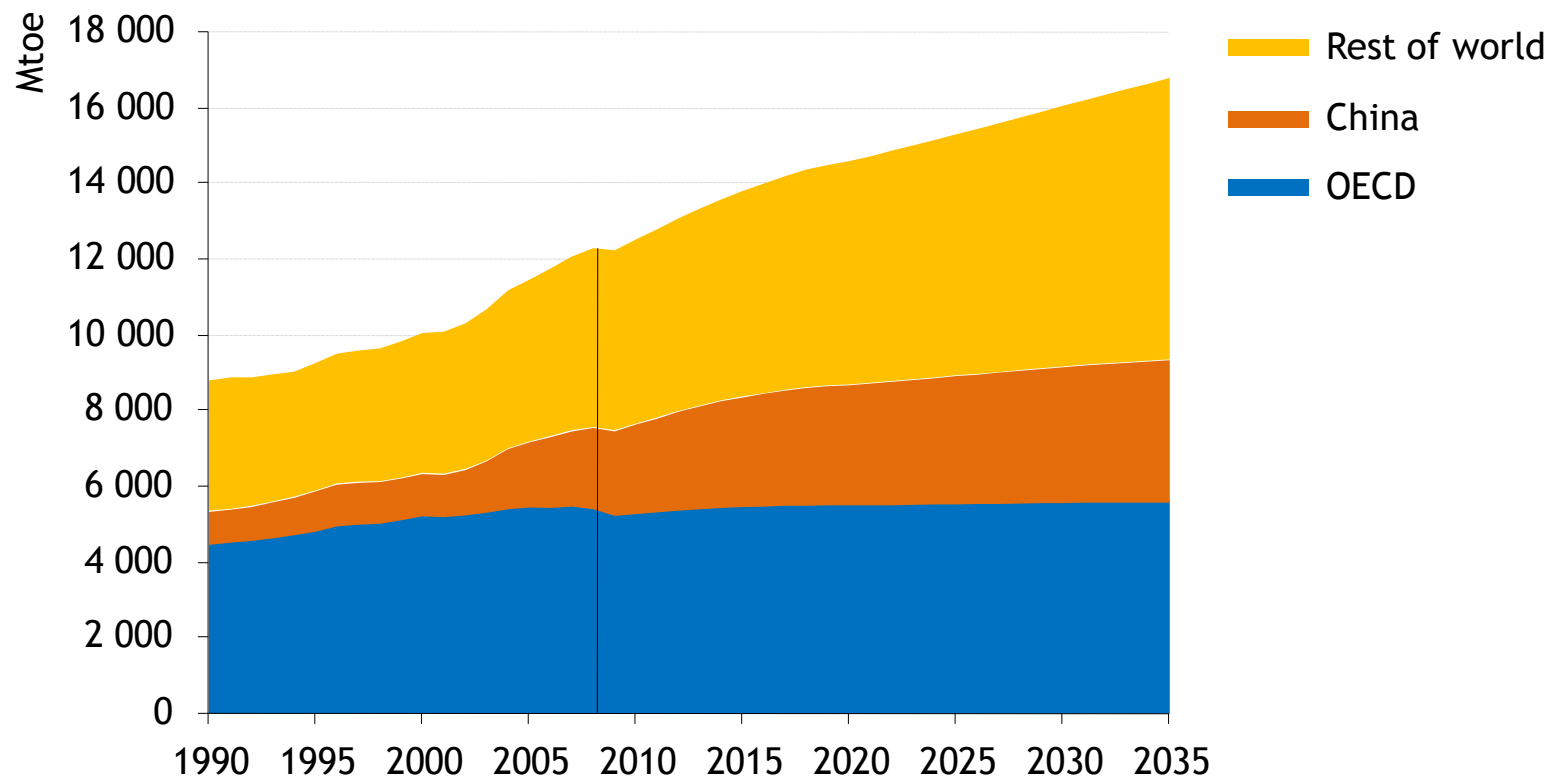


A glimpse into the energy future

Dr. Fatih Birol
IEA Chief Economist

EMA Distinguished Speaker Programme Lecture
21 June 2011

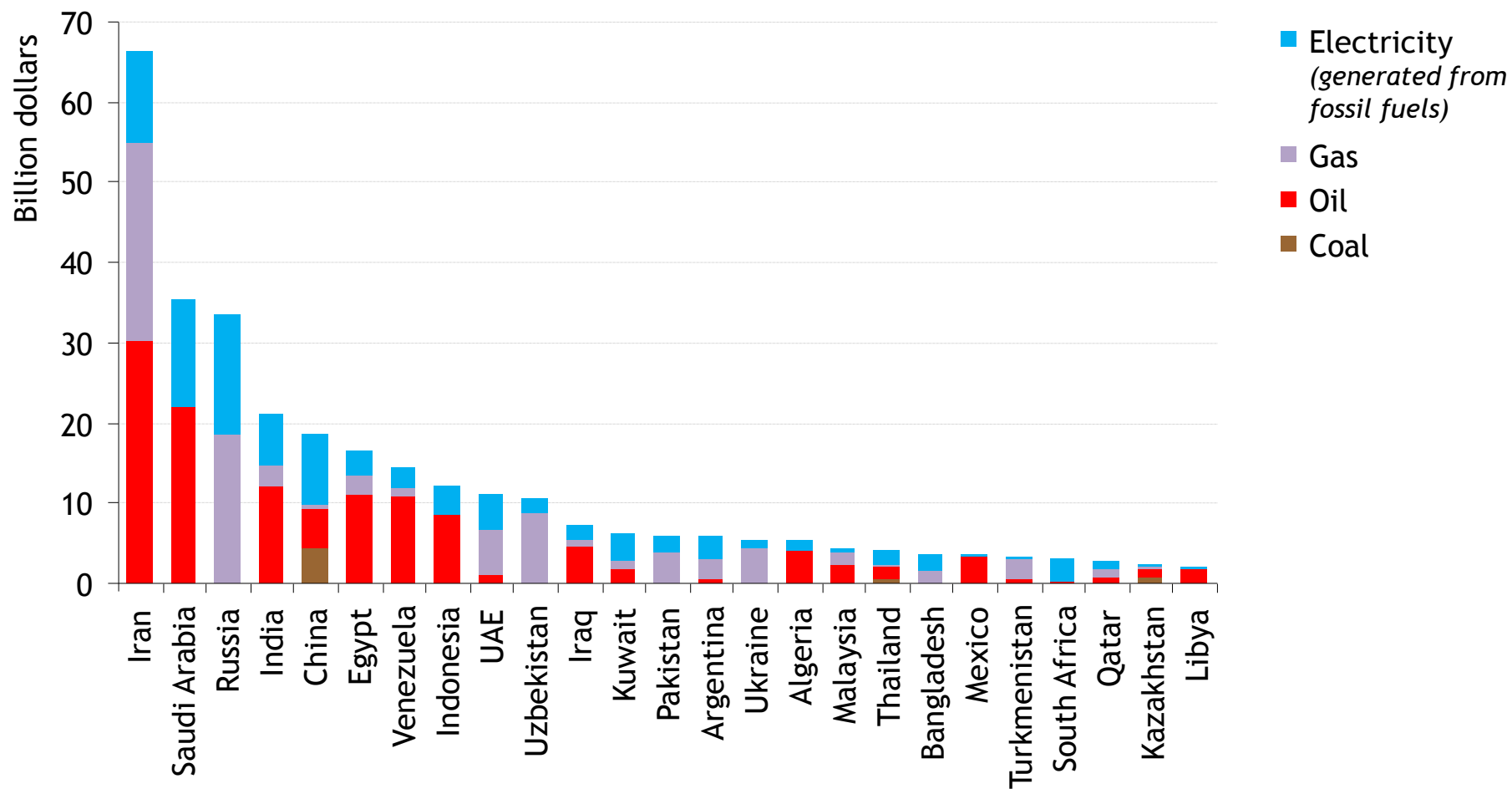
World primary energy demand by region to 2035



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

Fossil-fuel subsidies are distorting price signals

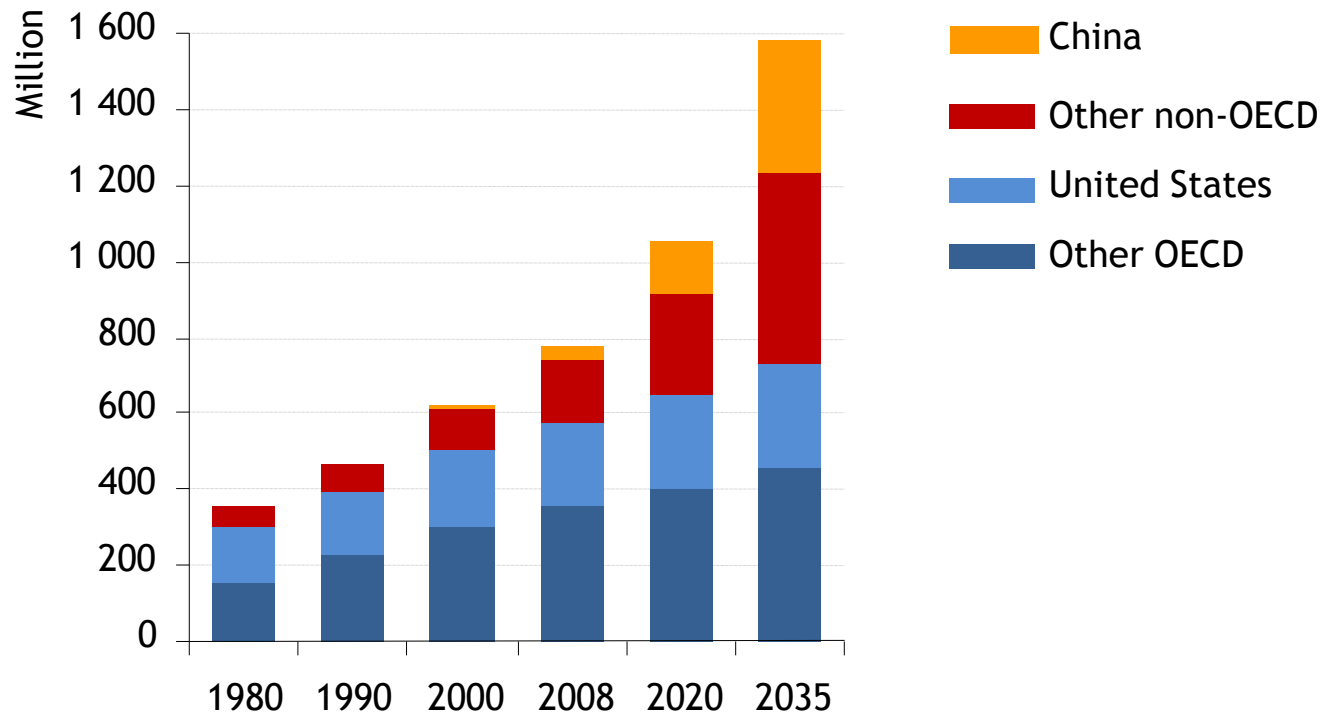
Economic value of fossil-fuel consumption subsidies by country, 2009



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

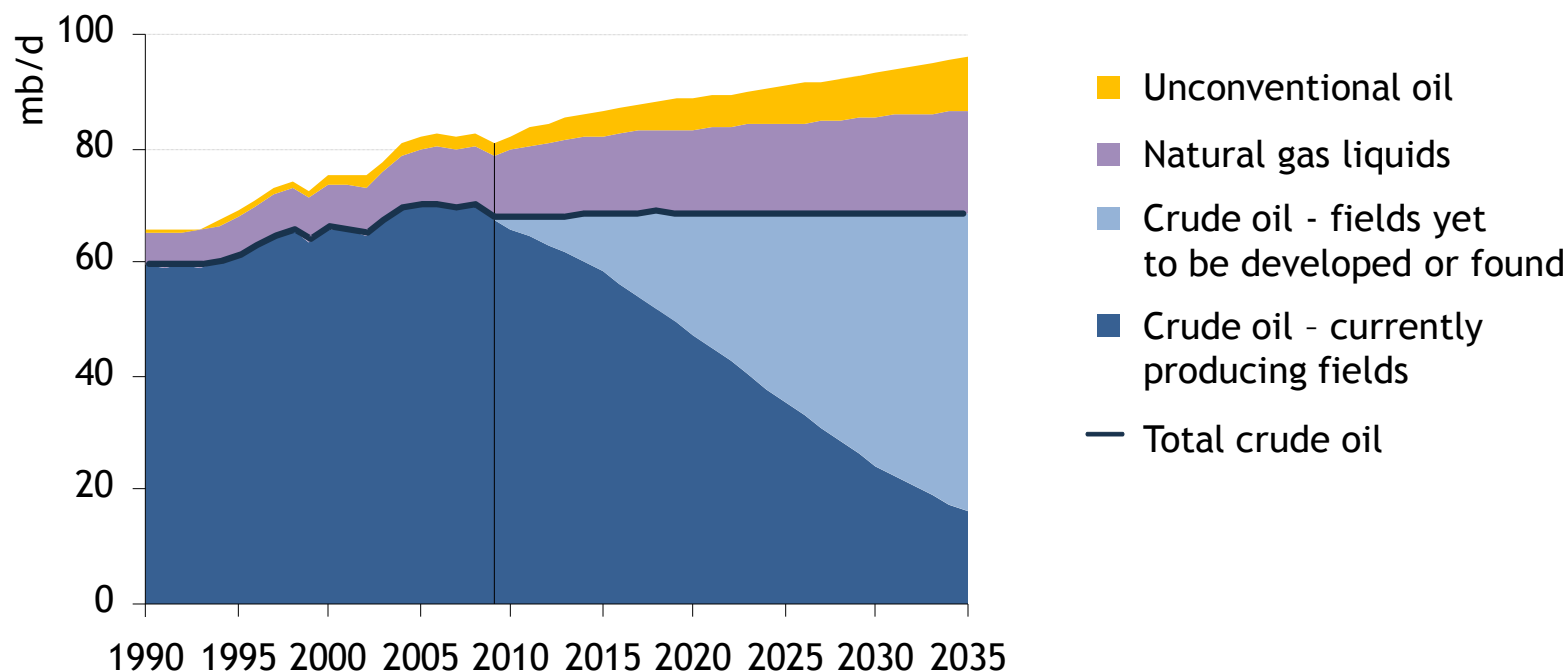
Passenger vehicles in selected regions



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

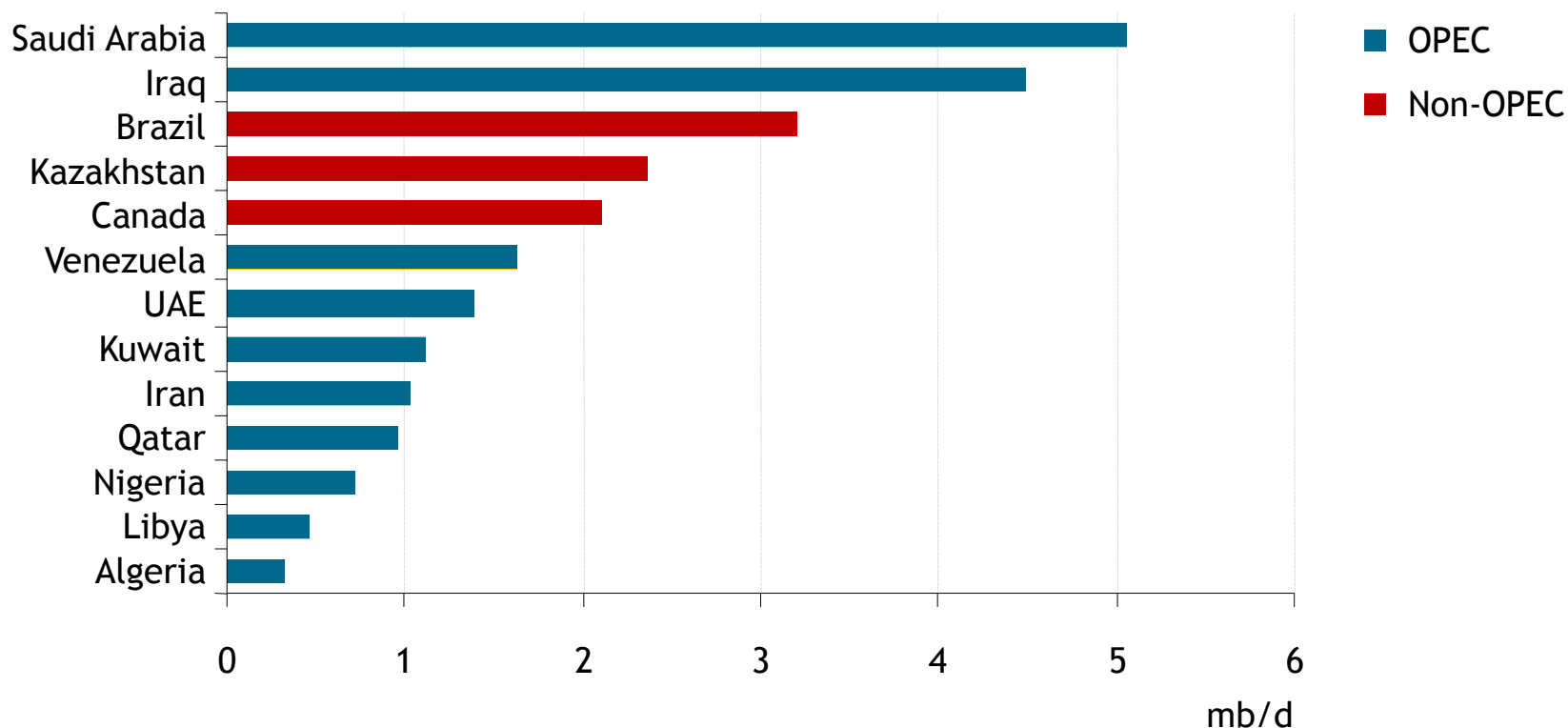
World oil production by type



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, 2009-2035



MENA region accounts for 90% of the net global increase in oil production to 2020 – if current unrest defers investment it could have implications for global energy security

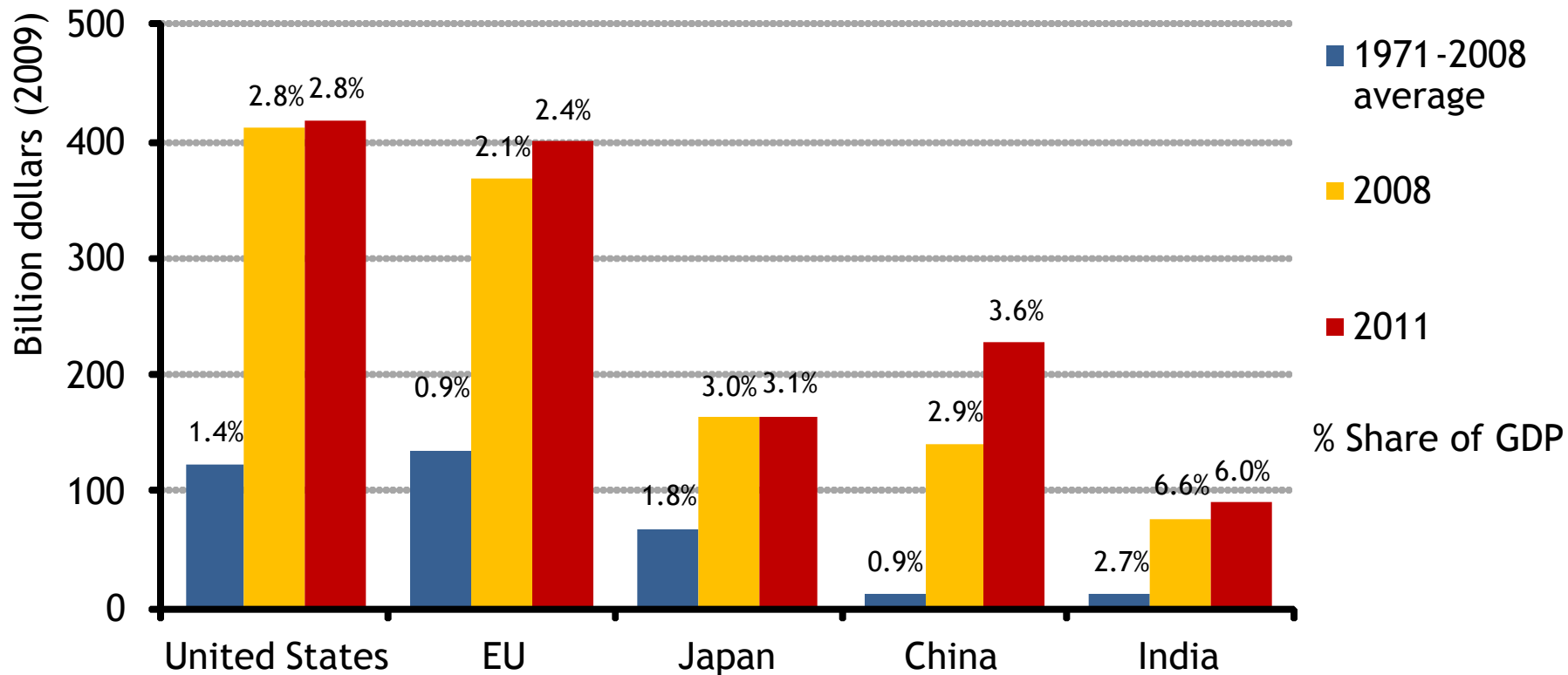
Oil prices enter the danger zone

- *Rising oil prices pose inflationary risks*
 - *Direct effect in line with weight of energy in consumer price index*
 - *Indirect effect as prices of goods & services rise to reflect higher input costs*

- *High oil prices represent a significant redistribution of wealth from oil importers to oil exporters*

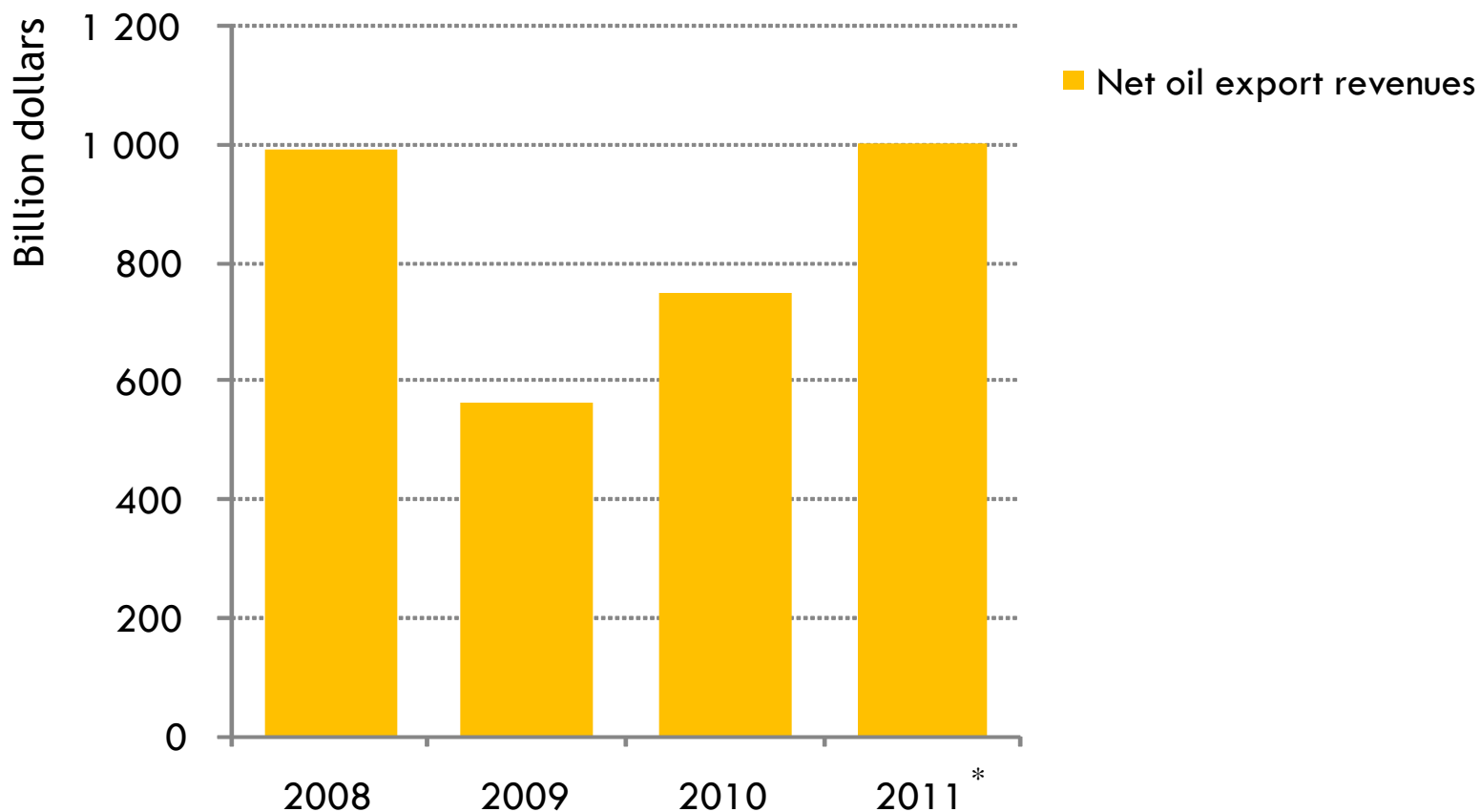
- *Impacts differ across OECD, Emerging Economies & LDCs in line with:*
 - *Oil-import dependence*
 - *Underlying economic structures & conditions*
 - *Behavioural & policy responses*

Annual expenditure on oil imports



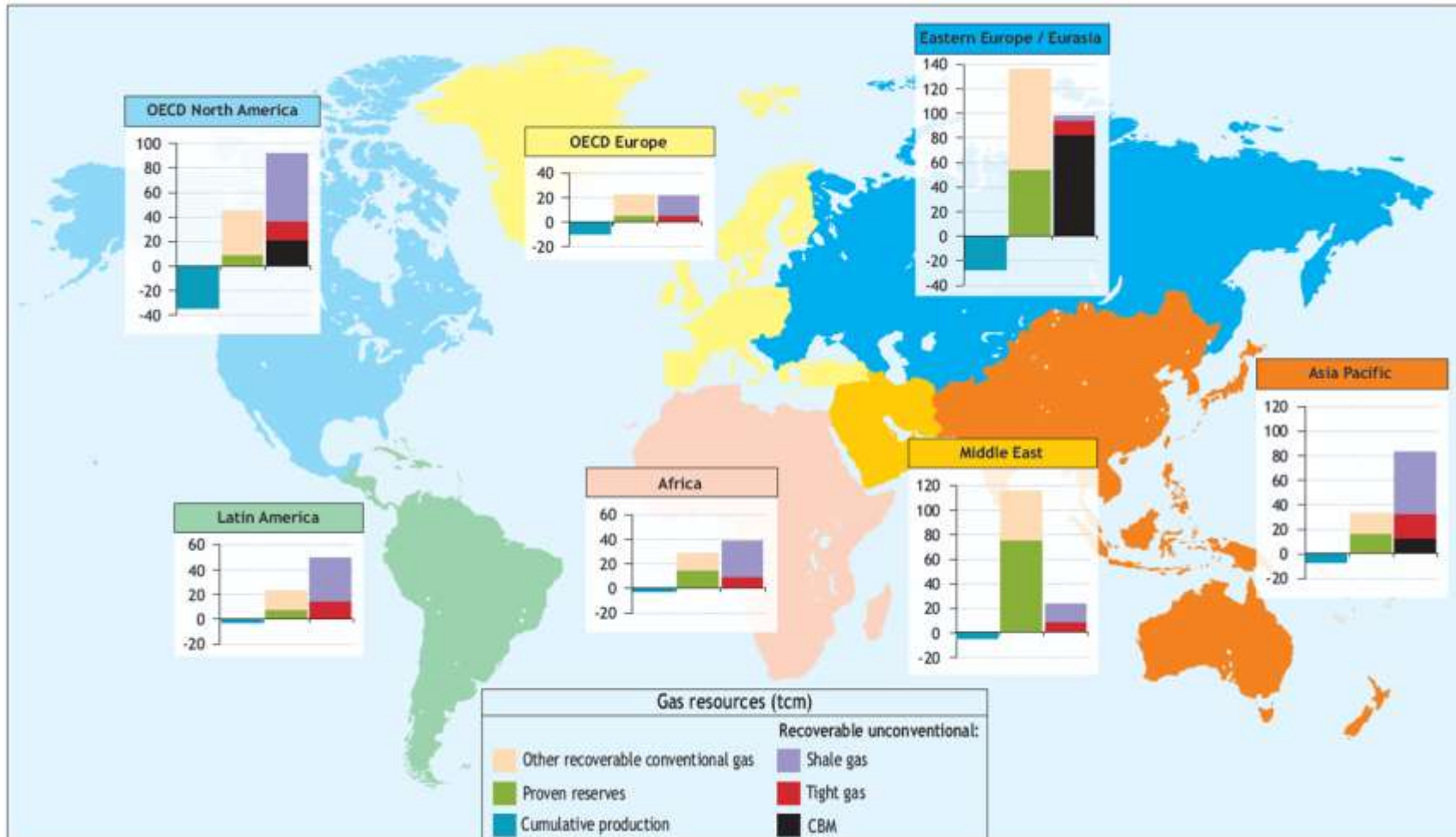
OECD spending on oil imports will be higher than 2008, if oil prices remain at current levels through 2011 – a serious risk to derail global economic recovery.

OPEC oil revenues set to top \$1 trillion



OPEC is set for export revenues of \$1 trillion if oil prices remain at current levels through 2011 – this record level would be an increase of \$240 billion on 2010

Natural gas: recoverable unconventional resources match conventional

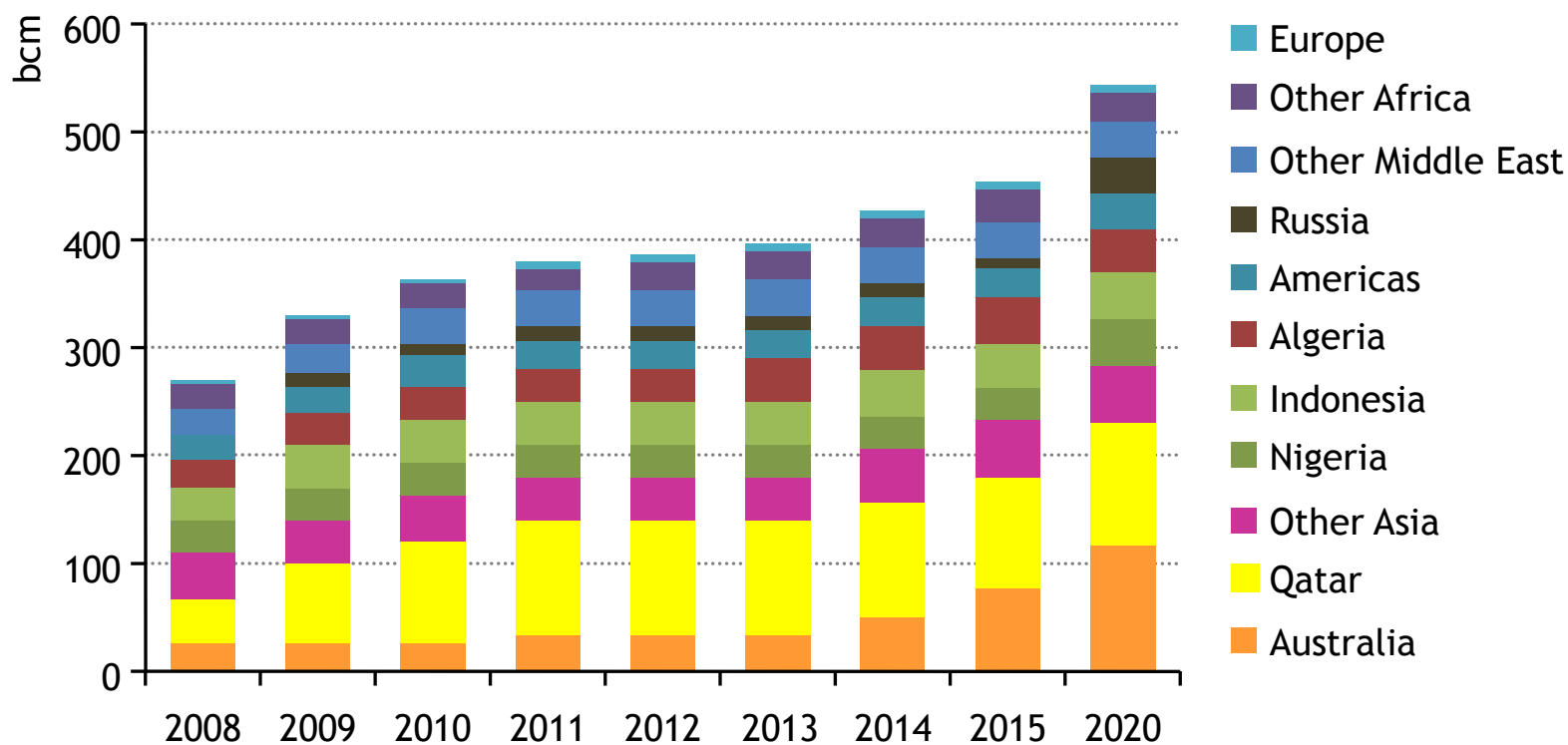


This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Natural gas can enhance security of supply: global resources exceed 250 years of current production; while in each region, resources exceed 75 years of current consumption

Growing LNG enhances supply security & market flexibility

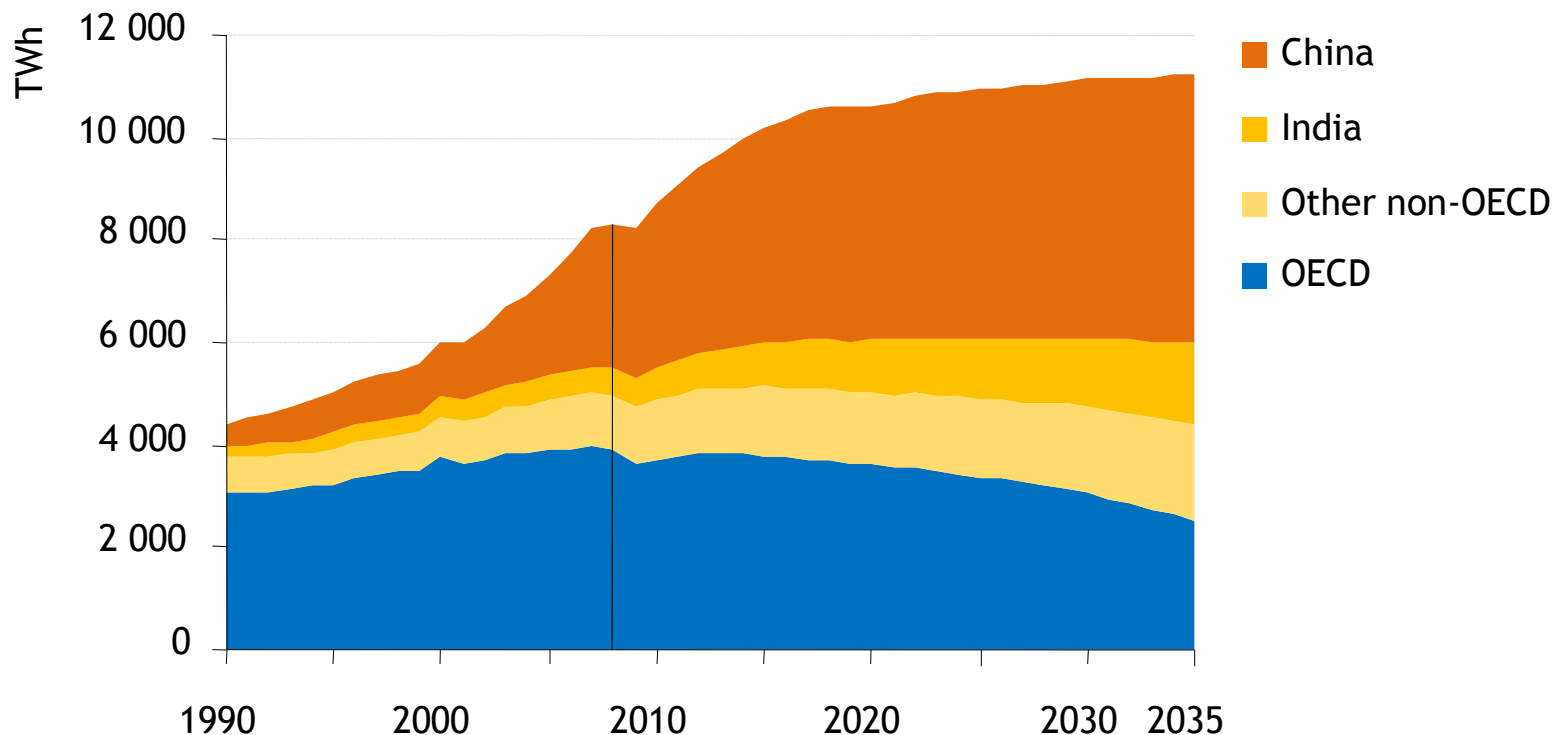
Projected LNG liquefaction capacity by country



Trade in natural gas between major regions doubles to over 1 tcm by 2035, with Australia becoming a leading LNG supplier

Coal remains the backbone of global electricity generation

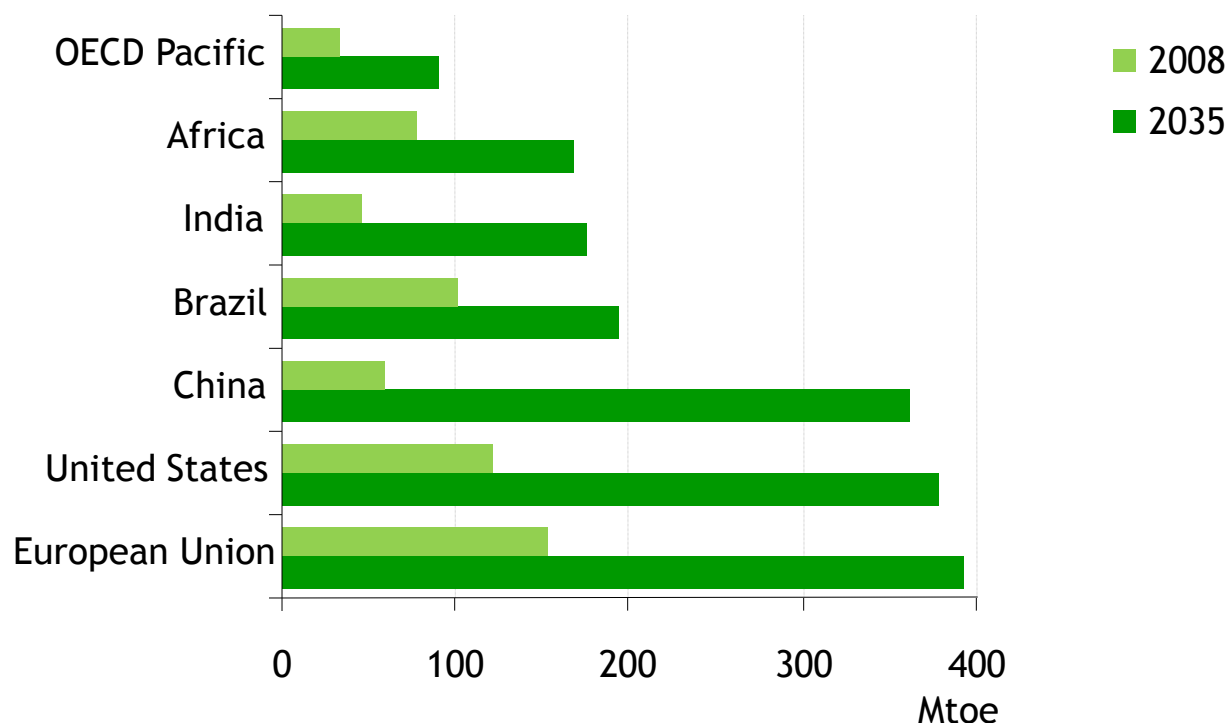
Coal-fired electricity generation by region



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....

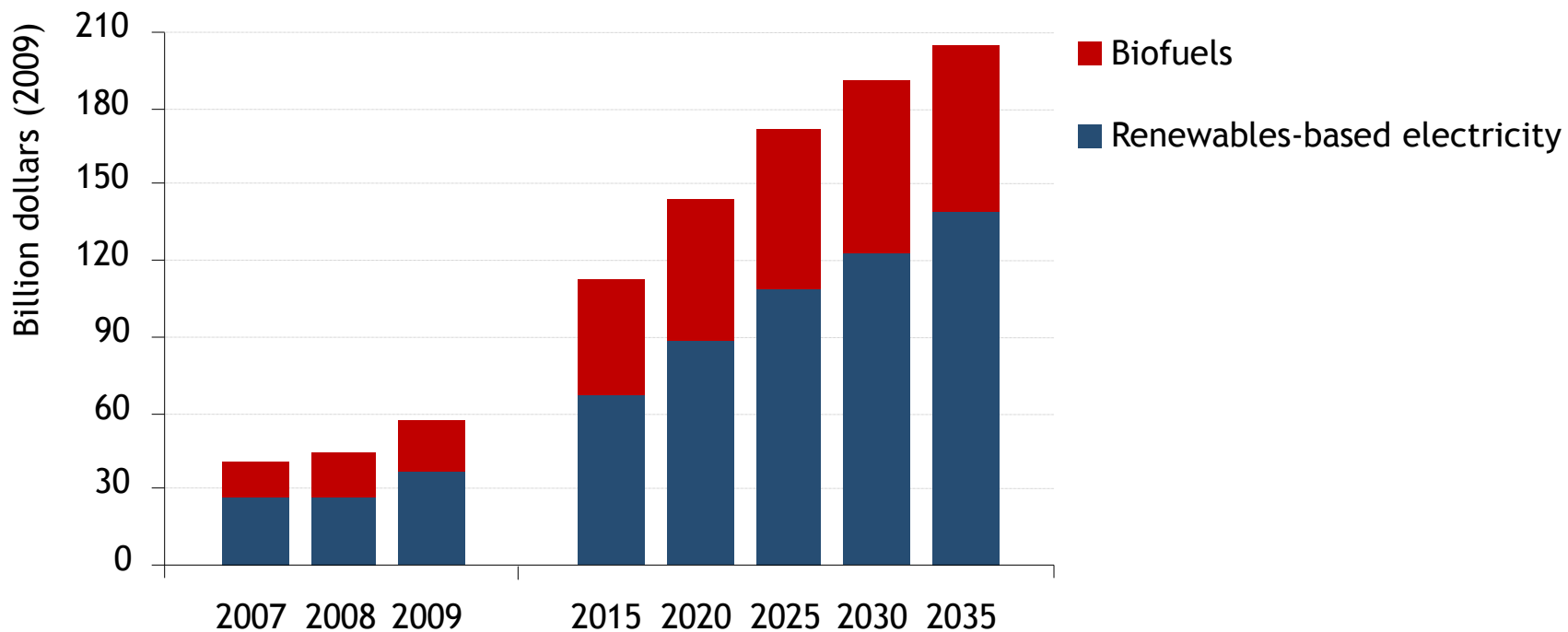
Renewable primary energy demand



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

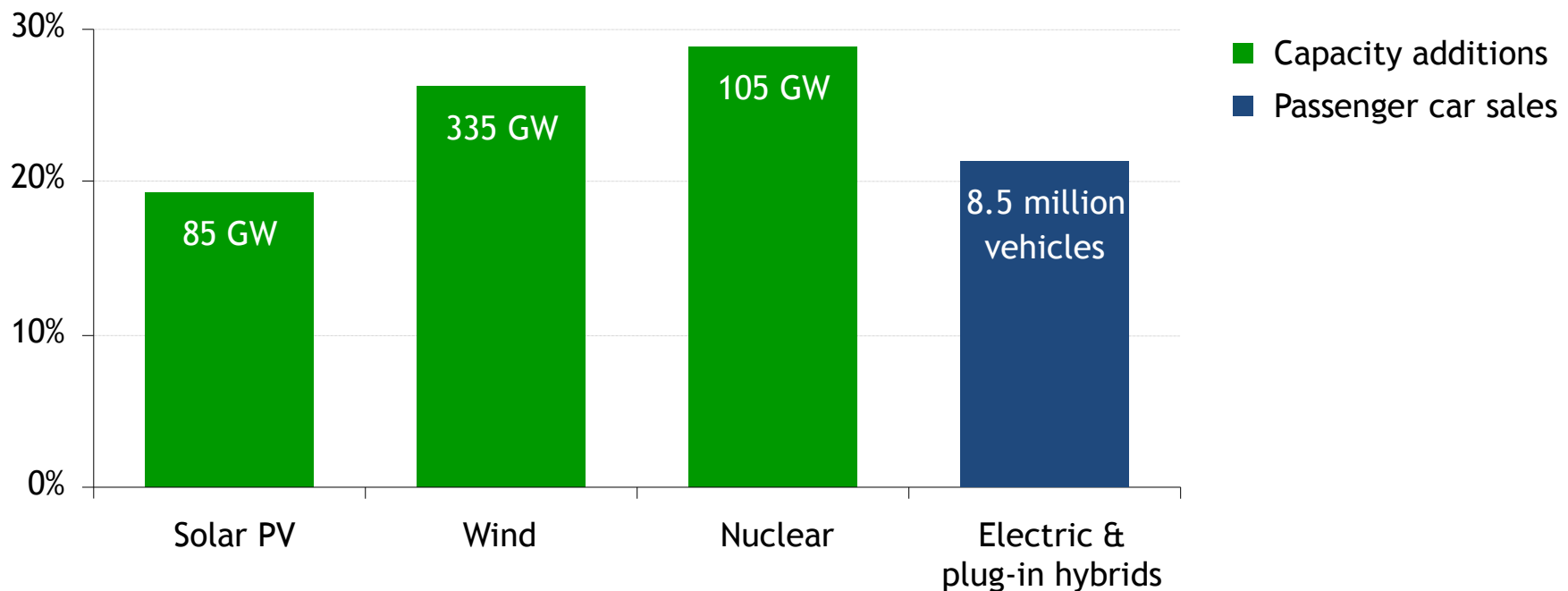
Annual global support for renewables



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



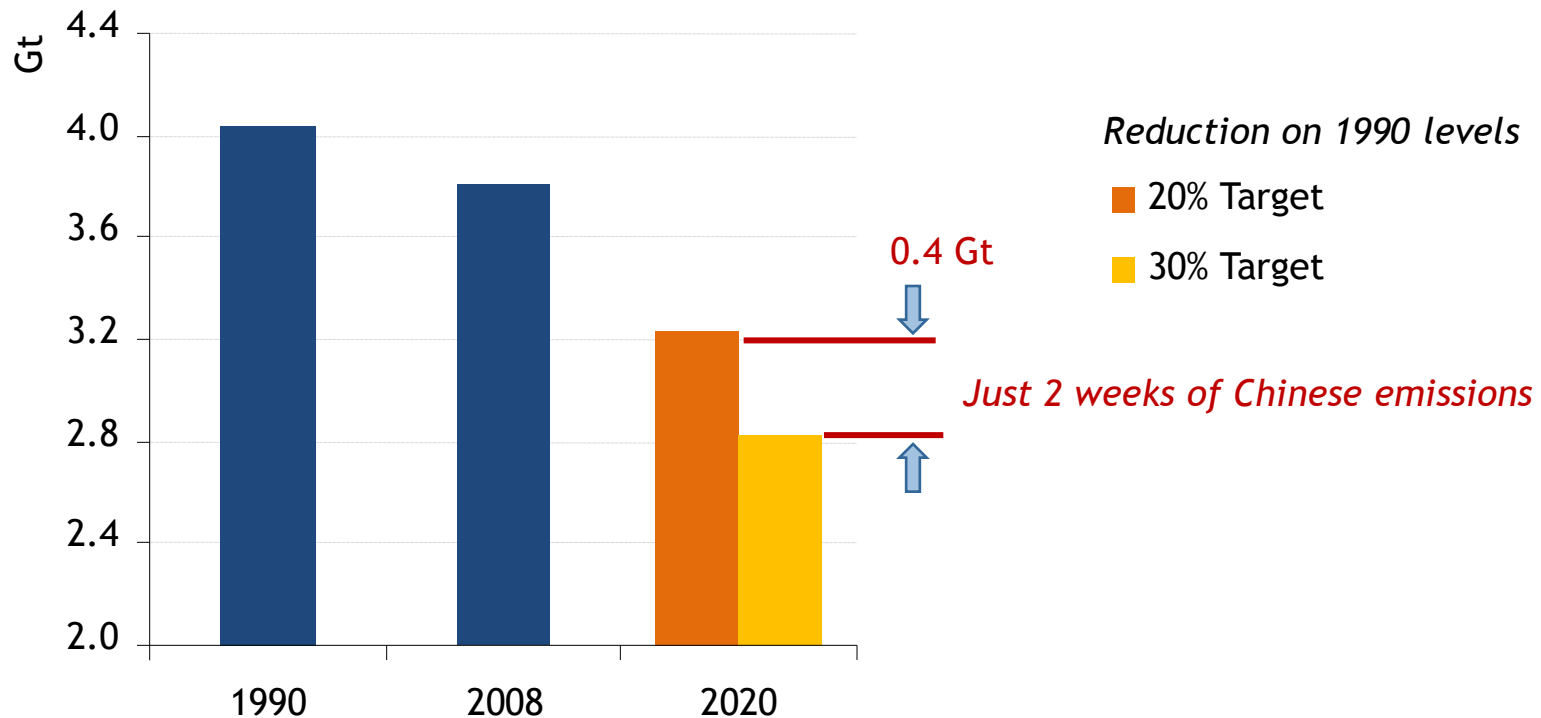
Given the sheer scale of China's market, its push to expand the role of low-carbon energy technologies is poised to play a key role in driving down costs, to the benefit of all countries

Is 2°C goal still achievable ?

- *The 2 °C Scenario assumes vigorous implementation of Copenhagen Accord/ Cancun Agreement pledges to 2020 & much stronger action thereafter*
- *Cancun Agreement commits countries to reducing emissions - a step forward from Copenhagen – but much deeper cuts are needed in 2020 to meet goal of 2 °C increase*
- *In this Scenario energy-related CO₂ emissions need to peak before 2020*
- *Given the current status quo of the international climate policy and efforts, the “door to 2 °C may be closing” soon*

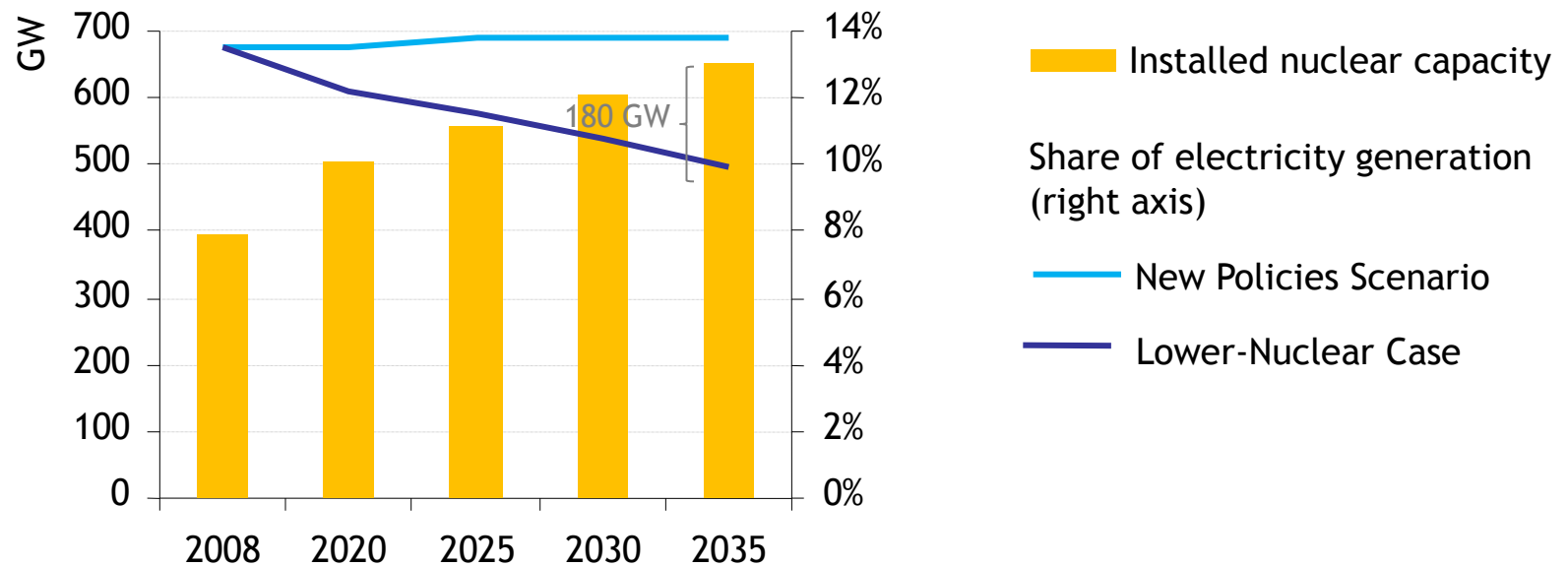
EU-27 emissions reductions targets: 20% or 30% ?

CO₂ emissions from fossil fuel combustion in the European Union



The European Union can play a key role in combating climate change, but all countries will have to take action on a large scale to reach the 2°C goal

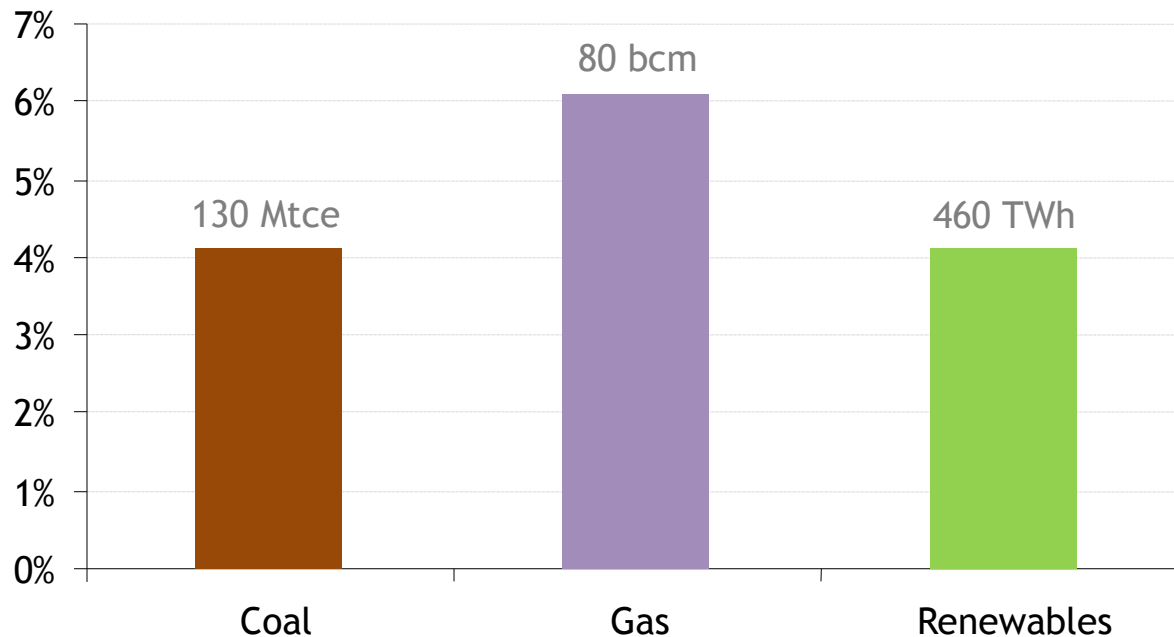
Lower-Nuclear Case: implications for electricity generation from nuclear



In the Lower-Nuclear Case, capacity additions are just half the level of the New Policies Scenario of WEO-2010, reducing nuclear's share of generation to 10% in 2035 from 14% today

Lower-Nuclear Case: implications for the fuel mix

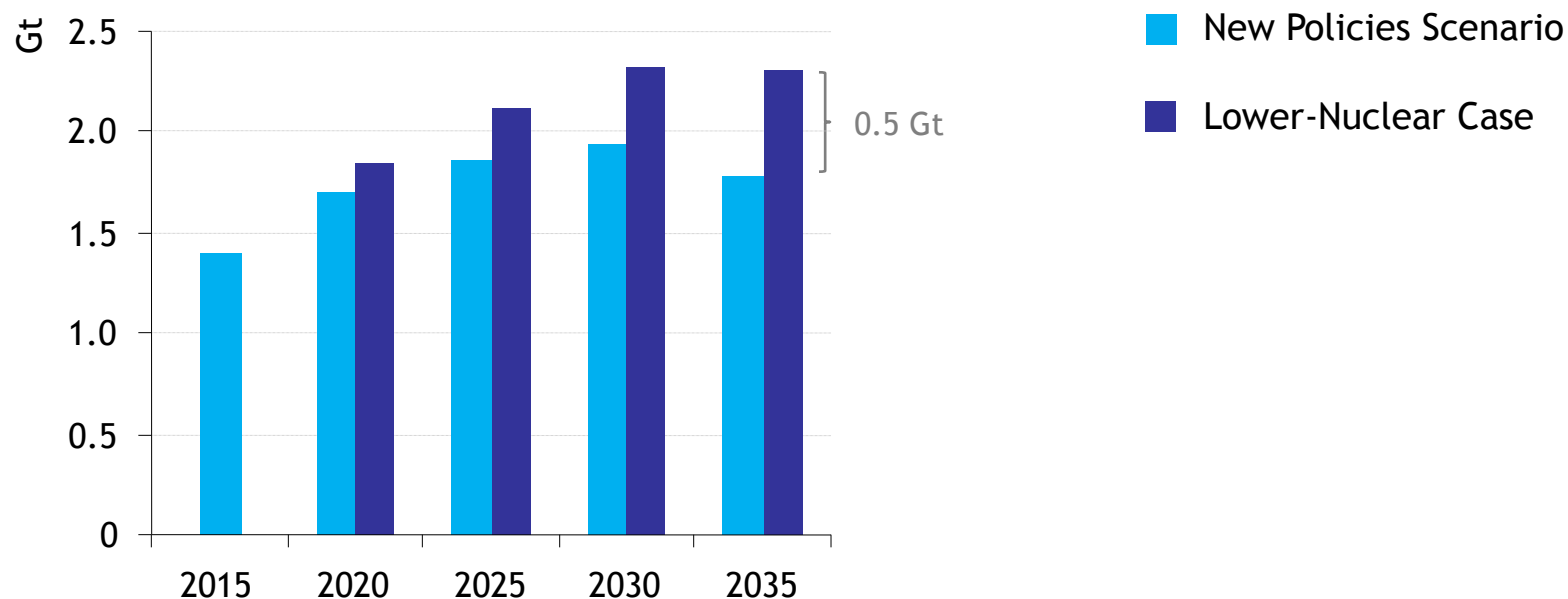
Increase of coal-, gas- and renewables-based electricity generation in 2035 compared with the New Policies Scenario



The Lower-Nuclear Case would push up demand for coal, natural gas & renewables, and have a corresponding knock-on effect on energy prices

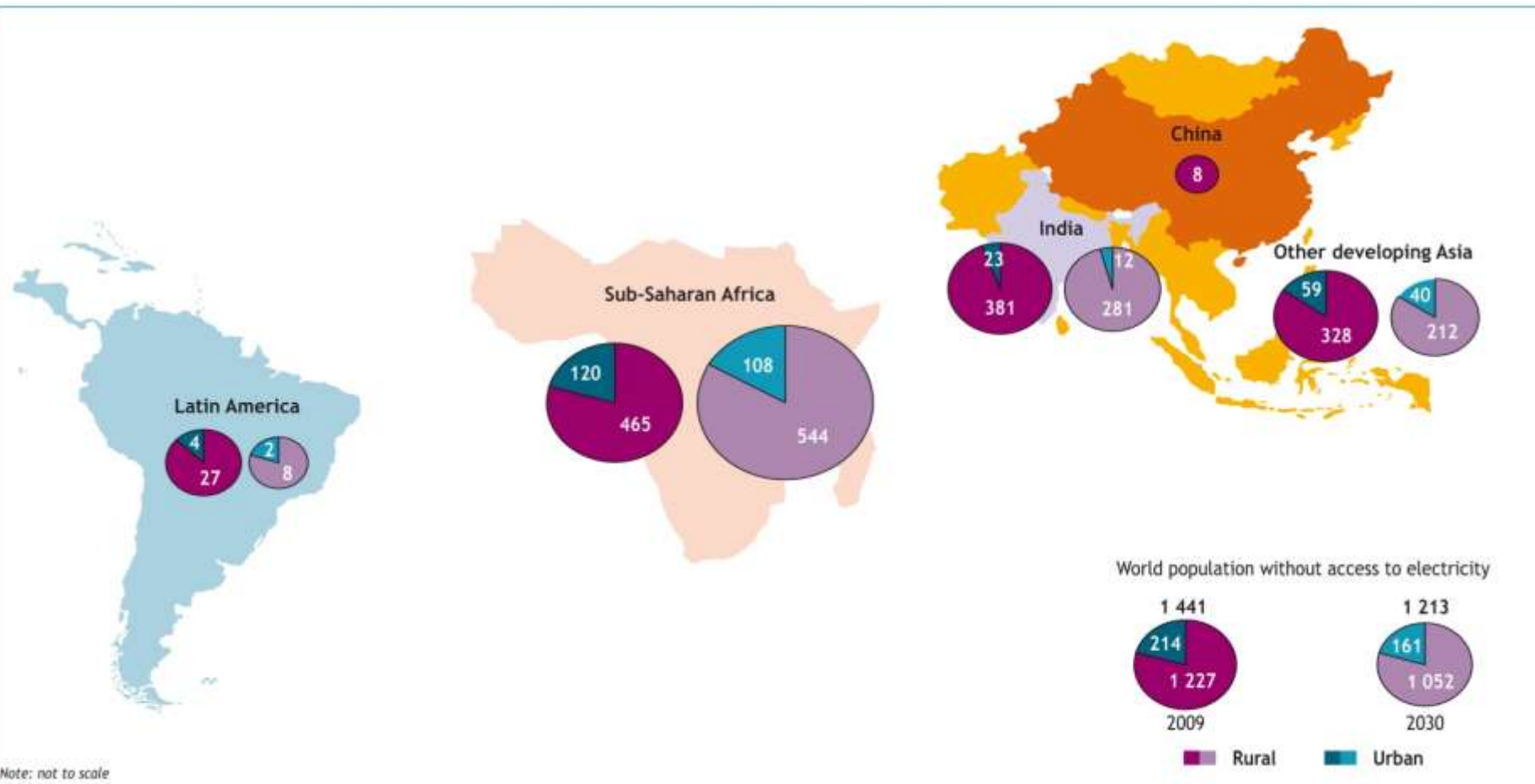
Lower-Nuclear Case: implications for CO₂ emissions

Growth in CO₂ emissions from power generation compared to current levels



The growth in emissions from the power sector in 2008-2035 is almost 30% higher in the Lower-Nuclear Case than in the New Policies Scenario

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.

**Today, there are 1.4 billion people lacking access to electricity.
Based on current trends, 1.2 billion people – or 15% of the world’s population – will still lack access in 2030**

Concluding remarks

- *Existing and announced policies can make a difference, but fall well short of what is needed for a secure and sustainable energy future.*
- *The era of cheap oil is over. There is a growing risk that the upturn in oil price could undermine the economic recovery.*
- *Stronger penetration of natural gas could have profound implications for global energy markets.*
- *China will be instrumental in shaping all energy markets.*
- *Energy and geopolitics will be more and more interwoven.*