Copenhagen: An opportunity to move towards a cleaner, more sustainable future energy future

IGU COP 15 Event, 13 December 2009

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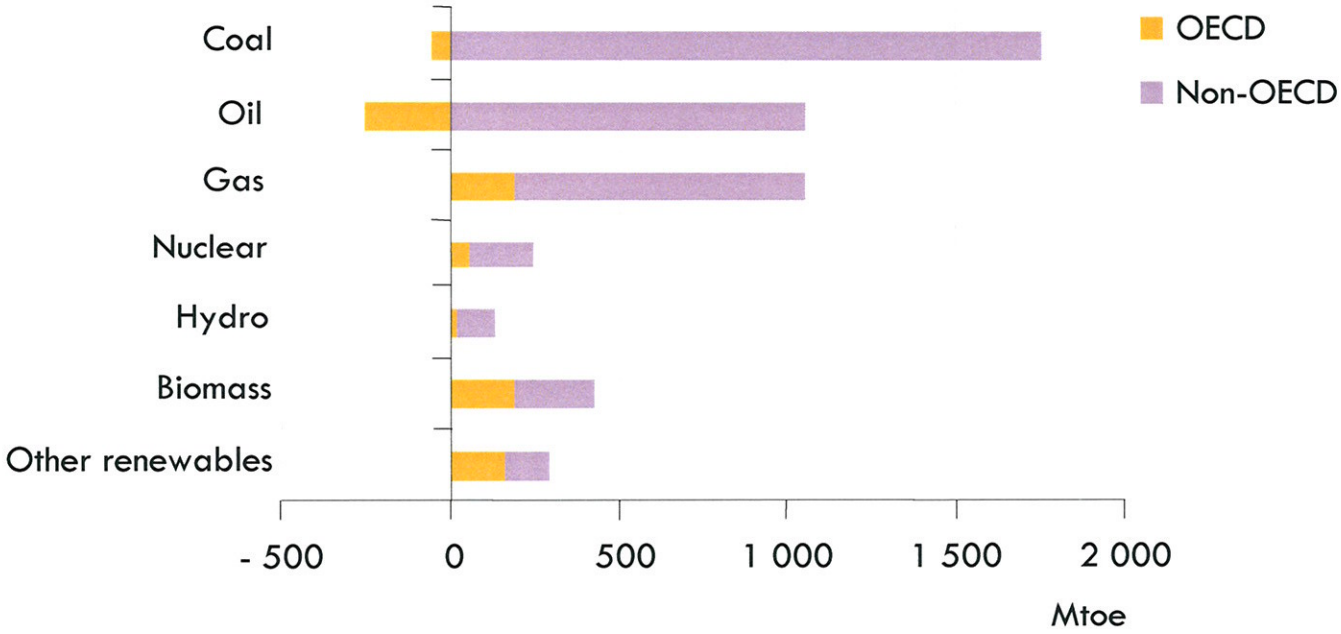
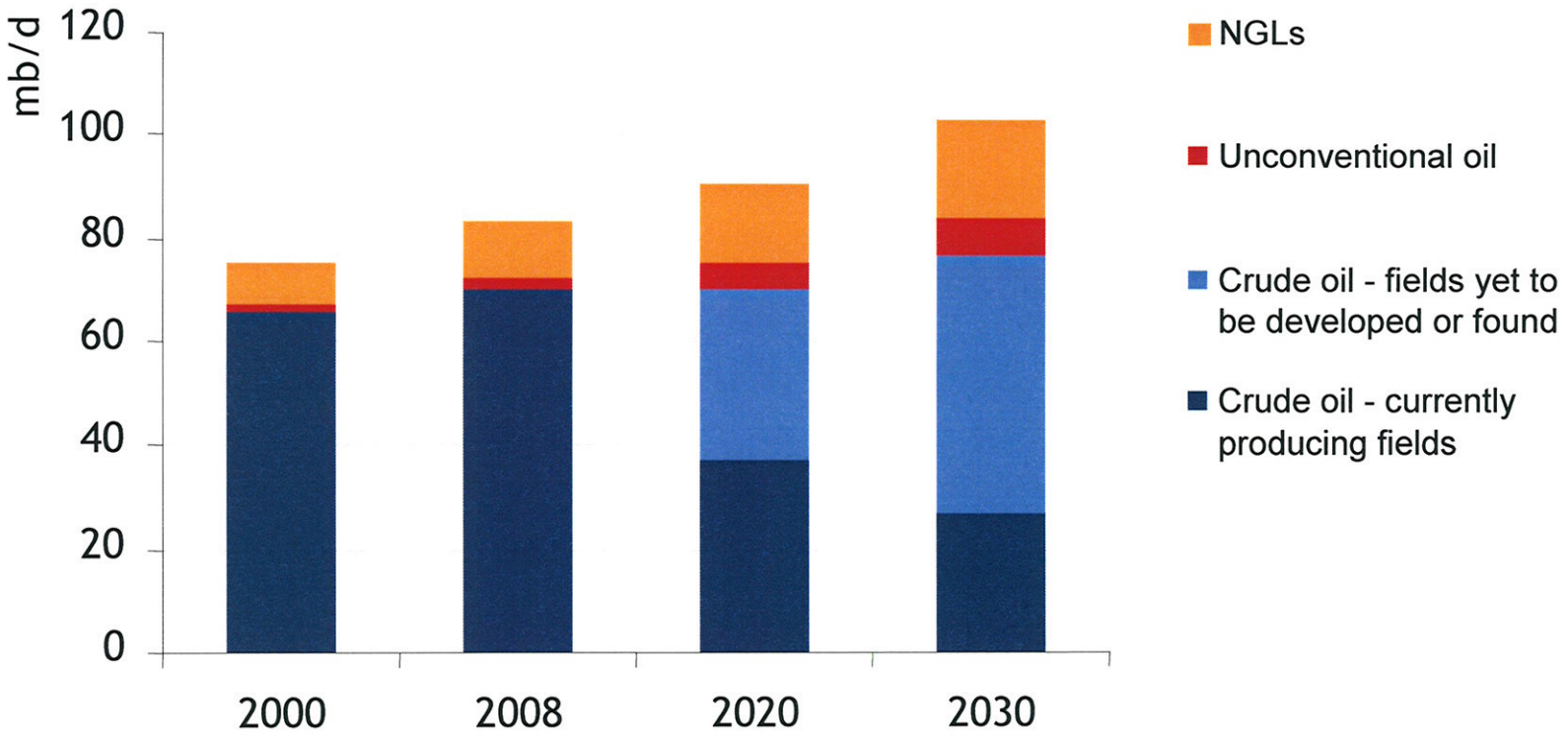
Change in primary energy demand in the Reference Scenario, 2007-2030



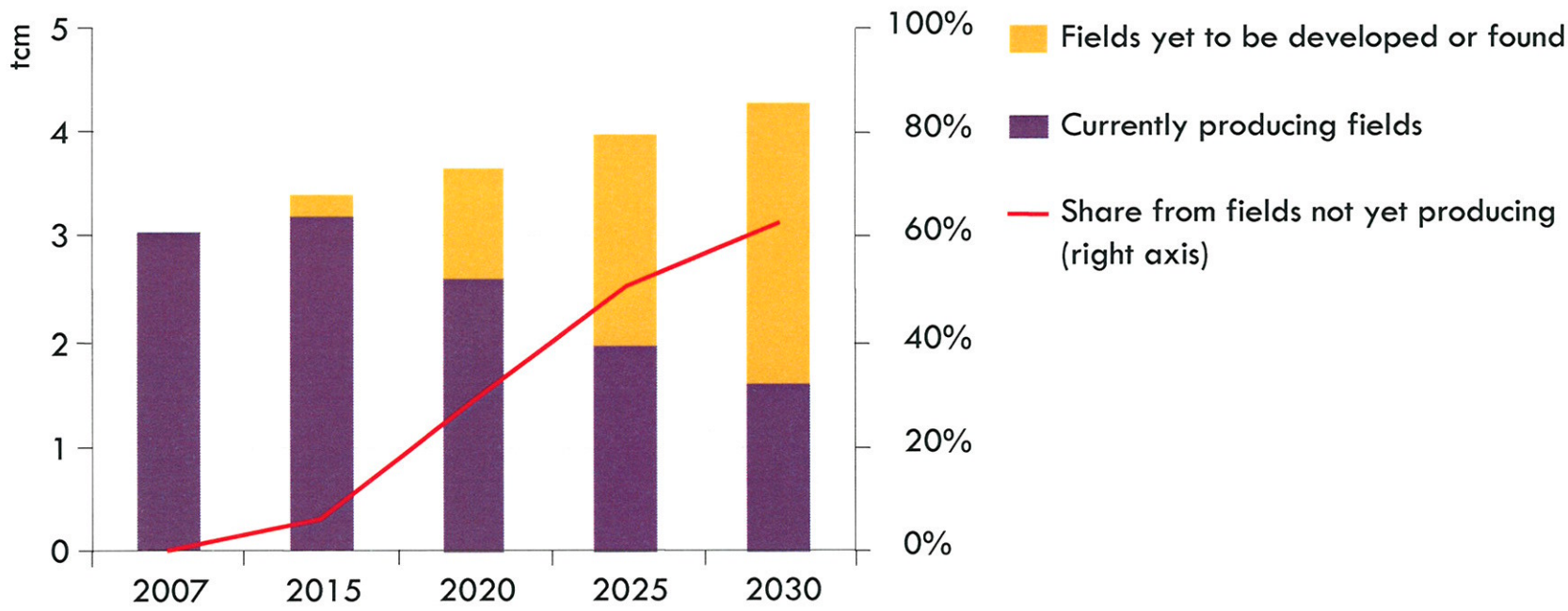
Fossil fuels account for 77% of the increase in world primary energy demand in 2007-2030, with oil demand rising from 85 mb/d in 2008 to 88 mb/d in 2015 & 105 mb/d in 2030

Oil production in the Reference Scenario



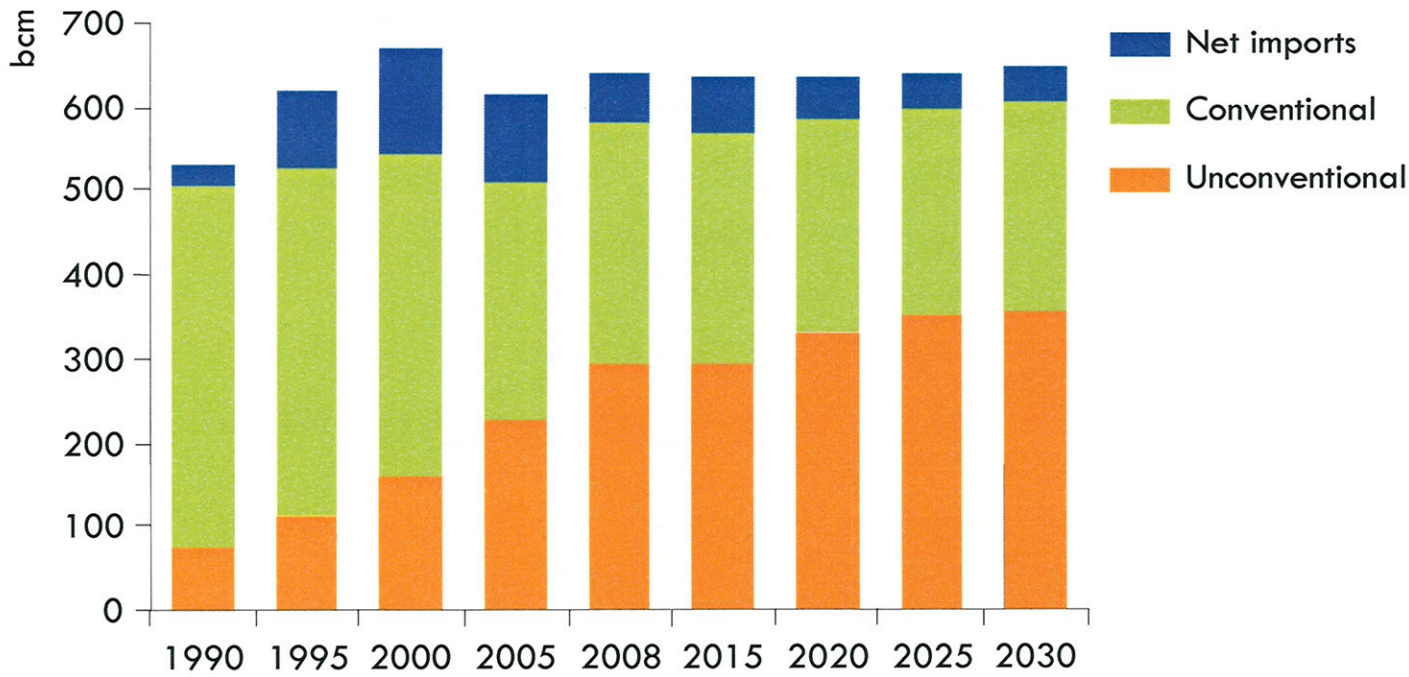
Sustained investment is needed mainly to combat the decline in output at existing fields, which will drop by almost two-thirds by 2030

Impact of decline on world natural gas production in the Reference Scenario



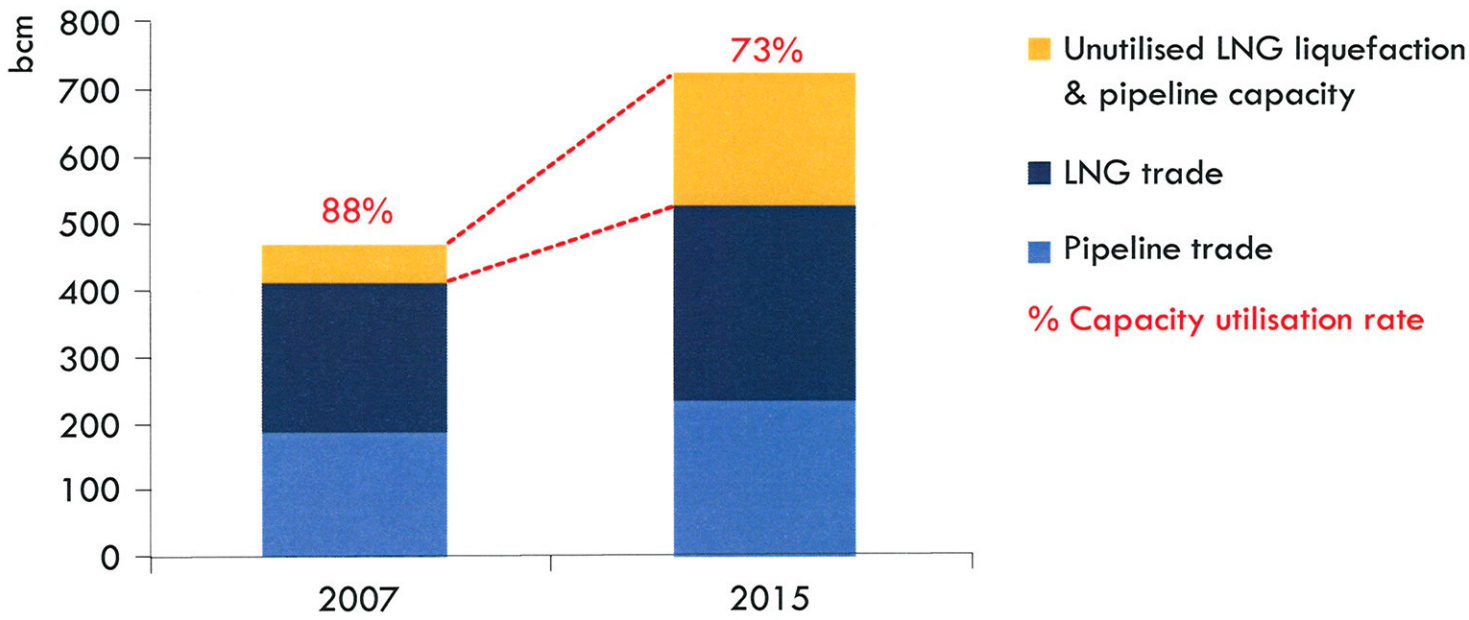
Additional capacity of around 2 700 bcm, or 4 times current Russian capacity, is needed by 2030 – half to offset decline at existing fields & half to meet the increase in demand

US natural gas supply in the Reference Scenario



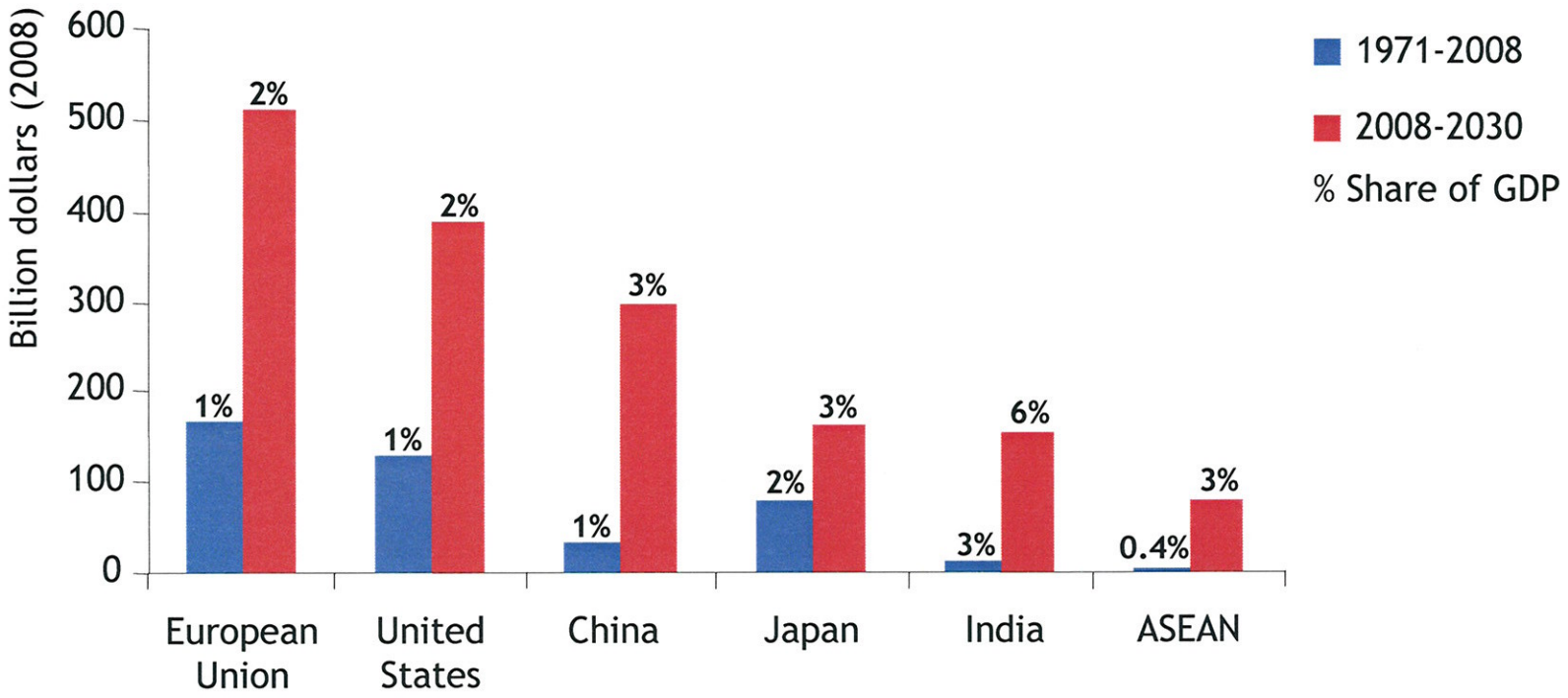
Thanks mainly to shale gas, US gas output grows gradually through to 2030, outstripping demand & squeezing imports

Natural gas transportation capacity



A glut of gas is developing – reaching 200 bcm by 2015 – due to weaker than expected demand & plentiful US unconventional supply, with far-reaching implications for gas pricing

Average annual expenditure on net imports of oil & gas in the Reference Scenario



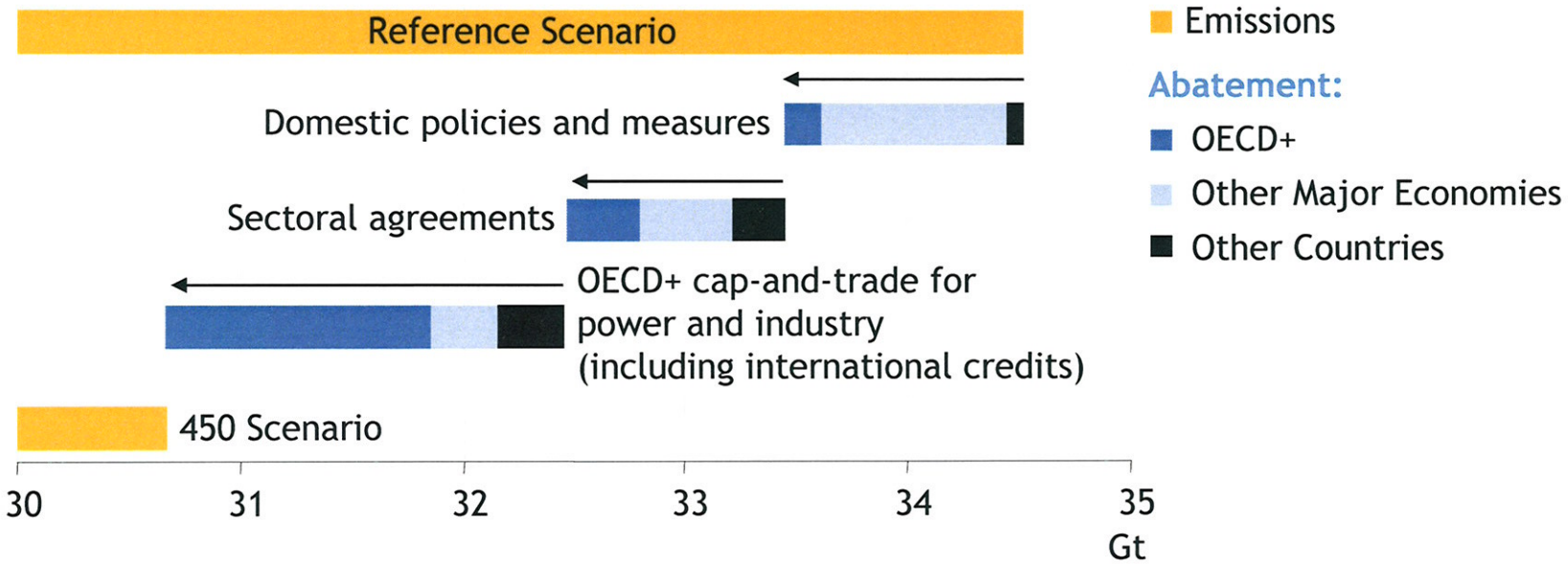
The Reference Scenario implies persistently high spending on oil & gas imports, with China overtaking the United States by around 2025 to become the world's biggest spender

The policy mechanisms in the 450 Scenario

International Energy Agency

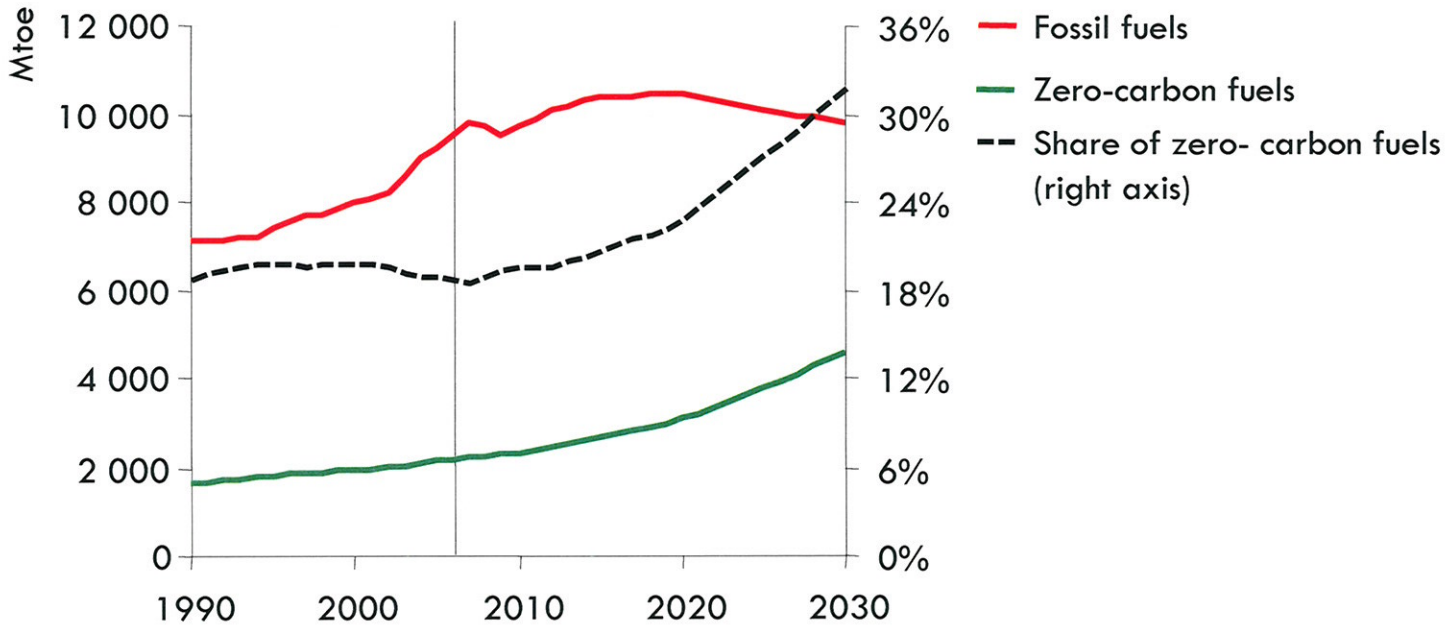
- A combination of policy mechanisms, which best reflects nations' varied circumstances & negotiating positions
- We differentiate on the basis of three country groupings
  - *OECD+: OECD & other non-OECD EU countries*
  - *Other Major Economies (OME): Brazil, China, Middle East, Russia & South Africa*
  - *Other Countries (OC): all other countries, including India*
- A graduated approach
  - *Up to 2020, only OECD+ have national emissions caps*
  - *After 2020, Other Major Economies are also assumed to adopt emissions caps*
  - *Through to 2030, Other Countries continue to focus on national measures*
- Emissions peaking by 2020 will require
  - *A CO_2 price of $50 per tonne for power generation & industry in OECD+*
  - *Investment needs in non-OECD countries of $200 billion in 2020, supported by OECD+ through carbon markets & co-financing*

Abatement by policy type in the 450 Scenario relative to the Reference Scenario, 2020



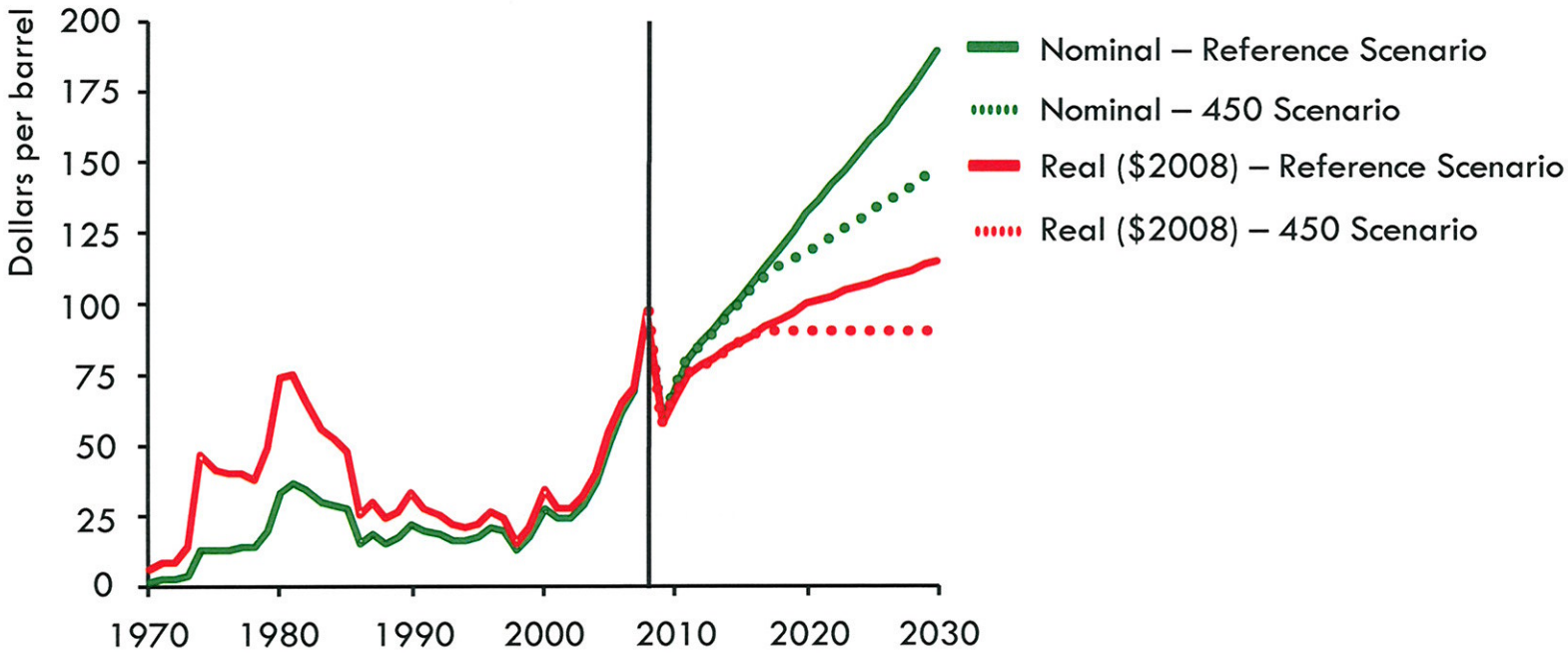
After realising the abatement potential of policies & measures and sectoral approaches, cap-and-trade in OECD+ yields a further 1.8 Gt

World primary energy demand by fuel in the 450 Scenario



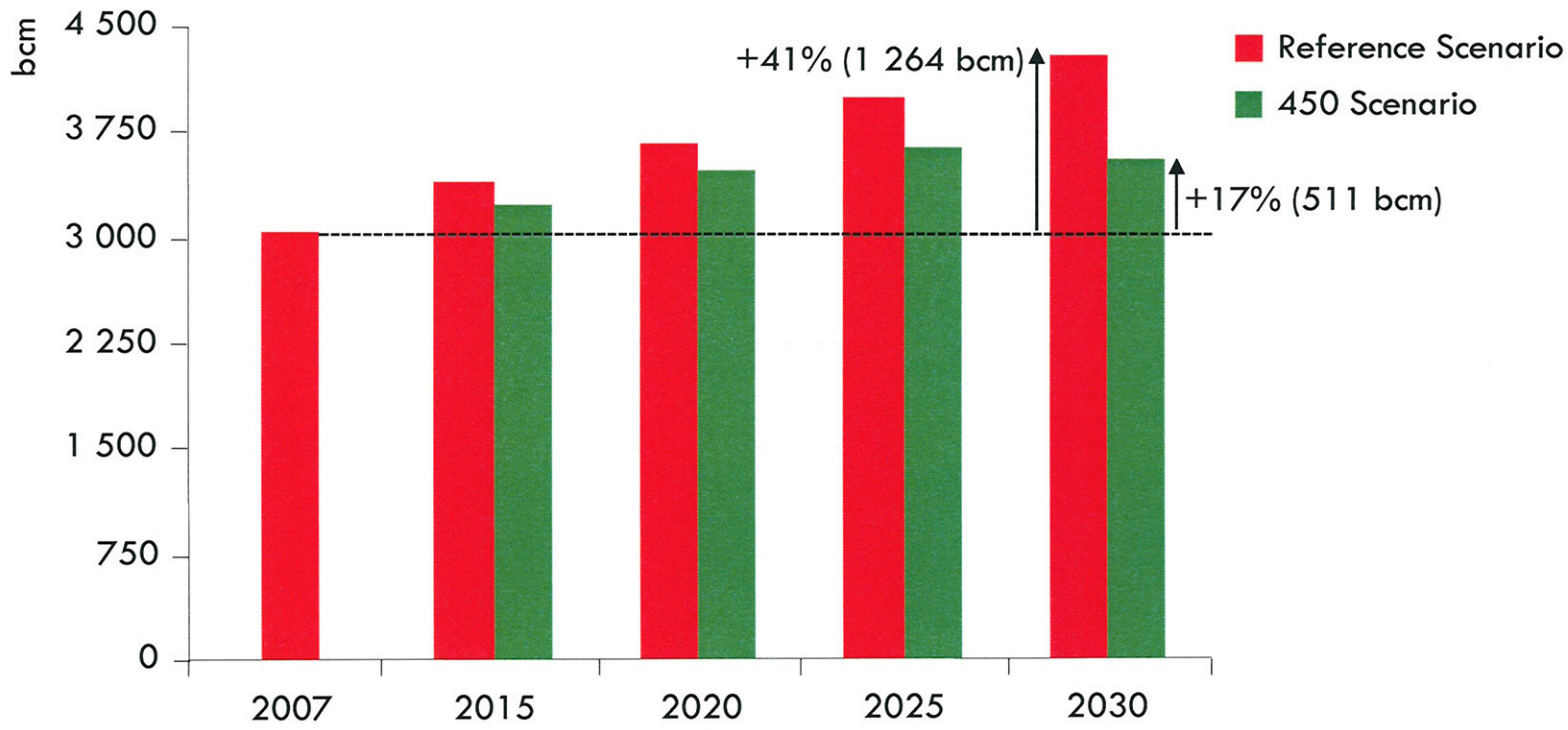
In the 450 Scenario, demand for fossil fuels peaks by 2020, and by 2030 zero-carbon fuels make up a third of the world's primary sources of energy demand

Average IEA crude oil import price



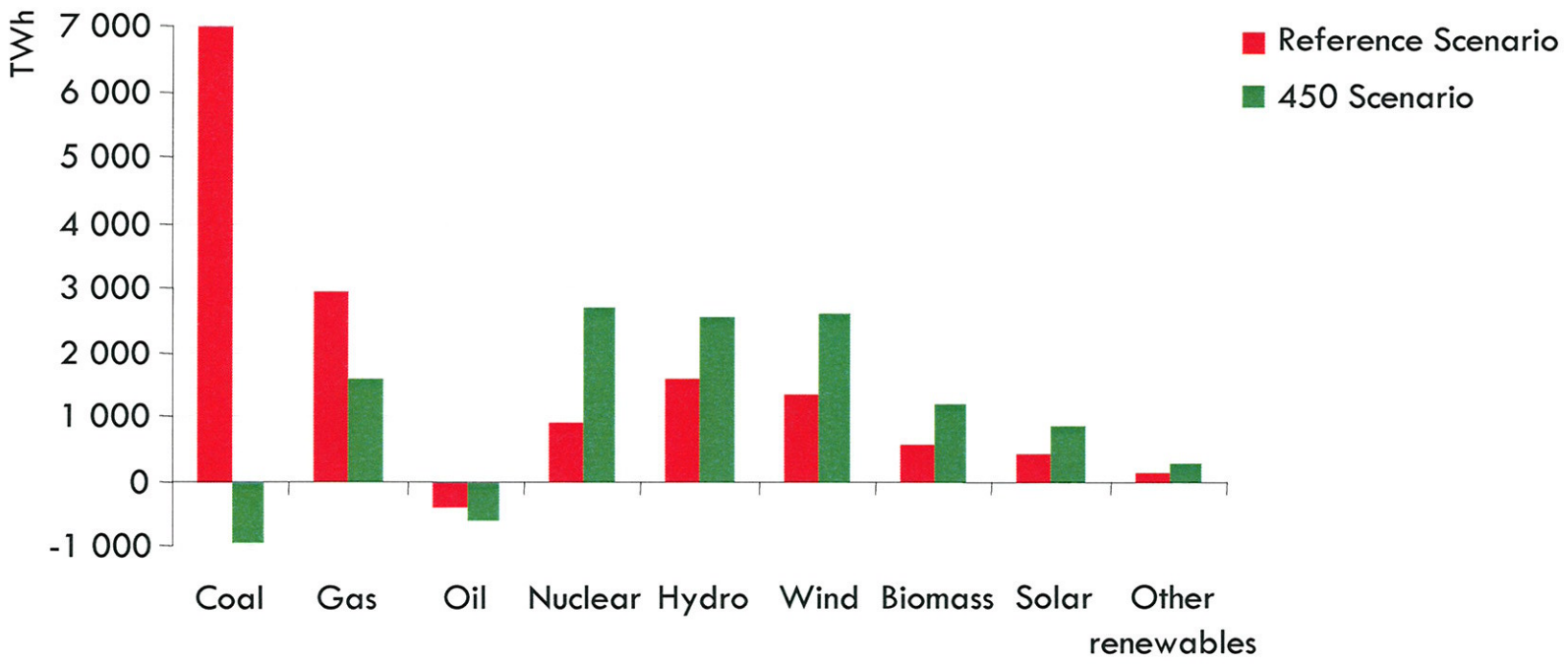
The oil price in real terms is assumed to rebound from around $60 per barrel in 2009 with the economic recovery, reaching $100 by 2020 & $115 per barrel by 2030 in Reference Scenario

World primary natural gas demand by scenario



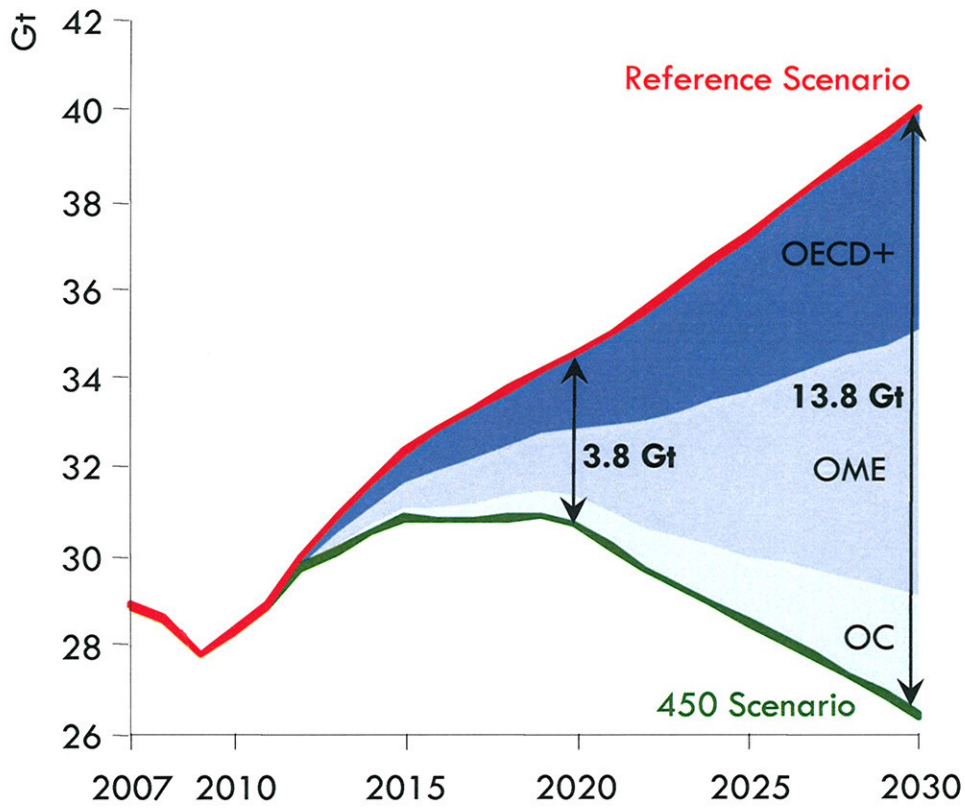
Gas demand continues to grow in both scenarios, peaking by around 2025 in the 450 Scenario & highlighting the potential role of gas as a transition fuel to a clean energy future

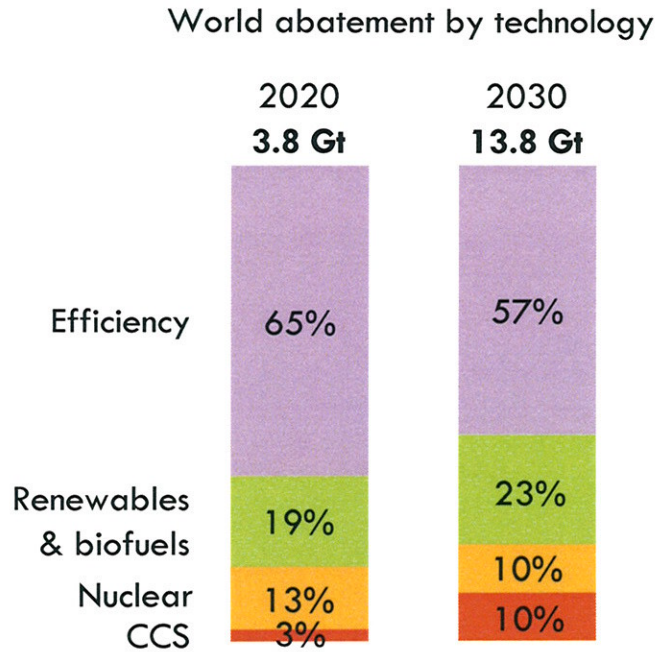
Incremental world electricity production in the Reference and 450 Scenarios, 2007-2030



Renewables, nuclear and plants fitted with CCS account for around 60% of electricity generation globally in 2030 in the 450 Scenario, up from less than one-third today

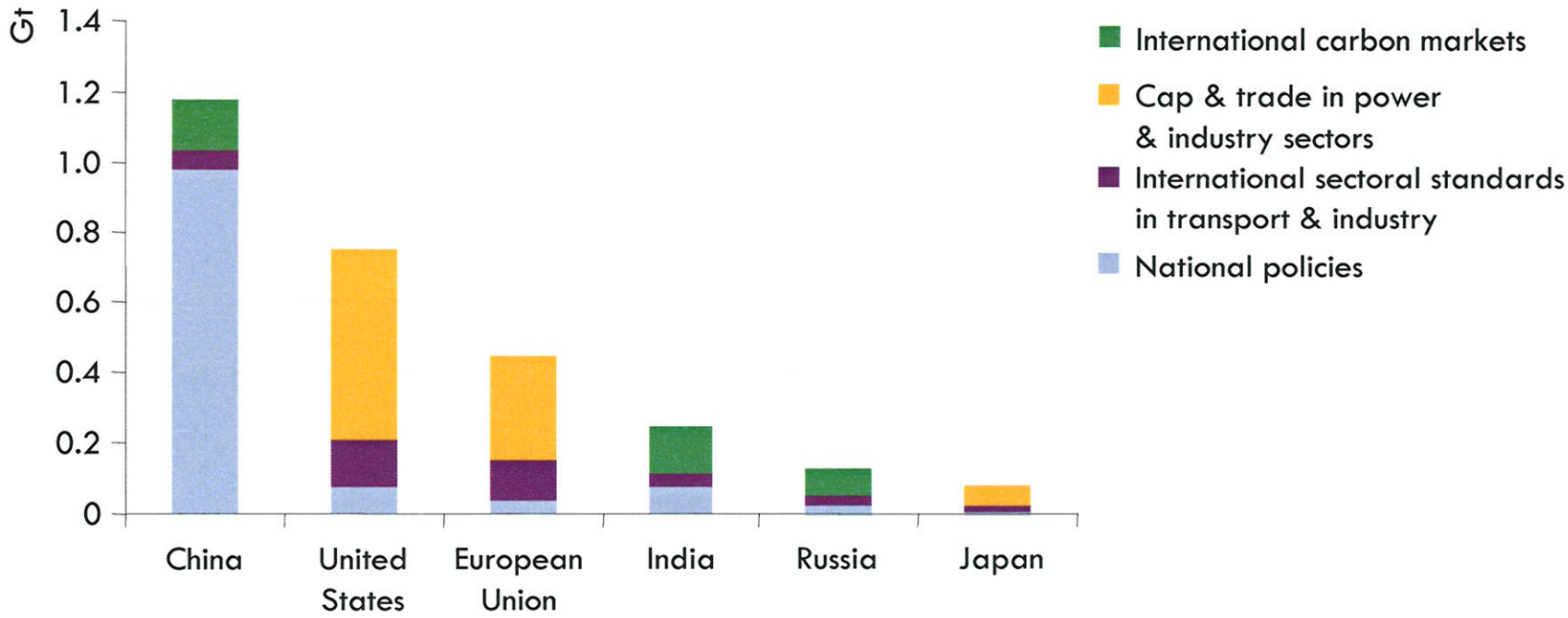
World abatement of energy-related CO_2 emissions in the 450 Scenario





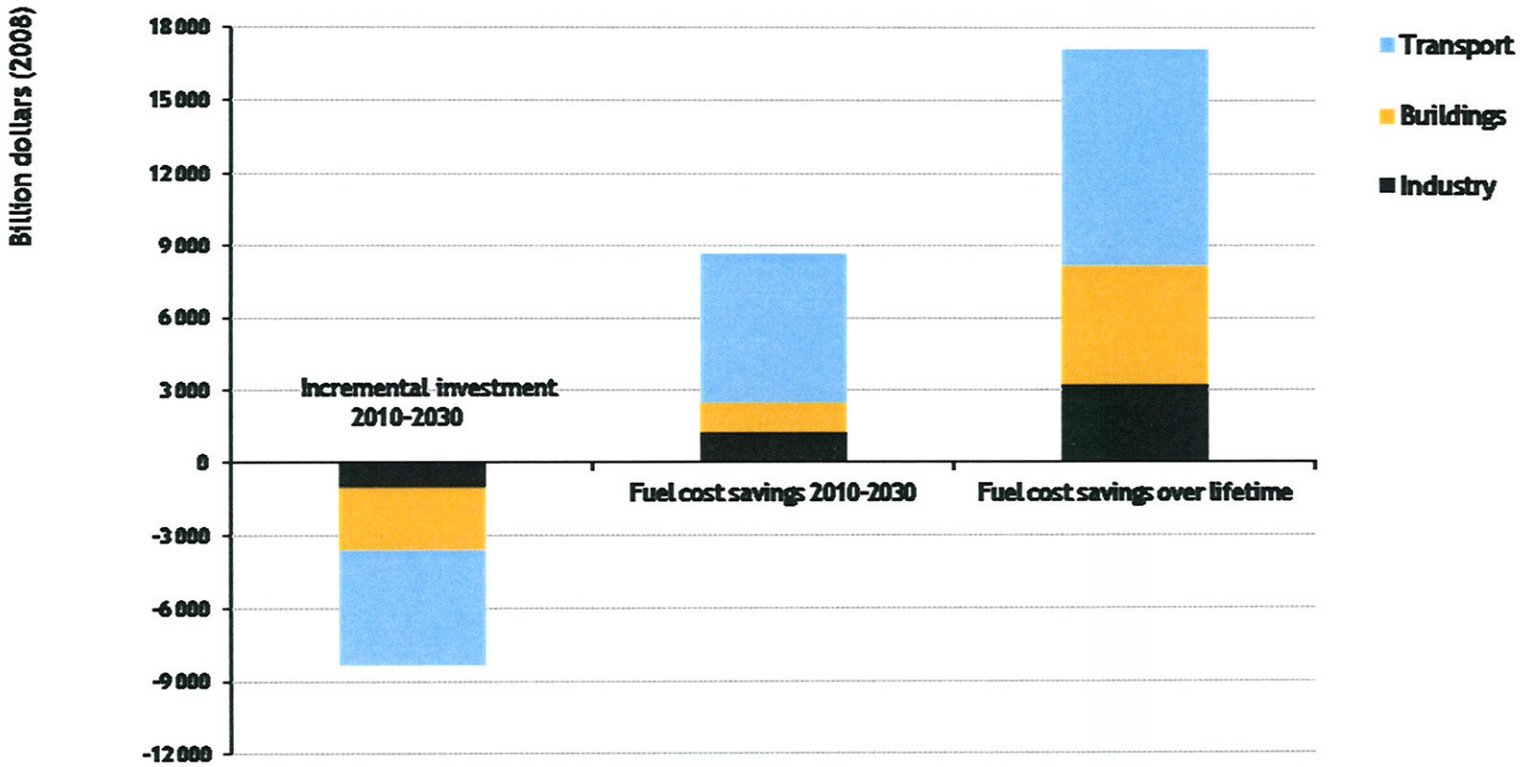
An additional $10.5 trillion of investment is needed in total in the 450 Scenario, with measures to boost energy efficiency accounting for most of the abatement through to 2030

Abatement in the 450 Scenario by key emitters, 2020



China, the United States, the European Union, India, Russia & Japan account for almost three-quarters of the 3.8 Gt reduction in the 450 Scenario

Additional investment and fuel cost savings in the 450 Scenario vs. the Reference Scenario

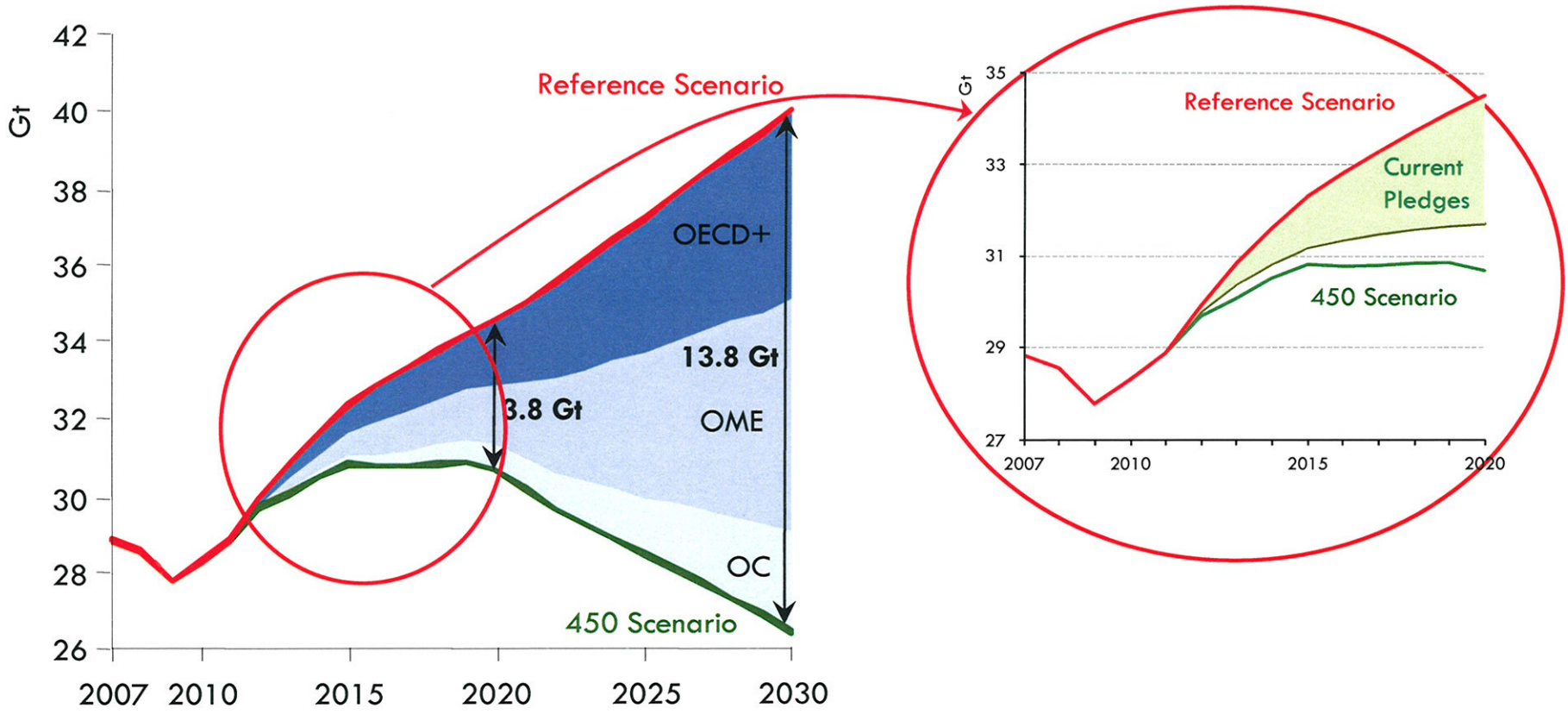


Fuel costs saving in industry, buildings and transport of $8.6 trillion over the 2010-30 period more than offset these sectors additional investment of $8.3 trillion

However, every year of delay adds $500 billion to the required investment, to remain on track with the 450 Scenario

Source: IEA analysis, and World Energy Outlook 2009

World abatement emissions in the 450 Scenario



Current pledges point in the right direction but further efforts would be needed to close the gap and reach the 450 Scenario

Source: **IEA analysis based on pledges as of 11 December 2009**, and World Energy Outlook 2009

Summary

International Energy Agency

- The financial crisis has halted the rise in global fossil-energy use, but its long-term upward path will resume soon without new policies
- Tackling climate change & enhancing energy security require a massive decarbonisation of the energy system
  - > ***Limiting temperature rise to 2°C requires significant emission reductions in all regions - every year of delay adds half a trillion dollars to cost.***
- A 450 path towards 'Green Growth' would bring substantial benefits
  - > ***Avoiding the worst effects and costs of climate change***
  - > ***Much less air pollution and huge health benefits***
  - > ***Investments in industry, transport and buildings would total $8.3 trillion, but reduce fuel costs by $8.6 trillion – energy efficiency is a priority area***
- The climate/energy challenge is enormous – but it can and must be met
  - > ***Improved energy efficiency & technology deployment are critical***
  - > ***Coordination is needed on breakthrough technology development***
- Copenhagen can deliver the signal and the tools: e.g. support to policy (energy efficiency) and an expanded carbon market
  - ➔ *IEA will analyse the goals coming out of Copenhagen*