

The background features three overlapping globes in shades of blue and white, set against a red background with a white network of lines connecting various points, suggesting global connectivity and energy networks.

# ***Transport Energy Outlook 2008***

## ***Lew Fulton, IEA/ETP***

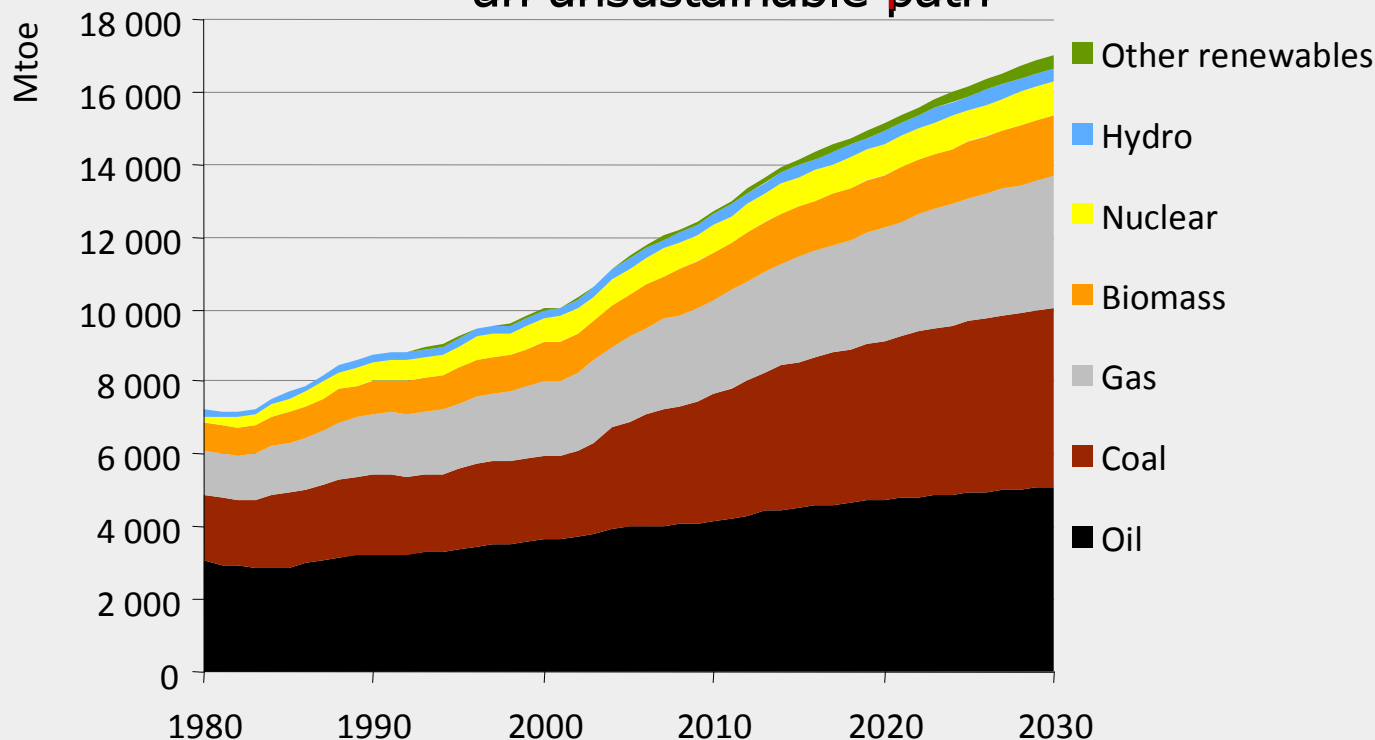
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World Bank – Transport Forum 2009  
Washington DC, March 31 2009

# Where are we headed? World Energy Outlook 2008

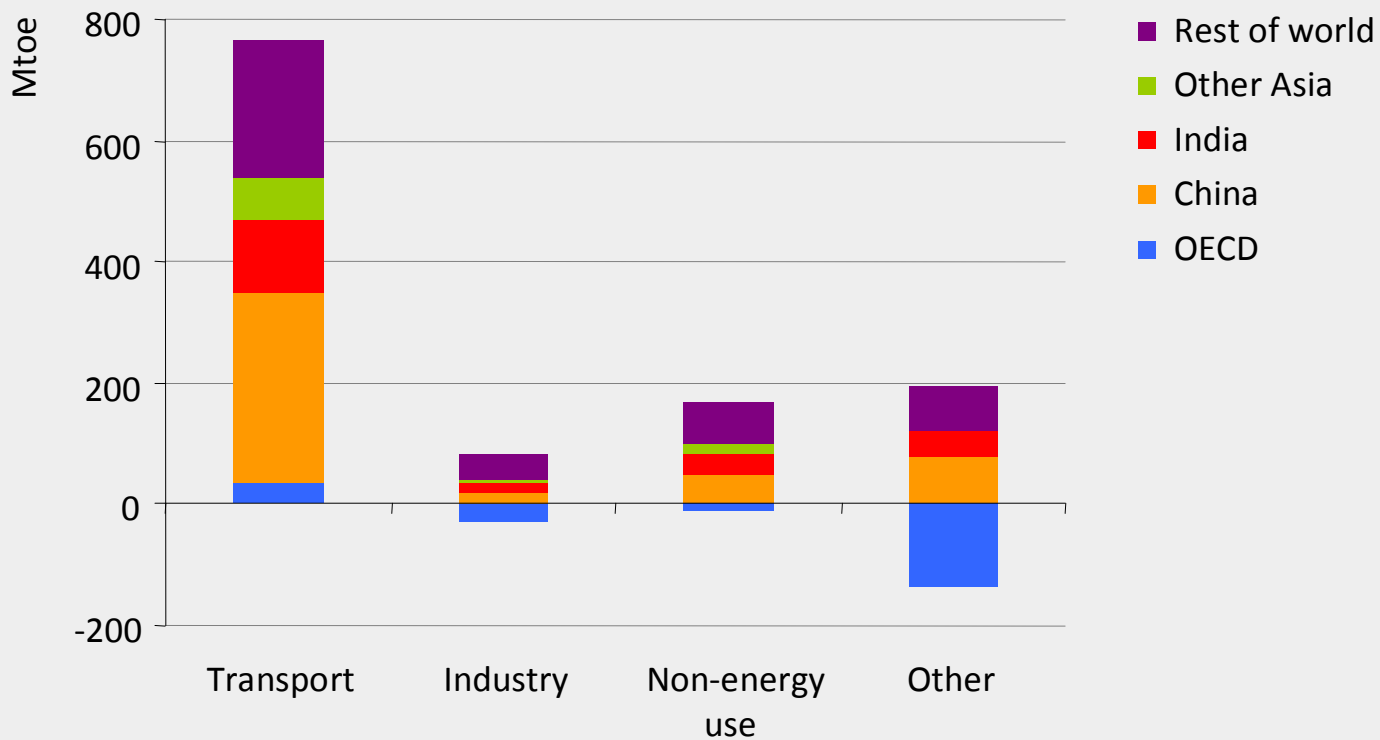
World Energy Outlook 2008

## World primary energy demand in the Reference Scenario: an unsustainable path



**World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise**

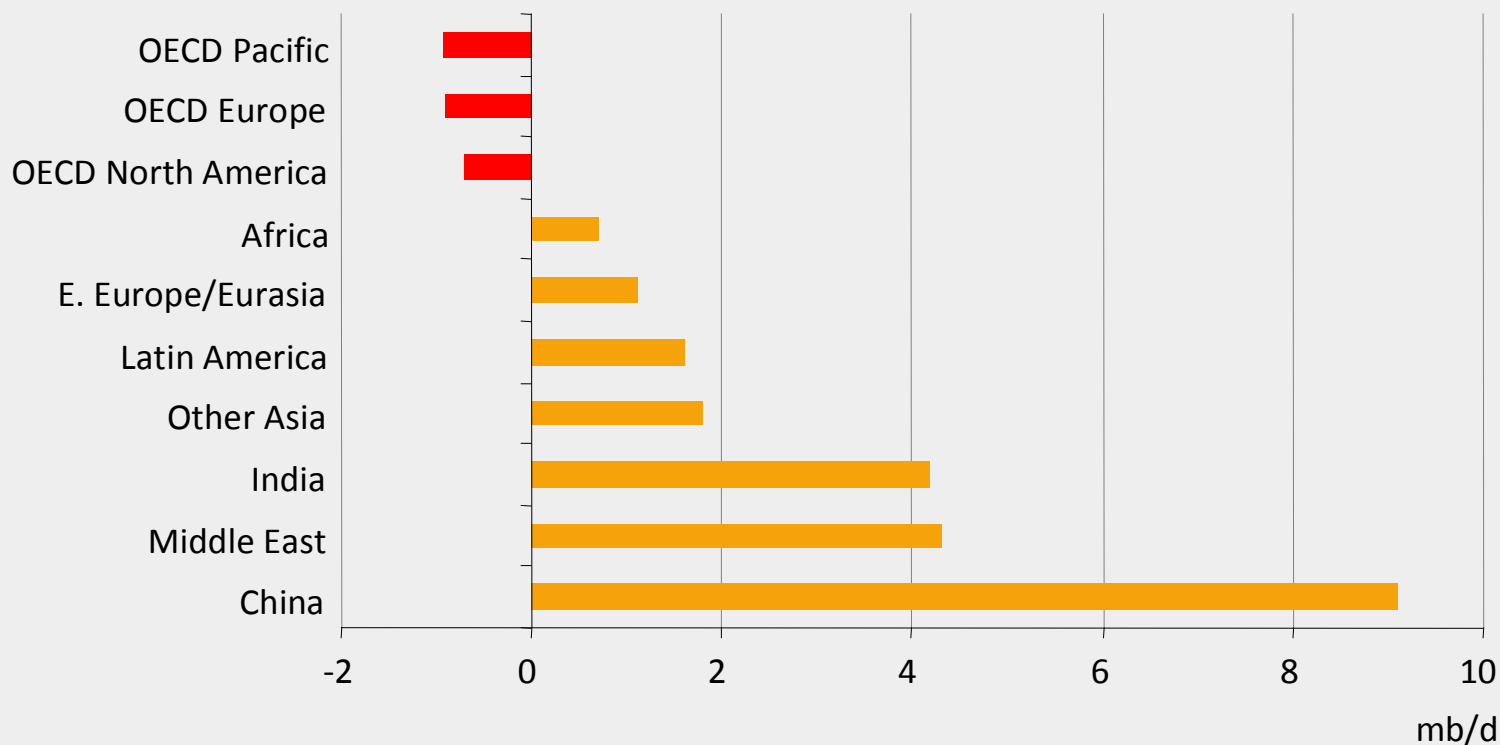
# WEO 2008 Reference Scenario: Incremental oil demand, 2006-2030



*Around three-quarters of the projected increase in oil demand comes from transportation*

# Change in oil demand by region in the Reference Scenario, 2007-2030

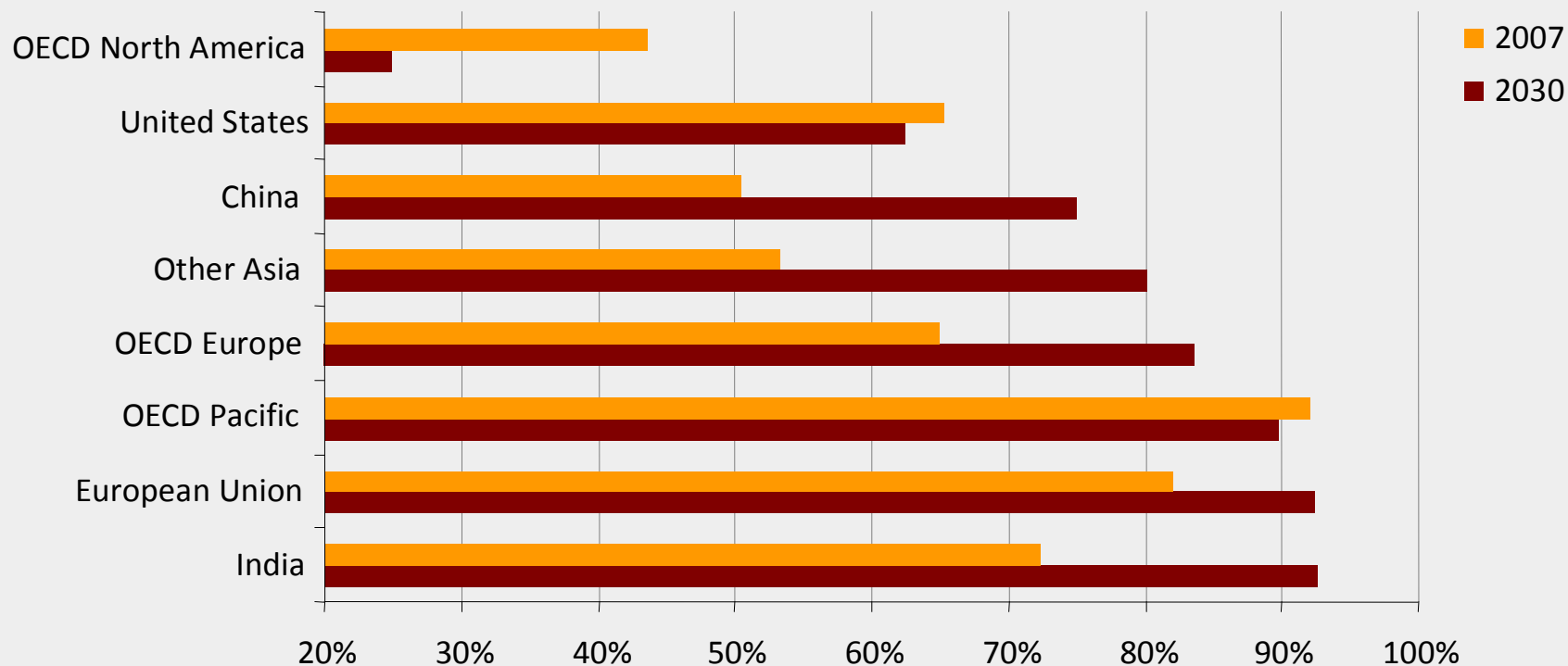
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***All of the growth in oil demand comes from non-OECD, with China contributing 43%, the Middle East & India each about 20% & other emerging Asian economies most of the rest***

# Oil-import dependence in the Reference Scenario

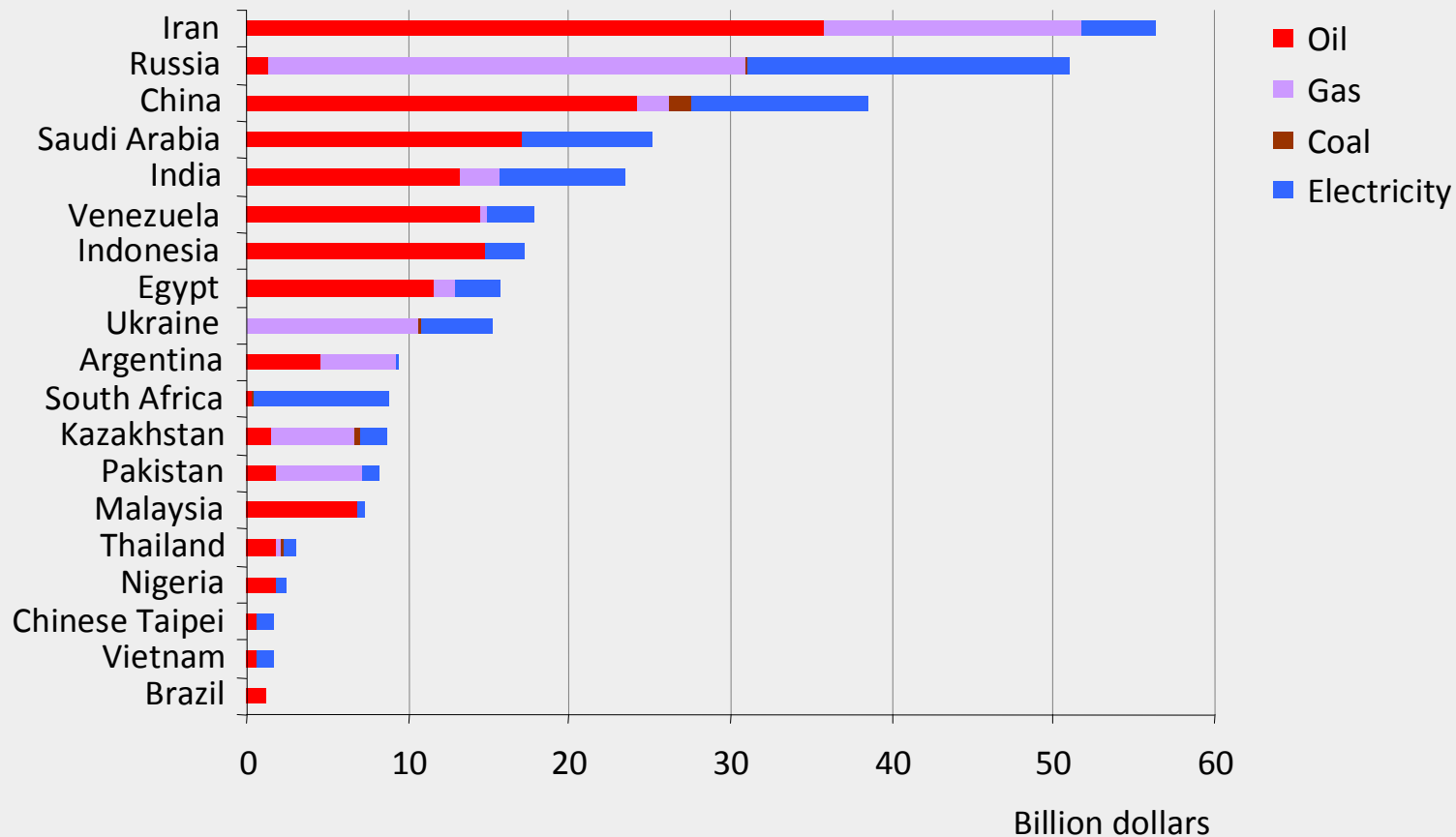
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***OECD Europe & Asia become even more dependent on oil imports, but import dependence drops in North America & OECD Pacific***

# Energy subsidies in non-OECD countries, 2007

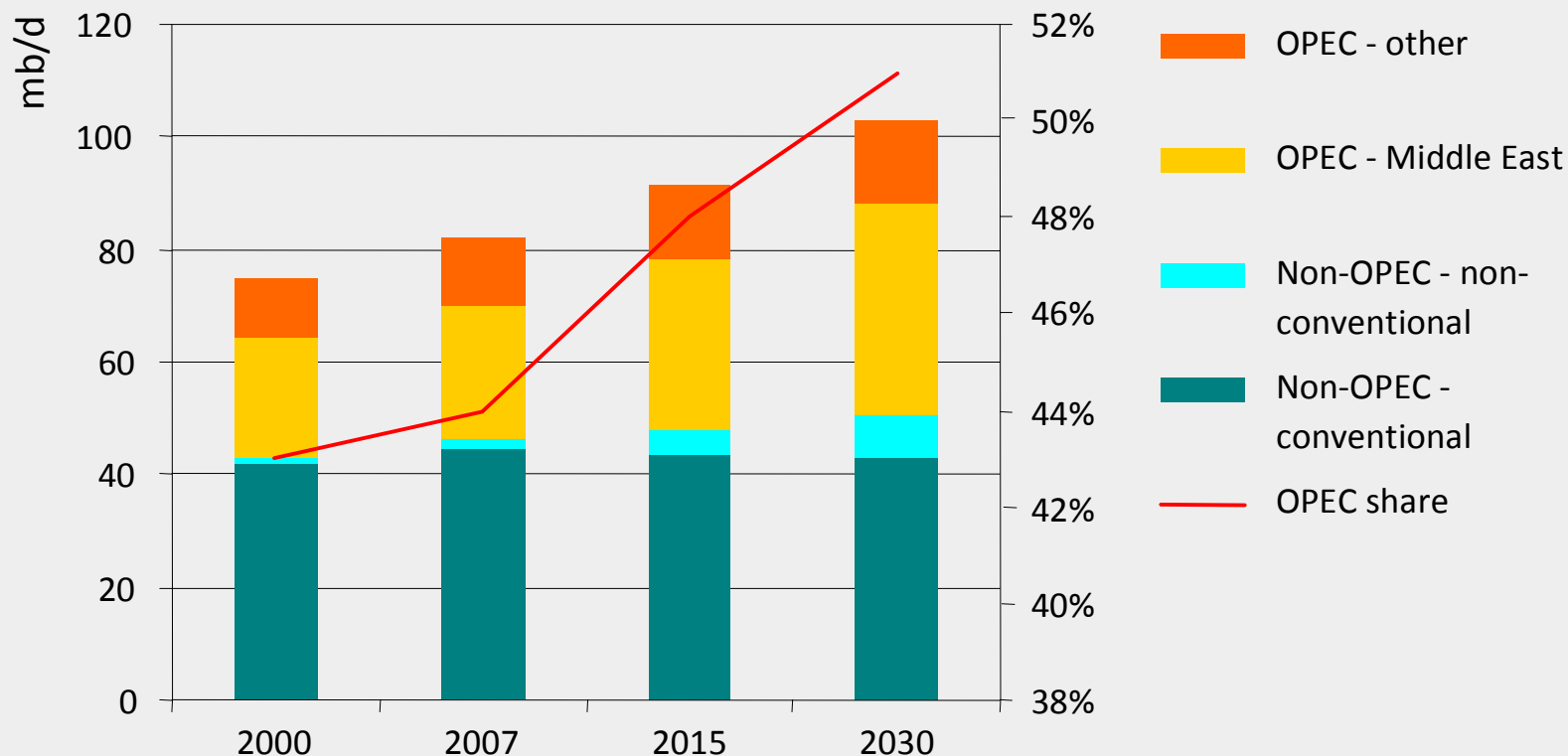
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***Energy subsidies in the 20 largest non-OECD countries hit \$310 billion in 2007 – creating, in many cases, an unsustainable economic burden & exacerbating environmental effects***

# World oil production by OPEC/non-OPEC in the Reference Scenario

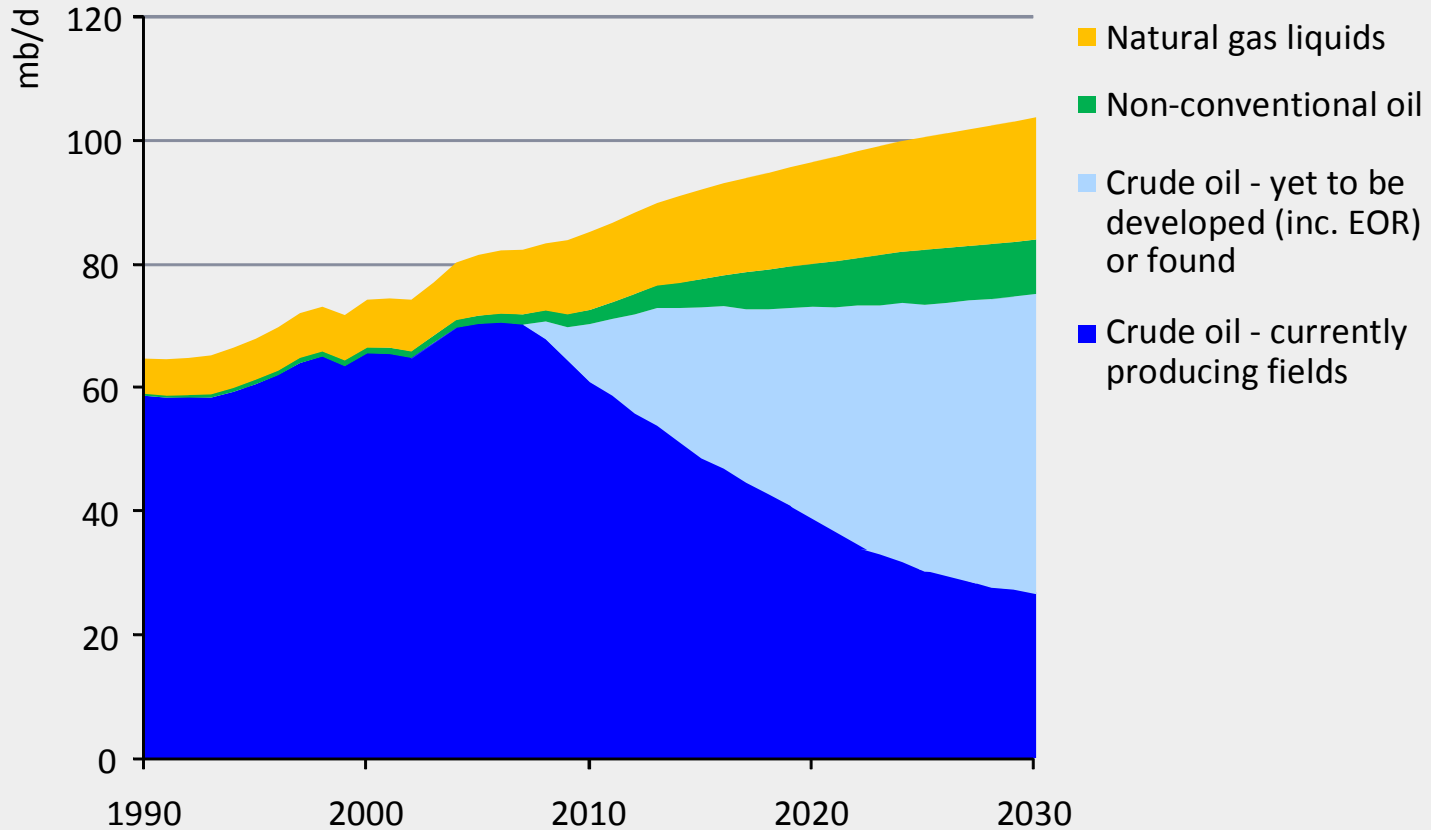
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***Production rises to 104 mb/d in 2030, with Middle East OPEC taking the lion's share of oil market growth as conventional non-OPEC production declines***

# World oil production by source in the Reference Scenario

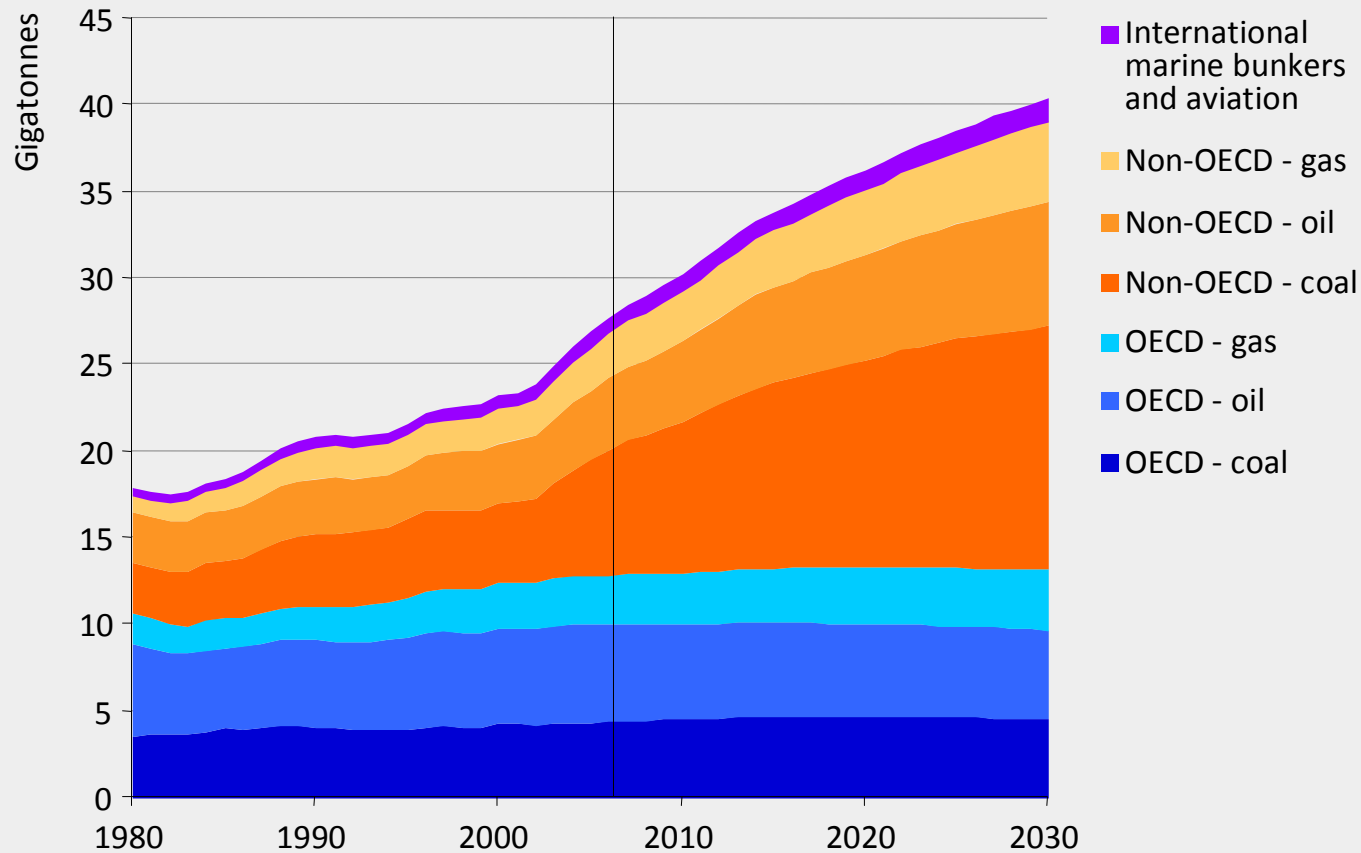
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***64 mb/d of gross capacity needs to be installed between 2007 & 2030 – six times the current capacity of Saudi Arabia – to meet demand growth & offset decline***

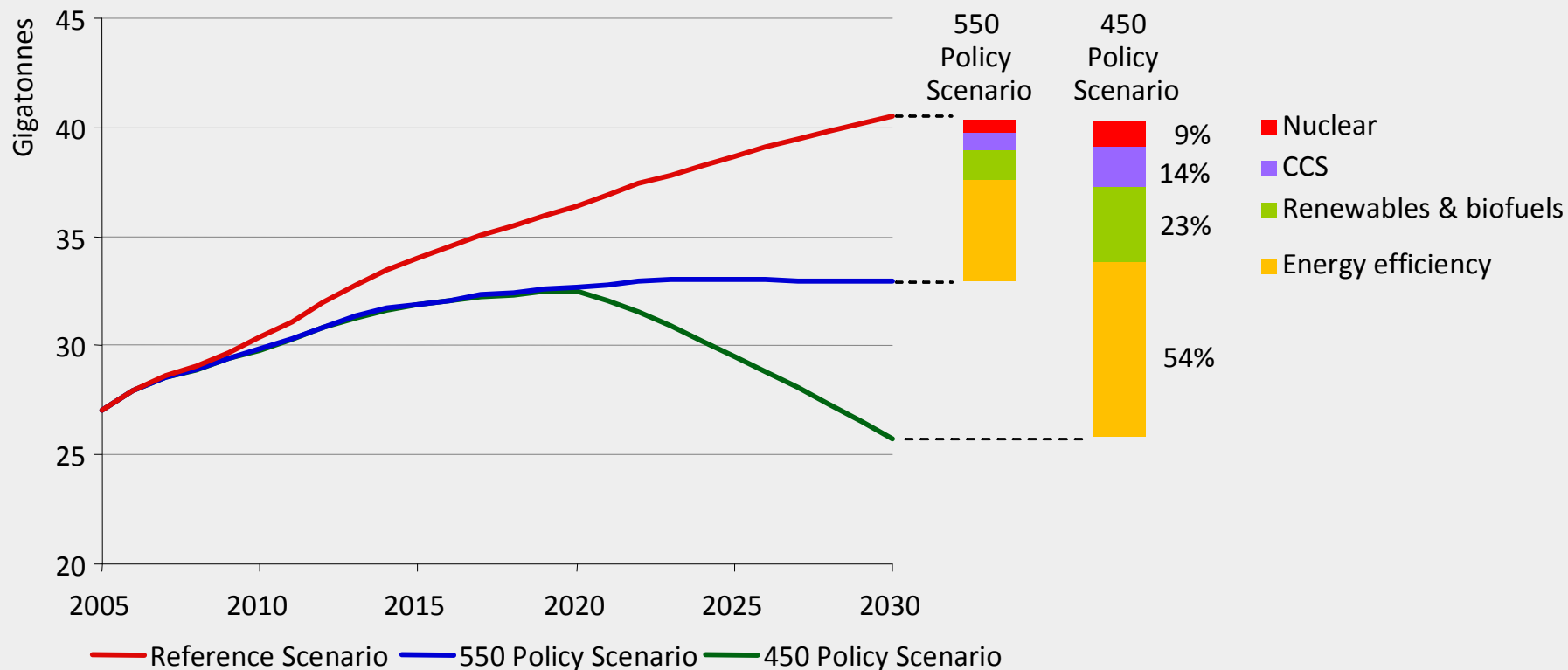
# Energy-related CO<sub>2</sub> emissions in the Reference Scenario

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***97% of the projected increase in emissions between now & 2030 comes from non-OECD countries – three-quarters from China, India & the Middle East alone***

# WEO 2008 scenarios for CO<sub>2</sub> emissions pathways to 2030



*While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy accounts for most of the savings*

# Key results of the post-2012 climate-policy analysis

## 550 Policy Scenario

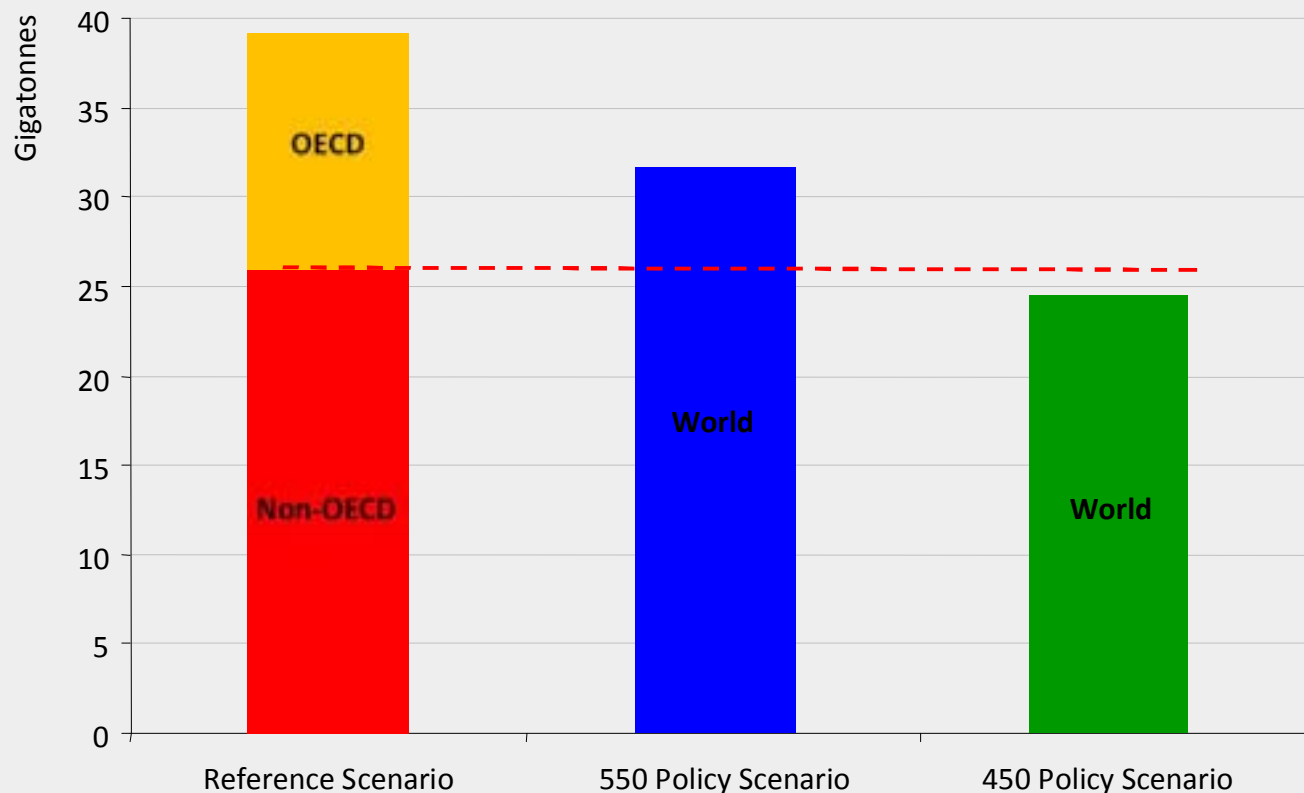
- Corresponds to a c.3°C global temperature rise
- Energy demand continues to expand, but fuel mix is markedly different
- CO<sub>2</sub> price in OECD countries reaches \$90/tonne in 2030
- Additional investment equal to 0.25% of GDP

## 450 Policy Scenario

- Corresponds to a c.2°C global temperature rise
- Energy demand grows, but half as fast as in Reference Scenario
- Rapid deployment of low-carbon technologies – particularly CCS
- Big fall in non-OECD emissions
- CO<sub>2</sub> price in 2030 reaches \$180/tonne
- Additional investment equal to 0.6% of GDP

# World energy-related CO<sub>2</sub> emissions in 2030 by scenario

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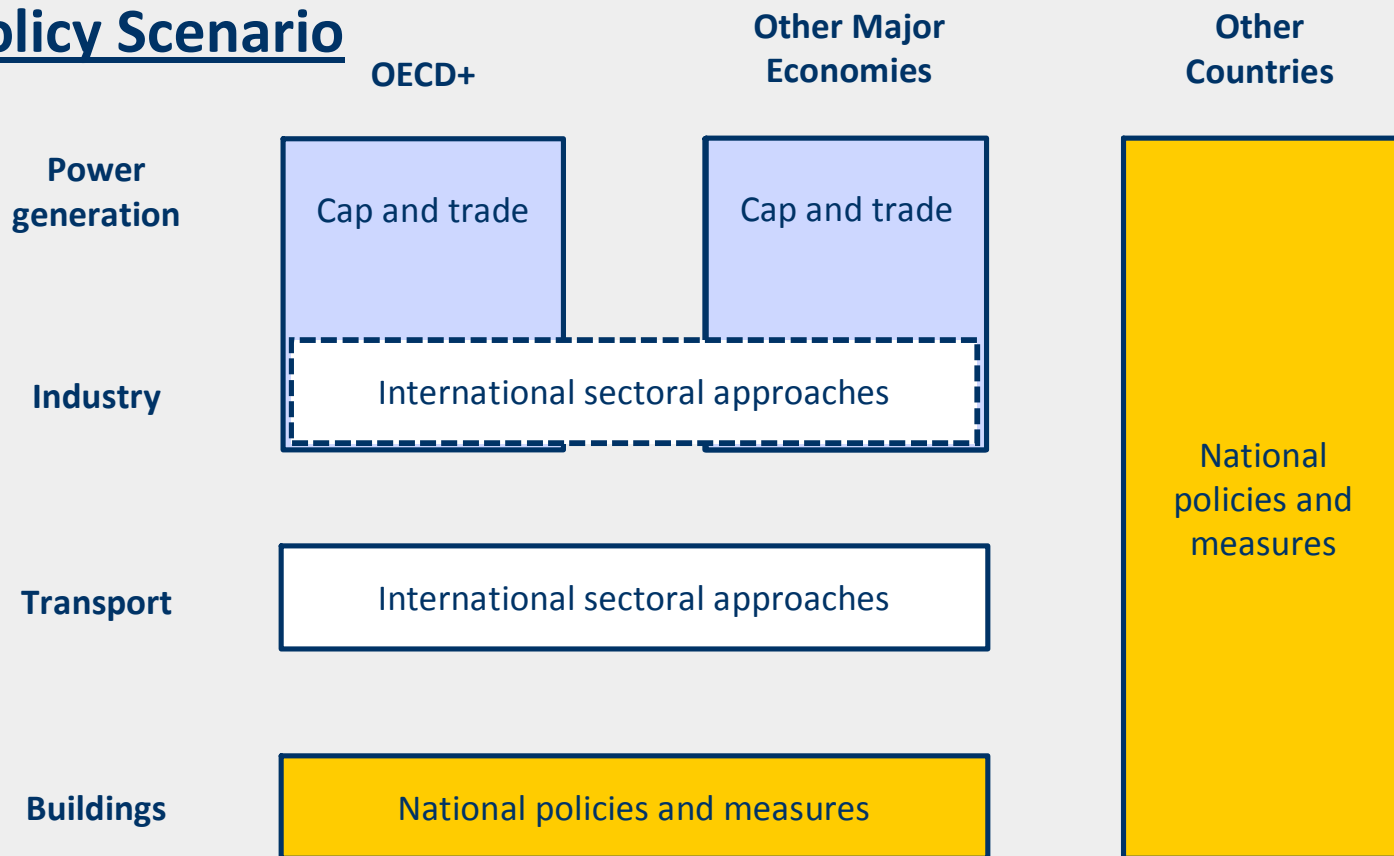


***OECD countries alone cannot put the world onto a 450-ppm trajectory, even if they were to reduce their emissions to zero***

# Copenhagen: a plausible post-2012 global climate-change policy regime

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## The 450 Policy Scenario



*A combination of policy mechanisms – reflecting nations' varied circumstances & current negotiating positions – is a realistic outcome at the Copenhagen COP at end-2009*

# IEA's Long-term View: Energy Technology Perspectives 2008

- **A Low CO<sub>2</sub> world to 2050: what it looks like and how to get there**
  - A study primarily about the role of technology
  - Achieving IPCC CO<sub>2</sub> emission targets
    - Transport does not have to achieve zero emissions, but it would clearly help.
  - Identifying short and medium term technology and policy needs
- **Scenario analysis – three main scenarios:**
  - Baseline WEO2007 Reference Scenario, extended to 2050
  - Global stabilization by 2050 (ACT – up to USD50/tonne)
  - Global 50% reduction by 2050 (BLUE – up to USD200/tonne)

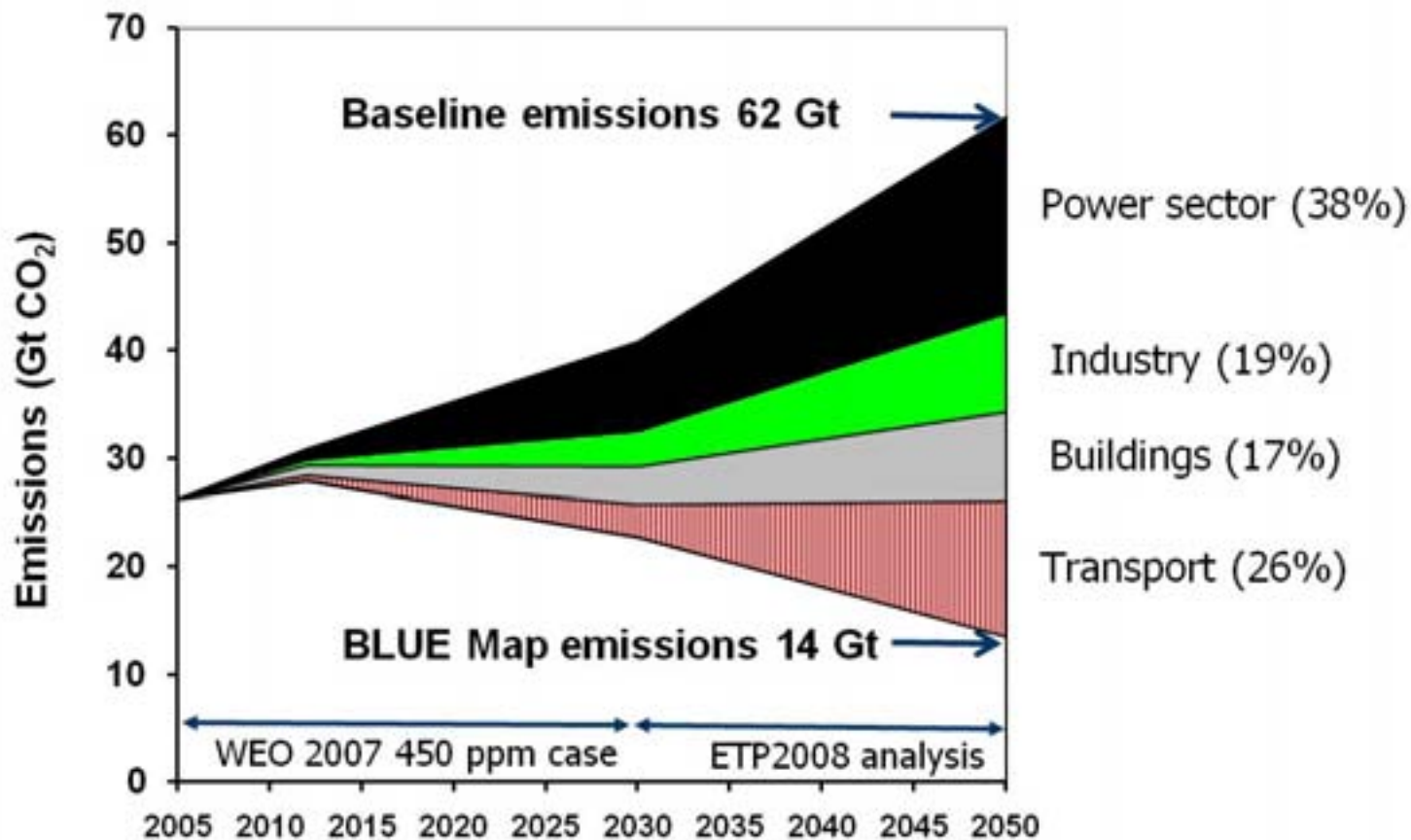
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# Sector Contributions



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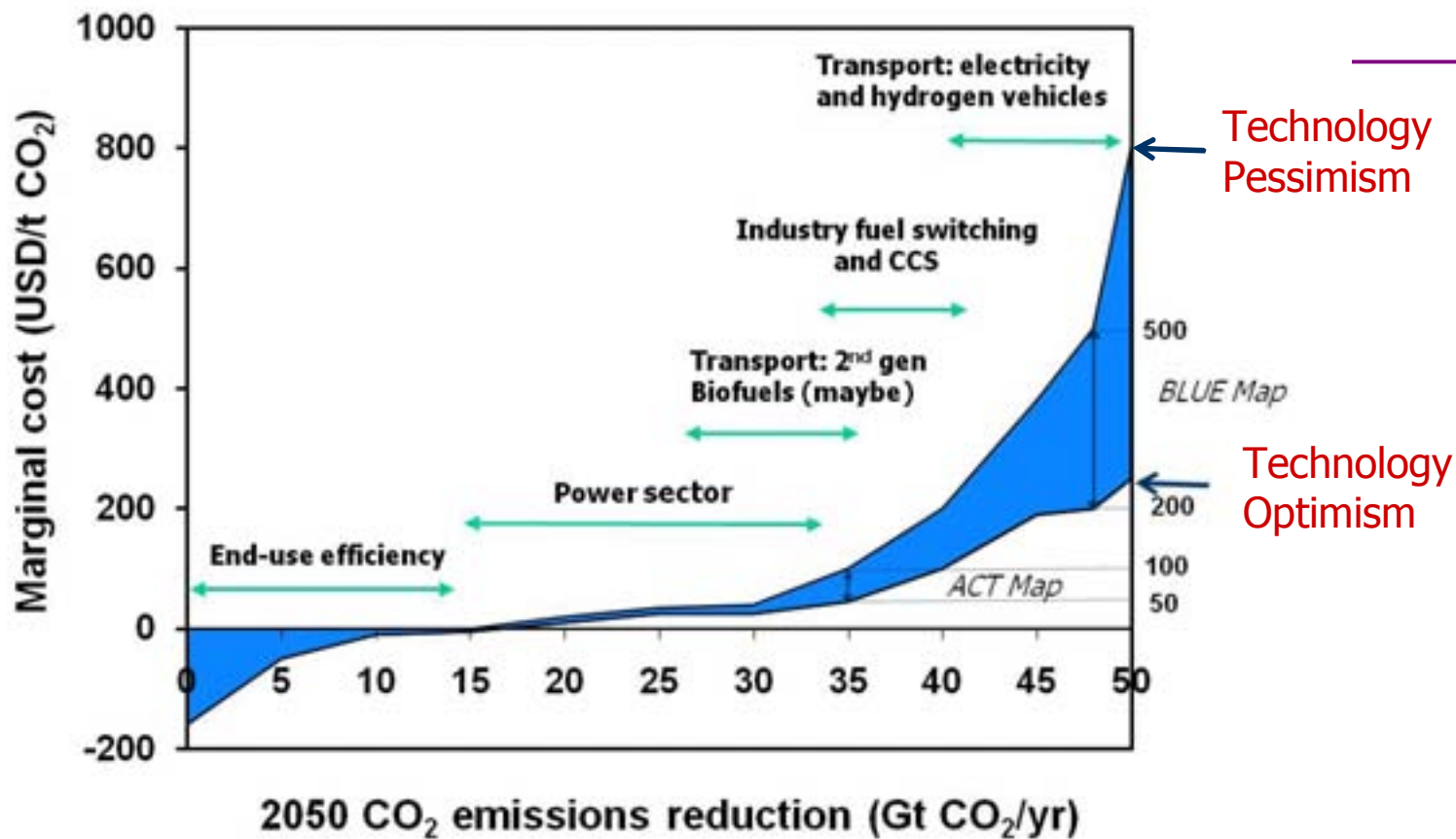
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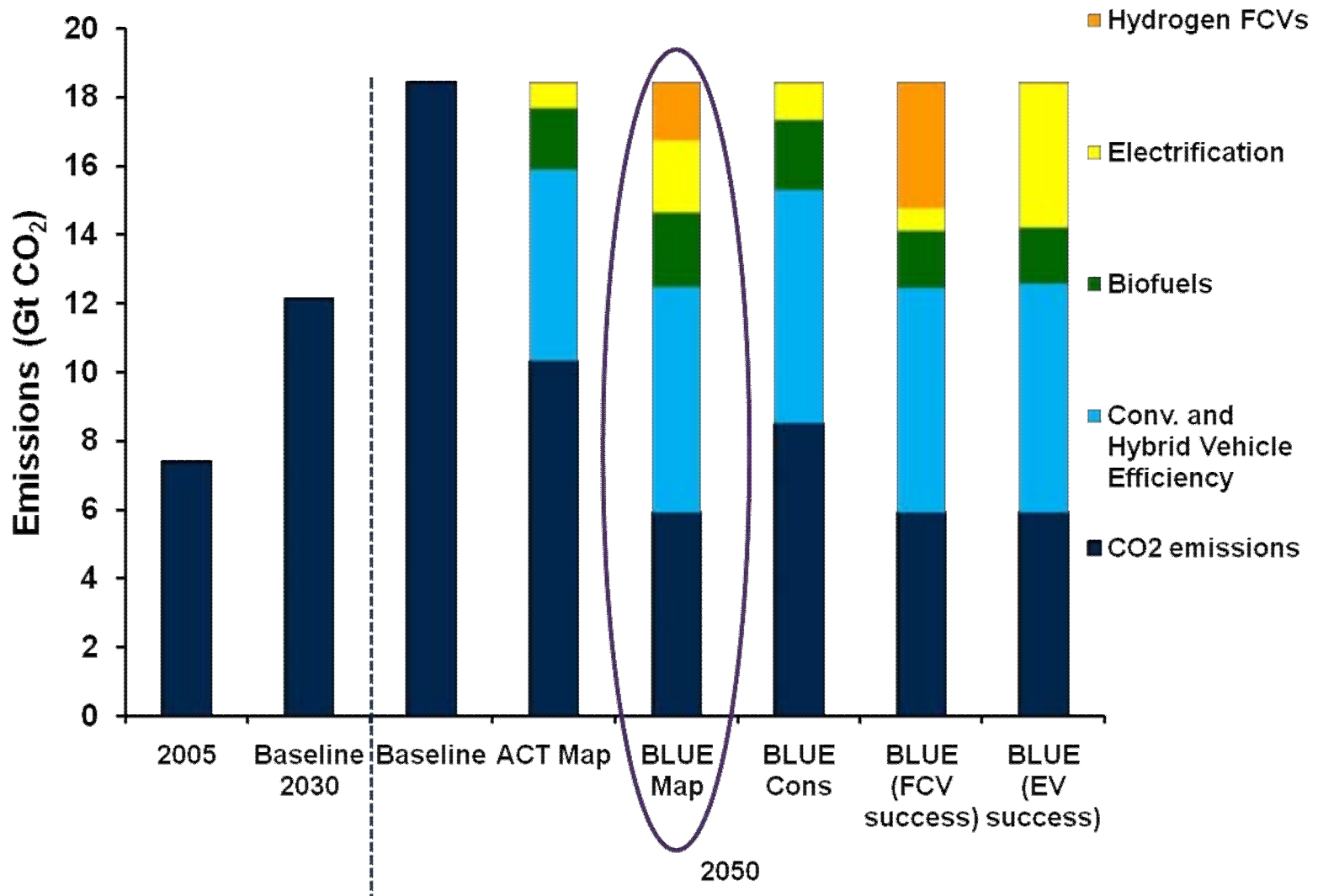
# A New Energy Revolution ?



**To bring emissions back to current levels by 2050 options with a cost up to USD 50/t are needed. Reducing emissions by 50% would require options with a cost up to USD 200/t, possibly even up to USD 500/t CO<sub>2</sub>**

# Transport GHG Emissions

(well-to-wheels CO<sub>2</sub>-equivalent emissions)



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# ETP BLUE

## Light-duty Vehicles (cars, SUVs)

- **LDVs 50% more efficient by 2030**
  - Hybrids dominate by 2030, plug-in hybrids dominate by 2050
  - IEA has launched the Global Fuel Economy Initiative
- **Electric and / or H2 Fuel Cell Vehicles play a major role after 2030**
- **Biofuels reach up to 12% of total liquid fuel share by 2030, mostly 2<sup>nd</sup> gen, mostly diesel**
  - Rising to 26% by 2050 (20-fold increase compared to 2007)
  - LDVs may not be the best application

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# ETP BLUE: Other Transport Modes

## *Half of total demand*

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- **Air**
  - **15% efficiency improvement over baseline (30% in baseline) by 2050**
  - **Some logistic improvements**
  - **30% biofuels (BTL fuel) by 2050**
- **Shipping**
  - **30% efficiency improvement by 2050;**
  - **30% biofuels (heavy fuel oil substitutes) by 2050**
- **Trucks, buses**
  - **30-50% efficiency improvement by 2050**
  - **Same biofuels share as for LDVs**
- **Lots of biofuels in these modes – and it probably won't be ethanol!**

# ETP BLUE

## Yes, some travel modal shift

- **But this work should be considered preliminary**
- **Assumed high quality transit systems (e.g. BRT) in developing worlds 500 largest cities**
  - **Assume transit retains 60% of motorized travel by 2030, rather than dropping to 30%**
  - **About 0.5 gt CO2 reduction by 2030**
- **High speed rail expansion and shift to rail of 25% of long-haul trucking by 2030**
  - **Also about 0.5 gt CO2 reduction by 2030**
- **Working on a new report with more explicit assessment of travel changes linked to policies, regions**

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- Current energy trends are patently unsustainable — socially, environmentally, economically
- Oil will remain the leading energy source but...
  - > *The era of cheap oil is over, although price volatility will remain*
  - > *Oilfield decline is the key determinant of investment needs*
  - > *The oil market is undergoing major and lasting structural change, with national companies in the ascendancy*
- To avoid "abrupt and irreversible" climate change we need a major decarbonisation of the world's energy system
  - > *Copenhagen must deliver a credible post-2012 climate regime*
  - > *Limiting temperature rise to 2 °C will require significant emission reductions in all regions & technological breakthroughs*
  - > *Mitigating climate change will substantially improve energy security*
- The present economic worries do not excuse back-tracking or delays in taking action to address energy challenges