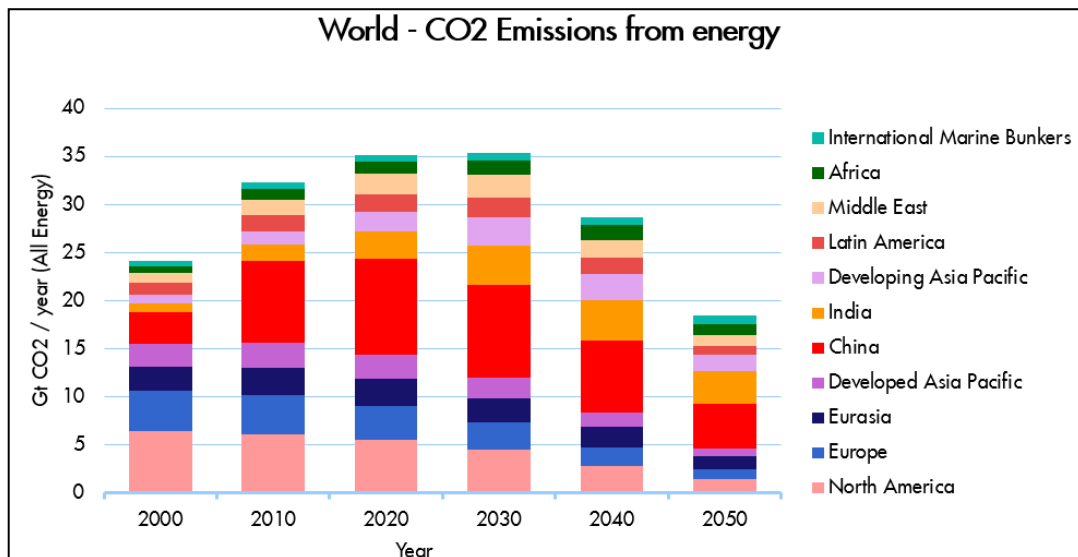


What is the Outlook for Paths towards a 50% Reduction in GHG Emissions by 2050 after the USA Withdrawal from the Paris Agreement?

W.L. Thomas *

The 2015 Paris Agreement on climate change has set ambitious goals in order to mitigate global warming. These include holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, reaching global peaking of greenhouse house emissions as soon as possible and achieving a balance between anthropogenic emissions by sources and removal of greenhouse gases by sinks in the second half of the century. The path to achieve these already challenging goals may become even more difficult following the announcement of US withdrawal from the agreement by 2020.

Shell’s Sky Scenario¹, illustrates a technically plausible, but challenging pathway for society to achieve the goals of the Paris Agreement and describes a path where global CO₂ emissions are reduced by 50% between now and 2050 (graph 1). The US, the world’s largest economy and second in terms of CO₂ emissions, has a key contribution to make to reach this target. In Sky, CO₂ emissions from the US are reduced by about 70% over this period to 1.4 Gt in 2050, from 5.4 GT CO₂ in 2017.

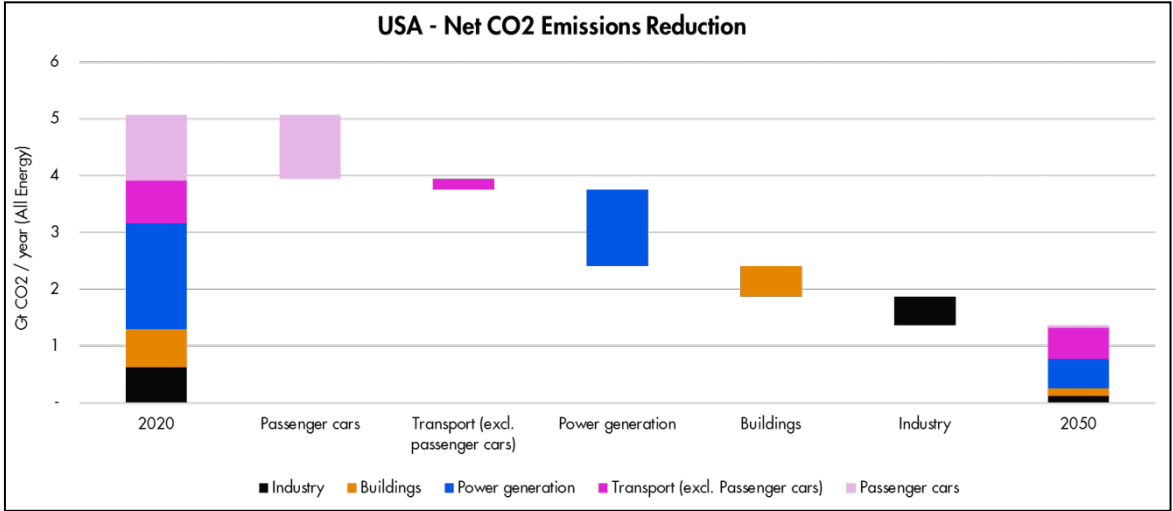


Graph 1: Sky - World CO₂ emissions by region (Source: Shell Analysis, Sky Scenario)

* Chief Energy Advisor, Shell International, Netherlands

¹ www.shell.com/skyscenario Scenarios are not predictions, plans, or policy proposals – they simply explore what might happen given the assumptions made in the scenario.

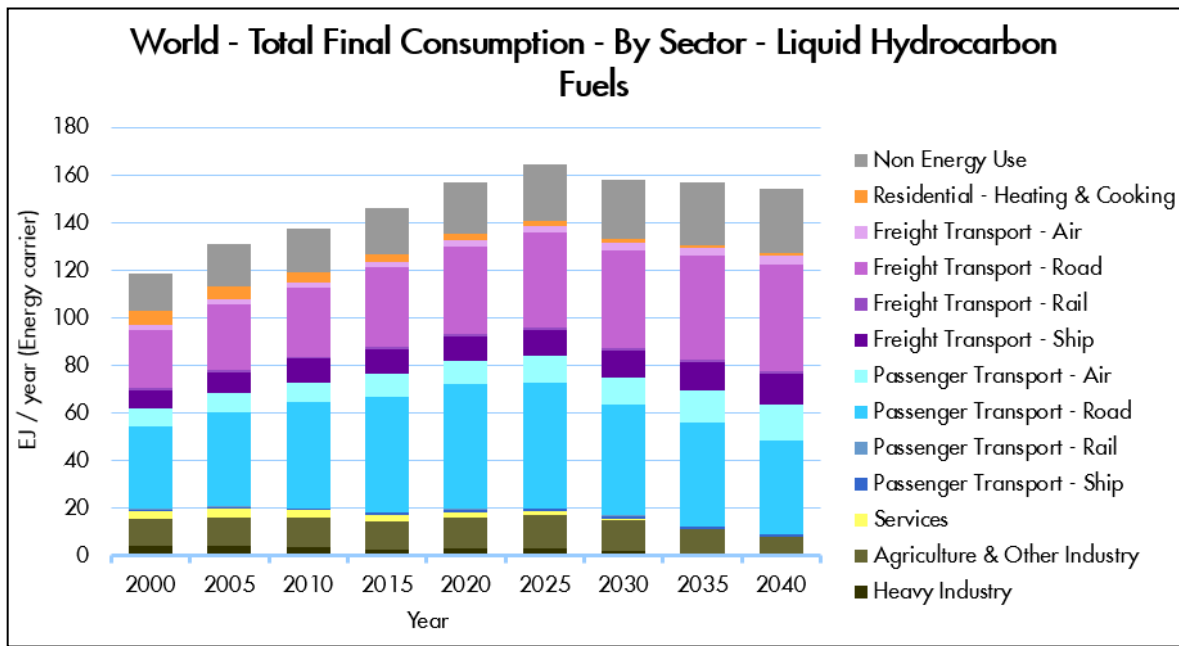
Following the recent decisions by the US administration, Federal initiatives are being reassessed, but individual States in the US continue their green journey through individual as well as collective action. In 2017, California passed a law targeting a 40% reduction in emissions by 2030 and an agreement to collaborate with China on reducing emissions through shared investments in research. Other states, including New York and Texas, are taking similar steps. However in Sky, Federal and State interventions are mostly needed in the building and transport sectors, while the industry and power sectors rely mostly on competitive forces and contribute about half of the overall emission reductions to 2050. Electricity generation is expected to change rapidly with coal usage decreasing while natural gas and renewables start playing an increasingly important role due to their cost advantages.



Graph 2: Sky - USA net CO2 reductions by energy sector (Source: Shell Analysis, Sky Scenario)

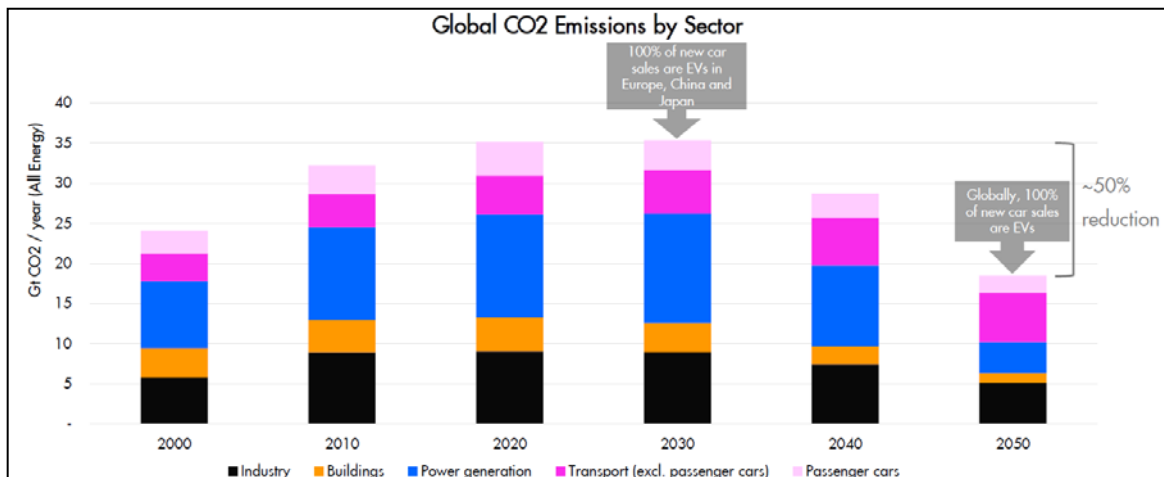
These changes, along with the expected efficiency improvements in the energy system, could make the Sky pathway for US emissions viable in spite of the challenges.

Passenger road transport is a sector which will be key in driving emissions reductions through the rise of Electric Vehicles (EVs). To reduce direct emissions from passenger cars, a larger share of new car sales need to be EVs, but also Internal Combustion Engine cars (ICEs) will have to become much more efficient at the same time. Several large car manufacturers have recently announced significant investment plans for production of EVs or hybrid cars. But even if EV uptake proceeds quickly globally, and significant ICE efficiency improvements materialise, global growth in the passenger road transport sector over the next 10-15 years and growth in other sectors which use liquid hydrocarbon fuels beyond that period (freight and air transport) could mean that total demand for liquid hydrocarbon fuels is unlikely to reduce by 2040 versus today (graph 3). The role of non-OECD countries in this will be critical since it is where most of the economic growth, and therefore energy demand growth, is expected to happen in the next decades.



Graph 3: Sky - World Consumption of Liquid Hydrocarbon Fuels by energy sector
(Source: Shell Analysis, Sky Scenario)

However, there are further challenges which could prevent a possible reduction in oil demand for transport. For example, if efficiency improvement of ICEs stalls in the early 2020s due to reduction in research and development from manufacturers in favour of EVs, or if Corporate Average Fuel Economy (CAFE) standards in the US are abandoned. Half of the projected global oil demand reduction in the passenger car sector between now and 2040 needs to come from much higher efficient ICEs. If that does not happen, oil demand could be driven higher than current projections, impeding the goal of reducing greenhouse gas emissions. Even if by 2050 100% of new car sales are EVs globally and about doubling of ICE efficiency have materialised, the passenger road transport sector will still contribute about 11% of total CO₂ emissions, but this will be only half of today's levels (graph 4).



Graph 4: Sky - World CO₂ emissions by energy sector (Source: Shell Analysis, Sky Scenario)

Despite the decisions made by the current US administration, it may still be possible to achieve the global target of 50% reduction in GHG emissions by 2050, given the commitments of individual States in the US to the Paris agreement and competitive forces in the business environment; but also because tackling climate change remains high on the agenda in the EU and other nations like China, which is the largest CO₂ emitting country. Moreover, as the costs of renewables and batteries are expected to continue to come down, policy support will become less vital in the power, industry and building sectors, while the rise of electric vehicles will significantly help reducing emissions in the road transport sector. The biggest challenge though to achieve the goals of Paris is that policy actions need to be taken global in a concerted and timely way.

Writer's Profile

W.L. Thomas

He is heading the Energy Analysis Team in Shell's Global Scenario Group, which is part of the Corporate Strategy Department. He leads a team responsible for worldwide energy analysis and long-term global energy scenarios, and advises Shell companies on a wide range of energy issues. He has been with the Shell group of companies for some 35 years, with prior positions in drilling operations, subsurface reservoir management, and commercial and regulatory affairs in gas.