



Energy research Centre of the Netherlands

IEA DSM task XVII: Welcome at ECN



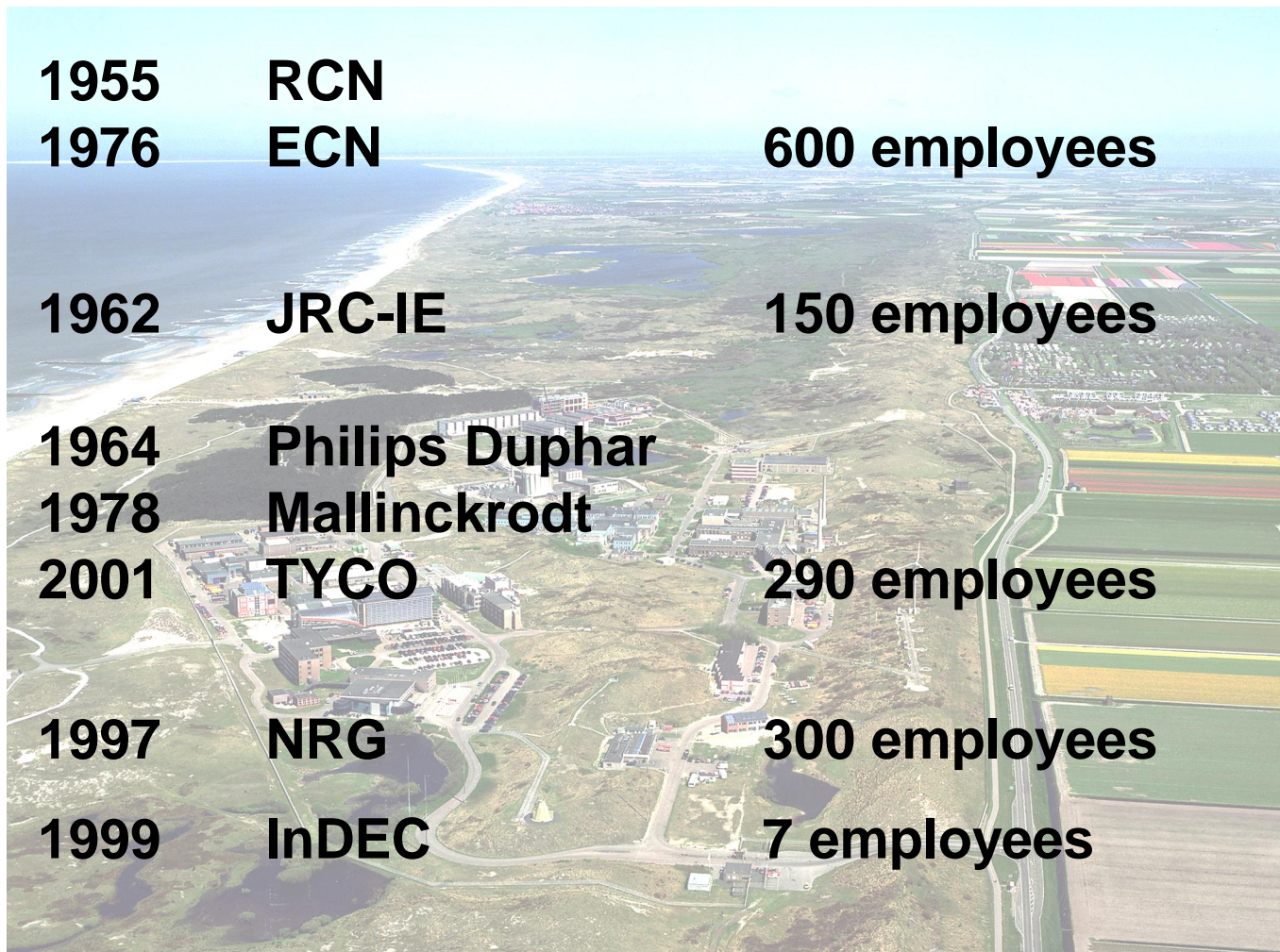
Welcome at ECN

- The Energy research Centre of the Netherlands:
 - ECN is the biggest, independent, market oriented and innovative Dutch energy research institute.
 - ECN investigates and develops technologies and products for a safe, efficient and environment-friendly energy supply.
 - ECN bridges the gap between research and real application.
 - A sustainable development is the guiding principle for all ECN activities.

Companies at the Petten site



Companies at the Petten site



ECN's targets

- ECN concentrates on the knowledge and information demand of the government for policy preparation and evaluation and for the realisation of policy goals in the fields of energy, environment and technological innovations.
- ECN is partner of the business community for the development and implementation of products, processes and technologies, which are important for the transition to a sustainable energy supply.
- ECN co-operates intensively with Dutch and foreign universities and R&D organisations.

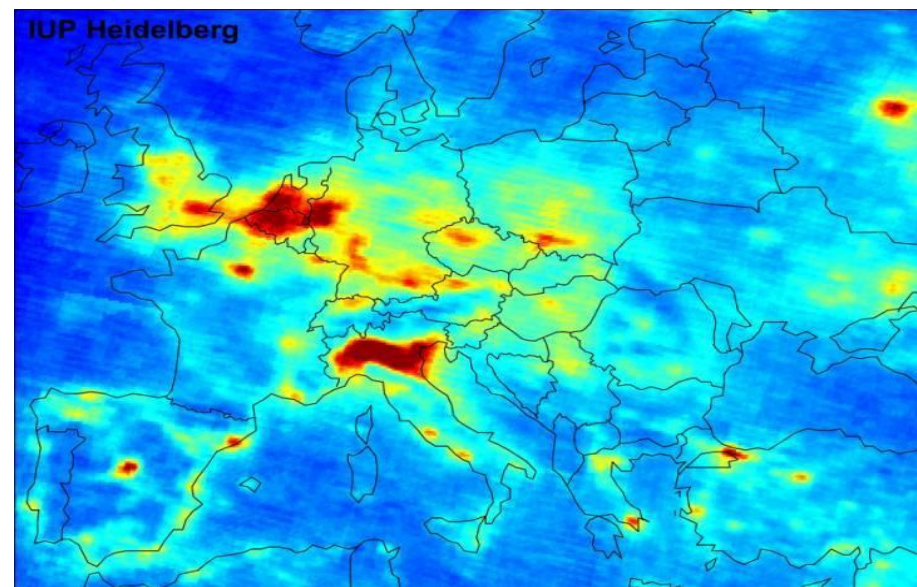
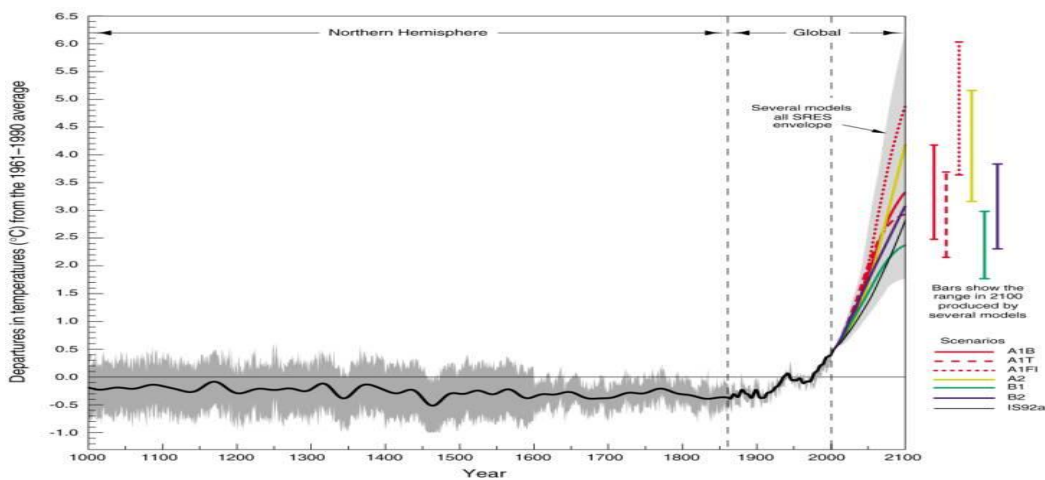
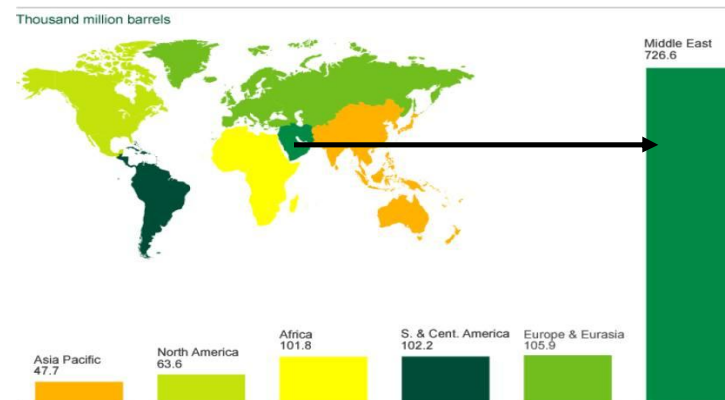
World energy supply

- Increased use of energy
 - Threat of climate change and growing environmental pollution
 - Two billion people without accessible energy sources (other than biomass)
 - Limited world supply (fossil fuels, uranium, thorium)
- Efficient use of energy
 - Clean use of fossil fuels
 - Strong increase of sustainable energy
 - Safe use of nuclear energy

Long term: 100% sustainable energy

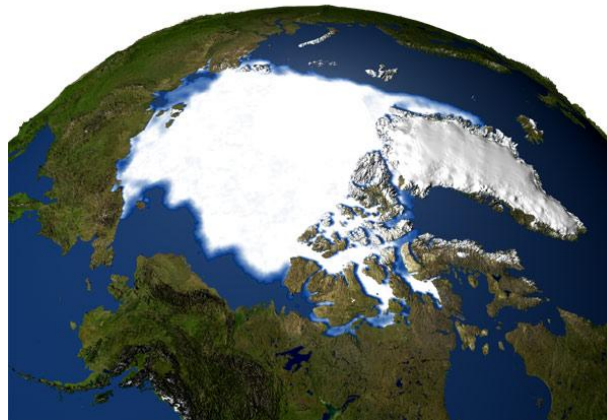
The energy dilemmas in the 21st century...

- supply of fossil fuels
- regional supply security
- environmental aspects:
 - NO_x
 - Aerosoles
 - Greenhouse gasses

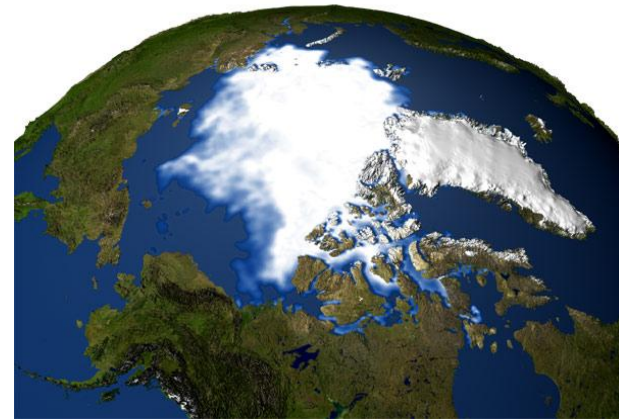


...and its effects...

Source: NASA



Arctic sea ice, 1979

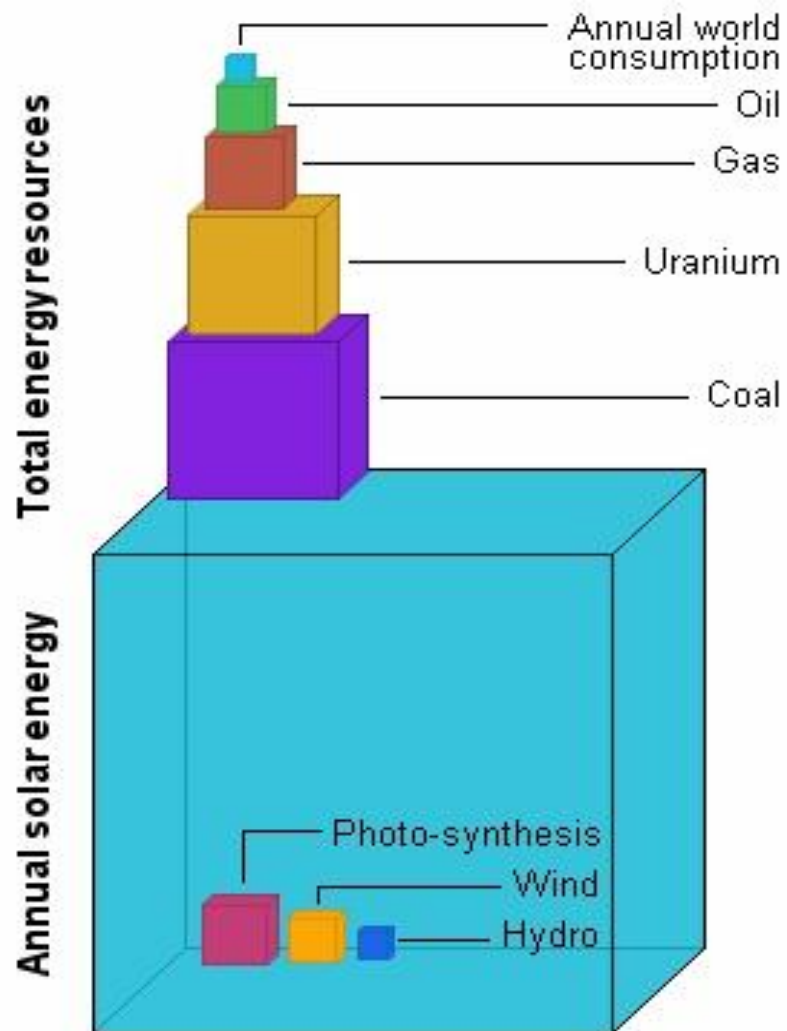


Arctic sea ice, 2003

...how about:

- Melting glaciers like Mount Everest
- Dry out soil like southern France
- Greater chance of extreme weather conditions
- Less biodiversity

Energy supply



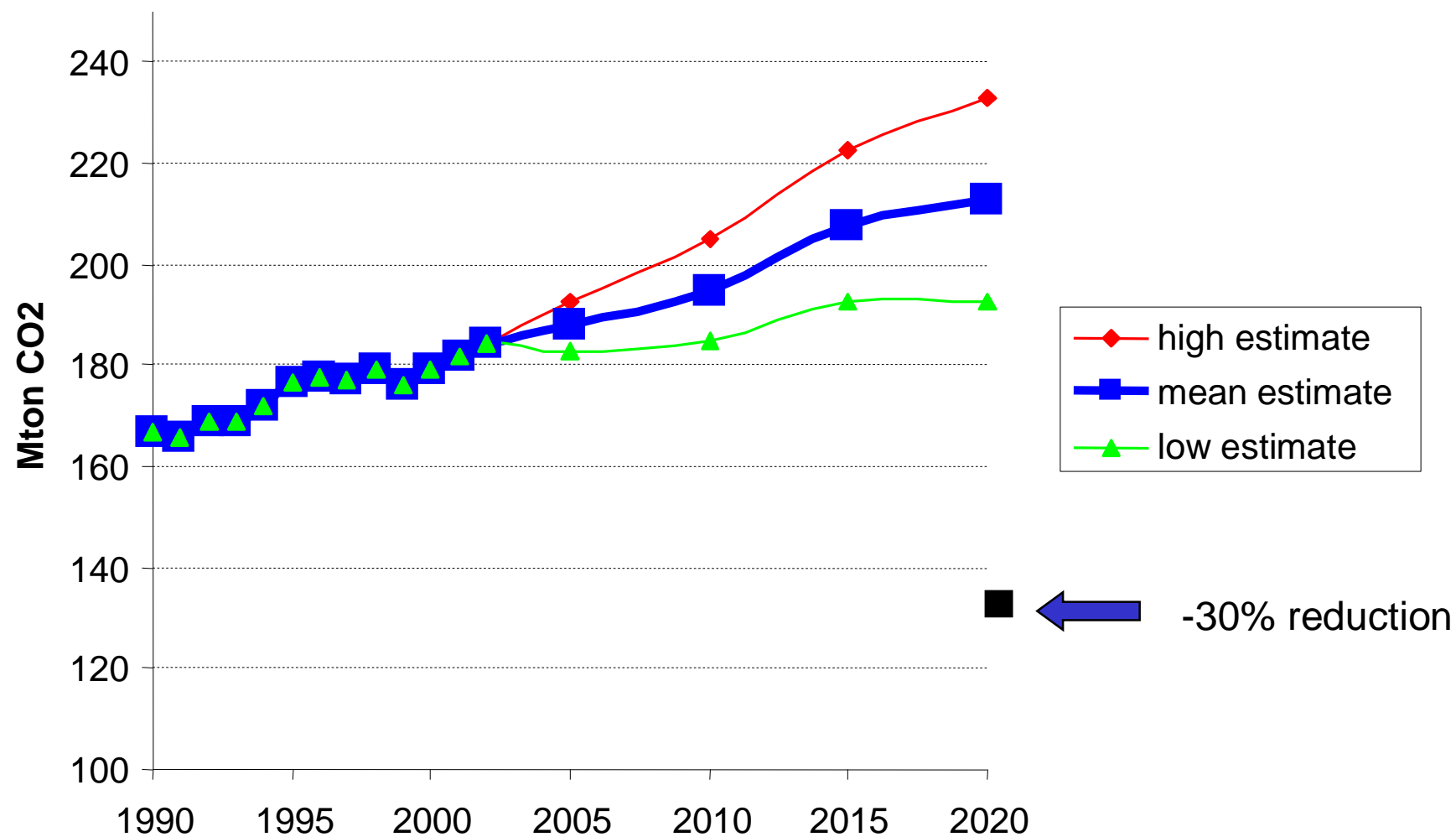
ECN research

Energy use and generation focus on :

- Efficiency improvement
- Generation with renewable energy
- Clean use of fossil fuels

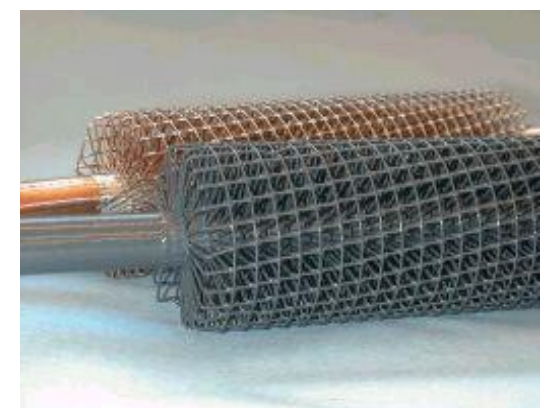
maximum reliability
minimal environmental burden
optimal costs effectiveness

Development of Dutch CO₂-emissions 1990-2020



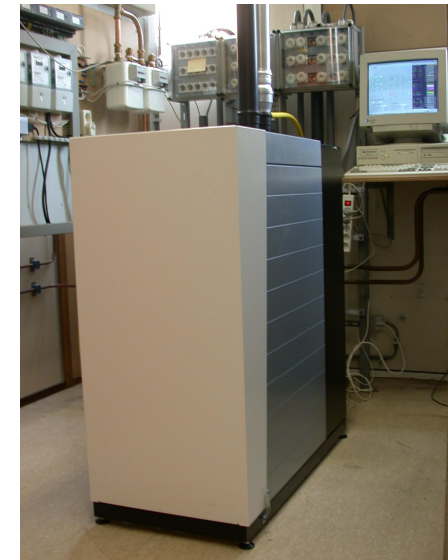
EHG: Energy Efficiency in Industry

- Separation Technology (ceramic membranes)
- Industrial Waste heat Recovery (HT heat pumps and cryogenics)
- Process Intensification



EHG: Built Environment and Intelligent Grids

- Integral Concepts
- Heat Management
- Electricity Storage
- ***Intelligent Energy Management***
- Stirling Micro-Cogeneration



IEM serves ECN Intelligent Electricity Grids Programme

Focus on three themes:

- A. Intelligent supply-demand matching
- B. Grid connection and power quality
- C. Electricity storage

ECN/IEM vision: Three stages of DG Growth



Growing DG Penetration

Accomodation

- DG accommodated in the current system
- DG units running free
- DG treated as negative demand
- Central control unchanged

Decentralization

- Added value of clustered control of DG.
- Common ICT systems: Virtual Utilities, Virtual Power Plants.
- Central control still needed
- Decentralized, bottom-up control is added.

Dispersal

- Distributed power dominates the market
- Network of networks
- Local network segments self-supplying.
- Central controller becomes a coordinator.

Source: IEA, 2002