Project ID	DIP017		
Long Title	Customer Led Network Revolution		
Short Title	CLNR		
Keywords	Region; Electricity; Heat; Multi-sector/Grid; Solar PV; Heat Pumps; Direct Electric Storage; Power Quality & Grid Integration; Demand Response; Active Network Management; Electric & Hybrid Vehicles; Stakeholder Engagemenet & Behaviour Change; Energy Strategy Development; Alternative Suppliers & Tariffs; Data Acquisition		
Location (Town, Region, Country)	Various	Northeast	England
Latitude and Longitude	n/a	n/a	
OSGB code	n/a		
Status	Complete		
Start Date	2011		
End Date	2014		
Description	CLNR was a major smart grid demonstration project which brought together the key stakeholders in the electricity system (customers, energy suppliers and distributors) developing innovative technologies and commercial arrangements. In addition to the integration of people, processes and technology, this is one of the most significant trials undertaken in GB of customer electricity practices and attitudes (particularly domestic and small and medium enterprises). The following provide an overview of the scope, scale and achievements of the CLNR project: The CLNR customer trials involved ca. 11,000 domestic, 2,000 SME, industrial & commercial (I&C) and distributed generation customers. • Domestic participants included ca. 650 on time of use (ToU) tariffs, 380 with heat pumps, 470 with solar photovoltaic (PV) panels and 160 electric vehicle (EV) users. • 16 I&C customers provided a total of 17MW of demand side response (DSR) in trials for large-scale fast reserve. • A wealth of customer insight and analysis undertaken by Durham University from ca. 1,250 surveys and ca. 250 face-to-face interviews completed with more than 130 customers. • We have published customer load and generation profiles based on data we collected with profiles for various subgroups such as customers with solar PV, heat pumps or on ToUtariffs. • The active network management (ANM) system deployed for CLNR is one of the most sophisticated wide area control schemes in operation in Europe – using real-time		

	monitoring inputs, plus state estimation and optimisation rather than relying on pre-programmed rules. • We installed and commissioned a range of novel network technologies and undertook ca.200 trials of the electrical energy storage (EES), enhanced automatic voltage control (EAVC), real-time thermal rating (RTTR) and demand side response (DSR) interventions deploying the interventions singly and in combinations under the control of the ANM system.
Sectors	Multi-sector/Grid
Funding Sources	Low Carbon Network Fund
Budget £	£31 million (£28 million from LCNF)
Partners	Northern Powergrid, British Gas, Newcastle University, Durham University, EA Technology.
Energy vectors	Electricity, heat, transport
Scale (lab/small/community/region/national)	Region (National relevance)
Technologies demonstrated	Large-scale smart grid, active network management, battery storage, demand data acquisition
Economic models demonstrated	Time-of-use tariffs, grid services
Other concepts demonstrated	Demand response, DNO-consumer engagement, grid constraint mitigation
Industry engagement	2,000 commercial customers
Consumer engagement	11,000 domestic customers
Project Reports (incl. links)	https://www.ofgem.gov.uk/sites/default/files/docs/2015/05/clnr-g026_project_closedown_report_final_v2.pdf Extensive output, including reports and academic papers, accessible via http://www.networkrevolution.co.uk/resources/project-library/
Datasets (incl. links)	http://www.networkrevolution.co.uk/resources/project-data/
Website/social media	http://www.networkrevolution.co.uk/
Information sources	LCNF. https://www.ofgem.gov.uk/electricity/distribution-networks/network-innovation/low-carbon-networks-fund/ http://www.smarternetworks.org/project/cet2001