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Gas markets, regulation and politics: implications of the energy transition

Until recently, gas was seen in Europe as a complement to renewable energy—i.e. a cleaner (albeit costlier) alternative to coal. Since 2017, opinions have been changing, primarily as a result of stronger evidence on the pace of climate change. Nonetheless, as Sir Philip Lowe, Oxera Senior Adviser, explains, gas will continue to have an important role—albeit this is contingent on future innovation and the roll-out of gas investment, both of which in turn depend on politics and market regulation

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For the last half a century, energy policies have placed increasing emphasis on the environmental sustainability of energy sources and use. Initially the major objectives were to halt an irrevocable destruction of natural resources, to prevent loss of biodiversity, and to protect human health. Subsequently the environmental concerns relating to energy have extended to preventing all forms of land, water and air pollution, as well as to the need to recycle waste.

In the last ten years, the increasingly strong scientific evidence of climate change has widened the notion of environmental sustainability to include a substantial reduction of greenhouse gases and a move towards a carbon-free energy sector.

Gas as a complement to renewables

Given that fossil fuels, and the technologies that exploit them, have dominated energy supplies in Europe for more than two centuries, the change to a low-carbon economy and carbon-free energy is by any standards a radical one. What is now called an 'energy transition' requires changes that are arguably more about revolution than evolution. Seven years ago, the European Commission's Energy Roadmap to 2050 certainly projected substantially more electricity in energy use and a majority share of renewables in the energy mix.[1] But the anticipated progression towards the 2050 objectives looked fairly smooth.

As far as gas was concerned, its lower CO2 content, combined with the shale gas boom in the USA and expansion of production in particular in Qatar, Australia and Angola, gave rise to some very optimistic scenarios. I am sure that many people will remember the IEA's 2012 'Golden Rules for a Golden Age for Gas'.[2] According to the report:

> Natural gas is poised to enter a golden age, but this future hinges critically on the successful development of the world's vast unconventional gas resources. North American experience shows unconventional gas – notably shale gas – can be exploited economically. Many countries are lining up to emulate this success.

Public debate at the time also centred on whether gas could be a transition fuel (up to 2035) or a destination fuel. Gas was seen as an ideal complement in power generation to intermittent supplies of renewable energy. The consensus view was also that natural gas delivered by pipeline would be competitive in the medium as well as the short term. It was cleaner than coal even if it was not as cheap.

In the very short term, some forecasts have been even more optimistic. Alexander Medvedev from Gazprom was able to state confidently in 2016 that:[3]

> this year we are going to supply a record amount of natural gas to Europe…We believe that Gazprom's gas will remain competitive in the European market throughout next year and beyond…We assume that the share of Russian gas in European consumption will, at the very least, remain at its current level and is likely to demonstrate slow but sustainable growth.

He was right for 2016 to 2018.

A changing mindset?

However, since 2017 opinions have been changing, primarily as a result of the stronger evidence on the speed of climate change and the Paris Agreement.[4] Boersma and Jordaan concluded a 2017 article on the energy transition by saying that:[5]

> natural gas is no panacea, and there is little evidence to support the idea that the fuel can play a role in a low-carbon economy, absent dramatic breakthroughs in technology that are currently not on the horizon.

Equally, the European Commission's strategy for a climate-neutral Europe by 2050, published in November 2018,[6] does not currently seem to see a 'destination role' for gas. As Commissioner for Climate Action and Energy, Miguel Arias Cañete, declared at the press conference on the launch of the strategy:[7]

> Going climate neutral is necessary, possible and in Europe's interest. It is necessary to meet the long-term temperature goals of the Paris Agreement. It is possible with current technologies and those close to deployment. And it is in Europe's interest to stop spending on fossil fuel imports and invest in meaningful improvements in the daily lives of all Europeans

Bearing in mind the EU's gas import bill of €23bn in 2018, the Commissioner's statement offers no endorsement of gas as an integral part of Europe's energy mix in the longer term.

But there are several reasons why this strategy may not be decisive for the future of gas.

First, demand for gas in Europe is no longer necessarily the primary influence on the supply and price of gas at a global level. Asian countries have become the primary destination for liquefied natural gas (LNG) exports, in particular from Australia and the USA. By the 2040s, China is predicted to overtake the EU as the world's major importer of gas.[8] The primary reason is almost certainly not CO_2 reduction. Dealing with air pollution in China, and in India, will require a shift from coal-burning to gas, and this move is already in progress. Gazprom may now be relying on its bedrock of European sales, but wants to develop pipeline links to China, India and South Korea. The price incentive is there, so despite political difficulties, it seems inevitable that Russia will sell more and more of its gas in Asia. Perhaps, given the prices obtained there, this will have a dampening effect on demand for gas in Europe and favour the application of carbon-free technologies there.

Second, and contrary to Boersma and Jordaan's view, things are unlikely to stand still. There will be attractive alternative uses for gas and technological breakthroughs. Use of gas in maritime and heavy road transport, as well as in industry and defence, will develop due to environmental, if not cost, advantages. Power to gas technologies will also develop—at present more than 50 demonstration projects are ongoing in Europe.[9] With a continuing increase in the price of carbon, some of these projects are likely to become viable, provided that existing gas infrastructures can accommodate higher percentages of biogas. There are around 2.2m km of gas pipelines in the EU, with an enormous potential to accommodate biomethane and hydrogen, although existing national limits vary between 1% and 12%.[10] There is also a strong financial incentive to create alternative uses for existing network assets, which are otherwise likely to be stranded on a large scale.

A joined-up (but flexible) approach

More widely, some commentators have pointed to the potential for coupling the use of electricity, gas and heat in transport and industrial infrastructures with a view to greater penetration of renewables and more decarbonisation of the economy at lower overall cost. Full substitution of gas by renewables for heating would seem to be a technically inefficient and costly alternative, even if there are considerable advances in storage technologies. With carbon capture, usage and storage and a high carbon price, there could also be scope for maintaining gas demand for industrial use.

Policies and regulations, at national and EU level, arguably need to create a framework in which alternative, innovative solutions can be developed and implemented without leading to a plethora of uncoordinated systems and consequently to significant wasteful public investment.

All this being said, current forecasts by the IEA and other bodies suggest that EU gas demand will rise to around 400 bcm p.a. in the 2020s, then decline slightly to around 375 bcm p.a. in the 2030s. According to the 2018 figures, 47% of gas imports came from Russia, 34% from Norway, 8% from North Africa, and 11% from LNG imports originating in several countries.[11]

Given the political implications of a high level of import dependence on Russia, a number of European countries are likely to favour diversifying suppliers, either through new pipelines such as the Trans-Anatolian Pipeline (TANAP) and the Trans-Adriatic Pipeline (TAP), or through increasing recourse to LNG. There are already 28 large-scale LNG terminals in the EU, which are sufficient to cover 40% of total EU demand.[12] Further terminals are also either approved or in construction (such as the one on the island of Krk in Croatia) or are planned (as in Tenerife and Gran Canaria). With an average utilisation rate of 20% between 2008 and 2014, regasification capacity is unlikely to be a major constraint on the use of imported LNG, although the price differential with pipeline gas remains a challenge.

Indeed, the low level of utilisation of LNG import terminals highlights a potential risk to the transition, which is that infrastructure investments are not sufficiently well integrated with policies for the development of a wider low-carbon energy system for power generation for heating and cooling, for transport, and for industry. Failing to ensure a sufficiently 'joined-up' approach to investment can increase energy costs to consumers, potentially to a point where the infrastructures concerned become unaffordable.

Conversely, adopting a rigid, centrally planned approach to infrastructure investment could frustrate the development of innovative services. In turn, this could reduce the productivity of the energy sector and undermine European competitiveness.

Avoiding these risks by simultaneously achieving a necessary degree of system planning, supply diversity, and competition will be a challenging task for regulators. Meeting this challenge is likely to require innovative approaches to the design of infrastructure access arrangements and tariffs, as well as providing greater incentives for transmission system operators (TSOs) and distribution system operators (DSOs) to facilitate the development of new markets.

On the same line of argument, plans such as the Nord Stream 2 Pipeline, which aims to increase natural gas capacity to the EU, have the potential to offer gas at very competitive prices relative to LNG, provided that these increased supplies can be shared across the EU's internal market without creating significant price differentials between northern and southern member states and regions.

A question of interconnectivity

This brings us to the increasingly vexed question of future gas infrastructure development within the EU. Historically, the most important transmission infrastructure links within Europe were constructed east to west to bring Ukrainian gas to Russia and then the reverse, and then Siberian gas through the Ukraine and through the Baltic Sea (via the Nord Stream pipeline system) to Eastern and Western Europe. Gas from the North Sea (from Norway, Denmark, the Netherlands, and in limited proportions from the UK) found its way through important cross-border interconnections into continental markets.

However, North Sea-supplied markets remained relatively isolated from those supplied from Russia. The concern about connecting 'energy islands' such as the Baltic countries has resulted in strengthened connections, such as those between Poland and Lithuania, among the three Baltic countries, and between Estonia and Sweden. The conversion of many pipelines to make them bidirectional has improved market operations. The recent 2018 decision on the Baltic Pipe Project will enable Norwegian gas to pass through Denmark to Poland, as well as the reverse: from Poland to Sweden and Denmark.[13] Work has also started on a Greece–Bulgaria gas interconnector which will bring additional non-Russian sources of gas to South-East Europe.

However, there are some doubts as to whether the existing organisation of the internal EU gas markets offers timely incentives to construct incremental and/or new capacities in order to ensure that infrastructure bottlenecks do not undermine the integrity of the market and produce unacceptable price differentials. This issue explains to a large extent the opposition of some Southern European member states to the Nord Stream 2 project. In their view, the project may well provide substantial additional liquidity in Northern Europe, but its advantages are unlikely to be shared with Southern European neighbours due to insufficient interconnections through Germany and Austria.

This question goes right to the heart of the debate as to whether ACER's Gas Target Model, together with the Commission's latest revised Network Codes on Capacity Allocation and Tariffs, provide the right incentives for infrastructure enhancements.[14] The discretion given to national regulators to take different decisions on projects under different regimes (e.g. exemptions, open seasons, and specific national legislation) also adds a level of complexity to the way the market is supposed to work.

Concluding thoughts

This article seeks to widen the debate on the future of gas in Europe, to speculate about future innovation in the use of gas and gas infrastructures, and to highlight some issues about the way in which the EU's internal gas market operates and the political pressures surrounding it.

Some years ago, when the direction of EU–Russia relations was towards continuity, rather than confrontation, we developed with Russian colleagues the concept of 'a tolerable level of uncertainty' about the future of gas, which would allow both exporters and importers to plan and invest. I sincerely hope that future discussions will help to develop such a concept between energy providers, investors, systems operators and regulators within Europe.

In addition, involving Europe's major gas suppliers in Russia, Norway and North Africa in these discussions could help them to orient their own commercial strategies within Europe, whether in terms of the mix of their sales (natural gas, hydrogen, biogas, etc.) or in terms of total sales volumes. Overall, these discussions could also make a positive and constructive contribution to the preparation of any future proposals of the European Commission for the gas sector.

Sir Philip Lowe, KCMG

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