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## FOUNDATIONS OF HUMAN WELLBEING : SOCIAL, ENVIRONMENTAL, ECONOMIC

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#### INTRODUCTION:

There is no universally accepted definition of sustainability. Despite the lack of a universally accepted definition of sustainability, maintaining and fortifying the human foundations of wellbeing is an everyday challenge and an opportunity for the engineer to serve.

**Sustainability** is the capacity to endure. For humans, sustainability is the long-term maintenance of responsibility, which has environmental, economic, and social dimensions, and encompasses the concept of stewardship, the responsible management of resource use. In ecology, sustainability describes how biological systems remain diverse and productive over time, a necessary precondition for the well-being of humans and other organisms. Long-lived and healthy wetlands and forests are examples of sustainable biological systems.

Healthy ecosystems and environments provide vital resources and processes (known as "ecosystem services"). There are two major ways of managing human impact on ecosystem services. One approach is environmental management; this approach is based largely on information gained from educated professionals in earth science, environmental science, and conservation biology. Another approach is management of consumption of resources, which is based largely on information gained from educated professionals in economics.

Human sustainability interfaces with economics through the voluntary trade consequences of economic activity. Moving towards sustainability is also a social challenge that entails, among other factors, international and national law, urban planning and transport, local and individual lifestyles and ethical consumerism. Ways of living more sustainably can take many forms from controlling living conditions (e.g., ecovillages, eco-municipalities and sustainable cities), to reappraising work practices (e.g., using permaculture, green building, sustainable agriculture), or developing new technologies that reduce the consumption of resources"

The foundations of human wellbeing will be discussed in terms of sustainability of the environment and human spirit.

#### THE FOUNDATIONS

The foundations of human wellbeing are freedom, self-determination, intimacy with another, a social community, protection from the elements, food, water, health, entertainment, accumulation of things of value to promote human well being, knowledge and opportunity to

prosper and opportunity to use one's talents . All these foundations are linked to the culture of a community-a tribe or government. The list is reflected in archeological studies and various life-styles from those who live as nomads in the desert and tribes in the rainforests to those who live in villages, small towns and large cities. You may add to this list and I hope you would.

#### ARE LARGE CITIES AT THE TIPPING POINT?

All of these foundations depend on sustainability of sources, of food, water, materials, and energy which are dependent on the environment. Humanity can have a large footprint on the natural environment and does as gravitation to cities increases and communities are created to serve the cities and in-turn the human wellbeing. The footprint cannot be erased in every case. The utilization of natural resources obviously depletes resources. The creation of roads, buildings and other structures of concrete and steel utilizes resources and creates other impacts.

The question is have we reached or when will we a tipping point when cities become so large that the foundations cannot be met. Have we reached that point?

#### USE OF TALENTS

One foundation, the opportunity to use talents, is realized by all in the activities one pursues either as an entertainer, musician, craftsman, farmer, leader, medical professional, scientist, engineer, economist or activity. that contributes to the community. A fundamental is that these talents are so essential to a community that they predate history and are part of the development of humanity. Development has resulted in increased population. Increased population requires greater use of resources which drives the pursuit of knowledge and technology to control and protect the environment to maintain and improve lifestyle. This creates a sophisticated tension between humanity and the environment. Sophisticated because each generation thinks it has reached an apex in knowledge that will solve environmental problems and "crises".

#### INTEGRITY –ESSENTIAL TO HUMAN WELLBEING

Critical to utilizing the talents of the scientist, engineer, economist and leader is integrity. Scientists must be comprehensive relative to observation and while not always able to be totally comprehensive should not ignore data to reach a desired conclusion. The engineer must not make decisions beyond his/her area of expertise. The economist must not shape data to support a concept or outcome. The political leader has the obligation to place alternatives to serve the community in a balanced perspective. The perspective must be unbiased and based on input from scientists, economist and engineers.

## THE BEST TECHNOLOGY

The question always arises- *what is the best technology to serve the foundations of human wellbeing by promoting an economic environment of growth and opportunity in the developing and developed world.* Economic growth and opportunity rely on people, funding, raw materials, water and energy. Thus, there is constant tension between satisfying the human foundations of wellbeing and the environment. Again, this tension exists in a desert nomadic community, a village, a small city and in the metropolis. The answer to the question, *which technology is best to serve the foundations of human wellbeing by promoting an economic environment of growth and opportunity in the developing and developed world*, is hijacked by emotions of those who are uninformed as to the true consequences of the technology. Responsible engineers and scientists are not often part of the discussion. There is no argument that communities are not the ultimate decision maker but the decision should be shaped on an informed basis. This is a challenge.

The human spirit is intrinsic to the success of political and economic systems. Thus, the “well-thought- out” seemingly logical solution may clash with the very foundations of human wellbeing. The world of political systems to meet the needs of human wellbeing is complicated and compounded by those who take up a cause for one solution to lighten the footprint on the environment. Some well intentioned causes have unintended consequences. The role of the scientist and engineer is to use knowledge and invention/technology to eliminate harmful consequences or mitigate harmful unintended consequences. The engineer translates knowledge and ideas into functional devices and structures to serve human wellbeing. The engineer and inventor spawn technology. The physical scientist reduces observation into knowledge. Thus, the engineer and scientist must be part of the discussion of the choice of technology to serve humanity.

The social scientist based upon the human condition sees its role to be the conscience of the accumulation and use of knowledge. However, physical knowledge is revealed through the study of the universe and physical phenomena. The universe has no conscience. Thus, the study of the universe and physical phenomena and accumulation of knowledge should not be restricted. The use of technology must be guided by morality. The use of engineering created technology is the purview of communities that exercise the freedom of the people to choose and exercise self determination based on an agreed ethic.

## TEAM

The economist is critical to a team approach to apply technology. The long and short-term economic impact of a choice to achieve sustainability cannot be overlooked. The engineer and economist In addition to the environmentalist, physical scientists and social scientists are a

team to evaluate the economic impact of technology on the community, water , agriculture, aquaculture, natural resources and environment.

## WORLD CONTEXT AND REGIONAL DIFFERENCES

Sustainability and the foundations of human wellbeing require an approach in a world context. Each community , each government , cannot act alone . The economics of communities are so intertwined that the foundations of human wellbeing can be shaken by a sudden or slowly developing situation resulting from the wrong choices to satisfy the foundations , the well meaning of few, or intentional choices based on self-interests of a few. Engineers are partners with the community ,scientists, economists and leaders to serve the foundations and create opportunity for a more rewarding journey through life.

Regional differences dictate that one sustainability solution is not applicable to every region or throughout a country. All too often one thinks in terms of a locality of familiarity and not in terms of unfamiliar territory. What is appropriate in one community is not in another, In fact many less developed communities can strengthen the foundations with simple appropriate technology. Engineers Without Borders and E4C, Engineering for Change, are examples of applying “appropriate technology” to developing communities.

## RIO + 20 FORUM ON SCIENCE, TECHNOLOGY & INNOVATION

RIO + 20 and this Forum brings scientists, engineers, and political leaders together to share information on promoting human well being with a light footprint on the environment. Overshadowing all of these efforts are the economics of systems to serve human wellbeing

My WFEO colleagues -have summarized nicely a set of points that we should all consider.

- The scientific and engineering basis for decision making needs to be strengthened across the UN system and the interface between science, engineering and policy-making should be enhanced.
- Science and Technology need to be recognized as essential elements for establishing sustainable development policies.
- Technology is a result of applying knowledge developed by science by means and processes set up by engineering.
- Policies and decision making should be based on the best available natural science, social science, economic science, up-to-date engineering criteria and state of the art technology and they must benefit from scientific advances and engineering, technological, economic and social innovation.

- Efforts to improve the institutional framework for sustainable development at all levels, and international environmental governance institutions, must include strengthening of science, engineering and policy links, and strengthening the science-base and engineering capacity within all institutions.
- It is essential to launch a process to develop a new contract between science, engineering and society to deliver the knowledge necessary for a sustainable future. There should be a better exchange and application of existing knowledge and technology towards solutions, and support for globally coordinated research initiatives on sustainable development challenges, as well as technological innovation.
- Global mechanisms for international scientific and technological collaboration on sustainable development issues, including a global knowledge platform, need to be set up.
- Proposals and projects for sustainable development should require a thorough analysis of their technical, economic and environmental feasibility for their implementation.
- There is a need to recognize planetary boundaries and to make regular reviews of the state of the planet.
- Integrated science based indicators beyond GDP have to be developed.

The UN Resolution declaring 2012 -International Year of Sustainable Energy for All should be supported. The Resolution states that three interlinked objectives must be achieved by 2030:

- \* Ensure universal access to modern energy services,
- \* Double global rate of improvement in energy efficiency
- \* Double share of renewable energy in global energy mix

This topic is so large that all in this meeting contribute to what we must consider and how we must act to contribute to the foundations of human wellbeing