WESTERN POWER DISTRIBUTION

LOW CARBON HUB

CONNECTING RENEWABLE ENERGY IN LINCOLNSHIRE

Second Tier Reward

Panel Presentation

LCN Fund
Low Carbon Networks

Introductions

Roger Hey is Western Power Distribution's Future Networks Manager

Ben Godfrey is Western Power Distribution's Network Strategy Manager

Will Topping is a Western Power Distribution Primary System Design Engineer

Richard Hampshire is CGI UK's lead for Future Utilities

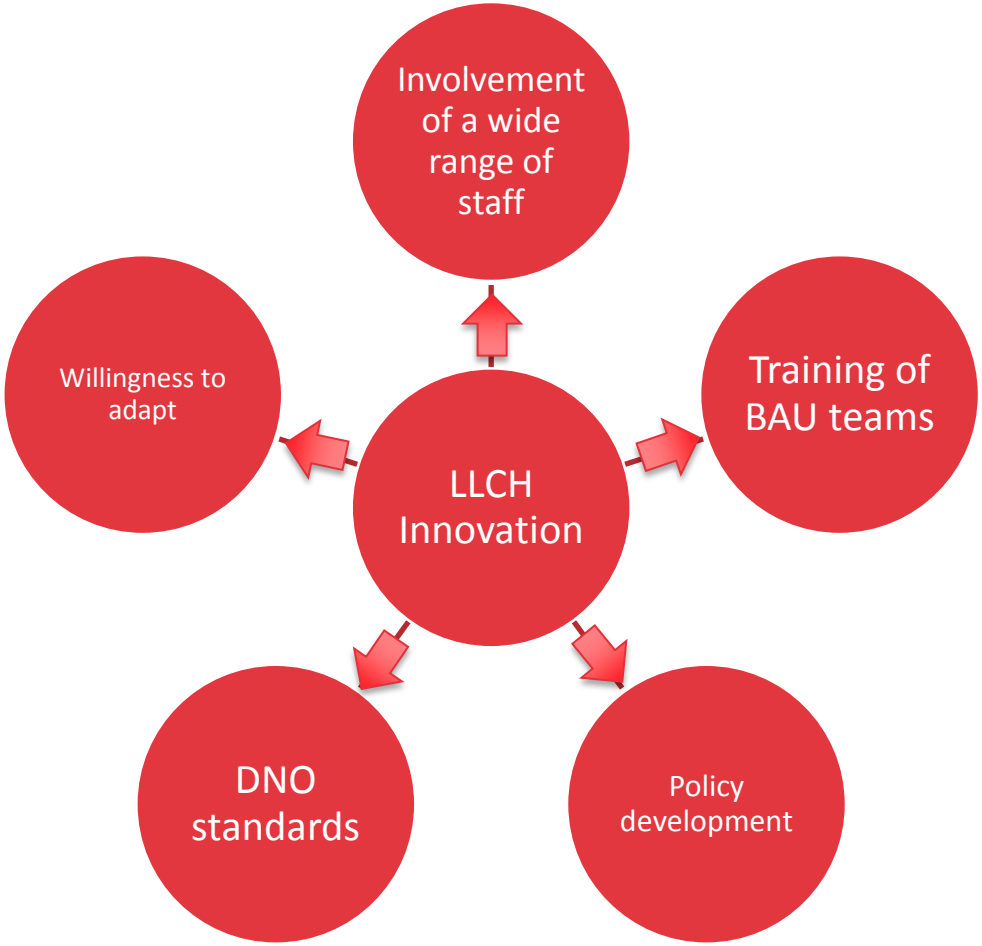
General | Q1

1. Please tell us, what are the exceptional outcomes from your project **(max 3)**? Please emphasise the truly exceptional outputs and/or transformational impact of project outputs on GB electricity networks? **(making clear comparison with what was expected at time of Project Direction)**

Exceptional Outcome	Project Expectation	Project Legacy
Connection of DG through Alternative Connections	Design, build and operate an ANM zone in the LLCH area	• ANM rollout through the business by 2021 • WPD Alternative Connections suite of 4 options developed • BAU integration of alternative connections since July 2014 • 1.2GW of ANM connections offered • UK-wide replication
Decarbonisation of the Grid	Connection of additional low carbon DG in the LLCH area	• Additional 101GWh of low carbon generation per year • Est 2.4TWh low carbon output by 2040

General | Q2

2. How has the project changed the culture of innovation in your organisation? Provide evidence of this change.



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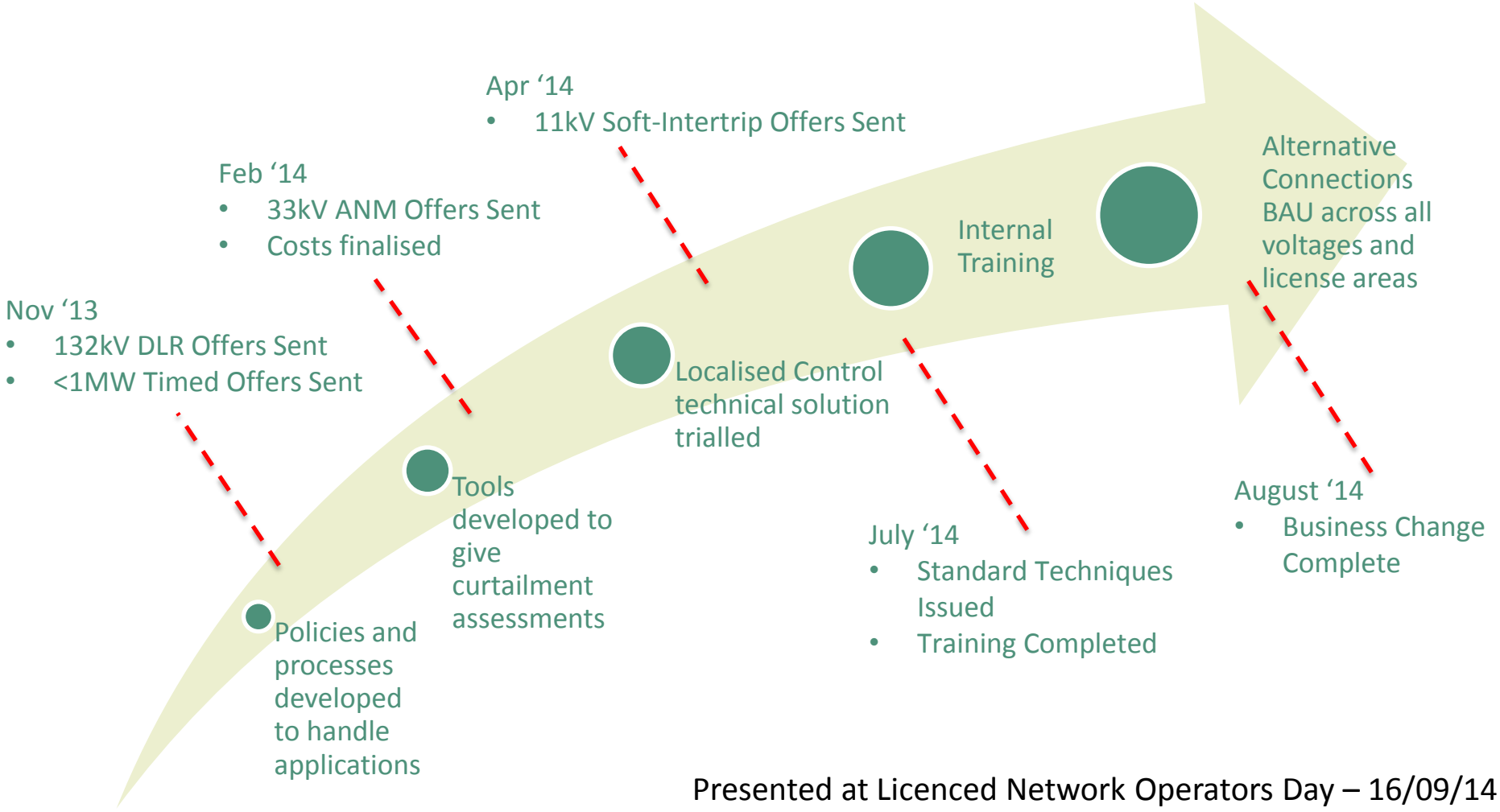
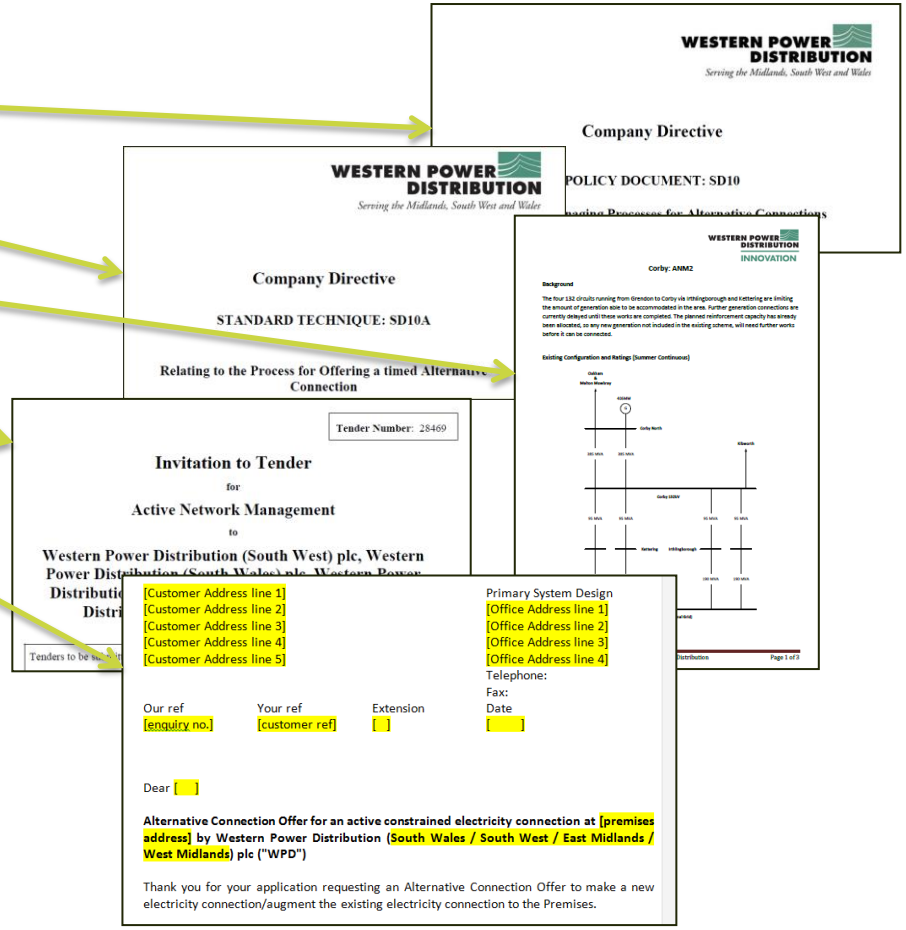


Internal Implementation

- Policies
- Standard Techniques
- Specifications
- Procurement
- Legal Agreements
- Curtailment Tools/Assessments
- Training Packs
- Business sign-off
- Support for internal teams
- External facing changes
- Conversion from projects to BAU
- Transferal of ownership/ responsibility



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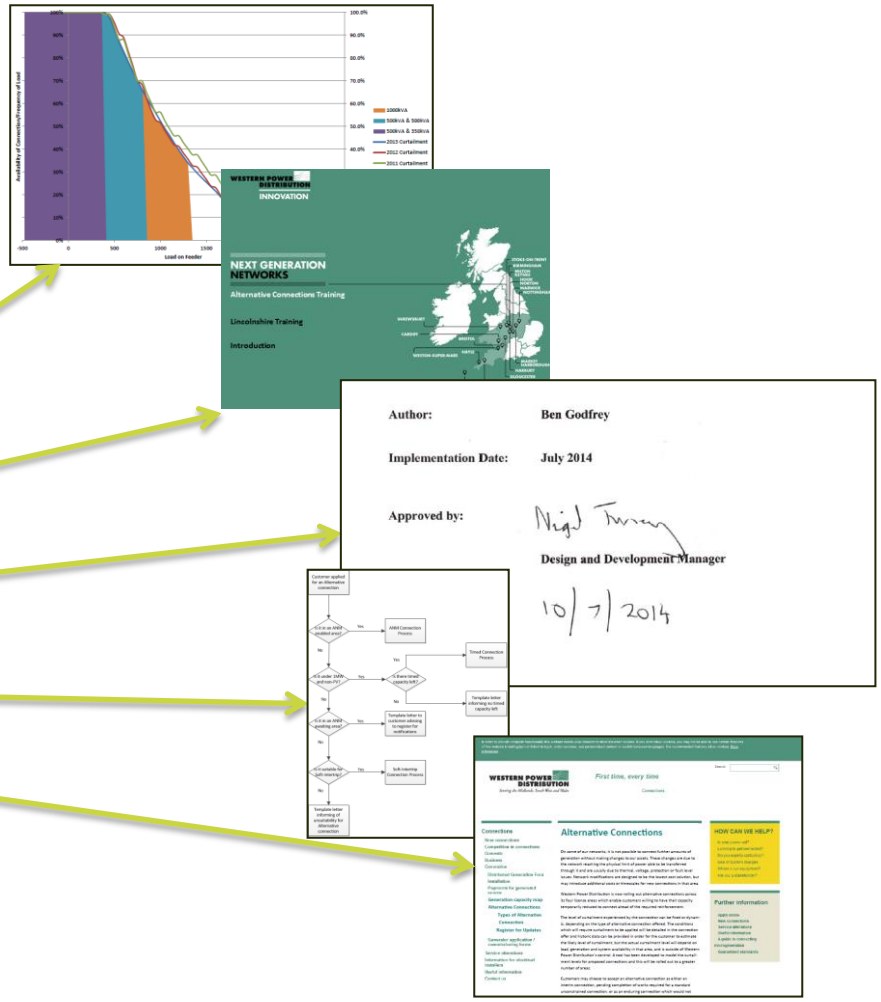

Presented at Licenced Network Operators Day – 16/09/14

General | Q3

3. How has this Second Tier Reward incentive influenced your project management and operational practices? Provide evidence.

The Second Tier Reward incentive influenced our approach to the projects as follows:

- Whilst Second Tier Successful Delivery Reward mechanism ensured delivery of the project, the Second Tier Reward incentive ensured the project approach supported delivery into 'Business as Usual'
- This led to the following changes to delivery approach:
  - WPD linked Policy, Strategy and Innovation teams
  - Policy engineers involved in innovation projects from the outset
    - This was to ensure that the project approach remained aware of BaU integration challenges and
    - Policy engineers, who would own changes to BaU, had an opportunity to influence and understand the project outcomes

Low Carbon Hub example:

- Before energisation of the 33kV Statcom: Policies for its operation were developed with the Policy Team; Policies were signed off and published; All Operational Control Engineers were trained on its operation
- 1Yr after energisation, the Policies were updated by the Policy Team, incorporating all learning to date

General | Q4

4. Please detail any datasets/other IP, generated as part of the project, that has been shared with other DNOs, academia? What efforts did you take to improve access and usability of any such data for interested users (over and above what was proposed in your original full submission and any subsequent project directions, if applicable)?

- Policies, Standards and specifications for Alternative Connections have been shared with other DNOs
- Ofgem has used the four categories of Alternative Connections created through Low Carbon Hub to request comparable data from all DNOs
- LLCH developed a curtailment assessment tool as part of the project.
  - The methodology for the curtailment assessment process developed has been shared with other DNOs and the SO through the ENA ANM working groups and, latterly, the Open Networks project
- An Alternative Connections section was created on the WPD website, detailing the types of connection available, the locations where available and the technical requirements
- Technical requirements for generators (TP18A) are also published on our Tech Info site
- Statcom policies and specifications have also been shared
- Procurement specifications and processes have been shared

Project Specific | Qi

i. What is the extent of adoption by other DNOs of the outputs generated from this project?

Request	We asked DNOs to clearly outline on connection offers that there may be alternative methods of connecting to the network.	Dec 2015	Present
Action update			
Electricity North West Ltd (ENWL)	Discussions held with customers prior to issuing quotation regarding flexible connection offers. Planned engagement with customers on the issue in 2016.	✗	✓
Scottish Power Energy Networks (SPEN)	SPEN issues flexible offers to customers with actively managed connection options. In the future, SPEN is looking to provide greater information on the options available to customers including: • The network/geographical areas where Active Network Management options may be available • Guidance for developers on Flexible Connection offers including a process to understand the implications of constraints. By the end of February 2016, SPEN will include appropriate wording in its connection offers to ensure that customers are aware of alternative means of connection that may be appropriate for their needs.	✗	✓
Western Power Distribution (WPD)	WPD has put information in the relevant offer letter templates explaining that it has alternative connection options available. This information directs customers to the relevant section on the WPD website where the customer can access full details of the pros and cons of an alternative connection. The following information is included in the offers: **Alternative Connections** If a customer is willing to temporarily reduce their export capacity at times of peak network usage, then WPD has a range of *Alternative Connections* which may allow connection with reduced costs and/or improved connection timescales. WPD's website has further information on the types of connection on offer and the areas these are available in: www.westernpower.co.uk/Connections/Generation/Alternative-Connections	✓	✓
Northern Powergrid (NPg)	This information will be included in connection offers with the exception of small works (since it is unlikely to be relevant to small works). Similar content is also available on NPg's website as a connections Frequently Asked Question (FAQ) on the topic of flexible connections: https://www.northernpowergrid.com/help-and-information/getconnected/flexible-connections-could-flexibility-reduce-my-connection-cost-or-timescales	✗	✓
Scottish and Southern Energy Power Distribution (SSE)	In SSE's 'Plans and Commitments for connections customers', it has committed to introduce an improved connection offer in the first quarter of 2016, which will include a new section on alternative connection options.	✗	✓
UK Power Networks (UKPN)	UKPN has added a paragraph to all new connection offers made with effect from 2 January 2016, advising customers of the possibility of an alternative method of connection and a link to the relevant section of the website: http://www.ukpowernetworks.co.uk/internet/en/our-services/list-of-services/electricity-generation/flexible-distributed-generation/	✗	✓

Due to the exceptional outcomes delivered under this project, WPD were able to roll out Alternative Connections in July '14 and provide alternative connection options for all customers as BAU.

The QMEC consultation responses of December '15 still showed WPD leading on making this information clearly available to customers.

Quicker more efficient connections – final Jan 2016, Ofgem

Project Specific | Qii

ii. The accelerated benefits from the project are specific to WPD licence areas. Do you have any evidence that other DNOs are utilising the learnings from this project? How can we reconcile this with the claims from other DNOs that they have used learnings from other projects to inform their practices?

- Following the ANM development within LLCH and the subsequent innovative approach taken to Alternative Connections, WPD defined its own terms for Timed, Soft-Intertrip , ANM and export limiting connections using material taken from its website.
- These terms and explanations have now been used throughout the industry:
  - In the QMEC consultation, Ofgem requested details of Alternative Connections based around those categories
  - SSEN's QMEC response also referenced identical terms and descriptions
  - SPEN's Flexible Connections and Principles Of Access Policy uses identical terms and descriptions
  - SSEN's October '17 Energy Storage Consultation uses identical terms and descriptions

Project Specific | Qiii

iii. What efforts did you make to identify any reactive compensation devices connected to GB Distribution networks at the time of the full submission for project funding?

- At the time of full submission WPD had little experience of reactive compensation devices.
- What experience existed was on the 132kV network to provide benefit to the transmission network

- WPD undertook the following steps to identify and understand the use of reactive compensation devices at the GB distribution level:
  - Internal research about 132kV experience
  - Consultation with other DNOs on their experience of the use of such devices at different voltage levels, e.g. UKPN's Quadrature booster under FPP
  - Consultation with equipment manufacturers to identify GB use and international experience that could form the basis of an assessment for GB

Project Specific | Qiv

iv. What knowledge, experience or learning did you take into account from other deployments before and during the project?

- SSEN's Orkney ANM installation and UKPN's FPP were also trialling ANM at the same time as LLCH was developed.
  - During the LLCH, we reciprocated learning from UKPN's Flexible Plug and Play (FPP) project, where a quadrature booster was installed.
    - UKPN's connection agreements for FPP fed into the development of our connection agreements, which we also subsequently shared with other DNOs through ENA's ANM working group
    - This reduced the time required to develop contracts and achieved consistency for customers
  - SSEN's developments pre-dated the LLCH and their tender specification was shared to inform our technology requirements
- UKPN's Quadrature booster from FPP was trialling comparable technical equipment

Project Specific | Qv

v. Please provide the decision making criteria used to stop the Dynamic Line Rating trials which was one of the methods under trial within this project. How was it determined that stopping trials was the best value for money option?

- The emerging learning from the DLR trials was demonstrating that the benefits would not outweigh the costs so a decision was taken to stop the trial and save the variable costs associated with delivering that part of LLCH
- The following factors were assessed as part of the CBA
  - Spend on the DLR trial (mobilisation, equipment, install, etc)
  - Emerging learning on likely level of benefits
  - Decommissioning/Redeployment costs
  - Alternative approaches considered that might increase benefits
  - Remaining spend

Project Specific | Qvi

vi. Please highlight what additional learning, i.e. beyond reasonable expectation at the time of project funding, was delivered by this project?

- During implementation of the LLCH, it was realised that the benefits and applicability of the techniques were greater than originally envisaged and that they could be applied more widely than first thought.
- The original project scope expected up to 110MW to be able to connect within the area, whereas the actual capacity of connections requested was over 170MW
- The LLCH was anticipated to be an unusual hotspot for renewable generation that required new developments to enabled quicker, more efficient connections.

- List the key themes of why Low Carbon Hub should receive an award.

Summary

- As a direct result of the Low Carbon Hub learning, Alternative Connections was accelerated into Business as Usual with rollout across WPD to be completed by 2021.
- Over 1.2GW of generation connections have been offered, 244.6MW accepted and 86.4MW made.
- The project delivered benefits saving distributed generation customers £12.83m, and
- when measured against the Government Carbon Plan, produces 2.5TWh of renewable energy by 2050 through the connection of generation which previously could not have connected.

Thank You

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