

# *Electricity Network Innovation Competition Full Submission*

## *Supplementary Answer Form*

### **Project: REVISE**

Tick if this answer has been provided verbally: ☐

Project code	WPD/EN/NIC/05	Question Number	37
Question date	20 September 2018	Answer date	24 September 2018
Submission section question relates to	K.4.2 Benefits		
Topic	(g.iii) the robustness of the project methodology, including whether it is technically robust and its outputs are statistically robust.		
Question	Please provide worked examples from simulation and/or research studies showing the improvements in plant availability and energy sent out from renewable DG attainable by implementing DPS and INR, compared to procedures and techniques which are presently used. The technologies are at TRL 4, so it is expected that such information should be readily available.		
Notes on question	None		
Answer	<p>In line with the NIC Governance (Section 5.48) we have quantified the benefits for DPS and INR into the following categories within our FSP:</p> <ul style="list-style-type: none"> <li><b>i. Contribution towards “the Carbon Plan”</b> <ul style="list-style-type: none"> <li>• Detailed in FSP Section 2 &amp; 3</li> </ul> </li> <li><b>ii. Network capacity released</b> <ul style="list-style-type: none"> <li>• Detailed in Appendix A &amp; K</li> </ul> </li> <li><b>iii. Environmental</b> <ul style="list-style-type: none"> <li>• Detailed in Appendix A &amp; K</li> </ul> </li> <li><b>iv. Financial</b> <ul style="list-style-type: none"> <li>• Detailed in Appendix A &amp; K</li> </ul> </li> </ul> <p>Our response to Question 35 (“Please explain the underlying benefit calculations within the submission - where appropriate by providing the calculations and describing any assumptions that informed these calculations”) included a description of how these benefits were calculated along with the detailed benefits calculation spreadsheet.</p> <p>Our response to Question 27 (“Method 2 appears to facilitate the delivery of the other two methods. Please provide an updated of each of the benefits calculations showing the benefits of 1 &amp; 3 when the negative benefits for</p>		

	<p><i>Method 2 are taken in to account”) detailed how DPS is a facilitator for INR and how the benefits are recorded in Appendix A – Benefits Table.</i></p> <p>The principal benefits of INR, as captured in Appendix K, are as follows:</p> <ol style="list-style-type: none"> <li>1. <b>Financial:</b> - The financial benefit calculation is the cost saving achieved by implementing capacity release using the REVISE Method compared against the Base Case (traditional reinforcement). Further details of the counterfactual can be found in Appendix H and our response to Question 26.</li> <li>2. <b>Environmental:</b> - As detailed in Appendix K there are two sources of carbon benefit associated with the INR Method. The first is associated with the accelerated DG connection times that the INR Method affords. We have calculated that the connection using the REVISE Method would accelerate connection times by 3 months compared with the Base Case. Therefore the carbon benefit is the reduction in carbon emissions due to a reduced reliance on centralised generation brought about by the earlier connection of renewable DG. The secondary carbon benefit is calculated from the embodied carbon content of the Base Case (traditional reinforcement) that would be required to match the REVISE Method.</li> <li>3. <b>Capacity:</b> - As described in Section 3.6 of the FSP, a series of power systems studies were performed on three 33kV networks selected as part of this FSP. The average capacity release from these three networks using the INR Method was used to determine the capacity release benefit. The methodology and simulation study files used for these calculations have been attached to this response.</li> </ol> <p>We have listed a number of intangible benefits in Appendix K.4.5 which have not been quantified at the FSP stage. In addition, it is quite probable that the DPS and INR Methods will increase <i>“plant availability and energy sent out from renewable DG”</i>. The work carried out as part of this FSP has focussed on calculating the main benefits as prescribed in the NIC Governance and listed above. As part of the trials, we would seek to explore and quantify these other benefits, and indeed, the benefits that may only become apparent during the implementation of the trial.</p> <p>Attached are also a number of technical papers, documenting research studies that were used to inform the REVISE FSP and specifically the TRL of the INR Method.</p>
Attachments	<p><b>INR Methodology</b></p> <div data-bbox="419 1585 525 1688" data-label="Image"> </div> <p>REVISE Studies Methodology v2.0.pdf</p> <p><b>INR Study Files</b></p>



Revise\_FSP CAPACITY  
CALCULATION.py

### **INR Models**



REVISE\_IPSA\_Models.  
zip

### **Technical Papers**



Technical\_Papers.zip