

# Electricity Network Innovation Guide For Communities

## Case Studies 2019



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**As we continue along the transition from an old, centralised energy system to an increasingly smart, low-carbon and decentralised energy system, Distribution Network Operators (DNOs) becoming Distribution System Operators (DSOs) is a key part of that transition. This means them being more proactive than in the old system and engaging with customers to build new markets and manage the network effectively. Communities have the opportunity to play a key role in this, in helping DSOs to manage the network and take advantage of emerging markets to stack revenues and build business cases for new low-carbon, local generation.**

To help communities and other local energy stakeholders understand how they could participate in our future energy system with new and innovative business models, we have updated case studies of DNO-led innovation projects which are already being carried out, featured in last year's Electricity Network Innovation Guide For Communities. The case studies are great examples of communities collaborating with DNOs on exciting new projects, and it's important to know what's already being done on the ground, as it can be difficult to get funding for a project that is not new and innovative. We hope that this and our 2018 guide, featuring handy tips on how to approach your DNO and where to find funding, can help you in starting your own innovation projects, showcasing communities at the heart of our energy transition.

## Case Studies

Domestic Energy Storage and Control (DESC)	2
Distributed Storage and Solar Study (DS3)	3
FUSION	4
Northern Isles New Energy Solutions (NINES)	5
OpenLV	6
The Value of Lost Load (VoLL)	7



## Domestic Energy Storage and Control (DESC)

Project Name	What is the innovation project?	How does the project engage local communities?
<b>Domestic Energy Storage and Control (DESC)</b>	UKPN worked with small-scale storage manufacturers and suppliers to install domestic storage units in 70 properties alongside existing solar generation.	Both individual customers and local community schemes can benefit from the energy savings delivered by the effective use of co-located solar generation and battery storage while increasing their earnings from providing services to the network.
<b>Company Name</b>		
UK Power Networks (UKPN)	The project monitored the performance of co-located domestic solar PV and battery units and the electricity consumed by the participating properties over time.	Building on the learning from the DESC project, UK Power Networks are investigating how this can be done in the future by creating 'virtual power plants', grouping communities of batteries together to provide a short term boost to the electricity system at peak times.
<b>Project Partners</b>	It also controlled the small-scale energy storage units to gain valuable insights into the benefits that DNOs can realise from responsive domestic customers.	
Powervault Limited and Imperial College London		
<b>Funding</b>		
NIA		
<b>What</b>		
Co-located domestic PV and battery storage that could be aggregated to supply extra capacity at peak times of demand on the network	The project demonstrated that co-located domestic PV and battery storage can benefit both customers and the distribution network. Specifically, each household could reduce their peak demand by up to 75% by using power stored in the batteries.	In terms of customer savings, it was found that financial savings per year can reach up to 15% of the battery price due to increased power self-consumption. For example, in June 2017 participating customers did not need to import electricity from the grid for 60% of the days. Services to network operators could be an additional revenue stream for customers owning small-scale energy storage units.
<b>Where</b>		
Across UKPN's three licence areas in the East and South East of England and London	Within 11 months of project trials, a total of 30% less electricity was imported by participating customers.	
<b>When</b>	It is also possible to reduce peaks on the distribution network by coordinating control of the battery units: it was estimated that up to 58% peak reduction on low voltage feeder can be achieved assuming 100% penetration of small-scale energy storage units.	
2016-2018		

Daniel Burges, from Richmond in London, who participated in the DESC project, said:

“ We wanted to 'do our bit' for the environment, but also see if we could make a significant dent in both our electricity and gas consumption. The home battery storage was the logical next step really.

### Website Links

<http://innovation.ukpowernetworks.co.uk/innovation/en/Projects/tier-1-projects/domestic-energy-storage-and-control/>



## Distributed Storage and Solar Study (DS3)

Project Name	What is the innovation project?	How does the project engage local communities?
<b>Distributed Storage and Solar Study (DS3)</b>	This project assesses the value of domestic energy storage alongside solar PV in reducing network constraints and saving customers money.	Homeowners will be able to use more of their solar energy, export less and reduce peak solar generation output on the network.
<b>Company Name</b>		
Northern Powergrid (NPG)		The participants, who are mainly pensioners living in bungalows, can see their battery usage on an online 'dashboard.'
<b>Project Partners</b>	Smart batteries have been installed in 40 homes in Oxspring connected to the same substation. The batteries will store the solar electricity generated from resident's PV at the sunniest times, which can then be used to reduce peak generation on the NPG's local electricity network.	Energise Barnsley is holding regular feedback sessions throughout the project to get a better picture of the benefits for participants.
<b>Project Partners</b>		
Moixa, Energise Barnsley		
<b>Funding</b>		
<b>What</b>		
Aggregating domestic households with solar PV and batteries to form a virtual power plant and provide balancing services to DNO (NPG)	NPG wants to use the data to determine whether it would be possible to incorporate electricity storage in similar low voltage schemes when assessing future network applications.	
<b>Where</b>		
Oxspring, Barnsley, South Yorkshire		
<b>When</b>		
2016-2019		

Simon Daniel, CEO of battery company Moixa, said:



Solar homes with batteries can halve their electricity bills, and this solution will become increasingly popular as costs of storage and PV fall.

Elaine Marsh, a pensioner in Oxspring said that she was "highly delighted" by the installation of the battery, which will enable her to use more of the solar generation:



I like eating my main meal in the evening and I shall be able to do that again [with the battery]. I will also be able to run the washing machine and cooker at the same time.

She is motivated by the cost savings: "Even if you just save £1 it is better in your pocket than the energy companies."

### Website Links

[www.northernpowergrid.com/innovation/news/home-battery-trial-aims-to-increase-electricity-network-capacity-to-enable-more-solar-homes-and-save-millions-for-customers](http://www.northernpowergrid.com/innovation/news/home-battery-trial-aims-to-increase-electricity-network-capacity-to-enable-more-solar-homes-and-save-millions-for-customers)



## FUSION

Project Name	What is the innovation project?	How does the project engage local communities?
<b>FUSION</b>	FUSION is implementing a local, open and structured flexibility energy market in East Fife. The project is designed to create flexibility for the increasing number of 'prosumers' within the network. These prosumers are increasingly becoming engaged in the supply and generation of their own energy.	FUSION has undertaken significant and meaningful customer engagement during the submission development, including direct engagement with multiple trial area flexibility providers:
<b>Company Name</b>		
SP Energy Networks (SPEN)		
<b>Project Partners</b>		
DNV-GL PassivSystems Origami Energy Imperial College SAC Consulting University of St Andrews Fife Council	<p>The project aims to:</p> <ul style="list-style-type: none"> <li>• Test a European market model (Universal Smart Energy Framework, USEF) for the trading of flexible network services</li> <li>• Create the Information Technology (IT) infrastructure to facilitate the energy market</li> <li>• Release additional network capacity for Low Carbon Technology connections</li> </ul>	<ul style="list-style-type: none"> <li>• Fife Council – social housing and industrial &amp; commercial</li> <li>• University of St Andrews</li> <li>• Kingdom Housing Association</li> <li>• The Agricultural community</li> </ul>
<b>Funding</b>		Throughout, feedback has been resoundingly positive demonstrating an appetite to participate in a local energy flexibility market.
NIC		
<b>What</b>		Customers will have the opportunity to participate in the local flexibility market for provision of energy services by either engaging with the USEF platform directly or through aggregators or energy suppliers. In principle, there is no restriction on the types of service providers that can participate in FUSION.
Implementing a local, open and structured energy flexibility market		
<b>Where</b>		
East Fife, Scotland	FUSION is working with communities with the aim to save customers over £236m and contribute to a 3.6m tonne reduction of CO <sub>2</sub> by 2050.	
<b>When</b>		
2018-2023		

### Website Links

[www.spenergynetworks.co.uk/news/pages/innovation\\_funding.aspx](http://www.spenergynetworks.co.uk/news/pages/innovation_funding.aspx)

[www.ofgem.gov.uk/publications-and-updates/electricity-nic-submission-sp-energy-networks-fusion](http://www.ofgem.gov.uk/publications-and-updates/electricity-nic-submission-sp-energy-networks-fusion)



## Northern Isles New Energy Solutions (NINES)

Project Name	What is the innovation project?	How does the project engage local communities?
<b>Northern Isles New Energy Solutions (NINES)</b> <b>Company Name</b> Scottish and Southern Electricity Networks (SSEN)	<p>The £18 million Northern Isles New Energy Solutions (NINES) project was the first time Active Network Management (ANM) was deployed at a large scale in the UK.</p> <p>The ANM monitors the local network and manages an appropriate response. As part of the wider NINES benefits, advanced storage and water heating systems were installed in 234 existing homes. These were specifically designed to use flexible charging based upon the predicted demand, weather forecasts, availability of renewables and any network constraints.</p>	<p>Electric heaters offered a more controllable and comfortable method of heating the homes. The NINES project benefit the local community by ensuring secure, affordable and sustainable energy provision.</p>
<b>Project Partners</b> Scottish Hydro Electric Power Distribution Hjaltland Housing Association	<p>The new heating system is designed to be more efficient, while giving the customer full control of both temperature and operating time and allowing for charging at times that best suit the network.</p>	
<b>Funding</b>		
<b>What</b> Active Network Management – excess wind energy converted to domestic heat storage and used as needed		
<b>Where</b> The Shetland Isles	<p>By creating flexible demand on the islands progress has been made in exploiting and maximising Shetland's wind generation potential, trebling the volume of renewable generation on Shetland and in reducing the generated output from thermal generation, thus creating a positive impact on the CO<sub>2</sub> footprint of Shetland.</p>	
<b>When</b> 2012-2017		

**Stewart Reid, Head of Asset Management and Innovation at SSEN, said:**

“ By creating flexible demand on the islands, through the use of smart technology and energy storage, we have made progress in exploiting and maximising Shetland's renewable generation potential and reducing the generated output from thermal power stations. The support for the project has been superb and we would like to thank the customers that participated in the trials. Their involvement was crucial to its overall success.

### Website Links

[www.ninessmartgrid.co.uk/our-project/](http://www.ninessmartgrid.co.uk/our-project/)



## OpenLV

Project Name	What is the innovation project?	How does the project engage local communities?
<b>OpenLV</b>		
<b>Company Name</b>	The OpenLV Project is an NIC Project, managed on behalf of Western Power Distribution by EA Technology.	The OpenLV project is making electricity data from Western Power Distribution's low voltage network 'open access' for the first time ever. This presents a great opportunity for smart thinking and innovation within community groups.
Western Power Distribution (WPD)		
<b>Project Partners</b>	OpenLV aims to trial and demonstrate an open, flexible platform that could ultimately be deployed in every low voltage (LV) substation in Great Britain. This would replace a wide range of systems that deliver substation management solutions with a single piece of hardware that could run different software applications.	CSE invited community organisations to come up with novel ideas for using this data to develop software applications (apps) that will change the way their community uses electricity and relates to the local network.
EA Technology		
Nortech		
Lucy Electric		
CSE		
Regen		
<b>Funding</b>		
NIC		
<b>What</b>	The OpenLV project is split into three trial approaches:	It is planned that apps developed through the OpenLV project will create benefits for all parties involved, and other communities will be able to replicate this success in future.
Using LV substation data to build apps with communities	<ol style="list-style-type: none"> <li>1. Testing the ability for control signals to be sent to better manage the local LV network.</li> <li>2. Community engagement</li> <li>3. Third party user engagement</li> </ol>	
<b>Where</b>		
WPD regions: South West, South Wales, West and East Midlands		
<b>When</b>		
2017-2020		

### Website Links

<https://openlv.net/about/>

### Progress so far

To date, 71 OpenLV platforms have been installed across WPD's licence area. Of these, ten platforms are being utilised for the Community Engagement trials.

Data is being received from all monitored substations and CSE has produced an App that has been in deployed in 12 relevant substations. The app is producing data that is displayed in a web portal that can be configured according to the priorities and aims of the groups participating in the trial. This configuration process is underway.

Case studies detailing the aims of each of the seven community groups are available on the project website.



## The Value of Lost Load (VoLL)

Project Name	What is the innovation project?	How does the project engage local communities?
<b>The Value of Lost Load (VoLL)</b> <b>Company Name</b> Electricity North West (ENW)	<p>Electricity supply interruptions have financial and social impacts on customers, which vary by season, time of day, customer load and customer type. At present a single uniform VoLL is used to evaluate what customers would be willing to pay to avoid a supply interruption. This innovative trial will produce improved valuations of VoLL by more fully understanding variations within customer groups and their specific needs and requirements.</p>	<p>ENW consulted key stakeholders who support customers during a supply interruption such as hospitals, care homes, local authorities, educational establishments and charitable organisations.</p>
<b>Project Partners</b> Impact Research Limited		
<b>Funding</b>	<p>VoLL varies significantly among customer groups: residential, small to medium commercial and industrial enterprises (SMEs) and large commercial/industrial users.</p> <p>The value also varies considerably within each of these groups, for example, between rural and urban residential customers.</p>	<p>A customer panel was convened representing urban domestic, rural domestic, worst-served customers, and SMEs. This panel and further consultation was used to improve the accuracy of VoLL valuations and methodology.</p> <p>A comprehensive assessment of how VoLL should be defined across a range of customer segments will be published in February 2018. This should inform a potential revised model to help DNOs better plan their network investment and customer strategies.</p> <p>The findings are also likely to have an impact on ENW's social obligations, influence their Priority Services Register (PSR) and help them to develop solutions to address fuel poverty.</p>
<b>What</b> Understanding the value of lost load (VoLL) to help determine network planning and investment		
<b>Where</b> Representative samples of customers from within Electricity North West's operating region and with consumers served by other DNOs		
<b>When</b> 2015-2018		

### Website Links

[www.enwl.co.uk/innovation/smaller-projects/network-innovation-allowance/enwl010---value-of-lost-load-to-customers/](http://www.enwl.co.uk/innovation/smaller-projects/network-innovation-allowance/enwl010---value-of-lost-load-to-customers/)



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