

Project ID	DIP007		
Long Title	Balanced Energy Network		
Short Title	BEN		
Keywords	Small-scale; Non-domestic; Heat Pumps; Fuel Cell; Thermal Storage; Microgrid; Smart Grid; District Heating; Active Network Management; Virtual Power Plant;		
Location (Town, Region, Country)	London		England
Latitude and Longitude	51.50N		0.10W
OSGB code	TQ 318 794		
Status	Ongoing		
Start Date	2016		
End Date	2018		
Description	<p>The Balanced Energy Network (BEN) at London South Bank University (LSBU) is an Innovate UK funded research project running from May 2016 to May 2018. BEN combines next generation heat networks with smart-grid technology to balance the production of heating, cooling, and electricity in a way that minimised costs and carbon emissions.</p> <p>BEN seeks to answer the UK's energy trilemma: delivering secure, affordable, and sustainable energy. Using a 'Cold Water Heat Network' to move and store energy, linked with heat pumps and borehole thermal storage (TFGI), BEN provides the efficiency benefits of a heat network without the added pollution of energy centres in dense urban areas. BEN allows us to completely rethink how we provide heating and cooling services, simply moving heat away from a place that needs cooling, towards a place that needs heating. No combustion - just efficient energy management.</p> <p>That management is enabled by a cloud-based aggregator that delivers a Virtual Energy Storage. This set of algorithms tells BEN systems when to turn on and off, when to store electricity as heat, or when to deliver cooling by moving heat to storage. In short, it provides heating, cooling, and electricity at optimal times to create the world's first Balanced Energy Network.</p> <p>BEN also creates an enabling infrastructure for a host of new technologies to make the grid electricity supply more robust and efficient. For example, hot water tanks create a 'smart storage' solution that both links with the Upside aggregator and improves the efficiency of heat pumps. Origen Power and Cranfield University have created a unique fuel cell that creates carbon negative electricity for BEN by actively removing CO2 from the atmosphere. The demonstration project at LSBU can also be linked to future buildings and energy technologies.</p>		
Sectors	Non-domestic		

Funding Sources	InnovateUK
Budget £	£4 million (£2.9m from InnovateUK)
Partners	ICAX, LSBU, Star Refrigeration, Upside Energy, Mixergy, Origen Power, Cranfield University, GLA
Energy vectors	Electricity, Heat
Scale (lab/single/small /community/region/national)	Small
Technologies demonstrated	Low temperature heat network, heat network-fed heat pumps, borehole thermal store, fuel cells, smart controls
Economic models demonstrated	Virtual power plant
Other concepts demonstrated	
Industry engagement	Industry partners
Consumer engagement	
Project Reports (incl. links)	Study Paper. http://researchopen.lsbu.ac.uk/1376/ Conference Paper. http://vbn.aau.dk/files/233716958/paper_648.pdf
Datasets (incl. links)	
Website/social media	https://www.benuk.net/ http://www.lsbu.ac.uk/research/centres-groups/sites/ben-project
Information sources	http://gtr.ukri.org/projects?ref=102624