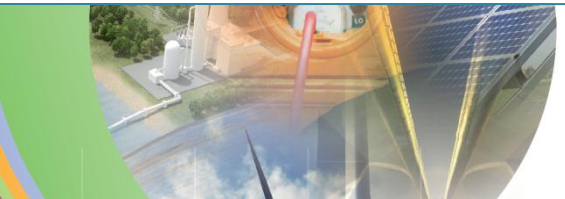
HELE COAL TECHNOLOGY ROADMAP

Mr. Bo Diczfalusy

Director, Sustainable Energy Policy & Technology
International Energy Agency

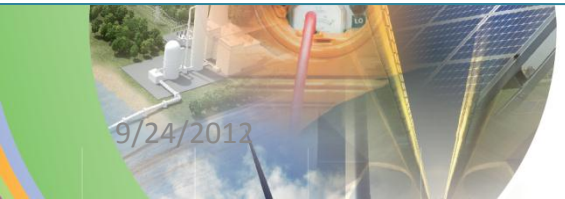
Workshop on Advanced USC Coal-fired Power Plants
Vienna, Austria
19-20 September 2012



© OECD/IEA 2012

Content of presentation

- **Summary of ETP2012**
- **Technology Roadmaps**
- **HELE Coal Technology Roadmap**
  - Coal-fired power generation today
  - Vision for HELE coal-fired power plant
  - Technologies for raising efficiency



© OECD/IEA 2012

ETP 2012 – Choice of 3 Futures

ETP 2012

2DS

a vision of a **sustainable** energy system of reduced Greenhouse Gas (GHG) and CO_2 emissions

The 2°C Scenario

4DS

reflecting pledges by countries to cut emissions and boost energy efficiency

The 4°C Scenario

6DS

where the world is now heading with potentially **devastating** results

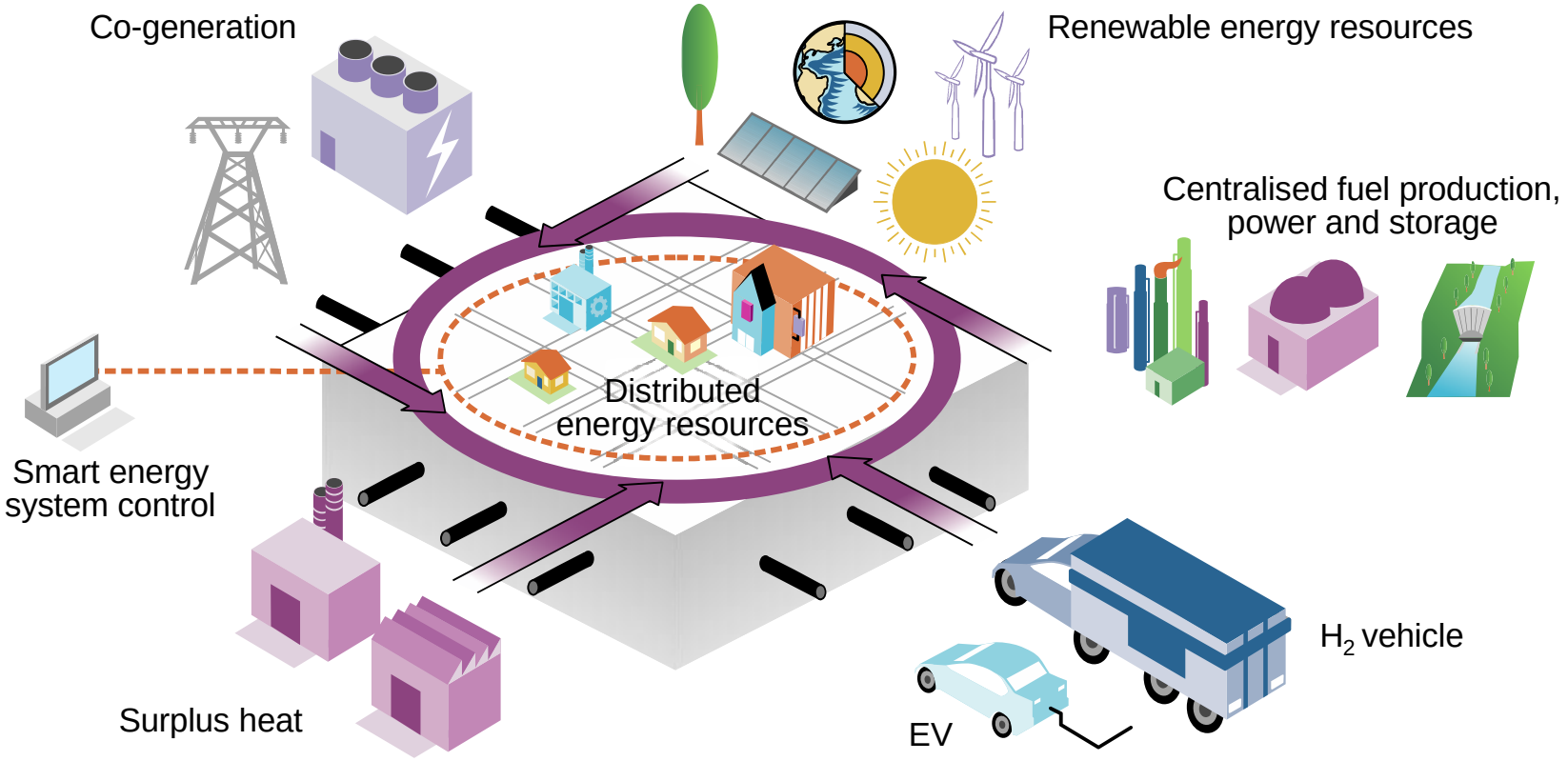
The 6°C Scenario

International Energy Agency

© OECD/IEA 2012

A smart, sustainable energy system

ETP 2012



A sustainable energy system is a smarter, more unified and integrated energy system

International Energy Agency

© OECD/IEA 2012

Clean energy: slow lane to fast track

ETP 2012

Cleaner coal power

Nuclear power

Renewable power

CCS in power

CCS in industry

Industry

Buildings

Fuel economy

Electric vehicles

Biofuels for transport

Progress is too slow in almost all technology areas

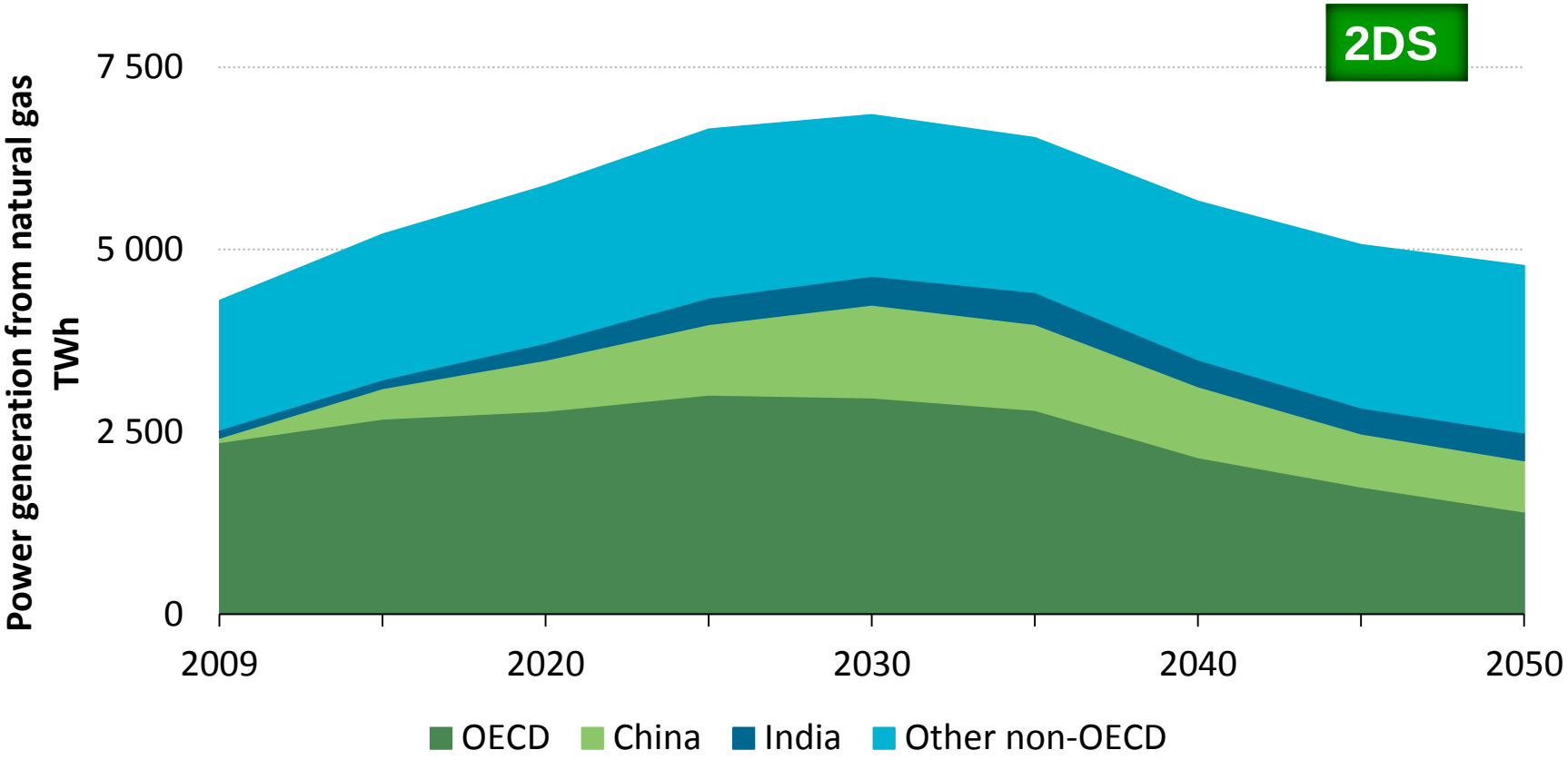
Significant action is required to get back on track

International Energy Agency

© OECD/IEA 2012

Natural gas: a transitional fuel

ETP 2012



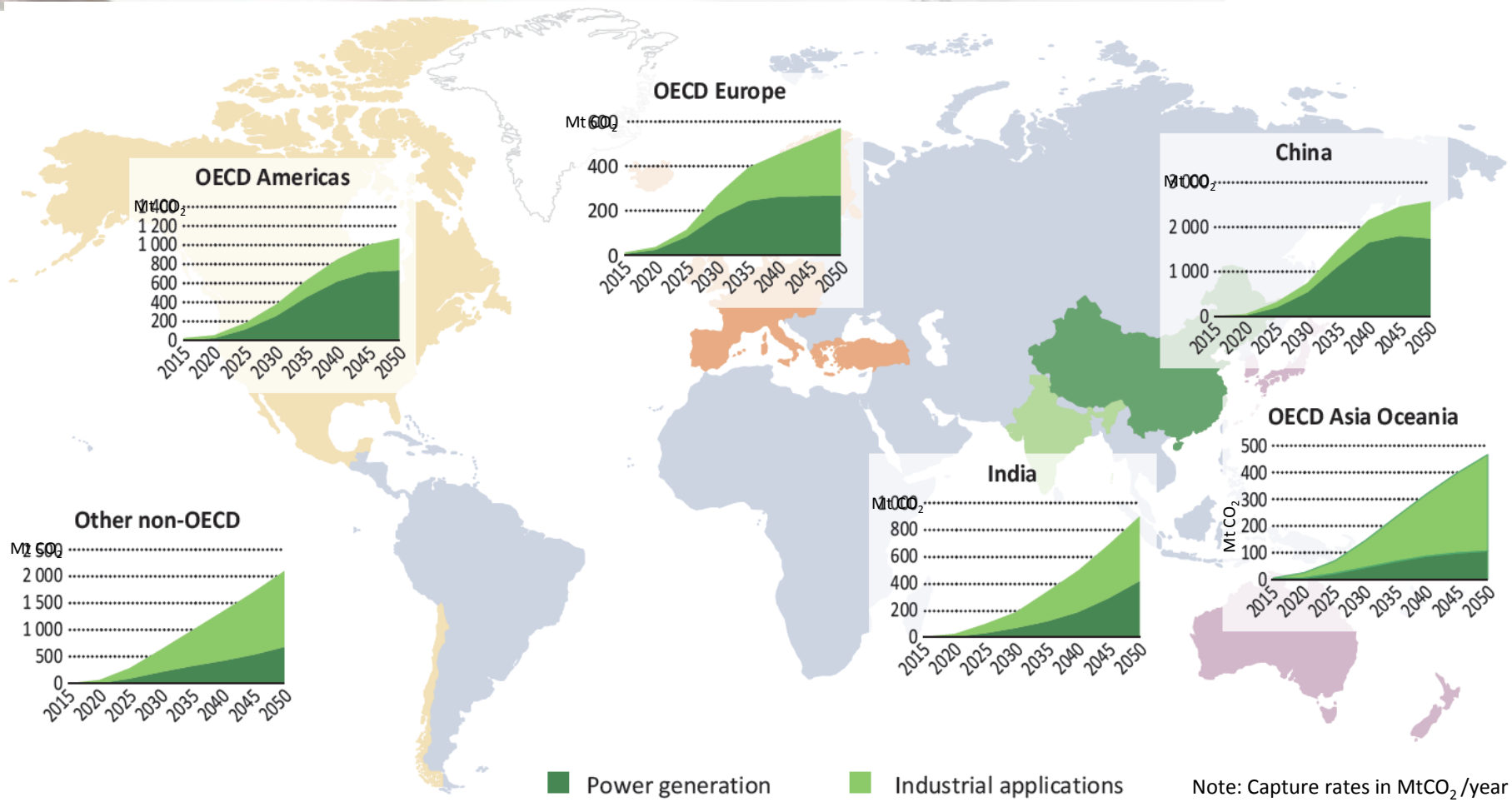
Around 2030, natural gas becomes ‘high carbon’.

International Energy Agency

© OECD/IEA 2012

The CCS infant must grow quickly

ETP 2012



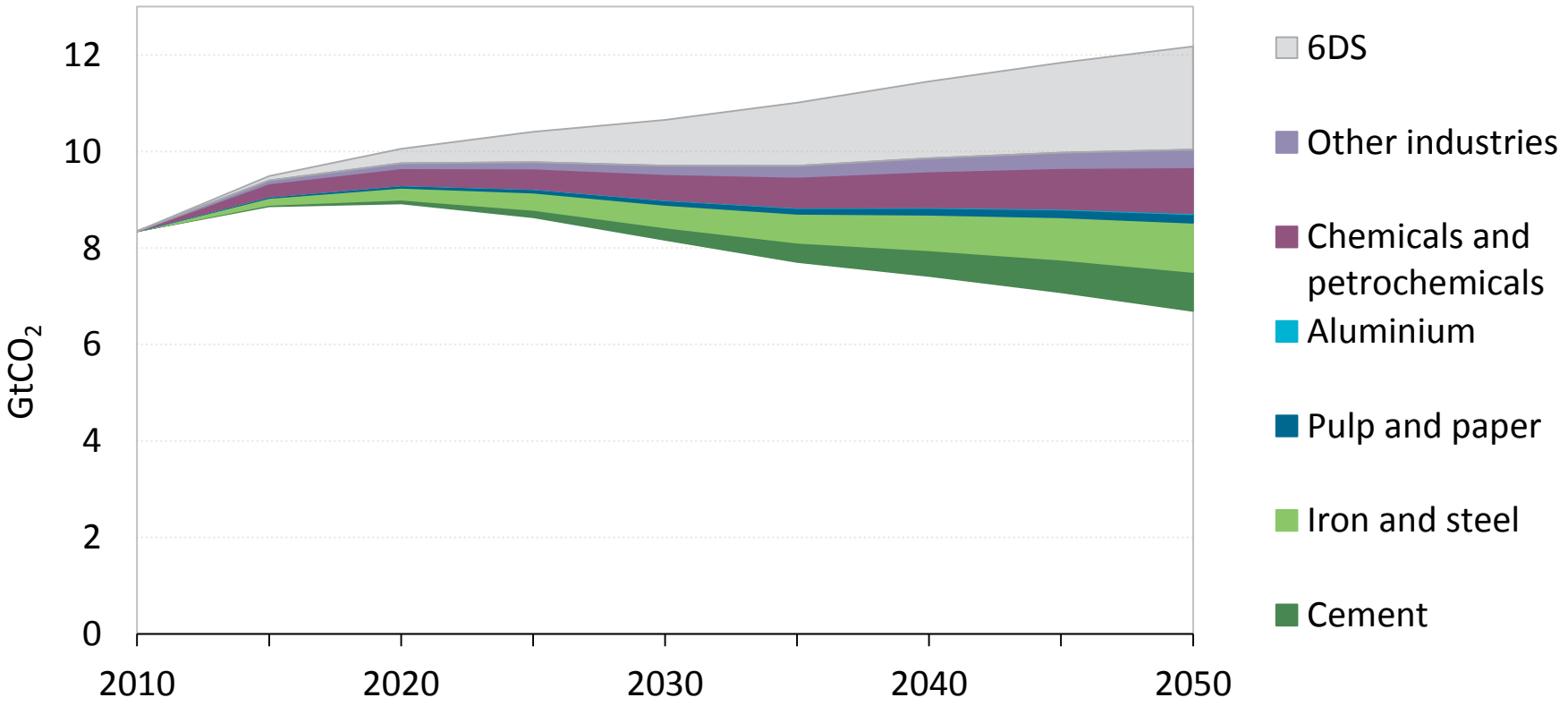
A projected 123 $GtCO_2$ captured between 2015 and 2050, the majority from power generation; in some regions, however, CO_2 captured from industrial applications dominates.

International Energy Agency

© OECD/IEA 2012

Industry must become more efficient

ETP 2012



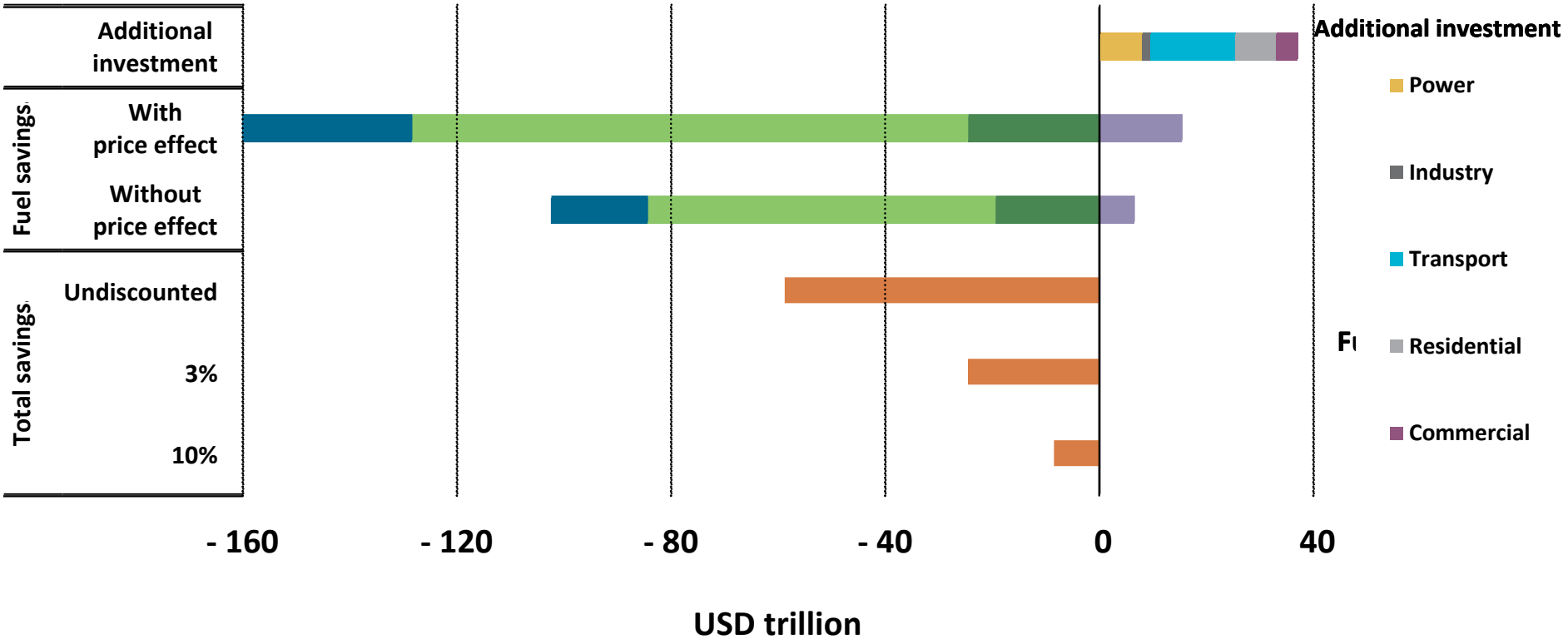
Significant potential for enhanced energy efficiency can be achieved through best available technologies.

International Energy Agency

© OECD/IEA 2012

Clean energy investment pays off

ETP 2012



Every additional dollar invested in clean energy can generate 3 dollars in return.

International Energy Agency

© OECD/IEA 2012

Recommendations to Governments

ETP 2012

1. Create an investment climate of confidence in clean energy

2. Unlock the incredible potential of energy efficiency – “the hidden” fuel of the future

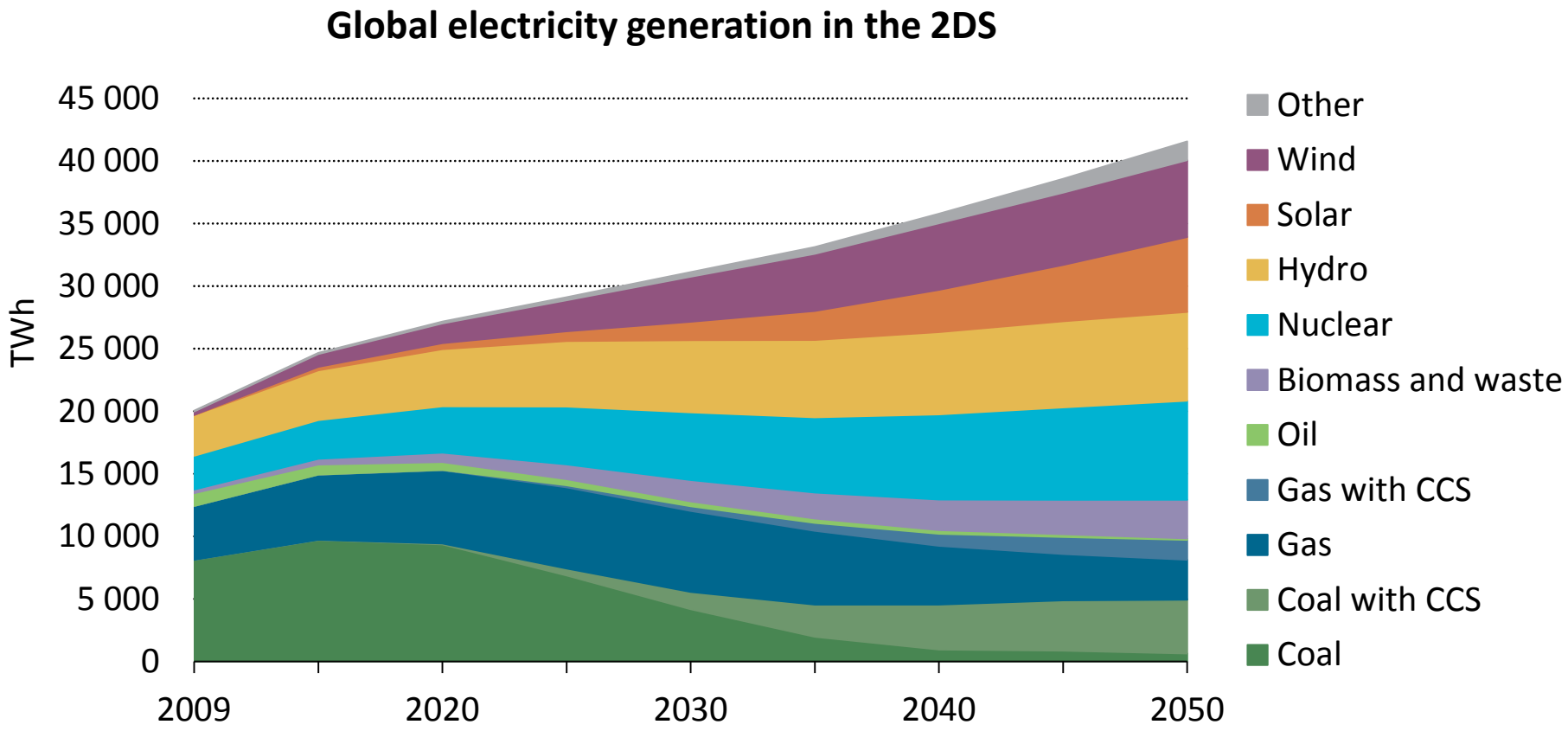
3. Accelerate innovation and public research, development and demonstration (RD&D)

International Energy Agency

© OECD/IEA 2012

Low-carbon electricity: a clean core

ETP 2012



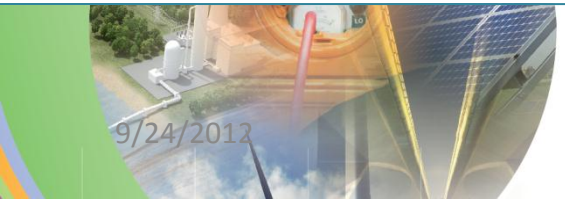
Renewables will generate more than half the world's electricity in 2050 in the 2DS

International Energy Agency

© OECD/IEA 2012

Content of presentation

- Summary of ETP2012
- **Technology Roadmaps**
- HELE Coal Technology Roadmap
  - Coal-fired power generation today
  - Vision for HELE coal-fired power plant
  - Technologies for raising efficiency

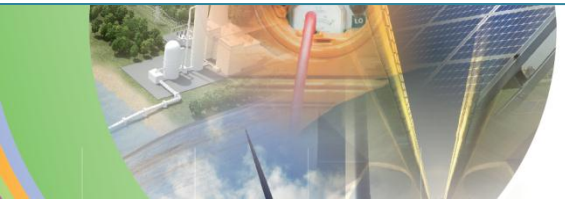


© OECD/IEA 2012

IEA Roadmap Definition

"A technology roadmap is a dynamic set of technical, policy, legal, financial, market & organisational requirements identified by all stakeholders involved in its development. The effort shall lead to improved and enhanced sharing and collaboration of all related technology-specific RDD&D information among participants.

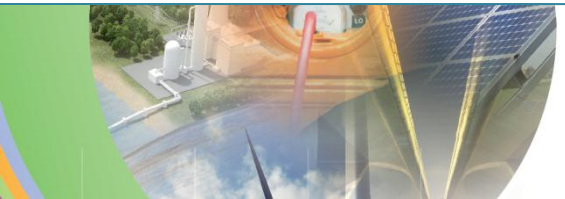
The goal is to accelerate the overall RDD&D process in order to deliver an earlier uptake of the specific energy technology into the marketplace".



© OECD/IEA 2012

Technology roadmaps provide answers

- **Where is technology today?**
- **What is the deployment pathway needed to achieve 2050 goals?**
- **What are the priority near-term actions?**



© OECD/IEA 2012

Technology roadmaps status

2009 **2010** **2011** **2012**

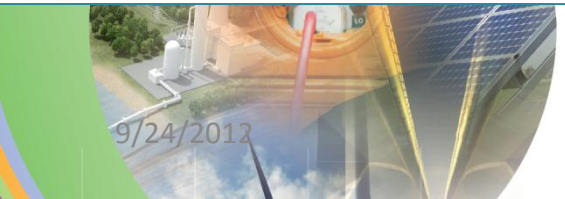
2012 / 2013

- **HELE Coal (for power)**
- **Chemical catalysis**
- **Hydropower**
- **Energy efficient building envelopes**

© OECD/IEA 2012

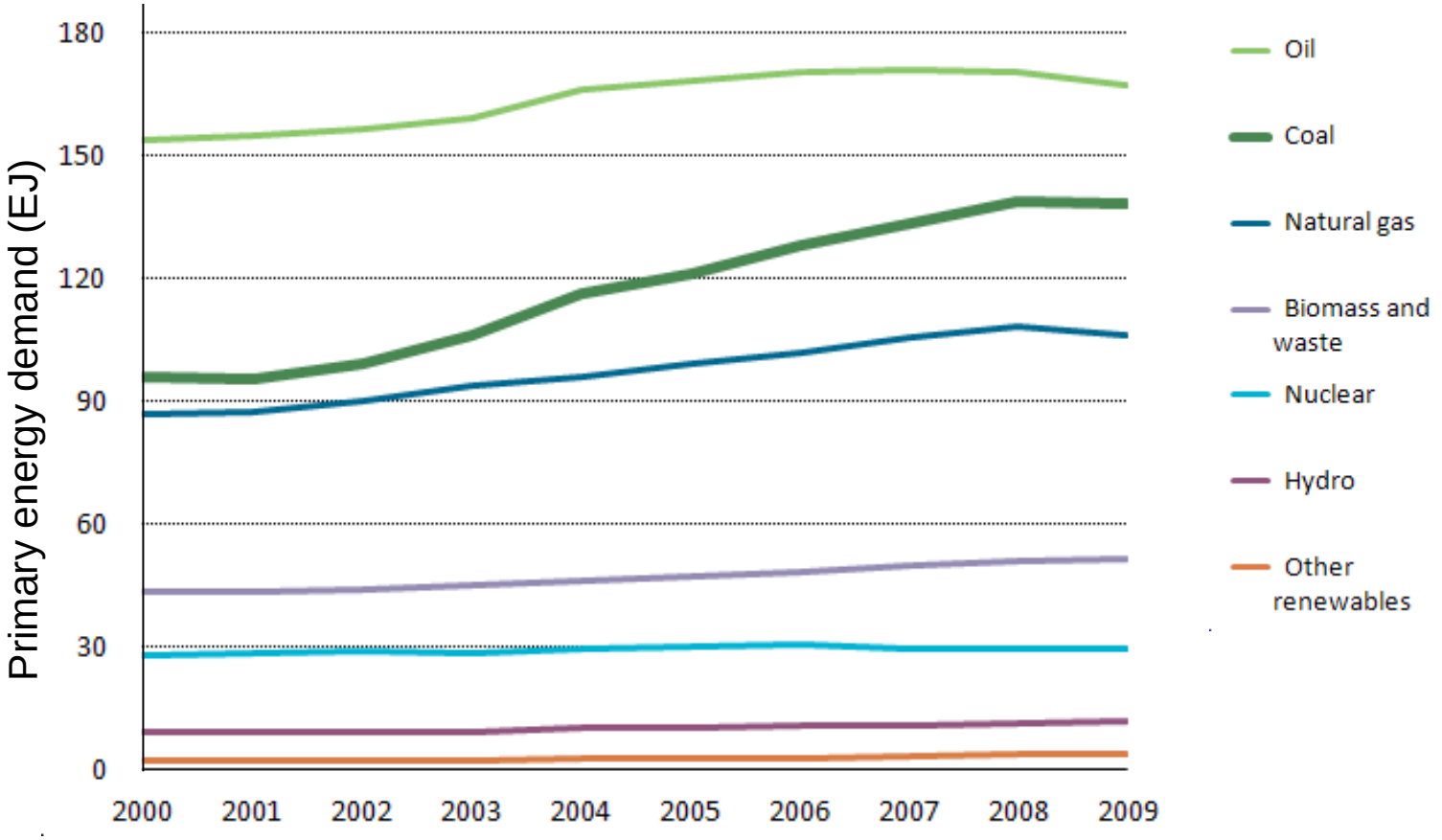
Content of presentation

- Summary of ETP2012
- Technology Roadmaps
- **HELE Coal Technology Roadmap**
  - **Coal-fired power generation today**
  - Vision for HELE coal-fired power plant
  - Technologies for raising efficiency



© OECD/IEA 2012

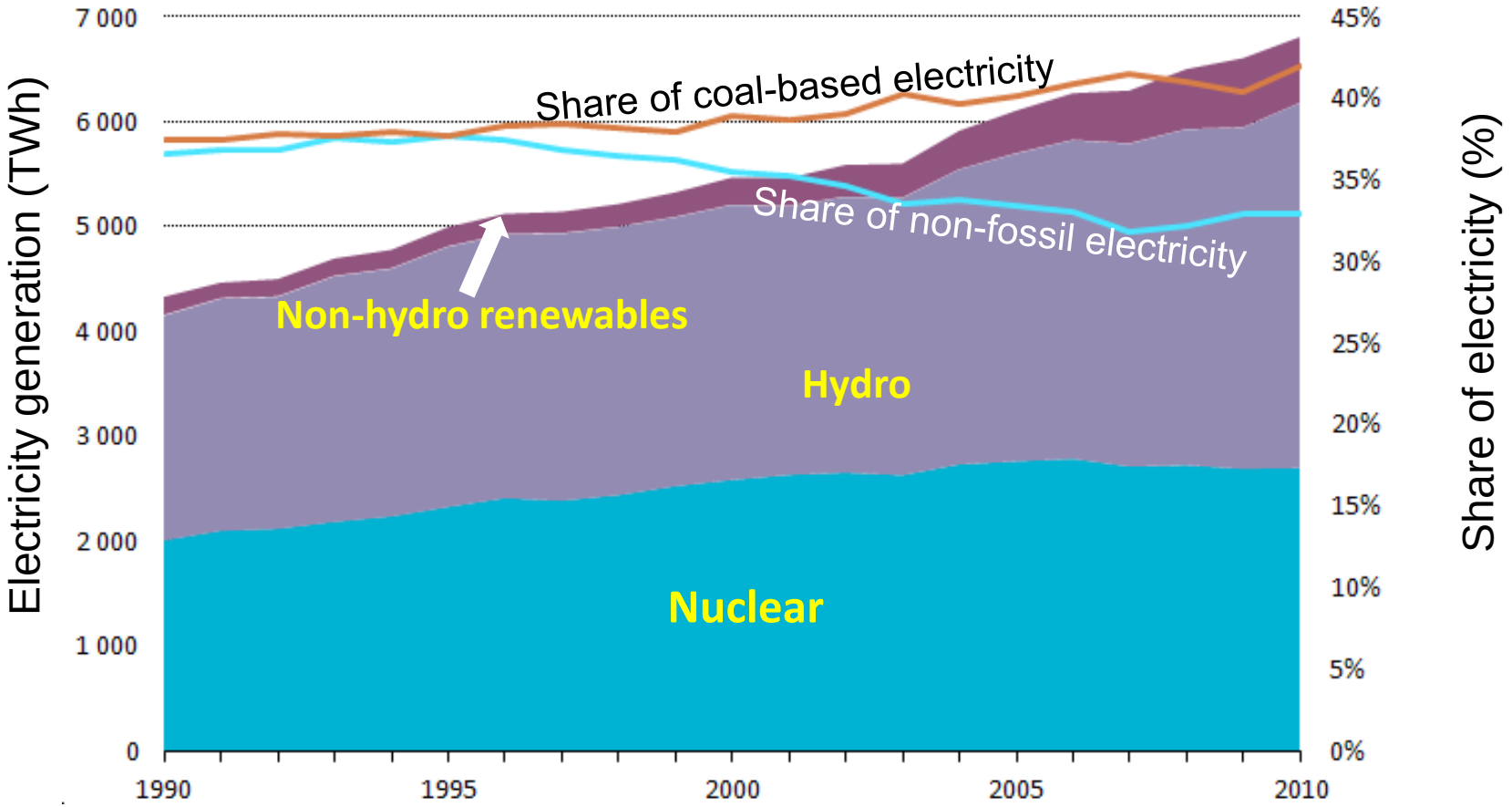
Fossil fuels dominate energy demand



Efficiency improvement reduces specific fuel consumption and also reduces specific pollutant emissions.

© OECD/IEA 2012

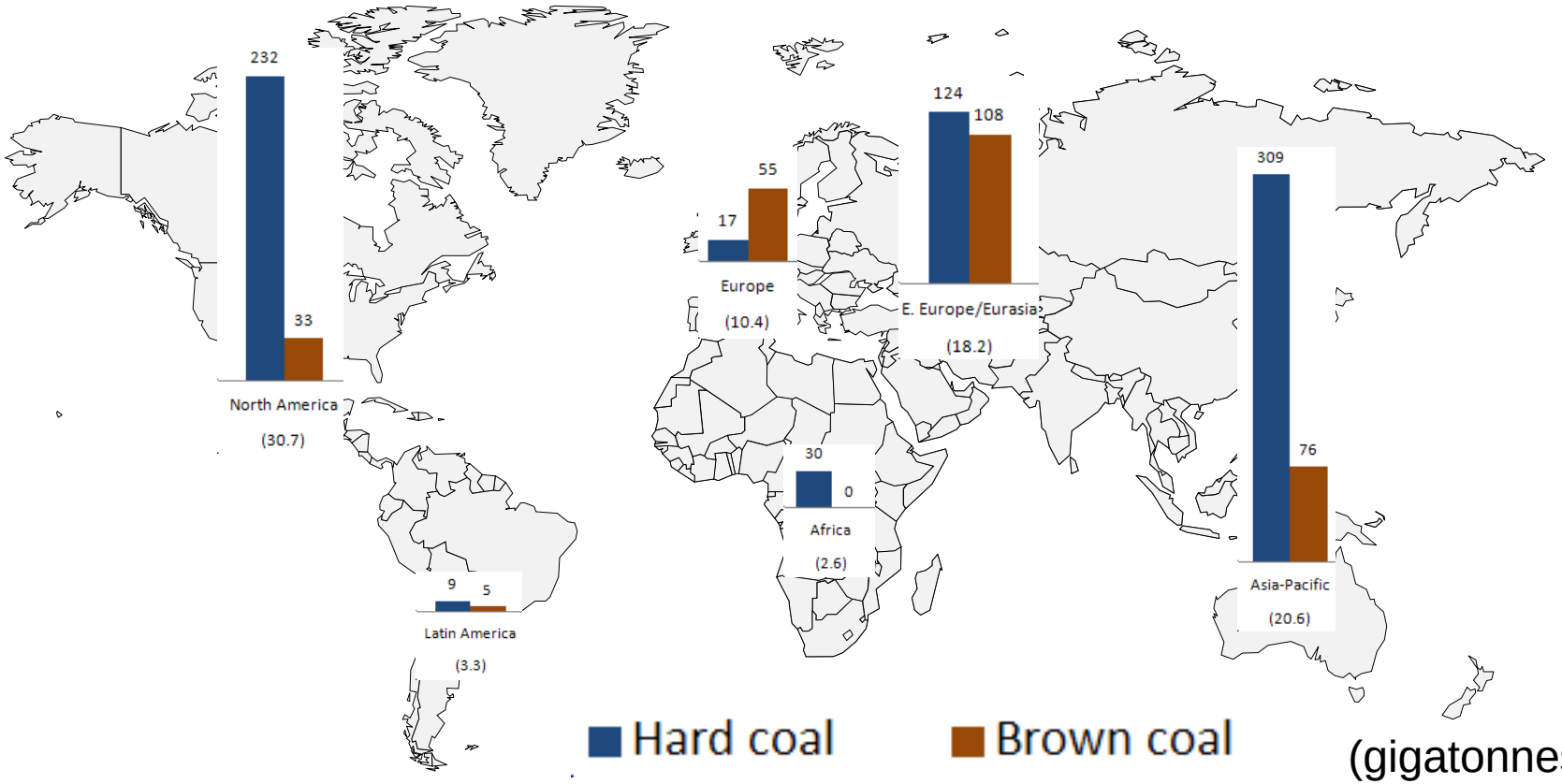
Non-fossil power generation



Despite an increasing contribution across two decades, the share of non-fossil generation has failed to keep pace with the growth in generation from fossil fuels, particularly coal.

© OECD/IEA 2012

Coal is abundant and widely available

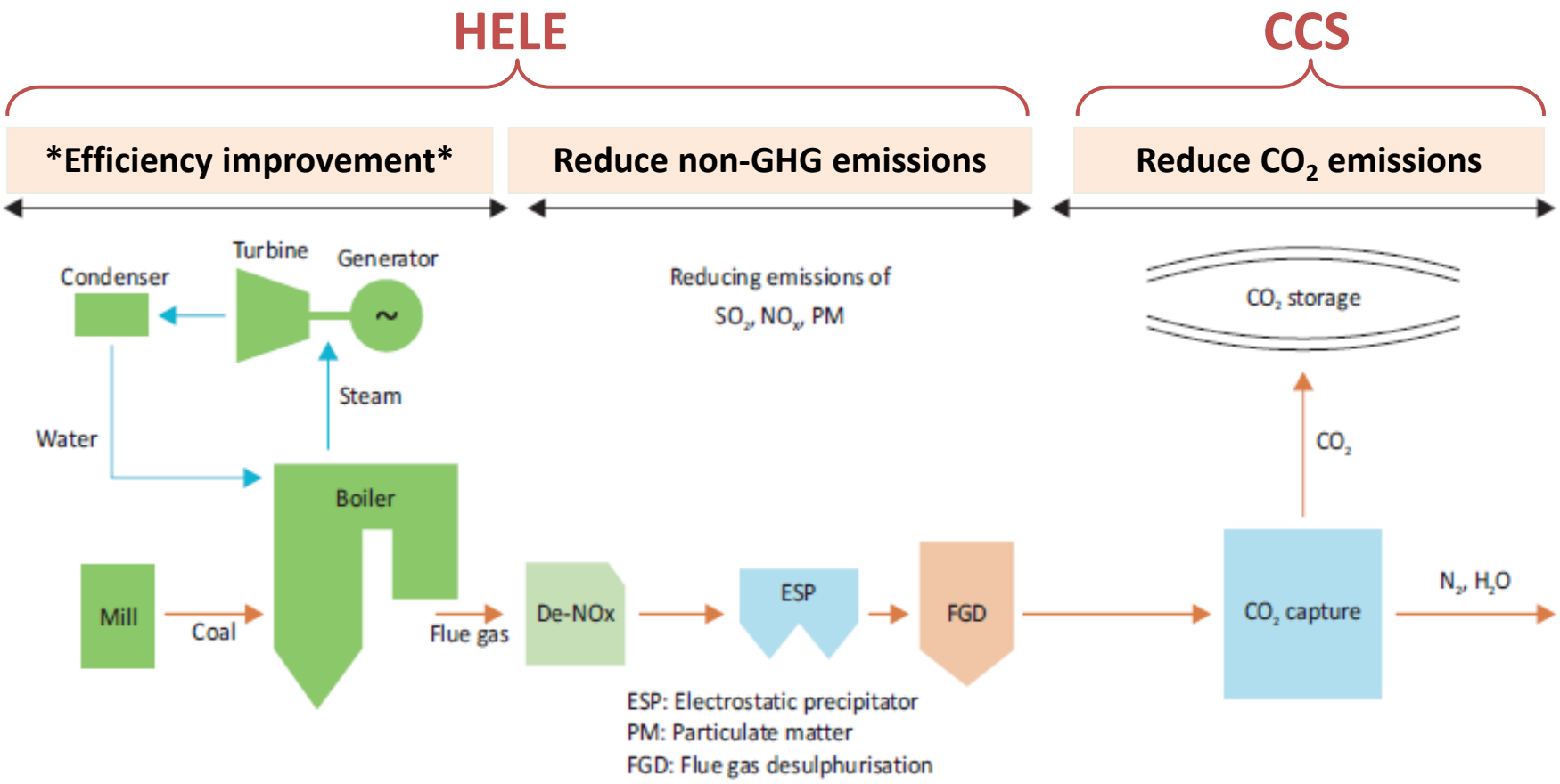


Sufficient coal reserves exist for an 150 years of generation at current consumption rates.

For some brown coals, reducing the moisture content is important for efficient use.

© OECD/IEA 2012

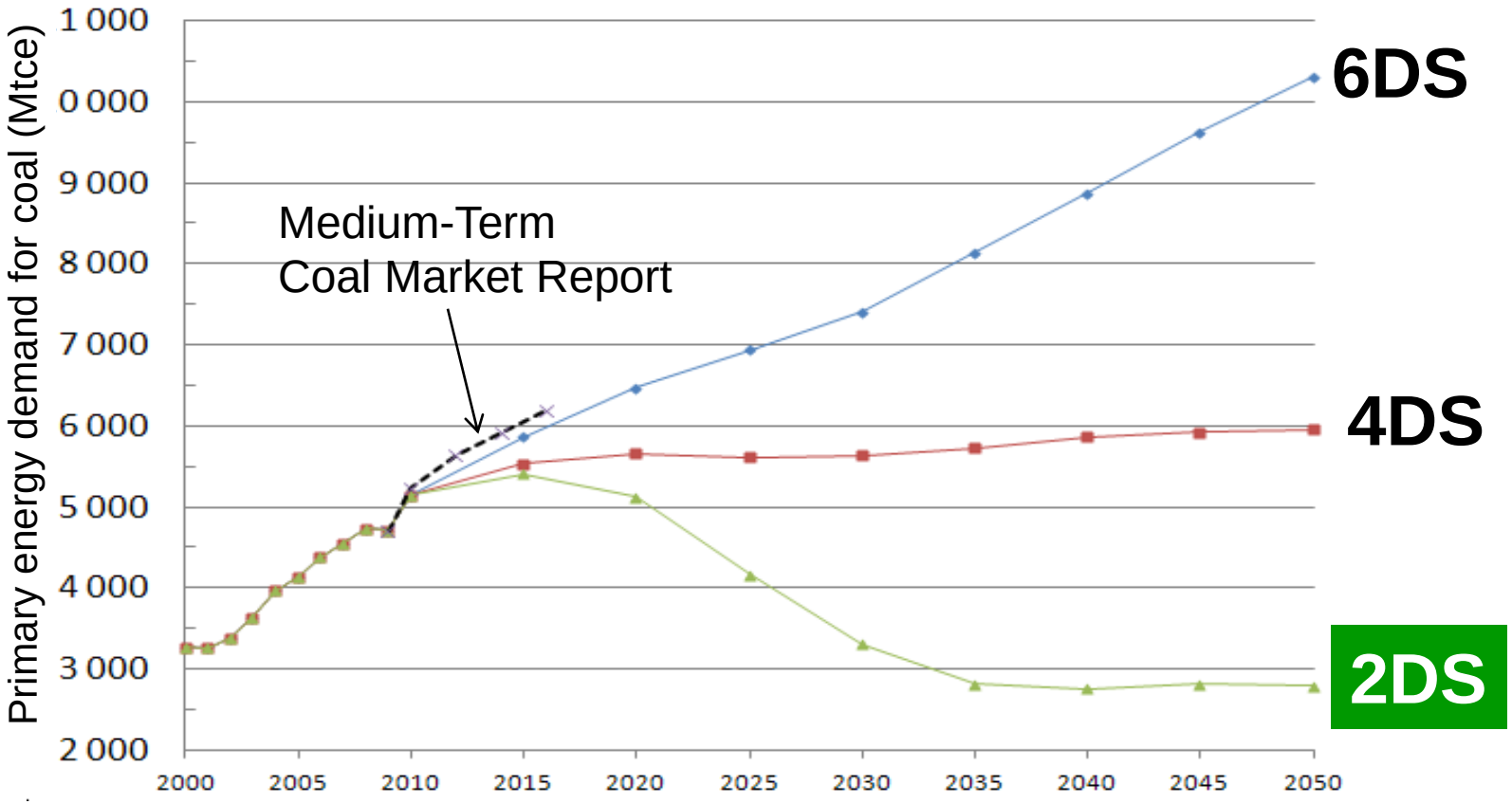
What are HELE technologies?



Efficiency improvement reduces specific fuel consumption and also reduces specific pollutant emissions.

© OECD/IEA 2012

The size of the challenge is clear

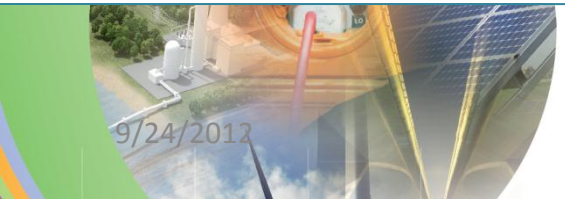


Near-term projections are not consistent with a low-carbon scenario

© OECD/IEA 2012

Content of presentation

- Summary of ETP2012
- Technology Roadmaps
- **HELE Coal Technology Roadmap**
  - Coal-fired power generation today
  - **Vision for HELE coal-fired power plant**
  - Technologies for raising efficiency



© OECD/IEA 2012