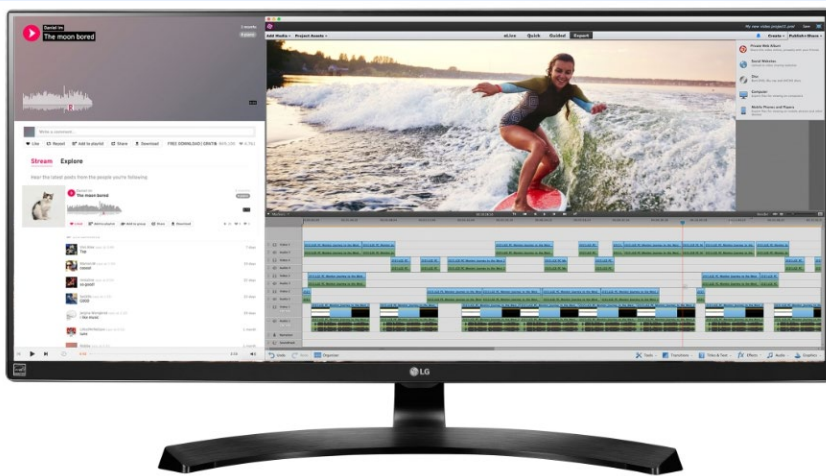


ENVIRONMENTAL PRODUCT DECLARATION

LG MONITOR

LG ELECTRONICS

LG 34UB88-P



34 Inch / 3440X1440 Resolution / LED Backlighting / IPS Panel



LG Electronics constantly researches and introduces a full range of innovative, greener products and services, and continue to be a leader in developing green innovations.

We are always looking for innovative ideas and technologies which will support our efforts as a leading company in practicing environmental management.

With 2017 global sales of USD 54.3 billion (KRW 61.4 trillion), LG comprises five business units - Home Entertainment, Mobile Communications, Home Appliance & Air Solution, Vehicle Components and Business-to-Business - and is one of the world's leading producers of flat panel displays, mobile devices, air conditioners, washing machines and refrigerators.\

For more information visit www.lge.com



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	LG Electronics
DECLARATION NUMBER	4789560264.101.1
DECLARED PRODUCT	LG 34" Class (34" Diagonal) QHD IPS Monitor 34UB88-P
REFERENCE PCR	Common Guideline for Energy Using Products(2017-3) / EDP 004.MONITOR (2013/00/201309). Environmental Declaration of Products_Product Category Rules(PCR) for Monitor by Ministry of Environment, Korea
DATE OF ISSUE	July 1, 2019
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications
The PCR review was conducted by:	PCR Review Panel
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	
	Jessica Kwon, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	
	Thomal Gloria, Industrial Ecology Consultants

ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

Product Definition

The 3440 X 1440 UltraWide QHD monitor offers amazingly sharp picture quality. Its pixel area is about 1.8 times larger than an UltraWide Full HD 21:9 monitor, and about 2.4 times larger than a Full HD 16:9 monitor. With IPS, color reproduction is improved and users can view the screen at virtually any angle.

Product Description

The product components are ;

- LCD module
- Back Cover
- Cabinet
- Stand
- Main PCB Assembly
- Speakers
- Adaptor
- Accessories and package

The table below shows the description of technical product properties.

Product Type	LED MONITOR
Model Name	34UB88-P (for the USA market)
Weight	11 kg (including stand, package and accessory)
Resolution	3440 x 1440
Diagonal size	34 inch
Signal input/output	HDMI, DisplayPort, Thunderbolt, Headphone Out, USB Up-stream and USB Down-stream
Power consumption	32.8W (tested in accordance with IEC62087)
Viewing angle	178/178
Brightness (Typ)	300 cd/m2
Back light type	LED lamp
Outline dimension	829.9 mm x 428.9 mm x 252.4 mm (with stand)
Panel Type	IPS
Color Depth	10bits(8bit+FRC), 1.07B



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

Range of Applications

For use in indoor spaces for displaying computer information.

Accreditation

- ISO9001 Quality management System
- ISO14001 Environmental Management System
- ISO45001 Occupational Health & Safety Management System

Life Cycle Assessment

General

A total Life Cycle Assessment was completed in accordance with ISO 14040 / ISO 14044.

Life Cycle Stages assessed:

- Pre-manufacturing Stage
- Manufacturing Stage
- Distribution Stage
- Use Stage
- End of Life Stage

Description of the Declared or Functional Unit

Using monitor to display pictures over 4 years (On Mode: 40%/day, Off mode: 55%/day, Sleep mode: 5%/day). The reference flow is monitor 1 set including stand, package, accessories.

Cut-off Criteria

Basically, Weight of major parts used as a criterion that is input cumulatively contribution is more than 95% of Monitor set. The parts which include PCB are included as the major parts because it is important part for environmental impact of electronic products.

1) Monitor set (including accessories)

Parts Name	Weight (kg)	Cumulatively Weight (kg)	Cumulatively Contribution %	Notes
LCD Module	3.71E+00	3.71E+00	39.9%	Inclusion
Stand Assembly	2.06E+00	5.76E+00	62.1%	Inclusion



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

Back Cover Assembly	1.86E+00	7.62E+00	82.1%	Inclusion
Adaptor	4.05E-01	8.02E+00	86.5%	Inclusion
Cabinet Assembly	3.51E-01	8.37E+00	90.3%	Inclusion
Main PCB Assembly	1.75E-01	8.55E+00	92.2%	Inclusion
Speaker Assembly	1.54E-01	8.70E+00	93.8%	Inclusion
Power cord	1.49E-01	8.85E+00	95.4%	Inclusion
DP Cable	1.09E-01	8.96E+00	96.6%	Exclusion
HDMI Cable	1.01E-01	9.06E+00	97.7%	Exclusion
Gap Pad (Rubber)	7.20E-02	9.13E+00	98.5%	Exclusion
Screw	4.70E-02	9.18E+00	99.0%	Exclusion
Manual	4.20E-02	9.22E+00	99.4%	Exclusion
Harness	1.60E-02	9.24E+00	99.6%	Exclusion
CD	1.50E-02	9.25E+00	99.8%	Exclusion
Tape	1.50E-02	9.27E+00	99.9%	Exclusion
Insulation sheet	3.00E-03	9.27E+00	100.0%	Exclusion
Control PCB Assembly	2.00E-03	9.27E+00	100.0%	Inclusion
FFC	1.50E-03	9.28E+00	100.0%	Exclusion
EMI Gasket	1.00E-03	9.28E+00	100.0%	Exclusion

2) Accessory

Parts Name	Weight (kg)	Cumulatively Weight (kg)	Cumulatively Contribution %	Notes
Box	1.15E+00	1.15E+00	64.4%	Inclusion
Packing(EPS)	5.50E-01	1.70E+00	95.1%	Inclusion
Vinyl Bag	8.70E-02	1.79E+00	100.0%	Exclusion



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

Allocation

There are no recycled components in the monitor. Weight of major parts used as a criterion that is input cumulatively contribution is more than 95% of monitor set and package.

Background Data

SimaPro 7 software was used for modeling the life cycle of the monitor. Korean national DB was used and when Korean national DB is not available, recent foreign country DB was used.

Data Quality

For the data used in this LCA, the data quality is considered to be “good to high” quality. The LCIs from the SimaPro 7 database and Korean national DB are mainly based on industry data and are completed, where necessary, by secondary data. Tables below show the data quality of this study.

<Table> Time-related/Geographical/Technology coverage of monitor manufacturing data

Time-related coverage	2018
Geographical coverage	Korea
Technology coverage	State-of-the-art

<Table> Time-related/Geographical/Technology coverage of data excluding manufacturing

Time-related coverage	Korean national DB(2012) http://www.kncpc.re.kr/lci/ Eco-invent DB(2007)
Geographical coverage	1 st :Korean national DB(2012) http://www.kncpc.re.kr/lci/ 2 nd : Foreign Country DB
Technology coverage	State-of-the-art technology similar to monitor manufacturing technology



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LG 21:9 UltraWide® Monitor

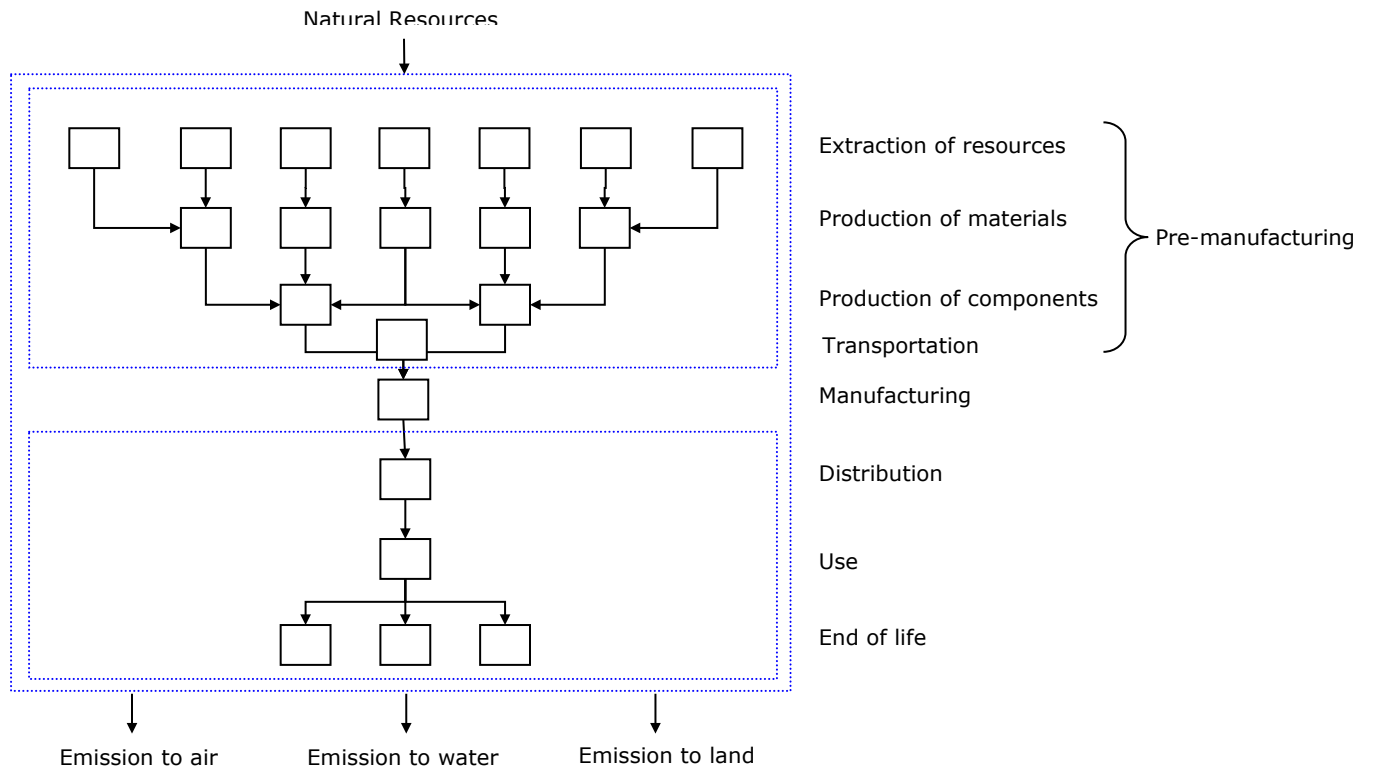
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System Boundaries

The Life Cycle Assessment includes all relevant cradle-to-grave environmental information for one monitor set. The system boundaries include raw material acquisition and processing, components/monitor manufacturing, energy production, packaging, transportation and use, as well as the end-of-life stage (recycling, incineration or landfill disposal).

Figure below shows the system boundaries of this study.

<Figure> System boundary of the product system



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

Life Cycle Inventory Analysis

The table below shows the resources used for the monitor

	Unit	Total Life Cycle	Pre-manufacturing	Manufacturing	Distribution	Use	Disposal
Non-renewable resources							
With energy content							
Hard Coal	lb	5.63E+01	7.21E+00	2.64E-01	4.26E-03	4.88E+01	1.75E-02
Crude Oil	oz	2.81E+02	2.29E+02	5.23E-01	1.47E+01	9.68E+01	-5.91E+01
Natural Gas	oz	1.75E+02	8.18E+01	5.39E-01	6.31E-01	9.99E+01	-8.00E+00
Without energy content							
Iron ore	oz	1.52E+02	1.52E+02	0.00E+00	2.21E-04	0.00E+00	2.23E-02
Limestone	oz	1.12E+01	1.27E+01	1.09E-05	1.76E-03	2.02E-03	-1.50E+00
Sand	oz	2.75E+01	2.75E+01	1.61E-07	1.41E-05	2.99E-05	-1.75E-02
Dolomite	g	1.33E+02	1.33E+02	0.00E+00	2.27E-10	0.00E+00	-1.38E-02
Phosphate ore	g	1.94E+02	1.96E+02	0.00E+00	0.00E+00	0.00E+00	-1.28E+00
Bauxite	g	7.98E+02	7.98E+02	3.73E-04	1.30E-03	6.91E-02	-6.15E-01
Copper	g	6.51E+02	6.20E+01	0.00E+00	0.00E+00	0.00E+00	5.89E+02
Zinc	g	1.46E-01	1.46E-01	0.00E+00	1.10E-10	0.00E+00	-5.71E-04
Others
Renewable resources							
With energy content							
Wood	g	2.06E+01	8.37E+00	1.70E-06	3.67E-09	3.15E-04	1.22E+01
Without energy content							
Water	kg	3.67E+03	3.72E+03	1.41E-02	6.52E-01	2.61E+00	-4.95E+01
Wastes							
Hazardous Waste	kg	-	-	-	-	-	-
Total Waste	g	1.04E+01	-	-	-	-	1.04E+01



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

Life Cycle Impact Assessment

The target system was assessed by using the eco-indicators developed by the Ministry of Knowledge Economy (Ministry of Knowledge Economy, Korea), as shown in tables and figure below. LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

<Table> The potential impacts per life cycle stage

Impact category	Unit	Total	Pre-manufacturing	Manufacturing	Distribution	Use	Disposal
Ozone layer depletion	kg CFC11	1.91E-05	5.27E-06	3.35E-11	4.78E-07	6.20E-09	1.34E-05
Acidification	kg SO2	4.92E-01	6.66E-02	2.04E-03	4.93E-02	3.78E-01	-4.51E-03
Abiotic resource depletion	kg Sb	1.64E+00	2.00E-01	7.87E-03	8.70E-03	1.46E+00	-3.66E-02
Global warming	kg CO2	2.58E+02	2.82E+01	1.21E+00	9.85E-01	2.24E+02	2.97E+00
Eutrophication	kg PO43-	9.42E-02	1.34E-02	3.80E-04	4.53E-03	7.04E-02	5.51E-03
Photochemical oxidation creation	kg C2H2	2.12E-01	2.73E-02	1.02E-03	2.87E-03	1.89E-01	-8.69E-03

<Table> Percentage of the environmental impact of the stage to the impact category

Impact category	Pre-manufacturing	Manufacturing	Distribution	Use	Disposal
Ozone layer depletion	27.54%	0.00%	2.50%	0.03%	69.93%
Acidification	13.54%	0.42%	10.02%	76.94%	-0.92%
Abiotic resource depletion	12.20%	0.48%	0.53%	89.02%	-2.23%
Global warming	10.93%	0.47%	0.38%	87.06%	1.15%
Eutrophication	14.20%	0.40%	4.81%	74.74%	5.85%
Photochemical oxidation creation	12.90%	0.48%	1.36%	89.37%	-4.11%



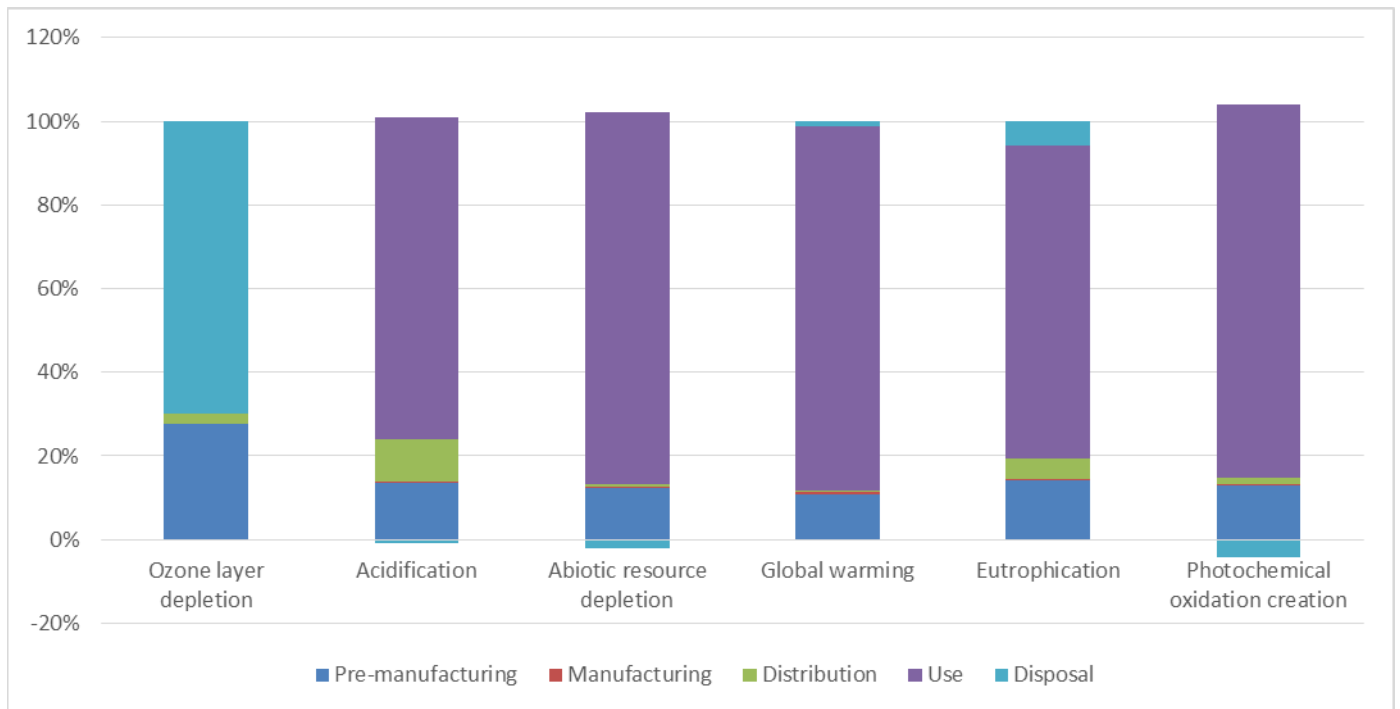
ENVIRONMENTAL PRODUCT DECLARATION



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<Figure> Percentage of the environmental impacts of the stages to the impact category



ENVIRONMENTAL PRODUCT DECLARATION



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Material Content

The main material content of the monitor is the following (given in weight percentage);

Material Content of the Product (Monitor)

Material	Content (%)
Steel	26.8%
ABS+PC	17.2%
Stainless steel	11.7%
PMMA	11.6%
Glass	9.3%
Aluminum	4.7%
PET	4.3%
ABS	4.3%
PCB	3.6%
PC	1.7%
Others	4.9%

Material Content of the Product (Package)

Material	Content (%)
Paper	67.6%
EPS	32.4%

Pre-manufacturing stage (Production of components)

Major components are LCD module including LCD panel, back cover, cabinet, stand, Main PCB assy and package.



ENVIRONMENTAL PRODUCT DECLARATION



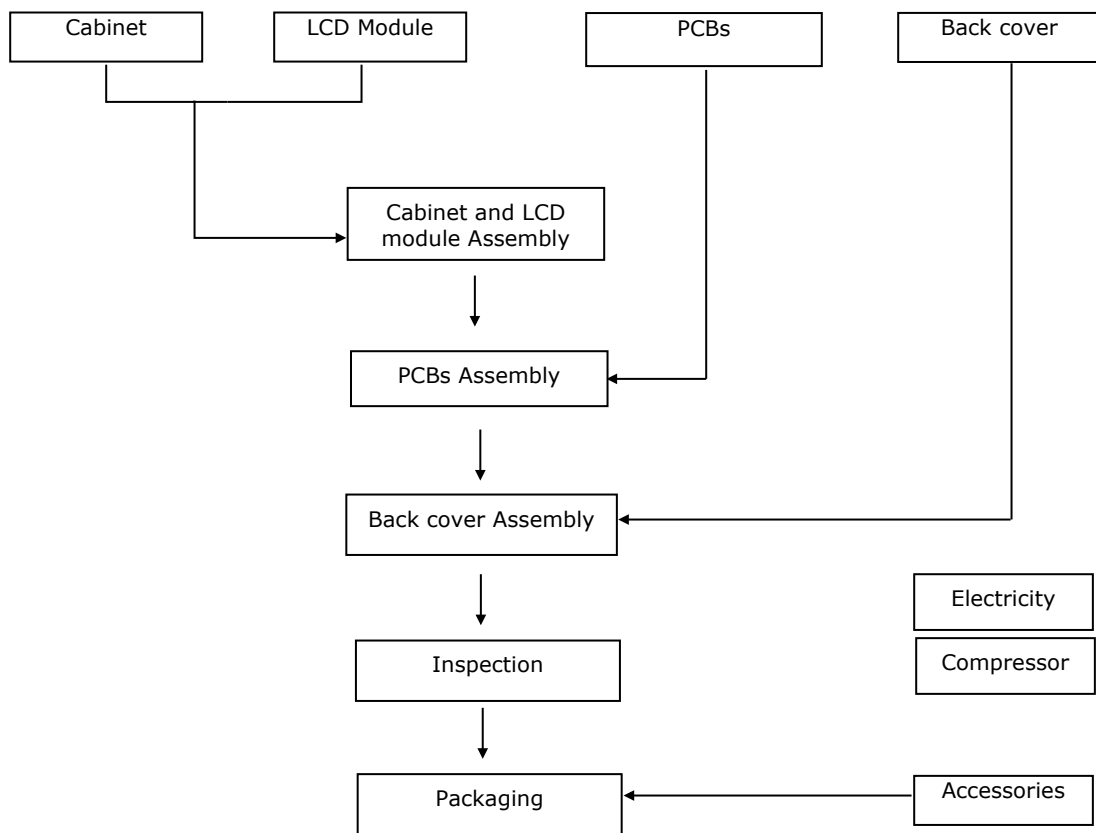
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Manufacturing stage (Production of the monitor)

Electricity used for manufacture of monitor is for monitor assembly/inspection/packaging lines and compressor operation. There are not by-products and co-products.

<Figure> Diagram of production process



ENVIRONMENTAL PRODUCT DECLARATION



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LG 21:9 UltraWide® Monitor

According to ISO 14025

Distribution stage

The product is most commonly transported by marine freight. For the life cycle assessment, product distribution is considered from Korea manufacturing site to USA customers.

Use stage

MONITORS are often replaced before their life span due to fashion and function. For the life cycle assessment, Electricity consumption of MONITOR usage is calculated according to PCR of Korea EPD for MONITOR.

- Life time of MONITOR : 4 years
- On mode : 40%/day
- Off mode : 55%/day
- Sleep mode : 5%/day

End-of-Life stage (Disposal)

Recycling information (Product disassembly process)

The basic steps that should typically be followed to remove components and materials requiring selective treatment:



Tool: screw driver



Step 1. Remove the stand body screw by driver (4EA)

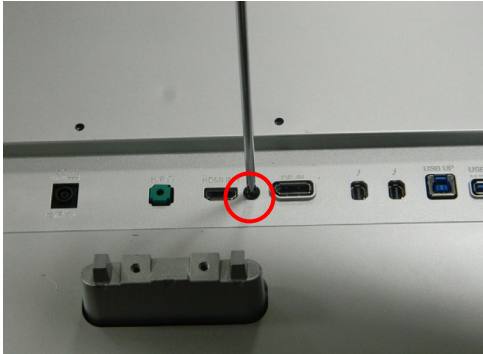


ENVIRONMENTAL PRODUCT DECLARATION

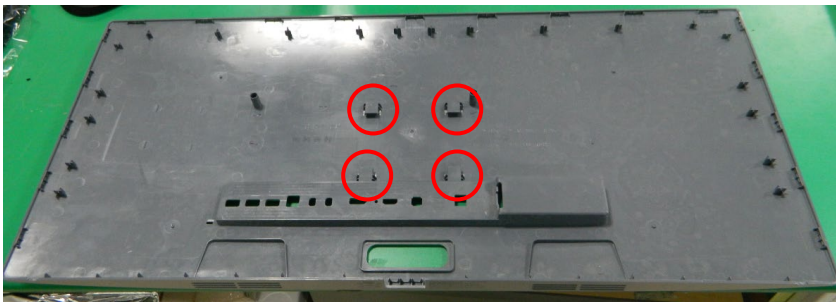


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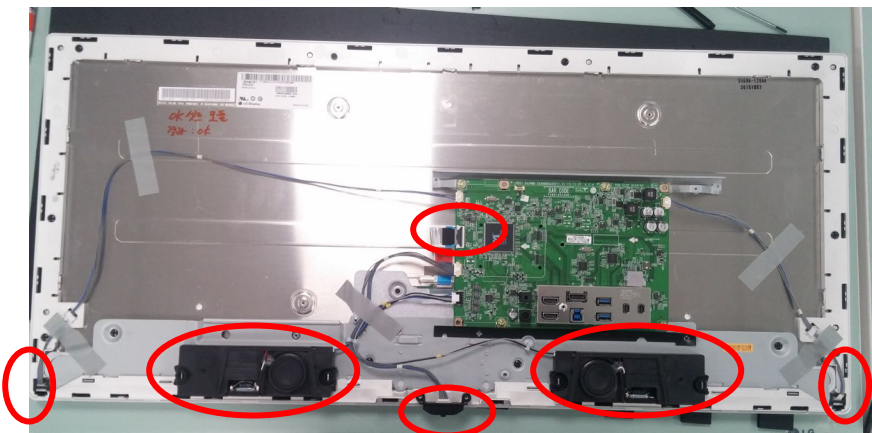
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Step 2. Remove the screw (1EA) and disassemble the back cover



Step 3. Disassemble the wall mount brackets at the back cover (4EA. Latch Type)



Step 4. Disassemble the harness cables, Flexible Flat Cables and control PCB and speakers.

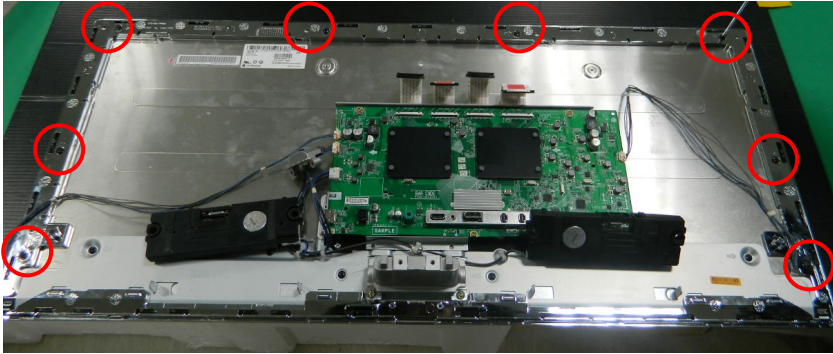


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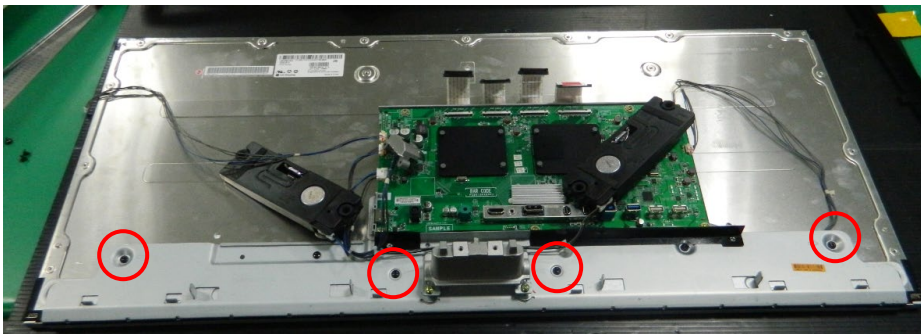
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Step 5. Remove the Screws (8EA) between middle cabinet and module by driver.



Step 6. Reverse the set and then remove the front cabinet (Latch Type)



Step 7. Remove the Screws between metal bar and module.

Environment

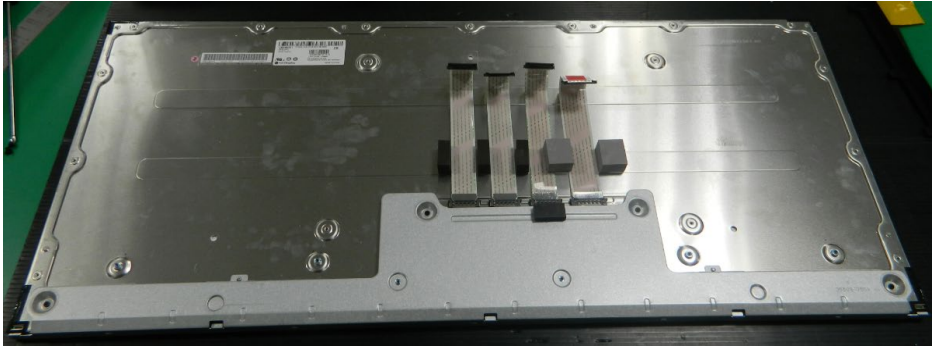


ENVIRONMENTAL PRODUCT DECLARATION

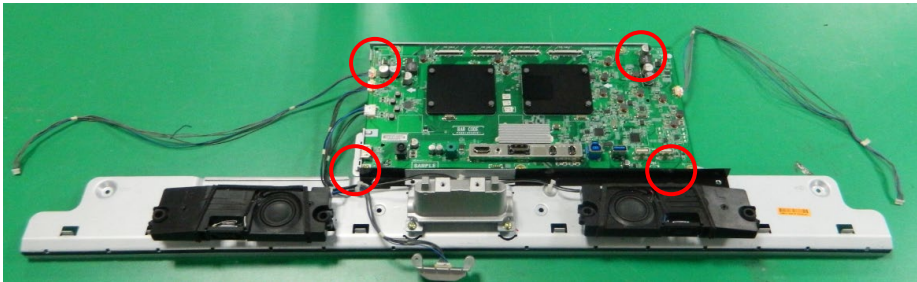


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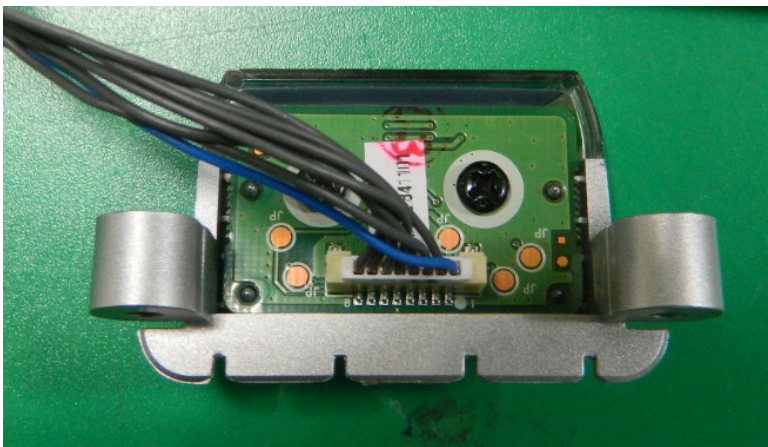
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Step 8. Remove Flexible Flat Cables from module.



Step 9. Disassemble the screws between metal bar and PCB, Remove the connector and speakers.



Step 10. Disassemble the screws (2EA) between control PCB and Control cover.



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Step 11. External cable, CD/Manual



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LG 21:9 UltraWide® Monitor

According to ISO 14025

Interpretation

The majority of the environmental impacts occur during the pre-manufacturing and use stages.

27.54% of the Ozone layer depletion potential occur in the pre-manufacturing stage.

And 76.94% of Acidification, 89.02% of Abiotic resource depletion, 87.06% of Global Warming, 74.74% of Eutrophication and 89.37% of Photochemical oxidation creation Potential occur in the use stage.

Within the pre-manufacturing stage the majority of the impacts result from the using of raw materials and components for MONITOR.

Also, Within the use stage the majority of the impacts result from the using of electricity. This is because using of the MONITOR consumes a significant amount of electricity, where significant portion of the electricity grid consists of fossil fuels.

Therefore, areas for possible improvement of the MONITOR are that:

Improving the function to reduce the energy consumption of the MONITOR and designing for reducing raw materials and components.

LGE's Corporate Plan is :

Low Carbon Purchasing Program

LGE announced that it will establish a low carbon supply chain by purchasing low-carbon parts from suppliers that actively participate in the greenhouse gas reduction program. Suppliers with greenhouse gas reduction goals will be selected as LGE's primary suppliers. LGE plans to purchase low carbon parts amounting to over KRW 5 trillion by 2020. To support its suppliers with low-carbon green management, LGE will support to establish greenhouse gas inventories and a monitoring system and provide third-party inspections, training programs.

Resource Reduction

LGE is conducting R&D to reduce resource usage by reducing the volume and weight of products while improving the convenience of product usage and appearance. Another way to raise resource efficiency is to increase the capacity while keeping the size of the products.

Manufacturing

For reduction of Environmental impact in Manufacture stage, LGE pursues various activities, including manufacturing process innovation, facility improvement, operation improvement, and renewable energy use. LGE improved the energy efficiency of compressors and air handling units, respectively used in the manufacturing facilities of air conditioners as well as MONITORS, household appliances and mobile phones. As the result, it could be reduced environmental impact.

Incineration Waste Heat Recovery System



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

LGE's Changwon factories invested approximately KRW 7.2 billion to establish a steam supply system operating with waste heat from the incineration plant of the city. With the introduction of the new system, the company achieved a yearly reduction of 10,000 tons of GHG emission and KRW 3.1 billion of energy consumption compared to the previous LNG system.

Distribution

For reduction of Environmental impact in Logistic stage, LGE aims to establish green logistics through modal shifts, energy usage optimization, and employee awareness.

Green Packaging

LGE has been working hard to create greener packaging suitable for each of its products. It tries its very best to improve the efficiency of shipping while providing safe product protection solutions, keeping the package compact and using greener materials.

- MONITORS.

LGE is carrying out research to find ways to reduce resource usage by reducing the weight of packages. In fact, LGE tries to introduce a new package with smaller size and recycled paper. Packages of some MONITORS use recycled paper.

Use

Energy Efficiency in On-mode LGE's top priority is to improve energy efficiency of our products based on Technology Roadmap(TRM) for each product line and achieving the specific goals set out on the roadmap. LGE set own future goals and detailed strategies to reduce energy consumption and standby power usage.

Standby Power Electronic devices including MONITOR and home appliances not only consume energy when they are being used, they also consume energy when they are plugged in, but not being used. The power that is consumed when the device is not being used is called standby power. LGE has reduced the standby power of its home appliances such as washing machines, MONITORS, and mobile phone chargers, etc to below 1 watt. Complying with technology development and regulation change, LGE has set a target to reduce standby power to below 0.5 watt for most home electronic products from 2013.

Disposal

Recyclability Improvement

LGE has an internal process to check the recyclability when products are designed and developed. With checklists, recyclability is evaluated and the results are used as a guidance to modify product design and development.



ENVIRONMENTAL PRODUCT DECLARATION



LG 34UB88-P
LG 21:9 UltraWide® Monitor

According to ISO 14025

References

EDP 004.MONITOR (2013/00/201309). Environmental Declaration of Products_Product Category Rules(PCR) for Monitor by Ministry of Environment, Korea.

ISO 14025 (2006). Environmental labels and declarations – Type III environmental declarations – Principles and procedures

ISO 14040 (2006). Environmental management - Life cycle assessment – Principles and framework

ISO 14044 (2006). Environmental management

