Interreg North-West Europe D2Grids

5GDHC and renewable electricity production

1 Energy issues leading to 5GDHC concept

About 5GDHC

The 5th generation of district heating and cooling (5GDHC) is an intelligent thermal grid based on a local tempered loop combined with heat pumps located at the user's premises, which bring the temperature to the required level.

It allows the exchange of energy between consumers and the recovery of cold and heat emitted by super-markets, data centers, factories, offices, etc.

5 principles

- **Closing the energy loop**
- **Using low-grade sources for low-grade demand**
- **Decentralized & demand-driven energy supply**
- **An integrated approach of energy flows**
- **Local sources as a priority**

Other solution

The electricity needed is produced LOCALLY

- To create low-carbon electricity for the grid
- To contribute to the installation of renewable energy
- To be a supplier in electricity for the district
- To protect from electricity prices raise

CONTEXT

The low-temperature loop works thanks to heat pumps which consume electricity

Peak loads on the thermal grid are linked to those on the power grid

BUT

- Peak electricity loads are usually covered by fossil fuels
- Electricity costs are rising **x 5** between 01'20 & 09'22

SOLUTION

THEREFORE

5GDHC promotes to integrate energy flows, which leads to shift or shave peak loads

2 Which solutions for producing local renewable electricity ?

Best practices of solar energy

Solar energy solutions
Photovoltaic
Thermal solutions

Smart monitoring & control
Intelligence and real time balance

Storage facilities
Optimizing the local use

Electricity producers

2 ways of governance :

1. As the grid operator, you can be a producer of electricity
2. As a grid consumer, you can be a "prosumer": produce electricity and sell it to the grid !

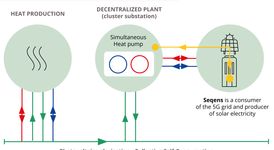
Good to know

France
- Individual self-consumption
- Collective self-consumption
  → Restricted collective self-consumption
  → Extended self consumption

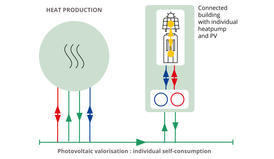
Belgium
- Energy sharing
- Energy selling

3 And concretely on the pilot projects ?

Paris-Saclay – Simplified PV scheme



Glasgow – Simplified PV scheme



Graph legend

Ambiant Temperature · Cooling network · Photovoltaic Network · Building supplied with solar energy · Heating Network · Photovoltaics panels

4 Renewable energy is an essential key for 5GDHC projects

Reduce GHG emissions and energy costs

- **Have a complete and holistic view of energy consumption at a territory scale**
- **Create a local energy community with low carbon emissions**
- **Curb energy costs on the long-term**

Next step

As a result of the 2nd capitalisation call, the D2Grids consortium is now also working on better integration of electrical uses and local renewable electricity production capacities, to improve the decarbonisation of 5GDHC grids.

The consortium has worked to **demonstrate the technical, legal, economic and organisational relevance of integrating local renewable electricity and heat production with local needs for heating, cooling, and electricity** (from buildings, urban structures or even charging stations for electric vehicles) while also considering the associated possibilities for better flexibility (reducing peak demand or utilising storage).

D2Grids project

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), Brumssum (NL), Glasgow (SC) and Plymouth (EN).

It is an Interreg North-West Europe (NWE) project that runs for **more than 5 years** (2018-2023).

Interreg North-West Europe D2Grids