Ashton Hayes Smart Village

Objectives

Ashton Hayes is an award winning village in rural Cheshire with ambition to become England's first carbon neutral village. Since 2006 the village has achieved a carbon reduction of 23% by introducing behavioural changes towards energy usage. For its endeavours, educational activities and future aspirations Ashton Hayes was awarded a DECC 'Low Carbon Community Challenge' Award in 2009. The village has subsequently become an early adopter of several low carbon technologies including substantial photo-voltaic generation schemes and the introduction of a community electric vehicle.

Utilising the Low Carbon Network Fund SP Energy Networks is now assisting Ashton Hayes in the next stage of its drive towards the carbon neutrality. In doing so we are also aiming to learn more about our existing and future networks, more specifically:

- How we can facilitate the connection of low carbon technologies such as Photo-Voltaic generation, Heat Pumps and Electric Vehicles to the village's existing electrical network without jeopardising the quality of supply to residents.

- How a Distribution Network Operator can engage with a community to assist in the reduction of their carbon footprint by providing total electricity consumption information.

- The practicalities of automating secondary substation monitoring and the analysis of Low Voltage network characteristics.

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What We Are Doing

In 2011 SP Energy Networks installed several advanced power quality instruments within the LV network in Ashton Hayes to enable the measurement of the village's combined consumption and the contribution distributed generation was making.

This data has been collated and utilised in:

- The production of Community Reports that provide the community with an update on the village's total consumption, the contribution the community generation is making and how much electricity is consumed by a typical property in the village.
- **The Analysis of LV Network** to identify the capacity of the existing networks for low carbon technology.
- **Network Modelling.**
- **Academic and Research Partners.**

With 12 months monitoring achieved we are now in a position to identify the underlying characteristics of the villages networks and pinpoint areas for improvement.

Over the remainder of the project we are hoping to introduce Future Network Testing Ground:

- Automated Power Quality measurements at the secondary substations supplying the village and at prominent locations in the village.
- Analysis of the power flows in the village via advanced modelling, identifying the impact of low carbon technology at its current level and at escalated levels
- Identification of methods to increase the headroom for low carbon technology.
- Academic and research partners, further analysis
- Identifying the village's total electrical consumption on a daily basis, providing the community with energy reports that detail consumption patterns and the impact low carbon technology is having.
- Introduction of new technology to the village's network that serves as an enabler for the further roll out of low carbon technology.

The solution will consist of the installation of secondary substation power quality monitoring and intelligence systems and integration of various embedded generation technologies on the low voltage network. It is also envisaged that the collated information and technologies introduced will contribute towards optimal network and energy consumption arrangements to reduce the overall carbon footprint of the village.

Project Benefits

The overriding benefit of this project will be the provision of information and assistance to the community that will enable it to connect more low carbon technology and reduce Ashton Hayes' carbon footprint further. In doing so Ashton Hayes can be showcased as a UK exemplar for other communities to follow and play a part in the UK's low carbon transition.

Aside from the strong community benefits SP Energy Networks and UK DNOs also stand to benefit a great deal from the project. With its relatively small scale the project has been quick to establish and deliver findings regarding the performance of network monitoring, LV network modelling and the analysis of domestic loads.

The project has also been able to fill a void in academic research for real life network data, the findings of this work will be of benefit to DNOs long after the project has ended.

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