SoLa Bristol

The SoLa Bristol project was funded through the second year of Ofgem's Low Carbon Networks Fund in November 2011. Western Power Distribution are leading, with Bristol City Council deploying the technology at their sites, Knowle West Media Centre co-ordinating the outreach work, Siemens providing the technology and the University of Bath (working with RWE npower) as the academic partner.

This innovative project will integrate battery storage with Demand Response, Direct Current Networks to connect PV panels and DC appliances together with Smart Tariffs. The technology will be implemented in ten schools, one office and thirty homes (all owned by the Council) and will address issues associated with the large-scale deployment of photovoltaic (PV) generation, all connected to 13 distribution substations. The £2.8m project will run for three years and fund measures to enable a Distribution Network Operator to react quickly to increases in embedded generation, offering a solution that can solve the issues rather than try to reduce their impact on the network.

Network operators currently operate networks passively (without monitoring of system demands or voltage profiles) and have to ensure that when new loads or generation are connected, the network performs within limits. This can result in costly conventional network reinforcement to maintain network conditions whilst facilitating the connection of generation to the network. SoLa Bristol is looking to provide an innovative approach instead of conventional network re-inforcement.

Benefits for customers include…

- Keeping the lights on. Through the installation of the SoLa Bristol system, the batteries will be used to provide enhanced resilience during power outages.
- Lower energy bills through a better control of energy. A Variable Tariff rewards customers for reducing their peak energy demand, passing on the cost savings.
- Improved energy efficiency through use of DC equipment.
- Quicker and cheaper connections. Conventional network reinforcement can not only be costly, but also require significant scheduling.

Benefits for DNOs include…

- The project will test the benefits of storage located at customer premises, rather then at substations, providing the additional LV feeder load, voltage control support and customer benefits.
- Testing how batteries can be used with demand response by customers to take advantages of variable retail tariffs.
- Exploring lower harmonic distortions on the network voltage by solving the problem, reducing power quality issues.
- Providing better use of the existing distribution assets.

BRISTOL CITY COUNCIL

SIEMENS

UNIVERSITY OF BATH

KNOWLE WEST MEDIA CENTRE

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

SoLa Bristol

What are we trying to solve?

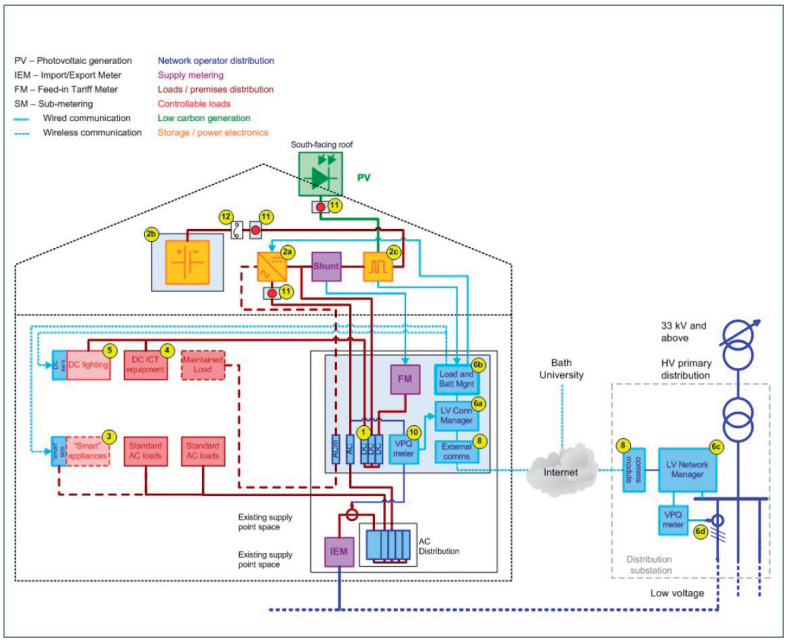
Voltage Rise

A common design of distribution networks is a high starting voltage, often close to the statutory limits to increase the permissible length of distribution networks whilst ensuring the network voltage stays within the permissible voltage range. Connecting increasing levels of distributed generation on multiple properties can lead to the network voltage rising during periods of low demand, potentially above the statutory network voltage.

Lightly loaded networks can have a limited ability to absorb solar PV generation. This can lead to network reinforcement to reduce the impact of solar PV during periods of minimum demand.

Power Quality

Households' energy demands are continually changing; an increasing percentage of electrical loads or generation now being connected to the Low Voltage network are being driven by power electronic components. In some locations the effects are already visible as the current waveform have distortions due to higher content of odd lower order harmonics being injected into the network. High current distortions on high-impedance networks will lead to increasing voltage distortions, reducing the quality of supply to customers.



How are we going to solve these problems?

Batteries

This project will connect 4.8 kWh of battery storage within homes and up to 18.4 kWh of battery storage within schools and an office to a DC network. These batteries will be shared between customers and the DNO, providing benefits to both.

Storing customers' PV generation locally in batteries, instead of exporting into the distribution network, allows customers to make the best use of their own generation. If excess energy is stored within the home, the impact of solar PV on the distribution network is reduced, preventing conventional network reinforcement.

DC Network

The project will utilise the existing lighting circuits within properties, converting these to operate on Direct Current to power lighting, computing and DC appliances. This can reduce the number of poor quality AC/DC converters, reducing distortions and current harmonics.

For more information contact:

Phillip Bale
01332 827448
pbale@westernpower.co.uk
www.westernpowerinnovation.co.uk

LOWCARBONUK.COM

SoLa Bristol
Solar energy when you need it

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales