



A Sustainable Energy Future: The Role of District Heating/Cooling & CHP

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International Energy Agency

Created in 1973; currently 26 Member Countries

Goals:

- energy security
- environmental protection
- economic growth

Activities:

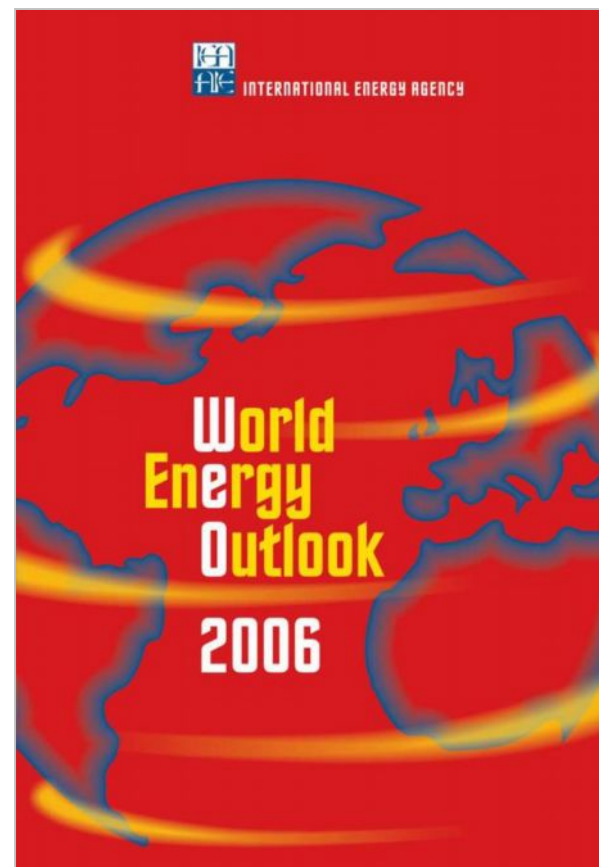
- co-ordinates efforts to ensure energy security
- compiles energy statistics
- conducts policy analysis
- reviews energy policies & programs
- convenes, mobilizes science & technology experts



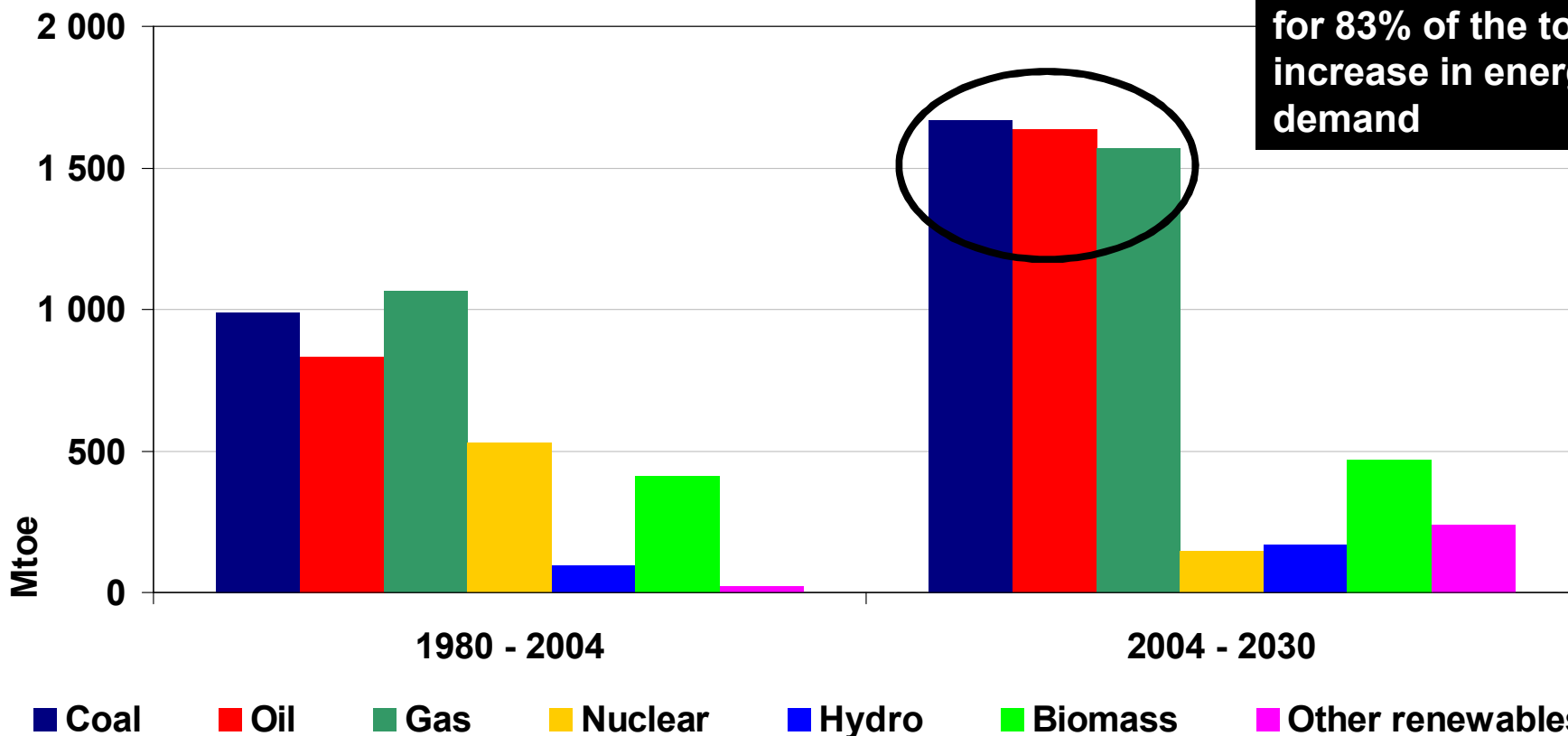
World Energy Outlook 2006

Contrasts two visions of the energy future to 2030:

- **Under-invested, vulnerable, unsustainable energy demand and emissions in the *Reference Scenario***
- **A cleaner, cleverer and more competitive outlook in the *Alternative Policy Scenario***



Incremental World Primary Energy Demand



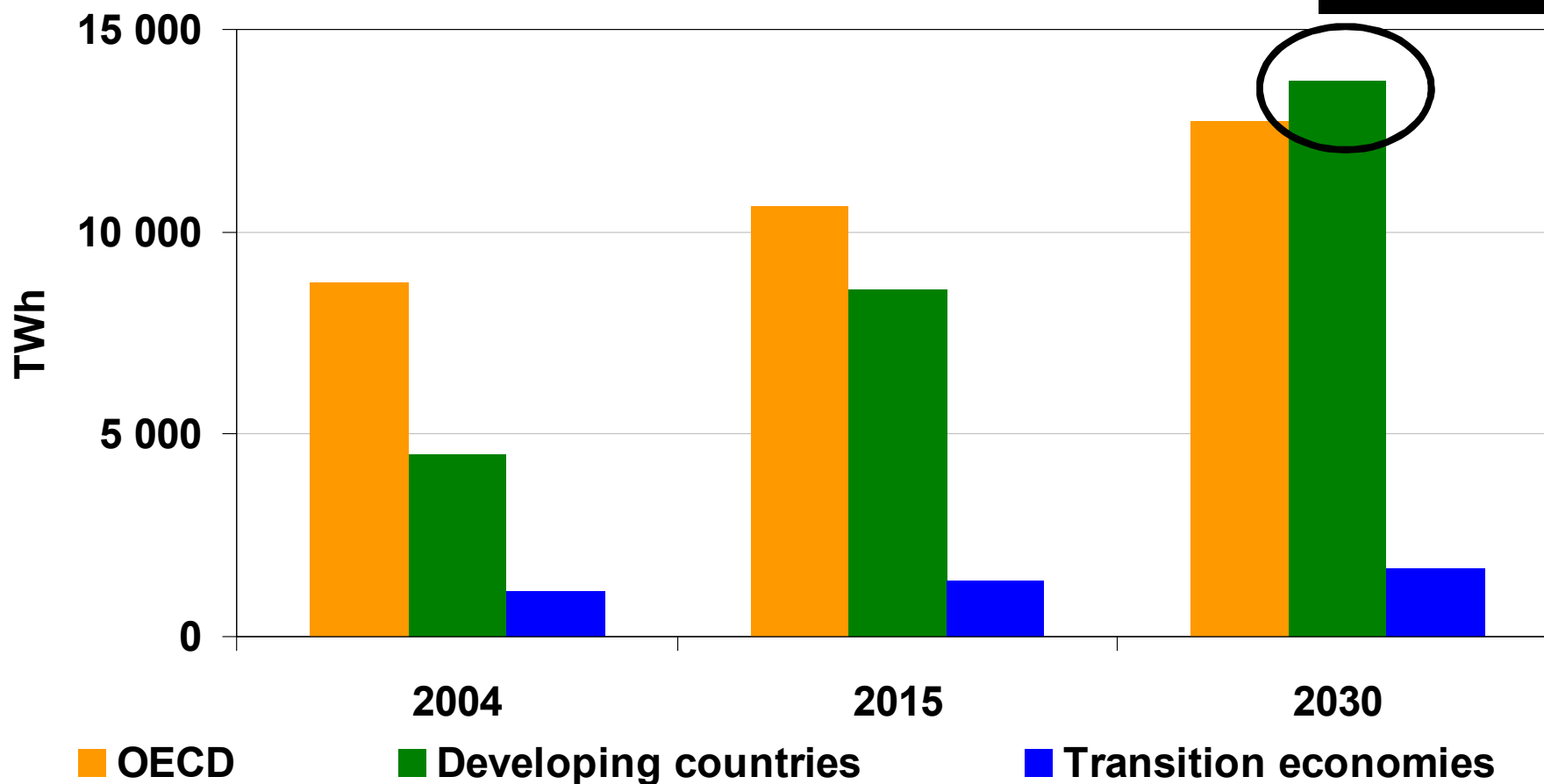
Fossil fuels account for 83% of the total increase in energy demand

Fossil fuels account for most of the increase in global energy demand between now & 2030, though non-hydro renewables grows fastest

Source: WEO 2006

World Electricity Demand by Region

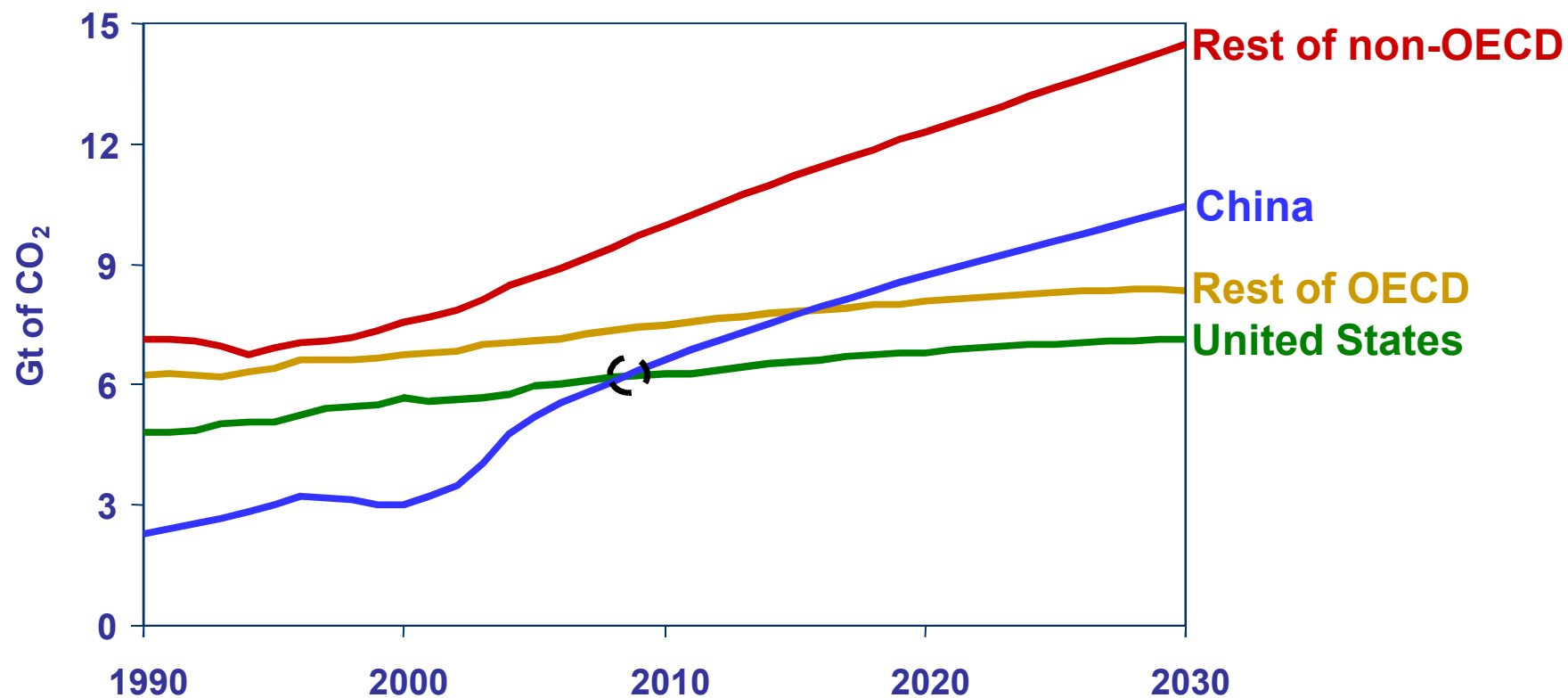
Demand triples in developing countries



Source: WEO 2006



CO₂ Emissions Are Not Sustainable



Source: WEO 2006



G8 Communiqués

Gleneagles 2005:

“The IEA will advise on alternative energy scenarios and strategies aimed at a clean, clever and competitive energy future.”

Heiligendamm 2007:

“Improving energy efficiency worldwide is the fastest, the most sustainable and the cheapest way to reduce greenhouse gas emissions and enhance energy security...a Sustainable Buildings Network...will develop practical instruments for assessing and advising on the implementation of energy efficiency in buildings and the use of renewable energies, especially for cooling and heating... we invite the IEA to take a central role in creating this Network...”

“Over the next 25 years, fossil fuels will remain the world’s dominant source of energy. Making power generation more efficient, climate friendly and sustainable is therefore crucial. Current innovations in power station design bear significant saving potential...we aim to increase average power plant efficiencies in each of our countries..[we will] adopt instruments and measures to significantly increase the share of combined heat and power (CHP) in the generation of electricity.”

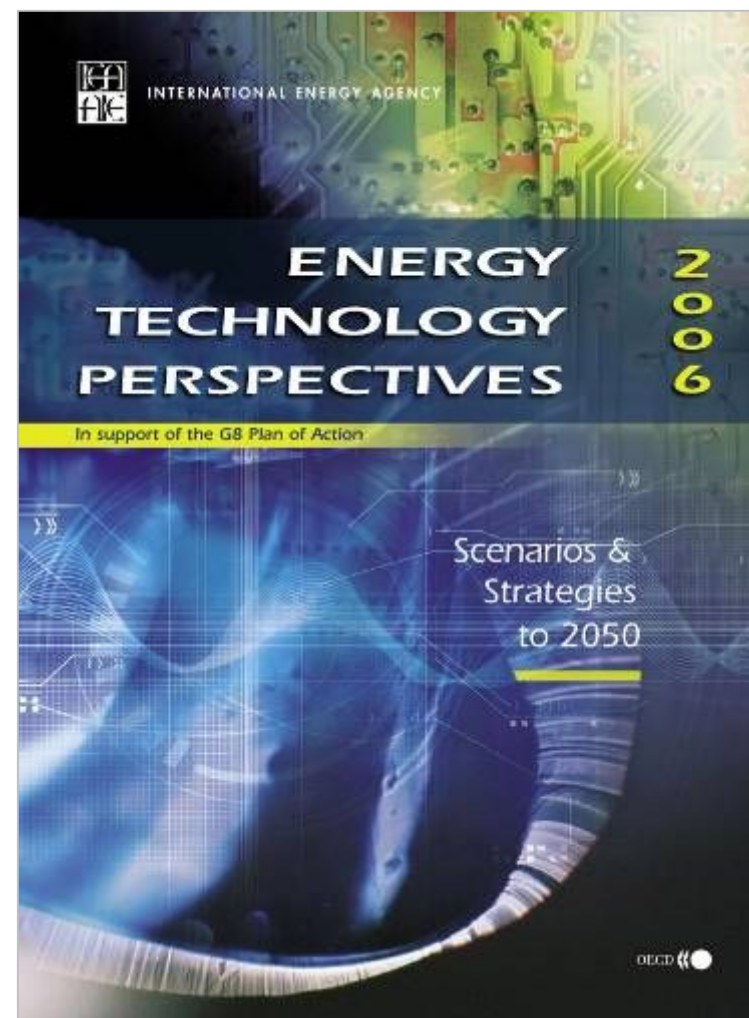


Energy Technology Perspectives 2006

Part of IEA's advice to G8 on scenarios and strategies

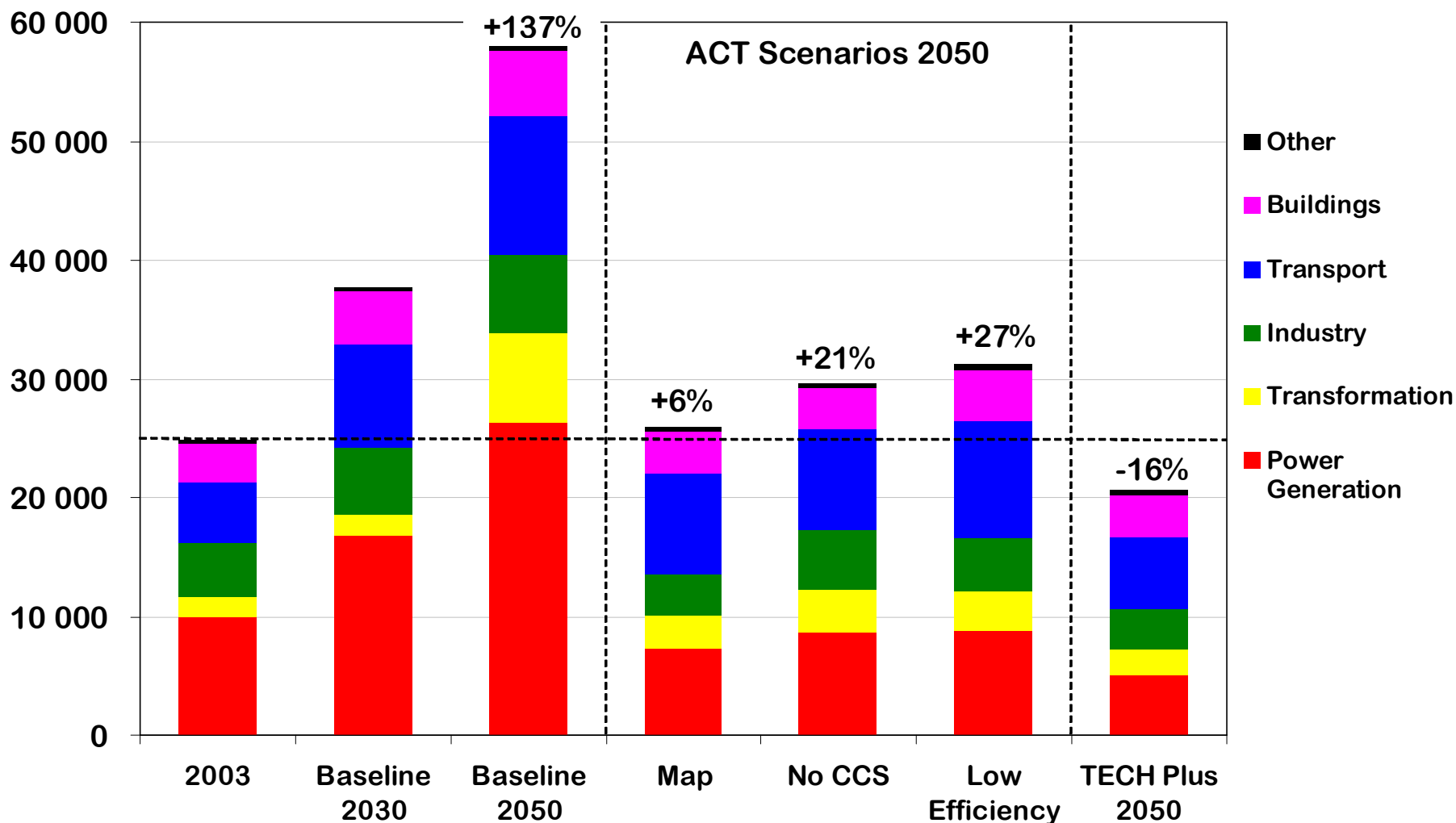
Presents a groundbreaking review of technology potential across sectors

Identifies key technologies and policies that will make a difference



Global CO₂ Emissions 2003-2050

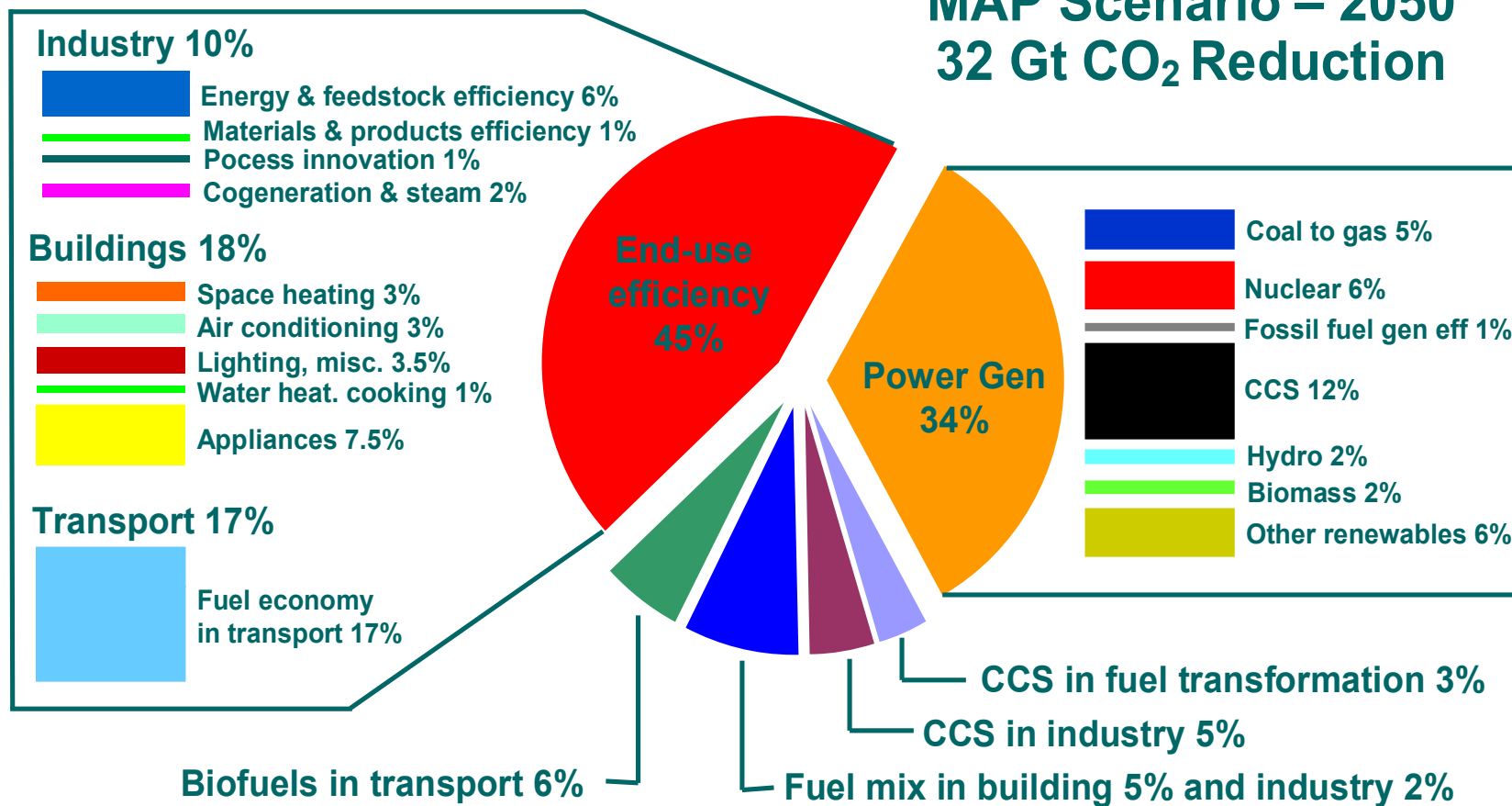
Mt CO₂





Emission Reduction by Technology Area

MAP Scenario – 2050
32 Gt CO₂ Reduction



ETP 2006 Key Findings

- **Most energy still comes from fossil fuels in 2050**
- **CO₂ emissions can be returned to today's level by 2050**
- **Growth in oil and electricity demand can be halved**
- **Power generation can be substantially de-carbonised by 2050**
- **De-carbonising transport will take longer but must be achieved in the 2nd half of the century**

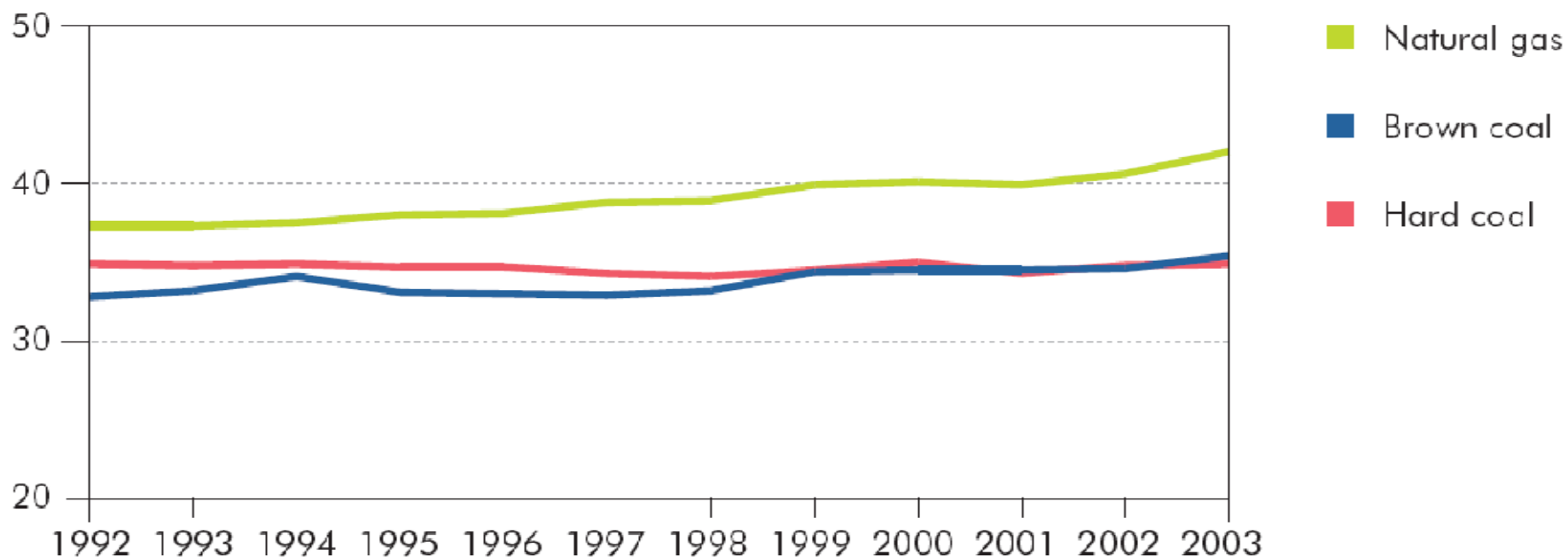


ETP Technology Implications

- **A technology portfolio will be needed**
- **Energy efficiency is the near-term priority**
- **Electricity and heat generation**
 - **Carbon dioxide capture and geological storage**
 - **Renewable energy**
 - **Nuclear**
 - **More efficient generation and use: CHP, district heating & cooling**
- **Transportation**
 - **Biofuels**
 - **Hydrogen**

Wasted Energy Is a Huge Opportunity

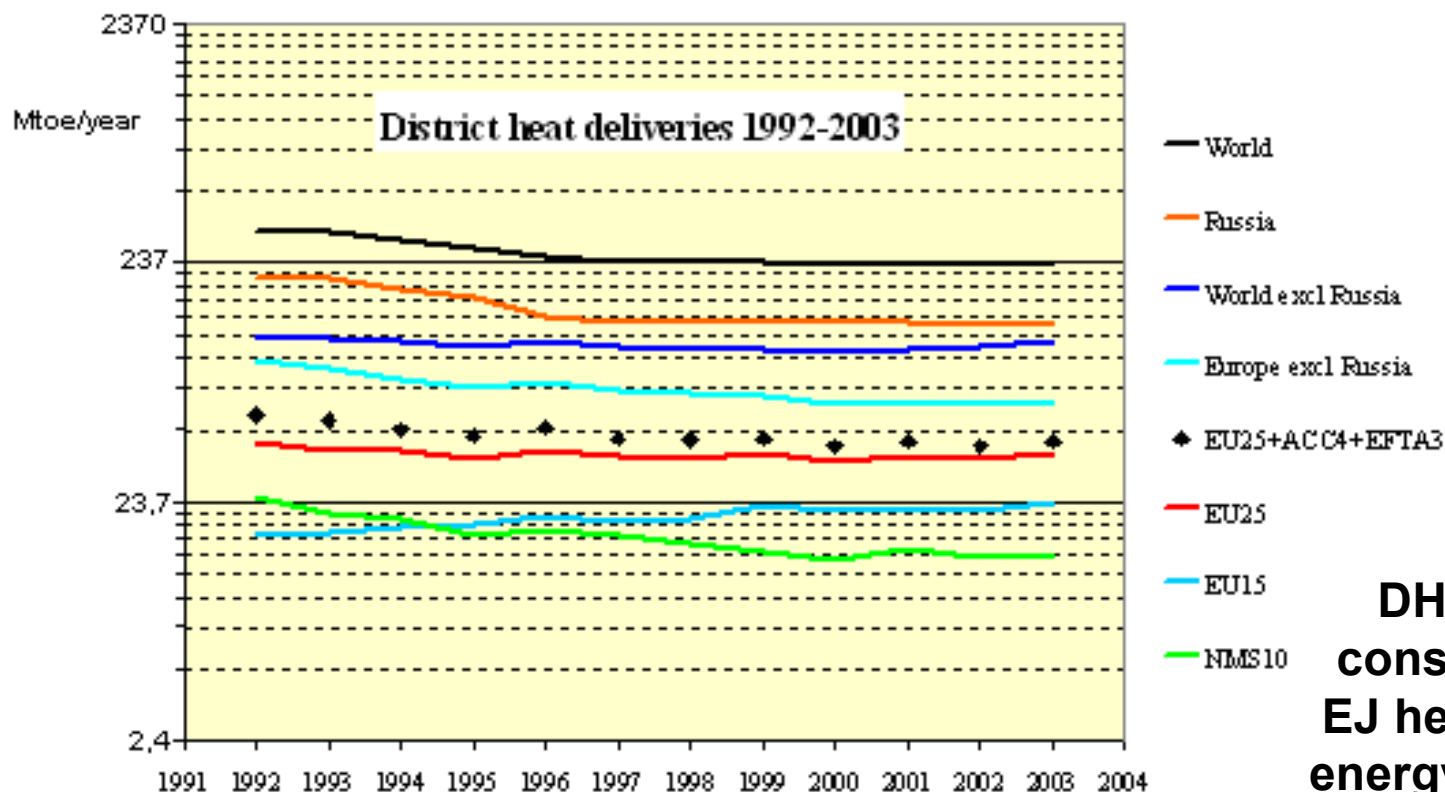
Global Average Power Plant Efficiencies



2/3 of the fuel burned for power generation is vented as waste heat – we can do better

Source: IEA, *Energy Technology Perspectives (2006)*

District Heating Trends

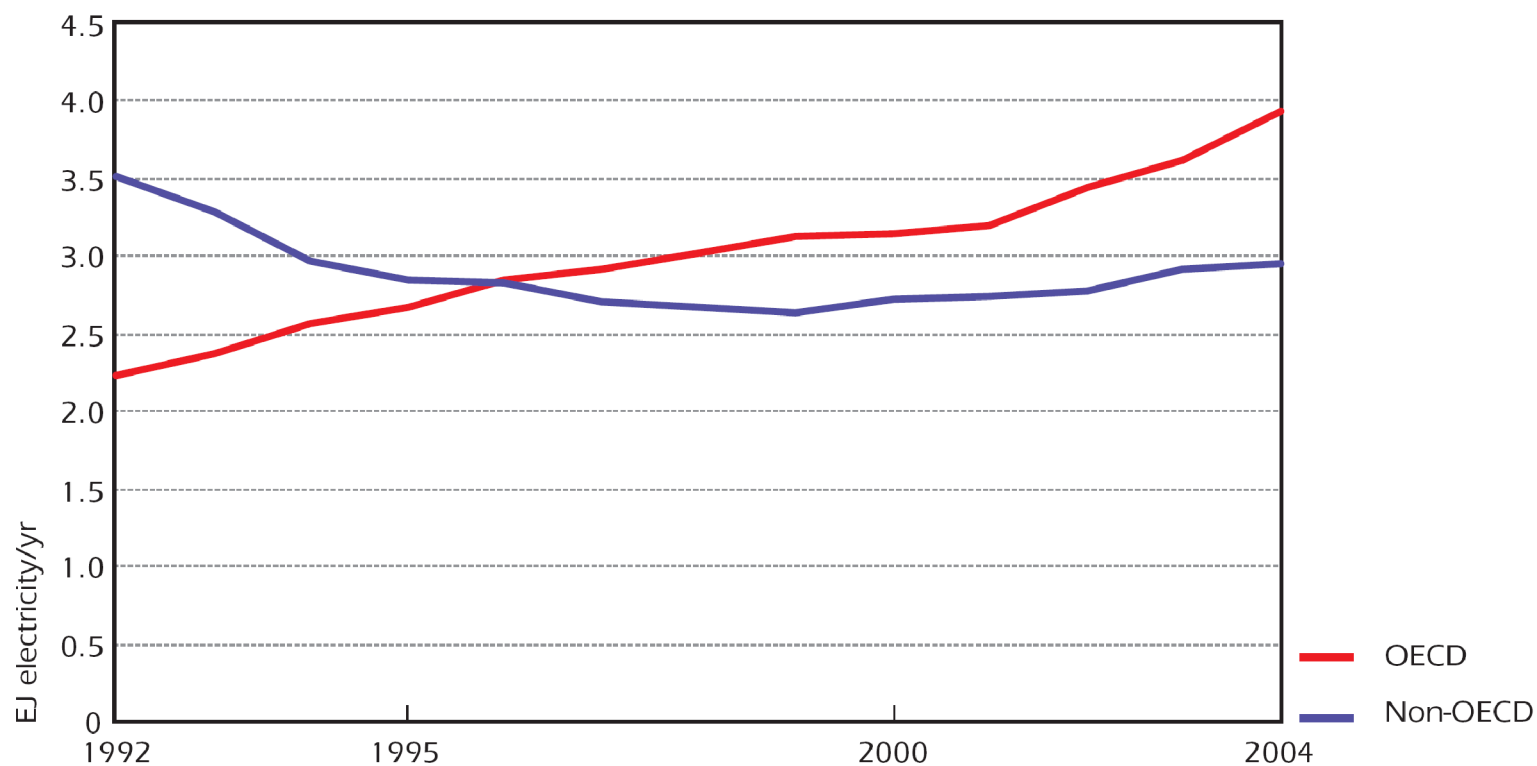


Source: Euroheat & Power, Ecoheatcool Project (2007)

**DH systems
consume 11–12
EJ heat (5% total
energy demand in
industrial,
residential, public,
and commercial
sectors)**

Global CHP Capacity

Key point: Global CHP use has not increased significantly in recent decades.



Source: IEA data and statistics.



IEA District Heating & Cooling Activities

- **Collect/publish heat statistics**
 - IEA is the most comprehensive source of international statistics on heat
- **Promote improved district energy in central/eastern Europe**
 - IEA 2004 publication *Coming in from the Cold*
 - 2 workshops
- **IEA DHC Implementing Agreement**
- **International CHP/DHC Collaborative**



IEA DHC Implementing Agreement

- **Analysis and Advice; examples include:**
 - evolution of all-plastic piping system
 - assessment of actual EE of building-scale systems
 - evaluating new materials and construction for DE
 - verifying environmental performance
- **Case studies/technical exchange**
- **Events/networking**
- **For more information: www.iea-dhc.org**



The International CHP/DHC Collaborative

- **Who: IEA with DHC and CHP leaders from around the world**
 - Euroheat & Power is a Founding Partner

- **What: Call attention to the attractiveness of CHP/DHC**
 - IEA will raise the profile and improve global analysis of these important near-term clean energy solutions

- **Deliverable**
 - 2008 Japan G8 Publication with
 - Expanded DHC/CHP scenarios in IEA and international energy/environment models
 - Improved global DHC/CHP data and prospects, by country/sector
 - Analysis of successful DHC/CHP policies from around the world
 - Related outreach: meetings, networking

Next Steps

- **Currently collecting global data**
 - **Treating CHP and DHC separately**
- **October 10-11 meeting at IEA HQ in Paris**
 - ***Global CHP/DHC Policies: Success Stories and Lessons Learned***
- **Networking**
 - **Beginning to match up experts from leading DHC countries – incl. Finland, Denmark, Sweden, USA – with developing economies in the Middle East, Asia, Russia**
- **Your input and ideas are welcome**

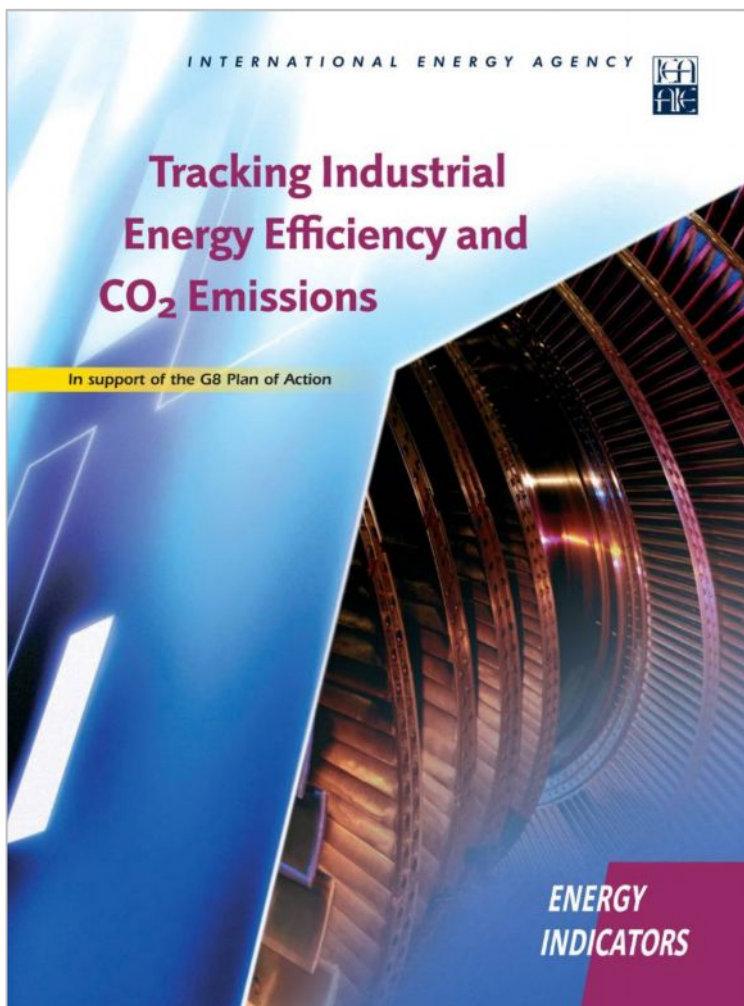
Conclusions

- **Energy sector changing dramatically**
- **Policy drivers**
 - Energy security
 - Economic growth
 - Environmental protection/Climate Change
- **Sustainable energy future is possible at acceptable costs**
- **Increasingly aggressive policies**
 - EE building codes, appliance standards
 - Grid codes – metering, scheduling, non-wires solutions
 - Support for nuclear, emerging renewables, CCS, second-generation biofuels to accelerate demonstration and deployment
 - Increased demand for near-term technologies like district energy

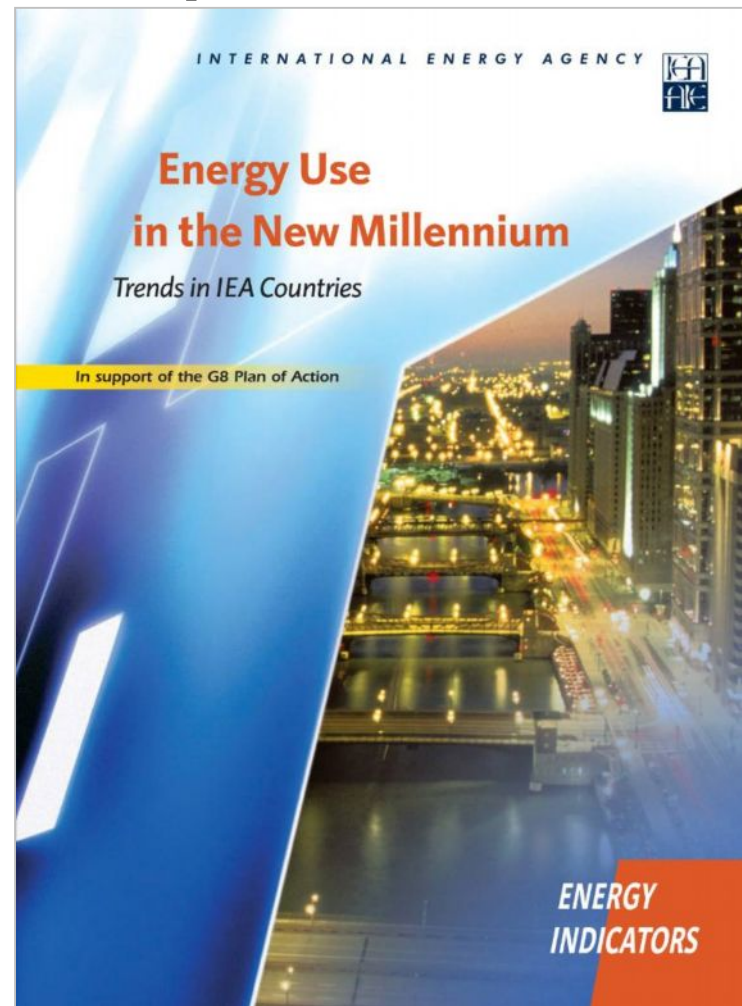


www.iea.org/books

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September 2007



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Thank you!

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