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abdus salam
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**College on Evaluation of Energy Technologies
and Policies for Implementation of Agenda-21**

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**Main Considerations in Energy Technology
Evaluation**

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These are preliminary lecture notes, intended only for distribution to participants

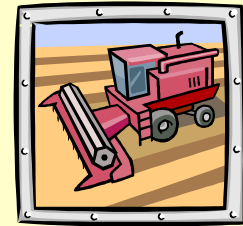
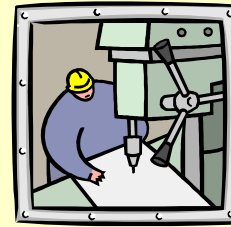
Main Considerations in Energy Technology Evaluation

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Energy Technologies



Architecture of the Energy System

What
Nature
Provides

Sources

coal oil natural gas sunlight uranium wind biomass

Extraction Treatment

Coal mining oil/gas extraction hydro dams uranium mining, etc.

Conversion Technologies

Hydropower plants thermal power plants nuclear power plants
photovoltaic cells wind turbines oil refineries gas processing coal
gasification/liquefaction, etc.

Energy carriers

electricity gasoline methanol methane hydrogen heat

Distribution

electricity grid gas grid district heat grid trucks railways

Service Technologies

automobile Light bulb furnace microwave aircraft PC
oven

Services

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

Energy
Sector

What
People
Want

Energy system should deliver services in a sustainable manner

Accessible and acceptable

Affordable and reliable

Do not interfere with nature's equilibria

Energy technologies should be evaluated in terms of:

- Technical Performance and needs**
- Economic competitiveness**
- Environmental impacts**
- Social aspects**
- National Policies and Goals**

Energy technology evaluation

Technical

- Potential
- Infrastructure
- Fuel and Spare supplies
- Manpower (skills)
- Technical performance
- Technical compatibility
- Reliability
- Technical and commercial maturity

Energy technology evaluation

Economic

- Investment
- Operating costs
- Other costs
- Construction time and service life
- Overall production cost
- Net present value
- Pay back period
- Return on investment

Energy technology evaluation

Environmental

- Air emissions
- Liquid and solid wastes
- Land use
- Accident risks

Energy technology evaluation

Social

- **Social acceptance and compatibility**
- **Employment**
- **Human Health**
- **Equity and income distribution**

Energy technology evaluation

National Policies and Goals

- Energy Security**
- Diversification**
- Regional Development**
- International Commitments**