



International Atomic Energy Agency

**Workshop on IAEA Tools for
Nuclear Energy System Assessment (NESA)
for Long-Term Planning and Development**

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Energy and Sustainable Development

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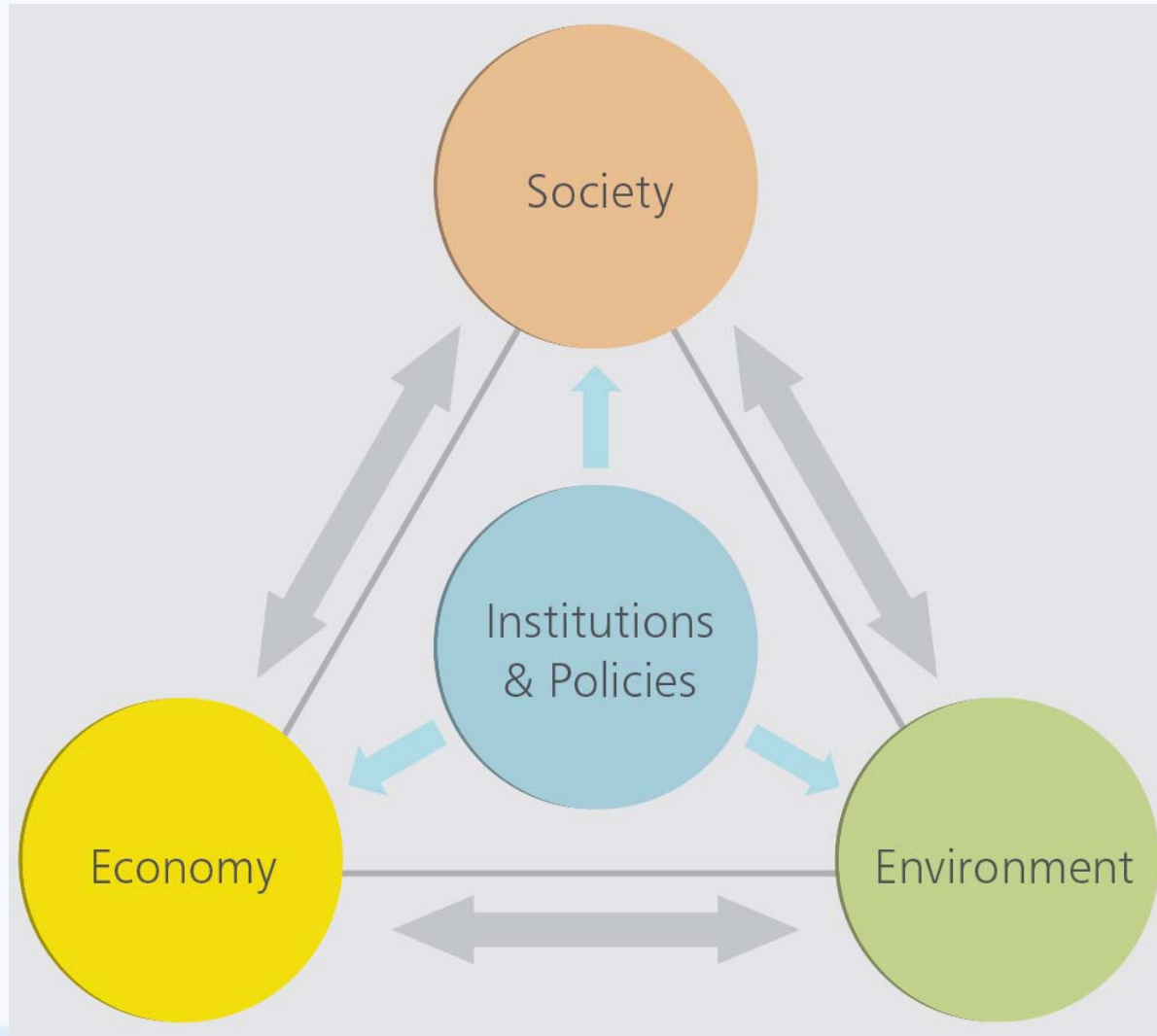
**IAEA TC Project INT/4/142: Promoting Technology Development and
Application of Future Nuclear Energy Systems in Developing Countries**

Outline

- What is sustainable development?
- Energy and sustainable development
 - Energy and the economy
 - Energy and society
 - Energy and the environment
- Where to next: Analysis and measurement



What is sustainable development?



What is sustainable development?

- ***"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."***
- **Some key concepts:**
 - **Weak sustainability**
 - **Strong sustainability**
 - **Measurement, planning and scenarios**

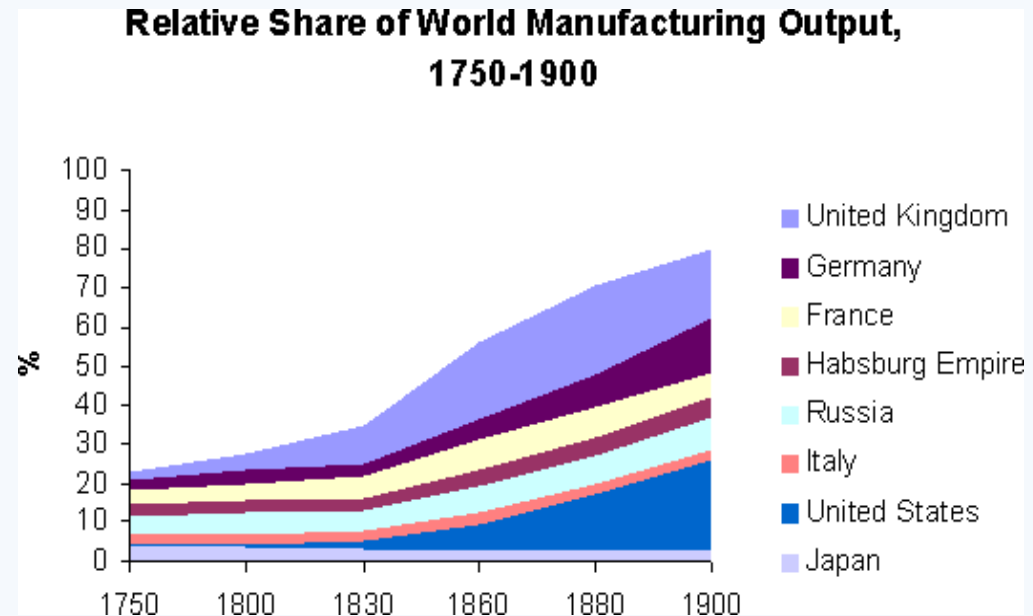
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World Commission on Environment and Development (WCED). *Our common future*. Oxford: Oxford University Press, 1987 p. 43



Energy and the economy

- Sustainable energy services must be accessible and affordable
- Their revenues must exceed full production cost
- Ideally, their prices must cover the full cost to society, i.e., external costs should be internalized
- *Without energy there is no economic activity*

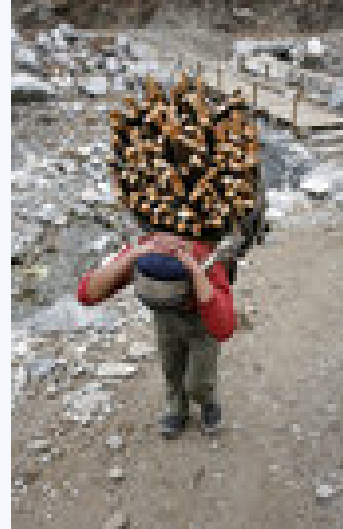


- ***With appropriate affordable energy (and associated utilization technology) there can be considerable economic gains***
 - Consider the for example the “industrial revolution” and the progress of the UK and the US above.

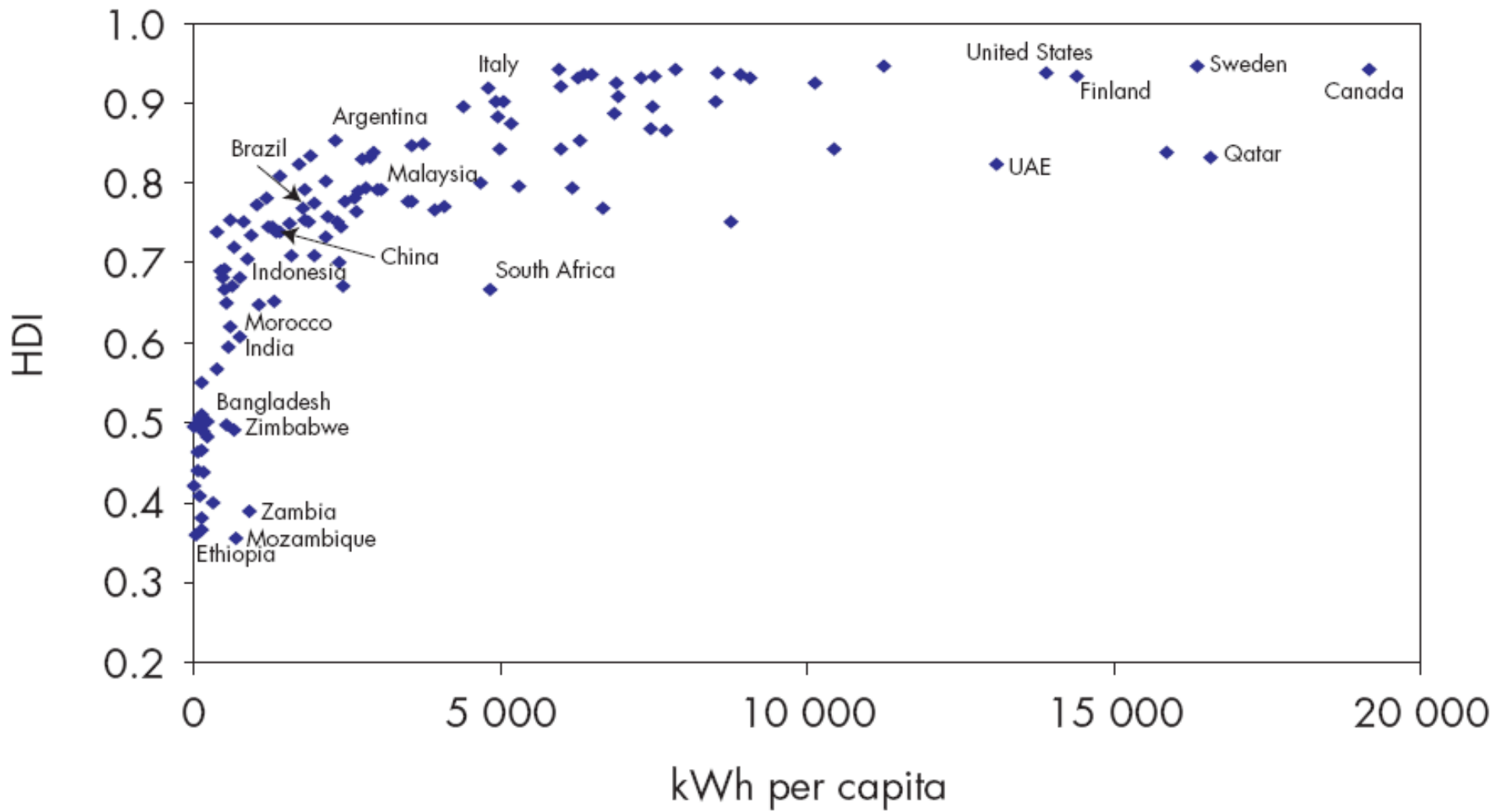


Energy and society

- **Appropriate affordable energy is needed for all MDGs. Some special considerations associated with access to appropriate energy include:**
 - Education
 - Reducing fuel collection times
 - Improved communication
 - Etc.
- **Note that as people get wealthier, income is associated with increased use of energy services**



Energy and society



Energy and the environment



- **Burning fossil fuels is the single biggest anthropogenic emitter of CO₂**
- **China: 300 000- 450 000 premature air-pollution related deaths annually**
- **2.4 billion people are exposed to woodsmoke annually**
- **Famous smog episodes in London killed thousands in the 50s**
- **In many cities, - due to new technology and regulation - pollution is now much lower**
- **A key element is the management of the energy component of the system**



Some considerations

- **Without energy there is no development**
- **Without an appropriate energy system there is / are:**
 - **Environmental damage**
 - **Poor allocation of resources**
 - **Energy security concerns**
 - **Inadequate social service**
 - **And many other issues the make development unsustainable ...**
- **Determining and measuring what the attributes of the energy system - as well as what potential development scenarios - are plausible are logical next steps.**



Where to next? Analysis and measurement

- **What you can't measure you can't manage:**
 - Indicators for Sustainable Energy Development
- **Consistent plausible scenarios require tools and experts:**
 - IAEA tools for energy planning and capacity building
- **Within these scenarios the roles of key technologies, such as nuclear can be established**





...Thank you for your attention!