

World Energy Outlook 2010

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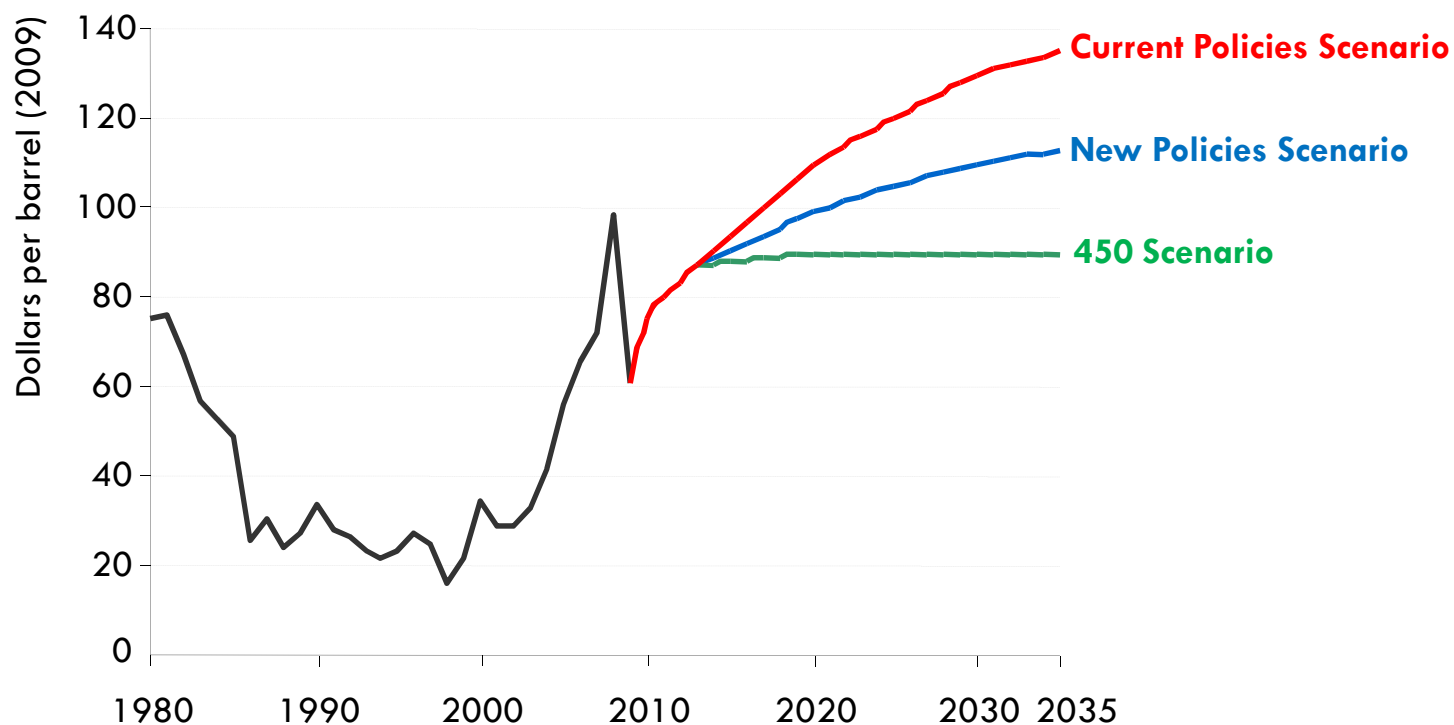
Office of the Chief Economist, IEA

Athens, 23 November 2010

The context: *A time of unprecedented uncertainty*

- The worst of the global economic crisis appears to be over – *but is the recovery sustainable?*
- Oil demand & supply are becoming less sensitive to price – *what does this mean for future price movements?*
- Natural gas markets are in the midst of a revolution – *will it herald a golden era for gas?*
- Copenhagen Accord & G-20 subsidy reforms are key advances – *but do they go far enough & will they be fully implemented?*
- China & other emerging economies will shape the global energy future – *where will their policy decisions lead us?*

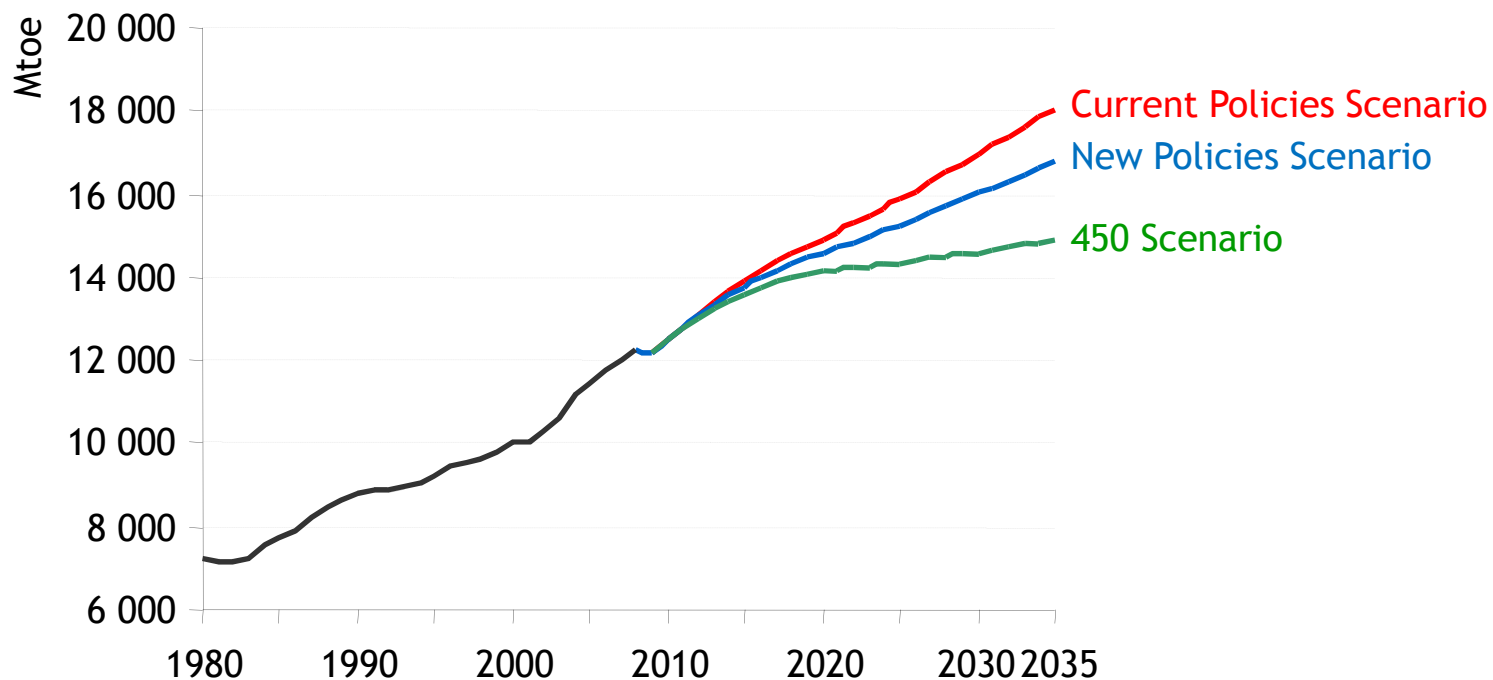
International oil price assumptions



The age of cheap oil is over, though policy action could bring lower international prices than would otherwise be the case

Policies could dramatically alter the long-term energy outlook

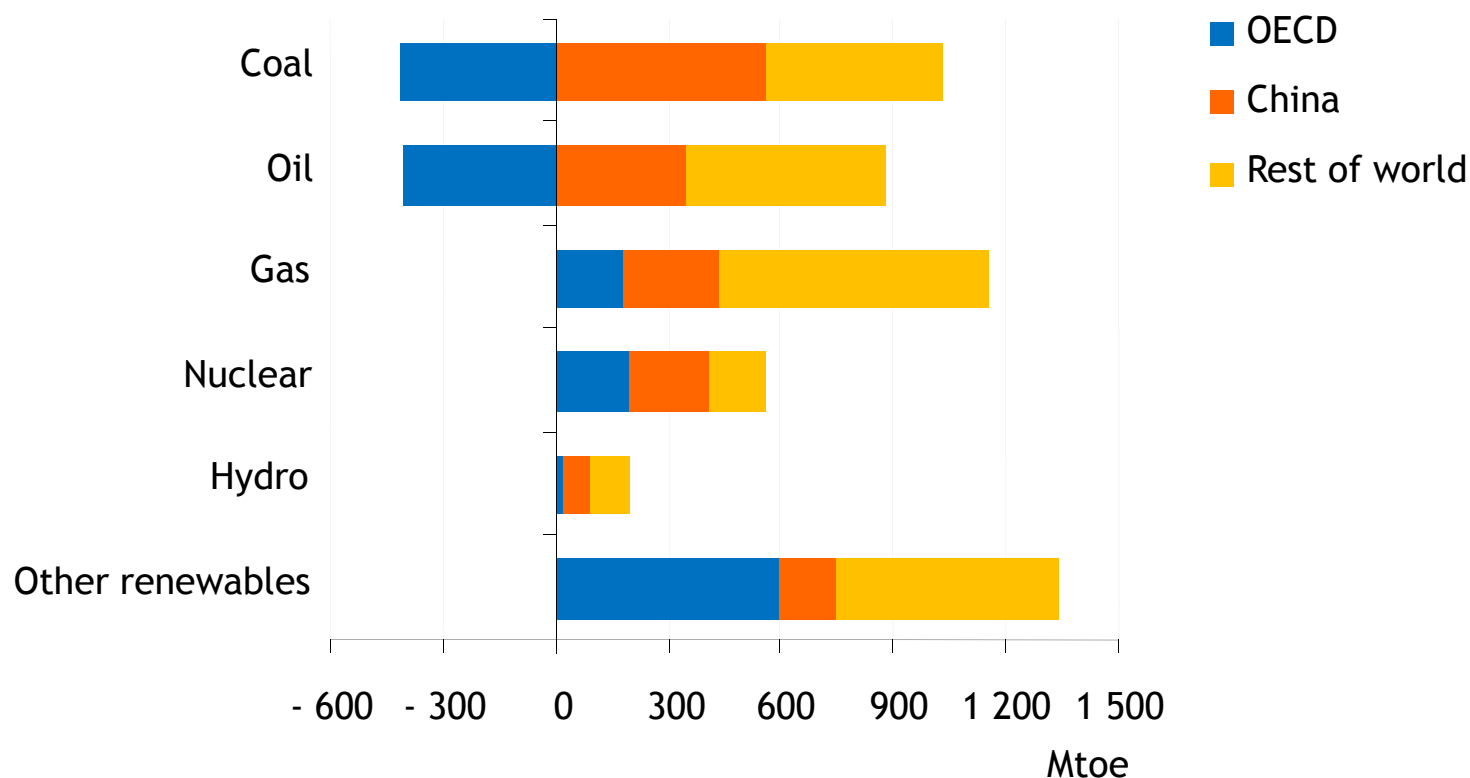
World primary energy demand by scenario



In 2035, energy demand is 8% higher in the Current Policies Scenario & 11% lower in the 450 Scenario than in the New Policies Scenario

Emerging economies dominate the growth in demand for all fuels

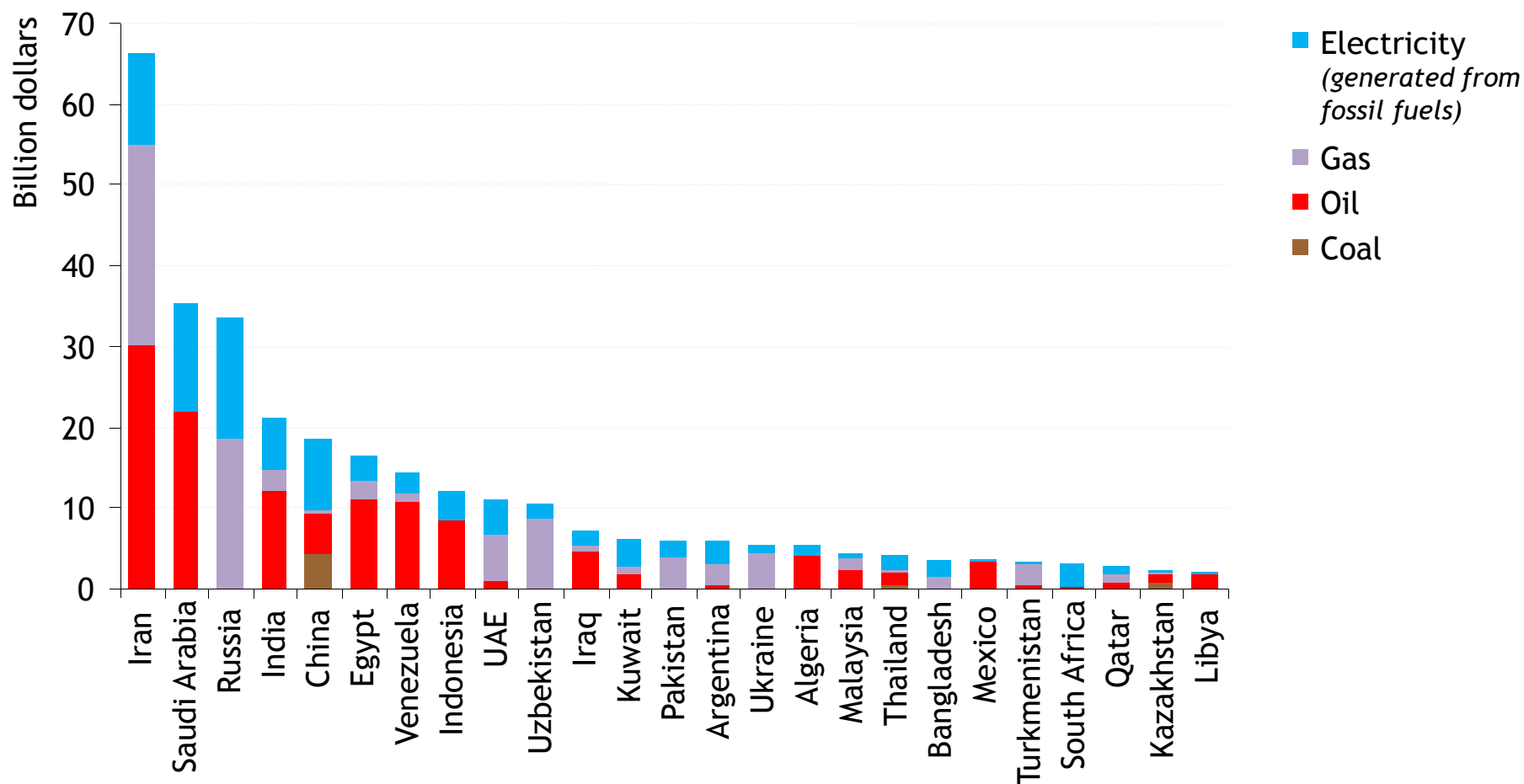
Incremental primary energy demand in the New Policies Scenario, 2008-2035



Demand for all types of energy increases in non-OECD countries, while demand for coal & oil declines in the OECD

Fossil-fuel subsidies are distorting price signals

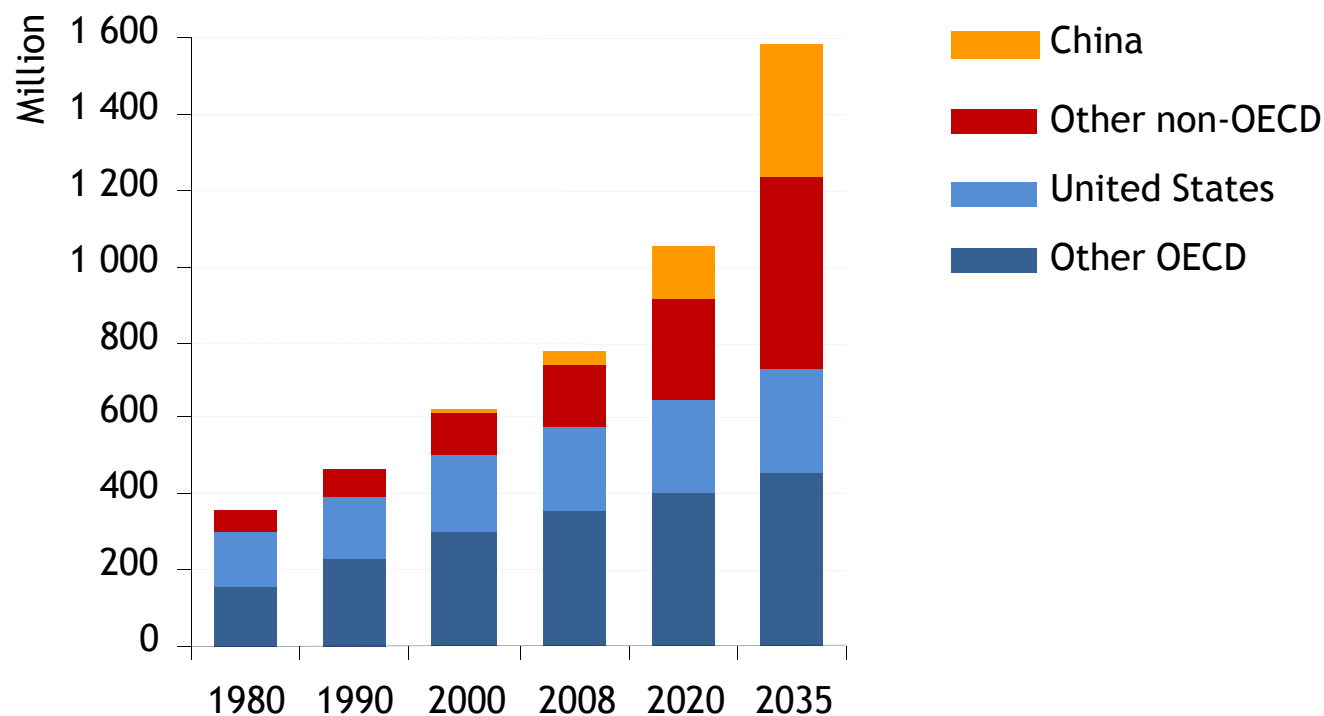
Economic value of fossil-fuel consumption subsidies by country, 2009



Fossil-fuel consumption subsidies amounted to \$312 billion in 2009, down from \$558 billion in 2008, with the bulk of the fall due to lower international prices

Booming demand for mobility in the emerging economies drives up oil use

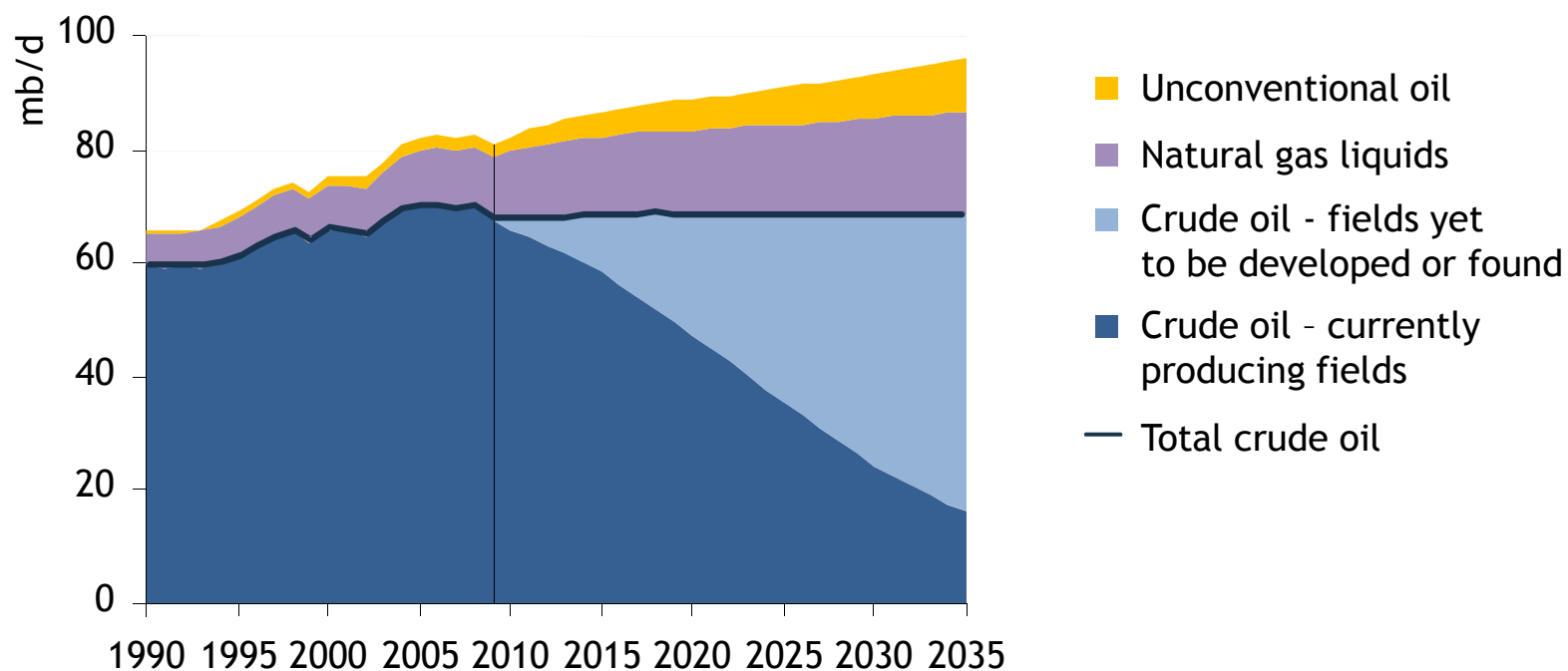
Passenger vehicles in the New Policies Scenario



The global car fleet will continue to surge as more & more people in China & other emerging economies buy a car, overshadowing modest growth in the OECD

Oil production becomes less crude

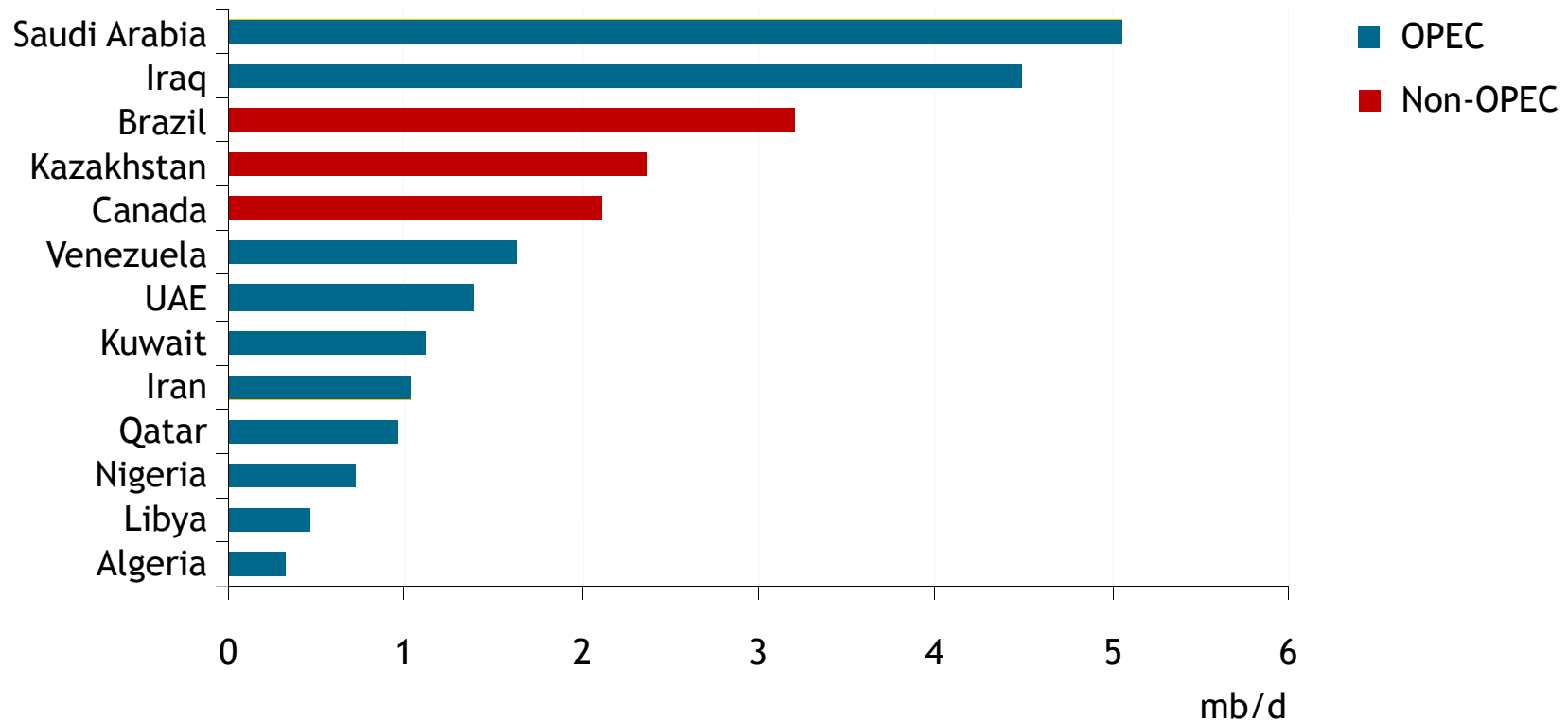
World oil production by type in the New Policies Scenario



Global oil production reaches 96 mb/d in 2035 on the back of rising output of natural gas liquids & unconventional oil, as crude oil production plateaus

More oil from fewer producers

Incremental oil production by key country in the New Policies Scenario, 2009-2035



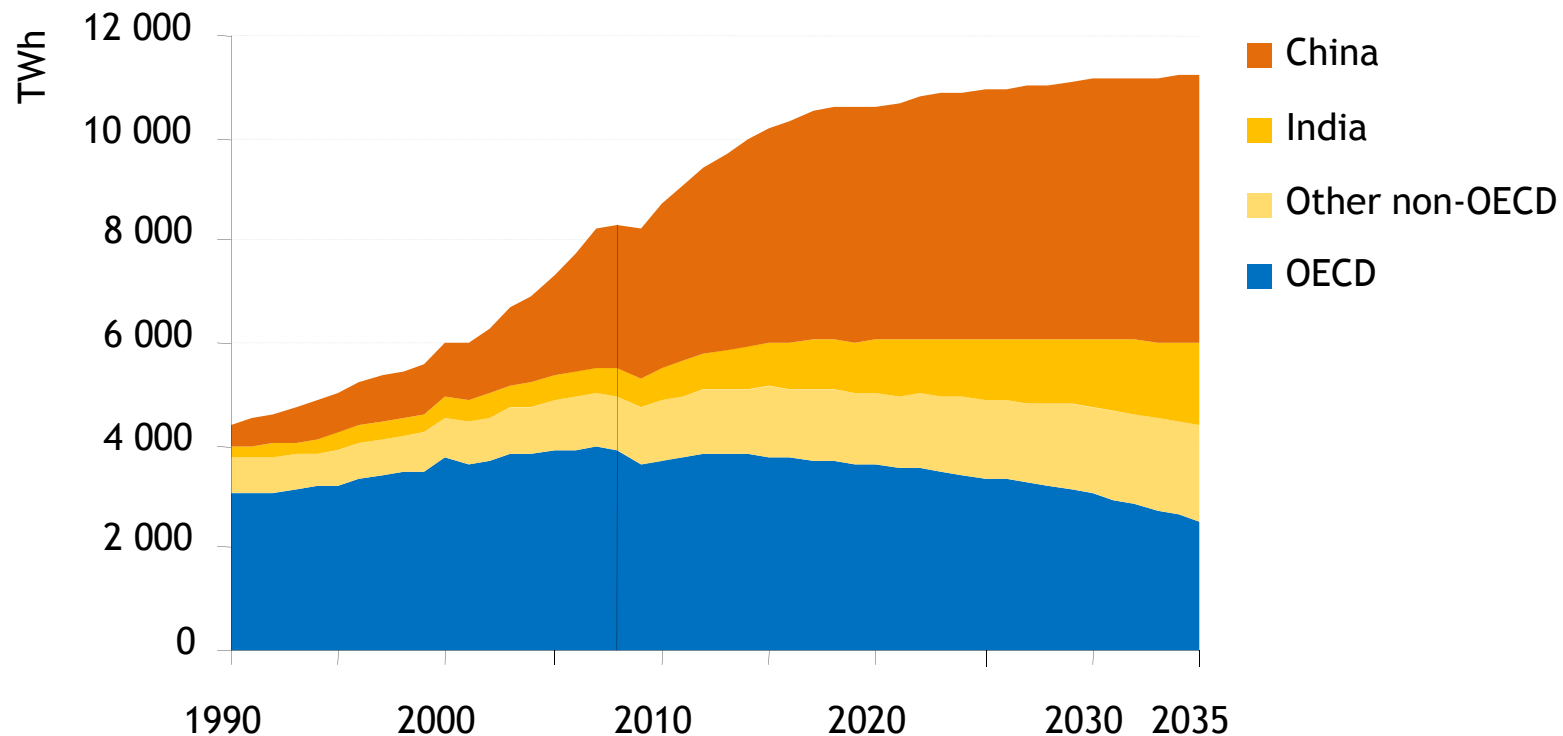
Production rises most in Saudi Arabia & Iraq, helping to push OPEC's market share from 41% today to 52% by 2035, a level last seen prior to the first oil shock of 1973-1974

A golden age for gas?

- Gas is set to play a key role in meeting the world's energy needs
 - > *demand rises by 44%, led by China & Middle East*
- Unconventional gas accounts for 35% of the increase in global supply to 2035, with new non-US producers emerging
- Gas glut will peak soon, but may dissipate only very slowly
- The glut will keep pressure on gas exporters to move away from oil-price indexation, notably in Europe
- Lower prices could lead to stronger demand for gas, backing out renewables & coal in power generation

Coal remains the backbone of global electricity generation

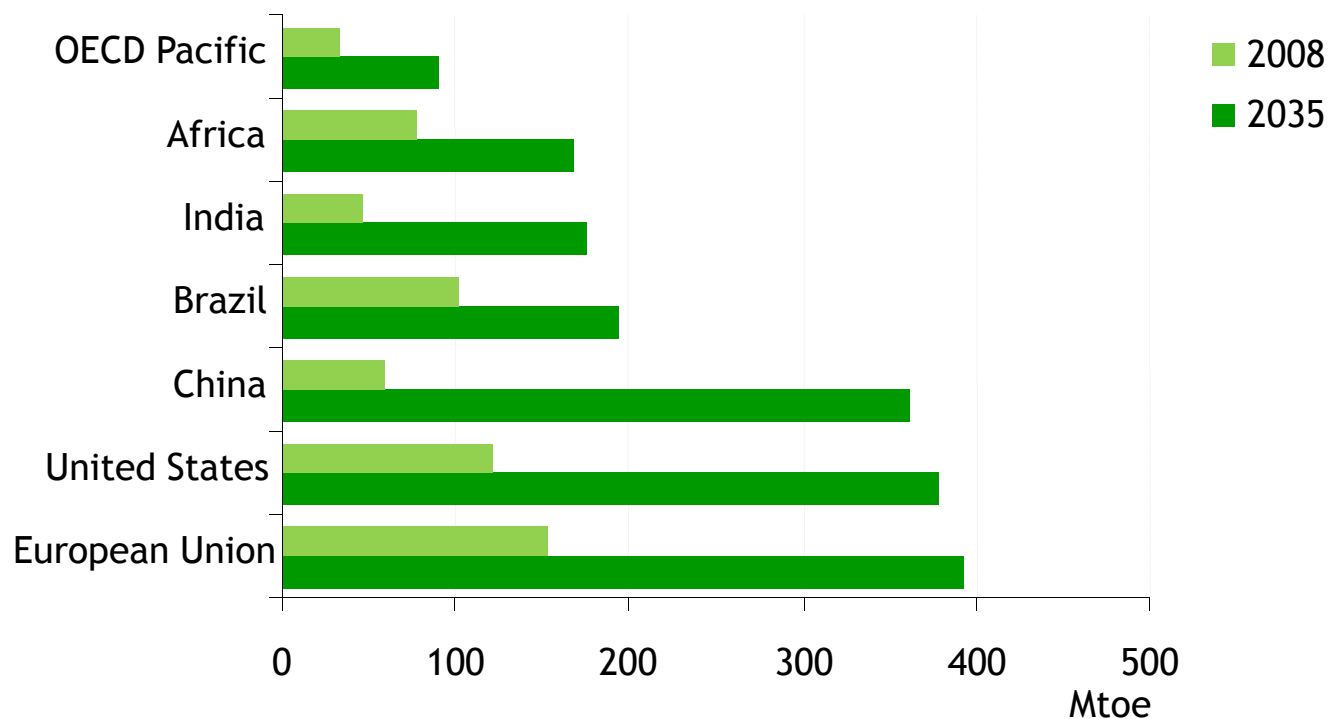
Coal-fired electricity generation by region in the New Policies Scenario



A drop in coal-fired generation in the OECD is offset by big increases elsewhere, especially China, where 600 GW of new capacity exceeds the current capacity of the US, EU & Japan

Renewables enter the mainstream....

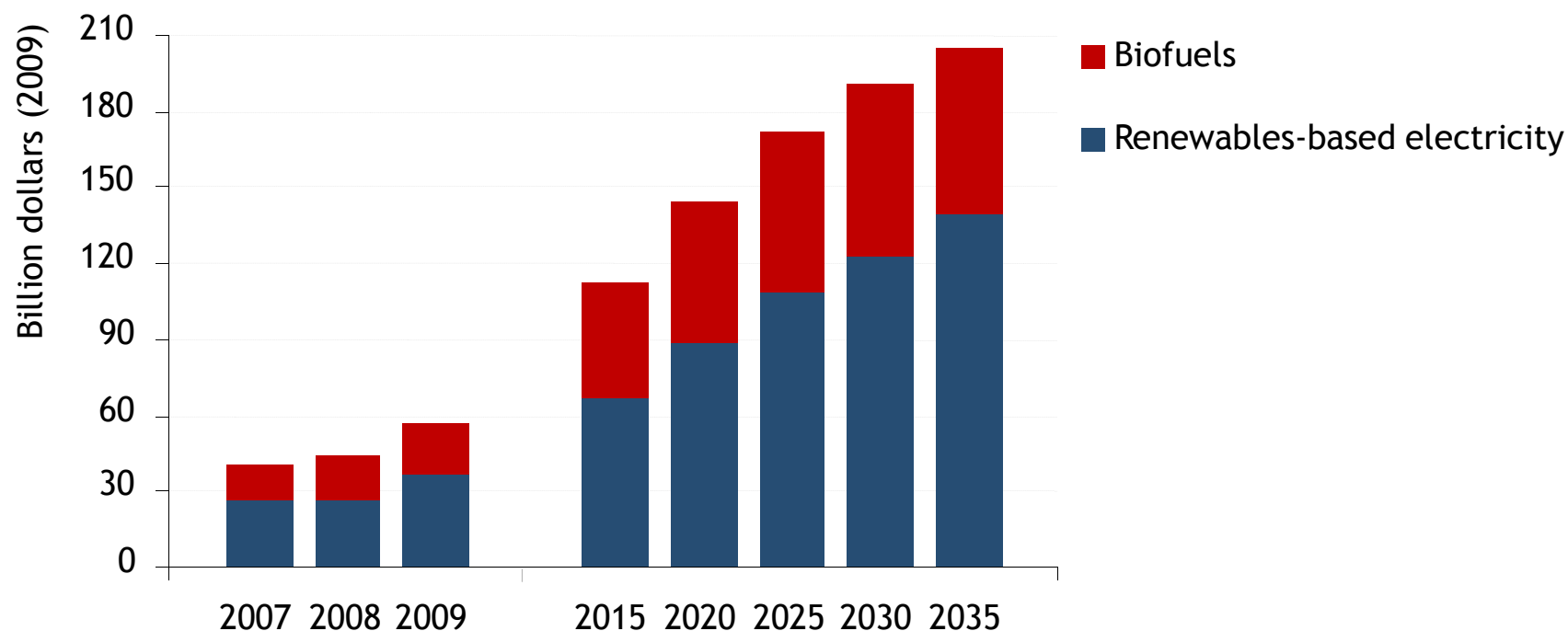
Renewable primary energy demand in the New Policies Scenario



The use of renewable energy triples between 2008 & 2035, driven by the power sector where their share in electricity supply rises from 19% in 2008 to 32% in 2035

....but only if there is enough government support

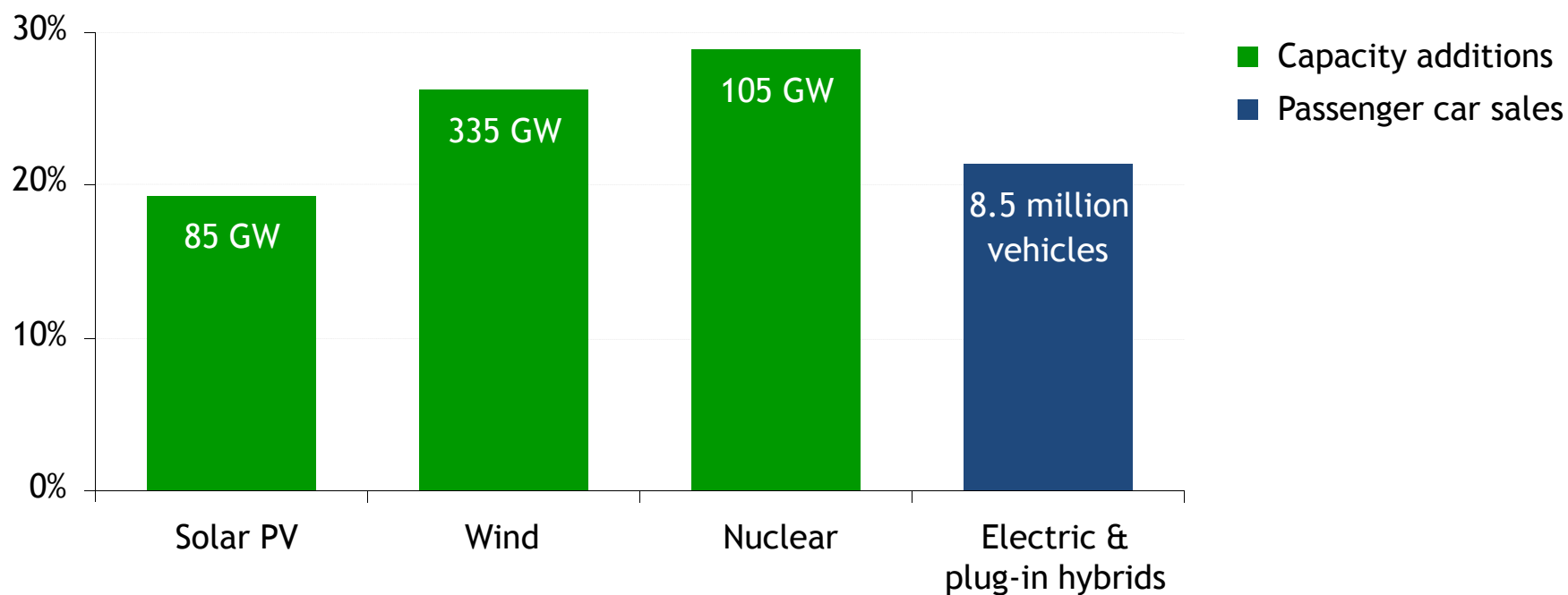
Annual global support for renewables in the New Policies Scenario



Government support remains the key driver – rising from \$57 billion in 2009 to \$205 billion in 2035 – but higher fossil-fuel prices & declining investment costs also spur growth

China becomes the market leader in low-carbon technologies

China's share of cumulative global additions to 2035 for selected technologies



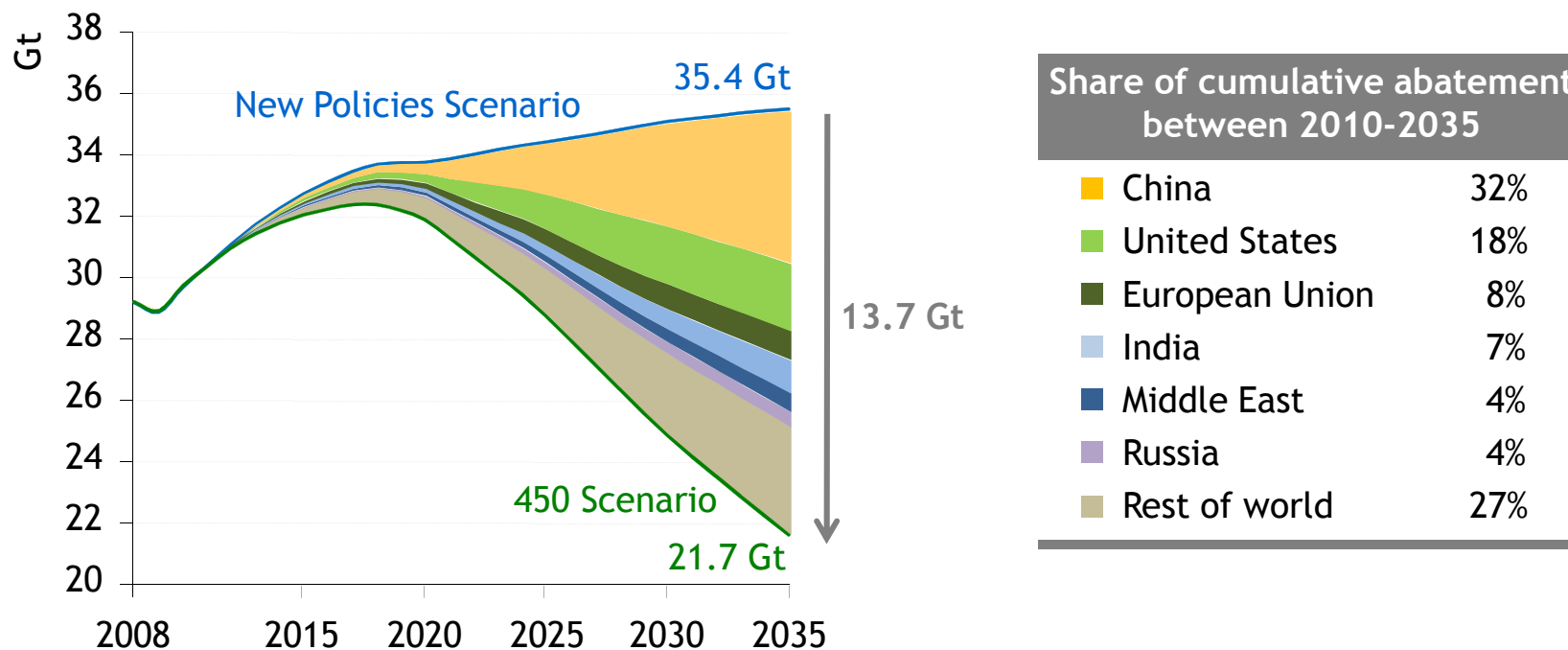
Given the sheer scale of China's market, its push to expand the role of low-carbon energy technologies is poised to play a key role in driving down costs, to the benefit of all countries

The 450 Scenario: A roadmap from 3.5°C to 2°C

- The 450 Scenario sets out an energy pathway consistent with limiting the increase in temperature to 2°C
- Assumes vigorous implementation of Copenhagen Accord pledges to 2020 & much stronger action thereafter
- The failure of the Copenhagen Accord pledges:
 - > *As many lack transparency, there is 3.9 Gt of uncertainty over the level of abatement pledged to 2020*
 - > *As many lack ambition, the cost of achieving the 2°C goal has increased by \$1 trillion in 2010-2030 compared with WEO-2009*

The 450 Scenario: *How do we get there now?*

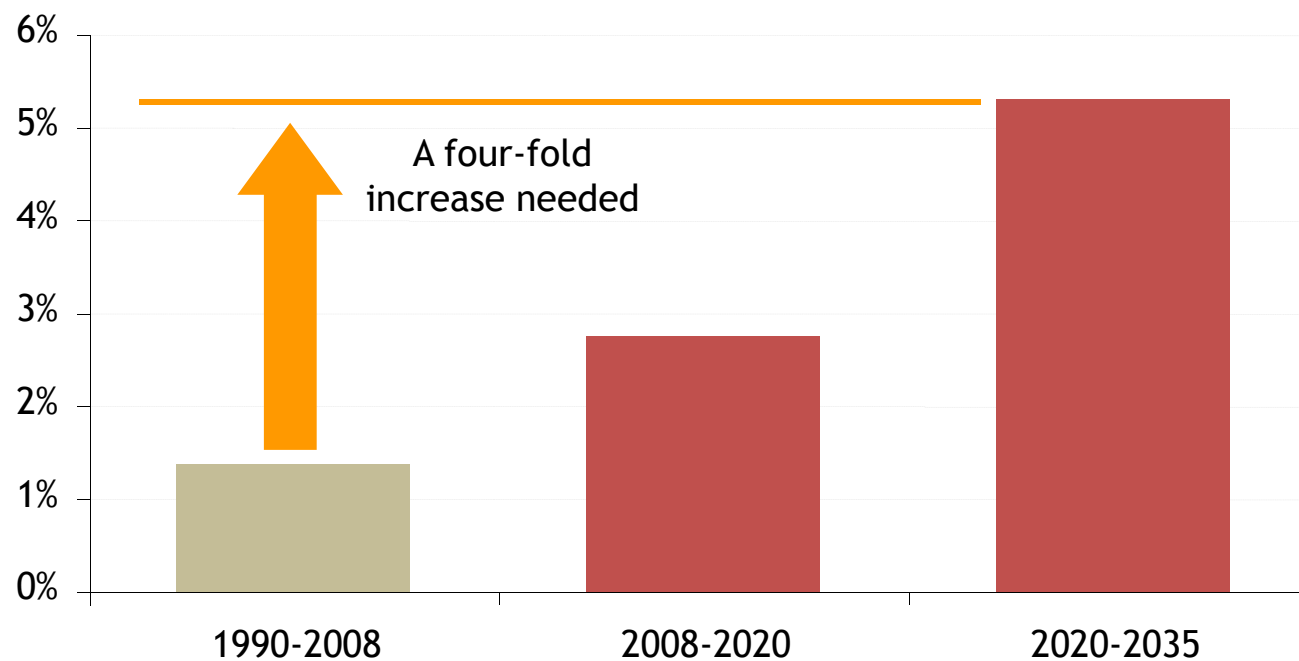
World energy-related CO₂ emission savings by country in the 450 Scenario



In the 450 Scenario, China & the US together account for 50% of the cumulative emission abatement that is needed in 2010-2035

Achieving the 2°C goal will require rapid decarbonisation of global energy

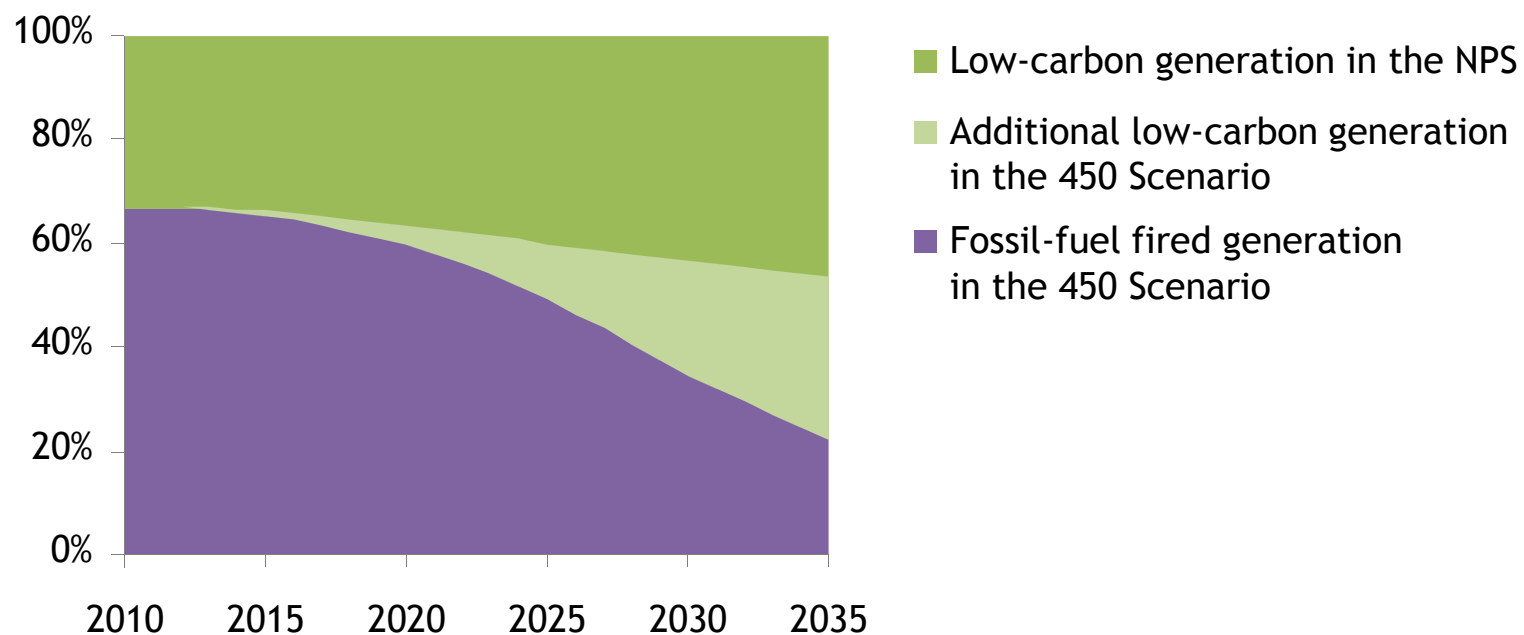
Average annual change in CO₂ intensity in the 450 scenario



Carbon intensity would have to fall at twice the rate of 1990-2008 in the period 2008-2020 & almost four times faster in 2020-2035

A fundamental change is needed in power generation

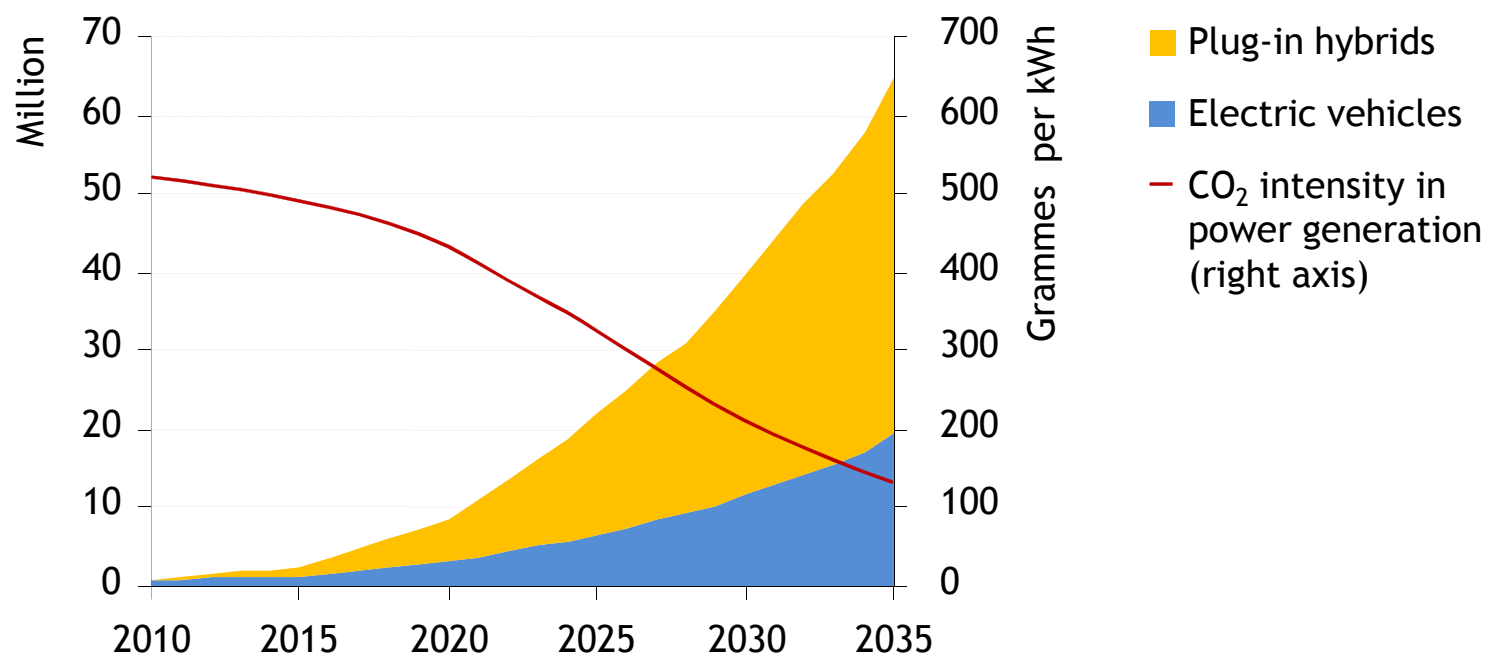
Share of world electricity generation by type and scenario



Low-carbon technologies account for over three-quarters of global power generation by 2035 in the 450 Scenario, a four-fold increase on today

... and also in transport

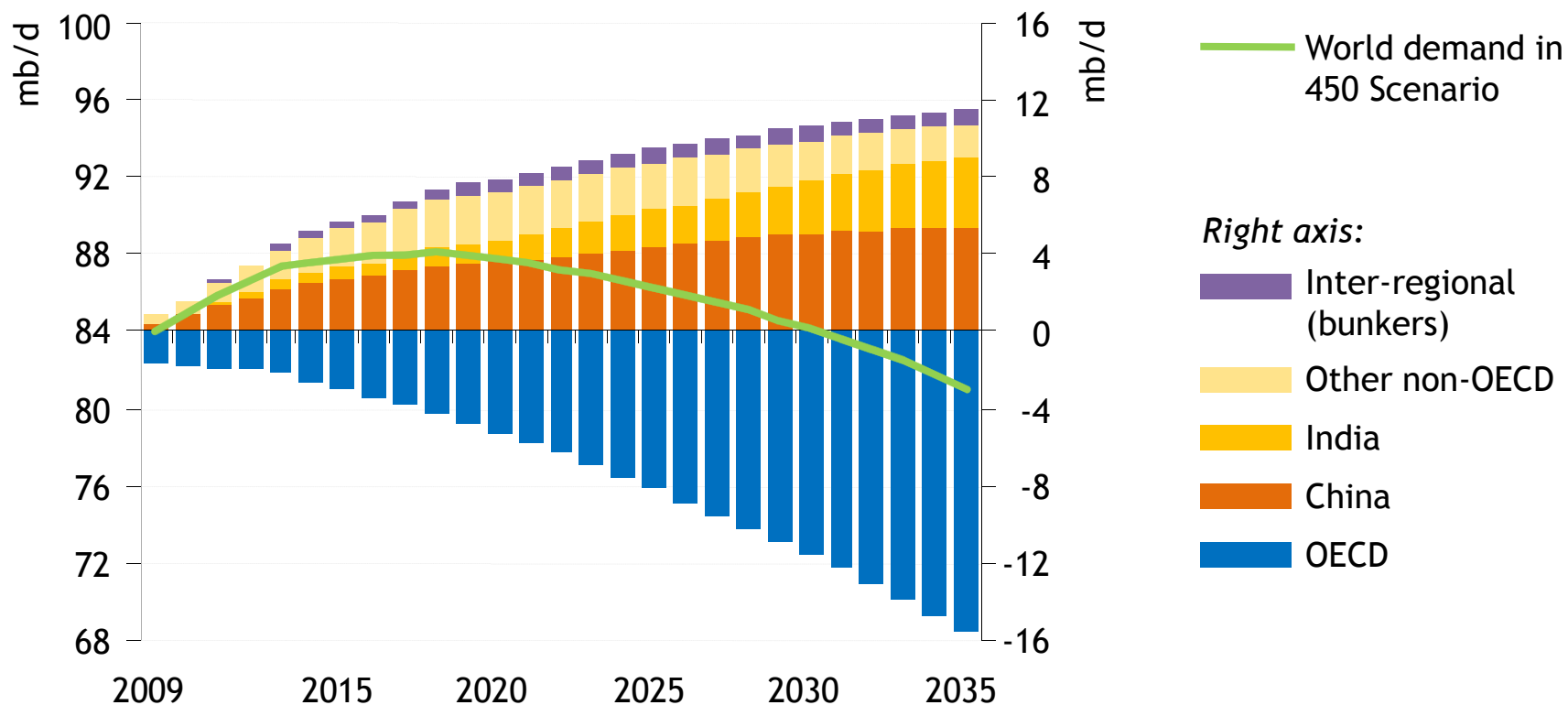
Sales of plug-in hybrid and electric vehicles in the 450 Scenario & CO₂ intensity of the power sector



Plug-in hybrids & electric vehicles reach 39% of new sales by 2035, making a big contribution to emissions abatement, thanks to a major decarbonisation of the power sector

Will peak oil be a guest or the spectre at the feast?

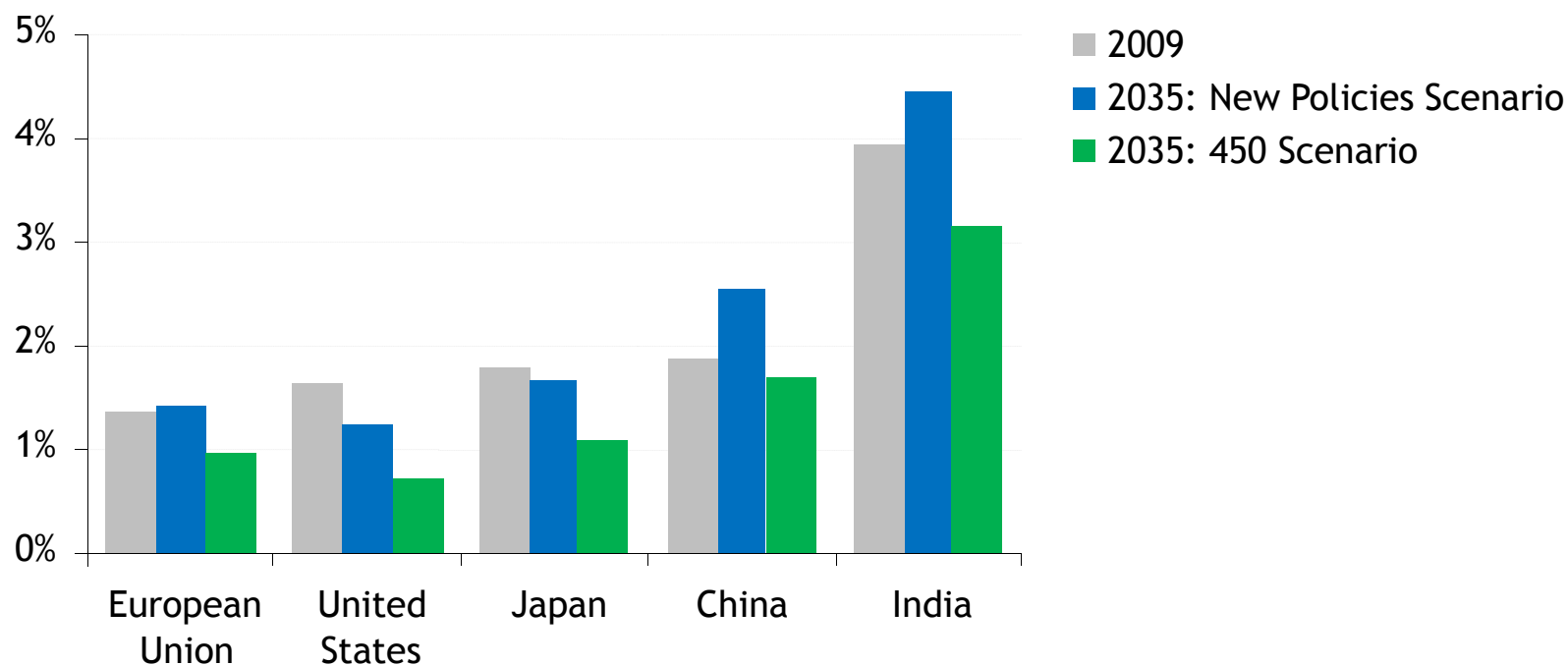
Oil demand in the 450 Scenario



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

Combating climate change will bring economic benefits as well as costs

Oil-import bills as share of GDP in selected countries



In the 450 Scenario, annual spending on oil imports in 2035 by the five largest importers is around \$560 billion, or one-third, lower than in the New Policies Scenario

- Recently announced policies can make a difference, but fall well short of what is needed for a secure & sustainable energy future
- Lack of ambition in Copenhagen has increased the cost of achieving the 2°C goal & made it less likely to happen
 - > *Unless commitments are fully implemented by 2020, it will be all but impossible to achieve the goal*
- The age of cheap oil is over, though policy action could bring lower international prices than would otherwise be the case
- Renewables are entering the mainstream, but long-term support is needed to boost their competitiveness
- Getting the prices right, by phasing-out fossil-fuel subsidies, is the single most effective measure to cut energy demand