



LCA of an Ecolabeled Notebook

**Consideration of Social and Environmental
Impacts Along the Entire Life Cycle**

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List of Abbreviations

ABS	acrylonitrile butadiene styrene
ACFTU	All-China Federation of Trade Unions
AE	advanced economy
AUO	AU Optronics
CDF	Congolese Franc
CLP	Chilean Peso
CNY	Chinese Yuan
CSR	Corporate Social Responsibility
DRC	Democratic Republic of the Congo
ECU	European currency unit
EE	emerging economy
EICC	Electronic Industry Code of Conduct
E-LCA	environmental life cycle assessment
EMS	environmental management system
EuP	energy using product
EUR	Euro
EPD	environmental product declaration
EPZ	export processing zone
e-waste	electronic waste
G	Governance
HDD	hard disc drive
HDPE	high density polyethylene
HR	human rights
HS	health and safety
HSPM	Hazardous Substance Process Management
IA	impact assessment
IDR	Indonesian Rupiah
IECQ	International Electrotechnical Commission Quality Assessment System for Electronic Components
ILO	International Labour Organization
IMF	International Monetary Fund
IR	indigenous rights
ISO	International Organization for Standardization
ITUC	International Trade Union Confederation
KCTU	Korean Confederation of Trade Unions
KRW	South Korean Won
LC	life cycle
LCA	life cycle assessment

LCI	life cycle inventory analysis
LCIA	life cycle impact assessment
LDC	least developed country
LDPE	low density polyethylene
NGO	non-governmental organisation
OECD	Organization for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
ODD	optical disc drive
OHSAS	Occupational Health and Safety
PA	performance assessment
PBDE	polybrominated diphenyl ether
PC	polycarbonate
PCB	polychlorinated biphenyl/printed circuit board
PDA	Personal Digital Assistant
PET	polyethylene terephthalate
PEZA	Philippine Economic Zone Authority
PHP	Philippine Pesos
PP	polypropylene
PS	polystyrene
PVC	polyvinyl chloride
PWB	printed wiring board
RAM	random access memory
RoHS	Restriction of (the use of certain) Hazardous Substances
SEPHIL	Samsung Electronics Philippines Manufacturing Corporation
SER	socio-economic repercussions
SETAC	Society of Environmental Toxicology and Chemistry
S-LCA	social life cycle assessment
SME	small and medium-sized enterprises
TCTU	Taiwan Confederation of Trade Unions
TSST	Toshiba Samsung Storage Technology Corporation
TSSTK	Toshiba Samsung Storage Technology Korea Corporation
TWD	New Taiwan Dollar
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
USD	United States Dollar
WC	working conditions
WEEE	Waste Electrical and Electronic Equipment

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Summary

This study investigates social and environmental impacts of an ecolabeled notebook during its entire life cycle. Raw material extraction processes as well as the production of basic materials, intermediate products, and the final product, but also use, reuse, and two recycling options are considered. Functional unit is one recent, lightweight laptop of the Taiwanese company ASUSTeK that is certified according to the EU Ecolabel.

The goal of the study is three-fold: First aim is the identification of social and environmental hot spots in the whole life cycle of the notebook, in order to understand and improve its sustainability performance. Second, the study aims at the derivation of recommendations on company and policy level. And third, on a more general level, aim is to apply the UNEP/SETAC guidelines for S-LCA on a complex product.¹

In order to address these goals, a social life cycle assessment (S-LCA) based on the UNEP/SETAC guidelines and an environmental life cycle assessment (E-LCA) were conducted in parallel. The E-LCA in the project is based on the ISO standards for life cycle assessment (ISO 14040 and 14044). The recently published methodological sheets,² which complement the UNEP/SETAC guidelines, were used for indicator modelling.

This project was conducted by GreenDeltaTC on behalf of the Belgian government in the context of the promotion of sustainable development. A working paper of this investigation was additionally provided to the OECD.³ Results of the study were presented at an informal EU meeting in Brussels⁴ and at an OECD meeting in Paris.⁵

Starting point for both the social and the environmental analysis parts of the study was a disassembly of the investigated product. This disassembly was performed in the beginning of the project; it helped to identify the composition of the laptop, involved suppliers, and production locations. Further data sources of the S-LCA were obtained from governmental and non-governmental organisations, corporate websites, sustainability reports, and literature as well as internet research. In addition, questionnaires were sent to ASUSTeK and 1st tier suppliers. In several cases interviews with workers were conducted.

The E-LCA uses the ecoinvent database⁶ as a basis for modelling the product system. Single processes were modified to product-specific data. Especially transport processes, electricity processes, and materials and weights of components were adapted in this way.

¹ UNEP/SETAC Life Cycle Initiative (2009)

² UNEP/SETAC Life Cycle Initiative (2010)

³ Ciroth (2010)

⁴ Ciroth/Franze (2010a)

⁵ Ciroth/Franze (2010b)

⁶ ecoinvent (2010)

The supply chain of the notebook shows that the majority of the components are produced in mainland China, although most of the considered companies are headquartered in Taiwan. For example, the Taiwanese manufacturer ASUSTeK is only involved in the design of the notebook.

In the supply chain, it was difficult to trace back the origin of the employed basic and raw materials. Therefore, production locations for these materials were assumed based on statistics. For the End of Life, recycling locations Belgium and China were selected in order to reflect a life cycle with a use phase in Belgium and a reuse phase in China.

For the assessment of the social impacts, an own approach was developed and applied⁷, given the lack of impact assessment methods for S-LCA. The applied method enables the evaluation of quantitative, semi-quantitative, and qualitative data with the aid of a colour scale. Moreover, quantitative factors were associated to the different colours to allow aggregation on stakeholder and process level.

The impacts of the environmental analysis were calculated with ReCiPe⁸ – a recent life cycle impact assessment method (LCIAM) with comprehensive resource consideration. Both a midpoint and an endpoint assessment were performed.

Social hot spots were found in every life cycle stage of the notebook. Particularly mining activities and the informal recycling are connected to serious societal problems. Also the production phase is relevant in terms of social issues, while the design phase and the formal recycling are in general uncritical.

From a stakeholder perspective, workers are worst affected regarding investigated subcategories, but also the stakeholder groups “local community” and “society” are involved in negative social impacts caused by specific economic sectors within the life cycle of the laptop. Especially in least developed countries and emerging economies negative effects occur, but also in advanced economies issues regarding sustainability are relevant. The end consumers and value chain actors are not affected by social hot spots, although also here problems could be detected as anti-competitive behaviour or lack of transparency. The latter two do not have serious negative impacts for the considered impact categories, though.

It was possible to reveal coherence between the development status of a country and social hot spots in specific sectors. For instance, there are similarities in the mining sector and in the electronic industry in emerging economies.

The environmental profile of the considered notebook is strongly dominated by the production phase. Also transport and use have a noticeable contribution to the environmental burden; with different relevance in midpoint and endpoint assessment. The use phase plays a larger role in the midpoint assessment, while in the endpoint assessment, transport is more important. Packaging and disposal have a rather low contribution in the midpoint perspective and hardly any contribution in the endpoint perspective. However, the informal recycling was not part of the E-LCA due to data gaps.

⁷ Franze/Ciroth (2009)

⁸ Goedkoop et al. (2009)

On process level, the analysis shows that main environmental impacts originate from mining activities, the production of energy carriers as well as electricity production, and processes linked to transport.

A comparison of the results of the environmental life cycle impact assessment and the EU ecolabel criteria⁹ allows the conclusion that the ecolabel is not sufficient to address the environmental burden caused by the laptop. Not all relevant life cycle stages, product characteristics, and process types are covered by the label. For example, the production phase, most important for the environmental impacts of the portable computer, is not considered by the ecolabel criteria. In addition, the active use of the notebook and the use of recycled materials¹⁰ are disregarded. Also “as such” harmless substances with serious environmental impacts in their extraction or production phase are out of consideration.

The interpretation of the inventories shows that there are differences in social and environmental LCA, though environmental and social hot spots are partly congruent, for instance for mining operations or for the production phase. However, negative environmental effects do not automatically entail social hot spots and the other way round.

Moreover, S-LCAs and E-LCAs consider different aspects. To some extent, social impacts are related to environmental impacts, but, for example, freedom of expression, discrimination, or high workload are out of the environmental scope. Likewise, there are environmental impacts without direct social impacts. As a consequence, it seems fair to say that both the environmental and the social dimension needs to be considered in a study in order to get a more complete picture of the sustainability performance of a product.

Based on the analyses, recommendations were formulated. The study provides first practical measures for companies to improve their sustainable performance as for instance through the implementation and verification of meaningful codes of conducts. Further, possible measures on policy level in the perspective of sustainable consumption and production patterns, policy coherence for development, and development cooperation are presented. Examples are the formalisation of informal sectors, support of fair trade, or the improvement of communication and educational work in terms of social and environmental effects of electronic products.

In addition, general recommendations with regard to the application of S-LCA are given. As one might expect for a pioneering study, this work faced several challenges due to the novelty of the approach and general issues linked to social information. In the course of the study, it was often possible to develop solutions to overcome these difficulties.

⁹ See annex I

¹⁰ Only in connection with packaging the use of recycled materials is stipulated.

1. Introduction

This chapter describes first the approach of social and environmental life cycle assessment as well as the development of the concepts. Furthermore, applied methodological foundations are outlined in subchapter 1.1. While section 1.2 introduces the European Ecolabel system which has awarded the investigated notebook an ecolabel certificate, chapter 1.3 explains the relevance of computers regarding a sustainable development. In subchapter 1.4 the manufacturing company of the investigated portable computer ASUSTeK is presented.

1.1 Background

The concept of life cycle thinking has its origin in the Agenda 21 which was endorsed at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. Since then, the approach has become increasingly more important for product policy and business and public decision making.

Relevant impacts of a product can take place at any of its life cycle stages, from production to use and disposal. In order to get a complete understanding of the impacts of a product, it is therefore necessary to investigate the product impacts throughout the complete life cycle. This idea is the core of life cycle thinking. Failing to investigate the product performance along the entire life cycle risks to overlook important impacts and to shift burdens, for example in the value chain from one supplier to another, what can ultimately increase the impacts related to the product.

Life cycle analyses are the tools to be used to apply life cycle thinking in a fact-based manner, with increasing use by industry and policy. While the consideration of environmental impacts of products in life cycle assessment (LCA) studies and the consideration of economic impacts in life cycle costing (LCC) studies are quite common today, the investigation of social effects in a life cycle perspective has been rarely done so far. This is the case despite a clear recognition that products have in addition to environmental and economic impacts many-faceted social impacts as well – not only on employees, but also on customers, suppliers, communities, and society. Main bottleneck was probably the lack of an accepted and thought-through method for analysing social effects across the whole life cycle.

It seems therefore fair to say that for social life cycle assessment (S-LCA), the publication of the “Guidelines for Social Life Cycle Assessment of Products”¹¹ of the UNEP/SETAC Life Cycle Initiative in 2009 was a very important contribution. The guidelines describe the analysis of social impacts of a product along the entire life cycle, building on the ISO standards 14040 and 14044 for life cycle assessment (LCA).

In the present study, the social and socio-economic impacts of an ecolabeled laptop are analysed based on the UNEP/SETAC guidelines for S-LCA. More precisely, the object of

¹¹ UNEP/SETAC Life Cycle Initiative (2009)

investigation is a notebook of the Taiwanese company ASUSTeK Computer Inc., which is certified according to the European ecolabel.

The study performs an environmental LCA (E-LCA) in parallel to a social LCA (S-LCA), and allows therefore a comparison between the social and the environmental performance of the computer.

An important motivation for the study lies in testing the UNEP/SETAC approach for social life cycle assessment on a complex product. Previous studies that were compiled according to the guidelines deal with products of lower complexity. Another motivation is to be able to compare social against environmental impacts of the notebook. And finally, it is interesting to investigate, whether and how far the ecolabel ensures the eco-friendliness of a product by investigating the environmental effects along the life cycle in a holistic manner and comparing them with the ecolabel criteria.

1.2 The European Ecolabel

The European Union Ecolabel (EU ecolabel) is a voluntary labeling system to promote products and services that are eco-friendlier than conventional ones. The label addresses private and public purchasers; it aims to help decision makers to identify green products in an easy way to support sustainable consumption. Certified goods and services are labeled with the logo of the EU ecolabel – “the flower”.¹²



Figure 1: The flower

The EU ecolabel was established in 1992 in the frame of a broader action plan on sustainable consumption. The label gains steadily in importance – in 2010 more than 1,000 products are awarded (see figure 2). It involves meanwhile twelve product groups as for instance cleaning, clothing, electronic equipment, furniture, paper, and services.¹³

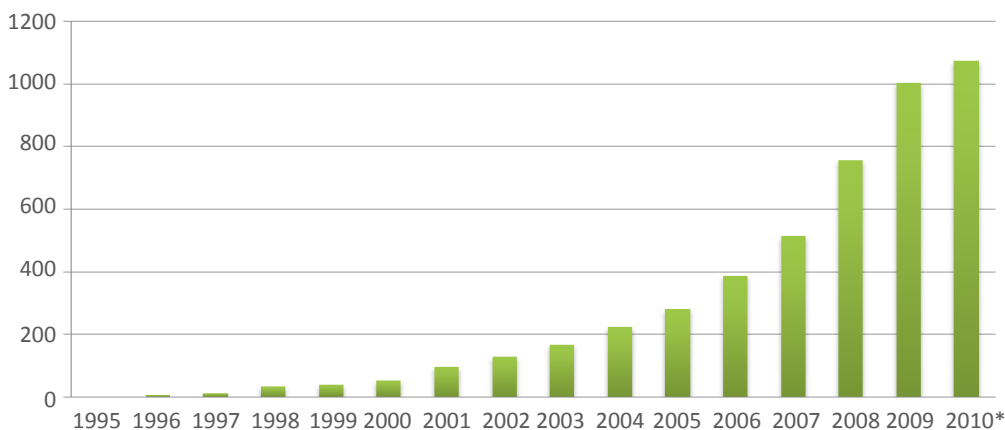


Figure 2: Evolution of the number of EU ecolabel licenses since 1992

Source: http://ec.europa.eu/environment/ecolabel/about_ecolabel/facts_and_figures_en.htm

¹² www.ec.europa.eu/environment/ecolabel

¹³ Ibidem

* Up to 31 July 2010

Ecolabeled products need to fulfil several criteria, and manufacturers get licenses for certified products.

The ecolabel claims that the criteria are derived from studies that consider the impacts of the product along the full life cycle from raw material extraction to production through to distribution, and disposal. The criteria are intended to guarantee the coverage of all relevant aspects regarding ecosystem quality and human health.¹⁴

The general criteria for portable computers are as follows:

- The product consumes less energy during use and standby
- It contains less substances that are dangerous for health and the environment
- The product can be taken back free of charge by the manufacturer after use
- It can be easily dismantled and recycled
- Increased product durability through upgrades
- The product uses less polluting batteries¹⁵

The criteria are described more in detail in annex I. They include among others thresholds for the content of heavy metals as mercury, cadmium, or lead, electromagnetic radiation, and noise. In addition, prohibitions for certain flame retardants (for instance R45, R46, R50, R51, R53, R60, or R61), minimum requirements regarding electricity consumption in certain modes, and regulations for take back systems are contained. The criteria set also requirements regarding life time extension, packaging materials, dismantling, and user instructions.¹⁶

1.3 Relevance of (Portable) Computers

Today's economy is not imaginable without computers; also the importance of computers in private life is continuously increasing. Computers are applicable in a versatile manner and part of modern life. In Belgium more than 70% of population aged between 16 and 74 uses regularly a computer; the average in EU27 is 66%.¹⁷ The global demand for computers is growing¹⁸ - even if slumps caused by the economic crisis are noticeable.

Further, it can be pointed out that the production of computers in the EU decreases, while their import rate increases. European trade balances reflect this trend in negative values. Figure 3 shows the trade balance for extra EU27 trade for office machines and computers in Mio ECU/EUR from 2004 to 2008.

¹⁴ Ibidem

¹⁵ http://ec.europa.eu/environment/ecolabel/ecolabelled_products/categories/portable_computers_en.htm

¹⁶ EU (2005)

¹⁷ www.epp.eurostat.ec.europa.eu/statistics_explained/index.php/Information_society_statistics

¹⁸ www.data.worldbank.org/indicator/IT.CMP.PCMP.P2/countries

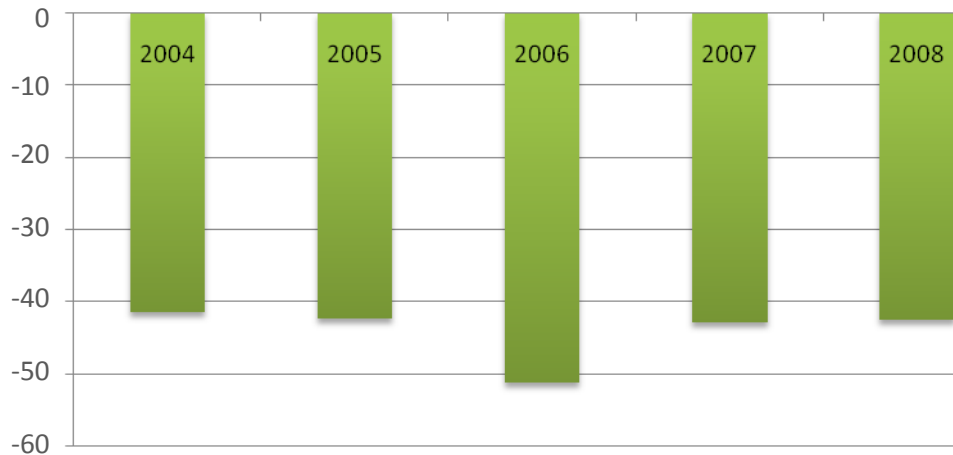


Figure 3: Trade balance for office machines and computers for extra EU27 trade

Source: eurostat (2009), p. 56

Reasons for this development are obvious: Rising prices, growing competition, and state subsidies lead to relocation of production in foreign countries, especially in low-wage countries, although labour costs amount only a marginal fraction to the manufacturing costs.¹⁹ The production of computers is first and foremost material-intensive and thus especially dependent on raw material prices. For the manufacturing of a PC many fossil fuels, rare metals, chemical substances, water, and other resources are necessary (see also the environmental analysis later).²⁰

In addition, computers contain many different components as hard discs, memories, displays, drives, processors, or the like, which are often produced by different companies in different countries. Today the majority of computers is assembled in Asia, pre-products come from Thailand, Malaysia, Mexico, Korea, China, India, or the Philippines; raw materials originate from all over the world. Computers have a global supply chain and cause therefore global impacts.

Computers are not alone an important economic good; they are as well very relevant regarding sustainability. Computers contain heavy metals as mercury, lead, chromium VI, and cadmium, rare metals as gold, palladium, or tantalum, and hazardous chemicals as flame retardants. They consume energy and have a relatively short life span. Furthermore, a computer causes numerous social impacts during its entire life cycle, and not only positive ones. The production of electronics is often linked to poor labour conditions. Currently, Foxconn, a manufacturer of electronic products for Apple, HP, Dell, and others, draws attention due to a suicide series of workers, which seem to be connected to bad conditions of employment. During the first five months in 2010 a

¹⁹ Weed (2007a), pp. 9

²⁰ Williams (2003)

dozen employees killed themselves; additional 24 workers have tried it. Foxconn reacted by stretching safety nets, raising wages, and reducing working time.²¹

Moreover the recycling of electronic waste (e-waste) poses social as well as environmental issues. Every year million tons of e-waste from industrial countries are shipped to developing countries, where it is recycled employing crude techniques which cause serious social and environmental impacts. For example, Europe (EU27) produces roughly 9 million tonnes of electronic scrap annually. Only a certain percentage of this e-waste is collected and treated. In 2005, for instance, this share amounted to only 25% with regard to medium sized appliances and anyhow 40% with regard to larger appliances.²² The residual scrap was probably exported to Asia, where the majority of e-waste ends up, and was recycled by the informal sector – in spite of Chinese laws that prohibit the import of e-waste, despite EU laws that prohibit the export of e-waste to non-OECD countries, and ratification of the Basel Convention by EU member states.²³

Laptop computers are even more relevant regarding sustainable development than desktop computers due to their shorter life span and their battery. Despite that they gain in popularity: The demand for notebooks increases strikingly in contrast to the demand for desktop PCs, which goes down.²⁴ Laptops provide users more and more advantages. They are portable, they are becoming faster, lighter, and more powerful and the battery lifes are increasing.

1.4 ASUSTeK Computer Inc. – a Company Profile

ASUSTeK Computer Inc. (in the following ASUS or ASUSTeK) is one of the leading manufacturers of computer hardware worldwide located in Taipei, Taiwan. The company was founded by four former Acer employees Wayne Hsieh, Ted Hsu, M.T. Liao, and T.H. Tung in 1989.

In January 2008, the enterprise was divided into three independent business units: ASUS, Pegatron, and Unihan. This reorganisation separated ASUSTeK's branded business from the manufacturing operations. While Pegatron manufactures PC related products, Unihan handles casing and non-PC devices.²⁵ Under the brand name ASUS are marked among others desktop computers, notebooks, netbooks, motherboards, graphic cards, displays, PDAs, and computer accessories.²⁶

In 2009, ASUS drew revenues of more than 21 billion USD and profits of 522 million USD selling 22 million motherboards, 6.8 million notebooks and around 5 million netbooks.²⁷

²¹ Watts (2010) and Moore (2010a)

²² Huisman et al (2007)

²³ Greenpeace International (2008)

²⁴ EITO (2007)

²⁵ Ho (2008)

²⁶ www.asus.com and ASUS (2008a), p. 4

²⁷ ASUS (2009b), p. 61 and www.money.cnn.com/magazines/fortune/global500

ASUS employs since the split in 2008 approximately 11,000 people. 6,500 thereof are located in China and overseas, the remaining 4,600 people are employed in Taiwan. ASUS has a global network of branch offices, service centres, and service corners.²⁸

On its own admission ASUS sets the benchmark for green IT. The management system of ASUS consists of a quality management system (GreenASUS), and an environmental and safety management system (SERASUS). While GreenASUS is responsible for the quality standard ISO 9001, Hazardous Substance Process Management (HSPM) of International Electrotechnical Commission Quality Assessment System for Electronic Components (IECQ) QC 080000, Restriction of Hazardous Substances (RoHS), and Waste Electrical and Electronic Equipment (WEEE), SERASUS covers the ISO standard for environmental management system (ISO 14001), Occupational Health and Safety (OHSAS) 18001, and Electronic Industry Code of Conduct (EICC).²⁹

The following list contains achievements of ASUS in the field of CSR.

ASUS' Milestones Regarding CSR³⁰

- Verification of ISO 14001 in 1998 and verification of OHSAS 18001 in 1999
- Establishment of GreenASUS in 2004
- First lead-free motherboard in 2004
- In 2005, publication of the first “Environmental, Health and Safety Report”
- Establishment of SERASUS steering committee and gender equality in 2006
- First RoHS compliant notebook in 2006
- Initiation of a free take back system for old computers and other electronic devices for Europe, North America, and Taiwan
- Implementation of Supply Relationship Management (SRM) to manage quality and CSR aspects
- Implementation of a Green Design System to manufacturing processes in 2007
- In 2008, certification of the N Series and the Bamboo Series according to the EU ecolabel
- Publication of ASUS' Declaration on Human Rights in 2008 (see annex II)
- Establishment of risk management and a control committee in 2009
- Publication of GRI G3 CSR report in 2009
- Launch of halogen-free products in 2009
- Since 2009 following of ISO 14064 for GHG inventory
- Establishment of a take back system in India in 2010

²⁸ ASUS (2008a), p. 4 and 31

²⁹ ASUS (2008a)

³⁰ ASUS (2008a), ASUS (2008b), <http://csr.asus.com/english/index.aspx#25> and www.asus.com/ContentPage.aspx?Content_Type=AboutASUS&Content_Id=9#6

The box below describes the CSR policy of ASUS.

ASUSTeK Social and Environmental Responsibility (SERASUS) Policy

1. Abide by all environmental protection, labor, safety and health laws.
2. Conserve natural resources and endeavor to prevent pollution.
3. Eliminate environmental impacts and safety risks.
4. Satisfy customer requirements and aim to become an “entirely green” enterprise [.]
5. Facilitate a company-wide promotion of corporate responsibility particularly social and environmental aspects.
6. Encourage all employees to participate in the program and continuously improve it.

Figure 4: SERASUS policy

Source: ASUS (2008a), p. 12

2 Goal and Scope

This chapter describes goal (chapter 2.1) and scope (chapter 2.2) of the study. Important elements for goal and scope, as functional unit (section 2.2.1), system boundaries (section 2.2.2), and data requirements (section 2.2.3) are provided. In addition, further methodological aspects for the S-LCA (subchapter 2.2.4.1) and the E-LCA (subchapter 2.2.4.2) regarding the compilation of the inventories and the conduction of the impact assessments are explained. As no international accepted social life cycle impact assessment method exists, an own approach was developed and applied. This method is presented in section 2.2.4.1.3. Due to the novelty of the S-LCA concept, basic principles, strategies, and methodological choices are described more comprehensively for the S-LCA than for the E-LCA.

2.1 Goal

General goal of the project is to apply the UNEP/SETAC guidelines for S-LCA of products on a specific case. Since the approach was tested so far only in small case studies, it is worthwhile to apply it in a more complex context. In addition, the product system should reflect a value chain with high sustainability impacts and should have relevance to other products. Electronic products as a notebook meet these requirements, since they are causing numerous social and environmental impacts along their rather complicated life cycles. A laptop computer contains many different metals, plastics, and chemicals, but also electronic modules. Beyond that, it has literally a global supply chain due to the globalised markets today.

More specific goal of the study is to identify social and environmental hot spots in the life cycle of the considered notebook in order to improve and ensure respectively the sustainable performance over its entire life cycle. The investigated computer is a recent laptop available in Europe, including Belgium, and is certified according to the EU eco-label. A comparison of different products is not part of the study.

The investigation addresses policy as well as economy. It comprises recommendations derived from the results of the S-LCA and the E-LCA on policy and company level. Recommendations for companies cover possible measures to improve the performance regarding social and environmental aspects. Recommendations for political actors focus on key policy issues from the perspective of sustainable consumption, policy coherence for development, and development cooperation.

2.2 Scope

2.2.1 Functional Unit

Object of analysis is one unit of an ASUSTeK UL50Ag notebook for office use. A portable computer fulfils many utilities so that it is very difficult to specify them all. Regarding the use of laptops in offices, some features are particularly important:

- Light weight and comfortable size
- Long battery life
- Opportunities for data exchange as USB ports, DVD-ROM drive, or card reader
- High performance and memory capacity
- Reliability and stability
- Modern design

Based on these requirements the ASUS UL50Ag was chosen. The notebook has a 15.6" display with LED backlight. It weighs 2.3kg and contains a 8 cell lithium-ion battery which has a battery life up to 12 hours. Integrated is an Intel® Core™ 2 Duo processor with 2*1.3 GHz, 4096 MB RAM, and 500 GB hard drive space. The computer provides 3 USB 2.0 ports, an optical DVD drive as well as a 5 in 1 card reader. Further, it provides W-LAN, Bluetooth, and a 0.3 mega pixel webcam.

The relevant market segment is lightweight portable computers with a very long battery life, similar in size. The computers should be geared to be used in offices and have similar hardware specifications.

Relevant product alternatives are netbooks, which are smaller than notebooks, usually with a 10" screen. Due to their size they are for one thing lighter than notebooks and for another thing they have a longer battery life. Netbooks are a relatively new product group which gains in popularity. One reason for this development is the low price compared to laptops. Because of the smaller screen they are less used as desktop computer replacement.

2.2.2 System Boundaries

The analysed ASUS notebook is produced in China. In this case it is ordered in Brussels, Belgium via internet and delivered there. The computer is used in an office for 4 years. After the use phase the laptop is submitted to a collecting point. It is assumed that 20% of collected laptops are reused; therefore it is modelled that 20% of the notebook is transported for reuse to China and the remaining 80% are sent to a recycling site in Belgium. Further, it is assumed that the reuse phase takes 2 years.³¹ The reused computer is recycled in China, because the laptop is out of reach for the take back system of ASUS which covers only Taiwan, Europe, North America, and India.³²

³¹ Own assumptions based on Matthews/Matthews (2003), Fraunhofer Institut (2008), Umweltbundesamt (2010) and Öko-Institut (2007)

³² <http://csr.asus.com/english/index.aspx#53>

The supply chain of the ASUS UL50Ag looks as follows: The mainboard is produced by company x³³ in Shanghai, China. This enterprise is also responsible for the final assembly. The HDD stems from a Seagate site in Suzhou, China. The memory comes from the company Hynix. It is manufactured in Icheon, Korea. The display is produced by AU Optronics in Taiwan and assembled in China as well from AU Optronics. The battery cells are produced in South Korea; the assembly of the battery pack is conducted by Simplo Technologies in Changshu, China. The drive is produced by SEPHIL – a daughter company of Samsung Electronics in the Philippines. While the fan is manufactured in Wujiang, China by Delta Electronics, the power supply is manufactured in Dongguang, China, by Lite-On Technology (see table 1).

Table 1: Companies in the upstream supply chain of the UL50Ag

Component	Company	Site
Mainboard	confidential	Shanghai, China
HDD	Seagate	Suzhou, China
Processor* [#]	Intel	unknown
RAM	Hynix	Icheon, South Korea
Display		
LCD panel	AU Optronics	Produced in Taiwan, assembled in China
Bezel*	confidential	China
Case*	unknown	unknown
Keyboard*	confidential	China
Touchpad*	ELan Microelectronics	China
Battery pack		
Assembly	Simplo Technology Inc.	Changshu, China
Plastics*	unknown	unknown
Circuit board*	unknown	unknown
Cells	unknown	Made in Korea
Drive	SEPHIL	Calamba City, Philippines
Fan	Delta Electronics Inc.	Wujiang, China
Speakers* [#]	unknown	unknown
Camera* [#]	unknown	unknown
Graphic card*	Intel	unknown
W-Lan card*	AzureWave	Shanghai, China
Power supply	Lite-On Technology Corp	Dongguang, China

*not considered in the S-LCA # not considered in the E-LCA

³³ The company name is known, but was provided by ASUS under a non-disclosure agreement

The S-LCA considers the extraction of raw materials, the production of basic materials and intermediate products, and the assembly of the end product as well as the end-of-life phase. Out of consideration for the social dimension are packaging, energy generation, distribution, and transportation processes with upstream chains. It is assumed that these processes have mainly positive social impacts; thus there are no social hot spots expected. In addition, it is not possible in the frame of this study to analyse all background processes in detail.

Further, the use and reuse phase are not considered for another reason: The UNEP/SETAC approach for S-LCA was developed to show the performance of companies and sectors respectively. Thus the indicators are not applicable to the use and reuse phase. Aspects as consumer health and safety, transparency, and after sales services are comprised in the stakeholder group consumers.

Concerning the extraction of raw materials and the production of basic materials, further restrictions are made due to the time window of the project. The following processes are considered:

- Extraction of copper
- Extraction of cobalt under co-production of nickel
- Extraction of gold
- Extraction of tin
- Mining of bauxite
- Production of plastics
- Production of non-ferrous metals
- Production of glass

Regarding the E-LCA the product system covers raw material extraction, and production of basic materials including product and mail packaging to production of pre-products through to manufacturing of the end product, its distribution, use, reuse, as well as disposal. The end-of-life phase comprises only a WEEE-conform disposal in Belgium. The informal recycling in China is not part of the environmental analysis due to lacking data.

Out of consideration are sundries as screws, speakers, webcam, and plugs also due to lack of data.

Figure 5 summarises the investigated product system for the social and the environmental perspective. A detailed picture of the process network can be found in annex III and IV respectively.

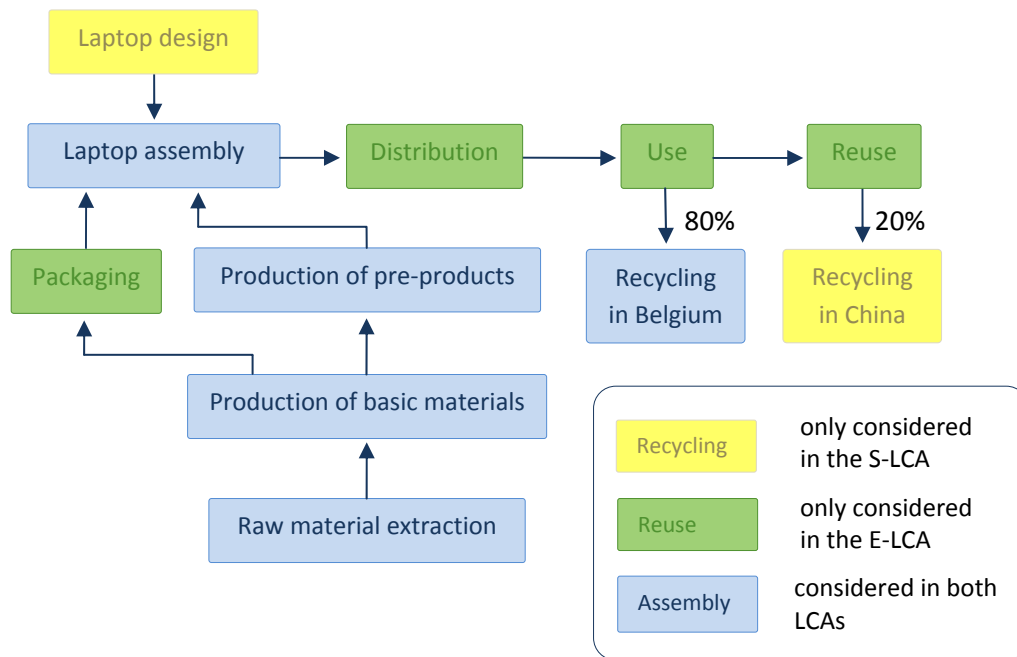


Figure 5: Flow chart of the product system for the S-LCA

2.2.3 Data Requirements

2.2.3.1 Data Types

For a reliable S-LCA study, country-, sector-, as well as organisation-, and site-specific data are needed. Organisation- and site-specific data are essential for the investigation of specific companies, but also country- and sector-specific information is important. The latter serve as a reference value for the corporate performance. For example, the specification of the wage level is as such not satisfying without consideration of the local living costs.

The study distinguishes between foreground and background processes. For foreground processes all four data types (country-, sector-, organisation-, and site-specific data) are ascertained, for background processes data on country and sector level are considered solely. If a sector in a specific country consists of just a few companies, all companies are considered in the social inventory. If a sector comprises in contrast a multitude of enterprises, only some of them are analysed and the average is described.

2.2.3.2 Time Reference

For both environmental and social analysis, goal is to provide a hot spot analysis, which allows a bit more relaxed time frame. A detailed analysis would need to look at more recent data, throughout.

S-LCA and E-LCA have different requirements for the time reference. Social conditions and impacts can change very fast, and therefore data of the S-LCI should be as current

as possible - especially regarding foreground processes. In this study, aim is to use data for the social inventory that is not older than 2008.

Furthermore, notebooks are very dynamic products. There is a high market pressure which forces companies to develop new technologies and launch new products quite rapidly, in order not to lose market shares. Therefore environmental LCI data were aimed to be not older than from 2006, with exception of processes characterised by a relatively low dynamic, as for example transportation, or production of plastics. For these, the time frame was set to five years, i.e. data were accepted from 2005 and younger.

2.2.3.3 Geography

The importance of geography depends on process. There are processes that differ significantly from country to country; there are processes that are more or less the same all over the world. First of all, it can be stated that for the social analysis regionalisation plays a more important role than for the E-LCA, because the specific situation in the country/region is part of the analysis. This is of course also crucial for the environmental LCIA, but current LCIAM are not able to consider local conditions. There are efforts to integrate regionalisation in impact assessment methods in order to indicate rather real than potential impacts.

Further, the geographical reference of foreground processes is more important than for background processes. As a basic principle it is tried to use data with identical geography.

2.2.3.4 Data Sources

Used data sources influence the robustness of the study, simply because different data sources provide data of different quality. For the S-LCA, the consideration of different data sources is important to be able to compare information, and to identify possible communalities and differences in data sources, in the sense of a triangulation.³⁴ The occurrence of contradictions using different data sources is very likely. On the one hand, subjectivity plays a role in terms of qualitative data; on the other hand sensitive information is involved. For instance, company-owned data regarding social hot spots are in general less reliable than publicly available data from NGOs, but there are also incorrect reports of NGOs. Some information is anyhow only available from one single source, e.g. the producing company, since not every enterprise was investigated by independent organisations. As well information from employees can be very valuable and helpful for the identification of weak points, but the perception of employees is subjective and stamped by individual experiences and personally traits. As a consequence, data sources for the S-LCA should cover accepted NGOs, governmental organisations, literature, involved companies, and workers.

³⁴ Flick (2008)

For the E-LCA, ecoinvent datasets³⁵ are adapted with product-specific data concerning foreground processes. Rationale for the modification was obtained from an own disassembly of the notebook, and also from information about the location of the process.

For background processes, the study considers generic data from the database ecoinvent.³⁶

2.2.4 Further Methodological Aspects

2.2.4.1 Social Life Cycle Assessment

The S-LCA is based, as already mentioned, on the UNEP/SETAC guidelines for social life cycle assessment of products. First of all, relevant stakeholder categories for foreground as well as for background processes were identified. For every stakeholder, special themes of interest were determined, so called “subcategories”, which refer to the impact categories. For instance, regarding workers freedom of association and collective bargaining, occurrence of child labour, occurrence of forced labour, fair salary, working time, occurrence of discrimination, health and safety, and social benefits/social security were classified as important aspects, which should be considered. To be able to assess the status of the different subcategories, several indicators were selected. The indicators comprise country, sector, and company data as well.

Data was obtained mainly from governmental and non-governmental organisations as CIA, UNICEF, U.S. Department of State, ILO, Greenpeace, etc. For company data corporate reports, websites, press agencies, and newspapers were additionally considered. Questionnaires were sent to each company of the foreground processes. In several cases, also interviews with employees of Chinese factories were conducted. Involved companies and production sites were identified through a disassembly of the notebook. The condensed social inventory is comprised in chapter 3.1; the detailed explanation of the social inventory can be found in annex V.

2.2.4.1.1 Stakeholder and Subcategories

In the following sections selected stakeholder, subcategories, and corresponding indicators are presented – first for foreground and then for background processes. The procedure within the impact assessment phase is also described. Finally, made assumptions are listed.

The following stakeholders and subcategories are considered in the present case:

³⁵ ecoinvent (2010)

³⁶ ecoinvent (2010)

Table 2: Stakeholders and subcategories

Source: UNEP/SETAC Life Cycle Initiative (2009)

Stakeholders	Subcategories
Workers	<ul style="list-style-type: none"> ■ Freedom of association and collective bargaining ■ Child labour ■ Forced labour ■ Fair salary ■ Working time ■ Discrimination ■ Health and safety ■ Social benefits/social security
Local community	<ul style="list-style-type: none"> ■ Access to material resources ■ Access to immaterial resources ■ Delocalisation and migration ■ Cultural heritage ■ Respect of indigenous rights ■ Safe and healthy living conditions ■ Secure living conditions ■ Local employment ■ Community engagement
Society	<ul style="list-style-type: none"> ■ Public commitments to sustainable issues ■ Contribution to economic development ■ Prevention and mitigation of conflicts ■ Technology development ■ Corruption
Value chain actors	<ul style="list-style-type: none"> ■ Fair competition ■ Promoting social responsibility ■ Supplier relationships ■ Respect of intellectual property rights
Consumers	<ul style="list-style-type: none"> ■ Health and safety ■ Feedback mechanism ■ Transparency ■ End of life responsibility

This table is based on the UNEP/SETAC approach. The stakeholder group “consumers” is only considered with regard to the final product: the laptop. All upstream processes do not incorporate this stakeholder group. In addition, the stakeholder “value chain actors” is not contained in the social inventory of background processes, as all subcate-

gories of this group focus on the behaviour of single companies and cannot be applied on sector level in the vast majority.

2.2.4.1.2 Indicators

Every subcategory is assessed by different indicators. The list of these indicators and the description of their status for the considered processes is the inventory of the S-LCA. The following tables show all indicators per stakeholder group that are applied in the framework of this study. It is assumed that the indicators have the ability to model the subcategories in an appropriate way, and allow the assessment of the sector/company performance. Tables 3 to 7 illustrate the indicators for foreground processes. For background processes, simplified tables are used (see tables 8 to 10), because some indicators are not relevant for background processes, some indicators are not applicable on sector level, and some indicators are too elaborate for a sectoral consideration. Further, regional indicators are excluded with regard to background processes, as not all enterprises within a sector are usually located in the same region.

Indicators for foreground processes

Stakeholder group workers:

Table 3: Indicators of the stakeholder workers for foreground processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Freedom of association and collective bargaining	<ul style="list-style-type: none"> ■ Evidence of restriction to freedom of association and collective bargaining in country/sector/company ■ Presence of unions within the sector/organisation and description of their influence
Child labour	<ul style="list-style-type: none"> ■ Percentage of child labour in country/sector/organisation ■ Description of kind of child labour in the company
Forced labour	<ul style="list-style-type: none"> ■ Frequency of forced labour in country/sector/enterprise ■ Description of kind of forced labour in the company
Fair salary	<ul style="list-style-type: none"> ■ Specification of living wage and minimum wage in the country ■ Wage level of the worker with lowest income and description of payment performance of the sector/enterprise
Working time	<ul style="list-style-type: none"> ■ Hours of work per employee and month in average ■ Number of days without work per week ■ Description of how overtime is handled
Discrimination	<ul style="list-style-type: none"> ■ Percentage of women in the labour force in the sector ■ Country gender index ranking ■ Occurrence of discrimination in the country/sector/company ■ Presence of formal policies of equal opportunities

Subcategory	Indicators
	<ul style="list-style-type: none"> ■ Share of women and minorities of personnel ■ Ratio of salary of women to wages of men in sector/company ■ Treatment of workers in general
Health and safety	<ul style="list-style-type: none"> ■ Description of potential main origins of danger and protection measures ■ Description of reported violations ■ Accident rate of the country/sector/organisation ■ Presence of a formal policy regarding health and safety
Social benefits/ social security	<ul style="list-style-type: none"> ■ Social security expenditures of the country/sector ■ List of social benefits provided to workers ■ Evidence of violations to laws and employment regulations

Stakeholder group local community:

Table 4: Indicators of the stakeholder local community for foreground processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Access to material resources	<ul style="list-style-type: none"> ■ Extraction of material resources and level of industrial water use ■ Percent of population with access to improved sanitation facilities ■ Existence of projects to improve community infrastructure ■ Presence of certified environmental management systems ■ Description of (potential) material resource conflicts
Access to immaterial resources	<ul style="list-style-type: none"> ■ Freedom of expression in country/sector/company ■ Annual arrests connected to protest of organisation actions ■ Presence of community education initiatives and community service programmes
Delocalisation and migration	<ul style="list-style-type: none"> ■ Migration rate of the country/region ■ Number of individuals who resettle that can be attributed to the sector/organisation
Cultural heritage	<ul style="list-style-type: none"> ■ Respect of the sector/company regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way ■ Strength of policies to protect cultural heritage
Respect of indigenous rights	<ul style="list-style-type: none"> ■ Human rights issues faced by indigenous people in the country/region ■ Respect of the company regarding indigenous rights ■ Strength of policies to protect indigenous community members

Subcategory	Indicators
Safe and healthy living conditions	<ul style="list-style-type: none"> ■ Burden of disease in the country/region ■ Pollution level of the country/region and contribution of the sector/company to the environmental load ■ Management effort to improve the environmental performance
Secure living conditions	<ul style="list-style-type: none"> ■ Crime rate ■ Management policies related to private security personnel
Local employment	<ul style="list-style-type: none"> ■ Percentage of unemployment in the country/region ■ Percentage of work force hired locally ■ Percentage of spending on locally-based suppliers
Community engagement	<ul style="list-style-type: none"> ■ Presence of policies regarding community engagement at company level ■ Description of community engagement of the sector/company

Stakeholder group society:

Table 5: Indicators of the stakeholder society for foreground processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Public commitments to sustainable issues	<ul style="list-style-type: none"> ■ Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments ■ Implementation/signing of principles or codes of conducts
Contribution to economic development	<ul style="list-style-type: none"> ■ Economic situation of the country/region and relevance of the considered sector for the (local) economy ■ Contribution of the product/sector/company to economic development
Prevention and mitigation of conflicts	<ul style="list-style-type: none"> ■ Presence of conflicts in the country/region ■ Risk of conflicts with regard to the sector³⁷ ■ Description of the organisation's role in the development of the conflicts
Technology development	<ul style="list-style-type: none"> ■ Sector efforts in technology development regarding eco-friendliness ■ Involvement of the company in technology transfer projects ■ Presence of partnerships regarding research and development ■ Investments in technology development

³⁷ For instance (potential) conflicts due to the depletion of rare resources, massive pollution, or poor working standards.

Subcategory	Indicators
Corruption	<ul style="list-style-type: none"> ■ Risk of corruption in country/sector ■ Presence of an anti-corruption program in the company ■ Presence of co-operations with internal and external controls to prevent corruption ■ Evidence of an active involvement of the enterprise in corruption and bribery

Stakeholder group value chain actors:

Table 6: Indicators of the stakeholder value chain actors for foreground processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Fair competition	<ul style="list-style-type: none"> ■ Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation ■ Presence of policies to prevent anti-competitive behaviour
Promoting social responsibility	<ul style="list-style-type: none"> ■ Presence of codes of conduct that protect human rights of workers among suppliers ■ Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year ■ Membership in an initiative that promotes social responsibility along the supply chain
Supplier relationships	<ul style="list-style-type: none"> ■ Interaction of the company with suppliers (payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues) ■ Fluctuation regarding suppliers
Respect of intellectual property rights	<ul style="list-style-type: none"> ■ Violations of the company against intellectual property rights

Stakeholder group consumers:

Table 7: Indicators of the stakeholder consumers for foreground processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Health and safety	<ul style="list-style-type: none"> ■ (Potential) risks of the product regarding consumers' health and safety ■ Presence of consumer complaints ■ Presence of management measures to assess consumer health and safety ■ Presence and quality of labels concerning health and safety
Feedback mechanism	<ul style="list-style-type: none"> ■ Presence of feedback mechanisms ■ Practices related to customer satisfaction
Transparency	<ul style="list-style-type: none"> ■ Presence of laws or norms regarding transparency in the country and non-compliance of the company with these regulations ■ Percentage of organisations within the sector which published a sustainability report ■ Publication of a sustainability report, availability of sustainability information on the website, and other communication tools ■ Quality of the provided information regarding sustainability ■ Presence of certifications or labels for the product/sites ■ Company rating in sustainability indices
End of life responsibility	<ul style="list-style-type: none"> ■ Strength of national legislation covering product disposal and recycling ■ Attention to and management of end-of-life issues ■ Structuring of the take back system including consumer involvement

Indicators for background processes

Stakeholder group workers:

Table 8: Indicators of the stakeholder workers for background processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Freedom of association and collective bargaining	<ul style="list-style-type: none"> ■ Evidence of restriction to freedom of association and collective bargaining in country/sector/company ■ Presence of unions within the sector/organisation and description of their influence
Child labour	<ul style="list-style-type: none"> ■ Percentage of child labour in country/sector/organisation ■ Description of kind of child labour in the sector
Forced labour	<ul style="list-style-type: none"> ■ Frequency of forced labour in country/sector/enterprise ■ Description of kind of forced labour in the sector
Fair salary	<ul style="list-style-type: none"> ■ Specification of living wage and minimum wage in the country ■ Wage level of the worker with lowest income and description of payment performance of the sector/enterprise
Working time	<ul style="list-style-type: none"> ■ Hours of work per employee and month in average ■ Number of days without work per week ■ Description of how overtime is handled
Discrimination	<ul style="list-style-type: none"> ■ Percentage of women in the labour force in the sector ■ Country gender index ranking ■ Occurrence of discrimination in the country/sector/company ■ Ratio of salary of women to wages of men in sector/company
Health and safety	<ul style="list-style-type: none"> ■ Description of potential main origins of danger ■ Accident rate of the country/sector/organisation
Social benefits/ social security	<ul style="list-style-type: none"> ■ Social security expenditures of the country/sector

Stakeholder group local community:

Table 9: Indicators of the stakeholder local community for background processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Access to material resources	<ul style="list-style-type: none"> ■ Extraction of material resources and level of industrial water use ■ Percent of population with access to improved sanitation facilities ■ Existence of projects to improve community infrastructure ■ Presence of certified environmental management systems ■ Description of (potential) material resource conflicts
Access to immaterial resources	<ul style="list-style-type: none"> ■ Freedom of expression in country/sector ■ Annual arrests connected to protest of sector actions ■ Presence of community education initiatives and community service programmes
Delocalisation and migration	<ul style="list-style-type: none"> ■ Migration rate of the country ■ Number of individuals who resettle that can be attributed to the sector
Cultural heritage	<ul style="list-style-type: none"> ■ Respect of the sector/company regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way
Respect of indigenous rights	<ul style="list-style-type: none"> ■ Human rights issues faced by indigenous people in the country ■ Respect of the company regarding indigenous rights
Safe and healthy living conditions	<ul style="list-style-type: none"> ■ Burden of disease in the country ■ Pollution level of the country and contribution of the sector to the environmental load ■ Sector effort to improve the environmental performance
Secure living conditions	<ul style="list-style-type: none"> ■ Crime rate ■ Sector policies related to private security personnel
Local employment	<ul style="list-style-type: none"> ■ Percentage of unemployment in the country ■ Percentage of work force hired locally
Community engagement	<ul style="list-style-type: none"> ■ Description of community engagement of the sector/company

Stakeholder group society:

Table 10: Indicators of the stakeholder society for background processes

Source: own, referring to UNEP/SETAC Life Cycle Initiative (2010)

Subcategory	Indicators
Public commitments to sustainable issues	<ul style="list-style-type: none"> ■ Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments ■ Implementation/signing of principles or codes of conducts
Contribution to economic development	<ul style="list-style-type: none"> ■ Economic situation of the country and relevance of the considered sector for the economy
Prevention and mitigation of conflicts	<ul style="list-style-type: none"> ■ Presence of conflicts in the country ■ Risk of conflicts with regard to the sector³⁸ and measures of the sector to reduce the risk
Technology development	<ul style="list-style-type: none"> ■ Sector efforts in technology development regarding eco-friendliness ■ Investments in technology development
Corruption	<ul style="list-style-type: none"> ■ Risk of corruption in country/sector

2.2.4.1.3 Social Impact Assessment

The study performs an environmental and a social impact assessment. For E-LCIA, pre-defined impact assessment methods exist, as for instance CML, Eco-indicator, Traci, or ReCiPe. These methods have been broadly discussed in the scientific community.

For S-LCIA, the situation is very different as there are no internationally accepted impact assessment methods available. GreenDeltaTC developed a first impact assessment method for social impacts, which is able to consider both quantitative and qualitative data.³⁹ This impact assessment method is also applied in this project. The procedure of the method is explained in detail in the following, to ensure replicability and transparency.

There are two types of impact categories in LCA: endpoints and midpoints. While midpoint categories model immediate effects as ozone depletion, acidification, or human toxicity, endpoint categories aim to consider the "final impact" on the areas of protection human health, environment, and resources. The developed S-LCIA method considers exclusively midpoints, because the use of endpoints implies the aggregation of results, which in turn reduces transparency and increases uncertainty. Furthermore, in

³⁸ For instance, (potential) conflicts due to the depletion of rare resources, massive pollution, or poor labour standards.

³⁹ Franze/Ciroth (2009)

the frame of S-LCA, there exists basically only one endpoint category: human well-being. This minimises the utility of an endpoint assessment.

Impact Categories

Considered impact categories for the social assessment are also based on the UNEP/SETAC guidelines for S-LCA. They are as follows:

- Working conditions (WC)
- Health and safety (HS)
- Human rights (HR)
- Socio-economic repercussions (SER)
- Indigenous rights including cultural heritage (IR)
- Governance (G)

Classification

Since there are no scientific based classification models of social LCI parameters an own approach was developed. However, it is not possible to illustrate the cause-effect-chains of every subcategory in the frame of the study.

Rating Scale

In S-LCA – in contrast to E-LCA studies – not only impacts shall be assessed, but also the performance of considered sectors and companies. Therefore the assessment is split into two phases: The first one assesses the performance of the sectors and companies respectively based on the status of the indicators taking the performance of the sector/company in relation to the situation in the country/region into account. Of course, a company cannot be blamed for low minimum wages, high unemployment rates, or underdeveloped infrastructure of a region, but it can improve the situation through fair wages, locally employed workers, or infrastructure projects.

The second phase assesses the impacts of the company/sector behaviour with regard to the selected impact categories.

Each subcategory is assessed twice with a colour system ranging from very good performance to very poor performance and very negative impacts to positive impacts (see table 11). The performance assessment follows school grades.

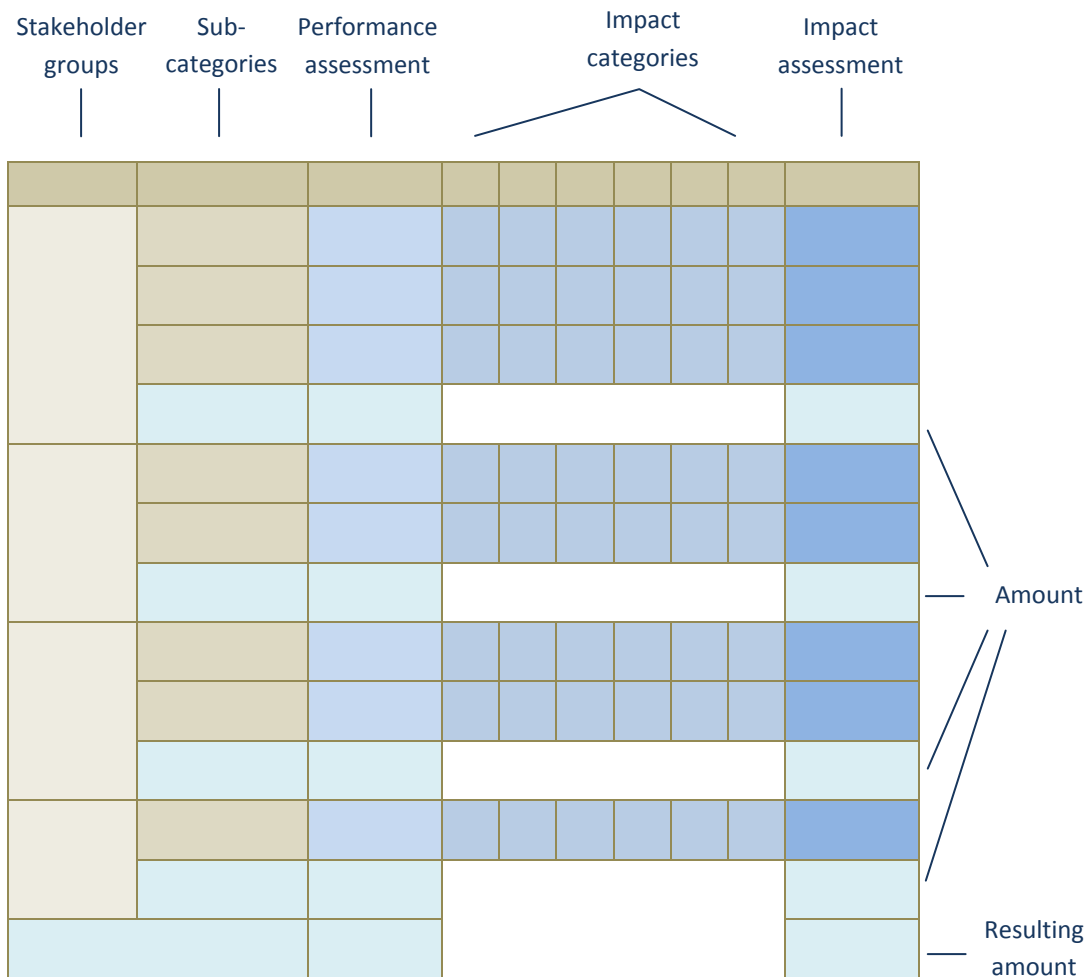
A specific factor is assigned to every colour to allow quantification of the impacts. The factors of all subcategories are summed up for every process and the resulting amounts for the company/sector performance and for the impacts are divided by the number of subcategories to take missing ones due to unavailability of data into account.

Table 11: Rating scale of social impacts

Performance assessment	Impact assessment	Colour	Factor
Very good performance	Positive effect		1
Good performance	Lightly positive effect		2
Satisfactory performance	Indifferent effect		3
Inadequate performance	Lightly negative effect		4
Poor performance	Negative effect		5
Very poor performance	Very negative effect		6

The social assessment is presented in tables. Table 12 gives a schematic example of such a table.

Table 12: Scheme of a social assessment table



The first column lists the different stakeholder groups; the second one incorporates subcategories associated to the stakeholders. The third and the last column are assessment columns. While the first assessment column rates the company/sector performance (PA), the second assessment column covers the impact assessment (IA). Column 4 to 9 show the relationship between each subcategory and the considered impact categories. Table 13 gives a short example on how to read the assessment tables.

Table 13: Example of a social impact assessment table

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association and collective bargaining	2	✓	✓	✓	✓	(✓)	(✓)	1
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Amount	4.00							5.00

The stakeholder group “workers” includes the subcategories “freedom of association and collective bargaining”, “child labour”, and “discrimination”. The company in this example provides a trade union and collective agreements. It does in general not restrict the rights of workers regarding freedom of association and collective bargaining, so the performance of the company was assessed with “good”, which gives a light green assessment colour and the factor “2”. This good company performance has positive impacts on working conditions, health and safety, human rights, and causes positive socio-economic repercussions. The impacts on indigenous rights including cultural heritage and governance are rather low, but also positive. In general, the company performance has positive impacts (green: factor “1”).

Further, the company does not employ children. This influences all impact categories positively in relation to an employment of children, which in turn would cause, usually, if it happened, several negative social impacts. The company performance is very good and this ideal company behaviour has positive social effects.

In terms of discrimination, the company performance is poor (factor “5”), because the company employs primary men and women earn less than men. In addition, cases of sexual harassment occurred. Because all impact categories are influenced negatively, the impacts of this company behaviour are estimated as very negative impacts (factor “6”).

The amount is the calculated average of the subcategory assessment; it is specified for each stakeholder group in terms of the performance assessment and in terms of the impact assessment. All subcategories are weighted with the same factor, although subcategories and stakeholders are not equal in their relevance. However, the importance

of each subcategory or stakeholder group cannot be specified, as it is a subjective estimation.

Specific calculation rules for the calculation of the average values are applied: If at least one subcategory in a specific stakeholder group is assessed with factor “6”, the amount of this stakeholder group cannot be better than “5.00”; if at least one subcategory in a specific stakeholder group is assessed with factor “5”, the amount of this stakeholder group cannot be better than “4.00”; and if at least one subcategory in a specific stakeholder group is assessed with factor “4”, the amount of this stakeholder group cannot be better than “3.00”.

The resulting amount is the average of the calculated amounts of the stakeholder groups.

The results of the impact assessment phase are summarised in process charts.

Basically, it is possible to multiply these amounts with an activity variable as for instance working hours, in order to address the relevance of each process in the product system. This step was left out in the described case study due to lack of data. In addition, the use of working hours as activity variable is only coherent for the stakeholder group workers. For the residual stakeholders it is much more difficult to determine appropriate activity variables.

The assessment of social impacts is inherently subjective in contrast to environmental impact assessment, which is at least in parts natural science-based. To gain as much objectivity as possible, the social assessment is based on international standards as for instance the ILO labour standards, ISO 26000, or the OECD Guidelines for Multinational Enterprises as performance reference points (see annex VII).

2.2.4.1.4 Assumptions

Since the origin of basic and raw materials could not be traced, production locations were assumed based on import and production statistics. For instance, China imports copper mainly from Chile, and Chile is the largest copper producer worldwide. Therefore, the extraction of copper in Chile is considered.

Sometimes the conditions in one site of a company were transferred to another site in the same country. Besides, in several cases sector-specific data were applied for company-data, but all these assumptions are clearly specified in the tables of the S-LCI. Educated guesses are taken into consideration in respect of the impact assessment phase; vague speculations are not part of the evaluation.

Moreover, in the impact assessment phase the assumption was made that all subcategories have the same weight.

2.2.4.2 Environmental Life Cycle Assessment

As already mentioned, the environmental LCA uses the ecoinvent database v 2.2 as basis.⁴⁰ Foreground processes were modified where needed to better reflect the specific product life cycle of this case study. The LCA software SimaPro was used for modelling the product system, calculating the inventory, and also the impact assessment.

The product system is split into foreground and background processes in order to allow a more detailed analysis of those processes with an assumed higher relevance. For background processes as for instance raw material extraction or production of basic materials, sector-specific data is used. For foreground processes, additionally organisation-specific data are applied as far as possible. Figures 6 and 7 illustrate how the specific processes are classified for the S-LCA and the E-LCA respectively.

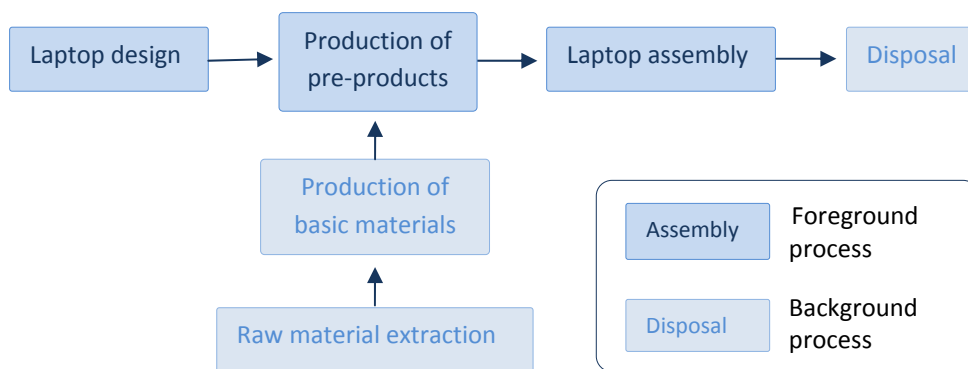


Figure 6: Foreground and background processes of the S-LCA

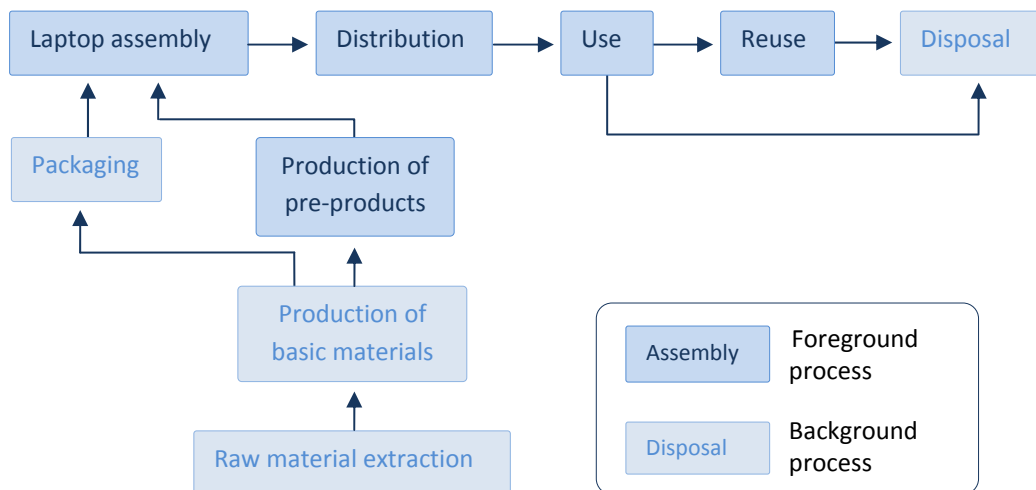


Figure 7: Foreground and background processes of the E-LCA

⁴⁰ ecoinvent (2010)

Goal and Scope

To obtain product-specific data, the ASUS UL50Ag was dismantled into single components as keyboard, HDD, ODD, memory, or display. This allowed it to weigh each module and to detect the material for mono-material components. It was usually not possible to determine the materials used in multi-material components. The required amount of materials in multi-material components was scaled based on their weight. The HDD in the ecoinvent database weighs for example around 220g, while the HDD of the UL50Ag weighs roughly 115g. Since the specific material composition of the implemented HDD could not be determined, the pre-modelled HDD in ecoinvent was used for the product system of the ASUS laptop, but only 0,523p to regard the different weights. Figure 8 shows exemplarily some components of the investigated notebook during the disassembly phase.

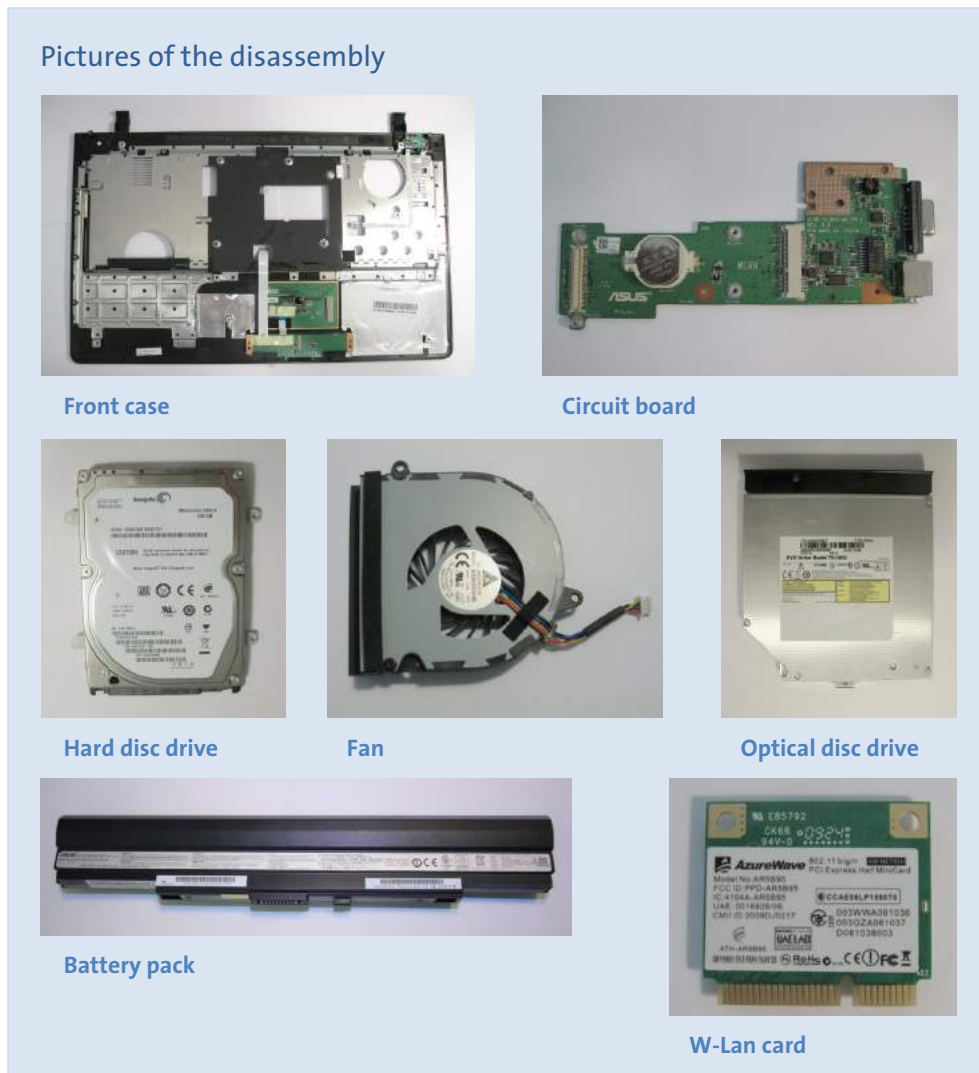


Figure 8: Pictures of the disassembly

2.2.4.2.1 Environmental Impact Assessment

For the calculation of the environmental impacts, the method “ReCiPe” was selected.⁴¹ ReCiPe is one of the most recent life cycle impact assessment methods (LCIAM). Compared to for example Eco-indicator 99, it contains a sophisticated resource modelling. ReCiPe combines the midpoint with the endpoint approach. Further, the method is available in three versions: egalitarian, individualist, and hierarchist. The egalitarian version is a long-term consideration of environmental impacts, while the individualist version assesses impacts in a short-term view. The hierarchist perspective is a combination of both approaches and is the default version of the method, why it is applied in this case study.

In general, the application of ReCiPe is recommended by LCA experts.⁴²

The method addresses the following midpoint impact categories:

- | | |
|-----------------------------------|--------------------------------|
| ■ Climate change human health | ■ Fresh water ecotoxicity |
| ■ Climate change ecosystems | ■ Marine ecotoxicity |
| ■ Ozone depletion | ■ Ionising radiation |
| ■ Terrestrial acidification | ■ Agricultural land occupation |
| ■ Freshwater eutrophication | ■ Urban land occupation |
| ■ Marine eutrophication | ■ Natural land transformation |
| ■ Human toxicity | ■ Metal depletion |
| ■ Photochemical oxidant formation | ■ Fossil depletion |
| ■ Particulate matter formation | ■ Terrestrial ecotoxicity |

The endpoint categories are as follows:

- Damage to human health
- Damage to the ecosystem
- Damage to resource availability

Both midpoint and endpoint categories were used, because both approaches have different advantages and disadvantages. A midpoint-based assessment allows a transparent analysis of environmental impacts with relative low uncertainties, but midpoint categories are rather difficult to interpret for laypeople. The consideration of endpoint categories is in contrast very easy to understand, but the results are less detailed and contain higher uncertainties.

Normalisation is applied in order to facilitate the derivation of recommendations.

The endpoint perspective of ReCiPe comprises a weighting step. Human health and ecosystem quality are both assessed with 40%; depletion of resources is weighted with 20%.

⁴¹ Goedkoop et al. (2009)

⁴² Goedkoop et al. (2010)

2.2.4.2.2 Assumptions

One basic assumption for the environmental analysis is that it is in general possible to adapt processes of a generic database with own data obtained from disassemblies and other sources. In addition, more specific assumptions were made:

- All components are compliant with the RoHS directive⁴³ and do not contain solder with lead
- The composition of the notebook case is 50% PC and 50% ABS
- The notebook needs two batteries during the entire use phase

Assumptions with regard to the use and reuse phase are described in chapter 3.2. For further assumptions concerning basic modelling principles, it is referred to the ecoinvent documentation.⁴⁴

⁴³ See glossary

⁴⁴ EMPA (2007)

3 Life Cycle Inventories

The inventories of the social and the environmental LCA are described separately, because the approach is very different, although in several cases identical processes are considered. Chapter 3.1 contains a condensed social inventory for the entire life cycle: raw material extraction processes (section 3.1.1), the production of basic materials (section 3.1.2), the design process of the laptop (section 3.1.3), the production of intermediate products (section 3.1.4), the final assembly (section 3.1.5), and finally the recycling phase (section 3.1.6). The full social inventory can be found in annex V. Subchapter 3.2 addresses the environmental inventory. Detailed process adaptations are provided in annex VI.

3.1 Social Life Cycle Inventory

The following subchapters show the summarised social life cycle inventory for all selected processes. Some background processes are analysed in different countries, as this was considered as relevant in order to have a direct comparison. For instance, the extraction of tin was investigated in China and Indonesia.

The first subchapter (3.1.1) addresses the extraction of raw materials, whereas the second subchapter (3.1.2) deals with the production of basic materials as metals, plastics, and glass. The origin of these materials is estimated based on economic data as import and production statistics. It was not possible to trace the specific source.

Chapter 3.1.3 shows the design process of the laptop; the solely process where ASUS is involved directly. Section 3.1.4 incorporates the manufacturing of pre-products as for instance the display, the hard disc drive, or the power supply. The identification of production locations of companies within the supply chain of the ASUS notebook by the product labels shows that the majority of intermediate products were manufactured in China, although most of the companies have their headquarters in Taiwan.

The assembly process of the portable computer is treated in passage 3.1.5.

The recycling processes are described in section 3.1.6. The recycling locations are selected due to the fictitious life cycle of the notebook with a use phase in Belgium and a reuse phase in China.

3.1.1 Raw Material Extraction

3.1.1.1 Copper from Chile

Copper is a ductile metal with excellent thermal and electrical conductivity, which made it very versatile. It belongs to the family of heavy metals. Indeed, compared to other heavy metals, it has a rather low toxicity for higher organisms.⁴⁵ It is produced in surface mining as well as in deep mining and can be recovered easily. It is assumed that more than 80% of the ever extracted copper is still in circulation.⁴⁶

⁴⁵ www.kupfer-institut.de

⁴⁶ *ibidem*

Copper is a very important metal in the electronic industry due to its characteristics. It is quasi indispensable for high quality electronic products. The metal is contained for instance in cables, electronic modules, and computer chips.⁴⁷

Main copper producer is Chile, while China is the largest copper consumer, and China is in turn Chile's largest export partner – also regarding copper.⁴⁸ China has also own copper deposits, but the quality is rather poor. In addition, China's copper consumption exceeds the domestic production.⁴⁹

The Chilean mining sector is characterised by a strong labour movement. Almost 100% of mining workers are members of trade unions. The influence of unions is noticeable; seasonal wage increases and the payment of bonuses are common.⁵⁰ Further, workers have detailed labour contracts, which regulate for instance overtime. Cases of child and forced labour could not be found.

The percentage of women in the mining sector is very low; women are not allowed inside the mines. It is a popular superstition that females in mines bring bad luck. However, women are employed in administration, but also here discrimination occurs. For instance, women earn much less than men.⁵¹

The majority of Chilean copper mines are modern and relatively safe due to a high degree of automation and comprehensive safety measures. However, there are accidents at times caused by blastings, landslides, cave-ins, or interrupted oxygen feed.

Copper mines cause severe environmental impacts through resource consumption and emissions. Although most copper mines are certified according to ISO 14001, local communities are affected from the mining activities. For instance, copper mines consume high volumes of water and almost all Chilean copper mines are located in the Atacama Desert, the driest desert worldwide, so that water shortage is an unavoidable problem.⁵² Another example is the high risk of lung and bladder cancer in northern Chile which can be linked to the arsenic emissions of the mining industry.⁵³ This leads to a rising conflict risk and the mining sector shows only a moderate engagement to reduce this risk.

Another social issue regarding local communities is the violation of indigenous rights of the Chilean mining sector. There are reproaches that companies acquire land that is owned by indigenous peoples.⁵⁴ On the other hand a few enterprises cover indigenous

⁴⁷ GHGm (2008)

⁴⁸ www.cia.gov/library/publications/the-world-factbook/geos/ci.html, www.industryweek.com/articles/worlds_largest_copper_producer_plans_15_billion_expansion_21516.aspx and <http://en.smm.cn/information/newsdetail.aspx?newsid=3029948>

⁴⁹ www.reuters.com/article/idUSPEK1257820090410, www.chinamining.org/Investment/2006-07-25/1153812_794d198.html

⁵⁰ www.uni-kassel.de/fb5/frieden/regionen/Chile/streik.html and Codelco (2008), p. 113

⁵¹ ICFTU (2003), p. 6

⁵² Carriger/Williams (2005)

⁵³ www.minesandcommunities.org/article.php?a=2510

⁵⁴ CorpWatch (2007), p. 12

peoples within their CSR activities and initiate special programs for indigenous communities.

3.1.1.2 Cobalt, Copper, and Nickel from the Congo

Cobalt is a rare, ferromagnetic metal, which is found solely in compounds. It has unique properties concerning strength, corrosion resistance, melting point, and magnetism, and is used in the electronic industry in rechargeable batteries, including Li-ion batteries, integrated circuits, semi-conductors, or thin metallic films.⁵⁵

Main producer of cobalt is the Democratic Republic of the Congo (DRC) with an annual output of 22,000 tonnes, which is more than 38% of the total cobalt extraction worldwide. The vast majority of the cobalt is extracted from nickel or copper ore.⁵⁶ China is the largest purchaser of copper and cobalt from DRC.⁵⁷

This section considers in particular the cobalt extraction in the Katanga province in the DRC, but can also be applied to copper and nickel extraction, as copper and nickel are co-products of the cobalt extraction.

The main cobalt extraction areas are located in Katanga, which is in the South East of the Congo. Katanga's mining sector is split into two parts: the formal and the informal sector. While the formal sector is affected by multinational enterprises from Europe or Asia, the informal one employs small-scale artisanal miners. Both sectors correlate – the output of the informal sector often ends up in the formal sector and is exported – and both sectors are characterized by human rights violations as well as Congolese law infractions. The conditions in the formal sector depend decisively on the company; Asian concerns have the worst reputation.⁵⁸

Freedom of association is severely restricted in the DRC. While the informal sector, which is much more important than the formal one, is non-unionised, most companies of the formal sector established bogus unions. Only 0.5% of workers are union members.⁵⁹ Thus the influence of trade unions is quasi non-existent. Further, child and forced labour are frequent,⁶⁰ long hours are common,⁶¹ the salary does not allow a decent living standard,⁶² occupational discrimination is present,⁶³ and workers are exposed to several health and safety risks. Accidents are very frequent as Congolese mines have hardly any safety measures. Especially informal diggers are in jeopardy.

⁵⁵ GHGm (2008), pp. 11 and CDI (2006)

⁵⁶ USGS (2007)

⁵⁷ SwedWatch (2007), p. 22

⁵⁸ SwedWatch (2007), p. 33

⁵⁹ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm

⁶⁰ SwedWatch (2007), p. 30 and 37 and www.state.gov/g/tip/rls/tiprpt/2010/142759.htm

⁶¹ RAID (2009), p. 3 and Clark/Smith/Wild (2008)

⁶² Global Witness (2006), p. 19 and 33 and Clark/Smith/Wild (2008)

⁶³ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm, <http://genderindex.org/country/congo-dem-rep>, www.amnesty.de/jahresbericht/2010/kongo-demokratische-republik?destination=node%2F2960#gewaltgegenfrauenundmdchen, Pact Congo and www.state.gov/g/drl/rls/hrrpt/2004/41598.htm

They have often no protection clothes, work with simple tools, and are not trained. Formal miners receive safety equipment from the mining companies.⁶⁴ Although several foreign companies established codes of conduct to protect human rights and improve labour conditions, effective monitoring systems are absent.⁶⁵

Among poor labour conditions Congolese mines cause also issues in respect to local communities and the society. The access to material resources is influenced negatively as well as the access to immaterial resources. Whereas mining companies initiate projects to improve infrastructure or education,⁶⁶ there are for instance hardly any efforts to minimise environmental impacts,⁶⁷ to improve freedom of expression, or to reduce the risk of conflicts. Due to the underdevelopment of the region Katanga and generally difficult living conditions because of incessant violent conflicts, a broader engagement of companies is necessary. In order to increase the contribution of companies to regional societal issues the government in Katanga stipulated that companies must grow a certain amount of staple food to combat hunger, but several companies violate this regulation.⁶⁸

Another problem is widespread corruption. It can be detected in every stage of the mining process.⁶⁹

3.1.1.3 Gold from China

Gold belongs to the precious metals. It occurs in ores, but can also be present in metal form.⁷⁰ Around 9% of the gold worldwide extracted is used in electronic products for connectors, switch and relay contacts, or solders. In computers it can be found in microprocessors and memory chips onto the motherboard and in plug-and-socket connectors used to attach cables.⁷¹

Gold is mined in more than 75 countries; main gold producers are China, Australia, the United States, and South Africa. While South Africa was the leading gold producer in the 20th century, in recent years its output has declined. At the same time other countries have increased their production. Today China is the number one producer, although the country has rather low gold deposits, which make up 7% of the worldwide gold reserves. Most of the discovered gold deposits are located in the eastern provinces, but also resources in the west are accessed, though in a much smaller scale.⁷²

The Chinese mining sector comprises as in many developing countries on the one hand large-scale mines, run by big companies, and on the other hand small-scale mines,

⁶⁴ Clark/Smith/Wild (2008) and Global Witness (2006), p. 26ff.

⁶⁵ Global Witness (2009)

⁶⁶ www.katangamining.com/kat/corp_respo/communityinvestment and www.anvilmining.com/go/corporate-social-responsibility/community-development

⁶⁷ Clark/Smith/Wild (2008)

⁶⁸ www.bloomberg.com/apps/news?pid=newsarchive&sid=aqPhXoENfwWI

⁶⁹ Global Witness (2006), p. 14ff.

⁷⁰ GHGm (2008), p. 7

⁷¹ WGC (2008) and <http://geology.com/minerals/gold/uses-of-gold.shtml>

⁷² GHGm (2008), p. 29 and www.miningbasics.com/world-gold-reserves

which are often illegal. According to the ILO, 250,000 small-scale mines existed in China in 1999 and around 80% of these mines were illegal. In recent years China has closed several small-scale mines due to the very high safety risks. Small-scale mining is often characterized by manual digging with simple tools and equipment, and high safety risks due to lack of management control.⁷³

The position of trade unions in China is in general difficult. The right for freedom of association and collective bargaining is severely restricted by the Chinese government. There are no independent unions, why the power of unions is very limited.⁷⁴ Another issue in China is that the national minimum wages do not cover living costs, so that workers are forced to work long hours. Informal workers are of course not unionised and not paid based on legal minimum wages.

A further characterisation of the Chinese economy is the high share of migrant workers. In the mining sector more than 50% of the personnel are not from local communities.⁷⁵ Migrant workers earn less, work longer, and receive fewer benefits than local workers. In addition, migrant workers are more often victims of occupational accidents.⁷⁶ The accident rate in China's mining sector is in general very high, especially in small-scale mines. There are in average 17 fatal accidents per day; coal mines are affected in particular.⁷⁷

Gold mining activities require a very high resource consumption and entail a massive environmental load due to resource consumption and the use of hazardous substances as mercury or cyanide to dissolve the gold,⁷⁸ what has also negative social effects. The efforts of the mining sector to reduce environmental impacts are estimated as low. Also engagement of companies in respect to improvements of living conditions in local communities is scarce.

Beyond that, corruption seems to be omnipresent in China, including the mining sector. According to an investigation, there are for instance many cases of corruption concerning safety inspectors.⁷⁹

3.1.1.4 Tin from China

Tin is a very mellow heavy metal with a very low melting point. It is relatively scarce; the metal occurs worldwide only in a few regions. However, world reserves are suffi-

⁷³ GHGm (2008), pp. 45, ILO (1999) and www.minesandcommunities.org/article.php?a=8213

⁷⁴ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm, Metcalf/Li (2006) and interview with China Labour Bulletin

⁷⁵ <http://libcom.org/history/chinas-migrant-workers>

⁷⁶ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

⁷⁷ <http://news.bbc.co.uk/2/hi/7855330.stm> and <http://news.bbc.co.uk/2/hi/asia-pacific/6607419.stm> and www.minesandcommunities.org/article.php?a=8213

⁷⁸ www.fairtrademinerals.de/projekte/gruenes-gold.html, www.worstpolluted.org/projects_reports/display/56, www.worstpolluted.org/projects_reports/display/60 and FIAN (2007)

⁷⁹ www.atimes.com/atimes/China/KF05Ad01.html

cient to meet future demand. In addition, tin can be recycled.⁸⁰ Tin occurs in combination with tungsten, silver, tantalum, lead, indium, and bismuth.⁸¹

In the electronic industry tin is used as solder on printed circuit boards, for instance.⁸² In the past tin-solder was mainly alloyed with lead, what is now in general forbidden according to the RoHS directive. As a result the demand on tin increased in recent years. Lead-free tin alloys contain copper, silver, zinc, or bismuth as replacement for lead.

China is the main producer of tin, closely followed by Indonesia. In 2009, China extracted 115,000 tons of tin. Peru, Bolivia, Democratic Republic of the Congo, and Brazil are also important tin producers.⁸³ Artisanal and small-scale mine production outweighs in Indonesia as well as in China.⁸⁴

In recent years China reduced export quotas among others for tin and increased imports contemporaneously from around 1000 tons/month in 2008 and just 2000 tons/month in 2009.⁸⁵ Chinese tin mines are mainly located in the provinces Yunnan, Guangxi, Guangdong, and Hunan.⁸⁶

It is assumed that the labour conditions in the Chinese mining sector are very similar independent from the metal that is extracted. Therefore the conditions of gold mining in China apply also for tin mining, although the extraction process is different. Further it is assumed that tin mines cause lower environmental burden and are less dangerous than gold mines.

3.1.1.5 Tin from Indonesia

Indonesia is the second largest tin producer after China, but the world's biggest tin exporter with a global market share of around 30%. The Indonesian government limited the production to 105,000 tons per year to reduce environmental pollution from tin mining and to stabilize market prices for tin. However, the production volume in 2010 may be less than 50,000 tons.⁸⁷

Tin mining is centred on Bangka Island and neighbouring islands Belitung and Singkep. Tin is not alone extracted in open pit mines, but also offshore. This has serious consequences for the environment: Not only the land is destructed, but also the coastal waters.

The Indonesian tin mining industry is split in the formal and the informal sector. The boundaries of both industries have become blurred. For one thing there is no clear definition, which mining activities are legal and which are illegal; for another thing PT

⁸⁰ USGS (2010a)

⁸¹ GHGm (2008), p. 23

⁸² GHGm (2008), p. 9 and p. 15

⁸³ USGS (2010a) and www.researchinchina.com/htmls/report/2010/5842.html

⁸⁴ GHGm (2008), p. 25

⁸⁵ www.researchinchina.com/htmls/report/2010/5842.html

⁸⁶ www.chinamining.org/Investment/2006-07-25/1153812794d198.html

⁸⁷ Sadmoko (2010)

Timah and independent smelters buy tin directly or indirectly through middlemen from the black market.⁸⁸

The formal sector is almost stark dominated by the public company PT Timah Tbk and its 30% subsidiary PT Koba Tin. In 2009, both companies produced 53,255 tons of tin. The majority of the tin was exported to China.⁸⁹

The informal sector has grown until 2008, because many fishermen and farmers have become miners, as the environmental pollution caused by tin mining has destroyed their basis of life. The Indonesian government combats illegal tin mining and aims to stop small scale mining until 2015. A new mining law hits small scale miners and lead to a halving of current tin production volume. Moreover, falling tin prices reduced the extent of small scale mining activities.⁹⁰

There are several restrictions regarding freedom of association in Indonesia. For instance, there are laws and regulations that restrict the right to strike, or the government tolerates labour law violations of companies. Further, unions must have at least a membership of 50% of the total personnel.⁹¹ The legal basis for the registration of trade unions in state-owned companies is unclear; anyway employees of public enterprises are not allowed to strike.⁹² It could not be clarified if there is a trade union in the formal tin sector in Indonesia.

The general conditions of employment in the formal tin sector, i.e. at PT Timah and PT Koba, are acceptable. The salary is above the living wage of roughly 2 million IDR, the working time is regulated with four days work and two days off and around 7h work/working day, and adequate measures regarding health and safety are implemented,⁹³ but discrimination of contract workers was identified as a problem. Working contracts of leased labourers are often unclear and contain less payment and social benefits compared to regular employees.⁹⁴ The working conditions of illegal tin miners are worse due to the lack of control and regulation. Their income is dependent on tin prices and they work under unsafe conditions. Many informal tin miners drown collecting tin sand on the sea bed.⁹⁵

Tin mining poses also several issues regarding local communities: First, tin mining destroys the landscape and entails marine and freshwater pollution;⁹⁶ even in protected rain forests illegal miners dig tin. In addition, tin mining contributes to the increase of infectious diseases as malaria through the creation of lakes in the mining process.

⁸⁸ Erman (2007) and FinnWatch (2009)

⁸⁹ FinnWatch (2007), pp. 43 and www.itri.co.uk/pooled/articles/BF_TECHART/view.asp?Q=BF_TECHART_285697

⁹⁰ FinnWatch (2009), Pinang (2010) and Sadmoko (2010)

⁹¹ <http://survey09.ituc-csi.org/survey.php?IDContinent=3&IDCountry=IDN&Lang=EN>

⁹² www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁹³ FinnWatch (2009) and FinnWatch (2007)

⁹⁴ www.reuters.com/finance/stocks/keyDevelopments?symbol=TINS.JK

⁹⁵ FinnWatch (2009) and FinnWatch (2007)

⁹⁶ Resosudarmo et al. (2009), p. 34ff. and www.youtube.com/watch?v=ijEfthxHe0w

These lakes are breeding ground for (disease-carrying) insects.⁹⁷ Therefrom also indigenous communities are affected. Above, indigenous land rights are neglected. According to Indonesian law, indigenous people can use their land as long as there is no conflict with national interest, which leaves much room for land use for the government. Also artisanal miners disregard land rights.⁹⁸

In general, it can be stated that the formal tin mining sector strives to minimise negative effects of its activities and to promote positive developments, while informal tin miners act rather irresponsibly. PT Timah shows relatively comprehensive engagement, including the reclamation of mined areas, support of rural regions through infrastructure projects, education institutes through donations, SMEs through loans programs, or low-income families through donations.⁹⁹

The performance of the Indonesian tin mining sector regarding the development of eco-friendlier technologies, commitments to sustainable issues, prevention of conflicts, or fighting corruption is overall rather poor.

3.1.1.6 Bauxite from Indonesia

Bauxite is the most common ore of aluminium and is the primary source for aluminium. Aluminium is the most abundant metal in the earth crust and there are deposits in numerous countries in Australia, Asia, Europe, and the Americas, but it is technically relatively difficult to extract the metal. Main producers of bauxite are Australia, Brazil, China, Jamaica, and India. The ore is mined in open-pits.¹⁰⁰

Aluminium is widely used in electronics because of its light weight and its excellent conductive properties. It can be found in frames, casings, heat exchangers, or in specialized parts for specific electrical and electronic components and devices.¹⁰¹

Recycling of old aluminium is common. Roughly one third of the global aluminium supply stems from scrap. Just three quarters of the metal ever produced is still in circulation.¹⁰²

Although China has own bauxite deposits its imports are growing. China imports bauxite mainly from Indonesia, meanwhile also from India and Australia.¹⁰³ In the following section only bauxite mining in Indonesia is considered due to the stated time frame of the study.

The Indonesian bauxite mining sector is concentrated on Bintan Island and Kalimantan province. Major actors with regard to bauxite mining are PT Aneka Tambang (Antam), a state-owned company, and PT Harita Prima Abadi Mineral. There are no more artisanal

⁹⁷ FinnWatch (2007), p. 45

⁹⁸ Resosudarmo et al. (2009), p. 36f. and www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁹⁹ PT Timah (2008) and (2009)

¹⁰⁰ USGS (2010b) and GHGm (2008), p. 11 and 26

¹⁰¹ GHGm (2008), p. 11

¹⁰² GHGm (2008), pp. 36

¹⁰³ Yam (2007), www.mineprocessing.com/News/detail-a386-b0-c-d-e-f.html and www.clarkson s.net/markets/feature_display.asp?section=&news_id=26802&title=The+Logic+Behind+China's+Booming+Bauxite+Imports

or small-scale bauxite mines in Indonesia, because the government has closed illegal mines in recent years.¹⁰⁴

There are two trade unions within Antam,¹⁰⁵ the main actor in the bauxite sector, but the power of trade unions in Indonesia is in general rather low as described above (see chapter 3.1.1.5). However, conditions of work are in general acceptable: No child or forced labour exists, no excessive working time, and high health risks neither, as bauxite mining is relatively nonhazardous compared to other mining activities. According to Laborsta, the average income of an Indonesian miner is around 960,000 IDR,¹⁰⁶ which exceeds admittedly the legal minimum wage, but does not allow a decent living standard. The living wage in Indonesia is estimated to be estimated to be 2 million IDR.¹⁰⁷ Further, it is assumed that the discrimination of contract workers as already mentioned in chapter 3.1.1.5 is also here a problem.

Main environmental issues in Indonesia are deforestation, water pollution, air pollution in urban areas, and forest fires.¹⁰⁸ Bauxite mining contributes to the environmental impact mainly via its vast land use. Antam and other mining companies are accused to mine even in protected rain forests.¹⁰⁹ Beyond that, tailings lead to water pollution and vegetation loss. Bauxite mining in Bintan was already curbed by the government to protect water.¹¹⁰ These environmental problems cause also negative social impacts on local communities. For instance, the livelihood of fishers and indigenous people is imperilled through water pollution and deforestation respectively. Admittedly, Antam has a comprehensive CSR program, including education support, infrastructure improvements, or efforts to reduce poverty,¹¹¹ but activities that are more related to the business segment are scarce: The bauxite mine has no certified EMS, indigenous land rights are ignored, protected rain forests are destroyed, etc. Hence, the risk of conflicts is high. The efforts of the company to reduce this risk are limited. Also the risk of corruption is estimated as being high. Despite measures of the government the corruption rate increased in recent years.¹¹² The destruction of protected rainforests can for example be a hint to corruption.

3.1.2 Production of Basic Materials

3.1.2.1 Non-Ferrous Metals from China

This process comprises the life cycle stages smelting, refinery, and finishing with regard to the production of non-ferrous metals. The majority of metals contained in a laptop

¹⁰⁴ Darvin (2005), GHGm (2008), p. 25 and www.minesandcommunities.org/article.php?a=7082

¹⁰⁵ Antam (2009a), p. 67f.

¹⁰⁶ <http://laborsta.ilo.org/STP/guest>

¹⁰⁷ FinnWatch (2009), p. 9

¹⁰⁸ www.cia.gov/library/publications/the-world-factbook/geos/id.html

¹⁰⁹ www.miningwatch.ca/en/save-indonesias-protected-forest-areas-mining

¹¹⁰ www.minesandcommunities.org/article.php?a=7082

¹¹¹ Antam (2009a), p. 73ff.

¹¹² www.thejakartapost.com/news/2008/08/25/corruption-crime-rate-stays-high-despite-measures.html

computer belong to the non-ferrous metals as aluminium, copper, tin, nickel, gold, silver, lithium, palladium, or platinum.

The importance of these metals is continuously growing, why China is going to limit the domestic production in order to be sparing with resources.¹¹³ In addition, China increases scrap imports and investments in mining sectors in Africa and Latin America.¹¹⁴

The production of non-ferrous metals in China can be linked to several social issues: Working conditions are poor, local communities are affected through resource consumption and hazardous emissions, and sector efforts to reduce negative impacts are lacking.

Among typical issues in China as corruption, restricted freedom of association and freedom of expression, unfair salary as well as insufficient safety measures, or discrimination of migrant workers, the production of metals can be linked to forced labour. Several labour camps produce metal products.¹¹⁵

With regard to local communities, the production of non-ferrous metals entails further issues due to the very high energy and water use. The Chinese government has already reacted and reduced the production of aluminium.¹¹⁶ Due to a drought the production of non-ferrous metals was partly shut down in southwest China.¹¹⁷ The sustainability engagement of the sector is very sparsely. Only a few companies have implemented certified EMS, codes of conducts, or initiate social projects.

In general, the data availability was limited, so that not all subcategories could be assessed.

3.1.2.2 Plastics from China

Plastics are polymeric synthetic materials which are produced from fossil fuels as oil, coal, or natural gas. Plastics consist of organic long molecular chains, what enables a widespread use. They are very versatile, lightweight, tough and durable, corrosion resistant, and cheap, why plastics have been the fast growing basic material.¹¹⁸

There are numerous types of plastics with numerous different varieties. Main plastic types are polyethylene terephthalate (PET), low density polyethylene (LDPE), high density polyethylene (HDPE), polypropylene (PP), polystyrene (PS), polycarbonate (PC), polyvinyl chloride (PVC), and acrylonitrile butadiene styrene (ABS).¹¹⁹

The plastic industry gains continuously in importance in the Chinese economy. The sector has a growth rate of 10% in average. There are more than 8,000 companies in

¹¹³ <http://english.peopledaily.com.cn/90001/90778/90860/7080171.html> and www.chinadaily.com.cn/business/2010-07/26/content_11048348.htm

¹¹⁴ www.cmra.cn/en/?cat=7, www.chinamining.org/News/2010-04-21/1271811712d35651.html and <http://timesofindia.indiatimes.com/world/rest-of-world/China-investment-in-Peru-tops-in-Latin-America-Official-/article-show/5842201.cms>

¹¹⁵ Laogai Research Foundation (2008)

¹¹⁶ www.chinamining.org/News/2010-09-13/1284368958d39025.html

¹¹⁷ www.chinadaily.com.cn/business/2010-04/10/content_9712227.htm

¹¹⁸ Gervet (2007)

¹¹⁹ *ibidem*

China producing plastic products. The majority of these companies are small enterprises (roughly 90%). However, plastic imports still outweigh the domestic production.¹²⁰

The plastic sector shows similar issues as the non-ferrous metals industry as restricted freedom of association and expression, forced labour, underpayment, or discrimination of migrant workers. Further, a source was found that reports a long work week with often more than 60h.¹²¹ Significant differences in consequence of very different production processes are safer workplaces and lower impacts on the environment. However, the production of conventional plastics is based on fossil fuels, what leads to competition with other sectors due to limited crude oil reserves. Above, plastics may contain hazardous substances as biphenyl A, chlorine, phthalates, or even heavy metals depending on plastic type, which have negative impacts on human health. Commitment of the plastic industry concerning sustainable development is imperceptible. There are, however, some efforts to minimise the use of critical substances as for instance phthalate-free or PVC-free products, but these developments are often initiated by purchasers.

The availability of data was sometimes difficult; for this reason, some subcategories could not be considered in the assessment phase.

3.1.2.3 TFT-LCD Glass from Korea

For the production of TFT-LCD monitors a specific glass substrate is needed. This substrate is equipped with transistors on the surface that drive liquid crystal. This technology enables the production of very thin displays.

The importance of TFT-LCD is growing. There are only a few TFT-LCD glass substrate suppliers worldwide. Main suppliers are located in South Korea, Japan, Singapore, Taiwan, and China.¹²²

The position of trade unions in South Korea is also critical. The ILO accuses the country for severe right violations regarding freedom of association and collective bargaining. The influence of unions is rather low and strikes are often quelled by the police.¹²³ While there are no justified complaints regarding working time, child or forced labour with respect to considered data sources, there are identified issues with fair salary, and health and safety: The Korean minimum wage does not absorb living costs. Further, the occupational accident rate in South Korea is high compared to Europe and the production of TFT glass entails some dangers as the exposure to heat, noise, respiratory hazards due to fumes, dust, and toxic compounds as well as physical and electrical hazards.¹²⁴ Beyond that, the TFT glass production is relatively resources-intensive. High

¹²⁰ Zhengpin (2004)

¹²¹ www.theonion.com/articles/chinese-factory-worker-cant-believe-the-shit-he-ma,1343

¹²² www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xml/100512_tft_lcd_glass_substrat_e_demand_forecast_to_grow_15_in_2010_to_278m_m2.asp

¹²³ KCTU (2006) and www.amnesty-korea.de/Suedkorea/Gewerkschaften

¹²⁴ [www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/\\$FILE/Final+-+Glass+M+anufacturing.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/$FILE/Final+-+Glass+M+anufacturing.pdf)

volumes of energy, sand, and water are needed in the production processes. Also different hazardous substances are used as polishing agents or coatings.¹²⁵ The TFT glass industry shows some efforts to reduce the environmental impacts. Sites have implemented certified EMS and there are trials to reduce resource consumption, to increase efficiency, and to develop more sustainable products. LG display has even made voluntary agreements with the Korean government regarding energy savings and greenhouse gas reductions since 2001.¹²⁶ However, community engagement of the glass sector seems rather deficient. Activities are almost limited to the support of underprivileged families and minorities.

3.1.3 Design of the Laptop by ASUSTeK Computer Inc.

The laptop was designed by ASUSTeK Computer Inc. in Taiwan. The design centre is located in Taipei. ASUS spun off the OEM business in 2008 to Pegatron and Unihan, and applied itself to the brand business. With regard to the UL50Ag ASUS hands off the assembly and the production of the mainboard to company x.

ASUS employs around 4,000 employees in Taiwan and generated a revenue of 7.6 billion USD in 2008.¹²⁷

The company has a global website (www.asus.com) with regional subsites as well as a specific website for the publication of CSR information (<http://csr.asus.com>). Furthermore, ASUS publishes among annual reports also sustainability reports. Since ASUS did not answer the questionnaire, the above mentioned websites and corporate reports were main data sources.

It is not known whether there is a trade union at ASUS in Taiwan. In general, the situation of trade unions in the country is difficult, so that the power of unions is very limited. The first legal and autonomous trade union was recognized by the government in the year 2000. Meanwhile there are at least more than 20 unions covering different sectors and regions.¹²⁸ Furthermore, it was not possible to ascertain data regarding basic salary and working time.

According to ASUS, there were no cases of discrimination in 2008 and 2009.¹²⁹ Internet research could reveal anyhow one case of occupational discrimination that is linked to ASUS; however, this case occurred in China and is thus not directly relevant in this process.¹³⁰ The ASUSTeK Human Rights Declaration covers non-discrimination¹³¹ and the enterprise promises equal payment.¹³² Also regarding worker's health and safety

¹²⁵ [http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/\\$FILE/Final+-+Glass+Manufacturing.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/$FILE/Final+-+Glass+Manufacturing.pdf)

¹²⁶ www.lgdisplay.com

¹²⁷ ASUS (2009a)

¹²⁸ www.tctu.org.tw/front/bin/ptdetail.phtml?Part=en001&Category=176367 and www.tctu.org.tw/front/bin/ptdetail.phtml?Part=en004&Category=176367

¹²⁹ ASUS (2009a), p. 84 and ASUS (2008a), p. 59

¹³⁰ Li (2007)

¹³¹ See annex II

¹³² ASUS (2009a), p. 48 and ASUS (2008a), p. 32

no issues could be detected. ASUS executes emergency simulations to minimise danger and provides education measures regarding environment, safety, and health. Further, ASUS is certified according to OHSAS 18001.¹³³ Moreover, the company provides several social benefits as a comprehensive insurance coverage, holidays, scholarships for employee's children, and others.¹³⁴

The impacts of ASUS on the local living conditions are relatively balanced. The contribution to the regional environmental load is rather low, as all production sites are abroad. ASUS shows some efforts to minimise the environmental impacts of their business activities. Through the production of ecolabeled notebooks, ASUS sets an example for the promotion of sustainable consumption. Also from a social perspective ASUS initiates rather positive developments. The company is important for the regional economy and society through their economic activities and their community engagement.¹³⁵ However, the commitment to sustainable issues with regard to the core business is under-achieved. ASUS has implemented a code of conduct for suppliers, but the company does not disclose its content to the public. Besides, the compliance of this code of conduct is not verified directly; vendors are only required to sign a consent document.¹³⁶ Another example is the cancellation of all pensions in the frame of the division of ASUS in ASUS, Pegatron, and Unihan in 2008.¹³⁷

Also regarding fair competition, misbehaviour could be detected. For one, ASUS published a misleading sales campaign, so that the enterprise was forced by the Taiwan's Fair Trade Commission to withdraw the advertisement from circulation immediately and had to pay a penalty.¹³⁸ In addition, ASUS is imputed to join a Microsoft-OEM cartel, because the prices for computers with Linux are higher than for computers with Windows.¹³⁹ Further, there are several charges against ASUS in terms of patent infringements.¹⁴⁰

According to Wayne Hsieh, one of the founders of ASUS, the company is also mired in corruption and nepotism. In 2003, Hsieh backed out and criticized the management harshly.¹⁴¹

3.1.4 Production of Pre-Products

3.1.4.1 Hard Disc Drive from Seagate

The hard disc drive (HDD) of the ASUS UL50Ag was produced by the company Seagate. Seagate is an international corporation which operates in 22 countries. Manufacturing

¹³³ ASUS (2008a)

¹³⁴ ASUS (2009b), p. 76 and ASUS (2008a), p. 32

¹³⁵ ASUS (2008a) and ASUS (2009)

¹³⁶ ASUS (2008a), p. 24

¹³⁷ Kubicki (2008)

¹³⁸ www.digitimes.com/news/a20090806PD207.html

¹³⁹ Gedda (2009) and www.linuxtoday.com/news_story.php3?ltsn=2008-07-11-015-26-NW-HW-RL&tbovrmode=3

¹⁴⁰ ASUS (2010), p. 28

¹⁴¹ www.digitimes.com

facilities are located in China, Thailand, Malaysia, and Singapore. According to the product label, the disc was produced in the Seagate factory in Suzhou, China, which employs 6,800 workers. The company's largest factory for hard disc drive manufacturing employing 9,500 workers is in Wuxi, China.¹⁴² Suzhou and Wuxi are located in Jiangsu province and the social impacts of both factories are very similar. A difference is that the salary in Suzhou is higher than in Wuxi.¹⁴³

Inventory data were mainly obtained from the company's CSR report, but also from the survey. In addition, Seagate provides a homepage which contains among others sustainability information (www.seagate.com).

There is a union at Seagate in Suzhou, but it is assumed that the influence of this union is rather low due to the difficult position of trade unions in China.

The basic wage is slightly above the legal minimum wage in Jiangsu province of 960 CNY. Beyond that, Seagate pays several premiums and bonuses, so that the final salary covers the living costs.¹⁴⁴ Wage deduction could not be proved.

Due to obtained information regarding working time, it is likely that Seagate violates the Chinese labour law. Also the occurrence of discrimination is quite likely. For instance, women have to be taller than 1.55m and men have to be taller than 1.70m, if they want to work for Seagate¹⁴⁵ and the high percentage of women in the labour force is a further clue for discrimination against men.¹⁴⁶ Although Seagate is a member of the EICC¹⁴⁷ and the UN Global Compact,¹⁴⁸ basic violations against labour rights could be found.

The production of HDDs requires the handling of several hazardous substances. Seagate is relatively engaged in the reduction of critical substances. The company eliminated bromine and chlorine in the half of products, produces RoHS compliant products, and restricts the use of numerous other harmful substances. Potential pollutants in waste water from assembly operations include acids, alkalis, organics and solvents, or heavy metals. In addition, the production and the assembly of PWBs causes acid fumes and VOC emissions.¹⁴⁹ According to an environmental ranking of America's largest 500 corporations, Seagate shows only average performance regarding its environmental management.¹⁵⁰ The contribution of Seagate to positive developments in the local community is also deficient. For instance, the site does not promote local employment, because primarily migrant workers are employed. Furthermore, the access to material and immaterial resources is restricted by Seagate through environmental impacts and a

¹⁴² www.seagate.com and email from Seagate

¹⁴³ <http://wuxi.baixing.com/zhiyezhongjie/a56372502.html>

¹⁴⁴ <http://suzhou.lbx.cc/gongqiu/17524.html>, Yang (2010), questionnaire Seagate and FIAS (2007), p. 53

¹⁴⁵ http://suzhou.qd8.com.cn/zhaopin14/xinxi12_511420.html

¹⁴⁶ Questionnaire Seagate

¹⁴⁷ EICC (2009a)

¹⁴⁸ www.unglobalcompact.org/participant/8284-Seagate-Technology

¹⁴⁹ Salazar (1997)

¹⁵⁰ <http://greenrankings.newsweek.com/companies/top500/seagate>

lacking local engagement.¹⁵¹ This behaviour of Seagate leads to a relatively high risk of conflicts.

Moreover, Seagate was involved in a bribery scandal.¹⁵² As reaction, the company implemented a “Code of Business Conduct and Ethics” which addresses among others anti-corruption and bribery.¹⁵³ In addition, Seagate was sued several times due to the violation of patents and protective rights, but there was no proof found for wilful infringements.¹⁵⁴

3.1.4.2 Random Access Memory from Hynix

The memory contained in the UL50Ag was produced by Hynix which is a semiconductor memory manufacturer located in South Korea. The company has sites in Seoul, Cheongju, and Icheon; the considered memory was produced in Icheon.¹⁵⁵ The company was founded in the 1980s as Hyundai Electronics Industries Co. and changed the name in 2001 to Hynix.¹⁵⁶

Hynix has a global website at www.hynix.com which covers also information in terms of sustainability and additionally the company publishes a CSR report. Moreover, Hynix took part in the survey and answered the questionnaire.

Hynix has a trade union with a membership of around 50%.¹⁵⁷ In addition, there is a regional labour union in Icheon which has 6,634 members.¹⁵⁸ It is assumed that these unions have a rather low influence on important company decisions due to the position of trade unions in South Korea.¹⁵⁹ Beyond that, it could be unveiled that union members of the Hynix Union were arrested in the past due to a strike.¹⁶⁰ However, all other aspects regarding conditions of employment seem to be uncritical: No occurrence of child or forced labour, salary is above the living wage, there are appropriate working times, the share of women to men is balanced, and so on.

The production of semiconductors implicates high energy and water consumption. Also the use of toxic substances is unavoidable. Hazardous emissions to water, soil, and air are the consequence. Therefore, Hynix causes several environmental impacts, which have as well impacts on the local community. But Hynix is certified according to ISO 14001 and develops greener products without halogens for example.¹⁶¹ On the other

¹⁵¹ Questionnaire Seagate and Seagate (2009)

¹⁵² Chong (2010)

¹⁵³ www.seagate.com/www/en-us/about/investor_relations/corporate_governance/code_of_business_conduct_and_ethics

¹⁵⁴ Bui (2008)

¹⁵⁵ Telephone call with Hynix Semiconductor Deutschland GmbH

¹⁵⁶ www.hynix.com

¹⁵⁷ www.bitbenderforums.com/vb22/showthread.php?t=42868 cited following www.reuters.com

¹⁵⁸ Hynix (2010), p. 56

¹⁵⁹ KCTU (2006) and www.amnesty-korea.de/Suedkorea/Gewerkschaften

¹⁶⁰ KCTU (2006), p. 22

¹⁶¹ Hynix (2010) and www.hynix.com/gl/sm/green/main.jsp?menuNo=6&m=6&s=0

hand the company's engagement in respect to community engagement is spare. CSR activities centre upon corporate volunteering, support of regional culture, and support of competent persons in the region. For one thing the environmental dimension is lacking, for another thing activities are mainly not related with the core business of Hynix.¹⁶²

There are some further critical points regarding the interaction with competitors. Hynix was fined by the European Commission for price fixing. The company is also a member of a DRAM cartel.¹⁶³ Probably as reaction, the company implemented a fair trade compliance program.¹⁶⁴ In addition, Hynix was convicted to infringe patent rights.¹⁶⁵

3.1.4.3 Optical Disc Drive from SEPHIL

The drive was produced by the Samsung Electronics Philippines Manufacturing Corporation (SEPHIL) in the Philippines. The company is subsidiary of the Toshiba Samsung Storage Technology Korea Corporation (TSSTK), which is in turn a daughter company of the Toshiba Samsung Storage Technology Corporation (TSST). TSST was established in 2004 and is owned by Toshiba (51%) and Samsung Electronics (49%). Its headquarter is located in Tokyo, Japan; the one of TSSTK in Suwon, Korea.¹⁶⁶ TSSTK is responsible for product development, marketing, and sales, while Samsung Electronics and Toshiba undertake mainly the task of manufacturing.

SEPHIL has no own website, but Samsung has a regional webpage for the Philippines (www.samsung.com/ph). SEPHIL has also no corporate report; the reports of Samsung Electronics were used as a substitute. It was not possible to send SEPHIL the questionnaire, because Samsung does not provide us any contact information, despite several queries.

SEPHIL is located in an export processing zone (EPZ) near Laguna Calamba, owned by the Philippine Economic Zone Authority (PEZA).¹⁶⁷

The working conditions in such EPZs are in general critical.¹⁶⁸ Trade unions are prohibited and even the police has only limited access to the economic zones. The violation of minimum wage standards and the employment of temporary staff to avoid payment of benefits are common, although the minimum wage of 298 PHP/day is far below a living

¹⁶² www.hynix.com/gl/sm/contribution/contribution.jsp?menuNo=6&m=5&s=0

¹⁶³ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/586&format=HTML&age d=0&language= EN&guiLanguage=en>

¹⁶⁴ www.hynix.com/gl/sm/trade/index.jsp?menuNo=6&m=4&s=0

¹⁶⁵ <http://query.nytimes.com/gst/fullpage.html?res=9B06E2D81F3EF930A35751C1A9629C8B6 3&sec=&spon=&pagewanted=2> and http://www.theregister.co.uk/2006/04/26/rambus_w ins_hynix_case

¹⁶⁶ www.tsstorage.com/tsst/corp_e/indexe.html

¹⁶⁷ www.peza.gov.ph/index.php?option=com_content&view=article&id=137&Itemid=164&zone=CalambaPremiere International Park - SEZ

¹⁶⁸ SOMO (2009)

wage.¹⁶⁹ In peak season employees often work 7 days a week, 12 hours a day. In low season the working time amounts around 55 - 66 hours per week.¹⁷⁰ The Philippine law does not stipulate a maximum for overtime hours.¹⁷¹ Further, gender and age discrimination is very common in the electronic industry. The same applies to sexual harassment, strict code of behaviour, and lacking freedom of expression.¹⁷² Also the violation of health and safety regulations is very likely. According to a report, 96% of surveyed companies in EPZs infringed basic occupational health and safety standards regarding heat, noise, or security equipment.¹⁷³ A formal health and safety policy does not exist. Other critical aspects with respect to local communities are access to material and immaterial resources, safe and healthy living conditions, local employment, and community engagement. SEPHIL is responsible for several negative social and environmental impacts, but does neither strive to reduce these impacts significantly nor to initiate other positive impacts.¹⁷⁴ For instance, Samsung promised to eliminate PVC and brominated flame retardants from new models of all its products until 2010, but the company broke both promises.¹⁷⁵ In addition, the social engagement of Samsung is limited to one project “Samsung Hope” which aims to construct IT training centres for blind youth in underdeveloped areas.¹⁷⁶ Samsung is a member of the EICC¹⁷⁷ and for 2009 a self-assessment concerning CSR for all suppliers was conducted in 2009.¹⁷⁸ Moreover, Samsung is involved in bribery and corruption as well as in anti-competitive behaviour and patent infringements. The Samsung chairman and his aides are said to having stolen 10 trillion KRW from Samsung subsidiaries for slush funds. Samsung is said to having bribed politicians, journalists, bureaucrats, as well as court officials.¹⁷⁹ Samsung was also accused for price fixing with regard to the U.S.-American ODD market, the membership in a CRT-cartel and the membership in a cartel which bulled the market of semiconductors.¹⁸⁰ In the past there were several charges from Pioneer, Spansion, Kodak, or Fujitsu against Samsung concerning the infringement of different patents.¹⁸¹

¹⁶⁹ SOMO (2009), p. 24f. and www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

¹⁷⁰ SOMO (2009), p. 26

¹⁷¹ www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

¹⁷² ICFTU (2005) and ICFTU (2004)

¹⁷³ ICFTU (2005), p. 2

¹⁷⁴ Samsung Electronics (2009), p. 46ff.

¹⁷⁵ www.greenpeace.org/international/en/press/releases/samsung-broken-promises

¹⁷⁶ Samsung Electronics (2009), p. 46ff.

¹⁷⁷ EICC (2009a), p. 10

¹⁷⁸ Samsung Electronics (2009), p. 61

¹⁷⁹ Nosowitz (2010), www.crocodyl.org/wiki/samsung_group, www.theinquirer.net/inquirer/news/1033501/samsung-bribery-scandal and www.bloomberg.com/apps/news?pid=newsarchive&refer=home&sid=aH3aDwXXn vqc

¹⁸⁰ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/586&format=HTML&aged=0&language=EN&guiLanguage=en> and Meller (2009)

¹⁸¹ Shiloy (2008), Crothers (2008), Nikkei Microdevices (2006), p. 10 and www.allbusiness.com/electronics/consumer-household-electronics/11668917-1.html

3.1.4.4 Production of the Battery

The battery is a lithium ion accumulator with 8 cells. The battery cells are produced in Korea and the accumulator is assembled in China by Simplo Technology Inc. in Changshu. Since it was not possible to find out from which company Simplo purchases their battery cells, the production of the cells is considered as background process. Simplo did not respond to any query.

3.1.4.4.1 Battery Cells from Korea

As already mentioned in section 3.1.3.3, the freedom of association and collective bargaining in South Korea is restricted. Further social issues with regard to the stakeholder group “workers” are unfair salary – the legal minimum wage is not sufficient,¹⁸² discrimination – women, migrant workers, as well as minorities are discriminated,¹⁸³ and there are safety risks due to the reactivity of lithium.¹⁸⁴

Issues in regard to the stakeholder groups “local community” and “society” are more divers. First, the reserves of lithium are limited, what involves potential resource conflicts. The demand for lithium is increasing due to the increasing importance of electric cars.¹⁸⁵ Second, the sector is not engaged in the promotion of sustainability. None of the analysed companies has implemented a code of conduct to improve labour conditions in the company or in the supply chain, and activities in the field of CSR seem to be rather superficial. LG Chem, for instance, invests only 0.07% of its revenue in CSR projects.¹⁸⁶ Third, the risk of corruption is relatively high due to high competitive pressure, and research intensity. The improvement of batteries is very important for the business success, especially regarding energy efficiency and resulting battery life, but also weight and size are competitive factors.

3.1.4.4.2 Assembly of the Battery by Simplo Technologies

Simplo Technology Inc. is a Taiwanese company with headquarter in Hsin Chu Hsien. The company is specializing in the production of battery packs for notebooks, cell phones, E-bikes, and the like.¹⁸⁷

The obtaining of company- and site-specific data was very difficult, as the homepage of Simplo (www.simplo.com.tw) does in general not incorporate social or environmental information. Beyond that, the company does not publish a sustainability report and did not answer the questionnaire. Therefore, mainly data on sector level were used.

¹⁸² www.koreatimes.co.kr/www/news/biz/2009/06/123_47677.html

¹⁸³ www.csr-asia.com/index.php?id=4597, Amnesty International (2009), http://english.hani.co.kr/arti/english_edition/e_national/180989.html and http://factsanddetails.com/japan.php?ite_mid=906&catid=24&subcatid=1_56

¹⁸⁴ www.pressetext.de/news/060830027/lithium-ionen-akkus-als-brandfalle and www.batteryuniversity.com/partone-5B.htm

¹⁸⁵ Hoelzingen (2009) and www.n24.de/news/newsitem_5642306.html

¹⁸⁶ LG Chem (2010), p. 31

¹⁸⁷ www.simplo.com.tw/company.htm

Severe restrictions regarding freedom of association,¹⁸⁸ low wages only slightly above the minimum wage,¹⁸⁹ excessive overtime, occupational discrimination based on gender, age, origin, and body height,¹⁹⁰ and lacking safety precautions are main identified issues concerning workers.

The local community is mainly negatively affected by Simplo concerning access to material and immaterial resources. Moreover, local employment is probably not promoted given that Simplo employs predominantly migrant workers as common in the sector.

The company has implemented very strict regulations to administrate the workers and has not implemented a code of conduct.¹⁹¹ Due to the poor labour conditions the risk of conflicts is high.¹⁹²

3.1.4.5 Display from AU Optronics

The LCD module of the UL50Ag was manufactured by AU Optronics (hereafter referred as AUO) the third largest producer of liquid crystal displays. AUO employs more than 42,000 employees worldwide – the half is employed in China. The company has business locations in Taiwan, China, Japan, Korea, Singapore, USA, Netherlands and Czech; their head quarter is in Hsinchu, Taiwan.¹⁹³

The LCD module was produced in Taiwan and assembled China; however it is unknown in which site.

3.1.4.5.1 Manufacturing of the Display in Taiwan

AU Optronics has 15 manufacturing sites in Taiwan with more than 19,000 employees. The facilities are located in the Hsinchu Science Park, the Kueishan Hwaya Science Park, the Lungtan Aspire Park, the Lungke Science Park and the Central Taiwan Science Park. Main activities of AUO in Taiwan are the manufacturing of components for LCD panels and R&D work.¹⁹⁴

AUO did not respond to the questionnaire. Data were mainly obtained from the company's website (www.auo.com) and the sustainability report. In addition, interviews with a worker in Chinese AUO factory and a worker in a Taiwanese site were conducted.

The power of trade unions in Taiwan is in general limited. AUO has not established a union so far, but the working conditions at AUO in Taiwan seem to be acceptable at

¹⁸⁸ Metcalf/Li (2006) and interview with China Labour Bulletin

¹⁸⁹ <http://www.xfwl.gov.cn/rsrc/article/2009-10-16/543-1.html>

¹⁹⁰ www.xfwl.gov.cn/rsrc/article/2009-10-16/543-1.html

¹⁹¹ <http://tieba.baidu.com/f?kz=787980470>

¹⁹² <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009), Yilian (2010) and Global Times (2010)

¹⁹³ AUO (2010) and www.auo.com

¹⁹⁴ AUO (2009), pp. 37 and <http://auo.com/auoDEV/about.php?sec=tftLcdFabs&ls=en>

large: The salary is above the minimum wage, the working time is around 180h per month, and the enterprise pays several social benefits as insurance policies and pensions.¹⁹⁵ However, the age structure of AUO's personnel¹⁹⁶ suggests the occurrence of discrimination.

Regarding the stakeholder "local community" there are critical aspects with regard to access to material as well as immaterial resources, safe and healthy living conditions, and community engagement. The production of LCD panels entails the use of numerous hazardous substances, including polycyclic aromatic hydrocarbons and halogenated aromatic hydrocarbons, and the consumption of resources as for instance water and energy.¹⁹⁷ Thus the production of LCD panels contributes considerably to the environmental load. AUO shows comprehensive efforts to minimise their environmental impacts reducing the use of harmful substances as for instance mercury, arsenic, antimony, or dimethyl fumarate. Further, the company applies eco-design for products and packaging.¹⁹⁸ Despite this commitment of AUO, it is assumed that the company affects local living conditions negatively. The corporate community engagement cannot compensate these impacts. The CSR activities are rather shallow. They are mainly corporate giving activities in the areas education, art and culture, and charity.¹⁹⁹ In addition, AUO implemented a CSR policy which addresses several themes as law-compliance, freely chosen employment, non-discrimination, compensation and benefits, and others, but this CSR policy is not explained.²⁰⁰ So far, AUO has not promoted the improvement of labour conditions in supplier companies, but audits are planned.²⁰¹ Moreover, AUO showed anti-competitive behaviour. Some companies, including AUO, were charged for price fixing.²⁰²

3.1.4.5.2 Assembly of the Display in China

AUO has relocated labour-intensive processes to China. There are three Chinese assembly sites in Xiamen, Songjiang, and Suzhou. These sites have a labour force of approximately 21,000 people.²⁰³

Working conditions in the Chinese sites are worse compared to those in Taiwan. Although the payment in China is also above the legal minimum level, employees have to work more and have only 1 day off per week. According to a report, AUO reduced overtime in recent years implementing lean management. The company tries to abide by

¹⁹⁵ AUO (2010) and interview with worker

¹⁹⁶ *ibidem*

¹⁹⁷ Williams (2003), pp. 57

¹⁹⁸ AUO (2010)

¹⁹⁹ AUO (2010), pp. 76 and <http://auro.com/auroDEV/citizenship.php?sec=SocialCommitment&ls=en>

²⁰⁰ <http://auro.com/auroDEV/citizenship.php?sec=socialresponsibility&ls=en>

²⁰¹ <http://auro.com/auroDEV/citizenship.php?sec=stakeholder>

²⁰² Lemon (2010) and Kendall (2010)

²⁰³ AUO (2009), pp. 37

the Chinese labour law which stipulates a maximum overtime of 36 hours per month.²⁰⁴ Furthermore, discrimination is more likely. The age structure and the ratio men to women are hints for discrimination.²⁰⁵ In addition, it is unclear, which social benefits are paid to Chinese workers. Presumably, Taiwanese workers are advantaged. In Chinese factories, AUO employs predominantly migrant workers.²⁰⁶

The scope of AUO's social engagement is mainly Taiwan, but the enterprise sponsored the construction of elementary schools in China and arranged, in co-operation with Northeastern University, a summer vacation educational camp in China.²⁰⁷ AUO implemented a CSR policy which addresses several themes as law-compliance, freely chosen employment, non-discrimination, compensation and benefits, and others, but this CSR policy is not explained.²⁰⁸ So far, AUO has not promoted the improvement of labour conditions in supplier companies, but audits are planned.²⁰⁹ Moreover, AUO showed anti-competitive behaviour. Some companies, including AUO, were charged for price fixing.²¹⁰

Due to the relatively poor working conditions and the poor engagement of AUO regarding CSR activities the risk of conflicts is rated as rather high, although the assembly process is not linked to severe environmental pollution, or high resource consumption.

3.1.4.6 Power Supply from Lite-On Technology Corporation

The power adapter was produced by Lite-On Technology Corporation in Dongguang (factory Lite Power^{2nd} Plant). Lite-On Technology is an international manufacturer of electronics and optoelectronic parts founded in 1975. Business locations cover Asia, Europe, and America, while the global headquarter is located in Taiwan. Product offering ranges from power supplies, enclosures, and LED displays to PDAs, printers, navigation systems or portable entertainment systems.²¹¹

Lite-On has a global website at www.liteon.com with a CSR section. The company publishes also a CSR report. Another data source was the report of the NGO SACOM from 2008.²¹²

The working conditions at Lite-On sites are rated as poor: The freedom of association is restricted (workers do not know anything about a trade union²¹³), basic salary has minimum wage level, which is not sufficient for living, and further allowances are vari-

²⁰⁴ Rammohan (2008), p. 11

²⁰⁵ AUO (2010), p. 92

²⁰⁶ Rammohan (2008), p. 10

²⁰⁷ AUO (2010), pp. 76

²⁰⁸ <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

²⁰⁹ <http://auo.com/auoDEV/citizenship.php?sec=stakeholder>

²¹⁰ Lemon (2010) and Kendall (2010)

²¹¹ www.liteon.com

²¹² SACOM (2008)

²¹³ SACOM (2008)

able (they range from 0 - 424 CNY per month²¹⁴), there are long work weeks (employees work at least 10 - 12 hours a day; in average 70 - 120 overtime hours accrue per month depending on season and factory; no day off in peak seasons²¹⁵), occupational discrimination, and social benefits are only paid if stipulated by the local law.²¹⁶ Similar to other companies in the electronic sector, Lite-On employs predominantly migrant workers. Local employment is in general not promoted. Further, Lite-On infringes the Chinese labour law regarding overtime and days off, although the enterprise is a member of the EICC and has implemented an own code of conduct which apply for all Lite-On Group employees and all Lite-On Group companies.²¹⁷

Although Lite-On has established a foundation, the commitment of the company is scarce. It is unclear, if Lite-On is also active in China.²¹⁸

Moreover, Lite-on was sued for price agreements and membership in a cartel.²¹⁹ In the past there were also a few lawsuits against Lite-On regarding patent infringements.²²⁰

3.1.4.7 Fan from Delta Electronics

The fan was produced by Delta Electronics Inc. in Wujiang, Jiangsu province. Delta Electronics is a producer of switching power supplies and fans, power management solutions, visual displays, industrial automation, networking products, and renewable energy solutions headquartered in Taipei, Taiwan. The company was established in 1971 and employs meanwhile 60,000 employees. The Delta Group has offices, manufacturing facilities, and R&D laboratories in Europe, Asia, and the Americas. It generated a return on sales of just 126 million TWD (ca. 3 million EUR).²²¹

Delta Electronics has a global homepage (www.deltaww.com) which does not contain CSR information and several local websites that publish partly social and environmental data. In addition, the enterprise provides a sustainability report. Delta did not participate in the survey, but an interview with an employee was conducted.

The working conditions in the Delta Electronics site in Wujiang are rather poor. While the salary is acceptable, the working time is long (60 – 66 hours/week²²²), discrimination occurs (There are some requirements on employees' height, weight, and eyesight at Delta.²²³ The high percentage of women in the labour force is also an evidence for employment discrimination.²²⁴), social benefits are mainly limited to legally mandated

²¹⁴ www.mingong123.com/company/index_1_75027_1.html, www.coent.cn/gsx33522.html and SACOM (2008)

²¹⁵ SACOM (2008)

²¹⁶ Lite-On (2009), p. 65

²¹⁷ Lite-On (2009), p. 2 and [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)

²¹⁸ Lite-On (2009)

²¹⁹ Magee (2010)

²²⁰ Decker (2008) and www.law.com/jsp/cc/PubArticleCC.jsp?id=1202430520113

²²¹ Delta Electronics (2010), p. 7 and Delta Electronics (2009), pp. 16

²²² Interview with employee

²²³ <http://suzhou.baixing.com/gongren/a60416006.html>

²²⁴ Interview with employee

ones,²²⁵ and there are strict regulations at the Delta Electronics site to administrate the workers, similar to other factories of the electronic sector.²²⁶ Delta implemented a code of conduct which indeed does not address directly labour standards or human rights.²²⁷

Delta Electronics shows in general a shallow societal engagement and there is probably no local commitment in Wujiang.²²⁸ Its contribution to negative impacts is rather high, for one because of the poor working conditions. On the other hand, the company manufactures a variety of electronic products and components, what leads to environmental pollution and resource consumption. Delta recorded a consumption of just 11,000 tons of metals, roughly 18,000 tons of plastics, 1914 tons of organic solvents, 416 million kWh electricity, and 6,010,000,000l water in 2008. Delta emitted approximately 380,000 tons of CO₂ in the same period.²²⁹ However, the contribution of the fan production is rather low.

Due to the above mentioned circumstances at Delta Electronics the risk of conflicts is estimated as high. However, the economic relevance of Delta Electronics is assessed as important for the Chinese economy. Delta's manufacturing and R&D operations are centred in China. 61% of direct and indirect employees are located in China.²³⁰

3.1.4.8 Motherboard from Company X

The motherboard was manufactured by company x.²³¹ The company assembled also the entire laptop; therefore the production of the mainboard is not considered in detail. Please see chapter 3.1.5, which is also valid for this process.

3.1.5 Assembly of the Laptop by Company X

Company x assembled the UL50Ag. It manufactures, develops, and sells computers, printers, and electronic components and was founded in 2004.

Since ASUS is responsible for the after sales service the stakeholder group "consumers" is considered with regard to ASUSTeK in Taiwan.

Company x has neither an own website nor own corporate reports. The company did not respond to the questionnaire, but an interview with a worker could be conducted.

In sum, working conditions in this company are critical. First, the basic salary equates the legal minimum wage, but company x pays only a few allowances (0 - 160 CNY per month). Second, the working time amounts 60h - 100h/week.²³² Also discrimination is present. For instance, employees must be taller than 1.50m (women) and 1.60m (men)

²²⁵ Delta Electronics (2009)

²²⁶ Interview with employee

²²⁷ Delta Electronics (2009), p. 23

²²⁸ Delta Electronics (2009)

²²⁹ Delta Electronics (2009), pp. 50

²³⁰ Delta Electronics (2009)

²³¹ The name of company x is known, but confidential.

²³² Interview with worker

respectively. Also the ratio between men and women is unbalanced.²³³ Further, there are very strict regulations as no delays or no talks during working time.²³⁴ Beyond that, company x provides social benefits required from the Chinese law. There are additional benefits as birthday coupons, wedding gifts, and maternity benefits and organises sport events.

The contribution of the company to local issues is also quite high. The production of mainboards entails environmental pollution and health effects, local employment is not promoted, as the enterprise employs primarily migrant workers, there are no promises or agreements to reduce negative impacts, and so on. Hence, the conflict risk is rather high.

With regard to consumers there is a lack of transparency. Although ASUS publishes CSR reports and has a special website for CSR information, including a feedback option,²³⁵ the quality of provided CSR information is only moderate. Main point of criticism is the scope: The sustainability report as well as the CSR website provides data with regard to ASUS sites in Taiwan. However, ASUS maintains in Taiwan only offices. Production sites are located in China or were outsourced to subsidiaries as Pegatron, Unihan, or in this case to company x. Thus all critical company activities are out of consideration.

Furthermore, ASUS is reluctant with regard to the publication of concrete facts and figures in critical areas as labour conditions or human rights. Focus areas are environmental management and the engagement of ASUS concerning community and employees.

In a ranking assessing the transparency of companies regarding environmental and social aspects ASUS obtained not more than 2 of 18 points.²³⁶

3.1.6 Recycling of the Laptop

3.1.6.1 Recycling in Belgium

The association Recupel is responsible for the take back of old ASUS products in Belgium.²³⁷ The association established just 4,000 collecting points throughout the country, which collected around 3,000 tonnes e-waste of professional electronic manufacturers in 2009.²³⁸ The collected e-waste is sent to recycling facilities in Belgium.²³⁹

The average recycling rate of major computer manufactures is approximately 9% according to Greenpeace.²⁴⁰ The total recycling rate of ASUS is not published; it is esti-

²³³ Employment ad of company x and interview with worker

²³⁴ Interview with worker

²³⁵ <http://csr.asus.com/english/index.aspx>

²³⁶ www.rankabrand.com/Asus

²³⁷ <http://csr.asus.com/english/#111>

²³⁸ Recupel (2009), p. 4

²³⁹ Telephone call with Recupel

²⁴⁰ www.greenpeace.org/international/en/news/features/e-waste-toxic-not-in-our-backyard210

mated for this study at 8 - 10%. For Taiwan, ASUS reports a recycling rate of 46.1% in 2008, which is quite high.²⁴¹

The recycling sector in Belgium is in general not connected to noteworthy social issues. Working conditions are classified as good. There is a strong labour movement, an appropriate minimum wage, sufficient safety measures, regulated working time, etc. Due to modern facilities, comprehensive EMS, and not least a broad set of regulations and laws there are rather no negative effects on local communities or society. The recycling of electronic scrap avoids the production of primary materials and reduces thus the emission of hazardous substances to a certain extent. However, the commitment to sustainable issues, including community engagement, is lacking. At least, there is a high risk of fraud and corruption concerning e-waste. Despite laws, it is illegal exported to Asia or Africa; often declared as reusable devices.²⁴²

During the study a German recycling facility was visited in order to investigate the conditions and standards in modern European recycling sites. Figure 9 shall give an impression.

3.1.6.2 Recycling in China

ASUS has initiated take back systems in Europe, North America, Taiwan, and India,²⁴³ e-waste flows in all other countries, including China, are not regarded. It is assumed that the notebook is recycled in an "informal" manner in Guiyu, the Chinese centre for illegal recycling. Here ends not only Chinese e-waste up, but also tonnes of electronic scrap from the USA, Europe, Australia, or Japan, although the import of e-waste is illegal since 2000.²⁴⁴

The main issue of informal recycling is that the focus is on cheap recovery of valuable raw materials and not on hazardous substances contained in electronic devices. Consequently inappropriate treatment methods as manual disassembly, open incineration, or acid baths are applied, which result in vast environmental pollution and severe health hazardous of the workers.²⁴⁵

Further problems arise from the illegality of the sector, as laws are not followed. Workers do not have a lobby in the form of trade unions; the salary is not based on the legal minimum wage; working hours are not regulated; there are neither safety or protection measures nor efforts to minimise environmental impacts. Beyond that, it is common that children help their parents dismantling components manually and burning parts to extract metals. Children are exposed to toxic substances and breathe in hazardous fumes and dust. Many children suffer from lead poisoning, for instance.²⁴⁶ Also

²⁴¹ <http://csr.asus.com/english/#52>

²⁴² Greenpeace International (2008) and Umweltbundesamt (2010)

²⁴³ <http://csr.asus.com/english/index.aspx#53>

²⁴⁴ http://current.com/shows/vanguard/76355482_pollution-to-protest.htm and www.worldwatch.org/node/3921

²⁴⁵ Greenpeace International (2008)

²⁴⁶ www.greenpeace.org/international/en/news/features/e-waste-china-toxic-pollution-230707

local communities are affected from the impacts of the informal e-waste recycling. The inappropriate recycling techniques cause water, soil, and air pollution. There is no engagement of the sector to act more sustainable. Thus, the risk of conflicts is very high. However, the informal recycling is important for the regional economy, why it is tolerated by the (local) government. Corruption, bribery, and fraud are widespread issues in the e-waste sector. They enable, for instance, the import of e-waste from other countries to China.²⁴⁷

Pictures of the formal recycling



E-scrap head



Cases with PCBs



Collected PCBs



Manual disassembly of a laptop

Figure 9: Pictures of the formal recycling

²⁴⁷ Greenpeace International (2008) and Umweltbundesamt (2010)

3.2 Environmental Life Cycle Inventory

Starting point for the modelling of the product system was the process network of the unit process “laptop computer, at plant” in the version ecoinvent v2.2.²⁴⁸ The modelling of devices and modules was adapted to case-specific characteristics. Mainly electricity and transport processes were exchanged to better reflect local conditions. The material composition of components was only modified in some cases, due to lack of data (see chapter 2.2.3.4). For instance, printed wiring boards with lead solder were replaced by wiring boards with lead-free solder.

The amount of required components was calculated by weight. The ecoinvent datasets are a bit outdated, so that the weight/size of the modelled components does not reflect the current technical standard of a light weight laptop. It is assumed that the material composition by itself has not changed significantly.

The laptop is equipped with a 15.6” display which weighs 0.73kg. Further components with considerable weight are the case (0.62kg), the battery pack (0.44kg), the power supply (0.36kg), and the mainboard (0.20kg). The product packaging consists of card board (0.74kg) and a HDPE handle (0.15kg), while the mail packaging contains card board (0.45kg) and a HDPE filling (0.02kg). The total weight of the laptop is 2.44kg (without power supply and packaging). The table below shows the modelled components with corresponding weights and the respective processes.

Table 14: Composition ASUS UL50Ag

Component	Weight	Material	Basic ecoinvent process
Mainboard	204.2g		Printed wiring board, mounted, Laptop PC mainboard, Pb free, at plant/GLO
HDD	114.8g		HDD, laptop computer, at plant/GLO
RAM	2*7.9g		Integrated circuit, IC, memory type, at plant/GLO
Display	731.0g		LCD module, at plant/GLO
Case (including the back of the display)	906.0g	ABS,PC, and Aluminium	Acrylonitrile-butadiene-styrene copolymer, ABS, at plant RER; Polycarbonate, at plant/RER; Aluminium, primary, at plant/RER
Keyboard	123.8g		Keyboard, standard version, at plant/GLO
Battery pack	440.0g		Battery, Lilo, rechargeable, prismatic, at plant/GLO
Drive	135.8g		CD-ROM/DVD-ROM drive, laptop computer, at plant/GLO
Fan	27.7g		Fan, at plant/GLO
Power adapter	362.0g		Power adapter, for laptop, at plant/GLO
Product packaging			
Card board	739.0g	Corrugated board	Corrugated board, fresh fibre, single wall, at plant/RER
Handle	14.8g	HDPE	Polyethylene, HDPE, granulate, at plant/RER
Mail packaging			
Card board	446.0g	Corrugated board	Corrugated board, fresh fibre, single wall, at plant/RER
Filling	4*5.8g	HDPE	Polyethylene, HDPE, granulate, at plant/RER

²⁴⁸ ecoinvent (2010)

The office use phase was calculated with 2200h active use, 800h standby, and 6600h off. The reuse phase was modelled differently with 2550h active mode, 1020h standby mode, and 1530h off mode. It is assumed that the laptop is reused in a private household, which entails a different way of use. How the aggregated hours of use are calculated is outlined in table 15.

Table 15: Calculation basis for use and reuse phase

Mode	Total amount	Calculation basis	Basic ecoinvent process
Use	9600h	10 h/day * 5 days/week * 48 weeks * 4 years	Use, computer, laptop, office use/RER
Active mode	2200h	0,22917h/1h office use	Use, computer, laptop, active mode/RER
Off mode	6600h	0,6875h/1h office use	Use, computer, laptop, off mode/RER
Standby mode	800h	0,08333h/1h office use	Use, computer, laptop, standby/sleep mode/RER
Reuse	5100h		
Active mode	2550h	5 h/day * 5 days/week * 51 weeks/year * 2 years	Use, computer, laptop, active mode/RER
Off mode	1530h	3 h/day * 5 days/week * 51 weeks/year * 2 years	Use, computer, laptop, off mode/RER
Standby mode	1020h	2 h/day * 5 days/week * 51 weeks/year * 2 years	Use, computer, laptop, standby/sleep mode/RER

The underlying electricity consumptions in the different modes are described in table 16.

Table 16: Electricity consumption of the notebook

Mode	Electricity consumption	Data source
Active mode office use	22.000 kWh	measured
Active mode private use	18.000 kWh	measured
Off mode	0.415 kWh	manufacturer information
Standby mode	0.746 kWh	manufacturer information

The end-of-life phase was modelled with different disposal scenarios. A specific disposal for the notebook was compiled, one for the battery back, and one for the packaging. Referred ecoinvent processes are listed in the table below.

Table 17: Used disposal scenarios

Disposal scenario	Basic ecoinvent process
Disposal laptop without battery	Dismantling, laptop, mechanically, at plant/GLO and Dismantling, laptop, manually, at plant/CH
Disposal battery	Disposal, Li-ions batteries, mixed technology/GLO
Disposal packaging	
Cardboard	Recycling paper/RER
Plastics	Recycling PE/RER

The modifications of the ecoinvent processes which were made to get a better model of the specific life cycle of the ASUS UL50AG are in detail described in annex VI. For further information about the modelling of the single processes please refer to the ecoinvent documentation.²⁴⁹ Annex VI lists moreover all new processes that were compiled.

²⁴⁹ EMPA (2007)

4 Life Cycle Impact Assessments

The assessment of the social inventory is presented in the following subchapter 4.1. The structure is similar to the structure of the social inventory. The results are given in assessment tables, whose basic structure is described in the goal and scope section of this report (chapter 2.2.4.1.3). The environmental life cycle impact assessment is illustrated in chapter 4.2. Both the results of the midpoint assessment (section 4.2.1) and the ones of the endpoint assessment (section 4.2.2) are provided.

4.1 Social Life Cycle Impact Assessment

The assessment is conducted based on a colour scale with six shades. The meaning of the colours is intuitive: Green nuances mean good performance/positive impact; yellow nuances mean rather poor performance/negative impact; red means very poor performance/very negative impact. Orange and red assessments show social hot spots.

The performance assessment of the companies/sectors is based on performance reference points, explained in annex VII. Main reference points are ILO conventions, the ISO 26000 guidelines, and the OECD Guidelines for Multinational Enterprises.

Each subcategory gets one assessment regardless of its number of indicators. If a subcategory contains more than one indicator the average of the assessment is calculated. Indeed, there are some exceptions from this rule: If a company violates labour rights, the performance in the subcategory “social benefits/social security” cannot be better than orange. Also if a company is involved in corruption, the performance assessment of the subcategory “corruption” cannot be better than orange.

Further, allocation is not applied. Each company is considered as one unit no matter which different products the company produces and which of these products are relevant for the study.

The impact assessment is based on numerous assumptions with regard to the effects of social conditions, which cannot be described in the frame of the study. There is a lack of scientific approaches concerning the compilation of social cause-effect-chains. The basic problem is that social interdependencies are very complex and depending on whether the company/sector performance is good or poor. Furthermore, a poor company/sector performance does not necessarily entail negative social impacts. For instance, if the CSR activities of a company are low, there is still a positive effect.

The impact assessment column summarises the impacts of the company/sector performance with regard to the specific impact categories. Since one subcategory can have positive and negative effects likewise, also the average is calculated. It is further distinguished if impacts are rather high (✓) or rather low ((✓)).

In the first place real impacts are considered, but also potential impacts are taken into account. This is for example valid for the subcategory “corruption”, because the effects of corruption are different case-by-case, so that it is very difficult to illustrate real effects of corruption. Theoretically, it can influence all impact categories. Also the influence of the subcategories on the impact category “governance” will be hard to trace back in reality.

Another point of interest is the reference for the impact assessment. The non-occurrence of child labour for instance does basically not have any effect, but it has positive impacts if we use the occurrence of child labour as reference point. In order to highlight good company/sector behaviour it was decided to take positive impacts for non-occurrence of child labour as a basis. The same applies to forced labour or promoting social responsibility, for instance.

4.1.1 Assessment of Raw Material Extraction Processes

4.1.1.1 Copper from Chile²⁵⁰

Table 18: S-LCIA table copper from Chile

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	2	✓	✓	✓	✓	(✓)	(✓)	1
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	2	✓	✓	✓	✓	✓	✓	1
	Working time	2	✓	✓	✓	✓	✓	✓	1
	Discrimination	5	✓	(✓)	✓	(✓)	(✓)	(✓)	4
	Health & safety	3	✓	✓	✓	(✓)	(✓)	✓	4
	Social benefits/social sec.	no data							
	Amount	4.00							3.00
Local community	Access to material res.	3	(✓)	✓	✓	(✓)	✓	✓	5
	Access to immaterial res.	2	✓	✓	✓	✓	✓	✓	1
	Delocalisation & migration	3	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	3
	Cultural heritage	deficient data							
	Respect of indigenous rights	4	-	-	✓	✓	✓	✓	5
	Safe & healthy living cond.	4	✓	✓	✓	(✓)	(✓)	✓	5
	Secure living conditions	no data							
	Local employment	3	✓	(✓)	-	(✓)	(✓)	(✓)	2
	Community engagement	3	-	✓	✓	(✓)	✓	(✓)	2
	Amount	3.14							4.00
Society	Public commitments to sustainable issues	4	(✓)	(✓)	(✓)	-	(✓)	✓	2
	Contribution to economic development	1	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	5	✓	✓	✓	-	(✓)	✓	5
	Corruption	3	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	4.00							4.00
Total amount	3.71							3.67	

²⁵⁰ For the legend please see chapter 2.2.4.1.3

4.1.1.2 Cobalt, Copper, and Nickel from the Congo

Table 19: S-LCIA table cobalt, copper, and nickel from DRC

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	6	✓	✓	✓	✓	✓	✓	6
	Child labour	5	✓	✓	✓	✓	✓	✓	6
	Forced labour	5	✓	✓	✓	✓	✓	✓	6
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	5	✓	✓	✓	✓	✓	✓	6
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Health & safety	6	✓	✓	✓	✓	(✓)	✓	6
	Social benefits/social sec.	5	✓	✓	✓	✓	(✓)	✓	6
	Amount	5.13							5.88
Local community	Access to material res.	5	(✓)	✓	✓	✓	(✓)	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	4	(✓)	(✓)	✓	(✓)	✓	✓	5
	Cultural heritage	no data							
	Respect of indigenous rights	4	-	-	✓	✓	✓	✓	5
	Safe & healthy living cond.	6	✓	✓	✓	(✓)	(✓)	✓	6
	Secure living conditions	4	✓	✓	✓	(✓)	-	✓	2
	Local employment	5	✓	✓	✓	✓	✓	✓	5
	Community engagement	5	-	✓	✓	(✓)	(✓)	✓	2
	Amount	5.00							5.00
Society	Public commitments to sustainable issues	4	(✓)	(✓)	(✓)	-	(✓)	✓	2
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	6	✓	✓	✓	✓	✓	✓	6
	Technology development	6	✓	✓	✓	-	-	✓	5
	Corruption	6	✓	✓	✓	✓	✓	✓	6
	Amount	5.00							5.00
Total amount	5.04							5.29	

4.1.1.3 Gold from China

Table 20: S-LCIA table gold from China

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	3	(✓)	(✓)	(✓)	✓	✓	(✓)	2
	Discrimination	4	✓	(✓)	✓	(✓)	(✓)	(✓)	5
	Health & safety	6	✓	✓	✓	✓	(✓)	✓	6
	Social benefits/social sec.	no data							
	Amount	5.00							5.00
Local community	Access to material res.	5	(✓)	✓	✓	✓	(✓)	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	deficient data							
	Cultural heritage	5	✓	(✓)	✓	(✓)	✓	✓	5
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	6	✓	✓	✓	(✓)	(✓)	✓	6
	Secure living conditions	deficient data							
	Local employment	4	(✓)	(✓)	(✓)	✓	(✓)	✓	3
	Community engagement	5	-	✓	✓	(✓)	(✓)	✓	2
	Amount	5.00							5.00
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	✓	✓	5
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	5	✓	✓	✓	-	(✓)	✓	5
	Corruption	5	✓	✓	✓	✓	✓	✓	5
	Amount	4.60							4.40
Total amount	4.87							4.80	

4.1.1.4 Tin from China

Table 21: S-LCIA table tin from China

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workexs	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	3	(✓)	(✓)	(✓)	✓	✓	(✓)	2
	Discrimination	4	✓	(✓)	✓	(✓)	(✓)	(✓)	5
	Health & safety	4	✓	✓	✓	✓	(✓)	✓	4
	Social benefits/social sec.	no data							
	Amount	4.00							5.00
Local community	Access to material res.	5	(✓)	✓	✓	✓	(✓)	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	deficient data							
	Cultural heritage	5	✓	(✓)	✓	(✓)	✓	✓	5
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	4	✓	✓	✓	(✓)	(✓)	✓	4
	Secure living conditions	deficient data							
	Local employment	4	(✓)	(✓)	(✓)	✓	(✓)	✓	3
	Community engagement	5	-	✓	✓	(✓)	(✓)	✓	2
	Amount	4.67							4.00
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	✓	✓	5
	Contribution to economic development	4	✓	✓	✓	✓	✓	✓	4
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	5	✓	✓	✓	-	(✓)	✓	5
	Corruption	5	✓	✓	✓	✓	✓	✓	5
	Amount	4.80							4.80
Total amount	4.49							4.60	

4.1.1.5 Tin from Indonesia

Table 22: S-LCIA table tin from Indonesia

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	3	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2
	Working time	3	(✓)	(✓)	(✓)	✓	✓	(✓)	2
	Discrimination	4	✓	(✓)	✓	(✓)	(✓)	(✓)	5
	Health & safety	3	✓	✓	✓	(✓)	(✓)	✓	4
	Social benefits/social sec.	no data							
	Amount	4.00							5.00
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	5
	Access to immaterial res.	4	✓	✓	✓	✓	✓	✓	2
	Delocalisation & migration	deficient data							
	Cultural heritage	no data							
	Respect of indigenous rights	5	-	-	✓	✓	✓	✓	5
	Safe & healthy living cond.	5	✓	✓	✓	(✓)	(✓)	✓	5
	Secure living conditions	no data							
	Local employment	5	✓	✓	✓	✓	✓	✓	5
	Community engagement	2	-	✓	✓	✓	✓	✓	2
	Amount	4.17							4.00
Society	Public commitments to sustainable issues	4	(✓)	(✓)	(✓)	-	(✓)	✓	3
	Contribution to economic development	2	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	4	(✓)	✓	✓	✓	✓	✓	4
	Technology development	5	✓	✓	✓	-	(✓)	✓	5
	Corruption	5	✓	✓	✓	✓	✓	✓	5
	Amount	4.00							4.00
Total amount	4.06							4.33	

4.1.1.6 Bauxite from Indonesia

Table 23: S-LCIA table bauxite from Indonesia

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	4	✓	✓	✓	✓	✓	✓	4
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	2	✓	✓	✓	✓	✓	(✓)	2
	Discrimination	3	✓	(✓)	✓	(✓)	(✓)	(✓)	4
	Health & safety	2	✓	✓	✓	(✓)	(✓)	✓	2
	Social benefits/social sec.	no data							
	Amount	3.00							
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	5
	Access to immaterial res.	3	✓	✓	✓	✓	✓	✓	2
	Delocalisation & migration	deficient data							
	Cultural heritage	no data							
	Respect of indigenous rights	4	(✓)	(✓)	✓	✓	✓	✓	5
	Safe & healthy living cond.	5	(✓)	(✓)	✓	(✓)	✓	✓	5
	Secure living conditions	no data							
	Local employment	3	(✓)	-	(✓)	✓	(✓)	(✓)	3
	Community engagement	3	-	✓	(✓)	✓	✓	(✓)	2
Amount	4.00								4.00
Society	Public commitments to sustainable issues	3	✓	✓	✓	-	(✓)	(✓)	2
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	4	(✓)	✓	✓	✓	✓	✓	4
	Technology development	no data							
	Corruption	5	✓	✓	✓	✓	✓	✓	5
	Amount	4.00							
Total amount	3.67								4.00

4.1.2 Production of Basic Materials

4.1.2.1 Non-Ferrous Metals from China

Table 24: S-LCIA table non-ferrous metals from China

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	5	✓	✓	✓	✓	✓	✓	6
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	no data							
	Discrimination	deficient data							
	Health & safety	4	✓	✓	✓	✓	-	✓	4
	Social benefits/social sec.	no data							
	Amount	4.00							
Local community	Access to material res.	5	(✓)	✓	✓	✓	-	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	deficient data							
	Cultural heritage	no data							
	Respect of indigenous rights	no data							
	Safe & healthy living cond.	4	✓	✓	✓	(✓)	(✓)	✓	4
	Secure living conditions	deficient data							
	Local employment	4	(✓)	(✓)	(✓)	✓	(✓)	✓	3
	Community engagement	5	-	✓	✓	(✓)	(✓)	✓	2
	Amount	4.60							
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	✓	✓	5
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	3
	Prevention & mitigation of conflicts	no data							
	Technology development	5	✓	✓	✓	-	(✓)	✓	5
	Corruption	5	✓	✓	✓	✓	✓	✓	5
	Amount	4.50							
Total amount	4.37								4.50

4.1.2.2 Plastics from China

Table 25: S-LCIA table plastics from China

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	5	✓	✓	✓	✓	✓	✓	6
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	4	✓	✓	✓	✓	✓	✓	5
	Discrimination	deficient data							
	Health & safety	3	✓	✓	(✓)	-	-	(✓)	3
	Social benefits/social sec.	no data							
	Amount	4.00							
Local community	Access to material res.	5	(✓)	✓	✓	✓	-	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	deficient data							
	Cultural heritage	no data							
	Respect of indigenous rights	no data							
	Safe & healthy living cond.	4	✓	✓	✓	(✓)	(✓)	✓	4
	Secure living conditions	deficient data							
	Local employment	4	(✓)	(✓)	(✓)	✓	(✓)	✓	3
	Community engagement	5	-	(✓)	(✓)	(✓)	(✓)	✓	3
	Amount	4.60							
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	✓	✓	5
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	3
	Prevention & mitigation of conflicts	no data							
	Technology development	no data							
	Corruption	3	✓	✓	✓	✓	✓	✓	4
	Amount	4.00							
Total amount	4.20								4.33

4.1.2.3 TFT-LCD Glass from Korea

Table 26: S-LCIA table TFT glass from Korea

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	4	✓	✓	✓	✓	(✓)	(✓)	4
	Working time	2	✓	✓	✓	✓	✓	✓	1
	Discrimination	deficient data							
	Health & safety	4	✓	✓	✓	(✓)	(✓)	✓	4
	Social benefits/social sec.	no data							
	Amount	4.00							5.00
Local community	Access to material res.	4	(✓)	✓	(✓)	(✓)	(✓)	✓	5
	Access to immaterial res.	4	✓	✓	✓	✓	✓	✓	4
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	3	✓	✓	✓	(✓)	-	✓	4
	Secure living conditions	no data							
	Local employment	no data							
	Community engagement	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2
	Amount	4.00							4.00
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	(✓)	✓	5
	Contribution to economic development	2	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	3	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Technology development	3	✓	✓	(✓)	-	-	✓	2
	Corruption	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	4.00							4.00
Total amount	4.00							4.33	

4.1.3 Design of the Laptop by ASUSTeK Computer Inc.

Table 27: S-LCIA table laptop design by ASUSTeK

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	deficient data							
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	no data							
	Working time	no data							
	Discrimination	2	✓	(✓)	✓	✓	(✓)	(✓)	1
	Health & safety	2	✓	✓	✓	(✓)	(✓)	(✓)	2
	Social benefits/social sec.	2	✓	✓	✓	✓	✓	✓	1
	Amount	1.60							1.20
Local community	Access to material res.	3	-	✓	(✓)	(✓)	-	✓	2
	Access to immaterial res.	3	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	3
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	2	-	✓	✓	-	-	✓	2
	Secure living conditions	no data							
	Local employment	3	✓	(✓)	-	(✓)	(✓)	(✓)	2
	Community engagement	3	(✓)	✓	✓	(✓)	✓	(✓)	2
Amount	2.67							2.17	
Society	Public commitments to sustainable issues	4	(✓)	(✓)	(✓)	-	(✓)	✓	2
	Contribution to economic development	1	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	not relevant							
	Technology development	3	(✓)	(✓)	(✓)	-	-	✓	2
	Corruption	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	3
	Amount	3.00							2.00
Value chain actors	Fair competition	4	-	-	-	✓	-	✓	4
	Promoting social respons.	4	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	4	-	-	✓	-	-	✓	4
	Amount	4.00							3.33
Total amount	2.82							2.18	

4.1.4 Production of Pre-Products

4.1.4.1 Hard Disc Drive from Seagate

Table 28: S-LCIA table HDD from Seagate

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	2	✓	✓	✓	✓	✓	✓	2
	Working time	4	✓	✓	✓	✓	✓	✓	5
	Discrimination	4	✓	(✓)	✓	(✓)	(✓)	(✓)	5
	Health & safety	3	✓	✓	✓	✓	(✓)	✓	5
	Social benefits/social sec.	4	✓	✓	✓	✓	✓	✓	3
	Amount	4.00							5.00
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	3	✓	✓	✓	-	-	✓	5
	Secure living conditions	deficient data							
	Local employment	4	✓	✓	✓	✓	✓	✓	5
	Community engagement	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	4.00							4.33
Society	Public commitments to sustainable issues	3	✓	✓	✓	-	(✓)	✓	2
	Contribution to economic development	2	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	4	✓	✓	(✓)	-	-	✓	2
	Corruption	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	4.00							4.00
Value chain actors	Fair competition	2	(✓)	(✓)	(✓)	-	-	✓	2
	Promoting social respons.	3	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	3	-	-	(✓)	-	-	(✓)	3
	Amount	2.66							2.33
Total amount	3.67							3.92	

4.1.4.2 Random Access Memory from Hynix

Table 29: S-LCIA table RAM from Hynix

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	1	✓	✓	✓	✓	✓	✓	1
	Working time	1	✓	✓	✓	✓	✓	✓	1
	Discrimination	2	✓	(✓)	✓	✓	(✓)	(✓)	1
	Health & safety	2	✓	✓	✓	✓	(✓)	✓	4
	Social benefits/social sec.	2	✓	✓	✓	✓	✓	✓	1
	Amount	3.00							4.00
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	5
	Access to immaterial res.	4	✓	(✓)	(✓)	(✓)	(✓)	(✓)	3
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	deficient data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	3	✓	✓	✓	(✓)	-	✓	5
	Secure living conditions	2	✓	✓	✓	(✓)	-	✓	2
	Local employment	1	✓	(✓)	-	✓	✓	✓	1
	Community engagement	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2
Amount	3.00							4.00	
Society	Public commitments to sustainable issues	3	✓	✓	✓	-	(✓)	✓	2
	Contribution to economic development	1	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	not relevant							
	Technology development	3	✓	✓	(✓)	-	-	✓	2
	Corruption	2	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2
	Amount	2.25							1.75
Value chain actors	Fair competition	5	(✓)	(✓)	(✓)	-	-	✓	4
	Promoting social respons.	3	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	deficient data							
	Respect of intellectual property rights	5	-	-	(✓)	-	-	(✓)	4
	Amount	4.33							3.33
Total amount		3.15							3.27

4.1.4.3 Optical Disc Drive from SEPHIL

Table 30: S-LCIA table ODD from SEPHIL

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	6	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	5	✓	✓	✓	✓	✓	✓	6
	Working time	6	✓	✓	✓	✓	✓	✓	6
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Health & safety	4	✓	✓	✓	✓	(✓)	✓	5
	Social benefits/social sec.	no data							
	Amount	5.00							5.00
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	5
	Access to immaterial res.	6	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	deficient data							
	Respect of indigenous rights	deficient data							
	Safe & healthy living cond.	4	✓	✓	✓	(✓)	-	✓	5
	Secure living conditions	deficient data							
	Local employment	4	(✓)	(✓)	-	(✓)	(✓)	(✓)	4
	Community engagement	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	5.00							4.16
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	(✓)	✓	3
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	not relevant							
	Technology development	3	✓	✓	(✓)	-	-	✓	2
	Corruption	6	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Amount	5.00							4.00
Value chain actors	Fair competition	5	(✓)	(✓)	(✓)	-	-	✓	4
	Promoting social respons.	4	(✓)	(✓)	(✓)	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	3	-	-	(✓)	-	-	(✓)	3
	Amount	4.00							3.00
Total amount		4.75							4.04

4.1.4.4 Production of the Battery

4.1.4.4.1 Battery Cells from Korea

Table 31: S-LCIA table battery cells from Korea

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	4	✓	✓	✓	✓	(✓)	(✓)	4
	Working time	2	✓	✓	✓	✓	✓	✓	1
	Discrimination	4	✓	(✓)	✓	(✓)	(✓)	(✓)	5
	Health & safety	5	✓	✓	✓	✓	(✓)	✓	5
	Social benefits/social sec.	no data							
	Amount	4.00							5.00
Local community	Access to material res.	4	(✓)	✓	(✓)	(✓)	(✓)	✓	5
	Access to immaterial res.	3	✓	✓	✓	✓	✓	✓	2
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	3	✓	✓	✓	(✓)	-	✓	3
	Secure living conditions	no data							
	Local employment	deficient data							
	Community engagement	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2
	Amount	3.20							4.00
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5
	Contribution to economic development	2	✓	✓	✓	✓	✓	✓	1
	Prevention & mitigation of conflicts	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Technology development	2	✓	✓	(✓)	-	-	✓	2
	Corruption	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	5.00							4.00
Total amount	4.07							4.33	

4.1.4.4.2 Assembly of the Battery by Simplo Technologies

Table 32: S-LCIA table battery assembly by Simplo

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA	
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6	
	Child labour	1	✓	✓	✓	✓	✓	✓	1	
	Forced labour	1	✓	✓	✓	✓	✓	✓	1	
	Fair salary	5	✓	✓	✓	✓	✓	✓	6	
	Working time	5	✓	✓	✓	✓	✓	✓	6	
	Discrimination	5	✓	✓	✓	✓	✓	✓	6	
	Health & safety	4	✓	✓	✓	✓	(✓)	✓	4	
	Social benefits/social sec.	4	✓	✓	✓	✓	✓	✓	3	
	Amount	4.00								5.00
Local community	Access to material res.	4	(✓)	(✓)	(✓)	-	-	(✓)	3	
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5	
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2	
	Cultural heritage	no data								
	Respect of indigenous rights	not relevant								
	Safe & healthy living cond.	3	(✓)	(✓)	(✓)	(✓)	-	✓	4	
	Secure living conditions	no data								
	Local employment	5	✓	✓	✓	✓	✓	✓	5	
	Community engagement	no data								
	Amount	4.00								4.00
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5	
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2	
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5	
	Technology development	no data								
	Corruption	deficient data								
	Amount	5.00								4.00
Value chain actors	Fair competition	3	(✓)	(✓)	(✓)	-	-	✓	2	
	Promoting social respons.	5	✓	✓	✓	(✓)	(✓)	✓	5	
	Supplier relationships	no data								
	Respect of intellectual property rights	2	-	-	(✓)	-	-	(✓)	2	
	Amount	4.00								4.00
Total amount		4.25								4.25

4.1.4.5 Display from AU Optronics

4.1.4.5.1 Manufacturing of the Display in Taiwan

Table 33: S-LCIA table display manufacturing by AUO

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA	
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6	
	Child labour	1	✓	✓	✓	✓	✓	✓	1	
	Forced labour	1	✓	✓	✓	✓	✓	✓	1	
	Fair salary	2	✓	✓	✓	✓	✓	✓	1	
	Working time	2							1	
	Discrimination	4	✓	(✓)	✓	(✓)	(✓)	(✓)	5	
	Health & safety	4	✓	✓	✓	✓	(✓)	✓	5	
	Social benefits/social sec.	1	✓	✓	✓	✓	✓	✓	1	
Amount	4.00								5.00	
Local community	Access to material res.	4	-	✓	✓	(✓)	-	✓	5	
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5	
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2	
	Cultural heritage	no data								
	Respect of indigenous rights	3	-	-	✓	✓	✓	(✓)	2	
	Safe & healthy living cond.	3	(✓)	(✓)	(✓)	(✓)	-	✓	6	
	Secure living conditions	no data								
	Local employment	1	✓	(✓)	-	✓	✓	✓	1	
	Community engagement	4	-	-	(✓)	(✓)	✓	(✓)	2	
	Amount	4.00								5.00
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5	
	Contribution to economic development	1	✓	✓	✓	✓	✓	✓	1	
	Prevention & mitigation of conflicts	not relevant								
	Technology development	no data								
	Corruption	2	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2	
	Amount	5.00								4.00
Value chain actors	Fair competition	5	(✓)	(✓)	(✓)	-	-	✓	4	
	Promoting social respons.	5	✓	✓	✓	(✓)	(✓)	✓	5	
	Supplier relationships	no data								
	Respect of intellectual property rights	2	-	-	(✓)	-	-	(✓)	2	
	Amount	4.00								4.00
Total amount		4.25								4.50

4.1.4.5.2 Assembly of the Display in China

Table 34: S-LCIA table display assembly by AUO

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA	
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6	
	Child labour	1	✓	✓	✓	✓	✓	✓	1	
	Forced labour	1	✓	✓	✓	✓	✓	✓	1	
	Fair salary	2	✓	✓	✓	✓	✓	✓	1	
	Working time	3	(✓)	(✓)	(✓)	✓	✓	(✓)	2	
	Discrimination	5	✓	✓	✓	✓	✓	✓	6	
	Health & safety	3	✓	✓	✓	(✓)	(✓)	✓	4	
	Social benefits/social sec.	deficient data								
	Amount	4.00								5.00
Local community	Access to material res.	4	-	✓	✓	(✓)	-	✓	3	
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5	
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2	
	Cultural heritage	deficient data								
	Respect of indigenous rights	3	-	-	✓	✓	✓	(✓)	2	
	Safe & healthy living cond.	3	(✓)	(✓)	(✓)	(✓)	-	✓	4	
	Secure living conditions	no data								
	Local employment	5	✓	✓	✓	✓	✓	✓	5	
	Community engagement	5	-	-	(✓)	(✓)	(✓)	(✓)	2	
	Amount	4.00								4.00
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5	
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2	
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5	
	Technology development	no data								
	Corruption	2	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	2	
	Amount	5.00								4.00
Value chain actors	Fair competition	5	(✓)	(✓)	(✓)	-	-	✓	4	
	Promoting social respons.	5	✓	✓	✓	(✓)	(✓)	✓	5	
	Supplier relationships	no data								
	Respect of intellectual property rights	2	-	-	(✓)	-	-	(✓)	2	
	Amount	4.00								4.00
Total amount		4.25								4.25

4.1.4.6 Power Supply from Lite-On Technology Corporation

Table 35: S-LCIA table power supply from Lite-On

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	4	✓	✓	✓	✓	✓	✓	5
	Working time	6	✓	✓	✓	✓	✓	✓	6
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Health & safety	4	✓	✓	✓	✓	(✓)	✓	4
	Social benefits/social sec.	5	✓	✓	✓	✓	(✓)	✓	5
	Amount	5.00							5.00
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	4
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	2	-	-	✓	✓	✓	(✓)	1
	Safe & healthy living cond.	3	(✓)	(✓)	(✓)	(✓)	-	✓	4
	Secure living conditions	deficient data							
	Local employment	5	✓	✓	✓	✓	✓	✓	5
	Community engagement	5	-	(✓)	(✓)	(✓)	(✓)	(✓)	2
	Amount	4.00							4.00
Society	Public commitments to sustainable issues	3	(✓)	(✓)	(✓)	-	(✓)	(✓)	2
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	deficient data							
	Corruption	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	4.00							4.00
Value chain actors	Fair competition	5	(✓)	(✓)	(✓)	-	-	✓	5
	Promoting social respons.	3	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	5	-	-	(✓)	-	-	(✓)	4
	Amount	4.33							4.00
Total amount	4.33							4.25	

4.1.4.7 Fan from Delta Electronics

Table 36: S-LCIA table fan from Delta Electronics

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	3	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Working time	5	✓	✓	✓	✓	✓	✓	6
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Health & safety	2	✓	✓	✓	(✓)	(✓)	(✓)	2
	Social benefits/social sec.	5	✓	✓	✓	✓	(✓)	✓	5
	Amount	4.00							
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	3
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	deficient data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	4	(✓)	(✓)	(✓)	(✓)	-	✓	4
	Secure living conditions	deficient data							
	Local employment	5	✓	✓	✓	✓	✓	✓	5
	Community engagement	4	-	(✓)	-	(✓)	-	(✓)	2
	Amount	4.00							
Society	Public commitments to sustainable issues	5	✓	✓	✓	-	✓	✓	5
	Contribution to economic development	2	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	2	✓	✓	(✓)	-	-	✓	2
	Corruption	4	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	4
	Amount	4.00							
Value chain actors	Fair competition	3	(✓)	(✓)	(✓)	-	-	✓	2
	Promoting social respons.	3	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	5	-	-	(✓)	-	-	(✓)	4
	Amount	4.00							
Total amount	4.00								4.00

4.1.4.8 Motherboard from Company X

Table 37: S-LCIA table MB from company x

Stake holder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	5	✓	✓	✓	✓	✓	✓	5
	Working time	6	✓	✓	✓	✓	✓	✓	6
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Health & safety	deficient data							
	Social benefits/social sec.	5	✓	✓	✓	✓	(✓)	✓	6
	Amount	5.00							5.00
Local community	Access to material res.	4	(✓)	✓	✓	(✓)	(✓)	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	deficient data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	4	(✓)	(✓)	(✓)	(✓)	-	✓	5
	Secure living conditions	no data							
	Local employment	5	✓	✓	✓	✓	✓	✓	5
	Community engagement	no data							
Amount	4.00							4.40	
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5
	Contribution to economic development	4	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	no data							
	Corruption	no data							
	Amount	5.00							4.00
Value chain actors	Fair competition	3	(✓)	(✓)	(✓)	-	-	✓	2
	Promoting social respons.	3	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	2	-	-	(✓)	-	-	(✓)	2
	Amount	2.67							2.00
Total amount	4.17							3.85	

4.1.5 Assembly of the Laptop by Company X

Table 38: S-LCIA table laptop assembly by company x

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	5	✓	✓	✓	✓	✓	✓	6
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	5	✓	✓	✓	✓	✓	✓	5
	Working time	6	✓	✓	✓	✓	✓	✓	6
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Health & safety	deficient data							
	Social benefits/social sec.	5	✓	✓	✓	✓	(✓)	✓	6
	Amount	5.00							5.00
Local community	Access to material res.	3	(✓)	✓	✓	(✓)	(✓)	✓	3
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	5
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	deficient data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	3	(✓)	(✓)	(✓)	(✓)	-	✓	4
	Secure living conditions	no data							
	Local employment	5	✓	✓	✓	✓	✓	✓	5
	Community engagement	no data							
Amount	4.50							4.00	
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5
	Contribution to economic development	4	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	no data							
	Corruption	no data							
	Amount	5.00							4.00
Value chain actors	Fair competition	3	(✓)	(✓)	(✓)	-	-	✓	2
	Promoting social respons.	3	✓	✓	✓	(✓)	(✓)	✓	2
	Supplier relationships	no data							
	Respect of intellectual property rights	2	-	-	(✓)	-	-	(✓)	2
	Amount	2.67							2.00

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Consumers	Health & safety	2	(✓)	✓	(✓)	(✓)	-	✓	3
	Feedback mechanism	3	-	(✓)	(✓)	(✓)	-	(✓)	2
	Transparency	4	(✓)	(✓)	(✓)	(✓)	-	(✓)	2
	End of life responsibility	3	(✓)	(✓)	(✓)	-	-	✓	2
	Amount	3.00							2.25
Total amount		4.03						3.45	

4.1.6 Recycling of the Laptop

4.1.6.1 Recycling in Belgium

Table 39: S-LCIA table laptop recycling in Belgium

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	1	✓	✓	✓	✓	✓	✓	1
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	2	✓	✓	✓	✓	✓	✓	1
	Working time	2	✓	✓	✓	✓	✓	✓	1
	Discrimination	no data							
	Health & safety	2	✓	✓	✓	(✓)	(✓)	(✓)	2
	Social benefits/social sec.	3	✓	✓	✓	✓	(✓)	✓	1
	Amount	1.71							1.14
Local community	Access to material res.	2	(✓)	✓	(✓)	-	-	✓	1
	Access to immaterial res.	no data							
	Delocalisation & migration	2	-	(✓)	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	2	(✓)	✓	(✓)	(✓)	-	✓	2
	Secure living conditions	no data							
	Local employment	2	✓	(✓)	-	✓	✓	✓	1
	Community engagement	no data							
Amount	2.00							1.50	
Society	Public commitments to sustainable issues	4	-	-	(✓)	(✓)	-	(✓)	4
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	not relevant							
	Technology development	3	✓	✓	(✓)	-	-	(✓)	2

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
	Corruption	5	(✓)	✓	(✓)	(✓)	-	(✓)	6
	Amount	4.00							5.00
Total amount		2.56							2.55

4.1.6.2 Recycling in China

Table 40: S-LCIA table laptop recycling in China

Stakeholder	Subcategory	PA	WC	HS	HR	SER	IR	G	IA
Workers	Freedom of association & collective bargaining	6	✓	✓	✓	✓	✓	✓	6
	Child labour	5	✓	✓	✓	✓	✓	✓	6
	Forced labour	1	✓	✓	✓	✓	✓	✓	1
	Fair salary	5	✓	✓	✓	✓	✓	✓	5
	Working time	5	✓	✓	✓	✓	✓	✓	6
	Discrimination	no data							
	Health & safety	6	✓	✓	✓	✓	(✓)	✓	6
	Social benefits/social sec.	6	✓	✓	✓	✓	(✓)	✓	6
	Amount	5.00							5.14
Local community	Access to material res.	5	(✓)	✓	✓	(✓)	-	✓	5
	Access to immaterial res.	5	✓	✓	✓	✓	✓	✓	6
	Delocalisation & migration	2	-	✓	✓	(✓)	✓	(✓)	2
	Cultural heritage	no data							
	Respect of indigenous rights	not relevant							
	Safe & healthy living cond.	6	✓	✓	✓	(✓)	-	✓	6
	Secure living conditions	4	(✓)	(✓)	(✓)	(✓)	-	(✓)	4
	Local employment	3	✓	(✓)	-	(✓)	(✓)	(✓)	3
	Community engagement	6	-	✓	✓	(✓)	✓	(✓)	5
	Amount	5.00							5.00
Society	Public commitments to sustainable issues	6	✓	✓	✓	-	(✓)	✓	5
	Contribution to economic development	3	✓	✓	✓	✓	✓	✓	2
	Prevention & mitigation of conflicts	5	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	5
	Technology development	6	✓	✓	✓	-	(✓)	✓	5
	Corruption	6	(✓)	✓	(✓)	(✓)	-	✓	6
	Amount	5.20							5.00
Total amount	5.07							5.05	

4.1.7 Summary of the S-LCIA

The following figures summarise the results of the S-LCIA, illustrating all processes in the process network with corresponding resulting amounts of the impact assessment (The performance assessment is not displayed in these figures.). Figure 10 gives an overview of the total amount of all processes in the process network, based on equal weighting factors for all subcategories. Figures 11 to 14 show the results for only one specific stakeholder group (workers are considered in figure 11, local communities in figure 12, society in figure 13, and value chain actors in figure 14).



Figure 10: Summary of the S-LCIA for all stakeholder groups



Figure 11: Summary of the S-LCIA for stakeholder workers



Figure 12: Summary of the S-LCIA for stakeholder local community



Figure 13: Summary of the S-LCIA for stakeholder society

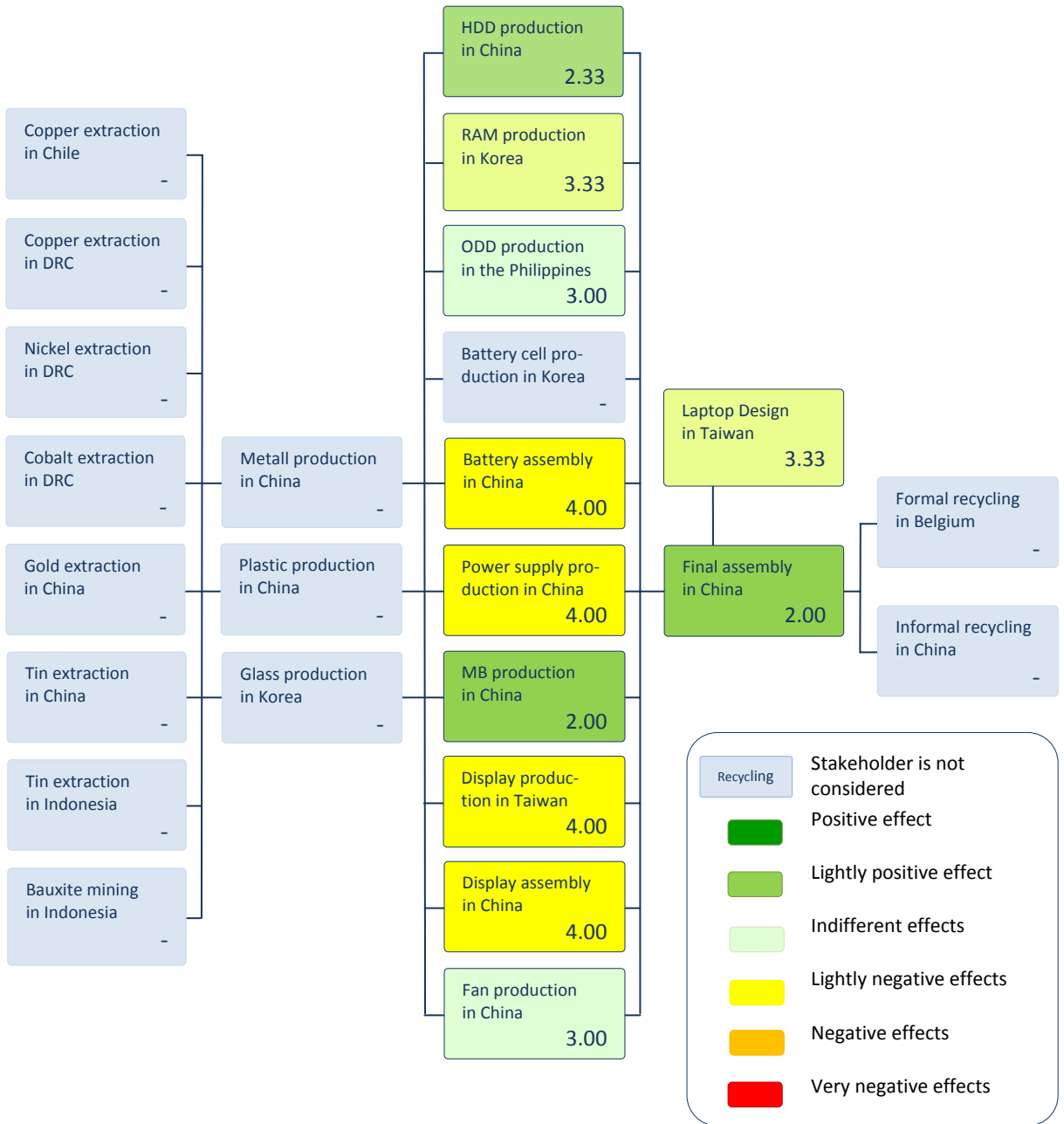


Figure 14: Summary of the S-LCIA for stakeholder value chain actors

4.2 Environmental Life Cycle Impact Assessment

The environmental impact assessment was calculated with the hierarchist version of the ReCiPe method, as this version reflects a rational, natural based assessment perspective. At first, the midpoint assessment is described in section 4.2.1; the endpoint assessment is outlined in chapter 4.2.2.

The midpoint assessment of ReCiPe²⁵¹ comprises a variety of impact categories from climate change to human toxicity to for instance urban land occupation. The midpoint perspective allows a detailed investigation about kind and origin of impacts. ReCiPe's endpoint assessment considers in contrast only three impact categories: human health, ecosystems, and resources. This kind of assessment has the advantage that results can be easier understood and communicated. In addition, it provides a long term consideration of environmental effects.

4.2.1 Midpoint Assessment

For the analysis of the characterisation the life cycle was divided into five groups: transport²⁵², production, packaging, use, and disposal. The characterisation shows that the production of the laptop dominates the environmental load throughout all impact categories (see figure 15). The use phase, including the reuse phase, is the second-largest causer of the environmental burden in the entire life cycle of the notebook. The packaging, the transport, and the disposal have rather low impacts in comparison to the other analysis groups. However, the informal recycling in China was not part of the E-LCA because of data gaps.

²⁵¹ The applied midpoint assessment includes already a weighting step in regard to the endpoint assessment. This version was chosen, because the current unweighted midpoint assessment version contains errors regarding the impact of chlorine emissions and normalisation factors.

²⁵² The group "Transport" contains only the transport from Shanghai to Taipei and from Taipei to Brussels.

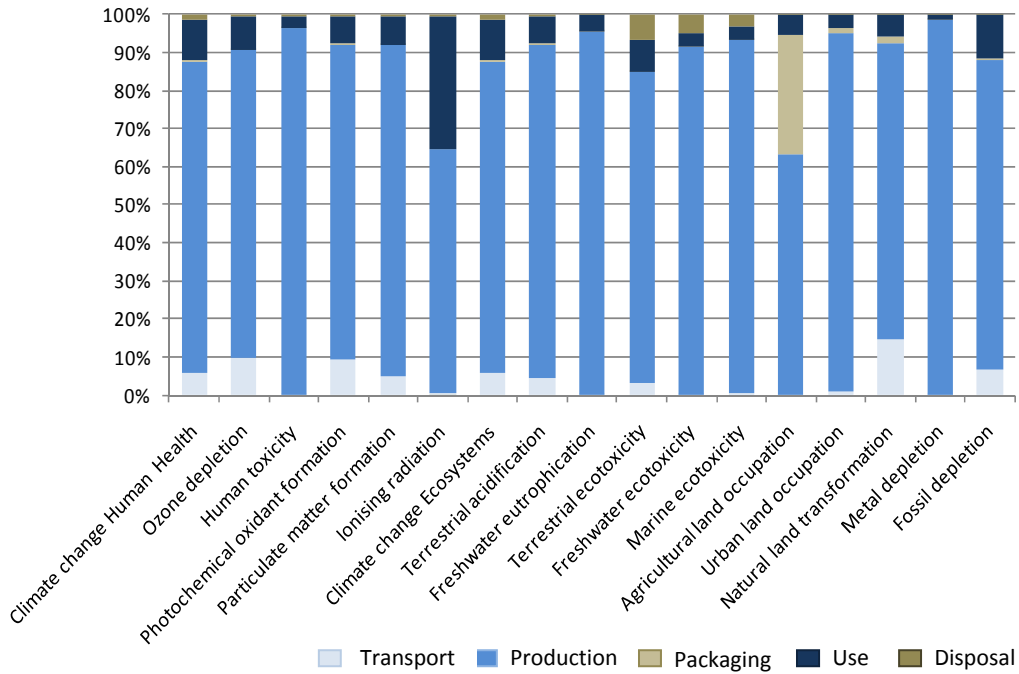


Figure 15: Results of the characterisation

To identify the environmental hot spots in the life cycle, normalisation was applied. Via normalisation, the results of the impact assessment are related to a total environmental load of a region. Here, the normalisation set “World ReCiPe H/H” with the reference year 2000 was selected.

Figure 16 shows the results for the normalisation. Relevant impact categories in the considered product system are climate change (human health and ecosystems), human toxicity, particulate matter formation, and fossil depletion. Metal depletion plays a minor role.

Furthermore, the figure demonstrates that the production of the notebook causes the majority of the environmental effects. Also the use phase and the transport of the notebook have a noticeable impact, in contrast to packaging and disposal.

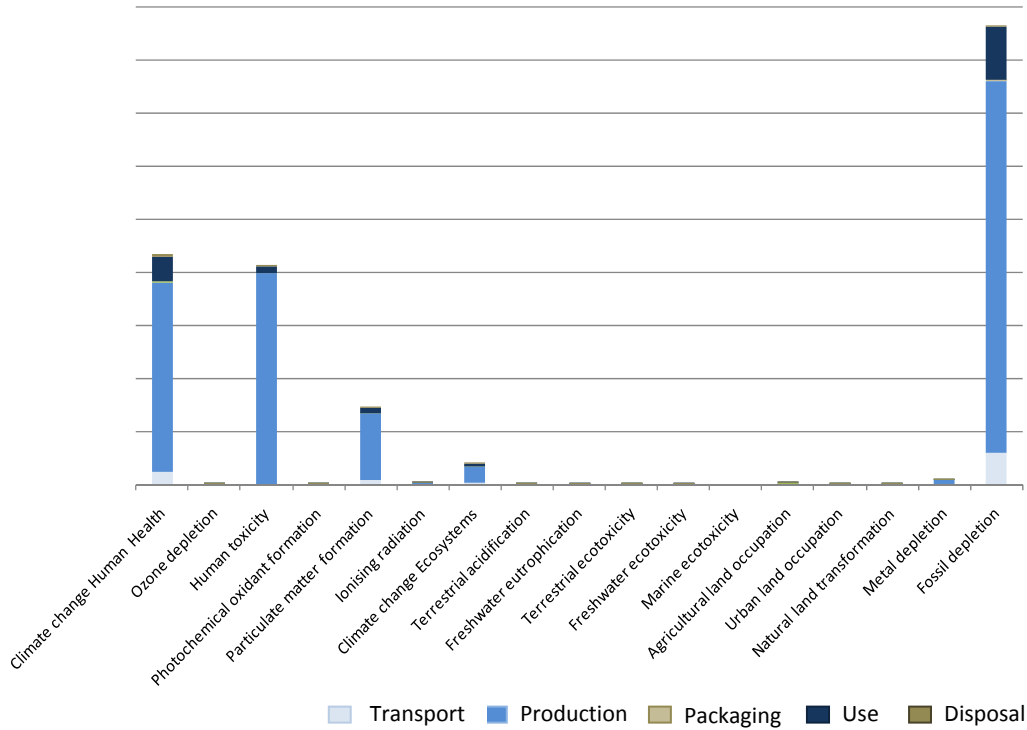


Figure 16: Results of the normalised midpoint assessment

The product system was further analysed for relevant and interesting impact categories by means of the network function in SimaPro (see figure 17 to 23). The figures of the networks do not show the entire product system; they use different cut offs to display only processes with major impact contribution.

Additionally to the categories that were identified as relevant in the normalisation step, the impact category metal depletion was considered. Other categories are not further investigated here.

4.2.1.1 Climate Change

The analysis of the network regarding climate change human health with a cut off at 5.8% shows that the display and the mainboard production cause the major impacts (see figure 17). The use phase is only responsible for roughly 8% of the impacts – generally through the active use of the laptop. This result is rather unusual for energy using products (EuPs); usually the use phase dominates the environmental impacts of larger EuPs.²⁵³ The low effects caused by the energy consumption during the use of the considered laptop can have different reasons. To begin with, it can be a proof for a high energy efficiency of the computer. Beyond that, the relative short use time of the laptop compared to other consumer electronics as refrigerators, televisions, or coffee machines, or an overweighted modelling of the other life cycle stages can be other reasons. Probably it is a mix from all three.

The reuse phase has in this and in other impact categories a positive impact, although the reuse entails energy consumption and transportation. The “second life” of the notebook avoids quasi the production of 0,2p laptop.

The processes at the bottom of the network indicate that the environmental load concerning climate change has its main origin in electricity production based on hard coal and in processes linked to transport.

The analysis of the process network regarding climate change ecosystems comes to a very similar result (see figure 18).

²⁵³ European Commission (2005)

Environmental Life Cycle Impact Assessment

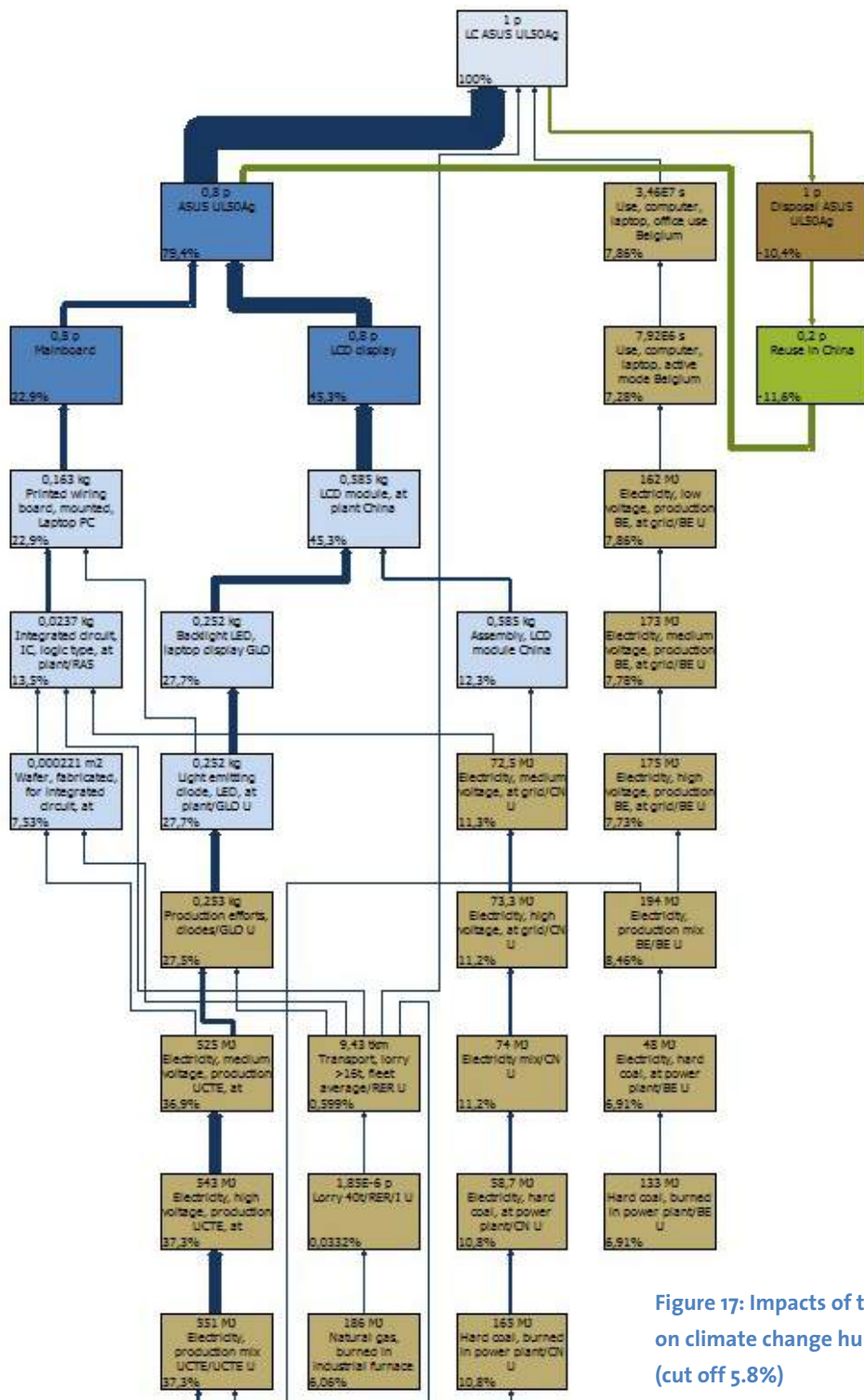


Figure 17: Impacts of the life cycle on climate change human health (cut off 5.8%)

Environmental Life Cycle Impact Assessment

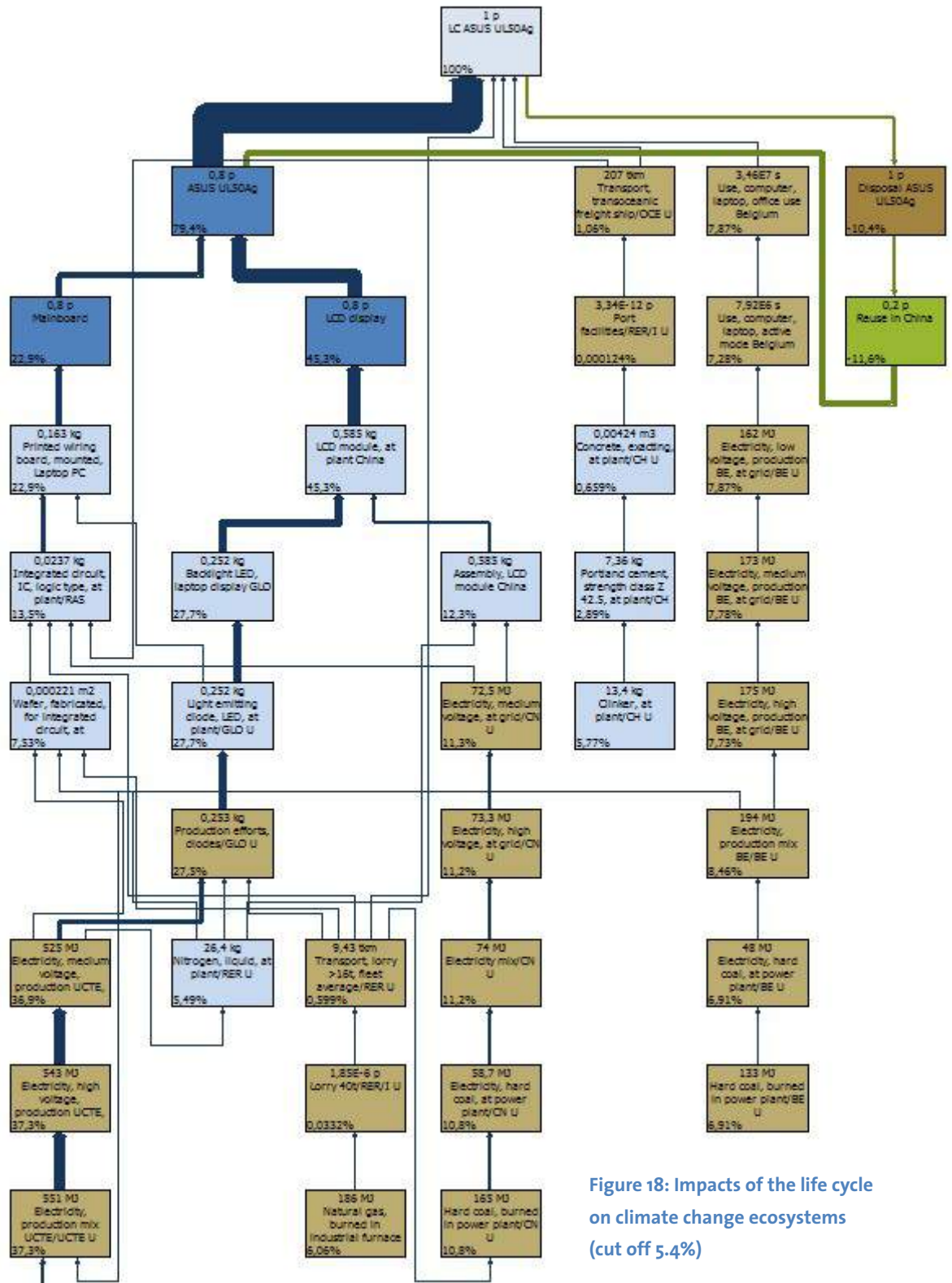


Figure 18: Impacts of the life cycle on climate change ecosystems (cut off 5.4%)

4.2.1.2 Human Toxicity

Figure 19 shows that the production of the laptop is responsible for 90% of the impacts on human toxicity, for the entire life cycle of the notebook. More than the half of these impacts is caused by the motherboard production, followed by the production of the LCD display with more than one fourth. The effect of the battery production is with around 6% quite moderate. The contribution of the use phase to human toxicity is under 4% and is thus not visible in the figure as the network has here its cut off.

The damage potential of the motherboard originates mainly from the gold and copper contained in the integrated circuit and the printed wiring board. The disposal of tailings from gold and copper mining operations cause severe environmental burdens and has also negative effects on human health.

The effects of the battery concerning human toxicity stem prevailing from the copper contained in the lithium battery cell and the gold content in the integrated circuit.

The impacts caused by the production of the LCD display are a bit more complex, but the overview of the life cycle shows that ultimately the disposal of tailings from gold and coal mines and the production of electricity are the determining processes (see figure 20).

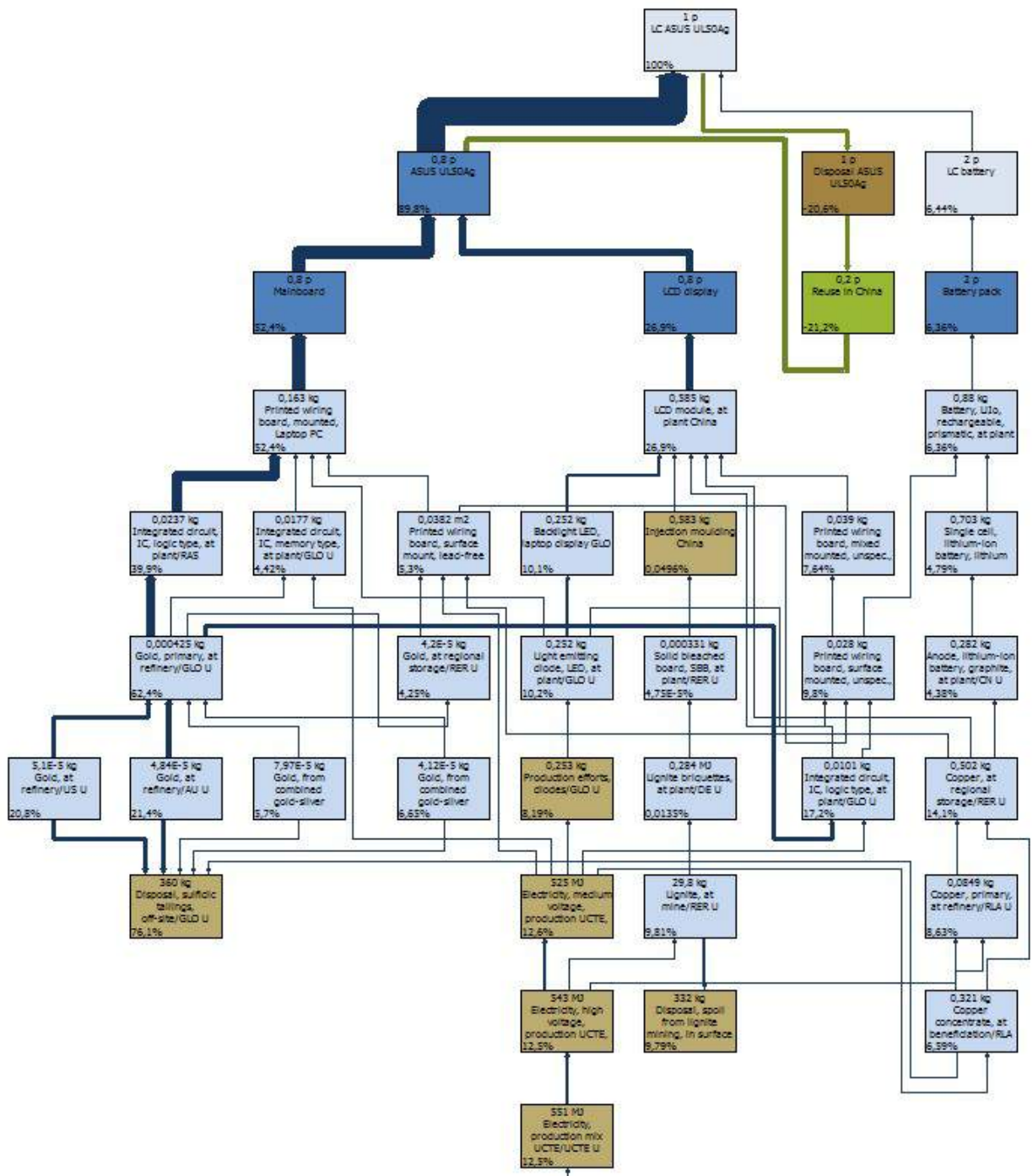


Figure 19: Impacts of the life cycle on human toxicity (cut off 4%)

Environmental Life Cycle Impact Assessment

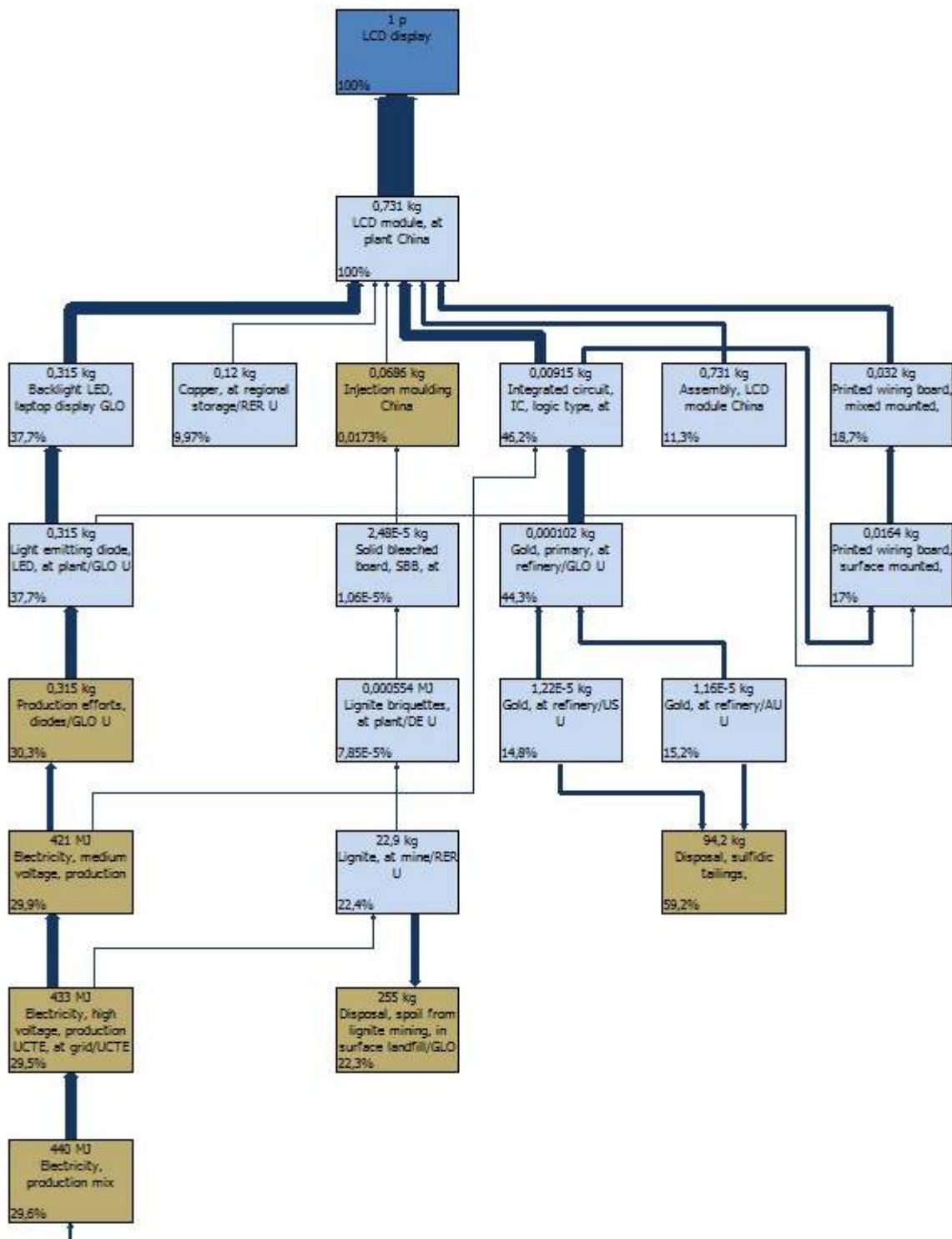


Figure 20: Impacts of the display on human toxicity (cut off 9.2%)

4.2.1.3 Particulate Matter Formation

For particulate matter formation, it can be stated that the notebook is the major contributor, mainly due to the display and the motherboard. If one traces back the effects, one can see that these impacts have their origins in the electricity production based on hard coal (see figure 21).

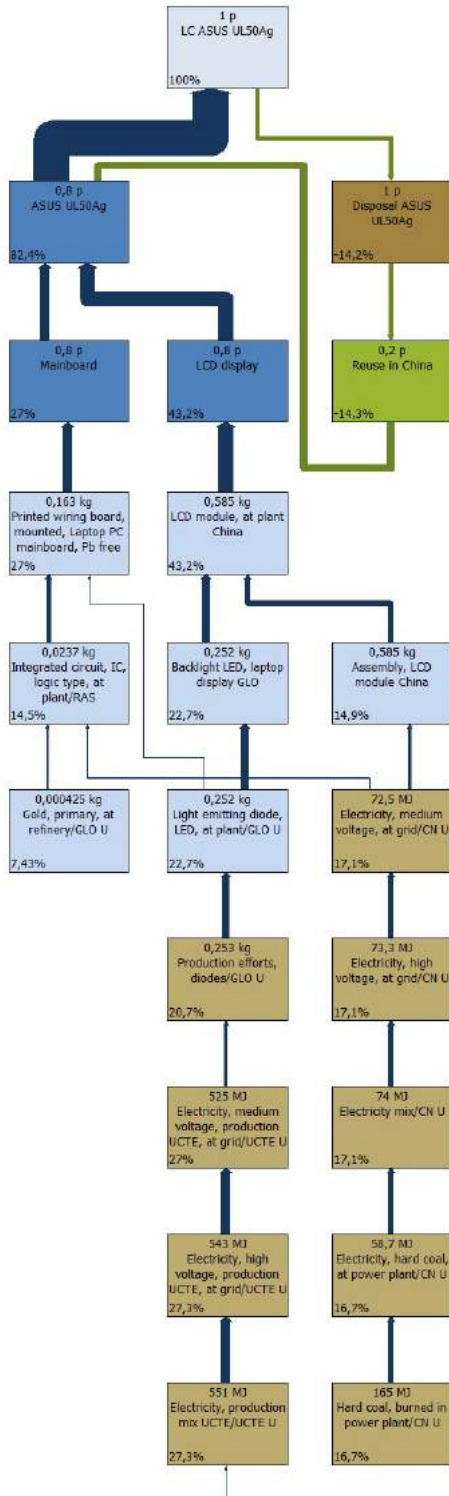


Figure 21: Impacts of the life cycle on particulate matter formation (cut off 6.5%)

4.2.1.4 Fossil Depletion

According to the normalisation, the most relevant impact category in the life cycle of the laptop computer is fossil depletion (see chapter 4.2.1). While the notebook is responsible for approximately 80% of the impacts, the use phase contributes with around 8% to the normalized results.

The impact of the computer is mainly caused by the display and the mainboard; similar as already seen in the other networks. The influence of the LCD display arises for the most part from the energy consumption during the production of the LED lights. Also the assembly of the LCD module accounts for roughly 10% of the impacts. The contribution of the motherboard is mainly dominated by the electricity consumption during the production of the integrated circuit board.

A consideration of the use phase in the network reveals that the electricity consumption during the active mode is the key process for depletion of fossil resources.

Since the disposal phase includes, besides the recycling, also the reuse and the transport from Belgium to China, this life cycle stage reduces the impacts only by 10%.

The contribution of the battery itself is around 3% (not visible in figure 22 due to the selected cut off).

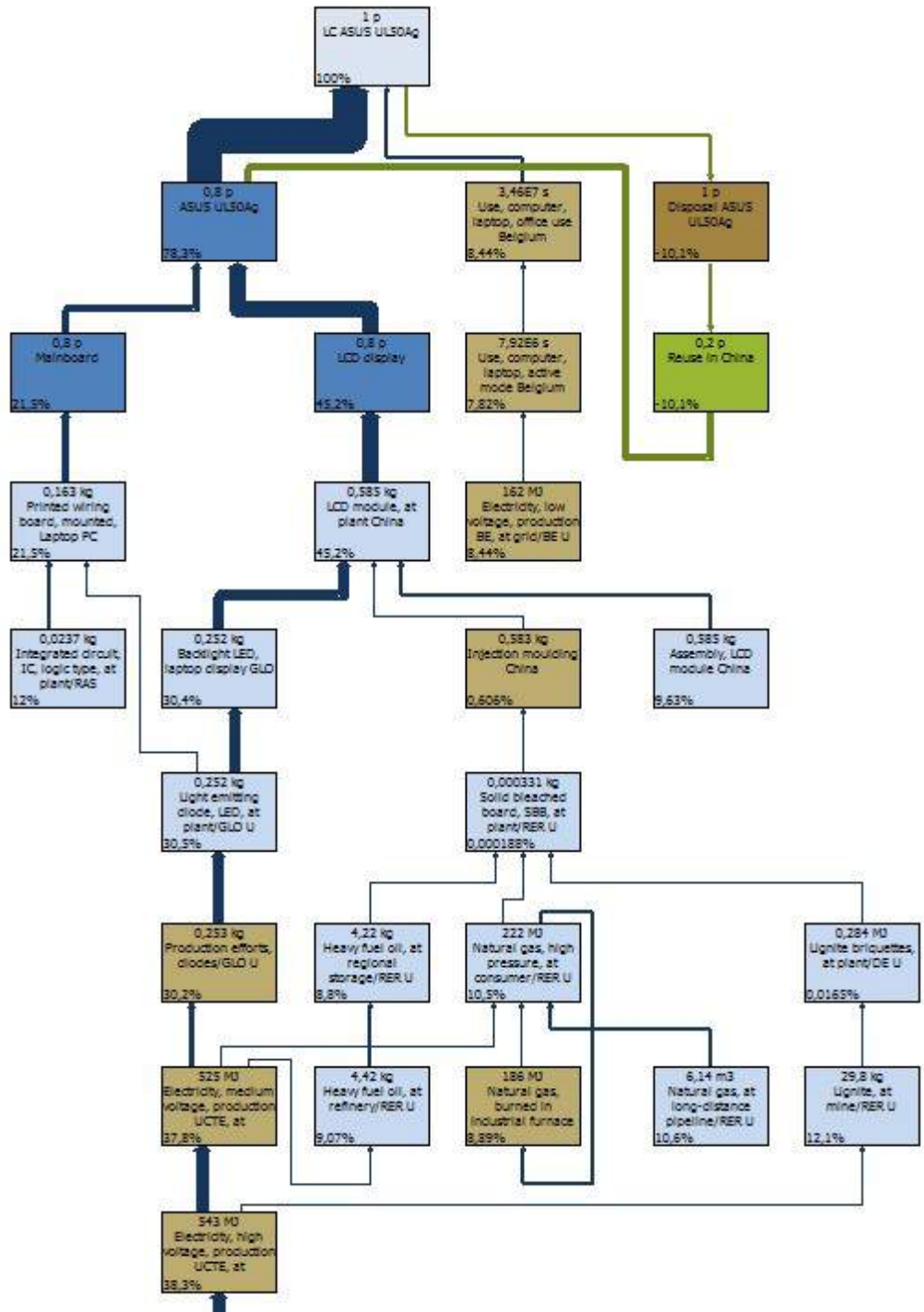


Figure 22: Impacts of the life cycle on fossil depletion (cut off 8.4%)

4.2.1.5 Metal Depletion

As can be seen in figure 23, the notebook is responsible for more than 80% of the impacts on metal depletion, mainly caused by the gold and copper content of specific boards and the use of tin solder. The disposal scenario, which includes the reuse and the recycling, provides a credit of roughly 20%. The battery contributes also noticeable to metal resource depletion, with more than 16%. This contribution is primary attributable to the use of lithium-ion cells.

In ReCiPe, metal depletion is measured in monetary units (USD). Other LCIAMs use “MJ equivalents” or “MJ surplus” as reference unit.

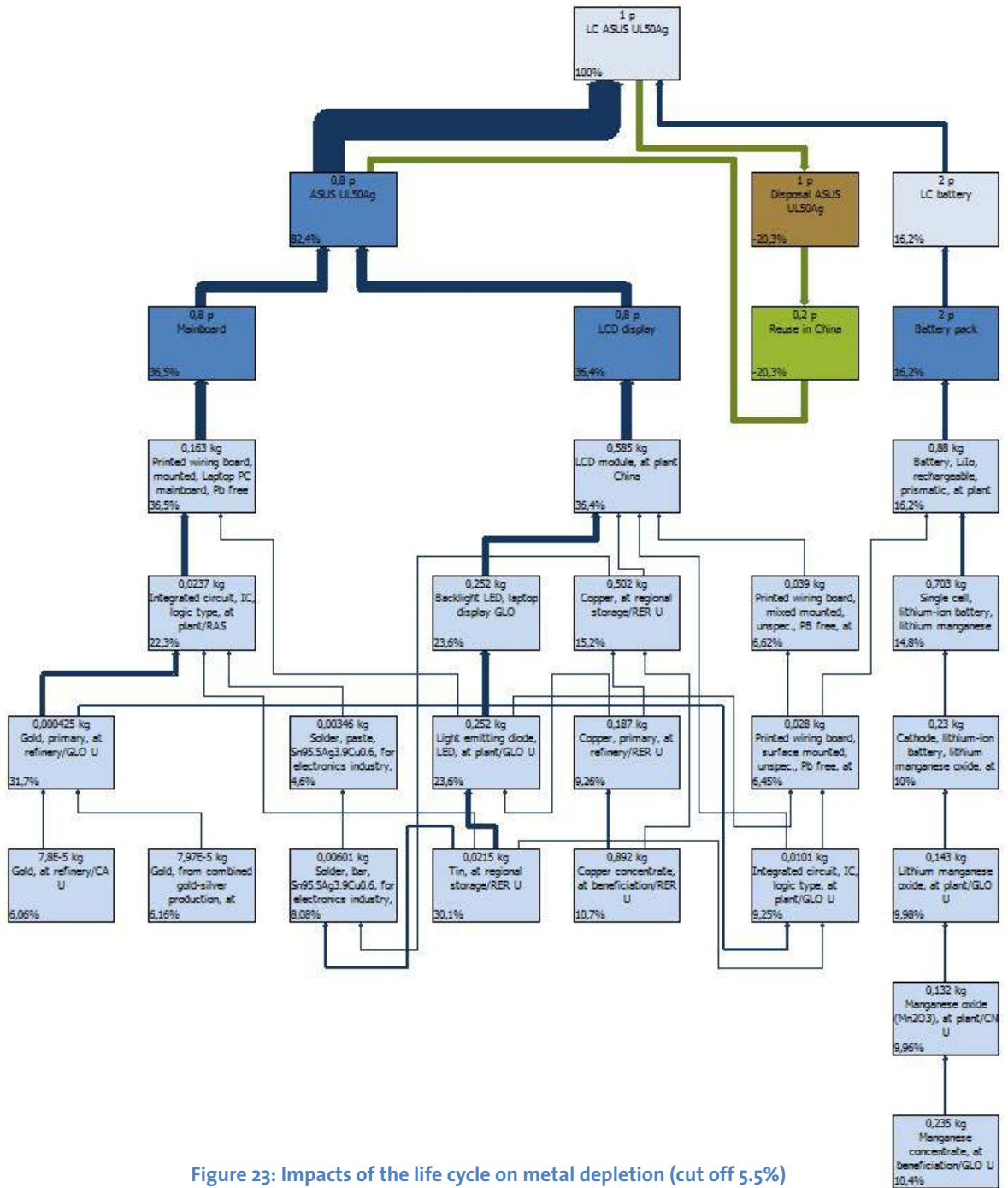


Figure 23: Impacts of the life cycle on metal depletion (cut off 5.5%)

4.2.2 Endpoint Assessment

The analysis of the entire life cycle regarding the endpoint impact categories human health, ecosystem, and resources (see figure 24) suggests that the production of the laptop is indeed the main origin of the environmental impacts with rounded 90%, but the use plays as well a role with a rounded average contribution of 10%. Transport accounts for approximately 5% in average. Disposal and packaging have hardly any effect, what the single score verifies (see figure 25).

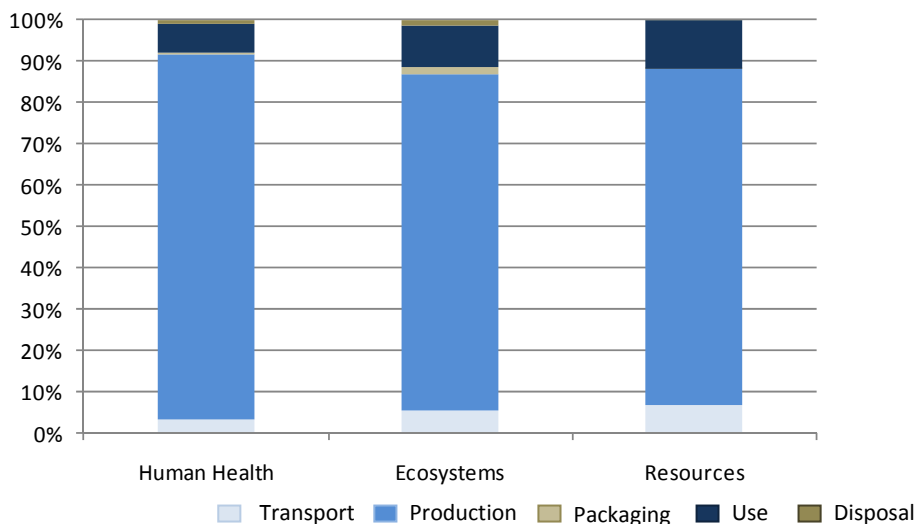


Figure 24: Results of the endpoint assessment

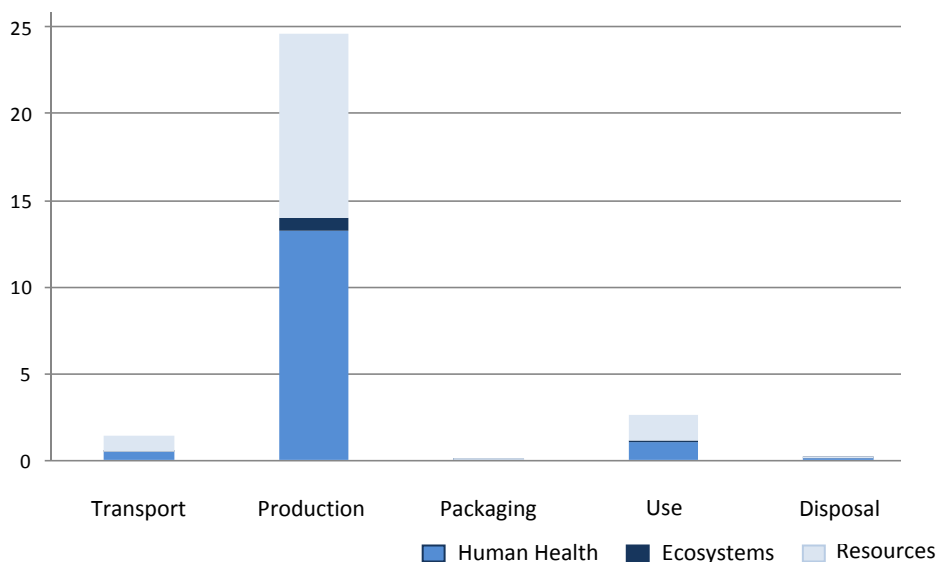


Figure 25: Results of the endpoint assessment single score (in pt)

The normalised²⁵⁴ assessment in the endpoint perspective (see figure 26) demonstrates that only the categories human health and resources are of concern. The damage of ecosystem quality plays a minor part according to this assessment. Already the results of the normalisation during the midpoint assessment indicate this tendency (see figure 16). Most of the environmental impact categories as ozone depletion, terrestrial acidification, freshwater ecotoxicity, or natural land transformation are of small importance, while impact categories with direct connection to humans (climate change human health and human toxicity) and fossil depletion belong to the most relevant categories.

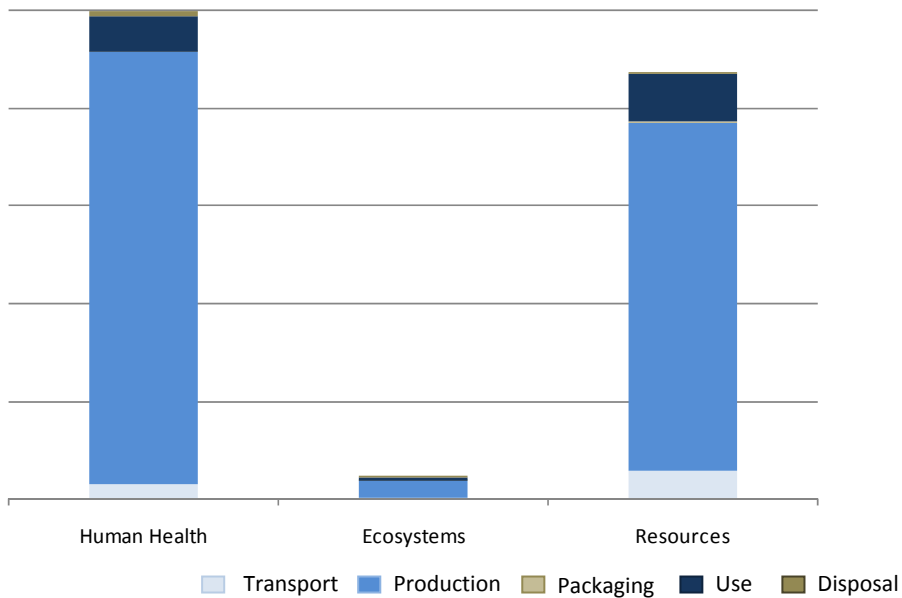


Figure 26: Results of the normalised endpoint assessment

²⁵⁴ The same normalisation set as for the midpoint normalisation was applied.

5 Data Quality Descriptions

Data quality is an important aspect of life cycle assessments. Only a sufficient quality of the used data allows reliable results and enables thus a meaningful interpretation. Section 5.1 addresses the quality of the social data, while section 5.2 describes the data quality of the environmental LCA. Different quality aspects as validity, relevance, consistency, and completeness are regarded.

5.1 Data Quality of the S-LCA

Generally speaking, the collected data provide the information that is needed to be able to assess the performance of companies and sectors respectively for the majority of selected subcategories. For some subcategories though, it was often not possible to find data. This was the case for the categories cultural heritage, secure living conditions, and supplier relationships. Admittedly, for the latter supplier companies were contacted but they were not willing to provide this confidential data.

Relevant information and data for the evaluation of the social LCA were mainly available. Initially quite widespread data gaps could in most cases be covered in the course of the study, sometimes by use of data with a somewhat lower quality, but sometimes also with additional data collection effort. The availability of data was primarily an issue for company- and site-specific data. In some cases, data from other sites could be used, in other cases sector-specific information was applied. Further, it was sometimes not possible to obtain regional and sector-specific data. Country-specific data served here as workaround.

Approximately 80% of the data sources of the social inventory are from the years 2008 until 2010 and allow thus a reliable analysis of the current situation. However, some uncertainty is always contained in non-actual social data, as societies and also living and working conditions are continually subjected to change.

Another source for uncertainty is attributable to the data origins. In general, interviews with directly affected stakeholders as workers or members of local communities are preferable to other data collection methods in social LCA. However, the timeframe of the project did not allow a comprehensive local data collection, so that it was not always (but at least in some cases) possible to interview employees of specific companies. Reports of independent NGOs acted as a substitute and supplement respectively. Such analyses are as well very reliable data sources, but mostly rather on sector level than on company/site level, depending on the methodology of the investigations.

Beyond that, corporate documents and websites as well as questionnaires provided comprehensive information, but these data entail rather high uncertainties depending on theme. Sustainability reports are often (mis)used as strategic communication tools in the field of public relations in the sense of green washing.²⁵⁵ Only in very rare cases such report incorporate critical aspects; usually companies place special emphasis on their social and environmental engagement as corporate giving or corporate volunteer-

²⁵⁵ www.sinsofgreenwashing.org, www.stopgreenwash.org and Müller (2007)

ing activities irrespective of their real impacts on society and environment. Furthermore, it is assumed that companies did not always fill out the questionnaires truthfully. By considering multiple data sources, it was often possible to arrive at a reasonable analysis of the impacts of the respective process.

The study comprises several processes in every life cycle stage: raw material extraction, production of basic materials, production of intermediate products, production of the final product, and end of life. It was impossible to investigate every process of the process network due to the complexity of the product of study. Therefore, an ex-ante selection of the processes that should be considered was made. In some cases, this selection was extended based on findings in the course of the study. For example, a German recycling site was visited which reflects well the Belgian formal recycling plants as it turned out that this process will become one of the socially positive hot spots in the life cycle.

The results of the social impact and performance assessment (chapter 4.1) show that processes of a specific sector of a specific country category (LCDs, EEs, and AEs) are quite similar. However, to be able to derive general recommendations by extrapolating findings of the study, further investigations seem necessary. This is extended in the outlook section (see chapter 8).

For all processes, the same procedures concerning data collection, handling of missing data, calculation rules, allocation rules, weighting of stakeholder groups, subcategories and indicators, and the like were applied. Hence, a high consistency could be achieved.

Overall, when assessing the data and approach used in this social LCA study against the goal and scope, the data quality can be considered as satisfactory. Data and approach provide a solid basis for robust and reliable results, at least for the considered processes.

This said, it is worth to mention that the goal of the study was not to compare different products, nor to develop results that could allow general conclusions, being extrapolated from the investigated product and data. Both would be exciting extensions of the present study (see also chapter 8).

5.2 Data Quality of the E-LCA

The modelling of the notebook life cycle is based on the ecoinvent unit process “laptop computer, at plant” in the version v2.2, which has the reference year 2005.²⁵⁶ Since computers are very dynamic products, the notebook that was considered in this ecoinvent process differs considerably from the investigated laptop in the present project concerning size, weight, performance, storage space, display backlights, etc. In order to attain more suitable data, comprehensive adaptations for the foreground processes were made based on the disassembly of the considered ecolabeled laptop. In this way a better suitable product system could be modelled. All process modifications of the original ecoinvent dataset are documented in this study.

²⁵⁶ ecoinvent (2010)

The authors believe that this modified product system covers the real product system, as far as required by goal and scope, to a satisfying degree. With this approach, the data availability for the environmental inventory was overall quite good, and relevant data for the E-LCA of the notebook was available. Minor data gaps for minor notebook parts as for instance screws and speakers or specific process inputs and outputs still exist, but it is assumed that these do not have a relevant influence on the results. For further information please consider the ecoinvent documentation (for the documentation of the “starting” product system)²⁵⁷, and annex VI (for a description of the process modifications).

²⁵⁷ EMPA (2007)

6 Interpretation

This chapter comprises the interpretation of the S-LCA (section 6.1) and the E-LCA (section 6.2). The interpretation of the S-LCA describes identified social hot spots and social issues respectively per sector. The interpretation of the E-LCA explains, first, main environmental impacts within the entire life cycle (chapter 6.2.1); then, conclusions are drawn with regard to how these environmental hot spots are addressed by the EU eco-label (6.2.2).

Subchapter 6.3 compares the social with the environmental impacts.

6.1 Interpretation of the S-LCA

Overall, social hot spots were found in every life cycle stage of the notebook. Particularly mining activities and the informal recycling are connected to serious societal problems. Also the production phase is relevant in terms of social issues. The design phase and the formal recycling are in contrast generally rather uncritical.

From a stakeholder perspective, workers are worst affected regarding investigated subcategories despite often implemented code of conducts. Frequently, these voluntary codes of behaviour are loosely worded and stipulate only minimal standards as no child labour, no forced labour, non-discrimination, or the payment of minimum wages, which are ordinarily already covered by local laws.

The stakeholders “local community” and “society” are as well involved in negative social impacts caused by specific economic sectors within the life cycle of the laptop. Especially in least developed countries and in emerging economies negative effects occur, but also in advanced economies issues regarding sustainability are ascertainable.

End consumers and value chain actors are not affected by social hot spots, although also here problems were detected, which do not have serious negative impacts with regard to considered impact categories, though. Anti-competitive behaviour as cartelization, patent infringements, and lacking transparency towards customers and society were identified as problem areas. Many of the investigated companies curtain poor working conditions under the guise of shining sustainability reports.

How far social hot spots in a specific sector are interconnected to the development status of a country is described in the following subchapters.

6.1.1 Social Hot Spots in the Mining Sector

Mining processes are the only raw material extraction processes considered in this study. The Chilean, the Congolese, the Chinese, and the Indonesian mining sector were investigated. Mining activities implicate inherently some negative social impacts - especially illegal mining operations cause multifaceted problems due to a general lack of control.

For one, it is simply dangerous to work in mines. Shafts can collapse or the oxygen feed can be interrupted. In addition, blasting operations carry a high risk of accidents. These dangers can be mitigated using modern technologies, highly automated processes, and appropriate safety measures and equipment. However, the mining sector in EEs and

LDCs is often characterised by outdated machinery and obsolete techniques. And not the least, mines reduce the access to material resources. Mining activities involve the quarrying of rocks as well as the consumption and use of high volumes of water respectively. The released water is often modified, and also frequently polluted. On the other side, modern mines tend to have environmental management systems which are often certified according to ISO 14001, in order to reduce the negative impacts.

The evaluation of the social inventory confirms these issues and reveals further social hot spots:

■ **Workers**²⁵⁸

- **Fair salary:** Wages in the mining sector are often low. This is in terms of the considered processes primarily an issue in the DRC and in China, where the minimum wages do not cover the living costs.

■ **Local community**

- **Access to immaterial resources:** Freedom of expression is often severely restricted in EEs and LDCs, what is also reflected in the mining sector. In addition, mining companies are often not committed to improve local education or service facilities.
- **Safe and healthy living conditions:** Mines contribute severely to the local environmental load, what has also negative effects on human health. Especially tailings pose a big problem as they in the majority of cases are not disposed in an environmental friendly way. Usually sector efforts to minimise the use/emission of hazardous substances are very low.

■ **Society**

- **Prevention and mitigation of conflicts:** Admittedly, there are so far only a few conflicts that are related to the mining sector, but the risk of conflicts is high. However, mining companies do not endeavour to reduce the risk. Fraught with problems is the situation in the DR Congo, where the war is partly financed with profits from mining activities.
- **Technology development:** The development of new technologies in the mining sector aims in the first place to increase the efficiency of mining operations. There are hardly any efforts to develop eco-friendlier technologies in the analysed processes.
- **Corruption:** Corruption is a fundamental issue which occurs likely in all countries and all industries, but with different impacts. In the mining sector the effects of corruption are very negative. For instance, corruption results in safety risks and enables the existence of an informal sector. In all considered countries with the exception of Chile the mining sector comprises a formal and an

²⁵⁸ Although the percentage of women in the mining sector is very low, occupational discrimination against females is here not considered as a social hot spot. Mining work is in general hard and dangerous, why women often do not want to work in the mining sector. Thus the low share of females is not mandatory an indicator of discrimination.

informal part. The conditions of the informal sector are worse compared to the ones of the formal industry due to a lack of control mechanisms. Therefore, the informal mining sector causes more negative impacts on workers, local communities, and society.

The inventory shows that negative social impacts are primarily of importance in the mining sectors of LDCs. However, the study does not provide representative results, as it analyses only one LCD: the DR of the Congo, which shows much higher impacts than mining operations in Chile. There is no informal sector in Chile and the majority of mines use modern technologies. The government is going to close dangerous mines due to a mining accident in Copiapó in August 2010, by which 33 miners were trapped for more than two month.²⁵⁹

6.1.2 Social Hot Spots in the Production of Basic Materials

Even if the processes in the production of basic materials as metal, plastic, or glass are very different, the analysis shows some similarities regarding social issues. All processes considered in this section are located in China or South Korea. It can be stated that the situation in China is in general worse than in Korea.

■ Workers

- **Freedom of association and collective bargaining:** The position of trade unions in Asian countries is in general weak and improvable. For instance, the registration of independent trade unions is difficult and impossible respectively and the right to strike is severely restricted in considered countries.
- **Forced Labour:** There are many so-called labour camps in China, which produce a wide range of products, including basic materials as plastic and metal products. In South Korea no cases of forced labour could be linked to the production of basic materials.
- **Fair salary:** In China as well as in Korea the government has stipulated a minimum wage, but in both countries this minimum wage does not allow a decent standard of living, so that workers are forced to work long hours.
- **Working time:** At least in China workweeks are in general long. More than 60h/week are common in several sectors.
- **Health and safety:** Especially in the metal industry the risk for accidents is high, but also the glass production is linked to several health and safety hazards.

■ Local community

- **Access to material resources:** The production of metals, plastics, and glass is very resource intensive, even if resources are partly different. At least much energy is needed for the production of all these basic materials.
- **Safe and healthy living conditions:** All considered basic materials are linked to significant environmental impacts which reduce the safe and healthy living

²⁵⁹ The New York Times (2010)

conditions in local communities. Sector efforts to minimise these environmental effects are often rather low.

- **Community engagement:** The study shows that already third-tier suppliers do not take their corporate social responsibility. Engagement in local communities but also the implementation of codes of conduct is rather exceptions.
- **Public commitments to sustainable issues:** The commitment to sustainable issues is in general weak.
- **Technology development:** The engagement concerning the development of ecologically harmless techniques and technologies is rather low. Considered sectors are characterized by a high amount of SMEs, which have in general not enough resources for comprehensive research and development activities.

6.1.3 Social Hot Spots in the Electronic Sector

6.1.3.1 The Electronic Sector in Asian Advanced Economies

The project comprises the electronic industry in Taiwan and South Korea as Asian AEs. The number of considered processes does not allow general conclusions; however, based on the analysed processes, the following statements are valid, in these countries.

■ Workers

- **Freedom of association and collective bargaining:** The position of trade unions in Asian countries is in general weak and improvable, also in AEs as Taiwan and Korea. For instance, it is difficult to register unions and the right to strike is often severely restricted. There is a noticeable labour movement, but it is still in its infancy.

■ Local community

- **Access to material resources:** Electronic products contain a variety of rare metals, what limits the access to material resources directly and indirectly. Second, production processes consume many resources as water and energy. Although the majority of companies is certified according to ISO 14001, the savings are insufficient.
- **Safe and healthy living conditions:** Taiwan and Korea as well as other newly industrialising economies struggle to cope with their seriously polluted environment what has also negative effects on human health. The electronic industry contributes in a large part to the environmental burden through water, air, and soil pollution. Especially the manufacturing of displays and semiconductors pollutes the environment.

■ Value chain actors

- **Respect of intellectual property rights:** The study reveals that charges due to patent infringements are frequent. To what extent these suits are justifiable, cannot be assessed.

6.1.3.2 The Electronic Sector in Emerging Economies

The study considers the electronic industry in China and the Philippines as EEs. The investigation showed that in both countries companies are mainly located in special economic zones. These economic zones enable the companies to defy national control to a certain degree, what leads among others to poor working conditions.

■ Workers

- **Freedom of association and collective bargaining:** In Philippine EPZs trade unions are not allowed; thus there is no influence of trade unions to company behaviour. There are unions in China, but they are not independent. Hence, the power of trade unions in China is very low.
- **Fair salary:** Companies pay the minimum wage as basic wage, but the minimum wage does not cover living costs. Therefore, employees are forced to work long hours, as also the allowances and bonus payments are not sufficient. In addition, deductions for “misbehaviour” are common.
- **Working time:** 10 - 12 working hours per day, six days a week are common. In peak seasons employees have to yield up their day off, even if it could be proved only in a few cases.
- **Discrimination:** Companies in the Chinese and Philippine electronic sector prefer the employment of young women. Furthermore, the majority of Chinese companies have irreproducible restrictions to body height. In addition, companies have implemented strict rules to control and outface the workers. These rules are also misused to legitimate wage deductions.
- **Health and safety:** Companies provide protective clothes, but these protective wear is in many cases not suitable. Beyond that, there is a lack of safety training, what could reduce the frequency of accidents.
- **Social benefits:** Near all companies pay social benefits, but many enterprises infringe national laws regarding working time and discrimination.

■ Local community

- **Access to immaterial resources:** The freedom of expression in the considered sector is severely restricted. In addition, companies do not initiate comprehensive education projects.
- **Safe and healthy living conditions:** The industry, including the electronic sector, poses especially in China a considerable environmental problem. Emissions of hazardous substances to water and air and a high energy consumption exacerbate the situation. The environmental pollution causes several health problems.
- **Local employment:** At least in China the majority of employees in the electronic sector are migrant workers. In the economic centres of the east coast there are not sufficient labourers to fill the vacancies. These migration movements have a variety of negative social impacts.

■ Society

- **Public commitment to sustainable issues:** Large companies implemented codes of conduct; smaller enterprises have rather none. In any case the codes of conduct are deficient – also the EICC – and are effectuated in an insufficient manner.
- **Prevention and mitigation of conflicts:** The electronic industry carries a high risk of conflicts due to poor working conditions and environmental pollution. Companies do not try to reduce the risk of conflicts.

Child labour could not be proved in this study, but it is assumed that this theme poses as well a problem in China's electronic sector. It is very difficult to get reliable data in these areas, but several investigations circumstantiate these conjectures.²⁶⁰ In addition, corruption could only be revealed in two cases. However, it is assumed that corruption is a severe problem in the electronic industry in emerging economies.

6.1.4 Social Hot Spots in the Recycling Sector

6.1.4.1 The Recycling Sector in Advanced Economies

Although the study considers only the recycling in Belgium as industrial nation, it is assumed that the results can in general be transferred to the recycling sector in other advanced economies.

The recycling sector in advanced economies is in general rather not connected with significant social issues. The sole social hot spot, which could be revealed, is corruption and fraud respectively. Fraud and corruption are widespread and enable the illegal shipment of e-waste to developing countries and emerging economies. A new study tries to disclose the different practices and transport routes in order to stem the flows of e-waste.²⁶¹

6.1.4.2 The Informal Recycling Sector in Emerging Economies

Although the study considers exclusively the illegal recycling in China, it is assumed that the conditions can be transferred to other Asian and African countries that are also involved in informal e-waste recycling.

In the considered informal sector numerous social hot spots could be disclosed. The lack of governmental control causes poor working conditions, lacking environmental standards, and missing engagement regarding sustainable development.

■ Workers

- **Freedom of association and collective bargaining:** There are no trade unions in the informal sector.
- **Child labour:** It is common that children help their parents to disassemble e-waste. Although, this kind of child labour is basically tenable, the working con-

²⁶⁰ China Labour Bulletin (2007), U.S. Department of Labor (2009) and Moore (2010b)

²⁶¹ Umweltbundesamt (2010)

ditions and the health effects are not acceptable. Children are exposed to harmful fumes and heavy metals.

- **Fair salary:** Workers of the informal sector are often underpaid and have to work every day to earn enough money to cover living costs.
- **Health and safety:** The simple techniques as burning of cables and acid bath pose severe health effects. Workers do not wear suitable protective clothes. The risk of occupational incidents is very high.
- **Social benefits/social security:** The informal sector does not pay social benefits.

■ Local community

- **Access to material resources:** Although the recycling of e-waste serves the recovery of materials, the illegal recycling has negative impacts on the access to material resources. For one thing, the workshops have no environmental management or initiate infrastructure projects. For another thing, the inappropriate techniques pollute water, soil, and air.
- **Access to immaterial resources:** The freedom of expression is restricted in the sector. The sector tries to conceal its activities. Further, there are no education initiatives or community service programmes.
- **Safe and healthy living conditions:** As mentioned above the applied techniques contribute considerable to the local environmental burden, what has severe health effects for workers and residents. There are no sector efforts to minimise the use of hazardous substances.
- **Community engagement:** The informal recycling sector does not engage in CSR activities.

■ Society

- **Public commitment to sustainable issues:** The workshops did not implemented codes of conduct.
- **Prevention and mitigation of conflicts:** The risk of conflicts is very high and the sector does not try to reduce this risk.
- **Technology development:** The informal sector uses outdated technologies and techniques. There are no investments in technology development or efforts to use more environmentally sound procedures.
- **Corruption:** Corruption is widespread. Otherwise the informal sector could not exist in this way. Already the import of e-waste to China is prohibited.

6.2 Interpretation of the E-LCA

6.2.1 Main Environmental Impacts

The environmental profile of the considered notebook is strongly dominated by the production phase. Also transport and use have a noticeable contribution to the environmental burden, but the relevance of these groups is different in the midpoint and endpoint assessment. While use plays a larger role than transport in the midpoint assessment, in the endpoint assessment, transport is more important than use. Packaging and disposal have a rather low contribution in the midpoint perspective and hardly any contribution in the endpoint perspective.

The main impact of the entire environmental impact, independent of the life cycle stage, originates from the extraction of raw materials as hard coal and connected processes as the disposal of tailings from mining activities, the production of energy carriers as crude oil and natural gas and electricity production, and processes linked to transport as the list of the top 20 process contributions²⁶² shows (see table 41).

Table 41: Top 20 process contributions

Rank	Process name	Total (in pt)	Rank	Process name	Total (in pt)
1	Disposal, sulfidic tailings, off-site/GLO	4.920	11	Natural gas, at production onshore/RU	0.996
2	Operation, lorry > 16t, fleet average/RER	3.900	12	Hard coal, at mine/EEU	0.893
3	Crude oil, at production onshore/RAF	2.690	13	Natural gas, at production onshore/DZ	0.875
4	Crude oil, at production onshore/RME	2.390	14	Hard coal, at mine/WEU	0.856
5	Crude oil, at production offshore/NO	1.690	15	Hard coal, burned in power plant/CN	0.847
6	Lignite, at mine/RER	1.890	16	Natural gas, at production offshore/NO	0.743
7	Crude oil, at production/NG	1.530	17	Natural gas, at production onshore/NL	0.665
8	Crude oil, at production onshore/RU	1.410	18	Disposal, spoil from lignite mining, in surface land-fill/GLO	0.658
9	Crude oil, at production offshore/GB	1.400	19	Hard coal, burned in power plant/BE	0.547
10	Hard coal, at mine/CN	1.240	20	Hard coal, at mine/ZA	0.506

²⁶² Calculated with ReCiPe endpoint in the hierarchist version

6.2.2 Conclusions Concerning the EU Ecolabel

The results of the interpretation regarding the environmental impacts of the notebook show that the effects of the EU ecolabel are only middling. The focus of the label does not address all relevant life cycle stages, product characteristics, and process types.

Main responsible for the environmental burden caused by the laptop is the production phase, which is not targeted by the label. In order to improve the sustainable performance of the notebook, it would be crucial to improve production processes, what indeed can hardly be achieved by a product label. Environmental product declarations (EPDs) are here better placed to do this. EPDs provide environmental profiles of products based on results of E-LCA studies and cover therefore all life cycle stages. Notwithstanding the ecolabel claims that used criteria are based on the results of LCA studies, the criteria reflect this only to a limited extent. But on the other hand the label is rather in a position to influence the end of life phase stipulating specific recycling rates for plastic and metal materials, easy disassembly, and a free take back system for waste electronic equipment (see annex I). Though, the label only regulates the take back in markets where the eco label is used. A free global take back system is not required.

Further, the label restricts the use of damaging substances as lead, mercury, cadmium, or brominated flame retardants (see annex I). This reduces of course the negative environmental impacts of the notebook, but it does not take the use of non-hazardous substances into account, which in turn cause a severe environmental load in their extraction or production phase as gold for instance. The consideration of such principally harmless substances would be a desirable extension of the label criteria.

Furthermore, the environmental impacts of the use phase are dominated by the active use of the laptop, but the criteria of the ecolabel concerning energy savings do not cover the energy consumption of the computer in active mode. They only restrict the energy consumption in the sleep and off mode, and the energy consumption of the power adapter, when it is connected to the electricity supply, but not the notebook. Thus, it would also be useful to stipulate for example a maximum tolerated energy consumption during the active use.

In addition, the ecolabel considers life time extension (see annex I), but it should pay more attention on this aspect. By extending the use phase, the production of new devices is avoided, which in turn reduces indirectly the environmental (and social) effects. Also the use of recycled materials in the production reduces the environmental load of the laptop considerably, but such materials are only stipulated for the packaging.

Beyond that, the ecolabel comprises restrictions in terms of the product characteristics noise and electromagnetic radiation which were not considered in the E-LCA. Probably also for these aspects a holistic view along the complete life cycle would be more beneficial, even if pretty difficult to put into practice.

A general point of criticism in terms of the ecolabel is the lacking verification, whether products fulfil the required criteria. Manufactures must only declare the compliance with the label criteria. The EU ecolabel relies more on market surveillance.

6.3 Comparison of the S-LCA and the E-LCA

The production of electricity and related processes has usually the highest environmental impacts in process networks, especially in terms of energy using products. This is also true for the investigated life cycle in this study, although the use phase contributes only marginally to the environmental burden. The social effects of electricity production were, however, not considered. Social hot spots in this sector are rather not expected aside from the (potential) impacts of the electricity generation by nuclear power.

Mining activities cause both negative social and environmental impacts. The social LCA shows that especially mining in LDCs and also often in EEs is responsible for a variety of social hot spots regarding labour conditions and local living conditions. While the society is affected due to a lacking engagement of mining companies in terms of the implementation of codes of conduct, the development of more ecologically compatible technologies and techniques respectively, or the prevention of conflicts. In particular countries with an informal mining sector are affected.

Further, transportation contributes noticeable to the environmental burden caused by the investigated computer. In a globalized world, the transport sector gains steadily in importance – also in an environmental perspective. From a social perspective, the transport sector is probably less relevant compared to considered industries.

Social hot spots were found in all life cycle stages. Mainly the extraction of metals in LDCs and EEs, the production of electronic components and devices in EEs, and illegal recycling activities are responsible for the negative social impacts of the notebook. As well environmental hot spots occur predominantly in the raw material extraction and production phase. Informal recycling operations could not be considered in the E-LCA due to lack of data, but it is assumed that this process shows up also an environmental hot spot.

The interpretation of the inventories shows that there are differences in social and environmental LCA, though environmental and social hot spots are partly congruent, for instance with respect to mining operations or the production phase. However, negative environmental effects do not automatically entail social hot spots and the other way round. Quite plainly, S-LCAs and E-LCAs consider different aspects. To some extent, social impacts are related to environmental impacts, but, for example, freedom of expression, discrimination, or high workload are out of the environmental scope. Likewise, there are environmental impacts without direct social impacts. As consequence it is important to have a look at both dimensions in order to get an entire picture of the situation.

7 Recommendations

In the following subchapters, recommendations addressing different issues are given. Section 7.1 explains challenges with regard to the conduction of social LCA studies resulting from the novelty of the concept (chapter 7.1.2) and from general characteristics of social data (chapter 7.1.1). Subchapter 7.2 provides practical measures for companies in order to improve their sustainable performance; social aspects are addressed in section 7.2.1 and environmental aspects in section 7.2.2. Chapter 7.3 presents possible measures on policy level regarding the promotion of sustainable consumption and production patterns, policy coherence for development, and development cooperation.

7.1 Use of S-LCA

As one might expect for a pioneering study, this work faced several challenges. Some referred to methodological aspects, while others were rather general, or inherent in the applied approach. All of the aspects concern the S-LCA part of the analysis. In the course of the study, it was often possible to develop solutions to overcome these difficulties.

7.1.1 General Issues

■ **Qualitative data in social assessments**

In the framework of S-LCA, the majority of data is qualitative; only a few indicators are quantifiable. This makes an aggregation of data across the life cycle less straightforward. In this study, the aggregation is performed on the assessment level, avoiding the need to aggregate textual descriptions.

■ **Subjectivity in social assessment**

The characterisation of the majority of social impacts requires normative judgments; thus, it is the subject of debate (e.g. what is seen as a social impact depends to some degree on subjective value choices). This leads to various issues, but the main issue is that the assessment of the data is inherently subjective. One approach to compensate for this factor, is the definition of performance reference points based on broadly accepted standards (e.g. the ILO conventions, the OECD Guidelines for Multinational Enterprises, or ISO 26000 (see annex VII)), as done in the study.

■ **Availability of data**

At present, very few databases that contain social data are available, and also software support is limited. This makes it relatively time consuming to conduct a social inventory. Furthermore, it is very difficult to obtain company- and site-specific data, especially regarding critical aspects as labour conditions. Companies are often not interested in the investigation of social hot spots. Therefore, company-specific reports from independent NGOs and interviews with workers are very important primary data sources. Beyond that, this information can be used to corroborate the quality of publicly available data.

7.1.2 Methodology-Specific Issues

■ Selection of indicators

It is somewhat arduous to select an appropriate set of indicators that is able to illustrate the specific situation, while at the same time addresses the stated goal of the study. The method sheets, which complement the UNEP/SETAC guidelines, propose examples for indicators, but there are no obligatory indicators. With a view to future case studies it would be helpful to determine a default set of indicators and subcategories that can be adapted to specific needs.

Further, some subcategories in the present case study are measured with very diverse indicators, what makes an aggregation difficult. It would be helpful to develop more homogenous indicator sets.

■ Consideration of the use phase

The current approach of the social guidelines relates to company behaviour, and to general behaviour within a sector. The indicators proposed in the UNEP/SETAC guidelines are not applicable to use phases as there are no companies or industries involved. An additional set of indicators is needed to enable an integration of the use phase in the approach of the Life Cycle Initiative. This would then address the social effects of the product when it is used, which will be very different from the assessment in production or end-of life.

■ Impact assessment and interpretation

The UNEP/SETAC guidelines propose an approach to model social impacts, but do not identify an accepted methodology for the interpretation of indicators. The applied impact assessment method shows that it is possible to assess social effects and company/sector performance even if indicators are qualitative. The rating with quantitative factors allows also a certain degree of aggregation. Indeed, the linkage from subcategories with impact categories is not fully reliable as science-based models of cause-effect chains for social impacts are absent for almost all of the impacts and indicators.

■ Weighting

In general, weighting is not required in life cycle assessments according to ISO 14040 and 14044, because results can be biased easily. This may also be the case for social life cycle assessments, though weighting could here be useful for the interpretation due to the plurality and variety of addressed themes (subcategories). In this case study equal weighting factors were applied, which leads as well to a certain distortion of results: Due to the applied calculation rules less important subcategories with a poor assessment can influence the total assessment significantly. It is clear that not all subcategories have the same relevance, but it is also clear that it is impossible to determine a universal weighting system, as the importance of different subcategories depends on the goal of the study.

7.2 Measures on Company Level

7.2.1 Social Aspects

■ Improvement of labour conditions

The study shows that there is need for broad improvements of labour conditions as wage increases, reduction of overtime hours, improved occupational health and safety, improved insurance coverage, containment of discrimination, etc. – especially in EEs and LDCs. Significant changes in corporate behaviour in terms of employee treatment would contribute considerably to a more sustainable life cycle of electronic products.

■ Implementation of meaningful codes of conducts

Many codes of conduct are formulated vaguely and do not contain appropriate limitations. Often the codes comprise legal minimum standards as no child labour, no forced labour, payment of minimum wages, maximum hours of labour according to local laws, and non-discrimination. Also the EICC does not require appropriate standards. For instance, the maximum working time per week is limited to 60h, what is quite high. In addition, this maximum work load can be increased in exceptional cases. Regarding freedom of association the EICC refers only to local laws. Further, the code does not address collective bargaining, what is a significant weak point.²⁶³

The integration of suppliers is also an important point for the improvement of social conditions.

■ Verification of codes of conducts

The best code of conduct is pointless if the compliance is not checked. This is especially relevant for suppliers. The majority of companies does not compile audits. The few companies that do checks prefer the application of self-assessments, which are very manipulable. This study and investigations of NGOs show that violations of codes of conducts are common.²⁶⁴

■ Fair behaviour within supply chains

The payment of fair prices for intermediate products within the supply chain enables fair salaries and social benefits and investments in environmentally sound technologies, health and safety, etc. The set of adequate deadlines for supplies can reduce overtime hours for instance.

■ Engagement in CSR

The CSR commitment of many companies is limited to some corporate giving activities to victims of earthquakes, and the organisation of summer camps or environment days. A wider engagement, especially on company level and with regard to local communities, would improve the overall situation. The construction of infra-

²⁶³ EICC (2009b)

²⁶⁴ SOMO (2007a-c) and WEED (2007b)

structure and the support of education are very important for the development of a country.

■ **Transparency**

In general there is a lack of transparency with regard to social aspects, especially in terms of labour conditions. Large companies publish admittedly CSR reports or have CSR information on their websites, but the focus of these data is mainly corporate giving activities or the corporate environmental performance. Critical aspects or subsidies are not considered. Smaller firms do not publish any social information.

The low response rate of submitted questionnaires in this study reflects the lacking interest of transparency and let divine social injustices.

■ **Local suppliers**

The construction of local supply chains has many advantages. Closer supplier relationships increase the cooperation and the spatial closeness enables more transparency. It is possible to strategize collectively regarding problem solutions.

7.2.2 Environmental Aspects

■ **Elimination/reduction of hazardous substances**

- Use of LED backlights instead of fluorescent lamps, which contain mercury
- Eschewal of PVC
- Reduction of flame retardants
- Reduction of obviously harmless substances with high environmental impacts in the production as gold

■ **Use of environmental friendlier materials and savings**

- Energy, water, and waste savings save both environment and pocket
- Use of waste plastics and other secondary materials
- Use of biodegradable materials as for instance bio-plastics
- Local supply chains reduce transport emissions and transport costs

■ **Establishment of global take back systems**

7.3 Measures on Policy Level

■ **Promotion of sustainable consumption and production patterns**

- Improve communication and educational work in terms of social and environmental effects of electronic products in order to promote reuse, increase recycling rates, promote the purchase of eco-friendlier devices, and to apply pressure on manufacturers of electronic components and devices to improve labour conditions and environmental standards
- Develop and apply of verifiable indicator systems

- Support the development of indicator systems for sustainability of products that comprise at least social and environmental information
 - Make this indicator system verifiable, so that false claims can be discovered
 - Apply this indicator system, for procurement, for support of companies, and for support of products
 - Support companies in applying the system, with easily available data for the indicator system, and with training and capacity building support
- **Policy coherence for development**
- Promote fair trade
 - Impose obligations for foreign companies acting in EEs or LDCs to reduce local social and environmental issues
 - Promote access to sustainable energy sources as energy consumption produced with conventional energy carriers causes at least severe environmental impacts
 - Promote of research and innovation regarding more environmentally sound electronic products (replacement of hazardous substances, reduction of environmental effects during the production phase by increased energy and material efficiency and improved techniques and technologies respectively, extension of the life time, etc.)
 - Increase security in EEs and LDCs
 - Prevent and mitigate conflicts
 - Increase transparency and justice with regard to the use of natural resources
 - Contain arms trade and human trafficking
- **Development cooperation**
- Support EEs and LDCs to improve working conditions and environmental standards
 - Build professional recycling sites in EEs and LDCs and curb of informal recycling sectors
 - Contain e-waste exports to EEs and LDCs
 - Support countries to curb artisanal mining and create jobs in the formal mining sector
 - Support EEs and LDCs in modernising mining technologies, techniques, and safety measures taking into account environmental and social criteria
 - Support trade unions in EEs and LDCs in order to increase the freedom of expression and the working conditions
 - Support education and professional training; creation of knowledge
 - Contain occupational discrimination due to gender, age, health situation, etc.
 - Use social and environmental LCA to communicate on the results of development cooperation to better illustrate how living conditions in the South are connected to living conditions in the North

8 Conclusions and Outlook

This study demonstrates that the consideration of social and environmental aspects in parallel, and for a complex product life cycle, is possible. Especially, the S-LCA methodology based on the UNEP/SETAC guidelines is already in this early phase applicable, and provides reasonable results which stimulate a decision making process. The results stimulate also the direct communication with the life cycle actors involved in the analysed process chain, in order to overcome or at least mitigate the identified hot spots.

The study has investigated one single product only; therefore, results cannot be directly extrapolated to an entire industry sector. More comprehensive analyses would be interesting to be able to derive a representative picture of, for example, notebooks, as they can be purchased in Europe today. Direct comparisons of different products in one study promise also new insights in the method.

While the S-LCA method proved to be applicable, challenges concerning both the method and the generic consideration of social impacts still exist. Especially the social life cycle impact assessment and the consideration of the use phase are not addressed in the UNEP/SETAC guidelines for S-LCA. A new approach for social Life Cycle Impact Assessment needed therefore to be developed in the course of this study.

As the present study was one of the first to be conducted following the UNEP/SETAC guidelines, it is expected that further studies will help to expand the pool of experience and, in turn, contribute to the development of S-LCA.

Finally, from a methodological standpoint, the development of a default set of subcategories and indicators would be very helpful for the practical appliance of the approach. In addition, it would greatly foster comparability between different studies.

From a rather generic view, this study poses the question whether it is possible to produce a socially acceptable computer. For the social dimension this seems, in principle, possible. All one would need is serious corporate responsibility and high customer awareness. These socially ideal products would not necessarily be more expensive for the end user, given that the margins of the end manufacturer might be to some extent allocated to higher prices for intermediate products.

From an environmental perspective, the question is more difficult. Computers contain many different metals which must be mined, plastics which must be mixed with additives as for instance flame retardants to reduce the inflammability, or other substances with specific unique properties which are very difficult to be substituted acceptably, and which pose problems in production, or in disposal. A *better* environmental performance of electronics can of course be achieved, by substituting critical materials. More easily, a better environmental performance of electronics can be achieved via life time extension, increase of recycling rates, and the increase of energy efficiency in the entire process chain, but it is still a long way to sustainable computers.

The EU ecolabel is a start, but its scope is insufficient. The focus on certain substances and product characterisations contradict life cycle thinking as these substances can

entail even more serious impacts in life cycle stages that are not considered by the label. Although this study does not provide a comparison between an ecolabeled laptop and a conventional one, the results of the E-LCIA show that the production phase is the main responsible for the environmental impact, which is rather not addressed by the ecolabel. A conclusion from this is that product labels should at least consider the entire life cycle to provide a more complete insight into the environmental performance. EPDs fulfil this requirement and could therefore be the basis for meaningful environmental labels for electronics.

Interesting future uses of the methodology and data stock developed in this study are:

- a) Comparison of different product alternatives in a buying decision: Conducting comparative S-LCA studies of specific products provides a basis for purchase decisions.
- b) Identification of hot spots in product life cycles: The investigation of specific product life cycles enables manufacturers to understand and improve the sustainable performance of their products. The analysis of hot spots on a sector level provides also starting points for political actions.
- c) Modelling of new life cycles for new products: Another application of the method is the ex ante assessment of specific suppliers or production locations for the production of new products. The investigation of entire sectors allows as well the identification of hot spots which should be considered during the selection of suppliers.

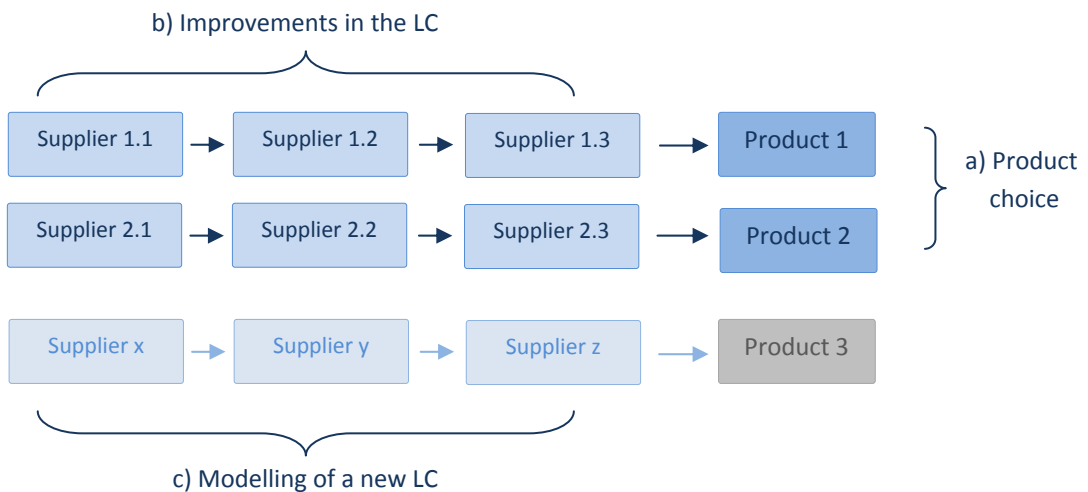


Figure 27: Application areas of S-LCA studies

Glossary

Activity variable	An activity variable weights the relevance of each unit process in a product system. An example is working time in regard to working conditions.
Advanced economies	Advanced economies are industrial nations characterised by a high GDP per capita, a highly developed infrastructure, and a modern economy structure.
Area of protection	A cluster of category endpoints of recognizable value to society e.g., human health, natural resources, natural environment and man-made environment. (UNEP/SETAC guidelines for S-LCA)
Characterisation	Characterisation is the conversion of inventory parameters in a consolidated value by dint of equivalence factors. In S-LCA, the characterisation models are the formalized, and “mathematical” operationalisation of the social and socio-economic mechanisms. (UNEP/SETAC guidelines for S-LCA)
Classification	Assignment of impacts to inventory indicators.
Data quality	Characteristics of data that relate to their ability to satisfy stated requirements. (ISO 14040)
Electronic Industry Code of Conduct	The EICC is a voluntary code of conduct for the global electronic sector initiated by the Electronic Industry Citizenship Coalition to improve working and environmental conditions. The code was launched in 2004 and has meanwhile more than 40 company members. However, it is often criticised by NGOs due to weak requirements and lack of audits.
Emerging economies	Emerging economies are rapidly growing and volatile economies, which have considerable growth potentials. Several Asian and Latin American countries are classified as EEs.
Environmental hot spot	An environmental hot spot is a (potential) problem area in terms of environmental burden.
EU Ecolabel	Voluntary product label initiated by the European Union to promote sustainable consumption. The label provides different criteria for several product groups that have to be fulfilled.
Export processing zones	Export processing zones can be defined as specific zones of intensive economic activity for the promotion of export.

	Companies located in such zones enjoy special governmental benefits as fiscal incentives, tax cuts, or the like. Most free trade zones are located in emerging economies.
Functional unit	Quantified performance of a product system for use as a reference unit in LCA studies. (ISO 14040)
Generic data	Country- or regional-specific data.
Goal and scope	Phase of an LCA where the aim and the scope, including functional unit, the product system, and the system boundaries of the study are determined.
Impact category	Class representing environmental and social issues of concern respectively to which life cycle inventory analysis results may be assigned. (ISO 14040)
Intermediate product	Output from a unit process that is input to other unit processes that require further transformation within the system. (ISO 14040)
Inventory indicator	Inventory indicators provide the most direct evidence of the condition or result they are measuring. They can be qualitative, quantitative, or semi-quantitative. (UNEP/ SETAC guidelines for S-LCA)
ISO 14040 and 14044	Standard initiated from the International Organization for Standardization in terms of environmental life cycle assessment.
Least developed countries	Least developed countries are underdeveloped countries, which are characterised by a very low income per capita, lacking infrastructure, and an outmoded economy structure.
Life cycle assessment	Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. (ISO 14040)
Life cycle inventory analysis	Phase of an LCA where data are collected, the process networks are modelled, and inventory results are obtained. (ISO 14040)
Life cycle impact assessment	Phase of an LCA that evaluates the (potential) impacts of a product system throughout the life cycle with regard to selected impact categories. (ISO 14040)
Life cycle interpretation	Phase of an LCA in which the findings of either the inventory analysis or the impact assessment, or both, are evaluated in

	relation to the defined goal and scope in order to reach conclusions and recommendations. (ISO 14040)
Normalisation	A normalisation step relates the results from the characterisation to the total burden of a region. Its advantage is that different impact categories can be compared with each other. Normalisation is an optional step in LCA according to ISO 14040.
Product system	Collection of unit processes with elementary and product flows, which models the life cycle of a product.
Performance reference points	Reference points for the assessment of the performance of companies/sectors in the social life cycle impact assessment phase based on internationally accepted standards, goals or objectives according to conventions and best practice, etc.
Qualitative indicator	Qualitative indicators provide information on a particular issue using text format.
Quantitative indicator	Quantitative indicators provide information on a particular issue using concrete numbers.
RoHS directive	European directive concerning the use of hazardous substances in electronic devices and components. The directive stipulates specific threshold values for lead, mercury, cadmium, hexavalent chromium, PBBs, and PBDEs. Among the European RoHS directive there is also a Chinese RoHS, which is more strict and comprehensive. For instance, it comprises also a requirement for labeling.
Semi-quantitative indicator	Semi-quantitative indicators provide information on a particular issue using a yes/no form or a scale. Qualitative and quantitative indicator results can be transformed in a semi-quantitative form.
Social hot spot	A social hot spot is a (potential) problem area in a specific sector/company in a specific country in regard to societal themes of interest as for instance child labour, forced labour, corruption, etc.
Stakeholder	Individual or group that has an interest in any activities or decisions of an organisation. (ISO 26000)
Subcategory	A representation of an impact category. (UNEP/SETAC guidelines for S-LCA)

System boundary	The system boundary specifies which processes are considered in the LCA.
Triangulation	Triangulation implies that different perspectives are brought together when investigating an object or research question. These perspectives can consist in different methods that are applied, in different theoretical approaches that are followed or more frequently in a combination of different types of data or data collection methods. It also refers to the collection of data from different persons or stakeholder groups which are contrasted. (UNEP/SETAC guidelines for S-LCA)
Unit process	A unit process is a non-aggregated process. (ISO 14040)
Value chain	A value chain comprises all successive stages of supply networks that create value as production of raw materials, production of intermediate products, production of final products, but also the recycling stage.
Waste	Substances or objects which the holder intends or is required to dispose of. (ISO 14040)
WEEE directive	European directive regarding e-waste. The directive aims to reduce the e-waste amount per capita and regularises the recycling and disposal respectively of e-waste.
Weighting	Converting and possibly aggregating indicator results across impact categories using numerical factors based on value-choices; data prior to weighting should remain available. (ISO 14040)

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Annex I: Criteria of the EU Ecolabel for Portable Computers

Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:115:0035:0041:EN:PDF>

Ecological Criteria

1. Energy savings

The portable computer shall be equipped with an easily accessible on/off switch.

The portable computer shall support the ACPI (1) S3 sleep state (suspend to RAM) to allow minimum energy consumption of no more than 3 watts. The computer shall be able to wake up from this mode in response to a command from any of the following:

- modem,
- network connection,
- keyboard or mouse action.

The default mode-change time from operation to the ACPI S3 sleep state shall be no more than 15 minutes of inactivity. The manufacturer must enable this feature.

The portable computer shall have a maximum off-mode consumption of no more than 2 watts when the battery is fully charged and the power supply is connected to the electricity supply. In this context, the off-mode is the state initiated through the command to shut down the computer.

The power supply of the portable computer shall have a maximum consumption of no more than 0,75 watt when it is connected to the electricity supply but is not connected to the computer.

The applicant shall provide the competent body with a report certifying that the level of power consumption in both the ACPI S3 mode and the off-mode have been measured using the procedure in the current Energy Star (2) computer memorandum of understanding. The report shall state the measured power consumptions in both of these modes. The applicant shall declare compliance with the power supply requirement.

2. Lifetime extension

The availability of compatible batteries and power supplies and of the keyboard and its parts shall be guaranteed for three years from the time that production ceases. In addition the portable computer shall meet the following criteria:

- the computer shall be designed so that the memory is easily accessible and can be changed,
- the computer shall be designed so that the hard disc, and if available either the CD drive or DVD drive, can be changed.

The applicant shall declare the compliance of the product with these requirements to the competent body.

3. Mercury content of the display

The background lighting of the flat panel display shall not contain more than 3 mg of mercury on average per lamp.

The display of a personal data assistant (PDA) shall contain no mercury.

The applicant shall declare the compliance of the product with these requirements to the competent body.

4. Noise

The declared A-weighted sound power level' (re lpW) of the portable computer, according to paragraph 3.2.5 of ISO 9296, shall not exceed:

- 3,5 B(A) in the idle operating mode (equivalent to 35 dB(A)),
- 4,0 B(A) when accessing a hard- drive (disc equivalent to 40 dB(A)).

The applicant shall provide a report to the competent body, prepared by an independent test laboratory accredited to ISO 17025, certifying that the levels of noise emissions have been measured in accordance with ISO 7779 and declared in accordance with ISO 9296. The report shall state the measured levels of noise emissions in both the idle operating mode and when accessing a disk drive, and be declared in accordance with paragraph 3.2.5 of ISO 9296.

5. Electromagnetic emissions

The portable computer shall meet the requirements set out in EN50279, Category A. The applicant shall provide a report to the competent body showing that the product's emissions are compliant with the requirement.

6. Take-back, recycling and hazardous substances

The manufacturer shall offer, free-of-charge, the take-back for refurbishment or recycling of the product and for any component being replaced, except for items contaminated by users (e.g. in medical or nuclear applications). In addition, the product shall meet the following criteria:

- (a) one qualified person alone, shall be able to dismantle it;
- (b) the manufacturer shall check the disassembly of the unit and provide a disassembly report that shall be made available to third parties on request. Amongst others, the report shall confirm that:
 - connections are easy to find and accessible,
 - connections are as standardised as possible, L 115/38 EN Official Journal of the European Union 4.5.2005
 - connections are accessible with commonly available tools,
 - the background lighting lamps of LCD monitors are easily separable;
- (c) hazardous materials shall be separable;
- (d) 90 % (by weight) of plastic and metal materials in the housing and chassis shall be technically recyclable;
- (e) if labels are required, they shall be easily separable or inherent;
- (f) plastic parts shall:
 - have no lead or cadmium intentionally added,
 - be of one polymer or compatible polymers, except for the cover, which shall consist of no more than two types of polymers which are separable,

- contain no metal inlays that cannot be separated by a single person using simple tools;

(g) plastic parts shall not contain polybrominated biphenyl (PBB) or polybrominated diphenyl ether (PBDE) flame retardants as listed in Article 4 of Directive 2002/95/EC of the European Parliament and of the Council. This requirement shall take account of subsequent adaptations and amendments made to that Directive regarding the use of Deca-BDE.

Plastic parts shall not contain chloroparaffin flame retardants with chain length 10 to 17 carbon atoms and chlorine content greater than 50% by weight (CAS No 85535-84-8 and CAS No 85535-85-9). The applicant shall declare compliance with this requirement to the competent body;

(h) plastic parts heavier than 25 grams shall not contain flame retardant substances or preparations that are assigned at the time of applying for the eco-label any of the risk phrases:

Dangerous for health:

- R45 (may cause cancer)
- R46 (may cause heritable genetic damage)
- R60 (may impair fertility)
- R61 (may cause harm to the unborn child)

Dangerous for the environment:

- R50 (very toxic to aquatic organisms)
- R50/R53 (very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment)
- R51/R53 (toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment) as defined in Council Directive 67/548/EEC; 4.5.2005 EN Official Journal of the European Union L 115/39

(i) plastic parts shall have a permanent marking identifying the material, in conformity with ISO 11469:2000. Excluded from this criterion are extruded plastic materials and the light-guide of flat panel displays;

(j) batteries shall not contain more than 0,0001% of mercury, 0,001% of cadmium or 0,01% of lead by weight of the battery.

The applicant shall declare the compliance of the product with these requirements and shall provide to the competent body assessing the application a copy of the disassembly report.

With reference to criterion 6(h), the flame retardants that are used, if any, shall not have been assigned any of the above risk phrases nor shall they be named in Annex 1 to Directive 67/548/EEC or its subsequent amendments regarding the classification, packaging and labelling of dangerous substances. This requirement does not apply to flame retardants that on application change their chemical nature to no longer warrant classification under any of the R-phrases listed above, and where less than 0,1 % of the flame retardant in the treated part remains in the form as before application. Any flame retardants that are used in plastic parts >25g must be specified in the application documentation by giving their name and CAS number.

7. User instructions

The product shall be sold with relevant user information, which provides advice on proper environmental use and, in particular:

- (a) recommendations for the use of the power management features, including information that disabling these features can lead to higher consumption of energy and thus can increase the running costs;
- (b) information that the energy drawn from the mains can be reduced to zero if the power supply is unplugged or if the wall socket is switched off;
- (c) information on the guarantee and the availability of spare parts. When it is appropriate for the consumer to upgrade or exchange components, information on the proper procedures shall be given;
- (d) information about the fact that the product has been designed to enable proper reuse of parts and recycling and should not be thrown away;
- (e) advice on how the consumer can make use of the manufacturer's take-back offer;
- (f) information as to how to make appropriate use of wireless local area network (WLAN) cards thus minimizing security risks;
- (g) information that the product has been awarded the Community eco-label with a brief explanation as to what this means together with an indication that more information on the eco-label can be found at the website address (http://europa.eu.int/eco_label).

The applicant shall declare the compliance of the product with these requirements, and shall provide a copy of the instruction manual to the competent body assessing the application.

8. Packaging

Packaging shall meet the following requirements:

- (a) All packaging components shall be easily separable by hand into individual materials to facilitate recycling.
- (b) Where used, cardboard packaging shall consist of at least 80% recycled material.

Assessment and verification: The applicant shall declare compliance with the requirement and provide a sample(s) of the packaging to the awarding competent body as part of the application. L 115/ 40 EN Official Journal of the European Union 4.5.2005

9. Information appearing on the eco-label

Box 2 of the eco-label shall include the following text:

- reduced energy consumption,
- designed to facilitate recycling,
- reduced noise level.

The applicant shall declare the compliance of the product with this requirement, and shall provide a copy of the ecolabel as it will appear on the packaging and/or product and/or accompanying documentation to the competent body.

Annex II: Human Rights Declaration of ASUS

Source: ASUS (2008a)

No child labor

Comply with local minimum age laws and requirements and do not employ child labor.

Minimum wages

Compensate our employees with wages and benefits that meet or even exceed the local legally required minimum.

Working hours

Provide employees with periodic holidays with pay. Do not force our employees to work more than the maximum hours of daily labor set by local laws. Comply with overtime pay requirements or compensations where required.

Health and Safety

Provide all our employees with a healthy and safe working environment with mutual trust and respect.

No harsh or inhumane treatment

Prohibit physical abuse, harassment or the threat of either.

Freely-chosen employment

Ensure no forced, bonded or involuntary prison labor is used in the production of ASUS products or services. Ensure that the overall terms of employment are voluntary.

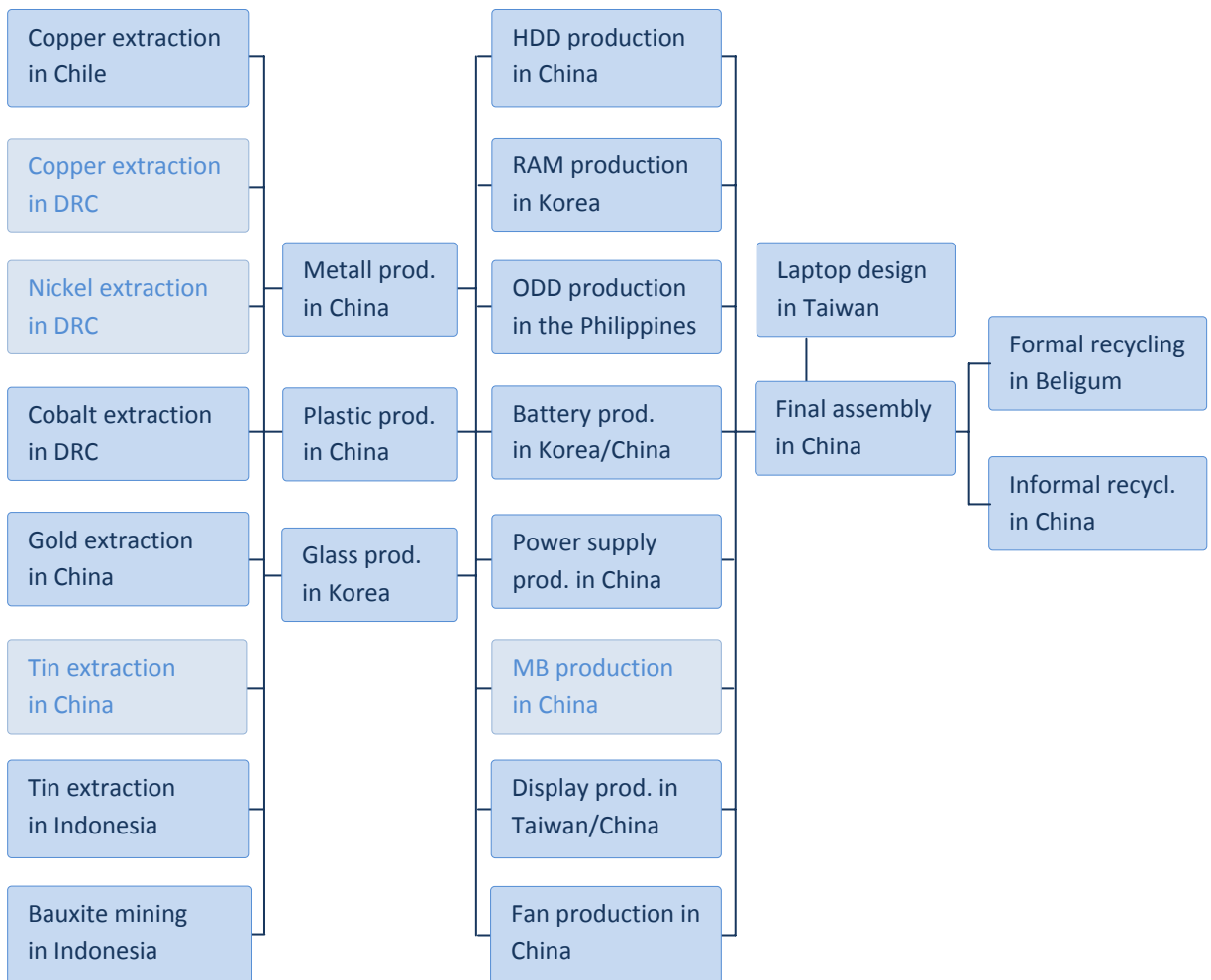
Non-discrimination

Prohibit discrimination based on race, color, age, gender, sexual orientation, ethnicity, religion, disability, union membership or political affiliation. All are entitled to equal protection against any discrimination.

Employee training and development

Provide facilities, training programs, time and subsidies to support our employees' career development.

Annex III: Product system of the S-LCA



Legend

HDD production

Considered process

Tin extraction

Indirectly considered process

Figure 9: Productsystem of the S-LCA

Annex IV: Product system of the E-LCA

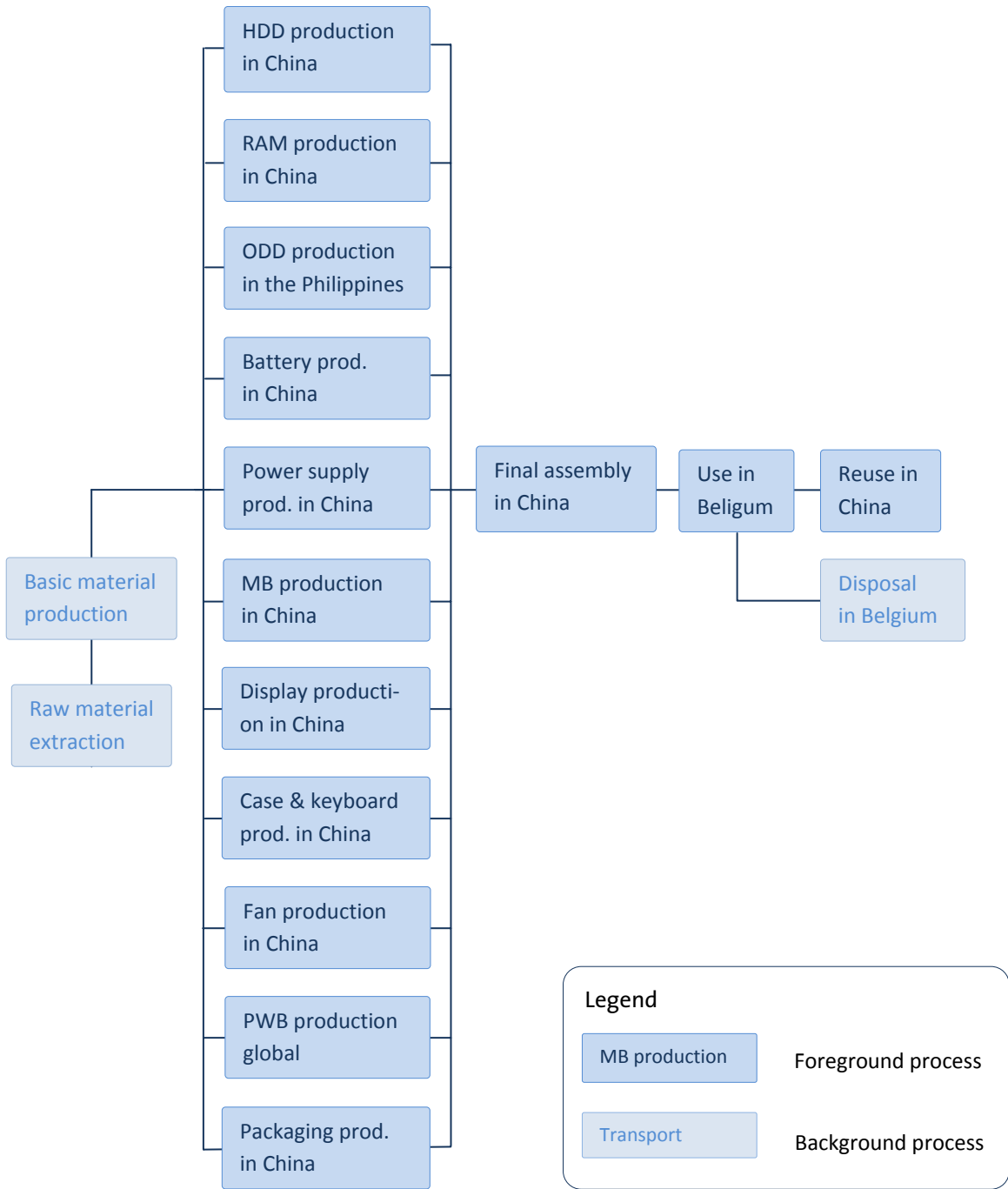


Figure 10: Productsystem of the S-LCA

Annex V: S-LCI

A Raw Material Extraction

A1 Copper from Chile

Stakeholder group workers:

Table 42: S-LCI table copper from Chile stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	Chile ratified the corresponding ILO conventions no. 87 and 98 in 1999. ²⁶⁶ Since the end of the dictatorial regime of Pinochet in the nineties there are only occasional infringements of the ILO conventions. It is reported that the clause "needs of the company", which allows dismissals for economic reasons, is sometimes misused to decruit union members or strike participants. ²⁶⁷ Thus union workers in Chile have relatively low negotiating power, because they can be replaced easily with non-union members. Around 13% of the total work force is unionized; more than 20,000 unions are registered. Employees in the private sector have generally the right to strike with some limitations. ²⁶⁸
	Presence of unions within the sector and description of their influence	The copper industry is characterised by strong labour movements. Almost 100% of workers are members of unions, because non-members earn less. ²⁶⁹ Current strikes arise from insufficient profit sharing of the mining companies with their workers. ²⁷⁰
Child labour	Percentage of child labour in country/sector	According to the ILO, less than 1% of children work in Chile. The most children work in agriculture, ranching, fishing, domestic work, and street sale. ²⁷¹ According to the US Department of State, there were also cases of child labour in the Chilean mining sector in the past. ²⁷² There was no evidence on current employing of chil-

²⁶⁶ www.ilo.org/ilolex

²⁶⁷ www.democracyweb.org/association/chile.php

²⁶⁸ www.state.gov/g/drl/rls/hrrpt/2008/wha/119152.htm

²⁶⁹ www.uni-kassel.de/fb5/frieden/regionen/Chile/streik.html and Codelco (2008), p. 113

²⁷⁰ www.coha.org/chile%E2%80%99s-mining-strike-at-la-escondida-has-ended-but-the-nation%E2%80%99s-labor-struggle-continues

²⁷¹ www.dol.gov/ilab/media/reports/iclp/tda2003/chile.htm and www.aktiv-gegen-kinderarbeit.de/welt/suedamerika/chile

²⁷² www.state.gov/g/drl/rls/hrrpt/2008/wha/119152.htm

Subcategory	Indicator	Status
		dren in copper mines found.
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	The Chilean legislation prohibits forced labour; besides Chile ratified the ILO conventions no. 29 and 105 against forced labour. ²⁷³ However, there are cases of forced labour, primarily for domestic bondage and prostitution. ²⁷⁴ The mining sector is not linked to forced labour.
	Description of kind of forced labour in the sector	-
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage in Chile amounts 222.34 EUR per month in 2010. ²⁷⁵ The living wage exceeds this value; probably it is around 400 EUR per month. ²⁷⁶ Poverty is an issue. Approximately 18% of population lives below poverty line. ²⁷⁷ However, Chile is better off in comparison to other Latin American countries.
	Wage level of the worker with lowest income and description of payment performance of the sector	Copper miners are considered as good earners. Due to rising prices of copper, unions negotiate wage increases and bonuses in the course of collective bargaining periodically. A copper mine worker with a higher education earns in average 1,300 - 1,600 EUR per month, while the wage of the worker with lowest income amounts ca. 420 EUR. ²⁷⁸
Working time	Hours of work per employee and month in average	The average working time in the mining sector in Chile amounts 45h/week. ²⁷⁹
	Number of days without work per week	Miners work in shifts. The shift system is different from mine to mine. At least miners have more than one day off in two weeks. ²⁸⁰
	Description of how overtime is handled	The workers have detailed labour contracts, which regulate overtime. Overtime is voluntary and excessive overtime does not occur.
Discrimination	Percentage of women in the labour force in the sector	Around 11% of women are employed in industry. ²⁸¹ The share of women in the mining sector

²⁷³ www.ilo.org/ilolex

²⁷⁴ www.state.gov/g/drl/rls/hrrpt/2008/wha/119152.htm

²⁷⁵ www.wageindicator.org/main/Wageindicatorfoundation/win-a-minimum-salary/-.#2010

²⁷⁶ www.sweatfree.org/nonpovertywages

²⁷⁷ www.cia.gov/library/publications/the-world-factbook/geos/ci.html

²⁷⁸ Quitzsch (2008) and Grüttner (2005)

²⁷⁹ <http://laborsta.ilo.org/STP/guest#note2291>

²⁸⁰ Córdova et al. (2007)

²⁸¹ <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?display=default>

Subcategory	Indicator	Status
		is inherently low. Moreover women have no admittance to mines due to superstitious reasons. However, females are employed in administration. For instance, at Escondida the share of women is 5% of total staff. ²⁸² Codelco employs 1,379 women, what comes up 7.1% of the total work force. ²⁸³
	Country gender index ranking	Rank 26 of 102 ²⁸⁴
	Occurrence of discrimination in the country/sector	Discrimination against women is persistent. Women suffer from employment discrimination and are affected by discrimination in politics, media, and the family. ²⁸⁵
	Ratio of salary of women to wages of men in sector	60.2% ²⁸⁶
Health and safety	Description of potential main origins of danger	The mining sector is inherently relatively dangerous. Main origins of danger are blastings, landslides, cave-ins, and suffocation. Modern, large-scale mines are characterized by a high degree of automation, which minimises the danger for humans. However, small-scale and medium-scale mines use often outdated technologies and violate safety regulations. ²⁸⁷ Most copper mines are certified according to ISO 90001 and OHSAS 18001. ²⁸⁸
	Accident rate of the country /sector	Chile's occupational accident rate per 100,000 employees amounts 14,458. The fatality rate is 15.4. ²⁸⁹ No information about the accident rate in the mining sector found.
Social benefits/ social security	Social security expenditures of the country/sector	Chile's government invests just 15% of GDP in social expenditures. ²⁹⁰ No information found regarding the amount of sectoral social expenditures.

Stakeholder group local community:

²⁸² Escondida (2008), p. 9

²⁸³ Codelco (2008), p. 128

²⁸⁴ www.genderindex.org

²⁸⁵ <http://genderindex.org/country/chile> and ICFTU (2003)

²⁸⁶ ICFTU (2003), p. 6

²⁸⁷ www.spiegel.de/wissenschaft/technik/0,1518,723319,00.html

²⁸⁸ www.codelco.com and www.escondida.cl

²⁸⁹ Hämäläinen/Saarela/Takala (2009)

²⁹⁰ ECLAC (2006)

Table 43: S-LCI table copper from Chile stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information found on resource use of the country. The industrial freshwater withdrawal in Chile amounts ca. 25%. ²⁹¹ The mining sector is characterised by high extraction of material resources and water.
	Percent of population with access to improved sanitation facilities	94% in 2006 ²⁹²
	Existence of projects to improve community infrastructure	The large companies of the sector initiate cultural, educational, and social projects to improve the living conditions in the communities. ²⁹³ For instance, the mining company Escondida initiate projects that comprise the implementing of drinking water supply systems and the construction of houses for people of shanty towns or sport fields. ²⁹⁴
	Presence of certified environmental management systems	Most copper mines are certified according to ISO 14001. ²⁹⁵
	Description of (potential) material resource conflicts	The mining sector requires large volumes of water. Waste water is burdened with heavy metals and can affect the environment severely. Since the Chilean copper mines are located in the Atacama Desert, water shortage is an unavoidable issue. The Atacama Desert is the driest desert in the world and large withdrawal of water has great impacts for the environment, farmers, and cities. The growing competition for water has led to increased water prices. ²⁹⁶
Access to immaterial resources	Freedom of expression in country/sector	Chile is ranked to be free concerning press freedom. ²⁹⁷ Due to the high presence of trade unions it is assumed that also the sector respects freedom of expression.

²⁹¹ www.cia.gov/library/publications/the-world-factbook/geos/ci.html

²⁹² www.unicef.org/infobycountry/chile_statistics.html and <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default>

²⁹³ www.codelco.com/english/desarrollo/fr_comunidad.html, www.escondida.cl/mel/en/sustainable_development/community.asp and Barrick (2009), p. 5

²⁹⁴ Escondida (2008), pp. 30

²⁹⁵ www.codelco.com and www.escondida.cl

²⁹⁶ Carriger/Williams (2005)

²⁹⁷ www.freedomhouse.org/template.cfm?page=251&year=2009

Subcategory	Indicator	Status
	Annual arrests connected to protest of sector actions	No information about arrests related to copper mining activities found. Protests turned rather against gold mining.
	Presence of community education initiatives and community service programmes	Mining companies invest in education and other social initiatives. ²⁹⁸
Delocalisation and migration	Migration rate of the country	Chile has meanwhile a light positive migration rate of 0.4 migrants/1,000 inhabitants (time frame from 2005 to 2010). ²⁹⁹ Chilean copper mines are located in the north of Chile, which is thinly populated. The heart of the Chilean copper production lies in the Atacama Desert. Thus the mining industry contributes to a positive migration rate of outlying regions.
	Number of individuals who resettle that can be attributed to the sector	No evidence of forced resettlements with regard to copper mines could be found.
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	Codelco established a museum for archaeological finds discovered in areas that will be flooded by tailings. ³⁰⁰
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	In the history of Chile there are many violations of Human rights regarding indigenous people. The main problem relates to land ownerships and territorial rights. In addition, the living standard of indigenous people is below the national average. ³⁰¹ Since the nineties Chile tries to improve the living conditions of the indigenous population; however, in 2003 the situation of indigenous people in Chile was still classified as severe according to a report of the UN. ³⁰² Only

²⁹⁸ www.codelco.com/english/desarrollo/fr_comunidad.html, www.escondida.cl/mel/en/sustainable_development/community.asp and Barrick (2009), p. 5

²⁹⁹ www.iom.int/jahia/Jahia/chile

³⁰⁰ www.codelco.com/english/desarrollo/fr_comunidad.html

³⁰¹ www.amnesty.org/en/region/chile/report-2009

³⁰² Stavenhagen (2003)

Subcategory	Indicator	Status
		<p>in 2008 Chile ratified the ILO convention no. 169 that protects indigenous people.³⁰³</p> <p>The settlement of indigenous people concentrates on southern Chile, while Chilean copper mines are located in northern Chile. Thus there are only a few indigenous communities, who are affected of the copper mining sector.</p>
	Respect of the sector regarding indigenous rights	<p>Some mining companies consider indigenous people within their defined corporate social responsibility. Codelco, for instance, implemented a program for them. The program aims to support local indigenous communities improving the access of resources and strengthening social capital.³⁰⁴</p> <p>On the other hand there are reproaches that companies acquire land, what is owned by indigenous peoples.³⁰⁵</p>
Safe and healthy living conditions	Burden of disease in the country	<p>Chile has a DALY rate of 13, which is rather low in international comparison.³⁰⁶ However there is a high lung and bladder cancer risk in northern Chile, which can be connected to the arsenic emissions of the mining industry.³⁰⁷</p> <p>The life expectancy at birth amounts 77.53 years.³⁰⁸</p>
	Pollution level of the country and contribution of the sector to the environmental load	<p>The main environmental problems in the country are air as well as water pollution, and deforestation.</p> <p>The CO₂ emissions amount 3.6 metric tons per capita, the content of PM 10 is 48µg/m³.³⁰⁹</p> <p>The copper industry contributes mainly to the environmental load by sulphur dioxide, arsenic, and particulate material (PM 10) emissions. In addition, the mines consume much water and energy. Further problems are the land use of</p>

³⁰³ www.ilo.org/ilolex/english/newratframeE.htm

³⁰⁴ www.codelco.com/english/desarrollo/fr_comunidad.html, www.escondida.cl/mel/en/sustainable_development/community_2.asp and www.barrick.com/CorporateResponsibility/Community/IndigenousCultures/default.aspx

³⁰⁵ CorpWatch (2007), p. 12

³⁰⁶ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

³⁰⁷ www.minesandcommunities.org/article.php?a=2510

³⁰⁸ www.cia.gov/library/publications/the-world-factbook/geos/ci.html

³⁰⁹ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,menuPK:2875803~pagePK:64168427~piPK:64168435~theSitePK:2875751,00.html>

Subcategory	Indicator	Status
		surface mining and the disposal of tailings, leaching residues, and other mine products. ³¹⁰
	Sector effort to improve the environmental performance	Decontamination measurements were implemented by all copper smelters. Further, the companies increased their energy efficiency and established waste as well as water management.
Secure living conditions	Crime rate	Chile has a moderate crime rate. In comparison to other Latin American countries it has with Uruguay and Costa Rica the lowest crime rate. ³¹¹ In the Global Peace Index Ranking Chile is placed on rank 28 of 149. ³¹²
	Management policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	The percentage of unemployment in country average amounted 10% in 2009. ³¹³
	Percentage of work force hired locally	The percentage of local workers is relatively high. At Escondida for instance, the local personnel make up around 70% of total work force. ³¹⁴
Community engagement	Description of community engagement of the sector	All large mining companies engage in their communities. They plant trees, build fences to protect animals against process solutions, support cultural initiatives, provide micro loans, or invest in health care. ³¹⁵ Participation of local communities regarding corporate plans is rather not practiced.

Stakeholder group society:

Table 44: S-LCI table copper from Chile stakeholder society

Subcategory	Indicator	Status
Public	Presence of publicly available promises or agree-	None.

³¹⁰ Castro/Sánchez (2002) and www.kas.de/proj/home/pub/52/1/year-2005/dokument_id-7637/index.html

³¹¹ van der Horst (2010)

³¹² www.visionofhumanity.org/gpi-data/#/2010/scor

³¹³ Castro/Sánchez (2002) and www.cia.gov/library/publications/the-world-factbook/geos/ci.html

³¹⁴ Escondida (2008), p. 9

³¹⁵ www.codelco.com/english/desarrollo/fr_comunidad.html, www.escondida.cl/mel/en/sustainable_development/community_2.asp and Barrick (2009), p. 5

Subcategory	Indicator	Status
commitments to sustainable issues	ments on sustainable issues and complaints to the non fulfilment of these commitments	
	Implementation/signing of principles or codes of conducts	Some mining companies have implemented own codes of conducts. ³¹⁶
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	In 2008, Chile had an economic growth rate of 3.7%; in 2009, the growth rate was negative and amounted to -1.5%. For the year 2010 a positive growth rate of 1% was stated regarding the first trimester. The GDP in 2009 amounted to 137,300 billion EUR. ³¹⁷ The mining of copper is an important economic sector. Around 40% of the worldwide copper deposits are located in Chile. The mining sector contributes with circa 13% to the GDP. ³¹⁸ Many mining companies are state-owned. Copper is one of the most important Chilean export goods. The global demand is growing – foremost China boosts the market. To be more efficient the degree of automation increases steadily. ³¹⁹ This leads to the reduction of jobs.
Prevention and mitigation of conflicts	Presence of conflicts in the country	Chile is involved in several conflicts. Due to territory and resources there are conflicts with Bolivia and Peru since 1945. There are also conflicts concerning the United Kingdom for same reasons. The intensity of these conflicts is admittedly low in contrast to the conflict with the Mapuche indians. The secession conflict between Mapuche groups and the Chilean government in southern Chile is classified as violent crisis. ³²⁰
	Risk of conflicts with regard to the sector and measures to reduce the risk	The risk of conflicts affecting the mining sector is increasing. Environmental pollution, resource depletion, and increasing job cuts due to automation lead to discontent. ³²¹ An example is the Pascua Lama project, a gold-silver-copper mine

³¹⁶ www.barrick.com/Company/CorporateGovernance/CodeofEthics/default.aspx, Escondida (2008), p. 8 and Codelco (2008), p. 49

³¹⁷ Banco Central de Chile (2010)

³¹⁸ www.state.gov/r/pa/ei/bgn/1981.htm

³¹⁹ Grüttner (2005)

³²⁰ Heidelberg Institute for International Conflict Research (2009), pp. 43.

³²¹ www.bpb.de/themen/AG1LTV.html

Subcategory	Indicator	Status
		of Barrack Gold Corporation in the Chilean-Argentinean borderland. ³²² The mining sector shows only a moderate engagement to reduce (potential) conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	The Chilean mining sector is characterized by a high degree of automatization. Indeed, the main aim of technology development is not eco-friendliness, but rather a more efficient production.
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	According to Transparency International, Chile has a corruption index of 6.7 (10 means not corrupt and 1 means totally corrupt) and thus it ranks on place 25 together with Uruguay. ³²³ Therefore it is believed that the risk of corruption in the Chilean mining sector is moderate.

A2 Cobalt, Copper, and Nickel from the Congo

Stakeholder group workers:

Table 45: S-LCI table cobalt, copper, and nickel from DRC stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	The law provides in general the right to form and join unions as well as the right for collective bargaining for workers. In practice, these rights are restricted. For instance, striking workers and trade unionists are fired, many unions do not engage in collective bargaining, or collective agreements are violated. ³²⁴ Many private companies registered bogus unions to intimidate real unions. Most unions of private companies have no members and were established by management. ³²⁵
	Presence of unions within the sector and description of their influence	There are around 400 unions in the private sector. 0.5% of workers are union members. One reason for such a low rate of unionisation is the

³²² CorpWatch (2007), www.sumacontrapascualama.blogspot.com and www.protestbarrick.net

³²³ Transparency International (2010)

³²⁴ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm and <http://survey09.ituc-csi.org/survey.php?IDContinent=1&IDCountry=COD&Lang=EN>

³²⁵ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm

Subcategory	Indicator	Status
		<p>informal sector. It is estimated that the informal sector accounts at least for 90% of the economy.³²⁶</p> <p>Almost all companies in Katanga possess unions, but their influence is very low. Some unions are fully controlled by the company.³²⁷</p> <p>In the informal mining sector there are no unions.³²⁸</p>
Child labour	Percentage of child labour in country/sector	<p>In country average 39.8% of the 5 - 14 year old children work. Affected industries are agriculture, prostitution, military, and mining.³²⁹</p> <p>Around 50,000 of the 100,000 - 140,000 artisanal miners are children or adolescents, what equates a percentage of 35 to 50. Also the formal sector employs children, but the percentage is rather low.³³⁰</p>
	Description of kind of child labour in the sector	<p>Some children work in mines, because the most holes are very small, and shovel into the walls to search for ore. Most of them, wash, sift, and transport the rocks.³³¹</p> <p>There are no protecting measures and the extraction of metals in mines is classified as one of the worst forms of child labour.³³²</p>
Forced labour	Frequency of forced labour in country/sector	<p>Forced labour occurs in several sectors as agriculture, military, domestic and sexual servitude, or mining. Further, DR Congo is a source and destination for human trafficking.³³³</p> <p>According to reports, armed groups and Congolese national army troops forced men and boys to mining. In addition, many artisanal miners are exploited in situations of debt bondage by enterprisers. The miners buy tools, food, or other provisions at exorbitant prices and must sell the ablated minerals at prices below the market value.³³⁴</p>

³²⁶ *ibidem*

³²⁷ SwedWatch (2007), pp. 36

³²⁸ SwedWatch (2007), p. 30

³²⁹ U.S. Department of State (2006) and U.S. Department of Labor (2009), pp. 15

³³⁰ SwedWatch (2007), p. 30 and 37

³³¹ Global Witness (2006), p. 32 and Clark/Smith/Wild (2008)

³³² Clark/Smith/Wild (2008)

³³³ www.state.gov/g/tip/rls/tiprpt/2010/142759.htm

³³⁴ www.state.gov/g/tip/rls/tiprpt/2010/142759.htm

Subcategory	Indicator	Status
	Description of kind of forced labour in the sector	Forced labourer dig ore in mines. ³³⁵
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage amounts 500 CDF per day (0.42 EUR). This results in a maximal monthly salary of 15,000 CDF (12.75 EUR). The average monthly wage did not provide a decent standard of living. ³³⁶
	Wage level of the worker with lowest income and description of payment performance of the sector	Day-workers in the mining industry carry a wage of 3 - 4 USD per day (2,800 - 3,700 CDF). Informal diggers earn about 2 - 4 USD per day (1,900 - 3,700 CDF). ³³⁷ Both wages exceed the minimum wage by far; however it is questionable, if the salary is adequate.
Working time	Hours of work per employee and month in average	Long working hours are common. ³³⁸ Informal diggers work up to 270h/month. ³³⁹
	Number of days without work per week	No information found about days off of formal miners. Artisanal miners work nearly every day. ³⁴⁰
	Description of how overtime is handled	No information found regarding the handling of overtime in mining companies. In any case regulations regarding overtime do not apply to informal workers.
Discrimination	Percentage of women in the labour force in the sector	While the formal mining sector employs predominantly men, the percentage of women in artisanal mining is very high in Africa. It amounts 40 - 50%. ³⁴¹
	Country gender index ranking	Rank 79 of 102. ³⁴²
	Occurrence of discrimination in the country/sector	Discrimination is widespread. Women and children have a disrespected social rank. Abuse and rape are frequent, also forced and child labour. Especially military troops are involved in abuse. In addition, women are confronted with occupational discrimination. ³⁴³

³³⁵ Global Witness (2009)

³³⁶ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm

³³⁷ Global Witness (2006), p. 19 and 33 and Clark/Smith/Wild (2008)

³³⁸ RAID (2009), p. 3

³³⁹ Clark/Smith/Wild (2008)

³⁴⁰ ibidem

³⁴¹ Hinton/Veiga/Beinhoff (2003), p. 2

³⁴² www.genderindex.org

³⁴³ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm, <http://genderindex.org/country/congo-dem-rep>, www.amnesty.de/jahresbericht/2010/kongo-demokratische-republik?destination=no%2F2960#gewaltgegenfrauenundmdchen and Pact Congo

Subcategory	Indicator	Status
		Disabled persons are confronted with discrimination in employment, education, and the provision of other governmental services. ³⁴⁴ In addition, societal discrimination as well as employment discrimination based on ethnic heritage, including indigenous people, is common. It is practiced by members of nearly all ethnic groups in the country. ³⁴⁵
	Ratio of salary of women to wages of men in sector	Women do not receive equal pay. Their income in the informal sector depends on activity, mine, and market prices. ³⁴⁶ A ratio of salary women to men cannot be specified.
Health and safety	Description of potential main origins of danger	The mining sector carries the dangers of landslips and cave-ins. Since Congolese mines have hardly any safety arrangements, accidents are very frequent. Further, there are no fans for air circulation, what increases the danger of suffocation. ³⁴⁷ Most workers of the informal sector have no protection clothes, work with simple tools, and have no training. ³⁴⁸ Workers of the formal sector receive safety equipment from mining companies.
	Accident rate of the country /sector	Congo's occupational accident rate amounts 17,695 per 100,000 employees. The fatality rate is 18.8. ³⁴⁹ The accident rate of the mines is very high, also the fatality rate, due to the lack of safety measures. ³⁵⁰
Social benefits/ social security	Social security expenditures of the country/sector	The social expenditure amounts around 7% of government primary expenditure. ³⁵¹ The formal sector pays some benefits, but day workers are disadvantaged in comparison with permanent workers. ³⁵² The informal mining sector does not take care of health care or other benefits and does not pay for insurance protection. ³⁵³

³⁴⁴ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm

³⁴⁵ www.state.gov/g/drl/rls/hrrpt/2006/78728.htm and www.state.gov/g/drl/rls/hrrpt/2004/41598.htm

³⁴⁶ Pact Congo

³⁴⁷ Clark/Smith/Wild (2008)

³⁴⁸ Global Witness (2006), pp. 26

³⁴⁹ Hämäläinen/Saarela/Takala (2009)

³⁵⁰ Global Witness (2006), pp. 26

³⁵¹ IMF (2003), p. 8

³⁵² SwedWatch (2007), pp. 35

³⁵³ Global Witness (2006), p. 19

Stakeholder group local community:

Table 46: S-LCI table cobalt, copper, and nickel from DRC stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No statistics found regarding material resource extraction. The industrial freshwater withdrawal amounts around 17%. ³⁵⁴ The mining sector is characterised by high material resource extractions and high water consumption.
	Percent of population with access to improved sanitation facilities	No information available. Around 43% of population have access to improved water sources.
	Existence of projects to improve community infrastructure	Mining companies initiate several projects to improve the regional infrastructure. They support health care, reconstruct roads, or modernise water supply. ³⁵⁵
	Presence of certified environmental management systems	None. ³⁵⁶
	Description of (potential) material resource conflicts	There are conflicts regarding raw materials as cobalt belongs to the rare metals and is relatively valuable. Potential causes for conflicts are the high water consumption and the massive environmental pollution.
Access to immaterial resources	Freedom of expression in country/sector	The press freedom of the Congo is classified as “not free”. ³⁵⁷ Journalists, human rights defenders, or union members are threaten and prosecuted. ³⁵⁸ It is assumed that also the freedom of expression in the sector is seriously restricted.
	Annual arrests connected to protest of sector actions	No information available.
	Presence of community education initiatives and	The mining companies invest among others also in education. They build schools and engage in

³⁵⁴ www.cia.gov/library/publications/the-world-factbook/geos/cg.html

³⁵⁵ www.katangamining.com/kat/corp_respo/communityinvestment and www.anvilmining.com/go/corporate-social-responsibility/community-development

³⁵⁶ Clark/Smith/Wild (2008)

³⁵⁷ www.freedomhouse.org/template.cfm?page=251&year=2009

³⁵⁸ www.amnesty.de/jahresbericht/2010/kongo-demokratische-republik?destination=node%2F2960#menschenrechtsverteidigerunddasrechtaufreimeinungserung and www.hrw.org/en/node/87600

Subcategory	Indicator	Status
	community service programmes	education of miners in order to supply skilled workers. ³⁵⁹
Delocalisation and migration	Migration rate of the country	The net migration rate of the Congo amounts 0.77 migrants/1,000 inhabitants. ³⁶⁰
	Number of individuals who resettle that can be attributed to the sector	There were many internally relocations in the past, but the main cause was the war in eastern Congo, not the mining activities. ³⁶¹ However, the mining sector is also responsible for resettlements. ³⁶²
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	In the DRC there are around 250 ethnic groups, who speak around 700 languages and dialects, including indigenous people. ³⁶³ In the eastern Congo live several Pygmies: Mbuti (Efé, Ausa, and Kango), Twa, and Cwa. Ethnic background is again and again cause for conflicts, including armed conflicts. Ethnic groups are kept under and fight. Mass murder, plunders, and rape are attending ills of the conflicts. ³⁶⁴ Especially Pygmies are affected by discrimination and suppression. In addition, deforestation, poverty, lack of education, intermarriage with Bantu people leads to population decrease. ³⁶⁵
	Respect of the sector regarding indigenous rights	The mining companies do not provide any information regarding the respect of indigenous

³⁵⁹ www.katangamining.com/kat/corp_respo/communityinvestment/education and www.anvilmining.com/go/corporate-social-responsibility/community-development

³⁶⁰ www.cia.gov/library/publications/the-world-factbook/geos/cg.html

³⁶¹ *ibidem*

³⁶² www.eib.org/projects/news/tenke-fungurume-mining-project-democratic-republic-of-congo-drc.htm?lang=en&

³⁶³ www.minorityrights.org/5082/democratic-republic-of-the-congo/democratic-republic-of-the-congo-overview.html

³⁶⁴ *ibidem*

³⁶⁵ www.state.gov/g/drl/rls/hrrpt/2009/af/135947.htm and www.amnesty.de/jahresbericht/2008/kongo-demokratische-republik?destination=node%2F2960

Subcategory	Indicator	Status
		rights. It is assumed that the respect regarding indigenous rights of the mining sector is rather low.
Safe and healthy living conditions	Burden of disease in the country	The DRC shows a DALY rate of 54, which is very high. ³⁶⁶ Main causes for death are diarrhoeal diseases, HIV/AIDS, respiratory infections, and Malaria. ³⁶⁷ The life expectancy at birth amounts 54.73 years. ³⁶⁸
	Pollution level of the country and contribution of the sector to the environmental load	Main environmental issues of the DRC are poaching, water pollution, and deforestation. ³⁶⁹ The mining industry plays a major role regarding the environmental burden of the DRC: The vast land use leads to deforestation and destruction of landscape. Tailings and other waste pollute water and soil. Further, the smelting of ore emits among others arsenic and carbon monoxide, what entails water and air pollution. In addition, mining causes air pollution with mineral particles. ³⁷⁰
	Sector effort to improve the environmental performance	Some companies build modern facilities, which reduce the environmental load. ³⁷¹
Secure living conditions	Crime rate	Crime is omnipresent in DRC. Thefts, burglaries, and armed robberies are frequent throughout the country; especially urban areas show a high crime rate. ³⁷² Also the eastern provinces of DRC said to be unsafe. The homicide rate is 35.2 per 100,000 individuals which is quite high in international comparison. ³⁷³ In the Global Peace Index Ranking the Congo is placed on rank 140 of 149. ³⁷⁴
	Management policies related to private security personnel	Many mines employ private security guards to safeguard the integrity of employees. ³⁷⁵

³⁶⁶ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

³⁶⁷ www.who.int/whosis/mort/profiles/mort_afro_cod_demrepcongo.pdf

³⁶⁸ www.cia.gov/library/publications/the-world-factbook/geos/cg.html

³⁶⁹ ibidem

³⁷⁰ SwedWatch (2007), pp. 40

³⁷¹ SwedWatch (2007), pp. 41

³⁷² http://travel.state.gov/travel/cis_pa_tw/cis/cis_1104.html#crime

³⁷³ <http://chartsbin.com/view/ueh>

³⁷⁴ www.visionofhumanity.org/gpi-data/#/2010/scor

³⁷⁵ www.katangamining.com/kat/corp_respo/drc_challenges

Subcategory	Indicator	Status
Local employment	Percentage of unemployment in the country	The unemployment rate of DRC amounts 8.9%, but the underemployment rate is estimated to be 81.9%. ³⁷⁶ In 2006, more than 40% of population were jobless. ³⁷⁷
	Percentage of work force hired locally	Many diggers are non-local workers. They live in camps and move from mine to mine. The majority of miners are temporary workers and do not have a permanent appointment. In addition, foreign mining companies employ foreign workers from India or China.
Community engagement	Description of community engagement of the sector	The consultation of companies with communities is kept within limits. Several companies support initiatives to improve the living conditions in the local community.

Stakeholder group society:

Table 47: S-LCI table cobalt, copper, and nickel from DRC stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	Officials in Katanga province stipulated that companies must grow 500 hectares of staple crops to combat food shortage. 16 companies do not comply with this regulation, including Chinese and Belgian companies. ³⁷⁸
	Implementation/signing of principles or codes of conducts	Several foreign companies established codes of conduct regarding human rights and labour conditions. ³⁷⁹ However, there are no effective monitoring systems to check them, especially concerning suppliers. ³⁸⁰
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	The conflicts limit the economic development of the country. They reduce the national output as well as governmental revenues and increase debt. Foreign investors withdraw from the country due to the high uncertainty, lack of infrastructure, and the general difficult situa-

³⁷⁶ www.fundforpeace.org/web/index.php?option=com_content&task=view&id=386&Itemid=543

³⁷⁷ Kasemuana (2009), p. 17

³⁷⁸ www.bloomberg.com/apps/news?pid=newsarchive&sid=aqPhXoENfwWI

³⁷⁹ www.katangamining.com/kat/corp_respo/drc_challenges and www.anvilmining.com/go/corporate-social-responsibility

³⁸⁰ Global Witness (2009)

Subcategory	Indicator	Status
		<p>tion. In 2002, the economy recovered slowly. The mining sector was the main driver for the economic development and boosted the GDP growth from 2006 to 2008. Falling world market prices affected the mining sector severely in 2009 and thus also the Congolese economy. Main export commodities are diamonds, gold, copper, cobalt, wood products, crude oil, and coffee. Main export partners are China and Belgium.³⁸¹</p> <p>The GDP in 2009 was estimated to be 21.33 billion USD. The real growth rate in the same year amounted 2.7%. The inflation rate was estimated to be 16.7%.³⁸²</p> <p>Although the mining sector dominates the DRC's economy, the contribution to the development of the country is limited due to corruption and low wages.</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country	<p>There are armed conflicts in eastern Congo since 1996. In 1998 began "Africa's World War", which involved 8 African countries, including the DRC.</p> <p>The causes for the fighting are multifaceted. Among political, ethnic, and territorial reasons, also the mineral deposits play a key role.³⁸³ The conflicts centre on the region Kivu and North Katanga.</p>
	Risk of conflicts with regard to the sector and measures to reduce the risk	<p>The conflicts are financed by profits from the mining sector. Several armed groups exploit the mines in the country.³⁸⁴ Foreign mining companies do not take active part in supporting the war.</p> <p>There is also a high risk of conflicts regarding the general working conditions and the massive environmental pollution. There are hardly actions of the mining sector to reduce the risk of conflicts.</p>
Technology development	Sector efforts in technology development regarding eco-friendliness	There are rather no efforts in technology development in the DRC.
	Investments in technology development	No information available. Probably the investments are very low.

³⁸¹ www.cia.gov/library/publications/the-world-factbook/geos/cg.html

³⁸² *ibidem*

³⁸³ Global Witness (2009)

³⁸⁴ *ibidem*

Subcategory	Indicator	Status
Corruption	Risk of corruption in country /sector	The corruption rate in the DRC is very high. The country has a corruption index of 1.9 (rank 162). ³⁸⁵ Also the mining sector is affected by corruption. Corruption was detected in every stage of the mining process. ³⁸⁶

A3 Gold from China

Stakeholder group workers:

Table 48: S-LCI table gold from China stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all unions have to officially register with and be approved by the government. ³⁸⁷
	Presence of unions within the sector and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ³⁸⁸ It is the largest trade union worldwide; however its influence is limited, because it is no independent union. They occupy rather a minor position, when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts, but they contain only minimum standards as required by national legislation. ³⁸⁹
Child labour	Percentage of child labour in country/sector	There are no official statistics about child labour in China. However, child labour is considered as a rising problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ³⁹⁰ Gold mining in China is not involved in child labour.

³⁸⁵ Transparency International (2010)

³⁸⁶ Global Witness (2006), pp. 14

³⁸⁷ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

³⁸⁸ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

³⁸⁹ Metcalf/Li (2006) and interview with China Labour Bulletin

³⁹⁰ U.S. Department of Labor (2009), p. 15, China Labour Bulletin (2007) and www.ihlo.org/LR/C/W/020807.html

Subcategory	Indicator	Status
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ³⁹¹ Forced labour occurs in coal mines; gold mines are not affected. ³⁹²
	Description of kind of forced labour in the sector	-
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage ranges from 605 - 1,120 CNY/month. ³⁹³ The living costs are deemed to be higher.
	Wage level of the worker with lowest income and description of payment performance of the sector	It is assumed that workers with lowest income in legal mines earn the minimum wage.
Working time	Hours of work per employee and month in average	The average working time of legal miners is 45 - 48 hours per week. ³⁹⁴ The working time of workers of illegal mines cannot be specified; it is probably higher.
	Number of days without work per week	It is assumed that workers get 1 day off per week.
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	The percentage of women in the Asian mining sector is rather low. While the artisanal mining sector employs less than 10% women, ³⁹⁵ the percentage in large-scale mines is any lower.

³⁹¹ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

³⁹² www.china-labour.org.hk/en/node/39622

³⁹³ <http://baike.baidu.com/view/895266.htm>

³⁹⁴ <http://laborsta.ilo.org/STP/guest>

³⁹⁵ Hinton/Veiga/Beinhoff (2003), p. 2

Subcategory	Indicator	Status
	Country gender index ranking	Rank 83 of 102 ³⁹⁶
	Occurrence of discrimination in the country/sector	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ³⁹⁷ Also discrimination in the workplace is common. ³⁹⁸ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract. ³⁹⁹ Employment discrimination against women is also present. ⁴⁰⁰ The share of migrant workers in the mining sector amounts 56%. ⁴⁰¹
	Ratio of salary of women to wages of men in sector	Employed women in the formal mining sector work exclusively in administration or accountant; there are no female miners.
Health and safety	Description of potential main origins of danger	Today gold is mainly extracted in surface mines, often with explosive. In order to dissolve the gold from rocks, the stones are grinded up and treated with cyanide. It remains liquid mining waste, which is dumped in large basins. Frequently these basins burst or overrun. ⁴⁰²
	Accident rate of the country/sector	Although Asia has very high accident rates, China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ⁴⁰³ However, the accident rate in China's mining sector is very high, especially in small-scale mines. There are in average 17 fatal accidents in Chinese mines per day, what results in more than 6,000 mining deaths a year. Particularly affected are coal mines. ⁴⁰⁴ In 2008, China's state news agency

³⁹⁶ www.genderindex.org

³⁹⁷ www.state.gov/g/drl/rls/irf/2009/127268.htm

³⁹⁸ Séguin (2009)

³⁹⁹ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

⁴⁰⁰ <http://genderindex.org/country/china>

⁴⁰¹ <http://libcom.org/history/chinas-migrant-workers>

⁴⁰² FIAN Deutschland (2007) and www.epochtimes.de/articles/2006/05/08/21267.html

⁴⁰³ Hämäläinen/Saarela/Takala (2009)

⁴⁰⁴ www.minesandcommunities.org/article.php?a=8213

Subcategory	Indicator	Status
		Xinhua reported 413,700 accidents. ⁴⁰⁵ Official numbers show lower accident rates. ⁴⁰⁶
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ⁴⁰⁷ No information about social expenditures of the Chinese mining sector.

Stakeholder group local community:

Table 49: S-LCI table gold from China stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of total freshwater withdrawals. ⁴⁰⁸ The mining sector is characterised by high material resource extraction and water consumption.
	Percent of population with access to improved sanitation facilities	65% ⁴⁰⁹
	Existence of projects to improve community infrastructure	There are some mining companies that improve community infrastructure. ⁴¹⁰
	Presence of certified environmental management systems	Some mines are certified according to ISO 14001. ⁴¹¹
	Description of (potential) material resource conflicts	The high level of water consumption and water pollution can lead to conflicts. The high land consumption as well is a potential cause for resistance.
Access to immaterial resources	Freedom of expression in country/sector	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the

⁴⁰⁵ <http://news.bbc.co.uk/2/hi/7855330.stm> and <http://news.bbc.co.uk/2/hi/asia-pacific/6607419.stm>

⁴⁰⁶ www.hurriyetdailynews.com/n.php?n=china-flood-toll-rises-to-175-dead-as-more-rain-forecast-2010-06-21 and www.acftu.org.cn/template/10002/file.jsp?cid=51&aid=241

⁴⁰⁷ IMF (2010), p. 5

⁴⁰⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁴⁰⁹ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/infobycountry/china_statistics.html#65

⁴¹⁰ www.eldoradogold.com/s/CorporateResponsibility.asp

⁴¹¹ www.zjky.cn/english/tabid/188/Default.aspx

Subcategory	Indicator	Status
		international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category “not free”. Media censorship through governmental organisations is common and the judiciary is not independent. ⁴¹² It is assumed that the freedom of expression is restricted in the entire country, including the mining sector.
	Annual arrests connected to protest of sector actions	No information available.
	Presence of community education initiatives and community service programmes	Some mining companies engage in education and other initiatives. ⁴¹³
Delocalisation and migration	Migration rate of the country	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ⁴¹⁴
	Number of individuals who resettle that can be attributed to the sector	No specific information found. Between 1950 and 2000 a total of 45.1 million people were resettled in China. Causes for resettlements are dams, roads, mines, or other infrastructure projects. ⁴¹⁵
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	In general, it seems that Chinese mining companies have rather a little respect regarding cultural heritage. Generating of profits take centre stage of company behaviour.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people. ⁴¹⁶ But there are officially 55 ethnic minority groups in the country ⁴¹⁷ who account for less than 9% of

⁴¹² www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

⁴¹³ www.eldoradogold.com/s/CorporateResponsibility.asp

⁴¹⁴ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

⁴¹⁵ Fuggle/Smith (2000), p. 72, Fearnside (1992) and www.freetibet.org/campaigns/nomadic-resettlement-qa

⁴¹⁶ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

⁴¹⁷ www.china.org.cn/e-white/phumanrights19/p-8.htm

Subcategory	Indicator	Status
		<p>population.⁴¹⁸ In addition, there are undistinguished ethnic groups that have not been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.⁴¹⁹</p> <p>The Chinese constitution provides equal rights to all ethnic groups.⁴²⁰ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides, there is an inflow of Han Chinese into indigenous regions.⁴²¹</p>
	Respect of the sector regarding indigenous rights	-
Safe and healthy living conditions	Burden of disease in the country	<p>China has a DALY rate of 16, which is relatively low.⁴²² The risk of infectious diseases is classified as intermediate.⁴²³ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year.</p> <p>In addition, around 200 million individuals suffer from occupational diseases.⁴²⁴ 80% of them suffer from pneumoconiosis.⁴²⁵ Most workers suffering from acute pneumoconiosis are commonly found in industries as gold mining, quartz cutting, and canal construction.⁴²⁶</p> <p>The life expectancy at birth amounts 74.51 years.⁴²⁷</p>
	Pollution level of the country and contribution of the sector to the environmental load	China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causers are energy production and consumption based on

⁴¹⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁴¹⁹ The World Bank (2007)

⁴²⁰ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁴²¹ www.amnesty.org

⁴²² http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁴²³ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁴²⁴ <http://en.epochtimes.com/news/7-2-24/52097.html>

⁴²⁵ www.china-labour.org.hk/en/node/100744

⁴²⁶ www.clb.org.hk/en/node/38422

⁴²⁷ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		<p>coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.⁴²⁸</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m³.⁴²⁹</p> <p>Gold mining contributes significantly to the environmental load. While small-scale mines use mercury to separate the gold, large-scale mines apply cyanide. Both processes lead to severe environmental issues. Other environmental problems are acid mine drainage, high water consumption, dumping of tailings, and emissions of arsenic. Deforestation, soil erosion, and land use are also connected to mining activities.⁴³⁰</p>
	Sector effort to improve the environmental performance	Sector efforts regarding the reduction of hazardous substances are estimated as low. Although some mining companies emphasise their engagement in environmental concerns they do not publish efforts or concrete measures. ⁴³¹
Secure living conditions	Crime rate	Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ⁴³² Global Peace Index: Rank 80 of 149 ⁴³³
	Sector policies related to private security personnel	Mines employ security personnel; to what extent their security guards contain local crime cannot be stated.

⁴²⁸ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁴²⁹ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATASTA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

⁴³⁰ www.fairtrademinerals.de/projekte/gruenes-gold.html,

www.worstpolluted.org/projects_reports/display/56,

www.worstpolluted.org/projects_reports/display/60 and FIAN (2007)

⁴³¹ www.eldoradogold.com/s/CorporateResponsibility.asp and www.zjky.cn/english/tabid/188/Default.aspx

⁴³² http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

⁴³³ www.visionofhumanity.org/gpi-data/#/2010/scor

Subcategory	Indicator	Status
Local employment	Percentage of unemployment in the country	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ⁴³⁴
	Percentage of work force hired locally	Around 44% of the work force in mines is hired locally. ⁴³⁵
Community engagement	Description of community engagement of the sector	A few mining companies invest in local communities and promise to initiate dialogues with local community members. ⁴³⁶

Stakeholder group society:

Table 50: S-LCI table gold from China stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	Only a few mining companies have implemented codes of conducts. ⁴³⁷
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	<p>Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed.⁴³⁸</p> <p>The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009.⁴³⁹</p> <p>China is relatively rich in mineral resources. It is the world's largest producer of coal, steel, ce-</p>

⁴³⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁴³⁵ <http://libcom.org/history/chinas-migrant-workers>

⁴³⁶ www.eldoradogold.com/s/CorporateResponsibility.asp and www.zjky.cn/english/tabid/170/Default.aspx

⁴³⁷ www.eldoradogold.com/i/pdf/CodeEthics-2009.pdf

⁴³⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁴³⁹ ibidem

Subcategory	Indicator	Status
		ment, aluminium, lead, zinc, tin, magnesium, tungsten, antimony, mercury, rare earth, and fluorspar. ⁴⁴⁰ Coevally, China is the largest resource consumer. ⁴⁴¹ Thus the mining industry is a key sector regarding economic growth. It is a very lucrative business; even small illegal mines generate profits of 1 million CNY. ⁴⁴² Indeed, the profit allocation is unbalanced. While mine owners gain wealth, workers go away nearly empty-handed.
Prevention and mitigation of conflicts	Presence of conflicts in the country	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, and Vietnam. ⁴⁴³ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ⁴⁴⁴ Especially industrial centres are involved. ⁴⁴⁵
	Risk of conflicts with regard to the sector and measures to reduce the risk	The risk of conflicts is rather high due to massive environmental pollution. Primarily the pollution of drinking water is an issue, but also the hazardous working conditions, low wages, and other environmental problems as land use and emissions can prompt conflicts. ⁴⁴⁶ The sector does not endeavour to reduce the risk of conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	No information available. The sector efforts are estimated to be low.
	Investments in technology development	Chinas mining sector has been generally considered low-tech and inefficient using outdated technologies, why the Chinese government opened the market for foreign investors in recent years. Due to the privatisation the investments in technology development has increased. China wants to invest 13 billion CNY in

⁴⁴⁰ www.austrade.gov.au/Mining-to-China/default.aspx

⁴⁴¹ www.guardian.co.uk/society/2006/jan/25/china.guardiansocietysupplement

⁴⁴² www.greenpeace-magazin.de/index.php?id=2885

⁴⁴³ Heidelberg Institute for International Conflict Research (2009)

⁴⁴⁴ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

⁴⁴⁵ Global Times (2010)

⁴⁴⁶ www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09 and www.bloomberg.com/news/2010-07-13/zijin-mining-says-copper-smelter-at-zijinshan-closed-after-river-polluted.html

Subcategory	Indicator	Status
		the next years; 1.5 billion CNY was already paid. ⁴⁴⁷
Corruption	Risk of corruption in country /sector	<p>Risk of Corruption and bribery in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)⁴⁴⁸ ■ Bribe payers index: Rank 19 with 3.1 points⁴⁴⁹ <p>Risk of Corruption and bribery in sector: Corruption in the mining sector is widespread. An investigation revealed, for instance, high corruption rates concerning safety inspectors.⁴⁵⁰</p>

A4 Tin from China

See A3

A5 Tin from Indonesia

Stakeholder group workers:

Table 51: S-LCI table tin from Indonesia stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	<p>There are several restrictions regarding freedom of association in Indonesia. For instance, illegal and inadequate use of contract personnel, statutory imposed processes that constrain the right to strike, and toleration of labour law violations by companies are frequent. Further, unions must have at least membership of 50% of the total work force or receive more than 50% support in a vote of all employees to negotiate collective agreements. In addition, strikes in the public sector have been prohibited.⁴⁵¹</p> <p>The formal tin mining sector consists quasi only of the state-owned company PT Timah and a few artisanal miners with mining permits. There are admittedly independent smelters, but all legal mines belong to PT Timah or its subsidiary PT Koba Tin. The legal basis for the registration</p>

⁴⁴⁷ Steinitz (2006) and www.financial.de/news/top-stories/2009/10/20/topstory-china-sucht-wi-n-win-gelegenheiten

⁴⁴⁸ Transparency International (2010)

⁴⁴⁹ www.nationmaster.com/graph/cr_bri_pay_ind-crime-bribe-payers-index

⁴⁵⁰ www.atimes.com/atimes/China/KF05Ad01.html

⁴⁵¹ <http://survey09.ituc-csi.org/survey.php?IDContinent=3&IDCountry=IDN&Lang=EN>

Subcategory	Indicator	Status
		of trade unions in state-owned enterprises is unclear. ⁴⁵²
	Presence of unions within the sector and description of their influence	It is not sure if there is a union in the formal tin mining sector. In general trade unions have a minor position in negotiations. Unions do not have the power to enforce substantial wage increases. ⁴⁵³
Child labour	Percentage of child labour in country/sector	Child labour occurs in Indonesia. Around 3 million children (ca. 4%) are working in industry (production of furniture, footwear, or toys), in agriculture, but also in the mining sector. Primarily gold and coal mining are affected. ⁴⁵⁴
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	There are some cases of forced labour reported, mainly with regard to migrant workers. In addition, girls and women, who are employed as household servants, get often no payment. ⁴⁵⁵ The tin mining sector is not involved in forced labour.
	Description of kind of forced labour in the sector	-
Fair salary	Specification of living wage and minimum wage in the country	The living wage is estimated to be 2 million IDR per month. However, the minimum wage in Bangka-Belitung for 2009 was 850,000 IDR (ca. 72 EUR). ⁴⁵⁶
	Wage level of the worker with lowest income and description of payment performance of the sector	Formal miners earn around 190 - 230 EUR (2.2 - 2.7 million IDR) a month. Illegal tin miners generate an income of 60 - 140 EUR per month (700,000 - 1,600,000 IDR). In the past, when tin prices were high, it is reported that some artisanal miners became rich. ⁴⁵⁷
Working time	Hours of work per employee and month in average	Formal workers have a working day of 7 hours. Informal workers work 8 - 10 hours a day, resulting in 56 - 70 hours per week. ⁴⁵⁸
	Number of days without work per week	Formal employees work four days and get two days off. In contrast, informal workers work often every day. ⁴⁵⁹

⁴⁵² www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁴⁵³ AIAS (2010), p. 48

⁴⁵⁴ U.S. Department of Labor (2009), p. 17, www.aktiv-gegen-kinderarbeit.de/welt/asien/indonesien and www.unicef.org/infobycountry/indonesia_2098.html

⁴⁵⁵ www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁴⁵⁶ FinnWatch (2009), p. 9

⁴⁵⁷ FinnWatch (2009) and FinnWatch (2007)

⁴⁵⁸ FinnWatch (2009), p. 10 and p. 15

Subcategory	Indicator	Status
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	The formal mining sector employs 0.2% women. ⁴⁶⁰ In addition, there are some women in the informal sector.
	Country gender index ranking	Rank 55 of 102 ⁴⁶¹
	Occurrence of discrimination in the country/sector	Discrimination is widespread in Indonesia. Causes for discrimination are religion, gender, race, or origin. In addition, persons with disabilities, inverts, persons with HIV/AIDS are faced with discrimination. ⁴⁶² In the mining sector contract workers are discriminated. Their working contracts are unclear and they are disadvantaged regarding salary and insurance. ⁴⁶³
	Ratio of salary of women to wages of men in sector	53.71% ⁴⁶⁴
Health and safety	Description of potential main origins of danger	Main origin of danger is soil erosion. Illegal miners often drown, because they lose their bearings raising sand from the sea bed. Approximately 175 - 230 illegal miners die every year. ⁴⁶⁵
	Accident rate of the country /sector	The occupational accidents in Indonesia have slightly decreased. The accident rate in 2003 was 15,873/100,000 employees and the fatality rate amounted 17.3. ⁴⁶⁶ Timah reports in average 9 accidents per year. ⁴⁶⁷ The informal sector said to have a high risk of accidents, but they are not reported. ⁴⁶⁸
Social benefits/ social security	Social security expenditures of the country/sector	Between 2001 and 2006 public expenditures on education, health, housing and social security amounted approximately 3% of GDP. The per-

⁴⁵⁹ ibidem

⁴⁶⁰ AIAS (2010), p. 61

⁴⁶¹ www.genderindex.org

⁴⁶² www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm and <http://genderindex.org/country/indonesia>

⁴⁶³ www.reuters.com/finance/stocks/keyDevelopments?symbol=TINS.JK

⁴⁶⁴ <http://laborsta.ilo.org/STP/guest>

⁴⁶⁵ FinnWatch (2009), p. 11 and www.thejakartapost.com/news/2010/02/08/hundreds-illegal-miners-killed-last-four-years.html

⁴⁶⁶ Hämäläinen/Saarela/Takala (2009), p. 136

⁴⁶⁷ PT Timah (2008), p. 20

⁴⁶⁸ Resosudarmo et al. (2009), p. 43

Subcategory	Indicator	Status
		centage of social security was not more than 1% of GDP in the same period. ⁴⁶⁹ Timah does not publish data about their expenditures for social security.

Stakeholder group local community:

Table 52: S-LCI table tin from Indonesia stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Indonesian industry is responsible for 1% of total freshwater withdrawals. ⁴⁷⁰ The mining sector is characterised by high material resource consumption including water use.
	Percent of population with access to improved sanitation facilities	52% ⁴⁷¹
	Existence of projects to improve community infrastructure	Timah improves community infrastructure. The enterprise invests in education, health care, public facilities, constructing houses, etc. In 2009, Timah invests 28 billion IDR (2.37 million EUR), what comes up to 2.43% of Timah's gross profit and 0.36% of Timah's net revenue. ⁴⁷²
	Presence of certified environmental management systems	PT Timah has an environmental management system, but it is not certified. The activities cover: <ul style="list-style-type: none"> ■ Top soil layers control ■ Planting, growth and evolution monitor ■ Water quality monitor ■ Air quality monitor in the workplace ■ Mining activities and techniques ■ Selection of species and planting techniques ■ Rehabilitation policy and techniques ■ Offshore pollution control⁴⁷³

⁴⁶⁹ UNICEF (2008)

⁴⁷⁰ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁴⁷¹ www.unicef.org/infobycountry/indonesia_statistics.html

⁴⁷² PT Timah (2009), p. 20 and pp. 29 and www.timah.com/eng/program-sosial

⁴⁷³ www.timah.com/eng/pengelolaan-lingkungan

Subcategory	Indicator	Status
	Description of (potential) material resource conflicts	<ul style="list-style-type: none"> ■ Competition for clean potable water ■ Competition for tin resources ■ Competition with other sectors (fishing and farming) for land and sea use
Access to immaterial resources	Freedom of expression in country/sector	<p>Freedom of speech is ensured by the Indonesian constitution, but new laws from 2008 restrict these rights. Mainly the legal and political environment is affected. For instance, defamation laws are misused to restrict reporting. Further, human rights activists, politically active citizens, and journalists are often victims of violence, verbal threats, and legal harassment.⁴⁷⁴</p> <p>In the international ranking of the Freedom House Indonesia reached 54 of 100 points in 2009 and was classified as “partly free”.⁴⁷⁵</p> <p>It is assumed that freedom of expression in the mining sector is moderate as the economic environment is freer than the legal and political one.⁴⁷⁶</p>
	Annual arrests connected to protest of sector actions	None.
	Presence of community education initiatives and community service programmes	Timah’s CSR activities also comprise education initiatives and service programmes. For instance, the company provides employment training for school dropouts.
Delocalisation and migration	Migration rate of the country	According to the IOM, the net migration rate of Indonesia was -0.6 migrants/1,000 inhabitants in the period from 2005 to 2010. ⁴⁷⁷ The CIA by contrast reports a migration rate of -1.23 migrants/1,000 inhabitants for 2010. ⁴⁷⁸

⁴⁷⁴ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.amnesty.de/jahresbericht/2010/Indonsien?destination=node%2F2934%3Fcountry%3D14%26topic%3D%26node_type%3Dai_annual_report%26from_month%3D0%26from_year%3D%26to_month%3D0%26to_year%3D%26submit_x%3D79%26submit_y%3D10%26submit%3DAuswahl%2Banzeigen%26result_limit%3D10%26form_id%3Dai_core_search_form#rechtauffreimeinungsuerung

⁴⁷⁵ www.freedomhouse.org/template.cfm?page=251&year=2009

⁴⁷⁶ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.amnesty.de/jahresbericht/2010/indonesien?destination=node%2F2934%3Fcountry%3D14%26topic%3D%26node_type%3Dai_annual_report%26from_month%3D0%26from_year%3D%26to_month%3D0%26to_year%3D%26submit_x%3D79%26submit_y%3D10%26submit%3DAuswahl%2Banzeigen%26result_limit%3D10%26form_id%3Dai_core_search_form#rechtauffreimeinungsuerung

⁴⁷⁷ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

⁴⁷⁸ www.cia.gov/library/publications/the-world-factbook/geos/id.html

Subcategory	Indicator	Status
	Number of individuals who resettle that can be attributed to the sector	There were resettlements due to mining activities in Indonesia, but a number cannot be specified. ⁴⁷⁹
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	There are various human rights infringements in regard with indigenous people in Indonesia, although the government considers all citizens as indigenous. However, the government recognized the existence of several “isolated communities”, including Dayak tribes, sea nomads, and the 312 officially recognized indigenous groups in Papua. Land rights are the main point of issue, as the Indonesian government allocated mining permits to companies on indigenous lands. According to the Indonesian constitution, all of the land is controlled by the state. Although indigenous lands are recognized by the government, they can use their land as long as there is no conflict with national interests. In rural regions there are often no land certificates, what exacerbates the situation. ⁴⁸⁰
	Respect of the sector regarding indigenous rights	There is rather no respect regarding indigenous rights. Especially mining activities – legal and illegal – cause social, economic, environmental, and logistical issues in indigenous communities. ⁴⁸¹
Safe and healthy living conditions	Burden of disease in the country	Indonesia’s DALY rate amounts 25. ⁴⁸² Main causes of death are heart diseases, tuberculosis, cerebrovascular disease, respiratory infections, perinatal conditions, and chronic obstructive pulmonary disease. ⁴⁸³

⁴⁷⁹ FinnWatch (2007) and www.youtube.com/watch?v=ijEfthxHe0w

⁴⁸⁰ Resosudarmo et al. (2009), pp. 36 and www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁴⁸¹ Resosudarmo et al. (2009), pp. 36 and www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁴⁸² http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁴⁸³ www.who.int/whosis/mort/profiles/mort_searo_idn_indonesia.pdf

Subcategory	Indicator	Status
		The risk of infectious diseases is high. ⁴⁸⁴ Tin mining contributes to the increase of infectious diseases as malaria through lakes that are created in the mining process. These lakes are breeding ground for disease-carrying insects. ⁴⁸⁵ The life expectancy at birth amounts 71.05 years. ⁴⁸⁶
	Pollution level of the country and contribution of the sector to the environmental load	Main environmental issues are deforestation, water pollution caused by industry, air pollution in urban areas, and forest fires. ⁴⁸⁷ CO ₂ emissions per capita amount around 1.5 metric tons, while the content of PM is approximately 83µg/m ³ . ⁴⁸⁸ Tin mining contributes to the environmental burden of Indonesia through land use (even in protected forests illegal miners dig tin), marine and freshwater pollution. In addition, mining leads to land erosion.
	Sector effort to improve the environmental performance	None.
Secure living conditions	Crime rate	The crime rate in Indonesia is rather high in international comparison. Especially frequent are robberies and homicide. ⁴⁸⁹ Global Peace Index: Rank 67 of 149 ⁴⁹⁰
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	Indonesia's unemployment rate decreased in recent years. In 2009, 7.7% of the labour force was, according to estimates, unemployed. ⁴⁹¹
	Percentage of work force hired locally	The employment of local workers is often marginal. ⁴⁹² According to a report from 2001, 75% of workers come from other communities. ⁴⁹³

⁴⁸⁴ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁴⁸⁵ FinnWatch (2007), p. 45

⁴⁸⁶ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁴⁸⁷ ibidem

⁴⁸⁸ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

⁴⁸⁹ www.nationmaster.com/country/id-indonesia/crime

⁴⁹⁰ www.visionofhumanity.org/gpi-data/#/2010/scor

⁴⁹¹ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁴⁹² Resosudarmo et al. (2009), p. 37

⁴⁹³ Aspinall (2001), p. 10

Subcategory	Indicator	Status
Community engagement	Description of community engagement of the sector	<p>Timah implemented guidelines for good corporate governance, which include transparency. “The company offers as much information as possible to the public and its shareholders.”⁴⁹⁴ Whether Timah keeps this promise is unknown.</p> <p>Examples of activities:⁴⁹⁵</p> <ul style="list-style-type: none"> ■ Support of the construction of two campuses for the University of Bangka Belitung ■ Loans program for local SME ■ Reclamation of mined land ■ Improvement of water supply to surrounding communities ■ Sponsoring of computers to schools ■ Donations to victims of natural disasters ■ Support of rural regions and low-income families

Stakeholder group society:

Table 53: S-LCI table tin from Indonesia stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	PT Timah has implemented an own code of conduct and guidelines for good corporate governance. The code of conduct refers to the relationships of the company with its different stakeholders (employees, third parties, shareholders, government, and society), but it is formulated very vague. ⁴⁹⁶

⁴⁹⁴ PT Timah (2009), p. 128

⁴⁹⁵ PT Timah (2008) and (2009)

⁴⁹⁶ PT Timah (2009), p. 174

Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	<p>Indonesia generated a GDP of 969.2 billion USD in 2009, what equates to rank 16 in international comparison. Indeed, the GDP per capita is rather low with 4,000 USD (rank 155). The estimated growth rate was 4.5% in 2009. The inflation rate decreased from 9.9% in 2008 to 4.8% in 2009.</p> <p>The mining industry is relatively important for the Indonesian economy, especially coal, gold, and copper mining, but also tin mining.⁴⁹⁷ 40% of the work force on Bangka-Belitung is involved in tin production.⁴⁹⁸ The informal sector employed in its peak in 2005 approximately 130,000 miners, while the formal sector employs around 34,000 miners. Since 2008, the employment declines due to falling tin prices.⁴⁹⁹</p> <p>Tin mining contributes significantly to the economic development. Even poor illegal miners are able to send their children to school for example. Indeed, the contribution of tin mining could be higher as the income allocation is unequal in both the formal and the informal sector. PT Timah is accused to apply monopoly practices, while middlemen exploit artisanal miners.⁵⁰⁰</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country	Indonesia is in conflict with China, Malaysia, and Timor due to land claims, resources and other reasons, but the majority of conflicts take place within the country caused by ideology, access to resources, strive after autonomy and secession respectively. There are several conflict parties: Dayak vs. Madurese, Muslims vs. Christians, Jemaah Islamiyah vs. government, and so on. These conflicts are in many cases violent. ⁵⁰¹
	Risk of conflicts with regard to the sector and measures to reduce the risk	With regard to the mining sector there are also several conflicts caused by land rights, artisanal mining, severe environmental pollution, and unemployment due to mining closure. Tin mining entails deforestation, soil and water pollution, acidic lakes, and a crater landscape as well as marine water pollution, seabed destruction, destruction of coral reefs

⁴⁹⁷ Resosudarmo et al. (2009)

⁴⁹⁸ Davis/Wulandari (2008)

⁴⁹⁹ FinnWatch (2007), FinnWatch (2009), p. 22 and Resosudarmo et al. (2009), p. 38

⁵⁰⁰ Erman (2007), Resosudarmo et al. (2009), FinnWatch (2007) and FinnWatch (2009)

⁵⁰¹ Heidelberg Institute for International Conflict Research (2009), pp. 59

Subcategory	Indicator	Status
		and mangrove forests due to offshore mining. ⁵⁰² The sector conducts some measures to reduce the risk of conflicts as for instance renaturation of old mining areas or the containment of the informal sector.
Technology development	Sector efforts in technology development regarding eco-friendliness	The main goal for technology investments of Timah seems to be an increased economic efficiency, for instance to be able to explore deeper tin deposits or to increase the capacity processed tin sand. ⁵⁰³ FinnWatch reports that smelters of Timah use at least appropriate filters to avoid air pollution, whereas independent smelters are not equipped with appropriate ones. ⁵⁰⁴ In general, the sector efforts in technology development in terms of environmental compatibility are rather low.
	Investments in technology development	It is assumed that the investments in technology development of the formal sector are moderate, while the informal sector and independent smelters do not invest in technology development.
Corruption	Risk of corruption in country/sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 2.8 (rank 111)⁵⁰⁵ ■ Bribe payers index: n.s.⁵⁰⁶ <p>Risk of corruption in sector:</p> <p>The corruption rate in Indonesia is high and increased in the last five years despite measures of the government.⁵⁰⁷ Therefore also the risk of corruption in the mining sector is estimated as high. The existence of an illegal sector, which is involved in the formal sector, implies fraud and corruption.⁵⁰⁸</p>

⁵⁰² Resosudarmo et al. (2009), pp. 34 and www.youtube.com/watch?v=ijEfthxHe0w

⁵⁰³ PT Timah (2009), p. 28 and 109

⁵⁰⁴ FinnWatch (2009), p. 16

⁵⁰⁵ Transparency International (2010)

⁵⁰⁶ www.nationmaster.com/graph/crime/crime-bribe-payers-index

⁵⁰⁷ www.thejakartapost.com/news/2008/08/25/corruption-crime-rate-stays-high-despite-measures.html

⁵⁰⁸ Erman (2008)

A6 Mining of Bauxite in Indonesia

Stakeholder group workers:

Table 54: S-LCI table bauxite from Indonesia stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	There are several restrictions regarding freedom of association in Indonesia. For instance illegal and inadequate use of contract personnel, statutory imposed processes that constrain the right to strike, and toleration of labour law violations by companies. Further, unions must have at least membership of 50% of the total work force or receive more than 50% support in a vote of all employees to negotiate collective agreements. In addition, strikes in the public sector have been prohibited. ⁵⁰⁹
	Presence of unions within the sector and description of their influence	There are two trade unions within Antam, namely Aneka Tambang Employees Association (Perpantam) and SPSI. For 2009 Perpantam reports a membership rate of 89.8%; 9.6% of personnel became members of SPSI. ⁵¹⁰ In general Indonesian trade unions have a minor position in negotiations. Unions do not have the power to enforce substantial wage increases. ⁵¹¹
Child labour	Percentage of child labour in country/sector	Child labour occurs in Indonesia. Around 3 million children (ca. 4%) are working in the industry (production of furniture, footwear, or toys), in agriculture, but also in the mining sector. Primarily gold and coal mining are affected. ⁵¹²
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	There are some cases of forced labour reported, mainly in regard with migrant workers. In addition, girls and women, who are employed as household servants, get often no payment. ⁵¹³ The bauxite mining sector is not involved in forced labour.
	Description of kind of forced labour in the sector	-

⁵⁰⁹ <http://survey09.ituc-csi.org/survey.php?IDContinent=3&IDCountry=IDN&Lang=EN>

⁵¹⁰ Antam (2009a), pp. 67

⁵¹¹ AIAS (2010), p. 48

⁵¹² U.S. Department of Labor (2009), p. 17, www.aktiv-gegen-kinderarbeit.de/welt/asien/indonesien and www.unicef.org/infobycountry/indonesia_2098.html

⁵¹³ www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

Subcategory	Indicator	Status
Fair salary	Specification of living wage and minimum wage in the country	The living wage is estimated to be 2 million IDR per month. ⁵¹⁴ However, the minimum wage in Bintan and Kalimantan is between 645,000 IDR (West Kalimantan) and 833,000 IDR (Bintan). ⁵¹⁵
	Wage level of the worker with lowest income and description of payment performance of the sector	It is assumed that workers earn at least the legal minimum wage. The average salary per month in the Indonesian mining sector amounts around 960,000 IDR. ⁵¹⁶
Working time	Hours of work per employee and month in average	Workers in the mining sector work in average 46h/week. ⁵¹⁷
	Number of days without work per week	No information available.
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	The formal mining sector employs 0.2% women. ⁵¹⁸ In addition, there are some women in the informal sector. Antam employs 9.25% females. ⁵¹⁹
	Country gender index ranking	Rank 55 of 102 ⁵²⁰
	Occurrence of discrimination in the country/sector	Discrimination is widespread in Indonesia. Causes for discrimination are religion, gender, race, or origin. In addition, persons with disabilities, invert, persons with HIV/AIDS are faced with discrimination. ⁵²¹ In the mining sector contract workers are discriminated. Their working contracts are unclear and they are disadvantaged regarding salary and insurance.
	Ratio of salary of women to wages of men in sector	The ratio of salary women to wages of men in the Indonesian mining sector amounts 53.71%. ⁵²² According to Antam, the salary is based on position, competency, and assessment

⁵¹⁴ FinnWatch (2009), p. 9

⁵¹⁵ www.indonesiamatters.com/1509/minimum-wage

⁵¹⁶ <http://laborsta.ilo.org/STP/guest>

⁵¹⁷ <http://laborsta.ilo.org/STP/guest>

⁵¹⁸ AIAS (2010), p. 61

⁵¹⁹ Antam (2009), pp. 64

⁵²⁰ www.genderindex.org

⁵²¹ www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm and <http://genderindex.org/country/indonesia>

⁵²² <http://laborsta.ilo.org/STP/guest>

Subcategory	Indicator	Status
		and not on gender. The company provides equal payment. ⁵²³
Health and safety	Description of potential main origins of danger	Bauxite is mainly mined in open-pits; the bauxite-bearing layers of earth are removed with bulldozers. Therefore the mining itself is not very dangerous. Main origin of danger is soil erosion.
	Accident rate of the country /sector	The occupational accidents in Indonesia have slightly decreased. The accident rate in 2003 was 15,873/100,000 employees and the fatality rate amounted 17.3. ⁵²⁴ The accident rate of the mining process is low compared to the other processing steps. Antam reports no accidents in 2009, 1 fatal accident in 2008, and 1 minor accident in 2007 for their bauxite mine. ⁵²⁵
Social benefits/ social security	Social security expenditures of the country/sector	Between 2001 and 2006 public expenditures on education, health, housing and social security amounted approximately 3%. The percentage of social security was not more than 1% of GDP in the same period. ⁵²⁶ The sector does not publish data about social expenditures.

Stakeholder group local community:

Table 55: S-LCI table bauxite from Indonesia stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Indonesian industry is responsible for 1% of total freshwater withdrawals. ⁵²⁷ Bauxite mining causes primarily land use, because it is mined in open pits. Further, high volumes of water are needed to wash the ore.
	Percent of population with access to improved sanitation facilities	52% ⁵²⁸
	Existence of projects to improve community infra-	The CSR activities of Antam focus on two areas: community development and environmental development. In the frame of community devel-

⁵²³ Antam (2009), p. 67

⁵²⁴ Hämäläinen/Saarela/Takala (2009), p. 136

⁵²⁵ Antam (2009a), p. 71

⁵²⁶ UNICEF (2008)

⁵²⁷ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁵²⁸ www.unicef.org/infobycountry/indonesia_statistics.html

Subcategory	Indicator	Status
	structure	opment they have different projects to improve the infrastructure. In 2009, the enterprise spent more than 3,300 million IDR in the construction of social, public, and health facilities. They built roads, bridges, security posts, meeting halls, and sports centres. ⁵²⁹
	Presence of certified environmental management systems	Several mines of Antam are certified according to ISO 14001, but not the bauxite mine. ⁵³⁰
	Description of (potential) material resource conflicts	<ul style="list-style-type: none"> ■ Competition for land use ■ Competition with the fishing sector, because mines cause a pollution of rivers and lakes. Bauxite mining in Bintan was already curbed to protect water.⁵³¹
Access to immaterial resources	Freedom of expression in country/sector	<p>Freedom of speech is ensured by the Indonesian constitution, but new laws from 2008 restrict these rights. Mainly the legal and political environment is affected. For instance, defamation laws are misused to restrict reporting. Further, human rights activists, politically active citizens, and journalists are often victims of violence, verbal threats, and legal harassment.⁵³²</p> <p>In the international ranking of the Freedom House Indonesia reached 54 of 100 points in 2009 and was classified as “partly free”.⁵³³</p> <p>It is assumed that freedom of expression in the mining sector is moderate as the economic environment is freer than the legal and political one.⁵³⁴</p>
	Annual arrests connected to protest of sector actions	None.

⁵²⁹ Antam (2009a), p. 75 and pp. 78

⁵³⁰ Antam (2009a), p. 100

⁵³¹ www.minesandcommunities.org/article.php?a=7082

⁵³² www.freedomhouse.org/template.cfm?page=251&year=2009 and www.amnesty.de/jahresbericht/2010/indonesien?destination=node%2F2934%3Fcountry%3D14%26topic%3D%26node_type%3Dai_annual_report%26from_month%3D0%26from_year%3D%26to_month%3D0%26to_year%3D%26submit_x%3D79%26submit_y%3D10%26submit%3DAuswahl%2Banzeigen%26result_limit%3D10%26form_id%3Dai_core_search_form#rechtauffreieinungsuerung

⁵³³ www.freedomhouse.org/template.cfm?page=251&year=2009

⁵³⁴ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.amnesty.de/jahresbericht/2010/indonsien?destination=node%2F2934%3Fcountry%3D14%26topic%3D%26node_type%3Dai_annual_report%26from_month%3D0%26from_year%3D%26to_month%3D0%26to_year%3D%26submit_x%3D79%26submit_y%3D10%26submit%3DAuswahl%2Banzeigen%26result_limit%3D10%26form_id%3Dai_core_search_form#rechtauffreieinungsuerung

Subcategory	Indicator	Status
	Presence of community education initiatives and community service programmes	Antam provides scholarships, especially to support indigenous people, and education projects for street children. Further, Antam initiated a health program that included free medical checks for elderly people, pregnant women, and children in Jakarta and provides regular trainings to improve the mental health condition of for instance teachers in Jakarta. ⁵³⁵
Delocalisation and migration	Migration rate of the country	According to the IOM, the net migration rate of Indonesia was -0.6 migrants/1,000 inhabitants in the period from 2005 to 2010. ⁵³⁶ The CIA by contrast reports a migration rate of -1.23 migrants/1,000 inhabitants for 2010. ⁵³⁷
	Number of individuals who resettle that can be attributed to the sector	There were resettlements due to mining activities in Indonesia, but a number cannot be specified. ⁵³⁸
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	There are various human rights infringements in regard with indigenous people in Indonesia, although the government considers all citizens as indigenous. However, the government recognized the existence of several “isolated communities”, including Dayak tribes, sea nomads, and the 312 officially recognized indigenous groups in Papua. Land rights are the main point of issue, as the Indonesian government allocated mining permits to companies on indigenous lands. According to the Indonesian constitution, all of the land is controlled by the state. Although indigenous lands are recognized by the government, indigenous people can use their land as long as there is no conflict with national interests. In

⁵³⁵ Antam (2009a)

⁵³⁶ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

⁵³⁷ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁵³⁸ FinnWatch (2007) and www.youtube.com/watch?v=ijFfthxHe0w

Subcategory	Indicator	Status
		rural regions there are often no land certificates, what exacerbates the situation. ⁵³⁹
	Respect of the sector regarding indigenous rights	The respect regarding indigenous rights is rather low in the mining sector. ⁵⁴⁰ Antam employs indigenous people to improve the relation between the company and local communities. ⁵⁴¹ However, Antam is accused to mine in protected rainforests, where indigenous people live. ⁵⁴²
Safe and healthy living conditions	Burden of disease in the country	Indonesia's DALY rate amounts 25. ⁵⁴³ Main causes of death are heart diseases, tuberculosis, cerebrovascular disease, respiratory infections, perinatal conditions, and chronic obstructive pulmonary disease. ⁵⁴⁴ The risk of infectious diseases is high. ⁵⁴⁵ The life expectancy at birth amounts 71.05 years. ⁵⁴⁶
	Pollution level of the country and contribution of the sector to the environmental load	Main environmental issues are deforestation, water pollution caused by industry, air pollution in urban areas, and forest fires. ⁵⁴⁷ CO ₂ emissions per capita amount around 1.5 metric tons, while the content of PM is approximately 83µg/m ³ . ⁵⁴⁸ Surface mining entails high "land consumption", what leads to deforestation and erosion. That is particularly in rainforest areas a severe problem, as the recultivation of rainforest is very difficult. Antam and other mining companies are accused to mine in protected rain forests. ⁵⁴⁹ Further, tailings lead to water pollution and vegetation loss. Indeed, problems concerning water pollution due to bauxite mining are less serious than in other mining industries, because

⁵³⁹ Resosudarmo et al. (2009), pp. 36 and www.state.gov/g/drl/rls/hrrpt/2009/eap/135992.htm

⁵⁴⁰ *ibidem*

⁵⁴¹ Antam (2009a), pp. 63

⁵⁴² www.miningwatch.ca/en/spare-our-homeland-rainforest-tribes-plead-with-bc-mining-giant

⁵⁴³ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁵⁴⁴ www.who.int/whosis/mort/profiles/mort_searo_idn_indonesia.pdf

⁵⁴⁵ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁵⁴⁶ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁵⁴⁷ *ibidem*

⁵⁴⁸ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATASTA/0,,contentMDK:21079>

⁵⁴⁹ www.miningwatch.ca/en/save-indonesias-protected-forest-areas-mining

Subcategory	Indicator	Status
		the process water is not acidic and tailings do not contain toxic substances. ⁵⁵⁰
	Sector effort to improve the environmental performance	None.
Secure living conditions	Crime rate	The crime rate in Indonesia is rather high in international comparison. Especially frequent are robberies and homicide. ⁵⁵¹ Global Peace Index: Rank 67 of 149 ⁵⁵²
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	Indonesia's unemployment rate decreased in recent years. In 2009, 7.7% of the labour force was, according to estimates, unemployed. ⁵⁵³
	Percentage of work force hired locally	The percentage of local employees at Antam is not clearly stated in their CSR report. "Recruitment of local manpower is conducted by all business units of the Company as an effort to develop and maintain constructive relations with surrounding community at operations areas". ⁵⁵⁴ The majority of the personnel stems probably from communities in the region. ⁵⁵⁵
Community engagement	Description of community engagement of the sector	Antam's CSR activities are widely varied and include education, health, infrastructure, environment as well as art and culture. Examples of activities: ⁵⁵⁶ <ul style="list-style-type: none"> ■ Provision of scholarships ■ Support of street children ■ Support and assistance regarding the national program to eradicate poverty ■ Construction of roads, bridges, and public facilities ■ Provision of free medical checks ■ Support of festivals ■ Construction of houses in traditional design ■ Recultivation of post-mining areas

Stakeholder group society:

⁵⁵⁰ UNCTAD (1994), p. 6

⁵⁵¹ www.nationmaster.com/country/id-indonesia/crime

⁵⁵² www.visionofhumanity.org/gpi-data/#/2010/scor

⁵⁵³ www.cia.gov/library/publications/the-world-factbook/geos/id.html

⁵⁵⁴ Antam (2009a), p. 63

⁵⁵⁵ UNCTAD (1994), p. 3

⁵⁵⁶ Antam (2009a), pp. 73

Table 56: S-LCI table bauxite from Indonesia stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	Antam has implemented an own code of conduct. The code addresses human rights, equal opportunities, and prevention of conflicts, including anti-corruption. ⁵⁵⁷ Every employee has to sign the standard.
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	Indonesia generated a GDP of 969.2 billion USD in 2009, what equates to rank 16 in international comparison. Indeed, the GDP per capita is rather low with 4,000 USD (rank 155). The estimated growth rate was 4.5% in 2009. The inflation rate decreased from 9.9% in 2008 to 4.8% in 2009. The mining industry is relatively important for the Indonesian economy, especially coal, gold, and copper mining, but also tin mining. Although bauxite mining is less important compared to other mining industries, bauxite belongs to the major mineral commodities. The production of bauxite is set at 10.284 million metric tons in 2010. ⁵⁵⁸ Wages are slightly above the legal minimum wage.
Prevention and mitigation of conflicts	Presence of conflicts in the country	Indonesia is in conflict with China, Malaysia, and Timor due to land claims, resources and other reasons, but the majority of conflicts take place within the country caused by ideology, access to resources, strive after autonomy and secession respectively. There are several conflict parties: Dayak vs. Madurese, Muslims vs. Christians, Jemaah Islamiyah vs. government, and so on. These conflicts are in many cases violent. ⁵⁵⁹
	Risk of conflicts with regard to the sector and measures to reduce the risk	With regard to the mining sector there are also several conflicts caused by land rights, artisanal mining, severe environmental pollution, and

⁵⁵⁷ Antam (2009b)

⁵⁵⁸ Resosudarmo et al. (2009), Kuo (2010) and www.indonesian-embassy.fi/in/index.php?lang=EN&p=News_Publications/1&s=15&tr=1262866772_866

⁵⁵⁹ Heidelberg Institute for International Conflict Research (2009), pp. 59

Subcategory	Indicator	Status
		unemployment due to mining closure. Bauxite mining entails primarily land consumption and water pollution, what can lead to conflicts. Although Antam has a comprehensive CSR program, activities with close relation to the business segment are lacking. Thus the efforts of the company reduce the conflict risk only partly.
Technology development	Sector efforts in technology development regarding eco-friendliness	No information available.
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 2.8 (rank 111)⁵⁶⁰ ■ Bribe payers index: n.s.⁵⁶¹ <p>Risk of corruption in sector: The corruption rate in Indonesia is high and increased in the last five years despite measures of the government.⁵⁶² Therefore also the risk of corruption in the mining sector is estimated as being rather high.</p>

B Production of Basic Materials

B1 Non-Ferrous Metals from China

Stakeholder group workers:

Table 57: S-LCI table non-ferrous metal from China stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all unions have to officially register with and be approved by the government. ⁵⁶³

⁵⁶⁰ Transparency International (2010)

⁵⁶¹ www.nationmaster.com/graph/crime_bri_pay_ind-crime-bribe-payers-index

⁵⁶² www.thejakartapost.com/news/2008/08/25/corruption-crime-rate-stays-high-despite-measures.html

⁵⁶³ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

Subcategory	Indicator	Status
	Presence of unions within the sector and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ⁵⁶⁴ It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position, when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts, but they contain only minimum standards as required by national legislation. ⁵⁶⁵
Child labour	Percentage of child labour in country/sector	There are no official statistics about child labour in China. However, child labour is considered as a problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ⁵⁶⁶ It is assumed that the production of metals is not connected to child labour.
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ⁵⁶⁷ Labour camps can also be found in the metal sector. A report identified more than 300 labour camps, including factories producing metal strip pipes, aluminium parts, iron, steel pipes, and steel balls. Also metal castings could be linked to forced labour. ⁵⁶⁸
	Description of kind of forced labour in the sector	No information available.
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage.

⁵⁶⁴ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

⁵⁶⁵ Metcalf/Li (2006) and interview with China Labour Bulletin

⁵⁶⁶ U.S. Department of Labor (2009), p. 15

⁵⁶⁷ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

⁵⁶⁸ Laogai Research Foundation (2008)

Subcategory	Indicator	Status
		The minimum wage ranges from 605 - 1,120 CNY/ month. ⁵⁶⁹ The living costs are deemed to be higher.
	Wage level of the worker with lowest income and description of payment performance of the sector	It is assumed that workers with lowest income earn the minimum wage except for forced labourer.
Working time	Hours of work per employee and month in average	No information available.
	Number of days without work per week	No information available.
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	The percentage of women in the industrial labour force is around 40%. The majority of females are employed in the garments and textiles sector. ⁵⁷⁰ The share of women in the metal industry is rather low.
	Country gender index ranking	Rank 83 of 102 ⁵⁷¹
	Occurrence of discrimination in the country/sector	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ⁵⁷² Also discrimination in the workplace is common. ⁵⁷³ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract. ⁵⁷⁴ Employment discrimination against women is also present. ⁵⁷⁵ A percentage of migrant workers in the metal industry cannot be specified. However, it is assumed that the share is relatively high, as it is

⁵⁶⁹ <http://baike.baidu.com/view/895266.htm>

⁵⁷⁰ UNPD (2003), p. 159

⁵⁷¹ www.genderindex.org

⁵⁷² www.state.gov/g/drl/rls/irf/2009/127268.htm

⁵⁷³ Séguin (2009)

⁵⁷⁴ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

⁵⁷⁵ <http://genderindex.org/country/china>

Subcategory	Indicator	Status
		common to employ migrant workers in the metal industry. ⁵⁷⁶
	Ratio of salary of women to wages of men in sector	No information available.
Health and safety	Description of potential main origins of danger	Main origins of danger in the non-ferrous metals industry are falls, unguarded machinery, falling objects, exposure to hazardous substances, contact with hot metal, fire and explosion, extreme temperatures, radiation, noise and vibration, and work in confined spaces. ⁵⁷⁷
	Accident rate of the country /sector	Although Asia has very high accident rates, China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ⁵⁷⁸ However, the accident rate in the metal industry is estimated as relatively high, because there are many origins of danger. A concrete rate cannot be stated.
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ⁵⁷⁹ No information about social expenditures of the Chinese metal industry.

Stakeholder group local community:

Table 58: S-LCI table non-ferrous metals from China stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of total freshwater withdrawals. ⁵⁸⁰ The non-ferrous metals industry is characterised by high power and water consumption.
	Percent of population with access to improved sanitation facilities	65% ⁵⁸¹
	Existence of projects to improve community infra-	The engagement of the sector regarding the improvement of infrastructure is low. With

⁵⁷⁶ International Metalworkers' Federation (2009), p. 10

⁵⁷⁷ ILO (2003), p. 59

⁵⁷⁸ Hämäläinen/Saarela/Takala (2009)

⁵⁷⁹ IMF (2010), p. 5

⁵⁸⁰ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁵⁸¹ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/info/bycountry/china_statistics.html#65

Subcategory	Indicator	Status
	structure	regard to considered companies in the sector only Chalco publishes information on infrastructure projects. ⁵⁸²
	Presence of certified environmental management systems	Some companies have ISO 14001 certified sites. ⁵⁸³
	Description of (potential) material resource conflicts	<ul style="list-style-type: none"> ■ Competition regarding energy: The Chinese government reduced the production of aluminium to reduce energy consumption.⁵⁸⁴ ■ Competition regarding water: Due to a drought in 2010 the production of non-ferrous metals was partly shut down in southwest China.⁵⁸⁵
Access to immaterial resources	Freedom of expression in country/sector	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ⁵⁸⁶ It is assumed that the freedom of expression is restricted in the entire country, including the metal industry.
	Annual arrests connected to protest of sector actions	None.
	Presence of community education initiatives and community service programmes	The engagement of the sector in education initiatives is low. With regard to considered companies in the sector only Chalco publishes information on education projects. ⁵⁸⁷
Delocalisation and migration	Migration rate of the country	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ⁵⁸⁸

⁵⁸² www.chalco.com.cn/zl/web/chalco_en_view.jsp?TID=20080620142917639366233

⁵⁸³ www.jtemcn.com/cer.htm, www.hng.com.cn/English/BusinessRead.asp?busi_id=49&class_id=10, www.hng.com.cn/English/BusinessRead.asp?busi_id=50&class_id=11 and www.chalco.com.cn/zl/web/chalco_en_show.jsp?ColumnID=130

⁵⁸⁴ www.chinamining.org/News/2010-09-13/1284368958d39025.html

⁵⁸⁵ www.chinadaily.com.cn/business/2010-04/10/content_9712227.htm

⁵⁸⁶ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

⁵⁸⁷ www.chalco.com.cn/zl/web/chalco_en_view.jsp?TID=20080620142917639366233

⁵⁸⁸ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
	Number of individuals who resettle that can be attributed to the sector	None.
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.⁵⁸⁹ But there are officially 55 ethnic minority groups in China,⁵⁹⁰ who account for less than 9% of population.⁵⁹¹ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.⁵⁹²</p> <p>The Chinese constitution provides equal rights to all ethnic groups.⁵⁹³ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into indigenous regions.⁵⁹⁴</p>
	Respect of the sector regarding indigenous rights	No information available.
Safe and healthy living conditions	Burden of disease in the country	China has a DALY rate of 16, which is relatively low. ⁵⁹⁵ The risk of infectious diseases is classified as intermediate. ⁵⁹⁶ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China

⁵⁸⁹ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

⁵⁹⁰ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁵⁹¹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁵⁹² The World Bank (2007)

⁵⁹³ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁵⁹⁴ www.amnesty.org

⁵⁹⁵ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁵⁹⁶ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		<p>Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year.</p> <p>In addition, around 200 million individuals suffer from occupational diseases.⁵⁹⁷ 80% of them suffer from pneumoconiosis.⁵⁹⁸</p> <p>The life expectancy at birth amounts 74.51 years.⁵⁹⁹</p>
	Pollution level of the country and contribution of the sector to the environmental load	<p>China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causers are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.⁶⁰⁰</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m³.⁶⁰¹</p> <p>The non-ferrous metals industry contributes to the environmental burden mainly through high volumes of energy and water consumption and through the usage and emission of several chemicals. For instance, red mud is incurred in the aluminium production, which is highly alkaline and burdened with heavy metals. Its physical, chemical, and mineralogical properties are depending on the quality of the used bauxite and the refining process.⁶⁰²</p>
	Sector effort to improve the environmental performance	Sector efforts to minimise the use of hazardous chemicals is rather low. There are a few new technologies that aim to increase the efficiency and to reduce the use of hazardous substances and the occurrence of wastes.

⁵⁹⁷ <http://en.epochtimes.com/news/7-2-24/52097.html>

⁵⁹⁸ www.china-labour.org.hk/en/node/100744

⁵⁹⁹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁰⁰ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁰¹ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

⁶⁰² Lin/Liu (2006)

Subcategory	Indicator	Status
Secure living conditions	Crime rate	Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ⁶⁰³ Global Peace Index: Rank 80 of 149 ⁶⁰⁴
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ⁶⁰⁵
	Percentage of work force hired locally	It is assumed that the percentage of local workers is rather low. Migrant work is common in the metal industry. ⁶⁰⁶
Community engagement	Description of community engagement of the sector	The engagement of the sector regarding commitment for the community is probably very low. All considered websites of companies in the sector do not contain information concerning social or environmental engagement except for Chalco.

Stakeholder group society:

Table 59: S-LCI table non-ferrous metals from China stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	A few companies have implemented a code of conduct. ⁶⁰⁷
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are

⁶⁰³ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

⁶⁰⁴ www.visionofhumanity.org/gpi-data/#/2010/scor

⁶⁰⁵ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁰⁶ International Metalworkers' Federation (2009), p. 10

⁶⁰⁷ [www.jxcc.com/english/Corporate culture.html](http://www.jxcc.com/english/Corporate%20culture.html)

Subcategory	Indicator	Status
		<p>industrial locations. The Chinese interior is less developed.⁶⁰⁸</p> <p>The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009.⁶⁰⁹</p> <p>The non-ferrous metals industry is very important for the Chinese economy. The demand is continuously growing and prices are rising due to a tight supply. The application of non-ferrous metals is versatile; thus the availability of these metals is essential for the export oriented economy of China. Therefore the Chinese government plans to limit the production of 10 non-ferrous metals (copper, aluminium, lead, zinc, nickel, tin, antimony, magnesium, sponge titanium, and mercury) to 41 million tons per year until 2015 in order to spare resources, control expansion of production capacity, and eliminate outdated production.⁶¹⁰</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ⁶¹¹ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ⁶¹² Especially industrial centres are involved. ⁶¹³
	Risk of conflicts with regard to the sector and measures to reduce the risk	No information available.
Technology development	Sector efforts in technology development regarding eco-friendliness	Sector efforts with regard to the development of eco-friendlier technologies and techniques seem to be very low. Main aim of R&D activities is the increase of efficiency and cost reduction. For instance, Chinalco developed a new technology to use low quality bauxite to produce

⁶⁰⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁰⁹ *ibidem*

⁶¹⁰ <http://english.peopledaily.com.cn/90001/90778/90860/7080171.html> and www.chinadaily.com.cn/business/2010-07/26/content_11048348.htm

⁶¹¹ Heidelberg Institute for International Conflict Research (2009)

⁶¹² <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09 and Jia (2009)

⁶¹³ Global Times (2010)

Subcategory	Indicator	Status
		alumina economically. Indeed, the new process can reduce the energy consumption by more than 50%, alkali consumption by more than 5%, the lime stone consumption by 50%, and the fresh water consumption by 40%. ⁶¹⁴
	Investments in technology development	The investments in technology development are depending on company size. While SMEs do not have enough resources to invest in technology development, large companies seem to be engaged to improve their production performance and to register patents. ⁶¹⁵
Corruption	Risk of corruption in country /sector	<p>Risk of Corruption and bribery in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)⁶¹⁶ ■ Bribe payers index: Rank 19 with 3.1 points⁶¹⁷ <p>Risk of Corruption and bribery in sector: Corruption is probably present in the entire economy. The risk of corruption in the Chinese metal industry is estimated as relatively high. Specific characteristics of the metal industry as for instance high-value commodities, labour-intensive and capital-intensive operations, frequency of mergers and acquisitions, and environmental impacts increase the vulnerability for corruption.</p>

B2 Plastics from China

Stakeholder group workers:

Table 6o: S-LCI table plastics from China stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all

⁶¹⁴ www.chinalco.com/chinalco/products/research_dev

⁶¹⁵ www.chinalco.com/chinalco/products/research_dev, www.tnmg.com.cn/english/index.asp, www.hng.com.cn/English/BusinessRead.asp?busi_id=51&class_id=12, www.jxcc.com/english/Science1.html, www.cymg.com/EN/XInfo.aspx?ColumnId=2&ArtId=11

⁶¹⁶ Transparency International (2010)

⁶¹⁷ www.nationmaster.com/graph/crime/crime-bribe-payers-index

Subcategory	Indicator	Status
		unions have to officially register with and be approved by the government. ⁶¹⁸
	Presence of unions within the sector and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ⁶¹⁹ It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position, when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts, but they contain only minimum standards as required by national legislation. ⁶²⁰
Child labour	Percentage of child labour in country/sector	There are no official statistics about child labour in China. However, child labour is considered as a rising problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ⁶²¹ The production of plastics could not be linked to child labour. Child labour occurs rather in further processing steps as for instance the assembly of toys. ⁶²²
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ⁶²³ A report identified several labour camps in China; also the plastic industry could be linked to forced labour. ⁶²⁴

⁶¹⁸ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

⁶¹⁹ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

⁶²⁰ Metcalf/Li (2006) and interview with China Labour Bulletin

⁶²¹ U.S. Department of Labor (2009), p. 15, China Labour Bulletin (2007) and www.ihlo.org/LR_C/W/020807.html

⁶²² <http://factsanddetails.com/china.php?itemid=358&catid=9&subcatid=61>

⁶²³ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

⁶²⁴ Laogai Research Foundation (2008)

Subcategory	Indicator	Status
	Description of kind of forced labour in the sector	No information available.
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage ranges from 605 - 1,120 CNY/month. ⁶²⁵ The living costs are deemed to be higher.
	Wage level of the worker with lowest income and description of payment performance of the sector	It is assumed that workers with lowest income earn the minimum wage. The average factory worker in Guangdong earns around 1,500 CNY/month. ⁶²⁶
Working time	Hours of work per employee and month in average	The working time in the plastic industry is estimated as high. A workweek exceeds often 60h. ⁶²⁷
	Number of days without work per week	It is assumed that workers get 1 day off per week.
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	The percentage of women in the industrial labour force is around 40%. The majority of females are employed in the garments and textiles sector. The share of women in the plastic industry is rather low. ⁶²⁸
	Country gender index ranking	Rank 83 of 102 ⁶²⁹
	Occurrence of discrimination in the country/sector	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ⁶³⁰ Also discrimination in the workplace is common. ⁶³¹ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace acci-

⁶²⁵ <http://baike.baidu.com/view/895266.htm>

⁶²⁶ Toloken (2010)

⁶²⁷ www.theonion.com/articles/chinese-factory-worker-cant-believe-the-shit-he-ma,1343

⁶²⁸ UNPD (2003), p. 159

⁶²⁹ www.genderindex.org

⁶³⁰ www.state.gov/g/drl/rls/irf/2009/127268.htm

⁶³¹ Séguin (2009)

Subcategory	Indicator	Status
		dents. In addition, they are often employed without a written labour contract. ⁶³² Employment discrimination against women is also present. ⁶³³ Amongst skilled engineers and technicians the plastic industry employs low skilled operators and assemblers. It is assumed that the jobs that require limited education or experience are mainly filled with migrant workers.
	Ratio of salary of women to wages of men in sector	No information available.
Health and safety	Description of potential main origins of danger	The production of plastics is relatively safe. Many production steps are automated, so that the main origins of danger are incorrect operation of machines or faulty machines.
	Accident rate of the country/ sector	Although Asia has very high accident rates, China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ⁶³⁴ No information regarding accident rates in the plastic industry.
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ⁶³⁵ No information about social expenditures of the plastic industry.

Stakeholder group local community:

Table 61: S-LCI table plastics from China stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of total freshwater withdrawals. ⁶³⁶ The production of plastic requires in the first place high quantities of fossil fuels, both as raw material and as energy source for the manufacturing process. ⁶³⁷

⁶³² Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

⁶³³ <http://genderindex.org/country/china>

⁶³⁴ Hämäläinen/Saarela/Takala (2009)

⁶³⁵ IMF (2010), p. 5

⁶³⁶ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶³⁷ Gervet (2007)

Subcategory	Indicator	Status
	Percent of population with access to improved sanitation facilities	65% ⁶³⁸
	Existence of projects to improve community infrastructure	None.
	Presence of certified environmental management systems	A few factories are certified according to ISO 14001. ⁶³⁹
	Description of (potential) material resource conflicts	The intensive use of crude oil in the plastic production causes material resource conflicts with other sectors.
Access to immaterial resources	Freedom of expression in country/sector	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ⁶⁴⁰ It is assumed that the freedom of expression is restricted in the entire country, including the plastic industry.
	Annual arrests connected to protest of sector actions	No information available.
	Presence of community education initiatives and community service programmes	None.
Delocalisation and migration	Migration rate of the country	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ⁶⁴¹
	Number of individuals who resettle that can be attributed to the sector	None.
Cultural heritage	Respect of the sector regarding local cultural heri-	No information available.

⁶³⁸ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/info/bycountry/china_statistics.html#65

⁶³⁹ www.pinpoint.com.cn/en/pzbz.asp

⁶⁴⁰ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

⁶⁴¹ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
	tage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.⁶⁴² But there are officially 55 ethnic minority groups in China,⁶⁴³ who account for less than 9% of population.⁶⁴⁴ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.⁶⁴⁵</p> <p>The Chinese constitution provides equal rights to all ethnic groups.⁶⁴⁶ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into indigenous regions.⁶⁴⁷</p>
	Respect of the sector regarding indigenous rights	No information available.
Safe and healthy living conditions	Burden of disease in the country	China has a DALY rate of 16, which is relatively low. ⁶⁴⁸ The risk of infectious diseases is classified as intermediate. ⁶⁴⁹ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year. In addition, around 200

⁶⁴² www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

⁶⁴³ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁶⁴⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁴⁵ The World Bank (2007)

⁶⁴⁶ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁶⁴⁷ www.amnesty.org

⁶⁴⁸ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁶⁴⁹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		<p>million individuals suffer from occupational diseases.⁶⁵⁰</p> <p>The life expectancy at birth amounts 74.51 years.⁶⁵¹</p>
	<p>Pollution level of the country and contribution of the sector to the environmental load</p>	<p>China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causers are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.⁶⁵²</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m³.⁶⁵³</p> <p>The plastic industry contributes to the environmental pollution mainly through energy consumption. Further, plastic waste pollutes the environment significantly. The Chinese government has reacted and banned free distribution of plastic bags in supermarkets.⁶⁵⁴ In addition, plastics contain hazardous substances as biphenyl A, chlorine, plasticiser as phthalates, or heavy metals as stabilizers depending on the plastic type.</p>
	<p>Sector effort to improve the environmental performance</p>	<p>The efforts of the sector to produce more sustainable plastics seem to be very low. If clients require for instance phthalate-free, PVC-free products, or bio plastics, the sector reacts. Self-motivated changes are scarce.</p>
<p>Secure living conditions</p>	<p>Crime rate</p>	<p>Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009.⁶⁵⁵</p>

⁶⁵⁰ <http://en.epochtimes.com/news/7-2-24/52097.html>

⁶⁵¹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁵² WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁵³ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

⁶⁵⁴ Block (2009)

⁶⁵⁵ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

Subcategory	Indicator	Status
		Global Peace Index: Rank 80 of 149 ⁶⁵⁶
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ⁶⁵⁷
	Percentage of work force hired locally	Most plastic part producers are located in industrial centres at the east coast in provinces as Guangdong, Fujian, or Jiansu, where migrant work is common. Therefore, it is assumed that the share of local staff is relatively low.
Community engagement	Description of community engagement of the sector	The engagement of the sector regarding commitment for the community is probably low. All considered websites of companies in the sector do not contain information concerning social or environmental engagement.

Stakeholder group society:

Table 62: S-LCI table plastics from China stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	None.
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed. ⁶⁵⁸ The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of

⁶⁵⁶ www.visionofhumanity.org/gpi-data/#/2010/scor

⁶⁵⁷ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁵⁸ *ibidem*

Subcategory	Indicator	Status
		around 8.7% and an inflation rate of -0.8% in 2009. ⁶⁵⁹ The importance of plastics in the Chinese economy is growing as all main industries as automobile, agriculture, consumer goods, foods and beverages, household electronics, infrastructure, etc need large amounts of plastics. ⁶⁶⁰ However, the degree of automation increases in the sector due to rising labour costs. ⁶⁶¹
Prevention and mitigation of conflicts	Presence of conflicts in the country	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ⁶⁶² There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ⁶⁶³ Especially industrial centres are involved. ⁶⁶⁴
	Risk of conflicts with regard to the sector and measures to reduce the risk	The risk of conflicts in the plastic industry is classified as moderate, because the sector is not responsible for massive environmental pollution. Motive for conflicts are poor conditions of employment and limited resources of crude oil. The sector does not endeavour to reduce this risk.
Technology development	Sector efforts in technology development regarding eco-friendliness	It is assumed that the investments in eco-friendlier technologies are rather low.
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	Risk of Corruption and bribery in country: <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)⁶⁶⁵ ■ Bribe payers index: Rank 19 with 3.1 points⁶⁶⁶ Risk of Corruption and bribery in sector: It is assumed that the risk of corruption in the plastic industry is moderate.

⁶⁵⁹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁶⁶⁰ www.packagingsouthasia.com/news/Recycling_of_Plastics_656.html

⁶⁶¹ <http://plasticsnews.com/headlines2.html?id=19781>

⁶⁶² Heidelberg Institute for International Conflict Research (2009)

⁶⁶³ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

⁶⁶⁴ Global Times (2010)

⁶⁶⁵ Transparency International (2010)

⁶⁶⁶ www.nationmaster.com/graph/cri_bri_pay_ind-crime-bribe-payers-index

B3 TFT-LCD Glass from Korea

Stakeholder group workers:

Table 63: S-LCI table TFT glass from Korea stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	The law allows workers in the private sector to associate freely. There is also a law that provides the right for collective bargaining and collective action. ⁶⁶⁷ However, the ILO criticises South Korea for severe right violations concerning freedom of association and collective bargaining. Especially the Korean Government Employees Union and the Korean Federation of Construction Industry Trade Unions are often target of attacks by the government. Many unions are repudiated by the government. ⁶⁶⁸
	Presence of unions within the sector and description of their influence	There are approximately 5,890 trade unions in South Korea. Around 10% of total work force are union members. ⁶⁶⁹ The power of trade unions is rather low. Admittedly, there are strikes, but they are often quelled by the police. ⁶⁷⁰
Child labour	Percentage of child labour in country/sector	No statistics about child labour found. The law prohibits child labour. The minimum age for employment amounts 15 years. ⁶⁷¹ Child labour with regard to prostitution is widespread. ⁶⁷² South Korea is a central point for trafficking of Asian women and children. ⁶⁷³ However, there is no link between child labour and the production of glass.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector	According to the Korean government, there is no forced labour in the country. The law prohibits forced labour; however, Korea has neither ratified the ILO Forced Labour Convention no. 29 nor the Abolition of Forced Labour Conven-

⁶⁶⁷ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

⁶⁶⁸ KCTU (2006) and www.amnesty-korea.de/Suedkorea/Gewerkschaften

⁶⁶⁹ Lienemann (2008)

⁶⁷⁰ www.amnesty-korea.de/Suedkorea/Gewerkschaften

⁶⁷¹ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

⁶⁷² www.aktiv-gegen-kinderarbeit.de/welt/asien/korea_sued

⁶⁷³ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

Subcategory	Indicator	Status
		tion no. 105. South Korea is known as hub for human trafficking. ⁶⁷⁴ There was no evidence found for cases of forced labour in the electronic sector.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage amounts 4,110 KRW (ca. 2.74 EUR) per hour. ⁶⁷⁵ Based on 170 working hours/month the monthly salary amounts 698,700 KRW (ca. 466.28 EUR). This wage does not absorb living costs, wherefore daily overtime is common.
	Wage level of the worker with lowest income and description of payment performance of the sector	It is assumed that the wage level of the worker with lowest income equates the minimum wage of 4,110 KRW/hour.
Working time	Hours of work per employee and month in average	43 - 46 hours/week ⁶⁷⁶
	Number of days without work per week	2 days off per week are legally required. ⁶⁷⁷
	Description of how overtime is handled	The Korean law stipulates that overtime must be paid higher than normal working hours. Further, the law limits overtime to 48 hours and 56 hours for specific weeks respectively. ⁶⁷⁸ Overtime work in South Korea is common. The country records the highest amount of working hours compared to other OECD countries. ⁶⁷⁹
Discrimination	Percentage of women in the labour force in the sector	More than 15% of the total labour force in industry are women. ⁶⁸⁰
	Country gender index ranking	Not ranked ⁶⁸¹
	Occurrence of discrimination in the country/sector	Women and minorities are discriminated from both society and legislature. ⁶⁸² For instance, good looking women are preferably employed, there are only a few women in executive posi-

⁶⁷⁴ www.state.gov/g/drl/rls/hrrpt/2008/eap/119044.htm and ILO (2010), pp. 30

⁶⁷⁵ www.koreatimes.co.kr/www/news/biz/2009/06/123_47677.html

⁶⁷⁶ <http://laborsta.ilo.org/STP/guest>

⁶⁷⁷ www.ilo.org/dyn/natlex/docs/WEBTEXT/46401/65062/E97KOR01.htm#a49

⁶⁷⁸ *ibidem*

⁶⁷⁹ <http://stats.oecd.org/Index.aspx?DataSetCode=ANHRS>

⁶⁸⁰ <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?display=default>

⁶⁸¹ www.genderindex.org/

⁶⁸² www.state.gov/g/drl/rls/hrrpt/2004/41647.htm

Subcategory	Indicator	Status
		tions, and sexual harassment at work is commonly occurring. Also unequal payment of women and men is widespread in different sectors, including the electronic industry. ⁶⁸³ In addition, migrant workers as well as production workers are faced with poor labour conditions. Migrant workers are more often victims of occupational accidents; they earn less, and work more than local workers. Often overtime is not paid and wages are withheld. ⁶⁸⁴ In 2009, there were about 680,000 migrant workers from China, Vietnam, Philippines, and Thailand in South Korea employed, mainly in textile factories and factories producing electronics. ⁶⁸⁵ It is unknown how many migrant workers are employed in the glass industry.
Health and safety	Description of potential main origins of danger	The most important health and safety hazards with regard to the glass manufacturing are the exposure to heat, noise, and respiratory hazards due to fumes, dust, and toxic compound exposure as well as physical and electrical hazards. ⁶⁸⁶
	Accident rate of the country /sector	Korea has an accident rate of around 10,647/100,000 employees. The fatality rate amounts 11.4. ⁶⁸⁷ The fatality rate of the manufacturing sector amounts 0.05/1,000,000 working hours in recent years. ⁶⁸⁸
Social benefits/ social security	Social security expenditures of the country/sector	Korea spends only around 5% of GDP to social security. ⁶⁸⁹ There is no information about the social expenditures of the glass industry.

Stakeholder group local community:

Table 64: S-LCI table TFT glass from Korea stakeholder local community

Subcategory	Indicator	Status
Access to	Extraction of material re-	Korea has a physical trade balance of 6t per capita for all materials. ⁶⁹⁰

⁶⁸³ www.csr-asia.com/index.php?id=4597

⁶⁸⁴ Amnesty International (2009), http://english.hani.co.kr/arti/english_edition/e_national/180989.html and <http://factsanddetails.com/japan.php?itemid=906&catid=24&subcatid=156>

⁶⁸⁵ McGrath (2010)

⁶⁸⁶ [www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/\\$FILE/Final+-+Glass+Manufacturing.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/$FILE/Final+-+Glass+Manufacturing.pdf)

⁶⁸⁷ Hämäläinen/Saarela/Takala (2009)

⁶⁸⁸ <http://laborsta.ilo.org/STP/guest>

⁶⁸⁹ OECD (2007), p. 18

Subcategory	Indicator	Status
material resources	sources and level of industrial water use	The industry of South Korea consumes 16% of freshwater withdrawals. ⁶⁹¹ The production of glass is relatively resource intensive. High quantities of sand, energy, and water are required.
	Percent of population with access to improved sanitation facilities	n.s.
	Existence of projects to improve community infrastructure	CSR projects in the field of community infrastructure are scarce. LG Display supported child care centres in regard to the purchase of computers, while Samsung Corning provides laboratory equipment, computers, and books to schools. ⁶⁹²
	Presence of certified environmental management systems	Sites are certified according to ISO 14001. ⁶⁹³
	Description of (potential) material resource conflicts	The high consumption of fresh water and energy can lead to local resource conflicts.
Access to immaterial resources	Freedom of expression in country/sector	The Korean constitution provides the right of freedom of speech, press, petition, and assembly. In the international ranking of press freedom South Korea has barely the status “free” (total score: 30; with a score of 31 points countries are classified as “partly free”). ⁶⁹⁴ However, the freedom of expression in Korea is, according to Amnesty International, restricted. ⁶⁹⁵ It is believed that the freedom of expression in the sector and company is moderate.
	Annual arrests connected to protest of sector actions	None.
	Presence of community education initiatives and community service programmes	None.
Delocalisation and migration	Migration rate of the country	South Korea has an estimated net migration rate of 0 migrants/1,000 inhabitants. ⁶⁹⁶

⁶⁹⁰ OECD (2008), p. 13

⁶⁹¹ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁶⁹² www.lgdisplay.com and www.scp.samsung.com/company/publicservice.asp

⁶⁹³ Asahi (2009), p. 31, www.lgdisplay.com and www.scp.samsung.com/company/prize.asp

⁶⁹⁴ www.freedomhouse.org/template.cfm?page=251&year=2009

⁶⁹⁵ www.amnesty.de/jahresbericht/2010/korea-sued?destination=node%2F2962

⁶⁹⁶ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
	Number of individuals who resettle that can be attributed to the sector	None.
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	South Korea has a very homogenous ethnic population. There are mainly Korean and a small Chinese minority. ⁶⁹⁷
	Respect of the sector regarding indigenous rights	-
Safe and healthy living conditions	Burden of disease in the country	The Republic of Korea has a DALY rate of 12 which is very low with regard to international comparison. ⁶⁹⁸ Main causes of death are cerebrovascular diseases, trachea, bronchus, and lung cancers, heart diseases, diabetes, stomach and liver cancer. ⁶⁹⁹ The life expectancy at birth amounts 78.81 years. ⁷⁰⁰
	Pollution level of the country and contribution of the sector to the environmental load	Main environmental issues are air and water pollution, including acid rain, due to very high population density and fast economic growth. Korea tries to come to grips with its environmental load, but belongs still to the most polluted OECD countries. ⁷⁰¹ (No data of CO ₂ emissions per capita and pm 10 air content available.) Glass manufacturing is an energy-intensive activity, what entails the emission of combustion by-products as sulphur dioxide, carbon dioxide, and nitrogen oxides. Further, the glass manufacturing industry is linked to dust emissions, water consumption and pollution, and the

⁶⁹⁷ www.state.gov/r/pa/ei/bgn/2800.htm

⁶⁹⁸ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁶⁹⁹ www.who.int/countries/kor/en/

⁷⁰⁰ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁷⁰¹ OECD and www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
		use of harmful substances in different processes as polishing or coating. ⁷⁰²
	Sector effort to improve the environmental performance	<ul style="list-style-type: none"> ■ Development of arsenic-free glass ■ Production of RoHS compliant glass ■ Increased energy efficiency ■ Closed water circulations ■ Reduction of waste and increase of recycling rates
Secure living conditions	Crime rate	South Korea has a low crime rate compared to North Korea or China. Japan, for instance, has a considerably lower crime rate. According to the Global Peace Index, South Korea is placed on rank 43 of 149. ⁷⁰³
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	The unemployment rate in South Korea is estimated to 4.1% in 2009. ⁷⁰⁴
	Percentage of work force hired locally	No information available.
Community engagement	Description of community engagement of the sector	Community engagement of the glass sector seems rather deficient. Primary underprivileged families and minorities are supported with commodity contributions. Beyond that, CSR activities are scarce: LG provides eye-checks and organises park cleaning days; Samsung Corning protects Korean artefacts, and the like. ⁷⁰⁵ The engagement of Asahi and NEG in Korea is lacking. ⁷⁰⁶

Stakeholder group society:

Table 65: S-LCI table TFT glass from Korea stakeholder society

Subcategory	Indicator	Status
Public	Presence of publicly available promises or agree-	LG display has made voluntary agreements with the Korean government regarding energy sav-

⁷⁰² [http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/\\$FILE/Final+-+Glass+Manufacturing.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GlassMfg/$FILE/Final+-+Glass+Manufacturing.pdf)

⁷⁰³ www.visionofhumanity.org/gpi-data/#/2010/scor

⁷⁰⁴ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁷⁰⁵ www.scp.samsung.com/company/publicservice.asp and www.lgdisplay.com

⁷⁰⁶ Asahi (2009), pp. 54 and www.neg.co.jp/EN/csr/socialactivity.html

Subcategory	Indicator	Status
commitments to sustainable issues	ments on sustainable issues and complaints to the non fulfilment of these commitments	ings and greenhouse gas reduction since 2001, ⁷⁰⁷ but it is unknown, if LG provides concrete and realistic aims.
	Implementation/signing of principles or codes of conducts	Codes of conducts are common in the TFT glass industry. ⁷⁰⁸
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	The Republic of Korea ranks among the twenty largest economies worldwide. The country has a highly industrialised economy which is geared to export manufactured goods. Main export commodities are electronics, mainly semiconductors, telecommunications, automobiles, chemicals, ships, and steel. ⁷⁰⁹ In 2009, the GDP per capita amounted to 28,000 USD; the real growth rate of the GDP was 0.2%. ⁷¹⁰ An estimation for the GDP growth in 2010 assumes a growth rate of 3.95%. ⁷¹¹ The inflation rate was estimated to be 2.8% in 2009. ⁷¹² The demand for TFT-LCD glass substrates is growing and only a few companies are producing this substrate worldwide. Thus, the manufacturing of TFT-LCD glass substrate is strategic and thus very important for the economy. ⁷¹³
Prevention and mitigation of conflicts	Presence of conflicts in the country	Since 1948 South Korea is at war with North Korea. Admittedly a ceasefire agreement exists since 1953, a peace treaty was never under-signed. ⁷¹⁴ Meanwhile the tensions had been relieved, but since March 2010 the conflict

⁷⁰⁷ www.lgdisplay.com

⁷⁰⁸ Asahi (2009), p. 9, http://audit.samsungscp.co.kr/ENG_ethics/ethics/index_ethics.asp, www.neg.co.jp/EN/csr/compliance.html, www.neg.co.jp/EN/company/philosophy.html and www.lgdisplay.com

⁷⁰⁹ www.state.gov/r/pa/ei/bgn/2800.htm, www.cia.gov/library/publications/the-world-factbook/geos/ks.html and www.economywatch.com/world_economy/south-korea/export-import.html

⁷¹⁰ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁷¹¹ www.economywatch.com/world_economy/south-korea

⁷¹² www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁷¹³ http://english.peopledaily.com.cn/200701/16/eng20070116_341789.html and www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xsl/100512_tft_lcd_glass_substrate_demand_for_ecast_to_grow_15_in_2010_to_278m_m2.asp

⁷¹⁴ Heidelberg Institute for International Conflict Research (2009)

Subcategory	Indicator	Status
		intensifies anew. Cause was that North Korea sank a South Korean warship. ⁷¹⁵ In addition, there is a conflict between South Korea and Japan due to territorial aspects. ⁷¹⁶
	Risk of conflicts with regard to the sector and measures to reduce the risk	Among these conflicts caused by military actions, conflicts arise also due to environmental pollution, which sometimes result in violent riots. The sector tries to minimise environmental impacts from production processes and thus also to minimise the conflict potential.
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Development of a new technique to eliminate bubbles from the glass to avoid the use of arsenic ■ Increase of recycling rates ■ Prevention of air pollution due to preventing equipment
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 5.5 (rank 39)⁷¹⁷ ■ Bribe payers index: Rank 18 with 3.4 points⁷¹⁸ <p>Risk of corruption in sector: The risk of corruption in the Korean TFT-LCD glass sector is estimated to be relatively high, because it is a dynamic sector.</p>

C Design of the Laptop by ASUSTeK Computer Inc.

Stakeholder group workers:

Table 66: S-LCI table laptop design by ASUSTeK stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	In Taiwan many restrictions concerning freedom of association and collective bargaining exist. For one thing there are several worker groups, including defence industry workers, fire fighters, teachers, doctors, medical personnel, and others, who are not permitted to form unions. Migrant workers can admittedly join unions, but

⁷¹⁵ www.telegraph.co.uk/news/worldnews/asia/northkorea/8155262/North-and-South-threaten-military-retaliation-as-conflict-intensifies.html

⁷¹⁶ Heidelberg Institute for International Conflict Research (2009)

⁷¹⁷ Transparency International (2010)

⁷¹⁸ www.nationmaster.com/graph/crime/crime_bri_pay_ind-crime-bribe-payers-index

Subcategory	Indicator	Status
		<p>they are not able to establish or chair unions. For another thing there are limitations regarding strikes, collective bargaining, and strength of labour laws. The Taiwanese law prescribes wide procedures before workers can go on strike. Consequently it is difficult to call a legal strike. With regard to collective bargaining it can be stated that there are admittedly collective agreements, but the number of workers, who are covered by these agreements is small. Further, the labour standards law does not apply for several sectors as doctors, nursery employees, gardeners, domestic workers, and lawyers. Approximately 10 - 15% percent of the work force are concerned of these limitations. Beyond that, the Taiwanese government has the power to intervene directly in internal affairs of trade unions.⁷¹⁹</p>
	<p>Presence of unions within the sector/organisation and description of their influence</p>	<p>In 2000, the first legal and autonomous trade union was recognized by the Taiwanese government, namely the Taiwan Confederation of Trade Unions (TCTU). Today the TCTU comprises 21 member unions covering telecommunication, petroleum, tobacco, alcohol, railway, bus, and banking industries as well as 9 local trade union federations.⁷²⁰ The power of trade unions in Taiwan is limited; thus also their achievements.⁷²¹ It is not known, if there is a trade union at ASUS.</p>
<p>Child labour</p>	<p>Percentage of child labour in country/sector/organisation</p>	<p>There are no statistics about child labour in Taiwan. According to crime statistics and the ITUC, there are cases of child trafficking. These children come from poor neighbour countries as China, Thailand, and Indonesia, or Vietnam and are forced into prostitution.⁷²² There was no evidence found that child labour is present in the electronic industry in Taiwan or in ASUS sites. ASUS Human Rights Declaration prohibits child labour.⁷²³</p>

⁷¹⁹ ITUC (2010), pp. 2 and <http://survey09.ituc-csi.org/survey.php?IDContinent=3&IDCountry=TWN&Lang=EN>

⁷²⁰ www.tctu.org.tw/front/bin/ptdetail.phtml?Part=en001&Category=176367

⁷²¹ www.tctu.org.tw/front/bin/ptdetail.phtml?Part=en004&Category=176367

⁷²² ITUC (2010), p. 6, www.nationmaster.com/country/tw-taiwan/crime and www.aktiv-gegen-kinder-arbeit.de/welt/asien/taiwan

⁷²³ <http://csr.asus.com/english/index.aspx#28>

Subcategory	Indicator	Status
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	In Taiwan forced labour occurs in the form of bonded labour; mainly concerning migrant workers. There are cases of human trafficking for the purpose of forced labour including prostitution. ⁷²⁴ There was no evidence found for forced labour in sector or company. ASUS Human Rights Declaration prohibits forced, bonded, or involuntary prison labour. ⁷²⁵
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	The basic wage in Taiwan per month is 17,280 TWD (ca. 440 EUR). According to the Council of Labor Affairs, this wage level does not allow a decent living standard. They call for an increase of 3.47%, resulting in a minimum wage of 18,500 TWD. Unions call for 22,115 TWD. ⁷²⁶
	Wage level of the worker with lowest income and description of the sector/enterprise	No information available.
Working time	Hours of work per employee and month in average	No information available.
	Number of days without work per week	No information available.
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	n.s.
	Country gender index ranking	Not ranked, China has rank 83 of 102 ⁷²⁷
	Occurrence of discrimination in the country/sector/company	There is gender discrimination in employment regarding payment, promotion, presence in leading positions, and access to employment. Discrimination also occurs concerning migrant workers. In general migrant workers earn less and they are excluded from certain social bene-

⁷²⁴ ITUC (2010), pp. 6

⁷²⁵ <http://csr.asus.com/english/index.aspx#28>

⁷²⁶ Tsai (2010)

⁷²⁷ www.genderindex.org

Subcategory	Indicator	Status
		fits. Further, indigenous people and persons with HIV/AIDS are discriminated. ⁷²⁸ According to ASUSTeK, there were no incidents of discrimination in 2008 and 2009. ⁷²⁹ Internet research could reveal anyhow one case of employment discrimination of ASUS in China. ⁷³⁰
	Presence of formal policies of equal opportunities	The ASUSTeK Human Rights Declaration covers non-discrimination. ⁷³¹
	Share of women and minorities of personnel	32% of the work force in Taiwan are women. ⁷³²
	Ratio of salary of women to wages of men in company	100% ⁷³³
	Treatment of workers in general	No information available.
Health and safety	Description of potential main origins of danger and protection measures	The design process is not linked to harmful aspects. ASUS executes emergency simulations to minimise danger and provides education measures regarding environment, safety, health. Further, ASUS is certified according to OHSAS 18001. ⁷³⁴
	Description of reported violations	No information available.
	Accident rate of the country /sector/organisation	Taiwan has an occupational accident rate of 10,406/100,000 employees, which is rather low in comparison to other Asian countries. The fatality rate amounts 11.1. ⁷³⁵ ASUS reported a disabling frequency rate for 2009 of 2.17% in average. ⁷³⁶
	Presence of a formal policy regarding health and safety	The social and environmental responsibility policy of ASUSTeK includes health and safety aspects. Laws regarding health and safety shall be satisfied and safety risks shall be reduced through health care programmes, education, and

⁷²⁸ ITUC (2010), p. 6 and www.minorityrights.org/?lid=5585#current

⁷²⁹ ASUS (2009a), p. 84 and ASUS (2008a), p. 59

⁷³⁰ Li (2007)

⁷³¹ See annex II

⁷³² ASUS (2009a), p. 44 and ASUS (2008a), p. 31

⁷³³ ASUS (2009a), p. 48 and ASUS (2008a), p. 32

⁷³⁴ ASUS (2008a)

⁷³⁵ Hämäläinen/Saarela/Takala (2009)

⁷³⁶ ASUS (2009a), p. 82

Subcategory	Indicator	Status
		the promotion of the occupational health and safety management system. ⁷³⁷
Social benefits/ social security	Social security expenditures of the country/sector	Taiwan spends around 3% of GNP to social welfare. ⁷³⁸
	List of social benefits provided to workers	Examples of benefits: ⁷³⁹ <ul style="list-style-type: none"> ■ Life insurance ■ Labour insurance ■ Health insurance ■ Pension program ■ Disability/invalidity coverage ■ Group medical insurance ■ Bonuses for special holidays ■ Financial aid for emergency, celebrations, etc. ■ Scholarships for employee's children ■ Language classes
	Evidence of violations to laws and employment regulations	In the frame of the division of ASUS in ASUS, Pegatron, and Unihan in 2008, all former pensions were cancelled. All employees with right to a pension are treated as if they were re-recruited on 1 January 2008. ⁷⁴⁰ This is admittedly no right infringement, but it is questionable behaviour.

Stakeholder group local community:

Table 67: S-LCI table laptop design by ASUSTeK stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information of country data available. The design process does not cause high resource consumption.
	Percent of population with access to improved sanitation facilities	n.s.; it is assumed that the majority of the population has access to improved sanitation facilities
	Existence of projects to improve community infrastructure	None.
	Presence of certified environmental management	Several sites of ASUS are certified according to ISO 14001. ⁷⁴¹

⁷³⁷ <http://csr.asus.com/english/index.aspx#24>

⁷³⁸ DGBAS (2009), p. 150

⁷³⁹ ASUS (2009b), p. 76 and ASUS (2008a), p. 32

⁷⁴⁰ Kubicki (2008)

⁷⁴¹ ASUS (2007), p. 26 and <http://csr.asus.com/english/index.aspx#26>

Subcategory	Indicator	Status
	systems	
	Description of (potential) material resource conflicts	The design process does not provoke material resource conflicts.
Access to immaterial resources	Freedom of expression in country/sector	According to the Freedom House ranking of press freedom, Taiwan is classified as “free” (total score: 23) and the freest country in Asia. The Taiwanese constitution provides freedom of speech and press and these rights are in general respected from the judiciary. For instance, it is common to criticise the government and high-ranking politicians. ⁷⁴² However, it is assumed that the freedom of expression in the electronic industry is restricted due to the restriction of trade unions.
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	The ASUSTeK Foundation sponsors domestic as well as international scholarships, and academic researches. Further, the foundation donates equipment and funding to assist students regarding innovations. ⁷⁴³
Delocalisation and migration	Migration rate of the country/region	While China has a negative migration rate of -0.34 migrants/1,000 inhabitants, Taiwan’s migration rate is light positive with 0.03 migrants/1,000 inhabitants. ⁷⁴⁴
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
	Strength of policies to protect cultural heritage	None.

⁷⁴² www.freedomhouse.org/template.cfm?page=251&year=2009

⁷⁴³ ASUS (2008a), p. 46

⁷⁴⁴ www.cia.gov/library/publications/the-world-factbook/geos/tw.html and www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	In the past indigenous people in Taiwan experienced colonialisations and political conflicts. There were numerous violations of Human rights as discrimination and oppression. This led among others to aboriginal population decrease, extinction of languages, and loss of cultural heritage. Indigenous people are usually employed in low skilled jobs with low payment. The unemployment rate in indigenous communities is high and the average wage amounts 65% of the national average income. ⁷⁴⁵ In addition, there are resettlements of the Taiwanese government affecting indigenous people. ⁷⁴⁶ The percentage of indigenous people in Taiwan today is relatively low. Only 2% of population has an indigenous origin. The most Aborigines live in the Taiwanese Highlands. In the region of Taipei, where ASUS is located, there are almost no indigenous people. ⁷⁴⁷
	Respect of the company regarding indigenous rights	-
	Strength of policies to protect indigenous community members	-
Safe and healthy living conditions	Burden of disease in the country/region	China, including Taiwan, has a DALY rate of 16, which is relatively low in a global context. ⁷⁴⁸ Main cause for death with an upstream tendency are malignant tumours. Heart diseases, cerebrovascular diseases, diabetes, accidents, pneumonia, and chronic liver diseases are following. ⁷⁴⁹ The life expectancy of birth amounts 78.15 years. ⁷⁵⁰
	Pollution level of the country/region and contribution of the company to the environmental load	Major environmental issues of Taiwan are air, water, and soil pollution. The fast growing economy contributes mainly to the environmental load as in other NIE. Also agriculture and traffic pollute the environment. Only ¼ of the

⁷⁴⁵ ITUC (2010), p. 5

⁷⁴⁶ Wang (2009) and www.asiaone.com/News/Latest+News/Asia/Story/A1Story20100807-230993.html

⁷⁴⁷ ITUC (2010), p. 5, Chiao (2008), www.minorityrights.org/?lid=5585#current and http://en.wikipedia.org/wiki/Taiwanese_aborigines

⁷⁴⁸ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁷⁴⁹ DGBAS (2009), p. 114

⁷⁵⁰ www.cia.gov/library/publications/the-world-factbook/fields/2102.html

Subcategory	Indicator	Status
		<p>country's territory is arable land. This leads to intensive cultivation with intensive fertilisation and irrigation. The results are water pollution and water scarce. Also resident producers of fertilisers emit toxic substances. Sewage treatment plants and appropriate filters are lacking.⁷⁵¹</p> <p>The air content of carbon monoxide amounts around 470 ppb. The concentration of suspended particulates amounts approximately 80µg/m³.⁷⁵² In 2008, 134,842 penalties regarding environmental pollution were reported.⁷⁵³</p> <p>The contribution of ASUS to the environmental load in Taiwan is rather low, because the production locations are abroad. The main impact causes ASUSTeK in Taiwan through its energy consumption.⁷⁵⁴</p>
	Management effort to improve the environmental performance	<ul style="list-style-type: none"> ■ Development of lead-free motherboards ■ Development of cadmium-free motherboards ■ Development of RoHS compliant notebooks ■ Development of halogen-free products ■ Restrictions in use of nickel and nickel compounds, polyvinyl chloride (PVC) and PVC blends, tetrabromobisphenol-A (TBBP-A), ozone-depleting substances, and radioactive substances ■ Establishment of Green Product Management System, which helps the R&D staff to determine, if suppliers use specific hazardous substances⁷⁵⁵
Secure living conditions	Crime rate	Taiwan has a relatively low violent crime rate, but bribery is for instance relatively frequent. ⁷⁵⁶ However, the region is deemed to be secure. According to the Global Peace Index, Taiwan ranks on place 35 of 149. ⁷⁵⁷
	Management policies related to private security personnel	No information available.

⁷⁵¹ www.muz-online.de/asien/taiwan.html

⁷⁵² DGBAS (2009), pp. 120

⁷⁵³ DGBAS (2009), p. 128

⁷⁵⁴ ASUS (2008a), pp. 19

⁷⁵⁵ ASUS (2008a), ASUS (2007) and <http://csr.asus.com/english/#35>

⁷⁵⁶ www.nationmaster.com/country/tw-taiwan/crime

⁷⁵⁷ www.visionofhumanity.org/gpi-data/#/2010/scor

Subcategory	Indicator	Status
Local employment	Percentage of unemployment in the country/region	The unemployment rate rose from 2008 to 2009 from estimated 4.1% to around 5.9%. The current unemployment rate amounts 5.39%. ⁷⁵⁸
	Percentage of work force hired locally	Around 42% (4.600 people) of the total work force of ASUS are employed in Taiwan. ⁷⁵⁹ Since migratory labour is unusual in Taiwan, it is assumed that this percentage reflects the locally hired personnel.
	Percentage of spending on locally-based suppliers	This study shows that ASUS co-operates mainly with companies that have their headquarters in Taiwan, whereas the production sites of these companies are often located in China.
Community engagement	Presence of policies regarding community engagement at company level	In 2008, ASUSTeK established a foundation to feedback their community and fulfil their CSR.
	Description of community engagement of the company	Examples of projects: ⁷⁶⁰ <ul style="list-style-type: none"> ■ Donation of 500 PCs for women in Taiwan ■ Project "PC Recycling for a Brighter Future", which aims to collect waste computers and refurbish them for reuse in schools or for disadvantages minorities in Taiwan ■ Sponsoring of local literature and arts ■ Charity campaigns for disadvantaged minorities, the poor, or disaster victims ■ Initiation of environmental days

Stakeholder group society:

Table 68: S-LCI table laptop design by ASUSTeK stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	ASUS follows the EICC. In addition, the company established an own code of conduct for suppliers, but did not publish it. ⁷⁶¹

⁷⁵⁸ http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201005240038&Type=aECO

⁷⁵⁹ ASUS (2008a), p. 31

⁷⁶⁰ ASUS (2008a), pp. 41

⁷⁶¹ ASUS (2009a), p. 45 and ASUS (2008a), p. 24

Subcategory	Indicator	Status
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	Taiwan has a prospering economy which is indeed very export dependent. Exports generate around 70% of Taiwan's GDP. Main export goods are electronics and machinery. In 2009, the estimated GDP was 362 billion USD and the estimated real growth rate was -2.5%. The GDP per capita amounted to around 29,800 USD. The inflation rate was -0.9%. ⁷⁶² Due to the high export dependency Taiwan feels the effects of the global recession obviously. However, Taiwan climbed in the Global Competitiveness Index of the World Economic Forum from rank 17 in 2008 to rank 12 in 2009. ⁷⁶³
	Contribution of the product/company to economic development	The electronics industry is the key sector of the Taiwanese economy. Taiwanese electronics are worldwide coveted. According to the Industrial Technology Research Institute (ITRI) of Taiwan, 92% of the globally offered notebooks came from Taiwanese sources in 2008. ⁷⁶⁴ Internationally established companies with own brands as ASUSTeK and Acer stimulate the economic progress.
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	Since 1949 there is a non-violent conflict about the secession of Taiwan, ⁷⁶⁵ but this conflict is not related to the electronic industry.
	Risk of conflicts with regard to the sector	The risk of conflicts in the Taiwanese electronic industry is rather low.
	Description of the organisation's role in the development of the conflicts	-
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Reduction of energy consumption ■ Reduction of hazardous substances ■ Development of environmental friendlier technologies as LED backlights ■ Development of smaller and lighter devices
	Involvement of the company in technology transfer projects	No information available.
	Presence of partnerships regarding research and	There are co-operations with subsidiaries or other companies as Intel for instance. ⁷⁶⁶

⁷⁶² www.cia.gov/library/publications/the-world-factbook/geos/tw.html

⁷⁶³ World Economic Forum (2009), p. 13

⁷⁶⁴ www.itri.org.tw

⁷⁶⁵ Heidelberg Institute for International Conflict Research (2009), p. 52

⁷⁶⁶ ASUS (2008b)

Subcategory	Indicator	Status
	development	
	Investments in technology development	In 2008, ASUS had R&D costs of 5,486,036 USD. ⁷⁶⁷ In 2009, R&D expenses of 3,967,382 USD were reported. ⁷⁶⁸
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 5.6 (rank 37)⁷⁶⁹ ■ Bribe payers index: Rank 17 with 3.5 points⁷⁷⁰ <p>Risk of corruption in sector: It is assumed that there is risk of corruption in the Taiwanese electronic sector. The research intensity and the high competition are for instance causes for corruption.</p>
	Presence of an anti-corruption program in the company	ASUS has implemented an anti-corruption and anti-bribery policy to prevent corruption. ⁷⁷¹
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	According to Wayne Hsieh, one of the founders of ASUS, the company is also mired in corruption and nepotism. In 2003, Hsieh backed out and criticized the management harshly. ⁷⁷²

Stakeholder group value chain actors:

Table 69: S-LCI table laptop design by ASUSTeK stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	<ul style="list-style-type: none"> ■ ASUS published a misleading sales campaign in 2009. ASUS was forced by the Taiwan's Fair Trade Commission to withdraw the advertisement from circulation immediately and had to pay a penalty.⁷⁷³ ■ ASUS set higher prices for Eee PCs with Linux than for Eee PCs with Windows, although Linux has no licensing costs. ASUS declared that Linux is likely to be phased out as a pre-

⁷⁶⁷ ASUS (2008b), p. 58

⁷⁶⁸ ASUS (2009b), p. 64

⁷⁶⁹ Transparency International (2010)

⁷⁷⁰ www.nationmaster.com/graph/crime_bri_pay_ind-crime-bribe-payers-index

⁷⁷¹ ASUS (2009a), p. 15

⁷⁷² www.digitimes.com

⁷⁷³ www.digitimes.com/news/a20090806PD207.html

Subcategory	Indicator	Status
		installed operating system on its notebook products. ASUS is imputed the joining to a Microsoft-OEM cartel. ⁷⁷⁴
	Presence of policies to prevent anti-competitive behaviour	None.
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	All suppliers of ASUS have to sign the "Consent of ASUSTeK Code of Conduct" which addresses corporate social responsibility. ⁷⁷⁵ There are no audits from ASUS.
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	ASUS initiated a self-assessment of 109 suppliers regarding quality and environmental aspects. ⁷⁷⁶
	Membership in an initiative that promotes social responsibility along the supply chain	None.
Supplier relationships	Interaction of the company with suppliers ⁷⁷⁷	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	IBM and Positive Technologies sued ASUS for patent infringements. The IBM charge was rejected from the U.S. International Trade Commission. ⁷⁷⁸ However, there were several other charges against ASUS. ⁷⁷⁹

D Production of Pre-Products

D1 Hard Disc Drive from Seagate

Stakeholder group workers:

⁷⁷⁴ Gedda (2009) and www.linuxtoday.com/news_story.php3?ltsn=2008-07-11-015-26-NW-HW-RL&tbovrmode=3

⁷⁷⁵ <http://csr.asus.com/english/index.aspx#13>

⁷⁷⁶ ASUS (2009a), p. 35

⁷⁷⁷ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

⁷⁷⁸ Shah (2009) and www.tcmagazine.com/tcm/news/misc/29448/positive-technologies-sues-apple-sony-hp-ot-hers-patent-infringement

⁷⁷⁹ ASUS (2010), p. 28

Table 70: S-LCI table HDD from Seagate stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all organisations have to officially register with and be approved by the government. ⁷⁸⁰ Seagate declares in their human rights policy that they “respect and adhere to all applicable laws concerning the right of workers to organize in labor unions and engage in collective bargaining.” ⁷⁸¹
	Presence of unions within the sector/organisation and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ⁷⁸² It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts but they contain only minimum standards as required by national legislation. ⁷⁸³ There is a labour union at Seagate Suzhou, namely the Seagate Suzhou Employee Union. ⁷⁸⁴ The influence of the union will be rather low, as it is registered to the ACFTU.
Child labour	Percentage of child labour in country/sector/organisation	There are no official statistics about child labour in China. However, child labour is considered as a rising problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ⁷⁸⁵ A percentage in the electronic sector cannot be stated. There was no evidence found that Seagate employs child labourer in Suzhou. Seagate declares in their human rights policy that they exclusively

⁷⁸⁰ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

⁷⁸¹ Seagate (2009), p. 28

⁷⁸² <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

⁷⁸³ Metcalf/Li (2006) and interview with China Labour Bulletin

⁷⁸⁴ Questionnaire Seagate and email from Seagate

⁷⁸⁵ U.S. Department of Labor (2009), p. 15, China Labour Bulletin (2007) and www.ihlo.org/LR/C/W/020807.html

Subcategory	Indicator	Status
		employ workers that are at minimum 18 years old. ⁷⁸⁶
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ⁷⁸⁷ There was no evidence found that Seagate employs forced labourer in Suzhou. Seagate declares in their human rights policy that they will “ensure no forced, bonded or involuntary prison labor is used in the production of Seagate products”. ⁷⁸⁸
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage in the Jiangsu province, increased from 850 CNY (101.36 EUR) to 960 CNY (114.47 EUR) in 2010. ⁷⁸⁹ This minimum wage does not cover the living costs so that many workers are forced to work long hours. Living costs in the industrial park Shenzhen were estimated to be more than 1,500 CNY (175.36 EUR), ⁷⁹⁰ which are comparable to living costs in Suzhou.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	The basic wage amounts 1,050 CNY per month (126.17 EUR). In addition, Seagate pays performance-based premiums of 50 - 400 CNY (6 - 48 EUR). Further, there are bonus payments of 100 CNY per month (12.02 EUR) and subsidies of 200 - 400 CNY per month (24 - 48 EUR). ⁷⁹¹ Ac-

⁷⁸⁶ Seagate (2009), p. 29

⁷⁸⁷ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

⁷⁸⁸ Seagate (2009), p. 29

⁷⁸⁹ Yang (2010)

⁷⁹⁰ FIAS (2007), p. 53

⁷⁹¹ <http://suzhou.lbx.cc/gongqiu/17524.html>

Subcategory	Indicator	Status
		According to Seagate, the basic salary amounts 1,728.45 CNY. ⁷⁹²
Working time	Hours of work per employee and month in average	Usually working time amounts 12 hours/day. ⁷⁹³ According to Seagate, the maximum overtime hours per week amount 24 hours. ⁷⁹⁴ Seagate declares in their human rights policy that they will “not require employees to work more than 60 hours on average per work week (...).” ⁷⁹⁵
	Number of days without work per week	3 - 4 days per week (The work schedule is a 7 day rolling work schedule with 3 days on and 4 days off, then 4 days on and 3 days off.); ⁷⁹⁶ Seagate declares in their human rights policy that they will “provide employees with at least one day off per every seven days, on average (...).” ⁷⁹⁷
	Description of how overtime is handled	Overtime payment is higher than the basic hourly wage: 1.5 times of basic wage on working days, 2.0 times of basic wage on weekend, 3.0 times of basic wage on holidays.
Discrimination	Percentage of women in the labour force in the sector	The companies of the electronic industry in China prefer the employment of young women, so the percentage of women of the labour force is very high.
	Country gender index ranking	Rank 83 of 102 ⁷⁹⁸
	Occurrence of discrimination in the country/sector/company	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ⁷⁹⁹ Also discrimination in the workplace is common. ⁸⁰⁰ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace acci-

⁷⁹² Questionnaire Seagate

⁷⁹³ <http://suzhou.lbx.cc/gongqiu/17524.html>

⁷⁹⁴ Questionnaire Seagate

⁷⁹⁵ Seagate (2009), p. 29

⁷⁹⁶ Questionnaire Seagate; also <http://wh.58.com/zpshengchankaifa/1800439430017x.shtml>

⁷⁹⁷ Seagate (2009), p. 29

⁷⁹⁸ www.genderindex.org

⁷⁹⁹ www.state.gov/g/drl/rls/irf/2009/127268.htm

⁸⁰⁰ Séguin (2009)

Subcategory	Indicator	Status
		<p>dents. In addition, they are often employed without a written labour contract.⁸⁰¹ Employment discrimination against women is also present.⁸⁰²</p> <p>Many companies of the electronic sector have restrictions on age, gender, and height. Such workplace discrimination is usually quite arbitrary.⁸⁰³</p> <p>According to Seagate, there are no cases of discrimination.⁸⁰⁴</p> <p>However, it seems that discrimination happens, though. For instance, women have to be taller than 1.55m and men have to be taller than 1.70m, if they want to work for Seagate.⁸⁰⁵ Also the high percentage of women in the labour force is a clue for discrimination against men.</p>
	Presence of formal policies of equal opportunities	Seagate has initiated an equal employment opportunity policy. There is also a policy that prohibits discrimination. ⁸⁰⁶
	Share of women and minorities of personnel	Approximately 75% of personnel are female, ⁸⁰⁷ around 90% of the employees are probably rural migrant workers. ⁸⁰⁸
	Ratio of salary of women to wages of men in company	100% ⁸⁰⁹
	Treatment of workers in general	There are strict regulations to administrate the workers. Wage deductions due to “misbehaviour” as talking during the work, delays, use of restrooms too frequent, etc. are common. In addition, it is a common practice to use fines for non-attendance regarding overtime as leverage. ⁸¹⁰
Health and	Description of potential main origins of danger and	Workers handle with hazardous substances as for instance solvents. The assembly of HDDs

⁸⁰¹ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

⁸⁰² <http://genderindex.org/country/china>

⁸⁰³ Interview with China Labour Bulletin

⁸⁰⁴ Questionnaire Seagate

⁸⁰⁵ http://suzhou.qd8.com.cn/zhaopin14/xinxi12_511420.html

⁸⁰⁶ Seagate (2009) and www.seagate.com/www/en-us/about/global_citizenship/work_environment

⁸⁰⁷ Questionnaire Seagate

⁸⁰⁸ Investigations in China; Seagate refused to give evidence about the percentage of migrant workers

⁸⁰⁹ Questionnaire Seagate

⁸¹⁰ Interview with China Labour Bulletin

Subcategory	Indicator	Status
safety	protection measures	<p>takes place in so-called “clean rooms”. Workers wear protection clothes, but the protection clothes were mainly developed to protect the product and not the worker’s health. The exposure of workers in terms of toxic chemicals leads to miscarriages, birth defects, and cancer.⁸¹¹</p> <p>Seagate tries to minimise the use of harmful substances. The company eliminated bromine and chlorine in the half of products, produces RoHS compliant products, and restricts the use of numerous other hazardous substances. However, according to an environmental ranking of America’s largest 500 corporations Seagate is average regarding its environmental performance.⁸¹²</p> <p>The site is certified according to OHSAS and has won an award for its safety management.⁸¹³</p>
	Description of reported violations	<p>In the 1990s there were four cases of death in a Seagate disc drive facility in Thailand. A medic investigated the death and found out that approximately 200 workers had blood levels that suggest chronic lead poisoning. Seagate responded denying the results and pressuring Thailand’s government to prohibit the medic from practicing occupational medicine.⁸¹⁴ The site in Suzhou is a modern facility with a high level of automation. It is assumed that the labour conditions today are safer. Seagate conducted audits in sites to review the compliance with EHS regulations,⁸¹⁵ but Seagate does not publish information about these audits.</p>
	Accident rate of the country /sector/organisation	<p>Although Asia has very high accident rates, China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2.⁸¹⁶</p> <p>Seagate reports an incident rate of 0.14 for 2010. According to Seagate, the accident rate of the sector is higher.⁸¹⁷</p>
	Presence of a formal policy regarding health and safety	<p>Among an environmental health and safety management system Seagate established a</p>

⁸¹¹ Zarsky/Roht-Arriaza/Brottem (2002)

⁸¹² <http://greenrankings.newsweek.com/companies/top500/seagate>

⁸¹³ Seagate (2009)

⁸¹⁴ Zarsky/Roht-Arriaza/Brottem (2002), p. 28

⁸¹⁵ Seagate (2006)

⁸¹⁶ Hämäläinen/Saarela/Takala (2009)

⁸¹⁷ Questionnaire Seagate and Seagate (2009), p. 16

Subcategory	Indicator	Status
		behavioural based safety program to prevent incidents at production sites worldwide. A web-based information tool was implemented as information and communication platform. ⁸¹⁸
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ⁸¹⁹
	List of social benefits provided to workers	<ul style="list-style-type: none"> ■ social insurance ■ medical insurance ■ unemployment insurance ■ work injury insurance ■ maternity insurance ■ free shuttles for workers⁸²⁰
	Evidence of violations to laws and employment regulations	Seagate violates probably the Chinese labour law with regard to the maximum working hours. According to the Chinese law, maximum overtime hours amount 36 hours per month; Seagate declares that their employees have maximal 24 overtime hours per week. So, it is highly probable that the legal maximum is regularly exceeded. In addition, more than 11 working hours/day are prohibited. ⁸²¹

Stakeholder group local community:

Table 71: S-LCI table HDD from Seagate stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information regarding material resource extraction found. China's industry is responsible for approximately 26% of freshwater withdrawal. ⁸²² The semiconductor industry is known for a very high energy and water consumption.
	Percent of population with access to improved sanitation facilities	65% ⁸²³

⁸¹⁸ Seagate (2009)

⁸¹⁹ IMF (2010), p. 5

⁸²⁰ <http://suzhou.lbx.cc/gongqiu/17524.html>

⁸²¹ www.china.org.cn/english/government/207383.htm

⁸²² www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁸²³ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/info-bycountry/china_statistics.html#65

	Existence of projects to improve community infrastructure	Seagate has implemented a community engagement programme and around 25% of donations were related to health and human services in 2009. However, there was no information found about infrastructure projects in Suzhou. ⁸²⁴
	Presence of certified environmental management systems	The company is certified according to ISO 14001. Further Seagate won the “Green Plant Award” for their factory in Suzhou in 2007. ⁸²⁵
	Description of (potential) material resource conflicts	<ul style="list-style-type: none"> ■ Competition regarding potable water, because factories not only consume much water, but also pollute water with heavy metals and other hazardous substances ■ Competition regarding raw materials as copper, gold, platinum, or tin
Access to immaterial resources	Freedom of expression in country/sector/company	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China’s media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category “not free”. Media censorship through governmental organisations is common and the judiciary is not independent. ⁸²⁶ Although Seagate guarantees in their human rights declaration free expression, ⁸²⁷ it is assumed that the freedom of expression is restricted in the company due to the prevalent conditions in the country and sector respectively. ⁸²⁸
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	More than two thirds of Seagate’s corporate giving activities address education. However, there were no local projects found. ⁸²⁹
Delocalisation and migration	Migration rate of the country/region	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ⁸³⁰

⁸²⁴ Questionnaire Seagate (the entry of Seagate is not applicable); also Seagate (2009), p. 19

⁸²⁵ Seagate (2009), p. 15 and 18

⁸²⁶ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

⁸²⁷ Seagate (2009), p. 28

⁸²⁸ Interview with China Labour Bulletin

⁸²⁹ Questionnaire Seagate and Seagate (2009)

⁸³⁰ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
	Strength of policies to protect cultural heritage	There is no policy that addresses cultural heritage. ⁸³¹ Different aspects as non-discrimination and freedom of expression are indirectly connected with cultural heritage.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.⁸³² But there are officially 55 ethnic minority groups in China,⁸³³ who account for less than 9% of population.⁸³⁴ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.⁸³⁵</p> <p>The Chinese constitution provides equal rights to all ethnic groups.⁸³⁶ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.⁸³⁷</p> <p>In the province Jiangsu live predominantly Han Chinese (99.6%) and only a few Hui Chinese (0.2%).⁸³⁸ Hui Chinese are counted among Mus-</p>

⁸³¹ Questionnaire Seagate and Seagate (2009)

⁸³² www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

⁸³³ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁸³⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁸³⁵ The World Bank (2007)

⁸³⁶ www.china.org.cn/e-white/phumanrights19/p-8.htm

⁸³⁷ www.amnesty.org

⁸³⁸ The New York Times (2009)

Subcategory	Indicator	Status
		<p>lims and the discrimination against Muslims increased in recent years. However, due to the very small share of ethnic minorities of population in Suzhou about 0.24%⁸³⁹ ethnic conflicts are rather not present.</p>
	Respect of the company regarding indigenous rights	-
	Strength of policies to protect indigenous community members	-
Safe and healthy living conditions	Burden of disease in the country/region	<p>China has a DALY rate of 16, which is relatively low.⁸⁴⁰ The risk of infectious diseases is classified as intermediate.⁸⁴¹ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year.</p> <p>In addition, around 200 million individuals suffer from occupational diseases.⁸⁴² 80% of them suffer from pneumoconiosis.⁸⁴³</p> <p>The life expectancy at birth amounts 74.51 years.⁸⁴⁴</p>
	Pollution level of the country/ region and contribution of the company to the environmental load	<p>China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causes are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.⁸⁴⁵</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10</p>

⁸³⁹ www.chinatouronline.com/china-travel/suzhou/suzhou-facts/suzhou-population.html

⁸⁴⁰ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁸⁴¹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁸⁴² <http://en.epochtimes.com/news/7-2-24/52097.html>

⁸⁴³ www.china-labour.org.hk/en/node/100744

⁸⁴⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁸⁴⁵ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		<p>decreased from 1995 to 2006 from 92 to 73$\mu\text{g}/\text{m}^3$.⁸⁴⁶</p> <p>The production of circuit boards induces a high water and energy consumption. In addition, circuit boards contain for one thing hazardous substances as heavy metals and halogens, for another thing hazardous substances are used for the processing of the PWBs as for instance for cleansing. Potential pollutants in waste water from assembly operations include acids, alkalis, organics and solvents or heavy metals. In addition, the production and assembly of PWBs causes acid fumes and VOC emissions.⁸⁴⁷</p>
	Management effort to improve the environmental performance	<p>Seagate developed bromine- and chlorine-free hard disc drives and has implemented also restrictions to the use of halogens and other hazardous substances. Seagate implemented a full material disclosure system that provides the chemical content of each component in order to be able to manage chemicals. Seagate demands proof of independent labs from its suppliers that all materials are conform to the RoHS directive, low-halogen restriction, and Seagate's list of banned substances. 50% of today produced disk drives comply with the restrictions.⁸⁴⁸</p>
Secure living conditions	Crime rate	<p>Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009.⁸⁴⁹</p> <p>Global Peace Index: Rank 80 of 149⁸⁵⁰</p>
	Management policies related to private security personnel	<p>Seagate employs security personnel;⁸⁵¹ however, it is questionable if Seagate's security agents influence the local crime rate.</p>
Local employment	Percentage of unemployment in the country/region	<p>China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher.⁸⁵²</p> <p>In provinces of the industrialised east coast</p>

⁸⁴⁶ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

⁸⁴⁷ Salazar (1997)

⁸⁴⁸ ChemSec (2009), pp. 47

⁸⁴⁹ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

⁸⁵⁰ www.visionofhumanity.org/gpi-data/#/2010/scor

⁸⁵¹ Questionnaire Seagate

⁸⁵² www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		there is this year even a lack of workers, because the number of migrant workers declines. ⁸⁵³
	Percentage of work force hired locally	Migrant workers are an important part of the personnel of factories located at the east coast, also in the electronic sector. They make up to more than 65% ⁸⁵⁴ of the work force and are primarily appointed as line workers. According to Seagate, 95% of the personnel is recruited through local recruitment channels, which indeed does not offer valuable clues to the employment of local staff. Seagate refused to give evidence about the percentage of migrant workers, who can also be hired through local recruitment channels. ⁸⁵⁵ Thus it is assumed that Seagate employs a high percentage of migrant workers.
	Percentage of spending on locally-based suppliers	60% ⁸⁵⁶
Community engagement	Presence of policies regarding community engagement at company level	Seagate has a policy that specifies the types of community programs and charitable engagement the company supports. It is a typical mix of environmental, health-wellness, education, and human services projects in local communities. ⁸⁵⁷
	Description of community engagement of the company	No information about community engagement of Seagate in Suzhou found. Also Seagate did not name concrete projects in Suzhou. ⁸⁵⁸

Stakeholder group society:

Table 72: S-LCI table HDD from Seagate stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.

⁸⁵³ www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

⁸⁵⁴ SOMO/SwedWatch (2008), p. 24

⁸⁵⁵ Questionnaire Seagate

⁸⁵⁶ Questionnaire Seagate

⁸⁵⁷ Questionnaire Seagate

⁸⁵⁸ Questionnaire Seagate

Subcategory	Indicator	Status
	Implementation/signing of principles or codes of conducts	Seagate signed the EICC ⁸⁵⁹ and is an active member of the UN Global Compact. ⁸⁶⁰ In addition, Seagate developed an own code of conduct regarding business and ethics. ⁸⁶¹
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	<p>Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed.⁸⁶²</p> <p>The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009.⁸⁶³</p> <p>The electronic sector is one of the main drivers for the Chinese economic development. Different industries are based in Jiangsu: textile industry, machinery and electronic branch, the petrochemical industry, and the production of building material. The electronic sector is also locally important.</p>
	Contribution of the product/company to economic development	<p>The market for HDDs is very capricious. There are large product and stock price fluctuations. Seagate has a global market share of around 30%, its greatest competitor is Western Digital, which has also around 30% market share. In 2009, Seagate generated a revenue of 9,805 million USD; in 2008, revenues amounted to 12,708 million USD.⁸⁶⁴</p> <p>Seagate owns two manufacturing facilities in Jiangsu province with approximately 16,300 employees. It is assumed that the company contributes to the economic development of the region. However, salaries are only moderate.</p>

⁸⁵⁹ EICC (2009a)

⁸⁶⁰ www.unglobalcompact.org/participant/8284-Seagate-Technology

⁸⁶¹ www.seagate.com/www/en-us/about/investor_relations/corporate_governance/code_of_business_conduct_and_ethics

⁸⁶² www.cia.gov/library/publications/the-world-factbook/geos/ch.html

⁸⁶³ ibidem

⁸⁶⁴ <http://investor.shareholder.com/seagate/en/secfiling.cfm?filingID=1047469-09-7888>

Subcategory	Indicator	Status
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ⁸⁶⁵ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ⁸⁶⁶ Especially industrial centres are involved. ⁸⁶⁷
	Risk of conflicts with regard to the sector	The risk of conflicts within the sector is rather high: Low wages, long working hours, environmental pollution, resource consumption, and use of rare materials pose (potential) causes for conflicts.
	Description of the organisation's role in the development of the conflicts	There is no active involvement of Seagate in conflicts so far.
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Reduction of electricity consumption of HDDs ■ Elimination/Reduction of toxic and hazardous substances as for instance halogens
	Involvement of the company in technology transfer projects	None. ⁸⁶⁸
	Presence of partnerships regarding research and development	None. ⁸⁶⁹
	Investments in technology development	Seagate Suzhou invests 10 million USD in technology development annually.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)⁸⁷⁰ ■ Bribe payers index: Rank 19 with 3.1 points⁸⁷¹ <p>Risk of corruption in sector: It is assumed that the risk of corruption in the Chinese electronic sector is rather high due to the specific conditions as for instance high competition, high research intensity, and rather low working and environmental standards.</p>

⁸⁶⁵ Heidelberg Institute for International Conflict Research (2009)

⁸⁶⁶ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

⁸⁶⁷ Global Times (2010)

⁸⁶⁸ Questionnaire Seagate (the entry of Seagate is not applicable)

⁸⁶⁹ Questionnaire Seagate

⁸⁷⁰ Transparency International (2010)

⁸⁷¹ www.nationmaster.com/graph/crime/crime_bri_pay_ind-crime-bribe-payers-index

Subcategory	Indicator	Status
	Presence of an anti-corruption program in the company	In 2008, Seagate implemented a “Code of Business Conduct and Ethics”, which addresses among others anti-corruption and bribery. “If an Employee or Director knows of or suspects a violation of this Code, or of applicable laws and regulations (including complaints or concerns about accounting, internal accounting controls, or auditing matters), he or she must report it immediately, either to the Company’s General Counsel or Chief Executive Officer, or by calling Seagate’s Ethics Helpline (...).” ⁸⁷²
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	Seagate shall have accepted bribe money from AEM-Evertch between 2004 and 2005. Motivation was the attainment of business advantages for AEM. ⁸⁷³

Stakeholder group value chain actors:

Table 73: S-LCI table HDD from Seagate stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	In the last decades there was a wave of mergers; also Seagate was involved. In 2005, Seagate acquired Mirra Inc.; in 2006, the company fused with Maxtor; in 2007, it acquired EVault; in 2008, the enterprise bought MetaLINGS, ⁸⁷⁴ but these acquisitions did not pose violations of anti-trust or monopoly legislation.
	Presence of policies to prevent anti-competitive behaviour	Seagate’s “Code of Business Conduct and Ethics” contains also policies that affect aspects of fair competition. ⁸⁷⁵
Promoting	Presence of codes of conduct that protect human	Seagate is member of the EICC that claims the implementation of the code on company level

⁸⁷² www.seagate.com/www/en-us/about/investor_relations/corporate_governance/code_of_business_conduct_and_ethics

⁸⁷³ Chong (2010)

⁸⁷⁴ www.seagate.com/www/en-us/about/corporate_information/company_milestones/

⁸⁷⁵ www.seagate.com/www/en-us/about/investor_relations/corporate_governance/code_of_business_conduct_and_ethics/

Subcategory	Indicator	Status
social responsibility	rights of workers among suppliers	and in a second step the involvement of suppliers as well as subcontractors. ⁸⁷⁶
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	There were no supplier audits during the last year. Seagate prefers self-assessment of suppliers. ⁸⁷⁷
	Membership in an initiative that promotes social responsibility along the supply chain	Seagate is a member of the EICC, which aims to involve the supply chain of member companies. The EICC comprises five CSR themes: labour, health and safety, environment, management system, and ethics.
Supplier relationships	Interaction of the company with suppliers ⁸⁷⁸	No information available.
	Fluctuation regarding suppliers	n.s. ⁸⁷⁹
Respect of intellectual property rights	Violations of the company against intellectual property rights	Seagate was sued several times due to the violation of patents and protective rights, but there was no proof found for wilful infringement. ⁸⁸⁰

D2 Random Access Memory from Hynix

Stakeholder group workers:

Table 74: S-LCI table RAM from Hynix stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	The law allows workers in the private sector to associate freely. There is also a law that provide the right for collective bargaining and collective action. ⁸⁸¹ However, the ILO criticises South Korea for severe right violations concerning freedom of association and collective bargaining. Especially the Korean Government Employees Union and the Korean Federation of Construction Industry Trade Unions are often target

⁸⁷⁶ EICC (2009b), p. 1

⁸⁷⁷ Questionnaire Seagate

⁸⁷⁸ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

⁸⁷⁹ Questionnaire Seagate

⁸⁸⁰ Bui (2008)

⁸⁸¹ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

Subcategory	Indicator	Status
		of attacks by the government. Many unions are repudiated by the government. ⁸⁸²
	Presence of unions within the sector/organisation and description of their influence	There are approximately 5,890 trade unions in South Korea. Around 10% of total work force are union members. ⁸⁸³ There is a Hynix Union and more than half of Hynix's employees are members (around 8,000 workers). ⁸⁸⁴ In addition, there is a regional labour union, which has 6,634 members. ⁸⁸⁵ It is assumed that the trade unions have inappropriate influence on important company decisions due to the position of trade unions in the country.
Child labour	Percentage of child labour in country/sector/organisation	No statistics about child labour found. The law prohibits child labour. The minimum age for employment amounts 15 years. ⁸⁸⁶ Child labour in the form of prostitution is widespread. ⁸⁸⁷ South Korea is a central point for trafficking of Asian women and children. ⁸⁸⁸ However, there is no link between child labour and the production of electronic modules. There were no evidence found that Hynix employs child labourer.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	According to the Korean government, there is no forced labour in the country. The law prohibits forced labour; however, Korea has neither ratified the ILO Forced Labour Convention no. 29 nor the Abolition of Forced Labour Convention no. 105. South Korea is known as hub for human trafficking. ⁸⁸⁹ There was no evidence found for cases of forced labour in the electronic sector or at Hynix.
	Description of kind of forced labour in the company	-

⁸⁸² KCTU (2006) and www.amnesty-korea.de/Suedkorea/Gewerkschaften

⁸⁸³ Lienemann (2008)

⁸⁸⁴ www.bitbenderforums.com/vb22/showthread.php?t=42868 cited following www.reuters.com

⁸⁸⁵ Hynix (2010), p. 56

⁸⁸⁶ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

⁸⁸⁷ www.aktiv-gegen-kinderarbeit.de/welt/asien/korea_sued

⁸⁸⁸ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

⁸⁸⁹ www.state.gov/g/drl/rls/hrrpt/2008/eap/119044.htm and ILO (2010), pp. 30

Subcategory	Indicator	Status
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage amounts 4,110 KRW (ca. 2.74 EUR) per hour. ⁸⁹⁰ Based on 170 working hours/month the monthly salary is 698,700 KRW (ca. 466 EUR). This wage does not absorb the living costs, wherefore daily overtime is common.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	The starting salary for production operator amounts in average 24 million KRW (around 15,500 EUR) per year, i.e. 2 million KRW per month (ca. 1,291 EUR). ⁸⁹¹
Working time	Hours of work per employee and month in average	40.2 hours per week ⁸⁹²
	Number of days without work per week	2 days off per week ⁸⁹³
	Description of how overtime is handled	Overtime is paid higher than the normal hourly rate. In average employees have 0.2 hours of overtime. Maximum overtime hours per week and employee amounts 14 hours. ⁸⁹⁴
Discrimination	Percentage of women in the labour force in the sector	More than 15% of the total labour force in industry are women. ⁸⁹⁵
	Country gender index ranking	Not ranked ⁸⁹⁶
	Occurrence of discrimination in the country/sector/company	Women and minorities are discriminated from both society and legislature. ⁸⁹⁷ For instance, good looking women are preferably employed, there are only a few women in executive positions, and sexual harassment at work is commonly occurring. In addition, migrant workers as well as production workers are faced with worse labour conditions. Migrant workers are more often victims of occupational accidents; they earn less money, and work more. Often overtime is not paid and wages are withheld. ⁸⁹⁸ In

⁸⁹⁰ www.koreatimes.co.kr/www/news/biz/2009/06/123_47677.html

⁸⁹¹ Hynix (2010), p. 51

⁸⁹² Questionnaire Hynix

⁸⁹³ Questionnaire Hynix

⁸⁹⁴ Questionnaire Hynix

⁸⁹⁵ <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?display=default>

⁸⁹⁶ www.genderindex.org/

⁸⁹⁷ www.state.gov/g/drl/rls/hrrpt/2004/41647.htm

⁸⁹⁸ Amnesty International (2009), http://english.hani.co.kr/arti/english_edition/e_national/180989.html and <http://factsanddetails.com/japan.php?itemid=906&catid=24&subcatid=156>

Subcategory	Indicator	Status
		2009, there were about 680,000 migrant workers from China, Vietnam, Philippines, and Thailand in South Korea employed, mainly in textile factories and factories producing electronics. ⁸⁹⁹ No case of discrimination at Hynix reported.
	Presence of formal policies of equal opportunities	Hynix's code of conduct comprises among others policies for equal opportunities and the promotion of diversity: <ul style="list-style-type: none"> ■ We support the human rights of our employees within all of our workplaces around the globe, and strive to promote diversity. (...) ■ We offer equal opportunities to all employees for education, transfer and promotion. ■ We offer equal opportunities based on outcomes, assessing employees using fair criteria and rewarding them suitably. (...)⁹⁰⁰
	Share of women and minorities of personnel	<ul style="list-style-type: none"> ■ Share of women is 49.6% of total work force ■ Share of full-time workers is 99.9% ■ Share of elderly staff amounts 0.1% ■ Share of disabled staff amounts 0.55%⁹⁰¹
	Ratio of salary of women to wages of men in company	According to Hynix, men and women have the same wage. ⁹⁰² However, it is common that women earn less than men in industries as construction, steel, electronics, and automobiles. ⁹⁰³
	Treatment of workers in general	No information available.
Health and safety	Description of potential main origins of danger and protection measures	The production of semiconductors requires the use of many hazardous substances. Hynix provides education and monitoring to prevent accidents. Further, Hynix evaluates the workplaces regarding content of heavy metals, organic solvents, level of noise, and other damaging substances. The site Icheon is certified according to OHSAS 18001. ⁹⁰⁴
	Description of reported violations	No information available.
	Accident rate of the country/ sector/organisation	Korea has an accident rate of around 10,647/100,000 employees. The fatality rate amounts 11.4. ⁹⁰⁵

⁸⁹⁹ McGrath (2010)

⁹⁰⁰ www.hynix.com/gl/sm/ethics/platform.jsp?menuNo=6&m=3&s=2#i03

⁹⁰¹ Hynix (2010), pp. 51

⁹⁰² Questionnaire Hynix

⁹⁰³ www.csr-asia.com/index.php?id=4597

⁹⁰⁴ Hynix (2010)

Subcategory	Indicator	Status
		The industrial disaster ratio amounts in average 0.04%. Icheon has an incident rate of 0.02%. ⁹⁰⁶
	Presence of a formal policy regarding health and safety	Hynix implemented an ESH (environment, safety and health) Policy. Their vision is to be the world's best ESH workplace. ⁹⁰⁷
Social benefits/ social security	Social security expenditures of the country/sector	Korea spends only around 5% of GDP to social security. ⁹⁰⁸ It is unknown how much money the electronic sector invests.
	List of social benefits provided to workers	Examples of social benefits: ⁹⁰⁹ <ul style="list-style-type: none"> ■ Maternity Program ■ Health check-ups and medical facilities ■ Flexible working system ■ Further education ■ Scholarships ■ Medical subsidies ■ Housing and marriage loans ■ Corporate pension subsidies
	Evidence of violations to laws and employment regulations	No evidence found.

Stakeholder group local community:

Table 75: S-LCI table RAM from Hynix stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	Korea has a physical trade balance of 6t per capita for all materials. ⁹¹⁰ The industry of South Korea uses 16% of freshwater withdrawals. ⁹¹¹ The production of semiconductors is resource intensive.
	Percent of population with access to improved sanitation facilities	n.s.
	Existence of projects to improve community infrastructure	Hynix initiated the project "Creating the Good Memory Street", which aims to create a clean and beautiful urban landscape. Further, Hynix

⁹⁰⁵ Hämäläinen/Saarela/Takala (2009)

⁹⁰⁶ Hynix (2010), p. 59

⁹⁰⁷ www.hynix.com/gl/sm/esh/vision.jsp?menuNo=6&m=2&s=2

⁹⁰⁸ OECD (2007), p. 18

⁹⁰⁹ Hynix (2010)

⁹¹⁰ OECD (2008), p. 13

⁹¹¹ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
		made own land available in order to build a child-care centre for local residents including low income families and disabled people. It was a co-operation project with the local government. ⁹¹²
	Presence of certified environmental management systems	Icheon is certified according to ISO 14001. ⁹¹³
	Description of (potential) material resource conflicts	The production of semiconductors implicates high energy and water consumption. In addition, the use of toxic substances is unavoidable. Hazardous emissions to water, soil, and air are the consequence, what can lead to local conflicts. Further, Korea is poor in material resources and is dependent from imports, just as China, Taiwan, and other neighbour countries. This fact can also lead to conflicts.
Access to immaterial resources	Freedom of expression in country/sector/company	The Korean constitution provides the right for freedom of speech, press, petition, and assembly. In the international ranking of press freedom South Korea has barely the status “free” (total score: 30; with a score of 31 points countries are classified as “partly free”). ⁹¹⁴ However, the freedom of expression in Korea is, according to Amnesty International, restricted. ⁹¹⁵ It is believed that the freedom of expression in the sector and company is moderate.
	Annual arrests connected to protest of organisation actions	In 2006, 6 union members of the Hynix Union were arrested due to a strike. ⁹¹⁶
	Presence of community education initiatives and community service programmes	A core theme of Hynix social responsibility actions is education. Indeed, the focus is to promote skilled workers. ⁹¹⁷
Delocalisation and migration	Migration rate of the country/ region	South Korea has an estimated net migration rate of 0 migrants/1,000 inhabitants. ⁹¹⁸
	Number of individuals who resettle that can be attrib-	None.

⁹¹² Questionnaire Hynix

⁹¹³ Hynix (2010), p. 90

⁹¹⁴ www.freedomhouse.org/template.cfm?page=251&year=2009

⁹¹⁵ www.amnesty.de/jahresbericht/2010/korea-sued?destination=node%2F2962

⁹¹⁶ KCTU (2006), p. 22

⁹¹⁷ www.hynix.com/gl/sm/contribution/education.jsp?s=2&menuNo=6&m=5&

⁹¹⁸ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
	uted to the organisation	
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	Hynix protects regional cultural heritage based on the "Agreement for Corporate Participation in Campaign of 1 Responsible Company for 1 Cultural Relic" with the Cultural Heritage Administration. ⁹¹⁹
	Strength of policies to protect cultural heritage	There are no specific policies.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	South Korea has a very homogenous ethnic population. There are mainly Korean and a small Chinese minority. ⁹²⁰
	Respect of the company regarding indigenous rights	-
	Strength of policies to protect indigenous community members	-
Safe and healthy living conditions	Burden of disease in the country/region	The Republic of Korea has a DALY rate of 12, which is very low in international comparison. ⁹²¹ Main causes of death are cerebrovascular diseases, trachea, bronchus, and lung cancers, heart diseases, diabetes, stomach and liver cancer. ⁹²² The life expectancy at birth amounts 78.81 years. ⁹²³
	Pollution level of the country/ region and contribution of the company to the environmental load	Main environmental issues are air and water pollution, including acid rain, due to very high population density and fast economic growth. Korea tries to come to grips with its environmental load, but belongs still to the most polluted OECD countries. ⁹²⁴ (No data of co2 emissions per capita and pm 10 air content.) Hynix contributes to the environmental damage through high energy consumption, water con-

⁹¹⁹ www.hynix.com/gl/sm/contribution/culture.jsp?s=2&menuNo=6&m=5&

⁹²⁰ www.state.gov/r/pa/ei/bgn/2800.htm

⁹²¹ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

⁹²² www.who.int/countries/kor/en/

⁹²³ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁹²⁴ OECD and www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
		sumption, and hazardous waste, including waste water.
	Management effort to improve the environmental performance	<ul style="list-style-type: none"> ■ Lead-free productions ■ Production of RoHS compliant products ■ Development of halogen-free products ■ Reduction of GHG emissions ■ Reduction of waste water ■ Increase of recycling rate⁹²⁵
Secure living conditions	Crime rate	South Korea has a low crime rate compared to North Korea or China. Japan, for instance, has a considerably lower crime rate. According to the Global Peace Index, South Korea is placed on rank 43 of 149. ⁹²⁶
	Management policies related to private security personnel	Hynix employs private security personnel. The company uses a 3 team - 2 shift system to monitor the company and prevent assets and secrets. ⁹²⁷
Local employment	Percentage of unemployment in the country/region	The unemployment rate in South Korea is estimated to be 4.1% in 2009. ⁹²⁸
	Percentage of work force hired locally	In the electronic and textile industry it is common to employ migrant workers motivated by wage dumping. According to Hynix, the share of local workers makes up 99.6% of the total work force. ⁹²⁹
	Percentage of spending on locally-based suppliers	According to Hynix, around 50% of their suppliers are local suppliers. ⁹³⁰
Community engagement	Presence of policies regarding community engagement at company level	The code of conduct of Hynix involves among others "Contribution to Social Development". ⁹³¹
	Description of community engagement of the company	<p>The social activities centre upon three areas: corporate volunteering, support of regional culture and education for competent persons in the region.</p> <p>Examples of projects:⁹³²</p> <ul style="list-style-type: none"> ■ Blood donation of employees ■ Support of flood victims ■ Initiation of a marathon for disabled persons

⁹²⁵ Hynix (2010) and www.hynix.com/gl/sm/green/main.jsp?menuNo=6&m=6&s=0

⁹²⁶ www.visionofhumanity.org/gpi-data/#/2010/scor

⁹²⁷ Questionnaire Hynix

⁹²⁸ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁹²⁹ Questionnaire Hynix

⁹³⁰ Questionnaire Hynix

⁹³¹ www.hynix.com/gl/sm/ethics/platform.jsp?menuNo=6&m=3&s=2

⁹³² www.hynix.com/gl/sm/contribution/contribution.jsp?menuNo=6&m=5&s=0

Subcategory	Indicator	Status
		<ul style="list-style-type: none"> ■ Support of cultural events ■ Protection of regional cultural heritage ■ Sponsoring of scholarships

Stakeholder group society:

Table 76: S-LCI table RAM from Hynix stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	<p>Hynix makes promises to the country and the society within their code of conduct, but these promises are very vague:</p> <ul style="list-style-type: none"> ■ (...) We sincerely take part in contributing to our local community, and are devoted to local development. ■ We encourage employees to participate in social work. ■ We are receptive to the opinions of the public, and take our social responsibility seriously as a corporate citizen. ■ (...) ■ We do our best to observe internationally environmental rules, and maintain clean operations. ■ We make efforts to enhance the development and expansion of ecological technology. ■ We are deeply aware of the problems that are expected to stem from global warming, and are stepping forward to prevent pollution and to protect the environment.⁹³³ <p>In addition, Hynix has signed a voluntary agreement with the Korean government to reduce its carbon dioxide emissions through energy conservation and the rational use of energy. Indeed, there are no concrete obligatory goals.⁹³⁴</p>
	Implementation/signing of principles or codes of conducts	Hynix is a member of the UN Global Compact since 2009. ⁹³⁵ In addition, the company has implemented an own code of conduct and is going to join the EICC. ⁹³⁶
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) econ-	The Republic of Korea ranks among the twenty largest economies worldwide. The country has a highly industrialised economy which is geared to export manufactured goods. Main export com-

⁹³³ www.hynix.com/gl/sm/ethics/platform.jsp?menuNo=6&m=3&s=2#i06

⁹³⁴ www.hynix.com/gl/sm/esh/ep_energy.jsp?menuNo=6&m=2&s=4

⁹³⁵ www.unglobalcompact.org/participant/5003-Hynix-Semiconductor-Inc-

⁹³⁶ Questionnaire Hynix and www.hynix.com/gl/sm/ethics/platform.jsp?menuNo=6&m=3&s=2

Subcategory	Indicator	Status
	omy	<p>modities are electronics, mainly semiconductors, telecommunications, automobiles, chemicals, ships, and steel.⁹³⁷</p> <p>In 2009, the GDP per capita amounted to 28,000 USD; the real growth rate of the GDP was 0.2%.⁹³⁸ An estimation for the GDP growth in 2010 assumes a growth rate of 3.95%.⁹³⁹</p> <p>The inflation rate was estimated to 2.8% last year.⁹⁴⁰</p> <p>The semiconductor industry is a key driver for economic growth. The market is dominated by the United States, Japan, South Korea, and the EU.⁹⁴¹ Admittedly, the economic crises in 2009 hit the Korean semiconductor industry hard;⁹⁴² however, it is assumed that the market recovers in 2010.⁹⁴³</p>
	Contribution of the product/company to economic development	<p>DRAM and NAND Flash products are the most relevant products in the Korean semiconductor industry in contrast to non-memory products. Korea has a global market share of more than 45% concerning DRAM products and more than 50% in terms of NAND Flash products.⁹⁴⁴</p> <p>Hynix generated revenues of 6,246 million USD (range 7 in comparison to global competitors) in 2009.⁹⁴⁵ In addition, Hynix pays adequate wages, what boosts the economy.</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	<p>Since 1948 South Korea is at war with North Korea. Admittedly, a ceasefire agreement exists since 1953, a peace treaty was never under-signed. Meanwhile the tensions had been relieved, but since March 2010 the conflict intensifies anew. Cause was that North Korea sank a South Korean warship.⁹⁴⁶</p>

⁹³⁷ www.state.gov/r/pa/ei/bgn/2800.htm, www.cia.gov/library/publications/the-world-factbook/geos/ks.html and www.economywatch.com/world_economy/south-korea/export-import.html

⁹³⁸ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁹³⁹ www.economywatch.com/world_economy/south-korea

⁹⁴⁰ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

⁹⁴¹ http://i.cmpnet.com/pldesignline/2010/03/100317_isuppli_top25.jpg

⁹⁴² www.eetimes.com/electronics-news/4085376/Korea-s-IC-industry-seen-on-shaky-ground

⁹⁴³ www.asianewsnet.net/news.php?sec=2&id=9417

⁹⁴⁴ <http://hubpages.com/hub/Semiconductor-Industry> and www.investkorea.org/InvestKoreaWar/work/ik/eng/bo/bo_01.jsp?code=102021601

⁹⁴⁵ http://i.cmpnet.com/pldesignline/2010/03/100317_isuppli_top25.jpg

⁹⁴⁶ www.telegraph.co.uk/news/worldnews/asia/northkorea/8155262/North-and-South-threaten-military-retaliation-as-conflict-intensifies.html

Subcategory	Indicator	Status
		In addition, there is a conflict between South Korea and Japan due to territorial aspects. ⁹⁴⁷ Icheon is located in the province Gyeonggi, which is not the centre of conflicts. In 2006, there were some riots with regard to military camps.
	Risk of conflicts with regard to the sector	Among these conflicts caused by military actions, conflicts arise also due to environmental pollution, which sometimes result in violent riots. In addition, the semiconductor industry uses rare materials that also can lead to tensions.
	Description of the organisation's role in the development of the conflicts	Hynix is not involved directly in conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Reduction of the use of hazardous substances ■ Increase of energy efficiency
	Involvement of the company in technology transfer projects	None.
	Presence of partnerships regarding research and development	In collaboration with research institutes Hynix developed a Tetra Methyl Ammonium Hydroxide Treatment System to improve the effectiveness of wastewater treatment processes. ⁹⁴⁸
	Investments in technology development	In 2008, Hynix invested 6,999,000,000 KRW in R&D activities. In 2009, the company invested 6,728,000,000 KRW despite economic downturn. At the Icheon site expenses in technology development amounted to 586,979 KRW in 2009. ⁹⁴⁹
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 5.5 (rank 39)⁹⁵⁰ ■ Bribe payers index: Rank 18 with 3.4 points⁹⁵¹ <p>Risk of corruption in sector: The risk of corruption in the Korean electronic sector is classified as relatively high, but it is lower than the risk of corruption in China. High competitive pressure and research intensity are (potential) causes for corruption.</p>

⁹⁴⁷ Heidelberg Institute for International Conflict Research (2009)

⁹⁴⁸ www.hynix.com/gl/sm/esh/ep_purity_tech.jsp?menuNo=6&m=2&s=4

⁹⁴⁹ Hynix (2010), p. 37 and Questionnaire Hynix

⁹⁵⁰ Transparency International (2010)

⁹⁵¹ www.nationmaster.com/graph/cri_bri_pay_ind-crime-bribe-payers-index

Subcategory	Indicator	Status
	Presence of an anti-corruption program in the company	Hynix implemented a policy regarding fair trade and corruption: "We will establish a system of transparent and fair transactions, and eradicate any trace of unfairness or corruption." ⁹⁵² The enterprise has implanted a cyber opinion centre and an audit information system to prevent corruption and to comply with laws and regulations. ⁹⁵³
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

Stakeholder group value chain actors:

Table 77: S-LCI table RAM from Hynix stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	There is a cartel of DRAM producers, including Micron, Samsung, Hynix, Infineon, NEC, Hitachi, Mitsubishi, Toshiba, Elpida, and Nanya. The European Commission fined the companies with a sum of 331 million EUR for price fixing. While Micron went unpunished, because the enterprise revealed the existence of the cartel to the commission, Hynix had to pay 51,471,000 EUR. ⁹⁵⁴
	Presence of policies to prevent anti-competitive behaviour	Hynix implemented a fair trade compliance program. ⁹⁵⁵ In addition, it exists a policy regarding fair trade and corruption: "We will establish a system of transparent and fair transactions, and eradicate any trace of unfairness or corruption." ⁹⁵⁶ Further the code of conduct at Hynix comprises among others free competition, fair trade, and support of business partners. ⁹⁵⁷

⁹⁵² www.hynix.com/gl/sm/ethics/policy.jsp?menuNo=6&m=3&s=1

⁹⁵³ Questionnaire Hynix

⁹⁵⁴ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/586&format=HTML&aged=0&language=EN&guiLanguage=en>

⁹⁵⁵ www.hynix.com/gl/sm/trade/index.jsp?menuNo=6&m=4&s=0

⁹⁵⁶ www.hynix.com/gl/sm/ethics/policy.jsp?menuNo=6&m=3&s=1

⁹⁵⁷ www.hynix.com/gl/sm/ethics/platform.jsp?menuNo=6&m=3&s=2#i05

Subcategory	Indicator	Status
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	None. Hynix is going to join the EICC. ⁹⁵⁸
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	around 5% (49 companies) ⁹⁵⁹
	Membership in an initiative that promotes social responsibility along the supply chain	Hynix promotes corporate sustainability among its partner companies. Hynix developed a plan that shall ensure the compliance of partner companies with the EICC. ⁹⁶⁰
Supplier relationships	Interaction of the company with suppliers ⁹⁶¹	No information available.
	Fluctuation regarding suppliers	almost no fluctuations ⁹⁶²
Respect of intellectual property rights	Violations of the company against intellectual property rights	Toshiba and Rambus sued Hynix accusing the company to violate different patents. Hynix had to pay 67,000 USD to Toshiba and 306,500,000 USD to Rambus. ⁹⁶³

D3 Optical Disc Drive from SEPHIL

Stakeholder group workers:

Table 78: S-LCI table ODD from SEPHIL stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	The Philippine law provides the right to form and join trade unions. The right is valid for most workers, except for foreign and contract workers and employees of the military and the police. Furthermore, the legislation provides the

⁹⁵⁸ Questionnaire Hynix

⁹⁵⁹ Questionnaire Hynix

⁹⁶⁰ Hynix (2010), p. 62

⁹⁶¹ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

⁹⁶² Questionnaire Hynix

⁹⁶³ <http://query.nytimes.com/gst/fullpage.html?res=9B06E2D81F3EF930A35751C1A9629C8B63&sec=&spon=&pagewanted=2> and http://www.theregister.co.uk/2006/04/26/rambus_wins_hynix_case

Subcategory	Indicator	Status
		right to organize and bargain collectively for both workers of the private and public sector. ⁹⁶⁴ However, these rights are restricted from the government. For instance, strikes have to be permitted – there are heavy penalties for illegal strikes – and the Secretary of Labour and Employment can abandon strikes, if the industry concerned by the strike is "indispensable to the national interest". In addition, there are high requirements regarding the registration of unions. In 2008, more than 200 new cases of trade union and human rights violations were reported. Union members were arrested, tortured, killed, and dismissed. ⁹⁶⁵
	Presence of unions within the sector/organisation and description of their influence	There are more than 15,800 sector unions in the private sector. 5.2% of the total work force are union members. ⁹⁶⁶ Most important initiatives are the Trade Union Congress of the Philippines and the Federation of Free Workers. ⁹⁶⁷ In general, the influence of trade unions in the Philippines is rather low, especially in EPZs. Indeed, it is not known if there is a trade union at SEPHIL, but it is common knowledge that unions are not allowed in economic zones. EPZ have the policy "union free – strike free". ⁹⁶⁸
Child labour	Percentage of child labour in country/sector/organisation	Although the Philippines signed all related ILO conventions, in country average 11 - 12% of the children are working. ⁹⁶⁹ The majority is employed in agriculture and the service sector, about 5% of the working children are employed in industry. The production of electronic goods is unconcerned in terms of child labour. ⁹⁷⁰ It was no evidence found for cases of child labour in this company.
	Description of kind of child labour in the company	-

⁹⁶⁴ www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

⁹⁶⁵ <http://survey09.ituc-csi.org/survey.php?IDContinent=3&IDCountry=PHL&Lang=EN> and www.laborrights.org/end-violence-against-trade-unions/philippines

⁹⁶⁶ www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

⁹⁶⁷ www.auswaertiges-amt.de/diplo/de/Laenderinformationen/01-Laender/Philippinen.html

⁹⁶⁸ SOMO (2009), p. 28 and ICFTU (2004), p. 9

⁹⁶⁹ www.unicef.org/infobycountry/philippines_statistics.html www.dol.gov/ilab/media/report-s/iclp/tda2004/philippines.htm and www.ilo.org/ilolex/English/newratframeE.htm

⁹⁷⁰ U.S. Department of Labor (2009), p. 19 and www.aktiv-gegen-kinderarbeit.de/welt/asien/philippinen

Subcategory	Indicator	Status
Forced labour	Frequency of forced labour in country/sector/enterprise	The law prohibits forced or compulsory labour. Nevertheless, according to reports, there are cases of forced labour in the country, in particular regarding children. ⁹⁷¹ The electronic sector is not connected to forced labour. ⁹⁷² No evidence found on cases of forced labour in this company.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage depends on region and size of the organisation. The minimum wage in Calamba City in the province Laguna amounts for non-agricultural work 298 PHP per day (5.10 EUR). ⁹⁷³ This wage is insufficient and does not equate a living wage. According to trade unions and NGOs, a small family needs 700 – 900 PHP per day. In addition, violation of minimum wage standards and the employment of temporary staff to avoid the payment of benefits are common. ⁹⁷⁴
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	298 PHP/day plus overtime payment of 44 - 50 PHP/hour ⁹⁷⁵
Working time	Hours of work per employee and month in average	The Philippine law provides a work week of 48 hours, but does not stipulate a maximum for overtime hours. ⁹⁷⁶ Because of the low wage level the majority of workers are forced to do overtime. In peak season employees often work 7 days a week, 12 hours a day. In low season the working time amounts around 55 - 66 hours per week. ⁹⁷⁷
	Number of days without work per week	0 - 1 day off per week ⁹⁷⁸
	Description of how overtime	Workers are indirectly forced to do overtime

⁹⁷¹ www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

⁹⁷² U.S. Department of Labor (2009), p. 19

⁹⁷³ Bureau of Labor and Employment Statistics (2009)

⁹⁷⁴ SOMO (2009), pp. 24 and www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

⁹⁷⁵ SOMO (2009), p. 25

⁹⁷⁶ www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

⁹⁷⁷ SOMO (2009), p. 26

⁹⁷⁸ SOMO (2009), p. 25

Subcategory	Indicator	Status
	is handled	due to the low basic wage. The payment of long hours amounts 44 - 50 PHP per hour. ⁹⁷⁹
Discrimination	Percentage of women in the labour force in the sector	The share of women in industry amounts approximately 11% of total work force. ⁹⁸⁰ The percentage of women in the electronic sector is very high. Up to 80% of the staff is female.
	Country gender index ranking	Rank 7 of 102 ⁹⁸¹
	Occurrence of discrimination in the country/sector/company	The law bans discrimination against women, children, and minorities; however, discrimination occurs. Violence against women and girls, including rape, is a serious problem. In addition, girls and boys have unequal access to education and employment opportunities. Further, indigenous people, disabled people, people with HIV/AIDS, and Gays or Lesbian are discriminated. ⁹⁸² In 2008, no case of discrimination at Samsung Electronics was reported. ⁹⁸³ Indeed, gender and age discrimination is very common in the electronic industry. ⁹⁸⁴
	Presence of formal policies of equal opportunities	The Samsung Code of Conduct prohibits discrimination in employment, assignment, promotion, payment, education, and retirement based on academic and/or regional background, gender, religion and race. In addition, Samsung set quotas for female staff. ⁹⁸⁵
	Share of women and minorities of personnel	In overseas locations the share of women amounts 47.4%, but it is believed that the percentage of women at SEPHIL is much higher. The share of disabled persons accounts for 0.6% in average. ⁹⁸⁶
	Ratio of salary of women to wages of men in company	Females are often paid less than males. ⁹⁸⁷
	Treatment of workers in	Works are domineered; sexual harassment is

⁹⁷⁹ SOMO (2009), pp. 24

⁹⁸⁰ <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?display=default>

⁹⁸¹ www.genderindex.org

⁹⁸² www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm and <http://genderindex.org/country/philippines>

⁹⁸³ Samsung Electronics (2009), p. 26

⁹⁸⁴ ICFTU (2004), p. 11

⁹⁸⁵ Samsung Electronics (2009), p. 6

⁹⁸⁶ Samsung Electronics (2009), p. 6 and 26

⁹⁸⁷ ICFTU (2004), p. 12

Subcategory	Indicator	Status
	general	common. There are strict regulations as for instance restricted access to restrooms. Freedom of expression is severely restricted. ⁹⁸⁸
Health and safety	Description of potential main origins of danger and protection measures	For one thing drives contain hazardous substances, for another thing hazardous substances are used in different processing steps as for instance cleansing. As protection measure workers wear protection clothes. Moreover Samsung Electronics controls the use of hazardous substances and investigates workplaces. ⁹⁸⁹
	Description of reported violations	No information available. Indeed, violations are very likely. According to a report, 96% of surveyed companies in EPZ infringed basic occupational health and safety standards regarding heat, noise, or security equipment. ⁹⁹⁰
	Accident rate of the country/ sector/organisation	The occupational accident rate of the Philippines is around 17,000/100,000 employees; the fatality rate amounts 18.1. ⁹⁹¹ No information about the accident rate of SEPHIL; the accident rate of Samsung Electronics in Korea is 0.063%. ⁹⁹²
	Presence of a formal policy regarding health and safety	None.
Social benefits/ social security	Social security expenditures of the country/sector	The Philippines had social expenditures of 3.1% of GDP in average between 1973 and 2000. ⁹⁹³ Because of government debt the budget for social security was cut in recent years; thus the governmental spending on social security amounted in 2008 only 0.85% of GDP. ⁹⁹⁴ The expenditures of the electronic sector in terms of social security are rather low. Companies evade the payment of benefits hiring more and more contract workers.
	List of social benefits provided to workers	There are some stipulated benefits as health benefits and social security insurance, but one

⁹⁸⁸ ICFTU (2005) and ICFTU (2004)

⁹⁸⁹ Samsung Electronics (2009), p. 29

⁹⁹⁰ ICFTU (2005), p. 2

⁹⁹¹ Hämäläinen/Saarela/Takala (2009)

⁹⁹² Samsung Electronics (2009), p. 42

⁹⁹³ Segura-Ubiergo (2007), p. 13

⁹⁹⁴ Opiniano (2010)

Subcategory	Indicator	Status
		third of companies evade the payment of these benefits. ⁹⁹⁵ It is unknown if SEPHIL provides social benefits to workers.
	Evidence of violations to laws and employment regulations	No evidence found.

Stakeholder group local community:

Table 79: S-LCI table ODD from SEPHIL stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information regarding material resource extraction found. The freshwater withdrawal of the Philippine industry amounts 9%. ⁹⁹⁶ The production of electronic products is characterised by a high resource consumption.
	Percent of population with access to improved sanitation facilities	78% in 2006 ⁹⁹⁷
	Existence of projects to improve community infrastructure	Samsung Electronics established a social program “Samsung Hope”, what aims to construct IT centres for juveniles in seven countries, including the Philippines. ⁹⁹⁸
	Presence of certified environmental management systems	SEPHIL is certified according to ISO 14001. ⁹⁹⁹
	Description of (potential) material resource conflicts	<ul style="list-style-type: none"> ■ Competition regarding potable water ■ Competition regarding rare metals contained in drives
Access to immaterial resources	Freedom of expression in country/sector/company	The freedom of expression in the Philippines is restricted. According to the Freedom House ranking with regard to press freedom, the Philippines are classified as “partly free” with 45 points. The government arrests, for instance, politically and socially engaged people and members of NGOs. The situation in the Philippines is especially very dangerous for journal-

⁹⁹⁵ ICFTU (2005), p. 3

⁹⁹⁶ www.cia.gov/library/publications/the-world-factbook/geos/rp.html

⁹⁹⁷ www.unicef.org/infobycountry/philippines_statistics.html

⁹⁹⁸ Samsung Electronics (2009), p. 48

⁹⁹⁹ http://siva-ph.jobstreet.com/_profile/previewProfile.asp?advertiser_id=3615

Subcategory	Indicator	Status
		ists. Several journalists were killed in the past. ¹⁰⁰⁰ The freedom of expression in companies located in EPZ is also severely restricted. ¹⁰⁰¹
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	None.
Delocalisation and migration	Migration rate of the country/region	-2.0 migrants/1,000 inhabitants between 2005 and 2010. ¹⁰⁰²
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
	Strength of policies to protect cultural heritage	Principle 5 of the Samsung's code of conduct addresses cultural heritage: "We respect the social and cultural values of local communities and practice prosperous coexistence." ¹⁰⁰³
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	The Philippine population consist of several ethnic groups. According to a census in 2000, 28.1% of inhabitants are Tagalog, 13.1% are Cebuano, 9% are Ilocano, 7.6% are Bisaya/Binisaya, 7.5% are Hiligaynon Ilonggo, 6% are Bikol, 3.4% are Waray, and 25.3% of population belong to other groups. ¹⁰⁰⁴ The share of indigenous people amounts 16%. They live pri-

¹⁰⁰⁰ www.article19.org, www.amnesty.org/en/region/philippines/report-2009 and www.state.gov/ov/g/drl/rls/hrrpt/2009/eap/136006.htm

¹⁰⁰¹ ICFTU (2005) and ICFTU (2004)

¹⁰⁰² www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/philippines

¹⁰⁰³ Samsung Electronics (2009), p. 14

¹⁰⁰⁴ www.cia.gov/library/publications/the-world-factbook/geos/rp.html

Subcategory	Indicator	Status
		marily in the mountainous areas of northern and central Luzon and in Mindanao. ¹⁰⁰⁵ Issues regarding the violation of indigenous rights concern primarily infrastructure projects and resource extraction. Their settlements are polluted, their health is put at risk, and their landholdings are condemned. In addition, indigenous peoples face disadvantages in education or language use. ¹⁰⁰⁶
	Respect of the company regarding indigenous rights	No information available.
	Strength of policies to protect indigenous community members	Indigenous people are not specifically addressed in the code of conduct or other corporate policies. ¹⁰⁰⁷
Safe and healthy living conditions	Burden of disease in the country/region	The Philippines have a DALY rate of 22, which is rather high in international comparison. ¹⁰⁰⁸ The risk of infectious diseases is classified as high. ¹⁰⁰⁹ Main causes for death are respiratory infections, heart diseases including hypertension, TB, perinatal conditions, cerebrovascular diseases, and violence. ¹⁰¹⁰ The life expectancy at birth amounts 71.38 years. ¹⁰¹¹
	Pollution level of the country/ region and contribution of the company to the environmental load	Main environmental issues in the Philippines are deforestation, soil erosion as well as water and air pollution. ¹⁰¹² The Philippines had CO ₂ emissions of 0.8 metric tons per capita in 2006. The content of PM 10 decreased from 58µg/m ³ in 1995 to 23µg/m ³ in 2006. ¹⁰¹³ SEPHIL mainly contributes to the environmental load through water use and energy consumption.
	Management effort to im-	<ul style="list-style-type: none"> ■ Pollutant and hazardous substance control ■ Production of RoHS compliant products

¹⁰⁰⁵ www.state.gov/g/drl/rls/hrrpt/2009/eap/136006.htm

¹⁰⁰⁶ www.amnesty.org/en/region/philippines/report-2009 and www.minorityrights.org/?lid=3462#current

¹⁰⁰⁷ Samsung Electronics (2009), p. 14

¹⁰⁰⁸ http://gamapsserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹⁰⁰⁹ www.cia.gov/library/publications/the-world-factbook/geos/rp.html

¹⁰¹⁰ www.who.int/countries/ph/en/

¹⁰¹¹ www.cia.gov/library/publications/the-world-factbook/geos/rp.html

¹⁰¹² www.cia.gov/library/publications/the-world-factbook/geos/rp.html

¹⁰¹³ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATASTA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

Subcategory	Indicator	Status
	prove the environmental performance	<ul style="list-style-type: none"> ■ Health and safety control at workplace ■ Expanding water reuse ■ Raw material and waste management ■ Use of waste plastics ■ Establishment of Supply Chain Environmental Management program¹⁰¹⁴
Secure living conditions	Crime rate	The crime rate in the Philippines is high. Political violence is a serious issue; terrorist groups as Al-Qaída plot and kill hundreds of civilians. Organized crime is as well a problem. ¹⁰¹⁵ Global Peace Index: Rank 130 of 149 ¹⁰¹⁶
	Management policies related to private security personnel	There is no information about management policies of SEPHIL regarding private security personnel. However, it is known that PEZA controls the EPZs with private security guards. The local government has hardly any influence and the police can only enter the zones after consultation with PEZA. ¹⁰¹⁷
Local employment	Percentage of unemployment in the country/region	The estimated unemployment rate amounted 7.5% in 2009. ¹⁰¹⁸
	Percentage of work force hired locally	The share of the locally hired work force amounts in average 48% for all overseas sites. ¹⁰¹⁹
	Percentage of spending on locally-based suppliers	No information available. Typically the percentage of local suppliers is very low.
Community engagement	Presence of policies regarding community engagement at company level	Principle 5 of the code of conduct deals with the interaction between the company and local communities. It is not formulated explicitly that community engagement is an aim, but it is contained indirectly. ¹⁰²⁰
	Description of community engagement of the company	Samsung invested 2.9% of pre-tax income in local community initiatives. The engagement of Samsung is limited to the project “Samsung Hope” that aims to construct IT training centres for blind youth in underdeveloped areas, including Thailand, Vietnam, Philippines, Malaysia, and Indonesia. ¹⁰²¹

¹⁰¹⁴ Samsung Electronics (2009), pp. 35

¹⁰¹⁵ www.pctc.gov.ph/updates/ocitp.htm and www.osac.gov/Reports/report.cfm?contentID=69919

¹⁰¹⁶ www.visionofhumanity.org/gpi-data/#/2010/scor

¹⁰¹⁷ SOMO (2009), p. 13

¹⁰¹⁸ www.cia.gov/library/publications/the-world-factbook/geos/rp.html

¹⁰¹⁹ Samsung Electronics (2009), p. 6

¹⁰²⁰ Samsung Electronics (2009), p. 14

¹⁰²¹ Samsung Electronics (2009), pp. 46

Stakeholder group society:

Table 8o: S-LCI table ODD from SEPHIL stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	Samsung promised to eliminate PVC and brominated flame retardants from new models of all its products until 2010. Samsung broke both promises. ¹⁰²²
	Implementation/signing of principles or codes of conducts	Samsung Electronics has formulated an own code of conduct, but it is very vague formulated. Further, Samsung signed the EICC. ¹⁰²³
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	The Philippines belong to the newly industrialized countries, why the economy is very dependent on the services and manufacturing industry. Main challenges of the country are poverty, unbalanced distribution of income, and population growth. ¹⁰²⁴ In 2009, the Philippines generated a GDP per capita of 3,300 USD and a growth rate of 0.9%. The inflation rate was estimated to be 3.3% in the same year. The electronic industry is a very important sector in the Philippines, which employs around 480,000 workers. Main export goods are semiconductors and electronic products, followed by transport equipment, garments, copper, and petroleum. ¹⁰²⁵ The majority of companies in the electronic sector are located in Calabarzon, where SEPHIL is resident, or in Metro Manila. ¹⁰²⁶
	Contribution of the product/company to economic development	The most important products in the electronic sector of the Philippines are semiconductors representing on average 73% of total electronic exports. Electronic data processing equipment as laptops, printer, hard disc drives, or optical drives are less relevant, but also important with a percentage of 20% of total electronic exports. Samsung distributed a total economic value of 16.42 trillion KRW in 2008. Indeed, just the half (7.1 trillion KRW) were invested in R&D. Labour

¹⁰²² www.greenpeace.org/international/en/press/releases/samsung-broken-promises

¹⁰²³ Samsung Electronics (2009), p. 14 and EICC (2009), p. 10

¹⁰²⁴ www.economywatch.com/economic-development/philippines.html

¹⁰²⁵ Congressional Planning and Budget Department (2009), p. 8, SOMO (2009), p. 11 and www.cia.gov/library/publications/the-world-factbook/geos/rp.html

¹⁰²⁶ SOMO (2009), p. 11

Subcategory	Indicator	Status
		<p>costs (without R&D costs), taxes and dues, and expenses to social contribution made up 3 trillion KRW, while retained earnings amounted 5 trillion KRW.¹⁰²⁷ Samsung is Korea's largest conglomerate and has a wide influence on economic development, politics, media, and culture in Korea.¹⁰²⁸</p> <p>The contribution of SEPHIL to economic development in the Philippines will be rather low due to the small size of the company and low wages. Indeed, employees in the industrial sector earn significantly more than for example farmers.</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	There are several trouble spots throughout the country. Several parties (Abu Sayyaf, the Moro Islamic Liberation Front, the Communist Party, and the New People's Army) are fighting against the government due to sessions, autonomy, resources, or ideologies. Further, the Philippines are in clash with Malaysia due to Philippine immigrants. ¹⁰²⁹
	Risk of conflicts with regard to the sector	Main causes for conflicts in the Philippines are initially poverty and land scarce due to deforestation and soil erosions. The wages are very low and do not enable a decent standard of living. In addition, poor labour standards and environmental pollution are potential causes for conflicts.
	Description of the organisation's role in the development of the conflicts	SEPHIL is probably not involved in conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Reduction and elimination respectively of hazardous substances as brominated flame retardants, chlorinated flame retardants, antimony trioxide, beryllium, phthalates, or PVC¹⁰³⁰ ■ Development of RoHS compliant products ■ Reduction of energy consumption
	Involvement of the company in technology transfer projects	None.

¹⁰²⁷ Samsung Electronics (2009), p. 72

¹⁰²⁸ www.crocodyl.org/wiki/samsung_group

¹⁰²⁹ Heidelberg Institute for International Conflict Research (2009)

¹⁰³⁰ www.greenpeace.org/international/campaigns/toxics/electronics/how-the-companies-line-up

Subcategory	Indicator	Status
	Presence of partnerships regarding research and development	Samsung Electronics supports business partners in developing and adopting new technologies. ¹⁰³¹
	Investments in technology development	Samsung Electronics invested 7.1 trillion KRW (5.9% of revenues) in R&D activities in 2008. ¹⁰³²
Corruption	Risk of corruption in country /sector	Risk of corruption in country: <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 2.4 points (rank 139)¹⁰³³ ■ Bribe payers index: n.s.¹⁰³⁴ Risk of corruption in sector: It is assumed that the risk of corruption in the Philippine electronic sector is also high.
	Presence of an anti-corruption program in the company	Samsung Electronics conducts regularly anti-corruption education programs for all employees. In the frame of the program educational videos are distributed. ¹⁰³⁵
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	Samsung is involved in bribery and corruption. The Samsung chairman and his aides shall have stolen 10 trillion KRW from Samsung subsidiaries for slush funds. Samsung shall have bribed politicians, journalists, bureaucrats, as well as court officials. ¹⁰³⁶

Stakeholder group value chain actors:

Table 81: S-LCI table ODD from SEPHIL stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation	Samsung, Sony, LG, Hitachi, and Toshiba were accused for price fixing with regard to the U.S. ODD market. ¹⁰³⁷

¹⁰³¹ Samsung Electronics (2009), pp. 62

¹⁰³² Samsung Electronics (2009), pp. 71

¹⁰³³ Transparency International (2010)

¹⁰³⁴ www.nationmaster.com/graph/crime/crime-bri-pay_ind-crime-bribe-payers-index

¹⁰³⁵ Samsung Electronics (2009), p. 14

¹⁰³⁶ Nosowitz (2010), www.crocodyl.org/wiki/samsung_group, www.theinquirer.net/inquirer/news/1033501/samsung-bribery-scandal and www.bloomberg.com/apps/news?pid=newsarchive&refer=home&sid=aH3aDwXXnvqc

¹⁰³⁷ Mearian (2010)

Subcategory	Indicator	Status
	of anti-trust and monopoly legislation which can be linked to the organisation	Moreover, Samsung was declared guilty to be a member of a cartel, which bulled the market of semiconductors. Samsung was fined most at 145.7 million EUR. ¹⁰³⁸ In addition, Samsung is sued to be in a CRT-cartel together with Philips, LG, Tatung, Matsushita, and Toshiba. The accuse is as well price-fixing. ¹⁰³⁹
	Presence of policies to prevent anti-competitive behaviour	Within the code of conduct there are some principles that address fair competition, as for instance principle 1.5: "We protect information on individuals and business partners." ¹⁰⁴⁰
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	Samsung Electronics is member of the EICC. ¹⁰⁴¹ In addition, the company initiated a CSR education program for domestic business partners.
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	A self-assessment was foreseen for 2009 concerning CSR. ¹⁰⁴²
	Membership in an initiative that promotes social responsibility along the supply chain	Samsung Electronics is member of the EICC. ¹⁰⁴³
Supplier relationships	Interaction of the company with suppliers ¹⁰⁴⁴	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	In the past there were several charges from Pioneer, Spansion, Kodak, or Fujitsu against Samsung concerning the infringement of different patents. ¹⁰⁴⁵ Indeed, there was no case of patent right violation with regard to ODDs.

¹⁰³⁸ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/586&format=HTML&aged=0&language=EN&guiLanguage=en>

¹⁰³⁹ Meller (2009)

¹⁰⁴⁰ Samsung Electronics (2009), p. 14

¹⁰⁴¹ EICC (2009a), p. 10

¹⁰⁴² Samsung Electronics (2009), p. 61

¹⁰⁴³ EICC (2009a), p. 10

¹⁰⁴⁴ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

¹⁰⁴⁵ Shiloy (2008), Crothers (2008), Nikkei Microdevices (2006), p. 10 and www.allbusiness.com/electronics/consumer-household-electronics/11668917-1.html

D4 Production of the Battery

D4a Battery Cells from Korea

Stakeholder group workers:

Table 82: S-LCI table battery cells from Korea stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	The law allows workers in the private sector to associate freely. There is also a law that provide the right for collective bargaining and collective action. ¹⁰⁴⁶ However, the ILO criticises South Korea for severe right violations concerning freedom of association and collective bargaining. Especially the Korean Government Employees Union and the Korean Federation of Construction Industry Trade Unions are often the target of attacks by the government. Many unions are repudiated by government. ¹⁰⁴⁷
	Presence of unions within the sector and description of their influence	There are approximately 5,890 trade unions in South Korea. Around 10% of total work force are union members. ¹⁰⁴⁸ The power of trade unions is rather low. Admittedly, there are strikes, but they are often quelled by the police. ¹⁰⁴⁹
Child labour	Percentage of child labour in country/sector	No statistics about child labour found. The law prohibits child labour. The minimum age for employment amounts 15 years. ¹⁰⁵⁰ Child labour with regard to prostitution is widespread. ¹⁰⁵¹ South Korea is a central point for trafficking of Asian women and children. ¹⁰⁵² However, there is no link between child labour and the production of electronic modules.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector	According to the Korean government, there is no forced labour in the country. The law prohibits forced labour; however, Korea has neither ratified the ILO Forced Labour Convention no. 29 nor the Abolition of Forced Labour Conven-

¹⁰⁴⁶ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

¹⁰⁴⁷ KCTU (2006) and www.amnesty-korea.de/Suedkorea/Gewerkschaften

¹⁰⁴⁸ Lienemann (2008)

¹⁰⁴⁹ www.amnesty-korea.de/Suedkorea/Gewerkschaften

¹⁰⁵⁰ www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

¹⁰⁵¹ www.aktiv-gegen-kinderarbeit.de/welt/asien/korea_sued

¹⁰⁵² www.state.gov/g/drl/rls/hrrpt/2001/eap/8336.htm

Subcategory	Indicator	Status
		tion no. 105. South Korea is known as hub for human trafficking. ¹⁰⁵³ There was no evidence found for cases of forced labour in the electronic sector.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage amounts 4,110 KRW (ca. 2.74 EUR) per hour. ¹⁰⁵⁴ Based on 170 working hours/month the monthly salary amounts 698,700 KRW (ca. 466.28 EUR). This wage does not absorb the living costs, wherefore daily overtime is common.
	Wage level of the worker with lowest income and description of payment performance of the sector	It is assumed that the wage level of the worker with lowest income equates the minimum wage of 4,110 KRW/hour.
Working time	Hours of work per employee and month in average	43 - 46 hours/week ¹⁰⁵⁵
	Number of days without work per week	2 days off per week are legally required. ¹⁰⁵⁶
	Description of how overtime is handled	The Korean law stipulates that overtime must be paid higher than normal working hours. Further, the law limits overtime to 48 hours and 56 hours for specific weeks respectively. ¹⁰⁵⁷ Overtime work in South Korea is common. The country records the highest amount of working hours compared to other OECD countries. ¹⁰⁵⁸
Discrimination	Percentage of women in the labour force in the sector	More than 15% of the total labour force in industry are women. ¹⁰⁵⁹
	Country gender index ranking	Not ranked ¹⁰⁶⁰
	Occurrence of discrimination in the country/sector	Women and minorities are discriminated from both society and legislature. ¹⁰⁶¹ For instance, good looking women are preferably employed, there are only a few women in executive posi-

¹⁰⁵³ www.state.gov/g/drl/rls/hrrpt/2008/eap/119044.htm and ILO (2010), pp. 30

¹⁰⁵⁴ www.koreatimes.co.kr/www/news/biz/2009/06/123_47677.html

¹⁰⁵⁵ <http://laborsta.ilo.org/STP/guest>

¹⁰⁵⁶ www.ilo.org/dyn/natlex/docs/WEBTEXT/46401/65062/E97KOR01.htm#a49

¹⁰⁵⁷ www.ilo.org/dyn/natlex/docs/WEBTEXT/46401/65062/E97KOR01.htm#a49

¹⁰⁵⁸ <http://stats.oecd.org/Index.aspx?DataSetCode=ANHRS>

¹⁰⁵⁹ <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?display=default>

¹⁰⁶⁰ www.genderindex.org/

¹⁰⁶¹ www.state.gov/g/drl/rls/hrrpt/2004/41647.htm

Subcategory	Indicator	Status
		tions, and sexual harassment at work is commonly occurring. Also unequal payment of women and men is widespread in different sectors, including the electronic industry. ¹⁰⁶² In addition, migrant workers as well as production workers are faced with poor labour conditions. Migrant workers are more often victims of occupational accidents; they earn less money, and work more than local workers. Often overtime is not paid and wages are withheld. ¹⁰⁶³ In 2009, there were about 680,000 migrant workers from China, Vietnam, Philippines, and Thailand in South Korea employed, mainly in textile factories and factories producing electronics. ¹⁰⁶⁴
Health and safety	Description of potential main origins of danger	Lithium is an unstable substance that reacts intensively with water. The air humidity in Li-ion battery factories has to be lower than 1%, otherwise fires can occur. ¹⁰⁶⁵ In addition, contamination of metal particles may cause internal short circuits. ¹⁰⁶⁶
	Accident rate of the country /sector	Korea has an accident rate of around 10,647/100,000 employees. The fatality rate amounts 11.4. ¹⁰⁶⁷ The fatality rate of the manufacturing sector amounts 0.05/1,000,000 working hours in recent years. ¹⁰⁶⁸
Social benefits/ social security	Social security expenditures of the country/sector	Korea spends only around 5% of GDP to social security. ¹⁰⁶⁹ There is no information about the social expenditures of the sector.

Stakeholder group local community:

Table 83: S-LCI table battery cells from Korea stakeholder local community

Subcategory	Indicator	Status
Access to	Extraction of material resources and level of indus-	Korea has a physical trade balance of 6t per capita for all materials. ¹⁰⁷⁰

¹⁰⁶² www.csr-asia.com/index.php?id=4597

¹⁰⁶³ Amnesty International (2009), http://english.hani.co.kr/arti/english_edition/e_national/180989.html and <http://factsanddetails.com/japan.php?itemid=906&catid=24&subcatid=156>

¹⁰⁶⁴ McGrath (2010)

¹⁰⁶⁵ www.pressext.de/news/060830027/lithium-ionen-akkus-als-brandfalle

¹⁰⁶⁶ www.batteryuniversity.com/partone-5B.htm

¹⁰⁶⁷ Hämäläinen/Saarela/Takala (2009)

¹⁰⁶⁸ <http://laborsta.ilo.org/STP/guest>

¹⁰⁶⁹ OECD (2007), p. 18

¹⁰⁷⁰ OECD (2008), p. 13

Subcategory	Indicator	Status
material resources	trial water use	The industry of South Korea uses 16% of fresh-water withdrawals. ¹⁰⁷¹ The production of battery cells is relatively resource intensive.
	Percent of population with access to improved sanitation facilities	n.s.
	Existence of projects to improve community infrastructure	LG Chem organised for example the renovation of youth and children facilities in community welfare centres and opened libraries in schools. ¹⁰⁷²
	Presence of certified environmental management systems	The factories of the market leaders (LG Chem and Samsung SDI) are certified according to ISO 14001. ¹⁰⁷³ Smaller companies do not publish CSR information.
	Description of (potential) material resource conflicts	According to rumours, a shortage of lithium can occur because of increasing demand due to the production of batteries for electric cars. ¹⁰⁷⁴
Access to immaterial resources	Freedom of expression in country/sector	The Korean constitution provides the right of freedom of speech, press, petition, and assembly. In the international ranking of press freedom South Korea has barely the status “free” (total score: 30; with a score of 31 points countries are classified as “partly free”). ¹⁰⁷⁵ However, the freedom of expression in Korea is, according to Amnesty International, restricted. ¹⁰⁷⁶ It is believed that the freedom of expression in the sector and company is moderate.
	Annual arrests connected to protest of sector actions	None.
	Presence of community education initiatives and community service programmes	Large companies support education initiatives and public welfare activities. The CSR engagement of LG Chem and Samsung SDI for example focus on classic themes as education, arts and culture, and local as well as global communities. ¹⁰⁷⁷
Delocalisation	Migration rate of the coun-	South Korea has an estimated net migration rate of 0 migrants/1,000 inhabitants. ¹⁰⁷⁸

¹⁰⁷¹ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

¹⁰⁷² LG Chem (2010), p. 76

¹⁰⁷³ www.lgchem.com and www.samsungsdi.com/sustain/s3_2.jsp

¹⁰⁷⁴ Hoelzingen (2009) and www.n24.de/news/newsitem_5642306.html

¹⁰⁷⁵ www.freedomhouse.org/template.cfm?page=251&year=2009

¹⁰⁷⁶ www.amnesty.de/jahresbericht/2010/korea-sued?destination=node%2F2962

¹⁰⁷⁷ LG Chem (2010) and Samsung SDI (2010)

¹⁰⁷⁸ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
and migration	try	
	Number of individuals who resettle that can be attributed to the sector	None.
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	South Korea has a very homogenous ethnic population. There are mainly Korean and a small Chinese minority. ¹⁰⁷⁹
	Respect of the sector regarding indigenous rights	-
Safe and healthy living conditions	Burden of disease in the country	The Republic of Korea has a DALY rate of 12 which is very low with regard to international comparison. ¹⁰⁸⁰ Main causes of death are cerebrovascular diseases, trachea, bronchus, and lung cancers, heart diseases, diabetes, stomach and liver cancer. ¹⁰⁸¹ The life expectancy at birth amounts 78.81 years. ¹⁰⁸²
	Pollution level of the country and contribution of the sector to the environmental load	Main environmental issues are air and water pollution, including acid rain, due to very high population density and fast economic growth. Korea tries to come to grips with its environmental load, but belongs still to the most polluted OECD countries. ¹⁰⁸³ (No data of CO ₂ emissions per capita and pm 10 air content available.) The contribution of the production of lithium battery cells to the environmental load of the country is probably rather moderate. Lithium batteries are reckoned as environmental

¹⁰⁷⁹ www.state.gov/r/pa/ei/bgn/2800.htm

¹⁰⁸⁰ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹⁰⁸¹ www.who.int/countries/kor/en/

¹⁰⁸² www.cia.gov/library/publications/the-world-factbook/geos/ks.html

¹⁰⁸³ OECD and www.cia.gov/library/publications/the-world-factbook/geos/ks.html

Subcategory	Indicator	Status
		friendly, because they do not contain cadmium. Further, lithium batteries have a longer life.
	Sector effort to improve the environmental performance	<ul style="list-style-type: none"> ■ Development of RoHS compliant products ■ Improvement of reusability and recyclability ■ Improvement of durability
Secure living conditions	Crime rate	South Korea has a low crime rate compared to North Korea or China. Japan, for instance, has a considerably lower crime rate. According to the Global Peace Index, South Korea is placed on rank 43 of 149. ¹⁰⁸⁴
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	The unemployment rate in South Korea is estimated to 4.1% in 2009. ¹⁰⁸⁵
	Percentage of work force hired locally	In the electronic and textile industry it is common to employ migrant workers motivated by wage dumping. ¹⁰⁸⁶ It is unknown how high the percentage of migrant workers is with regard to the production of battery cells.
Community engagement	Description of community engagement of the sector	Large companies support education initiatives and public welfare activities. The CSR engagement of LG Chem and Samsung SDI for example focus on classic themes as education, arts and culture, and local as well as global communities. ¹⁰⁸⁷ LG Chem, for instance, organises summer camps, festivals, volunteer days, etc. The company invests 0.07% of its revenue in charity and community support (less than 10 billion KRW). ¹⁰⁸⁸

Stakeholder group society:

Table 84: S-LCI table battery cells from Korea stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commit-	None.

¹⁰⁸⁴ www.visionofhumanity.org/gpi-data/#/2010/scor

¹⁰⁸⁵ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

¹⁰⁸⁶ McGrath (2010)

¹⁰⁸⁷ LG Chem (2010) and Samsung SDI (2010)

¹⁰⁸⁸ LG Chem (2010), p. 31

Subcategory	Indicator	Status
	ments	
	Implementation/signing of principles or codes of conducts	None (only LG Electronics, a subsidiary of LG Chem, is member in the UN Global Compact ¹⁰⁸⁹).
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	<p>The Republic of Korea ranks among the twenty largest economies worldwide. The country has a highly industrialised economy which is geared to export manufactured goods. Main export commodities are electronics, mainly semiconductors, telecommunications, automobiles, chemicals, ships, and steel.¹⁰⁹⁰</p> <p>In 2009, the GDP per capita amounted to 28,000 USD; the real growth rate of the GDP was 0.2%.¹⁰⁹¹ An estimation for the GDP growth in 2010 assumes a growth rate of 3.95%.¹⁰⁹²</p> <p>The inflation rate was estimated to be 2.8% in 2009.¹⁰⁹³</p> <p>South Korea shares the market for Li-ion batteries with China and Japan. Korea has a current global market share of around 33%. The Korean Li-ion battery industry developed rapidly, not at least because of government efforts.¹⁰⁹⁴ The increasing demand of Li-ion batteries promises profitable businesses.¹⁰⁹⁵</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country	<p>Since 1948 South Korea is at war with North Korea. Admittedly, a ceasefire agreement exists since 1953, a peace treaty was never under-signed.¹⁰⁹⁶ Meanwhile the tensions had been relieved, but since March 2010 the conflict intensifies anew. Cause was that North Korea sank a South Korean warship.¹⁰⁹⁷</p> <p>In addition, there is a conflict between South Korea and Japan due to territorial aspects.¹⁰⁹⁸</p>

¹⁰⁸⁹ www.unglobalcompact.org/participant/6119-LG-Electronics-Inc-

¹⁰⁹⁰ www.state.gov/r/pa/ei/bgn/2800.htm, www.cia.gov/library/publications/the-world-factbook/geos/ks.html and www.economywatch.com/world_economy/south-korea/export-import.html

¹⁰⁹¹ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

¹⁰⁹² www.economywatch.com/world_economy/south-korea

¹⁰⁹³ www.cia.gov/library/publications/the-world-factbook/geos/ks.html

¹⁰⁹⁴ www.marketavenue.cn/upload/articles/ARTICLES_1269.htm

¹⁰⁹⁵ www.allbusiness.com/services/business-services/4009223-1.html

¹⁰⁹⁶ Heidelberg Institute for International Conflict Research (2009)

¹⁰⁹⁷ www.telegraph.co.uk/news/worldnews/asia/northkorea/8155262/North-and-South-threaten-military-retaliation-as-conflict-intensifies.html

¹⁰⁹⁸ Heidelberg Institute for International Conflict Research (2009)

Subcategory	Indicator	Status
	Risk of conflicts with regard to the sector and measures to reduce the risk	Among these conflicts caused by military actions, conflicts arise also due to environmental pollution, which sometimes result in violent riots. In addition, Lithium is a relatively rare metal, what can lead to conflicts in future. The increasing demand intensifies the competition. It would seem that the sector does not pay particular attention regarding the prevention of conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Energy efficiency ■ Eco design: reduction of hazardous substances, improved durability, reusability, and recyclability ■ Reduction of water use ■ Reduction of waste generation
	Investments in technology development	It is assumed that battery producers invest relatively much in technology development as the sector is research intensive and competitive.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 5.5 (rank 39)¹⁰⁹⁹ ■ Bribe payers index: Rank 18 (3.4 points)¹¹⁰⁰ <p>Risk of corruption in sector: The risk of corruption in the Korean electronic sector is classified as relatively high, but it is lower than the risk of corruption in China. High competitive pressure and research intensity are (potential) causes for corruption.</p>

D4b Assembly of the Battery Pack by Simplo

Stakeholder group workers:

Table 85: S-LCI table battery assembly by Simplo stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all organisations have to officially register with and be approved by the government. ¹¹⁰¹

¹⁰⁹⁹ Transparency International (2010)

¹¹⁰⁰ www.nationmaster.com/graph/crime/crime_bri_pay_ind-crime-bribe-payers-index

¹¹⁰¹ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

Subcategory	Indicator	Status
	Presence of unions within the sector/organisation and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ¹¹⁰² It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts but they contain only minimum standards as required by national legislation. ¹¹⁰³ No information found regarding a trade union at Simplo. It is assumed that Simplo has no own union, but a regional one. In addition, it is assumed that this union has a rather low influence on conditions of employment.
Child labour	Percentage of child labour in country/sector/organisation	There are no official statistics about child labour in China; however, child labour in China is a problem according to reports. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ¹¹⁰⁴ A percentage in the electronic sector cannot be stated. There was no evidence found that Simplo Technology employs child labourer.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ¹¹⁰⁵ There was no evidence found that Simplo Technology employs forced labourer.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the	China has no uniform minimum wage; provinces, municipalities, and autonomous regions

¹¹⁰² <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

¹¹⁰³ Metcalf/Li (2006) and interview with China Labour Bulletin

¹¹⁰⁴ U.S. Department of Labor (2009), p. 15

¹¹⁰⁵ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

Subcategory	Indicator	Status
	country	are allowed to set their own minimum wage. The minimum wage in the Jiangsu province, where Simplo Technology is located, increased the minimum wage from 850 CNY (101.36 EUR) to 960 CNY (114.47 EUR) in 2010. ¹¹⁰⁶ This minimum wage does not cover the living costs so that many workers are forced to work long hours.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	The basic wage amounts 850 CNY per month. Further, Simplo pays allowances for night work of 6 - 8 RMB/day. ¹¹⁰⁷
Working time	Hours of work per employee and month in average	The official working time amounts 40 h/week, ¹¹⁰⁸ but it is assumed that the real working time exceeds this value by far. More than 60 h per week are common.
	Number of days without work per week	No information available.
	Description of how overtime is handled	Overtime payment is higher than the basic hourly rate following the Chinese labour law. It exist different wage levels for working days, weekend, and holidays. ¹¹⁰⁹
Discrimination	Percentage of women in the labour force in the sector	The companies of the electronic industry in China prefer the employment of young women, so the percentage of women of the labour force is very high.
	Country gender index ranking	Rank 83 of 102 ¹¹¹⁰
	Occurrence of discrimination in the country/sector/company	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ¹¹¹¹ Also discrimination in the workplace is common. ¹¹¹² Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace acci-

¹¹⁰⁶ Yang (2010)

¹¹⁰⁷ <http://www.xfwl.gov.cn/rsrc/article/2009-10-16/543-1.html>

¹¹⁰⁸ ibidem

¹¹⁰⁹ ibidem

¹¹¹⁰ www.genderindex.org

¹¹¹¹ www.state.gov/g/drl/rls/irf/2009/127268.htm

¹¹¹² Séguin (2009)

Subcategory	Indicator	Status
		<p>dents. In addition, they are often employed without a written labour contract.¹¹¹³ Employment discrimination against women is also present.¹¹¹⁴</p> <p>Many companies of the electronic sector have restrictions on age, gender, and height. Such workplace discrimination is usually quite arbitrary.¹¹¹⁵</p> <p>Simplo does not report cases of discrimination. However, it is likely that discrimination occurs. For instance, employees must be taller than 1.50m (women) and 1.65m (men) respectively.¹¹¹⁶ Also the ratio between man and women is not balanced, what is a further hint for discrimination.</p>
	Presence of formal policies of equal opportunities	No information available.
	Share of women and minorities of personnel	The ratio men to women is 1:2. ¹¹¹⁷
	Ratio of salary of women to wages of men in company	100%
	Treatment of workers in general	<p>There are strict regulations to administrate workers.¹¹¹⁸ Wage deductions due to “misbehaviour” as talking during the work, delays, use of restrooms too frequent, etc. are common. In addition, it is a common practice to use fines for non-attendance regarding overtime as leverage.¹¹¹⁹</p>
Health and safety	Description of potential main origins of danger and protection measures	<p>Batteries can explode and catch fire through mechanical load or high temperature. The company is certified according to TÜV and OHSAS.¹¹²⁰</p> <p>Simplo Technologies provide to their clients safety data sheets for their products, which</p>

¹¹¹³ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

¹¹¹⁴ <http://genderindex.org/country/china>

¹¹¹⁵ Interview with China Labour Bulletin

¹¹¹⁶ www.xfwl.gov.cn/rsrc/article/2009-10-16/543-1.html

¹¹¹⁷ www.xfwl.gov.cn/rsrc/article/2009-10-16/543-1.html

¹¹¹⁸ <http://tieba.baidu.com/f?kz=787980470>

¹¹¹⁹ Interview with China Labour Bulletin

¹¹²⁰ www.simplo.com.tw/company.htm

Subcategory	Indicator	Status
		contain safety instructions, first aid measures, product composition, etc. ¹¹²¹
	Description of reported violations	In 2007, the factory in Changshu caught fire due to a short circuit. ¹¹²² The cause of the fire is unknown; thus no conclusions can be drawn to violations of protection measures.
	Accident rate of the country /sector/organisation	Asia has very high accident rates. China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ¹¹²³ Simplo does not publish accident rates.
	Presence of a formal policy regarding health and safety	There are policies of environmental and occupational safe hygiene policies on the company's website. ¹¹²⁴
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ¹¹²⁵ There is no information available that mentions the social expenditures of the sector.
	List of social benefits provided to workers	<ul style="list-style-type: none"> ■ Social security for each employee, who has at least one year internship ■ Providing of accommodations¹¹²⁶
	Evidence of violations to laws and employment regulations	No evidence found, but it is likely that Simplo violates the Chinese labour law regarding the working time.

Stakeholder group local community:

Table 86: S-LCI table battery assembly by Simplo stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of freshwater withdrawals. ¹¹²⁷ Assembly processes do typically not consume many resources.

¹¹²¹ An example can be downloaded here www.dell.com/downloads/global/corporate/enviro/6cell_CF623_XD736_YD624.pdf

¹¹²² ResearchInChina (2009), Huang (2010) and <http://in.reuters.com/finance/stocks/keyDevelopments?symbol=6121.TWO>

¹¹²³ Hämäläinen/Saarela/Takala (2009)

¹¹²⁴ www.simplo.com.tw/company.htm

¹¹²⁵ IMF (2010), p. 5

¹¹²⁶ <http://www.xfwl.gov.cn/rsrc/article/2009-10-16/543-1.html>

¹¹²⁷ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
	Percent of population with access to improved sanitation facilities	65% ¹¹²⁸
	Existence of projects to improve community infrastructure	No information available.
	Presence of certified environmental management systems	The company is certified according to ISO 14001. ¹¹²⁹
	Description of (potential) material resource conflicts	-
Access to immaterial resources	Freedom of expression in country/sector/company	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ¹¹³⁰ It is assumed that the freedom of expression is restricted in the entire electronic sector, including Simplo. ¹¹³¹
	Annual arrests connected to protest of organisation actions	No information available.
	Presence of community education initiatives and community service programmes	No information available. Supposable, Simplo does not initiate CSR projects.
Delocalisation and migration	Migration rate of the country/ region	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ¹¹³²
	Number of individuals who resettle that can be attributed to the organisation	None.

¹¹²⁸ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/infobycountry/china_statistics.html#65

¹¹²⁹ www.simplo.com.tw/company.htm

¹¹³⁰ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

¹¹³¹ Interview with China Labour Bulletin

¹¹³² www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
	Strength of policies to protect cultural heritage	None.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.¹¹³³ But there are officially 55 ethnic minority groups in China,¹¹³⁴ who account for less than 9% of population.¹¹³⁵ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.¹¹³⁶</p> <p>The Chinese constitution provides equal rights to all ethnic groups.¹¹³⁷ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.¹¹³⁸</p> <p>In the province Jiangsu live predominantly Han Chinese (99.6%) and only a few Hui Chinese (0.2%).¹¹³⁹ Hui Chinese are counted among Muslims and the discrimination against Muslims increased in recent years. However, due to the very small share of ethnic minorities of population in Changshu ethnic conflicts are rather not present.</p>

¹¹³³ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

¹¹³⁴ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹¹³⁵ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹¹³⁶ The World Bank (2007)

¹¹³⁷ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹¹³⁸ www.amnesty.org

¹¹³⁹ The New York Times (2009)

Subcategory	Indicator	Status
	Respect of the company regarding indigenous rights	-
	Strength of policies to protect indigenous community members	None.
Safe and healthy living conditions	Burden of disease in the country/region	China has a DALY rate of 16, which is relatively low. ¹¹⁴⁰ The risk of infectious diseases is classified as intermediate. ¹¹⁴¹ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year. In addition, around 200 million individuals suffer from occupational diseases. ¹¹⁴² 80% of them suffer from pneumoconiosis. ¹¹⁴³ The life expectancy at birth amounts 74.51 years. ¹¹⁴⁴
	Pollution level of the country/region and contribution of the company to the environmental load	China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causes are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage. ¹¹⁴⁵ In 2006, China had CO ₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m ³ . ¹¹⁴⁶ The assembly of notebook battery packs is by itself not very relevant regarding environmental impacts – rather the upstream chain causes

¹¹⁴⁰ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹¹⁴¹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹¹⁴² <http://en.epochtimes.com/news/7-2-24/52097.html>

¹¹⁴³ www.china-labour.org.hk/en/node/100744

¹¹⁴⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>

¹¹⁴⁵ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹¹⁴⁶ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

Subcategory	Indicator	Status
		environmental effects. The assembly process contributes primarily through electricity consumption to the environmental load.
	Management effort to improve the environmental performance	No information available.
Secure living conditions	Crime rate	Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ¹¹⁴⁷ Global Peace Index: Rank 80 of 149 ¹¹⁴⁸
	Management policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country/region	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ¹¹⁴⁹ In provinces of the industrialised east coast there is this year a lack of workers, because the number of migrant workers declines. ¹¹⁵⁰
	Percentage of work force hired locally	Migrant workers are an important part of the personnel of factories located at the east coast, also in the electronic sector. They make up to more than 65% ¹¹⁵¹ of the work force and are primarily appointed as line workers. It is assumed that Simplo employs a significant percentage of migrant workers.
	Percentage of spending on locally-based suppliers	No information available.
Community engagement	Presence of policies regarding community engagement at company level	No information available.
	Description of community engagement of the company	No information available.

Stakeholder group society:

¹¹⁴⁷ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

¹¹⁴⁸ www.visionofhumanity.org/gpi-data/#/2010/scor

¹¹⁴⁹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹¹⁵⁰ www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

¹¹⁵¹ SOMO/SwedWatch (2008), p. 24

Table 87: S-LCI table battery assembly by Simplo stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	Simplo did not sign the EICC. ¹¹⁵² It is also non-member of the UN Global Compact or similar initiatives.
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	<p>Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed.¹¹⁵³</p> <p>The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009.¹¹⁵⁴</p> <p>The electronic sector is one of the main drivers for the Chinese economic development. Different industries are based in Jiangsu: textile industry, machinery and electronic branch, the petrochemical industry, and the production of building material. The electronic sector is also locally important.</p>
	Contribution of the product/company to economic development	<p>The production of batteries is concentrated in three countries: Japan, South Korea, and China. While the market share of Japan has continuously declined in recent years, Korea and China gain in importance. Today China grabs a market share of more than 30%.¹¹⁵⁵</p> <p>Simplo's revenues have grown continuously. In 2009, Simplo reported a global market share of 23% for power modules of notebooks and handheld devices and revenues of 880.4 million EUR.¹¹⁵⁶ Since Simplo Technologies has its head-</p>

¹¹⁵² EICC (2009a), p. 9

¹¹⁵³ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹¹⁵⁴ *ibidem*

¹¹⁵⁵ ResearchInChina (2009)

¹¹⁵⁶ *ibidem*

Subcategory	Indicator	Status
		quarter in Taiwan it is unsure, which part of the revenue was generated in China at the site in Changshu. Anyhow, the wage level is low, what limits the contribution to economic development.
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ¹¹⁵⁷ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ¹¹⁵⁸ Especially industrial centres are involved. ¹¹⁵⁹
	Risk of conflicts with regard to the sector	The risk of conflicts within the sector is rather high: Low wages, long working hours, environmental pollution, resource consumption, and use of rare materials pose (potential) causes for conflicts.
	Description of the organisation's role in the development of the conflicts	Simplo is not involved in conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	Li-ion batteries are environmental friendlier than NiCad or NiMH batteries. Li-ion batteries do not contain cadmium, lead, or mercury. They are also much lighter and have a higher performance. In addition, their lifetime is longer. ¹¹⁶⁰
	Involvement of the company in technology transfer projects	No information available.
	Presence of partnerships regarding research and development	No information available.
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	Risk of corruption in country: <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)¹¹⁶¹ ■ Bribe payers index: Rank 19 (3.1 points)¹¹⁶²

¹¹⁵⁷ Heidelberg Institute for International Conflict Research (2009)

¹¹⁵⁸ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

¹¹⁵⁹ Global Times (2010)

¹¹⁶⁰ Argonne National Laboratory (2008)

¹¹⁶¹ Transparency International (2010)

Subcategory	Indicator	Status
		Risk of corruption in sector: It is assumed that the risk of corruption in the Chinese electronic sector is rather high due to the specific conditions as for instance high competition, high research intensity, and rather low working and environmental standards.
	Presence of an anti-corruption program in the company	No information available.
	Presence of co-operations with internal and external controls to prevent corruption	No information available.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

Stakeholder group value chain actors:

Table 88: S-LCI table battery assembly by Simplo stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	No evidence for cartelization or the like found.
	Presence of policies to prevent anti-competitive behaviour	None.
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	None.
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	No information available.
	Membership in an initiative that promotes social responsibility along the supply	None.

¹¹⁶² www.nationmaster.com/graph/cr_i_bri_pay_ind-crime-bribe-payers-index

Subcategory	Indicator	Status
	chain	
Supplier relationships	Interaction of the company with suppliers ¹¹⁶³	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	No evidence found.

D5 Display from AU Optronics

D5a Manufacturing of the Display in Taiwan

Stakeholder group workers:

Table 89: S-LCI table display production by AUO stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	In Taiwan many restrictions concerning freedom of association and collective bargaining exist. For one thing there are several worker groups including defence industry workers, fire fighters, teachers, doctors, medical personnel, and others, who are not permitted to form unions. Migrant workers can admittedly join unions, but they are not able to establish or chair unions. For another thing there are limitations regarding strikes, collective bargaining, and strength of labour laws. The Taiwanese law prescribes wide procedures before workers can go on strike. Consequently it is difficult to call a legal strike. With regard to collective bargaining it can be stated that there are admittedly collective agreements, but the number of workers, who are covered by these agreements is small. Further, the labour standards law does not apply for several sectors as doctors, nursery employees, gardeners, domestic workers, and lawyers. Approximately 10 - 15% percent of the work force are concerned of these limitations. Beyond that, the Taiwanese government has the

¹¹⁶³ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

Subcategory	Indicator	Status
		power to intervene directly in internal affairs of trade unions. ¹¹⁶⁴
	Presence of unions within the sector/organisation and description of their influence	In 2000, the first legal and autonomous trade union was recognized by the Taiwanese government, namely the Taiwan Confederation of Trade Unions (TCTU). Today the TCTU comprises 21 member unions covering telecommunication, petroleum, tobacco, alcohol, railway, bus, and banking industries as well as 9 local trade union federations. ¹¹⁶⁵ The power of trade unions in Taiwan is limited; thus also their achievements. ¹¹⁶⁶ AUO has not established any trade union so far. ¹¹⁶⁷ Thus the influence of trade unions on company behaviour is probably rather weak.
Child labour	Percentage of child labour in country/sector/organisation	There are no statistics about child labour in Taiwan. According to crime statistics and the ITUC, there are cases of child trafficking. These children come from poor neighbour countries as China, Thailand, and Indonesia, or Vietnam and are forced into prostitution. ¹¹⁶⁸ There were no evidence found that child labour is present in Taiwanese AUO sites.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	In Taiwan forced labour occurs in the form of bonded labour; mainly concerning migrant workers. There are cases of human trafficking for the purpose of forced labour including prostitution. ¹¹⁶⁹ There was no evidence found for forced labour at AUO.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	The basic wage in Taiwan per month is 17,280 TWD (ca. 440 EUR). According to the Council of Labor Affairs, this wage level does not allow a decent living standard. They call for an increase

¹¹⁶⁴ ITUC (2010), pp. 2 and <http://survey09.ituc-csi.org/survey.php?IDContinent=3&IDCountry=TW&Lang=EN>

¹¹⁶⁵ www.tctu.org.tw/front/bin/ptdetail.phtml?Part=en001&Category=176367

¹¹⁶⁶ www.tctu.org.tw/front/bin/ptdetail.phtml?Part=en004&Category=176367

¹¹⁶⁷ AUO (2010), p. 92

¹¹⁶⁸ ITUC (2010), p. 6, www.nationmaster.com/country/tw-taiwan/crime and www.aktiv-gegen-kinder-arbeit.de/welt/asien/taiwan

¹¹⁶⁹ ITUC (2010), pp. 6

Subcategory	Indicator	Status
		of 3.47%, resulting in a minimum wage of 18,500 TWD. Unions call for 22,115 TWD. ¹¹⁷⁰
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	AUO declares that wages are higher than the legal minimum wage, but the company does not reveal the level of salaries. ¹¹⁷¹ According to an employee, the basic wage for a graduated student is about 20,000 TWD/month. ¹¹⁷²
Working time	Hours of work per employee and month in average	Around 180h/month ¹¹⁷³
	Number of days without work per week	Employees work 2 days and get 2 days off ¹¹⁷⁴
	Description of how overtime is handled	Overtime payment is twice than the regular payment ¹¹⁷⁵
Discrimination	Percentage of women in the labour force in the sector	n.s.
	Country gender index ranking	Not ranked, China has rank 83 of 102 ¹¹⁷⁶
	Occurrence of discrimination in the country/sector/company	There is gender discrimination in employment regarding payment, promotion, presence in leading positions, and access to employment. Discrimination also occurs concerning migrant workers. In general migrant workers earn less and they are excluded from certain social benefits. Further, indigenous people and persons with HIV/AIDS are discriminated. ¹¹⁷⁷ According to AUO, there were no incidents of discrimination. ¹¹⁷⁸ Indeed, the age structure of AUO's personnel gives rise to doubts. More than 70% of the staff is under 30 years old. ¹¹⁷⁹
	Presence of formal policies of equal opportunities	AUO has a CSR policy, which includes the principle of non-discrimination. ¹¹⁸⁰
	Share of women and minori-	The gender distribution of AUO's personnel is

¹¹⁷⁰ Tsai (2010)

¹¹⁷¹ Wang (2010) and AUO (2010), p. 91

¹¹⁷² Interview with worker

¹¹⁷³ Interview with worker

¹¹⁷⁴ Interview with worker

¹¹⁷⁵ Interview with worker

¹¹⁷⁶ www.genderindex.org

¹¹⁷⁷ ITUC (2010), p. 6 and www.minorityrights.org/?lid=5585#current

¹¹⁷⁸ AUO (2010), p. 92

¹¹⁷⁹ ibidem

¹¹⁸⁰ <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

Subcategory	Indicator	Status
	ties of personnel	balanced with regard to the total work force (50.92% men and 49.08% women). ¹¹⁸¹ The ratio men to women in Taiwan is roughly 2:3. ¹¹⁸² The percentage of disabled persons is 0.45%. ¹¹⁸³
	Ratio of salary of women to wages of men in company	100% ¹¹⁸⁴
	Treatment of workers in general	No information available.
Health and safety	Description of potential main origins of danger and protection measures	Workers handle with a variety of hazardous chemicals, but wear protection clothes. All Taiwanese plants are certified according to OHSAS 18001. ¹¹⁸⁵
	Description of reported violations	There was a leakages at the plant in Lungke in the reporting period of AUO's CSR 2009 report, what leads to the discharge of 40l nitrate. ¹¹⁸⁶
	Accident rate of the country/ sector/organisation	Taiwan has an occupational accident rate of 10,406/100,000 employees, which is rather low in comparison to other Asian countries. The fatality rate amounts 11.1. ¹¹⁸⁷ The frequency rate of AUO in Taiwan amounts 1.12 incidents/1,000,000 working hours; the seriousness rate amounts 10.49 days lost/1,000,000 working hours. ¹¹⁸⁸
	Presence of a formal policy regarding health and safety	None. ¹¹⁸⁹
Social benefits/ social security	Social security expenditures of the country/sector	Taiwan spends around 3% of GNP to social welfare. ¹¹⁹⁰ It is not known how much the electronic sector invests in social security.
	List of social benefits provided to workers	<ul style="list-style-type: none"> ■ Group insurance policies, including life insurance, accident insurance, medical insurance, cancer insurance and business trip insurance ■ Labour and health insurance ■ Maternity/paternity leaves ■ Pensions ■ Special benefits for employees in Taiwan as birthday offers, travel discounts, holiday

¹¹⁸¹ AUO (2010), p. 92

¹¹⁸² Interview with worker

¹¹⁸³ AUO (2010), p. 68

¹¹⁸⁴ Interview with worker and AUO (2010), p. 92

¹¹⁸⁵ <http://auo.com/auoDEV/about.php?sec=tftLcdFabs&ls=en>

¹¹⁸⁶ AUO (2010), p. 89

¹¹⁸⁷ Hämäläinen/Saarela/Takala (2009)

¹¹⁸⁸ AUO (2010), p. 90

¹¹⁸⁹ <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

¹¹⁹⁰ DGBAS (2009), p. 150

Subcategory	Indicator	Status
		packages, allowances to weddings, funerals, training programs, hospital stays, and occupational incidents ¹¹⁹¹
	Evidence of violations to laws and employment regulations	No evidence found.

Stakeholder group local community:

Table 90: S-LCI table display production by AUO stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information available.
	Percent of population with access to improved sanitation facilities	n.s. for Taiwan, China: 65% ¹¹⁹²
	Existence of projects to improve community infrastructure	None.
	Presence of certified environmental management systems	All Taiwanese fabs are certified according to ISO 14001. ¹¹⁹³
	Description of (potential) material resource conflicts	For one thing the production of LCD panels entails the use of numerous substances that pose a potential cause of conflicts. For another thing the production of LCD panels consumes high volumes of energy and water. ¹¹⁹⁴
Access to immaterial resources	Freedom of expression in country/sector	According to the Freedom House ranking of press freedom, Taiwan is classified as “free” (total score: 23) and the freest country in Asia. The Taiwanese constitution provides freedom of speech and press and these rights are in general respected from the judiciary. For instance, it is common to criticise the government and high-ranking politicians. ¹¹⁹⁵ However, it is assumed that the freedom of

¹¹⁹¹ AUO (2010), p. 68

¹¹⁹² <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/infobycountry/china_statistics.html#65

¹¹⁹³ <http://auo.com/auoDEV/about.php?sec=tftLcdFabs&ls=en>

¹¹⁹⁴ Williams (2003), pp. 57

¹¹⁹⁵ www.freedomhouse.org/template.cfm?page=251&year=2009

Subcategory	Indicator	Status
		expression in the electronic industry is restricted due to the restriction of trade unions.
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	AUO initiated several education programs as summer camps and the promotion of reading in elementary schools. ¹¹⁹⁶
Delocalisation and migration	Migration rate of the country/region	While China has a negative migration rate of -0.34 migrants/1,000 inhabitants, Taiwan's migration rate is light positive with 0.03 migrants/1,000 inhabitants. ¹¹⁹⁷
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
	Strength of policies to protect cultural heritage	There is a policy addressing "Culture Advance". ¹¹⁹⁸
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	In the past indigenous people in Taiwan experienced colonialisations and political conflicts. There were numerous violations of Human rights as discrimination and oppression. This led among others to aboriginal population decrease, extinction of languages, and loss of cultural heritage. Indigenous people are usually employed in low skilled jobs with low payment. The unemployment rate in indigenous communities is high and the average wage amounts 65% of the national average income. ¹¹⁹⁹ In addi-

¹¹⁹⁶ AUO (2010), pp. 76

¹¹⁹⁷ www.cia.gov/library/publications/the-world-factbook/geos/tw.html and www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

¹¹⁹⁸ <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

¹¹⁹⁹ ITUC (2010), p. 5

Subcategory	Indicator	Status
		<p>tion, there are resettlements of the Taiwanese government affecting indigenous people.¹²⁰⁰ The percentage of indigenous people in Taiwan today is relatively low. Only 2% of population has an indigenous origin. The most Aborigines live in the Taiwanese Highlands. There are only a few indigenous peoples in north west of Taiwan, where the factories of AUO are located.¹²⁰¹</p>
	Respect of the company regarding indigenous rights	<p>According to AUO, there were no legal incidents due to violations of indigenous rights. The enterprise employs indigenous people in order “to provide real-time and localized services.” Further, AUO supports indigenous artists.¹²⁰²</p>
	Strength of policies to protect indigenous community members	<p>AUO has a very vague CSR policy, which includes “non-discrimination” and “humane treatment” as principles. The scope of the principles is indeed unclear. Indigenous people are not addressed directly by any principle.¹²⁰³</p>
Safe and healthy living conditions	Burden of disease in the country/region	<p>China, including Taiwan, has a DALY rate of 16, which is relatively low in a global context.¹²⁰⁴ Main cause for death with an upstream tendency are malignant tumours. Heart diseases, cerebrovascular diseases, diabetes, accidents, pneumonia, and chronic liver diseases are following.¹²⁰⁵ The life expectancy of birth amounts 78.15 years.¹²⁰⁶</p>
	Pollution level of the country/region and contribution of the company to the environmental load	<p>Major environmental issues of Taiwan are air, water, and soil pollution. The fast growing economy contributes mainly to the environmental load as in other NIE. Also agriculture and traffic pollute the environment. Only ¼ of the country’s territory is arable land. This leads to intensive cultivation with intensive fertilisation and irrigation. The results are water pollution and water scarce. Also resident producers of fertilisers emit toxic substances. Sewage treat-</p>

¹²⁰⁰ Wang (2009) and www.asiaone.com/News/Latest+News/Asia/Story/A1Story20100807-230993.html

¹²⁰¹ ITUC (2010), p. 5, Chiao (2008), www.minorityrights.org/?lid=5585#current and http://en.wikipedia.org/wiki/Taiwanese_aborigines

¹²⁰² AUO (2010) and http://auro.com/auroDEV/citizenship.php?sec=SocialCommitment_3&ls=en

¹²⁰³ <http://auro.com/auroDEV/citizenship.php?sec=socialresponsibility&ls=en>

¹²⁰⁴ http://gamapserv.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹²⁰⁵ DGBAS (2009), p. 114

¹²⁰⁶ www.cia.gov/library/publications/the-world-factbook/fields/2102.html

Subcategory	Indicator	Status
		<p>ment plants and appropriate filters are lacking.¹²⁰⁷</p> <p>The air content of carbon monoxide amounts around 470 ppb. The concentration of suspended particulates amounts approximately $80\mu\text{g}/\text{m}^3$.¹²⁰⁸ In 2008, 134,842 penalties regarding environmental pollution were reported.¹²⁰⁹</p> <p>The production of LCD panels requires lots of water and energy as well as the usage of numerous chemicals, including polycyclic aromatic hydrocarbons and halogenated aromatic hydrocarbons. According to a study, 26 of 588 substances used in the manufacturing of liquid crystals are potentially highly toxic. In addition, LCD monitors with fluorescent backlights contain mercury.¹²¹⁰ Thus the production of LCD panels contributes significantly to the environmental load.</p>
	Management effort to improve the environmental performance	<ul style="list-style-type: none"> ■ Energy savings ■ Production of energy efficient products ■ Reduction of hazardous substances: <ul style="list-style-type: none"> □ More than 75% of LCD monitors produced in 2009 contain LED backlights to reduce the use of mercury □ Development of arsenic-free glass (threshold 100ppm) and antimony-free glass (threshold 1000ppm) □ Prohibition of the use of certain substances as Dimethyl Fumarate □ Substitution of five chemicals with high risks to human health or the environment ■ Usage of eco-friendly packaging ■ Usage of materials from local suppliers ■ Usage of materials with high commonality to reduce scrap¹²¹¹ ■ Reduction of waste; increase of waste recycling rates ■ Application of eco-design principles¹²¹²
Secure living	Crime rate	Taiwan has a relatively low violent crime rate, but bribery is for instance relatively frequent. ¹²¹³

¹²⁰⁷ www.muz-online.de/asien/taiwan.html

¹²⁰⁸ DGBAS (2009), pp. 120

¹²⁰⁹ DGBAS (2009), p. 128

¹²¹⁰ Williams (2003), pp. 57

¹²¹¹ AUO (2010)

¹²¹² AUO (2010), pp. 39

¹²¹³ www.nationmaster.com/country/tw-taiwan/crime

Subcategory	Indicator	Status
conditions		However, the region is deemed to be secure. According to the Global Peace Index, Taiwan ranks on place 35 of 149. ¹²¹⁴
	Management policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country/region	The unemployment rate rose from 2008 to 2009 from estimated 4.1% to around 5.9%. The current unemployment rate amounts 5.39%. ¹²¹⁵
	Percentage of work force hired locally	Since migratory labour is unusual in Taiwan, it is assumed that the majority of the personnel is local staff.
	Percentage of spending on locally-based suppliers	AUO's suppliers are mainly located in China and Taiwan. ¹²¹⁶
Community engagement	Presence of policies regarding community engagement at company level	None.
	Description of community engagement of the company	The engagement of AUO is mainly characterized by corporate giving activities in the areas education, art and culture, and charity. Examples of projects: <ul style="list-style-type: none"> ■ Internship program ■ Honest-intelligent camp and scholarship ■ AUO photonics camp ■ Support program for digital opportunity centre ■ Public welfare activities ■ Sponsoring of cultural events as the Hsinchu International Film Festival or the Taiwan International Video Art Exhibition ■ Support of agriculture in Taiwan ■ Planting of trees¹²¹⁷

Stakeholder group society:

Table 91: S-LCI table display production by AUO stakeholder society

Subcategory	Indicator	Status
Public	Presence of publicly available	None.

¹²¹⁴ www.visionofhumanity.org/gpi-data/#/2010/scor

¹²¹⁵ http://focustaiwan.tw/ShowNews/WebNews_Detail.aspx?ID=201005240038&Type=aECO

¹²¹⁶ AUO (2010), p. 64

¹²¹⁷ AUO (2010), pp. 76 and

<http://auo.com/auoDEV/citizenship.php?sec=SocialCommitment&ls=en>

Subcategory	Indicator	Status
commitments to sustainable issues	promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	
	Implementation/signing of principles or codes of conducts	None.
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	Taiwan has a prospering economy which is indeed very export dependent. Exports generate around 70% of Taiwan's GDP. Main export goods are electronics and machinery. In 2009, the estimated GDP was 362 billion USD and the estimated real growth rate was -2.5%. The GDP per capita amounted to around 29,800 USD. The inflation rate in 2009 was -0.9%. ¹²¹⁸ Due to the high export dependency Taiwan feels the effects of the global recession obviously. However, Taiwan climbed in the Global Competitiveness Index of the World Economic Forum from rank 17 in 2008 to rank 12 in 2009. ¹²¹⁹ The electronics industry is the key sector of the Taiwanese economy. Taiwanese electronics are worldwide coveted.
	Contribution of the product/company to economic development	AOU generated net sales of 423.9 billion TWD (10.4 billion EUR) in 2008 and employs around 19,000 people in Taiwan. AOU is one of the largest producers of LCD panels worldwide. Thus the company is relatively important for the Taiwanese economy. Capital-intensive processes and processes that require high-skilled personnel as R&D activities are located in Taiwan. However, AOU is going to extend its activities in China due to cost reductions. ¹²²⁰
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	Since 1949 there is a non-violent conflict about the secession of Taiwan, ¹²²¹ but this conflict is not related to the electronic industry.
	Risk of conflicts with regard to the sector	The risk of conflicts in the Taiwanese electronic industry is rather low.
	Description of the organisation's role in the development	-

¹²¹⁸ www.cia.gov/library/publications/the-world-factbook/geos/tw.html

¹²¹⁹ World Economic Forum (2009), p. 13

¹²²⁰ AOU (2009) and Tan (2010)

¹²²¹ Heidelberg Institute for International Conflict Research (2009), p. 52

Subcategory	Indicator	Status
	of the conflicts	
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Reduction of hazardous substances ■ Increase of energy efficiency ■ Use of LED backlights instead of fluorescent lamps
	Involvement of the company in technology transfer projects	No information available.
	Presence of partnerships regarding research and development	No information available.
	Investments in technology development	The LCD industry is characterized by fast technology developments. Therefore investments in R&D activities are very important for the competitiveness of companies. In 2008, AUO invested 1.3% of their net sales in R&D. This equates a sum of 5,511 million TWD (ca. 134 million EUR). ¹²²²
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 5.6 (rank 37)¹²²³ ■ Bribe payers index: Rank 17 (3.5 points)¹²²⁴ <p>Risk of corruption in sector: It is assumed that there is risk of corruption in the Taiwanese electronic sector. The research intensity and the high competition are for instance causes for corruption.</p>
	Presence of an anti-corruption program in the company	AUO provides training and education with regard to anti-corruption. Further, the company established an internal reporting mechanism by dint of letterboxes for anonymous submission of issues. In addition, the audit department conducts regularly risk assessments and compiles audit plans. ¹²²⁵
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

¹²²² AUO (2009), p. 46

¹²²³ Transparency International (2010)

¹²²⁴ www.nationmaster.com/graph/cr_i_bri_pay_ind-crime-bribe-payers-index

¹²²⁵ AUO (2010), p. 11

Stakeholder group value chain actors:

Table 92: S-LCI table display production by AUO stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	AUO, its American subsidiary, and six of its executives were charged due to price fixing for TFT-LCD displays over a five-year period from 2001 to 2006. Other indicted companies are among others Apple, Dell, and HP. So far, six companies were found guilty regarding price agreements (LG, Sharp, Chunghwa Picture Tubes, Seiko Epson, Hitachi, and Chi Mei Opto-electronics). ¹²²⁶
	Presence of policies to prevent anti-competitive behaviour	None.
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	None. AUO has a CSR policy based on SA 8000, EICC and the Global Sullivan Principles. ¹²²⁷
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	AUO set up a CSR evaluation tool that covers environmental aspects, health and safety, labour aspects, ethics, and management systems. The company plans to audit new subcontractors and suppliers as well as a periodically audit for existing ones. ¹²²⁸
	Membership in an initiative that promotes social responsibility along the supply chain	None. AUO has a CSR policy based on EICC and other standards as the Global Sullivan Principles, which promote the implementation of CSR along the supply chain, but the company is not a member of the EICC. ¹²²⁹
Supplier relationships	Interaction of the company with suppliers ¹²³⁰	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual	Violations of the company against intellectual property	LG sued AUO due to 4 patent infringements concerning flat-panel video technology in 2006.

¹²²⁶ Lemon (2010) and Kendall (2010)

¹²²⁷ AUO (2010), p. 87

¹²²⁸ <http://auo.com/auoDEV/citizenship.php?sec=stakeholder>

¹²²⁹ AUO (2010), p. 87

¹²³⁰ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

Subcategory	Indicator	Status
property rights	rights	However, AUO was acquitted and LG was pronounced guilty. ¹²³¹

D5b Assembly of the Display in China

Stakeholder group workers:

Table 93: S-LCI table display assembly by AUO stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all organisations have to officially register with and be approved by the government. ¹²³²
	Presence of unions within the sector/organisation and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ¹²³³ It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts but they contain only minimum standards as required by national legislation. ¹²³⁴ AUO has not established any trade union so far. ¹²³⁵ Thus the influence of trade unions is probably rather weak.
Child labour	Percentage of child labour in country/sector/organisation	There are no official statistics about child labour in China. However, child labour is considered as a rising problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ¹²³⁶ A percentage in the electronic sector cannot be stated.

¹²³¹ <http://auo.com/auoDEV/pressroom.php?sec=newsReleases&intTempId=1&intNewsId=786&ls=en>

¹²³² www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

¹²³³ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

¹²³⁴ Metcalf/Li (2006) and interview with China Labour Bulletin

¹²³⁵ AUO (2010), p. 92

¹²³⁶ U.S. Department of Labor (2009), p. 15, China Labour Bulletin (2007) and www.ihlo.org/LRC/W/020807.html

Subcategory	Indicator	Status
		There was no evidence found that AUO employs children.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ¹²³⁷ There was no evidence found that AUO employs forced labourers.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage in the Jiangsu province amounts 960 CNY (114.47 EUR), the one in Shanghai is 1,120 CNY (128.96 EUR), and the one in Fujian amounts 700 - 900 CNY (ca. 80 - 100 EUR) in 2010. ¹²³⁸ This minimum wage does not cover the living costs so that many workers are forced to work long hours. For instance, living costs in the industrial park Shenzhen were estimated to be more than 1,500 CNY (175.36 EUR), ¹²³⁹ which are comparable to living costs in Suzhou.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	The basic wage is above the minimum level. The wage in Xiamen is for example 1000 CNY per month. In addition, AUO pays different allowances (positional allowance: 100 CNY/month, job allowance: 200 CNY/month, overnight allowance: 100 CNY/month) and a performance bonus of 0 - 450 CNY/month. ¹²⁴⁰
Working time	Hours of work per employee and month in average	50 - 60 hours/week ¹²⁴¹

¹²³⁷ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

¹²³⁸ Yang (2010)

¹²³⁹ FIAS (2007), p. 53

¹²⁴⁰ Interview with worker

¹²⁴¹ Interview with worker

Subcategory	Indicator	Status
	Number of days without work per week	0 - 1 day/week ¹²⁴²
	Description of how overtime is handled	Overtime is paid higher than the basic hourly rate. AUO reduced overtime in recent years implementing lean management. In 2008, 90% of employees work less than the legal limit of 36 overtime hours per month. ¹²⁴³
Discrimination	Percentage of women in the labour force in the sector	The companies of the electronic industry in China prefer the employment of young women, so the percentage of women of the labour force is very high.
	Country gender index ranking	Rank 83 of 102 ¹²⁴⁴
	Occurrence of discrimination in the country/sector/company	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ¹²⁴⁵ Also discrimination in the workplace is common. ¹²⁴⁶ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract. ¹²⁴⁷ Employment discrimination against women is also present. ¹²⁴⁸ Many companies of the electronic sector have restrictions on age, gender, and height. Such workplace discrimination is usually quite arbitrary. ¹²⁴⁹ According to AUO, there were no incidents of discrimination. ¹²⁵⁰ Indeed, the high percentage of women and the age structure of AUO's personnel gives rise to doubts. More than 2/3 of

¹²⁴² Interview with worker

¹²⁴³ Rammohan (2008), p. 11

¹²⁴⁴ www.genderindex.org

¹²⁴⁵ www.state.gov/g/drl/rls/irf/2009/127268.htm

¹²⁴⁶ Séguin (2009)

¹²⁴⁷ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

¹²⁴⁸ <http://genderindex.org/country/china>

¹²⁴⁹ Interview with China Labour Bulletin

¹²⁵⁰ AUO (2010), p. 92

Subcategory	Indicator	Status
		the staff is female and more than 70% is younger than 30 years. ¹²⁵¹
	Presence of formal policies of equal opportunities	AUO has a CSR policy, which includes the principle of non-discrimination. ¹²⁵²
	Share of women and minorities of personnel	According to a report, the share of women in AUO's manufacturing sites amounts 76% of the total labour force. ¹²⁵³ The percentage of challenged persons is 0.45% in Taiwan. ¹²⁵⁴ AUO does not report the share for China or other business locations.
	Ratio of salary of women to wages of men in company	100% ¹²⁵⁵
	Treatment of workers in general	There are strict regulations to administrate workers. In general, wage deductions due to "misbehaviour" as talking during the work, delays, use of restrooms too frequent, etc. are common. In addition, it is a common practice to use fines for non-attendance regarding overtime as leverage. ¹²⁵⁶
Health and safety	Description of potential main origins of danger and protection measures	The assembly of LCD panels is rather not hazardous. However, the sites in Suzhou and Songjiang are certified according OHSAS 18001. ¹²⁵⁷
	Description of reported violations	No information available.
	Accident rate of the country/ sector/organisation	Although Asia has very high accident rates, China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ¹²⁵⁸ AUO specifies a frequency rate and a seriousness rate for China. Former amounts 0.82 incidents/ 1,000,000 working hours and latter is specified with 9.68 days lost/1,000,000 working hours. ¹²⁵⁹
	Presence of a formal policy	None. ¹²⁶⁰

¹²⁵¹ AUO (2010), p. 92

¹²⁵² <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

¹²⁵³ Rammohan (2008), p. 12

¹²⁵⁴ AUO (2010), p. 68

¹²⁵⁵ AUO (2010), p. 92

¹²⁵⁶ Interview with China Labour Bulletin

¹²⁵⁷ <http://auo.com/auoDEV/about.php?sec=tftLcdFabs&ls=en>

¹²⁵⁸ Hämäläinen/Saarela/Takala (2009)

¹²⁵⁹ AUO (2010), p. 90

¹²⁶⁰ <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

Subcategory	Indicator	Status
	regarding health and safety	
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ¹²⁶¹ It is unknown how much the electronic industry spends.
	List of social benefits provided to workers	<ul style="list-style-type: none"> ■ Group insurance policies, including life insurance, accident insurance, medical insurance, cancer insurance and business trip insurance ■ Labour and health insurance ■ Maternity/paternity leaves ■ Pensions ■ Special benefits for employees in Taiwan as birthday offers, travel discounts, holiday packages, allowances to weddings, funerals, training programs, hospital stays and occupational incidents¹²⁶² <p>Please note: It is unclear if these benefits apply also for employees in China.</p>
	Evidence of violations to laws and employment regulations	Until 2008 there were violations of the Chinese labour law regarding the maximum overtime hours of 36 hours per month in any case. ¹²⁶³ It is unclear, if there are still violations today.

Stakeholder group local community:

Table 94: S-LCI table display assembly by AUO stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information regarding material resource extraction found. China's industry is responsible for approximately 26% of freshwater withdrawal. ¹²⁶⁴ Assembly processes are generally not linked with high resource consumption.
	Percent of population with access to improved sanitation facilities	65% ¹²⁶⁵
	Existence of projects to improve community infrastructure	None.

¹²⁶¹ IMF (2010), p. 5

¹²⁶² AUO (2010), p. 68

¹²⁶³ Rammohan (2008), p. 11

¹²⁶⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁶⁵ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/infobycountry/china_statistics.html#65

Subcategory	Indicator	Status
	Presence of certified environmental management systems	The sites in Suzhou and Songjiang are ISO 14001 certified. ¹²⁶⁶
	Description of (potential) material resource conflicts	There are no (potential) material resource conflicts concerning the assembly process.
Access to immaterial resources	Freedom of expression in country/sector/company	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ¹²⁶⁷ Although AUO provides help lines and mailboxes to give employees the opportunity to express their opinion, ¹²⁶⁸ it is believed that the freedom of expression in the company is restricted due to the specific conditions in the Chinese electronic sector. ¹²⁶⁹
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	AUO initiated several education programs as summer camps and the promotion of reading in elementary schools, but the scope of the activities is mainly Taiwan. However, AUO arranged in co-operation with Northeastern University a summer vacation educational camp. ¹²⁷⁰
Delocalisation and migration	Migration rate of the country/region	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ¹²⁷¹
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural	Respect of the organisation regarding local cultural	No information available.

¹²⁶⁶ <http://auo.com/auoDEV/about.php?sec=tftLcdFabs&ls=en>

¹²⁶⁷ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

¹²⁶⁸ AUO (2010), p. 18

¹²⁶⁹ Interview with China Labour Bulletin

¹²⁷⁰ AUO (2010), pp. 76

¹²⁷¹ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
heritage	heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	
	Strength of policies to protect cultural heritage	There is a policy addressing “Culture Advance” . ¹²⁷²
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.¹²⁷³ But there are officially 55 ethnic minority groups in China,¹²⁷⁴ who account for less than 9% of population.¹²⁷⁵ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.¹²⁷⁶</p> <p>The Chinese constitution provides equal rights to all ethnic groups.¹²⁷⁷ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.¹²⁷⁸</p>
	Respect of the company regarding indigenous rights	According to AUO, there were no legal incidents due to violations of indigenous rights. The enterprise employs indigenous people in order “to provide real-time and localized services.” Further, AUO supports indigenous artists. ¹²⁷⁹
	Strength of policies to protect indigenous community members	AUO has a very vague CSR policy, which includes “non-discrimination” and “humane treatment” as principles. The scope of the principles is in-

¹²⁷² <http://auro.com/auroDEV/citizenship.php?sec=socialresponsibility&ls=en>

¹²⁷³ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

¹²⁷⁴ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹²⁷⁵ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁷⁶ The World Bank (2007)

¹²⁷⁷ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹²⁷⁸ www.amnesty.org

¹²⁷⁹ AUO (2010) and http://auro.com/auroDEV/citizenship.php?sec=SocialCommitment_3&ls=en

Subcategory	Indicator	Status
		deed unclear. Indigenous people are not addressed directly by any principle. ¹²⁸⁰
Safe and healthy living conditions	Burden of disease in the country/region	China has a DALY rate of 16, which is relatively low. ¹²⁸¹ The risk of infectious diseases is classified as intermediate. ¹²⁸² Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year. In addition, around 200 million individuals suffer from occupational diseases. ¹²⁸³ 80% of them suffer from pneumoconiosis. ¹²⁸⁴ The life expectancy at birth amounts 74.51 years. ¹²⁸⁵
	Pollution level of the country/region and contribution of the company to the environmental load	China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causes are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage. ¹²⁸⁶ In 2006, China had CO ₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m ³ . ¹²⁸⁷ The assembly process of displays is not linked to vast environmental pollution. The main contribution to the environmental burden comes probably from the energy consumption.
	Management effort to improve the environmental	<ul style="list-style-type: none"> ■ Energy savings ■ Reduction of non-process water

¹²⁸⁰ <http://auo.com/auoDEV/citizenship.php?sec=socialresponsibility&ls=en>

¹²⁸¹ http://gamapserv.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹²⁸² www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁸³ <http://en.epochtimes.com/news/7-2-24/52097.html>

¹²⁸⁴ www.china-labour.org.hk/en/node/100744

¹²⁸⁵ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁸⁶ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁸⁷ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

Subcategory	Indicator	Status
	performance	<ul style="list-style-type: none"> ■ Reduction of waste; increase of waste recycling ■ Reduction of waste; increase of waste recycling rates ■ Application of eco-design principles¹²⁸⁸
Secure living conditions	Crime rate	Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ¹²⁸⁹ Global Peace Index: Rank 80 of 149 ¹²⁹⁰
	Management policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country/region	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ¹²⁹¹ In provinces of the industrialised east coast there is this year even a lack of workers, because the number of migrant workers declines. ¹²⁹²
	Percentage of work force hired locally	Migrant workers are an important part of the personnel of factories located at the east coast, also in the electronic sector. They make up to more than 65% ¹²⁹³ of the work force and are primarily appointed as line workers. AUO provides dormitories at each manufacturing site. ¹²⁹⁴ These dormitories are a clue for a high percentage of migrant workers. Also according to a report, the percentage of migrant workers at AUO is high. ¹²⁹⁵
	Percentage of spending on locally-based suppliers	The majority of AUO's suppliers are located in China and Taiwan. ¹²⁹⁶
Community engagement	Presence of policies regarding community engagement at company level	None.

¹²⁸⁸ AUO (2010), pp. 39

¹²⁸⁹ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

¹²⁹⁰ www.visionofhumanity.org/gpi-data/#/2010/scor

¹²⁹¹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁹² www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

¹²⁹³ SOMO/SwedWatch (2008), p. 24

¹²⁹⁴ <http://www.auo.com/auoDEV/citizenship.php?sec=employee>

¹²⁹⁵ Rammohan (2008), p. 10

¹²⁹⁶ AUO (2010), p. 64

Subcategory	Indicator	Status
	Description of community engagement of the company	AUO sponsored the construction of elementary schools in China. ¹²⁹⁷

Stakeholder group society:

Table 95: S-LCI table display assembly by AUO stakeholder society

Subcategory	Indicators	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	None.
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	<p>Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed.¹²⁹⁸</p> <p>The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009.¹²⁹⁹</p> <p>The electronic sector is one of the main drivers for the Chinese economic development. It is especially important in industrial centres as Jiantsu, Shanghai, and Xiamen.</p>
	Contribution of the product/company to economic development	AOU generated net sales of 423.9 billion TWD (10.4 billion EUR) in 2008 and employs around 42,000 people. AUO is one of the largest producers of LCD panels worldwide. However, the contribution to economic development of the company in China is rather low in comparison with Taiwan. In China are exclusively assembly sites located to reduce labour costs, while capi-

¹²⁹⁷ http://auo.com/auoDEV/citizenship.php?sec=SocialCommitment_1&ls=en

¹²⁹⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹²⁹⁹ ibidem

Subcategory	Indicators	Status
		tal-intensive processes and processes that require high-skilled personnel as R&D activities are located in Taiwan. However, AUO is going to extend its activities in China due to cost reductions. ¹³⁰⁰
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ¹³⁰¹ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ¹³⁰² Especially industrial centres are involved. ¹³⁰³
	Risk of conflicts with regard to the sector	The risk of conflicts within the sector is rather high: Low wages, long working hours, environmental pollution, resource consumption, and use of rare materials pose (potential) causes for conflicts.
	Description of the organisation's role in the development of the conflicts	-
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Reduction of hazardous substances ■ Increase of energy efficiency ■ Use of LED backlights instead of fluorescent lamps
	Involvement of the company in technology transfer projects	No information available.
	Presence of partnerships regarding research and development	No information available.
	Investments in technology development	The LCD industry is characterized by fast technology developments. Therefore investments in R&D activities are very important for the competitiveness of companies. In 2008, AUO invested 1.3% of their net sales in R&D. This equates a sum of 5,511 million TWD (ca. 134 million EUR). ¹³⁰⁴

¹³⁰⁰ AUO (2009) and Tan (2010)

¹³⁰¹ Heidelberg Institute for International Conflict Research (2009)

¹³⁰² <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

¹³⁰³ Global Times (2010)

¹³⁰⁴ AUO (2009), p. 46

Subcategory	Indicators	Status
Corruption	Risk of corruption in country/sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)¹³⁰⁵ ■ Bribe payers index: Rank 19 with 3.1 points¹³⁰⁶ <p>Risk of corruption in sector: It is assumed that the risk of corruption in the Chinese electronic sector is rather high due to the specific conditions as for instance high competition, high research intensity, and rather low working and environmental standards.</p>
	Presence of an anti-corruption program in the company	AUO provides training and education with regard to anti-corruption. Further, the company established an internal reporting mechanism providing letterboxes for anonymous submission of issues. In addition, the audit department conducts regularly risk assessments and compiles audit plans. ¹³⁰⁷
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

Stakeholder group value chain actors:

Table g6: S-LCI table display assembly by AUO stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	AUO, its American subsidiary, and six of its executives were charged due to price fixing for TFT-LCD displays over a five-year period from 2001 to 2006. Other indicted companies are among others Apple, Dell, and HP. So far, six companies were found guilty regarding price agreements (LG, Sharp, Chunghwa Picture Tubes, Seiko Epson, Hitachi, and Chi Mei Optoelectronics). ¹³⁰⁸
	Presence of policies to prevent anti-competitive be-	None.

¹³⁰⁵ Transparency International (2010)

¹³⁰⁶ www.nationmaster.com/graph/crime/crime-bri-pay-ind-crime-bribe-payers-index

¹³⁰⁷ AUO (2010), p. 11

¹³⁰⁸ Lemon (2010) and Kendall (2010)

Subcategory	Indicator	Status
	haviour	
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	None. AUO has a CSR policy based on SA 8000, EICC and the Global Sullivan Principles. ¹³⁰⁹
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	AUO set up a CSR evaluation tool that covers environmental aspects, health and safety, labour aspects, ethics, and management systems. The company plans to audit new subcontractors and suppliers as well as a periodically audit for existing subcontractors and suppliers. ¹³¹⁰
	Membership in an initiative that promotes social responsibility along the supply chain	None. AUO has a CSR policy based on EICC and other standards as the Global Sullivan Principles, which promote the implementation of CSR along the supply chain, but the company is not a member of the EICC. ¹³¹¹
Supplier relationships	Interaction of the company with suppliers ¹³¹²	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	LG suited AUO due to 4 patent infringements concerning flat-panel video technology in 2006. However, AUO was acquitted and LG was pronounced guilty. ¹³¹³

D6 Power Supply from Lite-On Technology Corporation

Stakeholder group workers:

Table 97: S-LCI table power supply from Lite-On stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all

¹³⁰⁹ AUO (2010), p. 87

¹³¹⁰ <http://auro.com/auroDEV/citizenship.php?sec=stakeholder>

¹³¹¹ AUO (2010), p. 87

¹³¹² payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

¹³¹³ <http://auro.com/auroDEV/pressroom.php?sec=newsReleases&intTempId=1&intNewsId=786&ls=en>

Subcategory	Indicator	Status
		unions have to officially register with and be approved by the government. ¹³¹⁴
	Presence of unions within the sector/organisation and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ¹³¹⁵ It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts but they contain only minimum standards as required by national legislation. ¹³¹⁶ It is unclear if Lite-On has a trade union. In any case, interviews with workers of Lite-On revealed that workers do not know anything about a union. ¹³¹⁷
Child labour	Percentage of child labour in country/sector/organisation	There are no official statistics about child labour in China; however, child labour in China is a problem according to reports. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ¹³¹⁸ A percentage in the electronic sector cannot be stated. There was no evidence found that Lite-On employs child labourer.
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ¹³¹⁹ There was no evidence found that Lite-On employs forced labourer.
	Description of kind of forced	-

¹³¹⁴ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

¹³¹⁵ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

¹³¹⁶ Metcalf/Li (2006) and interview with China Labour Bulletin

¹³¹⁷ SACOM (2008)

¹³¹⁸ U.S. Department of Labor (2009), p. 15

¹³¹⁹ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

Subcategory	Indicator	Status
	labour in the company	
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage in Dongguang (level 2 of Guangdong) amounts 920 CNY. ¹³²⁰ This minimum wage does not cover the living costs, so that many workers are forced to work long hours.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	<ul style="list-style-type: none"> ■ Basic wage: 920 CNY/month ■ Positional allowance: 0 - 100 CNY/month ■ Performance bonus: 0 - 424 CNY/month ■ Seniority allowance: 0 - 100 CNY/month ■ Quality bonus: 0 - 50 CNY/month. In general, the salary is around 1,300 - 1,500 CNY. ¹³²¹
Working time	Hours of work per employee and month in average	Employees work at least 10 - 12 hours a day. Employees work in average 70 - 120 overtime hours per month depending on season and factory. ¹³²²
	Number of days without work per week	0 - 1 day off (It is reported that employees have to work every day in peak seasons. Lite-On has implemented in some factories a “full attendance bonus”.) ¹³²³
	Description of how overtime is handled	The hourly rate of overtime hours is higher than hourly rates of basic hours. It is reported that Lite-On forces overtime, for instance for poor working performance or in peak season. ¹³²⁴
Discrimination	Percentage of women in the labour force in the sector	The companies of the electronic industry in China prefer the employment of young women, so the percentage of women of the labour force is very high.
	Country gender index ranking	Rank 83 of 102 ¹³²⁵

¹³²⁰ <http://baike.baidu.com/view/895266.htm>

¹³²¹ www.mingong123.com/company/index_1_75027_1.html, www.coent.cn/gsx33522.html and SACOM (2008)

¹³²² SACOM (2008)

¹³²³ SACOM (2008)

¹³²⁴ www.mingong123.com/company/index_1_75027_1.html, www.coent.cn/gsx33522.html and SACOM (2008)

¹³²⁵ www.genderindex.org

Subcategory	Indicator	Status
	Occurrence of discrimination in the country/sector/company	<p>Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities.¹³²⁶ Also discrimination in the workplace is common.¹³²⁷ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract.¹³²⁸ Employment discrimination against women is also present.¹³²⁹</p> <p>Many companies of the electronic sector have restrictions on age, gender, and height. Such workplace discrimination is usually quite arbitrary.¹³³⁰ Also at Lite-On discrimination is present. Males have to pay a higher fee (500 - 600 CNY) than women (200 CNY) to be employed by Lite-On.¹³³¹</p>
	Presence of formal policies of equal opportunities	<p>Lite-On mentioned in their CSR report that salaries base on "educational attainment, past experience, and personal performance, but not on (...) employee gender."¹³³² Further, the code of conduct includes a policy regarding non-discrimination that covers equal opportunities.¹³³³</p>
	Share of women and minorities of personnel	<p>The share of women of the total personnel amounts 56%,¹³³⁴ the share in the factory in Dongguang is probably higher.</p> <p>No information about share of disabled or migrant workers. It is assumed that Lite-On employs predominantly migrant workers as other electronic companies in China. The large dormitories at the sites provide a solid evidence.¹³³⁵</p>

¹³²⁶ www.state.gov/g/drl/rls/irf/2009/127268.htm

¹³²⁷ Séguin (2009)

¹³²⁸ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

¹³²⁹ <http://genderindex.org/country/china>

¹³³⁰ Interview with China Labour Bulletin

¹³³¹ SACOM (2008), p. 27

¹³³² Lite-On (2009), p. 65

¹³³³ [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)

¹³³⁴ Lite-On (2009), p. 63

¹³³⁵ SACOM (2008)

Subcategory	Indicator	Status
	Ratio of salary of women to wages of men in company	100% ¹³³⁶
	Treatment of workers in general	There are strict regulations to administrate workers, also regarding the dormitories. Wage deductions due to “misbehaviour” as talking during the work, delays, use of restrooms too frequent, etc. are common. In addition, it is a common practice to use fines for non-attendance regarding overtime as leverage. ¹³³⁷ Further, employees have to carry on a very high workload; non-fulfilment leads to overtime or bonus deductions. ¹³³⁸
Health and safety	Description of potential main origins of danger and protection measures	Workers are exposed to hazardous substances. Lite-On provides health and safety training, but it is reported that this training is insufficient. Further, there are complaints of workers that protection clothes are not adequate. ¹³³⁹
	Description of reported violations	In 2008, a Lite-On factory in Dongguang caught fire due to a short cut. 14 product lines were partly destroyed. ¹³⁴⁰ Indeed, it is not clear, whether the fire was caused by violations of safety measures.
	Accident rate of the country/sector/organisation	Asia has very high accident rates. China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ¹³⁴¹ Lite-On reported an injury rate of 0.96/1,000,000 working hours in 2008. Each occupational injury resulted in 106.29 lost working hours. ¹³⁴²
	Presence of a formal policy regarding health and safety	The corporate pledge of Lite-On includes the promise “to improve working conditions and provide a healthy and safe workplace.” ¹³⁴³
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ¹³⁴⁴ It is unknown how much the electronic sector invests.

¹³³⁶ Lite-On (2009), p. 65

¹³³⁷ Interview with China Labour Bulletin

¹³³⁸ SACOM (2008)

¹³³⁹ SACOM (2008)

¹³⁴⁰ SACOM (2008) and <http://technology-base.blogspot.com/2008/02/lite-on-monitor-producti-on-lines-caught.html>

¹³⁴¹ Hämäläinen/Saarela/Takala (2009)

¹³⁴² Lite-On (2009), p. 66

¹³⁴³ Lite-On (2009), p. 17

¹³⁴⁴ IMF (2010), p. 5

Subcategory	Indicator	Status
	List of social benefits provided to workers	Overseas employees receive benefits and insurance as specified by the local law. ¹³⁴⁵
	Evidence of violations to laws and employment regulations	Lite-On infringes the law regarding overtime and days off: Article 41 of the Chinese Labour Law stipulates that overtime hours shall not exceed 3 hours a day and 36 hours per month. Article 38 stipulates that companies shall provide at least 1 day off per week. ¹³⁴⁶

Stakeholder group local community:

Table 98: S-LCI table power supply from Lite-On stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of freshwater withdrawals. ¹³⁴⁷
	Percent of population with access to improved sanitation facilities	65% ¹³⁴⁸
	Existence of projects to improve community infrastructure	None.
	Presence of certified environmental management systems	All Lite-On sites are certified according to ISO 14001. ¹³⁴⁹
	Description of (potential) material resource conflicts	Power Supplies contain rare metals as gold and copper, what can lead to resource conflicts.
Access to immaterial resources	Freedom of expression in country/sector/company	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is

¹³⁴⁵ Lite-On (2009), p. 65

¹³⁴⁶ www.china.org.cn/english/government/207383.htm

¹³⁴⁷ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹³⁴⁸ <http://data.worldbank.org/indicator/SI.STA.ACSN?display=default> and www.unicef.org/info/bycountry/china_statistics.html#65

¹³⁴⁹ Lite-On (2009), p. 18 and 66

Subcategory	Indicator	Status
		common and the judiciary is not independent. ¹³⁵⁰ It is assumed that freedom of expression is restricted in the entire electronic sector in China. ¹³⁵¹
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	Lite-On established the Lite-On Cultural Foundation, which is responsible for public interest and charitable activities. The activities include among others education initiatives, but it is not clear, whether there are initiatives in China. ¹³⁵²
Delocalisation and migration	Migration rate of the country/ region	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ¹³⁵³
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
	Strength of policies to protect cultural heritage	None.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people. ¹³⁵⁴ But there are officially 55 ethnic minority groups in China, ¹³⁵⁵ who account for less than 9% of population. ¹³⁵⁶ In addition, there are undistinguished ethnic groups that not have been officially rec-

¹³⁵⁰ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

¹³⁵¹ Interview with China Labour Bulletin

¹³⁵² Lite-On (2009), p. 20

¹³⁵³ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

¹³⁵⁴ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

¹³⁵⁵ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹³⁵⁶ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		<p>ognized. According to the World Bank, more than 35% of the worldwide indigenous population lives in China.¹³⁵⁷</p> <p>The Chinese constitution provides equal rights to all ethnic groups.¹³⁵⁸ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.¹³⁵⁹</p> <p>In the province Guangdong 99% of population are Han Chinese, 0.7% are Zhuang and 0.2% are Yao, who live in the mountains.¹³⁶⁰</p>
	Respect of the company regarding indigenous rights	Lite-On received the “Angel Customer Award” of the Council of Indigenous People for the promotion of tourism development in aboriginal villages in Taiwan. ¹³⁶¹
	Strength of policies to protect indigenous community members	None.
Safe and healthy living conditions	Burden of disease in the country/region	<p>China has a DALY rate of 16, which is relatively low.¹³⁶² The risk of infectious diseases is classified as intermediate.¹³⁶³ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year.</p> <p>In addition, around 200 million individuals suffer from occupational diseases.¹³⁶⁴ 80% of them suffer from pneumoconiosis.¹³⁶⁵</p> <p>The life expectancy at birth amounts 74.51 years.¹³⁶⁶</p>
	Pollution level of the coun-	China belongs to the most polluted countries in

¹³⁵⁷ The World Bank (2007)

¹³⁵⁸ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹³⁵⁹ www.amnesty.org

¹³⁶⁰ <http://en.wikipedia.org/wiki/Guangdong> and http://en.wikipedia.org/wiki/Yao_people

¹³⁶¹ Lite-On (2009), p. 2

¹³⁶² http://gamapserv.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹³⁶³ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹³⁶⁴ <http://en.epochtimes.com/news/7-2-24/52097.html>

¹³⁶⁵ www.china-labour.org.hk/en/node/100744

¹³⁶⁶ <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>

Subcategory	Indicator	Status
	try/region and contribution of the company to the environmental load	<p>the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causers are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.¹³⁶⁷</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m³.¹³⁶⁸</p> <p>The environmental load caused by Lite-On Power Plant keeps within limits. The factory contributes mainly to the environmental load through energy consumption.</p>
	Management effort to improve the environmental performance	Lite-On implemented Hazardous Substance Free management system and set restrictions for the use of harmful substances. ¹³⁶⁹
Secure living conditions	Crime rate	<p>Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009.¹³⁷⁰</p> <p>Global Peace Index: Rank 80 of 149¹³⁷¹</p>
	Management policies related to private security personnel	The enterprise employs security personnel, but it is not clear to what extent the security guards influence the local crime.
Local employment	Percentage of unemployment in the country/region	<p>China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher.¹³⁷²</p> <p>In provinces of the industrialised east coast</p>

¹³⁶⁷ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹³⁶⁸ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATASTA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

¹³⁶⁹ Lite-On (2009), p. 35 and [www.liteon.com/UserFiles/File/ROHS/Liteon LS-301_rev_K_0807.pdf](http://www.liteon.com/UserFiles/File/ROHS/Liteon_LS-301_rev_K_0807.pdf)

¹³⁷⁰ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

¹³⁷¹ www.visionofhumanity.org/gpi-data/#/2010/scor

¹³⁷² www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		there is this year a lack of workers, because the number of migrant workers declines. ¹³⁷³
	Percentage of work force hired locally	Migrant workers are an important part of the personnel of factories located at the east coast, also in the electronic sector. They make up to more than 65% ¹³⁷⁴ of the work force and are primarily appointed as line workers. It is assumed due to the large dormitories and common company practices in the sector that the company employs predominantly migrant workers.
	Percentage of spending on locally-based suppliers	No information available. Probably the percentage of locally-based suppliers is rather high, because Lite-On is located in an industrial centre.
Community engagement	Presence of policies regarding community engagement at company level	The CSR vision of Lite-On Technology covers among others a policy regarding community engagement: <ul style="list-style-type: none"> ■ “The company will actively share with society, vigorously participate in social and public interest activities, and contribute its business achievements. ■ The company will be a good neighbour to community residents and interact in a positive manner to build a stronger community.”¹³⁷⁵ Besides the corporate code of conduct contains a section about community involvement. ¹³⁷⁶
	Description of community engagement of the company	Project examples: ¹³⁷⁷ <ul style="list-style-type: none"> ■ Donation for earthquake victims in Sichuan ■ Sponsoring of a Taiwanese photographer ■ Planting of trees ■ Education initiatives

Stakeholder group society:

Table 99: S-LCI table power supply from Lite-On stakeholder society

Subcategory	Indicator	Status
Public commitments	Presence of publicly available promises or agreements on sustainable issues	None.

¹³⁷³ www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

¹³⁷⁴ SOMO/SwedWatch (2008), p. 24

¹³⁷⁵ Lite-On (2009), p. 17

¹³⁷⁶ [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)

¹³⁷⁷ Lite-On (2009)

Subcategory	Indicator	Status
to sustainable issues	and complaints to the non fulfilment of these commitments	
	Implementation/signing of principles or codes of conducts	Lite-On is a member of the EICC. Further, the company implemented an own code of conduct, which apply for all Lite-On Group employees and all Lite-On Group companies. ¹³⁷⁸
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed. ¹³⁷⁹ The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009. ¹³⁸⁰ The electronic sector is one of the main drivers for the Chinese economic development. Guangdong is one of the industrial centres of China. The economy of the province grew 9.5% in 2009. ¹³⁸¹
	Contribution of the product/company to economic development	Lite-On employs more than 18,000 employees in China. Thus it is assumed that the company has influence on the local economy. Indeed, wages are low.
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ¹³⁸² There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ¹³⁸³ Especially industrial centres are involved. ¹³⁸⁴
	Risk of conflicts with regard to the sector	The risk of conflicts within the sector is rather high: Low wages, long working hours, environ-

¹³⁷⁸ Lite-On (2009), p. 2 and [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)

¹³⁷⁹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹³⁸⁰ ibidem

¹³⁸¹ www.china.org.cn/china/2010-01/06/content_19192727.htm

¹³⁸² Heidelberg Institute for International Conflict Research (2009)

¹³⁸³ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

¹³⁸⁴ Global Times (2010)

Subcategory	Indicator	Status
		mental pollution, resource consumption, and use of rare materials pose (potential) causes for conflicts.
	Description of the organisation's role in the development of the conflicts	-
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Increased energy efficiency ■ Reduction of hazardous substances
	Involvement of the company in technology transfer projects	No information available.
	Presence of partnerships regarding research and development	Lite-On collaborates with universities regarding R&D. ¹³⁸⁵
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)¹³⁸⁶ ■ Bribe payers index: Rank 19 (3.1 points)¹³⁸⁷ <p>Risk of corruption in sector: It is assumed that the risk of corruption in the Chinese electronic sector is rather high due to the specific conditions as for instance high competition, high research intensity, and rather low working and environmental standards.</p>
	Presence of an anti-corruption program in the company	The Lite-On code of conduct includes policies regarding anti-corruption. ¹³⁸⁸
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

¹³⁸⁵ Lite-On (2009), p. 80

¹³⁸⁶ Transparency International (2010)

¹³⁸⁷ www.nationmaster.com/graph/crime_bri_pay_ind-crime-bribe-payers-index

¹³⁸⁸ [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)

Stakeholder group value chain actors:

Table 100: S-LCI table power supply from Lite-On stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	Lite-On was sued by reason of being a member of an optical drive cartel. Lite-On and other companies as Sony, Toshiba, Samsung, Hitachi, LG Electronics, and Philips are accused for price agreements. ¹³⁸⁹
	Presence of policies to prevent anti-competitive behaviour	The Lite-On code of conduct includes policies regarding fair competition. ¹³⁹⁰
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	Lite-On has signed the EICC in 2008. ¹³⁹¹
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	Lite-On requires self-assessment of companies within the Lite-On Group with regard to their code of conduct. ¹³⁹² The performance of suppliers regarding social responsibility is considered in the frame of EICC. In 2007, all key suppliers (30 of 240 = 12.5%) conducted a self-assessment and in 2009 Lite-On conducted audits and evaluation of key suppliers. ¹³⁹³
	Membership in an initiative that promotes social responsibility along the supply chain	The enterprise is a member of the EICC. ¹³⁹⁴
Supplier relationships	Interaction of the company with suppliers ¹³⁹⁵	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	In 2008, Gertrude Neumark Rothschild charged 34 companies, including Lite-On Technology, for patent infringements. The products affected

¹³⁸⁹ Magee (2010)¹³⁹⁰ [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)¹³⁹¹ Lite-On (2009), p. 2¹³⁹² [www.liteon.com/UserFiles/Lite-On CSER Code of Conduct.pdf](http://www.liteon.com/UserFiles/Lite-On%20CSER%20Code%20of%20Conduct.pdf)¹³⁹³ www.liteon.com/Page.aspx?id=64b19eaa-3150-4ad4-91d9-1677b0a7e17d¹³⁹⁴ Lite-On (2009), p. 2¹³⁹⁵ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

Subcategory	Indicator	Status
		from the suit are short-wavelength LEDs and laser diodes. ¹³⁹⁶ In the past there were also a few lawsuits against Lite-On regarding patent infringements.

D7 Fan from Delta Electronics

Stakeholder group workers:

Table 101: S-LCI table fan from Delta Electronics stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all organisations have to officially register with and be approved by the government. ¹³⁹⁷
	Presence of unions within the sector/organisation and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ¹³⁹⁸ It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts but they contain only minimum standards as required by national legislation. ¹³⁹⁹ It is not clear, whether there is a trade union or not. In any case it is assumed that the influence of unions on the corporate governance is very limited.
Child labour	Percentage of child labour in country/sector/organisation	There are no official statistics about child labour in China. However, child labour is considered as a rising problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ¹⁴⁰⁰ A percentage in the electronic sector cannot be stated.

¹³⁹⁶ Decker (2008) and www.law.com/jsp/cc/PubArticleCC.jsp?id=1202430520113

¹³⁹⁷ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

¹³⁹⁸ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

¹³⁹⁹ Metcalf/Li (2006) and interview with China Labour Bulletin

¹⁴⁰⁰ U.S. Department of Labor (2009), p. 15, China Labour Bulletin (2007) and www.ihlo.org/LRC/W/020807.html

Subcategory	Indicator	Status
		There was no evidence found that Delta Electronics employs children. Preferred age of employees is 16 - 28. ¹⁴⁰¹
	Description of kind of child labour in the company	-
Forced labour	Frequency of forced labour in country/sector/enterprise	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ¹⁴⁰² There was no evidence found that Delta Electronics employs forced labourers.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage in the Jiangsu province, increased the minimum wage from 850 CNY (101.36 EUR) to 960 CNY (114.47 EUR) in 2010. ¹⁴⁰³ This minimum wage does not cover the living costs so that many workers are forced to work long hours. Living costs in the industrial park Shenzhen were estimated to be more than 1,500 CNY (175.36 EUR), ¹⁴⁰⁴ which are comparable to living costs in Suzhou.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	<ul style="list-style-type: none"> ■ Basic wage: 960 CNY/month ■ Positional allowance: 50 - 300 CNY/month ■ Performance bonus: 100 CNY/month ■ Overnight allowance: 180 CNY/month ■ Subsistence allowance: 270 CNY/month The average salary amounts roughly 2,300 CNY. ¹⁴⁰⁵
Working time	Hours of work per employee and month in average	60 - 66 hours/week ¹⁴⁰⁶

¹⁴⁰¹ <http://suzhou.baixing.com/gongren/a60416006.html>

¹⁴⁰² U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

¹⁴⁰³ Yang (2010)

¹⁴⁰⁴ FIAS (2007), p. 53

¹⁴⁰⁵ <http://suzhou.baixing.com/gongren/a60416006.html>

¹⁴⁰⁶ Interview with employee

Subcategory	Indicator	Status
	Number of days without work per week	1 day/week ¹⁴⁰⁷
	Description of how overtime is handled	Overtime payment is higher than the basic hourly rate. ¹⁴⁰⁸
Discrimination	Percentage of women in the labour force in the sector	The companies of the electronic industry in China prefer the employment of young women, so the percentage of women of the labour force is very high.
	Country gender index ranking	Rank 83 of 102 ¹⁴⁰⁹
	Occurrence of discrimination in the country/sector/company	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ¹⁴¹⁰ Also discrimination in the workplace is common. ¹⁴¹¹ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract. ¹⁴¹² Employment discrimination against women is also present. ¹⁴¹³ Many companies of the electronic sector have restrictions on age, gender, and height. Such workplace discrimination is usually quite arbitrary. ¹⁴¹⁴ There are some requirements on employees' height, weight, and eyesight at Delta. ¹⁴¹⁵ The high percentage of women in the labour force is also an evidence for employment discrimination.
	Presence of formal policies of equal opportunities	Delta Electronics' employee policy covers among others any kind of discrimination "due to race, religion, color, nationality, age, gender,

¹⁴⁰⁷ Interview with employee

¹⁴⁰⁸ <http://suzhou.baixing.com/gongren/a60416006.html>

¹⁴⁰⁹ www.genderindex.org

¹⁴¹⁰ www.state.gov/g/drl/rls/irf/2009/127268.htm

¹⁴¹¹ Séguin (2009)

¹⁴¹² Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

¹⁴¹³ <http://genderindex.org/country/china>

¹⁴¹⁴ Interview with China Labour Bulletin

¹⁴¹⁵ <http://suzhou.baixing.com/gongren/a60416006.html>

Subcategory	Indicator	Status
		disability or other factors (...).” There is no explicit equal opportunities policy. ¹⁴¹⁶
	Share of women and minorities of personnel	The ratio between men and women is approximately 1:5. ¹⁴¹⁷
	Ratio of salary of women to wages of men in company	100% ¹⁴¹⁸
	Treatment of workers in general	The regulations at the Delta Electronics site are similar to other factories of the electronic sector, ¹⁴¹⁹ what means that there are strict regulations to administrate the workers. Wage deductions due to “misbehaviour” as talking during the work, delays, use of restrooms too frequent, etc. are common. In addition, it is a common practice to use fines for non-attendance regarding overtime as leverage. ¹⁴²⁰
Health and safety	Description of potential main origins of danger and protection measures	The main origins of danger are improper operation of machinery, plunged or crushed objects, falls or cuts, and transport accidents. In addition, workers handle with hazardous substances. Delta Electronics provides health and safety trainings and education. Further, the company set up labour safety departments in China and conducts internal and external health and safety inspections. The site in Wujiang is certified according to OHSAS 18001. Further, the company provides protection clothes, masks, and gloves to employees. ¹⁴²¹
	Description of reported violations	No information available.
	Accident rate of the country / sector/organisation	Although Asia has very high accident rates, China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ¹⁴²² Delta does not publish data on accident rates. Before 2008, the company recorded only major accidents. ¹⁴²³

¹⁴¹⁶ Delta Electronics (2009), p. 24

¹⁴¹⁷ Interview with employee

¹⁴¹⁸ Interview with employee

¹⁴¹⁹ Interview with employee

¹⁴²⁰ Interview with China Labour Bulletin

¹⁴²¹ Delta Electronics (2009), pp. 26

¹⁴²² Hämäläinen/Saarela/Takala (2009)

¹⁴²³ Rammohan (2008), p. 7

Subcategory	Indicator	Status
	Presence of a formal policy regarding health and safety	The CSR goals of Delta Electronics include a safe and healthy work place. ¹⁴²⁴
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ¹⁴²⁵ It is unknown how much the electronic sector invests.
	List of social benefits provided to workers	Delta Electronics provides legally mandated benefits. Further, the enterprise established medical clinics, libraries, movies, canteens, employee service centres, etc. ¹⁴²⁶
	Evidence of violations to laws and employment regulations	The average working time of 60 - 66 hours per week implies a violation of the Chinese labour law, which stipulates a maximum overtime of 36 hours per month and 3 hours a day. According to a report, Delta plans to comply with the 36 hour limit by improved productivity, storing more raw materials and finished goods buffer stock, and working with customers to avoid short dated orders of high volume. ¹⁴²⁷

Stakeholder group local community:

Table 102: S-LCI table fan from Delta Electronics stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No information regarding material resource extraction found. China's industry is responsible for approximately 26% of freshwater withdrawal. ¹⁴²⁸
	Percent of population with access to improved sanitation facilities	65% ¹⁴²⁹
	Existence of projects to improve community infrastructure	Delta donated for the rebuilding of elementary schools after an earthquake in Sichuan. At main plants in Wujiang and Dongguan the enterprise built medical clinics, libraries, movie theatres, etc., but these facilities are intended for employees. ¹⁴³⁰

¹⁴²⁴ Delta Electronics (2009), p. 19

¹⁴²⁵ IMF (2010), p. 5

¹⁴²⁶ Delta Electronics (2009), p. 24 and 29

¹⁴²⁷ Rammohan (2008), p. 11

¹⁴²⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴²⁹ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/info-bycountry/china_statistics.html#65

¹⁴³⁰ Delta Electronics (2009)

Subcategory	Indicator	Status
	Presence of certified environmental management systems	Several Delta Electronics facilities are certified according to ISO 14001, including Wujiang. ¹⁴³¹
	Description of (potential) material resource conflicts	A fan contains mainly plastics. So (potential) material resource conflicts are linked to the availability of crude oil.
Access to immaterial resources	Freedom of expression in country/sector/company	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ¹⁴³² Although Delta Electronics provides suggestions boxes and arranges exchange meetings, ¹⁴³³ it is assumed that the freedom of expression is restricted in the company due to the prevalent conditions in the country and sector respectively. ¹⁴³⁴
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	Delta sponsors scholarships and energy education projects in Taiwan; there is no information about community engagement in Wujiang. ¹⁴³⁵
Delocalisation and migration	Migration rate of the country/region	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ¹⁴³⁶
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language,	No information available.

¹⁴³¹ Delta Electronics (2009), p.26

¹⁴³² www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

¹⁴³³ Interview with employee

¹⁴³⁴ Interview with China Labour Bulletin

¹⁴³⁵ Delta Electronics (2009)

¹⁴³⁶ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
	social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	
	Strength of policies to protect cultural heritage	One of the CSR goals of Delta Electronics addresses the progress of human culture, but cultural heritage is not explicitly mentioned. ¹⁴³⁷
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.¹⁴³⁸ But there are officially 55 ethnic minority groups in China,¹⁴³⁹ who account for less than 9% of population.¹⁴⁴⁰ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank more than 35% of the worldwide indigenous population live in China.¹⁴⁴¹</p> <p>The Chinese constitution provides equal rights to all ethnic groups.¹⁴⁴² However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.¹⁴⁴³</p> <p>In the province Jiangsu live predominantly Han Chinese (99.6%) and only a few Hui Chinese (0.2%).¹⁴⁴⁴ Hui Chinese are counted among Muslims and the discrimination against Muslims increased in recent years. However, due to the very small share of ethnic minorities of population in Suzhou about 0.24%¹⁴⁴⁵ ethnic conflicts are rather not present.</p>

¹⁴³⁷ Delta Electronics (2009), p. 19

¹⁴³⁸ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

¹⁴³⁹ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹⁴⁴⁰ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁴¹ The World Bank (2007)

¹⁴⁴² www.china.org.cn/e-white/phumanrights19/p-8.htm

¹⁴⁴³ www.amnesty.org

¹⁴⁴⁴ The New York Times (2009)

¹⁴⁴⁵ <http://www.chinatouronline.com/china-travel/suzhou/suzhou-facts/suzhou-population.htm>

Subcategory	Indicator	Status
	Respect of the company regarding indigenous rights	-
	Strength of policies to protect indigenous community members	-
Safe and healthy living conditions	Burden of disease in the country/region	<p>China has a DALY rate of 16, which is relatively low.¹⁴⁴⁶ The risk of infectious diseases is classified as intermediate.¹⁴⁴⁷ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year.</p> <p>In addition, around 200 million individuals suffer from occupational diseases.¹⁴⁴⁸ 80% of them suffer from pneumoconiosis.¹⁴⁴⁹ The life expectancy at birth amounts 74.51 years.¹⁴⁵⁰</p>
	Pollution level of the country/ region and contribution of the company to the environmental load	<p>China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causes are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.¹⁴⁵¹</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m³.¹⁴⁵²</p> <p>The contribution of Delta Electronics is rather high, because the company manufactures a variety of electronic products and components.</p>

¹⁴⁴⁶ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹⁴⁴⁷ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁴⁸ <http://en.epochtimes.com/news/7-2-24/52097.html>

¹⁴⁴⁹ www.china-labour.org/hk/en/node/100744

¹⁴⁵⁰ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁵¹ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁵² <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

Subcategory	Indicator	Status
		Delta recorded a consumption of just 11,000t of metals (iron/steel, copper, aluminium, and core), roughly 18,000t of plastics, 1,914t of organic solvents, 416 million kWh electricity, and 6,010,000,000l water in 2008. Delta emitted approximately 380,000t of CO2 in the same period. ¹⁴⁵³ Indeed, the contribution caused by the fan production is rather low.
	Management effort to improve the environmental performance	<ul style="list-style-type: none"> ■ Substance control in order to produce RoHS compliant products ■ Increase of material efficiency ■ Reduction of electricity and water consumption ■ Reduction of waste
Secure living conditions	Crime rate	Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ¹⁴⁵⁴ Global Peace Index: Rank 80 of 149 ¹⁴⁵⁵
	Management policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country/region	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ¹⁴⁵⁶ In provinces of the industrialised east coast there is this year even a lack of workers, because the number of migrant workers declines. ¹⁴⁵⁷
	Percentage of work force hired locally	Migrant workers are an important part of the personnel of factories located at the east coast, also in the electronic sector. They make up to more than 65% ¹⁴⁵⁸ of the work force and are primarily appointed as line workers. As in other companies of the Chinese electronic sector also Delta Electronics employs mainly migrant workers. ¹⁴⁵⁹

¹⁴⁵³ Delta Electronics (2009), pp. 50

¹⁴⁵⁴ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

¹⁴⁵⁵ www.visionofhumanity.org/gpi-data/#/2010/scor

¹⁴⁵⁶ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁵⁷ www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

¹⁴⁵⁸ SOMO/SwedWatch (2008), p. 24

¹⁴⁵⁹ SACOM (2009), p. 7

Subcategory	Indicator	Status
	Percentage of spending on locally-based suppliers	No information available.
Community engagement	Presence of policies regarding community engagement at company level	None.
	Description of community engagement of the company	<p>Delta has established a foundation with the mission to “foster the sustainable development of human society by supporting efforts in environmental protection, scientific advancement and education.” The foundation initiates projects in the fields of environment education, energy efficient architecture, cultivating personnel, environment technology, and green enterprise.</p> <p>Examples of projects:</p> <ul style="list-style-type: none"> ■ Energy education program in schools ■ Mobile green energy museum ■ Home energy conservation plan ■ Green building project ■ Sponsoring energy related issues ■ Advancement of green capitalism¹⁴⁶⁰

Stakeholder group society:

Table 103: S-LCI table fan from Delta Electronics stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	Delta implemented an own code of conduct that “asks all employees to protect Delta's assets, rights and image by committing themselves to engaging in legal and ethical behavior.” ¹⁴⁶¹ The code of conduct does not address directly labour standards or human rights.
Contribution to economic development	Economic situation of the country/region and relevance of the considered	Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the

¹⁴⁶⁰ www.delta-foundation.org.tw/en/programs_environment.asp?sid=2&tid=1

¹⁴⁶¹ Delta Electronics (2009), p. 23

Subcategory	Indicator	Status
	sector for the (local) economy	coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed. ¹⁴⁶² The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009. ¹⁴⁶³ The electronic sector is one of the main drivers for the Chinese economic development. Different industries are based in Jiangsu: textile industry, machinery and electronic branch, the petrochemical industry, and the production of building material. The electronic sector is also locally important.
	Contribution of the product/company to economic development	The economic relevance of fans is estimated as rather low. The economic contribution of Delta Electronics is on the contrary assessed as important for the Chinese economy. Delta's manufacturing and R&D operations are centred in China. 61% of direct and indirect employees are located in China. However, paid wages are only moderate. ¹⁴⁶⁴
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ¹⁴⁶⁵ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ¹⁴⁶⁶ Especially industrial centres are involved. ¹⁴⁶⁷
	Risk of conflicts with regard to the sector	The risk of conflicts within the sector is rather high: Low wages, long working hours, environmental pollution, resource consumption, and use of rare materials pose (potential) causes for conflicts.
	Description of the organisation's role in the development of the conflicts	Delta is not involved in conflicts.

¹⁴⁶² www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁶³ *ibidem*

¹⁴⁶⁴ Delta Electronics (2009)

¹⁴⁶⁵ Heidelberg Institute for International Conflict Research (2009)

¹⁴⁶⁶ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

¹⁴⁶⁷ Global Times (2010)

Subcategory	Indicator	Status
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Production of RoHS compliant products, i.e. reduction of hazardous substances ■ Increased material efficiency ■ Production of smaller and lighter products
	Involvement of the company in technology transfer projects	None.
	Presence of partnerships regarding research and development	Delta works together with Universities to generate knowledge regarding environmental-friendly technologies and solve practical company issues. Further, the company cooperates with the Center for Information Technology Research in the Interest of Society (CITRIS), which aim is to develop innovative solutions for communications technology, energy efficiency, environmental monitoring, and metropolitan transportation. ¹⁴⁶⁸
	Investments in technology development	In 2009, Delta invested 6,742,736 TWD in R&D activities, what equates 6% of sales returns. ¹⁴⁶⁹
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)¹⁴⁷⁰ ■ Bribe payers index: Rank 19 (3.1 points)¹⁴⁷¹ <p>Risk of corruption in sector: It is assumed that the risk of corruption in the Chinese electronic sector is rather high due to the specific conditions as for instance high competition, high research intensity, and rather low working and environmental standards.</p>
	Presence of an anti-corruption program in the company	None.
	Presence of co-operations with internal and external controls to prevent corruption	None.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

¹⁴⁶⁸ Delta Electronics (2009)

¹⁴⁶⁹ Delta Electronics (2010), p. 7

¹⁴⁷⁰ Transparency International (2010)

¹⁴⁷¹ www.nationmaster.com/graph/cri_bri_pay_ind-crime-bribe-payers-index

Stakeholder group value chain actors:

Table 104: S-LCI table fan from Delta Electronics stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly legislation which can be linked to the organisation	None.
	Presence of policies to prevent anti-competitive behaviour	None.
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	The EICC membership of Delta's clients urges Delta indirectly to comply with the code and to investigate suppliers.
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	Delta reports on conducted questionnaire surveys and on-site surveys in order to analyse and improve the performance of suppliers regarding labour rights, health and safety, and environmental aspects, but does not specify a number or a percentage of investigated suppliers. ¹⁴⁷²
	Membership in an initiative that promotes social responsibility along the supply chain	Delta Electronics is not a member of the EICC, but the company complies with the code of conduct, because customers as Apple or HP are member of the EICC. ¹⁴⁷³
Supplier relationships	Interaction of the company with suppliers ¹⁴⁷⁴	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	In 2007, SynQor charged 13 companies, including Delta Electronics, due to infringement of three patents relating to bus converters and/or non-isolated point of load converters used in intermediate bus architectures. ¹⁴⁷⁵

¹⁴⁷² Delta Electronics (2009), p. 49

¹⁴⁷³ EICC (2009), SOMO (2007a), SOMO (2007b) and SOMO (2007c)

¹⁴⁷⁴ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

¹⁴⁷⁵ www.bloomberg.com/apps/news?pid=newsarchive&sid=aXFBSnNUA95k

D8 Motherboard from Company X

See E

E Assembly of the Laptop by Company X

Stakeholder group workers:

Table 105: S-LCI table laptop assembly by company x stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector/company	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all organisations have to officially register with and be approved by the government. ¹⁴⁷⁶
	Presence of unions within the sector/organisation and description of their influence	There is only one trade union federation in China, the All-China Federation of Trade Unions (ACFTU), which is divided into regional federations and national industrial unions. ¹⁴⁷⁷ It is the largest trade union worldwide; however its influence is determined. Unions occupy rather a minor position when it comes to negotiate collective contracts and salaries. There are admittedly collective contracts but they contain only minimum standards as required by national legislation. ¹⁴⁷⁸ There is probably only a regional union at company x. In any case it is assumed that the influence of trade unions on the enterprise is very low.
Child labour	Percentage of child labour in country/sector/organisation	There are no official statistics about child labour in China; however, child labour in China is a problem according to reports. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ¹⁴⁷⁹ A percentage in the electronic sector cannot be stated. There was no evidence found that company x employs child labourer. The age of workers should be range from 16 to 23 years.
	Description of kind of child labour in the company	-

¹⁴⁷⁶ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

¹⁴⁷⁷ <http://english.acftu.org/template/10002/file.jsp?cid=63&aid=156>

¹⁴⁷⁸ Metcalf/Li (2006) and interview with China Labour Bulletin

¹⁴⁷⁹ U.S. Department of Labor (2009), p. 15

Subcategory	Indicator	Status
Forced labour	Frequency of forced labour in country/sector/enterprise	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ¹⁴⁸⁰ There was no evidence found that company x employs forced labourer.
	Description of kind of forced labour in the company	-
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage in Shanghai amounts 1,120 CNY. ¹⁴⁸¹ This minimum wage does not cover the living costs, so that many workers are forced to work long hours.
	Wage level of the worker with lowest income and description of payment performance of the sector/enterprise	The basic wage amounts 1,120 CNY per month. In addition company x pays different allowances (bonus: 0 - 100 CNY/month, positional allowance: 30 or 60 CNY/month).
Working time	Hours of work per employee and month in average	60h - 100h/week ¹⁴⁸²
	Number of days without work per week	1 day off per week ¹⁴⁸³
	Description of how overtime is handled	Overtime payment is higher than the basic hourly rate. It exist different wage levels for working days, weekend, and holidays.
Discrimination	Percentage of women in the labour force in the sector	The companies of the electronic industry in China prefer the employment of young women, so the percentage of women of the labour force is very high.
	Country gender index ranking	Rank 83 of 102 ¹⁴⁸⁴

¹⁴⁸⁰ U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

¹⁴⁸¹ <http://baike.baidu.com/view/895266.htm>

¹⁴⁸² Interview with worker

¹⁴⁸³ Interview with worker

¹⁴⁸⁴ www.genderindex.org

Subcategory	Indicator	Status
	Occurrence of discrimination in the country/sector/company	<p>Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities.¹⁴⁸⁵ Also discrimination in the workplace is common.¹⁴⁸⁶ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract.¹⁴⁸⁷ Employment discrimination against women is also present.¹⁴⁸⁸</p> <p>Many companies of the electronic sector have restrictions on age, gender, and height. Such workplace discrimination is usually quite arbitrary.¹⁴⁸⁹</p> <p>No case of discrimination at company x was reported. However, it is probably that discrimination occurs. For instance, employees must be taller than 1.50m (women) and 1.60m (men) respectively. Also the ratio between men and women is unbalanced.¹⁴⁹⁰</p>
	Presence of formal policies of equal opportunities	No information available.
	Share of women and minorities of personnel	The ratio men to women is 1:3. ¹⁴⁹¹
	Ratio of salary of women to wages of men in company	100% ¹⁴⁹²
	Treatment of workers in general	There are strict regulations to administrate workers. No delays and no talks during working time. ¹⁴⁹³ Wage deductions due to “misbehaviour” are common. In addition, it is a common

¹⁴⁸⁵ www.state.gov/g/drl/rls/irf/2009/127268.htm

¹⁴⁸⁶ Séguin (2009)

¹⁴⁸⁷ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-platations/china-sweatshops

¹⁴⁸⁸ <http://genderindex.org/country/china>

¹⁴⁸⁹ Interview with China Labour Bulletin

¹⁴⁹⁰ Employment ad of company x and interview with worker

¹⁴⁹¹ Interview with worker

¹⁴⁹² Interview with worker

¹⁴⁹³ Interview with worker

Subcategory	Indicator	Status
		practice to use fines for non-attendance regarding overtime as leverage. ¹⁴⁹⁴
Health and safety	Description of potential main origins of danger and protection measures	A few workers handle with hazardous substances, but they have protection clothes. ¹⁴⁹⁵
	Description of reported violations	No information available.
	Accident rate of the country/ sector/organisation	Asia has very high accident rates. China is average in international comparison with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ¹⁴⁹⁶ Company x does not publish accident rates.
	Presence of a formal policy regarding health and safety	No information available.
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ¹⁴⁹⁷ It is unknown how much the electronic industry invests.
	List of social benefits provided to workers	Company x provides social benefits that are required by law. In addition, the company provides birthday coupons, wedding gifts, and maternity benefits and organises sport events.
	Evidence of violations to laws and employment regulations	Company x violates the Chinese Labour Law regarding working hours. The labour law stipulates maximal 3 working hours per day and at least one day off per week (max. 11 hours*6 days = 66 hours per week).

Stakeholder group local community:

Table 106: S-LCI table laptop assembly by company x stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of freshwater withdrawals. ¹⁴⁹⁸
	Percent of population with access to improved sanitation	65% ¹⁴⁹⁹

¹⁴⁹⁴ Interview with China Labour Bulletin

¹⁴⁹⁵ Interview with worker

¹⁴⁹⁶ Hämäläinen/Saarela/Takala (2009)

¹⁴⁹⁷ IMF (2010), p. 5

¹⁴⁹⁸ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁴⁹⁹ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/info/bycountry/china_statistics.html#65

Subcategory	Indicator	Status
	tion facilities	
	Existence of projects to improve community infrastructure	No information available.
	Presence of certified environmental management systems	The company is certified according to ISO 14001.
	Description of (potential) material resource conflicts	-
Access to immaterial resources	Freedom of expression in country/sector/company	Although the Chinese law guarantees freedom of speech, assembly, association, and publication, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ¹⁵⁰⁰ It is assumed that the freedom of expression in the company is restricted as well due to the specific conditions in the Chinese electronic sector. ¹⁵⁰¹
	Annual arrests connected to protest of organisation actions	None.
	Presence of community education initiatives and community service programmes	No information available.
Delocalisation and migration	Migration rate of the country/region	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ¹⁵⁰²
	Number of individuals who resettle that can be attributed to the organisation	None.
Cultural heritage	Respect of the organisation regarding local cultural heritage including language, social and religious prac-	No information available.

¹⁵⁰⁰ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

¹⁵⁰¹ Interview with China Labour Bulletin

¹⁵⁰² www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

Subcategory	Indicator	Status
	tices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	
	Strength of policies to protect cultural heritage	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country/region	<p>According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people.¹⁵⁰³ But there are officially 55 ethnic minority groups in China,¹⁵⁰⁴ who account for less than 9% of population.¹⁵⁰⁵ In addition, there are undistinguished ethnic groups that not have been officially recognized.</p> <p>According to the World Bank, more than 35% of the worldwide indigenous population live in China.¹⁵⁰⁶</p> <p>The Chinese constitution provides equal rights to all ethnic groups.¹⁵⁰⁷ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.¹⁵⁰⁸</p> <p>In the province Jiangsu live predominantly Han Chinese (99.6%) and only a few Hui Chinese (0.2%).¹⁵⁰⁹ Hui Chinese are counted among Muslims and the discrimination against Muslims increased in recent years. However, due to the very small share of ethnic minorities of population in Changshu ethnic conflicts are rather not present.</p>
	Respect of the company regarding indigenous rights	-
	Strength of policies to protect indigenous community	-

¹⁵⁰³ www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

¹⁵⁰⁴ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹⁵⁰⁵ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵⁰⁶ The World Bank (2007)

¹⁵⁰⁷ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹⁵⁰⁸ www.amnesty.org

¹⁵⁰⁹ The New York Times (2009)

Subcategory	Indicator	Status
	members	
Safe and healthy living conditions	Burden of disease in the country/region	China has a DALY rate of 16, which is relatively low. ¹⁵¹⁰ The risk of infectious diseases is classified as intermediate. ¹⁵¹¹ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year. In addition, around 200 million individuals suffer from occupational diseases. ¹⁵¹² 80% of them suffer from pneumoconiosis. ¹⁵¹³ The life expectancy at birth amounts 74.51 years. ¹⁵¹⁴
	Pollution level of the country/region and contribution of the company to the environmental load	China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causes are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage. ¹⁵¹⁵ In 2006, China had CO ₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m ³ . ¹⁵¹⁶ The contribution of company x to the environmental load of Shanghai is rather high due to the production of mainboards.
	Management effort to improve the environmental performance	No information available, but ASUS has some requirements regarding the environmental soundness of products.
Secure living	Crime rate	Crime rate in China is classified to be relatively

¹⁵¹⁰ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹⁵¹¹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵¹² <http://en.epochtimes.com/news/7-2-24/52097.html>

¹⁵¹³ www.china-labour.org/hk/en/node/100744

¹⁵¹⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵¹⁵ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵¹⁶ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATASTA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

Subcategory	Indicator	Status
conditions		low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ¹⁵¹⁷ Global Peace Index: Rank 80 of 149 ¹⁵¹⁸
	Management policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country/region	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ¹⁵¹⁹ In provinces of the industrialised east coast there is this year a lack of workers, because the number of migrant workers declines. ¹⁵²⁰
	Percentage of work force hired locally	Migrant workers are an important part of the personnel of factories located at the east coast, also in the electronic sector. They make up to more than 65% ¹⁵²¹ of the work force and are primarily appointed as line workers. The percentage of migrant workers is probably high. ¹⁵²²
	Percentage of spending on locally-based suppliers	No information available.
Community engagement	Presence of policies regarding community engagement at company level	No information available.
	Description of community engagement of the company	No information available.

Stakeholder group society:

Table 107: S-LCI table laptop assembly by company x stakeholder society

Subcategory	Indicator	Status
Public commitments	Presence of publicly available promises or agreements on sustainable issues	None.

¹⁵¹⁷ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

¹⁵¹⁸ www.visionofhumanity.org/gpi-data/#/2010/scor

¹⁵¹⁹ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵²⁰ www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

¹⁵²¹ SOMO/SwedWatch (2008), p. 24

¹⁵²² Interview with worker

Subcategory	Indicator	Status
to sustainable issues	and complaints to the non fulfilment of these commitments	
	Implementation/signing of principles or codes of conducts	Company x did not sign the EICC, the UN Global Compact, or similar codes of conduct.
Contribution to economic development	Economic situation of the country/region and relevance of the considered sector for the (local) economy	Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed. ¹⁵²³ The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009. ¹⁵²⁴ The electronic sector is one of the main drivers for the Chinese economic development.
	Contribution of the product/company to economic development	The relevance of company x for the economy of Shanghai will be rather low, because paid wages are only slightly above the minimum wage, albeit revenues and profits are not known.
Prevention and mitigation of conflicts	Presence of conflicts in the country/region	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ¹⁵²⁵ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ¹⁵²⁶ Especially industrial centres are involved. ¹⁵²⁷
	Risk of conflicts with regard to the sector	The risk of conflicts within the sector is rather high: Low wages, long working hours, environmental pollution, resource consumption, and use of rare materials pose (potential) causes for conflicts.
	Description of the organisation's role in the development of the conflicts	The company is not involved in conflicts.

¹⁵²³ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵²⁴ *ibidem*

¹⁵²⁵ Heidelberg Institute for International Conflict Research (2009)

¹⁵²⁶ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

¹⁵²⁷ Global Times (2010)

Subcategory	Indicator	Status
Technology development	Sector efforts in technology development regarding eco-friendliness	None.
	Involvement of the company in technology transfer projects	No information available.
	Presence of partnerships regarding research and development	No information available.
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)¹⁵²⁸ ■ Bribe payers index: Rank 19 (3.1 points)¹⁵²⁹ <p>Risk of corruption in sector: It is assumed that the risk of corruption in the electronic sector is rather high due to the specific conditions as for instance high competition, high research intensity, and rather low working and environmental standards.</p>
	Presence of an anti-corruption program in the company	No information available.
	Presence of co-operations with internal and external controls to prevent corruption	No information available.
	Evidence of an active involvement of the enterprise in corruption and bribery	No evidence found.

Stakeholder group value chain actors:

Table 108: S-LCI table laptop assembly by company x stakeholder value chain actors

Subcategory	Indicator	Status
Fair competition	Presence of anti-competitive behaviour or violation of anti-trust and monopoly	No evidence for cartelization or the like found.

¹⁵²⁸ Transparency International (2010)

¹⁵²⁹ www.nationmaster.com/graph/cri_bri_pay_ind-crime-bribe-payers-index

Subcategory	Indicator	Status
	legislation which can be linked to the organisation	
	Presence of policies to prevent anti-competitive behaviour	No information available.
Promoting social responsibility	Presence of codes of conduct that protect human rights of workers among suppliers	No information available.
	Percentage of suppliers the enterprise has audited with regard to social responsibility in the last year	No information available.
	Membership in an initiative that promotes social responsibility along the supply chain	No information available.
Supplier relationships	Interaction of the company with suppliers ¹⁵³⁰	No information available.
	Fluctuation regarding suppliers	No information available.
Respect of intellectual property rights	Violations of the company against intellectual property rights	None.

Stakeholder group consumers:

Table 109: S-LCI table laptop assembly by company x stakeholder consumers

Subcategory	Indicator	Status
Health and safety	(Potential) risks of the product regarding consumers' health and safety	Health and safety risks of a laptop are rather low: <ul style="list-style-type: none"> ■ Batteries can explode ■ Toxic substances can evaporate ■ Electromagnetic radiation can cause damage to health
	Presence of consumer complaints	There are several consumer complaints with regard to ASUS computers, ¹⁵³¹ but they are not related to consumer health and safety.

¹⁵³⁰ payment on time, sufficient lead time, reasonable volume fluctuations, appropriate communication, collaboration regarding quality issues

Subcategory	Indicator	Status
	Presence of management measures to assess consumer health and safety	No information available.
	Presence and quality of labels concerning health and safety	<ul style="list-style-type: none"> ■ The laptop is certified according to the EU ecolabel; thus it contains less hazardous substances, what affects consumer health and safety. ■ The electromagnetic radiation of the UL50Ag is classified as “ultra low”
Feedback mechanism	Presence of feedback mechanisms	ASUS provides a specific support website for consumers. ¹⁵³² In addition, there are call centres that take consumer queries. ¹⁵³³ Indeed, only 41.7% of customers were satisfied with the hotlines. Besides ASUS needs in 14.3% of repair cases 3 or more tries to correct defects. ¹⁵³⁴ Further, ASUS provides a contact regarding CSR aspects on their website and conducted an online survey.
	Practices related to customer satisfaction	<ul style="list-style-type: none"> ■ Development of green products ■ Development of innovative products ■ Provision of feedback mechanism ■ Publication of CSR information ■ Establishment of free take back systems
Transparency	Presence of laws or norms regarding transparency in the country and non-compliance with these regulations of the company	There are no Taiwanese laws that require the publication of environmental or social data from companies.
	Percentage of organisations within the sector, which published a sustainability report	All leading computer manufacturer as Dell, Acer, Samsung, Apple, Toshiba, Fujitsu, Sony, or HP publish sustainability reports. ¹⁵³⁵
	Publication of a sustainability report, availability of	ASUS publishes a CSR report since 2008. In 2005, ASUS released the first environmental, health and safety report. In 2007, an environ-

¹⁵³¹ www.consumeraffairs.com/computers/asus.html, www.complaintsboard.com/complaints/asus-international-c61073.html, www.complaintsboard.com/complaints/asus-c157238.html and www.customerservicescoreboard.com/Asus

¹⁵³² <http://support.asus.com/service/service.aspx?no=410&SLanguage=en-us>

¹⁵³³ <http://support.asus.com/service/service.aspx?no=407&SLanguage=en-us>

¹⁵³⁴ Wölbart (2010), pp. 143

¹⁵³⁵ <http://content.dell.com/us/en/corp/report.aspx>, www.apple.com/environment/reports, www.acer-group.com/public/Sustainability/sustainability08.htm, www.toshiba.co.jp/csr/en/report/pdf/report09_all.pdf, www.fujitsu.com/downloads/ECO/rep2010/fujitsureport2010-e.pdf, www.sony.net/SonyInfo/csr/issues/detail/pdf/Report2010Detail.pdf and www.hp.com/hpinfo/globalcitizenship/downloads.html

Subcategory	Indicator	Status
	sustainability information on the website, and other communication tools	mental sustainability report ensued. Further, ASUS implemented a special website for CSR information, including a feedback option. ¹⁵³⁶
	Quality of the provided information regarding sustainability	The quality of provided CSR information is medium. Main point of criticism is the scope: The sustainability report as well as the CSR website provides data regarding ASUS sites in Taiwan. However, ASUS maintains in Taiwan only offices. Production sites are located in China or were outsourced to subsidiaries as Pegatron, Unihan, or in our case to company x. Thus all critical company activities are out of consideration. Furthermore, ASUS is reluctant concerning the publication of concrete facts and figures in critical areas as labour conditions and human rights. Focus areas are environmental management and the engagement of ASUS concerning community and employees. In a ranking assessing the transparency of companies regarding environmental and social aspects ASUS obtained not more than 2 of 18 points. ¹⁵³⁷
	Presence of certifications or labels for the product/sites	<ul style="list-style-type: none"> ■ EU Ecolabel ■ ISO 14001 ■ OHSAS 18001
	Company rating in sustainability indices	ASUS is not ranked in sustainability indices.
End of life responsibility	Strength of national legislation covering product disposal and recycling	Taiwan implemented regulations that require the recycling of used computers, printers, TVs, refrigerators, washing machines, and air-conditioners in 1998. ¹⁵³⁸
	Attention and management of end-of-life issues	The end-of-life phase is regarded from the management. For instance, ASUS published "Guidelines for Management of End-of-Life ASUSTeK Electronic Product". ¹⁵³⁹ In addition, the laptop was designed in a way that it is easy to disassemble and easy to recycle. ¹⁵⁴⁰
	Structuring of the take back system including consumer	ASUS established a take back system in Europe, North America, India, and Taiwan. Other countries are not covered by the system. ¹⁵⁴¹

¹⁵³⁶ <http://csr.asus.com/english/index.aspx>

¹⁵³⁷ www.rankabrand.com/Asus

¹⁵³⁸ Spire Research and Consulting (2006)

¹⁵³⁹ publishes "Guidelines for Management of End-of-Life ASUSTeK Electronic Product"

¹⁵⁴⁰ ASUS (2008a), p. 23

¹⁵⁴¹ <http://csr.asus.com/english/index.aspx#52>

Subcategory	Indicator	Status
	involvement	The product packaging contains only a short reference to a workmanlike disposal, but ASUS provides more comprehensive information about recycling on their homepage and in the CSR reports.

F Recycling of the Laptop

F1 Recycling in Belgium

Stakeholder group workers:

Table 110: S-LCI table laptop recycling in Belgium stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	There are no severe restrictions regarding the rights of freedom of association and collective bargaining, neither in Belgium nor in the Belgian recycling sector. ¹⁵⁴²
	Presence of unions within the sector and description of their influence	In Flanders there are 6 unions registered. ¹⁵⁴³ Around 75% of the personnel are members in trade unions. Unions play an important role in Belgium's economy. The Belgian trade union movement is one of the strongest in the Western world. ¹⁵⁴⁴
Child labour	Percentage of child labour in country/sector	There are no statistics about child labour in Belgium. The percentage of child labour is rather low; however child prostitution is classified as an issue. ¹⁵⁴⁵ Other sectors do not employ children.
	Description of kind of child labour in the sector	-
Forced labour	Frequency of forced labour in country/sector	Forced labour occurred only in connection to child prostitution.
	Description of kind of forced labour in the sector	-

¹⁵⁴² <http://survey09.ituc-csi.org/survey.php?IDContinent=4&IDCountry=BEL&Lang=EN> and www.state.gov/g/drl/rls/hrrpt/2006/78803.htm

¹⁵⁴³ <http://de.wikipedia.org/wiki/Gewerkschaft#Belgien>

¹⁵⁴⁴ Blanpain (1975)

¹⁵⁴⁵ www.state.gov/g/drl/rls/hrrpt/2006/78803.htm

Subcategory	Indicator	Status
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage in Belgium amounts 1,387.49 EUR and is one of the highest in Europe. ¹⁵⁴⁶ In combination with a comprehensive social welfare services the minimum wage allows a decent living standard.
	Wage level of the worker with lowest income and description of payment performance of the sector	The wage level in the recycling sector is not very high, but it is assumed the worker with lowest income earns at least the minimum wage. ¹⁵⁴⁷
Working time	Hours of work per employee and month in average	No information available. The Belgian law stipulates a maximum of 50 working hours/week and 11h/day respectively. ¹⁵⁴⁸ It is assumed that the companies of the recycling sector observe this law. Overtime hours are uncommon; employees work in regular shifts. ¹⁵⁴⁹
	Number of days without work per week	At least one day off per week according to the Belgian labour law. ¹⁵⁵⁰ It is assumed that the companies of the recycling sector observe this law.
	Description of how overtime is handled	No information available.
Discrimination	Percentage of women in the labour force in the sector	10.5% of the labour force in the industrial sector are women. ¹⁵⁵¹ The percentage of women in the recycling sector is lower. ¹⁵⁵²
	Country gender index ranking	Not ranked. ¹⁵⁵³
	Occurrence of discrimination in the country/sector	There is discrimination in Belgium against women, persons with disabilities, and ethnic and other minorities. Especially immigrants are victims of discrimination regarding access to education and restaurants, employment, and housing. ¹⁵⁵⁴

¹⁵⁴⁶ www.eu-mindestloehne.info

¹⁵⁴⁷ www.coolrec.com and interview with German recycling company

¹⁵⁴⁸ www.employment.belgium.be/defaultTab.aspx?id=6224

¹⁵⁴⁹ Interview with German recycling company

¹⁵⁵⁰ www.employment.belgium.be/defaultTab.aspx?id=6224

¹⁵⁵¹ <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?display=default>

¹⁵⁵² Interview with German recycling company

¹⁵⁵³ <http://genderindex.org/>

¹⁵⁵⁴ www.state.gov/g/drl/rls/hrrpt/2006/78803.htm

Subcategory	Indicator	Status
		In addition, occupational discrimination occurs. For instance, older persons and pregnant women are discriminated. ¹⁵⁵⁵
	Ratio of salary of women to wages of men in sector	No information available.
Health and safety	Description of potential main origins of danger	The first disassembly step of laptops is conducted manually; further disassembly steps are highly automated. Workers wear protection clothes and the pollutant content of the air is monitored. Modern recycling sites have installed dust extracting plants to improve indoor air quality. Moreover, if sites disassemble laptops with fluorescent backlights they have to meet special legal requirements due to the mercury content. In addition, employees are trained and companies are OSHAS certified. ¹⁵⁵⁶
	Accident rate of the country /sector	Belgium has a very low occupational accident rate of 1,940/100,000 employees. The fatality rate amounts 2.1, which is also very low in international comparison. ¹⁵⁵⁷ No sector data available.
Social benefits/ social security	Social security expenditures of the country/sector	Belgium spends between 25 and 27% of GDP to social security. ¹⁵⁵⁸ It is unknown how much the recycling sector invests. It is assumed that the sector provides at least legally required social contributions.

Stakeholder group local community:

Table 111: S-LCI table laptop recycling in Belgium stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	Belgium has a physical trade balance of 5.8t per capita regarding all materials. ¹⁵⁵⁹ The industry consumes 85% of total water withdrawals. ¹⁵⁶⁰ The recycling sector consumes primarily energy due to the high level of automation.

¹⁵⁵⁵ www.ffw.com/feature/discrimination-at-work-survey.aspx and www.ilo.org/wcmsp5/group_s/public/---ed_norm/---declaration/documents/publication/wcms_decl_fs_90_en.pdf

¹⁵⁵⁶ Interview with German recycling company, www.preciousmetals.umicore.com/sustainable_development/health_safety, www.preciousmetals.umicore.com/sustainable_development/businessExcellence and www.coolrec.com

¹⁵⁵⁷ Hämäläinen/Saarela/Takala (2009)

¹⁵⁵⁸ OECD (2007), p. 18

¹⁵⁵⁹ OECD (2008), p. 13

¹⁵⁶⁰ www.cia.gov/library/publications/the-world-factbook/geos/be.html

Subcategory	Indicator	Status
	Percent of population with access to improved sanitation facilities	No information available. 100% of population have access to improved potable water. ¹⁵⁶¹
	Existence of projects to improve community infrastructure	No information available.
	Presence of certified environmental management systems	Companies are certified according to ISO 14001. ¹⁵⁶²
	Description of (potential) material resource conflicts	As long as the environmental impacts of recycling sites are limited and under control the risk of conflicts is low. The recovery of valuable materials reduces the risk of conflicts.
Access to immaterial resources	Freedom of expression in country/sector	The legislation provides freedom of speech and of the press, and these rights are respected generally in practice. ¹⁵⁶³ It is assumed that the freedom of expression is also guaranteed in the recycling sector.
	Annual arrests connected to protest of sector actions	None.
	Presence of community education initiatives and community service programmes	No information available.
Delocalisation and migration	Migration rate of the country	Belgium's migration rate is 3.8 migrants/1,000 inhabitants (time frame from 2005 to 2010). ¹⁵⁶⁴
	Number of individuals who resettle that can be attributed to the sector	None.
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not deter-	No information available.

¹⁵⁶¹ www.unicef.org/infobycountry/belgium_statistics.html

¹⁵⁶² www.preciousmetals.umicore.com/sustainable_development/businessExcellence, www.colrec.com, www.metallo.com/en/sustainable-development/environment.html, <http://eu.simsrecycling.com/about-us/iso-certification> and www.recyflux.com/presentation/documents

¹⁵⁶³ www.state.gov/g/drl/rls/hrrpt/2006/78803.htm

¹⁵⁶⁴ www.iom.int/jahia/Jahia/activities/europe/western-europe/belgium

Subcategory	Indicator	Status
	mine them in any way	
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	There are no indigenous peoples in Belgium.
	Respect of the sector regarding indigenous rights	-
Safe and healthy living conditions	Burden of disease in the country	Belgium's DALY rate is very low (11). ¹⁵⁶⁵ The life expectancy at birth amounts 79.37 years. ¹⁵⁶⁶
	Pollution level of the country and contribution of the sector to the environmental load	Belgium's environment suffers from the very high population density. Urbanisation, traffic, industry, and agriculture cause air, water, and soil pollution. ¹⁵⁶⁷ The recycling of e-waste has a positive effect as the production of primary materials is avoided to a certain part. Nevertheless, the recycling entails also negative environmental impacts as emissions of dust, metals, gases and dioxins, water use, or the generation of waste. Owing to the use of modern technologies as for instance de-dusting plants, specific filters, waste water treatment plants, sprinkling plants, and the like the environmental impacts are limited. ¹⁵⁶⁸
	Sector effort to improve the environmental performance	Many recycling processes do not use hazardous substances. Processes that use such substances are strictly controlled and it is assumed that recycling companies aim to reduce the amount of these substances.
Secure living conditions	Crime rate	The crime rate in Belgium is rather low in international comparison. Indeed, there are many cases of kidnappings. ¹⁵⁶⁹ Global Peace Index: Rank 17 of 149 ¹⁵⁷⁰
	Sector policies related to private security personnel	No information available.
Local employment	Percentage of unemployment in the country	Belgium had an estimated unemployment rate of 7.9% in 2009. ¹⁵⁷¹

¹⁵⁶⁵ http://gamapserver.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹⁵⁶⁶ www.cia.gov/library/publications/the-world-factbook/geos/be.html

¹⁵⁶⁷ *ibidem*

¹⁵⁶⁸ Interview with German recycling company and Umicore (2009)

¹⁵⁶⁹ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1044.html#crime and www.nationmaster.com/country/be-belgium/crime

¹⁵⁷⁰ www.visionofhumanity.org/gpi-data/#/2010/scor

¹⁵⁷¹ www.cia.gov/library/publications/the-world-factbook/geos/be.html

Subcategory	Indicator	Status
	Percentage of work force hired locally	It is assumed that the majority of personnel is local staff as migrant work in Belgium is unusually.
Community engagement	Description of community engagement of the sector	No information available.

Stakeholder group society:

Table 112: S-LCI table laptop recycling in Belgium stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	None.
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	<p>Belgium has a prosperous economy with a diversified industry and a very modern transport system. Indeed, the Belgian economy is very dependent from the volatilities of the global market, because the country is poor in raw materials and has an export-oriented economy.¹⁵⁷²</p> <p>Belgium generated a GDP of around 36,800 USD per capita in 2009. Since the country's economy was hit by the economic crises the real growth rate of the GDP was negative in 2009 (-2.7%), while the inflation rate was estimated to be 0% in the same period.¹⁵⁷³</p> <p>The recycling of e-waste becomes more and more economically attractive due to rising raw material prices, but does not play a key role in the Belgian economy.</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country	There is an internally conflict for years between Flanders and Wallonia, but it is a latent and non-violent conflict. ¹⁵⁷⁴
	Risk of conflicts with regard	The risk of conflicts is very low. The recycling of e-waste serves as the basis for the recovery of

¹⁵⁷² www.cia.gov/library/publications/the-world-factbook/geos/be.html

¹⁵⁷³ www.cia.gov/library/publications/the-world-factbook/geos/be.html

¹⁵⁷⁴ Heidelberg Institute for International Conflict Research (2009), p. 10

Subcategory	Indicator	Status
	to the sector and measures to reduce the risk	raw materials as metals, glass, and plastics. In addition, during the recycling process hazardous substances are separated and converted to adequate treatments in order to avoid environmental pollution. Thus, the recycling of e-waste reduces the risk of conflicts.
Technology development	Sector efforts in technology development regarding eco-friendliness	<ul style="list-style-type: none"> ■ Development of a disassembly workbench with integrated filter system for the disassembly of LCD displays with fluorescent backlights ■ Development of dust extracting plants
	Investments in technology development	No information available.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 7.1 (rank 21)¹⁵⁷⁵ ■ Bribe payers index: Rank 8 with 6.8 points¹⁵⁷⁶ <p>Risk of corruption in sector: The risk of fraud and corruption in the electronic recycling sector is estimated as relatively high. Despite laws e-waste is illegal exported to Asia or Africa; often declared as reusable devices.¹⁵⁷⁷</p>

F2 Recycling in China

Stakeholder group workers:

Table 113: S-LCI table laptop recycling in China stakeholder workers

Subcategory	Indicator	Status
Freedom of association and collective bargaining	Evidence of restriction to freedom of association and collective bargaining in country/sector	Although the Chinese constitution provides the right for freedom of association and collective bargaining for workers, the government restricts this law in practice. Workers are not allowed to form or belong to independent trade unions; all organisations have to officially register with and be approved by the government. ¹⁵⁷⁸ Since the recycling takes place in the informal sector there is no statutory base.
	Presence of unions within the sector and description of their influence	None.

¹⁵⁷⁵ Transparency International (2010)

¹⁵⁷⁶ www.nationmaster.com/graph/crime/crime-bri-pay_ind-crime-bribe-payers-index

¹⁵⁷⁷ Greenpeace International (2008) and Umweltbundesamt (2010)

¹⁵⁷⁸ www.state.gov/g/drl/rls/hrrpt/2008/eap/119037.htm

Subcategory	Indicator	Status
Child labour	Percentage of child labour in country/sector	There are no official statistics about child labour in China. However, child labour is considered as a rising problem. Affected goods are bricks, cotton, electronics, fireworks, textiles, and toys. ¹⁵⁷⁹ A percentage in the informal sector of e-waste cannot be stated; however it is common that children help their parents with the dismantling of electronic devices. ¹⁵⁸⁰
	Description of kind of child labour in the sector	Children dismantle manually components and burn parts to extract metals. They are exposed to toxic substances and breath in hazardous fumes and dust. ¹⁵⁸¹
Forced labour	Frequency of forced labour in country/sector	So called labour camps are widespread in China. There are more than 1,000 camps known, but it is assumed that there are much more. In these labour camps inmates produce several products from clothing to bricks through to toys and electronics. These products are offered on both national and international markets. The prisons have two names: a commercial name for trade and an official name as prison. ¹⁵⁸² There are no cases of forced labour in the recycling sector known.
	Description of kind of forced labour in the sector	-
Fair salary	Specification of living wage and minimum wage in the country	China has no uniform minimum wage; provinces, municipalities, and autonomous regions are allowed to set their own minimum wage. The minimum wage in the province Guangdong, where Guiyu is located, has a minimum wage ranging from 660 -1,030 CNY depending on the size of the city. ¹⁵⁸³ The living costs are deemed to be higher.
	Wage level of the worker with lowest income and description of payment performance of the sector	The workers earn about 900 CNY per month. ¹⁵⁸⁴

¹⁵⁷⁹ U.S. Department of Labor (2009), p. 15, China Labour Bulletin (2007) and www.ihlo.org/LRC/W/020807.html

¹⁵⁸⁰ http://current.com/shows/vanguard/76355482_pollution-to-protest.htm

¹⁵⁸¹ http://current.com/shows/vanguard/76355482_pollution-to-protest.htm

¹⁵⁸² U.S. Department of Labor (2009), p. 15, Human Rights Watch (2010) and www.laogai.org/our_work/laogai

¹⁵⁸³ <http://baike.baidu.com/view/895266.htm>

¹⁵⁸⁴ www.ilo.org/public/english/region/asro/bangkok/events/greenjobs/download/paper25.pdf

Subcategory	Indicator	Status
Working time	Hours of work per employee and month in average	Workers work around 12 hours a day.
	Number of days without work per week	No information.
	Description of how overtime is handled	No information.
Discrimination	Percentage of women in the labour force in the sector	Workshops employ men as well as women. There are no statistics about share of women of personnel.
	Country gender index ranking	Rank 83 of 102 ¹⁵⁸⁵
	Occurrence of discrimination in the country/sector	Discrimination in China is widespread. People are discriminated because of their origin, gender, age, religion, or disabilities. ¹⁵⁸⁶ Also discrimination in the workplace is common. ¹⁵⁸⁷ Especially rural migrant workers are discriminated. They earn 30% less than local workers, they work twice as long as members of the local personnel, they receive lower social benefits, and are more often involved in workplace accidents. In addition, they are often employed without a written labour contract. ¹⁵⁸⁸ Employment discrimination against women is also present. ¹⁵⁸⁹ No information found regarding discrimination in the Chinese recycling sector.
	Ratio of salary of women to wages of men in sector	No information available.
Health and safety	Description of potential main origins of danger	The main problem of the informal recycling is the appliance of crude methods as acid baths with sodium cyanide, burning of plastics, or manual disassembly of components. ¹⁵⁹⁰ There are hardly protection measures and waste is disposed unconcerned locally. ¹⁵⁹¹
	Accident rate of the country /sector	Although Asia has very high accident rates, China is average in international comparison

¹⁵⁸⁵ www.genderindex.org

¹⁵⁸⁶ www.state.gov/g/drl/rls/irf/2009/127268.htm

¹⁵⁸⁷ Séguin (2009)

¹⁵⁸⁸ Amnesty International (2007) and www.waronwant.org/overseas-work/sweatshops-and-plantations/china-sweatshops

¹⁵⁸⁹ <http://genderindex.org/country/china>

¹⁵⁹⁰ Greenpeace (2005)

¹⁵⁹¹ Stormer (2009)

Subcategory	Indicator	Status
		with an accident rate of 12,399/100,000 employees and a fatality rate of 13.2. ¹⁵⁹² There are no statistics of accident rates of the informal sector.
Social benefits/ social security	Social security expenditures of the country/sector	China invests around 6% of GDP in social security. ¹⁵⁹³ The informal recycling sector does not provide social benefits. ¹⁵⁹⁴

Stakeholder group local community:

Table 114: S-LCI table laptop recycling in China stakeholder local community

Subcategory	Indicator	Status
Access to material resources	Extraction of material resources and level of industrial water use	No data on material resource extraction found. The Chinese industry is responsible for 26% of total freshwater withdrawals. ¹⁵⁹⁵
	Percent of population with access to improved sanitation facilities	65% ¹⁵⁹⁶
	Existence of projects to improve community infrastructure	None.
	Presence of certified environmental management systems	None.
	Description of (potential) material resource conflicts	The recycling of e-waste serves as recovery of valuable metals; this reduces the risk of material resource conflicts. However, the recovery rate for precious metals and noble earths are lower than recovery rates in professional facilities. ¹⁵⁹⁷ Second, the inappropriate recycling techniques cause water, soil, and air pollution. Indeed, drinking water can be bought, but it is very expensive. ¹⁵⁹⁸
Access to immaterial	Freedom of expression in country/sector	Although the Chinese law guarantees freedom of speech, assembly, association, and publica-

¹⁵⁹² Hämäläinen/Saarela/Takala (2009)

¹⁵⁹³ IMF (2010), p. 5

¹⁵⁹⁴ www.ilo.org/public/english/region/asro/bangkok/events/greenjobs/download/paper25.pdf

¹⁵⁹⁵ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁵⁹⁶ <http://data.worldbank.org/indicator/SH.STA.ACSN?display=default> and www.unicef.org/info/bycountry/china_statistics.html#65

¹⁵⁹⁷ Umweltbundesamt (2010)

¹⁵⁹⁸ Stormer (2009)

Subcategory	Indicator	Status
resources		tion, China's media environment is classified as one of the most restricted in the world. In the international ranking of the Freedom House China got 85 of 100 points in 2009, what equates the category "not free". Media censorship through governmental organisations is common and the judiciary is not independent. ¹⁵⁹⁹ The freedom of expression is very restricted in Guiyu. The press is not welcome. ¹⁶⁰⁰
	Annual arrests connected to protest of sector actions	No information available.
	Presence of community education initiatives and community service programmes	None.
Delocalisation and migration	Migration rate of the country	-0.3 migrants/1,000 inhabitants in the period from 2005 to 2010 ¹⁶⁰¹
	Number of individuals who resettle that can be attributed to the sector	None.
Cultural heritage	Respect of the sector regarding local cultural heritage including language, social and religious practices, knowledge and traditional craftsmanship as well as cultural spaces and objects and does not determine them in any way	No information available.
Respect of Indigenous rights	Human rights issues faced by indigenous people in the country	According to the Chinese government, there are no indigenous people in China and thus also no issues related to indigenous people. ¹⁶⁰² But there are officially 55 ethnic minority groups in China, ¹⁶⁰³ who account for less than 9% of population ¹⁶⁰⁴ . In addition, there are undistinguished ethnic groups that not have been officially rec-

¹⁵⁹⁹ www.freedomhouse.org/template.cfm?page=251&year=2009 and www.democracyweb.org/expression/china.php

¹⁶⁰⁰ Stormer (2009)

¹⁶⁰¹ www.iom.int/jahia/Jahia/activities/asia-and-oceania/east-and-south-east-asia/china

¹⁶⁰² www.china-embassy.ch/eng/ztnr/rqwt/t138829.htm

¹⁶⁰³ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹⁶⁰⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

Subcategory	Indicator	Status
		<p>ognized. According to the World Bank, more than 35% of the worldwide indigenous population live in China.¹⁶⁰⁵</p> <p>The Chinese constitution provides equal rights to all ethnic groups.¹⁶⁰⁶ However, China violates the human rights of indigenous people. There are limitations regarding the use of aboriginal languages and severe restrictions on freedom of religion. Besides there is an inflow of Han Chinese into their regions.¹⁶⁰⁷</p> <p>In the province Guangdong live among 99% Han Chinese Biao Mien (< 0.1%) and Zaomin Yao (0.2%), but they are resident in the northern mountains while Guiyu is located near the coast. There are also 0.7% Zhuang in Guangdong, but not in Guiyu. The prosperous economy allures around 30 million migrant workers.¹⁶⁰⁸</p>
	Respect of the sector regarding indigenous rights	-
Safe and healthy living conditions	Burden of disease in the country	<p>China has a DALY rate of 16, which is relatively low.¹⁶⁰⁹ The risk of infectious diseases is classified as intermediate.¹⁶¹⁰ Major causes of death are cardiovascular diseases, chronic respiratory diseases, and cancer. According to the China Institute for Environmental Sciences, more than 400,000 people die from air pollution related diseases every year.</p> <p>In addition, around 200 million individuals suffer from occupational diseases.¹⁶¹¹ 80% of them suffer from pneumoconiosis.¹⁶¹²</p> <p>Medical investigations in Guiyu revealed that children have high lead concentrations in their blood and workers have very high concentrations of toxic flame retardants in their bodies. Further, miscarriages and handicapped babies</p>

¹⁶⁰⁵ The World Bank (2007)

¹⁶⁰⁶ www.china.org.cn/e-white/phumanrights19/p-8.htm

¹⁶⁰⁷ www.amnesty.org

¹⁶⁰⁸ www.missionsupportgroup.org/reports/asia.php, <http://de.wikipedia.org/wiki/Zhuang> and www.newworldencyclopedia.org/entry/Guangdong

¹⁶⁰⁹ http://gamapserv.who.int/gho/interactive_charts/mbd/as_daly_rates/atlas.html

¹⁶¹⁰ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁶¹¹ <http://en.epochtimes.com/news/7-2-24/52097.html>

¹⁶¹² www.china-labour.org.hk/en/node/100744

Subcategory	Indicator	Status
		<p>are frequent. There are high incidents of skin damages, headaches, vertigo, nausea, (chronic) gastritis, and duodenal ulcers, especially among migrants, who recycle circuit boards and plastic parts.¹⁶¹³</p> <p>The life expectancy at birth amounts 74.51 years.¹⁶¹⁴</p>
	<p>Pollution level of the country and contribution of the sector to the environmental load</p>	<p>China belongs to the most polluted countries in the world. 16 of 20 most polluted cities are located in the country. Main issues are air and water pollution, including acid rain. Causers are energy production and consumption based on coal as main energy source, increasing traffic, and factories. The majority of factories discharge raw sewage into surface waters and have inadequate filter systems. Also agriculture contributes to the environmental load through pesticides and fertilizers. Northern China suffers also from water shortage.¹⁶¹⁵</p> <p>In 2006, China had CO₂ emissions per capita of 4.7 metric tons - meanwhile they are likely above 5 metric tons. The content of PM 10 decreased from 1995 to 2006 from 92 to 73µg/m³.¹⁶¹⁶</p> <p>The region Guiyu shows very high to high concentrations of several damaging substances. Samples of dust and sediments contained high levels of lead, tin, copper, antimony, cadmium, nickel, or mercury. For instance, the concentration of lead from dust in workshops was hundreds of times higher than typical levels of indoor dusts. The concentration of copper, lead, tin, nickel, and cadmium in sediments of the discharge channel was 400 - 600 times higher than in sediments of uncontaminated rivers. Another issue is the occurrence of flame retardants as PCBs or PBDEs.¹⁶¹⁷</p>
	<p>Sector effort to improve the environmental performance</p>	<p>None.</p>

¹⁶¹³ www.greenpeace.org/international/en/news/features/e-waste-china-toxic-pollution-230707

¹⁶¹⁴ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁶¹⁵ WWF (2008) and www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁶¹⁶ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:21079353~pagePK:64168445~piPK:64168309~theSitePK:2875751,00.html>

¹⁶¹⁷ Greenpeace International (2005), pp.3

Subcategory	Indicator	Status
Secure living conditions	Crime rate	Crime rate in China is classified to be relatively low. However, an increase in industrial and urban regions was reported due to the economic crisis in 2009. ¹⁶¹⁸ Global Peace Index: Rank 80 of 149 ¹⁶¹⁹
	Sector policies related to private security personnel	None.
Local employment	Percentage of unemployment in the country	China has an estimated unemployment rate of 4.3% for urban areas. It is assumed that the unemployment rates of rural regions are much higher. ¹⁶²⁰ In provinces of the industrialised east coast there is this year a lack of workers, because the number of migrant workers declines. ¹⁶²¹
	Percentage of work force hired locally	While the formal e-waste recycling sector in China employs around 16,000 workers, the informal sector creates approximately 690,000 jobs. ¹⁶²² The informal recycling sector employs local and migrant workers.
Community engagement	Description of community engagement of the sector	None.

Stakeholder group society:

Table 115: S-LCI table laptop recycling in China stakeholder society

Subcategory	Indicator	Status
Public commitments to sustainable issues	Presence of publicly available promises or agreements on sustainable issues and complaints to the non fulfilment of these commitments	None.
	Implementation/signing of principles or codes of conducts	None.

¹⁶¹⁸ http://travel.state.gov/travel/cis_pa_tw/cis/cis_1089.html

¹⁶¹⁹ www.visionofhumanity.org/gpi-data/#/2010/scor

¹⁶²⁰ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁶²¹ www.chinastakes.com/2010/3/the-vanishing-chinese-migrant-worker.html

¹⁶²² Duan/Eugster (2007), quoted from www.ilo.org/public/english/region/asro/bangkok/events/greenjobs/download/paper25.pdf

Subcategory	Indicator	Status
Contribution to economic development	Economic situation of the country and relevance of the considered sector for the economy	<p>Since the opening of the Chinese market, the economy is rapidly growing. Today China plays a major role in global trade. Though, not all regions are comparably industrialised; mainly the coastal zones as Jiangsu and Guangdong are industrial locations. The Chinese interior is less developed.¹⁶²³</p> <p>The GDP in 2009 amounted 8.789 trillion USD, the estimated per capita income was 6,600 USD. The country recorded a real growth rate of around 8.7% and an inflation rate of -0.8% in 2009.¹⁶²⁴</p> <p>Guangdong is one of the richest provinces in China. The local economy still booms. The region generated a GDP of 3.776 trillion CNY and had a growth rate of 9.5% in 2009.¹⁶²⁵</p> <p>The recycling of e-waste contributes to the economic growth with a revenue of 964 million CNY per year which correspond to a share of 2.6% of Guangdong's GDP.¹⁶²⁶ The recycling sector is from an economic perspective very important for Guiyu, although wages are rather low.</p>
Prevention and mitigation of conflicts	Presence of conflicts in the country	China is involved in several conflicts, for instance with Tibet, Taiwan, Hong Kong, Vietnam, and others. ¹⁶²⁷ There are also conflicts within the country: Protests against environmental pollution and labour conditions become more frequent. ¹⁶²⁸ Especially industrial centres are involved. ¹⁶²⁹
	Risk of conflicts with regard to the sector and measures to reduce the risk	The risk of conflicts is relatively high, because the recycling causes massive pollution of water, soil, and air. On the other hand, the recycling of e-waste is the main industry in Guiyu and contributes to the economic development. The sector does not initiate measures to reduce the risk of conflicts.

¹⁶²³ www.cia.gov/library/publications/the-world-factbook/geos/ch.html

¹⁶²⁴ *ibidem*

¹⁶²⁵ www.china.org.cn/china/2010-01/06/content_19192727.htm

¹⁶²⁶ Stormer (2009)

¹⁶²⁷ Heidelberg Institute for International Conflict Research (2009)

¹⁶²⁸ <http://libcom.org/blog/update-pollution-protests-china-07092009>, www.taz.de/1/zukunft/umwelt/artikel/1/chinas-bauern-proben-den-aufstand-1/?src=SE&cHash=c8bf5c0a09, Jia (2009) and Yilian (2010)

¹⁶²⁹ Global Times (2010)

Subcategory	Indicator	Status
Technology development	Sector efforts in technology development regarding eco-friendliness	None.
	Investments in technology development	None.
Corruption	Risk of corruption in country /sector	<p>Risk of corruption in country:</p> <ul style="list-style-type: none"> ■ Corruption Perceptions Index: 3.6 (rank 79)¹⁶³⁰ ■ Bribe payers index: Rank 19 (3.1 points)¹⁶³¹ <p>Risk of corruption in sector: Corruption, bribery, and fraud are widespread in the informal recycling sector. They enable illegal exports from e-waste of OECD countries as well as the illegal imports of e-waste in China. In addition, at least the local government tolerates the sector.</p>

¹⁶³⁰ Transparency International (2010)

¹⁶³¹ www.nationmaster.com/graph/crime/crime-bribe-payers-index

Annex VI: Process Adaptions

A Processing and Electricity

This section contains all process modifications regarding the processing of materials. The reason for the adaption is specified in square brackets.

- Extrusion, plastic film China (original: Extrusion, plastic film/RER)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Transport, lorry 3.5-16t, fleet average/RER replaced by Transport, lorry 7.5-16t, EURO3/RER [adapting to regional conditions]
- Extrusion, plastic pipes China (original: Extrusion, plastic pipes/RER)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Transport, lorry 3.5-16t, fleet average/RER replaced by Transport, lorry 7.5-16t, EURO3/RER [adapting to regional conditions]
- Injection moulding China (original: Injection moulding/RER)
 - Transport, lorry 3.5-16t, fleet average/RER replaced by Transport, lorry 7.5-16t, EURO3/RER [adapting to regional conditions]
- Assembly, LCD module China (original: Assembly, LCD module/GLO)
 - Amount for Electricity, medium voltage, at grid/CN changed to 18,7357 kWh [regional data]
 - Electricity, medium voltage, at grid/JP deleted (amount was added to Electricity, medium voltage, at grid/CN) [non-regional data]
 - Transport, freight, rail/RER replaced by Transport, barge/RER [adapting to regional conditions]
 - Transport, lorry > 16t, fleet average/RER replaced by Transport, lorry 16-32t, EURO3/RER [adapting to regional conditions]
- Electricity, high voltage, production KR, at grid/KR (original: Electricity, high voltage, production BE, at grid/BE)
 - Electricity, production mix BE/BE replaced by Electricity, production mix Korea (new process) [regional data]
- Electricity, medium voltage, production KR, at grid/KR
 - Electricity, high voltage, production BE, at grid/BE replaced by Electricity, high voltage, production KR, at grid/KR [regional data]

B Electronic Devices/Modules

This subchapter itemizes the process adaption with regard to electronic devices and modules. The reason for the adaption is specified in square brackets.

- Battery, Lilo¹⁶³², rechargeable, prismatic, at plant China (original: Battery, Lilo, rechargeable, prismatic, at plant/GLO)
 - Printed wiring board, surface mounted, unspec., solder mix, at plant/GLO replaced by Printed wiring board, surface mounted, unspec., PB free, at plant/GLO [product-specific data]
 - Transport, transoceanic freight ship/OCE amount changed to 0,79937*800kgkm (transport relates to battery cells) [regional data]
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, at grid/CN [regional data]
 - Transport, lorry >16t fleet average/RER replaced by Transport, lorry 16-32t, EURO4/RER; amount changed to 0,79937*130kgkm (transport relates to battery cells) [adapting to regional conditions]
- Printed wiring board, mounted, Laptop PC mainboard, Pb free China (original: Printed wiring board, mounted, Laptop PC mainboard, Pb free, at plant/GLO)
 - Integrated circuit, IC, logic type, at plant/GLO replaced by Integrated circuit, IC, logic type, at plant/RAS [regional data]
 - Transport processes deleted [Transport is considered separately.]
- HDD, laptop computer, at plant China (original: HDD, laptop computer, at plant/GLO)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Printed wiring board, mixed mounted, unspec., solder mix, at plant/GLO replaced by Printed wiring board, mixed mounted, unspec., PB free, at plant/GLO [product-specific data]
 - Transport, freight, rail/RER replaced by Transport, barge/RER [adapting to regional conditions]
 - Transport, lorry >16t fleet average/RER replaced by Transport, lorry 16-32t, EURO3/RER [adapting to regional conditions]
- CD-ROM/DVD-ROM drive, laptop computer, at plant Philippines (original: CD-ROM/DVD-ROM drive, laptop computer, at plant/GLO)
 - HDPE, granulate added as avoided product (producer uses waste plastics) [product-specific data]
 - Printed wiring board, mixed mounted, unspec., solder mix, at plant/GLO replaced by Printed wiring board, mixed mounted, unspec., PB free, at plant/GLO [product-specific data]

¹⁶³² Abbreviation for Lithium-Ion

- Transport, freight, rail/RER replaced by Transport, barge/RER [adapting to regional conditions]
- Transport, lorry >16t fleet average/RER replaced by Transport, lorry 3.5-7.5t, EURO3/RER [adapting to regional conditions]
- Keyboard, at plant China (original: Keyboard, standard version, at plant/RER)
 - Amount changed for Copper, at regional storage/RER to 0,029kg (the standard keyboard contains copper for the cable) [product-specific data]
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Extrusion, plastic pipes/RER deleted (this process refers to the production of the cable) [product-specific data]
 - Polyvinylchloride, at regional storage/RER deleted (PVC is mainly contained in cables) [product-specific data]
 - Printed wiring board, surface mounted, unspec., solder mix, at plant/GLO replaced by Printed wiring board, surface mounted, unspec. PB free, at plant/GLO [product-specific data]
 - Transport freight, rail/RER replaced by Transport, barge/RER [adapting to regional conditions]
 - Amount changed for Wire drawing, copper/RER to 0,029kg (amount for the cable was subtracted) [product-specific data]
- Fan, at plant China (original: Fan, at plant/GLO)
 - Injection moulding/RER replaced by Injection moulding China [regional data]
 - Printed wiring board, through-hole mounted, unspec., solder mix, at plant/GLO replaced by Printed wiring board, through-hole mounted, unspec., PB free, at plant/GLO [product-specific data]
- Power adapter, for laptop, at plant China (original: Power adapter, for laptop, at plant/GLO)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Extrusion, plastic pipes/RER replaced by Extrusion, plastic pipes China [regional data]
 - Transport, freight, rail/RER replaced by Transport, barge/RER [adapting to regional conditions]
 - Transport, lorry >16t fleet average/RER replaced by Transport, lorry 3.5-7.5t, EURO3/RER [adapting to regional conditions]
- Integrated circuit, IC, memory type, at plant Korea (original: Integrated circuit, IC, memory type, at plant/GLO)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, production KR, at grid/KR [regional data]
 - Lead, at regional storage/RER deleted (use of lead free solder) [product-specific data]

- Solder, paste, Sn95.5Ag3.9Cu0.6, for electronics industry, at plant/GLO added; amount: 21g (indirect calculated through lead content in lead-tin solder) [product-specific data]
 - Amount changed for Tin, at regional storage/RER to 0,0031 (amount for solder was subtracted, because this amount is included in the solder paste) [product-specific data]
- Integrated circuit, IC, logic type, at plant/RAS (original: Integrated circuit, IC, logic type, at plant/GLO)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/CN (regional electricity mix) and amount changed to 222.87kWh (The original amount of 668.61kWh was divided to three electricity processes from China, Japan, and Korea to obtain an electricity mix for Asia.) [regional data]
 - Electricity, medium voltage, at grid/JP added with 222.87 kWh [regional data]
 - Electricity, medium voltage, production KR, at grid/KR added with 222.87 kWh [regional data]
 - Lead, at regional storage/RER deleted (use of lead free solder) [product-specific data]
 - Silver, at regional storage/RER replaced by Silver, from combined gold-silver production, at refinery/GLO [global process]
 - Solder, paste, Sn95.5Ag3.9Cu0.6, for electronics industry, at plant/GLO added; amount: 21g (transferred from Integrated circuit, IC, memory type, at plant Korea) [product-specific data]
- LCD module, at plant China (original: LCD module, at plant/GLO)
 - Backlight, LCD screen, at plant/GLO replaced by Backlight LED, laptop display GLO [product-specific data]
 - Injection moulding/RER replaced by Injection moulding China [regional data]
 - Assembly, LCD module/GLO replaced by Assembly, LCD module China [regional data]
 - Printed wiring board, mixed mounted, unspec., Solder mix, at plant/GLO replaced by Printed wiring board, mixed mounted, unspec., PB free, at plant/GLO [product-specific data]

C Packaging

This chapter comprises all adaptations that were made concerning packaging materials. The reason for the adaptation is specified again in square brackets.

- Corrugated board, fresh fibre, single wall China (original: Corrugated board, fresh fibre, single wall, at plant/RER)
 - Potato starch, at plant/DE replaced by potato starch, at plant China [regional data]
 - Electricity, medium voltage, production NORDEL deleted (amount was added to Electricity, medium voltage, production UCTE)

- Electricity, medium voltage, at grid/GB replaced by Electricity, medium voltage, at grid/CN [regional data]
- Transport, van replaced by Transport, lorry 3.5-7.5t, EURO3/RER [adapting to regional conditions]
- Transport, freight, rail replaced by Transport, barge/RER [adapting to regional conditions]
- Transport, lorry >16t, fleet average replaced by Transport, lorry 16-32t, EURO3/RER [adapting to regional conditions]
- Corrugated board, 80% secondary fibre, single wall China (original: Corrugated board, fresh fibre, single wall, at plant/RER)
 - Corrugated board, fresh fibre, single wall China added as avoided product [product-specific data]
 - Potato starch, at plant/DE replaced by potato starch, at plant China [regional data]
 - Electricity, medium voltage, production NORDEL deleted (amount was added to Electricity, medium voltage, production UCTE) [no regional valid data]
 - Electricity, medium voltage, at grid/GB replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Transport, van <3.5t/RER replaced by Transport, lorry 3.5-7.5t, EURO3/RER [adapting to regional conditions]
 - Transport, freight, rail/RER replaced by Transport, barge/RER [adapting to regional conditions]
 - Transport, lorry >16t, fleet average/RER replaced by Transport, lorry 16-32t, EURO3/RER [adapting to regional conditions]
- Potato starch, at plant China (original: Potato starch, at plant/DE)
 - Electricity, medium voltage, at grid/DE replaced by Electricity, medium voltage, at grid/CN [regional data]
 - Transport, lorry >16t, fleet average/RER by Transport, lorry 16-32t, EURO3/RER [adapting to regional conditions]

D Use Phase

The following section lists all changes, which were made with regard to the processes applied for the use phase. The reason for the adaption is specified in brackets.

- Use, computer, laptop, active mode Belgium
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, production BE, at grid/BE [regional data]
 - Laptop computer, at plant/GLO, Transport, freight, rail/RER and Transport, lorry > 16t, fleet average/RER were deleted [laptop is modelled separately]
- Use, computer, laptop, off mode Belgium
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, production BE, at grid/BE and amount was modified to 0,000415 kWh [regional and product specific data]

- Laptop computer, at plant/GLO; Transport, freight, rail/RER; and Transport, lorry > 16t, fleet average/RER were deleted [laptop and transport are modelled separately]
- Use, computer, laptop, standby/sleep mode Belgium
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, production BE, at grid/BE and amount was modified to 0,000746 kWh [regional and product- specific data]
 - Laptop computer, at plant/GLO; Transport, freight, rail/RER; and Transport, lorry > 16t, fleet average/RER were deleted [laptop and transport are modelled separately]
- Use, computer, laptop, office use Belgium (original: Use, computer, laptop, office use/RER)
 - Use, computer, laptop, active mode/RER replaced by Use, computer, laptop, active mode Belgium [regional data]
 - Use, computer, laptop, off mode/RER replaced by Use, computer, laptop, off mode Belgium [regional data]
 - Use, computer, laptop, standby/sleep mode/RER replaced by Use, computer, laptop, standby/sleep mode Belgium [regional data]
- Use, computer, laptop, off mode China (original: Use, computer, laptop, off mode/RER)
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, at grid/CN and amount was modified to 0,000415 kWh [regional and product-specific data]
 - Laptop, computer, at plant/GLO; Transport, freight, rail/RER; and Transport, lorry > 16t, fleet average/RER deleted [laptop and transport are modelled separately]
- Use, computer, laptop, standby/sleep China (original: Use, computer, laptop, standby/sleep/RER)
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, at grid/CN and amount was modified to 0,000746 kWh [regional and product-specific data]
 - Laptop, computer, at plant/GLO; Transport, freight, rail/RER; and Transport, lorry > 16t, fleet average/RER deleted [laptop and transport are modelled separately]
- Use, computer, laptop, standby/sleep mode China (original: Use, computer, laptop, standby/sleep mode/RER)
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, at grid/CN and amount was modified to 0,000746 kWh [regional and product-specific data]
 - Laptop, computer, at plant/GLO; Transport, freight, rail/RER; and Transport, lorry > 16t, fleet average/RER deleted [laptop and transport are modelled separately]

- Use, computer, laptop, active mode China (original: Use, computer, laptop, active mode/RER)
 - Electricity, low voltage, production UCTE, at grid/UCTE replaced by Electricity, low voltage, at grid/CN [regional data]
 - Laptop, computer, at plant/GLO; Transport, freight, rail/RER; and Transport, lorry > 16t, fleet average/RER deleted [laptop and transport are modelled separately]

E End of Life Phase

This section considers modifications of all processes in the end-of-life phase. The reason for the adaption is specified in brackets.

- Dismantling, laptop, manually, at plant Belgium (original: Dismantling, laptop, manually, at plant/CH)
 - Disposal, Li-ions batteries, mixed technology/GLO deleted [The disposal of the battery is considered separately.]
 - Disposal, NiMH batteries/GLO deleted [not contained in the laptop]
 - Disposal, fluorescent lamps/GLO deleted [not contained in the laptop]
- Dismantling, laptop, mechanically, at plant Belgium (original: Dismantling, laptop, mechanically, at plant/GLO)
 - Disposal, Li-ions batteries, mixed technology/GLO deleted [The disposal of the battery is considered separately.]
 - Disposal, NiMH batteries/GLO deleted [not contained in the laptop]
 - Disposal, fluorescent lamps/GLO deleted [not contained in the laptop]
- Disposal, Li-ions batteries, hydrometallurgical Belgium (original: Disposal, Li-ions batteries, hydrometallurgical/GLO)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/BE [regional data]
- Disposal, Li-ions batteries, pyrometallurgical Belgium (original: Disposal, Li-ions batteries, pyrometallurgical/GLO)
 - Electricity, medium voltage, production UCTE, at grid/UCTE replaced by Electricity, medium voltage, at grid/BE [regional data]
- Disposal, Li-ions batteries, mixed technology Belgium (original: Disposal, Li-ions batteries, mixed technology/GLO)
 - Disposal, Li-ions batteries, hydrometallurgical/GLO replaced by Disposal, Li-ions batteries, hydrometallurgical Belgium [regional data]
 - Disposal, Li-ions batteries, pyrometallurgical/GLO replaced by Disposal, Li-ions batteries, pyrometallurgical Belgium [regional data]

D New Processes

The following listing summarises all new processes that were compiled in this project.

- Electricity, production mix Korea (1kWh)

- Inputs from technosphere:¹⁶³³
 - Electricity, hard coal, at power plant/BE (0.4kWh)
 - Electricity, oil, at power plant/FR (0.06kWh)
 - Electricity, natural gas, at power plant/JP (0.20kWh)
 - Electricity, hydropower, at power plant/JP (0.01kWh)
 - Electricity, nuclear, at power plant/CH (0.33kWh)
- Backlight LED, laptop display GLO (1kg)
 - Inputs from technosphere:
 - Light emitting diode, LED, at plant/GLO (1kg)
- Disposal scenario ASUS UL50Ag (1kg)
 - Waste streams remaining after separation:
 - Dismantling, laptop, mechanically, at plant Belgium (80%)
 - Dismantling, laptop, manually, at plant Belgium (20%)
- Printed wiring board, mixed mounted, unspec., PB free, at plant/GLO (1kg)
 - Inputs from technosphere:
 - Printed wiring board, surface mounted, unspec., Pb free, at plant/GLO (0.5kg)
 - Printed wiring board, through-hole mounted, unspec., Pb free, at plant/GLO (0.5kg)

¹⁶³³ Based on country data of the International Energy Agency

Annex VII: Performance Reference Points for the S-LCIA

The following table itemizes the performance reference points that were used as basis for the S-LCIA. Main reference points are ILO conventions, the ISO 26000 guidelines and the OECD Guidelines for Multinational Enterprises, but also the principles of the United Nations Global Compact or the IFC Performance Standards on Social and Environmental Sustainability.

Table 116: Performance reference points

Subcategory	Performance Reference Points	Basis
Freedom of association and collective bargaining	Freedom of association and collective bargaining should be ensured. The forming and joining of independent trade unions should be possible.	<ul style="list-style-type: none"> ■ ILO labour standards ■ UN Declaration on Human Rights ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Child labour	No occurrence of child labour.	<ul style="list-style-type: none"> ■ ILO labour standards ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Forced labour	No occurrence of forced labour.	<ul style="list-style-type: none"> ■ ILO labour standards ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Fair salary	The wage level should ensure a decent standard of living. The payment of the minimum wage is often not sufficient. Further, companies should pay in	<ul style="list-style-type: none"> ■ ILO labour standards ■ UN Declaration on Human Rights ■ The Global Sullivan Principles

Subcategory	Performance Reference Points	Basis
	time and do not withhold shares of the salary.	<ul style="list-style-type: none"> ■ UNEP/SETAC method sheets
Working time	The working time should not exceed 8 hours per day and 48 hours per week.	<ul style="list-style-type: none"> ■ ILO labour standards ■ UNEP/SETAC method sheets
Discrimination	No occurrence of discrimination. Further, companies should employ minorities and the employment ratio men to women should be balanced.	<ul style="list-style-type: none"> ■ ILO labour standards ■ UN Declaration on Human Rights ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Health and safety	Adequate management of health and safety, so that the risk of workers is low.	<ul style="list-style-type: none"> ■ ILO labour standards ■ ISO 26000 ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Social benefits/ social security	Companies should provide social benefits as for instance medical insurance or pension insurance, which ensure a decent standard of living. Other social benefits as swimming pools, staff cars, or the like are classified as rather unimportant.	<ul style="list-style-type: none"> ■ ILO labour standards ■ UNEP/SETAC method sheets
Access to material resources	Companies should not overexploit material resources and should implement certified environmental management systems to minimise resource consumption. In addition, companies should improve community infrastructure, if the infrastructure is underdeveloped or not sufficient for a decent standard of living.	<ul style="list-style-type: none"> ■ UN Declaration on Human Rights ■ ISO 26000 ■ ISO 14000 ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Access to immate-	Companies should provide for one	<ul style="list-style-type: none"> ■ UN Declaration on Human

Subcategory	Performance Reference Points	Basis
rial resources	thing freedom of expression; for another thing they should support communities in education or other community services, if necessary.	Rights <ul style="list-style-type: none"> ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Delocalisation and migration	Companies should not cause resettlements or migration movements on a large scale. If resettlements are necessary companies should provide appropriate compensations.	<ul style="list-style-type: none"> ■ UN Declaration on Human Rights ■ IFC Performance Standards on Social and Environmental Sustainability ■ UNEP/SETAC method sheets
Cultural heritage	Companies should respect cultural heritage and do not infringe cultural customs and traditions in any way.	<ul style="list-style-type: none"> ■ UN Declaration on Human Rights ■ ILO conventions ■ Universal Declaration on Cultural Diversity ■ IFC Performance Standards on Social and Environmental Sustainability ■ UNEP/SETAC method sheets
Respect of indigenous rights	Companies should respect indigenous rights, including the rights to lands, resources, cultural integrity, self-determination, and self-government.	<ul style="list-style-type: none"> ■ UN Declaration on Human Rights ■ Indigenous rights ■ ILO conventions ■ UN Declaration on the Rights of Indigenous Peoples ■ IFC Performance Standards on Social and Environmental Sustainability ■ UNEP/SETAC method sheets
Safe and healthy living conditions	Companies should minimise their environmental pollution in order not to jeopardise the health of community members.	<ul style="list-style-type: none"> ■ UN Declaration on Human Rights ■ ISO 26000 ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Secure living conditions	In countries with high crime rates companies should contribute to secure living conditions through private security personnel.	<ul style="list-style-type: none"> ■ UN Declaration on Human Rights ■ IFC Performance Standards on Social and Environmental Sustainability ■ UNEP/SETAC method sheets

Subcategory	Performance Reference Points	Basis
Local employment	Companies should contribute directly or indirectly through local suppliers to the reduction of local unemployment.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ ILO conventions ■ UNEP/SETAC method sheets
Community engagement	Companies should engage in their communities in different areas. In addition, companies should include community stakeholders in relevant decision-making processes.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Public commitments to sustainable issues	Companies should contribute to the sustainable development of the society with regard to the impacts from their activities.	<ul style="list-style-type: none"> ■ OECD Guidelines for Multinational Enterprises ■ UNEP/SETAC method sheets
Contribution to economic development	Companies should contribute the local economic development through different aspects as payment of wages, purchase of raw materials and supplies, investments etc.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ UNEP/SETAC method sheets
Prevention and mitigation of conflicts	Companies located in regions with a high risk of conflicts due to resource depletion, massive pollution or poor working standards should try to reduce the risk by dint of appropriate measures	<ul style="list-style-type: none"> ■ UNEP/SETAC method sheets
Technology development	Companies acting in technology relevant areas should engage in the development of efficient and environmental sound technologies.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ UNEP/SETAC method sheets
Corruption	Companies should not be involved into cases of corruption and should implement appropriate measures to prevent corruption.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ UN Global Compact ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Fair competition	Companies should act fair, i.e. not anti-competitive.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises

Subcategory	Performance Reference Points	Basis
		<ul style="list-style-type: none"> ■ United Nations Set of principles and rules on competition ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Promoting social responsibility	Companies should promote social responsibility among suppliers, including monitoring, audits, and training with regard to social responsible behaviour.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ IFC Performance Standards on Social and Environmental Sustainability ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Supplier relationships	Companies should develop supplier relationships, which base on mutual co-operation. Companies should act fair regarding their suppliers and should support them, if necessary.	<ul style="list-style-type: none"> ■ UNEP/SETAC method sheets
Respect of intellectual property rights	Companies should respect intellectual property rights and should not infringe patent rights.	<ul style="list-style-type: none"> ■ ISO 26000 ■ The Global Sullivan Principles ■ UNEP/SETAC method sheets
Health and safety	Companies should minimise health and safety risks of products.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ UNEP/SETAC method sheets
Feedback mechanism	Companies should implement feedback mechanisms to come in contact with consumers in an uncomplicated way.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ UNEP/SETAC method sheets
Transparency	Companies should communicate regarding their product and social responsibility in a transparent way. The communication should enable an informed consumer choice.	<ul style="list-style-type: none"> ■ ISO 26000 ■ OECD Guidelines for Multinational Enterprises ■ UNEP/SETAC method sheets
End of life responsibility	Companies should provide information to consumers regarding appropriate end-of-life options, if relevant. Manufactures of electronic products should establish product take back systems and should ensure appropriate product disposal.	<ul style="list-style-type: none"> ■ WEEE directive ■ UNEP/SETAC method sheets