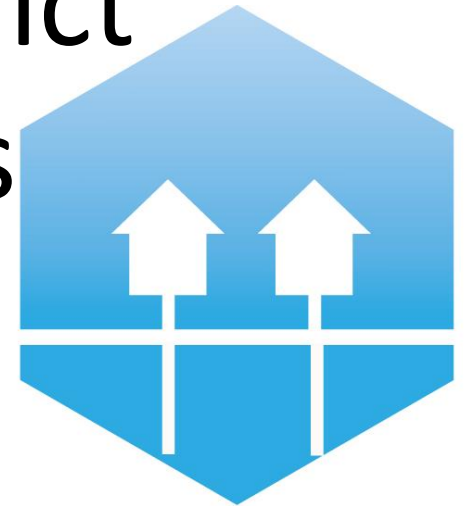
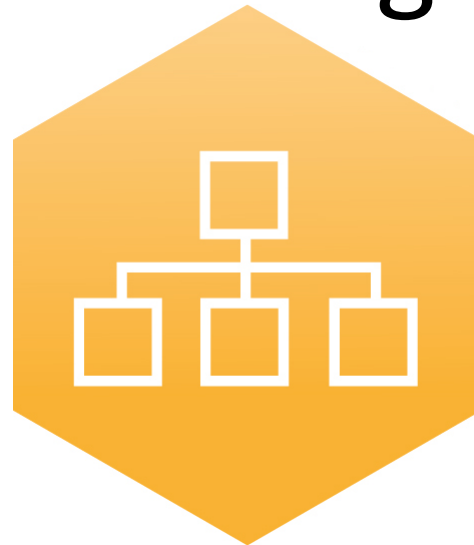


International Conference on Smart Energy Systems and 4th Generation District Heating
Copenhagen, 25-26 August 2015

Decentralised heat generation in District Heating Systems



AALBORG UNIVERSITY
DENMARK

4DH

4th Generation District Heating
Technologies and Systems

A way to develop DH by including not only heat delivery, but also decentralised heat supply



Prosumers – consumers that act both as heat users and producers of heat

Boilers and other heat sources that is owned by the DH-company or by a third part



A part of Fjärrsynsprojekt: Små värmekällor – kunden som prosument

Small heat resources – the customer as prosumer

Lunds Universitet

Patrick Lauenburg – PhD
Lund University
Patrick.lauenburg@energy.lth.se

Energianalys

Gunnar Lennermo, Energianalys AB,
Energi Consultant
0322 – 61 17 54, 0708 – 335 434
gunnarl@energianalys.net
PhD student at Mälardalen University

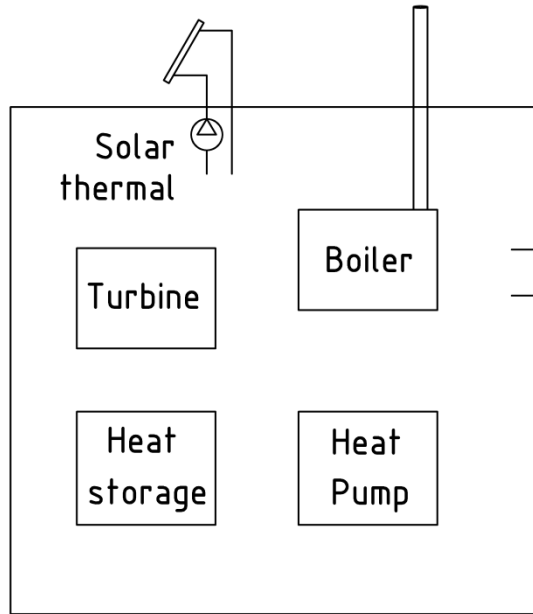
Final report, in Swedish, in summer 2016



Decentralized heat resources;

- Solar thermal
- Excess heat from cooling machines, (data centres, shopping centres and sports arenas).
- Excess heat from industrial processes, (casting, moulding or excess steam)
- Old boiler that no longer is in permanent use but could be used temporarily
- Waste dump with methane aggregation and burning
- Crematorium
- Heat pumps (when cheap electricity)
- And a lot more



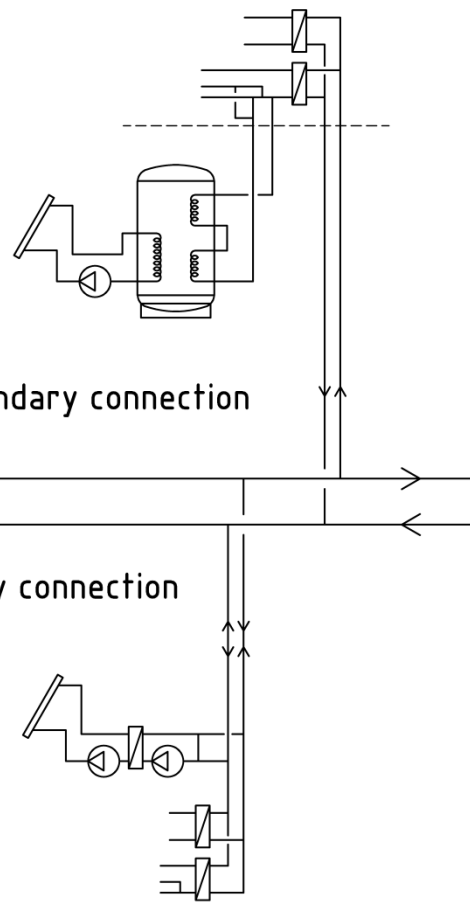


Central heat generation

Secondary connection

Primary connection

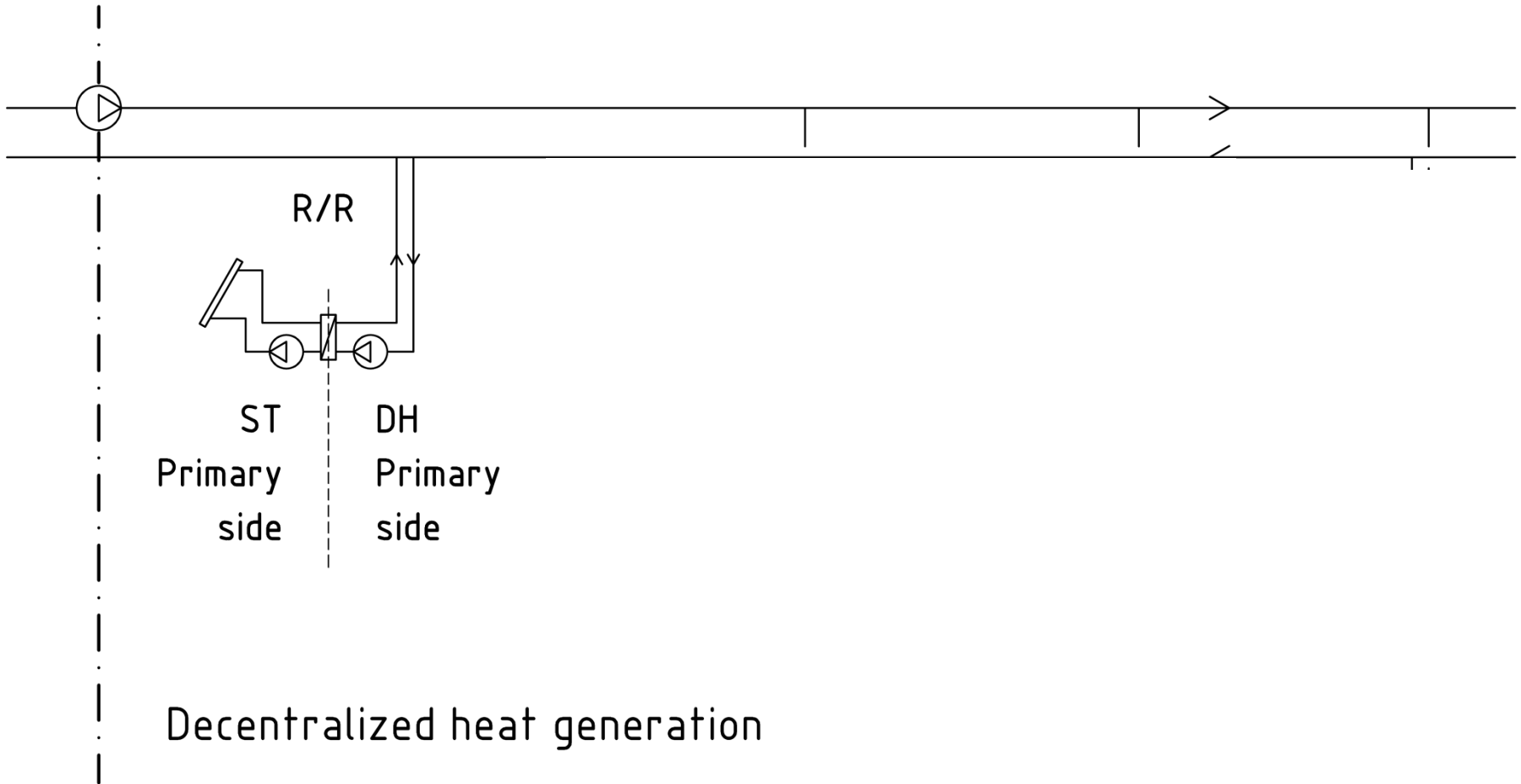
Decentralized heat generation



4DH

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Return/return connection (R/R)

- Affects return temperature in the DH-network
- Can't produce it's own flow in the DH-network(limited heat power)
- Can feed in at any temperature higher than the return temperature
- Easy control principle

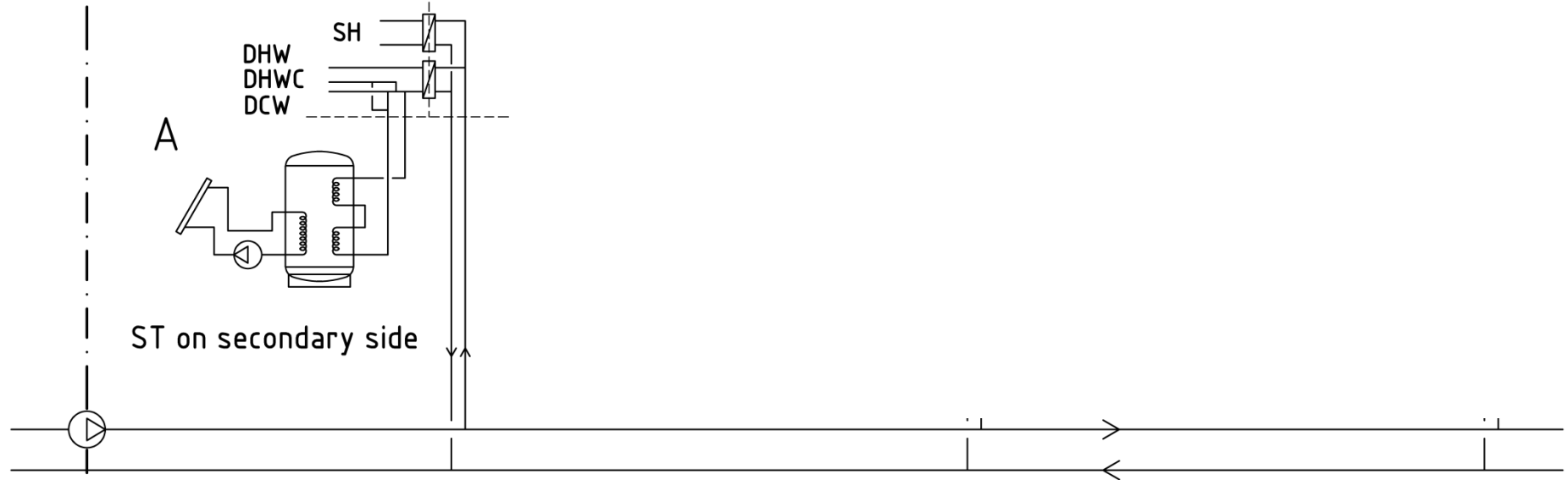
Return/supply connection (R/S)

- Does not affect return temperature in the DH-network
- Can produce it's own flow in the DH-network
- Must deliver heat at a given (high) temperature
- Much more complicated control principle than R/R

Rarely used;

- Supply/return (S/R) – over heat protection system – few hours a year and low heat power feed in
- Supply/supply (S/S) – over heat protection system, more complicated then S/R but easier than R/S

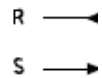
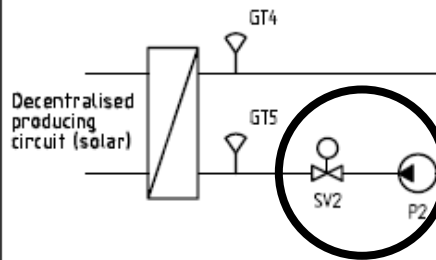
DH Secondary side | DH Substation



Decentralized heat generation

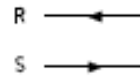
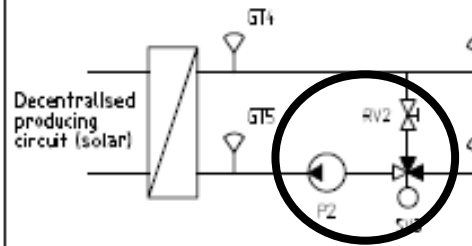
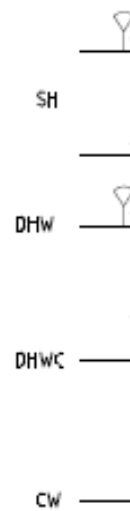


Maybe



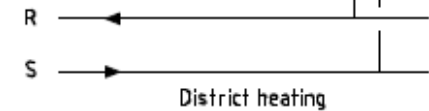
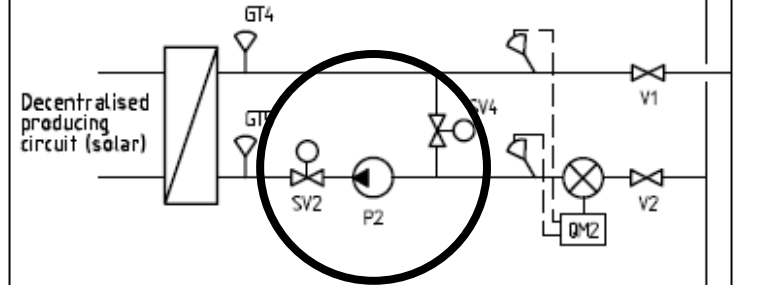
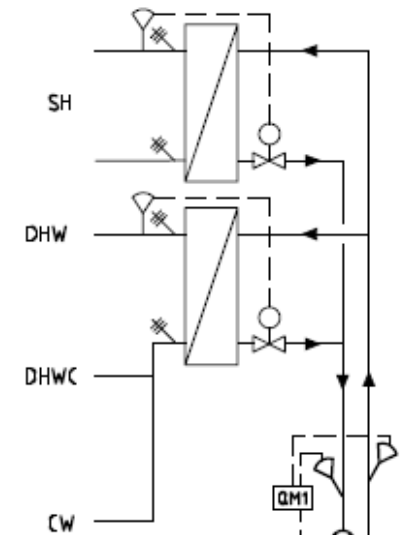
System layout 1

Possible

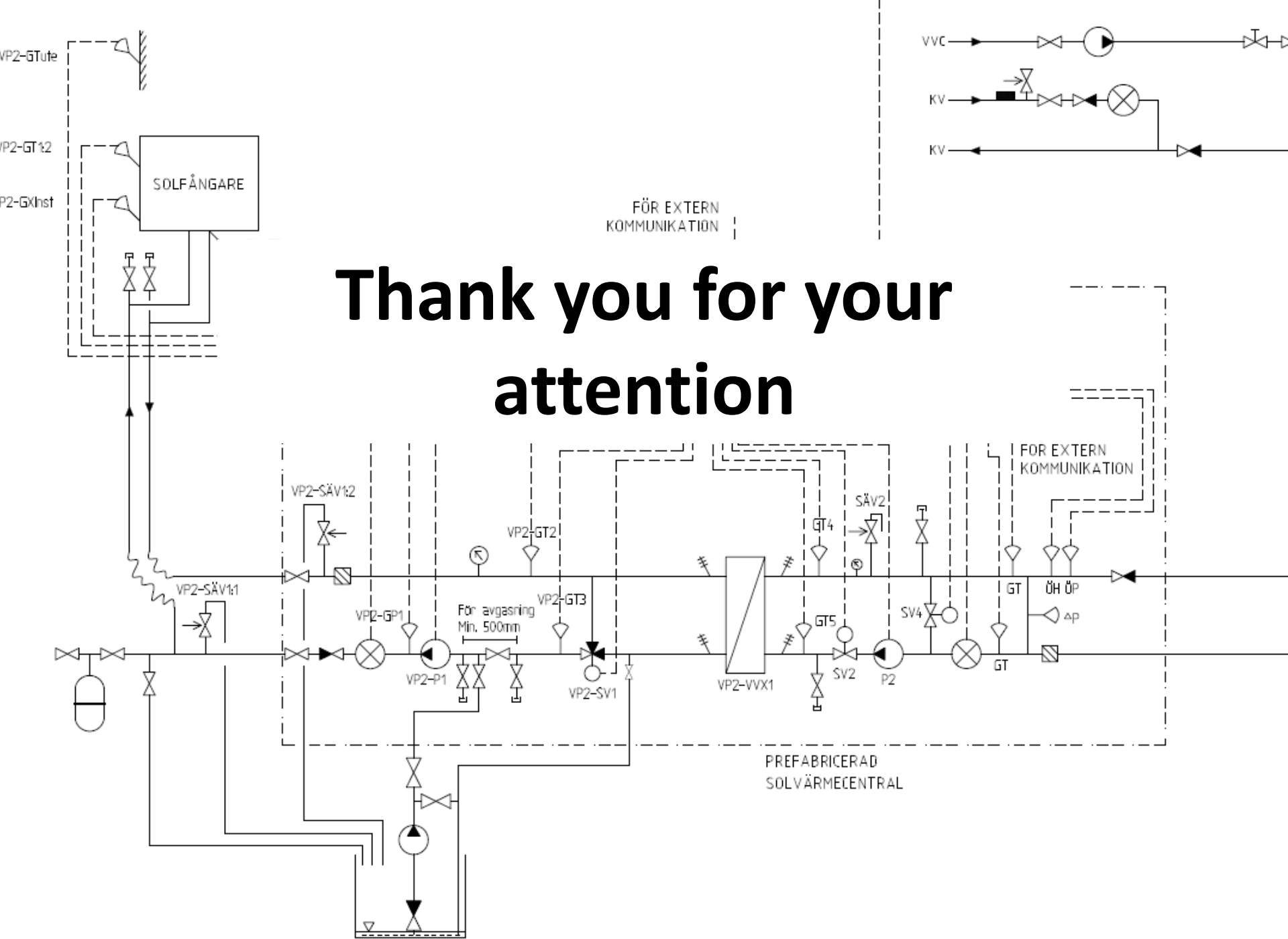


System layout 2A

Our strategy today



System layout 3A



**Thank you for your
attention**