

Electricity Network Innovation Competition Full Submission
Supplementary Answer Form

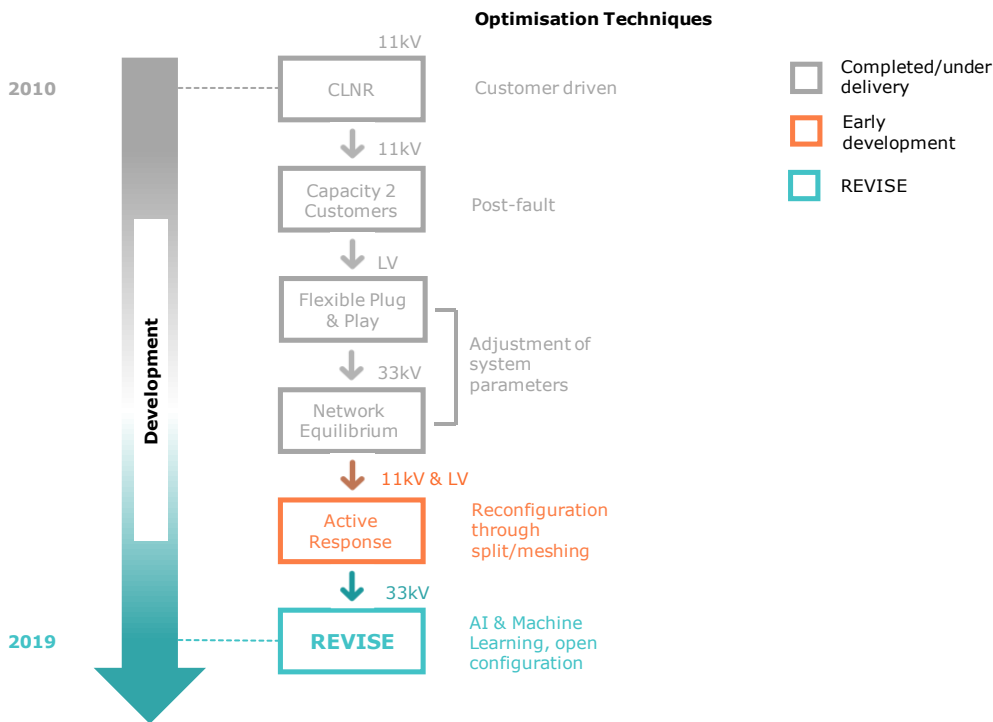
Project: REVISE

Tick if this answer has been provided verbally: ☐

Project code	WPD/EN/NIC/05	Question Number	23
Question date	23 August 2018	Answer date	28 August 2018
Submission section question relates to	Section L.4 Intelligent Network Reconfiguration		
Topic	d) Is innovative		
Question	For the INR, can you describe how the proposed system will optimise losses, network capacity or network operability. How this optimisation differ from that proposed in other NIC/NIA projects such as UKPN's Active Response.		
Notes on question	None		
Answer	<p>Our research and studies have shown that optimisation of different system outputs (such as maximum generation output, reduction in losses, increase network security etc.) could result in different network configurations. Hence, the INR Method will be developed to have selectable priority as described in Section L.4.3. This will provide operators with the ability to prioritise INR to optimise a specific system output whilst ensuring that the necessary security and safety standards are met.</p> <p>The INR optimisation process will be driven by real-time data from the network. This data will be retrieved from our NMS system and then cleansed and filtered by the data management element of the INR system. The data will then be used to perform a series of power system calculations to determine the optimal arrangement based on the selected priority. In conjunction with the power system studies, INR will also seek to streamline the selection of the optimised network configuration through the use of Artificial Intelligence and Machine Learning as detailed in Section L.4.3. This innovative feature will significantly reduce calculation times to determine a fully optimised solution. In addition, the use of these new techniques will allow the INR system to continue to optimise even if some data is not available in real-time. We recognise that the development of such an innovative system will require the optimisation and implementation process to be accurately tested. Hence, we will design the INR system to have a</p>		

number of different levels of control capability so that users can check and dispatch the configuration in the early stages of the trials, through to full INR control once the system has been fully tested and verified.

As part of the ISP and FSP production for REVISE, we reviewed the output from a number of projects which have had a network management element and were either completed or were in the delivery phase. We were able to determine that the development of the INR Method would provide significant additional learning by building upon what been completed previously. For example, previous projects have explored post-fault optimisation of the network (such as ENW’s C2C project) or optimisation through control of network parameters (such as Equilibrium or UKPN’s FPP project). In addition, we reviewed the objectives from projects which are in the early development stages such as UKPN’s NIA project “LoadShare” and NIC project “Active Response for Distribution Network Constraints”. Network optimisation proposed by Active Response will use either a “split” or “mesh” configuration to release capacity on the LV and 11kV system. The more advanced technique for REVISE will calculate, and automatically implement, the optimal configuration on the 33kV network based on all possible permutations (further information can be found in Question 4). Our studies and calculations have shown that by using the innovative optimisation with Artificial Intelligence and Machine Learning as described above, we can release more capacity for less expenditure for each roll-out scenario. A diagram showing how INR builds on these previous projects is shown below:



Attachments

None