



# Understanding Sustainability

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# Sustainability!

- A word is almost in all conversations!
- 92,800,000 web results from Google!
- Everyone wants to be sustainable!
- Entities (people, corporations, governments) claim to be sustainable
- A buzzword.

# Sustainable Development

**“Development which meets the needs of the present without compromising the ability of future generations to meet their own needs”**

Brundlant Report “Our Common Future”

# Understanding Sustainability

- *What happened by now?*
- *What is the meaning?*
- *Why is it so important?*
- *Connecting the dots with alternative energy and sustainability*
- *Sustainability and Resilience*

# Historical Timeline

- **1969 : The U.S. passed “National Environmental Policy Act”**
- **1970: “The U.S. Environmental Protection Agency”** was established
- **1972: “Stockholm Conference” the United Nations Conference on the Human Environment.**
- **1972: The United Nations Environmental Program (UNEP) was formed**
- **1975: International Environmental Education Program was formed**
- **1980: World Conservation Strategy was launched**
- **1983: Gro Harlem Brundtland (Norway’s Prime Minister) was asked to chair special independent Commission” “The World Commission on Environment and Development (WCED)”**
- **WCED recognized first time that environmental quality and sustainable development were two inseparable concepts and must be linked in formulating global strategy**
- **1987: “The Brundtland Report “Our Common Future”** was published.
- **1992: “Rio Summit” or “Earth Summit” United Nations conference on Environment and Development. This was the second meeting in 20 years after 1972 Stockholm Conference.**
- **1992: Agenda for 21<sup>st</sup> Century was signed at the Earth Summit**

# Historical Timeline

1993: U.S. President's Council on Sustainable Development (PCSD) was established to help create U.S. policies that will encourage economic growth, job creation, and environmental protection.

1996 & 1997: PCSD released two major reports on "Building on Consensus: A Progress Report on Sustainable America."

**1997: "Kyoto Climate Change Agreement" was signed by more 150 nations.**

2001: "World Summit for Sustainable Development" in Johannesburg/South Africa to confront new critical issues the world is facing in this century with globalization.

**2012: Rio Summit on Sustainable Development released a report "The Future We Want".**

By 2015: "Millennium Development Goals" will be developed!

# Sustainability Concepts

- **“Sustainable development is development that meets the needs of the present w/o compromising the ability of future generations to meet their own needs”** ( Brundtland Report)
- Is environmental sustainability always an expensive to achieve?
- Can the environment be improved in conditions of poverty?
- Is social sustainability the most important element?
- The economically socially and environmentally stable development is needed.
- **“The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations”** ( Rio Declaration, Principle 3 )  
(<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>)

## From “Our Common Future” to “The Future We Want”

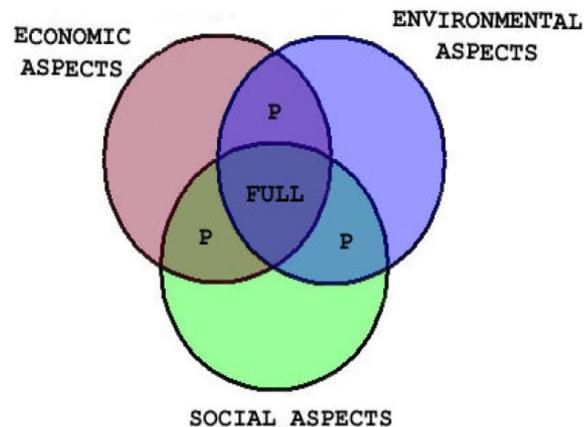
- There is need to further mainstream sustainable development at all levels, integrating economic, social and environmental aspects and recognizing their inter-linkages, so as to achieve sustainable development in all its dimensions.
- Recognizing that people are at the center of sustainable development and in this regard to strive for a world that is just, equitable and inclusive. Committing to work together to promote sustained and inclusive economic growth, social development and environmental protection is essential to benefit all.

## What is needed?\*

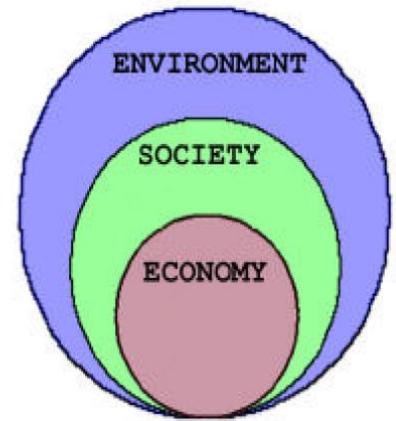
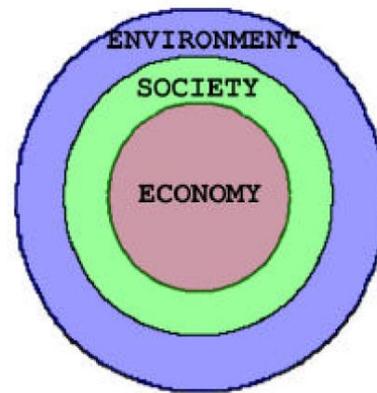
- Reaffirm all the principles of past action plans.
- Advance integration, implementation and coherence.
- Since 1992 there have been **insufficient progress and setbacks** in the integration of three dimensions of sustainable development.
- Sustainable development should progress at a **regional, national, subnational and local levels**.
- Engage major groups and stakeholders and individuals.
- Promote **green /low-carbon economy** in the context of sustainable development.
- \* "The future we want" Report of the U.N. Conf. on Sustainable Development, Rio de Janeiro, 2012.

# Understanding Sustainability

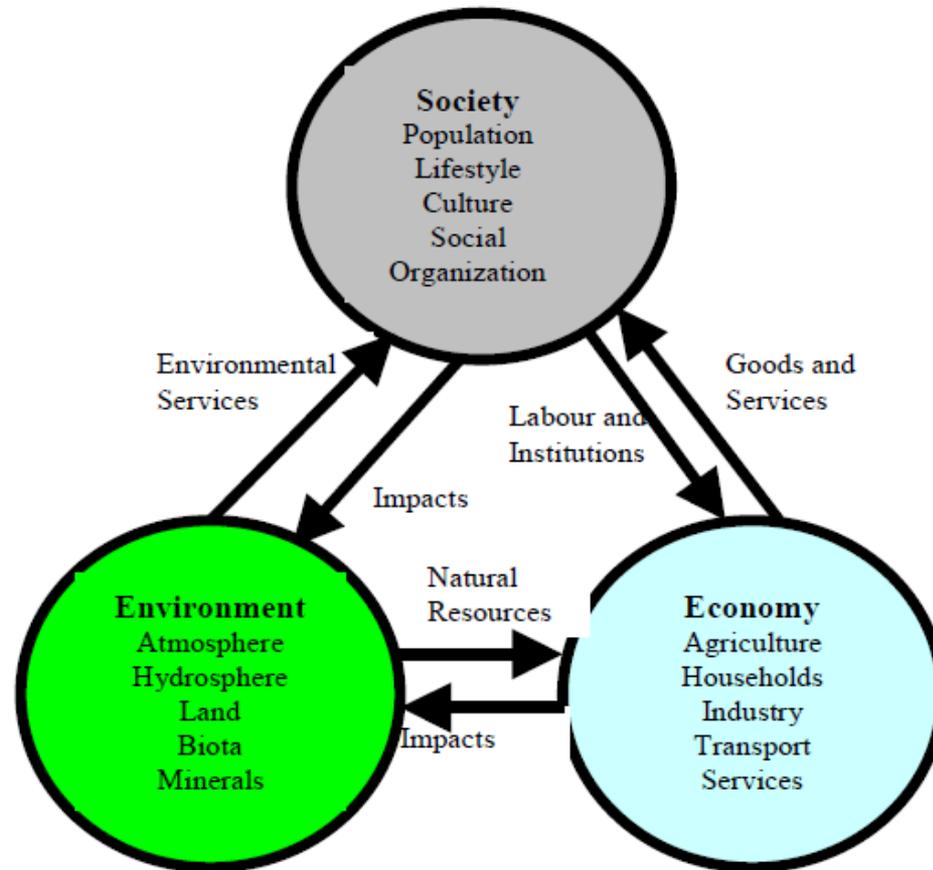
- Alternative to the dominant socio-economic paradigm
- Three pillars of sustainability usually represented as:



P: Partial integration  
 FULL: Full integration



# Three Elements of Sustainability\*



\*<http://www.exergy.se/goran/hig/ses/pdfs/algobaisi1.pdf>

# Understanding Sustainability

- Sustainability embodies **integration, understanding, and acting** on the complex interconnections that exist between environment, economy, society and organizations.
- This is not a balancing act or playing of one issue off against the other, but realizing the **interdependent, systemic nature of these pillars**.

# Concepts of Sustainability

- **Strong Sustainability:** The development does not lead to irretrievable loss of resources. The ecosystem including plants, animals and raw materials have a value in themselves and not just as input in the economic process
- **Weak Sustainability:** Human or manufactured capital can take the place of natural capital. Natural capital can be used up as long as it is converted into manufactured capital of equal value.
- **Resilience:** The capacity to absorb shocks while maintaining the function. Managing the capacity of systems to cope with, adapt to and shape change. Resilience enhances the likelihood of sustaining development in changing environments where future is unpredictable.

## Sustainable Developments:

- Inter-generational and intra-generational equity
  - Multiple generations – present and future
- Precautionary or risk aversion strategies
- Conservation of biodiversity
- Multiple domains
  - Natural, economic, social and institutional
- Micro versus macro scale

# Sustainable Development

- Sustainability Goals:
  - Based on scientific evidence and expertise
  - Quantifiable, measurable, reportable and verifiable
  - Include global sustainable development standards
  - Address urbanization and its implications

# Need for Sustainable Development:

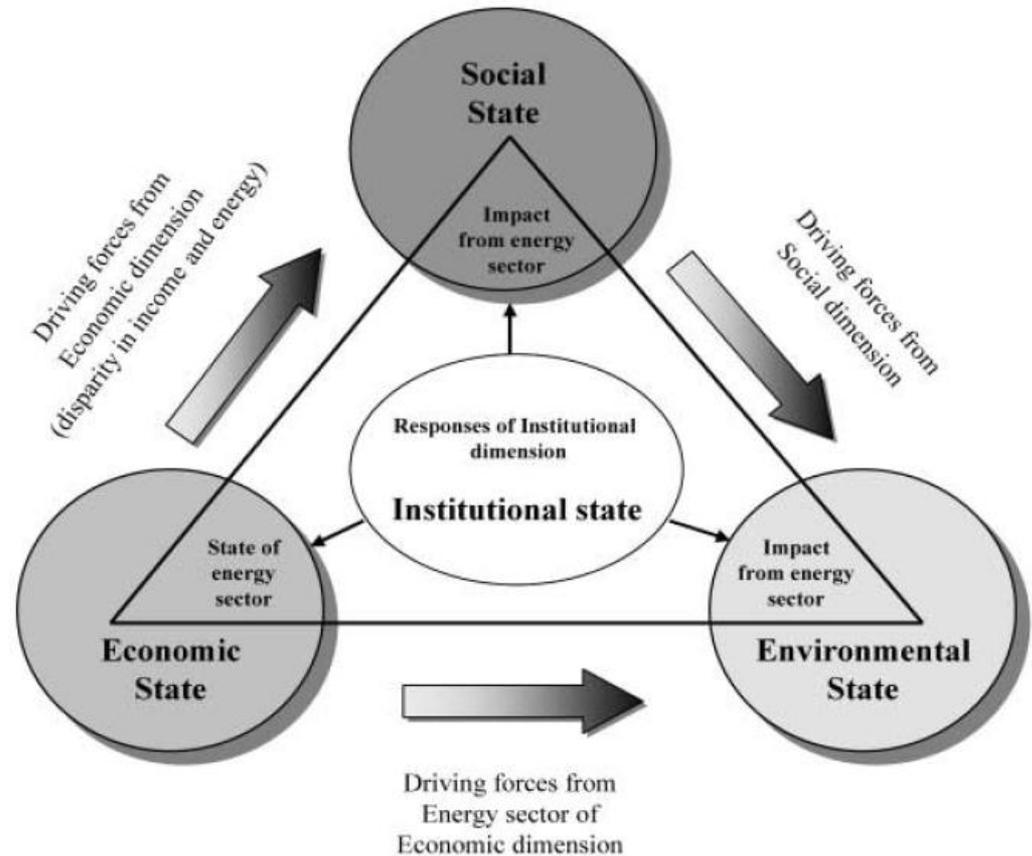
- Address Growing Energy Demand
- Reduce Global Warming
- Improve Environment
- Create Economic Growth
- Provide Social Equity
- Realize Sustainable Development Overall

# Linking Sustainability & Energy:

- Energy is vital for :
  - **Eradicating poverty**
  - **Improving human welfare**
  - **Raising living standards**
- Current energy supply and consumption is not sustainable
- Policy makers should understand the implications and impacts of various energy programs, alternative energy policies, strategies and plans to shape sustainable development.

# Indicators for Sustainable Energy Development:

- **Economic Dimension**
- **Social Dimension**
  - Ethic Dimension
- **Environmental Dimension**
  - Global Dimension
  - Ecological Dimension
- **Institutional Dimension**



# Achieving Diffusion of Innovation in the Alternative/Clean Energy Sector

- Bench-scale energy technologies need to be further developed to pilot-scale level
- Engineering aspects need to be validated
- Pilot and demo scale trials needed
- Life cycle analysis of the processes
- Readiness testing for commercialization
- Experience & lessons learned at every step of the process documented
- Distribution of new technologies and new information

## Need Clean Energy for Low-Carbon “Green Economy”

- **Power Generation:**

- Making progress but fossil fuels continue to outpace them
- More aggressive policies are needed for RE and EE
- Policy need for CCS to achieve climate change goals faster and efficiently
- Storage technology is needed

- **Transportation:**

- **Sustainable Advanced Biofuels**
  - Low carbon, second or third generation ethanol or gasoline like fuels for light duty passenger cars
  - Low carbon biodiesel for heavy duty and jet fuel for airplanes
- **Electric Vehicles**
- **CNG ( NG and biogas) vehicles**

## Needs for Clean Energy Progress:

- An increased level of systems thinking is needed to integrate the **broad range of clean energy technologies** into the energy system.
- Increased attention and resources are required to **expand smart grid projects on a regional level**.
- Developing policy frameworks and engaging the public.
- Public spending on research, development and demonstration.

## Lastly: How to succeed as a “Sustainability Officer”?

- **Recognize that:**
  - Sustainability programs are not the kind that finish
  - They are ongoing and can and should be improved w/innovation
- **Be a change agent with a systems thinking.**
- **Do not be a hero! Be a catalyst!**
- **Make the connections and understand how the social, business and environmental community operate.**
- **Take risks and recognize you do not know all the answers.**
- **Be willing to borrow good ideas, ask for advice and when necessary be equally willing to admit that you guessed wrong!**