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Energy Technology Perspectives 2010

Results for Industry, Buildings and Transport in
OECD Europe

Dr Peter Taylor
Madrid, 20 September 2010

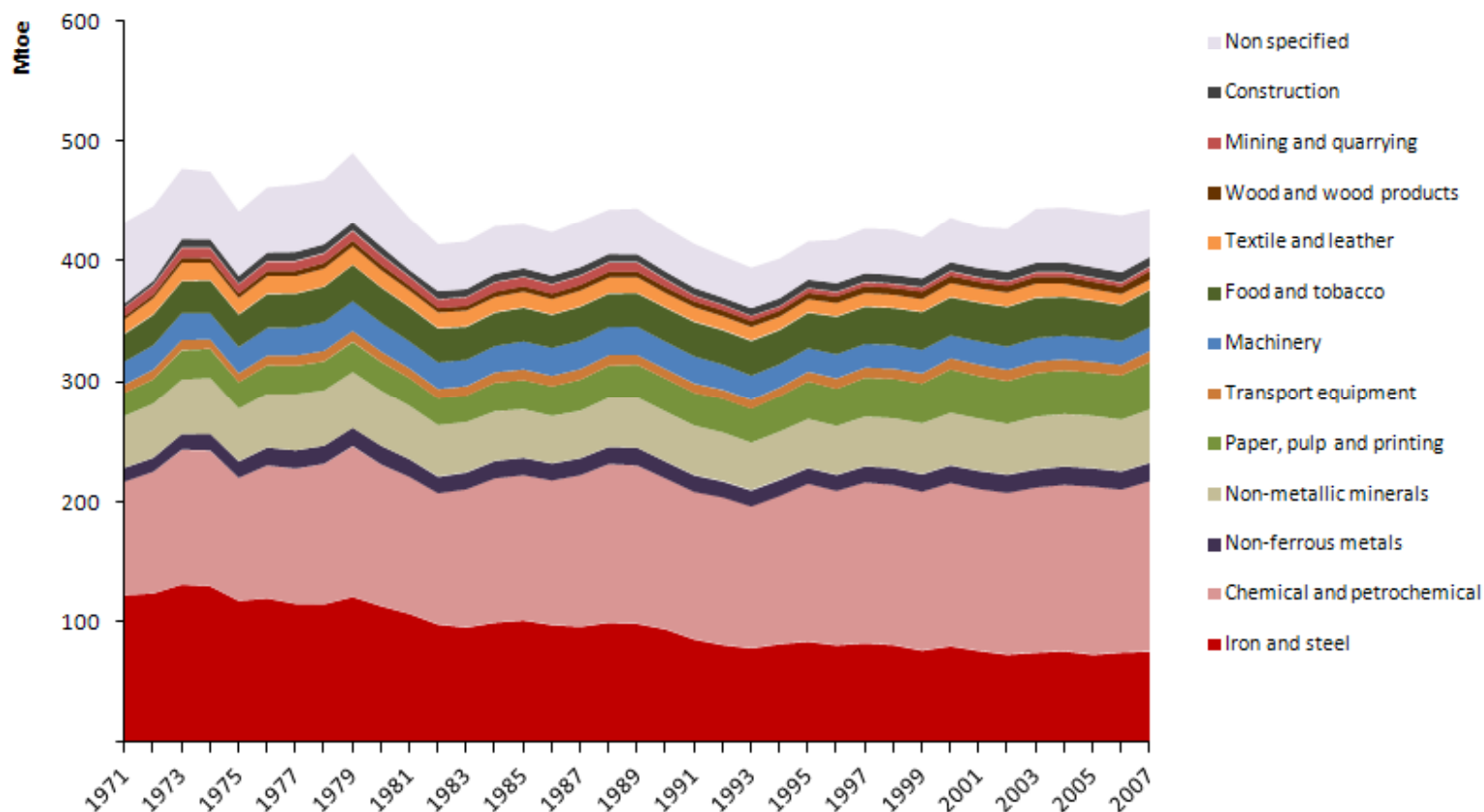


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Industry

OECD Europe

Industrial energy use by sector in OECD Europe



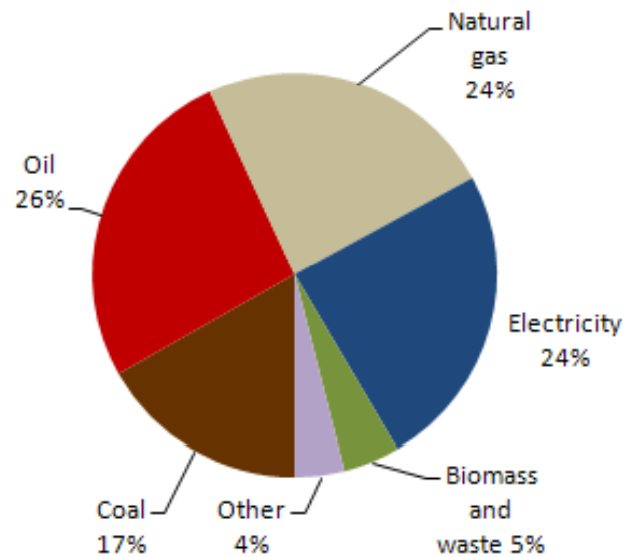
Energy use has remained relatively stable for the last 30 years, with increases in chemicals and pulp and paper offsetting the decline in iron and steel.



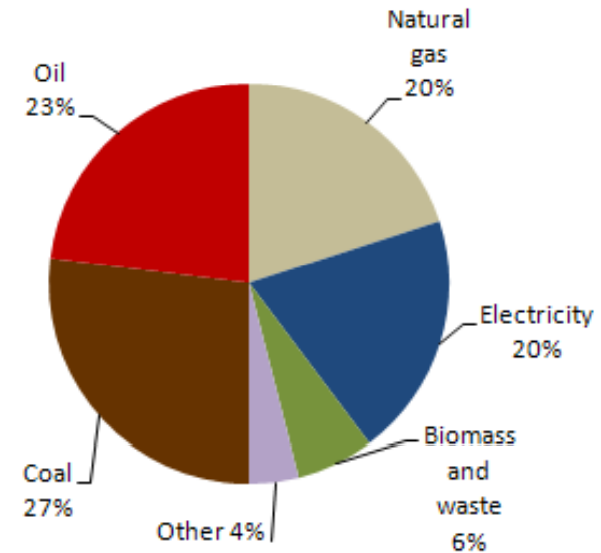
Industrial final energy mix in OECD Europe and the world, 2007



OECD Europe - 438 Mtoe

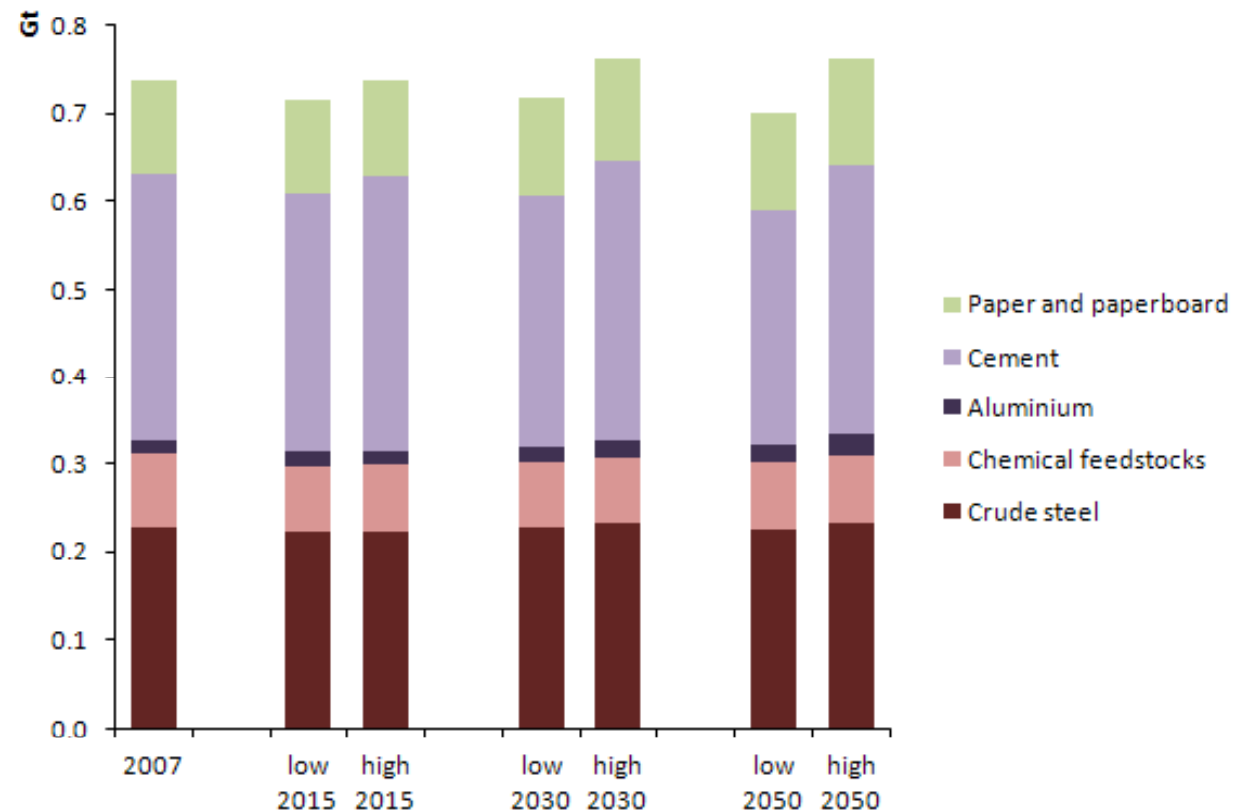


World - 3 019 Mtoe



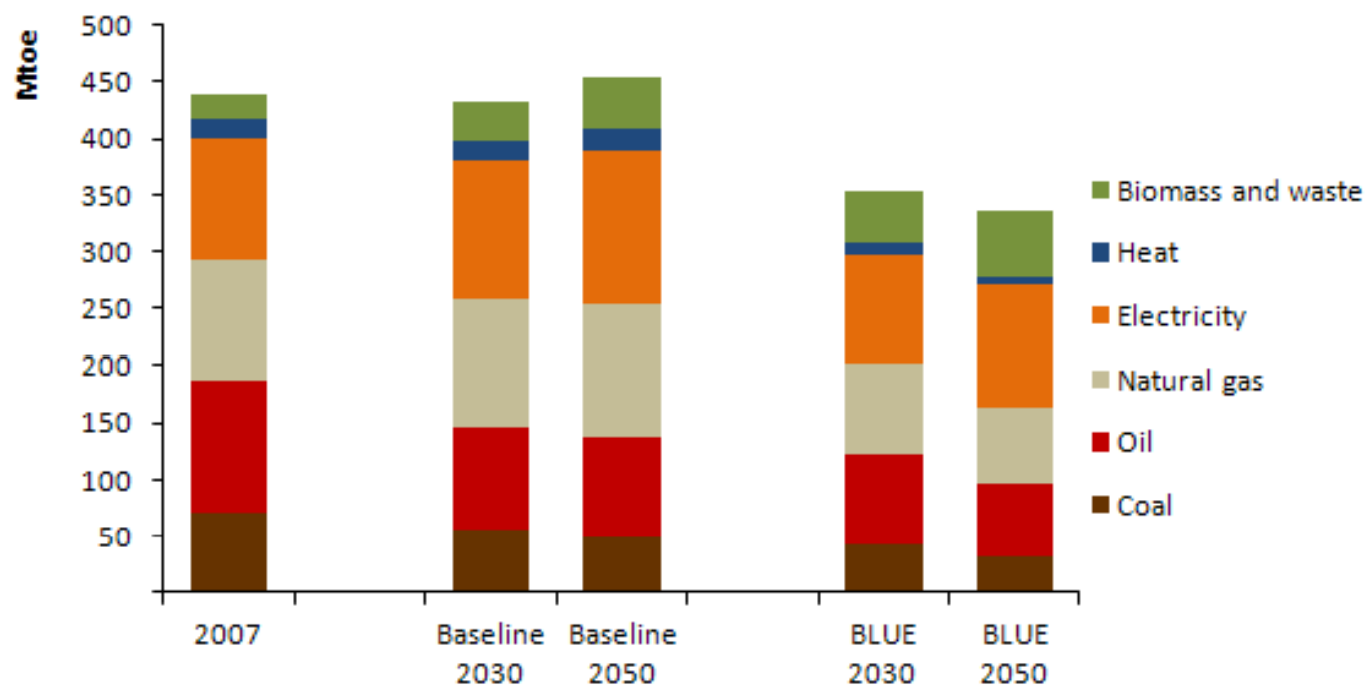
Oil and gas represent half of all energy use by industry in OECD Europe

Materials production in OECD Europe in different scenarios



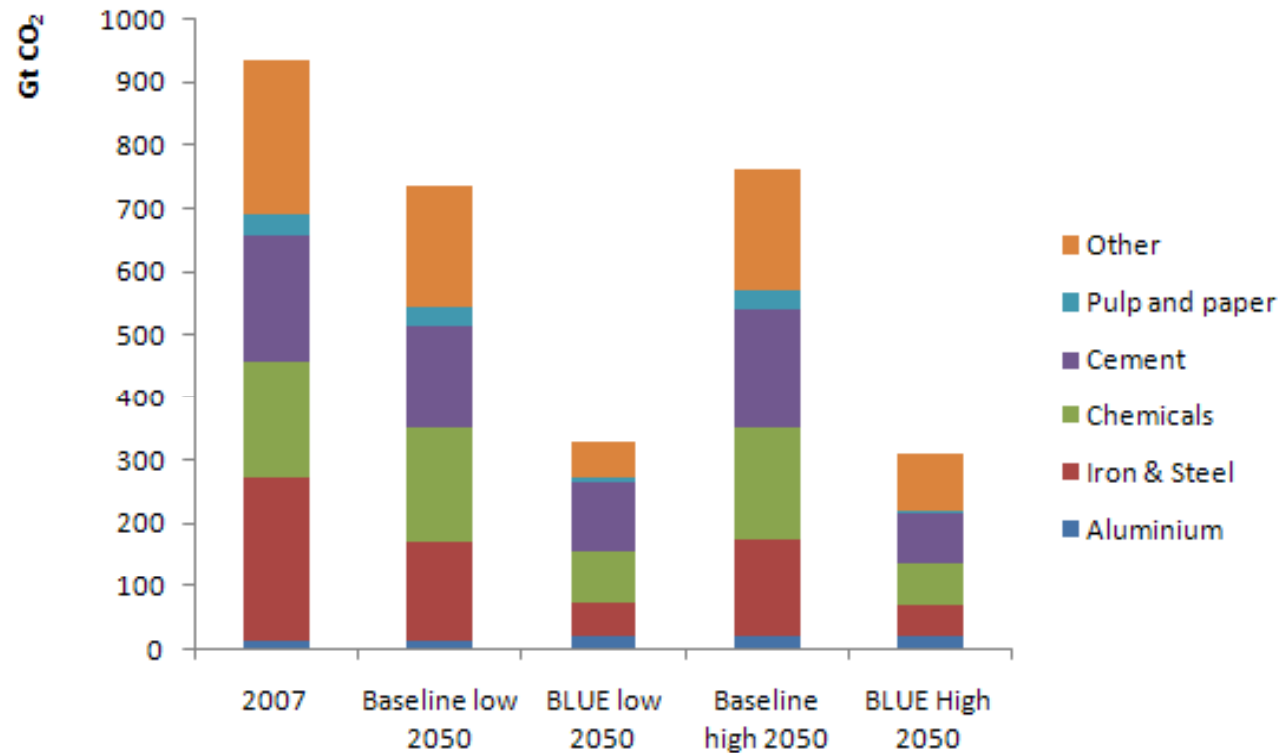
The production of materials in OECD Europe is not expected to change much between 2007 and 2050.

Industrial energy use in OECD Europe



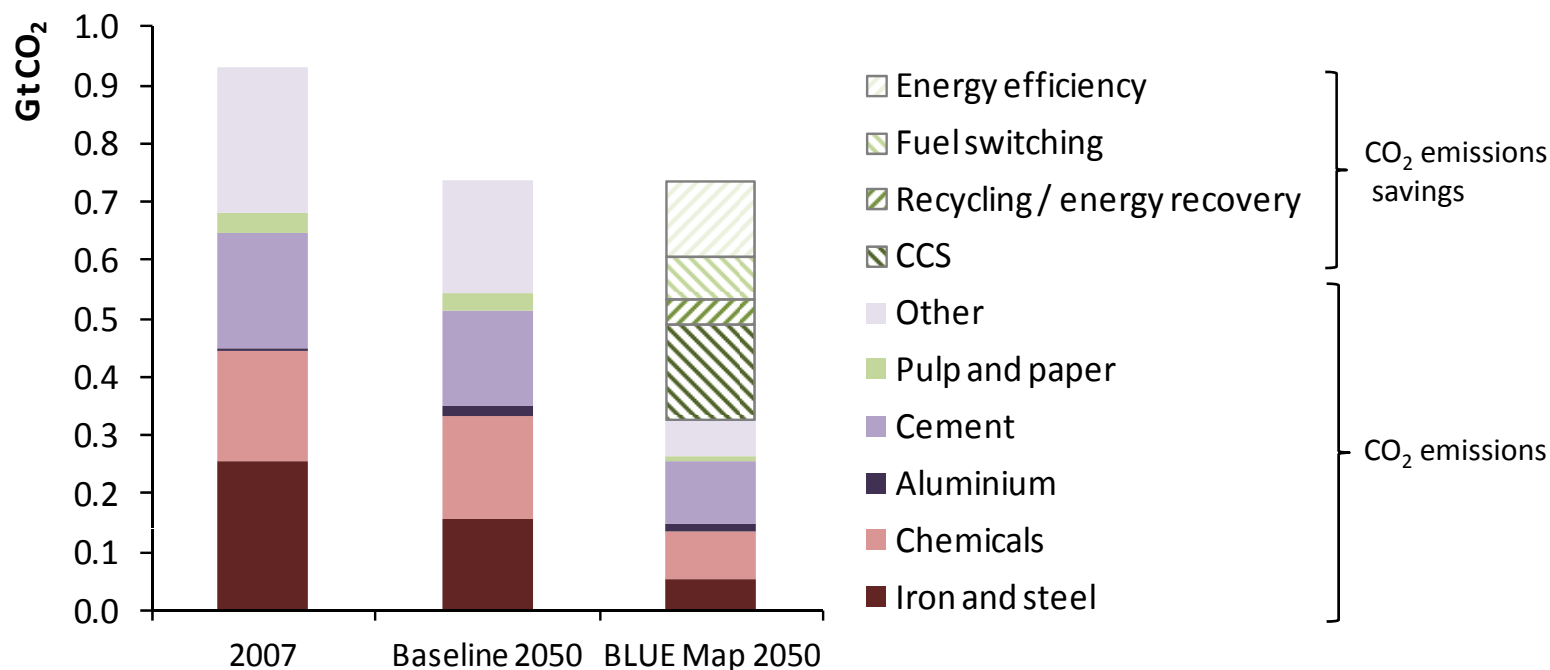
Higher levels of energy efficiency in the BLUE scenario lead to energy use in 2050 being 25% lower than in 2007.

Direct energy and process CO₂ emissions in OECD Europe



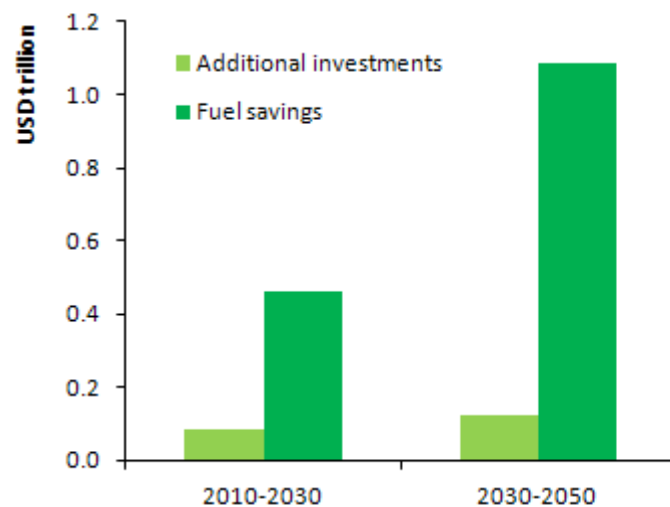
Industry emissions in OECD Europe decline by about 30% between 2007 and 2050 in the Baseline scenario. In the BLUE scenario, emissions fall by more than 65%.

Industrial abatement options in OECD Europe

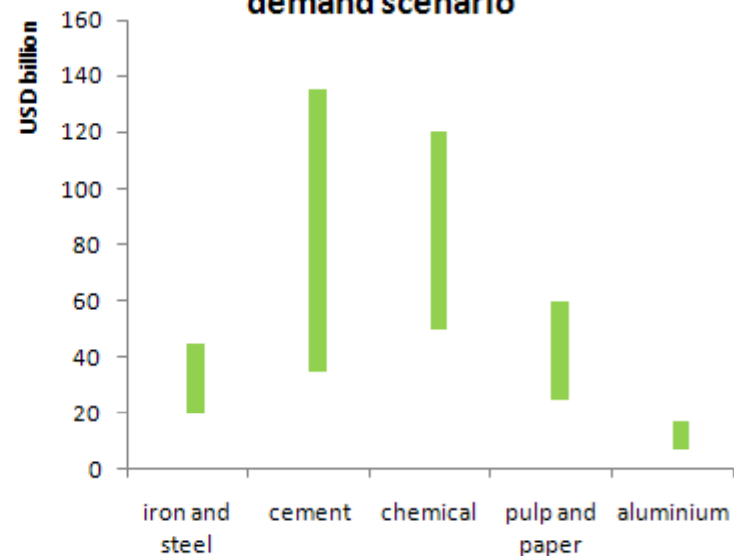


Energy efficiency and CCS are the two most important abatement options in industry.

Investment and fuel savings for industry in OECD Europe



Additional investment by sector to 2050, range for low- and high-demand scenario



Fuel savings far outweigh the need for additional investment over the period 2010 to 2050.

Conclusions on industry

Technology changes:

- **Implementation of BAT for all new and replacement equipment / processes**
- **RD&D to go beyond current BAT**
 - Under development / demonstration: smelting reduction, new separation membranes, black liquor and biomass gasification, regenerative burner systems and advanced CHP
 - New research needed for: Hydrogen in iron and steel, bio-based feedstock in chemical
- **CCS could be critical to achieve long-term deep emissions reductions in a number of sectors**

Policy needs:

- **Clear, stable, long-term policies that put a price on CO₂ emissions**
- **International agreements covering specific energy-intensive sectors**
- **Standards, incentives and regulatory reforms**





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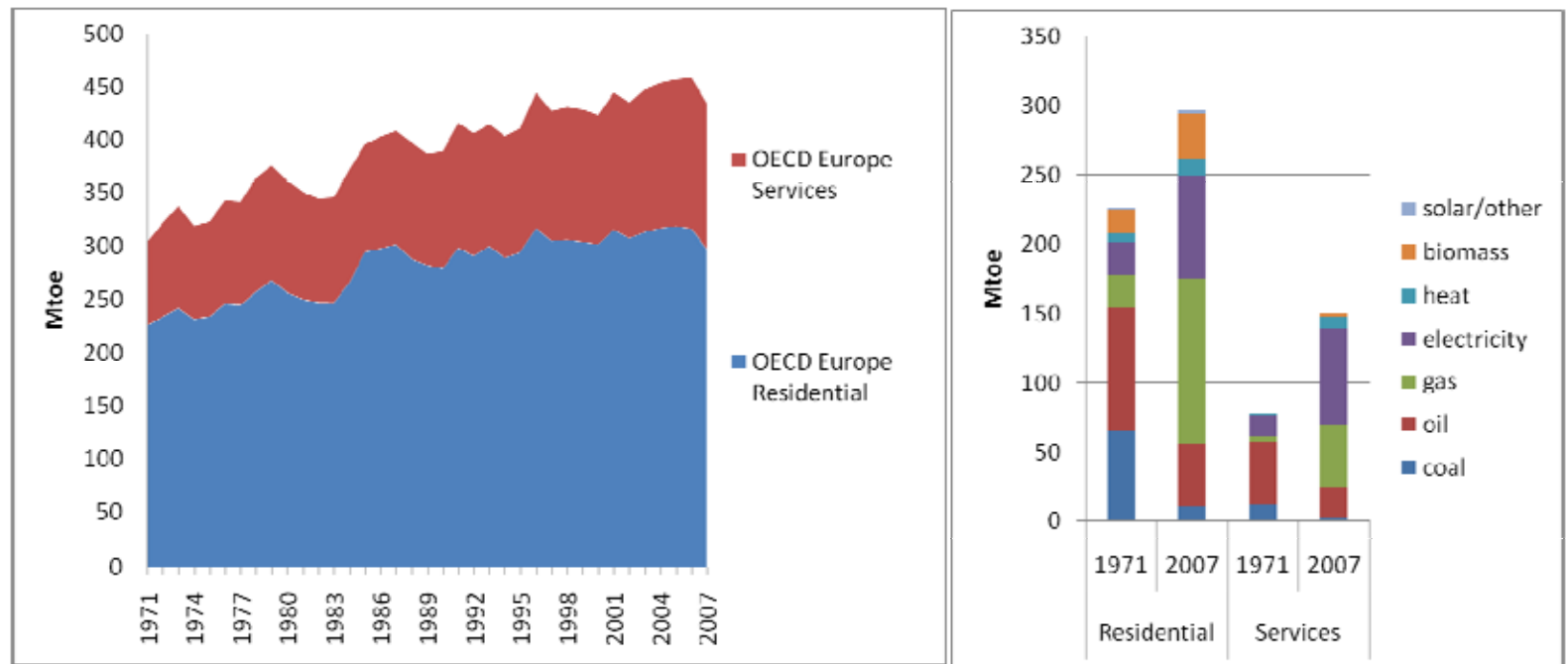
Buildings

OECD Europe

OECD Europe: Historical Energy Demand by Fuel

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Service sector energy consumption has doubled since 1971. Residential demand growth has been modest. Gas now dominates residential energy consumption and electricity in services.



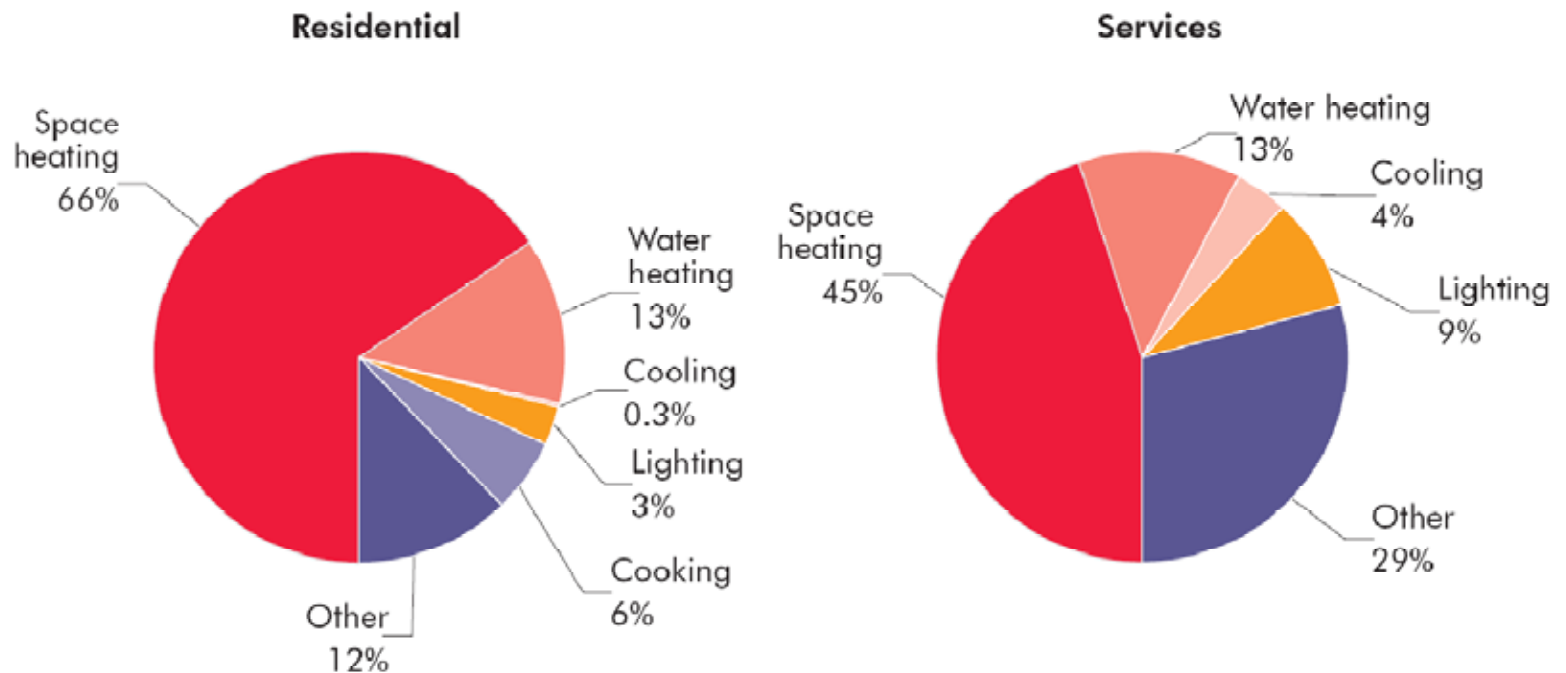
OECD Europe energy consumption by end-use, 2007

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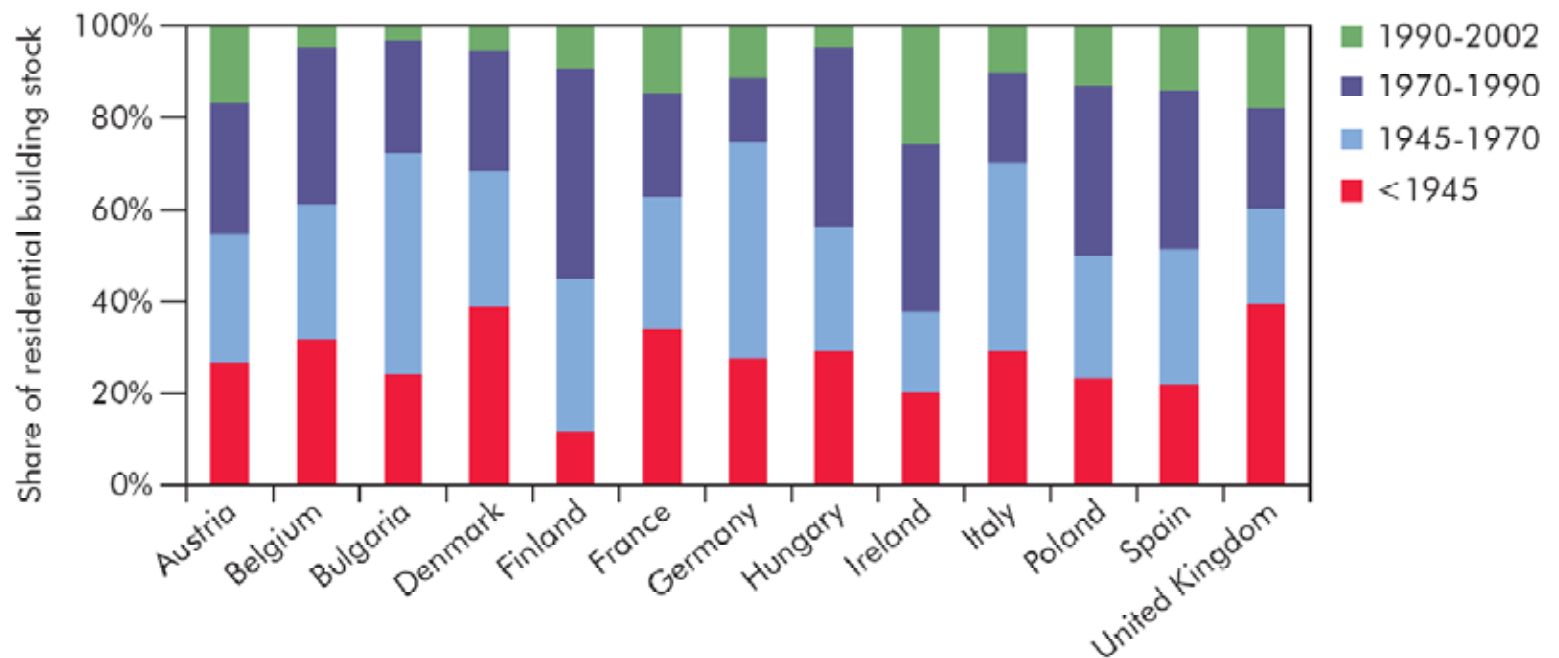


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Space heating dominates energy consumption in the residential and service sectors.

Age profile of residential buildings in OECD Europe



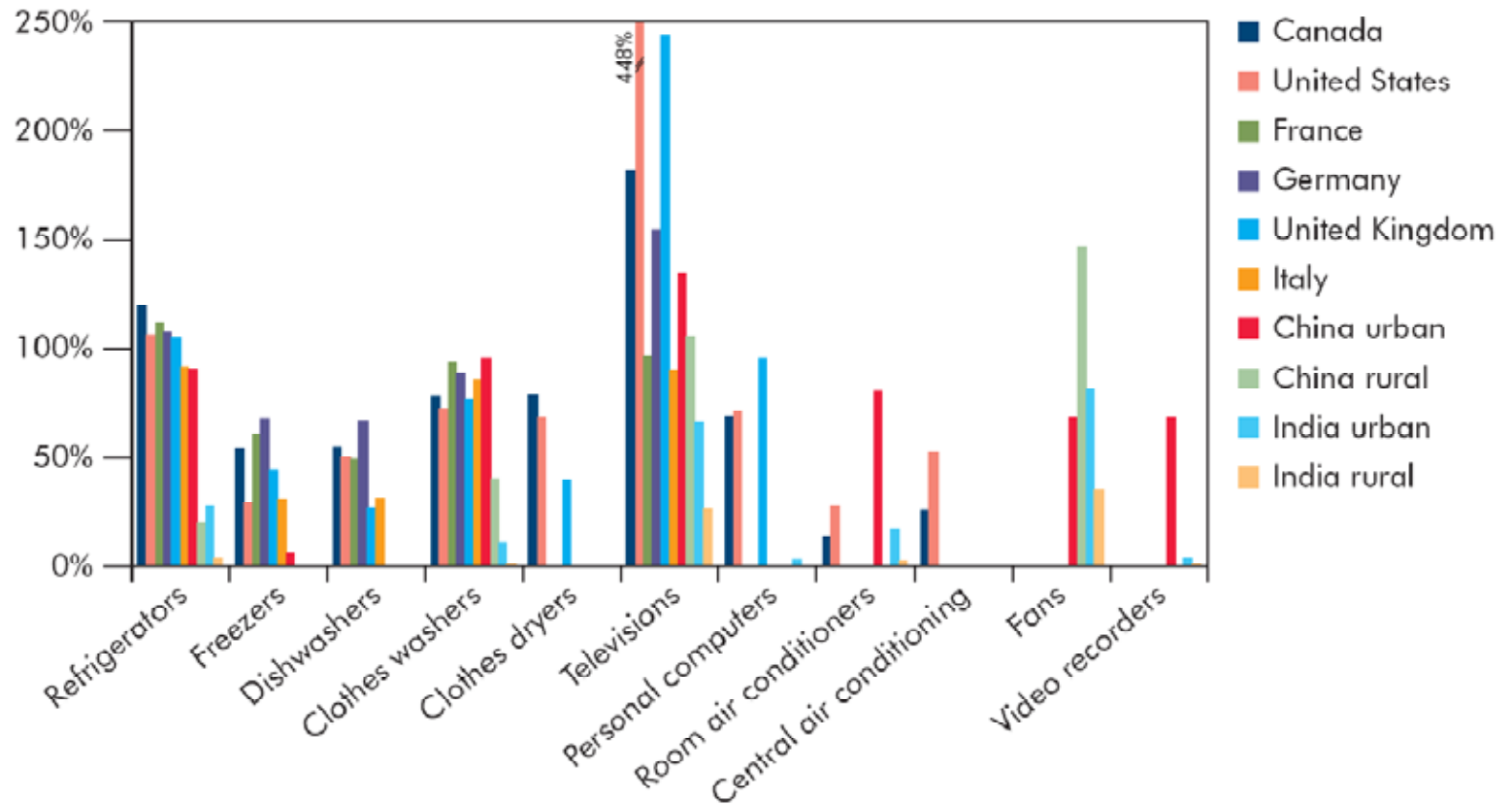
Europe is characterised by old building stock, with high space heating intensity. There is low growth in the stock and modest retirement.

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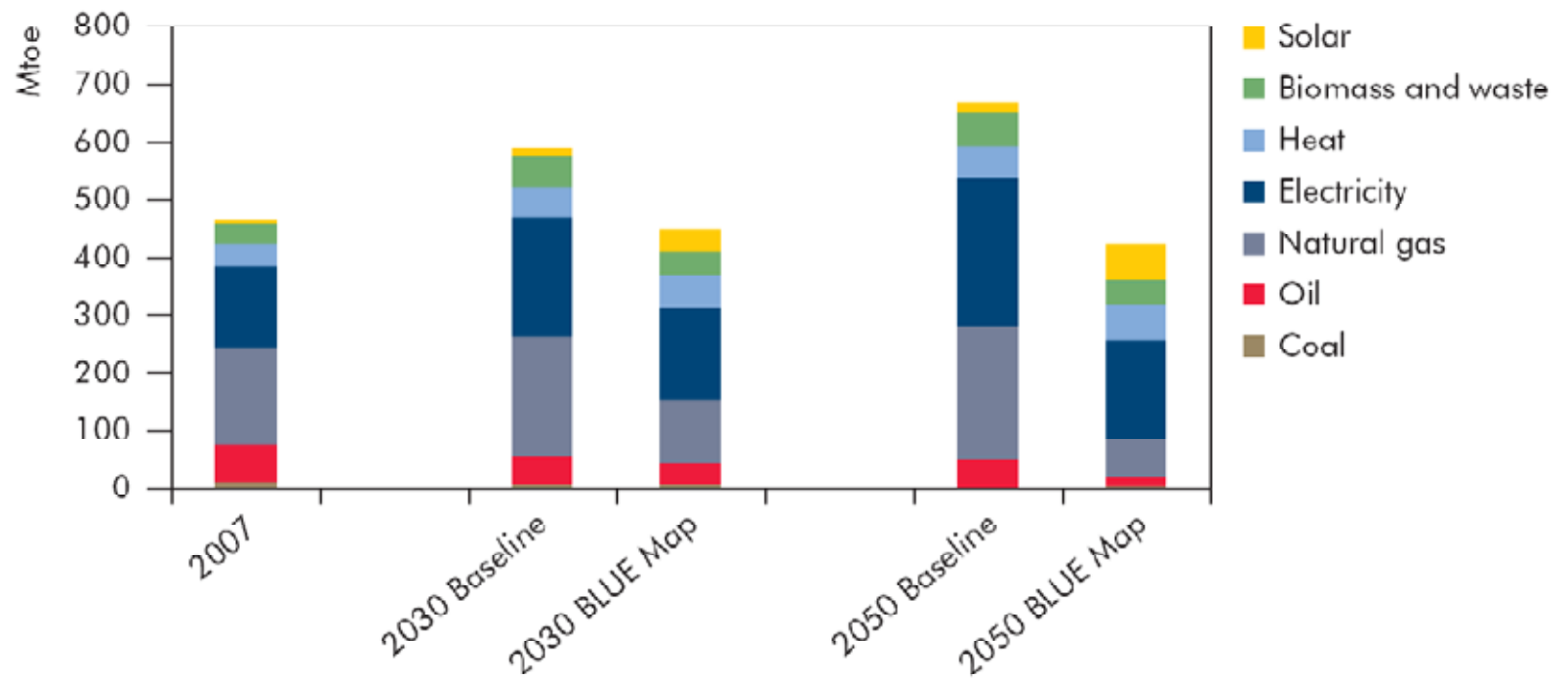
Appliance ownership



With the exception of cooling, large appliance ownership in Europe is largely saturated.

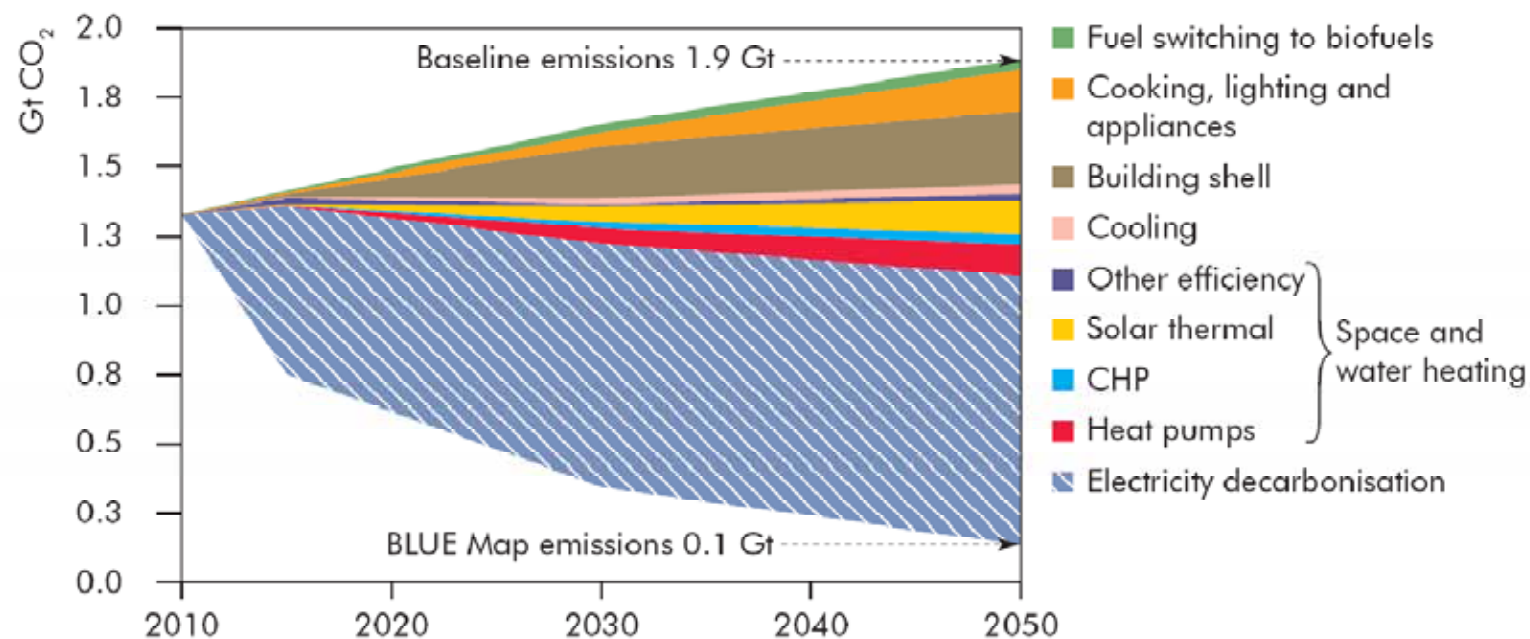


Buildings final energy consumption, OECD Europe



In BLUE Map scenario, energy consumption is 40% lower than in Baseline in 2050, with fossil fuel use greatly reduced.

CO₂ abatement options, OECD Europe



Space heating, water heating and cooling account for 71% of CO₂ reductions in OECD Europe. Larger than global figure of 63%.

Policies and savings potential

	Overall savings potential	Policy urgency	Bulk of savings available
Energy efficiency			
Lighting	Medium	Average	Quickly
Appliances	Large	Average	Short- to medium-term
Water heating systems	Medium to large	Urgent	Short- to medium-term
Space heating systems	Medium to large	Urgent	Short- to medium-term
Cooling/ventilation systems	Medium to large	Urgent	Short- to medium-term
Cooking	Small	Average	Quickly
Fuel switching			
Water heating systems	Medium to large	Urgent/average	Short- to long-term
Space heating systems	Medium to large	Urgent/average	Short- to long-term
Cooking	Small	Average/urgent	Short- to medium-term
Building shell measures			
New residential buildings	Medium to large	Average/urgent	Medium- to long-term
Retrofit residential buildings	Large	Urgent	Medium- to long-term
New commercial buildings	Large	Urgent	Medium- to long-term
Retrofit commercial buildings	Medium to large	Average	Medium- to long-term

Note: Overall savings potential is relative to their contribution to total savings in the buildings sector. Where two policy urgency ratings are given, it is for OECD/non-OECD.

Urgent policies are needed to improve the efficiency of space and water heating and cooling, and to improve the building shell of existing homes and new commercial buildings



Conclusions on buildings

- Heating and cooling account for a large share of CO₂ emissions reduction opportunities in buildings in OECD Europe
 - Large-scale refurbishment of residential buildings
 - Introduction of new technologies: solar thermal, bioenergy, heat pumps, fuel cell CHP
- Many technologies are available today and are generally mature, but more R&D needed in some areas
- Strong policy action is required:
 - tighter building standards and codes for new residential and commercial buildings
 - information campaigns, fiscal and financial incentives, and minimum energy performance standards
 - boost investment in research and development



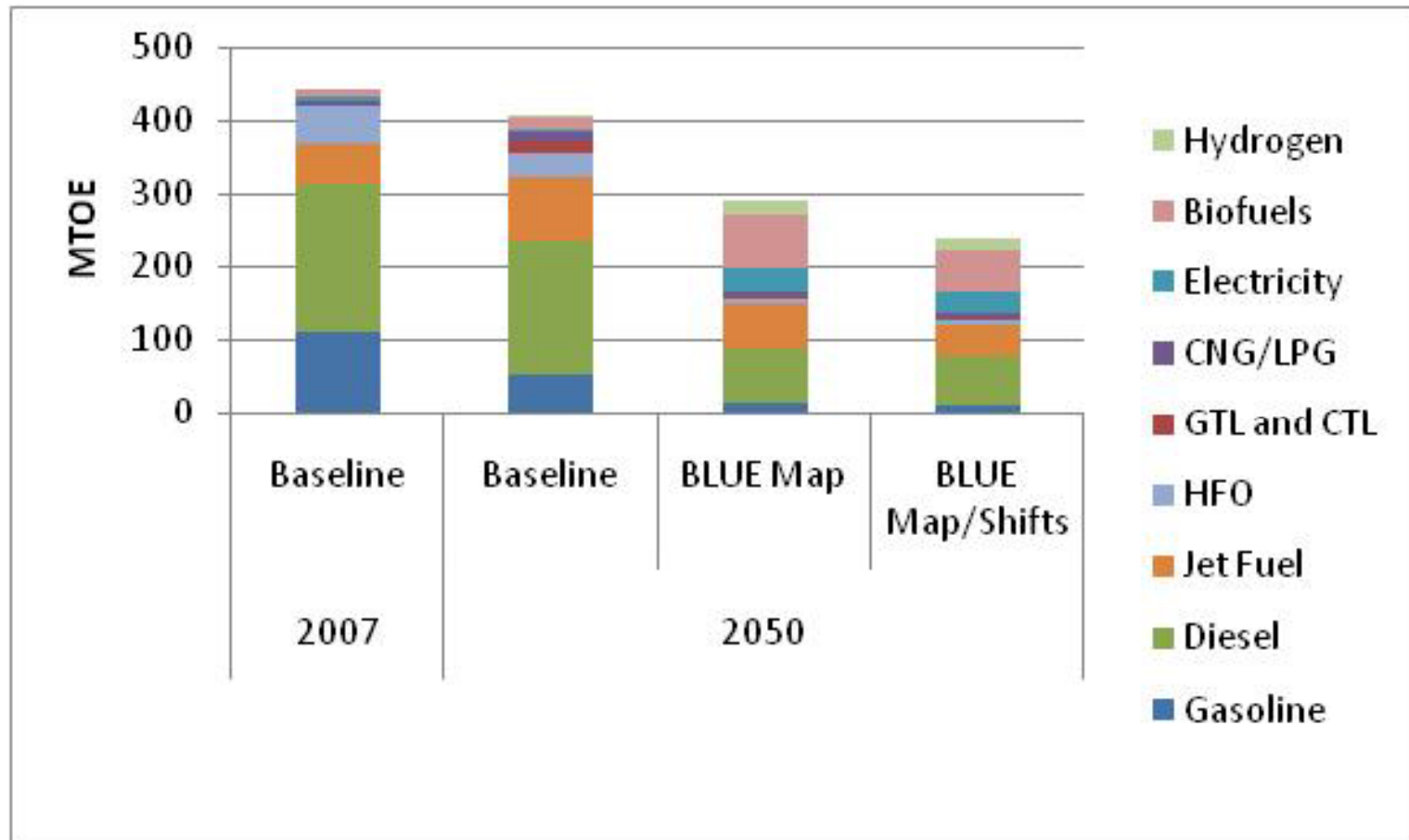


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Transport

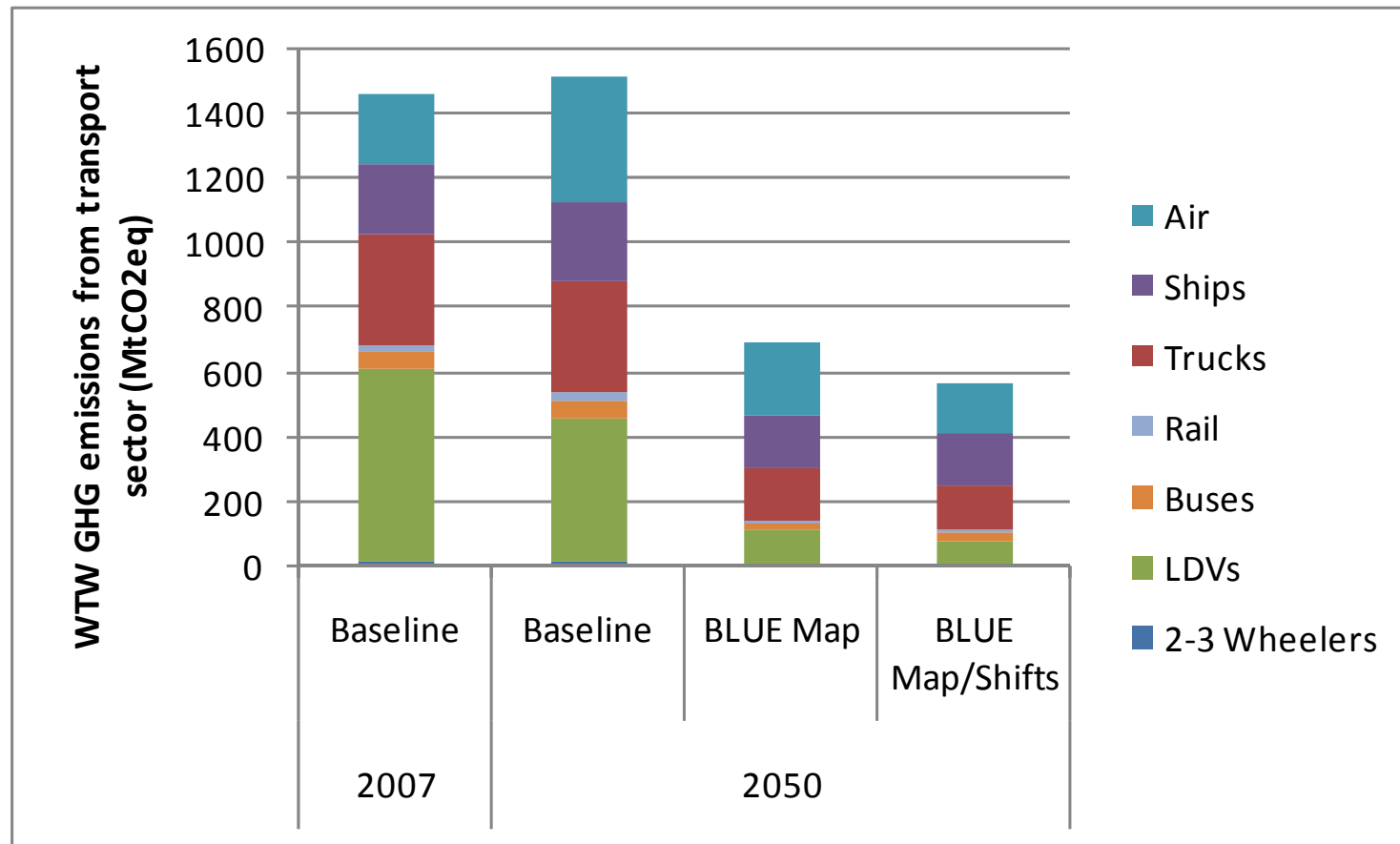
OECD Europe

Transport fuel use by fuel type, OECD Europe



Transport fuel use declines slightly in Baseline, by one third in BLUE Map and by 45% in BLUE Map/shifts. Fossil fuels take only a 50% share by 2050 in the BLUE scenarios.

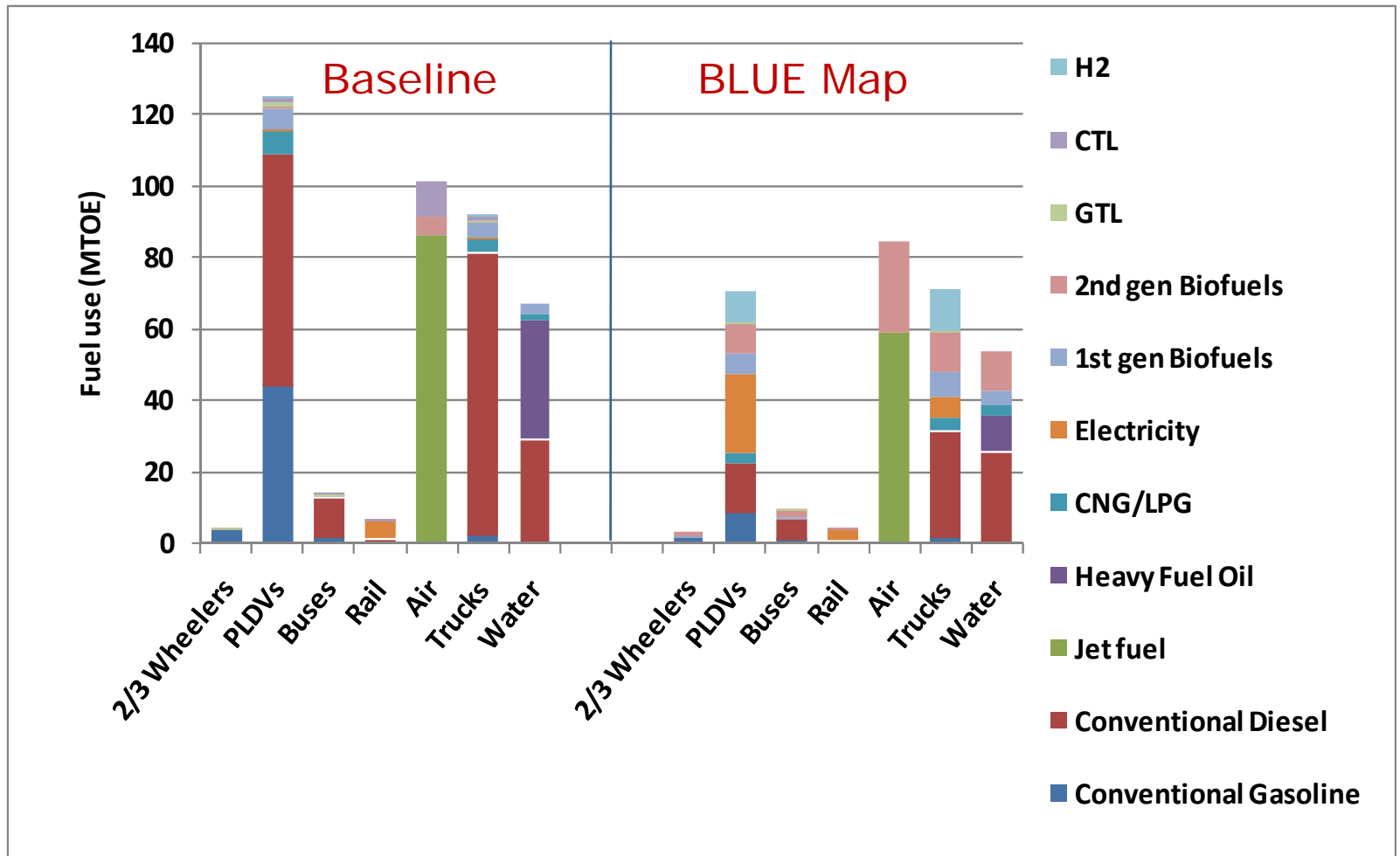
Transport GHG by mode, OECD Europe



Transport CO₂ emissions rise slightly in Baseline, are cut by over half in BLUE Map and by 60% in BLUE Map/shifts.



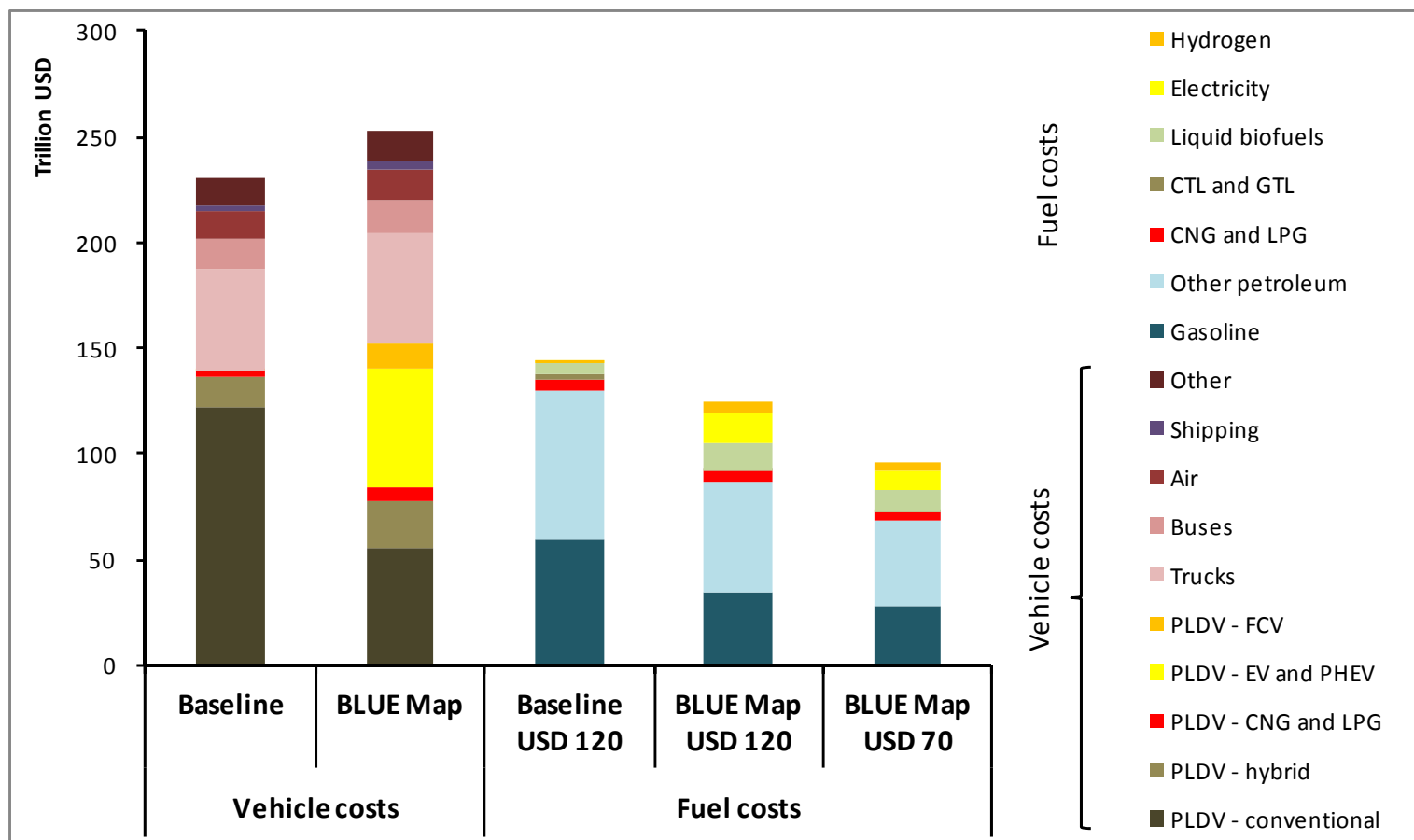
Fuel use in 2050 by mode, OECD Europe



In 2050 BLUE Map, fuel use for all modes is cut significantly and shifted to biofuels, electricity and hydrogen.



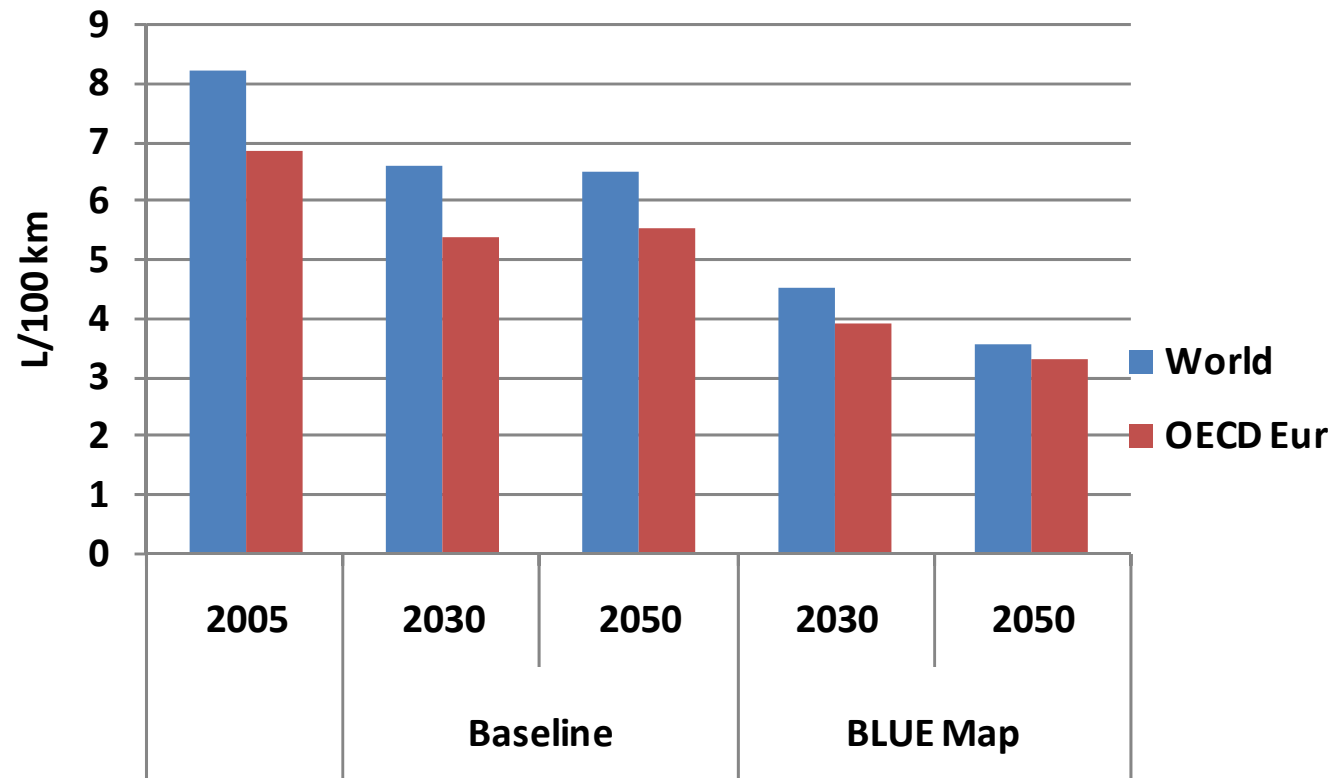
Global vehicle and fuel costs, 2010-2050



PLDV=passenger light-duty vehicle; costs are in real \$2008, 0 discount rate.

Fuel cost savings mostly offset the costs of advanced technology vehicles in BLUE Map; savings exceed costs if lower oil price results

Passenger light-duty vehicle fuel economy



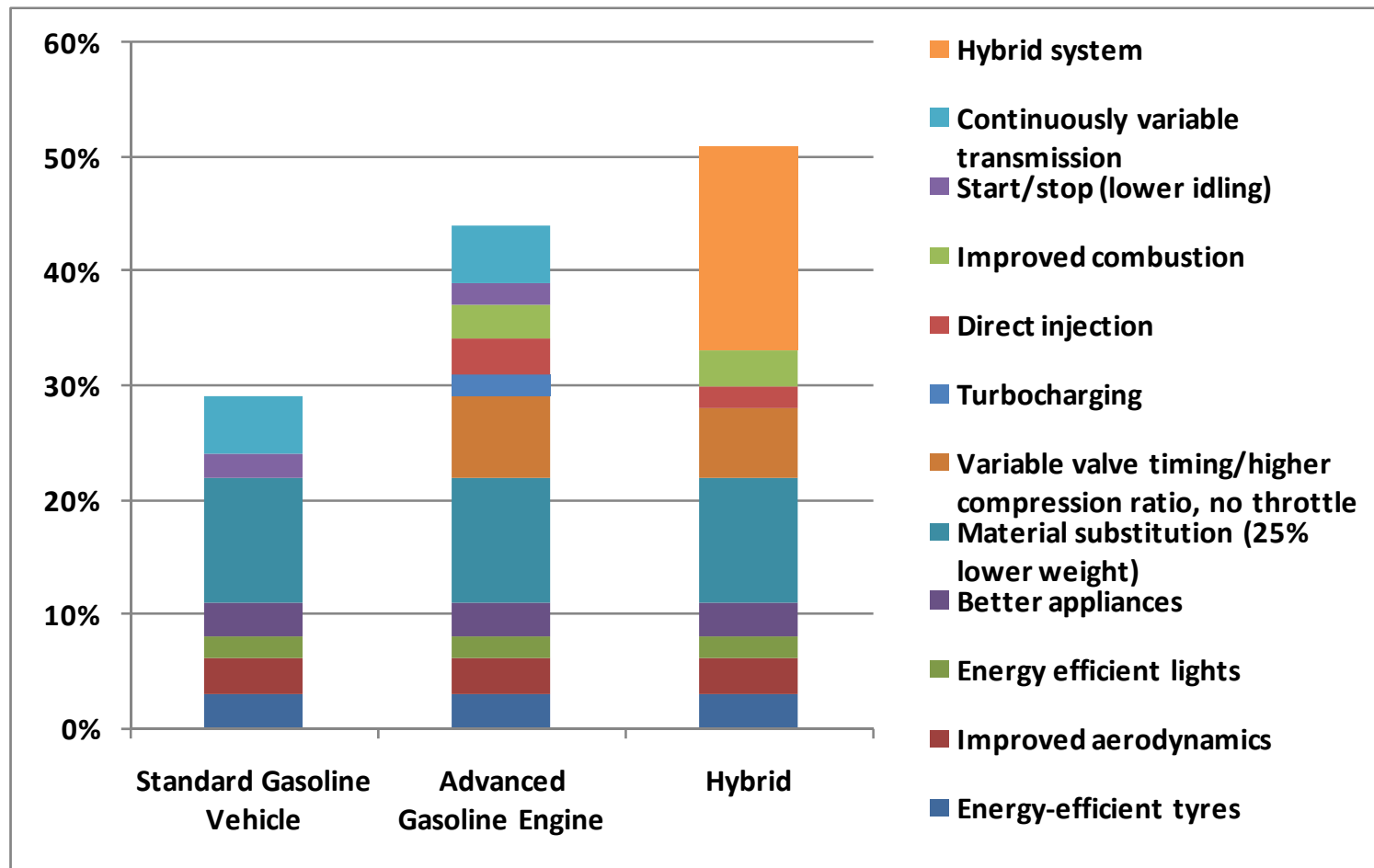
Under baseline LDV fuel economy reaches 5 L/100km by 2020. Under BLUE Map fuel economy is 50% better in 2050 than in 2005..

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Fuel Economy Improvement Potential for Gasoline Vehicles



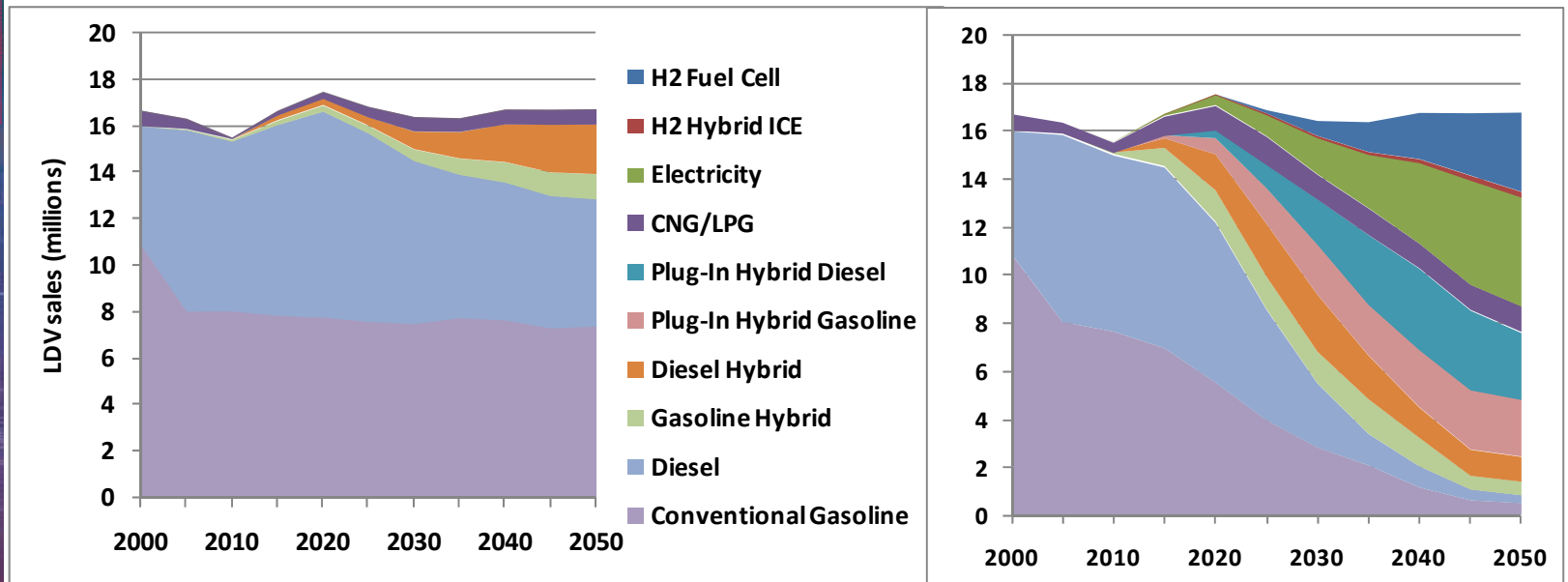
LDVs with advanced gasoline engines can cut fuel use and CO₂ by over 40%, full hybridisation by 50%. Most of the key technologies are already commercial and cost-effective.



Passenger LDV sales, OECD Europe

Baseline

BLUE Map



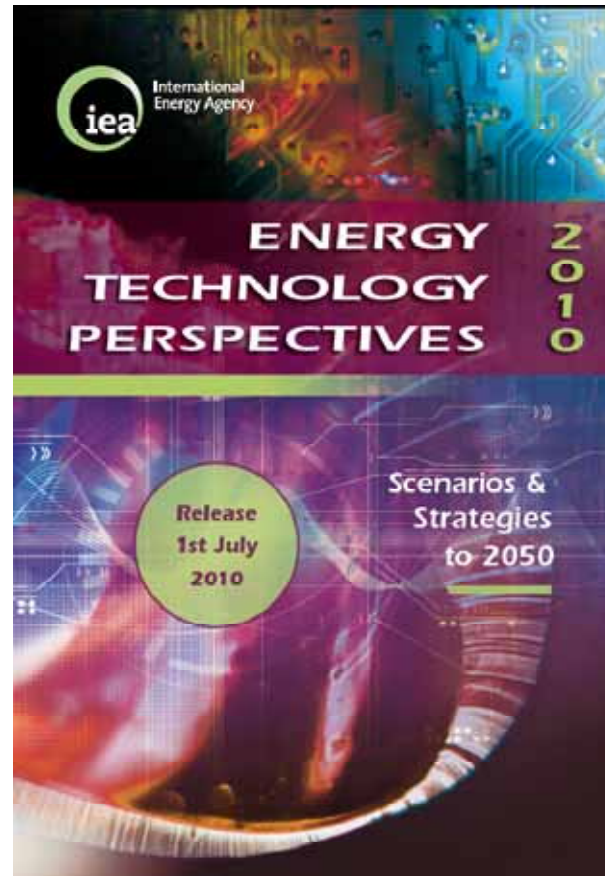
BLUE Map results in the rapid uptake of advanced vehicle technologies; EV/PHEV sales in OECD Europe exceed one million per year by 2020.



Conclusions on transport

- Without new policies, transport oil use and CO₂ emissions in OECD Europe will likely increase
- But emissions can be reduced below current levels via a combination of:
 - Strong efficiency improvements to all modes – both car and truck CO₂ standards, plus strong and consistent market signals to consumers (e.g. CO₂-based vehicle taxes)
 - Rapid uptake of advanced technology vehicles especially EVs/PHEVs after 2012
 - Strong adoption of alternative fuels (especially electricity and biofuels, and eventually hydrogen)
 - Modal shifts via smart growth and strong investments in state-of-art intercity rail, rail transit and bus systems
- Europe should target a 50% improvement in stock fuel economy (i.e. reduction in L/100km), by 2050
- Costs of action may be surprisingly small or even negative on a societal cost basis, especially if oil prices are high (in Baseline)





Thank You

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