

# *LCN Fund Full Submission*

## *Supplementary Answer Form*

Tick if this answer is Confidential: ☐

Tick if this answer has been provided verbally: ☐

Project code:	SPT 2003	Question Number	13
Question date	08/09/2011	Answer date	13/09/2011
Submission section question relates to	Section 4		
Topic	Carbon		
Question	Please provide further details of carbon emissions reductions resulting from the project.		
Notes on question			
Answer	<p>The implementation of the proposed solution both within constrained network areas and embedding within the overall business will enable deferral or avoidance of network reinforcement in many cases, as demand on the network increases towards 2020 and beyond. This will ensure that the network does not constrain the increasing deployment of low carbon technology by customers and the associated carbon savings.</p> <p>Carbon savings will be achieved from the solution through the following key mechanisms:</p> <ul style="list-style-type: none"> <li>- <i>Facilitating higher volumes of low carbon generation and faster connection.</i></li> </ul> <p>At the project scale, Wrexham council have applied for connection of domestic PV installations for 3958 properties across Wrexham, totalling 6.26MW. It is possible to connect 2399 properties (3.23MW) without network reinforcement however the other 1559 properties (3.03MW) require reinforcement and are currently restricted until the reinforcement</p>		

requirements are better understood.

The energy savings trust states that a 2.2kWp domestic PV system can save 1 tonne of CO<sub>2</sub> pa, this is valid if the panels are facing directly south. For the Wrexham network trial site, the trial of the solution will enable the connection of 3.03 MW of PV, equating to a carbon savings of up to 1380 tonnes pa on this basis.

According to DECC, domestic PV uptake is expected to increase rapidly, with cumulative installations nearly doubling year on year to 2015. For the GB Roll-out of this solution, if the GB distribution network infrastructure constraints prevent 10% of domestic PV installations from connecting until local reinforcement of the network is complete, this represents a potential delay of up to 3-4 years for those customers. The deployment of this solution across GB distribution networks in 2015 should enable at least one third of the restricted customers to connect earlier leading, to carbon savings of at least 0.3 Mt CO<sub>2</sub> per annum by 2020, or 0.5Mt of CO<sub>2</sub> cumulatively from 2014.

To provide some context, the rollout of smart meters across GB is estimated by DECC to provide savings of 1Mt CO<sub>2</sub> a year by 2020 in the domestic sector.

There will also be some carbon savings from early connection of small and medium-scale wind generation although this is not expected to be in the same order as domestic PV.

*- Facilitating additional demand from the transition to EVs and heat pumps.*

Rollout of the solution will result in a GB distribution network that does not present a barrier to the increasing connection of low carbon demand such as heat pumps and EVs.

A report by NERA Economic Consulting et al in 2009 ("Renewable Heat Technologies for Carbon Abatement: Characteristics and Potential") estimates that there will be 980,000 domestic ground source heat pump systems by 2022, increasing from 90,000 in 2012. In the commercial and industrial sector, there will be a similar trend although the overall number of systems will be smaller for higher capacity systems. For air source pumps, this is likely to be around 2,200,000 new build and retrofit domestic systems by 2022. Also, 260,000 EVs are expected to be on UK roads by 2020, increasing from a few thousand in 2011.

If 10% of customers are delayed from connecting heat pumps and EVs while local network reinforcement takes place over 3-4 years, and the deployment of the proposed solution across GB enables at least one-third of the constrained customers to connect early, this translates to a carbon saving of up to 0.2 Mt CO<sub>2</sub> per annum by 2020, or 0.7Mt cumulatively from a 2014 roll-out.

	<p>- <i>Optimising the network to reduce losses through dynamic network control, limiting the need for more reinforcement. This will reduce the embodied carbon in additional assets such as transformers and cables and carbon emissions from transport of assets to site, and landfill from excavation.</i></p> <p>Estimates for the carbon savings achieved through reduction of embodied carbon in network assets such as transformers and cables, and landfill from excavation are difficult to quantify in a generalised manner as reinforcement equipment and works can vary significantly depending on the network area details. Also, carbon emissions for manufacture of network assets are typically not available from OEMs.</p> <p>It is expected that these will not be trivial but most likely of a lesser magnitude compared to potential carbon savings described above.</p> <p>- <i>Reduction of Network Losses due to load balancing through the application of flexible network control.</i></p> <p>The application of real-time load balancing across neighbouring primaries to release capacity can have an additional benefit of reducing active power losses – which has a corresponding carbon benefit as it reduces the total network losses. This has the benefit of reducing the amount of electricity that needs to be generated. The saving achieved will be relatively small and difficult to quantify compared to the benefits outlined above but are worth highlighting.</p>
Attachments	
Verbal Clarifications (Consultants )	