

Innovation Competitions - Full Submission

Supplementary Answer Form

Tick if this answer has been provided verbally:

| | | | |
|--|---|-----------------|----------|
| Project code | SSET2/07 | Question Number | 1 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | 1.3 Project Summary | | |
| Topic | Project Methodology | | |
| Question | The proposal specifies that two methods will be trialled which will reduce losses on the 33kV/11kV networks. Does ANT reduce losses? It's description suggests that it mitigates any reduction in grid resilience produced by TASS. | | |
| Notes on question | | | |
| Answer | <p>The Alternative Network Topology's (ANT) primary purpose is to mitigate any risk of reduction in grid resilience caused by TASS or any other network fault or system event during TASS operation. This method is only of use where two interconnected substation both have implemented TASS, e.g. running two transformers in a meshed arrangement as opposed to 4 transformers with a static network open point.</p> <p>However, as a secondary function of operating the network in a meshed configuration, the ANT method is expected to reduce the overall 11 kV network or paralleled/interconnected 11 kV feeder impedance, and as a consequence, it will further reduce losses in the 11 kV network; thus complimenting the Transformer Auto Stop-Start (TASS) method.</p> <p>SEPD's 'Isle of Wight Network Losses Reduction Study' undertaken during 2013-2014, has shown that although the ANT method on its own provides the shortest return of investment, the amount of loss reduction benefits the method achieves over a 45 year assessment period was found to be relatively small (around 15% of the technical and cost benefits achieved by TASS method).</p> <p>In consequence, the LEAN project does not include any claim for loss savings from the ANT method because these losses are small and will be difficult to quantify.</p> | | |
| Attachments | | | |

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|--|--|-----------------|----------|
| Project code | SSET207 | Question Number | 2 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | 3.5 Project benefits, page16 | | |
| Topic | Document Content | | |
| Question | In this section, when quoting the energy saved per substation per year, 90MWh/annum is quoted as the 'typical' figure. In Section 3.4, however, 90MWh/annum is presented as a higher bound figure ('...losses equated up to...') for sites with higher loss transformers. Is 90MWh/annum a mean or a maximum figure? | | |
| Notes on question | | | |
| Answer | <p>The figure of 90MWh/annum has been used to indicate what we expect can be saved at a typical substation where the LEAN method can be applied and hence is a mean value of what we expect to achieve at this preliminary stage.</p> <p>Please note that inspection of SEPD's 33/11kV transformer data indicates that iron losses may be between 3.5kW and 60kW with a median value of 9kW. With our focus on transformers with higher than average iron losses an annual saving of 90MWh would involve a saving of ~10 to 20kW for every hour of the year which would appear achievable in typical circumstances.</p> <p>We will also be validating our assumptions about iron losses, which may have changed/deteriorated since the date of first commissioning and this may also lead us to increase the savings achievable via the LEAN method.</p> | | |
| Attachments | | | |

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|--|---|-----------------|----------|
| Project code | SSET207 | Question Number | 3 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | 3.5 Project benefits, page17 | | |
| Topic | Document Content | | |
| Question | What is the justification for the 45 year value calculation? Is this based on anticipated asset life or is it an accounting measure? | | |
| Notes on question | | | |
| Answer | <p>We made use of the OFGEM RIIO business case spreadsheet to calculate the annual benefit and carbon savings for LEAN. This spreadsheet made use of a 45 year forecasting period and we continued with the same in our benefit assessments.</p> <p>We are aware that OFGEM anticipates transformers to be replaced after an asset life of about 60-65 years (as per PB Power Assessment of DNO Business Plans for OFGEM, 2004) although replacement may be sooner, due to load growth, or later, if there is minimal load growth and the transformer continues to deliver a reliable service.</p> <p>In addition the figure of 45 years is also the number SEPD Procurement department use to calculate the transformer lifetime costs and hence compare the total cost between manufacturers.</p> | | |
| Attachments | | | |

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|--|--|-----------------|----------|
| Project code | SSET207 | Question Number | 4 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | 3.5 Project Benefits, p18 | | |
| Topic | Document Content | | |
| Question | What is the justification for the estimated cost of Options 1, 2 or 3? | | |
| Notes on question | | | |
| Answer | <p>The estimated costs for the various options have been formulated using a combination of industry knowledge, experience and publicly available data based on the content of each option.</p> <p>As indicated in the project risk register, careful cost tracking will be an integral part of the project and regular reviews will identify any potential issues and allow decisions to be taken with regards project spend.</p> <p>The costs for the first two options are more accurate as the costs are based on existing equipment / engineering practices. The final option has a bespoke equipment requirement and is inherently more difficult to accurately cost at this early stage.</p> <p>At this initial stage we have had early engagement with major switchgear suppliers re the proposed switching regime integrated with the simplistic switching algorithm software. To date we have had more than ten positive responses from manufacturers interested in the work, however have not had any formal quotations, as such the cost may vary for this final option. This work will be an integral part of the first phase of the project - should the cost be out of budget this option will not be implemented.</p> | | |
| Attachments | | | |

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|--|--|-----------------|--------|
| Project code | SSET207/01 | Question Number | 5 |
| Question date | 31/7/14 | Answer date | 4/8/14 |
| Submission section question relates to | 2.1.2 Methods, p8 | | |
| Topic | Document Content | | |
| Question | Figure 2.e is titled "Simple diagram of Alternative Network Topology"; when the same diagram is reproduced in Appendix 3 it is titled "Primary Substation with Additional Switching Equipment" - suggesting that it is a diagram of breakers installed for TASS. Can you please clarify? | | |
| Notes on question | | | |
| Answer | The naming of the diagram figure2.e although does pertain to the same general concept should be named; "Primary Substation with Additional Switching Equipment" and is, as suggested, a diagram of the potential locations for the new circuit breaker installed for TASS. | | |
| Attachments | | | |

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| Project code | SSET207/01 | Question Number | 6 |
| Question date | 31/7/14 | Answer date | 4/8/14 |
| Submission section question relates to | 2.1.2 Methods, p9 | | |
| Topic | Project Approach | | |
| Question | "Development of loss-reduction model: This activity involves in-depth study and analysis to investigate actual load profiles across the network..." Is this information already known as part of business as usual? | | |
| Notes on question | | | |
| Answer | <p>Yes it is correct to say that the information mentioned exists under business as usual. The data is collected using monitoring equipment located within each 11kV circuit breaker and records maximum demand for each half hourly period throughout the year. This data is fed back to our central control room and stored within our PI Historian system.</p> <p>The present modelling practices only consider maximum demand as a static value at substation and feeder level annually - to quantify the load growth against firm capacity. There are however certain circumstances where more in depth modelling of the demand profile over the year is required.</p> <p>The dynamic modelling proposed under LEAN is to consider the 48 half hourly periods for each day of the year to provide daily load duration curves for each substation. The daily profile is created by aggregating the 11kV feeder data over each 24 hour period.</p> <p>It is however not a trivial task to collate the data required and complete modelling to this level of detail; hence it is only completed under business as usual if there is a specific issue at a particular substation, e.g. cyclic loading.</p> <p>The loss reduction model will consider in detail the potential savings that could be achieved from the implementation of Transformer Auto Stop Start (TASS) and the specific considerations. The intention is that this will become a simple to use tool that can ultimately be used by the Distribution business to very quickly work out if the existing equipment and networking loading levels make it economical to implement TASS.</p> | | |
| Attachments | | | |

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|--|--|-----------------|----------|
| Project code | SSET2/07 | Question Number | 7 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | 3.5 Project Benefits, page 17 | | |
| Topic | Document Content | | |
| Question | This section suggests that Appendix 5 provides further detail on the claims made in the business case. However, Appendix 5 contains a reiteration of the Method already detailed in Section 2.1, without providing further facts or evidence for the claims presented, is this intentional? | | |
| Notes on question | | | |
| Answer | <p>Apolgiers for any confusion caused, appendix 5 was drafted separately from the Business Case section when it was considered that the Business Case section may require "cropping" so as to meet the text / page limits applied to Tier 2 project proposals.</p> <p>It was subsequently discovered that all of the details in Appendix 5 could be included in the Business Case without exceeding the text/page limits so that appendix 5 and the business case are very similar in their content.</p> | | |
| Attachments | | | |

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|--|--|-----------------|----------|
| Project code | SSET2/07 | Question Number | 8 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | 4 Evaluation Criteria, p22 | | |
| Topic | Document Content | | |
| Question | How have the risks that are tabulated been judged to be the most significant for the project? | | |
| Notes on question | | | |
| Answer | <p>The project bid submission includes, in Appendix 6, a comprehensive risk register. The table of risks on highlights the risks relevant to that particular section. It is intended that the document is considered in its entirety with respect to identification of risks and associated mitigation / contingency measures.</p> <p>During the bid preparation process a comprehensive review of risks was undertaken, discussed internally according to defined processes and peer reviewed by all relevant departments. Utilising this approach, the risks documented in the bid are considered accurate and encompass all required areas where risks are present.</p> <p>The risks that have been highlighted as most significant are generally related to customer impacts, e.g. loss of supply / power quality or an impact on asset health where the costs have a large cost associated. These significant risks have then been used to populate the project contingency plan.</p> | | |
| Attachments | | | |

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|--|--|-----------------|----------|
| Project code | SSET2/07 | Question Number | 9 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | Appendix 4, p53 ono | | |
| Topic | Document Format | | |
| Question | The tabular format used for the project plan makes it difficult to navigate - can you please provide a copy where the headers are repeated across pages? | | |
| Notes on question | | | |
| Answer | This has been amended as requested within the updated Appendices. | | |
| Attachments | SSET207 Collated Appendices rev 1.1.pdf | | |

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|--|--|-----------------|----------|
| Project code | SSET2/07 | Question Number | 10 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | Appendix 4 [5], page 59 | | |
| Topic | Numerical Query | | |
| Question | In the tables of financial and carbon benefits the numbers don't tally with those found in the body text (for example █████ = █████ rather than the █████ quoted in the text). Which of these numbers is correct? | | |
| Notes on question | | | |
| Answer | <p>With apologies for the error in transcription from spreadsheet to word document, please see revised set of financial and carbon benefits summary tables for Appendix 5.</p> <p>Please note that there are some other changes to numbers in these tables – these were caused by a spreadsheet calculation method setting at <manul> instead of <automatic>, now rectified within the updated appendices.</p> | | |
| Attachments | SSET207 Collated Appendices rev 1.1.pdf | | |

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| Project code | SSET2/07 | Question Number | 11 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | Appendix 4, page 59 | | |
| Topic | Numerical Query | | |
| Question | It is not clear from the table how the base case costing has been calculated. Is there a reference that could be provided in order to clarify these numbers? | | |
| Notes on question | | | |
| Answer | <p>The base case costings are the losses which occur during normal transformer operation (i.e. without the application of the LEAN method). This could be considered a do nothing scenario and hence there is no additional cost to operating the network in the existing manner.</p> <p>The savings have been calculated as the cost of not operating the transformer for certain periods throughout the day. These are derived from the typical annual load duration curves to confirm at which times it is most efficient to operate one or two transformers. The losses saved (made up of iron and copper losses) multiplied by the present value of losses per kWh, which is taken as £0.048/kWh (the rate specified by Ofgem as the value of losses).</p> | | |
| Attachments | | | |

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|--|---|-----------------|----------|
| Project code | SSET2/07 | Question Number | 12 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | Appendix 6, p66 ono | | |
| Topic | Document Format | | |
| Question | The tabular format used for the risk register makes it difficult to navigate - can you please provide a copy where the headers are repeated across pages? | | |
| Notes on question | | | |
| Answer | This has been amended as requested within the updated Appendices. | | |
| Attachments | SSET207 Collated Appendices rev 1.1.pdf | | |

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|--|---|-----------------|----------|
| Project code | SSET2/07 | Question Number | 13 |
| Question date | 31/7/2014 | Answer date | 1/8/2014 |
| Submission section question relates to | Appendix 6, p66 ono | | |
| Topic | Document Content | | |
| Question | The qualitative descriptions for risks 'Remote',' Occasional', 'Improbable', etc are unclear and leave the table open to misinterpretation. Please can you provide numerical bandings for these values? | | |
| Notes on question | | | |
| Answer | Please see two images added to the updated Appeddices document after the Risk Register which provide the numerincal detail on bandings within the project risk register and contingency plan. | | |
| Attachments | SSET207 Collated Appendices rev 1.1.pdf | | |

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|--|---|-----------------|----------|
| Project code | SSE_T2_07 | Question Number | 14 |
| Question date | 31/7/2014 | Answer date | 4/8/2014 |
| Submission section question relates to | Appendix 7, Appendix M | | |
| Topic | Document Content | | |
| Question | The first 62 references in Appendix 7, Appendix M are unreferenced by the body text - suggest removing. | | |
| Notes on question | | | |
| Answer | The first 62 references listed under 'Appendix M: Document References' on Page 78 were covered as part of Appendix 8. Appendix M has now been renamed and moved to the end of section 8 to cover both Appendix 7 & 8. | | |
| Attachments | SSET207 Collated Appendices rev 1.1.pdf | | |

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|--|--|-----------------|----------|
| Project code | SSET2/07 | Question Number | 15 |
| Question date | 31/7/2014 | Answer date | 4/8/2014 |
| Submission section question relates to | Appendix 8 | | |
| Topic | Document Content | | |
| Question | Should Appendix M appear after both Appendix 7 and 8? - It appears to pertain to both of them. | | |
| Notes on question | | | |
| Answer | <p>The reference list on Page 78 was inaccurately labelled as 'Appendix M: Document References', this label heading pertains to references in Appendix 7 and 8; this inaccurate label has been renamed with 'Appendix 7 and 8: Document References' and has been moved to the end of section 8.</p> <p>Existing reference list under 'SSET2 LEAN Appendix 11 – References' pertains to the bid main body text.</p> | | |
| Attachments | SSET207 Collated Appendices rev 1.1.pdf | | |

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|--|--|-----------------|----------|
| Project code | SSET207 | Question Number | 16 |
| Question date | 14/08/14 | Answer date | 18/08/14 |
| Submission section question relates to | Section 1 | | |
| Topic | Project Partners | | |
| Question | Please clarify the role of S & C Consulting within the project. | | |
| Notes on question | | | |
| Answer | <p>SEPD awarded S&C Consulting a contract to support aspects of LEAN bid preparation; specifically, this includes analysis on the business case and benefits. A full tender exercise with multiple potential suppliers was carried out after the ISP was accepted. S&C were successful as they demonstrated that they could provide best value and had the relevant experience and resource available to ensure the successful delivery of the LEAN bid. In particular, S&C's Consultancy group were able to draw on the significant experience gained from their contribution to SEPD's 2013 IFI loss-reduction studies.</p> <p>Should LEAN be awarded Tier 2 funding, SEPD will conduct a further competitive and transparent procurement process to secure project partners for the delivery of the LEAN project. This will include for the provision of specialist technical support as well as the supply and installation of the LEAN equipment. This exercise will be open for S&C to respond to.</p> <p>Identification of the project suppliers and validation of the equipment costs are key outputs from phase 1 of the project.</p> | | |
| Attachments | | | |

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|--|---|-----------------|-----------|
| Project code | SSET207 | Question Number | 17 |
| Question date | 14 August 2014 | Answer date | 18/8/2014 |
| Submission section question relates to | Section 1 | | |
| Topic | Project Partners | | |
| Question | On page 30, of the proforma you outline the potential role of an academic partner in the project. Please clarify whether you have already engaged with potential academic partners to establish the interest, resources and specialisms to carry out the roles described. | | |
| Notes on question | | | |
| Answer | <p>SEPD is committed to working with a range of partners which can offer the project good value for money through the delivery of relevant experience and technical expertise.</p> <p>LEAN will require collaboration with project partners for specific project elements relating to asset and network monitoring, and the delivery of knowledge capture/dissemination. This includes:</p> <ul style="list-style-type: none"> • Site selection for TASS • Monitoring of transformer health and asset life expectancy • Evaluation of the project's impact on the network • Creation of the Network Losses Reduction Tool • Development of training material <p>The project team will collaborate with transformer and network asset specialists where appropriate to do so. While the project team has identified two universities as possible partners for knowledge dissemination and research activities, we recognise that there are other, non-academic organisations offering similar services at competitive rates. For this reason, detailed engagement with potential partners will only go ahead if funding is awarded.</p> <p>Partnership sourcing will involve a competitive procurement process designed to seek best value for money. The LEAN project team will enter into appropriate commercial arrangements with the selected partners and suppliers, with clear, tangible objectives, timeframes, deliverables and responsibilities agreed by all parties.</p> | | |
| Attachments | | | |

| Project code | SSET2/07 | Question Number | 18 | | | | | | | | | | | | |
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| Question date | 14/8/2014 | Answer date | 18/8/2014 | | | | | | | | | | | | |
| Submission section question relates to | Section 2 | | | | | | | | | | | | | | |
| Topic | Project Description | | | | | | | | | | | | | | |
| Question | At how many substations are you planning to trial TASS? I couldn't see it in the report, but I assume that there must be a planned number as financial costs and benefits have been produced. | | | | | | | | | | | | | | |
| Notes on question | | | | | | | | | | | | | | | |
| Answer | <p>TASS will be deployed on a maximum of 11 substations. The key outcome from the LEAN project is the development of a Network Losses Reduction Tool, which can be used by DNOs to assess the benefits of applying TASS methodology to their own assets. TASS application on a number of substations and the outputs arising from this will validate the outcomes from the Network Losses Reduction Tool.</p> <p>Three options for the TASS solution have been identified, all of which will be deployed. The number of deployments in the trials correlate to the anticipated cost of each option, and the potential for replication if the method is adopted as business as usual:</p> <table border="1"> <thead> <tr> <th></th> <th>Description</th> <th>Indicative no. Of deployments</th> </tr> </thead> <tbody> <tr> <td>Option 1</td> <td>Remote switching using existing equipment</td> <td>Max 5 deployments</td> </tr> <tr> <td>Option 2</td> <td>Advanced switching using existing equipment</td> <td>Max 4 deployments</td> </tr> <tr> <td>Option 3</td> <td>Advanced switching using new higher performance switchgear</td> <td>Max 2 deployments</td> </tr> </tbody> </table> <p>During Phase 1 the Network Losses Reduction Tool will be developed using the actual load profiles and network details for each location. This will give further confidence on the level of loss reduction that can be anticipated from each location. Phase 1 will also see the development of a requirements specification for each of the TASS options; this will be used to engage with the supply chain to develop a more detailed cost for each of the three options.</p> <p>At the end of Phase 1, SEPD will validate the underlying cost and benefits assumptions, allowing the team to confirm that the project offers sufficient value and warrants deployment. If we identify that the cost of the trials is higher than estimated or that the potential benefits are significantly lower than anticipated we will conduct a review. The options will be examined and</p> | | | | Description | Indicative no. Of deployments | Option 1 | Remote switching using existing equipment | Max 5 deployments | Option 2 | Advanced switching using existing equipment | Max 4 deployments | Option 3 | Advanced switching using new higher performance switchgear | Max 2 deployments |
| | Description | Indicative no. Of deployments | | | | | | | | | | | | | |
| Option 1 | Remote switching using existing equipment | Max 5 deployments | | | | | | | | | | | | | |
| Option 2 | Advanced switching using existing equipment | Max 4 deployments | | | | | | | | | | | | | |
| Option 3 | Advanced switching using new higher performance switchgear | Max 2 deployments | | | | | | | | | | | | | |

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| | we may reduce the number of deployments to ensure that the project remains within the allocated budget. |
| Attachments | |

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| Project code | SSET207 | Question Number | 19 |
| Question date | 14/08/14 | Answer date | 18/08/14 |
| Submission section question relates to | Section 2 | | |
| Topic | Project Description | | |
| Question | How interchangeable are the three TASS options? For example, can you easily and cheaply upgrade from option 1 to option 3, or could you reuse the option 3 assets in another substation once they are no longer required? If so, has investigation and learning from this been included as part of the project? | | |
| Notes on question | | | |
| Answer | <p>The options have been designed so that in theory, it is simple to build up the options at minimal additional expense to implementing the final option e.g. parts of option 2 are common to option 3. The work in the first phase of the project will consider how the interchange of options can be implemented in practise, and confirm the expected costs for this.</p> <p>The assets from option 3 could indeed be used in another substation if the network characteristics changed e.g. site load profiles. This would be very similar to the established, current industry process of moving 33kV circuit breakers from one location to another. The decision would come down to the cost of relocation against the potential savings.</p> <p>Further investigation of the interchangeability of the options will be completed in the first phase of the project. The learning gained here will help to influence and shape the number of trial sites for each option.</p> | | |
| Attachments | | | |

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|--|--|-----------------|-----------|
| Project code | SSET2/07 | Question Number | 20 |
| Question date | 14/8/2014 | Answer date | 18/8/2014 |
| Submission section question relates to | Section 2 | | |
| Topic | Project Description | | |
| Question | The inrush current from transformer energisation can cause adverse voltage dips on the network. Will these be monitored and assessed as part of the project? | | |
| Notes on question | | | |
| Answer | <p>Frequent switching activity may carry a risk of affecting power quality i.e. flicker in supply quality and harmonics, therefore SEPD have factored mitigation against this into the project's risk and contingency planning.</p> <p>We have planned the budget to include procurement and installation of monitoring equipment. This is to ensure that suitable measurements are carried out at trial locations in advance to assess background power quality. Monitoring will continue after the installation of the trial equipment and throughout the operational phase of the trial.</p> <p>If there are any indications that power quality has been adversely affected outwith industry limits, work will halt until a suitable resolution can be identified. Security of supply is of critical importance to SEPD and the trials will only go ahead when risks are reduced to an acceptable level. Note that site selection is a key component of the trials and great care will be taken to avoid disruption of any type on the network.</p> | | |
| Attachments | | | |

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| Project code | SSET207 | Question Number | 21 |
| Question date | 14/08/14 | Answer date | 18/08/14 |
| Submission section question relates to | Section 2 | | |
| Topic | Project Description | | |
| Question | Please could you provide more information on the Network Losses Reduction Tool? Very little information is provided on it. What will it do, what does it consist of, why is it required etc.? | | |
| Notes on question | | | |
| Answer | <p>The project will create a fast and simple method of analysing whether a particular substation can deliver a reduction in technical losses through the deployment of TASS, and therefore, provide benefits to customers. This tool will be available for use by any DNO. This will allow rapid adoption of this solution and will encompass much of the validated knowledge accumulated through the project.</p> <p>The first phase of the project will create a spreadsheet-based tool to calculate potential savings from the implementation of TASS on a specific substation. The spreadsheet will require data from multiple sources to be input in order to perform the required analysis, such as feeder half hourly loading and transformer losses characteristics. This data will be gathered and entered on a manual basis to complete the analysis of the potential sites.</p> <p>The Network Losses Reduction Tool will be a refined version of the spreadsheet-based tool created within the first phase. The final version of the tool will have a simplistic interface to select sites. Critically, the tool will have autonomous links to the data sets required to complete the modelling. This allows the DNO to complete modelling on particular sites very quickly, and allow reports to be run based on changing loading profiles each year. It will also incorporate the addition of new sites without the need for supplementary data entry.</p> | | |
| Attachments | | | |

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| Project code | SSET2/07 | Question Number | 22 |
| Question date | 14/8/2014 | Answer date | 18/8/2014 |
| Submission section question relates to | Section 5 | | |
| Topic | IPR arrangements | | |
| Question | At what point will you be able to confirm whether the project will conform to the default IPR arrangements? | | |
| Notes on question | | | |
| Answer | <p>It is our intention that the work undertaken using LCNF awards will adhere to the LCNF default IPR arrangements. However, this will be subject to confirmation depending upon the outcome of the commercial negotiations with equipment suppliers and SEPD's project partners. In all negotiations, SEPD will strive for maximum availability of the project work for dissemination and sharing purposes.</p> <p>Phase 1 of the project includes the development of a detailed requirements specification and involves extensive interaction with potential suppliers. It is envisaged that this will clarify IPR arrangements.</p> | | |
| Attachments | | | |

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| Project code | SSET207 | Question Number | 23 |
| Question date | 14/08/2014 | Answer date | 18/08/2014 |
| Submission section question relates to | Section 3 | | |
| Topic | Benefits case | | |
| Question | When calculating the benefits it appears that you have not taken into account that transformer losses will naturally be reducing due to the EU directive. Why? | | |
| Notes on question | | | |
| Answer | <p>The EU Directive 2009/125/EC only applies to transformers purchased after the regulation comes into force. The Directive specifies incremental transformer efficiency specification in two separate phases: Tier 1 to commence from 1st Jul 2015, and Tier 2 from 1st Jul 2021.</p> <p>Fig.1 shows transformer capacity (MVA) versus peak efficiencies for all existing SEPD's 33/11 kV primary transformers plotted against the EU Directive Tier 1 (blue curve) and Tier 2 (red curve) requirements. Among these primary transformers, only 17.1% fall below the EU Directive's Tier 1 transformer efficiency specification, and 25.2% below the Tier 2 specification. In other words, the majority of SEPD's transformers already comply with, or are more efficient than, the EU Directive's Tier 1 and 2 specification. It must also be noted that there is no requirement to replace existing transformers that do not comply with the directive.</p> <p>Assuming a 60 year (typical) transformer life, we do anticipate that a number of transformer replacements due to end of life replacements are likely to occur during the next 15 years, i.e. from 2015 up to 2030. The approximate expected replacement rate is in the region of four to five sites per year.</p> <p>The LEAN project will however, focus the initial study work on the transformers that fall outside the directive requirements and hence provide a better return on investment. Therefore, from a SEPD's perspective, the impact of EU Directive on presented LEAN business case is expected to be minimal.</p> | | |

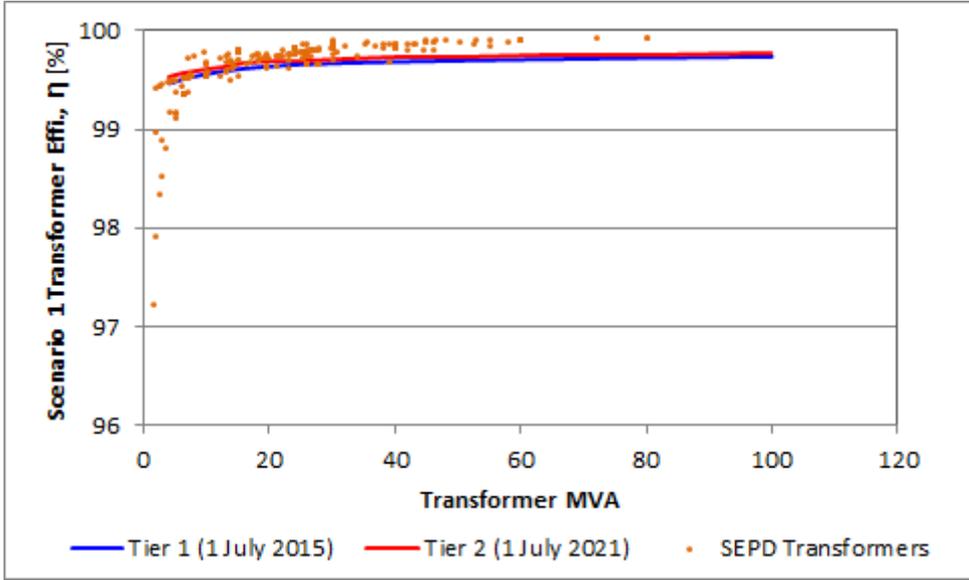


Fig.1 SEPD Transformer Efficiency against EU Requirements

Attachments

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|--|--|-----------------|------------|
| Project code | SSET207 | Question Number | 24 |
| Question date | 16/09/2014 | Answer date | 18/09/2014 |
| Submission section question relates to | Appendices | | |
| Topic | Project Plan | | |
| Question | The project plan, as resubmitted as an annex to your interrogation report responses, provides limited detail of the tasks and interdependencies for project delivery and does not clearly reference to the SDRC outlined in section 9 of your full submission. Do you have a more detailed project plan which includes the tasks associated with the SDRC? If so, please provide it. | | |
| Notes on question | | | |
| Answer | Revised project plan attached showing SDRC. | | |
| Attachments | Revised Project Plan | | |

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|--|--|-----------------|-------------------|
| Project code | SSET207 | Question Number | 25 |
| Question date | 25 September 2014 | Answer date | 26 September 2014 |
| Submission section question relates to | Section 2 | | |
| Topic | Project Description | | |
| Question | Are there any potential impacts of the proposed TASS method on the warranty of the transformers it will be applied to? If so, have you discussed these with the manufacturer? | | |
| Notes on question | | | |
| Answer | <p>Whilst it is recognised that there is a potential impact on transformers under manufacturer warranties, it is not envisaged that this should be seen as a major obstacle to the project's progression. In general terms, transformer manufacturers only provide a warranty for a fixed period – typically for no longer than three to five years. Therefore, the vast majority of the transformers currently connected to the network are already outwith their warranty periods.</p> <p>We do anticipate that there may be some consequences related to Method One; this includes the impact of TASS on equipment which is still covered by the manufacturers' warranty. During Phase 1 of the project we plan to engage with both transformer specialists and transformer manufacturers to assess the impact on the integrity of the transformers. The outcome of this will be an essential element of the decision-making process at the end of the first phase.</p> | | |
| Attachments | | | |

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|--|---|-----------------|----------|--------------|------|---------------------------|------|--------------------------|------|--------------------------|------|----------------------------|----|
| Project code | SSET207 | Question Number | Q26 | | | | | | | | | | |
| Question date | 20/10/14 | Answer date | 22/10/14 | | | | | | | | | | |
| Submission section question relates to | Section 3 | | | | | | | | | | | | |
| Topic | Business case assumptions | | | | | | | | | | | | |
| Question | We note that you state on p.17 of your submission that you have assumed a value of £48.42 per MWh saved by the solution. Dividing the gross benefits shown in the table by the total MWh saved gives a figure of around £43.10. Please clarify how you have calculated the financial value of the MWh avoided losses for each of the 3 options. | | | | | | | | | | | | |
| Notes on question | | | | | | | | | | | | | |
| Answer | <p>The benefits from the project arise from avoiding the cost of "lost" energy if one of the transformers can be switched off. In order to place a monetary value on this lost energy, a figure of £48.42/MWh was used. This is the value of lost energy which was used in the RIIO ED1 submission process. The benefits calculation firstly calculates the volume of losses which can be avoided over a forty five year period. The gross benefit for the project was then established by applying the discounts rates shown below; again this is similar to the methodology used in the RIIO ED1 submission.</p> <p>This spreadsheet applies a discount rate of 3.5% and 3% for costs up to and over 30 years from 'year 1'. The following image is an excerpt from the "Fixed Data" tab:</p> <p>Parameters</p> <table border="1"> <tr> <td>pre-tax WACC</td> <td>4.2%</td> </tr> <tr> <td>Discount Rate <= 30 years</td> <td>3.5%</td> </tr> <tr> <td>Discount Rate > 30 years</td> <td>3.0%</td> </tr> <tr> <td>Discount rate for safety</td> <td>1.5%</td> </tr> <tr> <td>Assumed Asset Life (Years)</td> <td>45</td> </tr> </table> <p>The gross benefits figure identified is the NPV of all of the future avoided losses using the rates identified above. Therefore, dividing this gross benefit figure by the volume of losses give a figure of £43.10 rather than</p> | | | pre-tax WACC | 4.2% | Discount Rate <= 30 years | 3.5% | Discount Rate > 30 years | 3.0% | Discount rate for safety | 1.5% | Assumed Asset Life (Years) | 45 |
| pre-tax WACC | 4.2% | | | | | | | | | | | | |
| Discount Rate <= 30 years | 3.5% | | | | | | | | | | | | |
| Discount Rate > 30 years | 3.0% | | | | | | | | | | | | |
| Discount rate for safety | 1.5% | | | | | | | | | | | | |
| Assumed Asset Life (Years) | 45 | | | | | | | | | | | | |

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| | <p>£48.42.</p> <p>The detailed analysis planned for Phase 1 of the project will be used to validate the costs and assumptions which have been used to establish the business case.</p> |
| Attachments | OFGEM COST BENEFIT ANALYSIS spreadsheet. |

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|--|---|-----------------|----------|
| Project code | SSENT02 | Question Number | 27 |
| Question date | 20/10/14 | Answer date | 22/10/14 |
| Submission section question relates to | Section 3 | | |
| Topic | Business Case Assumptions | | |
| Question | Please clarify how you derived the total CO2e benefits for each of the 3 options. | | |
| Notes on question | | | |
| Answer | <p>For this calculation, we made use of the OFGEM RIIO Business Plan Cost Benefit Analysis spreadsheet.</p> <p>This spreadsheet includes DECC/OFGEM/DEFRA forecasts of the carbon intensity of each future year's kWh. The following image is an excerpt from the "Fixed Data" tab, outlining Decarbonisation of Electricity Consumption, full spreadsheet is attached.</p> <p>The future reduction in carbon intensity has reduced the carbon savings in future years of our project. These forecasts are the reason for the differences identified in your question; again, these calculations are consistent across all three options.</p> | | |

Decarbonisation of electricity assumption:

Power sector emissions are anticipated to reduce to 10g/kWh by 2050
assume a linear decarbonisation pathway from 2009/10 until 2050

Power sector emissions reduce by 14.5 g/kWh p.a. between now and 2030.
Beyond 2050 keep emissions at 10g/kWh

| | | g CO2e per kWh |
|--------------------|---------|---|
| 1,000 kg = 1 tonne | 2009/10 | 589.82 (Defra) |
| 1,000 kWh = 1 MWh | 2010/11 | 575.32 |
| 1 kg = 1,000g | 2011/12 | 560.83 |
| | 2012/13 | 546.33 |
| | 2013/14 | 531.84 |
| | 2014/15 | 517.34 |
| | 2015/16 | 502.85 |
| | 2016/17 | 488.35 |
| | 2017/18 | 473.86 |
| | 2018/19 | 459.36 |
| | 2019/20 | 444.87 |
| | 2020/21 | 430.37 |
| | 2021/22 | 415.87 |
| | 2022/23 | 401.38 |
| | 2023/24 | 386.88 |
| | 2024/25 | 372.39 |
| | 2025/26 | 357.89 |
| | 2026/27 | 343.40 |
| | 2027/28 | 328.90 |
| | 2028/29 | 314.41 |
| | 2029/30 | 299.91 |
| | 2030/31 | 285.41 |
| | 2031/32 | 270.92 |
| | 2032/33 | 256.42 |
| | 2033/34 | 241.93 |
| | 2034/35 | 227.43 |
| | 2035/36 | 212.94 |
| | 2036/37 | 198.44 |
| | 2037/38 | 183.95 |
| | 2038/39 | 169.45 |
| | 2039/40 | 154.96 |
| | 2040/41 | 140.46 |
| | 2041/42 | 125.96 |
| | 2042/43 | 111.47 |
| | 2043/44 | 96.97 |
| | 2044/45 | 82.48 |
| | 2045/46 | 67.98 |
| | 2046/47 | 53.49 |
| | 2047/48 | 38.99 |
| | 2048/49 | 24.50 |
| | 2049/50 | 10.00 |
| | check | 10.00 assumption; power sector should reduce to 10 g CO2e/kWh |

14.50 p.a. reduction in carbon intensity

The detailed analysis planned for Phase 1 of the project will be used to validate the costs and assumptions which have been used to establish the business case.

Attachments OFGEM COST BENEFIT ANALYSIS spreadsheet.

Project code SSET207

Question Number

28

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|--|---|-------------|-----------------|
| Question date | 21 October 2014 | Answer date | 22 October 2014 |
| Submission section question relates to | Project Summary | | |
| Topic | Project Benefits | | |
| Question | <p>We note that the potential 45-year NPV benefits range from £49m, if option 1 is applied to 30% of the substations, to £17m if option 3 only is applied to 5% of the substations. In your submission (see p. 1) and in the your bilateral presentations you stated a potential benefit figure of £40m. How was this figure derived?</p> | | |
| Notes on question | | | |
| Answer | <p>The figure of £40m, used in the bilateral meetings and also in the summary section of the submission, is based on Option 2, and was given in order to simply not over or understate the benefits. The £40m is a conservative figure over the three options. The specific assumptions and calculations on cost savings are clearly outlined throughout the main body of the submission.</p> | | |
| Attachments | | | |

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|--|--|-----------------|-----------------|
| Project code | SSET207 | Question Number | 29 |
| Question date | 21 October 2014 | Answer date | 22 October 2014 |
| Submission section question relates to | Section 9 / Appendix 4 | | |
| Topic | SDRC | | |
| Question | <p>We note that SDRCs 9.3 and 9.6 do not have associated delivery dates included in section 9 of the proforma – the dates shown in the plan against these criteria should be included in the proforma). We also note that the Delivery dates for SDRC 9.1, SDRC 9.4 and SDRC 9.5 included in section 9 of the proforma are different to the dates included in the plan. The plan included in the appendix does not appear to show SDRCs 9.7 or 9.8 is this an error?</p> | | |
| Notes on question | | | |
| Answer | <p>SDRC 9.3's delivery date is July 2016.</p> <p>SDRC 9.6's delivery date is March 2018.</p> <p>The confirmed delivery dates for the SDRC 9.1, 9.4 and 9.5 are as follows: 9.1: July 2015. 9.4: September 2017 and 9.5: December 2017</p> <p>These dates were revised following the reworking of the plan; the plan is correct.</p> <p>9.7 and 9.8 are missing from the appendix; we have attached this to this question.</p> <p>If Ofgem would prefer a resubmitted submission document, we are happy to provide this.</p> | | |
| Attachments | LEAN Appendix 4 – Revised Detailed Project Plan | | |

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|--|--|-----------------|----------|
| Project code | SSET207 | Question Number | 30 |
| Question date | 28/10/14 | Answer date | 30/10/14 |
| Submission section question relates to | Section 9 | | |
| Topic | SDRC | | |
| Question | <p>We note the revised SDRC in your resubmission, including the proposed evidence for SDRC 9.3 - 'Written confirmation from external stakeholders that the solution proposed in conjunction with the projected benefits is applicable for GB wide rollout. In order to move into phase 2 of the project, the modelling work must show a positive return on investment and acceptably mitigate the risk to network security and asset health.' In relation to this SDRC and the proposed evidence, please clarify –</p> <ol style="list-style-type: none"> 1) Which external stakeholders you would expect gather responses from as a minimum. 2) What aspects of the project they would be asked to comment on. 3) What consultation you would have with these stakeholders prior to reaching the decision point vis-à-vis the aspects of the project they will be asked to comment. | | |
| Notes on question | | | |
| Answer | <p>1) We intend to engage with and seek responses from every GB DNO as a minimum. In addition we feel that the project learning would be of interest to TOs, large generators and large demand customers; however it may or may not be directly applicable to these groups e.g. differing transformer sizes / types without the same interconnection. We therefore appreciate that it will be more difficult to obtain responses from these groups; however we will still endeavour to share the results of the phase 1 modelling work.</p> <p>2) The intention is have the DNOs comment on the suitability for wide-scale rollout / adoption with questions focused on; an approximate percentage of their substations that the loss saving methods would be applicable to. SEPD are not requesting the DNOs to perform detailed modelling – we will supply some simplistic parameters that are readily available to DNOs; e.g. number of substations with loading below 40%. The exact parameters required will be defined as part of the phase 1 study work and will form the basis of a simplistic survey which will allow the potential numbers of GB sites to be calculated accurately.</p> <p>In addition we are looking for an understanding of any particular nuances</p> | | |

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| | <p>that would either aid or hinder the implementation of the loss saving methods, bespoke to an individual network operator.</p> <p>3) The project team will hold a dissemination event to share the learning from the phase 1 study work. At this event we will have internal business stakeholders and representatives from the LEAN team to discuss and debate the project outcomes, challenges identified and potential future rollout (if applicable).</p> <p>A report detailing the extent of the work and conclusions the first phase has achieved will be provided with a simplistic questionnaire for the network operators to fill in. The results of the questionnaire will form a key part of the decision process to move into phase 2.</p> |
| Attachments | |