Gas Networks Ireland

Systems Performance Report 2019

gasnetworks.ie

Contents

01 Executive summary

The Gas Networks Ireland Performance Report has been produced annually since 2008. There are two 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 2019 in relation to all network systems activities.

Natural gas is a clean, secure, flexible, adaptable fuel which can play a key role in the transition of the Irish economy to a low carbon future, capable of meeting Ireland's future energy needs. As the economy continues to grow, connections to the network have increased and gas demand has also increased, rising by 2.0% in 2019 compared to 2018; this can be attributed to economic growth factors and further requirements from the power generation sector during the period.

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 solution and offset the market demand challenges. Decarbonisation of the energy sector will present Gas Networks Ireland with future demand challenges that require planning preparation, and consideration of how the network will be used in the coming decades. Gas Networks Ireland is involved in innovative projects to develop the energy sector, including projects in the areas of Compressed Natural Gas (CNG) and renewable gas.

Gas Networks Ireland measures its performance against a number of key metrics comparing it to the performance in the previous year but also measuring it against KPIs that have been set out and agreed with the Commission for Regulation of Utilities (CRU). In terms of pipeline length and number of customers, the figures for 2019 have remained substantially in line with the figures for 2018 with slight increases in both. The number of Transmission connections for 2019 also remained in line with 2018, showing a reduction of 3 LDM new connections from 34 to 31 and the DM new connections remaining static at 19. The total volume of gas transported through the system in 2019 increased by 2.8% over 2018 with an increase of 2.4% for gas transported for power generation purposes. The volume of Unaccounted for Gas (UAG) on the system declined in 2019, dropping from 0.44% in 2018 to 0.31%.

There are a number of Key Performance Indicators (KPI) that Gas Networks Ireland are required to achieve in the areas of safety, system availability, Meter Data Services and Maintenance Days all being achieved with the exception of interruptions due to maintenance at 5 days against a KPI of 0.

It is Gas Networks Ireland's strategic ambition to develop over 150 CNG stations and 11TWh of renewable gas on the network by 2030. This will assist Ireland to transition to a sustainable low carbon economy. A planning application is being prepared for a Biomethane Central Grid Injection facility (CGI) to be located in Mitchelstown, Co. Cork.

02 Introduction

The Gas Networks Ireland Systems Performance Report has been produced to comply with the licence conditions pertaining to “Overall standards and performance” of the four licences held by Gas Networks Ireland, granted by the Commission for Regulation of Utilities (CRU), formerly the Commission for Energy Regulation.

Gas Networks Ireland is responsible for developing, maintaining and operating the gas transmission and distribution systems. The Gas Networks Ireland system connects the Republic of Ireland (RoI) to Scotland, Northern Ireland (NI) and the Isle of Man (IoM). Gas Networks Ireland does not purchase, trade or sell gas to customers; it transports the gas on behalf of suppliers and shippers who purchase the gas from the wholesale gas market, and in turn use the transportation services of Gas Networks Ireland to deliver gas to almost 705,868 businesses and homes throughout Ireland. The Gas Networks Ireland system includes infrastructure in RoI, regulated by the CRU; NI, regulated by the Utility Regulator (UR); and South West Scotland, regulated by Ofgem.

The natural gas network is differentiated by prevailing pressures:

- High pressure transmission infrastructure, which operates above 16 barg (the total length of transmission pipeline is 2,477 km[1]); and
- Distribution infrastructure, which operates below 16 barg (the total length of distribution pipeline is 12,044 km).

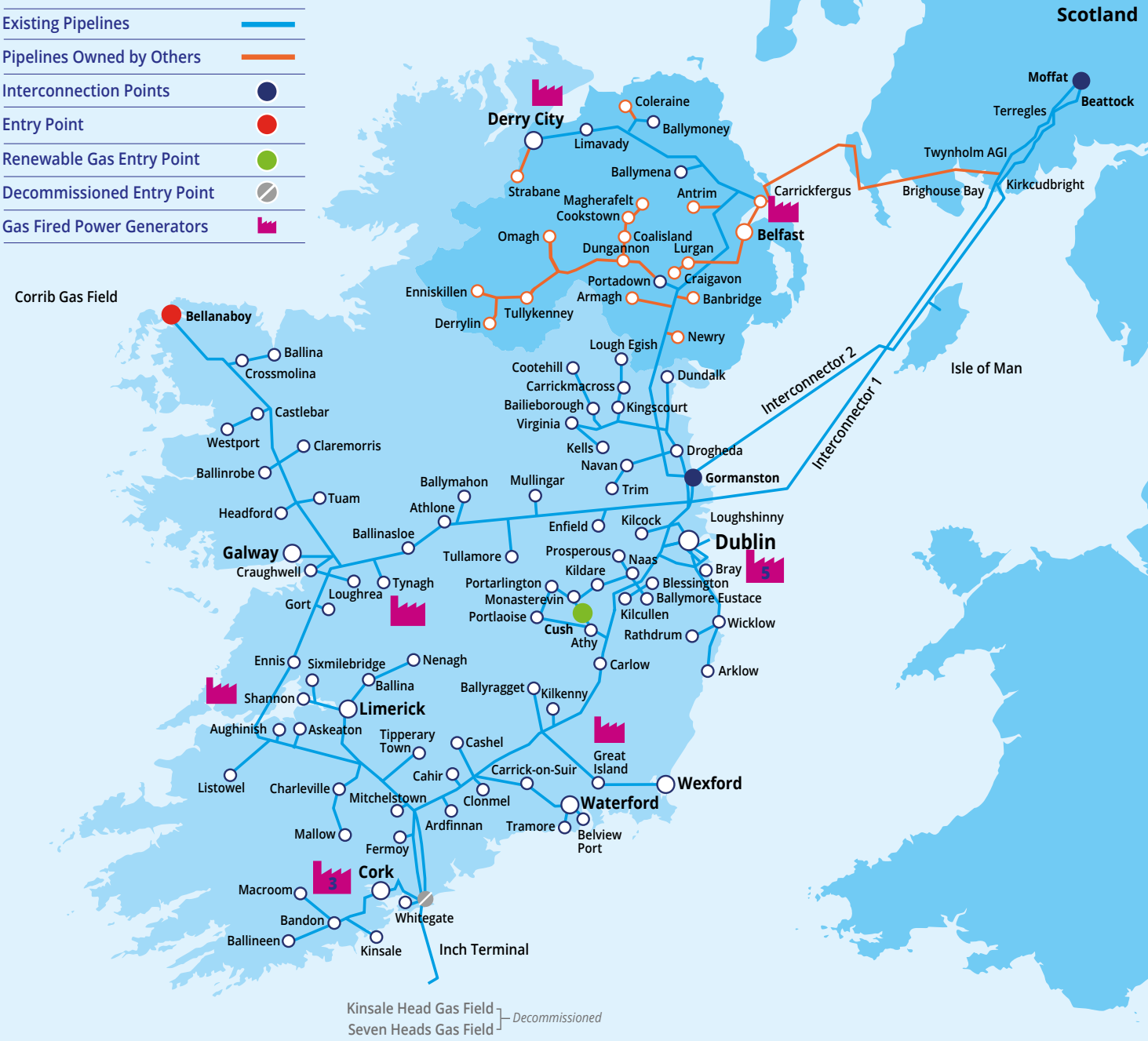
The transmission system is detailed in Figure 2.1.

1 Total length of transmission pipeline is the entire network including pipeline in RoI, NI and on-shore Scotland.

02 **Introduction**

Figure 2.1 Overview of Gas Networks Ireland transmission system

Pipeline map



Natural gas is transported to 705,868 customers through a network of 14,521 km pipelines, 24 hours a day, 365 days a year. 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, which handled 15,822 callouts in 2019.

Through the Gas Networks Ireland Connections Policy, Gas Networks Ireland continually brings the benefits of natural gas to new towns. There were increased sales and marketing efforts in Listowel, Wexford and Nenagh towns during 2019, and significant commercial orders were secured as a result. The Center Parcs Longford development also commenced operations in 2019. The design and build phase commenced in July 2017 to extend the natural gas network from Athlone, a total of circa 26km to the Ballymahon holiday village development. This was a significant project for Gas Networks Ireland and was critical to the success of the Center Parcs development which is now open. Significant efforts were undertaken in pre-selling connections to a large number of both domestic and commercial sites along this feeder main to ensure accessibility to the natural gas network in advance of completion and the network expansion also facilitated the expansion of the natural gas network into the neighbouring town of Ballymahon. The natural gas network now extends to 20 counties in Ireland.

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 CNG and renewable gas.

Throughout this report, data is presented in graphical form. The corresponding figures and statistics are located in the appendices, presented in table format, and may be referred to for interpretation of graphs and factual performance.

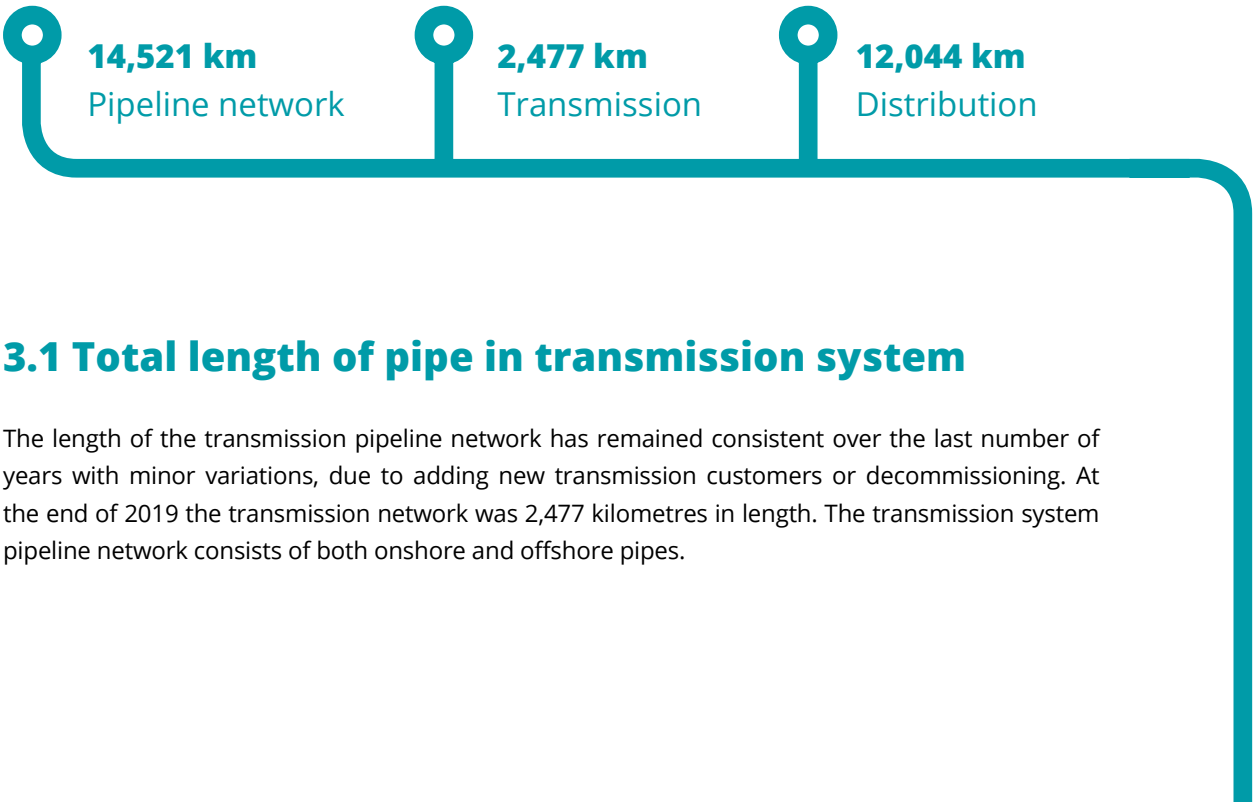
03 Transmission system

This report is produced to comply with condition 17 of the Transmission System Operator Licence and condition 13 of the Transmission System Owner Licence. Gas Network's Ireland primary responsibility is to transport gas from entry to exit points on the network on behalf of customers, while ensuring that the network is operated safely and efficiently.

The natural gas network consists of 14,521km of pipeline, of which 2,477km is high-pressure steel transmission pipelines. The RoI transmission system consists primarily of the high-pressure (70 barg) ring-main linking Dublin, Galway, and Limerick. It also consists of 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 ringmain to the Bellanaboy terminal, Co. Mayo, where gas from the Corrib gas field enters the Irish transmission system. The addition of the Corrib entry point at the end of 2015, brings the total number of entry points on the transmission system to three including Moffat and Inch, see Figure 2.1.

The natural gas network is comprised of high pressure steel transmission pipes and low-pressure polyethylene distribution pipes. The transmission pipes link Ireland's major urban areas and connects Ireland to the UK. Power Stations and some large Industrial customers are also directly connected to the transmission network.

Figure 3.1: Pipeline network

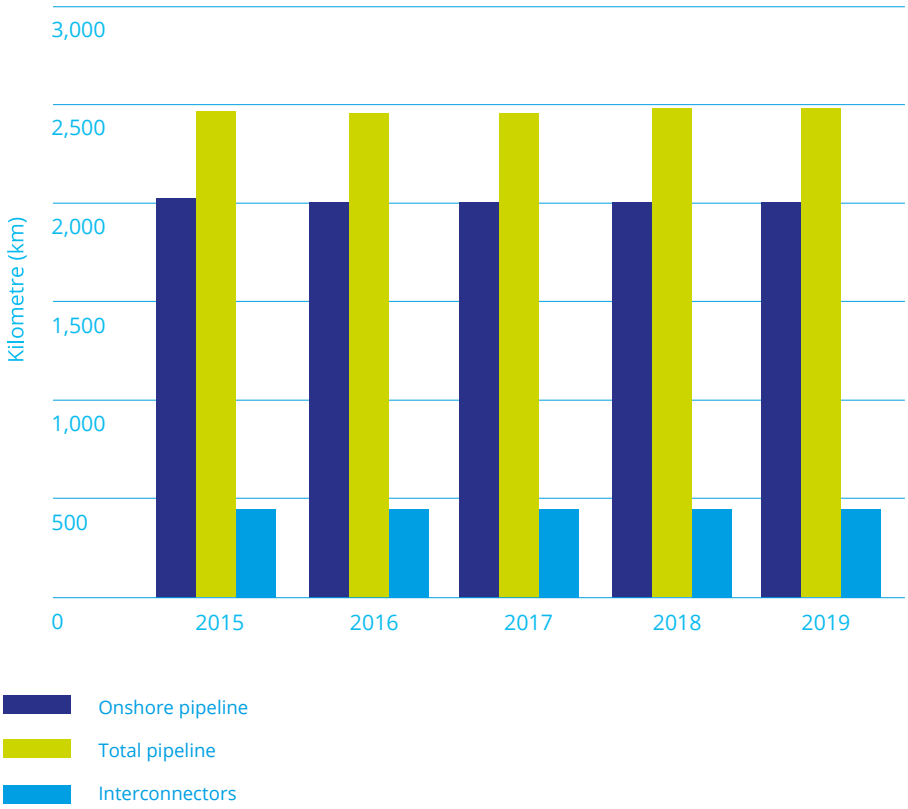


3.1 Total length of pipe in transmission system

The length of the transmission pipeline network has remained consistent over the last number of years with minor variations, due to adding new transmission customers or decommissioning. At the end of 2019 the transmission network was 2,477 kilometres in length. The transmission system pipeline network consists of both onshore and offshore pipes.

03 **Transmission system**

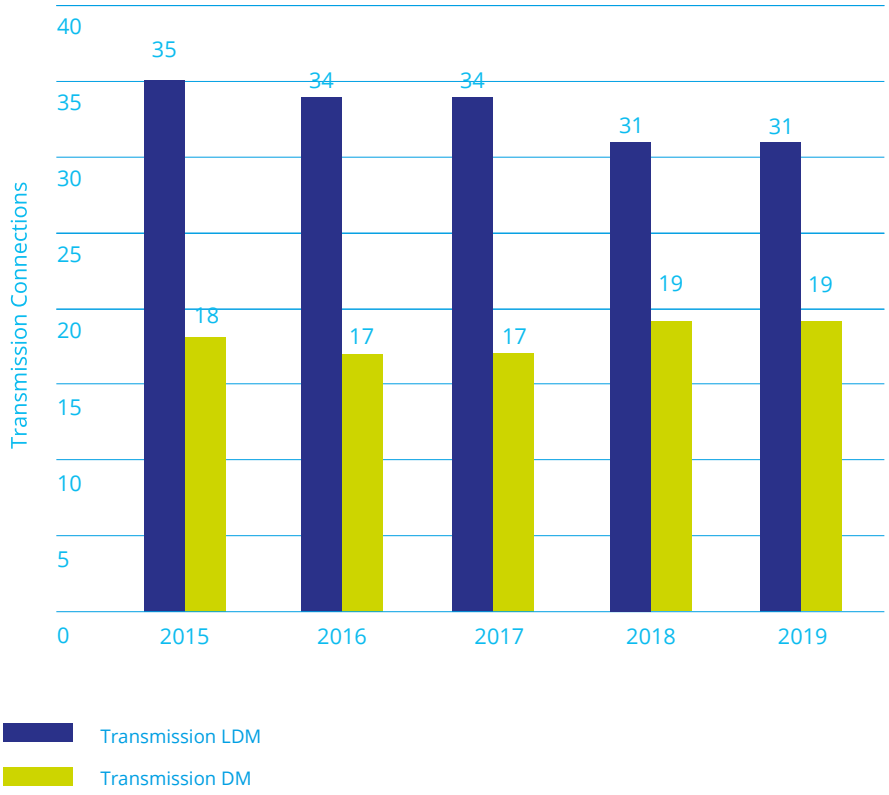
Figure 3.2: Transmission pipeline length



3.2 Total number of connections

The total number of connections to the Gas Networks Ireland transmission network in 2019 was 50; of these 31 were Large Daily Metered (LDM) sites and 19 were Daily Metered (DM) sites, see Figure 3.3.

Figure 3.3: Transmission connections



04 Transmission system data

Managing the flow of gas from the entry points to the end consumer is a sophisticated 24-hour operation. It involves continuous monitoring of gas flows, temperatures and system pressures through a Supervisory Control and Data Acquisition (SCADA) system for both transmission and distribution networks. SCADA uses process data telemetry from all the operational sites and installations to monitor and operate the entire gas network. In addition to the SCADA system, Gas Networks Ireland utilises a number of additional systems to assist with the operation of both the transmission and distribution networks. These include the Geographical Information System (GIS), Maximo work management system, Safe Permit for non- routine operations, work permits and on-line access to Gas Networks Ireland IT infrastructure and systems.

The transmission network is operated by grid control, which is a 24/7 manned control room with a team of 12 Grid Controllers, who rotate different shifts. The grid controllers are responsible for operational and commercial functions. The operational element of the control room is facilitated by SCADA to safely and efficiently operate the network including system flows, temperatures, pressures and alarm management. The commercial aspect of gas transportation is facilitated by the Gas Transportation Management System (GTMS) through which the grid controllers ensure supply demand balance. This is achieved through management of the daily nomination and allocation process, ensuring that the correct volume of gas is transported at all times to meet shipper, customer and system requirements.

4.1 Throughput

System throughput is the total physical volume of natural gas transported through the Irish gas network by Gas Networks Ireland. The total gas transported in the calendar year 2019 was 59,379 GWh, which represents an increase of 2.8% from 57,785 GWh in 2018. This includes 65 GWh of fuel gas transported for NI, which was burned at the Beattock Compressor Station. Gas transported for RoI Power-Generation in 2019 increased by 2.4% in comparison to 2018 figures. A summary of the gas throughput from 2015 to 2019 is illustrated in Table 4.3 and Figure 4.1.

59,379
Total gas transported (GWh)

163
Daily average gas transported (GWh)

216
Peak day gas transported (GWh)

04 **Transmission system data**

Figure 4.1: System throughput

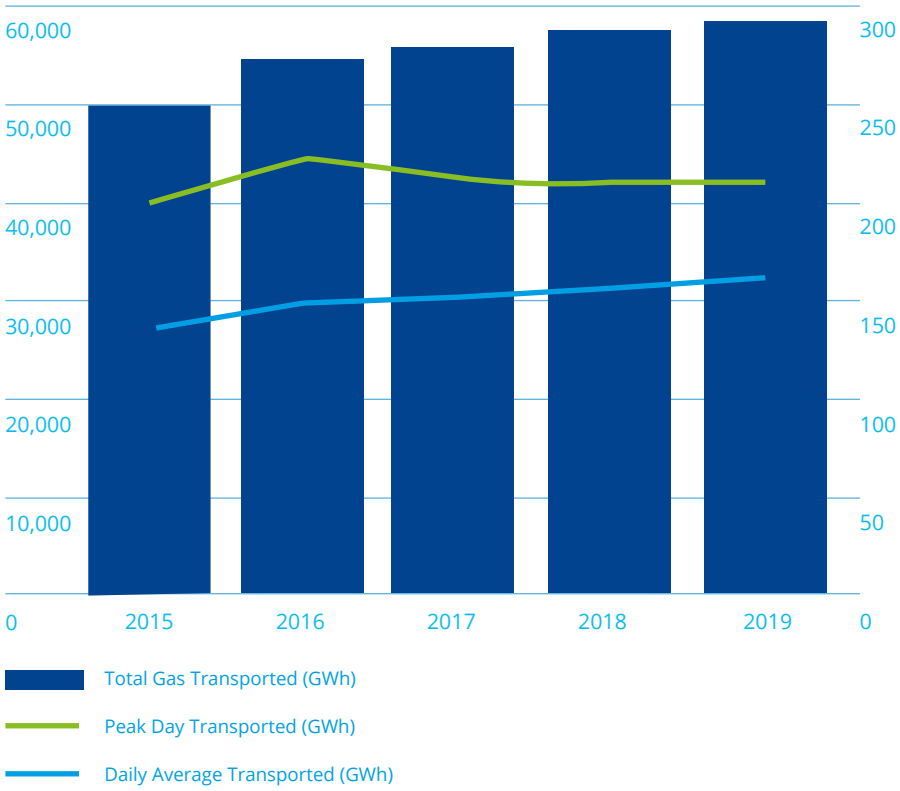
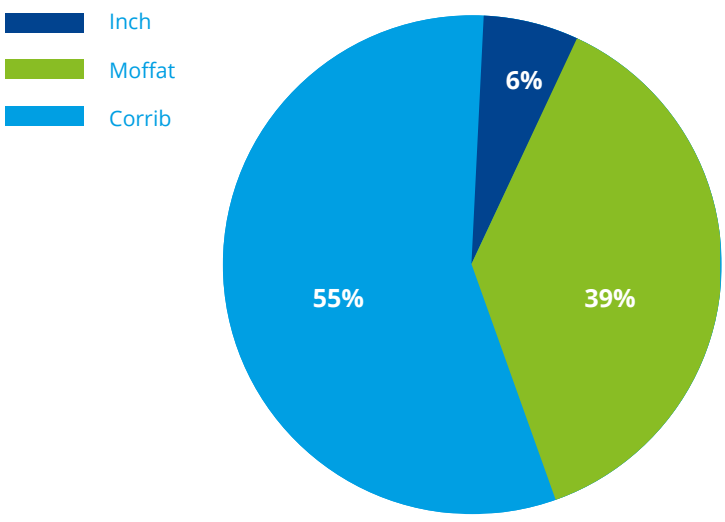


Figure 4.2: System throughput per entry point (Calendar Year 2019)

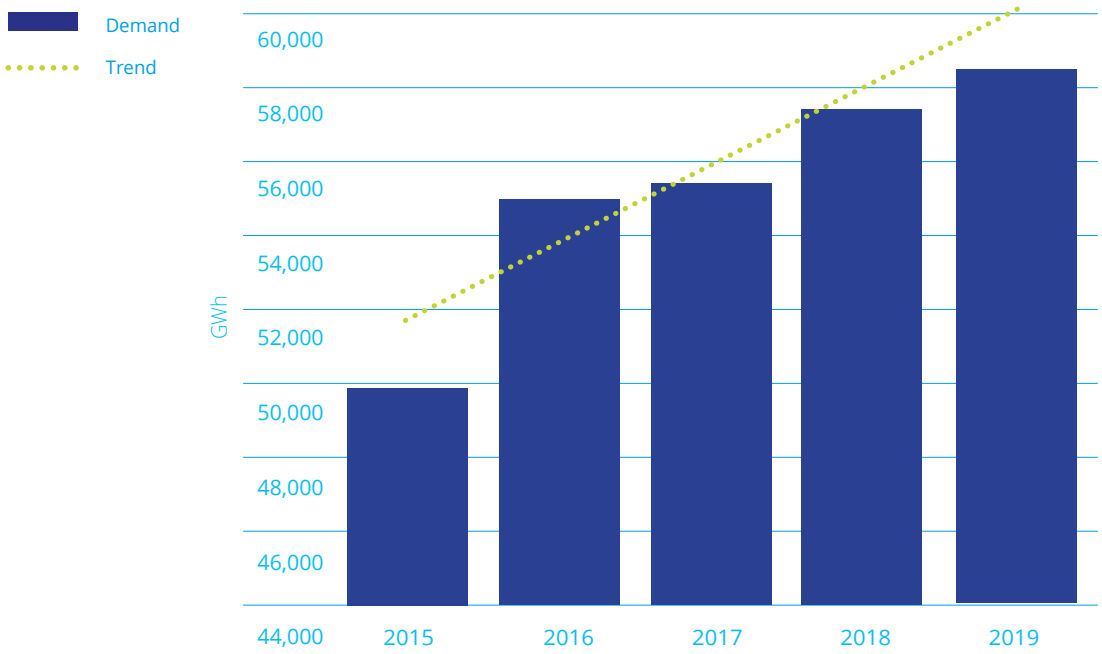


4.2 Demand change

Demand is the total amount of gas physically off-taken from the gas network in RoI each year (excluding Unaccounted for Gas (UAG) and fuel gas). Figure 4.3 reflects the demand for gas in 2019, which has increased by 2% on the 2018 demand. The increase has been experienced across almost all sectors of the gas market, including power generation, LDM and DM:

- **Power Gen** Increase of 2.4% was recorded;
- **LDM & DM** Continued growth in the Industrial and Commercial (I & C) sector with a 2.8% increase in annual demand; and
- **NDM** There was a small decrease in NDM demand (.8%)

Figure 4.3: Demand change



04 Transmission system data

4.3 System efficiency

(a) Delivery

The amendment to the EU Network Code in October 2015 saw the removal of the requirement for shippers to maintain a Zero Imbalance Position (ZIP)[2]. This has resulted in higher variability in entry-exit nominations at the Moffat IP. Large upward nomination movements late in the gas day are now much more frequent strongly correlated with the increasing variability in the running of gas fired power generators in the Single Electricity market (SEM) compressors.

(b) Fuel Usage

Fuel usage of 626 GWh for 2019 increased from 601 GWh in 2018 as per Figure 4.4. This increase is a direct result of reduced Corrib entry gas and increased Moffat entry gas. Delivery of gas through Moffat requires operation of Beattock and Brighouse Bay compressor stations; which, results in very high-pressure gas being received at the two landfall stations in Ireland, located at Loughshinny and Gormanston. Pressure must then be reduced to enter the RoI network. This requires the use of boilers to heat the gas prior to pressure reduction.

(c) Meter Read Verification

Transmission meter read verifications give an indication of the number of transmission connected gas points that require meter reading adjustments as a result of failed meter reading validation[3]. Figure 4.5 shows that 1.67% of all transmission site-metering validation checks carried out in 2019 resulted in adjustments (i.e. approximately 99 transmission site-metering monthly adjustments performed out of 5,940 metering validation checks in 2019). Adjustments are required to ensure accurate reading when a meter is out of tolerance, configured incorrectly or replaced.

Adjustments increased from 0.86% in 2018 to 1.67% in 2019. This has resulted from continued reviews of consumption patterns of all fiscal metering sites; both transmission and distribution. Gas Networks Ireland continues to improve its daily and monthly metering validation checks, which has resulted in an increased number of adjustments in 2019, ensuring more accurate end user allocations.

2 ZIP required that Total Entry Nominations = Total Exit Nominations at all times during a gas day. The requirement has now moved to an end of day requirement.

3 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.

Figure 4.4: Fuel usage

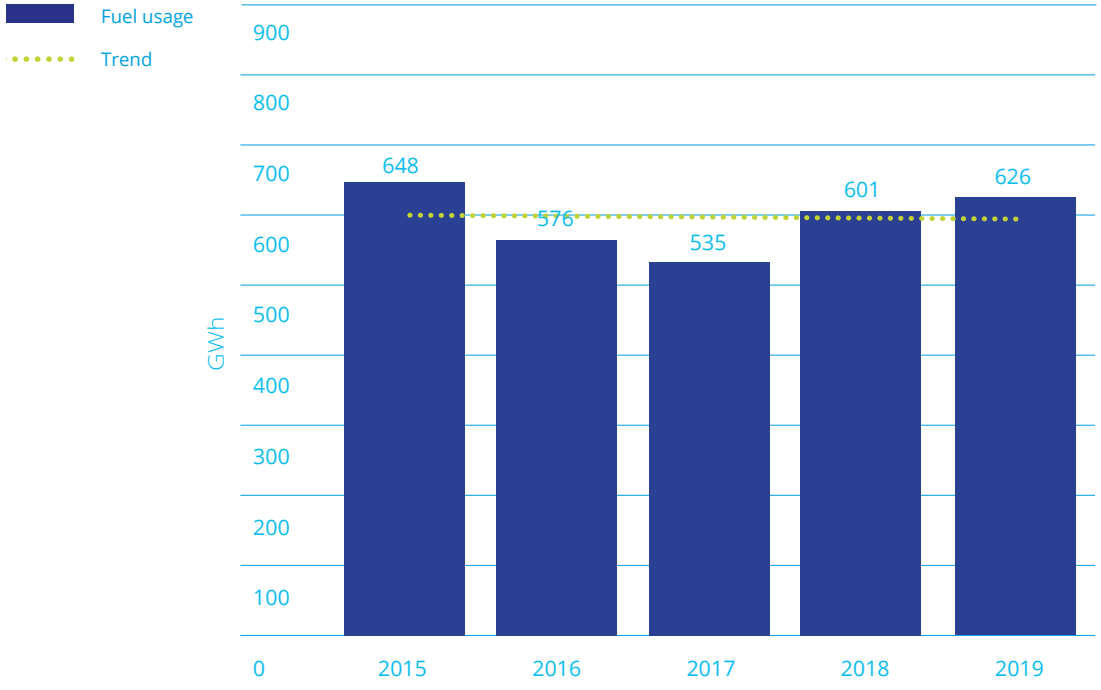
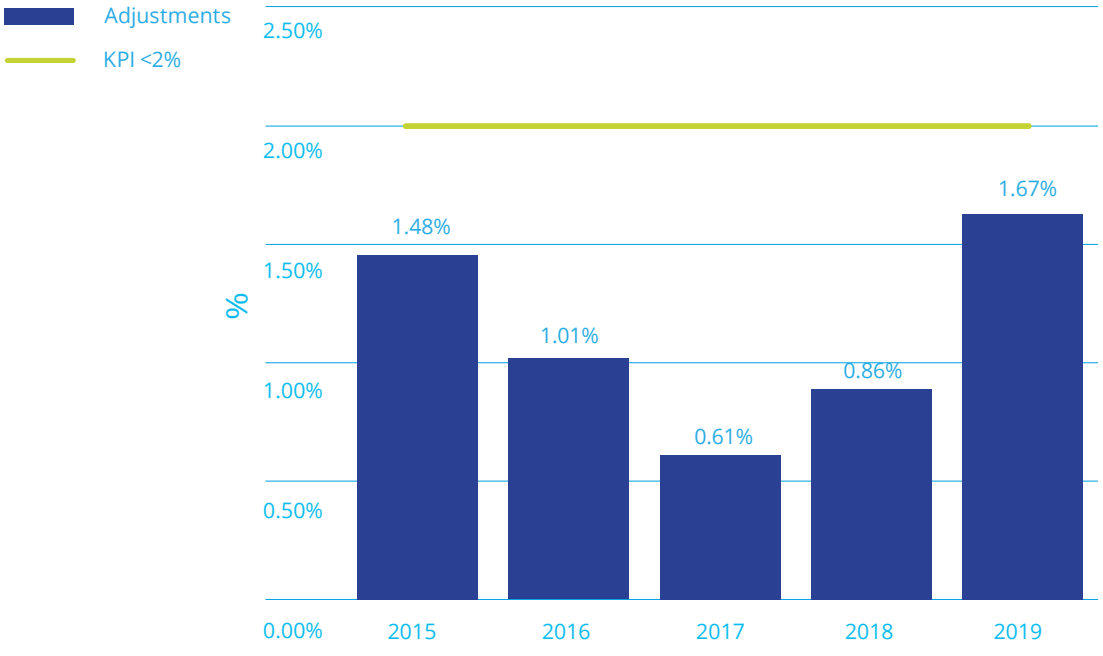


Figure 4.5: Meter read verification



04 Transmission system data

4.4 Transmission unaccounted for gas

Unaccounted for Gas (UAG)[4] means natural gas which is lost or otherwise unaccounted for in the transportation system or any localised part thereof. Figure 4.6 relates to transmission UAG[5] as a percentage of the overall system throughput.

UAG is dependent on a number of factors including the following;

- **Gas Measurement** – The received gas at the three entry points differs in terms of its composition and energy value. This leads to measurement uncertainties in terms of the fixed gas component values on fiscal metering flow computers; and
- **Operations and maintenance** – venting of gas, purging of pipelines, meters, gas chromatographs and gas leakage.

Gas Networks Ireland has maintenance and calibration policies in place for all meters and instrumentation to ensure measurement accuracy 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.

UAG reduced in 2019. Corrib supply continues to decline, dropping in flow by 21% in 2019 compared to 2018. CV values vary based on the source gas. Corrib gas penetrating deep into the network can lead to changes in CV values on the Network that can result in UAG. The primary driver of lower UAG is the Gas Networks Ireland UAG Change Programme which included many workstreams across the organisation.

Gas Networks Ireland continues to actively knowledge share with National Grid in the UK to better understand the drivers with regards to movement in UAG numbers. Gas Networks Ireland is also involved in a major EU benchmarking initiative which covers UAG as well a wide range of other industry metrics. Gas Networks Ireland is always keen to learn from these interactions and has initiated a number of improvements to our processes as a result. This includes improvements to network modelling capabilities, particularly with regard to the modelling of stock gas, to ensure that the variability of CV associated with Corrib Gas is accurately accounted for. Gas Networks Ireland has also reviewed the methodology for purchasing shrinkage gas to ensure that sufficient gas is purchased to cover both UAG and metered fuel gas.

4 Volume as a % of total gas

5 Transmission UAG is calculated as Entry (Stock Gas + Metered Entry) Minus Exit (Metered Exit + Shrinkage + Own Use Gas)

Figure 4.6: Transmission UAG (% throughput)

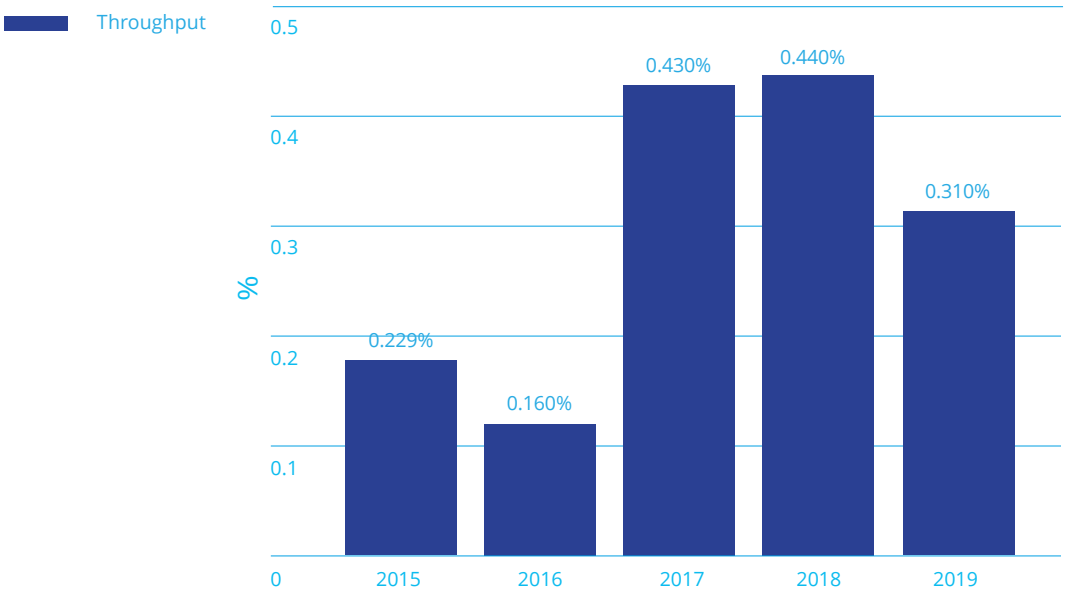
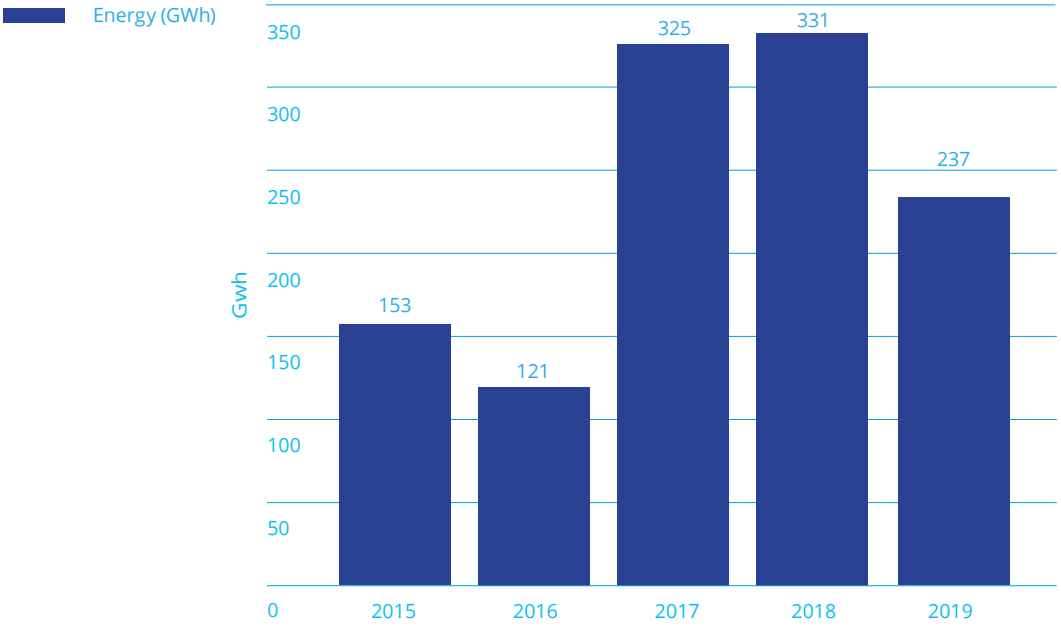


Figure 4.7: Transmission UAG (energy – GWh)

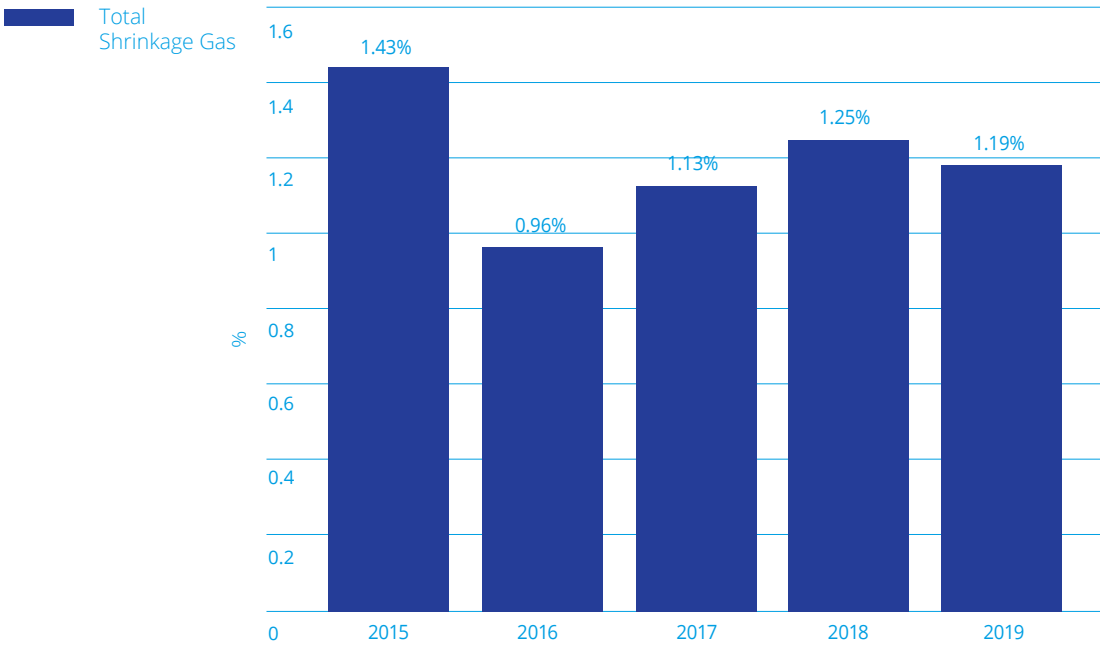


04 **Transmission system data**

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. Figure 4.8 shows Shrinkage Gas attributed to the RoI system as a percentage of throughput of 1.19% in 2019, this is illustrated in Figure 4.8.

Figure 4.8: Shrinkage as % of throughput



The fuel gas component of shrinkage gas continues to increase annually, due to the reduction in flows at the Bellanaboy Entry Point. Fuel gas is used to run the compressor stations and network installations.

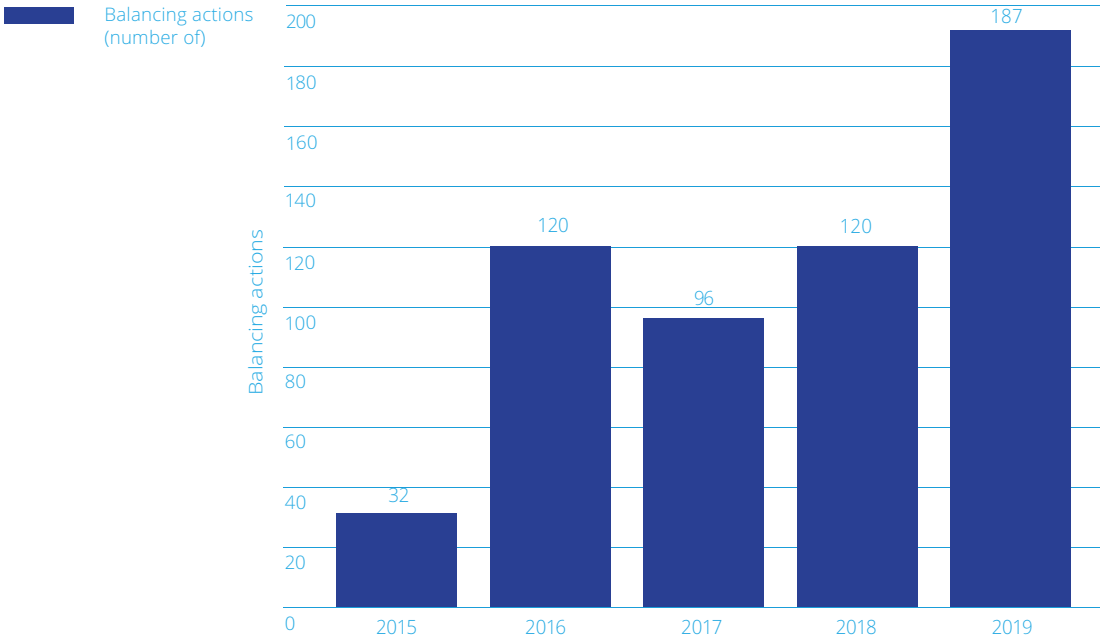
A balancing action means buying or selling gas as required to match the amount of gas entering and leaving the system. Smaller, more frequent balancing actions are now being utilised to foster liquidity at the Irish Balancing Point (IBP). Gas Networks Ireland has been utilizing the IBP for balancing actions since June 2018 in order to comply with European Balancing Network Codes. This has resulted in estimated savings of approximately €1 million to the end of 2019. In addition, shipper behaviour in terms of nomination imbalances has greatly contributed to the significant increase in balancing actions needed to maintain sufficient line-pack[6] for network service and operational safety. Gas Networks Ireland will continue to work within the appropriate industry fora to address this issue.

6 Natural gas occupying all pressurised sections of the pipeline network.

Table 4.1: System balancing actions[7]

Action	2015	2016	2017	2018	2019
System balancing actions (number of)	32	120	96	120	**187**
System balancing volumes (GWh)	195	653	329	429	**458**
System balancing as a % of total volume	0.30%	0.90%	0.40%	0.60%	**0.60%**
ROI Shipper imbalance as % of total flow	0.24%	0.54%	0.65%	0.51%	**0.38%**

Figure 4.9: System balancing actions



4.6 Carbon usage/emissions

Gas Networks Ireland is committed to managing its impact on the environment. Transmission system activities such as the operation of compressors 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[8]. 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[9], including the implementation of an Energy Management System in accordance with the requirements of ISO 50001. The company has also committed to making design decisions which take into account and integrate energy efficiency considerations in the final design which ensures optimal operation throughout the life cycle of the plant, equipment and services of the gas network.

7 Since the 1st of June 2018 Gas Networks Ireland uses the trading platform as its primary source for balancing actions in order to ensure that these necessary balancing actions are cost efficient.

8 Environment and Energy Policies

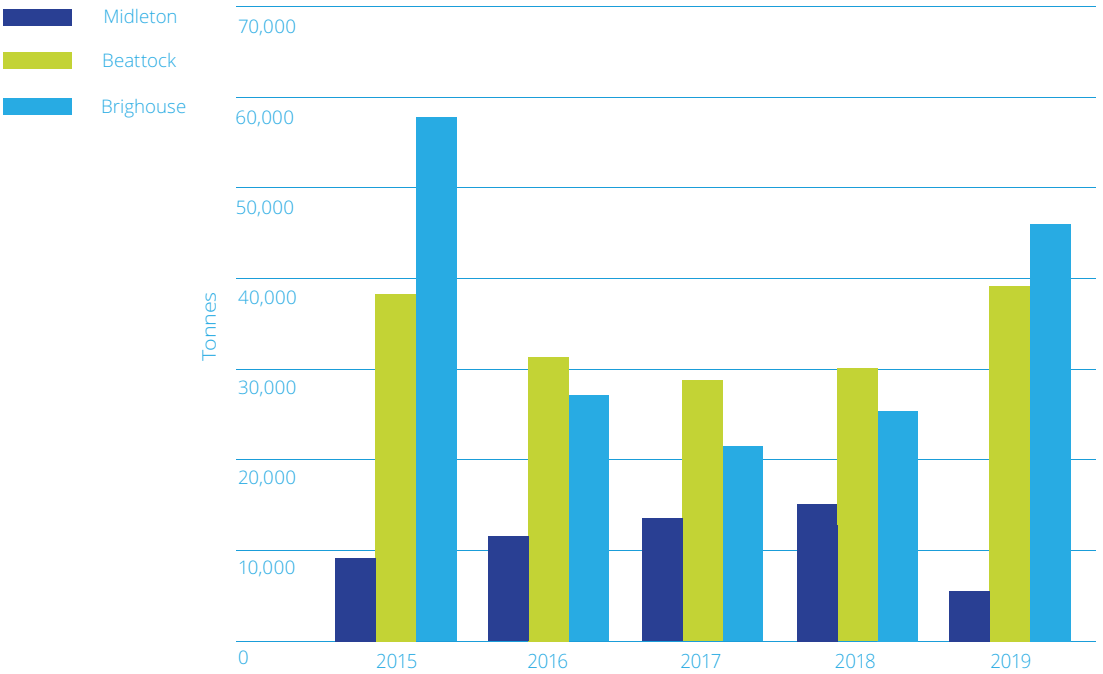
9 In 2018 Gas Networks Ireland published its first Sustainability Report which highlights progress in implementing sustainable development across all aspects of operations.

04 **Transmission system data**

Gas compressors are used by Gas Networks Ireland to move gas through, and around, the transmission system. As a participant in the European Emissions Trading System (ETS) Gas Networks Ireland has an emissions allowance for CO_2 emissions. Gas Networks Ireland is committed to monitoring and reducing emissions from these compressors. Gas Networks Ireland is also required to comply with environmental legislation in respect of the compressors, such as noise monitoring and mitigation. In order to meet legal obligations, it is essential to develop and maintain a robust strategy for operations, maintenance, upgrading and replacement of the compressors. This is being achieved through the Capital Programme; further details of which is provided in section 6. As GNI UK is a fully owned subsidiary of Gas Networks Ireland and forms part of the CRU regulated accounts, all GNI regulated costs are included in the tariff and RAB calculations as it forms an integral part of the transmission network.

Carbon usage is a measurement of the tonnes of carbon emissions produced at each of the compressor stations based on fuel gas consumption. Emissions reduce with lower fuel gas consumption, but increase when subject to high flow variation (e.g. intra-day peaks). This variation arises where the compressors are forced to operate outside their most efficient operating range.

Figure 4.10: Compressor station carbon emissions



4.7 Capacity bookings

Gas Networks Ireland transports natural gas around the country on behalf of licensed natural gas 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 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 December 2019, 266 GWh was the total exit capacity booked for Power, DM[10] I&C, NDM[11] and Shrinkage for the year. This is shown in Table 4.12 and illustrated in Figure 4.11.

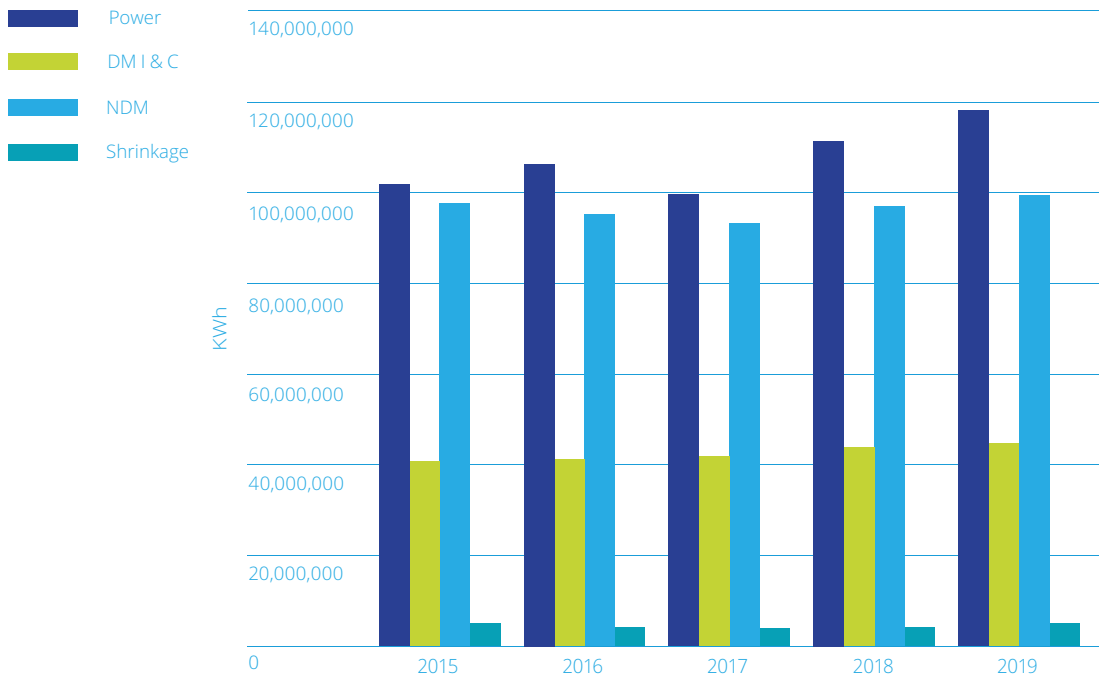
Power - Since 2015, capacity bookings have increased year-on-year (with exception of 2017) mainly due to increased power demand. 2019 was a relatively strong year for power, primarily as a result of significant outages in coal plant.

DM I&C - bookings have continued to increase since 2015 mainly due to increased load from large energy users, New Town anchor load connections and the economic recovery. CNG bookings are also included in this sector.

NDM - bookings have remained relatively stable since 2015 despite strong economic growth, mainly due to increased energy efficiency.

On 31st December 2019, 121 GWh was the total SPC for DM I&C, NDM I&C and Residential customers as shown in Table 4.12 and illustrated in Figure 4.12.

Figure 4.11: Exit capacity bookings

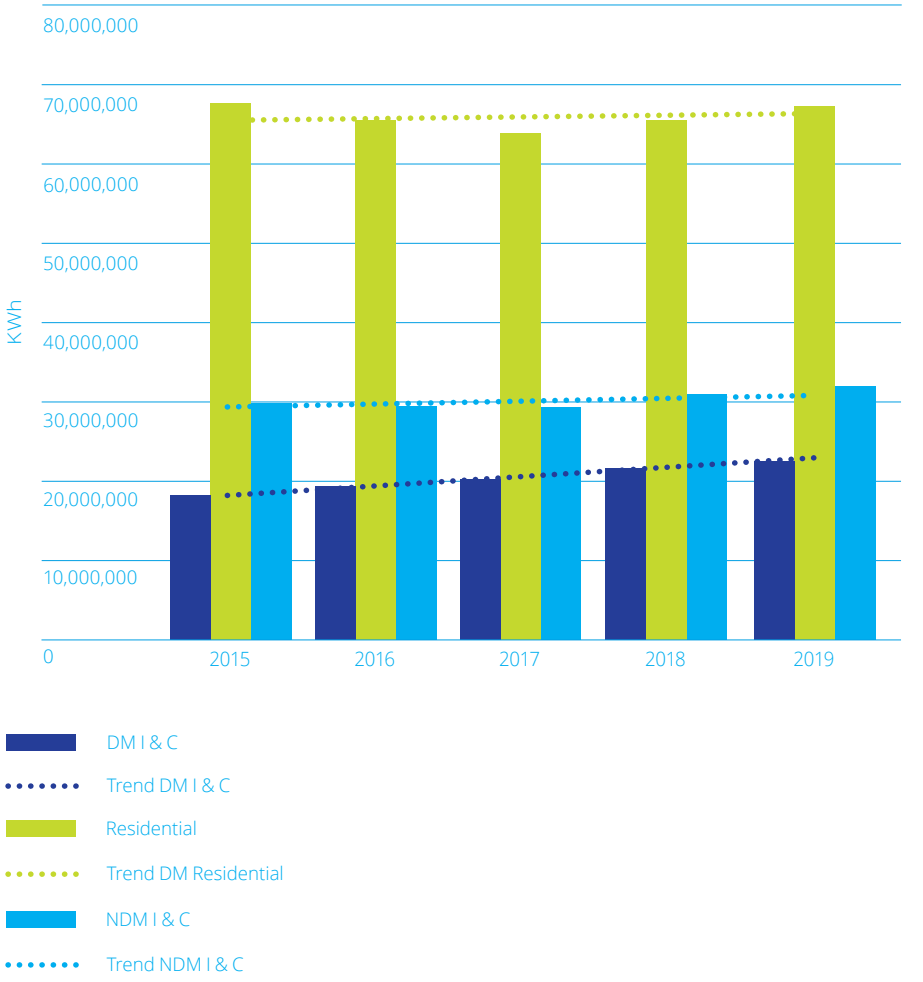


10 In this instance Daily Metered (DM) customers refers to Daily Metered (DM) and Large Daily Metered (LDM) customers i.e. any customer which consumes over 5.55 GWh annually. CNG also included within this sector.

11 The Non-Daily Metered (NDM) sector refers to those who consume less than 5.55 GWh of gas annually. This covers small Industrial & Commercial (I&C) customers and residential properties.

04 **Transmission system data**

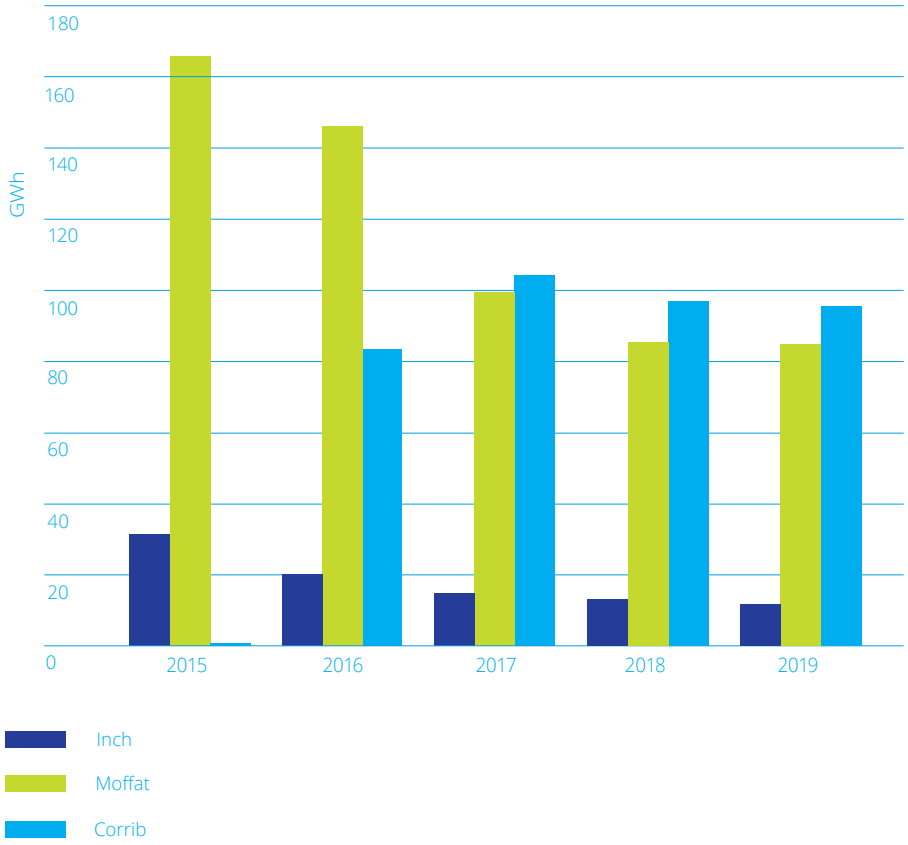
Figure 4.12: Distribution SPC bookings



4.8 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 gas field entered the natural gas network at the end of December 2015, which is why there is a minimal amount exhibited in Figure 4.13 for Corrib capacity bookings in 2015. Commissioning of the field and the terminal facilities continued in the first half of 2016 before full commercial flows were declared in early Q3 2016. The entry capacity booked at Corrib is predominantly annual, with some short-term capacity booked as required. This pattern was also observed at the Moffat and Inch entry points. As Corrib production continues to decline and Inch approaches its decommissioning, bookings are shifting back towards Moffat as the marginal source of gas.

Figure 4.13: Annual entry capacity bookings



4.9 Performance standards

There was no safety incident reported under guidelines in 2019.

Table 4.2: Transmission service standards 2019

Customer Commitments	KPI	2012	2013	2014	2015	2016	2017	2018	2019
Safety & Quality Reportable safety incidents	0	0	0	0	1	1	1	0	0

05 Gas point registration office (GPRO)

5.1 Overview of GPRO

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

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

The GPRO provides information and reports to the CRU and industry on historic activity; it processes corrections and amendments, and it maintains the I&C listing, the vulnerable customer and priority customer lists[12]. The total number of gas points registered on the 31st of December 2019 was 705,868. This was a 1.2% increase on the number registered on the same date in 2018. The total number of new Gas Points registered during the year 2019 was 11,879. There were 1,398 Gas Points deregistered during the year[13].

Suppliers have been focused on getting existing gas customers to switch suppliers. Ireland has one of the most active markets for customer switching in Europe. The retail energy providers invest heavily in advertising and marketing incentives, such as cheaper rates and bundle offers. There was a 6.2% decrease in switching activity in 2019 when compared to 2018. Many factors can influence switching behaviour; such as consumer sentiment and inertia, points of differentiation between the suppliers, attractive offers, recruitment and retention campaigns.

There was an increase of 16.8% in the number of historical consumption requests during 2019, such as requests for bulk data releases from 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 the population as a whole.

12 Vulnerable customers.

13 The criteria for deregistration of GPRNs is that they have been locked, no end-user assigned and no consumption has been recorded at the premises for 18 months.

05 **Gas point registration office (GPRO)**

Figure 5.1: Total gas points and market activity

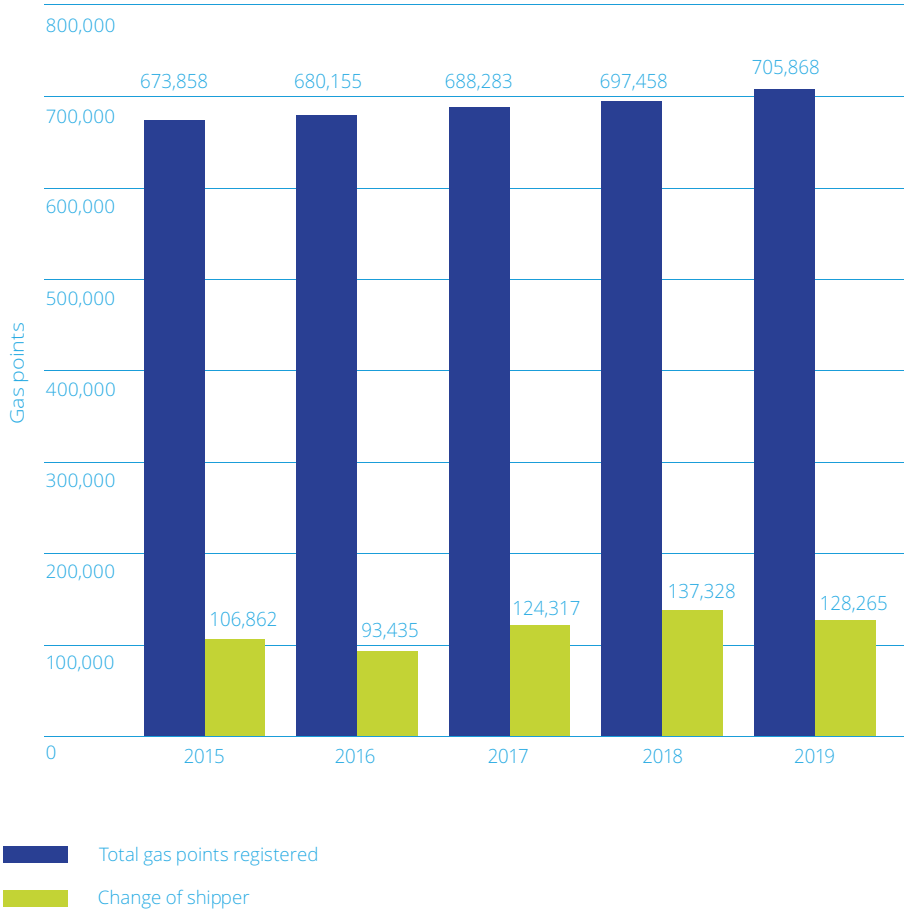
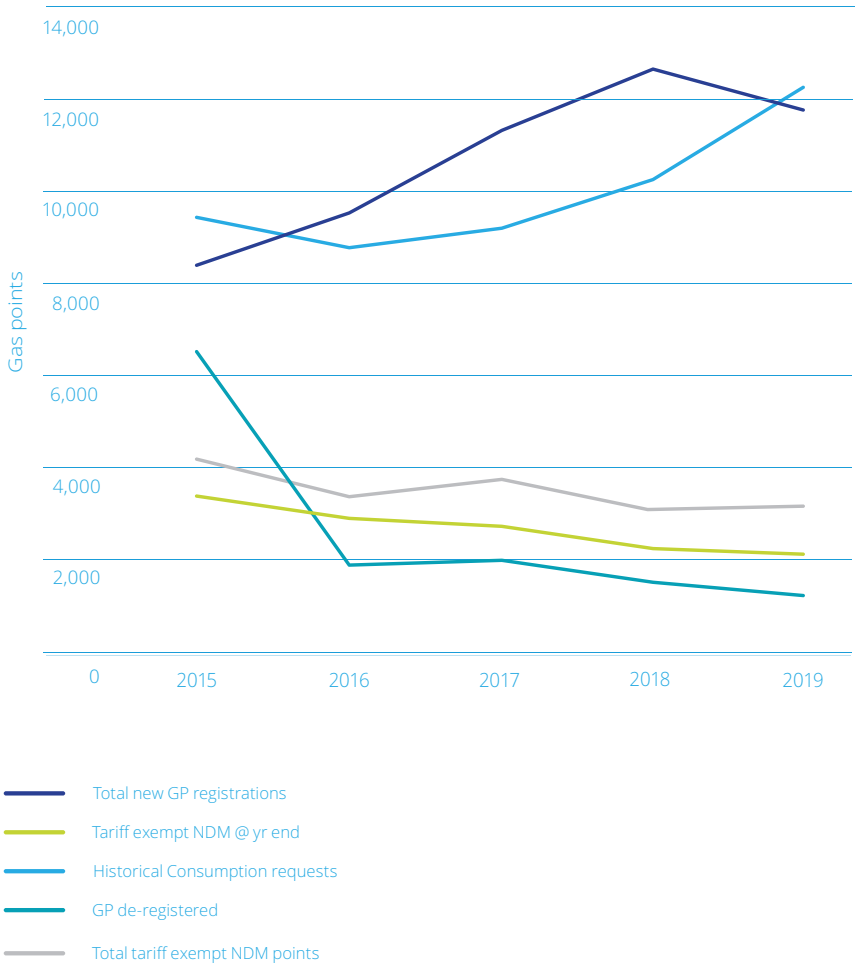


Figure 5.2: Gas point activity by year[14]



14 For a meter to be considered Tariff Exempt, it has to be locked more than two months and no customer registered for more than one month. If there is no consumption two months after the lock, the GPRN becomes tariff exempt (G701N message to supplier).

06 Achievement of capital programme

As part of the Price Control (allowed revenues) process, the CRU and Gas Networks Ireland agree a 5-year programme of capital works for the transmission network. Gas Networks Ireland is currently in its fourth regulatory Price Control Period (PC4), which runs from October 2017 to September 2022. 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 CRU. 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), adding new AGIs to the network or major pipeline projects. During 2019, a new AGI was completed at Laughanstown, Co. Dublin and capacity upgrades were completed in Nangor, Co. Dublin and Belview, Co. Waterford.

6.2 Refurbishment

Refurbishment programmes involve the upgrading or replacing of certain network assets due to the age or condition of the existing asset. Examples of refurbishment projects include:

- replacement of inefficient and ageing boilers at AGI locations with reliable and more efficient units;
- upgrading works to bring pressure reduction sites into compliance with the ATEX[15] directive; and
- installation of attenuation measures to limit noise emissions in the vicinity of pressure reduction sites.

There was a total of 193 refurbishment projects ongoing during 2019, their status at year-end at various stages from design through to fully commissioned and in operation. The 2018 Performance Report indicated that the next phase involving 57 sites would be upgraded in 2019. However, this phase did not commence until the end of 2019 due to a materials issue.

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

06 **Achievement of capital programme**

6.3 Interconnectors

This programme involves the refurbishment and upgrading of assets on the onshore Scotland network, which is connected to the onshore Ireland 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.

During 2019 a number of refurbishments projects were carried out including:

- Service exchang e for Turbo compressor Unit B at Beattock Compressor Station.
- Installation of Diesel Air Compressor at Beattock Compressor Station.

In addition, a number of significant projects were in the design stage for delivery in 2020/21. These included:

- A major upgrade of Beattock Compressor Station to increase its operational flexibility, reliability and performance in order to meet current and future shipper/market demands and environmental and regulatory requirements.
- Security upgrades at 4 sites on the onshore Scotland network, namely, Beattock and Brighouse Bay Compressor Stations, Twynholm AGI and Cluden Block Valve.
- Electrical system upgrade at Beattock and Brighouse Bay Compressor Stations

Delivery of some of these projects has been delayed from 2019/20 due to a number of reasons including in the case of the Beattock project, due to the Coronavisrus pandemic. The security upgrades project has been deferred due to a requirement to re-run the procurement competition for a contractor.


This programme involves the refurbishment and upgrading of assets on the onshore Scotland network

07 Transmission gas safety

7.1 High level safety statistics

This section of the report is an extract from quarterly reports submitted to the CRU 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 CRU. The report includes Key Performance Indicator (KPI) measures and statistics that have been under continuous monitoring during 2019. The purpose of the KPIs is to identify opportunities for improvement and to ensure the network continues to be managed in a safe manner.

The reference numbers 1 – 5 denotes metrics grouping under the key safety regulatory objectives.

Table 7.1 Safety statistics

Reference	Items	Compliance Monitor	2015	2016	2017	2018	2019
1A	Public Reported Escapes (PREs) (Reported Leaks)	Total Reported Escapes	11	6	10	4	**4**
6B	Third Party Damage	Development enquiries requiring action	824	952	998	1070	**1322**
1D	Third Party Damage Prevention Detected Encroachment Events	Category A - Pipeline Damage or Leak	0	0	0	0	**0**
		Category B - Serious Potential for Damage	21	12	12	5	**14**
		Category C - Limited Potential for Damage	23	39	23	41	**22**
		Total detected encroachment	44	51	35	46	**36**
1E	Transmission Pipelines	Line breaks (major leakage)	0	0	0	0	**0**
		Line damaged (sustainable level of leakage)	0	0	0	0	**0**
		Line damaged (no leakage)	0	1	0	1	**1**
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**
2C	Gas Outages	Number of Unplanned Outages	0	0	0	0	**0**
3A	Gas Quality	Number of non-compliant events (constituent parts outside criteria)	0	4	1	0	**2**
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	1	0	**0**
4B	Gas Emergency Exercises	Emergency Exercises planned per annum (Minimum)	2	2	2	2	**2**
		Emergency Exercises undertaken	5	3	4	3	**3**
5A	Incidents	Gas Related Incidents	0	0	0	0	**0**

07 **Transmission gas safety**

7.2 Third party damage

Third Party Development enquiries which potentially impacted on the transmission network and required response from Gas Networks Ireland, increased from 1070 in 2018 to 1322 in 2019. The increase is attributed in part to a general increase in construction activity in the economy, but also to the launch in Q4 of GNI's Online Dial Before You Dig service which resulted in a notable increase in enquiries. The outcomes of some of these engagements may ultimately involve a range of control measures including supervision of works in close proximity to GNI pipelines, but this is dependent upon whether or not the development work ultimately takes place, the nature of the work and the proximity of it to the pipeline.

There were 36 total encroachments (instances of unauthorised excavation in the pipeline wayleave) detected in 2019, which is a decrease on the 46 detected in 2018. 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 A: Pipeline leak or damage;
Category B: Potential for damage; and
Category C: Limited or minimal potential for damage.

Category A is the most severe and includes actual damage to a transmission pipeline, wrap or sleeve. There were no Category A encroachments in 2019 or 2018. 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. Gas Networks Ireland is committed to reducing encroachments and third -party damage on the gas network and has taken a number of steps to improve the 'Dial Before You Dig' service, culminating in the launch of an online service in Q4 2019. See Section 10.6 for further details.

7.3 Update on the safety case

Gas Networks Ireland operates it activities in accordance with the Gas Safety Regulatory Framework. The Gas Networks Ireland Transmission System Safety Case demonstrates the safety management arrangements in place for the network.

Within the Safety Case Framework, a quarterly KPI report is submitted to the CRU for review (see section 7.1). The Gas Networks Ireland Transmission System Safety Case was revised in April 2019 and is the current accepted Safety Case as of 31st December 2019. The changes to the Transmission Safety Case were non-material and included the addition of the MD of Gas Networks Ireland as the Duty Holder. 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; and
- Cooperation with third parties.

Under the Framework, Gas Networks Ireland is required to conduct a full independent audit of its Safety Case every five years to ensure that the safety case remains a 'living document' within the organisation and fully reflects the current safety operating measures and practices.

7.4 Update on national gas emergency manager activities

Gas Networks Ireland (GNI) was appointed as the National Gas Emergency Manager (NGEM) by the CRU in 2008, in accordance with the Gas (Interim) (Regulations) Act 2002, as amended. The Natural Gas Emergency Plan (NGEP) is the industry procedure for managing a network gas emergency and provides details on the role of the NGEM.

The Natural Gas Emergency Plan (NGEP) is subject to annual testing through an emergency exercise against a credible scenario arranged by the NGEM. The 2019 emergency exercise, titled 'Exercise Arctic' was carried out over two days on the 2nd and 3rd October 2019. Exercise Arctic was carried out in tandem with the UK's Network Emergency Co-ordinator (NEC) exercise of the same name and simulated a natural gas emergency arising from a progressively worsening gas supply deficit from Great Britain. The interaction between the gas and electricity system operators in an emergency is of critical importance and was also tested as part of Exercise Arctic.

Exercise Arctic had the following key objectives:

- To test the NGEP (Version 4) through the declaration of an emergency in accordance with the plan;
- To test the alignment of GNI's processes with that of a 'Secondary Transporter' off the National Transmission System (NTS) in Great Britain;
- To convene and test the effectiveness of the Gas Emergency Response Team (GERT);
- To test communication between industry stakeholders; and
- To test GNI arrangements and industry response to load shedding gas-fired power generation and certain large industrial end users.

Feedback on the exercise was sought from industry participants and an exercise report has been compiled by the NGEM which includes some actions and recommendations for future exercises.

08 Code of operations obligations

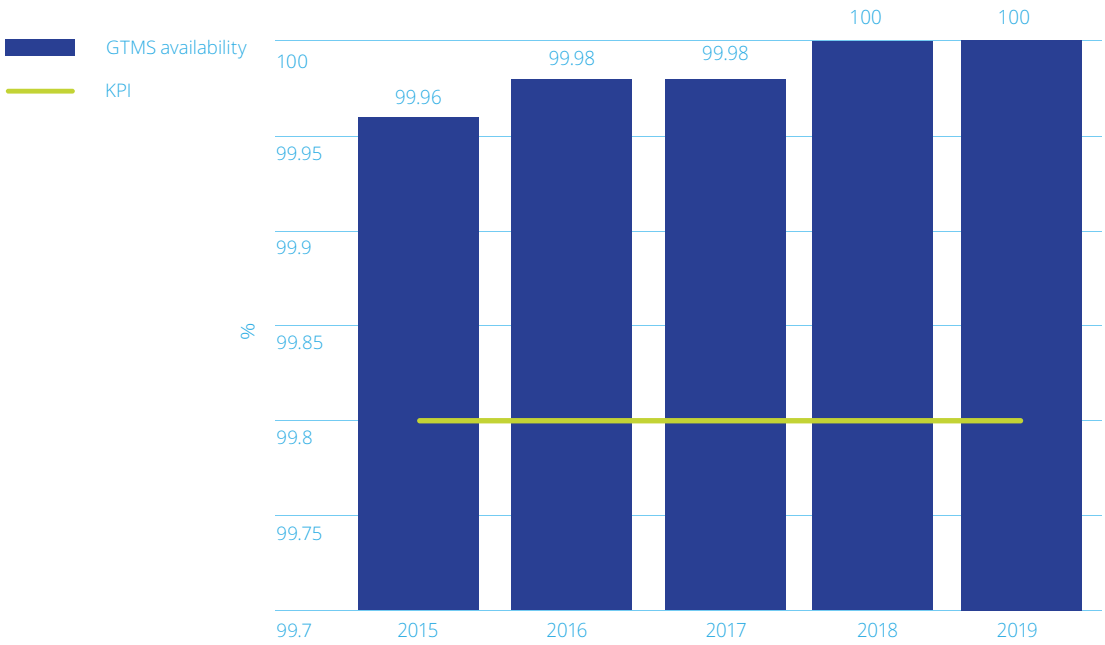
The Code of Operations governs the relationship between the Transporter and the shippers on the transportation (transmission and distribution) network. By signing Framework Agreements, shippers accept the terms of the Code of Operations. In February 2005, the CRU approved the implementation of a new Code of Operations (the Code) which governs the rules for both the transmission and the distribution networks. These rules became effective on 1st April 2005.

The latest version of the Code (Version 5.02) was published in April 2018, The Code is comprised of sections outlining the general principles of 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 KPI for GTMS system availability is 99.8%, this target has been consistently achieved over the years and in 2019 the system was available 100% of the time.

Figure 8.1: System availability



8.2 NDM Change of Shipper (CoS) processing

The CoS 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 8.3 in the appendix. The performance targets have 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 tor all shippers on a monthly basis. The invoices are for transmission and distribution capacity and commodity charges. The performance targets for invoices is that they issue by the 12th day of the month, this has been achieved 100% of the time. The KPI for providing shippers with the shrinkage pricing mechanism is prior to the October billing date. This too has been at 100% as illustrated in Table 8.5 in the Appendix.

08 **Code of operations obligations**

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 2019 for both credit and Pre-Payment Meters (PPM) was 86%, this is above the KPI of 80% which has been consistently achieved by Gas Networks Ireland over the past five years. This KPI is the expected average annual access rate for all NDM sites in total. The target is to maintain total access levels at 80% or above per annum. This figure is consistent with the 2018 figure of 86% also. Increased number of callbacks to sites and variation of start times in different areas has helped to achieve this consistency in access levels. The read rate per site in 2019 was 3.43 times; the KPI for how often a meter is read per calendar year is 3.2 times. This covers the expected average read rate per individual site. The target is an average of 3.2 per annum. The target takes into account that if four calls are made to a site to take a reading there may still be times when access is not available. If this target average read rate was set at 4 per annum it would mean that to achieve it, access would have to be gained at each site every time a call was made.

The performance has remained steady at circa 3.4 times over the past five years, this is illustrated in Figure 8.3.

Figure 8.2: Meter read access rates

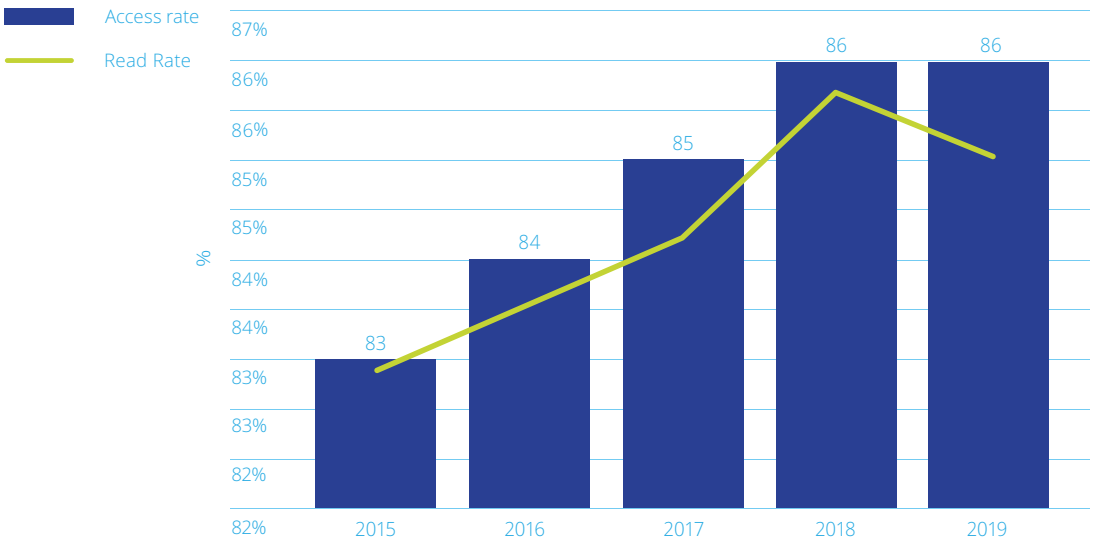
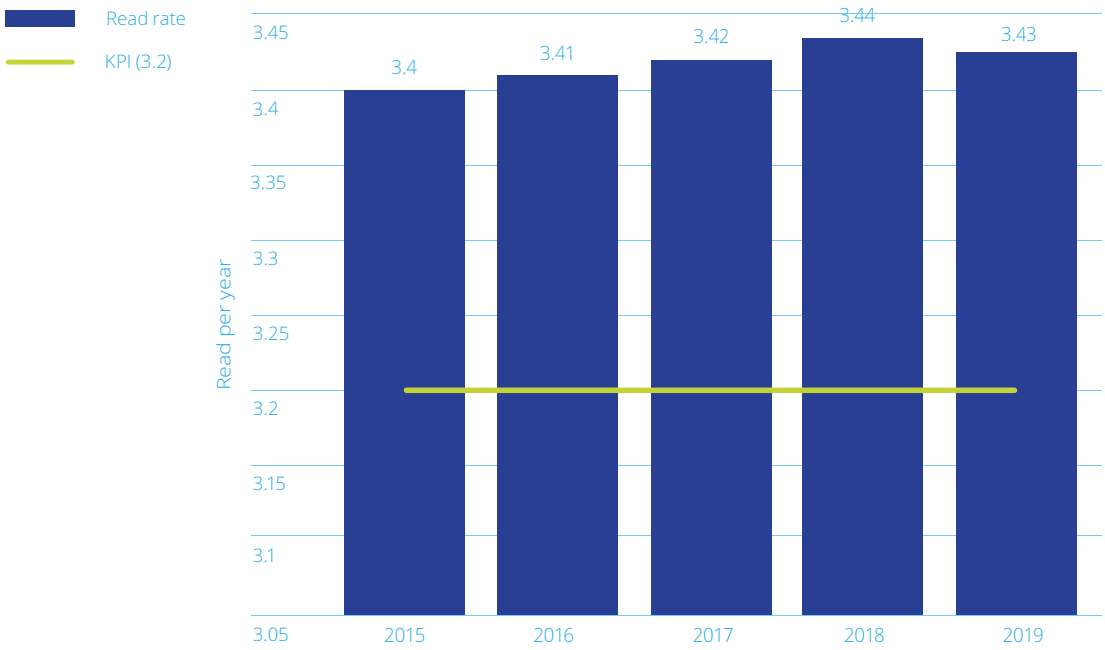


Figure 8.3: Meter read rate



8.5 Meter data services

In conjunction with the Code of Operations, procedures are in place that govern forecasting of demand at gas points and determining allocations by the transporter for the reconciliation process. The KPI for accuracy of forecasting, allocation and reconciliation (FAR) is that 80% of reconciliation adjustments are less than or equal to 1,250 kWh for domestic customers and are less than or equal to 4,500 kWh for I&C customers.

Table 8.1: Meter data services[16] [17]

Meter data services	KPI	2015	2016	2017	2018	2019
Forecasting, Allocation and Reconciliation (FAR) – Domestic Reconciliation (PPM Meters - 12 month Rolling)	80% within adjustment range of 1,250 kWh	99.44%	99.39%	99.33%	99.32%	**99.38%**
Forecasting, Allocation and Reconciliation (FAR) – Domestic Reconciliation (Credit Meters - 12 month Rolling)	80% within adjustment range of 1,250 kWh	91.35%	91.25%	91.94%	92.37%	**88.98%**
Forecasting, Allocation and Reconciliation (FAR) – I & C Reconciliation	80% within adjustment range of 4,500 kWh	74.23%	75.76%	77.27%	75.49%	**74.82%**

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

17 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.

08 Code of operations obligations

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. Gas Networks Ireland 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 Network Code charge for shrinkage, there is a distribution shrinkage factor included in the tariff. Shrinkage charges are paid by shippers, on a pro-rata basis, 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.

8.7 Maintenance days interruptions

Gas Networks Ireland operates, maintains and repairs the transportation system in accordance with the provisions of the Code[18]. 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 for the 2019 gas year were selected and presented to shippers for consultation in May 2018 and accepted for the 2018/19 gas year. 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. Notice will be given to each affected shipper as soon as is reasonably practicable, recognising that such maintenance is unscheduled.

For the 2018/19 gas year GNI informed the Shippers of the four planned maintenance days affecting the entry points prior to the gas year commencing. These dates were as follows:

Date	Duration	Entry Point
7th Mar 2019	1 day	Corrib
9th May 2019	1 day	Inch
4th July 2019	1 day	Moffat
12th Sept 2019	1 day	Corrib

18 Part G, section 5, Code of Operations

Through enhanced preparatory work and coordination with the connected system operators GNI did not need to curtail gas flows over any of these days.

In 2019 the Bellanaboy Bridge Gas Terminal operator curtailed flow into the GNI system from the Bellanaboy Entry Point on eleven occasions for a total of approximately 228 hours. There were no instances in 2019 where GNI constrained gas flow at the Bellanaboy Entry Point.

The Moffat Entry points was available throughout all of 2019.

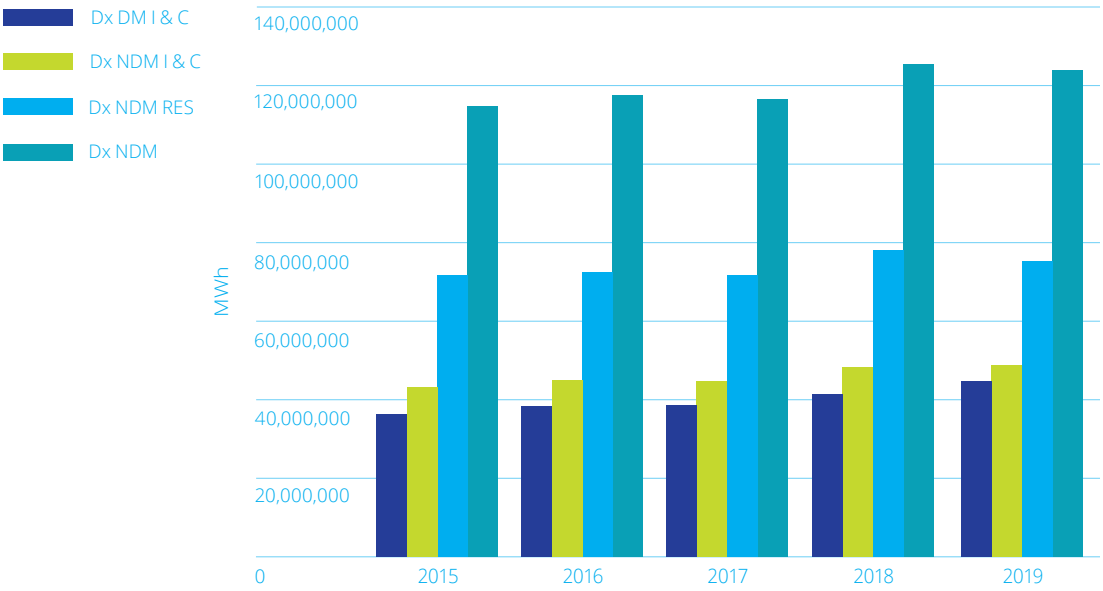
09 Distribution system

9.1 Distribution system data

In the DM (I & C) sector gas demand was up by 10% in 2019, compared to 2018. The key factor in terms of increased gas demand within the DM (I & C) sector is economic growth, while an increase in new connections is also having an impact. The DM (I & C) sector as a whole witnessed an increase of 2.6% in connections. In the NDM sector gas demand is sensitive to weather, based on a Degree Day (DD) comparison, the most recent winter (October '18 to March '19) was approximately 17% warmer than the previous year, due to exceptionally cold weather in early 2018. There was a slight decrease in gas demand in the NDM sector of 0.8% in 2019 compared to the previous year. When weather correction is taken into account however, an increase in NDM sector gas demand of about 2.6% is observed. This is due to an increase of 1.2% in NDM connections in 2019.

In the NDM (I & C) sub-sector, demand was up by about 1.3%. When weather correction is taken into account this would have represented an increase of 4.0%. In the Residential NDM sub-sector, there was a decrease of 2.0% in gas demand. However, this changes to an increase of 1.8% allowing for weather correction in Residential NDM gas demand. Table 9.1 illustrates the distribution system data.

Figure 9.1: Distribution system data



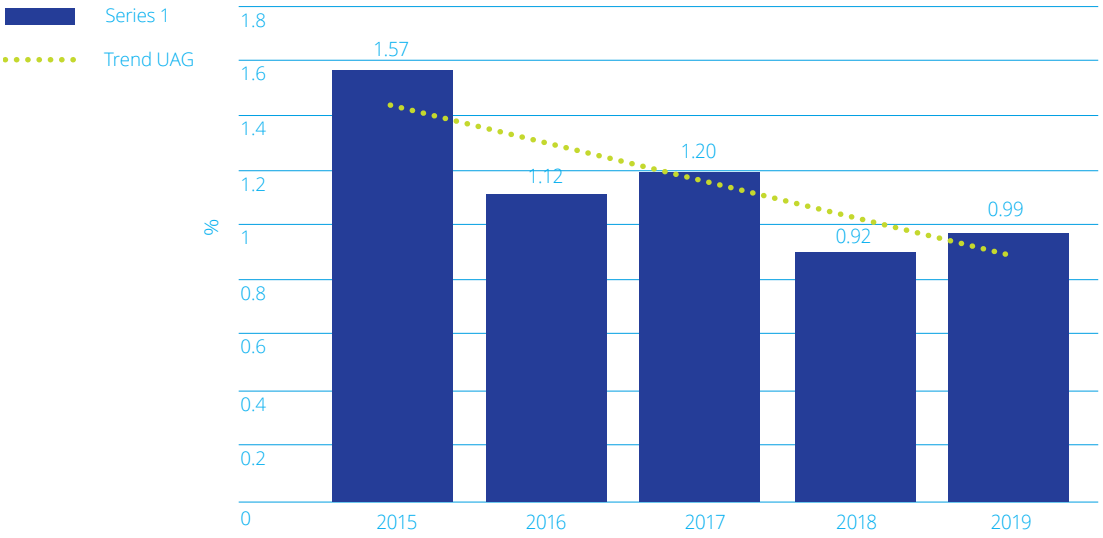
9.2 Distribution UAG

Unaccounted for Gas (UAG) on the distribution network represents total unallocated distribution gas. Distribution UAG causes include network leakage, gas escapes, theft of gas, gas quality variation, long-term no access and unregistered consumption. Distribution UAG is calculated, as agreed with the CRU, using a metering by difference formula[19] on a rolling 12-month basis. Distribution UAG as percentage of total distribution throughput in 2019 was 0.99%. The Distribution UAG percentage for 2019 was under 1% for the second year in a row. This is a result of the fact that there is a Distribution UAG project team in place which is focused on reducing UAG by addressing a range of contributing factors including metering and gas quality variation.

19 Distribution UAG formula: UAG = (distribution throughput - LDM & DM consumption – read NDM consumption – un-reconciled NDM allocations) / total distribution throughput; 12 month Rolling Average as of end of December 2018.

09 **Distribution system**

Figure 9.2: Distribution UAG (%)



9.3 Total number of connections (by category)

The total number of distribution connections in 2019, stands at 702,466. This is up by 1.24% on 2018. The largest increase was in the DM (I&C) sector experiencing a rise of 2.61% from 2018, see Table 9.2.

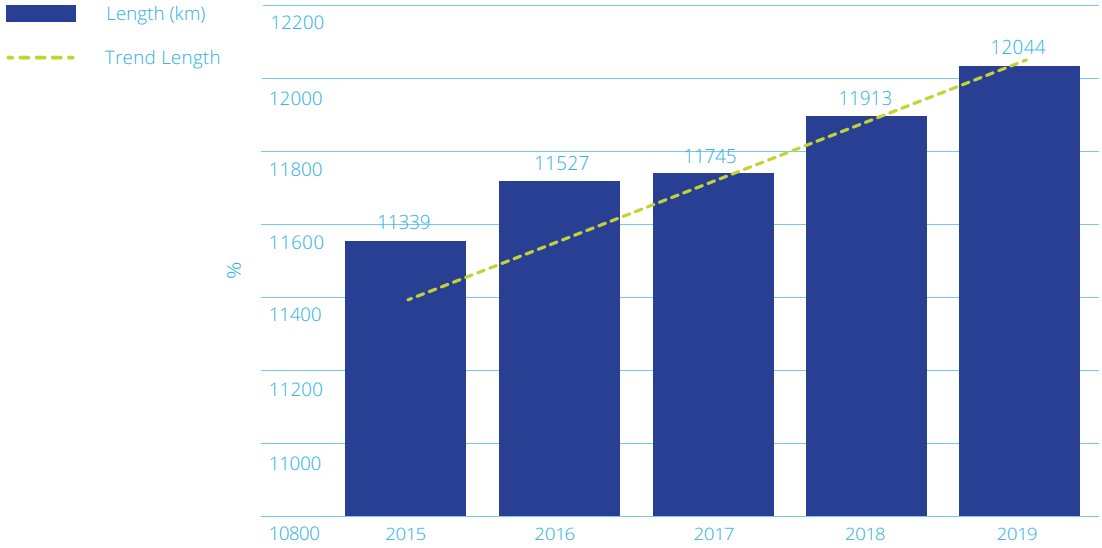
Table 9.2: Distribution connections by category

Connections	2015	2016	2017	2018	2019	% Change from 2018
Dx DM I&C	212	218	232	230	236	**2.61**
Dx NDM I&C	25,111	25,565	25,993	26,256	26,482	**0.86**
Dx NDM Res	642,836	649,445	657,638	667,340	675,728	**1.26**
Dx Total	668,159	675,228	683,863	693,835	702,446	**1.24**

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 pipelines. As residential 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 2019 is measured at 12,044 km. This has been growing incrementally in the last five years.

Figure 9.3: Distribution system length (km)



9.5 Achievement of distribution capital programme

As part of the Price Control process, the CRU and Gas Networks Ireland agree a 5-year programme of capital works for the distribution network. Gas Networks Ireland is currently in its fourth regulatory Price Control Period (PC4), from October 2017 to September 2022. The programme includes works relating to reinforcement, refurbishment and new supply. This includes new connections and servicing increased demand 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 CRU 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;
- upgrading works to bring distribution installations sites into compliance with the ATEX Directive.
- remedial works at multi-occupancy buildings with more than 6 gas points

Illustrated overleaf are some 2019 high volume programmes; the percentage of completion represents the percentage scope completed for the project versus the target for PC3 or PC4, as appropriate.

09 **Distribution system**

Figure 9.4: Distribution capital programmes

9.6 Reinforcement

The reinforcement works completed in 2019 are listed below:

- O'Curry Street DRI Reinforcement
- Leinster Lawn Clonskeagh
- Ferrybank, Waterford
- Outer Ring Road, Waterford
- Cherrywood Development
- Carpenterstown Road, Castleknock
- Victoria Road, Greystones

Design has been completed on the following sites:

- Jamestown Business Park, Kylemore, Dublin 8
- Lennox Street, Portobello, Dublin 8
- Thormanby Road
- Carpenterstown Road, Castleknock
- South City Business Park, Tallaght, Dublin 24
- St Canice's Road
- Portlaoise Reinforcement
- Feltrim Road, North County Dublin

Design is ongoing at the following sites:

- Trim Rationalisation Phase 2
- Carlow IT Reinforcement
- Prosperous/Clane Reinforcement
- Woodleigh Ave, Blessington, Co. Wicklow
- Bellevue Park Phase 2 Reinforcement
- Mercer Street Upper
- Peter Street
- Whitestown Way, Dublin 24
- Newtownmountkennedy Reinforcement
- Glandore Road
- Shandon Park, Dublin 7
- North Circular Rd. Dublin 7
- Railway Street, Cork City
- Shannon Street, Limerick
- Foxhill Avenue

9.7 New connections during year (by category)

Gas Networks Ireland has seen an upward trajectory in connection numbers for new dwellings between 2013 and 2018 followed by a slight drop in 2019. As shown in the chart below, mature housing and commercial connections have remained consistent year-on-year.

Ireland has benefited from solid Irish GDP growth which has translated to a large increase in new dwelling completions. Recently published CSO figures reported an increase in new dwellings completed from 17,946 in 2018 to 21,138 in 2019 (18% increase year-on-year). Despite this increase, there has been a slight drop in the number of new dwellings connecting to the gas network of circa 6% from 2018 results. This is mainly due to much more stringent Building Regulations introduced at the end of 2018 making it more difficult for natural gas homes to meet these standards, and increased competition from renewable technologies such as electric heat pumps.

The All of Government Climate Action Plan published in June 2019 also resulted in significant uncertainty in both the New Housing and the Mature Domestic sectors as, among other things, the document contained a proposed ban on natural gas boilers in new homes from 2025 onwards.

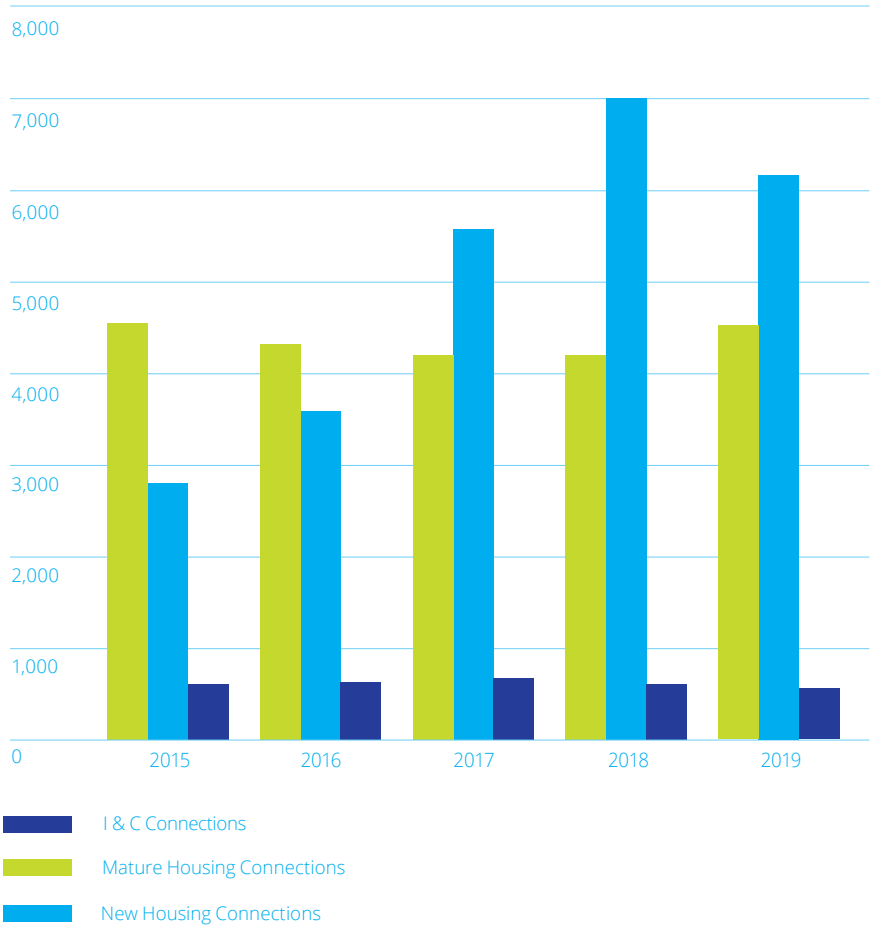
The Mature Housing sector also faced challenges within GNI in 2019 due to the removal of the SEAI grant for high efficiency gas boilers in late 2018 and also some increased competition from heat pumps which benefit from SEAI grant support giving them a competitive advantage. This, together with the proposed ban on gas boilers, resulted in many homeowners delaying decisions on energy systems during the second half of 2019 and some builders and developers reassessing their use of natural gas on new housing developments.

09 **Distribution system**

Against these many challenges, Gas Networks Ireland has continued to focus on increasing the utilisation of the gas network through increased sales and marketing activity. A number of campaigns were run during 2019 focussing on the SME and Mature Domestic sectors, while also continuing to promote Combined Heat and Power in the Large I&C Sector (Dairy, Pharma, BioMedical, Hotels etc). The SME Sales Team also focussed on selling into the Public Sector, targeting schools, public buildings and OPW owned premises while also working with the Marketing Team to sponsor and take a lead role in Ibec's Regional Insight Series late 2019. The Data Centre market continued to be an area of focus for the GNI Large I&C Sales team providing this sector with a short lead-time, low cost solution to Data Centre developers and operators where electrical grid power was not available.

Gas Networks Ireland's marketing campaign "Progress Naturally: A Cleaner Energy Future" ran throughout 2019. The aim of this campaign was to inform the public about the decarbonisation efforts of the company which include a target of 20% renewable gas on the network within 10 years from the introduction of government support. In October, GNI published its "Vision 2050 - A Net Zero Carbon Gas Network for Ireland" document outlining how GNI intends to decarbonise the natural gas network by 2050, demonstrating the company's commitment to renewable energy which will undoubtedly appeal to potential customers across all sectors.

Figure 9.5: New Connections by category



9.8 Update on new towns receiving gas

Gas Networks Ireland continually brings the benefits of natural gas to new customers and new towns. The Connections Policy is a Gas Networks Ireland document and is approved by the CRU. The Connections Policy facilitates high level objectives that encourage 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 the benefit of all gas customers.

Gas Networks Ireland actively promotes natural gas as a fuel of choice for homes, businesses and industry, encourages greater utilisation of the natural gas network and looks for opportunities to expand the network where economically viable. Towns connected to the gas network have a significant competitive advantage compared to those that are not. The benefits include economic opportunities, efficiencies and lower emissions that are associated with gas.

There were increased sales and marketing efforts in Listowel, Wexford and Nenagh towns during 2019, and significant commercial orders were secured as a result.

The Center Parcs Longford development also commenced operations in 2019. The design and build phase commenced in July 2017 to extend the natural gas network from Athlone, a total of circa 26km to the Ballymahon holiday village development. This was a significant project for Gas Networks Ireland and was critical to the success of the Center Parcs development which is now open. Significant efforts were undertaken in pre-selling connections to a large number of both domestic and commercial sites along this feeder main to ensure accessibility to the natural gas network in advance of completion and the network expansion also facilitated the expansion of the natural gas network into the neighbouring town of Ballymahon.

As a low carbon fuel with low energy costs, natural gas is appealing to multi-national organisations. Cities and towns that have natural gas infrastructure are attractive for Foreign Direct Investment (FDI) and can benefit through direct employment and investment in the local economy. The natural gas network developed by Gas Networks Ireland has sufficient capacity to meet the gas demands of a modern Ireland competing in the global economy, contributing to Ireland's social and economic progress.

The clear benefits of natural gas for the customer are that it is cheaper, cleaner and more reliable than other fossil fuels. 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 25% less CO_2 than oil and approximately 45% less than coal[20]. Natural gas provides energy security for Ireland through existing infrastructure, through indigenous sources at Corrib and imports from the UK. This ensures a robust supply of gas and liquid pricing.

20 https://www.eia.gov/tools/faqs/faq.php?id=73&t=11

09 **Distribution system**

9.9 Innovation and new technologies

The first publicly accessible CNG fuelling station in Ireland became operational in December 2018 and demand at the station continued to build throughout 2019. The station, located in Dublin Port, is being operated by Circle K and has a capacity to fuel up to 50 vehicles per day. It is the first of 14 public stations being developed as part of the Causeway Study for which Gas Networks Ireland has received co-funding from the European Commission, under the CEF Transport Fund, and the CRU Innovation Fund. A second public CNG station was constructed at Circle K's Cashel station and is due to be commissioned in 2020. An additional 7 public stations are currently progressing through the design and planning project phases. GNI also delivers infrastructure to private fleet operators and hauliers – there were three medium-sized private CNG stations operational in Ireland in 2019.

Ireland's first renewable gas injection point was constructed at Cush, Co. Kildare in 2018 with the first injection of renewable gas to the gas network taking place in 2019. The site is expected to become commercially operational in 2020 with a capacity to inject up to 200GWh per annum of renewable gas into the network. Challenges which were overcome include supporting a third-party developer / asset owner to commission in line with the Irish Grid Code and Gas Networks Ireland Health and Safety requirements. Despite commitments from some large companies, the route to market for the first Irish produced renewable gas remains challenging as the market is slow to pay a premium over the wholesale price for gas. Lessons learned at these projects will be used to streamline processes for upcoming CNG stations and renewable gas injection points. These developments are an important part of Gas Networks Ireland's vision for the future and will play a key role in decarbonising the heat and transport sector.

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 CRU policies. The primary function of the network is to transport gas from entry to exit, on behalf of all 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 structure ensures 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, should it occur.

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, Rev. 4 was accepted by the CRU in October 2019. It demonstrates the Gas Networks Ireland arrangements 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. 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; and
- 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 15,822 gas public reported escapes (PREs) in 2019 was 27 minutes, well withinthe 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.

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. 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.

10 **Distribution gas safety**

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.

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 CRU 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 CRU.

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 coordinated safety promotional activities.

Gas Networks Ireland submits quarterly reports to the CRU under the gas safety regulatory framework. The report includes measures and statistics that have been under continuous monitoring and improvement during the year.

10.3 High level distribution safety statistics

Table 10.1: High level gas safety statistics [21]

Ref	Subject	High level KPI	2015	2016	2017	2018	2019
1A	Public Reported Escapes	Number of External Leaks Detected	3,811	3,691	3,498	3,534	**3,456**
		Number of Internal Leaks Detected	5,007	4,214	3,712	3,771	**3,771**
1C	Third Party Damage	No. of Main Damages	84	93	107	89	**122**
		No. of Service Damages	395	426	457	461	**528**
1D	Gas in Buildings	Number of 'Gas in Buildings' events (i.e. all gas ingress from external infrastructure)	0	1	0	0	**1**
2B	Gas Outages	> 15 Customer affected	1	1	0	0	**5**
		> 100 Customer affected	2	2	0	0	**1**
4A	Public Reported Escapes	% attended within one hour	99.90	99.89	99.91	99.3	**99.9%**
4B	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	1	0	**0**
5C	Incidents (Occurring on Gas Network)	Reportable under Gas Legislation	0	0	0	0	**0**
5D	Incidents (Occurring on Gas Network)	Reportable under CRU Guidelines	6	4	5	3	**6**
5E	Incidents (Occurring on Customer installations)	Reportable under Gas Legislation	0	0	1	0	**1**
5F	Incidents (Occurring on Customer installations)	Reportable under CRU Guidelines	7	3	2	8	**3**
5G	Non Gas related incidents	Number of Non Gas related incidents attended by Gas Networks Ireland	3	3	1	3	**2**
4D	Emergency Reports	Total no. of calls received via the 24-hour emergency telephone number (1800 20 50 50)	19,198	23,919	25,107	30,131	**27,006**
6A	Third Party Damage	Total enquiries to 1800 427 747 (inward communication)	2,106	1,772	1,610	1,565	**1,420**
		Total enquiries to distribution DBYD[26] email/post/fax/calls (inward communication)	5,029	5,723	5,939	8,088	**13022**[22]
		Total inward enquiries	7,135	7,495	7,549	9,653	**14,442**

21 In 2019 Gas Networks Ireland responded to 15,822 PREs. In many cases there is no trace of gas. The figures illustrated in Table 10.1 are the actual number of leaks detected.

22 The figure of 13,022 includes 8,914 enquiries to the "traditional" email/ fax/ phone Dial Before You Dig service plus 4,108 plots generated via the online Dial Before You Dig system which launched in Q3 (soft launch) and Q4 (public launch). Online DBYD figures measure the number of plots generated. Email/ fax/ post figures measure the number of enquiries (an individual enquiry may result in several plots being generated). 2019 figures cannot therefore be directly compared with historical figures.

10 Distribution gas safety

10.4 Public reported escapes

There were 15,822 Public Reported Escapes (PREs) related to leaks on the Gas Networks Ireland distribution network in 2019. This is a decrease from the 16,883 PREs reported in 2018. In approximately 54% 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 in 2019, a brief summary is outlined below:

- 1 gas in building events;
- 6 unplanned outages in 2019; and
- 0 gas supply emergencies.

10.6 Promoting public awareness of gas safety

In quarter 4 of 2019, Gas Networks Ireland launched a new online version of its Dial Before You Dig mapping service. The new online service, which complements the existing Dial Before You Dig phone and email service, makes it easier than ever to check whether there are underground gas pipes on a site before commencing work. The new service resulted in a notable increase in the number of third-party enquiries generated. This is partly due to a difference in the way that the online system measures usage (the online system plots generated whereas the phone/ post/ email system measures enquiries received which may, in fact result in several plots being generated). GNI also has anecdotal evidence that new users of the online DBYD system are generating plots simply to try out the system rather than for actual usage purposes. GNI expects that this pattern of behaviour (and the numbers of plots generated as a result) will settle down once users become familiar with the service. By way of direct comparison with 2018, the number of enquiries received via phone/ post/ email for the first 3 quarters of 2019 increased by 17.6% over the same period in 2018. GNI believes that this increase is representative of the increase in construction activity in the economy.

Gas Networks Ireland promotes its Dial Before You Dig service to a wide range of people and organisations involved in construction, utilities, farming and forestry via digital, social media and trade press advertising.

Gas Networks Ireland continued to promote its gas emergency service to gas consumers and the general public via a multimedia advertising campaign in 2019. The total number of calls received via the 24-hour emergency telephone number (1800 20 50 50) in 2019 was 27,006 which was a decrease on the 2018 figure of 30,131.

The multi award-winning Gas Networks Ireland carbon monoxide advertising campaign, the most recent version of which launched in 2014, continued during 2019.

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.

A key message in the area of revenue protection is safety for gas customers and the general public. Gas Networks Ireland works throughout the year on raising awareness of the dangers of gas meter tampering and the associated risk to life through targeted media campaigns, including radio, print media, bill inserts, meter stickers and door drops. In excess of 320,000 safety leaflets would have been distributed throughout 2019 to gas customers.

As part of the public awareness campaign, Gas Networks Ireland developed a meter tampering sticker for the gas meter to continue the important safety message to the meter. The purpose of the sticker is to reinforce the dangers and act as a deterrent to meter tempering. These stickers are placed on meters as part of siteworks activities such as meter exchanges and meter fits. Working with the same safety messaging re-enforces the message to individuals.

Continuing the message of safety, one of the primary roles of the revenue protection department is taking prosecutions against individuals it suspects of committing an offence or offences under the Energy (Miscellaneous Provisions) Act 2012. In 2019, GNI brought successful prosecutions in 11 cases, by identifying gas theft and prosecuting individuals in the district courts for unlawful interference.

Site investigations are another key focus in the area. This is a daily process that runs in parallel but separate to the prosecution process to identify meters that may be subject to interference. Following approved market processes, 317 sites were confirmed as tampered in 2019. To date, over 2,600 meters have been identified as tampered and been subject to this process.

Following a number of workshops between Gas Networks Ireland, suppliers and the CRU, the Revenue Protection Code of Practice was approved by the CRU and implemented on 28 January, 2019. The implementation of the Code of Practice was an important milestone for the industry as it sets out a guiding framework for the mechanisms to protect gas consumers and the general public from the safety issues and costs related to gas theft, and also to maintain a safe and secure gas network.

The introduction of a new market message for revenue protection activity was implemented during 2019. The market message was developed in order to provide a supplier with up to date information on the progression of sites that have been confirmed as tampered within their portfolio. A decision was taken to pilot the market message for the first year, this pilot will conclude in 2020.

11 Conclusion

In 2019 Gas Networks Ireland delivered key asset programmes and essential services to shippers and customers. A strengthening economy contributed to growth in distribution connections and in overall gas demand across the various sectors. Gas Networks Ireland is currently in its fourth price control period (PC4), which helps to determine the plans for the network from October 2017 to September 2022.

Commercially, Gas Networks Ireland focused on growing the number of natural gas customers on the existing networks, to increase the use of natural gas among existing gas users and to extend the network to areas not currently serviced by the natural gas network. Gas Networks Ireland is looking at innovative ways to deliver Ireland's low carbon energy future, with targeted initiatives such as compressed natural gas for transport and renewable gas already underway. Furthermore, Gas Networks Ireland is also considering the future role of the gas network in the longer term, including consideration of Hydrogen Networks and Carbon Capture & Storage (CCS).

Growth in new connections to the gas network continued in 2019 with 11,298 new commercial and residential customers connected. This represents a slight decrease of 4.55% on 2018. Increasing competition from other technologies such as heat pumps will continue to pose challenges, particularly for the residential sector.

In 2018, Gas Networks Ireland the first publicly accessible CNG fuelling station in Ireland became operational. The station, located in Dublin Port, is being operated by Circle K and has a capacity to fuel up to 50 vehicles per day. In 2018, Ireland's first renewable gas injection point was constructed at Cush, Co. Kildare. The facility has capacity to inject up to 200GWh per annum of renewable gas onto the network. These are very positive developments for Gas Networks Ireland, the energy industry and the environment.

Safety remained a top priority for assets and operations throughout 2019. Gas Networks Ireland has an excellent record in meeting all its safety, statutory and regulatory obligations. There were 15,822 Public Reported Escapes (PREs) related to leaks on the Gas Networks Ireland distribution network in 2019 (a decrease of 6% on the 16,883 PREs reported in 2018). In approximately 54% 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. Gas Networks Ireland's average response time to 15,822 PREs in 2018 was 27 minutes, within the response time target of 1 hour. Gas Networks Ireland is committed to delivering the highest safety standards, while operating in an environmentally friendly manner, ensuring that gas is used to power homes, businesses and essential services throughout Ireland, 365 days a year, regardless of the weather and demand challenges that are placed on the system.

12 Appendices

12.1 Glossary of terms

AGI	Above Ground Installation
ALARP	As Low as Reasonably Practical
CRU	Commission for Regulation of Utilities
CES	Customer Effort Score
CO	Carbon Monoxide
CSO	Central Statistics Office
DBYD	Dial Before You Dig
DM	Daily Metered
DSO	Distribution System Operator
Dx	Distribution
FAR	Forecasting, Allocation and Reconciliation
IBP	Irish Balancing Point
I & C	Industrial & Commercial
I/C	Interconnector
km	Kilometre
KPI	Key Performance Indicator
kWh	Kilowatt hour
GDP	Gross Domestic Product
GIS	Geographical Information System
GMARG	Gas Market Arrangements Retail Group
GP	Gas Point
GPRO	Gas Point Registration Office
GTMS	Gas Transportation Management System
GWh	Gigawatt hour
LDM	Large Daily Metered
LEL	Lower Explosive Limit
LPG	Liquefied Petroleum Gas
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
OBA	Operational Balancing Account
OGP	Office of Government Procurement
PPL	Planned Performance Level
PPM	Pre-Payment Meters
PREs	Public Reported Escapes
RES	Residential
RGI	Registered Gas Installer
RoI	Republic of Ireland
RuG	Reportable under Guidelines
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
ZIP	Zero Imbalance Position

12 **Appendices**

12.2 Tables used for chart graphics

Table 3.1: Transmission pipeline length (km)

	2015	2016	2017	2018	2019
Length of Onshore Pipeline	2021	2015	2015	2065	**2065**
Decommissioned	32	32	0	0	**0**
Length of Offshore Pipeline	412	412	412	412	**412**
Decommissioned	0	0	0	0	**0**
Total Length of Pipeline	2433	2,427	2,427	2,477	**2,477**
Total Decommissioned	32	32	0	0	**0**

Table 3.2: Transmission connections

Category	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19
Transmission LDM	35	34	34	31	**31**
Transmission DM	18	17	17	19	**19**

Table 4.3: System throughput

	2015	2016	2017	2018	2019
Total Gas Transported (GWh)	50,192	55,109	55,768	57,785	**59,379**
Daily Average Transported (GWh)	138	151	153	158	**163**
Peak Day Transported (GWh)	204	225	217	216	**216**

Table 4.4: System throughput per entry point

	2019	%
Inch (GWh)	**3,412**	6
Moffat (GWh)	**22,489**	39
Corrib (GWh)	**31,389**	55

Table 4.5: Demand change

	2015	2016	2017	2018	2019
Demand (GWh)	50,025	55,180	55,405	57,354	**58,501**
Change (GWh)	-126	+5,155	+225	+2,387	**+1,147**
Change (%)	-0.3%	+10.3%	+0.41%	+3.6%	**+2.0%**

Table 5.1: Gas Point activity by category

Category	Type	2015	2016	2017	2018	2019
Gas points registered	LDM	50	48	**51**	**45**	**45**
	DM	215	221	232	**245**	**255**
	NDM I & C	25,798	26,048	26,492	**26,638**	**26,813**
	NDM Domestic	647,795	653,838	661,508	**670,530**	**678,755**
	Total	**673,858**	**680,155**	**688,283**	**697,458**	**705,868**
Total gas points registered during the year	LDM	0	0	**3**	**2**	**0**
	DM	8	7	8	**5**	**3**
	NDM I & C	665	732	759	**686**	**679**
	NDM Domestic	7,719	8,791	10,555	**11,917**	**11,197**
	Total	**8,392**	**9,530**	**11,325**	**12,610**	11,879
Gas points deregistered	LDM	-	-	**-**	**-**	**-**
	DM	-	-	**-**	**-**	**-**
	NDM I & C	1,404	205	215	**240**	**177**
	NDM Domestic	5,110	1,667	1,761	**1,293**	**1,221**
	Total	**6,514**	**1,872**	**1,976**	**1,533**	1,398
Tariff exempt NDM supply points @ 31st December	LDM	-	-	**-**	**-**	**-**
	DM	-	-	-	**-**	**-**
	NDM I & C	297	286	342	**258**	**227**
	NDM Domestic	3,076	2,602	2,373	**2,054**	**1,861**
	Total	**3,373**	**2,888**	**2,715**	**2,312**	2,088
Total tariff exempt NDM supply points during year	LDM	-	-	**-**	**-**	**-**
	DM	-	-	**-**	**-**	**-**
	NDM I & C	373	320	379	**272**	**236**
	NDM Domestic	3,803	3,039	3,357	**2,755**	**2,882**
	Total	**4,176**	**3,359**	**3,736**	**3,027**	3,118
CoS Jan-Dec	LDM	7	6	3	**4**	**4**
	DM	129	114	169	**149**	**214**
	NDM I & C	5,456	3,392	5,316	**4,295**	**3,282**
	NDM Domestic	101,270	89,923	118,829	**132,880**	**124,765**
	Total	**106,862**	**93,435**	**124,317**	**137,328**	128,265
Historical consumption requests Jan-Dec	LDM	11	9	17	**14**	**8**
	DM	112	77	117	**84**	**90**
	NDM I & C	**9.311**	**8.688**	**9.064**	**10.277**	**12.020**

12 **Appendices**

Table 4.12: Exit capacity bookings (kWh)

	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19
Power	101,872,899	106,324,361	99,575,135	111,92,555	118,423,914
DM I & C	40,652,518	41,108,477	41,803,481	43,704,699	44,392,970
NDM	97,543,678	95,157,457	93,138,962	96,877,924	98,794,801
Shrinkage	4,969,000	4,092,500	3,924,500	4,194,250	4,368,750
Total	245,038,095	246,682,795	238,442,078	256,699,428	265,980,43
Distribution SPC (kWh)	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19
DM I & C	18,249,319	19,320,029	20,222,761	22,603,166	22,682,300
Residential	67,646,657	65,450,119	63,794,927	66,438,547	67,530,069
NDM I & C	29,811,248	29,476,324	29,272,311	30,346,708	31,191,411
Total	115,707,224	114,246471	113,289,999	119,388,420	121,403,780

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

Table 4.13: Entry capacity bookings (GWh)

	2015	2016	2017	2018	2019
Inch	31.1	20.6	14.8	11.98	11.97
Moffat	165.1	145.5	99	86.46	86.45
Corrib	0.1	83	103.9	96.18	96.14
Total	196.2	249.1	217.7	194.14	194.56

Table 5.1: Gas Point activity by category

Category	Type	2015	2016	2017	2018	2019
Gas points registered	LDM	50	48	**51**	**45**	**45**
	DM	215	221	232	**245**	**255**
	NDM I & C	25,798	26,048	26,492	**26,638**	**26,813**
	NDM Domestic	647,795	653,838	661,508	**670,530**	**678,755**
	Total	**673,858**	**680,155**	**688,283**	**697,458**	705,868
Total gas points registered during the year	LDM	0	0	**3**	**2**	**0**
	DM	8	7	8	**5**	**3**
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	NDM Domestic	7,719	8,791	10,555	**11,917**	**11,197**
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Gas points deregistered	LDM	-	-	**-**	**-**	**-**
	DM	-	-	**-**	**-**	**-**
	NDM I & C	1,404	205	215	**240**	**177**
	NDM Domestic	5,110	1,667	1,761	**1,293**	**1,221**
	Total	**6,514**	**1,872**	**1,976**	**1,533**	1,398
Tariff exempt NDM supply points @ 31st December	LDM	-	-	**-**	**-**	**-**
	DM	-	-	-	**-**	**-**
	NDM I & C	297	286	342	**258**	**227**
	NDM Domestic	3,076	2,602	2,373	**2,054**	**1,861**
	Total	**3,373**	**2,888**	**2,715**	**2,312**	2,088
Total tariff exempt NDM supply points during year	LDM	-	-	**-**	**-**	**-**
	DM	-	-	**-**	**-**	**-**
	NDM I & C	373	320	379	**272**	**236**
	NDM Domestic	3,803	3,039	3,357	**2,755**	**2,882**
	Total	**4,176**	**3,359**	**3,736**	**3,027**	3,118
CoS Jan-Dec	LDM	7	6	3	**4**	**4**
	DM	129	114	169	**149**	**214**
	NDM I & C	5,456	3,392	5,316	**4,295**	**3,282**
	NDM Domestic	101,270	89,923	118,829	**132,880**	**124,765**
	Total	**106,862**	**93,435**	**124,317**	**137,328**	128,265
Historical consumption requests Jan-Dec	LDM	11	9	17	**14**	**8**
	DM	112	77	117	**84**	**90**
	NDM I & C	**9,311**	**8,688**	**9,064**	**10,277**	**12,020**

12 **Appendices**

Table 6.1: Achievement of capital programme

Reinforcement	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
AGI Capacity Upgrades	1			
Cluden to Brighouse Bay Pipeline			●	
Refurbishment	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
Ballough bypass	●			
AGI boiler replacement	9	1		3
AGI site instrumentation	7			4
ATEX Compliance	44			14
Noise Attenuation	17			
Pipe Support Remediation	38			14
Interconnectors	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
Beattock CS Upgrades	●			
SWSOS Station Security Upgrades	●			
CS Electrical Systems Upgrades	●			
New Supply	**Design**	**Construction ongoing**	**Construction Complete**	**Commissioned and in operation**
Derryhale AGI		●		

Table 7.1 Safety Statistics

Public Reported Escapes (PREs) (Reported Leaks)	Total Reported Escapes	2014	2015	2016	2017	2018	2019
Third Party Damage	Development enquiries requiring action	6	11	6	10	4	4
Third Party Damage	Category A - Pipeline Damage or Leak	816	824	952	998	1070	1322
Prevention Detected	Category B - Serious Potential for Damage	0	0	0	0	0	0
Encroachment Events	Category C - Limited Potential for Damage	20	21	12	12	5	14
	Total detected encroachment	19	23	39	23	41	22
Transmission Pipelines	Line breaks (major leakage)	39	44	51	35	46	36
	Line damaged (sustainable level of leakage)	0	0	0	0	0	0
	Line damaged (no leakage)	2	0	0	0	0	0
Pressure Control	Occasions where pressure drops below minimum design pressure	0	0	1	0	1	1
Gas Outages		0	0	0	0	0	0

Table 8.2: Systems availability

Communications & instrumentation	KPI	2015	2016	2017	2018	2019
GTMS System availability	99.80%	99.96%	99.98%	99.98%	100%	**100%**

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Table 8.3: Shipper operations

Customer Commitment	KPI	2015	2016	2017	2018	2019
CoS (NDM)	Process CoS Requests- 100% <=5 business days	100%	100%	100%	100%	100%
CoS (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 8.4: Meter reading

Customer Commitment	KPI	2015	2016	2017	2018	2019
Access Rate	80%	83%	84%	85%	86%	86%
Read Rate	Average 3.2 reads per site per calendar year	3.40	3.41	3.42	3.44	3.43

Table 8.5: Trading and settlements

Customer Commitment	KPI	2015	2016	2017	2018	2019
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 8.6: Maintenance days

	KPI	2015	2016	2017	2018	2019
Maintenance days						
Unscheduled maintenance/Interruptions	0	0	0	1	0	0
Interruptions due to maintenance	0	0	3.15	4	5	5

Table 8.7: Corrib Entry Point Constraint/ Curtailment 2018

Month	Number of Constraints	Number of curtailments	Average Duration of Curtailments (hours)
January 2019	0	1	6
February 2019	0	0	0
March 2019	0	0	0
April 2019	0	2	8
May 2019	0	1	15
June 2019	0	0	0
July 2019	0	0	0
August 2019	0	0	0
September 2019	0	0	2
October 2019	0	0	0
November 2019	0	0	16
December 2019	0	0	12

Table 9.1: Distribution gas flows

Dx DM I & C		2015	2016	2017	2018	2019	% Change
Annual Total	MWh	3,629,253	3,838,030	3,866,772	4,143,092	4,558,433	**10.02%**
Annual Daily Average	MWh	9,943	10,486	10,594	11,351	12,489	**10.02%**
Peak Day Flow	MWh	13,737	14,091	14,063	11,842	18,664	**57.61%**
Dx NDM I & C							
Annual Total	MWh	4,315,443	4,508,467	4,467,897	4,809,207	4,867,008	**1.20%**
Annual Daily Average	MWh	11,823	12,318	12,241	13,176	13,334	**1.20%**
Peak Day Flow	MWh					26,726	
Dx NDM RES							
Annual Total	MWh	7,158,766	7,237,864	7,178,800	7,790,422	7,629,615	**-2.06%**
Annual Daily Average	MWh	19,613	19,776	19,668	21,344	20,903	**-2.07%**
Peak Day Flow	MWh					49,634	
Dx NDM Total							
Annual Total	MWh	11,474,209	11,746,331	11,646,697	12,599,629	12,496,622	**-0.82%**
Annual Daily Average	MWh	31,436	32,094	31,909	34,520	34,237	**-0.82%**
Peak Day Flow	MWh	73,463	71,453	74,682	97,228	76,360	**21.46%**
Dx Total							
Annual Total	MWh	15,103,462	15,584,361	15,513,469	16,742,720	17,055,055	**1.87%**
Annual Daily Average	MWh	41,379	42,580	42,503	45,870	46,726	**1.87%**
Peak Day Flow	MWh	86,402	84,630	88,360	106,506	92,129	**13.50%**

Table 9.2: Distribution connections by category

Connections	2015	2016	2017	2018	2019
Dx DM I & C	212	218	232	230	**236**
Dx NDM I & C	25,111	25,565	25,993	26,256	**26,482**
Dx NDM Residential	642,836	649,445	657,638	667,340	**675,728**
Dx Total	668,159	675,228	683,863	693,835	**702,446**

Table 9.3: Distribution network lengths - systems length at year end

2015	2016	2017	2018	2019
11,288	11,339	11,527	11,745	**12,044**

Table 9.4: New connections by category

Meters	2015	2016	2017	2018	2019
Mature Housing	4,544	4,314	4,195	4,196	**4,417**
New Housing	2,804	3,588	5,574	7,030	**6,259**
I & C	607	630	668	610	**622**

Table 9.5: Distribution UAG

	2015	2016	2017	2018	2019
Distribution UAG	1.57	1.12	1.20	0.92	**0.99**

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Gas Networks Ireland

The main contact details for
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