

Mitigation planning and capacity building in the energy system

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IAEA

International Atomic Energy Agency

Why capacity building in energy planning?

- **A prerequisite for informed decision making and sustainable energy development**
 - **Optimal domestic resource allocation**
 - **Establishment of merit order of action / technology choice / NAMAs based on long-run marginal system costs**
 - **Access and affordability**
 - **Environmental risks and benefits**
 - **Investment requirements, financial viability, finance & long-run marginal costs**
- **Shift from sequential stop-gap measures to comprehensive and integrated system planning including mainstreaming climate change (NAMAs)**
- **Testing of effectiveness of policy measures**

Architecture of the Energy System

What
Nature
Provides

Energy
Sector

Efficiency &
Infrastructure

What
People
Want

Sources

coal oil natural gas sunlight uranium wind biomass

Extraction Treatment

coal mine hydro dam oil cleaning rig separation beneficiation liquefaction gasification

Conversion Technologies

hydro station thermal power plant oil refinery nuclear generating station photovoltaic cell wind converter

Currencies (fuels)

electricity gasoline methanol methane hydrogen heat

Distribution

electricity grid gas grid truck dewar railway district heat grid

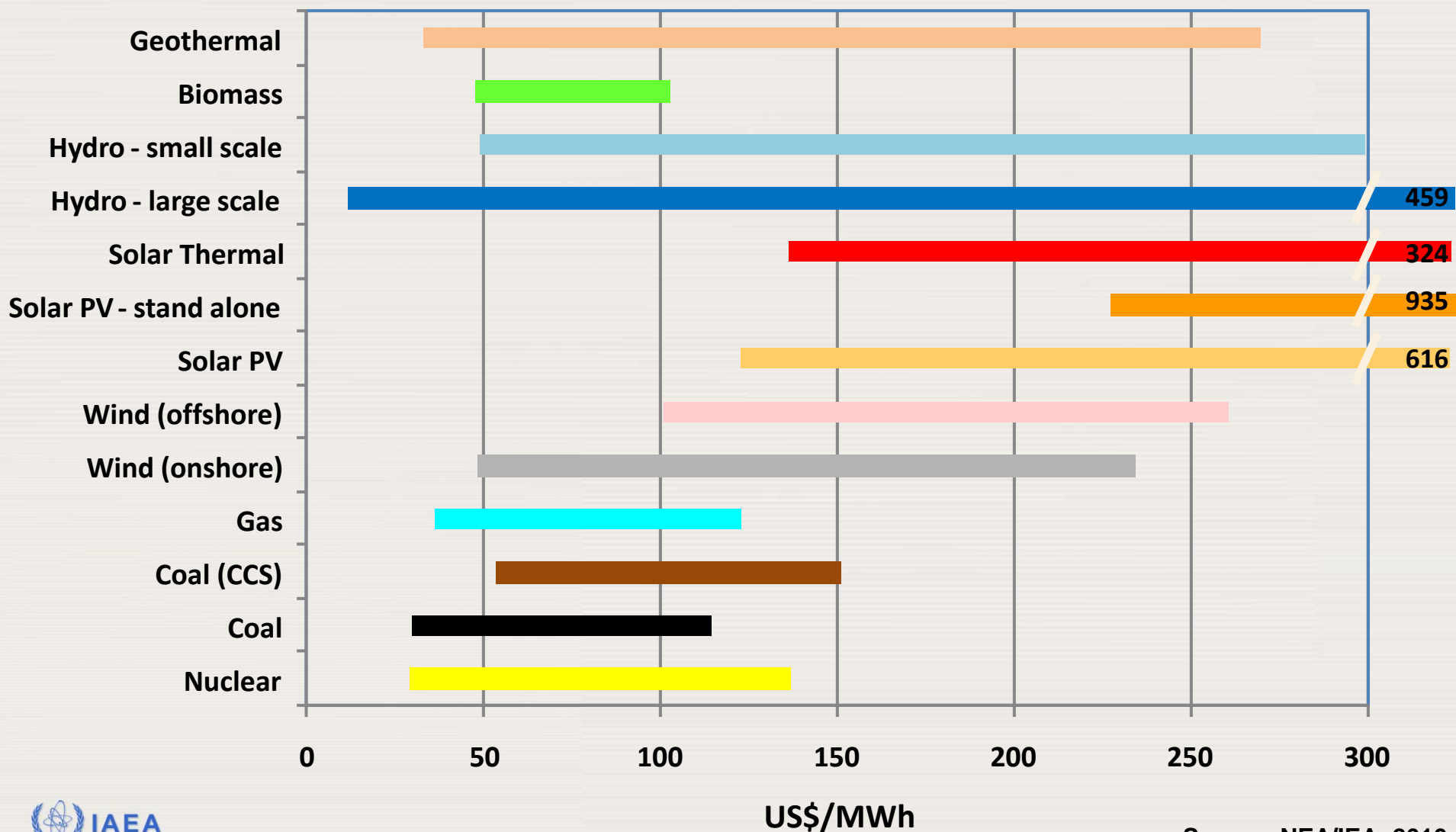
Service Technologies

automobile light bulb telephone furnace microwave oven aircraft PC

Services

transportation communication keeping warm/cold food
potable water health care security consumer goods

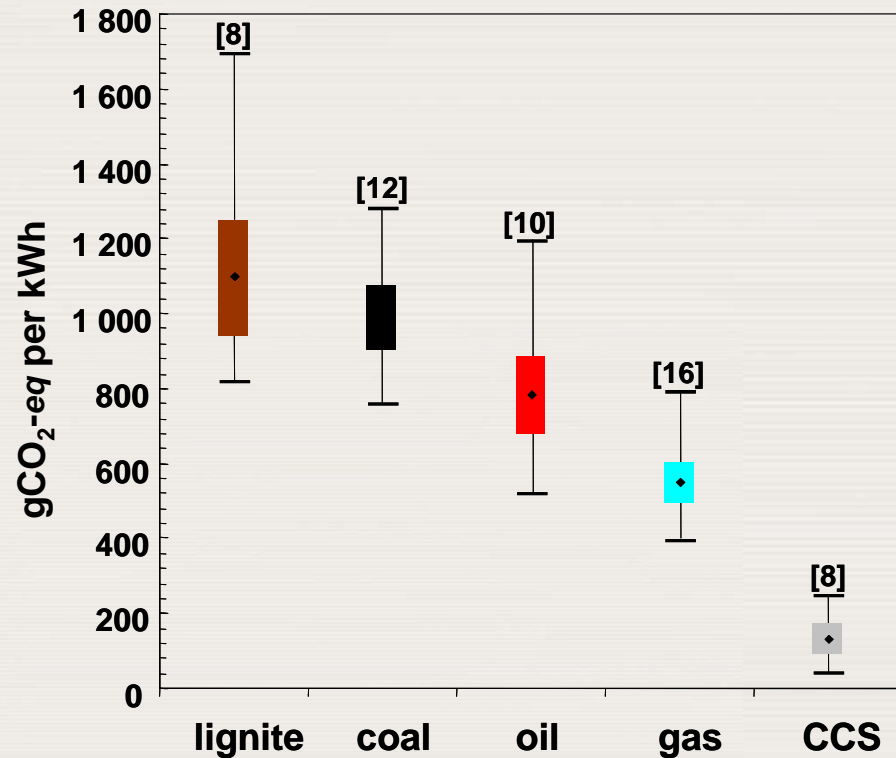
Range of levelized generating costs of new electricity generating capacities



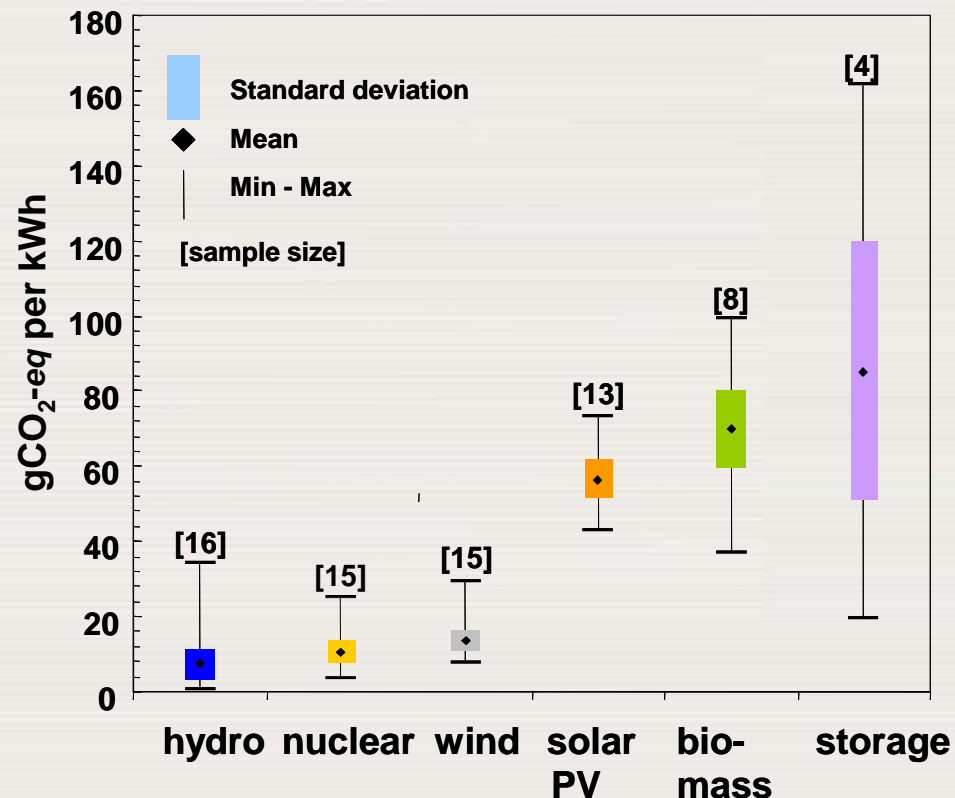
Mitigation – Comparison of different electricity generating options

Life cycle GHG emissions of different electricity generating options

Fossil electricity generation
(life cycle emissions)



Non-fossil electricity generation
(life cycle emissions)



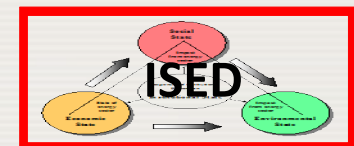
IAEA: Capacity building – hands on expert training

- Transfer planning models tailored to developing countries (and the analysis of NAMAs)
- Help identify data: technologies, resources and economics
- Train local experts
- Jointly analyze national options
- Help establish lasting local expertise



Sample of IAEA energy planning and analysis tools

- **M**odel for the **A**nalysis of **E**nergy **D**emand
- **M**odel for **E**nergy **S**upply **S**ystem **A**lternatives and their **G**eneral **E**nvironmental impacts
- **F**inancial Analysis of Electric Sector Expansion **P**lans
- **S**implified Approach for Estimating **I**mpacts of Electricity Generation
- **I**ndicators for **S**ustainable **E**nergy **D**evelopment



Why modeling?

- **Comparative assessment of options**
- **Transparency & boundaries**
- **Quantification**
- **Repeatability / reproducibility**
- **Sensitivity analyses – What if questions**
- **Documentation**
- **Communication & acceptance**
- **Indicators for monitoring progress**
- **Re-occurring or rolling activity**

Closing remarks

- **IAEA analysis tools help identify and rank NAMAs based on**
 - **cost-effectiveness of mitigation measures**
 - **national or local conditions such as energy resource availability, technology, human resources**
 - **policy objectives**
 - **finance**
- **But most importantly is the establishment of lasting national capacity in the area of energy system planning – the analysis of mitigation options and NAMAs is just a co-benefit**

IAEA



...atoms for peace.

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