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# Brexit's impact on gas markets

*The Oxford Institute for Energy Studies is launching a new research theme on the impact of Brexit on gas markets. This publication is the first of a series that will focus on this subject as negotiations continue between the UK and the EU.*

## Brexit and security of supply for UK and Ireland

The future demand picture for gas is difficult to predict for both the UK and the EU<sup>1</sup>. Brexit is coming at a time when UK North Sea gas production is in terminal decline and the main UK storage facility (Rough) is facing technical issues that will reduce its capacity with a possible extreme outcome, namely total decommissioning. These specific issues will make the Brexit negotiations even more difficult for the UK as far as gas is concerned.

As the outcome of Brexit is still unknown, we can only draft hypotheses ranging from a benign (soft) energy Brexit with virtually no changes, through to a full (hard) energy<sup>2</sup> Brexit leading to massive changes (via solutions similar to those reached in Norway or Switzerland<sup>3</sup>). From being the leader and at the core of the EU liberalised energy market, Brexit will result in the UK being outside the EU market. Additionally, Ireland would also be effectively cut off from the main European Continent. This means we have to look at three energy issues relating to Brexit: 1) the impact on the UK; 2) the impact on the EU-26, and 3) the impact on Ireland (which is still part of the EU but cut off by the UK from the EU energy markets). It is also worth clarifying some terms used in this paper:

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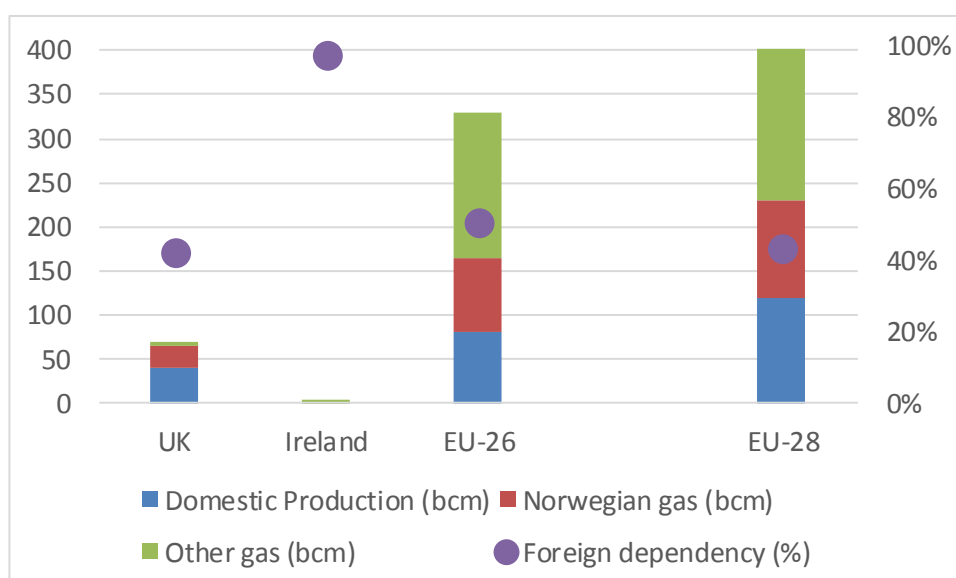
<sup>1</sup> Please refer to "The Future of Gas in Decarbonising European Energy Markets: the need for a new approach" by Jonathan Stern (January 2017 – OIES Paper: NG 116). The UK government wants to replace coal with gas in power generation which could lead to increased gas demand.

<sup>2</sup> Energy could suffer in the crossfire as many other issues will have to be negotiated.

<sup>3</sup> The European Free Trade Association (EFTA) is an intergovernmental organisation set up for the promotion of free trade and economic integration for the benefit of its four Member States: Iceland, Liechtenstein, Norway and Switzerland. In 1973, the UK left EFTA to join the EU. EFTA is responsible for the management of the European Economic Area (EEA) Agreement, which enables three of the four EFTA Member States (Iceland, Liechtenstein and Norway) to participate in the EU's internal market. Switzerland has adopted, via treaties, various provisions of EU law in order to participate in the EU's single market. This will not be the UK option as Theresa May's Lancaster House speech on 17 January made it clear that the UK would be leaving the EU Single market and the Customs Union, and that it would negotiate a new relationship with the EU that would not equate to, "partial membership of the European Union, associate membership of the European Union, or anything that leaves us half-in, half out." Nor would the government, "seek to adopt a model already enjoyed by other countries."

- “EU”: This refers to the EU post-Brexit, i.e. the 27 Member States excluding the UK. EU-26<sup>4</sup> refers to the Continental part of the EU i.e. excluding the UK and Ireland.
- “Foreign dependency”: Up until this point, UK gas has been labelled EU gas and the UK has been able to access Norwegian gas (part of the European Economic Area) and EU piped domestic gas. As soon as Brexit is formally completed, the UK will still have its own domestic gas supply but will also need to access foreign gas (Norwegian and/or EU) to meet demand. By applying this definition, in 2015, 42 per cent of UK demand was ‘foreign’ gas. In the future, UK gas production is bound to decline and domestic shale gas production does not look promising enough to alter the trend. ‘Foreign dependency’ will also become a major issue for Ireland. Until now Ireland has been getting 97 per cent<sup>5</sup> of its gas from the UK and in the internal market this was labelled EU gas, but post-Brexit, this same gas will be labelled ‘foreign’ gas. And with no regas capacity, all Irish ‘foreign’ gas will either have to be sourced from the UK or be transited via the UK.
- “EU-26 gas exports”: So far, the EU has been a net importer of gas and the only time gas has been exported, it was in fact re-exports such as Russian gas being re-exported to Ukraine or LNG being re-loaded. Post-Brexit, the UK will make up its gas shortfall by importing Norwegian gas but also EU-26 gas (a mixture of domestic and imported gas).

**“Foreign dependency”: Post Brexit vs 2015 EU-28 situation**



Source: Net flows from BP Statistical Review June 2016, thierrybros.com

In short, post-Brexit, EU-26 would be slightly more dependent on foreign gas than the former EU-28 but both the UK and Ireland would be much worse off. From being hardly foreign dependent at all, the UK and Ireland would become respectively 42 and 97 per cent dependent on foreign gas. In a world awash with LNG (at least after the Brexit outcome), the issue of security of supply is not the primary issue in Brexit negotiations. But as the LNG supply and demand balance is forecast to tighten during the 2020s, the UK and Irish<sup>6</sup> agendas should then be concentrated on security of supply as: 1) the NBP would have moved from being a major international hub to a regional one with less liquidity than

<sup>4</sup> In EU-26, Cyprus has no gas business, and Malta is just starting to import LNG.

<sup>5</sup> The Corrib gas field that started in December 2015, will greatly enhance Ireland’s security of supply in the short-term. But post 2020, Ireland is likely to remain largely dependent on imported gas. Electricity generation in Ireland relies mainly on gas, with 42 per cent of the electricity generated coming from gas in 2015.

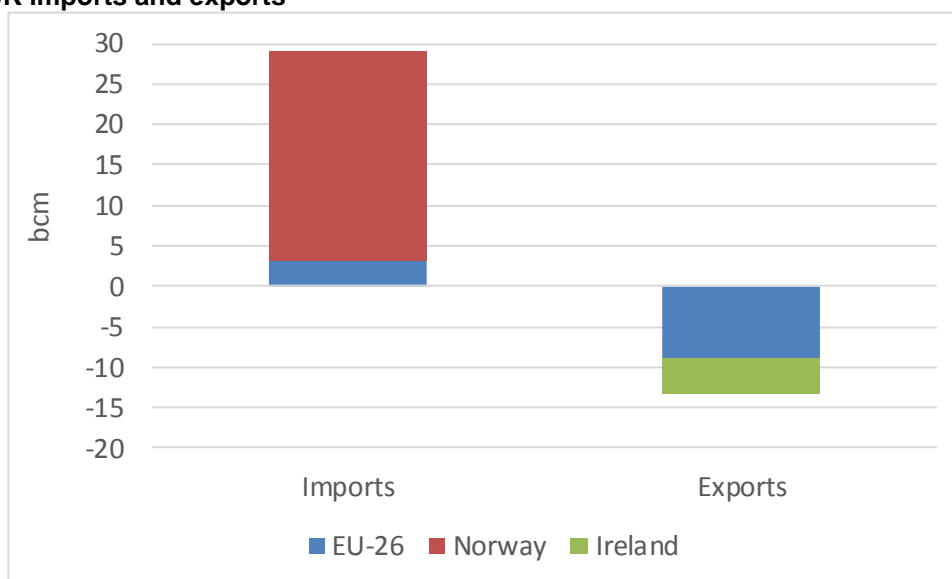
<sup>6</sup> Although with an estimated 20-year life for Corrib field, production rates will begin to decline after 5 years.

the TTF<sup>7</sup>; 2) the UK would have move “down the pipe” with supply coming from further away (UK regas competing with EU regas; piped gas transiting via the EU, Norway’s<sup>8</sup> ability to swing supply between the UK and the EU), and 3) the UK has very little (and diminishing) storage capacity (equal to 6.6 per cent of annual UK demand<sup>9</sup>). Ireland, which would be cut off from the main European Continent, has an even lower storage capacity compared to annual demand (5.2 per cent). And how is Ireland, once disconnected from the rest of the EU market, going to implement the EU Security of Supply directive? Post-Brexit, it would be impossible for Ireland alone to mitigate a serious gas supply disruption (known as N-1, for example the shutdown of a major supply infrastructure or its equivalent).

**First conclusion:** The UK needs to reshape its energy diplomacy<sup>10</sup> that has in the last decade increasingly been handled by Brussels, with a concomitant decrease in knowledge and power within the UK. In the future, the UK will need to negotiate not only with the EU but also with Norway which provides 38 per cent of its gas.

**Moving from an annual to a seasonal analysis, we have to take into account the flows with Continental Europe**

**Split of UK imports and exports**



Source: BP Statistical Review June 2016, thierrybros.com

On top of its imports from Norway and the exports to Ireland mentioned above, the UK has some trade with Continental Europe. The UK is linked to the EU by three pipelines: Moffat to Ireland, Interconnector UK (IUK) with Belgium, and the Balgzand Bacton Line (BBL)<sup>11</sup> which enters from the Netherlands. The respective national regulatory authorities (Ofgem in the UK, CREG in Belgium, ACM in the Netherlands and CER in Ireland) are currently charged with regulating and supervising these pipelines (IUK (Ofgem and CREG), BBL (Ofgem and ACM) and Moffat (Ofgem and CER)) under the EU Third Energy Package. It is important to consider how the UK and EU delegations are going to view existing bi-lateral agreements for these pipelines. Will it be the case that the existing separate

<sup>7</sup> The changes in the hub’s liquidity and churn ratio will be looked once we know how Brexit will unfold. But according to ICIS, the NBP tradability score has been lower than the TTF since Q3 2015 showing that the TTF has become the premier European hub.

<sup>8</sup> And if the UK doesn’t rejoin EFTA, Norway should be better off selling its gas to the EU unless there is a sizeable extra margin to be made in the UK to cover any new trade barrier/tax.

<sup>9</sup> Derived from GIE December 2016 storage data and Eurogas 2015 demand data.

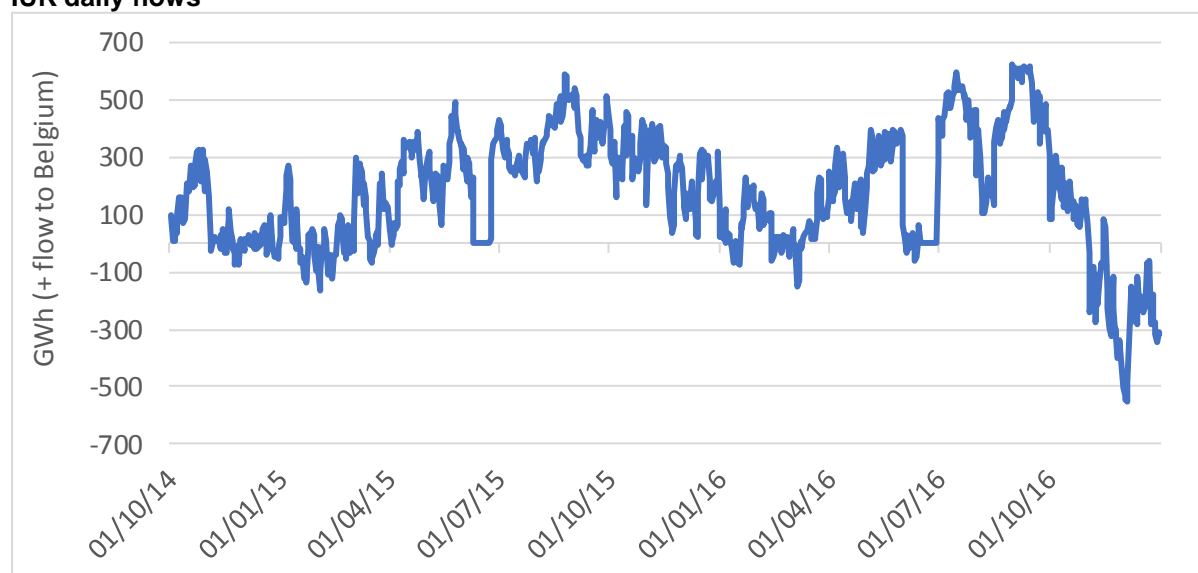
<sup>10</sup> As the first British Prime Minister ever to visit to the Gulf Cooperation Council (GCC), which controls vast oil resources, in December 2016, Theresa May said, “I want these talks to pave the way for an ambitious trade arrangement”.

<sup>11</sup> Moffat, IUK and BBL’s respective headquarters are in Ireland, UK and the Netherlands.

bilateral agreements (UK-Ireland, UK-Belgium and UK-Netherlands) will continue in order to comply with EU rules or could the EU step in and impose a single legal UK-EU agreement post-Brexit?

In Moffat and BBL, gas is only flowing physically one way (from the UK to Ireland for Moffat and from the Netherlands to the UK for BBL). A virtual, administrative reverse flow can only be allocated when forward flow capacity has been nominated. Only the IUK is a real bi-directional pipeline.

### IUK daily flows



Source: Interconnector UK, thierrybros.com

In 2016, net exports of 51.7 TWh to Belgium from the UK were recorded, made up of 67.1 TWh flowing from the UK to Belgium and 15.4 TWh in the opposite direction.

The NBP-TTF<sup>12</sup> spread provides the direction for gas to flow but the incentive to use BBL and/or IUK is linked not only to this spread but also to the cost of the service versus other options (Norway's ability to swing, LNG regas). To date trade has been at sunk cost levels for capacity, i.e. zero, underpinned by long term contracts. Irrespective of Brexit, as these long term contracts expire, the NBP-TTF spread will have to increase for EU gas to move to and from the UK. The UK's interest in keeping integrated energy markets is obvious as it will limit the NBP from de-coupling too much from the TTF. On the other hand, why would the EU provide a level playing field to the UK when it is not part of the same club any longer? Some countries in Europe could be tempted to impose severe and costly regulation on EU-UK pipelines to push up energy prices in the UK allowing *de facto* the EU to be slightly more competitive. In addition, the EU Commission does not want to see any gross welfare loss<sup>13</sup> in the future, and could possibly request some form of solidarity mechanism for Ireland to be levied on EU gas exports. It is possible that the EU could add some fees (at EU transmission system operator level) or taxes when piped gas is exported (to the UK), with little risk of retaliation as the UK is now an energy importer. The issue of Irish security of supply is going to be extremely important during negotiations and could be used by the UK to try to preserve the status quo as this is the cheapest way to provide security of supply to Irish consumers<sup>14</sup>. For IUK and BBL, the proposed "merchant model" is going to have to adapt to allow greater commercial flexibility in parallel to the

<sup>12</sup> We assume that ZEE and TTF are completely correlated and that TTF is the main European hub

<sup>13</sup> €4.5bn estimated by ACER in its annual report on the results of monitoring the internal gas markets in 2015

<sup>14</sup> Without this option, Ireland would need to build a dedicated regas terminal. Brexit could improve the ability of LNG producers/portfolio players to arbitrage EU/UK and to improve profits.

Brexit negotiations, as the end of the initial long term contracts (IUK 2018, BBL 2022) puts further stress on NBP-TTF spread and the viability of those assets.

The outcome of the Brexit negotiations on these three specific pieces of infrastructure<sup>15</sup> will be watched carefully. The way these interconnectors will be regulated post-Brexit is also going to be very interesting when considering other international pipelines (e.g. North Stream 2). As regulation in both the UK and the EU will continue to evolve post Brexit, we can assume that the current simple solution is unlikely to continue in the long term. We could see some minor changes with the aim of improving the whole system for the benefit of all consumers, or major changes with the aim of providing a harmonised unified EU/third party regulatory system for transportation pipelines.

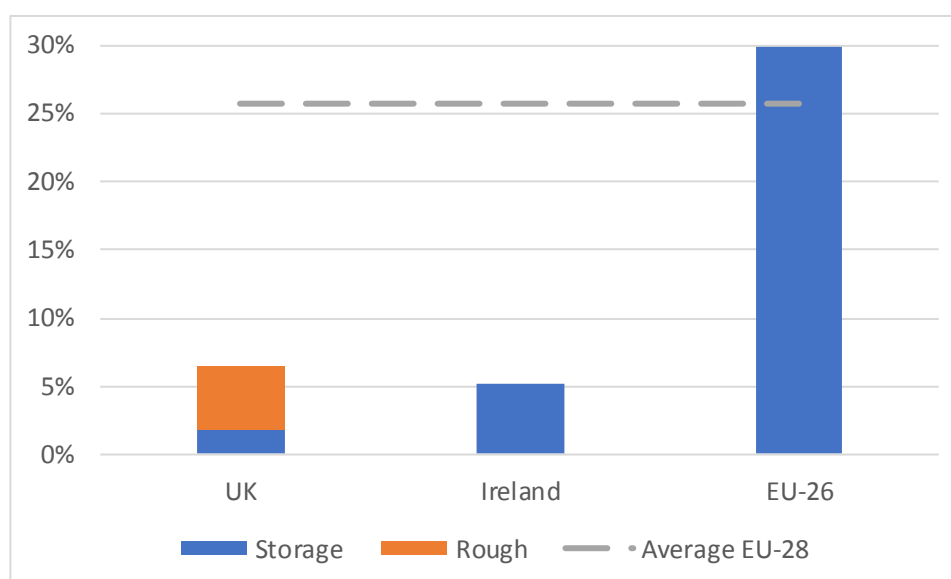
Currently the UK is fully implementing the EU network code. But how is the UK going to diverge regarding this network code post-Brexit? Will the UK try or want to retain influence over future European regulations? The market will have to price in new commercial risks for potential discontinuity.

**Second conclusion:** BBL, IUK and Moffat pipeline regulations are going to be crucial to the way Brexit impacts on gas markets. The use and value of these infrastructures could be affected by negotiations.

#### A seasonal analysis also needs to look at storage in Continental Europe

As indicated on the IUK flow graph, the UK is a net exporter but needs imports in winter due to its limited storage capacity. Under normal circumstances, where there is no supply emergency, “foreign dependency” is just a shift in terminology as there is no reason to expect a change in the movement of molecules (although there may be cost increases due to tariff barriers as discussed later). But when there is a supply emergency “foreign dependency” becomes very important because the UK and Ireland can no longer rely on the EU-26 solidarity mechanism.

#### Storage in per cent of annual demand (for UK, Rough is specifically mentioned)



Source: GIE, Eurogas, thierrybros.com

<sup>15</sup> Contrary to producing pipes linking a field to a market, these three infrastructures are for transporting gas from one market to another.

The graph data assumes Rough is working at its technical capacity of 36.5 TWh as stated in the GIE December 2016 spreadsheet. However, Rough is facing a series of outages and the final outcome is still unknown (as of January 2017). In March 2015, Centrica Storage informed<sup>16</sup> the market that it was limiting the maximum operating pressure which had the effect of: limiting the maximum reservoir volume to between 29 and 32 TWh (in 2014, the maximum reservoir volume was 41 TWh), and decreasing injection and withdrawal performance. Centrica Storage has already applied for a reduction in the volume it has to sell to the market<sup>17</sup>. So the question of an unreliable storage facility that needs to be called on in the case of an emergency must be addressed. As it accounts for 67 per cent of storage capacity, any reduction in Rough capacity will massively impact the UK storage picture. Should Rough be closed down, UK storage capacity would represent a mere 1.8 per cent of its annual consumption. The reduction in storage capacity will hugely impact on the UK and Ireland's security of supply during winter. Three options are open to mitigate this risk:

- A rational outcome for the UK and Ireland to secure winter supply could be to use both regas (in competition with the EU) and the ample EU-26 storage especially that is located in NWE (29.9 per cent capacity of EU-26 annual demand) thanks to the BBL and IUK interconnectors<sup>18</sup>. As EU-26 is very long in storage, the EU should not prevent (via trade barriers) the UK from using continental storage. If this rational outcome is achieved, the NBP-TTF spread should represent the cost of the interconnections (inclusive of any potential tariff to exit the EU and to enter the UK).
- Alternatively, as there is no guarantee that the UK will be included in the EU-26 solidarity mechanism, new underground storage could be built in the UK. However as Europe has a surplus of storage capacity, winter-summer spreads are too low to allow the financing of new facilities. It would therefore require a policy decision to push companies to invest in new facilities as they would normally more likely wait for future NBP winter-summer spreads to increase before taking a Final Investment Decision.
- A third possibility is that Gazprom could offer to go back to its original plan and change Nord Stream 2 to Brexit Stream, channeling gas straight to the UK, which could, post-2019, be free of the EU Third Energy Package. This would allow both Russia and the UK to strike a deal which would give security of demand and security of supply (and this goes back to first conclusion with the UK needing to strike deals with energy producers). With TurkStream and Brexit Stream, the Ukraine transit risk would only be an issue for the EU-26 alone.

**Third conclusion:** Brexit negotiations will have an impact on the NBP-TTF spread. So far, NBP and TTF future curves are still aligned but as soon as draft negotiations on infrastructure are available, the market will adapt. We believe that a possible outcome could be for the NBP premium to increase versus TTF particularly in winter. In addition, with the NBP becoming a smaller regional hub, trades will be reduced (and with financial services moving away from the UK, the NBP paper market could shrink), and NBP volatility could increase compared to the TTF. This is something policy makers like to avoid but it would benefit independent trading houses. Freedom always comes at a price!

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<sup>16</sup> 19 March 2015 press release available on <http://www.centrica-sl.co.uk/news/space-sales-suspended>

<sup>17</sup> Market consultation application to reduce Rough capacity for 2017/2018 available at: [http://www.centrica-sl.co.uk/sites/default/files/20161215\\_CSL\\_Application\\_document.pdf](http://www.centrica-sl.co.uk/sites/default/files/20161215_CSL_Application_document.pdf)

<sup>18</sup> For the UK, and Moffat for Ireland

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Prior to that he was, from 2010 to 2016, Senior European Gas and LNG Analyst for Société Générale. He joined Société Générale in 2007 as a Senior Financial Analyst to provide recommendations on listed pan-European gas stocks and in-depth research on gas issues. From 2002 to 2007, Thierry was a Senior Oil & Gas expert at the French Ministry of Economy, Finance and Industry, where he represented France on oil markets and advised on emergency issues at the International Energy Agency, the European Commission and the Energy Charter. His responsibilities included providing global oil and gas industry reviews to senior French officials and negotiating European directives. As a gas specialist, he reviewed the regulations governing the liberalisation of the French gas market and supervised the Contingency Gas Plan. Prior to that, Thierry worked, for eight years at IFPEN, an oil & gas research institute. Thierry Bros holds a Master of chemical engineering from ESPCI ParisTech and a PhD from Ecole Centrale Paris.

Thierry is the author of the book “After the US Shale Gas revolution” (2012). He is a member of the EU-Russia Gas Advisory Council and an advisor for the World Energy Council – Global Gas Centre. He is also a visiting professor at SciencesPo Paris and a senior expert at Energy Delta Institute. Thierry regularly presents his research results at conferences.