



Alternative Fuels EU Policy

Energy consumption and CO₂ emission

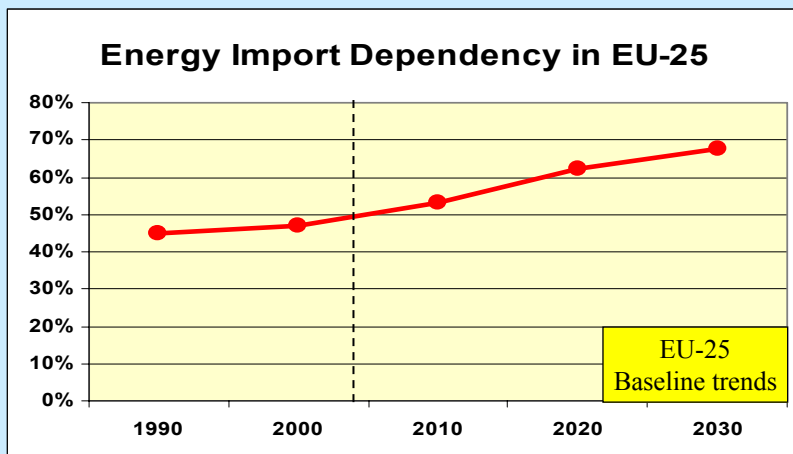
EU activities on alternative fuels

Perspectives for alternative fuels

EU support to hydrogen development



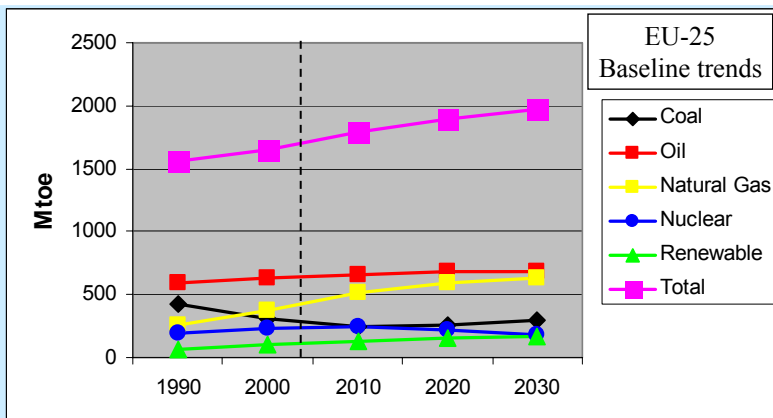
Trend in Energy Import



Import dependency rises from 47% to 68% in 2000 - 2030



Trends in Energy Consumption



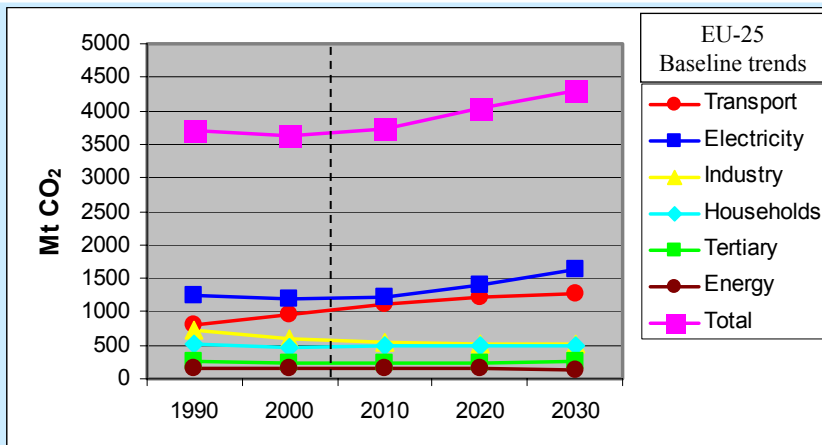
- Oil remains main energy source
- Natural gas increases its share considerably
- Renewable energy sources remain at low level

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Slide 3



Trends in CO₂ Emissions



- CO₂ emissions increase after 2010
- Electricity production and transport remain main emitters

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Slide 4



EC Activities on Alternative Fuels

EC activities on alternative fuels have two policy drivers:

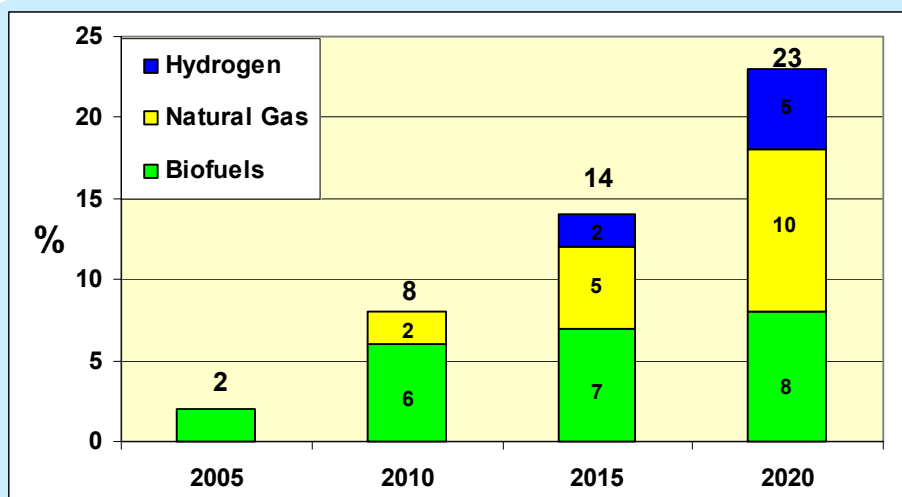
- **Security of energy supply** (Energy Green Paper 11/2000)
- **Reduction of greenhouse gas emissions** (Transport White Paper 9/2001)

Energy efficiency and alternative fuels are complementary approaches

- ◆ **Communication on alternative fuels** (11/2001):
Biofuels, Natural gas, Hydrogen
- ◆ **Contact Group Alternative Fuels** (Report 12/2003):
Expert assessment of market development perspectives of the main alternative fuels
- ◆ **Biomass Action Plan**
Commission adoption in December 2005
- ◆ **European Technology Platforms** on:
Hydrogen and fuel cells (1/2004), transport (ERTRAC, 2004), biofuels (2005)
- ◆ **Research Framework Programmes**
FP-7 proposals by the Commission in April and September 2005



Alternative Fuels Market Development Scenario





Contribution of alternative Fuels

20% market share of alternative fuels provide

Security of energy supply

Substitution of 70 Megatonnes oil per year,

- Amount of total North Sea production in 2020

Reduction of greenhouse gas emissions

Saving of 80 Megatonnes CO₂ per year,

- Amount of about 10% of total transport emissions



Perspectives of Alternative Fuels

Market share

Significant potential, exceeding 20% in next decades

- Consistent step-up process required

Bio Fuels: Domestic resource base; mature for the broad market.

- economic incentives

Broadening of resource base with innovative biofuels.

- feedstock, logistics, pilot plants

Natural gas: Diversification of resource base; potential for significant market share in the medium term.

- supply infrastructure, vehicle choice, economic incentives

Hydrogen: Potential for main energy carrier in the long term.

- broad research + focused technical development; large demonstration projects



Biofuels

- ◆ **Security of energy supply**
Diversification of supply base;
Indigenous resources
- ◆ **Reduction of greenhouse gas emissions**
Large reductions possible, up to 75% with
1st generation, higher with second generation biofuels
- ◆ **Economic aspects**
Economic viability not far at present oil prices (~70\$/bl)



Natural Gas Fuel

- ◆ **Security of energy supply**
Diversification of the supply base;
10% of transport fuels represents only 5% of all demand
- ◆ **Reduction of greenhouse gas emissions**
Advanced technology 15% better than diesel
- ◆ **Low pollutant emissions**
Low emissions of NO_x and particulates
- ◆ **Economic aspects**
Economic viability possible in mass market conditions



Hydrogen Fuel

- ◆ **Security of energy supply**
Universal energy carrier for all primary sources;
buffer storage for renewable energy sources.
- ◆ **Reduction of greenhouse gas emissions**
Fuel cell systems with high efficiency allow saving also
with hydrogen from fossil sources.

Internal combustion engines provide saving with
renewable hydrogen.
- ◆ **Economic aspects**
Fuel economic in high efficiency fuel cell systems;
Infrastructure economic with staged build-up;
Vehicle cost reduction highest priority.



Summary

- ◆ **Need for oil substitution in transport growing**
 - ◆ Concerns on future oil supply capacities
 - ◆ Necessity of CO₂ emission reductions in transport
- ◆ **Transition to multiple fuel mix expected**
 - ◆ Staged oil substitution with combination of new fuels
 - ◆ Biofuels, natural gas, hydrogen main candidates
- ◆ **Package of policy actions in place**
 - ◆ Targets for market share and tax relief for biofuels
 - ◆ Tax relief for natural gas
 - ◆ Priority R&D funding for hydrogen and fuel cells