

Project ID	DIP040		
Long Title	Flexible Residential Energy Efficiency Demand Optimisation and Management		
Short Title	FREEDOM		
Keywords	Small-scale; Domestic; Electricity; Heat; Multi-fuel heating; Power Quality & Grid Integration; Smart Grids; Demand Response; Active Network Management; Alternative Suppliers & Tariffs;		
Location (Town, Region, Country)		South Wales	Wales
Latitude and Longitude	51.51N	3.58W	
OSGB code	SS 91 81		
Status	Ongoing		
Start Date	2016		
End Date	2019		
Description	<p>The research objectives of this project are to better understand if hybrid-heating systems are technically capable, affordable and attractive to customers as a way of heating homes. This project aims to investigate the feasibility of the use of heat pumps on both WPD's & WWU's network in order to:</p> <ol style="list-style-type: none"> 1. Demonstrate the ability of the hybrid heating system to switch between gas and electric load to provide fuel arbitrage and highly flexible demand response services; 2. Demonstrate the consumer, network, carbon and energy system benefits of deployment of hybrid heating systems with an aggregated demand response control system; and 3. Gain insights into the means of balancing the interests of the consumer, supplier, distribution and transmission network when seeking to derive value from the demand flexibility. 		
Sectors	Domestic		
Funding Sources	Network Innovation Allowance		
Budget £	£5.2 million		
Partners	Western Power Distribution, Wales and West Utilities, PassivSystems, City University, Imperial College, Delta Energy and Environment		
Energy vectors	Electricity, Heat		
Scale (lab/site /small/community/region/national)	Small		
Technologies demonstrated	Hybrid gas/electric heating systems, smart controls, active network management		
Economic models demonstrated	Virtual power plant/market aggregation, grid services, new commercial models		
Other concepts demonstrated	Demand response, DNO-consumer engagement, grid constraint mitigation		

Industry engagement	
Consumer engagement	75 households
Project Reports (incl. links)	Closedown report: https://www.westernpower.co.uk/docs/Innovation/Current-projects/FREEDOM/Freedom-Project-Interim-Report-Online.aspx Library: http://www.smarternetworks.org/project/nia_wpd_023/documents Paper: http://hpc2017.org/wp-content/uploads/2017/05/O.2.2.3-Early-results-from-the-FREEDOM-project-fully-optimised-hybrid-heat-pumps-providing-demand-flexibility.pdf
Datasets (incl. links)	
Website/social media	https://www.westernpower.co.uk/Innovation/Projects/Closed-Projects/SYNC.aspx
Information sources	http://www.smarternetworks.org/project/nia_wpd_023