SGN
Your gas. Our network.

Long Term Development Statement 2019

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LTDS annual cycle

February
We provide pre-forecast information to National Grid Gas UK Transmission (NGG UKT)

February / March
We and NGG UKT meet to discuss pre-forecast data

April
We provide our initial forecasts to NGG UKT

June
We meet NGG UKT to discuss our final forecasts

July
NGG UKT provides calorific value (CV) forecast

October
We publish our LTDS

The research we carry out to inform our LTDS is completed by the end of May each year

Our Long Term Development Statement (LTDS) is the product of a yearly cycle of data gathering, analysis and consultations with our stakeholders all of which allows us to understand how our business may develop over the next 10 years and beyond.

We use the LTDS to inform our operational strategy as well as our investment and business decisions. It also allows our customers to identify and evaluate opportunities for entry and exit gas connections.

Each year we update our demand forecasts with learning from the previous year. This ensures we're in the best position to deliver a reliable gas supply for our customers whatever challenges the future may hold.

Our Long Term Development Statement (LTDS) is produced by our Network Capacity team with input from across our business.

If you have any comments or suggestions on the publication please feel free to get in touch with the team at network.capacity@sgn.co.uk or contact one of our experts via the contact details in Appendix 4.

Foreword

Welcome to our Long Term Development Statement for 2019

As we continue to play our part in the UK's net-zero carbon future, how our customers use energy is going to change and we, along with our associates throughout the gas and electricity industries, are looking to understand how we should manage a smooth and cost-effective transition.

We're facing a significant challenge as we manage the capacity and integrity of ageing assets whilst ensuring we make sound investment decisions for both the short and long-term future.

Our annual forecasts look at demand over a ten-year period and we present our findings in this our Long Term Development Statement (LTDS). Each year we look at how our forecasting methodology might change so it's better able to accommodate an evolving energy market. While we carry out this review we're mindful to avoid changes which introduce risk to our ability to maintain security of supply for our customers.

This year we've listened to and acted upon recent feedback from our stakeholders who asked us to present a range of scenarios for gas demand in the planning period. You can read more on these in the section 'Energy Progression Study' on page 6.

Within the period this LTDS covers - 2019 to 2029 - our industry will be governed by three separate price controls. RIIO-GD1, RIIO-GD2 and RIIO-GD3.

RIIO-GD1, is coming to an end in 2021 and at the time of writing we've already submitted the first draft of our business plan for RIIO GD2 to the Customer Challenge Group appointed by OFGEM for review. The second draft was submitted on 1st October with formal submission to OFGEM in December.

I do hope that you find this publication informative and useful. If you have any questions, please contact one of our industry experts named within the document.

Paul Denniff
Network and Safety Director

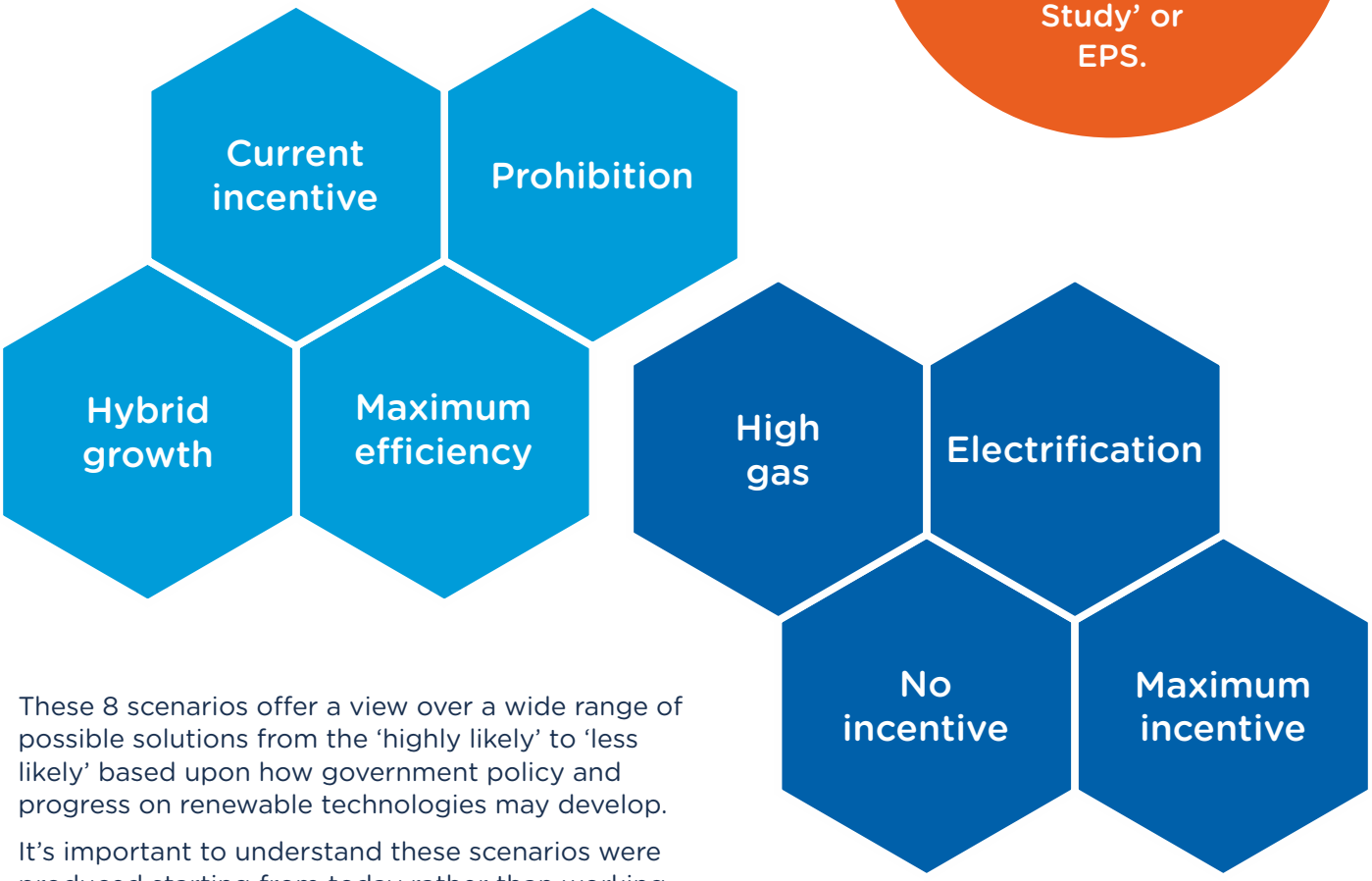
Energy progression study

The UK's energy industry is in transition and we believe our networks have a major part to play on the challenging journey to a net zero carbon future.

We recognise the growing need to be able to appraise the impact of renewable technologies and other changes brought about.

When developing our forecasts for 2019 we looked at 8 scenarios which may reflect the possible paths the future energy market may take.

To help our customers differentiate our scenarios from other available studies we're referring to them as our 'Energy Progression Study' or EPS.



These 8 scenarios offer a view over a wide range of possible solutions from the 'highly likely' to 'less likely' based upon how government policy and progress on renewable technologies may develop.

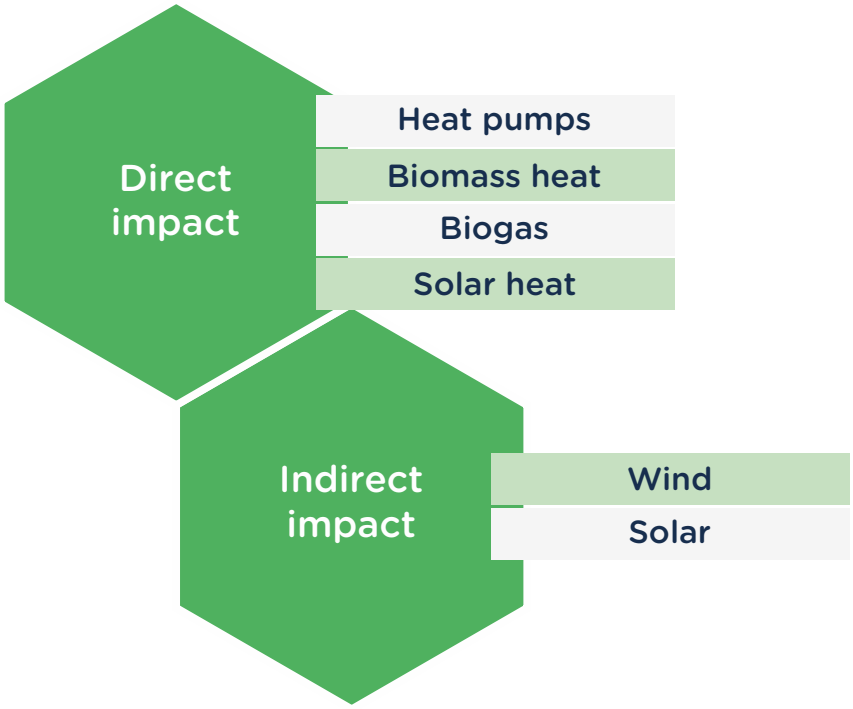
It's important to understand these scenarios were produced starting from today rather than working backwards from the desired outcome. Whilst we discuss a number of factors which may change in the longer term, our forecast results detail the 10-year period of this planning period and publication.

Our annual and peak scenarios were developed by making specific adjustments either downwards or upwards from the 'current incentive' scenario.

Current incentive

is the starting point for all our analysis. Sensitivities are then applied relative to the assumptions to develop the other scenarios.

The sensitivities applied during the analysis include a range of renewable energy sources contributing to the energy mix. Some of these renewable energy sources have a direct impact on gas demand and some an indirect impact.



Heat pumps have the potential for the most impact on gas demand. Therefore when developing a set of scenarios which may be easily interpreted we focused on renewable heat options for customers, specifically heat pumps. Heat pumps of all types are considered within all scenarios. Air source and ground source heat pumps are currently the most widely used and have the potential to significantly reduce annual and peak gas demand.

Hybrid heat pumps will also have a similar impact but to a lesser extent as gas will be used when there's insufficient heat generated by the heat pump, or it's cheaper to use gas than electricity to produce the heat needed. Gas absorption heat pumps are starting to enter the market and they will result in a reduction in gas demand related to the improvement in efficiency these are expected to give.

Heat pumps are included within all scenarios.

Our forecast assumes growth in renewables continues at the same rate as recent historical growth.

Renewables targets have not been revised since those set out by government for 2020. As a result, when producing our scenarios assumptions were made for renewable heat targets based upon the potential outcomes regarding the growth in specific renewable heat sources and sensitivities which relate to new or expanding uses of natural gas.

Solar heat has the potential to reduce annual demand very little due to its unsuitability to provide central heating. We have as a result not incorporated this renewable in any sensitivities featuring heat.

Solar heat has not been incorporated in sensitivities featuring heat.

This year we did not consider the impact of biomass when developing our scenarios.

Biomass for heat has potential for growth particularly in rural areas where there's less of an impact on air quality. The Government is currently providing significant support for the use of biomass on the understanding that the source of the biomass remains carbon neutral. Our view is widespread use of biomass in urban areas will be limited by its impact on air pollution and the need for dedicated storage space for the large volumes of feedstock required.

Biomethane transported through our networks does not impact gas demand, only system management, so the various options for growth in this area have not been considered within our scenarios. There may however be a secondary effect where biogas may be produced and used locally for electricity generation with a resulting impact on embedded power station growth, but we do not consider this will have a material effect on annual or peak demand.

Biomethane transported through our network does not currently impact gas demand.

In addition to these sensitivities we also looked at the following when producing our forecasts:

Embedded Power Stations are being installed across the UK to generate electricity as a back-up to when sources of renewable energy aren't available, when there are low levels of wind and little or no sun.

All indications are this customer group will increase significantly over the coming years and will as a result have a major influence on how we manage gas supply and demand in the future due to the on/off nature of these sites, often at short notice.

We're currently reviewing our Network Exit Agreements (NEXAs) for these customers so we're in a better position to meet their requirements whilst complying with the notification periods we're obliged to give the upstream party, National Grid Gas UK Transmission (NGG UKT), to change our supply intake rates as defined in the Uniform Network Code (UNC) and ultimately protect security of supply going forward.

Flexible sources of energy are key to achieving net carbon zero by 2050.

Peak demand sources of energy such as embedded power stations are required to fill the gap when renewables are not available due to low wind levels and insufficient solar capacity.

In this year's forecasts we've refrained from making assumptions as to the impact this customer group may have on peak demand over the next ten years. We've instead included an assessment from the limited data we have for those sites currently on our database. We've not been able to include any impact on annual demand.

When all accepted sites are connected our peak day increases by 2.2Mcmd.

We've only included embedded power sites that are actually connected and those which have accepted a quotation but are yet to begin taking gas.

Due to the very high level of uncertainty and insufficient historic data for this sector we don't believe it prudent to make firm assumptions on potential growth.

However, we've included accepted and connected embedded power sites in our assessment of our peak day. No sensitivity has been applied to our annual demand due to the small number currently connected and insufficient data to establish their impact on annual demand. We'll review this as more sites are connected.

Number of accepted embedded sites per LDZ

South East **18**

Scotland **20**

South **23**

The operation of embedded power stations is intrinsically linked to the unavailability of renewables. Other factors which influence the way these sites operate and impact the management of our networks are...

Unplanned outages at times of high demand of other sources of electrical generation has the potential to increase the frequency of use and number of embedded power sites required to maintain electricity supplies. This becomes more important as we rely further on sources of renewable power.

These sites may be required to provide support to cover for periods of planned maintenance which could well be in the summer period.

We've seen an increase in demand in the summer months which has been attributed to increased electrical demand to satisfy cooling in warmer summers.

To be able carry out our scheduled maintenance work safely we plan it in for periods of low demand when system pressures are able to be lowered. The on / off operation of these sites during these works may create a significant issue for this work.

Heat commonly relates to how we use energy in our homes to keep warm. In 2018 the Government announced its intention to prohibit the installation of gas in new buildings from 2025. Although this has not yet been made legislation the Government's target regarding carbon emissions is for heat in the UK to be carbon neutral by 2050.

This will have a substantial impact on the use of fossil fuels for heat particularly domestic heating. The option of electrification of heat could prove to be expensive depending on the level of subsidies and investment required in the electricity networks. There's no guarantee the proposed changes will be able to sustain heating temperatures in winter without support from gas.

Another way to approach the de-carbonisation of heat is the use of hydrogen. A hydrogen boiler, either alone or in combination with an electric heat pump, would be able to meet all heating demands. The Committee on Climate Change Net Zero report states "Moving beyond an 80% target changes hydrogen from being an option to an integral part of the strategy"

Our H100 project is looking to construct and demonstrate the UK's first network to carry 100% hydrogen. The project is built-up of a series of smaller projects that focus on each key aspect of hydrogen research. These will develop the evidence to enable us to progress towards the construction and physical operation of the UK's first 100% hydrogen network. The information we learn from this research will feed in to our demand forecasts in future years.

For more information on H100 please visit our website: sgn.co.uk/about-us/future-of-gas/hydrogen/hydrogen-100

Transport is going to play a major role in the UK's journey to net zero. The UK Government has stipulated there should be no new cars sold in the UK running exclusively on diesel or petrol after 2040. This may be brought forward into the 2030s with more stringent rules requiring all new vehicles to be plug in vehicles with a minimum pure electric range. There remains high uncertainty over the growth of electric vehicles (EVs) although the continuing increase in the number of EV models available indicates considerable growth is likely to occur. Projections from one single source suggest that there could be anything between 2.7 and 10.6 million electric cars by 2030.

There's a long way to go to reach this target as at the end of 2018 the total of all Ultra Low Emission Vehicles (ULEVs) on the UK's roads was around 200,000 or 0.5% of all vehicles. The recent cut in hybrid subsidies has seen a rapid decline in the number of vehicles being purchased.

It's difficult to determine precisely what impact this may have on gas demand. Full electrification

will likely result in a substantial increase in electricity demand which, given the extreme variability of renewables and a lack of large scale commercially viable electricity storage solutions other than hydro, means a large proportion of this additional electricity will need to be met through conventional gas generation solutions and an increase in embedded power stations.

We've also seen a small number of connection enquiries for compressed natural gas filling stations for transport. At this time, we haven't included any of these in our forecasts. We'll review this as we see this sector develop and received acceptances and connect sites.

Net zero

In 2019 the UK Government announced a new legally binding target for the UK to be 'net-zero' carbon by 2050 replacing the old target of 80% reduction set within the 2008 Climate Change Act. The Scottish Government also announced its commitment to net zero emissions by 2045 with a reductions of 70% by 2030 and 90% by 2040.

Net zero means looking at the overall picture of energy usage, wherever possible removing sources of carbon and, where they can't be removed, reducing or offsetting their impact with methods such as carbon capture.

With almost 85% of UK homes heated using natural gas significant savings can be made by de-carbonising the gas networks.

We believe the UK's gas networks are key to delivering the least cost, lowest impact future energy solution for our customers.

This is why we're playing our part towards the UK meeting the Government's 2050 climate change targets by promoting the injection of greener gas into our network and working with our partners across the industry to investigate the use of alternative gases such as hydrogen.

With the right solutions, such as hydrogen boilers, and legislation this can be done without installing new heating systems in people's homes or new network infrastructure thereby saving money for our customers.

"...while we've seen incredible innovation in the gas networks over the last couple of years, with many hydrogen projects starting to become a reality, the emphasis is on us and our partners to continue to develop new and exciting forms of energy."

John Morea, CEO, SGN

Our customers

While our customer numbers continue to increase year on year, largely through connections to IGT and UIP sites, greater energy efficiencies are likely to result in the annual and peak day demand reductions seen over the last few years continuing.

However, the expected proliferation of embedded power stations may result in an increase to peak day demand.

Our customers' views and opinions help us shape our forecasts and business strategy.

"Our customers tell us we should increase the amount of greener gas in our networks and push ahead with innovative ways of delivering an affordable low carbon source of energy."

Number of customers as of 2018

5.95m

Renewable

The current domestic renewable heat incentive (RHI) scheme provides the greatest benefits to adopters of Ground source heat pumps (GSHP) and solar PV systems, Air source heat pumps (ASHP) and biomass.

Solar heat is really only suitable for domestic hot water so will have a minimal impact on gas demand in the home and far less so than heat pumps. For this reason, and the fact they are designed to replace or easily integrate into the home alongside conventional gas boilers, hybrid systems are the most likely renewable technology to have an impact on our forecasts in the journey to net zero.

In the non-domestic sector biomass is favoured over ASHP however biomass is more generally utilised in rural areas and concerns of increased air pollution may limit any wider usage. The low carbon choice for the non-domestic sector is likely to be either a blend or 100% hydrogen.

Renewable technologies which have influenced our forecasts are:

- Biomass heat
- Hybrid heat systems including ground source and air source heat pumps
- Solar heat

When considering suitable solutions, it should be noted that around 18% of heat pumps are hybrid heat pumps with a gas boiler back-up to either support the heat pump when it can't meet heating demand or when the market dictates it's more cost effective to use gas than electricity.

This is likely to have implications for the forecasting of peak gas demand and to a lesser degree annual demand when we consider the impact of smaller scale gas powered generation.

What follows is a breakdown of the eight scenarios along with the corresponding annual and peak day demand for each LDZ...

Current incentive – *based on recent statistics, Government current policy and legislation*

- Growth in renewables continues at the same rate as recent historical growth as a result of no change to the current Government schemes to encourage growth in renewable heat and improved energy efficiency.
- The ambitious 2030 target of 32% of all energy use to be from renewable sources, will not be achieved.
- In addition, the current 2020 target for heat will not be achieved therefore this forecast assumes that the same level of shortfall will occur with respect to any subsequent 2030 heat target that may be set.
- The number of heat pumps to be installed per annum based on recent history is SC – 2000, SE – 2300, SO – 1600.
- No assumptions relative to an impact of the increased use of Hydrogen in this forecast period.
- All accepted embedded power generation/STOR sites are on stream by gas year 2020/21 and there are no constraints on the network or diversity between the sites.

South East LDZ
(2019–2028)
Annual demand -6.9%
Peak demand -6.5%

South LDZ
(2019-2028)
Annual demand -4.6%
Peak demand -4.6%

Scotland LDZ
(2019-2028)
Annual demand -7.7%
Peak demand -5.5%

Prohibition – *addition of no gas in new builds after 2025*

- As per current incentive and in addition;
- Gas is not permitted for new build or retrofit beyond the end of 2025.
- No new connections are made to the gas network after 2025.

South East LDZ
(2019-2028)
Annual demand -8.1%
Peak demand -7.9%

South LDZ
(2019-28)
Annual demand -6.3%
Peak demand -6.2%

Scotland LDZ
(2019-28)
Annual demand -9.0%
Peak demand -8.1%

Hybrid growth – *immediate increase in numbers of hybrid heat pumps*

As per current incentive and in addition;

- Adoption of hybrid heat pumps is encouraged with immediate effect.
- DNs are rewarded for maintaining their networks to satisfy the variable demands imposed by the use of hybrid heat pumps.
- Proportion of hybrid heat pumps of total heat pumps installed is maintained at its current level of 18%.
- Growth in total heat pumps is assumed to be in line with the "maximum incentive" scenario. Total running time assumed to be 120 days or one third of the year.
- The number of additional hybrid heat pumps to be installed annually are; SC- 3,800, SE – 4,300 and SO – 3,100.

South East LDZ
(2019-2028)
Annual demand -12.9%
Peak demand -12.0%

South LDZ
(2019-2028)
Annual demand -11.1%
Peak demand -10.3%

Scotland LDZ
(2019-2028)
Annual demand -13.7%
Peak demand -12.2%

Maximum efficiency – *Government policy change and subsidies for large scale efficient improvements*

As per current incentive and in addition;

- Government sets out on a massive programme of efficiency improvements and widespread insulation schemes with immediate effect.
- The impact here is assumed to be equivalent to a high gas price scenario.
- It's anticipated in this scenario that cavity wall and loft insulation will be close to the maximum possible by the end of the plan and the current low levels of solid wall insulation will be substantially increased by subsidy.
- The number of heat pumps to be installed every year over the plan period is SC - 21,000, SE – 24,000 and SO – 17,000.

South East LDZ
(2019-2028)
Annual demand -11.1%
Peak demand -10.8%

South LDZ
(2019-2028)
Annual demand -9.0%
Peak demand -9.0%

Scotland LDZ
(2019-2028)
Annual demand -11.4%
Peak demand -10.5%

No incentive – *renewable policy abandoned by Government*

As per current incentive and in addition;

- All RHI is stopped by Government or the RHI scheme is such that the only consumers that take it up are those that choose to do so irrespective of the incentive.
- This is assumed to come into immediate effect and is assumed to have the same effect as a low gas price scenario.

South East LDZ
(2019-2028)
Annual demand -4.2%
Peak demand -3.9%

South LDZ
(2019-2028)
Annual demand -2.6%
Peak demand -2.5%

Scotland LDZ
(2019-2028)
Annual demand -5.4%
Peak demand -4.4%

High gas – *an increase in multi-purpose gas usage and development in shale*

As per current incentive and in addition;

- Natural gas is used everywhere to replace higher hydrocarbon fuels to bring a rapid reduction in fossil fuel emissions.
- NGVs are incentivised to replace diesel and petrol vehicles. It's assumed that in the timescale of this plan that NGVs will only have minimal impact.
- Gas absorption heat pumps and hybrids are promoted and incentivised at the expense of other options.
- Gas network is extended to all parts of the country.
- Extensive shale gas development is permitted.
- The same number of additional heat pumps will be installed as the 'maximum incentive' scenario, but they are all assumed to be gas absorption heat pumps with 18% being hybrids.
- No new connections are made to the gas network after 2025.
- All accepted STOR sites are on stream by 2020/21 winter and there are no constraints on the network or diversity between the sites.

South East LDZ
(2019-28)
Annual demand -1.8%
Peak demand -1.5%

South LDZ
(2019-2028)
Annual demand -0%
Peak demand -0%

Scotland LDZ
(2019-28)
Annual demand -2.6%
Peak demand -1.6%

Maximum incentive – *changes to Government targets, policy and RHI*

As per current incentive and in addition;

- Maximum growth of all renewable heat driven by maximising the RHI to enable a return on the investment within 5 years.
- New national renewable heat target for 2030 assumed to be 156TWh of which gas contribution would be 109TWh.
- The contribution from within the SGN network supply area is assumed to be equivalent to 17TWh compared to the previous assumed target for 2020 of 8TWh.
- Remaining renewable heat required to meet SGN's network supply area share of the national target is 12TWh to be achieved between 2017 and 2030.
- Linear growth rate between now and 2030 based on immediate introduction of higher incentives resulting in the number of heat pumps installed every year over the plan period to be SC - 21,000, SE – 24,000 and SO – 17,000,

South East LDZ
(2019-2028)
Annual demand -13.3%
Peak demand -13.0%

South LDZ
(2019-2028)
Annual demand -11.4%
Peak demand -11.3%

Scotland LDZ
(2019-2028)
Annual demand -14.1%
Peak demand -13.2%

Electrification – *electrification of heat and vehicles. Gas remains to provide electricity*

As per current incentive and in addition;

- Electric heating and vehicles are fully phased in by 2050 replacing fossil fuels with the exception of gas for power generation to provide support to cover wind and solar downtime.
- DNs are incentivised to maintain sufficient capacity to accommodate the uncertainties associated with the mode of operation.
- There's an immediate ban on gas for new housing and retrofitting of heating provided by gas.
- It's assumed that all new heating installations are either electric heaters or heat pumps or a combination of both.
- This scenario assumes therefore that no new gas connections are made throughout the period of the plan. It does not assume any form of prohibition of gas use in existing premises that are currently using natural gas. It also does not assume that there will be any incentive mechanism to encourage a switch from natural gas to electric heating.

South East LDZ
(2019-2028)
Annual demand -8.6%
Peak demand -8.3%

South LDZ
(2019-2028)
Annual demand -6.7%
Peak demand -6.7%

Scotland LDZ
(2019-2028)
Annual demand -9.7%
Peak demand -8.8%

National Grid Future Energy Scenarios (FES)

NGG UKT have developed four scenarios influenced by its analysis of the impact of different assumptions regarding the uptake of renewable energy sources and the reduction in carbon based fuels. This is known as the Future Energy Scenarios (FES) publication which is published in July each year.

The publication is based on data gathered through meetings and workshops from within the industry and webinars with stakeholders. The aim being to inform NG's network planning process but also to drive debate throughout the industry.

The document aims to outline a range of pathways for the future of energy out to 2050 by discussing the possible sources of and demands for gas and electricity in the future and the implications for the energy industry.

Comparison between NG and SGN scenarios

The Future Energy Scenarios are scenarios not forecasts. NG develop scenarios starting with an assumption regarding the end point in 2050 it then develops the different scenarios to achieve the desired end point. This results in some anomalies, for example, the actual demand starting point for each scenario develops differently.

Our approach differs as we develop scenarios to inform our forecast. Our scenarios are built from a base-case which uses historical trends as a predictor of the future. This is then modelled forwards to determine the likely impact of various 'unknowns' including renewable energy sources.

The scenario which we use to plan network development includes an assumption of the reduction in demand as a result of new renewable energy sources replacing gas. This is different for annual and peak demand. These renewable assumptions are currently related to progress against the 2020 targets and from 2019, will relate to the 2030 targets. We don't make an assessment of the impact of the 2050 targets as it's assumed performance against the shorter-term is more appropriate to the accuracy of the forecast. It's worth noting the 2050 targets require many more new government energy policies that have not yet been developed.

It's difficult to draw clear comparisons between the results of our forecast and FES as one is a forecast and the other a set of scenarios. The FES scenarios have also changed year-on-year, either in terms of the way the scenarios are developed or the drivers used to produce them. For example, one of the key levers in the FES framework recently changed from "Prosperity" to "Level of decentralisation" fundamentally changing the scenarios.

Importantly, the FES scenarios are not the primary driver for NG's National Development Plan (NDP) and no one FES scenario is considered key to determining network investment. Instead the range of demand (and supply) scenarios that could happen are used, to quote NG, "to influence their NDP". Whereas, our forecasting regime allows us a clear starting point to determine suitable investment and development of our networks.

The following shows how the FES scenarios would specifically relate to our networks...

FES Consumer Evolution – 2050 target not met

- Highest shale gas, developing strongly from 2020s
- Gas boilers dominate
- Moderate levels of thermal efficiency

South East LDZ (2019-2028)
Annual demand +1.8%
Peak demand +1.1%

South LDZ (2019-2028)
Annual demand +2.4%
Peak demand +1.8%

Scotland LDZ (2019-2028)
Annual demand +3.0%
Peak demand +1.7%

FES Steady Progression – 2050 target not met

- UK Continental Shelf still producing gas in 2050
- Some shale gas included
- Gas boilers dominate
- Moderate levels of thermal efficiency

South East LDZ (2019-2028)
Annual demand +3.7%
Peak demand +3.1%

South LDZ (2019-2028)
Annual demand +4.7%
Peak demand +3.7%

Scotland LDZ (2019-2028)
Annual demand +6.2%
Peak demand +4.3%

FES Two Degrees – 2050 target is met

- Some green gas including biomethane and Bio SNG
- Hydrogen from steam reformation of methane from 2030s and some district heating
- High levels of thermal efficiency

South East LDZ (2019-2028)
Annual demand -10.0%
Peak demand -8.8%

South LDZ (2019-2028)
Annual demand -17.9%
Peak demand -12.0%

Scotland LDZ (2019-2028)
Annual demand -5.0%
Peak demand -7.1%

FES Community Renewables – 2050 target is met

- Highest green gas development from 2030s
- Heat pumps dominate
- High levels of thermal efficiency

Comparative graphs showing how the FES scenarios relate to each of our LDZ's energy progression study scenarios can be found in Appendix 3 on page 45.

Summary of forecast

We've selected current incentive to adopt as our forecast for the current short-term planning period. This forecast is based on current national data statistics, policy and legislation.

However, it should be clearly understood our forecast position may change as a result of Government changes to policy in support of the journey to net zero, a greater uptake in renewable technologies and the expected significant number of new connections associated with embedded power generation which may result in net peak demand increases.

The potential impact of these unknowns can be seen in the variances in the annual and peak day figures shown within our scenarios for each LDZ as follows; Scotland annual -14.1% to -2.6%, South annual -11.4% to 0.0% and South East annual -13.3% to -1.8% and peak day figures as follows; Scotland -13.2% to -1.6%, South -11.3% to 0.0% and South East -13.0% to -1.5%.

In addition we're currently undertaking a number of innovation projects to better enable us to forecast our customers' changing requirements and optimise our networks to meet them.

More detail

This section along with Appendices 1, 2 and 3 provide a more in-depth view of the information and econometric assumptions used to develop our forecasts.

Please get in touch if you would like to discuss the forecasting process further or feel we've not covered everything here. See contact details on page 53.

Regulatory obligations

We produce our LTDS in accordance with our Gas Transporter Licence and Section 'O' of the Uniform Network Code Transportation Principal Document obligations. In addition, the Uniform Network Code Offtake Arrangements document sets out the framework for exchanging the necessary information to assist transporters to generate long-term demand forecasts. The publication of our LTDS forms part of this process.

The publication of our LTDS provides our customers with an overview of our 10-year forecast of the annual and peak day demands which we use in the management of our gas networks.

These forecasts' primary function is to ensure we maintain our 1 in 20 licence obligations ensuring our domestic customers can benefit from an affordable and reliable supply of energy.

Forecasting process

We work with expert industry partners to develop our forecasts each year. The starting point being the actual demand data from the previous year which is analysed along with information procured from recognised industry sources. The results are tested against the previous year's forecast to improve the accuracy year-on-year. This gives us greater confidence when planning work on our networks and the suitability of investment decisions we make on behalf of our customers.

Over time, this forecast methodology has proven very reliable in ensuring we're able to keep gas flowing even during the more challenging times, such as late February early March 2018, during periods of unusually adverse weather.

Validating our 1:20 peak day

Our 1:20 peak day demand is determined year on year using historical demand and weather data. The extremely low temperatures in early 2018 allowed us the opportunity to validate our current forecast regime against an actual extreme weather event. The resulting analysis showed our 2017 1:20 peak day for SGN overall was accurate to within 0.25%.

Improving our forecasting process

We recognise while our forecasting regime has served us and our customers extremely well, the UK's energy infrastructure will be undergoing changes to facilitate a net zero future and this requires us to understand the role we'll play within the energy mix.

As a result, our planning process now requires two separate viewpoints. The immediate one which is covered by our 10-year statement whereby we maintain current operating requirements and continue to invest in our networks to maintain a reliable supply of gas for our customers and a more long-term view of what might develop.

To add to the mix of variables our current price control RIIO-GD1 comes to an end in 2021 meaning any decisions we make now in planning the development of our networks will have an impact within a regulatory period which has yet to be agreed with our stakeholders and regulator.

Our aim is to continue our work in collaboration with our stakeholders and our colleagues in the other GDNs, sharing best practice and looking for ways to engage with new areas of the energy industry. This engagement will help inform and improve the accuracy of our analysis.

A lot of the changes we're likely to see as we move towards net zero are yet to develop, so our approach is to remain cautious with our decisions to ensure we're able to maximise the value of the investment in our networks.

UK view

For an understanding of the UK's overall energy supply position and security of supply assessment refer to National Grid for its 10-year System (NTS) and other publications and consultations including the Future Energy Scenario process (FES).
www.nationalgrid.com/uk/publications/gas-ten-year-statement-gtys

Demand forecasting performance

Here we show how our 2018 forecast performed and what we've done in 2019 to improve the accuracy of our 2019 forecast.

As you read this information please be aware when we talk about a particular year's forecast it relates to that year's Long Term Development Statement 10-year forecast. Also, when we refer to our networks we generally only talk about Scotland and Southern although you will see our Southern LDZ is made up of two networks, South and South East.

Please note also the changes shown in the following review of domestic, commercial and industrial demand have been corrected using the latest Seasonal Normal Composite Weather Variable (CWV).

0 to 73MWh - Domestic

Scotland LDZ - This LDZ has seen a small rise in the level of demand in this sector (1.2%), when compared to a large drop that had taken place in the previous year (3.5%).

South East LDZ - There has been a rise in demand in 2018 (2.3%) in this sector compared to a decline in demand in 2017 of 1.9%.

South LDZ - This LDZ has seen a very small decrease in the level of demand in 2018 (0.4%), which is similar to the situation in 2017 where there was a small decline of 0.8%.

73 to 732 & >732MWh – Commercial / Industrial

There was sustained growth in the economy during 2018 despite ongoing difficulties over the negotiations to leave the EU and the uncertainty over the future of favourable trade deals with the EU countries.

All four quarters showed quarter-on-quarter growth, but this does not seem to have had an impact on the level of demand in two of the LDZs showing decline in this sector similar to last year.

The data on total customer numbers show an increase between 2017 and 2018 for all three LDZs compared to a small fall the previous year.

This year's analysis shows there remains a link between gas demand in this sector, the economy and gas price.

UK outlook

This section provides a general overview of the UK economy to give some context to the regional data that is provided in this report. It also outlines some of the key econometric assumptions used to develop the forecasts.

Considering the unprecedented political changes and uncertainty surrounding Brexit at the time of writing, it's worth noting the figures quoted are as they were when the forecast was created in March 2019.

Inflation

Last year's forecasts for the end of 2018 were in the range of 2% to 2.4%. Actual figures in December were 2.1% with the forecast for 2019 in the region of 2.2%.

This year's forecast of CPI for the end of 2019 is 2.1%. The forecast for 2020 is around 1.9%, then 2.0% for following years.

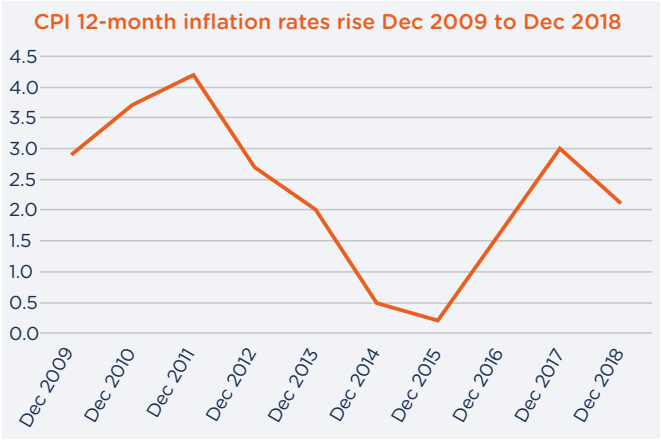


Figure 1: Change in rate of CPI

UK Gross Domestic Product (GDP) and Gross Value Added (GVA)

GDP is a key indicator of the state of the whole economy and equates to GVA plus taxes on products minus subsidies on products. Gross Value Added (GVA) measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom.

The latest economic figures produced by the Office of National Statistics (ONS) show a sustained growth in the economy during 2018 (see figure 2). This is despite the referendum result to leave the EU and major ongoing uncertainty over future trading relationships with the EU and the rest of the world. The preliminary figures from the ONS show that annual GDP growth for 2018 is around 1.4%. This is a significant decline from the outturn figure for 2017 of 1.7%.

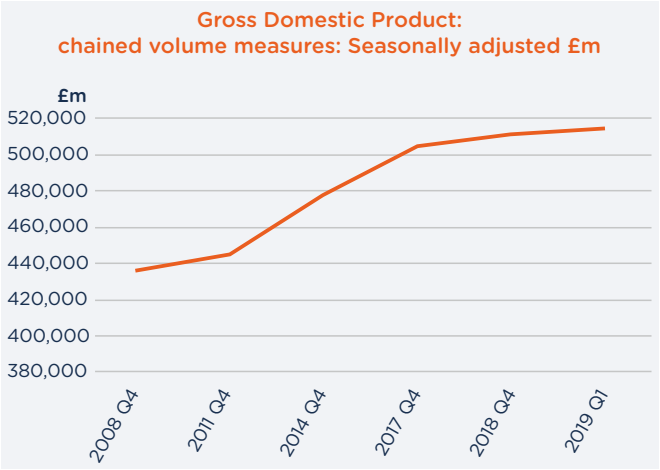


Figure 2: Change in GDP

The level of growth is expected to continue to decline in 2019 at around 1.2% in the central case, rising to 1.6% by 2023. The Office for Budget Responsibility (OBR) published its central forecast in March 2019 which is shown in figure 3.

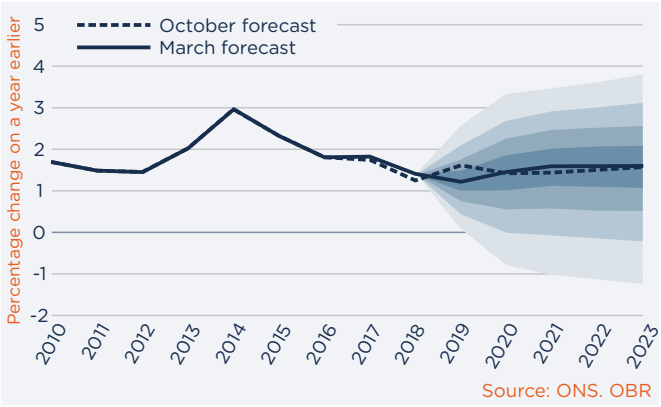


Figure 3: Forecast inflation rate

Gross Disposable Household Income (GDHI)

This can be used as an indicator of householders' ability to absorb rising energy prices and provides a reasonable indication of how affluent households are in a particular area.

The latest published figures produced by the ONS are for 2017 and show London has the highest GDHI per head of population followed by the south east. Scotland is ranked fifth of all the UK regions just below the UK average.

Manufacturing output index

The index of Manufacturing Output provides one measure of how this type of industry is performing. Following the economic crisis in 2008 there was a significant downturn in manufacturing during 2009 but it has been showing some recovery since then, with periods of decline and recovery between 2012 and 2018, with a rise in the first quarter of 2019 with the index at 105.1. This can be seen in the quarterly figures for the Manufacturing Index from the ONS (see figure 4).

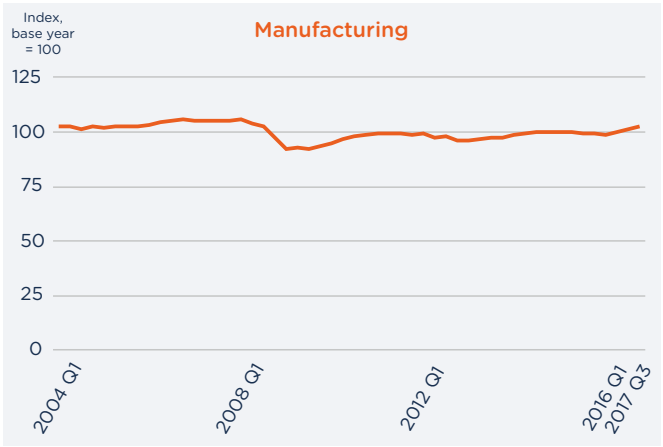


Figure 4: Manufacturing Index from the ONS

Household numbers

The historical data used as the basis for our analysis is taken from the Department for Communities and Local Government (DCLG) website reported data (mid-year) adjusted to year end.

Employment

UK employment levels have been rising steadily for nearly 20 years with only small reductions in 2009 and 2011. In 2017 a total of 268,000 jobs were created, the majority of which were employee jobs, as opposed to self-employed. For the first three quarters of 2018 the total number of jobs created was 335,000 all employee jobs.

Future employment levels are currently quite unpredictable as a result of uncertainty over the EU exit negotiations but we're assuming that future employment levels in UK will grow at a level equivalent to the average rate of growth over the period of the historical data set.

Gas/fuel price

There was a steady recovery in oil prices to a significant degree during 2017 and into 2018. It was also forecast that US shale oil will continue to be developed along with new conventional US oil production despite the low oil price. The reasoning behind this is that shale costs are expected to fall with further innovation and the shale technology is being utilised on conventional reservoirs.

On balance it can be expected that oil prices may fluctuate a little before gradually rising again, resulting in slowly increasing gas prices. We believe this is likely unless there's a major supply disruption, which would almost certainly see a significant rise in oil prices, and hence wholesale gas prices. US shale oil production is however forecast to increase again in 2019 so this may counter some of the efforts by OPEC and bring oil prices down again.

Efficiency improvements

Gas demand, when corrected to seasonal normal weather conditions, has been declining in recent years, although there are instances of growth in some sectors in parts of the country, possibly driven by historical falling gas prices and the improving economy.

There's also evidence that average consumption per customer is falling steadily. It's difficult to separate the impact of efficiency improvements from the impact of variations in gas prices and the effects of variations in the number of supply points.

This is further complicated by the impact of renewables in households which were using gas as their primary source of heating but now use renewable alternatives when available and gas when they are not. As a result there remains the possibility that gas demand at peak could be the same as previously before the installation of renewable heat sources.

Regulation and technological improvements have resulted in substantial energy efficiencies to gas fired domestic boilers. The high levels of efficiency achieved with these new boilers is a major factor in the decline of gas demand.

Energy Bill 2011 (Updated 2018)

There was a range of provisions in the original 2011 bill to encourage energy efficiency and to remove barriers to investment in energy efficiency.

Private rented sector

From 1 April 2016 tenants were able to request consent from their landlords to carry out energy efficiency improvements to privately rented properties and landlords are not able to unreasonably refuse consent. There are also regulations requiring properties to be brought up to an E rating on an Energy Performance Certificate (EPC) which are effective from 1 April 2018.

Energy Company Obligation (ECO)

This is the Government's domestic energy efficiency programme. In 2018 there was a total of 212,000 efficiency related installations under the ECO, compared to 202,000 for 2017. To date a large proportion of these installations were for loft and cavity wall insulation (24% and 35% respectively). Boiler replacement accounted for 23% and solid wall insulation 7%.

Carbon neutral housing

The previous Government policy on carbon neutral new housing made it clear that although being carbon neutral is an objective for new housing, the proposed standards published in November 2009 were aimed at reducing energy consumption as much as possible. This was planned to come into force in 2016, but the current government axed this policy in 2015. We've not made a specific adjustment for this initiative in 2019 during our assessment of household demand within this forecast but will continue to review this each year to see if there has been any impact.

Renewable Heat Incentive scheme (RHI)

In March 2011 the Government announced the introduction of the Renewable Heat Incentive Scheme (RHI). The original RHI documentation is still considered to be a primary source of information for any study on renewables until analysis has been carried out on the effectiveness of RHI and the level of adoption of renewable energy.

The RHI was aimed at helping to accelerate deployment of renewable heat sources by providing a financial incentive to install renewable heating in place of fossil fuels. Initially, in the first phase, long-term tariff support was targeted at the big emitters in the non-domestic sector. This sector, which covers everything from large-scale industrial heating to small business and community heating projects, was anticipated to provide the majority of the renewable heat needed to meet the targets and represents the most cost-effective way of increasing the level of renewable heat.

Under the revised domestic RHI scheme introduced in April 2014, there's financial support for renewable heat, targeted at, but not limited to, off gas grid households. The support is paid at a set rate per unit of renewable heat produced (kWh), for seven years, to the owner of the heating system.

The scheme is administered by Ofgem and in order to control the costs of the policy a system of degression was introduced, which is reductions in tariffs over time as threshold spend figures (known as triggers) are reached. The latest published tariff for the period 1 April 2019 to 30 June 2019 shows support for biomass has been retained and minor increases for the rest. At the time of writing there were no degressions in the previous quarter.

Regional economy

In this section we look at the specific LDZ econometric assumptions which influenced our forecasts.

Scotland

Scotland possesses a strong commercial and services sector base, accounting for around 79% of the Scottish economy. Financial and insurance services growth underpinned by the presence in Edinburgh and Glasgow of many leading financial institutions is the fifth largest in GVA terms in the UK behind London, the South east, North west and Eastern. A better indicator however is the GVA per head of population. The current figure is £26,685 which places Scotland third behind London and the South east. The overall figure for the UK is £27,430.

The Scottish Government is keen to emphasise the impact that its economy has on UK GDP as illustrated by the significant contribution that Scotland makes to the extra-regional elements of UK GDP. Scottish GDP growth had fallen significantly behind the UK in 2016 and was still behind in 2017. However during 2018 the Scottish economy has been recovering to be in line with the UK.

South East

In South East LDZ, there's strong representation in financial and business services and transport and communications, the best-performing sectors of the national economy. Some banks indicated their desire to move to another country within the EU because of Brexit but speculation of widespread moves seems to be unlikely given that London is currently ranked as the second highest financial centre in the world.

The pattern of growth and development remains unbalanced, with economic hot and cold spots in the region. Manufacturing is still a significant element contributing to 8.2% of the South East economy, with some reasonable levels of growth in recent years. The impact on this sector of the level of economic activity could be significant assuming there's to be continued growth, but the extent of the impact of the UK leaving the EU could depress economic growth. The sector of the economy that has generally performed the best appears to be the Wholesale and Retail sector (12% of South East GVA).

Housing development is still forecast to grow by government in the South East. There are physical signs of this growth with the Greenwich Peninsula developments, which are part of the Thames Gateway regeneration project (now renamed Thames Estuary 2050), where there are plans to build river side and park side homes (16,000 in total) on the peninsula over the next 20 years. There are also commercial developments and various cultural developments that form part of the scheme. A report produced in June 2018 by the Thames Estuary 2050

Growth Commission identified several areas for potential development. The Thames Gateway Kent Partnership (TGKP) has targets of creating 50,000 new homes and 58,000 jobs between 2006 and 2026 but there's no information on progress against these targets provided.

Another large influence on the South East is the South East Local Enterprise Partnership (SELEP). This covers the local authorities of East Sussex, Essex, Kent, Medway, Southend and Thurrock. In total the SELEP Growth Deal with Government has brought nearly £600m of investment to the area under the SELEP and over the lifetime of the Deal (2015-2021) they aim to deliver 78,000 jobs and 29,000 homes.

South

The South LDZ provides a favourable environment for investment opportunities and employment growth due to good rail, sea and airport links. This combined with a reasonably broad mix of commerce, industry, housing and tourism creates the opportunities for economic growth.

The ongoing review of the Ministry of Defence portfolio of properties has already resulted in the closure of three sites in the south. A further five sites are at risk of closure between 2023 and 2029 all of which will have an effect on the economy within this LDZ.

The UK Powerhouse Tracker produced by Irwin Mitchell and the Centre for Economics and Business Research provides an estimate of GVA growth and job creation within 45 of the UK's largest cities. Published in May 2019, the study revealed Reading is the highest placed with 2.7% although it's predicted to drop to 2% by the end of 2020. Reading's success is associated with its close location to London and the network of other urban areas in the South East. The report also forecasts Milton Keynes will be the fastest growing city by 2020 at 2.1% annual growth in GVA and Oxford will have the third fastest-growing employment rate in the UK in 2018.

Forecast methodology

General assumptions

The starting point for production of the full set of demand forecasts is the annual seasonal normal demand. The following general assumptions were used to assist in the development of the annual forecasts:

- All forecasts are seasonal normal demands calculated using the latest Seasonal Normal Composite Weather Variable (CWV)
- Historic annual demand data is provided to our service provider on the same basis and daily demand data is available broken down by load band
- The historic data was corrected by our service provider using reconciliation data we provided
- SIU demand and Borders (supplied by NGN) was not incorporated into the Scotland LDZ numbers
- Shrinkage was forecast on a fixed daily basis irrespective of demand levels to be consistent with the Uniform Network Code (UNC)
- It should be noted Xoserve has started providing Unaccounted for Gas data (LDUG) as part of the throughput data from June 2017. This data was examined to assess any impact on the actuals and forecasts with adjustments made as required
- Retail gas price forecasts that are used as part of the demand modelling process continue to be developed by our service provider
- Load band 0-73MWh is assumed to consist predominantly of households therefore behaviour patterns are based on typical household demand
- Load band 73 to 732MWh is considered to be predominantly small commercial/retail premises with some small industrial. Although there are some households within this band it's assumed the behaviour patterns will be linked to predominantly commercial/retail behaviour
- The load bands >732MWh will be predominantly industrial and commercial premises and therefore exhibit behaviour related to these types of load.

General methodology

The forecasting models for the different load bands have been refined over a number of years. The underlying principle is the models make specific linkages between the load bands and traditional market categories like households and industrial and commercial customers. These models are tailored specifically to each LDZ, although the underlying approach is the same across the whole of our networks.

An important factor affecting recent demand levels has been the decline in the price of gas over recent years, this has resulted in growth in some demand historically, but prices increased in 2018 and are expected to rise again in 2019 as a result of the increase in the price cap.

As with last year, models were tailored to each LDZ, as customer behaviour proved to be materially different in each LDZ.

Our service provider has developed a current retail gas price forecast specifically for the purposes of this forecast.

The impact of efficiency gains were not incorporated separately in this year's model as these are assumed to be driven by gas price.

Consideration of the Scottish Government's evolving strategy on renewable heat targets will need to be taken when reviewing the LDZ in future years. The 2019 update to the 2030 renewable energy targets say there should be 50% renewable energy for electricity generation, heat and transport and 20% of non-electric heat demand will be renewable.

0 to 73.2MWh – Domestic

The primary driver in this sector is still believed to be the behaviour of households although it includes a number of small commercials. Annual demand growth has traditionally been driven by the number of houses built and the number that subsequently on completion are occupied and of that population, how many of these properties will be using gas.

Data was collected on all aspects of the housing market and regression analysis was carried out to establish if there's any need to amend the models from last year. In last year's analysis the best fit was a relationship between average consumption per gas customer and the current retail gas price, this remained the case this year.

Variables reviewed include:

- Total households
- Average household consumption
- Average consumption per customer
- Current and real retail gas prices
- Household disposable income
- Efficiency improvements
- GDP

73.2 to 732MWh - Commercial

It has traditionally been assumed this sector is generally influenced by energy prices and economic drivers. As a result of detailed evaluation of alternative econometric models as part of last year's analysis, the best fit was achieved by using a multi-variable model that related annual gas consumption to a combination of UK GDP and current retail gas price for this sector.

We repeated the analysis this year re-examining the following drivers:

- Current and real retail gas prices for this type and size of load
- Average non-domestic retail gas price
- GDP indices, actual GDP (seasonally adjusted) and GDP growth, regional GVA
- Manufacturing output
- Consumption per unit of GDP
- Efficiency improvements
- Impact of renewables

>732MWh – Large industrial

This sector can be significantly affected by the behaviour at a small number of large loads and therefore the forecasts continue to be split into two elements. The large loads are forecast individually and separately from the rest of the market sector. The remaining demand is forecast as a whole.

Peak demand forecasting

General assumptions

The traditional primary basis for calculating the peak-day demand in any market is the relationship between average daily demand and peak-day demand, typically known as the load factor, where:

$$\text{Peak day demand} = \frac{\text{average daily demand}}{\text{load factor}}$$

The following assumptions were made when producing the 1 in 20 peak day demand:

- The modelling method results in no additional requirements for demand diversity analysis
- The use of 1 in 20 CWVs, provided by xoserve to calculate the 1 in 20 peak day meets the requirements of the licence and UNC with respect to the specified methodology for determining 1 in 20 peak day demand
- No allowance will be made in calculating the base case 1 in 20 peak day for the differences between the calculated peak demand and the SOQ booked by shippers for larger loads
- No demand reduction will be allowed associated with demand management products offered by Shippers
- No allowance will be made to take account of any capacity buy-back contracts that may have been negotiated between ourselves and our customers

LDZ specific assumptions

All general assumptions are applied across the three LDZs with no specific assumptions relative to an individual LDZ used in this analysis, unless the weather demand analysis suggests this should be considered.

Methodology

Forecast base case peak day demands were calculated from projections of annual demands by using the following relationship:

$$\text{Peak demand} = \frac{\text{(annual demand/365)}}{\text{load factor}}$$

The relationship was applied in each of a number of different market sectors, for which the load factor may be assumed to be constant over the forecast period. The following market sectors have been used as the starting point for the production of the base case peak day forecasts:

- NDM 0 to 73.2MWh
- NDM 73.2 to 732MWh
- NDM >732MWh
- DM consumption
- Load factors for each market sector were estimated from historical daily demand and other data.

Demand forecasts

The next section provides an overview of our latest annual and peak gas demand forecasts through to 2028/29. These forecasts have been developed around the UNC load band categories and relate only to gas that is transported through our systems.

A more detailed view can be found on page 33 in Appendix 1, which includes the forecasts for both annual and peak demand on a year-by-year and LDZ basis.

Annual demand

These figures show historical gas demand and the forecast going forward. Note specifically the sudden demand reduction in 2009 followed by a minor recovery in 2010 and then a further decline between 2011 and 2014.

Note also that interruption ceased to exist in 2011 as a standard type of load, this is shown in blue within the graphs.

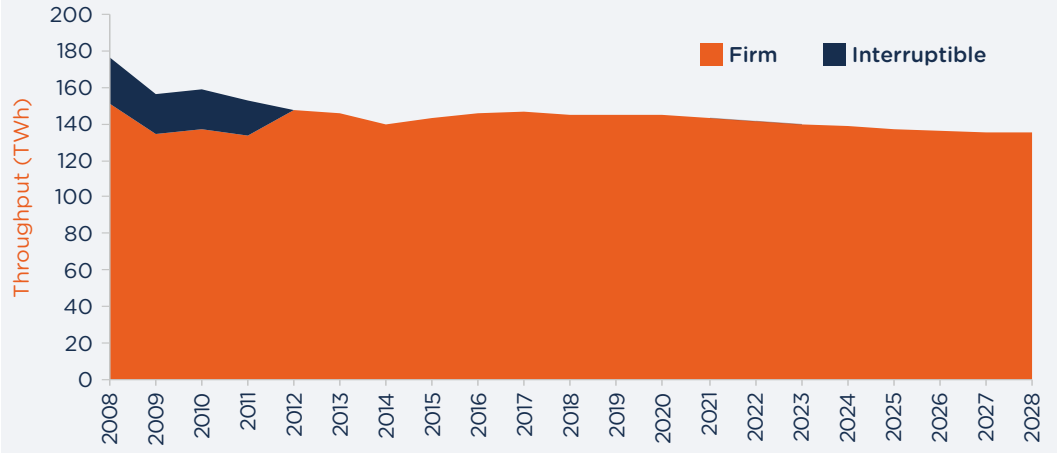


Figure 5: Change in historic and future annual demand – SGN overall

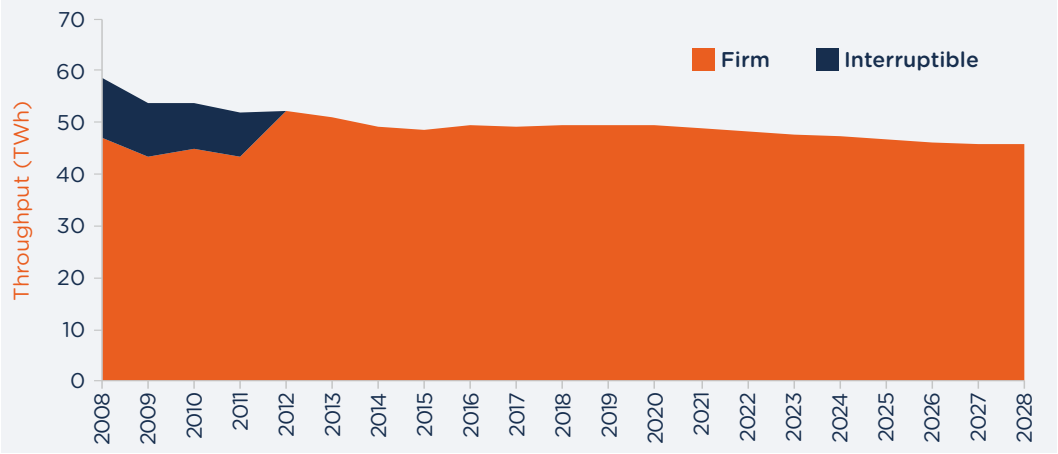


Figure 6: Change in historic and future annual demand – Scotland LDZ

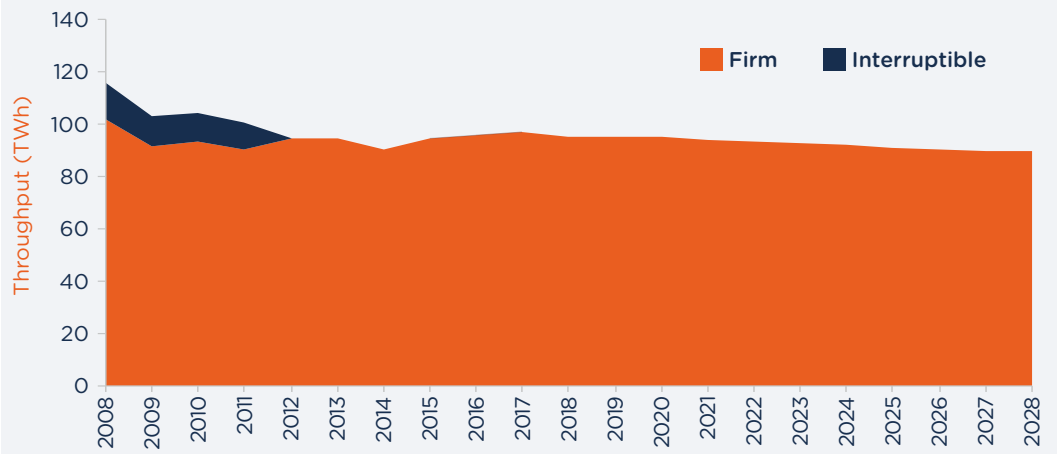


Figure 7: Change in historic and future annual demand – Southern LDZ

Change in forecast annual growth (2019/28)			
	SGN	SCOTLAND	SOUTHERN
Annual demand growth	-0.67%	-0.82%	-0.6%

Table 1: Change in forecast annual growth (2019/28)

Peak demand

The following graphs show the equivalent view for peak demand, the key driver for investment in SGN.

Note also that interruption ceased to exist in 2011 as a standard type of load, this is shown in blue within the graphs.

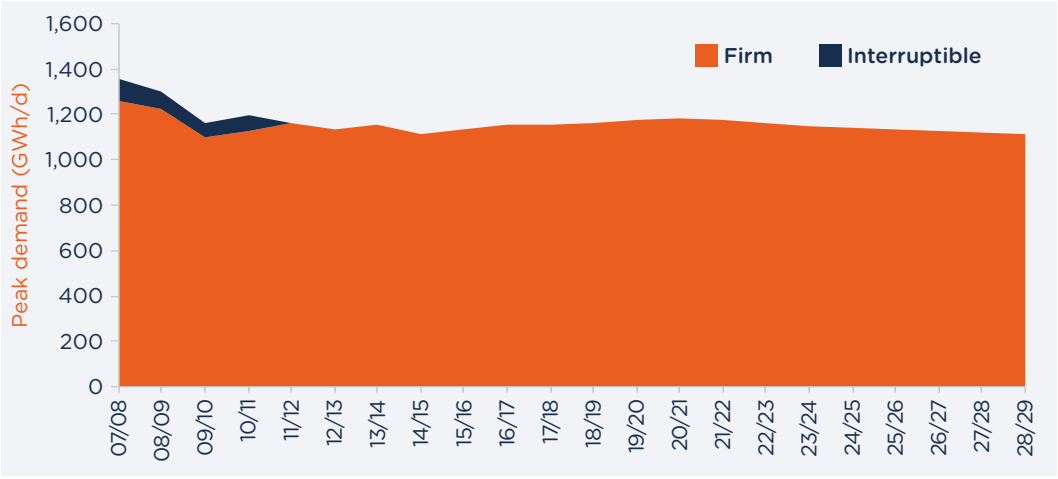


Figure 8: Change in historic and future peak demand – SGN overall

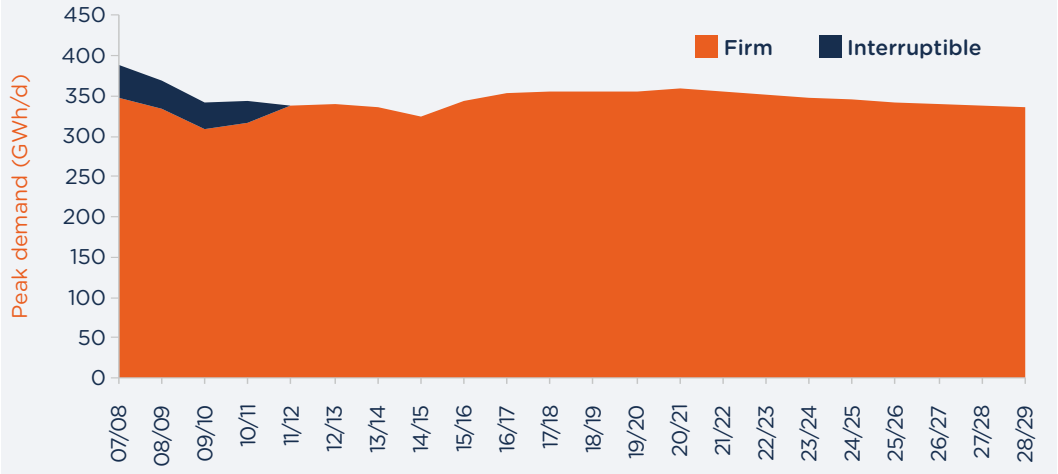


Figure 9: Change in historic and future peak demand – Scotland LDZ

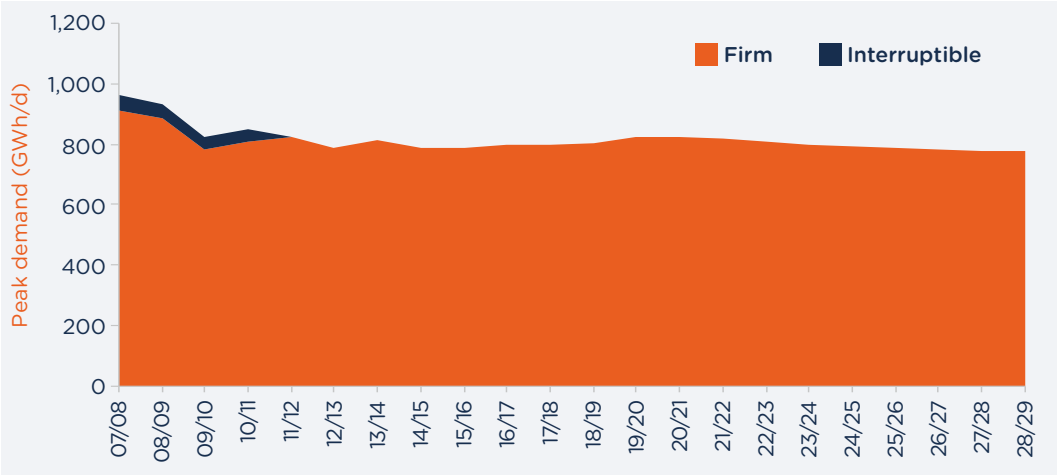


Figure 10: Change in historic and future peak demand – Southern LDZ

Change in forecast annual growth (2019/28)			
	SGN	SCOTLAND	SOUTHERN
Peak demand growth	-0.33%	-0.53%	-0.24%

Table 2: Change in peak day demand (2019/28)

Forecast comparisons

Figures 11 to 13 provide a comparison of the current forecasts with those produced in 2018.

The latest annual demand forecast for Scotland is significantly higher and for SGN in total higher over the period of the plan than last year's forecast. The South is marginally lower. The driver for the difference in the forecasts is partly due to the fact that the 2019 forecasts have taken account of the difference between the forecast for 2018 and the actual demand in 2018. The forward price assumptions also have a different profile to last year as a result of a different forecast profile for the wholesale gas price.

There are marginally higher demands in the domestic and small commercial sector in all LDZs for most of the plan period due to the impact of lower relative retail gas price assumptions in particular years. This sector in Scotland is essentially the same as last year towards the end of the planning horizon. In the larger industrial/commercial sectors Scottish demand is marginally higher reflecting a small recovery in demand the over the last year compared to the forecast. South East is lower as a result of a drop in demand at Shoreham Power Station and South demand is higher reflecting higher demand during 2018 than was forecast, driven entirely by greater demand from Fawley. There is overall a forecast of modest decline in demands throughout the forthcoming forecast period.

One significant factor that may influence future gas demand, the impact of which remains uncertain, is the outcome of the decision of the UK to leave the EU.

Another major influence on gas demand in the future will be the Government's strategy to deal with the environmental targets. The previous European Directive known as the "20 - 20 - 20 Targets" was to reduce the European Union's Greenhouse gas emission by 20% below 1990 levels, ensure 20% of energy is generated from renewable sources and reduce primary energy use by 20% by improving energy efficiency. Performance against the 20% renewable target has been variable amongst the member states with the UK until recently being well below their renewable source target. New targets have been agreed within the EU for 2030 which will require 27% of total energy from renewables and efficiency savings of 27%. This may require increases in renewable subsidies if this is to be met, assuming the UK continues to abide by these targets after leaving the EU. In 2019 the Government committed the UK to being carbon neutral by 2050 but there's no clear strategy at this time as to how this will be achieved.

Greater customer awareness on environmental issues and their 'carbon footprint' may also have an effect on the annual gas demands during the forecast period.

Sustained higher gas prices would also encourage efficiency improvements and maybe even switching to renewable energy. The recent introduction of a price cap did initially produce the prospect of lower energy prices, but the price cap has been increased by Ofgem, under the rules that they agreed for setting the price of the cap. The potential for shale gas development within the UK, currently supported by the UK Government but not the Scottish Parliament, could be an influencing factor on gas price.

Any of the above could have a substantial impact on consumption year to year or may not materialise in the near or possibly even mid-term future depending on Government policy and the decisions of UK and Scottish Parliaments.

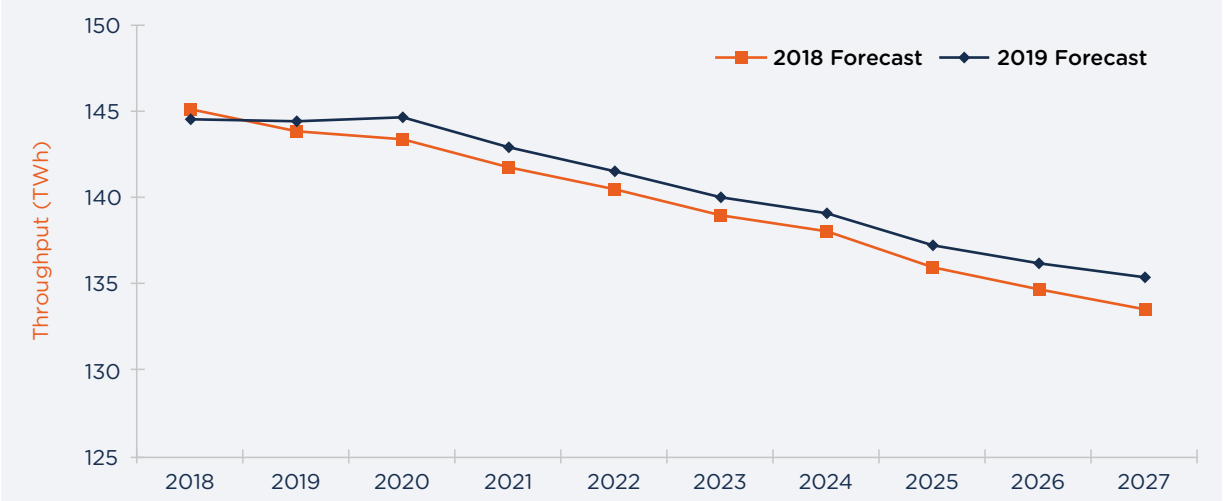


Figure 11: Comparison of total annual demand forecasts SGN overall

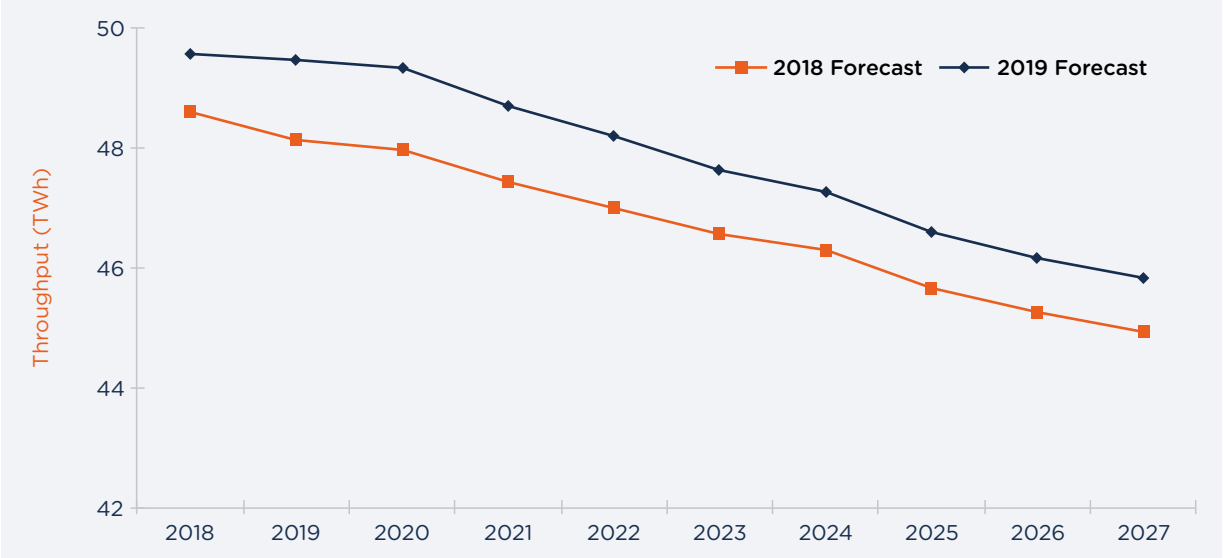


Figure 12: Comparison of total annual demand forecasts Scotland

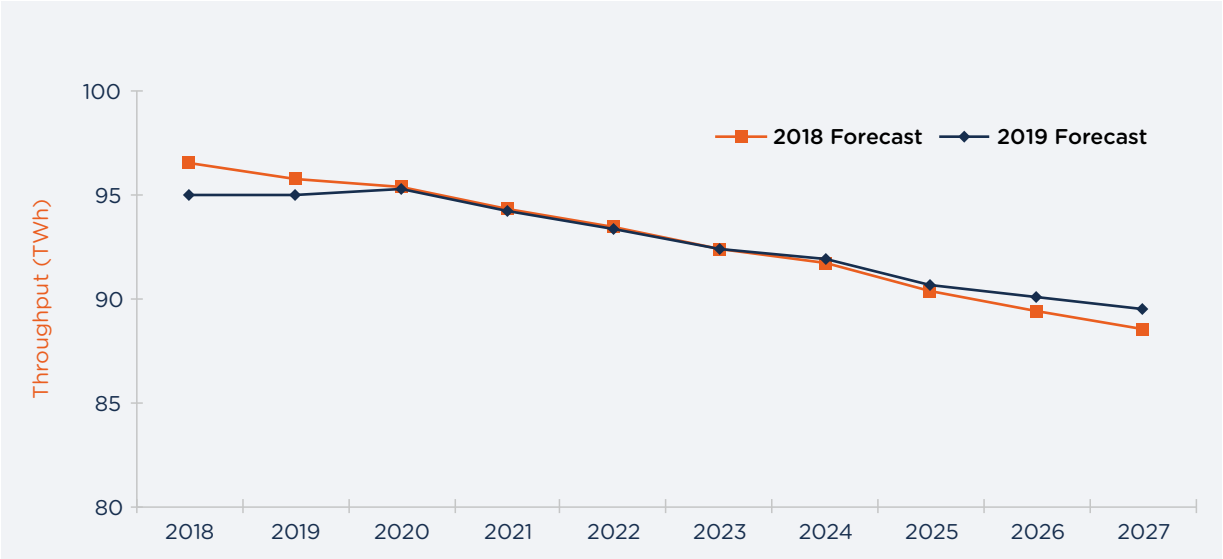


Figure 13: Comparison of total annual demand forecasts Southern

Appendix 1

Demand forecast tables

Annual demand forecast by load category – SGN overall											
Calendar year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
0 - 73.2MWh	90.6	91.3	91.6	90.6	89.9	89.0	88.7	87.7	87.2	86.8	86.8
73.2 - 732MWh	13.5	13.9	14.1	14.0	13.8	13.6	13.5	13.2	13.1	13.0	13.0
732 – 2,196MWh	6.3	6.2	6.1	6.0	5.9	5.8	5.8	5.7	5.6	5.5	5.5
2,196 – 5,860MWh	4.0	3.9	3.9	3.8	3.7	3.7	3.7	3.6	3.5	3.5	3.5
Total small user	114.4	115.4	115.7	114.4	113.4	112.2	111.6	110.2	109.5	108.9	108.8
>5,860MWh	8.0	7.8	7.7	7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9
DM consumption	21.4	20.6	20.6	20.2	20.0	19.7	19.5	19.2	19.0	18.8	18.6
Total large user	29.4	28.4	28.2	27.8	27.5	27.1	26.8	26.4	26.1	25.8	25.5
Total LDZ	143.8	143.8	143.9	142.2	140.8	139.3	138.4	136.6	135.5	134.6	134.4
Shrinkage	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total throughput	144.5	144.4	144.6	142.8	141.5	140.0	139.1	137.2	136.2	135.3	135.0

Gas supply year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Total throughput	144.8	144.9	143.2	141.9	140.4	139.5	137.6	136.5	135.6	135.2	133.8

Table 3: Forecast annual demand - SGN load categories (TWh)

Annual demand forecast by load category – Scotland LDZ											
Calendar year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
0 - 73.2MWh	29.6	29.8	29.9	29.6	29.4	29.1	29.0	28.7	28.6	28.5	28.5
73.2 - 732MWh	4.6	4.7	4.7	4.7	4.6	4.6	4.6	4.5	4.5	4.4	4.4
732 – 2,196MWh	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.1
2,196 – 5,860MWh	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4
Total small user	38.5	38.7	38.7	38.3	38.0	37.6	37.4	37.0	36.7	36.5	36.5
>5,860MWh	3.5	3.4	3.3	3.3	3.2	3.2	3.1	3.0	3.0	2.9	2.9
DM consumption	7.4	7.2	7.1	6.9	6.8	6.7	6.5	6.4	6.3	6.2	6.1
Total large user	10.9	10.6	10.4	10.2	10.0	9.8	9.7	9.4	9.3	9.1	9.0
Total LDZ	49.4	49.3	49.2	48.5	48.0	47.4	47.1	46.4	46.0	45.6	45.5
Shrinkage	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total throughput	49.6	49.4	49.3	48.7	48.2	47.6	47.3	46.6	46.2	45.8	45.6

Gas supply year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Total throughput	49.5	49.5	48.8	48.3	47.8	47.4	46.7	46.3	45.9	45.7	45.2

Table 4: Forecast annual demand - Scotland LDZ (TWh)

Annual demand forecast by load category – South East LDZ											
Calendar year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
0 - 73.2MWh	37.3	37.5	37.5	37.1	36.8	36.4	36.3	35.9	35.7	35.5	35.5
73.2 - 732MWh	5.2	5.3	5.2	5.2	5.1	5.0	4.9	4.7	4.6	4.6	4.5
732 – 2,196MWh	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8
2,196 – 5,860MWh	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total small user	45.8	46.0	46.0	45.5	45.0	44.5	44.3	43.7	43.3	43.1	43.0
>5,860MWh	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8
DM consumption	7.5	7.3	7.3	7.2	7.1	7.0	7.0	6.9	6.8	6.7	6.7
Total large user	9.5	9.3	9.2	9.1	9.0	8.9	8.8	8.7	8.6	8.5	8.5
Total LDZ	55.3	55.3	55.3	54.6	54.1	53.5	53.1	52.4	52.0	51.6	51.5
Shrinkage	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total throughput	55.6	55.6	55.6	54.9	54.3	53.7	53.4	52.7	52.2	51.9	51.8

Gas supply year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Total throughput	55.7	55.7	55.0	54.5	53.9	53.6	52.8	52.4	52.0	51.9	51.3

Table 5: Forecast annual demand - South East LDZ (TWh)

Annual demand forecast by load category – South LDZ											
Calendar year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
0 - 73.2MWh	23.7	24.1	24.2	23.9	23.7	23.5	23.4	23.1	23.0	22.8	22.8
73.2 - 732MWh	3.7	4.0	4.1	4.1	4.1	4.1	4.1	4.0	4.0	4.0	4.1
732 – 2,196MWh	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5
2,196 – 5,860MWh	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Total small user	30.1	30.7	30.9	30.6	30.3	30.0	29.9	29.6	29.4	29.3	29.3
>5,860MWh	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2
DM consumption	6.5	6.1	6.2	6.2	6.1	6.1	6.0	6.0	5.9	5.9	5.9
Total large user	9.0	8.5	8.6	8.5	8.4	8.4	8.3	8.2	8.2	8.1	8.1
Total LDZ	39.1	39.2	39.5	39.1	38.8	38.4	38.2	37.8	37.6	37.4	37.4
Shrinkage	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total throughput	39.3	39.4	39.7	39.3	39.0	38.6	38.4	38.0	37.8	37.6	37.6

Gas supply year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Total throughput	39.6	39.7	39.3	39.1	38.7	38.5	38.1	37.9	37.7	37.6	37.3

Table 6: Forecast annual demand - South LDZ (TWh)

1 in 20 peak day firm demand forecast – at a glance											
Calendar year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Scotland	355.7	355.1	359.2	356.0	352.3	348.6	345.3	342.5	340.1	337.9	335.8
South East	468.5	469.0	468.6	464.4	459.5	454.5	450.2	446.7	443.7	441.0	438.3
South	337.6	353.8	354.9	352.4	349.4	346.3	343.8	341.9	340.3	338.9	337.5
SGN overall	1,161.8	1,178.0	1,182.7	1,172.7	1,161.1	1,149.4	1,139.3	1,131.1	1,124.1	1,117.8	1,111.6

Table 7: Forecast 1 in 20 peak day firm demand forecast - at a glance (GWh)

1 in 20 peak day firm demand forecast – SGN overall by load categories											
Calendar year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
0 - 73.2MWh	836.5	837.1	832.2	825.8	818.2	810.8	804.8	800.2	796.4	793.0	789.5
73.2 - 732MWh	122.8	124.6	124.0	122.9	121.4	119.6	117.8	116.5	115.6	115.0	114.4
732 – 2,196MWh	42.5	41.7	41.2	40.6	40.1	39.6	39.1	38.6	38.1	37.7	37.2
2,196 – 5,860MWh	26.8	26.3	26.0	25.6	25.3	24.9	24.6	24.3	24.0	23.7	23.4
>5,860MWh	53.6	52.6	51.9	51.3	50.6	49.9	49.3	48.7	48.1	47.5	46.9
Total NDM consumption	1,082.2	1,082.3	1,075.3	1,066.3	1,055.6	1,044.8	1,035.6	1,028.3	1,022.2	1,016.8	1,011.4
DM firm consumption	77.7	93.8	105.7	104.7	103.7	102.8	101.9	101.0	100.1	99.3	98.4
Total firm consumption	1,159.9	1,176.2	1,180.9	1,170.9	1,159.3	1,147.6	1,137.5	1,129.3	1,122.3	1,116.0	1,109.8
Total shrinkage	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Total LDZ	1,161.8	1,178.0	1,182.7	1,172.7	1,161.1	1,149.4	1,139.3	1,131.1	1,124.1	1,117.8	1,111.6

Table 8: Forecast 1 in 20 peak day firm demand forecast - SGN by load categories (GWh)

1 in 20 peak day firm demand forecast – Scotland LDZ by load categories											
Calendar year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
0 - 73.2MWh	242.8	242.9	241.8	240.2	238.2	236.2	234.6	233.4	232.4	231.5	230.6
73.2 - 732MWh	37.7	38.1	38.0	37.7	37.3	36.9	36.5	36.2	36.0	35.8	35.6
732 – 2,196MWh	16.2	15.9	15.6	15.3	15.0	14.7	14.4	14.2	13.9	13.7	13.4
2,196 – 5,860MWh	10.9	10.6	10.4	10.2	10.0	9.8	9.7	9.5	9.3	9.1	9.0
>5,860MWh	21.9	21.4	21.0	20.6	20.2	19.8	19.5	19.1	18.8	18.4	18.1
Total NDM consumption	329.5	328.9	326.8	324.0	320.8	317.5	314.6	312.3	310.3	308.5	306.7
DM firm consumption	25.7	25.7	32.0	31.5	31.0	30.6	30.1	29.7	29.3	28.9	28.5
Total firm consumption	355.2	354.6	358.7	355.5	351.8	348.1	344.8	342.0	339.7	337.5	335.3
Total shrinkage	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total LDZ	355.7	355.1	359.2	356.0	352.3	348.6	345.3	342.5	340.1	337.9	335.8

Table 9: Forecast 1 in 20 peak day firm demand forecast - Scotland LDZ by load categories (GWh)

1 in 20 peak day firm demand forecast – South East LDZ by load categories											
Calendar year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
0 - 73.2MWh	357.5	357.2	355.0	352.2	348.9	345.7	343.1	341.1	339.5	337.9	336.4
73.2 - 732MWh	46.1	46.1	45.6	44.8	43.9	42.8	41.7	40.8	40.2	39.6	39.0
732 – 2,196MWh	14.0	13.9	13.7	13.6	13.4	13.3	13.1	13.0	12.8	12.7	12.6
2,196 – 5,860MWh	9.0	8.9	8.8	8.7	8.6	8.5	8.4	8.3	8.3	8.2	8.1
>5,860MWh	14.0	13.8	13.6	13.5	13.3	13.2	13.0	12.9	12.8	12.6	12.5
Total NDM consumption	440.7	439.9	436.7	432.8	428.2	423.5	419.4	416.2	413.5	411.0	408.6
DM Firm consumption	26.9	28.4	31.1	30.8	30.5	30.3	30.0	29.7	29.5	29.2	29.0
Total firm consumption	467.7	468.2	467.8	463.6	458.7	453.7	449.4	445.9	442.9	440.2	437.5
Total shrinkage	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Total LDZ	468.5	469.0	468.6	464.4	459.5	454.5	450.2	446.7	443.7	441.0	438.3

Table 10: Forecast 1 in 20 peak day firm demand forecast - South East LDZ by load categories (GWh)

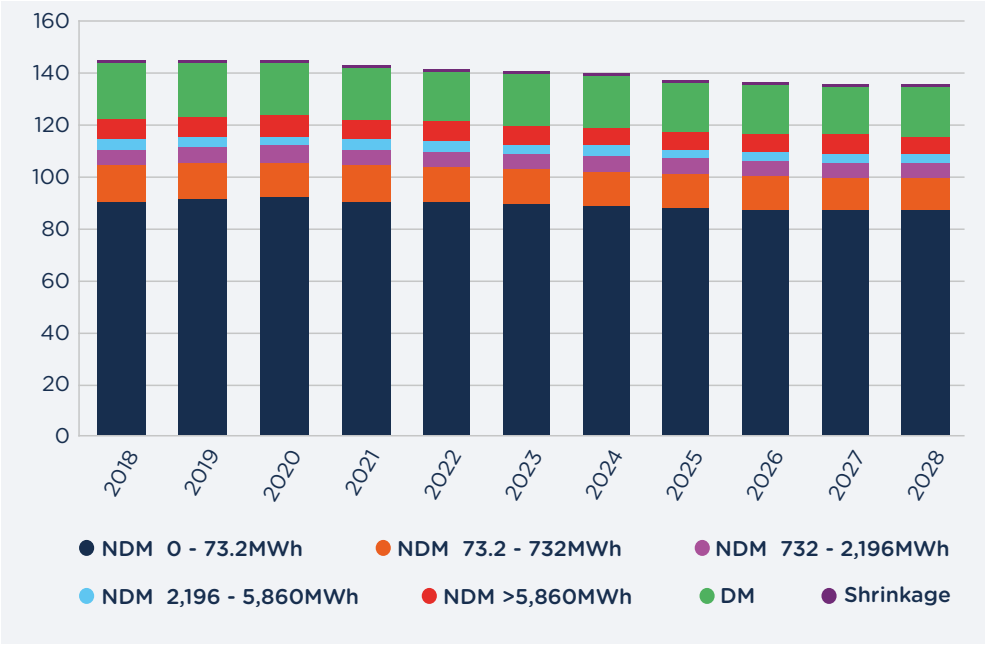


Figure 14: Annual demand forecast - SGN overall

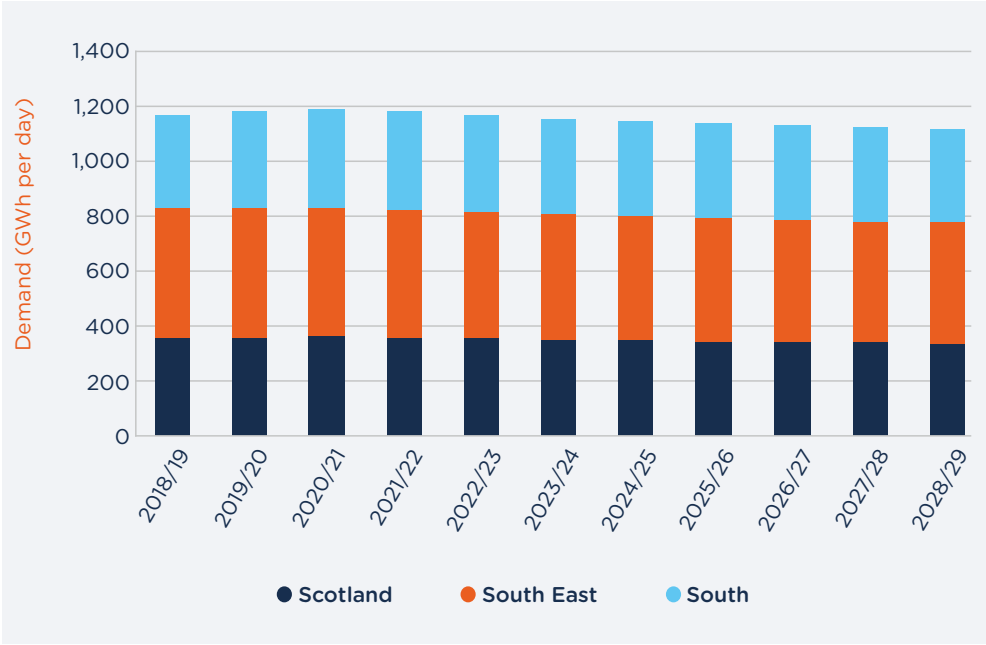


Figure 15: 1 in 20 peak day demand forecast - SGN overall

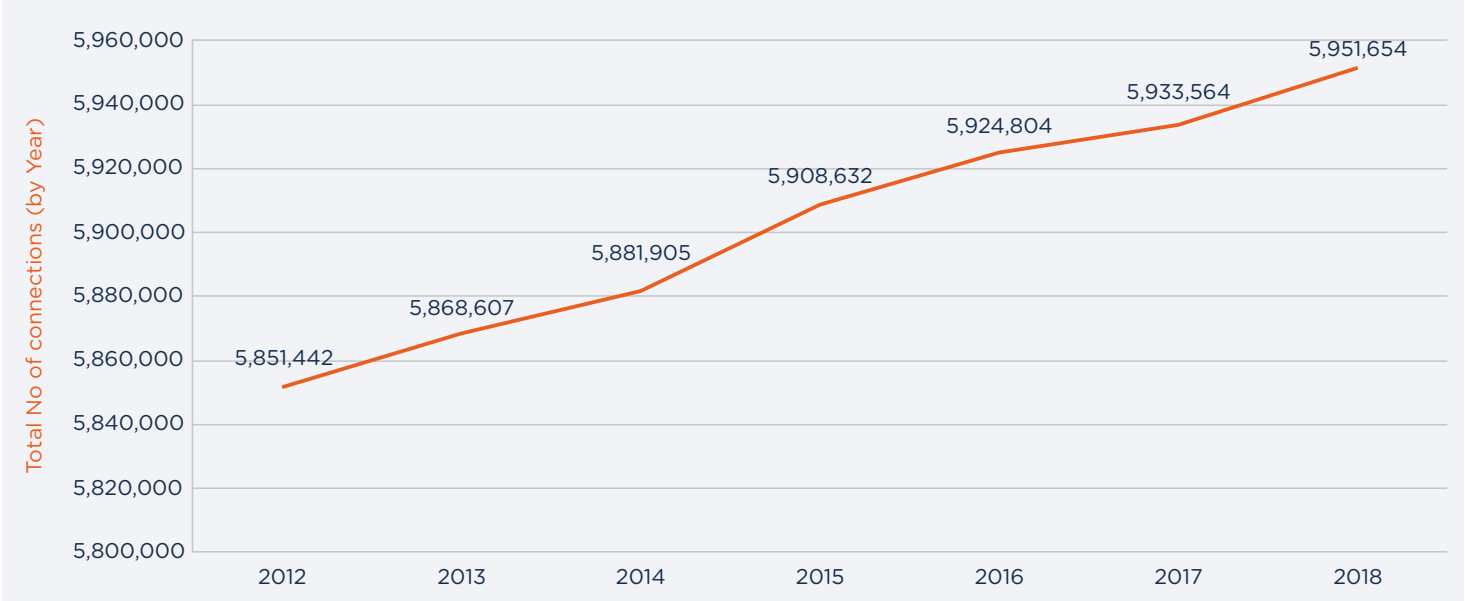


Figure 16: Year-on-year customer numbers - SGN overall

Appendix 2

2018 flows

This appendix describes annual flows during the 2018 calendar year

Annual flows

Forecasts of annual demand are based on average weather conditions. Therefore, when comparing actual demand with forecasts, demand must be adjusted to take account of the difference between actual weather conditions and seasonal normal weather. The result of this adjustment is the weather corrected demand.

Recent winters have included some of the warmest of any in the weather data history employed for demand modelling, dating back to 1960-61. Consequently, the basis of the average weather condition used for demand forecasting purposes has been adjusted to better reflect these conditions.

Anecdotal evidence to the contrary is based on specific days or weeks and not the entire winter period. As a result, the 2016 weather corrected annual demands and forecasts are based on the industry's current view and research in co-operation with the Hadley Centre, which is part of the Met Office.

Tables 11 to 13 provide a comparison of actual and weather corrected demands during the 2016 calendar year with the forecasts presented in the 2016 LTDS. Annual demands are presented in the format of LDZ load bands/categories, consistent with the basis of system design and operation.

Note: figures may not sum exactly due to rounding.

Annual demand for 2018 (TWh) - Scotland LDZ			
	Actual demand	Weather corrected demand	2018 LTDS forecast demand
0 - 73.2MWh	29.69	28.65	29.13
73 – 5,860MWh	9.02	8.76	8.80
>5,860MWh firm	11.01	10.93	10.46
Total LDZs	49.72	48.34	48.40
Shrinkage	0.20	0.20	0.19
Total throughput	49.92	48.54	48.59

Table 11: Annual demand for 2018 (TWh) – Scotland LDZ

Annual demand for 2018 (TWh) - South East LDZ			
	Actual demand	Weather corrected demand	2018 LTDS forecast demand
0 - 73.2MWh	35.88	35.89	36.46
73 – 5,860MWh	8.35	8.35	8.38
>5,860MWh firm	9.47	9.47	12.59
Total LDZs	53.71	53.71	57.43
Shrinkage	0.40	0.40	0.30
Total throughput	54.11	54.11	57.73

Table 12: Annual demand for 2018 (TWh) – South East LDZ

Annual demand for 2018 (TWh) - South LDZ			
	Actual demand	Weather corrected demand	2018 LTDS forecast demand
0 - 73.2MWh	23.87	23.54	23.69
73 – 5,860MWh	6.41	6.34	6.61
>5,860MWh firm	9.06	9.04	8.30
Total LDZs	39.34	38.91	38.60
Shrinkage	0.20	0.20	0.20
Total throughput	39.54	39.11	38.80

Table 13: Annual demand for 2018 (TWh) – South LDZ

LDZ winter severity statistics

Sourced from the May 2019 National Grid Winter Severity Report 2018-19, these statistics cover the gas industry interpretation of winter lasting from October 2018 to March 2019 inclusively.

By way of explanation a winter can be either warm, cold or average. The 1 in 'X' is a measure of how far away from average it is and if it is either cold or warm. The most severe cold winter is the one that has happened once in the last 56 years. This would be a 1 in 56, cold winter and this occurred in 1962/63.

UK wide the winter of 2018-19 was the 5th warmest winter recorded in the last 56 years.

1 in 'X' winter severities per LDZ	
LDZ	F
Scotland	Average
South East	4 – Warm
South	5 – Warm
National	3 - Warm

Table 14: 1 in X winter severities per LDZ

Maximum and minimum flows

Table 15 indicates the highest and lowest daily demands for each LDZ seen between October 2018 and September 2019 and when they occurred.

Table 16 shows % flow of forecast peak day for each LDZ on the maximum and minimum demand day of gas year 2018-19.

Actual flows on the maximum and minimum demand day of gas year 2018-19		
LDZ	Maximum day 2018-19	Minimum day 2018-19
Scotland	24.2 mscmd (31st January 2019)	4.34 mscmd (25th August 2019)
South East	30.70 mscmd (23rd January 2019)	3.77 mscmd (25th July 2019)
South	22.69 mscmd (31st January 2019)	2.73 mscmd (25th August 2019)

Table 15: Actual flows on the maximum and minimum demand day of gas year 2017/18

Maximum and minimum flows of gas year 2018-19 (as a percentage)			
LDZ	Forecast peak day	Actual maximum peak day	Actual minimum peak day
Scotland	32.30 mscmd	74.9%	13.4%
South East	43.21 mscmd	71%	8.7%
South	31.17 mscmd	72.8%	8.8%

Table 16: Maximum and minimum flows of gas year 2017/18 (as a percentage)

Biomethane sites

Table 17 shows the total number of biomethane sites connected to our networks with contracted capacity and the equivalent number of domestic customers this gas might be able to supply based on the Ofgem average AQ of 12,01.

The figures include 4 sites (Hill Farm, Banbury, Newton Longville and Tornagrain) which have lost their Letters of Direction in the last year.

Portfolio of biomethane sites		
LDZ	Total	Equivalent no of domestic customers
Scotland	15	135,658
Southern	16	186,592
Total	31	322,251

Table 17: Portfolio of sites as of end August 2018

<7bar distribution projects

Tables 18 to 21 detail the <7bar projects which relate to the planning horizon discussed with this years LTDS.

When scheduling our major reinforcement projects, we consult with local authorities and developers. This may result in a planned build year change compared with the last year LTDS.

Major projects are works estimated to cost in excess of £500,000.

Projects under construction

<7 Bar major projects under construction in Scotland		
Project	Build year	Project scope
Edinburgh St James	2019/20	630m x 400/630mmPE and a new DG
Inverness Canal Crossing	2019/20	1.1km x 250/355mmPE and a new DG
New Winton to Tranent	2019/20	1.3km x 315mmPE IP

Table 18: <7Bar projects under construction in Scotland

<7 Bar major projects under construction in southern England		
Project	Build year	Project scope
35mbar - Denmark Hill, Brixton, London SE5 8EN	2019/20	137m x 250mm PE IP + 36m x 355 PE LP + DG Installation
35mbar - Junction of Thurlow St and East St London SE17 2SD	2019/20	8m x 8" ST IP + 43m x 315mm PE LP + DG Installation
Greenham Park, Berkshire, RG19 6HA	2019/20	658m x 250mm PE MP
Kennet Walk, Reading	2019/20	0.1km x 355/630mmPE and 2 DGs

Table 19: <7Bar major projects under construction in southern England

Projects under consideration

<7 Bar major projects under consideration in Scotland		
Project	**Build year**	**Project scope**
Haddington DPG	2020/21	0.3km x 180/315mm HDPE and a new DPG
Ferniehill Drive, Edinburgh (Phase 1)	2020/21	0.69km x 500mmPE
Dunning - Auchterarder MP (Phase 1)	2020/21	0.8km x 315mmPE MP
Aberlady - Gullane (Phase 1)	2021/22	2.6km x 315/355mmPE MP
South East Wedge, Millerhill	2022/23	2.3km x 12"/630mm PE and a new TRS/DPG
Haddington - Dunbar IP leg	2022/23	1.8km x 315mm/250mmHDPE
Hilton Drive, Aberdeen	2022/23	1.72km x 355mmHDPE

Table 20: <7Bar major projects under consideration in Scotland

<7 Bar major projects under consideration in southern England		
Project	**Build year**	**Project scope**
Galpins Road, Mitcham	2020/21	0.17km x 24"ST
Kingsnorth Industrial Estate, Rochester, ME3 9ND	2020/21	1.4km x 500mmPE MP
Allington Track, Salisbury, SP4 0EL	2020/21	2.1km x 400mmPE MP
Elson Road, St Thomas Road, Hardway, Gosport, PO12 4AD	2020/21	1.2km x 315mmPE MP and a DG
Botley, Eastleigh, Hampshire, South East, SO32	2020/21	0.56km x 315mmPE MP
Berryfields Phase 2, Aylesbury	2020/21	1.023km x 355mmPE MP
Mortimers Lane, Fairoak, Eastleigh, SO50 7EA (Phase 2)	2020/21	1.1km x 180mmPE and a new DG
Bridge Street, Brackley	2020/21	0.57km x 315mmPE MP
Folkestone DPG	2020/21	Replace Folkestone DPG
Tingewick Road, Buckingham (Phase 1)	2021/22	0.5km x 355mmPE MP
Collier Street, Maidstone	2021/22	2.0km x 180mmPE MP
Bicester MP (Phase 1)	2021/22	1.66km x 315mmPE MP
Aldermaston (Phase 1)	2022/23	4.1km x 180mmPE MP
Phase 3 A422 Brackley	2022/23	2.05km x 315mmPE MP
Mitcham Common IP MP CGS	2022/23	Replace Mitcham Common CGS
Mitcham Depot CGS	2022/23	Replace Mitcham Depot CGS

Table 21: <7Bar major projects under consideration in southern England

Appendix 3

Summary of all scenarios (SGN and FES)

South East

Annual demand ranges from a 13.4% decrease (FES community renewables) to a 3.7% increase (FES steady progression)

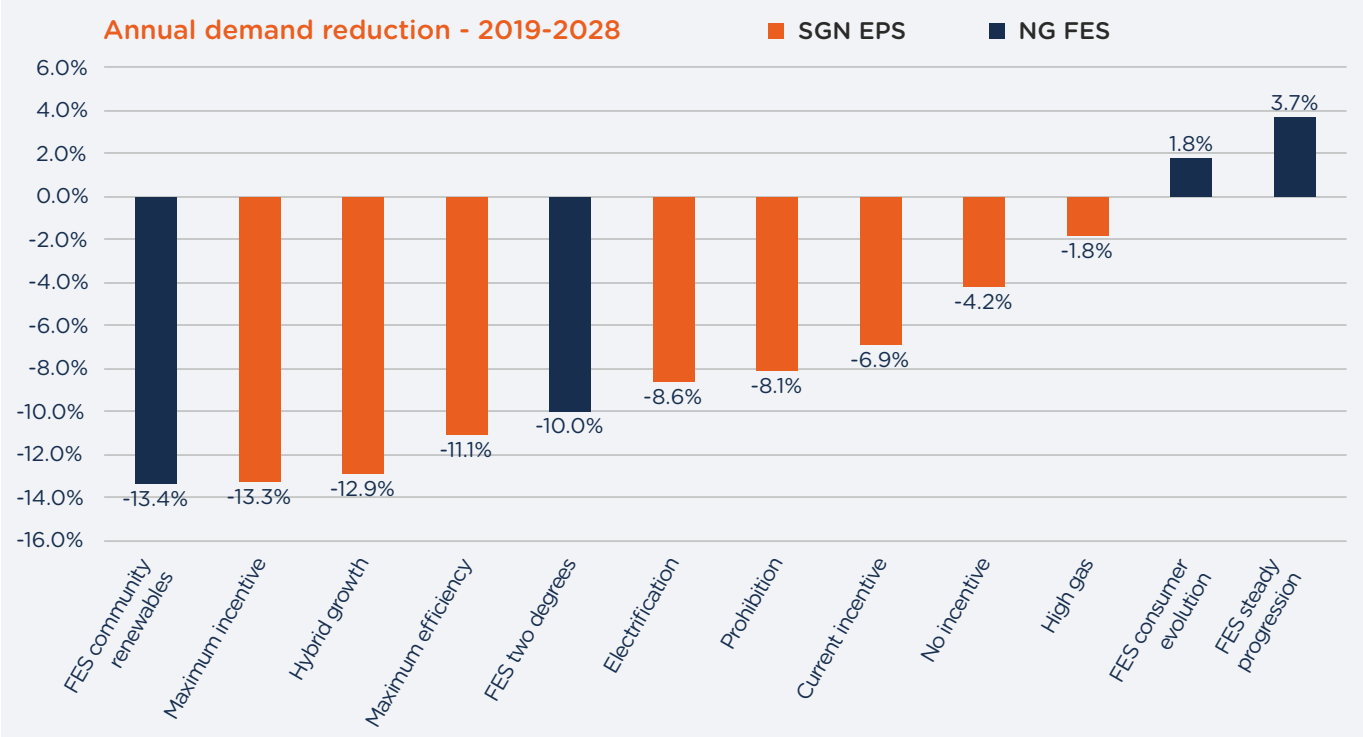


Figure 17: South East annual demand reduction - 2019-2028

Peak demand ranges from a 16.8% decrease (FES community renewables) to a 3.1% increase (FES steady progression)

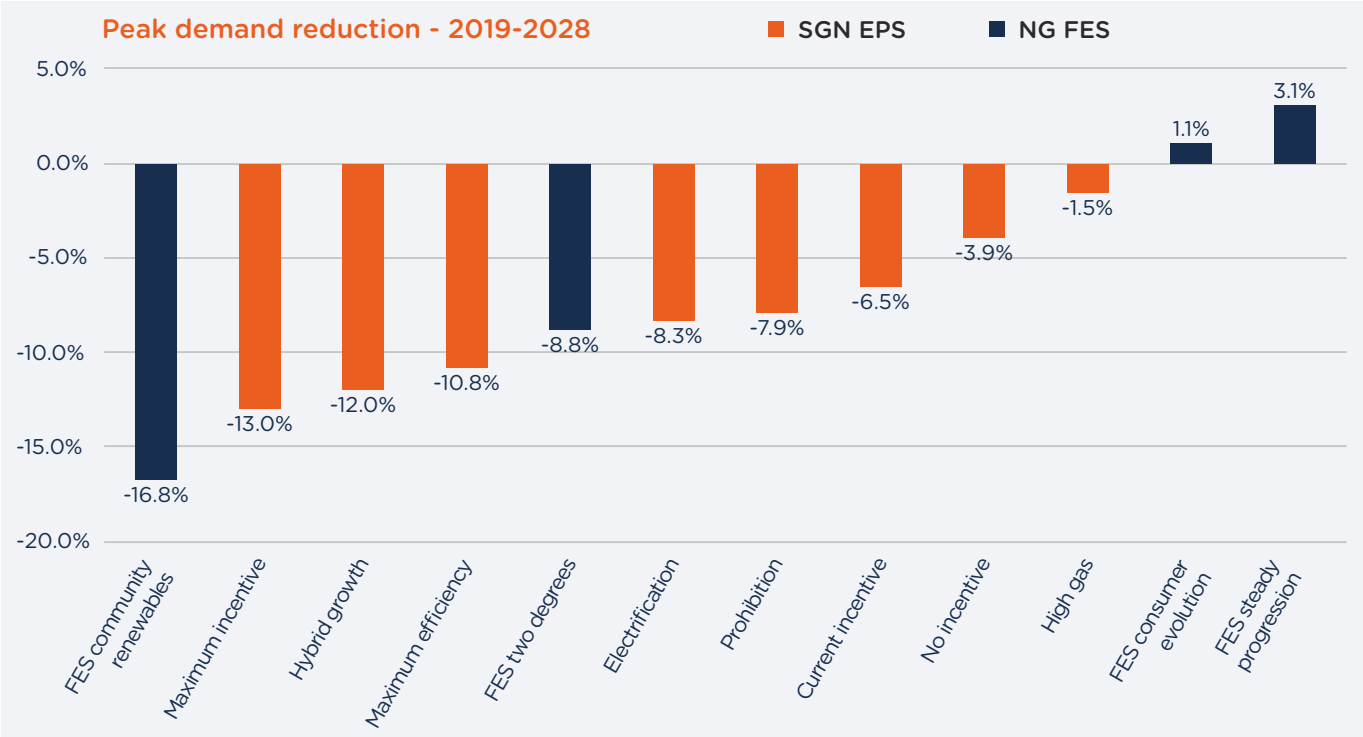


Figure 18: South East peak demand reduction - 2019-2028

South

Annual demand ranges from a 22% decrease (FES community renewables) to a 4.7% increase (FES steady progression)

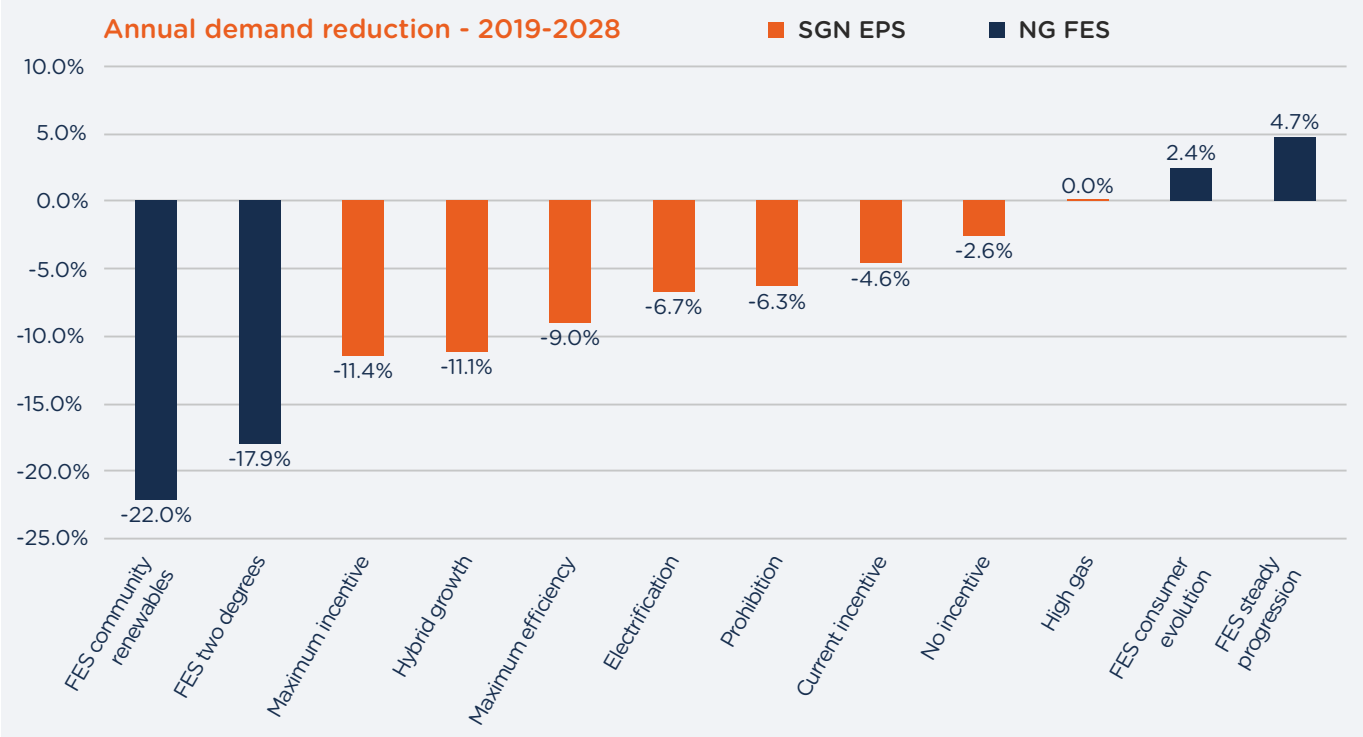


Figure 19: South annual demand reduction - 2019-2028

Peak demand ranges from a 17.1% decrease (FES community renewables) to a 3.7% increase (FES steady progression)

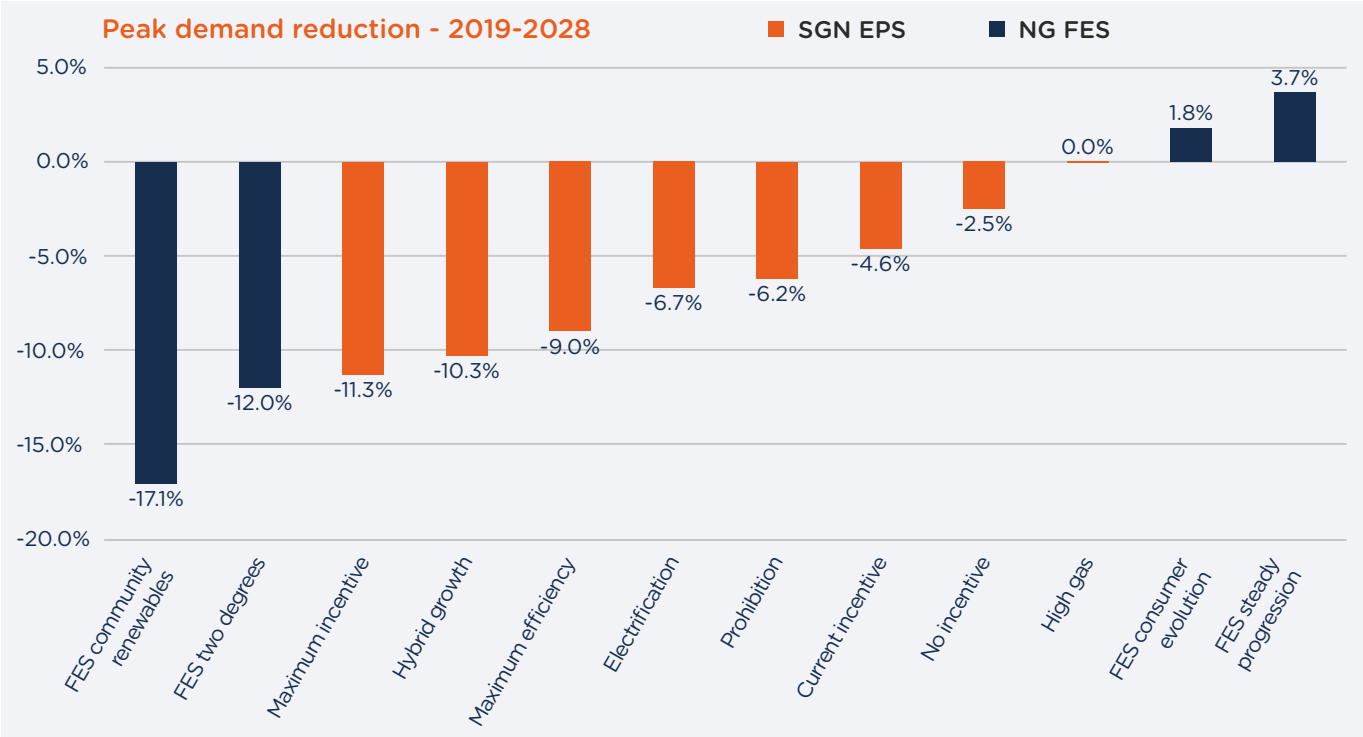


Figure 20: South peak demand reduction - 2019-2028

Scotland

Annual demand ranges from a 14.1% decrease (maximum incentive) to a 6.2% increase (FES steady progression)

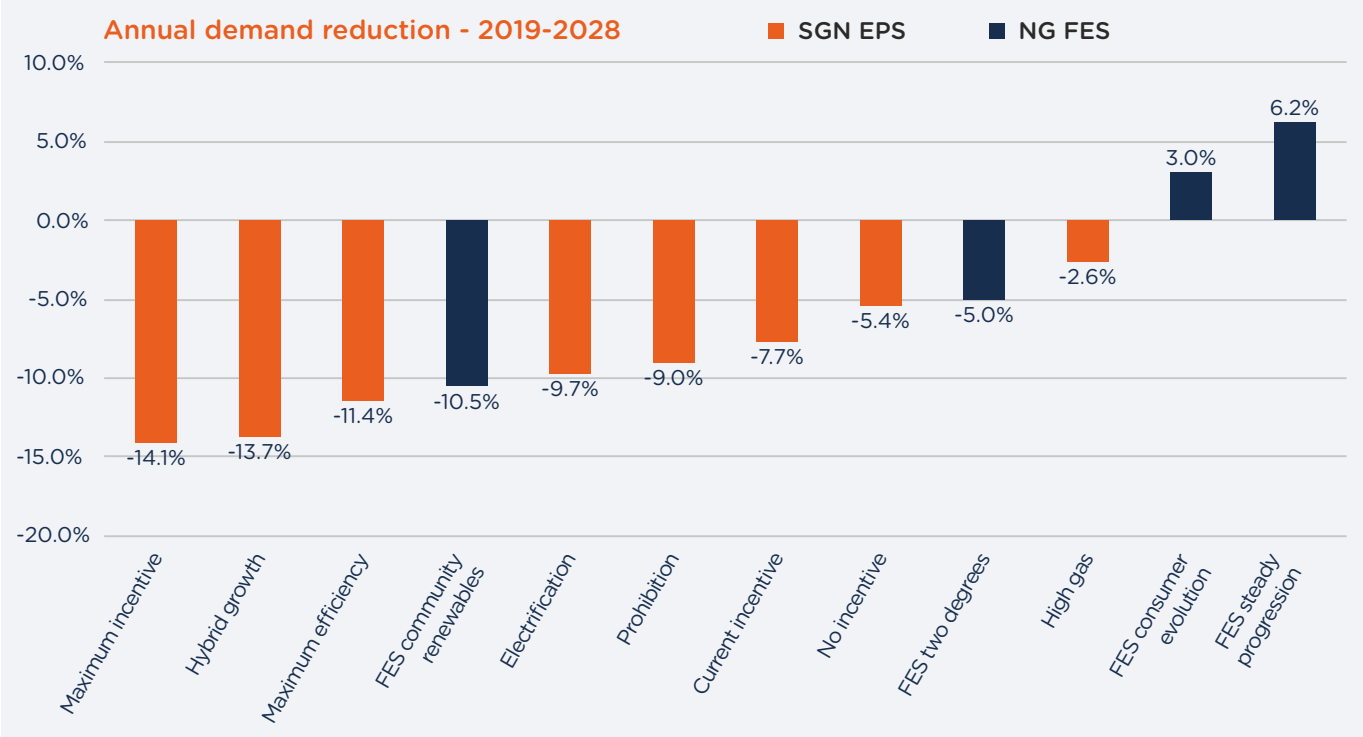


Figure 21: Scotland annual demand reduction - 2019-2028

Peak demand ranges from a 13.2% decrease (maximum incentive) to a 4.3% increase (FES steady progression)

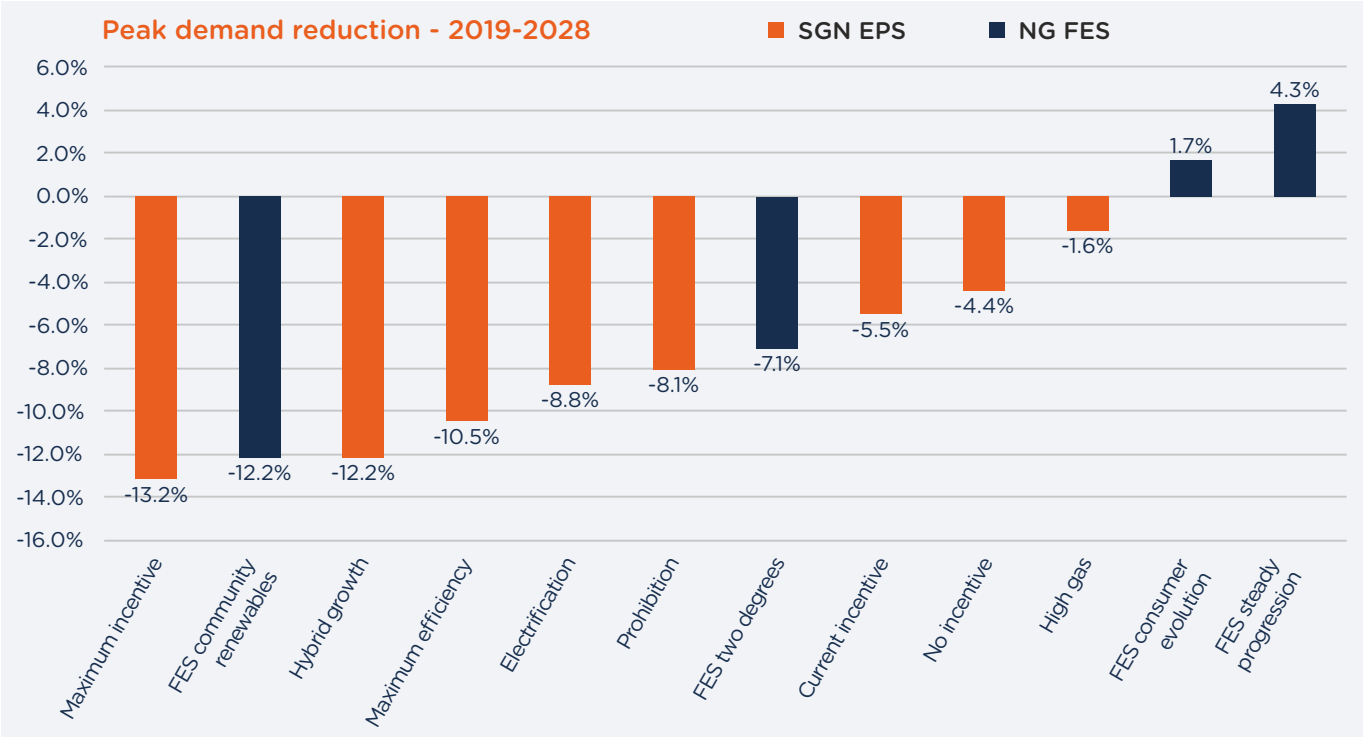


Figure 22: Scotland demand reduction - 2019-2028

Appendix 4

Links and contacts

Internal contacts

sgn.co.uk
You can apply for a new gas connection online through our website and learn more about our Help to Heat Scheme for our fuel poor scheme. You can also find further information about our planned and emergency works in your area.

network.capacity@sgn.co.uk
Our dedicated email address for any questions regards our Long Term Development Statement.

Leyon.Joseph@sgn.co.uk
Network Planning Manager – above 7bar transmission system.

Barrie.Gillam@sgn.co.uk
LTS Planning Officer – above 7bar transmission system, LTDS Contact.
Tel: 01293 818244

GT1.GT2@sgn.co.uk
Mailbox for requests for increased loads at existing sites where meter capacity may be an issue.

linesearchbeforeudig.co.uk
Safety is our number one priority, before you dig always request details of our pipework's location via this online service.

customer@sgn.co.uk
Our 24-hour Customer Service team can be reached by email or by calling 0800 912 1700. You can also find us on Facebook or follow us on Twitter at @SGNgas.

lets.chat@sgn.co.uk
We are always interested in engaging with our stakeholders. This is how we look to improve the way we do things by listening to your feedback.

Paul.Denniff@sgn.co.uk
Network & Safety Director.

Joel.Martin@sgn.co.uk
Regulatory Finance Manager – point of contact for storage and biomethane enquiries.

Stuart.Forrest@sgn.co.uk
Head of Network Distribution.

External contacts

ofgem.gov.uk
Office of Gas and Electricity Markets. Regulating authority for gas industry and markets.
ofgem.gov.uk

ENA
Energy Networks Association (ENA) represents the 'wires and pipes' transmission and distribution network operators for gas and electricity in the UK.
energynetworks.org

Joint Office of Gas Transporters
The Joint Office is where the UNC can be found. There are also details of live modifications to the document and the various working bodies relating to the gas industry.
gasgovernance.co.uk

BEIS - Department for Business Energy & Industrial Strategy
BEIS brings together responsibilities for business, industrial strategy, science, innovation, energy, and climate change.
gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy

xoserve
One of several service providers supporting the UK gas industry.
xoserve.com

Glossary

Annual Quantity (AQ) - The AQ of a supply point is its annual consumption over a 365 or 366-day year, under conditions of average weather.

Bar - The unit of pressure that is approximately equal to atmospheric pressure (0.987 standard atmospheres). Where bar is suffixed with the letter g, such as in barg or mbarg, the pressure being referred to is gauge pressure, i.e. relative to atmospheric pressure. One millibar (mbar) equals 0.001 bar.

BEIS – Government Department for Business, Energy & Industrial Strategy. BEIS replaced the Department for Business, Innovation and Skills (BIS) and the Department of Energy and Climate Change (DECC) in July 2016.

Biomethane - Biogas that has been cleaned in order to meet GSMR requirements.

Calorific Value (CV) - The ratio of energy to volume measured in Mega joules per cubic meter (MJ/m3), which for a gas is measured and expressed under standard conditions of temperature and pressure.

Climate Change Levy (CCL) - Government tax on the use of energy within industry, commerce and the public sector in order to encourage energy efficient schemes and use of renewable energy sources. CCL is part of the UK Government's Climate Change Programme (CCP).

Connected System Exit Point (CSEP) - A connection to a more complex facility than a single supply point. For example, a connection to a pipeline system operated by another gas transporter.

Cubic Metre (m3) - The unit of volume, expressed under standard conditions of temperature and pressure, approximately equal to 35.37 cubic feet. One million cubic metres (mcm) are equal to 10^6 cubic metres, one billion cubic metres (bcm) equals 10^9 cubic metres.

Daily Metered Supply Point - A supply point fitted with equipment, for example a data-logger, which enables meter readings to be taken on a daily basis. These are further classified as SDMC, DMA, DMC or VLDMC according to annual consumption. Of these the most relevant is VLDMC which is defined further on.

DECC - Department of Energy and Climate Change - In 2016 absorbed into Department for Business, Energy and Industrial Strategy.

Distribution system - A network of mains operating at three pressure tiers: intermediate (7 to 2barg), medium (2barg to 75mbarg) and low (less than 75mbarg).

Diurnal storage - Gas stored for the purpose of meeting within day variations in demand. Gas can be stored in special installations, such as gasholders, or in the form of linepack within transmission, i.e. >7barg pipeline systems.

Embedded Entry Points - Entry point which is not an offtake from NTS. Can be a biomethane or other unconventional source of gas.

Embedded Power Stations – Gas fired power stations designed to provide resilience within a local electricity power grid by generating electricity according to operational and market factors.

Exit Zone - A geographical area within a LDZ, which consists of a group of supply points, which on a peak day, receive gas from the same NTS Offtake.

Formula year - A twelve-month period commencing 1 April predominantly used for regulatory and financial purposes.

Future Energy Scenarios (FES) - National Grid's annual industry-wide consultation process encompassing the 10 Year Statement, targeted questionnaires, individual company and industry meetings, feedback on responses and investment scenarios. Previously called Transporting Britain's Energy.

Gas Day – Used by gas industry for buying and selling gas on open market. Defined as running from 05:00 on one day to 05:00 on the following day.

Gas Distribution Network (GDN) - An administrative unit responsible for the operation and maintenance of the local transmission system (LTS) and <7barg distribution networks within a defined geographical boundary, supported by a national emergency services organisation.

Gas Transporter (GT) - Formerly Public Gas Transporter (PGT). GTs such as SGN, are licensed by the Gas and Electricity Markets Authority to transport gas to customers.

Gasholder - A vessel used to store gas for the purposes of providing diurnal storage.

Gas supply year - A twelve-month period commencing 1 October also referred to as a Gas Year.

Gemini - A computer system which supports Uniform Network Code operations, including energy balancing.

GVA - Gross Value Added (GVA) measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom.

H100 100% hydrogen project – Our Hydrogen 100 project has been designed to demonstrate the safe, secure and reliable distribution of hydrogen to reduce carbon output and progress towards the 2050 UK carbon target. More information is available at sgn.co.uk/about-us/future-of-gas/hydrogen/hydrogen-100

Interconnector - This is a pipeline transporting gas from or to another country.

Interruptible Supply Point - A supply point that offers lower transportation charges where SGN can interrupt the flow of gas to the supply point and that is prepared to be interrupted if the Transporter needs it to.

Kilowatt hour (kWh) - A unit of energy used by the gas industry. Approximately equal to 0.0341 therms.

LDUG – LDz **U**naccounted for **G**as.

Linepack - The usable volume of compressed gas within the national or local transmission system at any time.

Liquefied Natural Gas (LNG) - Gas stored in liquid form. Can be firm or constrained (CLNG). Shippers who book a constrained service agree to allow us to use some of their gas to balance the system.

Load Duration Curve (Average) - The average load duration curve is that curve which, in a long series of winters, with connected load held at the levels appropriate to the year in question, the average volume of demand above any given threshold, is represented by the area under the curve and above the threshold.

Local Distribution Zone (LDZ) - A geographic area supplied by one or more NTS offtakes. Consists of high pressure (>7barg) and lower pressure distribution system pipelines.

Local Transmission System (LTS) - A pipeline system operating at >7barg, that transports gas from NTS offtakes to distribution systems. Some large users may take their gas direct from the LTS.

National Balancing Point (NBP) - An imaginary point on the UK gas supply system through which all gas passes for accounting and balancing purposes.

National Transmission System (NTS) - A high-pressure system consisting of terminals, compressor stations, pipeline systems and offtakes. Designed to operate at pressures up to 85barg. NTS pipelines transport gas from terminals to NTS offtakes.

National Transmission System Offtake - An installation defining the boundary between NTS and LTS or a very large consumer. The offtake installation includes equipment for metering, pressure regulation, etc.

Network Entry Agreement (NEA) - The Network Entry Agreement sets out the technical and operational conditions for any third party site injecting gas into our networks.

Network entry facility - Sites with the necessary equipment and agreements in place which enable the injection of gas into our networks by a third party.

Non-Daily Metered (NDM) - A meter that is read monthly or at longer intervals. For the purposes of daily balancing, the consumption is apportioned using an agreed formula, and for supply points consuming more than 73.2MWh pa reconciled individually when the meter is read.

Odorisation - The process by which the distinctive odour is added to gas supplies to make it easier to detect leaks. Odorisation is provided at all Network Entry points.

Office of Gas and Electricity Markets (Ofgem) - The regulatory agency responsible for regulating the UK's gas and electricity markets.

Offtake - An installation defining the boundary between NTS and LTS or a very large consumer. The offtake installation includes equipment for metering, pressure regulation, etc.

ONS - Office for National Statistics.

Operating Margins - Gas used to maintain system pressures under certain circumstances, including periods immediately after a supply loss or demand forecast change, before other measures become effective and in the event of plant failure, such as pipe breaks and compressor trips.

OPN - Offtake Profile Notice. Method of notifying National Grid of the next day or future demand for gas at offtakes.

Planning and Advanced Reservation of Capacity Agreement (PARCA) - A bilateral contract between National Grid and their customer which allows entry and/or exit capacity to be reserved in advance of the completion of a connection.

Peak-day demand (1 in 20 peak demand) - The 1 in 20 peak day demand is the level of demand that, in a long series of winters, with connected load held at the levels appropriate to the winter in question, would be exceeded in one out of 20 winters, with each winter counted only once.

Price Control Review – RIIO - Ofgem's periodic review of Transporter allowed returns. The current period has been called RIIO-GD1 and covers April 2013 to March 2021. RIIO-GD2 will commence in 2021 and last five years to 2026.

RIIO stands for:

Revenue = Incentives + Innovation + Outputs.

PRI - Pressure Regulating Installation - The replacement term for PRS, district governor and all other local terms (such as STRS or TRS) when IGEM standard TD13 was introduced.

PRS - Pressure Regulating Station - An installation which reduces the supply pressure as gas passes either between different pressure rated tiers of the LTS or from the LTS to the below 7barg network or between different pressure tiers of the <7barg network.

Real Time Networks - Our Real-Time Networks project aims to make gas supply's more secure and affordable by demonstrating how a flexible gas network could be more efficient for our evolving energy market and meet changing customer demands. To do this we are capturing representative data of customer gas demand recording how much gas is needed and when from 1,200 gas meters in the south east. More information is available on the Real Time Network pages of our website. sgn.co.uk/about-us/future-of-gas/hydrogen/real-time-networks

Seasonal Normal Temperature (SNT) - Seasonal Normal Temperature is the average temperature that might be expected on any particular day, based on historical data.

Shipper or Network Code Registered User (System User) - A company with a shipper licence that is able to buy gas from a producer, sell it to a supplier and employ a GT to transport gas to consumers.

Shrinkage - Gas that is input to the system but is not delivered to consumers or injected into storage. It is either 'own use gas' or 'unaccounted for gas'.

Supplier - A company with a supplier's licence contracts with a shipper to buy gas, which is then sold to customers. A supplier may also be licensed as a shipper.

Supply Hourly Quantity (SHQ) - The maximum hourly consumption at a supply point.

Supply Offtake Quantity (SOQ) - The maximum daily consumption at a supply point.

Supply point - A group of one or more meters at a site.

Therm - An imperial unit of energy. Largely replaced by the metric equivalent: the kilowatt hour (kWh). One therm equals 29.3071 kWh.

Unaccounted for Gas (UAG) - Gas lost during transportation. Includes leakage, theft and losses due to the method of calculating the Calorific Value.

Uniform Network Code (UNC) - The Uniform Network Code covers the arrangements between National Grid, shippers and the DNs following the selling off of four of the networks.

UKCS - United Kingdom Continental Shelf.

UK-Link - A suite of computer systems that supports Uniform Network Code operations. Includes Supply Point Administration; Invoicing, and the Sites and Meters database.

VLDMC - Very Large Daily Metered Customer. A site which uses greater than 50,000,000 therms per annum.

Disclaimer

This document is produced for the purpose of and in accordance with Scotland Gas Network plc's and Southern Gas Networks plc's, collectively known as SGN, obligations.

These are Standard Condition 25 and Standard Special Condition D3 of their respective Gas Transporter Licences and Section O 4.1 of the Transportation Principal Document in the Uniform Network Code in accordance with information supplied pursuant to Section O of the Transportation Principal Document in the Uniform Network Code. Section O 1.3 of the Transportation Principal Document in the Uniform Network Code applies to any estimate, forecast or other information contained in this document.

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If you smell gas or are worried about gas safety you can call the National Gas Emergency Number on:
0800 111 999

Carbon monoxide (CO) can kill. For more information visit:
co-bealarmed.co.uk

Before you dig contact:
linesearchbeforeudig.co.uk

SGN
Your gas. Our network.

SGN
St Lawrence House
Station Approach
Horley
sgn.co.uk