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RIIO-ET1
Annual Report
2017-18

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Associated documents

[RIIO-T1: Final Proposals for NGGT and NGET - Overview](#)
[RIIO-T1: Final Proposals for NGGT and NGET – Outputs, incentives and innovation](#)
[RIIO-T1: Final Proposals for NGET and NGGT – Cost assessment and uncertainty](#)
[RIIO-T1: Final proposals for SP Transmission Ltd and Scottish Hydro Electricity Transmission](#)

Transmission networks own reports on their performance:

NGET: <http://www.talkingnetworkstx.com/general-performance.aspx>
 SHE Transmission (SHET): <https://www.ssen-transmission.co.uk/information-centre/industry-and-regulation/transmission-price-control-review/>
 SPT: [https://www.spenergynetworks.co.uk/pages/transmission annual performance reports.aspx](https://www.spenergynetworks.co.uk/pages/transmission_annual_performance_reports.aspx)

Other documents:

Mid-period review parallel work decision:
<https://www.ofgem.gov.uk/publications-and-updates/mpr-parallel-work-decision>
 National Grid's deferral of RIIO-ET1 allowances:
<https://www.ofgem.gov.uk/publications-and-updates/modifications-et1-gtd1-pcfms-account-london-medium-pressure-refund-and-national-grid-voluntary-allowance-deferral>
 SPT Green Economy Fund:
https://www.spenergynetworks.co.uk/pages/green_economy_fund.aspx
 SHET hand back of RIIO-ET1 allowances (page 32):
http://sse.com/media/485986/SSE-Interims-17_18.pdf

Exec Summary

RIIO-ET1 is the first electricity transmission price control that utilises the RIIO (Revenue = Incentives + Innovation + Outputs) price control model. This price control began on 1 April 2013 and runs for eight years, to 31 March 2021.

This report outlines our key findings on the delivery and financial performance of onshore electricity transmission owner (TO) businesses through the RIIO-ET1 price control period. It presents TO performance in the following areas:

- achievement of annual output targets (with a specific focus on performance in 2017-18).
- anticipated level of delivery against outputs that adjust automatically with changing needs.
- innovation incentives.

The report gives an overview of the TO's current expectations of costs incurred¹ against the total allowance anticipated across RIIO-ET1. Chapter three summarises the companies' own views of delivery performance. Our assessment of TO performance is set out in the company specific appendices.

We also comment on certain aspects of the electricity transmission system operator's (SO) performance over the same period.

Meeting annual output targets

All TOs have met or exceeded the annual targets set against all applicable output categories. These include: safety; reliability; availability; customer satisfaction, environmental and timely connections.

Meeting baseline output targets

The connections & wider works output category measures delivery against expected thresholds, based on 'baseline' assumptions of customer needs set at the start of RIIO-ET1, or scheduled delivery dates of large scale reinforcements (known as 'baseline wider works').

We note that NGET's current eight-year volume of new generation, new demand and works to strengthen boundaries is forecast to be lower than the baseline amount agreed at the time of settlement. This position reflects the changing requirements of customers.

Based on current information, SPT is currently expecting to fall short against its baseline expectations in relation to sole-use connection capacity. The change in customer requirements is expected to reduce the portfolio forecast below the baseline threshold

¹ Five year actual costs incurred and a forecast of the costs to be incurred over the remaining three years of the RIIO-ET1 period. All financial values in the summary are in 2017-18 price base.

output – and a clawback of allowance is assumed. SHE Transmission is forecasting to exceed the baseline thresholds forecast at the business plan stage.

In terms of baseline wider works, delays are reported against the completion of the Western link - which is being delivered through a joint venture between NGET and SPT.

TO: Eight-year performance

All of the TOs currently anticipate underspending relative to their expected totex allowances, with forecast underspends ranging between 3% and 15% across RIIO-ET1.

The primary drivers that are contributing to the companies' totex underspend are associated with costs incurred in the categories of load related activities (new assets) and non-load related activities (monitoring, maintaining and replacing existing assets).

In the non-load related area NGET is currently forecasting to achieve significant underspend (25% below forecast allowance) across the entire RIIO-ET1 period. This is as a result of the net effect of re-scheduling of work and change in its intervention strategies on existing assets. On the load side of the business, changes in NGET's portfolio of investment relative to the original baseline plan and adjustment around it is driving a forecast underspend across the price control period.

SHET's expected totex underspend (9% below forecast allowance) is the largely driven by forecast cost savings associated with load related activities. Approximately a third of the forecast totex underspend is driven by delivery of the three large scale reinforcement projects being lower than the original allowance – the result of project delivery efficiencies reported by the company². The forecast underspend on load related activities is anticipated to outweigh the overspend anticipated on non-load activities.

SPT's current forecast of totex underspend (3% below forecast allowance) is driven by three main factors. First, there have been changes in the scope of activity necessary to connect new generators to its network such that increased capacity across some routes is no longer needed. Second, improvement in contracting techniques, particularly on large scale projects. Thirdly, re-profiling of investment to manage network access issues has led SPT to substitute equivalent asset types and volumes and to reduce spend.

Based on our own assessment of the value of TOs' forecast totex performance at the end of the eight-year period, we have calculated a current Rate of Regulatory Return on Equity (RoRE) range between 8.0% and 10.4%.

SO: Eight-year performance

The SO is currently expecting spend to be 1% above totex allowance across the RIIO-ET1 period. This is driven by an overspend in business support and non-operational capex outweighing underspend in other areas.

² Not including the impact of a proposed 'hand back' of allowance valued at c.£60 million (2017/18 prices).

1. Introduction and context

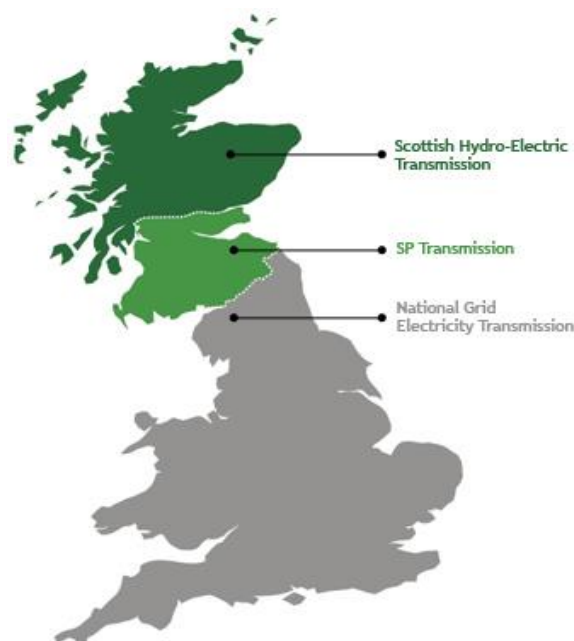
1.1. The electricity transmission network in Great Britain (GB) consists of the high voltage electricity wires and cables, which convey electricity from power stations to local distribution networks and large-scale customers directly connected to the system.

1.2. Owners of the networks have obligations including ensuring that they are able to provide an economic and efficient service to parties who wish to connect onto their network. This means having in place necessary new infrastructure or refurbish existing infrastructure appropriately to ensure its network is capable of transporting electricity at all times.

1.3. Three activities are crucial in providing a robust network: minimising the impact of construction activities to accommodate new generation and demand (to avoid unnecessary interruptions), good management of existing assets (to reduce the likelihood of failure) and, when there is a loss of supply, to ensure supplies are restored as quickly as possible. The challenge is to do this safely, effectively and at lowest cost to consumers.

1.4. The providers of electricity transmission services (transmission owners, or TOs) are natural regional monopolies. To ensure value for money for consumers, we regulate TOs through periodic controls. Among other things, this determines the amount of revenue that TOs are able to earn from network users (through the charges users pay) and stipulates the level of performance we expect TOs to deliver. It also sets the framework for the capital investment they are able to make in maintaining and developing the networks. There are three onshore providers of electricity transmission services.

Company	Network	Ref. used in report
National Grid Electricity Transmission	England & Wales	NGET TO (NGET SO is GB-wide)
Scottish Hydro Electric Transmission	North of Scotland and Scottish island groups	SHET
ScottishPower Transmission	South of Scotland	SPT



RIIO framework

1.5. To set our price controls we use the RIIO (Revenue = Incentives + Innovation + Outputs) framework. The current electricity transmission price control runs for an eight-year period from April 2013 until March 2021.

1.6. At the start of the price control, we set the 'baseline' allowance that would determine the revenue that TOs can earn. The value of this allowance was based on knowledge of projects that were deemed fairly certain to proceed at the time of settlement. There are outputs associated with baseline allowances that TOs must deliver either on an annual or eight-year basis. The outputs are intended to capture the things most valued and needed by consumers.

1.7. Three main categories of allowances were set in the RIIO-ET1 price control:

- Ex-ante (upfront and fixed) allowance. This reflects areas of work where there was an established customer-driven need for the delivery of pre-agreed outputs (or works not linked to specific outputs because of their unique nature).
- Allowances driven by 'uncertainty mechanisms'. In some areas (like connecting 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. To reflect this uncertainty allowances flex year-on-year, depending on TOs' performance against targets. The parameters of these mechanisms were agreed upfront.
- Where there is significant uncertainty with some investment projects, the individual schemes are subject to a within-period determination by the Authority. The most notable example is the Strategic Wider Works (SWW) process.

Annual reporting

1.8. Each year we report on how the onshore TOs have performed against the outputs and allowances set for the RIIO-ET1 price control. This is part of our annual process of monitoring network companies, and holding them to account for the money they spend and collect from consumer bills.

1.9. In July of each year, each TO must submit information to us that outlines the actual costs they have incurred up to 31 March of that year and forecast costs to the end of RIIO-ET1. They also provide a written commentary with further detail, including reasons for differences between costs, allowances and forecasts.

1.10. We analyse this information and examine any variation in TO performance against their annual and eight-year output targets. We also meet with the companies to discuss technical and financial aspects of their submissions.

1.11. This report presents the data in two ways.

- a. The main body of the report presents each licensee's eight-year totex performance against the price control obligations and incentives using data and supporting information provided by each licensee (the 'company view').
- b. The appendices set out our assessment of the eight-year performance for each TO (the 'Ofgem's view').

1.12. The company assessment of totex values includes:

- the impact of decisions made as part of the 2017 Mid Period Review (MPR)
- the impact of any voluntary deferrals that are currently reflected in the financial model, and
- all TO estimates of expenditure and expectations of funding to be made available under uncertainty mechanisms across the price control period.

The company assessment does not include:

- the impact of any 'hand back' of allowance where the profile has yet to be formally agreed with Ofgem (this is applicable to SHET only), and
- the current forecast value of the end-of-period "true-up"³.

1.13. Our assessment builds upon the above and makes further adjustments to exclude:

- TO estimates of volume driver allowances and expenditure where the Authority have not made a determination and funding has not yet been agreed⁴, and
- expenditure in areas we think are outside the scope of RIIO-ET1, and where it is unlikely that the conditions required to trigger the additional allowances will be met.

1.14. Our assessment of the current forecast value of the true-up is highlighted (see appendices 3 and 4) but its impact is not deducted from the value of the price control allowance.

³ The original business plan included forecasts of the contributions expected to be received from customers with connections to single users. The net expenditure for these connections is funded directly by the customer and any income received by the TO is not treated as part of the allowed revenue permitted to be recovered through network charges. Final Proposals clarified that the position would be "trued up" at the end of T1.

⁴ We have removed the impact of works that have not yet been assessed or the assessment has to be concluded in two areas: (i) construction costs associated with SWW projects 'not yet approved', and (ii) the licence term TPWW (this licence term is applicable to NGET TO only).

1.15. For the avoidance of doubt, the approach applied in our “true-up” assessment is a snapshot based on current information and is not a conclusion on the form and scope of the end of period reconciliation. Separate discussions will continue with the network companies on the parameters to be applied at the end of the RIIO-ET1 period.

1.16. It is important to note that by removing costs/allowance forecasts from our analysis we are not indicating that the company values submitted as part of the reporting pack are not an accurate forecast of the required activities or suggest that the activities they are associated with are inefficient. The adjustments have been made only to reflect the uncertain nature of these costs and the associated within period assessment that has yet to take place or has not yet concluded. It also seeks to provide an additional level of transparency and understanding of drivers of the current forecast of under- and over-spend across the RIIO-ET1 period.

1.17. The following chapters provide more detail:

- **Chapter 2: Outputs, incentives and innovation** – explains how the TOs have performed against their output commitments over the fifth year of the RIIO-ET1 period. It also indicates the incentive payments earned by the licensees, presents an overview of TOs’ expenditure in relation to the innovation incentives, and briefly sets out the key elements of financial performance⁵.
- **Chapter 3: Eight year TO totex performance** - outlines the current eight-year ‘company’ view of totex compared with the current forecast allowances. Our assessment of the annual submissions is set out in the appendices.
- **Chapter 4: SO performance** – provides information regarding the performance and costs incurred by NGET in its role as the SO for the GB system.
- **Appendices**
 - Appendix 1 summarises the current ‘company view’ forecast of SHET and SPT across the price control period. These are grouped together due to the decision to fast-track the settlement of these network companies.
 - Appendix 2 provides more detail on the current ‘company view’ forecast of NGET TO across the price control period.
 - Appendix 3 summarises our assessment of performance for SPT and SHET.
 - Appendix 4 summarises our assessment of performance for NGET TO.

1.18. Unless otherwise stated, all financial values in this report are in 2017-18 prices.

⁵ More detail on the financial performance of the ETOs can be found in a separate document published alongside this annual report.

2. Outputs, incentives and innovation

Chapter Summary

This chapter examines TO actual performance in meeting their output commitments over the fifth year of the RIIO-ET1 period and forecast position across the entire RIIO-ET1 period. This chapter also presents an overview of TOs' expenditure in relation to the various innovation incentives and financial performance.

Outputs and measures of performance

2.1. RIIO-ET1 was set as an outputs-based price control. On output delivery, our assessment is against expectations set out in the licence and/or detailed in the Final Proposals (FP) document, including:

- targets which have associated rewards/penalty through incentives
- targets (and associated allowances) which adjust automatically with changing needs
- other expectations against which we hold TOs and the SO to account.

2.2. The following seven outputs form the cornerstone of the RIIO price control framework⁶:

- i. safety
- ii. reliability
- iii. availability
- iv. environmental
- v. customer satisfaction
- vi. timely connections
- vii. connection works and wider works

2.3. In this chapter, we focus on those outputs which are financially incentivised through rewards and/or penalties. We finish the chapter with an overview of TOs' expenditure in relation to the various innovation incentives over the RIIO-ET1 period.

2.4. Table 1 below provides an overview of output performance across all categories. Where outputs have multiple metrics, we present some quantifiable measures for illustration.

⁶ Further detail of the outputs framework in RIIO-ET1 is available on the Ofgem website in the link: [RIIO-ET1: Final Proposals for NGGT and NGET – Outputs, incentives and innovation](#)

Table 1: Outputs and measures of performance

White: no financial incentive
Green: on target / ahead of target
Red: off target / behind target

Output requirement	RIIO measure	TO's Performance
i Safety		
Comply with Health & Safety Executive law	To meet all safety legislation requirements.	All met
ii Reliability		
Minimise how much electricity is lost to our customers because of failures of the assets on the network	<u>2017/18 targets</u> NGET: less than 316 MWh SPT: less than 225 MWh SHET: less than 120 MWh	All below target
iii Availability		
Implement the Network Access Policy⁷	Implement and maintain policy.	All met
iv Environmental benefits		
Minimise SF6 greenhouse gas emissions Reward/penalty based on the non-traded carbon price for carbon equivalent emissions.	<u>2017/18 limits⁸</u> NGET: 12,449.9 tCO ₂ e SPT: 782.1 tCO ₂ e SHET: 340.2 tCO ₂ e	All below limits⁹
Environmental Discretionary Reward (EDR) Annual funding of up to £4m will be available in each scheme year.	<u>Performance band:</u> SPT: Proactive (69%) NGET: Proactive (68%) SHET: Leadership (81%)	Financial reward¹⁰ SPT: none NGET: none SHET: £4m
Publish annual progress on <ul style="list-style-type: none"> Business Carbon Footprint¹¹ Transmission Losses 	No financial incentive	All met
v Customer satisfaction		
Customer Satisfaction Survey (NGET only) and Stakeholder Satisfaction Survey (all)	<u>2017/18 targets</u> <ul style="list-style-type: none"> NGET Customer 6.9/10 NGET Stakeholder 7.4/10 SPT Stakeholder 7.4/10 SHET Stakeholder 7.4/10 	NGET: 7.74/10 NGET: 7.88/10 SPT: 8.3/10 SHET: 8.0/10
Stakeholder engagement discretionary reward	Neutral point: 5.0/10	NGET: 5.1/10 SPT: 6.4/10 SHET: 3.25/10

⁷ In June 2015 the Authority approved a single common NAP for Scotland, applicable to both SPT and SHET, and a separate NAP for England and Wales, capturing NGET's functions of SO and TO.

⁸ The target for SF6 leakage increases as the number of assets on the network using SF6 increases.

⁹ This is the first year that SHET have achieved a reduction in leakage rates relative to the pre-agreed annual limit (326.8MW).

¹⁰ <https://www.ofgem.gov.uk/publications-and-updates/decision-riio-t1-environmental-discretionary-reward-2017-18-scheme-year>

¹¹ Total BCF (tonnes per CO₂ equivalent) in 2017-18: 2,197,699; Total BCF in 2016-17: 2,384,362; Total BCF in 2015-16: 2,911,307; Total BCF in 2014-15: 3,151,539.

vi Timely connections		
The timely meeting of existing licence requirements in relation to delivering new generation & new demand connections.	Financial incentives apply to SPT/SHET only; no financial incentive on NGET as it is the contractual interface with customers.	All new or modified offers provided to customers within the 90 days.¹²
vii Connection works and Wider works		
NGET (TO): Connection of new generation	<ul style="list-style-type: none"> Baseline target: 33.7GW¹³ Current T1 forecast: 12.5GW 	These measures are subject to company specific volume driver mechanisms.
Construction of new OHL to accommodate new customers	<ul style="list-style-type: none"> Baseline target: 215.4km OHL Current T1 forecast: 41.4km OHL 	
NGET (TO): Construction of new super grid transformers (SGT)	<ul style="list-style-type: none"> Baseline target: 72 SGT Current T1 forecast: 40 SGT 	
Construction of new OHL to accommodate new customers.	<ul style="list-style-type: none"> Baseline target: 27km OHL Current T1 forecast: 5.42km OHL 	
NGET (TO): Incremental Wider Works to strengthen specific boundaries	<ul style="list-style-type: none"> Baseline target of 23GW Current T1 forecast: 11GW 	Further detail is provided in the section below and in the relevant company appendices.
SPT: New generation connections (MW)	<ul style="list-style-type: none"> Baseline threshold: 2,503MW Current T1 forecast: 1,620MW 	These measures are subject to company specific volume driver mechanisms.
SPT: New network capacity (MVA)	<ul style="list-style-type: none"> Baseline threshold: 1,073MVA Current T1 forecast: 3,482MVA 	
SHET: New generation connections (MW)	<ul style="list-style-type: none"> Baseline threshold: 1,168MW Current T1 forecast: 1,572MW 	Further detail is provided in the section below and in the relevant company appendices.
SHET: New network capacity (MVA)	<ul style="list-style-type: none"> Baseline threshold: 1,006MVA Current T1 forecast: 4,179MVA 	
Delivery of Baseline Wider Works (BWW)	<p>SPT: Three BWW outputs delivered on time. The WHVDC link is forecast to be delivered to a revised completion date. The Kilmarnock South scheme is the subject of a substitution.¹⁴</p> <p>SHET: All BWW outputs delivered on time.</p> <p>NGET (TO): Four BWW outputs delivered on time. The WHVDC link is delayed.</p>	Further detail is provided in the relevant appendices.
Delivery of Strategic Wider Works (SWW)	<p>SPT: No approved SWW projects or potential SWW projects within RIIO-ET1.</p> <p>SHET: Based on current information, all three approved SWW projects have been delivered.</p> <p>NGET: Progressing five projects which NGET expects to meet the criteria of the SWW arrangements¹⁵.</p>	

¹² SPT reports that one final offer was delivered late, with the draft being delivered early, but no customer impact was recorded as the customer received their offer on time.

¹³ The baseline assumed 33.7GW of generation would connect during the 8-year period, which was based on an energy outlook premised on the 2012 Gone Green scenario and NGET's 2012 Business Plan.

¹⁴ The MPR confirmed that SPT propose to deliver an alternative Voltage Control scheme (420MVA) in lieu of delivering Kilmarnock South scheme and will utilise the baseline funding accordingly.

¹⁵ The connection of the Hinkley-Seabank project, the North West Coast Connection at Moorside, the Eastern

Annual targets

2.5. The safety category requires adherence to all safety legislation requirements and has no explicit target. All companies are in compliance with the necessary legislation.

2.6. Four categories contain an annual output target that was agreed as part of the RIIO-ET1 settlement (reliability; availability; customer satisfaction and environmental). Meeting the commitment will generate incentive payments to the TO, with penalty deductions triggered in the event of a TO missing an annual target. All TOs performed well in 2017-18 and have met or exceeded the targets set in these categories.

2.7. The sixth output category (timely connections) reflects the licence requirement to ensure the TOs respond in a timely manner to customer requests for connection to the national electricity transmission network (NETS). All network companies are providing new or modified connections offers to customers within the required licence timescales.

Volume drivers

2.8. Volume driver mechanisms are linked to actual volume of network services provided over the price control. The mechanisms ensure that consumers only pay for the actual volume of activity that is required – the total allowance is adjusted when the actual volume of output delivered is different from the forecast delivery envisaged by the original business plan submissions (also referred to as the 'baseline').

2.9. The volume driver seeks to recognise the uncertainty associated with changes driven by factors that are beyond the direct control of the each TO (eg. distance from the existing network, size and design of connection required). A range of volume driver mechanisms were introduced to manage this uncertainty.

2.10. The mechanisms include:

- works needed to connect new generators to the national electricity transmission system (NETS¹⁶) in England and Wales and reinforcement of existing local infrastructure in some cases. This reflects the construction of infrastructure¹⁷ assets associated with an individual generator's choice of the design and type of connection (ie. new connections to the local network).¹⁸
- works needed to connect new generators to the NETS in Scotland. There are separate mechanisms to connect one generator at a time, measured in megawatts (MW), and another to connect multiple generators, which is measured by the increase in transfer capability, megavolt amperes (MVA).

HVDC link from Scotland to England, a new east-west circuit between the north east of England and Lancashire, and new transmission route Between South London and the South East Coast.

¹⁶ The NETS is the high voltage network of overhead lines, cables and substations that transports electricity across Great Britain.

¹⁷ Infrastructure assets can be potentially shared by other users of the NETS. 'Local' infrastructure will be between the point of entry to the NETS and the point of entry to the main interconnected system.

¹⁸ The output is measured in terms of the additional generation capacity connected in Megawatts (MW) and the circuit kilometres of overhead line required.

- works driven by new demand customers requesting connection to the NETS in England and Wales and reinforcement of existing local infrastructure in some cases¹⁹.
- works to strengthen network boundaries measured by the increase in transfer capability in England and Wales. Referred to as incremental wider works (IWW). This refers to infrastructure assets “deeper” into the transmission system whose design is subject to a more rigid set of design criteria to reflect the ‘interconnected’ nature of the network.
- to reflect mitigation activities on a distribution network (e.g. taking over a distribution voltage route and rebuilding at transmission voltage) and undergrounding of cable required by planning requirements in England and Wales.

211. The expected output is based on the baseline assumptions set at the start of RIIO-ET1 and then adjusted with actual outturn. The output delivery for each of the above mechanisms is heavily influenced by the scale of change in customer-driven activity.

2.12. For NGET TO, the required output across three customer-led mechanisms (generation, demand and works to strengthen network boundaries) is significantly lower than the original baseline due to the reduction in the number and size of customer connections observed across the period.

2.13. Over the entire price control period, NGET TO is currently anticipating to deliver:

- 12.5 GW of generation capacity against a baseline delivery of 33.7 GW,
- 40 SGTs against a total baseline delivery of 72
- 13 GW compared to the baseline of 25.3 GW.
- mitigation works include a new Grid Supply Point and the removal of an existing overhead line (79 towers) to meet planning requirements.

2.14. For SPT, the output delivered under the sole-use infrastructure mechanism is significantly lower than the baseline threshold due to the reduction in the number and size of customer connections observed across the period. The shared-use infrastructure mechanism has delivered the threshold level of network capacity. To date, SPT have delivered 1,361MW of sole-use capacity and 1,073MVA of shared-use capacity.

2.15. Over the entire price control period, SPT is currently anticipating to deliver 1,620MW of sole-use capacity. SPT currently anticipates a clawback allowance through

¹⁹ The output is measured in terms of the number of additional supergrid transformers (SGTs) connected and the circuit kilometres of overhead line required.

the operation of the volume driver mechanism (details in appendix 3). In terms of shared-use, SPT currently expects to deliver 3,482MVA across the price control period.

2.16. For SHET, the actual output delivery across both the sole and shared use mechanisms is 1,155MW of sole-use capacity and 1,020MVA of shared-use capacity.

2.17. Over the entire price control period, SHET is currently anticipating to deliver 1,572MW of sole use capacity and 4,179MVA of shared use capacity.

Baseline wider works (BWW)

2.18. These are reinforcement projects that, at the start of RIIO-ET1, were identified as having a strong needs case and a high degree of certainty. The works will increase electricity transfer capability across system boundaries, or within system boundaries. The output, scheduled delivery dates and level of funding were subsequently set out in the licence. The delivery status of the BWW outputs is as follows:

- SHET have delivered both BWW outputs,
- SPT have delivered four (of five) BWW outputs,
- NGET TO have delivered three (of four) BWW outputs, and
- Delays are reported against the completion of the Western link - which is being delivered through a joint venture between NGET and SPT.

Strategic wider works (SWW)

2.19. These are large scale reinforcement projects that, at the start of RIIO-ET1, had a high degree of uncertainty as to whether the associated projects would actually be required. To help manage this uncertainty TOs can seek a decision during RIIO-ET1 to confirm the needs case and to determine the level of funding for construction works.

2.20. To date, only SHET have sought and received approval for three SWW investments. All projects have been delivered. SPT and NGET have no approved projects.

Network Output Measures (NOMs)

2.21. A further output target is the NOMs. One measure - the Network Replacement Output - has directly associated allowances related to delivery of specified targets. The targets apply at the end of the price control. If by that time a TO has delivered above or below its target then it may receive a revenue reward or penalty in RIIO-ET2. Any reward or penalty is dependent on whether the over or under delivery is justified or unjustified.

2.22. Based on current information, we note that each TO does not expect to deviate significantly from its end-of period targets. However, it should be noted that the methodologies that will be used for assessing delivery have only recently been approved, and we need to restate (rebase) the targets in accordance with the new methodologies.

Incentives

2.23. Table 1 highlights that during RIIO-ET1 to date all three TOs have performed well under the incentive framework; outperforming their baseline targets. The key features of this outperformance (to date) is briefly summarised below.

2.24. There is a two year lag between a TO incurring a reward or penalty and the adjustment to its allowed revenue. The numbers below relate to year of performance, not the year of revenue recovery. A positive number reflects a payment to the network.

Stakeholder Satisfaction Output

2.25. The Stakeholder Satisfaction Output (SSO) was designed to encourage TOs to become more outwardly focused in their business practices and to be more responsive to changing stakeholder needs.

2.26. In RIIO-ET1 performance against the SSO is primarily incentivised and assessed through the quality of network companies' engagement with their stakeholders (the 'Stakeholder Engagement Incentive' or SEI).

2.27. The SEI was designed to drive behavioural change by financially rewarding those network companies that undertake high quality engagement activities and use the outputs from this process to inform how they plan and run their business on an ongoing basis.

2.28. Company performance under the SEI has been positive overall – see table 2. So far in RIIO-ET1 stakeholder engagement has become increasingly embedded in the businesses and the independent panel has determined that the majority of network companies are committed to engagement.

Table 2: TO performance under the SEI

	2013-14	2014-15	2015-16	2016-17	2017-18
	Score out of 10				
SPT	4.90	5.50	6.25	6.25	6.40
NGET	5.75	6.00	6.25	7.00	5.10
SHET	5.40	6.00	6.00	5.40	3.25

2.29. The SEI is managed independently from the other components of the SSO, which include²⁰:

- a Stakeholder Satisfaction Survey weighted at 60% for the Scottish TOs and 30% for NGET of the incentive's overall value;
- Key Performance Indicators (KPIs) that apply to the Scottish TOs and are weighted at 30% of the incentive's overall value; and
- an External Assurance (EA) methodology applies to the Scottish TOs and has a weighting set at 10% of the incentive's overall value.

2.30. These components of SSO were 'switched on' in the year 2016/17. Performance from the last two years in which the incentive was live showed that there has been sector outperformance against the survey baseline of 7.4 (out of 10). We have seen mixed performance from the Scottish TOs (SPT and SHET) against the KPIs, with general compliance within the External Assurance component.

2.31. Table 3 below summarises performance to date in RIIO-ET1 against the above components.

Table 3: Performance Scores for the SSO Survey

	16/17	17/18	Baseline
Survey Scores			
SPT	7.9	8.3	7.4
SHET	8.7	8.0	7.4
NGET	7.7	7.88	7.4
KPI Scores			
SPT	77	78	69
SHET	69	76	89
External Assurance			
SPT	Exceeding	Exceeding	N/A
SHET	Compliant	Compliant	N/A

2.32. The combined incentive payment earned by each TO under the SSO presented in table 4 below.

2.33. NGET, SHET and SPT will receive a financial reward of approximately £32.1 million, £2.5 million and £4.8 million respectively for performance between 2013-2018 (values presented in 2009-10 prices).

²⁰ The survey, KPIs and external assurance components were introduced at the beginning of RIIO-ET1 but the incentive was 'switched off' for the first three years (2012-2015). This 'switched off' period enabled us to gather performance data to help create an informed baseline for surveying in the remainder of the price control (2016-2021)

Table 4: TO financial performance under the SSO

	2013-14	2014-15	2015-16	2016-17	2017-18
	£m, 2009-10 prices				
SPT	0.3	0.5	0.7	1.6	1.6
NGET	5.4	6.1	7.0	7.8	5.8
SHET	0.3	0.6	0.7	1.0	-0.2

Small rounding errors may exist.

Energy Not Supplied (ENS)

2.34. 'Energy not supplied' means the volume of energy to customers that is lost as a result of faults or failures on the network. ENS is measured in Megawatt hours (MWh). Reducing ENS means minimising interruptions to supply on the electricity system.

2.35. The transmission network supplies all of GB, including distribution networks and other large industrial customers. In general, reliability on the transmission system is very high. Disruptions to supply at transmission level voltages typically have a low probability of occurrence, but a high impact on those connected to the network.

2.36. The ENS incentive was first introduced to enhance the existing regulatory and legislative framework by providing a financial incentive to encourage TOs to go above the minimum standards required by Security and Quality of Supply Standard (SQSS)²¹, and to deliver a higher level of reliability, where it is good value for consumers.

2.37. The purpose of the ENS incentive is to encourage TOs to prioritise and improve network reliability, where reasonably practicable, by reducing the number and duration of loss of supply events by managing shorter term operational risk and mitigation actions. This also includes ensuring the TOs respond in a timely manner to, and mitigate the impact of, incidents when they do occur.

2.38. TOs are set a target for ENS at the start of the price control. TOs then receive an annual penalty/reward depending on whether their actual ENS in the year is above or below the target level (£16,000/MWh multiplied by the efficiency incentive rate)²².

2.39. Over RIIO-ET1, we have seen TOs consistently outperform their baseline ENS target. All three TOs are reporting low levels of ENS, as highlighted in table 5 below.

²¹ <https://www.ofgem.gov.uk/licences-industry-codes-and-standards/standards/security-and-quality-supply-standard-sqss>

²² The incentive value for ENS reflects a value of lost load (VoLL). VoLL represents the value that electricity users attribute to security of electricity supply.

Table 5: ENS performance

	2013-14		2014-15		2015-16		2016-17		2017-18 ²³	
	MWh	% below target	MWh	% below target	MWh	% below target	MWh	% below target	MWh	% below target
SPT	42.2	81%	2.8	99%	13.9	94%	10.3	95%	3.0	99%
NGET	135.0	57%	8.7	97%	4.5	99%	6.8	98%	39.7	87%
SHET	35.6	70%	106.1	12%	0	100%	4.4	96%	24.3	80%

Small rounding errors may exist.

2.40. NGET, SHET and SPT will receive a financial reward of approximately £13.1 million, £4.3 million and £10.6 million respectively for outperformance against between 2013-2018 (values presented in 2009-10 prices).

Table 6: TO financial performance under ENS

	2013-14	2014-15	2015-16	2016-17	2017-18
	£m, 2009-10 prices				
SPT	1.9	2.3	2.1	2.1	2.2
NGET	1.8	2.9	2.9	2.9	2.6
SHET	0.9	0.1	1.2	1.2	0.9

Limiting sulphur hexafluoride (SF₆) emissions

2.41. TO activities involve the emissions of several environmentally damaging gases – carbon dioxide (CO₂) and SF₆ are the most significant of these. SF₆ is a particularly potent greenhouse gas (GHG).

2.42. SF₆ gas is used in some high voltage (HV) switchgear, because it has excellent insulating properties that cannot commonly be matched by other insulation and interruption gases (IIG) available in the market. SF₆ assets are used when air insulated switchgear is not a viable option, due to limitations such as available building space.

2.43. TOs are subject to a financial incentive to limit their emission levels of SF₆ gas. The RIIO-ET1 SF₆ incentive is designed to drive companies to fully consider lifetime costs (including the environmental impact of the expected emissions) when making decisions about SF₆ assets and to improve the management of, and reduce leakage rates from, SF₆ assets operating on the system.

2.44. In RIIO-ET1 each TO has a different leakage target depending on its assets, and baselines adjust each year to account for new assets containing SF₆ that are added to the network. TOs are subject to a reward/penalty based on the difference between their

²³ For SHET and NGET, while the ENS value is worse than the previous reporting year (2016/17), incidents have reduced and both companies continue to perform well against the annual target.

actual emissions and their baseline leakage target. The value of the incentive is set each year based on prevailing non-traded annual carbon price.²⁴

2.45. The SF₆ incentive in RIIO-ET1 has been effective in driving improved management of SF₆ assets, as shown by the overall decrease in emissions from leakage - there has been a 12% reduction in total SF₆ emissions between 2013/14 and 2017/18. However, due to new assets being constructed, the total volume of SF₆ used on the electricity networks is increasing.

2.46. SHET reported an annual improvement in their scores against the target over the first five years of the price control but an increase on year-on-year emitted kg of SF₆ (74kg) due to expansion of SF₆ asset base. Based on current information, this is the first year that SHET will be rewarded for meeting their agreed target for reducing leakage of SF₆ gas in the environmental output category.

2.47. SPT reported an increase on year-on-year emitted kg of SF₆ (72kg) compared to the previous RRP, despite being below the target emission. The increase in year is due to leaks at the Torness 400kV GIS board which is in excess of 30 years of service. SPT continues to target to reduce these leaks by utilising new technologies to detect and repair leaks.

2.48. NGET reported a decrease on year-on-year emitted kg of SF₆ (1,385kg) compared to the previous RRP. The decrease in year is due to continued improvement in repairing SF₆-leaking assets. NGET replaced 24 of the top-leaking instrument transformers in the 2017-18RRP.

Table 7: SF₆ performance

	2013-14	2014-15	2015-16	2016-17	2017-18
	% vs target	% vs target	% vs target	% vs target	% vs target
SPT	+27%	-16%	-29%	-45%	-41%
NGET	-16%	-22%	-21%	-11%	-23%
SHET	+122%	+96%	+22%	+0.03%	-4%

2.49. In RIIO-ET1, NGET and SPT have outperformed against target emissions levels of SF₆ and will receive a cumulative financial reward of approximately £8.2 million and £0.7 million respectively (values presented in 2009-10 prices). In contrast, 2017/18 is the first year that SHET have met their agreed target for reducing leakage of SF₆ gas. As a result, SHET is subject to a cumulative financial penalty of approximately -£0.2 million across the RIIO-ET1 period (2009-10 prices).

²⁴ Recommended by the Department for Business, Energy & Industrial Strategy.

Table 8: TO financial performance under SF₆

	2013-14	2014-15	2015-16	2016-17	2017-18
	£m, 2009-10 prices				
SPT	-0.1	0.1	0.1	0.3	0.3
NGET	1.4	1.9	1.8	1.0	2.1
SHET	-0.1	-0.1	0.0	0.0	0.0

Small rounding errors may exist.

Cumulative rewards and penalties

2.50. Table 9 below summarises the indicative revenue rewards and penalties accumulated to date over the first four years of RIIO-ET1 across all of the output incentive mechanisms with an associated annual revenue reward or penalty. There is a two year lag between a TO incurring a reward or penalty and the adjustment to its allowed revenue.

Table 9: Output incentive mechanisms – indicative cumulative revenue rewards and penalties for 2013-18²⁵

	Cumulative reward or penalty			
	£m, 2009-10 prices	NGET	SHET	SPT
Total all mechanisms	55.1	6.4	22.4	83.9

Small rounding errors may exist.

2.51. So far, based on current indicative information taken from our price control model, the TOs will receive a cumulative reward of £83.9 million for exceeding targets during the first five years of the control period.

Business carbon footprint (BCF)

2.52. The TOs must report annually on the transmission network BCF. The network BCF includes:

- Scope 1 emissions directly related to the day-to-day business activities of network business.
- Scope 2 emissions which arise from operating the network, including the CO₂ emissions from losses of electricity that occur as a result of transporting energy on the network.
- Scope 3 emissions which are due to third party contractors carrying out business activities on behalf of the network.

²⁵ Figures are based on indicative estimates derived from our price control model and there will be differences with the values reported via the annual revenue returns provided by each company.

2.53. Table 10 below shows the BCF reported in the first five three years of the price control by the three transmission companies in terms of tonnes of carbon dioxide equivalent.

Table 10 - BCF in terms of tonnes of CO₂ equivalent per licensee in 2013-18

Year	NGET	SHET	SPT
2013-14	2,233,421	26,384	18,106
2014-15	2,552,420	346,176	252,944
2015-16	2,400,267	306,158	204,884
2016-17	1,986,349	124,173	273,844
2017-18	1,886,503	112,643	198,553

2.54. For all three TOs, transmission line losses were a dominant factor in their BCF contribution with NGET’s losses contributing 86% to total BCF, SPT at 94% and SHET at 77%. These are heavily influenced by the ongoing changes in the characteristics of the network (e.g. connection of renewables far from areas of high demand) and so year-on-year comparisons of BCF are not a suitable metric of efforts to reduce carbon emissions.

Transmission losses

2.55. In order to help provide long term value to consumers, all onshore TOs have a reputational incentive to reduce transmission losses. To date all three TOs have complied with the licence condition by putting strategies in place to reduce losses on their networks and by reporting against these annually.

2.56. Losses on the transmission network are affected by a number of factors including the volume of electricity transmitted, loading profile of circuits, the transmission distances between generation and demand, the level of reactive compensation, the type of transmission equipment (such as conductor) and the composition of circuits.

2.57. SHET’s network is prone to incurring higher losses than those of NGET or SPT.

2.58. Both SHET and SPT have shown a decrease in transmission losses from the previous RRP indicating performance improvement. NGET has shown a slight increase in transmission losses from the previous RRP. NGET state that the increase in losses is due to the dependency of losses on the locational balance of supply and demand.

Table 11 – Historical annual losses from the GB transmission system

Losses (%)	2013-14	2014-15	2015-16 ²⁶	2016-17	2017-18
NGET	1.59	1.68	1.73	1.55	1.78
SHET	6.48	11.82	11.45	4.96	4.90
SPT	2.26	1.86	1.93	3.01	2.60
GB losses	1.73	1.88	1.93	1.72	1.90

Innovation

2.59. The RIIO innovation mechanisms encourage TOs to make innovation central to the transition to a low carbon economy.

Network Innovation Allowance (NIA)

2.60. The NIA was established as part of the RIIO-ET1 price control. It is a use-it-or-lose-it allowance that each licensee received as part of its price control settlement. It is designed to fund smaller scale research, development and demonstration projects in line with the NIA Governance Document.²⁷ Licensees are able to use the allowance to fund qualifying expenditure.

2.61. This year all licensees have registered further NIA projects. Details on all the registered NIA projects can be found by following the footnote link.²⁸

Table 12 – Company activity under the NIA

Company	Total number of projects since 2013	Actual allowance claimed for the year (£m, nominal prices)				
		13-14	14-15	15-16	16-17	17-18
NGET ²⁹	197	6.1	9.1	8.8	6.1	5.6
SPT ³⁰	38	0.6	0.7	0.8	1.1	1.2
SHET ³¹	29³²	1.2	1.3	1.1	1.2	0.7

²⁶ Data reported by SHET was higher than usual due to an error in meter reading at grid supply point

²⁷The NIA Governance Document can be found here: <https://www.ofgem.gov.uk/publications-and-updates/version-30-network-innovation-allowance-governance-documents>

²⁸ <http://www.smarternetworks.org/>

²⁹ NGET's Annual Summary of NIA Activity is available [here](#)

³⁰ SPT's Annual Summary of NIA Activity is available [here](#)

³¹ SHET's Annual Summary of NIA Activity is available [here](#)

³² SHE Transmission do not have a cap on their annual NIA allowance – they have a cap on their allowance for the whole price control period. Their spending against the cap will be reviewed by us at the end of T1.

Network Innovation Competition (NIC)

2.62. The NIC is an annual competition open to both electricity transmission and distribution companies. It provides funding to a small number of large-scale innovation projects. If successful, these projects should bring a wide variety of financial and environmental benefits.

2.63. The scope of licensee involvement in the NIC is broader than the NIA, whereas other licensees may lead bids for funding under the NIC.

2.64. In 2018, one electricity transmission project was selected by us to receive a total of £10.27 million of funding. Further information on this projects is in our funding brochure³³ and the companies' full submissions published on our website³⁴.

Table 13 – Projects selected for funding in the 2018 NIC

Project Title	Lead company	NIC funding awarded (£m)	Total project costs (£m)*	Project end date
Black Start from Distributed Energy Resources (DER)	NGET	10.27	11.69	2022

*Includes other contributions e.g. from project partners or the network company shareholders.

Innovation Rollout Mechanism (IRM)

2.65. The purpose of the IRM is to facilitate the rollout of proven innovations, which will provide long-term value for money to consumers, in advance of the next price control period. To qualify, rollouts must deliver carbon and/or environmental benefits and must not provide a commercial return for the licensee within the price control period.

2.66. The first application window of the RIIO-ET1 price control opened in May 2015. We received one submission from SPT to deploy a new type of conductor on parts of its network to increase capacity. The alternative was to completely rebuild sections of network.

2.67. We concluded that the project met the relevant criteria and was in the interests of consumers. SPT received funding from the IRM of £24 million (2015/16 prices), which we considered to be an efficient cost to implement the project.³⁵

2.68. There are no further windows for transmission licensees to apply for IRM funding in the price control period.

³³ <https://www.ofgem.gov.uk/publications-and-updates/2016-network-innovation-competitions-brochure>

³⁴ <https://www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/electricity-network-innovation-competition>

³⁵ https://www.ofgem.gov.uk/sites/default/files/docs/2015/09/decision_irm_2015.pdf

Financial performance

2.69. Accompanying this report we have included a regulatory financial performance annex³⁶. This sets out our detailed assessment of the network companies'³⁷ regulatory financial performances, based on the information they submitted using the new regulatory finance performance reporting (RFPR) process. This provides more targeted, detailed financial information on performance under RIIO, namely the impact on each company's returns of that company's level of gearing, cost of debt and actual tax payments.

2.70. In that Annex we set out our view of the following:

- RoRE for the RIIO-1 period
- Allowed revenue and the Annual Iteration Process (AIP)
- Gearing and financing
- Regulatory Asset Value (RAV).

2.71. A summary of ETOs' RoRE performance is shown in Figure 1 and in Table 14.

Customer bill impact

2.72. Our Default Tariff Cap³⁸ provides an estimate of the overall cost of domestic energy bills. This includes estimates of the proportion of the overall cost of energy which is electricity transmission costs. Our methodology uses an average electricity demand applied uniformly across all regions and over time.³⁹ Actual customer bills are sensitive to geographic region, consumption volume and the timing and duration of contracts.

2.73. Our latest bill estimates using this methodology are reported in Figure 2 and in Table 15. We estimate that the average GB customer in 2019-20 will pay £35 per annum in real 2017-18 price terms for electricity transmission costs. Charges differ considerably depending on the region in which a domestic consumer resides: ranging from £16 in North Scotland to £44 in South East England.

³⁶ The Finance annex is available here: <https://www.ofgem.gov.uk/publications-and-updates/regulatory-financial-performance-annex-riio-1-annual-reports-2017-18>

³⁷ This includes financial performance for all sectors – RIIO-GD1, RIIO-T1 and RIIO-ED1.

³⁸ We used the latest data as per the Default Tariff Cap: <https://www.ofgem.gov.uk/publications-and-updates/default-tariff-cap-level-1-april-2019-30-september-2019>. This report assumes charges remain unchanged throughout 2019-20. However when the Default Tariff Cap is updated in late summer 2019 it will reflect the latest data available. For this report, the DTC nominal bills have been deflated using RPI data.

³⁹ Using median domestic consumption behaviour (volume and timing of use) for a 12-month fixed price contract.

Figure 1: RoRE based on Notional Gearing – RIIO-ET1 period

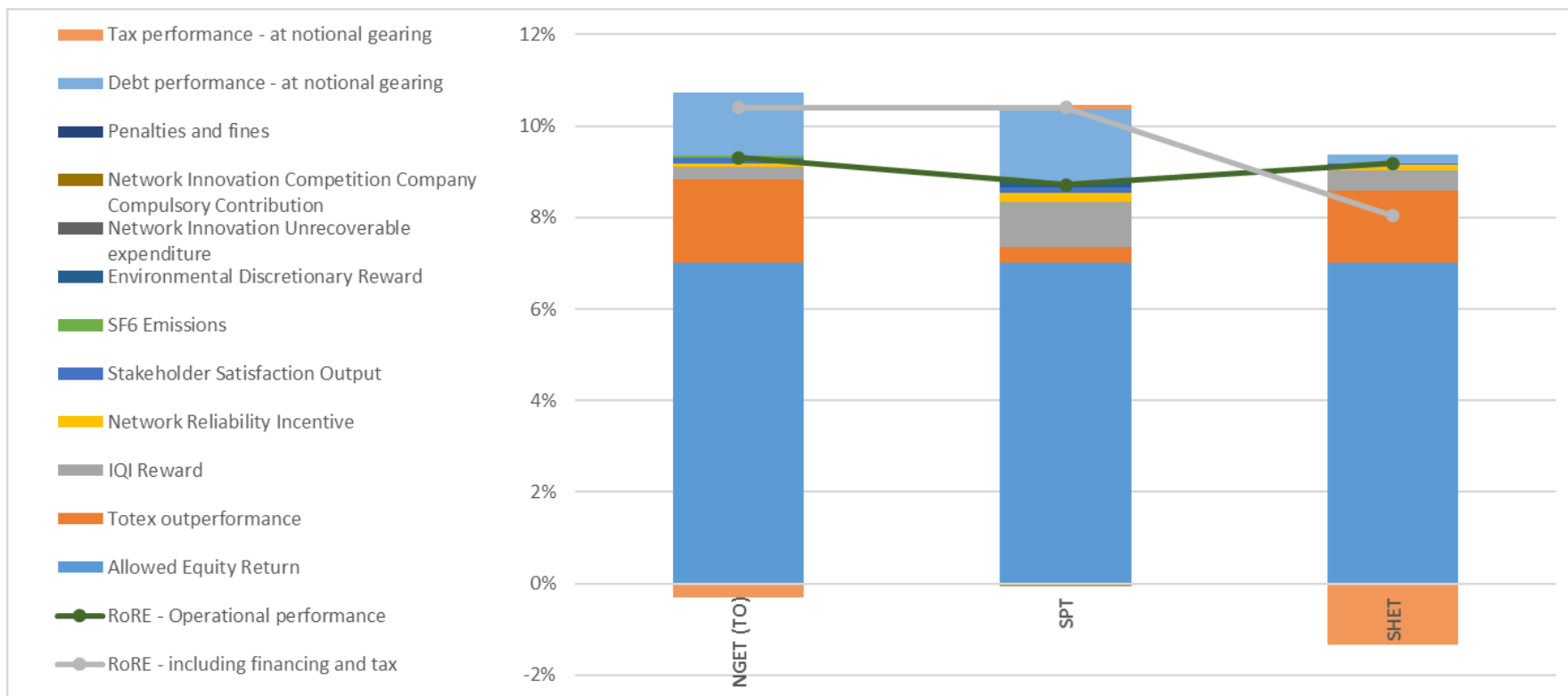


Table 14 – RoRE based on Notional Gearing – RIIO-ET1 period

	NGET TO	SPT	SHET
RIIO-ET1 operational RoRE	9.3%	8.7%	9.2%
Financing and tax performance	1.1%	1.7%	-1.1%
Total RoRE	10.4%	10.4%	8.0%

Figure 2: Estimates of typical GB consumer costs to meet allowed revenue

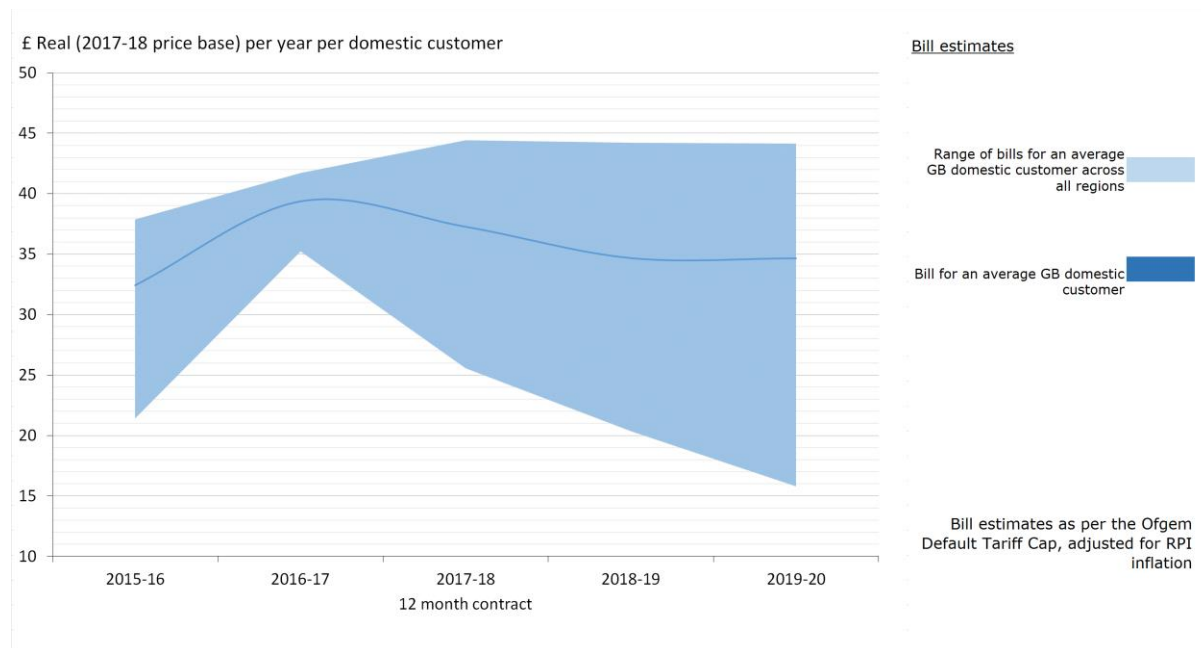


Table 15: Regional estimates of typical GB consumer cost to meet allowed revenue (£ Real (2017-18 price basis) customer bill per typical domestic consumer)

Year Beginning		Apr-15	Apr-16	Apr-17	Apr-18	Apr-19
GB average		32	39	37	35	35
Region	Licensee					
North West	ENWL	31	35	35	34	35
North East	NPgN	27	42	35	29	29
Yorkshire	NPgY	33	41	36	33	34
Midlands	WMID	34	39	38	38	38
East Midlands	EMID	33	39	37	36	37
South Wales	SWALES	33	39	34	32	32
South West	SWEST	36	41	43	42	42
London	LPN	38	40	33	35	35
South East	SPN	37	41	44	44	44
East Anglia	EPN	35	40	43	41	42
South Scotland	SPD	23	39	26	23	23
Merseyside and N Wales	SPMW	36	41	40	35	36
North Scotland	SSEH	21	36	37	20	16
Southern	SSES	38	39	41	42	42

3. Eight-year totex performance drivers

Chapter summary

This chapter compares the TOs' forecast totex for the whole price control with the TOs' current view of the adjusted totex allowance. It also outlines the company views on what is responsible for driving the current forecast of totex for each TO across RIIO-ET1.

Our view of performance and an overview of the drivers of outperformance is provided in appendices three and four.

Introduction

3.1. This chapter considers the TOs' forecasts of total expenditure across the eight-year control period, against the TOs' current view of adjusted totex allowance. Further details on the main components of totex: load related capital expenditure (LRE) and non-load related capital expenditure (NLRE), non-operational capital expenditure (non-op capex) and operating costs (opex) can be found in the appendices to this document.

3.2. The TOs have revised their forecasts of allowances to reflect their own view of the operation of uncertainty mechanisms, the current levels of outputs and their current forecast of future outputs in the remaining RIIO-ET1 period.⁴⁰

3.3. The totex values summarised in this chapter are adjusted to reflect (unless stated otherwise)

- the impact of the Mid-Period Review (MPR) decision
- the reported values of the voluntary deferrals that are currently reflected in the financial model, and
- all TO estimates of expenditure and expectations of funding to be made available under uncertainty mechanisms.

3.4. The allowances are not adjusted to reflect the current company forecast of the end-of-period true up.

3.5. We conclude the chapter with a summary of the drivers identified by the TOs of the differential between their forecast total expenditure and their allowances.

⁴⁰ TO adjustments reflect changing circumstances. For example, downward adjustments may reflect a current view that certain outputs are no longer required or the licence target will not be met in the eight-year period.

RIIO-ET1

3.6. TOs are incentivised to outperform the RIIO-ET1 allowances as they retain a share of any underspend. However, the scale of underspend is currently higher than anticipated at the start of the price control period.

3.7. Based on the information provided to us through the 2017-18 regulatory reporting pack, the TOs currently expect to receive over £18 billion over the entire RIIO-ET1 period (NGET TO: £12,213 million; SPT £2,258 million; and SHET £3,737 million⁴¹). This represents actual totex for the period between 1 April 2013 to 31 March 2018 plus a three-year forecast spend for the remaining price control period.

3.8. All TOs currently anticipate a totex underspend across the price control period (ranging between 3% and 15%). The combined value of total expenditure for the TOs across the period is currently forecast to be close to £16 billion; a cumulative forecast underspend of 12%. This is a 2% rise on the position reported in last year's report.

3.9. The variance between the TO's current view of costs and allowance across the entire RIIO-ET1 period is due to the following factors:

- The impact of National Grid's voluntary deferral and the MPR decision, reducing the size of the eight-year totex allowance relative to position reported in previous years.
- On the load-related (LR) side, as we move deeper into the T1 period, the range of volume driver mechanisms take effect by automatically flexing allowances to reflect the level of outputs required.⁴²
- Also on the LR side, changes in the portfolio of investment relative to the original baseline plan and the TOs' response to the level of change is an important driver of costs being less than forecast allowance. In the majority of cases, the actual unit cost of delivering outputs in the RIIO-ET1 period is seen to be lower than the unit cost adjustment for delivering an additional unit of the relevant output. Lower costs (below UCA) are mainly driven by reductions in the size of the connection, and delays to projects beyond the price control period. Based on current information, all TO's are expecting LR spend across RIIO-ET1 to be lower than the forecast level of allowances, which were set on the basis of the portfolio of projects in the original business plans.

⁴¹ This figure does not include the impact of a proposed 'hand back' of allowance valued at c.£60 million (2017/18 prices). All TO figures do not include the company forecast true-up value.

⁴² For example, SPT is currently expecting to fall short of its new generation connection originally anticipated (2,503MW) and currently expects the mechanism to 'claw back' allowance. In some instances, funding can also be triggered by events defined in the licence.

- On the non-load related (NLR) side, as was reported last year, the performance reflects the considerable change in respect of the timing, working practices and internal processes to monitor, maintain and replace existing assets applied by some companies. Much of this has been caused by their improved understanding of asset condition levels (relative to the business plan stage) and changes in external circumstances. Efficiency has played a role too, but the effects and level are difficult to independently verify.
 - For NGET TO, revised understanding of asset condition has driven some of the forecast reductions in spend. Other drivers of the forecast reduction include some work being deferred, the extension of asset lives (eg OHL conductors) and a more targeted asset replacement approach⁴³.
 - For SHET the opposite holds true: revised understanding of asset conditioning has triggered additional requirements due to asset condition being worse than expected.
 - For SPT, asset condition re-assessment is not a primary driver for expected cost reductions. The main reason for lower costs in delivery of non-load projects is the change to SPT's working practices associated with the procurement and management of capital delivery.

3.10. Table 15 summarises the current forecast performance position of each TO across the entire price control period. More detail on our assessment in each of the component cost categories is available in the company specific appendices.

Table 16: TO view of totex expenditure vs adjusted allowed totex (£m)

<i>£m, 2017-18 prices</i>	<i>Current RIIO-ET1 company forecast (company adjustments applied, pre true-up)[†]</i>			
	Allowance	Expenditure	Difference	
			£m	%
NGET (TO)	12,213	10,365	-1,849	-15%
SPT	2,258	2,193	-65	-3%
SHET	3,737	3,395	-342	-9%
Total	18,203	15,953	-2,255	-12%

[†] The figures are based upon the TOs' published values. Small rounding errors may exist.

3.11. We have focussed our analysis on working towards understanding drivers of forecast underspend and whether we consider them to be attributable to the following four factors:

⁴³ As noted in last year's report, NGET (TO) have redesigned its refurbishment techniques to identify and replace parts that become obsolete whilst bay infrastructure and complex plant wiring is retained.

- **Efficiency:** reflecting genuine improvements in how things are being done, resulting from eg innovation and more efficient working practices.
- **External factors:** windfall gains or losses achieved by external factors outside of the control of the TOs.
- **Circumstantial factors:** instances where a TO expects to deliver the output anticipated by the baseline assumptions but with different physical content.
- **Provision in the price control settlement:** assumptions made within the RIIO-ET1 settlement that have varied against the actual position.

3.12. We have been engaging with the TOs to understand their view of key cost drivers. The next sections are based on those discussions and our current view on information submitted by the TOs. More detail on the allocation to each of the above factors is set out in the appendices.

Input price changes (or Real Price Effects)

3.13. As previously highlighted, all TOs are forecasting an underspend over the eight year RIIO-ET1 period against their view of allowed Totex. The TOs highlighted operational and delivery improvements and technical innovation leading to cost savings. Changes in input prices are also a driver for some of the underspend.

3.14. In our Final Proposals (FPs) we acknowledged that several key inputs (labour, material equipment/plant) do not necessarily change in line with RPI and will not match main components of network companies' costs. To account for this differential between the economy-wide RPI inflation index and inflation on inputs, we provided an ex-ante allowance based on the Real Price Effects (RPEs) forecast.

3.15. The RPE values were different for each TO. It was then left to the network companies to manage any actual above inflation input price fluctuations. At this point in the RIIO-ET1 control period, the level of inflation has been below the level of the historical indices used when setting the ex-ante allowance. The current forecast view is that in total the RPEs will not reach the levels that were forecast in any of the TO's business plans, or in Ofgem's own forecast at the FP stage.

3.16. Based on current information, we estimate that TOs have benefitted from slower than expected growth in input prices by approximately £700 million⁴⁴ (the counterfactual

⁴⁴ This calculation is the cumulative difference between the level of ex ante allowance in the FPs and the level of allowance that would be established if we were to base this on the TO's updated view of RPEs (a 'perfect hindsight' approach); c.£370m for NGET, c.£110m for SPT and c.£200m for SHET. This analysis takes no account of the contracting strategies applied by each TO or the impact of internal efficiency measures.

is full indexation of RPEs). We attribute this difference to the “external factors” driver, as it is due to lower than expected inflation.

TO view of performance drivers

3.17. In this section we set out some of the key cost drivers outlined by each of the TOs.

SPT

3.18. SPT is currently forecasting to spend close to £2.2 billion by the end of RIIO-ET1, which is approximately £70 million (3%) below expected totex allowance. The forecast underspend is driven by savings in both LRE and NLRE outweighing the anticipated overspend in the opex and non-operational capex categories across the RIIO-ET1 period.

3.19. The main driver for the variance in opex is the increase in Business Support costs associated with a business strategy change, made after the RIIO-ET1 bid, to increase the focus of operations on internal activity. The resultant change to accounting measurement increased the allocation of overheads to opex from capex. The main driver for the variance in non-operational capex is the higher level of IT expenditure associated with the implementation of a new Network Asset Management System (NAMs).

3.20. SPT currently expects expenditure on LR activities across RIIO-ET1 to be lower than forecast allowance by £55 million (4%). This is attributable to several factors including those beyond SPT’s control (ie. changes in customer-driven circumstance) and the impact on the associated infrastructure works required to facilitate changes in demand and generation. This underspend also reflects the impact of the MPR decision which confirmed that a subset of works currently being progressed by SPT to deliver connection solutions is not suitable for funding through the pre-agreed mechanism.⁴⁵

3.21. An important driver of net forecast underspend on the load side of the business is SPT’s approach to the management of its capital delivery process. SPT has adopted an ‘in-house’ design and capital delivery management approach. This has led to engagement with a broader base of contractors and a more competitive procurement process. This ‘disaggregated’ model is estimated by SPT to account for approximately half of the potential savings on the LR side.

3.22. A key example highlighting the positive impact of its approach to design and tendering of the works is the Series and Shunt Compensation project⁴⁶. SPT reports that its approach enabled the procurement of a solution which required the installation of

⁴⁵ More information on this can be found in the MPR decision document.

⁴⁶ Boundary B6 is the boundary between SPT in southern Scotland and the NGET system in the north of England. The reinforcement of the boundary is being realised by the completion of two complimentary projects: (a) Series and Shunt Compensation; and (b) East-West 400kV Upgrade.

equipment at fewer sites and enabled it to deliver the required output at a lower cost (£44 million below allowance).

3.23. On the non-load side of the business, SPT is forecasting an underspend of approximately £100 million (11% below forecast allowance). This underspend is reported by SPT to primarily be the result of a disaggregated investment model and the timing of supplier engagement (after our decision to fast-track) in the case of its overhead line modernisation work.

3.24. A secondary driver impacting non-load investment is the level of customer-driven changes to its load-related programme, which are driving consequential changes in the assets requiring replacement through non-load work programmes. There are two factors that contribute to this aspect of non-load investment.

- **Decisions to re-profile investment** driven by the evolving picture of generation connections and the ongoing challenges associated with obtaining the necessary consents.
- **The scope of work has changed.** In some cases, SPT's asset condition assessment has highlighted that the replacement of some conductors can be deferred, reducing the scope of replacement works.

SHET

3.25. SHET is currently forecasting to spend almost £3.4 billion by the end of RIIO-ET1, against an expected totex allowance⁴⁷ of £3.7bn. The forecast underspend (9%) is driven by savings in LRE which outweighs the expected overspend in both non-load related expenditure NLRE across the RIIO-ET1 period.

3.26. LRE is currently forecast to be c.£460 million (15%) lower than forecast allowance. Approximately a third of this underspend (c.£170 million) is directly related to expenditure on the SWW projects. As reported last year, this is due to phasing and project delivery efficiency savings realised on the completed Beaully-Mossford and Kintyre-Hunterston projects and anticipated savings on the near-complete Caithness Moray project. The remaining forecast LRE underspend is primarily delays in and/or cancellations to a number of connections and the associated reinforcement works.

3.27. As noted in chapter one, SHET have identified £47.48m (2009-10 prices) of allowances associated with its largest SWW project (Caithness Moray) attributable to unspent risk allowances that are no longer required. The overall impact of the 'hand

⁴⁷ This figure does not include the impact of a proposed 'hand back' of allowance valued at c.£60 million (2017/18 prices) or the company forecast true-up value.

back' will be to reduce the overall capex allowances associated with the scheme and reduce the size of the forecast LRE underspend to c.£400 million (13%).⁴⁸

3.28. On the non-load side of the business, SHET is forecasting an overspend against allowance of close to £100 million (30% above forecast allowance) across the RIIO-ET1 period. The reason for this overspend is access to better information on asset condition, particularly in relation to some large OHL schemes. These schemes now require major upgrades or complete rebuild in contrast to the scope of requirements set out in the business plan (which envisaged a simple like-for-like conductor replacement). Non-load investment has also been impacted by delays and cancellations in the LR programme.

NGET (TO)

3.29. NGET TO is currently forecasting to spend close to £10.4 billion by the end of RIIO-ET1; 15% below the expected totex allowance. This forecast underspend (NGET's estimate is over £1.8 billion) is driven by savings across LRE and NLRE across the RIIO-ET1 period. These figures include the impact of the MPR decision and the reported value of the voluntary deferral by National Grid.⁴⁹

3.30. NGET estimates that LRE is lower than forecast allowance by close to £600 million. The factors that are representative of the biggest factors driving this cost reduction are summarised below:

- New connection projects which have a unit cost lower than the level to which the mechanism was originally calibrated.
- Refinements to reduce the scope of works to facilitate transmission connections.
- The change in the number and location of connections have led the energy background to evolve in a different way to that originally anticipated. In some cases, this has led to an increase to the boundary capacity provided by investments, the majority of which were not included in the design of the RIIO-ET1 arrangements.
- As the energy background evolves, NGET continually review the investments available on each constraint boundary to find the most cost effective and timely options available. Through this process NGET have identified efficiencies of c.£180 million in the wider works portfolio, all of which relates to schemes currently delivering outputs in the RIIO-T1 period. NGET have also identified efficiencies in

⁴⁸ There has been no agreement yet to determine the agreed profile of the 'hand back' allowance. For the purposes of this analysis we have assumed that the profile is spread over the last two years of RIIO-ET1.

⁴⁹ Excluding the value of the voluntary deferral from NGET's forecast allowance from our analysis (ie. not deducting £615 million (2017/18 prices) increases the level of totex underspend to 19% across RIIO-ET1.

other load related categories including £122 million in the generation volume driver and £55 million in the demand volume driver.

3.31. On the non-load side of the business, NGET explains that the level of underspend (£1.5 billion⁵⁰, or 25%) is the direct result of developments in its intervention and asset condition strategies. The range of factors driving this performance include the following:

- **Revised understanding of asset condition** through introducing developments in IT and internal asset management processes. For example, the insights gathered through the transformer replacement plan have led NGET to add a 5-year life extension for all transformers. This has meant that 41 transformers have been deferred out of the RIIO-T1 period while still achieving the Network Replacement Output target. This life extension is estimated to drive savings of more than £200 million across the RIIO-ET1.
- **Changing asset intervention plans.** An example is the adoption of targeted bay replacement or targeted refurbishment approach to the remainder of the bay. A forecast cost saving of approximately £88 million is estimated through adoption of this approach. NGET have also extended their range of in-house refurbishment and reconditioning intervention techniques. NGET estimates savings across the switchgear portfolio of approximately £35 million. Also within switchgear, NGET has developed new interface engineering to install replacement circuit breakers into existing bays utilising, where possible, the original civil structures without modification. This new approach is estimated to provide savings of £42 million. The theme is continued across protection and control interventions where, compared to a RIIO-ET1 allowance of c.£470 million to deliver all interventions, NGET is currently forecasting to spend c.£250 million; a saving of close to 50%.
- **Delivering work in ways that are significantly different to the working practice and processes underpinning the original business plan.** This area involves targeted efforts to reduce the scope of delivery and methods of working to reduce time and cost due to material reductions in the scope of work envisaged in the original settlement. One example is "bushing"⁵¹ replacement; NGET currently expects allowances of £57 million not to be utilised within RIIO-ET1. The proposed Sheffield network reinforcement is an example of where the original strategy (a like-for-like replacement of the existing 275kV cables) has been altered by external forces. As much of the heavy steel industry in the area has closed, the existing network configuration is no longer considered to be the most appropriate one and significant savings can now be identified (estimated by NGET to be c.£170 million).

⁵⁰ Approximately £2 billion pre-voluntary deferral, or 30%.

⁵¹ A bushing reduces the electrical stresses in the insulating material of assets. A typical bushing design has a 'conductor', surrounded by insulation (usually oil). A fixing device will also be attached to the insulation to hold it in its location. In 2012 NGET identified a number of bushings reaching the end of their reliable service life. The original intention was to replace approx. 200 wall bushings over T1 but the work has been deferred.

4. SO Performance

Chapter summary

This chapter evaluates RIIO-ET1 forecast expenditure for NGET in its role as SO against the costs allowed to deliver the associated outputs across the eight-year RIIO-ET1 period.

Introduction

4.1. NGET is the designated electricity System Operator (SO) responsible for day-to-day system operation, including balancing supply and demand and constraint management. To do this NGET buys and sells electricity and procures associated services. The cost NGET incurs is recovered from users of the system via Balancing Services Use of System (BSUoS) charges.

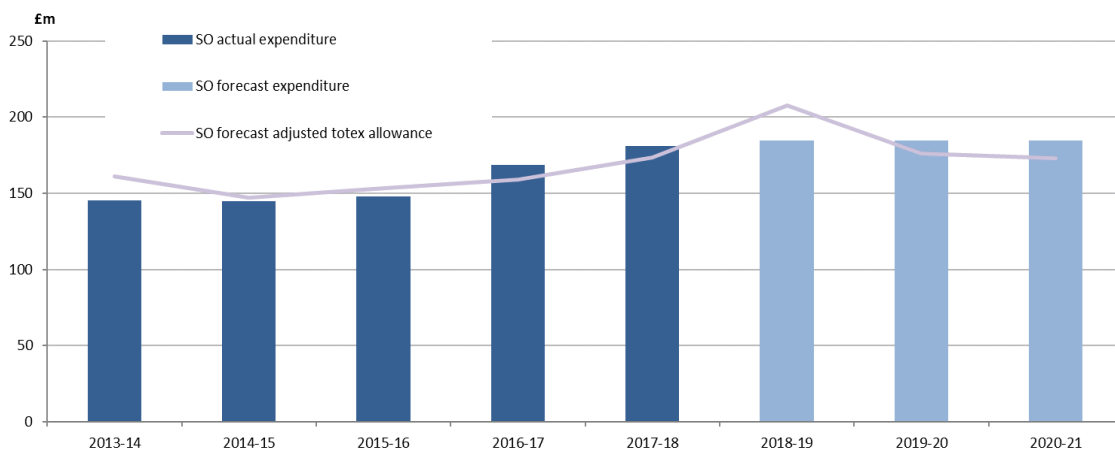
4.2. There are various costs that NGET incurs as SO and for which it seeks to recover revenue through its price controls. The RIIO-ET1 price control for the SO includes allowances for capex (primarily related to investment in IT systems) and opex (covering the ongoing costs of running the business, including support for IT systems).

4.3. All SO cost allowances for system balancing are determined via a separate process outside the RIIO-ET1 mechanism. The main incentive is the Balancing Services Incentive Scheme (BSIS) which incentivises the SO on actions it has to take to operate the GB electricity transmission system.

Forecast totex performance

4.4. The figure below shows the performance to date and forecast expenditure for the SO over the course of the RIIO-ET1 price control period against its adjusted SO allowances (including its role as Electricity Market Reform delivery body).

Figure 3: Actual and forecast expenditure vs SO forecast allowance



4.5. Over the RIIO period NGET (SO) forecasts to spend £430.6 million on capex against the RIIO-ET1 allowance of £417.8 million corresponding to an increase of £12.8 million.

4.6. The overspend is due to additional investment in the Electricity Market Reform system (£16.9 million) and investment required to ensure compliance with European network codes (£28.0 million). This overspend is partly offset by reprioritisation of other IS projects within the portfolio.

4.7. Over the RIIO-ET1 period controllable Opex is forecast at £927.2 million (including £12.9 million Uncertainty Mechanism costs) which is £5.0 million lower than forecast adjusted allowances of £932.4 million.

4.8. NGET SO therefore forecasts to spend £7.6 million more than the RIIO-ET1 totex allowance of £1,350 million (including EMR costs).

Key expenditure

4.9. The key areas of NGET (SO) expenditure in the RIIO-ET1 Price Control Period are:

- Critical Network Infrastructure (CNI) Data Centre project (£47.1 million): Work is underway to operationalise two new Data Centres.
- European future energy regulations (£25.3 million): NGET (SO) defined the programme of work to establish the enduring programme deliverables and processes for compliance with the European Network Codes. The full project scope extends into RIIO-ET2.
- Electricity Balancing System / Balancing Mechanism Sustain (£11.5 million): Expenditure to support new GB and EU codes and to adapt the system to support increases in distributed generation.

Performance for 2017-18 against previous forecast

4.10. During 2017/18, the SO has underspent against its prior year capex forecast of £88.5 million by £26.4 million. The difference is mainly due to deferral of spend on CNI data centres to future years (£14.9 million) due to change in the proposed solution, and timing of spend on legal separation property and IS projects (£8.4 million) where costs will mainly occur in the next RRP (2018/19).

4.11. During 2017/18, the SO has underspent against its prior year controllable opex forecast of £132.9 million by £14.3 million. The level of actual expenditure is in-line with the 2017/18 level of allowance (£118.9 million). NGET explains this year on year difference is due to costs incurred through Business Support (£7.0 million), Finance, Audit & Regulation due to the ESO legal separation programme (£4.1 million); and, IT expenditure driven by Project ONE and the Electricity Balancing System (£3.3 million).

4.12. The year-on-year difference in expenditure related to the above changes therefore amounts to £40.7 million. This movement is broadly matched by a similar difference in the year-on-year value of totex allowance (£46.5 million). Overall, there has been a 3% increase in the year-on-year level of overspend (£1.5 million to £7.4 million).

Key expenditure

4.13. The key areas of SO expenditure in the 2017/18RRP are:

- Electricity Balancing System (EBS) (£14.0 million): The SO completed build of scheduling components for the EBS system, deploying the system into the electricity control room. However, the system functionality could not be fully automated as dispatch functionality of the system did not meet requirements and due to the speed of market change, the SO intends to deliver the capability by consolidating the scheduling system with the existing balancing mechanism.
- The Integrated Electricity Management System (£8.7 million): The SO successfully delivered the Integrated Electricity Management System, which has the purpose of mitigating the risk of a prolonged or irrecoverable system failure which could lead to a loss of electricity supply in the UK.
- EMR (£4.9 million): The SO developed systems to enable their role as EMR Delivery Body. It considers that further investment is required into these systems to keep up-to-date with BEIS and Ofgem regulatory changes in addition to customer requirements and compliance controls.
- CNI Data Centre project (£12.1 million): The SO undertook the decision to change the proposed solution (from a Build/Host to fully hosted solution). Connection of the Wide Area Network (WAN) is underway to enable enhanced security for the migration of the first CNI application.

Performance against incentives

4.14. The major activities reported by the SO in the 2017/18RRP are:

- Balancing the System: The Overall Reliability of Supply was 99.999984%, an increase of 0.000020% from the 2016/17 reported value. In the 2017/18 price control period, there occurred two incentivised Loss of Supply incidents and 3 non-incentivised Loss of Supply incidents. The two incentivised events resulted in a total Loss of Supply of 39.7MWh for the year 2017-18 against a target of 316MWh. The resulting ENS incentive scheme payment is £3.25 million.
- Balancing activity was incentivised under BSIS. The actual Incentivised Balancing Cost for 2017/18 was £942 million compared with the Cost target of £1,094 million (a difference of £152 million). This has provided the SO with a capped payment of £10 million under the incentive scheme.

Appendices

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Appendix 1: Scottish TO's current view of totex (company view)

A1.1. In this appendix we present tables summarising the Scottish TOs' view of expenditure and adjusted total allowance across the RIIO-ET1 period. The view is based on the baseline allowances, but with the changes applied through operation of the uncertainty mechanisms to reflect the current levels of outputs and the company's current forecast of future outputs in the remaining RIIO-ET1 period.

A1.2. SPT currently expects to spend £2,192 million to meet customers' needs during RIIO-ET1 with a total forecast allowance of £2,258 million.

Table A1.1: SPT current view of totex vs forecast allowance (pre true-up)

Cost	<i>£m, 2017-18 Prices</i>	Forecast allowance	Actual & forecast expenditure [†]	Performance
Load related	i. Opening allowance 1 April 2013 ⁵²	1,073		
	ii. MPR impact	0		
	iii. Green Economy Fund (GEF)	0		
	iv. Additional Direct Funding (2017 AIP)	+20		
	v. Opening allowance 2017-18 (i+ii+iii+iv)	1,093		
	vi. TO view of UM adjustments (2018 RRP)	+121		
	Current T1 forecast (v+vi)	1,214	1,159	-55 (5%)
Non Load related	i. Opening allowance 1 April 2013	821		
	ii. Additional Direct Funding (2017 AIP)	+15		
	iii. Opening allowance 2017-18 (i+ii)	836		
	iv. TO view of UM adjustments	0		
	Current T1 forecast (iii+iv)	836	745	-90 (11%)
Non-op capex	Current T1 forecast	9	18	9 (100%)
Opex	i. Opening allowance 1 April 2013	196		
	ii. Additional Direct Funding	+3		
	iii. TO view of UM adjustments	+1		
	Current T1 forecast (i+ii+iii)	200	270	70 (35%)
Published RRP values (small rounding errors may exist)		2,258	2,192	-66 (3%)

[†] LR figures do include the current forecast of contributions received to date/forecast to be received from customers across the RIIO-ET1 period (£90 million).

⁵² This value includes the impact of RPEs and a forecast value of the contributions expected to be received from customers with connections to single users across the RIIO-ET1 period.

A1.3. SHET currently expects to spend £3,395 million to meet customers' needs during RIIO-ET1 with a total forecast allowance of £3,737 million.

Table A1.2: SHET current view of totex vs forecast allowance (pre true-up)

Cost	<i>£m, 2017-18 Prices</i>	Forecast allowance	Actual & forecast expenditure [†]	Performance
Load related	i. Opening allowance 1 April 2013 ⁵³	807		
	ii. MPR impact	0		
	iii. 'Hand back'	0 ⁵⁴		
	iv. Additional Direct Funding (2017 AIP)	1,912		
	v. Opening allowance 2017-18 (i+ii+iii+iv)	2,719		
	vi. TO view of UM adjustments (2018 RRP)	436 ⁵⁵		
	Current T1 forecast (v+vi)	3,154	2,696	-459 (15%)
Non Load related	i. Opening allowance 1 April 2013	266		
	ii. Additional Direct Funding (2017 AIP)	0		
	iii. Opening allowance 2017-18 (i+ii)	266		
	iv. TO view of UM adjustments	60		
	Current T1 forecast (iii+iv)	326	426	99 (30%)
Non-op capex	Current T1 forecast	9	28	19 (201%)
Opex	i. Opening allowance 1 April 2013	209		
	ii. Additional Direct Funding	28		
	iii. TO view of UM adjustments	9		
	Current T1 forecast (i+ii+iii)	247	246	1 (0%)
Published RRP values (small rounding errors may exist)		3,737	3,395	-342 (9%)

[†] LR figures do include the current forecast of contributions received to date/forecast to be received from customers across the RIIO-ET1 period (£95 million).

⁵³ This value includes the impact of RPEs and a forecast value of the contributions expected to be received from customers with connections to single users across the RIIO-ET1 period.

⁵⁴ There has been no agreement yet to determine the agreed profile of the 'hand back' allowance of £60 million (2017/18 prices). Adjusting for the value of the hand back reduces the published RRP value of underspend from £342 million to £281 million (8%).

⁵⁵ This includes total expenditure forecast to be incurred within RIIO-ET1 on construction activities associated with prospective SWW projects (c.£135 million).

Appendix 2: NGET TO's current view of totex (company view)

A2.1. In this appendix we summarise NGET's view of expenditure and adjusted total allowance across the RIIO-ET1 period. This view is based on the baseline allowances, but with the changes applied through operation of the uncertainty mechanisms to reflect the current levels of outputs and NGET's current forecast of future outputs across RIIO-ET1.

A2.2. NGET TO currently expects to spend £10,365 million to meet customers' needs during RIIO-ET1 with a total forecast allowance of £12,213 million.

Table A2.1. NGET TO expenditure vs forecast allowance (pre true-up)

Cost	£m, 2017-18 Prices	Forecast allowance	Actual & forecast expenditure ^{††}	Performance
Load related	i. Opening allowance 1 April 2013 ⁵⁶	6,192		
	ii. MPR impact	-49		
	iii. Voluntary Deferral	-166		
	iv. Additional Direct Funding (2017 AIP)	-721		
	v. Opening allowance 2017-18 (i+ii+iii+iv)	5,258		
	vi. TO view of UM adjustments (RRP 18) ⁵⁷	-1,337		
	Current T1 forecast (v+vi)	3,921	3,330	-592 (-15%)
Non Load related	i. Opening allowance 1 April 2013	5,936		
	ii. ISS reopener ⁵⁸ (2017 AIP)	+154		
	iii. Voluntary deferral	-446		
	iv. Opening allowance 2017-18 (i+ii+iii)	5,643		
	iv. TO view of UM adjustments [†]	+374		
	Current T1 forecast (iv+v)	6,017	4,509	-1,509 (-22%)
Non-op capex	Current T1 forecast	189	317	129 (68%)
Opex	i. Opening allowance 1 April 2013	2,069		
	ii. Additional Direct Funding	213		
	iii. TO view of UM adjustments	-196		
	Current T1 forecast (i+ii+iii)	2,086	2,209	123 (6%)
Published RRP values		12,213⁵⁹	10,365	-1,849 (-15%)

[†] Mitigating the impact of pre-existing infrastructure and Physical Site Security.

^{††} LR figures do include the current forecast of contributions received to date/forecast to be received from customers across the RIIO-ET1 period (£239 million).

⁵⁶ This value includes the impact of RPEs and a forecast value of the contributions expected to be received from customers with connections to single users across the RIIO-ET1 period.

⁵⁷ This includes total expenditure forecast to be incurred within RIIO-ET1 on TPWW projects (c.£80m) and on construction activities associated with prospective SWW projects (c.£250m).

⁵⁸ An uncertainty mechanism was included within RIIO-ET1 whereby companies could apply for costs incurred in upgrading the security at Critical Network Infrastructure (CNI) sites. Additional allowance for Physical Site Security (referred to as "ISS") were provided. The agreed allowances were allocated in the PCFM to the 'other capex' cost category (within Non-load).

⁵⁹ £12,826m excluding the value of the voluntary deferral (pre true-up); the adjusted totex underspend becomes £2,461m (19%)

A2.3. Taking NGET's view of the proposed value of the true-up into account (£212 million for excluded services and £16 million for pre-construction activities), the total LR allowance falls to £3,694 million; an underspend of £363m (10%). Post true-up, NGET's forecast totex underspend falls to £1,621 million (14%).

Load related capex: T1+2

A2.4. NGET's load-related uncertainty mechanisms (UMs) contain an automatic trigger to adjust allowances through an extension of the volume drivers for the first two years of RIIO-ET2 (referred to as "T1+2").

A2.5. In 2017, NGET provided a one-off forecast of the T1+2 outputs expected to be delivered. This 'fixed' forecast can then be used to determine the allowance adjustments to be made in the RIIO-ET1 period (with the remaining efficient costs calculated are assumed to be provided in the baseline of RIIO-ET2).

A2.6. The fixed forecast reflected NGET's "best view" (as of July 2017) of when contracted projects were due to connect and reflected investments recommended by the Network Options Assessment (NOA) process. There is no provision in the price control to update this forecast.

A2.7. Based on NGET's fixed forecast, the allowance in RIIO-ET1 associated with the delivery of expected outputs to be delivered in the T1+2 period is £613m. However, NGET has provided an update on this as it considers the more appropriate LR allowance figure for the T1+2 period to be £390m.

A2.8. NGET explains that all LR allowances detailed in its July 2018 regulatory submission ignore the effect of fixing allowances, i.e. NGET updated outputs and allowances for these years is based on its latest view (July 2018).

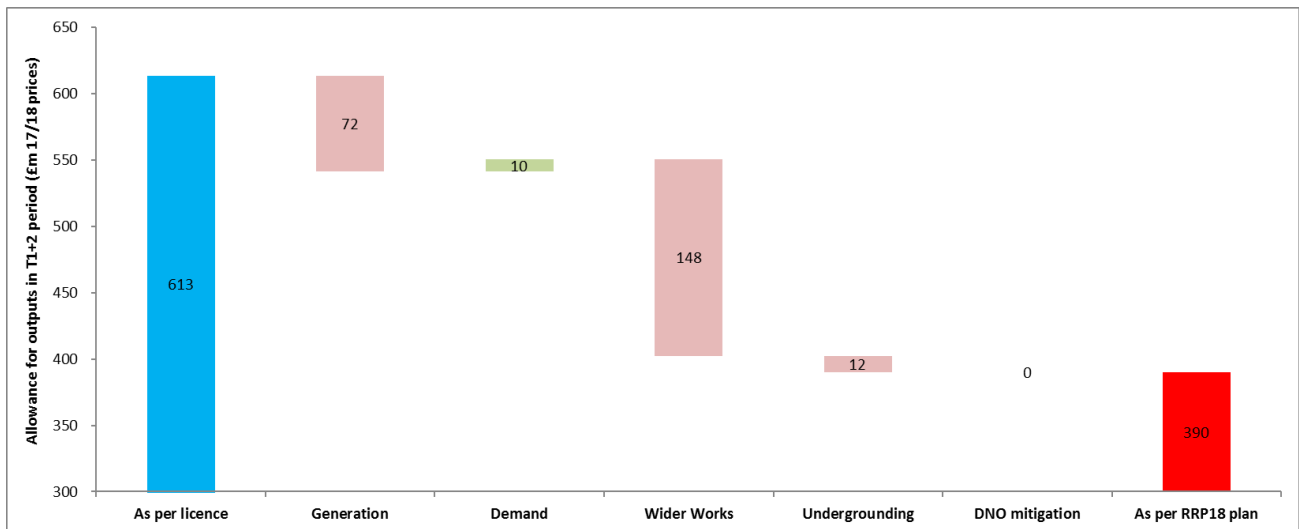
A2.9. The movement between the RRP17 fixed forecast and NGET's current view, and the variation in the estimated value of LR allowance, is driven by the following effects.

- some projects have advanced from having an expected delivery date during the T1+2 window (RRP17 fixed forecast) into the eight year RIIO-ET1 period (RRP18 forecast). These projects will effectively have two sets of allowances if the fixed forecast is applied: one for the expenditure originally envisaged to be incurred and deliver the expected output in T1+2 (which NGET currently consider to be out of date) and a second allowance calculation associated with the current expenditure envisaged to be incurred and deliver the output in T1. This is relevant for the following projects: Kemsley-Littlebrook reconductoring (+£113m) and the connection of IFA2 (+£29m).

- some projects were originally included in the T1+2 window (RRP17 fixed forecast) but have since been delayed (RRP18 forecast) and are currently expected to be delivered beyond the T1+2 period. Under a fixed forecast approach, the costs originally envisaged to be incurred to deliver the expected output in the T1+2 period will be allocated an allowance for work that is currently expected to be delivered beyond T1+2 (deeper into RIIO-ET2). This is relevant for the following projects: installing series reactors at Thornton, connecting Gridlink and Spalding Energy.
- projects that were outside of the T1+2 window (RRP17 fixed forecast) but have since advanced (RRP18 forecast) will not have any allowances under the fixed forecasting approach. Examples include the South Coast Protective Switching project, connecting the OGN interconnector, Norton-Osbaldwick reconductoring and Grain-Kingsnorth Busbar replacement.
- delays and advances within the T1+2 period itself, eg. expected delivery moving from 2021/22 to 2022/23 (relative to the RRP17 forecast), will mean that some projects have phased allowances that no longer reflect NGET’s current expectation of the construction profile.

A2.10. The movement in allowance NGET currently anticipates to receive through each LR mechanism during the T1+2 period that is attributable to the change in NGET’s forecasting approach is detailed in the waterfall diagram below.

Figure A2.1: Uncertainty mechanism movement: NGET TO current view of allowances for the T1+2 period (fixed forecast to RRP18 forecast).



Drivers of LR performance

A2.11. NGET have attempted to categorise differences between spend and allowances based on two of the four categories described in our guidance. The philosophy that NGET

have followed in deciding on the categorisation of variances in spend is summarised below.

1. **External factors (“external”):** Economic conditions, and the broader commercial framework, influence customer decisions to connect to the transmission network, as well as the rate at which demand grows (and its location).
2. **Provision in the price control parameters (“price control”):** NGET have reserved the use of this category to capture projects for which the price control funding arrangements do not provide an allowance (e.g. projects that deliver outputs beyond T1+2). NGET considers that this narrow interpretation provides improved insight relative to a broader interpretation where changes (to the means of delivery/timing of delivery) can lead to considerable overlap other categories.
3. **Efficiency:** The intention was to allow the each company to illustrate instances of genuine improvements that reduce the costs (or are forecast to reduce cost) or factors driving increased cost. NGET’s view is that, because the projects it now expects to deliver are different from those envisaged when the baseline was agreed, to apply the definition would under-estimate the value created by NGET. This is because performance is strongly influenced by the external change in the background that has occurred, ie. the costs of a project may be simultaneously influenced by a number of interactive drivers with both positive and negative impacts. NGET considers the cumulative impact of these changes to be highly subjective and difficult to isolate from other cost drivers.

Against this background, NGET have estimated efficiencies by seeking to establish counterfactual project costs based on what it might have expected to incur using the investment that existed at the start of RIIO-ET1. Specific examples, where NGET consider the effects can be disaggregated and project specific efficiencies can be identified, are presented separately to the total impact. The level of efficiency (£361 million) is embedded within NGET’s RRP18 forecasts and therefore within the £380 million of underspend (post true-up).

4. **Circumstantial factors:** The intention was to allow the each company to illustrate instances where a company expects to deliver the output anticipated by the baseline assumptions but with different physical content. NGET’s view is that there is considerable overlap with the external factors category. In practice, NGET considers it difficult to systematically separate the underlying driver and therefore have not used this category.

A2.12. The results of NGET’s analysis is summarised in the table below. Note that these values are based on NGET’s updated RRP18 forecast for the T1+2 period and include the impact of the proposed true-up of excluded services (-£212 million).

Table A2.2: NGET view of drivers of performance for price control mechanisms (post true-up)

Load-Related Mechanism £m 2017/18 prices	a. Price Control	b. External	Total Impact (a+b)	Efficiency Examples
Generation Connection (6F)	197	-65	132	-122
Local Demand volume Driver (6L)	23	71	94	-55
Incremental Wider Works (6J)	153	-543	-390	-179
TPWW (6J)	0	-62	-62	-
DNO Volume Driver (6k)	0	-3	-3	nr
Undergrounding provision (6k)	5	-26	-20	nr
Baseline Wider Works (6l)	0	-35	-35	nr
non-variant	0	-95	-95	-5
Total	378 overspend	-758 underspend	-380 underspend	-361

nr - not reviewed for efficiencies

Non-Load related expenditure

A2.13. Against allowances of £6,017 million NGET TO anticipates spending £4,509 million, representing a saving of £1,509 million (22% underspend, including the impact of the voluntary deferral).

A2.14. This represents an increase of approximately £300 million in the forecast value of underspend across the price control period reported last year (£1,200 million, or 20%). This is because the increase in the total allowance forecast by NGET TO is significantly outweighed by a fall in the total NLR costs forecast across the RIIO-ET1 period. This is summarised in the table below.

Table A2.3: NGET TO NLR expenditure and allowance comparison RRP17 and RRP18 (pre true-up)

	£ billion, 2017-18 Prices	RRP 17	RRP 18	Difference
Non-load related	a. Current forecast of T1 expenditure	4.76	4.51	
	b. Current forecast of T1 allowance	5.96	6.02	
	Performance (a-b)	-1.20 (20%)	-1.51 (26%)	0.31

A2.15. NGET TO reports that, despite the significant level of financial savings forecast, it is on track to meet or exceed the Network Replacement Output Measure targets in all asset categories.

A2.16. As was forecast previously, in 2017/18 NGET TO reports that it has continued to increase the volume of asset replacement and refurbishment, with switchgear, overhead

lines conductors and fittings volumes delivered being the highest since the beginning of RIIO-ET1.

A2.17. The driver for the financial savings are primarily due to NGET TO being able to further embed the innovations and efficiencies that we developed over the early years of RIIO-ET1.

A2.18. NGET TO has sought to attribute the difference between expenditure and allowances to driver categories - which can only be done on an estimated and indicative basis. Overall across the non-load related portfolio NGET TO estimates majority (over £1 billion) is driven by direct efficiency, a modest proportion (c. 15%) is driven by the outturn of external risks that were allocated to National Grid such as changing demand levels, and the remainder (c.5%) is due to efficient deferral of investment but which does not have an output defined.

Non-operational capex

A2.19. The latest forecast for Non-Operational capex over the RIIO-ET1 period is £316 million which is higher than the allowances of £188 million. The forecast overspend across the entire RIIO-ET1 period is £127 million (68%). This includes a significant level of costs (£67 million) for Optel/BT21 mitigation work. The total forecast cost of the Optel/BT21 activity has risen by £12 million against the RIIO-ET1 forecasts provided last year by NGET.

A2.20. Expenditure in this category is largely driven by IT investments to facilitate ongoing business and performance improvement (£269 million). The majority of the IT investment is driven three projects:

- “Project One” costs attributable to the TO business, forecast to total £26.4 million over the RIIO-ET1 period. This accounts for 10% of all IT costs to be over the T1 period. The vast majority of these costs are expected to be incurred over the remaining years of RIIO-ET1.
- Technology Change Roadmap⁶⁰, forecast to total £64 million over the RIIO-ET1 period. This accounts for 24% of all IT costs to be over the T1 period. The vast majority of costs have already been incurred.
- Cyber security activity is forecast to total £18 million over the RIIO-ET1 period. This accounts for 7% of all IT costs to be over the T1 period. All of the costs are expected to be incurred over the remaining years of the RIIO-ET1 period. This is

⁶⁰ This programme delivers the data and technology changes required to enable the successful implementation of the Asset, Maintenance Planning & Delivery transformation project within NGET TO.

an enterprise wide programme, benefiting all NG business areas, and NGET TO have been allocated a proportion of the costs (based on a headcount percentage).

Opex

A2.21. The overall RIIO-ET1 operating cost forecast is £2,209 million, against an allowance of £2,086 million: an overspend of £123 million (6%). The opex allowances have marginally decreased from last year's values due to the ISS reopener.⁶¹

A2.22. The main driver for the differential between spend and allowance is higher pension costs, increases in ongoing IT expenditure and T2 preparation costs, higher business support costs - as a consequence of the TO business growing in size relative to other business areas - and the result of a review of allocations between SO and TO resulting in much of the SO allocation moving to the TO.⁶²

⁶¹ <https://www.ofgem.gov.uk/publications-and-updates/outcome-informal-consultation-riio-1-price-control-reopeners-may-2018-0>

⁶² We note NGET's explanation that financial data is not captured in sufficient granularity to enable mapping of costs at the activity level. As a result, future costs have been apportioned based on 2017/18 actual costs.

Appendix 3: Ofgem's assessment of Scottish TO's totex

A3.1. In their Original Business Plan (OBP), SHET and SPT presented a 'best view' position of all the costs they expected to incur in continuing to look after assets and the impact of plans to grow the network to accommodate new customers between April 2013 and March 2022.

A3.2. We decided to 'fast track' both Scottish TOs. This meant that we set their ex-ante allowances on the basis of their business plan, including their view of real price effects (RPEs).

A3.3. The 'best view' position was not fully funded with ex-ante allowances as part of the RIIO-ET1 settlement. Instead, we included a combination of ex-ante allowances and allowances that would be released through "uncertainty mechanisms" (UMs). The agreed UMs automatically increase the level of allowance to cover additional costs incurred or flex downward in response to lower volumes below an agreed threshold. The parameters of such mechanisms were agreed upfront.

A3.4. The 'automatic' UM approach was not suitable to all aspects of the OBP; there was significant uncertainty associated with some large-scale investment projects. To deal with these in RIIO-ET1, we put in place the Strategic Wider Works (SWW) process for the approval of future major investments that we had decided not to fund up-front and which were not captured by the volume drivers. The SWW process allows us to consider the need for and the funding of these projects during the price control period, so that delivery of these outputs can be brought forward in a timely manner.⁶³

A3.5. There are broadly four types of allowed expenditure category:

- **Load-related expenditure (LRE):** investment on the network to accommodate changes in the level or pattern of electricity generation and demand.
- **Non-Load related expenditure (NLRE):** mainly capital investment on replacement and prevention maintenance (refurbishment) to keep assets in good condition, but also other capital expenditure directly related to maintaining a reliable network, such as investments to improve flood defences.

⁶³ To date, only SHET has been granted approval for project funding under the SWW mechanism. Three projects have received funding; Beaulay Mossford, Kintyre Hunterston and Caithness Moray and have been successfully delivered.

- **Non-operational capital expenditure (Non-op capex):** expenditure on equipment not directly related to transmission operations, for example, IT capital expenditure.
- **Controllable operational expenditure (Opex):** this is day-to-day spending on activities required to maintain and operate the transmission networks.

A3.6. The table below summarises our view of SPT and SHET’s totex allowance position across the eight-year RIIO-ET1 period.

Table A3.1: Ofgem’s current view of total expenditure and adjusted allowed totex⁶⁴: SPT & SHET (pre true-up)

	£ billion, 2017-18 Prices	SHET	SPT
TOTEX	a. Current forecast of T1 expenditure	3.24	2.19
	b. Current forecast of T1 allowance	3.54	2.26
	Performance (a-b)	-0.3 (8%)	-0.07 (3%)

A3.7. As noted in chapter one, our presentation of the Scottish TOs totex performance value includes:

- the impact of decisions made as part of the 2017 MPR
- the impact of any agreed ‘hand back’ of allowance
- TO estimates of volume driver allowances and expenditure where the Authority have made a determination and funding has been agreed⁶⁵, and
- expenditure in areas we think are outside the scope of RIIO-ET1.

A3.8. The impact of the current forecast “true up”⁶⁶ of allowances is highlighted but its impact is not deducted from the value of the price control allowance. Our analysis also excludes the current forecast of contributions received to date/forecast to be received from customers across the RIIO-ET1 period (unless stated otherwise).

Load related expenditure

A3.9. The current forecast of LRE across the eight-year price control period for SPT and SHET is summarised in tables A3.2 and A3.3 below. Alongside SWW, there are a further six main categories of load related expenditure applicable to SHET.

⁶⁴ Values include RPEs but exclude the value of approved projects under the Transmission Investment Incentive (TII) or Transmission Investment for Renewable Generation (TIRG) mechanisms.

⁶⁵ For the avoidance of doubt, our analysis excludes costs and forecast allowances associated with ‘not yet approved’ SWW determinations and TPWW claims at the time of submission (latter applicable to NGET only).

⁶⁶ The “true up” reflects the removal of actual “excluded services” income from total allowed revenue, and the expectation that the monies received by TOs through customer contributions will be paid back, as well as the current forecasted true-up of pre-construction allowances (special condition 3L).

- **Local enabling entry/exit sole-use (excluded services).** This includes expenditure on assets that are covered by connection charges. The net expenditure for these connections (deducting any customer contributions) is funded directly by the customer over the life of the asset⁶⁷.
- **Local enabling shared-use infrastructure:** expenditure triggered by individual projects (generation or demand) that provides assets or reinforcements that are shared by several users of the transmission network (Megavolt Ampere, MVA). The cost is paid by all users through use of system network charges.
- **Local enabling sole-use infrastructure.** This is expenditure triggered because of generation/load growth. It includes expenditure on infrastructure assets that connect a single user to the transmission network (MW). The cost is paid by all users through use of system network charges.
- **OFTO and Shetland connections (SHET only):** expenditure associated with facilitating the connection of potential offshore transmission projects to the onshore network and the proposed construction of demand infrastructure on the island of Shetland.
- **Baseline Wider Works:** transmission reinforcement works (not local enabling works) associated with reinforcing the integrated network.

A3.10. The reporting template is identical for both SPT and SHET, but differences apply in the reporting categorisation applicable to specific network reinforcement works. As a result, SPT has no expenditure applicable to the "OFTO and Shetland" category of load related expenditure but is instead reporting expenditure associated with:

- **Series and shunt compensation**⁶⁸: works to increase the transfer capability across the B6 boundary (referred to as "MSCDN"), and
- **Grid Supply Point reinforcement projects**⁶⁹: in response to continuing uncertainty in the renewable sector, SPT has scaled back some larger reinforcement projects (eg the Dumfries and Galloway Strategic Reinforcement) and is looking to improve the existing network in other ways. This has led to additional reinforcement schemes.

⁶⁷ The connection charging methodology allows users to pay upfront capital contributions as well as annual charges for their connection over the lifetime of the asset. SHET's OBP did not consider the upfront contribution method of payment (ie assumed a zero value for potential customer contributions in this area). SPT assumed an original total contribution of £57m (17-18 prices) in the establishment of an ex-ante allowance for the delivery of generation and demand connection 'sole use' activity.

⁶⁸ This work is categorised as 'Wider Works not subject to an Uncertainty Mechanism' in the regulatory reporting pack (RRP) and entitled LR13.

⁶⁹ This work is categorised as 'Local Enabling Exit schemes not subject to an Uncertainty Mechanism' in the RRP and entitled LR15.

Table A3.2: Ofgem's current view SPT's LRE vs forecast allowance (pre true-up)

Cost category (RRP reference) <i>£m, 2017/18 Prices</i>	A 8 year forecast allowed Totex	B T1 forecast expenditure: T1 delivery ⁷⁰	C T1 forecast expenditure: delivery beyond T1 ⁷¹	D = B-A T1 Performance	E = (B+C)-A Total cost Performance
Transmission connection assets (LR1 & LR2)	121 ⁷²	86	35	-35	0
Generation connection volume driver: Sole use (LR9 & LR10)	41 ⁷³	64	18	+23	+41
Generation connection volume driver: Shared use (LR11) <i>Plus IRM adjustment</i>	153 (+26)	213 (+11)	0	+45	+45
Generation connection volume driver: Shared use (LR12) <i>Plus IRM adjustment</i>	177	170 (+6)	20	-1	+19
Baseline wider works connections (LR21)	654	537	0	-117	-117
MSCDN (LR15) [†]	19	8	4	-11	-7
GSP reinforcement (LR13)	72	35	35	-37	-2
SWW pre-construction activity only (LR20)	28	3	0	-25 ⁷⁴	-25
Transmission System Services (LR22)	1	3	0	+2	+2
Total (excl current forecast of capital contributions)	1,292	1,136	112	-156 (12%)	-44 (3%)
Current forecast of customer contributions		-90	0		
Adjusted total		1,046	112	-246 (19%)	-134 (10%)

[†] Series and shunt compensation works on the B6 boundary; these costs are excluded from LR21. Related Party Margins (£26 million) have been removed from our assessment of T1 expenditure (col B).

The value of T1 Allowance includes the allowance granted by Ofgem (September 2015) within 2016/17 and 2017/18 to fund the IRM project to deploy High-Temperature Low Sag conductor.⁷⁵

During autumn 2017, it was identified that there was an inconsistency in the reporting of IRM project costs and allowances. Prior to this the AIP allowance did not include the full eight years of IRM funding; it only included to 2016/17. Furthermore, Ofgem's allocation of the September 2015 additional allowances in the PCFM, split the allowance across load, non-load and direct opex. The approach generates a difference in allowance comparisons. The difference, after adjusting for the original forecast level of capital contributions expected under LR1 and LR2, has two elements: the IRM allowance for the period from 2016/17 that is not currently captured in table 2.2 of RRP18 (£3 million) and the IRM allowance in table 2.2 that SPT considers should be assigned to the LR cost category (£18 million).

⁷⁰ This category is associated with projects incurring expenditure in T1 that are currently expected to complete within the T1 period.

⁷¹ For SPT this category is associated with projects incurring expenditure in T1 that are currently expected to be delivered in timescales beyond 31 March 2021. SPT is not funded for expenditure relating to projects which do not have an output beyond the end of RIIO-ET1.

⁷² Adjusting for the original T1 forecast of customer capital contributions (-£57 million) reduces the total allowance value from £121 million to £64 million. In turn, the total LR allowance is reduced to £1,235 million.

⁷³ Includes the impact of SPT's estimated clawback value.

⁷⁴ We note that it is SPT's intention to fully spend this allowance in developing substitute schemes and to submit appropriate output substitution requests in accordance with special condition 3L.

⁷⁵ https://www.ofgem.gov.uk/sites/default/files/docs/2015/09/decision_irm_2015.pdf

Table A3.3: Ofgem’s current view of SHET’s LRE vs forecast allowance (pre true-up)

Cost category (RRP reference) <i>£m, 2017/18 Prices</i>	A 8 year forecast allowed Totex ⁷⁶	B T1 forecast expenditure: T1 delivery ⁷⁷	C T1 forecast expenditure: T1+2 delivery ⁷⁸	D = B-A T1 Performance	E = (B+C)-A Total cost Performance
Transmission connection assets (LR1 & LR2)	291	145	11	-145	-136
Generation connection volume driver: Sole use (LR5 & LR6)	390	388	60	-2	+58
Generation connection volume driver: Shared use (LR7 & LR8)	583	541	94	-42	+52
Baseline wider works connections (LR20)	67	61	0	-6	-6
Ex ante infrastructure: onshore (LR3)	9	16	0	+7	+7
Ex ante infrastructure: offshore (LR3)	39	27	0	-12	-12
Shetland (LR13)	39	28	0	-11	-11
Shared-use pre construction activity (LR15)	35	40	3	+5	+8
Approved SWW (LR18) <i>capex only</i> [†]	1,472	1,303	0	-169	-169
SWW pre construction activity only (LR21)	91	73	0	-16	-16
Transmission System Services (LR22)	3	3	0	0	0
Pre True-up Total	3,020	2,625	168	394 (13%)	-227 (7%)
Current forecast of customer contributions		-96	0		
1. Adjusted total		2,529	168	-490 (16%)	- 322 (11%)
Hand back	-60				
2. Adjusted total	2,959	2,529	168	-430 (17%)	-262 (9%)

[†] Not including the handback.

A3.11. The next sections provide further summary detail on the performance of each Scottish TO under each of the above cost categories.

⁷⁶ Five year actual expenditure and three years of forecast expenditure.

⁷⁷ This category is associated with projects incurring expenditure in T1 that are currently expected to complete within the T1 period. This includes the delivery of schemes within the original project portfolio upon which the original baseline settlement was based and new schemes.

⁷⁸ This category is associated with projects incurring expenditure (and forecast to be incurred) that are currently expected to be delivered in timescales on or before 31 March 2023.

Transmission connection assets

A3.12. Both Scottish TOs are forecasting incurring costs attributable to the connection of new generation and demand users below the forecast level of allowance. This takes into account income received from customers choosing to pay upfront capital contributions (rather than as revenue)⁷⁹.

A3.13. The differential is primarily due to the changes in the number of schemes anticipated to progress to connection (customer terminations, deferrals to RIIO-ET2 and decisions to connect at a lower voltage). For projects that have been delivered to date, the companies indicate that refinements in scope and construction (reducing the footprint of the project) and improvements in contracting strategies, in some instances, have delivered the project for lower costs than forecast. While there may be instances where higher costs have been incurred (due to delays) these do not outweigh the cost reductions.

A3.14. The net expenditure for these connections is funded directly by the customer over the life of the asset in accordance with a pre-determined charging methodology. This income is treated as an excluded service income which we net from the total allowed revenue. To reflect the level of uncertainty over RIIO-ET1 with such activity we are minded to "true up" the ex-ante allowances in this area; resetting allowances to mirror the actual net capex and to reflect the removal of actual excluded service income from total allowed revenue. The next section details the performance of SPT and SHET both with and without our current forecast value of the true-up adjustment.

SPT (LR1 & LR2)

A3.15. SPT currently forecasts incurring total costs of £111 million (excluding RPMs) in the connection of new sole use generation projects and £12m in the connection of new sole use demand projects.

A3.16. The costs can be further broken down into works that are currently forecast to be completed within the T1 period and those to be delivered in the next control period. Table A3.4 highlights that SPT is currently forecasting to underspend against its combined LR1 and LR2 allowance for schemes delivered within T1 (£35 million).

A3.17. SPT report the value of spend incurred to date/forecast to be incurred on schemes expected to be delivered within T2 timeframes is forecast to be £35 million (for

⁷⁹ Relates to "customer choice" design under the network – for example, developers choosing an underground cable option rather than a cheaper OHL solution. As such, developers fund this differential. The cost of this solution is included with SHET's infrastructure forecast but is ultimately offset by this income so that the wider GB users do not get impacted by this cost.

which there are no allowances). The net position across T1 and T2 timeframes is broadly neutral. This value does not take into account customer contributions.

Table A3.4: excluded services spend vs allowance (pre true-up)

£m, 2017/18 prices	T1	T2	Total
LR1 expenditure	75	35	110
LR2 expenditure	11	0	11
a. Sub total	86	35	121
LR1 allowance	99	n/a	99
LR2 allowance	22	n/a	22
b. Sub total	121 ⁸⁰	n/a	121
TOTAL a-b	-35	35	0

A3.18. Our current forecast value of the potential ex-post reconciliation at the end of the price control (or excluded services true-up), using SPT's current forecast view of the eight year expenditure, is £20 million. This is detailed in the table below.

Table A3.5: excluded services true-up, including RPEs

	1	2	3 (1+2)	4	5	6 (4+5)
<i>£m, 2017/18 prices</i>	Baseline allowance (pre CC)	Original Forecast Customer Contributions	Baseline allowance (post CC)	Current forecast Customer Contributions	Current view of expenditure	Net current view of expenditure
LR1 Allowance	100	-36	64	-68	111	44
LR2 Allowance	22	-22	0	-11	11	0
TOTAL	122⁸¹	-58	64	-79	122	44
Forecast "true-up" value (Col 6 - Col 3)						-20

SHET (LR1 & LR2)

A3.19. SHET currently forecasts incurring total costs of £72 million in the connection of new sole use generation projects and £84 million in the connection of new sole use demand projects.

A3.20. The costs can be further broken down into works that are currently forecast to be completed within the T1 period and those to be delivered in the next control period.

A3.21. Table A3.6 highlights that SHET is currently forecasting to spend a combined £146 million across the LR1 and LR2 mechanisms (pre true-up) for schemes delivered within the T1 timeframe. This represents an underspend of £145 million against its

⁸⁰ £5 million RPEs value included.

⁸¹ £5 million RPEs value included.

combined allowance (£291 million). This value does not take into account the current estimate of customer contributions.

A3.22. The forecast T1 underspend value is marginally offset by the forecast spend (£11 million) being incurred/forecast to be incurred on schemes expected to be delivered within T2 (which currently has no allowance under the T1 framework).

Table A3.6: excluded services spend vs allowance (pre true-up, incl. RPEs)

£m, 2017/18 prices	T1	T2	Total
LR1 expenditure	61	11	72
LR2 expenditure	84	0	84
a. Sub total	145	11	155
LR1 allowance	177	0	177
LR2 allowance	114	0	114
b. Sub total	291	0	291
TOTAL a-b	-145	11	-136

A3.23. Our current forecast value of the potential ex-post reconciliation at the end of the price control (true-up), using SHET's current forecast view of the eight year expenditure, is £176 million. This is detailed in the table below.

Table A3.7: excluded services true-up, including RPEs

	1	2	3 (1+2)	4	5	6 (4+5)
<i>£m, 2017/18 prices</i>	Baseline allowance (pre CC)	Original Forecast Customer Contributions	Baseline allowance (post CC)	Current forecast Customer Contributions	Current view of expenditure	Net current view of expenditure
LR1 Allowance	177	0	177	-35	72	37
LR2 Allowance	114	0	114	-5	84	78
TOTAL	291⁸²	0	291	-41	155	115
Forecast "true-up" value (Col 6 - Col 3)						-176

Generation connection volume drivers

A3.24. There is a two stage approach to the funding of new generation connections under the RIIO-ET1 framework; an upfront allowance to deliver a specified threshold capacity based on the best estimate of projects most certain to proceed at the time, augmented by a volume driver, designed to flex the allowance in accordance with the actual outturn demand and consequential system-wide requirements.

⁸² £12 million RPEs value excluded.

A3.25. Two mechanisms apply to the costs of connecting new generation sources; to connect one generator at a time (MW deemed to be for the use of one generator) and another to connect multiple generators⁸³ and the costs of associated infrastructure (network capacity, MVA). The mechanisms are summarised below in table A3.8. The sections below summarise the current forecast position of SHET then SPT under each mechanism across RIIO-ET1.

Table A3.8: Generation volume driver summary⁸⁴

	SPT	SHET
Description	Connection works including local substation, OHL and cable to the existing network	
Baseline description	Sole-use: 2,503MW across the 8-year period. (LR9 & LR10) Shared-use: 1,073MVA across the 8-year period. (LR11 & LR12)	Sole-use: 1,168MW across the 8-year period. (LR5 & LR6) Shared-use: 1,006MVA across the 8-year period. (LR7 & LR8)
Baseline output definition	Sole-use: MW 'using' network (Transmission Entry Capacity or TEC) Shared-use: MVA (asset rating)	
Pre threshold Unit Cost Allowance (UCA)	Sole-use: £27.3k/MW (excl RPE) Shared-use: £104.6k/MVA (excl RPE)	Sole-use: £85k/MW (excl RPE) Shared-use: £83k/MVA (excl RPE)
Post threshold UCA	Sole-use: £43k/MW (excl RPE) Shared-use: Asset specific captured in licence condition	Sole-use: £75k/MW (excl RPE) Shared-use: £83k/MVA (excl RPE)
Trigger threshold for High Cost Projects	Not applicable	Sole-use: \geq £150k/MW Shared-use: \geq £166k/MVA
Atypical UCA⁸⁵	Not applicable	Sole-use: £294k/MW Shared-use: £182k/MVA

SHET (LR5 to LR8)

A3.26. Under SHET's baseline RIIO-ET1 package, it will seek to connect 1,168MW of new generation that includes sole-use infrastructure elements. The baseline package provided an allowance of £136 million (including RPEs⁸⁶) associated with the delivery of new generation connections with a sole-use element.

A3.27. Table A3.9 summarises SHET's current estimate of spending to deliver the threshold capacity of 1,168MW (against the baseline allowance). SHET is currently

⁸³ "Shared use" infrastructure relates to expenditure triggered by individual connection projects but only provides assets or reinforcements which are shared by users of the transmission network.

⁸⁴ Financial values in 2009-10 prices.

⁸⁵ Some schemes were excluded from SHET's revenue drivers to reflect the level of uncertainty and very high unit costs. A variation to both the sole-use and shared-use mechanism was introduced for schemes brought forward during the T1 period with a forecast unit cost greater than £150k/MW for sole-use and £166k/MVA for shared-use are defined as "Atypical". This approach was not applied by SPT.

⁸⁶ £126 million excluding the impact of RPEs.

forecasting an overall spend of £25 million below the current estimate of allowance it expects to receive across RIIO-ET1. This value does not take into account the current estimate of customer contributions.

Table A3.9: sole-use spend vs allowance (up to threshold)

(£m, 2017/18 prices)	T1	T2	Total
a. LR5 expenditure	111 ⁸⁷	3	114
b. LR5 allowance	136	n/a	136
Performance (a-b)	-25	3	-22

A.3.28. Delivery of every MW of additional capacity above the threshold (1,168MW) will trigger additional allowances via the volume driver mechanism. The level of funding is determined by two broad categories of above-threshold capacity; “typical” and “atypical” (see table A3.8 for details). SHET will receive additional funding of £96k/MW in 2017-18 prices (typical) and £375k/MW in 2017-18 prices (atypical) for the delivery of every incremental MW.

A3.29. Table A3.10 summarises the current estimate of RIIO-ET1 performance associated with the delivery of capacity above this threshold that SHET expects to receive funding via the volume driver mechanism.

A3.30. Above the baseline threshold of 1168MW, SHET is currently forecasting total expenditure of £76 million to deliver an additional 345MW of capacity through the delivery of typical schemes and £259 million to deliver 560MW through atypical schemes. Overall expenditure above the baseline is therefore estimated to be £334 million; a net overspend of £53 million above the estimated allowance provided via the volume driver mechanism of LR5 and LR6 (£288 million in total).

A3.31. It is important to note that the allowance derived from the above threshold revenue driver is divided by the typical number of years that it takes to deliver connections (assumed to be four years) to derive a flat revenue allowance. Hence, a typical 100MW sole-use connection will receive funding of £9.6m (100MW * £96k/MW). If the scheme is expected to be delivered in the final year of the price control period (2020/21), a totex allowance of £2.4 million per annum (9.6/4) will be made available in 2017/18, 2018/19, 2019/20 and 2020/21.⁸⁸

⁸⁷ Customer contribution is estimated to have a T1 value of £23m.

⁸⁸ A further 1.5% annual adjustment is made to the UCAs for RPEs – the uncertainty associated with the fluctuations in the value of component costs. In the above example this equates to £0.04m per annum.

Table A3.10 sole-use spend vs allowance (above threshold)

(£m, 2017/18 prices)	T1	T1+2	Total
typical expenditure	49 ⁸⁹	27	76
atypical expenditure	228 ⁹⁰	30	259
a. Total	277	57	334
typical allowance	29	9	38
atypical allowance	225	25	250
b. Total	254	34	288
Performance (a-b)	20	23	53

A3.32. The baseline package also provided SHET with a level of funding for the construction of shared-use connections of £114 million (including RPEs⁹¹). This is applied to the delivery of an installed capacity target of 1,006 megavolt amperes (MVA) – a measure representing the “deeper” reinforcement to the surrounding transmission network required to enable the generation to connect.

A3.33. Table A3.11 summarises SHET’s current estimate of spending to deliver the baseline 1,006MVA capacity (against the ex-ante baseline allowance). The table highlights that SHET is currently forecasting to spend £62 million⁹², which is below the allowance it expects to receive across the RIIO-ET1 price control period.

Table A3.11: SHET’s shared-use spend vs allowance (up to threshold)

(£m, 2017/18 prices)	T1	Total
a. LR7 expenditure	62 ⁹³	62
b. LR7 allowance	114	114
Performance (a-b)	-52	-52

A3.34. Delivery of capacity in excess of the licence target will trigger additional allowances via the volume driver mechanism. The level of funding is determined by two broad categories of capacity; “typical” and “atypical”. SHET will receive additional funding of £106k/MW (typical) and £233k/MW (atypical) for the delivery of every incremental MW – both values in 2017-18 prices.

A3.35. Table A3.12 summarises the current estimate of RIIO-ET1 performance associated with the delivery of capacity above the threshold that SHET expects to receive funding via the volume driver mechanism.

⁸⁹ SHET currently expects to receive no customer contributions.

⁹⁰ Customer contribution is estimated to have a value of £23m.

⁹¹ £106 million excluding the impact of RPEs.

⁹² Taking into account of the value of customer contributions and excluding expenditure on schemes where the output is anticipated to be delivered in T2.

⁹³ Customer contributions is estimated to have a total value of £0.06m and is excluded from the analysis.

A3.36. SHET is currently forecasting expenditure of £502 million to deliver 4020MVA of network capacity through the delivery of typical schemes and £71 million to deliver a further 226MVA of atypical capacity above the baseline threshold. The cumulative expenditure (£573 million) is above the additional funding forecast to be provided via the volume driver mechanisms of LR7 and LR8 (£556 million); a net overspend of £17 million.

A3.37. The breakdown of total costs over the T1 and T2 timeframe highlights that SHET is currently forecasting to spend £9 million above the anticipated allowance in T1 for network capacity currently forecast to be completed within the T1 period. An overspend is currently anticipated over the T2 timeframe (£8 million) on network capacity expected to be delivered in T2 timeframes.

A3.38. Parallel to the sole use mechanism, the allowance derived from the above threshold shared-use revenue driver is divided by the typical number of years that it takes to deliver connections (assumed to be four years) to derive a flat revenue allowance. Hence, a typical shared-use connection that will deliver 100MVA network capacity will receive funding of £10.6m (100MVA * £106k/MW). If the scheme is expected to be delivered in the final year of the price control period (2020/21), a totex allowance of £2.65 million per annum (10.6/4) will be made available in 2017/18, 2018/19, 2019/20 and 2020/21.

Table A3.12 shared-use spend vs allowance (above threshold)

(£m, 2017/18 prices)	T1	T2	Total
typical expenditure	441 ⁹⁴	61	502
atypical expenditure	38	33	71
a. Total	479	94	573
typical allowance	430	53	483
atypical allowance	39	33	72
b. Total	469	86	556
Performance (a-b)	9	8	17

A3.39. Overall expenditure under the shared-use infrastructure mechanism (LR7 & LR8) is currently forecast to be £634 million to deliver an estimated network capacity increase of 5252MVA. This forecast level of expenditure is £36 million below the total funding SHET currently expects to receive through the baseline allowance and volume driver (£670 million).

A3.40. The reasons for the T1 differential is linked to the way that the parameters of the automatic funding mechanism were initially set up and changes to the initial list of projects. The initial schemes (projects deemed most certain to proceed based on available information at the time) were not funded explicitly, but rather were used as the

⁹⁴ No customer contributions estimated.

illustrative of the likely types of investment required during the period. For projects that have been delivered to date, the SHET indicates that refinements in scope and construction (increasing the footprint of the project) and delays have delivered the project for higher costs than forecast. While there may be instances where lower costs have been incurred (due to contracting strategies) these do not outweigh the cost increases.

SPT (LR9 to LR12)

A3.41. Under SPT's baseline RIIO-ET1 package it will seek to connect 2.5GW of new generation that includes sole-use elements within the RIIO-ET1 period. A baseline allowance of £97 million (including RPEs⁹⁵) was set to deliver this threshold target. A volume driver applies to the costs of sole use generation connections delivered by SPT during RIIO-ET1 in excess of the threshold.

A3.42. SPT is currently expecting to connect 1,620GW of generation requiring sole-use elements across RIIO-ET1, at a cost of £82 million. This capacity is below the baseline target level (2,503MW). SPT currently anticipates a clawback of c.£56 million⁹⁶ allowance through the operation of the volume driver mechanism (on the basis that the output target was set on the final year of the price control). As a result, SPT currently forecasts expenditure will be greater than allowance by c.£41 million (post clawback).

A3.43. SPT's performance under the sole-use mechanism is summarised in table A3.13 below. The costs incurred by SPT have been broken down into works that are currently forecast to be completed within the T1 period and those to be delivered in the next control period (ie. beyond 31 March 2021). Of the total forecast overspend, SPT is currently forecasting £23 million to be attributable to schemes being delivered within the T1 timeframe. A further £18 million of costs is currently forecast to be incurred on schemes to be delivered in T2 timeframes.

A3.44. As a result of missing the threshold, SPT currently forecasts no additional allowances will be triggered via the volume driver mechanism and no values are forecast under the relevant mechanism (LR10).

Table A3.13: sole-use spend vs allowance (up to threshold)

(£m, 2017/18 prices)	T1	T2	Total
a. LR9 expenditure	64 ⁹⁷	18	82
b. LR9 allowance	97	n/a	97
c. Performance (a-b)	-33	18	-15
d. Estimated clawback (SPT value)	56	n/a	56
Adjusted performance (c+d)	23	18	41

⁹⁵ £87 million excluding the impact of RPEs.

⁹⁶ £48 million excluding the impact of RPEs.

⁹⁷ Customer contributions is estimated to have a total value of £0.06m and is excluded from the analysis.

A3.45. The baseline package also provided SPT with a level of funding for the construction of new shared-use infrastructure for generation connection works. SPT's baseline package contains an output target to deliver 1,073MVA of new network infrastructure capacity. An allowance of £153 million (including RPEs⁹⁸) was set to enable SPT to deliver this capacity. A volume driver is applicable for the delivery of shared-use connections infrastructure that exceeds the capacity threshold.

A3.46. SPT is currently forecasting expenditure of £213m to deliver the target of 1,073MVA; an overspend of £60 million against an allowance of £153 million.

A3.47. SPT make a further adjustment to reflect the value of additional spend (and ex-ante funding) attributable to specific projects subject to the Innovation Roll Out Mechanism (IRM)⁹⁹. The net effect of this adjustment is to reduce the level of overspend across the price control period from £60 million to £45 million. SPT's performance in the delivery of the baseline target is summarised below.

Table A3.14: SPT shared-use spend vs allowance (up to threshold)

(£m, 2017/18 prices)	T1	Total
LR11 expenditure	213 ¹⁰⁰	
IRM expenditure	11	
a. Expenditure	224	224
LR11 allowance	153	
IRM allowance	26	
b. Allowance	179	179
Performance (a-b)	45	45

A3.48. Unlike SHET, SPT does not have any provisions for "high cost" connection projects. Therefore, all connections SPT undertakes during RIIO-T1 will either be covered by the RIIO-ET1 baseline or by the volume driver (and subject to the efficiency sharing factor)¹⁰¹.

A3.49. SPT currently anticipates that it will over-deliver on shared-use infrastructure outputs (2409MVA above baseline). SPT is currently forecasting total expenditure of £190 million to deliver this above-baseline MVA (£188 million taking into account the current estimate of customer contributions). This is an estimated overspend of £13 million.

⁹⁸ £143 million excluding the impact of RPEs.

⁹⁹ High-Temperature Low Sag conductor on XY and YY 275kV routes and Torness /Dunbar/Innerwick 132kV OHL to increase circuit capacity and improve utilisation of these existing overhead lines. The treatment is discussed in the MPR decision paper.

¹⁰⁰ Customer contributions is estimated to have a total value of £9m; reducing expenditure to £204 million.

¹⁰¹ More detail on SPT's above-threshold approach to shared-use capacity is available in our MPR document.

A3.50. SPT make an adjustment to reflect the value of additional spend (£6 million) attributable to specific projects subject to the IRM. The result of the adjustment is to increase the forecast total overspend to £19 million.

A3.51. The costs incurred by SPT above the 1,073MVA threshold can be broken down into works that are currently forecast to be completed within the T1 period and those to be delivered in the next control period. SPT is currently forecasting to underspend c.£1 million against its forecast allowance for schemes delivered within the T1 timeframe. This value is outweighed by the spend forecast to be incurred (£20 million) on schemes currently expected to be delivered in T2 timeframes. This results in a total forecast overspend of £19 million, as shown in Table A3.15 below.

Table A3.15: SPT shared-use spend vs allowance (above threshold)

(£m, 2017/18 prices)	T1	T2	Total
LR11 expenditure	170 ¹⁰²	20	190
IRM expenditure	6	0	6
a. Expenditure	176	20	196
LR11 Allowance	177	n/a	177
IRM allowance	0	n/a	0
b. Allowance	177	0	177
Performance (a-b)	-1	20	19

A3.52. Overall expenditure under the shared-use infrastructure mechanism (including IRM adjustment) is currently forecast to be c.£420 million. This forecast level of expenditure is approximately £90 million above the funding SPT expects to receive (c.£330 million) across RIIO-ET1. Looking specifically at the expected costs to facilitate delivery of shared-use network capacity within the RIIO-ET1 price control period, SPT is currently forecasting an overspend of £70 million, which is reduced by approximately £10 million taking into account the current estimate of customer contributions.

A3.53. The reasons for the differential is linked to the way that the parameters of the automatic funding mechanism were initially set up and changes to the initial list of projects. The baseline allowance is not specific to individual projects or programmes that were considered at the time of the submission. The mechanism recognises that the mix and scope of projects within the baseline may change over time.

Baseline wider works connections¹⁰³

A3.54. Reinforcement works on the wider transmission system to accommodate existing and future generation and demand as projected in the TOs' business plans are known as Baseline Wider Works (BWW) outputs. BWW outputs (and Incremental Wider Works

¹⁰² Customer contributions is estimated to have a total value of £1m.

¹⁰³ These are set out in Special Condition 6I of each licence.

outputs – discussed in the next section) are measured in terms of the additional transfer capacity across system boundaries.¹⁰⁴

A3.55. The electricity transmission licence sets out each reinforcement project, the boundary it will affect and the amount of additional transmission transfer capability (MW) agreed as part of the BWW output.

SHET

A3.56. SHET’s electricity transmission licence contains two BWW reinforcement schemes to provide additional boundary transfer capability in the north of Scotland. Both schemes (Beauly Blackhillock Kintore and the Beauly – Mossford substation)¹⁰⁵ were delivered in line with licence requirements during reporting year 2015-16.

A3.57. Across RIIO-ET1, SHET reports totex expenditure of £60.6 million in the delivery of its BWW outputs. This is approximately £6.7 million below total allowance across the price control (see table A3.16 below).

Table A3.16: SHET BWW forecast

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	67.3	60.6	-6.7

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

SPT

A3.58. SPT’s electricity transmission licence details five BWW reinforcement schemes. SPT has delivered one BWW output through the energisation of the subsea cable link between Hunterston and Kintyre. The delivery plan of the other BWW outputs (based around the south of Scotland) have been delayed due to uncertainty on timing of renewable generation and planning considerations.

A3.59. SPT currently expects to deliver two BWW outputs: the East-West upgrade (voltage uprating from 275kV to 400kV) and the Series and Shunt Compensation projects (installation of series capacitor units) during T1. Of the remaining two BWW schemes specified in SPT’s electricity transmission licence:

¹⁰⁴ A system boundary splits the transmission network into two parts across which the capability to transfer electrical power can be assessed. For the avoidance of doubt, system boundaries are not network ownership boundaries and each TO’s network could contain multiple system boundaries.

¹⁰⁵ The Beauly Mossford substation on its own does not provide a boundary increase, but it is a sub component of the b10 boundary and is defined as a BWW project as it does provide further reinforcement to the wider system. Two further outputs - associated with the Beauly-Dounreay and Beauly Mossford projects - were delivered in the previous price control and are not specified as a Baseline Wider Works scheme in special condition 6I. However, SHET reports the additional expenditure associated with each legacy scheme.

- the Western HVDC link has a revised completion date of 2018/19 (delayed from 2016-17), and
- voltage support at Kilmarnock-South (K-S) is not anticipated to be delivered. SPT's review of its network in that area has led it to substitute the baseline output to install shunt reactive compensation equipment at several sites including K-S.¹⁰⁶

A3.60. Across RIIO-ET1 for the five BWW schemes, SPT currently anticipates a total expenditure of £537 million in the delivery of the relevant BWW outputs. This is approximately £117 million below SPT's current forecast of total allowance across the price control. This is summarised in the table below. Excluding the Western HVDC link project, SPT forecast an underspend across the portfolio compared with allowances (£47 million). The reason for the underspend is efficiency savings associated with SPT's contracting process and with the delivery of the schemes.

Table A3.17: SPT BWW forecast

Scheme name <i>£m, 2017-18 prices (excl RPMs)</i>	Allowance	Expenditure	Performance	Net position K-S project only
Scottish series and shunt compensation	108.6	59.5	-49.1	
East - West Upgrade	71.9	76.7	5.1	
Western HVDC	428.0	357.9	-70.1	
Hunterston Kintyre link	24.9	29.5	4.6	
Kilmarnock South (not a 'live' project)	21.3	0	-21.3	
Kilmarnock South Substitute	0	13.6	13.6	-7.7
TOTAL	654.3	537.2	-117.2	

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.61. SPT explains that this expected level of outperformance is largely the result of efficiencies in the programme of upgrade work – Series and Shunt compensation projects and Western HVDC account for the majority of the expected underspend.

A3.62. Alongside the specific BWW projects, SPT is incurring cost by installing shunt compensation units ('MSCDN')¹⁰⁷. The current forecast for these works is £8 million across the eight-year period against an allowance of £19 million. SPT explains that all savings have been achieved through the tendering and site management process. SPT anticipates incurring a small level of additional costs in T2 (£4 million).

¹⁰⁶ Our MPR decision made the following statement "our decision is to consider the output delivered if SPT manages voltage in a manner that delivers the greatest consumer value."

¹⁰⁷ This work is categorised as 'Wider Works not subject to an Uncertainty Mechanism' in the RRP.

Table A3.18. SPT's MSCDN spend vs allowance

£m, 2017/18 prices	T1	T2	Total
a. expenditure	8	4	12
b. LR15 allowance	19	n/a	19
Performance (a-b)	-11	4	-7

Ex-ante infrastructure

SHET

A3.63. SHET's baseline plan included the development of a single investment for new demand on the island of Shetland (LR13). An allowance of £39.2 million was agreed at the start of RIIO-ET1. The scheme has now been cancelled.

A3.64. SHET is currently reporting the costs incurred in three new reactor schemes against this allowance. The overall forecast expenditure in this category is £28 million (excluding customer contribution of £8.2m), which is £11.2 million below the baseline allowance. The expenditure relates to the installation of additional reactors on the network (Peterhead, Kintore & Tealing) that were not foreseen in the original business plan and two additional schemes (Dudhope GSP and St Fergus Gas GT Replacement). The latter schemes reflect the need for additional infrastructure associated with offline construction of replacement GSP sites.

Table A3.19: revised Shetland spend vs allowance (LR13)

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	39.2	28.0	-11.2

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.65. A separate cost category (entitled LR3) provides for the recovery of costs associated with four potential offshore transmission connections¹⁰⁸. An allowance of £39.4 million was agreed at settlement, based on SHET's best view of the likelihood of investment. Currently, SHET has confirmed that two projects are currently not included in its best view projection (the Islay scheme has terminated and the Firth of Forth scheme is currently expected to be delivered in T2).

A3.66. As in other areas, the scope of works associated with the remaining projects is now substantially different, due to changes in customers' requirements and the NOA process. An underspend of £12.3 million is currently expected across the RIIO period. Most expenditure for offshore generation schemes will now be required later in the RIIO-T1 period based on current contracted position and delivery plan for the Moray Offshore Windfarm (scheduled for delivery in 2021).

¹⁰⁸ Moray Firth, Firth of Forth, Argyll Array (Islay) and Beatrice.

A3.67. There is a separate onshore element to the LR3 cost category covering the progression and delivery of four programmes of work identified by SHET at the time of the business plan submission¹⁰⁹. An allowance of £9.2m was agreed at settlement to deliver these wider works (driven by anticipated renewable generation growth) within the RIIO-ET1 period.

A3.68. Three of the four projects are currently incurring cost (Errochty – Tummel OHL works has been terminated). SHET currently estimates incurring cost of £16.3 million across the price control period, which is £7 million above the level of allowance. SHET explains that the higher costs are driven by the Fort Augustus to Skye scheme due to delays associated with consenting issues.

Table A3.20: SHET wider work spend vs allowance (LR3)

£m, 2017-18 prices	Allowance	Expenditure	Performance
Onshore	9.2	16.3	7.1
Offshore	39.4	27.1	-12.3
TOTAL	48.6	43.4	-5.2

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.69. A final category of ex-ante funding was provided to allow SHET to undertake pre-construction activities associated with the development of shared-use infrastructure projects prior to the commitment to the construction phase. The funding was intended to allow the projects to be tendered and consented. The shared-use reinforcements were identified at the time of business plan submission and used as the parameters of the “typical” shared-use volume driver mechanism (see LR7).

Table A3.21: SHET shared-use pre-construction spend vs allowance (LR15)

£m, 2017/18 prices	T1	T2	Total
a. expenditure	40	3	43
b. LR15 allowance	35	n/a	35
Performance (a-b)	5	3	8

A3.70. Separate ex-ante funding was developed for the pre-construction design costs for prospective strategic wider works projects. This is discussed in the SWW section.

GSP reinforcement

A3.71. The RIIO-ET1 settlement included funding of £72m for general reinforcement necessary to meet security standard requirements, to connect known customers and to manage the future requirements for low carbon expectations through RIIO-ET1.

¹⁰⁹ Errochty – Tummel OHL reinforcement, Fort Augustus to Skye Tee, Inveraray SQSS compliance and Keith - Macduff second 132kV circuit.

A3.72. SPT is currently forecasting to incur total costs of £70 million in delivering reinforcement work. Costs can be further split into works that are currently forecast to be completed within the T1 period and those to be delivered in the next control period. Table A3.22 highlights that SPT is currently forecasting to spend £35 million to deliver works within the T1 period; an underspend of £35 million against the baseline allowance.

A3.73. The main factor in the variance against allowance is the removal of Devol Moor – Erskine scheme¹¹⁰, project changes – Cupar (reprofiled) and Galashiels (delayed¹¹¹) - and the deferral of three projects (Livingston East, Devonside and Newton Stewart) beyond T1. SPT also reports that there are underlying cost savings against allowance for original GSP reinforcement schemes; mainly the result of SPT’s dis-aggregated approach to tendering and expected contract savings on transformer purchase prices to date (c.£10 million).

Table A3.22. SPT’s GSP reinforcement spend vs allowance (LR13)

(£m, 2017/18 prices)	T1	T2	Total
b. expenditure	35	35	70
b. LR13 allowance	72	n/a	72
Performance (a-b)	-37	35	-2

The Green Economy Fund

A3.74. SPT, through its Green Economy Fund, is committed to fund initiatives over a two year period (2019/20-2020/21) that will support Scotland’s ambitious green energy plans and local economic growth. The fund has a value of £19.2 million and will focus on helping communities to invest in low-carbon heating and accelerating a green economy. The GEF was introduced in July 2018.

A3.75. SPT is currently reviewing the submissions received. We understand that there are approximately 30 projects being considered for funding under this investment vehicle.

A3.76. Until the proposed projects are fully evaluated through the GEF assessment process it is not possible to define the nature of such outputs and where they would best fit. At such a point, or other time to be agreed we will discuss the presentation of this data to inform the ongoing reporting requirement (ie. capex/opex profile).

¹¹⁰ The network between Devol Moor and Erskine had been assessed as non-compliant with security standards - re-assessment has concluded that the load in the area has reduced and the reinforcement (rebuild OHL as a double circuit) is not justified based on current load projections.

¹¹¹ The delays at Galashiels were due to the transformer that had been ordered being diverted to replace a faulted unit at Devonside.

A3.77. As an interim measure, the value of the forecast investment (£19.2 million) is split evenly across the last two years of the price control and categorised to the LR13 mechanism.

Strategic wider works

A3.78. The Strategic Wider Works (SWW) process allows for the approval of future major investments that were neither in the baseline nor captured by the volume drivers. These schemes are subject to a within-period determination by the Authority and the TO will only receive funding for efficiently incurred costs.

SHET

A3.79. In 2013-14 we approved three projects proposed by SHET: Kintyre-Hunterston (KH), Beaully-Mossford (BM) and Caithness-Moray (CM). Two projects (KH and BM) were successfully energised during 2015/16, ahead of schedule. SHET reports that it spent 84% of the allowance for the KH project and 86% of the allowance for the BM project. The main driver of underspend in relation to both projects was the ability of SHET to deliver the project with reduced resource, favourable weather, and productive relationships with landowners enabling access to sites.

A3.80. At the time of submission, the information relevant to the CM project indicated that it was still under construction with remaining risks still to be managed.¹¹² Using the submitted information, SHET forecasts an outperformance of c.£169 million in relation to all three SWW projects across the RIIO-ET1 period.

Table A3.23: SHET approved SWW spend vs allowance (excl. handback)

£m, 2017-18 prices	Capex Allowance	Expenditure	Performance
Caithness Moray	1,195.1	1,070.0	-125.1
Beaully Mossford overhead line	57.4	49.5	-7.9
Kintyre Hunterston	219.6	183.5	-36.2
TOTAL	1,472.1	1,303	-169.2

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.81. As noted in chapter 1, SHET have identified £47.48m (2009-10 prices) of allowances associated with the CM project attributable to unspent risk allowances that are no longer required. The overall impact of the 'hand back' will be to reduce the overall

¹¹² Based on current information, we understand that SHET have now energised the CM scheme in line with licence timescales (31 December 2018).

capex allowances associated with the CM scheme to £1,135m.¹¹³ Table A1.20 updates SHET's forecast SWW performance to reflect the adjusted allowances for the CM project.

Table A3.24: SHET approved SWW spend vs allowance (incl. handback)

£m, 2017-18 prices	Capex Allowance	Expenditure	Performance
Caithness Moray	1,135	1,070	-65
Beauldy Mossford overhead line	57.4	49.5	-7.9
Kintyre Hunterston	219.6	183.5	-36.2
TOTAL	1,412	1,303	-109.1

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.82. SPT currently do not have any approved SWW schemes and no longer anticipate triggering allowances within RIIO-ET1. Current estimates show that further to SWW assessment of Dumfries and Galloway Strategic Reinforcement, and the requirement to proceed with revised schemes, SPT expects to incur zero costs in the construction of potential SWW projects.

SWW pre-construction activity

A3.83. Funding allowances were included in the T1 settlement for expenditure linked to pre-construction activities of prospective SWW projects. In broad terms, this focussed on the delivery of preparatory activities to include: routing, siting and optioneering studies, project design, environmental assessments, and planning consents.

A3.84. A funding approach for pre-construction activity was developed to provide certainty on a level of funding to progress activities deemed necessary to define the required scale and timing of construction work.

A3.85. A licence provision (special condition 3L) was developed to complement the SWW arrangements with the aim of providing relatively small levels of funding for pre-construction activity. The total value of the allowed expenditure available to fund pre-construction activities was fixed as part of the T1 settlement for each TO (originally on the basis of the portfolio of projects in SHET's business plan).¹¹⁴

A3.86. Pre-construction works associated with named schemes identified in SHET's electricity licence have a fixed T1 allowance of £91.1 million (including RPEs¹¹⁵). The current forecast expenditure incurred in the delivery of outputs during T1 is forecast to be £72.9 million (not taking into account the value of customer contributions already

¹¹³ There has been no agreement yet to determine the agreed profile of the 'hand back' allowance. For the purposes of this analysis we have assumed that the profile is spread over the last two years of RIIO-ET1.

¹¹⁴ A pre-construction Output Substitution request has been submitted and approved reflecting the change in requirements for preconstruction expenditure. More information on the schemes can be found here: <https://www.ofgem.gov.uk/publications-and-updates/notice-modification-under-special-condition-3l-she-transmission-s-electricity-transmission-licence>

¹¹⁵ £86.1 million excluding RPEs.

received). The forecast reflects the ongoing expenditure to develop the Island connections (Western Isles, Shetland and Orkney) along with the development of the Eastern B2/B4 boundary upgrade schemes. A forecast for “future design schemes” has also been included to reflect the potential outcomes from the annual NOA process. The table below also highlights the impact of removing such “future schemes”.

Table A3.25: SHET pre construction activity (LR21)

£m, 2017-18 prices	Allowance	Expenditure	Performance
SWW pre construction (incl. future schemes)	91.1	75.2 ¹¹⁶	-15.1
SWW pre construction (excl. future schemes)	91.1	54.9	-36.2

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.87. In accordance with the licence, in the event that the licensee does not deliver (or only partially delivers) an agreed pre-construction output by the end of RIIO-ET1 then an adjustment to baseline expenditure will be made to reflect the full value of the funding provision.¹¹⁷

A3.88. The forecast value of the ex-post reconciliation at the end of the price control (or “true-up”), using SHET’s current forecast view of the eight year expenditure, is therefore £36 million. This reflects a view that the current expenditure being incurred in relation to “future schemes” can be excluded from the analysis as they do not currently align with a named output under special condition 3L. We note that SHET may raise a future output substitution request to address this.

SPT

A3.89. As noted above, SPT currently forecast that no SWW projects will take place in the RIIO-ET1 period due to delays in consents and gaining agreement with landowners. No costs have been incurred on the pre-construction activities associated with the named SWW schemes identified in the business plan.¹¹⁸ These projects are identified in special condition 3L of SPT’s electricity licence and have a corresponding allowance of £28 million.

A3.90. SPT is currently re-allocating the allowance associated with the SWW pre construction activities to fund the cost of pre-construction works incurred in relation to “non-baseline shared-use” projects. The current forecast expenditure in this category is £2.7 million.

¹¹⁶ Customer contributions received during T1 have a total value of £2.3m and are not excluded.

¹¹⁷ See paragraph 17 of special condition 3L.

¹¹⁸ Following a CBA, the Dumfries and Galloway Strategic Reinforcement Project is now a reduced scheme, known as the Kendoon to Tongland Reinforcement project. It will be progressed under a different set of regulatory mechanisms – no longer a SWW project. Eastern HVDC Link offshore project team was stood down in January 2015 also following a CBA.

Table A3.26: SPT pre construction activity (LR21)

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	28.0	2.7	-25.3

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.91. In accordance with the licence, an adjustment to baseline expenditure will be made to reflect the full value of the funding provision¹¹⁹ to ensure only efficiently incurred costs are recovered.

A3.92. The forecast value of the ex-post reconciliation at the end of the price control (or “true-up”), using SPT’s current forecast view of the eight year expenditure, is therefore £25.3 million. We note SPT’s intention to raise future substitution requests to fully utilise the funding provision.

Transmission System Services (TSS)

A3.93. This category is intended to report on network investment carried out by the TOs driven by the system operational requirements.

SHET

A3.94. The original business plan included an allowance for generator management /intertrips. The current overall forecast expenditure in this category is £2.7m versus the baseline allowance of £2.5m.

SPT

A3.95. SPT currently estimates that £2.8m will be incurred on auto close and system monitoring schemes versus the baseline allowance of £0.7m; an underspend of £2.1 million.

Drivers of LR performance

A3.96. This section briefly summarises the categorisation applied by each of the Scottish TOs to explain the differences between spend and allowances based on the broad allocation specific in our guidance. To recap, the four broad categories set out in our guidance document are:

- External factors
- Provision in the price control parameters (“price control”)
- Efficiency, and
- Circumstantial factors.

¹¹⁹ See paragraph 17 of special condition 3L.

SHET

A3.97. SHET have separated its work programme in to the four categories outlined above. The results of SHET’s load related analysis is summarised in the table below.

Table A3.27: SHET view of drivers of load related performance

Load-Related Mechanism £m 2017/18 prices	Efficiency	External	Circumstantial	Price control	Total Impact
Demand Connections* (LR13)		-19			-19
Generation Connections* (LR3/5/6/7/8)	-27	80		-27	20
Baseline Wider Works (LR15/21)	-3	1	4		2
SWW (LR20)	-109				-109
Other		13			
Total	-139	69	4	-27	-92

* including customer contributions

A3.98. The drivers of change for each broad cost category are briefly discussed below.

- **Demand connections:** The reason for outperformance is that the original business plan included an allowance for a Demand scheme that has since terminated (Shetland demand scheme) an external change.
- **Generation connections:** SHET’s view is that the expected outperformance in this area is explained by a combination of efficiency drivers (e.g. delivering additional capacity via a robust optioneering process) and price control factors (the program of delivery has changed significantly compared to the baseline business plan resulting in a different unit cost for delivery). External factors also account for a large underperformance due to a growing number of schemes incurring costs in T1 but which are currently expected to deliver an output in T2.
- **Wider works:** this includes baseline wider works and preconstruction allowances for shared use infrastructure. Efficiency savings are associated with successful delivery of the agreed baseline wider works schemes. These savings are offset by the increase in costs incurred (and forecast to be incurred) on preconstruction activity. The recategorisation of two schemes as Shared Use Infrastructure preconstruction (Lewis Infrastructure and Orkney Trident Link) provide the main driver for the overall increase in forecast expenditure and associated overspend against RIIO-ET1 allowance (ie. circumstantial change).
- **SWW projects:** The overall forecast, for approved schemes, is lower than allowance due mainly to efficiency savings already realised on both the Kintyre Hunterston (c.£8 million) and Beaully Mossford (c.£36 million) schemes along with forecast savings on the Caithness Moray Scheme (c.£65 million, including voluntary handback). The key reason for underspend being efficiency savings due to improved project management during the construction phase of these projects.

Specific focus has been placed on lessons learned from previous projects, project team capabilities and proactive risk management.

- **Other:** This category reflects additional costs to SHET in respect of the capitalisation of overheads and managing wayleaves on its system. Cost increases are driven by external factors.

A3.99. The above assessment excludes the value of excluded services income and SWW pre construction activities. Both are subject to true-up arrangements and are discussed earlier in this appendix.

SPT

A3.100. SPT have separated its work programme in to three of the four categories outlined above. The results of SPT's load related analysis is summarised in the table below. These figures reflect a RIIO-ET1 pre-true up position in respect of excluded services and pre-construction activities for prospective SWW projects (special condition 3L).

A3.101. SPT considers the cumulative impact of changes in the categories of 'external factors' and 'efficiency' to have considerable overlap and difficult to isolate. SPT have therefore only used the efficiency category.¹²⁰

A3.102. SPT's overall totex performance forecast is an underspend of £76 million - derived from a total LRE value of £1,159 million against an allowance of £1,235m¹²¹ million.

Table A3.28: SPT view of drivers of load related performance (pre true-up)

Load-Related Mechanism £m 2017/18 prices	Price Control	Efficiency	Circumstantial	Total Impact
Demand Connections	0.3	0.0	-1.1	-0.8
Generation Connections	174.3	0.0	-100.3	74.0
Baseline Wider Works	0.0	-66.5	-83.7	-150.2
GSP Reinforcement	0.0	1.4	-2.9	-1.5
Infrastructure TSS	0.0	0.0	2.1	2.1
Total	174.6	-65.1	-185.9	-74.6

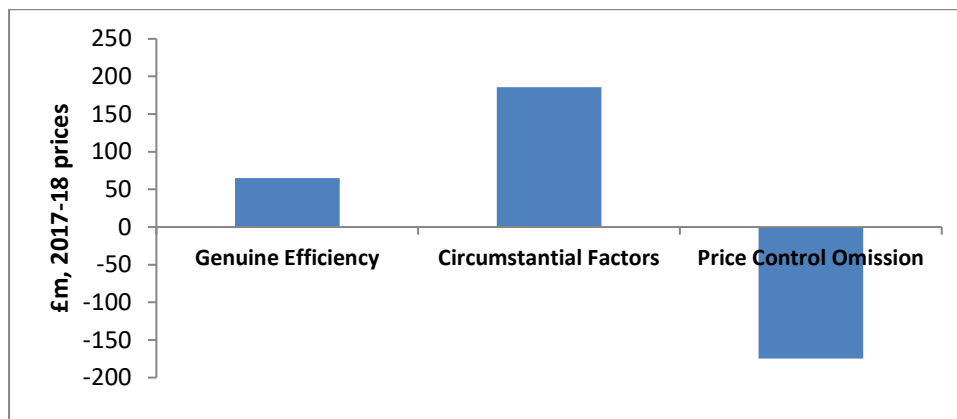
Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.103. The breakdown is also shown in the graph below.

¹²⁰ We note that SPT has expressed a willingness to provide further disaggregation in future reporting submissions to improve understanding.

¹²¹ Adjusting for the original T1 forecast of customer reduces this total allowance value in respect of excluded services from £121 million to £64 million. In turn, the total LR allowance is reduced from £1,292 million – as reported in table A3.2 - to £1,235 million.

Figure A3.1: SPT view of drivers of load related performance



A3.104. The drivers of change for each mechanism are briefly discussed below.

- **Generation:** The expected net overspend is the direct result of the volatility in the number and size of generators contracted to connect to SPT’s network and higher costs across a number of schemes due to additional civil and environmental works (eg. higher costs of ground condition work in the south of Scotland). The change in the general mix of schemes and introduction of new schemes to reinforce the network has also altered outputs compared to what was envisaged at the time of the original submission. For example, sole-use infrastructure outputs are below target resulting in a claw back of allowance. The above effects are not outweighed by the expected cost savings as a result of the proposed solutions for the current portfolio require less investment.
- **Demand:** The circumstantial category has resulted in spend being forecast to be marginally lower than allowances due to changes in some proposed solutions. Overall, SPT anticipates spend to be broadly in accordance with allowance for this category.
- **Baseline Wider Works:** SPT explains that the expected outperformance (£150 million) is due to lower expenditure on the BWW projects than originally forecast, due to the contracting structure and subsequent management of the project. These savings are driven by the internal techniques adopted by SPT including the disaggregated contract approach, developments in the supply chain and retention of tendering efficiency. The key projects are briefly summarised below:
 - Series and Shunt compensation: A novel tendering approach was applied where SPT engaged specialist procurement resource to work alongside its internal system designers and plant specialists. The result was the installation of equipment across fewer sites than originally planned. SPT currently forecast spending c.£44 million less than allowances as a result.

- MSCDNs: SPT currently expects to complete work on MSCDNs for £10 million less than was originally forecast. The bulk of this saving has been achieved through the choice of location for the Longannet unit and through the better coordination of works with other projects.
- Hunterston-Kintrye: Overall costs are greater than SPT's submission originally estimated for this project (£6 million). Higher than expected equipment costs and performance issues with a contractor were the main drivers of underperformance in this instance.
- **GSP reinforcement**: These projects are being delivered by a fully dis-aggregated approach. The net effect is broadly neutral from an efficiency perspective as the gains from bulk-buying transformers early in RIIO have been (and forecast to be) offset by current and future equipment price rises. The circumstantial category is expected to drive small cost savings as a result of the proposed solutions being different to what was originally envisaged.

Non-operational capex

SHET

A3.105. For SHET, non-operational capital expenditure is comparatively small, with a total allowance of £9.43 million across the RIIO-ET1 price control period.

A3.106. SHET is currently forecasting £28.42 million of costs in this area across the eight-year period; approximately £19 million above forecast allowance.

A3.107. SHET explains that the bulk of the additional costs it expects to incur in this category relate to its Information Technology (IT) Transformation Project - a large programme of work to upgrade and replace the whole IT system environment of SHET and two Distribution Businesses. The initial implementation of the new system (Maximo phase 1) took place during 2017/18 There will continue to be spend on Maximo and the new Work and Asset Management (WAM) system through RIIO-T1 as the full functionality of the system (including work scheduling and potential financial ledger integration) is implemented.

A3.108. The cost of the Transformation Project is being split between the three networks, based on the requirements and utilisation of each system. We expect this Transformation Project to drive enhancements to the efficiency of future inspection and maintenance programmes and the overall regulatory reporting process. We expect SHET to demonstrate the benefits of this work in the coming years.

A3.109. The reasons for the overspend is that the extent and scale of the IT transformation (including networks mobility technology and equipment to front line

staff¹²² and cyber security enhancements) was not envisaged at the time of business plan submission. The business plan assumed a small scale replacement of one of its systems (ENMAC) which has yet to commence. We understand that the ENMAC project is intended to separate the software used for the Distribution and Transmission Networks.

Table A3.29: SHET non-operational capex spend vs allowance

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	9.43	28.42	18.98

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

SPT

A3.110. For SPT, non-operational capital expenditure is a minor element of their activities with a total allowance of £9 million across the RIIO-ET1 price control period. SPT is forecasting £17.8 million of costs in this area across the eight-year period. A total overspend of approximately £9 million is currently forecast across RIIO-ET1.

A3.111. Forecast expenditure has increased, relative to the original business plan estimates, due to an underestimation of the scale and cost of IT projects of future IT investments. The main IT project is a new Network Asset Management System, which has been implemented over the last 3 years.¹²³ As with SHET, we expect the IT developments to drive efficiency improvements in future inspection and maintenance programmes and in the regulatory reporting process more generally.

Table A3.30: SPT non-operational capex spend vs allowance

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	9.17	17.80	8.63

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

Opex

A3.112. Operational expenditure (opex) relates to the costs attributable to the activities required to maintain and operate the transmission networks.

SHET

A3.113. The overall RIIO-ET1 operating cost forecast is £246 million, against an adjusted allowance of £247 million; a small underspend of £1 million. The main drivers of cost are

¹²² SHET is rolling out Networks mobility technology and equipment to front line staff, whereby staff will be able to look at live data and update records as they carry out direct capex and opex activities.

¹²³ SPT confirm that it is also now being recharged depreciation on central fixed asset additions capitalised, outside SPT but within the group, in support of the NAMS project.

a forecast rise in vegetation management, faults, and property through the price control as SHET's network grows and complexity increases (in line with allowances).

A3.114. We recognise that the vast majority of spend for SHET is in relation to capex, with only 7% deemed as controllable opex.

Table A3.31: SHET opex spend vs allowance

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	247	246	-1

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

SPT

A3.115. Operating cost has a total forecast value of £270 million across the RIIO-ET1 price control period, which is £70 million higher than forecast allowance over the eight-year period (£200 million). As in previous years, the main driver for this is the change to accounting measurement made after the RIIO-ET1 bid, which led to a change in the allocation of indirect costs between capex and opex. The primary impact is on Business Support costs which appear to be adverse to allowance (overspend of c.£98 million).

A3.116. We recognise that the vast majority of spend for SPT is in relation to capex, with only 12% deemed as controllable opex.

Table A3.32: SPT opex spend vs allowance

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	200.25	270.38	70.13

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

A3.117. Adjusting the cumulative financial values for the first five years of RIIO-ET1 to include the capitalised elements illustrates that total Indirect Costs (Capex+Opex) are marginally overspent against the cumulative allowance position across the same period.

Table A3.33: SPT opex spend vs allowance 2013/14 to 2017/18 (including capitalisation)

£m, 2017-18 prices	Allowance	Expenditure	Performance
TOTAL	307.78	309.78	2.4

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

Non-Load related expenditure

A3.118. Non-load related (NLR) capex is capital investment made by a TO to maintain its existing network. This investment relates mainly to replacement and refurbishment of assets but also includes other capital expenditure directly and indirectly related to maintaining a reliable network, such as investments to improve flood defences.

A3.119. NLR allowances are split into Asset Replacement Capex and Other Capex. However, our analysis considers these as a single category and compares actual and revised forecast expenditure against original allowances.

A3.120. For each TO over-spend or under-spend against allowances may be attributable to a combinations of factors. We have tried to identify and estimate the impact of as many of these as possible. In order to aid understanding of the reasons for over-spends and under-spends, when we have been able to do so, we have separated them into five broad categories. These categories are explained below.

A3.121. It should be noted that the values we provide are based on the information we currently have available and are therefore our best estimates at this stage. They are intended to give an indication of the magnitude of the factors that contribute to over-spend or underspend and in some cases are based on assumptions, which we would hope to improve as we progress to the end of RIIO-T1. It should also be noted that in some cases, where we indicate year-on-year changes, that the value of the changes are to some extent driven by refinement in our assessment methodologies or updated data for the prior year.

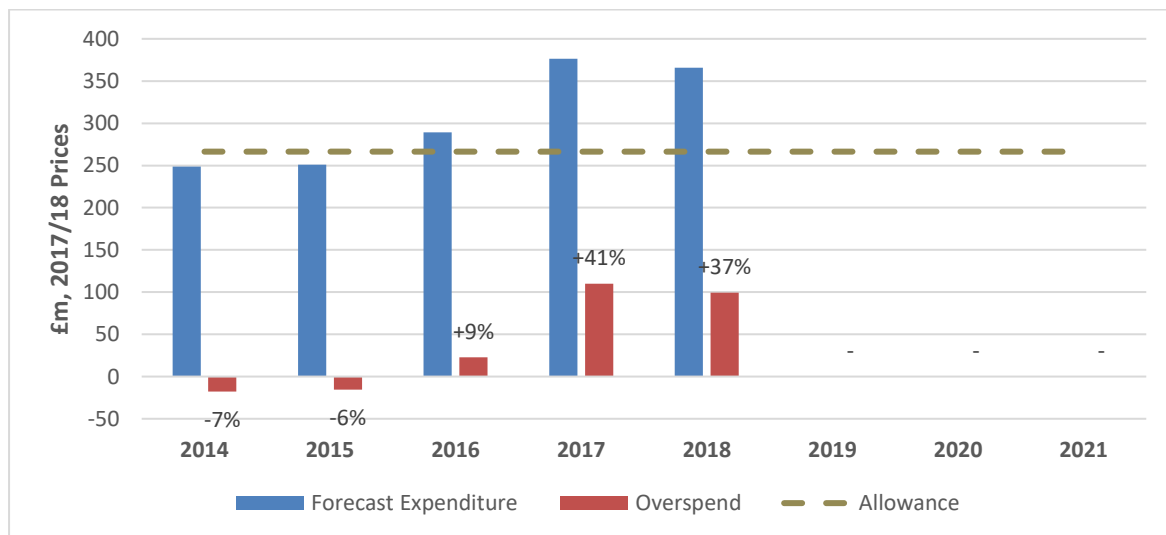
- Work volume changes: changes in the total quantity of outputs for a given asset type that a company expects to deliver during the eight years of RIIO-ET1. In estimating the cost impact of work volume changes we calculated unit costs of carrying out the work implied by the companies' allowances (for each asset type) and assumed that the unit cost does not change over the course of the price control. The impact of any unit cost changes are reflected in the second category, 'work cost changes'.
- Work cost changes: changes to the cost of delivering like-for-like outputs. Decreases or increases in this category could be attributable to efficiencies / inefficiencies on the part of a company or be due to external factors such as input price changes (as discussed in chapter 4), or a combination of both.
- Work type changes: changes in the type of work used to deliver an output or desired benefit. For example if a company had been previously expecting to replace an asset and now discovers that the asset is no longer required and can be decommissioned, then the associated cost savings would fall within this category.
- Work schedule changes. Costs are included in this category if:

- at the time of the RIIO-ET1 business plan an output was planned for delivery either in TPCR4 or RIIO-ET2,
- there are changes to the timing of delivery but these timing changes do not impact RIIO-ET1 output volumes, or
- timing changes impact RIIO-ET1 expenditure. For example, if a TO was forecasting to start replacing underground cables in RIIO-ET1 but to deliver the final outputs RIIO-T2, and if replacement is subsequently delayed and no expenditure is incurred in RIIO-ET1 then the associated cost savings will be included in this category.
- Other factors: a balancing category and will include the impact of miscellaneous factors that do not fall into one of the above categories.

SHET

A3.122. The below chart illustrates an eight year (RIIO-ET1) view of the progression to date of overspend against forecast expenditure as reported every year to date. For example, for the reporting year 2013/14 in column 2014, SHET reported an overall actual and forecast expenditure of £249 million (first blue bar) against allowances of £266 million (broken green line). This indicated a 7% (£18 million) underspend (first red bar). This interpretation applies to the succeeding years to date.

Figure A3.2: Evolution of cumulative forecast expenditure vs TO forecast NLR allowance: SHET



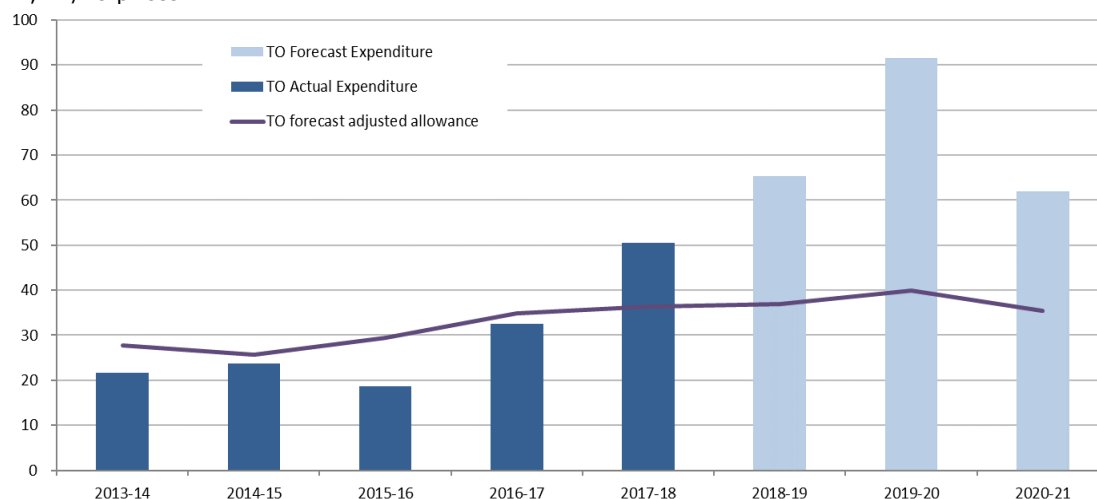
A3.123. SHET is currently forecasting an overall RIIO-ET1 overspend of 37% (£99.3 million) against forecast allowance over the entire price control period. The forecast

overspend position is slightly reduced when compared to last year’s forecast (c.£11m) – this is discussed further in the next section.

A3.124. The profile across the eight-year period is illustrated in Figure A1.2 below. SHET’s expected profile for the remaining price control period is largely consistent with last year’s; SHET is forecasting to significantly increase expenditure over the remainder of RIIO-ET1. As reported last year, this forecast expenditure profile is driven to a large extent by delays and scope changes on a number of projects, including Fort William to Fort Augustus (FW-FA), Inveraray to Taynuilt (I-T) and Inveraray to Port Ann (I –PA) overhead line schemes.

Figure A3.3: Actual and forecast expenditure vs TO forecast NLR allowance: SHET

£m, 17/18 prices



Drivers of change

A3.125. We have attempted to categorise the reasons and the estimated costs associated with SHET’s overall actual and forecast overspend in the table below. We have also provided more specific analysis on the drivers for the year on year changes which altogether indicate a decrease in the expected eight-year overspend between this year’s submission and RRP17.

Table: A3.34: Factors contributing to RIIO-ET1 forecast position 2017RRP vs 2018RRP

Overspend/Underspend Category		2016/17 ¹²⁴	2017/18	Year on Year Change
RIIO-T1 Allowance		266.4	266.4	-
Changes	i Work volume changes	+5.3	-8.7	-14.1
	ii Work cost changes	+69.8	+128.9	+59.1
	iii Work type changes	-0.2	-26.6	-26.6
	iv Work schedule change	-	-28.8	-28.8
	v Other	+35.0	+34.2	-0.8
Forecast Expenditure		376.4	365.7	-10.7
Total RIIO-T1 Overspend, £m 2017/18 Prices		+110.0	+99.3	-10.7

Work volume changes and Work cost changes

A3.126. There has been a reduction in the value of the activity on circuit breakers and transformers by due to improved and revised condition assessment information (category i). This has led to the deferral and cancellation work with a forecast reduction in overall expenditure of approximately £14 million across the price control period compared with last year's submission (over the eight year period).

A3.127. We estimate the combined impact of volume changes and associated work cost changes over RIIO-ET1 (net of i+ii) has increased expenditure by £45 million relative to the information provided as part of last year's submission. This is mainly driven by an increase in value of the 'work cost changes' category (£59.1 million) as result of changes in the scope of projects and the subsequent changes to unit costs.

A3.128. We reported last year that SHET had or was planning to replace nine reactors due to an unforeseen issue which led to a number of early life failures. The cost of these reactor replacements is estimated at £17.7 million. No specific allowance is assigned to fund this replacement activity. Following discussions with the manufacturer, SHET does not expect to recovery any of these costs.

Work type changes

A3.129. We reported last year that SHET was forecasting an increase in expenditure due to three like-for-like reconductoring schemes (FA-FW, I-T, and I-PA) that now require either major upgrades (i.e. increase of circuit capacity) or complete offline rebuild (i.e. replacement of conductors, fittings, and towers). SHET now reports that a new rebuild is the optimal solution for the FA-FW and I-PA schemes. This is in contrast to the scope of requirements originally set out in the original business plan (simple like-for-like conductor replacement).

¹²⁴ Some of the figures may not reconcile with last year's report due to updated assessment approaches or the use of updated or new data.

A3.130. SHET is reporting a reduction of about 296km in overhead line conducting and about 74km in fittings which together account for a reduction in costs of c.£27 million. This is due to data quality and reporting revisions and the deferral of several schemes (e.g. Shin Mybster, Beaully Deanie¹²⁵ and Inveraray to Taynuilt¹²⁶).

A3.131. As we reported last year, SHET continues to optimise the scope of activities that underpin its current T1 overspend due to improvements in its asset management strategy and processes since the start of RIIO. We continue to see this optimisation in the form of variances up and down in scope of work and commensurate overspend year on year.

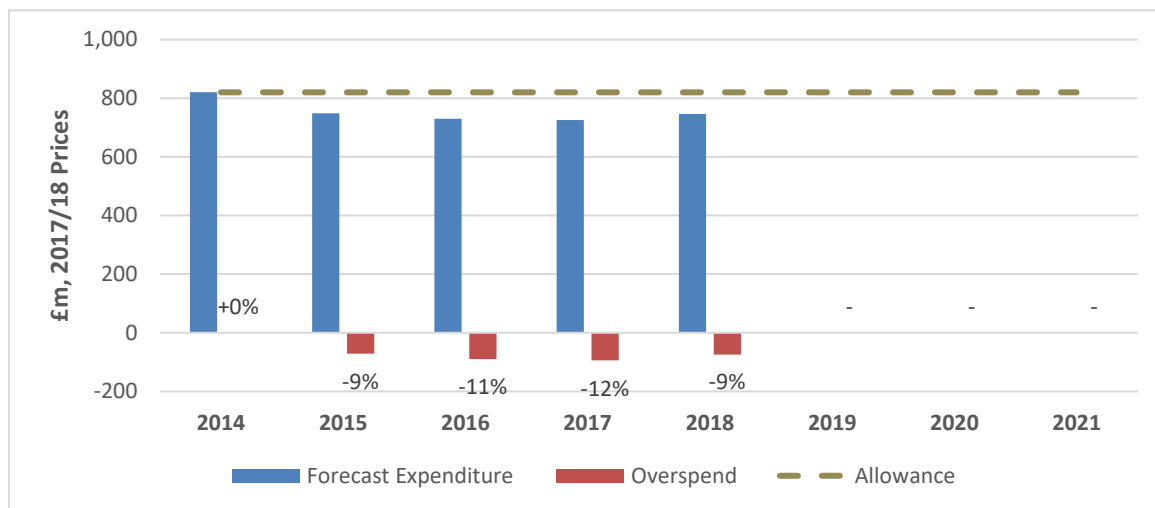
Cost Schedule changes

A3.132. There is a c.£29 million reduction in costs in this category due to the deferral of work on the reconductoring of the Inveraray – Taynuilt overhead line scheme.

SPT

A3.133. The figure below illustrates an eight year (RIIO-ET1) view of the progression to date of forecast expenditure against allowances reported every year to date. For this reporting year, SPT reported an overall actual and forecast expenditure of £746 million (blue bar) against allowances of £820 million (broken green line). This indicated a 9% (£74 million) underspend (the red bar). This interpretation applies to the preceding years of RIIO-ET1.

Figure A3.4: Evolution of forecast cumulative expenditure vs TO forecast NLR allowance: SPT



¹²⁵ Both reconductoring projects have been deferred whilst foundation and tower strengths are investigated.

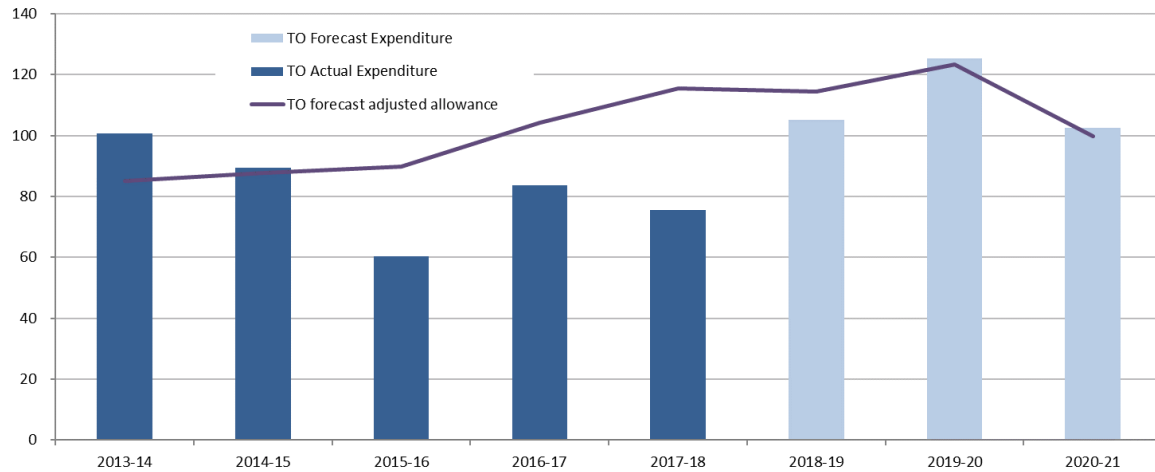
¹²⁶ This reconductoring project has been deferred due to the change in scope - it will now comprise a full rebuild.

A3.134. SPT is forecasting an overall RIIO-ET1 underspend (£77.8 million) against forecast allowance over the entire price control period. This is a slight decrease in underspend from £83 million reported last year.

A3.135. The expected profile across the eight-year period is illustrated in Figure 2.2 below and shows that SPT is forecasting to retain a relatively steady expenditure profile over the remainder of RIIO-ET1.

Figure A3.5: Actual and forecast expenditure vs TO forecast NLR allowance: SPT

£m, 17/18 prices



A3.136. The following section presents our analysis of the main factors that our analysis suggests are driving the forecast value of NLR RIIO-ET1 underspend (£77.8 million).

Table A3.35: Factors contributing to RIIO-ET1 forecast position 2017RRP vs 2018RRP

Overspend/Underspend Category		2016/17 ¹²⁷	2017/18	Year on Year Change
RIIO-T1 Allowance		820.1	820.1	-
Changes	Work volume changes	+335.2	+201.7	-133.5
	Work cost changes	-750.3	-323.9	+426.4
	Work type changes	-1.1	-1.1	
	Work schedule change	+138.5	+138.5	
	Other	+194.7	-93.0	-287.7
Forecast Expenditure		737.1	742.3	+5.3
Total RIIO-T1 Overspend, £m 2017/18 Prices		-83.0	-77.8	+5.3

Work volume changes

A3.137. We reported last year that changes in load related programme resulted in assets requiring replacement through NLR programmes. While these changes have remained stable, the costs for schemes that have both load and non-load related schemes have now been split according to those categories for reporting purposes. This has resulted in a year on year reduction of £134 million despite the enduring overall overspend that is down to £201 million from £335 million last year.

Work cost changes

A3.138. There is a reduction in underspend of £426 million reported this year compared to last year. This is due to a correction in reporting to include the volumes for fittings and towers that were previously not included. The remaining underspend of £324 million continues to be due to unit cost changes for replacement and refurbishment.

A3.139. SPT reports that its disaggregated model of investment delivery adopted for the first half of RIIO-ET1 continues to keep unit costs low in the face of upward pressure on tender and commodity prices.

Work schedule changes

A3.140. There are no changes to this category from last year's reported position. A large proportion of the overspend in this category continues to be due to projects that were due for delivery in the previous price control period but were delayed to RIIO-ET1 due to consenting or operational issues. These include Bonnybridge 132kV switchgear replacement, Neilston to Windyhill OHL modernisation, and Kaimes to Whitehouse 275kV cable replacement schemes.

¹²⁷ Some of the figures may not reconcile with last year's report due to updated assessment approaches or the use of updated or new data.

A3.141. As reported last year, expenditure on Non-Rechargeable Diversions (NRD)¹²⁸ (stable at approximately £20 million) also continues to contribute to the overspend in this category. This is due to the upturn in commercial and residential construction has led to an increase of those claims since 2015/16 and is largely stable over the RIIO-ET1 period.

Other changes

A3.142. As noted in paragraph A3.121, this is a balancing category that includes the impact of factors that do not fall into one of the above categories. The bulk of the variance in this category is due to efficiency savings that we have not be able to specifically categorise at this stage.

¹²⁸ The raising or rerouting of a circuit on third party land can potentially lead to a claim from the landowner to be compensated for loss of land value associated with these works. In circumstances where the landowner terminates the wayleave agreement, seeks for enhanced payments for the electrical equipment, etc., the compensation cost will fall on the network company. This is known as a non-rechargeable diversion.

Appendix 4: Ofgem's assessment of NGET TO's totex

A4.1. In their Original Business Plan (OBP), NGET presented a 'best view' position of all the costs they expected to incur in continuing to look after assets and the impact of plans to grow the network to accommodate new customers between April 2013 and March 2022.

A4.2. We decided not to 'fast track' NGET. This meant that we did not proceed on the basis of their business plan but engaged in further dialogue with NGET to set an ex-ante baseline and the level of allowances that would be released through "uncertainty mechanisms" (UMs), including the value of real price effects (RPEs).

A4.3. The agreed UMs automatically increase the level of allowance to cover additional costs incurred or flex downward in response to lower volumes below an agreed threshold. The parameters of such mechanisms were agreed upfront.

A4.4. There are broadly four types of allowed expenditure category:

- **Load-related expenditure (LRE):** investment on the network to accommodate changes in the level or pattern of electricity generation and demand.
- **Non-Load related expenditure (NLRE):** mainly capital investment on replacement and prevention maintenance (refurbishment) to keep assets in good condition, but also other capital expenditure directly related to maintaining a reliable network, such as investments to improve flood defences.
- **Non-operational capital expenditure (Non-op capex):** expenditure on equipment not directly related to transmission operations, for example, IT capital expenditure.
- **Controllable operational expenditure (Opex):** this is day-to-day spending on activities required to maintain and operate the transmission networks.

A4.5. As noted in chapter 1, our presentation of the totex performance value includes:

- the impact of decisions made as part of the 2017 MPR
- the impact of any voluntary deferral
- TO estimates of volume driver allowances and expenditure where the Authority have made a determination and funding has been agreed¹²⁹, and

¹²⁹ For the avoidance of doubt, our analysis excludes costs and forecast allowances associated with 'not yet approved' SWW determinations and TPWW claims at the time of submission.

- the impact of the current forecast “true up”¹³⁰ of allowances (where noted).

Load-related expenditure

A4.6. Load-related capex is the investment on the network to accommodate changes in the level or pattern of electricity generation and demand. For NGET, this is split further into a number of funding mechanisms, the largest of which are for (i) connecting new electricity generation sources (special condition 6F), (ii) connecting new demand sources (Special condition 6L), and (iii) incremental ‘wider works’ which are associated reinforcements that facilitate these connections whilst maintaining network integrity (special condition 6J)¹³¹. There are also mechanisms with provisions for undergrounding cables and for mitigating works on the electricity distribution systems (special licence condition 6K).

A4.7. In setting the load related elements of NGET TO’s price control, we used a baseline allowance to reflect its business plan expectation of c.£4 billion (2009-10 prices) of varying costs - that are able to flex depending on outputs actually required through the above volume driver mechanisms - and c.£1 billion (2009-10 prices) of non-variant costs - for works that are deemed to be needed but mostly without directly measurable output¹³². Both allowances were set based on a list of projects proposed by NGET in its original business plan.

A4.8. The price control also provides NGET allowances for outputs expected to be delivered in the first two years of RIIO-T2 (referred to as T1+2). These allowances are fixed based on a forecast at a point in time. The forecast relates to the new outputs that NGET - based on the best information available at that time - expected to be delivered across 2021/22 and 2022/23 and for which a contract exists with customers.

A4.9. Our assessment of performance of the current load-related performance position for NGET TO across the eight-year price control period - applying the “fixed forecast” - is summarised in the table below.

¹³⁰ The “true up” reflects the removal of actual “excluded services” income from total allowed revenue, and the expectation that the monies received by TOs through customer contributions will be paid back, as well as the current forecasted true-up of pre-construction allowances (special condition 3L).

¹³¹ Baseline Wider Works (special licence condition 6I) also contains details of scheduled delivery dates associated with specific projects that we hold the TOs to account for. Ex-ante allowances were set based on the delivery profile. The delivered boundary capacity of each ‘baseline’ wider work project is linked to the framework in special condition 6J.

¹³² Only a small proportion of the non-variant allowance was explicitly specified as outputs in their own right in order to maintain flexibility of the sources of load expansion.

Table A4.1: Ofgem’s view of NGET TO’s LRE vs forecast allowance (fixed T1+2 period forecast)

Cost category (RRP reference) <i>£m, 2017/18 Prices*</i>	A	B	C	D	E = B-A	F = (B+C)-A
	Forecast allowed totex	T1 forecast expenditure: T1 delivery ¹³³	T1 forecast expenditure: T1+2 delivery ¹³⁴	T1 forecast expenditure: >T1+2 delivery ¹³⁵	T1 Performance	Total cost Performance
“Excluded services” (LR1 & LR2)	412	380	58	0	-32	+26
Generation connections (LR4)**	555	388	31	197	-167	-136
Demand Connections (LR14)**	150	221	10	23	+71	+81
Incremental Wider Works excluding TPWW*** (LR16)	968	192	40	198	-776	-736
DNO volume driver & undergrounding (LR18 & LR19)	42	5	0	0	-37	-37
SWW pre-con (LR20) approved only***	59	43	n/a	n/a	-16	-16
BWW (LR21) incl WHVDC	959	924	n/a	n/a	-35	-35
Other (LR3, LR13, LR15 & LR22)	579	402	40	0	-177	-13
TOTAL	3,724¹³⁶	2,554	178	418	-1,169 (31%)	-991 (27%)
Forecast customer contributions		-239	-53	0		
Adjusted total		2,316	126	418	-1,408 (38%)	-1,282 (34%)
Voluntary deferral	-166					
Adjusted total	3,558	2,316	126	418	-1,242 (35%)	-1,116 (31%)

* Our assessment includes the impact of RPEs but excludes the current forecast of customer contributions.

** Values do not include the net impact of TPD/TPRD (LR14) or TPG/TPRG (LR4)

*** Our assessment does not include construction costs and forecast allowances associated with prospective SWW projects that are not yet approved and the total value associated with TPWW claims.

A4.10. Our assessment indicates that, excluding the impact of the LRE voluntary deferral, NGET currently forecasts to spend 27% (c. £1 billion) below the anticipated level of LRE allowances across the RIIO-ET1 period.

¹³³ This category is associated with projects incurring expenditure in T1 that are currently expected to complete within the T1 period. This includes the delivery of schemes within the original project portfolio upon which the original baseline settlement was based and new schemes.

¹³⁴ This category is associated with projects incurring expenditure in T1 that are currently expected to be delivered in timescales between 1 April 2021 and 31 March 2023.

¹³⁵ This category is associated with projects incurring (and/or forecast to incur) expenditure in T1 that are currently expected to be delivered in timescales beyond 31 March 2023. NGET is not funded for expenditure relating to projects which do not have an output within the RIIO-ET1 / T1+2 period.

¹³⁶ This value does not include the impact of the load related voluntary deferral by NGET (-£166m) but does include the impact of our MPR decision (-£49m).

A4.11. The table below highlights the impact of NGET's updated forecast (updated allowances are underlined).

Table A4.2: Ofgem's view of NGET TO's LRE vs forecast allowance (NGET's updated T1+2 period forecast)

Cost category (RRP reference) <i>£m, 2017/18 Prices*</i>	A Forecast allowed totex	B T1 forecast expenditure: T1 delivery	C T1 forecast expenditure: T1+2 delivery	D T1 forecast expenditure: T2 delivery	E = B-A T1 Performance	F=(B+C)-A Total cost Performance
Transmission connection assets (LR1 & LR2)	412	380	58	0	-32	-26
Local generation connections** (LR4)	<u>483</u>	387	31	197	-96	-65
Local demand Connections (LR14)	<u>159</u>	221	10	23	+62	+72
Incremental Wider Works excluding TPWW*** (LR16)	<u>820</u>	192	40	198	-628	-588
DNO volume driver & undergrounding (LR18 & LR19)	<u>29</u>	5	0	0	-24	-24
SWW pre-construction activity approved only (LR20)	59	43	n/a	n/a	-16	-16
Baseline Wider Work connections (LR21) incl WHVDC	959	924	n/a	n/a	-35	-35
Other (LR3, LR13, LR15 & LR22)	579	402	40	0	-177	-177
TOTAL	3,502¹³⁷	2,554¹³⁸	178	418	-946 (27%)	-767 (22%)
Forecast customer contributions		-239	-53	0		
Adjusted total		2,316	126	418	-1,185 (34%)	-1,059 (30%)
Voluntary deferral	-166					
Adjusted total	3,337	2,316	126	418	-1,021 (31%)	-895 (27%)

* Our assessment includes the impact of RPEs but excludes the current forecast of customer contributions.

** Values do not include the net impact of TPD/TPRD (LR14) or TPG/TPRG (LR4)

*** Our assessment does not include construction costs and forecast allowances associated with prospective SWW projects that are not yet approved and the value associated with TPWW claims.

A4.12. This assessment indicates that, excluding the impact of the LRE voluntary deferral, NGET currently forecasts to spend 22% (c. £770 million) below the anticipated level of LRE allowances across the RIIO-ET1 period.

¹³⁷ This value does not include the impact of the load related voluntary deferral by NGET (-£166m) but does include the impact of our MPR decision (-£49m).

¹³⁸ This expenditure value is £2,316m including the impact of the current estimate of LR customer contributions (£2,912m with the addition of columns C and D).

A4.13. NGET's published totex allowance value (£3,921 million pre-true up and including the value of the load-related voluntary deferral) can be determined by the addition of NGET's estimated values for TPWW (£101m) and SWW not yet approved (£318m) to the LR total of £3,502 million.

A4.14. The next section provides further detail on our assessment of performance across each of the above categories of LR expenditure. Our assessment reflects the "fixed forecast" for the T1+2 period provided by NGET.

Transmission connection assets

NGET (LR1 & LR2)

A4.15. NGET TO is forecasting incurring total costs of £8 million in the connection of new sole use generation projects and £430 million in the connection of new sole use demand projects. This is above the forecast level of allowance across the price control period (£412 million).

A4.16. The differential is primarily due to the changes in the number of schemes anticipated to progress to connection (customer terminations and decisions to connect at a lower voltage).

A4.17. The costs have been further broken down by our assessment of the works that are currently forecast to be completed within the T1 period and those to be delivered in the next control period.

A4.18. Table A4.3 highlights that NGET TO is currently forecasting to underspend against its combined LR1 and LR2 allowance for schemes delivered within the T1 timeframe (£32 million). This value is partially offset by the spend incurred/forecast to be incurred on schemes expected to be delivered in T2 (£58 million); resulting in a total overspend of £26 million. This value does not take into account the current estimate of customer contributions across the RIIO-ET1 period¹³⁹.

Table A4.3: excluded services spend vs allowance (pre true-up, incl. RPEs)

(£m, 2017/18 prices)	T1 forecast expenditure: T1 delivery	T1 forecast expenditure: T2 delivery	Total
LR1 expenditure	7	1	8
LR2 expenditure	373	57	430
a. Sub total	380	58	438
LR1 allowance	0	0	0
LR2 allowance	412	0	412
b. Sub total	412	0	412
TOTAL a-b	-32	58	26

¹³⁹ Estimated value of c.£238 million across the RIIO-ET1 price control period.

A4.19. Our assessment of the forecast value of the ex-post reconciliation at the end of the price control (or “true-up”), using NGET’s current forecast view of the eight year expenditure, is set out below. We estimate a value of £212 million.

Table A4.4: excluded services true-up, including RPEs

	1	2	3 (1+2)	4	5	6 (4+5)	
(£m, 2017/18 prices)	Baseline allowance (pre CC) ¹⁴⁰	Original Forecast Customer Contributions	Baseline allowance (post CC)	Current forecast Customer Contributions	Current view of expenditure ¹⁴¹	Net current view of expenditure	
LR1 Allowance	0	0	0	0	8	8	
LR2 Allowance	691	-278	412	-238	430	192	
TOTAL	691	-278	412	-238	438	200	
			Forecast “true-up” performance (Col 6 - Col 3)				-212

Local Generation Connections

A4.20. An allowance was originally set on the basis of a baseline of connecting 33.7GW of new generation to NGET’s electricity transmission network over the eight year RIIO-ET1 period.¹⁴² The latest view is that 12.5GW of new generation will connect in NGET’s area across the period; a reduction of 21.2GW (62%).

A4.21. The changes in the numbers of customers connecting to NGET’s transmission network drive a reduction in the associated allowance through the volume driver mechanism to reflect the reduced level of outputs required. NGET forecasts that the total allowance under this mechanism will reduce from the starting baseline allowance level by approximately £900 million (c. 70% reduction) during the course of RIIO-ET1; broadly comparable with the forecast reduction in GW.

A4.22. The forecast expenditure across the T1 period is £387 million; an estimated overspend of £86 million against forecast allowances across the eight year period.

A4.23. The price control also provides NGET allowances for outputs expected to be delivered in the first two years of RIIO-T2 (referred to as T1+2). These allowances are fixed based on a forecast at a point in time designated by NGET’s electricity transmission licence (special condition 6F)¹⁴³. The forecast relates to the new generation connection outputs that NGET – based on the best information available at that time - expected to

¹⁴⁰ £25 million RPE allocation value included.

¹⁴¹ £14 million RPEs allocation value included.

¹⁴² Licence special condition 6F, table 1.

¹⁴³ In accordance with paragraph 13, NGET provided a fixed forecast based on the information available in July 2017.

be delivered across 2021/22 and 2022/23 and for which a contract exists with customers.

A4.24. The forecast expenditure across the combined T1 and T1+2 period is £418 million; a net underspend of £137 million (based on the fixed RRP17 forecast).

A4.20. However, if the effect of fixing allowances is removed, i.e. update outputs and allowances for these years based on NGET's latest view (July 2018), then related allowances in the T1+2 period would fall by £72m (from £254 million to £182 million).¹⁴⁴ This will increase the anticipated net underspend position from £223 million to £151 million during the T1+2 period.

A4.25. NGET is forecasting to spend significant levels on new capacity in timescales beyond T1+2 (£197 million). NGET is not funded for expenditure relating to projects which do not have an output within the RIIO-T1 / T1+2 period, either because the original driver for the works has gone away (e.g. the customer has since terminated) or because the output is currently expected to be delivered beyond T1+2 timescales. The expectation is that efficiently incurred costs will be funded in due course as part of the RIIO-ET2 framework.

Table A4.5: generation connection volume driver spend vs allowance (fixed forecast for T1+2)

(£m, 2017/18 prices)	Delivery within T1 period	Delivery within T1+T2	Delivery beyond T1+T2	Total
a. LR4 expenditure	388 ¹⁴⁵	31	197	616
b. LR4 allowance	301	254	0	555
Performance (a-b)	87	-223	197	60

A4.26. NGET's electricity licence also requires it to report annually on the number of kilometres of overhead line (OHL) installed. The baseline expected 215.4km to be built across the price control (associated with the baseline forecast of 33GW). NGET currently expects a significant reduction in the length of OHL to be commissioned across RIIO-ET1 from 215km to 41.4km (to be commissioned in 2020/21). The reduction in new OHL (route/circuit) is largely the result of a delay of works associated with delayed generation projects.

Local Demand Connections

A4.27. NGET has seen a significant fall in terms of new demand connections, reducing the number of supergrid transformers (SGTs) required across RIIO-ET1 from 72 to 40 (a reduction of more than 40%).

¹⁴⁴ This movement is attributable to advancements in offshore wind projects and delays of interconnector and CCGT projects relative to the July 2017 forecast. NGET estimates the difference between the fixed forecast and the updated forecast to be a reduction of 2GW.

¹⁴⁵ Customer contributions is estimated to have a T1 value of £2m and are excluded.

A4.28. The changes in the number of new demand connections drive a reduction in the associated allowance through the volume driver mechanism to reflect the reduced level of outputs required. NGET forecasts that the operation of the uncertainty mechanism will reduce its allowance approximately £200 million to adjust for the current estimate of outputs in the RIIO-ET1 period that are no longer anticipated to be required. The reduction (c. 60%) during the course of RIIO-ET1 is greater than the forecast reduction in the required output level.

A4.29. The forecast expenditure across the T1 period is £221 million; an estimated overspend of £76 million against forecast allowances across the eight year period.

A4.30. As with new generation connections, the price control also provides NGET allowances for new SGT's expected to be delivered in the T1+2 period. These allowances are fixed based on a forecast at a point in time designated by NGET's electricity transmission licence (special condition 6L)¹⁴⁶.

A4.31. Based on NGET's fixed forecast of future outputs, NGET estimates the allowance associated with the delivery of outputs in T1+2 period to be £5 million. The forecast expenditure across the combined T1 and T1+2 period is £231 million; a net overspend of £81 million (based on the fixed forecast).

A4.32. However, if the effect of fixing allowances is removed, i.e. update outputs and allowances for these years based on NGET's latest view (July 2018), then related allowances in the T1+2 period would rise by c.£9 million (from £5 million to £14 million).¹⁴⁷ This will reduce the net overspend position in the period from £81 million to £72 million.

A4.33. NGET is incurring/forecast to incur a significant level of cost on demand connections that will be delivered in timescales beyond T1+2 (£23 million). NGET is not funded for expenditure relating to projects which do not have an output within the RIIO-ET1 / T1+2 period. The expectation is that efficiently incurred costs will be funded in due course as part of the RIIO-ET2 framework. The addition of these costs is seen to increase the net overspend position from £81 million to £104 million (based on the fixed forecast).

¹⁴⁶ In accordance with paragraph 13, NGET provided a fixed forecast based on the information available in July 2017.

¹⁴⁷ NGET estimates the difference between the fixed forecast and updated forecast to be an increase of 3 SGTs. This "best view" contains additional outputs to those currently contracted.

Table A4.6: demand connection volume driver spend vs allowance (fixed forecast T1+2 period)

(£m, 2017/18 prices)	Delivery within T1 period	Delivery within T1+T2	Delivery beyond T1+T2	Total
a. LR14 expenditure	221	10	23	254
b. LR14 allowance	145	5	0	150
Performance (a-b)	76	5	23	104

A4.34. The reduction in outputs required by customers (and allowance) across RIIO-ET1 has been matched by a reduction in the length of OHL to provide local demand connections, from a length of 27km to 5.42km across RIIO-ET1 (all of which was commissioned by the end of 2015-16). NGET anticipates no new cable routes across RIIO-ET1 which is consistent with the business plan and forecast position.

Incremental wider works¹⁴⁸

A4.35. Incremental Wider Works (IWW) are transmission infrastructure works that deliver an increase in boundary transfer capability which NGET determines is required, in line with the implementation of its Network Development Policy (NDP).

A4.36. Baseline allowances were set on the basis of NGET's expected delivery of 23.1GW of boundary reinforcements over the RIIO-ET1 period. NGET is now forecasting a substantial fall in its IWW delivery against its baseline levels due to a fall in new generation and new demand connections. NGET's latest forecast is that 9.9GW of boundary reinforcements will be required across the price control (c. 60% reduction).

A4.37. NGET anticipates that the licence mechanism will substantially reduce baseline allowances across the RIIO-ET1 period to take account of the outputs that are no longer required due to changes in customer requirements. NGET forecasts that the operation of the uncertainty mechanism will reduce its allowance approximately £900 million. The reduction (c. 50%) during the course of RIIO-ET1 is broadly comparable to the forecast reduction in the required output level.

A4.38. The forecast expenditure across the T1 period is £192 million; an estimated underspend of £434 million (c.70%) against forecast allowances across the eight year period.

A4.39. As with the demand and generation volume driver mechanisms, the price control provides NGET allowances for boundary capability increases expected to be delivered in

¹⁴⁸ Detailed in Special Condition 6J of NGET's licence.

the T1+2 period. These allowances are fixed based on a forecast at a point in time designated by NGET's electricity transmission licence (special condition 6J)¹⁴⁹.

A4.40. Based on NGET's fixed forecast of future outputs, NGET estimates the allowance associated with the delivery of outputs in T1+2 period to be £342 million. NGET TO is currently forecasting an underspend against the totex allowance of c.£300 million during this specific time period.

A4.41. The forecast expenditure across the combined T1 and T1+2 period is £232 million; a net underspend of £736 million (based on the fixed RRP17 forecast).

A4.42. However, if the effect of fixing allowances is removed, i.e. update outputs and allowances for these years based on NGET's latest view (July 2018), then related allowances in the T1+2 period would decrease by c.£150 million (to £194 million).¹⁵⁰ This will reduce the net overspend position across the combined T1 and T1+2 period from £736 million to £588 million. We will continue to work with NGET to keep under review both its forecasts and the implications these have through the revenue adjustment mechanisms in the licence.

A4.43. NGET is incurring/forecast to incur a significant level of cost associated with works to strengthen boundary capacity that will be delivered in timescales beyond T1+2 (£198 million). NGET is not funded for expenditure relating to projects which do not have an output within the RIIO-ET1 / T1+2 period. The expectation is that efficiently incurred costs will be funded in due course as part of the RIIO-ET2 framework. The addition of these costs is seen to reduce the net underspend position from £736 million to £538 million (based on the fixed forecast).

Table A4.7: IWW volume driver spend vs allowance (fixed forecast)

(£m, 2017/18 prices)	Delivery within T1 period	Delivery within T1+T2	Delivery beyond T1+T2	Total
a. LR16 expenditure	192	40	198	431
b. LR16 allowance	626	342	0	968
Performance (a-b)	-434	-302	198	-538

TPWW¹⁵¹

A4.44. As noted in the previous section, NGET's baseline IWW Allowed Expenditure reflects the timing of overall increases in boundary transfer capability. This was based on

¹⁴⁹ In accordance with paragraph 13, NGET provided a fixed forecast based on the information available in July 2017.

¹⁵⁰ NGET explains that this movement is attributable to revised timings of reinforcements due to NOA optimal path revisions.

¹⁵¹ We have removed the impact of costs that we have not yet assessed or agreed from our assessment of NGET's TO totex performance.

best information then available about the contracted generation background, demand changes forecast, and clusters of prospective transmission reinforcements to best meet consumers' long-term needs.

A4.45. However it was recognised that, after a TO had initiated network investment in response to requirements at the time, conditions could change leading to delay or disappearance of the needs case.

A4.46. The RIIO-ET1 framework introduced the licence term Transmission Provisions in Wider Works (TPWW) such that, should conditions change and it stops being in the interests of existing and future consumers for an investment to proceed, costs efficiently incurred can be recovered by NGET. The mechanism also provides a safeguard that NGET does not continue to incur costs on new infrastructure that is not aligned with consumers' needs.

A4.47. All funding claims under this licence provision need to be assessed by Ofgem – both the value and the justification. to understand if it was efficiently incurred as well as whether it is reusable to deliver a different output.

A4.48. At the time of submission, NGET had submitted one claim but the Authority had not reached a funding decision. Four new requests for additional funding have since been notified. These investments have been stopped because it is no longer economic to proceed due to changes in broader customer requirements (since the initial decision to proceed).

A4.49. Five TPWW claims are therefore included within the allowance figures presented by NGET, totalling £102 million. The figure represents spend to date, including pre-T1 spend (£63 million¹⁵²) and expenditure incurred within the first five years of RIIO-ET1 (£39 million). In the case of the TPWW mechanism, spend in RIIO-T1 is therefore less than allowances reported by NGET because the allowance provides funding for spend incurred prior to RIIO-T1 that would not be the case following the operation of the uncertainty mechanism.

Table A4.8a: TPWW spend vs allowance

(£m, 2017/18 prices)	Pre-RIIO	T1	Total
a. LR17 expenditure	63	39	101
b. LR17 allowance request	0	101	101
Performance (a-b)	63	-63	0

¹⁵² Costs which NGET TO do not consider to have received commensurate funding for through any price control period mechanism.

Table A4.8b: TPWW scheme expenditure breakdown

Reinforcement	Expenditure in RIIO-T1	TPWW Request
Hackney - Tottenham - Waltham Cross Uprate	2	28
Bramford - Braintree - Rayleigh Main Reconductoring	1	31
Bramford - Twinstead _Pelham Reconductoring	0	0
Rayleigh Coryton Tilbury	28	28
High Marnham - West Burton Reconductor	6	14
Total	39	101

Undergrounding and DNO mitigation works¹⁵³

A4.50. In its RIIO-ET1 business plan NGET TO was forecasting to start replacing underground cables in RIIO-ET1. This work has subsequently been delayed and currently only a fraction of original level of expenditure has been incurred in RIIO-ET1.

A4.51. NGET TO currently anticipates delivering 5.7km of underground cable (due to be commissioned in 2023/24). Similar to last year, there are no DNO mitigation work currently incurring cost. Forecast mitigation works include a new Grid Supply Point (two bays) and the removal of an existing distribution overhead line (79 towers) to meet planning requirements; associated with the commissioning of the Nemo and Richborough projects in 2021. For brevity, we have combined the assessment presentation of these two output categories.

A4.52. NGET anticipates that the licence mechanism will substantially reduce baseline allowances across the RIIO-ET1 period to take account of the outputs that are no longer required due to changes in customer requirements. NGET forecasts that the operation of the uncertainty mechanism will reduce its allowance by approximately 99% during the course of RIIO-ET1 is comparable to the forecast reduction in outputs.

A4.53. The forecast expenditure across the T1 period is zero; an estimated underspend of £29 million against forecast allowances across the eight year period.

A4.54. The forecast expenditure across the total period is £5 million; a net underspend of £36 million (based on the fixed RRP17 forecast).

A4.55. However, if the effect of fixing allowances is removed, i.e. update outputs and allowances for these years based on NGET's latest view (July 2018), then related allowances in the T1+2 period would decrease by £12 million (to zero; associated with the removal of 5.7km underground cable).

¹⁵³ Detailed in Special Condition 6K of NGET's licence.

Table A4.9: Undergrounding/DNO mitigation volume driver spend vs allowance (fixed forecast)

(£m, 2017/18 prices)	Delivery within T1 period	Delivery within T1+T3	Delivery beyond T1+T3	Total
LR 18 expenditure	0	0	0	0
LR18 expenditure	0	0	5	5
a. Total expenditure	0	0	5	5
LR18 allowance	4	0	0	4
LR19 allowance	25	12	0	37
b. Total allowance	29	12	0	41
Performance (a-b)	-29	-12	5	-36

Baseline Wider Works

A4.56. NGET's electricity transmission licence details four reinforcement projects that were defined as Baseline Wider Works (BWW) schemes. It has delivered the required BWW output in three schemes in accordance with the delivery date specified in the licence and the associated ex-ante allowance has been released.

A4.57. The fourth BWW scheme is the Western HVDC (WHDVC) undersea cable link. This is a £1 billion link between Scotland and Wales, jointly developed by NGET and SPT that will increase the capacity of the transmission system. The link was due to be delivered in 2016/17. The project has encountered technical problems with the cable manufacture process and the output is forecast to be delivered to a revised completion date within the 2017-18 financial year. This delay has been the subject of debate in the MPR parallel work.¹⁵⁴

A4.58. NGET TO reports the expenditure incurred to deliver three (of four) BWW outputs¹⁵⁵ to be £180 million; an overspend of £28 million against the cumulative level of ex-ante allowances across the eight year period. This overspend is driven by the cost of additional works on two BWW projects¹⁵⁶. The overspend is offset by the anticipated £62 million underspend on the delayed WHVDC project, resulting in a net underspend of £35 million.

¹⁵⁴ https://www.ofgem.gov.uk/system/files/docs/2017/07/mpr_parallel_work_decision-v3.pdf

¹⁵⁵ Harken-Hutton-Quernmore, Penwortham Quadrature Boosters and Scottish Series and Shunt.

¹⁵⁶ A thyristor commissioned as part of the 'Series and Shunt' output experienced a fault and remedial work resulted in additional spend (~£14m). The delivery of the Penwortham output incurred additional cost in the procurement of equipment (~£8m).

Table A4.10: NGET TO BWW forecast spend vs allowance (incl. RPE)

£m, 2017-18 prices	Allowance	Expenditure	Performance
Delivered BWW outputs	153	180	+27
WHVDC (delayed)	806	744	-62
TOTAL	959	924	-35

Positive numbers in the performance column indicate overspend; negative numbers indicate underspend

Strategic Wider Works: construction activity¹⁵⁷

A4.59. NGET currently do not have any approved SWW schemes. The information provided by NGET confirms that there is significant uncertainty associated with the progression of prospective SWW investments. Based on the information provided in the submission, NGET TO reports significant costs incurred to date (approximately £80 million) in the construction of six potential SWW projects. A further £240 million is expected to be incurred across the remaining RIIO-ET1 period in the construction of these projects.

A4.60. To overcome the uncertainty around the actual amount and timing of certain categories of expenditure over the price control period, the network companies agreed to populate the reporting pack by assuming a neutral performance. This means that the level of indicative allowance reported by the company is the same as the level of forecast costs expects to incur.

A4.61. NGET TO's summary of actual expenditure and current estimates of construction costs within the RIIO-ET1 period and beyond for each prospective SWW investment are summarised in the table below.

Table A4.11: SWW construction cost forecast (not yet approved)

(£m, 2017/18 prices)	T1	Beyond T1	Total
Hinkley Seabank	291	383	
Moorside (North West Coast)	26	0	
Eastern HVDC 1	<1	0	
Eastern HVDC 2	<1	0	
South Coast OHL	<1	0	
New circuit between the North East and Lancashire	<1	0	
a. Total construction expenditure	318	383	701
b. Total forecast allowance	318	383	701
Performance (a-b)	0	0	0

¹⁵⁷ We have removed the impact of costs that we have not yet assessed or agreed from our assessment of NGET's TO totex performance.

A4.62. NGET TO's summary of actual expenditure and current estimates of pre-construction costs within the RIIO-ET1 period and beyond for each unapproved SWW investment are summarised in the table below. Across RIIO-ET1, NGET current forecasts incurring costs of £58 million to advance pre-construction activity across three sites; Moorside, South Coast OHL and North East-Lancashire circuit.

A4.63. NGET currently does not have any project specific funding in its RIIO-ET1 price control for these pre-construction activities (or construction works) it has undertaken for the specific projects.

Strategic Wider Works: pre-construction activity

A4.64. NGET TO have designated funding to proceed with pre-construction activity on three prospective SWW projects; Hinkley Seabank and Eastern HVDC (further split into two distinct elements). The projects and corresponding fixed allowances are set out in table 1 of special condition 3L¹⁵⁸.

Table A4.12: SWW pre-construction cost forecast

£m, 2017/18 prices	T1	Total
Hinkley Seabank	29	
Eastern HVDC 1	7	
Eastern HVDC 2	8	
Total pre-construction expenditure	43	43

A4.65. In addition to the agreed list of outputs detailed in special condition 3L, NGET TO currently forecasts significant activity and cost in preparation of projects it currently expects to be considered under the SWW arrangements ('not yet approved'). The costs incurred by NGET TO in progressing pre-construction activities against these projects currently have no allowance allocation, ie the schemes do not form part of the agreed list of pre-construction outputs under special condition 3L.

A4.66. NGET currently forecasts incurring total costs of £59 million to advance pre-construction activity across these sites within the T1 period.

¹⁵⁸ More information can be found here: <https://www.ofgem.gov.uk/publications-and-updates/notice-modification-under-special-condition-3l-national-grid-s-electricity-transmission-licence>

Table A4.13: SWW pre-construction cost forecast (not yet approved)

(£m, 2017/18 prices)	T1	Total
Moorside (North West Coast) ¹⁵⁹	50	
South Coast OHL	7	
New circuit between the North East and Lancashire	1	
Total pre-construction expenditure	59	59

A4.67. Across RIIO-ET1, NGET TO currently forecasts incurring total costs of £102 million to advance pre-construction activity across all of the above sites. This is £43 million above the total fixed allowance set out in table 1 of special condition 3L.

A4.68. In accordance with the licence, in the event that the licensee does not deliver (or only partially delivers) an agreed pre-construction output by the end of RIIO-ET1 then an adjustment to baseline expenditure will be made to reflect the full value of the funding provision.¹⁶⁰ Hence, based on the current list of agreed outputs (see table A4.12), NGET TO is currently forecasting to spend £16 million below the fixed allowance provision of £59 million. The forecast value of the ex-post reconciliation at the end of the price control (or “true-up”), is therefore £16 million.

Non-variant load related capex

A4.69. This category includes to expenditure on projects that manage a broad set of network requirements identified as being needed to accommodate expected changes in generation and demand over the eight-years of the price control. Some works were identified to facilitate the delivery of specific outputs (e.g. construction of the Islington tunnel)¹⁶¹ but works were mostly not associated with the delivery of directly measureable outputs in their own right (such as MW).

A4.70. NGET TO was awarded fixed allowances to cover these load-related activities as part of the RIIO-ET1 price control (in excess of £1.2 billion in total).

A4.71. The allowance funds projects that are not covered by any uncertainty mechanisms – ie the allowances do not adjust automatically depending on the volumes

¹⁵⁹ Since receipt of the regulatory submission, Toshiba have announced that it is cancelling its Nugen venture to build the nuclear power station in Moorside, Cumbria. NGET have spent a total of £76 million to date on progressing the Moorside project. NGET currently does not have any project specific funding for either the pre-construction activities or construction works it has undertaken for the project.

¹⁶⁰ See paragraph 17 of special condition 3L. Currently, an allowance value of £5.3 million is associated with the output entitled “Prospective future Strategic Wider Works Pre-construction Engineering Outputs”. It is our current understanding that if no further request is received from NGET to reallocate the allowed expenditure to a named project then an adjustment to baseline expenditure will be made. The substitution request – both the value and the justification – will be assessed by Ofgem. NGET cannot request an increase in its pre-construction allowances through this provision as the amount is fixed.

¹⁶¹ See paragraph 4.9 and table 4.2 of our FP Cost assessments and uncertainty for NGET <https://www.ofgem.gov.uk/ofgem-publications/53601/3riiot1fpuncertaintydec12.pdf>

delivered (termed 'non-variant' to distinguish from allowances that are subject to volume drivers).

A4.72. The expenditure incurred by NGET in progressing the set of investments anticipated to deliver non-variant outputs is not reported under any of the established volume driver mechanisms. Instead, NGET reports expenditure against the cost category relevant to the activity. Five separate cost categories informed Ofgem's view of the value of the non-variant allowance. The five categories are:

- i. **Local Enabling (LE) exit sole use & entry sole use (LR1 & LR2).** Expenditure by the TO required to meet increases or changes in the power demand or directly connected generation. It only includes expenditure on assets that are covered by connection charges as per the connection charging boundary. The net value of capex (after deducting of directly funded customer contributions) is referred to as "excluded services" and is funded through totex.
- ii. **Local Enabling Entry – Shared use (LR3).** Expenditure triggered by individual generation connection projects but provides assets or reinforcements which are shared by users of the transmission network.
- iii. **Wider Works Entry (LR13).** Expenditure by the TO required for generation driven reinforcement of the transmission system to meet security standards and to fulfil licence obligations.¹⁶²
- iv. **Wider Works General (LR15).** Expenditure that cannot be clearly attributable to either large changes in generation or demand.
- v. **Infrastructure – TSS (LR22).** A relatively small category of investment on the transmission network that is driven by the system operator (SO).

A4.73. Our assessment of NGET's estimated expenditure across the eight year RIIO-ET1 period and beyond under each category is set out in table A4.14 below.

¹⁶² There were no anticipated demand changes considered large enough for NGET to forecast any Wider Works (Exit) funding.

Table A4.14. NGET TO Non-variant costs spend vs allowance (incl. RPE)

(£m, 2017/18 prices)	Delivery within T1 period ¹⁶³	Delivery beyond T1 ¹⁶⁴	Total
LR3 expenditure	0	0	0
LR13 expenditure	0	0	0
LR15 expenditure	413	40	453
Pre True-up LR1 & LR2 expenditure	380	58	438
TSS expenditure	-11	0	-11
a. Total expenditure	782	98	880
LR3 allowance	58	0	58
LR13 allowance	12	0	12
LR15 allowance	500	0	500
Pre True-up LR1 & LR2 allowance	412	0	412
TSS allowance	9	0	9
b. Initial allowance	991	0	991
c. Performance (a-b)	-199	98	-111

A4.74. NGET TO is currently expecting to spend to be £111 million lower than the fixed allowance (before the proposed end of period true-up of excluded services and special condition 3L)

A4.75. NGET explains that the underspend has occurred because the needs for outputs associated with the non-variant allowance have changed as customer requirements have evolved. Since the start of the price control there has been a substantial shift in the profile of load related works.

- NGET TO's eight year generation connection profile is currently 12.5GW (reduced from the baseline profile of 33.7GW).
- Demand connections have also fallen (forecast is currently to connect 40 SGTs, down from 72).
- There are also a number of other elements which have evolved since the onset of RIIO-ET1 - including, for example, the connection of large volumes of embedded generation - where investments will need to adapt to meet stakeholder needs that were not foreseen.

A4.76. Due to the lack of automatic adjustment of the non-varying allowance, the above changes have driven changes to NGET's capital investment plan that have resulted in schemes that formed the basis of the baseline funding no longer being required or being

¹⁶³ This category includes projects incurring expenditure in T1 that are currently expected to be delivered within the RIIO-ET1 period. This includes the delivery of schemes within the original project portfolio and new schemes.

¹⁶⁴ This category includes projects incurring expenditure in T1 that are currently expected to be delivered beyond 31 March 2012. This includes the delivery of schemes within the original project portfolio that have subsequently been delayed and new schemes.

deferred to RIIO-ET2. This means that NGET needs to undertake a very different set of investments than was originally anticipated.

A4.77. Specifically, NGET explains that it is no longer progressing investments worth £338m; including major investments such as Ironbridge closure (£58m), Barking-Northfleet East reconductoring (£49m); installation of quadrature boosters at Nursling (£45m); and building a new GIS substation at Aust (£41m). This is offset against £217 million of new investment NGET is now being undertaken, including: Connah's Quay (£77m) and the installation of additional shunt reactors to address high voltage issues (£121m).

A4.78. The differential is also driven by some projects having higher or lower costs compared to the original allowance (NGET estimate the overall net effect of this to result in an overspend of £21 million). Changing customer requirements also have the impact of reducing expenditure on excluded services like sole-use demand (a reduction of £26m due to delays to Network Rail connections relative to RRP 17 is noted).

A4.79. The above assessment includes the impact of the load related element of NGET's voluntary deferral (£166 million) and the relevant MPR decision (£49 million), which are both attributable to the non-variant category. It does not include the proposed true-up value of excluded services income.

Non-load related expenditure

A4.80. Non-load related (NLR) capex is capital investment made by a TO to maintain its existing network. This investment relates mainly to replacement and refurbishment of assets but also includes other capital expenditure directly and indirectly related to maintaining a reliable network, such as investments to improve flood defences.

A4.81. NLR allowances are split into Asset Replacement Capex and Other Capex. However, our analysis considers these as a single category and compares actual and revised forecast expenditure against original allowances.

A4.82. For each TO over-spend or under-spend against allowances may be attributable to a combinations of factors. We have tried to identify and estimate the impact of as many of these as possible. In order to aid understanding of the reasons for over-spends and under-spends, when we have been able to do so, we have separated them into five broad categories. These categories are explained below.

- Work volume changes: changes in the total quantity of outputs for a given asset type that a company expects to deliver during the eight years of RIIO-ET1. In estimating the cost impact of work volume changes we calculated unit costs of carrying out the work implied by the companies' allowances (for each asset type) and assumed that the unit cost does not change over the course of the price

control. The impact of any unit cost changes are reflected in the second category, 'work cost changes'.

- Work cost changes: changes to the cost of delivering like-for-like outputs. Decreases or increases in this category could be attributable to efficiencies / inefficiencies on the part of a company or be due to external factors such as input price changes (as discussed in chapter 4), or a combination of both.
- Work type changes: changes in the type of work used to deliver an output or desired benefit. For example if a company had been previously expecting to replace an asset and now discovers that the asset is no longer required and can be decommissioned, then the associated cost savings would fall within this category.
- Work schedule changes. Costs are included in this category if:
 - at the time of the RIIO-ET1 business plan an output was planned for delivery either in TPCR4 or RIIO-ET2,
 - there are changes to the timing of delivery but these timing changes do not impact RIIO-ET1 output volumes, or
 - timing changes impact RIIO-ET1 expenditure. For example, if a TO was forecasting to start replacing underground cables in RIIO-ET1 but to deliver the final outputs RIIO-T2, and if replacement is subsequently delayed and no expenditure is incurred in RIIO-ET1 then the associated cost savings will be included in this category.
 - Other factors: a balancing category and will include the impact of miscellaneous factors that do not fall into one of the above categories.

NGET TO

A4.83. NGET TO's total NLR allowance over RIIO-ET1 is £5,936 million - this is before the voluntary deferral adjustment of £446 million and excluding the impact of re-openers and uncertain cost category allowance adjustments. Adjusting for these factors increases the total NLR allowance value to £6,017 million.

A4.84. NGET TO is currently forecasting to underspend against this baseline position by £1.76 billion over the eight years of RIIO-ET1, which equates to approximately 30% of its NLR allowance.¹⁶⁵ This is comprised of a £1.37bn underspend on lead assets and a £386m underspend on non-lead assets. This is a £129m further reduction of spend over

¹⁶⁵ This assessment highlights the position against the starting baseline value of NGET TO's NLR allowance. The allowance value used in our calculation of the eight-year average RoRE is derived by deducting the UM allowance adjustment value (from the table above this is represented by v-ii = £5,756 million).

RIIO-ET1 compared to last year. The forecast RIIO-ET1 performance reported by NGET TO is lower than our assessment at £1.5bn.

A4.85. The high level calculation behind each performance position is set out in the table below.

A4.86. Appendix 2 contains further detail of NGET TO's forecast allowance and expenditure across the price control period.

Table A4.15: NGET TO NLR expenditure and allowance

<i>£m, 2017-18 prices</i>		NGET view	Unadjusted baseline
i. Starting Allowance	5,936		
ii. Uncertainty mechanism allowances	374		
iii. Re-opener	153		
iv. Voluntary Deferral	-446		
v. Effective Allowance	6,017		
vi. Total NLR Expenditure	4,509		
vii. Reverse exceptional items	133		
viii. Category change: expenditure	40		
ix. Subtract uncertainty mechanism costs	-508		
x. Effective Expenditure	4,175		
Forecast performance		-1,508 (vi – v)	-1,760 (x – i)

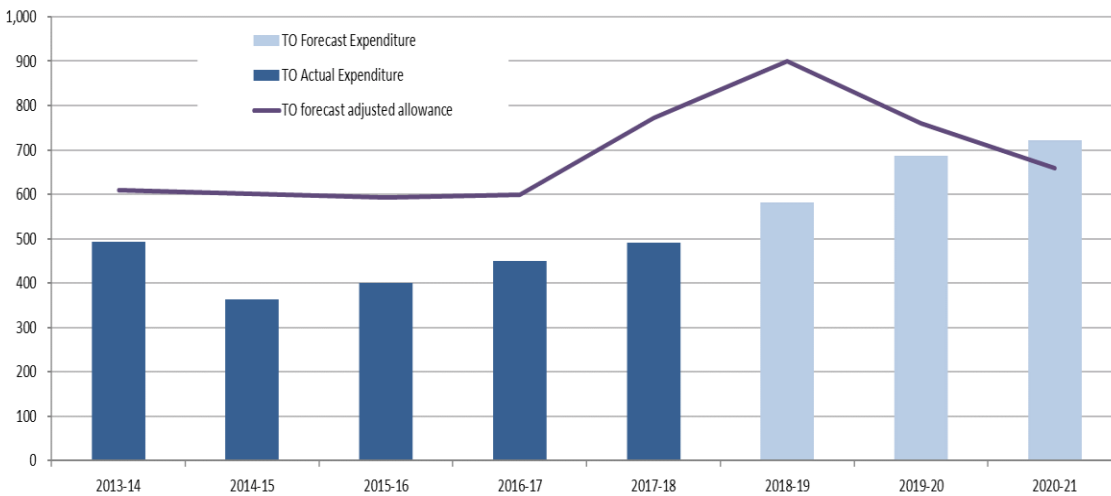
A4.87. As in last year's report, we have not adopted the allowance recategorisations in the NLR category proposed by NGET¹⁶⁶.

A4.88. The expected profile across the eight-year period is highlighted in the chart below and indicates that NGET TO is forecasting to significantly increase expenditure over the remainder of RIIO-ET1.

¹⁶⁶ Optel & BT21 allowances recategorised from Asset Replacement Capex to Non Operational Capex, and Metering, Protection and Control, substation Other, Cable Tunnels and other non load related allowances recategorised from Asset replacement Capex to Other capex.

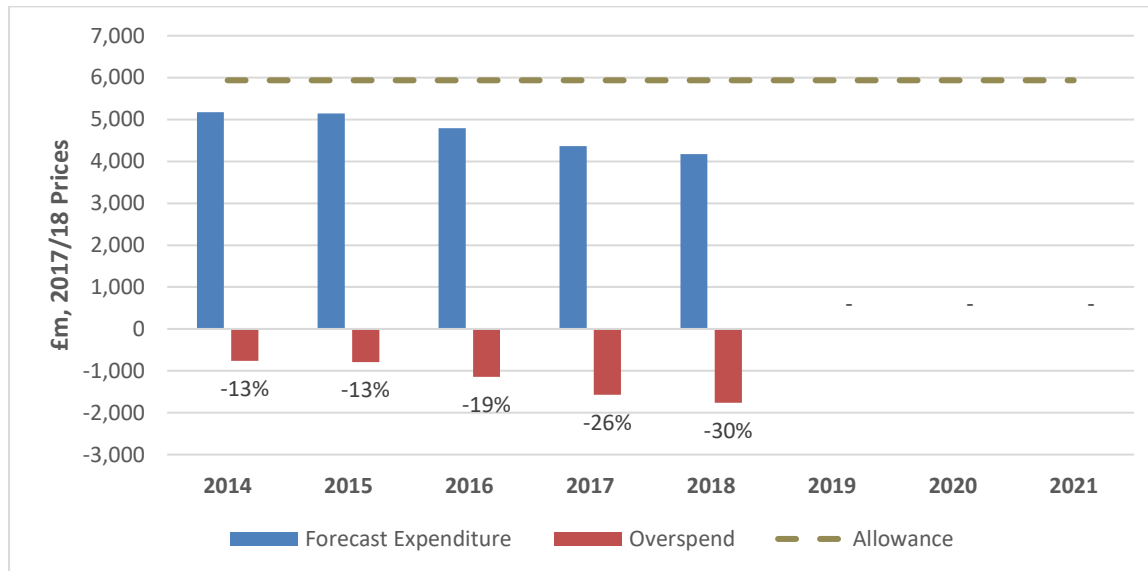
Figure A4.1: Actual and forecast expenditure vs TO forecast NLR allowance¹⁶⁷

£m, 17/18 prices



A4.89. The following chart shows the evolution of RIIO-ET1 NLR forecast expenditure and overspend since the start of the RIGs submissions for the RIIO-ET1 period.

Figure A4.2: Evolution of NGET TO’s RIIO-ET1 eight year NLR forecasts



A4.90. The following section presents the factors that our analysis suggests are driving the forecast underspend of £1.76bn.

¹⁶⁷ The TO forecast adjusted allowance figures do not account for the £446 million (2009-10 prices) of deferred NLR allowances.

Table A4.16: Factors contributing to RIIO-ET1 forecast position 2017RRP vs 2018RRP¹⁶⁸

Overspend/Underspend Category		2016/17	2017/18	Year on Year Change
RIIO-T1 Allowance		5,935.6	5,935.6	-
Changes	Work volume changes	-273.8	-418.1	-144.4
	Work cost changes	-616.8	-796.2	-179.4
	Work type changes	-384.8	-294.8	+90.0
	Cost schedule change	-452.6	-277.0	+175.7
	Other	+96.7	+25.4	-71.3
Forecast Expenditure		4,304.2	4,174.8	-129.4
Total RIIO-T1 Overspend, £m 2017/18 Prices		-1,631.4	-1,760.8	-129.4

A4.91. The following sections detail the main drivers of the overall actual and forecast underspend for the eight years of RIIO-ET1 along the categories in the above table.

Work volume changes

A4.92. Work volume changes has resulted in a forecast net underspend of £418m in RIIO ET1. This is predominantly due to revised condition assessments of lead assets, which amount to a total forecast saving of £451m. These savings are attributable mainly to Transformers (£236m saving) and OHL (£102m saving).

A4.93. Increasing the life of all transformers by 5 years has allowed NGET to reduce the number of units requiring replacement in RIIO ET1 by 41.

A4.94. Using an 'improved condition monitoring approach' has led to NGET increasing its view on the expected life of certain OHL fittings (e.g. 5 year increase for spacers and dampers and 10 year increase for glass insulators). This has resulted in a reduction in the volumes of fittings requiring replacement by around 450km. This is a further reduction of 269km compared to last year's forecast.

Work cost changes

A4.95. The £796m underspend in this category is attributable to unit cost reductions for all lead asset categories with the exception of reactors. Overhead fittings and Underground cable categories have seen the biggest unit cost savings. The leading factor driving this for these two categories is a reduced scope of physical intervention to deliver the same NLR outputs. For OHL Fittings, this has been driven by a targeted fittings approach, where NGET is using improved condition monitoring to only replace those fittings that need to be replaced. These include slower than expected asset deterioration (leading to NGET replacing only faulted parts of circuits instead of entire circuits) and

¹⁶⁸ Some of the figures may not reconcile with last year's report due to updated assessment approaches or the use of updated or new data.

changes in demand and generation patterns (leading to gains being made by finding cheaper solutions).

Work type changes

A4.96. NGET has reported that 13 transformers will be decommissioned instead of being replaced due to substation voltage rationalisation works, as well as changes to demand and generation patterns, resulting in a saving of £73m.

A4.97. It is also reported that instead of the original 20 reactors in the business plan, only 14 will be replaced, but at a higher voltage. This has resulted in a net forecast spend increase of £25m.

A4.98. The Protection and Control work programme is on track for delivery against the target number of site interventions but with a large scope reduction on majority of the projects thus leading to a total cost saving of £210m in the category for National Grid against an allowance of £464m. The scope reduction comprises of retaining a large number of relays and equipment that were originally due for replacement in the Business Plan.

A4.99. NGET has stated that through carrying out testing and working with their supply chain after the start of RIIO, they established that the remaining life of the retained equipment matches that of the replaced components (for example, specified by NGET to be 20+ years for new protection equipment). NGET has assured Ofgem that if the retained equipment need to be replaced before that time, whether due to fault or planned work, the cost will be funded by the savings made in the RIIO ET1 period. We will take this into account in future price controls and expect NGET to demonstrate that an accounting system has been put in place that will prevent it from charging the consumer base again when a retained equipment fails. Such an accounting system should record the expected lifetime of the replaced equipment associated with the protection or control system so that any work on the associated retained equipment during this lifetime is not double funded.

A4.100. For Substation Control System (SCS), NGET has stated that following the replacement programme that was agreed in the Business Plan and covered by regulatory funding allowances would be costly and cause constraints on the network. This has led to intervention techniques with a much reduced scope of work which has resulted in a net forecast saving of £169m for the SCS category. As this is a novel approach to replacing substation control systems, a better understanding is needed on its impact on the integrity of the SCS as a whole and on the resilience of the SCS to cyber security threats. We expect to examine such impact (e.g. additional costs needed elsewhere because of the scope reduction in this programme) when considering future funding requirement.

A4.101. We also expect NGET to consider more carefully economising of the protection and control work programme at the time of business plan submission, with a view on

deliverability of replacement projects, both in terms of costs and network constraints. If refurbishment or reduced scope replacement is the preferred approach, then consideration should be given to individual equipment longevity and its need for replacement within a protection or control system before submitting a Business Plan.

Work schedule changes

A4.102. NGET's NLR allowances included approximately £1,046m of allowances to cover RIIO-ET1 expenditure on schemes expected to deliver final outputs in RIIO-T2. There are therefore no RIIO-ET1 outputs to which these allowances can be linked. A number of these schemes have subsequently been either cancelled or fully deferred beyond RIIO-ET1. The current estimate of the value of cost savings attributable to these deferrals is £277 million. The bulk of these savings are in underground cable and tunnel schemes.

Other changes

A4.103. As noted in paragraph A3.121, this is a balancing category that includes the impact of factors that do not fall into one of the above categories. The bulk of the variance in this category is due to efficiency savings that we have not been able to specifically categorise at this stage.

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