

RIIO-ED2 Decarbonisation and the Environment Working Group: session 2



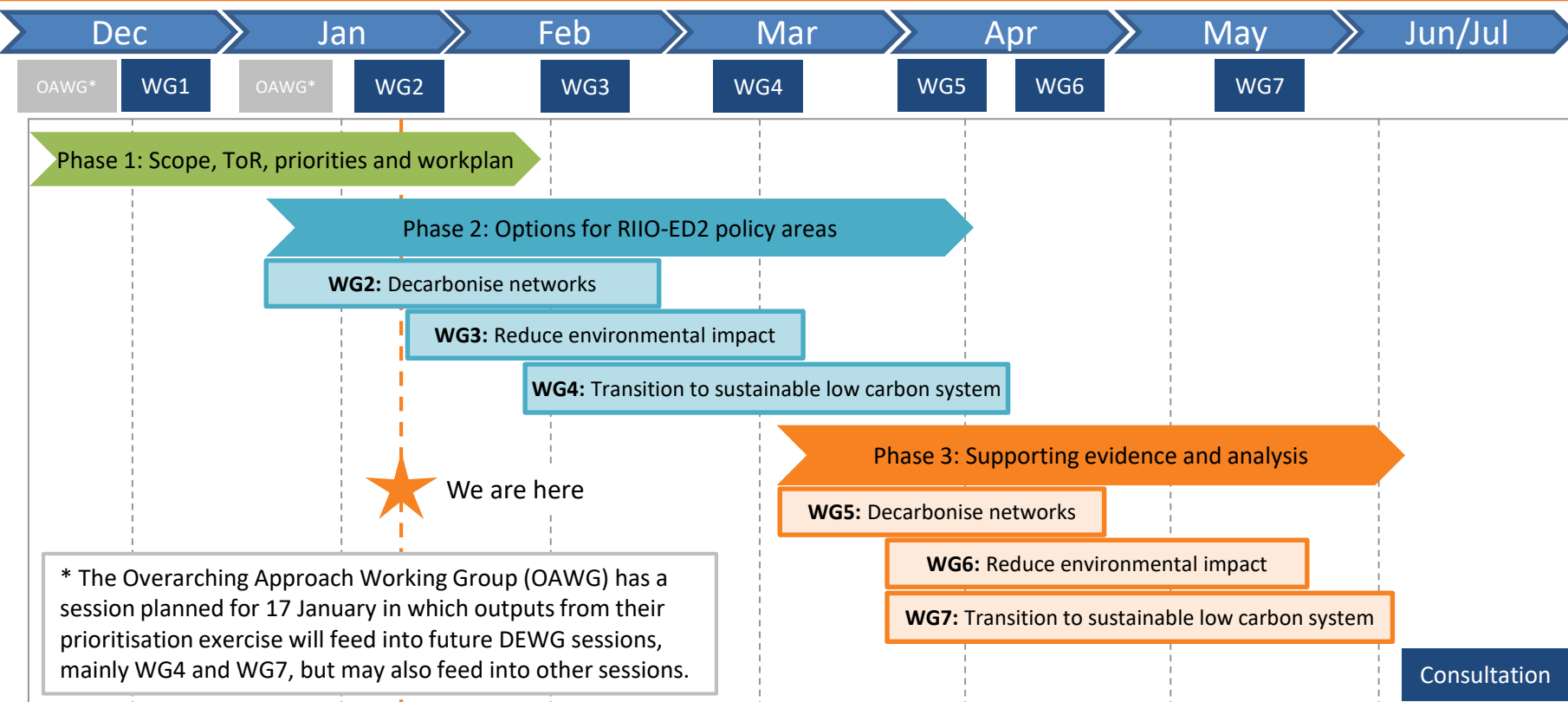
RIIO-ED team
28 January 2020

Purpose of today's meeting is to:

- Review work plan for the group and priorities for consideration
- Discuss options for decarbonising networks in ED2, specifically with regards to Business Carbon Footprint and losses

Timings	Agenda item
10:00 – 10:45 (45mins)	1. Intro/recap (Ofgem) <ul style="list-style-type: none"> a) Phased work plan for the group b) Recap actions from first session
10:45 – 12:00 (75mins)	2. Update on priorities and options for consideration for ED2 <ul style="list-style-type: none"> a) Priorities for WG incl options for consideration (NPg) b) Roundtable discussion on potential options, incl. merits and drawbacks
12:00 – 12:45	Lunch
12:45 – 13:45 (60mins)	3. Business Carbon Footprint <ul style="list-style-type: none"> a) Presentation on options for how common methodology could be used to measure BCF – (WPD) b) Roundtable discussion on potential options, incl. merits and drawbacks
13:45 – 15:00 (75mins)	4. Losses <ul style="list-style-type: none"> a) Presentation on key findings and considerations for ED2 (WSP) b) Roundtable discussion on potential options, incl. merits and drawbacks
15:00 – 15:30 (30mins)	Actions and next steps

Item 1: Recap of actions from first session – Ofgem



Phase 1 Settle scope of Group, share and agree a ToR & carry out a prioritisation exercise to inform future work (WGs 1 and 2).

Phase 2 Explore options (for outputs and incentives) for the policy areas under consideration by the Group and the merits and drawbacks of these options. **Group members should put forward policy options for discussion and review ahead of these sessions** (WGs 2, 3 and 4).

Phase 3 Gather evidence and analysis to support and develop options (WGs 5, 6 and 7). As such, options should be brought to the Group by middle of March, to ensure sufficient time for consideration.

In some sessions we may discuss more than one issue area but the aim is to focus on one issue area per session. The above plan allows us to discuss an issue area more than once where policy options can be developed over time.

Proposed dates and locations for D&E working group sessions

WG session	Date	Time	Location
1. Introductory session	9 December 2019	10am-4pm	Ofgem London offices (Room 1.11)
2. Group priorities and policy options: Decarbonising the networks (losses & BCF)	28 January 2020	10am-4pm	Ofgem Glasgow offices (Rooms 1 and 2)
3. Policy options: Reduce environmental impact (SF6, TBC)	19 February 2020	10am-4pm	Ofgem Glasgow offices (Rooms 1 and 2)
4. Policy options: Transition to sustainable, low carbon energy system	12 March 2020	10am-4pm	Ofgem London offices (Room 1.09)
5. Evidence and analysis: Decarbonising the networks	2 April 2020	10am-4pm	Ofgem London offices (Room 1.19)
6. Evidence and analysis: Reduce environmental impact	23 April 2020	10am-4pm	TBC
7. Evidence and analysis: Transition to low carbon energy system	21 May 2020	10am-4pm	TBC

Item 2: Update on ED2 priorities and options for consideration - NPg

Decarbonisation and Environment ED2 working group

Priorities for consideration

Northern Powergrid

28 January 2020



Objective

Deliver an environmentally sustainable network: Enable the transition to a smart, flexible, low cost, and low carbon energy system for all consumers and network users.

(i) Decarbonise networks with emphasis on business carbon footprint and embedded carbon in networks



Obligation to manage losses
Business Carbon Footprint (BCF)
SLC47: Environmental Report

(ii) Reduce the environmental impact of network activity eg pollution, resource waste, bio-diversity loss and other local effects



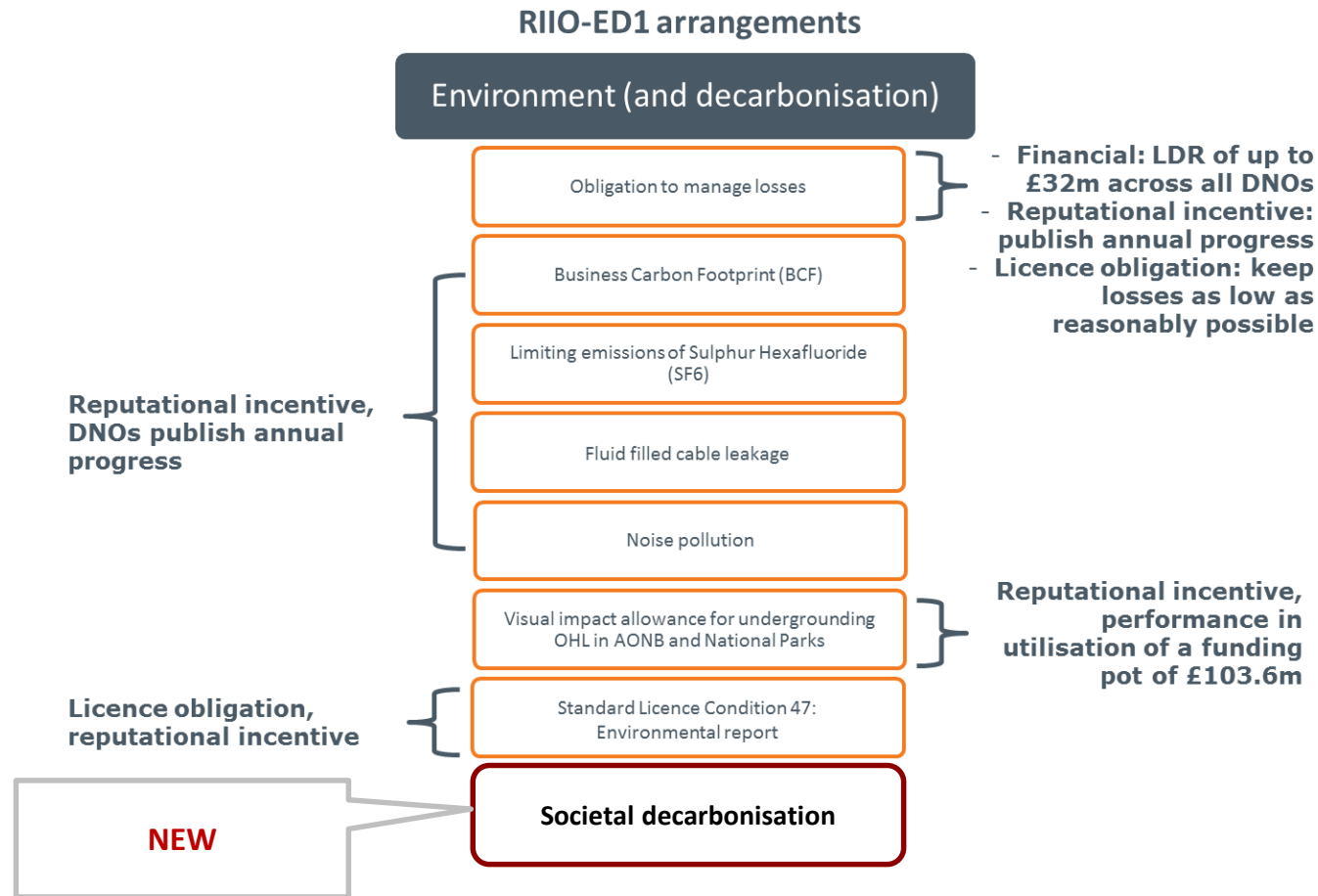
Limiting emissions of SF6
Fluid Filled Cables
Noise pollution
Visual impact allowance
SLC47: Environmental Report

(iii) Support the transition to a smarter, more flexible, sustainable low carbon energy system.

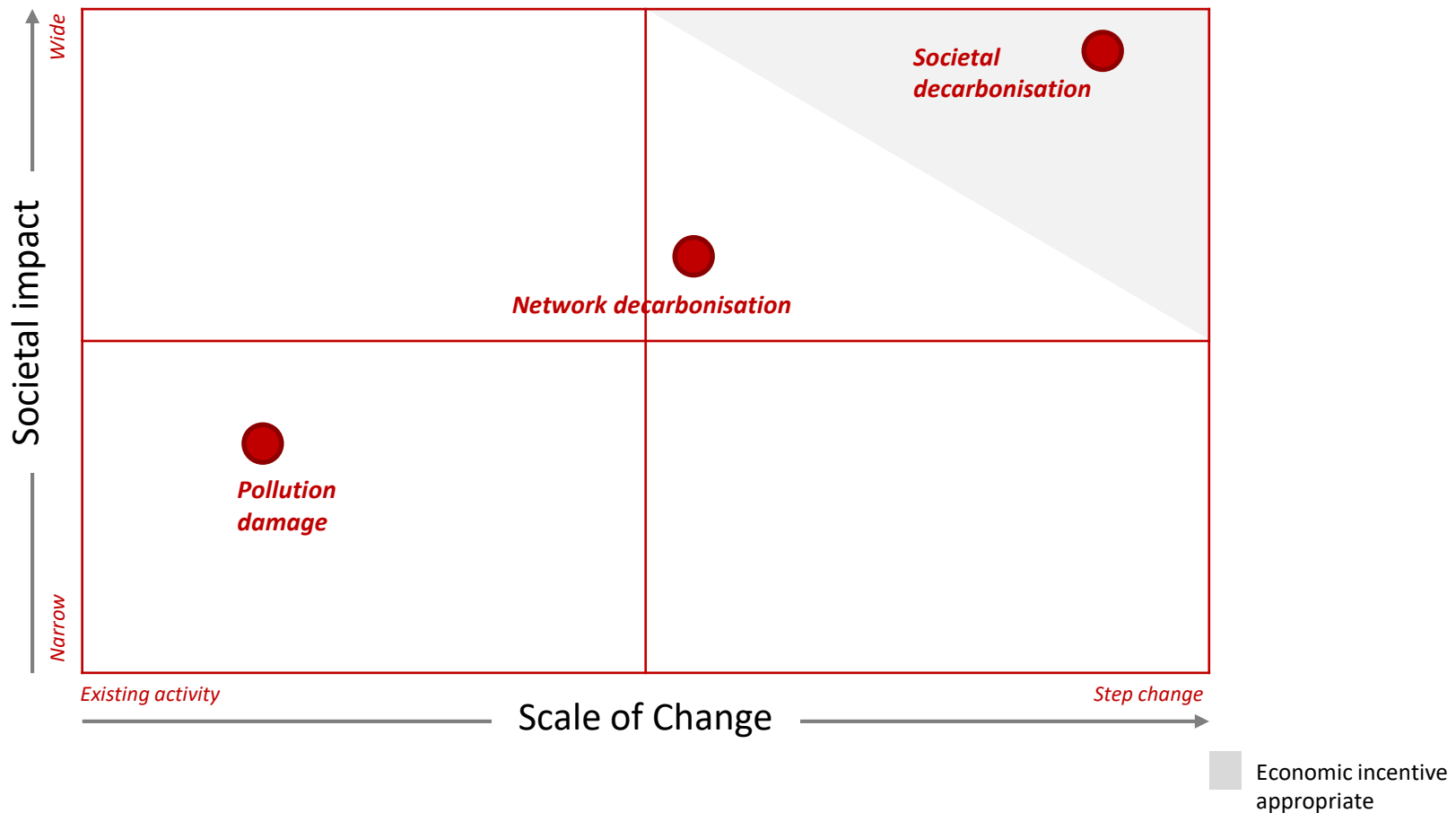


?

The ED1 framework has led to significant reductions in the industry's environmental impact and should largely be retained as BAU



Electricity distribution is key to meet the net zero target and Ofgem is right to questions how to achieve this outcome alongside existing objectives



The government's net zero by 2050 target will have significant implications for DNOs, as will the move towards cleaner air...

- Heat and local road traffic will be increasingly electrified during the ED2 price control period and beyond.
- Government will “*introduce a future homes standard, mandating the end of fossil-fuel heating systems in all new houses from 2025.*” This means that, from 2025 at least, many new homes will have to be fitted with heat pumps. More policy steps like this are likely.
- Public and political awareness of the problems caused by highly polluted air in urban centres is growing. The UK routinely breaks legal limits.
- A major acceleration in the uptake of ultra-low emission vehicles for local traffic is necessary, and the only available technologies at present are electric or hybrid cars.
- There is a high chance of significant uptake of these vehicles within the next decade, driven by government policy reform and falling technology costs.

“Heat pumps are an established solution in many other countries, but not yet in the UK. Establishing them as a mass-market solution will take some time, with strong progress required during the 2020s. There are particular opportunities in new-build properties, homes off the gas grid, non-residential buildings and for hybrid heat pump systems retrofitted around existing gas boilers.” and that

“In our recent Net Zero report we recommended an end to sales of petrol and diesel cars and vans by 2035 at the latest and early deployment of hybrid heat pumps, increasing electrification in the 2020s. A heat decarbonisation strategy could imply further electrification beyond this.”

Climate Change Committee, July 2019, Reducing UK emissions: 2019 Progress report to Parliament

... but, there is still significant uncertainty over the longer term pathway to net zero carbon emissions and clean local air

- Hydrogen might ultimately play a significant role, meeting needs that may otherwise have required investments in electricity distribution networks.
- We're yet to see an Energy White Paper that is expected to set out some milestones for the route to decarbonisation... may be published Q2 2020 following anticipated Government changes.
- The extent of customer uptake of new technologies is uncertain.
- Therefore, Ofgem needs to ensure its framework is flexible and adaptive.
 - DNOs should not be incentivised based on outcomes which are beyond their control, such as the level of uptake of new technologies by end users (like electric vehicles).
 - These outcomes will be largely determined by the cost of these technologies, consumer attitudes and government policies.

Societal decarbonisation – **NEW and EXTENDED**

Behaviours/Outcomes	Mechanism
<p>Networks enable the uptake of low-carbon technologies</p> <ul style="list-style-type: none"> • Connection • Use 	<p><i>Connection</i></p> <ol style="list-style-type: none"> 1. Extend BMCS to services that support decarbonisation (3rd party data usage, installation of heat pumps, witness testing installation of DG etc.) 2. Extend TTQ and TTC to include disruptive load 3. Volume driver <p><i>Use</i></p> <ol style="list-style-type: none"> 4. Incentivise kWh output from generators?
Flexibility is part of all network investment considerations	<ol style="list-style-type: none"> 5. Whole System CBA? 6. Reporting (data) to build market confidence that enables a route to a deep and liquid flexibility market
<p>Transition to low carbon at lowest possible cost</p> <ul style="list-style-type: none"> • Minimise the whole electricity bill, not solely ED2 costs. 	<ol style="list-style-type: none"> 7. Cost reflective price signals 8. Whole system CBA to minimise overall costs for customers? 9. Totex cost benchmarking to allow for optimal opex or capex solutions – no perverse incentives through false boundaries
Sustainable low-carbon energy system	<ol style="list-style-type: none"> 10. Cost reflective price signals 11. Whole system CBA? 12. Regional plans through enhanced stakeholder engagement 13. Consistent standards for national and regional Future Energy Scenarios

Network decarbonisation – **STRENGTHEN**

Behaviours/Outcomes
DNO delivers an environmentally sustainable network and establish credibility with regional stakeholders
Respond to climate change emergencies and reflect heightened interest from stakeholders
Build stakeholder trust through consistent reporting across the sector – reducing carbon measured consistently
Recognise the changing landscape for network losses – reducing may not be best with higher network utilisation from low carbon technologies

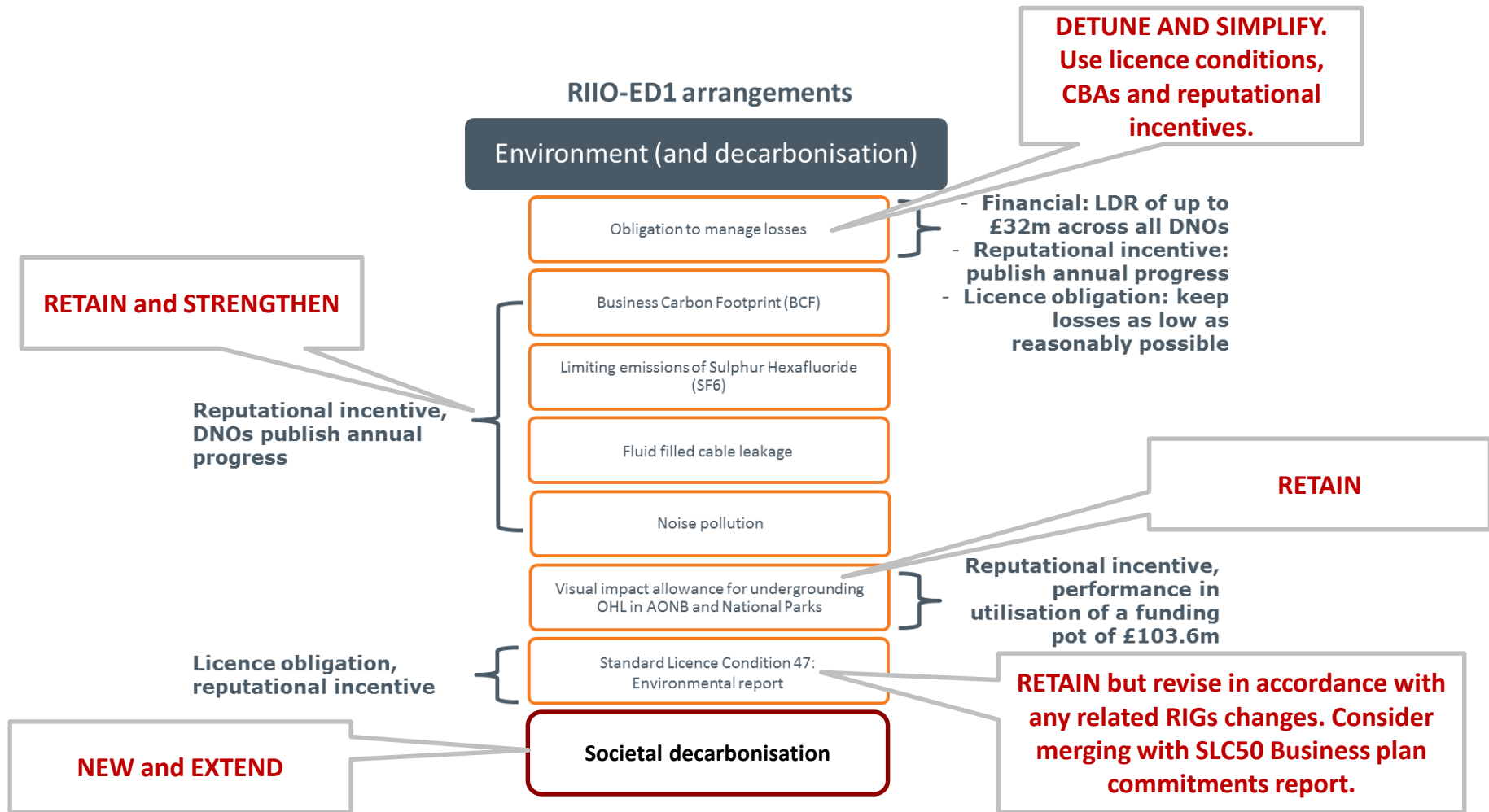
Incentive/Mechanism
1. Enhanced stakeholder engagement (throughout ED2)
2. Whole system CBA?
3. Environment plans as part of ED2 business plan
4. ED2 commitments and annual stakeholder reporting process
5. Enhanced stakeholder engagement (throughout ED2)
6. Environment plans as part of ED2 business plan
7. Consistent business carbon footprint and embedded carbon definition in public reporting
8. Ofgem annual reporting
9. Business plans
10. Optimised through whole system CBA?
11. Losses strategy
12. ED2 commitments and annual stakeholder reporting process

Environmental impact - **RETAIN**

Behaviours/Outcomes
Reduction of adverse environmental impact
Good asset stewardship
Responsive to regional stakeholder needs

Incentive/Mechanism
1. Law - Environment Agency regulator
2. ED2 commitments and annual stakeholder reporting process
3. Law - Environment Agency regulator
4. Enhanced stakeholder engagement (throughout ED2)
5. Area of Outstanding Natural Beauty allowance
6. ED2 commitments and annual stakeholder reporting process

The ED1 framework has led to significant reductions in the industry's environmental impact and should largely be retained as BAU



The RIIO price control framework was built for this challenge

- The main totex approach to funding costs removes distortions between different types of cost:
 - Strongly endorsed by the CMA who gave clear guidance that Ofgem should give careful consideration to any changes to how costs are treated or assessed that might re-introduce distortions.
 - This means new activities (such as DSO functions, and flexibility tendering) can all be accommodated within that framework for funding and performance.
- “Mainstream” the low carbon transition into the existing outcome incentives, (e.g. ensuring the relevant outcomes are built into the customer satisfaction incentive).
- DNOs should continue to be exposed to incentives to minimise their total costs, and deliver good performance in areas such as reliability, customer service and connections – but the existing mechanisms could be extended.
 - Reliability (Interruptions Incentive Scheme) incentives can continue to give DNOs an imperative to operate their system in a manner that mitigates risks of power cuts, including through new DSO activities. Question about strength of incentives to generate kWh (increasingly renewables).
 - The Broader Measure of Customer Satisfaction incentive could be extended to all activities that can support decarbonisation (like third party data usage, installation of heat pumps, or witness testing of generation installations).
 - Extend Time-to Quote and Time-to-Connect incentives to new or modified connections which involve disruptive loads, like heat pumps.
- Manage uncertainty through volume drivers that provide additional cost allowance as and when uptake occurs.

Item 3: Options for Business Carbon Footprint common methodology - WPD

WPD BCF Methodology

WPD methodology format;

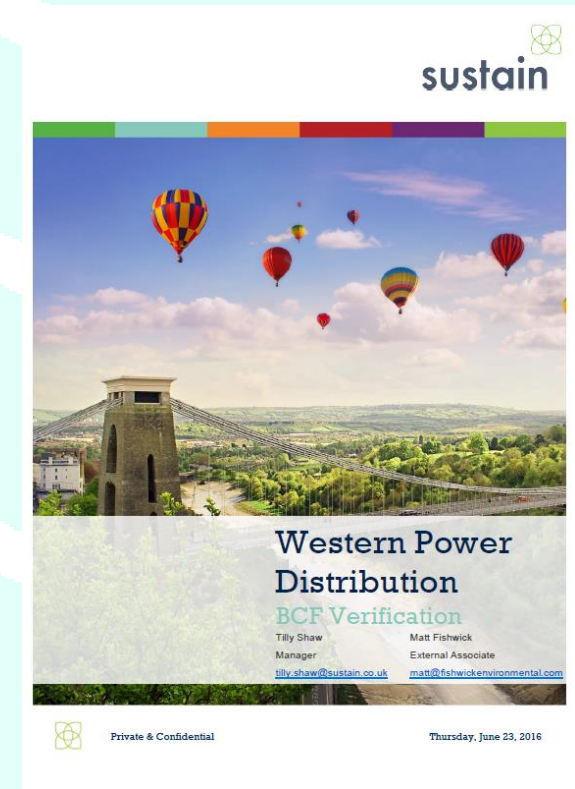
- Business line responsibilities for data gathering
- Data principles and criteria
- Reported emission categories and associated emission scope
- Company-wide data reporting assumptions (specific reportable aspect assumptions are stated within the methodology)
- Specific details for each reportable aspect e.g. data source, conversion factor, data checks.
- Data assurance details for BCF e.g. external verification

WPD -Business Carbon Footprint (BCF)

WPD's annual BCF and associated data gathering methodology verified externally to ensure a consistent and accurate approach in line with the GHG Protocol and ISO14064*.

Verification and the use of an established common approach each year provides assurance to our parent company, PPL, and to our stakeholders that our BCF has been calculated in an appropriate, transparent and reliable manner and that all assumptions which have been made are reasonable and consistent.

*ISO14064 – Quantification and reporting of greenhouse gas emissions



Adopting a common BCF methodology for ED2

Extract from current WPD BCF methodology

BCF Emission Category	Emission Aspect	Data Source	Methodology and assumptions	Checks / Clarification
Building Energy Use (scope 1 &2)	Electricity - Building	SMART meter downloads Invoice data	Data from installed SMART meters is collected via www.stark.co.uk Additional information is gathered from received invoice information via Fortis and direct requests to providers e.g. Haven Energy. All data is converted from kWh to tCO _{2e} using 2018 DEFRA conversion factor 0.28307 Data tables are retained by the WPD Environment Team.	Invoices against meters and www.stark.co.uk annual reports
	Other fuels - Buildings	Invoice data	All data is converted from kWh to tCO _{2e} using 2018 DEFRA conversion factor. 0.21448 Data tables are retained by the WPD Environment Team.	Invoices against meters
	Energy use for the following sites; WPD Avonbank, WPD Pegasus, WPD Lamby Way and WPD Tipton is apportioned according to the following allocations; •South West 25% / South Wales 15% / East Midlands 30% / West Midlands 30%			

Adopting a common BCF methodology for ED2

A published detailed Ofgem BCF methodology would provide;

- Consistent approach to data handling and assumptions;
 - stating acceptable sources of data per reported aspect
 - setting limits on the range of data to be used
 - clarifying appropriate DEFRA conversion factors
 - confirming the emission scope for each reported aspect
 - providing examples of reasonable assumptions which may be used
 - establishing expectations on data assurance and validation
 - establishes a common approach across all sectors which Ofgem regulates.

Adopting a common BCF methodology for ED2

A published detailed BCF methodology would provide;

- Common reporting approach within individual DNOs and across the sector for ED2;
 - improving data reliability and assurance
 - reducing subjectivity and interpretation discrepancies
- Reliable cross-DNO and sector comparisons;
 - Supporting transparent and unambiguous league table comparison and evaluation.
 - Providing the opportunity for establishing relative carbon intensity metrics e.g. tCO₂e per employee or tCO₂e per m² of depot space.

Adopting a common BCF methodology for ED2

A published detailed BCF methodology would provide;

- Opportunity for the use of external indicators;
 - Verification at sector or DNO level.
 - Requirement for a statement of external verification to published methodology or disclosure to certified carbon disclosure scheme e.g. Carbon Disclosure Project (CDP) (WPD currently participates in this scheme as part of a wider parent company submission)
- Opportunity to extend scope 3 emission reporting;
 - Water supply / treatment
 - Waste disposal
 - Material use
 - Smaller external service providers

Adopting a common BCF methodology for ED2

In practice;

- Methodology should be in line with the requirements of ISO14064/PAS 2050 and GHG reporting protocol.
- Consultation required on any proposed methodology
- All DNOs and interested third parties would need to agree and sign up to the methodology

Item 4: Losses - WSP



January 28th 2020, Ofgem DEWG

Potential RIIO-ED2 Losses Regulatory Approach

WSP,
ENA Technical Losses
Working Group



ENA TLWG - Purpose and Aims

1. Improve understanding of technical losses
2. Development of best practice and sharing of successful losses activities
3. Review of technical and regulatory options for a fair and effective losses mechanism in ED2

ENA TLWG - Structure

- Convened in March 2016
- Attended by all six DNO Groups and National Grid
- Reports to ENA Electricity Networks and Future Group



Work packages commissioned to investigate *The Impact of Low Carbon Transition on Technical Losses & Potential Regulatory Approaches*

Technical Losses WG – Work Packages

- Impact of the Low Carbon Transition on Losses
- Potential Regulatory Approaches for RIIO-ED2

Key Findings

- Losses inherent with operation of electricity networks - cannot be eliminated, vary by network topology and predominantly driven by customer behaviour.
- Losses cannot be accurately measured.
- Technical losses will increase as we move to a low carbon future.
- An approach consistent with RIIO-T2 reputational approach, recognising that there is also opportunity for CBA losses activity is recommended.

Technical Losses Mechanism Study

WSP

- **Key Findings**
- **Complexity**
- **LCT Impact**
- **Regulatory Approach**
- **Conclusion**
- **Discussion**

Key Findings

Complexity

Losses are complex, difficult to measure and vary based on regional topology

LCT Impact

Technical losses will increase as we move to a low carbon future

Regulatory Approach

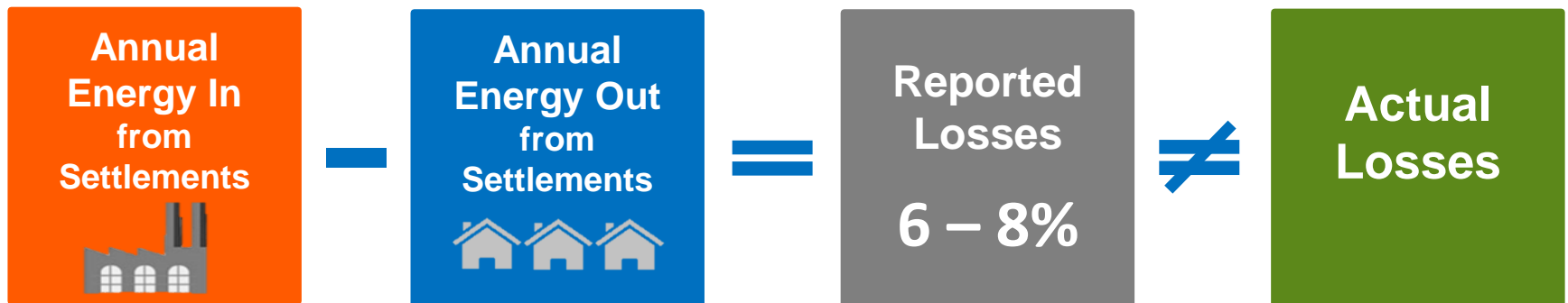
A reputational incentive with a CBA approach is recommended

Complexity

Calculating Losses Is Inaccurate

**Losses are small in absolute terms...
They vary a lot when settlement values vary by a small %.**

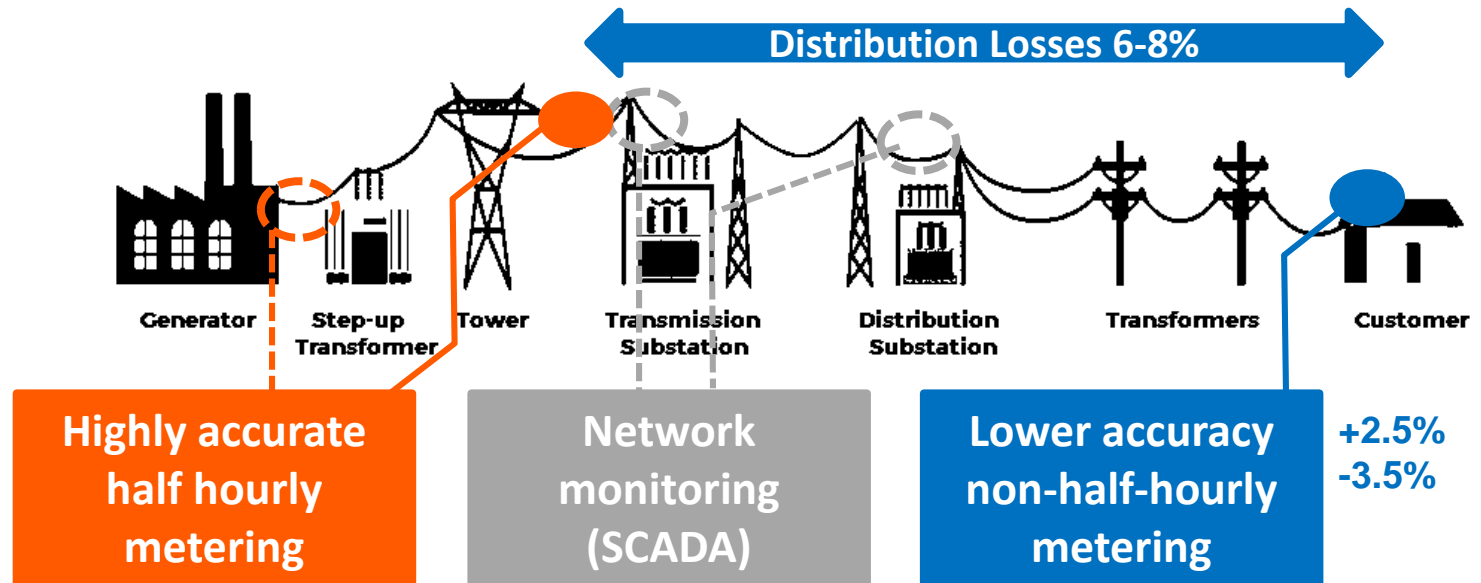
- Statutory limits for domestic energy metering is +2.5% / -3.5% accuracy
- Small metering accuracy values appear as a large tolerance on losses
- Different metering systems consume different levels of electricity
- Energy Out Settlement are mix of HH, NHH and UMS (up to 18month process)



Small variations in settlement volumes lead to large inaccuracies on losses

Measurement of Losses

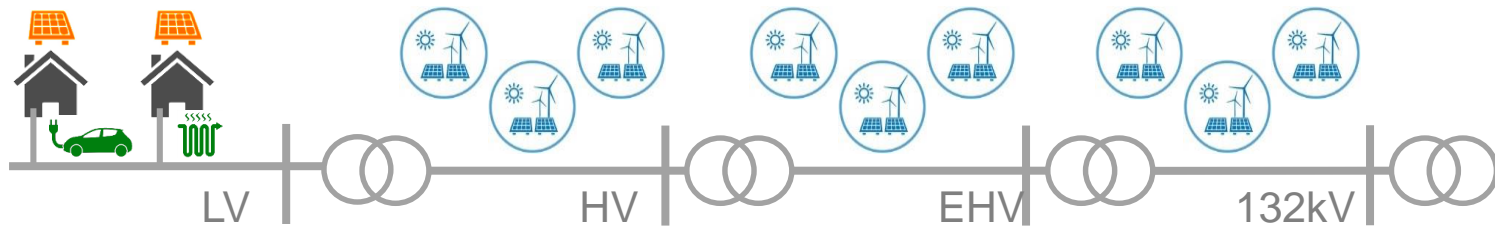
Different types of metering arrangements and monitoring at only some network locations do not allow losses to be measured accurately.



Electrical losses are not measured directly.

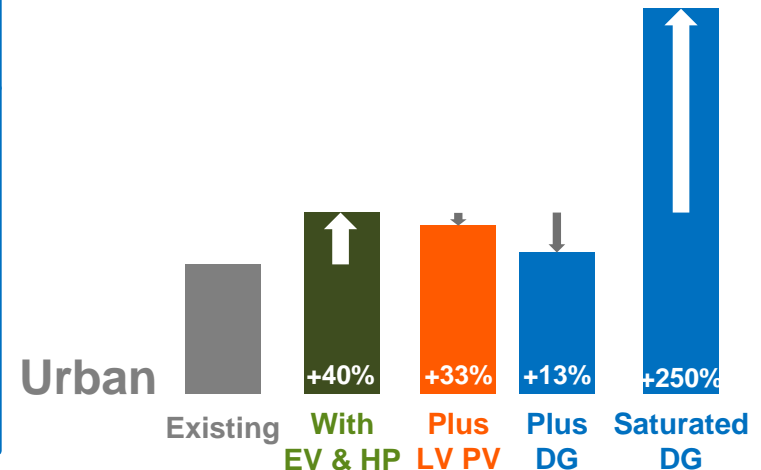
LCT Impact

LCT Impact by 2030 – Urban



Impact of 2030 LCT uptake in Urban areas

- Losses significantly increase due to future load growth from EVs & HPs
- Low uptake generation reduces losses
- High penetrations of actively managed generation dramatically increases losses

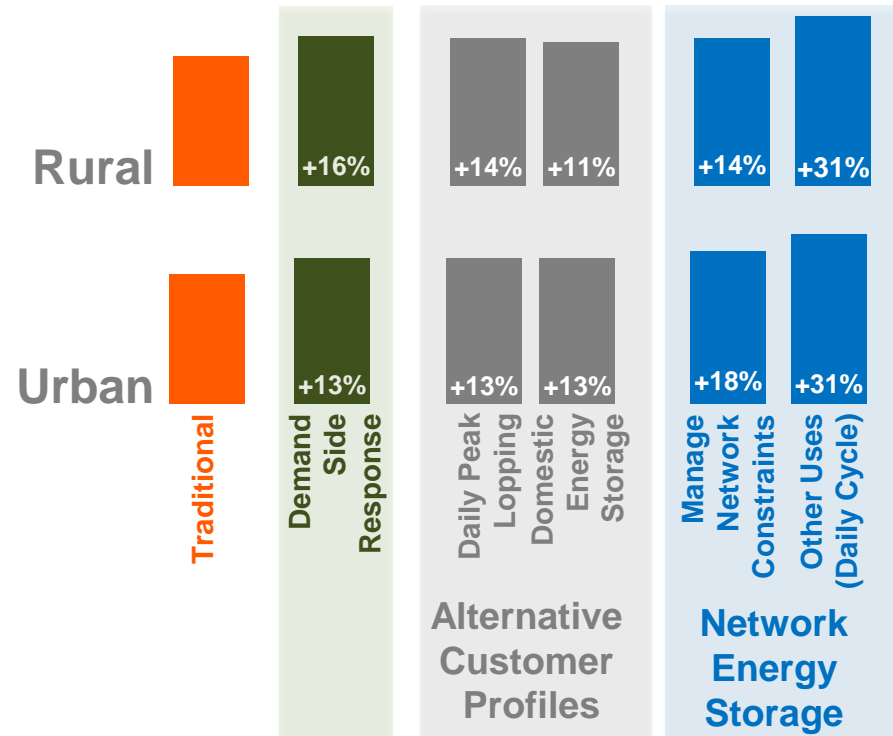


The uptake of low carbon technologies will significantly impact losses

Network Evolution

Smart Solutions

- Smart solutions increase network utilisation and therefore load and losses
- Simulations considered:
 - Demand Side Response
 - Alternative Customer Profiles
 - Grid Energy Storage
- Comparisons of losses against network with traditional reinforcement applied



**Smart Solutions increase losses,
reinforcement choices must adequately consider losses**

Regulatory Approach

History of Loss Reduction Incentives

DPCR 1 (1990-1994)	None
DPCR 2 & 3 (1995-2005)	Financial incentive based on outputs plus volume driver
DPCR 4 (2005-2010)	Financial incentive based on outputs Losses target based on historic 5 year rolling average
DPCR 5 (2010-2015)	Fixed targets Never activated , replaced with losses reporting requirement
RIIO-ED1 (2015-2023)	Licence obligation, reporting and reward mechanism

Rolling Losses Mechanism was indefinitely suspended by Ofgem prior to ED1 due to data volatility and inability to link changes to DNO actions.

Established Guiding Principles

Incentivise

**Incentivise economic & efficient
management of losses**

Balance

**Balance between todays and
tomorrows customers**

Harmonious

**Harmonious with other
incentives and revenue streams**

Efficient

**Efficient to operate, practical to
implement**

International Regulatory Approaches Considered

- 1** — **Reputational Incentive**
(e.g. score actions to manage / understand losses)
- 2** — **Cost-Benefit Analysis**
(e.g. CBA tools to justify losses interventions)
- 3** — **Mechanism based on measured losses**
(e.g. DPCR4 losses incentive mechanism)
- 4** — **DNO Procurement of Losses**
(e.g. capping losses rate in tariffs)

**Options identified from
Stakeholder Engagement and Literature Review**

1) Reputational Incentive

Building on the RIIO-ET2 Sector Methodology:

- Assessing implementation of a reputational incentive model for Distribution.
- Reputation incentive could be used alongside additional incentives, such as a CBA-based incentive.
- Understanding the advantages and disadvantages of different possible reputational incentives.



Assessing whether a Reputation Incentive is fit for purpose for Distribution and potential options for the approach

2) Cost-Benefit Analysis Approach



Cost Benefit Analysis (CBA) to fairly account for financial and environmental cost of losses in designs:

- CBA compares lifetime costs - may justify losses efficient designs with higher upfront costs.
- CBA used by some countries to inform / justify key investment decisions (e.g. Australia, Sweden)
- In ED1, DNOs already use the Ofgem CBA template to test and justify losses activities.

A CBA based approach can be used to inform investment decisions and fairly account for the cost of network losses when comparing options

3) Mechanism based on measured losses

- GB DPCR4 & DPCR5 mechanisms used settlement data. DNO allowed revenues were adjusted by calculated losses vs. losses target.
- Suspended by Ofgem due to difficulties in accurately measuring losses and in making meaningful comparisons between DNOs.
- Remains difficult to measure losses accurately.
- Only a few countries use formulaic incentive, no evidence of improvements yet.



A mechanistic approach heavily reliant on accurate losses measurement

4) DNO Procurement of Losses



- In many countries (including Norway, Denmark, Austria, Belgium and France) procurement of losses is the responsibility of network operators.
- Incentives are applied through capping revenue or capping the losses rate in tariffs.
- Very different in GB where procurement of losses is by suppliers – not the DNOs.
- To apply in GB would require wide scale and costly industry changes.

**In GB procurement of losses is by suppliers, not the DNO.
This approach would require far reaching whole industry change.**

International Regulatory Approaches Considered

- | | | |
|---|--|--|
| 1 | Reputational Incentive
(e.g. score actions to manage / understand losses) | ✓
✓
Complimentary to both incentivise and fund responsible losses activities |
| 2 | Cost-Benefit Analysis
(e.g. CBA tools to justify losses interventions) | |
| 3 | Mechanism based on measured losses
(e.g. DPCR4 losses incentive mechanism) | ✗ Same issues as DPCR5 approach which was indefinitely suspended |
| 4 | DNO Procurement of Losses
(e.g. capping losses rate in tariffs) | ✗ Used across Europe, would require wide scale industry change in GB |

**Options identified from
Stakeholder Engagement and Literature Review**

Recommended:



Reputational Incentive

Losses activities could be added to Environmental scorecard as part of Ofgem annual report.

- **Performance of DNOs monitored against their own Losses Strategies.**
- **Transparently allows interested stakeholders to easily review DNOs against their losses obligations.**



Cost-Benefit Analysis



Justify losses Strategy activities as part of ED2 submission using CBA.

Enhance existing CBAs:

- **Commonality in assumptions using ENA Best Practice Guide.**
- **Review impact of certain variables (cost of procuring losses; carbon price; societal benefits etc.)**

Approach for consideration within wider ED2 regulatory framework

Conclusions

How should detail be progressed?

Losses funding arrangements in ED2?

- Within other area of ED2 Settlement e.g. increased unit costs?
- Separate Losses allowance?

How to measure DNO performance against Losses Strategy?

- Output driver, reputational, combination?

Is LDR still required?

- Losses innovation included within innovation allowances?

SRRWG to determine actions and next steps to develop options for a detailed Losses Mechanism.

Conclusion

Conclusions from assessments of different approaches:

- ① — A mechanistic/formulaic approach is not recommended for ED2 due to difficulties accurately measuring losses.
- ② — A mechanism based on procurement of losses is not recommended due to the complexity and errors.
- ③ — **Both Reputational and CBA-Based Incentives are recommended for consideration within wider RIIO-ED2 framework.**

The finalised report will be published on the
ENA website in early 2020.

Discussion

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.