National Grid Electricity Transmission

Our performance

2016/17

nationalgrid

Welcome

Executive Summary from Nicola Shaw, Executive Director

We are proud to report that our Electricity Transmission business has continued to perform strongly for consumers by delivering **safe, efficient and reliable** transmission services throughout 2016/17. Our ongoing focus on innovation has ensured we have continued to benefit current and future customers.

We are in the middle of a transformation to a low carbon energy system and 2016/17 has seen a number of firsts underlining this. These include the first working day of operation without coal fired generation since the industrial revolution, and record levels of embedded generation connected to the electricity system – with an additional 14.6GW connecting in less than 5 years. We have risen to the network and system operation challenges it presents, and continue to drive down costs whilst delivering excellent **network reliability.**

We continue to invest efficiently in the network to connect our customers; including renewable, low carbon, generation. We are confident that we are on the right trajectory to deliver our network replacement output measures by the end of the RIIO-T1 period, and we are delivering benefits of efficiency strategies. These benefits lead to lower costs for the completed work.

This investment will help secure continued long term system reliability and **keep bills lower** for customers in the future. We have recognised the current pressure on energy consumer bills and in reviewing our investment plans identified a number of investments that had moved into future periods, and as a result voluntarily deferred **£590m**[1] of allowances out of the RIIO-T1 period.

We have continued to deliver strongly on our five primary RIIO outputs:

Safety: We were all reminded of the importance of safety this year, following a tragic incident in which one of our UK employees lost his life. There are always things to do to improve in this sphere and we keep working hard to do so.

Reliability & availability: Our network continued to deliver exceptionally high levels of reliability of 99.999964% in 2016/17 providing our customers with excellent security of supply.

Customer satisfaction: We are listening to what our customers and stakeholders are telling us and changing the way that we work to meet their needs. In 2016 we began a UK-wide customer transformation programme which focuses on putting customer experience at the heart of our business and equipping our employees with the tools, training and information they need to enable them to improve the way we ultimately serve our customers and stakeholders.

Connections: We have delivered all the customer connection outputs required in 2016/17 on time.

Environment: We have continued with our programme to replace and repair equipment leaking SF6 insulating gas (which is harmful to the environment) and we have

[1] £480m in 09/10 price base

reduced forecast leakage rates by over 1000kg. We also won the 2017 'Business in the Community Award for Environmental Leadership' for reducing the CO2 emissions associated with construction projects.

We have delivered these key outputs at a lower cost to consumers. We have done this by driving efficiencies in our plan, challenging how we are delivering the scope of the output and driving down costs in our supply chain. Approximately £774m of savings will be passed on to consumers' bills through lower network costs.

Following discussions with the Government and Ofgem, and an industry consultation, we have issued a joint statement setting out our timeline for the greater separation of the electricity system operator (ESO) function within National Grid. The ESO will be independent of the transmission business by April 2019 and we have begun to set out how our future system operator role might develop to deliver for the needs of our future customers. Transforming our balancing markets and governance, thinking across transmission and distribution networks and facilitating new markets against a backdrop of becoming more independent are our focus areas.

I hope that you find this booklet informative and helpful. If you have any questions or feedback, please use the links at the end of this report to get in touch.

Nicola Shaw
Executive Director, UK

Content/output area	Highlights	Page
Who we are and RIIO fundamentals	Own and operate over 14000km of overhead lines, 300 substations, and 650km of underground cable. RIIO is Revenue = Incentives + Innovation + Outputs.	4-5
Performance scorecard	Successful delivery of all annual outputs, though some incentive output performance slightly worsened. Uncertainty mechanisms delivering lower volumes than originally forecast.	6-7
Incentives	Strong performance in system reliability, reduction in rewards for customer satisfaction, and environmental incentives.	8-9
Innovation	Good progress in both large scale schemes like at Deeside and an increase in the volume of smaller schemes delivering new technologies.	10-11
Uncertainty Mechanisms	Generation and demand mechanisms broadly working as expected; though at lower volumes than original business plan. Wider works outputs remain uncertain in terms of which schemes may progress.	12-13
Revenue and the domestic electricity bill	We forecast to spend less than forecast allowances. Savings will be shared with customer. Overall cost of our network charges has increased and is £26.16 of the average annual domestic electricity bill.	14-18

Who we are and what we do

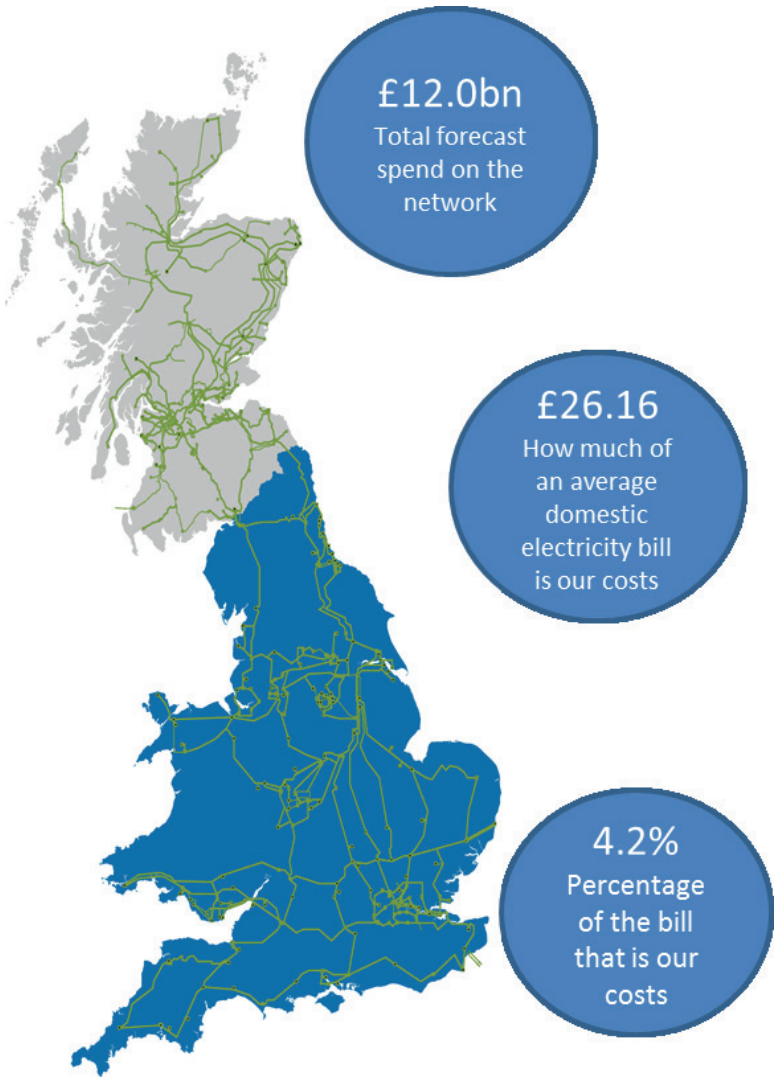
We are a Transmission Owner (TO) and a System Operator (SO). This means that National Grid Electricity Transmission (NGET) owns the electricity transmission network in England and Wales – that's the high-voltage network connecting electricity generators to distribution networks and large-scale consumers. We also operate Great Britain's entire electricity transmission system, including the Scottish and offshore networks.

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 a 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.

The unprecedented rate of change in the energy landscape means we have to be adaptable and responsive. That's why we invest efficiently to provide world-class 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 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 expect to continue our work to modernise the country's energy infrastructure.
We know that building new assets or refurbishing existing ones has an impact on our customers and stakeholders and so we believe the best way forward is to involve them as early as possible in the decision-making process.



Fundamentals of 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 efficiently in return for an efficient revenue allowance that we have 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 the interests of National Grid 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 on to end consumers through lower network charges. This ensures National Grid is driven 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 across different areas of our operations through a range of incentives agreed as part of the RIIO framework. For instance, customers and stakeholders want us to improve how we work with them 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. We are changing the way that we work to meet the outputs that our stakeholders tell us are important to them.

Finding a better way in everything we do

The RIIO framework provides a stimulus package to support 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 as a result of one of the innovation funds are exploring and driving benefits for consumers through innovation projects.

Flexible and fixed allowances

In some areas (like connecting customers to the electricity system) the future costs to be incurred and outputs to be delivered over the current RIIO period were uncertain and expected to evolve. So our allowances flex using an "uncertainty mechanism" reflecting changing customer requirements. There's also an allowance for the maintenance and asset replacement work that's needed in order to continue to provide a safe and available electricity network, and to keep the current level of network reliability. On the next two pages you can see our overall in year performance across all of the five output areas.

Performance Scorecard

This information includes incentives, uncertainty mechanisms, reopener submissions and ex-ante allowances. To help, the performance is coloured coded as per the key below.

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 failure for our 8-year output.

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

Grey - An "uncertainty mechanism" where there was an agreed baseline forecast of annual outputs but we have not delivered the baseline due to our customers' requirements changing over time.

Output requirement	RIIO measure	2016/17 Performance
Safety		
Comply with Health & Safety Executive (HSE) law We continually review our processes to try to reduce the risk of accidents to the public, our staff, and our contractors. We were all reminded of the importance of safety this year, following a tragic incident in which one of our UK employees lost his life. Our injury frequency rate (an industry standard measure of safety) rose slightly to 0.13. We are redoubling our efforts to reduce this measure.	To meet all safety legislation requirements	**All met**
Reliability and availability		
Minimise how much electricity is lost to our customers because of failures of the assets on our network The third year in a row where we have had less 10MWh of interruptions to our customers' service. This equates to 99.999964% availability of our network.	Neutral point at 316MWh p.a.	**6.8MWh**
Non load related network replacement outputs There has been a threefold increase in output delivery in 2016/17 compared to last year. We are on track to have the agreed level of network risk remaining on the system at the end of RIIO-T1 for all but one of the measures. In addition we are delivering this for less cost than our allowances and so are sharing the savings with customers.	Compliant with network risk level at end of RIIO	**Lower spend and volumes than at this stage in original business plan. On track for the full price control.**
Protect our critical assets to minimise disruption (physical security) We're working hard to deliver the programme submitted in 2015 for the allowances that were agreed. We've reprogrammed work leading to lower costs in 16/17 and new contracting strategies will reduce costs in future.	£11m totex allowance	**£7.1m totex spend**
Incremental Wider Works (IWW) to strengthen specific boundaries Two IWW schemes were due to complete in 16/17, but both have been delayed due to changing customer requirements and are not required at present.	3850MW	**0MW**
Forecast the amount of wind generation produced £3m annual cap and collar incentive based on accuracy of forecasting of renewable generation. Our accuracy improved in 16/17 compared to previous years but narrowly missed neutral point resulting in a £67k loss.	+/- 3.5% and +/- 4.25 accuracy in summer/winter	**3.86% in summer 4.28% in winter**
Balance the supply and demand on the transmission system The System Operator has a number of products and services that it can procure in order to balance the electricity network. Good balancing performance has led to £17.5m to be shared between NG (£5.3m) and customers (£12.2m)	Target spend £963.5m	**Actual spend was £945.8m**

Environmental benefits		
Minimise greenhouse gas emissions, especially SF6 Neutral point is 1.48% leakage rate and the 2016/17 performance was 1.31%. This performance was slightly worse than last year due in part to a failure of a single circuit breaker asset. However, this performance is still over 20% ahead of the baseline forecasts. Efforts to find innovative leak repairs and other ways of reducing leakage continue to be developed.	Neutral point of 12,242kg of SF6 top-ups	**10795kg topped up**
Going above and beyond to deliver low carbon solutions Environmental Discretionary Reward panel meeting to discuss our submission will be held on the 12th October 2017. During this discussion we will be informed of the reward outcome. One of the great successes in the year was winning industry awards for our focus on reducing the emissions associated with construction projects which we have used at Wimbledon substation.	50-70% is proactive 70%+ is leadership	**Scored in 50-70% range in 2015/16 Results due 12th October for 2016/17 submission**
Customer satisfaction		
Measure the way that we have satisfied our customers and stakeholders We carry out surveys with our customers and stakeholders which gives and annual score of their overall satisfaction with the way that we deal with them. Our customer satisfaction reduced slightly and we are working closely with customers to understand how we can improve the service to them.	Neutral point at Customer 6.9/10 Stakeholder 7.4/10	**Score out of 10** **7.41** **7.66**
Go above and beyond in the way we engage with our stakeholders This result was the highest score that we have received for the Stakeholder Engagement Incentive Scheme and reflects positively on the work that we are doing to keep customers and stakeholders at the heart of all that we do.	Neutral point at 4.0/10	**7.0**
Customer connections		
Send customer offers within 90 days We sent all new or modified offers to customers within the 90 days and have changed our processes to include the customer much more in the offer development process.	100%	**100%**
Connect new generation customers to our network We delivered all our customers' capacity requirements for 2016/17 but this was lower than the original baseline. Our 8-year forecast, based on customer needs, is for 10.5W of transmission connected generation (original business plan (OPB): 26GW), a decrease of 3.4GW on 2015/16.	3553MW 100km OHL	**1261 MW No new OHL**
Connect new demand customers onto the network We delivered all of the demand connection requirements that our customers contracted us to complete. This volume was lower than the baseline amount. We forecast that we will need to connect 52 new super grid transformers (OPB 72) and 5km of OHL (OPB: 27km) for demand customers.	9 SGTs 3km OHL	**3 SGTs No new OHL**

Incentive performance

Reliability

The incentive output that measures our system's reliability is the Energy Not Supplied (ENS) incentive. The total incentivised energy not supplied in 2016/17 was 6.8 MWh compared with the neutral point of 316 MWh. The table below shows that there was a total unsupplied energy of 89.3 MWh. However, two events were excluded from the ENS, one due to the type of contract a customer has, and in the other the duration of the loss of supply was less than three minutes.

Energy not supplied (ENS)	2013/14	2014/15	2015/16	2016/17
Volume of unsupplied energy	135.9	9.8	4.5	89.3
Volume of unsupplied energy from excluded incidents	0.9	1.1	0.0	82.5
Volume of unsupplied energy in Incentivised Events	**135.0**	**8.7**	**4.5**	**6.8**
Neutral point (in MWh)	316.0	316.0	316.0	316.0
Difference (in MWh)	**(181.0)**	**(307.3)**	**(311.5)**	**(309.2)**

Customer

Increasing our focus on customers and stakeholders, and better meeting their requirements, is one of our main priorities. We are rolling out a number of initiatives to help improve the service and engagement we provide. In 2016 we began a programme focusing on putting the customer experience at the centre of our business and equipping our employees with the tools, training and information they need to improve how we serve our customers and stakeholders.

In 2016/17, we achieved a customer satisfaction score of 7.41 in the survey that is carried out. The stakeholder satisfaction score was 7.66; an improvement since last year.

Each year all the gas and electricity transmission and distribution companies submit an overview of their stakeholder engagement activities held over the previous 12 months, and how these have informed their business plans. At an independent panel, stakeholder engagement experts probe the submissions, asking in-depth questions about the work. We scored 7.0 – an increase of 0.75 against our 2015/16 score. Ofgem's summary feedback from the panel session reflects the improvements we're making in this area.

The table below shows the annual scores in the different incentives that we are measured against.

Customer & Stakeholder Incentives	2013/14	2014/15	2015/16	2016/17
NGET Customer survey – neutral point	6.90	6.90	6.90	6.90
NGET Customer survey – score	7.41	7.40	7.54	7.41
Stakeholder survey – neutral point[2]	N/A	N/A	N/A	7.4
Stakeholder survey - score	7.53	7.74	7.53	7.66
Stakeholder Engagement neutral point	4.0	4.0	4.0	4.0
Stakeholder Engagement Incentive score	5.75	6.0	6.25	7.0

[2] The stakeholder satisfaction survey neutral point was not established until after the first three years of RIIO-T1.

Environment

There are two incentives that reward (or penalise) our efforts to deliver a low carbon future. The SF6 incentive rewards us for topping up less than the neutral point and penalises us if we lose more than this amount of gas from our substation assets. The table below shows how we're doing so far in this price control:

SF6	2013/14	2014/15	2015/16	2016/17
Actual top-ups (kg) (a)	10110	9544	9713	10795
Neutral point (kg) (b)	12037	12139	12199	12242
Business plan forecast (kg)	12950	13370	13830	14310
Difference (kg) (a-b)	1927	2595	2486	1447

For the 2016/17 period, we experienced higher SF6 top-ups than in any previous RIIO reporting year but still leaked less than the forecast published in the RIIO-T1 business plan.

During 2016/17, our worst-leaking asset was repaired and will lead to over 1,000kg reduction in losses annually from mid-March 2017 onwards. During 2017/18 we have planned to include 24 of the top-leaking assets for replacement to improve the leakage performance.

The Environmental Discretionary Reward (EDR) submission has been made to the independent panel for 2016/17, using learning from feedback on the format of our submission in 2015/16 for which we received no incentive reward. The outcome is expected in October 2017. The table below shows our results in first three years of the scheme.

Environmental Discretionary Reward	2014	2015	2016
Strategic understanding and commitment to low carbon objectives	Proactive	Leadership	Leadership
Whole electricity system planning	Proactive	Good evidence	Engaged
Connections for low-carbon generators	Proactive	Good evidence	Engaged
Collaboration on innovation	Proactive	Leadership	Engaged
Network development solutions that avoid the need to reinforce the network	Proactive	Leadership	Not enough evidence
Direct environmental impact	Proactive	Leadership	Leadership
Greenhouse gas emissions	Proactive	Leadership	Not enough evidence
Overall total	**Proactive[3]**	**Leadership**	**Proactive**

[3] <50%=Engaged, 50-69%=Proactive, 70+%=Leadership

Innovation – a summary of innovation projects

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

As part of RIIO, Ofgem introduced two new funding mechanisms for network innovation: the Network Innovation Allowance (NIA) and the Network Innovation Competition (NIC). Both of these funds 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 central to the work we do 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 and innovative 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.

Themes for innovation

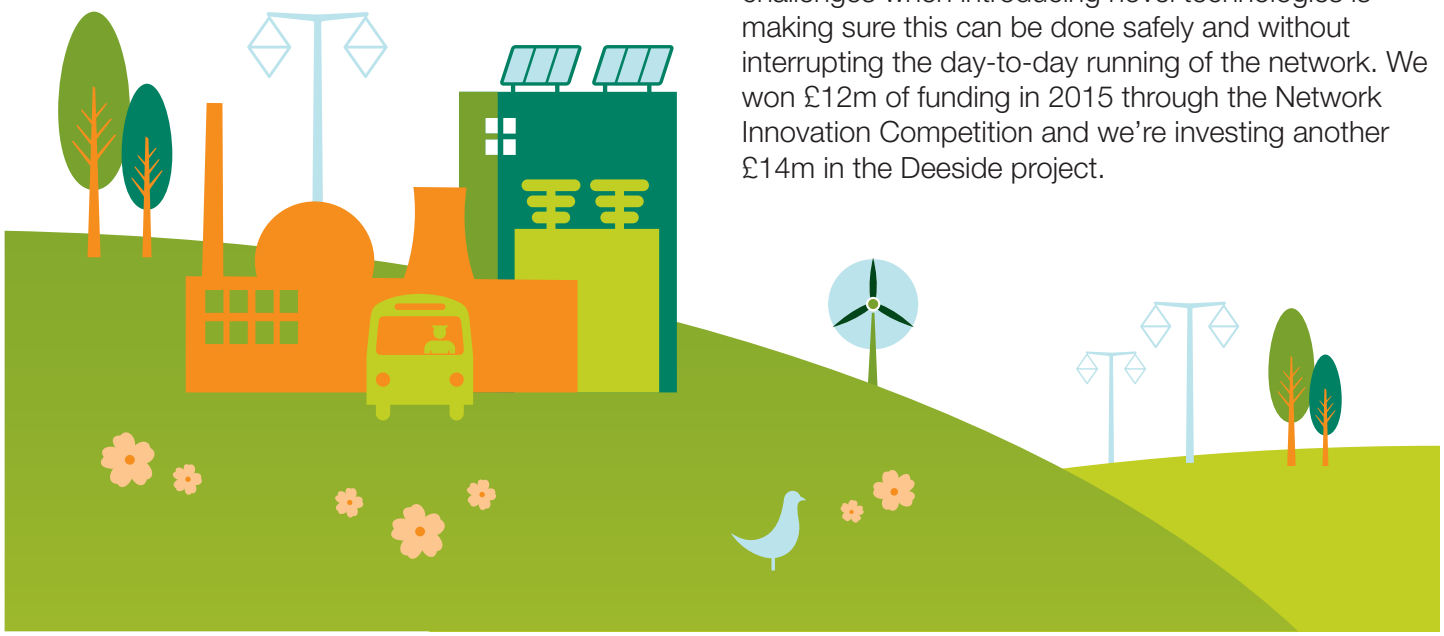
This year we have invested the £6.7 million NIA allowance in 116 projects covering a wide range of network asset and system operation challenges and opportunities. We also enter the Network Innovation Competition (NIC) for our larger innovation activities and look forward to sharing the benefits, including the intellectual property of these schemes with our utility colleagues.

Where we're investing for the future

At our Sellindge substation, we have trialled a novel alternative to SF6 from GE Grid Solutions: g3 (Green Gas for Grid). g3 is a new gas mixture that delivers the same technical benefits as SF6 while reducing the global warming potential ratio from 23,900 to 345, an amazing 98% improvement, saving approximately 40,000tCO2e4. This pilot project has stimulated international academic appetite to further progress the SF6-alternative research.

Creating a testbed for technologies

Elsewhere, the development of an innovation centre at Deeside will help us speed up the implementation of new ideas and technologies onto the network. By mirroring a live substation but working off-grid, we can test assets in real life conditions. One of the biggest challenges when introducing novel technologies is making sure this can be done safely and without interrupting the day-to-day running of the network. We won £12m of funding in 2015 through the Network Innovation Competition and we're investing another £14m in the Deeside project.



[4] CO2e is the carbon dioxide equivalent value. For SF6, the multiplier is 23900 to work out the CO2e of this insulating gas

New opportunities from and for distributed generation

The energy landscape across Great Britain continues to change, particularly with the growth of embedded generation. Our portfolio of projects seeks to address these changes and to anticipate the challenges that lie ahead. The Power Potential project is an example of how we're seeking to harness distributed energy sources such as wind turbines and solar panels in a new way.

Together with UK Power Networks (UKPN) we're using £9.5m of innovation funding to explore whether sources of generation connected to the distribution network can be used to provide services such as dynamic voltage control. By 2050, the project could result in cumulative savings for consumers of up to £412m.

Improving solar forecasting

As the amount of solar generation on the network increases, we're also working on a series of projects to help realise the full potential of solar photovoltaic (PV) generation. These projects include collaboration with the Met Office to improve the accuracy of solar forecasts we receive.

There's also a second piece of work with the University of Reading to assess the probability of different weather scenarios and what they might mean for solar PV and wind generation. Meanwhile, the Sheffield Solar project focuses on solar monitoring and is developing a live data feed of national and regional solar generation.

Collaboration is vital

Although technology is a crucial component of our innovation portfolio, the real driving force behind the work is people, and the projects draw on the expertise of colleagues from right across our business. We also reach out beyond National Grid and in the past year we've worked with 55 different suppliers and partners, including universities, distribution network operators (DNOs), equipment manufacturers, tech companies and many others.

Looking ahead, we'll continue to work on the projects that are already under way in close co-operation with our external partners. Later this year, with the support of the Energy Networks Association (ENA), we and the other GB electricity networks will prepare an electricity networks innovation strategy.

Find out more about our pioneering innovation work by downloading the NGET Innovation Annual Summary[5]

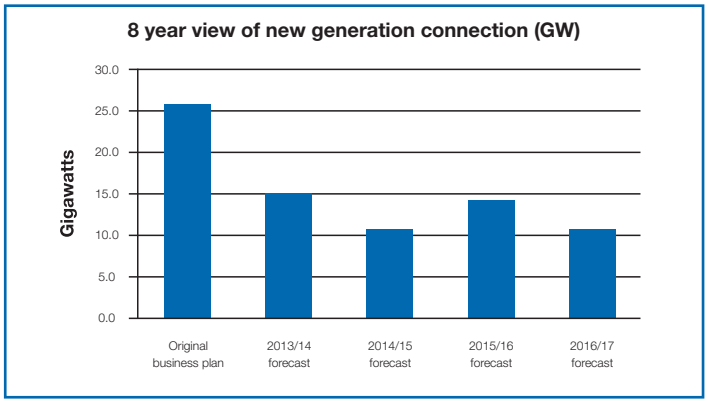
[5] http://www2.nationalgrid.com/Annual-Summaries.aspx

Uncertainty Mechanisms

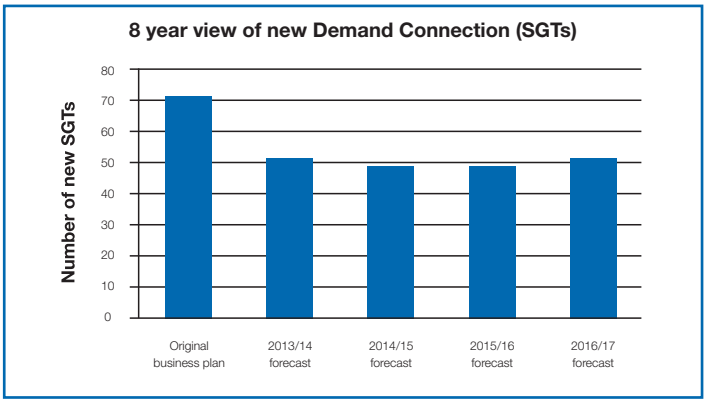
In the price control it was agreed that a number of outputs could be described but the volumes, and indeed timing, were less certain given how far into the future they were. The RIIO framework allows for a flexing of our allowances as these uncertainty mechanisms flex depending on the volume of output.

For instance, connecting new generation had a baseline of 33GW (original business plan (OBP) submission forecast 26GW) and 216ckm of OHL and a unit cost allowance (UCA) of £27.0/kW and £1.1m per circuit km of OHL respectively. Our current capital plan delivers generation outputs for £28.3/kW (in 2009/10 prices), which is largely unchanged from last year's average. This shows the uncertainty mechanism is working as intended even though the volume of new generation has significantly reduced to an 8-year forecast of 10.5GW. The unit cost of connecting new generation varies from project to project, dependent upon the size and location of the generation in question. For example, one connection requires a new 400kV substation to be constructed and the extension of another, the construction of a new OHL between these substations, works on existing circuits, and the extension of an operational tripping scheme. Conversely, the use of existing capacity on the network can be utilised to provide a less costly solution. For example, another connection utilises an existing bay in a substation, lowering the overall cost of delivering the connection.

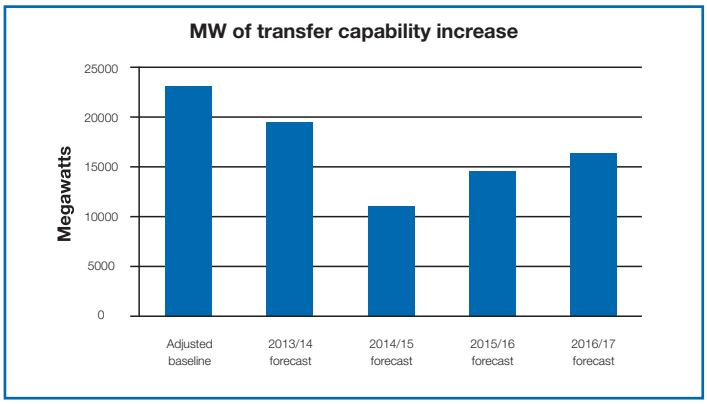
It should be noted that while the anticipated volume of transmission connected generation has fallen, the level of embedded generation connecting to the transmission and distribution systems remains high. In the last four years, 14.6GW of embedded generation has connected, with approximately another 8.8GW anticipated in the remainder of RIIO-T1. This may necessitate additional investment in shunt reactors and / or other transmission solutions that are not funded through the uncertainty mechanisms.



For connecting customers to facilitate increases and changes to electricity demand, there was a baseline of 72 new SGTs with a unit cost allowance of £3.9m per new transformer and associated substation works, and 27 circuit km of overhead line for £1.1m/circuit km unit cost allowance. The cost of providing infrastructure to facilitate new demand connections also varies in a similar manner to that for generation. Our current capital plan delivers demand outputs for £4.4m/SGT (in 2009/10 prices), which is lower than our forecast last year (£4.5m/SGT, 09/10 prices) and is higher than the unit cost allowance.



A third area of uncertainty was for reinforcing the network to allow safe and reliable flow of electricity due to wider changes in generation and demand. Wider works UCAs were developed using the cost of investments identified based in our business plan. Each year, the Network Outputs Assessment (NOA) looks at all of the inputs (customer requirements, timing, network topology etc.) and gives the least worst regret cost benefit analysis which leads to different solutions (based on the most up to date information) being recommended. Occasionally schemes are recommended that are significantly lower cost than the original baseline schemes. This is mainly due to the inputs detailed above.



Baseline and strategic wider works

During RIIO there have been c£145m (16/17 prices) costs incurred on three potential strategic wider works (SWW) schemes; Hinkley Point C, North West Coast Connection (NWCC) at Moorside, and Horizon Nuclear at Wylfa. The progression and timing of these new nuclear power stations remains challenging to determine. Within our investment plans we have included the works associated with the connection of all three, however, it is likely that not all will proceed in these timescales which would impact spend in RIIO-T1. Given this uncertainty, we are carefully managing expenditure related to these projects.

The SWW final needs case submission for the prospective Hinkley – Seabank project was made in March 2017 and is currently under consideration by Ofgem. This submission reported an estimate of £839m (2016/17 price base) for the SWW elements of the project.

In May 2017, NuGen (the generator at Moorside) announced that, as a result of shareholder and reactor vendor issues, a strategic review of the Moorside project would be undertaken. In light of this, we are pausing all activities as this is in consumers' interest to not to commit spend without certainty of an output being delivered.

Currently the costs on the specified preconstruction schemes in SC3L (Eastern HVDC and Wylfa-Pembroke HVDC) total £1.4m during RIIO. It is likely that only Eastern HVDC will progress preconstruction during RIIO. The table below shows the baseline wider works as shown in the transmission licence in special condition 6I (SC6I).

Project	RIIO-T1 Allowance (09/10 prices)	RIIO-T1 Spend (09/10 prices)	Licence delivery date	Expected delivery date	Complete?
Scottish Series and Shunt	£51.584m	£67.26m	2014/15	2014/15	Yes
Harker – Hutton – Quernmore	£62.227m	£61.48m	2014/15	2014/15	Yes
Penwortham QBs	£4.344m	£12.46m	2014/15	2014/15	Yes
Western Link	£621.1m	£602.37m	2016/17	2017/18	No
Total	**£739.255m**	**£743.57m**			

Across the portfolio of baseline wider works, there has been an overspend compared with allowances. There are a number of reasons for this; additional works required in the Series and Shunt scheme to fix post commissioning faults, and reprofiling of spend in the Penwortham scheme meant that costs were greater than allowances. For the re-conductoring scheme, costs were less than allowances due to efficiencies in contracting and delivery, and for the Western link project we are forecasting to spend less than allowances and will report on the full reasons for this once the scheme is complete.

The Western link joint venture encountered a number of delays in cable manufacturing, installation, and commissioning. In accordance with the mid period review output accountability decision, we will submit a Western Link post commissioning report to Ofgem, within three months of project commissioning. This will detail the steps we have taken in response to the various delays and how we have gone about minimising the impact on consumers. The current completion forecast for delivery remains in the 2017/18 financial year.

Current Year and 8-year view

Across SO and TO, we have driven down costs to £1.28bn in 2016/17 and the RIIO framework provides allowances of £1.45bn. The saving will be shared with our customers. Our overall Totex forecast costs for the RIIO-T1 period are £12.0bn set against adjusted allowances of £13.5bn which is a £1.46bn of savings against allowances, again to be shared with customers. We have saved these costs in a number of ways; from reducing costs in our supply chain to targeting the scope of works that deliver the output, and from bundling schemes to optimise the plan to extending the life of our assets. We have also found savings in how we forecast to reinforce the network based on the latest recommendation of the NOA.

Within this overall forecast, we are to invest £9.0bn Capex over the RIIO-T1 period in order to deliver our load and non-load related plans. This delivery will sustain the current high levels of reliability and resilience into the long term, facilitate new low carbon generation to access the market, connect new load, and keep the total of network and balancing costs low for the benefit of future consumers.

To deliver all of our 'load related' outputs for new connections and associated network reinforcements our capex is forecast, over the 8-years of this price control, to be £3.7bn which is £0.1bn lower than our adjusted allowances. Costs which are currently lower than allowances could change into being higher than allowances if different generators connect and different system reinforcements are triggered than are forecast for the remainder of RIIO-T1.

To deliver 'non-load related' investment to ensure the long term health and reliability of our assets our 8-year capex forecast is to be £4.13bn which is £1.1bn lower than allowances.

SO Opex spend is lower than allowances due to lower Information Systems (IS) support costs and fewer IS projects going ahead than forecast at the start of the period. This underspend against allowances is partially offset by additional spend for some of the new enhanced roles that the SO is carrying out that weren't foreseen at the start of RIIO.

SO Capex spend is slightly higher than allowances because of increased forecast spend to build new data centres to deal with the emerging and dynamic cyber security threats.

Costs and revenue impact – actual revenue vs. allowances for reporting year

We have published below a table showing what we have spent to date and what we forecast to spend in the rest of RIIO-T1 in both the electricity TO and SO businesses. The first part of the table is called total expenditure (Totex) as it includes both our capital expenditure (Capex) and our operational expenditure (Opex)[6].

The next part of the table shows our adjusted allowances[7] for the first three years of RIIO, our forecast allowance for 2016/17, and for the remainder of this price control. The final part of the table shows the difference between costs and adjusted allowances with numbers shown in red meaning costs exceed allowances.

AllowanceActual/Forecast Expenditure (£m, 2016/17 Prices)		Actual	Actual	Actual	RIIO-T1 Forecast					
		2014	2015	2016	2017	2018	2019	2020	2021	Total
TO	Load Related Capex	696.7	537.3	492.2	366.6	387.3	269.4	408.5	551.9	3,709.8
	Asset Replacement Capex	270.2	194.9	223.0	307.4	395.0	432.6	341.1	434.1	2,598.3
	Other Capex	222.5	72.0	157.5	132.9	201.1	385.0	451.1	386.3	2,008.3
	Non Operational Capex	37.3	29.8	38.5	50.4	49.8	30.7	23.3	18.0	227.8
	Total Capex	**1,226.8**	**833.9**	**911.2**	**857.3**	**1,033.2**	**1,117.6**	**1,223.9**	**1,390.3**	**8,594.3**
	Total Controllable Opex	**252.7**	**277.0**	**281.9**	**258.6**	**268.5**	**270.0**	**263.6**	**240.7**	**2,113.1**
TO	**TOTEX**	**1,479.6**	**1,110.9**	**1,193.1**	**1,115.9**	**1,301.7**	**1,387.6**	**1,487.5**	**1,631.1**	**10,707.4**
SO	**Non Operational Capex**	39.6	42.3	41.1	55.3	85.3	68.3	46.2	31.6	409.6
	Controllable Opex	100.7	97.4	101.3	107.1	128.1	122.3	111.3	110.3	878.6
SO	**TOTEX**	**140.3**	**139.7**	**142.3**	**162.5**	**213.4**	**190.6**	**157.5**	**141.9**	**1,288.2**
	TO and SO TOTAL	**1,619.8**	**1,250.6**	**1,335.4**	**1,278.4**	**1,515.1**	**1,578.2**	**1,645.0**	**1,773.0**	**11,995.6**

Total Allowances (£m, 2016/17 Prices)		RIIO-T1 Allowances								
		2014	2015	2016	2017	2018	2019	2020	2021	Total
TO	Load Related Capex	1,040.3	775.3	544.1	388.6	149.4	287.2	340.0	473.1	3,998.0
	Asset Replacement Capex	375.1	385.8	361.9	369.5	475.4	585.9	532.3	430.2	3,516.1
	Other Capex	216.4	210.8	223.3	245.5	332.4	432.6	353.0	324.0	2,338.0
	Non Operational Capex	51.8	48.5	32.0	35.7	34.9	12.4	16.1	14.7	246.2
	Total Capex	**1,683.6**	**1,420.4**	**1,161.3**	**1,039.3**	**992.1**	**1,318.1**	**1,241.3**	**1,242.1**	**10,098.2**
	Total Controllable Opex	**236.1**	**241.2**	**250.4**	**253.5**	**256.3**	**258.0**	**262.2**	**263.0**	**2,020.7**
TO	**TOTEX**	**1,919.6**	**1,661.6**	**1,411.7**	**1,292.8**	**1,248.5**	**1,576.1**	**1,503.6**	**1,505.1**	**12,118.9**
SO	**Non Operational Capex**	63.8	46.3	42.1	42.0	79.2	57.4	44.8	39.4	414.9
	Controllable Opex	**91.0**	**96.6**	**106.4**	**115.9**	**132.8**	**131.5**	**122.3**	**124.2**	**920.7**
SO	**TOTEX**	**154.8**	**142.9**	**148.6**	**157.9**	**211.9**	**188.9**	**167.1**	**163.6**	**1,335.6**
	TO and SO TOTAL	**2,074.4**	**1,804.5**	**1,560.3**	**1,450.7**	**1,460.4**	**1,765.0**	**1,670.6**	**1,668.7**	**13,454.6**

Variance Actual/Forecast v Allowances (£m, 2016/17 Prices)		Variance to Allowance								
		2014	2015	2016	2017	2018	2019	2020	2021	Total
TO	Load Related Capex	343.6	238.0	51.9	22.0	-237.8	17.8	-68.4	-78.8	288.2
	Asset Replacement Capex	104.9	191.0	138.9	62.1	80.4	153.3	191.2	-3.9	917.7
	Other Capex	-6.1	138.8	65.9	112.6	131.3	47.6	-98.2	-62.3	329.6
	Non Operational Capex	14.5	18.7	-6.5	-14.7	-14.9	-18.2	-7.2	-3.3	-31.6
	Total Capex	**456.8**	**586.5**	**250.1**	**182.0**	**-41.0**	**200.5**	**17.4**	**-148.3**	**1,503.9**
	Total Controllable Opex	**-16.7**	**-35.8**	**-31.5**	**-5.1**	**-12.2**	**-12.0**	**-1.4**	**22.3**	**-92.4**
TO	**TOTEX**	**440.1**	**550.7**	**218.6**	**176.9**	**-53.2**	**188.5**	**16.0**	**-126.0**	**1,411.5**
SO	**Non Operational Capex**	24.2	4.0	1.1	-13.4	-6.1	-10.9	-1.4	7.8	**5.3**
	Controllable Opex	**-9.7**	**-0.8**	**5.2**	**8.8**	**4.6**	**9.2**	**11.0**	**13.9**	42.1
SO	**TOTEX**	**14.5**	**3.2**	**6.3**	**-4.6**	**-1.5**	**-1.7**	**9.6**	**21.7**	**47.5**
	TO and SO TOTAL	**454.6**	**553.9**	**224.8**	**172.3**	**-54.7**	**186.8**	**25.6**	**-104.3**	**1,459.0**

[6] 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.

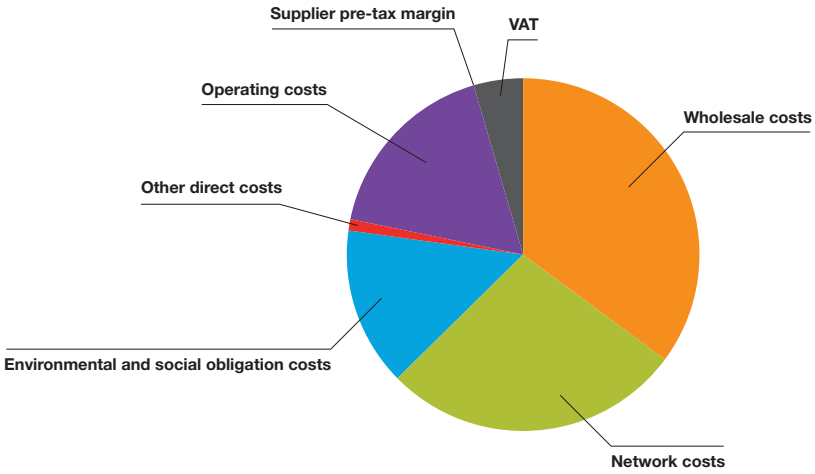
[7] This figure is after the alignments of allowance categorisation to be consistent with treatment of spend. Therefore, in load related capex, this includes the allowance deferral but not the end of RIIO-T1 true up as this is not agreed at present and so is not consistent with numbers quoted in the text.

Consumer bill – how RIIO revenue affects the domestic electricity bill

So what does this mean for the end consumer? Our revenues are recovered through the charging our customers for the services we provide. These network costs for both transmission and distribution make up about 25% of the domestic electricity bill that consumers receive from their supply company.8 Of this total bill only 4.4% is attributed to our TO and SO costs, or approximately 20% of the network costs.

The consumer 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.

Breakdown of an electricity bill



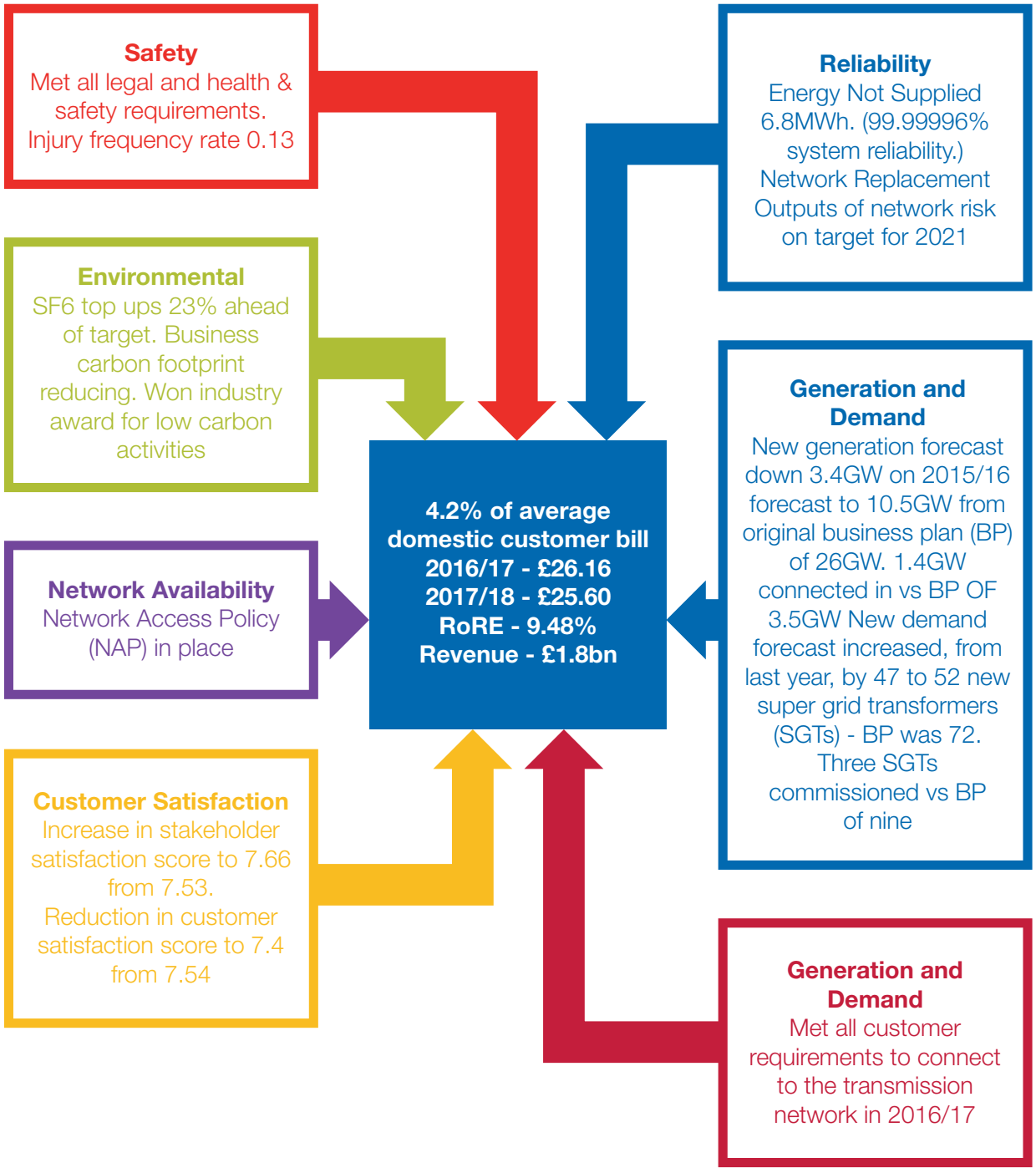
National Grid TO and SO costs in an electricity bill – to date and forecast

Business		2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
National Grid Transmission Owner	£	20.25	22.49	24.96	25.13	24.49	23.70	26.68	30.61
System Operator Internal costs	£	0.92	1.07	1.17	1.03	1.11	1.29	1.32	1.36
TOTAL[9]	£	21.17	23.26	26.14	26.16	25.60	24.98	28.01	31.97
Average domestic electricity bill	£	603	601	596	-	-	-	-	-

[8] 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**

[9] There is rounding of both TO and SO costs, but as a total they are correct (2015/16 and 18/19 look 1p out)

Outputs at a glance



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 **talkingnetworks.transmission@nationalgrid.com** or using the “Have your say” feedback link on our Talking Networks website **www.talkingnetworkstx.com.**

To find out more about customer bills and the impact of network costs, visit **www.ofgem.gov.uk/information-consumers/domestic-consumers/understanding-energy-bills**

For information on our Innovation activities, visit **http://www2.nationalgrid.com/UK/Our-company/Innovation/Electricity-Transmission-Innovation/**

To see how this fits in with how the energy network powers your home, visit **ww.ofgem.gov.uk/network-regulation-riio-model/energy-network-how-it-works-you**

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**

Legal disclaimer

This document contains certain statements that are neither reported financial results nor other historical information. These statements are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended.

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