Summer Outlook 2016

Gas Networks Ireland

Key Messages

- The first half of the 2015/16 gas year has seen significant change occurring on the Irish gas system.
- The Corrib gas field has commenced commercial production, and is anticipated to transition to full production capacity during the summer period, following completion of the Gas Networks Ireland pipeline commissioning programme of the Linkline (the feeder pipe for Corrib gas entering the Republic of Ireland (ROI) network).
- It is anticipated that storage operations at Kinsale storage facility will cease in 2016 and blowdown of Southwest Kinsale cushion gas will subsequently commence. As a result, injections to Kinsale storage facility are not expected to take place over the summer period. This will have a negative impact on system demand in comparison to previous summer periods (as storage injections would create demand on the system).
- Based on the demand forecast load duration curve, there will be a number of days over the summer period where indigenous supply capacity will exceed the total ROI gas demand requirement.
- Shippers and large end users will experience increased variability in gas specification/Calorific Value due to variable supply scenarios and the associated mixture of Corrib and Moffat gas at various periods throughout the year.
- System operability challenges are evident, particularly with recent changes in Shipper behaviour where significant quantities of gas are being left on the network, thus creating the need for Gas Networks Ireland to undertake balancing sell activities.
- Demand/Supply forecasts indicate that there will be a number of days when flows at Moffat will be less than the minimum flow limits associated with the compressor stations in Scotland. As a result, there will be a requirement on the South West Scotland Onshore System (SWSOS) to batch flow the daily nomination on certain days.

Data Freeze

In order to complete the detailed analysis required to produce this document, the input data was defined in May 2016, based on the most up to date information available at the time.

Disclaimer

Gas Networks Ireland has followed accepted industry practise in the collection and analysis of data available. However, prior to taking business decisions, interested parties are advised to seek separate and independent opinion in relation to the matters covered by this Summer Outlook and should not rely solely upon data and information contained therein. Information in this document does not purport to contain all the information that a perspective investor or participant in the Republic of Ireland's gas market may need.

Overview

The Summer Outlook Report 2016 sets out Gas Networks Ireland's analysis and views of the adequacy of the gas network for the summer ahead (April to October 2016). It is designed to inform the energy industry on the anticipated status of the gas system over the period, to help the industry in preparing for the summer months.

This is the first publication of a Summer Outlook by Gas Networks Ireland. The first half of the 2015/16 gas year has seen significant change occurring on the gas system, with the addition of a new Entry Point at Bellanaboy, the associated first forward flow of Corrib gas onto the network, the introduction of an enhanced within day Virtual Reverse Flow (VRF) product at Moffat, and the suspension of storage injections at the Kinsale storage facility. The Summer Outlook has been produced as a medium for Gas Networks Ireland to comment on any potential impact that these changes have on the gas system, and in addition, to provide commentary on the increasing system operability challenges present on the system.

In the Summer Period 2015, Great Britain (GB) imports through the Moffat Entry Point met 99% of ROI gas demand over the period, with the balance of gas supplies being met by supplies through Inch Entry Point. Of the total gas supplied over the period, 8% was imported to storage at the Kinsale storage facility.

The Corrib gas field commenced commercial production on the 31st December 2015. It initially operated at a reduced capacity of 5.7 mscm/d until the end of the Winter 2015/16 period, and at 7.9 mscm/d since the 1st April 2016, resulting from operational constraints on the Gas Networks Ireland transmission system. It is anticipated that Corrib will increase to 100% production capacity (9.9 mscm/d) during the summer 2016 period, following completion of the Gas Networks Ireland pipeline commissioning programme. As a result, shippers and large end users will see increased variability of Calorific Values (CV) entering the network as the CV of Corrib gas generally differs to that of gas supplied via Moffat (albeit the CV will remain within the limits of the specification as agreed under the Code of Operations).

PSE Kinsale Energy Limited (KEL) has advised the Commission for Energy Regulation (CER) that it plans to cease full storage operations in 2016 and commence blowdown of Southwest Kinsale cushion gas. As a result, for the summer period, the facility will operate as a production source, where gas will be withdrawn from the facility, in contrast to previous years where the facility was operated in storage injection mode over the summer months (and thereby created additional system demand in the summer period).

System operability challenges are evident on the system, particularly with recent changes in Shipper behaviour where significant quantities of gas are being left on the network, thus creating increased need for Gas Networks Ireland to undertake balancing sell activities. Given the prospect of additional supplies coming from Corrib later in the summer, Gas Networks Ireland are working with the CER, producers and industry to ensure the system remains physically in balance and that appropriate signals are in place to deter excess gas which would create operational issues for Gas Networks Ireland.

Summer Period 2015

Figure 1 shows actual gas demand (exclusive of storage) for the 2015 summer period. Non-daily metered (NDM) demand showed a dependence on seasonal weather; the standard trend within this demand sector. Industrial and Commercial (I&C) demand showed an element of weather dependence, albeit the base load contribution is higher in this sector than in the NDM sector. Power generation demand proved the most variable of the three demand sectors, continuing on historical trends. The volatility of Power Generation demand is associated with the interdependency between this sector and wind powered generation (and general demand conditions) on the Single Electricity Market (SEM). It is notable that the 2014/15 gas year peak day for Power Generation gas demand occurred on the 18th August 2015 with gas generation getting a higher than usual share of electricity generation on the day due to low wind conditions and unavailability of other thermal plant on the SEM.

Figure 1: Summer 2015 Actual Gas Demand

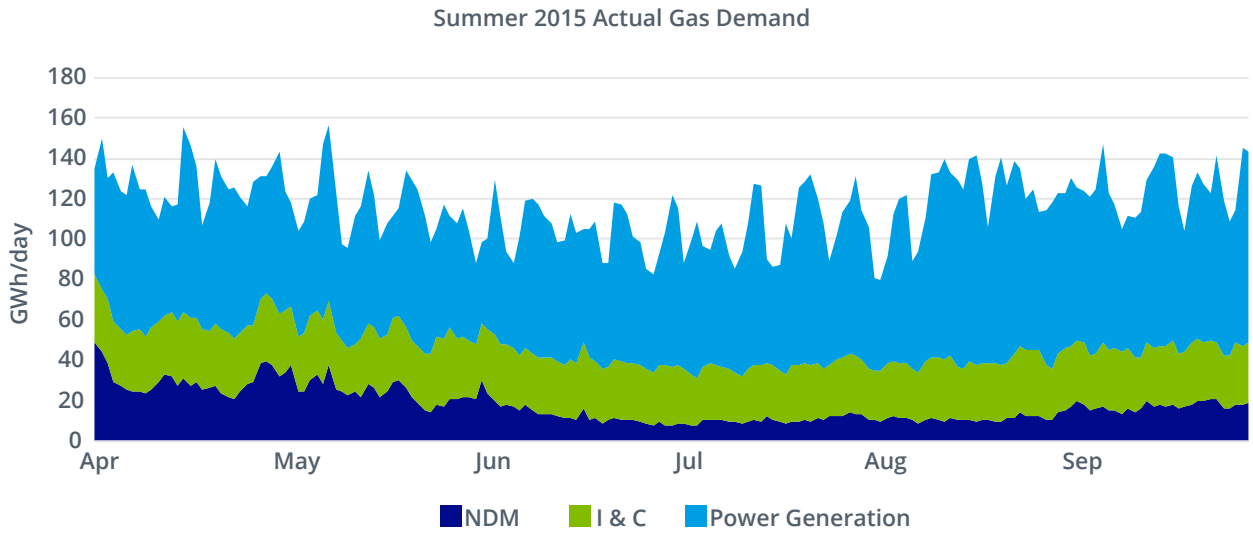
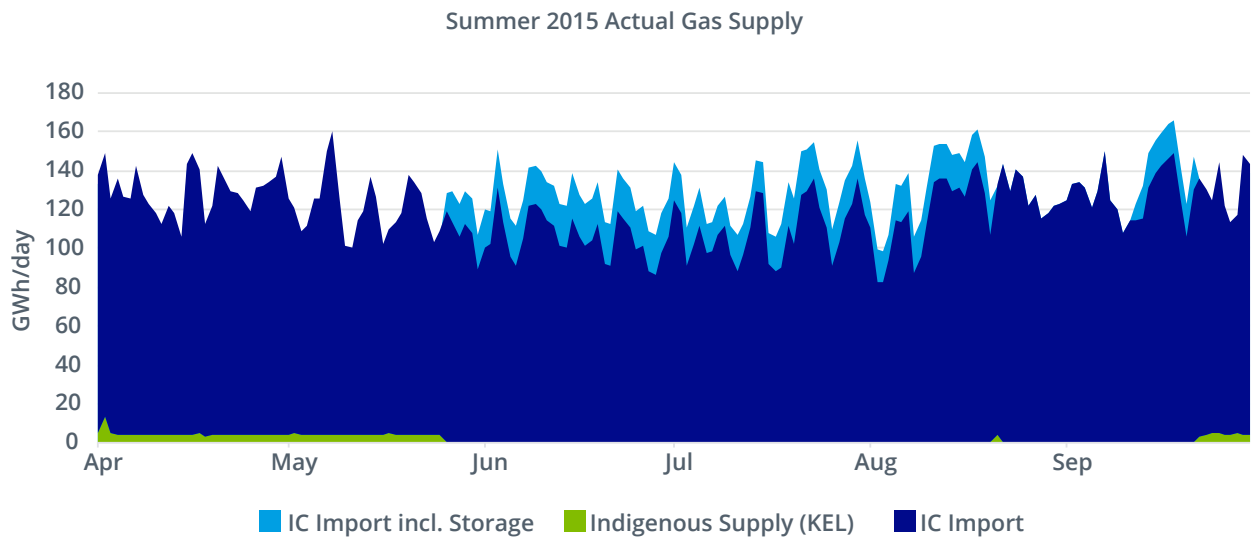


Figure 2 shows actual gas supply sources over the summer 2015 period. Supply sources attributed to those supplying gas to Kinsale storage facility are shown in green. It is notable that the portion of 'demand' attributed to storage will not be on the system for the 2016 Summer period as a result of cessation of storage operations at Inch. The cessation of storage will lead to up to 27.6 GWh/day less 'demand' to be supplied for the 2016 and subsequent summer periods.

Figure 2: Summer 2015 Actual Gas Supply



Summer Period 2016
Forecast Supply/Demand Position

Figure 3 shows the forecast gas demand for the 2015/16 gas year[1]. Plotted with the gas demand curve are two potential indigenous supply scenarios as detailed in Table 1. The supply scenarios are based on the outcome of consultation between Gas Networks Ireland and gas suppliers, run as part of the Network Development Plan 2016. Based on the forecast load duration curve, it is anticipated that for 36 days during the summer period, the total indigenous supply capacity will exceed the total ROI gas demand requirement for Indigenous Supply Scenario 1. For the second Indigenous Supply Scenario (where Corrib has reached full capacity) the number of days where total indigenous supply capacity is anticipated to exceed the total ROI gas demand requirement increases to 100. This is a very positive Security of Gas Supply position. However, this supply/demand position has the potential to lead to increased complexity in the operability of the gas system, in the event that shippers leave gas on the system. This topic is considered in detail in the section on *Gas System Operability*.

Figure 3: Gas Year 2015/16 Supply/Demand Forecast

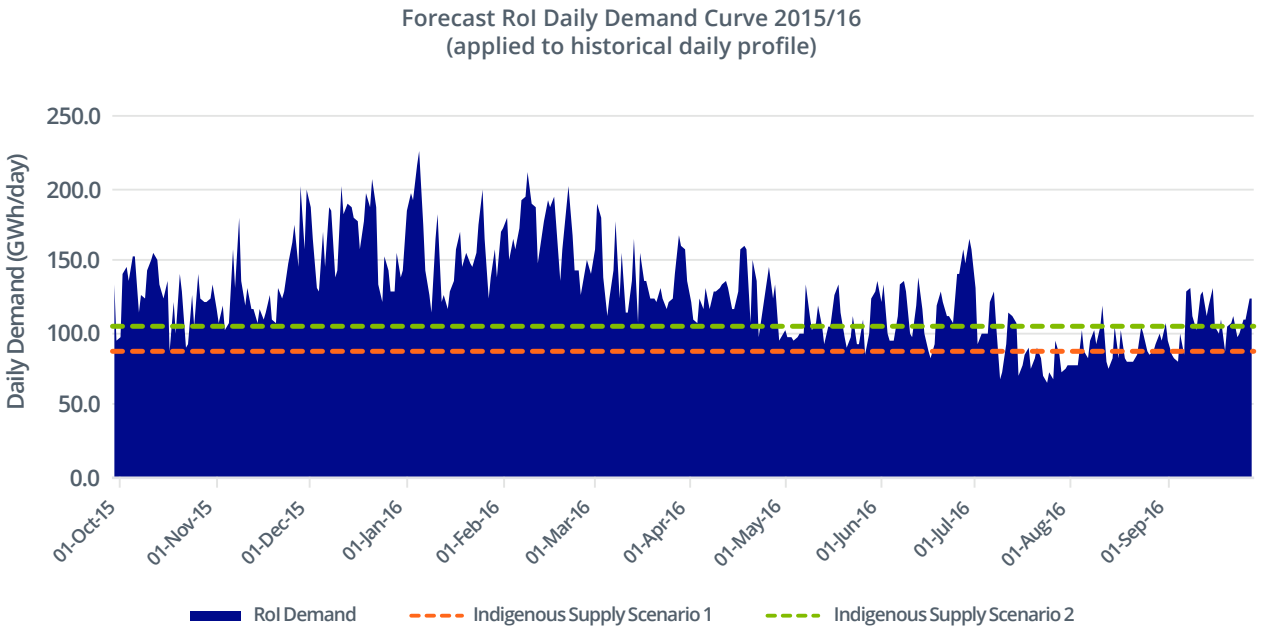


Table 1: Gas Year 2015/16 Forecast Indigenous Supply Scenarios

Indigenous Supply Scenarios		
Scenario	Corrib	KEL
1	82.9 GWh/day	3.6 GWh/day
2	100.5 GWh/day	3.6 GWh/day

[1] The gas demand forecast is the output of a stacked load duration curve applied to a historical daily demand profile. Therefore the profile of the demand forecast may only be taken as a typical scenario, based on a historic daily demand profile. The actual daily demand profile in any given year is highly variable, and dependant on numerous factors e.g. wind generation on the Single Electricity Market.

Penetration of Corrib Gas

The introduction of Corrib gas to the system has led to increased variation on the Calorific Value (CV) of gas on the network, due to differing constituent profiles at the three Entry Points (Bellanaboy, Inch and Moffat). Figures 4 (a), (b) and (c) demonstrate the anticipated penetration of Corrib gas into the network for a typical summer high demand day. The illustrations are based on the output of hydraulic modelling, and from left to right look at scenarios where Corrib gas is meeting 38%, 52% and 65% respectively of a typical summer high ROI gas demand day (demand day modelled at 157 GWh/day).

Figure 4 (d) shows the anticipated penetration of Corrib gas into the network for a typical summer minimum demand day, where Corrib gas is meeting 100% of ROI gas demand.

Figure 4(a): Corrib Gas meeting 38% of Summer High Demand

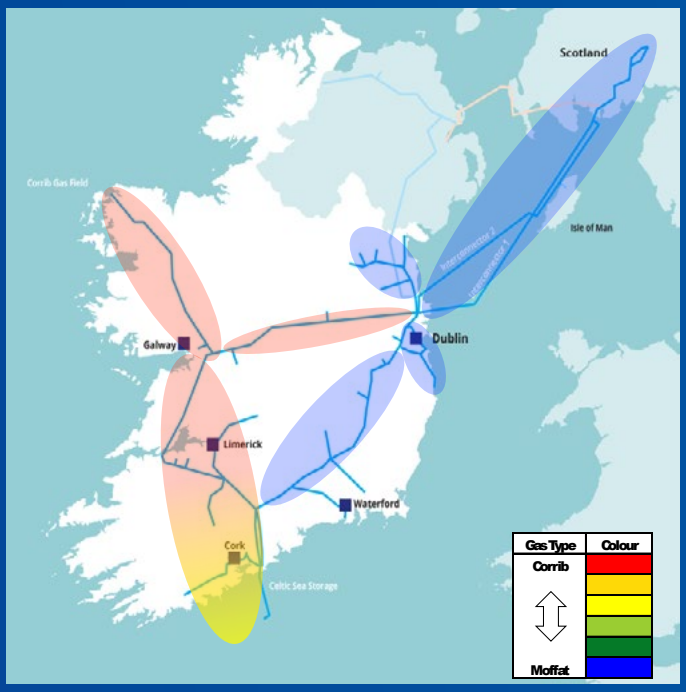


Figure 4(b): Corrib Gas meeting 52% of Summer High Demand

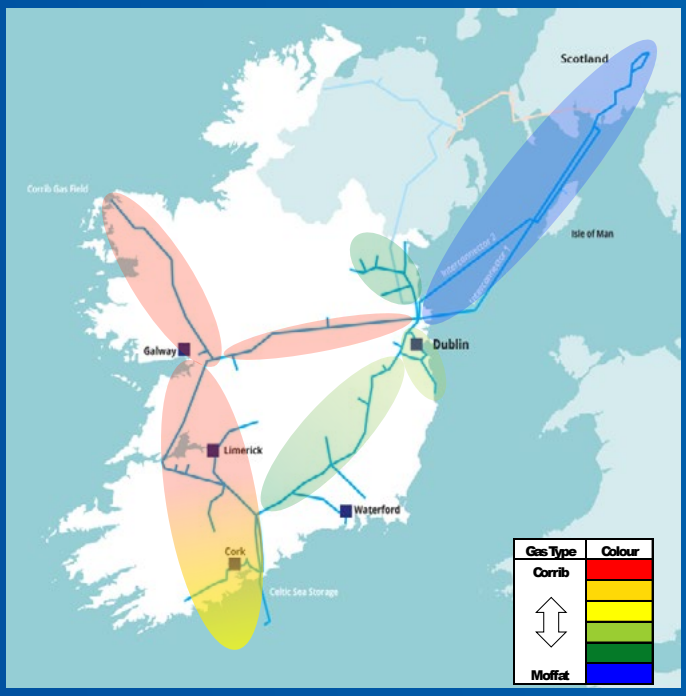


Figure 4(c): Corrib Gas meeting 65% of Summer High Demand

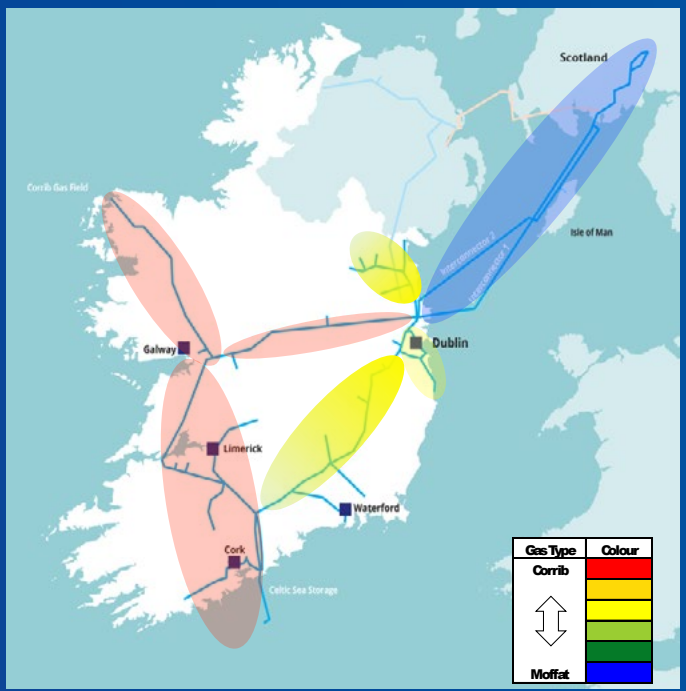
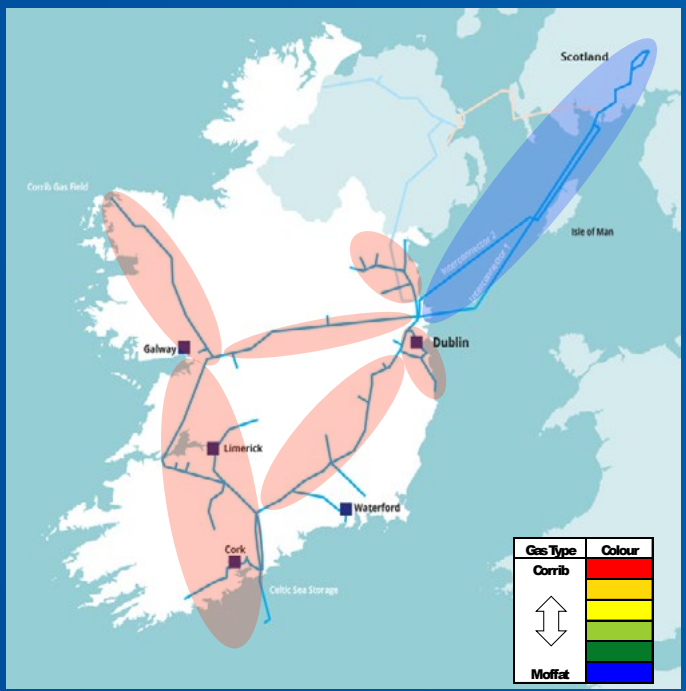


Figure 4(d): Corrib Gas meeting 100% of Summer Low Demand



Maintenance on the Gas Transmission System

Table 2 shows significant network maintenance scheduled[2] on the transmission system for the 2016 summer period:

Item	Works	Period
1	Midleton Compressor Station Shutdown – DCS Upgrade	August 2016
2	Uprating of Mayo – Galway Pipeline to 85 barg	Anticipated completion date: end of June 2016
3	2016 Online Inspection Programme	Summer 2016

Gas System Operability

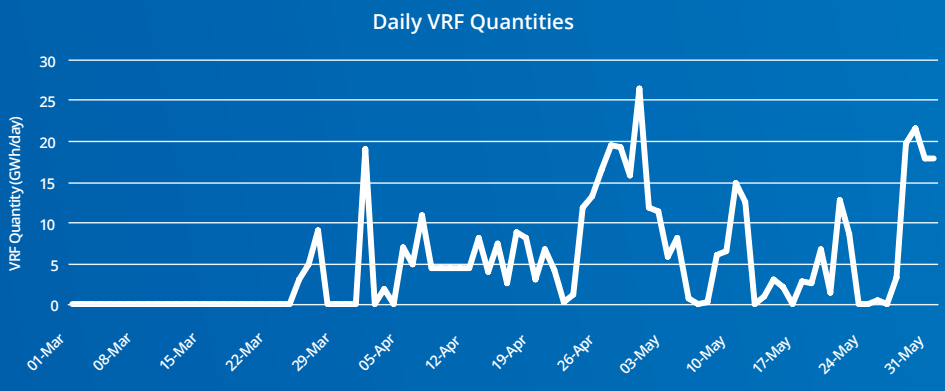
Demand/Supply Balance

Gas Networks Ireland has previously facilitated a trend in Shipper behaviour whereby Shippers tend to leave the system short over winter months and then leave the system long over the summer months. The Transporter has consequently taken balancing buys and sells to counteract this, and to ensure system pressures and integrity are maintained in compliance with the Winter Balancing Policy. However over the past 2 years, a change in that trend has emerged, where Gas Networks Ireland has seen shippers leave the system long for 10 months of the year. This has resulted in an increase in the frequency and volume of Balancing Sell and a reduction in the frequency and volume of Balancing Buy actions since October 2013.

This tendency to leave the system long for a larger portion of the gas year, appears to be getting worse, with gas being left on the Network for every month of Gas Year 2015/16 to date[3], with the exception of one month due to a large multi period adjustment.

The introduction of a within day Virtual Reverse Flow (VRF) product at the Moffat Interconnection Point provides an outlet for Shippers to 'export' surplus gas. Since its introduction in April 2016, this commercial product has helped to reduce the quantity of imbalanced gas, by facilitating virtual reverse flow of gas into the UK, which may otherwise have been left on the network as imbalanced gas. Since its introduction, within day VRF has enabled an aggregate virtual flow of 460 GWh of gas to the UK market[3]. Figure 5 shows daily VRF usage.

Figure 5: Daily VRF Usage January 2016 – May 2016



The following mechanisms are available to Gas Networks Ireland for addressing shipper imbalances and maintaining the integrity of the transmission system:

- Issue of constraint notices at Entry Points
- Completion of Balancing Buys/Sells via the balancing contract

The Code of Operations sets out the cash out prices for shippers who close the day with excess (or deficit) gas. Gas Networks Ireland is currently reviewing the appropriateness of the cash out regime with industry and the CER and may propose changes to the regime as a means to reducing the frequency and quantity of balancing actions required on the system.

Batching Flowing on the SWSOS[4]

Demand/Supply forecasts indicate that there will be a number of days when flows at Moffat will be less than the minimum flow limits associated with the compressor stations in Scotland. Instantaneous SWSOS flows may fluctuate between 0 kscm and 500 kscm. This will drive a requirement to batch flow the daily gas nomination on the SWSOS on certain low-flow days.

Stepping/batching the flow at the compressor stations in Onshore Scotland will vary pressures in SWSOS. This has the potential to impact the Twynholm Flow Profile (in order to maintain pressures).

GNI (UK) will still deliver the End of Day Quantity (EODQ) and meet its contractual commitments, but it may be delivered in a different shape to what was requested (for example front loaded prior to any drop in flow rates).

GNI (UK) will be installing a volumetric control system to cater for low flow periods. This solution does not offer an optimum long term solution to batching, but in the short term the system will:

- Reduce the frequency of batching
- Reduce the current minimum flow rate
- Enable a situation where units are in 'idle' as opposed to being 'off'

[2] Information contained within Table 2 is provisional at the time of writing, and is subject to change.
[3] At time of data freeze.
[4] South West Scotland Onshore System.