RIIO-ED1 RIGs Environment and Innovation Commentary, version 2.0

2015-16

Scottish and Southern Energy Power Distribution

Contents

Summary – Information Required

One Commentary document is required per DNO Group. Respondents should ensure that comments are clearly marked to show whether they relate to all the DNOs in the group or to which DNO they relate.

Commentary is required in response to specific questions included in this document. DNO's may include supporting documentation where they consider it necessary to support their comments or where it may aid Ofgem's understanding. Please highlight in this document if additional information is provided.

The purpose of this commentary is to provide the opportunity for DNOs to set out further supporting information related to the data provided in the Environment and Innovation Reporting Pack. It also sets out supporting data submissions that DNOs must provide to us.

Worksheet by worksheet commentary

At a worksheet by worksheet level there is one standard question to address, where appropriate, as follows:

- **Allocation and estimation methodologies**: DNOs should detail estimates, allocations or apportionments used in reaching the numbers submitted in the worksheets.

  This is required for all individual worksheets (ie not an aggregate level), where relevant. Not all tables will have used allocation or estimation methods to reach the numbers. Where this is the case simply note "NA".

  Note: this concerns the methodology and assumptions and not about the systems in place to check their accuracy (that is for the NetDAR). This need to be completed for all worksheets, where an allocation or estimation technique was used.

In addition to the standard commentary questions, some questions specific to each worksheet are asked.

E1 – Visual Amenity

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.
SSEH and SSES Project costs have been allocated on a project by project basis in Harmony. The total expenditure for these projects has been allocated based upon the appropriate activity driver with no apportionment.

Explanation of the increase or decrease in the total length of OHL inside designated areas for reasons other than those recorded in worksheet E1. For example, due to the expansion of an existing, or creation of a new, Designated Area.
N/A

E2 – Environmental Reporting

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.

SSEH and SSES

The allocation of these project costs to individual cells in the regulatory reporting table is automated in Harmony for 2015/16.

Data obtained from our Asset Management Systems

The following parameters mandated in the table were extracted from our asset management systems:

- Fluid used to top-up cables;
- Fluid recovered;
- SF_6 Bank;
- SF_6 Emitted.

Fluid recovered is a figure we now capture for fluid-filled cables on a monthly basis. The value for 15/16 reporting is derived from our asset management system PLACAR.

Data obtained from our Environmental Management Systems

The following parameters mandated in the table were extracted from our environmental management systems;

- Environmental Civil Sanction;
- Environmental Management System (EMS) Certified Activities

Environmental Volume information is derived from actual projects completed during 2015/16.

DNOs must provide some analysis of any emerging trends in the environmental data and any areas of trade-off in performance.

SSEH and SSES

Overall in 15/16, activities to mitigate the risk of discharging hazardous fluids, such as oil from fluid-filled cables into the environment and activities to clean up contaminated land, have reduced from 14/15 levels and DPCR5 averages. There are no areas of trade-off in performance.

Where reported in the Regulatory Year under report, DNOs must provide discussion of the nature of any complaints relating to Noise Pollution and the nature of associated measures undertaken to resolve them.

N/A

Where reported in the Regulatory Year under report, DNOs must provide details of any Non-Undergrounding Visual Amenity Schemes undertaken.

N/A

Any Undergrounding for Visual Amenity should be identified including details of the activity location, including whether it falls within a Designated Area.

N/A

Where reported in the Regulatory Year under report, DNOs must provide discussion of details of any reportable incidents or prosecutions associated with any of the activities reported in the worksheet.

SSEH

There were 2 environmental civil penalties issued to SSEH in 15/16 for exceeding carbon emissions. Both penalties were issued to SSE Loch Carnan Power Station by Scottish Environment Protection Agency (SEPA). SSE Loch Carnan Power Station is a non-commercial standby generator that is used to ensure security of supply should the subsea cable to the Western Isles fail. The total cost incurred for civil penalties in 15/16 was [redacted].

- The first penalty issued in April 2015 was for non-compliance with the Regulations for exceeding installation emissions targets contrary to Regulation 55 of the Greenhouse Gas Emissions Trading Scheme Regulations 2012.

- The second penalty issued in July 2015 was for non-compliance with paragraph 5 of schedule 5 of the Greenhouse Gas Emissions Trading Scheme Regulations 2012.

Where reported in the Regulatory Year under report, DNOs must provide discussion of details of any Environmental Management System (EMS) certified under ISO or other recognised accreditation scheme.

NA

DNOs must provide a brief description of any permitting, licencing, registrations and permissions, etc related to the activities reported in this worksheet that you have purchased or obtained during the Regulatory Year.

During 15/16, SSES obtained a number of Environmental Permits for storing waste insulating oil.

DNOs must include a description of any SF6 and Oil Pollution Mitigation Schemes undertaken in the Regulatory Year including the cost and benefit implications and how these were assessed.

SSEH **SF6** There were no SF6 mitigation schemes undertaken by SSEH in 15/16. **Oil Pollution Mitigation Scheme - Operational Sites** In 15/16, there were 4 oil pollution mitigation schemes at operational sites in SSEH's area. The schemes were undertaken to mitigate the risk of discharging insulating oil into the environment at these sites. The schemes cost a total of [redacted]. **SSES** **SF6** There were no SF6 mitigation schemes undertaken by SSES in 15/16. **Oil Pollution Mitigation Scheme - Operational Sites** In 15/16, there were 13 oil pollution mitigation schemes at operational sites in SSES' area. The schemes were undertaken to mitigate the risk of discharging insulating oil into the environment at these operational sites identified.The schemes cost a total of [redacted]. **Contaminated Land Clean up** In 15/16, there were 20 incidents of land contamination in the SSES area. Initial risk assessments were undertaken to determine the extent of the contamination and to ascertain the risk mitigation works and/or clean up works required. The schemes cost a total of [redacted].

E3 –BCF

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.
Energy and fuel consumption figures used to calculate the CO_2 emissions submitted for SSEH and SSES have been extracted from a number of sources which include our asset management system, PLACAR and our expenses and travel systems. The only area where we have used estimation principles is in calculating the electrical load for each substation in the SSES and SSEH area which are then used to derive the CO_2 emitted. The estimating principle is described in this narrative under Building energy usage.

BCF reporting boundary and apportionment factor DNOs that are part of a larger corporate group must provide a brief introduction outlining the structure of the group, detailing which organisations are considered within the reporting boundary for the purpose of BCF reporting. Any apportionment of emissions across a corporate group to the DNO business units must be explained and, where the method for apportionment differs from the method proposed in the worksheet guidance, justified.
This narrative details the total Green House Gas emissions produced by Scottish and Southern Power Distribution (SSEPD) in the financial year 2015/16. SSEPD is comprised of Scottish Hydro-Electric Power Distribution (SSEH) and Southern Electric Power Distribution (SSES). In turn, SSEPD is part of the wider corporate group SSE plc, which includes generation, transmission, supply, retail, telecoms and contracting activities. There are no apportionment of emissions across the corporate group.

BCF process
The reporting methodology for BCF must be compliant with the principles of the Greenhouse Gas Protocol.1 Accounting approaches, inventory boundary and calculation methodology must be applied consistently over time. Where any processes are improved with time, DNOs should provide an explanation and assessment of the potential impact of the changes.

We have followed Ofgem's classification of carbon sources. We have been developing the capability to report our carbon footprint for several years, leading to more accurate identification of relevant equipment and its associated emissions. This piece of work satisfies the requirements of the Business Carbon Footprint RIGs.

All conversion rates are extracted from specific annexes listed in the Defra/DECC Greenhouse Gas (GHG) Conversion Factors for Company Reporting.

Please refer to our BCF report and accompanying tables for the data for each respective source.

Commentary required for each category of BCF
For **each** category of BCF in the worksheet (ie Business Energy Usage, Operation Transport etc) DNOs must, where applicable, provide a description of the following information, ideally at the same level of granularity as the Defra conversion factors:

- the methodology used to calculate the values, outlining and explaining any specific assumptions or deviations from the Greenhouse Gas Protocol
- the data source and collection process
- the source of the emission conversion factor (this shall be Defra unless there is a compelling case for using another conversion factor. Justification should be included for any deviation from Defra factors.)
- the Scope of the emissions ie, Scope 1, 2 or 3
- whether the emissions have been measured or estimated and, if estimated the assumptions used and a description of the degree of estimation
- any decisions to exclude any sources of emissions, including any fugitive emissions which have not been calculated or estimated
- any tools used in the calculation
- where multiple conversion factors are required to calculate BCF (eg, due to use of both diesel and petrol vehicles), DNOs should describe their methodology in commentary
- 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 describe their methodology in commentary, including the relevant physical units, eg miles.

DNOs may provide any other relevant information here on BCF, such as commentary on the change in BCF, and should ensure the baseline year for reference in any description of targets or changes in BCF is the Regulatory Year 2014-15. DNOs should make clear any differences in the commentary that relate to DNO and contractor emissions.

Building energy usage

[1] Greenhouse gas protocol

All relevant distribution buildings have been identified using the same office/depot/store log provided to Ofgem's property consultants. Energy usage (both electricity and gas) within shared buildings is allocated using our Corporate Recharge model which is consistent in all submissions to Ofgem[2]. The 'Grid Rolling Average' conversion factor has been used to provide the buildings electricity section. The Gross Calorific Value has been applied consistently for the conversion of gas figures.

Consumption	2015/16 Electricity (kWh)	2015/16 Gas (kWh)	2015/16 tCO_2	2014/15 Electricity (kWh)	2014/15 Gas (kWh)	2014/15 tCO_2	% Change
SSEH	2,109,109	181,125	1,008	2,323,785	59,036	1,040	-3%
SSES	2,877,323	427,392	1,409	2,611,434	877,488	1,334	5.3%

Substation Energy
Substations have been separated into three categories for energy usage estimations.

HV: 6.6kV - 20kV,
EHV: 22kV - 66kV,
132kV (SSES only), as 132kV is Transmission in Scotland

All SSEPD substations are registered as unmetered supplies. A best estimate framework for the energy consumption at these sites has been used. Principles and assumptions used in this estimation are detailed below:

Substation Numbers - The number of substations in each category is taken from our plant database (PLACAR). The numbers are split between our licensees to give figures for both SSES and SSEH. Out of area substations are excluded.

Estimating Principles. All substations in SSEPD's licensees are registered as unmetered supplies. A best estimate framework for the energy consumption at these sites has been used, as detailed below. Electrical load in a substation is a combination of the following factors:

- Space Heating: Based on multiples of 3kW off-peak heating ON for 4 hours per day, for 4 months of the year (only 4% of HV sites are heated).
- Panel Heaters: Based on multiples of 0.07kW. On for 8 hours per day, for 4 months of year in the South; and 12 hours per day, for 12 months of a year in the North.
- Lighting: Based on multiples of 0.2kW - ON for 10 days during the year.
- Battery-Chargers and Tele-control equipment: Based on multiples of 0.5kW - continuous supply to DC standing loads.
- Mains powered equipment: Based on 0.5kW - continuous supply.
- Transformer Coolers: Based on cooler ratings of individual transformers.
- Flood lighting: Based on 0.3kW, ON for 2.5 days in a year. (Only Designated Sites)
- CCTV Cameras: Based on 0.002kW – continuous supply (Only Designated Sites)
- Infra Red Illumination: Based on 0.014kW, ON for 12 hours per day for 12 months of a year. (Only Designated Sites)
- Digital Video Recorders: Based on 0.125kW – continuous supply (Only Designated Sites)

[2] This is externally audited as part of our EU Cross Subsidy Submission, Standard License Condition 44.

	2015/16			2014/15				
SSEH	*Number of Substations*	*Total Units (kWh)*	*tCO_2*	*Number of Substations*	*Total Units (kWh)*	*tCO_2*	*% Change (kWh)*	*% Change (tCO_2)*
HV	7,903	1,853,967	916	7,619	1,787,343	883	3.73%	*3.59%*
EHV	431	9,236,191	4563	412	8,829,746	4,364	4.60%	*4.35%*
Total	8,334	11,090,158	5,479	8,031	10,617,090	5,248	*4.46%*	*4.21%*

SSES	*Number of Substations*	*Total Units (kWh)*	*tCO_2*	*Number of Substations*	*Total Units (kWh)*	*tCO_2*	*% Change (kWh)*	*% Change (tCO_2)*
HV	28,934	5,280,652	2,609	28,511	5,203,451	2,572	1.48%	*1.40%*
EHV	515	7,484,684	3,697	501	7,283,471	3,600	2.76%	*2.64%*
132kV	106	2,781,084	1,374	106	2,761,659	1,365	0.70%	*0.64%*
Total	29,555	15,546,420	7,680	29,118	15,248,581	7,537	1.95%	*1.86%*

Operational Transport

Road

The volume of fuel (litres) consumed by operational vehicles is captured using fuel cards and is reported separately for SSEH and SSES. We do not report freight separately from passenger operational transport, so all operational travel has been reported under passenger transport. The appropriate conversion factor has been used to convert the volume of fuel consumed into tonnes of CO_2. The volume figures are shown below.

In addition, the transport spend from SSE Contracting has been converted into miles travelled using SSE's mileage rate of £0.35 per mile. This has then been converted into tonnes of CO_2 using the appropriate conversion factor.

SSEPD

	2015/16					*2014/15*					
	Petrol (l)	Diesel (l)	*Gas Oil (l)*	*LPG (l)*	tCO2	*Petrol (l)*	Diesel (l)	*Gas Oil (l)*	*LPG (l)*	tCO2	*% Change*
SHEPD	13,851	1,952,226	4,954	1,671	5227	13,399	1,922,505	4,779	5,253	5,054	3%
SEPD	30,208	3,513,701	64,266	191	9,376	35,757	3,470,465	338,009	129	10,099	-7%

Contractors

	2015/16		*2014/15*		
	Miles	*tCO2*	*Miles*	*tCO2*	*% Change*
SSEH	7,461,012	3,002	7,231,429	2,899	3.5%
SSES	18,505,671	7,445	18,311,429	7,341	1.4%

Rail

Any operational rail journeys have been included in the business travel section of the report.

Sea

The use of sea travel is minimal, and considered negligible due to the scale of the emissions.

Air

Emissions for business travel by air are recorded and broken down into SSES or

SSEH. Class of travel is not recorded. All flights taken between UK locations have been recorded as domestic, flights from the UK to Europe as Short-Haul International and flights from the UK to non-European destinations as Long Haul International. Internal flights in countries other than the UK have been recorded as domestic flights.

An average fuel consumption rate of 160 l/hr (single squirrel helicopters) and 212 l/hr (for twin squirrel helicopters), and a petrol conversion factor has been used to convert the hours into mass of CO_2 emissions. These figures are shown below:

SSEPD

	2015/16					*2014/15*					
	Petrol (l)	Diesel (l)	*Gas Oil (l)*	*LPG (l)*	tCO2	*Petrol (l)*	Diesel (l)	*Gas Oil (l)*	*LPG (l)*	tCO2	*% Change*
SSEH	13,851	1,952,226	4,954	1,671	5227	13,399	1,922,505	4,779	5,253	5,054	3%
SSES	30,208	3,513,701	64,266	191	9,376	35,757	3,470,465	338,009	129	10,099	-7%

Although the hours of helicopter hire havw decreased in SSEH compared to the previous year, the increased emissions in SSEH licensed area is due to the increase in use of twin squirrel helicopters for line patrol.

Business Transport

Road

Business transport miles are captured through our expenses department. The distance travelled by both petrol and diesel vehicles are used to calculate the relevant CO_2 emissions.

Rail

Journeys made for business travel by rail are recorded through our travel department. The distance travelled is used to calculate the relevant CO_2 emissions.

Sea

SSEH experienced 3 major weather events in 15/16 which required the use of sea travel to restore supplies to remote islands. However, the use of sea travel has reduced in 2015/16 from the levels in 2014/15.

Air

Emissions for business travel by air are recorded and broken down into SSEH or SSES. Class of travel is not recorded. All flights taken between UK locations have been recorded as domestic, flights from the UK to Europe as Short-Haul International and flights from the UK to non-European destinations as Long Haul International. Internal flights in countries other than the UK have been recorded as domestic flights.

	2015/16					2014/15					
	Road (miles)	*Rail (km)*	*Air (km)*	*Sea (km)*	*tCO2*	*Road (miles)*	*Rail (km)*	*Air (km)*	*Sea (km)*	*tCO2*	*% Change*
SSEH	1,993,583	203,763	644,098	2,458	698	1,685,257	248,479	960,489	4,448	664	5%
SSES	4,135,937	226,916	609,079	-	1,332	3,972,547	66,634	377,243	-	1,249	7%

Fugitive Emissions

SF_6

Emissions of SF_6 are calculated by combining the volume of SF_6 used in routine maintenance and the volume used during fault repair. These figures are extracted from our Asset Management System which is recorded in accordance with ENA Engineering Recommendation (ER) S38. In addition, natural leakage is calculated using the aforementioned ER and a model produced by the ENA. The appropriate conversion factor is used to transform this combined figure of SF_6 lost to tCO_2.

We take any leakage of SF_6 extremely seriously and have detailed policies and procedures in place to manage our associated assets. This is an area where we are actively exploring the possibility of new, less hazardous, insulation materials.

	2015/16		2014/15		
	SF6 (kg)	*tCO_2*	*SF6 (kg)*	*tCO_2*	*% Change*
SHEPD	79	1,808	67	1,592	13.59%
SEPD	382	8,702	304	7,254	19.96%

Fuel combustion

We record the volume of fuel used to provide generation on our distribution networks.

Mobile Generation

Mobile generation is primarily required as backup to ensure continuity of supply when works requiring a network outage are taking place. Diesel fuel is used in SSEH while, in SSES, a combination of diesel and gas oil are combusted.

Fixed Generation (Diesel)

Our fixed (embedded) generation is primarily required as a backup in the event of network faults. Our 7 fixed sites are located on the islands off the North of Scotland. No fixed generation sites are located in SSES's area.

There has been an 87% decrease in fixed diesel used during 15/16 and this is attributed to the speed of restoring supplies during the major weather events.

Losses

Figures for network losses have a two year lag, but an estimate is produced at the end of the reporting year and converted to tCO_2.

	2015/16		2014/15			
	MWh	*$tCO2_e$*	*MWh*	*$tCO2_e$*	*% Change (MWh)*	*% Change (tCO2e)*
SSEH	534,286	241,816	536,883	265,360	-0.5%	-9%
SSES	1,799,841	824,683	1,821,351	900,221	-1%	-8%

Contractors

When reporting BCF emissions due to contractors in the second half of the worksheet please:

- Explain, and justify, the exclusion of any contractors and any thresholds used for exclusion.
- Provide an indication of what proportion of contractors have been excluded. This figure could be calculated based on contract value.

Please provide a description of contractors' certified schemes for BCF where a breakdown of the calculation for their submitted values is not provided in the worksheet. If a DNO's accredited contractor is unable to provide a breakdown of the calculation and has entered a dummy volume unit of '1' in the worksheet please provide details of the applicable accredited certification scheme which applies to the reported values.
BCF emissions due to contractors are reported under operational transport and is related to fuel used in vehicles for business activities. The source of the emissions is vehicles owned by others i.e. non SSEPD vehicles. The SSEPD's contractor mileage rate of £0.35/mile is applied to convert transport spend into miles travelled. This is then converted into tonnes of CO_2 using the appropriate conversion factor under scope 3. Contractor coverage makes up 1.1% of total BCF.

Building energy usage Natural gas, Diesel and other fuels are all categorised as fuel combustion and must be converted to tCO_2e on either a Gross Calorific Value (Gross CV) or Net Calorific Value (Net CV) basis. The chosen approach should be explained, including whether it has been adapted over time. Substation Electricity must be captured under Buildings Energy Usage. Please explain the basis on which energy supplied has been assessed.
SSEH and SSES Please refer to the paragraph on Building energy usage under the section titled "Commentary required for each category of BCF"

E4 – Losses Snapshot

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.
SSEH and SSES The numbers submitted are based on the Ofgem Cost Benefit Analysis (CBA) and were calculated as part of the analysis. The CBAs were calculated as part of our update to our Losses Strategy https://www.ssepd.co.uk/lossesstrategy/ For non technical losses, it is necessary to estimate the number of MWhs that will be metered and billed following resolution by our Revenue Protection Teams. The RP team have identified the number of properties / MPANS that they have rectified during the period. The number of MWhs was estimated using the "average consumption" per property type derived from the SSEH or SSES CDCM model as appropriate.

Programme/Project Title Please provide a brief summary and rationale for each of the activities in column C which you have reported against.
SSEH and SSES **EHV and 132kV Transformers** Analysis has been conducted to consider three types of transformer: Super Low Loss; Low Loss; and Minimum Standard. • 33kV Transformer (GM) • 66kV Transformer • 132kV Transformer (SSES only): The minimum standard is a transformer that simply meets the requirements of the EU Eco Directive Tier 1. There are numerous ways to improve the efficiency from advanced core materials to lower winding resistances. Completing a CBA over the lifetime of the project allows an assessment to be drawn as to whether or not the higher capital cost breaks even over the predicted lifetime of the asset. LV Transformers – GMT: We considered the benefits of prioritising our asset replacement programme to focus on pre 1960s transformers before more modern assets. Transformers installed before this date had significantly higher losses due to the quality of the steel used in the core and hence a losses benefit can be achieved if these units

are targeted for replacement.

Primary driver of activity
If, in column E, you have selected 'Other' as the primary driver of the activity, please provide further explanation.

SSEH and SSES

The 'Other' reference in column E relates to Connections for the transformer measures.

The final reference to 'Other' relates to our work within our Revenue Protection team to recovery DUOS under Non Technical Losses.

Baseline Scenario
Please provide a brief description of the 'Baseline Scenario' inputted in column K for each activity.

SSEH & SSES

EHV and 132kV Transformers
The minimum standard is a transformer that simply meets the requirements of the EU Eco Directive Tier 1. This has been used as the baseline scenario with all calculations of energy or financial savings calculated over and above this value. This was completed in the same manner for 33kV, 66kV and 132kV transformers.

LV Transformers – GMT
The baseline scenario is not to consider losses when prioritising assets for replacement.

Use of the RIIO-ED1 CBA Tool
DNOs should use the latest version of the RIIO-ED1 CBA Tool for each of the activities reported in column C. Where the RIIO-ED1 CBA Tool cannot be used to justify an activity, DNOs should explain why and provide evidence for how they have derived the equivalent figures for the worksheet. The most up-to-date CBA for each activity reported in the Regulatory Year under report must be submitted.

SSEH and SSES

Please find below, the filepaths to the specific CBAs for the programme / project titles in column C of the worksheet. These have been split between Asset Replacement, General Reinforcement and Connections:

[redacted]

We have not included a CBA for the LV Transformers – GMT; this activity is a prioritisation of our asset replacement programme and hence there is not a baseline to make comparison with from a financial perspective.

There is not a CBA provided for our Non Technical Losses work on DUOS recovery given the lack of a clear baseline scenario to evaluate the benefit.

Changes to CBAs If, following an update to the CBA used to originally justify the activity in column C, the updated CBA shows: • a negative net benefit for an activity, but the DNO decides it is in the best interests of consumers to continue the activity, or • a substantively different NPV from that used to justify an activity that has already begun. the DNO should include an explanation of what has changed and why the DNO is continuing the activity. For example, where the carbon price used in the RIIO-ED1 CBA Tool has changed from that used to inform the decision such that the activity no longer has a positive NPV.
There are no significant changes to our CBAs.

Cost benefit analysis additional information Please include a reference to the file name and location of any additional relevant evidence submitted to support the costs and benefits inputted into this worksheet. This should include the most recent CBA for each activity reported in column C in the Regulatory Year under report.
Where relevant, refer to the filepaths provided in the section titled "**Use of the RIIO-ED1 CBA Tool"** for access to each of the programme / project titles in column C of the worksheet which have been split between Asset Replacement, General reinforcement and Connections.

E5 – Smart Metering

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.
SSEH and SSES <u>Smart Meter Communication Licensee Costs (pass through)</u> Values submitted relate to actual costs incurred as invoiced by the DCC. <u>Smart Meter Information Technology Costs (pass through)</u> The values submitted relate to actual expenditure incurred by both the smart meter programme and our smart meter business team.

Actions to deliver benefits Detail what activities have been undertaken in the relevant regulatory year to produce benefits of smart metering where efficient and maximise benefits overall to consumers. At a minimum this should include: • A description of what the expenditure reported under Smart Meter Information Technology Costs is being used to procure and how it expects this to deliver benefits for consumers. • A description of the benefits expected from the non-elective data procured as part of the Smart Meter Communication Licensee Costs. The DNO should set out how it has used this data. • A description of the Elective Communication Services being procured, how it has used these services, and a description of the benefits the DNO expects to achieve.
No benefits have been delivered in this regulatory year. The central smart metering system being delivered by the DCC is not planned to be available until regulatory year 2016/ 2017. **Information Technology Costs:** Significant effort has been undertaken by SSEPD throughout RY 2015/2016 to manage our obligations under the Smart Energy Code. In particular we have followed a programme led approach to develop new IT infrastructure and systems specifically to interface with the new national smart metering infrastructure that is currently being developed by the DCC. During 2015/2016 SSEPD undertook the procurement and definition of the following projects: • Registration Data Provider (RDP) Service • Network DCC Access Gateway (NDAG) • Security Architecture Definition and Framework • Technical Infrastructure Definition and initial deployment • Business Implementation Plan and deployment strategy <u>Non-elective data procured:</u> No non-elective data has been procured. <u>Elective Communication Services</u> No elective data has been procured.

Calculation of benefits Explain how the benefits have been calculated, including all assumptions used and details of the counterfactual scenario against which the benefits are calculated.
N/A

Use of the RIIO-ED1 CBA Tool DNOs should use the latest version of the RIIO-ED1 CBA Tool for each solution reported in the worksheet in the Regulatory Year under report. Where the RIIO-ED1 CBA Tool cannot be used to justify a solution, DNOs should explain why and provide evidence for how they have derived the equivalent figures for the worksheet. The most up-to-date CBA for each activity reported in the Regulatory Year under report which are used to complete the worksheet must be submitted.
N/A

Cost benefit analysis additional information Please include a reference to the file name and location of any additional relevant evidence submitted to support the costs and benefits inputted into this worksheet. This should include the most recent CBA for each solution reported in the Regulatory Year under report.
N/A

E6 – Innovative Solutions

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.

SSEH and SSES

1) Costs represent the cost of the technology only i.e. they don't include associated costs in the CBA such as reinforcement costs
2) MVA released represents the MVA released by the technology only i.e. it doesn't include associated MVA released by reinforcement as shown in the CBA
3) Estimated gross avoided costs are the gross costs avoided by the technology plus the actual cost of implementing the technology. It doesn't include NPV costs e.g. for ANM

SSEH
Hybrid Generator
This is a generator that runs on both diesel and battery power.

CO_2e calculation = Number of litres used x 2.67614. This figure has been taken from DECC carbon calculation factors for 100% mineral oil.
It is assumed that the maintenance costs of the hybrid generator are half that of the diesel generator. Obtained by internal stakeholder engagement.
Standard generator diesel use per hour is estimated at 6 litres for a 30kva generator running at 75% load.

Live Line Tree Harvesting
This is where tree felling occurs by a specialised machine working adjacent to a live line.

<u>Conventional Harvesting under planned outage with temporary generation</u>
CIs & CMLs: These are halved in value in the event of a planned outage.
Two disconnections occur: Customers are disconnected from their main supply onto temporary / back-up generation and then disconnected again when put back onto their main supply. This means CIs are doubled.
Staff costs: These include staff, senior authorised personnel and standby staff. They are calculated using estimated daily costs multiplied by the number of days they are required for.
Temporary / Back-up generation costs: Estimated generator equipment costs based on size/type of generator and number of days used for.
CI CML Generator trip costs: Generators are estimated to trip at least once in 55 days for a period of 4 hours before supply is restored. This counts as an unplanned outage, therefore full CI CML costs are incurred. These CI CML costs are calculated by assuming the generator will trip for a 4 hour period before power is restored, multiplied by the percentage likelihood of the generator tripping. Generator trip percentages are calculated by dividing the number of days the outage occurred by 55 (the number of days before a generator is likely to trip). The 4 hour figure was obtained from internal stakeholder engagement.
Staff generator trip costs are incurred as staff are required to attend faulty

generators. This is calculated by multiplying £500 (average staff costs to attend and fix faulty generators) by the percentage likelihood that the generator will trip.

Live Line Harvesting

Live Line Harvester Costs: These are based on costs incurred by SSEPD and costs to rent the harvester from the contractor.

Potential system security benefits: Under the conventional harvesting method, there is increased potential for CIs and CMLs in the event that a fault develops on a nearby circuit, which would usually have the ability to be back-fed from the circuit that is out for harvesting purposes. Manual tree felling work relies on a planned shutdown over several weeks. Other customers are therefore at risk if a fault develops and their supply can no longer be back-fed. This risk has been quantified by taking the total CIs and CMLs if a fault was to occur on an affected circuit and multiplying it by 5%. 5% is a conservative estimate. Live line harvesting removes this risk.

All calculations are presented in the CBA workings tabs.

Pole Pinning

This is where poles reaching the end of their life are pinned to extend their life.

Cost of replacing one pole: This is taken from the RIIO-ED1 2016 unit cost sheet. The values vary slightly for SSEH and SSES and have therefore been separated in the CBA.

PP Tractor/Beaver Cost per month: This is the cost involved in hiring the pole pinning beaver tail machine. The annual hire cost of the machine has been divided by 12 to derive a monthly figure.

Pole pinning cost per pole: This is the cost involved for pinning a single pole i.e. labour costs, pole pinning material costs.

# of poles pinned: The number of poles that were pinned in any given month.

Total pole pinning cost: Total costs of pinning poles for any given month. This is also the method investment used in the asset deferment table (see CBA).

Replacement cost avoided: This is the cost that would have been spent had the poles been replaced rather than pinned. This is also the base investment figure that is used in the asset deferment table.

Method NPV: The NPV costs involved in pole pinning based on the assumption that one pole, once pinned, does not need to be replaced for 14 years. This is calculated using the asset deferment benefits table.

NPV Saving: The actual saving of replacing a pole based on a pole's life being extended 14 years before it needs to be replaced. It is the base investment minus the method NPV.

All calculations are demonstrated in the CBA.

SSES

Pole Pinning

As per SSEH above.

Bidoyng
This technology locates LV underground cable faults.

BD3 calculated data: BD3 CIs and CMLs occur where Bidoyng fuses are available and a fault has been located using Kelvatec's location services.

It is assumed that rogue circuits (circuits prone to faulting), where Bidoyng equipment is located, will have an average of 4 faults on them per year.

If a cable problem is located before it faults and causes a fuse operation then the maximum number of CIs and CMLs are saved i.e. CI CMLs multiplied by 4 (the average number of times the circuit would have faulted because of the fault). The more fuse operations that occur, the less CI CML savings occur. Once 4 fuse operations have occurred no more CI CML savings can be gained (as it is assumed 4 is the number of times a circuit will fault).

Calculation details below:

0 fuse operations =Number of CIs and CMLs multiplied by 4
1 fuse operation = Number of CIs and CMLs multiplied by 3
2 fuse operations = Number of CIs and CMLs multiplied by 2
3 fuse operations = Number of CIs and CMLs multiplied by 1
4 or more fuse operations = Number of CIs and CMLs multiplied by 0

CMLs: It is assumed that one fault will cause an outage of 181.3 mins. This is based on average fault restoration times for cable faults.

CIs: It is assumed that one fault will cause an interruption for all customers on that particular circuit.

CBA Data
# of CIs: This is the total number of customers multiplied by the CI fine of £10.75 (April to August) or £10.77 (September to March) and then multiplied again by the number of fuse operations.

# of CMLs: This is the number of customers multiplied by £47.13. This is the average cost of a 3 hour outage i.e. 181.3*0.26. The resulting figure is multiplied again by the number of fuse operations to obtain a final figure.

Additional costs: These include Planned Supply Interruption (PSI) costs, backfeed costs and excavation costs.

PSI costs: It is estimated that an average cost of [redacted] will be incurred as a result of planned interruptions being necessary due to specific faults on specific circuits. This is an average figure taken from the Bidoyng business case, which takes into account average PSI costs.

Backfeed costs: These are average costs incurred as a result of backfeeding. It is estimated that an average cost of [redacted] will be incurred if backfeeding is required. This figure has been derived from the Bidoyng business case, which takes into account average costs of backfeeding. Backfeeding savings only occur on BD3 faults i.e. faults that are transient in nature and are cleared by the automatic replacement of fuses due to Bidoyng technology. This is because it removes the need for backfeeding.

Excavation costs: Bidoyng creates an average estimated saving of [redacted] in terms of reduced excavation costs. This is because it can pinpoint underground faults more effectively, reducing the need for multiple excavations

Total costs: This is a summation of all costs stated above.

BD1 calculated data: BD1 costs vary from BD3 costs as there are no fuse units available to prevent multiple faults from occurring. However, the Bidoyng technology can prevent faults from occurring by locating pre fault 'signatures' or warning signs before an actual fault occurs. This is why we have CI and CML savings.

CBA Data
# of CIs: This is the total number of customers that could be affected by an LV fault. It is calculated by taking the total number of customers on each feeder and dividing it by 3 to find the average number of customers per phase. As the fault is likely to occur on one of the phases not all customers lose supply. If faults occur on more than one phase these additional affected customers are added to obtain a final figure of how many customers could have been interrupted.
The number of customers is multiplied by £10.75 or £10.77 (depending on the month) to obtain a customer interruption figure.

# of CMLs: This is the number of customers that have been interrupted as calculated previously, multiplied by 180 to find the total CML cost. 180 mins is the average amount of time customers are expected to be off supply due to an LV cable fault.

Total out of hours cost: This is the cost associated for attending faults out of working hours. It has been derived from the Bidoyng business case which calculates an average out of hours cost per fault.

BD1 & BD3 costs are then added to get total costs used in the CBA.

Total Bidoyng contract spend: This is the amount of money spent on the Bidoyng contract specifically for fault location and fuse replacement services.
Bidoyng incentive spend: It is estimated that a total of [redacted] will be spent for 2015/16.

Total Bidoyng spend is the addition of these two spends.

Active Network Management (ANM)
ANM frees up additional capacity on the network by constraining generation during specific conditions.

CBA Narrative

Option Baseline: Do nothing. It is unlikely that this scenario would ever occur as it would mean generators would be constrained on the Isle of Wight (IoW) beyond acceptable levels. Given the network capacity is at its maximum, there is no benefit in terms of constrained volume avoided. It also shows a lack of commitment to customers for developing the network and prevents new connections from occurring. For these reasons, this option was not chosen.

Option 2: There is strong demand for generators to be placed on inter-trip connections on the IoW. Previously this has not been an issue as there was sufficient network capacity to connect new generators. However, as the network is at its limit in terms of its capacity, the cost to connect and time to connect has increased considerably.

For example, a generator requesting a new inter-trip connection would be quoted approximately [redacted] in 2016. This is because reinforcement would be necessary on the 132kV circuits on the island in order to provide sufficient capacity. However, this reinforcement will only increase network capacity by a small amount: enough for the one generator requesting the inter-trip connection.
Once this [redacted] reinforcement is complete, any additional generators requesting an inter-trip connection on the IoW will trigger the need for a subsea cable reinforcement. This will cost [redacted] and take approximately two years to complete. During this time no additional generators will be able to connect.

In this scenario, generators operate on a constrained network for the first two years where this is no available capacity. Therefore no constrained volume is avoided. The [redacted] reinforcement releases an additional 9MVA of capacity, once works have completed (approximately 2 years). This avoids constraints each year over RIIO-ED1. By 2020 the [redacted] submarine cable reinforcement will be completed releasing additional capacity of over 100MVA. It is assumed that 27MVA of this capacity will be used initially by a large generator(s) followed by an additional 9MVA of capacity each year thereafter. These forecasts will be updated with real figures each year.

Constrained volume avoided is calculated as the cost per MWh. This cost has been taken from the [redacted]. The amount of MVA released is assumed to be the same as MW released i.e. 9MVA = 9MW. The [redacted] reinforcement is assumed to release 9MVA in 2018. The MVA figure is multiplied by the capacity factor. This is assumed to be 0.15 for the IoW. 0.15 (or 15%) is the average efficiency that Solar PV farms are expected to generate at in that region. This has been taken from multiple web based sources and internal stakeholders. Finally the resulting number is multiplied by the number of hours in the year to give an answer in MWh. This MWh figure is used in the RIIO CBA.

Option 3: Instead of going ahead with the traditional reinforcement proposed above, we have implemented ANM on the IoW. ANM allows us to offer generators requesting an inter-trip connection to be given a constrained connection instead. It is estimated that ANM will free up an additional 45MVA of constrained capacity on the IoW network without the need for expensive reinforcement. This MVA figure was calculated by using the lowest summer load figure. It is estimated that generators will take advantage of the new capacity made available and it will be filled over the next four years. After this point any new generator requesting an inter-trip connection will trigger the [redacted] reinforcement and then the [redacted] reinforcement thereafter, as described above. Installing and operating ANM in 2016 cost [redacted]. Every year thereafter the operating expenditure of the ANM scheme is estimated to be [redacted].

In this scenario ANM is in place, which allows increased capacity on the network of 45MVA. It is assumed that around 9MVA of capacity will be taken up each year until capacity is reached in 2020. The [redacted] reinforcement will then be triggered by demand for new inter-trip connections. This will be completed by 2022 and release an additional 9MVA of capacity, which will be fully utilised by a connecting generator. The [redacted] reinforcement will also occur in RIIO-ED1, although additional capacity will not be available until RIIO-ED2.

The constrained volume avoided figure for this option is calculated in the same way as option 2. The only difference is that the final MWh figure is multiplied by an ANM constraint factor figure, as due to the nature of ANM, it will constrain generators at certain times. For 2016 there has been no constraint for the one generator that is operating. Therefore no constraint factor has been included.

For 2017 to 2020 it is estimated that generators will be constrained an additional 10% each year. This means generators that connect in 2017 will be constrained 10% by ANM and generators connecting in 2020 will be constrained 40% by ANM. This is representative of what has occurred on the Orkney ANM and follows the last in first off principle (LIFO). It is unknown exactly how much will be constrained, so this CBA will be updated as we receive better information.

Option 4: This approach is the same as Option 3 except reinforcement is forecast to be delayed by 12 years instead of 4.

The Option Baseline is not a feasible option as it shows a lack of commitment to our customers and acts as a barrier towards new connections. Option 2 is very costly and prevents new connections for the next four years. Option 4 is a possible scenario. However, at this moment in time, with expected generator connections we expect Option 3 to be the most likely option of the four.

It is also assumed that ANM will not be removed once conventional reinforcement is complete. If ANM were to be removed once conventional reinforcement was completed, this would not occur until RIIO-ED2.

E6 Template
Costs: Only costs for the ANM solution have been inserted here
Only the MVA released by ANM has been included. It does not include the MVA released by traditional reinforcement. Total MVA released is 45MVA, of which 9MVA is assumed to be connected each year until capacity is filled. This will take 5 years.
Estimated Gross Avoided costs: This shows the saving per year of ANM vs traditional reinforcement. In the E6 reporting template the final £m figure is a positive £1.7m. This is because it does not take into account the benefits of deferring reinforcement. When taking into account NPV benefits the figure should be -£2.07m over RIIO-ED1. However, this template does not allow this functionality.

General
For each of the solutions please explain:

- In detail what the solution is, linking to external documents where necessary.
- How this is being used, and how it is delivering benefits.
- What the volume unit is and what you have counted as a single unit.
- How each of the impacts have been calculated, including what assumptions have been relied upon.

SSEH

1) The hybrid generator (HG) technology is offered as a solution for off-grid power supply requirements in remote locations and can be used to provide power for residential, construction, telecom towers and disaster relief applications. It is a temporary mobile generator and not utilised full time.

The HG is a combination of a diesel generator (DG) and a power-electronic converter with integrated battery storage. In conventional generator-only applications, the diesel generator must "load follow" and therefore operates at off-optimal conditions for the vast majority of time – the battery system alleviates this requirement.

Other benefits include low/no noise through noise insulation and operation in battery-only mode, less carbon emissions through operation of the DG at optimal conditions and use of battery, generally more efficient operation of the DG and reduced cost of ownership since the engine has to run less often.

Close down report located here:
[redacted]

2) Four hybrid generators currently exist. However, they have been in testing phase due to reliability issues. One hybrid generator is currently in use and has been providing benefits since December. The main benefit of the hybrid generator is that it reduces the amount of money spent on diesel by running in battery mode. This also reduces CO2 output. Maintenance costs are also less than diesel generators.

3) The volume unit is the number of hybrid generators. One generator equates to one unit.

4) Litres of fuel saved by the hybrid generator are reported on a monthly basis (30 kVA standard diesel generator fuel use – 30kVA hybrid generator fuel use). CO2e is calculated using DCF carbon calculation figures for 100% diesel mineral oil.

Live Line Tree Harvester

1) Tree harvesting adjacent to our overhead network presents increasing challenges to SSEPD, particularly in our SSEH licence area. Volumes of timber available to be harvested by third parties will continue to rise over the next 20 years and we have increased ESQCR obligations to gain enhanced (falling distance) clearances over the next 25 years.

Current guidance and practice on tree felling within falling distance of the network is to either plan an outage or to fell or dismantle the trees using manual techniques.

Outages have obvious disadvantages:

- significant CI/CML consequences
- hazards associated with switching and provision of generation
- reduction in network security
- time constraints on shutdowns could result in failure to complete works

The use of manual methods adjacent to a live line for large numbers of trees also has significant drawbacks:

- operatives are at increased risk from working for long periods at height, chainsaws, falling trees and electricity
- drain on highly trained resources needed to carry out programmed maintenance work

The objective of the project was to fully investigate the scope of the issue, evaluate potential methods and machinery that could be employed and to develop safe systems of work to carry out mechanised harvesting adjacent to a live network.

The close down report is located here:
[redacted]

2) Currently one live line harvester is in operation, which is under contract. Plans are in place to procure our own harvester due to the success of this technology. It has only been used in the SSEH and Scottish Hydro Electric Transmission plc (SHET) regions (SHET use is not reported here). The harvester works by felling trees adjacent to live lines. It produces benefits as it is a less costly method of harvesting vs conventional hand felling harvesting methods. It is also more efficient. Benefits come from reduced CI CML's, improved security of supply (also CI CML benefits) and lower generation costs. Unquantifiable safety benefits also exist, as hand felling of trees for long periods of time are risky.

3) There are various units that have been used e.g. £s related to CI CMLs, litres for amount of diesel used, etc.

4) Assumptions and how they have been calculated are mentioned in the first box.

Pole Pinning

1) Poles reaching their end of life or those that are significantly deteriorating to the point where they need to be replaced, can instead be pinned. Pole pinning involves using a specialised pole pinning machine that drives a pin through the base of a deteriorating pole. The pin provides the pole with additional strength. It is estimated that pinned poles will their lifetime extended by 14 years, providing significant financial benefits.

2) Unfortunately pole pinning failed to deliver positive financial benefits and the technology has been stopped by SSEPD. This is because not enough poles were being pinned to cover the cost of the equipment hire. Field staff reported problems such as poles being too rotten to pin.

3) The volume unit is the number of poles pinned and one pinned pole counts as a single unit.

Assumptions and how they have been calculated are mentioned in the first box.

SSES

Pole Pinning
As per SSEH above.

Bidoyng
1) Bidoyng provides us with accurate demand data, pre-fault detection and location, post fault location, cable condition assessment and fault remote reclosing.

   SSEPD have a team of approximately 20 field and office staff who are dedicated entirely to the Bidoyng project as well as 20 other depot personnel who provide ad hoc assistance and support to the team.

   Kelvatek is the vendor that supplies the Bidoyng fault detection equipment. It also provides a fault analysis service which rapidly interprets data from the devices and sends details of fault location to the SSEPD Supply Restoration

Teams.

Bidoyng fault detection equipment is designed to be mobile. It is placed on rogue circuits (i.e. circuits with high numbers of faults) until faults are identified and resolved. The Bidoyng equipment is then moved to the next location in order to detect and prevent as many faults as possible.

When the SSEPD Bidoyng team are notified of a fault by Kelvatek, a team of field staff is sent out to locate the fault using initial location data provided by Kelvatec. In order to establish a detailed location based on the information from Kelvatek, a device from EATL called a 'Sniffer' is used. Sniffers are able to detect underground faults by identifying gases that are emitted from arcing and heated cables. Once a fault is located the area must be excavated in order to fix the fault. If the fault is not located the devices continue to gather intelligence gradually building up a more accurate location of the fault.

2) Before Bidoyng technology was available, cable faults resulted in large financial penalties and operational costs. Using traditional techniques, finding faults in the underground network was difficult. This often resulted in multiple excavation attempts in order to identify the fault location, each of which would have incurred costs. In addition, the length of time taken to locate the fault was very long, resulting in high CML penalties.

   The main purpose of the Bidoyng project is to locate faults before they cause a CI along with associated CMLs. It does this by identifying pre fault signals. Once enough signals have been recorded and analysed, it is possible to identify potential fault locations with an associated level of confidence. A team is dispatched to the pre-fault location when the analysis predicts a fault location with an estimated accuracy of +/-10 metres. The team can then locate and repair the faulty cable before it becomes a full blown fault, in most cases avoiding any unplanned interruptions to customers. In addition to this ability to identify and locate faults before an outage occurs, the devices also provide detailed locational information for "hard" faults, which allows the DNO to respond more quickly to minimise customer disruption. Uniquely, the device also gives the licensee the ability to reclose the circuit remotely in the case of an intermittent fault.

3) The volume unit is the number of CIs and CMLs.

Assumptions and how they have been calculated are mentioned in the first box.

ANM

1) The solution deployed is Active Network Management (ANM), where generators that may otherwise have been unable to connect to the distribution network due to excessive reinforcement costs or timescales, can connect through a flexible connection. The system constitutes of Information Communication Technology (ICT) architecture that monitors, in real time, the pre-identified network

constraint points and ensures that no generators connected through it can breach the network's operational limits. If those limits are threatened, then the system sends control signals to the most appropriate generator to reduce their export until the network limits are no longer threatened, at which point the generators are released back to a safe operating state. The key governing principles are described in the ENA's ANM Good Practice Guide, which can be found via the following link.
http://www.energynetworks.org/assets/files/news/publications/1500205_ENA_ANM_report_AW_online.pdf
The report was created by the ENA ANM Working Group where the relevant subject matter experts meet to share learning and to tackle industry wide issues affecting the wider roll out of ANM.

SSEPD have been working on ANM for a number of years, as can be seen through the work completed and charted for the Orkney ANM via the following link https://www.ssepd.co.uk/OrkneySmartGrid/ . Through this work, SSEPD have built up an in-depth understanding of ANM that has allowed us to roll out ANM into Business as Usual so that more of our customers can experience the benefits that ANM can bring.

SSEPD have also recognised the need to support the rollout of this kind of innovation and have implemented business structural change to setup a team, the Active Solutions Team, whose sole responsibility is the rollout out of the more involved proven innovations, like ANM. Through setting up this team, SSEPD aim to better rollout innovations quicker so that our customers can start realising the benefits sooner.

The main document detailing the reinforcement costs for IoW over the RIIO-ED1 period is located here:
[redacted]

2) Customers benefit from ANM as they are able to connect much sooner and at a far cheaper cost compared to traditional reinforcement. ANM defers this reinforcement cost creating NPV benefits, while allowing more generators to connect.

3) The volume unit on this is £s in terms of reinforcement deferred.

4) Reinforcement costs have been calculated by system planners based on the size of the subsea cable that is necessary for the Isle of Wight network to ensure additional capacity is available for new connections as soon as possible.

The amount of time reinforcement is deferred for is calculated by system planners and is based upon how much additional capacity ANM can free up and predicted generator connection demand.

Currently 9MVA has been released by ANM. It is unknown how much will be released each year, as it depends on demand for generator connections. We do know ANM has the ability to release 45MVA. We have assumed that over RIIO-ED1 this 45MVA capacity will be fully utilised. This is in line with predictions that reinforcement will be needed in RIIO-ED1 as well. We do not know when generators will connect. We have assumed 9MVA per year for the first 5 years will be released by ANM.

Use of the RIIO-ED1 CBA Tool
DNOs should use the latest version of the RIIO-ED1 CBA Tool for each solution reported in the Regulatory Year under report. Where the RIIO-ED1 CBA Tool cannot be used to justify a solution, DNOs should explain why and provide evidence for how they have derived the equivalent figures for the worksheet. The most up-to-date CBA for each solution reported in the Regulatory Year under report which are used to complete the worksheet must be submitted.

SSEH and SSES
RIIO-ED1 CBA tool used for all technologies.

Changes to CBAs
If, following an update to the CBA used to originally justify the activity in column C, the updated CBA shows a negative net benefit for an activity, but the DNO decides it is in the best interests of consumers to continue the activity, the DNO should include an explanation of what has changed and why the DNO is continuing the activity.

SSEH and SSES
Negative monetary benefit occurred only for pole pinning. This technology has been stopped.

Calculation of benefits
Explain how the benefits have been calculated, including all assumptions used and details of the counterfactual scenario against which the benefits are calculated.

SSEH

Hybrid Generator

Option 1 (Baseline):
Total Running time of hybrid generator was used to compare figures against.
Amount of Diesel used by a similar standard diesel generator was used. This was estimated to be 6 litres an hour for a generator of the same size (30kVA) running at 75% load. These figures were used by consulting internal company experts and well known web sites.
CO_2 used: Multiply litres used by 2.67614 (taken from DCF carbon calculation spreadsheet for 100% diesel mineral oil)
Maintenance Cost: This was assumed to be twice that of the hybrid generator (confirmed by internal company experts who use the generator).

Option 2
Total running time was estimated from use of the hybrid generator on specific jobs over a one month period.
Diesel used: The amount of diesel that the hybrid generator used over a one month period.
CO_2 used: Multiply litres used by 2.67614 (taken from DCF carbon calculation spreadsheet for 100% diesel mineral oil).
Maintenance costs: Costs spent on maintaining the hybrid generator.

Live Line Tree Cutter

Refer to first box

Pole Pinning

Refer to first box

SSES
Pole Pinning

Refer to first box

Bidoyng

Refer to first box

ANM

Benefits of ANM is an NPV cost reduction that must be viewed in the CBA. Traditional reinforcement (Option 2) will have an NPV cost of -£32.09m over 45 years vs ANM forecast scenario (Option 3), which has an NPV cost of -£30.13m over 45 years. This represents and NPV cost saving of £1.96m.
NPV calculations are demonstrated in the CBA and assumptions explained in previous boxes.

Cost benefit analysis additional information
Please include a reference to the file name and location of any additional relevant evidence submitted to support the costs and benefits inputted into this worksheet. This should include the most recent CBA for each solution reported in the Regulatory Year under report.

SSEH
Hybrid Generator

Link to reporting document where hybrid generator benefits are calculated:
[redacted]

CBA Location:
[redacted]

Live Line Tree Cutter

CBA Location:
[redacted]

Pole Pinning

CBA Location:
[redacted]

SSES
Pole Pinning

CBA Location:
[redacted]

Bidoyng

Link to original BD1 and BD3 data:
[redacted]

[redacted]

CBA Location:
[redacted]

ANM

RIIO-ED1Isle of Wight Development Plan with reinforcement costs is located in:
[redacted]

CBA Location:
[redacted]

Changes to CBAs
If, following an update to the CBA used to originally justify the activity in column C, the updated CBA shows:

- a negative net benefit for an activity, but the DNO decides it is in the best interests of consumers to continue the activity, or
- a substantively different NPV from that used to justify an activity that has already begun.

the DNO should include an explanation of what has changed and why the DNO is continuing the activity.

For example, where the carbon price used in the RIIO-ED1 CBA Tool has changed from that used to inform the decision such that the activity no longer has a positive NPV.

N/A

Cost benefit analysis additional information
Please include a reference to the file name and location of any additional relevant evidence submitted to support the costs and benefits inputted into this worksheet. This should include the most recent CBA for each activity reported in column C in the Regulatory Year under report.

N/A

E7 – LCTs

Allocation and estimation methodologies: detail any estimations, allocations or apportionments to calculate the numbers submitted.

SSEH and SSES

At this time we are unable to differentiate between applications made for low carbon technology specifically heat pumps and those submitted for other requests. We are working on this and will be able to report these figures in 2016-2017.

Where we are notified that a charging site is connected the installer provides the ampage of the installation. This has been converted to kW's and then collated and summated. Based on our understanding we have allocated installations of less than 3kW as slow change and greater than 6kw as fast charge.

We have used the FITs register to provide the figures for G83 DG making the assumption that anything under 11kW falls under G83.

It was not possible to use the FIT's data to calculate the number for non G83 DG connections or the increased capacity. In order to determine this we have used CR5 of the connections pack. Using the CR5 pack gives a greater level of detail. There may have been other DG projects connected in the year, which as yet have not been financially closed and recognised in CR5, however this will be report in 2016-2017.

LCT – Processes used to report data (i) Please explain processes used to calculate or estimate the number and size of each type of LCT. (ii) If any assumptions have been made in calculating or estimating either of these values, these must be noted and explained.
As above

LCT - Uptake Please explain how the level of LCT uptake experienced compares to the forecast in your RIIO-ED1 Business Plan and the DECC low carbon scenarios. This must also include any expectation of changes in the trajectory for each LCT over the next Regulatory Year in comparison to actuals to date.
SSEH and SSES As detailed in our RIIO ED1 submission, our predictions were based on an assessment of likely economic uptake and assumption that tariffs to incentive uptake (eg FITs, Green Deal etc) would continue to incentivise significant uptake of LCT. SSEPD has seen significantly lower levels than predicted of LCT uptake. As a result we have revised our projections and expect the new lower uptake across all categories of LCT will continue over the next Regulatory Reporting Year.