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Scottish & Southern Electricity Networks

TRANSMISSION

RIIO-T2: Our Network Access Policy

December 2019

Scottish Hydro Electric Transmission plc

RIIO T2 Our Network Access Policy

Contents

About us

We are Scottish Hydro Electric Transmission (SHE Transmission), part of the SSE Group, responsible for the electricity transmission network in the north of Scotland. We operate under the name of Scottish and Southern Electricity Networks, together with our sister companies, Scottish Hydro Electric Power Distribution (SHEPD) and Southern Electric Power Distribution (SEPD), who operate the lower voltage distribution networks in the north of Scotland and central southern England.

As the Transmission Owner (TO) we maintain and invest in the high voltage 132kV, 275kV and 400kV electricity transmission network in the north of Scotland. Our network consists of underground cables, overhead lines on wooden poles and steel towers, and electricity substations, extending over a quarter of the UK's land mass crossing some of its most challenging terrain.

We power our communities by providing a safe and reliable supply of electricity. We do this by taking the electricity from generators and transporting it at high voltages over long distances through our transmission network for distribution to homes and businesses in villages, towns and cities.

Introduction

The electricity industry is changing rapidly due to the transition to a net zero-carbon future. To connect new low carbon technologies during RIIO T2, our network must continue to be safe and reliable while new sections are added or upgraded. These works require a significant level of outages, meaning parts of our network will be 'out' whilst work is being undertaken. These outages can mean low carbon technologies are unable to transmit energy, or, cause network constraints.

The Networks Access Policy (NAP) was introduced in order to ensure outage planning is efficiently coordinated between network owners to benefit consumers and customers by minimising whole system costs. An example of this may be spending more during construction to realise greater constraint savings, both of which are ultimately funded by consumers. The purpose of this document is to outline our plans of how we apply the NAP during RIIO T2.

We believe the way we have applied the NAP in our business has delivered benefits to consumers and GB since its introduction and will continue to do so if network operators and the ESO are accountable and can demonstrate the NAP's benefits. Our aim is to continuously improve the NAP to the benefit of consumers and society.

Specifically, we believe our aim can be achieved by:

1. **Continuing to adapt our business to ensure NAP continuous improvement** is realised by implementing **innovative and whole system** ways of working from RIIO T1 into business as usual for RIIO T2
2. Improving our **customer service by including an enhanced engagement** service once a customer is connected[1]
3. Publishing regular internal updates for new KPIs
4. **Continuing to work with the ESO to deliver consumer savings** through existing and any new processes
5. **Collaborating with other GB TOs and the ESO to develop a common NAP and KPIs** to ensure parity across GB

Background- What is the Network Access Policy (NAP)?

For the UK to meet its climate change obligations, it was decided that the industry could not wait for all GB transmission network reinforcement projects to be completed before allowing new renewable generators to connect. A Connect and Manage principle was therefore adopted in 2011. This meant renewable generators could *Connect* ahead of transmission reinforcement. Connecting ahead of reinforcement means a constraint to the generator, or on the system, could be created. The ESO would *Manage* this constraint until the reinforcement work was complete. The management of constraints involves the ESO instructing generators to reduce output and paying them to do so which is known as constraint payments. To help minimise these constraint payments, Ofgem added a license obligation for the Scottish Transmission Owners (TOs) to develop and maintain a Network Access Policy (NAP). The Scottish TOs produced the NAP, in conjunction with National Grid, who at that time, were GB System Operator, which was then approved by Ofgem in 2013. The NAP ensures the necessary outages on the transmission network to connect low carbon technologies or upgrade

[1] this is referred to as a network User in the NAP

or maintain our existing network are managed as efficiently as possible to minimise consumer costs, whilst considering the impact on customers and other stakeholders.

The principles of the NAP[2] are:

- The TOs must ensure that the transmission network provides a means for the safe and reliable transportation of electricity throughout the country.
- They must ensure that the operation, maintenance and development of the network are undertaken with the principle of value for money for consumers and customers.
- The NAP is also developed to show that there is transparency in balancing the requirements of the ESO and the TOs.
- This means that the operational and construction costs of work scheduling for the TOs; the impact on project delivery timescales; the constraint payments made to generators by the ESO; and the likely impact on customers, consumers and other stakeholders all need to be considered.

Developing our approach to the NAP in RIIO T2: Stakeholder Engagement

Transmission customers attend OC2 Forums to engage with the ESO and TOs to identify issues arising from network outages. OC2 is the section of the Grid Code which determines when the ESO communicates outages to affected customers. There has been consistent feedback from customers they want to see KPIs introduced which clearly demonstrate TOs consider the impact of outages in line with the NAP. Ofgem have stated in their RIIO T2 Business Plan Guidance, they want TO proposals for qualitative KPIs that demonstrate TOs are complying with NAP principles. We believe the suite of TO KPIs proposed in the draft RIO T2 GB NAP and Continuous Improvement section in this document, will satisfy the KPI requests above, help identify areas of good performance and highlight areas that need to be improved.

The ESO have shared KPI reports at the OC2 Forums showing high levels of outage change within year which needs to be reduced. We have restructured, as detailed in Lessons Learned from RIIO T1, to directly address this issue. Due to lead times of projects, benefits from this change will be more fully realised by the start of RIIO T2.

We held Stakeholder Workshops to obtain feedback from stakeholders on our proposals for RIIO T2. Slides and Output Reports from these events can be found here. A consistent message throughout the feedback is on engagement regarding outages. Feedback such as “Customers are keen on knowing outage plans in advance” and “Need to be much clearer on what outages are likely when post-connection during the connection offer process. Need to record the total 'lost MW/hr' from planned outages for all generators” is often also stated at OC2 Forums.

We believe the combination of the new Commercial and Connection policy and the proposed KPIs will deliver on our continuous improvement ambitions for RIIO T2 by addressing the issues raised in the feedback above.

[2] https://www.ssen.co.uk/TransmissionPriceControlReview/

Lessons learned from RIIO T1

By the end of RIIO T1 we will have over 8GW of renewable generation connected to our network with growth expected to continue throughout RIIO T2. The Committee on Climate Change Net Zero report recognises Scotland has a greater relative capacity to remove emissions than the UK as a whole and recommends Scotland has a net zero date of 2045. This growth in renewable generation has created challenges to outage planning as the new generation of connection applications require new outages which present a continually changing future outage pattern.

During RIIO T1, collaborative industry engagement with other TOs and the ESO has led to customers being able to communicate outage related issues face to face through events such as bi-laterals and the OC2 forum. This engagement has proven beneficial to customers, TOs and the ESO with process changes directly resulting from these interactions:

Our Business Structure

We had to adapt our business in order to improve the accuracy of our outage plans as we received feedback from customers and the ESO, that there was an unacceptable level of outage changes within year. A new project support team has been set up to help identify detailed outage requirements as early as possible. This will help reduce the outage changes close to, or within, current year. We have also placed our most experienced outage planners in roles to ensure our outage plans will be robust and more likely to be acceptable when first submitted to the ESO and network customers.

Innovative ways of working

Implementing the NAP during RIIO T1 meant we had to think of new ways of working beyond the conventional outage planning methods which would have focused solely on the minimal cost solution to what would provide the most benefit to the overall system, consumers, customers and society. Examples of these methods would be offline builds and creating temporary by-passes or deviations. Working with customers to accelerate their connection date and plan outages through the connect and manage scheme often requires such techniques. Examples of each are given below:

Sloy Gas Insulated Switchgear (GIS) 132kV s/s

This new GIS substation was built offline as it was the cheapest feasible option. It would also help to retain maximum availability of the Sloy – Windyhill ccts during the works. Multiple outages on these circuits would cause constraints and significant customer risk. The offline build meant that each of the circuits could be transferred one at a time with each outage taking approx 8 weeks and causing minimal constraints. An inline build would have meant 2 x outages periods of approx 6 months to rebuild each half of the substation in turn. This would also have caused a network constraint for the same period as well as being harder to manage from a site safety perspective. A suitable hold point in construction was planned for the winter period to maximise availability during the high boundary transfer periods as the project spanned 2 outage seasons[3]

Dounreay to Spittal

[3] Benefits calculated in appendix 1 shows the benefit associated with minimising outages on 2 x Sloy generators only.

We retained the existing 132kV overhead line between Dounreay and the old Thurso 132kV site whilst the new 275kV section was constructed in close proximity. This involved temporary deviations to retain the necessary proximity for construction. This approach from our Field Unit Engineers reduced constraints, allowed work to proceed with less interruptions and reduced network User risk for Thurso and the Orkney (SHEPD) networks. These by-passes were in service for approx 12 weeks with the 40MW figure quoted in Appendix 1, an estimated constraint saving for indicative purposes only.

Dunbeath

Temporary by bypasses are being used to maintain the 132kV route between Loch Buidhe and Spittal substations to reduce constraints and to minimise interruptions to customers connected at Dunbeath Grid Supply Point. Outages reduced from 8 weeks to 8 days. This reduced duration is reflected in the table in Appendix 1. This project also happens to be installing the first SF6 free CBs anywhere on the GB power system.

Beauly – Corriemoillie (Loch Luichart in 2014 and 2015)

A challenging overhead line upgrade which involved building new sections of overhead line alongside existing overhead line and cross jumpering between old and new sections of overhead line to facilitate the build while retaining supplies to customers in Grudie Bridge and multiple generation connections. An ANM scheme was also incorporated into this part of the network to allow a generator (Loch Luichart) to connect ahead of the completion of the overhead line upgrade. The figures in the table in Appendix 1 are a conservative estimate of the additional capacity realised by the generator each year it was connected during ANM scheme operation

Whole Energy System

We have network Users, such as the gas industry customers connected at St Fergus, who play significant roles in wider energy industry security. During RIIO T1, the different outage notification processes to Transmission and Distribution customers highlighted that a unique approach was required for outages affecting these gas industry customers. The collaborative approach across transmission and distribution, involving owners and operators from both electricity and gas industries, worked well and will be replicated in RIIO T2 as and when required.

Gas power stations across GB provide reliable power to supplement renewable sources as and when required. They would also play a key role should there ever be a black start event so close working relationships with these industry colleagues is essential. The gas industry customers at St Fergus play a significant role in GB energy security and this will continue for a long time in the future. Several of the customers are SSEN's distribution business (SHEPD) customers so when there is a transmission outage planned that affects SHEPD and these customers, close coordination with all parties is essential to ensure whole system security is maximised. We already work together with SHEPD to avoid reducing security at multiple SHEPD sites where there are gas network compressors.

Small changes to outages such as placing short outages at weekends, when demands can be 50% lower, can significantly reduce the risks and contingency costs for all affected so these opportunities are explored with customers, SHEPD and the ESO whenever possible.

New Processes

Stakeholder Feedback at the OC2 Forums highlighted that network customers were willing to pay to reduce the impact of future outages if a process could be found to facilitate this. The existing System

Operator Transmission Owner Code Procedure STCP 18.1 Connection and Modified Application, was assessed by all TOs and was highlighted as an enabler for existing network customers to modify their connection to reduce future outage impact. This change in application of an existing process came directly from Stakeholder Feedback at the OC2 Forums, which demonstrates the value of encouraging and acting on stakeholder feedback. Although we have not yet had any successful examples of utilising this process in RIIO T1, we aim to highlight further opportunities with customers going forward.

A new System Operator Transmission Owner Code Process, STCP 11.4 for Enhanced Service Provision by TOs, was established by Scottish TOs and the ESO during RIIO T1. This allows the ESO to fund changes to planned outage delivery methods for the purpose of realising consumer savings. These changes can be proposed from any party but are primarily expected from the ESO and TOs. We view this as a contingency option to Business as Usual processes which should minimise the need for this fund to be required. It does however allow the ESO to fund changes required due to unforeseen changes or new opportunities which may have arisen since TO funding and outage plans were agreed.

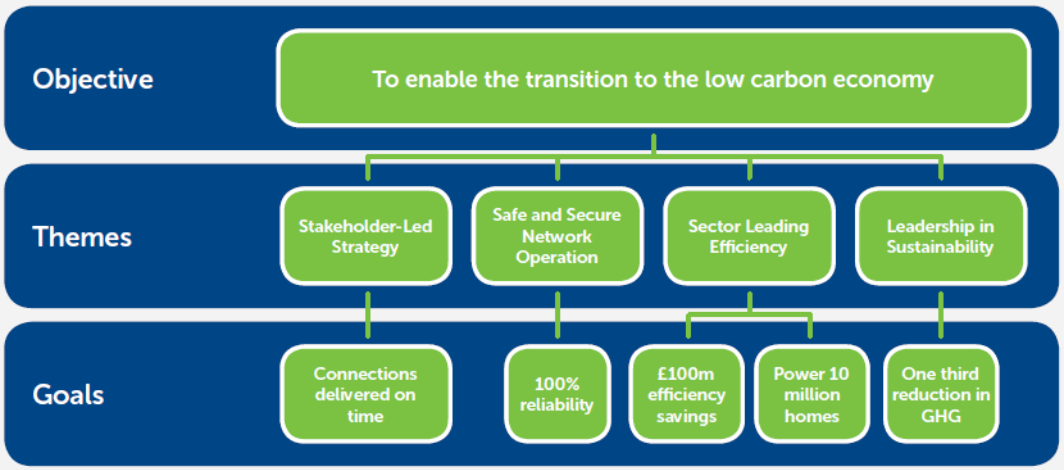
We continue to investigate with the ESO a suitable process for customers to fund changes to network outages. The first stage of this is highlighting significant outages via the outage portal proposed as part of our new Commercial and Connections customer journey. This process is required for customers as we aim to construct outage programmes and ensure efficient expenditure of consumers' funds. There are a number of aspects we need to consider such as the impact on all stakeholders including consumers and the safety of our network and employees. This will occasionally result in outages which, although significant, do not justify customers paying to modify their connection via STCP 18.1. A new process to allow customers to fund changes which are beneficial to them, yet have no detrimental effect on consumers or project delivery, will help reduce the overall financial impact on customers.

Throughout RIIO T1, working with customers and industry stakeholders has helped produce efficient and economic outage solutions to benefit both consumers and society. The practices we've implemented during RIIO T1, such as advising customers of high impact outages and utilising alternative outage strategies to achieve the best whole system outcome, will become Business as Usual, during RIIO T2.

Our RIIO T2 Business Plan and the NAP

Our Business Plan has the overall strategic objective to enable the transition to a low carbon economy. The NAP complements the Business Plan as it ensures these goals are met by maintaining a safe and reliable network and considers customer impact and consumer cost.

Our business plan is structured under four strategic themes:



The NAP and outage planning are critical to the safe and secure operation of our network and therefore feature in the safe and secure section of our Business Plan.

Our plans for the NAP in RIIO T2 also contribute towards our Five Goals:

• **Transport the renewable electricity that powers 10 million homes** – The NAP will ensure that the projects required to achieve this goal are done so efficiently and with due consideration to stakeholder impact.

• **Aim for 100% network reliability for homes and businesses** – The NAPs first priority is safe and secure system operation.

• **Every connection delivered on time** – The NAP KPIs we are proposing will highlight any poor outage planning performance, including late connection delivery. NAP principles are also a key enabler in delivering accelerated connections which contribute to our Sustainability Strategy.

• **One third reduction in our greenhouse gas emissions** – There is no direct link to the NAP in controlling our businesses greenhouse gas emissions from say powering our substation buildings. However, for certain outages, we do rely on diesel generators to maintain customer supplies so minimising the duration of the outages will help contribute to this target.

• **£100 million in efficiency savings from innovation** – Minimising consumer costs is one of the primary reasons the NAP was introduced. A lower outage burden from an efficient outage plan means reduced system operation costs which benefits customers and consumers. Innovation such as dynamic line ratings will also produce savings for customers and consumers through reduced system operation costs.

RIIO T2 and NAP Continuous Improvement

The Lessons Learned from RIIO T1 show how we have evolved and adapted to improve our performance throughout RIIO T1 including implementing innovative solutions and a whole system approach to benefit customers and consumers, without financial incentive. We believe the improvements from RIIO T1 and the further improvements we have proposed in RIIO T2 go beyond the minimal requirements of the NAP by putting consumers and stakeholders' needs at the centre of our NAP approach.

We see improvements in relationships, and communication with customers and our industry peers, as key to continuing to improve our collective performance in delivering our outage programmes as efficiently as possible. Our stakeholder led and whole system approach requires collaboration with stakeholders.

Going beyond compliance of the NAP (in which we apply the NAP principles in our future years planning which includes considering the needs of all stakeholders) we believe the way we have applied the NAP in our business has delivered benefits to consumers, customers and society since its introduction and will continue to do so if network operators and the ESO are accountable and can demonstrate the NAP's benefits.

Our RIIO T2 aim is to continuously improve the NAP to the benefit of consumers and society.

Specifically, we believe our aim can be achieved by:

1. **Continuing to adapt our business to ensure NAP continuous improvemen**t is realised by implementing **innovative and whole system** ways of working from RIIO T1 into Business as Usual for RIIO T2
2. Improving our **customer service by including an enhanced engagement** service once a customer is connected[4]
3. Publishing regular internal updates for new KPIs
4. **Continuing to work with the ESO to deliver consumer savings** through existing and any new processes
5. **Collaborate with other GB TOs and the ESO to develop a common NAP and KPIs** to ensure parity across GB

Each of these ambitions are explained in detail in the remainder of this paper.

[4] this is referred to as a network User in the NAP

Our proposed common NAP and KPIs

A key aim for RIIO T2 is to better communicate the value we can add by implementing the NAP and sharing this success. With this goal in mind, we agree that implementing a common GB NAP and KPIs for all GB TOs will greatly help achieve this aim. We are actively engaged with other TOs and the ESO to deliver this objective. We are proposing the following KPIs:

Network Access Policy KPIs - Transmission Owner

1. Number of faults due to asset failure

This would not include weather related faults or those caused by external parties. It would only include faults which are attributable to TO behaviour, require emergency switching, or where failure causes protection operation. *This KPI is used to measure a TOs ability to ensure their assets are safe and reliable, which is a key NAP principle*

2. Number of unplanned outages

This would include faults identified through routine inspections and managed via unplanned outage requests, such as hot spots. *This KPI would also measure a TO's ability to ensure their assets are safe and reliable.*

3. How many assets are out of service more than once per annum?

This KPI helps identify good outage alignment practices. *This KPI helps identify good outage alignment practices which help reduce constraint costs and stakeholder impact*

4. Percentage of TO outages started outside 60 mins of agreed start time (delay attributable to TO)

Stakeholders at OC2 forums have requested a measure of TOs ensuring outages are started on time.

5. MW/HRs of generation curtailed by BCA per annum - firm connections

This is a measure of lost network access due to transmission outages and connection agreements requiring a generator to be at 0MW. *Stakeholders at OC2 forums have requested a KPI which shows the volume of generation impacted by TO's outages*.

6. MW/HRs of generation curtailed by BCA per annum - non firm connections

This is a measure of lost network access due to transmission outages and connection agreements requiring a generator to be at 0MW. *Stakeholders at OC2 forums have requested a KPI which shows the volume of generation impacted by TO's outages.*

7. Percentage of outages plan started within +/-3 days (tbc) of date agreed at Week 49

This is a measure of the TOs capability to construct and deliver a robust outage plan. *This KPI was used through RIIO-T1 and it is to be continued in RIIO-T2 to provide a consistent KPI through price control periods.*

8. Number of outage changes within 4 weeks of start date (attributable to TO)

This measure only includes significant outage scope change such as a new outage, change to the start or end date but would not include a minor ERTS change or start time change made to manage workload and prevent outage congestion. *All stakeholders agree these changes should be highlighted to identify root causes so they can be addressed and help reduce stakeholder impact of outages*

9. Average outage duration accuracy

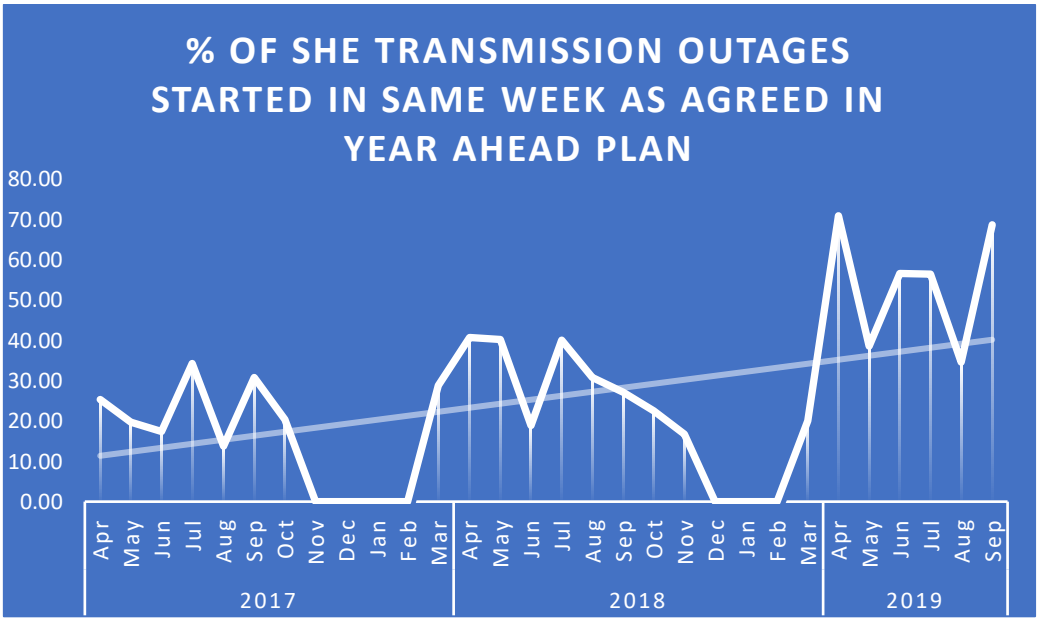
This KPI would measure how accurate a TO plans their outage durations. *A negative figure would indicate outages generally overrun, a positive figure would indicate outages generally finish early. It would help identify good and bad planning practices to further improve outage planning efficiency*

10. Number of uses of STCP 11.4 TO Enhanced Service Provision (attributable to TO proposal)

This would highlight how often the TO is able to proactively generate consumer savings as STCP 11.4 requires consideration in longer timescales.

Example KPI from RIIO T1

This actual data KPI below from the las few years of RIIO T1 demonstrates an underlying improved performance in following our agreed outage plans. The significant increase in 2019 is based on 18 live projects in 2019, a reduced level of project activity than the previous year. A sustained figure above 50% through RIIO T2 would be a significant achievement given the possible high level of project outages and increasingly complex outage interactions.



We believe the proposed KPIs will demonstrate how well each TO is complying to NAP principles. The cost transparency principle between TO and ESO requirements in the NAP is covered using NAP Change Control documents which include both TO and ESO costs to ensure the best outcome for

consumers. Customer's impact will already have been factored into outage plans, but we are committed to highlighting significant outages to customers and making them aware of any options they may have to reduce this impact.

We will continue to adapt our business to ensure NAP continuous improvement is realised by implementing innovative and whole system ways of working in from RIIO T1 into business as usual for RIIO T2

We have already made changes to how we are structured to better deliver against NAP obligations as outlined in Lessons Learned from RIIO T1.

We will also make all necessary employees and contractors aware of innovative outage options, new processes and their benefits to them, consumers and stakeholders. This will lead to greater implementation and make these options and processes Business as Usual. We've listed two projects that will benefit from these new ways of working and the Commercial and Customer journey during RIIO T2 in Appendix 2. Widening the audience of the NAP should lead to more innovative ideas being put forward across all timescales in line with our Innovation Strategy.

We will also continue to take a whole energy system approach to our outage planning continuing to work with SHEPD, the ESO and customers including gas industry customers who play a critical role in security of supply.

Once we have our RIIO T2 plans confirmed, we will liaise with SHEPD on potential high impact outages. We can then work together to ensure the best whole system outcome is put in place to manage these impacts as they prepare for their ED2 price control. An example of this may be SHEPD installing additional distribution network capacity so they can restore all consumer supplies at a GSP should there be a fault during our outages, rather than rely on temporary diesel generators. This would also mean less restrictive work methods as the need to return the transmission asset on outage quickly would be reduced. Less restrictive work methods would lead to shorter outage durations and potentially less constraint payments and shorter interruptions for network Users. These benefits would also be realised during further outages at the GSP.

We will improve our customer service including an enhanced engagement service once a customer is energised

As part of our enhanced engagement service, our customer service will go beyond the energisation stage to ensure our customers' connection solution remains optimal. This will include engaging with our customers, in conjunction with the ESO, on outage planning and outage solutions. Training on our commercial and connections plans (found here) will help employees and contractors understand the drivers for continued improvement as the two are very closely linked. As an example, they include notification of outages to customers in longer timescales than at present to allow customers to assess any necessary mitigating actions. The policy also includes a new condensed outage product which would allow customers to pay for condensed outage arrangements where there is a customer only benefit and we will work with the ESO and stakeholders to develop this.

We will publish regular internal updates on our performance against existing and new KPIs

To keep all employees and contractors engaged and up to date on our NAP goals, we will keep them informed via regular publications of our NAP KPIs.

We will continue to work with the ESO to deliver savings through existing and any new processes

STCP 11.3 Outage Change Costs is an existing STCP that allows the ESO to fund short notice outage changes to reduce constraint costs. For example, delaying an outage start by 1 day can generate significant savings on a windy day. Although a late notice change, it should benefit customers who otherwise may be curtailed to 0MW and lose income. We have proposed STCP 11.3 opportunities are added as a fixed agenda item to monthly System Access Meetings to help increase utilisation. The System Access Meetings are primarily to discuss short term and longer term within year outages so it is the best place to highlight these opportunities.

Implementation of technologies new to our network such as Dynamic Line Ratings and new tower structures, such as NeSTS, are being investigated for implementation during RIIO T2 for projects on Skye. Dynamic Line Ratings will deliver constraint savings and NeSTS structures environmental benefits. Any new processes or technologies. which deliver savings will be shared at appropriate events, such as OC2 Forums, to share with other TOs and customers

The table below shows the past benefits realised from the ESO using STCP 11.3 to request outage changes from SHE Transmission on high constraint cost days.

Year	No of Changes	TO Costs	ESO Saving	Net Saving
2017 / 2018	5	£256,000	£891,000	£635,000
2018 / 2019	10	£32, 679	£209,440	£176,760

Benefits to our application of the NAP

Carbon savings

Reducing the duration of outages, which NAP principles promote, has a wider benefit to society through displaced carbon emissions (e.g. carbon emissions avoided as a result of renewable generation exporting into the network). Condensing outages, as we have done through various RIIO T1 projects, reduce the amount of time that a renewable generator is unable to produce electricity, resulting in additional megawatt-hours (MW/Hs) of renewable electricity being available. We've assumed that this additional renewable electricity enables a larger amount of carbon emissions to be displaced. The value of this can be calculated using a similar methodology to the one applied in the Scottish Government Renewable Electricity Output Calculator[5].

In Appendix 1, we've outlined the methodology we've used and given indicative figures using the examples from RIIO T1 (page 6). The figures are shown in the table under Indicative Benefit Calculations from Shortening Outage Durations. The estimate of the carbon saving and the associated cost benefit to society has been calculated for these **schemes amount to an estimated £3.9m societal benefit**. Additional initiative examples for the RIIO-T2 projects listed in Appendix 2 showing the potential benefits of continued application of the NAP, are also provided which amount to **an estimated projection of £3.6m societal benefit**. These figures are examples of what can be achieved by individual projects and are not total figures for either RIIO T1, or RIIO T2.

Avoided constraint costs

In addition to the benefits of displaced carbon emissions there is also a direct consumer benefit of reduced outage duration through reduced constraint costs. Condensing outages, or utilising bypasses, increases network availability. As the network owner, we know where in our network to increase availability and help reduce constraint costs. The volume and type of actions required through the duration of an outage will vary depending on many influences such as location and output of generation, network outages both inside and outside of our network area and the demand and system reserve requirements which also continuously vary.

Calculating constraint costs savings is the responsibility of the ESO but attributing definitive costs to one outage is extremely difficult due to the many volatile influences and number outages at any given time. However, upon request the ESO provided **indicative** constraint volume savings of 79,240MWh based on the Dounreay to Spittal example and 9,720MWh based on the Sloy example from RIIO T1.

If generation is required to be constrained, in addition to paying constraint payments the ESO may also have to find replacement energy elsewhere on the system, further increasing costs:

- For the Dounreay to Spittal example using a constraint price of £75 MW/HR and a replacement energy price of £75MW, this would mean a MW cost variation of between £0MW and £150MW. This would equate to a **cost saving range of between £0 and £11,886,000**. The bypasses cost approx £2,700,000 so a significant overall saving is likely to have been realised. This approach also secured our customers in Orkney and Thurso. For the Sloy example using a constraint price of £75 per MW/HR and a replacement energy price of £75MW, this would mean a MW cost variation of between £0MW and £150MW. This would equate to a **cost saving range of between £0 and £1,458,000**.

[5] We've used the same methodology to calculate benefits in our Sustainability Action Plan

From these two projects, where the ESO was requested to provide us with indicative data, there is a total estimated consumer saving of **£0-£13,322,00m**.

For network customers, it can be the case that outages they may have faced are greatly reduced as a result of the NAP being applied to realise consumer benefit. The bypasses installed within the RIIO T1 example at Dunbeath are a good example of where this can occur. Outages for customers at Dunbeath were reduced from 8 weeks to 8 days with the 8 days being spread over the outages season.

However, this is not always the case which is why we will continue to pursue a new process allowing customers to fund changes to projects which are causing a significant interruption. Through the Network Access Policy working group, all GB TOs and the ESO have committed to highlighting outages affecting customers for periods of 4 weeks or more as far ahead as possible, to increase the opportunity to reduce the outage impact.

The overall benefits associated from the NAP examples during RIIO T1 is very hard to define, due to the volatility of constraints and directly associating costs to specific outages. However, from the two quoted examples alone, an estimated range between **£3.6m and £16.9m** demonstrates the value the NAP can deliver for both consumers and customers.

During RIIO T2 we aim to continue to improve application of the NAP and continue to generate savings for both consumers and customers.

We want to hear from you

This document is our Networks Access Policy for the RIIO-T2 period, from 1 April 2021 to 31 March 2026. Our approach is one of continuous development. To support that, this is a living document which you can directly influence by challenging and amending areas to increase its effectiveness. Please contact us if you would like to provide input on our proposed actions.

Information provided in response to this document may be used in future SHE Transmission documents. Responses will be generalised and not attributed to specific people. If you would prefer the information you provide to be confidential, please let us know.

If you would like to post us your feedback, please send it to: Transmission Control Room, Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ

If you have any queries on this document, please get in touch with us at: YourPlanOurFuture@sse.com

Appendix 1 – Indicative Benefit Calculations from Shortening Outage Durations

The calculation steps are as follows:

- Input values are the connection scheme name, connection scheme generation type, megawatt capacity, the year the outage occurs, the original outage duration and the condensed outage duration.
- Source references are the BEIS UK electricity carbon factor, the BEIS non-traded carbon price forecast and the average load factors per generation technology type (e.g. onshore wind, hydro).
- The renewable megawatt-hours (MWh) for the original outage duration and the actual condensed outage duration are calculated based on **average** load factors per generation technology type.
- The carbon displaced by the original and condensed outage durations is calculated by multiplying the MWh values by the BEIS grid mix greenhouse gas factor for the year selected. This provides a value in tonnes of carbon equivalent (tCO2e) for both outage durations.
- The difference in carbon displacement between both outage durations is calculated by subtracting the value for the condensed outage from the original outage. This value is then multiplied by the BEIS non-traded carbon price for the year selected to give a £GBP value for the cost of these avoided emissions.
- The estimates produced by this calculation assume no additional constraints on generation are present following the outage.

Scheme Name	Generation Customer Scheme Type	Generation Customer Capacity (MW)	Year	Outage Duration - Original (weeks)	Outage Duration - Condensed (weeks)	Renewable Generation Lost - Original (MWh)	Renewable Generation Lost - Condensed (MWh)	Carbon Not Displaced - Original (tCO2)	Carbon Not Displaced - Condensed (tCO2)	Carbon Displaced as a Result of Condensed Outage (tCO2)	Carbon Cost Saving as a Result of Condensed Outage (£)
RIIO-T1											
Sloy Gas Insulated Switchgear	Hydro	76	2013	24	8	110,772	36,924	49,347	16,449	32,898	**£ 2,018,115.11**
Dounreay to Spittal	Onshore Wind	40	2018	12	0	21,697	-	6,142	-	6,142	**£ 405,875.40**
Dunbeath	Onshore Wind	15	2019	8	1	5,424	678	1,446	181	1,265	**£ 84,860.20**
Loch Luichart 2014	Onshore Wind	10.35	2014	52	0	24,327	-	12,024	-	12,024	**£ 748,673.81**
Loch Luichart 2015	Onshore Wind	10.35	2015	52	0	24,327	-	11,244	-	11,244	**£ 710,597.64**
										Total	**£3,968,122.16**
RIIO-T2											
Tealing 20	Mix	100	2020	26	0	103,636	-	25,914	-	25,914	**£ 1,764,283.99**
Tealing 21	Mix	100	2021	26	0	103,636	-	24,202	-	24,202	**£ 1,675,237.58**
Culligran	Hydro	19	2025	4	0	4,616	-	773	-	773	**£ 57,015.52**
Deanie	Hydro	38	2025	4	0	9,231	-	1,546	-	1,546	**£ 114,031.04**
										Total	**£3,610,568.13**

Appendix 2 Projected RIIO T2 Benefits of Network Access Policy Compliance Delivering Consumer Benefit

The following examples show how previous projects now influence our projects and are becoming Business as Usual.

Tealing 275kV upgrade works

The whole programme of works to deliver an upgrade of the 275kV busbars at Tealing is being planned to maintain 3 out of 4 major power circuits on the east coast for the majority of the duration. This involves jumpering through a circuit and swapping circuit connection points from one side of the substation to the other at Tealing. The swapping of ccts at Tealing is key to maintaining the 3 out of 4 power corridors and is requiring close planning with SPEN as this is being planned around their works at Kincardine. SPEN are also assisting with temporary protection configurations. Maximising the circuit availability helps reduce network constraints required during these works. The 100MW figure in the calculation table is an estimated average MW benefit for the period of the work duration each year.

Beauly – Deanie Overhead Line (Culligran and Deanie GT Replacements)

The Beauly Deanie overhead line requires refurbishment in RIIO T2. Deanie and Culligran hydro stations are impacted by this work, with these sites also requiring GT replacements. Providing all of these works are approved to go ahead, we will work with the affected network User to best align these projects to minimise disruption and minimise the constraint costs faced by the System Operator. As these hydro sites also affect salmon rivers, the timing of necessary outages within each year needs to take this into account. As stated in our Stakeholder Engagement Strategy document, we will work with the relevant stakeholders in the planning phase with the goal of achieving mutually acceptable and agreed outcomes.

If the overhead line and GT replacement works are not aligned, it would also result in duplicate outages for these hydro stations. The MW figures in the table are the capacities of the stations affected showing the savings from the works being aligned.

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