

World Energy Outlook 2017

**Impacts of the energy-sector
transition on supply**

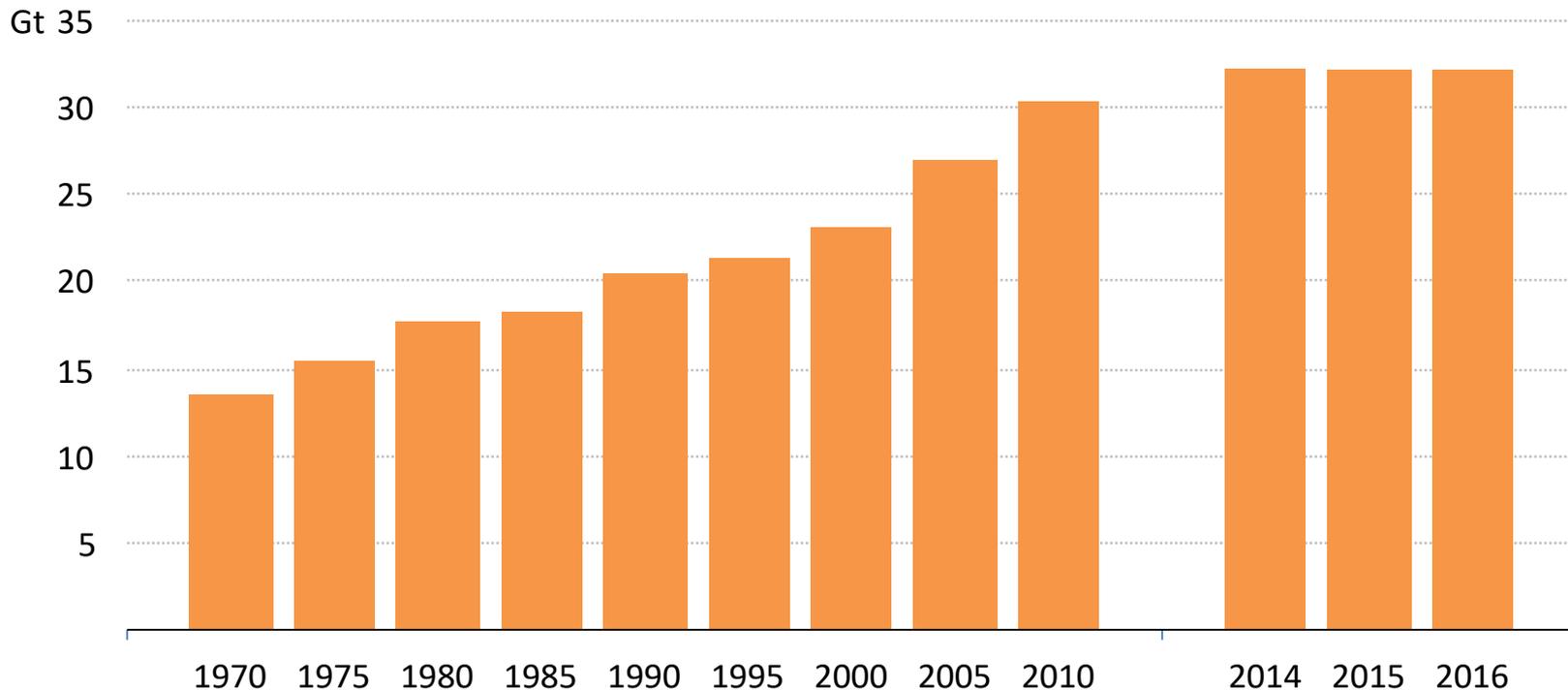
Christophe McGlade

Evidence for the energy-sector transition

- **Global energy intensity fell by 1.8% in 2015 and by 2.1% in 2016, around twice the rate of improvement seen in the previous decade**
- **In 2015, global coal consumption decreased for the first time in this century and fell again in 2016**
- **Renewables supplied half of global electricity demand growth in 2016; global renewable capacity now exceeds that of coal**
- **Average cost of solar PV has fallen by over 75% since 2008; 20% of wind generation is now competitive without subsidy**
- **Number of electric cars on the road in 2015 surpassed 1 million and sales in 2016 were up 40% on 2015**

Global CO₂ emissions flat for 3 years

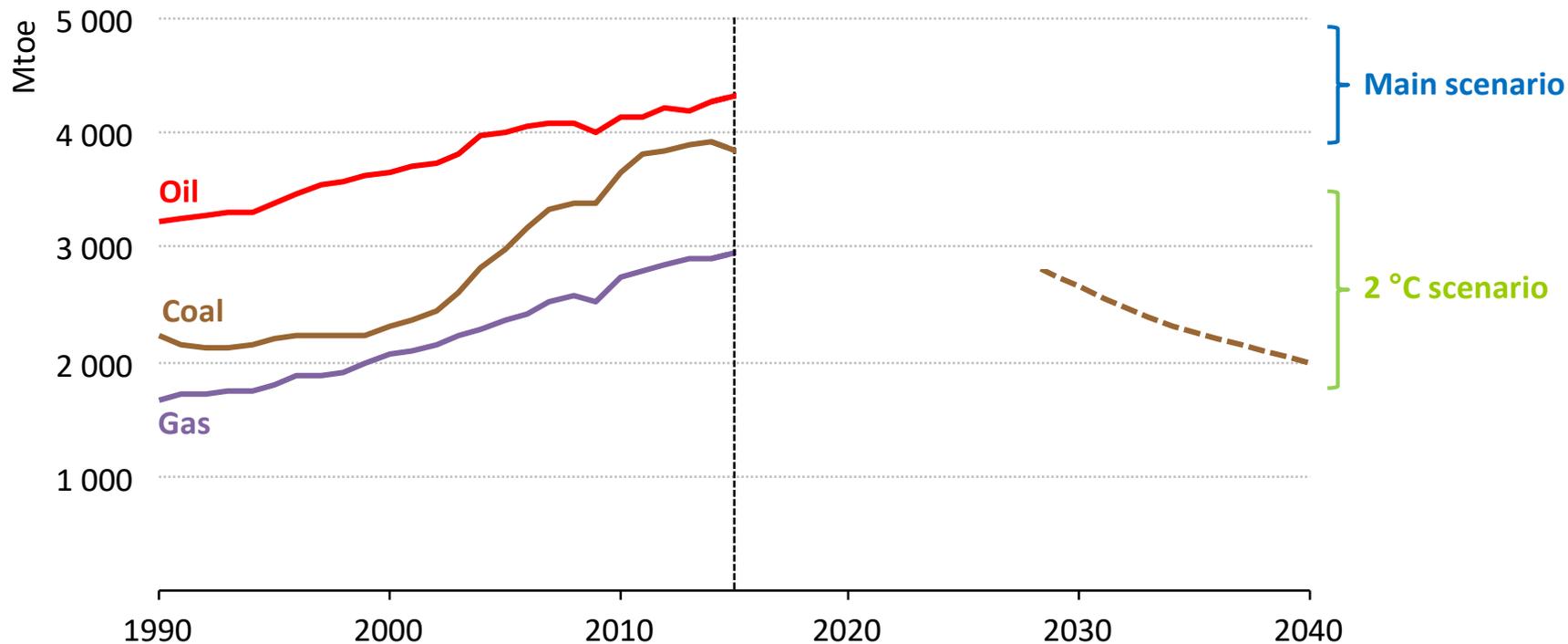
Global energy-related CO₂ emissions



IEA analysis for 2016 shows that global CO₂ emissions did not increase for the third consecutive year in a row, even though the global economy grew

Fossil fuels in a decarbonising system

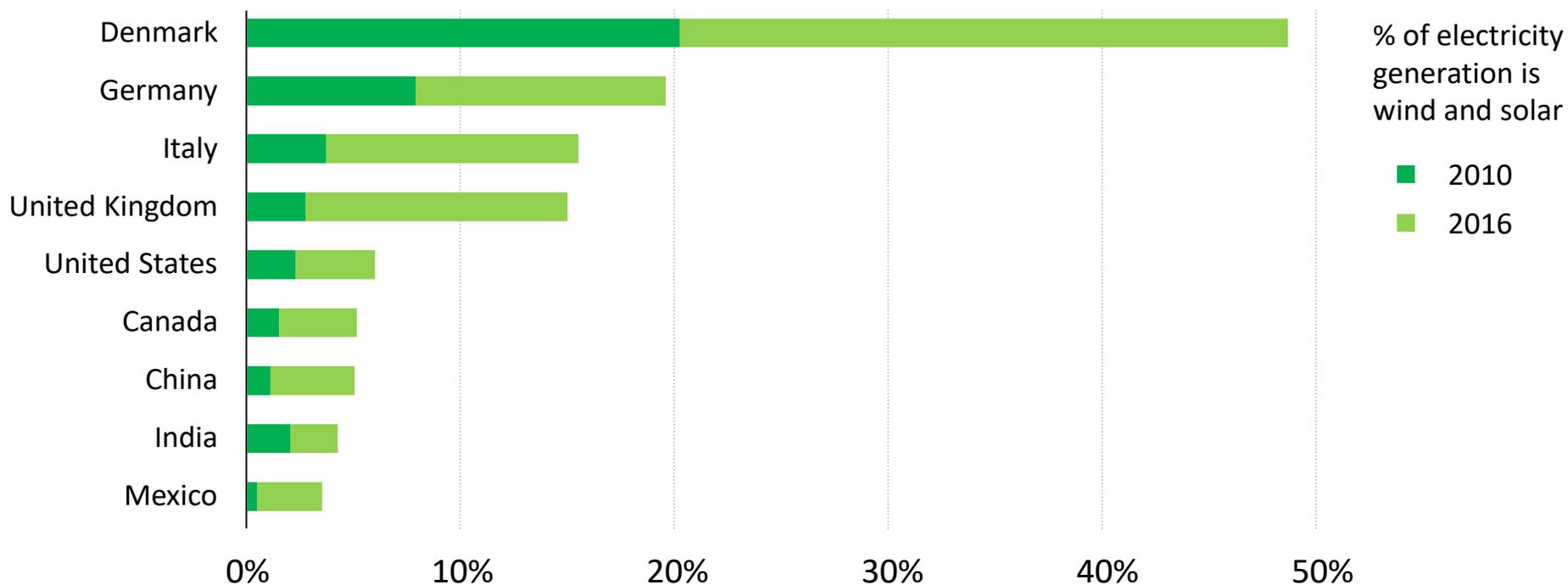
Energy demand by fuel & scenario



***Coal is hit hardest in a 2 °C scenario & oil demand peaks before 2020:
only consumption of natural gas ends up higher than today***

More wind and solar mean system integration is key

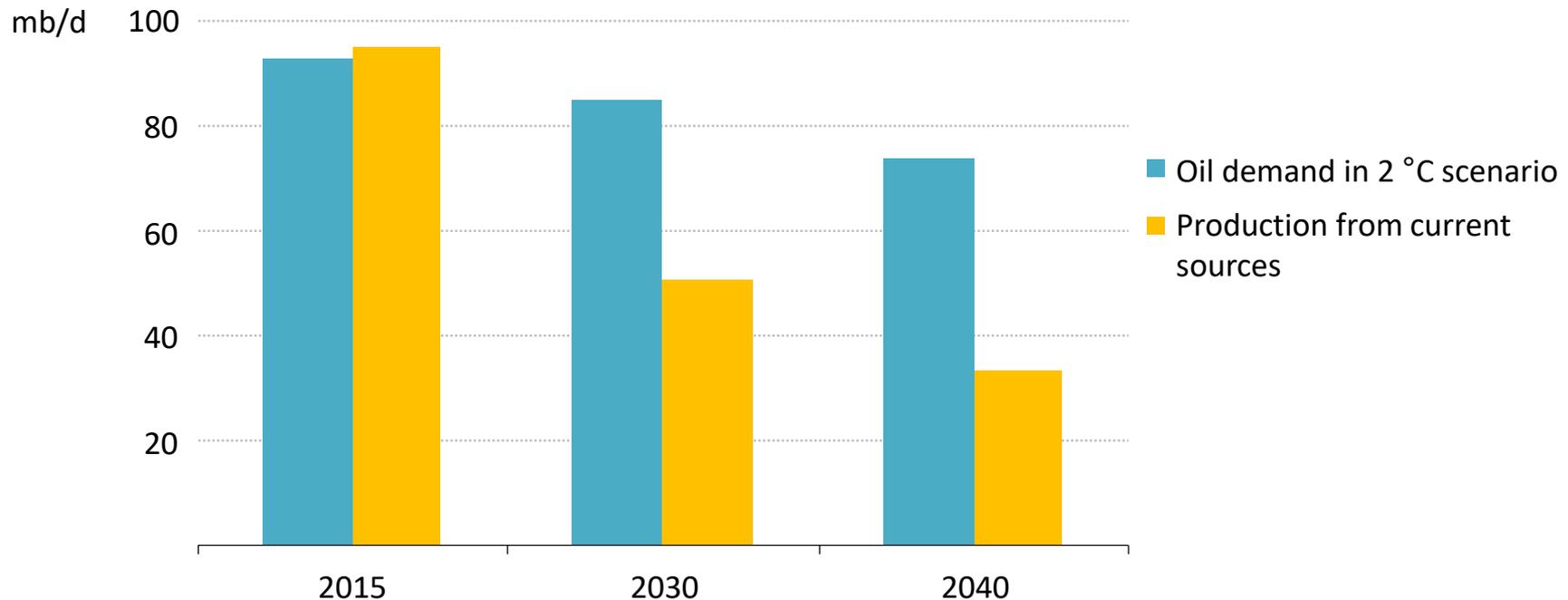
Share of wind and solar in total electricity generation in selected countries



Investment in US renewables in 2016 reached half the level of investment in oil & gas supply. The US now has the 2nd largest solar & 3rd largest wind markets globally

Investment into new fossil fuel supply is still needed

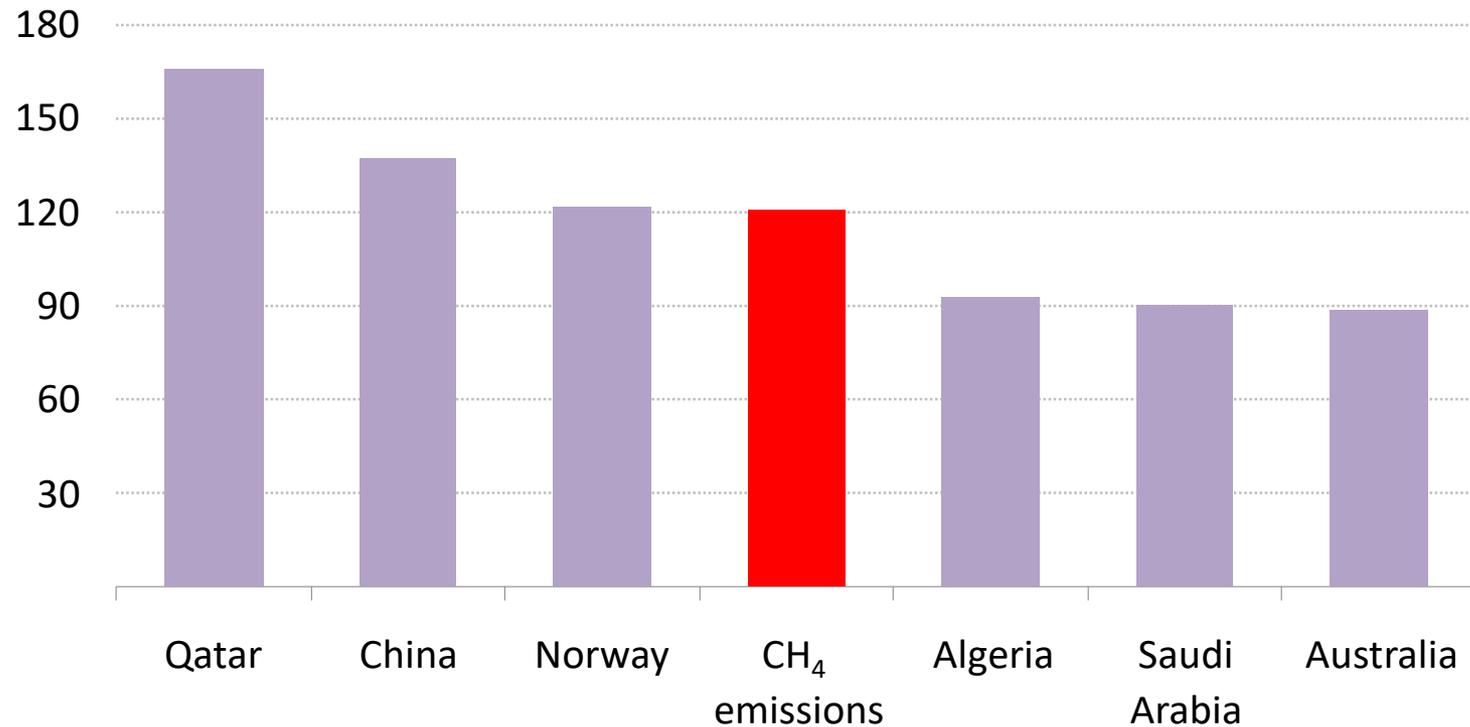
Global oil demand in 2 °C scenario & decline in current supply sources



Production from today's fields declines much faster than the fall in oil demand in a 2 degree scenario, leaving a gap that needs to be filled with new investments

Methane emissions threaten the benefits provided by natural gas

Global oil & gas sector methane emissions and gas production from selected regions

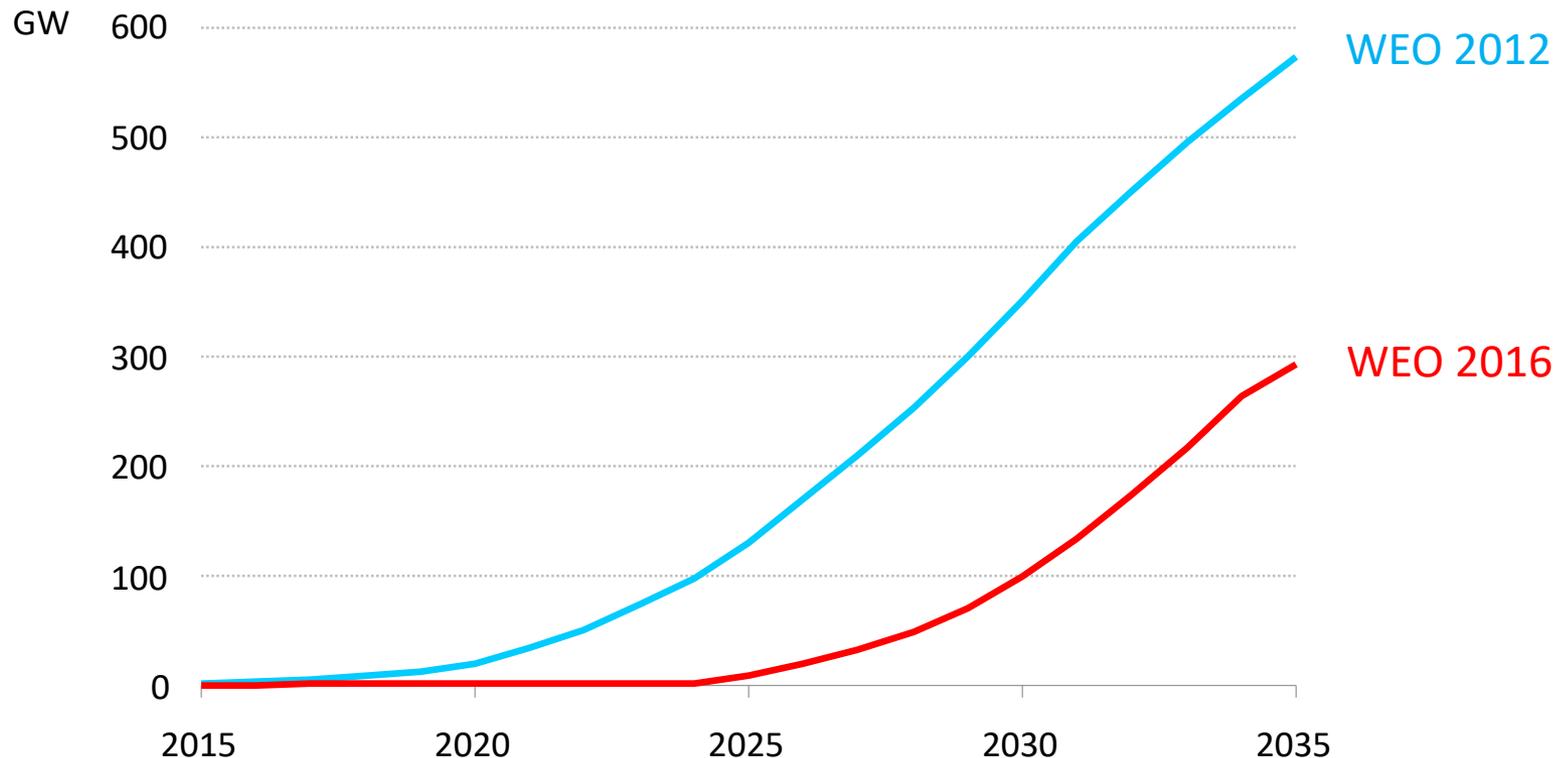


Methane emissions from oil and gas operations are roughly equivalent to the annual gas production of Norway; these represent a real danger to the environmental credentials of gas

- **Offshore energy plays a major role in in all of our scenarios, but there is no definitively positive or negative view of the future**
- **Investment in offshore power grows in our main scenario but remains much smaller than offshore oil & gas investment**
- **Many similarities exist between successful development of offshore wind projects and offshore oil & gas projects**
- **But also many challenges: expected project returns and risk profiles are quite distinct and project locations may not coincide**
- **Integrated approaches could reduce costs by combining maintenance staff and coordinating supply chains**

Carbon Capture and Storage and EOR+

CCS capacity in the 2 °C scenarios in the 2012 and 2016 World Energy Outlook



Carbon capture and storage faces many economic, financing and legal issues at present. Using captured CO₂ for EOR is one of the few avenues available to offset additional costs

- **The energy sector transition is underway and will have profound impacts on the way fossil fuels are produced and consumed**
- **Gas-fired capacity continues to play a major role in helping to integrate intermittent renewables into the power system**
- **New investments into fossil fuel supply required even under a steep decarbonisation scenario, reducing risk of stranded assets**
- **Methane emissions cannot be ignored and, if not abated, threaten the environmental credentials of natural gas**
- **Supply-side can play a role in speeding the transition through synergies with offshore power and carbon capture and storage**