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RIIO-ET Policy Working Group 4

ET Policy Team

11/10/2018

For today's meeting, we have pulled together our initial thoughts ahead of our December consultation in a number of policy areas:

At this stage we are still considering options and have not reached a minded-to position on any policy areas.

These slides summarise key discussions to date, and introduce new considerations not covered to date including:

- Potentially introducing relative incentives, as signaled in our RIIO2 Framework Decision
- Potentially revising how rewards are allocated and how much is available

*** We are seeking views on all these points. All options remain on the table ***

*** We are also seeking views on any potential outputs/ incentives which you think we may have missed! ***

Losses: SHE-T Presentation

11 October 2018

Scottish & Southern Electricity Networks

Losses

Recap from Policy WG 2

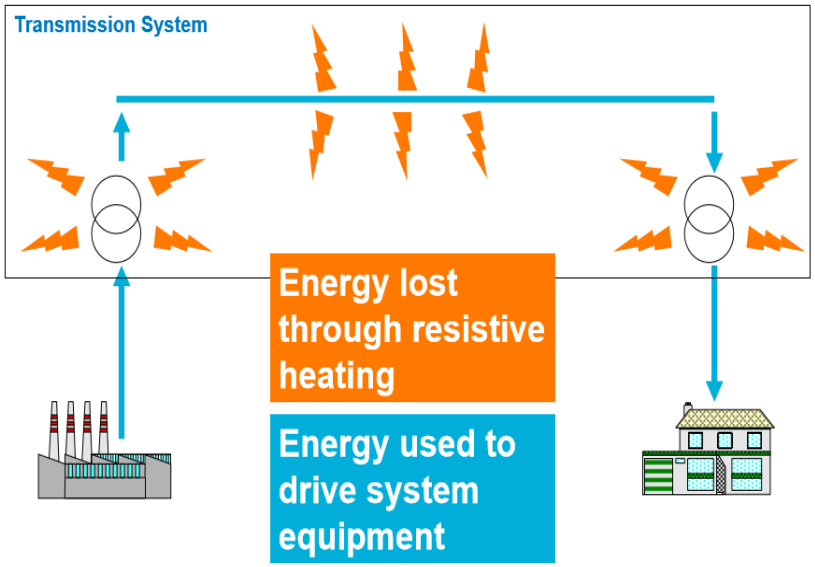
- Agreement that current losses incentive has helped to improve and embed consideration for losses when making investment decisions.
- Numerous factors involved and losses are of only limited control of the TOs, due to the role of the System Operator in managing the network.
- Three different ways in which losses are considered; (1) system losses, (2) losses over which TOs have direct control (e.g. substations losses), and (3) how losses are considered in the context of investment decisions.
- Companies noted that the definition of losses and associated network operator strategies are not always widely understood by external stakeholders.
- Agreement at WG that a reputational only incentive would likely still remain appropriate, due to ability to control losses by TOs, as losses are affected by the operation of the network by the SO.
- Some consideration was given to a financial incentive within the context of a discussion regarding more collaboration and innovation in technologies to reduce losses, particularly around efficiencies in substations and the use of metering to track this.
- It was agreed that it was important to be able to quantify the losses that can be controlled by the TO to understand their value, in particular before the group considers any potential move to a financial incentive.

What are Electricity Transmission Losses?

- Losses occur in a transmission system when power is transported from the power generating stations to the grid supply points. There are two main components of losses in a transmission system .

Fixed losses (no load losses)

- When equipment is energised, eg corona losses in Overhead lines and iron losses in transformers.



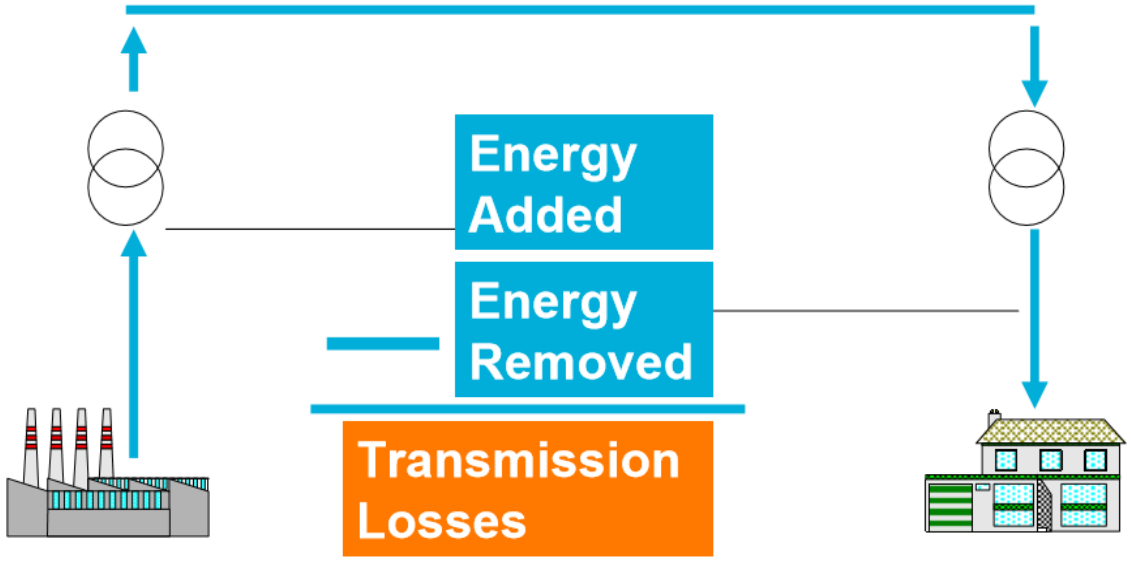
Variable losses (I^2R losses)

- Variable losses occur due to the loading of the Transmission system and are proportional to the load squared and the resistance. The variable losses are heating losses due to the resistance of the conductor in overhead lines and the resistance of copper in the HV and LV windings of the transformers.

Scottish & Southern Electricity Networks

Calculating Transmission Losses

- Losses are calculated by the Electricity System Operator National Grid ESO.
- Overall the losses arising from the GB transmission system can be calculated by taking the difference between the sum of infeed to and the sum of the offtakes from the transmission system.
- This is carried out using data from the Elexon SAA-IO14 data feed. At a GB level the Total Generation and Total Demand values are used



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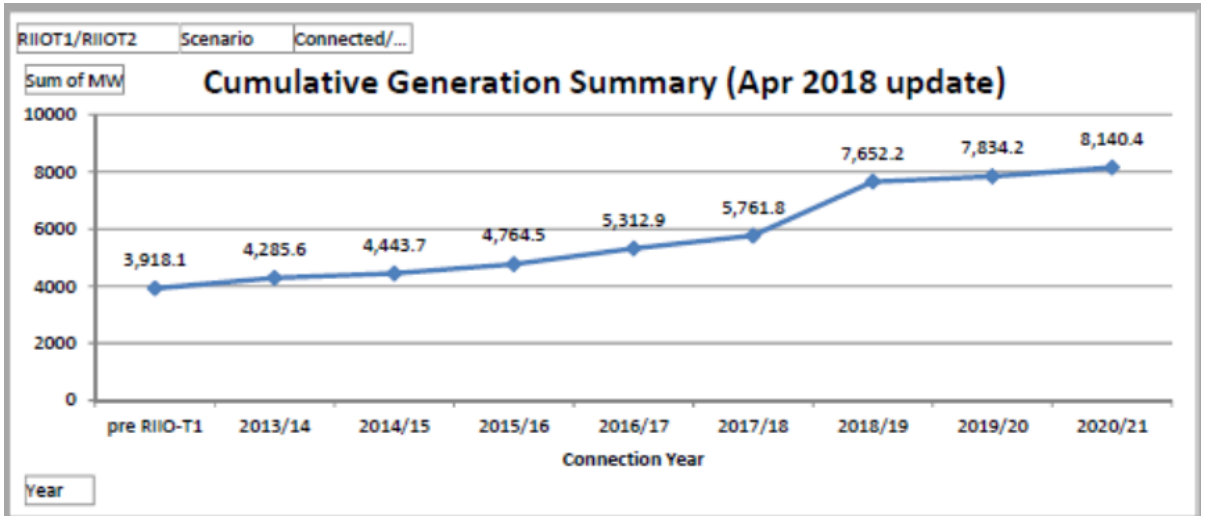
Challenge of North of Scotland Renewables Growth on Losses



Connected Generation

From 3.9GW (pre RIIO T1) To 7.6GW (2018)

- The route energy fed in to the north of Scotland takes to reach the demand centres in the south of England can be thought of as a very long conductor
- A longer length increases the overall resistance, and hence transmission losses
- More power transferred also increases the current and hence losses increase
- Operation of the system affects losses – eg switching out circuits and switching reactors to reduce voltage profiles on the system increases losses

Scottish & Southern Electricity Networks

What do we as a Transmission Owner do to Reduce Losses?

- ## Project Assessment
- We model and assess the calculated system losses associated with load related and non load related project development

- ## System Design
- Eg Raise voltage levels from 132kV to 275kV and 400kV, eg Beauly – Denny. Raising voltage decreases current for equivalent power transfer.

- ## Plant and Material Specifications
- Eg Use of whole life capitalised losses in transformer specifications to optimise designs and promote low loss core steel; use of Extra High Conductivity AAAC conductor

- ## New Technologies
- HVDC systems for long distance transmission, ACCC High temperature low sag conductor, Flexible AC Transmission devices (eg Static VAR Compensators)

Losses

Examples from TO Losses Strategies

- Considering the impact of transmission losses when developing the network
- Considering the whole life costs, including transmission losses, of transmission equipment
- Influencing system losses through key strategic asset choices and the application of new and alternative technology
- Avoiding new transmission build wherever possible, and maximise the use of existing routes through higher voltage circuits
- Removing unnecessary transmission lines
- Working with National Grid as System Operator to measure and identify the scale and location of transmission system losses
- Transmitting electricity at higher voltage
- Utilising low loss transformers
- The strategic addition of capacitor banks and other components throughout the system to control reactive power flow for reduction of losses and stabilisation of system voltage
- Adopting new technology

Losses in T2

Controllable losses – within TO Control

Financial

Question on size and merits of a financial reward - are the controllable factors large enough to warrant a reward… in who's benefit is reducing losses? We do not propose the introduction of a financial incentive for T2.

Environmental

A site efficiency and a substation losses reduction target could be introduced, we propose this is included in the wider Environmental incentive criteria

Reputational

The current annual losses report we publish on relies on the accuracy of data from National Grid. Improving reporting by taking the responsibility for the data into our own control would require boundary metering to be installed at all "outlet" points which could be prohibitively expensive, and may not derive any real benefit.

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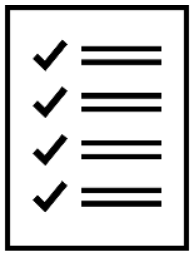
Stakeholder Engagement (and Consumer Vulnerability) Incentive in RIIO-2

Purpose of the Stakeholder Engagement Incentive in RIIO-1

'To *drive network companies to engage with a range of stakeholders and ensure the ongoing delivery of an efficient network that embraces wider social and environmental objectives*.'

Reasons for introducing the Stakeholder Engagement Incentive in RIIO-1:



- Stakeholder engagement is a key part of business plan development, but we wanted network companies to put stakeholder interests at the heart of their businesses on an ongoing basis.
- Networks need to understand and influence key decisions that might impact their network.
- Decisions taken by networks can have a large impact on their stakeholders.
- In an eight year price control, and in an energy system that is undergoing significant change, network companies need to be aware of future potential challenges.

What have the SEI and SECV delivered?

The incentives have driven a number of changes in the way network companies run their businesses:

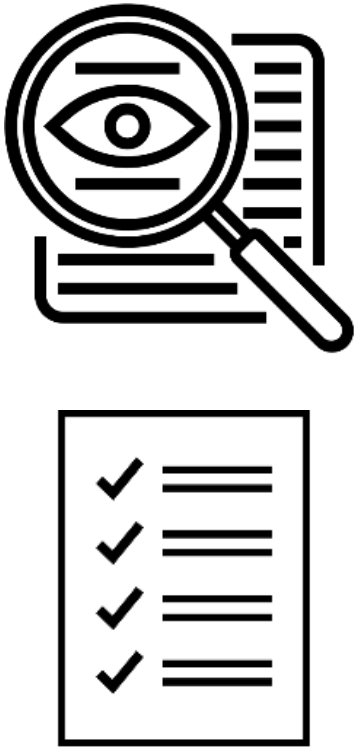
SEI and SECV:

- ✓ Stakeholder engagement has become increasingly embedded in businesses.
- ✓ A culture of working collaboratively has become more established year-on-year.
- ✓ Companies have taken more strategic approaches to engagement, thinking about how future challenges can be addressed.
- ✓ Clear demonstration by some companies of what they want to achieve, why they have chosen to go down that route and whether their approaches have worked or not.
- ✓ Evidence that some companies are using feedback to influence their decisions on their projects.

With specific regard to the Consumer Vulnerability element of the SECV:

- ✓ Helping vulnerable consumers has been included in DNOs' strategic priorities, which are informed by stakeholder engagement.
- ✓ DNOs have demonstrated that they have a good understanding of how varied vulnerability can be.

Feedback from the panel is that there is still room for improvement for a number of companies.



- Has stakeholder engagement become business as usual? If so, should it be incentivised in RIIO-2?
- Are there overlaps with other incentive/output areas? Eg:
  - RIIO-2 Enhanced Engagement programme
  - ENA Open Networks Project
  - Innovation programmes
  - Stakeholder satisfaction/social obligations outputs
- We are moving from an 8 year to a 5 year price control
- We need an efficient mechanism that is not overly burdensome for both network companies and the regulator

Option 1: Retain the incentive (minimal change)

- Update the minimum requirements and assessment criteria?

Option 2: Reform the incentive

- Move towards a reward and penalty or penalty-only incentive. Rewards and/or penalties based on relative or absolute performance?
- Combine financial incentive with common and/or bespoke performance commitments? Performance commitments reviewed annually with panel assessment once during/at the end of the price control?

Option 3: Remove the incentive

- Embed stakeholder engagement in the core outputs and introduce common/bespoke performance commitments?
- Fund stakeholder engagement activities through the price control?

1. Would the outcomes delivered so far in RIIO-1 have been delivered without this incentive?
2. What are your thoughts on these options?
3. Are there any other options we should consider?

Stakeholder Satisfaction Output

11th October 2018

Scottish & Southern Electricity Networks

Look back at RIIO-T1

Stakeholder Satisfaction Incentive (SSI)

Stakeholder Survey

- Score 0 – 10
- One killer question. No maximum number of questions.
- Weighting 60%.

KPIs

- KPIs developed by SHE Transmission and approved by Ofgem.
- Score 0 – 100
- Weighting 30%.

External Assurance

- External audit
- Assessed as Non-compliant, Compliant & Exceeding.
- Weighting 10%

Stakeholder Engagement Incentive (SEI)

Two part submission

- Part 1 - demonstrates that there is a robust engagement strategy in place.
- Part 2 - showcases evidence of the outcomes of the engagement process.

Ofgem assesses Part 1 to ensure submission meets minimum requirements.

Submission assessed by independent panel

- Panel assesses Part 2 of the submission
- Scorecard used to assess submissions along with Question & Answer interview
- Score given between 1-10

Stakeholder Satisfaction Survey

Successes	Lessons
• Provides the most customer facing element of the incentive. • Flexible, simple and straightforward. Captures current mood and shapes business objectives.	• Feels disproportionate that 1 'killer' question accounts for 60% of the incentive. • Could be more tailored to specific “customers” to avoid feedback on low level process issues, delivering more valuable outcomes.

RIIO-T2 Proposals

- Support retaining the Stakeholder Satisfaction Survey.
- Have 3 or 4 ‘killer’ questions consistent across all TOs.
- Greater steer on Topic Areas and target Stakeholder groups from Ofgem, while retaining flexibility.
- Recalibration of Target - Use of improved data to set challenging yet appropriate target.

Key Performance Indicators (KPIs)

Merits	Improvements
• Drive process improvement across the industry. • Assists customers and stakeholders understand and monitor the quality of service we provide in a clear and concise format.	• KPIs are locked down in RIIO-T1 and need to be opened up to allow them to evolve through the Price Control to better meet the requirements of Stakeholders.

RIIO-T2 Proposals

- Support retention of the KPI component.
- Amend to include new metrics, common metrics across TO's and company-specific metrics driven by Stakeholders.
- Review and amend mechanism throughout T2 to ensure KPI metrics and targets evolve and remain appropriate for Stakeholders.
- Recalibration of target
  - Use of improved data from RIIO-T1 to set challenging yet appropriate target.

RIIO-T2 Position – External Assurance

Merits	Improvements
• Provides accountability and transparency • Ensures industry best practice.	

RIIO-T2 Proposals

- Very supportive of retaining the External Assurance component.
- Keep in current format – non-compliant/compliant/Exceeding

Stakeholder Engagement Incentive

Merits	Disadvantages/Improvements
• Important to have a measure of effective engagement to continue to drive improvement.	• The incentive it too subjective - the narrative may not truly reflect Stakeholder views. • Needs to be more evidence based with Stakeholder involvement.

RIIO-T2 Proposals

- An assessment of our stakeholder engagement by others is important and therefore we support the intent of the SEI.
- Incentive needs to be more evidence based.
- The reward assessment should become a more Stakeholder led, rather than a purely narrative submission.
- Achieved through the panel interviews, written testimony from Stakeholders or a form of audit of submissions.
- Minimum requirements should be explicitly listed and if evidence is not provided of how they are being implemented, the opportunity to participate in the reward will not be available.

Summary

- The incentive is very valuable to driving change that benefits stakeholders.
- Stakeholder Engagement is being embedded to BAU but the incentive is needed to continue to drive the investment that is required to continue to improve.
- Support the view of retaining the core principles of the Incentive with amendments to improve for the Stakeholders.

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Stakeholder Satisfaction Output

Eilidh Alexander
11/10/2018

Existing framework – RIIO-1 review

Since working group 1 we have gathered information, drawn comparisons with other sectors and set up bilateral calls with the Transmission Owners. These are our initial findings:

	TO/ Stakeholder Insights	Pros	Cons
KPIs	Mixed views from the TOs: • Some highlighted that the KPIs were already in processes prior to this output • Others viewed that they are of value but only if the KPIs and targets can be modified every year throughout the Price Control	• Drive a broad range of behaviours, i.e. Connections, Project Delivery, Environment • Attempt to capture the views of the stakeholders	• Potential double counting in light of other outputs • Some KPIs exist as BAU • Difficult to compare between TOs • Requires modification year on year to drive improvements • Potentially encouraging focus on the targets rather than stakeholder needs
External Assurance	Mixed views from the TOs: • Some viewed this as a valuable confirmation of strategy • Others found this was already captured in the SEI	• Ensures that the TOs are developing high quality stakeholder strategies	• Is already captured through the SEI
Survey	• Surveys are delivering value • TO's appreciate flexibility in developing surveys to meet the stakeholders' needs.	• Drives improvement in Stakeholder satisfaction • Creates awareness of stakeholder views in the wider business	• Difficult to involve a standardised framework or criteria that will suit all TOs

Key questions for Consultation and Initial Thinking

KPIs

- Due to concerns that KPIs overlap with other outputs and that there is potential that these exist as BAU, do we retain the KPIs?

External Assurance

- Do we retain the External Assurance if this is already captured in the SEI?

Survey

Survey Content

- How should we (if at all) set the framework for the surveys so stakeholder satisfaction scores are more comparable across Transmission Owners?

Stakeholder Groups

- Should we be involved (and to what extent) in defining the stakeholders to be included in the survey?

Survey Metrics

Killer question:

- Could this capture stakeholders views adequately?
- Should we apply multiple Killer Q's throughout?

- How should we set the baseline?
  - New average target against previous performance? (~8/10)
  - Dead-band baseline?
- Do we modify the Cap and Collar?

The next six slides will outline the various options, advantages/disadvantages for the questions listed above.

Strawman for Surveys

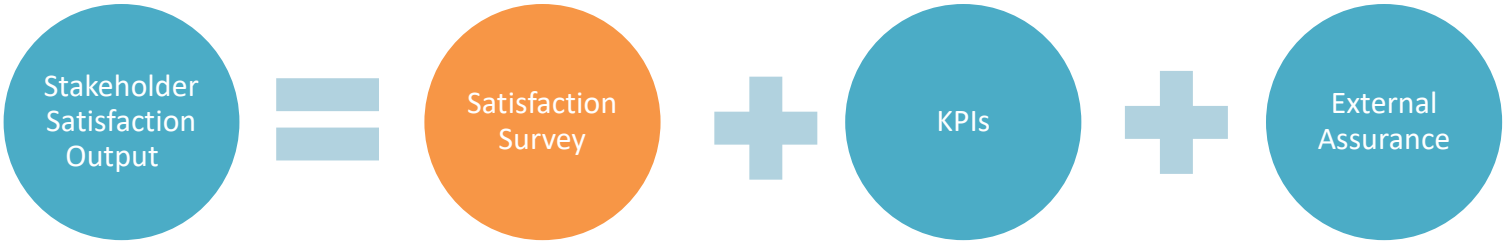
Baseline target

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A New 'average' based on previous performance (~8) applied to all TOs	Find the mean on the scores from all TOs throughout RIIO1	Evidence based target Potentially enables comparison	Doesn't incentivise improvements from one year to another Previously high scoring TOs will be less incentivised to improve as average will be lower than their own current targets Difficulty in identifying what constitutes good stakeholder satisfaction
Option B Dead-Band Targets	Dead- band targets would create a range where there is no reward or penalty	Absolute targets may not be accurate and therefore dead band targets minimise over-rewarding and unnecessary penalising	Difficulty in identifying an appropriate range

Survey Cap and Collar

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Maintain the cap and collar at +/-1.6	As in RIIO-T1		This decision was based on the cap and collar of National Grid's customer satisfaction survey
Option B Develop a wider cap and collar	Widening the cap and collar dampens the power of the incentive	Creates a more challenging incentive	Challenge in identifying a cap and collar that isn't too difficult to obtain. Concerns that this option will weaken the incentive

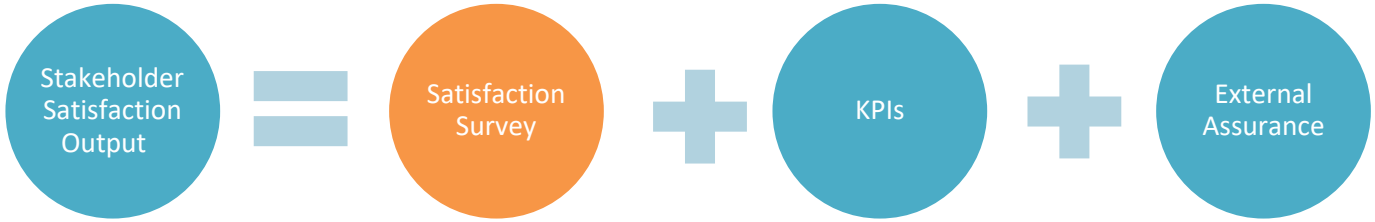
Strawman for Surveys



Survey content

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Enabling each TO to set its individual questions	Maintain the current arrangements	TOs know the areas their stakeholders are interested in and how to best capture this	Potentially too much freedom with the survey content Lack of clarity as to whether scores reflect the improvements made in stakeholder satisfaction or amendments in the survey TO performance not comparable
Option B Developing a framework or criteria for the surveys.	The TOs and respective stakeholders to develop a criteria that must appear in the surveys that applies to all TOs	Creates a degree of comparability amongst the TOs performance	Feedback from the TOs demonstrated that the flexibility creates value How realistic is it that a framework can be applied to all TOs?
Option C Requiring standard questions but allowing TO input	TOs collaborate, share their surveys and identify a list of questions that apply to all	Creates clear comparability against TO performance	Feedback from the TOs demonstrated that flexibility creates value How realistic is it that a framework can be applied to all TOs?

Strawman for Surveys



Killer question

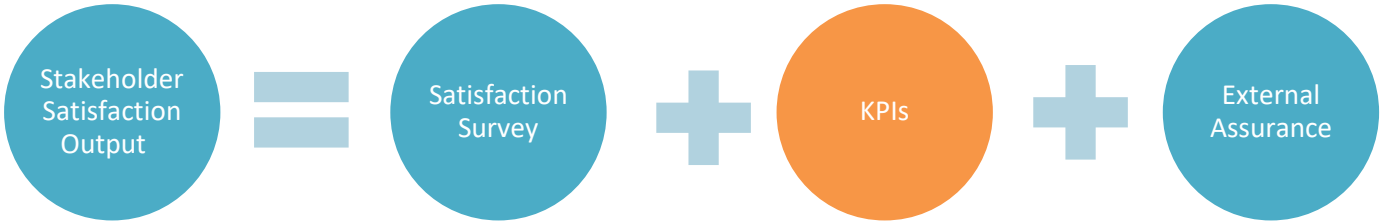
Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Continue using one killer Q	As in RIIO-1	Comparability amongst TOs	Risk that one question isn't sufficient to reflect the full range of stakeholders' views
Option B Embed multiple questions throughout the survey	Outsource advice from marketing research experts on how to best embed the killer questions into the survey	Could deliver more reflective satisfaction scores	Difficulty in knowing where to embed these questions

Stakeholders surveyed

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Continue to allow TOs to choose stakeholders to survey*	As in RIIO-1	TOs potentially know best how and who they should approach for survey	Unclear as to whether all possible stakeholders are being surveyed
Option B Ofgem to provide guidance on which groups of stakeholders must be surveyed by all TOs*	Develop a high level list of groups that all the TOs can survey	Ensures that no stakeholder group is misrepresented i.e. new local stakeholders from visual amenity projects for example. Creates comparability across the TOs	TOs' stakeholders may differ. Some TOs may therefore be disadvantaged if disengaged stakeholders are surveyed

*potential for the User Groups to provide guidance here.

Consultation in retaining the KPIs



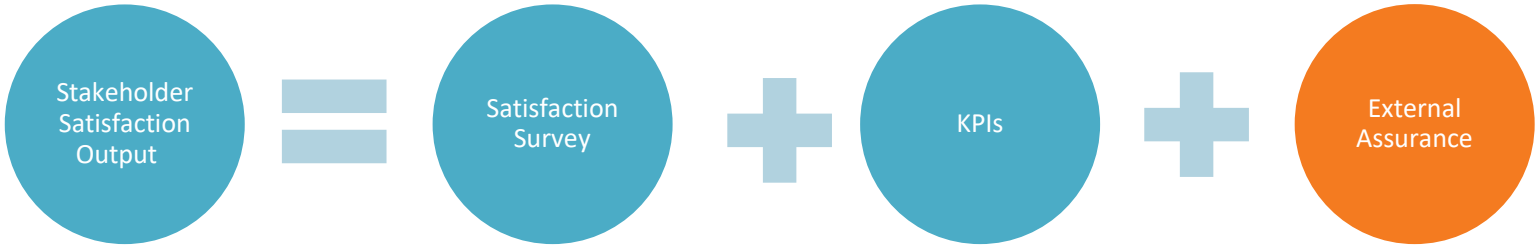
Objective of the KPIs was to identify what were stakeholder's priorities and ensure that these were met by the TOs through applying KPIs.

Retention of KPIs

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Maintain the KPIs and attempt to iron out the challenges they represent	Attempt to identify the KPIs that that potentially overlap with other Outputs Ensure that stakeholders views are represented Include opportunities for modifying the KPIs	Contribute good 'objectives' to the SSO	Create challenges to ensure that the stakeholders are being represented without creating double counting Risk that we are incentivising an area that is BAU
Option B Remove the KPIs	Remove the KPI component of the SSO	Remove the risk of any double counting and inefficiencies of the output Removes risk of wrong incentives (KPIs might not be relevant/appreciated by stakeholders even if achieved) Removes any doubt that we are incentivising a process that should be BAU	Impact on real (non-incentivised) performance in some areas unknown, and survey alone might not capture reduction of performance in certain areas

Due to concerns that KPIs overlap with other outputs and that there is potential that these exist as BAU; **it is our initial view to remove the KPIs**

Strawman for External Assurance

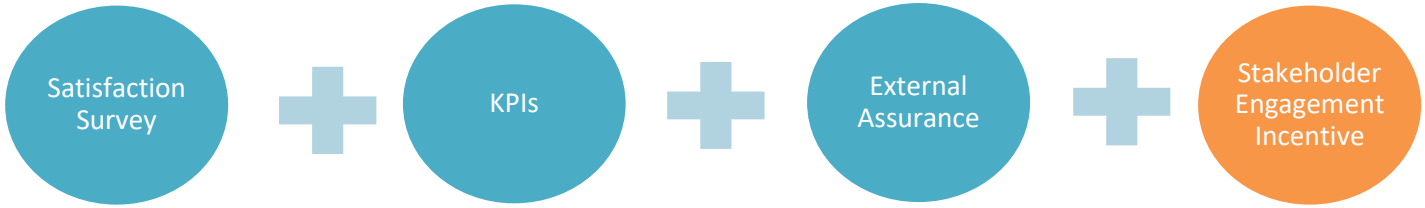


The objective of the External Assurance was to ensure that TOs were developing quality stakeholder strategies. In our review we identified that very similar audits are undertaken as part of the Stakeholder Engagement Incentive. Our current view is to remove the External Assurance as a reward/penalty component, however, this would be dependent on decisions made for the SEI.

Retention of External assurance

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Maintain the External Assurance with a 10% weighting	As in RIIO-1	Incentivises TOs to create good strategies	Is already captured in the SEI. Potentially rewarding TOs twice
Option B Maintain the External Assurance as a licence obligation with no reward/penalty	Modify the license to create a licence obligation and remove its contribution to the overall incentive revenue	Maintains the incentive whilst removing the risk of double counting with the SEI	Is already captured in the SEI
Option C Remove the External Assurance and ensure that it is captured in the Stakeholder Engagement Incentive for RIIO-2	Remove the external assurance component altogether	Removes the risk of double counting	We aren't aware of what impact this may have on the output if the audit is removed

Stakeholder Engagement Incentive and the SSO



There is scope to capture the SSO as part of the Stakeholder Engagement Incentive (SEI). Format and content of SEI in RIIO2, including this option is currently under review.

Advantages

- Reduces the risk of relying on just a survey to reflect performance of the TOs in a stakeholder output
- Maintains a qualitative and quantitative balance

Disadvantages

- Some TOs voiced that they see these outputs as two very different processes driving different outcomes

Financial incentive level

In RIIO-T1 the SSO has a financial collar of +/-1% of the Base Revenue. This financial collar creates a strong monetary incentive to achieve high levels of stakeholder satisfaction.

Question:

Should we retain the existing cap or would a lower cap more accurately reflect costs incurred by the company and value for consumers?

We are currently reviewing the SSO as part of the wider incentive package for the following reasons:

- There is a risk that the SSO will lead to double counting with other incentives that currently drive stakeholder satisfaction i.e. ENS, Connections
- The current stakeholder incentive enabled the highest incentive related earnings in comparison to other outputs for TO's in RIIO-1

Incentive Frameworks that we are considering:

1. Should this output continue as a Symmetric incentive or should this output exist as an Asymmetric (penalty only) output in RIIO-2?
2. In addition, we are considering whether a further competitive element could be introduced to the SSO through the use of a **relative incentive**. One way this could be achieved is through the use of a combined pot for rewards.

Discussion

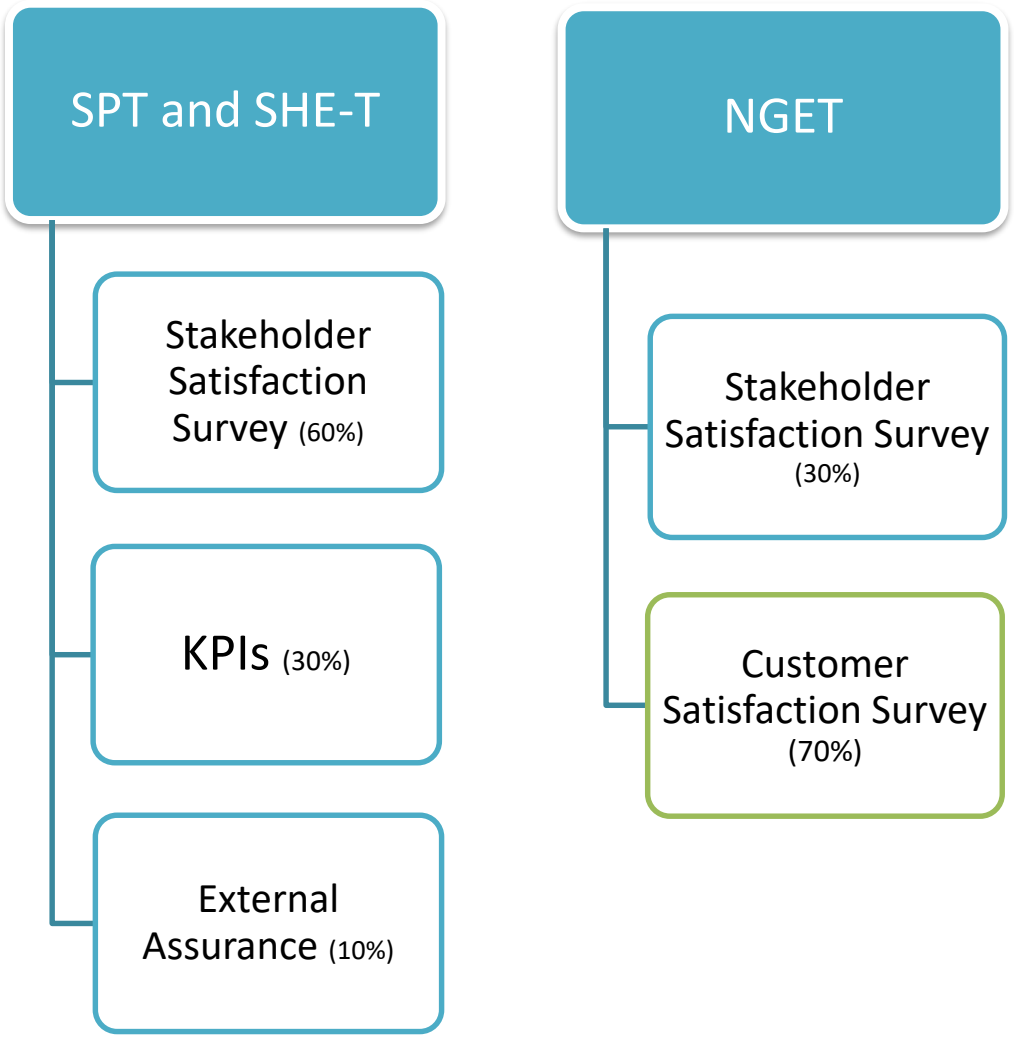
- What are your views on these consultation topics?
- Is there anything that we have missed?
- How do you see the SSO and the SEI interacting?
- Would removing the KPIs and External Assurance create concerns that we have not considered?
- Are there other components that could be added to measure Stakeholder Satisfaction?
- Should there be opportunity to capture the interaction of the Connections output within the SSO for RIIO-2?

Next Steps

- Investigate how the SSO and the SEI could be brought together.
- Research any correlation between stakeholder satisfaction and company returns in other sectors.

Annex 1- Recap of RIIO-1

- **Customer Satisfaction Survey**
  - ✓ NGET's output operates under a different structure as the SO has the ability to interact with their customers. Customer Satisfaction Output is therefore exclusive to NGET.
- **Stakeholder Satisfaction Survey**:
  - ✓ TO's are only obligated to include 1 question in their surveys that asks 'overall stakeholder satisfaction to be rated on a scale of 1 to 10, when 1 is low and 10 is high.'
- **Key Performance Indicators**
  - ✓ Proposed by the TO
  - ✓ Scored from 0-100
- **External Assurance**:
  - ✓ External Assurance methodology set by the TO and assessed by an external auditor

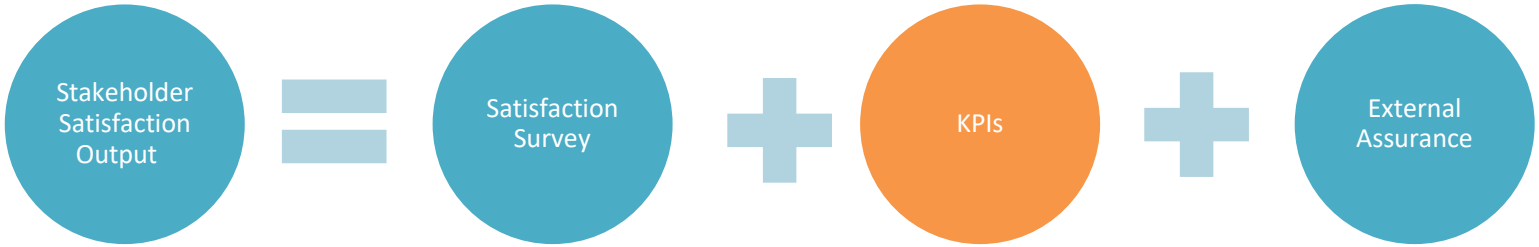


Annex 2- Strawman for KPIs

Content and format of KPIs

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A TOs create a set of KPIs with their stakeholders	As in RIIO-1	Opportunity to reflect stakeholder's priorities	Risk of creating further overlap within outputs Risk that we are incentivising an area that is BAU
Option B Allow TOs to create KPIs with their stakeholders but remove any areas the Ofgem perceives may lead to double counting	Ofgem to review and approve the KPIs that the TOs develop with their Stakeholders	TOs capture stakeholder's views whilst ensuring Ofgem's sign off. Enables some level of comparison	Risk removing the key priorities of the Stakeholders Risk that we are incentivising an area that is BAU
Option C Allow TOs to create KPIs with their stakeholders but remove any areas that Ofgem perceives may lead to double counting. Additionally create opportunities to modify KPIs within the price control	Potential to involve points in the price control that TOs will consult with their stakeholders on the applicability of the KPIs and modify as is seen necessary	Ensures that the KPIs are an ongoing reflection of stakeholder's concerns	Risk that TOs will develop a case to remove any KPIs that are too challenging Risk removing the key priorities of the Stakeholders Risk that we are incentivising an area that is BAU

Annex 3- Strawman for KPIs



Baseline for KPIs

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Develop a new average value based on previous scores	Find the mean on the scores from all TOs throughout RIIO1 (average will include Scottish TOs only)	Evidence based target for Scottish TOs	Potentially disadvantage to NGET
Option B Dead-band baseline	Dead-band targets would create a range where there is no reward or penalty	Recognises that the targets may not be accurate and therefore minimises over-rewarding or unnecessary penalties	Difficulty in identifying an appropriate range
Option C Allow a baseline to be developed with the Stakeholders and TOs	TOs engage with their stakeholders to identify a suitable baseline	TOs become accountable to the stakeholder's priorities	Realistically, will stakeholders be able to come to an informed agreement on the baseline?

Cap and Collar application KPIs

Ofgem is considering…	How this could work in RIIO2	Advantages	Disadvantages
Option A Maintain the cap and collar at +/-16	As in RIIO-T1		This decision was based on the cap and collar of National Grid's customer satisfaction survey.
Option B Develop a wider cap and collar	Widening the cap and collar dampens the power of the incentive.	Creates a more challenging incentive.	Challenge in identifying a cap and collar that isn't too difficult to obtain. Concerns that this option will weaken the incentive.

Electricity Transmission

ENS Incentive

RIIO-T2 Policy Working Group 4
11 October 2018

nationalgrid

The Energy Not Supplied (ENS) Incentive

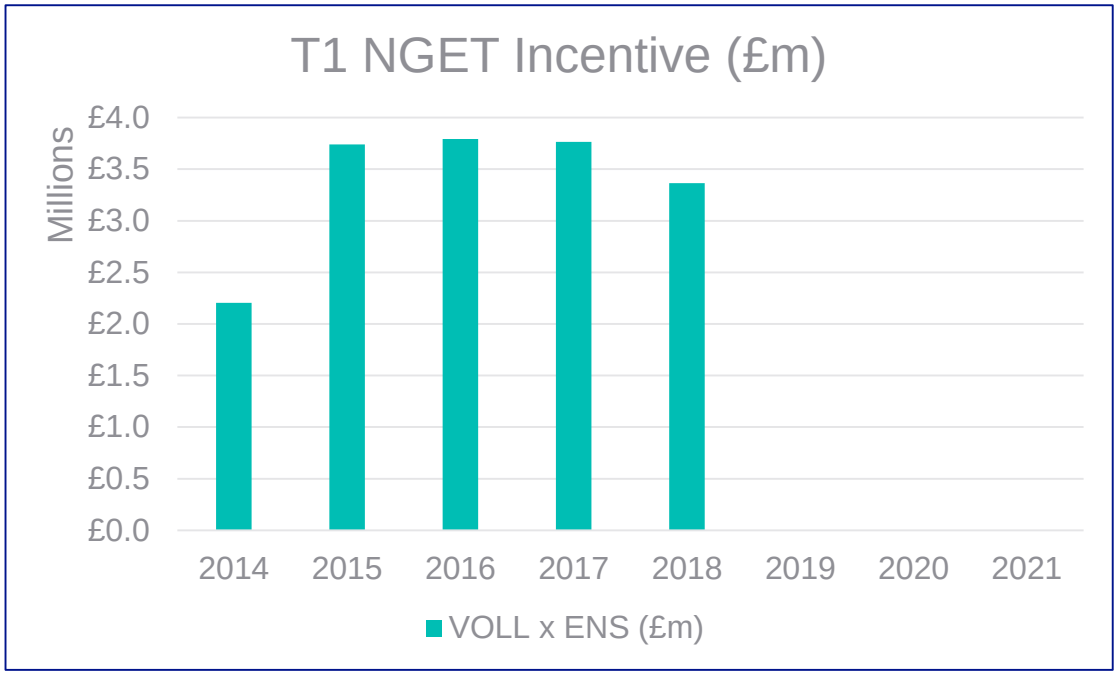
Considerations

- ENS is the lagging indicator for reliability as seen by consumers and determined by Ofgem in T1
- Incentive drives reliability at levels requested by stakeholders
- There are exclusions for exceptional events
- Performance in T1 has been good so far
- A single incident could impact the reward/penalty significantly
- The incentive values the loss of demand for consumers
- Using same methodology, a T2 target would be lower

Delivering reliability at levels consumers want incurs costs (just TO, not whole system)

Weekly demand at risk process	There is a cross business weekly demand at risk web conference to identify actions to reduce ENS.
ERTS reviews	NOT NAP, manages demand cycle. Throughout the life-cycle of a project, the ERTS is reviewed, and sometimes changed at cost to minimise ENS.
Daily weather reviews	Circuits are recalled to provide additional security if inclement weather is expected.
Weekend / Bank Holiday working	Work can be moved to lower demand times where ENS is a consideration.
Offline build	A more expensive off-line build is sometimes delivered to minimise the risk of ENS.

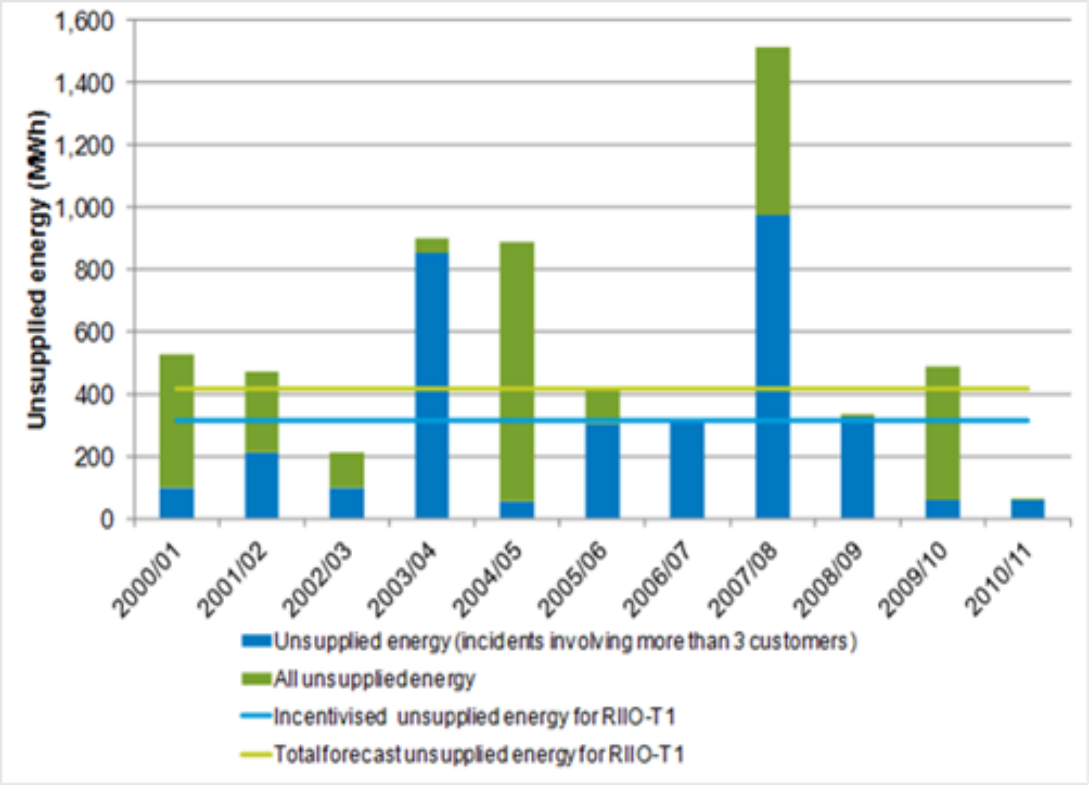
The incentive to reduce ENS has a value to consumers



The benefit to consumers is what drives the incentive

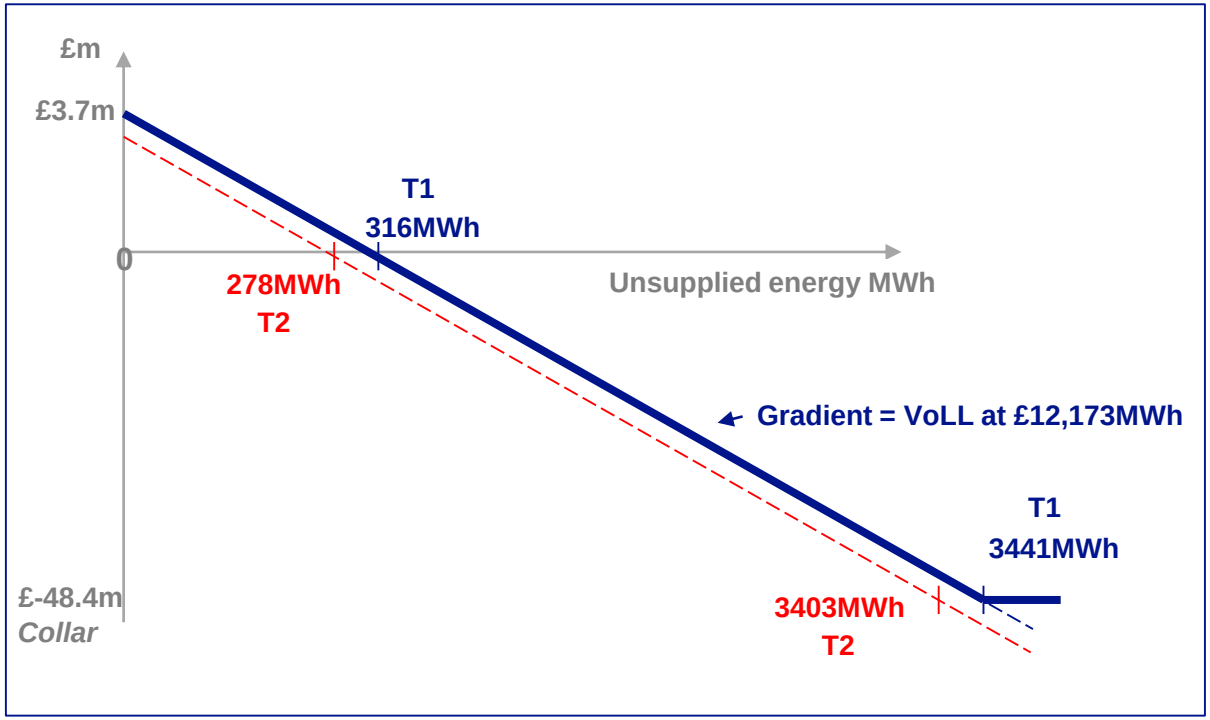
- VOLL set at £16,000
- Reduces to £12,000 due to ‘tax’ effects
- Collar is 3% of revenue
- Benefit to consumers is £16k/MWh x 316 = £5m p.a.

A single incident could mean we quickly exceed our ENS target…



- 2007 is the summer flooding in Gloucester (Walham substation) which is a single event at a single location.
- Figures from 2003/4 to 2006/7 show a downwards trend which could indicate an increase in reliability, however the high impact low probability event in the Gloucester area affected the average over the period significantly.
- St John's Wood (Central London) – peak demand is 600MW and so target would be exceeded in 31 minutes
- Bramley (Oxford/Reading) – peak demand 1000MW (forecast) and so target would be exceeded in 19 minutes

It is possible to make the target 12% more challenging by updating ENS data



- Break even point more onerous for network companies
- 'Natural' cap reduces to £3.4m
- Retains VOLL
- Collar remains at 3% revenue
- Collar hit earlier

Target (break even point) is lower (278MWh) in T2

Energy not supplied – embedded generation

- **Energy not supplied (ENS)** is the sum of the MWh lost during each incentivised event.

MWh loss = Demand Loss * Event Duration

- Some events can be excluded or classed as exceptional

- **Embedded generation** – generation that is connected to the demand side of a grid supply point (GSP) at any depth in the network.

The issues –

1) Should we, in principle, net off embedded generation from the ENS calculation?
2) How do we net off embedded generation from the ENS calculation?

Should we, in principle, net off embedded generation?

The case in principle for netting off embedded generation

As embedded generation grows the ENS target could become a larger proportion of the energy supplied by TOs.

The case in principle against netting off embedded generation

The ENS incentive relates to the value of lost load to customers. Only the actual impact on customers should be taken into account, not what would have happened if there had been no embedded generation.

How do we net off embedded generation? Method 1

Method 1 - detailed accounting

We deduct a measure of embedded generator supply at the time of the incident from the ENS calculation. This can only increase the measure of energy not supplied.

Defining the embedded generator supply raises challenges:

Definition A (pure) – all generation with operational metering that is connected to the demand side of a GSP at any depth in the network. This would require DNOs to provide a list of known embedded generators connected to a GSP. We would also need real time data on the aggregate embedded generator MW supply immediately before the ENS event. It will be costly to collect this data for embedded generators, DNOs and TOs. There is no requirement to share the data.

Definition B (simplified) – embedded generators with operational metering greater than 10MW that are directly connected to a GSP via a discrete feeder. This makes the embedded generation easier to measure, but at the cost of excluding a considerable amount of harder-to-measure embedded generation. It might impact the three TOs differently.

There are other possible definitions but they all have their drawbacks with a broad trade-off between simplicity and accuracy.

How do we net off embedded generation? Method 2

Method 2 – macro adjustment

Instead of detailed accounting for embedded generation we make a macro adjustment for the average size of embedded generation in a reporting year.

The formula could become:

> ENS MWh volume = MW flow through GSP immediately prior to the incident * duration * embedded generation correction factor

Where the “embedded correction factor” = 1 + MWh generated from embedded generation in that year / Total MWh generated over the whole year

This increases the ENS MWh volume based on the average amount of embedded generation.

This approach still requires DNOs to supply data on embedded generation and there remains the question of how detailed the data should be (with a trade-off between accuracy and simplicity).

The macro adjustment only provides an estimate of the amount of embedded generation supply at the time of an incident.

Our conclusions on Energy Not Supplied

We should retain ENS because it delivers benefits to consumers by TOs adjusting their behaviour to achieve reductions in lost load volumes.

The current methodology for ENS works well and takes account of the fact that ENS events are high impact, but low probability. Using the current methodology for ENS will lead to a tougher target for NGET in the T2 period.

We should not adjust ENS for embedded generation because: (1) in principle it should focus on actual impacts on consumers; and (2) making adjustments for embedded generation is difficult, with no perfect answer, and imposes considerable costs on DNOs and embedded generators as well as TOs.

Ofgem Policy and Output Working Group

WG 4 October 11th 2018

Energy Not Supplied

Contingency Examples

Contingency Examples

General Contingency Approach

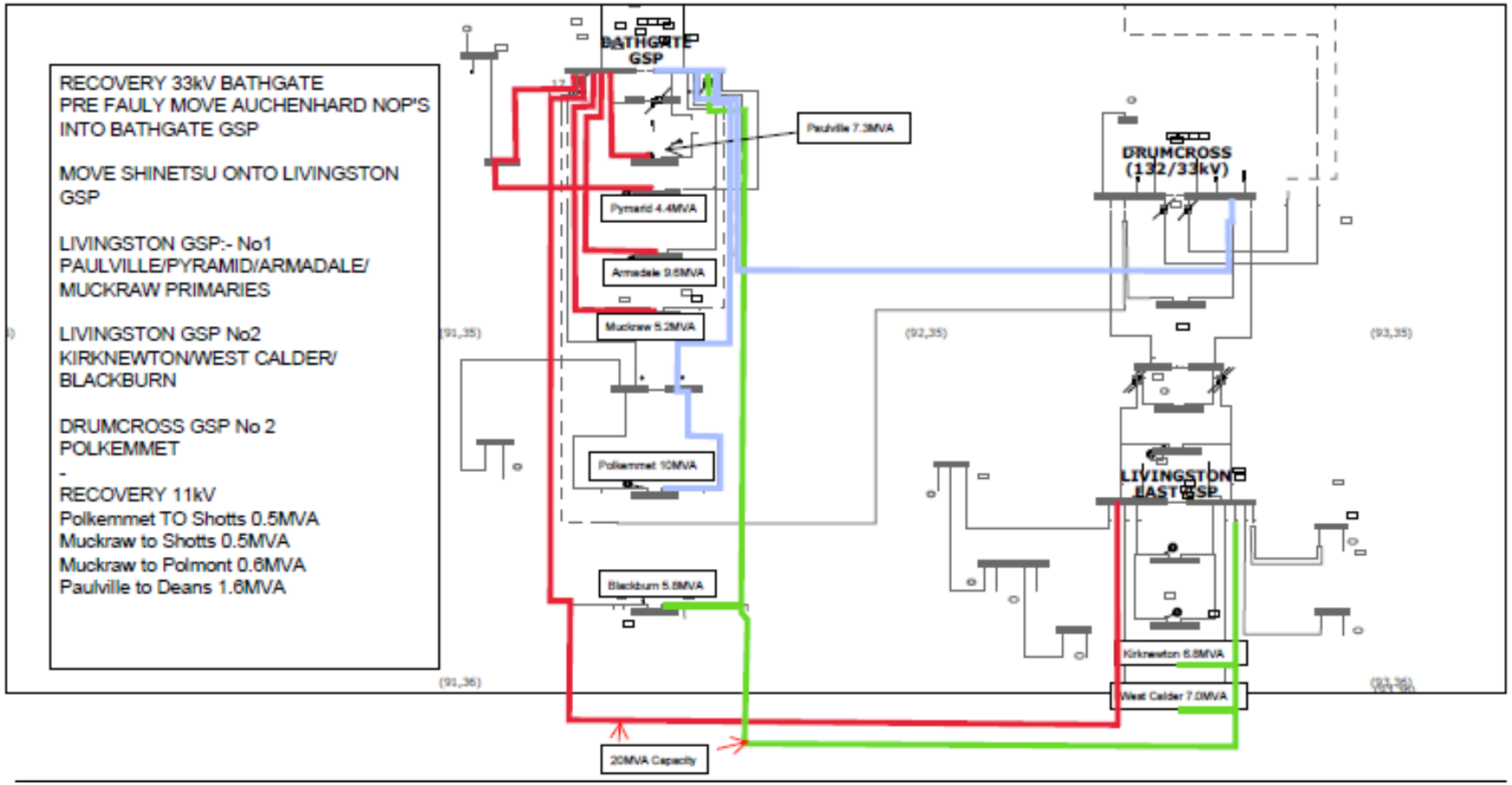
For all major outages on Transmission system we will review the increased risk of supply to customers being lost. This includes our directly connected transmission customers and distribution customers connected to our grid supply point (GSP's) where the transmission /distribution interface exists.

For example: where the DNO has Primary Substations connected to GSP via circuits the DNO will regularly move demand from one GSP to another to ensure the risk of supply loss from a transmission incident. This can be as simple as moving the open point on the 33kV network into the point of work.

In addition we develop contingency plans to restore customer supplies as quickly as we can in the event of a fault on the remaining in-feed. In some instances we will also make local generation aware that we are carrying out work at their local GSP and ask that, should it become necessary, if they would be able to provide support to the local demand, a good example of that is at Chapelcross GSP.

Contingency Examples

Example: Protection Maintenance on 33kV circuit breakers



Background : RIIO-T1 Output Incentive Mechanisms

1. Wishaw 275kV modernisation project.

Installed a 275kV contingency cable rated at 200MVA to ensure we can secure supplies to two grid supply points (GSP's) during the project works associated with the 275kV switchgear at Wishaw (see next slide).

2. Kilmarnock South 275kV modernisation project.

Installed a 33kV contingency cct between Kilmarnock South GSP & Kilmarnock Town GSP's to secure supplies to Kilmnack Town while it's on a single circuit transmission infeed. The contingency cct utilises an existing 275kV and will be in service for approx 2 years

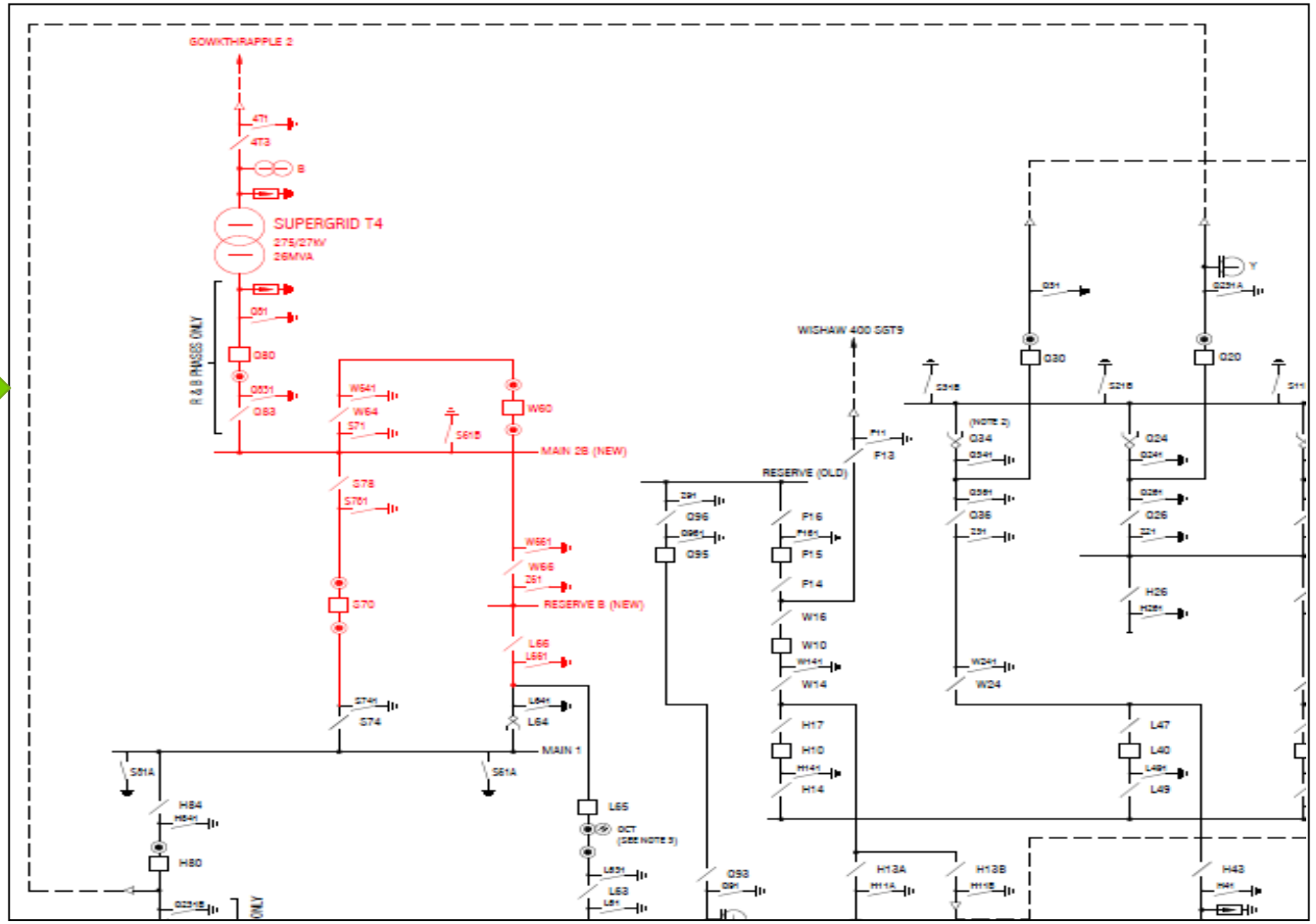
3. Erskine Grid T2 transformer replacement project

A contingency cct is prepared to secure supplies to the GSP in the event of a fault during the outage window. We will use the 132kV OHL between Devol Moor & Erskine GSP's operating at 33kV as a means of restoring full customer supplies

Contingency Example

Wishaw 275kV modernisation project.

contingency cable is dotted



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Energy Not Supplied – Considerations for RIIO2

Cissie Liu

Recap of WG discussion

Overview of scheme

- Performance against baseline during RIIO1 has been very good.
- TOs stated that the incentive drove them to be better asset managers, making them more aware of the risk of lost load and driving them to work with DNOs on replacement plans.
- Determined that ENS best incentivises short term/operational asset management and NOMs and SQSS incentivises long term asset management

ENS baseline

- ENS performance under previous price control (TPCR4) used to set RIIO1 baseline.
- Didn't include improvement factor in baseline.
- RIIO2 ENS baseline will be much lower given RIIO1 performance.

Incentive Rate (VoLL)

- Is existing Value of Lost Load (VoLL) fit for purpose? Agreement that granular customer segmentation doesn't apply to TOs as it does for the DNOs. Discussion on accounting for minimum requirements for supply in place (SQSS) and use of WTP or WTA
- Ofgem will consider past studies to determine VoLL. Specifically, ENWL study, TO input and studies to be produced, ACER study, etc. if we choose this method to identify value customers place on energy not supplied.

Outstanding Issues

- Stakeholders discussed the impact and challenges that embedded generation has on measuring and ensuring reliability.

Summary of key potential questions for December consultation

Policy area	Key questions for December consultation	Work undertaken

Scheme purpose	• What is the purpose of the ENS incentive?
	  • What does ENS incentive add alongside Network Output Measures (NOMs)?
	  • Is the incentive still needed?
	  • How should the structure of the scheme be amended to reflect performance and developments of system?
		• Reviewed TPCR4 and RIIO1 initial proposals, consultation responses, and final proposals.
		• Analysis of London and Birmingham black out and lessons learned.

Baseline, incentive rate, & financial collar	• What is a fair ENS baseline which is challenging, however also accounts for fluctuations in ENS performance? • What is the most suitable value for VoLL to measure value consumers place on energy? • Should we continue to include a financial collar to limit risk of penalty on allowed revenue?	• Reviewed London Economics and ENWL VoLL reports • Analysis of performance pre-TPCR4 to RIIO1 • Analysis of company revenue made during RIIO1 • Engineering and cost teams input • TOs provided extensive list of loss of supply events.
Outstanding areas	• How can the calculation for ENS include embedded generation? • Is the definition of excluded events still appropriate?	• TBD

Considerations for ENS Incentive scheme in RIIO2 - PURPOSE

Purpose	
Current thinking	• Originally, intended to be an "interim measure" established in response to the London/Birmingham black outs. • ET network reliability is 99.999% reliable (since 1991/92). • It's important that the TOs are incentivised to manage the risk of high impact, low likelihood events for consumers. • Need better info on the steps and activities that TOs have taken to reduce of ENS (other than asset replacement) to determine whether it is efficient to keep incentivising TOs.
Considerations	• Should we retain a financial incentive or move to reputational incentive? • If financial should this be an absolute vs relative incentive? • Should the scheme be symmetric or penalty only?
Preference & next steps	• Considering design of incentive • Include additional reporting on processes and actions undertaken to reduce ENS

Considerations for ENS Incentive scheme in RIIO2 – PURPOSE

	Pros	Cons
Financial	• Provides strong incentive and focus that drives behaviour and good performance • Incentivises development and focus on processes TOs may not otherwise improve on	• Could be incentivising behaviours that are already BAU • Uncertain that reward paid equals value consumers put on energy not supplied due to imperfect information
Reputational	• Eliminates risk of over-awarding for processes that are already BAU and other measures (eg VoLL) if calibrated incorrectly • Helps build trust with customer groups and increases good publicity	• May not be strong enough to drive efficient behaviour - no financial incentive to develop and focus improvements of ENS, embedding culture change, etc. • TOs are commercial entities and are profit driven
Absolute	• If set properly, incentive would drive efficient behaviour in reducing ENS to level consumers value • Historic performance data available for each TO that helps indicate economic level	• Based on past performance of TOs, therefore lack of competition to further drive and motivate high performance
Relative	• Mimics competitive market and therefore could drive good performance • Could help reveal additional information around level of economic efficiency of TOs	• Impact on behaviour of TOs uncertain • Comparability across networks is key

Consideration for ENS Incentive scheme in RIIO2 – PURPOSE

	Pros	Cons
Symmetric	• Incentivise TOs financially to implement improvements, embed new culture, etc. to reduce ENS • Rewards TOs for service provided at efficient level for consumers (assuming perfect knowledge)	• Unsure if rewards are used to toward improving ENS • Risk of over rewarding processes that should be BAU/already established highly reliable system
Asymmetric (penalty only)	• Limits over-rewarding processes that should be BAU • Limits over-rewarding for already established highly reliable system • Strong incentive that drives good performance	• No fast money for TOs to use towards improving ENS/network • May incentivise maintenance of acceptable level rather than actively decrease ENS • May reduce focus of importance and worthwhile improvements in managing ENS • Cost to TO of providing high quality may change over time

Consideration for ENS Incentive scheme in RIIO2-BASELINE

	Baselines
Current thinking	• RIIO1 baselines are much higher than performance seen to date therefore suggesting at the time, there were significant steps TOs were able to take to reduce ENS • Current targets based on past performance may not be best and most accurate indication of future performance because they don't take into account improvements in operational practices, learning, and responding to events, etc. • For RIIO2, we want targets to be challenging, fair for consumers and TOs, accommodating of adverse events, and attainable.

Considerations	• For ENS (MWh) baselines:
	  • Roll over of RIIO1 methodology
	  • 5 year rolling target based on historic performance
	  • Target set at start of price control for entire period (carry over)
	  • % annual improvement
	  • Annual revenue neutral dead band target
	  • Hybrid
	  • TO forecasts
	• Is it in the interests of consumers that the number of loss of supply events are reduced? Should we include a target for # of events as another measure of short term reliability?

Preference & next steps	• Baselines should reflect improvements made on the system in the past (eg baselines that are dynamic and improving) • Baselines should be challenging, fair to both consumers and TOs, flexible for adverse events, and attainable. • Options are dependent on symmetry of scheme

Consideration for ENS Incentive scheme in RIIO2 – BASELINE

	Pros	Cons
Roll over of RIIO1 Methodology	• Would reflect RIIO1 good performance therefore targets would be lower and more challenging	• No annual improvement factor • Too focussed on past behaviour which may not be good indicator of future performance + improvements
5 year rolling target based on historic performance	• Would reflect past good performance to drive more challenging targets • Would take into account recent improvements to processes	• If performance deteriorates, targets could increase.
Rolling Target (carry over)	• Acts as an annual improvement factor year on year • Accounts for flexibility of variation of performance year on year	• If there is surplus from previous year target may not drive most efficient behaviours in following years
Percentage annual improvement factor	• Increasingly challenging targets year on year • In line with DNO scheme	• Determination of % of improvement would require careful consideration

Consideration for ENS Incentive scheme in RIIO2 – BASELINE

	Pros	Cons
Dead band	• Flexible and accounts for variation in for TO performance (eg "bad luck" events) • Acknowledges baseline target may not be set 100% fairly and accurately due to imperfect information • Limits impact on revenue (penalty and/or reward)	• May not incentivise TOs to perform past dead band width • Over performance and underperformance not rewarded/penalised therefore causing stagnation of performance and effort • Not necessarily fair for consumers who are paying and expecting reliable service
Additional target (# of loss of supply events)	• Incentivises reduction of number of loss of supply events to consumers • In line with DNO scheme	• This number has not been increasing, therefore may not require incentive

Consideration for ENS Incentive scheme in RIIO2 - INCENTIVE RATE

	Incentive Rate
Current thinking	• General agreement VoLL matrix is not applicable for TOs however Ofgem recognise it would be appropriate if customers have different valuation of energy. • Supply of end user is out of TO control

Considerations	• Is WTP more appropriate VoLL value?
	• Is VoLL the most accurate way to measure customer willingness to pay
	• Ofgem will consider:
	  • various studies (eg ENWL, ACER, etc.);
	  • roll over existing Value of Lost Load (VoLL);
	  • proposals from TOs and interested parties.

Preference & next steps	• Initial view to consult on appropriateness of uniform incentive rate based on VoLL and measured as £/MWh subject to research on up to date, most reflective value of VoLL.

Consideration for ENS Incentive scheme in RIIO2 – INCENTIVE RATE

	Pros	Cons
Uniform VoLL	• Discourages neglect or focus on particular areas – all areas are treated equally	• Not reflective of different value of customer groups
Matrix VoLL	• More accurately reflects value customers place on energy • Potentially fairer for customers as it better reflects value placed on energy	• May result in highly complex scheme
WTP	• More reflective of purpose of incentive scheme – how much extra customers are willing to pay for a higher service	• WTP usually lower than WTA – may not be strong incentive rate as a lower rate may indicate to TOs reliability is not a high priority and therefore not drive as improvement • An inaccurate/unreliable value would skew level of service provided by TOs to be economically inefficient.

Consideration for ENS Incentive scheme in RIIO2 - FINANCIAL COLLAR

	Financial Collar
Current thinking	• Collar has not been reached during RIIO1 • TOs are best placed to manage risk • Greater exposure of allowed revenue for penalties will strengthen the incentive and expose the TOs to the full value that customers place on ENS.
Considerations	• Greater exposure to penalty vs reward (asymmetric) in the past • Reward has natural cap set by target (0 MWh) • Ofgem will consider potential impact on the overall return on regulated equity (RoRE).
Preference & next steps	• Considering keeping/removing financial collar. Ofgem has not looked into details of changing the current financial collar, however believe that TOs are in best place to manage their risks.

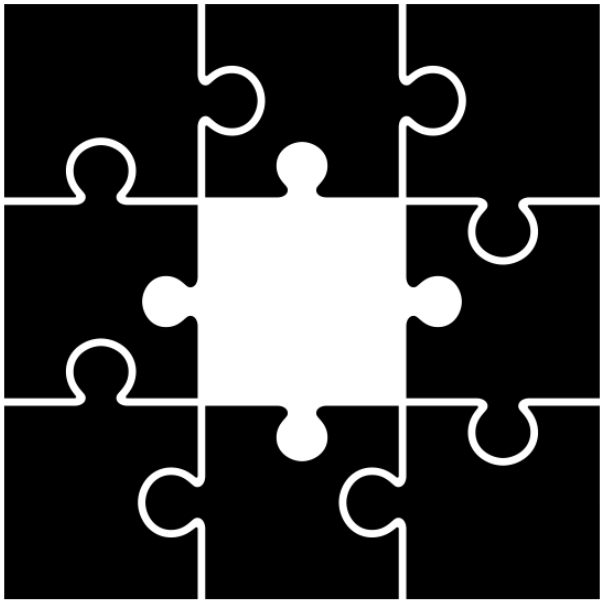
Consideration for ENS Incentive scheme in RIIO2 – FINANCIAL COLLAR

	Pros	Cons
No collar	• Strengthen the incentive by exposing the businesses to the full value that customers place on unsupplied energy. • More accurate reflection of full value customers place on energy unsupplied	• TOs could suffer from significant revenue impacts – especially if RIIO2 baselines are challenging and scheme is penalty only. • TOs would suffer from events that arise from "bad luck" (eg transient faults)
Collar	• Protects against significant revenue impacts in the cases of low probability, high magnitude events • Protect TOs against "bad luck" events	• Collar has never been reached and therefore not utilised yet

Consideration for ENS Incentive scheme in RIIO2 – OTHER CONSIDERATIONS

	Other Considerations
Current thinking	• **Embedded generation** – How to include into ENS calculations • **Excluded events** - Re-visit excluded events and definitions
Considerations	• **Embedded generation** - Distributed generation is increasing. The current calculation of ENS doesn't take into account embedded generation. • **Excluded events** – Some definitions have been unchanged since TPCR4. Give opportunity for stakeholders to raise concerns on what should/shouldn't be included in the incentive.
Preference & next steps	• Continue engage with TOs on embedded generation • Examine excluded events and definitions for WG5

Discussion points



- Any additional thoughts on how targets, incentive rate, and financial collar should be set in RIIO2?
- What other considerations should Ofgem be taking into account?
- Is there anything else that should be covered in the December consultation on ENS?

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Environmental outputs for RIIO2

James Tyrrell

Review of working groups

What we've covered

- Review of RIIO1 outputs performance (BCF, SF6, EDR, Losses)
- Sustainability First proposal for LCI

What we've heard

- SF6 incentive has led to a clear reduction in SF6 leakage across the pricing control
- RIIO1 incentives are disparate, process oriented, and not pushing TOs enough
- Reputational incentives could be strengthened
- RIIO2 needs to consider the right balance between driving competition and encouraging collaboration
- Stakeholders want an incentive that recognises and rewards thinking across sector

Stakeholders want a package that

- Drives overall efficiency and transparency in achieving a carbon reduction/environmentally responsible practices
- Is more holistic, cohesive and increases consistency across sectors
- Looks at ways to integrate our environmental metrics better
- Has more upfront interplay with the business plan
- Continues to focus on driving behavioural change
- Ensures focus on what's in company control and company ability to influence, not areas out of company control
- Ensures that where we have reputational incentives they have greater impact

Refresh on RIIO1 ET environmental package

Metric	RIIO1 performance	✓	✗
Business carbon footprint (excluding losses and SF6)	22% increase in total TOs CO2 emissions between 2013/14 and 2017/18	• Metric has helped build reporting capability • Better understanding of key drivers of TOs BCF & areas of control	• Limited transparency of company activities and performance • Issues with reporting consistency across period & companies
SF6	12 % reduction in total SF6 emissions between 2013/14 and 2017/18	• Financial reward effective in driving improved management & practices • Wholly within company control	• Didn't include performance improvement in annual target which accumulates over price control period – potential over-reward
Losses	20% reduction in total CO2 emissions between 2013/14 and 2017/18	• Encouraged assessment of lifetime costs in decision making	• Most of improved environmental impact due to changes in CO2 intensity of grid electricity • Reporting hasn't shed much light on controllable versus non controllable elements
Environmental Discretionary Reward	Variable company performance to date	• Helped raise profile of sustainability initiatives within companies	• Cumbersome format for putting in a submission and assessment • Is susceptible to companies cherry picking projects • A challenge to drive improvement without amending criteria

Proposed framework for RIIO2 environmental package

RIIO2 price control objective

To ensure that regulated network companies deliver the value for money services that both existing and future consumers want

In particular, that the price controls:

- Give due attention to mitigating the impact of networks on the environment
- They should develop and maintain a reliable, safe and secure network that is flexible in supporting the transition to a low-carbon future

Purpose of RIIO2 environmental package

Drive networks to support the transition to a low carbon future, further integrate environmental awareness into business practices, and to continue contributing to the UK's broader energy and environmental objectives

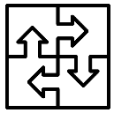
RIIO2 environmental objectives

Drive effective and efficient carbon reduction (LCT) and environmentally responsible practices

Focus on areas in company control to influence, not areas out of company control

Improve transparency of performance – good and bad

Are holistic and consistent across sectors where suitable



Encourage companies to integrate environmental and low carbon commitments in their RIIO2 business plan

Overview of options Ofgem is considering

	Low carbon incentive	Sustainability + low carbon
Description	• Single financial incentive on TOs contribution to low carbon objective • Combination of metrics and qualitative indicators of TOs activities and impact • Potential to roll out across all sectors	Three part framework to cover sustainability and LCT: 1. Baseline funding and PCDs for well-justified initiatives eg low loss transformers, LC suppliers 2. ODI on environmental outcomes that satisfy output principles eg SF6 3. ODI for exceptional contribution to LCT – See next slide Framework could be suited for cross sector application
Rationale	• Climate change biggest environmental issue • Need single message on networks role in decarbonisation of energy system • LCI a comprehensive and cohesive approach to reducing carbon in the energy system	Network owners should be: • accountable for well-defined deliverables that are low risk and in consumers' interests eg low-loss transformers to help reduce network emissions. Consumers should only pay efficient costs. • incentivised to improve operational practices to efficiently deliver well-defined output. Incentive value to be based on economic value of output to consumer eg SF6 • incentivise to play full role in LC transition with value based on benefits/impact.
Scope	1. Reducing carbon emissions from network operation (transition to low-carbon energy system 2. Connecting low-carbon energy sources (Sustainable network) 3. Reducing/de-carbonising demand (Whole system outcomes)	• Low carbon transition • Company commitment to company specific carbon reduction targets • Broader sustainability (procurement practices, waste management, etc…)

Exceptional contribution to LCT ODI

Flexible reward incentive for network operators to make an exceptional contribution towards the low carbon transition

How will it work?

- TO/Stakeholder led
- Two opportunities to present ODI proposals (business plan and End of year 2)
- 1st opportunity: TO to make a case as part of BP for an exceptional contribution they are going to deliver (2nd opportunity to operate the same), detailing:
  - Output (proposal) commitment / forward planning
  - Metrics that performance will be assessed against
  - TO and consumer benefits of proposal (to inform amount of reward)
  - Timeframe for delivery
  - Ofgem will then assess delivery as per milestones
- Reward upon successful delivery

This is intended to:

- Strengthen strategic focus on LCT
- Revolutionise operational practices, partnership collaboration, implementation
- Cover new outputs for activities that are not captured by the framework ie an exceptional contribution to LCT.

It is **not** intended for R&D innovation or large capital projects.

Advantages

	Low carbon incentive	Sustainability + low carbon
LCT and enviro management 	• Potentially more ability to deal with future uncertainty	• Networks funded upfront to deliver a more sustainable network. • Consumers only pay efficient costs of improvement.
Within control 	• Could allow companies increased flexibility in how they deliver outcomes • Qualitative aspects could focus on behavioural changes	• Emphasises aspects that are in company control • Increased certainty and assurance that actions will be delivered
Transparency 	• Would address the disparate nature of incentives by having a single incentive with a clear focus	• Pre-commitment on outputs TO will deliver for consumers and the associated costs • More accountability for delivery/sets delivery targets for assessment • Forward looking - clearly defines actions upfront that each company will deliver
Consistent across sector 	• Increases the focus on competition • Potential to be considered at a cross sector level	• Aspects could be implemented cross sector
Integrated plan 		• Allows more integrated business planning (eg interactions with refurbishment/replacement) • Integrates environmental awareness further into business practices and gives TO more discretion to plan/programme project works

Disadvantages

Low carbon incentive	Sustainability + low carbon
Risk that if scope is narrowed to only focus on low carbon it may detract from other wider environmental issues that companies currently have to consider	Potential decrease in flexibility to deal with uncertainty since large parts will be written in to Pricing Control Deliverables (I.e. SF6 – build in flexibility in PCD in how metrics are set)
Potentially more difficult to compare company performance on specific metrics.	
Backwards looking and post business plan process	

Where to next

At this stage we are working up the detail for the options and need to do some further thinking.

For working group 5:

- Will further scope out the underlying metrics for both options
- Consider how to set targets for ODIs ie SF6
- Set out our thinking on an exceptional contribution to LCT ODI and how it will work
- Give the working group a clear steer on which option we think best achieves the policy aim and lay out our consultation approach

Our key principles for developing appropriate metrics

- Is it within company control?
- It is measurable?
- Is it material (will this significantly help to address the problem/lead to a material improvement)?
- Is this already covered elsewhere?
- Is there scope for cross sector interactions?
- Is it workable?

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Our core purpose is to ensure that all consumers can get good value and service from the energy market. In support of this we favour market solutions where practical, incentive regulation for monopolies and an approach that seeks to enable innovation and beneficial change whilst protecting consumers.

We will ensure that Ofgem will operate as an efficient organisation, driven by skilled and empowered staff, that will act quickly, predictably and effectively in the consumer interest, based on independent and transparent insight into consumers' experiences and the operation of energy systems and markets.

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