

SP Transmission

# Annual Performance Report 2015/16



SP TRANSMISSION



# Key facts and figures

## Our performance at a glance

**£240m**  
Invested over  
last 3 years

The investment in renewing network assets over the last 3 years, represents 97% of allowance.

Of our output targets

**38% are achieved**

Our % of output targets achieved for the period to 2021 is 38% – this compares to 19% at this stage under our original plans. We have replaced 447km of overhead line in 3 years.

Stakeholder engagement up to

**6.25**

The assessment score of our stakeholder engagement by Ofgem's independent panel of experts (up from 5.5 in the previous year).

Energy we failed to supply

**0.00006%**

13.9/22m, is the amount of energy (MWh) we failed to supply to our customers because of faults on our network – 0.00006% of the total energy.

**116**

connection offers made

**+88**

on last year

The number of connection offers made to customers during the year (up from 88 in the previous year).

Our tCO<sub>2</sub>e from SF<sub>6</sub> losses have

**reduced by 55%**

Down from 2,322 the previous year to 1,050 this year.

RIIO-T1

**95%**

spend compared to allowance

Our latest forecast spend for RIIO-T1 compared to allowance – with the 5% reduction due to efficiencies in several major projects and programmes of work.

# CEO Foreword

I am delighted to introduce the latest edition of our annual performance report for our Transmission business. It aims to provide our stakeholders with a clear, concise and easy-to-understand view of how we have performed in this, the third year of our business plan for the period 2013 to 2021.

As we approach the half-way point in our plan, we are pleased that our strong start has been maintained.

First, we remain on track to complete our ambitious programme of network renewal. We used the early certainty provided by our plans receiving “fast-track” approval by Ofgem to get ahead of the game, and the benefit of this opportunity is now in evidence. We are more than half-way through our overhead line replacement programme of 800km, 251 km ahead of our plans at this stage. Our total spend in 2015/16 was £357.8m, £6.6m ahead of our original plans, and provides confidence in delivery of the remainder of our RIIO T1 programme.

Second, we are working more effectively with our stakeholders, and this is driving a wide range of benefits. This year we re-organised how we plan and deliver engagement, with the aim of providing a much more inclusive and joined up experience. The results are encouraging. For example, we used the requirement to consult with communities affected by our investment plans as opportunities to listen to – and address – local issues on our distribution networks. As a result 245 issues were re-prioritised and resolved ahead of the original plans. On reducing the visual impact of our network, we have empowered local experts and interest groups to help us develop ideas around Loch Lomond and the Trossachs – and we are in a much stronger position to put forward effective projects fully supported by our communities as a result. The success of this new approach to engagement was recognised in Ofgem’s annual assessment of stakeholder engagement, where we received a much improved score and were placed joint-1st.

Third, we are responding efficiently and with agility to new information, and new challenges. For example, we have re-focused network reinforcement plans in Dumfries and Galloway because the demand for additional capacity has eased off as developers react to changes in Government policy. We are also managing the transmission impacts of the closure in March 2016 of Longannet Power Station, the last large thermal generating unit in Central Scotland. We have improved our ability to monitor and control the loading on our network differently to reflect the large changes in prevailing power flows, and we are supporting the updating of contingency plans for getting the power system back up-and-running in the event of a large scale disruption (a process known as “Black Start”).

The key indicators of our performance are also looking healthy. Undelivered energy as a result of faults on our networks was 13.9MWh (equivalent to 0.00006% of the total, or the average annual consumption of around four houses) – and well below the benchmark level of 225MWh. Important, and long-planned, increases to transmission capability were also delivered this year. Working jointly with SHETL, the 1,150MW upgrade between Beaully and Denny was energised, as was the critical subsea cable between Hunterston and Kintyre. Our world-class standards of safety continue to be in evidence, with zero incidents and significant initiatives to promote public safety and build the right culture of safety among our contractors. Our pipeline of innovation projects and deployment continues to expand, with the aim of addressing key future challenges for UK transmission and delivering our services efficiently and effectively. Following the successful development of our innovative conductor project we were awarded funding under the Innovation Roll Out Mechanism, the only Transmission company to be successful under all innovation mechanisms in RIIO T1.

We are committed to transparency in how we report our performance, and welcome the positive feedback that this format of reporting has received to date from our stakeholders. We hope you find this year’s edition to be informative, and easy-to-read. We intend issuing an updated version of this report, showing how we compare to others in early 2017.



**Frank Mitchell**  
CEO of SP Energy Networks

# This report

## About us

We are the licensed Transmission Owner (TO) for the Central Belt and South of Scotland. Our transmission network comprises just under 4,000 kilometres of circuits and 140 substations operating at 400kV, 275kV and 132kV.

Our system maximum demand is 3.4GW and we currently have over 8.7GW of generation connected to our network.

We provide transmission services to National Grid, who as the GB System Operator (GBSO) then provides transmission services to generators, electricity suppliers and large customers. SP Transmission is part of SP Energy Networks, which in turn is part of the Iberdrola Group.

Our vision as a business is to be a customer-focused company trusted by our communities and stakeholders; an engineering company with strong stewardship of assets and world-class safety credentials, and a company that attracts and develops skills for the future from the communities that we serve.

## The context we operate in

We are a regulated utility with a licence to operate awarded by Ofgem, the GB energy regulator. Our regulation is set to create incentives for us to meet the outputs that our stakeholders value at efficient cost. The core mechanism for this is our price control. It defines outputs and revenue allowances for an eight year period, based on a business plan that we produce in consultation with our stakeholders.

Our business plan for 2013 to 2021 was recognised by Ofgem as high-quality, and was “fast-tracked”. The plan embodies a range of outputs relating to reliability, how we modernise our network, how we contribute to environmental objectives, and how effectively we engage with our stakeholders. These outputs are linked to financial incentives.

We have a key, strategic role in facilitating the connection of renewable generation in Scotland, which is critical to meeting GB environmental targets. To this end, some of our revenues are linked directly to specific, large-scale investment schemes – so called ‘wider works’. One of the key uncertainties we need to manage is the timing, volume and location of new generation – particularly in the context of large changes to how generators are remunerated, and subsidised through Government policy.

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# Our performance in summary



# Performance against outputs

## Summary

### Our infrastructure

#### Modernisation

On track to deliver network renewal outputs in full

Ahead of plans (by 251km) on overhead line work

Controlling costs:

38% of outputs met, 30% of funding used.

Ahead of schedule on build and spend

#### Environmental impacts

Long-standing commitment to reduce our emissions

Continuing focus on losses and SF6

Innovative work with stakeholders and SHE  
Transmission developed effective projects to improve visual amenity in Loch Lomond and the Trossachs National Park.

Commitment and strategy in place

#### Reliability and resilience

Very low levels of energy not served (0.00006%), and an associated incentive award of £2.8m

Operational changes in train to manage network with no large thermal generation (with closure of Longannet this year).

Sustaining high levels

#### Safety

Continue to demonstrate leadership, and deliver world-class standards

Total Recordable Injury Rate (TRIR) among our contractors down from 0.73 to 0.47, and number of metal theft incidents down from 9 to 4

Maintaining wide range of initiatives to promote public safety.

Sustaining high levels

### Our user services

#### Additional network capacity:

Beaully-Denny (1,150MW) and Hunterston-Kintyre (240MW) energised this year, working jointly with SHE Transmission

But reductions in financial support for onshore wind are driving uncertainty – our forecast for period down from 3.6GW to 2.1GW

Changing our reinforcement plans accordingly, e.g. re-specified and scaled back investment plans in Dumfries & Galloway.

Adapting to meet updated needs

#### Individual connections:

High volumes continue – 116 offers this year, up from 88

Average of 64 days to issue – 7 days quicker than last year.

Supporting continuing high volumes

### Our collaborations

#### Stakeholders:

More engagement and active collaboration, and joined-up delivery with our Distribution business

Strong improvement in annual assessment

6.25 out of 10 (joint 1st), and £750k award.

Ahead of schedule on build and spend

#### Innovation:

Implementing FITNESS project – to trial smaller, smarter substations – following success in Network Innovation Competition

21 'live' projects under Network Innovation Allowance

Deploying innovative "low sag" conductors in key areas of network in south-west Scotland, releasing additional capacity without building new towers.

Successful on all three regulatory mechanisms

● Ahead of target  
 ● On target  
 ● Partially/marginally Below target  
 ● Substantially Below target

# Financial performance Summary

## Our expenditure

### This year:

Our total expenditure this year was £357.8m. This was £6.6m (or 1.8%) above our revenue allowance. The breakdown was as follows:

	Allowance £m	Actual £m	Difference £m
<b>Capital expenditure</b>			
(i) Load-related	243.7	264.9	+21.2
(ii) Non-load related	85.9	60.8	-25.1
Controllable operating costs	21.5	32.1	+10.6
<b>Total</b>	<b>351.1</b>	<b>357.8</b>	<b>+6.6</b>

### Forecast to 2021:

We have updated our forecast expenditure for the duration of the business plan to reflect the response from generation project developers to changes to funding support for renewables. Our best estimate is now:

	Allowance £m	Forecast £m	Difference £m
<b>Capital expenditure</b>			
(i) Load-related	1,315.8	1,223.5	-92.4
(ii) Non-load related	833.6	740.2	-93.4
Controllable operating costs	187.8	247.8	+60.0
<b>Total</b>	<b>2,337.2</b>	<b>2,211.5</b>	<b>-125.7</b>

The most significant factor affecting the revised forecast has been our decision to scale back Strategic Wider Words in Dumfries & Galloway to reflect new information on the likely scale and timing of renewable generation connections.

## Our revenues

This year our allowed revenues totalled £314.5m, of which £3.5m related to past incentive performance and adjustments for under or over recovery.

Our performance this year earned incentive payments of £3.9m, which will be reflected in our allowed revenues next year. The breakdown of incentive was as follows:

Incentives	£ thousand
Reliability	2,770
Stakeholder engagement	750
SF6 emissions	180
Stakeholder satisfaction	170

## Our Return on Regulated Equity (RoRE)

Our closing Regulatory Asset Value (RAV) this year was £1,984m (up from £1,699m last year). Our performance-related projected average real return over the 8-year price control period is:

<b>7.00%</b>	<b>Base Return</b> The benchmark set by Ofgem
<b>+0.54%</b>	<b>Information Quality Incentive (IQI)</b> A bonus for our high-quality, fast-tracked business plan
<b>+0.86%</b>	<b>Totex Efficiency Savings</b> Our 50% share of projected cost savings
<b>+0.15%</b>	<b>Incentive mechanisms</b> Performance-related awards against key outputs
<b>+0.44%</b>	<b>TIRG Incentive</b> Reflected the legacy return under the funding mechanism
<b>8.99%</b>	<b>Return on Regulatory Equity</b> Estimate average real return over 8-year price control



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# Our performance by theme





# Serving our stakeholders and communities

Within SP Energy Networks we have actively changed our culture to put our stakeholders at the very heart of what we do. By breaking down barriers between transmission and distribution, and changing how we manage and resource our engagement, we have developed whole new ways of working collaboratively with stakeholders. There is still work to do, but we are encouraged by the improvements we have delivered to our stakeholders this year.

This year we embedded our new approach to stakeholder engagement into all aspects of our business – and tried out new ways of doing things. Some examples of these are shown opposite:

This level and depth of commitment has been reflected in a marked improvement in how our engagement is measured. The assessment of our stakeholder engagement by Ofgem's independent panel of experts gave us a score of 6.25 (up from 5.5) and ranked us joint 1st among transmission companies. Our score against our Key Performance Indicators also increased from 69% to 73%. We were disappointed, however, that our score of 6.9 in our stakeholder survey was down slightly on last year – and we are working hard to address the identified areas for improvement.

In consulting communities affected by our investment plans in Dumfries & Galloway we listened to how people wanted to be involved, and adapted our plans to meet their needs. We attended church groups, agricultural shows and engaged with 48 different local groups and councils. We committed 2,515 hours, and received 1,638 different pieces of feedback.

**2,515** hours



Planting trees with school children in the Hunterston area.

We used our need to engage communities on transmission issues as an opportunity to address wider concerns. By bringing distribution colleagues to our transmission events we addressed 245 distribution queries quickly and conveniently for the customer.

**245** queries resolved

We took the lead in finding a solution to a procedural glitch in how we work with National Grid to process connection offers, which was causing unnecessary delays for some embedded generators. The new process is being successfully trialled at three of our Grid Supply Points – reducing timescales by 12 months for those affected.



# Facilitating renewable generation

## Delivering the network capacity

We have continued to progress delivery of our strategic reinforcement projects. Much of the work is now complete and already enabling more renewable generation to find a route to market. There have been some significant changes to the environment in which we work this year and this has had an impact on some of our projects. We have taken some prudent steps to make sure we continue to do the right thing with our investments and always deliver the best value for money.



This year, two major and long-term projects to increase capacity between northern and southern Scotland were completed, working jointly with SHETL: the new overhead line between Beaulieu in the north of Scotland with Denny in the central belt, and the subsea link between Hunterston and Kintyre. Beaulieu to Denny – which has been over 4 years in construction – increases transfer capability by 1,150MW, and delivers a route to market for many renewable generation projects. Although we did not complete all the works we had planned on two other major schemes (East-West and Series Compensation) construction is largely complete. Full commissioning will now take place in suitable outage windows by mid-2017.

This year has also demonstrated how well we respond to changing circumstances – specifically the impact of reduced financial support for renewables. This has significant implications on the need for network reinforcement in Dumfries and Galloway. We have updated our models and proposed an alternative development that is an innovative approach to the 132kV network – hence removing the cost, inconvenience and visual impacts of constructing 180km of new 275kV network. This new solution requires greater flexibility by the System Operator and network users and scales back our investment significantly. But we firmly believe it to be the most efficient approach.



We also continue to make progress with laying the cable for our subsea HVDC project, Western Link. This project, which is a joint venture with NGET, uses advanced technology to improve the network capacity between Scotland and England/Wales by 2,150MW. We are on track for completion in mid 2017.





# Connecting new generation

## Helping individual projects connect

The volume of connection offers remains high, and is increasing – 116 issued this year, compared to 88 last year. And offers are being made to a more diverse range of project, including solar, hydro and CHP. However, changes in financial support for onshore wind mean a reduction in the overall amount of new generation we expect to connect over the period, and a consequential reduction in the total amount of addition capacity we need to provide. We continue to monitor developments closely.

During 2015/16 one wind farm was commissioned, Blacklaw Wind Farm Extension, bringing our total volume of new renewable connections in the RIIO-T1 price control period to 469MW.

While the majority of connection applications are still for wind (90) we also had 13 applications for solar generation and 13 others (including chp and hydro), compared to previous years which was almost exclusively onshore wind generation. The number of connection offers issued this year was 116, significantly up on the 88 issued in 2014/15. All connection offers were issued within our licensed timescales of 74 days and on average they were issued in 64 days showing improved performance by a full 7 days on last year.

Reductions in government financial support for onshore wind has driven significant uncertainty. Some project have requested acceleration in connection dates, while other projects have been deferred or cancelled. We have analysed these developments carefully, and updated our own projections of volumes and expenditure. Whilst our current contracted level of generation for the RIIO-T1 period is 3,511MW, with 5,064MVA of related reinforcement, we have revised our RIIO-T1 forecasts down from last year to 2,090MW and 4,229MVA respectively.

The biggest influence on the variance in expenditure between the 2015 forecast for 2016 and the actuals was in the further delays associated with the South West Scotland group of projects.



# Modernising our network

We are delivering efficiently against our accelerated plans for network renewal – a set of investments which are key to providing long-term, reliable electricity supplies to customers. Whilst Asset Replacement & Other Capex was £27m below allowance in the year, with spend of £240m to date on modernising assets, we are broadly in line with plan. The network performance benefits are already being seen, and we remain on track to deliver all of our target Network Outputs for 2021.

## Keeping within budget (March 2016)

Funding used **30%**

Progress towards network output targets **38%**

## Replacing overhead lines earlier (March 2016)

Original plan **200KM**

Actual **447KM**

## Performance benefits of network renewal (March 2016)

Faults on lead assets **DOWN 72%**

Overhead reliability outages **DOWN 58%**

Our RIIO-T1 Business Plan described how we intended to target investment to manage the risk of asset deterioration on our network. Following the fast track decision, we refined this aspect of our plan further to make best use of developments in resource and outage availability. We brought forward our replacement of overhead lines, and smoothed out our delivery profile for replacement transformers and switchgear.

Performance this year was all about delivering against that revised plan. We are performing well, and managing costs efficiently. The additional 122km of overhead line we have replaced takes the 3-year total to 447km. This is more than double the amount we originally planned. In combination with our continuing investment in transformers and switchgear, it means that we have met 38% of the output targets for the period to 2021. Under our original plan, we projected to have completed around 19% of the total by now. We are therefore well on track to deliver all of our target Network Outputs by 2021.

Further, the flexibility of our delivery capability, through our partnership with Iberdrola Engineering & Construction and reduced reliance on large, “turn-key” contractors, has delivered these outputs while using just 30% of the total investment allowances. If we continue this trend, as we expect we will have delivered significant cost savings by the end of the period – which will reduce costs to customers.

While these investments are for the long-term, it is already delivering stronger network performance. In 2015/16 we recorded a 72% drop in the number of faults in lead assets, and a 58% reduction in the number of overhead reliability outages.

We are now building momentum on our switchgear portfolio. With the need to maintain network security a priority, we have collaborated closely with the System Operator to determine outage sequences to achieve this.



The old and new Lambhill 275kV substations.



## A reliable and resilient network

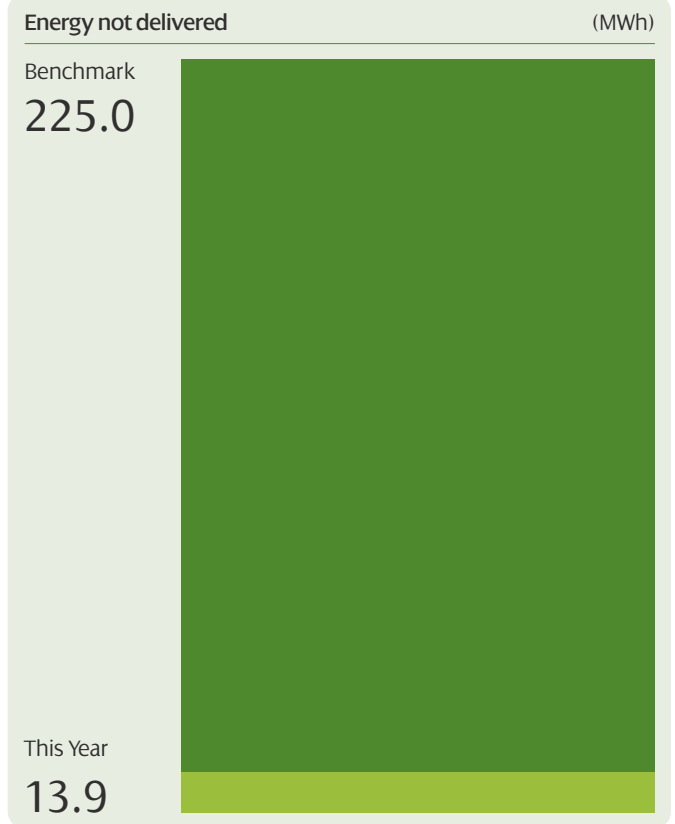
This year we continued our excellent level of network reliability, with faults on our network resulting in only 13.9MWh of Energy Not Supplied (ENS) to customers. This represents 0.00006% of the total. This year also saw the closure of Scotland's last large thermal power station, at Longannet – an event that we have planned for, and which has driven some adjustments to how we operate.



Our network is critical to delivering reliable supplies to customers. While transmission faults are rare, when they do occur they can have large impacts. Our network has delivered excellent levels of reliability this year, continuing a trend of strong performance. Our network was responsible for 13.9MWh of unserved energy this year. This represents 0.00006% of the total, or the annual electricity consumption of around 4 houses – and well under the benchmark level of 225MWh.

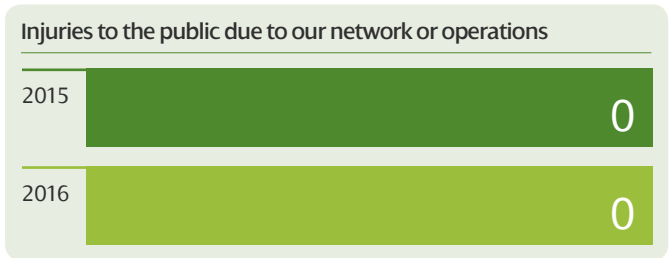
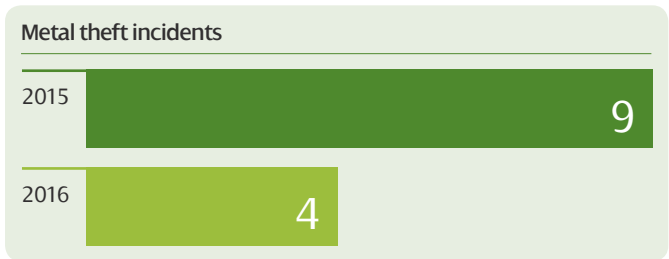
We are also making necessary adjustments to reflect the closure of large thermal plant in central Scotland (which concluded with the closure of Longannet power station in March 2016), and the growth of renewables. These trends affect when and where our network is subject to higher system loading – and we have made commensurate changes to how we monitor and control our network. Focusing primarily on our capability to manage winter periods of high total demand is no longer sufficient.

The retirement of all large thermal plant in Scotland also has implications for contingency planning, and in particular the ability to “re-start” the network quickly after a system-wide failure (a process known as “Black Start”). This year we have worked closely with our fellow transmission companies, Governments and our stakeholders – and have led important strands of engagement, including with the emergency services and other utilities in our area – to ensure that joint restoration plans remain effective and robust.



# A safe network

We have a key responsibility to ensure that our infrastructure is safe. The health and safety of the public and of the people who work on our network is paramount. We pride ourselves on our excellent track record and our rigour and leadership in retaining a world class level of performance.



In conjunction with our sister SP Energy Networks Licenced Network Operators (SP Distribution and SP Manweb), we take considerable pride in our reputation as an industry leader in public safety gained through our behaviours, investments in operational integrity and comprehensive public safety education programmes.

We can report again this year that there were zero injuries to the general public and staff resulting from our assets or operations. We have also observed fewer incidents of metal theft (down from 9 last year to 4 this year) – a criminal activity and public safety risk that we have targeted over recent years, working in partnership with law enforcement agencies. We continue to commit significant resources to strengthen public safety awareness. Our active presence at many agricultural shows, and our “Powerwise” initiative with local schools, are good examples of ongoing activities.

Another focus this year has been on continuing to embed the highest standards of safety among our growing number of contractors, where we have hosted and facilitated a number of events. We monitor performance using Total Recordable Injury Rate (TRIR). TRIR is a widely used indicator and expresses injury levels as a factor of hours worked (injuries per 100,000 hours). With 11 recorded incidents this year saw contractor TRIR improved from 0.73 last year to 0.47 this year. The second consecutive year-on-year fall of more than 30%.

We comply with relevant health and safety legislation, including The Health and Safety at Work Act 1974, The Electricity, Safety, Quality and Continuity Regulations 2002 and the Electricity at Work Regulations 1989. Our safety management systems are independently assessed against relevant international standards.



Scenarios like the one in this photo are a risk to public safety as well as to the integrity of our network. Our staff are continually vigilant and when a situation like this is uncovered we react quickly. The key is to explain clearly what the dangers are in this situation and to explore how the customers can go about their business in a safe manner.

David MacLean, Plant Protection Engineer



# Visual amenity

Pylons, wires, substations are critical for the delivery of electricity to our homes and businesses. However these essential components can have a visual impact – particularly if they are situated, or proposed to be situated, in areas such as National Parks.

Last year we developed a new approach to considering visual impacts in our investment planning, and in early 2015 published our updated “**Approach to the Siting of Transmission Infrastructure**”. This document sets out the range of mitigation measures, and how we will work with stakeholders and make decisions.

We also stepped up our work in collaboration with experts and interest groups to identify effective ways of increasing visual amenity in Loch Lomond and the Trossachs National Park. Through a structured programme of workshops, meetings and visits with organisations such as the John Muir Trust and the Association for the Protection of Rural Scotland – and by formalising this engagement through a Partnership Group we supported and resourced the development of a wide range of options. These included re-routing paths and tree-planting, through to undergrounding sections of overhead line. We complemented this with unprecedented levels of joint work with SHE Transmission on land and environmental planning to develop five excellent projects.



# Business carbon footprint

As part of SP Energy Networks and the wider Iberdrola Group, SP Transmission is committed to reducing its impact on the environment. We have a long standing target (2010) to reduce our carbon emissions by 20% from our 2010 levels by 2020. We address this commitment through a strategy which focuses on measurable reductions in key areas: losses, emissions of Sulphur Hexafluoride, our buildings, and our means of transport.



## Losses

We calculate the carbon associated with energy transmission using our published Losses Report and an Ofgem agreed carbon conversion factor. Under this method, the carbon impact of losses across our transmission network this year is estimated at 194 tCO<sub>2</sub>e. This compares to a reported figure of 240 tCO<sub>2</sub>e last year. We remain focused on reducing losses as a percentage of energy transmitted, and have built this objective into our investment planning and procurement systems.

## Sulphur Hexafluoride (SF<sub>6</sub>) emissions

SF<sub>6</sub> is a safer and more effective insulator for electrical equipment than oil, and is present in much of the new equipment we procure. But it is also a highly potent greenhouse gas, and small leakages can make a material difference to our carbon footprint. We target much better performance than the historic SF<sub>6</sub> leakage rate of c3% in the assets we procure, and are focused on reducing actual leakage rates over time – and exploring the use of alternatives as technology develops further. Our SF<sub>6</sub> losses this year equate to 1,050 tCO<sub>2</sub>e, using the Ofgem agreed carbon conversion figure. This compares to a reported figure of 2,322 tCO<sub>2</sub>e last year.

## Building and transport

We continue to implement site-specific technology solutions and to rationalise our site portfolio in order to improve our energy efficiency. This year our buildings energy use equated to 264 tCO<sub>2</sub>e, which represents a year-on-year reduction. On transport, the use of electric vehicles is becoming increasingly practical (although there remain concerns about range for some of our uses), and trials continue. We also continue to make incremental improvements by emphasising and supporting the use of lower carbon forms of travel (e.g. rail), and video-conferencing.



# Innovation

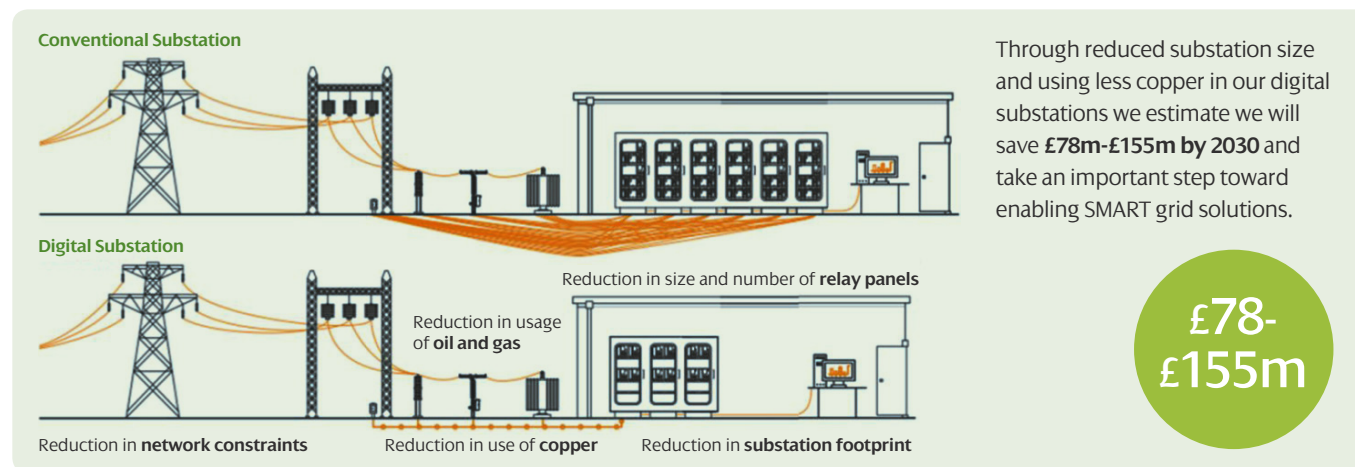
Innovation is at the core of SP Energy Networks. We are demonstrating our ambition and capability by making effective use of all three RIIO T1 mechanisms to encourage innovation. We are progressing six new smaller projects under the Network Innovation Allowance mechanism, as well as implementing our Network Innovation Competition (NIC) funded projects VISOR and FITNESS. And we are the only Transmission Operator to successfully make use of funding under the Innovation Roll Out Mechanism.

Following successful on-going delivery of our flagship VISOR project on Wide Area Network Monitoring, our focus has moved on to a new national flagship innovation project – which we have successfully secured funding for through the Network Innovation Competition (NIC) in 2015. Future Intelligent Transmission Substation (FITNESS) will trial smaller, smarter digital substations on our transmission network.

We are also continuing to make active use of the Network Innovation Allowance (NIA) to support smaller innovation projects. This year we have been working on twenty-one projects funded through this mechanism. Experience has demonstrated that this is an effective pipeline for future larger innovation projects, and for eventual business-as-usual deployment on our network.

Through the Innovation Rollout Mechanism we are investing in Aluminium Conductor Composite Reinforced (ACCR) High Temperature Low Sag conductors on 65km of our network around Mark Hill and Coyton in South-West Scotland. This innovative new technology allows existing routes to be operated more intensively – and in the right circumstances represents a quicker, more cost-effective way of increasing capacity because it can be done using the existing transmission towers. This project is aiming to save over £50m investment for the GB electricity customers, in addition to the significant environmental benefits.

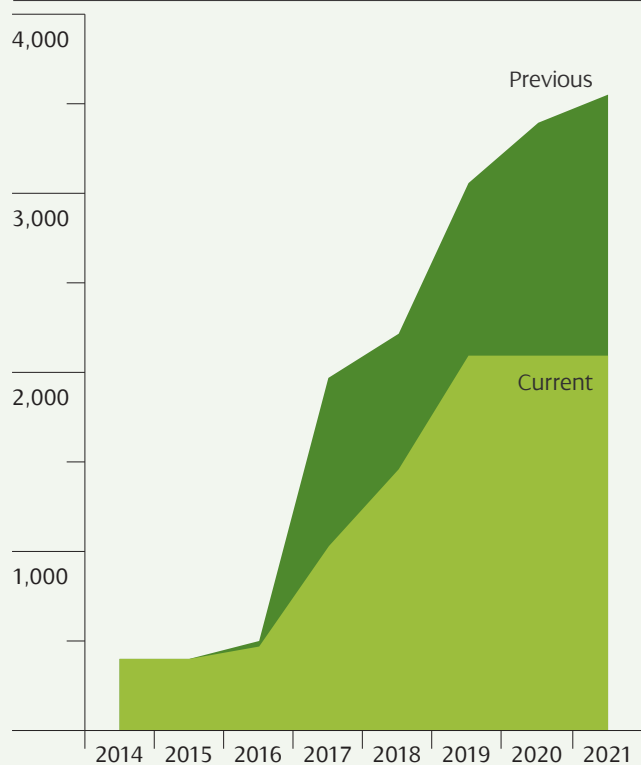
Finally, we also are taking a holistic approach and leveraging our knowledge and skills as a transmission business to support innovation by our distribution business. This year SPEN secured funding for ANGLE-DC. This will be the first time a DC link has been embedded into a distribution system in GB, and unlocks capacity for renewables on the island of Anglesey. Our planning and operational experience with HVDC links on our transmission system was useful in this context.



# Meeting uncertain needs for transmission capacity

The key uncertainty facing our network – and how we develop it economically and efficiently – is the changing generation landscape, both the scale, timing and location of new generation and the timing of generation closures. Not responding quickly enough risks delaying the connection of new generation and the transition to a low carbon energy sector. But building too much or too far ahead of time leads to higher customer bills. We have an ongoing role to help to strike the right balance. And this means active scenario planning, and taking decisive action to modify our investment plans, where necessary.

Forecast Generation Connections



## The scale of change, and range of uncertainty

The mix of generation connected to our network is being transformed between now and 2021. A key milestone in this transformation was reached this year, with the closure of Longannet power station in March 2016 – the last large thermal plant operating in Central Scotland. Our forecast of maximum demand in our area remains relatively stable, at around 3.4GW. But large uncertainty remains around the scale, timing and location of new, renewable generation.

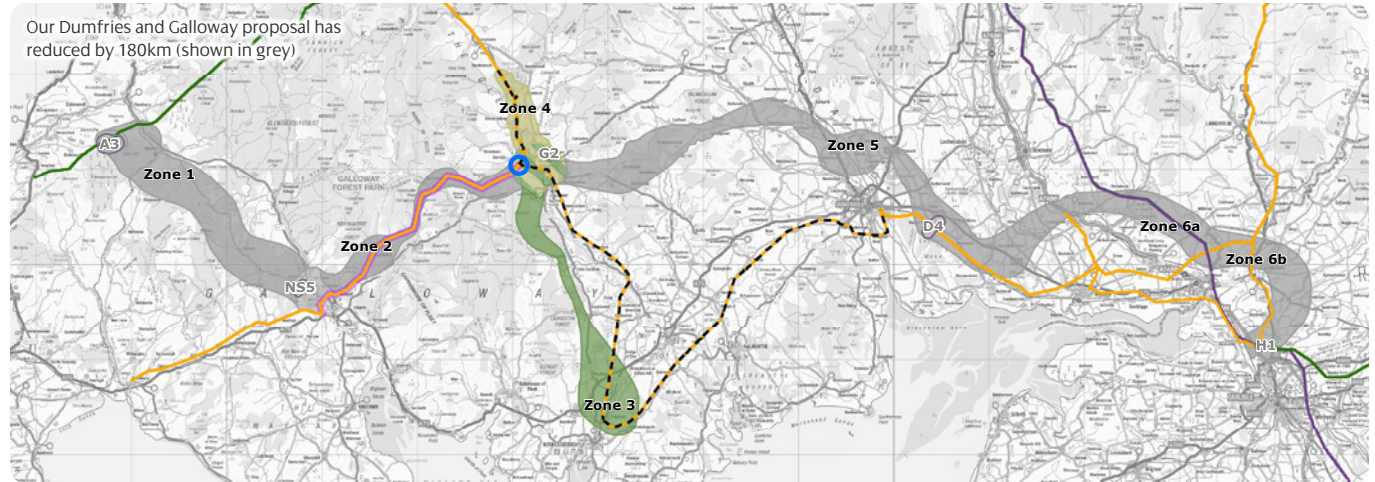
The range of uncertainty is illustrated clearly in the 2015 UK Future Energy Scenarios, published by National Grid with input from ourselves and SHE Transmission. While all scenarios show continued growth in low carbon generation, the scale, timing and location varies significantly across the scenarios. The changes to forms of financial support provided to different renewable technologies adds another layer of uncertainty, most acutely for onshore wind where levels of financial support have been scaled back.

These uncertainties are important for us because of our strategic investment challenges related to transferring power from renewable generators to centres of demand, and to ensuring that there is sufficient transfer capacity to import electricity when demand is high but output from renewable generation is low, e.g. on cold, still days.

Many of the projects to connect new generation before 2021 will already have a connection offer. Therefore the total pool of projects with connection offers provides a good platform for forecasting possible investment requirements. There are currently around 8.5GW of onshore and offshore generation with connection offers, and our best view is that 2.1GW will connect by 2021. The network capacity requirements will depend on which combination of projects (and any new projects that come forward) actually proceed, and when. This is inherently uncertain – and the costs to consumers of getting it wrong can be sizable, either by investing too far ahead of time or too late.



# Meeting uncertain needs for transmission capacity continued



## How we seek to manage these uncertainties

There are a wide range of our established activities that contribute to managing uncertainty:

**Scenario planning:** We contribute key information to National Grid's annual Electricity Ten Year Statement, and to Government's Future Energy Scenarios. And we update our own forecasts for new connection to capture new information. For example, this year we have reduced our forecast of total additional renewables expected to connect to our network in 2021 from 3.6GW to 2.1GW.

**Developing strategic investment options:** We work jointly with National Grid and SSE Transmission to develop and specify Strategic Wider Works proposals. Western Link HVDC, which is currently under construction, is one example.

**Optimising investment needs:** We apply rigorous and common standards to identify what is required in any set of circumstances – the Security and Quality of Supply Standard. And we are agile in adapting our plans to new information. Our decision to scale back and defer our investment plans in Dumfries & Galloway this year is an example.

**Minimising investment costs:** We manage the cost of any necessary investment down to the minimum efficient costs, including by developing and deploying innovation. Our replacement of 65km of conductors on our network surrounding Mark Hill and Coylton in South-West Scotland with new technology High Temperature Low Sag (HTLS) conductors over 65km of is a good example of using innovation to reduce costs, and to provide capacity upgrades more quickly.

# Our Costs Performance this year

There are two key areas of expenditure: load related i.e. projects to cater for significant increases in customer demand and renewable generation; and asset replacement to renew our existing network. The load related programme is by far the more volatile and uncertain as we and our customers/developers are subject to many external factors outwith our control.

## Load-Related Programme 2015/16 position: £21.2m above allowance

We had previously revised our plan due to uncertainty on timing of renewable generation and delays on some Baseline Wider Works projects. We have recovered some of the expenditure that had been forecast in the first two years and expect to largely complete this by the end of 2017/18.

We continue to build momentum in our load-related portfolio continue, achieving an increase of 56% over last year despite the ongoing impact of system availability and consenting challenges. The main issues on the Western HVDC link (BWW) have been resolved and significant efforts are being made to meet a revised completion date in mid 2017.

## Asset Replacement & Other Capex: -£27.3m below allowance

Our RIIO-T1 Business Plan described how we intended to target investment to manage the risk of asset deterioration on our network. We have prioritised activity and profiled investment accordingly in the first three years.

Whilst investment in the year is below plan, the cumulative Asset Replacement and Other Capex position to date shows £240m spent modernising assets, which is broadly in accordance with plan. The associated outputs are in line or ahead of submission with 447km of overhead line conductor replaced to date against the RIIO-T1 plan of 196km. Our transformer and 132KV switchgear programmes are broadly in line with submission.

## Opex

Our indirect costs during 2015/16 exceeded allowances by £10.7m. The main driver for this was an increase in our Business Support costs which were impacted following a change to accounting measurement made after the RIIO-T1 bid.

We repaired a larger than expected volume of minor plant and cable defects (classified under faults), to maintain the integrity of our network. These defects are identified through our regular routine inspection and maintenance regimes.

<b>Totex comparison</b> (2015/16 real £m)	Allowance £m	Actual £m	Variance £m
<b>Capex</b>			
Baseline – Wider Works (BWW)	182.0	132.9	-49.1
Baseline – Other LR Capex	61.7	132.1	70.4
<b>Sub-Total Load Related Capex</b>	<b>243.7</b>	<b>264.9</b>	<b>21.2</b>
Asset Replacement Capex	53.8	32.8	-21.0
Other Capex	31.0	24.7	-6.3
Non Operational Capex	1.1	3.2	2.1
<b>Total Capex</b>	<b>329.6</b>	<b>325.7</b>	<b>-3.9</b>
<b>Opex</b>			
Faults	1.0	1.7	0.7
Inspections & Maintenance and Other direct costs	7.2	6.4	-0.8
Indirect Costs	13.3	24.0	10.7
Adjustment for IAS 19 pension accrual	0.0	-0.1	-0.1
<b>Total Controllable Opex</b>	<b>21.5</b>	<b>32.1</b>	<b>10.6</b>
<b>Totex</b>	<b>351.1</b>	<b>357.8</b>	<b>6.6</b>



# Our Costs

## Forecast for RIIO-T1

### Highlights of future performance

We are currently forecasting RIIO-T1 total expenditure (totex) of £2.2Bn. This is approximately 5% below allowance due to efficiencies in several major projects and programmes of work.

This forecast is our best estimate of the scale and timing of renewable generation connections, local network reinforcement and the wider works projects that could be needed to provide added network capacity to support that generation.

We anticipate that our forecasts will change over time as new information becomes available. After the UK Government's announcement (Summer 2015) on changes to subsidy arrangements for renewable generation, we undertook an extensive exercise to gain a better understanding of likely levels of generation that will ultimately connect to our network. The current forecast reflects the outcome of our review; we will continue to monitor the situation and reflect changes in future forecasts. It is recognised that such uncertainty exists, and our regulatory contract includes mechanisms that enable cost allowances and revenues to accommodate these circumstances the movement above or below agreed baselines.

We have shown our forecasts and indicative allowances for these uncertainty mechanisms in the table to the right, including non-load related works under Other Capex. These mechanisms if they are triggered would add approximately £325m to the current baseline allowance.

The forecast for generation connections requiring sole-use infrastructure, at 2,090MW, falls below the 2,503MW baseline. A reduction in allowance under the incentive mechanism of around £25m has been applied. There is still a significant requirement for additional shared-use infrastructure capacity for other generation connections, including smaller embedded generators. We expect to deliver some 3,156MVA of new capacity above a 1,073MVA baseline with associated allowance of £275m. The balance of £75m relates to permitted costs associated with Strategic Wider Works projects that we expect will be needed and non-load related works whose timing could be affected by such works. In these cases we have assumed that allowances will match our forecast costs, pending further discussions with the regulator, Ofgem.

In our totex forecast we have assumed that as a result of the revised methodology for allocating indirect costs described in the previous section (Performance this year), approximately £60m of indirect costs will be allocated to opex instead of capex.

<b>Totex comparison</b> (2015/16 real £m)	Allowance £m	Forecast £m	Variance £m
<b>Capex</b>			
Baseline – Wider Works (BWW)	656.3	562.7	-93.6
Baseline – Other LR Capex	371.2	440.1	68.9
Uncertainty Mechanism – Generation Connections Sole- Use Infrastructure	-24.8	19.9	44.7
Uncertainty Mechanism – Generation Connections Shared- Use Infrastructure	275.4	159.5	-116.0
Uncertainty Mechanism – Strategic Wider Works (SWW)	37.7	41.3	3.6
<b>Sub-Total Load Related Capex</b>	<b>1,315.8</b>	<b>1,223.5</b>	<b>-92.4</b>
Asset Replacement Capex	584.7	465.7	-119.1
Other Capex	240.2	262.2	22.0
Non Operational Capex	8.7	12.3	3.7
<b>Total Capex</b>	<b>2,149.4</b>	<b>1,963.7</b>	<b>-185.7</b>
<b>Opex</b>			
Faults	8.3	12.5	4.3
Inspections & Maintenance and Other direct costs	73.5	65.8	-7.8
Indirect Costs	106.0	171.4	65.3
Adjustment for IAS 19 pension accrual	0.0	-1.8	-1.8
<b>Total Controllable Opex</b>	<b>187.8</b>	<b>247.8</b>	<b>60.0</b>
<b>Totex</b>	<b>2,337.3</b>	<b>2,211.5</b>	<b>-125.7</b>

# Our Costs

## Change in Forecast for RIIO-T1

### Update on Forecast from 2014-15

Our latest forecast of £2,212m is £417m lower than the view presented last year. Whilst it represents an improvement in overall performance it has been achieved through delivery efficiency on several key projects as they mature. There continues to be cost and delivery challenges in several areas including generation connections and switchgear replacement. The main changes are highlighted in the sections below.

### Load-Related Programme RIIO T1 Forecast:

#### £403m below 2014/15 Forecast

In our Strategic Wider Works (SWW) project portfolio the Dumfries and Galloway Strategic Reinforcement (DGSR) project has been significantly scaled back to deliver a lower cost alternative technical solution, following a cost benefit analysis, for delivery in RIIO-T1/T2.

The investment for generation connections has been updated in accordance with the current forecast of new generation expected to connect (c2.1GW) and the associated new network capacity (c4.2GMVA) that will be required.

### Asset Replacement & Other Capex RIIO T1 Forecast: £40m below 2014/15 Forecast

The primary difference has been a reduction in forecast activity for non-load related works, which are triggered by certain load-related projects. This has been partially offset by increased forecast investment associated with diversions of existing overhead line infrastructure. We have also forecast some further efficiency associated with delivery of our core modernisation investment in RIIO-T1 as more projects move through the construction phase.

### Opex

Overall, our Faults, Inspections & Maintenance and Other direct costs forecasts remain broadly in line with the 2014/15 Forecast.

There has been an increase since last year as a result of an increase in corporate charges for business support activities and a detailed analysis of all budget areas to determine shared cost allocations across SP Energy Networks (SPEN).

Totex comparison (2015/16 real £m)	RIIO-T1 Forecast (2015/16) £m	RIIO-T1 Forecast (2014/15) £m	Plan- on-plan £m
<b>Capex</b>			
Baseline – Wider Works (BWW)	562.7	557.0	-5.7
Baseline – Other LR Capex	40.1	430.4	-9.7
Uncertainty Mechanism – Generation Connections Sole- Use Infrastructure	19.9	74.6	54.7
Uncertainty Mechanism – Generation Connections Shared- Use Infrastructure	159.5	335.6	176.1
Uncertainty Mechanism – Strategic Wider Works (SWW)	41.3	229.0	187.7
<b>Sub-Total Load Related Capex</b>	<b>1,223.5</b>	<b>1,626.6</b>	<b>403.1</b>
Asset Replacement Capex	465.7	476.5	10.8
Other Capex	262.2	292.1	29.8
Non Operational Capex	12.3	10.2	-2.1
<b>Total Capex</b>	<b>1,963.7</b>	<b>2,405.3</b>	<b>441.6</b>
<b>Opex</b>			
Faults	12.5	8.0	-4.5
Inspections & Maintenance and Other direct costs	65.8	72.1	6.4
Indirect Costs	171.4	145.6	-25.8
Adjustment for IAS 19 pension accrual	-1.8	-2.5	-0.7
<b>Total Controllable Opex</b>	<b>247.8</b>	<b>223.3</b>	<b>-24.5</b>
<b>Totex</b>	<b>2,211.5</b>	<b>2,628.6</b>	<b>417.1</b>



# Our Revenues

## Our revenue allowance – the basics:

An allowance is set by Ofgem

This is calculated using a formula

There are various components to the formula

Some components are fixed, and some depend on variables (such as MW of generation connected)

Some components relate to individual investment schemes, e.g. those listed under Strategic Wider Works

Performance under the various incentive schemes will affect revenue allowance with a lag of two years

Differences between what we recover and what we are allowed to recover are adjusted for in subsequent years

## From our charges to customer bills:

Our charges form part of the total revenues recovered by National Grid through transmission charges

The cost of running the Transmission network in Great Britain is spread out over consumers and generators across the country. For non-half hourly metered customers (representing domestic and small business customers), the average cost of running SP Transmission amounts to approximately £4 per customer per year\*.

\*Average over the 8-year RIIO ET1 price control, in 2015/16 prices. Calculations prepared by National Grid.

In 2015/16 we recovered £314.5m. Our revenues are set through regulation by Ofgem. They comprise an element which is fixed, an element which is linked to specified variables (such as the amount of connected generation), and an element to capture incentives and adjustments from previous years. We recover our revenues through charges to the system operator, National Grid – who, in turn, levies charges on users of the transmission system across GB. Based on our forecast performance the Return on Regulatory Equity over the full RIIO-T1 period is estimated at 8.99%.

### Our base revenues in 2015/16

#### Allowed Revenues (£m)

Past incentives & adjustments  
3.5

Fixed  
311.0



### Incentive awards earned in 2015/16 (revenue rec'd in 2016/17)

#### Smaller incentives earned in 2015/16 (£ thousands)

SF6 emissions 180

Stakeholder Satisfaction 170

#### Larger incentives earned in 2015/16 (£ thousands)

Stakeholder engagement 750

Reliability 2,770

# Our RoRE (Return on Regulatory Equity)

(average real equity return over 8 year price control)

## RAV (Regulatory Asset Value)

### For every pound that we spend, we collect:

10% of the costs in the same year

90% of the costs over the life of the asset, which gets added to the 'Regulated Asset Value' (RAV) balance.

### Ofgem assume that we fund this RAV by:

55% borrowing – on which we receive interest payments of 2.55% (for 2015/16)

45% equity – on which we receive a return of 7.0%, as set by Ofgem for the 8-year price control.

The weighted average cost of **funding the RAV is therefore 4.55%** for 2015/16.

At 31st March 2016 **our RAV was £1,984m (15/16 prices)**, an increase of 17% from £1,699m (15/16 prices) in the prior year, as we continue to invest in the network.

Investment into the electricity transmission network is a long-term project, the costs of which are spread out over the lives of those assets.

Consistent with the RIIO price control framework Ofgem attached a financial reward/penalty to a number of the incentives. This has the effect of changing our Return on Regulated Equity (RoRE) as shown in the table opposite:

RoRE is calculated based on values in 09/10 prices and therefore represents an average real equity return over the 8-year price control.

We have followed the methodology used by Ofgem in their Electricity Annual Report 2014/15 to ensure consistency. This is an evolving area of reporting, but we are voluntarily presenting these numbers to aid stakeholders.

The main movement in RoRE from prior year is an increase in the WACC differential we expect to achieve on the TIRG projects across the 8-year period.

For detailed information about our financial performance, please see the SP Transmission Regulatory Accounts which are published annually, available from [www.scottishpower.com/pages/accounts\\_information.asp](http://www.scottishpower.com/pages/accounts_information.asp)

## 8 year average 2015/16

7.00%	<b>Base Return</b> – Set by Ofgem for the eight-year period.
0.54%	<b>IQI Additional Income</b> – Agreed by Ofgem as part of the price control, and is a reward for the quality of our business plan and recognition of our fast-tracking.
0.86%	<b>Totex Efficiency Savings</b> – Any savings we make on our investment plan are shared 50:50 with the consumer, and we are currently forecasting some savings over the eight-year period. This results in a benefit to both consumers and our shareholders, and is in addition to meeting all of our specified outputs.
0.12%	<b>Reliability Incentive</b>
0.01%	<b>Stakeholder Engagement</b>
0.02%	<b>Environmental Discretionary Reward &amp; SF6 Emissions incentive</b>
0.44%	<b>TIRG Incentive</b> – Differential in allowed WACC reflecting higher risk TIRG projects
8.99%	<b>Return on Regulatory Equity</b>





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