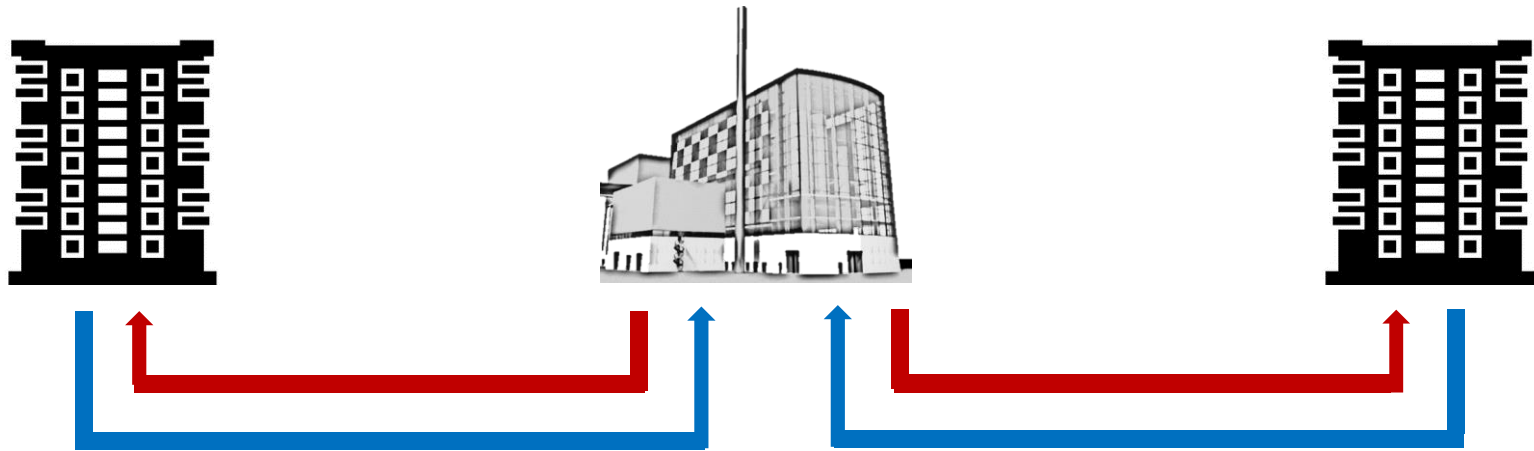


Active management of heat customers towards lower district heat return water temperature

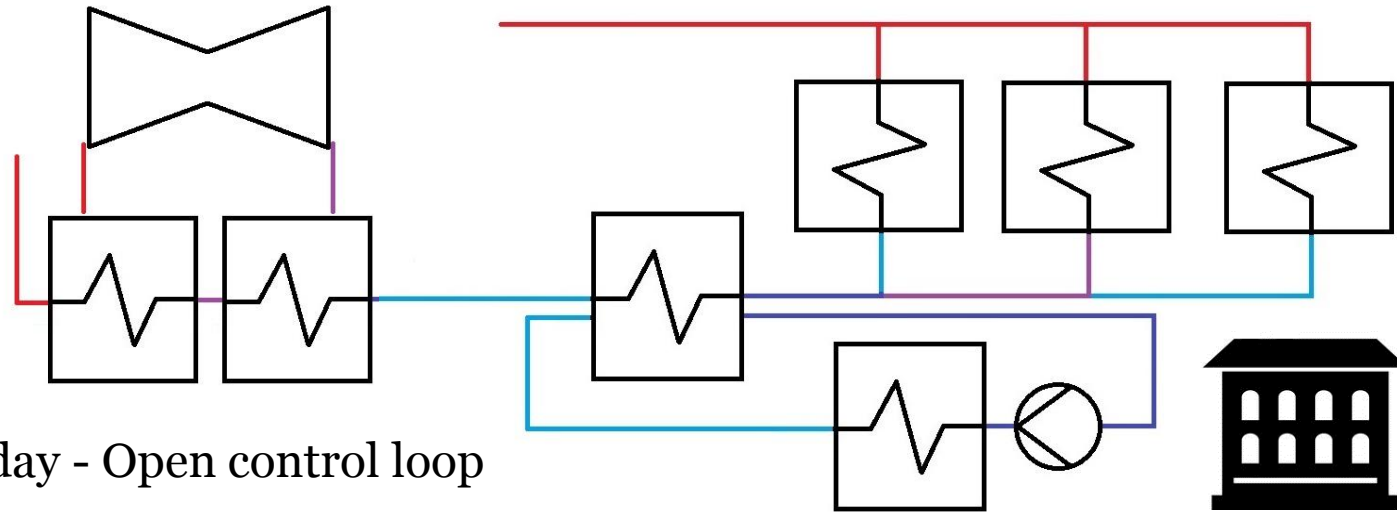
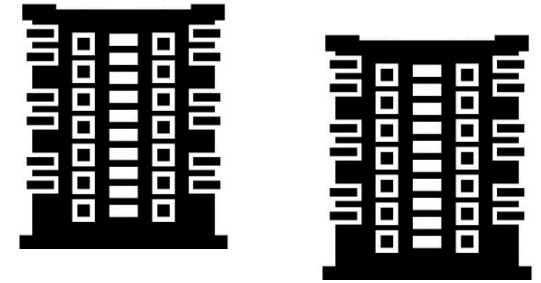
Tommy Rosén

Phd student at Energy systems
Linköping University, Sweden

Power plant and control perspective on DHS



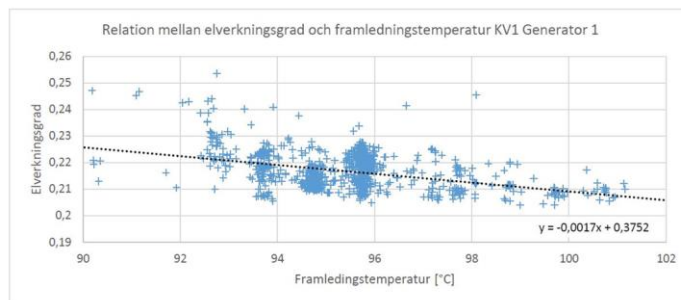
- Supply – Demand system where the power plant works as a slave.
- The only power plant control system over the heat load is the short term thermal storage.
- The uncontrolled return water temperature affects efficiency for several power plant components.



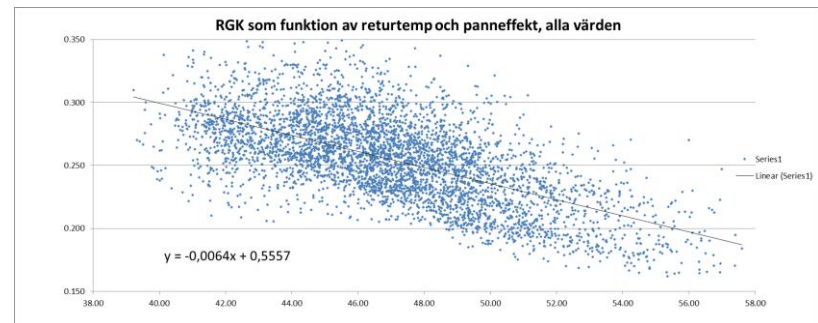
- Today - Open control loop
- Future design – Closed control loop
- Adding house integrated heat solutions that can lower the return water temperature and adjust demand according to power plant needs.
- What is the potential? In terms of efficiency, carbon dioxide emissions and money.

Case study – DHS in the municipality of Linköping.

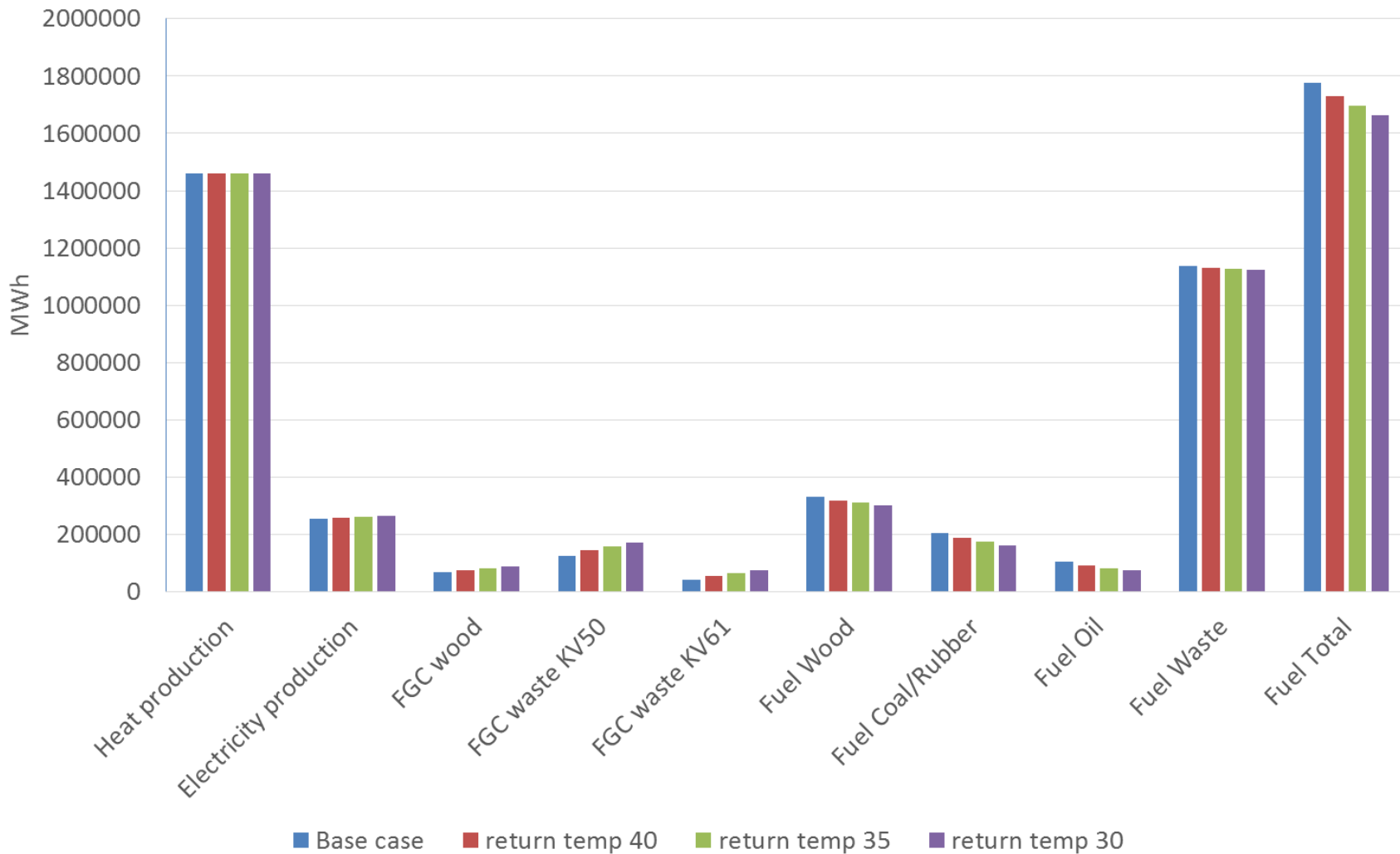
- Annual load 1500 GWh heat.
- Fuel mixture: waste, wood, rubber, coal and oil
- Eight power plant components that are affected by system temperatures. Five backpressure turbines and three flue gas condensers.
- Modell with four different return temperatures and corresponding supply temperature – base case, 40 °c, 35 °c, 30 °c.



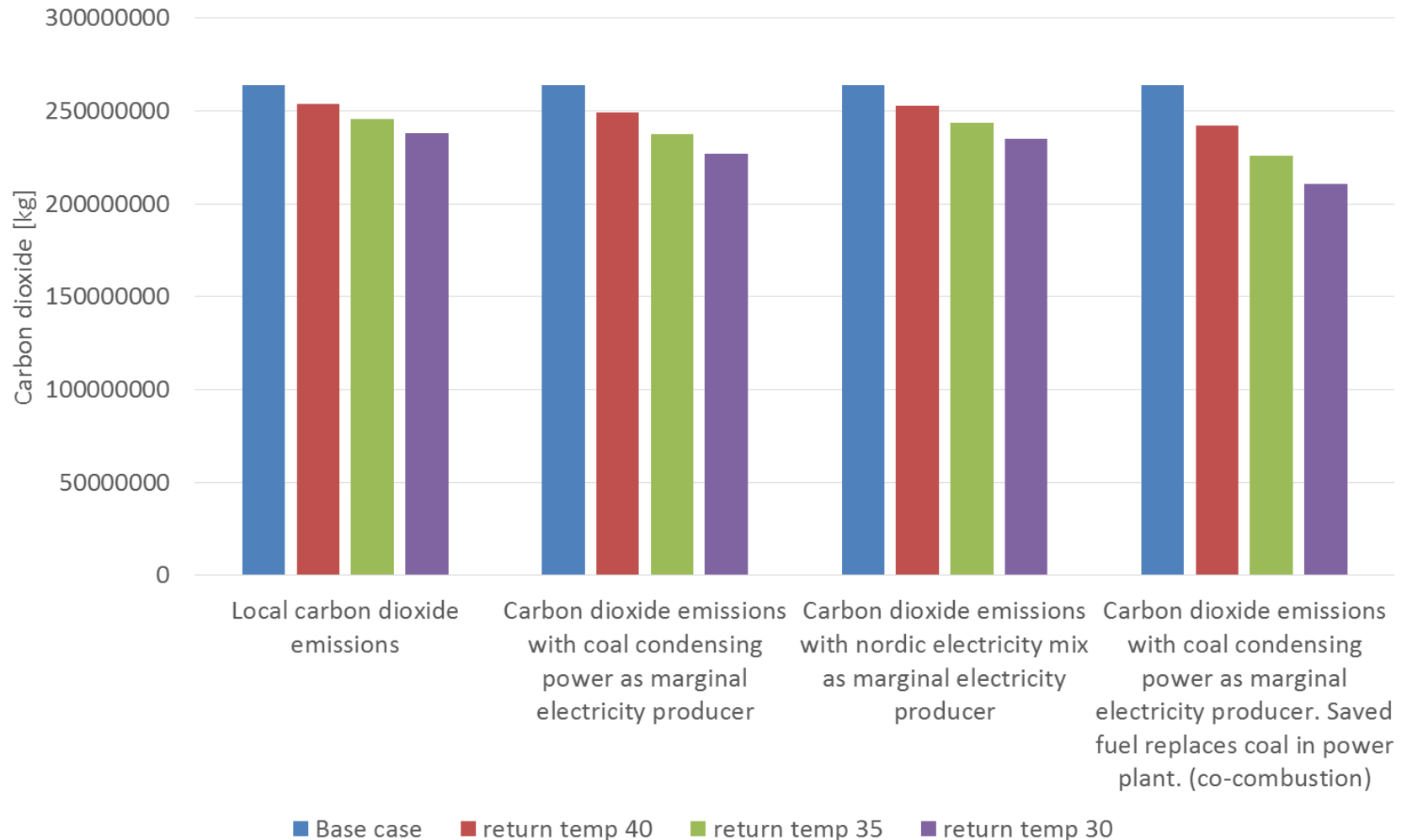
Figur 13: Punktdiagram som visar relationen mellan elverkningsgrad och framledningstemperatur för turbin 1 i KV1. Data för elproduktion under 10 MW har exkluderats.



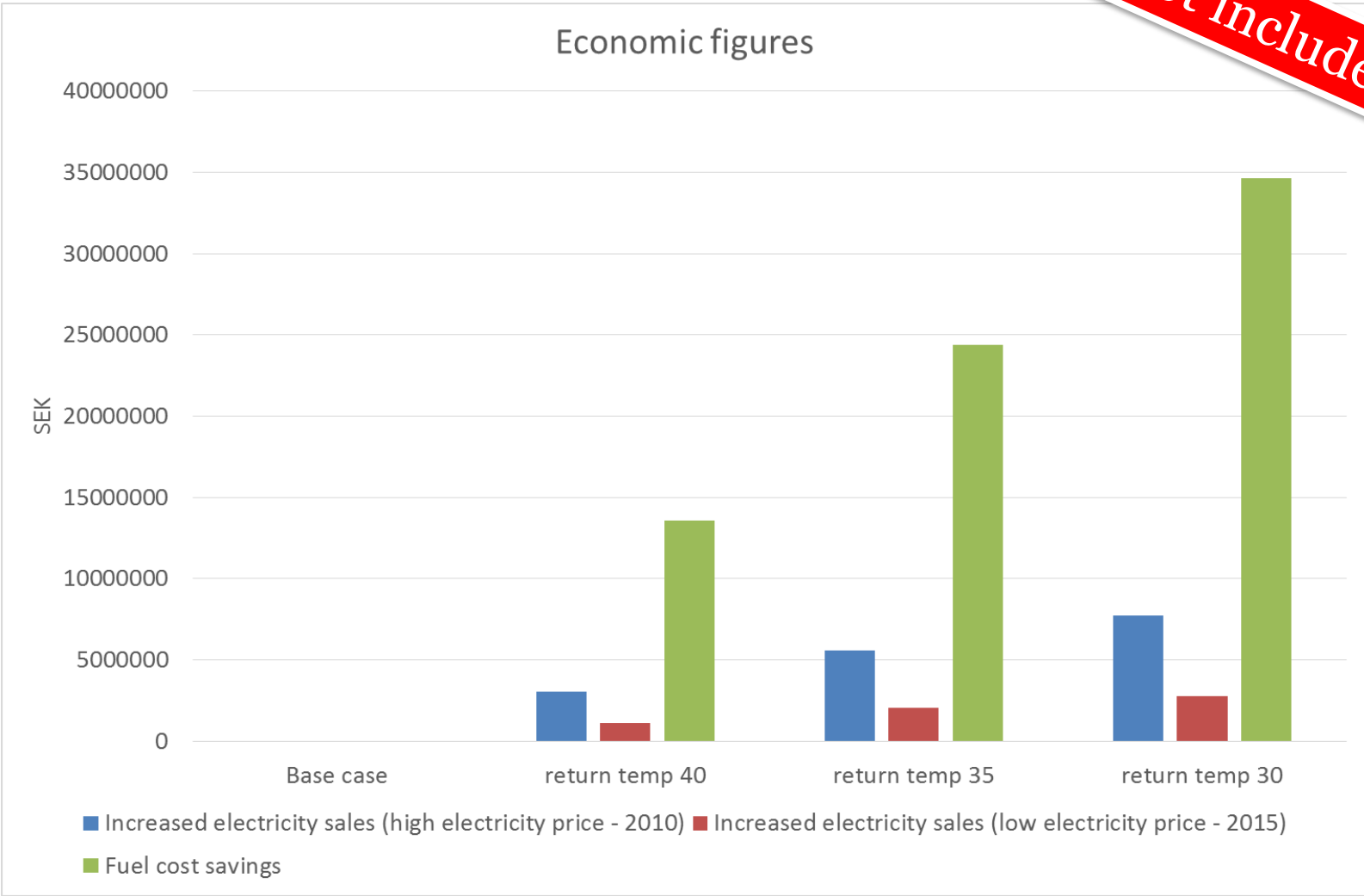
Efficiency and fuel mixture



Carbon dioxide emissions



Taxes not included!



A mean description of the district heating return water system today:

A system that is pumping warm water, which is too hot to take a bath in, away from buildings that need to be heated.

Thank you!

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www.liu.se