atelier
Positive Energy Districts

PROJECT RESULT

Ground Source Heat Pump (GSHP)

PARTNER

Telur
Geotermia y Agua, S.A.

http://www.telur.es

PROJECT

EU Programme:
Horizon 2020 Innovation Action

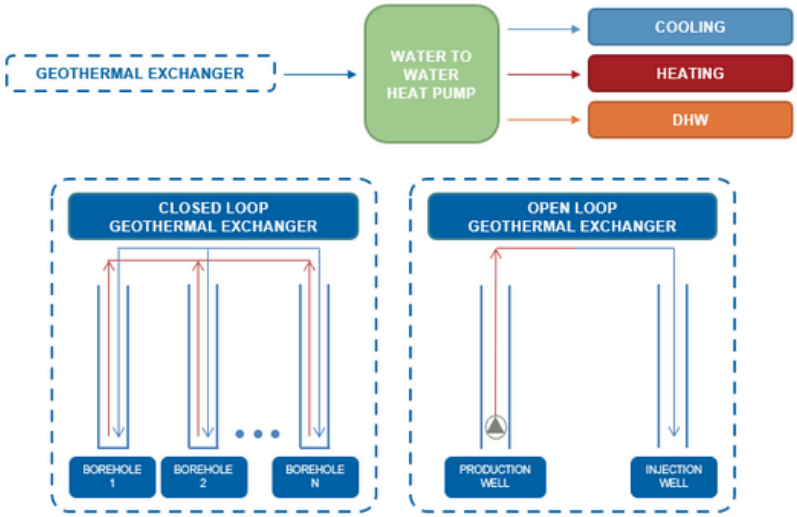
Coordination:
City of Amsterdam

Partners:
29 partners, 10 countries

European grant:
19.6 M€

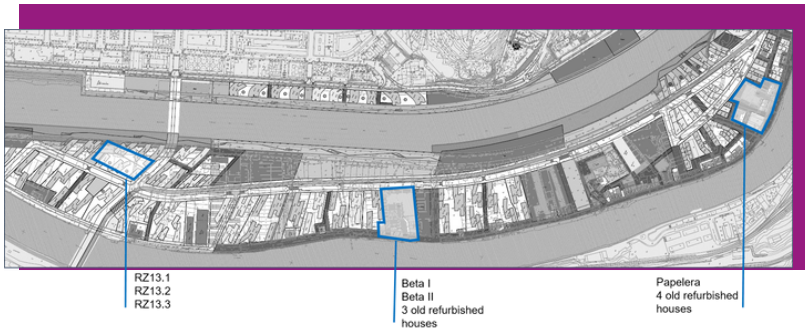
Get in touch:
info@smartcity-atelier.eu
www.smartcity-atelier.eu
AtelierH2020
@AtelierH2020
AtelierH2020

Result in a nutshell



- Production of renewable energy (heating, cooling and domestic heating water) using the thermal stability of the ground
- Highly efficient and independent from weather conditions
- Compatible with other renewable technologies to be part of a bigger solution
- High saving in primary energy consumption and extremely low CO2 emissions
- Smart controls
- For new construction & refurbishment

Demonstration site



Three Locations (north, center and south) within the Zorrotzaurre island were connected via a closed geo-exchange loop that will cover the thermal demand and enable to export the surplus within as well as outside the island.

Detail on result

Technical aspects:

- Life-span of the equipment: up to 50 years for ground source exchanger and up to 20 years for the mechanical room
- Liquid-to-water heat pumps connected to a very low temperature (T^a < 25ºC) geothermal loop or geo-exchange
- Seasonal Performance Factor between 3 and 5
- Design of the geo-exchange loop, which can be closed (in a horizontal or vertical arrangement), open (with or without re-injection) or hybrid

Technical requirements:

- Design of geo-exchange loop has to be specifically designed for the site (hydrogeological characteristics, surface available, building size and building thermal requirements)
- Easy future accessibility for maintenance work

Advantages:

- No combustion of fossil fuel
- Increase Seasonal Performance Factor through simultaneous supply of heating and cooling in district networks and building
- Efficient independently from the outdoor conditions
- Between 40%-60% energy savings; for example, within the ATELIER project, in the Beta II building, the SPF increased from 2,2 with ASHP to 4,4 with GSHP
- Technical rooms with little need of space
- Low maintenance and operation costs
- Wide array of application's area

Challenges:

- High investment needed (geotechnical, technical and economic feasibility studies necessary; use of special machinery)
- Little-known technology & fear of adopting a new technology
- Installation of GSHP is more complex than conventional technologies

Further development

Potential for further development:

- Offer GSHP technology as an ESCo (Energy Service Company)
- Extent use of low temperature networks connected to geothermal systems in cities

Potential areas of applicability:

- Heating, HDW and Cooling in:
  - new or renovation of residential buildings
  - new or renovation of industrial or service buildings
  - use in low temperature district heating and cooling network

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