7th International Conference on Smart Energy Systems
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#SESAAU2021

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COOL DH: A PIONEERING PROJECT TO IMPLEMENT LTDH SYSTEMS AS AN INTEGRATED PART OF SMART ENERGY SYSTEMS

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COOL DH
COOL DISTRICT HEATING

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"The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 767799-COOL DH- H2020-EE-2016-2017/H2020-EE-2017-RIA-IA"

COOL DH – Abbreviation

- **C**ool ways of using low grade heat sources from c**OO**ling and surplus heat for heating of energy efficient buildings with new **L**ow temperature **D**istrict **H**eating solutions.

- Cool DH is an EU funded project to enhance the Technology Readiness Level (TRL) of LTDH networks from single components to a real complete demonstration

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Timetable of Project

- 2017: Design and start of the project
- 2018 - 2019: Constructions and transitions
- 2020: Heat recovery process, Partly operation
- 2021: Completely under operation & monitoring
- 2022: Evaluation

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Objective

- Demonstrating technologies to utilize low temperature waste heat for implementing LTDH systems.

- Demonstrations:
  - Full scale LTDH grid in Lund (Brunnshög) as the biggest LTDH – 4GDH
  - Full scale LTDH network Høje-Taastrup (Østerby) - 4GDH
  - ULTDH Demo in Lund - 5GDH

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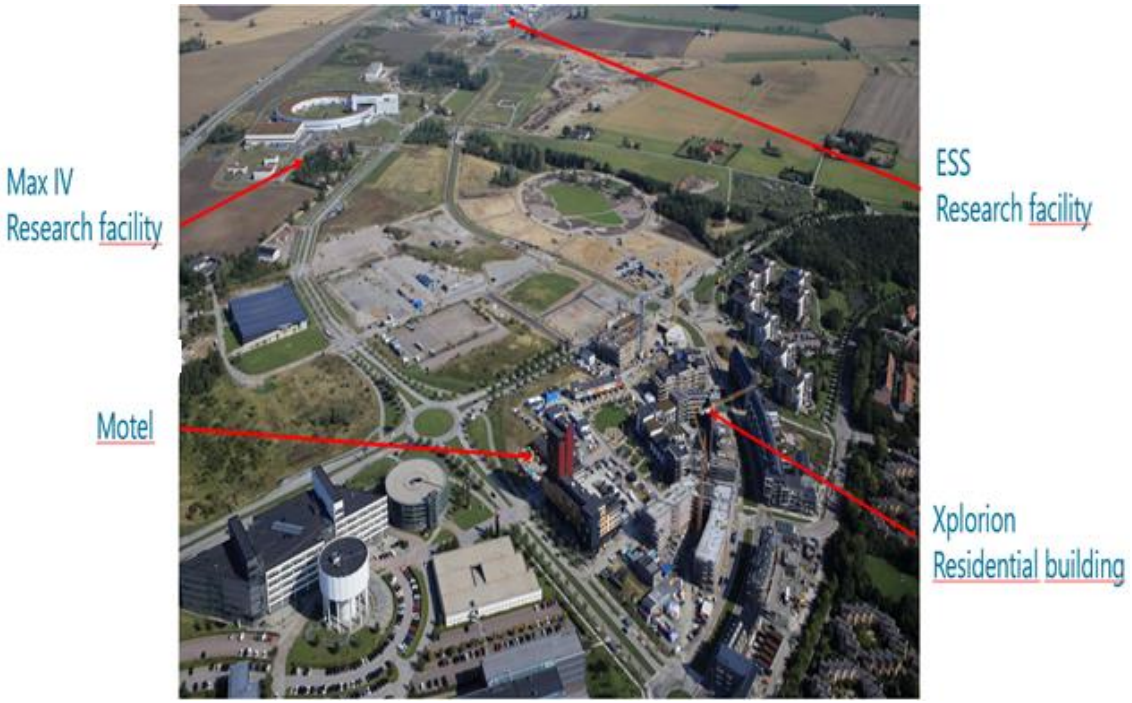
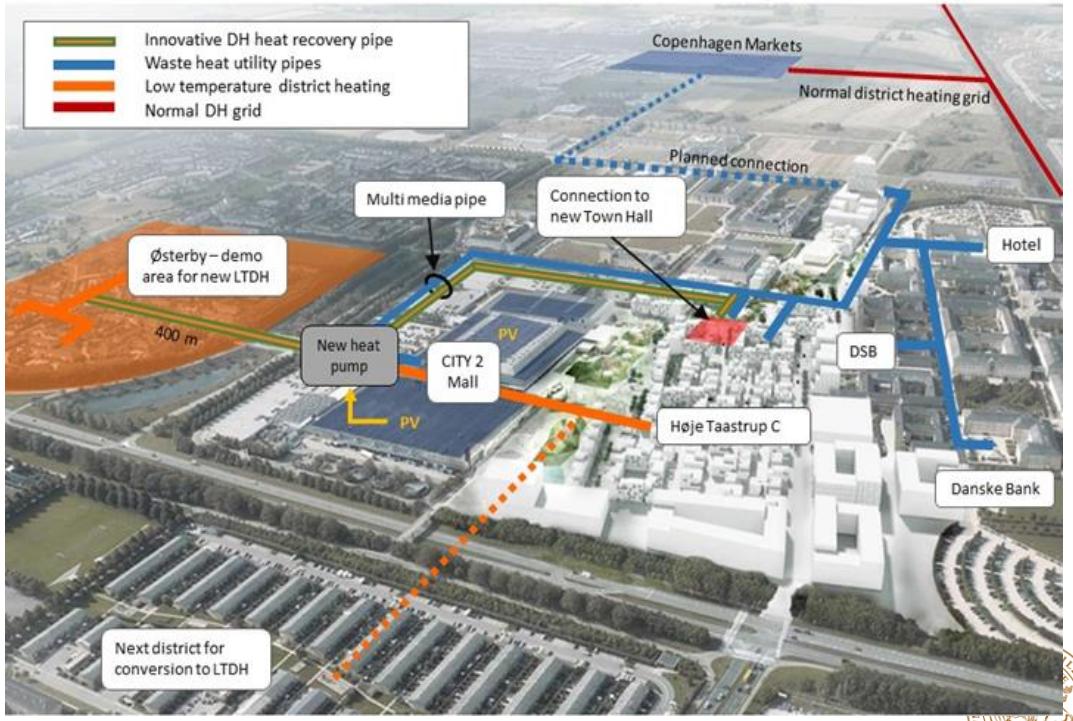
Demos

Brunnshög (Sweden)



Østerby (Denmark)



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Main Characteristics

- Integration of heat pumps for heat recovery and topping hot water
- 2 LTDH networks (4GDH)
- 1 ULTDH demo (5GDH)
- Prosumers role: Shopping, Bank data centers, Hotels
- New Plastic PE-RT pipes
- Flat stations
- Heat recovery pipes
- High RES share

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COOL DH – Evaluations

- Energy performance: More efficiency, lower heat losses, higher COP
- Economical impacts: Lower cost and investment
- Emissions: Reduction in CO_2
- Social study: Increasing comfort, safety & customer satisfactions, Experiences & feedback
- Replicability: More than 800 DH utilities in both countries

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RES usage

- Higher share of renewables and waste heat can be increased by lowering DH temperatures.
- Heat pumps are used to increase quality of low-grade waste heat.
- Renewable Energy Sources (RES) provide electricity of the network mainly driven by PhotoVoltaic (PV), hydropower and wind.

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COOL DH - Challenges

- COVID-19 (Stop & delay)
- Coordination between companies & municipalities in two countries
- Progress is not the same as planned
- Low knowledge & experiences in innovations & new concepts
- Changes in project plans (Demos & fabrication)
- Communication with costumers and partners

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COOL DH – Lessons Learned

- Predict unexpected events
- Importance of planning
- Mutual understanding
- Considering practical delays
- Training
- Flexibility for changes
- Having plans B, and C
- Social awareness

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Briefly…

- COOL DH as a part of smart thermal energy network can be integrated into a smart energy system to make the cities more efficient in terms of energy consumption, environmental and social impacts regarding economical aspects.

- The replication of this project can be facilitated by experiences and lessons learned of that.

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THANK YOU

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