Issue 14: October 2017

Al-Attiyah Foundation Research Series

Expert energy opinion and insight

Energy in Europe: opportunity amid decline

Outside renewables, the demand part of Europe's energy story has been a study in decline punctuated by brief interludes. One of those interludes is underway now. But the recovery is modest and it comes from a low base. Oil consumption in the EU in 2016 was its highest since 2012, yet still well beneath consumption in 2006. The natural gas-demand trajectory has been similar. A recent peak was hit in 2016; but demand was still 13% lower than a decade earlier. Decarbonisation, conservation, the shift to renewables and economic weakness are the underlying reasons for the trend; and a mild economic recovery in recent months is a main source of the uptick. Yet for energy exporters targeting the EU, the picture is more mixed than this suggests. While decarbonisation and enhanced support for renewable energy will remain headwinds, the rapid decline of domestic output means the EU will provide a growing market for gas exporters and especially LNG.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Oil ('000 b/d)	14661	14893	14812	14904	14999	15156	15165	14878	14737	14023	13942	13499	12955	12702	12500	12707	12942
Gas (bn cm)	441.0	452.5	453.5	472.9	484.9	496.4	490.1	483.0	494.9	462.8	497.9	449.7	438.6	431.2	383.0	399.1	428.8
Coal (m toe)	321.0	322.0	320.8	332.1	325.8	316.5	327.2	328.4	303.6	267.4	280.2	288.1	294.3	288.0	268.4	261.1	238.4
Nuclear (TWh)	945.3	979.2	990.4	998.8	1011.5	998.1	990.2	935.5	937.7	894.3	916.5	906.7	882.6	877.1	876.6	857.4	839.8
Hydro (TWh)	369.1	383.0	323.8	309.8	329.8	312.4	316.0	315.4	333.3	336.2	378.5	314.1	337.2	370.9	374.5	341.0	347.8
Solar (TWh)	O.1	0.2	0.3	0.4	0.7	1.5	2.5	3.8	7.4	14.1	23.1	46.5	71.3	85.3	97.5	108.1	111.6
Wind (TWh)	22.4	27.0	37.0	44.6	59.4	70.6	82.3	104.7	119.1	132.8	149.0	179.2	206.0	234.9	251.4	301.8	300.5

FIGURE 01: EUROPEAN PRIMARY ENERGY CONSUMPTION, BY SELECTED SOURCE (2000-16)

Source: BP

Strong decline, mild recovery

The overall trend is startling. European demand for oil, gas and coal has been in freefall for the past decade. Economic performance is a major reason. The EU's total GDP in 2016, about \$16.4 trillion according to the World Bank, was barely higher than in 2015 and well beneath the \$19.1 trillion of 2008 (in real terms). In the same period, China's GDP rose from \$2.8 trillion to \$11.2 trillion and that of the US from \$13.9 trillion to \$18.6 trillion. Of major economies, only Japan's GDP has expanded at such a modest pace as the EU's.

The impact of this economic sluggishness on energy demand has been stark (see Figure 01). EU oil

consumption in 2016 was 12.9m b/d, its highest level since 2012. But this was 15% beneath demand in 2006. Natural gas demand of 429bn cubic metres (cm) last year was also higher than in the two preceding years. But it was still 12% beneath consumption a decade earlier. Coal consumption in the same 10-year time period fell even more steeply, dropping by more than 27% to 238m tonnes of oil equivalent (toe). Demand for nuclear fell. Of the primary energy sources, only hydroelectricity supply in the EU held steady — as well as, of course, renewables, which saw very strong growth. Consumption was just 39m toe in 2006; last year it reached 136m toe, a near-250% rise.



Source: Eurostat, DG Energy

The case of natural gas is more complex. The reasons for the decline of coal and oil are well-known. But for much of the first decade of the century, analysts said the EU would enjoy a boom in natural gas use. They expected also that the recession-induced drop in energy demand following the global financial crisis would, for gas, be brief. It did not transpire this way. The Oxford Institute of Energy Studies' (OIES) Jonathan Stern points to several reasons. First, gas has in the European context been critically associated with fossil fuels, giving it a policy disadvantage shared by coal and oil (and obscuring its plain advantages as a lower-carbon source of baseload power). Second, the rise in oil prices of 2011-14 also inflated European gas prices, stunting its take-up and spurring greater coal use (alongside renewables). Third, the failure of the emissions-trading scheme in the EU did not price carbon high enough to promote gas. Fourth, renewable energy and storage got cheaper. Fifth, gas as a fuel - and not just Russian gas – was associated with the problem of security of supply that followed the Ukraine-Russia gas crises.

The past few years have bucked these trends for oil and gas. As the economy, especially in the Eurozone, has improved since 2014, the overall energy-demand picture has also been healthier. The International Energy Agency (IEA) says oil demand in OECD Europe as a whole (which includes Turkey, Norway and Switzerland) rose by 300,000 b/d in 2014 and 200,000 b/d in 2015, and will increase by 300,000 b/d in 2017 but remain flat in 2018.

It was rosier for gas. According to the most recent data from the Directorate-General for Energy, the European Commission's energy department, natural gas consumption rose in Q2 2017 by 11% compared with a year earlier; the sixth consecutive quarter of growth (see Figure 02). A cold winter in 2016-17 helped, but so did more pull from the power sector and the gradual improvement in the economy.

The near-term question is whether this growth will continue — and for how long. In oil, the IEA's outlook for nearly flat consumption (50,000 b/d) growth in 2018 seems plausible. Germany has been a main source of demand growth in recent months. In July, its demand was 80,000 b/d higher than a year earlier, buoyed by strong gasoil demand. But the latest data pointed to contraction in August as the heating-oil buying spree ended, the agency said. In France, recent oil-demand growth has also eased off. The same is expected in other big European consumer countries. Although high taxation of petroleum fuels in Europe insulates consumers from international price swings, softness in the euro coupled with the recent Brent rally can be expected to have at least some impact on buying, especially for storage.

In gas, short-term demand will depend on weather forecasts (unreliable) and price (more predictable). Price appreciation in the past two years seems to have followed the increase in consumption. From a low beneath 33p per therm in January 2016, UK natural gas futures have risen unevenly (including a period of weakness between February and September 2017) and were trading above 55p at the end of October. The closure of the Rough storage facility will likely lift prices, especially for LNG into the UK. Prices at the Netherlands' Title Transfer Facility, provider of Europe's other main benchmark, have followed a similar pattern, and were trading at around €18.50 per megawatt-hour this autumn.

Policy versus geology

For exporters watching the continent, the recent updraft in both demand and prices is misleading — but for different reasons in oil and gas. Europe's long-term gradual decline as an oil consumer seems inexorable and the only opportunity for oil exporters targeting Europe arises in the equally inexorable decline in domestic production. But no oil producer is pinning hopes on European consumers, who remain well supplied by Russian oil and the Atlantic Basin's products. In gas, production is also falling, increasing the need for imports; but gas still faces a market-share battle with renewable energy. If it can keep its place in the matrix, exporters will compete among themselves for access to an expanding (import) market.

Policy and geology are the two main determinants. The broad thrust of the former is clear: by 2030, according to the European Commission's energy strategy, the EU must reduce greenhouse-gas emissions by 40% compared with 1990; derive at least 27% of its energy from renewable sources; and

FIGURE 03: EUROPE IS GAS RESOURCE POOR RELATIVE POPULATION AND ECONOMY



Source: BP

achieve a 27% saving in energy compared with a businessas-usual scenario. These targets followed the EU's signing of the Paris Climate Agreement in 2015. (The 2050 targets, also in line with the Paris goals, are more severe, and include reducing emissions compared with 1990 levels by 90-95%.)

Not only will the policy goals drive growth in renewable capacity, but consumption of energy in general will fall. BP expects an 8% drop in demand by 2035 — and for the annual pace of the decline to increase from 0.1% over the past 20 years to 0.4% over the next 18. It predicts that renewable energy will account for 20% of all consumption by 2035.

But the news is not bad for anyone selling gas to the block. According to BP, demand for gas will rise by 0.7% a year to 2035, or a pace that is nearly twice that seen in the past 20 years, to reach 45bn cubic feet a day, or 465bn cm/y (compared with 39bn cf/d in 2015). Its share of the total energy matrix will rise from 22% to 28%. European production will decline by a startling 52% over the same period. Imports will make up the difference — and command a growing share of Europe's gas market.

The Directorate-General of Energy thinks the rise of EU gas demand will be somewhat uneven: demand from gas-fired generation will decrease slightly until 2020, but then rise on the back of higher CO2 prices (in a revamped emissionstrading scheme). This outlook leaves much scope for gas to increase its penetration of the market in the short term.

The domestic production outlook is dire. Europe is gaspoor by comparison with other areas of the world, both in terms of reserves per capita and reserves per unit of GDP (see Figure 03). Production has been falling steeply already and will drop further in the coming years. Natural gas output was 202bn cm in 2006 and just 118bn in 2016. Total EU production of natural gas — chiefly from the Netherlands and the UK (here still considered a member of the bloc) — is expected to fall to 111bn cm/y by 2020 and to 79bn cm/y by 2030 (see Figure 04). It could drop more steeply more quickly thanks to the Dutch government's decision in 2014 to cut production from the Groningen



gas field. Groningen produced about 54bn cm/y until 2013 and was expected to produce 49bn cm/y until 2020. The phasing-down of output has cut it by more than half. As of October 2017, its new quota was just 21.6bn cm/y.

The upshot of these competing forces — falling domestic production of gas, rising renewable capacity and evertightening emissions targets, loss of capacity from coal and nuclear generation, conservation, growth in natural gas use — is that the EU will be left with a growing gas deficit. To be sure, the market will remain atypical: the IEA says that 98% of the world's gas-demand growth will occur outside OECD Europe. Still, from an exporter's point of view, the geological reality of declining production will more than offset this. The demand-supply gap in the EU will widen from 279bn cm in 2015 to 403bn cm/y by 2035, according to BP — effectively offering a new growing market of 124bn cm/y by then.

Rising import needs

This is a considerable opportunity for gas exporters. By comparison, the gas-import need of China — considered the great long-term growth target — will rise from 62bn cm in 2015 to 227bn cm/y by 2035. In India, projections show imports rising from 20bn cm/y to 60bn cm/y. In other words, the EU's import needs will over the next 20 years remain greater in absolute terms than either of those two countries; and increase by just 40bn cm/y less than China's.

Established exporters to the EU, who already control much of its import market, can be expected to defend their position. Russia, the biggest exporter to the EU, sold 153bn cm to the EU in 2016, giving it a market share of 36% of total consumption (and almost half of all imports). Norway, the second biggest, shipped 109bn cm. Algeria and Libya were the other main pipeline suppliers to the EU. Qatar, Nigeria and Algeria also sent some LNG.

Norway has suggested its exports to Europe will remain stable at around 100bn cm/y. Algerian and Libyan pipeline shipments to the EU are also unlikely to increase significantly, if at all. The main new pipeline supplies will come from Russia

and Central Asia. Gazprom says its Nord Stream 2 pipeline, following the route of the original one to Germany, will be on stream in 2019, adding 55bn cm/y of export capacity to that route. (US sanctions and some EU resistance to the project may affect its timing.) In May, Gazprom began construction of Turkstream, twin pipelines each with 15.75bn cm/y of capacity. Gas in the first is intended for the Turkish market and the second for southeast Europe.

FIGURE 04: SUPPLY GAS FOR EU-28 GAS MARKETS



Source: Prognos, European Commission

In part to reduce this increased dependence on Russian gas, the EU has pinned much hope on the Southern Gas Corridor (SGC) — an infrastructure-building programme to facilitate gas imports from Azerbaijan (including the South Caucasus Pipeline, in Azerbaijan and Turkey; the Trans-Anatolian Pipeline, in Turkey; and the Trans-Adriatic Pipeline, in Greece, Albania and Italy). Yet, like the ill-fated Nabucco project once backed by the European Commission, the SGC may prove less viable than the EU initially hoped, because of limitations in Azerbaijan's upstream and local demand. (Turkmenistan has also been talked of as a potential supplier, but this would depend on the agreement of Caspian littoral states, including Russia, to build a sub-sea pipeline.) Simon Pirani, of the OIES, estimates that Azerbaijan may be able to supply just 10bn cm/y to the SGC in the 2020s. To be significant, the SGC would need also to gather gas from Israel, Cyprus, Iran or Irag, for shipment through Turkey. None of these plans is advanced. In other words, of the 124bn cm/v of natural gas the EU will need by 2035, viable and probable pipeline projects on the table now will cater for just ~80bn cm/y.

LNG is the obvious makeweight for the remaining market of ~44bn cm/y. Yet in 2016, European LNG imports were 37.5m tonnes (just under 52bn cm), or only around 13% of all imports: the much-anticipated rise of Europe as the "LNG market of last resort", or "sink" for global stray supplies, has not emerged. Qatar and Algeria were the biggest LNG exporters to the bloc in 2016, but while the UK and Spain remained its biggest importers, the UK's imports actually fell last year.

The potential for growth is significant. Existing regasification capacity is underused and would already allow for 190bn cm/y of imports. Much of this capacity is concentrated in Western Europe and would need the development of interconnections to other parts of the continent. Another 27 new terminals, including floating, storage and regasification units, are under construction or planned, however, including in Eastern Europe.

Price and availability will determine which LNG exporters capture this market. Several US exporters, including Cheniere Energy, expect Europe to consume the lion's share of their growing output. Wood Mackenzie has predicted that 55% of American LNG could be sold in Europe. But Gazprom has the ability to stymie this growth. A recent study from the Netherlands' Clingendael International Energy Programme estimates that the Russian firm could afford to sell its gas in Europe at \$3-3.5 per million British thermal units, undercutting US exporters needing at least \$4/mmBtu.

Yet unless it decides to build more capacity to Europe in addition to that already on the table, Gazprom can only defend market share up to the point of its maximum physical export capacity. Over time, this would still leave a gap to be filled. Expanding LNG exports from the US would therefore battle with new volumes from Qatar, West Africa and possibly the East Mediterranean and East Africa. Because of the need to fill this extra ~40bn cm/y of demand, European customers could not rely on Gazprom to set a low base price but would have to compete with Asian and other buyers for cargoes.

Conclusion: opportunity and challenges

While Europe is an unreliable destination market for oil, it will be a much more significant one again for natural gas, despite gas's image problem in the bloc. Geology means import needs will rise sharply over the coming two decades.

Furthermore, the outlook for European gas imports could increase beyond the ~40bn cm/y by 2035 that we expect here - provided the gas industry can successfully make a case for greater gasification in the coming years. Gas offers the easiest and cheapest feedstock for European countries. that otherwise would miss their emissions-reductions targets. As much as 80 GW of coal-fired generation capacity will remain online for the next few years. While it is unclear how much of this capacity will fall to natural gas, the potential is nonetheless apparent, if gas remains cheap enough and if its advocates can make its case powerfully enough.

Europe's energy story is atypical of the world's, marked by decline - of energy intensity, absolute energy consumption, and fossil-fuel production. But for gas exporters it is about to become a critical destination market again, with everything to fight for.