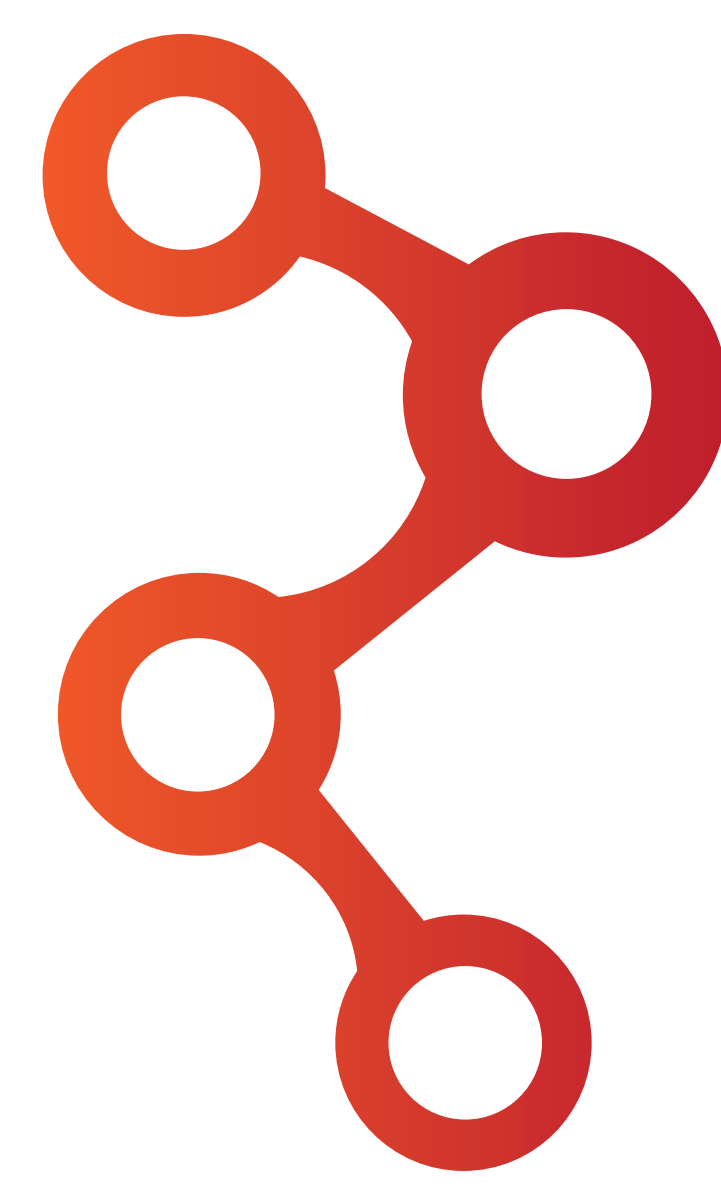




This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 768567



# RELaTED

## New Heating and Cooling Solutions Using low grade sources of thermal energy

[www.relatedproject.eu](http://www.relatedproject.eu)

### About RELaTED PROJECT

District heating systems are one of the most energy efficient heating systems to deliver heat in urban environments. DHs are also identified as key systems to achieve the de-carbonization of heating energy in European Cities. Renewable and waste heat sources are foreseen at the same time as de-carbonized heat sources and the way to guarantee competitive energy costs with limited influence of fossil fuel supply price volatility.

Despite this fact, district heating are serving to a market share of only 12% of the European citizens today, when studies have shown that these systems can be expanded to a market share of 50% in 2050.

Such ambitious scenario requires a conversion of actual DH concept. In the forthcoming energy market, DHs need to evolve regarding:

- The reduction of their operation temperature to integrate low-grade industrial heat sources.
- The introduction of larger shares of renewable energy sources.
- The introduction of distributed heat sources (reject heat from cooling equipment...).
- To guarantee economic viability with the trend of DH heat load reduction due to the evolution of Near Zero Energy Buildings.

### DEMONSTRATIONS

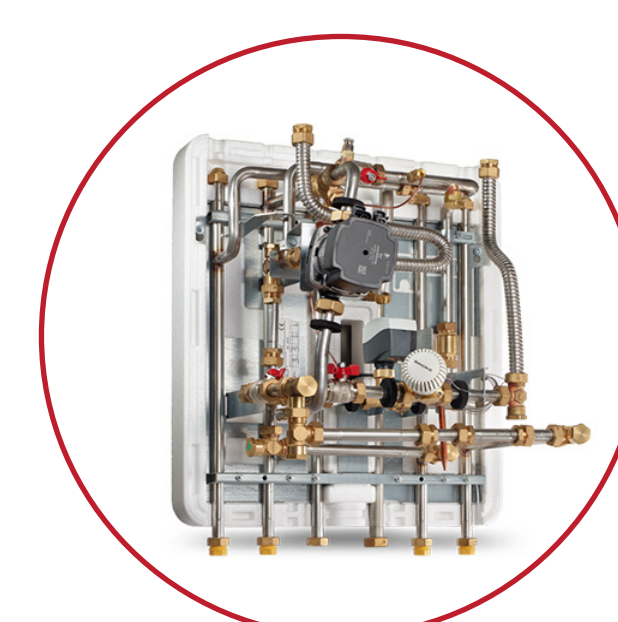


Considering the complexities and particularities of each district heating (DH), RELaTED concept is being implement in four different DH networks covering extremely different climatic conditions, construction traditions, urban density, pre-existing district scheme, ownership and energy services contract schemes:

- BELGRADE (SERBIA), LARGE DH NETWORK**  
The district heating network of Belgrade delivers 3500GWh to approximately 50% of the city. RELaTED will deploy the low temperature conversion of one subnetwork comprising several households and apartment buildings with modern insulation levels. Tentative network temperature levels of ~50-55°C are expected in this conversion.
- VINGE (DENMARK), NEW URBAN DEVELOPMENT**  
RELaTED will demonstrate its ULT DH system for new low-energy developments with large shares of renewable energy with the best possible fiscal solution for homeowners and district heating company and minimal environmental impact.
- TARTU (ESTONIA), OPERATIONAL DH**  
94% of the energy delivered to Tartu consumers is obtained from biomass and peat. RELaTED will develop a heat purchase strategy from one or several industrial waste heat producers with an estimated power of 0.5 to 1 MW.
- IURRETA (SPAIN), CORPORATE DH NETWORK**  
Within RELaTED will be performed ULT conversion of the DH network, with LT conversion of heat delivery systems within buildings. Operation temperatures in the main distribution network will be adapted for at~40-45°C.

### TECHNOLOGIES

RELaTED will integrate present technologies into a new ULT DH concept, at distribution temperatures below commercially operative DH networks today.



#### DISTRICT HEATING SUBSTATION TECHNOLOGY

3FSs allow buildings to operate without local storage and to integrate buildings as distributed heat sources in the DH network.



#### HEAT PUMP TECHNOLOGY

District heating integrated renewable heat pump system will be integrated with the DH networks as its primary heat source, at sensibly constant temperatures at 30-45°C, depending on connection pipe of the primary loop.

#### BUILDING INTEGRATED SOLAR THERMAL SYSTEMS TECHNOLOGY

RELaTED will integrate two ST collector as components of the Building Integrated Solar Thermal (BILTST) solar loop. These are differenced by their aesthetics and their geographic suitability:



##### Glazed ST collector system

All-polymeric solar collectors demonstrate aesthetic integration into the building envelope, overcoming existing installation barriers and reducing overall costs at the building site.



##### Unglazed ST collector system

The unglazed ST collector is integrated into an architectural envelope highly customizable in terms of aesthetics and integration into architectural projects.

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