

# World Outlook Energy 2015

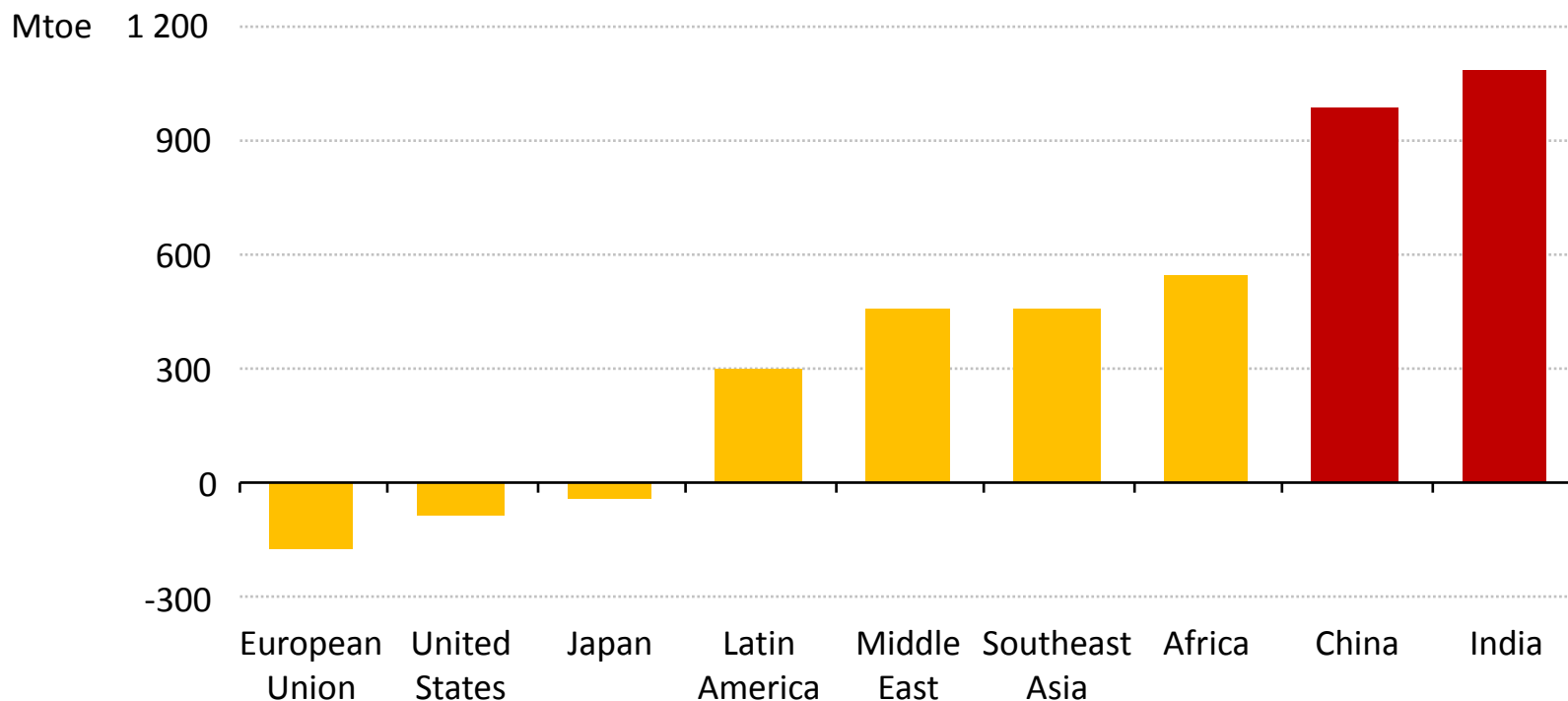
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**IEA Executive Director**  
**The Institute of Energy Economics**  
**Tokyo, 21 December 2015**

# The start of a new energy era?

- **Universal agreement from COP21 is an historic milestone that can stimulate energy sector innovation**
  - *Pledges of 180+ countries account for 95% of energy-related emissions*
  - *Renewables capacity additions at a record-high of 130 GW in 2014*
  
- **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*

# Demand growth in Asia – the sequel

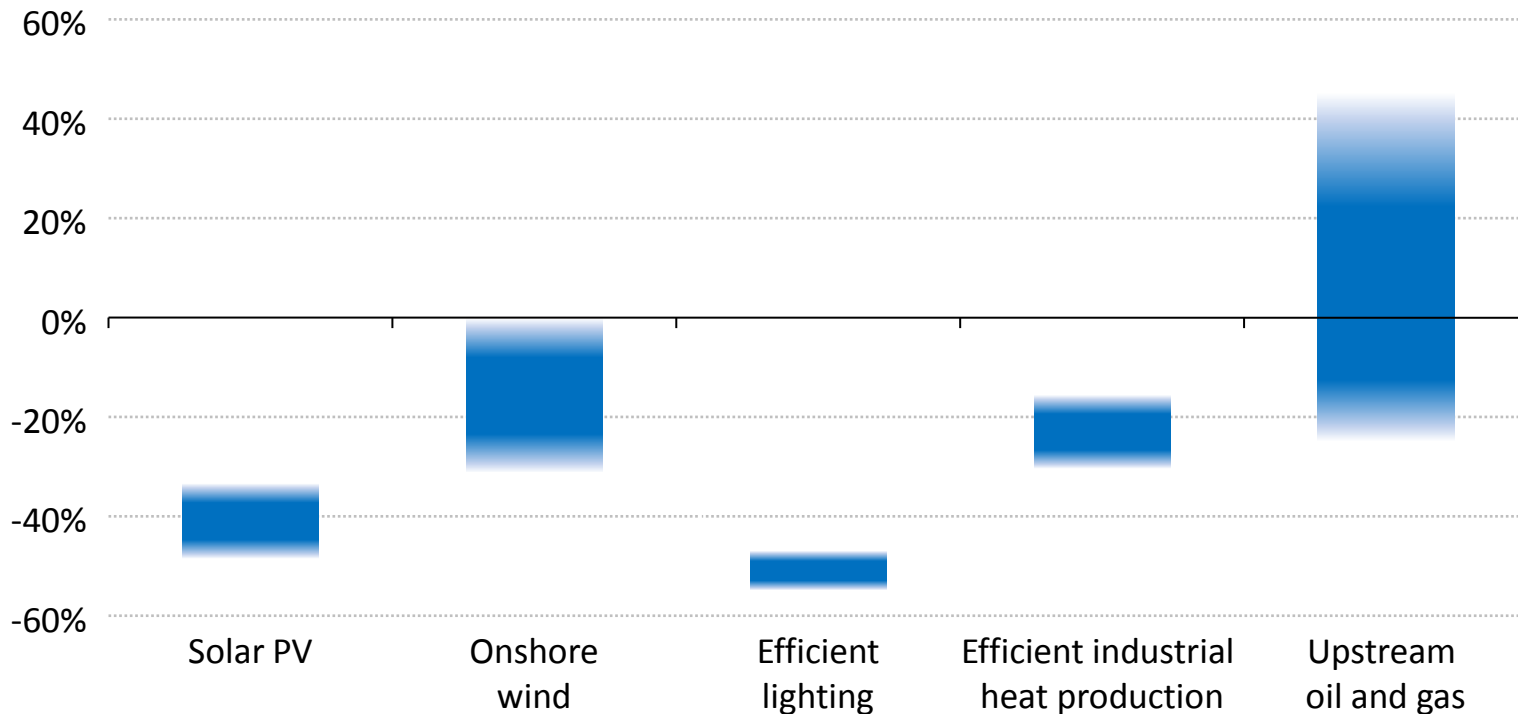
## Change in energy demand in selected regions, 2014-2040



***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***

# Policies spur innovation and tip the balance towards low-carbon

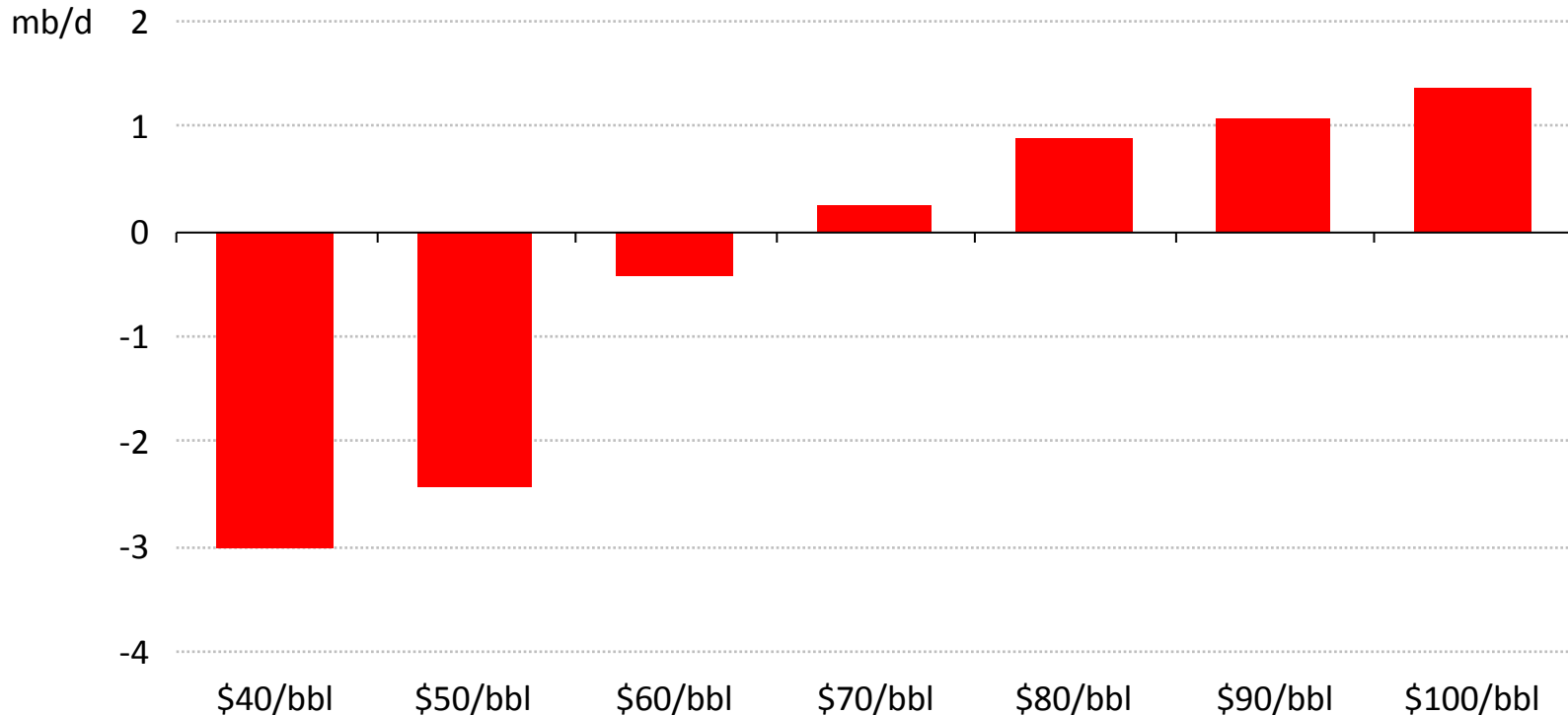
## Costs in 2040 for different energy sources/technologies, relative to 2014



***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 balancing item in the oil market?

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



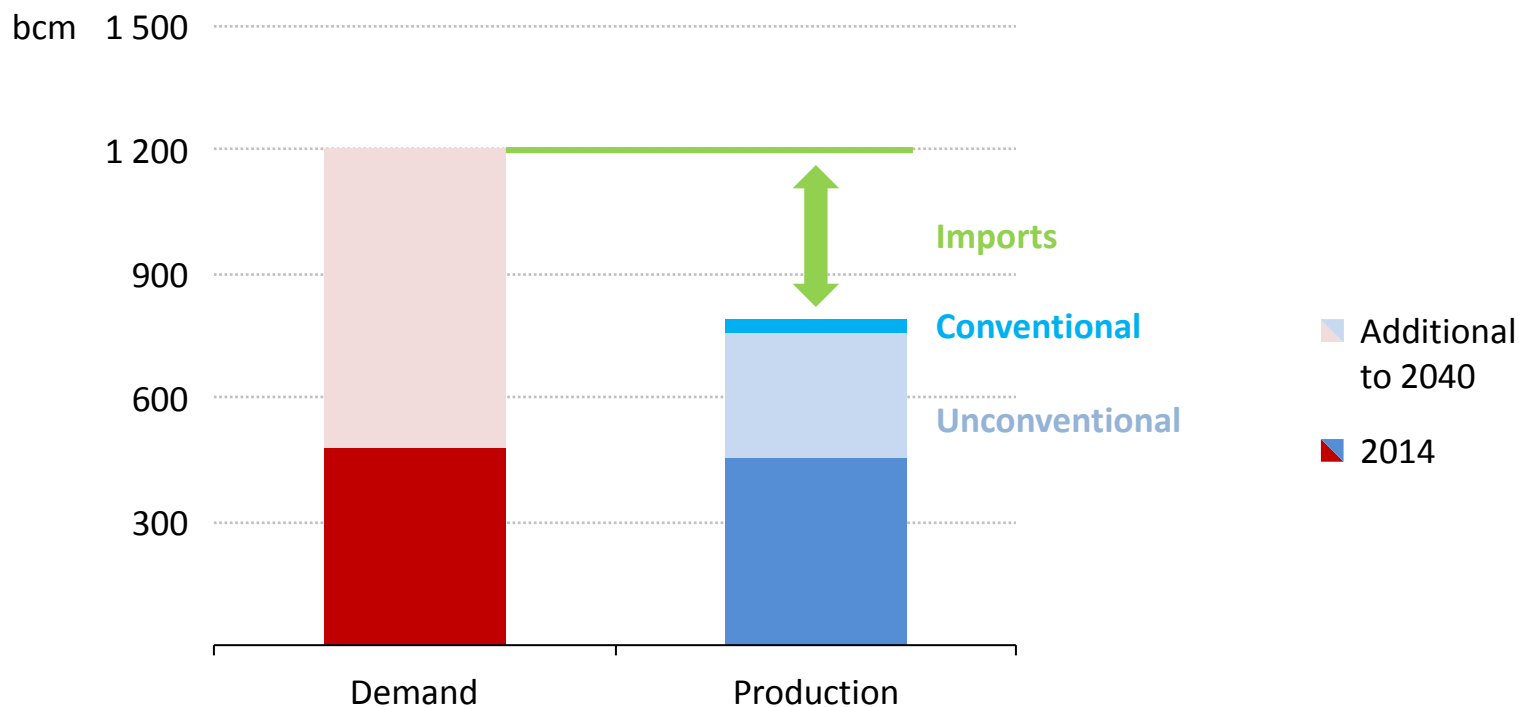
***Tight oil has created more short-term supply flexibility, but there is no guarantee that the adjustment mechanism in oil markets will be smooth***

# If oil prices stay lower for much longer: what would it take, what would it mean?

- **Much more resilient non-OPEC supply & higher output from a stable Middle East could maintain downward pressure on oil prices**
- **Oil importers gain, each \$1/bbl reduction is \$15 billion off import bills; major window of opportunity to press ahead with subsidy reform**
- **If lower prices persist for decades, reliance on Middle East oil gets back to 1970s levels; risk of a sharp market rebound if investment falls short**
- **Lower prices could undercut essential policy support for renewables & energy efficiency, key pillars of the energy transition**
- **A prolonged period of lower prices seems unlikely & would not be all good news**

# The big opportunities & uncertainties for natural gas are in Asia

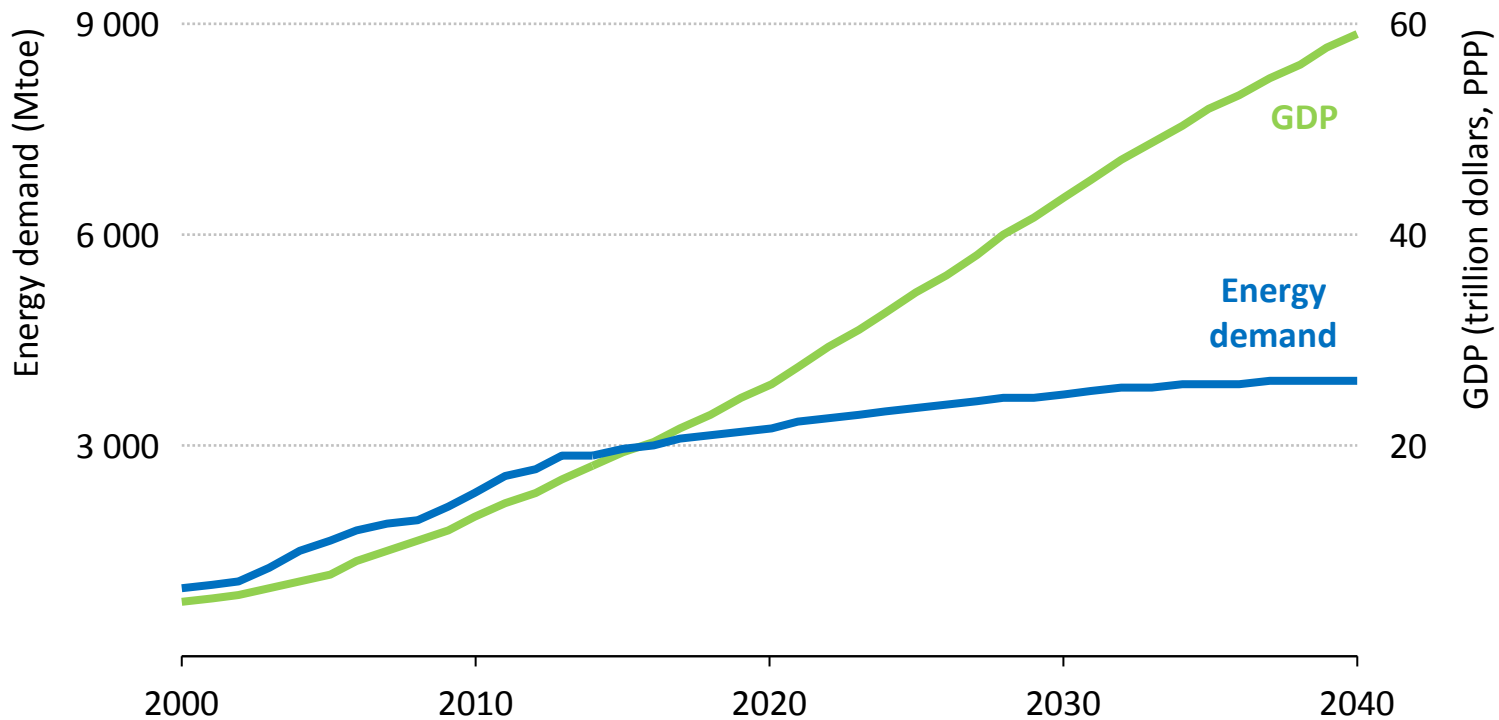
## Natural gas demand and supply in developing Asia, 2040



***Developing Asia accounts for almost half of the rise in global gas demand & 75% of the increase in imports, but gas faces strong competition from renewables & coal***

# A new chapter in China's growth story

## Energy demand in China

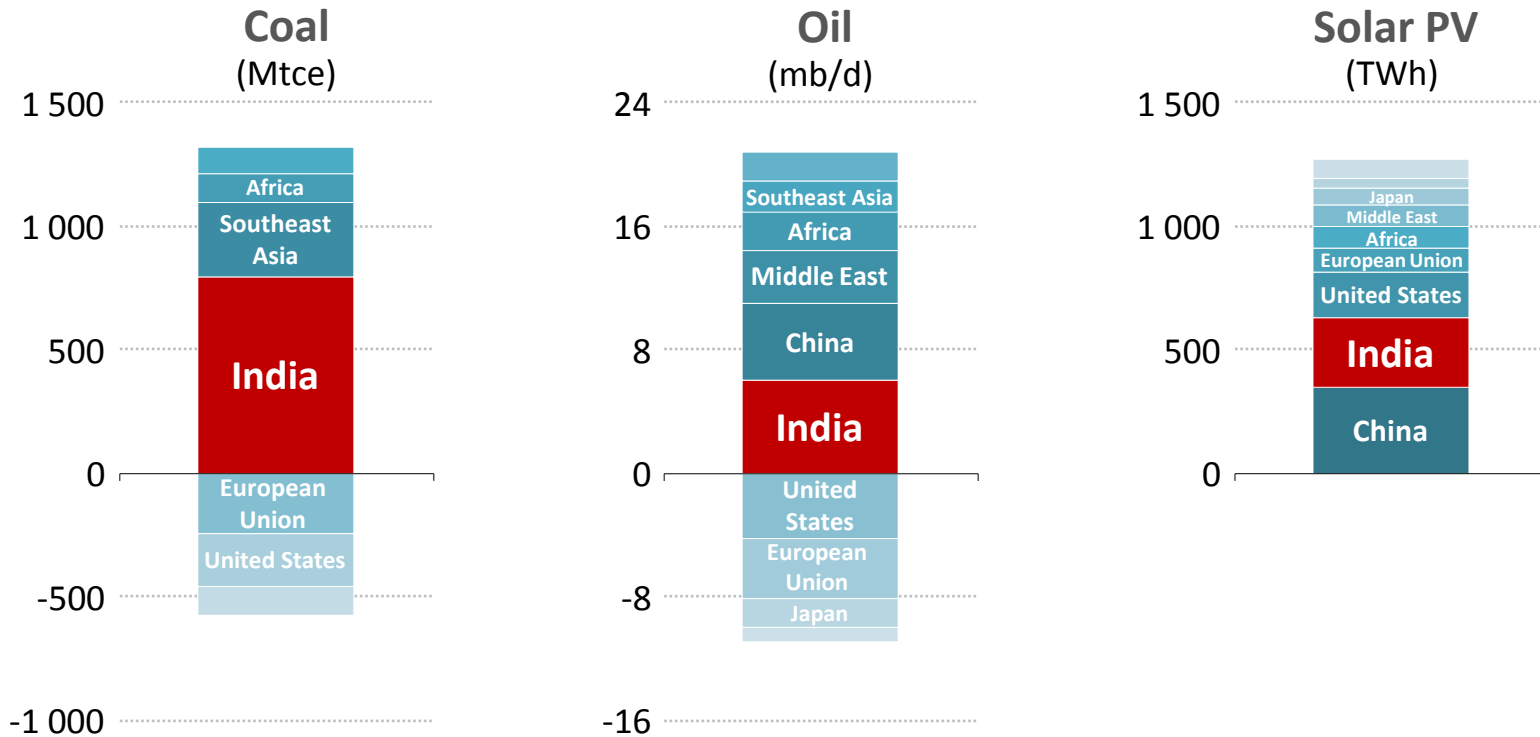


***Along with energy efficiency, structural shifts in China's economy favouring expansion of services, mean less energy is required to generate economic growth***



# India moving to the centre of the world energy stage

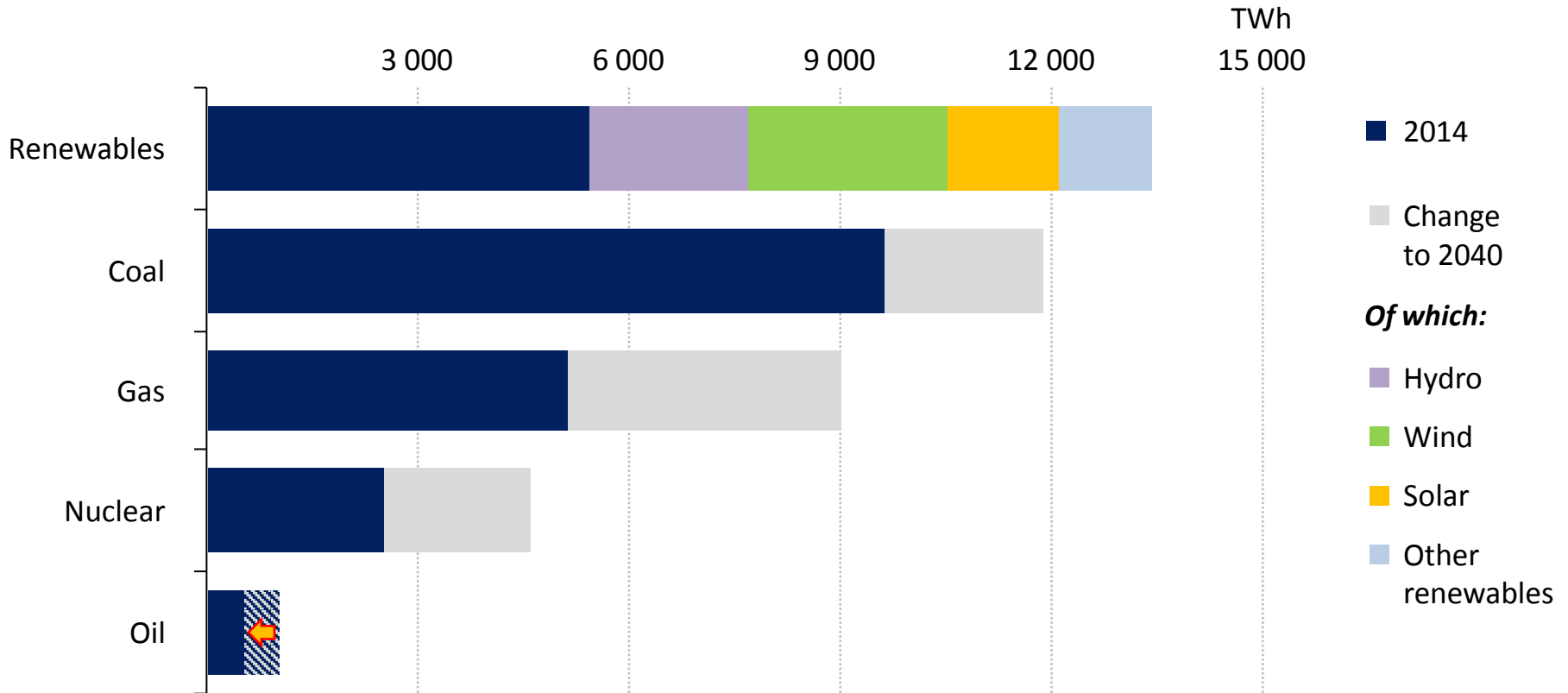
## Change in demand for selected fuels, 2014-2040



***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

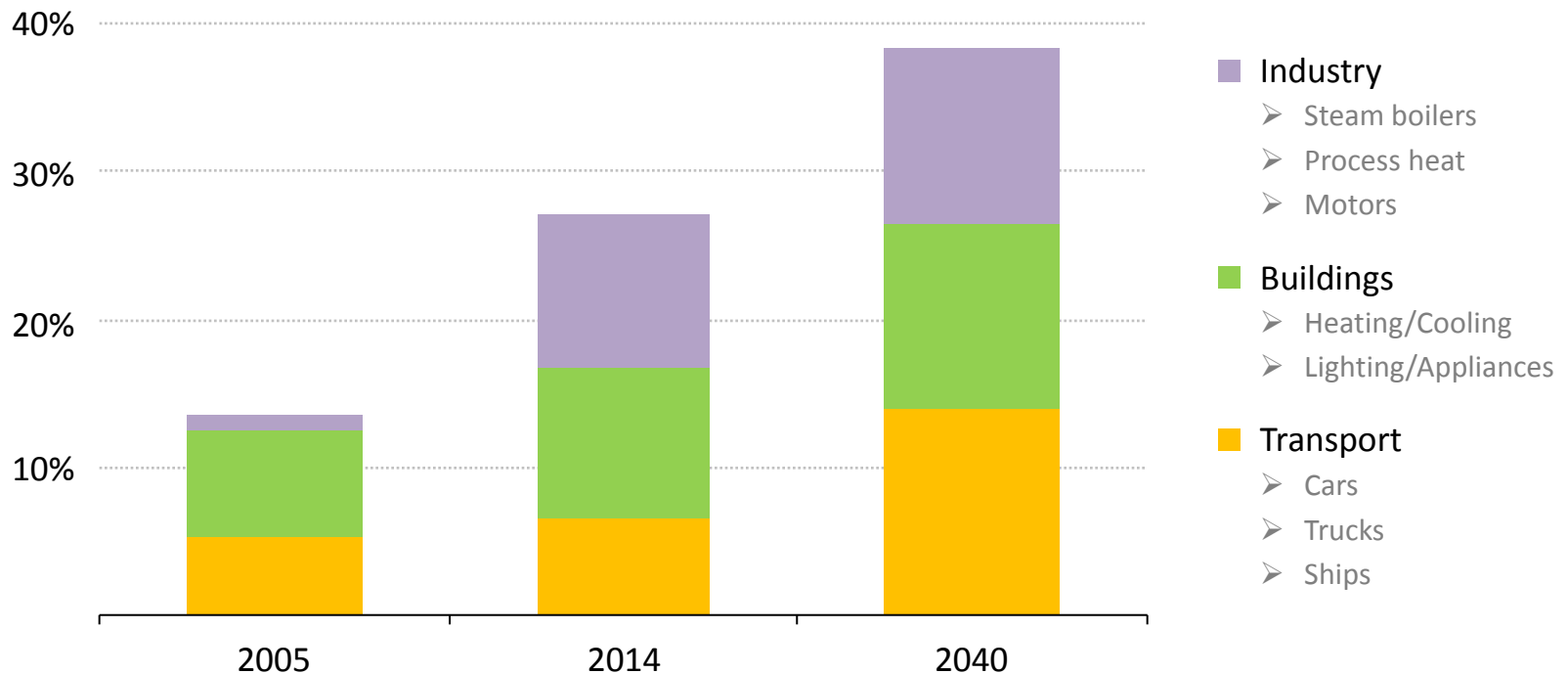
## Global electricity generation by source



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

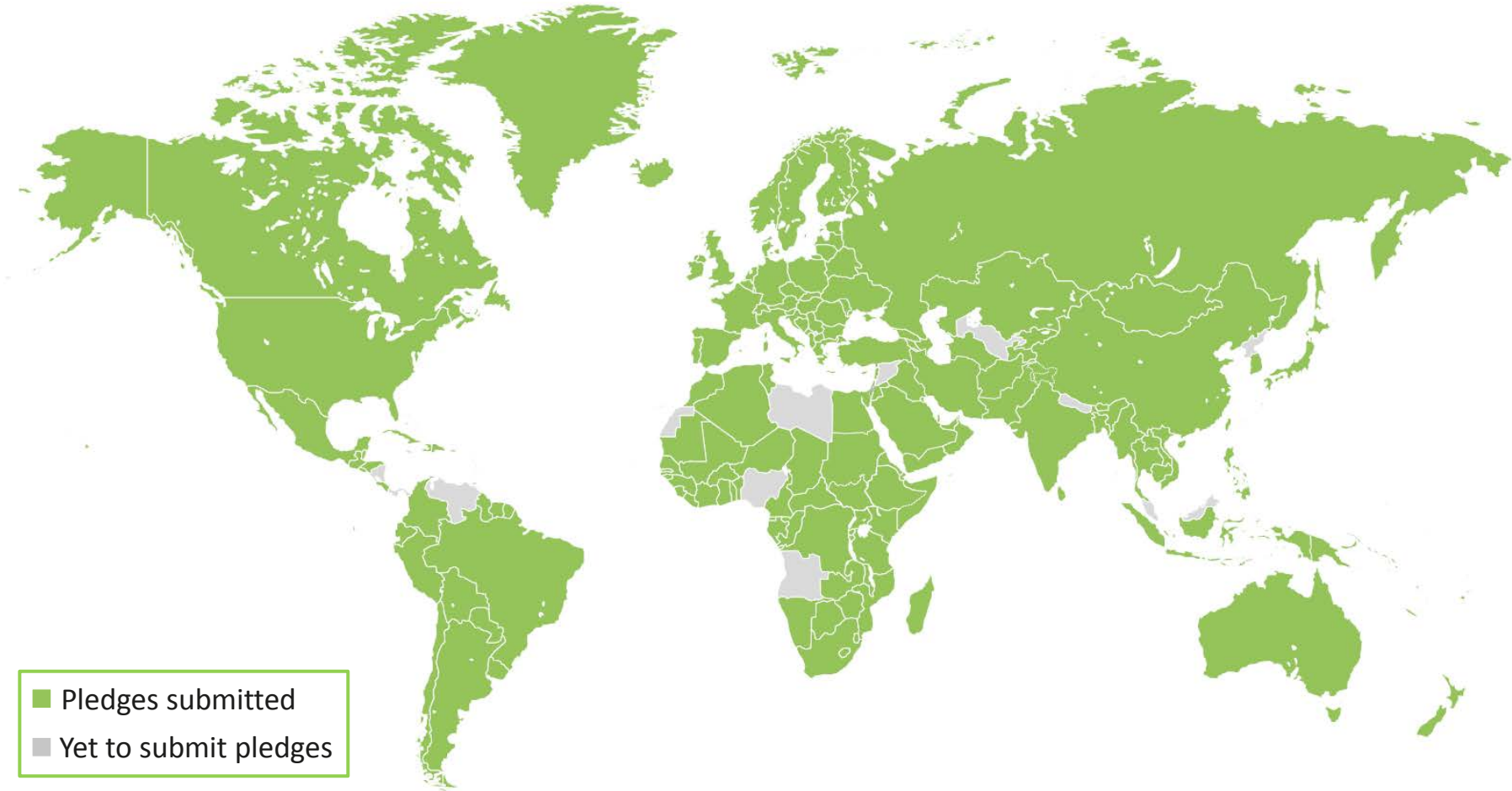
# Efficiency measures on the rise, but significant potential still exists

## 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***

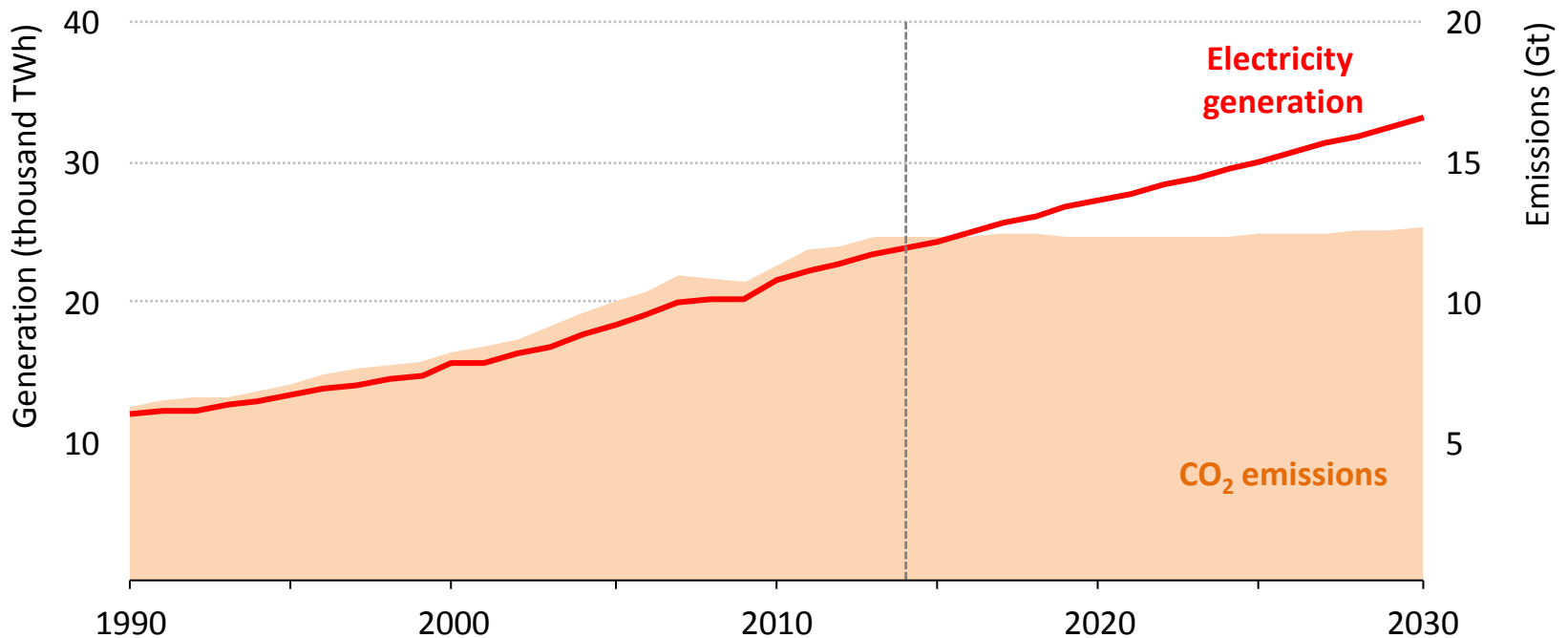
# The coverage of climate pledges is impressive



***Pledges for Paris COP21 are consistent with a temperature rise of 2.7 °C, with investment needs of \$13.5 trillion in low-carbon technologies & efficiency to 2030***

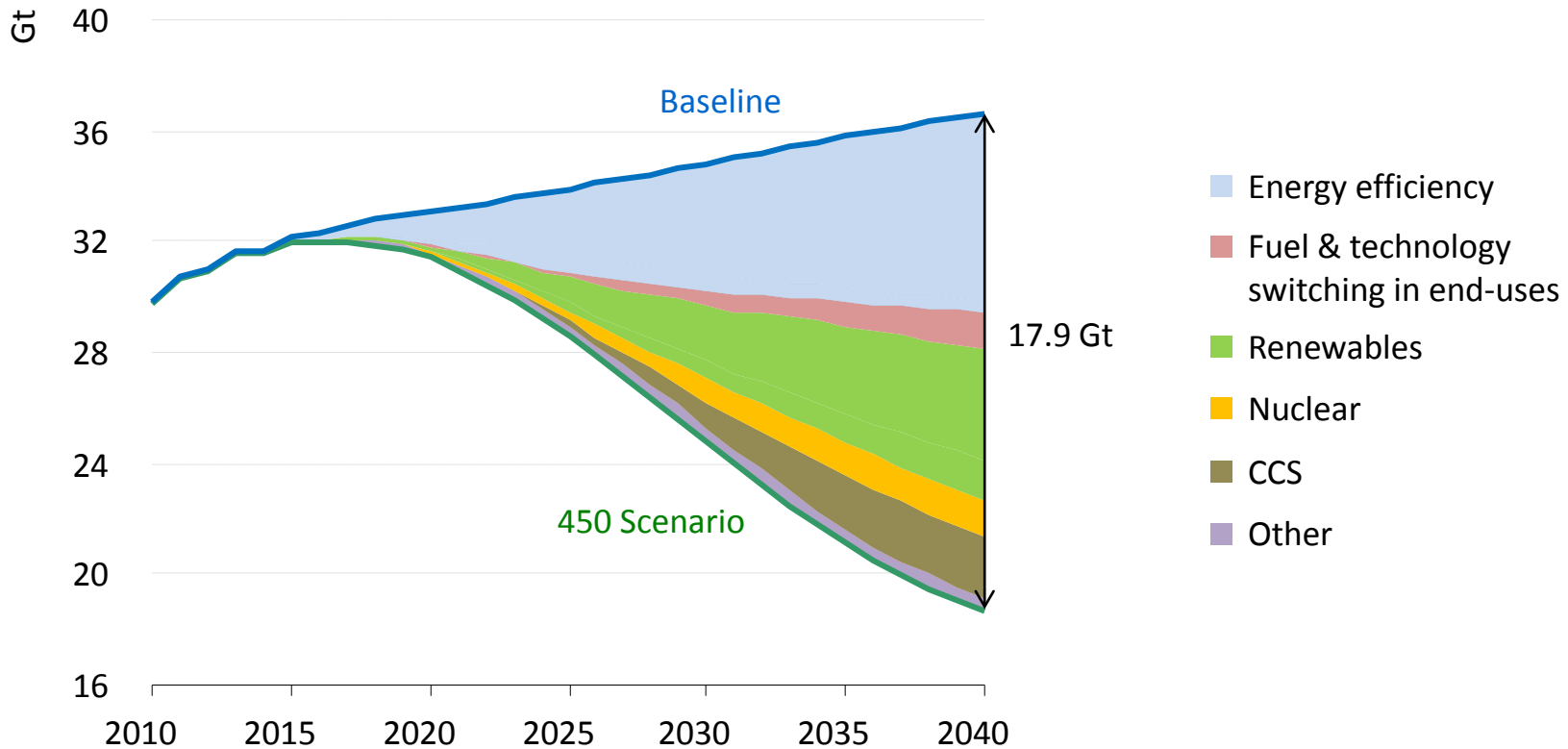
# Climate pledges decouple power sector emissions from electricity demand

## World electricity generation and related CO<sub>2</sub> emissions



***The share of low-carbon power generation grows to almost 45% in 2030 so that power emissions remain flat, while electricity demand grows by more than 40%***

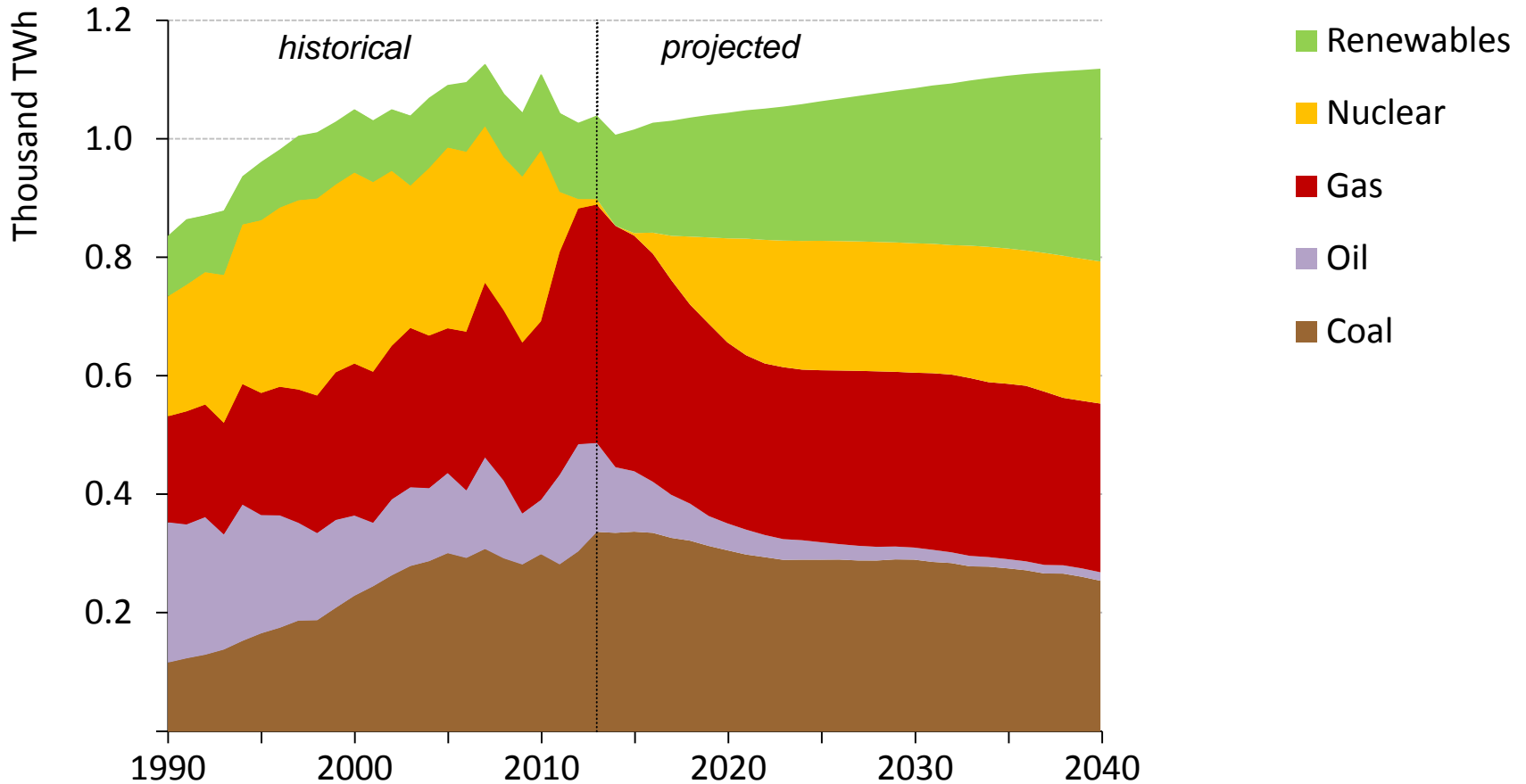
# A 2 °C pathway is still some further efforts away



***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.***

# Japan's power sector sees more diversified mix by 2040

## Japan electricity generation by source



**With gradual restart of nuclear plants & increased use of renewables, Japan's electricity mix becomes increasingly decarbonized by 2040**

# 2015 IEA Ministerial endorsed “3 pillars” to modernise the IEA

- 1. “Opening the doors of the IEA” to the emerging economies**
  - *29 members at present, Mexico joining, plus Chile in accession*
  - *China, Indonesia & Thailand became IEA Association countries, the 1st step in an ongoing process of strengthening engagement*
  - *Many other countries have expressed strong interest in Association*
- 2. Greater emphasis on energy security, including new mandate on gas co-ordination**
- 3. Increased focus on clean energy technology & to become an international hub for energy efficiency**



# Conclusions

- **COP21 sends strong signal for a low-carbon transition – focus must turn to implementation, tracking & building ambition**
- **Low energy prices bring gains to consumers, but can also sow the seeds of future risks to energy security**
- **Key steps for Japan to balance energy security, economic competitiveness & environmental sustainability concerns include:**
  - *Continue to improve energy efficiency*
  - *Further reforms to power markets to maximize the contribution from renewables*
  - *Gradually restart nuclear reactors that get necessary safety approvals*
- **Japan has a crucial opportunity as G7 President in 2016**
  - *The IEA stands ready to support Japan's work in G7 on global gas security & energy technology innovation*



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# World Energy Outlook 2015

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