

# RIIO-ED1 regulatory instructions and guidance: Annex J – Environment and Innovation

## Guidance

**Reference:** V~~3~~4.0

**Publication date:** Original publication  
18 June 2015  
Revised publication  
16 April 2018

**Contact:** Louise Deighan

**Team:** RIIO-ED1

**Tel:** 0141 331 6363

**Email:** [RIIO.ED1@ofgem.gov.uk](mailto:RIIO.ED1@ofgem.gov.uk)

### Overview:

RIIO-ED1 is the price control for electricity distribution network operators (DNOs) from 1 April 2015 to 31 March 2023.

This document is part of the regulatory instructions and guidance (RIGs) for RIIO-ED1.

## Contents

---

<b>1. Introduction .....</b>	<b><u>333</u></b>
Scope of this document .....	<u>333</u>
General instructions .....	<u>444</u>
<b>2. Instructions for completing Visual Amenity, Environmental Reporting and BCF worksheets .....</b>	<b><u>666</u></b>
E1 – Visual Amenity .....	<u>666</u>
E2 – Environmental Reporting .....	<u>777</u>
E3 – BCF.....	<u>888</u>
<b>3. Instructions for completing the Losses Snapshot worksheet.....</b>	<b><u>141414</u></b>
E4 – Losses Snapshot.....	<u>141414</u>
<b>4. Instructions for completing Smart Metering, Innovative Solutions, LCTs and IRM worksheets .....</b>	<b><u>191919</u></b>
E5 – Smart Metering .....	<u>191919</u>
E6 – Innovative Solutions .....	<u>202020</u>
E7 – LCTs (low carbon technologies) .....	<u>252525</u>
E8 – IRM (Innovation Roll-out Mechanism).....	<u>272726</u>

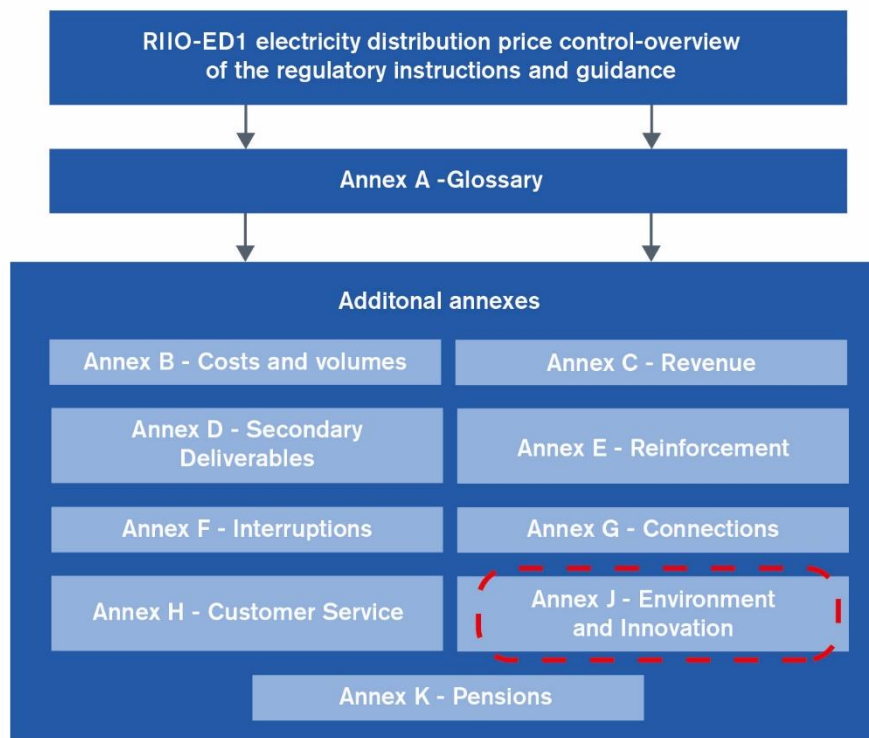
# 1. Introduction

## Scope of this document

1.1. This document is part of the regulatory instructions and guidance (RIGs) for RIIO-ED1. The term RIGs refers to a collection of documents - our instructions and guidance, and the reporting packs and commentaries the electricity distribution network operators (DNOs) have to fill out.

1.2. Figure 1.1 shows all the instructions and guidance documents for the RIIO-ED1 RIGs. This document, circled in Figure 1.1, is one of a series of annexes containing instructions and guidance. It provides DNOs with information on how to fill in the Environment and Innovation Reporting Pack and Environment and Innovation Commentary that they are required to submit to us.

**Figure 1.1: Map of the RIIO-ED1 instructions and guidance**



1.3. This document should be read in conjunction with:

- the RIIO-ED1 electricity distribution price control – overview of the regulatory instructions and guidance document
- Annex A – Glossary for the regulatory instructions and guidance
- the associated Microsoft® Excel 2010 reporting pack named “Environment and Innovation Reporting Pack”
- the associated commentary named “Environment and Innovation Commentary”.

1.4. The purpose of the Environment and Innovation Reporting Pack is to collect information in order to monitor DNOs’ actions and performance in RIIO-ED1. It will also provide information that will inform the next price control review. DNOs are also required to publish the worksheets in the reporting pack as part of their Environment Reports. This is to provide stakeholders with a picture of DNOs’ environmental activities. If DNOs consider the publication of any information contained in the Environment and Innovation Reporting Pack would be detrimental to consumers, they must provide evidence of this to Ofgem, and Ofgem will decide on a case-by-case basis whether this may be redacted.

## General instructions

### Recording information

1.5. In the worksheets the numbers will be displayed to two decimal places. The DNOs are required to provide data to a minimum of two decimal places for actual data and one decimal place for forecast values, unless otherwise indicated in the guidance. Where a reportable value is zero the cell input should be zero. Where it is not applicable to the DNO, the cell can be left as a blank.

1.6. Some costs must equal costs reported in the Costs and Volumes Reporting Pack. DNOs must make sure that, where stated in the guidance, the costs in the Costs and Volumes Reporting Pack are equal to the costs in the Environment and Innovation Reporting Pack.

### RIIO-ED1 CBA Tool guidance

1.7. Where CBAs are referenced in the worksheet guidance below, figures for costs and benefits should be derived from an up-to-date version of the DNO’s completed RIIO-ED1 CBA Tool for that particular solution or scheme. CBAs should be undertaken as, and when, any decision support tool would be used for the DNO’s own investment purposes or business decisions, for example when making or changing a policy, or when evaluating options for a particular scheme.

1.8. The DNO should take reasonable steps to ensure CBAs are kept up to date to account for:

- new or updated information (including field data), that are materially different from the assumptions in the most recent CBA previously submitted, or

- any other material change to a driver or input in the RIIO-ED1 CBA Tool.

1.9. New or updated information could include the specifics of a scheme or deployment (eg volume, unit costs, local factors) that are materially different from the assumptions in the most recent CBA previously submitted. For example, if it was originally assumed that the benefits of a particular scheme scale linearly with the number of deployments, but, over time, substantial economies of scale are observed, then a new CBA for that scheme may be required. Bespoke assessments for deployments of a solution are not required.

1.10. The most up-to-date CBA for each activity reported in the Environment and Innovation Reporting Pack must be submitted to Ofgem alongside the RIGs. Each CBA should be provided as an attachment to the Environment and Innovation Commentary or, if it is already published elsewhere, with a link to its location. Where the RIIO-ED1 CBA Tool cannot be used to justify an activity, DNOs should explain why and provide evidence of how they have derived the equivalent figures for the worksheets. Ofgem would expect any such methodology and the resulting figures to take account of societal benefits.

### **Change logs**

1.11. The Changes Log must be used by the DNOs to record any amendments (formulae or presentation) that are made to the reporting pack, including the date those changes were made. Ofgem will also record any changes made to the reporting pack in this worksheet.

1.12. In the Data Change Log worksheet a DNO must record any changes it has made to data that has previously been submitted and the date this change was made. A reason for the change should be included.

## 2. Instructions for completing Visual Amenity, Environmental Reporting and BCF worksheets

---

### E1 – Visual Amenity

2.1. The purpose of this worksheet is to record the costs and volumes associated with Visual Amenity Projects relating to the undergrounding of overhead lines under the Visual Amenity Allowance funding mechanism. The funding mechanism allows undergrounding of overhead lines for Visual Amenity Inside Designated Areas and allows for up to 10% of the total allowances to be used for undergrounding of overhead lines for Visual Amenity Outside Designated Areas. The final table in this worksheet is for the reporting year only.

2.2. The following terms are defined in Annex A - Glossary:

- Designated Areas
- OHL Inside Designated Areas at End of Reporting Year (km)
- OHL (Overhead Lines)
- OHL (km) Removed During Year
- UG Cables Installed During Year (km)
- Visual Amenity Allowance
- Visual Amenity Expenditure
- Visual Amenity Inside Designated Areas
- Visual Amenity Outside Designated Areas
- Visual Amenity Projects.

2.3. The Volume - Visual Amenity Inside Designated Areas and Volume - Visual Amenity Outside Designated Areas tables are for recording the volume related to this activity for each Regulatory Year.

2.4. In the Volumes tables, the values to be inputted relate to activities undertaken during the Regulatory Year funded under the Visual Amenity Allowance and the status at the end of the Reporting Year.

2.5. The Costs table is for recording the costs of activity for Visual Amenity Inside and Designated Areas and Visual Amenity Outside Designated Areas. For the avoidance of doubt, costs recorded in this table are only those for eligible Visual Amenity Projects funded under the Visual Amenity Allowance.

2.6. The Total Gross Costs entered in CV20 – Visual Amenity of the Costs and Volumes Reporting Pack must be equal to the Total Visual Amenity Expenditure (Row 46) of this table.

2.7. In the table “Undergrounding Activity Under ED1 Visual Amenity Allowance”, the DNO is to report OHL Inside Designated Areas at End of Reporting Year (km) by Designated Area, ensuring double-counting of lines which cross the boundary of two such areas is avoided. They should also list total activity volume and expenditure by Designated Area under the Visual Amenity Allowance, for both Visual Amenity Inside Designated Areas and Visual Amenity Outside Designated Areas. Visual Amenity Outside Designated Areas should be reported against the relevant Designated Area which is associated with the Visual Amenity Project for which the funding was allocated.

2.8. Where no activity has been undertaken in a particular Designated Area, these cells should remain blank. Total volumes of lines in place in the relevant Designated Area should be reported here, regardless of how any work relating to them was funded.

## **E2 – Environmental Reporting**

2.9. The purpose of this worksheet is to record the costs and volumes relating to environmental activities and their impact. It also collects data on compliance with environmental legislation.

2.10. The following terms are defined in Annex A - glossary:

- Contaminated Land Clean Up
- Environmental Civil Sanction
- Fluid-Filled Cables
- Fluid-Filled Cables in Service
- Fluid Recovered
- Fluid Used to Top Up Cables
- Noise Pollution
- Non-Undergrounding Visual Amenity Schemes
- Oil in Service in Cables
- Oil Pollution Mitigation Scheme - Cables
- Oil Pollution Mitigation Scheme - Non Operational Sites
- Oil Pollution Mitigation Scheme - Operational Sites
- SF6 Bank
- SF6 Emitted
- SF6 Emitted Mitigation Schemes
- Undergrounding for Visual Amenity.

2.11. This worksheet excludes activity for Visual Amenity Projects undertaken under the Visual Amenity Allowance, which is reported in worksheet E1 – Visual Amenity. Detailed losses reporting and BCF are also reported separately, in worksheets E3 – BCF, E4 – Losses Snapshot, and CV21 – Losses of the Costs and Volumes Reporting Pack.

2.12. Costs and volumes for each activity should be reported by category listed in the table “Environmental costs and volumes”. These should be recorded here where the primary driver of the activity undertaken was environmental improvements. The

Total Gross Costs entered in CV22 – Environmental Reporting of the Costs and Volumes Reporting Pack must be equal to the Total costs reported in this table (Row 18).

2.13. Additional volume information must be provided by DNOs associated with Fluid Filled Cables, SF6 and Noise Pollution under the separate tables in this worksheet. Data relating to Fluid-Filled Cables captures cable oil volumes. This gives clarity on the leakage volumes in relation to the related Oil in Service in Cables for the Fluid-Filled Cables systems.

2.14. In the “SF6” table, SF6 should be reported in kg as opposed to tCO2e (as it is in E3 – BCF).

2.15. It is not intended that the reporting requirements should be any more onerous than would be required by current reporting or management practices. It is therefore expected that DNOs will use existing information systems to report these measures (including those introduced to support the National Operating Code on the Management of Fluid Filled Cable Systems).

2.16. Ofgem continues to take an interest in Schedule 9 matters. Ofgem may request Schedule 9 statements from DNOs.

## **E3 – BCF**

2.17. The purpose of this worksheet is to collect information on DNOs’ Business Carbon Footprint (BCF). The data is required in order to monitor performance under the different measures, as well as monitoring key drivers of that performance. This worksheet provides a quantification of DNOs’ BCF (in tonnes of CO2 equivalent).

2.18. Losses are included in the BCF in order to provide an annual estimate of total BCF. DNOs must therefore report Losses under their BCF, in addition to the separate reporting on losses management activities in E4 – Losses Snapshot and CV21 – Losses of the Costs and Volumes Reporting Pack.

2.19. The BCF reporting year used by the DNO should align with the Regulatory Year.

2.20. The following terms are defined in Annex A - Glossary and include:

- Buildings – Electricity
- Buildings Energy Usage
- Buildings – Other Fuels
- Business Carbon Footprint (BCF)
- Business Transport
- Carbon Emission
- Fuel Combustion
- Fuels Other



- Fugitive Emissions
- Gas Natural
- Gases Other
- Greenhouse Gas Emission
- Losses
- Operational Transport
- SF6
- Substation Electricity
- tCO2e.

### **General principles of the reporting methodology**

2.21. The reporting methodology must be compliant with the principles of the Greenhouse Gas Protocol (GHG Protocol).<sup>1</sup> In summary, the BCF reporting must be:

- *Relevant*: the inventory must reflect the substance and economic reality of the company's business relationships, not merely its legal form.
- *Complete*: all relevant emission sources must be included (although in practice lack of data or cost of gathering could be a limiting factor).
- *Consistent*: accounting approaches, inventory boundary and calculation methodology must be applied consistently over time.
- *Transparent*: information on the processes, procedures, assumptions and limitations of the BCF reporting must be disclosed in a clear, factual, neutral and understandable manner, enabling internal and external verifiers to attest to its credibility.
- *Accurate*: GHG measurements, estimates, or calculations must be systemically neither over nor under the actual emissions value, as far as can be judged, and that uncertainties be reduced as far as practicable.

### **Reporting boundaries**

2.22. DNOs must report on all Scope 1 and Scope 2 emissions and a subset of Scope 3 emissions, as detailed below on an operational control basis. ie report all emissions from operations on which the DNO has full authority to introduce and implement its operating policy.

2.23. DNOs must also report on a subset of Scope 3 emissions (business travel and external contractors), to ensure that the reporting captures all of the emissions arising from the development and operation of the licensee's Distribution System, regardless of the legal entity carrying out each activity.

### **Contractors**

2.24. BCF emissions due to contractors must be separately reported for RIIO-ED1 in the BCF tables in the second half of the worksheet. DNOs are not required to reverse

---

<sup>1</sup> For further details, please refer to [GHG Protocol – A corporate Accounting and Reporting Standard](#).

populate the separate contractor emissions for DPCR5 values and should complete the DNO emissions table based on the RIGs in place at the time.

2.25. As far as possible, DNOs must try to ensure that data provided from different contractors is based on consistent assumptions. Ofgem continue to work with DNOs to develop the consistency of reporting of contractors' emissions. As such, the tables allow for reporting of contractors emissions in any category and DNOs may enter zero in those cells where they are not reporting emissions from contractors.

### **Detailed reporting requirements**

2.26. DNOs are given flexibility to set their own standards for the use of estimates rather than direct measurement<sup>2</sup> and any exclusion from the reporting based on (lack of) materiality considerations.<sup>3</sup> It is anticipated that data will need to be estimated under two scenarios:

- when the type of emissions is not measured
- when there is measurement data, but an estimate is required as the data is not at the same level of granularity as required by the summary BCF worksheet.

2.27. As a general principle, DNOs must focus more on the first type of estimation.

2.28. Ofgem expects BCF to be expressed using 2014-15 as the base year for any comparisons or discussion of changes. This will also be the baseline for reporting and discussion of BCF in the Environment Report (as established through Standard Condition 47 of the electricity distribution licence). During RIIO-ED1, Ofgem will indicate a possible point where a review of baselines will be considered and invite DNOs to submit for baseline readjustment under BCF.

### **Apportionment across Distribution Service Areas**

2.29. When the emissions data is not available for individual Distribution Service Areas then the apportionment factor used must be transparent.

2.30. Ofgem expects that the basis for calculating the apportionment factor will vary according to the area of emissions. Table 2.1 below gives the preferred basis for determining the apportionment factor. Other methodologies can be used, but they must be justified.

---

<sup>2</sup> In accordance with the principles of the GHG protocol and ISO14001, Ofgem expects a process of continual improvement, so that estimates are progressively replaced by direct measurement. More attention must be given to those estimates of emissions, which are likely to be significant.

<sup>3</sup> In cases where emissions have not been estimated, it is important that this is transparently documented and justified in the methodology.

**Table 2.1 – Apportionment factor determination**

Area of emissions	Basis for apportionment factor
Building usage	Head count
Operational Transport	Network length or km <sup>2</sup> of the DSA
Business Transport	Head count, or like operational transport
Substations usage	Number of substations
Diesel mobile generation	CML or CI or number of interventions

**Guidance on completing the worksheet**

2.31. In the worksheet, data entry is in the form of base measurement and conversion factors. Such factors will be the factors published by DEFRA in place on 31 March of the regulatory period being reported, unless there is a compelling case for using an alternative factor.

2.32. DNOs are required to enter volumes and applied conversion factors within the worksheet tables for the RIIO-ED1 period. This is not required for the DPCR5 years included, where a direct value in tCO<sub>2</sub>e may be entered.

2.33. Where multiple conversion factors are required to calculate BCF within a particular category (eg due to use of both diesel and petrol vehicles), DNOs should enter a weighted average of these factors. Where multiple units are required for calculation of volumes in a given BCF category (eg a mixture of mileage and fuel volume for transport), DNOs should enter volumes in a single equivalent unit.

2.34. If a DNO's contractor is unable to provide a breakdown of the calculation of their contribution to BCF including relevant volumes and conversion factors, but their BCF values are the product of an accredited certification scheme, DNOs may enter a dummy volume unit of '1' in the calculation table.

*Buildings Energy Usage*

2.35. Emission for electricity usage in buildings must be converted according to the relevant DEFRA conversion factor.

2.36. Natural gas, Diesel and other fuels are all categorised as fuel combustion and must be converted to tCO<sub>2</sub>e on either a Gross Calorific Value (Gross CV) or Net Calorific Value (Net CV) basis. Ofgem expects the chosen approach to be applied consistently over time.

2.37. Substation Electricity must be reported under Buildings Energy Usage. All substation consumption must be treated as energy supplied rather than Losses. It is recognised that not all substations will be metered; rather, it is expected that licensees will, in time, register all substations as unmetered supplies and develop a common method for estimating consumption. Estimation could be based on a bottom-up approach, whereby the substation energy usage is split into estimates of its constituent parts, such as heating and lighting etc.

### *Transport*

2.38. DEFRA guidelines provide for a range of emission conversion factors for transport means, with the aim to provide the best possible estimate of emissions from the vehicle portfolio owned and/or operated by the company. The reporting must, as far as reasonably practicable, use the full range of emission conversion factors available (as applicable to the range of means of transport actually used by the company).

2.39. DEFRA allows for transport to be entered in terms of both mileage and fuel consumption. Reporting must be based upon mileage, using conversion factors at the greatest level of disaggregation that is reasonably practicable. Reporting can be based on fuel consumption only where detailed and reliable data is available, eg through fuel cards.

2.40. In cases where emission factors for specific transport are not available (Ofgem is aware of this issue for helicopters, but there may be some other instances) tCO<sub>2</sub>e must be estimated and summed to the closest means of transport (eg air for helicopters).

2.41. Operational Transport is the transportation (often a fleet of vehicles) used in the day to day operation of the business, ie in the inspection and maintenance of the network.

2.42. Business Transport is that undertaken by staff travelling to locations other than their normal place of work or moving between sites for purposes such as meetings.

### *Fugitive Emissions*

2.43. This category caters for GHG emissions from a range of gases that may be relevant to the DNO business. Ofgem anticipates that this will mainly include SF<sub>6</sub> emissions, but other gases may be included (e.g. HFC from air conditioning). SF<sub>6</sub> emissions must be reported using the conversion factor published by DEFRA in place on 31 March of the applicable regulatory period being reported unless there is a compelling case for using an alternative.

### *Fuel Combustion (non-building)*

2.44. This is to cover for non-building fuel usage, such as mobile plants and the stand-by diesel mobile generators that are deployed from time to time in response to planned outages or faults. DEFRA emissions factors must be used. All mobile plant and generation used by the DNO, related and affiliate undertakings, contactors and sub-contractors must be included in so far as it is reasonably practicable. The methodology must describe the degree of estimation, and decisions to exclude any sources of emissions, applied.

### *Losses*

2.45. This is to consider DNOs' responsibility towards losses as a Scope 2 emission. DNOs should apply the most relevant DEFRA conversion factor for electricity generation to their reported losses levels to derive the associated emissions in terms of tCO<sub>2</sub>e. The Scope 3 conversion factor for Transmission and Distribution Losses should not be used.

## 3. Instructions for completing the Losses Snapshot worksheet

---

### E4 – Losses Snapshot

#### General

3.1. The purpose of this worksheet is to collect ~~data on a snapshot of the types of activities under taken by~~ DNOs' ~~activities~~ to manage Distribution Losses. Standard Licence Condition (SLC) 49 (Electricity Distribution Losses Management Obligation and Distribution Losses Strategy) paragraph 49.9(b)<sup>4</sup> requires DNOs to publish information on their actions to manage Distribution Losses and to deal with Relevant Theft of Electricity. By annually publishing the Environment Report, including this worksheet and any associated documents, eg CBAs and commentary, we would consider this obligation met.

3.2. The following terms are defined in Annex A - Glossary:

- Asset Replacement
- Baseline Scenario
- Cable
- Distribution Losses
- Distribution Losses-Justified Costs
- Distribution Losses Strategy
- ED1 Final Determination
- Environment Report
- Equipment to Manage Losses
- Fault Level Reinforcement
- General Reinforcement
- Innovative Solution
- Non-Technical Losses
- Operational Activities to Manage Losses
- Relevant Theft of Electricity
- RIGs
- RIIO-ED1 Business Plan
- RIIO-ED1 CBA Tool
- Smart Meters
- Technical Losses
- Transformer.

3.3. DNOs should report the following activities to manage Distribution Losses:

---

<sup>4</sup> SLC 49 is found in the Electricity Distribution Licence.

- Activities where the costs incurred principally relate to managing Distribution Losses.
- Activities where some of the costs incurred relate to managing Distribution Losses (but where losses are not the principal reason for the expenditure) subject to paragraph 3.4.

3.4. DNOs should not report activities that may help to manage losses but where Distribution Losses are not associated with the DNOs decision to undertake the activity and where any losses benefits are purely coincidental. For example, the installation of a new piece of network equipment may reduce losses. However, losses benefits did not inform the decision to undertake the activity because the equipment had to be installed to meet safety standards.

3.5. This worksheet should be completed on an incremental-a discrete basis for each Regulatory Year so that it provides an in-year sample up-to-date picture of the types of activities undertaken by DNOs to manage Distribution Losses. Actual volumes should be completed for every year in RIIO-ED1 up to and including the Regulatory Year under report in order to assess the total net benefits accrued.

### Activity

3.6. Column B lists the relevant category of activity - Cable, Innovative Solution, Transformer, Smart Meters and Relevant Theft of Electricity. There is space for up to two five separate examples of activities under each category. If the programme activity or project entered in column C is not covered by one of the categories, DNOs should enter it against 'other' and specify in column B what this category is.

3.7. DNOs are to provide an example of an activity which falls under each category listed in Column B based upon a random sampling of activities undertaken within the year. Where a DNO considers an activity, which is under a listed category, to be a novel approach (for example, when replacing a cable with one of a greater diameter – a different low loss core composite is used), this activity should be entered against the relevant category.

3.7.3.8. In column C, the title of the programme or project of the policy decision to manage Distribution Losses should be provided. This decision should be at the level used to justify the activity, using the RIIO-ED1 CBA Tool where appropriate.

3.8.3.9. In column D, the type of Distribution Losses that are managed by the activity should be selected – either Technical Losses or Non-Technical Losses.

3.9.3.10. In column E, DNOs should select the primary driver of the activity from the list - Equipment to Manage Losses, Operational Activities to Manage Losses, Asset Replacement, General Reinforcement, or Fault Level Reinforcement.

~~3.10.3.11.~~ In column F, DNOs should provide a cross reference to the RIGs worksheet where the costs and volume data for the activity has been reported.

~~3.11.3.12.~~ In column G, the DNO should state whether or not this activity was identified in its RIIO-ED1 Business Plan submitted for assessment before its ED1 Final Determination.

~~3.12.3.13.~~ If appropriate, in column H, the DNO should provide a reference to the paragraph number(s) where this activity can be found in its current Distribution Losses Strategy.

### **Units and estimated unit costs**

~~3.13.3.14.~~ In column I, the DNO should state the unit of activity that is being adopted, eg number of projects, km of cable, transformer volumes, etc.

~~3.14.3.15.~~ In column J, the DNO should enter the estimated unit cost of the activity. The unit cost should be that taken from the relevant RIIO-ED1 CBA Tool, updated to be in nominal prices as appropriate.

~~3.15.3.16.~~ In column K, the DNO should enter the title of the Baseline Scenario which would be employed if Distribution Losses management was not a consideration in the decision to undertake the activity. Where used, this should be equivalent to the 'Baseline scenario' in the RIIO-ED1 CBA Tool.

~~3.16.3.17.~~ In column L, the unit cost of the Baseline Scenario solution should be entered. The unit cost should be that taken from the relevant RIIO-ED1 CBA Tool, updated to be in nominal prices as appropriate. '0' should be inputted if the activity would not otherwise have taken place.

~~3.17.3.18.~~ In column M, enter the estimated incremental component of the unit cost that is justified by Distribution Losses benefits should be entered. For example, if losses reduction is the primary driver, this could be the difference in cost between the adopted option and the Baseline Scenario.

### **Volumes**

~~3.18.3.19.~~ In columns N to U, actual volumes of each activity for every year of RIIO-ED1 up to and including the Regulatory Year under report are required.

### **Estimated total costs**

~~3.19.3.20.~~ In columns V to AC, the estimated total costs, in nominal prices, for every year of RIIO-ED1 up to and including the Regulatory Year under report should be entered. For the Regulatory Year under report, this should be equal to the product of the estimated unit cost (column J) of the activity and the actual volumes. Figures



for preceding years should be copied across from the submission for the previous year.

### **Estimated Distribution Losses-Justified Costs**

~~3.20~~3.21. In columns AD to AK the Distribution Losses-Justified Costs should be entered, in nominal prices, for every year of RIIO-ED1 up to, and including, the reporting Regulatory Year. For the Regulatory Year under report, this should be equal to the product of the estimated Distribution-Losses Justified Cost (column M) and the actual volumes. Figures for preceding years should be copied across from the submission for the previous year.

### **Estimated Distribution Losses benefits over 'Baseline Scenario'**

~~3.21~~3.22. In columns AL to AS, the estimated Distribution Losses benefits should be entered (based on the activity compared with the Baseline Scenario) for each year of RIIO-ED1 for which volumes data have been provided. These benefits should be entered in MWh based on the 'Reduced losses' row under 'Societal net benefits' in the RIIO-ED1 CBA Tool completed for each project or programme and calculated for the actual volumes reported. A reduction in losses should be presented as a negative value in this worksheet (please note this is the opposite convention to the information in the RIIO-ED1 CBA Tool, where a reduction in losses is presented as a positive value).

~~3.22~~3.23. Figures for each year should be based on an estimate of the reduction in losses from the volumes of activity undertaken in that year in addition to any enduring effects from volumes in earlier years.

~~3.23~~3.24. A theoretical example is described below.

- Assumed losses reduction per unit of activity of 10 MWh for the adopted option relative to the Baseline Scenario (on an enduring basis to the end of the asset life).
- A volume of two units is implemented in Year 1; three additional units in Year 2.
- Estimated Distribution Losses benefits over 'Baseline Scenario' =
  - Year 1: 20 MWh ( $2 \times 10$ )
  - Year 2: 50 MWh ( $(2 \times 10) + (3 \times 10)$ ).

### **RIIO-ED1 CBA Tool summary – estimated cumulative values for RIIO-ED1 and 45 years**

~~3.24~~3.25. The figures used in this section should be the same as those in the latest RIIO-ED1 CBA Tool used to inform the decision to undertake each project or programme. For instance, volumes should be based on those estimated when completing the CBA.

~~3.25~~3.26. In columns AT and AU, the DNO should enter the Distribution Losses-Justified Costs over RIIO-ED1 and, where appropriate (ie for capital investment), for 45 years. This should be the product of the losses-justified unit costs and estimated volumes over RIIO-ED1 and for the 45 years from the start of the activity. The costs should be presented on an equivalent basis to the 'Total Net DNO benefits' row of the RIIO-ED1 CBA Tool.

~~3.26~~3.27. In columns AV and AW, the DNO should enter the avoided DNO costs over RIIO-ED1 and for 45 years (if applicable). These should be the avoided costs based on undertaking the activity compared with the Baseline Scenario. These costs should be presented on an equivalent basis to the 'Total Net DNO benefits' row of the RIIO-ED1 CBA Tool.

~~3.27~~3.28. In columns AX and AY, the DNO should enter the Distribution Losses benefits (based on the activity compared with the Baseline Scenario) over RIIO-ED1 and for 45 years (if appropriate). These should be based on the sum of the 'Losses' and 'CO2e associated with losses' rows under Societal Benefits in the RIIO-ED1 CBA Tool.

~~3.28~~3.29. In columns AZ and BA, the DNO should enter the cumulative discounted net benefits over RIIO-ED1 and for 45 years (if applicable). These values should be based on all benefits identified in the CBA tool, including those not related to losses. Excluding some benefits may result in a negative NPV, which would raise questions among stakeholders as to why such a programme is being implemented. The values presented should be based on the discount factor in the RIIO-ED1 CBA Tool.

## 4. Instructions for completing Smart Metering, Innovative Solutions, LCTs and IRM worksheets

---

### E5 – Smart Metering

4.1. This worksheet collects the DNOs' estimates of the benefits of smart metering for domestic and non-domestic customers using the categories set out in DECC's January 2014 Impact Assessment.<sup>5</sup> It also summarises the smart meter IT and data costs that are either passed through or outside the price control in order to allow for the calculation of net benefits of smart metering for DNOs and customers.

4.2. The commentary to this worksheet provides a single location for commentary on smart meter IT and data costs as these are otherwise found in two separate worksheets: C22 – Pass-Through and C16 – Smart Meter Outside PC.

#### Costs

4.3. Smart Meter Communication Licensee Costs (pass through): DNOs must reproduce row 30, columns M to Y from worksheet C22 – Pass-Through in this row.

4.4. Smart Meter Information Technology Costs (pass through): DNOs must reproduce row 31, columns M to Y from worksheet C22 – Pass-Through in this row.

4.5. Elective Communication Services (outside price control): DNOs must reproduce row 27, columns M to Y from worksheet C16 – Smart Meter Outside PC in this row.

4.6. Smart Meter Communication Licensee Costs (outside price control): DNOs must reproduce row 28, columns M to Y from worksheet C16 – Smart Meter Outside PC in this row.

#### Estimated Benefits

4.7. The DNO must report the estimated gross financial benefits delivered in the Regulatory Year from the use of smart metering data against each of the categories in the table. These categories are defined in the DECC Impact Assessment from

---

<sup>5</sup> [DECC Smart meter roll-out for the domestic and small and medium non-domestic sectors \(GB\): Impact Assessment \(Jan 2014\)](#)

January 2014. The benefits must be estimated using the RIIO-ED1 CBA Tool. Please refer to the RIIO-ED1 CBA Tool guidance. Where the DNO is unable to use the RIIO-ED1 CBA Tool, it should justify this and instead use an appropriate alternative tool or methodology to produce the relevant figures for this worksheet.

4.8. In the above Smart Meter Information Technology Costs, Smart Meter Communication Licensee Costs, and Elective Communication Services should be interpreted as defined in CRC 2B, Part H.

## E6 – Innovative Solutions

4.9. This worksheet is used to capture information about the Innovative Solutions deployed on or in support of the network throughout the RIIO-ED1 price control period, as well as informing on solutions deployed during DPCR5. This information will allow Ofgem to monitor ongoing innovation rollout.

4.10. The costs and volumes associated with this worksheet are embedded in the relevant activities in the Costs and Volumes Reporting Pack and feeds through to the C1 worksheet and the PCFM.

4.11. Only solutions that meet the definition of Innovative Solution may be included in this worksheet. The information about the solutions should only include enablers that are used specifically for each solution. Wider, general enablers (eg smart meter IT systems, other IT system upgrades) should not be included. Each solution should be supported either by a completed RIIO-ED1 CBA Tool. Where the DNO is unable to use the RIIO-ED1 CBA Tool, it should justify this and instead use an appropriate alternative tool or methodology to produce the relevant figures for this worksheet. either i) a completed RIIO-ED1 CBA, or, where the DNO is unable to use the RIIO-ED1 CBA Tool, an appropriate alternative tool or methodology to detailed explanation of the tool and methodology used to derive the Estimated Gross Avoided cost and impacts (as listed in paragraph 4.12) or ii) completed RIIO-ED1 CBA. Where an alternative tool or methodology is used to produce the relevant figures for this worksheet, DNOs should justify this in the commentary and provide a detailed explanation of the tool or methodology used. The detailed explanation of any tools and methodologies are to be reported in the commentary. Where the DNO is unable to use the RIIO-ED1 CBA Tool, it should justify this and instead use an appropriate alternative tool or methodology to produce the relevant figures for this worksheet.

4.12. For worksheet E6, this guidance applies to the impacts listed below:

- MVA released
- Estimated Gross Avoided cost
- Estimated Losses impact
- Estimated CI impact
- Estimated CML impact
- Other Estimated GHG Emissions
- Estimated Impact on Fatalities
- Estimated Impact on Major Injury
- Estimated Impact on Oil Leakage.

4.13. DNOs only need to provide estimates of the impacts where relevant, ie where they are material. Estimates should be provided whether positive or negative. An explanation of how these figures are derived should be provided in line with paragraph 4.11. The RIIO-ED1 CBA Tool (or justifiable equivalent as indicated under paragraph 4.11) should be used in each instance to provide this information for each Innovative Solution. The CBA should include all material impacts.

## **Solution Type**

4.14. The solutions must be placed into one of the categories. Category selection should be based on the intended outcome of applying the solution. A short description of each Innovative Solution should be written in place of 'Add description of innovative solution'. The descriptions will be determined by a Working Group to provide consistency between DNOs. Until such time as the Working Group can provide descriptions, DNOs may use their own description for each solution.

4.15. The definitions of each category are as follows:

- Increase network capacity/utilisation:  
This relates to Innovative Solutions where the intended outcome is to provide additional network capacity, remove capacity constraints or operate the networks in a manner where existing assets allow more power to flow through them.
- Improve asset life cycle management  
This relates to Innovative Solutions where the intended outcome is to provide improved asset life cycle management processes. This includes asset management decisions tools, improvements to condition analysis, novel techniques for monitoring assets and novel techniques and processes for extending the life of assets.
- Improve network performance  
This relates to Innovative Solutions where the intended outcome is to minimise the disruption to customers as a consequence of faults on network assets. This includes reducing the number of customers interrupted and the duration of supply interruptions, improvements to fault location techniques, improved information and knowledge of customers affected, and improvements to power quality.
- Improve vegetation management  
This relates to Innovative Solutions where the intended outcome is to have better processes for vegetation management. This includes methodologies for identifying vegetation clearance requirements and techniques for vegetation clearance.
- Improve safety

This relates to Innovative Solutions where the intended outcome is to reduce the likelihood of third party access to, or theft of, distribution network assets or improve the safety of networks.

- Improve environmental impact

This relates to Innovative Solutions where the intended outcome is to reduce the environmental impact of DNO activities. This includes processes for managing environmental issues and changes to asset composition/construction.

- Improve Connection Performance

This relates to innovative solutions related to improving the speed and cost of connection to distribution networks.

## Unit

4.16. Each DNO should give an appropriate unit for the Innovative Solution being recorded in this worksheet. This unit will be determined by the Working Group to provide consistency between DNOs. Until such time as the Working Group can provide a defined unit, DNOs may use their own units for the solutions. The default is 'deployment'; however Ofgem acknowledges this may not be appropriate for all solutions.

4.17. Two examples of units are given for reference:

- For Static Compensators (STATCOMS) Ofgem expects the unit will be the 'number of STATCOMS deployed on the network'. This is because each STATCOM is a single piece of equipment acting at a single point.
- For 'LV network automation', the expected unit would be 'schemes', where a scheme would be an installation designed to automate a single defined network area.

4.18. The above references may be subject to change should the Working Group decide on alternative units.

## Voltage level of Issue

Indicate the voltage level of the issue being addressed by the Innovative Solution. This can be informed by where this solution is reported in the relevant cost worksheet. In cases where the issue is spread across multiple levels indicate this in the worksheet.

## RIIO Output

4.19. State which of the RIIO outputs the solution will principally be addressing. The RIIO outputs are: safety, environment, customer satisfaction, connections, social obligations, and reliability and availability.

### **Worksheet (costs)**

4.20. DNOs must detail where the cost of the solution has been reported elsewhere in the RIGs. DNOs should provide the reference of the relevant worksheet.

### **Worksheet (savings)**

4.21. DNOs must state in which worksheet the cost reductions will have been accrued. This is to acknowledge that the savings from a solution may not occur where the costs of that solution have been reported, for example where reinforcement costs have been deferred due to an operational solution. DNOs should provide the reference of the relevant worksheet.

### **Costs**

4.22. Costs should be reported for each Regulatory Year and be derived from the appropriate costs and volumes table. Note that these costs may not be explicitly identified in the other costs and volumes tables, and may form only a proportion of a reported total cost.

### **Additions**

4.23. DNOs must report the additions of a solution in the unit expressed in Column G for each Regulatory Year. Costs do not necessarily have to have an associated volume or addition, for example upgrades to an Innovative Solution may be necessary for interoperability, but provide no volume change.

### **Disposals**

4.24. DNOs must report the disposals of a solution in the unit expressed in column G for each Regulatory Year where relevant, noting that for some solutions there may not be an appropriate notion of a disposal.

### **MVA Released**

4.25. DNOs must report the estimated capacity released in MVA due to each solution on a year by year basis. In the case of capacity being reduced, DNOs should report with a negative figure to ensure aligned cumulative totals. DNOs should place a 0 where no capacity is released by the solution in that year. For example, if a temporary smart solution delivers 10MVA in year 1 and is removed in year 3 when conventional reinforcement takes place, this should be reported as 10MVA in year 1, zero in year 2 and -10MVA in year 3.

4.26. DNOs must complete this for all solutions that change network capacity, even if this is not the intent of the deployment (eg if an active network management

system is used primarily for improving Customer Interruption performance and coincidentally releases capacity, this should be reported).

4.27. Non-firm capacity solutions are to be reported in line with the non-firm capacity estimation method in the Connection Charging Methodology.

### **Estimated Gross Avoided Costs**

4.28. DNOs must enter the ~~Estimated gGross estimated a~~ avoided costs from using the Innovative Solution, ie the total cost of the avoided solution or activity. DNOs should use the ~~figures derived from their tool and methodology, as described in accordance with paragraph 4.11 or a cost-benefit analysis used to to~~ assess the solution to derive the estimated saving. This should be reported as the saving in each year taken individually, ~~as input into the relevant RIIO-ED1 CBA tool, or equivalent~~. This should be the saving to the DNO except in the category “Improving Connection Performance”, where the saving to the DNO and connecting customer(s) should be provided. Avoided costs must be reported as a negative figure.

### **Estimated Losses Impact**

4.29. DNOs should provide an estimate of the increase or decrease in Distribution Losses caused by each Innovative Solution. Distribution Losses is defined as in Standard Licence Condition 1. Reduction in losses must be reported as a negative figure, and an increase in losses must be reported as a positive figure.

### **Estimated CI Impact**

4.30. DNOs must provide an estimate of the number of Customer Interruptions (CIs) avoided (negative) or caused (positive), by each Innovative Solution. Where a solution has an ongoing impact this must be reported for each Regulatory Year. For example, a solution that avoids five interruptions per year will have 5 placed into each relevant year, which gives scope for adjustment should the impact change. This ensures the total number of avoided interruptions is correctly totalled for the regulatory period. The estimated interruptions may be taken in comparison to the conventional alternative where appropriate.

### **Estimated CML Impact**

4.31. DNOs must provide estimates of the increase (positive) or decrease (negative) in Customer Minutes Lost (CML) for each Innovative Solution. This should follow the same principles as for reporting the CI Impact.

### **Other Estimated GHG Emissions**

4.32. Estimates must be provided of the increase (positive) or decrease (negative) in Greenhouse Gas Emissions, excluding the impact of losses, for each Innovative



Solution. This should be reported in terms of CO2 equivalent. This should follow the same principles as for reporting the CI Impact.

### **Estimated Impact on Fatality**

4.33. Estimates must be provided of the increase (positive) or decrease (negative) in fatalities for each Innovative Solution. This should follow the same principles as for reporting the CI Impact.

### **Estimated Impact on Serious Injury**

4.34. Estimates must be provided of the increase (positive) or decrease (negative) in serious injuries for each Innovative Solution. This should follow the same principles as for reporting the CI Impact.

### **Estimated Impact on Oil Leakage**

4.35. Estimates must be provided of the increase (positive) or decrease (negative) in oil leakage for each Innovative Solution. This should follow the same principles as for reporting the CI Impact.

### **Working Group**

4.36. A Working Group will be convened in order to determine the following items in relation to this worksheet:

- definition of a unit for different solutions
- consistent reporting of Innovative Solutions definitions
- consistent reporting methods with regards to impacts.

4.37. Representatives from Ofgem, DNOs, and other relevant stakeholders will be invited to take part.

## **E7 – LCTs (low carbon technologies)**

4.38. This worksheet captures the number and size of Low Carbon Technologies (LCTs) connected in the Regulatory Year. This will help to track the low carbon scenario in comparison with those set out by DECC and by the DNOs in their RIIO-ED1 Business Plans.

4.39. The term Low Carbon Technologies is defined in Annex A - Glossary.

4.40. Ofgem recognises that at the beginning of the RIIO-ED1 period there will not be perfect processes for DNOs to receive this data and therefore that the data may not be complete or accurate. Ofgem expects DNOs to work together and with other

relevant organisations to develop better notification processes during the price control.

4.41. DNOs must report on the following LCTs:

- Heat pumps at existing connections that do not lead to a new or modified connection
- Electric vehicle (EV) chargers, both slow and fast charging, at existing connections that do not lead to a new or modified connection
- Photovoltaics (PV) connected under Engineering Recommendation G83
- Other renewable distributed generation (DG), excluding PV, connected under Engineering Recommendation G83
- Renewable DG not connected under Engineering Recommendation G83.

4.42. For the recording of renewable DG not connected under Engineering Recommendation G83, we would expect:

- the DG to be “still energised in the reporting year”; or
- the DG was “subject to use of system charges in the reporting year”

4.43. For the recording of renewable DG not connected under Engineering Recommendation G83, where the DNO is able to split the number of those that are subject to ‘use of system charges in the reporting year’ against those that are not, it should do so within its RIGs commentary to Annex J.

### **Volumes of LCTs Installed**

4.44. DNOs must input the number of LCTs added to the network in each Regulatory Year. This should be disaggregated between those added at the Primary (EHV+) and Secondary (LV-HV) networks.

### **Size of LCTs Installed**

4.45. DNOs must report the ‘maximum export allowed’ (in MW) of the LCTs added to the network in each Regulatory Year. This should be disaggregated between those added at the Primary (EHV+) and Secondary (LV-HV) networks.

### **Electric Vehicles**

4.46. For recording information on Electric Vehicles DNOs must input the volumes using the following logic:

- EV Slow charging: means EV up to 16A/3.7kW draw-down rate; and
- EV Fast charging: means anything above 16A/3.7kW draw-down rate.

## **E8 – IRM (Innovation Roll-out Mechanism)**

4.47. The purpose of this worksheet is to record costs and volumes related to schemes designed to roll-out a proven innovation. This worksheet will only need to be completed where the DNO has applied to, and Ofgem has approved, a relevant adjustment for the purposes of the IRM.

4.48. The costs and volumes associated with this worksheet are embedded in the relevant activities in the Costs and Volumes Reporting Pack and feed through to the C1 worksheet and PCFM Variable Values.

4.49. The IRM allows for additional funding to roll-out proven innovations if they have carbon or wider environmental benefits, and provide long term value for money. The DNO cannot receive commercial benefits from the roll-out within the remainder of the price control period and funding cannot be used to fund ordinary business arrangements.

4.50. There are two application windows for a DNO to propose a relevant adjustment. The first application window opens on 1 May 2017 and ends on 31 May 2017. The second application window opens on 1 May 2019 and closes on 31 May 2019. No costs should be reported before 2018-19.

4.51. The costs allocated by PCFM Cost Type table requires the DNO to allocate total costs, where the primary driver has been delivery of IRM schemes. Total costs should include indirects. The total costs for each year in this table must equal the total costs in Row 62.

4.52. The costs by scheme (including indirects) table requires the DNO to record costs (including indirects) by scheme name and by year where the primary driver has been delivery of IRM schemes.

4.53. The final table in this worksheet named “Asset volumes” requires the input of data on the assets added (additions) or removed (disposals) from the distribution network in carrying out the relevant network activity.