SP Energy Networks

Community Energy

SP Energy Networks
community support case studies

Tanygrisiau Community Heat Network

Community Energy

Tanygrisiau Community Heat Network

Tanygrisiau, Blaenau Ffestiniog, Gwynedd, Wales

Location: Tanygrisiau, Blaenau Ffestiniog, Gwynedd, Wales

Development stage: Development

Organisations involved: Cwmni Bro Ffestiniog, Energy Local, SP Energy Networks, Welsh government, Gwynedd Council, Rehau and local social landlords

Technology type: Integrated community heat project combining water source heat pumps, district heating network, home retrofitting and electricity from local micro-hydro projects.

Scale and intended customers:

- Feasibility proposes a 1 MW containerised water source heat pump, potentially with air source or direct heating for peak lopping.
- Built to serve about 217 residential properties (mix of privately owned/ rented, holiday lets and registered social housing properties), the Rehau manufacturing facility (c. 900 kW heat demand anchor load), a church and the local primary school.

Business model: Community Energy Service Company (CESCO), potentially with a 20-year payback model (specific financial details are still being developed).

Finance: InnovateUK, Heat Network Delivery Unit (HNDU), Welsh government-funded feasibility study for the heat network.

Community benefit: Aims to tackle fuel poverty while creating local jobs, improving health outcomes and keeping energy spending in the local economy.

What is a heat network?

Heat networks (also known as district heating) are a system of underground pipes that carry hot water from a central heating source to multiple buildings, avoiding the need for individual boilers in each building.

A project to tackle fuel poverty

Tanygrisiau, a former quarrying village in North Wales, has long faced high rates of fuel poverty. Many homes are not connected to the gas network and still depend on expensive and inefficient electric storage heaters, making energy costs a persistent challenge. Efforts to address such issues are often fragmented, focusing on individual home upgrades or technologies rather than addressing this as a more localised challenge.

In Tanygrisiau, a more integrated, community-led approach is beginning to take shape. Rather than treating heat, energy generation and building upgrades as separate concerns, local partners are working to develop a coordinated solution that draws on local renewable resources. This approach is rooted in the Energy Local model (see Figure 1.), which enables communities to use locally generated renewable electricity more directly and cost-effectively.

In this case, it aims to include two hydroelectric schemes owned by Dwr Cymru alongside area-wide energy efficiency measures and a district heating system. Together, these elements form the foundation of the Tanygrisiau Community Heat Network proposal, which aims to deliver affordable, low-carbon heat to local residents at scale.

SP Energy Networks

Project development and initial steps

The idea for the heat network grew from local needs, existing assets and a desire to try a different approach. While Energy Local arrangements (see Figure 1.) are technically feasible, they proved difficult to implement because many households use prepayment meters, which makes it challenging to connect households to local generation, and for suppliers to bill people accurately. To avoid excluding these residents, the team explored combining local renewable energy sources with a community heat pump under Energy Local to create an inclusive, reliable and scalable heating solution tailored to the community's needs.

To move this idea forward, a Community Energy Service Company (CESCO), a company that can generate, buy and sell electricity, was established to develop and manage the project. Early outreach with the community included leafleting and public meetings to raise awareness and gather input.

The team also developed a business model and conducted feasibility studies, supported by early stage funding from Innovate UK and the Heat Network Delivery Unit. This groundwork helped shape early-stage technical planning and identify practical challenges, such as establishing who owned specific parcels of land crucial for the project's infrastructure.

Currently, the focus is on refining costs through detailed contractor quotes and exploring affordability options for end users. The feasibility study highlighted key next steps, including detailed technical assessments for energy efficiency retrofit of individual homes. They will also need to secure heads of terms agreements with key stakeholders, including Rehau and the registered social landlord-owned properties, to define the key parameters associated with the eventual heat supply agreement. Council engagement is helping to secure land use and planning consent and to complete route assessments. Early discussions with SPEN, the electricity network operator, will also help to better understand connection costs and possible limitations on how much power can be exported.

SPEN is also running the 'Battery to Bypass Constraints for Smart Local Energy' project funded by the Network Innovation Allowance (NIA), investigating approaches to using local renewable projects to power community heat pumps to reduce potential constraints on the network as more people switch from gas boilers to electric heat pumps. Such innovations support the technical development of the Tanygrisiau project.

Project development and initial steps (cont.)

What is Energy Local?

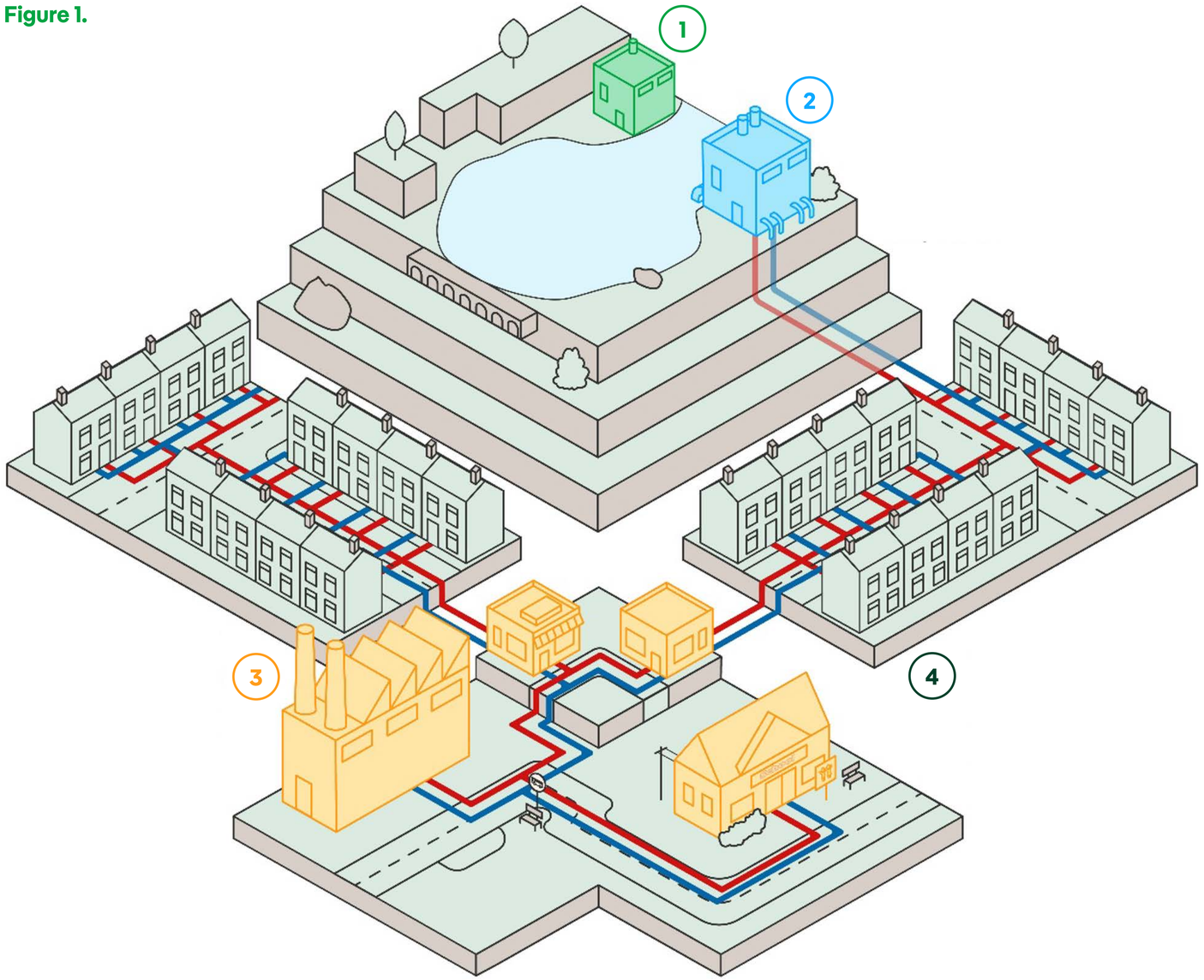
Energy Local is a social enterprise that helps communities form local energy markets using smart meters, forming an Energy Local Club. It helps match local electricity consumption with renewable energy generation, such as from small hydro or solar projects, providing fair prices and supporting local producers.

How it works:

- Households' electricity use is tracked every 30 minutes and compared to local renewable energy generation during the same period.
- When usage matches the local generation, you pay a reduced 'match tariff', directly supporting local renewable generators by cutting out middlemen. If more power is used than generated locally, it is shared out between users.
- A licensed supplier provides any power not generated locally on a 3-band time-of-use tariff (e.g. off-peak, mid-peak and peak) to encourage people to shift away from times of expensive power and stressed networks.
- This system helps households lower their bills, supports local clean energy projects and reduces carbon emissions.

For more information, visit the Energy Local website.

Figure 1.



Components of the project

The Tanygrisiau Community Heat Network combines several key technologies and approaches to deliver affordable, sustainable heat across the community. The main components include:

1. **Hydroelectric projects**
   Two small hydroelectric schemes, Cwmorthin and Ffestiniog Hydro plants, have the potential to supply electricity for the heat network through a Power Purchase Agreement (PPA), supporting low-carbon operation and price security.

2. **Water source heat pump**
   A large water source heat pump will form the core of the system. This aims to be powered primarily by the local hydro schemes, drawing water from a nearby reservoir.

3. **Water source heat pump**
   A new network of pipes will distribute heat from the central heat pump to about 217 houses, a local school, cafe and a large factory.

4. **Water source heat pump**
   A new network of pipes will distribute heat from the central heat pump to about 217 houses, a local school, cafe and a large factory.

Community Energy

Overcoming challenges in a complex project

The integrated nature of the Tanygrisiau Community Heat Network brings many benefits but also adds complexity. Coordinating multiple technologies, costs and community needs creates challenges that require clear communication and careful management to maintain trust and keep the project moving forward.

Community benefits and value

This project aims to deliver affordable, sustainable heat that reduces reliance on fossil fuels and lowers energy bills for residents. By leveraging local renewable resources, the project supports economic resilience and seeks to create opportunities for local employment. Beyond cost savings, the network may also enhance energy security within the community, help meet broader environmental goals and foster long-term wellbeing and climate action locally.

SP Energy Networks

Community Energy

Network benefits

Rather than each home having electric heating, this project takes heat directly to homes through a heat network, reducing the demand on the local electricity network and the need for upgrades. The project also incentivises the use of electricity produced locally (the two hydro schemes) and uses electrical and heat storage to maximise its use, reducing the amount of power from the main electricity network and keeping costs down for all customers. The project is also exploring innovative ways to move electricity around locally (e.g. between feeders using direct current power connections or batteries) without putting strain further up the electricity network.

SP Energy Networks

Key lessons for community energy groups

One of the project leaders highlights two key lessons from their experience:

- First, start engaging with your community early, and don't wait for all the details to be finalised. People want to be involved and kept informed, even if plans are still evolving. Honest, ongoing communication builds trust and helps prevent bigger issues later on.
- Second, expect complexity and be ready to adapt. Working with multiple partners, managing technical challenges and handling changing costs are all part of the process. Flexibility and persistence are essential. You won't get everything right the first time, but staying engaged and creative will help you find workable solutions.

Looking ahead

While the Tanygrisiau Community Heat Network is still in its early stages, the feasibility work has laid a solid foundation. The project team remains committed to working closely with the community and partners to overcome challenges and refine the design. With continued collaboration and careful planning, this initiative has the potential to deliver affordable, sustainable heat and become a model for community-led energy solutions.

For more information, please contact the project leads:

Mary Gillie - mary@energylocal.org.uk

Ceri Cummington - ceri.c@cwmnibro.cymru

Glossary

Name	Definition
Community Energy Service Company (CESCO)	A local energy company owned by a community that can generate, buy and sell electricity directly to residents and businesses, often at fairer prices than traditional energy suppliers.
Connections	The point where an energy project links to the electricity network to supply homes and businesses.
Electricity network	The system of cables and equipment that carries electricity from energy projects (e.g., a hydro project) to consumers.
kW (Kilowatt)	Measures how much electricity something uses or produces at any moment, like a speedometer shows how fast you are driving. A kettle uses about 3kW when running.
MW (Megawatt)	A much larger measure of power than kW. 1 MW equals 1,000 kW. It is usually used for measuring larger projects.
Network constraint	A limitation in the electrical grid's capacity to deliver power to a specific area, which may require managing demand or upgrading infrastructure to avoid overloading.

SP Energy Networks

Community Energy

SP Energy Networks
community support case studies

Tanygrisiau Community Heat Network

communityenergy@spenergynetworks.co.uk