

A bridge to where?



It used to be simple – gas-fired power generation has significantly lower carbon emissions than coal. But the fossil fuel may now be more a more expensive option than power from renewables. And new gas-fired power stations may become ‘stranded assets’. What will become of natural gas in the post-pandemic age?

Jennifer Johnson takes a look.

For years, proponents of gas-fired power have touted it as a ‘bridge fuel’: a link between the coal plants of the past and the wind farms of the future. But, from a financial perspective, the time for building bridges already appears to be over.

In the US, the world’s top producer of natural gas, combinations of solar, wind, storage and energy efficiency are now less expensive than most proposed gas power plant projects, according to the Rocky Mountain Institute. In just three years, analysts from Wood Mackenzie have stated that solar is likely to be cheaper than gas nearly everywhere around the world.

So why are some of the world’s most environmentally progressive states still giving gas-fired power stations the green light?

Political popularity

The answer is – as with all major infrastructure commitments – partly a matter of politics. The UK government’s decision to press ahead with a bid to develop Europe’s largest new gas plant is a case in point. In 2018, Drax Group submitted plans to install four large new gas turbines totalling 3.6 GW at its site in Selby, North Yorkshire. In its application, the company stated that the turbines would replace two coal-fired units

slated for retirement in line with the country’s 2025 coal phase-out deadline.

However, environmental law firm ClientEarth has pointed out that the government’s own forecasts state that the UK will need just 6 GW of new gas generation in the next 15 years. It has already approved 15 GW of large-scale gas projects.

The proposed units at Drax would take planned gas capacity to 18 GW – a move that ClientEarth said would lock the country into superfluous fossil fuel power for decades. The government’s own Planning Inspectorate recommended that the installation be blocked on climate grounds, but Andrea Leadsom, then the Secretary of State for Business, Energy and Industrial Strategy, approved it regardless. In May, ClientEarth lost a high court challenge it had mounted over this case.

The judge who handed down the ruling, Mr Justice Holgate, said there were other public interest issues in favour of the plant’s development: ‘such as its contribution to security and diversity of energy supply and the provision of support for the transition to a low-carbon economy’. Ultimately, Holgate conceded that energy policy making is a balancing act that

involves political judgment.

On paper, gas plants do appear to be a preferable replacement for coal, widely regarded as the most polluting fossil fuel. But coal simply cannot be switched with gas en masse if humanity wants to keep planetary warming within safe limits – especially not if new gas projects have anticipated lifespans of several decades.

Stranded assets

With less than 30 years to go until their carbon neutrality deadlines, the UK and the EU cannot afford to build much in the way of new fossil fuel infrastructure. Still, some policymakers feel their economies and energy systems will need gas to act as a buffer to smooth the transition to renewables.

In a press conference about the EU’s COVID-19 recovery plan, Frans Timmermans, the head of the bloc’s Green Deal programme, indicated that it was trying to steer away from fossil fuels as quickly as possible. However, he noted that there was one exception: ‘In some areas of transition, the use of natural gas will probably be necessary to shift from coal to sustainable energy,’ he told journalists.

In February, the European Parliament approved a list of so-called ‘projects of common

Data from the UK’s Oil and Gas Authority suggests that the production of natural gas from the UK Continental Shelf creates less than half the greenhouse gas emissions of imported LNG

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interest', amid a heated debate among MEPs. While 70% of the schemes that were backed relate to electricity and smart grid infrastructure, 32 major gas initiatives also received the go-ahead. Climate campaigners denounced the decision as a victory for the powerful oil and gas lobby in Brussels. Meanwhile, Europe's Energy Commissioner, Kadri Simson, explained that MEPs had the choice of either accepting the whole of the new list or allowing an earlier iteration – with 40% more gas projects – to remain in force.

The 32 projects would add 338 GW of capacity to Europe's natural gas infrastructure network and come at a cost of €29bn, over half of which could end up being funded by taxpayers. In a study conducted on behalf of the European Climate Foundation, the consultancy Artelys found that Europe's existing gas infrastructure is 'sufficiently capable' of meeting a range of future gas demand scenarios, including instances of serious supply disruption.

According to the report, this implies that most of the EU's proposed gas schemes 'are unnecessary from a security of supply point of view, and represent a potential overinvestment of tens of billions of Euros'. Simply put, the risk is that the projects become stranded assets, propped up by public funds.

The mass devaluation of fossil fuel production and distribution infrastructure would send shockwaves through global financial markets. Despite increasingly stark warnings, the fossil fuel system continues to invest some \$5tn a year in new supply and demand projects. The think tank Carbon Tracker, which studies the impact of the energy transition on capital markets, has said that companies engaged in expansion will be exposed to the consequences of peaking fossil demand. And there is mounting evidence to show that global gas consumption may be approaching the moment of terminal decline.

'Technological innovation and policy support is driving peak fossil fuel demand in sector after sector and country after country, and the COVID-19 pandemic has accelerated this. We may now have seen peak fossil fuel demand as a whole,' said Carbon Tracker Energy Strategist Kingsmill Bond. 'Now is the time to plan an orderly wind-down of fossil fuel assets and manage the impact on the global economy rather than try to sustain the unsustainable.'

The true benefits of this fossil fuel switching can only be realised if gas actually has a better environmental profile than coal – recent studies have shown that gas may in fact be a far more serious polluter than many analysts have estimated

Case-by-case

The task facing the global energy industry is easy to summarise. It must rapidly reduce and ultimately eliminate the greenhouse gas emissions associated with producing, transporting, and burning fossil fuels. The journey to carbon neutrality is less easy to map out. The International Energy Agency (IEA) believes that in specific countries, sectors and timeframes, gas may offer some CO₂ and air quality benefits over more carbon-intensive fuels. The agency reports that coal-to-gas switching in particular has saved around 500mn tonnes of CO₂ since 2010.

In a report issued last year: *The Role of Gas in Today's Energy Transitions*, IEA analysts estimated that an additional 1,200 Mt of CO₂ could be abated worldwide by firing up existing gas plants in place of coal units. The greatest potential for savings can be found in 'mature energy markets with relatively flat electricity demand growth and significant spare gas capacity, notably the United States and Europe,' the report claims. If coal-to-gas switching were utilised optimally, the IEA believes the markets in question could displace about half of their coal-fired power output.

Of course, the true benefits of this fossil fuel switching can only be realised if gas *actually* has a better environmental profile than coal. Recent studies have shown that gas may in fact be a far more serious polluter than many analysts have estimated, depending on how it's produced and transported.

In his single term as US President, Donald Trump has approved the construction of 11 new natural gas export terminals. Data compiled by Bloomberg researchers has shown that if all of the terminals were completed and commissioned, they could emit 78mn tonnes of CO₂ every year. The figure is comparable to the emissions of 24 coal plants.

Data published in June by the UK's Oil and Gas Authority (OGA) suggested that the production of natural gas from the UK Continental Shelf creates less than half the greenhouse gas emissions of imported liquefied natural gas (LNG). Meanwhile, importing gas via pipeline, particularly from Norway, is said to produce lower emissions still, which suggests that the UK could realise additional improvements in its own operations.

However, the OGA reports that the process of liquefaction,

combined with the emissions generated by the transportation and regasification of LNG, are behind the considerably higher emissions intensity of imported LNG.

In order to be easily transported around the world on ships, gas must first be supercooled into liquid form using ozone-depleting refrigerants. All gas transport and processing facilities are also subject to a degree of 'methane slip', or leakages from infrastructure into the atmosphere. Both factors make it difficult to accept that gas – especially of the imported variety – is truly the 'greener' fossil fuel. To minimise fugitive methane emissions, and improve their environmental credentials, gas plant operators should consider utilising domestic reserves and infrastructure.

Falling costs of renewables

So far this year, renewables have generated more power than all fossil fuels put together in the UK. As the pandemic abates, and energy demand rises once more, it will be up to the government to decide just how much gas it wants to keep on the grid. Given the falling costs of renewables across Europe, new gas-fired power stations and transport infrastructure seem like increasingly shaky investments. Arguments will be made for the importance of gas as a source of peaking power, though its continued importance could be threatened by the growth of large-scale battery storage solutions.

The idea that gas will be essential to the energy transition seems shakier than it once did. Determining where and how to deploy it in the coming decades will require some careful calculations. Governments must use the science to help them decide whether it's better to take a 'bridge' to net zero, or find another way around. ●