Gas Networks Ireland

Systems Performance Report

2015

gasnetworks.ie

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1 Executive Summary

The Gas Networks Ireland Performance Report has been published annually since 2008. However, 2015 sees a change in format, the original report is being replaced with the introduction of two specific performance reports;

- A Systems Performance Report; and
- A Customer Performance Report.

The Systems Performance Report provides an overview of how both the natural gas transmission and distribution networks have operated during the twelve month period of 2015 in relation to all systems activities.

In 2015 Gas Networks Ireland continued to build and operate one of the most modern and safe gas networks in the world. The business maintained a strong safety record and successfully completed planned work programmes.

Gas demand across all market areas has contracted over the past 5 years, this can be attributed to economic factors during Ireland's recessionary period, increased use of renewables in power generation and energy efficiency schemes.

As the economy recovers, gas demand has shown a slight increase in 2015 and is forecast to grow in the shorter term. However, climate change policies and technological advances in renewable technology and storage will present Gas Networks Ireland with long term demand challenges.

Gas Networks Ireland endeavours to operate and maintain an efficient system by investing in replacement and maintenance of the pipeline assets through capital programmes and growing the network to facilitate new connections and towns, so that it can continue to deliver a safe, secure and cost effective energy and offset the market demand challenges.

2 Introduction

The Gas Networks Ireland System Performance Report satisfies the licence conditions pertaining to "Overall standards and performance" of the four licences held by Gas Networks Ireland.

Gas Networks Ireland is responsible for developing, maintaining and operating the gas transmission and distribution systems. On the 1st of August 2015 the Transmission System Operator (TSO) and Distribution System Operator (DSO) Licences and responsibilities were transferred from Gaslink to Gas Networks Ireland. The Gas Networks Ireland System connects Republic of Ireland (RoI) to Scotland, Northern Ireland (NI) and the Isle of Man (IoM). The natural gas is not owned by Gas Networks Ireland but it transports the gas on behalf of suppliers and shippers who purchase the gas from the wholesale market and use the transportation services of Gas Networks Ireland to deliver gas to over 23,000 businesses and almost 650,000 homes throughout Ireland. The Gas Networks Ireland system includes infrastructure in RoI regulated by the Commission for Energy Regulation (CER), NI is regulated by UReg and South West Scotland is regulated by Ofgem. The natural gas network is differentiated by the prevailing pressure:

- High pressure transmission infrastructure which operates above 16 barg (the total length of transmission pipeline is 2,433km)
- Distribution infrastructure which operates below 16 barg (the total length of distribution pipeline is 11,339km)

The transmission system is detailed in figure 2.1 below.

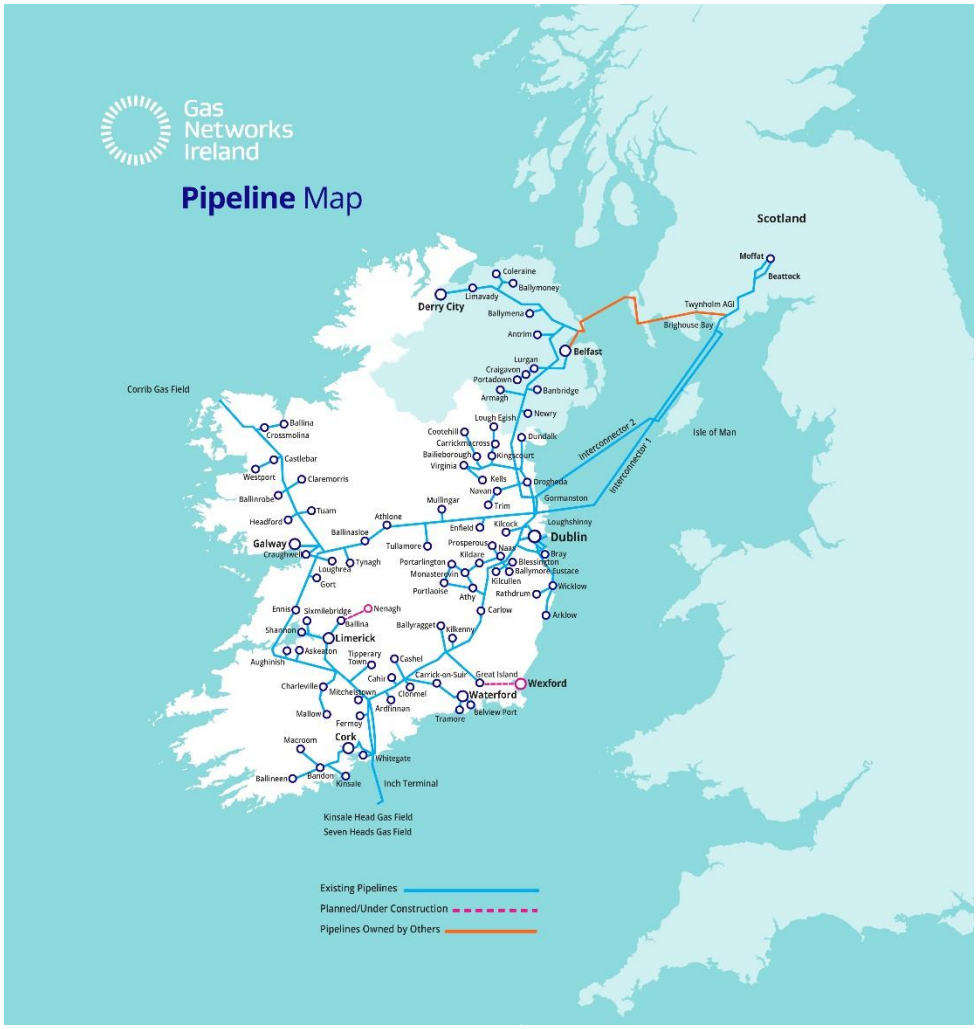


Fig. 2.1 Overview of Gas Networks Ireland Transmission System

Gas Networks Ireland, operates, builds and maintains the natural gas network in Ireland, ensuring that over 670,000 natural gas customers receive a safe, efficient and secure supply of natural gas, 24 hours a day, 365 days a year. Natural gas is transported through a network of 13,722 km pipelines, both transmission and distribution. Gas Networks Ireland is responsible for connecting all customers to the network, regardless of their supplier. The company manages a 24 hour gas emergency service handling over 19,000 call-outs a year.

13,772km Network	**RoI, Scotland, NI, IoM**	**673,000 customers**	**19,449 call-outs**

Through the New Gas Networks Ireland Connections Policy, Gas Networks Ireland continually brings the benefits of natural gas to new towns. The Connections Policy was revised in September 2015 and is a Gas Networks Ireland policy approved by the CER.

Natural gas is a clean, efficient and cost effective fuel. Natural gas is actively promoted by Gas Networks Ireland as a fuel of choice for homes, businesses and industry. The organisation is keen to see greater utilisation of the natural gas network and explore opportunities to expand the network where viable. There is considerable emphasis on investing in new business areas such as natural gas vehicles, renewable gas, and smart metering.

3 Transmission System

This report satisfies condition 17 of the Transmission System Operator Licence and condition 13 of the Transmission System Owner Licence. Gas Network Ireland's primary responsibility is to transport gas from entry to exit, on behalf of customers, while ensuring that the network is operated safely and efficiently. The overall natural gas network in RoI consists of 13,772km of pipeline of this 2,433Km is made of high pressure steel transmission pipelines. The RoI transmission system consists primarily of the high pressure (70 barg) ring-main linking Dublin, Galway , Limerick, and a number of spur lines to Cork, Waterford and lower pressure (40 barg and 19 barg) local area (regional) networks in large urban centres. In addition, the Mayo-Galway pipeline connects the ring-main to the Bellanaboy terminal, Co. Mayo, where Corrib gas enters the Irish transmission system. The natural gas network is comprised of high pressure steel transmission pipes and low pressure plastic distribution pipes. The transmission pipes link Ireland's major urban areas and also connect Ireland to the UK. Electricity Generating Power Stations and some large Industrial customers are also directly connected to the transmission network.

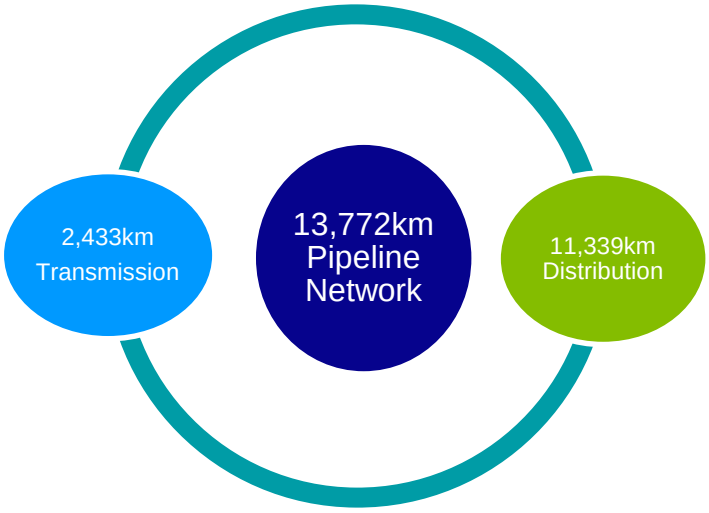


Fig. 3.1 Pipeline Network (RoI)

3.1 Total length of pipe in transmission system

The transmission system pipeline network consists of both onshore and offshore pipes. The length of pipeline has remained consistent over the last number of years with minor variations due to adding new transmission customers or decommissioning; at the end of 2015 it was 2,433 kilometres in length.

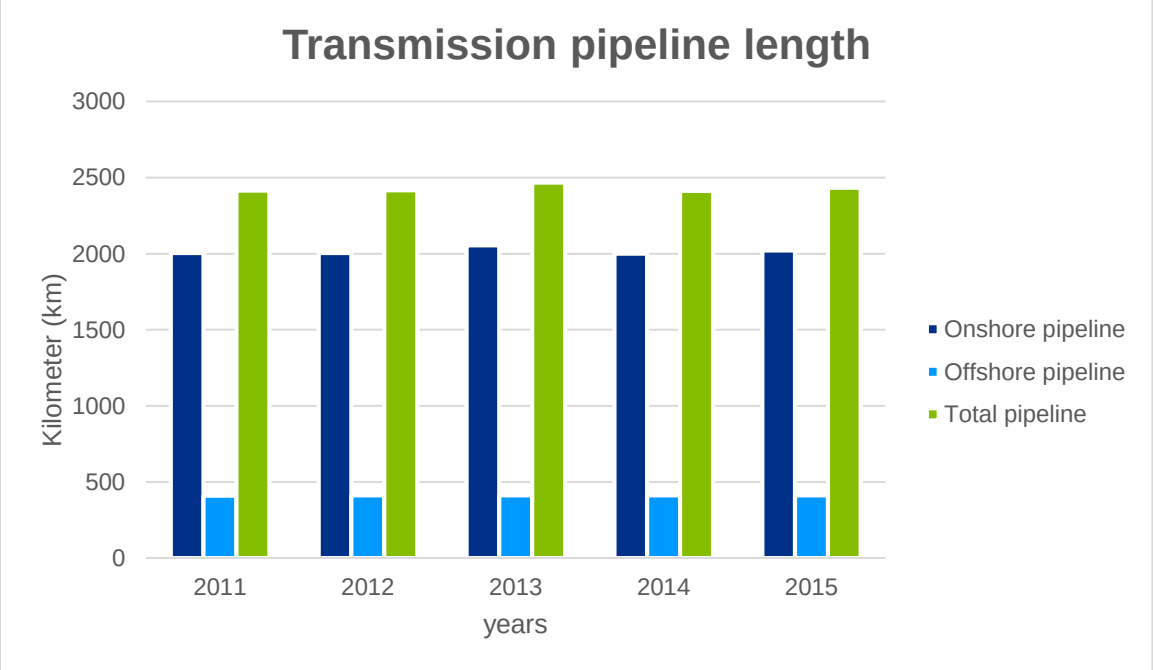
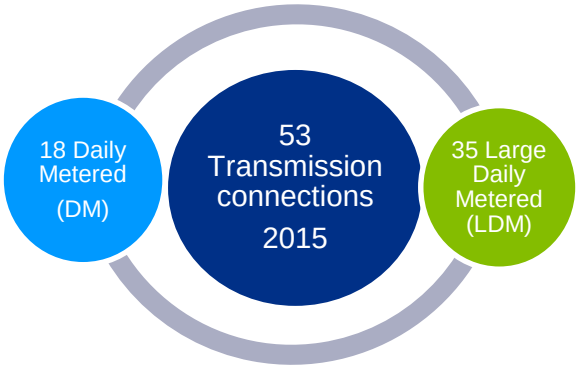


Fig: 3.2 Transmission pipeline length

3.2 Total number of Connections



The total number of connections to the Gas Networks Ireland transmission networks in 2015 was 53, of these 35 were LDM and 18 were DM. There have been some slight variances over the past few years with a marked

decline in 2012 and 2013, most likely due to economic reasons. A positive bounce in figures can be seen for 2014 and 2015 again most likely prompted by an uplift in the economy, see Figure 3.3.

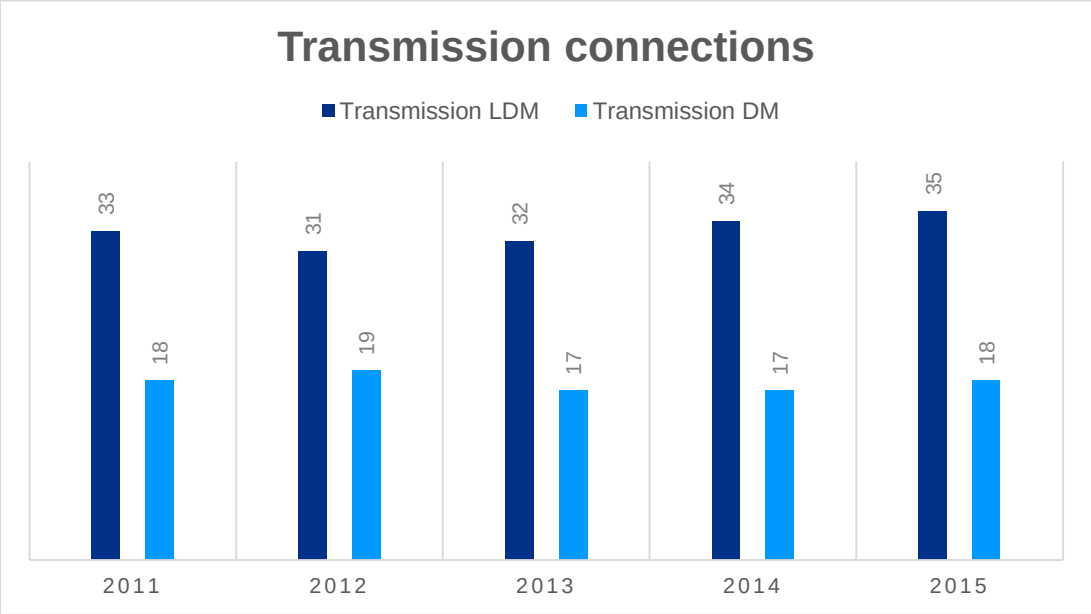


Fig 3.3: Transmission connections

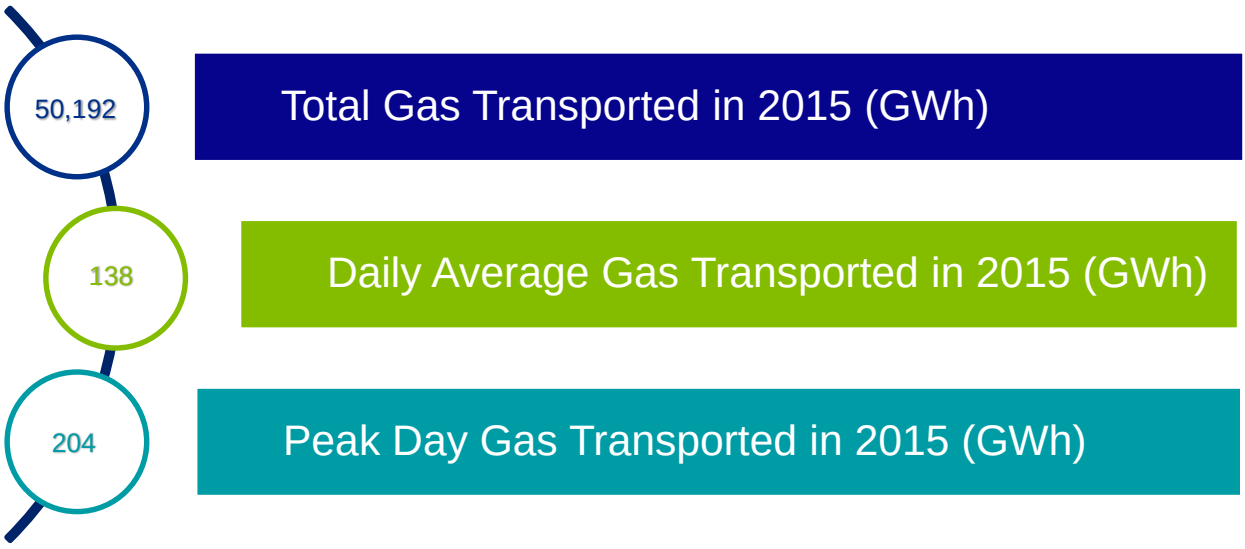
4 Transmission system data

Managing the flow of the gas from the entry points to the end consumer is a sophisticated 24-hour operation. It involves constant monitoring of transmission gas flows and system pressures through a Supervisory Control and Data Acquisition (SCADA) system and also via gas control management of the distribution system, through a separate SCADA system, including the Geographical Information System (GIS) and on-line access to Gas Networks Ireland systems. It uses telemetry data from all the operational sites to monitor the system.

The grid controllers man the control room 24/7 and are responsible for monitoring the alarms on the network via SCADA. The grid controllers are also responsible for monitoring the Gas Transportation Management System (GTMS) and managing the daily nomination and allocation process ensuring that the correct volume of gas is being transported at all times to meet shippers and customers' requirements.

4.1 Throughput

Throughput is the total amount of natural gas transported through the Irish gas network by Gas Networks Ireland each year. The total gas transported in the calendar year 2015 was 50,192 GWh, which is down marginally from 50,163 GWh in 2014. This includes 50 GWh of fuel gas transported for NI which was consumed at Beattock Compressor Station. Gas transported for the RoI Power-Gen sector continued to show year on year decline with a 2.4% decline for 2015 against 2014. A summary of the gas throughput from 2011 to 2015 is illustrated in table 4.1 and figure 4.1.



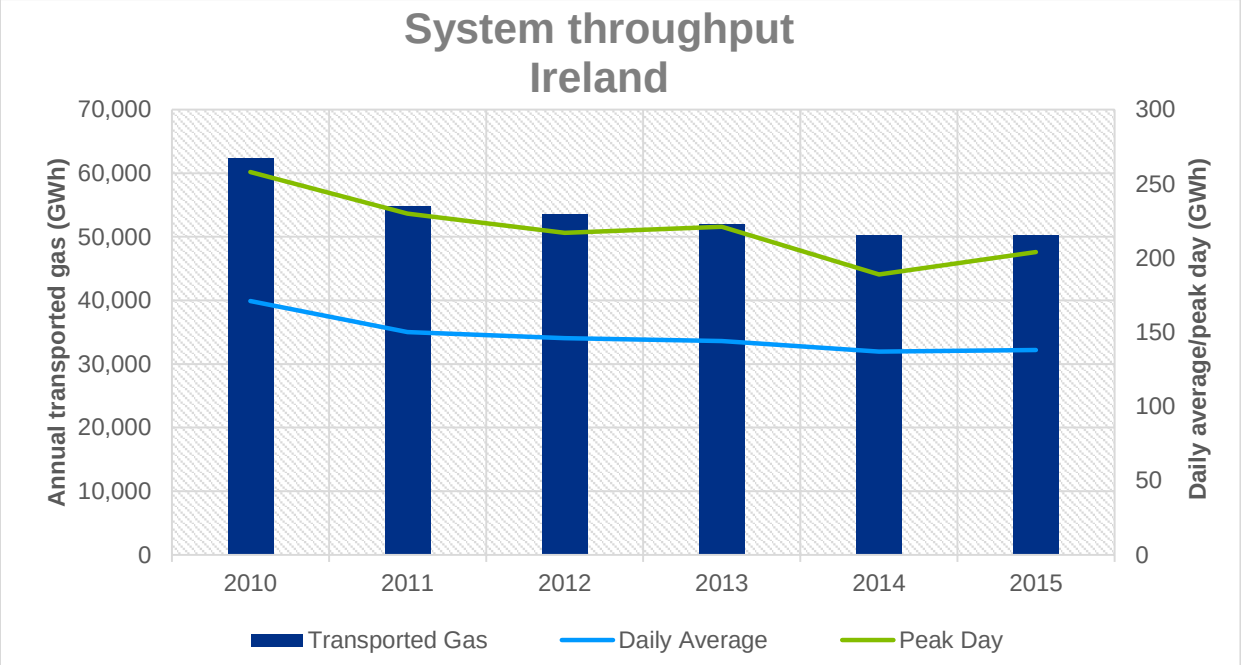


Fig: 4.1 System Throughput Ireland

4.2 Demand change

Demand is the total amount of gas physically off-taken from the gas network in the Republic of Ireland (RoI) each year. Figure 4.2 reflects the demand for gas in in 2015 which was at a similar level to 2014. The decrease in gas demand over the past number of years has been primarily due to reduction in demand within the power generation sector. A continued increase in the dispatch of Renewable Electricity sources with the Single Electricity Market combined with the low price of coal has seen gas fired plants running less, which has a direct impact on gas demand. Growth in the Industrial and Commercial (I & C) sector is partially off-setting the decline, with 2015 showing a slight increase of 0.2% in demand reflecting a changing economic situation within Ireland.

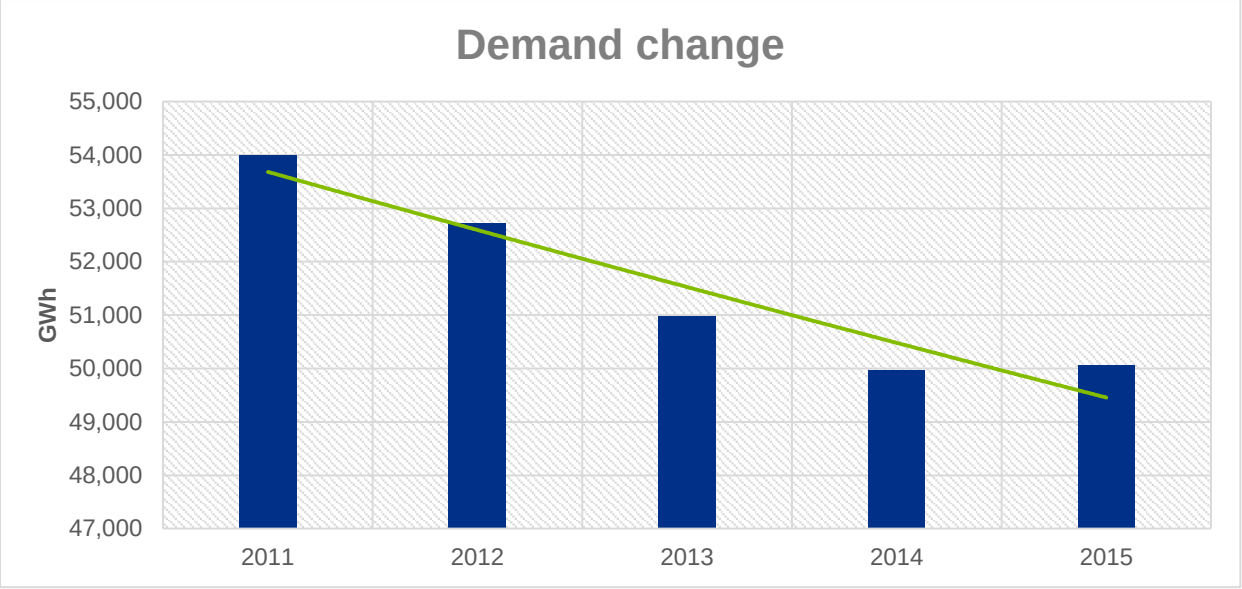


Fig 4.2: Demand change

4.3 System Efficiency

(a) Delivery

Table 4.3 reflects the amount of gas delivered to shippers as a percentage of the actual nomination amount. The target is to be within Key Performance Indicator (KPI) limits of 99% of the time. Low hourly flows at Inch can lead to difficulties in achieving the end of day quantity nominated by shippers. Low hourly flows are a result of shipper/producer requirements. At Inch, providing entry gas at low flow required recycling of the flow for the safe and economical running of the Compressors. Bellanaboy entry point became active and delivered first entry gas to ROI on 30th December 2015.

The amount of gas delivered to shippers as a percentage of the actual nomination amount is shown in table 4.3. The target is to be within KPI limits of 99% of the time, 100% was achieved at all entry points in 2015.

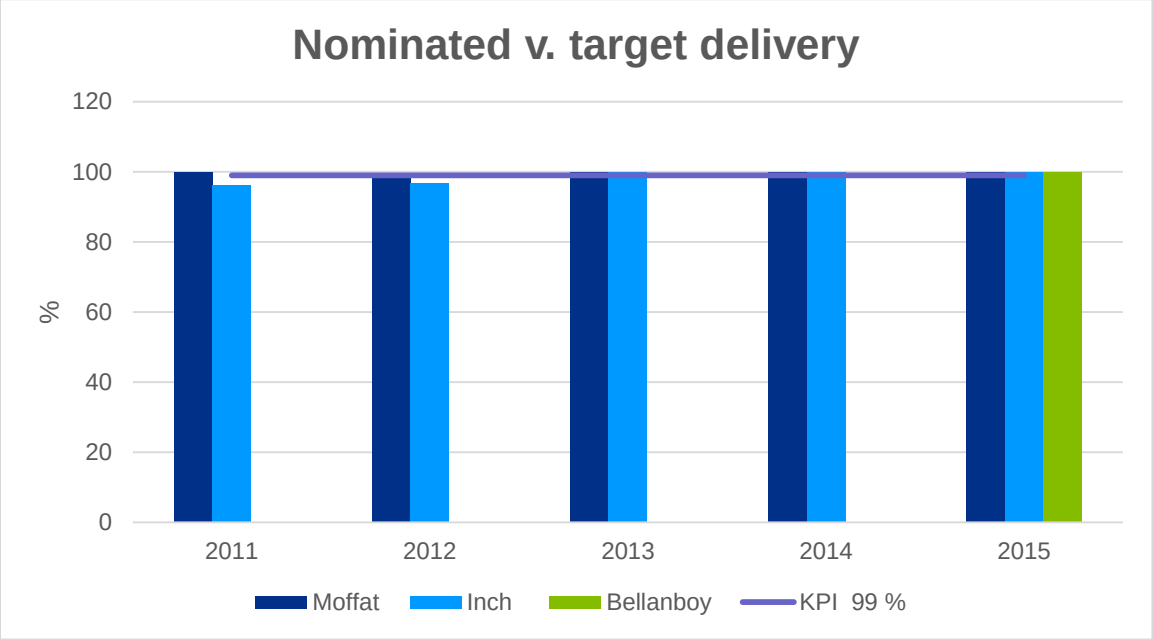


Fig: 4.3 Nominated v. target delivery

(b) Fuel Usage

Fuel usage of 648 GWh for 2015 was down on the 818 GWh for fuel usage for 2014. This decline can be attributed to low throughput and reduced onshore delivery at Inch in 2015. This is shown in Figure 4.4.

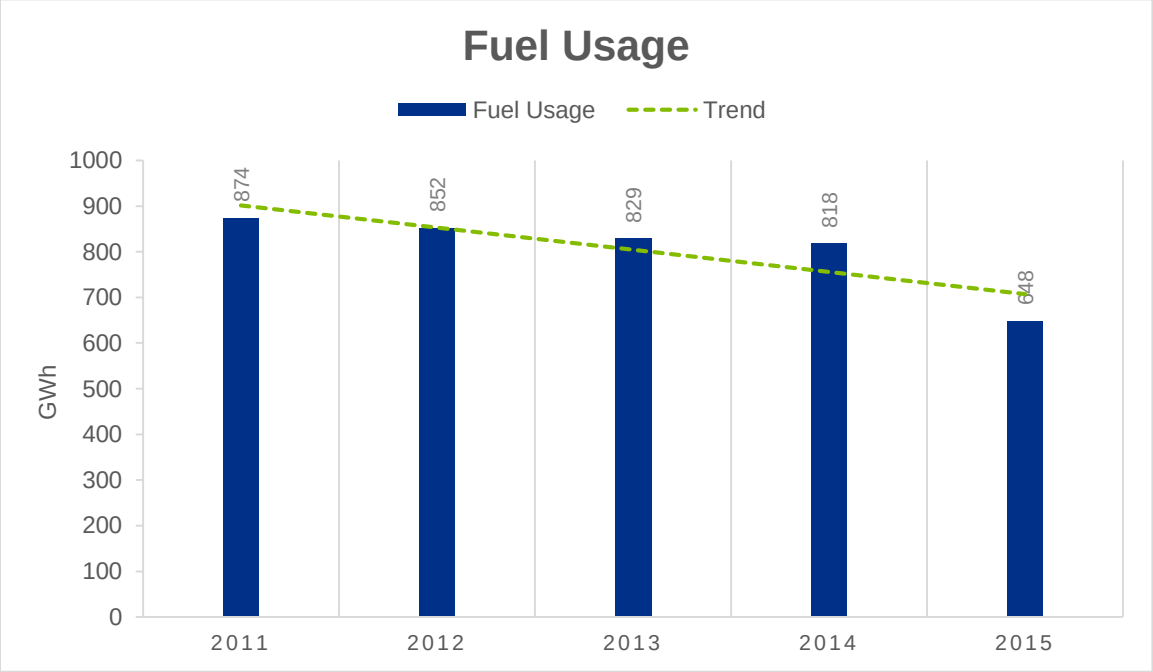


Fig 4.4: Fuel usage

(c) Meter Read Verification

Transmission meter read verification gives an indication of the number of transmission connected gas points that require meter reading adjustments as a result of failed meter reading validation[1]. Table 4.5 notes that 3.1% of all site-metering validation checks carried out in 2015 resulted in adjustments (i.e. approximately 84 site-metering adjustments were performed out of 2,721 meter reading validation checks in 2015). Adjustments are required to ensure accurate reading when a meter is out of tolerance, configured incorrectly or replaced. Gas Networks Ireland has increased the frequency of validation checks, from less than 2000 in 2013, which has resulted in an increased number of adjustments being required. The rise in adjustments in 2015 up by 1.1% on the previous year, is due to a review of consumption patterns of all fiscal metering sites of over 300 individual metering streams. The review identified a number of sites where there was suspect metering, field operators' visited the sites to rectify issues. Following the visit an adjustment was calculated and applied to each metering stream so that billing was accurate.

[1] Adjustments typically arise as a result of (i) a communications failure – e.g. a site telemetry failure resulting in advances in the site meter not properly communicated to GTMS via SCADA. (ii) An issue with the meter correction equipment on site.

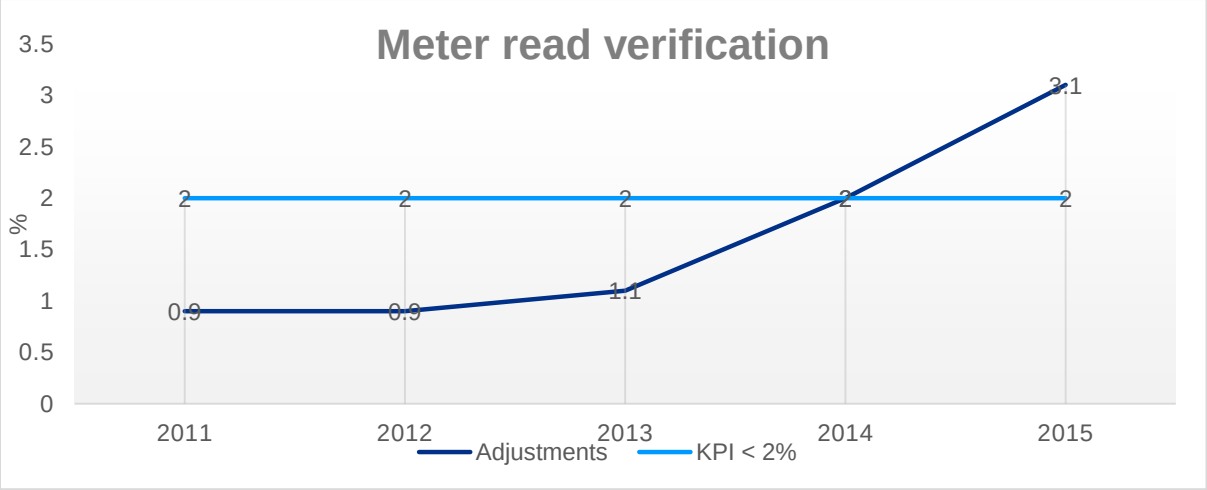


Fig 4.5: Meter read verification

4.4 Unaccounted for Gas

Unaccounted for Gas (UAG)[2] means natural gas which is lost or otherwise unaccounted for in the transportation system or any localised part thereof. Table 4.6 relates to UAG as a percentage of the overall system throughput. UAG can be quite volatile in terms of change month-on-month and year-on-year. It is dependent on a number of factors;

- **Operations and maintenance** – *venting of gas, purging of pipelines, meters, gas chromatographs, gas leakage*
- **Gas Accounting** – *If a meter is causing issues resulting in over or under accounting it will require a retroactive adjustment to the meter for the amount incorrectly applied or not.*

UAG in simple terms is entry minus exit; if the total of gas off-taken from the system exceeds the gas brought into the system then it results in a negative UAG which means we have "found" gas that is "surplus" gas. This UAG is in fact taken from Gas Networks Ireland's system stock required for the operation of the pipeline network. Other reasons for "surplus" gas is the rectification of under-accounting issues that is then manually applied at the end of each month. This would also affect the cleansed exit total for each shipper. Gas Networks Ireland has maintenance and calibration policies in place for all meters and instrumentation to ensure the accuracy of measurement of gas entering and exiting the system. Gas Networks Ireland's general pipeline and Above Ground Installation (AGI) maintenance policies seek to prevent leakage and minimise venting of gas.

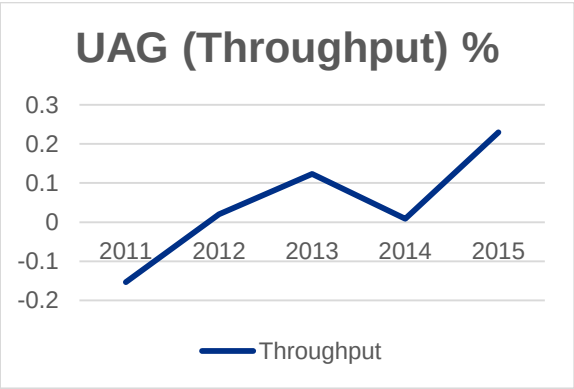


Fig 4.6: UAG (% Throughput)

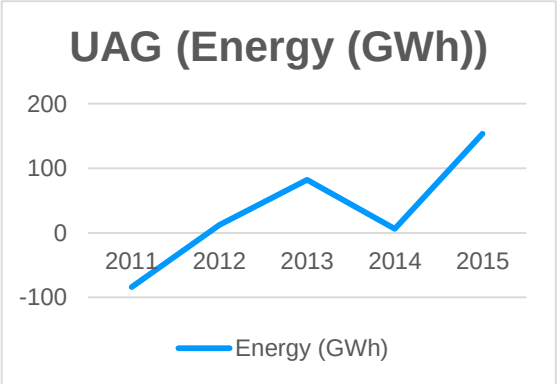


Fig 4.7: UAG (Energy)

[2] Volume as a % of total gas

The rise in UAG seen in the 2015 figures as shown in Table 4.6 and figures 4.6 and 4.7 is due to a significant configuration issue relating to Ballybeg AGI in November and December 2015. This caused a rise in UAG which was subsequently balanced in January and February 2016. UAG is measured in "Gas Year" (October-September), and therefore the calendar year calculation is not an accurate portrayal.

4.5 Shrinkage and Balancing

"Shrinkage Gas" means own use gas and/or natural gas required to replace "Unaccounted for Gas" (UAG) and gas used for fuel within the network. Table 4.7 shows Shrinkage Gas attributed to the RoI system as a percentage of throughputs which stood at 1.2% in 2015. This is illustrated in Figure 4.8.

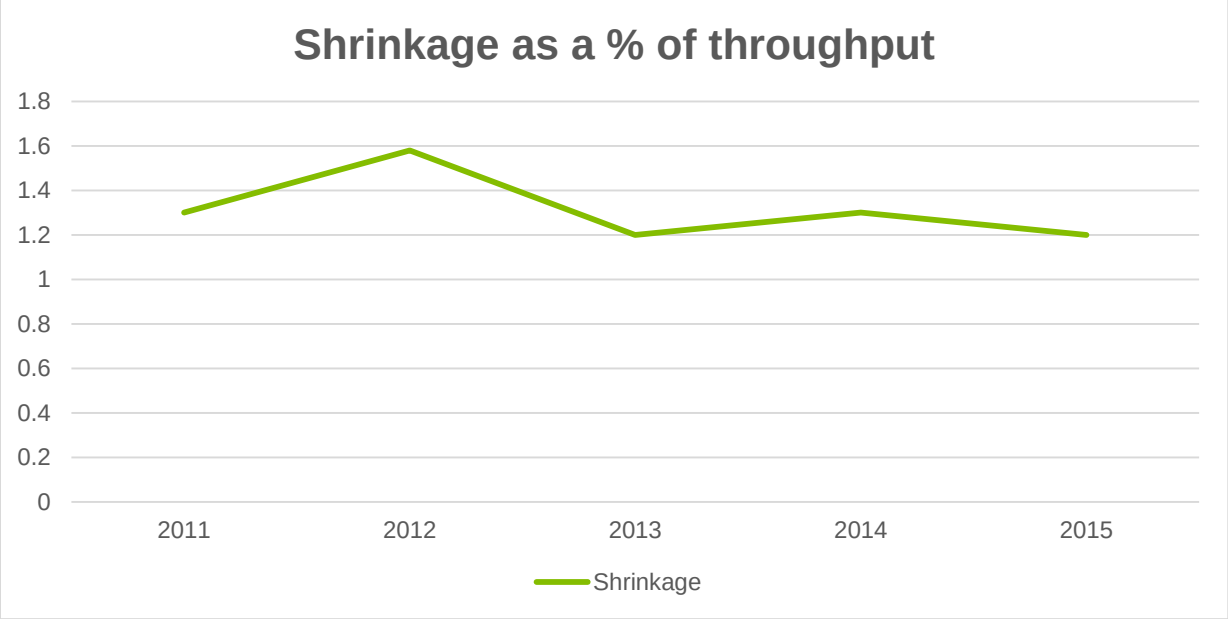


Fig 4.8: Shrinkage as % of throughput

A balancing action means a balancing gas buy or sell in respect of a day as required to match the amount of gas entering and leaving the system. The target is to have no more than 12 balancing actions per quarter – equating to 48 per year.

Action	KPI	2011	2012	2013	2014	2015
System balancing Actions	48 (12 per Qtr.)	39	20	22	35	32
Shipper Imbalance as % of total flow[3]	N/A	0.14%	0.4%	0.22	0.39%	0.24%

Table 4.8: System balancing

The Shipper imbalance was 0.24% as % of total flow in 2015.

[3] This relates to overall system throughput, i.e. section 4 that is RoI 2015 Total Gas Transported of 50192 GWh.

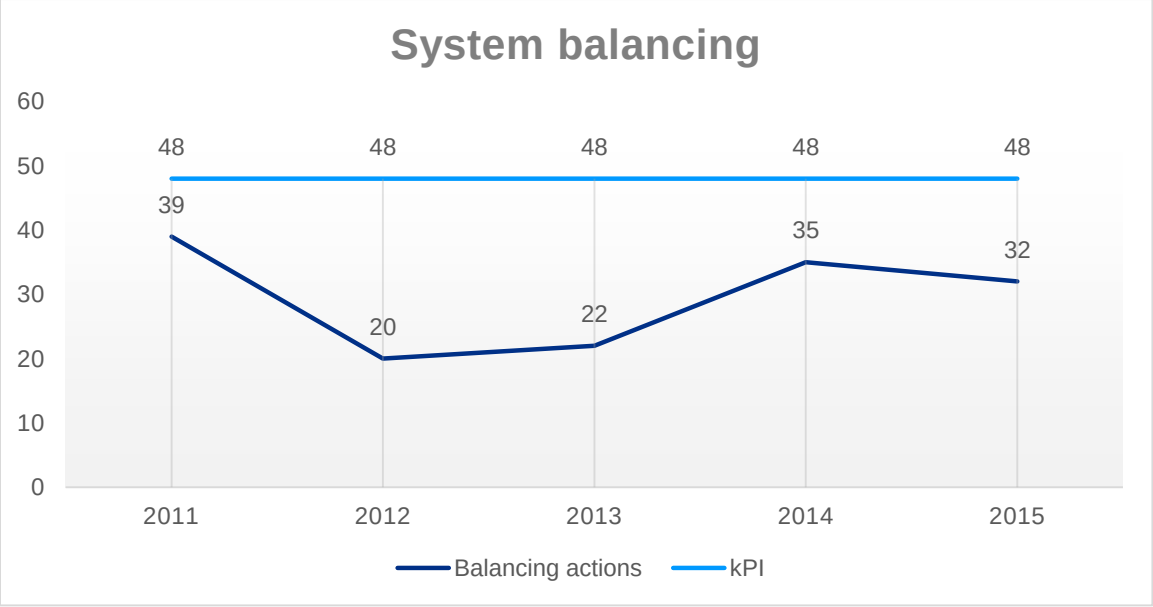


Fig 4.9: System balancing

4.6 Carbon usage/emissions

Gas Networks Ireland is committed to managing its impact on the environment. The transmission system activities affect the environment and the organisation recognises its responsibility to manage and minimise this impact.

As part of its commitment to sustainable environmental and energy practices, Gas Networks Ireland has documented environmental and energy policies[4]. The environmental policy addresses the key areas of climate change, biodiversity, waste, resource use and procurement. The energy policy specifically addresses issues of energy performance and energy efficiency.

Gas compressors are used by Gas Networks Ireland to move gas through and around the transmission system. As a participant of the European Emission Trading Scheme (ETS) Gas Networks Ireland has an emissions allowance for CO_2. Gas Networks Ireland is committed to monitoring and reducing emissions from these compressors. The compressors are also required to meet environmental compliance legislations such as noise monitoring and mitigation. In order to meet the legal obligations and compliance, it is essential to develop and maintain a robust strategy for operations, maintenance, upgrading and replacement of the compressors. This is being done through the Capital Programme, see section 6 for more detail.

Carbon usage is a measurement of the tonnes of carbon emissions produced at each of the compressor stations based on fuel gas consumption. The emissions should reduce with lower throughput but can increase with high flow variation (e.g. intra-day peaks) which mean the compressors can operate outside of their most efficient operating range.

[4] Environment and Energy Policies

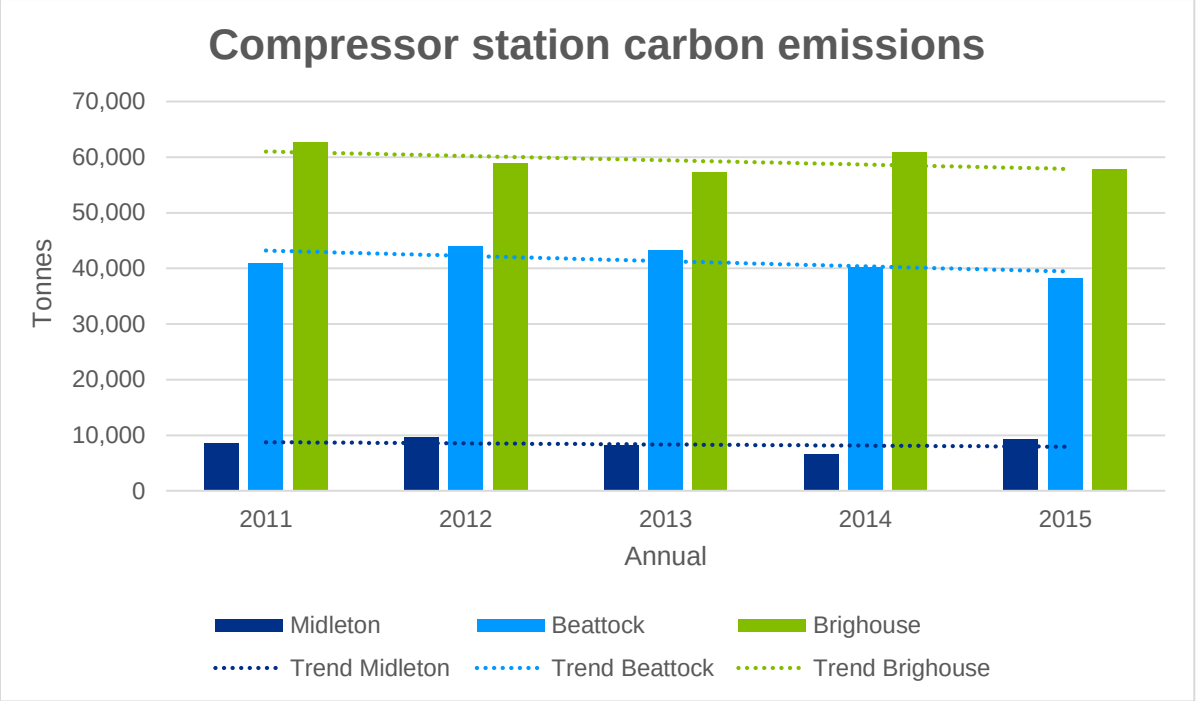


Fig 4.10: Compressor station carbon emissions

There are a number of factors that influence the emissions levels in 2015. Contributing factors to the amount of CO_2 emitted by the stations include the number of units running, power generation demand in the 37.5 barg network, and suction and discharge pressures on the network.

4.7 Usage of Inventory Product and Storage

The Kinsale storage facility is operated by PSE Kinsale Energy Limited using the depleted Southwest Kinsale gas field.

The Interconnector (IC) Inventory space was not offered as a product in 2015 as it is suspended as part of the EU Capacity Allocation Mechanism (CAM) Network Code implementation project, that was delivered in October and November 2015. It was agreed with the CER to rule it out of scope of what was delivered. The reason for so doing is that in order to maintain the product; systemisation changes would have been required that would not have been possible to deliver together with all the other required system changes that took place on GTMS. All requirements were prioritised with regards to progressing GTMS systemisation changes ahead of October 2015. The demand changes for the various compressor sites is shown in Table 4.9.

4.8 Capacity bookings

Gas Networks Ireland transports natural gas around the country on behalf of licensed natural gas suppliers (shippers). These shippers are required to reserve capacity 'space' in the natural gas network to guarantee a secure supply to each of their customers. Exit Capacity reflects the total amount of capacity booked by shippers on the transmission system. The amount of space reserved by shippers for each customer on the Distribution network is referred to as the Supply Point Capacity (SPC). On the 31st of December 2015, 245 GWh was the total exit capacity booked for Power, DM, I & C, Non-Daily Metered (NDM) and Shrinkage. This is shown in Table 4.11 and illustrated in Figure 4.11.

In the power sector, capacity bookings from 2011 to 2013 decreased, mainly due to increased wind generation and the position of gas in with the Single Electricity Market (SEM) and depressed coal prices. Since 2014,

power capacity bookings have increased mainly due to increased power demand. However, bookings are still less than 2012 levels.

The LDM bookings have increased since 2012 mainly due to the removal of secondary transfers (October 2013), Aughinish calciners connection, New Towns connections and the economic recovery. NDM bookings have decreased overall mainly due to increased energy efficiency.

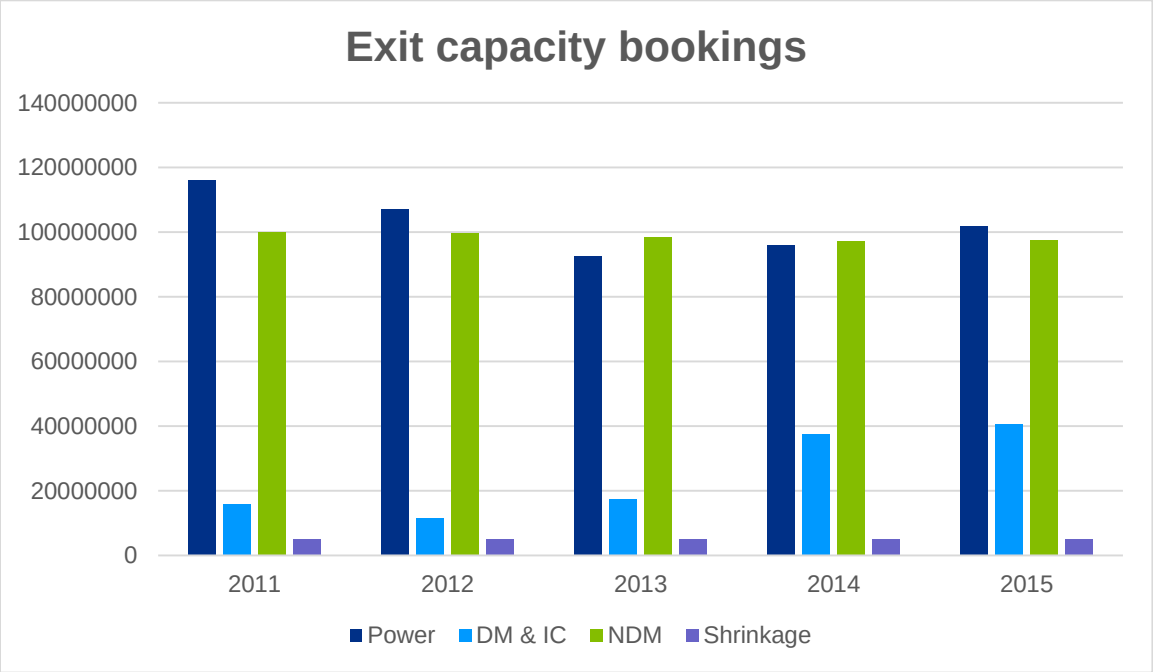


Fig 4.11: Exit capacity bookings

On the 31st of December 2015, 116 GWh was the total SPC for Power, DM, I & C. Residential, NDM and industrial commercial is also shown in Table 4.11 and illustrated in Figure 4.12.

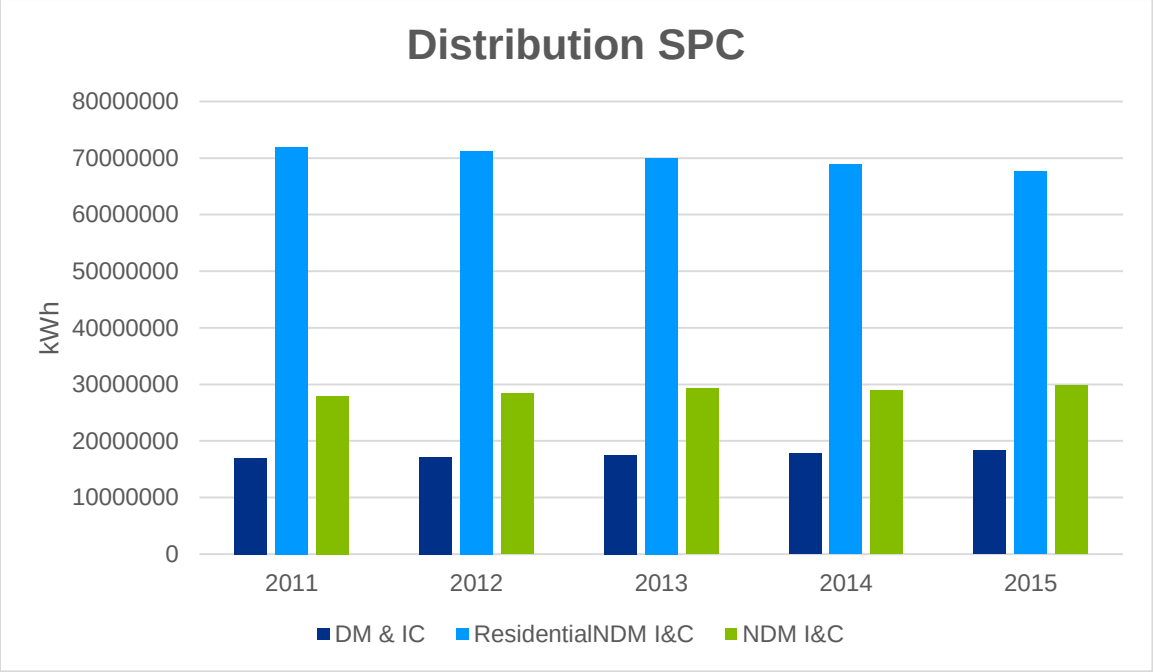


Fig 4.12: Distribution SPC

4.9. Entry Capacity booking processing

Entry capacity means capacity at an Entry Point to the Transmission System required to take delivery of natural gas to the Transportation System. There are various rules concerning the entry booking process outlined in the Code of Operations. The first flow of natural gas from the Corrib field entered the natural gas network at the end of December in 2015, which is why there is a minimal amount exhibited in Figure 4.12 for Corrib capacity bookings in 2015. There will be a marked increase in these in the 2016 bookings.

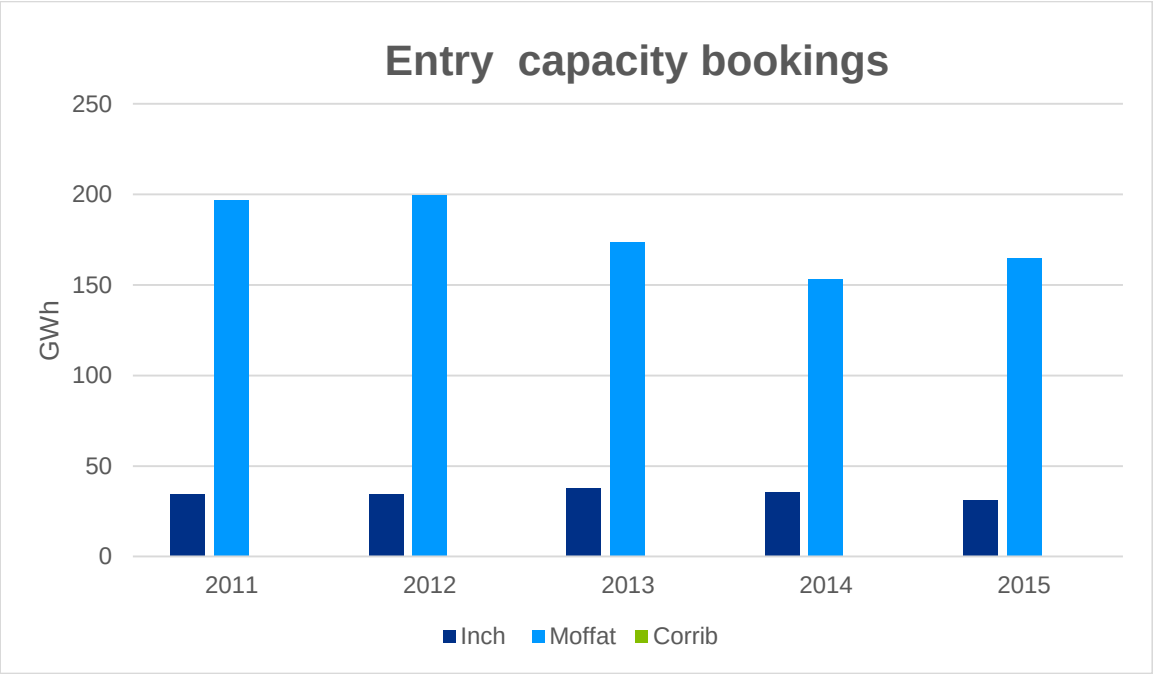


Fig 4.13: Entry capacity bookings

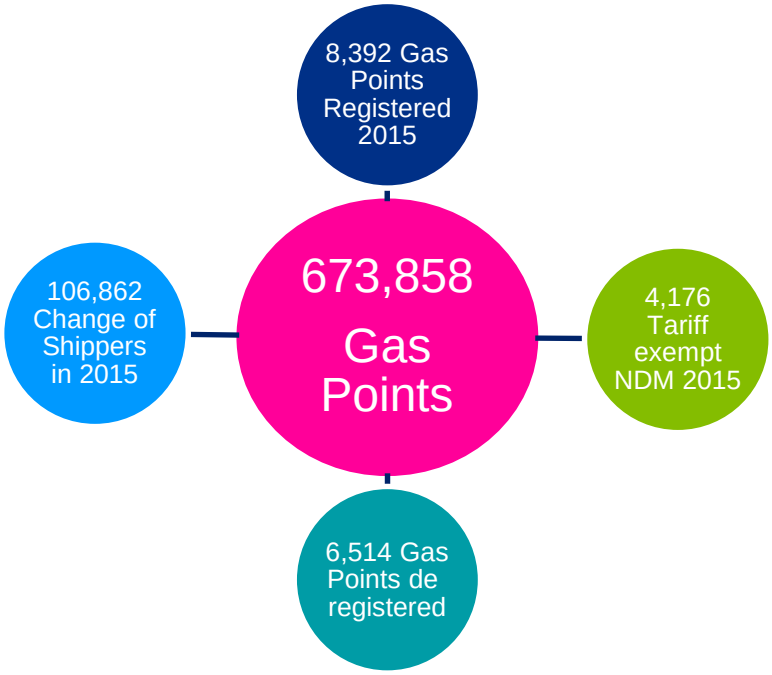
4.10 Performance standards

There was one reportable safety incident in 2015, when a small process leak was detected at Priorsland AGI, Dundalk during our leak survey works programme in November 2015. The leak was repaired by decommissioning the AGI and replacing the gasket at the leak location. The area was back-fed using the South North pipeline via the Haynestown AGI with approval from the CER and UReg.

Customer Commitments	KPI	2011	2012	2013	2014	2015
Safety & Quality						
Reportable safety incidents	0	0	0	0	0	1

Table 4.13 Transmission Service Standards 2015

5 Gas Point Registration Office (GPRO)



5.1 Overview of GPRO

The function of the GPRO is to maintain the Gas Point Register for each Gas Point through which a natural gas customer is supplied; this includes registrations and de-registrations.

The GPRO manages the Change of Shipper (CoS), process within Gas Networks Ireland. This process is essential in order to facilitate an open market and enable supply competition by allowing customers to change from one Shipper to another. It is responsible for all supply point ownership transfers within the Gas Point Register.

The GPRO provides information and reports to the CER and industry on historic activity and processes corrections and amendments, it maintains eligibility listing, the vulnerable customer list and the priority customer list.

The total number of gas points registered on the 31st of December 2015 was 673,858. This was a 0.1% increase in the number registered on the same date a year previous. The total number of Gas Points registered during the year 2015 was 8,392. There were 6,514 Gas Points deregistered during the year, there is a significant rise in this figure when compared with the figure of 98 the previous year. The increase is due to a data cleansing exercise that was undertaken to ensure that Gas Point Registration Numbers (GPRN) that matched the criteria for de-registration were removed from the database. The criteria for de-registration of GPRNs that were tariff exempt is that they were locked, no end-user assigned and that no consumption is recorded at the premises for 18 months. If a meter is not in use for more than two months the supplier does not pay capacity charges. As the meters that were de-registered in 2015 had not been in use for well over the two month period there was no charge to suppliers as a result of the data cleansing exercise.

Shippers have been focused on getting existing gas customers to switch from one supplier to the other. Ireland has one of the most active switching markets in Europe. The retail energy providers invest heavily on advertising and marketing of incentives such as cheaper rates, and bundle offers. However, there was a 3% decline in this activity in 2015 when compared to 2014. Many factors can influence this, such as consumer sentiment and inertia, new entrants to the market and points of differentiation between the suppliers.

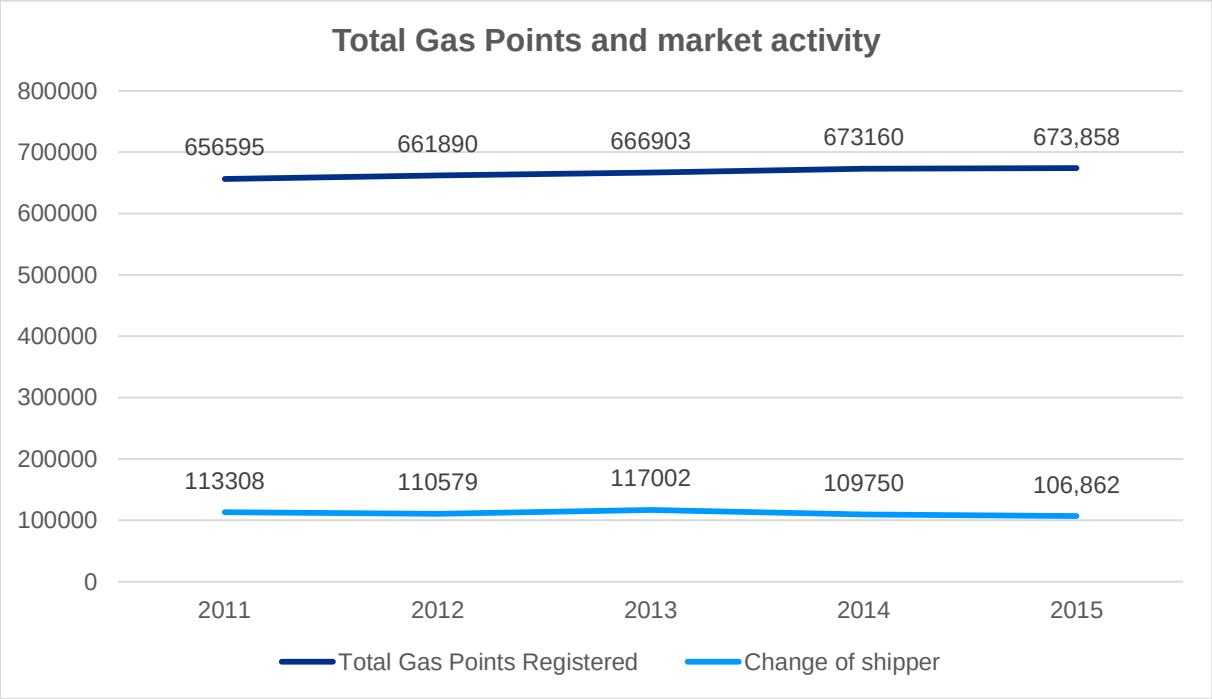


Fig 5.1: Total gas points and market activity

There was a marked increase in the number of historical consumption requests during 2015. This was mostly due to requests for bulk data releases for the Central Statistics Office (CSO), Sustainable Energy Authority of Ireland (SEAI) and the Office of Government Procurement (OGP). The data requests were to fulfil reporting requirements on energy consumption at various sites and for populations as a whole.

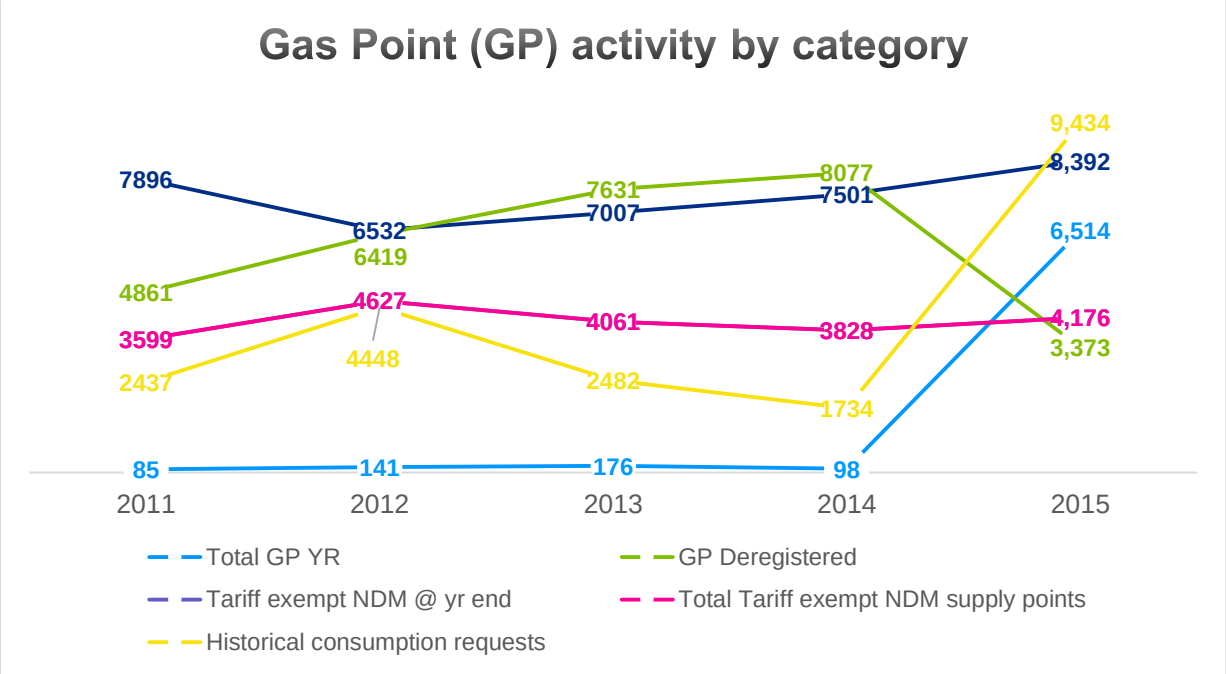


Fig 5.2: GP activity by category

6 Achievement of Capital Programme

As part of the Price Control process, the CER and Gas Networks Ireland agree a 5 year programme of capital works for the Transmission network. Gas Networks Ireland is currently in its third regulatory Price Control Period (PC3), which runs from October 2012 to September 2017. The programme includes works relating to reinforcement, refurbishment and new supply. Additional works outside of the programme can be undertaken in the period if proposed by Gas Networks Ireland and agreed by the CER. Gas Networks Ireland continues to work with stakeholders to extend the natural gas network to new towns. Gas Networks Ireland welcomes new sources of gas supply and remains willing to discuss prospective projects with project promoters.

6.1 Reinforcement

Reinforcement programmes are carried out to increase the capacity of the network in response to increased demand. Examples of reinforcement projects include upgrades to increase the capacity of an Above Ground Installation (AGI) or major pipeline projects, such as Cluden to Brighouse Bay Pipeline where the twinning of the existing pipeline will increase overall network capacity. In 2015, there were 3 reinforcement projects progressed, these consisted of two AGI capacity upgrades and one pipeline project.

6.2 Refurbishment

Refurbishment programmes involve the upgrading or replacing of certain network assets upon establishing that this is required due to the age or condition of the existing asset. Examples of refurbishment projects include:

- Upgrade of the pipeline serving Limerick city to a pipe with increased wall thickness and delivering increased capacity to the eastern side of the city.
- Replacement of inefficient and aging boilers at AGI locations with reliable and more efficient units.

- Upgrading works to bring pressure reduction sites into compliance with the ATEX[5] directive.
- Installation of attenuation measures to limit noise emissions in the vicinity of pressure reduction sites.

There were a total of 109 refurbishment projects at various stages from design through to commissioning and operation carried out during 2015, many of these were across multiple locations.

6.3 Interconnectors

This programme involves the refurbishment and upgrading of assets on the onshore Scotland network which is connected to the Irish gas network via two sub-sea interconnectors. These projects primarily involve works on the two compressor station sites at Beattock and Brighouse Bay in Scotland. Examples of these projects include:

- Upgrade works to the turbine air intake equipment at Brighouse Bay to improve reliability and replace equipment approaching obsolescence.
- Replacement of ancillary equipment, supporting turbine operation at Beattock, which was approaching end-of-life or obsolescence.
- Installation of a station recycle valve at Beattock Compressor Station and connecting same to the station control system.

6.4 New Supply

The Newtownfane to Haynestown (Mullagharlin) project is now commissioned and in operation. Construction on the Drumbannon AGI is ongoing.

7 Transmission Gas Safety

7.1 High Level Safety Statistics

This section of the report is an extract from quarterly reports submitted to the CER under the natural gas safety regulatory framework (the 'Framework'). All information has been provided to the best ability of Gas Networks Ireland at the time of submission to the CER. The report includes KPI measures and statistics that have been under continuous monitoring during 2015. The purpose of the KPI's are to identify opportunities for improvement and to ensure the Network continues to be managed in a safe manner.

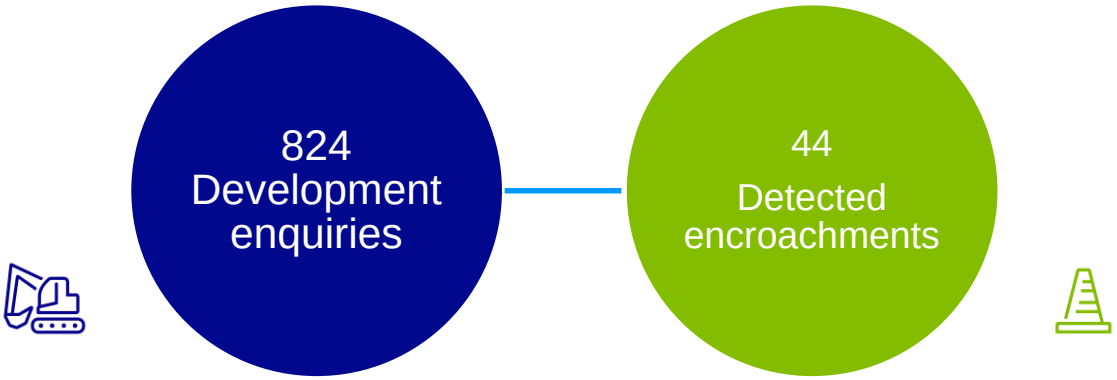
The reference number (ref: 1 – 5) denotes metrics grouping under the Key Safety Regulatory Objectives.

[5] The ATEX directive consists of two EU directives describing what equipment and work environment is allowed in an environment with an explosive atmosphere

	Items	Compliance Monitor	2011	2012	2013	2014	2015
1A	Public Reported Escapes (PREs) (Reported Leaks)	Total Reported Escapes	4	9	13	6	11
1B	Third Party Damage	Development enquiries requiring action	869	875	990	816	824
	Third Party Damage Prevention Detected Encroachment Events	Category A - Pipeline Damage or Leak	0	1	0	0	0
		Category B - Serious Potential for Damage	20	19	29	20	21
		Category C - Limited Potential for Damage	25	22	16	19	23
		Total detected encroachment	45	42	45	39	44
1C	Transmission Pipelines	Line breaks (major leakage)	0	0	0	0	0
		Line damaged (sustainable level of leakage)	0	1	0	2	0
		Line damaged (no leakage)	0	1	0	0	0
2A	Pressure Control	Occasions where pressure drops below minimum design pressure	0	0	0	0	0
		Occasions where pressure is greater than 1.1 x Maximum Operating Pressure	0	0	0	0	0
2B	Gas Outages	Number of Unplanned Outages	0	0	0	0	0
3A	Gas Quality	Number of non-compliant events (constituent parts outside criteria)	0	0	1	0	0
3B	Gas Quality	% Availability of the gas measurement equipment	100%	100%	100%	100%	100%
4A	Gas Supply Emergencies	Local Gas Supply Emergencies 1,000 - 9,999 customers affected	0	0	0	0	0
		NGEM Emergencies > 10,000 customers affected	0	0	0	0	0
4B	Gas Emergency Exercises	Emergency Exercises planned per annum (Minimum)	2	2	2	2	2
		Emergency Exercises undertaken	4	5	3	2	5
5A	Incidents	Gas Related Incidents	0	0	0	0	0

Table 7.1: Safety statistics

7.2 Third Party Damage



Third Party Development works enquiries which potentially impacted on the transmission network and required action from Gas Networks Ireland increased slightly from 816 in 2014 to 824 in 2015.

There were 44 encroachments detected in 2015 which is an increase on the 39 detected in 2014 but a slight reduction on the 45 detected in 2013. Since 2011 Gas Networks Ireland has classified transmission pipeline encroachments in line with the United Kingdom Onshore Pipeline-Operators Association (UKOPA) model, these include:

- **Category A:** Pipeline leak or damage;
- **Category B:** Potential for damage
- **Category C:** Limited or minimal potential for damage.

Category A is the most severe and would include actual damage to a transmission pipeline, wrap or sleeve. There were no Category A encroachments in 2015, none in 2014 or 2013. Categories B and C relate to a level of potential damage and are differentiated by the actual activity and method carried out in the vicinity of the pipeline. Category B encroachments are deemed to have serious potential for damage while Category C have limited potential for damage. Gas Networks Ireland reviews each encroachment and monitors trends closely.

7.3 Update on the Safety Case

Gas Networks Ireland fully complies with the Framework. The Gas Networks Ireland Transmission System Operator Safety Case outlines in detail how this is achieved.

The Gaslink System Operator Safety Case was originally submitted to the CER and approved in June 2009. Within the safety case framework a quarterly KPI report is submitted to the CER for review. A number of updates to the Safety Case have been made since 2009 and have been accepted by the CER. In 2015, the CER accepted from the 1st of August the Gas Networks Ireland Transmission system Safety Case. The Safety Case demonstrates the arrangements that are in place for:

- The safe control and operation of the transmission system.
- The management of the life cycle of the assets including design, construction, commissioning, maintenance and repair, reinforcement and renewal, and decommissioning and abandonment.

- Ensuring that staff meet the required standards of qualification and competence.
- Emergency preparedness.
- Ensuring that gas transported in the network meets required standards for gas composition and quality.
- Hazard assessment and mitigation of the risks to a level that is as low as is reasonably practicable associated with the transportation of gas.
- Compliance with relevant standards and codes of practice.
- Cooperation with third parties.

The primary change to the Transmission Safety Case in 2015 was Gas Networks Ireland becoming a legal entity, which was accepted as previously indicated on the 1st of August. Under the Framework, Gas Networks Ireland is required to conduct a full review of its safety case every five years to ensure that the safety case remains a 'living document' and fully reflects the current safety operating measures and practices. This review will be due in 2020.

7.4 Update on Natural Gas Emergency Manager (Currently Network Emergency Manager) activities

The CER appointed Gaslink as the National Gas Emergency Manager (NGEM) and approved the Natural Gas Emergency Plan (NGEP) submitted to the CER in November 2008, pursuant to SI 697 Section 19B of 2007. Revision 3 of the NGEP was updated in late 2013 and approved by the CER in January 2014. Gas Networks Ireland assumed all responsibilities in this regard on the 1st of August 2015.

8 Code Obligations

The Code of Operations governs the relationship between the Transporter and the Shippers on the transportation (transmission and distribution) network. By signing Framework Agreements, Shippers accept the terms of the Code of Operations. In February 2005, the CER approved the implementation of a new Code of Operations (the Code) which governs the rules for both the transmission and the distribution network. These rules became effective on April 1st 2005. The latest version of the Code (Version 5.0) was published in August 2016[6]. The Code is comprised of sections outlining the general principles of the Code, regulatory compliance, the capacity arrangements (both entry and exit), the nomination and allocation arrangements, balancing, Shipper registration, gas specification and quality, as well as the various sections on congestion management, legal and general.

8.1 Systems availability

Grid control is responsible for monitoring the GTMS and managing the daily nomination and allocation process ensuring that the correct volume of gas is being transported at all times to meet Shippers' and customers' requirements. The performance standard for the GTMS system availability is 99.8% this has been consistently achieved over the past five years. In 2015, the system was available 99.96% of the time.

[6] http://www.gasnetworks.ie/en-IE/Gas-Industry/Services-for-Suppliers/codeofoperations/

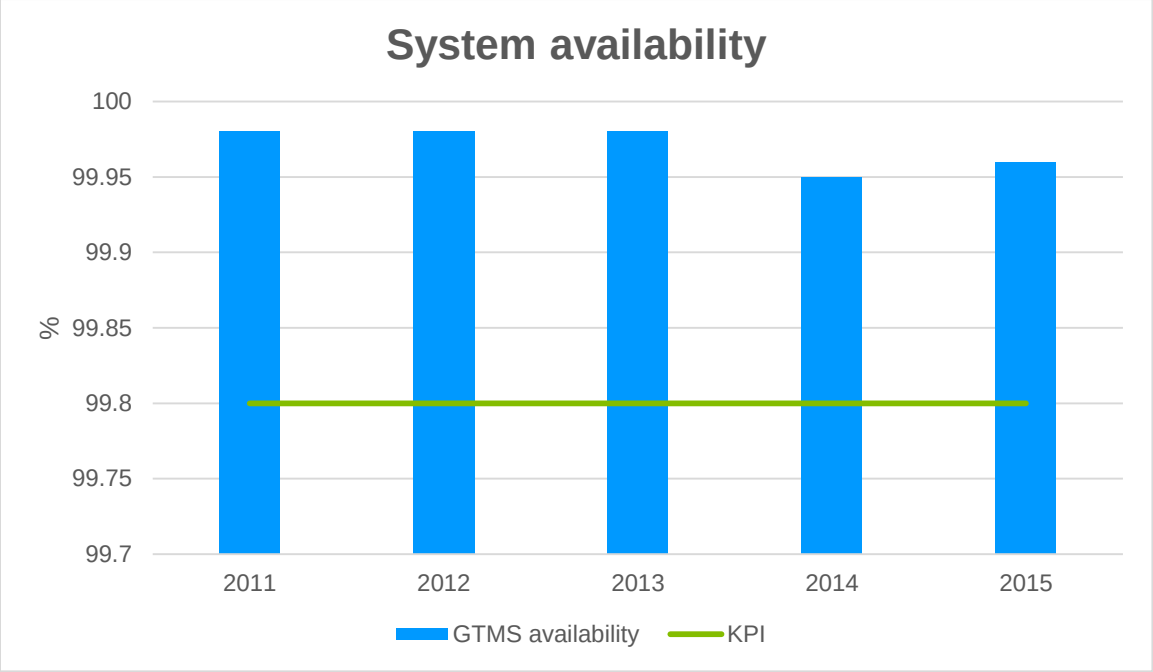


Fig 8.1: System availability

8.2 DM Change of Shipper processing

The Change of Shipper process governs the recording of a change of registration of NDM Supply Points between Shippers on the Gas Point Register. A number of performance targets have been set in terms of processing requests for change of shipper and entry and exit capacity booking requests. These are outlined in table 4.12. The performance target has been consistently achieved over the past five years.

8.3 Invoice circulation

The trading and settlements team in Gas Networks Ireland generates and issues transportation invoices for all shippers on a monthly basis. The invoices are for transmission and distribution capacity and commodity. The team also issue shippers a letter each year regarding the pricing mechanism on the shrinkage contract and are responsible for the disbursement of account invoices and credit notes. The performance targets for invoices is to issue by the 12th day of the month, this has been achieved 100% of the time since 2011. The KPI for providing shippers with the shrinkage pricing mechanism is prior to the October billing date. This too has been achieved 100% of the time since 2011.

8.4 Meter reading access rates

This process governs the receipt and validation of all meter read information for Generic and Volume Corrected NDM Gas Points. The access rate in 2015 for both credit and PPM meters was 83%, this is above the KPI of 80% which has been consistently achieved by Gas Networks Ireland over the past five years. The read rate per site in 2015 was 3.4 times, the KPI for how often a meter is read per calendar year is 3.2 times. The performance has remained steady at circa 3.4 times in the past three years, this is illustrated in Figure 8.2. However there has been a decline in total access rate since 2011, the introduction of PPM meters into the read cycle has led to decrease in the figure as they have a lower access level.

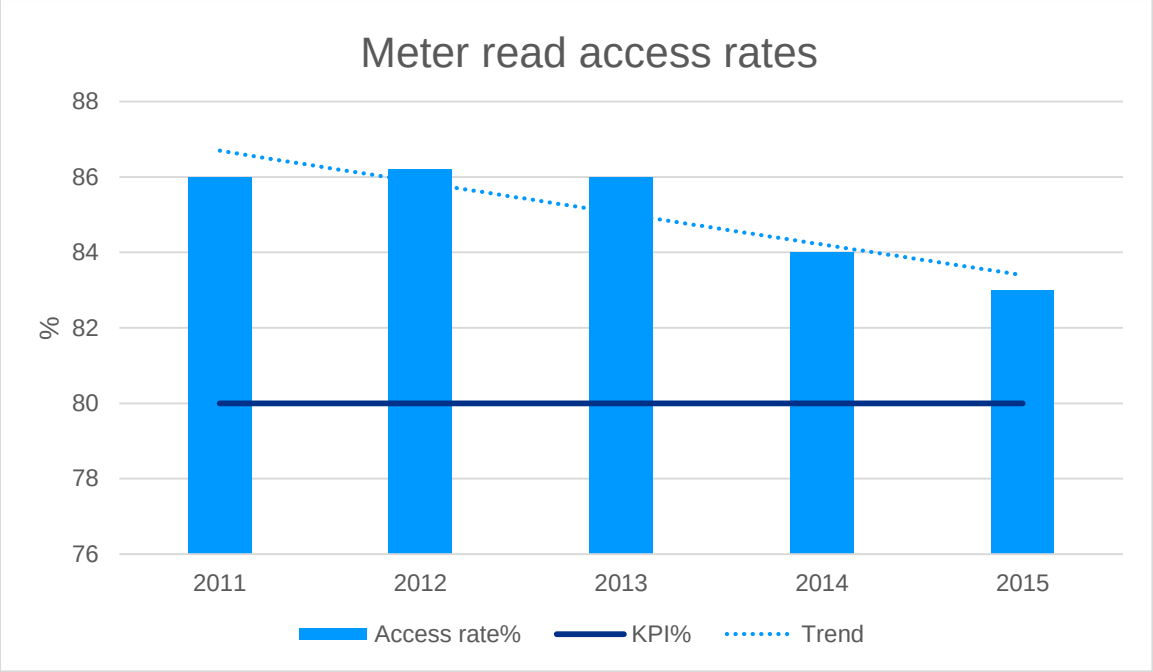


Fig 8.2: Meter read access rates

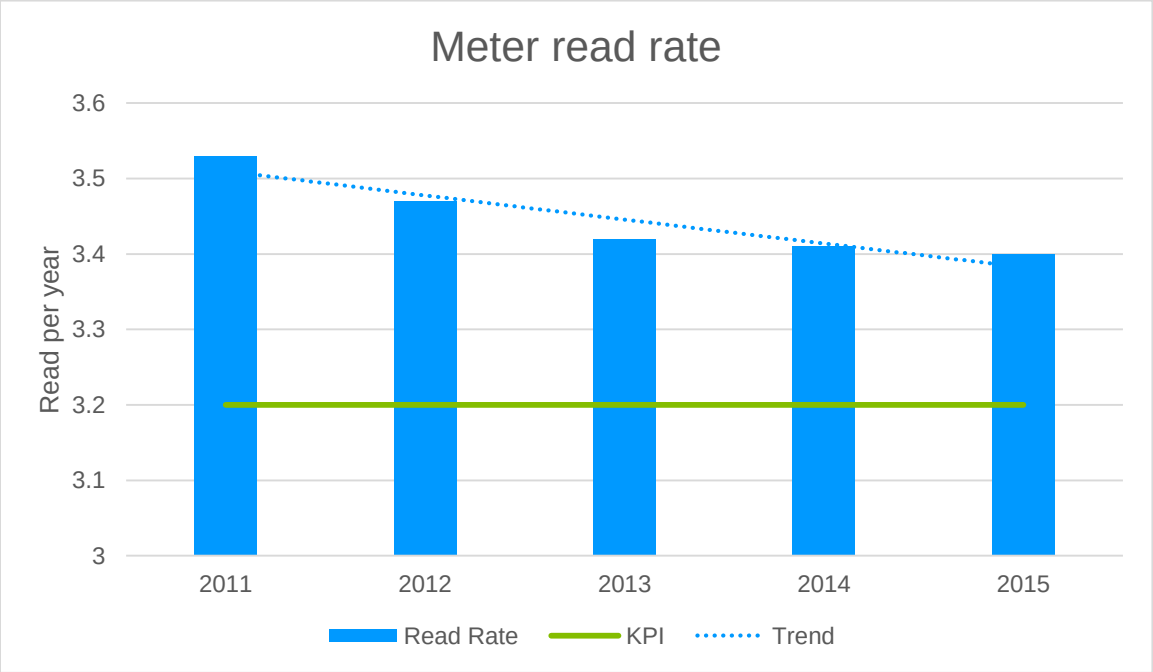


Fig 8.3 Meter read rate

8.5 Meter data services

In conjunction with the Code of Operations, procedures are in place that govern the forecasting demand at gas points, determining allocations by the transporter and for the reconciliation process. The KPI for within accuracy forecasting, allocation and reconciliation is 80% accuracy depending on the KWh. The accuracy rate has steadily improved for credit meters and I & C meters in 2015.

Meter data services	KPI	2011	2012	2013	2014	2015
Forecasting, Allocation and Reconciliation (FAR)[7] – Domestic Reconciliation (PPM[8] Meters - 12 month Rolling)	80% within accuracy of 1,250 kWh	N/A	N/A	N/A	99.37%	94.58%
Forecasting, Allocation and Reconciliation (FAR) – Domestic Reconciliation (Credit Meters - 12 month Rolling)	80% within accuracy of 1,250 kWh	90.30%	92.43%	94%	89.54%	99.56%
Forecasting, Allocation and Reconciliation (FAR) – I & C Reconciliation[9]	80% within accuracy of 4,500 kWh	74.47%	74.54%	74%	74.98%	76.51%

Table 8.6: Meter data services

8.6 Provision of shrinkage gas quantity/costs estimates

"Shrinkage gas" is used to operate the System (own use gas) and to replace gas which is lost or unaccounted for. The Transporter buys Shrinkage Gas to ensure the safe and efficient operation of the System and enters into one or more contracts for Shrinkage Gas.

The Transporter recovers the cost of shrinkage gas for the transmission system from Shippers (by reference to throughput). For distribution Shippers that are not subject to an additional Code charge for shrinkage, there is a distribution shrinkage factor included in the tariff. Shrinkage charges are paid by Shippers based on throughput (their entry and exit allocations).

Imbalance charges are paid to or by Shippers depending on whether they have positive or negative imbalances. Overrun charges are charges payable by Shippers where their allocations exceed their relevant active capacity on a day. Shrinkage charges are paid by Shippers based on throughput (their entry and exit allocations).

8.7 Maintenance Days interruptions

Gas Networks Ireland operates, maintains and repairs the transportation system in accordance with the provisions of the Code of Operations[10]. Maintenance days are days nominated by Gas Networks Ireland where part of the transportation system may be subject to maintenance. During maintenance days, natural gas available for offtake from that part of the transportation system may be reduced, the maintenance programme is planned in advance with the input of the Shippers. From time to time additional unscheduled maintenance may need to be conducted due to unforeseen circumstances as considered necessary in order to ensure the operational integrity and security of the transportation system. Reasonable notice will be given to each affected

[7] http://www.gasnetworks.ie/en-IE/Gas-Industry/Services-for-Suppliers/Capacity-registerFAR/

[8] PPM figures were not reported from 2011-2013

[9] The I & C band ranges between 73,000 kWh and 5,500,000 kWh so range of reconciliation accuracy can vary significantly given the wide range of annual volumes consumed at these sites.

[10] part G, section 5, Code of Operations

Shipper as soon as is reasonably practicable, recognising that such maintenance is unscheduled. In 2015, there were no scheduled or unscheduled maintenance days. In 2015 the in-line inspection programme was very limited, which would be the primary cause of planned interruptions on the network. There was no planned upgrade works at any of the connection points or AGIs which required flows to be interrupted. When carrying out these types of planned maintenance activities Gas Networks Ireland will implement measures to prevent interruptions on the network where possible. Upgrades and in-line inspection requirements occur every 10-15 years which may be an intermittent programme based on the age of the assets.

Unplanned/ reactive maintenance requiring flow interruption are unpredictable and is generally a result of 3rd party intervention or asset failure. Gas Networks Ireland designs its network according to the appropriate codes and standards which requires redundancy to be built to minimise interruptions.

2015 was an excellent year from a network performance perspective but this figure was influenced by the low level of intrusive planned maintenance under taken. See Table 8.7.

9 Distribution System

9.1 Distribution System Data

In the DM I & C sector gas demand was up by circa 4.9%, compared to 2014. The key factors in terms of increased gas demand within the I & C sector are economic growth and new connections growth. The I & C sector as a whole witnessed an increase of 3.1% growth in connections.

In the NDM sector gas demand in 2015 was up by approximately 6% on the previous year. The NDM sector is sensitive to weather and demand. In 2015 demand was up due to the fact that 2014 was particularly mild. On a Degree Day (DD) basis 2014 was approximately 8% warmer than 2015, which was more in line with long run averages. For the NDM I & C sub-sector growth was further driven by the increase in economic activity. In the Residential NDM sub-sector, despite growth in new connections, growth was dampened, most likely due to the impact of domestic energy efficiency measures/improvements. Table 9.1 illustrates the distribution system data.

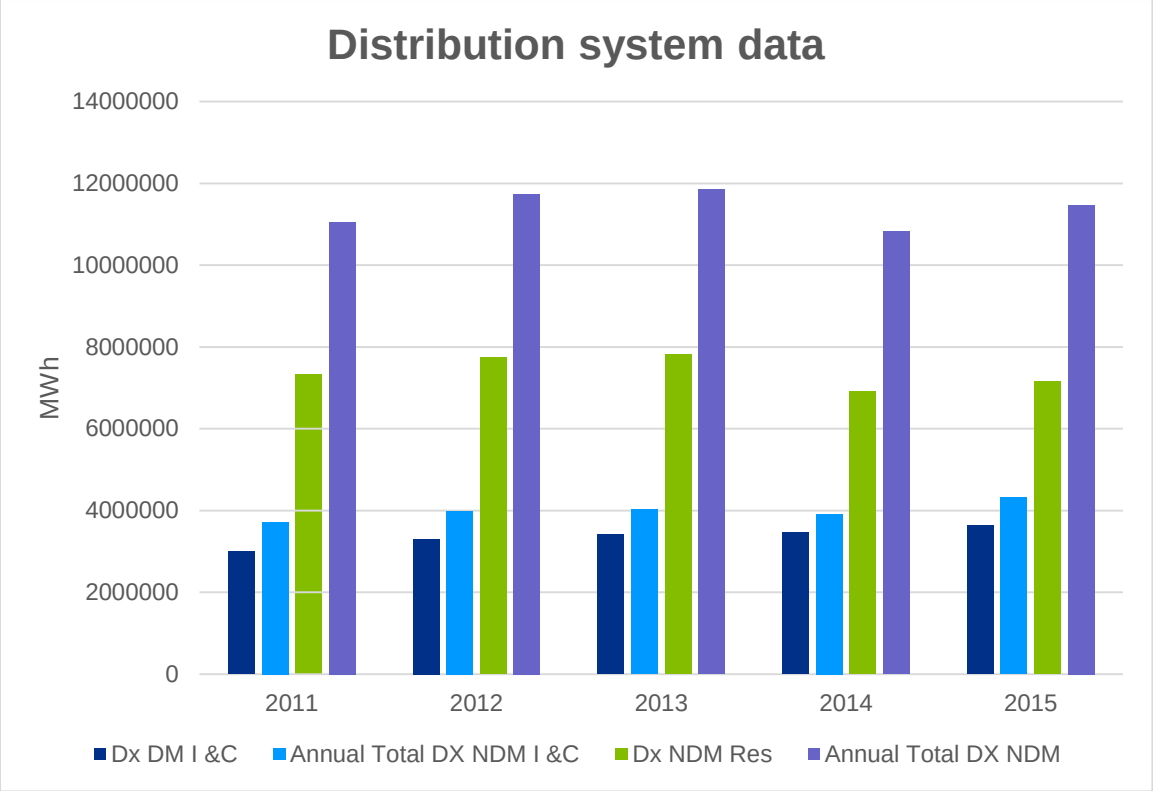


Fig 9.1: Distribution system data

9.2 Distribution UAG

Distribution UAG is comprised of distribution shrinkage and the difference between NDM allocations and meter reads. Distribution UAG as percentage of total distribution throughput in 2015 was 1.57%.

9.3 Total number of connections (by category)

The total number of distribution connections in 2015 stands at 668,159 this is up by 1.1% on 2014. The largest increase was in the DM I & C sector experiencing a rise of 6% from 2014, see Table 9.2.

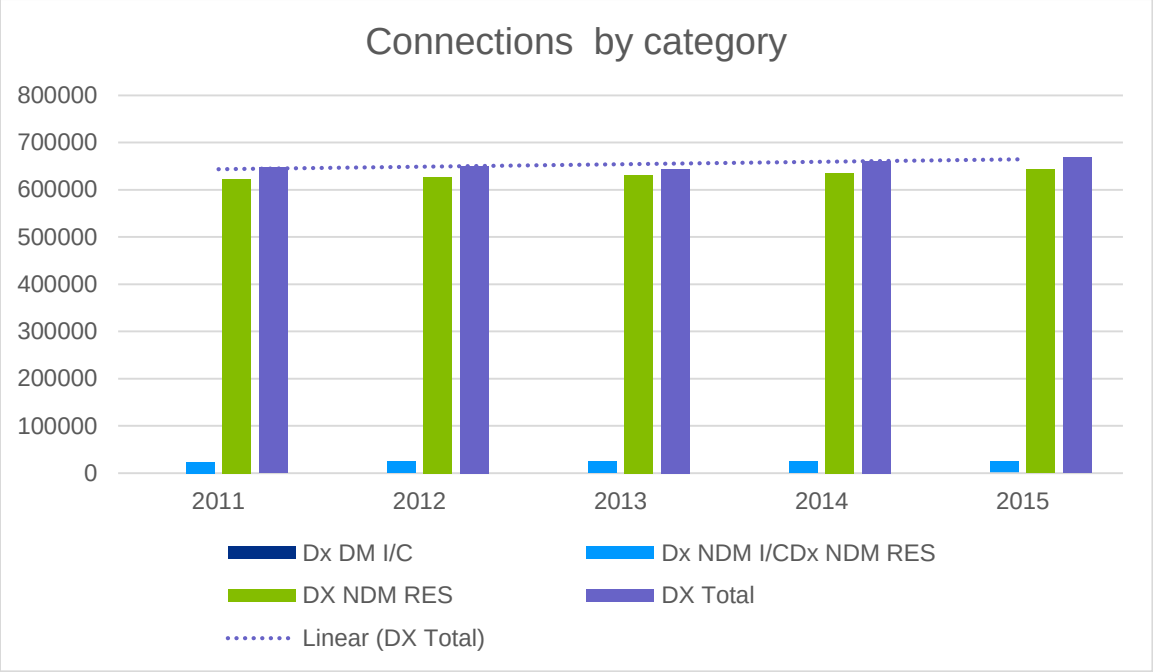


Fig 9.2: Connections by category

9.4 Total length of pipe in the distribution system

The distribution network operates in two tiers; a medium pressure and a low pressure. The distribution network is predominantly polyethylene distribution pipelines. As residents and business premises are added to the network the length of pipe in the distribution network grows. The length of the distribution network at the end of 2015 is measured at 11,339 km. This has been growing incrementally in the last five years.

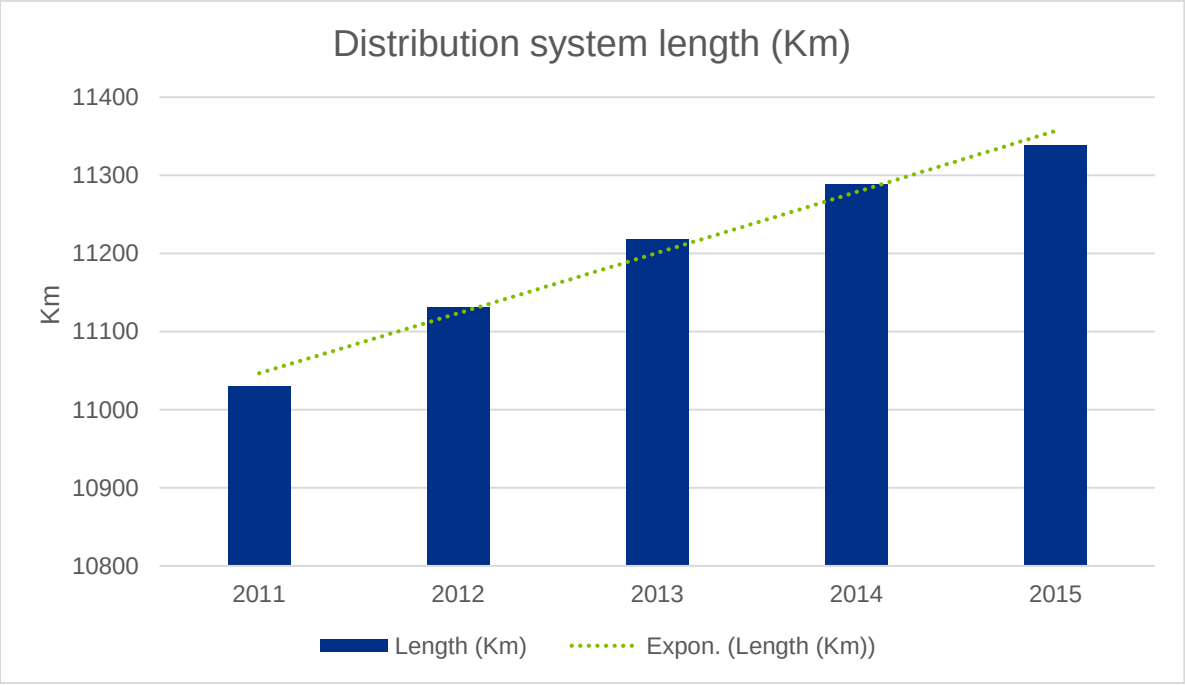


Figure 9.3: Distribution system length (Km)

9.2 Achievement of Capital Programme

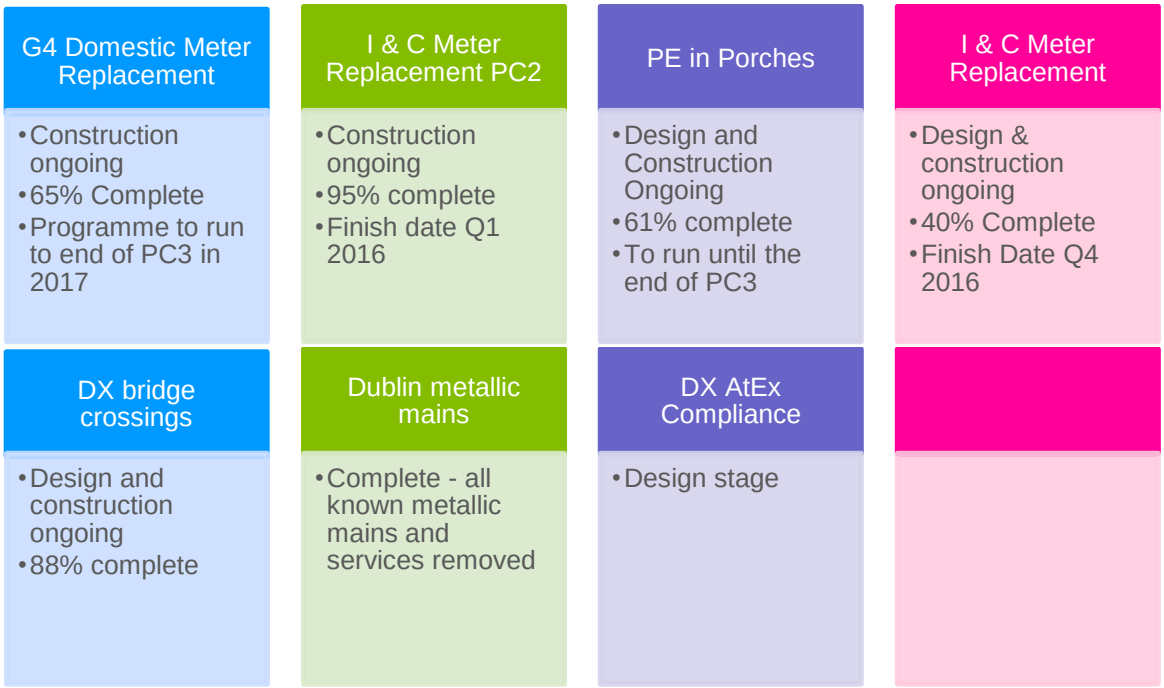
As part of the Price Control process, the CER and Gas Networks Ireland agree a 5 year program of capital works for the distribution network. Gas Networks Ireland is currently in its third regulatory Price Control Period (PC3), it runs from October 2012 to September 2017. The programme includes works relating to reinforcement, refurbishment and new supply related.

As part of the Price Control process, the CER and Gas Networks Ireland agree a 5 year programme of capital works. The programme includes works relating to reinforcement, refurbishment and new supply related which includes new connections and servicing increased loads at existing connections. Additional works outside of the programme can be undertaken in the period if proposed by Gas Networks Ireland and agreed by the CER, e.g. the connection of a new town.

Examples of projects undertaken as part of the Distribution capital programme are:

- Replacement of meters at domestic locations and I &C locations which are 20 years old or older.
- Remediation works required at bridge crossings over watercourses on the distribution network.
- Removal of metallic mains from the distribution network and replacement with polyethylene mains.
- Upgrading works to bring distribution installations sites into compliance with the ATEX Directive.

Illustrated below are some 2015 high volume programmes; the percentage of completion represents the percentage scope completed for the project versus the target for PC3.



9.3 Reinforcement

The reinforcement works completed in 2015 are listed below:

- Glasanaon Road
- Zion Road
- Ninth Lock Road
- Wolfe Tone Street, Kilkenny Advance Works
- St. Stephens Green
- Phoenix Park Phase 1

Design work has commenced on the following projects which are scheduled for construction in 2016:

- Barrow Street
- Kincora Avenue
- Ormond Road
- Willie Nolan Road
- Phoenix Park Phase 2
- Wolfe Tone Street, Kilkenny
- Shangan Gardens, Ballymun
- Dublin Road, Maynooth
- Green Road, Blackrock
- Catherine Street, Waterford
- Gracedieu Road / Summerhill, Waterford
- Newbridge
- Dublin Road, Bray
- Bellevue Park
- Meadowbrook Avenue
- Grange Castle Business Park

9.7 New Connections during year (by category)

Over the past decade Gas Networks Ireland has been involved in the economic analysis of connecting new towns where gas is currently not available. The analysis was carried out over three phases, with circa 70 towns being analysed and 21 towns approved for connection. Towns were only connected where the analysis of costs and revenues resulted in the town having a positive net present value[11], on its own or as part of a group. Gas Networks Ireland will continue to periodically review non-gas towns to assess their viability for connection.

The Gas Networks Ireland sales team continues to promote connecting to natural gas in the residential sector to households that are on the network but not connected to natural gas. These are categorised as "mature housing". Many external factors influence this household type in choice of energy, more recently low oil and coal prices have acted as a deterrent in replacing older heating systems. Similarly access to finance, choice of alternative fuels and investing in energy efficiency have been impacting the figures. As house building has started to increase, the opportunity for growing the network in the new housing sector has increased. This has been illustrated with year on year growth in new connections activity, confidence in the economy and an improved property market with the consequential demand for property influencing this growth. The upturn in the economy was first felt in the export and manufacturing sector, this increased economic activity has led to the growth in the I & C sector, which saw a significant jump in 2014 from 2013, however this declined somewhat in 2015 back to 2013 levels. Gas Networks Ireland will be targeting the various sectors with strategic marketing activity.

[11] Net present value analysis relates current investment to future returns taking inflation and other factors into account.

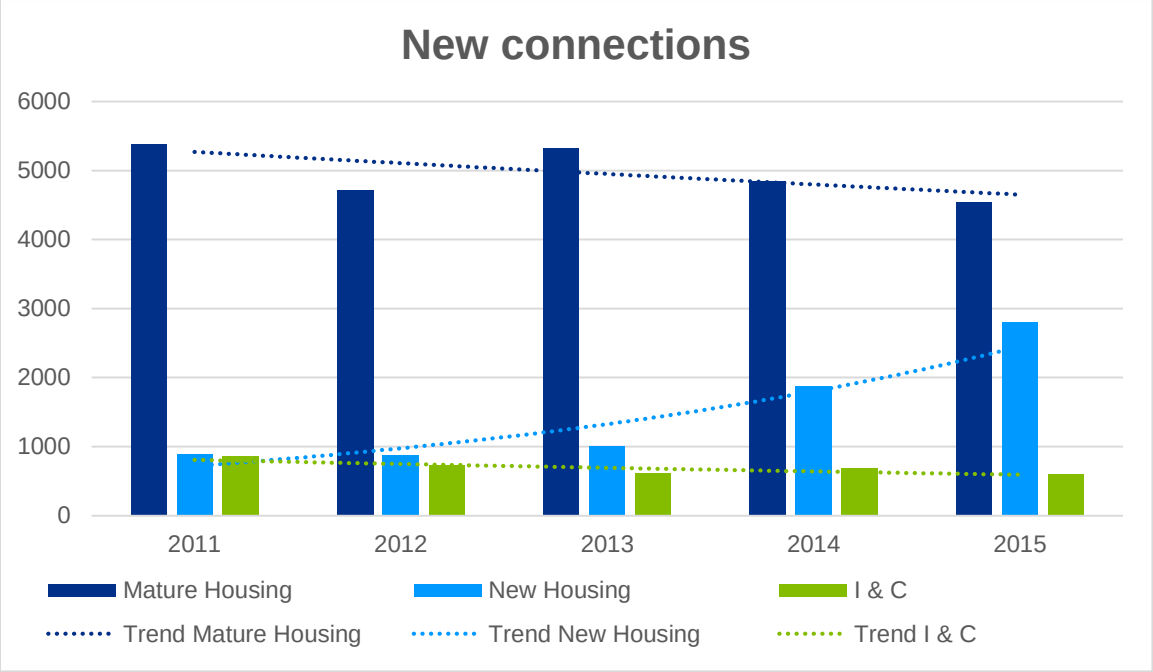


Fig 9.4: New Connections by category[12]

9.8 Update on new towns receiving gas

Through the Gas Networks Ireland Connections Policy[13], Gas Networks Ireland continually brings the benefits of natural gas to new towns. The Connections Policy is a Gas Networks Ireland policy that is approved by the Commission for Energy Regulation (CER). The Connections Policy was revised in 2015, it encourages the connection of new customers, offers transparency around charges, treats connections consistently and minimises the impact on tariffs. The more customers that are connected to the gas network, the more throughput on the system which in turn reduces the tariffs for all gas customers.

Gas Networks Ireland actively promotes natural gas as a fuel of choice for homes businesses and industry, greater utilisation of the natural gas network and looks for opportunities to expand the network where economically viable. In 2015, Arrabawn Co-op was connected as the anchor load which facilitated the viability of connecting Nenagh town to the natural gas network, with construction on the town phase commencing in October 2015. Water and waste water infrastructure will be delivered as part of the Ervia multi-utility project in Nenagh in 2016; a joint collaboration between Irish Water and Gas Networks Ireland. Developing water and gas infrastructures as one project will reduce costs and will also minimise disruption, avoiding the need for a second major construction project in the town. On completion, Nenagh will have a future proofed infrastructure that will benefit the town, its people and its businesses for many decades to come.

The first phase to extend the network from Great Island, Co. Wexford commenced in July 2015. The 40km feeder main will bring natural gas to Wexford town in 2016. Towns connected to the gas network have a significant competitive advantage compared to those that are not; there are economic possibilities, efficiencies and lower emissions that are associated with gas.

[12] There is often a time lag from when a new connection order is received to when it is installed. To ensure that the numbers reported are for connections only rather than a mix of orders and connections there has been an adjustment in how new connections are reported in 2015. This is to ensure consistency across the business units that record connections. Note: there is a variation in reported figures in past performance reports.

[13] Connections Policy

Natural gas helps attract Foreign Direct Investment (FDI) to cities and towns as it is appealing to multi-nationals in terms of its low energy costs as well as being a low carbon fuel. FDI brings direct employment and injects investment in the local economy by utilising local suppliers. Lower energy costs for residences provides more disposable income to spend in the local economy benefiting the retail and service sectors.

The clear benefits of gas for the customer are that it is cheaper, cleaner, and more reliable than other fossil fuels and it is a versatile energy source that can play a significant role in decarbonising the nation's energy consumption. Natural gas already contributes to competitiveness being at a lower cost than oil for domestic consumers, it produces approximately 22% less CO_2 than oil and 40% less than coal[14]. Natural gas provides energy security for Ireland through existing infrastructure, indigenous sources at Corrib which will meet over 50% of RoI total gas requirement for a period of time, and interconnections to the UK market which has diverse gas sources, thus ensuring a robust supply of gas and liquid pricing.

10 Distribution Gas Safety

10.1 Overview of Gas Safety

Safety performance is a core value and top priority for Gas Networks Ireland. It underpins the company brand and its reputation of being a trusted and responsible gas infrastructure company. The network is constructed, operated and maintained to the highest international safety standards, in line with the CER policies. The primary function of the network is to transport gas from entry to exit, on behalf of our customers, while ensuring the network is operated safely and efficiently. This is achieved by the use of sophisticated information systems and grid controllers monitoring the system 24/7. The systems ensure that pressure is maintained within the system, alarms are responded to and escalated in a timely manner, the quality of the gas meets regulated requirements and that processes and procedures are in place to manage a natural gas emergency.

Compliance with national safety legislation including implementation of "A Safety Regulatory Framework for Natural Gas" is core to the operation of the business. The Gas Networks Ireland Distribution Safety Case was accepted by the CER on the 1st of August 2015 and it demonstrates the Gas Networks Ireland arrangement for managing the distribution network. This is delivered through adherence to well established Irish and International codes and standards, reflected through internal processes and procedures. For example:

- Gas Networks Ireland's management systems are accredited as follows:
  - OHSAS 18001 for safety management;
  - ISO 14001 for environmental management;
  - ISO 9001 for quality management;
  - ISO 55001 for asset management;
  - ISO 50001 for energy management.

  The safety and asset management systems received their accreditation in 2015
- Gas Networks Ireland has an excellent record in meeting all its safety statutory and regulatory obligations. Its average response time to 19,449 gas public reported escapes (PREs) in 2015 was 28 minutes and well within its target of 1 hour.
- Gas Networks Ireland is committed to ensuring that all gas technical and operational personnel have the necessary levels of experience, knowledge and skills appropriate to their range of duties.

[14] The Irish Academy of Engineering Policy Advisory The Future of Oil and Gas, published February 2013

- Gas Networks Ireland run numerous public safety promotion campaigns including advice on what to do if someone smell's gas and carbon monoxide awareness. The carbon monoxide awareness campaign won a number of national and advertising awards in 2015.

10.2 High level safety objectives

The key safety regulatory objectives are outlined below:

1. **Minimising the Risk of Loss of Containment**
   Gas undertakings are required to demonstrate that they have suitable management systems and procedures in place for managing the risks that lead to, and arise from, loss of gas containment events.

2. **Maintaining Safe System Operating Pressure**
   Gas undertakings are required to demonstrate that they have suitable management systems in place for managing the risks that can result in dangerously high or low gas operating pressure in the pipeline system(s).

3. **Minimising the Risk of Injecting Gas of Non-Conforming Quality**
   Gas emergency incidents can arise due to gas of inappropriate quality being injected into the system and, as such, gas undertakings are required to demonstrate that they have suitable management systems in place for gas quality monitoring and managing the risks associated with the quality of gas that is injected into the system.

4. **Providing an Efficient and Coordinated Response to Gas Emergencies**
   Gas emergency events can and do occur for a variety of reasons including the actions of third parties. For example, Gas Networks Ireland is required to demonstrate that it has suitable arrangements in place for: (i) managing the response to 'localised' gas emergencies; and (ii) undertaking the role of National Gas Emergency Manager (NGEM) during 'network' gas emergencies. Additionally, all natural gas undertakings are required to demonstrate that they have suitable arrangements in place for responding to the requirements of the NGEM in the event of large-scale 'network' gas emergencies being declared by the NGEM.

5. **Minimising the Safety Risks Associated with the Utilisation of Gas**
   The Framework provides for a comprehensive regime relating to the regulation of gas installers. The key aim of this regime is that all categories of 'gas works' designated by the CER are only undertaken by competent gas installers who are registered, and subject to ongoing regulation and inspection, by the Gas Safety Supervisory Body appointed by the CER.

6. **Promoting Public Awareness of Gas Safety**
   The Framework places duties and obligations on both individual gas undertakings and the industry generally for the promotion of gas safety awareness. This involves a combination of both individual and co-ordinated safety promotional activities by undertakings.

Gas Networks Ireland submits quarterly reports to the CER under the natural gas safety regulatory framework. The report includes measures and statistics that have been under continuous monitoring and improvement during the reported period of 2015.

10.3 High Level Distribution Safety Statistics

Ref	Subject	High Level KPI					
			2011	2012	2013	2014	2015
1A	Public Reported Escapes[15]	Number of External Leaks Detected	3091	2605	2797	3538	3811
		Number of Internal Leaks Detected	4693	4660	4806	4480	5007
1C	Third Party Damage	No. of Main Damages	89	48	59	68	84
		No. of Service Damages	482	404	408	457	395
1D	Gas in Buildings	Number of 'Gas in Buildings' events (i.e. all gas ingress from external infrastructure)	2	2	1	3	0
	Evacuations	No. of Gas Networks Ireland initiated evacuations	2	0	1	5	2
2B	Gas Outages	> 15 Customer affected	1	1	1	0	1
		> 100 Customer affected	0	1	1	0	2
4A	Gas Supply Emergencies	Local Gas Supply Emergencies 1,000 – 9,999 customers affected	0	0	0	0	0
		NGEM Emergencies - >10,000 customers affected	0	0	0	0	0
4B	Public Reported Escapes	% attended within one hour	99.86	99.90	99.90	99.88	99.90
5A	Incidents (Occurring on Gas Network)	Reportable under Gas Legislation	0	1	1	0	0
	Incidents (Occurring on Gas Network)	Reportable under CER Guidelines	3	1	2	3	6
5B	Incidents (Occurring on Customer installations)	Reportable under Gas Legislation	1	0	2	2	0

[15] In 2015 Gas Networks Ireland responded to 19,449 PREs. In many cases there is no trace of gas. The figures illustrated in the table are the actual number of leaks detected.

Ref	Subject	High Level KPI					
			2011	2012	2013	2014	2015
	Incidents (Occurring on Customer installations)	Reportable under CER Guidelines	0	1	3	6	7
5C	Non Gas related incidents	Number of Non Gas related incidents attended by Gas Networks Ireland	2	1	0	2	3
6A	Emergency Reports	Total no. of calls received via the 24-hour emergency telephone number (1800 20 50 50)	33206	29504	30672	30519	19198
6B	Third Party Damage	Total enquiries to 1800 427 747 (inward communication)	1511	3442	3437	2706	2106
		Total enquiries to distributionDBYD@bge.ie/post/fax/ calls (inward communication)	4876	4533	4631	4700	5029
		Total inward enquiries	6387	7975	8068	7406	7135
6C	Carbon Monoxide Helpline	No. of CO-related calls received via the 'Carbon Monoxide Helpline (1800 79 79 79)	2298	1845	1792	1718	1294

Table 10.1: High level gas safety statistics

10.4 Public Reported Escapes

There were 19,449 Public Reported Escapes (PREs) related to leaks on the Gas Networks Ireland distribution network in 2015. This is consistent with the 19,031 reported in 2014. In approximately 55% of these cases, no trace of gas was found. In the vast majority of cases where gas was detected, the leaks were minor in nature and were repaired by Gas Networks Ireland technicians using standard reactive maintenance and repair methods.

10.5 Distribution safety performance

There was a consistently high safety distribution performance over the year 2015, a brief summary is outlined below.

- 0 gas in building events.
- 3 unplanned outages in 2015
- 0 non-compliant gas quality events reported
- 0 gas supply emergencies

10.6 Promoting Public Awareness of Gas Safety

The total number of calls received via the 24-hour emergency telephone number (1800 20 50 50) in 2015 was 19,198 which was a decrease on the 2014 figure of 30,519. This was due to new scripting in the call receipt process which helped to divert non-emergency calls to other locations. The number of incoming enquiries received for "Dial-Before-You-Dig" enquiry phone line has decreased from 2,706 in 2014 to 2,106 in 2015 as enquiries increasingly arrive by email.

Gas Networks Ireland launched a new carbon monoxide campaign in the latter quarter of 2014, this continued in to 2015. Other initiatives included Carbon Monoxide awareness week in September 2015.

10.7 Addressing Gas Meter Tampering

Established in 2013/14, Gas Networks Ireland's Revenue Protection Unit is tasked with the detection and prevention of gas theft and unauthorised interference with gas metering equipment and pipework. The Revenue Protection Unit also raises awareness of the dangers of gas meter tampering and the associated risk to life through targeted media campaigns, including radio, print media, bill inserts, and door drops.

The Revenue Protection Unit investigated 941 suspected cases of meter tampering in 2015, of which 618 were confirmed as tampered. In each of these cases, the meters were exchanged and made safe.

In the vast majority of cases of confirmed meter tampering, the Revenue Protection Unit seeks cost recovery from the customer in respect of the damaged meter. In a select number of cases (approximately 12 per year is typical), Gas Networks Ireland prosecutes individuals who have tampered with their gas meters in the District Courts under the Energy (Miscellaneous Provisions) Act 1995. Successful prosecutions are publicised to highlight the dangers of gas meter tampering and the potential consequences for the individual i.e. a criminal conviction. A small number of criminal convictions of this sort is intended to act as a deterrent to others who may be considering tampering with their gas meter.

11 Conclusion

The year 2015, marked a year of changes for Gas Networks Ireland, among these was the transfer of the Gaslink system operator licences and all rights and responsibilities. Gas Networks Ireland continued to deliver on key asset programmes and essential services to shippers and customers. The safety, integrity and performance of the network remained the focus of Gas Networks Ireland in 2015. Gas Networks Ireland has been positive in meeting targets across all measures, remaining committed to delivering to the highest standards ensuring that gas is used to power homes, businesses and essential services 365 days a year regardless of the weather and demand challenges that are placed on the system.

12 Appendices

Glossary of Terms

AGI	Above Ground Installation
ALARP	As Low as Reasonably Practical
CER	Commission for Energy Regulation
CES	Customer Effort Score
CO	Carbon Monoxide
CSO	Central Statistics Office
DM	Daily Metered
DSO	Distribution System Operator
Dx	Distribution
FAR	Forecasting, Allocation and Reconciliation
I & C	Industrial & Commercial
IC	Interconnector
Km	Kilometre
KPI	Key Performance indicator
KWh	Kilowatt hour
GIS	Geographical Information System
GMARG	Gas Market Arrangements Retail Group
GTMS	Gas Transportation Management System
GWh	Gigawatt hour
LEL	Lower Explosive Limit
MWh	Megawatt hour
MOP	Maximum Operating Pressure
N/A	Not Applicable
NDM	Non-Daily Metered
NGEM	Natural Gas Emergency Manager
NGEP	Natural Gas Emergency Plan
No.	Number
OGP	Office of Government Procurement
PPL	Planned Performance Level
PREs	Public Reported Escapes
RES	Residential
RGI	Registered Gas Installer
RoI	Republic of Ireland
RuG	Reportable under Guideline
SCADA	Supervisory Control and Data Acquisition
SEAI	Sustainable Energy Authority of Ireland

TPD	Third Party Damage
TSO	Transmission System Operator
UAG	Unaccounted for Gas
UKOPA	United Kingdom Onshore Pipeline-operators Association

13 Tables used for Chart Graphics

Transmission pipeline length (Km)

Transmission pipeline length (Km)					
	2011	2012	2013	2014	2015
Length of Onshore Pipeline	2004	2005	2055	2000	2021
Decommissioned	25	25	25	30	32
Length of Offshore Pipeline	411	412	412	412	412
Decommissioned	0	0	0	0	0
Total Length of Pipeline	2415	2417	2467	2412	2433
Total Decommissioned	25	25	25	30	32

Table: 3.1 Transmission pipeline length (Km)

Transmission connections

Category	31/12/11	31/12/12	31/12/13	31/12/14	31/12/15
Transmission LDM	33	31	32	34	35
Transmission DM	18	19	17	17	18

Table 3.2: Transmission connections

System throughput

System throughput	2011	2012	2013	2014	2015
Total Gas Transported (GWh)	54,762	53,541	51,922	50,163	50,192
Daily Average Transported (GWh)	150	146	144	137	138
Peak Day Transported (GWh)	230	217	221	189	204

Table 4.1 System throughput

Demand change

Demand change					
	2011	2012	2013	2014	2015
Demand (GWh)	54,007	52,721	50,981	49,970	50,069
Change (GWh)	-7,293	-1,286	-1,740	-1,011	99
Change (%)	-11.9	-2.38	-3.3	-1.98	.20

Table 4.2: Demand change

System delivery

Delivery	KPI For nominated v. target	Actual performance				
		2011	2012	2013	2014	2015
Moffat delivery	99%	100%	99.7%	100%	100%	100%
Inch delivery	99%	96%	96.7%	100%	100%	100%
Bellanboy	99%	n/a	n/a	n/a	n/a	100%

Table: 4.3 System delivery

Fuel usage

Fuel usage	2011	2012	2013	2014	2015
	874GWh	852GWh	829 GWh	818 GWh	648 GWh

Table.4.4 Fuel usage

Meter read verification

No. of Adjustments						
	KPI	2011 Actual	2012 Actual	2013 Actual	2014 Actual	2015 Actual
Metering Data Validation	<2% of sites	0.9%	0.9%	1.1%	2.0%	3.1%[16]

Table 4.5: Meter read verification

Unaccounted for Gas (UAG)

UAG	**Target %**	**2011**	**2012**	**2013**	**2014**	**2015**
Throughput %	< 1	- 0.153	+0.020	+0.123	+0.009	+0.229
Energy (GWh)	< 1	- 83.8	+12.4	+82.3	+6.1	+153.2

Table 4.6: Unaccounted for gas

[16] Putting a KPI on metering adjustments is not effective. Adjustments are required to ensure accurate reading when a meter is out of tolerance, configured incorrectly or replaced.

Shrinkage

Shrinkage	2011	2012	2013	2014	2015
Shrinkage as a % of throughput	1.30	1.58	1.2	1.3	1.2

Table 4.7: Shrinkage

Compressor stations carbon emissions

Compression Site	2011 (tonnes)	2012 (tonnes)	2013 (tonnes)	2014 (tonnes)	2015 (tonnes)
Midleton	8,528	9,707	8,116	6,536	9,204
Beattock	41,002	44,012	43,186	40,257	38,269
Brighouse	62,619	58,896	57,302	60,783	57,740

Table 4.9 Compressor stations carbon emissions

Demand change for the year (KWh)

Compression site	2011 (GWh)	2012 (GWh)	2013 (GWh)	2014 (GWh)	2015 (GWh)
IC Inventory Space Utilised[17]	261	106	91 injection 91 withdrawal	9 injection 9 withdrawal	No longer offered as a product
Inch Export to Storage[18]	1,576	1,670	2,122	2,179	1,804

Table 4.10: Demand change for the year (KWh)

[17] "IC Inventory Space" related to the IC interconnector with GB
[18] "Inch" relates to gas that is stored in the depleted Kinsale Gas Field.

Exit capacity bookings

Exit Capacity bookings (kWh)	31/12/11	31/12/12	31/12/13	31/12/14	31/12/15
Power	116,104,901	107,200,391	92,616,149	95,862,000	101,872,899
DM I & C	15,900,008	11,485,874	17,441,235	37,692,205	40,652,518
NDM	100,011,382	99,602,449	98,419,126	97,127,877	97,543,678
Shrinkage	4,982,750	5,050,172	5,226,501	5,004,800	4,969,000
Total	236,999,040	223,338,886	207,325,745	235,730,081	245,038,095
Distribution SPC (kWh)	31/12/11	31/12/12	31/12/13	31/12/14	31/12/15
DM I & C	16,977,979	17,209,269	17,524,068	17,838,242	18,249,319
Residential	71,967,306	71,245,185	70,036,711	68,891,063	67,646,657
NDM I& C	27,941,225	28,389,133	29,309,426	28,903,865	29,811,248
Total	116,886,509	116,843,587	115,870,205	115,633,170	115,707,224

Table 4.11: Exit capacity bookings

Note: in recent years the annualised bookings (which includes short-term) are reported on.

Gas Point activity by category

Category	Type	2011	2012	2013	2014	2015
Gas points registered	LDM	46	42	45	48	50
	DM	215	220	217	213	215
	NDM I & C	25,468	26,014	26,200	26,737	25,798
	NDM Domestic	630,866	635,614	640,441	646,162	647,795
	Total	**656,595**	**661,890**	**666,903**	**673,160**	**673,858**
Total gas points registered during the year	LDM	5	0	1	1	0
	DM	5	7	3	7	8
	NDM I & C	967	746	611	696	665
	NDM Domestic	6,919	5,779	6,392	6,797	7,719
	Total	**7,896**	**6,532**	**7,007**	**7,501**	**8,392**
Gas points deregistered[19]	LDM	-	-	-	-	-
	DM	-	-	-	-	-
	NDM I & C	11	18	23	33	1,404
	NDM Domestic	74	123	153	65	5,110
	Total	**85**	**141**	**176**	**98**	**6,514**
Tariff exempt NDM supply points @ 31st December[20]	LDM	-	-	-	-	-
	DM	-	-	-	-	-
	NDM I & C	1,003	1,334	1,518	1,566	297
	NDM Domestic	3,858	5,085	6,113	6,511	3,076
	Total	**4,861**	**6,419**	**7,631**	**8,077**	**3,373**
Total tariff exempt NDM supply points during year	LDM	-	-	-	-	-
	DM	-	-	-	-	-
	NDM I & C	700	666	496	394	373
	NDM Domestic	2,899	3,961	3,565	3,434	3,803
	Total	**3,599**	**4,627**	**4,061**	**3,828**	**4,176**
Change of shippers Jan-Dec	LDM	7	6	6	3	7
	DM	52	42	82	110	129
	NDM I & C	4,283	3,819	4,698	3,513	5,456
	NDM Domestic	108,966	106,712	112,216	106,124	101,270
	Total	**113,308**	**110,579**	**117,002**	**109,750**	**106,862**
Historical consumption requests Jan-Dec[21]	LDM	8	11	7	12	11
	DM	107	73	114	60	112
	NDM I & C	2,322	4,364	2,361	1,662	9,311
	NDM Domestic	-	-	-	-	-
	Total	**2,437**	**4,448**	**2,482**	**1,734**	**9,434**

Table 4.12: Gas Point activity by category

[19] Data cleansing exercise resulted in de-registration of a large number of GPRNs
[20] Decrease in tariff exempt GPRN's following data cleanse
[21] Increase in historic consumption reports due to bulk release requests from CSO, SEAI & OGP

Achievement of capital programme

Reinforcement	Design	Construction ongoing	Construction Complete	Commissioned and in operation
AGI Capacity Upgrades				1
AGI Capacity Upgrades	1			
Cluden to Brighouse Bay Pipeline	•			
Refurbishment	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
Ballybough bypass	•			
Limerick Optimisation			•	
AGI boiler replacement	4			4
AGI water bath replacement	3			1
AGI site instrumentation	21			10
AtEx Compliance	22		13	
Noise Attenuation	3			
Pipe Support Remediation	20	5		
Interconnectors	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
Brighouse bay and Beattock pipeworks modifications			•	
Brighouse Bay turbine air intakes	•			
Brighouse Bay fuel gas skid upgrade		•		
Beattock turbine ancillary equipment upgrade		•		
Beattock actuator upgrades			•	
Beattock solenoid upgrades			•	
Beattock volume control		•		
Beattock odorant plant upgrade		•		
New Supply	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
Newtownfane to Haynestown (Mullagharlin)				•
Drumbannon AGI		•		•

Table 8.1: Achievement of capital programme

Entry capacity bookings

Entry capacity bookings (GWh)	31/12/11	31/12/12	31/12/13	31/12/14	31/12/15
Inch	34.49	34.3	37.65	35.7	31.1
Moffat	197	199.5	173.9	153.1	165.1
Corrib	0	0	0	0	0.1
Total	250.17	231.5	233.8	211.55	196.2

Table 8.1: Entry capacity bookings

Systems availability

Communications & instrumentation	KPI	2011	2012	2013	2014	2015
GTMS System availability	99.8%	99.98%	99.98%	99.98%	99.95%	99.96%

Table 8.2 Systems availability

Shipper operations

Shipper Operations						
Customer Commitment	**KPI**	**2011**	**2012**	**2013**	**2014**	**2015**
Change of Shipper (NDM)	Process Change of Shipper Requests- 100% <=5 business days	100%	100%	100%	100%	100%
Change of Shipper (DM)	Outgoing shipper notified with >=10 business days' notice	100%	100%	100%	100%	100%
Entry Capacity Booking Requests	Process <=20 days – 100%	100%	100%	100%	100%	100%
Exit Capacity Booking Requests	Process <=20 days – 100%	100%	100%	100%	100%	100%

Table 8.3: Shipper operations

Meter reading

Meter reading						
Customer Commitment	**KPI**	**2011**	**2012**	**2013**	**2014**	**2015**
Access Rate	80%	86%	86.2%	86%	84%	83%
Read Rate	Average 3.2 reads per site per calendar year	3.53	3.47	3.42	3.41	3.40

Table 8.4: Meter reading

Trading and settlements

Trading and settlements						
Customer Commitment	**KPI**	**2011**	**2012**	**2013**	**2014**	**2015**
Invoice circulation	By 12th day of month	100%	100%	100%	100%	100%
Provision of shrinkage Pricing mechanism	Prior to October billing	100%	100%	100%	100%	100%

Table 8.5: Trading and settlements

Maintenance days

Maintenance Days	KPI	2011	2012	2013	2014	2015
Maintenance Days Unscheduled maintenance/Interruptions Interruptions due to maintenance	0	0 5	0 5	0 5	0	0

Table 8.7: Maintenance days

Distribution gas flows

Dx* DM I & C		2011	2012	2013	2014	2015	% Change
Annual Total	MWh	2,997,560	3,312,979	3,407,738	3,460,876	3,629,253	4.9%
Annual Daily Average	MWh	8,212	9,052	8,412	9482	9,943	4.9%
Peak Day Flow	MWh	12,149	12,668	12,541	12,785	13,737	7.4%
Dx NDM I & C							
Annual Total	MWh	3,716,728	3,990,528	4,030,462	3,916,686	4,315,443	10.2 %
Annual Daily Average	MWh	10,183	10,903	11,025	10,731	11,823	10.2 %
Peak Day Flow	MWh						
Dx NDM RES							
Annual Total	MWh	7,341,417	7,744,001	7,817,915	6,908,094	7,158,766	3.6%
Annual Daily Average	MWh	20,113	21,158	21,438	18,926	19,613	3.6%
Peak Day Flow	MWh						
Dx NDM Total							
Annual Total	MWh	11,058,146	11,734,529	11,848,376	10,824,780	11,474,209	6.0%
Annual Daily Average	MWh	30,296	32,062	32,464	29,657	31,436	6.0%
Peak Day Flow	MWh	74,481	71,705	75,507	65,821	73,463	11.6 %
Dx Total							
Annual Total	MWh	14,055,705	15,047,508	15,256,114	14,285,656	15,103,462	5.7%
Annual Daily Average	MWh	38,509	41,113	40,875	39,139	41,379	5.7%
Peak Day Flow	MWh	85,525	84,373	87,913	78,393	86,402	10.2 %

Table 9.1: Distribution gas flows

Distribution connections by category

Connections	2011	2012	2013	2014	2015	% Change from 2014
Dx DM I &C	203	207	203	200	212	+6.0%
Dx NDM I &C	23,684	23,967	24,054	24,548	25,111	+2.3%
Dx NDM RES	622,573	626,791	630,921	636,012	642,836	+1.0%
Dx Total	646,460	650,965	655,178	660,760	668,159	+1.1%

Table 9.2 Distribution connections

Distribution system length

Distribution system length					
	2011	2012	2013	2014	2015
Total Length (km)	11,030	11,131	11,218	11,288	11,339

Table 9.3: Distribution Network Lengths - Systems Length at end 2015.

New Connections by category

Meters	2011	2012	2013	2014	2015
Mature Housing	5,378	4,722	5,321	4,841	4544
New Housing[22]	887	874	1,003	1,878	2,804
I & C	867	724	610	681	607

Table 9.4 New Connections by category

14 List of figures

[22] New housing connection records do not currently differentiate between houses and apartments.

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