

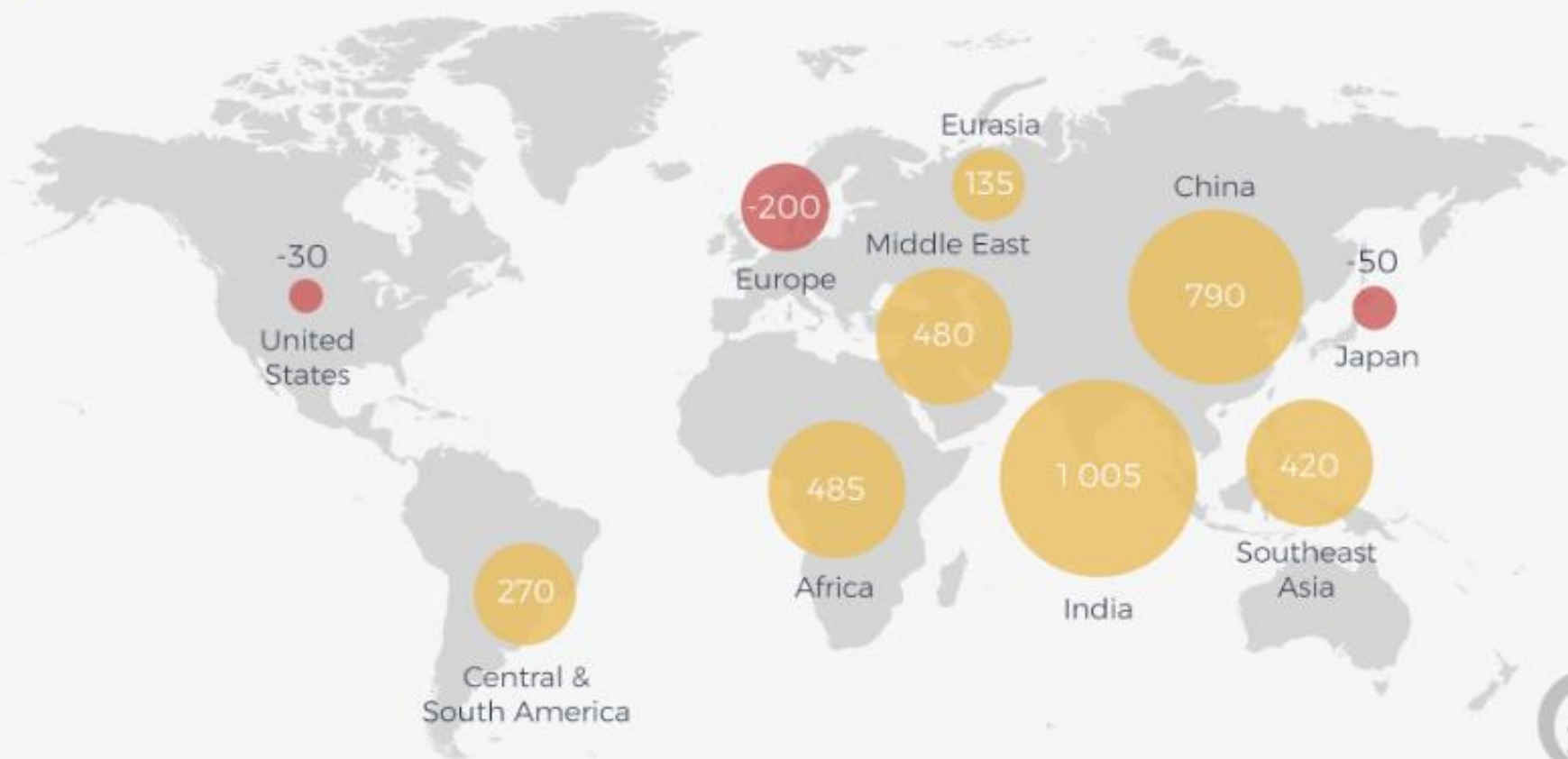
Substitution of NiO catalysts

not economically feasible today, but what about its use in the longer term with reduced diesel and fuel use?

Jens Tørsløv

Change in primary energy demand, 2016-40 (Mtoe)

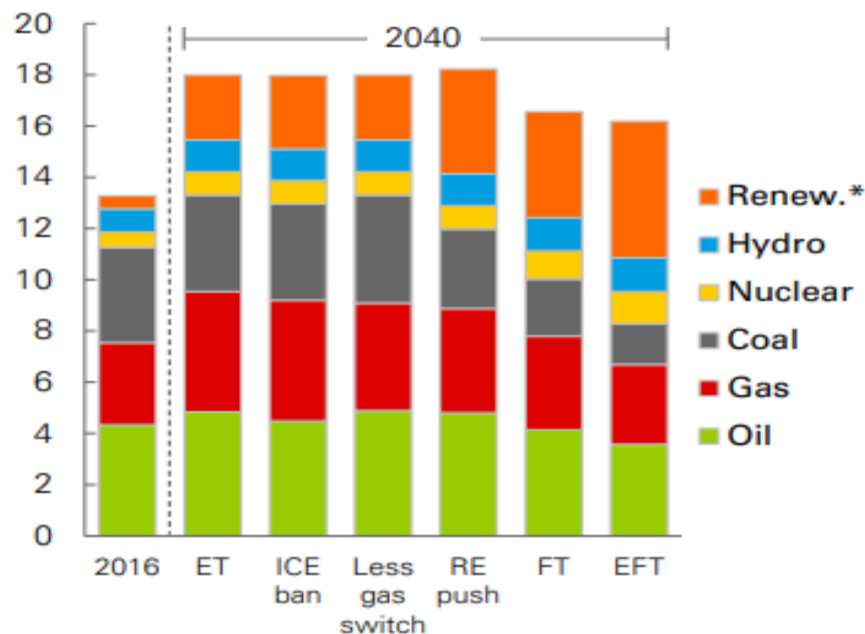
World Energy Outlook 2017



The Energy Outlook considers a range of scenarios...

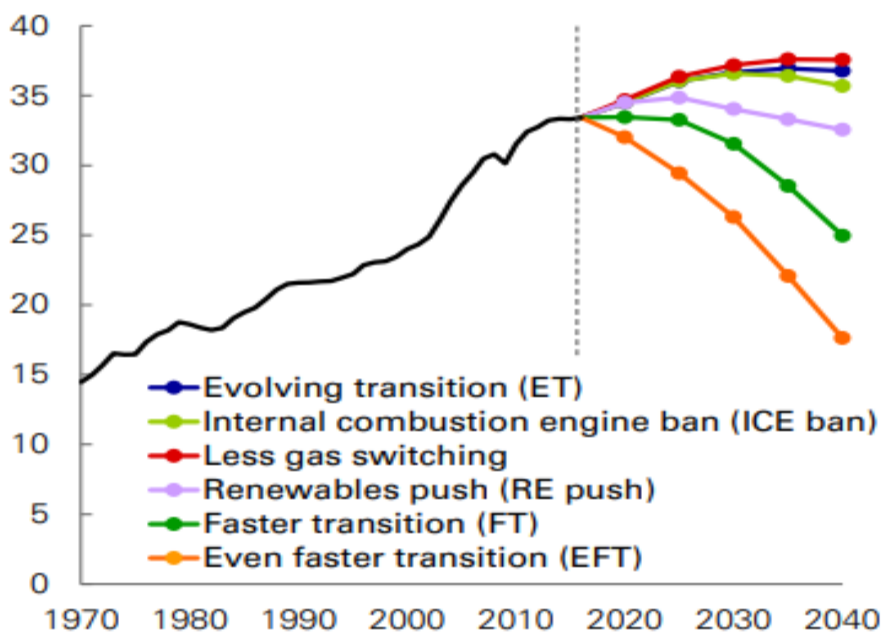
Primary energy consumption by fuel

Billion toe



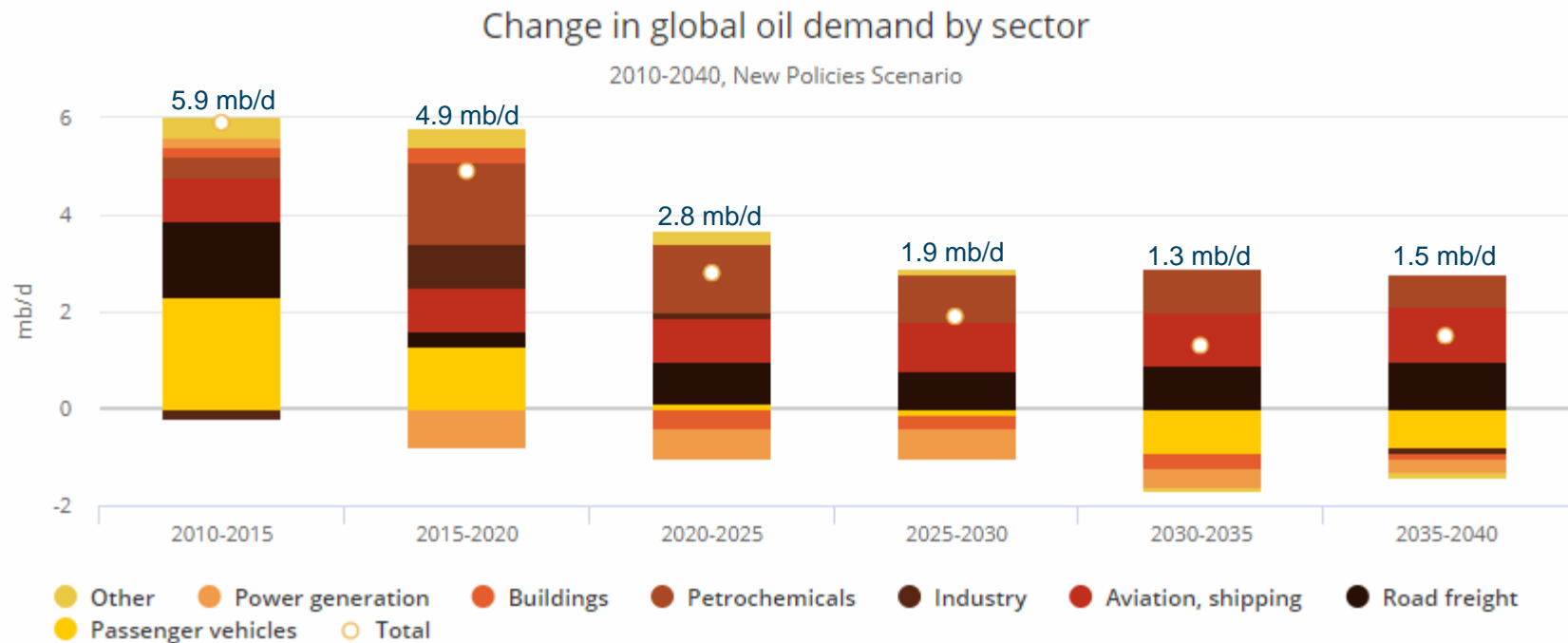
Carbon emissions

Billion tonnes CO₂



*Renewables includes wind, solar, geothermal, biomass, and biofuels
For full list of data definitions see p122

“The overall increased energy demand from 2020 – 2040 is enough to keep oil demand on a rising trajectory to 105 mb/d by 2040: note petrochemicals, aviation and road freight” (World Energy Outlook 2017, IEA)



The future for nickel catalysts 2020-2040

- Trends
 - Switching to electricity (industry, cars, buildings)
 - From coal and oil to gas
- Trends for use of oil
 - Fuel for passenger vehicles will decrease
 - Fuel for aviation and road transport will increase
 - Petrochemicals production increases

Where is Ni- catalysts used?

- Refineries
- Chemicals industry
 - Hydrogen production
 - Fertilisers
 - Petrochemicals

Market	Refinery	Hydrogen	Fertilisers	Petrochemicals	Fine chemicals	Oleochemicals
Steam reforming/ Methanation						
Hydrotreating (HDS, HDN, HDO)						
Hydrocracking						
Hydrogenation						
Amination						
Sulfur trapping						

What is Ni catalysts used for in 2040?

- Ni catalysts will still be needed in large scale production of hydrogen and methanol (steam reforming) and desulphurisation (hydrotreating).
- Even if use in oil refineries decrease over time other large scale productions uses remain important:
 - Hydrogen production
 - Fertiliser production
 - Chemicals production

Conclusions

- Ni catalysts remain important for several important large scale production processes not related to energy supply
- Oil remains an important energy source for aviation and road transport. And is important in petrochemical industry