RELaTED, REnewable Low TEmperature District

A Flexible Approach to the Deployment and Conversion of DH Networks to Low Temperature, with Increased Use of Local Solar Systems

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Renewable Low Temperature DH networks

- District heating (DH) is a very energy efficient heating system with proven reliability
- DHs are key systems to the de-carbonize heating in Europe.
- Renewable and waste heat sources need to be integrated in DH systems
- Need for updated configurations:
  - Reduce operation temperature to better integrate low-grade industrial heat sources
  - Introduction of larger shares of renewable energy sources (RES) in the DH network.
  - The introduction of distributed heat sources (reject heat from cooling equipment...).
  - To guarantee economic viability with reduced heat loads in NZEB (Near Zero Energy Buildings).

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RELaTED, REnewable Low TEmperature District

- Decentralized Ultra-Low Temperature (ULT) DH networks
- Incorporation of low-grade heat sources with minimal constraints
- Reduced operational costs due to fewer heat losses
- Better energy performance of heat generation plants
- Extensive use of de-carbonized energy sources at low marginal costs
- Technology developments in line with the overall concept:
  - Building Integrated Low Temperature Solar Thermal Systems (BILTST)
  - Triple Function Substations (3FS)
  - District Heating connected Reversible Heat Pump (DHRHP)
- Demonstration in four complementary environments in Denmark, Estonia, Serbia and Spain

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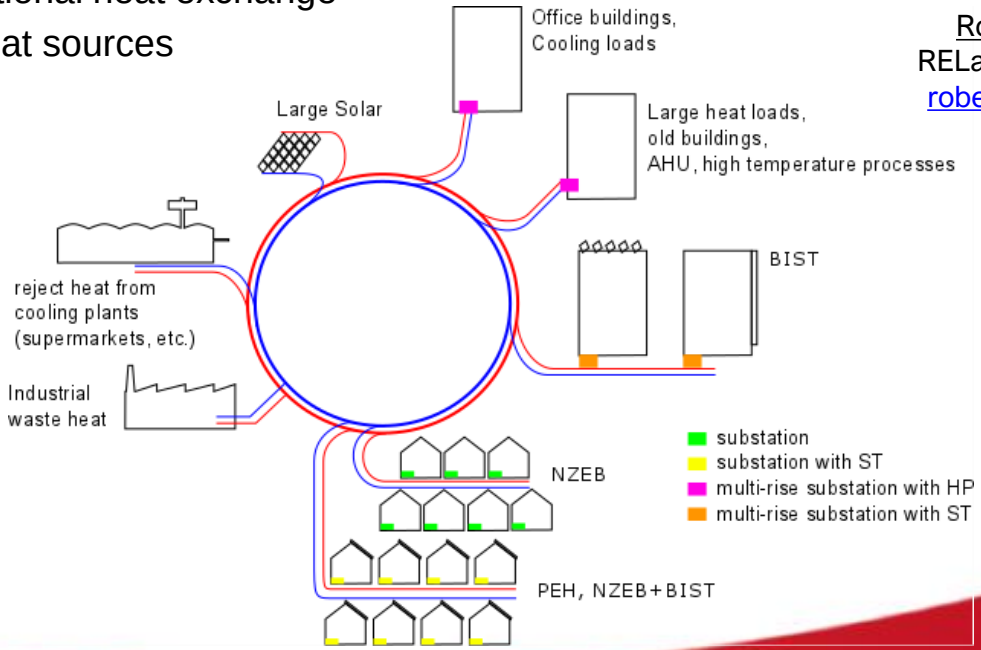
- Ultra-Low Temperature (ULT) System (~45ºC)
- Decentralized DH network
- Buildings acting as energy nodes
- Substations allow for bi-directional heat exchange
- Incorporation of low-grade heat sources
- Heat Pumps recover heat from cooling applications
- Decentralized, Building Integrated Solar Thermal



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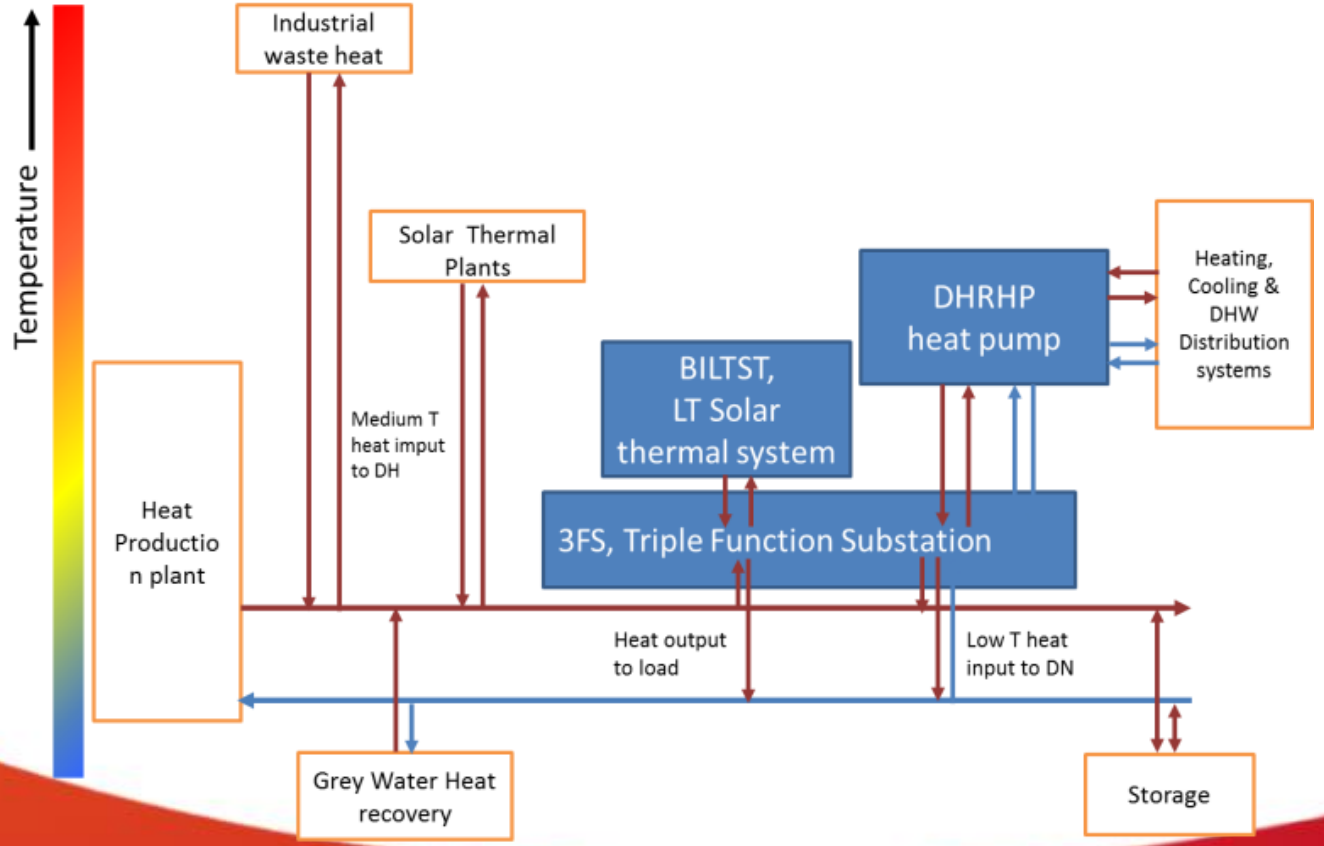

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Main outcome of the project

1. Ultra-low temperature (ULT) heat distribution concept, at 40-45ºC.
   a. NZEB performance or low urban density
   b. Existing systems, and new systems in existing urban environments
2. 3 key technologies: 3FS, DHRHP, BILTST
3. Proven concept in 4 clearly different environments
   a. New ULT DH in a green field development, with NZEB in Denmark
   b. Operational DH, with high share of biomass heat production, in Estonia
   c. Large DH network, in Serbia
   d. Corporate DH network in Spain
4. Replicability study in 2 European regions.
5. Profitable Low-carbon concept
   a. Profitable district construction and operation schemes
   b. Viable cost of heat production and distribution
   c. Fair price system for all stakeholders
   d. Reduced import dependency and fossil fuel price volatility.
6. Increased share of RES and waste heat energy production in DH.
7. Greenhouse Gas Emissions Reductions & Air Quality Improvements

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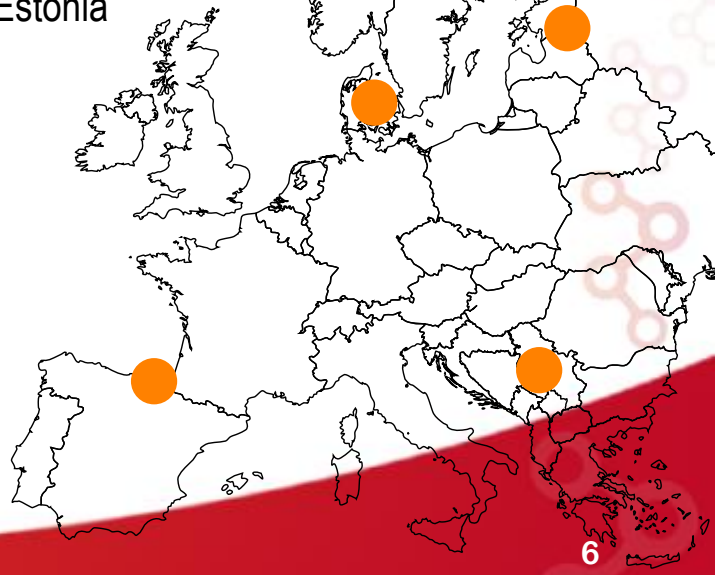
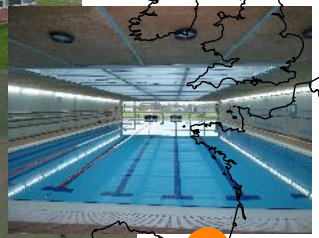
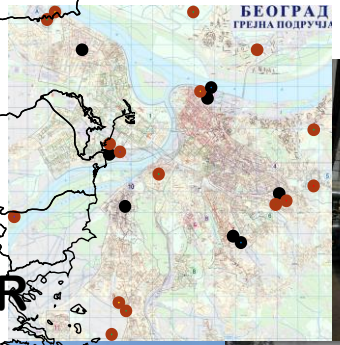


Our Networks





Vinge, DK

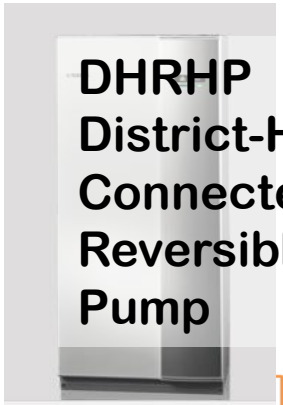
Tartu, EE

Iurreta, ES

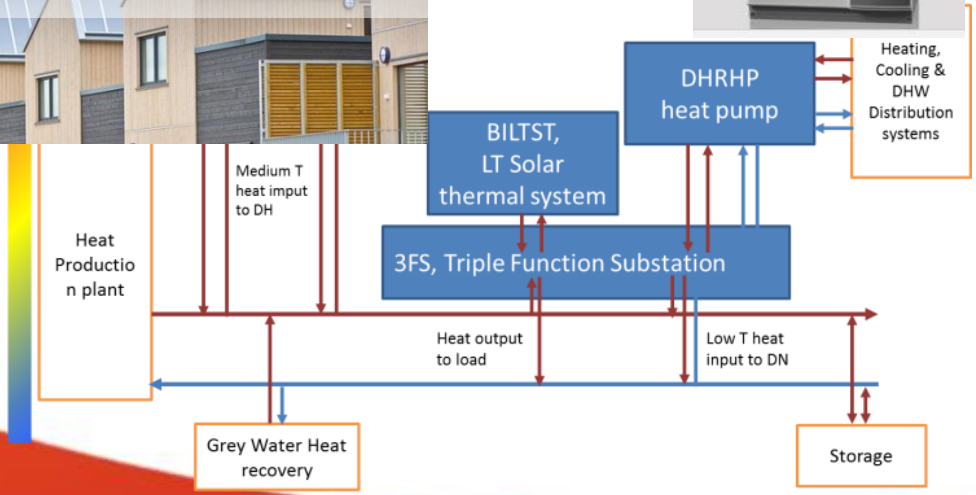
Belgrade, SR

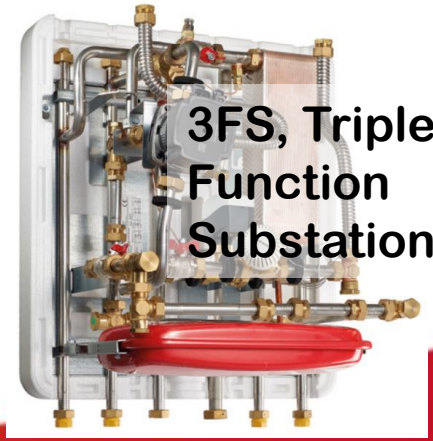
Our Technologies

BILTST
Building Integrated Low Temperature Solar Thermal Systems



DHRHP
District-Heating Connected, Reversible Heat Pump





3FS, Triple Function Substation

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Project implementation plan

- Started in Nov. 2017. 48 month work program.
- Already 16 month into the project.
- Networks fully instrumented in the 18-19 heating season.
- DH Engineering and subsystem design ended in 2019
- ULT conversion to be ready for the 19-20 heating season in some networks.

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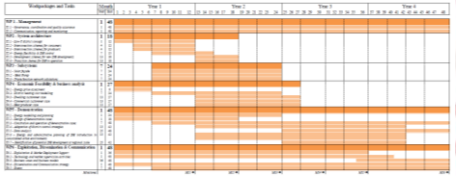
FEB 2019

MS	Title	Month
1	RELaTED concept developed	12
2	**Design and engineering of demonstration sites performed**	**18**
3	Subsystems designed and tested Energy flexibility schemes defined	24
4	**ULT concept on demonstration sites implemented**	**30**
5	Smart control of demonstration sites implemented	36
6	Accomplishment of project objectives	45



RELaTED, Available information

- Public Deliverables
  - D2.1 Low-T district concept
  - D4.1 Energy price assessment
  - (5 more to come by April 2019)
  - (Others later in the project)
- Journal and Conference Papers
  - Solar District Heating Graz 2018 (2 papers + posters)
  - International Conference on Building Envelopes 2018 (1 paper)
  - Journal of Façade Design & Engineering (1 paper)
  - HVAC-R Congress Belgrade 2018
- Public dissemination materials

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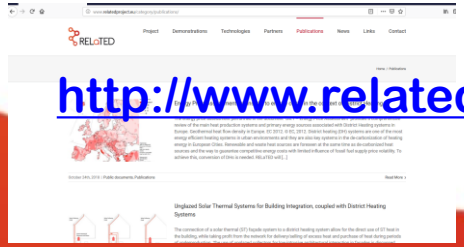

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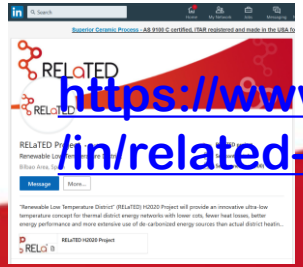

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RELaTED, Where to find us

- EUSEW, Brussels, 17-21 June 2019 (*)
- IAPE, Oxford, 14-15 March 2019
- IBPSA Building Simulation, Rome, 2-4 September 2019 (*)
- CISBAT, Lausanne, 4-6 September 2019 (*)
- IAQVEC, Bari, 5-7 September 2019 (*)
- SBE19, Thessaloniki, 23-25 October 2019 (*)

- Our Newsletter
- Future Covenant of Mayors Webinars
- Future events
- By direct contact to Tecnalia or any of our partners

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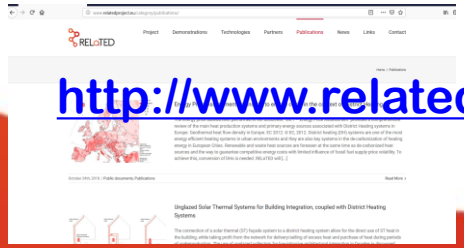

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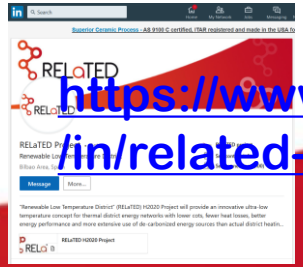
Leave us your contact details here!



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Project partners:
Tecnalia
Danish Technical Institute
Fortum Tartu
Beogradske Elektrane
Basque Government
Metro Therm
Nibe
Aventa
Industrias IMAR
Basque Energy Agency
Mazovia Energy Agency
Institute of Baltic Studies
FEDARENE
El Taller De Comunicación y CIA.

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