

EARE

ESA Ambassador Platform for
European Adoption of Renewable Energies



National Renewable
Energy Center of Spain

ENERGY RELATED APPLICATIONS



Introduction: Energy challenges and renewable energies



MINISTERIO
DE INDUSTRIA, TURISMO
Y COMERCIO

MINISTERIO
DE CIENCIA
E INNOVACIÓN



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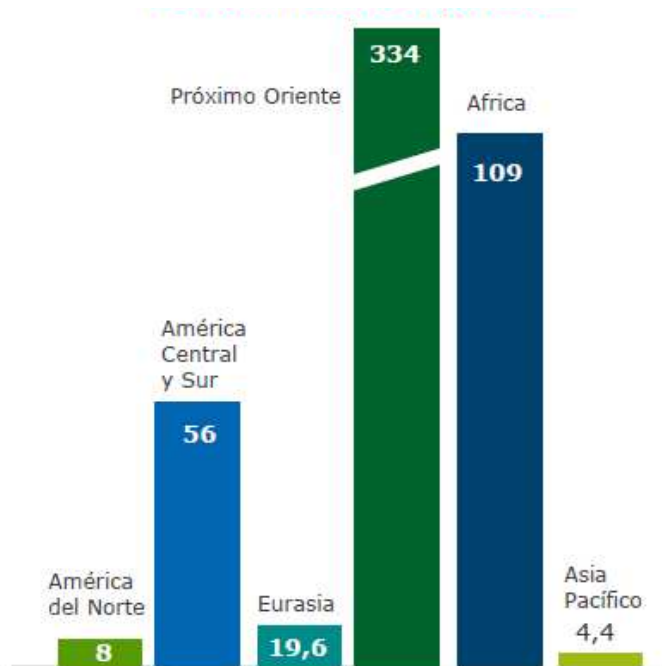
01

CONTEXT



Ratio reserves/consumption

In years (2007)

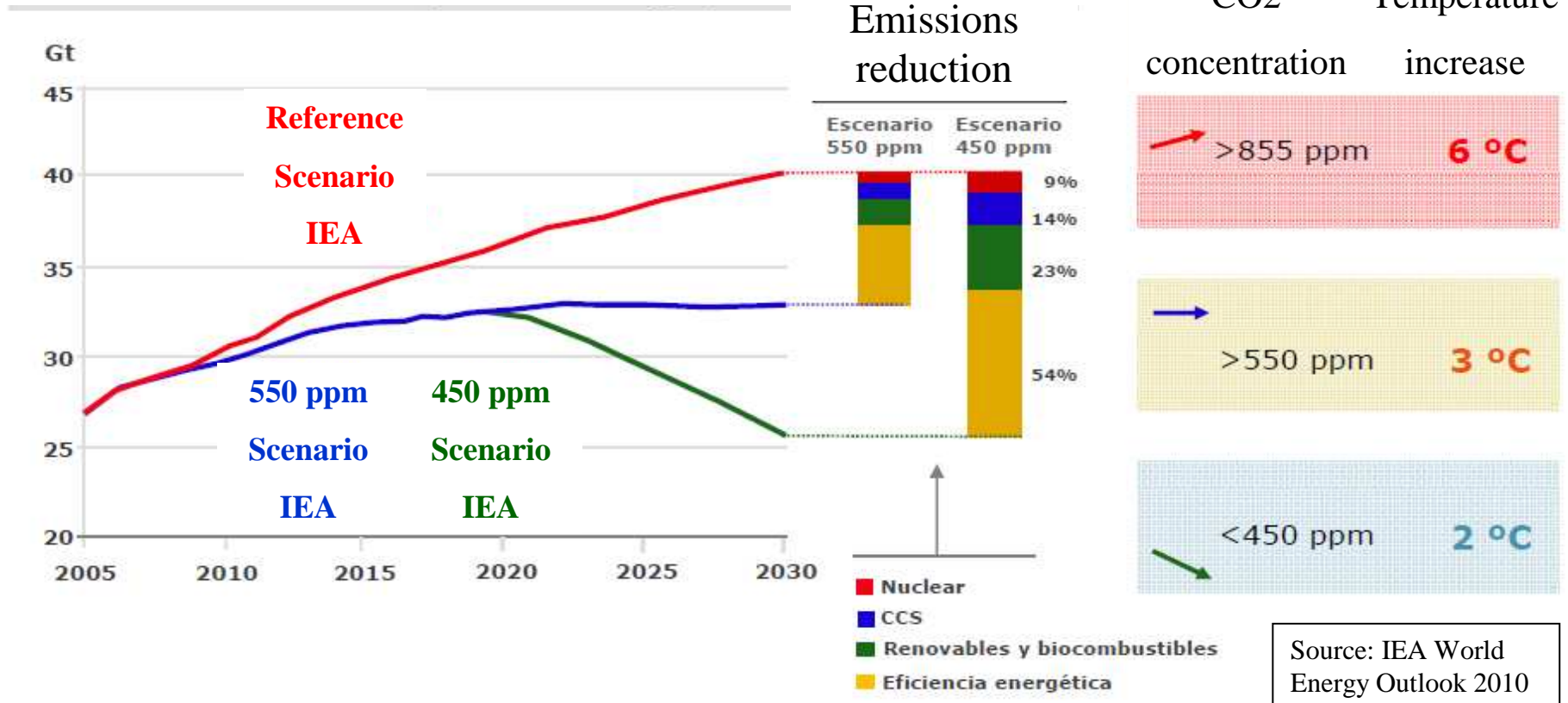


Fuente: BP Statistical Review of World Energy, 2008

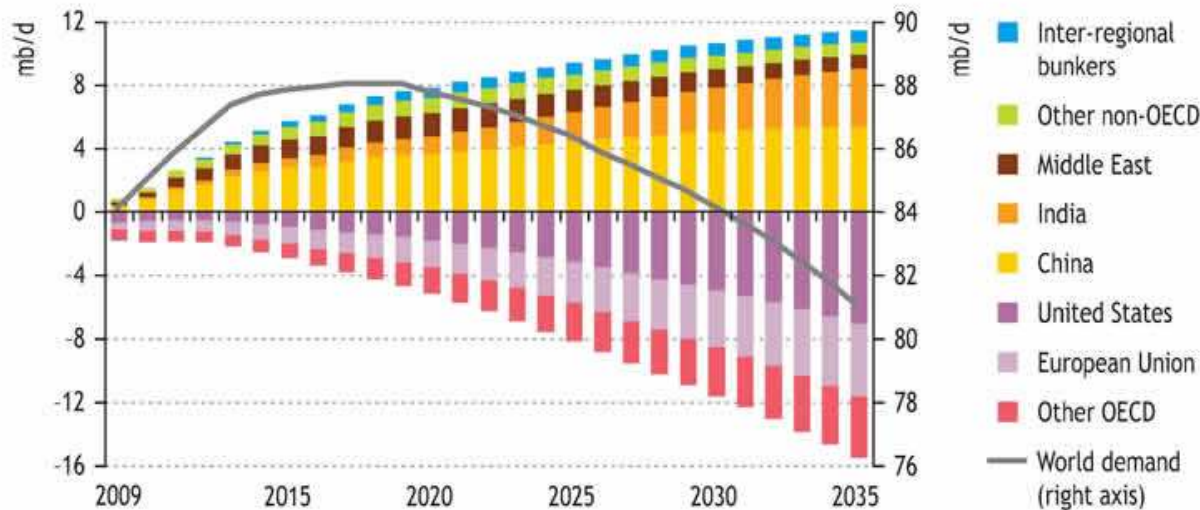


With the actual consumption, petroleum reserves are not guaranteed for more than 40 years

CO2 emissions



Change in oil demand by region in the 450 Scenario compared with 2008



Climate policies can drive an early peak in oil demand

Oil demand peaks at 88 mb/d before 2020 & falls to 81 mb/d in 2035, with a plunge in OECD demand more than offsetting continuing growth in non-OECD demand

Source: IEA World Energy Outlook 2010

© OECD/IEA 2010



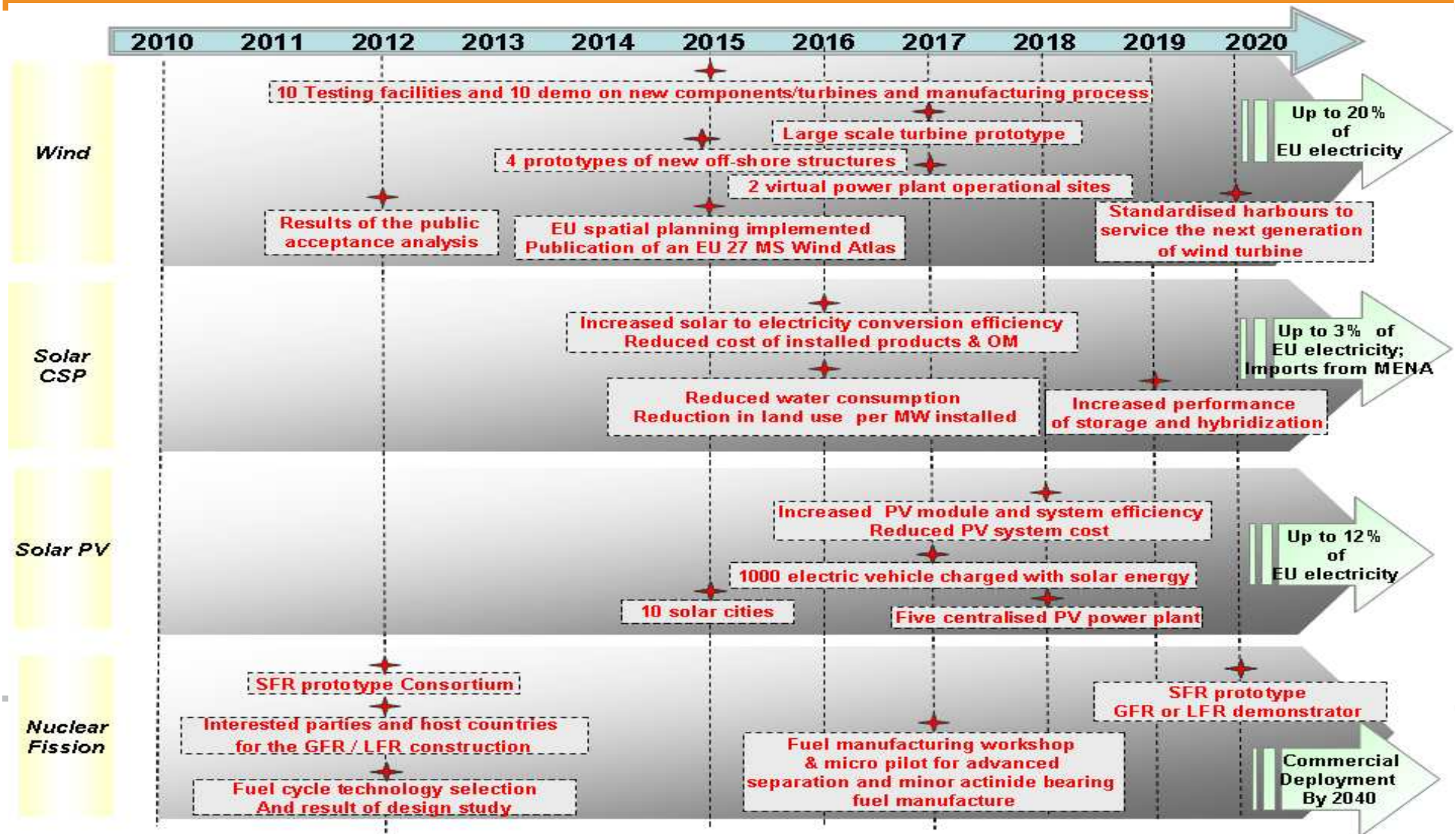
The strategy for energy in Europe based in low carbon technologies



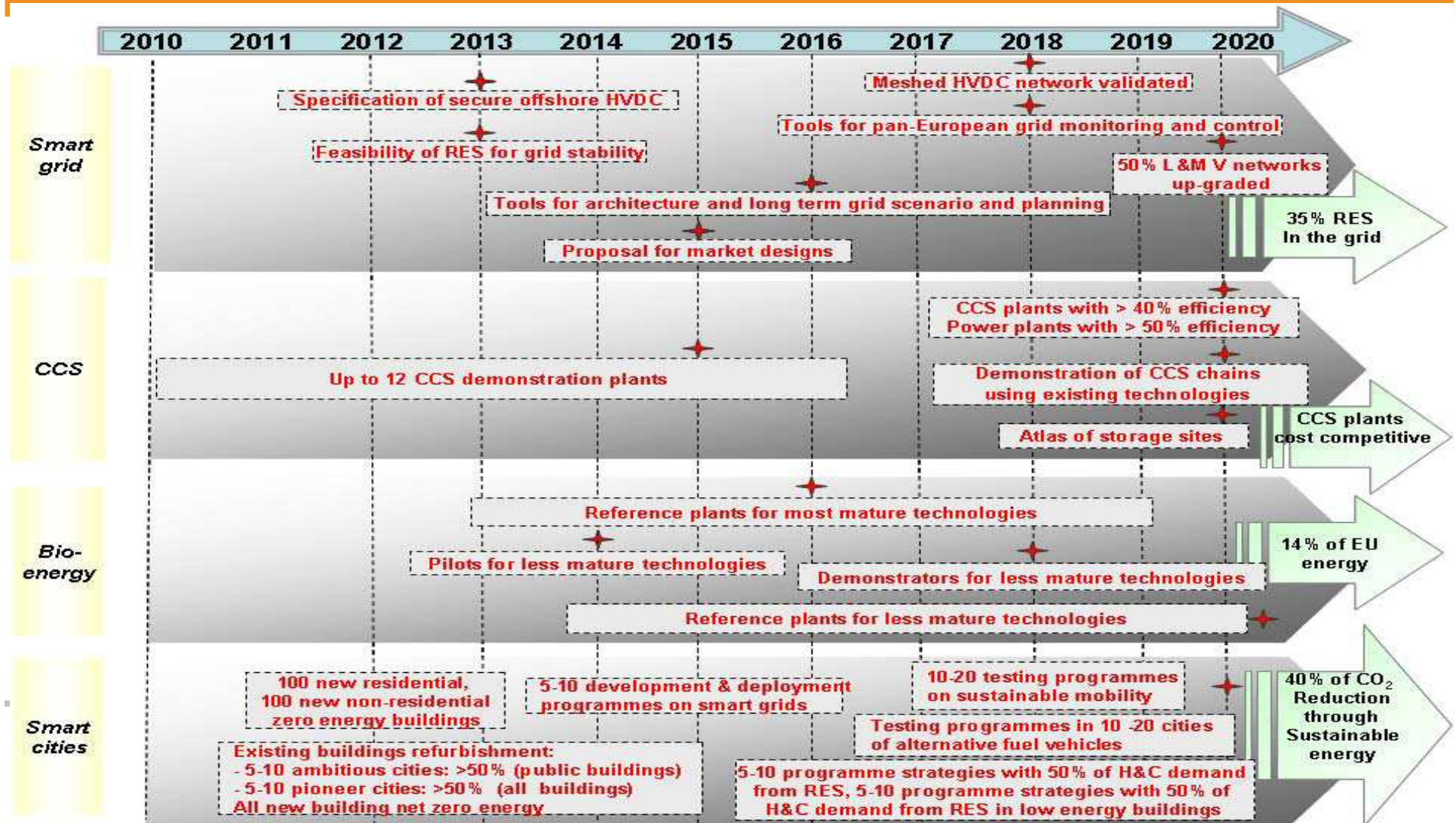
The SET-Plan, adopted by the European Union in 2008, is a first step to establish an energy technology policy for Europe. It is the principal decision-making support tool for European energy policy, with a goal of:

- Accelerating knowledge development, technology transfer.
- Maintaining EU industrial leadership on low-carbon energy technologies.
- Fostering science to achieve the 2020 Energy and Climate Change goals.
- Contributing to transition to a low carbon economy by 2050.

Objectives for the low carbon technologies (I)



Objectives for the low carbon technologies (II)



03

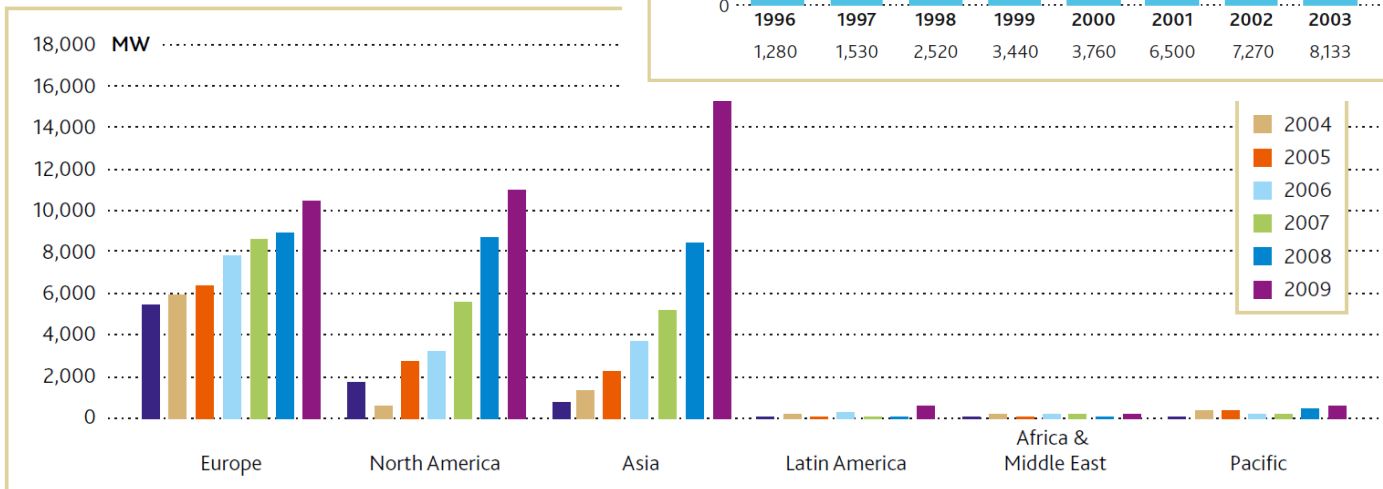
Time for renewable energies



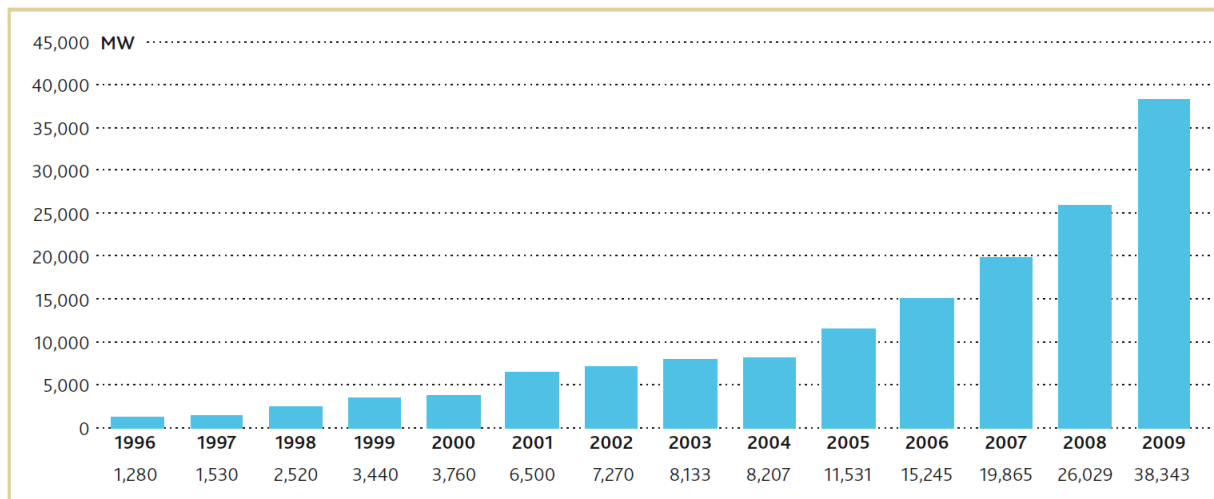
Wind energy: a mature technology

Wind energy was N°1 technology in installed capacity in EU in 2010

ANNUAL INSTALLED CAPACITY BY REGION 2003-



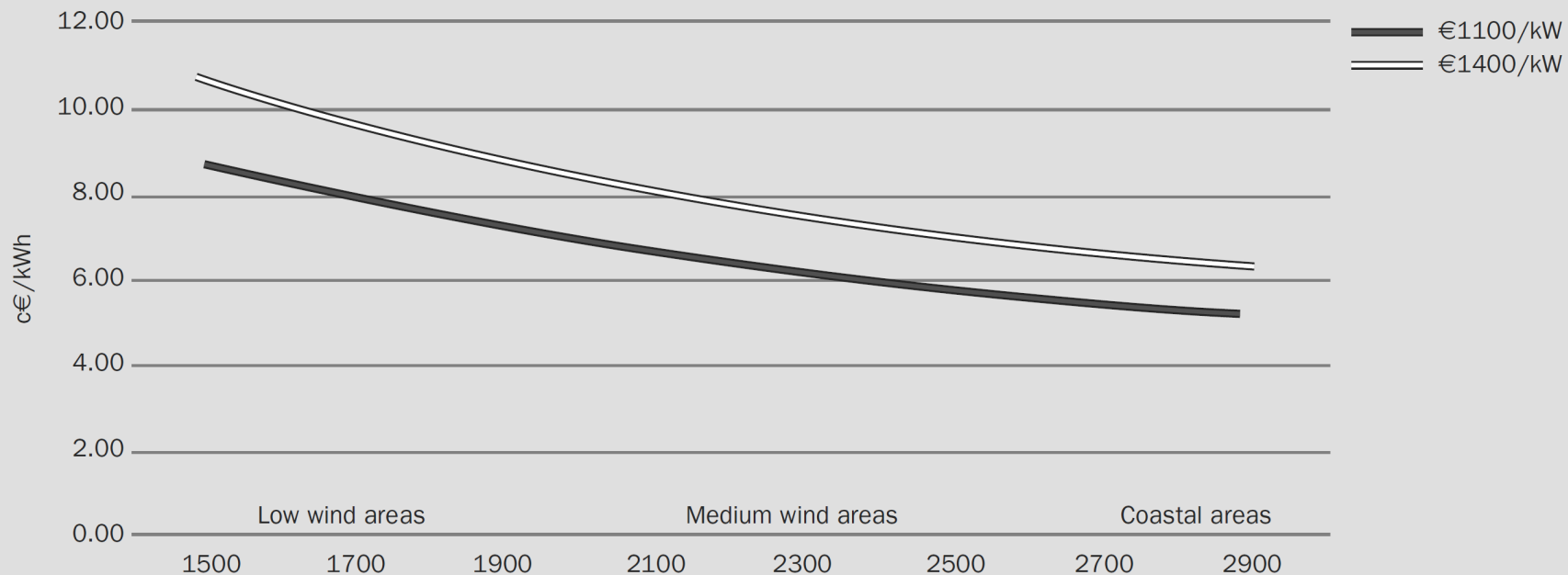
GLOBAL ANNUAL INSTALLED CAPACITY 1996-2009



Source: GWEC - Global Wind 2009 Report

03 TIME FOR RENEWABLE ENERGIES

Wind energy: close to be competitive with conventional energy sources without subsidies

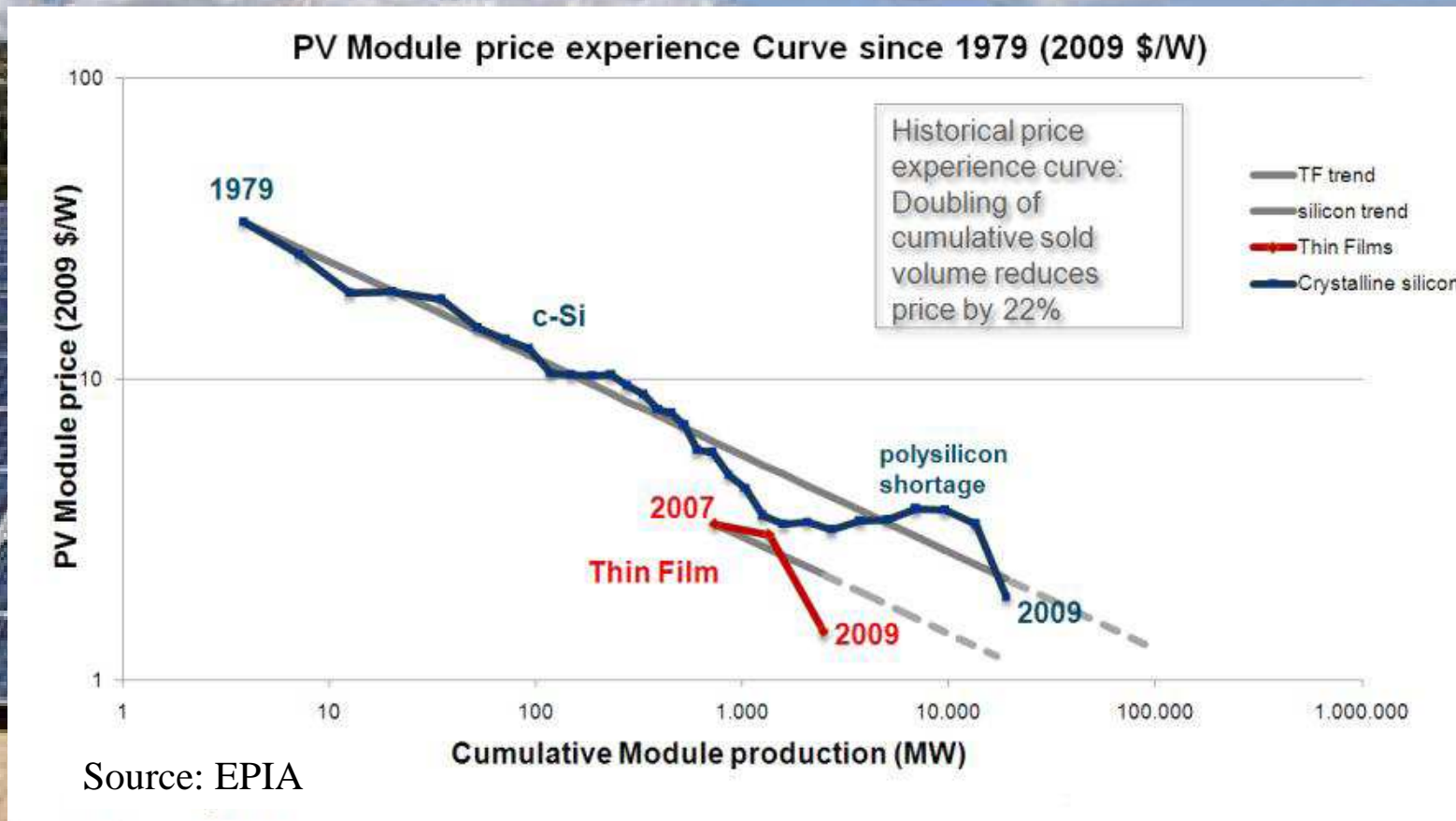


Note: In this figure, the number of full load hours is used to represent the wind regime. Full load hours are calculated as the turbine's average annual production divided by its rated power. The higher the number of full load hours, the higher the wind turbine's production at the chosen site.

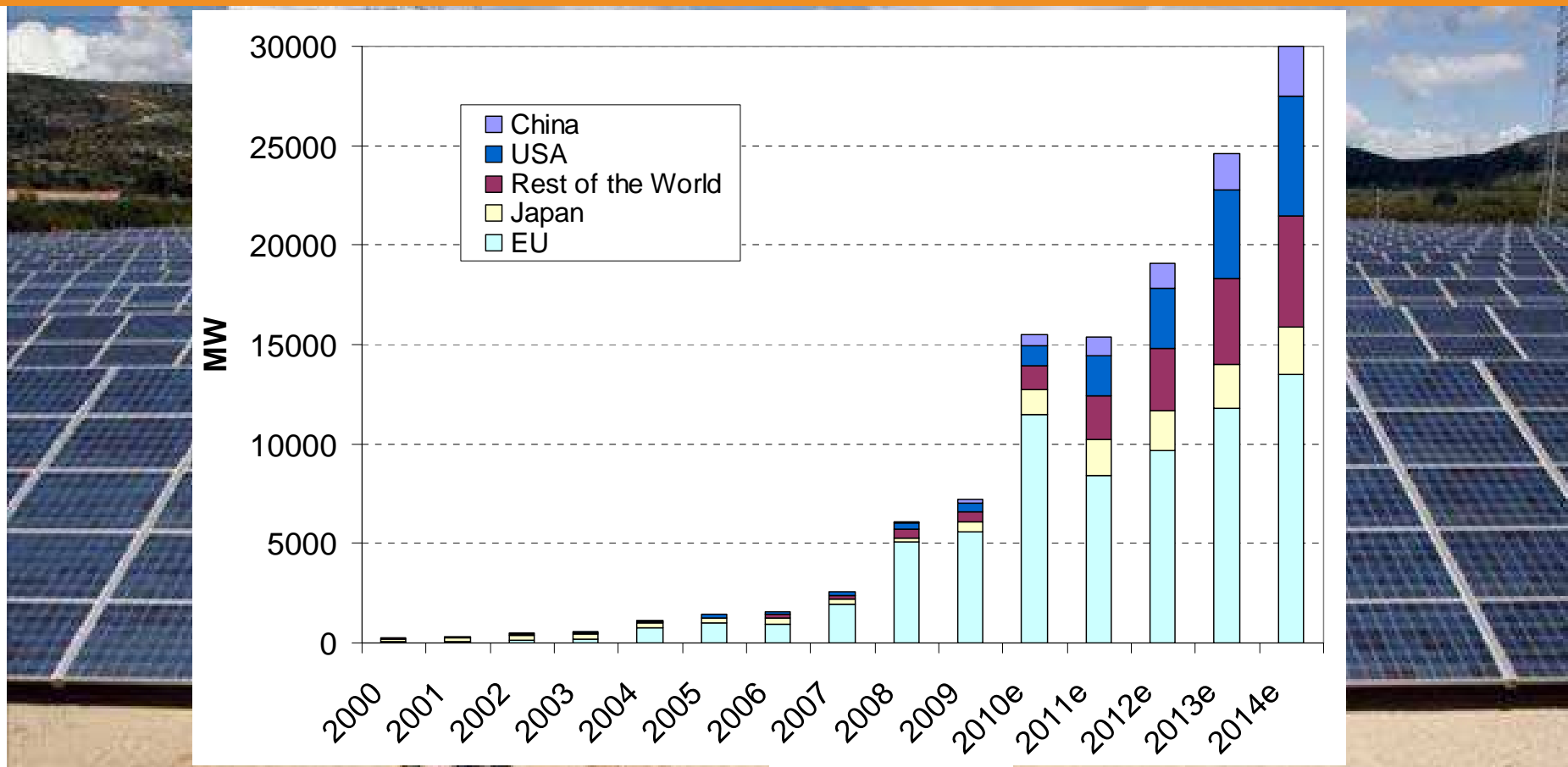
Source: Risø DTU

Wind is comparable to gas in the cost of kWh in windy areas

Photovoltaic energy: grid parity in a few years

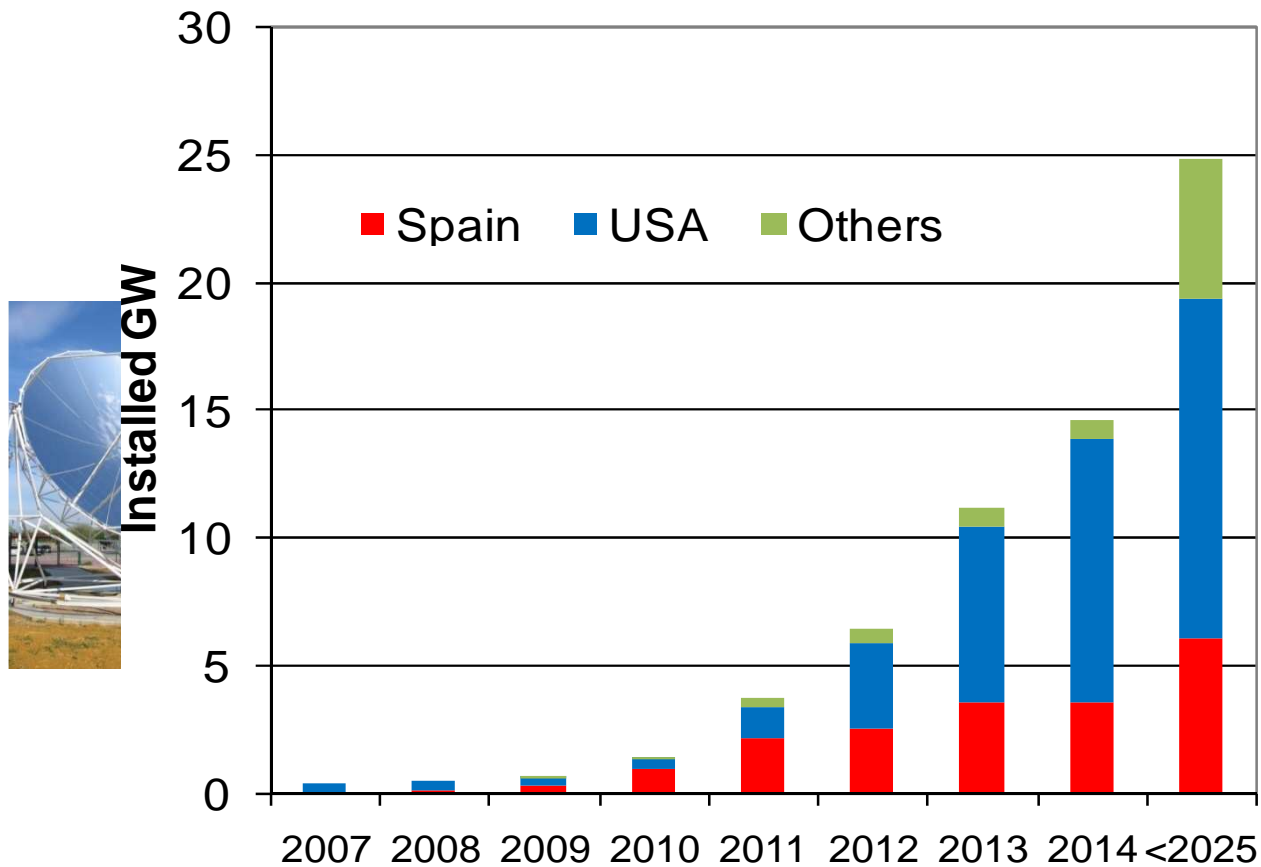


Photovoltaic energy: from a European to a global market

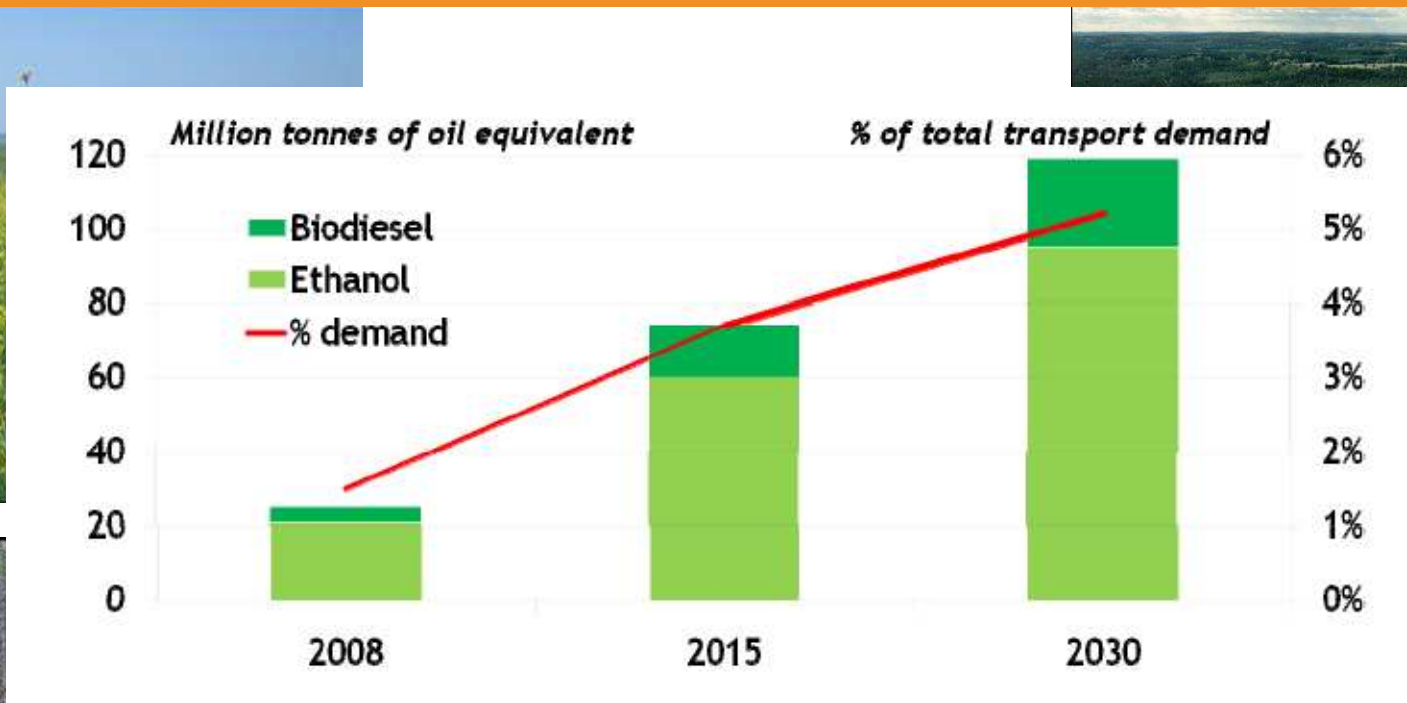


Source: EPIA

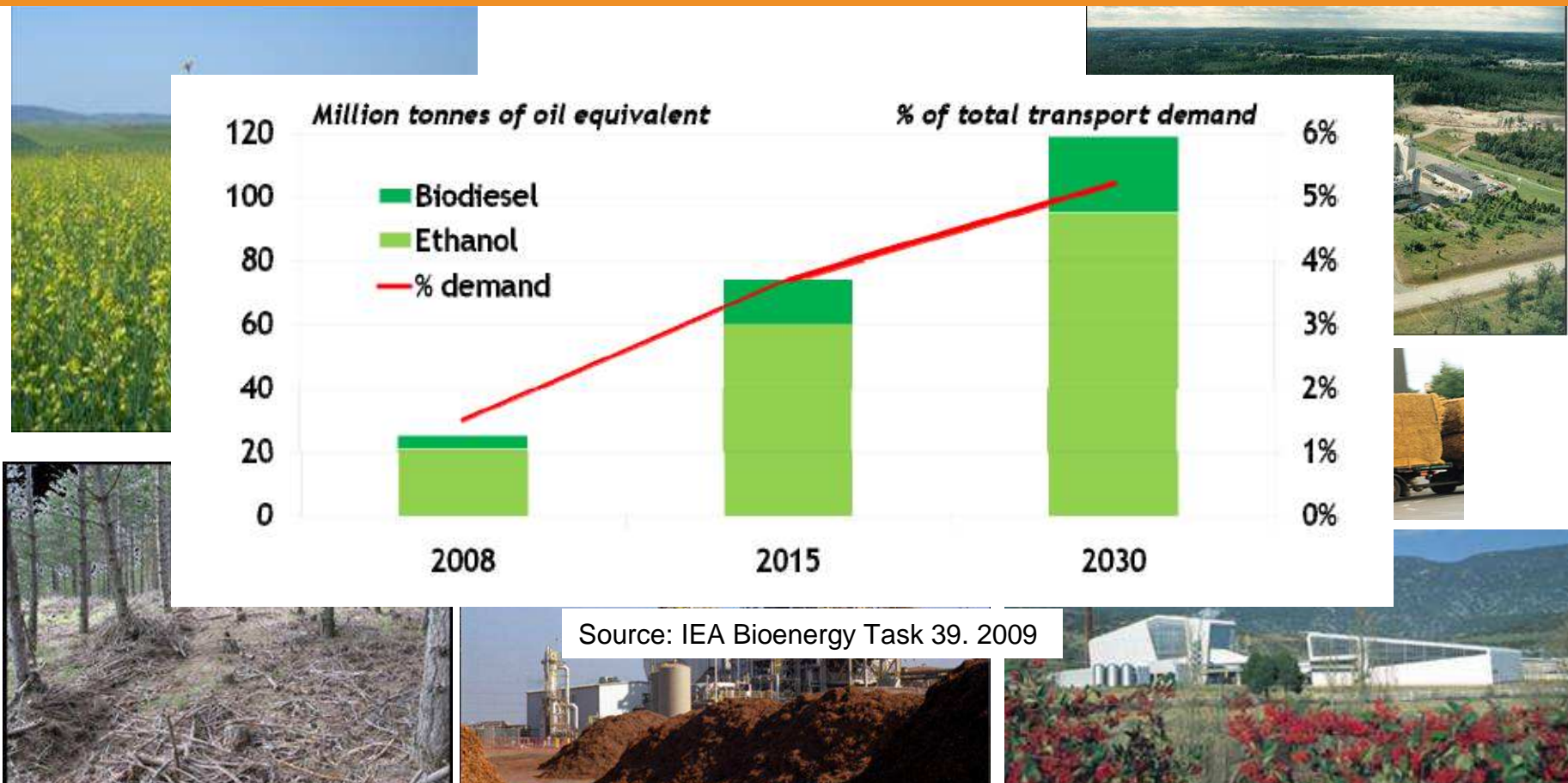
Concentrating Solar Thermal Power: multiple solutions with storage



Biofuels: expected growth of second generation biofuels



Source: IEA Bioenergy Task 39. 2009



Grid integration: a big challenge for the extensive use of renewable energies

Area relevant for impact studies

Task 25

System wide
1000-5000 km

Regional
100-1000 km

Local
10-50 km

ms...s

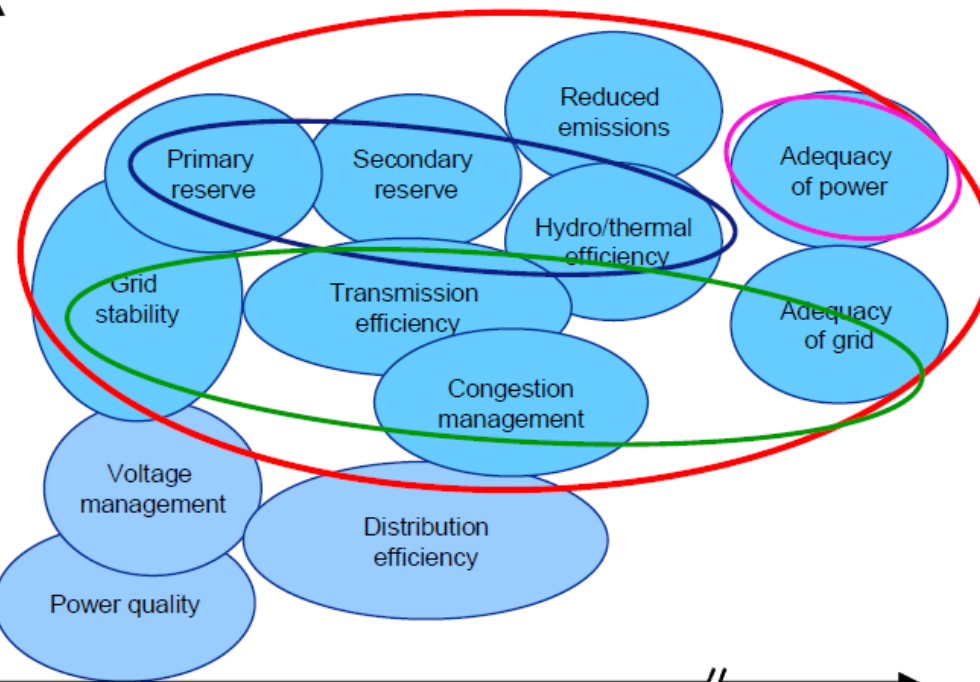
s...min

min...h

1...24 h

years

Time scale relevant for impact studies



Adequacy

Balancing

Grid



