Draft Determination Supporting Document NGET NGETAnnex Q3b TOs-ESO joint paper on reducing constraint costs

As a part of the NGET Draft Determination Response

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RIIO-T2 System Outage Management Proposals to Reduce Constraint Costs

Introduction

This is an informal document providing initial thinking on output incentive proposals for mitigating constraint costs associated with planned network outages. Each onshore TO and the GB electricity System operator (NGESO) have included bespoke proposals within their respective RIIO-T2 business plan submissions in this area and have subsequently engaged to identify opportunities for collaboration.

This document is provided in response to Ofgem feedback in respect of Transmission Owner (TO) proposals provided in an email from Charlotte Friel of 21st April 2020 an extract of which states:

> *"We welcome TOs and ESO having further discussions on this bespoke ODI proposal. However, it remains difficult to identify what benefit the proposals provide in addition to current arrangements to ensure collaboration between the TOs and ESO (including but not limited to the NAP, STCP provisions, OC2). STCP 11.4 provides funding to deliver infrastructure solutions that will benefit consumers.*
>
> *We would therefore welcome further input by mid-May (date to be agreed – welcome TO views on this) on:*
>
> 1. *Further clarity on the need for/value of incentivising SO:TO collaboration*
> 2. *Potential tools to measure the whole system benefits of the interventions by the TOs through these proposals.*
> 3. *Proposals to calculate the counterfactual to the constraint costs post-adoption of a flexible solution to ensure the risk of double counting via other existing incentives is minimised.*
> 4. *TO views on the protections that could be in place to safeguard against TO outage plans being inflated or adjusted to prioritise certain works in order to receive incentive payments. "*

Each of the above points are addressed in turn.

RIIO-T2 System Outage Management Proposals to Reduce Constraint Costs

1. Further clarity on the need for/value of incentivising SO:TO collaboration

GB Constraints costs

There is a pressing and increasing need for combined action by network companies to identify new ways to mitigate the risk of high constraint costs and increase the flow of low carbon generation across the transmission system.[1] Achieving progress in these areas is essential to help deliver "net-zero" ambitions. Ofgem's recent decarbonisation action plan[2] recognises this challenge:

> "The increasing amount of renewables on the system is expected to make the ESO's balancing role more difficult. However, this capability will be essential to reaching net zero. In 2019, the ESO committed to being capable of operating a zero-carbon system by 2025……. As well as managing the increasing challenges of maintaining a secure and reliable energy system, system operators will need to promote greater strategic planning of investment and improved coordination across transmission and distribution, and across electricity and gas"

It also explains that flexibility in system operation will be key to achieving this and rightly includes constraints as a factor in its definition of "flexibility":

> "Flexibility refers to the ability of users on the network to quickly change their operations (e.g., modifying generation and or consumption patterns) in reaction to an external signal. (e.g., change in price) in order to provide system services, such as supporting system balancing and network constraint management. Sources of flexibility are typically demand-side response, storage, and dispatchable generation."

This ESO-TO Outage management proposal provides a real opportunity for TOs to contribute to the net-zero ambition by offering services to the ESO to deploy that will reduce constraint costs associated with the essential outages they need to take.

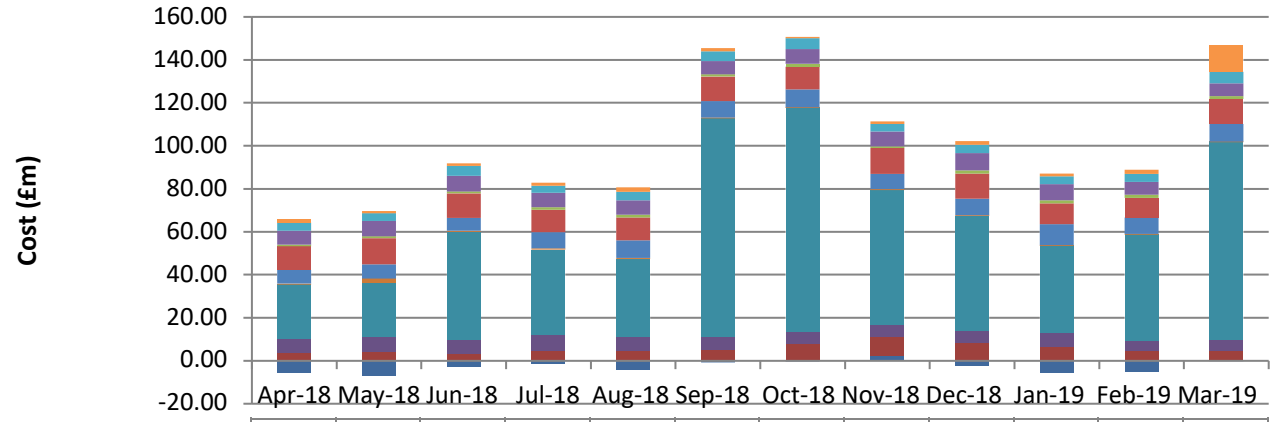
TO's have always had to undertake planned network outages to carry out essential work; such as connecting new low carbon generation, maintaining existing assets and upgrading the capacity of their systems. These planned outages can reduce the capacity of the transmission network, requiring excess generation to be constrained off. We work hard to mitigate these costs, but we believe we can do more if we could provide additional services to offer infrastructure solutions for network situations that arise during the period.

The transformation of the electricity system to accommodate low carbon, disaggregated, non-synchronous generation increases constraint costs. This is due in part to the challenge to balance wind and solar generation sources with demand. However, it is important to note that the economic assessment of infrastructure investment in the transmission network, such as wider works, only recommends investment to increase capacity to the point where it becomes more economical to

[1] https://www.telegraph.co.uk/politics/2020/01/19/wind-farms-paid-3-million-per-day-switch-turbines/

[2] https://www.ofgem.gov.uk/system/files/docs/2020/02/ofg1190_decarbonisation_action_plan_revised.pdf

constrain. Increasing constraint costs are therefore an essential element of an economic transmission network. Their increase is arising due to the changing system background not uneconomic or lack of investment by TO's. The inevitable rise of constraint costs is evidenced in looking at constraints costs incurred over the past two years and forecast constraints for the RIIO-T2 period to 2026 reported by the NGESO as shown below:



	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
Minor Components	1.48	1.14	1.26	1.29	2.12	1.49	0.58	1.20	1.77	1.28	2.01	12.58
Black Start	3.79	3.56	4.53	3.34	4.00	4.66	5.10	3.54	3.85	3.62	3.63	5.32
Reactive	6.39	7.12	7.41	6.61	6.76	6.15	6.84	6.87	7.94	7.55	6.07	6.04
Other Reserve	0.79	0.92	0.83	1.16	1.15	1.06	1.34	0.84	1.52	1.36	1.39	1.32
Response	11.02	12.21	11.46	10.54	10.76	11.40	10.51	12.06	11.79	9.69	9.08	11.54
Fast Reserve	6.46	6.47	6.01	7.56	8.23	7.56	8.46	7.03	7.55	9.79	7.77	8.22
Negative Reserve	0.42	2.06	0.41	0.57	0.40	0.56	0.21	0.37	0.39	0.24	0.08	0.10
Constraints	25.27	24.82	50.12	39.66	36.05	101.50	104.27	62.65	53.25	40.72	49.60	92.23
STOR	6.10	7.04	6.65	7.37	6.81	5.77	5.38	5.85	6.00	6.09	4.63	5.05
Operating Reserve	4.06	4.38	3.27	4.65	4.48	5.40	8.02	8.54	8.16	6.75	4.67	4.43
Energy Imbalance	-5.68	-6.76	-2.81	-1.11	-3.90	-0.67	-0.04	2.48	-2.33	-5.50	-5.13	0.22

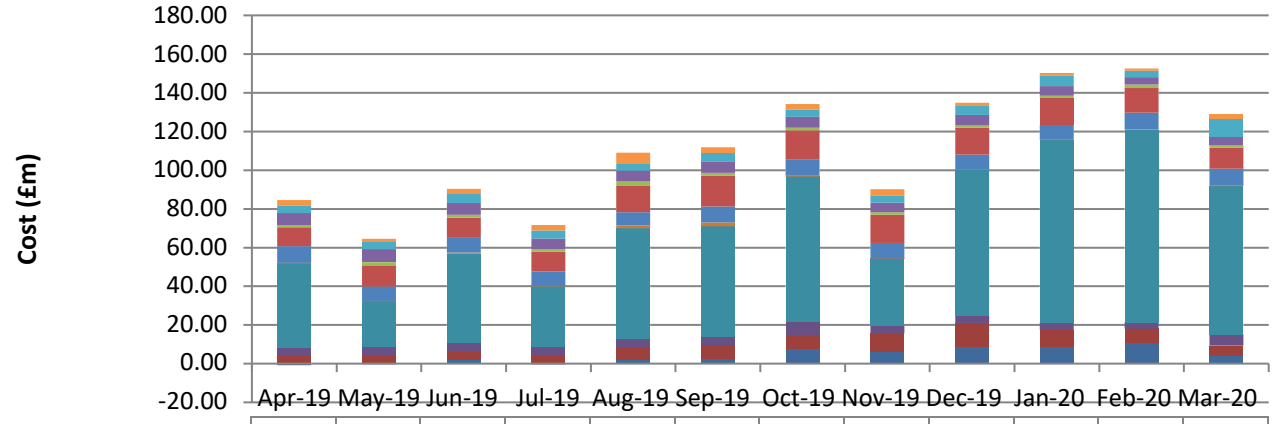
Figure 1: 2018/19 Balancing costs by month

Figure 1 (source MBSS data March 2019[3]) shows total balancing costs from April 2018 to March 2019 with constraints totalling £680m for the full 12-month period.

Similarly, Figure 2 below shows total constraint costs for the 12 months from April 2019 to March 2020[4] are £714m.

[3] https://www.nationalgrideso.com/balancing-data/system-balancing-reports

[4] http://data.nationalgrideso.com/backend/dataset/f89a12fc-94ef-4a09-bce2-c094c7212e1f/resource/e711cf04-3d76-4c22-8ee9-1fd04fe666b2/download/mbss-data-march-2020.xlsx



	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
Minor Components	3.02	1.65	2.69	2.81	5.49	2.93	2.83	3.33	1.59	1.53	1.21	2.43
Black Start	3.71	3.79	4.57	4.12	3.86	4.40	3.80	3.60	4.70	5.31	3.37	9.52
Reactive	5.91	6.70	6.08	5.66	5.68	5.84	5.54	4.86	5.37	4.87	3.81	4.33
Other Reserve	1.46	1.51	1.44	1.24	2.18	1.50	1.40	1.34	1.12	1.21	1.82	1.34
Response	9.69	10.99	10.47	10.14	13.56	15.94	15.13	14.60	13.91	13.89	12.62	10.83
Fast Reserve	8.64	7.36	7.62	7.63	6.90	8.23	8.42	8.09	7.70	7.35	8.49	8.62
Negative Reserve	0.27	0.15	0.73	0.10	1.42	2.03	0.30	0.08	0.17	0.43	0.28	0.37
Constraints	43.46	23.57	45.63	31.21	57.01	57.32	75.42	34.70	75.41	94.20	99.58	76.65
STOR	3.77	3.97	4.66	4.40	4.37	3.79	6.34	3.90	3.89	4.13	3.33	5.92
Operating Reserve	4.68	4.84	4.31	4.39	6.30	7.37	7.60	9.66	12.21	8.49	7.44	5.14
Energy Imbalance	-0.80	0.00	2.14	-0.36	2.36	2.52	7.41	5.97	8.76	8.83	10.68	4.12

Figure 2: 2019/20 Balancing costs by month

Forecast constraints for the RIIO-T2 period are also available. In accordance with STCP 16-1, NGESO prepares an Operational Assessment report for each TO. The report makes suggestions and comments on level of constraint volumes and forecast costs, volume of work within each year, problematic outages and outage combinations, problematic transmission reinforcements and operational complexity issues. This includes a forecast for annual GB constraint costs.

The NGESO Operational Assessment Report (Nov 2019) shows a steep rise in total costs from 2021 to 2026 across all four FES scenarios as per table 1 below:

Scenario	2021	2026
Two Degrees	£1286m	£3700m
Consumer Evolution	£1281m	£1722m
Community Renewables	£1049m	£2704m
Steady Progression	£1118m	£1996m

Table 1: Forecast GB constraint costs per year

There is a clear and pressing need to mitigate these rising costs to protect consumers where possible.

Minimising GB constraint costs

Currently there are no common metrics or reporting by the NGESO and TOs on the effectiveness or otherwise of system outage management. This will be addressed to some extent through the changes to the Network Access Policy (NAP)[5] in RIIO-T2.

Although delivering solutions by TOs to mitigate the risk of high constraints on planned outages that require capital investment is funded by the ESO (STCP 11-4); this is an immature mechanism and subject to uncertainty on the regulatory approval process. This process was adopted into the STC in April 2019. The appropriate licence mechanism to support STCP 11-4, which described the proposed ESO-TO arrangements for implementing solutions to reduce constraints, was included in the NGESO licence in April 2017 as Special Condition 4J "The SO-TO mechanism". To date only one proposal has been approved for progressing under this scheme.

The Network Access Policy (NAP), and SO-TO code procedures (STCP) 11.3 and 11.4 attempt to unlock consumer benefit. But there remain three main barriers:

1. **Uncertainty over cost recovery -** TOs can only recover their direct costs for the innovative service and only when it is used by the ESO.
2. **The process is slow and burdensome** – We calculate the current STCP defined process for outage change (including costing and delivery) involves at least 16 steps with 8 separate interactions between the ESO and TOs.
3. **Cap on costs** - Under the current STCP 11-4 rules there is a baseline limit of £1.147m (09/10 prices) per year on funding for commercial operational services, limiting the scope for TOs to provide a range of flexible services to the SO. A cost adjusting mechanism and an additional mechanism for joint works projects form part of the

[5] The three onshore TO's are introducing a set of key performance indictors into a consolidated NAP.

relevant NGESO licence condition, but these exacerbate the concern over regulatory uncertainty and inhibit project progression

These issues led to all the TOs and NGESO proposing solutions in their RIIO-T2 plans.

RIIO-T2 Business Plan Proposals

Rising constraint costs are an inevitable part of a low carbon energy system alongside essential transmission system outages to deliver and maintain the low carbon energy system. The increasing volume, complexity and impact of transmission system outages on non-synchronous, disaggregated generation requires a step change in priority and focus to achieve an optimum balance between taking outages and minimising the impact on generation flows and constraint costs.

Each TO has recognised this and responded with bespoke proposals in their RIIO-T2 business plans. In summary these are listed as follows:

SP Transmission

Two bespoke ODIs:

1. Optimising Network Availability for the Connected Generators
2. ESO-TO Whole System Incentive

NGET

Two proposals to facilitate better consumer outcomes at the TO-ESO interface as part of a market based whole System mechanism:

1. More flexible system access (NGET estimates potential consumer benefits at up to £188m per year)
2. Getting more from the existing network

SHE Transmission

CVP 2b: Above Business as Usual in whole system Network Access Policy - Energised Engagement Service (included in the Commercial and Connection Policy)

NGESO

The ESO has also included proposals for deliverables and metrics to respond to this issue:

Role 3: System insight, planning and network development.

Deliverable: Extension of current SO-TO 'enhanced service provision' mechanism to E&W

Annex 7 - Metrics and measuring performance:

- Metric 12 Future balancing costs saved by operability solutions: £75m
- Metric 14 Capacity saved through our access planning actions: +10% on previous year
- Metric 15 Number of short notice changes to planned outages: Less than 2.5 per 1000 outages delayed by more than an hour or cancelled within day (as a result of planning process failure)

2. Potential tools to measure the whole system benefits of the interventions by the TOs through these proposals.

The NAP incorporates a change control process that could be used to calculate and evidence the benefits of these interventions. Section 4.4 of the draft consolidated NAP states:

"To promote transparency around the approval/ rejection of the changes to the agreed outage plan, when the impact of the change may have a detrimental impact on NGESO or the Transmission Owner, a within year Outage Change Control document shall be completed, containing as a minimum:

- A summary of the work
- Background from the perspective of the Transmission Owner
- Background from the perspective of NGESO
- Options and mitigating actions available
- Forecast costs and risks from the Transmission Owner
- Implications and forecasts on overall system expenditure from NGESO
- Conclusions and recommendations

The forecast TO costs and forecast on overall system expenditure would be the basis for demonstrating consumer benefits of each individual proposal.

At a higher level two of NGESO KPIs proposed in their RIIO-T2 proposals could provide a potential measure of the benefits to consumers of these proposals:

- Metric 12 Future balancing costs saved by operability solutions: £75m
  Measures balancing costs saved through implementation of new approaches to operating the electricity system e.g. NOA Pathfinders and other opportunities to access new services.

- Metric 14 Capacity saved through our access planning actions: +10% on previous year
  Measures customer value created through innovative ways of working with TOs and DNOs to release capacity across the whole electricity system. Demonstrating that we are establishing zero carbon operability of the electricity system and improving our service

The capacity for NGESO to measure and report these metrics could provide a mechanism to measure the system benefits achieved by implementing these ESO-TO solutions. This would require a breakdown of the overall savings to be able to be calculated and reported by the NGESO under metric 12.

3. Proposals to calculate the counterfactual to the constraint costs post-adoption of a flexible solution to ensure the risk of double counting via other existing incentives is minimised.

This is addressed in question 2 above. The forecasting methodology conducted by the ESO as part of the existing NAP procedure identified could be used to provide the counterfactual position. It is further proposed that TO's could report on all instances of the proposed use and solutions that are approved will be reported by each TO potentially to their User Groups/ongoing enhanced engagement groups and events such as the OC2 forum.

Ultimately, we anticipate NGESO will be best placed to calculate counterfactual and benefit outcomes as the party with all the information on actual, and forecast constraint costs

In addition, SHE-Transmission have been able provide a counterfactual to support their CVP2B proposal using an evidence-based approach for changes to outage plans for RIIO-T1 and forecast for RIIO-T2. This approach allowed SHE-Transmission to estimate the consumer benefits from carbon emissions displaced and avoided constraint costs (provided by NGESO). A similar methodology could work in RIIO-T2 working together with NGESO to provide data on forecasted and actual constraints.

We do not believe there is any impact on other ODIs. The new Quality of Connections Incentive focuses on the customer service provided to the connected customer, including measuring the service related to the TOs outage plans. In addition, this is focused on the connected customer and not the wider GB consumer which is the focus of this proposal and potential common ODI.

We do not believe there is any double counting associated with CVP for SP Transmission. The purpose of the CVP, as laid out in the June 2019 Guidance with the Framework Decision, was that there would be an incentive on companies to submit high quality business plans - demonstrating ambition and added consumer and societal value. Companies, regardless of Ofgem's decision on common ODIs, should still be rewarded based on their December 2019 Business Plan submissions.

NGET has included ESO:TO optimisation as its CVP8 and, as noted above, SHE Transmission has included an above BAU NAP as its CVP2B. If Ofgem takes forward the proposal in this paper, applying it to all TOs, NGET and SHE Transmission are committed to working with Ofgem to make sure there would be no double-counting with their CVP proposals. This is in line with the approach SHE Transmission has taken with its CVP2A on Commercial and Connections Services and the new QOS Incentive.

4. TO views on the protections that could be in place to safeguard against TO outage plans being inflated or adjusted to prioritise certain works to receive incentive payments.

The current network outage request and approval process conducted according to STCP and NAP procedures provides robust mechanism incorporate challenge by the ESO of all TO plans. They are well placed to identify and challenge outages and hold the TO accountable to justify durations.

To support this further in RIIO-T2, TOs are proposing to introduce KPIs as part of the revised NAP. These are provided as an appendix at the end of this document. Importantly, one of these is to measure the average outage durations of each TO's outage programme and report on this annually. Specifically, this is:

> **KPI 9: Average Outage Duration Accuracy Measure** of TO ability to plan outage durations. A negative figure would indicate outages generally overrun, a positive figure would indicate outages generally finish early.
>
> a) Average outage duration accuracy – year ahead outage plan
> b) Average outage duration accuracy - within year outages

There is also already considerable scrutiny and pressure from connected customers affected by outages and internal cost and project drivers on TOs to minimise outage durations. Outage plans are evidence based using previous outage planning data, and this can be provided to Ofgem upon request.

In respect of TOs prioritising certain works to receive incentive payments this would be entirely contrary to their licence obligations, therefore to do this would be risking licence breach and enforcement action. Moreover, it would wholly undermine the primary driver on TOs which is to deliver their RIIO-T2 outputs. The need for, and planning of, network outages is an essential aspect of construction or maintenance projects. The cost of these in terms of constraints is also only determined by the ESO after the submission of an outage proposal.

The SHE Transmission CVP, SPT incentive and NGET market-based approach are focussed on incentivising TOs to prioritise flexible options that save the most constraint costs (net of the TOs' costs) and deliver the most benefit for consumers.

Conclusions and Next Steps

The ESO and TO's have met jointly via conference calls on several occasions in the first quarter of 2020 to review and discuss areas of potential collaboration. We have identified that although we have proposed solutions with different mechanisms and approaches there is a clear and shared intention to deliver customer and consumer benefits in these areas. At this early stage of collaboration, we have identified four key principles that we do agree on:

- TOs can provide flexible and enhanced services to the ESO that can help the ESO to reduce constraint costs for GB consumers.
- TOs have incentives to reduce their costs but not to provide additional flexible and enhanced services that help the ESO to reduce constraint costs whilst mitigating their risk.
- The NAP and STCP processes can continue to be improved to help ESO:TO optimisation.
- The NAP and STCP processes can be complemented by other tools.

An "on-demand service" (referred to as a market-based system as proposed by NGET) could be beneficial to consumers because:

a) if a TO chooses to provide an option to the ESO it must be better than the others in the balancing market for the ESO to choose it;
b) the ESO will choose a TO's option if and only if it represents the best value for consumers; and
c) it incentivises TOs to be innovative, which is needed to tackle the potential size of future constraint costs.
d) Any TO solutions brought into a market would be cost reflective and tested against potential negative behaviours.

However, an "on-demand service" is an innovative service and extends beyond the current role of a TO. Given the early stages of this approach testing would be required in RIIO-T2. This would benefit from being an innovation project with separate ring-fenced arrangements and funding, for TOs who wish to take this forward. We are therefore proposing a staged approach to implementing these incentives:

1. **Streamline the administrative process for STCP 11-4 to make it quicker and easier to complete**
2. **Introduce a common ODI from year 1 of RIIO-T2 for TO's to identify and progress asset-based solutions using STCP 11-4**
3. **Report on the forecast constraint cost savings and solutions to demonstrate consumer benefits.**
4. **Trial an "on-demand service" with a defined budget which could be provided through the network innovation allowance (NIA) for TOs who wish to take this forward.**

In the first instance we propose a joint ESO-TO conference call with the Ofgem Policy team to consider the merits of this proposal and agree next steps.

Appendix 1: Network Access Policy Proposed KPI's

1. Long Term Outage Planning Performance.

Measure of the number of outages in the year ahead plan submitted at week 49 vs the number of actual outages delivered in the regulatory year. This is a high-level measure of Long Term Outage Planning Performance

a) Number of outages in the year ahead plan
b) Number of these outages delivered
c) Percentage of year ahead plan delivered

2. Accuracy of the Year Ahead Outage Plan

This is a measure of the TOs' capability to construct and deliver a robust outage plan. This is detailed measure of Long Term Outage Planning Performance

a) Percentage of outages in the year ahead plan started on the date agreed at the year ahead stage – week 49
b) Percentage of outages in the year ahead plan started within the outage week agreed at the year ahead stage – week 49
c) Percentage of outages changed in the year ahead plan for a "positive" reason e.g. NG ESO cost saving change or stakeholder requested change

3. Within Year Outage Planning Performance.

Measure of new outages requested within year by the TO during the relevant regulatory year. These are essential outages to carry out defect repairs, remove potential hazards or complete construction works. There is a balance of flexibility and these measures are intended to show a reduction in the number of short term requests being made.

a) Number of new within year outages submitted to NG ESO prior to the Optimisation phase (17 -52 weeks ahead)
b) Number of new within year outages submitted to NG ESO during the Optimisation Phase (4 – 16 weeks ahead as specified in STCP 11.1)
c) Number of new within year outages submitted to NG ESO during the delivery Phase (0 – 3 weeks ahead as specified in STCP 11.1)

4. **How Many Connection Assets or Transmission Circuits Are Out of Service More Than Once Per Annum?**

Measure of the number of times the same item of equipment or circuit is removed from service

5. **Outage Coordination**

Measure of the number of times the TO has carried out different work during a single outage. Measure is based on the number of outages that have been combined into a single outage vs the total number of outages delivered in the regulatory year.

6. **Percentage of TO Outages Started Within 60mins of Agreed Start Time.**

Measure of outage start time accuracy

7. **Transmission Connected Generation - Percentage of Annual Access Curtailed by Bilateral Connection Agreement Per Annum - Firm Connections.**

Measure of lost network access due to transmission outages and connection agreements. Measure would be 100 x (total days of actual outages \ 365)

8. **Transmission Connected Generation - Percentage of Annual Access Curtailed by Bilateral Connection Agreement Per Annum – Non-Firm Connections.**

Measure of lost network access due to transmission outages and connection agreements. Measure would be 100 x (total days of actual outages \ 365)

9. **Average Outage Duration Accuracy**

Measure of TO ability to plan outage durations. A negative figure would indicate outages generally overrun, a positive figure would indicate outages generally finish early.

c) Average outage duration accuracy – year ahead outage plan
d) Average outage duration accuracy - within year outages

10. Number of Unplanned Outages Due to Faults or Defects

This is a measure of the number of times an asset or circuit has been removed from service due to a system fault, has been removed from service by emergency switching or has been made unavailable to NG ESO and removed from service

a. Number of system faults removing an asset or circuit from service
b. Number of emergency switching outages removing an asset or circuit from service
c. All other unplanned outages when an asset or circuit has been made unavailable to NG ESO due to a defect

11. Enhanced Service Provision

Measure of the number of STCP11.3 and STCP11.4 proposals identified within a regulatory year.

a) Number of proposals identified by NG ESO or TO
b) Number of proposals delivered by the TO
c) Measure of System Operational costs savings vs cost to deliver by TO

12. In Service Works

Measure of the number of "In Service" bookings to highlight works taking place without an asset being taken out of service e.g. Telecoms works, Risk of Trips etc