Electricity
Transmission

Our Performance 2018/19

nationalgrid

Welcome

Nicola Shaw
Executive Director

The aim of this report is to highlight the work that National Grid Electricity Transmission (NGET) has carried out in 2018/19 and show our plan for the future. We want to tell you about who we are, what we do and how we are meeting the needs of our customers and stakeholders. I'd like to share with you how we are keeping our network safe and reliable and what steps we are taking to meet challenging environmental targets taking us towards a lower carbon future.

I am proud to report our Electricity Transmission business has continued to perform solidly for our customers and ultimately for end consumers by delivering safe, efficient, and reliable transmission services in 2018/19. This year we have again improved customer service and continued to innovate and invest for the benefit of future consumers.

This year, we have delivered the legal separation of the Electricity System Operator (ESO) from the Transmission Owner (TO), completed as planned by April 1st 2019. We are pleased that we delivered all the people, process, system, and property separation requirements successfully.

Customer requirements of where, when and if they will connect to the system have changed hugely within the RIIO-T1 period. We have responded by changing our plans to better serve end consumers by not spending money when there isn't certainty of the need to. We've continued to play a central role in the decarbonisation agenda, making investments that support the connection of new generation technologies, and responding to changing patterns of demand. The last year has again seen several 'firsts' that evidence this, with a whole working week without coal fired generation delivered through record levels of renewable generation that we have connected to the system and transported to businesses and homes.

Operationally, we also delivered some fantastic projects this year, including our first new electricity overhead line in England and Wales for sixteen years. Our Canterbury to Richborough line has been completed which connects the Nemo interconnector (from Belgium) to the UK, strengthening the link between our electricity system, and that of mainland Europe. This provides our customers with better access to a wider market improving competition. This lowers the overall costs to end consumers, along with providing more opportunities for our customers to export power to Europe.

We have continued to invest in the network for the benefit of future consumers. This has meant that we have optimised our investment plan based on our understanding of our assets and how they will be used to serve customers. This will deliver savings now, and into the future because we are only replacing our assets when we have a solid economic case to do so. These investments will also help secure long term system reliability, which our customers have told us they value.

We have developed innovations and efficiencies in delivering our plans so far in RIIO-T1. We will embed these as business as usual for the rest of T1 and into future price controls.

We have stepped up our stakeholder engagement over the last year and their feedback on our future plans has helped shape our T2 business plan submission.

We could not have achieved all of this without our number one asset, our people. We have a diverse and inclusive group of skilled employees. I'd personally like to thank them for all of the work that they have done.

I hope you find this report informative and welcome your feedback on how we can improve our reporting in the future.

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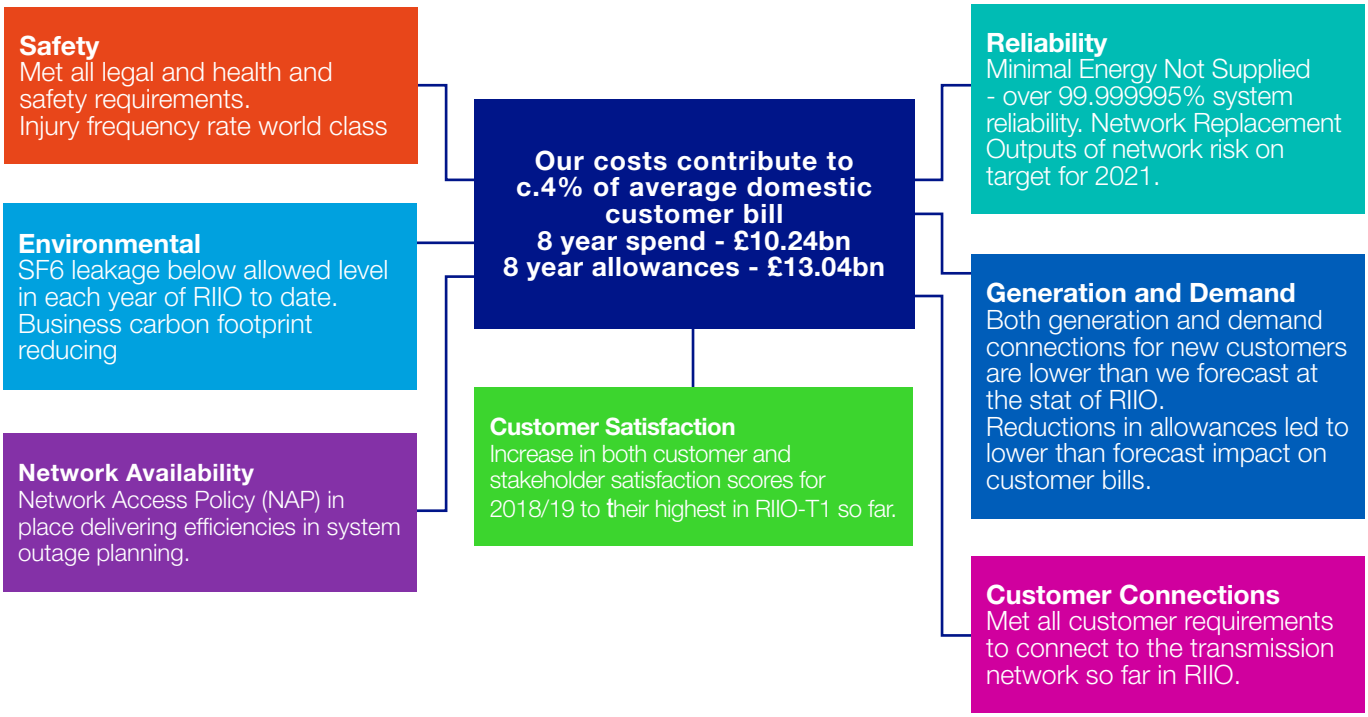
The infographic below highlights, how we are performing compared to the primary outputs in the RIIO-T1 framework.



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High level review of 2018/19 outputs

This year our transmission business has again continued to deliver strongly on our five primary RIIO output areas: Safety, Reliability, Customer Satisfaction, Connections and Environment.

Safety - This continues to be our number one priority. We are proud to report that our injury frequency rate (IFR) has improved significantly to 0.07 (compared to 0.12 in 2017/18) which is **world class performance**. This step change has been delivered through working closely with our contractors to deliver strong improvements in their safety performance, whilst keeping up a focus on staff safety programmes and process improvements.

In June 2019, we received a fine relating to the serious incident in 2016 where one of our employees, Paul Marsden, tragically died while carrying out his work. Paul's death sent shockwaves through our business and we have made changes to our working procedures. We live our safety ambition every day, challenging ourselves to stop tragedies like this from happening again.

Reliability - the total energy not supplied in 2018/19 was 12MWh. This result is well below our average loss of 34.5MWh over the RIIO-T1 period, and is a significant improvement on our 39.7MWh loss of 2017/18. This result represents an overall level of **network reliability of 99.999995%**. Our stakeholders tell us this high level of reliability continues to be important to them.

Customer satisfaction - we are extremely proud that our improvements in customer service have led to an increase in customer satisfaction. Each year, our customers and stakeholders are surveyed by an independent provider. The scores have increased to 7.92 from last year's 7.74. This increase reflects the focus and hard work across our whole business to improve the way we provide the experience our customers value. Our stakeholder satisfaction score has also increased from 7.88 to 7.92 and now reflects of the opinion of a much broader set of stakeholders than ever before.

Connections - There has been a continued upward trend in the number of requests for connection offers in 2019. Working closely with the Electricity System Operator (ESO), we have continued to deliver all contracts within the required timeframe. We sent out 186 offers in 2018/19 compared to 116 in 2017/18, a 60% increase. We are proud that we have been able to successfully deliver this increase alongside improving customer satisfaction levels.

Environment - Our first major visual impact provision (VIP) project **selected by our Stakeholder Advisory Group** was approved this year. We are removing 16.5km of overhead line in the Dorset Area of Outstanding Natural Beauty and replacing it with an underground cable to enhance this protected landscape.

On the other hand, we are disappointed that we have had our worst year in RIIO-T1 in SF6 leakage from our equipment, albeit still less than the forecast. This is important because we want to reduce our emissions of greenhouse gases, due to the environmental damage that it causes. The increase was caused by significant increase in leakage from 15 assets which were responsible for 28% of the leakage. We have repaired or have a planned intervention for all of them. We are confident that the initiatives and process improvements that we have in place will return us, for the future, to the ahead of target performance that we had in the first five years of RIIO-T1.

Financials - We plan to **invest over £8.7bn** in our network over the RIIO-T1 period. So far, we have invested over £6.1bn. This investment maintains or replaces our assets to keep reliability high, as well as improving the network to facilitate our customers' connections to it. These costs are recovered from our customers; electricity generators, large electricity users, and distribution companies and the costs are passed onto the end consumers' bills as network charges.

The combined bill impact from our performance is to lower our proportion of the bill to **£22.40**

more detail is on page 10

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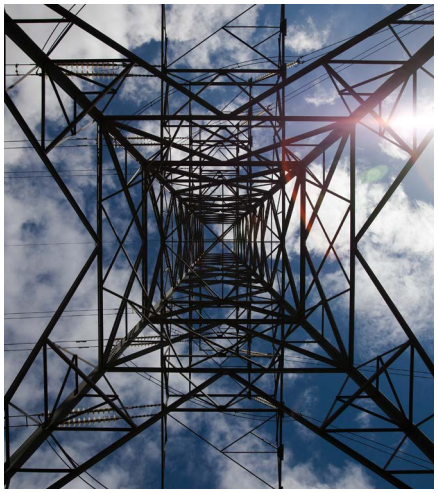


When customers' needs change and investments are no longer required, we amend our plans accordingly. One of the ways that we are funded, via an uncertainty mechanism, automatically reduces allowances by £1.9bn over RIIO-T1 as customer needs change and we don't invest in assets that aren't required. **This means that consumer bills will be lower** in 2018/19 than they were forecast at the start of the price control because we won't receive this allowance. On top of this reduction, we have voluntarily deferred some £640m of allowances into future price controls. We deferred the allowances because there are pieces of work that aren't required but no mechanism to reduce allowances. This provides further savings on bills.

We also deliver value through the totex incentive mechanism (a way of sharing savings or overspend with customers) which has meant we have strived to innovate to drive down costs for customers and end consumers. For instance, we have used our engineering expertise to find ways to increase the lifespan of our assets. We are spending less money than we forecast at the start of RIIO-T1 whilst still delivering the output agreed. These innovations, along with all of the other initiatives and efficiencies, will reduce customer charges by a further £1.3bn which will lower the consumer bill.

Next steps - at the end of June, we submitted our first **draft of the RIIO-T2 business plan**. This milestone has been the culmination of extensive customer and stakeholder engagement. We will continue to engage with our customers and stakeholders in preparing and submitting a subsequent draft plan in October. The final plan will be submitted to Ofgem at the end of the year taking account of stakeholders and customers views. We believe our plan, based on extensive feedback, will represent what our customers and stakeholders want, at a price they are willing to pay.

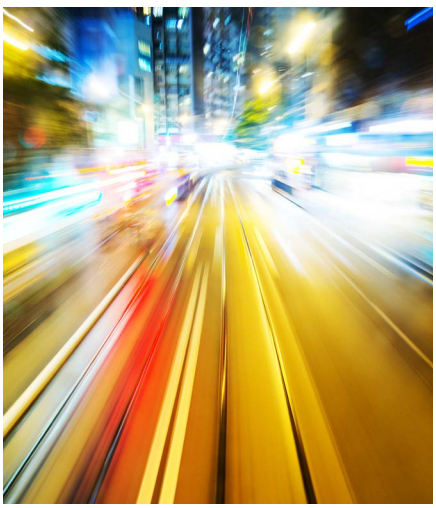
To find out more about our plans for RIIO-T2, go to ***https://www.nationalgridet.com/planning-together-riio/help-shape-our-business-plan-riio/we-have-developed-our-draft-plan-with-you***

Our T1 plans will continue to be influenced by uncertainty in the progress of our customers' projects and the impact and **speed of take-up of new technologies**. This will remain a major feature of the business environment and we will continue to revise our plans to reflect our evolving customers and the energy industry.

We will continue to innovate and drive efficiencies to deliver better service at lower operating costs. We want to reduce our investment costs through opportunities for lean asset design, enhanced management of risk and contracting and construction efficiency.

While performance has improved in most areas over the past year we have experienced delays to the commissioning of the Western HVDC link which is being delivered through a Joint Venture with Scottish Power Transmission Ltd. We have worked hard to maximise its availability throughout the whole period. In 2018/19, when attempting to complete the project there were further faults on one of the HVDC cables. We are working hard to ensure our contractors resolve the problem and the time unavailable is kept to an absolute minimum.

More broadly, we will continue to engage with stakeholders on a range of issues, including Future Energy Scenarios, competition in onshore transmission, the development of smart networks and the expanding role of the demand side and distribution networks.



Who we are and what we do

NGET

National Grid Electricity Transmission (NGET) are now solely a Transmission Owner (TO). This is because, in April 2019, we legally separated from the Electricity System Operator (ESO). This means that **we own the electricity transmission network** in England and Wales – that's the high-voltage network connecting electricity generators to distribution networks and large-scale consumers.

Our role is to **connect people to the energy they use** – whether it's heat and light for their homes or to keep factories and offices running. As society continues to become ever more reliant on electricity for every aspect of modern life, we have an increasingly central role to play in meeting one of Britain's biggest challenges: providing secure and affordable energy while also meeting ambitious low-carbon energy targets and connecting new sources of energy to the people who use them.

Other TOs own and operate the Scottish, offshore, and interconnector networks that make up the rest of Great Britain's high-voltage electricity transmission system. The separate ESO operates Great Britain's entire electricity transmission system, including the Scottish and offshore networks. They balance, second by second, the amount of electricity supply and demand by users of the transmission system.

We take electricity from all types of power stations and other networks and transport this across the country. At each of our 346 substations across England and Wales we supply **electricity from our high-voltage system to local lower voltage substations**. These substations are owned and operated by other companies called Distribution Network Operators (DNOs). The DNOs distribute this electricity through their local distribution networks, and ultimately deliver electricity to homes and business where it is needed.

A final link in the chain is the companies that send consumers their bills; these are the Suppliers. Consumers can choose who their electricity supply company is, and so who they pay their bill to. Network owners like us and the DNOs, generation and supply companies are all regulated by Ofgem. Ofgem sets the **Revenue** for networks through the **RIIO** framework. This **RIIO** framework encourages value for money for end consumers by setting **Outputs** and **Incentivising** performance encouraging **Innovation**.

The unprecedented rate of change in the energy landscape means we must be adaptable and responsive. That's why we invest efficiently to provide system reliability and to enable customers to connect to the network. We also promote the development and implementation of sustainable, innovative and economical energy solutions that will help us achieve security of supply.

At the heart of our RIIO-T1 business plan is the delivery of an **affordable electricity transmission network** that meets our stakeholders' needs in terms of energy security and environmental considerations.

Over the next decade, we will continue our work to modernise the country's energy infrastructure. We know that building new assets or refurbishing existing ones will have an impact on our customers and stakeholders. This is why we are directly engaging with them in the decision-making process.

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Components of a power system

Component	What part it plays in the power system
Generators/Power Stations	The conversion of low grade energy (wind, solar, nuclear, coal, gas etc.) into electricity
Transmission	The process of moving large volumes of energy across long distance at high-voltage. In England and Wales, this voltage is mainly 275 or 400kV. We are the Transmission Owner (TO) in England and Wales. There are a further two TOs in Scotland. There are also a number of offshore TOs that own the network connecting offshore windfarms to the onshore system
Distribution	Distribution Network Owners (DNOs) are companies that distribute power to homes and businesses through local networks at 132kV and below
Transformer	These step up or down the voltage of the electricity as it is transmitted from power stations through the transmission and distribution networks for use in homes and businesses. Using transformers to transmit power at high voltage allows us to reduce 'losses' on the system. We have almost 800 transformers on our network and are replacing 80 of them during RIIO-T1 to maintain a reliable system
Reactor	Similar in construction to transformers although these are used to control voltage of the power system to keep it within stable levels. There are 180 reactors on our network and we are replacing or adding over 30 during this price control
Switchgear	Equipment that is used to switch transmission and distribution equipment in and out of service. Under fault conditions these react within milliseconds to remove equipment to maintain a safe and secure system. We have almost 3000 on our network and are refurbishing or replacing over 1000 during this price control
Underground cable	Used in built-up areas, subsea, or to reduce visual impact. Cables transmit electricity underground and can be either directly buried or placed in tunnels. We have over 600km of cable on the network and are replacing almost 100km of this during RIIO-T1
Overhead line (OHL)	These are cables used for transmitting electricity that are suspended from pylons. These are normally much more economical than underground cables because the majority of insulation and cooling is provided by air. We have over 14,000km of OHL in England and Wales and are refurbishing or replacing over 1,200km of this in RIIO-T1.
Substation	Where our cables and OHL circuits connect with transformers to supply DNOs or connect power stations, or with each other for onward transmission of electricity to areas of higher demand
Protection and control	Protection systems automatically remove faulted equipment to prevent system instability. Our control systems also allow us to switch equipment in and out of service manually, so we can direct power flows and maintain our network

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RIIO: Revenue = Incentives + Innovation + Outputs

RIIO introduced a range of new principles that are relevant to our performance

RIIO-T1 started in 2013/14 and lasts for eight years. Under this regulatory framework, we have a set of outputs to deliver that we have agreed with stakeholders. We deliver these outputs in return for an efficient revenue allowance that has been set by our regulator Ofgem. RIIO also introduced a range of new principles which drive our performance, so we've outlined them below.

Risks and benefits are shared with customers

One of the principles of the RIIO framework is to align our interests with those of consumers through the sharing of risks and benefits. This means that, for every pound we save, 53p of the benefit is passed back to end consumers through lower network charges. This drives us to find efficiencies to reduce costs and consumers benefit in both the short and long term.

Incentives are encouraging better ways of working

We are encouraged to improve how we work across different areas of our operations through a range of incentives agreed as part of the RIIO framework. For instance, stakeholders want us to improve how we work with them and our customers and we receive rewards or penalties depending on how we perform. There are other incentives to improve our environmental performance (SF6 leakage) and the reliability of our supply to the distribution networks and other customers.

Finding a way to innovate in everything we do

The RIIO framework provides routes for innovation: The Network Innovation Allowance (NIA); the Network Innovation Competition (NIC); and the Innovation Roll-out Mechanism (IRM). Innovation is not only at the heart of the RIIO regulatory framework but also at the heart of everything that we do. There are many examples where we have identified improvements because the innovation funds are exploring and driving benefits for consumers through innovation projects from monitoring our assets to environmental cable removal, or from regenerating cable oil to safe working on live lines.

Flexible and fixed allowances

In some areas (like connecting customers to the electricity system) the costs were uncertain at the start of RIIO-T1 because the volume of work had to be estimated. So, our allowances flex using an "uncertainty mechanism" reflecting changing customer requirements.

A fixed allowance covered the maintenance and asset replacement work that's needed to continue to provide a safe and reliable electricity network.

Opportunities to improve for RIIO-T2

We have worked for six years during RIIO-T1 on delivering the right outputs (e.g. connecting customers or replacing assets) at the right time, and improving the way that we work with our customers and stakeholders. However, we believe that there are ways that the framework could deliver further benefits for consumers now and into the future:

- We could improve the uncertainty mechanisms so that the changes in our allowances more closely reflect the changes in costs we face due to the volatility of outputs compared with RIIO-T1. This could include how we make changes to our preconstruction process to improve project delivery.

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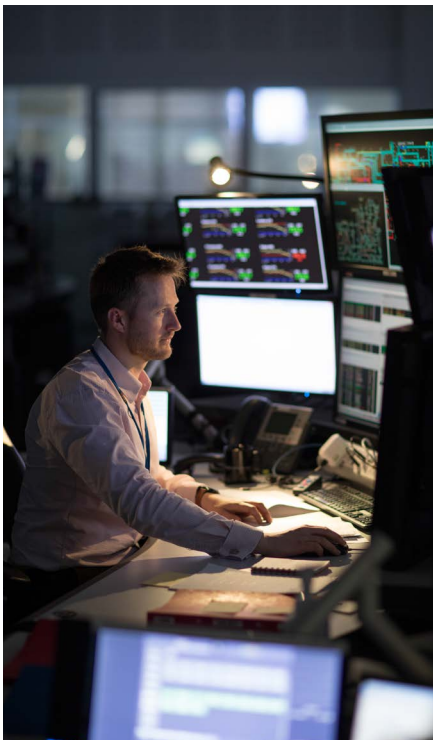
- How we deal with the solutions to voltage issues could be more holistic. Using a whole system approach, working with the ESO, DNOs, and directly connected customers could identify different solutions than capex intensive investment in large voltage reactors.
- We could develop the portfolio of incentives to reflect where our stakeholders want us to go above and beyond to deliver an output. We shouldn't be rewarded for business as usual activity, nor should we be penalised for outputs beyond our control.
- We could further embed innovation in our culture. We also need to collaborate more on innovation with other organisations to help address the challenges we all face in the future
- What equates to an output could be more clearly defined in RIIO-T2. We need to ask ourselves whether it is an outcome or an output when we are completing an activity. What value does it add? What is the driver? Is it required now?
- We should make investment decisions based on the whole-life cost of each option, including the cost of carbon, and use this approach to help minimise our overall carbon emissions. This will help our commitment to becoming net zero on carbon.
- By using our stakeholder groups, along with our extensive stakeholder engagement and internal expertise, to build our plans for RIIO-T2 together, we could deliver a truly economic, efficient and coordinated future for the integrated energy system.



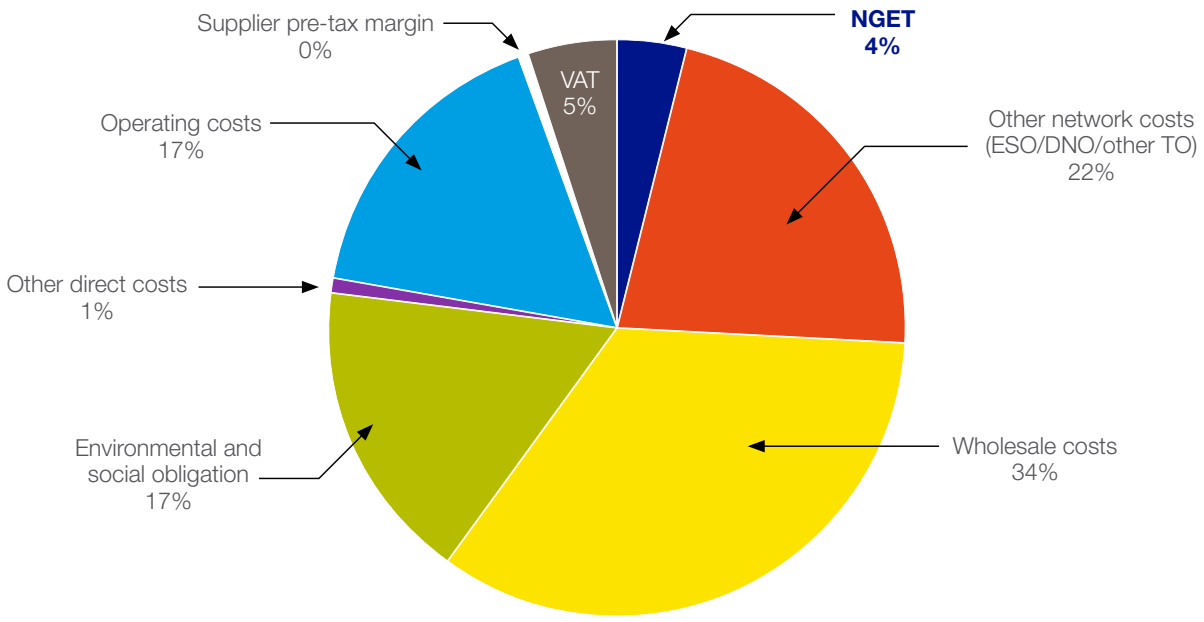
Customer bill – how RIIO revenue affects consumer bills

What does this mean for the end consumer? The ESO charges our customers (like those who generate electricity onto the system) for the services we provide. This charge is our base revenue and is the allowances that have been derived from the outputs that we are delivering. Ofgem reports that network costs for both transmission and distribution make up about 25% of the domestic electricity bill that consumers receive from their supply company.[1] Of this total bill only 4% or £22.40 is attributable to our costs. For less than the average cost of a high street cup of coffee each month, consumers get the benefit of over £1bn of transmission network investment each year. This investment keeps our assets safe and reliable by maintaining or replacing them and strengthens our network to connect customers to it.

Ofgem's RIIO framework has ensured over half of the efficiency savings that we have reported on are passed to customers resulting in lower network charges, and so lower electricity bills. In 2014, we estimated that the bill impact would be £21.50 at the start of the period rising to £27.00 at the end. We have saved £3.60 on the original forecast estimate of £26 for 2018/19, because of the savings we have made.

The customer bill infographic shows the cost of the different parts that make up the average domestic electricity bill. The table below shows our actual and forecast contribution to the customer bill. There is some fluctuation in the total costs because of changes to the timing of our developments, the mid-period review adjustments, and the impact of changes to how much generators pay us to use the system.

National Grid TO proportion of an average electricity bill - to date and forecast



National Grid TO proportion of an average electricity bill - to date and forecast

Business		2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
NGET	£	20.25	22.49	24.96	25.13	24.33	**22.40**	23.11	23.19

[1] Overall network costs account for approximately 25% of the domestic electricity bill, over 20% of which is distribution network costs not transmission. Source ***https://www.ofgem.gov.uk/information-consumers/domestic-consumers/understanding-energy-bills***

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Our RIIO-T1 Outputs

On the following pages, you can read about in-year, and RIIO-T1 performance to date. As mentioned in the previous section, we have committed to certain deliverables in order to receive allowances. These deliverables could be improving how we work with customers, to how reliable our network is.

We have included details of how much we are spending to connect customers (our load related portfolio) and to maintain and replace our assets (our non-load related portfolio). We'll give examples of how we believe that the RIIO framework is performing, along with ideas for the RIIO-T2 price control that stakeholders, customers, and end consumers agree could be of interest to them.

The key below can help understand where we are on or off target.

Red - An annual output that has been missed and forecast to miss our 8-year output.

Amber - An annual output that has been missed but is on target to achieve our 8-year output. Or the achievement of annual output but is at risk of missing our 8-year output. Or a significant negative trend in annual performance but on target.

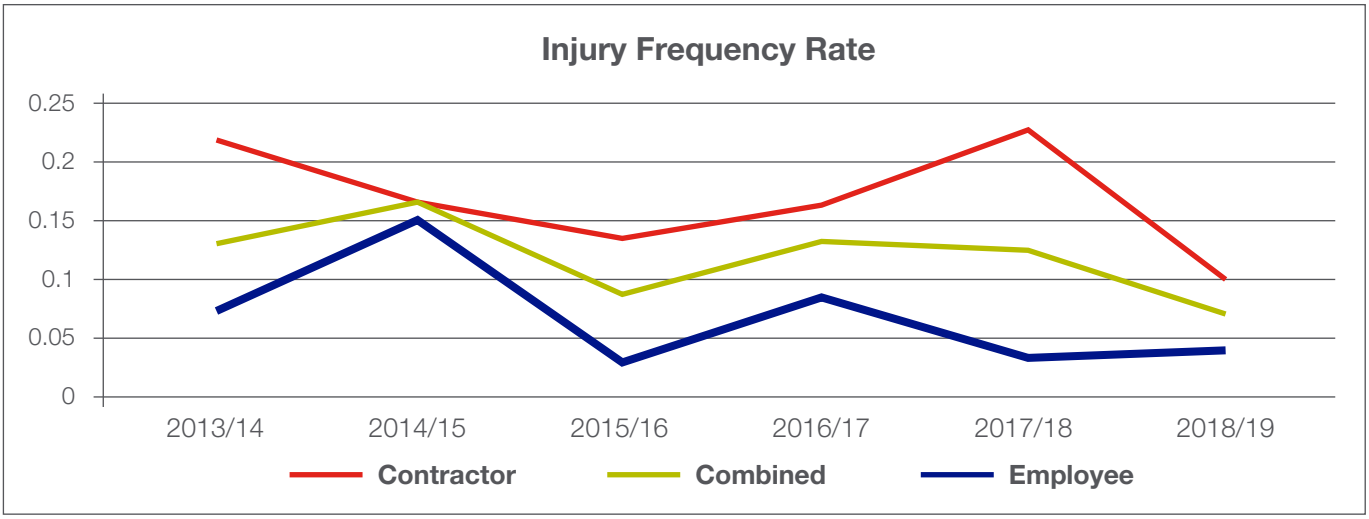
Green - Achievement of an annual output and on-target to meet our 8-year output.

Safety

The primary output for safety is that we comply with our legal safety requirements. There aren't any financial incentives attached to the primary safety outputs as other agencies and mechanisms (the HSE and legal obligations) incentivise us to do the right thing.

Safety Outputs	Target	RAG status
Comply with Health & Safety Executive (HSE) legislation We continually review our processes to reduce the risk of accidents to the public, our staff, and our contractors.	To meet all safety legislation requirements.	100% met
Injury Frequency Rate While the RIIO target is compliance with relevant HSE legislation, we use Injury Frequency Rate (IFR), an industry standard measure of safety, to track our performance. The 2018/19 performance has improved since last year with a significant improvement in contractor safety.	To reduce our overall IFR to below 0.1 to show world class safety performance. NB this is not a specific RIIO target.	IFR of 0.07

The chart below shows our IFR results so far in RIIO-T1. The measure is number of injuries per 100,000 hours worked.

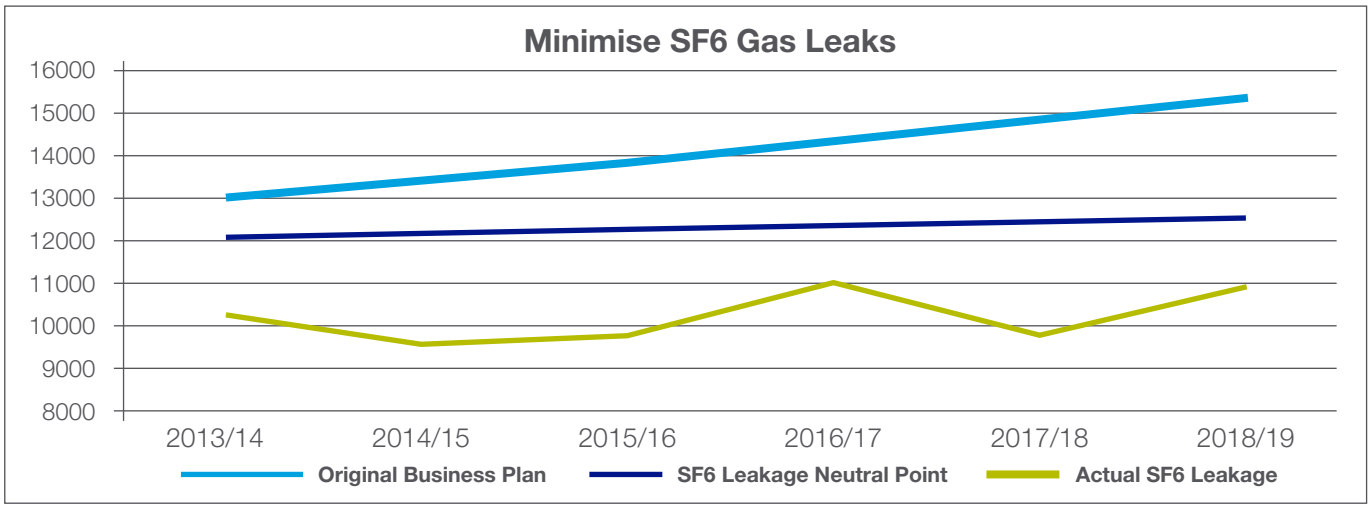


Environmental performance

We have set a voluntary target to reduce our Greenhouse Gas (GHG) emissions across our UK and US businesses by 45% by 2020 based on 1990 levels. Our baseline emissions level was set, at group level, at 21.6m tonnes of carbon dioxide equivalent (TCO_2e). Our current forecast is that we will better the 2020 target.

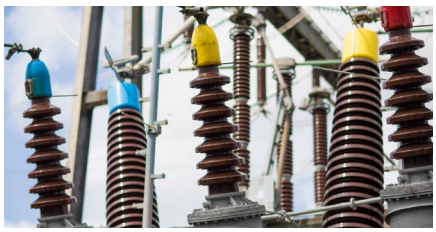
GHG emissions in Electricity Transmission can be broken down into sources including SF_6 leakage, line losses, buildings and transport. SF_6 is used extensively within high voltage switchgear as a unique insulating medium and high voltage arc-quencher. Due to the nature of pressurised systems, any leaked gas needs to be replaced to maintain a working pressure for a safe and reliable interconnected network. The harmful effects of SF_6 upon the global environment continue to drive our focus on the effectiveness of controls around our management of this essential gas.

Environmental Outputs	Target	RAG status
Minimise greenhouse gas emissions, especially SF_6 SF_6 is a greenhouse gas that is 23,900 times worse for the environment than CO_2. As part of our commitment to reduce greenhouse gases as a business, we need to minimise the amount of SF_6 that leaks from our assets. The incentive scheme neutral point varies depending on the total inventory of SF_6 on the system. This neutral point in 2018/19 was 12,485kg. Actual leakage increased to 11,935kg. This was a significant increase in leakage compared to 2017/18 and there is work to do to return to the performance of earlier years. The number of new leaks decreased in comparison with 2017/18, however the magnitude of a small number of leaks grew. There were 15 assets which were responsible for 28% of total SF_6 emissions.	The target changes annually to reflect the additions and removals of SF_6 from the electricity system. The chart shows the neutral point 12052kg at the start of RIIO-T1, rising to 12485kg now.	11,935kg of SF_6 leaked



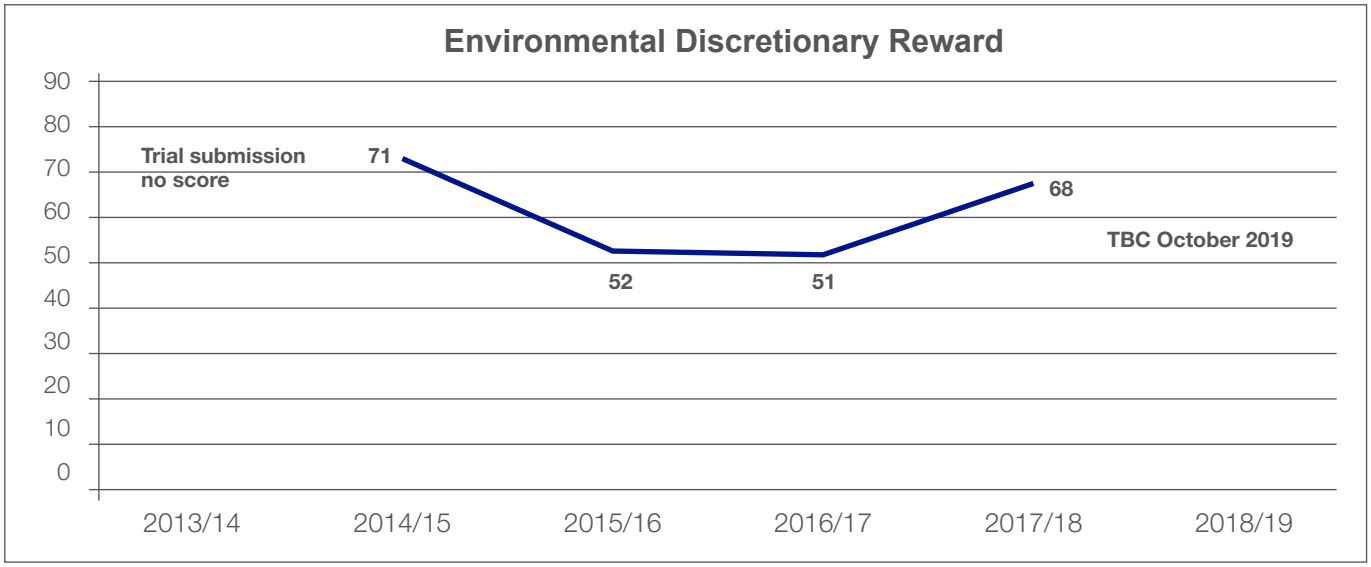
A second way that we can be measured on how we are supporting the transition to a low carbon future is the work that we do. The transition to a low carbon economy will bring significant opportunities and challenges for the transmission network. During RIIO-T1 and beyond, we are investing billions in our networks to accommodate a huge increase in new low carbon generation.

We work with our customers to facilitate their connections, from wind farms, batteries and other low carbon generation, to the recent move into electric vehicle charging. But these customer driven initiatives are only part of how we are moving towards a net zero future. Internally, we have introduced initiatives to reduce waste, measure the carbon intensity of our investments, reuse concrete in our substations, and recycle assets like aluminium and copper from our overhead line replacements.



Environmental Outputs	Target	RAG status
Going above and beyond to deliver low carbon solutions Each year we make a submission detailing the efforts that we have made to find ways to reduce our impact on the environment. An Environmental Discretionary Reward panel meeting to discuss our submission will be held in October 2019 and confirm our score.	The panel decide the score. A score of 50-70% is proactive and 70%+ is leadership. Only leadership scores receive a financial reward.	2017/18 score 68%

The graph below show our scores for the Environmental Discretionary Reward. We had an improved result last year by acting on the feedback from the panel from previous submissions.



Customer and stakeholder outputs

The primary output for customer and stakeholder is supported by two separate financial incentives. The first, worth up to +/- 1% of allowed base revenue (the amount of money that we recover via customer charges), is based on results from an externally provided customer/stakeholder satisfaction survey. The second is a discretionary reward available where we demonstrate that our effective stakeholder engagement has led to exceptionally positive outcomes for customers. This is worth up to 0.5% of allowed base revenue. The score that we receive each year leads to an allowance that makes up part of the revenue calculation for 2 years after the result. We are proud that we have seen a steady increase in the scores that we have received from our customers and stakeholders as RIIO-T1 has progressed.

Our customers and stakeholders remain a key priority as we continue our focus on putting them at the heart of everything we do, from our operations and activities as part of RIIO-T1, to engagement and building our RIIO-T2 plans with them. Through the customer feedback received in 2017/18, our Customer Experience Governance Board aligned behind four strategic focus areas that were created from the drivers of satisfaction:

- **Customer Ownership** - from aligning objectives to customer service training.
- **Customer Relationship Development** - developing Account Management capability and customer experience tools and systems.
- **Customer Journey Development** - redesigning processes through the customer experience lens.
- **No Surprises** - Measuring the important things for customers, as they happen - turning insight into action.

As part of our customer transformation programme, we made inroads to improving our performance on these, and we have done this whilst expanding our reach across more customer and stakeholder contacts than ever before.

We previously engaged with customers to identify the behaviours that are important to them recognising that they are a diverse and varied customer and stakeholder base. This led to creating five customer principles (Care, Agile, Trust, Transparency, and Value). We are now monitoring our performance against these and this informs our customer action plan for the future.

We learnt that collaboration, listening and understanding the impact our actions have, hold the greatest overall importance to our customer base. Whilst our poorest performance is currently seen in our transparency, flexibility and understanding the impact of our actions. Overlaying the importance of our behaviour versus our performance has highlighted that we need to focus our attention on collaborating, the transparency of our processes and understanding our impact as three key focus areas for improvement for the year ahead.

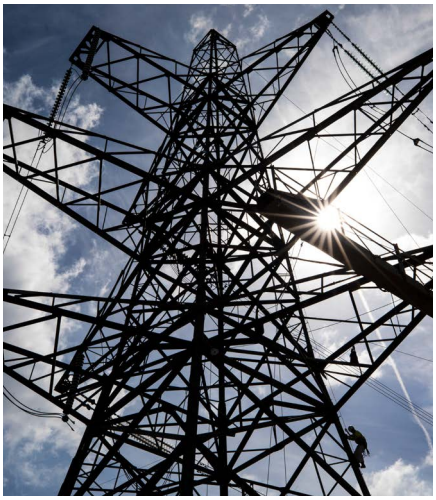
We have continued to prioritise the management of the electricity connection journey and have built the capability in our Transmission Connections team to independently account manage the connection experience in England and Wales. This is for both traditional customers wishing to connect and new emerging customers. As noted in the summary, the volume of applications has grown significantly in the past two years, and we are finding a better way to complete this process quicker, and to the customer's satisfaction.

We also carried out a study into the needs of these new emerging customers and have since adapted how we manage their 'pre-application to offer' journey. This is reflected in the rating of 10/10 recently received from a new customer, along with their comments to our survey question: "Please tell us what you think we do well, to ensure that we continue to deliver for you."

"Think outside of the box, particularly on the connections side of the business, where there is a 'can do' attitude even when presented with challenges and/or unique situations." CEO of a new customer, Feb 2019.

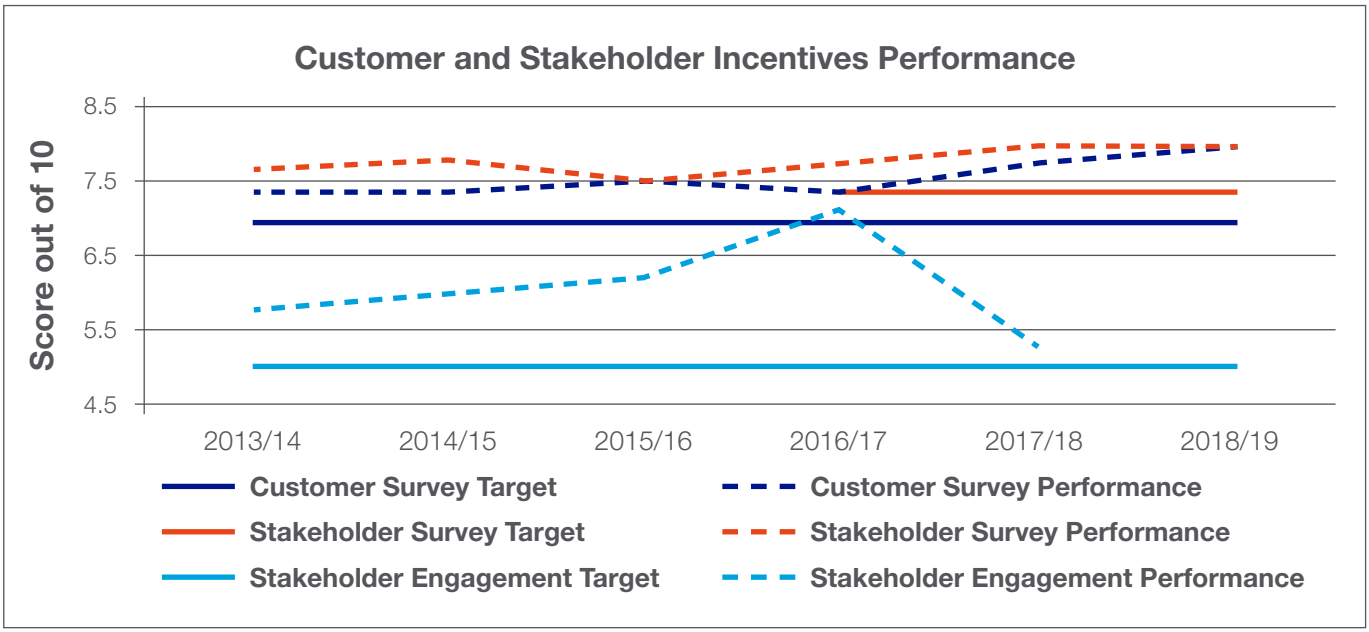
We recognise the importance of listening to our customers and stakeholders so that we fully understand their needs and the impact our actions have on them. This listening to, and understanding of them is the only way we can continue to fundamentally improve their experience. In 2018/19 we built on the success of the previous year and continued to deliver a positive impact. This materialised in achieving a further 0.18 improvement on last year for customer satisfaction and 0.04 for stakeholder satisfaction.

In 2018/19, the external surveying company told us we achieved a customer satisfaction score of 7.92 against a baseline of 6.90. The stakeholder satisfaction score was 7.92 against a baseline of 7.40. The stakeholder satisfaction score has increased by 0.04 from 2017/18, where we have focussed efforts on increasing the breadth of feedback through our stakeholder satisfaction survey. Responses to our survey this year have doubled since 2017/18.



Customer and Stakeholder Outputs	Target	RAG status
Measure the way that we have satisfied our customers and stakeholders We carry out surveys with our customers and stakeholders which gives an annual score of their overall satisfaction with us. This year we have seen a noticeable increase in the scores compared to both last year's score and the longer-term average score and this reflects the increased focus that we have applied in this area.	Customer satisfaction survey neutral point 6.9/10 Stakeholder satisfaction survey neutral point 7.4/10	Customer survey = 7.92 Stakeholder survey = 7.92
Go above and beyond in the way we engage with our stakeholders The significant drop off in the score for the 2017/18 submission is disappointing given the trend of steadily improving scores over previous years. We understand the reasons for this and have acted to improve performance. The 2018/19 result hasn't been decided as the submission was at the end of May 2019 and the decision won't be made until September.	Stakeholder engagement incentive scheme neutral point 5.0/10	Latest score for 2017/18 = 5.1

The chart below shows how we have performed so far during RIIO-T1.



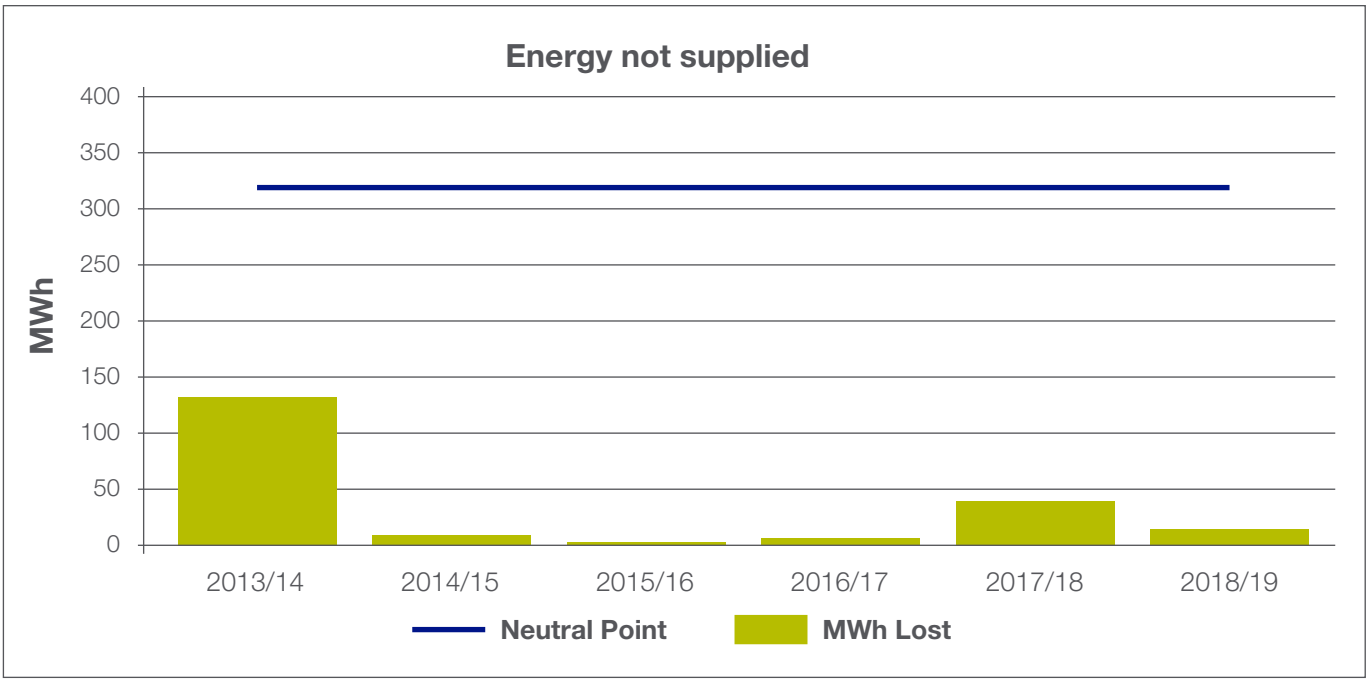
Reliability and availability

There are two primary and two secondary outputs in this area.

1. Energy not supplied - measuring reliability and availability of the network
2. Network output measures - to agreed level of network risk
3. Physical security – making sure that our critical assets are kept secure
4. Cyber security - taking action to reduce the likelihood and impact of cyber attacks

1. Measuring how reliable and available the transmission system is via energy not supplied is the first primary output measure. We keep sufficient controls in place to minimise loss of supply events (measured in Megawatt hours - MWh), and so we keep the lights on for homes and business in Great Britain. Conversely, having a lack of control and more losses of supply could lead to greater penalties. The penalty is up to a maximum of 3% of base revenue. This means that we could lose up to £50m each year if we are responsible for significant loss of supply events. There is a natural cap to the reward that we can earn as we can't lose less than zero energy. This means if we lose no energy (0MWh) we can earn about £4m a year from this incentive. This incentive is therefore asymmetric - with the neutral point, where we receive no rewards or penalty, - set at losing 316MWh. Like other incentives, the reward (or penalty) is reflected in revenue two years after the result.

Reliability and Availability Outputs	Target	RAG status
Minimise how much electricity is lost to our customers because of failures to the assets on our network There were two Loss of Supply incidents in 2018/19, totalling 12MWh of energy not supplied against an annual neutral point of 316MWh. This performance resulted in a ENS incentive scheme payment of £3.98m in 2021. This performance equates to 99.999995% overall reliability of our network.	We have an incentive to minimise 'energy not supplied' against an annual neutral point of 316MWh.	12MWh of energy not supplied

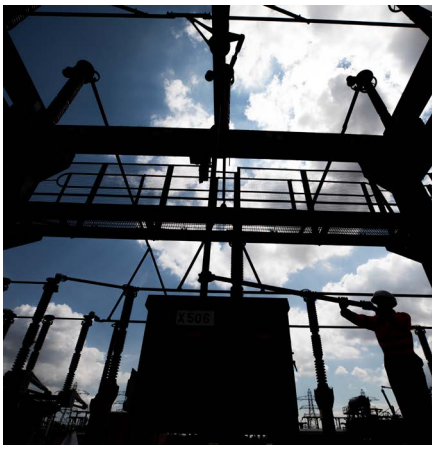


2. A second primary measure is our agreed level of network risk. The lower the risk, the more stable and reliable the transmission system is. However, this need for reliability through replacing and maintaining our assets needs to be balanced with the cost to consumers. A level of risk was agreed at the start of RIIO-T1 and allowances were set at this time to deliver this level.

Non-load related investment portfolio

The non-load related portfolio is our plan of work to maintain, refurbish or replace assets on our system. Our aim as an asset management company is to replace the right assets at the right time, i.e. just before we believe they will break, as this is the most economic time to replace something. In 2018/19 we have continued to increase the volume of asset replacement and refurbishment, with switchgear, overhead lines conductors and fittings volumes delivered being the highest since the beginning of RIIO-T1. We are confident in our forecast that these will deliver the right volume of work whilst delivering savings over the remainder of RIIO-T1 and offer good value to customers.

The 2018/19 non-load related plan shows a forecast spend of £3.9bn over the RIIO-T1 period. We forecast to deliver a difference between spend (our costs to complete the work) and what revenue we are allowed to recover (allowances) of £1.7bn. These savings over the RIIO-T1 period will return c£900m to consumers through lower bills.



Non-load related cost reduction drivers

There are a range of drivers behind the cost reductions that we have achieved and are forecasting for the remaining programme. The overall difference between forecast cost and allowance are driven by four significant categories:

- Refining our asset intervention plans. For example, for protection replacement we have developed a more efficient approach to target replacement of higher-risk, life-expired components (e.g. fault detection relays) whilst retaining lower-risk, reliable infrastructure (such as fixed wiring).
- Improving our understanding of asset condition. For example, by better understanding the deterioration of our transformers and linking this to how network use is changing. Coupled with procurement savings from bulk supply of transformers, we have reduced costs whilst forecasting to deliver the right level of network risk in transformer replacements over RIIO-T1. We have also been able to extend the anticipated life of some overhead line conductor types and fittings. We have developed industry leading condition monitoring collection of data, undertaken research into failure modes, created models to predict failure which now gives us the confidence to extend the time before we forecast to replace them.
- Finding more efficient ways to deliver work. For example, we have fundamentally reviewed our entire approach to switchgear replacement. By collaborating with our supply chain, we have:
  - reviewed and reduced scope to deliver the output at a lower cost
  - reduced delivery time through better methods of working
  - increased our annual delivery volume by reducing system access and resource requirements
- Driving competition in our supply base. For example, we have used new suppliers in lower-cost countries to purchase these assets in bulk.

Reliability and Availability Outputs	Target	RAG status
Non-load related network replacement outputs Network risk is the key measure of a reliable and available electricity system. It is measured by the number of our assets that we believe need to be replaced within certain timescales. Non-load related describes the work to refurbish or replace assets as they get older and could become more unreliable. There has been a further increase in output delivery in 2018/19 compared to 2017/18. We are on track to meet the RIIO-T1 target. Delivery is costing less than allowances and we are sharing savings with customers.	Compliant with network risk level at end of RIIO-T1. This means that the right number of assets have been replaced to keep the network safe, secure, and available.	On, or below target level of network risk

3. Thirdly, in response to the increased terror threat that developed during the previous price control, we needed to improve the physical security of our critical national infrastructure. As the amount and type of work required to mitigate these threats was uncertain at the beginning of the price control, a "reopener" mechanism was agreed. In 2015 and again in 2018 we submitted a requested to adjust allowances for this work, Ofgem and the UK Government agreed the costs and volumes of work required to deliver the secondary output.

In more recent times, this security threat has included the increased threat of cyber attack on our assets. We are working hard to develop plans and activities to mitigate this risk to network reliability and believe that there will be significant investment in this area in future price controls.

Reliability and Availability Outputs	Target	RAG status
Protect our critical assets to minimise disruption (physical security) Keeping our critical assets safe from physical attack is important to keep the nation's lights on. We're working hard to deliver the programme agreed with Ofgem and BEIS in 2015 and have a plan to complete the upgrades by the end of March 2021. Due to the sensitive nature of the programme, we cannot share numbers or locations of assets that are part of the programme.	Agreed programme of work to be delivered.	
Protect our critical assets to minimise disruption (cyber security) There is an increased risk of cyber attack on our assets requiring additional investment to keep the system secure. We have signed up to the government's National Cyber Security Centre directive about network and information systems (NIS).	Agreed programme of work to be delivered.	

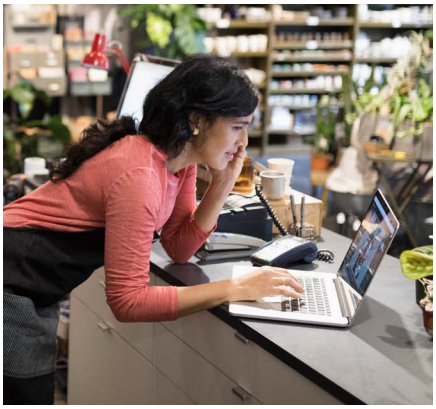
Connecting customers

Our load related capital plan is informed by our best view of the future. This was developed using a combination of market insights and intelligence on specific customer projects. This is also informed by the four Future Energy Scenarios (FES) published by the ESO as a benchmark, but also takes into account a number of key changes since the FES publication, including:

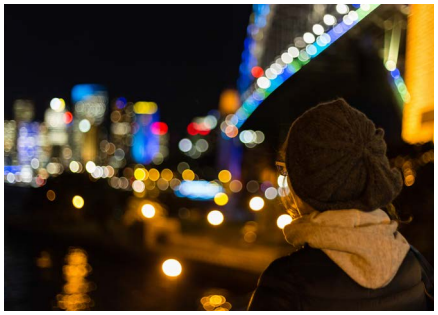
- the announcement of the government agreeing a sector deal for offshore wind, signalling increased growth in this area;
- the suspension of the Capacity Market, casting doubt over the timing of a number of new projects, and increasing the likelihood of potential closures of existing thermal plant;
- the government's publication of the Clean Growth Strategy and car manufacturers' commitment to producing electric vehicles, signalling increased growth in the decarbonisation of transport; and
- the suspension of the development of new nuclear power stations at Moorside and Wylfa.

As part of our RIIO-T2 engagement we have tested our energy scenario. Using our stakeholder groups, along with our extensive stakeholder engagement and internal expertise, to build our plans for RIIO-T2 together could deliver a truly economic, efficient and coordinated future for the integrated energy system. Stakeholders broadly supported our view of how the energy landscape will evolve, providing assurance that our plan delivers what they expect from us.

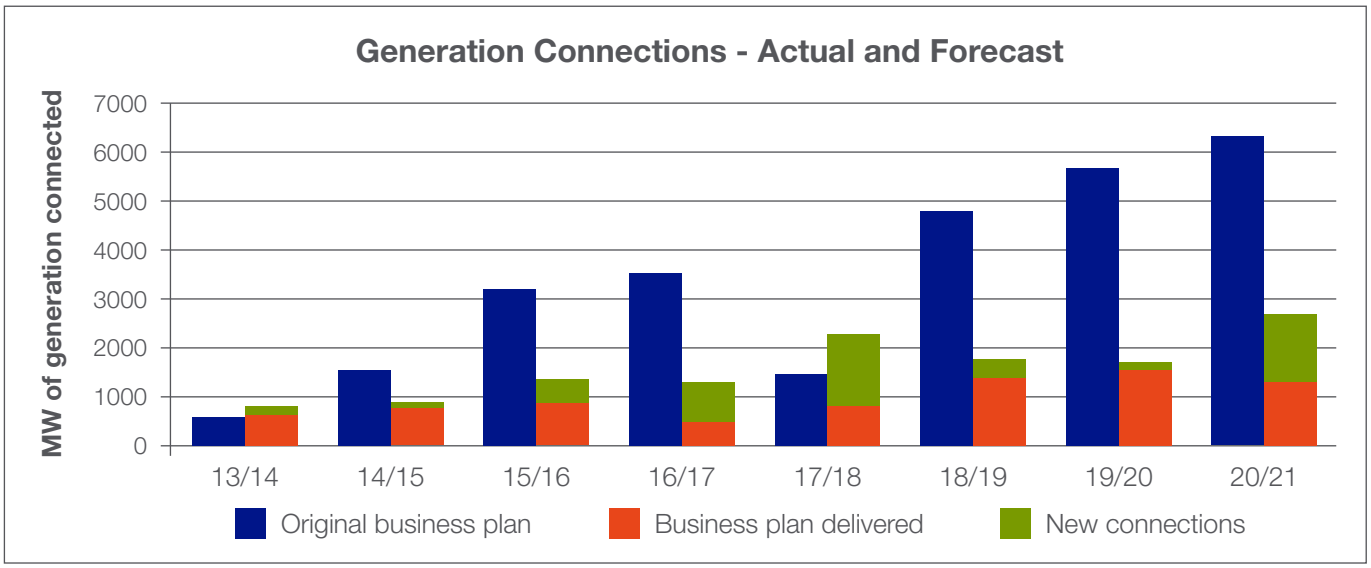
The following tables and charts describes how we are performing in connecting customers and dealing with uncertainty during RIIO-T1.



Customer connection Outputs	Target	RAG status
Sending out customer contracts. We have worked closely with the ESO to send customer offers within 90 days. All new or modified offers were sent to customers within the 90 days. We sent out 186 in 2018/19 compared to 116 in 2017/18, a 60% year on year increase in contracts sent out.	All offers to be sent within 90 days of application.	100% sent
Connect new generation customers to our network We delivered all our customers' requirements for 2018/19. Our 8-year forecast, based on customer needs, is for 12.6W of transmission connected generation (baseline: 26GW), an increase of 0.1GW on our view in 2017/18. We are forecasting to complete almost 8GW of the original business plan, but because of customers' changing needs, this number is substantially lower than our original estimate. Meanwhile we are forecast to complete almost 5GW of new customer connections that weren't anticipated at the start of RIIO T1.	To connect all customers in line with their available for commercial load date – the time that the can start generating electricity onto the high-voltage electricity network.	All new connections completed on time



The chart below shows what amount of new generation was forecast at the start of RIIO-T1, how much of that has actually connected, and how much unanticipated generation has connected. We also show how much we forecast will complete in the final two years of this price control. Our original forecast has reduced as customer needs have changed, less gas fired generation has come along when expected, along with the proposed wind farms connecting later than expected. The nuclear connections expected have also been hit by delays to their plans.



Load related investment portfolio

Our load related plan is the work that we have to do to connect customers or to strengthen the network to facilitate these connections. On load related investments we anticipate spending £3.43bn, a small reduction compared to our forecast last year. This compares to allowances of £4.35bn, an increase of £533m on last year. The increase in allowance reflects the different outputs we forecast to deliver to the end of RIIO-T1 and the first two years of RIIO-T2. This means that we have found ways to strengthen our network at a lower cost than we previously estimated, using innovative new technologies. Optimisation of the plan, innovation, efficiencies in delivery, and changes to projects' timing has resulted in forecast expenditure being £925m lower than forecast allowances.

We are investing only where we have a clear signal to do so, and as these signals change we are responding accordingly. These adjusted allowances demonstrate that the uncertainty mechanisms are working broadly in the right way, albeit with occasional year-on-year changes as customer requirements develop. We are working closely with stakeholders to improve these uncertainty mechanisms in RIIO-T2.

Over and above the automatic reductions in allowances, the key factors influencing the difference between spend and allowance to reduce costs and deliver benefits to end consumers are:

- introducing 'Smartwires' to deliver increased boundary at lower cost,
- activities to drive down costs within the supply chain,
- changing industry codes to allow more efficient solutions,
- value engineering and lean engineering design,
- design variations negotiated with customers to allow lower cost investments while still meeting customers' needs, and
- improvements in our management of uncertainty associated with customer projects.

Each year we refresh our plans to take account of the actual and anticipated requests for customer connections, changing customer needs, and our latest view of the most efficient investments to meet these needs. This is cross checked through the ESO's Network Output Assessment (NOA) annual review. The continual optimisation of our plans protects our customers, ensuring that we invest only where and when it is supported by signals, and responding to changes of those signals.

Across the eight years of RIIO-T1 the major influence on the difference between expenditure

and allowances has been the changing requirements of our customers in terms of the contracted generation and demand connections, and the associated wider works. The changes that we have faced have been in both volume and timing of customers connecting to the system. When our customers' requirements have changed, we have changed the investments that we have made compared to our original plans. The uncertainty mechanisms then change our allowances to better align with the new outputs that we are delivering for customers.

Generation connections case study - Battery Storage

A new customer is developing several battery storage and rapid electric vehicle charging facilities. At 49.9MW of battery capacity per site, they are much smaller than customers that have typically connected to our network in the past.

However, they are large enough to face restrictions on connecting to the distribution network due to limited capacity, which may result in the cost or timing of a DNO solution being unfavourable.

Connecting these sites via traditional methods of installing a standard transmission sized supergrid transformer (SGT) would have resulted in an uneconomic cost for the customer. We have worked with them to develop a more cost effective alternative solution. This uses an innovative technical solution on existing SGTs which meets their requirements at a lower cost than both the alternative transmission and distribution solutions. Instead of the cost and complexity of building a whole new SGT at the site to connect the battery storage, the connection can be made to an SGT already there.

Customer connection Outputs	Target	RAG status
Connect new demand customers to our network We delivered all the demand connection requirements that our customers contracted us to complete. This volume was lower than the baseline amount forecast (72) in our business plan due to changes in customer requirements. We forecast that we will need to connect 41 new SGTs and 5km of OHL (baseline 27km) over the RIIO-T1 period.	To connect all customers in line with their available for commercial load date – the time that the can start taking electricity from the high-voltage electricity network	

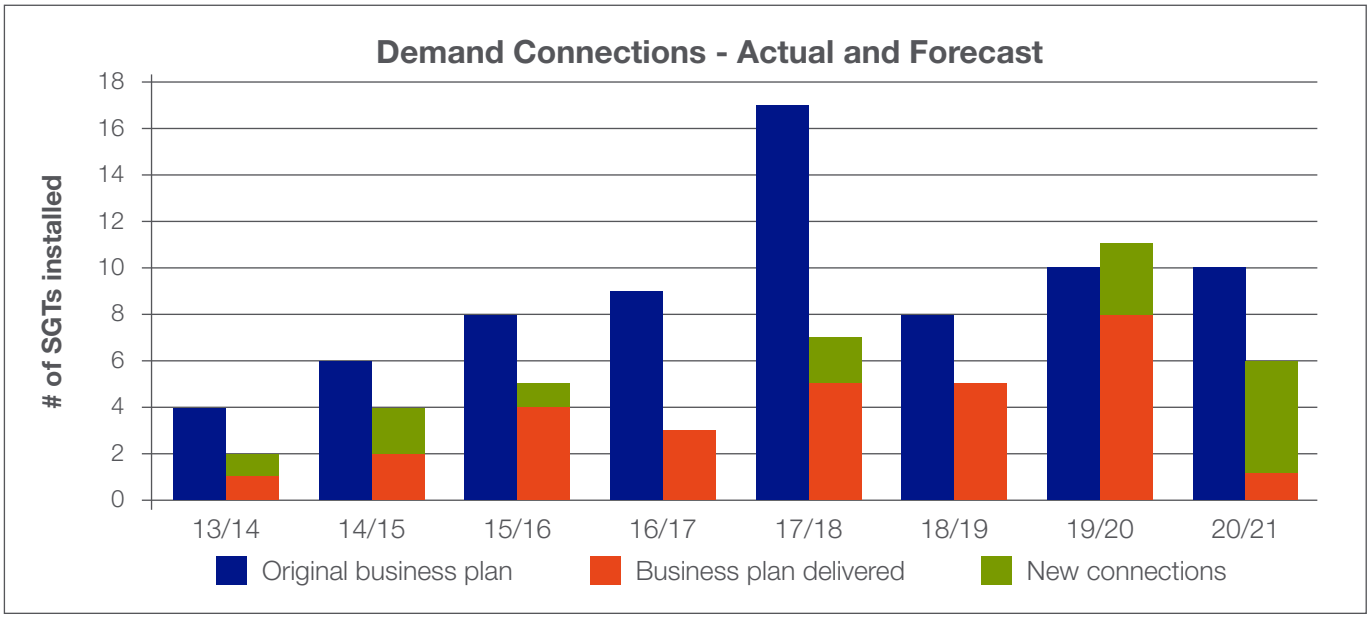
£3.43bn

The amount we're investing in connecting customers during RIIO-TI

Almost £500m

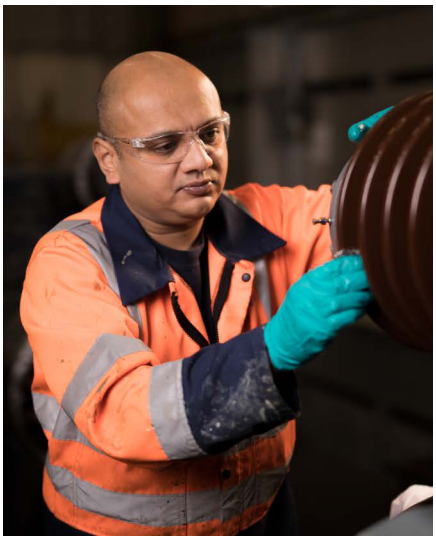
The amount of additional savings passed on to the end consumers

The graph illustrates the level of churn in our customers' requirements. This is shown by the volume of new connections that weren't anticipated at the start of RIIO-T1 and the reduction in the orignal business plan.



Demand connections case study - Active Network Management

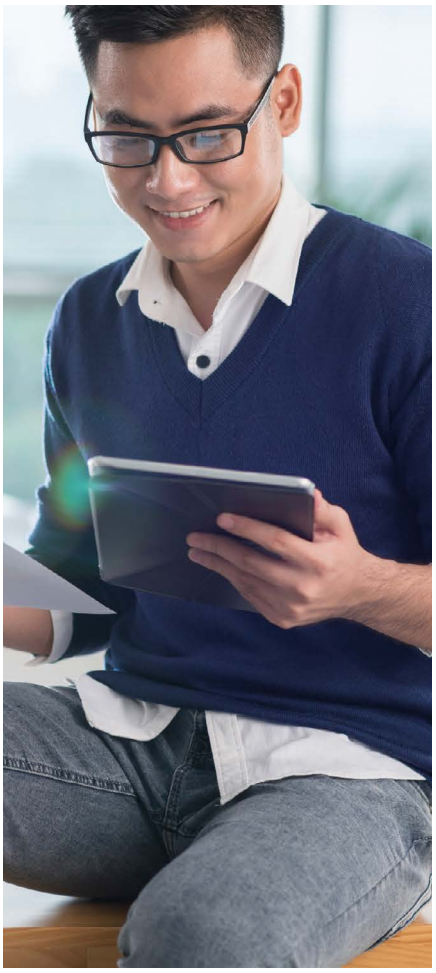
To avoid the cost and delay associated with the provision of new SGTs to connect new Distributed Energy Resources, NGET, in collaboration with DNOs and the ESO, has worked to identify whole system solutions in the form of Active Network Management (ANM).



These schemes allow DNOs to restrict the output of certain embedded generation customers during specific network conditions (e.g. SGT outages).

During RIIO-T1, we have agreed to implement ANM schemes at nine sites in RIIO-T1. We estimate this to save £10m-£12m per site, through avoiding the installation of a new SGT, other assets and the cost of the system outage. This results in an overall cost benefit of between £90-108m.

IWW investments are required to upgrade or strengthen the network to ensure that new generation customers aren't constrained from producing electricity for the grid. There are technical limitations on the substations and overhead lines on our network and so we need to upgrade these assets to allow generation to move from where it is created, to where it is needed. We use three primary methods for increasing the bulk transfer capability of the transmission system – it can introduce new assets (e.g. Eastern HVDC Link, Hinkley-Seabank new overhead line); it can increase the capability of existing assets (e.g. reconductoring schemes); and/or it can introduce devices that allow the control of power flows on the network so that use of the existing network can be improved (e.g. Quad Boosters). Allowing this generated electricity to flow onto the network reduces costs to consumers as the ESO doesn't need to make payments to the generator to stop generating – a constraint payment.



Customer connection Outputs	Target	RAG status
Incremental Wider Works (IWW) to strengthen specific boundaries No IWW schemes were completed in 2018/19. We currently forecast 12.4GW of boundary capacity increases to be delivered compared to the business plan forecast of 23GW. This position reflects the changing requirements of our customers and is almost 2GW higher than last year's total forecast. We are finding innovative new ways to increase boundary capability and are delivering significant improvements to the network in the last year of RIIO-T1 and in the first years of the next price control. The Western HVDC Link has been delayed due to installation and commissioning issues but is forecast to be fully available in 2019/20. This link was available for up to 2400MW in 2018/19 with a focus on when this was most beneficial to customers.	To complete all required network upgrades in line with signals from the Networks Options Assessment (NOA). This economic assessment recommends the least cost option that will reduce customer constraint payment required by the ESO.	

IWW case study - New Power Control Technology Solutions

Using power flow control devices is often the preferred reinforcement option based on costs, environmental issues and delivery times. Quadrature boosters (QBs) have been installed on the system to provide power flow control capability. However, there are limitations to QBs. For example, they tend to be standard sizes, meaning they may not be optimised for each specific use, and they adversely impact system voltages due to their electrical performance characteristics.

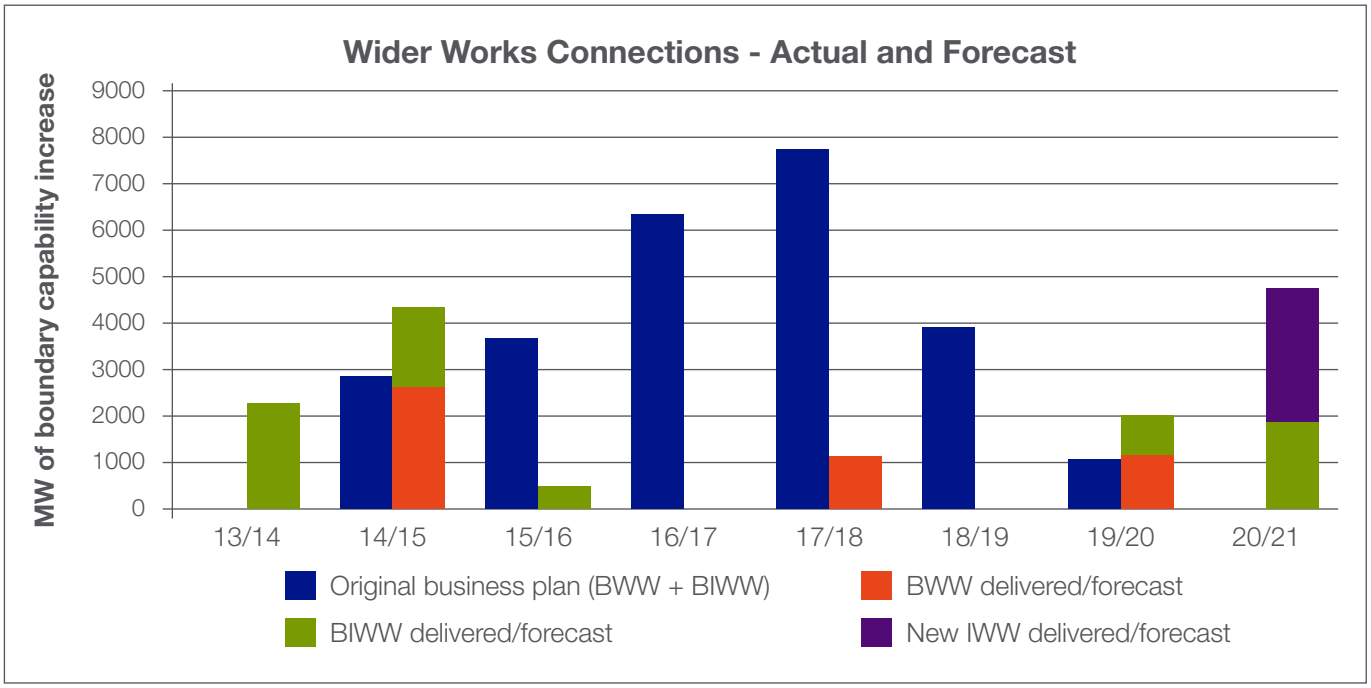
In 2016 we became aware of a new technology, that was being deployed on low voltage (distribution) systems. This technology was similar to QBs, but used small modules that could be hung from circuits, allowing greater flexibility in the delivered capability than QBs. We undertook a joint project to assess the feasibility of using their devices on the transmission system. This work concluded that a transmission system solution would not be economic – scaling the devices up for transmission use increased the costs and increased the weight, preventing their installation on overhead lines and requiring substantial civil works in substations.

We have since been working with this technology partner to develop a newer ground based technology and assess its potential use on the transmission system. Based on what we have learnt, this technology could be used extensively on the transmission network with significant benefits to consumers, both in providing alternatives to other reinforcements and in providing economic reinforcement options where there isn't currently a viable alternative.

We developed a number of these schemes for assessment in NOA 2018-19, and will be progressing five schemes for delivery in Northern England in the early 2020s. These schemes, costing less than the ones they replaced, and shorter deployment timescales will provide consumers with additional constraint cost savings.

We anticipate that we will further develop these schemes in the future – the modular nature of the technology easily facilitates this. We also expect to install devices at a number of other sites to optimise the use of our existing network during the RIIO-T2 period.

The graph below shows how the effect of the changes to the generation connections has also changed the required transfer capability upgrades to the network.



Innovation

Our work is driven by stakeholder feedback, future technological developments and business objectives. We're constantly seeking new people and organisations who are willing to learn about our industry and help us develop our network for the future.

Our innovation focuses on four main areas of our business:

- managing assets: developing ways to manage new and ageing assets more effectively to extend their operational lives
- service delivery: developing our stakeholder and customer focused capabilities through exploiting existing assets and developing new service-based business propositions
- efficient build: developing techniques, ways of working or procurement strategies to build new assets faster and at lower capital and whole life costs
- corporate responsibility: doing the right thing, including social responsibility, safety and sustainability, in all new developments.

The pace of change in the energy industry shows no sign of slowing and we recognise that we have a crucial role to play in making sure the UK has a sustainable energy future. Innovation is at the forefront of that challenge.

As part of RIIO-T1, Ofgem introduced two new funding mechanisms for network innovation; the Network Innovation Allowance (NIA) and the Network Innovation Competition (NIC). Both mechanisms enable us to take forward ground-breaking new ideas and technologies that will make a tangible difference to customers and communities.

NIA and NIC tell only part of the innovation story within National Grid; innovation is at the heart of how we operate every day to keep the energy flowing to homes and businesses across Great Britain, to drive down costs, and to improve the service we provide to customers and end consumers. We are finding a better way to improve our internal processes to deliver a better customer experience. We are innovating to understand more about our assets every day, so we know the best time to replace, repair or refurbish them. We are choosing new ways of delivering the outputs that we have agreed and we are using innovative contracting and procurement methods to reduce costs when we are completing the construction.

The key NIC project that has continued to develop this year is detailed in the case study below

The Deeside Project

Using funding from Ofgem's NIC, National Grid is converting an existing 400kV substation into a high voltage innovation centre.

The Deeside Centre for Innovation (DCI) is the first facility in Europe where assets associated with electricity networks can be investigated, tried and tested, prior to being rolled out on live transmission and distribution systems.

The overhead line (OHL) test area was completed in April 2019. This is an important milestone for the facility bringing the first operational area into service so that innovation trials can begin. The centre is due to become fully operational in 2021.

As construction progresses, we'll be running a number of innovation projects, in phases, over the next four years. These will deliver benefits in three key service areas:

- accelerating innovation by using this live environment
- research and development by collaborating with different partners
- extending asset life through testing how assets perform.

The project aims to research, deliver and demonstrate an off-line substation that allows the acceleration of the development of new, innovative technologies and concepts into business as usual. This increase in speed will deliver benefits to consumers faster and allow the de-risking of more complex, disruptive innovations. The project modifies an existing 400kV substation into an easily reconfigurable facility capable of replicating a live substation environment to overcome operational barriers. The project is managed through a technical advisory board, which comprises industry stakeholders.

The project remains on track to deliver the construction works and innovation project trials by October 2020 and is forecast within the project budget. Technical advisory board meetings have been held regularly and the next phase of construction has been approved. The construction programme has been re-phased to manage risks related to site availability. The changes to the construction programme do not impact the innovation and delivery of consumer benefits.

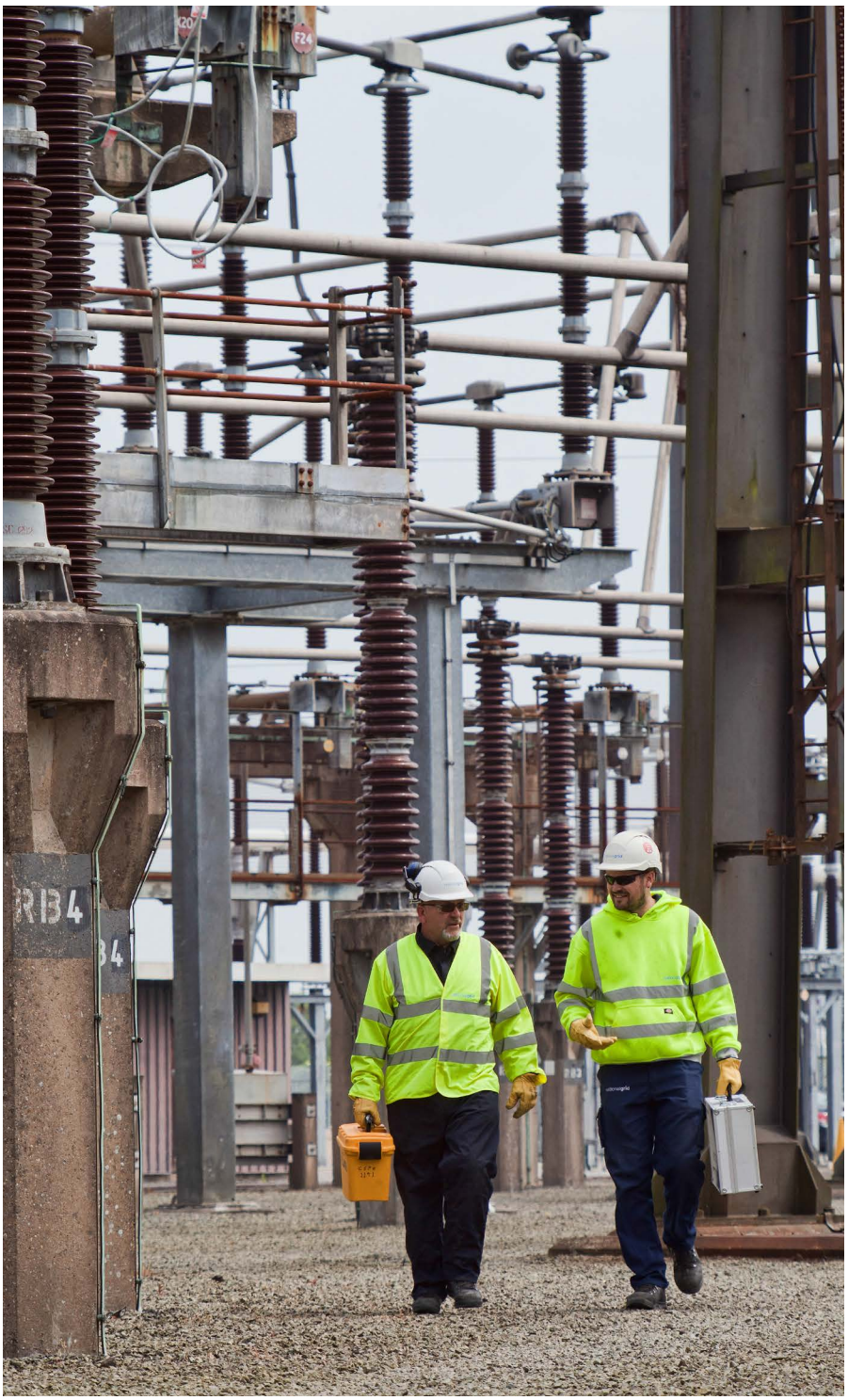
There have been changes to the timeline in the construction of the overhead line test area due to high amounts of asbestos and other contamination found on site. Further surveys have also identified the ground to be unstable and has required us to conduct some reinforcing works prior to any construction activity. These timeline changes have had a knock-on effect and have also delayed the procurement of the equipment for the test area. There have also been delays in the building refurbishment caused by aligning the works schedule to the Connah's Quay Substation delivery.

However, there is sufficient contingency time to cover these delays. They are therefore not expected to impact the October 2020 delivery date of the facility and will not affect the delivery of consumer benefits.

RIIO-T2, can make an even bigger impact on innovation.

National Grid's overarching strategy is to 'exceed the expectation of our customers and our communities today and make possible the energy systems of tomorrow'. We are engaging with our customers and stakeholders and listening to them so that we can ensure what they need is driven into our business plans for delivery. We explain what we do and how we do it, and clearly demonstrate the value for money that we are creating for them. In RIIO-T2 we aim to build on our strategy and focus on three proposal areas for innovation:

- Delivering cleaner energy through reducing our carbon footprint and helping others reduce theirs and accelerating the testing; rollout of new technologies at our Deeside Centre for Innovation.
- Delivering cheaper energy through a long-term innovation programme to deliver a net-zero whole energy system solution at minimum cost.
- Creating the future by embedding innovation into our culture and increase collaboration with other organisations, enabling us to deliver maximum value from our innovation programme.



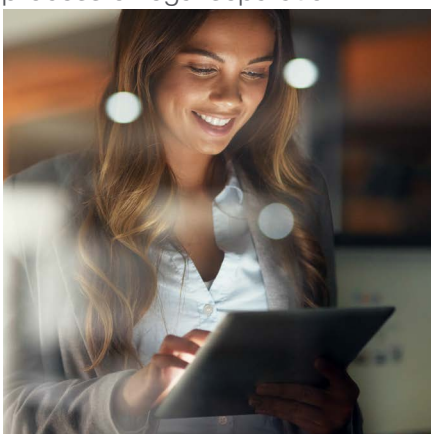
Financial performance – spend and allowances

Our overall total expenditure forecast for the RIIO T1 period is £10.24bn against forecast allowances of £13.04bn. This total is a £2.8bn reduction of costs below allowances. The underlying performance is lower at £2.53bn once allowances are returned for an activity called excluded services. We have found ways to maintain and replace our assets for less cost than we originally forecast and are finding ways to connect customers and strengthen our network for less than the allowances provided.

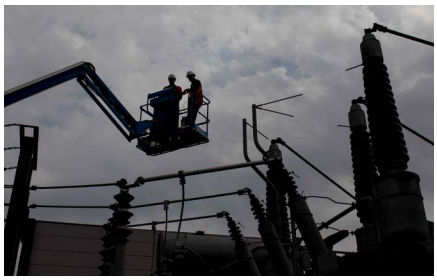
Changing plans - When customer needs change and investments are no longer required, we amend our plans accordingly and an uncertainty mechanism automatically reduces allowances. This means that consumer bills will not be as high as they were forecast to be at the start of RIIO-T1. We also made a voluntary deferral of allowances for Outputs deferred into future price controls. In addition, the totex incentive mechanism has incentivised us to innovate and deliver more efficiently. This will reduce customer charges by a further £1.3bn which will lower the consumer bill.

Changing allowances - In 2018/19, we have spent over £1bn in our activities, from building new assets like overhead lines to replacing existing ones to keep the network safe and secure. The amount also includes the costs to keep the business running, from investing in upgrades to our IT systems to recruiting, training, and developing our number one asset, our people. This investment is lower than our allowances of £1.6bn that we will recover for this financial year. This difference between allowance and cost reflects the innovations and efficiencies made, along with the way that the framework adjusts allowances for our customer works. This is offset by higher than planned for costs in running the business as we invest more in our people and systems now for benefits in the future.

We publish a table **overleaf** showing what we have spent to date and what we forecast to spend in the rest of RIIO-T1 in the transmission business. The ESO will report their costs and allowances separately for the first time this year, as part of the process of legal separation.



Detailed costs - The first part of the table is called total expenditure (totex) as it includes both our capital expenditure (Capex) and our operational expenditure (opex)[2]. The next part of the table shows our adjusted allowances for the first 5 years of RIIO, our forecast allowance[3] for 2018/19 and for the remainder of this price control. The final part of the table shows the difference between costs and adjusted allowances with negative numbers meaning costs exceed allowances.



[2]Capex is broadly the costs incurred in building new assets and replacing existing ones. Opex is broadly the costs incurred for maintaining the assets and running the National Grid business.

[3]This figure is after alignment of allowance categorisation to be consistent with treatment of spend.

Actual/Forecast Expenditure (£m, 2018/19 Prices)	Actual	Actual	Actual	Actual	Actual	Actual	RIIO-T1 Forecast		Total
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	
Load Related Capex	745	574	526	392	265	**237**	321	366	**3,426**
Asset Replacement Capex	289	208	239	330	366	**282**	282	344	**2,340**
Other Capex	238	77	168	142	144	**182**	378	477	**1,806**
Non Op Capex	40	32	41	54	40	**52**	59	40	**358**
Total Capex	1,312	892	975	918	815	**753**	1,040	1,226	**7,930**
Total Opex	270	296	301	276	285	**303**	304	278	**2,314**
TOTEX	1,582	1,188	1,276	1,195	1,100	**1,056**	1,345	1,504	**10,244**

Total Allowances (£m, 18/19 Prices)	RIIO-T1 Allowances								Total
	2013/14	2014/15	2015/16	2016/17	2017/18	x 2018/19	2019/20	2020/21	
Load Related Capex	1,156	857	573	416	214	**361**	449	591	**4,617**
Asset Replacement Capex	401	412	387	395	508	**626**	569	460	**3,759**
Other Capex	231	224	238	260	342	**369**	302	283	**2,249**
Non Op Capex	55	52	34	38	37	**13**	17	16	**263**
Total Capex	1,843	1,545	1,232	1,109	1,102	**1,370**	1,337	1,350	**10,889**
Total Opex	253	258	268	271	273	**274**	277	278	**2,152**
TOTEX	2,096	1,803	1,500	1,379	1,375	**1,645**	1,614	1,628	**13,040**

Variance to Allowances (£m, 18/19 Prices)	Variance to Allowance								Total
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	
Load Related Capex	411	282	46	24	-50	124	128	226	1,191
Asset Replacement Capex	112	204	148	65	143	344	287	116	1,419
Other Capex	-7	147	70	118	198	188	-77	-194	443
Non Op Capex	15	20	-7	-16	-3	-39	-41	-24	-94
Total Capex	531	654	257	191	288	617	297	125	2,959
Total Opex	-18	-38	-33	-6	-12	-29	-27	0	-162
TOTEX	514	615	224	185	276	588	270	125	2,796

We wrote in earlier sections about the load related and asset replacement capex spend and allowances, and the reasons for differences between the two. Below is some further detail on other areas from the table above.

Non-operational Capex

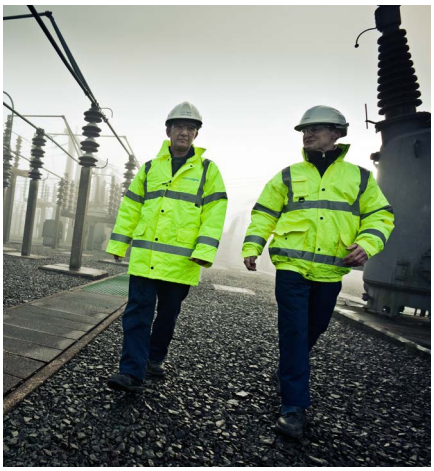
The NGET Non-Operational capex spend in 2018/19 was £52.1m, which was £11.8m higher than last year. This predominantly reflects increased spend on a project that aims to provide efficiencies in data management to transform finance processes. Our 8-year forecast is £357.5m which is £94.3m higher than allowances. This mainly reflects the additional costs of IT transformation projects and cyber security improvements. These costs weren't forecast at the start of the period but the work is required to improve our cyber security.

Opex

Our current year NGET controllable operating expenditure was £306.3m against restated allowances of £270.4m, reflecting an overspend of £36m. Over the 8 years of RIIO-T1, controllable Opex is forecast at £2.31bn which is £162m higher than restated allowances of £2.15bn. One of the reasons for this overspend includes higher IT costs and costs incurred in the restructuring programme. The IT transformation project will further support efficient decision making and data reporting. The restructuring programme leads to a lower head count and leaner structure that will make savings too. Both these programmes will deliver benefits in the short and medium term, making us fit for the future challenges.

Return on regulated equity (RoRE)

Our performance against allowances and RIIO-T1 incentives, contribute to one of the measures of performance that Ofgem uses for regulated networks: Return on Regulated Equity (RoRE). We forecast our eight-year average RoRE to be 9.30% for the Electricity TO. We have used Ofgem's approach to calculate an updated RoRE figure this year of 9.45%. The increase in RoRE of 0.15% reflects the increased difference between allowances and expenditure that we are reporting this year. We are showing the effect of reflecting performance when it will be delivered, e.g. the IWW outputs to be delivered in the first two years of RIIO-T2. As noted however this number will remain subject to several external factors (e.g. timing of customer driven projects) and the impact of the anticipated adjustment to allowances for the Western HVDC Link to reflect the removal of any timing benefit arising from the delay to this project.



£358m — **Spend on IT and cyber security during RIIO-T1**

£2.3bn — **Cost of running the business over RIIO-T1**

9.45% — **Our RoRE. The amount of return we are earning on average in RIIO-T1**

The rest of RIIO-T1 and beyond

There are two years remaining in the current price control. We are working closely with stakeholders to design, refine and agree our plans for the next price control, RIIO-T2, which starts in April 2021.

Non-load related plans - we forecast to invest almost £1.5bn in the final two years of RIIO-T1. The outputs that this increase in investment will deliver are:

- The agreed level of network risk, measured using the agreed Network Replacement Outputs for lead assets such as circuit breakers and overhead lines. This means that we are replacing the right number of assets rather than the original number forecast.
- The right amount of investment in non-lead assets such as our protection and control equipment at substations. This means that we are only replacing assets where there is an engineering and an economic need to do so.
- The physical security upgrades of our critical national infrastructure agreed with Ofgem and BEIS in the 2015 and 2018 reopeners for uncertain costs.
- The visual amenity outputs in Dorset agreed with Ofgem along with proposed submissions before the end of the price control.
- Additional works identified since the price control started, especially in cyber security, but also in the timing of large schemes like the next phase of London Power Tunnels replacement.

Load related plans - we forecast to invest nearly £700m to facilitate connecting customers to the transmission network. Some of this work includes:

- Preparation to deliver the strategic sider works output of our new Hinkley to Seabank route and continue preconstruction activities for other new routes planned for completion in the next price control.
- Reconductoring multiple circuits to strengthen the network, increasing the amount of reactive power capability, and installing the first innovative power control technology schemes (smart wires).
- Installing new assets at our substation sites. This could be as simple as connecting a customer into existing infrastructure to extending the whole substation including new overhead line configuration.

Opex spend - we forecast to spend over £580m in the next two years. We are starting to see the benefits of restructuring the business to become leaner and more agile for the future. We want to be quicker and more adaptable to the changing energy landscape and so we are spending time and money in making sure that our people have the right skills, knowledge and capability to deliver what our customers want, and when they want it.

Planning our business together - we care about the communities in which we work, the environment, and the views of people and organisations who have an interest in what we do. Decarbonisation, digitisation and decentralisation are all shaping the energy system of the future. We now face some important choices as we shape our business plan and we want to gain insight from our stakeholders.

By planning together, we can make sure we reflect what's important and it will also help us shape plans that provide real benefits to consumers. Understanding the views of our stakeholders is an ongoing process. By consulting regularly with stakeholders to find out how they think we're doing, we can see where we need to improve. Regular feedback also helps inform our ongoing business planning. We need to submit our final business plan to Ofgem by the end of 2019 and are encouraging everyone who has an interest in what we do to get involved.

We're also working with our new independently chaired stakeholder group whose role is to scrutinise our engagement approach and how well our RIIO-T2 business plan reflects that engagement. The group provides challenge and feedback on whether our plan reflects what our stakeholders want, which also includes end consumers. Alongside this, Ofgem's RIIO-T2 challenge group is considering the affordability and sustainability of our plan. The groups will each submit a report to Ofgem in December 2019 in addition to our own submissions. We have made some great progress in RIIO-T1, and want this to continue into the future, for the benefit of all.

Amount we're investing to keep the network safe and reliable and to connect new customers in the last two years of RIIO-T1

How to contact us and other useful links

If you have questions or opinions on this performance summary, please get in touch with us:

by emailing us at ***box.talkTO@nationalgrid.com***

To find out more about how stakeholders are helping to shape our future plans go to ***https://www.nationalgridet.com/planning-together-riio/help-shape-our-business-plan-riio/we-have-developed-our-draft-plan-with-you***

To find out more about customer bills and the impact of network costs, visit ***https://www.ofgem.gov.uk/consumers/household-gas-and-electricity-guide/understand-your-gas-and-electricity-bills***

For information on our Innovation activities, visit ***https://www.nationalgridet.com/imagining-tomorrow/innovation***

To find out more about our electricity business and the market we operate in, visit ***http://media.nationalgrid.com/factsheets/***

For further information on our financial performance, visit our dedicated website at ***http://investors.nationalgrid.com/***

Legal disclaimer

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