

Biomass district heating system



Image 16: Identified locations for biomass generation facilities

Main sector

- District energy

Overview

In addition to retrofitting residential buildings in the neighbourhood, a biomass district heating network will be deployed. A two-step implementation process has been developed for the district heating network in order to maximize the cost effectiveness of the investment in the distribution network. This approach emphasizes working towards reducing the distribution length and maximizing the connection rate in a smaller area. Accordingly, two locations within the neighbourhood have been selected to host the necessary generation equipment, serving small range, compact distribution networks that can be interconnected in a modular approach. This way, further growth of the network is possible, and distributed generation as well as poly-generation can be more easily integrated.

For the 1st phase that will be covered in the SmartEnCity project, the estimated installed power is 5,300 kW. The primary fuel for this generation will be biomass (wood chips) and natural gas will be used as a backup for high demand scenarios, with an estimated demand coverage of 5% to 10%. Preliminary studies have been carried out for both the network layout (1st phase) and location of the generation facilities (for both the 1st and 2nd phase, see images). The estimated space needed for this room in phase 1 is 500 m², and future expansions are also foreseen.

The biomass boiler rooms will be equipped with biomass boilers, additional backup gas boilers as previously defined, and primary network pumping systems. A resource management centre (RMC) will enable optimal management of the district heating production and distribution system. A website will be set up for online consultations and energy consumption information.

For the distribution network, a two-pipe system has been chosen. Pre-insulated piping with leak detection monitoring systems will be used. These piping systems provide several advantages.

- pre-insulation minimizes on-site work and reduces deployment time and costs;
- better manufacturing quality means less heat losses and a longer service life;
- optimal accuracy in the incorporated leak detection systems



Business model

Owner of the infrastructure (no specific equipment): Town Hall

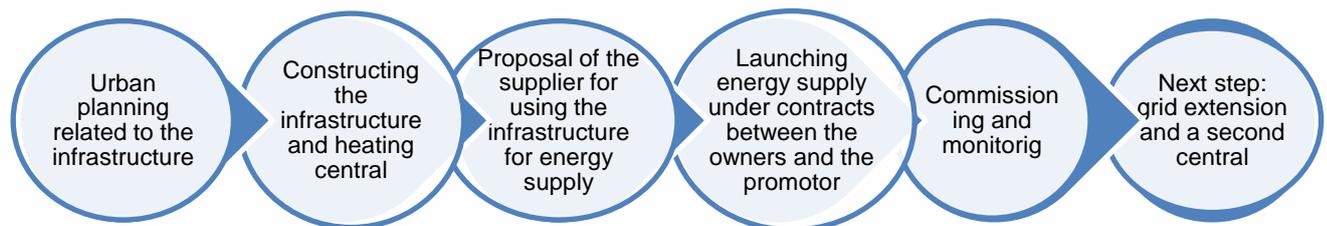
Supplier (and owner of the equipments): Giroa (energy provider)

Energy is supplied by Giroa through a direct contract with citizens and owners of the buildings. Nevertheless, there is an agreement with the energy retrofiting promotor in order to add retrofiting and energy supply in the same invoice.

Citizen engagement

Citizen engagement is needed for the district heating solution to be a success. What is more, district heating is crucial in the project in economical terms. As the area and urban impact of the solution is considerable, citizen engagement has been of key importance in order to explain its benefits and the comfort of controlling the heating supply.

Process



Benefits

- Reduced global installed power, due to optimised simultaneity factor driven by a larger number of dwellings served
- Increase in the overall rate of system performance at the neighbourhood level.
- Reduction in overall maintenance and operation costs.
- Access to better energy pricing (economy of scale)
- Improved security in homes (no fuels), as well as significant reductions in disturbance and operation /maintenance tasks by building owners/tenants
- Increased resource and energy efficiency
- Reduction of energy bills
- Independence in energy supply
- Reduction of carbon emissions
- Better management of service providers
- New business opportunities

Stakeholders

Owner of the solution	Vitoria Gasteiz Town Hall
Service/technology provider	Giroa
Users	Owners
Investors	Vitoria-Gasteiz/Giroa

Investment/Finance

Ca. 4.4 MEUR

Potential for replication

In this case, replication is not the first objective, but rather extending the system further. The idea is take a look at the evolution of the district supply and try to extend the solution in the whole city, not only with wood supply, but with different heating sources. This will create a grid with points of consumption and production, using also residual heat from urban facilities and industries.

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