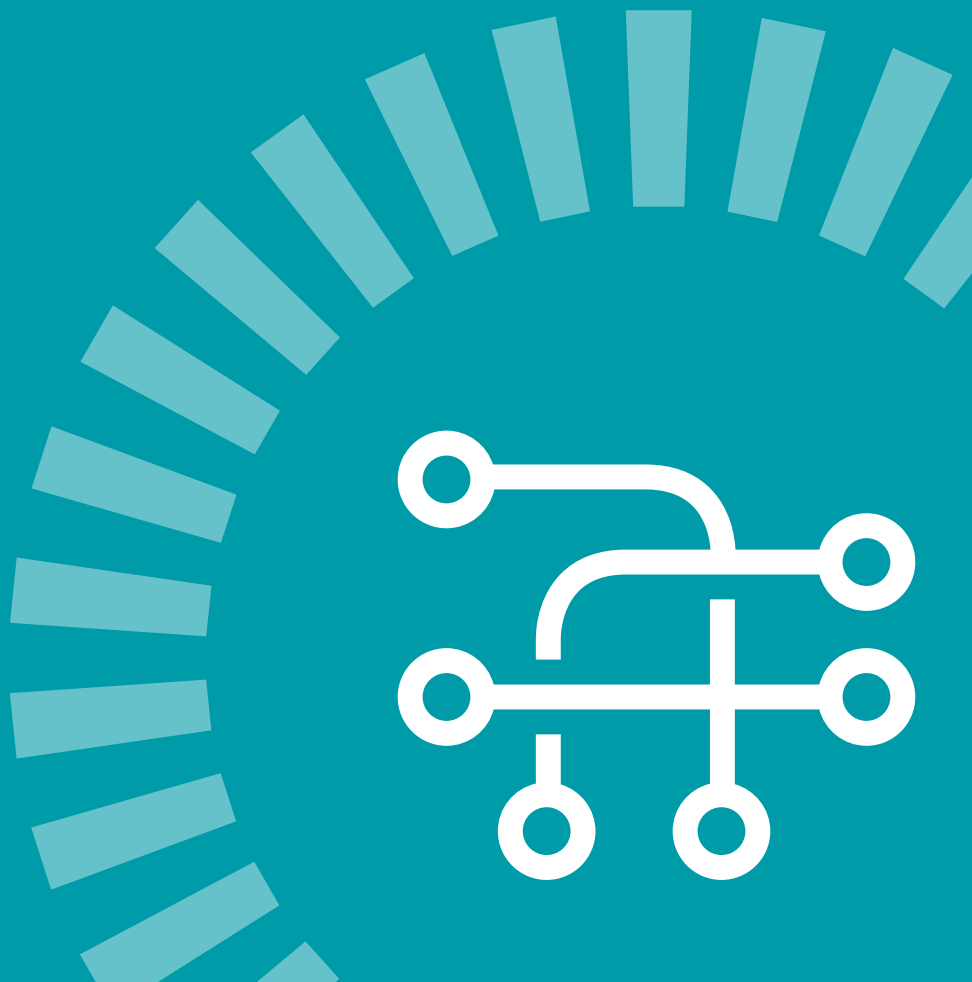
Gas Networks Ireland

Systems Performance Report 2020



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 2020 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. 2020 was an unusual year for the Gas Network as for the rest of economy, with the advent of the global pandemic. Gas 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 2020, 259 GWh was the total exit capacity booked for Power, DM[1] I&C, NDM[2] and Shrinkage for the year.

- **Power** - 2020 there was a slight decrease in bookings of 1.38% from 2019.
- **DM I&C** - 2020 saw a slight decrease in 2020 primarily due to covid19 restrictions, of 1.19% in 2020 from 2019.
- **NDM** - 2020 saw a slight decrease overall, primarily in the I&C sector due again to covid19 restrictions.

Following a reasonably strong 2019, with almost 11,300 new meter fits completed, a more challenging 2020 was expected, particularly on the back of the published 2019 Climate Action Plan (CAP2019). The publication of this plan resulted in significant uncertainty in both the New Housing and Mature Domestic sectors as, among other things, the document contained a proposed ban on natural gas boilers in new homes from 2025 onwards. For these reasons, coupled with the effects of the Covid 19 restrictions, new connections in all three categories dropped as follows:

Category	2019	2020
Mature Housing Connections	4,417	3,408
New Housing Connections	6,259	4,220
I&C Connections	622	465

1 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.

2 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.

01 **Executive summary**

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 2020 have remained substantially in line with the figures for 2019. The number of Transmission connections for 2020 also remained in line with 2019, showing a reduction of 3 LDM new connections from 31 to 28 and the DM new connections remaining static at 19. The total volume of gas transported through the system in 2020 increased by 2.8% over 2019 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 2020, dropping from 0.31% in 2019 to 0.19%.

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 targeted KPIs were achieved in 2020.

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 in the transition to a sustainable low-carbon economy. A planning application has been approved for a Biomethane Central Grid Injection facility (CGI) to be located in Mitchelstown, Co. Cork and work has commenced on a hydrogen test facility outside Dublin.

1.1 Key performance summary matrix

Category	Metric	Report Section	2020 Performance	2019 Performance	Comments
Infrastructure	Length of Transmission Pipeline	3.1 - Total length of pipe in transmission system	2,477 km	2,477 km	
	Length of Distribution Pipeline	9.4 - Total length of pipe in distribution system	12,140 km	12,044 km	
Connections	Number of connections to the Transmission Network	3.2 - Total number of connections	47	50	28 LDM & 19 DM connections
System Throughput	Total Gas Transported	4.1 - Throughput	58,688 GWh	59,379 GWh	64% - Moffat 34% - Corrib 2% - Inch
	Total Demand	4.2 - Demand Change	57,886 GWh	57,988 GWh	
	Fuel Usage	4.3 - System Efficiency	699 GWh	626 GWh	Increase due to reduced flows at Corrib, requiring additional fuel to drive compressors at Moffat
	Unaccounted for Gas (UAG)	4.4 - Transmission Unaccounted for Gas	147 GWh	237 GWh	
	Total Shrinkage Gas (Own use gas and gas to replace UAG)	4.5 - Shrinkage and balancing % of Throughput	1.07%	1.12%	
	System Balancing Actions		242	187	
	System Balancing Actions		633 GWh	458 GWh	
	Compressor Station carbon emissions	4.6 - Carbon usage/emissions	98,655 TCO_2	91,428 TCO_2	Increase due to increased use of compressors at Moffat
Capacity Bookings	Exit Capacity Bookings	4.7 - Capacity Bookings	258,916 GWh	265,980 GWh	
	Entry Capacity Bookings	4.8 - Entry Capacity Booking Process	192.80 GWh	184.97 GWh	

01 Executive summary

1.1 Key performance summary matrix *(continued)*

Category	Metric	Report Section	2020 Performance	2019 Performance	Comments
Gas Point Registration Office	Total number of Gas Points Registered	5.1 - Overview of GPRO	712,507	705,868	
	New Registrations		8,664	11,879	
Transmission Gas Safety	Third Party Damage (instances of unauthorised excavation in the pipeline wayleave)	7.1 - High Level Gas Safety Statistics	2,204	1,322	
	Third Party Damage Prevention Detected Encroachment Events	7.1 - High Level Gas Safety Statistics	50	36	
Code of Operations Obligations	GTMS System Availability	8.1 - System Availability	100%	100%	
	Meter Read Access Rates	8.4 - Meter Reading Access rates	80%	86%	The drop in 2020 can be attributed to restrictions in place on travel and people's hesitancy because of the pandemic.
	Meter Read Rate	8.4 - Meter Reading Access rates	2.84	3.43	2020 was the first year in the past 5 to fall below the KPI of 3.2, due to the effects of the pandemic.
Distribution System	Distribution Gas Flows	9 - Distribution System	16,622 GWh	17,055 GWh	
	Distribution Unaccounted for Gas (UAG)	9.2 - Distribution UAG	0.59%	0.99%	Due to increased efforts to reduce UAG. Effects of Pandemic not clear as yet.
	Total number of connections	9.3 - Total number of connections	710,068	702,446	
	New Connections (Total)	9.7 - New connections during year	8,093	11,298	Reduction due to a number of factors including new dwelling requirements to meet NZEB standards and effects of the pandemic especially in SME sector

1.1 Key performance summary matrix *(continued)*

Category	Metric	Report Section	2020 Performance	2019 Performance	Comments
Distribution Gas Safety	Third Party Damage	10.3 - High Level distribution safety statistics	483	650	
	Third Party Damage - Total inward enquiries	10.3 - High Level distribution safety statistics	20,395	14,442	
	Emergency Reports Total no. of calls received via the 24-hour emergency number	10.3 - High Level distribution safety statistics	26,960	27,006	

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 712,507 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)[3]; and
- Distribution infrastructure, which operates below 16 barg (the total length of distribution pipeline is 12,140 km).

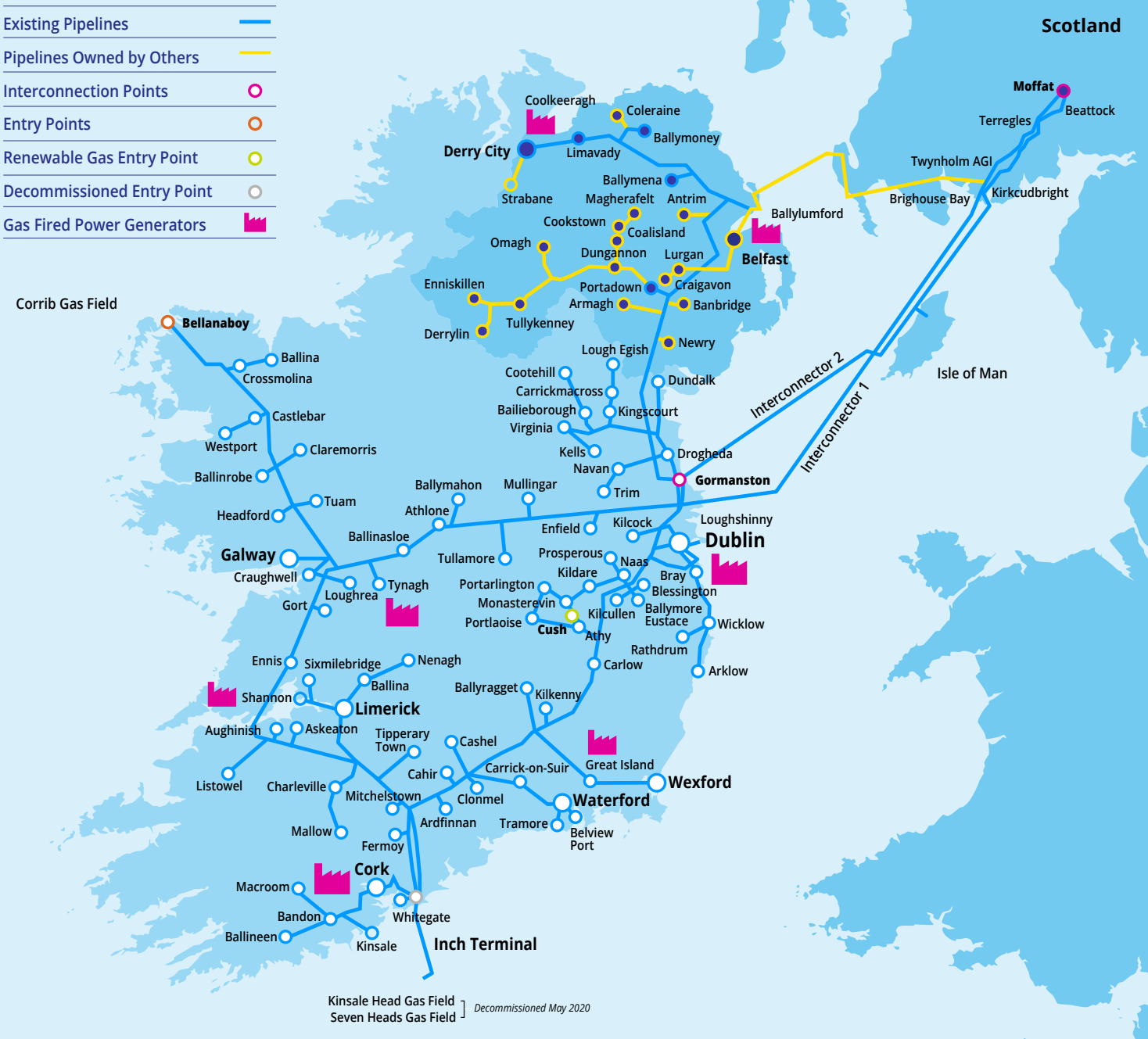
The transmission system is detailed in Figure 2.1.

"Gas Networks Ireland is responsible for developing, maintaining and operating the gas transmission and distribution systems."

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

02 **Introduction**

Figure 2.1: Gas Networks Ireland transmission pipeline map



Natural gas is transported to 712,507 customers through a network of 14,617 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 14,928 call-outs in 2020.

Through the Gas Networks Ireland Connections Policy, Gas Networks Ireland continually brings the benefits of natural gas to new towns. This activity was severely restricted in 2020 as a result of the effects of the pandemic and its related shutdowns.

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.

"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."

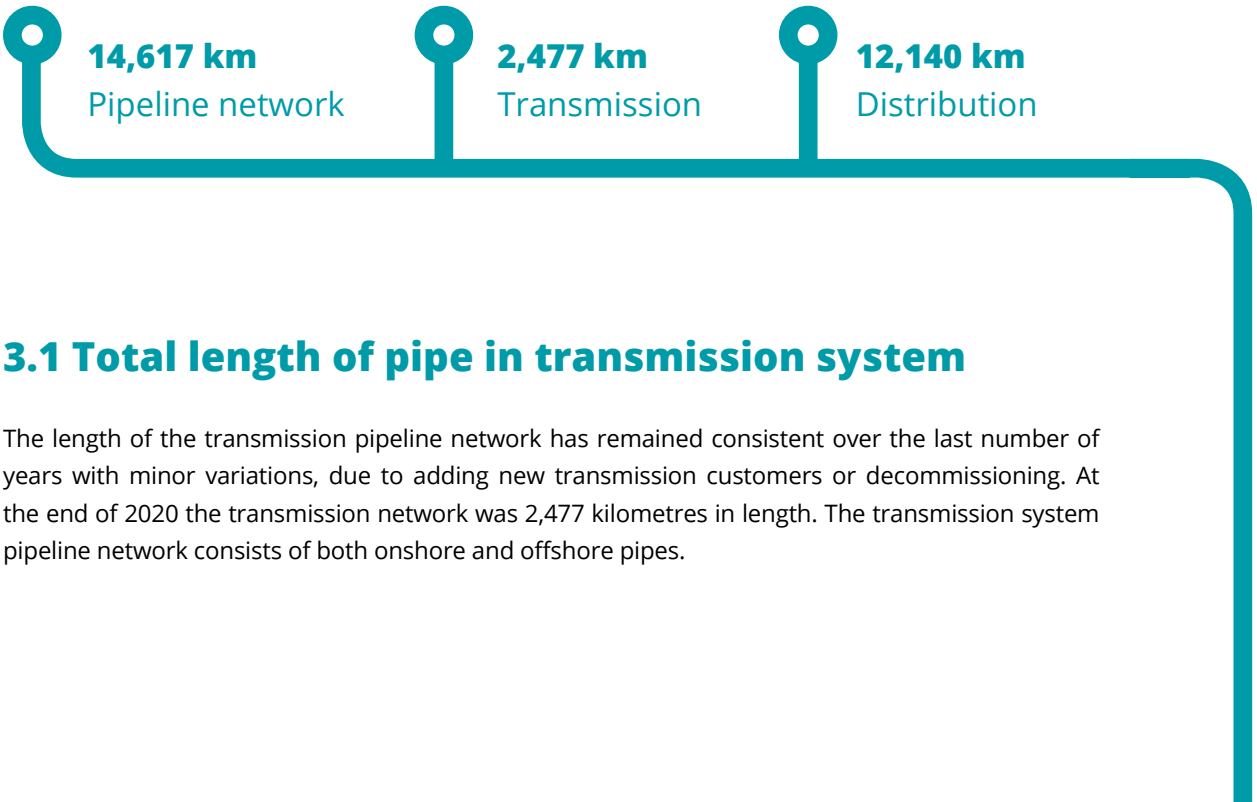
03 Transmission system

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 Networks 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 14,617km 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 ring-main 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

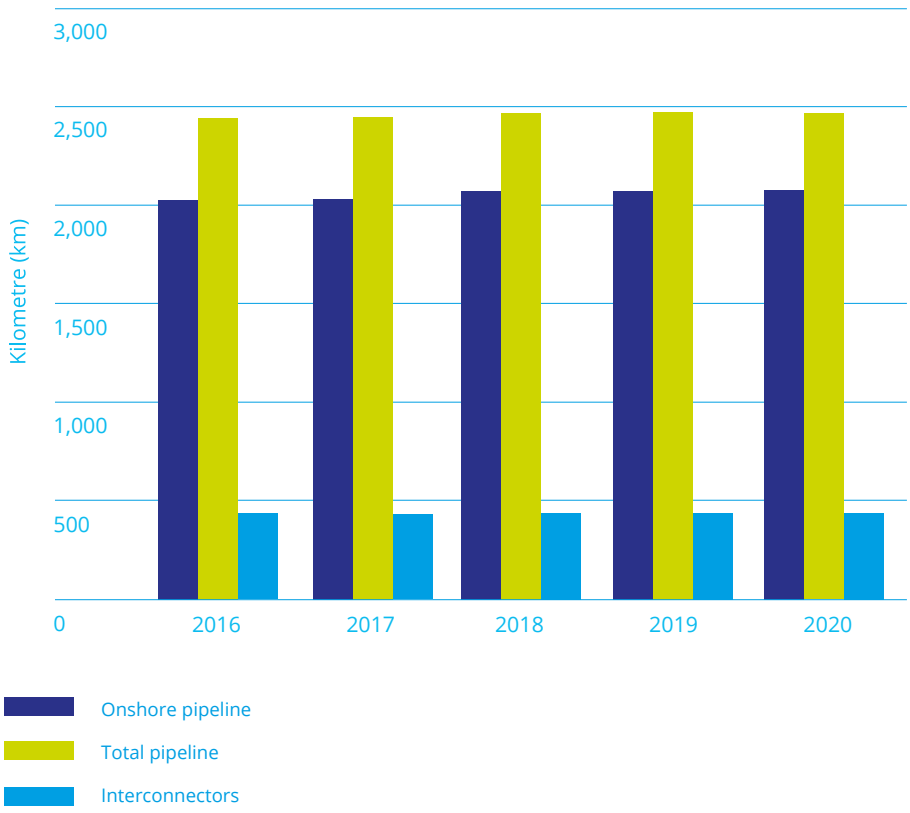


3.1 Total length of pipe in transmission system

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 2020 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 2020 was 47; of these 28 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 always transported 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 for ROI in the calendar year 2020 was 58,688 GWh, which represents a decrease of 1.1% from 59,379 GWh in 2019. This includes 62 GWh of fuel gas transported for NI, which was burned at the Beattock Compressor Station. Gas transported for RoI Power-Generation in 2020 increased by .9% in comparison to 2019 figures. A summary of the gas throughput from 2016 to 2020 is illustrated in Table 4.3 and Figure 4.1.

58,688
Total gas transported (GWh)

160
Daily average gas transported (GWh)

234
Peak day gas transported (GWh)

04 **Transmission system data**

Figure 4.1: System throughput

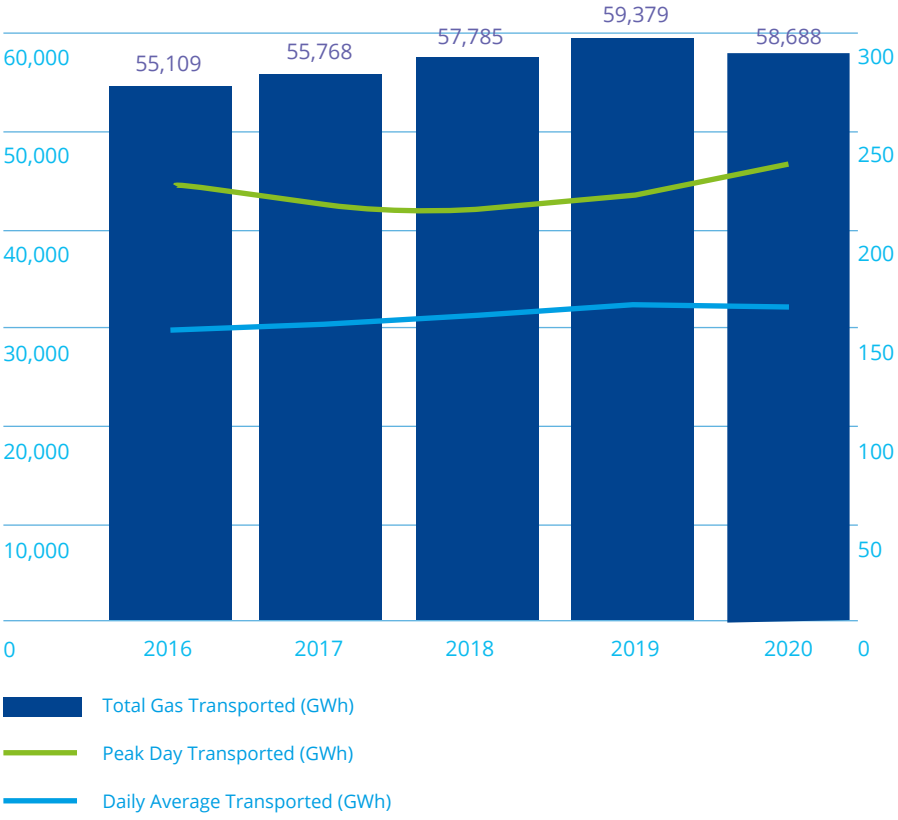
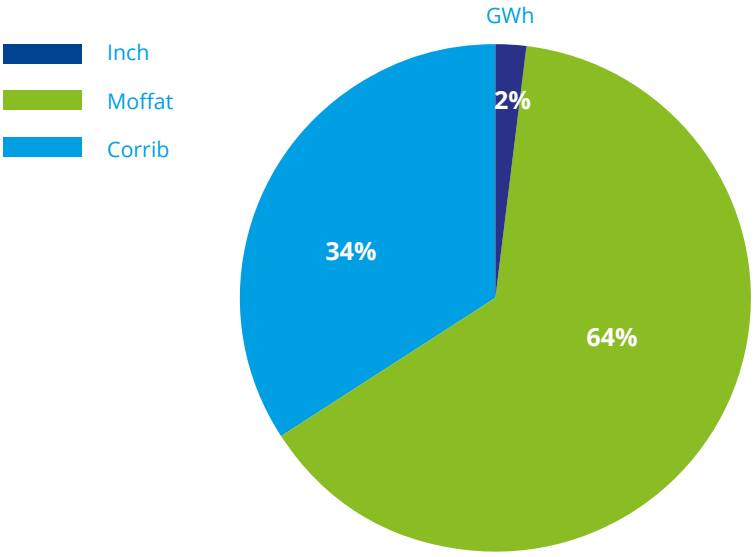


Figure 4.2: System throughput per entry point (Calendar Year 2020)

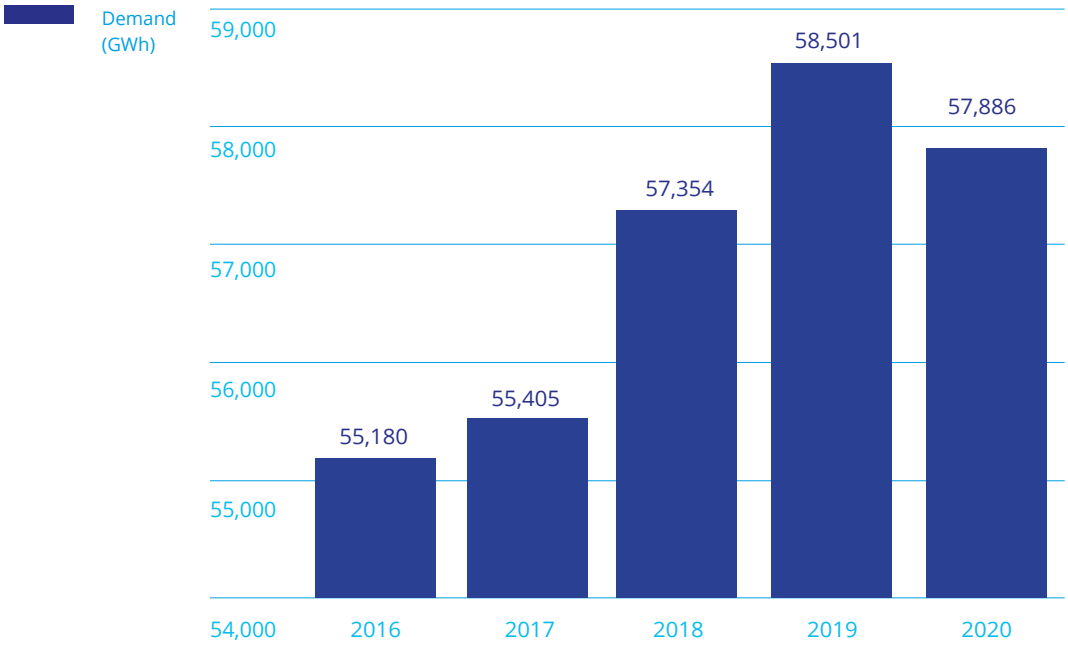


4.2 Demand change

Demand is the total amount of gas physically off-taken from the gas network in Ireland each year (excluding Unaccounted for Gas (UAG) and fuel gas). Figure 4.3 reflects the demand for gas in 2020, which has decreased by .2% on the 2019 demand. There was a slight increased demand experienced in Power Generation, but a decrease in demand for LDM/DM and NDM. The reason for this decrease in demand was as a result of an increase in renewable electricity on the grid and the effects of the pandemic with lockdowns in the early part of 2020 (March – May).

- **Power Gen** Increase of .9% was recorded;
- **LDM & DM** The Industrial and Commercial (I & C) sector had a decreased demand of 1.2% in annual demand; and
- **NDM** The NDM sector experienced a decrease of 2.6%.

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)[4]. 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 669 GWh for 2020 increased from 626 GWh in 2019 as per Figure 4.4. This increase is a continued 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[5]. Figure 4.5 shows that 1.45% of all transmission site-metering validation checks carried out in 2020 resulted in adjustments (i.e. approximately 81 transmission site-metering monthly adjustments performed out of 5,650 metering validation checks in 2020). Adjustments are required to ensure accurate reading when a meter is out of tolerance, configured incorrectly or replaced. The reason for the reduction in the number of meter read adjustments in 2020 could not be ascertained but will be closely monitored in 2021.

Gas Networks Ireland continues to improve its daily and monthly metering validation checks, ensuring more accurate end user allocations.

4 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.

5 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

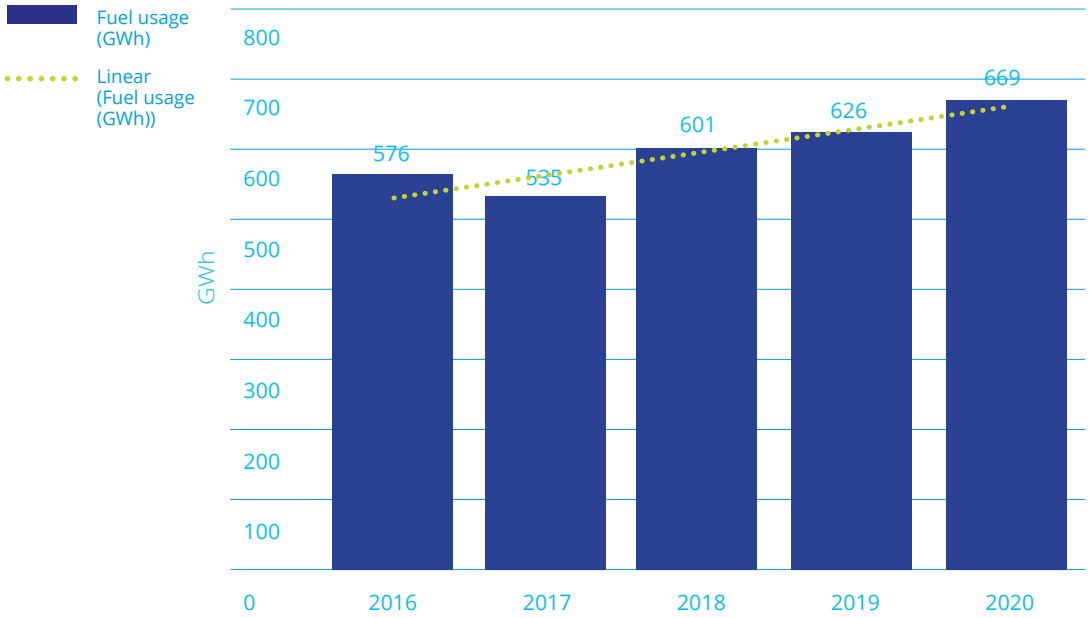
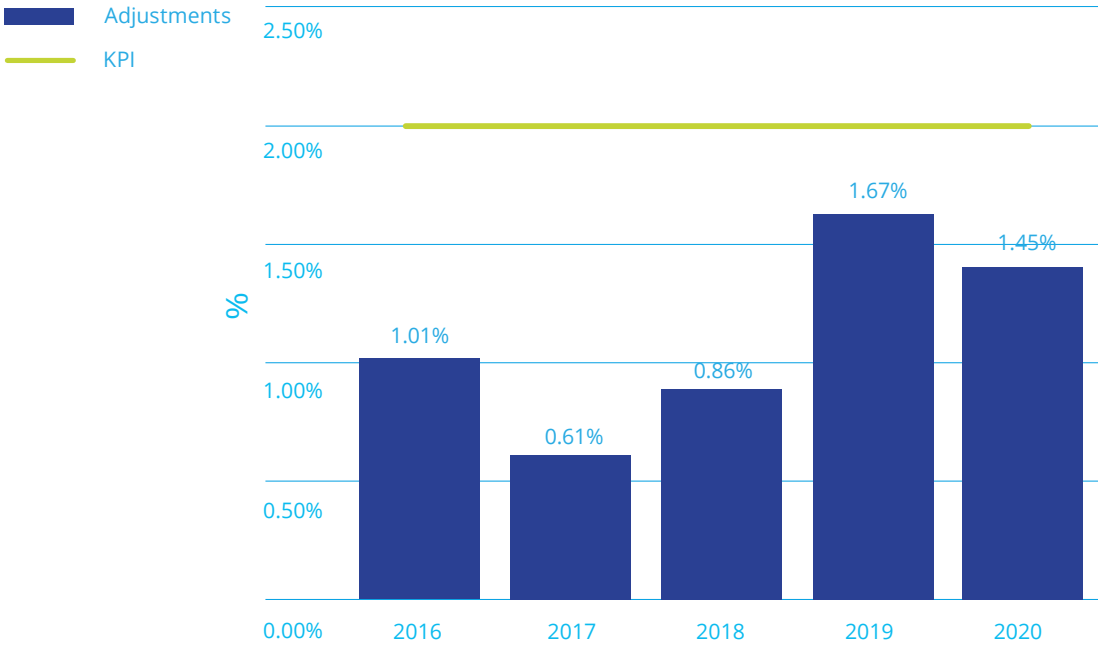


Figure 4.5: Meter read verification



04 Transmission system data

4.4 Transmission unaccounted for gas

Unaccounted for Gas (UAG)[6] 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[7] 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 continued to reduce in 2020. Corrib supply continues to decline, dropping in flow by 19% in 2020 compared to 2019. Calorific Value (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 as 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.

6 Volume as a % of total gas

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

Figure 4.6: Transmission UAG (% throughput)

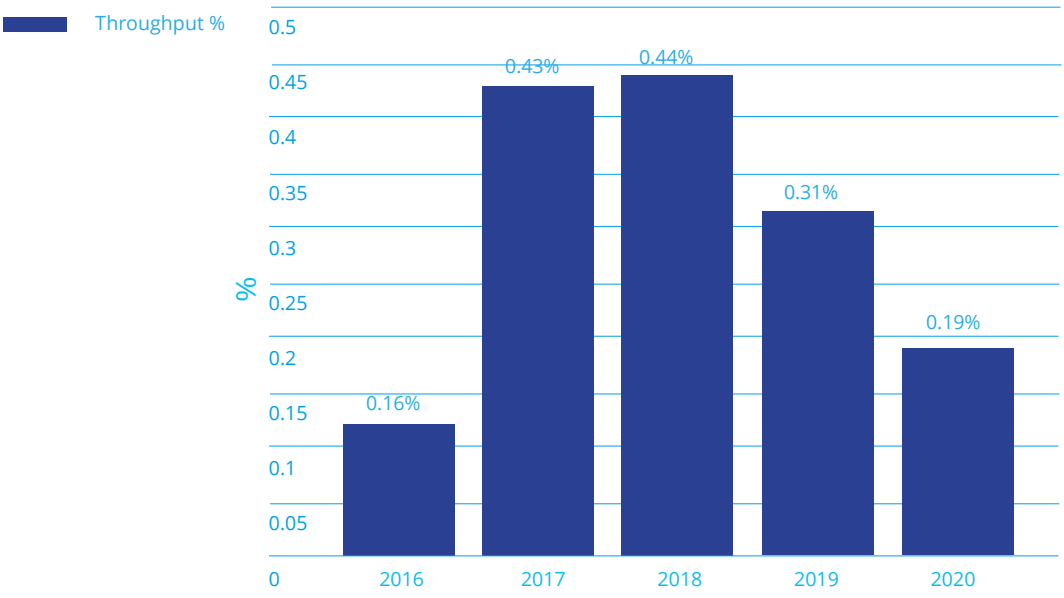
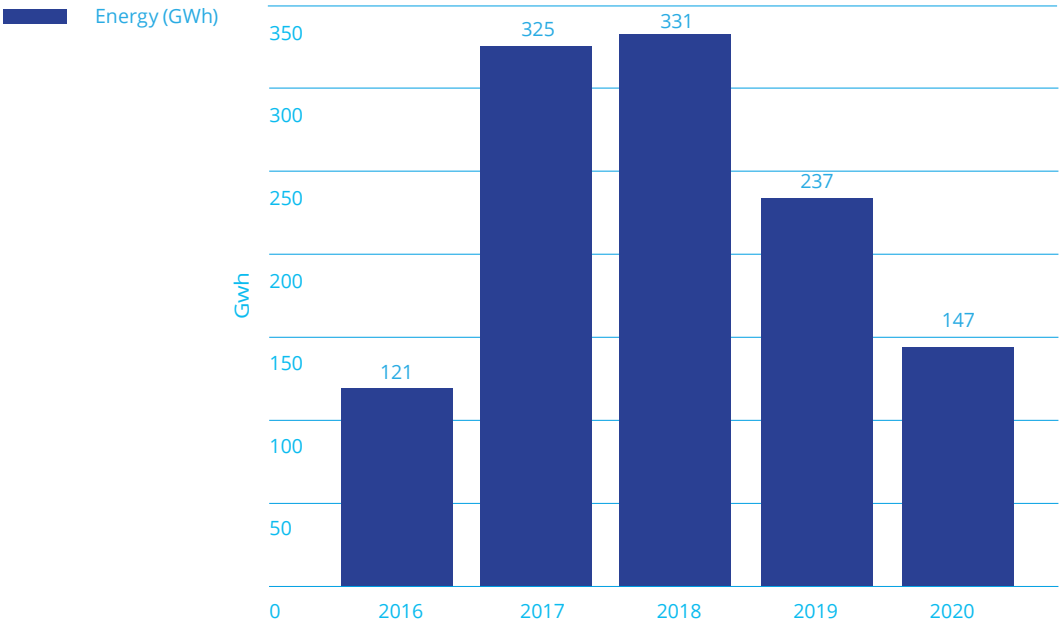


Figure 4.7: Transmission UAG (energy – GWh)

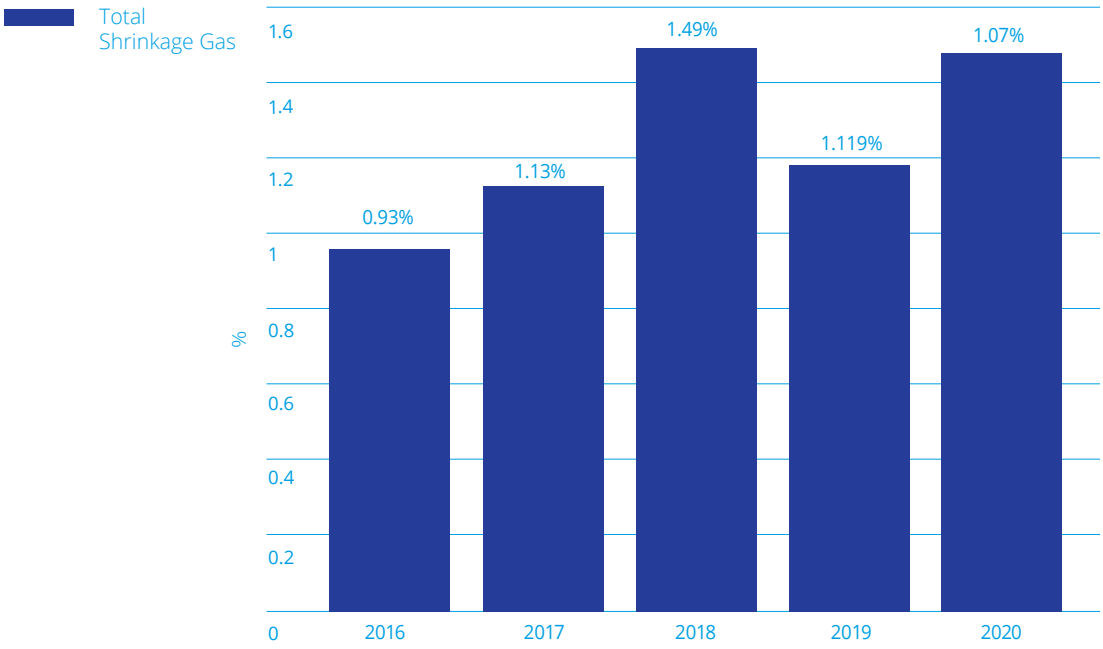


04 Transmission system data

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 1.07% in 2020.

Figure 4.8: Shrinkage as % of throughput



The fuel gas component of shrinkage gas has increased, due to the continued reduction in flow at the Bellanaboy Entry Point. Fuel gas is used to run the compressor stations and network installations. As previously described the Transmission (Tx) UAG component of Shrinkage reduced in 2020, resulting in the overall reduction in Shrinkage.

In Q3, 2020 Gas Networks Ireland moved to the trading platform to secure shrinkage gas, in place of tendering for a shrinkage contract.

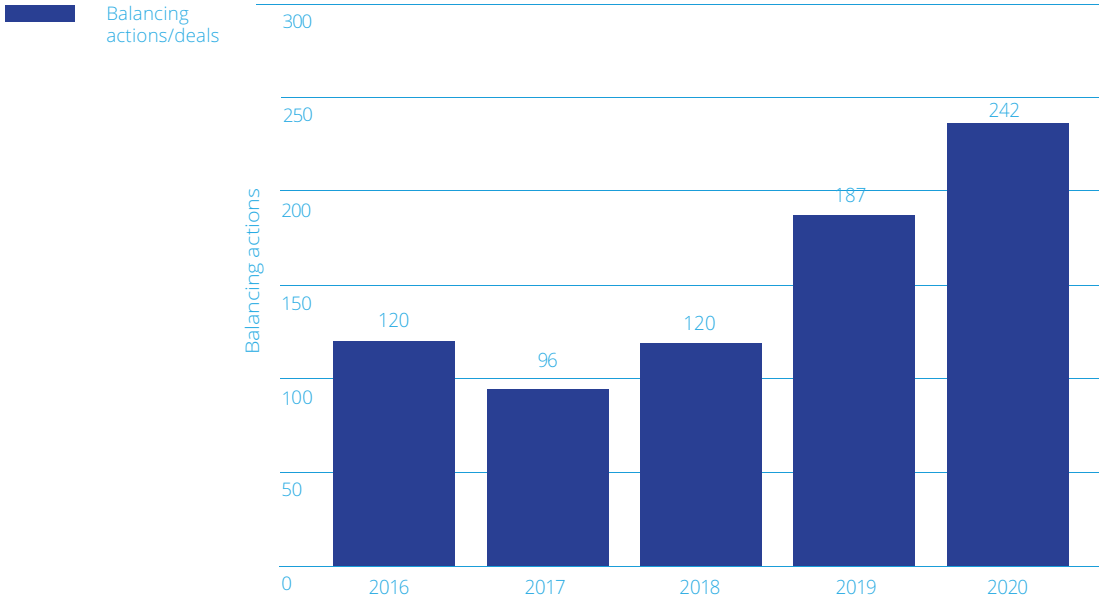
A balancing action means buying or selling gas as required to match the amount of gas entering and leaving the system. On 125 days in 2020 balancing actions were taken. Now that Gas Networks Ireland are completing all balancing actions on the trading platform, there are opportunities to take smaller, more frequent balancing actions in order to continue to foster liquidity at the Irish Balancing Point (IBP). Over those 125 days in 2020, 242 individual transactions took place. Ireland has not procured balancing services since commencing trading on the trading platform in May 2018 and has decided not to renew the pre-existing residual Balancing Gas Contracts after their expiration date on the 31st December 2020.

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[8] for network service and operational safety. This is illustrated in the table below:

Table 4.1: System balancing actions[7]

Action	2016	2017	2018	2019	2020
System balancing actions (number of)	120	96	120	187	**242**
System balancing volumes (GWh)	653	329	429	458	**633**
System balancing as a % of total volume	0.90%	0.40%	0.60%	0.60%	**0.80%**
ROI Shipper imbalance as % of total ROI flow	0.54%	0.65%	0.51%	0.38%	**1.00%**

Figure 4.9: System balancing actions[9]



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[10]. 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[11], 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.

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

9 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.

10 Environment and Energy Policies

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

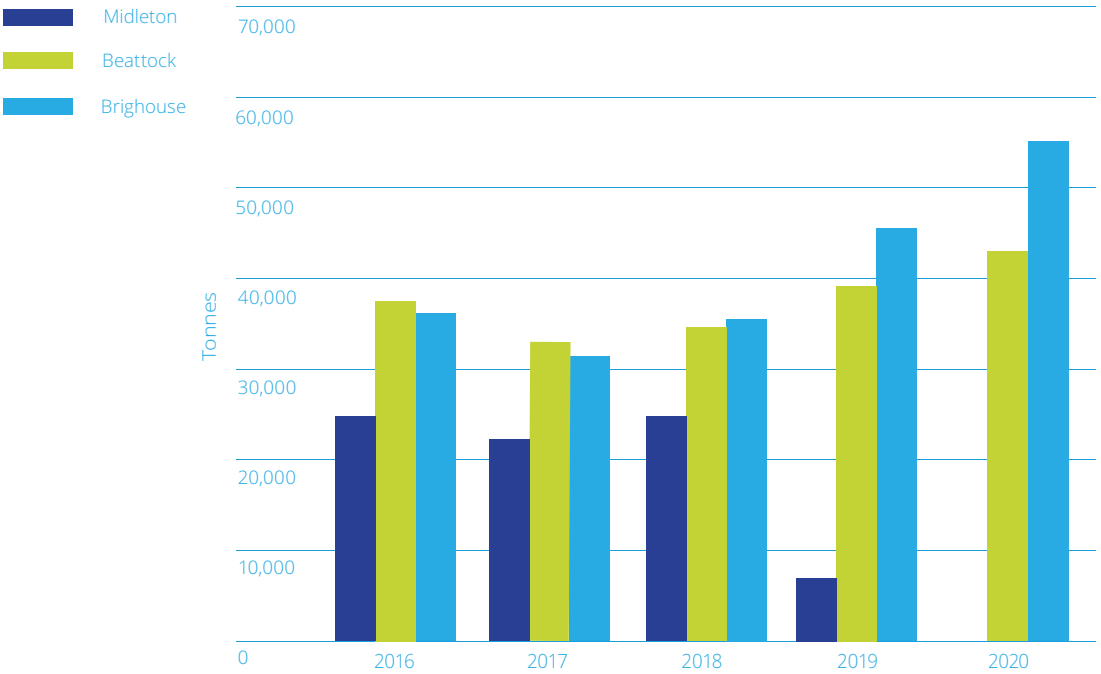
04 Transmission system data

4.6 Carbon usage/emissions *(continued)*

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.

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

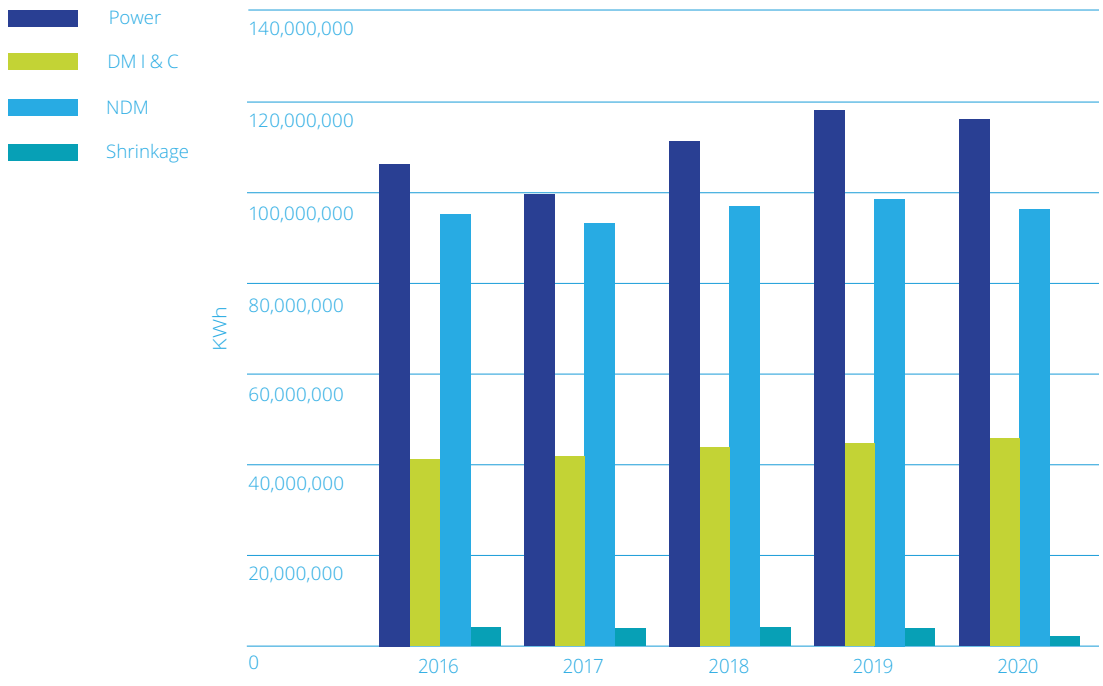


4.7 Capacity bookings

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 2020, 259 GWh was the total exit capacity booked for Power, DM[12] I&C, NDM[13] and Shrinkage for the year. This is shown in Table 4.12 and illustrated in Figure 4.11.

- **Power** - Since 2016, we have seen strong growth in capacity booking mainly due to increased power demand. 2020 was a relatively strong year for power, however we saw a slight decrease from 2019 of 1,634,475 kWh or 1.4%.
- **DM I&C** - bookings have continued to increase since 2016 mainly due to increased load from large energy users, New Town anchor load connections and the economic recovery. We saw a slight decrease in 2020 primarily due to covid19 restrictions. CNG bookings are also included in this sector.
- **NDM** - bookings have remained relatively stable since 2016 despite strong economic growth, mainly due to increased energy efficiency. We saw a slight decrease in 2020 overall primarily in the I&C sector due to covid19 restrictions.

Figure 4.11: Exit capacity bookings



12 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.

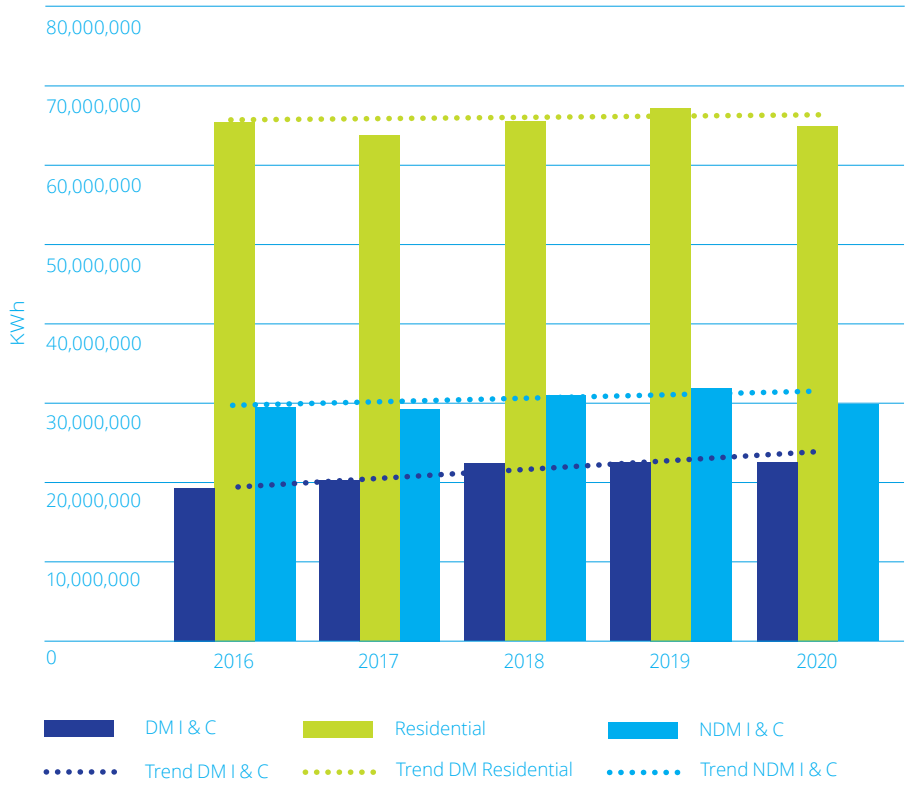
13 The Non-Daily Metered (NDM) sector refers to those who consume less than 5.55 GWh of gas annually. This covers small Industrial & Commercial (I&C) customers and residential properties.

04 Transmission system data

4.7 Capacity bookings *(continued)*

On 31st December 2020, 118.6 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 4.12: Distribution SPC bookings

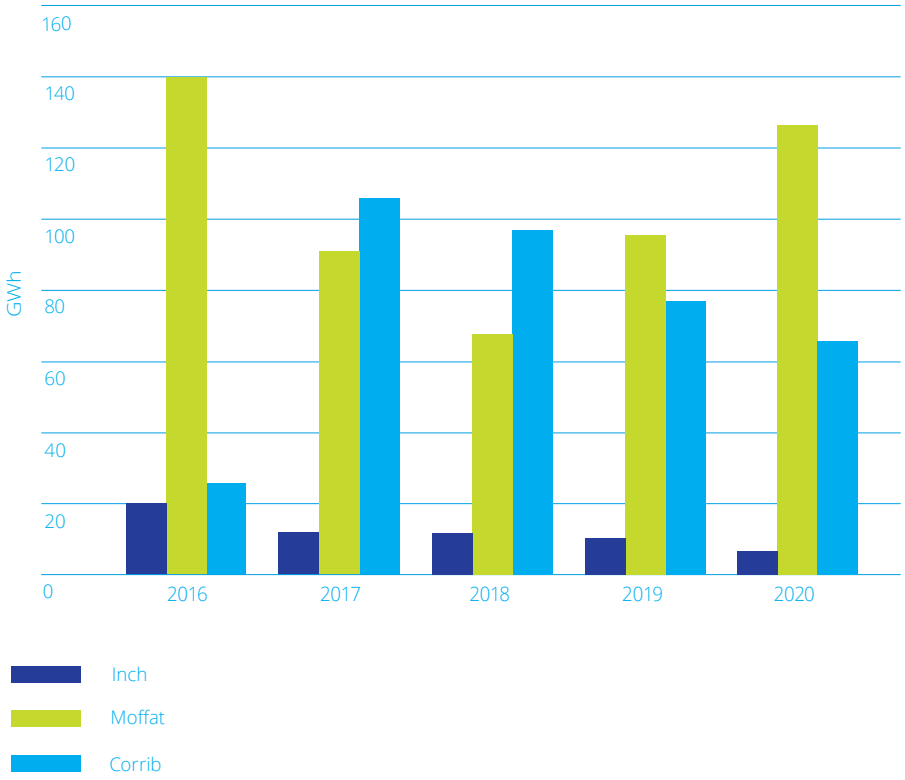


4.8 Entry capacity booking processing

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 2016. 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.

It should be noted that these are Annual Capacity Bookings at each of the Entry Points. In addition, there are short term products available which have not been included.

Figure 4.13: Annual entry capacity bookings (GWh)



4.9 Performance standards

There was no safety incident reported under guidelines in 2020.

Table 4.2: Transmission service standards 2020

Customer Commitments	KPI	2013	2014	2015	2016	2017	2018	2019	2020
Safety & Quality Reportable safety incidents	0	0	0	1	1	1	0	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[14]. The total number of gas points registered on the 31st of December 2020 was 712,507. This was a 0.94% increase on the number registered on the same date in 2019. The total number of new Gas Points registered during the year 2020 was 8,664. There were 1,221Gas Points deregistered during the year[15].

14 Vulnerable customers.

15 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.

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 11.16% increase in switching activity in 2020 when compared to 2019. Many factors can influence switching behaviour; such as consumer sentiment and inertia, points of differentiation between the suppliers, attractive offers, recruitment and retention campaigns. Lower gas prices in early 2020 are considered to having been an influencing factor.

There was an increase of 4.76% in the number of historical consumption requests during 2020, 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.

Table 5.1: Gas Point activity by category

Category	LDM	DM	NDM I/C	NDM Domestic	2020 Total	2019 Total	% Change from 2019	
Gas Points Registered @ 31 Dec 2020	43	258	27,118	685,088	712,507	705,868	0.94%	↑
Total Gas Points Registered during 2020	0	5	494	8,165	8,664	11,879	-27.00%	↓
Gas Points Deregistered during 2020	N/A	N/A	166	1,055	1,221	1,398	-12.66%	↓
Tariff Exempt NDM Supply Points @ 31 Dec 2020	N/A	N/A	179	1,180	1,359	2,088	-35.00%	↓
Total Tariff Exempt NDM Supply Points during 2020	N/A	N/A	2,417	1,497	3,914	3,118	25.50%	↑
Change of Shippers Jan - Dec 2020	3	239	3,533	110,177	113,952	128,265	-11.16%	↓
Historical Consumption Requests Jan – Dec 2020	5	215	12,592	N/A	12,812	12,118	5.72%	↑

Table 5.2

Category	31st December 2019	31st December 2020	% change
Transmission LDM	31	28	-9.6%
Transmission DM	19	19	0%

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

Figure 5.2: Total gas points and market activity

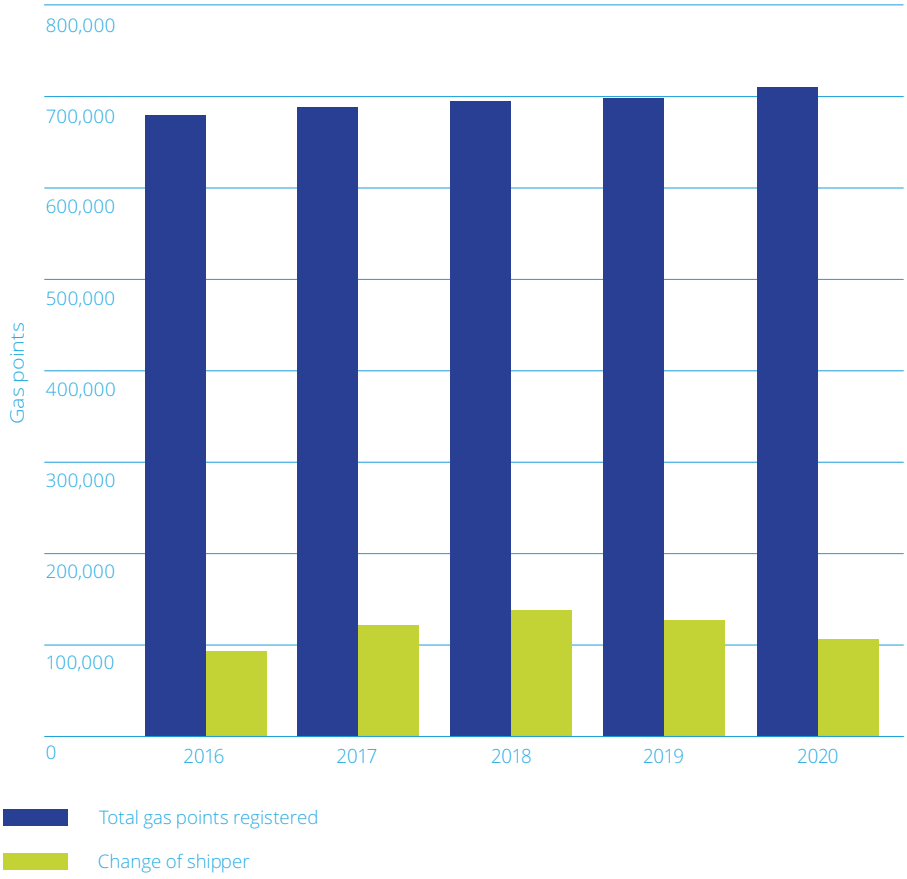
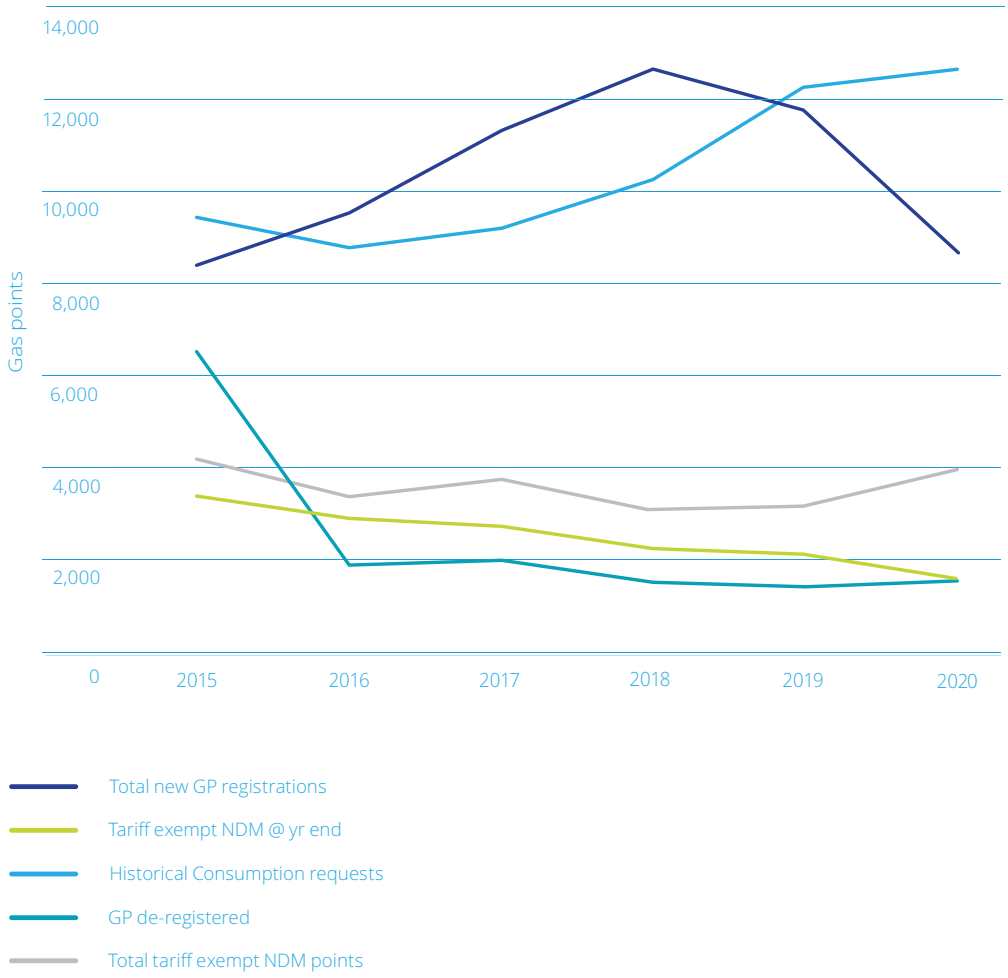


Figure 5.3: Gas point activity by year[16]



16 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 2020, an AGI capacity upgrade was completed at Naas, Co. Kildare.

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;
- upgrade works to bring pressure reduction sites into compliance with the ATEX[17] directive; and
- installation of attenuation measures to limit noise emissions in the vicinity of pressure reduction sites.

There were a total of 192 refurbishment projects ongoing during 2020, their status at year-end at various stages from design through to fully commissioned and in operation.

"Reinforcement programmes are carried out to increase the capacity of the network in response to increased demand."

17 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 2020 a number of refurbishments projects were carried out including:

- At Brighouse Bay Compressor Station, the power turbine and exhaust collector on Siemens Unit B were replaced

- At Beattock Compressor Station, the exhaust collector on Solar Unit C was replaced

In addition, a number of significant projects are planned for construction in 2021/22. These include:

- 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. Construction was due to take place on this project in 2020 but was deferred due to the operational risk of carrying out the project during the Covid-19 pandemic.

- Security upgrades at 4 sites on the onshore Scotland network, namely, Beattock and Brighouse Bay Compressor Stations, Twynholm AGI and Cluden Block Valve. Construction on this project has been delayed from 2021 to 2022 as the procurement competition for the Design & Build contract for the project had to be cancelled and reconstituted.

- Electrical system upgrade at Beattock and Brighouse Bay Compressor Stations. Construction on this project is expected to commence in 2022.

07 Transmission gas safety

7.1 High level gas 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 2020. 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	2016	2017	2018	2019	2020
1A	Public Reported Escapes (PREs) (Reported Leaks)	Total Reported Escapes	6	10	4	4	**N/A**
6B	Third Party Damage	Development enquiries requiring action	952	998	1070	1322	**2204**
1D	Third Party Damage Prevention Detected Encroachment Events	Category A - Pipeline Damage or Leak	0	0	0	0	**1**
		Category B - Serious Potential for Damage	12	12	5	14	**13**
		Category C - Limited Potential for Damage	39	23	42	22	**36**
		Total detected encroachment	51	35	47	36	**50**
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)	1	0	1	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)	4	1	0	2	**0**
3B	Gas Quality	% Availability of the gas measurement equipment	100%	100%	100%	100%	**100%**
4A	Gas Supply Emergencies	Local Gas Supply Emergencies 5,000 - 9,999 customers affected	0	0	0	0	**0**
		NGEM Emergencies > 10,000 customers affected	0	1	0	0	**0**
4B	Gas Emergency Exercises	Emergency Exercises planned per annum (Minimum)	2	2	2	2	**2**
		Emergency Exercises undertaken	3	4	3	3	**2**
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 1,322 in 2019 to 2,204 in 2020. The increase is attributed to the launch in Q4 of 2019 Gas Networks Ireland'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 Gas Networks Ireland 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 50 total encroachments (instances of unauthorised excavation in the pipeline wayleave) detected in 2020, which is an increase on the 36 detected in 2019. Since 2011, Gas Networks Ireland has classified transmission pipeline encroachments in line with the United Kingdom Onshore Pipeline Operators Association (UKOPA) model, these include:
Category A: Pipeline leak or damage;
Category B: Potential for damage; 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 was one Category A encroachment in 2020 involving minor coating damage to a pipeline. 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 several 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. The Gas Networks Ireland Transmission System Safety Case was revised in December 2020 and is the current accepted Safety Case as of 31st December 2020. 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 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 2020 emergency exercise, titled 'Exercise Baltic' was carried out over three days on the 6th, 8th and 9th October 2020 (Preparatory courses 6th & 8th). Exercise Baltic 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 Baltic.

Exercise Baltic 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 Gas Networks Ireland'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 Gas Networks Ireland 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.

NGEP (Version 5) is currently being drafted and is in the latter stages of review.

08 Code of operations obligations

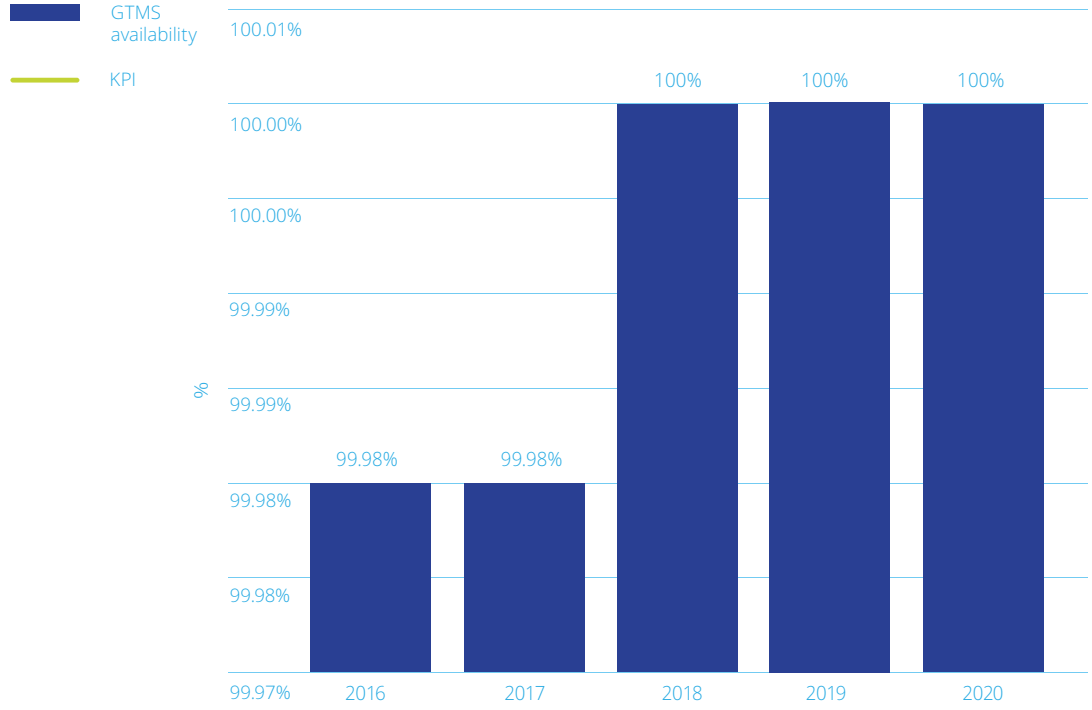
The Code of Operations governs the relationship between the Transporter and the shippers on the transportation (transmission and distribution) network. By signing Framework Agreements, shippers accept the terms of the Code of Operations. In February 2005, the CRU approved the implementation of a new 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 Gas Transmission Management System (GTMS) and managing the daily nomination and allocation process, ensuring that the correct volume of gas is being transported at all times to meet shippers' and customers' requirements. The KPI for GTMS system availability is 99.8%, this target has been consistently achieved over the years and in 2020 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 to all shippers on a monthly basis. The invoices are for transmission and distribution capacity and commodity charges. The team also issue shippers a letter each year regarding the pricing mechanism on the shrinkage contract and is responsible for the disbursement of account invoices and credit notes. It should be noted that Gas Networks Ireland no longer issues a letter on the shrinkage contract as all shrinkage, as of the 1st October 2020, is procured on the Trading Platform. The performance targets for invoices is that they issue by the 12th day of the month, this has been achieved 100% of the time.

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 dropped in 2020 having remained steady at circa 3.4 times over the previous five years, this is illustrated in Figure 8.3. The drop in 2020 can be attributed to restrictions in place on travel and people's hesitancy because of the pandemic.

Figure 8.2: Meter read access rates

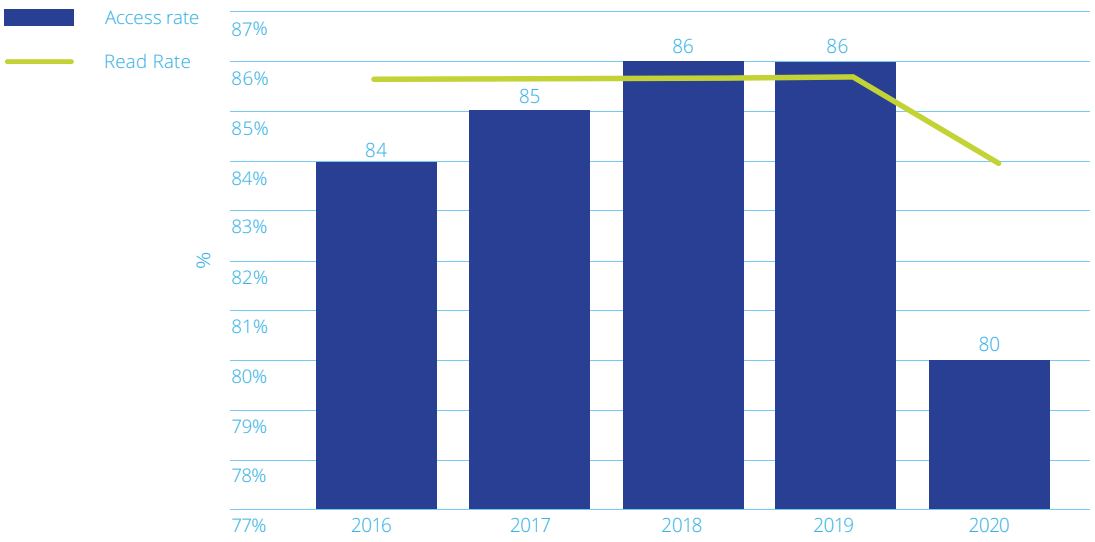


Figure 8.3: Meter read rate

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. 2020 saw a drop in I&C FAR due mainly to the effects of the pandemic and its associated lockdowns.

Table 8.1: Meter data services[18] [19]

Meter data services	KPI	2016	2017	2018	2019	2020
Forecasting, Allocation and Reconciliation (FAR) – Domestic Reconciliation (PPM Meters - 12 month Rolling)	80% within 1,250 kWh	99.39%	99.33%	99.32%	99.38%	98.72%
Forecasting, Allocation and Reconciliation (FAR) – Domestic Reconciliation (Credit Meters - 12 month Rolling)	80% within 1,250 kWh	91.25%	91.94%	92.37%	88.98%	89.85%
Forecasting, Allocation and Reconciliation (FAR) – I & C Reconciliation (12 month Rolling)	80% within 4,500 kWh	75.76%	77.27%	75.49%	74.82%	69.62%

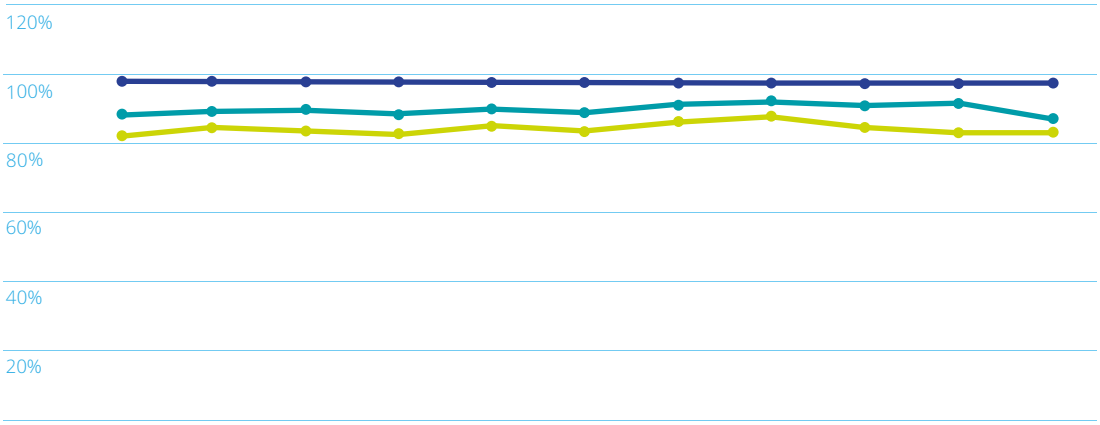
18 http://www.gasnetworks.ie/en-IE/Gas-Industry/Services-for-Suppliers/Capacity-registerFAR/

19 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**

The following chart plots the percentage of reconciliations within 10% of annual quantity over the past 11 years up to and including 2020. Performance over this period has been stable apart from the drop in I&C in 2020 highlighted below.

Figure 8.4: Percentage of reconcilliations <= 10% of Annual Quantity



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PAYG	98%	98%	98%	98%	98%	98%	98%	97%	97%	98%	97%
RD CREDIT	82%	84%	84%	83%	84%	84%	85%	87%	85%	83%	83%
IC	88%	89%	89%	88%	89%	88%	90%	91%	90%	91%	86%

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.

Prior to October 2020, the transporter recovered the cost of shrinkage gas for the transmission system from shippers (by reference to throughput). From October 2020, shrinkage is included in tariff calculations.

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[20]. 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 2019/20 gas year was selected and presented to shippers for consultation in May 2019 and accepted for the 2019/20 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 2019/2020 gas year Gas Networks Ireland informed the Shippers of three planned maintenance days affecting the entry points prior to the gas year commencing. These dates were as follows:

Date	Duration	Entry Point
20th May 2020	1 day	Corrib
17th June 2020	1 day	Inch
9th September 2020	1 day	Corrib

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

In 2019/20 gas year the Bellanaboy Bridge Gas Terminal operator curtailed flow into the Gas Networks Ireland system from the Bellanaboy Entry Point on ten occasions for a total of approximately 148 hours. There were no instances during 2019/20 gas year where Gas Networks Ireland constrained gas flow at the Bellanaboy Entry Point.

The were no interruptions to the Moffat entry point in the year.

20 Part G, section 5, Code of Operations

09 Distribution system

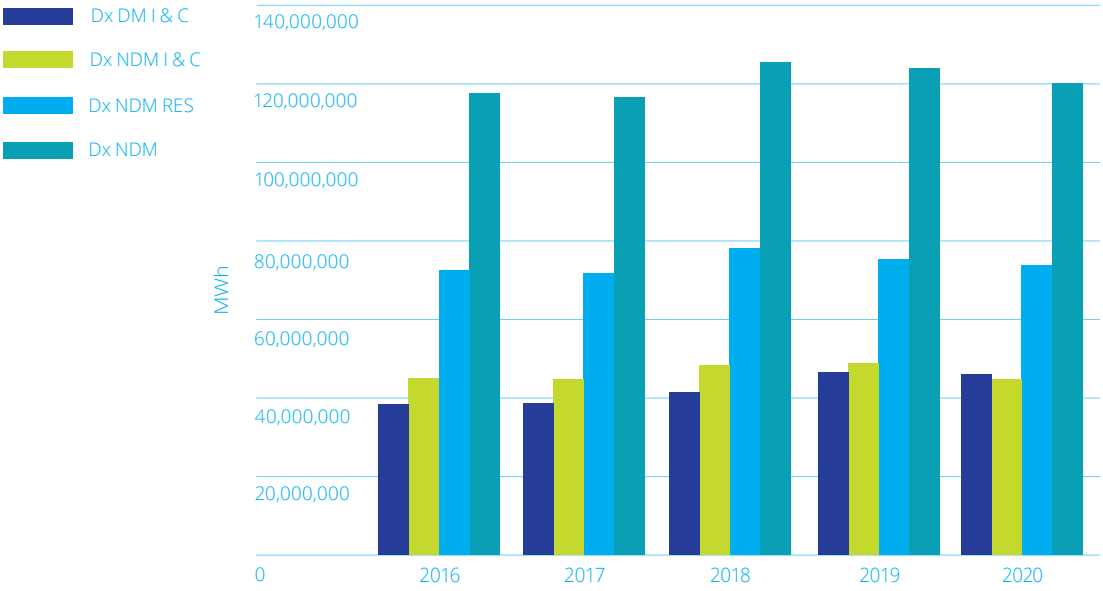
9.1 Distribution system data

In the DM (I & C) sector, gas demand was approximately the same in 2020 as it was for 2019, with a slight increase of 0.1%. While there was an increase in connections in this sector of nearly 3%, the lack of economic growth resulted in the gas demand remaining flat across the two years.

In the NDM sector gas demand is sensitive to weather; based on a Degree Day (DD) comparison, the winter of October 2019 to March 2020 was approximately 12% colder than the previous year. However, overall the year 2020 was 1% warmer than 2019 and there was a decrease in gas demand in the NDM sector of 3.5% in 2020 compared to the previous year. When weather correction is taken into account, a decrease of 4% in NDM sector gas demand is observed. There was a slight increase of 1% in the number of NDM connections in 2020 but this is offset by the warmer temperatures vs. 2019.

In the NDM (I & C) sub-sector, demand was down by 7.7% in 2020 vs. 2019. When weather correction is considered, demand falls further to 8.2% less than 2019. In the Residential NDM sub-sector, there was a decrease of 0.8% in gas demand. Allowing for weather correction, demand in this sector is down 1.4% on 2019. Table 9.1 illustrates the distribution system data.

Figure 9.1: Distribution system data



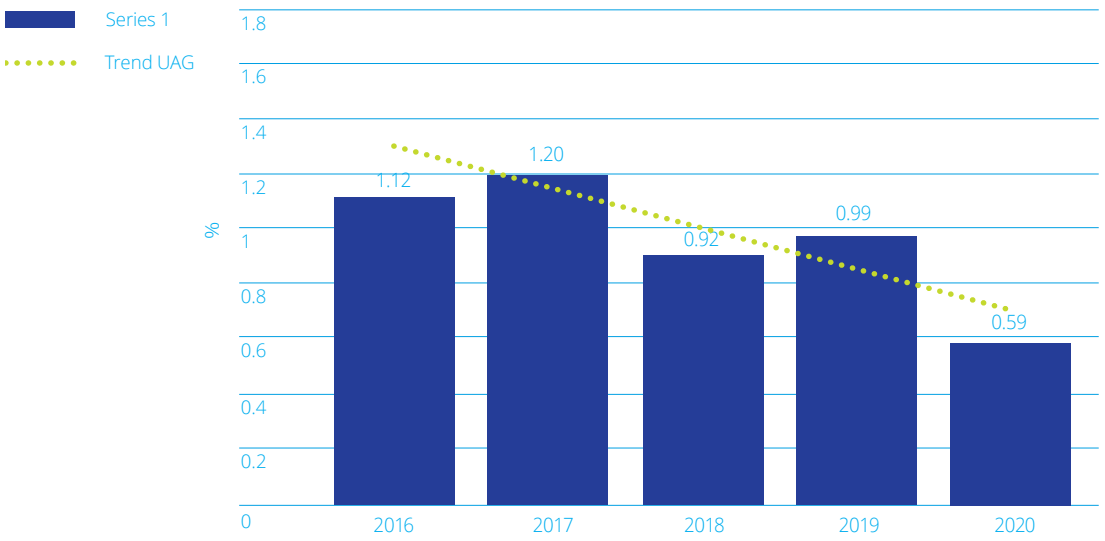
9.2 Distribution UAG

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[21] on a rolling 12-month basis. Distribution UAG as percentage of total distribution throughput in 2020 was 0.59%. The Distribution UAG percentage for 2020 was significantly lower than previous years. This is primarily as a result of the efforts of the Distribution UAG project team and the various initiatives they have undertaken to reduce DX UAG, including updating of the National Meter Correction Factor. However, it is as yet unknown how COVID 19 and the associated restrictions that impeded on meter reads may also have impacted Distribution UAG.

21 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 2020.

09 **Distribution system**

Figure 9.2: Distribution UAG (%)



9.3 Total number of connections (by category)

The total number of distribution connections in 2020 stands at 710,068. This is up by 1.1% on 2019. The largest increase was in the DM (I&C) sector experiencing a rise of 2.97% from 2019, see Table 9.2 below.

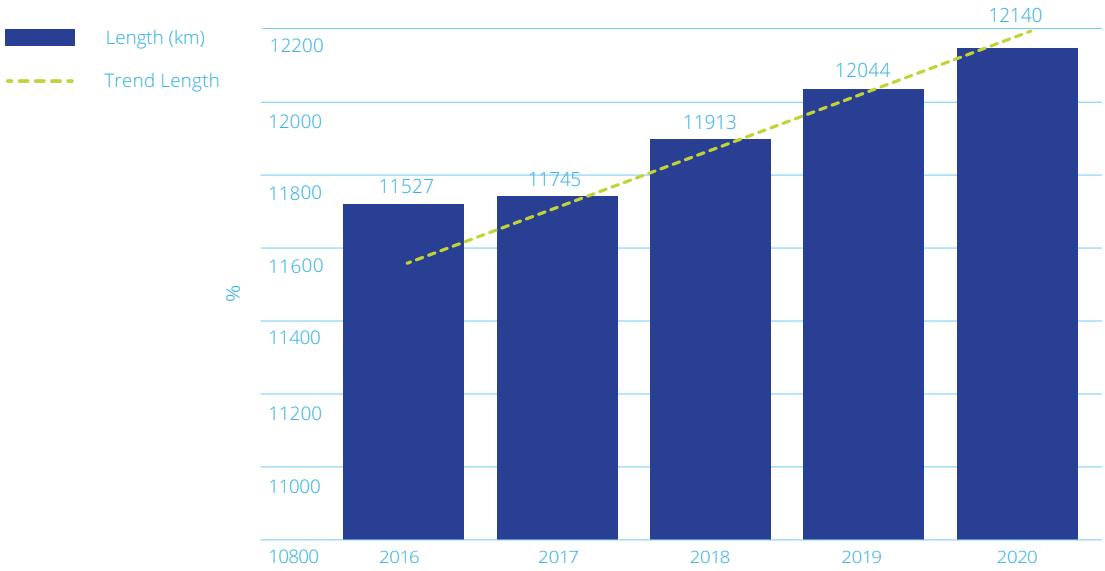
Table 9.2: Distribution connections by category

Connections	2016	2017	2018	2019	2020	% Change from 2019
Dx DM I&C	218	232	230	236	243	**2.97%**
Dx NDM I&C	25,565	25,993	26,256	26,482	26,845	**1.37%**
Dx NDM Res	649,445	657,638	667,340	675,728	682,980	**1.07%**
Dx Total	675,228	683,863	693,835	702,446	710,068	**1.09%**

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 2020 measured 12,140 km. This has been growing incrementally in the last five years as shown below in Figure 9.3.

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 on the next page are some 2020 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 2020 are listed below. Note that productivity on this programme was significantly impacted by Covid-19 related Construction restrictions.

- St. Canice's Road
- Carpenterstown Road, Castleknock

Design has been completed on the following sites:

- Jamestown Business Park, Kylemore, Dublin 8
- Lennox Street, Portobello, Dublin 8
- Thormanby Road
- Kimmage Road Lower
- South City Business Park, Tallaght, D24
- Portlaoise Reinforcement
- Railway Street, Cork City
- Trim Rationalisation, Phase 2

Design is ongoing at the following sites:

- 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
- Feltrim Road, North County Dublin
- North Circular Rd., Dublin 7
- Shannon Street, Limerick
- Foxhill Avenue

9.7 New connections during year (by category)

Connections to the Gas Networks Ireland natural gas network are split into four (4) main sectors as follows:

- Large Industrial and Commercial (LIC)
- Small and Medium Enterprise
- Residential – New Housing
- Residential – Mature Domestic

Following a reasonably strong 2019, with almost 11,300 new meter fits completed and new incremental gas demand of circa 714 GWh secured by the New Connections team, a more challenging 2020 was expected, particularly on the back of the published 2019 Climate Action Plan (CAP2019). The publication of this plan resulted in significant uncertainty in both the New Housing and Mature Domestic sectors as, among other things, the document contained a proposed ban on natural gas boilers in new homes from 2025 onwards. It was also expected that this publication, and the general negative sentiment towards fossil fuels of all types, would negatively impact on gas connections across the Industrial and Commercial sectors (SME and LIC). The uptake of natural gas connections within the public sector was forecasted to reduce as the CAP2019 recommended a move away from fossil fuels in public sector buildings.

09 Distribution system

9.7 New connections during year (by category) *(continued)*

The New Housing sector continues to be challenged by the introduction of NZEB (Nearly Zero Energy Buildings) Building Regulations and strong competition from electric heat pumps for new traditional housing units (e.g. semi-detached houses in housing estates). Although the majority of large residential developers have moved away, or are in the process of moving away, from natural gas and are now installing electric heat pumps in new homes, some builders and their consultants continue to choose natural gas in conjunction with solar technology to meet the building standards. Natural gas, in conjunction with solar photovoltaic (PV) technology can meet the NZEB standards resulting in a cost-effective solution and offering homeowners more versatility in terms of appliances (cooking, decorative fires, high-efficiency boilers, tumble-dryers, etc). In addition to the traditional new homes, Gas Networks Ireland was very successful in 2020 in delivering cost-effective energy solutions for the multi-occupancy buildings (apartments) with almost 2,500 new apartments built during 2020 with heating systems provided by a combination of natural gas, Combined Heat and Power and electric heat pumps (ref. new Bridgefield and Pappan Grove case study).

Clearly the Covid-19 global pandemic had a significant impact on Gas Networks Ireland's sales efforts across all sectors, but most negatively impacted on the SME sector, and particularly those SME's operating in the hospitality sectors (hotels, bars, restaurants, café's, B&B's, etc). From mid-March 2020, all sales and marketing activities were put on hold and only essential activities continued. The numbers of SME connections in 2020 decreased by 24% compared with 2019. This reduction can be explained by a combination of the impact of the Climate Action Plan plus the impact of the Covid-19 pandemic.

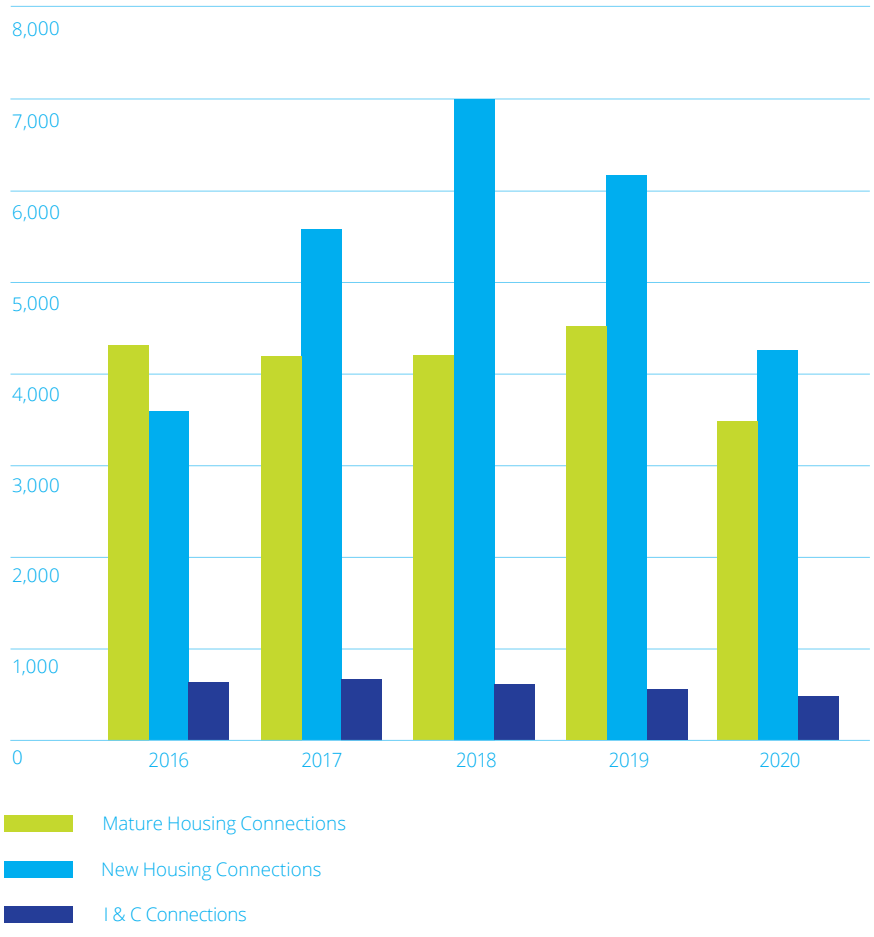
The Mature Housing sector also faced challenges in 2020 due to Covid-19 restrictions and the continued impact of competition from heat pumps which benefit from SEAI grant support giving them a competitive advantage. This, together with the proposed ban on gas boilers in the 2019 Climate Action Plan resulted in a 23% decrease in mature housing meter fits in 2020 compared to 2019.

Against these many challenges, Gas Networks Ireland has continued to focus on increasing the utilisation of the gas network through focusing efforts during 2020 on large energy users across the Power Generation, Data Centre and Pharma/Manufacturing sectors. Gas Networks Ireland's third Combined Heat and Power Conference was held in the Gibson Hotel in Dublin in February 2020, just before the government restrictions were enforced, and this was a great success with multiple stakeholders in the Large I&C Sector (Dairy, Pharma, BioMedical, Hotels etc.) in attendance and presenting.

The SME Sales team also focused on promoting natural gas to the large number of Chambers of Commerce in existence across the country. This included presenting at Chamber events, the majority of which were help virtually, and also included direct 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 virtual Regional Insight Series in late 2020. The Data Centre market continued to be an area of focus for the 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" continued during 2020. The aim of this campaign was to inform the public about the decarbonisation efforts of the company including the introduction of renewable gas onto the gas network. In October 2019, Gas Networks Ireland published its "Vision 2050 - A Net Zero Carbon Gas Network for Ireland" document outlining how Gas Networks Ireland 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. In 2020 the first commercial flows of renewable gas entered the natural gas network and this was widely publicised by Gas Networks Ireland's marketing team to communicate the positive message around the importance of decarbonising the national gas network to Ireland Inc and how this can deliver real reductions in Greenhouse Gas Emissions from the difficult to address heat and transport sectors while also reducing emissions from the agricultural sector, the sector responsible for the highest levels of emissions in Ireland today.

Figure 9.5: New Connections by category



09 **Distribution system**

9.8 Update on new towns receiving gas

Gas Networks Ireland continually brings the benefits of natural gas to new customers and new towns across the country, with natural gas now available in 22 counties and 181 population centres throughout Ireland. The Connections Policy, a Gas Networks Ireland document approved by the CRU, 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 over towns without a natural gas network. Sales and Marketing efforts continued in Listowel, Wexford and Nenagh during 2020, restricted only by the Covid-19 government restrictions, and significant commercial orders were secured as a result of these ongoing efforts.

During 2020 Gas Networks Ireland worked with multiple stakeholders in Sligo to identify the possibility of developing a virtual gas network for this town to economically bring the benefits of both natural gas and renewable gas to Sligo without the significant costs associated with a Transmission Network extension (from Corrib pipeline or Northern Ireland). Over the past number of year's it has been demonstrated that a network extension to Sligo was not a viable project for Gas Networks Ireland based on the total cost estimates and the economic appraisal. Therefore, an innovative approach has been taken by stakeholders in Sligo town to identify is a virtual network supplied with compressed natural gas or renewable gas could be a viable option. This is still being considered at the end of 2020.

The Center Parcs Longford development, connected to the natural gas network in 2019, ramped up to full operations between 2019 and early 2020. The expansion of the natural gas network into the neighbouring town of Ballymahon was also completed in 2019 and sales efforts in this town delivered a significant number of new connections during 2020.

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.

Natural gas is cheaper, cleaner and more reliable than other fossil fuels and these benefits are extremely important for both existing and new customers connecting to the natural gas network. It is a versatile energy source that can play a significant role in decarbonising the nation's energy consumption. Natural gas already offers cost savings to circa 680,000 domestic consumers and oil home-owners are continuing to switch to natural gas to avail of the benefits this fuel has to offer. Natural gas produces approximately 25% less CO_2 than oil and approximately 40% less than coal[22]. 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.

9.9 Innovation and new technologies

Two public access CNG refuelling stations are now operational in Ireland, located at Circle K's Dublin Port and Cashel forecourts. Both of these stations are operated by Circle K and have a capacity to refuel up to 50 vehicles per day. These two stations form part of the initial network 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 Connecting Europe Facility Transport Fund, and the CRU Innovation Fund. A further two public access CNG stations have been constructed at Circle K's Ballysimon and Clonshaugh stations and are due to be commissioned in 2021. An additional 8 Causeway public stations are currently progressing through the various project phases of design and planning. Gas Networks Ireland also delivers infrastructure to private fleet operators and hauliers – there are currently three medium-sized private CNG stations operational in Ireland. A large private CNG station in Virginia Co. Cavan was constructed in 2020 and is due to become operational in the second half of 2021. Demand at the five operational public and private CNG stations continued to grow robustly throughout 2020.

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 became commercially operational in 2020 with a capacity to inject up to 200GWh per annum of renewable gas into the network. Challenges 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 from these projects will be used to streamline processes for upcoming CNG stations and renewable gas injection facilities. Planning permission have been obtained for what will be Gas Networks Ireland's first owned and operated biomethane central gird injection facility, to be developed at a site in north Cork. Once fully operational, this facility will have the technical capacity to inject up to 700 GWh of biomethane per annum, which will be produced at anaerobic digestion facilities in its catchment area. 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.

22 https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/

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 using 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:

- ISO 45001 for safety management;
- ISO 14001 for environmental management;
- ISO 9001 for quality management;
- ISO 55001 for asset management; and
- ISO 50001 for energy management.

In 2020 all 5 management systems were reaccredited by the National Standards Agency of Ireland (NSAI) following a 5-day audit, the first time the NSAI have audited 5 management systems at once.

Gas Networks Ireland has an excellent record in meeting all its safety, statutory and regulatory obligations. Its average response time to the 14,928 public reported gas escapes (PREs) received in 2020 was 29 minutes, well within the 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 [23, 25]

Ref	Subject	High level KPI	2016	2017	2018	2019	2020
1A	Public Reported Escapes	Number of External Leaks Detected	3,691	3,498	3,534	3,456	**2,771**
		Number of Internal Leaks Detected	4,214	3,712	3,771	3,771	**3,758**
1C	Third Party Damage	No. of Main Damages	93	107	89	122	**82**
		No. of Service Damages	426	457	461	528	**401**
1D	Gas in Buildings	Number of 'Gas in Buildings' events (i.e. all gas ingress from external infrastructure)	1	0	0	1	**1**
2B	Gas Outages	> 15 Customer affected	1	0	0	5	**0**
		> 100 Customer affected	2	0	0	1	**0**
4A	Public Reported Escapes	% attended within one hour	99.89	99.91	99.3	99.9%	**99.96%**
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	1	0	0	**0**
5C	Incidents (Occurring on Gas Network)	Reportable under Gas Legislation	0	0	0	0	**2**
5D	Incidents (Occurring on Gas Network)	Reportable under CRU Guidelines	4	5	3	6	**2**
5E	Incidents (Occurring on Customer installations)	Reportable under Gas Legislation	0	1	0	1	**1**
5F	Incidents (Occurring on Customer installations)	Reportable under CRU Guidelines	3	2	8	3	**3**
5G	Non Gas related incidents	Number of Non Gas related incidents attended by Gas Networks Ireland	3	1	3	2	**2**
4D	Emergency Reports	Total no. of calls received via the 24-hour emergency telephone number (1850 20 50 50)	23,919	25,107	30,131	27,006	**26,960**
6A	Third Party Damage	Total enquiries to 1850 427 747 (inward communication)	1,772	1,610	1,565	1,420	**962**
		Total enquiries to distribution DBYD[26] email/post/fax/calls (inward communication)	5,723	5,939	8,088	13022[24]	**2,777**
		N/A	N/A	N/A	N/A	16,656[25]	Total responses from DBYD Online
		Total inward enquiries	7,495	7,549	9,653	14,442	**20,395**

23 In 2020 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

24 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

25 From 2020, Gas Networks Ireland have reported on outward responses from the Dial Before You Dig online service. On the online system, each individual response (plot) is counted whereas for enquiries received by email, phone or fax it is the enquiry that is counted, regardless of how many plots are requested/ issued

10 Distribution gas safety

10.4 Public reported escapes

There were 14,928 Public Reported Escapes (PREs) related to leaks on the Gas Networks Ireland distribution network in 2020. This is a decrease from the 15,822 PREs reported in 2019. In approximately 56% of these cases, no trace of gas was found. In most cases where gas was detected, the leaks were minor in nature and were made safe by Gas Networks Ireland technicians using standard methods.

10.5 Distribution safety performance

There was a consistently high safety distribution performance in 2020, a brief summary is outlined below:

- 1 gas in building events;
- 0 unplanned outages in 2020
- 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). Gas Networks Ireland 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. Gas Networks Ireland 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. Gas Networks Ireland 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 (1850 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.

Gas Networks Ireland plays a key role as an advocate for safety in relation to the natural gas network ensuring that the safety of both gas customers and the general public is always paramount. Gas Networks Ireland meters and pipes are installed by trained professionals, and only authorised personnel of appropriate certification make any alterations to Gas Networks Ireland meters or pipes.

In the interest of safety, the installation, removal, repair, service, maintenance or replacement of natural gas fittings and appliances within a premise are only to be carried out by Registered Gas Installers (RGI). It is a requirement for all RGIs to issue a certificate of conformance (completion certificate) in respect of gas works carried out.

Gas Networks Ireland works to highlight the safety risks and consequences relating to the unauthorised interference of a gas meters to gas customers and the general public. Each year a meter tampering public awareness campaign is developed by Gas Networks Ireland to drive awareness of the dangers of meter tampering. This campaign typically includes digital, social, door drops and some outdoor media and primarily focuses on neighbourhoods that have been identified because of high incidences of meter tampering. The target audience is gas customers, their neighbours and members of the public. The campaign would typically communicate the key meter tampering messaging which highlights that it is an offence to tamper with a meter and that such tampering can put people's lives in danger.

One of the primary roles of the Revenue Protection Unit is taking prosecutions against individuals it suspects of committing an offence or offences under the Energy (Miscellaneous Provisions) Act 2012. In 2020, Gas Networks Ireland brought successful prosecutions in 3 cases, by identifying gas theft and prosecuting individuals in the district courts for unlawful interference.

Our site investigations are another key focus for the Revenue Protection team. This process runs in parallel with, but separate to, the prosecution process to identify meters that may be subject to interference. Following investigations, 136 sites were confirmed as tampered in 2020. To date, over 2,700 meters have been identified as tampered and been subject to this process.

Gas Networks Ireland encourages members of the public to confidentially report suspected or known cases of tampering by calling 1800 464 464. Gas Networks Ireland receives several potential meter tampering tip offs through this channel each year, through the website and by phone.

11 Conclusion

2020 was an unusual year for Gas Networks Ireland, as it was for businesses all over the world. Demand in 2020 of 57,886 GWh was in line with the 2019 figure of 57,988 GWh. Again, as in previous years, the supply of indigenous gas from Corrib and Inch decreased requiring an increase from the UK through the Moffat entry Point. This increase has led to an increase in gas fuel usage by Gas Networks Ireland of approximately 11% to operate the compressors in South West Scotland. The supply of indigenous gas fell from 61% of the total in 2019 to 36% of the total in 2020.

Gas Networks Ireland's ability to deliver key asset programmes and essential services to shippers and customers was severely curtailed in 2020 because of the protracted lockdowns due to the global pandemic.

2020 also saw a reduction in Unaccounted for Gas (UAG). This is a result of Gas Networks Ireland's efforts to reduce UAG but it is also thought that the effects of the pandemic helped reduce UAG though by how much has not yet been determined and may not be for some time to come.

An area that Gas Networks Ireland was focused on over the past number of years was growing the number of residential connections, especially to existing dwellings close to the network. It was estimated that this could add an additional 300,000 new residential connections. This initiative slowed in 2020 partly due to the effects of the pandemic but more likely due to the requirements for modifications to existing dwellings to meet the more stringent requirements of the building regulations where fossil fuels such as natural gas are not considered favourably.

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 with the development of a hydrogen test facility.

In 2020, planning permission was granted for a biomethane Central Grid Injection facility (CGI) in Mitchelstown, Co. Cork. Construction on this project is expected to commence in 2021. This facility, which will cost in the region of €28million to build, will be the second facility of its kind in the country and will also involve the placement of a series of more than 20 agri-anaerobic digestion (AD) biomethane units within a 60km radius of the proposed central-injection facility. These will convert the farm and food waste into renewable gas that will be collected by a fleet of purpose-built trailers and fed into the network through the Central Gas Injection facility. Once operational, the Mitchelstown facility will inject enough renewable gas to supply green energy to approximately 64,000 homes. It is estimated that, at maximum capacity, the Mitchelstown operation could reduce Ireland's annual harmful CO_2 emissions by up to 170,000 tonnes per annum, 27,000 tonnes of which will be made up from agricultural emissions.

Safety remained a top priority for assets and operations throughout 2020. Gas Networks Ireland has an excellent record in meeting all its safety, statutory and regulatory obligations. There were 14,928 Public Reported Escapes (PREs) related to leaks on the Gas Networks Ireland distribution network in 2020 (a decrease of 5.65% on the 15,882 PREs reported in 2019). 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 14,928 PREs in 2019 was 29 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)

	2016	2017	2018	2019	2020
Length of Onshore Pipeline	2015	2015	2065	2065	**2065**
Decommissioned	32	0	0	0	**0**
Length of Offshore Pipeline	412	412	412	412	**412**
Decommissioned	0	0	0	0	**0**
Total Length of Pipeline	2,433	2,427	2,477	2,477	**2,477**
Total Decommissioned	32	0	0	0	**32**

Table 3.2: Transmission connections

Category	2016	2017	2018	2019	2020
Transmission LDM	34	34	31	31	**28**
Transmission DM	17	17	19	19	**19**

Table 4.3: System throughput

	2016	2017	2018	2019	2020
Total Gas Transported (GWh)	55,109	55,768	57,785	59,379	**58,688**
Daily Average Transported (GWh)	151	153	158	163	**160**
Peak Day Transported (GWh)	225	217	216	216	**234**

Table 4.4: System throughput per entry point

	2020	%
Inch (GWh)	**1,174**	2
Moffat (GWh)	**37,560**	64
Corrib (GWh)	**19,954**	34

Table 4.5: Demand change

	2016	2017	2018	2019	2020
Demand (GWh)	55,180	55,405	57,354	58,501	**57,886**
Change (GWh)	+5,155	+225	+2,387	+1,147	**-615**
Change (%)	+10.3%	+0.4%	+3.6%	+2.0%	**-1.1%**

Table 4.6: Fuel usage

	2016	2017	2018	2019	2020
Fuel usage	576 GWh	535 GWh	601 GWh	626 GWh	699 GWh

Table 4.7: Meter read verification

	KPI	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Actual
Metering Data Validation	<2% of sites	1.01%	0.61%	0.86%	1.67%	1.45%

Table 4.8: Transmission Unaccounted for gas (UAG)

UAG	2016	2017	2018	2019	2020
Throughput %	+0.16%	+0.43%	+0.44%	+0.31%	+0.19%
Energy (GWh)	+121	+325	+331	+237	+147

Table 4.9: Shrinkage

	2016	2017	2018	2019	2020
Shrinkage as a % of throughput	+0.96%	+1.13%	+1.25%	+1.12%	+1.07%

Table 4.10: Compressor stations carbon emissions

Compression Site	2016 (tonnes)	2017 (tonnes)	2018 (tonnes)	2019 (tonnes)	2020 (tonnes)
Midleton	11,534	12,829	14,893	6,087	
Beattock	31,321	28,768	29,972	39,713	43,813
Brighouse	27,114	21,274	25,840	45,628	54,842

Table 4.11: Demand change for the year

Compression site	2016 (GWh)	2017 (GWh)	2018 (GWh)	2019 (GWh)	2020 (GWh)
Inch Export to Storage	505	0	0	0	0

12 **Appendices**

Table 4.12: Exit capacity bookings (kWh)

	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20
Power	106,324,361	99,575,135	111,92,555	118,423,914	116,789,439
DM I & C	41,108,477	41,803,481	43,704,699	44,392,970	43,863,416
NDM	95,157,457	93,138,962	96,877,924	98,794,801	94,866,131
Shrinkage	4,092,500	3,924,500	4,194,250	4,368,750	3,397,500
Total	**246,682,795**	**238,442,078**	**256,699,428**	**265,980,434**	**258,916,486**
Distribution SPC (kWh)	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20
DM I & C	19,320,029	20,222,761	22,603,166	22,682,300	22,960,478
Residential	65,450,119	63,794,927	66,438,547	67,530,069	65,874,125
NDM I & C	29,476,324	29,272,311	30,346,708	31,191,411	29,805,925
Total	**114,246,471**	**113,289,999**	**119,388,420**	**121,403,780**	**118,640,529**

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

Table 4.13: Entry capacity bookings (GWh)

	2016	2017	2018	2019	2020
Inch	20.27	11.70	12.08	8.76	6.16
Moffat	141.06	92.68	68.54	98.58	122.60
Corrib	23.98	103.53	98.33	77.63	64.04
Total	185.31	207.91	178.95	184.97	192.80

Table 5.1: Gas Point activity by category

Category	Type	2016	2017	2018	2019	2020
Gas points registered	LDM	48	51	45	45	43
	DM	221	232	245	255	258
	NDM I & C	26,048	26,492	26,638	26,813	27,118
	NDM Domestic	653,838	661,508	670,530	678,755	685,088
	Total	**680,155**	**688,283**	**697,458**	**705,868**	**712,507**
Total gas points registered during the year	LDM	0	3	2	0	0
	DM	7	8	5	3	5
	NDM I & C	732	759	686	679	494
	NDM Domestic	8,791	10,555	11,917	11,197	8,165
	Total	**9,530**	**11,325**	**12,610**	**11,879**	**8,664**
Gas points deregistered	LDM	-	-	-	-	N/A
	DM	-	-	-	-	N/A
	NDM I & C	205	215	240	177	166
	NDM Domestic	1,667	1,761	1,293	1,221	1,055
	Total	**1,872**	**1,976**	**1,533**	**1,398**	**1,221**
Tariff exempt NDM supply points @ 31st December	LDM	-	-	-	-	N/A
	DM	-	-	-	-	N/A
	NDM I & C	286	342	258	227	179
	NDM Domestic	2,602	2,373	2,054	1,861	1,180
	Total	**2,888**	**2,715**	**2,312**	**2,088**	**1,359**
Total tariff exempt NDM supply points during year	LDM	-	-	-	-	N/A
	DM	-	-	-	-	N/A
	NDM I & C	320	379	272	236	2,417
	NDM Domestic	3,039	3,357	2,755	2,882	1,497
	Total	**3,359**	**3,736**	**3,027**	**3,118**	**3,914**
CoS Jan-Dec	LDM	6	3	4	4	3
	DM	114	169	149	214	239
	NDM I & C	3,392	5,316	4,295	3,282	3,533
	NDM Domestic	89,923	118,829	132,880	124,765	110,177
	Total	**93,435**	**124,317**	**137,328**	**128,265**	**113,952**
Historical consumption requests Jan-Dec	LDM	9	17	14	8	5
	DM	77	117	84	90	215
	NDM I & C	8,688	9,064	10,277	12,020	12,592
	Total	**8,774**	**9,198**	**10,375**	**12,118**	**12,812**

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	2016	2017	2018	2019	2020
Third Party Damage	Development enquiries requiring action	6	10	4	4	N/A
Third Party Damage	Category A - Pipeline Damage or Leak	952	998	1070	1322	2204
Prevention Detected	Category B - Serious Potential for Damage	0	0	0	0	1
Encroachment Events	Category C - Limited Potential for Damage	12	12	5	14	13
	Total detected encroachment	39	23	41	22	36
Transmission Pipelines	Line breaks (major leakage)	51	35	46	36	50
	Line damaged (sustainable level of leakage)	0	0	0	0	0
	Line damaged (no leakage)	0	0	0	0	0
Pressure Control	Occasions where pressure drops below minimum design pressure	1	0	1	1	1
Gas Outages		0	0	0	0	0

Table 8.2: Systems availability

Communications & instrumentation	KPI	2016	2017	2018	2019	2020
GTMS System availability	99.80%	99.98%	99.98%	100%	100%	100%

12 **Appendices**

Table 8.3: Shipper operations

Customer Commitment	KPI	2016	2017	2018	2019	2020
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	2016	2017	2018	2019	2020
Access Rate	80%	100%	100%	100%	86%	80%
Read Rate	Average 3.2 reads per site per calendar year	3.41	3.42	3.44	3.43	2.84

Table 8.5: Trading and settlements

Customer Commitment	KPI	2017	2018	2019	2020
Invoice circulation	By 12th day of month	100%	100%	100%	100%

Table 8.6: Maintenance days

	KPI	2016	2017	2018	2019	2020
Maintenance days						
Unscheduled maintenance/Interruptions	0	0	1	0	0	0
Interruptions due to maintenance	0	3.15	4	5	5	3

Table 8.7: Corrib Entry Point Constraint/ Curtailment 2020

Month	Number of Constraints	Number of curtailments	Average Duration of Curtailments (hours)
January 2020	0	1	6
February 2020	0	0	0
March 2020	0	0	0
April 2020	0	2	8
May 2020	0	1	15
June 2020	0	0	0
July 2020	0	0	0
August 2020	0	0	0
September 2020	0	0	2
October 2020	0	0	0
November 2020	0	0	16
December 2020	0	0	12

Table 9.1: Distribution gas flows

Dx DM I & C		2016	2017	2018	2019	2020	% Change
Annual Total	MWh	3,838,030	3,866,772	4,143,092	4,558,433		**10.02%**
Annual Daily Average	MWh	10,486	10,594	11,351	12,489		**10.02%**
Peak Day Flow	MWh	14,091	14,063	11,842	18,664		**57.61%**
Dx NDM I & C							
Annual Total	MWh	4,508,467	4,467,897	4,809,207	4,867,008		**1.20%**
Annual Daily Average	MWh	12,318	12,241	13,176	13,334		**1.20%**
Peak Day Flow	MWh				26,726		
Dx NDM RES							
Annual Total	MWh	7,237,864	7,178,800	7,790,422	7,629,615		**-2.06%**
Annual Daily Average	MWh	19,776	19,668	21,344	20,903		**-2.07%**
Peak Day Flow	MWh				49,634		
Dx NDM Total							
Annual Total	MWh	11,746,331	11,646,697	12,599,629	12,496,622		**-0.82%**
Annual Daily Average	MWh	32,094	31,909	34,520	34,237		**-0.82%**
Peak Day Flow	MWh	71,453	74,682	97,228	76,360		**21.46%**
Dx Total							
Annual Total	MWh	15,584,361	15,513,469	16,742,720	17,055,055		**1.87%**
Annual Daily Average	MWh	42,580	42,503	45,870	46,726		**1.87%**
Peak Day Flow	MWh	84,630	88,360	106,506	92,129		**13.50%**

Table 9.2: Distribution connections by category

Connections	2016	2017	2018	2019	2020
Dx DM I & C	218	232	230	236	**243**
Dx NDM I & C	25,565	25,993	26,256	26,482	**26,845**
Dx NDM Residential	649,445	657,638	667,340	675,728	**682,980**
Dx Total	675,228	683,863	693,835	702,446	**710,068**

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

2016	2017	2018	2019	2020
11,339	11,527	11,745	12,044	**12,140**

Table 9.4: New connections by category

Meters	2016	2017	2018	2019	2020
Mature Housing	4,314	4,195	4,196	4,417	**3,407**
New Housing	3,588	5,574	7,030	6,259	**4,220**
I & C	630	668	610	622	**465**

Table 9.5: Distribution UAG

	2016	2017	2018	2019	2020
Distribution UAG	1.12	1.20	0.92	0.99	**0.59**

12 **Appendices**

Table 10.1 High level gas safety statistics

Ref	Subject	High level KPI	2016	2017	2018	2019	2020
1A	Public Reported Escapes	Number of External Leaks Detected	3,691	3,498	3,534	**3,456**	**2,771**
		Number of Internal Leaks Detected	4,214	3,712	3,771	**3,771**	**3,758**
1C	Third Party Damage	No. of Main Damages	93	107	89	**122**	**82**
		No. of Service Damages	426	457	461	**528**	**401**
1D	Gas in Buildings	Number of 'Gas in Buildings' events (i.e. all gas ingress from external infrastructure)	1	0	0	**1**	**1**
2B	Gas Outages	>15 customers affected	1	0	0	**5**	**0**
		>100 customers affected	2	0	0	**1**	**0**
4A	Public Reported Escapes	% attended within one hour	99.89	99.91	99.3	**99.9%**	**99.96%**
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	1	0	**0**	**0**
5C	Incidents (Occurring on Gas Network)	Reportable under Gas Legislation	0	0	0	**0**	**2**
5D	Incidents (Occurring on Gas Network)	Reportable under CRU Guidelines	4	5	3	**6**	**2**
5E	Incidents (Occurring on Customer installations)	Reportable under Gas Legislation	0	1	0	**1**	**1**
5F	Incidents (Occurring on Customer installations)	Reportable under CRU Guidelines	3	2	8	**3**	3
4D	Emergency Reports	Total no. of calls received via the 24 hour emergency telephone number (1850 20 50 50)	23,919	25,107	30,131	27,006	26,960
6A	Third Party Damage	Total enquiries to 1850 427 747 (inward communication)	1,772	1,610	1,565	1,420	962
		Total enquiries to distribution DBYD[26] email/post/fax/calls (inward communication)	5,723	5,939	8,088	13,022	2,777
		N/A	N/A	N/A	N/A	16,656	Total responses from DBYD Online
		Total inward enquiries	7,495	7,549	9,653	**14,442**	**20,395**

Gas Networks Ireland

The main contact details for Gas Networks Ireland are:

General Enquiries
1800 464 464

24hr Emergency Service
1800 20 50 50

networksinfo@gasnetworks.ie

@GasNetIRL
gasnetworks.ie