



Global Energy Markets in Transition: Implications for the economy, environment & geopolitics

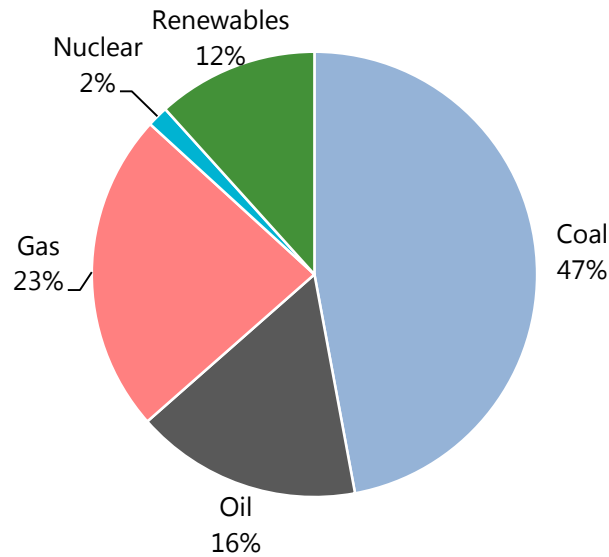
Dr. Fatih Birol, Executive Director, International Energy Agency

15th IAEE European Conference 2017 Vienna, 4 September 2017

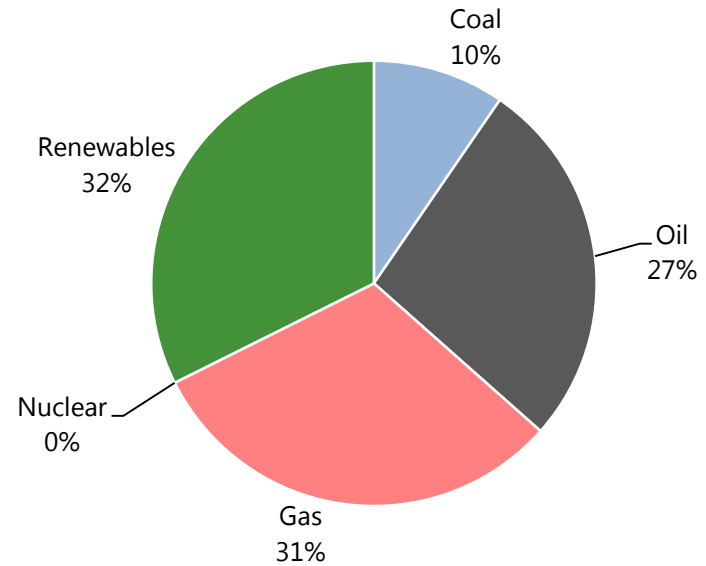


- Global energy markets are changing rapidly
 - *Renewables supplied half of global electricity demand growth in 2016*
 - *Global energy intensity fell by 2.1% in 2016*
 - *Electric car sales were up 40% in 2016, a new record year*
- Universal access to modern energy remains a distant goal
 - *1.2B people lack access to electricity; 2.7B people lack access to clean cooking*
- Energy & geopolitics remain intrinsically linked, but the changing energy landscape is altering the nature of this relationship

Shares in *growth* in world energy demand



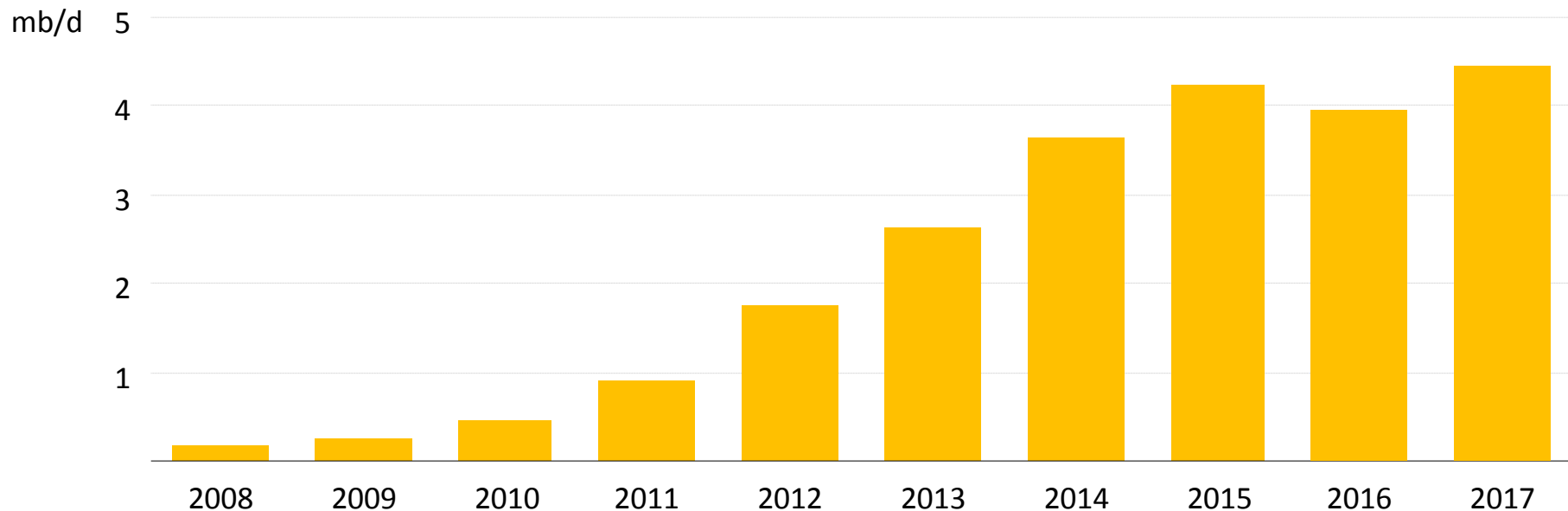
2000-2010



2010-2016

Since 2010, efficiency measures have slowed down growth in global energy consumption; Renewables and natural gas account for almost two-thirds of the growth.

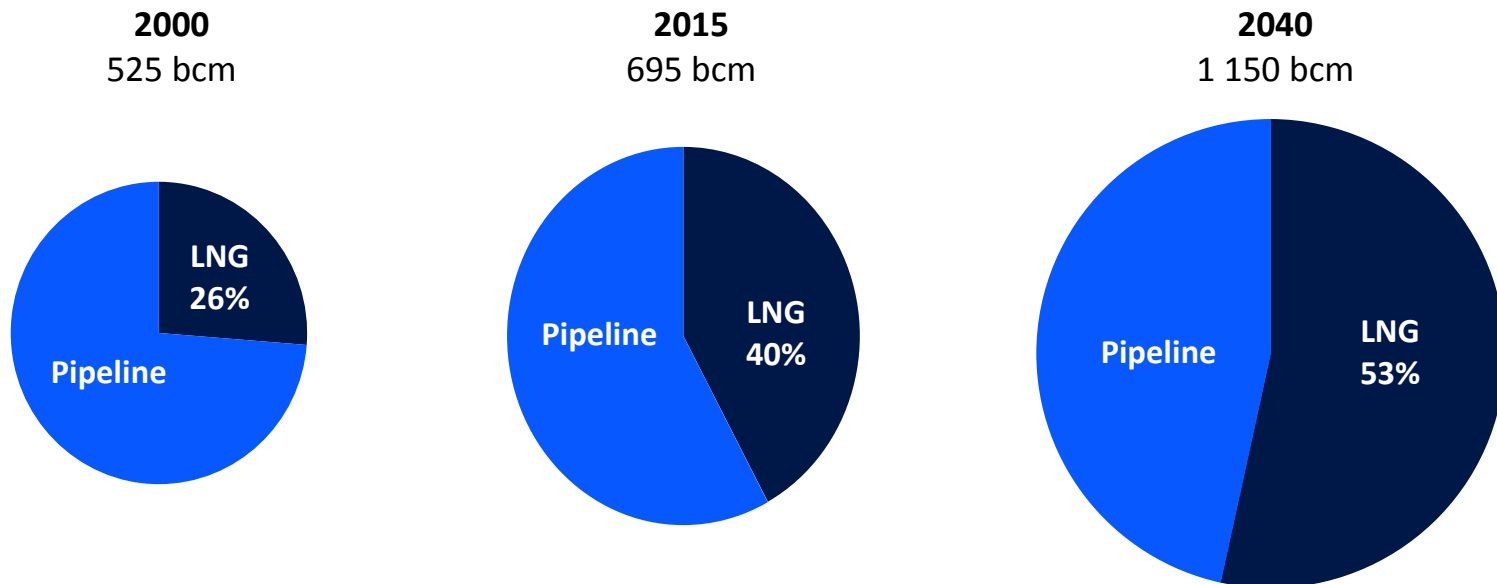
US shale oil production



**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**

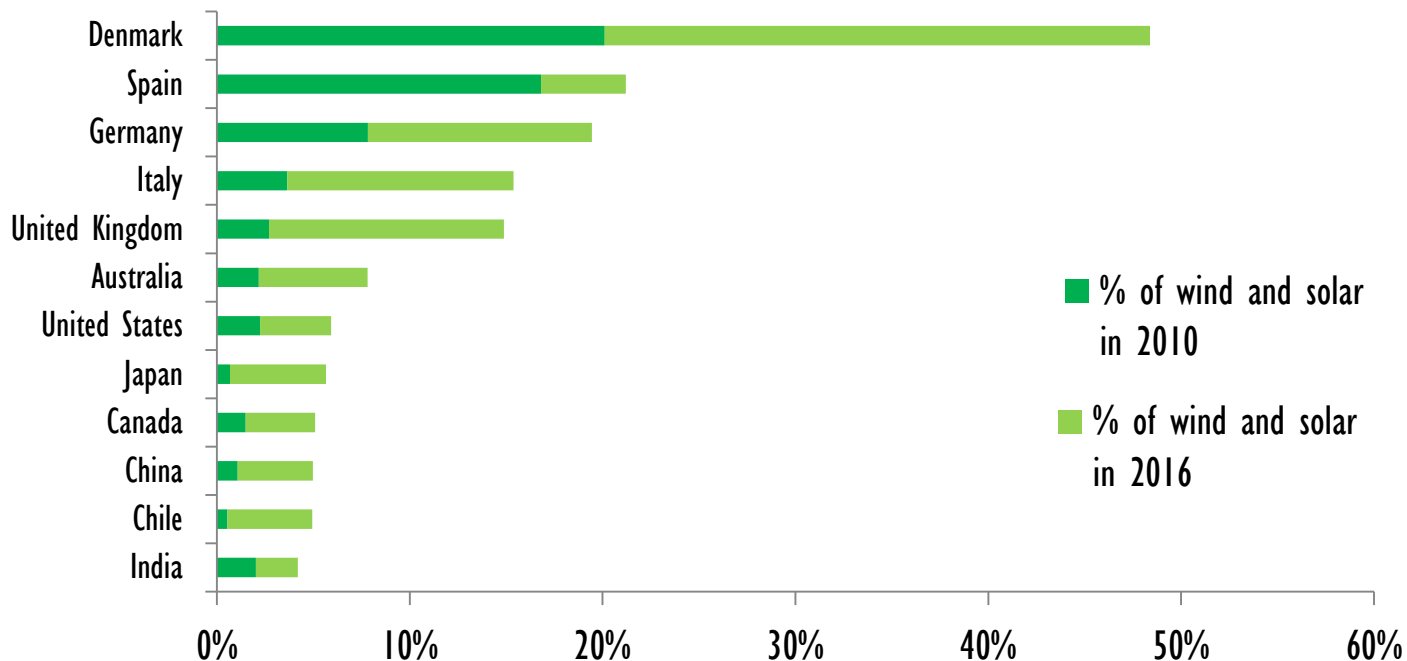
A 2nd natural gas revolution is changing the gas security equation

Share of LNG in global gas trade



A wave of new LNG supply, led by Australia and the US will improve the ability of the system to react to potential demand or supply shocks, but security of gas supply cannot be taken for granted

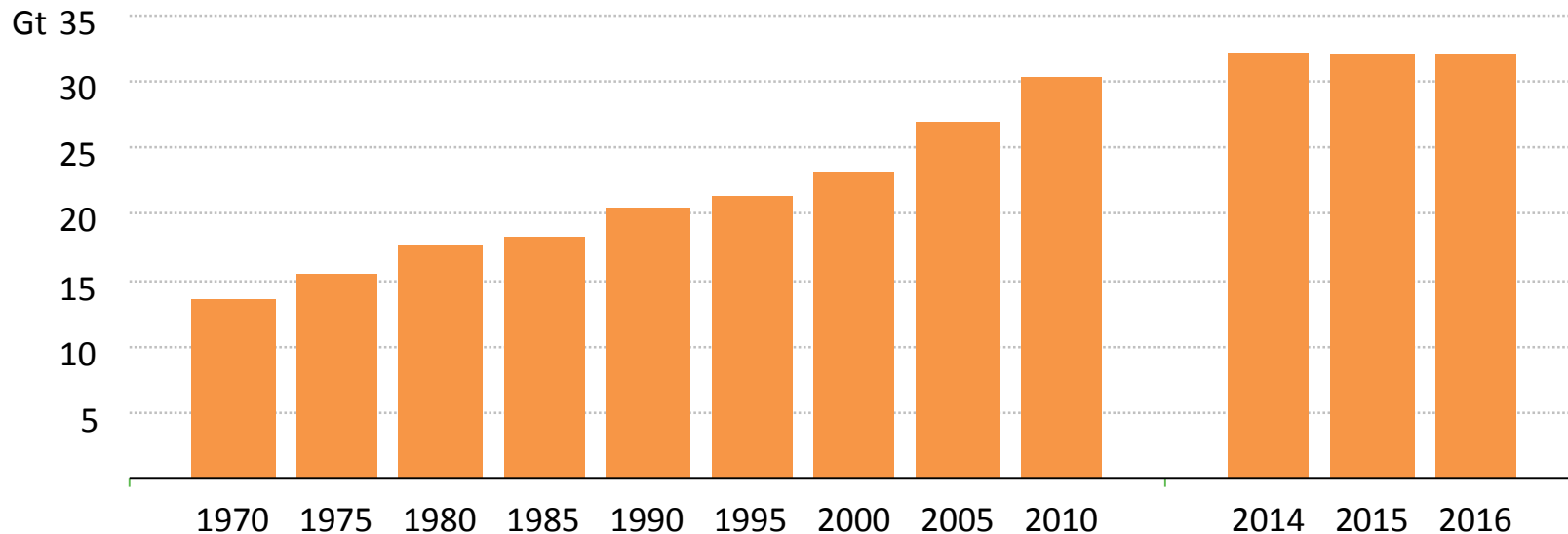
Share of wind and solar in total electricity generation in selected countries



Better grids, more flexible power plants and storage & demand side response will be needed to integrate larger shares of wind & solar in a secure and cost-effective way

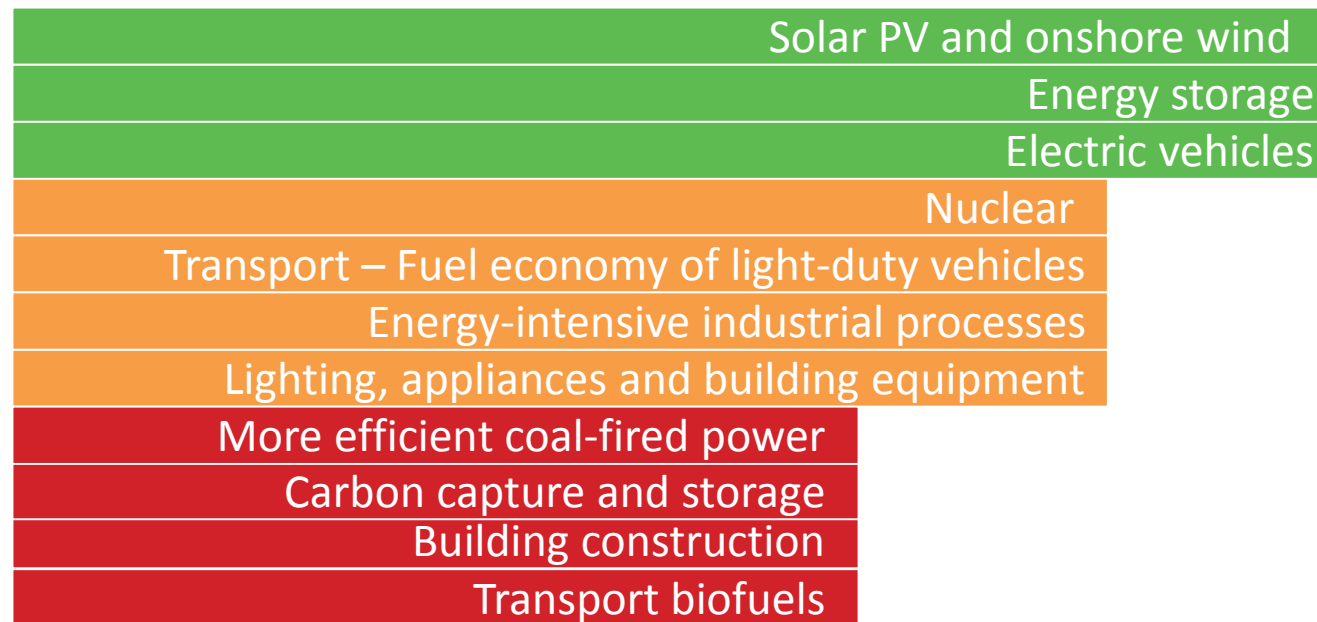
Global CO₂ emissions flat for 3 years – an emerging trend?

Global energy-related CO₂ emissions



IEA analysis shows that global CO₂ emissions remained flat in 2016 for the third year in a row, even though the global economy grew, led by emission declines in the US & China

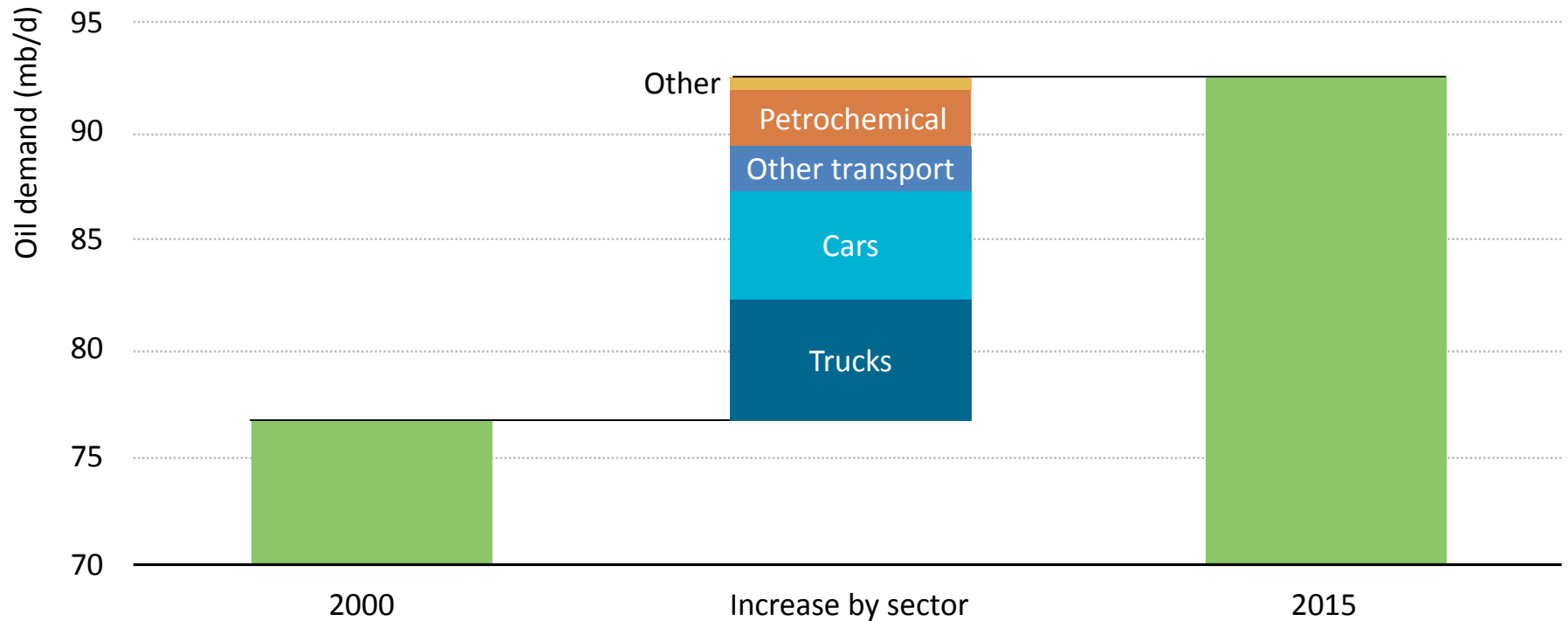
The potential of clean energy technology remains under-utilised



● 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

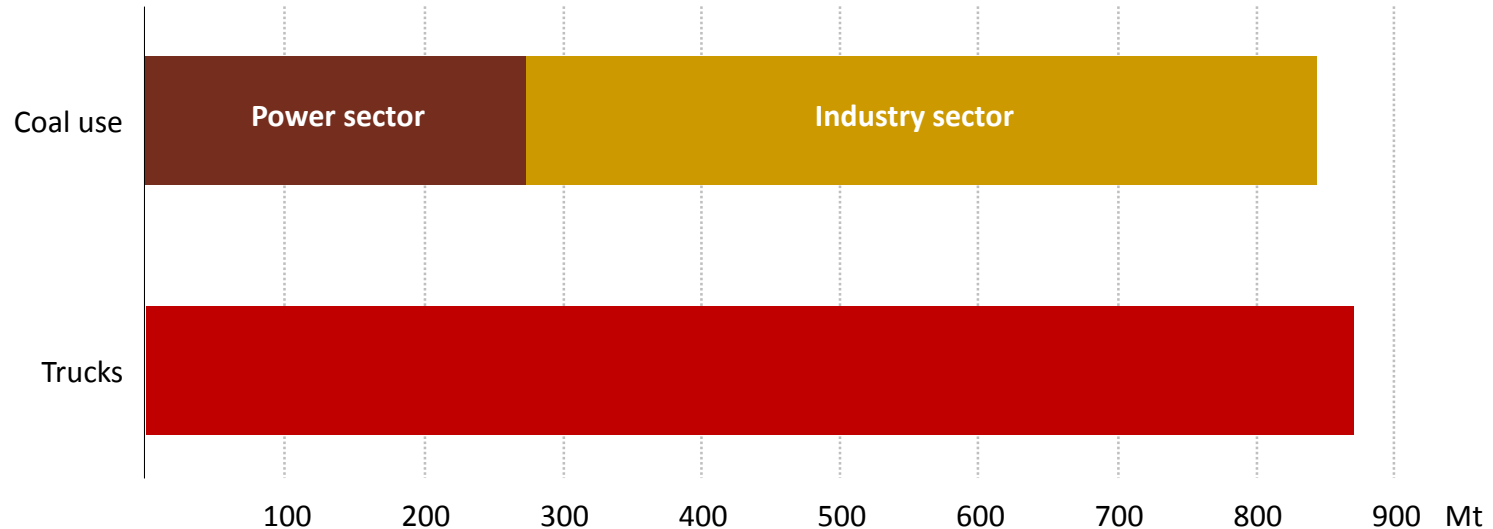
Trucks drive global oil demand



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.

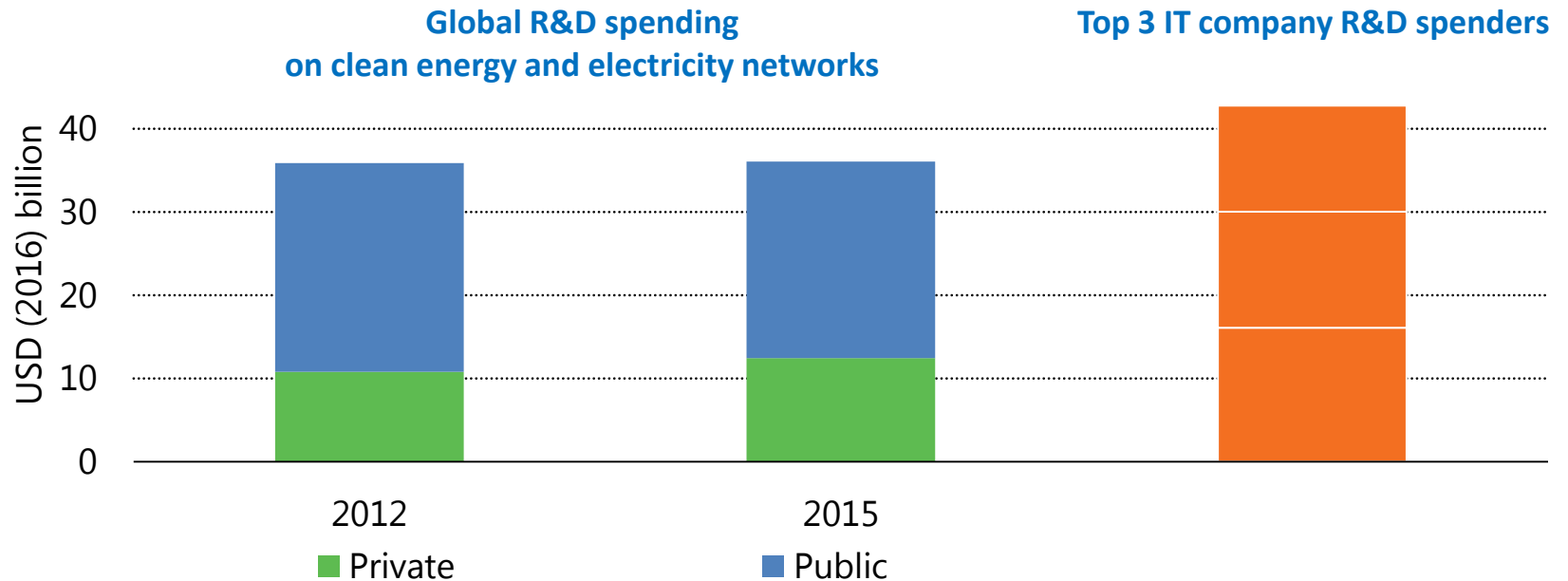
A modern truck sector is still a long haul away

CO₂ emissions growth in the Reference Scenario, 2015-2050



Without further policy efforts, trucks will account for 40% of the oil demand growth to 2050 and 15% of the increase in global CO₂ emissions

Global clean energy R&D funding needs a strong boost



We've tracked a steady \$37 billion/year of clean energy and electricity networks R&D spending, with room for growth from the private sector. As a share of GDP, China now spends most on energy R&D

- 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
- US shale oil triggers a deep transformation of oil industry dynamics
- 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
- Limiting the global temperature rise to 2°C would require an energy transition of exceptional scope, depth & speed, including stronger R&D efforts