ENARD and other IEA activities related to Distributed Generation

1st International Symposium – Distributed Generation and Smart Grids, Vienna, 18-19 October 2006

Samantha Ölz
Renewable Energy Unit

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Distributed Generation

- The integrated or stand-alone use of **small, modular electricity generation sources**
- Installed **within the distribution system** or on **customer's site**
- **By utilities, utility customers** and other **third parties**
- To meet specific **capacity** and **reliability needs**
- **In applications that benefit** the electricity system, end-use customers, or both

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The IEA's interest in DG

- Electricity market liberalisation
- Climate change concerns
- Developments in DG technologies
- Transmission system constraints
- Demand for reliable electricity

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IEA 3 Es

- Energy security
- Economic growth
- Environmental protection

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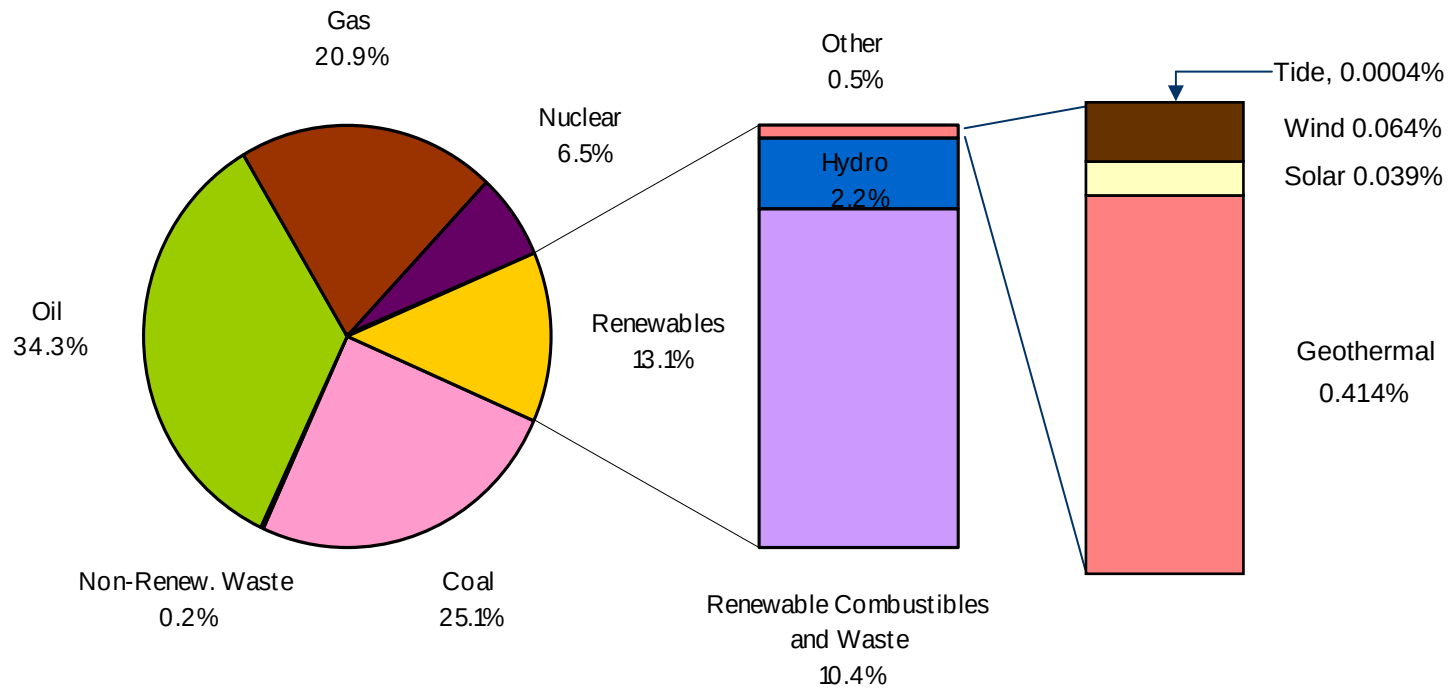
2004 Fuel Shares of World Total Primary Energy Supply



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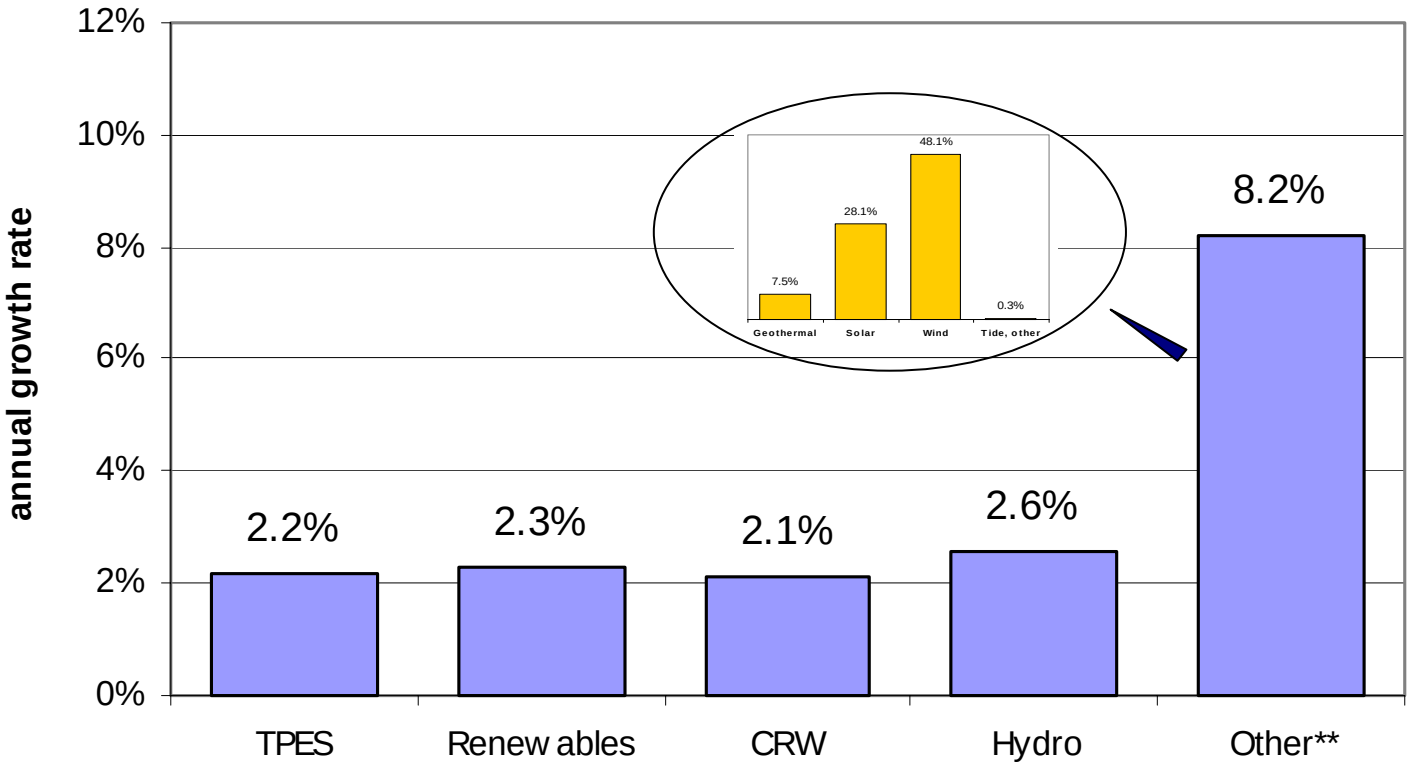
Annual Growth of Global Renewables Supply from 1971 to 2004



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WORLD ENERGY OUTLOOK

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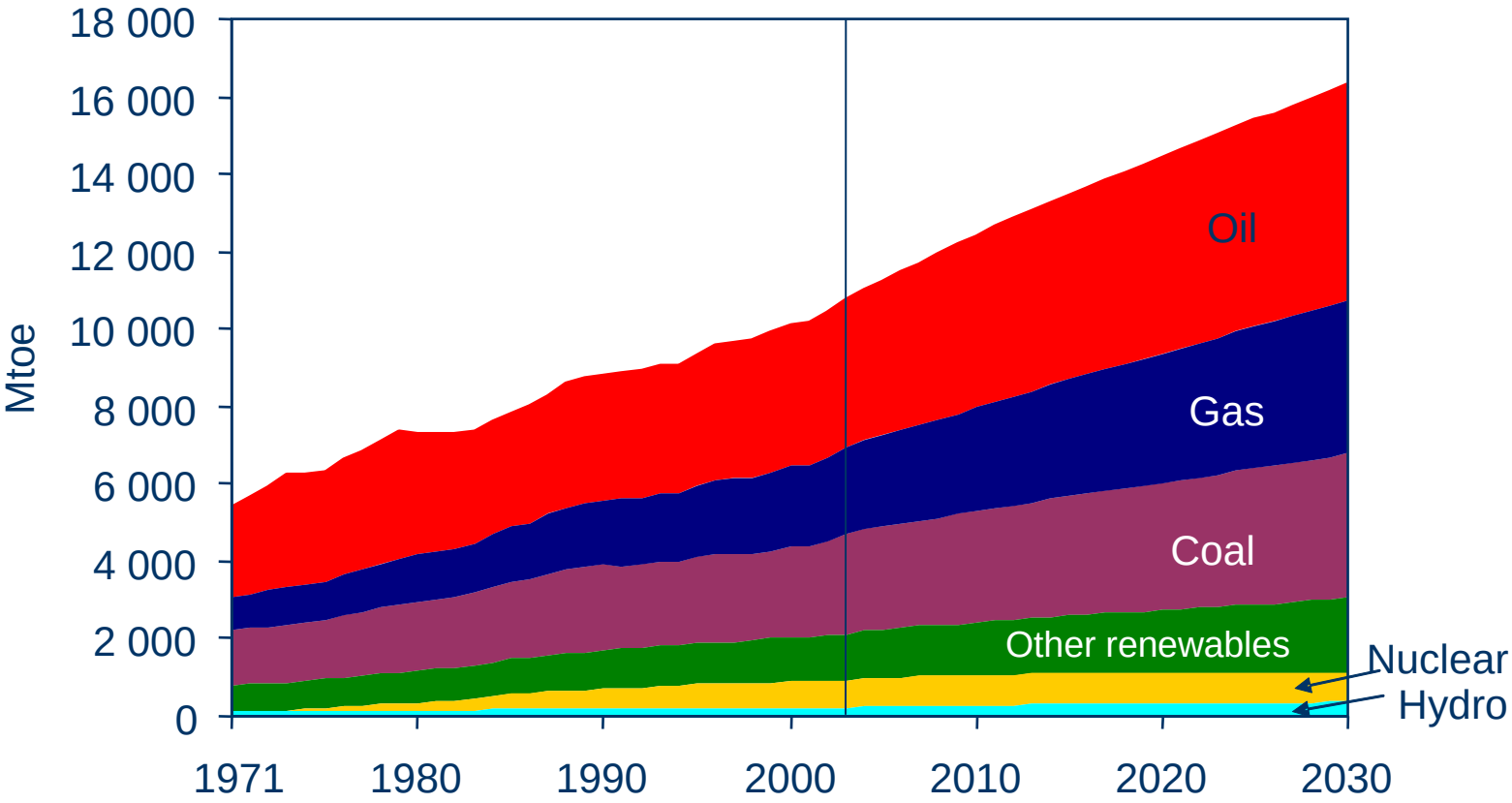
World Primary Energy Demand



Oil and gas together account for more than 60% of the growth in energy demand between now and 2030 in the Reference Scenario

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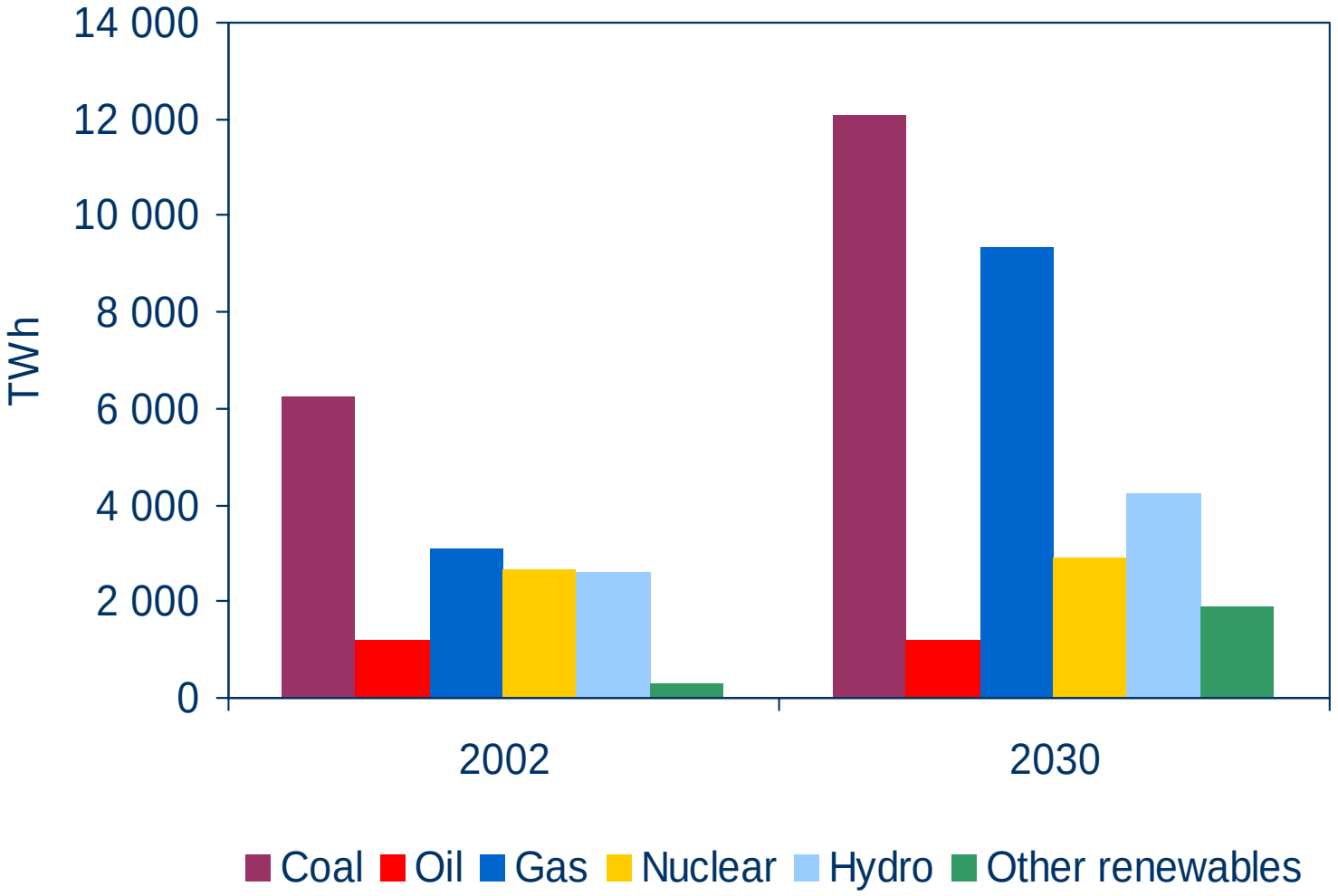
World Electricity Generation



Gas-based electricity production will triple, but coal will remain the dominant fuel worldwide

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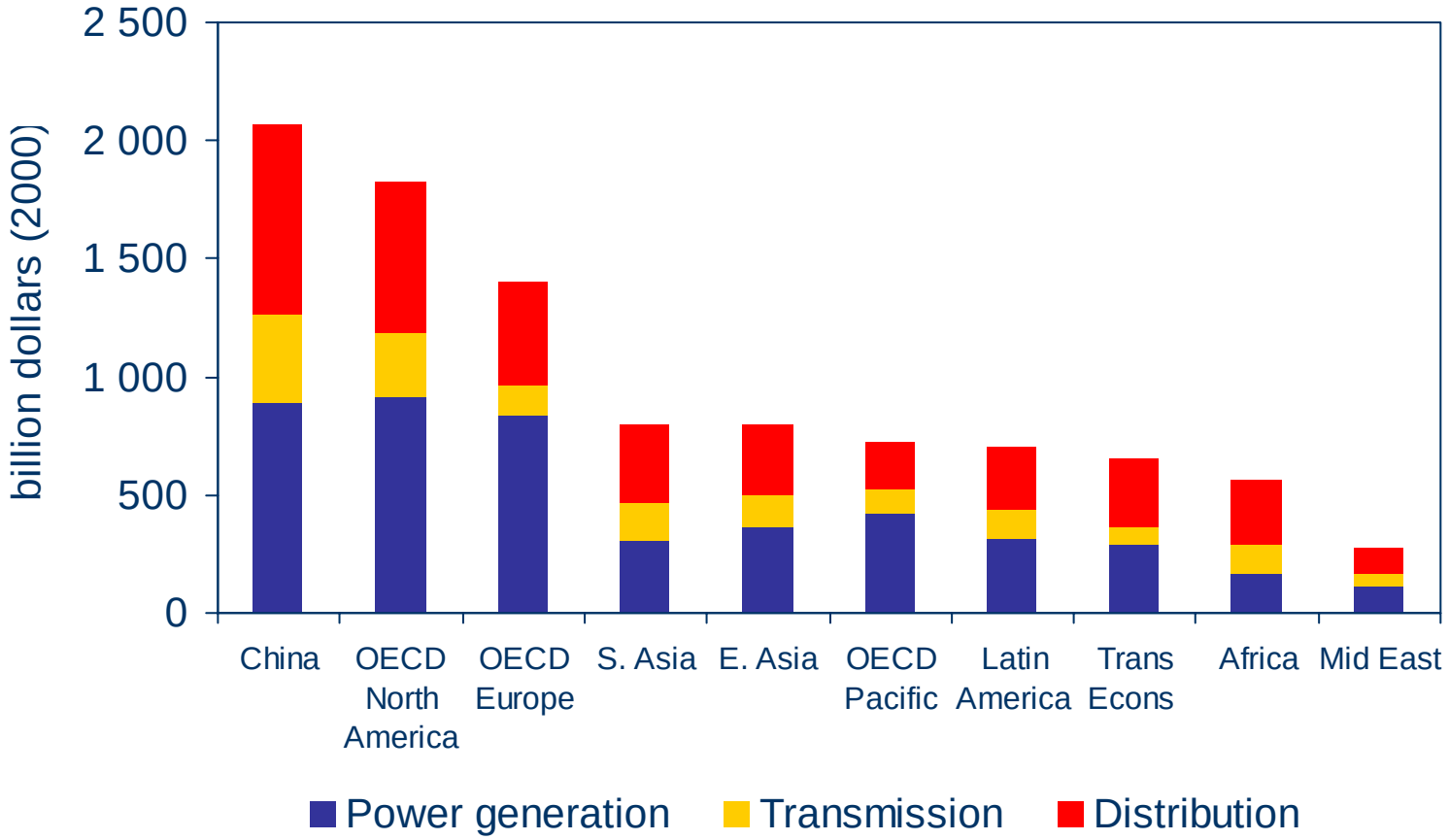
Power Sector Investment 2003-2030



Investment of almost USD10 trillion is needed, more than half for transmission & distribution networks

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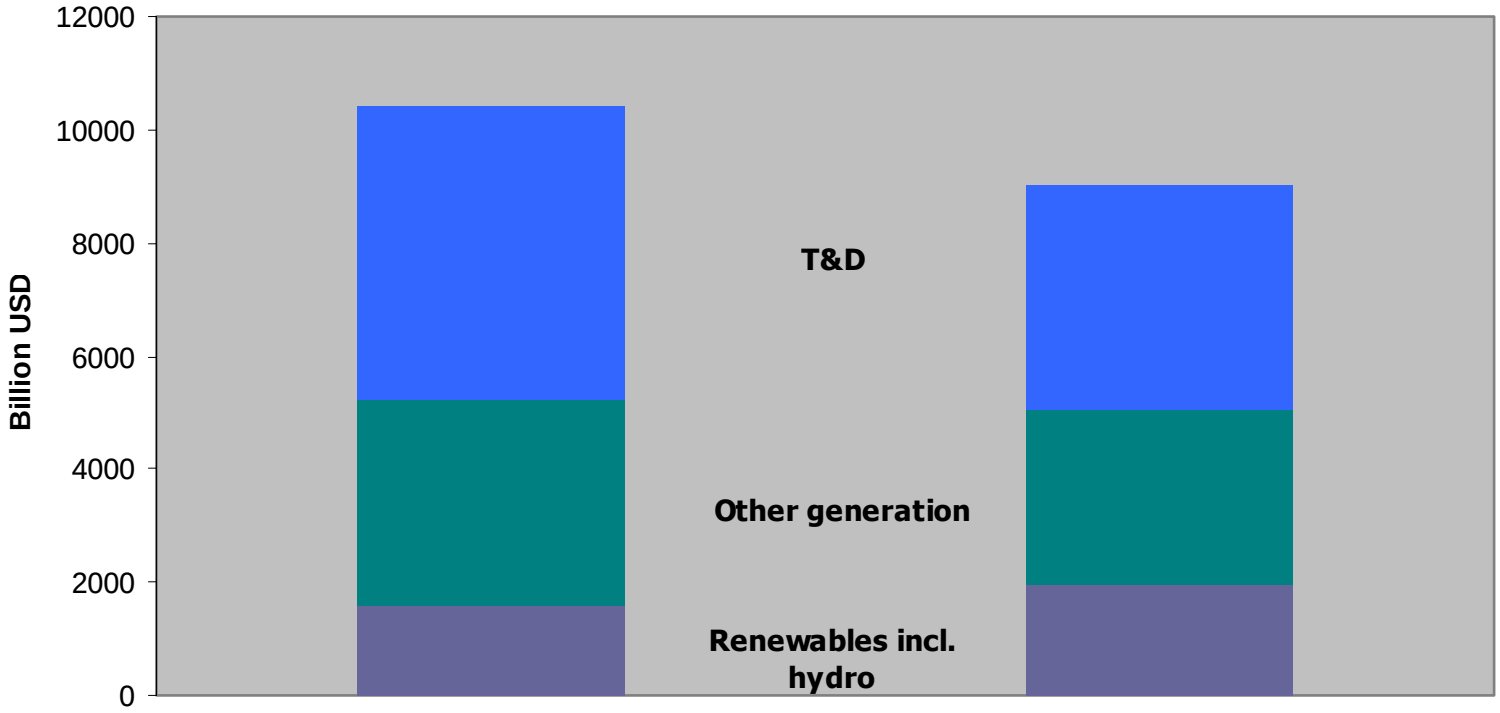
Investment 2003-2030



Reference Scenario

Alternative Scenario

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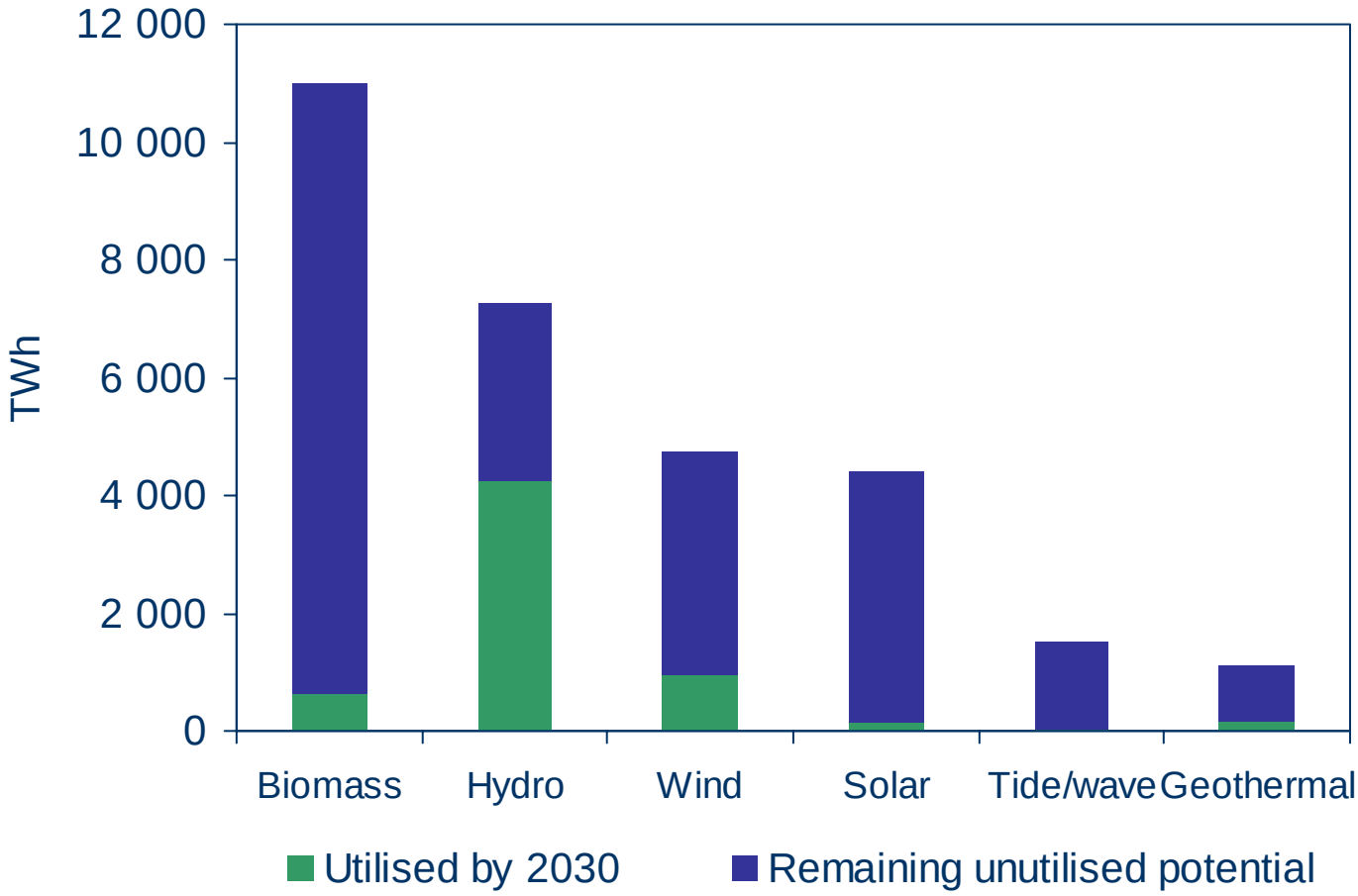
World Long-Term Renewable-Energy Potential for Electricity Generation



Only a small fraction of the long-term potential of non-hydro renewables will have been exploited by 2030

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RD&D priorities - key messages

- Renewables are one important means to improve energy security and to mitigate CO_2 emissions (WEO Alternative Scenario - 20% contribution of renewables to CO_2 reduction).
- RD&D leads to cost reduction and makes renewables competitive.
- Market deployment policies are key for the realization of renewable energy potentials.
- Strategies need to be developed further since most renewables have not reached their potential.

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IEA Technology Collaboration Programme (Implementing Agreements)

- 9 focusing on renewables out of 41 current Agreements (ImpAgs)
- Over 100 tasks
- Nearly 500 participating institutions
- Average 12 countries per Agreement
- USD 120-150 million spent each year under the collaborative programme
- Non-IEA Member countries and industries can and do participate

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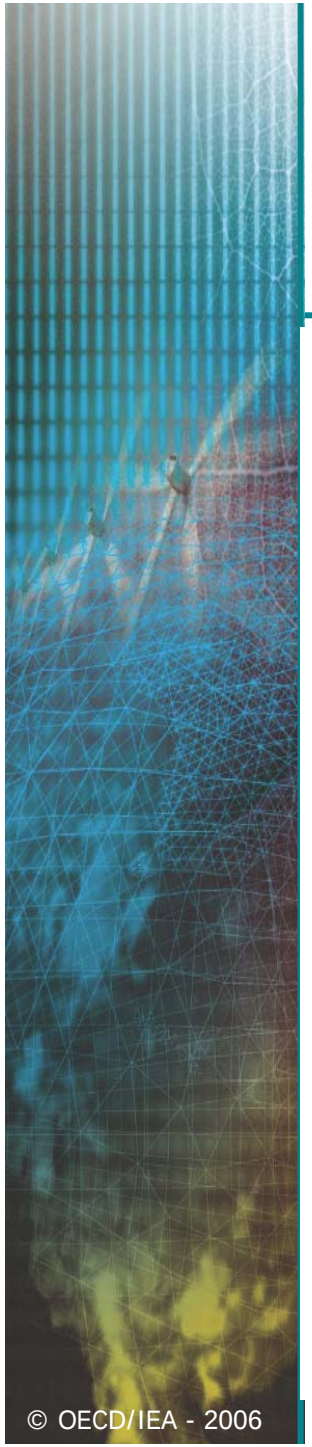

IEA Network for Technology RD&D and Deployment

- Renewable Energy Working Party (REWP) oversees ImpAgs on Renewables:
  - Bioenergy
  - Hydropower
  - Geothermal
  - Photovoltaic
  - Solar Heating and Cooling
  - SolarPACES
  - Ocean Energy
  - Wind Energy
  - Renewable Energy Technology Deployment
    New

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IEA DG research activities

- **Technical**
  - **ImpAgs: PVPS; Wind; Hydro; Geothermal; SHC, SolarPACES; Bioenergy; RETD; Hydrogen; DHC/CHP; ECBCS**
  - **IEA G8 Gleneagles Programme: Grid integration of renewables**
  - **CHP and district heating & cooling: possible expanded work programme**
- **Socio-economic**
  - **ImpAgs: Bioenergy**

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IEA DG research activities – cont'd

- **PVPS**
  - Task 3: Use of PV power systems in stand-alone and island applications
  - Task 5: Design and grid interconnection of building integrated and other dispersed PV systems
  - Task 7: PV power systems in the built environment
  - Task 9: PV services for developing countries
  - Task 10: Urban-scale grid-connected PV applications
  - Task 11: PV hybrid systems within mini-grids
- **Wind**
  - Task 14: Integration of wind and hydropower systems
  - Task 21: Dynamic models of wind farms for power system studies
- **Hydro**
  - Task 2: Small-scale hydro power
- **Geothermal**
  - Task 8: Direct use of geothermal energy
- **SolarPACES**
  - Task 4: SHIP – Solar Heat for Industrial Processes

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IEA DG research activities – cont'd

- **Solar Heating and Cooling**
  - Task 27: Performance of solar façade components
  - Task 31: Daylighting buildings
  - Task 32: Advanced storage concepts in low-energy buildings
- **Bioenergy**
  - Task 29: Socio-Economic Drivers in Implementing Bioenergy Projects
  - Task 32: Biomass Combustion and Co-firing
  - Task 41: Bioenergy Systems Analysis
- **RETD**
  - RETs in heating and cooling markets
- **Hydrogen**
  - Task 18: Integrated Systems Evaluation
- **DHC/CHP**
  - All tasks
- **ECBCS**
  - All tasks, e.g. heating, cooling, ventilation, building-integrated fuel cell & cogeneration

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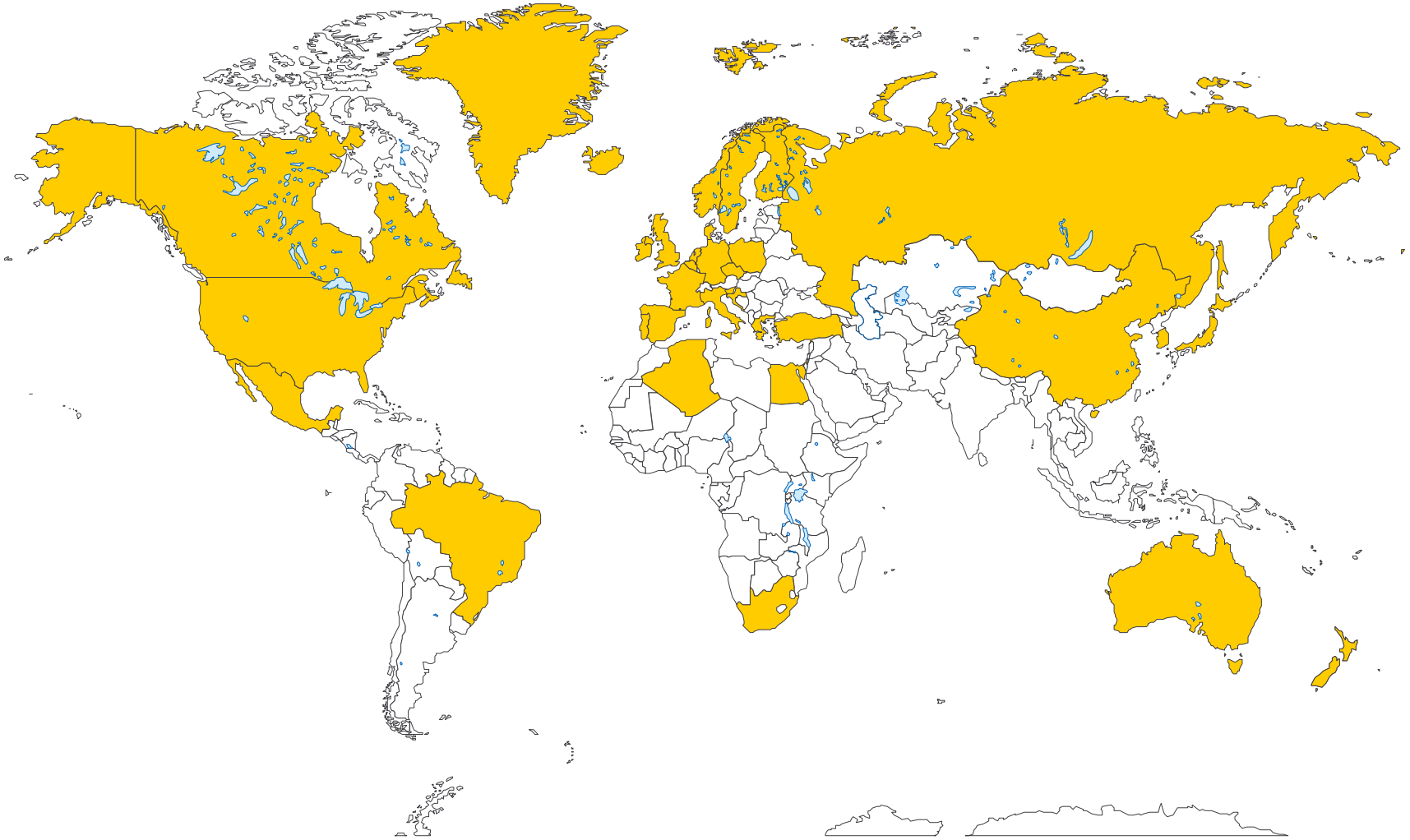
Participating countries of DG-related ImpAgs



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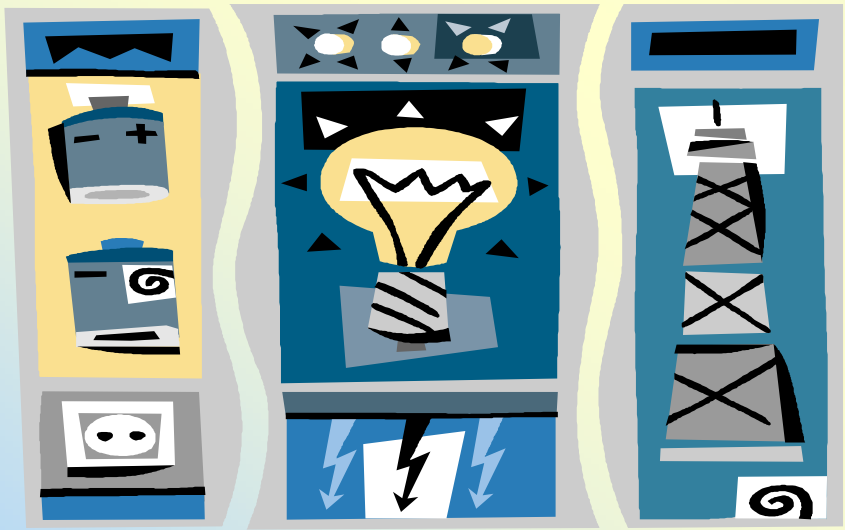
Electricity Networks Analysis, Research & Development (ENARD)

- New Implementing Agreement
- Contracting Parties: Belgium, Denmark, Finland, Italy, Norway, Switzerland, Sweden, United Kingdom



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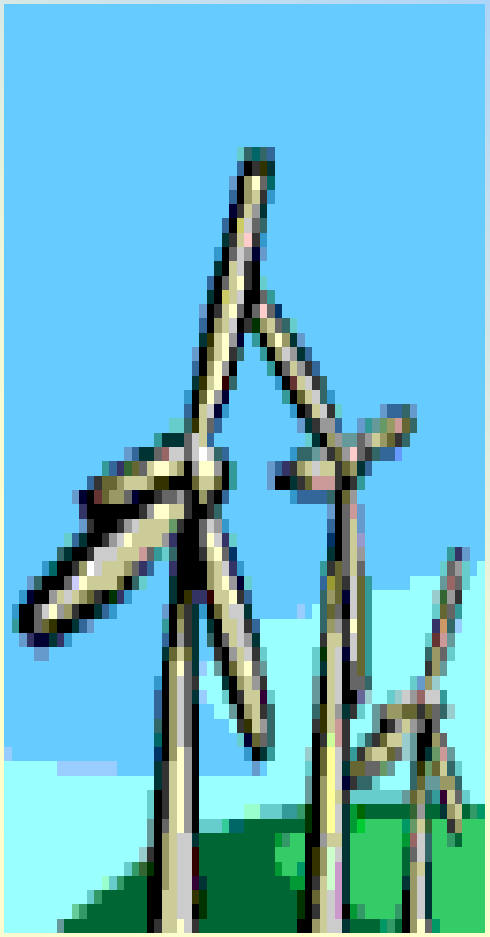
ENARD Mission

... to provide a major international forum for information exchange, in-depth research and analysis and collaborative R&D in relation to electricity T&D networks.



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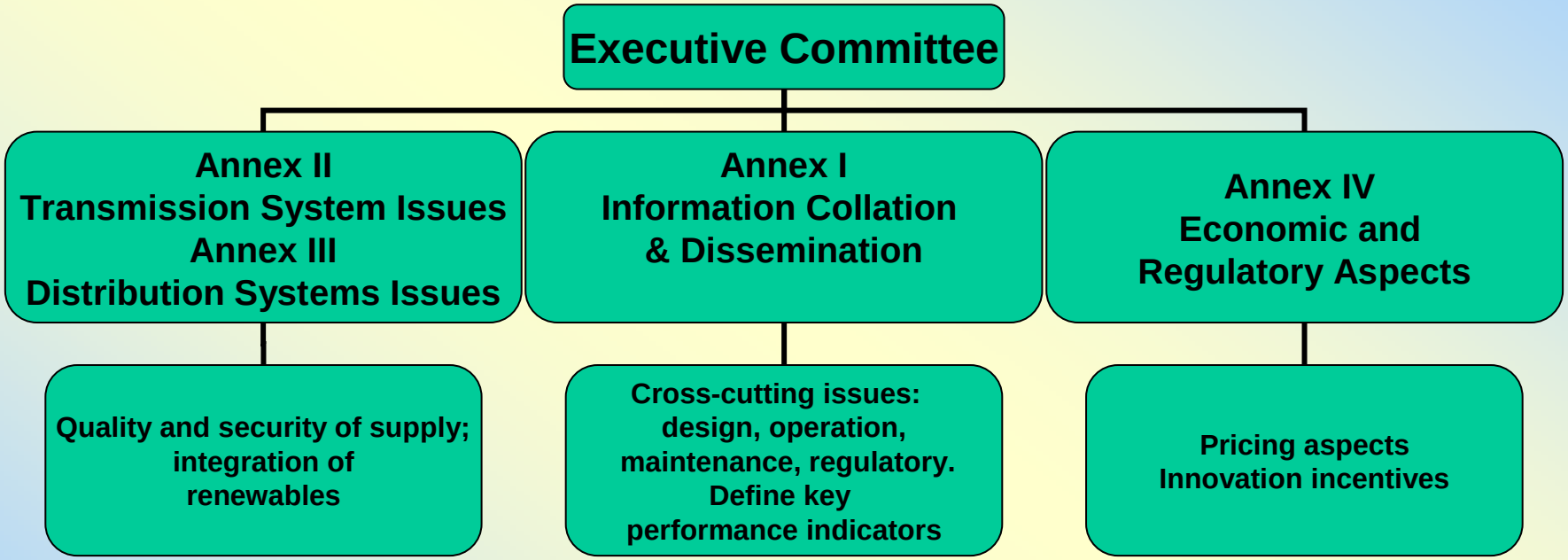
Indicative Structure



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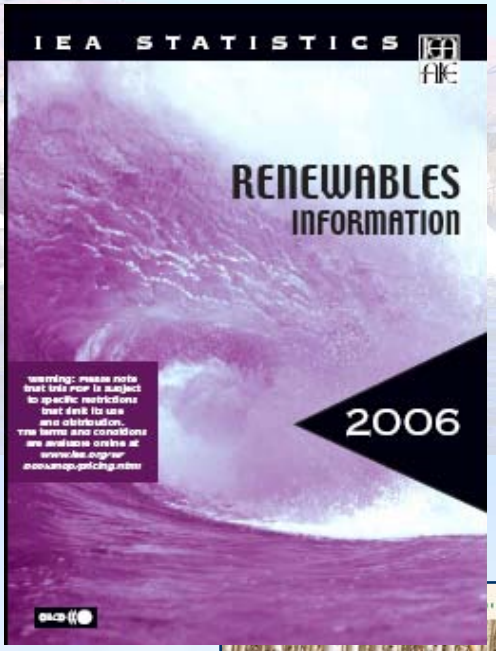
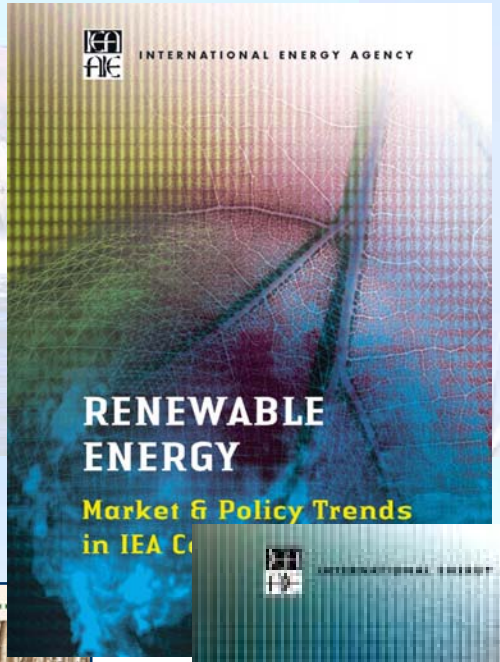
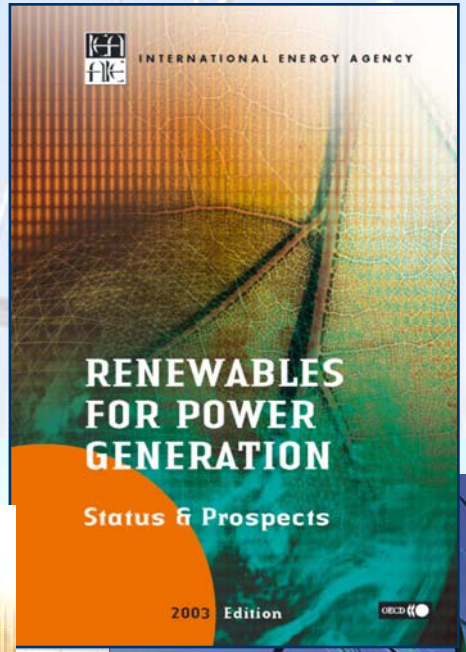
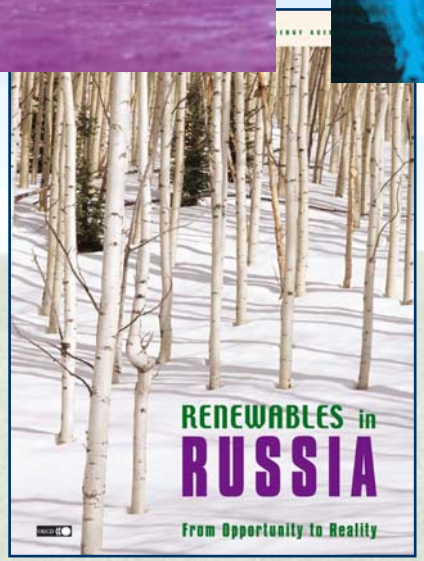
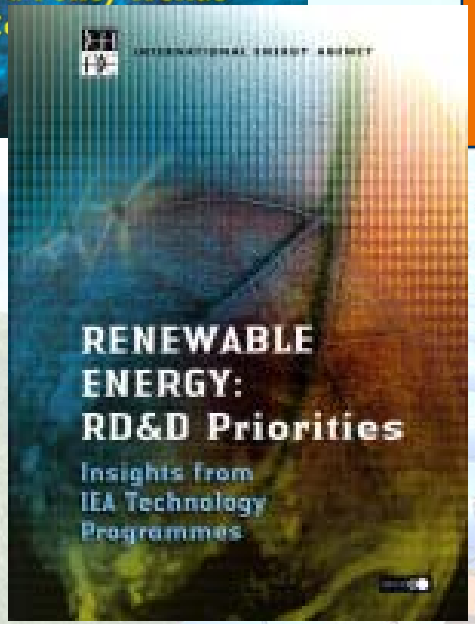
IEA Renewable Energy Publications

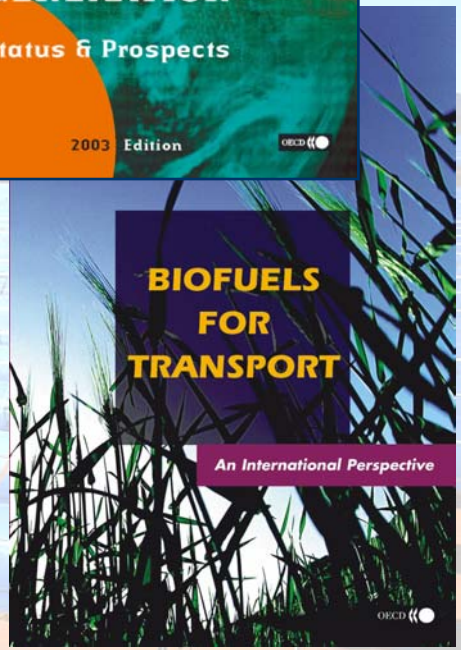












IEA contacts

- IEA Technology Agreements: http://www.iea.org/textbase/techno/index.asp
- Grid integration of renewables (IEA G8 Gleneagles Programme): kick-off in November 2006 http://www.iea.org/G8/renewable.htm
- Samantha Ölz: samantha.olz@iea.org

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