Energy Systems
in
Developing Countries & Emerging Economies

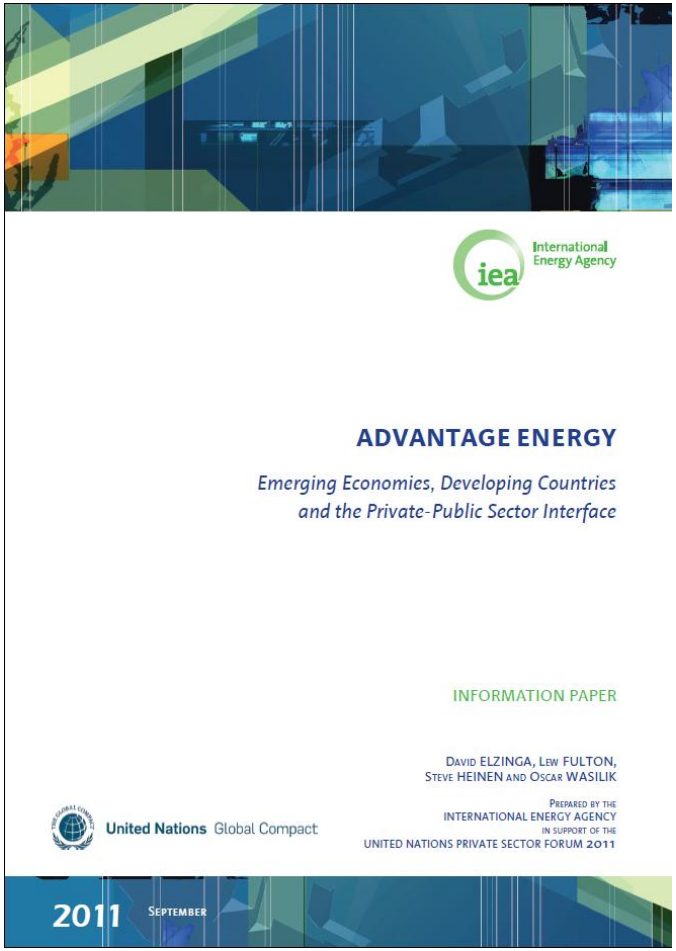
Steve HEINEN

Energy Systems Workshop

Paris, 7th November 2011

Advantage Energy

Emerging economies, developing countries and the private-public sector interface



http://www.iea.org/papers/2011/advantage_energy.pdf

Why look outside the OECD countries?

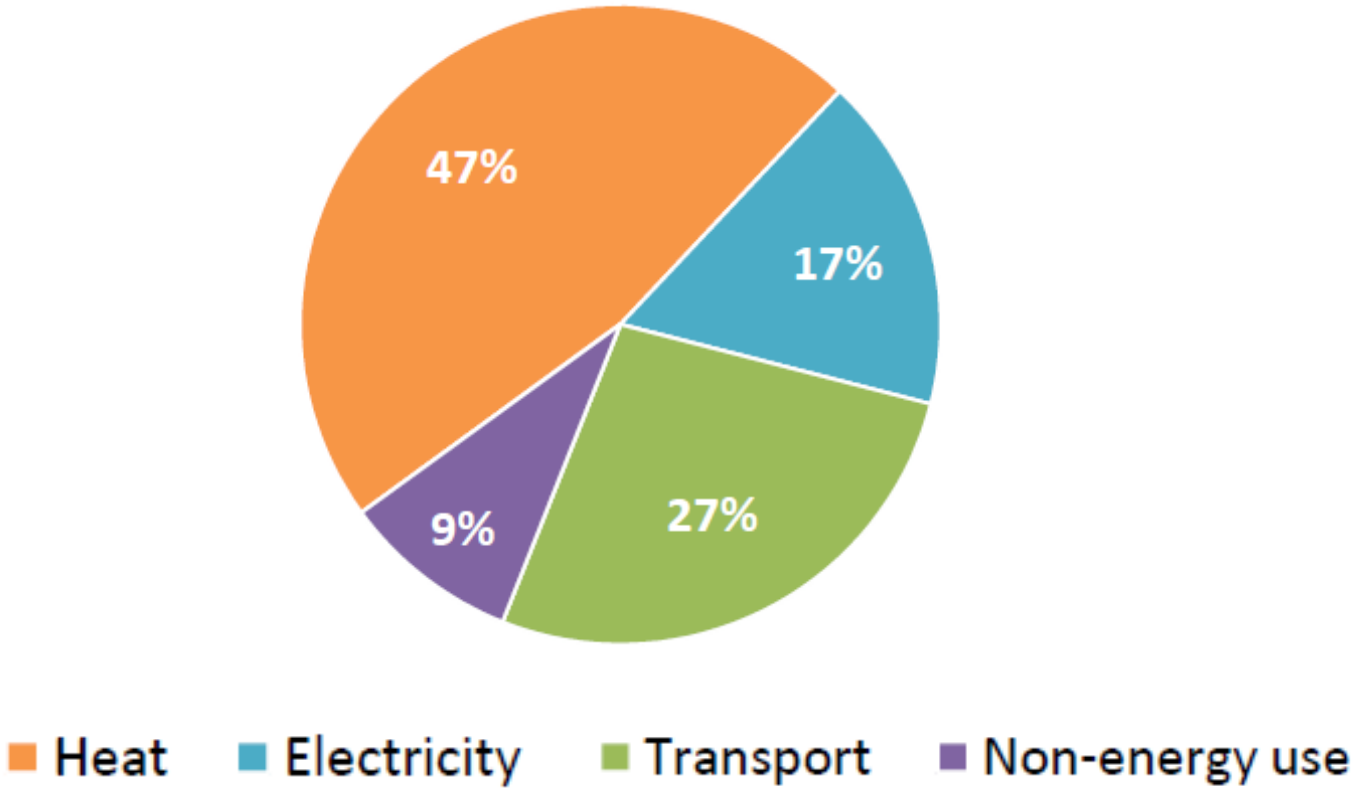
- High demand growth for energy in non-OECD countries
- Vision of sustainable energy system is global…..
- …..but the starting point and technology development pathway are different
- Role of technology
  - Different technologies are available at an earlier stage of social and economic development
  - Avoid technology lock-in
  - Long-term (2050) strategy, thinking and planning required

Is the systems approach important?

	Access to energy	Renewable energy	Energy efficiency
Heat	Modern heat	Renewable heat	Thermal efficiency
Electricity	Electrification	Generation	End-use technologies
Transport	Public transit and non-motorised modes	Biofuels	Vehicle fuel economy and electric vehicles

- **Provides framework for detailed assessments: the needs, pathways and stakeholders for the different energy subsystems vary widely – especially on a regional basis**
- **A holistic approach can identify synergies between the energy sub-systems**
- **All energy sub-systems contribute to the development agenda, but lack exposure in some circles**
- **A "one size fits all" does not apply**

Global final energy use

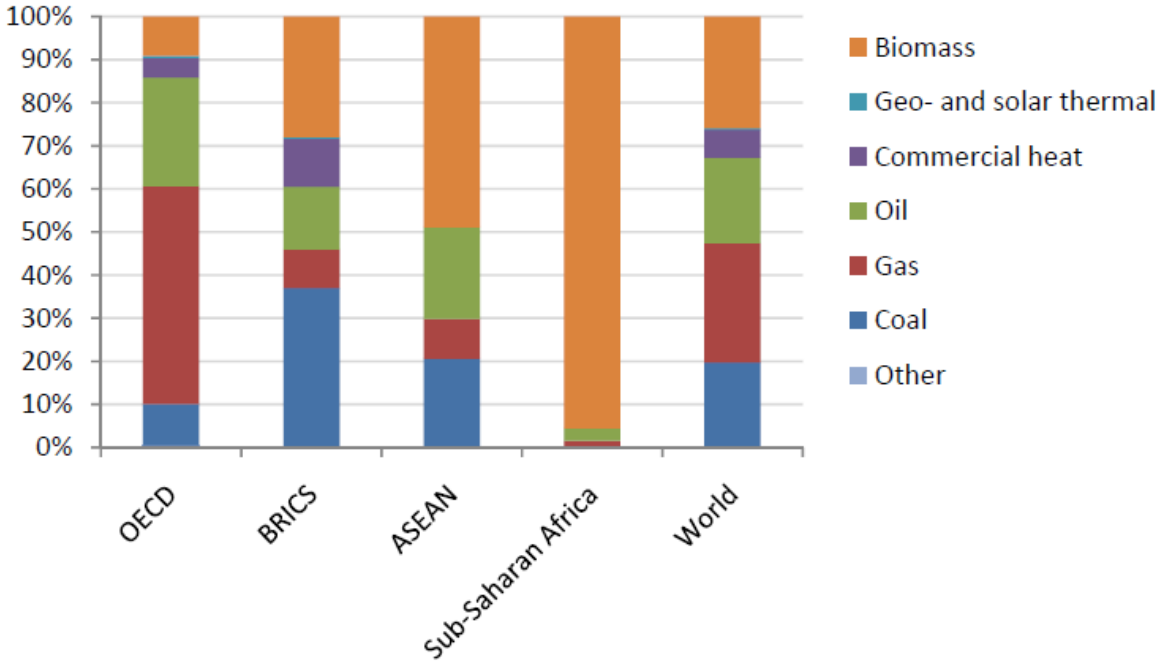


Includes all sectors of energy use

Heat

- The distribution of heat is highly dispersed and often decentralised, making it difficult to analyse.
- As countries are developing, the use of heat sources shifts from lower quality (e.g. conventional biomass) to higher quality fuels (e.g. gas, electricity)

World end-use fuel supply for heat consumption (selected countries, 2008)



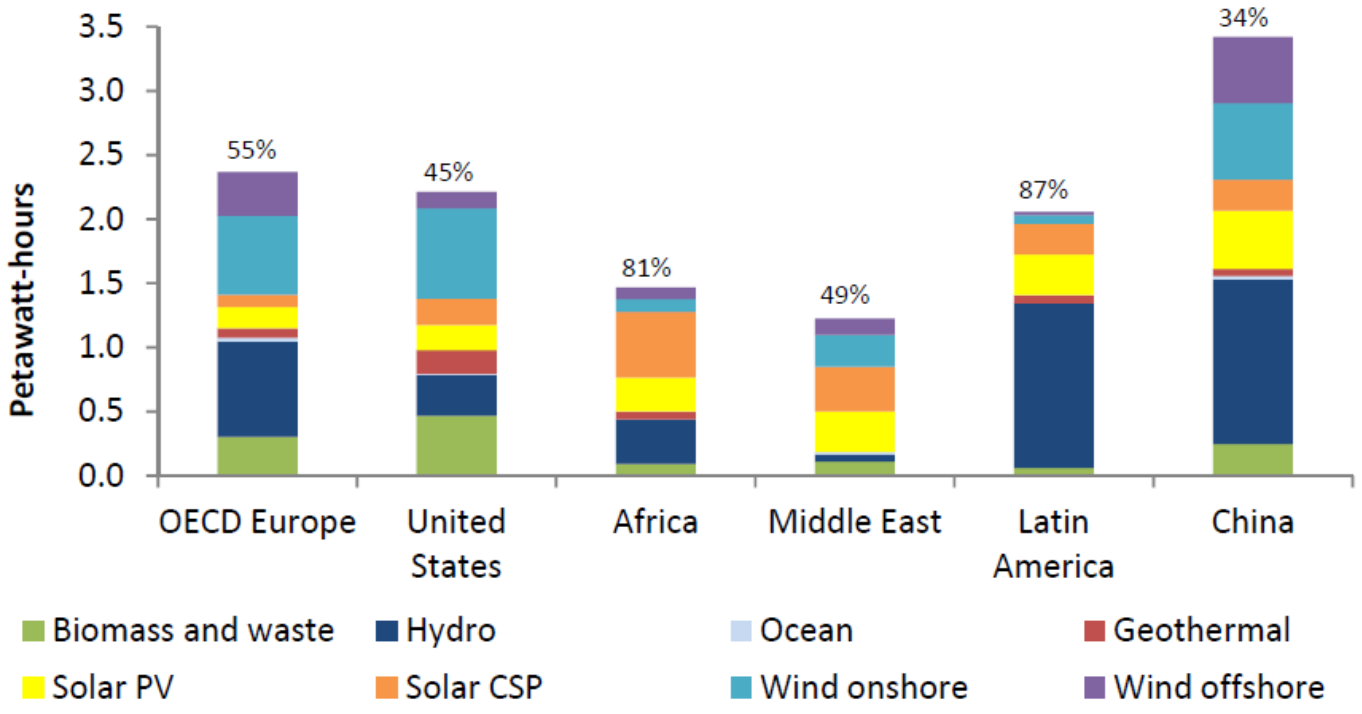
Electricity (1/2)

- Growth in general demand and increased use of electricity in heating and transport is seen in all regions globally
- Typically a highly regulated environment with significant changes to approaches over the last 20 years
- Technologies for access:
  - Rural applications
  - Urban
- Technologies for efficiency:
  - Large-scale generation can be improved through off-the-shelf technologies and improved operations and maintenance.
  - Technical losses and theft in T&D can be greatly reduced through smart-grid technology deployment.
- Technologies for End-use
  - Typically a global market and standards are key for efficiency

Electricity (2/2)

- **Renewable energy will play a large role in addressing access to electricity issues**

Renewable generation in the BLUE Map scenario for key countries and regions, 2050

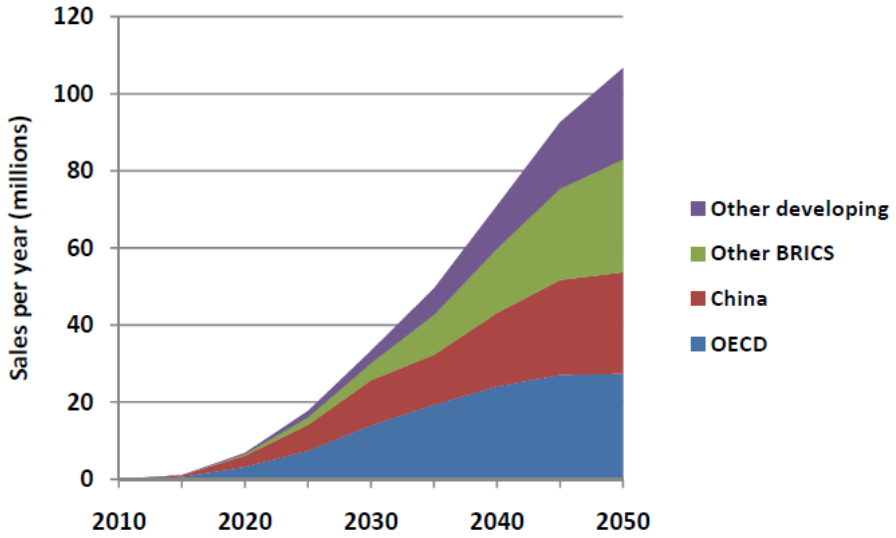


Note: Percentages above columns show the share of renewable energies in total electricity generation.

Transport

- **A range of technologies and forms of mobility will be important to sustainable transport:**
  - **Public transit (such as light rail and bus rapid transit)**
  - **Non-motorised transport (especially in regions that are unlikely to experience high car ownership levels)**
- **Road transport**
  - **Improved vehicle fuel economy**
  - **Adoption of electric and plug-in hybrid electric vehicles (EV/PHEVs)**
  - **Wider use of biofuels**

Annual EV/PHEV sales between, 2010 - 2050



Key questions

1. Emerging economies discussion

- What are the similarities between OECD countries and emerging economies? Is further categorisation required?
- What is the risk to not engaging?
- Is it worth investing in advanced technology when conventional technology is sufficient? How can decisions be made to develop a energy deployment roadmap?

2. Developing countries discussion

- What are the similarities between OECD countries/ emerging economies and developing countries? Is further categorization required
- Building from scratch: what can be potential benefits and risks?
- Is it worth investing in advanced technology when basic needs are not met? How can decisions be made to develop a energy deployment roadmap?
- Where are the synergies between low-carbon technologies and energy poverty/access to energy?

Key questions

1. Emerging economies discussion

- What are the similarities between OECD countries and emerging economies? Is further categorisation required?
- What is the risk to not engaging?
- Is it worth investing in advanced technology when conventional technology is sufficient? How can decisions be made to develop a energy deployment roadmap?

2. Developing countries discussion

- **What are the similarities between OECD countries/ emerging economies and developing countries? Is further categorization required**
- **Building from scratch: what can be potential benefits and risks?**
- **Is it worth investing in advanced technology when basic needs are not met? How can decisions be made to develop a energy deployment roadmap?**
- **Where are the synergies between low-carbon technologies and energy poverty/access to energy?**