



# GLOBAL ENERGY INVESTMENTS: WHAT'S NEXT?

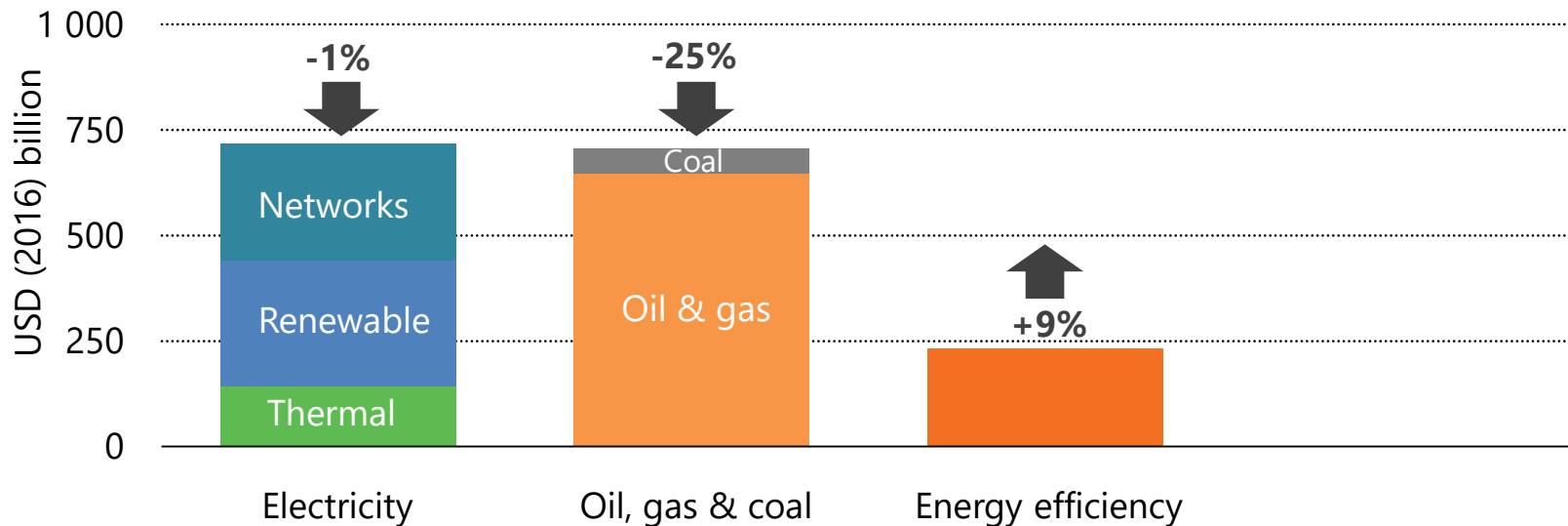
---

Dr. Fatih Birol, Executive Director, International Energy Agency  
IICEC 8th International Energy and Climate Forum, 13 October 2017



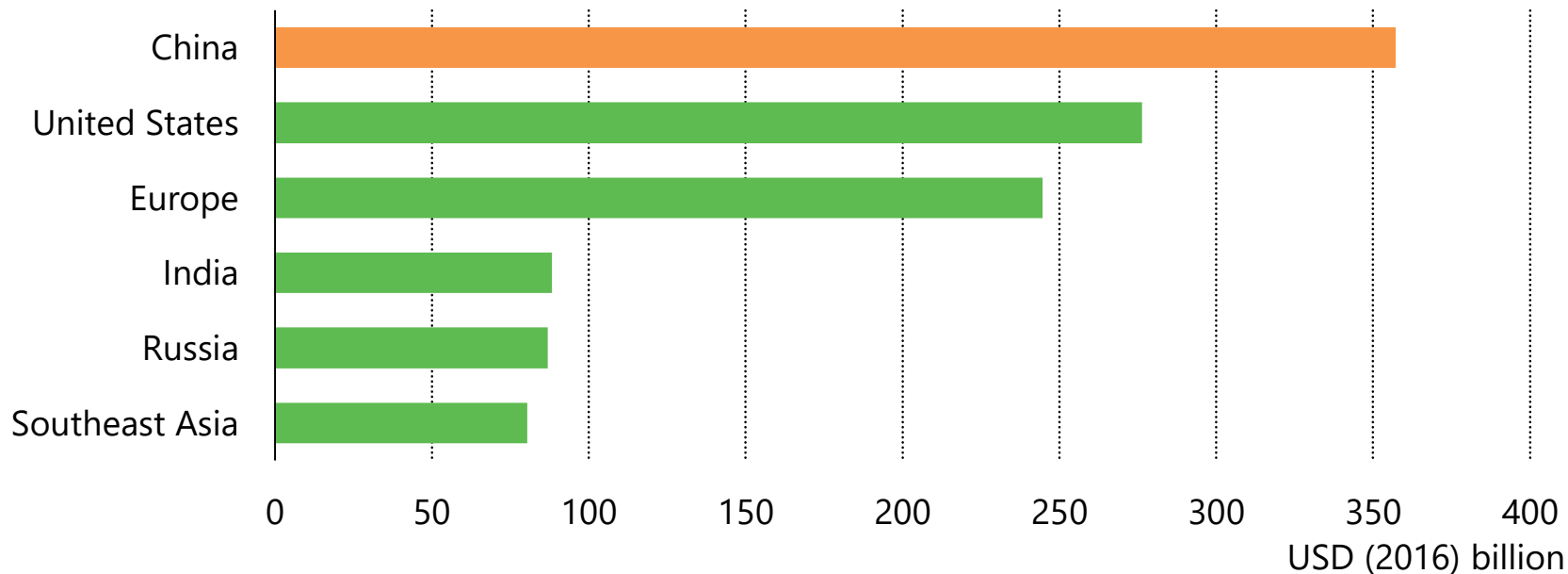
- Global energy markets are changing rapidly
  - *North America entering a new age of energy prosperity*
  - *Solar at records highs, driven by policy support & cost reductions*
  - *Electric car sales are growing exponentially*
- Digitalization is having profound impacts on the energy sector
- Local air pollution is becoming a key driver of energy policy
- There is no single story about the future of global energy; policies will determine where we go from here

# Global energy investment fell 12% in 2016, a second consecutive year of decline



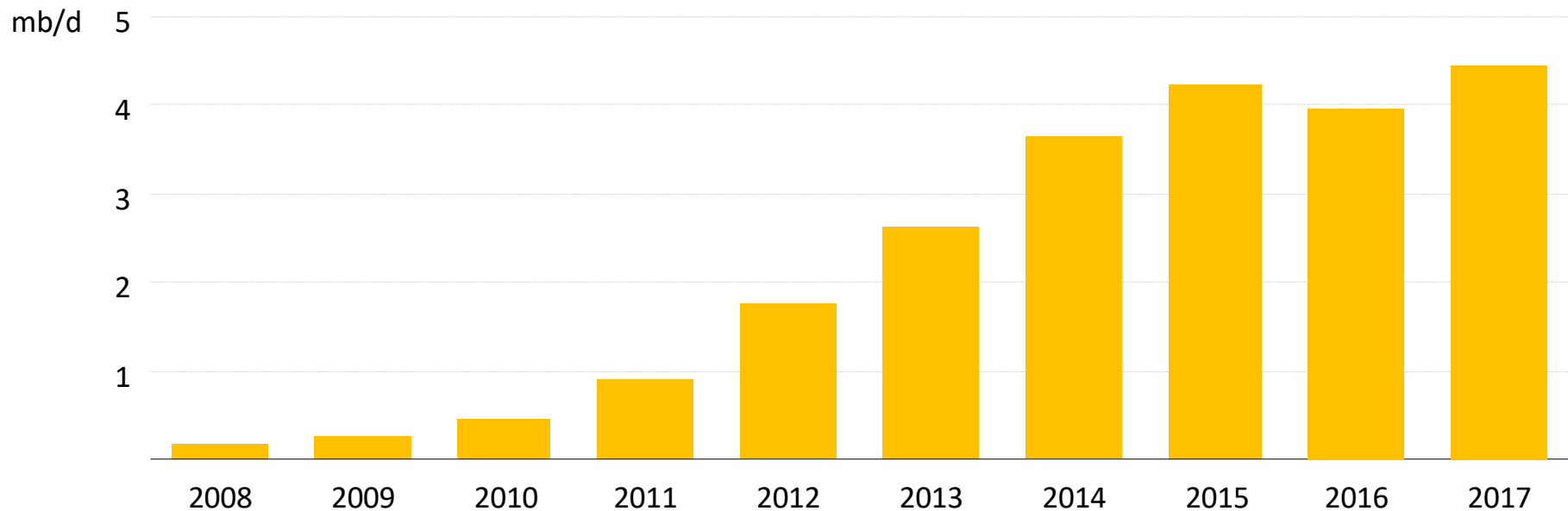
**Total energy investment was \$1.7 trillion in 2016;  
Electricity sector investment overtook oil and gas for the first time, while energy efficiency saw the biggest growth**

# China remains the first destination of energy investment in 2016



**China represented 21% of global energy investment (supported by renewables, electricity networks and energy efficiency), followed by the US and Europe**

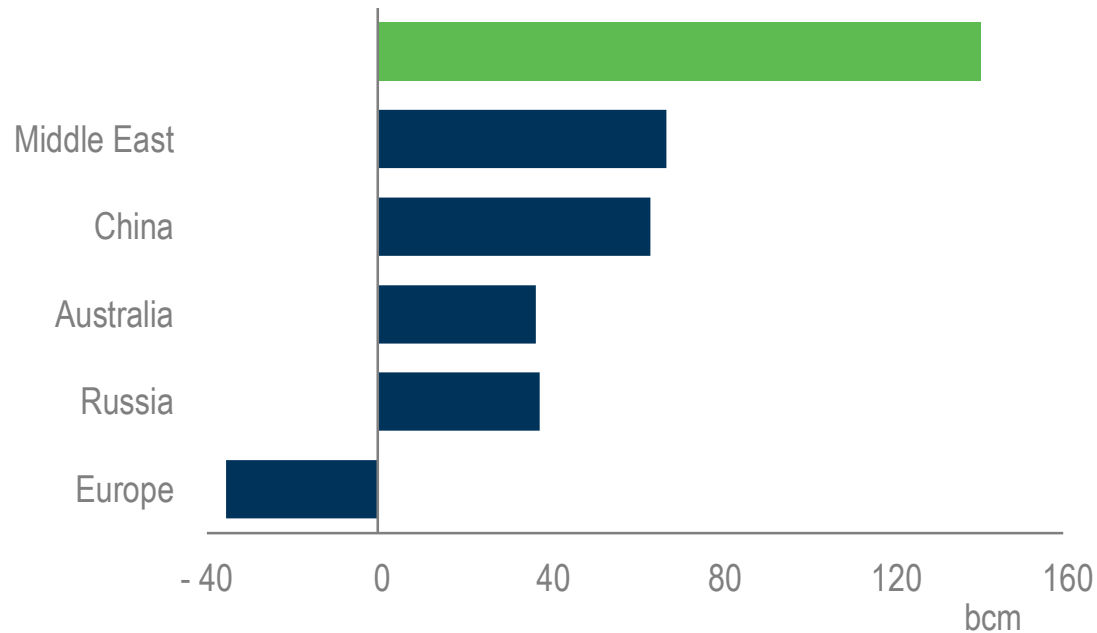
## US shale oil production



**US shale oil has surged in recent years on enormous cost savings & technological improvements;  
The US is set to lead the growth in global oil supply over the next 5 years**

# Natural Gas: The United States accounts for 40% of global production growth

Global natural gas production growth, 2016-22

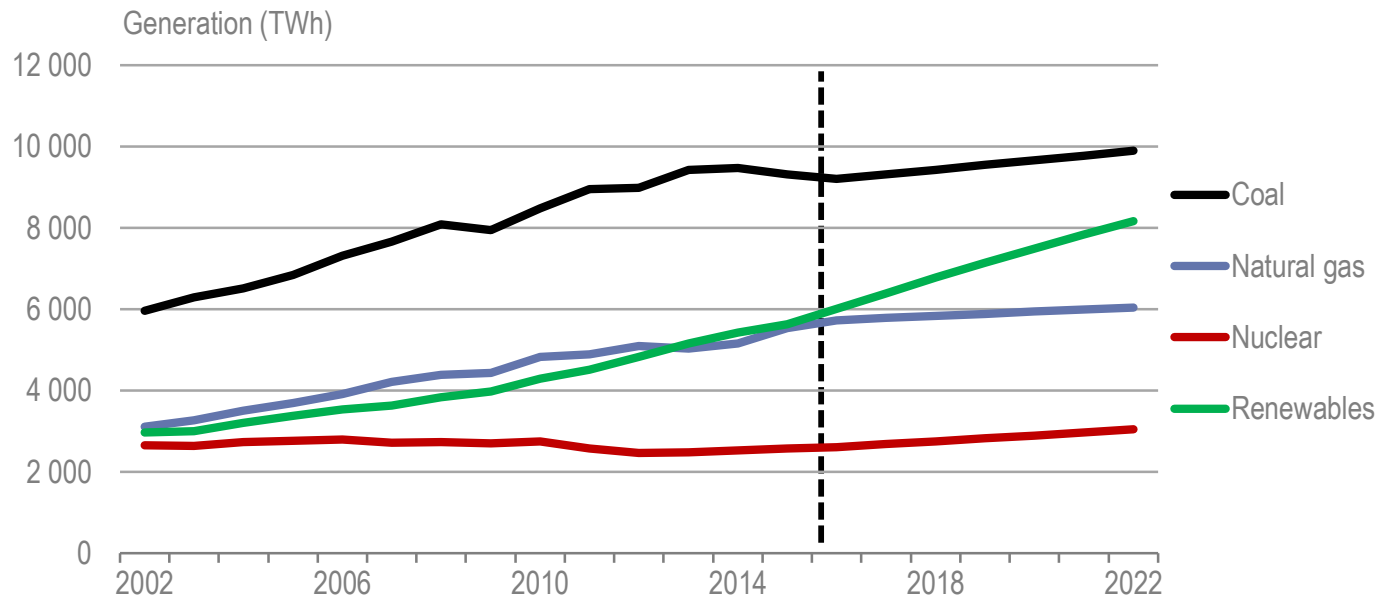


**Since 2009, US shale has added the equivalent of two Qatars to the global balance; Middle East and China set to significantly expand production to 2022**

# Renewables closing the gap with coal



## Electricity generation by fuel

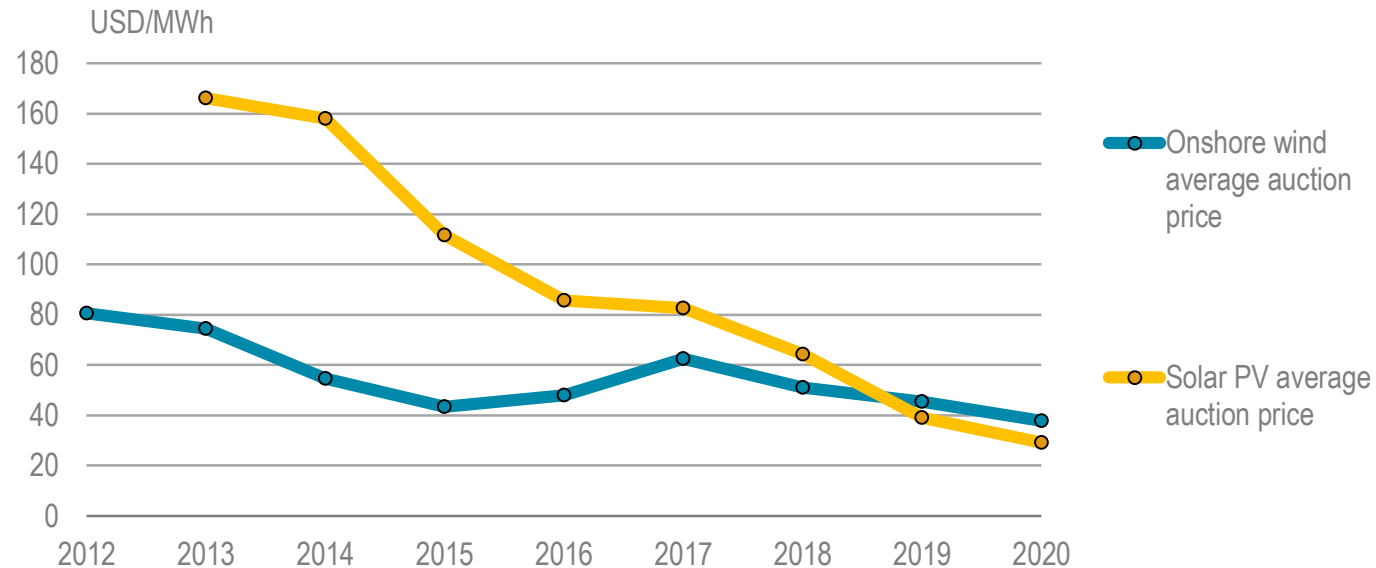


**Renewable generation to expand by over a third with its share increasing from 24% in 2016 to 30% in 2022, rapidly closing the gap with coal**

# Competition driving renewables costs down



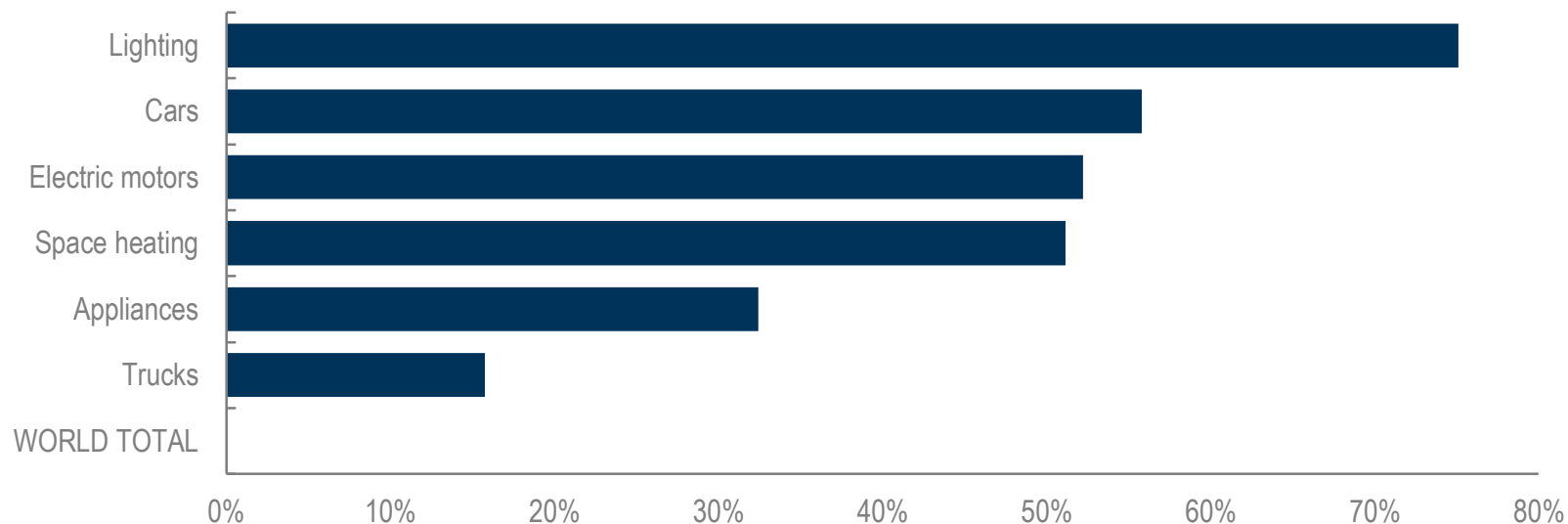
Announced wind and solar PV average auction prices by commissioning date



**Price discovery through competitive auctions effectively reduces costs along the entire value chain;  
Auctions with long-term contracts will drive almost half of new capacity growth**

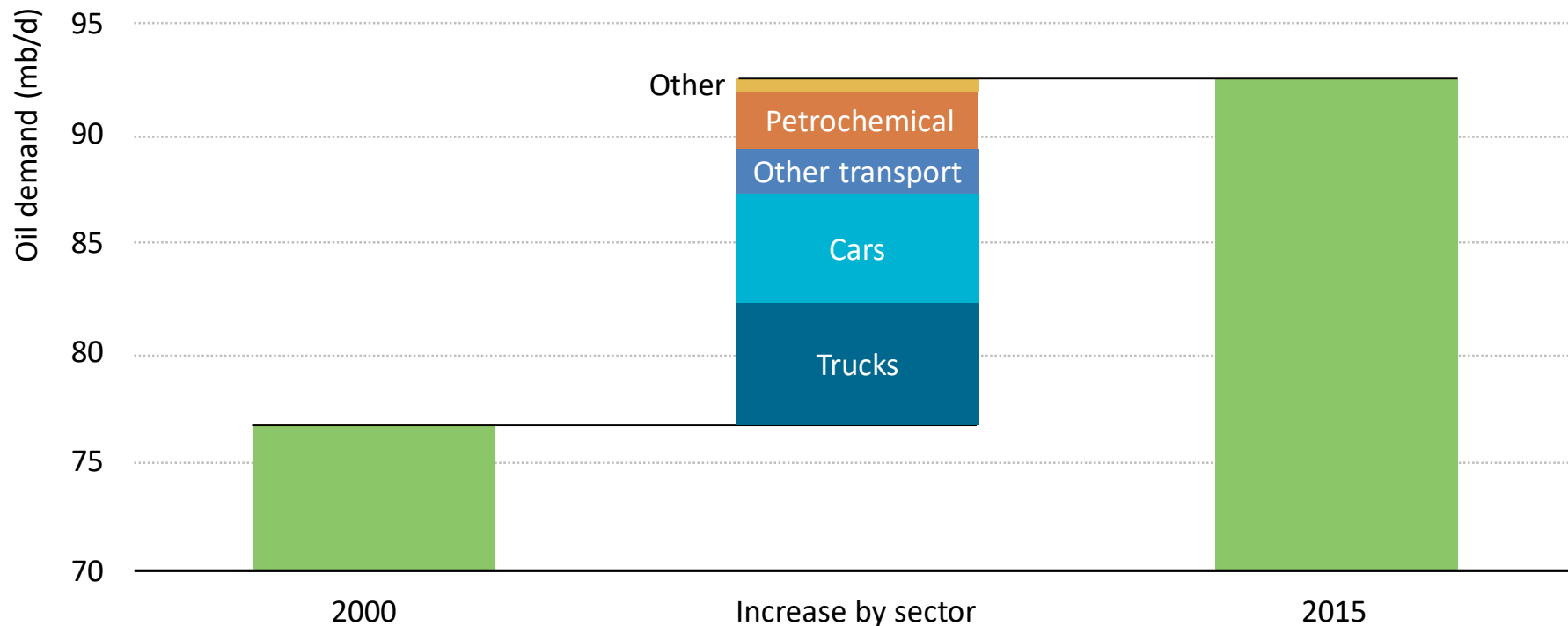


## Share of global energy use covered by mandatory efficiency policies, 2016



**The amount of global energy use covered by mandatory efficiency policies grew in 2016, but 68% of energy use remains uncovered. We owe the efficiency gains of today to the policies of the past.**

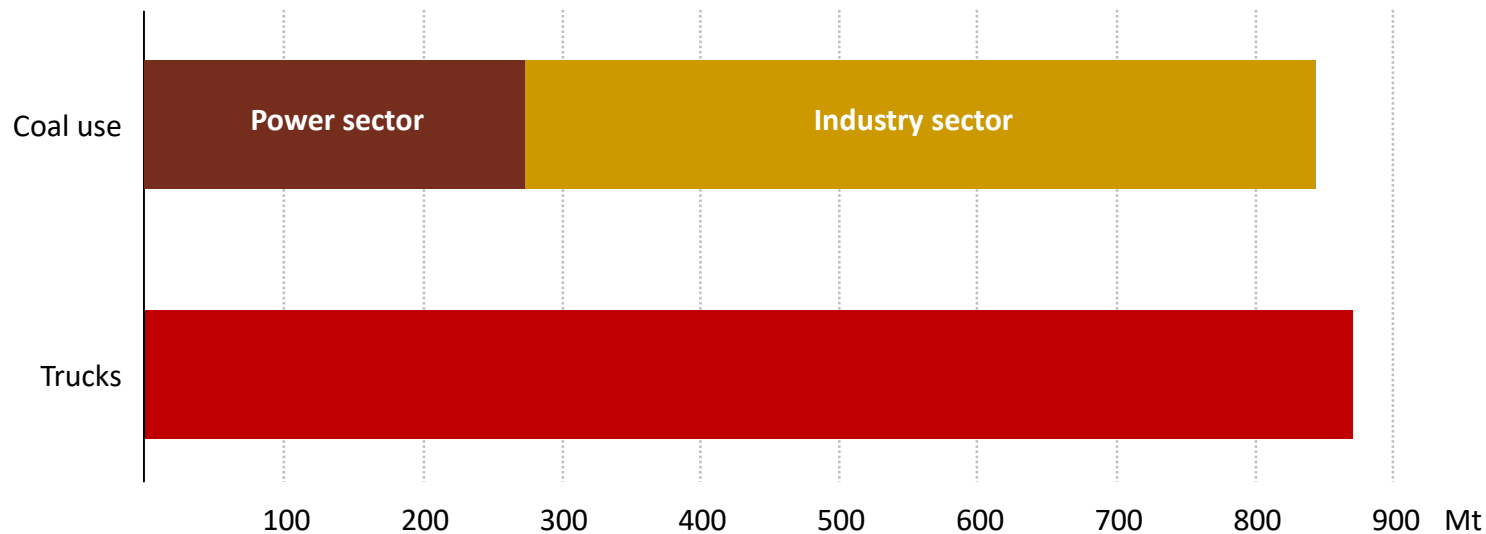
# Trucks drive global oil demand



**Trucks were responsible for nearly 40% of the growth in global oil demand since 2000; they are the fastest growing source of oil demand, in particular for diesel.**

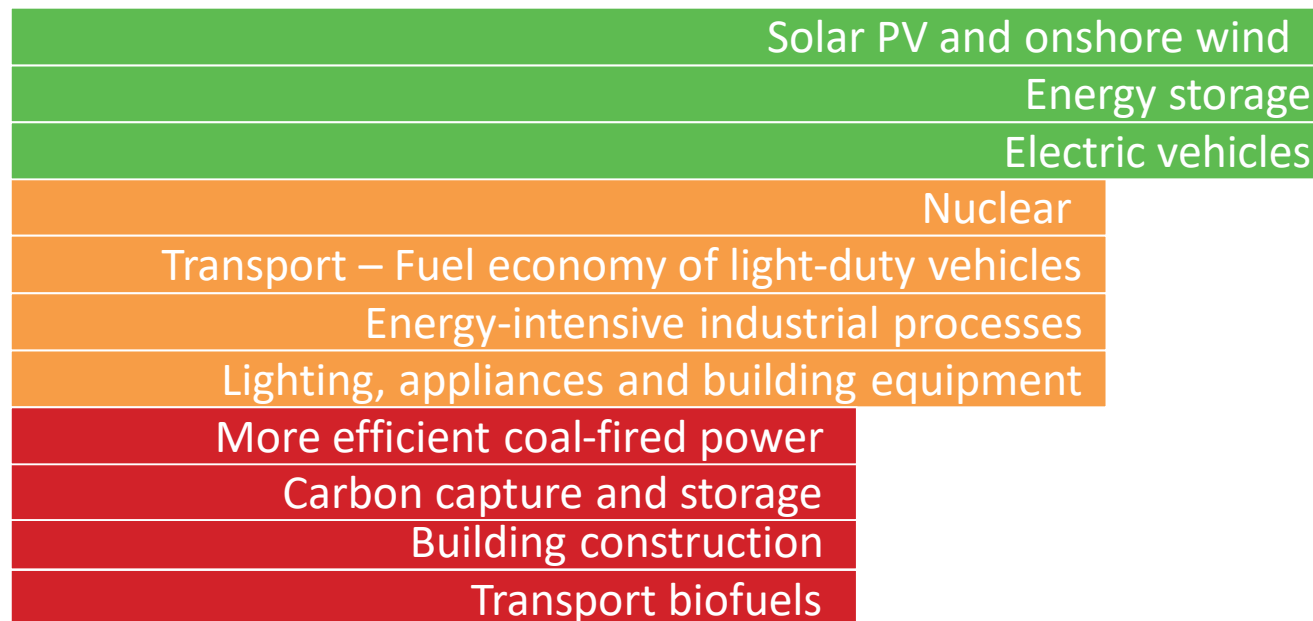
# A modern truck sector is still a long haul away

## CO<sub>2</sub> emissions growth in the Reference Scenario, 2015-2050



**Nearly 40 countries have fuel efficiency standards for cars.  
Only Canada, China, Japan and the United States have standards for trucks.**

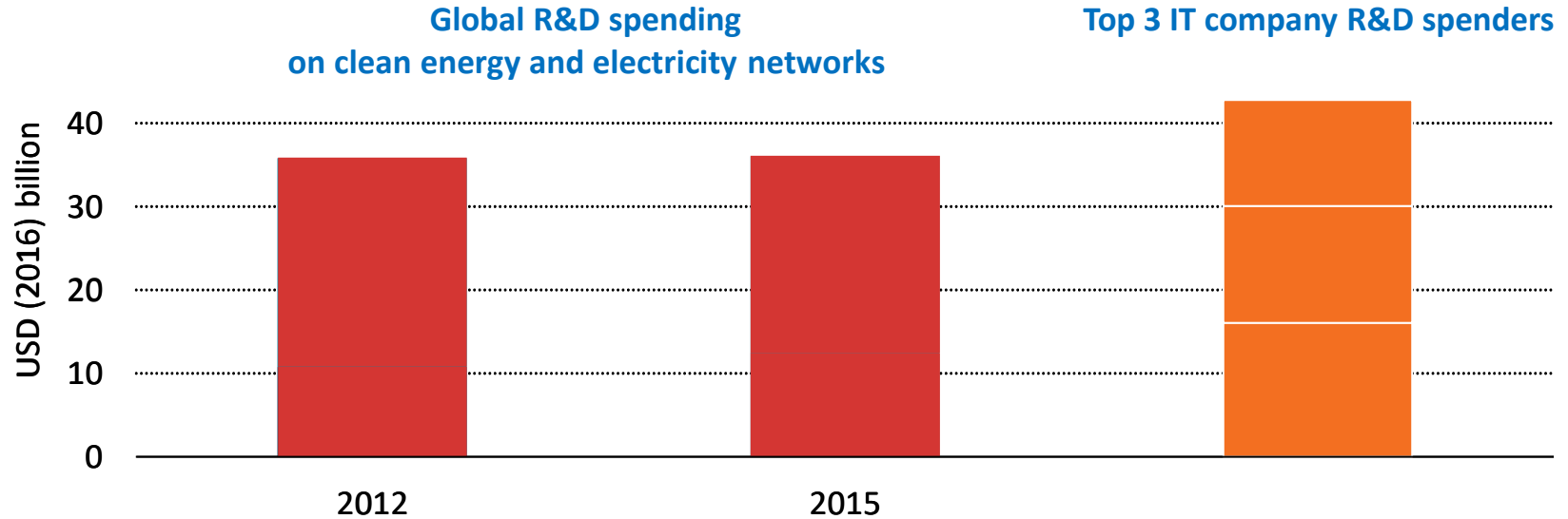
# The potential of clean energy technology remains under-utilised



● Not on track   ● Accelerated improvement needed   ● On track

**Recent progress in some clean energy areas is promising, but many technologies still need a strong push to achieve their full potential and deliver a sustainable energy future**

# Global clean energy R&D funding needs a strong boost



**R&D funding on clean energy has remained steady at around \$37 billion/year, leaving significant room for growth**

- While a continued focus on oil security is essential, a broader approach to energy security is needed to reflect changing nature of natural gas & electricity markets
- New oil market dynamics & subdued upstream investment are ushering in a period of greater market volatility
- A wave of LNG is the catalyst for a second natural gas revolution, with far-reaching implications for gas pricing & contracts
- The next chapter in the rise of renewables requires more work on systems integration & expanding their use beyond the power sector
- Addressing environmental challenges will require an energy transition of exceptional scope, depth & speed, including stronger R&D efforts