





Northwest European gas industry

Stakeholders and all other interested parties

July 2013

Dear Colleagues,

Further analysis and next steps: review of the gas interconnectors between Great Britain and the Belgian and Dutch markets

The Great British (GB), Belgian and Dutch regulatory authorities published a call for evidence on 1 October 2012 about our initial analysis of gas flows across the Interconnector UK (IUK which connects GB and Belgium) and the Balgzand Bacton Interconnector (BBL, which connects GB and the Netherlands). This initial analysis suggested that gas flows across the two interconnectors could be further optimised and that there are occasions where gas does not flow to the market with the highest price. Such inefficiency has a negative impact on the security of supply of the three countries as it leads to markets exporting when market signals imply they should be importing or that they are not importing sufficiently. Furthermore, with increasing gas import dependency in GB as UK continental shelf gas declines and all three markets experiencing an increase in wind generation leading to more variable levels of gas demand within-day, it becomes even more important that the interconnectors operate efficiently.

Summary of respondents:

There were thirteen responses from stakeholders: both interconnectors, National Grid, a Belgian large consumer body and eight gas shippers (representing a quarter of companies with capacity on either IUK or BBL).

Key points:

- 1. Respondents suggest that the use of different data (ICIS Heren rather than Bloomberg) and a better incorporation of transmission/capacity charges into the analysis can explain why flows don't appear as responsive as we initially indicated.
- 2. Ten stakeholders said GB transmission charging rules need to be reformed.
- 3. There is no support for a wider review of current arrangements on the interconnectors. Six respondents state that implementation of Network Codes would be the most effective way to deal with these issues.
- 4. All respondents agree that IUK is working efficiently, supported by both IUK analysis and their own work in this area. Five respondents state cross-border flows between GB and Belgium are the most efficient in Europe.
- 5. The high cost of short-term entry and exit capacity in the Netherlands, particularly backhaul at Julianadorp, is cited as an issue by three stakeholders.

- 6. Long-term contracts are mentioned by three shippers as a reason that inefficiencies might exist.
- 7. Two stakeholders note that a lack of liquidity at Zeebrugge can sometimes be an issue for traders looking to maximise cross-border trade.

Our response:

The regulators have rerun the initial analysis assessing flows against the hub prices reported by ICIS Heren¹ and taken account of the transportation charges. We conclude that overall our original conclusions still hold. There are occasions when the price at the GB hub, NBP², is higher than Zeebrugge in Belgium but IUK exports gas from GB to Belgium. Further analysis confirms the market feedback we received that the marginal costs of transporting gas may contribute to this.

Ofgem has launched a review of GB transportation charges³. The Gas Transmission Charging Review (GTCR)will look at the way in which all of the entry and exit charges on the National Transmission System (NTS) are set. Current charging arrangements tend to discourage the import to GB and encourage the export of gas from GB. This has potential security of supply implications. One of the issues the GTCR will consider is the impact that gas transmission charges have on cross-border flows. Ofgem published an open letter on 24 June 2013 calling for evidence from stakeholders. It invites views on the scope of and priorities for the review and calls for evidence from all interested parties, with responses due by the close of business on Monday 16 September 2013.

On both IUK and BBL flows are not always maximised even when there are clear price signals. With respect to BBL, on a majority of days in our study when the price at TTF is higher than NBP, gas still flows from Netherlands to GB. This letter sets out our further analysis on the gas flows at these interconnection points and our views on next steps.

Further Assessment of gas flows on the interconnectors

In our initial analysis we examined whether or not gas trades between GB and Belgian and Dutch hubs (i.e. between the NBP and ZEE and TTF hubs, respectively) are economically efficient. We consider cross-border trades to be economically efficient if gas flows from the low priced to the high priced market. If this is not the case, and gas flows in the opposite direction we observe flows against price differentials ("FAPDs"). Where FAPDs can be observed, the role of interconnectors in security of supply is undermined, since it may result in additional gas being exported from the market in which price signals suggest gas should actually flow to.

In our subsequent analysis we have replicated, with daily granularity, the same analysis of physical flows between GB and its adjacent hubs (TTF and ZEE) for each day between 1 January 2009 and 30 June 2012 using the ICIS Heren data of day-ahead prices (see

¹ Given that the majority of trades in the gas market take place on a over-the-counter basis and the recent reports of companies ceasing to submit data to price reporting agencies, including ICIS Heren, then it is possible to question the data from any pricing agency (and this review should not be taken as an endorsement of a particular reporting agency).

² NBP stands for National Balancing Point and is the virtual trading hub in GB. ZEE is short for Zeebrugge which is the trading point between IUK and the Belgian entry-exit system. TTF stands for Title Transfer Facility which is the virtual trading hub in The Netherlands.

³http://www.ofgem.gov.uk/Networks/Trans/GasTransPolicy/Documents1/Gas%20Trans%20Charging%20Revie w%20Call%20for%20Evidence.pdf

figure 1 and 3). We also looked at shipper flow decisions in three further tests: firstly, we looked at the number of FAPDs that occur when the sum of the marginal charges to flow gas are less than the price difference between the markets (see the Annex, figure 5 and 7). The purpose of this is to recognise that when the marginal charges to transport gas are greater than the price spread, shippers do not have the same incentives to flow gas. Secondly, we looked at FAPDs when gas is at Bacton Beach for IUK (i.e. it has come in at Bacton from production or LNG) and not bought at the NBP or ZEE trading hub (see figure 6). This is to better understand how the flow charges themselves affect shipper flows, and whether shippers are flowing in an economically rationale response to them. Note that this test cannot be meaningfully done for BBL because it is a unidirectional pipeline. Finally, we took the opportunity to assess the price responsiveness of the interconnectors during March 2013 when there were particularly wide gas price spreads with neighbouring countries (see figures 2 and 4).

<u>IUK</u>

On IUK we found that:

- Using the day ahead price differentials between NBP and Zeebrugge hub from ICIS Heren, net flows (without any adjustments for costs accrued by shippers) on 26 per cent of days gas flowed on IUK from the high priced to the low priced market (ie gas flowed against price differentials). This is comparable to the 28 per cent of FAPDs that we found in our initial analysis. The tendancy for IUK to export gas from GB to Belgium even when the price at the NBP is higher than Zeebrugge was also reconfirmed (see figure 1).
- On eighty-three per cent of days NBP and ZEE prices were converged to the degree that the hub price spread was smaller than the aggregate marginal charges of flowing gas between the two markets (see figure and table 5 in the Annex). Further, on those days where the market spread was higher than the marginal costs there were no FAPDs.
- Some shippers who use IUK may not necessarily buy gas at the NBP but may bring gas to Bacton entry point from UK gas fields, Norway, LNG or from the Netherlands and then export it via IUK to Belgium. If gas landed at Bacton is exported (and not sold at NBP) the shipper pays a smaller commodity charge (known as the short haul tariff by virtue of the gas not using much of the GB network). When comparing gas flows to price spreads between NBP and ZEE and then taking account of this short haul tariff (the avoided entry commodity charge and all IUK fuel charges), FAPDs fall to nine per cent of days (see figure 6 in annex for details). In addition the tendency for gas to flow away from GB at low price spreads largely disappears.
- Our initial analysis suggested that there was an underutilisation of IUK based on the price differential between GB and Belgium. This was confirmed during our subsequent analysis, and can be seen in Figure 1. However, in March 2013, prices in GB were very high, and on many days the price in ZEE much less so. This meant a number of days when there were very high price differentials. Although the initial flow response (on the first weekend of March) was relatively low, thereafter, particularly in historical terms, we saw a notable response from shippers flowing gas from Belgium to GB when the price signals existed to do so (see figure 2). Even so, we still see days of high price spreads and below

maximium capacity utilisation. An explanation given by respondants to the consultation suggests this could be partially attributed to lower liquidity at ZEE.



Each blue dot in Figure 1 displays physical flows between GB and Zeebrugge on one day between 1 January 2009 and 30 June 2012⁴. The horizontal axis shows the difference between day-ahead prices on the British hub (NBP) and Zeebrugge hub (in Belgium), all converted to pence/therm⁵. The vertical axis indicates the flow in kWh/day: any flows above the zero line are imports from Belgium to GB. Any flows below the zero line are exports from GB to Belgium. The red line depicts the economically efficient flow using day-ahead prices as an indication of the short-term value of gas (assuming no marginal cost of transportation)⁶.

Table 1

	IUK gas flows vs price	
Title:	spread	
Data	ICIS Heren	
Data points		1216
FAPD		322
FAPD as %		
of total days		26%
Median price		
spread p/th		0.6

Figure 2: Gas Flows on IUK between GB and Belgium in March 2013

In Figure 2, the blue dots refer to all days in 2012 (for context) and the red dots each of the days in March 2013.

⁴ The diagrams do not include days on which the flow was zero as we have assumed that this is because IUK/BBL were technically unable to flow gas on that day.

⁵ 1 therm ≈ 29,3 kWh.

⁶ The use of day-ahead prices means that changes in the value of gas during the day are not captured, but we considered it the best approximation for the short-term value of gas.



Figure 3 applies the same approach as figure 1 except shows flows between the Netherlands and GB and the price differential between the NBP and TTF hubs (there are no negative flows because BBL does not have the capability to export to the Netherlands). Note that the maximum capacity of BBL increased on 14 April 2011 which is why there are two lines that indicate the maximum flow. Flows to the left of the vertical red line indicate flows to GB, when the GB price is lower than the TTF price.



Figure 4, applies the same approach as in figure 2, except shows data for BBL flows, and the NBP TTF price spread. The red points represent flows for each day in March, with the blue dots data for 2012 as reference.

<u>BBL</u>

It is worth noting that as BBL is a unidirectional pipeline gas can only physically flow from the Netherlands to GB. A virtual reverse flow product was introduced on BBL to allow shippers to counter-nominate to flow in the direction GB to the Netherlands and for this to be netted off against the forward flow. Whilst in theory virtual reverse flow should ensure an interconnector is as efficient as a physical flow, in practice we are aware that this may be less so given the additional financial risks associated with the use of an interruptible product.

On BBL we found:

- Using the day ahead price differentials between NBP and TTF from ICIS Heren there was a significant percentage of days (58 per cent) with gas flowing from the Netherlands to GB when NBP prices were below those at TTF (see figure 3). This is slightly lower than the 63 per cent of FAPDs which we estimated in our initial analysis.
- Even when we only examine the days when price spreads exceeded the costs of flow (annex figure 7.) there are still FAPDs on 54 per cent of days.
- BBL's utilisation rate in our analysis period is 47.5 per cent. In March 2013, BBL remained underutilised despite significant price spreads. As well as underutilised capacity, there were only six days when capacity was fully sold out. It took almost three weeks for utilisation rates to increase in response to the price signals.

Regulators views

Our analysis indicates that IUK's price responsiveness is reasonable although there are factors that need to be addressed. In March 2013, gas flows across IUK did increase quickly in response to price signals. We also note that there is a commercial logic to shippers bringing gas to Bacton and exporting to Zeebrugge even when the price at NBP is slightly higher than that at ZEE. This is due to the GB commodity charge increasing costs to deliver gas to the NBP, and this increased cost can outweigh the price spread between NBP and ZEE. When landing gas at Bacton it is possible to export to Belgium on IUK and pay a reduced short haul tariff⁷. Ofgem is committed to a review of all gas transmission charges as noted. The relevant regulators think it is important not only to review the charges but to look at ZEE liquidity, and to further analyse the impact of long term take or pay contracts on shipper nominations.

On BBL, our analysis indicates that at this stage, BBL's price responsive is poor, with flows going against price differentials in more than half the days assessed. In times of high gas demand, BBL rarely maximises gas flows and is slow to respond. BBL has 90 per cent of capacity sold on long-term contracts and ten per cent remains unsold (except for a six day period in March 2013). Given these results the level of price responsiveness is a concern to the relevant regulators. The relevant regulators consider a number of operational issues on BBL or in the neighbouring markets, which are pointed out by respondents, as possible causes of the inefficiency:

- Day-ahead capacity during our analysis period was only available to book two working days before delivery and no within-day capacity is available. BBL have, as of 15 May 2013, amended this to one day. This change is welcomed. Prior to this change market participants would need to have a view, two days in advance, of potential price spreads in order to respond. Yet, market liquidity is at the day ahead stage. This previous lack of day-ahead, and current lack of within-day, products undermines market participants ability to react to price signals;
- The price of daily capacity on BBL is reported to be so high that price spreads between the two markets need to be significant for market participants to make a

⁷ It is important to note that we haven't analysed individual shipper nominations. If there are nominations being made by shippers to flow from NBP to Zeebrugge when the price at the NBP is higher than the commodity charges do not explain the inefficiencies.

profit from the trade. We note that our analysis shows that in March 2013 the day ahead price spread reached as high as 15p/th as late in the month as the 22^{nd} yet capacity on BBL remained unsold.

- The interruption of virtual reverse flows when forward flows decline are difficult for market participants to manage. Even interruptions of only a few hours can expose market participants to a risk of imbalance and they would face cash-out charges on any such imbalance in the Dutch market.
- The high cost of short term entry and exit capacity in the Netherlands, particularly the backhaul tariff at Julianadorp, means a high price differential between TTF and NBP is required to make virtual reverse flow an attractive option.
- The lack of response in cases where flows might be expected based on the price differentials between NBP and TTF, may be driven by physical balancing requirements. Therefore, as BBL connects both grids, flows on BBL may (in part) be explained by balancing considerations. Further work is needed to fully understand how grid balancing interacts with BBL flows.

Next Steps

At this stage, the regulators consider that the initial steps on IUK and BBL should focus on the implementation of the European network codes as these may tackle some of the inefficiences. The Third Package⁸ foresees European network codes to harmonise the capacity allocation, gas flow nominations and tariff arrangements at interconnection points (IPs) across Europe. In addition Annex I of current regulation was amended recently by adopting procedures for congestion management. IUK, in particular, has been proactive in bringing forward proposals to implement the congestion management procedures⁹, which the relevant regulators welcome. The relevant network codes are the following:

- <u>Congestion Management Procedures (CMP)</u> introduces four mechanisms at IPs and requires capacity that has been sold but is underused, in the event of contractual congestion, to be made available to the market, with the purpose of maximising the efficiency of cross-border gas transmission networks. Three mechanisms must be implemented by 1 October 2013: oversubscription and buy-back; surrender of contracted capacity; long-term use-it-or-lose-it. The fourth mechanism, firm day-ahead use-it-or-lose-it, shall be implemented by 1 July 2016 on points which are still contractually congested.
- <u>Capacity Allocation Management (CAM)</u> requires available capacity at interconnection points to be auctioned as a single capacity product (instead of separate GB entry/exit capacity, interconnector capacity and Belgian/Dutch entry/exit capacity). These products should be auctioned on a European platform in standard annual, quarterly, monthly, daily and intra-day products. CAM is to be implemented by November 2015.

⁸ In this document the term "Third Package" refers to Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC and to Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005.

⁹ IUK has launched a consultation on its proposed arrangements for Congestion Management Procedures.

- <u>Balancing</u> requires there to be a harmonized approach to nominations at IPs as well as a market-based approach to balancing. It also requires the transmission system operators (TSOs) to introduce market-based approaches to balancing their systems and to consider merging or coupling market areas.
- <u>Tariffs</u> requires national regulatory authorities (NRAs) to set reserve prices for the capacity auctioned at the cross-border points in cooperation with their neighbouring regulator. The reserve prices should be set to recover the revenues required by the TSOs and any adjustments included in the reserve prices and separate charges, like the commodity charge should be avoided.

The relevant regulators consider that progressing the implementation of the European network codes will help to improve the efficiency on both interconnectors and address some of the barriers to cross-border trade. For example, auctioning a day-ahead and within-day capacity product between the Belgium and GB and Netherlands and GB on an open platform will ensure that all shippers, and not just those with IUK or BBL long-term contracts, can respond to price signals much closer to real time. Also, bundling the capacity products into GB from the Netherlands and between GB and Belgium will reduce the number of transactions shippers must make in order to respond to market price signals.

Current charging arrangements tend to discourage the import to GB and encourage the export of gas from GB. This has potential security of supply implications. As noted above, Ofgem launched a review of GB transportation charges10. Ofgem published an open letter on 24 June 2013 calling for evidence from stakeholders and invites views on the scope of and priorities for the review and calls for evidence from all interested parties by the close of business on Monday 16 September 2013.

As part of the European work on tariffs, NRAs are working on ensuring that all entry and exit tariffs are cost reflective. Depending on the precise outcome of the work on tariffs, this might impact the charges at Julianadorp for entering (backhaul tariff) and exiting the Dutch system. It will also be important to consider the prices levied by the TSOs for short-term capacity. Shippers have raised concerns with the prices imposed by BBL for such capacity. We recognise the importance of not undermining long-term contracts on IUK or BBL or BBL's partial Third Party Access exemption, but are equally mindful of our duty under the Third Package to remove the barriers to cross-border trade. A further area of future analysis will be the impact of take or pay long term contracts on ZEE liquidity and the possible impact on flow inefficiency.

These network codes cannot be delivered by IUK or BBL alone but will require close cooperation between the relevant TSOs. Therefore, the relevant regulators call on the relevant TSOs (Fluxys, NGG and IUK for the Belgium/GB connection and GTS, NGG and BBL for the Netherlands/GB link) to jointly bring forward a roadmap and proposals for the implementation of these codes by autumn 2013. We consider that the roadmap should set out a phased approach to implementation, which should include the following steps:

• Workstream 1 - early implementation of the CAM network code: short-term dayahead and within-day bundled capacity products between NBP and Zeebrugge

¹⁰http://www.ofgem.gov.uk/Networks/Trans/GasTransPolicy/Documents1/Gas%20Trans%20Charging%20Review%20Call%20for%20Evidence.pdf

and TTF and NBP to be auctioned on the PRISMA platform. Although all of IUK's capacity and most of BBL's capacity is sold out under long-term contracts, regulators expect that the implementation of the congestion management procedures from October 2013 will make available additional short term capacity. Therefore, it is a logical first step for the relevant TSOs to bundle and auction this available capacity.

- Workstream 2 early implementation of the harmonised nomination procedures and TSO-TSO cooperation required under the balancing network code by June 2015; including for BBL a review of the virtual reverse flow nominations arrangements to consider any changes needed to work with bundled forward capacity products, improve the use of virtual reverse flows and improve efficiency.
- Workstream 3 auction of bundled capacity products for monthly, quarterly and annual capacity as the capacity becomes available on IUK, BBL but also at GB, Belgian and Dutch entry/exit points. There are considerations on how to efficiently share capacity at the IPs in GB, Belgium and the Netherlands where the capacity is used for supplies of gas other than interconnectors. Also for consideration is how to structure the tariffs and share the revenue between the relevant TSOs.

Kind regards,

Ofgem, CREG, ACM

Annex

Figure 5: IUK flows excluding the days where the marginal transportation charges are above the NBP - Zeebrugge price spreads

Figure 5 is a chart which shows the flows against price spreads including marginal charges only when the market spread exceed the total value of these charges.

Figure 5 shows:

- Where NBP is greater than ZEE, subtract from the spread the following charges: Electricity and Bacton gas compressor charges and UK Entry Commodity Charge (only when aggregate charges cost exceeds hub price spread).
- Where Zee is greater than NBP, subtract from the spread Fuel gas and Bacton gas compressor charges and UK Entry Commodity Charge (only when aggregate charges cost exceeds hub price spread).
- iii. Otherwise nothing.

Figure 5



Table 5.

	IUK gas flows vs price spread including cost of flow. (Only showing data		
Title:	points where strikes met)		
Data	ICIS Heren		
Data points	210		
% of days of			
price spread			
but forecast			
strike not met	83%		
FAPD	0		

On eighty three per cent of days prices were converged to the extent that hub price spreads were smaller than the aggregate of marginal charges. On the seventeen per cent of days where that was not the case there were no FAPDs.

Figure 6: IUK flows with price spreads between NBP - Zeebrugge adjusted for charges faced by shippers with gas at Bacton Beach

To explore the impact of charges on the possible bias in flows, we have also looked at IUK efficiency from the position of a shipper with gas at neither hub (but at Bacton Beach). The relevant marginal charges are different to gas bought at NBP as markets participants face a lower commodity charge, known as the short-haul charge (by virtue of using less of the GB network). The charges are:

- 1. GB short haul commodity charges
- 2. IUK fuel charges/Bacton compressor charges

In Figure 6 we see the following spread against flows.

((NBP-Commodity Charge) - (Zee - Short Haul Tariff - IUK Fuel Charges)) vs IUK Flows.

Figure 6



Table 6

	IUK gas flows vs Price		
	spread from Bacton Beach		
	including marginal costs of		
Title:	flow		
Data	ICIS Heren		
Data points	1192		
FAPD	107		
FAPD as %	9.0%		
Median price s	0.87		

Table 6 shows that FAPDs, including shipper marginal costs, occurred on only nine per cent of days and on occasions with relatively low flows. Also notable is that the persistent tendency to flow from GB to Belgium has been largely eliminated.

Figure 7. BBL flow analysis including marginal charges

Figure 7 is a chart showing flows against price spreads which include marginal charges only when the market spread exceed the total value of these charges.

The charges considered in Figure 7 are:

- i. Where NBP is greater than TTF: Subtract from the spread BBL T2 fuel charges and GB Entry Commodity Charge.
- ii. Where TTF is greater than NBP: subtract from the spread BBL Interuptible Reverse Flow cost, GTS entry capacity and GB Exit Commodity Charge.
- iii. Otherwise show nothing.

Figure 7



Table 7

	BBL gas flows vs price spreads including costs of flow - only showing data points when stirke			
Title:	conditions met			
Time horizon	Pre-Interruptible Reverse Flow	Post-Interruptible Reverse Flow	Total	
Data points	294	105.00	399.00	
FAPD	153	63.00	216.00	
FAPD as %	52%	60%	54%	

Even when only examining days where the market spread exceeds marginal charges the flow efficiency picture is unchanged with FAPDs on 54 per cent of days.