

# *World Energy Outlook 2010*

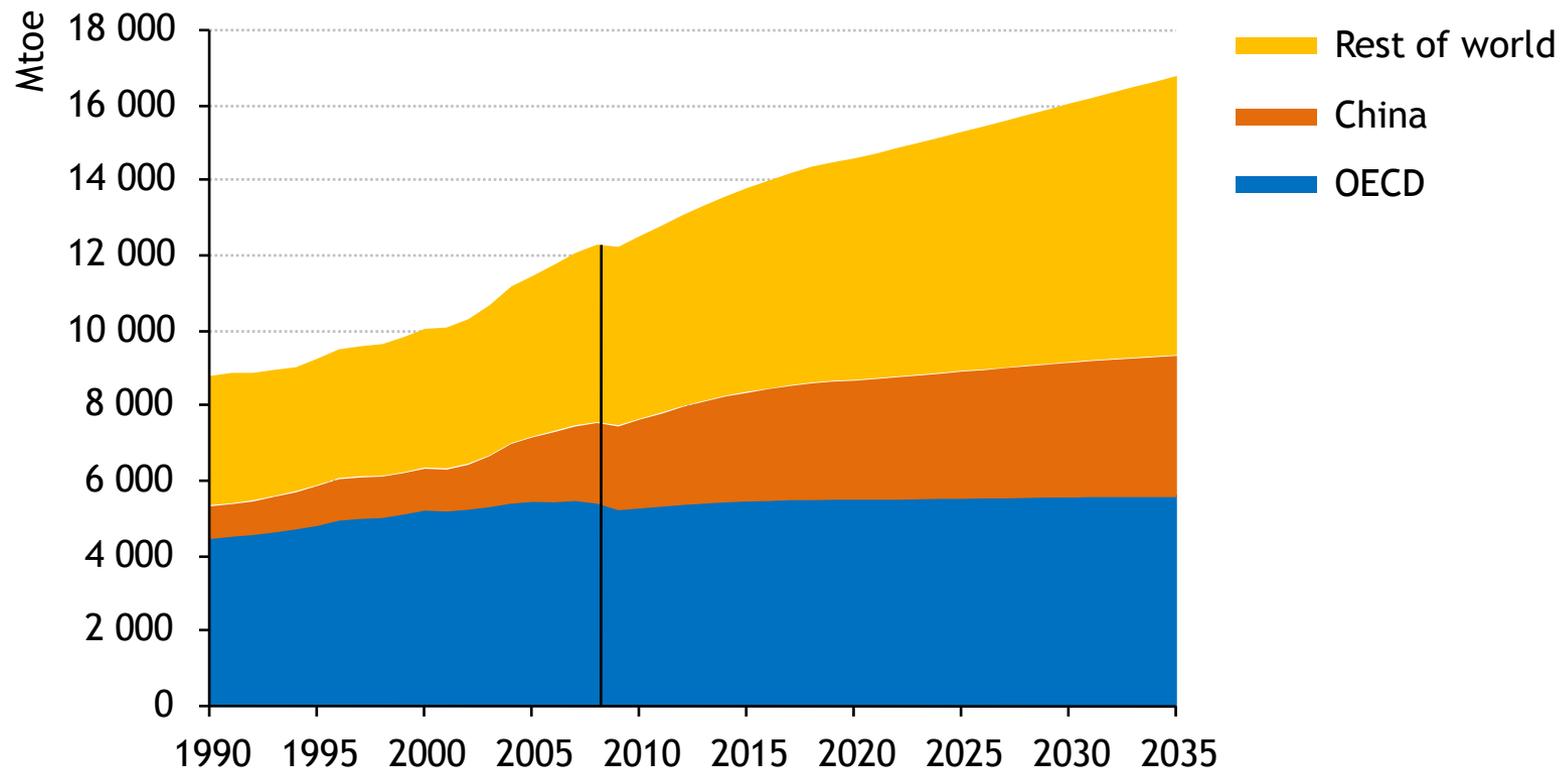
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**17 November 2010**

# 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?*

# Recent policy commitments, if implemented, would make a difference

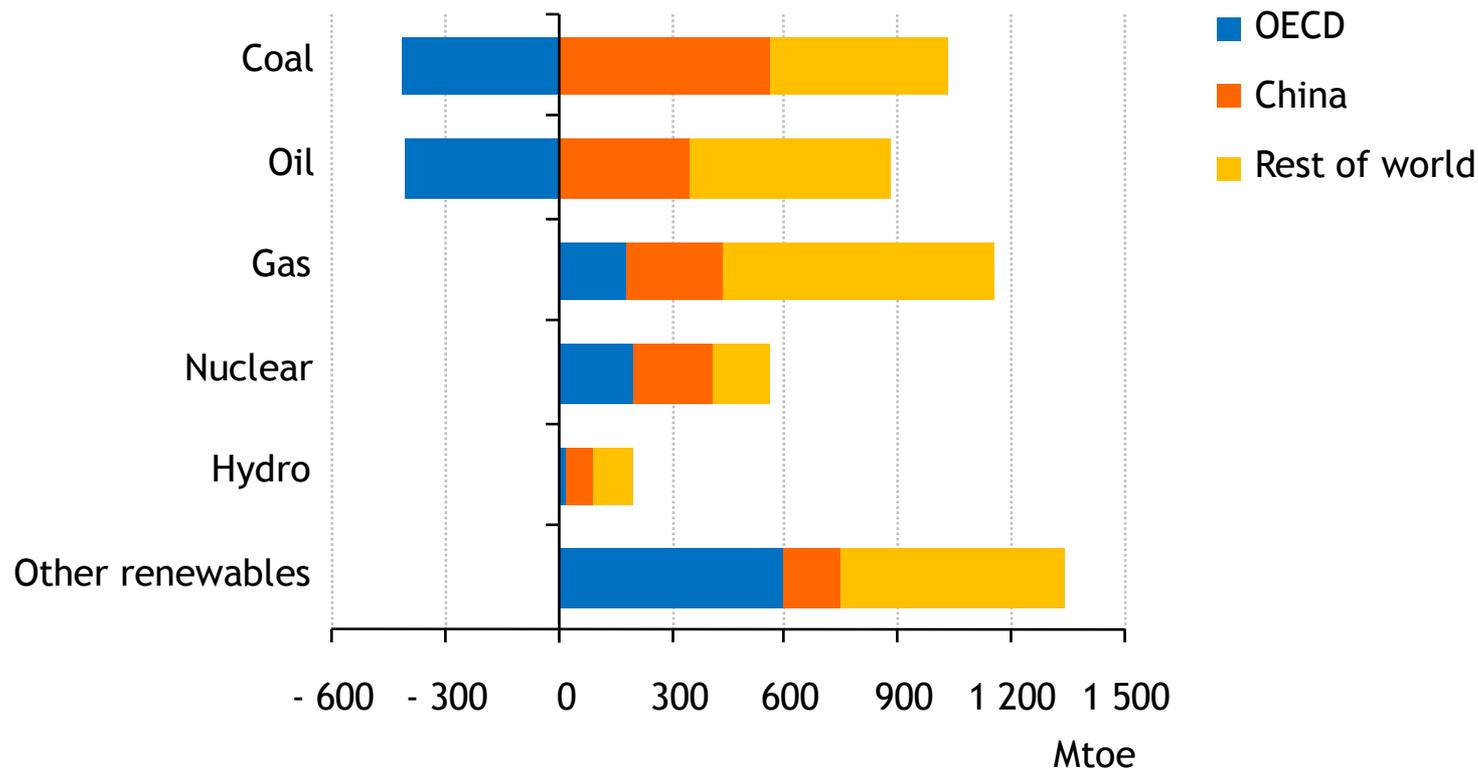
## World primary energy demand by region in the New Policies Scenario



*Global energy use grows by 36%, with non-OECD countries – led by China, where demand surges by 75% – accounting for almost all of the increase*

# Emerging economies dominate the growth in demand for all fuels

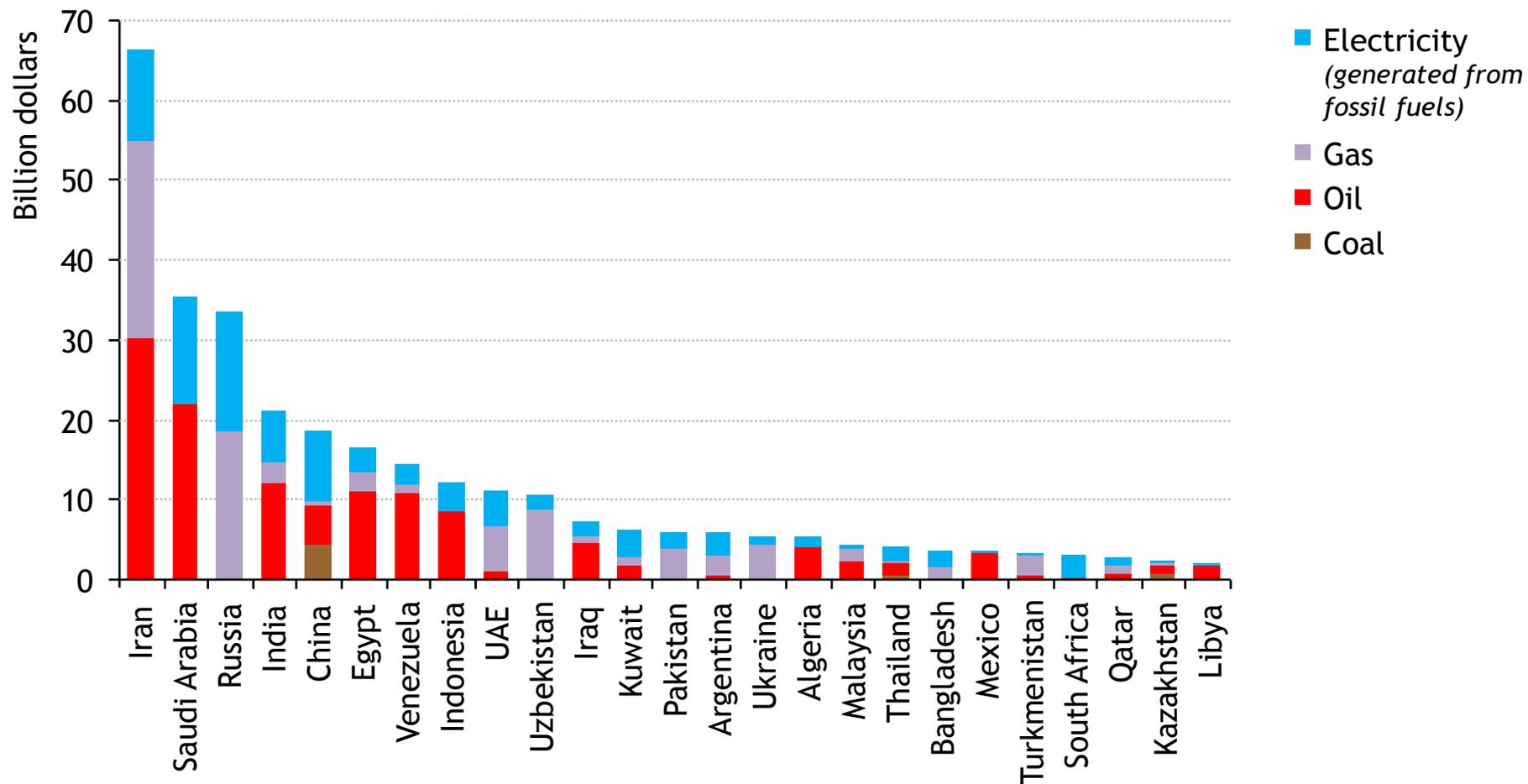
## Incremental primary energy demand in the New Policies Scenario, 2008-2035



*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

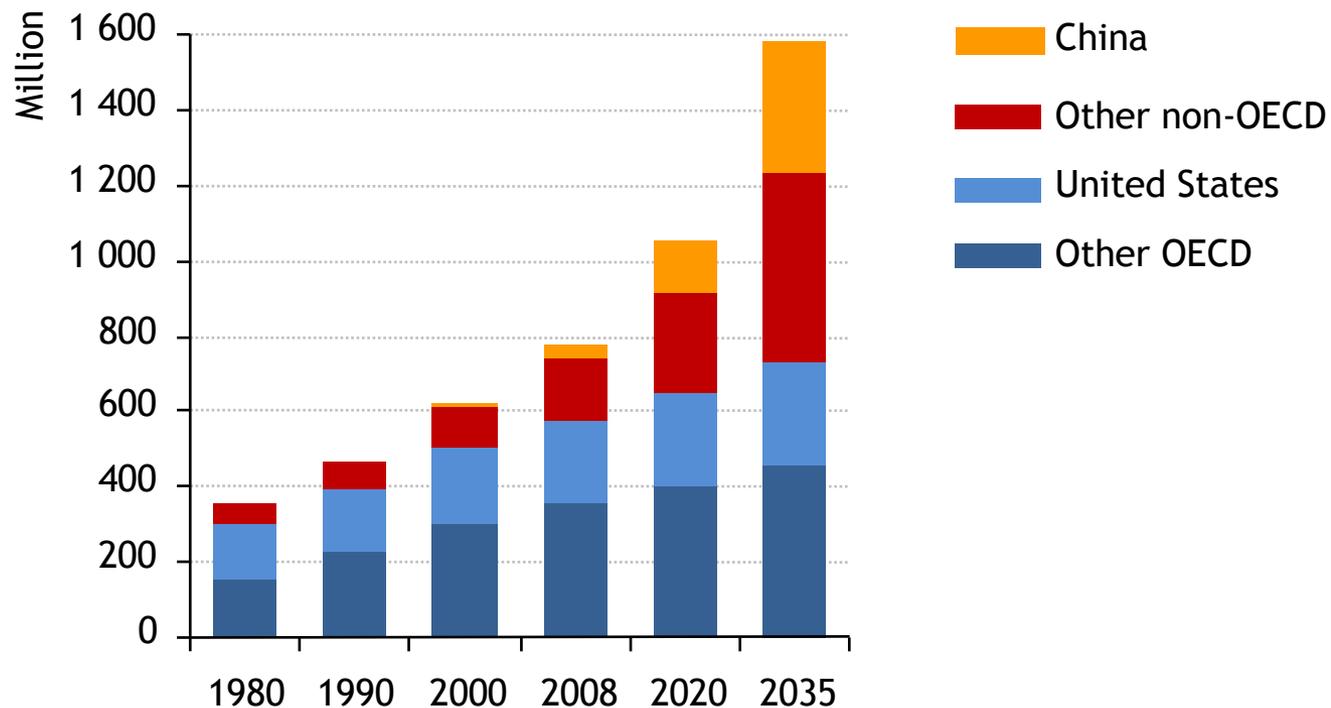
## Economic value of fossil-fuel consumption subsidies by country, 2009



**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

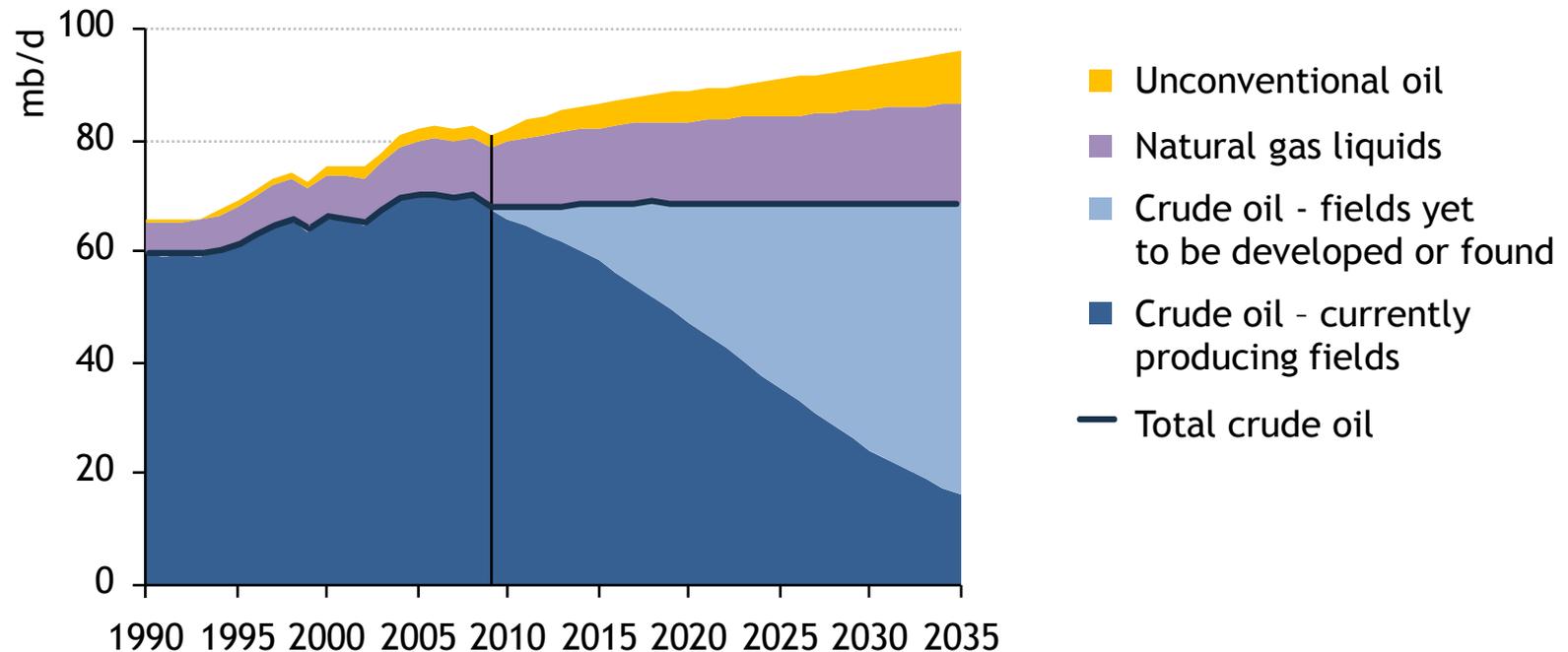
## Passenger vehicles in the New Policies Scenario



*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

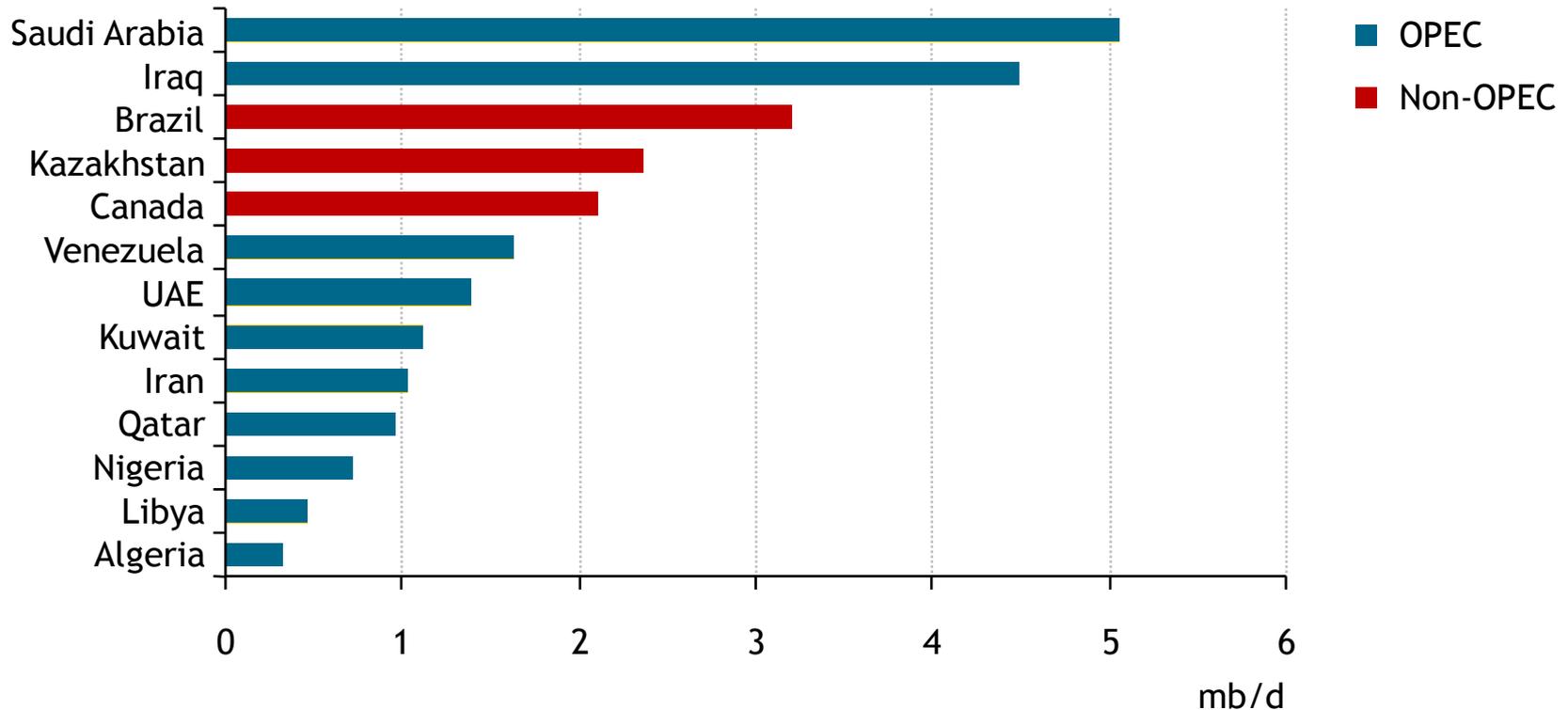
## World oil production by type in the New Policies Scenario



**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



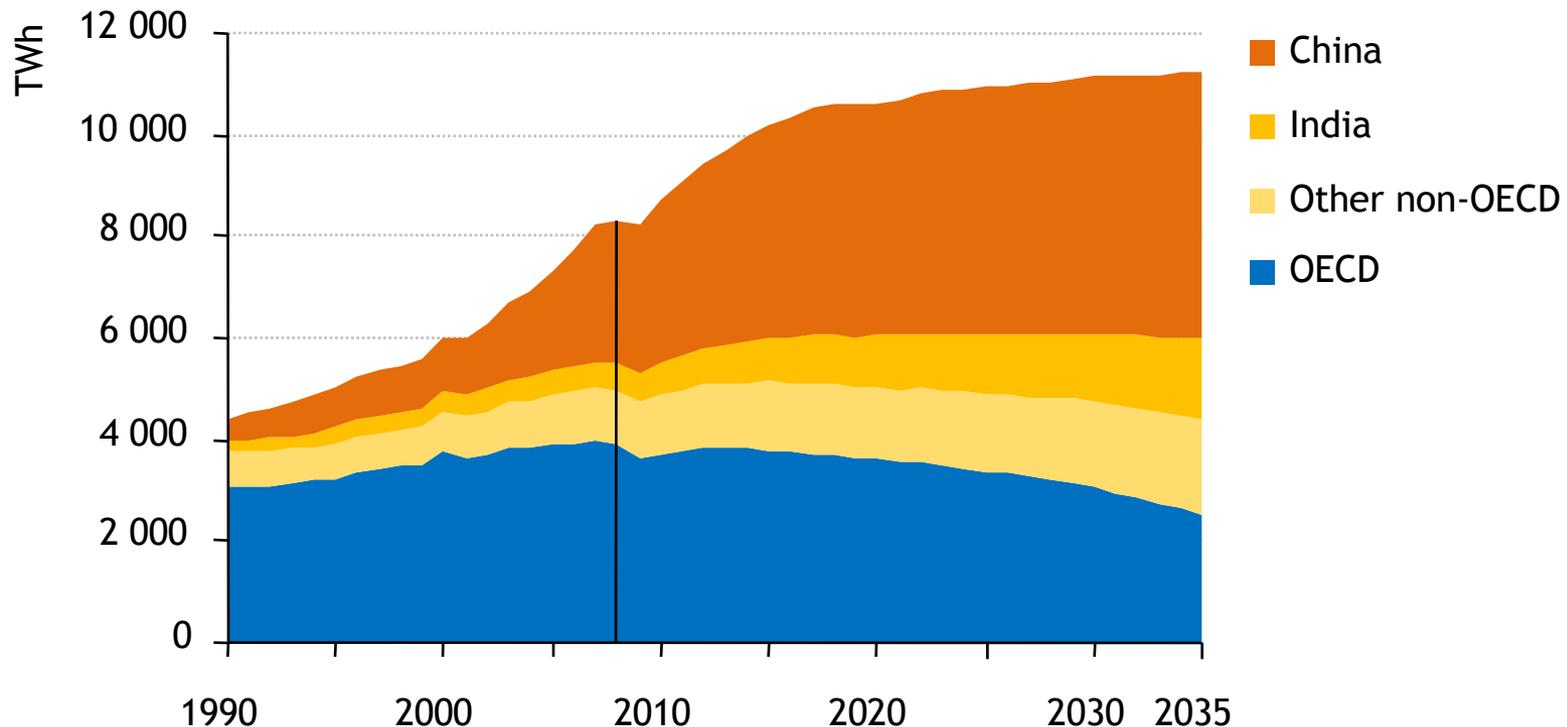
*Production rises most in Saudi Arabia & Iraq, helping to push OPEC's market share from 41% today to 52% by 2035, a level last seen prior to the first oil shock of 1973-1974*

# 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

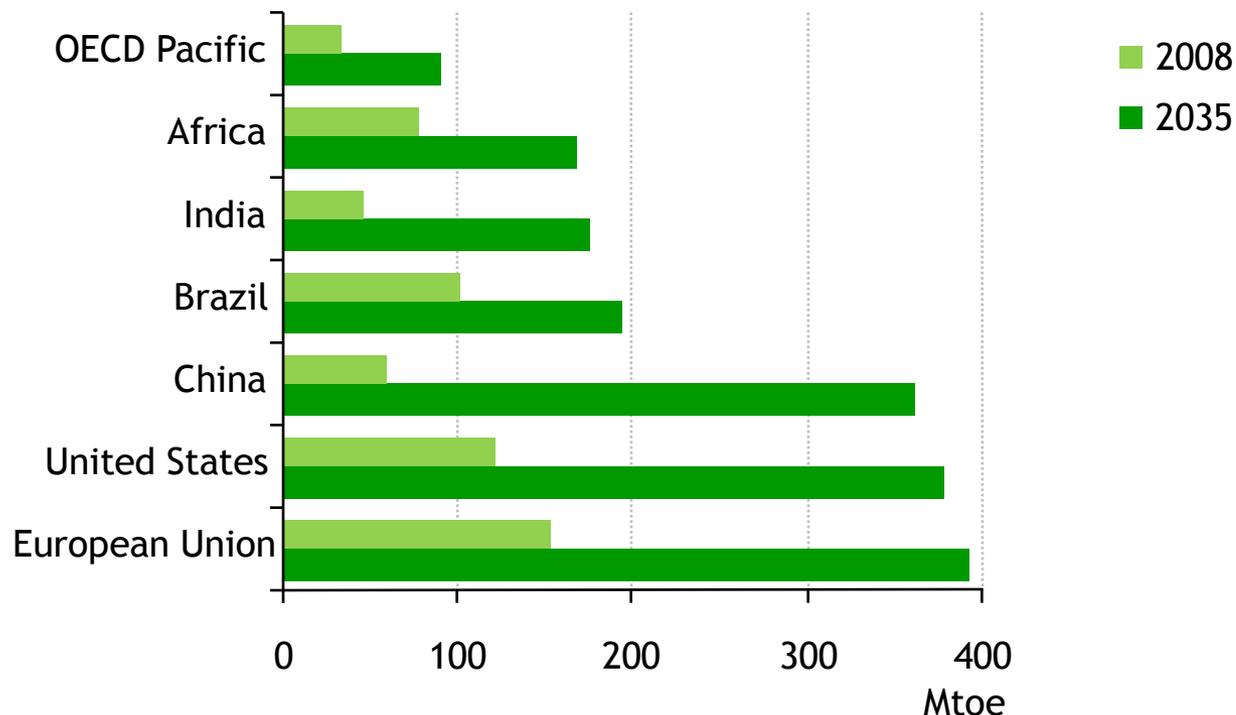
# Coal remains the backbone of global electricity generation

## 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***

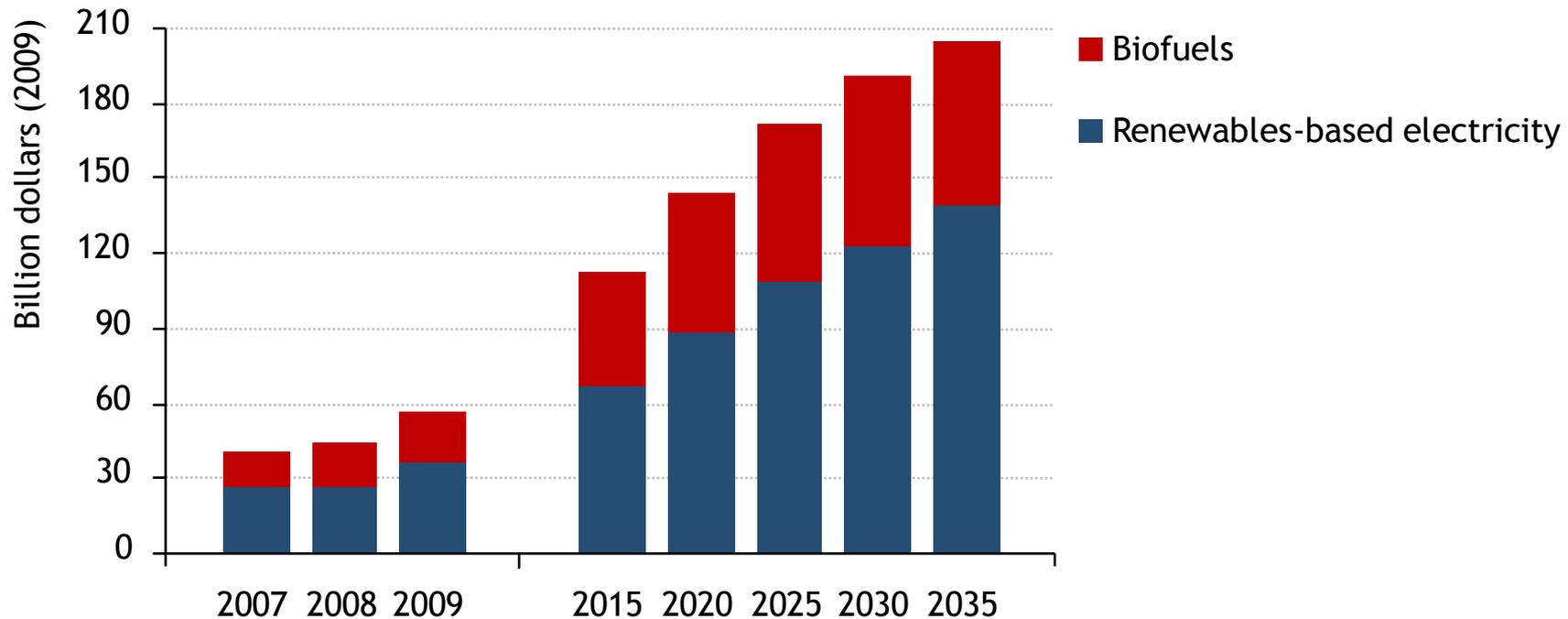
## Renewable primary energy demand in the New Policies Scenario



*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

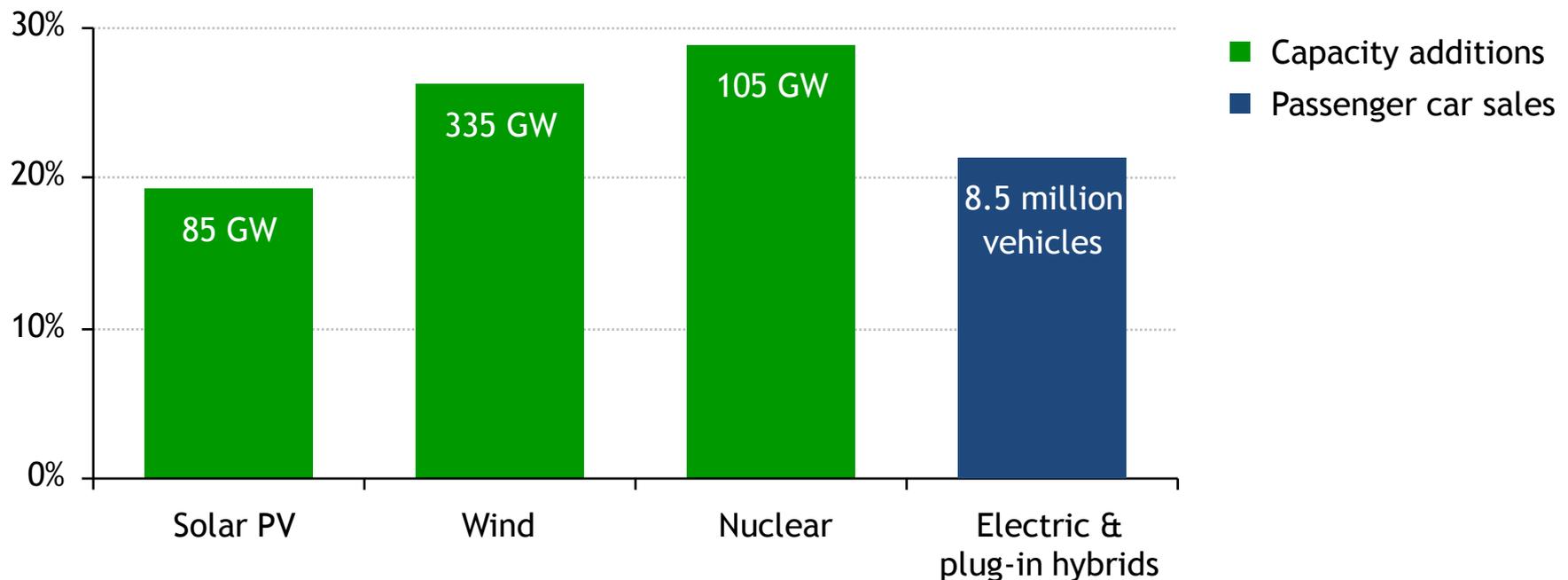
### Annual global support for renewables in the New Policies Scenario



*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

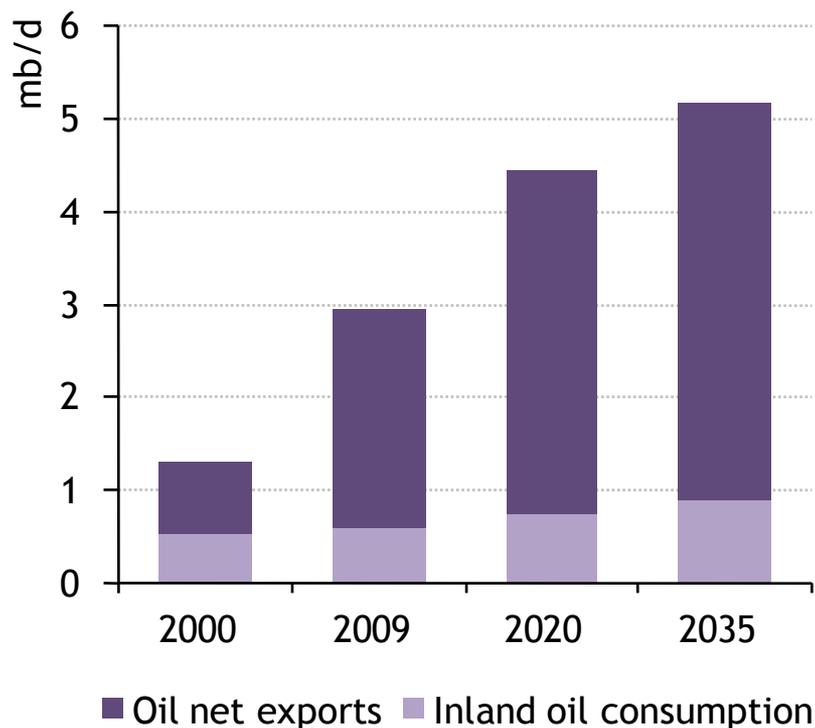
## China's share of cumulative global additions to 2035 for selected technologies



*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*

# Caspian energy riches could enhance global energy security

## Caspian oil & gas outlook in the New Policies Scenario



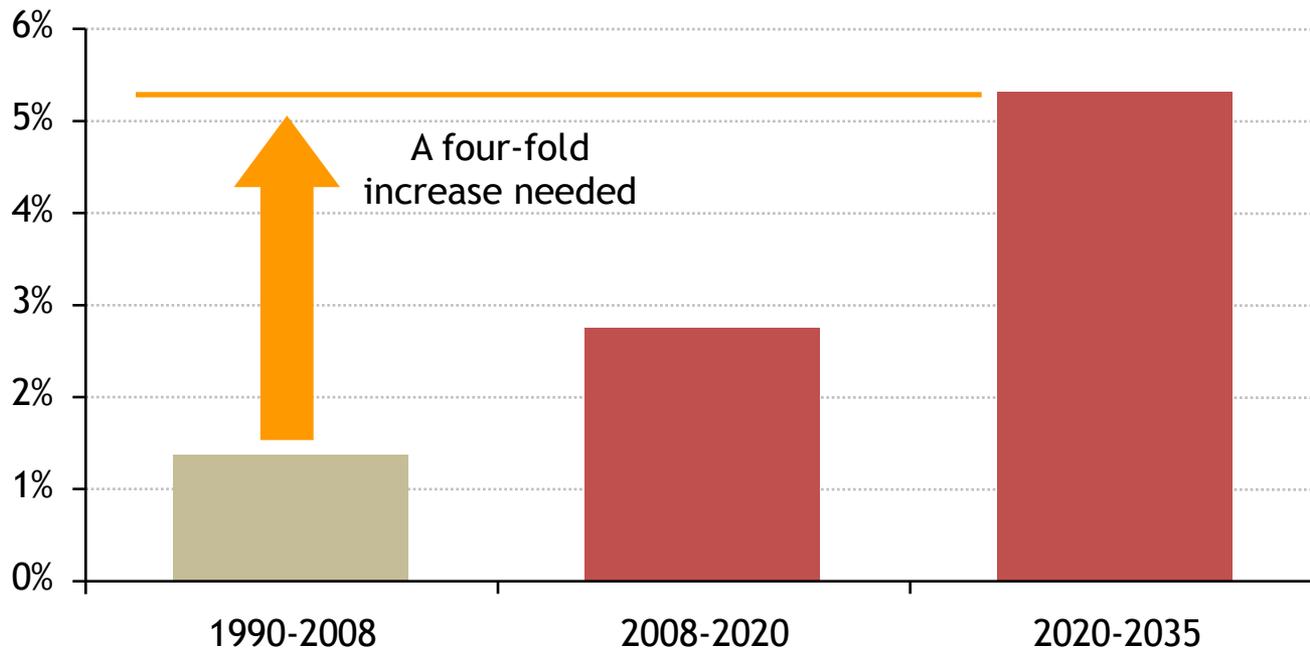
***Kazakhstan drives an increase in Caspian oil production to 5.2 mb/d by 2035, while Turkmenistan & Azerbaijan push up gas production to over 310 bcm***

# 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*

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

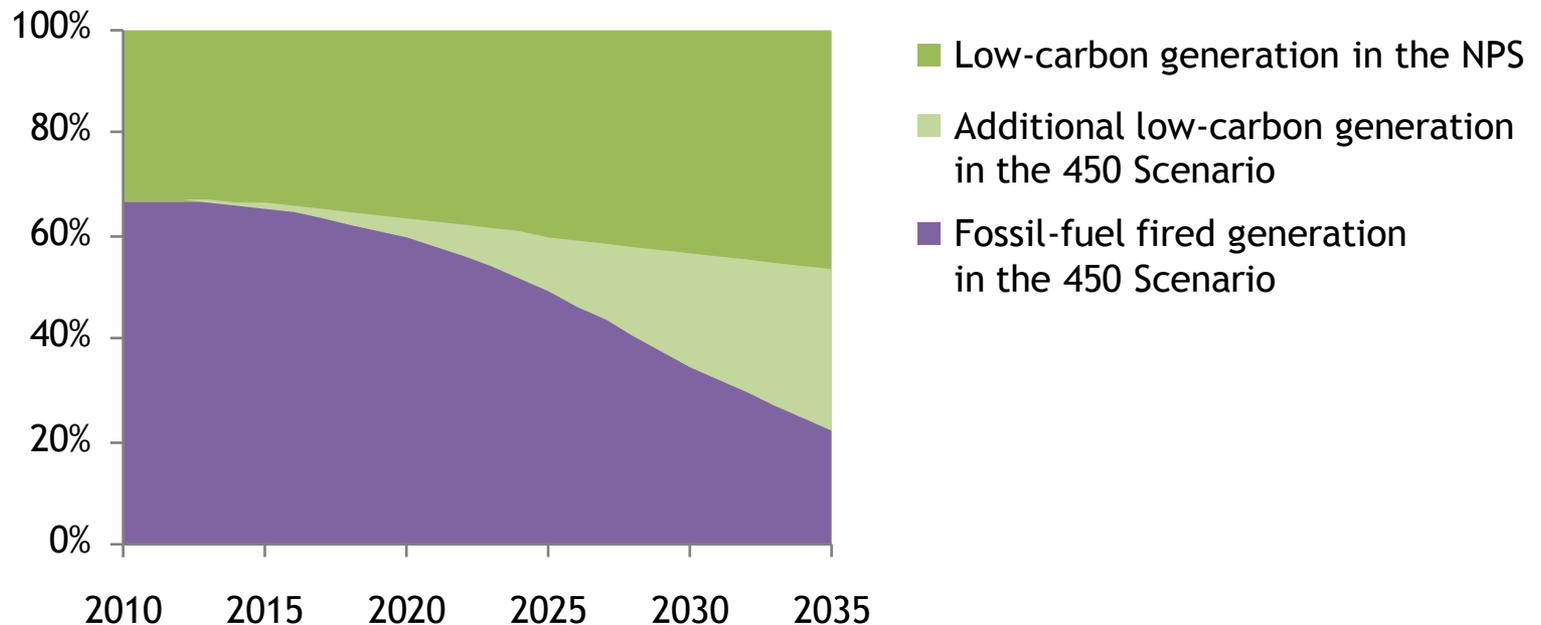
Average annual change in CO<sub>2</sub> intensity in the 450 scenario



*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*

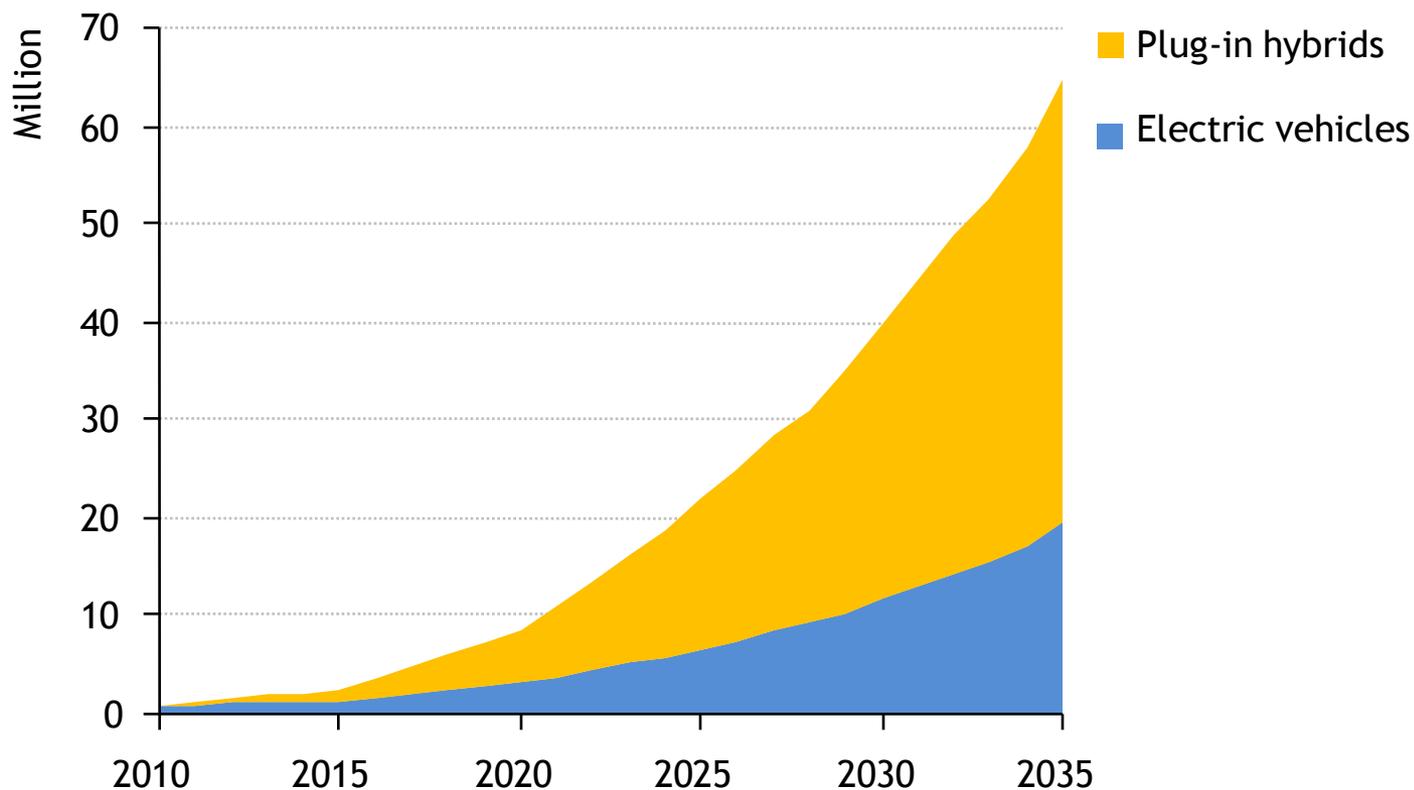
# A fundamental change is needed in power generation

## 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***

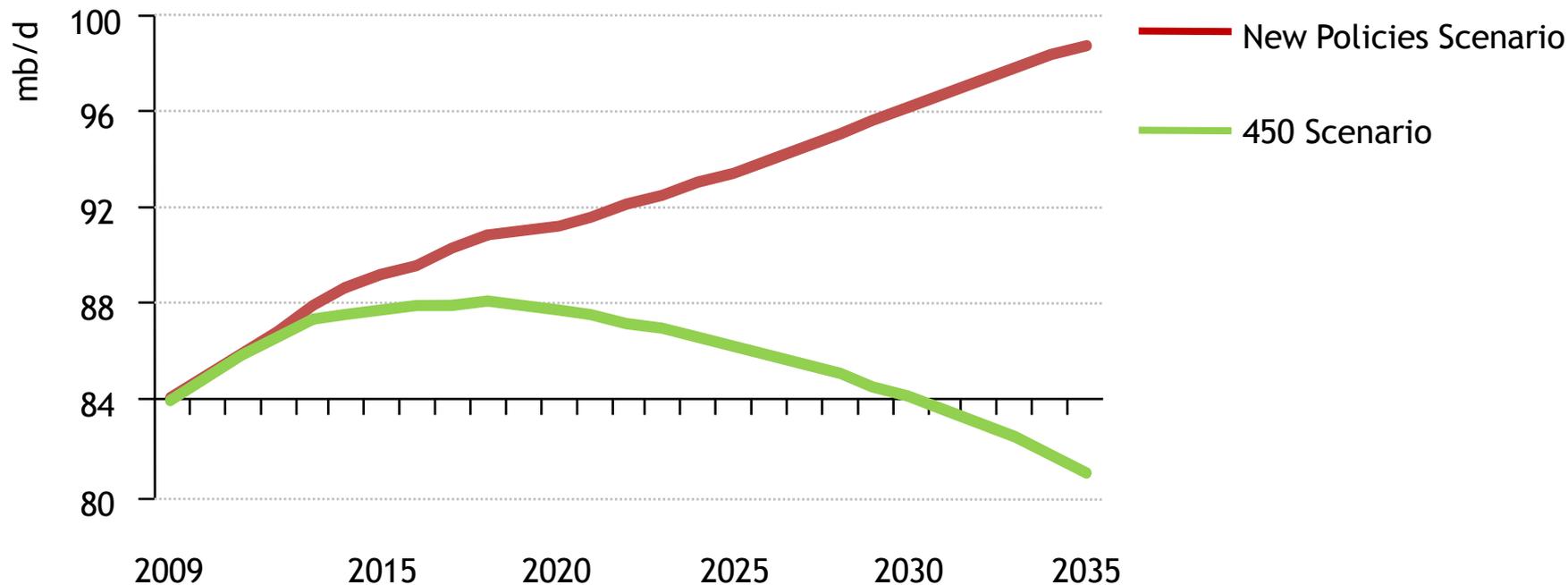
## Sales of plug-in hybrid and electric vehicles in the 450 Scenario



***Plug-in hybrids & electric vehicles reach 39% of new sales by 2035, making a big contribution to emissions abatement – China becomes the top advanced car manufacturer***

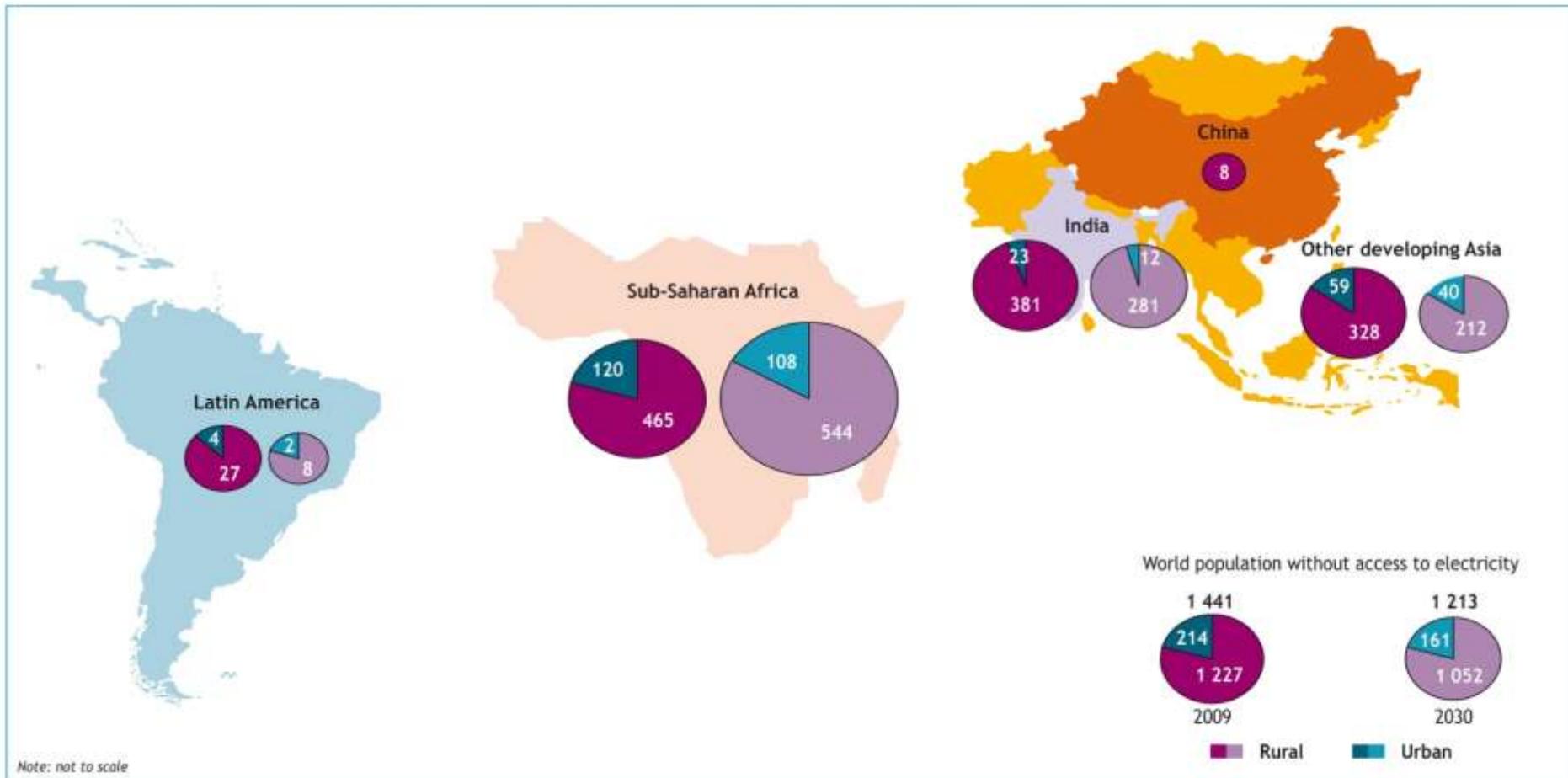
# Climate policies can improve oil security

## World oil demand by 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***

# Number of people without access to electricity (million)



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

***1.4 billion people lack access to electricity – achieving universal modern energy access requires investment of only \$36 billion per year over the next two decades***

- 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