Innovative Thermal energy supply For Landbrukskvartalet in Oslo

Que?

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Main gig	Consultancy and projecting of energy-efficient buildings, optimizing building in regard to daylight, energy use, indoor climate, energy supply, environmental goals, etc.
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Our task

- Develop a concept solution for thermal energy supply focusing on interaction between the different functions and their energy needs
- Identify solutions that allow for easier operation, lower maintenance needs, lower need for replacements, longer life, flexibility in use
- Reduce the energy need and the size of central components
- While focusing on economical sustainability
- The basic idea was simple

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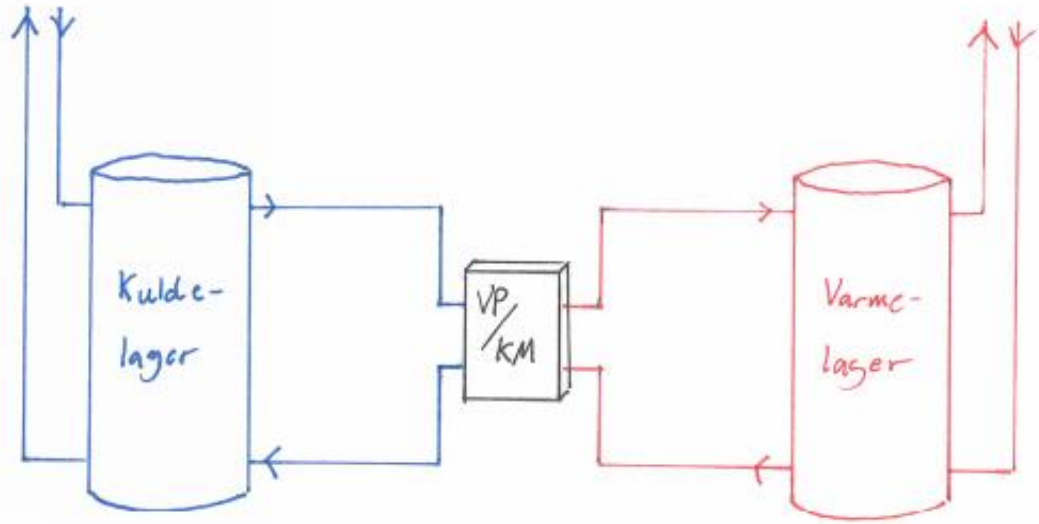
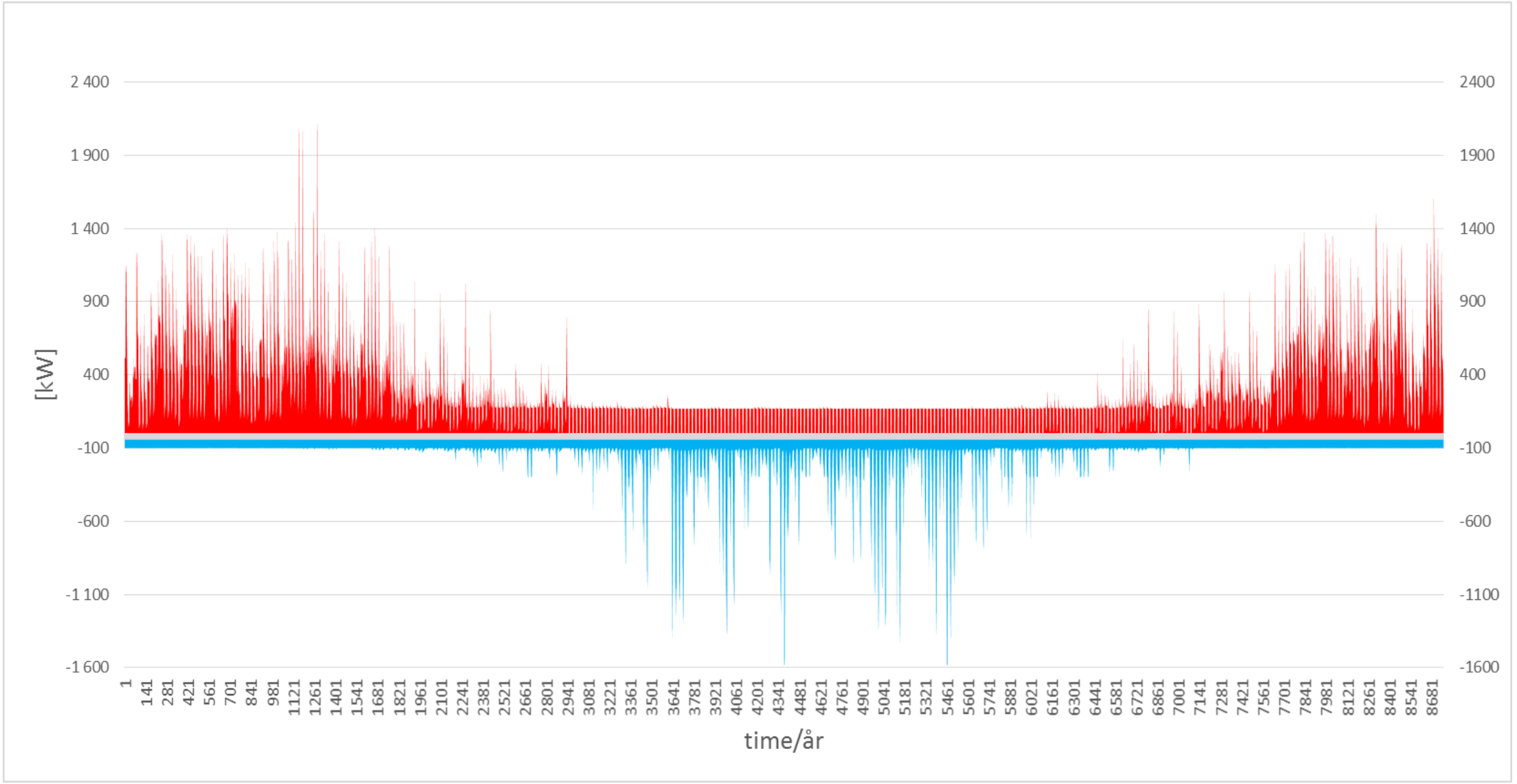
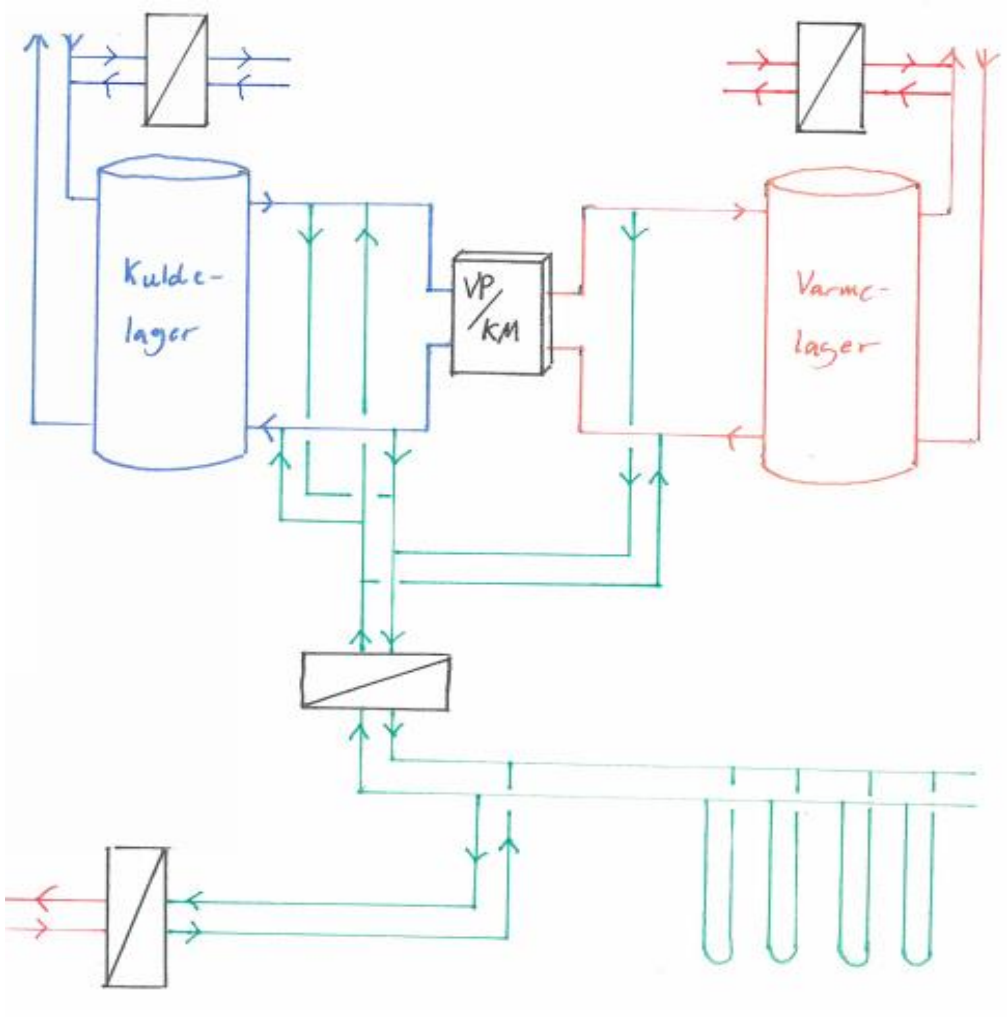


Thermal energy needs throughout the year

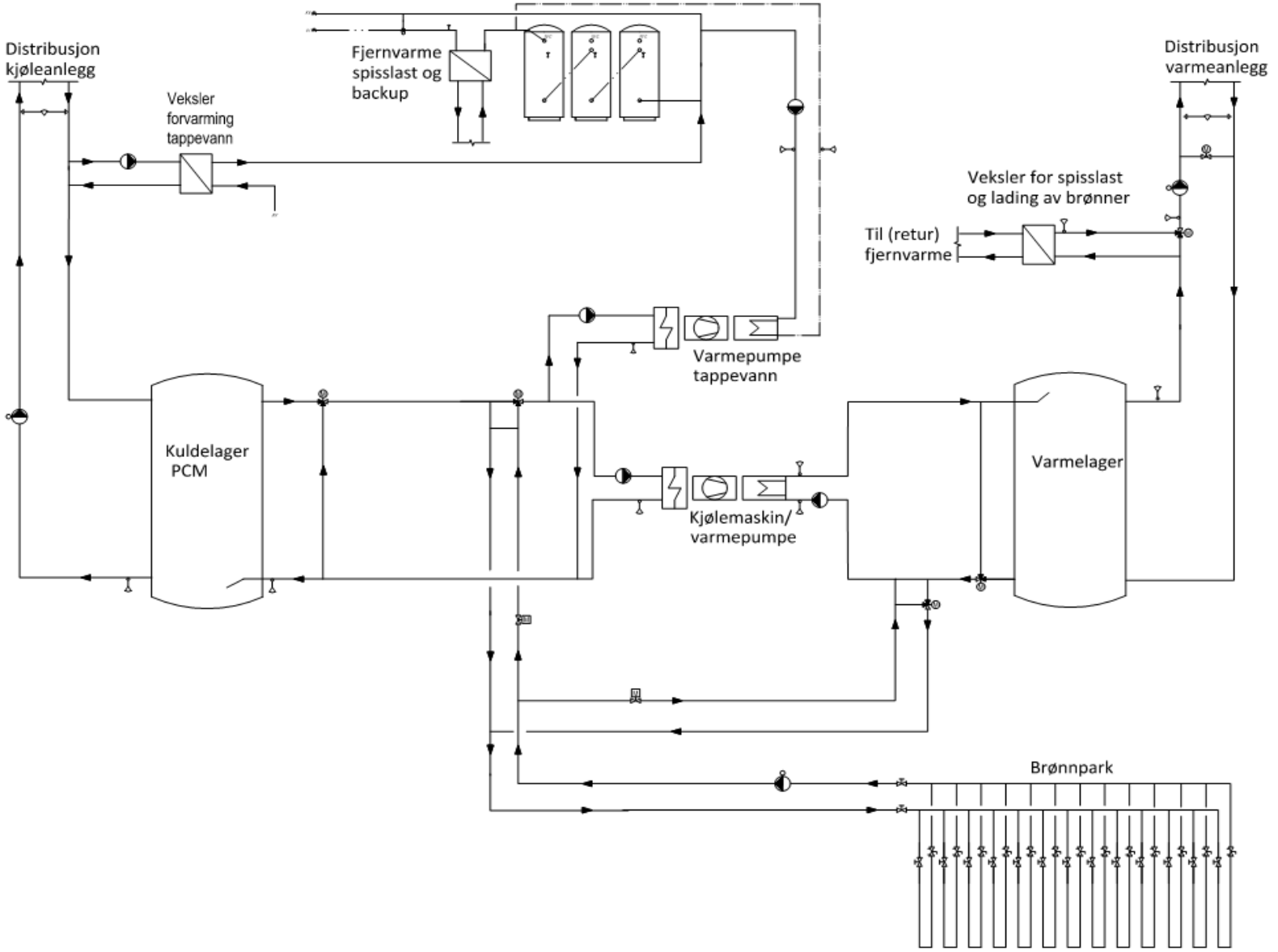


Basic concept



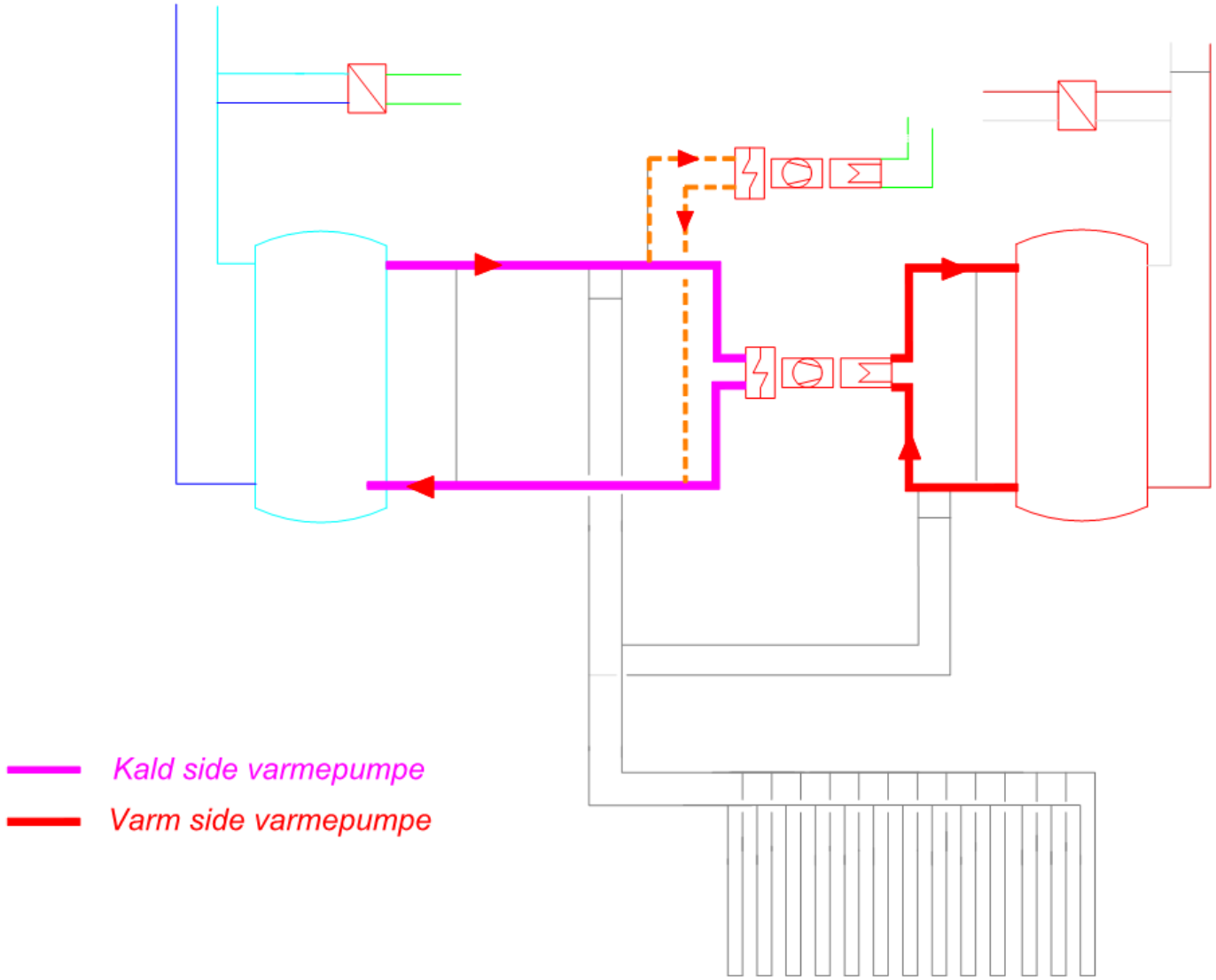
- Utilize variability in heating and cooling
- Minimize the need for external supply of energy
- Familiar components in a new composition
- Focus on opportunities, not constraints
- Low threshold for new ideas
- Identify different operating modes

System schematics after some development

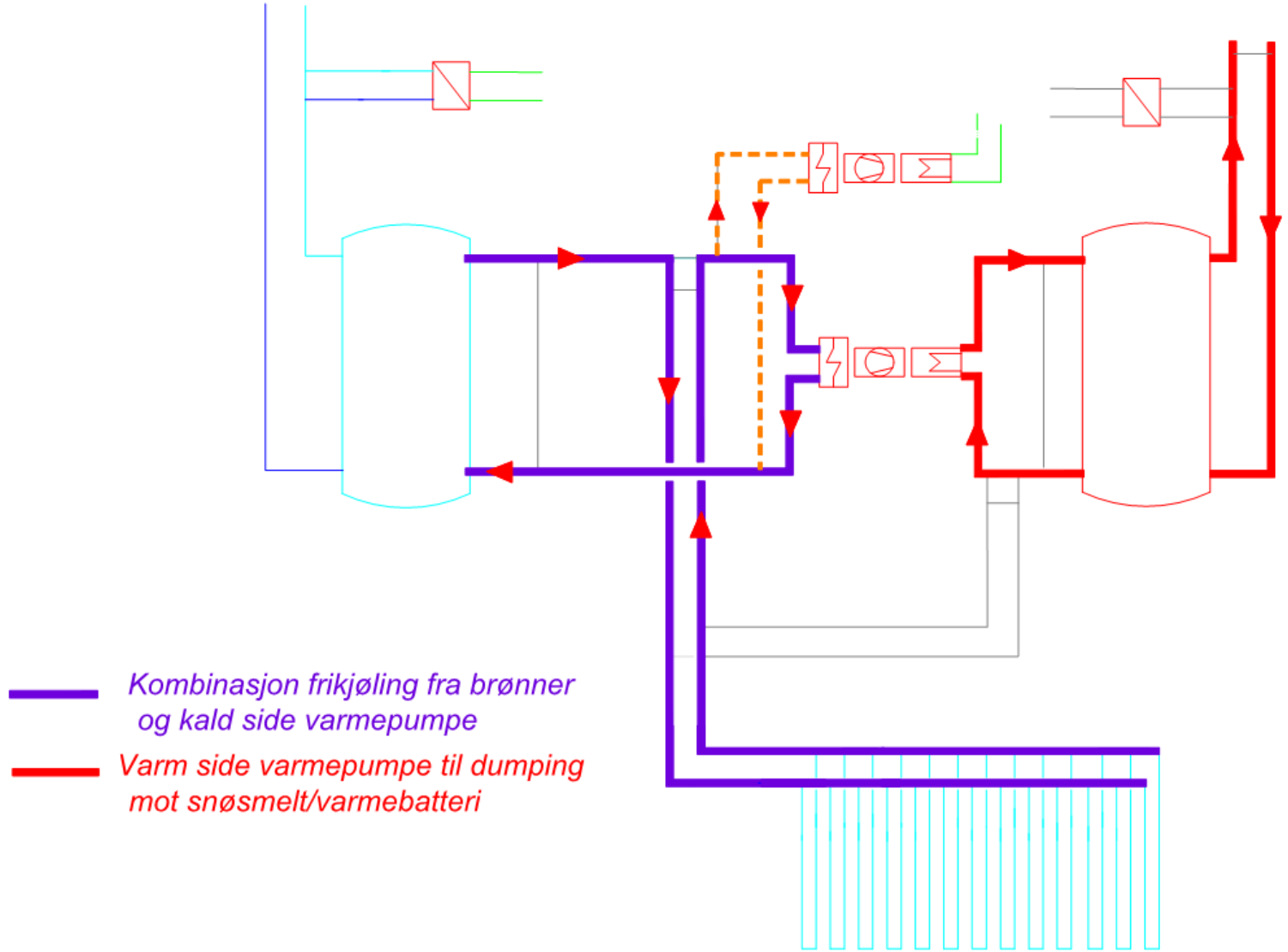


- PCM storage tanks for cooling storage
- Water Tanks for heating storage
- Deep boreholes (500 m +)
- Low temperature heat distribution
- High temperature cooling distribution
- CO_2 heat pump for tap water
- No internal heat exchangers

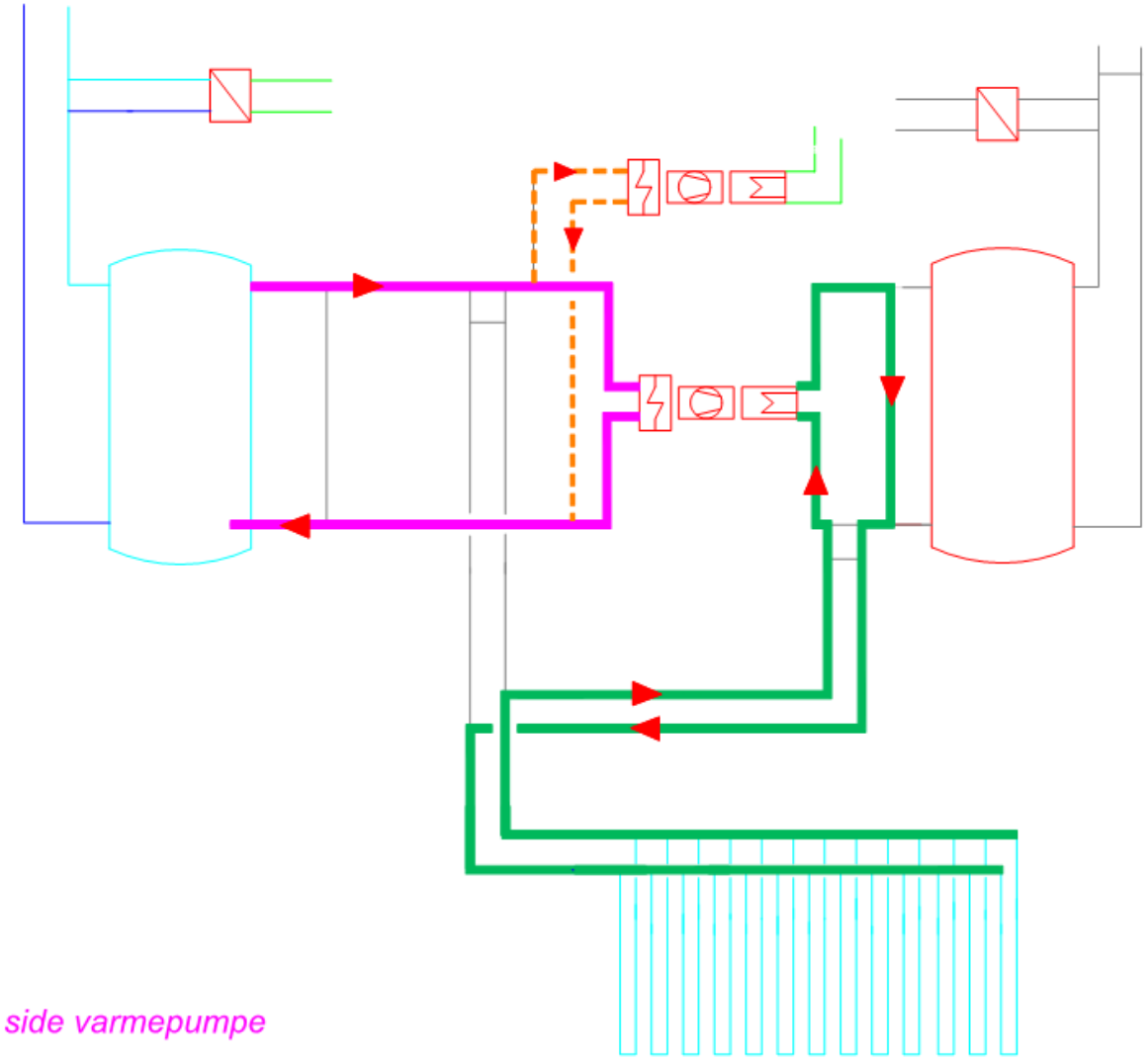
When the balance between heating and cooling is just right



Free cooling from boreholes and heat pump production



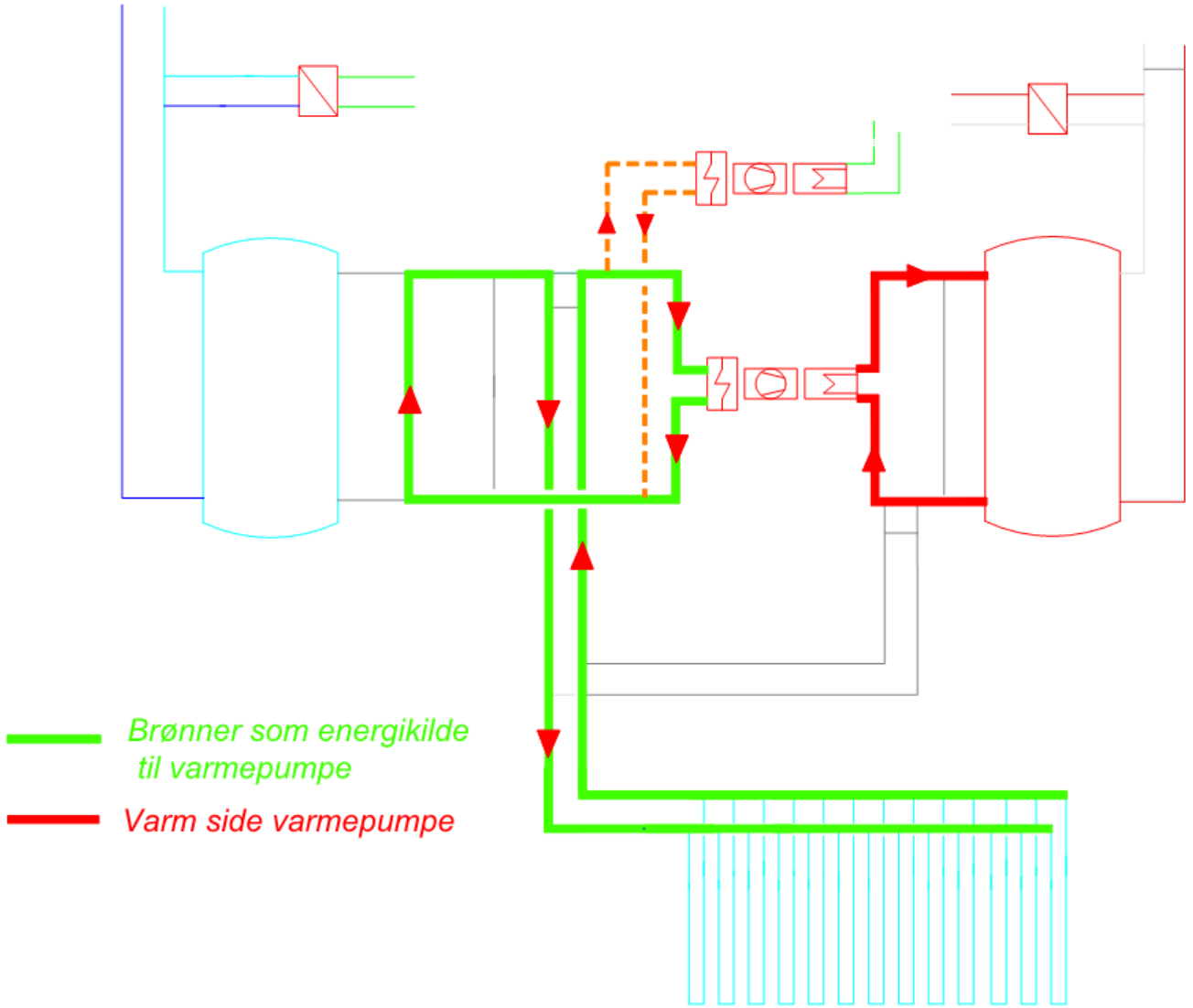
Machine cooling based on boreholes



Kald side varmepumpe

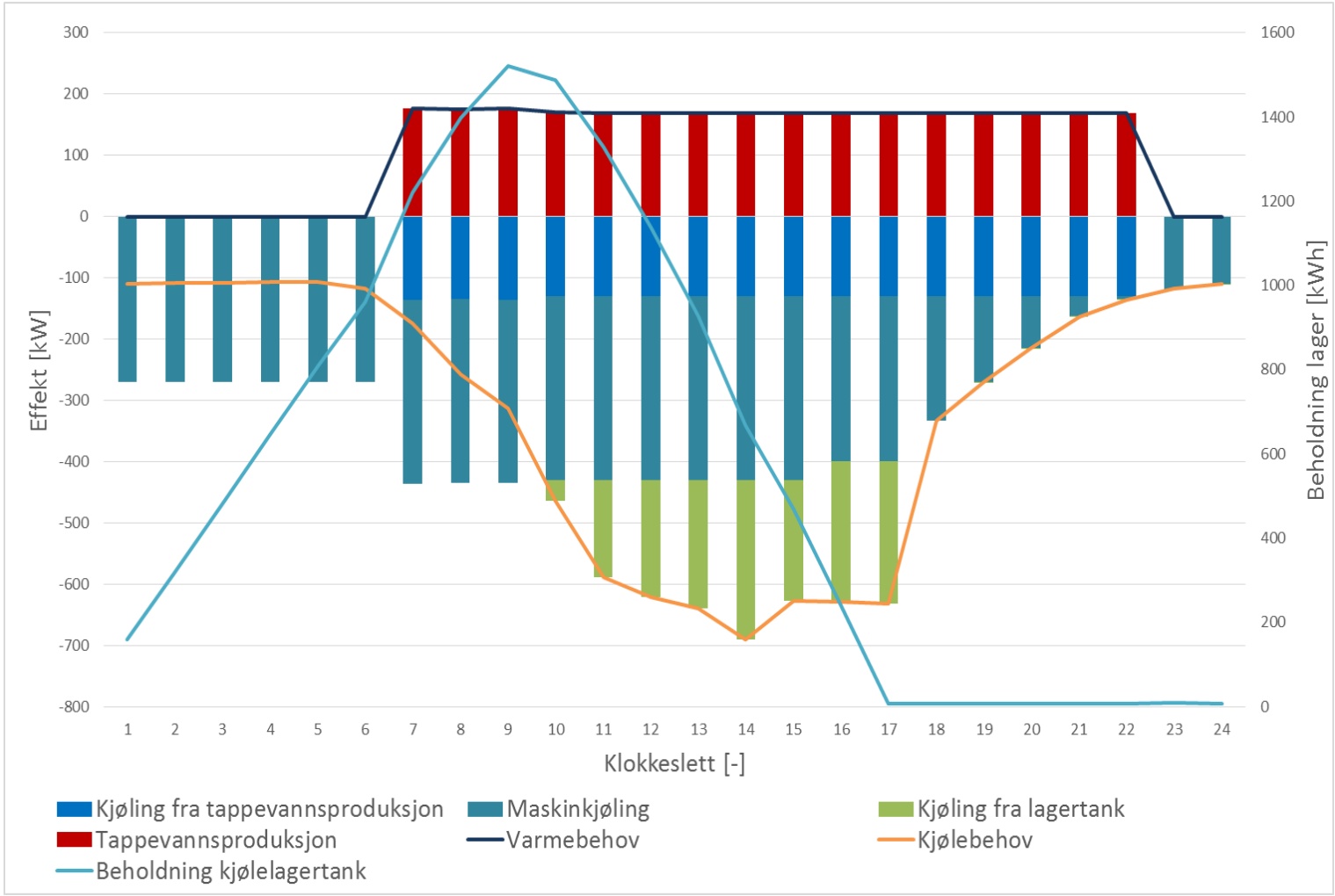
Varm side varmepumpe til lading av brønner

Heat production with boreholes as source



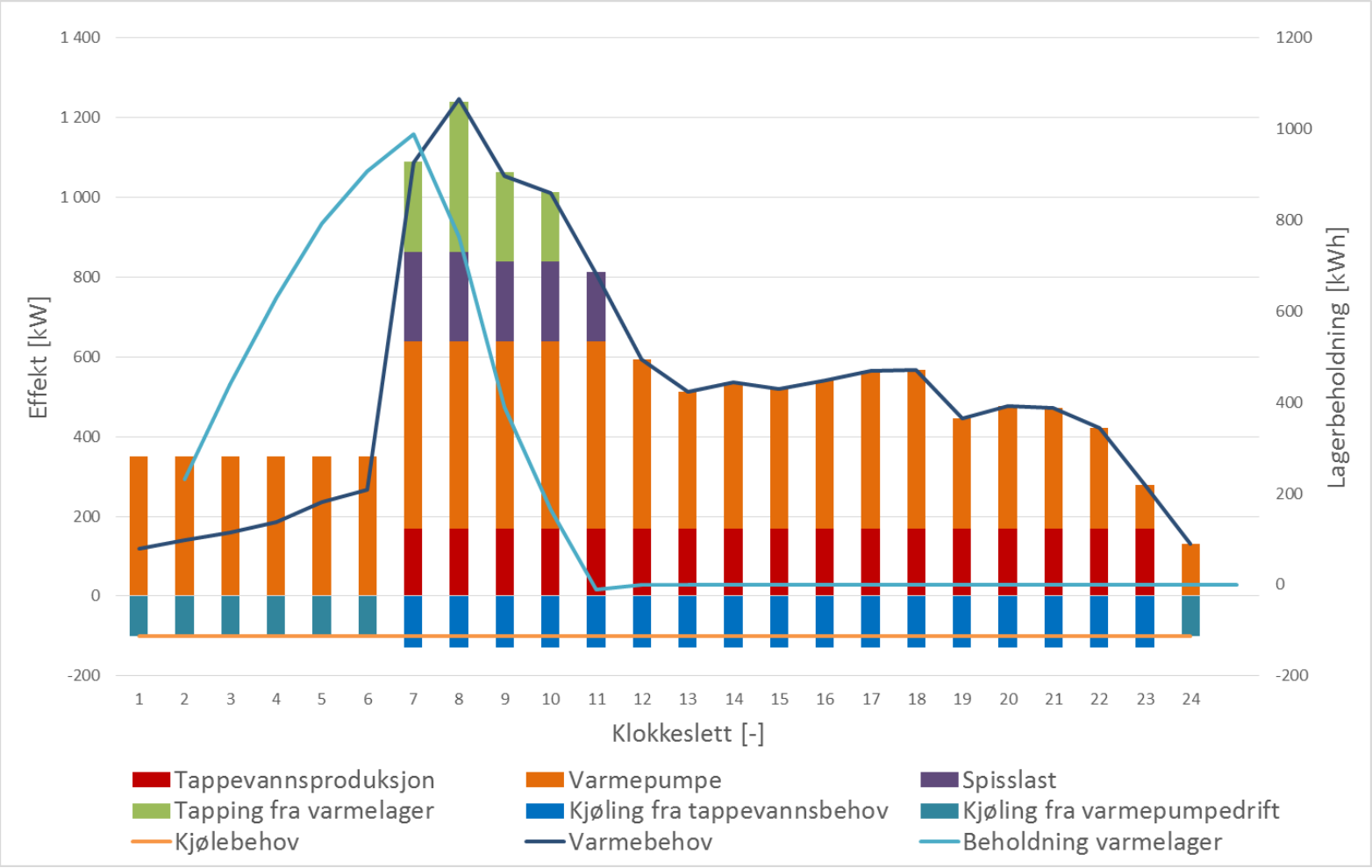
Load scenario - cooling

- Medium hot summer day (+22C)



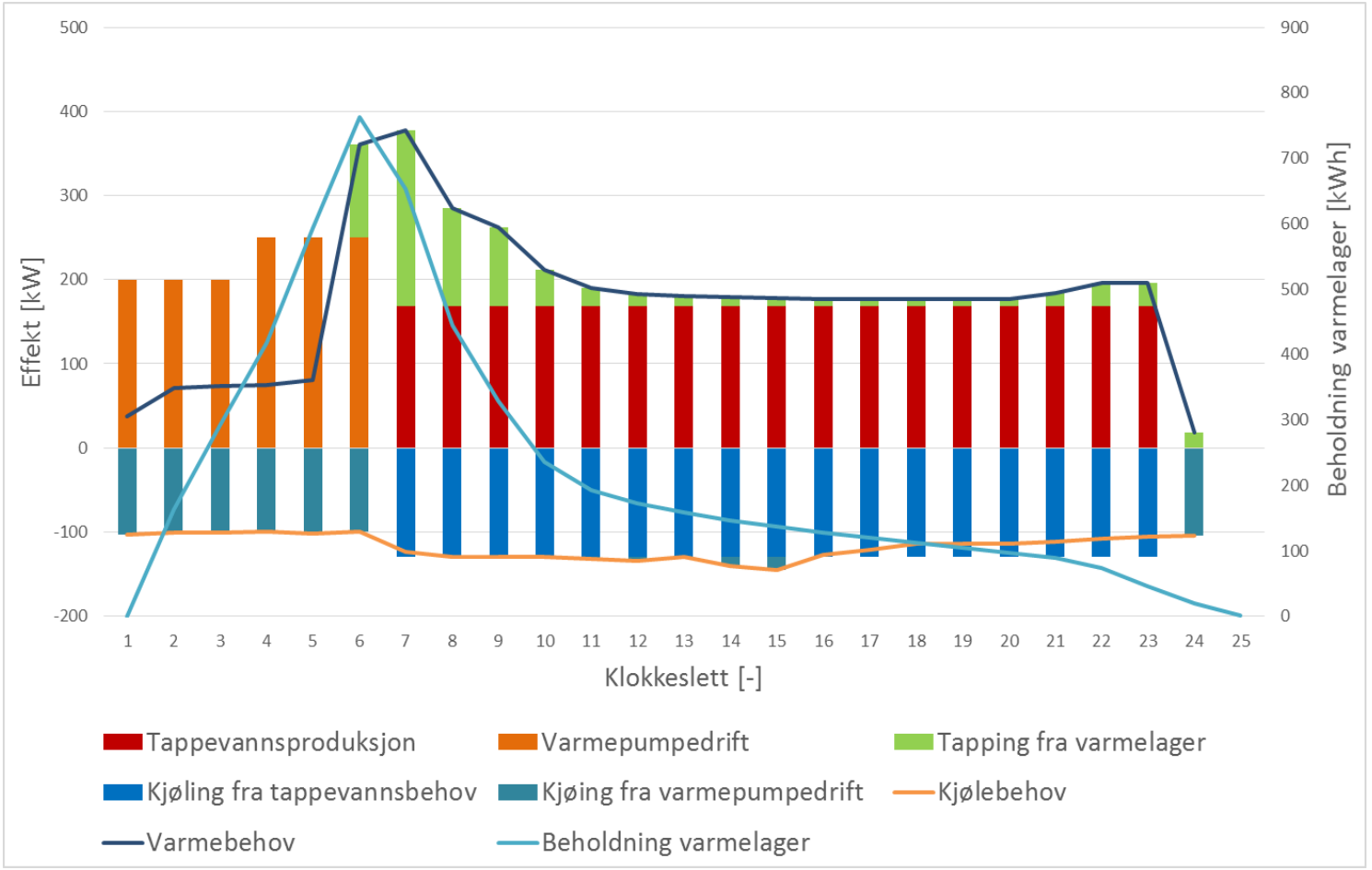
Load scenario - heating

- Medium cold winter day (-10C)



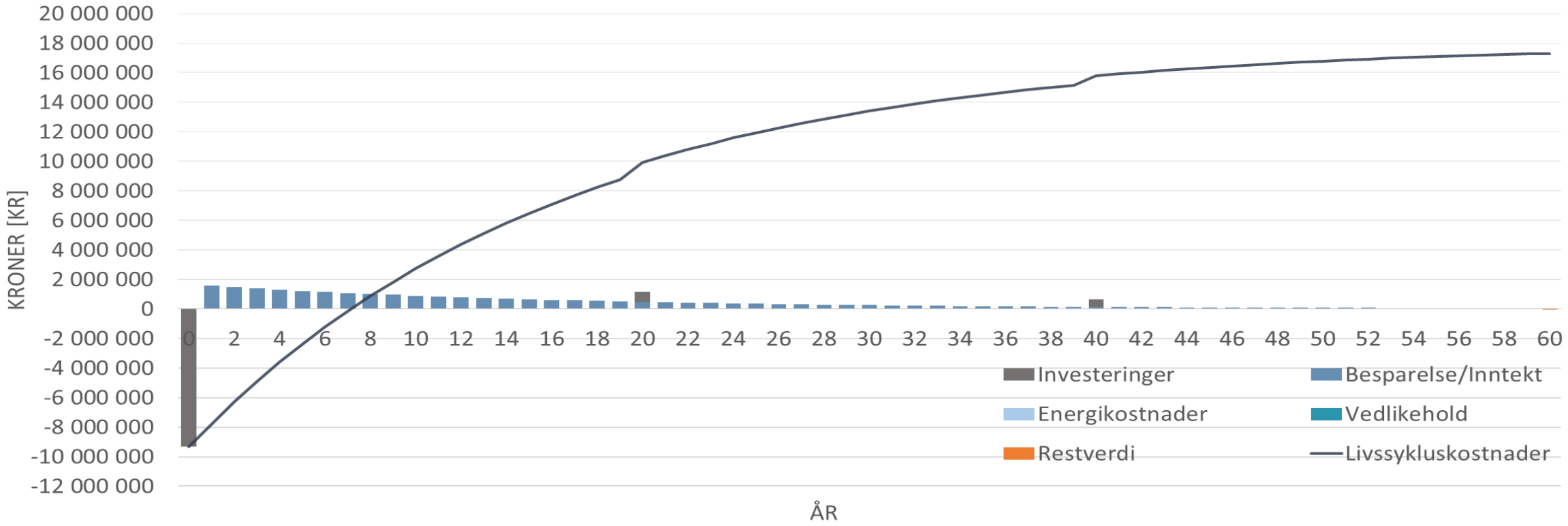
Load scenario - heating

- Autumn/Fall day with night tarrifs



Economy

- Conservative pay back time of 8 years compared to a conventional energy central
- Mainly due to reduced power and energy costs
- The coming changes in the electricity tariffs will make concepts such as this even more profitable



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