

ENERGY TRANSITION

Caution: new energy order ahead

The US shale revolution, climate change and the prospect of 'peak oil demand' herald a new energy order, according to Michael Bradshaw, Professor of Global Energy, Warwick Business School (WBS).

Two developments are undermining the foundations of the existing energy order. First is the shale revolution that has transformed the place of the US in the global energy system. Second is the unequivocal evidence of human impact on the earth's climate system and the realisation that rapid and significant action is required if we are to avoid the most catastrophic impacts of global warming.

The two developments promote countervailing tendencies. The shale revolution is heralding an age of fossil fuel abundance, while the pressing need to mitigate greenhouse gas emissions means that the world must transit away from fossil fuels to a low carbon energy system. The two tendencies are colliding in ways that are challenging old assumptions and creating a new energy order.

Age of abundance

In the last decade, the shale revolution in North America has gained rapid momentum and has transformed the role of the US in the global energy system. The US Energy Information Administration's (EIA) *Annual Energy Outlook 2019* charts how the US will become a net energy exporter in 2020, having been an importer since 1953.

The ban on crude oil exporters, imposed in 1975, was lifted in 2015; and the following year the US exported its first cargo of LNG. This does not mean that the US won't have to import oil, and even some gas, but it is changing the dynamics of both markets. The rapid growth of US light tight oil (LTO) has challenged the position

of OPEC, which is fast losing its ability to influence the global oil market. At the same time, as the US LNG sector draws on a continental gas market, it is introducing greater flexibility and competitiveness in this fast globalising arena.

At home (in the US), abundant gas and liquids supply is driving coal out of the power sector and promoting a renaissance in petrochemicals. Abroad, this newfound 'energy dominance', to use the term favoured by the White House, is impacting on US foreign policy with, as yet, unclear consequences. The question now being asked is: how far can the shale revolution travel? Will it result in a similar change in fortunes elsewhere? The answer to that is unclear, but already the narrative has changed from a world struggling with the prospect of peak oil supply, to a world contemplating global peak oil demand.

Climate change and decarbonisation

Since the 1990s the UNFCCC (United Nations Framework Convention on Climate Change) has been warning that human activity was having an increasingly negative impact on the world's climate. With each round of evidence gathered, the warnings came with greater certainty and more significant impact. Yet carbon emissions have continued to rise, the concentrations of carbon dioxide (CO₂) in the atmosphere have increased, as has the global temperature compared to the world before the industrial revolution. In 2015, 174 countries and the European Union agreed in Paris to set in train policies that

would limit global warming by the end of this century to less than 2°C and closer to 1.5°C.

Late last year (2018) the Intergovernmental Panel on Climate Change (IPCC) published a report explaining the impacts of global warming above 1.5°C and made clear the possible emission pathways to achieving the Paris Agreement.¹ A few weeks later, at COP24 in Katowice, Poland, the nations of the world agreed on the 'rule book' needed to realise the promises made in Paris. However, the initial Nationally Determined Contributions (NDCs) fall well short of what is required and there is a pressing need to 'ratchet up' global climate ambitions. But one thing is clear – as the single greatest source of anthropogenic carbon emissions, there must be rapid 'decarbonisation' of the global energy system. This means fossil fuel consumption must peak, very soon, and thereafter decline rapidly to achieve net zero emissions by the 2050s. Fossil fuels must be replaced by low carbon power, and industry and transport must also become low carbon.

The challenge is immense and, although 'clean growth' will create new opportunities, it also presents a threat to the incumbent energy system. This was apparent in Katowice when the US, Saudi Arabia, Russia and Kuwait refused to 'welcome' the IPCC report. It is becoming clear that future competition will not be over access to fossil fuels, but over what remains of the global carbon budget in a carbon-constrained world.

Challenge for producer economies

Just as there is growing acceptance of the need for more action on climate change, so the geopolitical consequences of the low carbon transition are becoming clearer. It is relatively easy to think of a global energy transition and generate scenarios to achieve the required rate of decarbonisation, even if there is a need for technologies that have yet to be

As the single greatest source of anthropogenic carbon emissions, there must be rapid 'decarbonisation' of the global energy system. This means fossil fuel consumption must peak, very soon, and thereafter decline rapidly to achieve net zero emissions by the 2050s.

deployed at scale, such as carbon capture and storage (CCS).

However, the incumbent system is a cornerstone of the global political economy, with strong vested interests. A recent study by the International Energy Agency (IEA) examined what the changing energy dynamics mean for major oil and gas exporters.² The IEA calculated that the difference in oil demand between its 'New Policies' scenario, which includes pledges made under the Paris Agreement, and the 'Sustainable Development' scenario that constrains warming to 2°C, would lead to a long-run oil price in the \$60–70/b range that would mean that oil and gas income never returns to the 2010–2015 levels, leading to a cumulative loss in revenue of \$7tn over the period to 2040.

There seems to be an emerging school of thought that the combination of abundant supply and carbon constraints will produce a future of 'lower forever' that will see development of only the most cost-competitive oil and gas resources. The narrative surrounding future oil and gas demand now talks of 'unburnable carbon', 'stranded assets', 'carbon lock-in', 'divestment' and 'transition risk'. In an industry that makes multi-billion dollar investments that must pay back over decades, the impact of decarbonisation on future demand and price is now a critical uncertainty.

National champion challenges

The aforementioned study by the IEA, and a more recent study by its sister organisation IRENA,³ make clear that the biggest losers in the coming energy transition are the so-called 'fossil fuel producer economies'. It remains unclear how they will respond to the new energy order.

Some, such as the Gulf States, seem to have a two-track policy of increasing production to ensure that their assets do not become stranded, while using their oil and gas rents to diversify their economies. At the same time, they are promoting efficiency and low carbon energy at home to preserve their exportable surplus of fossil fuels.

Ironically, recognition that reserves in the ground may not be worth more in the future may lead to over-supply that will push down the price, reducing income; while seeking to constrain supply to push up the price will encourage competition and result in a loss of market share. But, prolonged periods of high oil and gas prices will drive demand destruction as

consumers seek alternatives. The harsh reality is that the producer economies must now plan for the new energy order or face economic and political instability when the oil and gas rents decline and eventually disappear.

The real challenge is that nobody knows how quickly this is going to happen. What is worrying is that some producer economies are still in complete denial – Russia, for example, seems to have an energy strategy based on increased oil and gas production and exports. While it has plentiful gas reserves, it is oil exports that generate the bulk of the government's revenues and future oil production is likely to be expensive.

The national champions of the producer economies face a particular challenge as they were created to harvest the resource wealth of their host states and are likely to struggle to deliver in the increasingly competitive new energy order. This may well create opportunity for the international service companies, but many of these states are under sanctions and/or present a high political risk. All of this highlights that the energy transition is going to be a bumpy ride and that falling demand for fossil fuels will create new geopolitical tensions that will demand careful management.

The future for IOCs

The various forecasts and scenarios produced by the international oil companies (IOCs) reflect the growing uncertainty over future demand for oil and gas. At the same time, their shareholders are demanding that they make clear the potential impact of climate change policy on their business and their plans for the future.

An early response was to expand their involvement in natural gas in the belief that it had a brighter future as a 'transition' fuel to a low carbon future. That remains to be seen, but for gas to stay in the mix it must be cost competitive in the face of renewables and address the problem of fugitive methane emissions. Even then, its future is limited without CCS. Beyond that the responses are varied. Some do not see global oil demand peaking before 2040 but accept that the future will demand cost competitiveness, and their strategy is to improve their performance, technically, financially and environmentally to be the most competitive. Others see peak oil demand in the 2020s or 2030s, and accept the need to reposition

themselves for the new energy order and are seeking to invest in new energy and its supporting infrastructures. The two approaches are not mutually exclusive, but it remains to be seen if IOCs have the skill-sets necessary to thrive in a carbon-constrained world.

New geopolitical landscape

When it comes to energy futures, the only thing that is clear is that it will not be business as usual. There is good reason to think that the current energy transition will be different from those in the past. First, it is driven by the purpose of reducing global emissions. Second, the rate at which the cost of low carbon alternatives are falling is adding a growing sense of dynamism. And third, there is growing political commitment that can only be reinforced as evidence of extreme weather events and a changing climate gathers.

The energy transition is generating a new geopolitical landscape, which itself may act as an impediment to progress. The emphasis here has been on the challenges facing the incumbent fossil fuel economy. However, the emerging low carbon economy comes with its own geopolitics related to conflict over critical raw materials, control over 'clean tech' and the new independencies associated with electricity grid interconnection.

In the final analysis, it is all too easy to demonise the fossil fuel economy and be overly optimistic about the pace of progress of the low carbon transition. What is required is a clearer understanding of the threats and opportunities and winners and losers in the coming new energy order. ●

In an industry that makes multi-billion dollar investments that must pay back over decades, the impact of decarbonisation on future demand and price is now a critical uncertainty.

1. *Global warming of 1.5°C: Summary for policy makers*. IPCC, WMO, Geneva, 2018.
2. *Outlook for producer economies 2018: What do changing energy dynamics mean for major oil and gas exporters?* IEA, Paris, 2018.
3. *A new world: The geopolitics of the energy transformation*. IRENA, Abu Dhabi, 2019.