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NEW PILOT SITE integrated into D2Grids Project: Plymouth City Council



IN SHORT :

Plymouth City Council is joining the European project D2Grids! This Interreg NWE project aims to develop 5th generation district heating and cooling (5GDHC) in North-West Europe. After working on 4GDHC in the HeatNet project, Plymouth will develop a new pilot site. Joining the D2Grids project will help the city make a huge step towards decarbonising its building stock.

The D2Grids project aims to develop a **generic technology model for 5th generation district heating and cooling grids**, to create a **solid business plan**, to promote this new generation of smart local energy grids, train professionals for its deployment, and demonstrate the technology through impactful pilot investments in: Paris-Saclay (FR), Bochum (DE), Brunssum (NL), Glasgow (SC) and **now Plymouth (UK)**.

The Interreg North-West Europe (NWE) project started in 2019 and was developed by 12 European partners. The project aims to roll-out 5th generation district heating and cooling systems (5GDHC) across North-West Europe, thereby increasing the share of renewable energy and decreasing carbon emissions.

Why 5th generation in Plymouth?

Plymouth City Council (PCC) has declared a Climate Emergency and committed to achieving carbon neutrality in the City by 2030, ahead of the national legally binding targets of 2050. PCC has a Climate Emergency Action Plan and Corporate Carbon Reduction Plan. It is actively working to reduce its own carbon footprint across its portfolio and working with other partners across the city, on a range of areas particularly with heat grids.

Building on the **work completed through the preceding HeatNet Interreg NWE project**, 5GDHC has great potential for scaling-up and rolling out in the city centre area, both in new developments and existing buildings, with a mix of heating and cooling loads.

Joining D2Grids: a step forward for the city

The D2Grids pilot will build on the initial work completed through the HeatNet NWE project. It allowed the city to **map out heating and cooling loads**, identify opportunities for renewable heat sources and develop the concept design of a 5GDHC network. Involvement in HeatNet also resulted in the delivery of infrastructure in Millbay, but also in drilling test wells into the principal aquifer in the underlying limestone within this area.

Similar to HeatNet, the pilot will cover the same **two clusters in the Southern City Centre area**, which form part of the same overall masterplan. **Plymouth City Council has been developing both schemes with a view to link these together over time and to allow sharing of waste heat and renewable energy sources.** It is reviewing the wider development proposals in the city centre, including being "connection ready" to link to a wider 5GDHC grid.

About Millbay Cluster

The 5GDHC grid aims to **supply social residential dwellings (147 units)**, a hotel, office block and events arena with zero carbon heating & cooling, delivering high levels of comfort at a competitive price.

Renewable energy (alongside waste heat) will be derived from a **combination of ground source, marine and air source using heat pumps (decentralised and centralised)**.

In the Millbay area, some of the basic assumptions of the original scheme have changed, in particular the basis for ground source, and D2Grids will complete further testing of this resource to gain the necessary full consents to use this and inform the final integration into the design. After a peer review, and liaison with the Environment Agency, a local geological society and the University of Plymouth geology department, further work is underway to complete a stepped pumping test to **establish the maximum yield of the existing well (117m; tests at the time demonstrated at least 20L/s)** to inform development of further wells in this area, to support the scheme. Other existing wells across this area will be monitored over this test, and **beyond to establish any changes in water level but also salinity and tidal variation, as seawater may also be connected**.

Further work is already underway to deliver decentralised heat pumps which are 'connection ready' on a new Hotel scheme (currently onsite) but also on an adjacent PCC building (Ballard House) 200kW heat pump together with the solar PV on the roof over the next 6 months. **The scheme will expand over time to include these buildings** but also the adjacent Pavilions events arena, and **a new social housing development (147 units)** with some commercial areas. Since HeatNet, **other heat loads have been identified that can potentially connect to this scheme, including new Health Hub (Cavell Centre) that will be 'connection ready'** along with other opportunities including housing units and a school.

About Civic Cluster

Work is also underway on the other Civic Cluster, with phase 1 on-site to deliver a new energy centre (200kW air source heat pump) and one new heat main connection serving three buildings (Guildhall/ Council House and Lawcourts), along with **solar PV on the Council House roof connecting to a private wire electricity network**. Phase 2 will follow on to connect the **mixed-use development at Civic Centre (144 residential units and commercial) and Theatre Royal over the next 2 years**. These two buildings will also have some cooling loads, with the intention to **capture waste heat with storage**, where possible. The proposals would be future-proofed for connection **with a wider 5GDHC network, as this expands**.

D2Grids involvement will help Plymouth demonstrate the 5GDHC approach through the pilot.



Not only will this pilot help to demonstrate **how the 5GDHC approach can be applied to the initial areas**, but also help to inform the proposals to expand, with **a review of the masterplan in this area**. It will help to demonstrate how **different sources of renewable heat can be deployed** alongside exploring opportunities to use waste heat. Some of the buildings have historic designations and are challenging to reduce their operating temperatures, although a number of measures are being taken to try to achieve this. As 5GDHC grids use lower temperatures, this brings an opportunity to use waste heat and a greater range of renewable heat sources, such as ground source. Plymouth has already identified the City Centre as a 'Low Temperature Building Zone' to try to support this. **The cooling aspect of 5GDHC is a bonus**, particularly as the climate warms. This approach can **deliver cooling in a more efficient way than a traditional district energy scheme, which gives some flexibility and resilience** thanks to the business model, which is not just focused on heat. Plymouth City Council has also been asked by the Government Department for Business, Energy and Industrial Strategy to participate in a national pilot to test Heat Network zoning **and is keen to share any learning about the promotion and development of smarter fifth generation heat grids** as part of this.

Read more information about 5GDHC on our website

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THE D2GRIDS PARTNERS

16 PROJECT PARTNERS



6 PROJECT SUBPARTNERS



CONTACT INFO



Paul Capgras
Communication manager
Construction21
Paul.Capgras@construction21.fr