

Next Generation end of project case study: Plymouth Energy Community- developing affordable net zero homes through the use of an ESCo



About Plymouth Energy Community:

Plymouth Energy Community (PEC) is a charity and social enterprise with a co-operative ethos.

We have a vision to empower our community to create a fair, affordable, low-carbon energy system with local people at its heart.

About this innovation project and its impact:

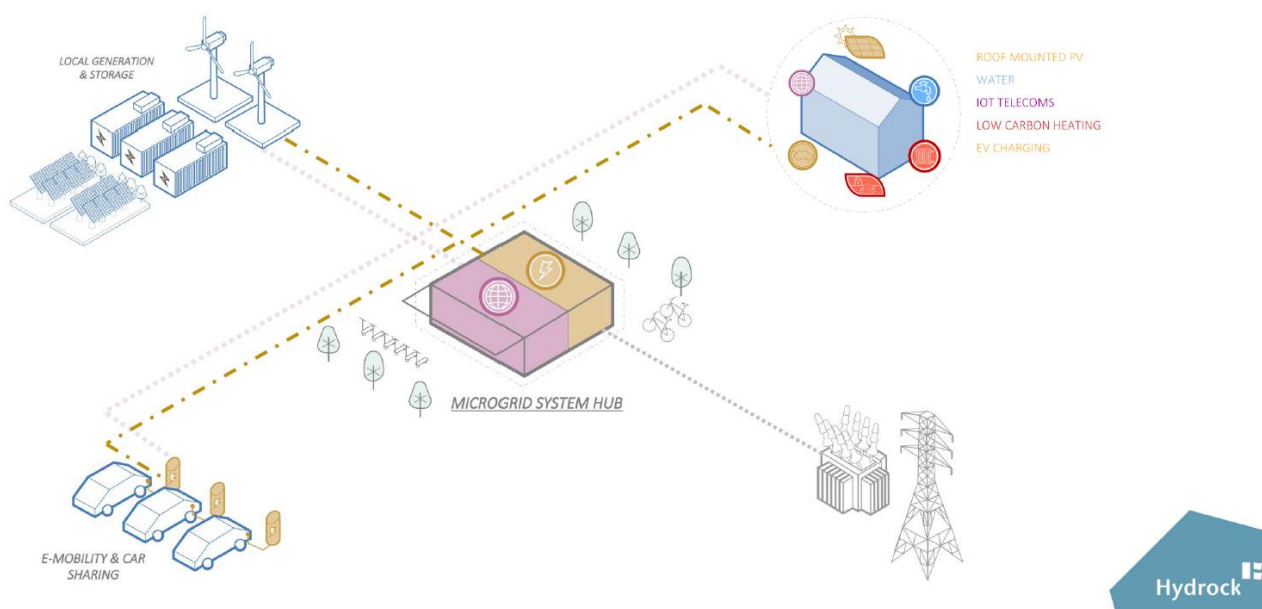
PEC's aim in this project was to explore the potential for Energy Service Company (ESCO) business models to improve the energy and carbon performance of community-led housing developments. It did this by developing modelling for a specific site in Plymouth (and using another case study site in Launceston).

A specific output of the project was a viability tool produced by Hydrock, an engineering design company, which will help community energy groups better select projects, build a technical understanding of the project and its viability, and engage partners with greater clarity. It should also help to move projects to a more advanced stage before requiring grant funding for feasibility studies. A link to this tool and other resources can be found at the end of the case study.

Through this project, business models were explored involving:

- Highly energy efficient building fabric.
- Integration of PV and storage technology.
- Communal heat solutions utilising biomass or heat pumps.
- Electric vehicle car club and charging infrastructure with vehicle-to-grid functionality.
- A microgrid.
- A new affordable rental model encompassing comfort (heat and power) and transport charges (electric vehicle (EV) car club) into a single package.

The diagram below gives an overview of a smart microgrid.



Advice for other groups considering this approach:

PEC's analysis strongly indicates that an ESCo would be viable based around a smart microgrid on the specific site modelled for this project. Key conditions for any other housing project to replicate this would be:

- **The right sized site.** Fewer than 25-30 houses will be more challenging, while with more than 100 houses you begin to approach the limits set by Ofgem electricity licence exemptions.
- **The right site designs.** This will have many variables and is complex, but the Hydrock tool enables any community energy organisation to work with housing organisations to assess this.

- **A housing provider** that is committed to investing in low carbon technologies, ideally having committed to investing in heat pumps and solar. In this circumstance, an onsite ESCo would be likely to reduce capital costs for the developer and deliver better social and environmental outcomes.
- In addition to this, smart grids may be particularly valuable in **grid-constrained locations**, where they have a potential to avoid the need for reinforcement through new substations or similar.

Important considerations for any community group considering this type of initiative are:

- Although on a headline level this appears positive, the level of uncertainty within this business case is very high. Currently, it is unlikely that a community group could bring forward a project without some form of **grant or investment** on non-commercial terms.
- In addition, a community group would need **experienced professional project management** support and an engaged board or higher executive to provide strategic direction to deliver a successful project of this nature.

Advice for policy makers:

Key areas that need to progress to reduce barriers are:

- Better access to data from half-hourly electricity meters to feed into modelling.
- Better understanding of the impact of smart grids. This would be best achieved by having demonstration sites that data can be analysed from.
- A process mapped out with Distribution Network Operators (DNOs) that unlocks the potential for smart grids to minimise the need for grid reinforcement in constrained areas and realising a capital saving for this.
- A better understanding of the impact of electric vehicles (EVs).
- A less volatile energy system. The cost of imported electricity is a significant expense to an ESCo and setting a cost for a smart grid operating from 2023 is hard enough but then plotting forward this price for 30 years is a huge area of risk.

If you want to know more:

- The project final report, the Hydrock tool, and other resources can be found at: <https://www.next-generation.org.uk/resources>
- Contact Justin Bear, Project Manager; justin@plymouthenergycommunity.com