LCN Fund Full Submission

Supplementary Answer Form

Tick if this answer is Confidential: ☐

Tick if this answer has been provided verbally: ☐

Project code:	WPDT205	Question Number	19
Question date	03/10/13	Answer date	08/10/13
Submission section question relates to	Expert Panel Bilateral		
Topic	Benefits		
Question	Quantify the circumstances (e.g. location, electricity price, hydrogen price, etc) where this would be the least cost roll out strategy to deal with distribution network constraints?		
Notes on question			
Answer	The project seeks to prove a model that can be either rolled out by the DNO or commercially funded (but providing DNO benefit by deferring conventional reinforcement) DNO Funded rollout will be determined by the number of generators connecting/looking to connect and timescales until reinforcement becomes viable Where commercially driven the adoption of one of more of the CEB Methods to support renewable connection will be driven by: • The availability of DNO scheme backing • Generator objectives – Profit Vs Local generation maximisation • The attractiveness of a location for renewable generation, not simply available network capacity • The willingness of third parties to provide the services required to support this		

- The timescales in which connection is required (Reinforcement can take years. A generators time horizon is measured in months)

To support rollout the DNO will use the learning of this project to:

- Define a set of solution options for generators to enable them to connect in constrained areas (e.g. Gas Engine, Gas Inject)
- Provide working examples for companies who can provide a constraint scheme as a service and/or constraint management solutions
- Understand a CHP model to promote to Local Authorities, communities and others in constrained urban areas
- Use a CHP model to defer local reinforcement in urban networks
- Understand the options to 'leapfrog' DNO constraints by using alternative fuels and gas networks

The tables below highlight the specific circumstances in which a specific Method is likely to prevail.

Method	**Potential Selection Conditions**
Method 0 Network Reinforcement	• Where the connection cost is low enough to make the wind farm cost effective in isolation • Where the generator is driven purely by financial return, not by maximising local generation • Where timescales for connection are not a concern
Method 1 Constraint Scheme	• Where the above circumstances do not hold true and/or • Where significant capacity exists within the core network which can be released by a simple constraint scheme, i.e. where the existing constraint is driven by circumstances infrequent in nature rather than absolute equipment limitations (such as a thermal constraint, e.g. on a voltage regulator)
Method 2 Gas Enabled Peak Shifting (Gas Engine)	• Where the above circumstances do not hold true and/or • Where the generator is NOT driven purely by financial return, but by the desire to maximise profitable local generation • Where the ability to inject gas into the local network is limited due to network distance/availability, flow rate, other challenges with physical connection • When there is a thermal constraint, which can be avoided by introducing load in close proximity to the generation • High spark spread / high electricity price

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<tr><th>Method</th><th>Potential Selection Conditions</th></tr>
<tr><td>Method 3
Constraint Circumvention via Gas Network</td><td>• Constrained electricity network unsuitable for Method 0 and Method 1
• Where the generator is not driven by the desire to maximise profitable generation but simply maximise wind farm export
• Where the gas prices are sufficient (e.g. High case and/or RHI)
• Where a constraint scheme is already in operation and hence time-shifting generation does not released unused export capacity
• Where the electricity network has an absolute constraint that means better returns can result from gas inject (e.g. Off electricity grid)
• Low spark spread / low electricity price</td></tr>
<tr><td>Method 4
Network Arbitrage</td><td>• Where the constraints experienced by each network vary significantly over time
• Where conditions for Method 3 exist (making gas inject viable)
• Where the electricity price varies sufficiently and dips below the gas price for sufficient periods in the year to justify the cost of both options</td></tr>
<tr><td>Method 5
CHP for Reinforcement Avoidance</td><td>• Constrained Urban network
• Where the FIT tariff is available for Micro CHP
• Where large scale CHP operators are willing to relinquish control to support CHP connection / Community energy schemes</td></tr>
<tr><td>Methods 6/7</td><td>• Combinations of above</td></tr>
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<tr><td>Attachments</td><td></td></tr>
<tr><td>Verbal Clarifications

(Consultants
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