



Christian Holm Christiansen
Danish Technological Institute

DECENTRALIZED LOW TEMPERATURE SOLAR THERMAL FOR DISTRICT HEATING WITH SMART STORAGE



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

Introduction

- **The RElated Project**
- **Catching the sun**
- **Deliver heat to the district heating network**
- **Store the heat locally**
- **Perspectives**

The RElated project

- **Title: REnewable Low TEmpérature Districts**
 - Horizon 2020 project with 14 partners
- **Addressing district heating system needs:**
 - Reduction of operational temperatures
 - Introduction of larger share of renewables
 - Introduction of distributed heat sources
 - Viability of supplying NZEB
- **Demonstration in 4 districts in 4 countries**
- **Until mid 2022**



Website: relatedproject.eu

The RELaTED project



- **New ultra-low temperature district heating concept (ULT DH)**
 - Ultra low supply temperatures where applicable ($< 45^{\circ}\text{C}$)
 - Space heating (ex underfloor heating)
 - Domestic hot water (temperature boost, ex Microbooster)
- **Heat sources considered:**
 - Industrial surplus heat
 - Building integrated solar thermal
 - Reversible heat pumps
- **Focus:**
 - System architecture and subsystems
 - Economy
 - Demonstration and dissemination

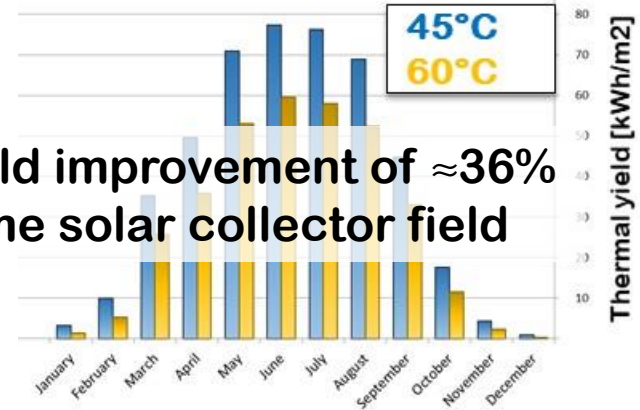


Catching the sun

- Why low temperature solar thermal?
 - New design options
 - Higher efficiency
 - Higher capacity factor

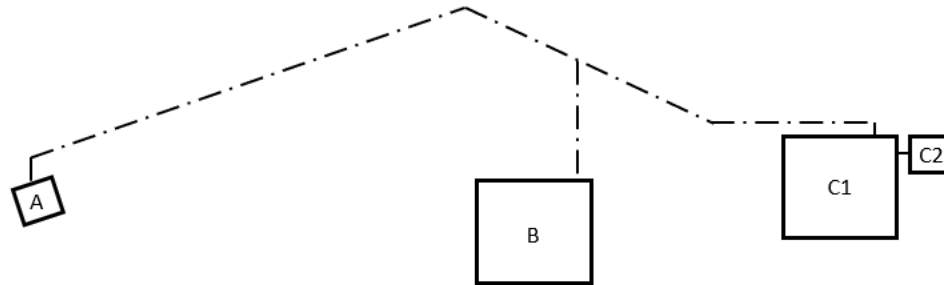
- Building integrated or not?

Annual yield improvement of $\approx 36\%$
for the same solar collector field



Deliver heat to district heating network

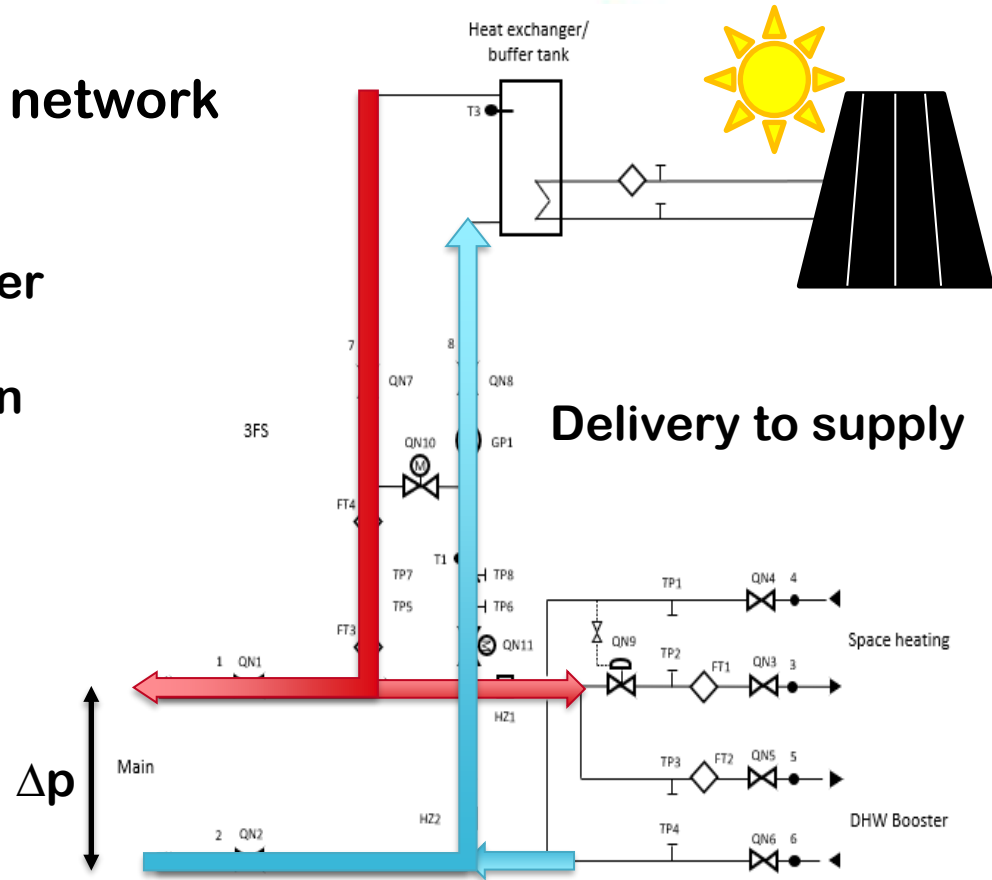
Demonstration facility



- A** Heat central
- B** NZEB: Solar + substation + Microbooster
- C1** NZEB: Substation + Microbooster
- C2** Annex: Substation + Microbooster

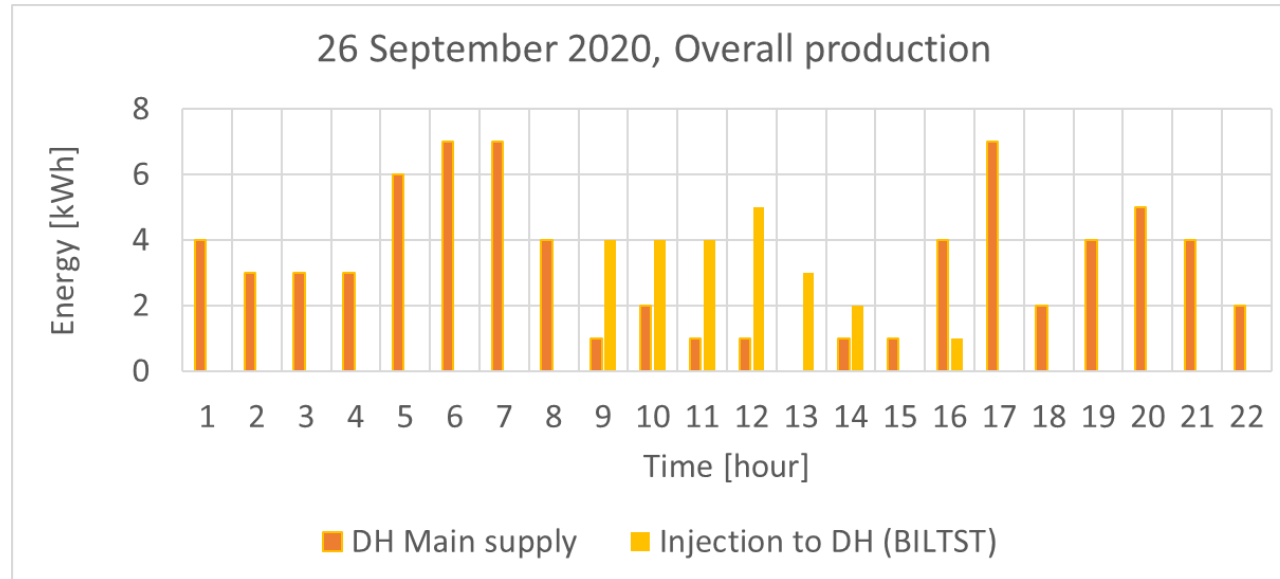
Deliver heat to district heating network

- Delivering to district heating network requires new prosumer substations
- Deliver to supply pipe or return pipe?
 - Value of heat
 - Part of network
 - Complexity of installation



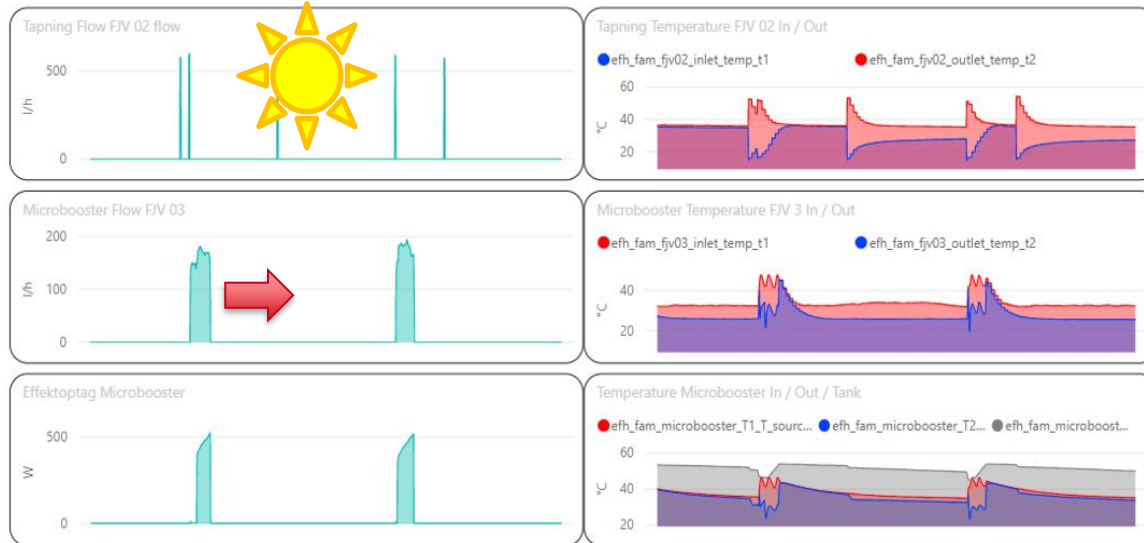
Deliver heat to district heating network

- Injection of heat from building integrated solar thermal



Store the heat locally

- Local storage in every building with smart control



Perspectives

- Lowering temperatures in district heating networks for better uptake of low temperature heat sources
- Adding production capacity for extensions or new areas
- Standardizing substation design for prosumers
- Providing smart control and demand side management in buildings
- Aggregating storage capacity and flexibility





Contact

Christian Holm Christiansen
Danish Technological Institute
+7220 2424
cnc@teknologisk.dk



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