SGN

Your gas. Our network.

Long Term Development Statement 2021

Contents

Foreword

Welcome to our Long-term Development Statement for 2021. Our opportunity to present the results of our annual forecasting process to our 5.9m customers and wider stakeholders.

In December last year Ofgem published its RIIO-GD2 Final Determinations for the gas distribution price control period 2021 to 2026.

This included a new licence obligation for gas transporters relating to the NTS (National Transmission System) exit capacity booking process, **Standard Special Licence Condition ("SSC") A57 Exit Capacity Planning**.

As a result you'll see we've revised our LTDS in places, making changes to the content to accommodate the new reporting requirement as well as publishing additional content on our website in support of SSC A57.

The COVID-19 pandemic continues to make life challenging for us all and our planning and forecasting processes have not escaped the need to adapt. As you review this years LTDS, you'll see our assessment of the potential impact of Covid-19 included within last year's forecast differed slightly to what actually occurred. As we said last year, this was to be expected due to the high number of unknowns which can impact on gas demand brought about by the emerging pandemic.

These differences have centred around our assumptons on the impact on the economy being slightly pessimistic, compared with what actually occurred and demand being marginally higher than we forecast.

To add some detail to this, our 2020 forecast had a 15% reduction to non-domestic demand for the first year of the forecast. We based this reduction on government projections of the likely impact of the pandemic on economic activity as well as prevailing industry and expert knowledge at the time. However, what actually transpired was demand remained relatively stable, as a result of a number of initiatives including government backed financial stimulus packages and diversification of commercial and industrial activity to support the response to the pandemic. This year the Government has included within its forecasts, its view of the impact of COVID-19 on the UK's economy, therefore our forecasts have benefitted from a centralised view of the economic indices which impact gas demand.

I do hope you find this publication both useful and informative. If you have any questions or feedback on our LTDS or any aspect of our forecasting process please contact one of our industry experts listed in **links and contacts**.

Paul Denniff
Network and Safety Director

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 links and contacts.

Reviewing our forecasts

Our forecasts are reviewed annually to ensure they benefit from the most up-to-date information available.

In 2019 we incorporated a bottom-up assessment of the factors which impact gas demand where possible to do so. This has enabled us to better understand why demand for gas changes and how the detailed elements of our forecast have performed over the previous year.

Around three quarters of our analysis now benefits from the use of the bottom-up approach with the rest covered through the more traditional econometric forecasting process.

Improvements in our approach to modelling demand have resulted in a better understanding of our customers' gas usage and the reasons behind the supply and demand requirements within our peak and annual demand forecasts.

COVID-19

Our 2020 forecast was developed at the very start of the pandemic when there was very little information available on how it might impact on our lives and general demand for gas. As a result, we chose to include within our analysis two potential impacts of COVID-19:

- A reduction in domestic comfort levels i.e. how warm someone heats their home
- Reduced economic activity

The reductions in home heating levels and our assessments on economic activity were generally correct. Although we under forecast some elements due to economic indices proving more favourably as a result of government stimulus packages and diversification of industrial activity over the last year.

The impact on gas demand has therefore proved to be less than we thought with overall annual demand for all of our networks increasing by just under 0.5%.

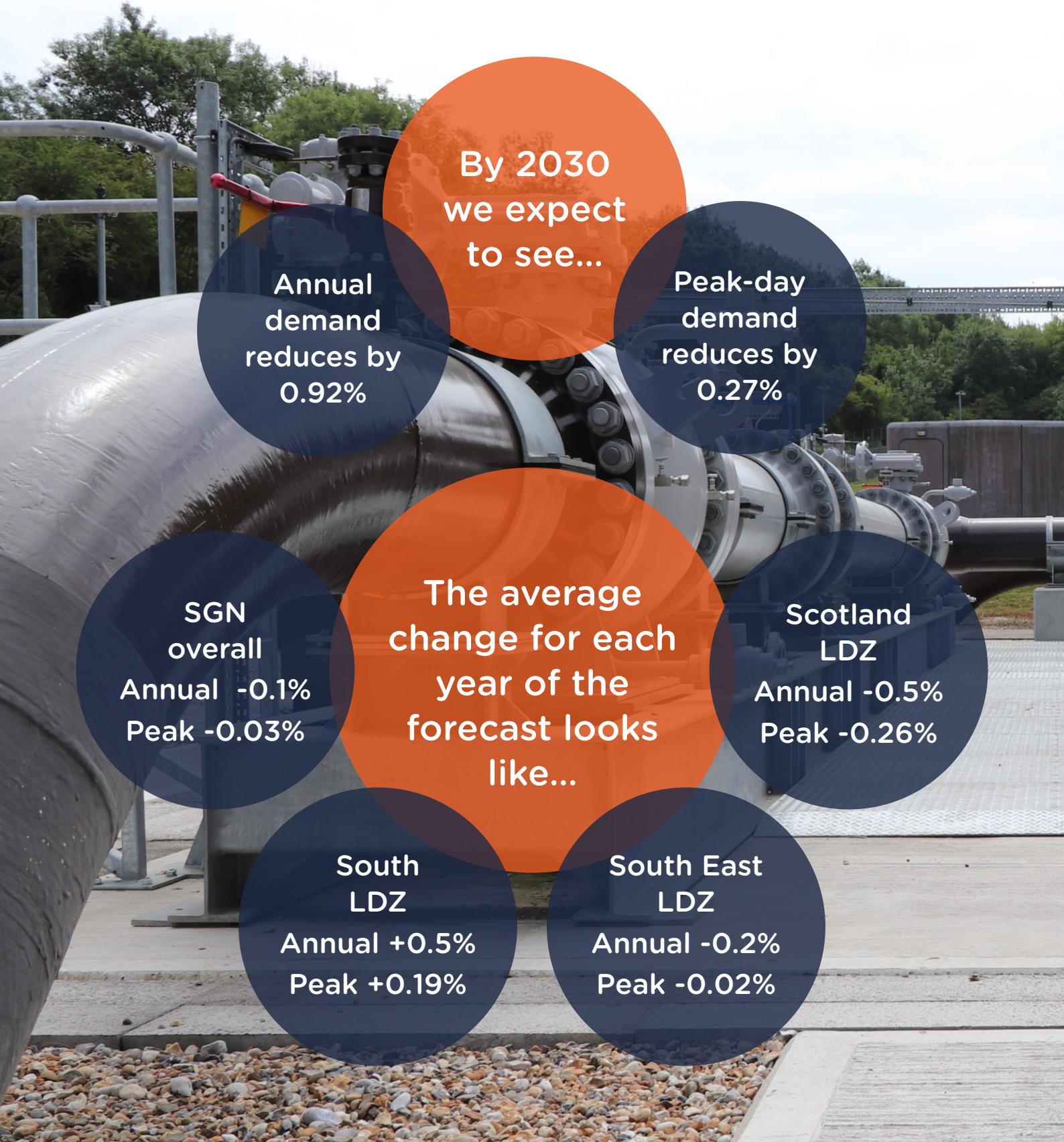
Increases in gas demand are a combination of several factors not just as a result of COVID-19:

- **Production of COVID-19 related products such as PPE and vaccines**
- **Growth in capacity at virus testing facilities**
- **Increased demand for building products for home improvements**
- **Increased demand for gas fired electricity generation**
- **Pre-planned expansion of some of our largest customers sites**

The next 10 years

Our forecast covers a 10 year planning horizon and is the result of a detailed assessment of current government legislation, historic and projected economic trends as well as customer behaviour.

The outputs from our analysis enables us to plan and manage our networks to ensure a safe and efficient supply of energy on behalf of our 5.9 million customers.



The main factors which influenced our 2020 forecasts are...

Growth in embedded power stations connected to our networks increasingly being used as back-up for when renewable energy sources are unavailable

Exapansion of the largest site in our South LDZ increasing total annual and peak demand for the LDZ

Household comfort levels are no longer increasing resulting from reduced domestic disposable income and increasing gas prices

The industries five yearly review of the Composite Weather Variables (CWV) with updates this year including the impact of climate change

Reduction in the levels of domestic insulation retrofitted to existing homes

The following sensitivities are not yet developed enough to be included within our forecasts. These include proposed legislation by both central and regional governments and technological developments designed to enable net-zero.

Central government proposals to end the sale of new diesel and petrol HGVs by 2040 and a resulting impact this may have on electricity generation

Central government proposals to ban fossil fuel boilers in new homes from 2025 and the impact this may have on gas demand

Proposed Future Homes Standard intended to be introduced in 2025 and the impact it may have on gas demand

Potential 600,000 heat pump installations each year by 2028 and the impact this may have on gas demand

Embedded power stations

As the UK's electricity system decarbonises and introduces more renewable technologies, the need to back these up with others forms of generation increases.

The UK Government incentivises this back-up market through the Capacity Mechanism to ensure electricity networks have the required flexibility at times of low or no renewable power availability.

A considerable amount of this back-up, which we refer to as embedded generation, is gas fired as it is a low-cost established technology which is currently lower in carbon than many alternatives.

Our forecast analysis shows an increasing need for flexibility within the electricity networks, will result in the number of embedded power stations growing considerably. In fact, we have already seen an increase in enquiries and applications for these types of customers. This is one reason why we are seeing an increase in peak gas demand within our forecast.

As renewables grow embedded gas fired generators' operation times becomes increasingly variable.

Managing supply and demand during these periods is a real challenge for the gas networks and industry collaboration will be required to ensure both electricity and gas systems are able to work together on behalf of all energy users.

Energy efficiency

We continue to develop and improve the assessment of energy efficiency and last year introduced **Energy Company Obligation (ECO) data from BEIS**.

The next iteration of ECO (ECO4) is due to begin in 2022 following the outcome of the July 2021 consultation process. We will review the details of the scheme once they are finally released, to include any relevant sensitivities within next year's planning cycle forecasts. Early indications from the consultation process however, suggests resultant changes to our forecast are likely to be limited.

Our analysis shows replacing old inefficient gas boilers with modern more efficient units, currently has the greatest impact on reducing domestic demand.

Comfort levels

The link between the price of gas and changes in demand is long established. We refer to this within our forecast as comfort levels.

Over recent years comfort levels have continually increased resulting in an uplift in gas demand. However, reduced disposable income due to the economic impacts of COVID-19 and rising fuel prices has meant for many households, energy is less affordable which has resulted in a drop in gas demand.

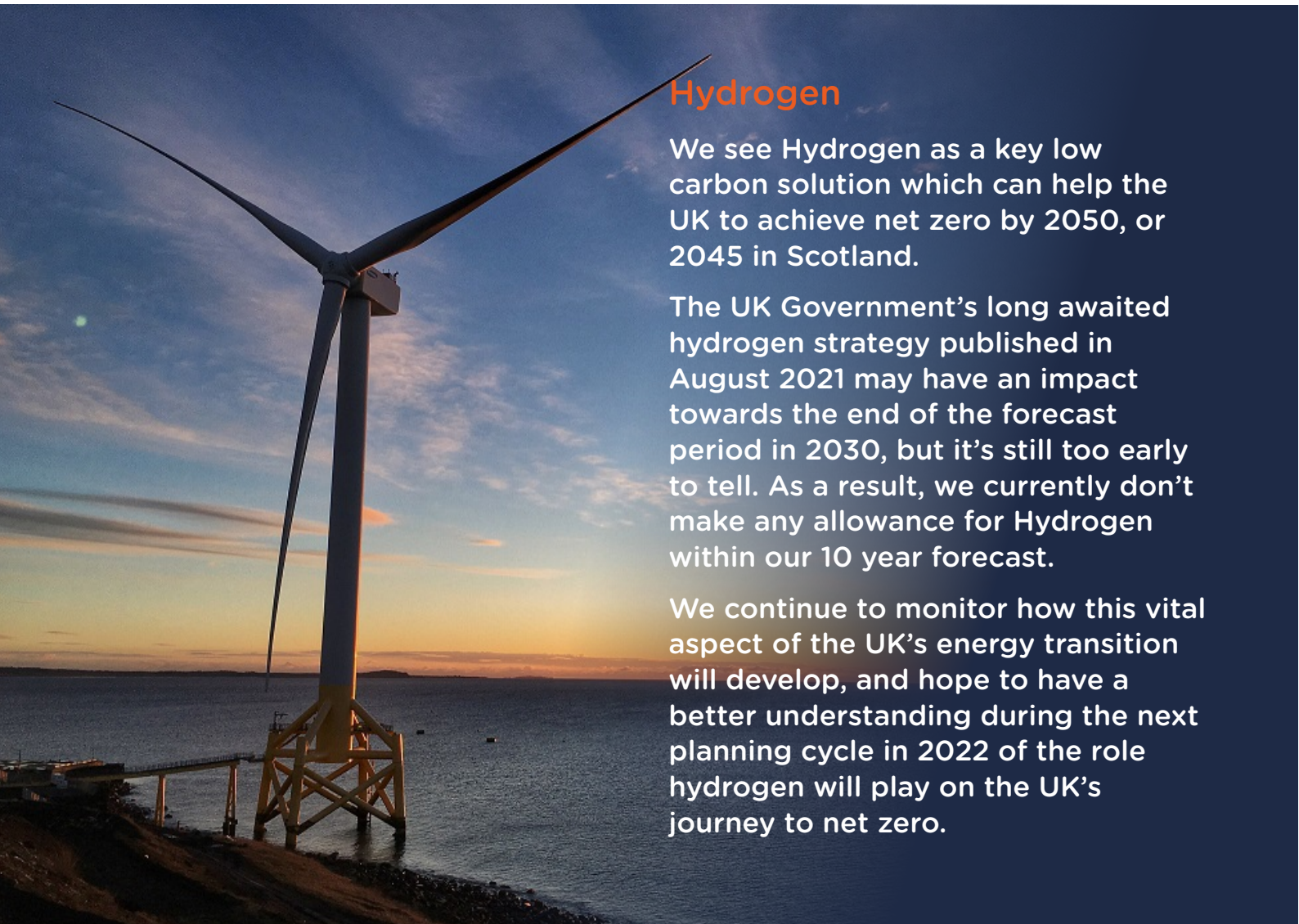
Low carbon heating

Consultations on the UK Government's future homes standards were ongoing during this planning cycle and the writing of this document. We have not included any potential changes the consultation may have on the proposed legislation, along with the consequential influence it may have on the inputs to our analysis.

The current primary low carbon energy scheme, Renewable Heat Incentive (RHI), has had little impact in terms of low carbon heat technology on gas, as a primary source of heat in our homes.

The schemes replacement, Clean Heat Grant (CHG) is due to come into effect from April 2022 and is currently scheduled to last two years. Our analysis shows the CHG scheme is unlikely to have a greater impact than the outgoing RHI scheme and, as a result, we've made no changes to our current position on low carbon heat and its affect on gas demand.

RHI incentivises around **10,000** heat pump installations each year. Most of these are in homes which have not previously been connected to a gas network, so there's little impact on gas demand.



Hydrogen

We see Hydrogen as a key low carbon solution which can help the UK to achieve net zero by 2050, or 2045 in Scotland.

The UK Government's long awaited hydrogen strategy published in August 2021 may have an impact towards the end of the forecast period in 2030, but it's still too early to tell. As a result, we currently don't make any allowance for Hydrogen within our 10 year forecast.

We continue to monitor how this vital aspect of the UK's energy transition will develop, and hope to have a better understanding during the next planning cycle in 2022 of the role hydrogen will play on the UK's journey to net zero.

New housing

We've not included the full Future Homes Standard (FHS) and the proposed changes to part L and F of the building regulations for new buildings in our forecast, as it's still at the consultation stage. However, we have included the interim standard as it's at a more advanced stage.

The majority of new homes being built within our network areas continue to use gas as the primary source of heat, although they have much lower gas demand than old housing stock due to better levels of thermal efficiency.

Adjustments to weather data (CWV)

Throughout our forecast we utilise a correction factor to align the outputs of the analysis with known demand and weather patterns. This is known as the composite weather variable or CWV. It's managed on behalf of the gas industry by Xoserve.

Every five years the assumptions within the CWV are reviewed and updated to improve the relationship between demand and weather through the Seasonal Normal Review process.

The CWV is mainly composed of temperature but also includes wind speed and now, as a result of the 2020 update, includes solar radiation and adjustments to allow for the effect of climate change.

Our 2021 forecast utilised the new CWV. The result of which has been a change in Peak demand for all LDZs.

Change in gas peak demand due to CWV revisions:	
Scotland LDZ reduced by:	4.8%
South East LDZ reduced by:	4.4%
South LDZ increase by:	1.1%

Specific large loads

One single customer in our South LDZ, accounting for 7% of overall LDZ peak demand, significantly increased its gas usage in 2020 as part of a programme of expansion.

This increase outweighs forecasted demand reductions, resulting in an increase in peak for our South LDZ for 2021, as well as levelling out demand changes across SGN as a whole.

We've also seen an increase in demand in our South East LDZ due to one large power generation site changing its patterns of usage. While this hasn't had an impact on peak demand, it's had a direct impact on annual demand, with an increase of 2% in the South East LDZ compared with last year's forecast.

These explanations are included to make sense of the obvious uplift in gas demand we see in our forecasts.

Smart tech

We recognise technology has a very important part to play in managing energy. We therefore include within our analysis an overview of how smart tech including metering, thermostats and controllers may be impacting on demand.

While smart meters have many benefits, especially in a connected home, their overall impact on gas demand is relatively low, although it is much greater with electricity demand.

Smart controls, such as Wifi and App connected thermostats, have a greater impact than Smart meters, but the effectiveness is often lower than expectations due to installations not including all the elements required to maximise the benefits.

This year's review of the effectiveness of the assumptions we include in our analysis has shown there's no reason to change our current thinking for this element of our forecasts.

More detail

This section along with Appendices A and B 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 38.

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 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.

This publication provides our customers an overview of our 10-year forecast of annual and peak-day gas 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, safe and reliable supply of gas.

Validating our 1:20 peak day

There have been relatively few periods of weather conditions approaching peak-day demand in recent history.

A 60-year weather dataset has been used to establish 1 in 20 peak weather conditions, with the last 20 years used to establish potential peak demand condition, with adjustments for changes in annual demand.

Particular focus has been paid to cold periods of 2010, 2011 and 2018 for this work. The cold periods of 2018 have been used to calibrate our peak demand forecasts and this has been corroborated using our demand data for 2010 and 2011.

Peak demand has also been calibrated against our previous peak demand forecasts, with favourable results and adjustments made for minor changes in annual demands between years. This is along with improved site specific intelligence.

Forecasting process

We work with expert industry partners to develop our annual forecasts. The starting point is actual demand data from the previous year which is analysed along with information obtained from recognised industry sources. The results are tested against our previous year's forecast to improve 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 the gas flowing, even during more challenging times of unusually adverse weather, such as we saw in late February and early March 2018.

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 significant changes to facilitate a low carbon future and this requires us to understand the role we will play within the energy mix.

Our 10 year forecast is a forecast based specifically on current energy markets, policies, and incentives, including changes which we know are happening, but not changes that 'may' happen.

This has to be the case as gas networks need to be planned on what's known, and not on speculative assumptions. This approach has worked well for many years however, it's recognised the energy industry is changing, and further changes will occur due to the requirement to achieve the net zero targets set in law back in June 2019.

UK view

Readers looking for an understanding of the UK's overall energy supply position and security of supply assessment, can refer to **National Grid for its 10-year system (NTS)** and other publications and consultations including the Future Energy Scenario process (FES).

Demand forecasting process

Here we show how our 2020 forecast performed and what we did in 2020 to improve the accuracy of our 2021 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 for the purpose of regulatory reporting we are uniquely required to discuss our local distribution networks (LDZs) individually. So you'll also see 'Scotland' and for Southern, 'South East' and 'South' shown separately.

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

0-73 - Domestic

Scotland LDZ: We saw a 1.5% reduction in gas demand between 2019 and 2020, mainly due to homeowners decreasing their comfort levels (behaviour change) as a result of the negative impact on the economy from COVID-19. This is attributed to decreasing levels of employment, GDP and concerns for future job security. The decrease in comfort levels was not as large as the demand reductions from boiler energy efficiency and insulation. However, it's a fundamental change to the behaviour seen in recent years where comfort levels increased 2.6% between 2018 and 2019.

South East LDZ: We saw a 0.1% reduction in gas demand between 2019 and 2020. As with our Scotland LDZ this is mainly due to a behaviour change in comfort levels and for the same reasons. Unlike Scotland LDZ, comfort levels did not decrease but the increase was less than a quarter of the previous year's rise, and considerably less than the long term trend. The slight decrease in domestic demand is also contrary to previous years trends, which showed an increase of 1.4% between 2018 and 2019.

South LDZ: Our South LDZ experienced a 2.5% decrease in domestic gas demand. This is for the same reasons as Scotland, where COVID-19 impacts reduced comfort levels after years of historic increases. As with Scotland, these decreases were outweighed by the underlying energy efficiency in this LDZ. The 2.5% decrease in domestic demand is in contrast to growth of 2.6% between 2018 and 2019.

73-732 - Commercial

In the commercial sector the impacts of COVID-19 on the economy and directly on businesses led to a contraction in the commercial output and hence gas demand in this sector.

This sector reverted from historic growth to decline across all LDZs. However, the impact on gas demand was less than anticipated largely due to businesses adapting to changes in business patterns and the fact the lockdown period in 2020 was generally during periods of warm weather which meant the impact on heat demand was lessened. After growth between 2.3% and 4.1 % between 2018 and 2019, all our LDZs saw a decrease in gas demand in this sector.

Scotland had the largest demand reduction of 2.2% between 2019 and 2020. Larger than the Southern LDZs as it has lower underlying growth. South East and South experienced declines of 1.5% and 1.4% respectively.

>732 - Industrial

This sector showed many variations from the previous year due to a combination of factors.

Generally small industrial sites reduced demand due to economic impacts of COVID-19 but larger sites tended to increase demand for a number of reasons, including the impacts of COVID-19 for new products, such as PPE, vaccines and services supporting the pandemic response.

Scotland reversed its underlying long-term trends of reduction in this sector, with 1.2% increase in demand compared with a 3.3% reduction the year before. This has been attributed to some of the largest sites increasing demand to supply specific products to help manage the impact of COVID-19 and for the buildings industry, which saw an increase in activity during 2020. These increases more than offset decreases in the smaller industrial sectors.

In the south east, the shrinking economy resulted in reductions within the smaller industrial sectors,

which was contrary to trends of growth in recent years. However, as with Scotland, the larger industrial sites increased demand for similar reasons.

If the largest power generation load in South East is excluded from the demand assumptions the overall change would be an increase of 2.4% year-on-year. This customer, a power generation site, increased its demand considerably due to recent change of ownership, site upgrades and return from an operational outage and this impacted the sector considerably. Overall, demand for the sector increased by 12.9%.

Our South LDZ industrial demand is also dominated by large gas loads. Specifically, a return from outage and expansion of the largest load has resulted in a 9.4% increase in this sector for South LDZ which has offset the reductions we saw the previous year.

Excluding the large loads, the sector's demand was also impacted in the same way as other LDZs, with smaller industrial demand reducing due to the economic conditions, but larger demands showing small increases.

Approach to the forecasting process

This year we've continued to develop the updates we made to our demand forecasting process last year.

Prior to last year, the majority of our forecasting was through economic analysis. While this was appropriate for many years some areas of the forecast, specifically domestic demand, benefit from more detailed inputs, as this gives us a clearer picture of what's occurred and why, linking historic demand changes to specific elements. Forecasting these specific elements individually and then adding their impact, provides a clearer understanding of the reasons for future forecast demand changes, also improving our understanding and confidence in our forecast.

This is particularly important as the UK looks to achieve more stringent low carbon targets, as it allows us to benchmark wider industry scenarios with our forecasts. This allows us to understand what needs to be done to help the UK decarbonise. Importantly, our forecast is developed using current behaviours and government policies rather than scenario-based analysis which uses a desired set end point then works out how to achieve it.

The more granular approach means the majority of the inputs to the analysis are forecast through the individual elements which impact gas demand. We refer to this as a 'bottom-up' approach which is in contrast to a 'top-down' economic approach. 'Top-down' analysis looks at a sector as a whole and as we said, is more detailed. A good example being this methodology helped us to isolate some of the specific impacts of COVID-19.

The 'bottom-up' approach has been applied to our domestic forecasting and our forecast of specific large loads. We've been able to include a greater number of customers within the large load category in our forecast this year than previously.

The 'bottom-up' approach now covers around 75% of total demand and 80% of peak demand as opposed to 71% and 78% respectively last year.

Inputs to forecast

The section provides a general overview of the key inputs to our forecasts. These inputs are a combination of economic indicators and specific elements for 'bottom-up' forecasting, particularly in the domestic sector. Economic indices are still important to all elements of our forecast.

Domestic demand

Domestic demand contributes to around two thirds of our total demand. We separate the individual elements impacting gas demand to see how they have changed historically and why. We then forecast each element individually over the 10 year period at an LDZ basis.

While the underlying message is the same for all LDZs there are specifics to each. Most notable of these is higher thermal insulation improvements in Scotland due to the way it is prioritised by the devolved government.

We have engaged in extensive research on the domestic elements gathering information from: BEIS, English and Scottish housing surveys, MHCLG (Ministry of Housing, Communities & Local Government), Heating and Hot water Industry Council (HHIC) as well as the Energy and Utilities Alliance among others.

The reasons for gas demand changes over the last 10 years can be seen in Figure 1 Domestic demand factors. The measures shown within the graph are those we included within the analysis to support the forecasts. The numbers of houses in our South East and South LDZs have been scaled to those in Scotland to enable a comparison.

Energy efficiency in the home

This relates to measures such as loft, cavity and solid wall insulation as well as double glazing. Efficiency levels improved considerably under the Carbon Emissions Reduction Target (CERT), which ran from 2008 to the end of 2012. Since then rates of retro fitting thermal energy efficiency measures have reduced significantly under existing policies, with further impacts due to changes in the main scheme which now incentivises retrofit insulation Energy Company Obligation (ECO). These have been reflected in our forecast this year.

Boilers

The UK Government's mandate in 2005 for all new gas boilers to be higher efficiency condensing boilers has made this the element of greatest reduction in gas demand in the domestic sector. Although there's still a high number of boilers which haven't been replaced, replacement rates have increased over the last year from around one million a year to one and a half million a year nationally. This still leaves considerable reductions to be gained in gas demand from more efficient boilers. This is reflected in our forecast as the single largest element reducing gas demand across all of our networks.

Controls

This refers to thermostatic radiator valves, programmers including SMART thermostats. These have had a notable but relatively small reduction in the last decade. We've included a consistent level of impact within our forecast going forwards.

Secondary heating - wood burners

Over the last year wood burning heating has come into some criticism for the impact it has on climate change with the UK Government introducing legislation to help curtail any associated carbon emissions. This consideration aside, wood burners have a very low influence on gas demand due to a relatively low number of them being installed in homes heated with gas. The expected impact of woodburning stoves on gas demand is therefore forecast to be very low.

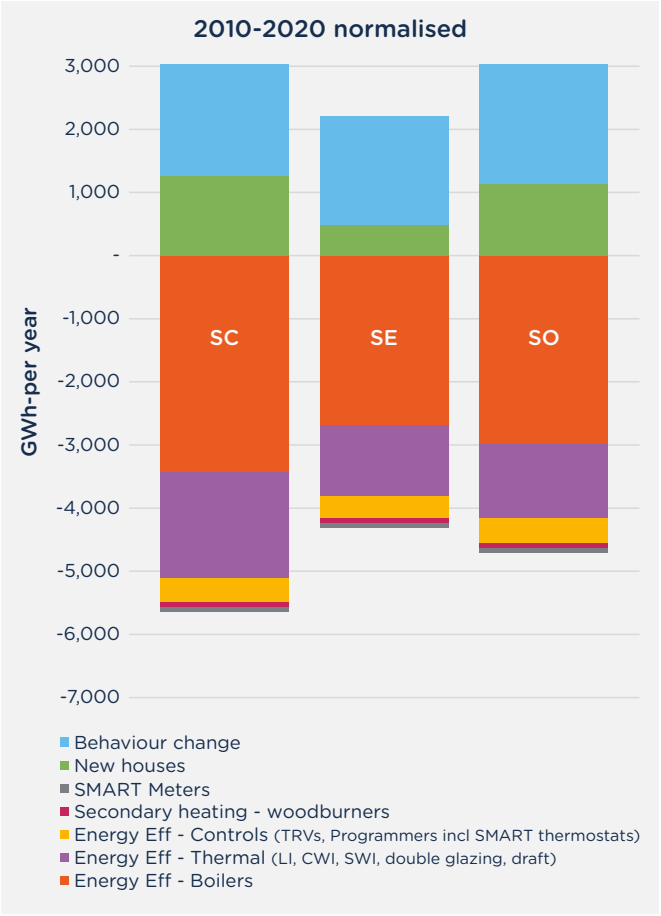


Figure 1 Domestic demand factors

Smart meters

Their impact has been low due to a relatively low impact on gas demand of each customer, established from customer trials. Their future impact on gas demand is forecast to be very low.

New homes

The impact of new homes is significant but not as high as may be thought. This is due to the relatively low numbers being built relative to existing housing stock and those which are built having very low gas demand compared to existing stock. This is because of their high levels of thermal efficiency.

Over the next 10 years their impact is forecast to be similar but slightly lower than the last 10 years, due to incremental increases in energy efficiency. We've included the impact of the Interim Future Homes Standard on energy efficiency of new homes, as this has been announced as new policy. We've not included the full Future Homes Standard, as it remains at the consultation stage at the time of writing. Expectations are it will have an impact on demand during the next planning cycle.

Behaviour change

The behaviour change element of our forecast, brings an equally significant impact on gas demand as the new homes' element has historically.

Since the recession in 2008, while there's been fluctuations, there's also been a general increase in prosperity. This has led to an average increase of around 1% a year in domestic gas demand directly related to increasing comfort levels (the temperature people heat their homes to) which broadly equates to 0.1 degree C increase each year on average.

However, in 2020 COVID-19 has impacted this considerably due to reductions in household prosperity and GDP, alongside increasing fuel prices. This led to a reduction in baseline comfort levels in our South and Scotland LDZs while an increase on baseline in South East has been reduced by over three quarters. These changes were broadly in-line with last year's forecast which predicted this element to decrease by over 90% to almost no change in comfort levels across our scenarios.

Behaviour change is forecast through our 'top-down' econometric forecasting process.

Domestic efficiency policy

Boilers

As mentioned earlier, the 2005 regulation requiring all new boilers to be condensing boilers has driven considerable reductions in domestic gas demand and continues to do so. It's the largest single element of demand reduction in our forecasts. In 2018 Boiler Plus regulations has essentially strengthened the 2005 regulation. However, it's really mandating what's already occurring, mainly that new boilers need to be above 92% efficiency levels. This is reflected in our forecasts.

ECO (Energy Companies Obligation)

ECO started fairly well in 2013 installing nearly 500,000 measures that year. This has since reduced annually to less than 150,000 last year. It's not the only means for increasing retro fitting energy efficiency measures and makes up a considerable part of overall installations. It forms part of our understanding of the underlying reasons for insulation measures reducing and corroborates our forecast to keep these numbers relatively low. In 2018 a rule change allowed ECO obligations to be satisfied through boiler replacements and not through retrofit insulation. This has shifted focus from retrofit insulation to boiler replacement, resulting in reduced insulation retrofit rates in existing buildings.

Green Deal

The Green Deal was not a particularly successful government initiative to increase energy efficiency since it followed on from CERT's finish in 2013. There have been just over 20,000 measures installed nationwide since its introduction, with numbers falling until its closure in 2015. Its replacement was the Green Homes Grant, announced in July 2020.

Green Homes Grant

The Green Homes Grant was a £1.5bn programme which offered households grants of £5,000 to £10,000, to install insulation or low-carbon heating. It was announced in July 2020 but suffered problems from the start and was scrapped in March 2021. As of June 2021, just over 20,000 of the targeted 600,000 measures were installed.

Renewable Heat Incentive (RHI)

The Renewable Heat Incentive was introduced in April 2014 to incentivise retrofitting of renewable heat in homes and businesses and led to a consistent but relatively small number of renewable heating installations. The domestic scheme led to around 10,000 installations of heat pumps each year across GB, some of these replacing gas heating in homes. The RHI scheme is due to finish in March 2022 with its replacement, the Clean Heat Grant, already set up to replace it. Considering the end date and current numbers, we've not needed to create a separate forecast, as the impact on our gas demand has been low and its replacement the Clean Heat Grant is not expected to increase the rollout of Heat pumps significantly. Any changes to gas heated house numbers are also captured in our base data from Xoserve and BEIS.

Clean Heat Grant

As explained above, this is the replacement to the RHI. It's simpler but offers less financial incentive to a household. Unlike the RHI scheme it's a domestic only scheme with no non-domestic replacement for the equivalent RHI planned at the time of writing. The Clean Heat Grant scheme will only last for two years with its funding being capped at £100m. The scheme will only incentivise heat pumps whereas the RHI also incentivised biomass and solar thermal.

Economic inputs

It's important to recognise the impact of COVID-19 on the economic inputs to our forecasts. This year the impact and rebound of the main economic indices has been smoothed to ensure what would be considerable dips and spikes do not occur in the first few years of the forecast. This is especially pertinent when we consider the Government's COVID-19 support packages which do not feature as part of our main economic indices as they've been accounted for within the impact on the national economy.

GDP

Our forecasts of GDP are based on OBR central forecast announced at the Spring 2021 budget. After an dip of 9.9% in 2020 They show an increase of 4% in 2021 followed by an increase of 7.3% in 2022. From 2023 they are forecast to return to historic levels of growth of around 1.7%. This level of growth remains for the rest of our forecast. Although the forecast returns to historic growth the large dip as a result of COVID-19 results in GDP remaining at a level below the OBR's pre pandemic forecasts. See Figure 2.

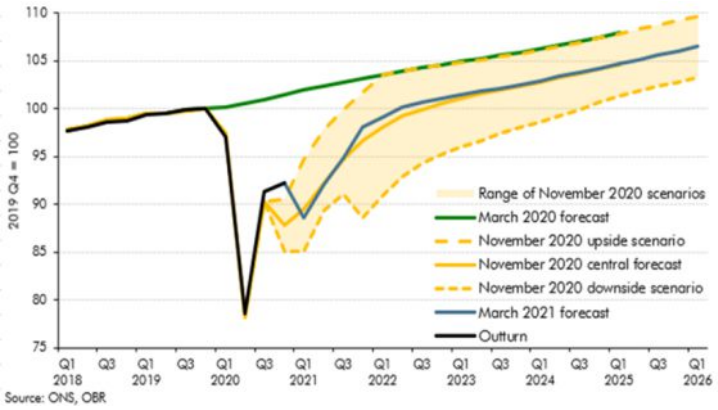


Figure 2 Source: Office of Budget Responsibility

Inflation

Prior to COVID-19, after a period of variability, inflation remained relatively stable. In 2020 inflation reduced and government measures to stabilise the economy meant inflation rates remained low. They are forecast to return to historic rates over the next few years staying within the government target of 2%. This is reflected in our forecast with little change for this element from last year. CPI has relatively little impact in our econometrics this year so variations in this have had less impact than other economic inputs. See Figure 3.

Figure 3 Source: Office of Budget Responsibility

Service sector output

This uses the national and local indices in the forecast which match the best output suited to the individual LDZ. Service output nationally and by region are from the Office for National Statistics (ONS). Both show a considerable reduction in output in 2020 after consistent and sustained growth over the previous years. Nationally, this is a reduction of 9% from the previous year. Our forecast shows a return to historic growth from 2020 levels over a two year period. This growth is forecast to continue throughout the forecast period returning to pre COVID-19 levels around 2023/24.

Manufacturing output

Manufacturing output from ONS publications has been used for this element of the econometric forecasting. As well as national indices we've used local outputs this year to forecast smaller manufacturing sectors in the southern LDZs, as this gives us better relationships with historic demand. It also enables more specific forecasting of these LDZs. There are year-on-year variations in national and regional output, but a clear long-term trend of consistent increase. This is forecast to continue and recover from COVID-19 impacts by the end of 2021. This output measure is forecast to be less impacted by COVID-19 than the commercial sector due to the more consistent requirement for products than services and manufacturing changing to adapt to new requirements.

Household disposable income

COVID-19 has had the biggest impact on this with all economic indices meaning householders are forecast to have less prosperity than prior to COVID-19. As a result, household disposable income reduces in the forecast decreasing the behaviour change element of domestic gas demand. i.e. people no longer continuing to heat

their houses a little more each year. We've benchmarked the forecast of this input to align with the changes in income that were experienced after the 2008 recession.

Jobs in each region

Historical service jobs data is from the ONS. Due to COVID-19 all regions are forecast to have lower employment in 2020 and 2021 than in 2019 before recovering and rising above 2019 levels in 2022. The level varies for each region but all LDZs are forecast to show a consistent and sustained growth in-line with historical trends.

Regional and specific variations

Domestic energy efficiency

This has been analysed on a regional basis, using the area breakdowns published by BEIS mapped to our LDZs through postcodes. Some key points specific to an LDZ are:

- Scotland has higher insulation partially due to ECO and partly due to the devolved government considering housing as an infrastructure asset which is not the case in England. This has helped investment in more energy efficiency projects in Scotland proportionally than England especially with regards to those who are considered fuel poor.
- Scotland also has slightly higher boiler replacement rates. As with insulation this is partly because the devolved government considers housing as an infrastructure asset.
- In the South East there's been less additional gas demand from new houses as London tends to have smaller properties than the rest of the country including a higher proportion of flats. Plus there's a higher proportion of new properties being built without gas.

Embedded power

As the UK's electricity system decarbonises and introduces more renewable technologies, the need to back these up with others forms of generation increases. The UK Government incentivises this back-up market through the Capacity Mechanism to ensure the electricity networks have the required flexibility at times of low or no renewable electricity generation. A considerable amount of this back-up, which we refer to as embedded generation, is gas fired as it's a low-cost established technology which is currently lower in carbon than many alternatives.

Our forecast analysis shows an increasing need for flexibility within the electricity networks will result in the number of embedded power stations growing considerably. There are variations to the amount of embedded generation in each of our LDZs. Scotland has the seen the highest level of new embedded power generation quotation acceptances over the last year. With the number of acceptances running at 25% higher than South LDZ and over three times the amount for South East LDZ.

Large loads

DM demand is dominated heavily by one large site in South LDZ and two large sites in South East LDZ. These three sites are heavily influencing the demand forecast for these LDZs due to their historic patterns of gas usage altering over the last couple of years. This has led to more variable patterns of demand in both the South and South East LDZs, creating challenges in terms of both long and short range forecasting. In Scotland we don't have any similar sized customers influencing demand to such a degree and demand is therefore more consistent as a result.

Service sector econometrics

While all LDZs were similarly affected by COVID-19 in 2020, our analysis suggests the South East service sector will be more affected in the long-term largely due to the implications of population density and expense for service sector premises in London. As a result, employment and output become limited from the middle of the forecast. These are constituent parts of the econometric forecast for South East LDZ. This is however a relatively small part of the LDZs gas demand, accounting for around 10% of overall demand in 2020.

Forecast methodology

In 2021 Ofgem introduced Special Standard Licence Condition ("SSC") A57 (Exit Capacity Planning). This new licence condition includes a requirement for all licencees to report on their forecast methodology in full. As a result, to avoid duplication of information the methodology content of our LTDS has been replaced with a comprehensive understanding of our forecasting process in-line with the requirements of SSC A57. This can be found on our website **here**.

Demand forecasts

This next section provides an overview of our latest annual and peak gas demand forecasts through to 2030/31. These forecasts have been developed around the UNC load band categories and relate only to gas transported through our systems.

A more detailed overview can be found in Appendix A from page 26, 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 large demand reduction in 2019 due to one of our largest loads reducing its demand. Then demand remaining low in 2020 as partial recovery from the large load offsetting wider reductions due to COVID-19.

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

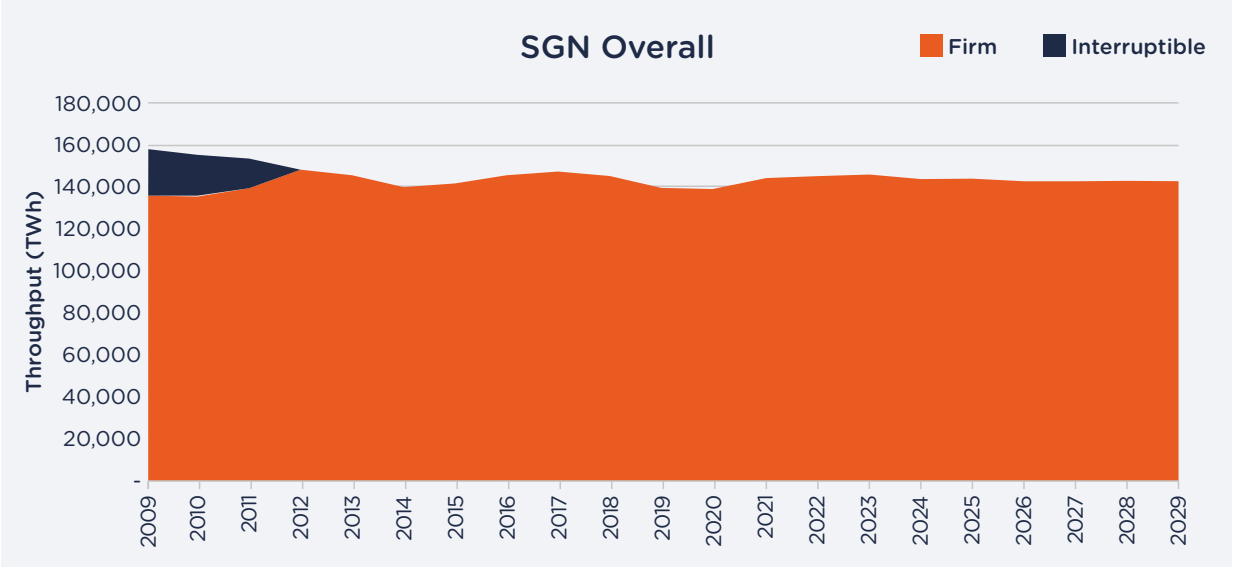


Figure 4 Change in historic and forecast annual demand - SGN overall

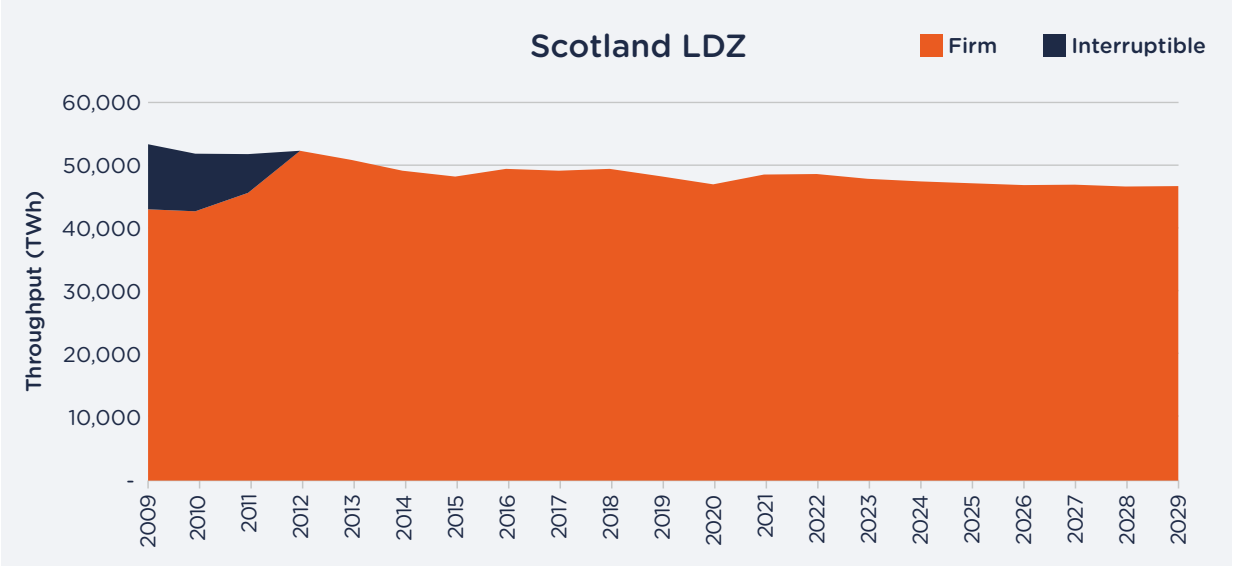


Figure 5 Change in historic and forecast annual demand – Scotland LDZ

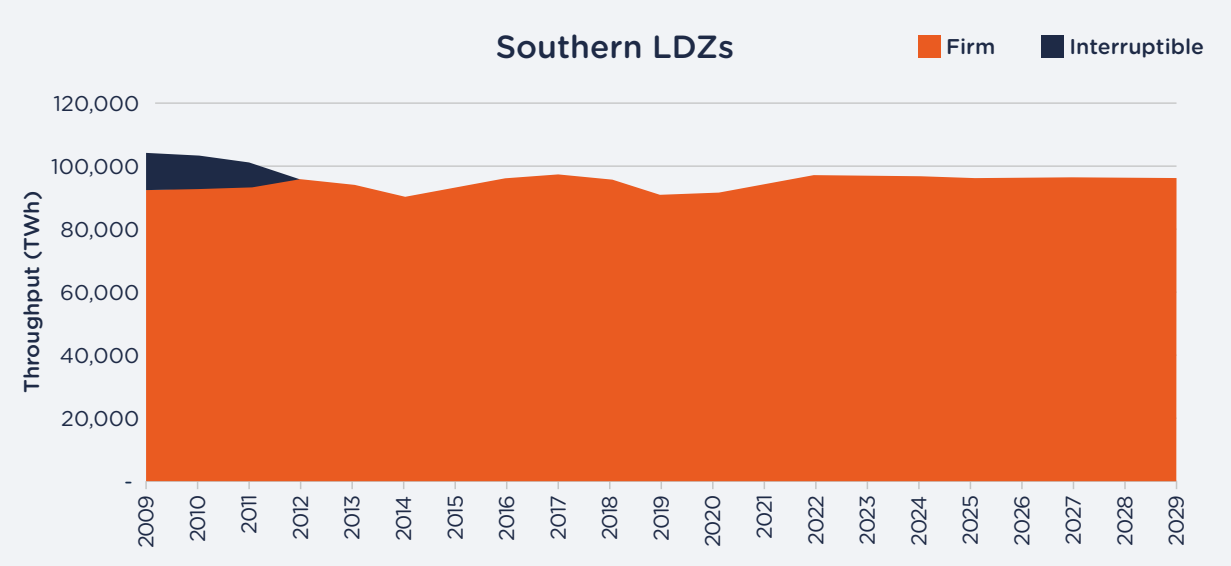


Figure 6 Change in historic and forecast annual demand - Southern LDZs

Average annual change in forecast Annual demand growth (2021–30)			
	SGN	SCOTLAND	SOUTHERN
Annual demand growth	-0.1%	-0.5%	-0.1%

Table 1 Change in forecast Annual demand growth (2021 - 30)

Peak demand

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

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

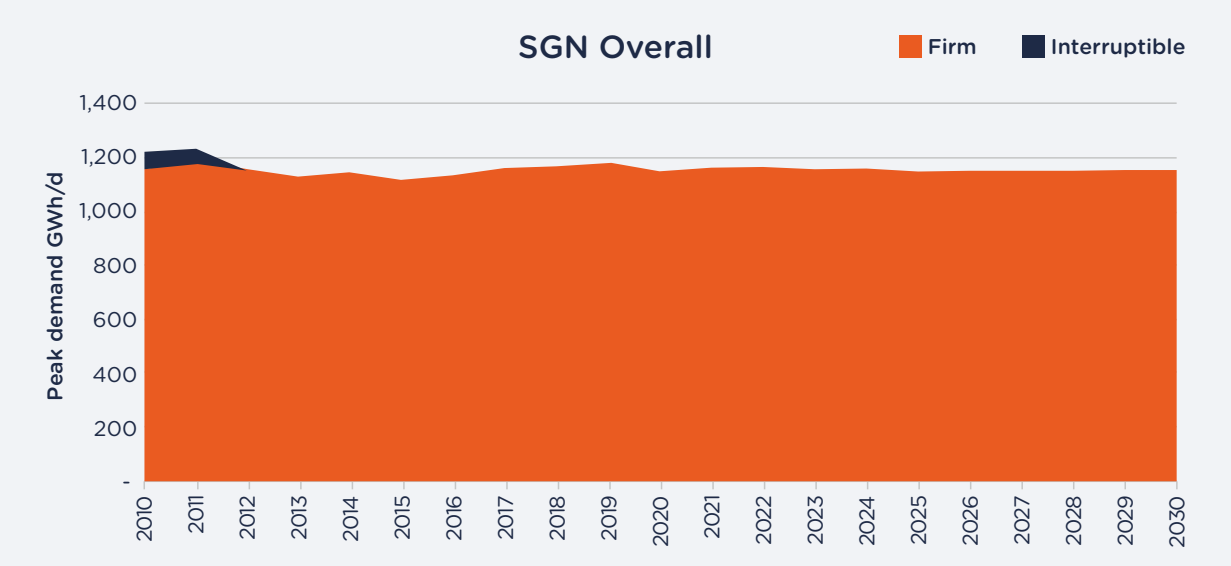


Figure 7 Change in historic and Peak demand - SGN overall

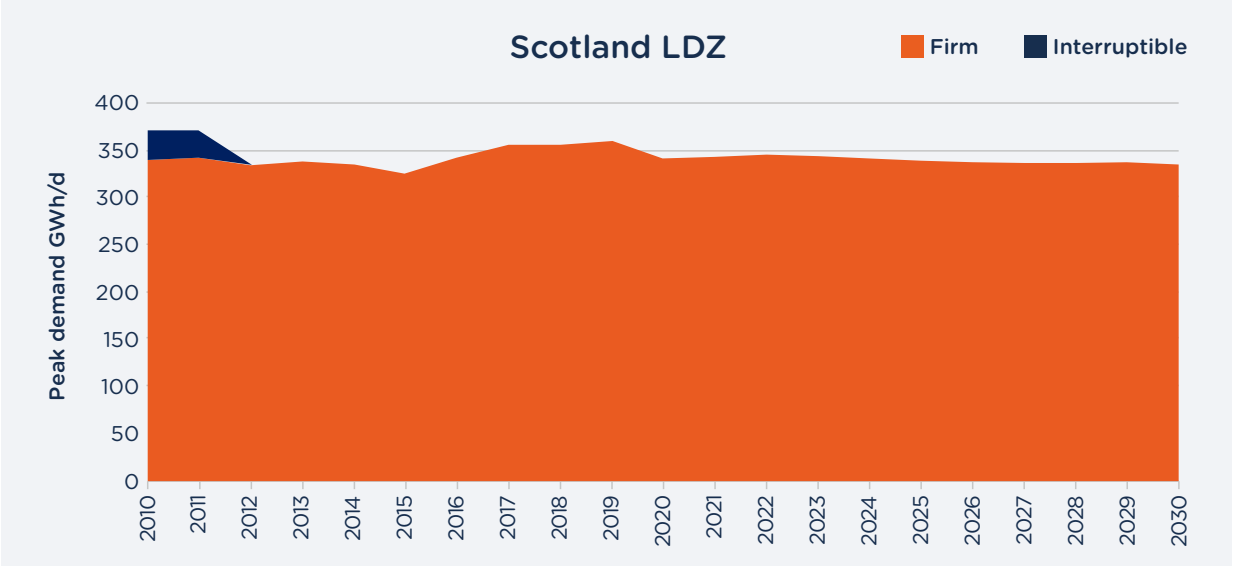


Figure 8 Change in historic and Peak demand - Scotland LDZ overall

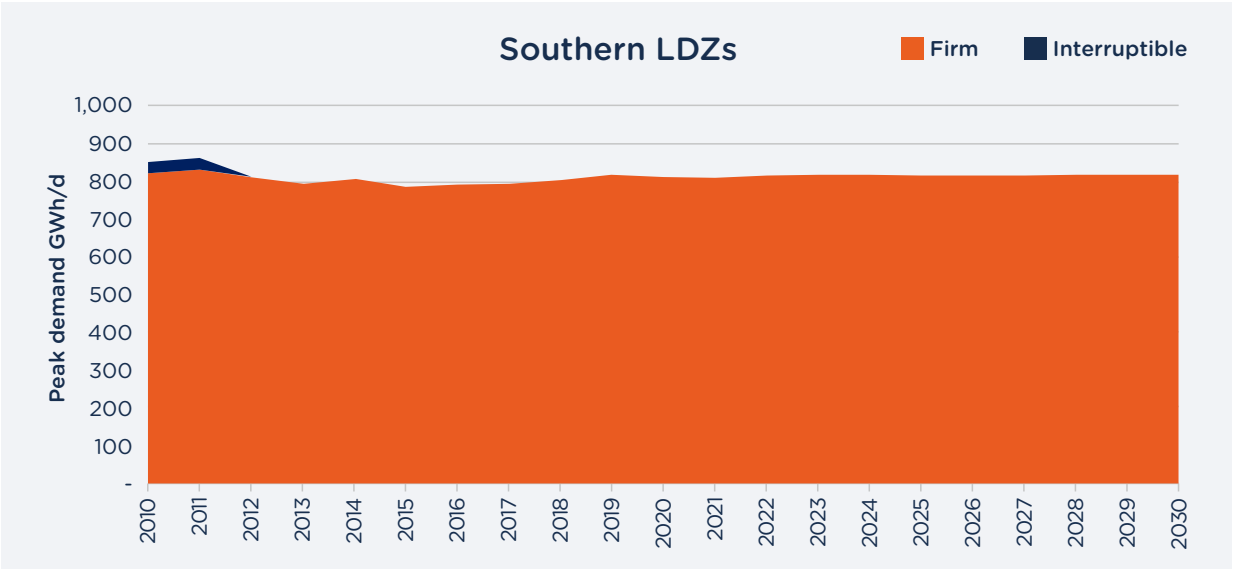


Figure 9 Change in historic and Peak demand - Southern LDZs

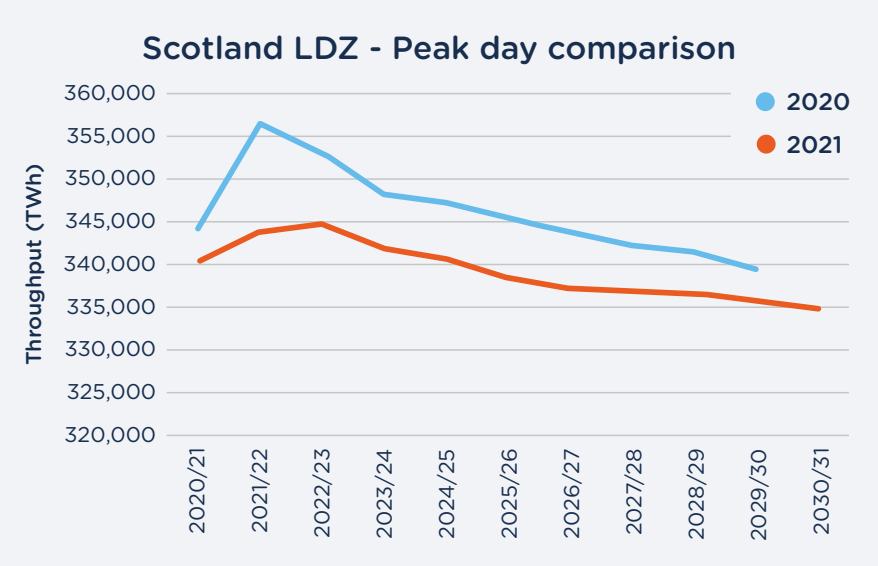
Average annual change in forecast Peak demand growth (2021-30)			
	SGN	SCOTLAND	SOUTHERN
Peak demand growth	-0.0%	-0.3%	-0.1%

Table 2 Change in forecast peak demand growth (2021-30)

Forecast comparisons

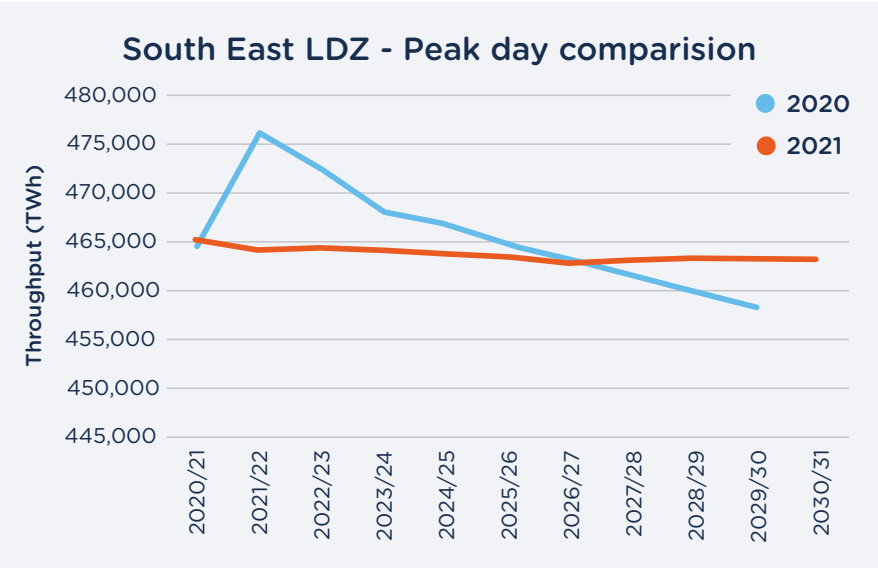
Scotland LDZ

Scotland has lower peaks than last year throughout the forecast period. This is mainly due to the underlying weather data (CWV data) changing, as part of the five yearly review across the industry, which takes into account climate change. The CWV has changed and the 1 in 20 CWV has also changed, reducing the peak in the NDM sector, which accounts for the majority of the peak demand. This has been offset to some degree by an increase in annual demands across the forecast period. This is due to forecasts of less domestic energy efficiency, a more optimistic economic outlook, and higher demands in some of our largest loads in this LDZ, than last year's forecast. Peaks are 1% lower than last year at the end of the forecast period. As with all LDZs, the 2020 forecast for peak in 2020/21 was reduced due to the forecast impact of COVID-19, which ended up being less than we had forecast.



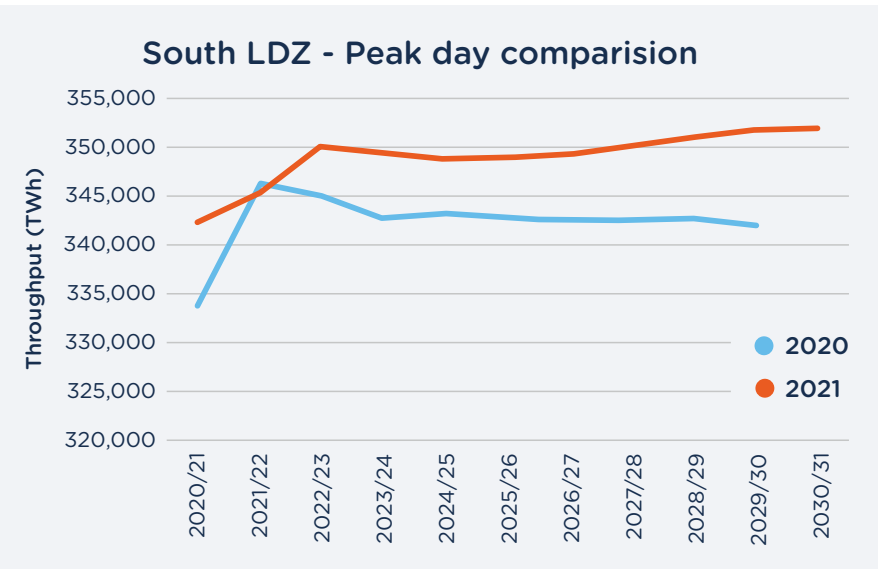
South East LDZ

South East also has higher annual demands being offset by the impact on peak of the changes to CWV. Annual demand forecasts are higher this year for the same reasons as in Scotland LDZ. In this LDZ the CWV changes have also decreased the NDM peak. In South East the annual demand increase eventually accounts for a higher increase in peak than the CWV changes, resulting in a small increase in peak of 1.1% at the end of the forecast period.



South LDZ

South has higher peak demands from higher annual demand and a slight increase in peak from CWV. Annuals have increase due to reduced energy efficiency and improved economic outlook. This results in a 2.8% increase in peak at the end of the forecast period.



Comparison with National Grid's FES

It's important to note our forecasts are not based on a set of scenarios. Instead they use various inputs to arrive at a set of potential outcomes, then from these outcomes we select the most appropriate for the planning period.

We're often asked to compare our outputs to other work such as National Grid's (NG) annual Future Energy Scenarios (FES) publication. NG's FES is a different type of analysis and because of this direct comparison is not appropriate.

FES is a set of scenarios from which a narrative on likely outcomes is produced. Key differences between our forecasts and this analysis is:

Our forecast described within our LTDS is a forecast of gas demand for the next 10 year based on current policies. It's used for efficient and effective planning to ensure our gas is delivered to end customers safely and at least cost. It's also our best prediction of what gas demand will be in the next 10 years based on:

- Government policies which are in place now
- The behaviours which we see currently and how those behaviours may change over the next 10 years based upon recent trends we've seen
- Our forecasts don't have an end point in mind or aim to predict what gas demand should be if certain conditions were to be true, such as the various pathways to net zero.

FES is a set of scenarios, not forecasts. These aim to explore:

- How the energy landscape would look if a set of conditions exist
- Which policies and incentives need to be created to achieve each scenarios aims
- Which technologies need to come to the fore
- Which policies may be required to achieve specific conditions, such as net zero

Appendix A

Demand forecast tables

Annual demand forecast by load category – SGN overall											
Calendar year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0 - 73.2 MWh	89.2	89.1	88.6	87.7	87.2	86.6	86.5	86.5	86.4	86.2	85.9
73.2 - 732 MWh	13.3	13.4	13.5	13.7	13.7	13.7	13.7	13.7	13.8	13.8	13.8
732 – 2,196 MWh	6.1	6.1	6.0	6.0	6.0	6.0	5.9	5.9	5.8	5.8	5.8
2,196 – 5,860 MWh	3.8	3.8	3.7	3.7	3.7	3.7	3.6	3.6	3.6	3.6	3.6
Total small user	112.4	112.4	111.8	111.1	110.5	110.0	109.7	109.7	109.6	109.4	109.0
>5,860 MWh	7.5	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.2	7.2	7.1
DM consumption	18.0	22.9	25.4	25.8	25.7	25.6	25.5	25.5	25.4	25.4	25.4
Total large user	25.5	30.5	32.8	33.2	33.0	32.9	32.8	32.7	32.6	32.5	32.5
Total LDZ	137.9	142.8	144.6	144.3	143.6	142.9	142.6	142.4	142.2	141.9	141.5
Shrinkage	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total throughput	138.5	143.5	145.2	144.9	144.2	143.6	143.2	143.1	142.8	142.6	142.2

Gas supply year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total throughput	142.2	144.8	145.0	144.4	143.7	143.3	143.1	142.9	142.6	142.3	141.9

Table 3 Forecast annual demand by load category - SGN overall (TWh)

Annual demand forecast by load category – Scotland LDZ											
Calendar year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0 - 73.2 MWh	28.9	28.9	28.6	28.2	28.0	27.7	27.6	27.6	27.5	27.3	27.2
73.2 - 732 MWh	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
732 – 2,196 MWh	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3
2,196 – 5,860 MWh	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Total small user	37.3	37.4	37.1	36.7	36.5	36.1	36.0	35.9	35.8	35.7	35.5
>5,860 MWh	3.1	3.2	3.2	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0
DM consumption	6.5	7.9	8.2	8.0	7.9	7.8	7.8	7.7	7.7	7.7	7.7
Total large user	9.7	11.2	11.4	11.1	11.0	10.9	10.8	10.8	10.7	10.7	10.7
Total LDZ	47.0	48.6	48.5	47.9	47.5	47.0	46.8	46.7	46.6	46.4	46.2
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	47.2	48.8	48.7	48.0	47.7	47.2	47.0	46.9	46.7	46.6	46.4

Gas supply year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total throughput	48.4	48.7	48.2	47.8	47.3	47.1	46.9	46.8	46.6	46.4	46.2

Table 4 Forecast annual demand by load category - Scotland LDZ (TWh)

Annual demand forecast by load category – South East LDZ											
Calendar year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0 - 73.2 MWh	36.6	36.4	36.2	36.0	35.8	35.6	35.5	35.5	35.5	35.4	35.3
73.2 - 732 MWh	5.2	5.1	5.2	5.2	5.2	5.2	5.2	5.3	5.3	5.3	5.3
732 – 2,196 MWh	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,196 – 5,860 MWh	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.2	1.2	1.2	1.2
Total small user	45.1	44.7	44.6	44.5	44.3	44.2	44.0	44.0	44.0	43.9	43.8
>5,860 MWh	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0
DM consumption	5.6	7.1	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1
Total large user	7.7	9.1	9.3	9.3	9.2	9.2	9.2	9.2	9.2	9.1	9.1
Total LDZ	52.8	53.8	53.9	53.7	53.5	53.4	53.3	53.2	53.2	53.1	52.9
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	53.0	54.1	54.1	54.0	53.8	53.7	53.5	53.5	53.4	53.4	53.2

Gas supply year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total throughput	53.9	54.1	54.0	53.9	53.7	53.6	53.5	53.4	53.4	53.2	53.1

Table 5 Forecast annual demand by load category - South East LDZ (TWh)

Annual demand forecast by load category – South LDZ											
Calendar year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0 - 73.2 MWh	23.7	23.8	23.7	23.5	23.4	23.3	23.3	23.4	23.4	23.4	23.4
73.2 - 732 MWh	3.7	3.9	3.9	3.9	3.9	4.0	4.0	4.0	4.0	4.0	4.0
732 – 2,196 MWh	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5
2,196 – 5,860 MWh	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	30.0	30.2	30.1	29.9	29.8	29.7	29.7	29.7	29.8	29.8	29.7
>5,860 MWh	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1
DM consumption	5.8	7.9	9.9	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Total large user	8.1	10.2	12.2	12.8	12.8	12.8	12.8	12.7	12.7	12.7	12.7
Total LDZ	38.1	40.4	42.2	42.7	42.5	42.5	42.5	42.5	42.5	42.5	42.4
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	38.3	40.6	42.4	42.9	42.7	42.7	42.7	42.7	42.7	42.7	42.6

Gas supply year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total throughput	40.0	42.0	42.8	42.8	42.7	42.7	42.7	42.7	42.7	42.6	42.6

Table 6 Forecast annual demand by load category - South LDZ (TWh)

1 in 20 Peak day firm demand forecast – at a glance											
Calendar year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Scotland	340.2	343.7	344.8	341.8	340.4	338.2	337.2	336.9	336.3	335.7	334.8
South east	465.1	463.9	464.3	464.0	463.5	463.2	462.6	463.0	463.3	463.2	463.1
South	342.0	345.2	349.8	349.2	348.6	348.8	349.3	350.2	351.1	351.6	351.8
SGN overall	1,147,371	1,152,868	1,158,905	1,154,996	1,152,511	1,150,233	1,149,147	1,150,104	1,150,713	1,150,482	1,149,720

Table 7 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	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
0 - 73.2 MWh	824.9	823.6	821.0	817.1	815.0	813.2	813.5	814.8	815.7	815.6	815.4
73.2 - 732 MWh	111.6	112.7	113.2	114.5	115.0	115.0	114.9	115.3	115.6	115.9	115.8
732 – 2,196 MWh	36.3	36.2	35.7	35.6	35.5	35.4	35.2	35.0	34.8	34.6	34.4
2,196 – 5,860 MWh	22.3	22.3	21.9	21.9	21.8	21.8	21.6	21.5	21.4	21.3	21.1
>5,860 MWh	44.8	44.7	44.1	43.9	43.7	43.6	43.3	43.1	42.8	42.5	42.3
Total NDM consumption	1,040.0	1,039.5	1,036.0	1,033.1	1,031.0	1,029.0	1,028.6	1,029.7	1,030.2	1,029.9	1,028.9
DM firm consumption	105.5	111.5	121.1	120.1	119.7	119.5	118.7	118.6	118.7	118.8	119.0
Total firm consumption	1,145.5	1,151.0	1,157.1	1,153.2	1,150.7	1,148.4	1,147.3	1,148.3	1,148.9	1,148.7	1,147.9
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	1,147.4	1,152.9	1,158.9	1,155.0	1,152.5	1,150.2	1,149.1	1,150.1	1,150.7	1,150.5	1,149.7

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

1 in 20 Peak day firm demand forecast – Scotland LDZ by load categories											
Calendar year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
0 - 73.2 MWh	235.4	234.3	233.4	231.2	230.4	228.8	228.8	228.9	228.6	228.1	227.4
73.2 - 732 MWh	33.9	34.4	34.3	34.7	34.7	34.6	34.5	34.5	34.6	34.6	34.6
732 – 2,196 MWh	13.3	13.6	13.3	13.2	13.1	13.0	12.9	12.8	12.7	12.7	12.6
2,196 – 5,860 MWh	8.3	8.5	8.4	8.3	8.3	8.2	8.1	8.1	8.0	8.0	7.9
>5,860 MWh	17.0	17.4	17.1	17.0	16.9	16.7	16.6	16.5	16.4	16.3	16.1
Total NDM consumption	307.9	308.2	306.5	304.5	303.4	301.3	301.0	300.9	300.3	299.6	298.6
DM firm consumption	31.8	35.0	37.7	36.8	36.6	36.4	35.6	35.6	35.6	35.6	35.7
Total firm consumption	339.7	343.2	344.3	341.3	339.9	337.7	336.7	336.4	335.9	335.2	334.3
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	340.2	343.7	344.8	341.8	340.4	338.2	337.2	336.9	336.3	335.7	334.8

Table 9 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	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
0 - 73.2 MWh	347.4	346.0	344.9	344.1	343.3	342.9	342.6	343.0	343.3	343.2	343.2
73.2 - 732 MWh	45.1	44.5	45.0	45.5	45.7	45.7	45.7	45.8	45.9	46.1	46.0
732 – 2,196 MWh	12.5	12.3	12.2	12.3	12.4	12.5	12.4	12.3	12.3	12.2	12.2
2,196 – 5,860 MWh	7.8	7.7	7.6	7.7	7.7	7.8	7.7	7.7	7.7	7.6	7.6
>5,860 MWh	12.8	12.6	12.5	12.6	12.7	12.8	12.7	12.6	12.6	12.5	12.5
Total NDM consumption	425.6	423.2	422.3	422.1	421.8	421.6	421.1	421.5	421.8	421.6	421.4
DM firm consumption	38.7	40.0	41.3	41.1	41.0	40.9	40.8	40.8	40.8	40.8	40.9
Total firm consumption	464.3	463.2	463.5	463.2	462.8	462.5	461.9	462.2	462.5	462.4	462.3
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	465.1	463.9	464.3	464.0	463.5	463.2	462.6	463.0	463.3	463.2	463.1

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

1 in 20 Peak day firm demand forecast – South LDZ by load categories											
Calendar year	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
0 - 73.2 MWh	242.1	243.2	242.7	241.8	241.2	241.5	242.1	242.9	243.8	244.3	244.7
73.2 - 732 MWh	32.6	33.9	33.9	34.3	34.6	34.7	34.8	34.9	35.1	35.2	35.2
732 – 2,196 MWh	10.6	10.3	10.2	10.1	10.0	10.0	9.9	9.8	9.8	9.7	9.7
2,196 – 5,860 MWh	6.2	6.0	6.0	5.9	5.9	5.8	5.8	5.7	5.7	5.7	5.6
>5,860 MWh	15.0	14.6	14.4	14.3	14.2	14.1	14.0	13.9	13.8	13.7	13.7
Total NDM consumption	306.4	308.2	307.2	306.5	305.8	306.0	306.5	307.3	308.2	308.6	308.9
DM firm consumption	35.0	36.5	42.1	42.2	42.2	42.2	42.3	42.3	42.3	42.4	42.4
Total firm consumption	341.5	344.7	349.3	348.6	348.0	348.2	348.8	349.6	350.5	351.0	351.3
Total shrinkage	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total LDZ	342.0	345.2	349.8	349.2	348.6	348.8	349.3	350.2	351.1	351.6	351.8

Table 11 1 in 20 peak-day firm demand forecast - South LDZ by load categories (GWh)

Appendix B

2020 flows

This appendix describes annual flows during the 2020 calendar year.

Annual flows

Forecasts of annual gas 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 2020 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.

In our 2020 forecast we applied a 15% reduction to non-domestic demand for the first year of the forecast. This reduction was based on prevailing knowledge at the time including government projections of the impact on economic activity as a result of the emerging COVID 19 pandemic. However, as a result of a number of initiatives; including government backed financial stimulus packages and diversification of commercial and industrial practices, demand actually remained relatively stable. The result of this is the difference you will see in tables 12 to 14.

Tables 12 to 14 provide a comparison of actual and weather corrected demands during the 2020 calendar year with the forecasts presented in our 2020 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 2020 (TWh) - Scotland LDZ			
	Actual demand	Weather corrected demand	2020 LTDS forecast demand
0 - 73.2MWh	29.8	28.9	28.7
73 – 5,860MWh	8.7	8.4	7.1
>5,860MWh firm	10.8	10.9	8.6
Total LDZs	49.3	48.2	44.5
Shrinkage	0.2	0.2	0.2
Total throughput	49.5	48.4	44.6

Table 12 Annual demand for 2020 (TWh) – Scotland LDZ

Annual demand for 2020 (TWh) - South East LDZ			
	Actual demand	Weather corrected demand	2020 LTDS forecast demand
0 - 73.2MWh	36.9	36.6	36.0
73 – 5,860MWh	8.5	8.5	6.7
>5,860MWh firm	8.7	8.7	6.4
Total LDZs	54.1	53.8	49.1
Shrinkage	0.3	0.3	0.3
Total throughput	54.4	54.0	49.4

Table 13 Annual demand for 2020 (TWh) – South East LDZ

Annual demand for 2020 (TWh) - South LDZ			
	Actual demand	Weather corrected demand	2020 LTDS forecast demand
0 - 73.2MWh	24.4	23.7	23.4
73 – 5,860MWh	6.5	6.3	5.2
>5,860MWh firm	9.2	9.2	7.9
Total LDZs	40.0	39.2	36.5
Shrinkage	0.2	0.2	0.2
Total throughput	40.2	39.4	36.7

Table 14 Annual demand for 2020 (TWh) – South LDZ

LDZ winter severity statistics

Sourced from the May 2021 National Grid Winter Severity Report 2020/21, these statistics cover the gas industry interpretation of winter lasting from October 2020 to March 2021 inclusive.

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 2020/21 was the 25th coldest peak winter day compared to the last 61 years.

1 in 'X' winter severities per LDZ	
LDZ	F
Scotland	3_Cold
South East	3_warm
South	4_warm
National	Ave

Table 15 1 in X winter severities per LDZ

Maximum and minimum demand

Table 16 indicates the highest and lowest daily demands for each LDZ seen between October 2020 and September 2021 and when they occurred.

Table 17 shows % flow of forecast peak day for each LDZ on the maximum and minimum demand day of gas year 2020-21.

Actual flows on the maximum and minimum demand day of gas year 2020/21		
LDZ	Maximum day 2020/21	Minimum day 2020/21
Scotland	25.83 mscmd (11/02/2021)	3.72 mscmd (25/07/2021)
South East	34.84 mscmd (08/02/2021)	4.65 mscmd (08/09/2021)
South	24.81 mscmd (11/02/2021)	3.05 mscmd (12/08/2021)

Table 16 Actual flows on the maximum and minimum demand day of gas year 2020/21

Maximum and minimum flows of gas year 2020/21 (as a percentage)			
LDZ	Forecast peak day	Actual maximum peak day	Actual minimum peak day
Scotland	31.57 mscmd	81.82%	11.77%
South East	42.65 mscmd	81.70%	10.91%
South	31.1 mscmd	79.79%	9.79%

Table 17 Maximum and minimum flows of gas year 2020/21 (as a percentage)

Biomethane sites

Table 18 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 8 sites which currently have suspended Letters of Direction.

Portfolio of biomethane sites		
LDZ	Total	Equivalent no of domestic customers
Scotland	19	124,172
Southern	20	130,085
Total	39	254,257

Table 18 Portfolio of sites as of end August 2021

<7bar distribution projects

Tables 19 to 24 detail the <7bar projects which relate to the planning horizon discussed with this year's 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 up to and in excess of £500,000.

Projects under construction

<7 Bar major projects under construction in Scotland LDZ		
Project	Build year	Project scope
We have no major projects currently under construction in Scotland LDZ		

Table 19 <7 bar major projects under construction in Scotland LDZ

<7 Bar major projects under construction in South LDZ		
Project	Build year	Project scope
We have no major projects currently under construction in South East LDZ		

Table 20 <7 bar major projects under construction in South LDZ

<7 Bar major projects under construction in South East LDZ		
Project	Build year	Project scope
We have no major projects currently under construction in South East LDZ		

Table 21 <7 bar major projects under construction in South East LDZ

Projects under consideration

<7 Bar major projects under consideration in Scotland LDZ		
Project	**Build year**	**Project scope**
South East Wedge, Edinburgh	2022-24	4" ST HP pipeline / HP to IP TRS / 2.7km x 125mm HDPE IP / IP to Local MP DPG / 88m of 180mm MDPE local MP
Haddington – Dunbar IP	2022-23	1.63km x 315mm HDPE IP OR installation of DPG (dependant on acquiring land)
Aberlady - Gullane (Phase 1)	2022-23	2.6km x 315/355mm PE MP
Hilton Drive, Aberdeen	2022-23	1.72km x 355mmHDPE
Tranent IP – Phase 2	2024-25	2.4km x 315 HDPE IP
Perth Bridge DPG Outlet	2023-24	2.7km x 400mm PE MP

Table 22 <7 bar major projects under consideration in Scotland LDZ

<7 Bar major projects under consideration in South LDZ		
Project	**Build year**	**Project scope**
Newton Tony DPG	2022-25	Replace DPG
Aldermaston (Phase 1)	2022-23	2.4km x 180mmPE MP
Phase 3 A422 Brackley	2022-23	2.05km x 315mmPE MP
Newbury IP	2023-24	3.4km x 12" ST IP

Table 23 <7 bar major projects under consideration in South LDZ

<7 Bar major projects under consideration in South East LDZ		
Project	**Build year**	**Project scope**
Hawe Lane, Canterbury	2023-24	1.6km x 180mm PE MP
Old London Road, Hythe	2023-24	1.7km x 355mm PE MP
Rocks Road, Uckfield	2024-25	0.7km x 355mm PE MP
Hazel Grove Road, Haywards Heath	2024-25	0.9km x 250mm PE MP
Collier Street, Maidstone	2024-25	2km x 180mm PE MP
Folkestone DPG	2021/22	Replace DPG

Table 24 <7 bar major projects under consideration in South East LDZ

Links and contacts

Internal contacts

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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.

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

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.

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

External contacts

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

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

Joint Office of Gas Transporters
The Joint Office is where the UNC can be found. It also has details of live modifications to the document and the various working bodies relating to the gas industry.

BEIS - Department for Business Energy & Industrial Strategy
BEIS brings together responsibilities for business, industrial strategy, science, innovation, energy, and climate change.

xoserve
One of several service providers supporting the UK Gas Industry.

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 106 cubic metres, one billion cubic metres (bcm) equals 109 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.

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.

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

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 an 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 12-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 in Fife, Scotland is 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 www.sgn.co.uk/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 Unaccounted for Gas

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 (>7 barg) 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 is called RIIO-GD2 and commenced in April 2021 and lasts five years to March 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. www.sgn.co.uk/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 a year.

Disclaimer

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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.

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