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Transportation: Is oil's primacy assured?

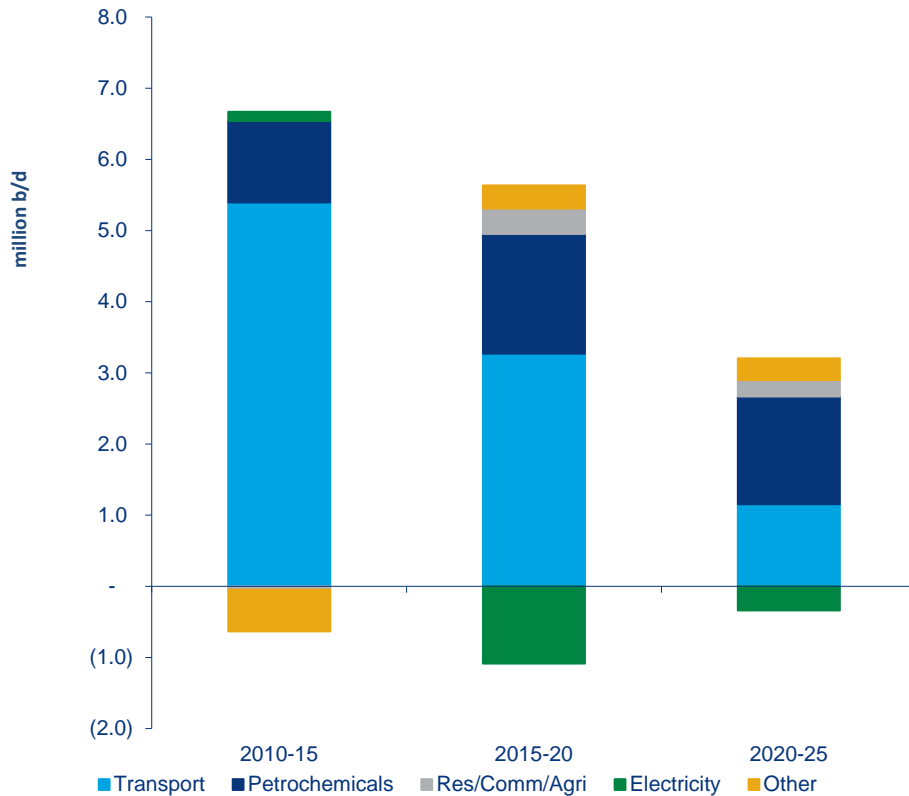
Session III

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Transportation has been a key driver in oil demand growth. It is to become non-OECD focussed, but contribute less to overall growth....

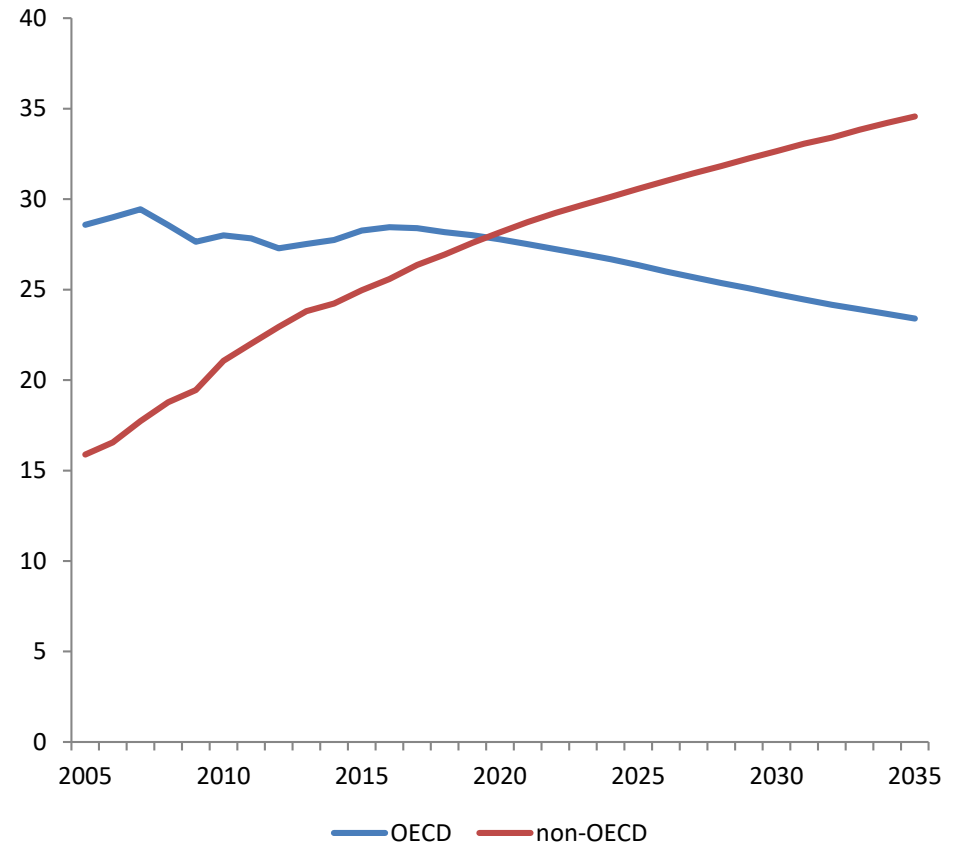
In the longer term, oil demand growth becomes petrochemical focused

Cumulative oil demand growth by sector



Source: IEA Energy Statistics, Local Statistics, Fcst: WoodMackenzie

Transportation oil demand (million b/d)

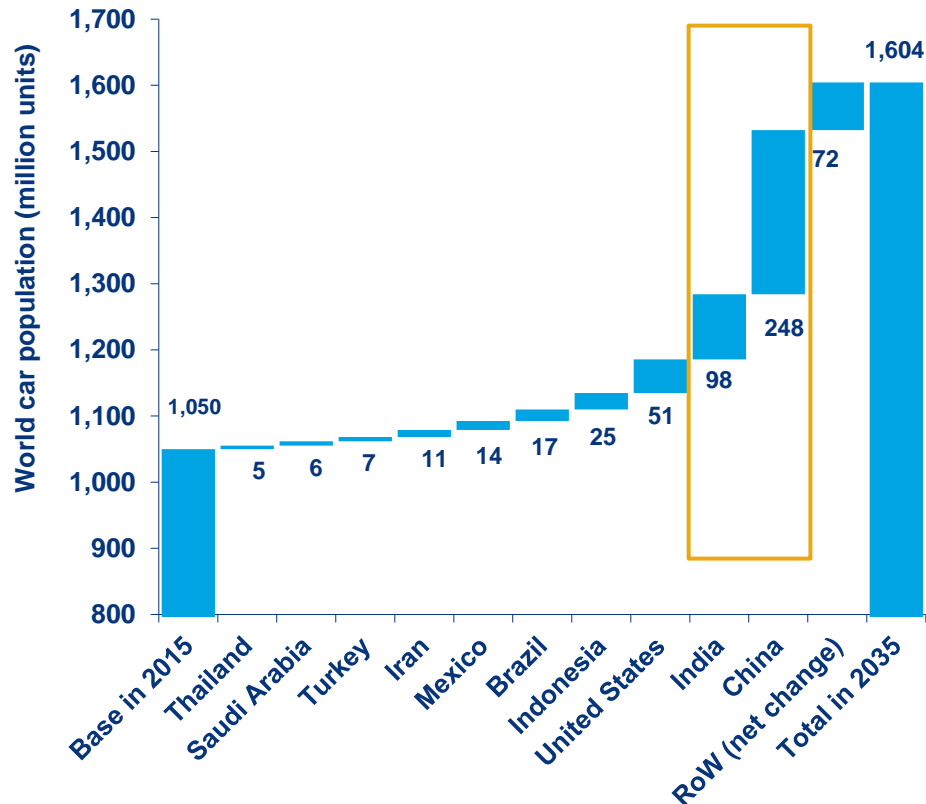


Source: Wood Mackenzie

Car ownership levels are projected to grow strongly in Asia as incomes rise, but overall fuel efficiency counters the higher stock

Sustained low prices and consumer preference act against fuel efficiency improvements....

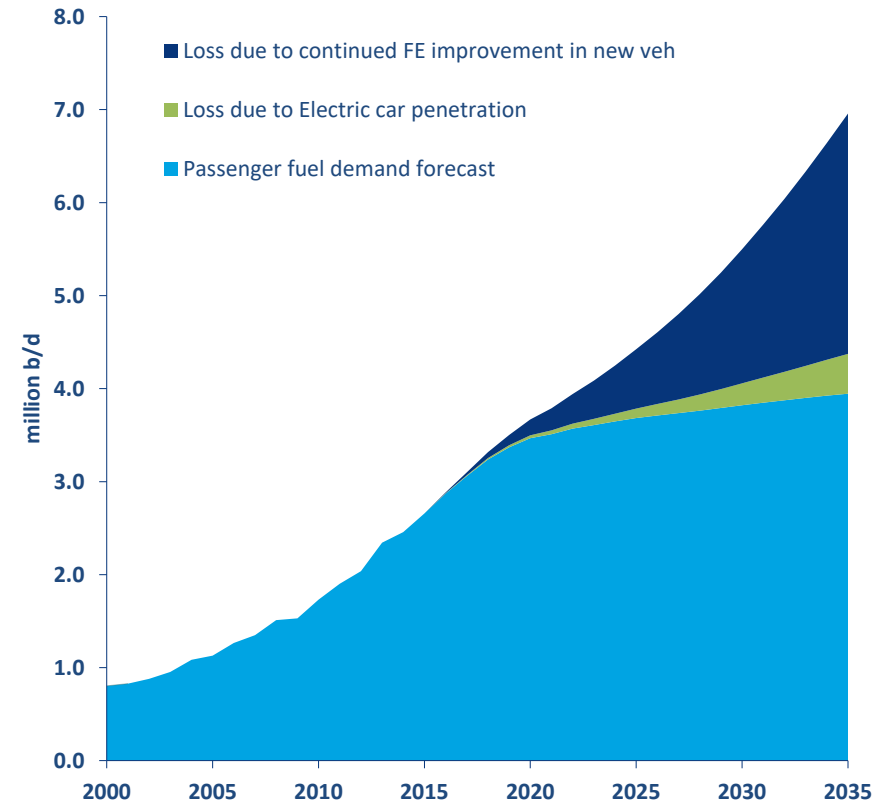
Car Ownership Levels



Source: Wood Mackenzie

Source: Wood Mackenzie

Fuel efficiency impact on China's gasoline demand

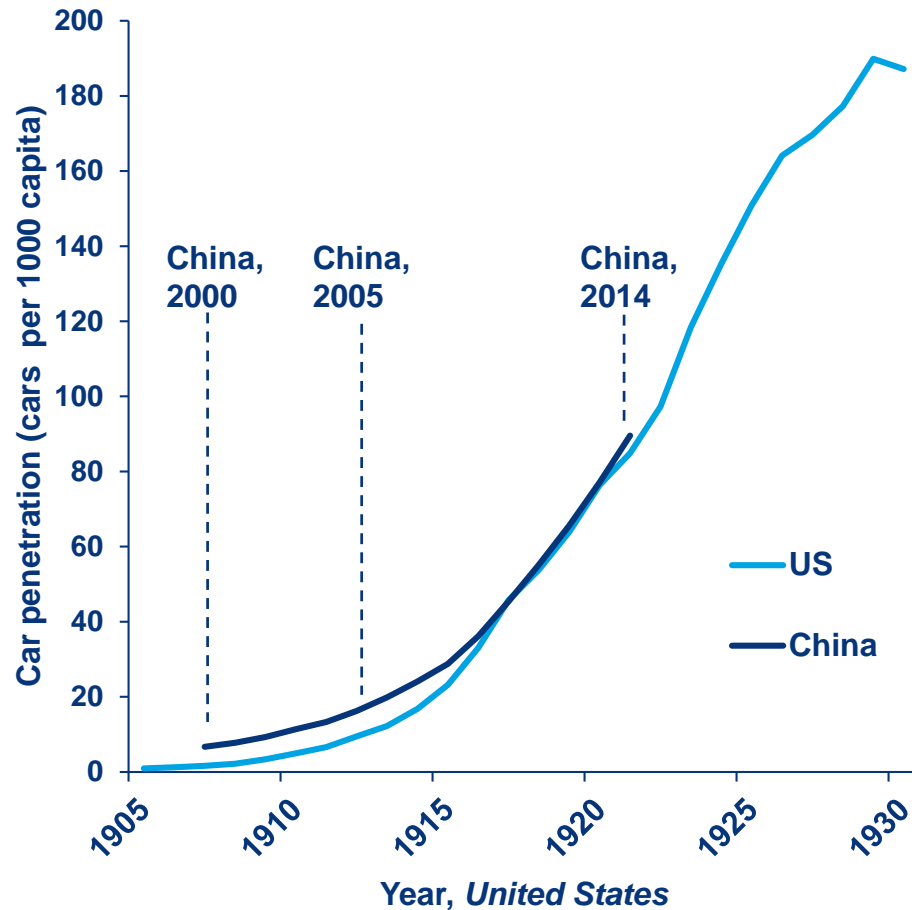


Source: IEA, National Statistics, Forecast: Wood Mackenzie.

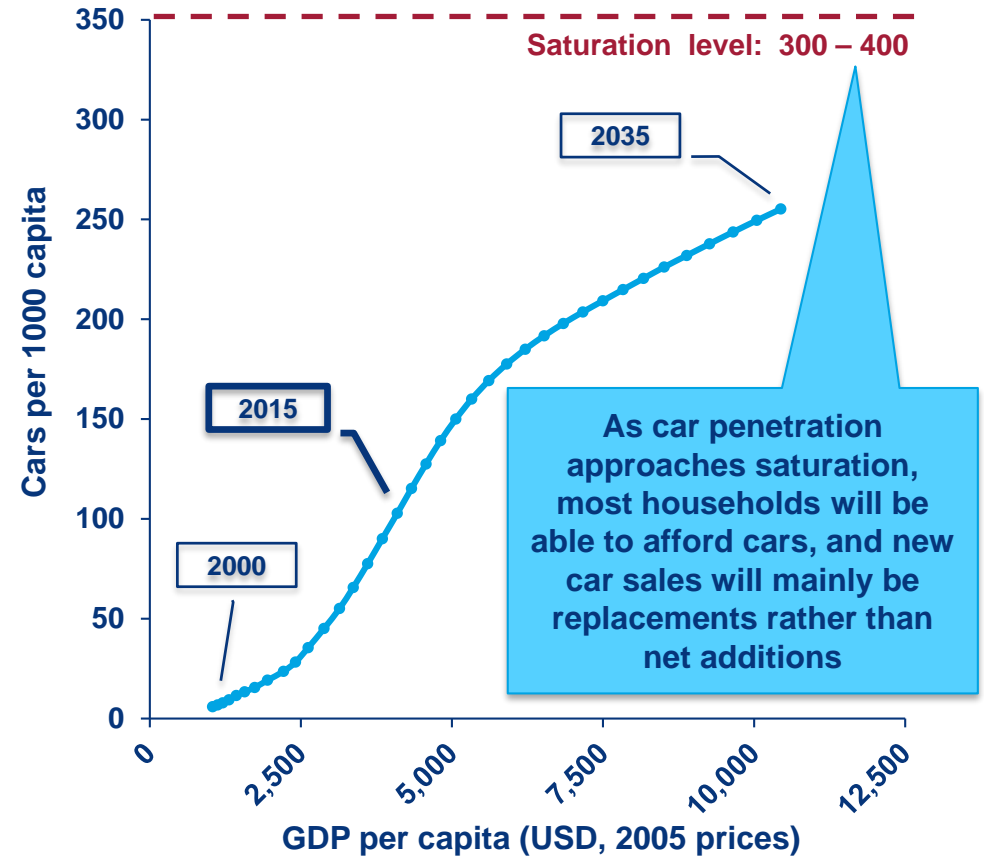
China's vehicle population is key – it decouples from the US due to smaller road length and high urban population

With similar land area and more people, but is expected to saturate at half US levels

Car penetration in China vs. US in the early 1900s



Car penetration vs GDP per capita

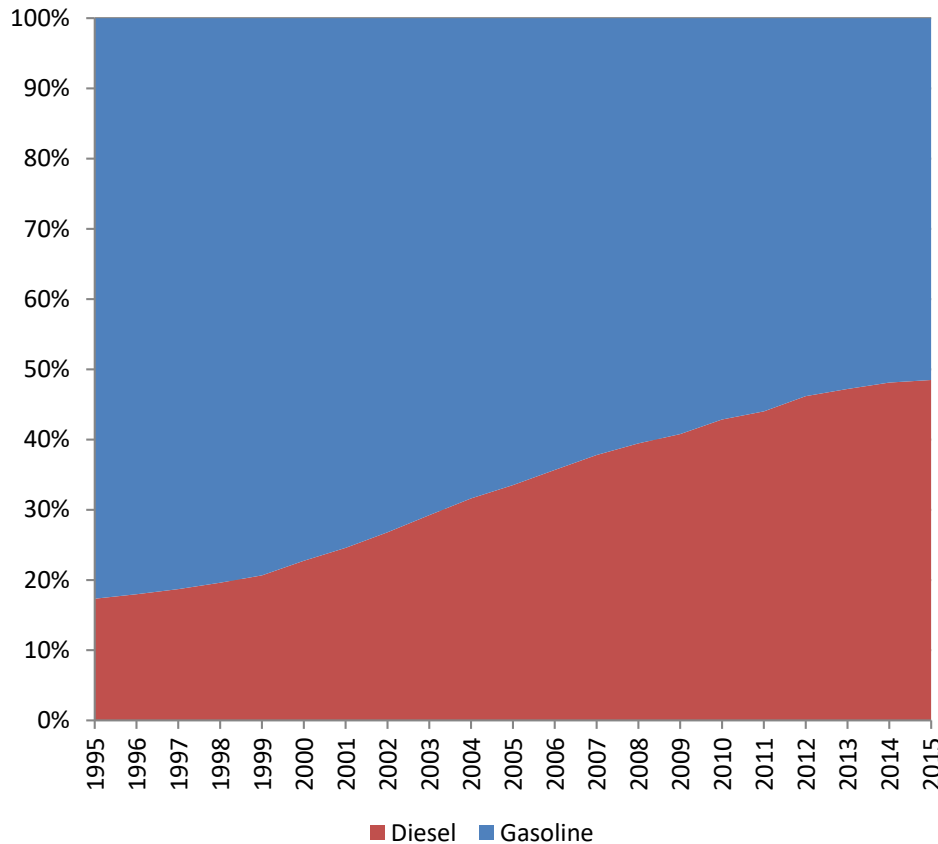


Source: U.S. Department of Transportation, China NBS, Wood Mackenzie

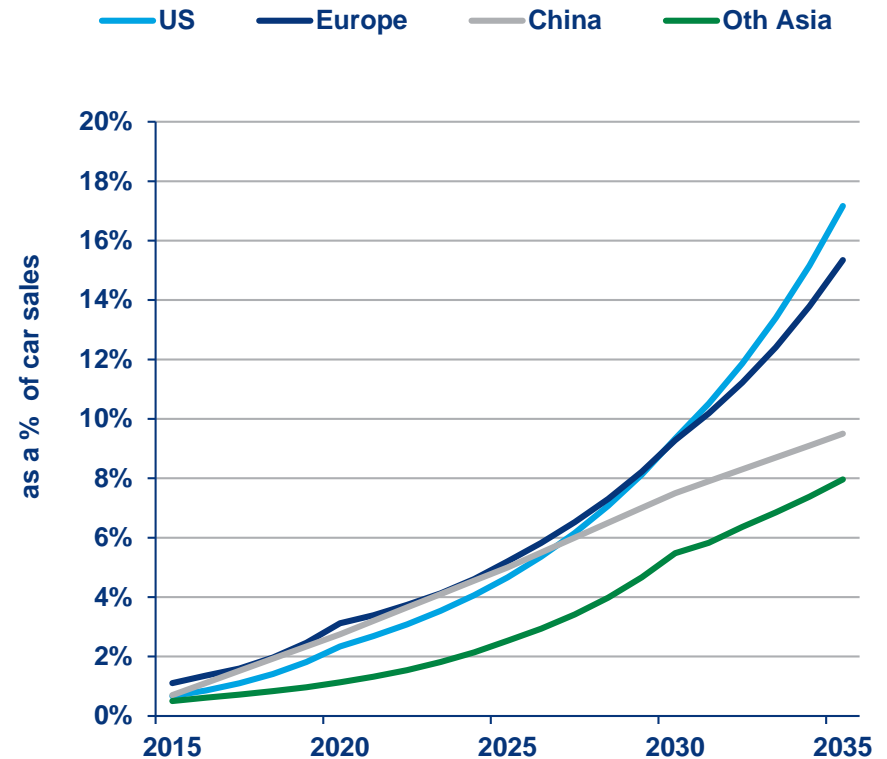
Without a technology revolution to dramatically cut costs, diesel's history in Europe suggests EV penetration is likely to be slow.

Policy response to "diesel gate" is necessary, but not sufficient....

European passenger car fuel share



Plug-in and all electric passenger cars (% of sales)



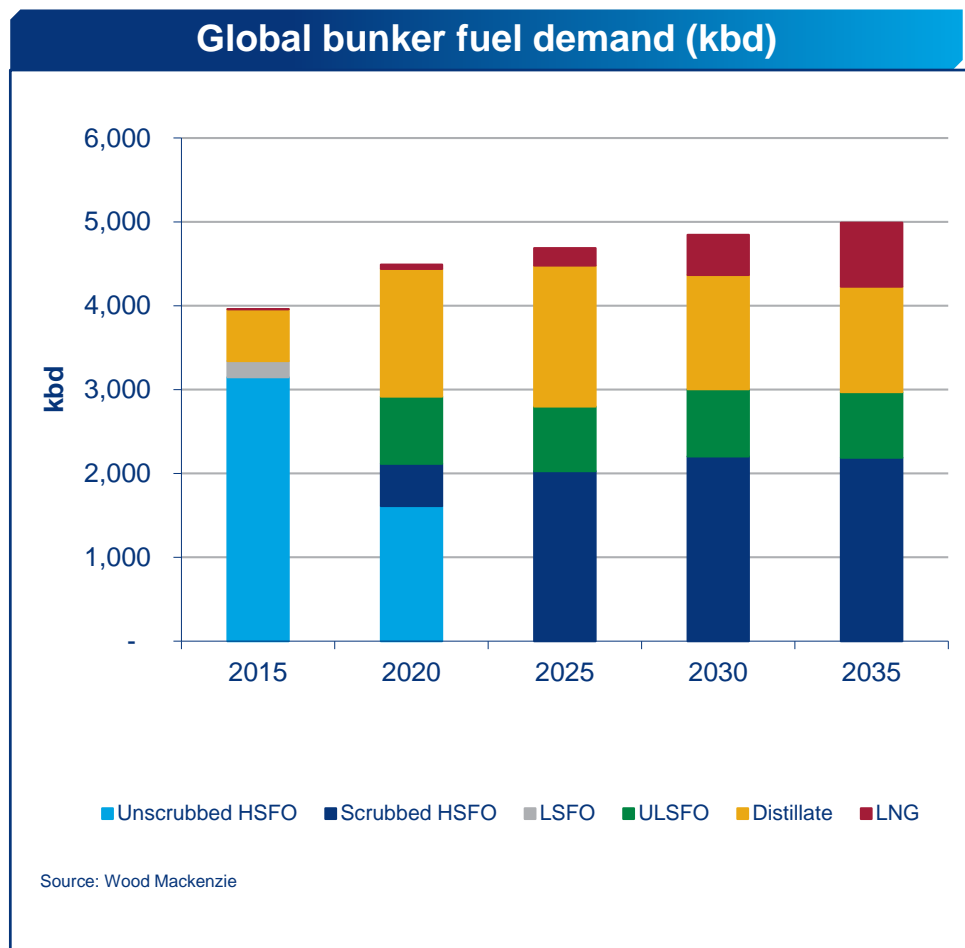
Source: Wood Mackenzie

Source: Wood Mackenzie

Even with the MARPOL VI regulation, refined products are to be the key fuel for the shipping sector for a prolonged period

LNG penetration is supported by this regulation, but the implementation path is unclear

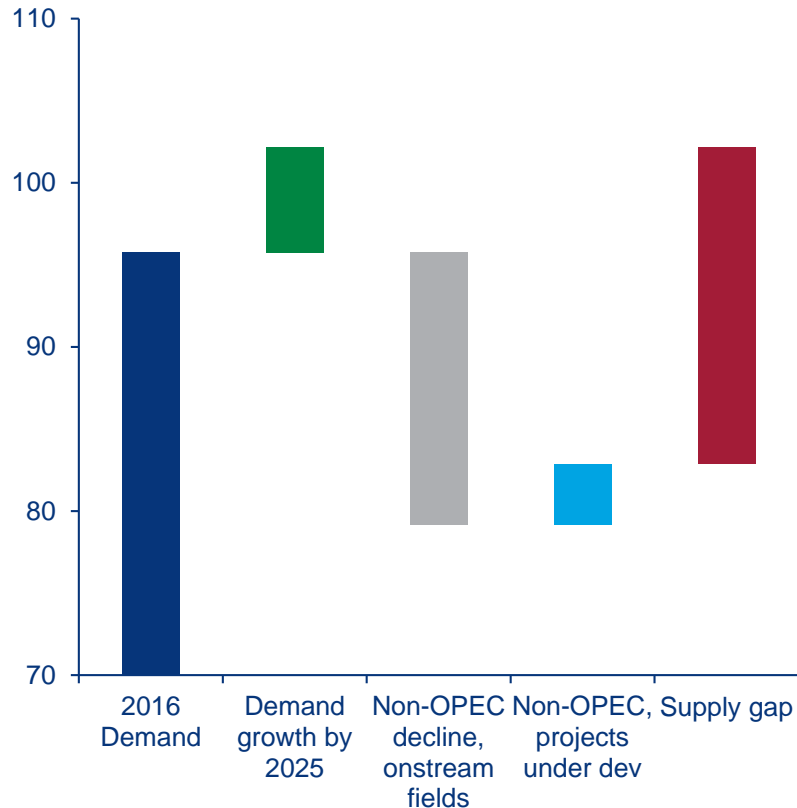
- ◆ International Maritime Organisation has established 2020 as the implementation for lower sulphur emissions from bunker fuels
- ◆ The consequences could be dramatic, as there are competing solutions available to both the shipping and refining sectors, both of which require time and investment. This introduces considerable uncertainty, so we expect a “partial compliance” outcome in the switch to middle distillates
- ◆ Other uncertainties include:
 - » Economic growth and energy use within emerging markets.
 - » Oil displacement by alternatives in the transportation sector



The Upstream sector is not solely reliant upon demand growth for ongoing investment, as production declines must be overcome.....

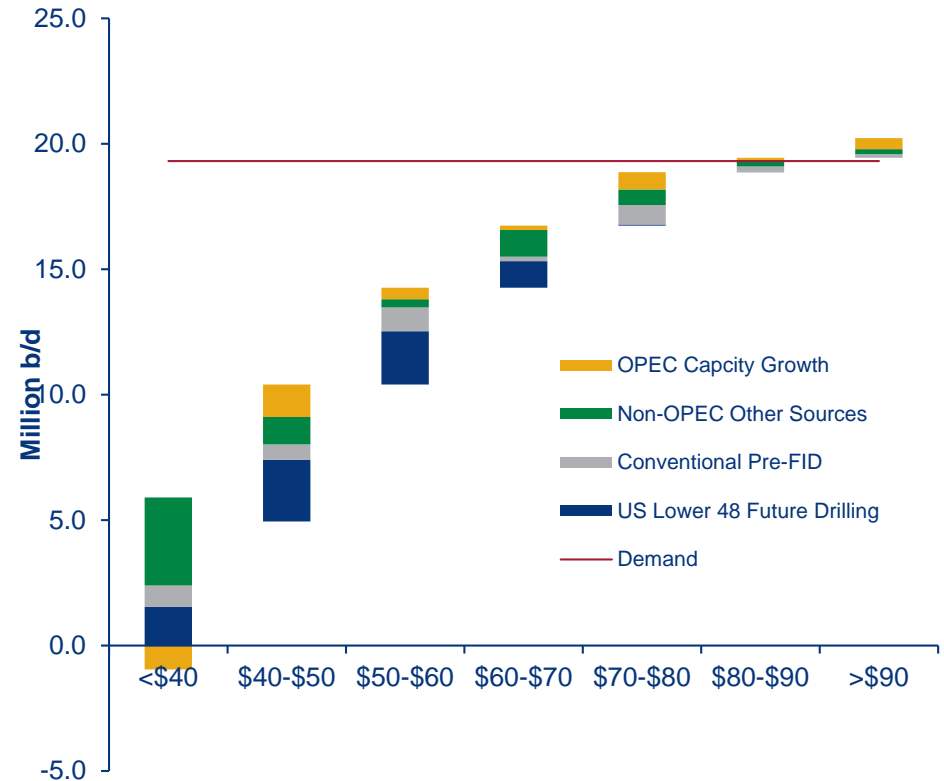
US tight oil is not expected to fill the supply gap, particularly post 2020

Supply Gap to 2025



Source: Wood Mackenzie

Cost of new supply required



Source: Wood Mackenzie

Source: Wood Mackenzie, Point forward Breakevens, Onshore at 10% discount rate offshore at 15%

To discuss - what are the key risks to these conclusions?

Key takeaways

- Transportation is a key component of oil demand growth
- The role of the OECD weakens as the car population of non-OECD continues to grow
- Improving fuel efficiency flattens oil demand growth
- Peak oil demand is not reached by 2035 unless there is a battery technology revolution and a shift in manufacturing capabilities
 - Risk profile increases post 2025
- Oil is difficult to displace in aviation and commercial freight (road and marine).
 - LNG is the key threat in these sectors
- Ongoing production decline means refining at greater risk than Upstream of “peak demand”

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