Overview on the REWARDHeat project

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Background

- 72% of the European population (EU28) lives in cities and towns
- A huge amount of low-grade waste heat is diffused within the urban texture, the largest amount being rejected by air-conditioners, cooling systems in industrial processes and tertiary buildings, chillers of refrigeration systems and service facilities, e.g. sewer pipes
- For historic reasons, cities and towns have born along rivers, lakes and seashores. All these sources make low-temperature renewable energy available, which utilisation is highly replicable because it is accessible right where it is needed
- ...not to mention the solar source, available for thermal and electric energy production
The Vision

• The overall objective of REWARDHeat is to demonstrate district heating and cooling (DHC) networks, which are able to recover renewable and waste heat available at low temperature, i.e. lower than 40°C.

• Focus is on the exploitation of the energy sources available within the urban context, allowing to maximize the upscale potential of the decentralized solutions developed.

• To do this, we need to lower the supply temperature compared to conventional networks. Focus on supply temperature lower than 60 °C and down to 10-20°C.
Specific Objectives

TO INTEGRATE MULTIPLE URBAN RENEWABLE AND WASTE ENERGY SOURCES

REWARDHeat will explore alternative configurations of a DHC network, where multiple heating and cooling sources are available, with the aim to providing recommendations for the replication of the systems depending on their boundary conditions.

• Planning schemes database
• Pre-design tool
• Informational material for publication in wiki-tools
• Guidebook for planners
• Serious gaming

Source: Kelly Sikkema on Unsplash
Specific Objectives

TO DEVELOP INNOVATIVE TECHNOLOGIES FOR FLEXIBLE USE OF HEAT IN DHC NETWORKS.

Substations - Two approaches are pursued: prefabrication for building solutions and standardisation for large-scale district heating plants:

• Small-size (up to 50 kW) prefabricated substations including booster heat pump specialised to specific demonstration cases.
• Large scale industrialised Energy Centre at sub-network level
Specific Objectives

TO DEVELOP INNOVATIVE TECHNOLOGIES FOR FLEXIBLE USE OF HEAT IN DHC NETWORKS.

Substations - Two approaches are pursued: prefabrication for building solutions and standardisation for large-scale district heating plants.

Pipes adapted to low temperature networks.

Source: Vattenfall
Specific Objectives

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Pipes adapted to low temperature networks

Thermal storages

• Local, intra-day storages at customer substations

• Central, intra-day storages to balance the network and store energy during off-peak periods
Specific Objectives

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Pipes adapted to low temperature networks
Thermal storages
  • Local, intra-day storages at customer substations
  • Central, intra-day storages to balance the network and store energy during off-peak periods
  • Central, seasonal storage: borehole storage
Specific Objectives

TO DEMONSTRATE DIGITALISATION SOLUTIONS ALLOWING TO OPTIMISE THE MANAGEMENT OF THE DHC NETWORK

In REWARDHeat, storage capacity and control will be used synergically to manage the system.

- Smart metering communicating real-time
- Data-mining platform will permit to manage communication with smart meters and to handle controls
- Fault detection and expert control strategies elaboration for optimisation and electricity grid coupling
Specific Objectives

TO DEVELOP BUSINESS MODELS AND FINANCIAL SCHEMES TO ENABLE LARGE PUBLIC AND PRIVATE INVESTMENTS TO BE MOBILIZED

Options will be studies to sell heat as a service in contrast to a commodity, and business models will be built for each of the demonstrator networks.

The overall the idea is to change paradigm from “Heat as a Commodity” to “Heat as a service”

Financial support approaches will be elaborated based on reliable and transparent information, allowing for a clear risk assessment.
REWARDHeat demo cases

### Demo description

1. **MILAN** - Newly built neutral-temperature networks
2. **HAMBURG** - Newly built low-temperature network
3. **ALBERTSLUND** - Retrofitted network to low-temperature network
4. **HELSINGBORG & MÖLNDAL** - Newly built low-temperature networks
5. **TOPUSKO** – Heat cascading in low-temperature network
6. **TOULON** - Upscaled neutral-temperature network
7. **HEERLEN** – Intra-day storage in neutral-temperature network
Thank you

www.rewardheat.eu

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