UK Power Networks
Delivering your electricity

Validation of PV Connection Assessment Tool

Funding mechanism:	LCNF Tier 1
Project budget:	£367,000
Status:	Live Start date: January 2012 End date: November 2014

Project concept/overview/challenge

Domestic solar panels and other small-scale renewable generation are usually connected to our low voltage electricity networks without needing our consent. Low penetration does not cause any significant impact on our network, but we have seen network issues arise when penetration levels are high. The question is what will happen when these forms of renewable energy become mainstream?

Increasing clusters of solar panels connected to our electricity network will result in more two-way power flows on our cables and substations. Conventional reinforcement is often expensive so our challenge is to find smarter ways to support increasing use of small-scale distributed generation, without risking overloading the electricity network.

Stakeholder benefits

- Enable more renewable generation on the network without conventional reinforcement.
- Allow householders and businesses to benefit from generating their own energy.
- Understand our network's performance when more renewable energy is connected.
- Develop a pragmatic connection assessment approach covering both innovative solutions and more traditional network reinforcements.
- Establish whether low voltage monitoring can be minimised by using PV installers' data.
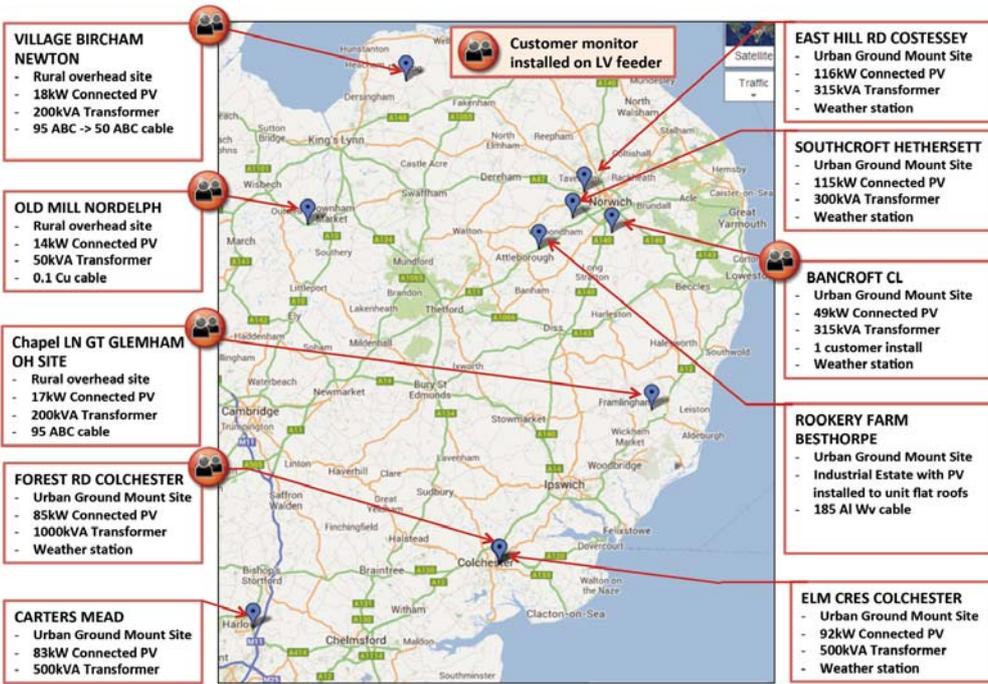
What we are doing/deliverables

- Monitor PV clusters to understand their impact on our low voltage network.
- Explore whether PV output information, held by installers, could be used by network operators.
- Investigate innovative solutions which can be applied to address network constraints.
- Validate planning assumptions in our draft connection assessment tool and develop an approved policy to provide more cost effective network interventions.

Findings

- Our 10 customer metering devices, 10 weather stations and 20 substation monitors installed across out trial area in SPN and EPN provide us good insight into the net energy production of our customers and the resulting network impact (see the two pictures overleaf).
- The initial data is now being used to find ways to improve our connection assessment tools.

Next steps

- Continue to monitor the impact of PV generation for another 12 months to capture seasonal variations.
- Use our trial data to improve and validate our planning assumptions.
- Explore the suitability of using third party data, such as from PV installers.
- Build an understanding of how network constraints can be mitigated by novel solutions.

VILLAGE BIRCHAM NEWTON
- Rural overhead site
- 18kW Connected PV
- 200kVA Transformer
- 95 ABC -> 50 ABC cable

Customer monitor installed on LV feeder

EAST HILL RD COSTESSEY
- Urban Ground Mount Site
- 116kW Connected PV
- 315kVA Transformer
- Weather station

SOUTHCROFT HETHERSETT
- Urban Ground Mount Site
- 115kW Connected PV
- 300kVA Transformer
- Weather station

OLD MILL NORDELPH
- Rural overhead site
- 14kW Connected PV
- 50kVA Transformer
- 0.1 Cu cable

BANCROFT CL
- Urban Ground Mount Site
- 49kW Connected PV
- 315kVA Transformer
- 1 customer install
- Weather station

Chapel LN GT GLEMHAM OH SITE
- Rural overhead site
- 17kW Connected PV
- 200kVA Transformer
- 95 ABC cable

ROOKERY FARM BESTHORPE
- Urban Ground Mount Site
- Industrial Estate with PV installed to unit flat roofs
- 185 Al Wv cable

FOREST RD COLCHESTER
- Urban Ground Mount Site
- 85kW Connected PV
- 1000kVA Transformer
- Weather station

CARTERS MEAD
- Urban Ground Mount Site
- 83kW Connected PV
- 500kVA Transformer

ELM CRES COLCHESTER
- Urban Ground Mount Site
- 92kW Connected PV
- 500kVA Transformer
- Weather station

211916 – FAIRVIEW ROAD
- Urban Ground Mount Site
- 56kW Connected PV
- 315kVA Transformer
- 300 Al Wv cable

Customer monitor installed on LV feeder

324172 – SUFFOLK ROAD
- Urban Ground Mount Site
- 24kW Connected PV
- 1000kVA Transformer
- 0.2Cu cable

444388 – BANKFIELD WAY
- Urban Ground Mount Site
- 86kW Connected PV
- 1000kVA Transformer
- 300 Al Wv cable

394970 – YMCA
- Urban Ground Mount Site
- 25kW Connected PV
- 500kVA Transformer
- 185H Al cable

511757 – RAMBLING COURT
- Urban Ground Mount Site
- No PV (Baseline site)
- 1000kVA Transformer
- 300 Al Wv cable

501518 – UPPER STAPLEFIELD COMMON OH SITE
Baseline site

503100 – WARNINGLID LANE
- Rural overhead site
- 23kW Connected PV
- 200kVA Transformer
- 0.05 Cu cable

472077 – PRIESTHAWES PMT
- Rural overhead site
- 23kW Connected PV
- 100kVA Transformer
- 95 ABC cable

503563 – MAPLE DRIVE EAST
- Urban Ground Mount Site
- 63.15kW Connected PV
- 315kVA Transformer
- 120H Al cable

474397 – ALVERSTON CLOSE
- Urban Ground Mount Site
- 24kW Connected PV
- 500kVA Transformer
- 185H Al cable
- G83-2 Connection

Partners