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Energy Agency
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World Outlook Energy 2015

Budapest, 4 March 2016

The start of a new energy era?

■ 2015 has seen lower prices for all fossil fuels

- *Oil & gas could face second year of falling upstream investment in 2016*
- *Coal prices remain at rock-bottom as demand slows in China*

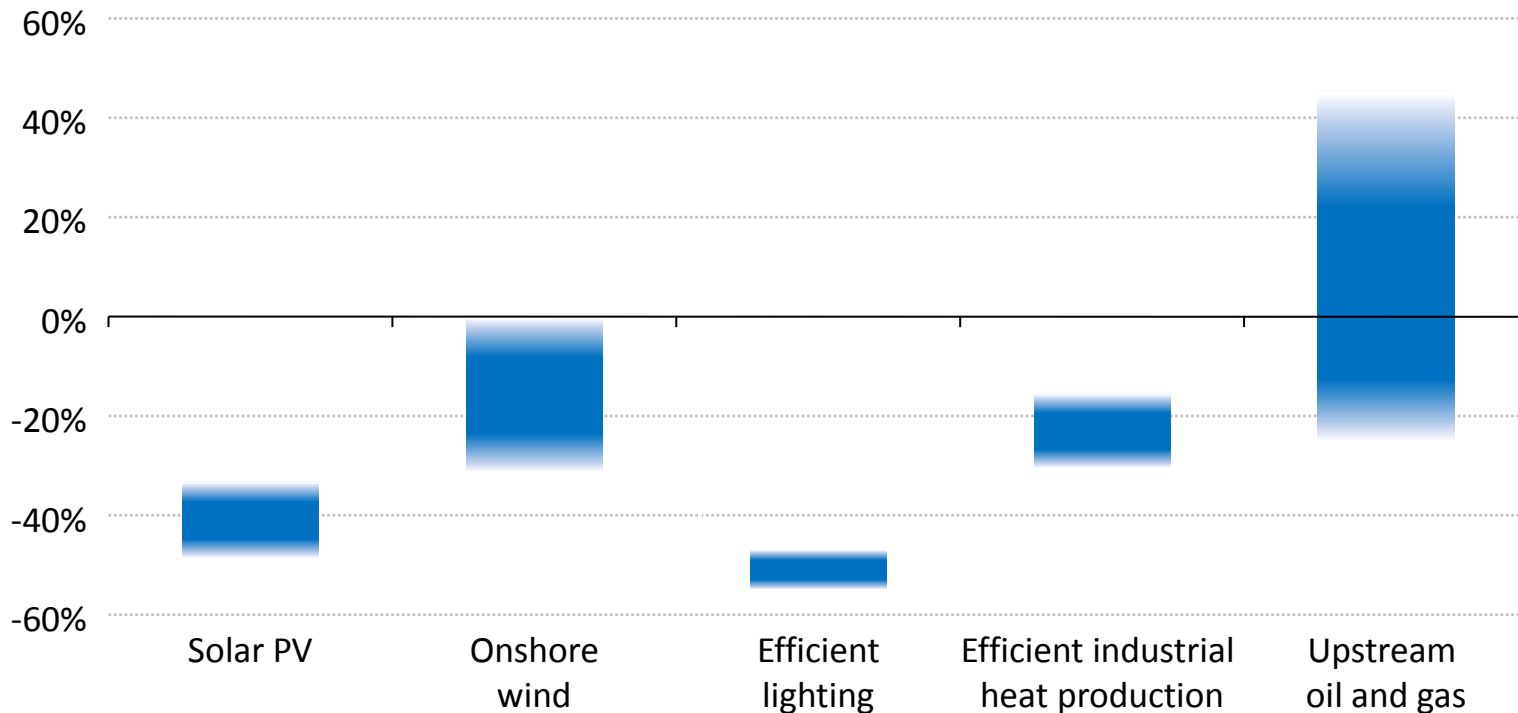
■ Signals turn green ahead of key Paris climate summit

- *Pledges of 150+ countries account for 90% of energy-related emissions*
- *Renewables capacity additions at a record-high of 130 GW in 2014*
- *Fossil-fuel subsidy reform, led by India & Indonesia, reduces the global subsidy bill below \$500 billion in 2014*

■ Multiple signs of change, but are they moving the energy system in the right direction?

Policies spur innovation and tip the balance towards low-carbon

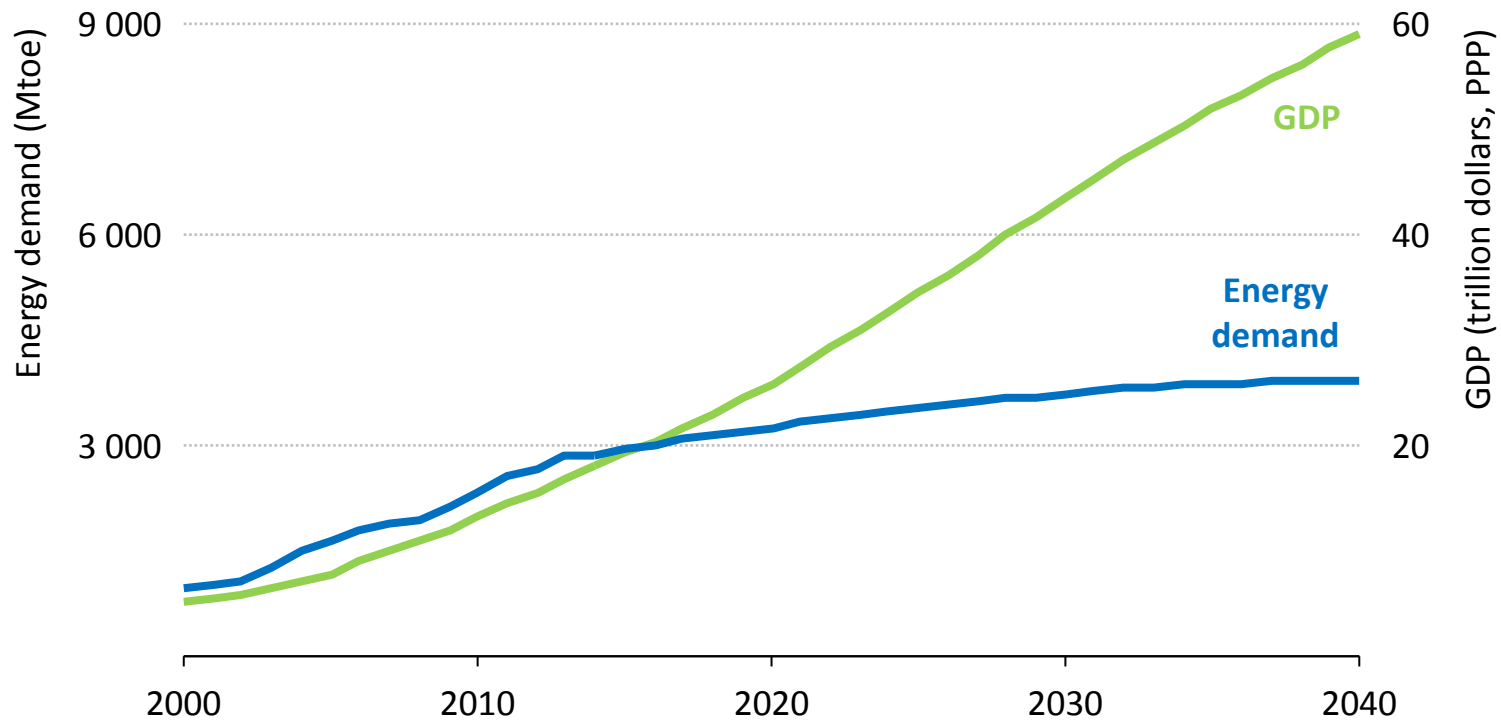
Costs in 2040 for different energy sources/technologies, relative to 2014



Innovation reduces the costs of low-carbon technologies & energy efficiency, but – for oil & gas – the gains are offset by the move to more complex fields

A new chapter in China's growth story

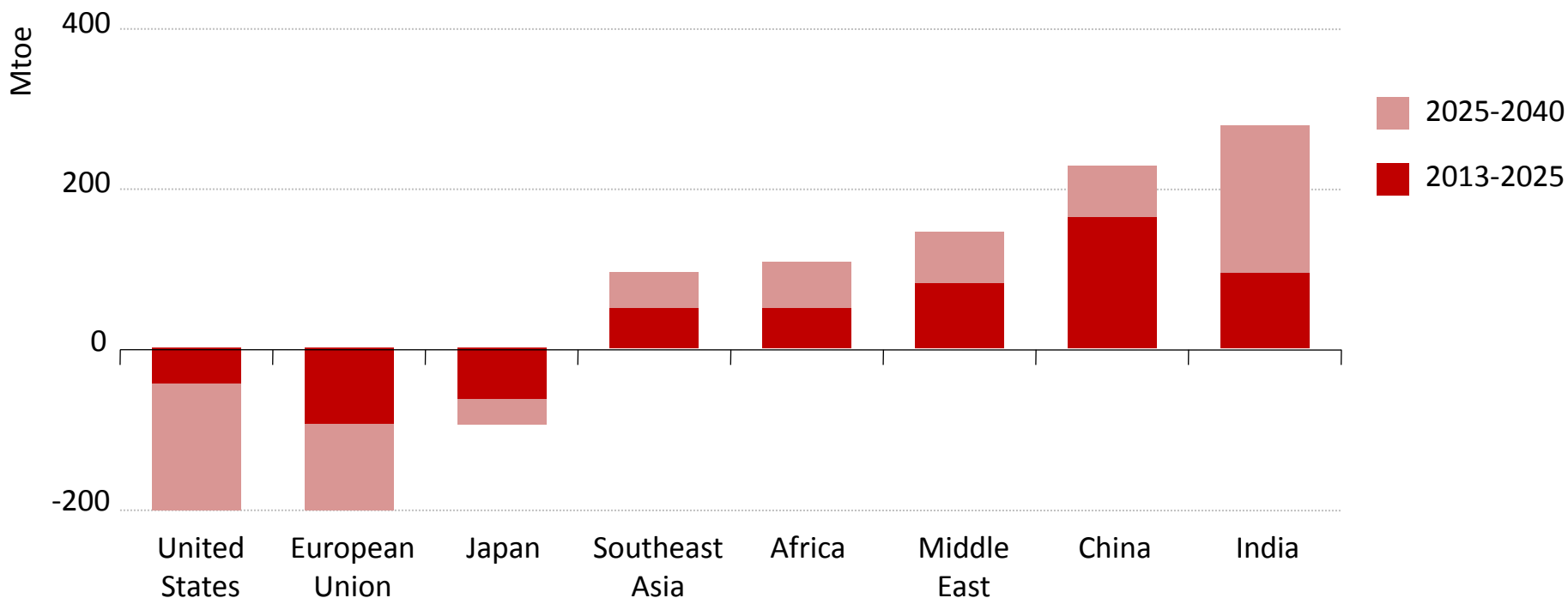
Energy demand & GDP in China



Along with energy efficiency, structural shifts in China's economy favouring expansion of services, mean less energy is required to generate economic growth

Oil use grows, but in a narrowing set of markets

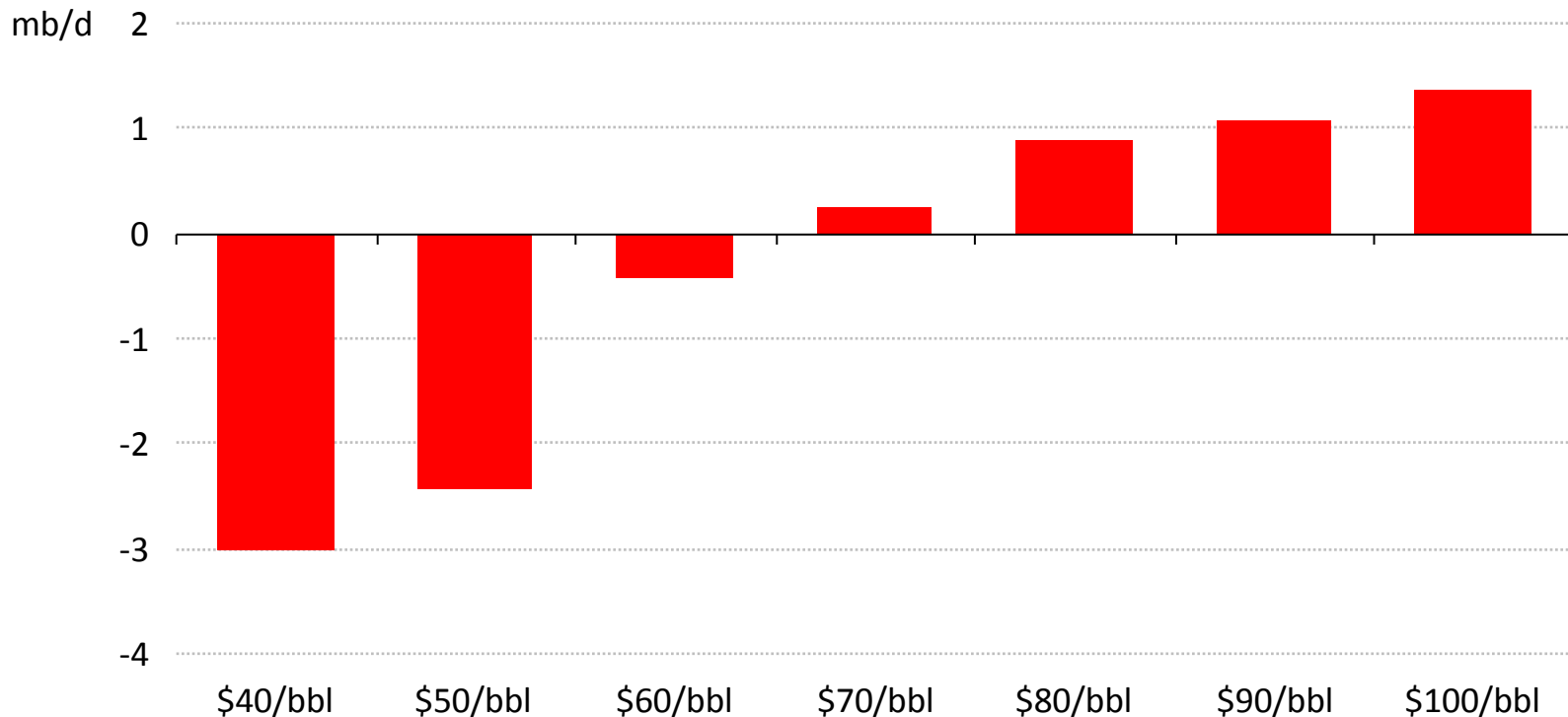
Oil demand growth by selected region



Oil demand picks up to 2020, but the subsequent rise to 103.5 mb/d is moderated by higher prices, subsidy phase-out, efficiency policies & fuel switching

A new balancing item in the oil market?

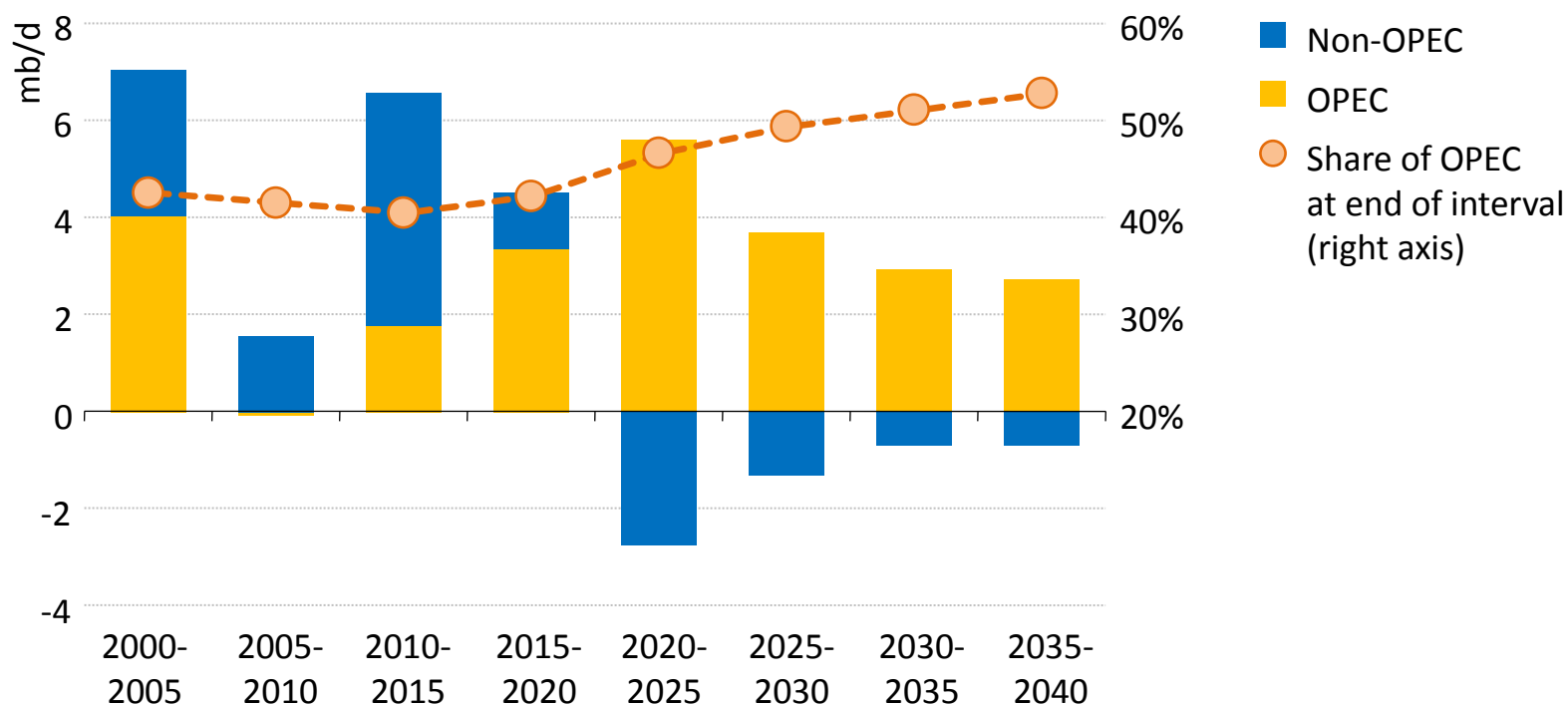
Change in production (2015-2020) of US tight oil for a range of 2020 oil prices



Tight oil has created more short-term supply flexibility, but there is no guarantee that the adjustment mechanism in oil markets will be smooth

The low oil price scenario relies on a high OPEC market share

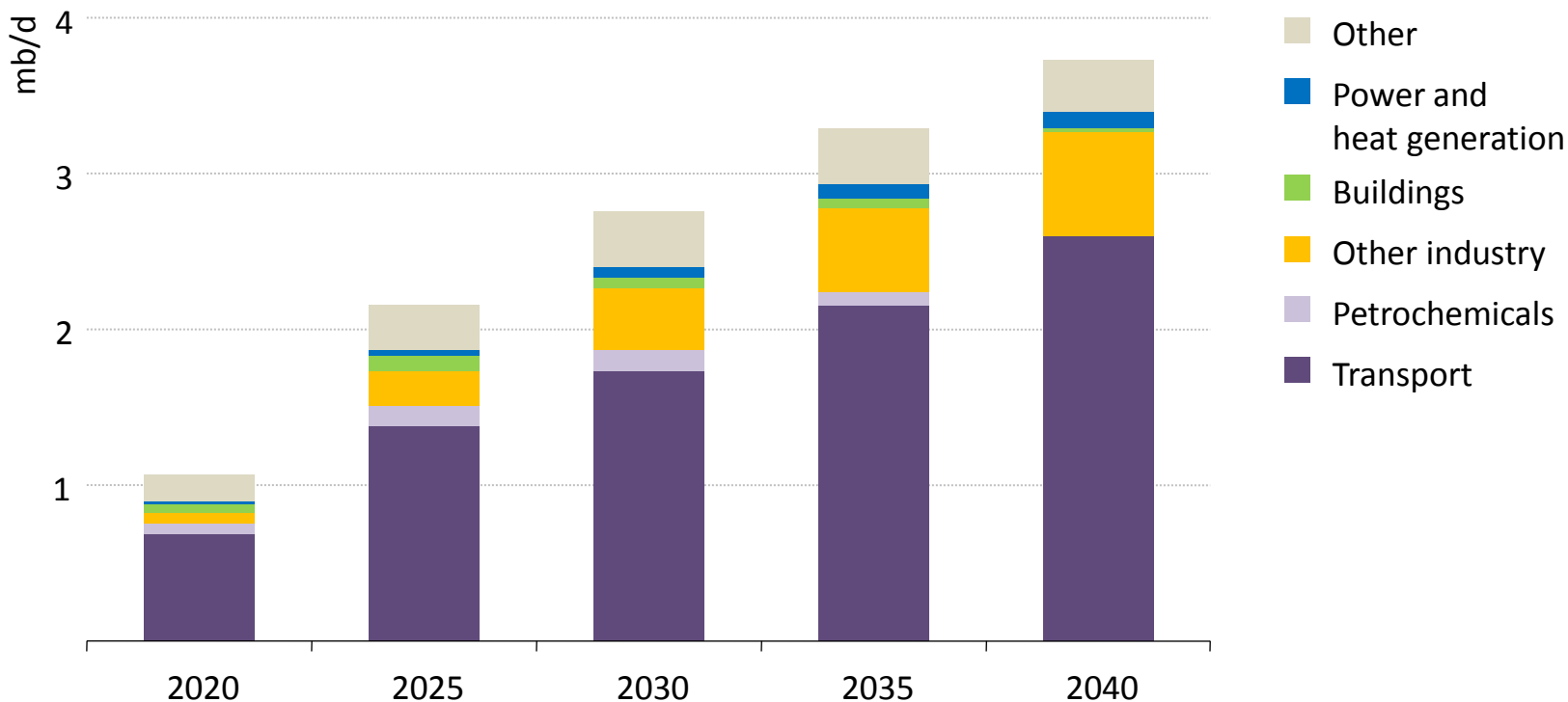
Change in non-OPEC & OPEC oil production by five-year periods in the Low Oil Price Scenario



Some non-OPEC producers manage to keep production levels close to those of the New Policies Scenario, but OPEC's share rises to levels not seen since the 1970s

Low oil price scenario: Transport leads the ramp up in demand

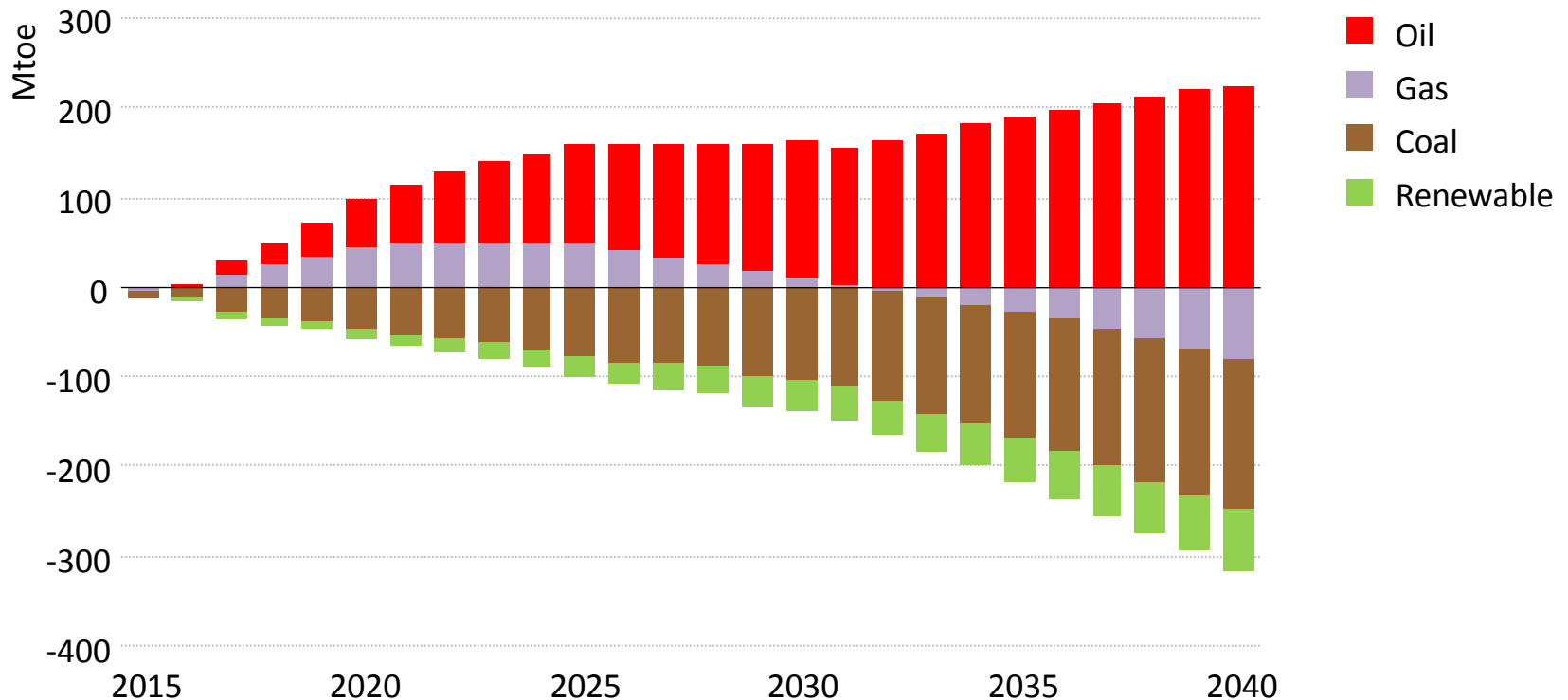
Change in global oil demand by sector in the Low Oil Price Scenario relative to the New Policies Scenario



Use of cars and trucks increases, there is a slower pace of improvement in the efficiency of vehicles and aircraft, and more limited switching to alternative fuels

Lower oil prices affect the competitiveness of fuels

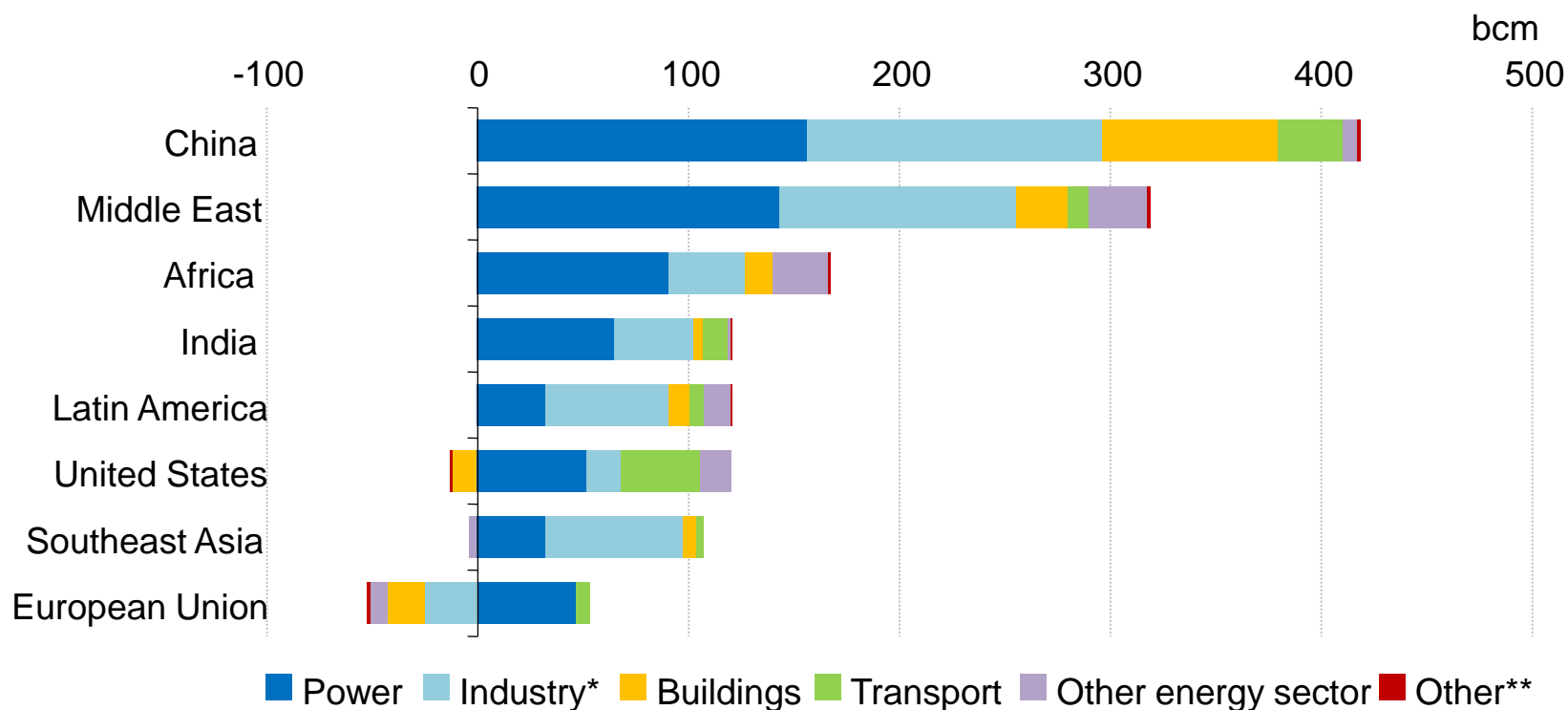
Change in global primary energy demand by fuel in the Low Oil Price Scenario relative to the New Policies Scenario



As well as increases in oil, natural gas benefits (for a while), particularly in regions where import prices are indexed to oil: with coal pushed out in the power sector

The opportunities for gas are in the developing world

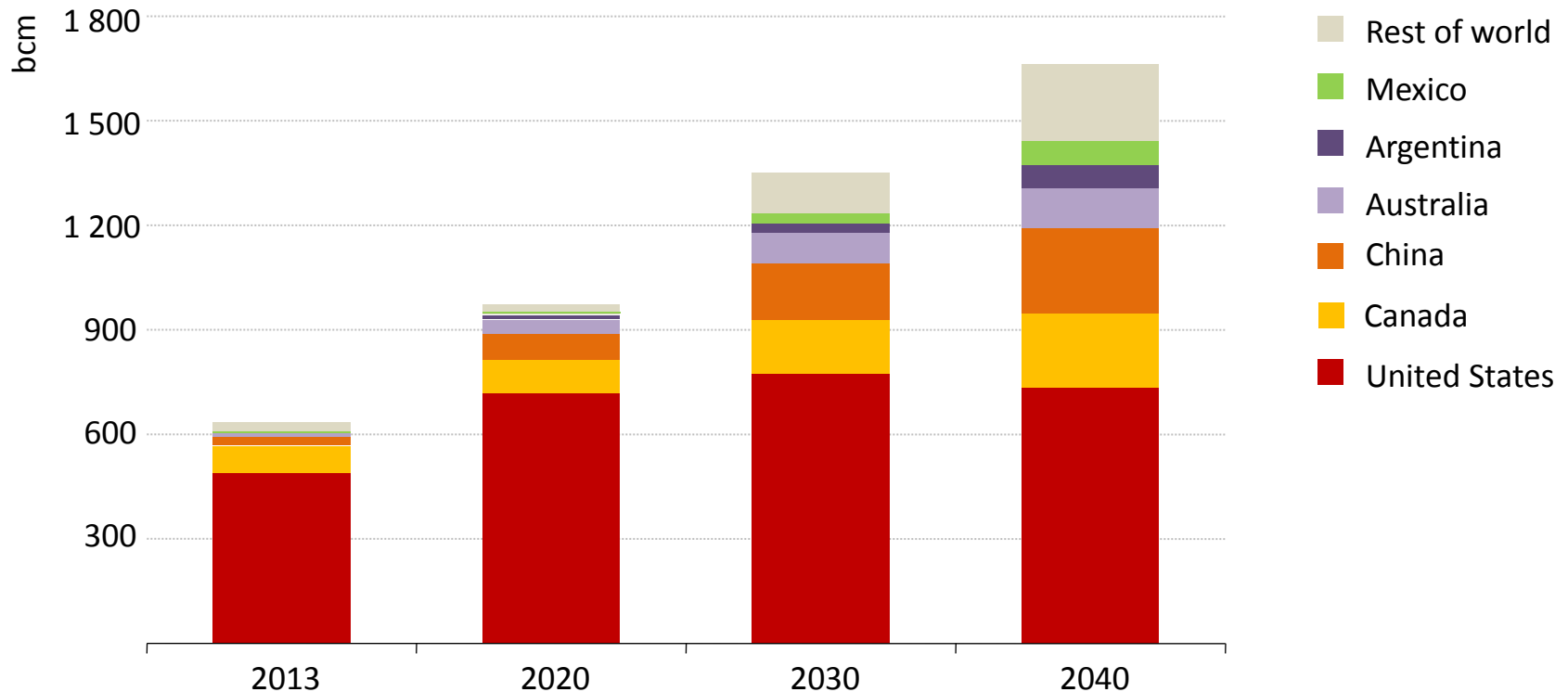
Change in natural gas demand by key sectors and regions in the New Policies Scenario, 2013-2040



Continued economic growth, leading to growth in the power, industry and transport sectors account for about 75% of the global gas demand growth by 2040.

Multi-speed revolution

Unconventional gas production by key country in the New Policies Scenario

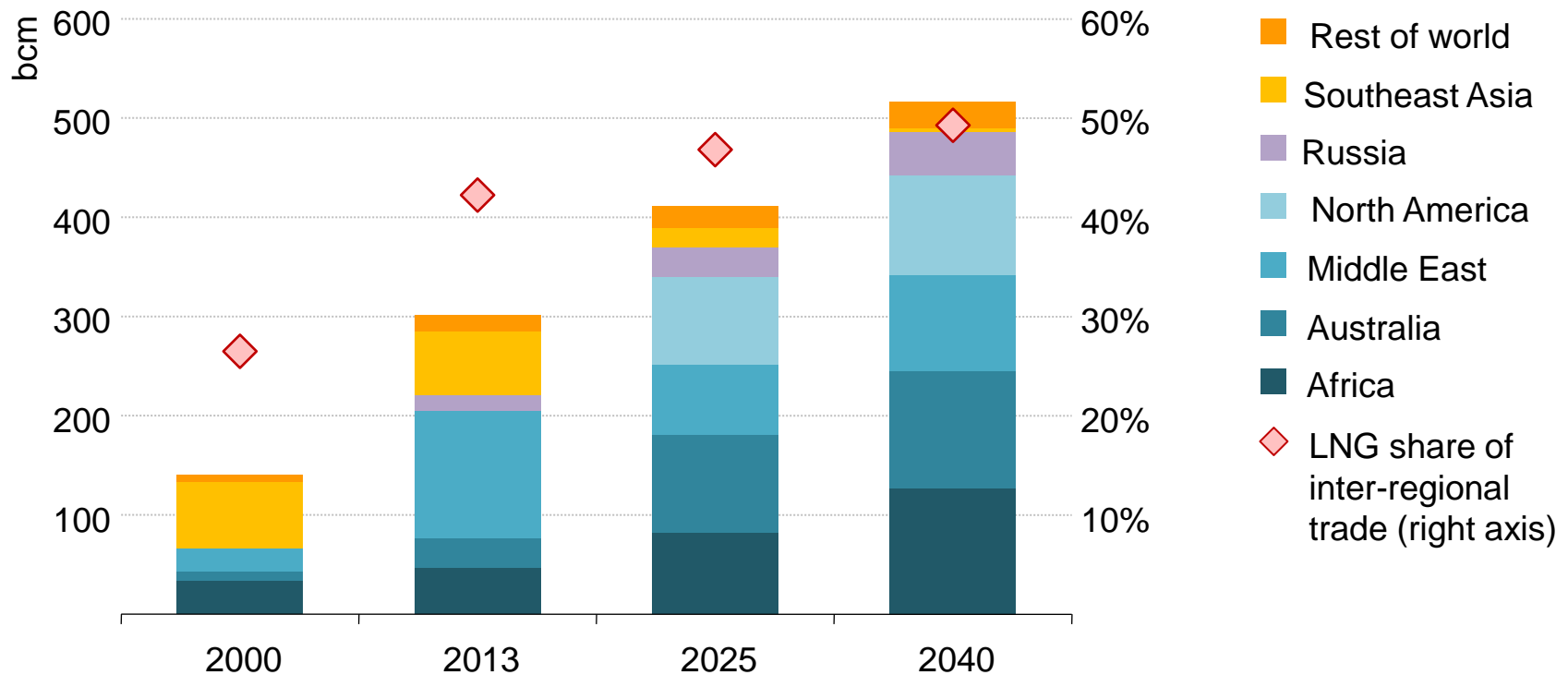


The North American experience is difficult to replicate.

Unconventional gas developments elsewhere are much smaller and slow to take off.

Plain sailing for LNG?

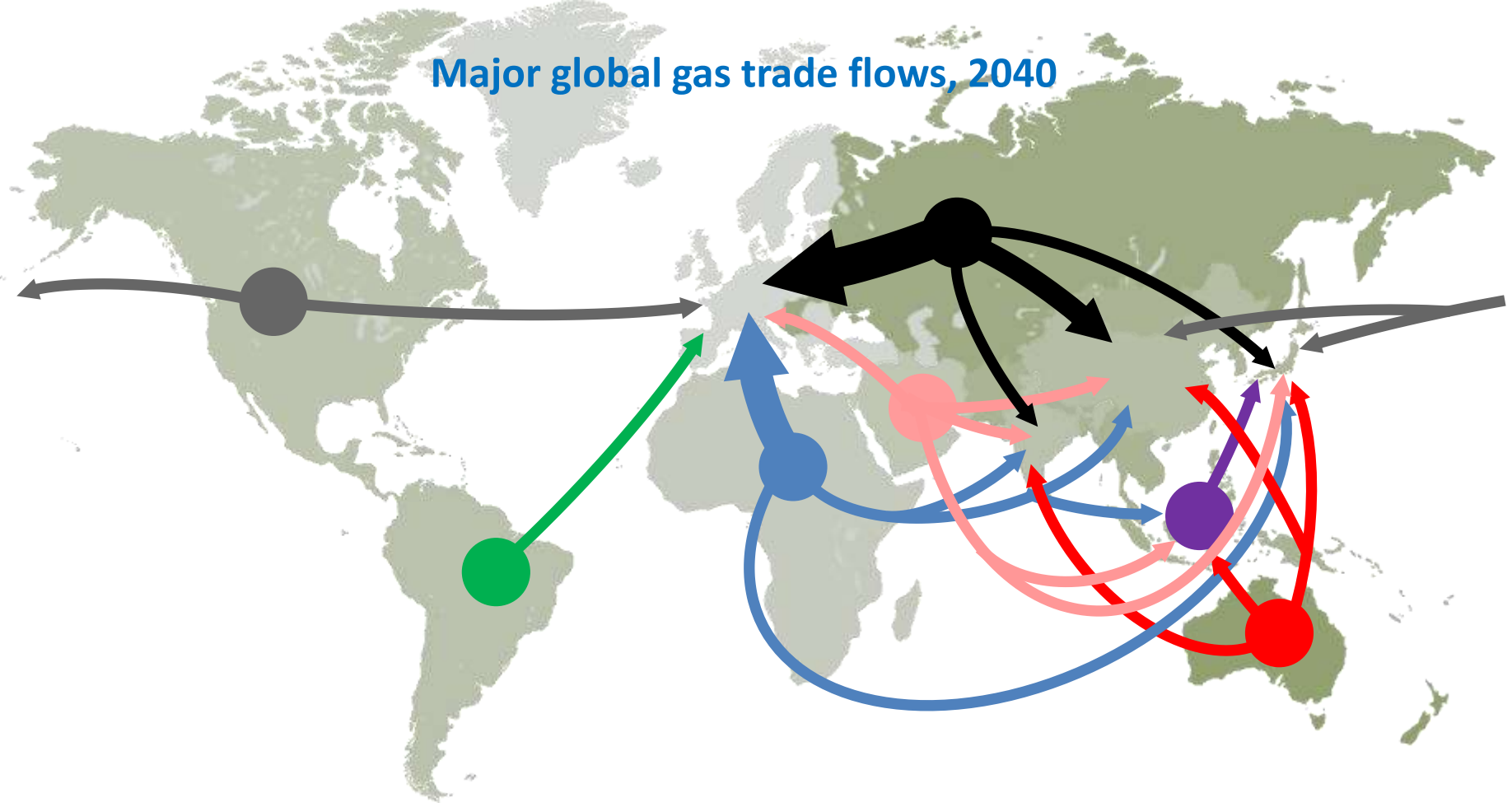
LNG exports by region in the New Policies Scenario



Ample new LNG supply in the medium term from a growing set of suppliers could lead to more contract flexibility in the long term.

Transformation of LNG markets a chance for Europe

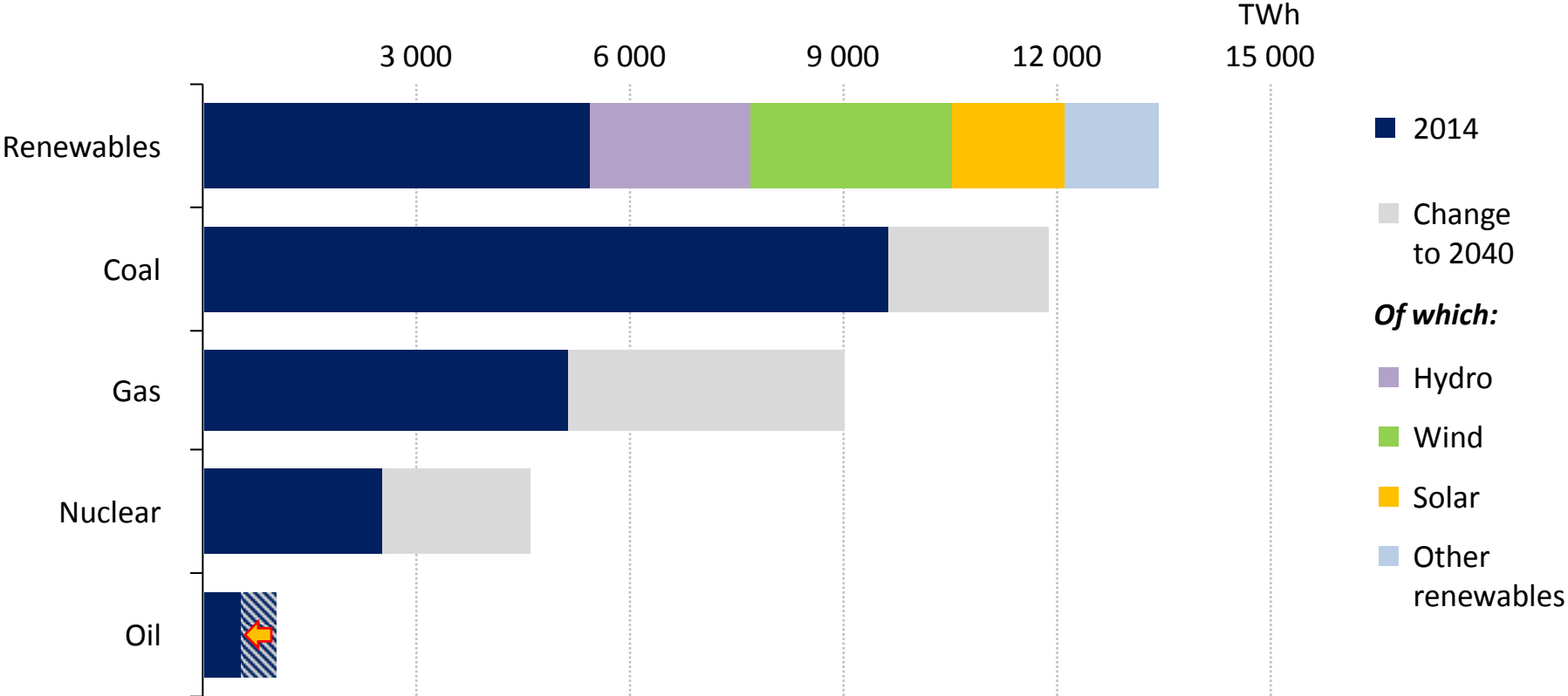
Major global gas trade flows, 2040



Ample supplies of LNG & low prices are diversifying trade & opening up opportunities for gas, but – by holding back new projects – could bring tighter markets in the 2020s

Power is leading the transformation of the energy system

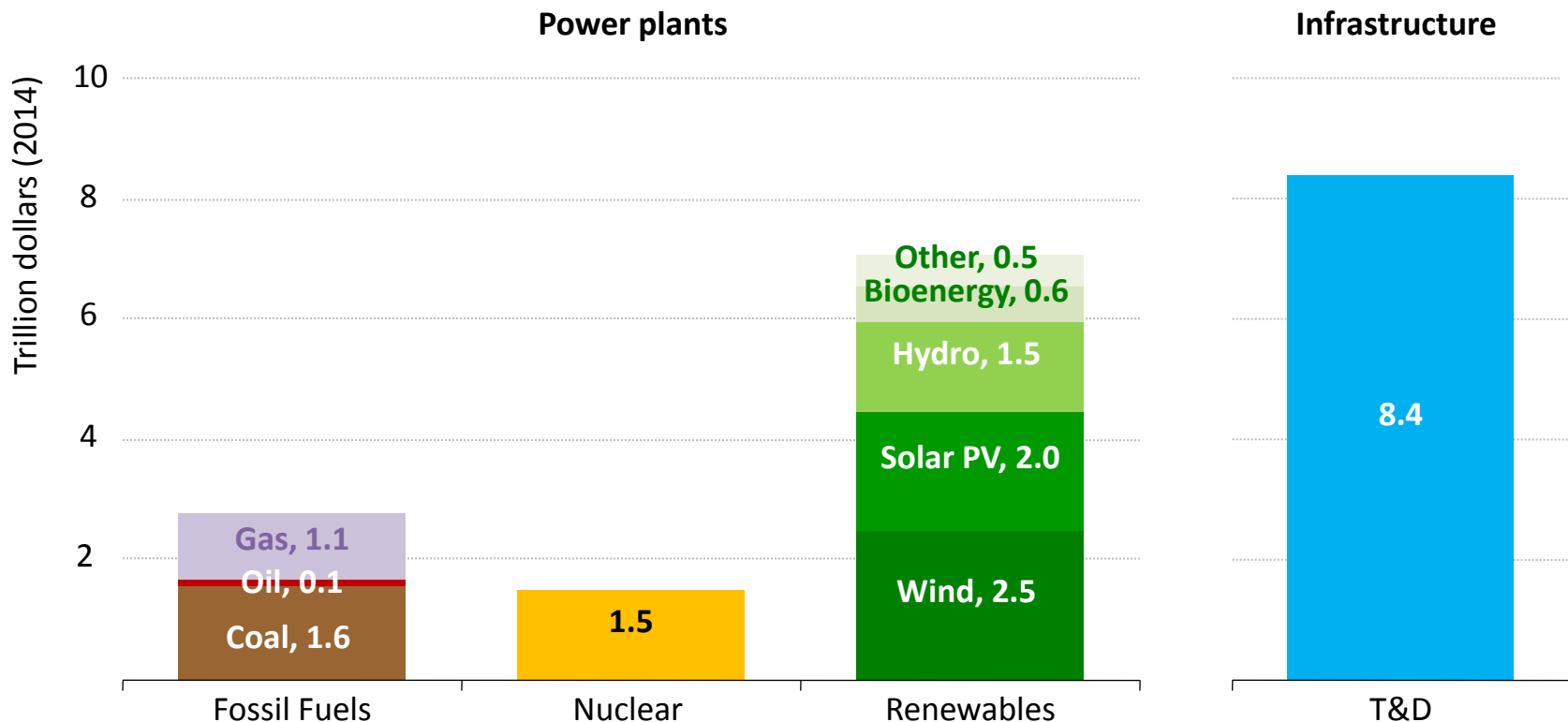
Global electricity generation by source



Driven by continued policy support, renewables account for half of additional global generation, overtaking coal around 2030 to become the largest power source

The power sector requires the largest investment

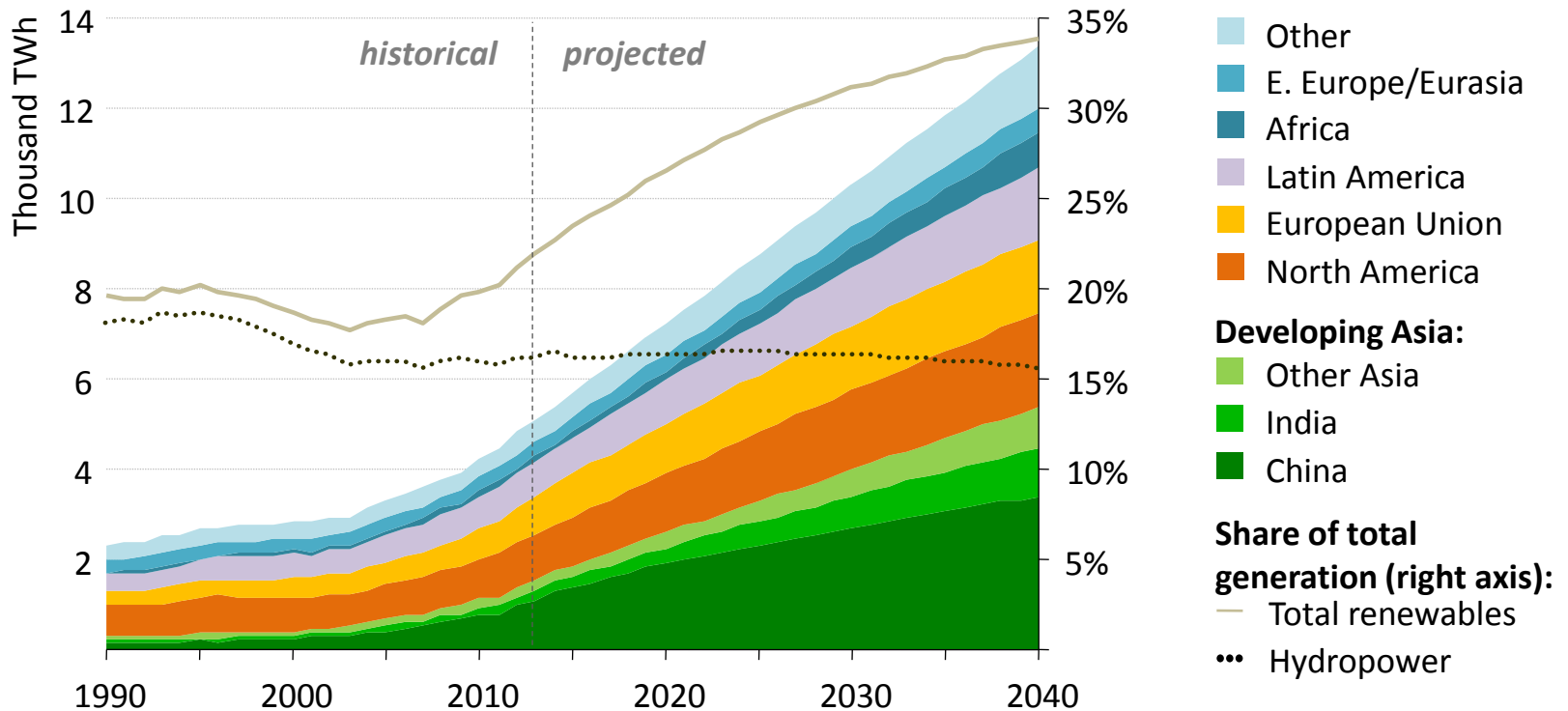
Global power sector cumulative investment by type, 2015-2040



Power sector investment totals \$19.7 trillion to 2040, over 40% of total energy supply investment, and 60 cents of every dollar in new power plants goes to renewables

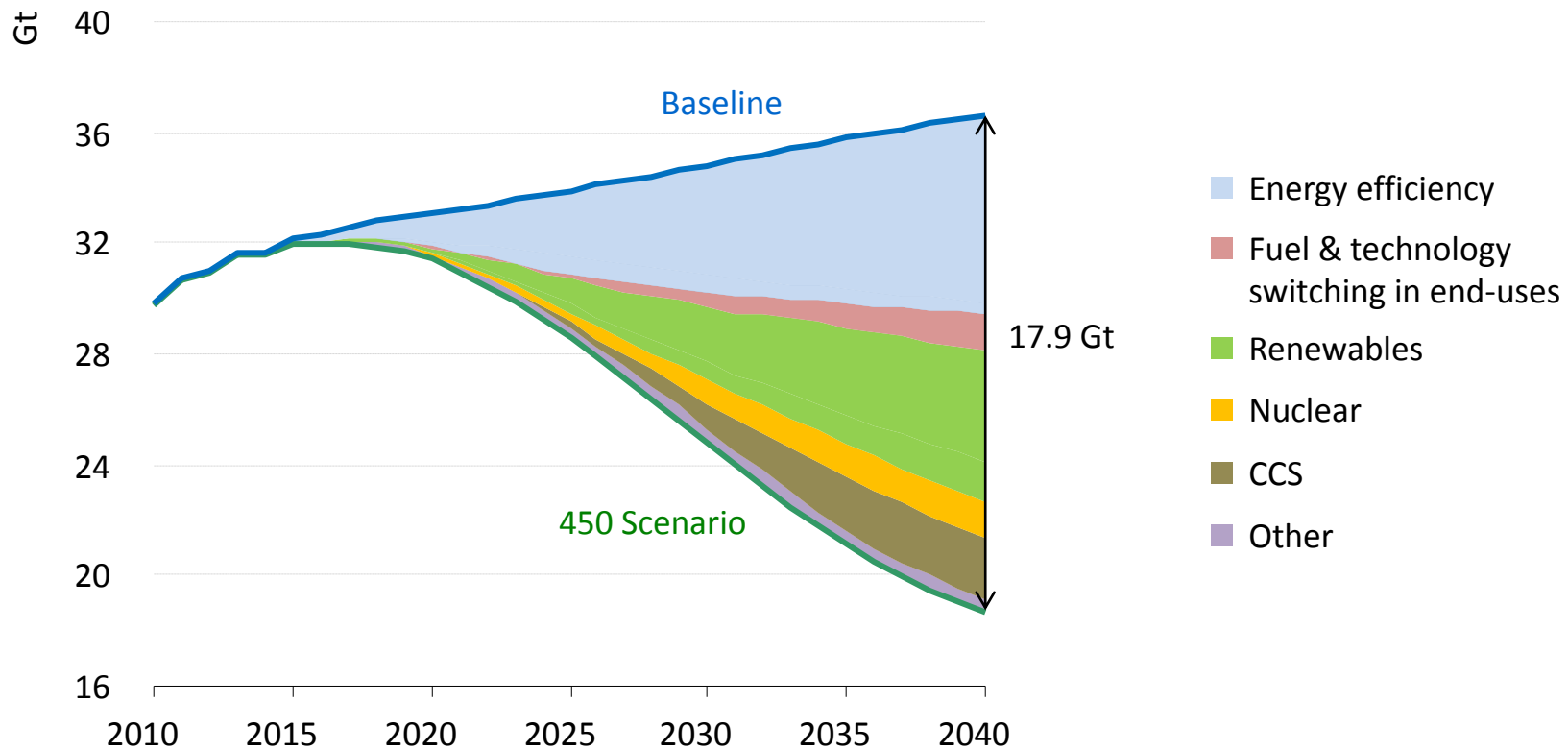
Renewables become the largest source of electricity

Renewables-based electricity generation by region



Non-hydro renewables raise the share of renewables in the mix, with one-third of renewables growth in China, one-third in the OECD & one-third in other regions

A 2 °C pathway is still some further efforts away



A peak in emissions by around 2020 is possible using existing policies & technologies; technology innovation and RD&D will be key to achieving the longer-term goal.



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