

C Appendix: Energy Projects and Initiatives in Bristol

This appendix summarises some of the energy projects and initiatives in Bristol.

C.1 System projects

- **SoLa BRISTOL**, (2011-2016) – WPD, combining PVs and batteries with local DC microgrid and variable tariffs to shift demand in homes and schools.
- **STEEP** (Systems Thinking for Efficient Energy Planning, 2013-15) – precursor to REPLICATE with the same EU partners (Bristol, San Sebastien and Florence) and EU funding. Bristol's partners were UoB, BCC, CSE and Arup. STEEP aimed to develop Energy Master Plans for districts in three cities, adopting a 'systems thinking' methodology in combination with open data sourcing to achieve carbon reduction targets and overcome the barriers to energy efficiency. <http://www.smartsteep.eu>.
- **REPLICATE** (i.e. REnaissance of PLaces with Innovative Citizenship And Technologies, 2016-21), European research and development project in Bristol, San Sebastien and Florence ¹⁷.

REPLICATE is a Horizon 2020 project deploying integrated energy, mobility and ICT solutions in cities. The city of Bristol, as part of a consortium with San Sebastián and Florence (and with a total of 39 partners), was awarded €25 million in October 2015 to create integrated smart city solutions tackling urban problems such as traffic congestion, poor air quality and unsustainable energy use. The project has multiple elements in its partner cities. In Bristol, the project focuses on the inner-east area of the city to deploy energy efficiency, sustainable mobility and connected smart digital services. It took a systems' approach, looking at smart homes, retrofit and travel solutions, including installation of EV charging points, shared use of EVs through a smart mobility app; installation and use of smart household appliances for a demand-response trial; community engagement and education all connected through the Bristol's Open Data platform.

- **Bristol Energy Smart System Transformation** ¹⁸ (BESST) project was an Innovate UK-funded PFER pilot research project in 2019. The project was led by Bristol Energy with six other partners: Bristol City Council, Bristol Community Transport, Upside Energy, Regen, Bristol Energy Network and SevernNet. The project focused on the whole system: "looking at technology, commercial viability, regulatory constraints and consumer acceptance and engagement" [B9]. It sought to design a customer-focused way to deploy smart energy and digital technology at scale.
- **City Leap** ¹⁹ (since 2018) is the City Council's initiative to bring in new investment to meet the 2030 carbon neutrality target. The aim is to form a joint venture between BCC and an external partner to provide services to the Council and substantial investment in delivery of a

¹⁷<https://replicate-project.eu/about/>, <https://www.connectingbristol.org/projects/replicate/>

¹⁸<https://www.regen.co.uk/project/bristol-energy-smart-system-transformation-besst/>

¹⁹<https://www.energyservicebristol.co.uk/cityleap/>, Original prospectus at https://www.energyservicebristol.co.uk/wp-content/pdf/City_Leap_Prospectus\%204-5-18.pdf

low-carbon infrastructure in the City. This is still at a tendering stage, with changes needed following the sale of Bristol Energy in September 2020.

- **Interoperable Open Digital Control Unit System Project** (IODiCUS, 2015-2016) – research demonstrating the technical viability and future market for a connected energy network, in buildings with microgeneration, local energy storage and optimised interaction with the electricity grid²⁰

C.2 Retrofit and energy efficiency

- Cold Homes Energy Efficiency Survey Experts²¹ (or CHEESE) is a CIC focusing on thermal imaging to inform householders of low-budget retrofit options.
- **Futureproof**²² – engaging builders and the able-to-pay in retrofitting for energy efficiency.

The Green Register has partnered with CSE on the Futureproof project which aims to support and connect those homeowners who might be up for taking action with suitably qualified builders, thus helping to develop the market and supply chain. It engages with homeowners who can afford to pay for energy efficiency retrofit, yet are not sure where to look or what to do. Simon Roberts of CSE wrote a short paper called, ‘Do the Next Million First’, suggesting that the most effective approach is to identify who’s likely to take up energy efficiency measures and concentrating on them rather than trying to bring in everyone, which then builds the supply chain enabling others to follow. This project builds on the Bristol Green Doors initiative which followed the popular art trail format (where art is displayed in local homes) to exhibit energy efficiency and retrofit processes in domestic homes, enabling visitors to discuss with the homeowner what was done, how, by whom and with what outcomes.

- **SONNET**²³ (SOcial iNNovation in Energy Transitions): as stated in the BCC property strategy, the city council’s aspiration is that their estate ‘leads by example’ in the contribution it makes to Bristol’s carbon neutrality. The SONNET project is exploring how to help community buildings reduce their carbon footprint, developing templates for audit and engagement and exploring investment crowdfunding mechanisms such as ‘Community Municipal Bonds’ to fund investable measures with short payback periods. This forms the ‘Bristol City Lab’ element of the wider SONNET project across six EU cities.
- **Schools**²⁴: the BCC Energy Service is offering to audit and support schools to improve their energy efficiency with any costs paid for by a zero % loan which is repaid out of savings over a maximum of 5 years.

²⁰<https://gtr.ukri.org/projects?ref=102001>

²¹<https://cheeseproject.co.uk>

²²<https://futureproof.uk.net/>

²³<https://sonnet-energy.eu/portfolio-item/bristol/>

²⁴<https://www.energyservicebristol.co.uk/business/schools-energy-efficiency-scheme/>

C.3 Renewables and Heat

C.3.1 Microgrids

Volume housebuilders have been reluctant to embrace new technologies and approaches to making developments more sustainable, so it has been left to smaller developers to make the first moves. **Owen Square** ²⁵ – (2016-ongoing) had ambitions to connect rows of existing homes to a private wire microgrid with linked energy efficiency retrofit and domestic solar all connected to a ground source heat pump in the park and solar array on an adjacent community building, working with Easton Energy Group and CEPRO. The (award-winning) project has currently stalled due to a lack of funding.

Bright Green Futures are developing community eco-builds, with their current development of around 50 homes. (**Waterlilies** ²⁶) planning a crowd-funded microgrid connected to a whole development solar and battery system. CEPRO is working with BEC to take this initiative forward. New developments are seen as less complex for the microgrid approach.

Just outside the eastern edge of Bristol is the site of **Hanham Hall** ²⁷, a larger flagship carbon challenge scheme of 186 homes which was completed in 2015. It was judged as the Best Sustainable Development in Britain in the 2014 What House? Awards and was England's first large-scale housing scheme to achieve the 2016 zero-carbon standard. Barratt Homes were the developers working with HTA architects.

C.3.2 Heat networks

Through the energy service, BCC is developing heat networks across the city centre and beyond. The first map below shows the areas already planning for heat and the second shows a wider area where developments might connect, with the current area forming only a small part of this at present ²⁸. Currently BCC is aiming at connecting city civic buildings, social housing, businesses and hospital ²⁹.

C.3.3 Solar

Bristol Energy Co-operative has been developing community-owned solar on buildings and land since 2010 with a 4.2MWp solar farm at Lawrence Weston supporting the local community. Low Carbon Gordano also have ground-mounted solar projects with the largest one being in Avonmouth (1839kW) ³⁰.

- Community-led solar farms and roofs – Bristol Energy Co-operative since 2010, also
- Low Carbon Gordano,
- Bristol Power Co-operative

²⁵<https://www.owensquare.coop>

²⁶<https://www.brightgreenfutures.co.uk/projects/water-lilies/>

²⁷<https://www.hta.co.uk/project/hanham-hall>, <https://www.theguardian.com/environment/2007/dec/14/energyefficiency.energy1>, <https://www.barrattdevelopments.co.uk/showcase/hanham-hall-bristol>

²⁸<https://www.energyservicebristol.co.uk/business/heat-networks/>

²⁹<https://www.energyservicebristol.co.uk/business/heat-networks/>

³⁰<http://lowcarbongordano.co.uk/our-community-generation-projects/>

- PROSEU research – mainstreaming renewable energy prosumers, led by Leeds University with Bristol Case studies

C.3.4 Wind energy

Avonmouth on the Severn Estuary is the site of a number of wind turbines providing power to the port and into the national grid. This coastal, industrial site is ideal for good wind and energy connections to the National Grid in one of the largest dock areas in Europe.

- The first development was of 3 turbines (6MW) in 2007, owned and operated by Ecotricity and the Bristol Port Company on the edge of the estuary ³¹.
- There are another 4 wind turbines (8.2MW) located on the land of Wessex Water's waste treatment plant, operational since 2013 in a collaboration between BCC and Thrive Renewables ³².
- A further two turbines, which became operational in 2013, are co-located with a solar farm to the south of the Seabank Power Station on BCC land ³³. BCC was the first UK local authority to build and manage its own large-scale wind turbines ³⁴.
- In 2020, ALW has been developing its own community-owned wind turbine which has received planning approval ³⁵.

C.4 Storage

Batteries are another area where Bristol is innovating. The Council HQ at City Hall installed a 300kW battery developed with Upside Energy in 2020, with payback from load shifting and grid services.

In Lockleaze, a 15MW battery, developed by Aura Power with clean energy investors Hazel Capital, provides frequency response to the National Grid. The battery was installed in 2017 after earlier applications for diesel generators were opposed by residents and rejected by planners. At the time, it was thought to be the UK's largest standalone battery storage facility. Aura have another 20MW battery in development at a site on Feeder Road.

In September 2020 agreement was reached for a new 33MW battery storage facility to be built at Avonmouth, Bristol after a lease was signed between land investor Electric Land and Hallen Energy, part of French renewable energy firm Voltalia SA ³⁶. Electric Land purchased the 5-acre site to develop 'Avonmouth Energy Park' in 2018, and current plans are for a 49.9MW gas powered generation facility alongside the separate 33MW battery storage.

³¹<https://www.ecotricity.co.uk/our-green-energy/our-green-electricity/from-the-wind/wind-parks-gallery/bristol-port>

³²<https://www.thriverenewables.co.uk/projects/avonmouth-wind-farm/>

³³<https://www.bristol.gov.uk/policies-plans-strategies/avonmouth-wind-turbines-project>

³⁴<https://www.energyservicebristol.co.uk/about/>

³⁵<https://www.bristol247.com/news-and-features/news/wind-turbine-150m-could-be-build-avonmouth-lawrence-weston/>

³⁶<https://www.businessgreen.com/news/4019486/giant-battery-storage-project-secures-site-near-bristol>, <https://www.businessleader.co.uk/tlt-advises-voltalia-on-its-first-uk-battery-storage-venture/96845/>, <https://electricland.co.uk/voltalia-avonmouth/>

C.5 Transport and Mobility

The *Go Ultra Low West* (GULW) programme is a £7m project across the West of England authorities to improve access to electric vehicles via public charging networks, rapid charging hubs and electric car clubs. The local authorities are converting a proportion of their fleets to electric. Bristol City Council has taken on the running of the network with a *partnership of suppliers* (Siemens, ChargePoint Services and Alfen) who plan to install 120 public EV charging points across the region by 2021.

SCIURUS – vehicle to grid with Kaluza / OVO and Nissan, 2018 -2020 (InnovateUK / BEIS / OLEV funding)

Some useful links for these projects:

- <https://www.kaluza.com/case-studies/project-sciurus/>
- <https://www.ovoenergy.com/electric-cars/vehicle-to-grid-charger>
- <https://gtr.ukri.org/projects?ref=104248>
- WPD Electric Nation, trialling V2G smart charging – a national project with SW component 2020-2022
- Go Ultra Low West <https://travelwest.info/drive/electric-vehicles/go-ultra-low-west>