

Energy and Climate Change

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EDF, Paris, 28 January 2016

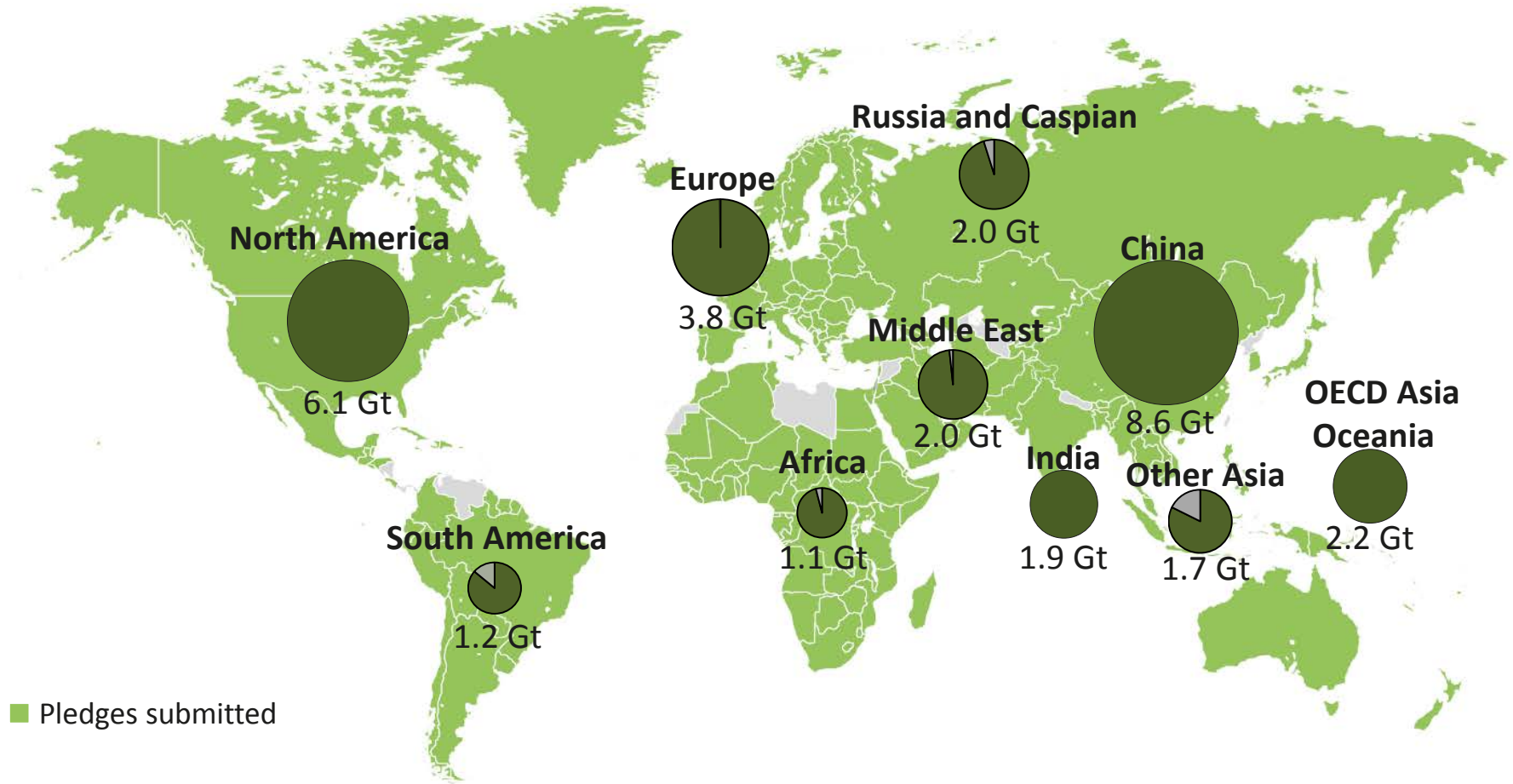
The start of a new energy era?

■ Energy sector turns green?

- *Paris agreement: pledges of 180+ countries account for over 90% of energy-related emissions*
- *Energy accounts for at least 2/3 of greenhouse gas 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*
- *Carbon pricing covers 13% of global emissions, but China intention of trading system in 2017 will triple this share*

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

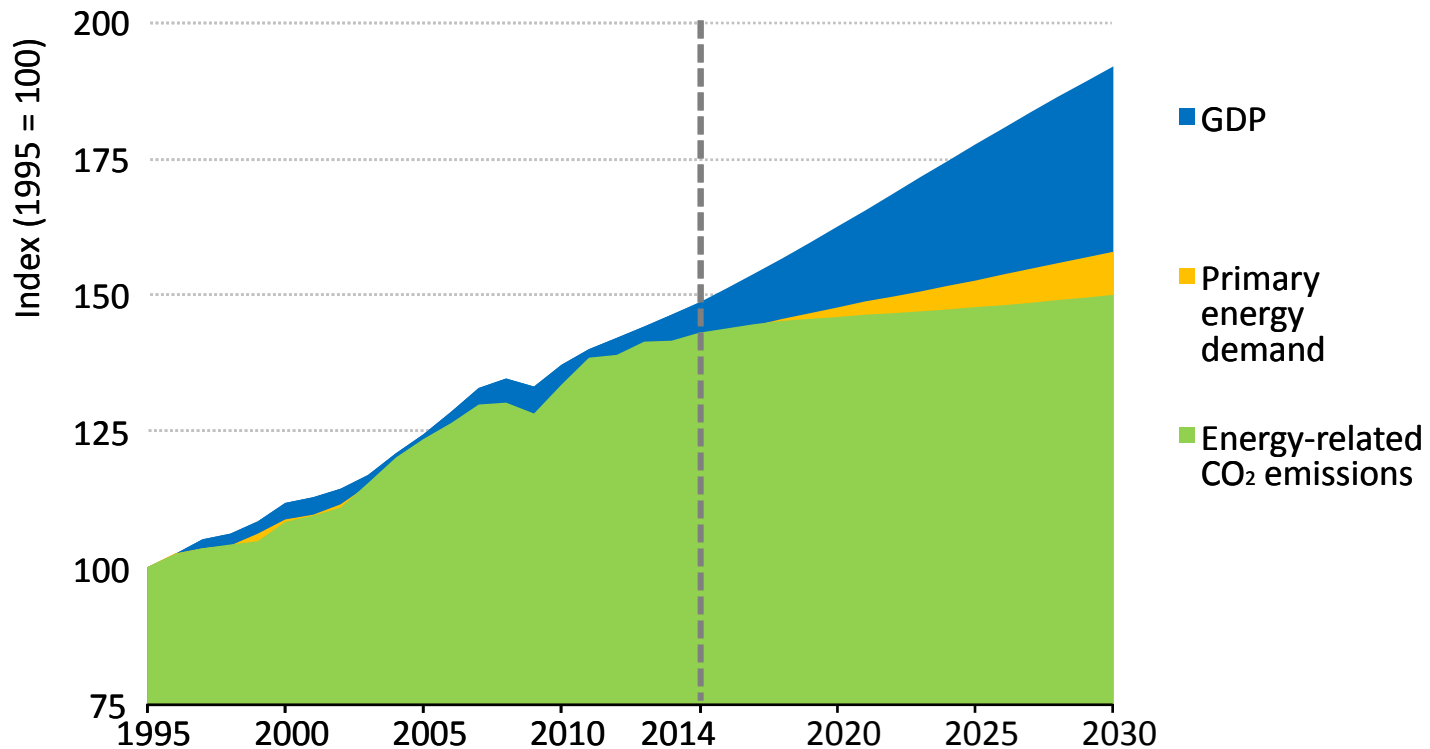
...the global coverage of climate pledges is impressive



Pledges from countries that account for 95% of global energy-related GHG emissions; their full implementation would be consistent with a temperature rise of 2.7 °C

Energy sector starts to go its own way

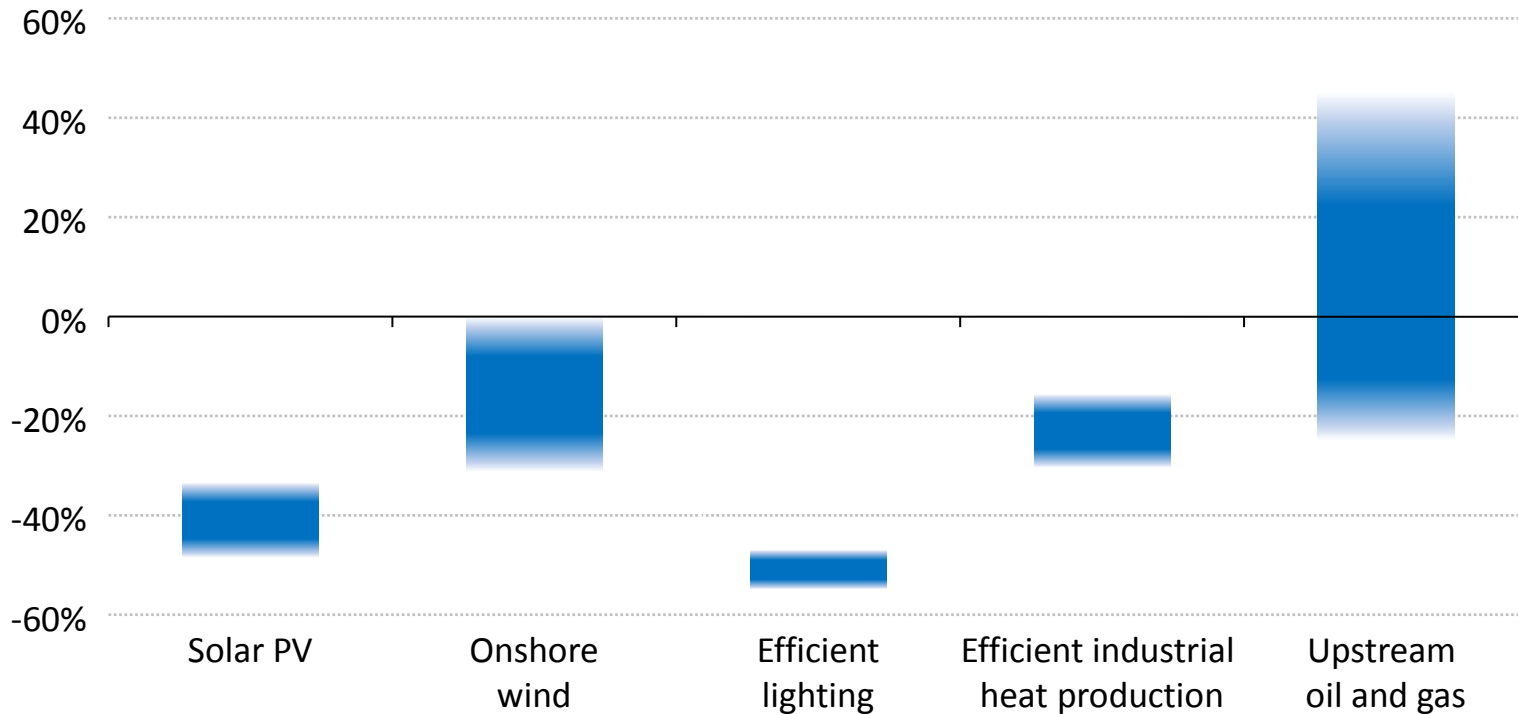
Growth in the global economy, primary energy demand and related CO₂ emissions



Growth in energy demand and emissions has tracked economic growth closely but decouples over time, with emissions growth slowing to a crawl by 2030

Policies spur innovation and tip the balance towards low-carbon

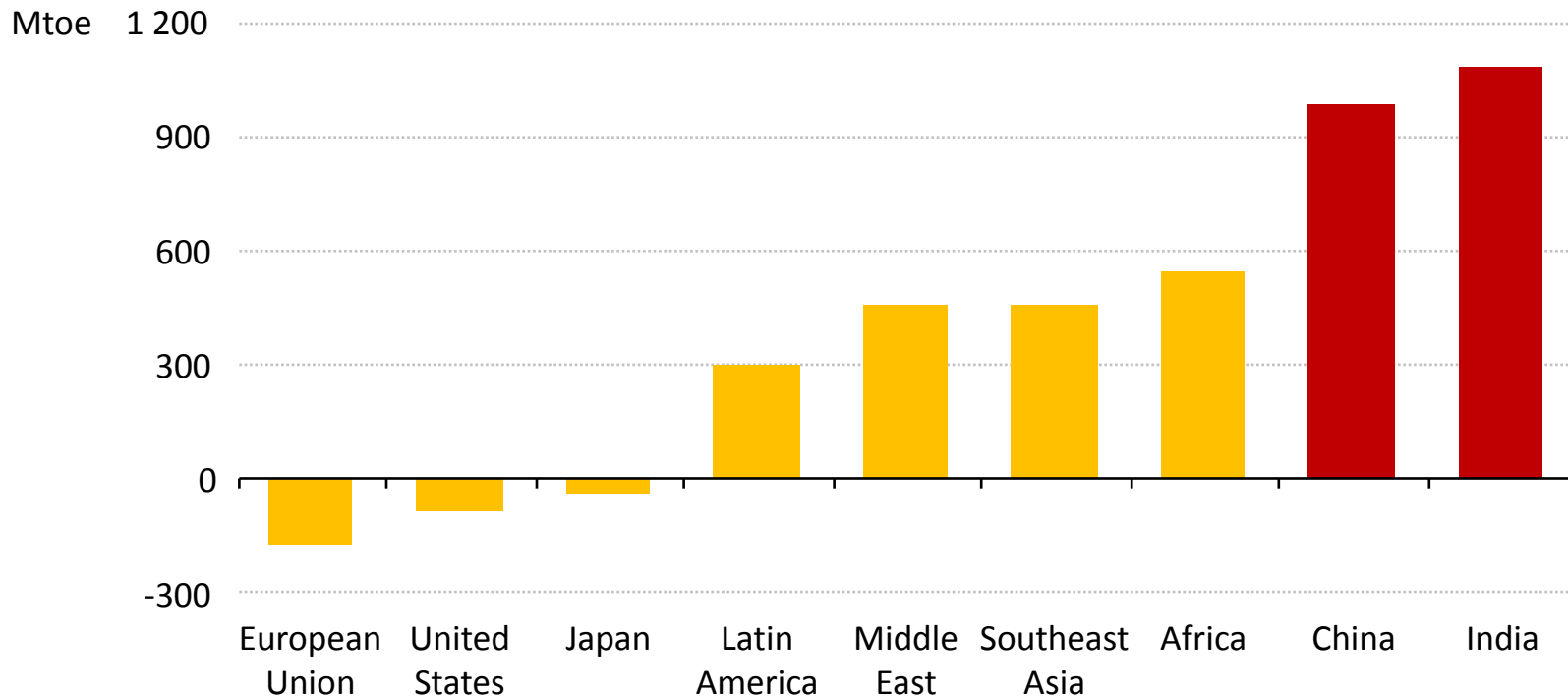
Costs in 2040 for different energy sources/technologies, relative to 2014



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

Demand growth in Asia – the sequel

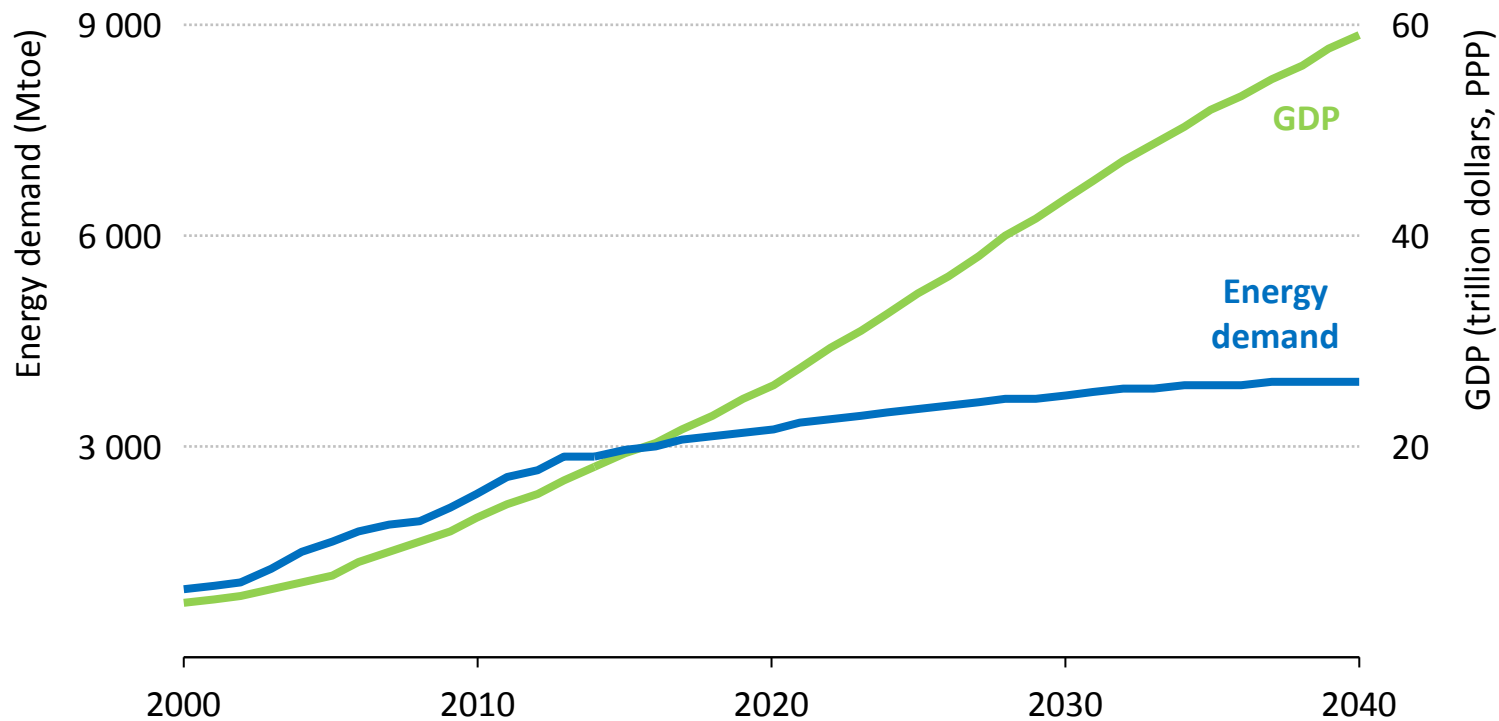
Change in energy demand in selected regions, 2014-2040



By 2040, India's energy demand closes in on that of the United States, even though demand per capita remains 40% below the world average

A new chapter in China's growth story

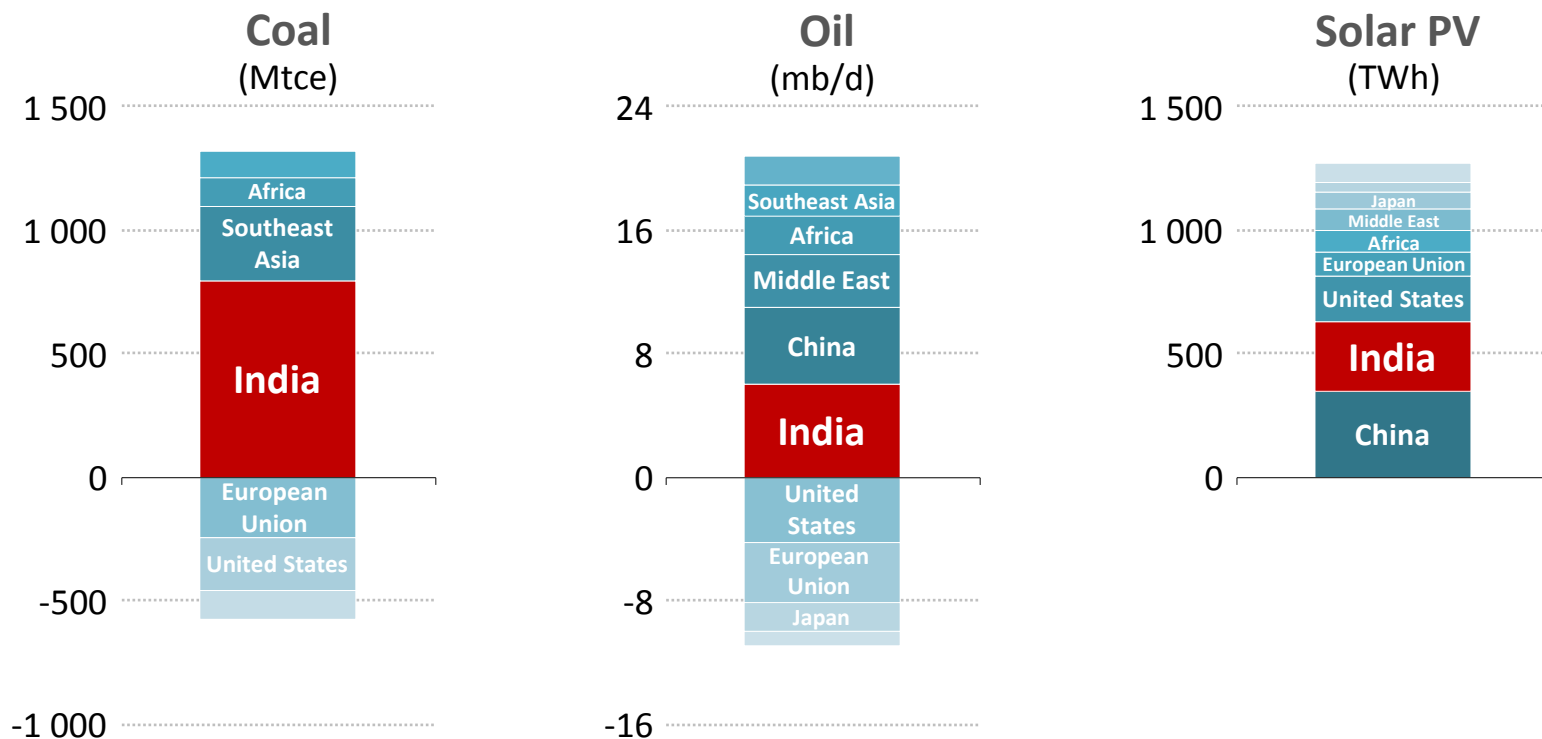
Energy demand in China



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

India moving to the centre of the world energy stage

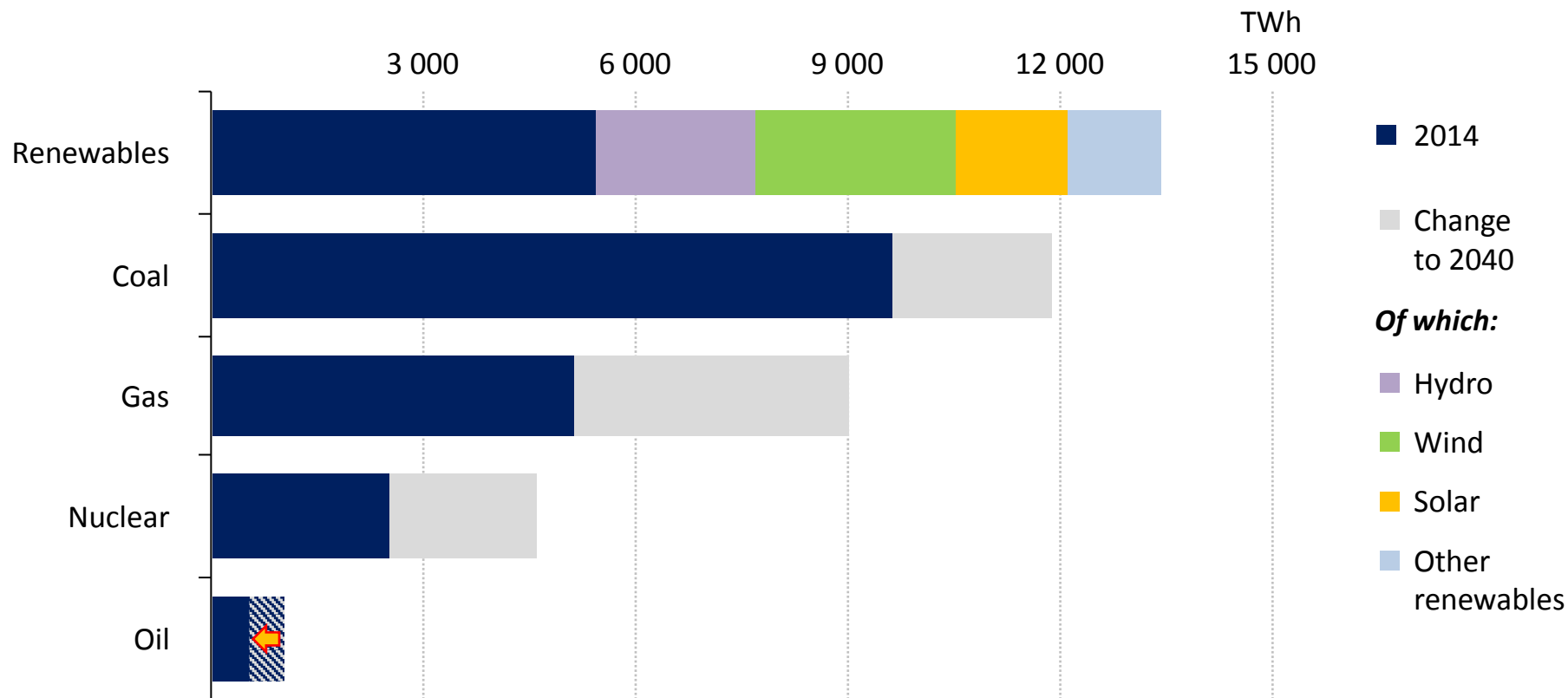
Change in demand for selected fuels, 2014-2040



New infrastructure, an expanding middle class & 600 million new electricity consumers mean a large rise in the energy required to fuel India's development

Power is leading the transformation of the energy system

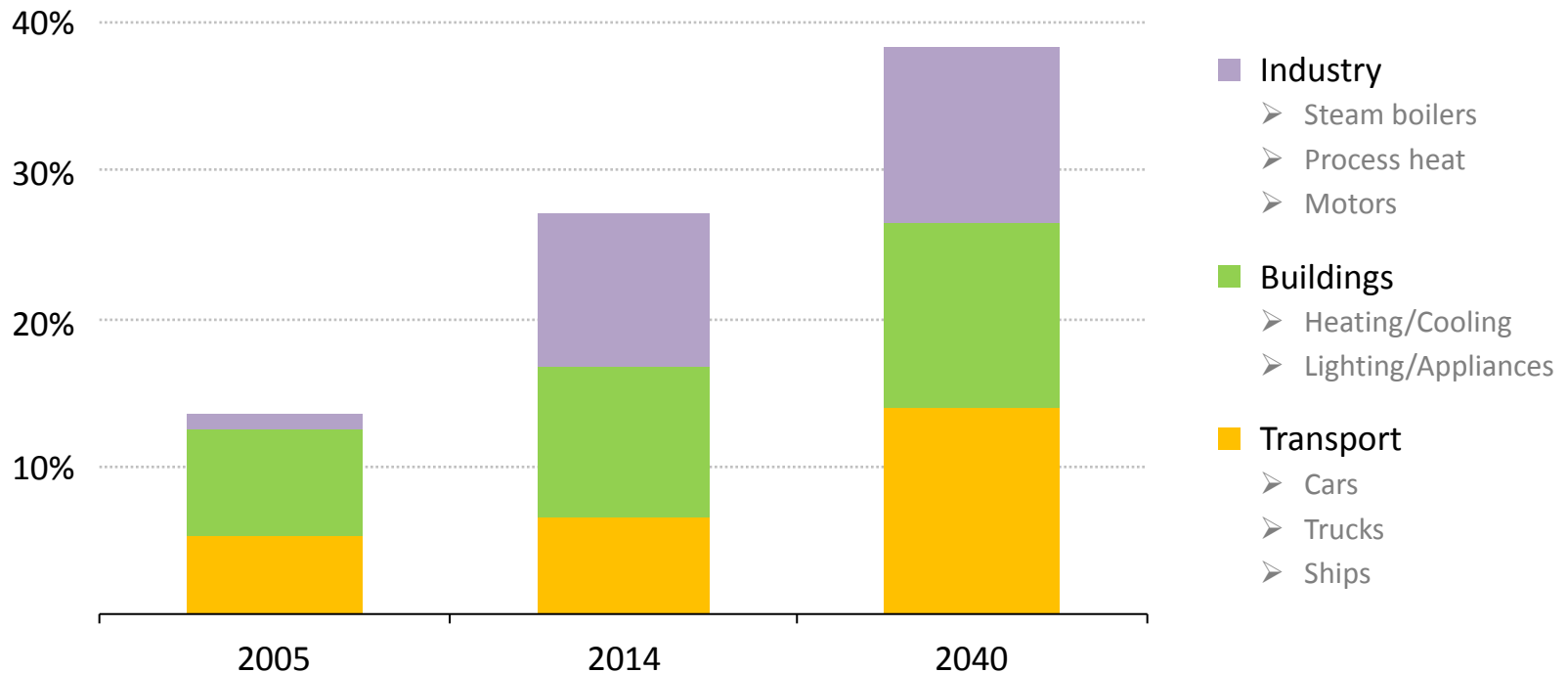
Global electricity generation by source



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

Efficiency measures on the rise, but significant potential still exists

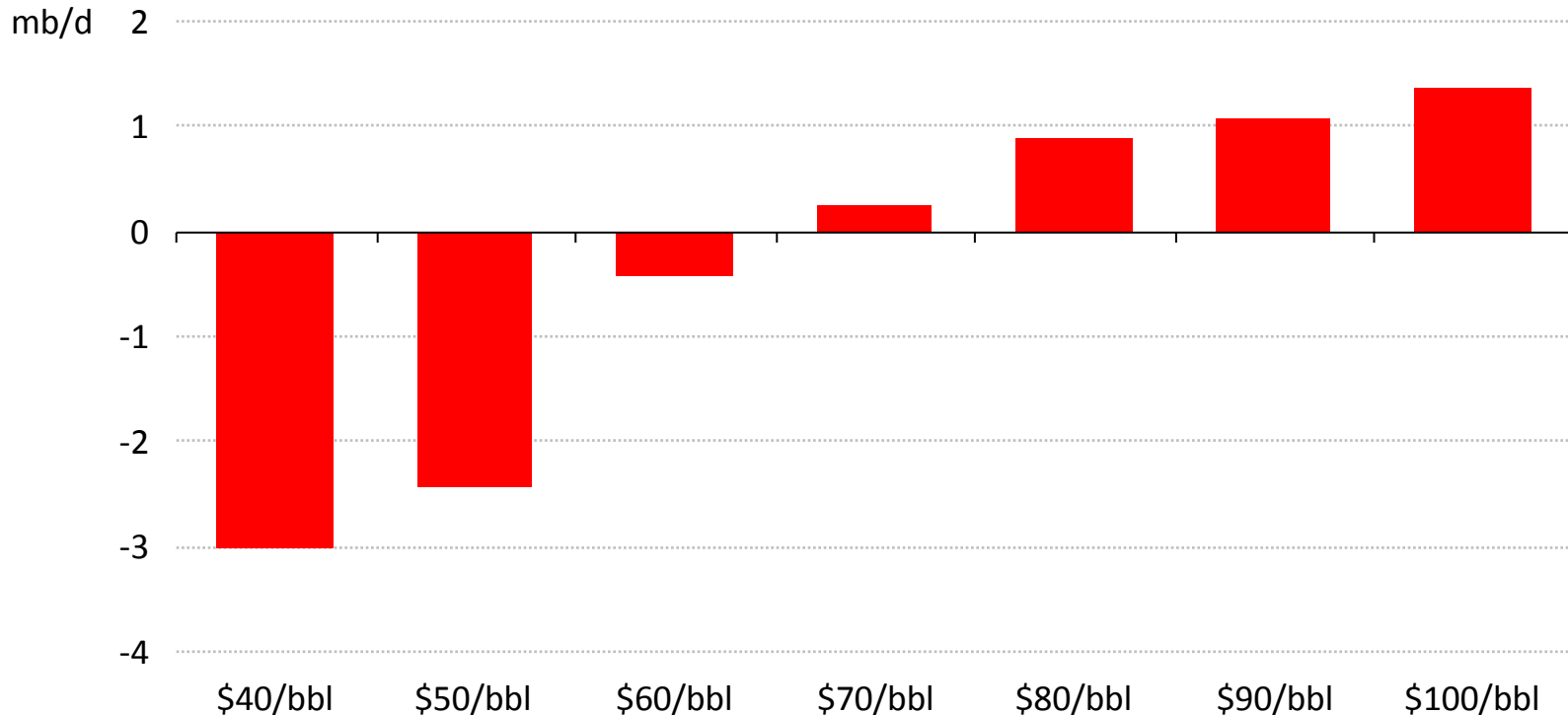
Share of global mandatory efficiency regulation of final energy consumption



***Energy efficiency policies are introduced in more countries and sectors;
they continue to slow demand growth but more can be done***

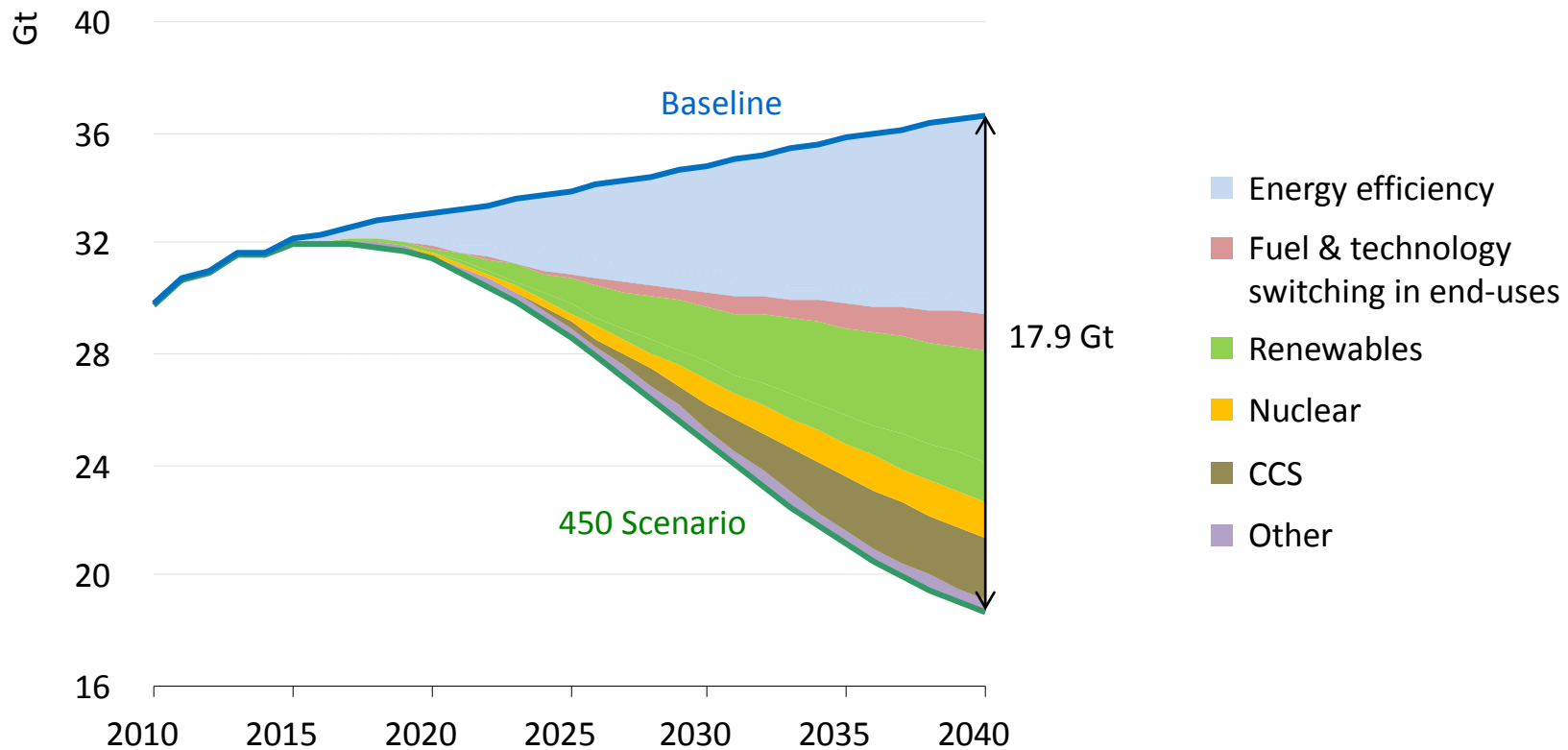
A new balancing item in the oil market?

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

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.

- **The energy transition is underway, but needs continued strong signal from governments to attract necessary investment**
- **Existing technologies are enough to enable a peak in energy-related emissions, but innovation is needed for scenarios compatible with 2 C**
- **Models give essential insights on key technologies needed for the transition, and costs associated with the lack of one of them**
- **Models also help understanding the speed of transition linked to infrastructures and economic development**
- **With looming energy security and environmental challenges, international cooperation on energy has never been more vital**



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Energy Agency
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World Energy Outlook 2015

www.worldenergyoutlook.org