

Ratkaisuja energiatehokkuuteen

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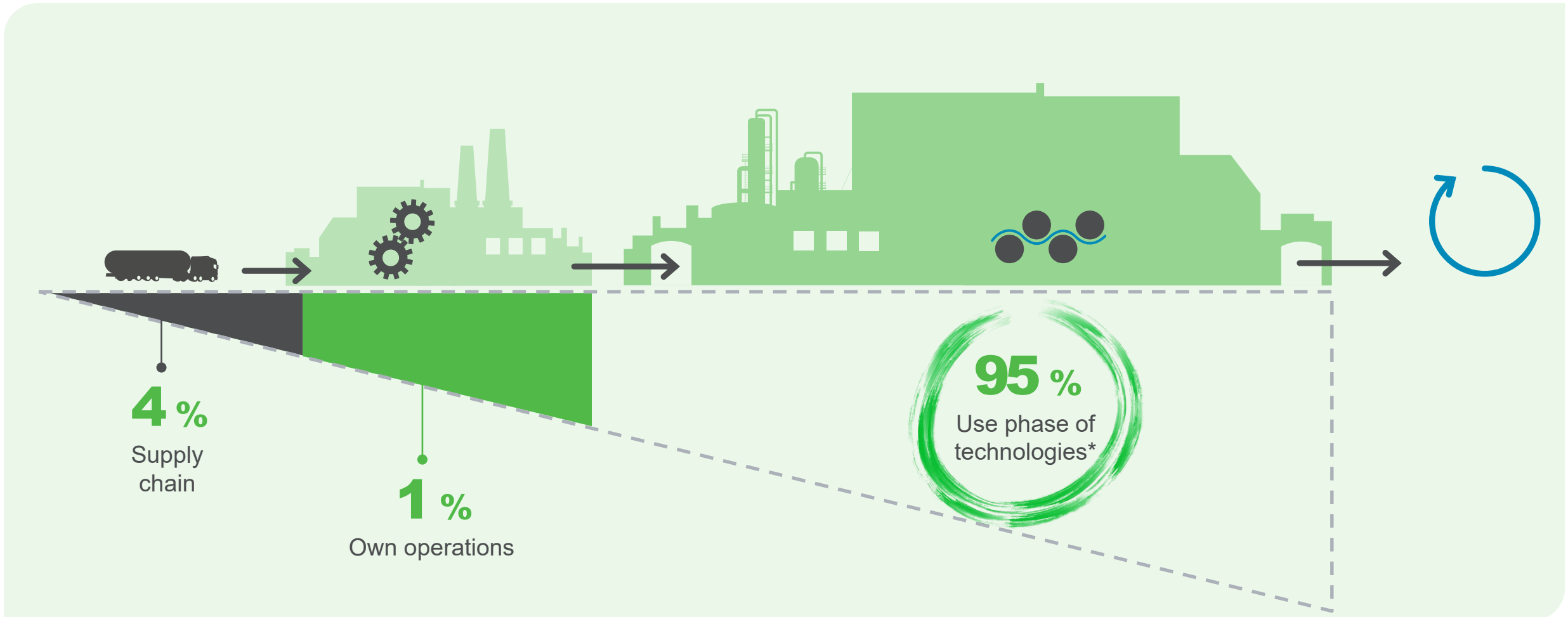
Tuotepäällikkö, Energiatehokkuus ja Industrial internet

Valmet Technologies, PM Ilmajärjestelmät

27.1.2023

Valmet's value chain CO₂ emissions: main impact from customer use of Valmet's technologies during life cycle of a paper machine

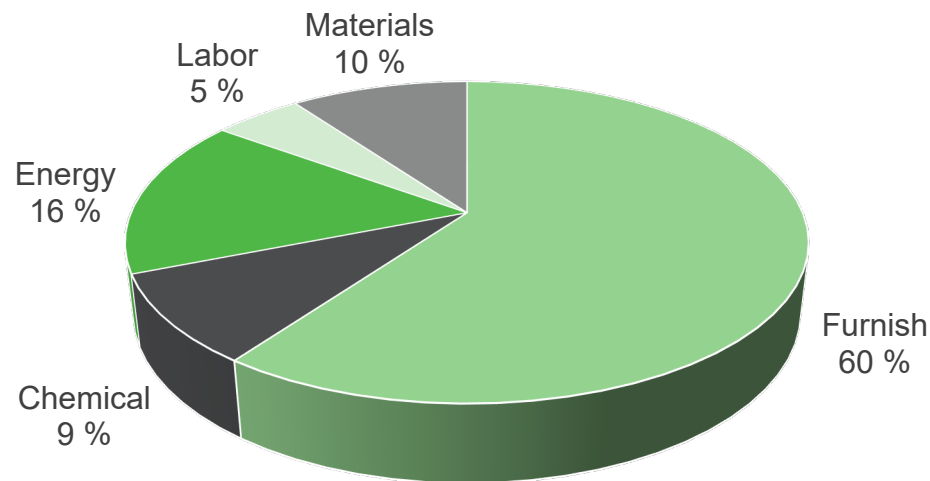
-Valmet's energy efficiency target to improve 20% by 2030 (current technologies)



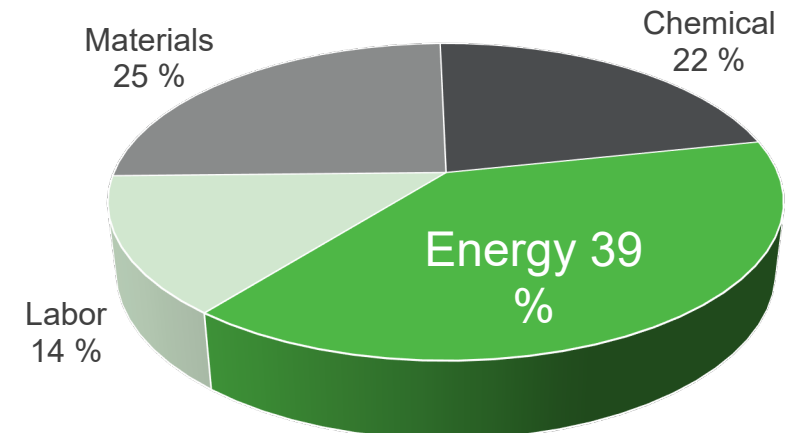
Board machine production cost items (before 2020 situation)

- Furnish costs are dominant to produce board
- Changing furnish and keeping up high quality is a difficult combination
- Other costs might be easier to optimize
 - ➔ In this group of production factors energy is the biggest cost by far

Cost contribution BM



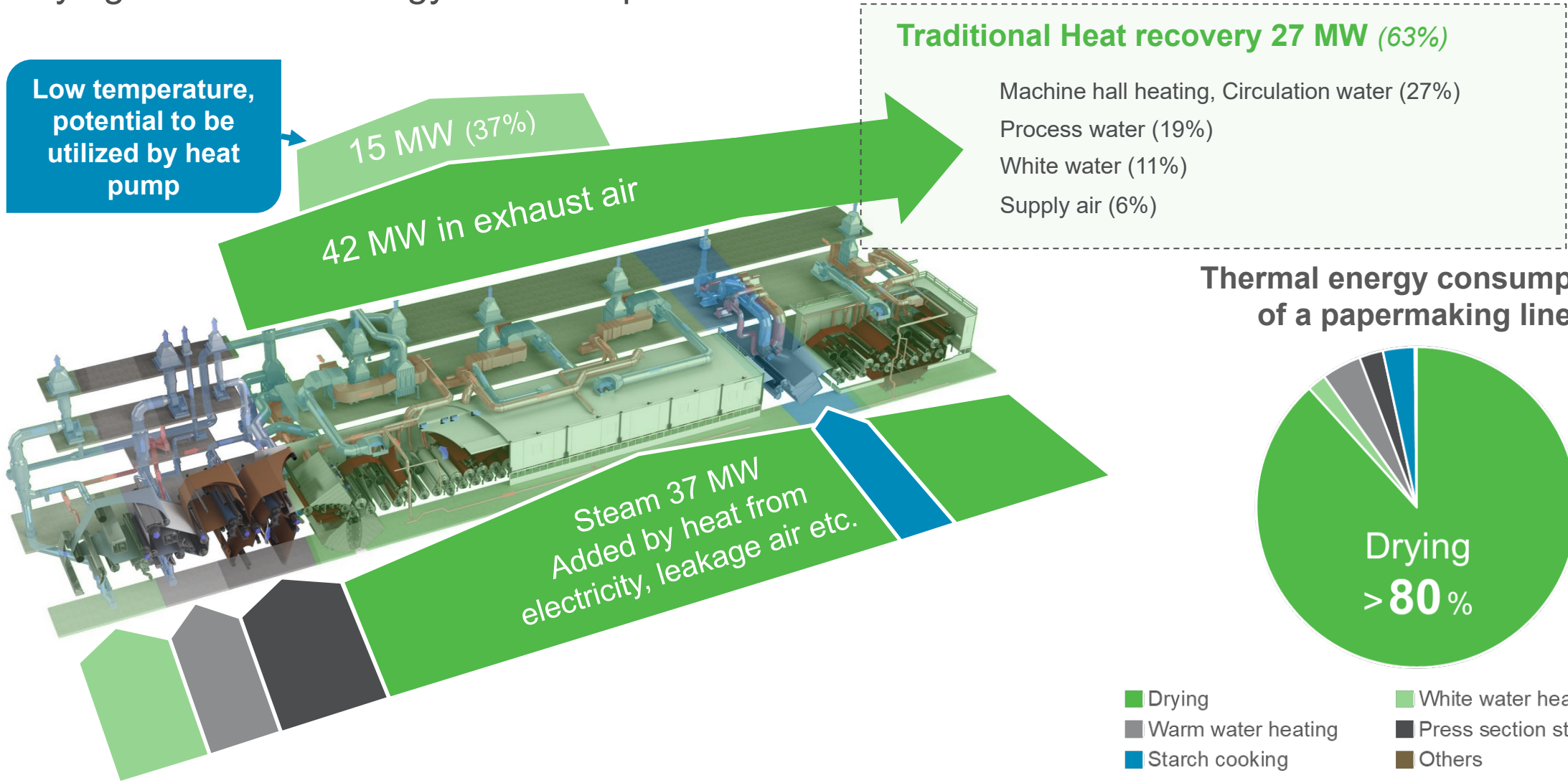
Cost contribution BM without furnish



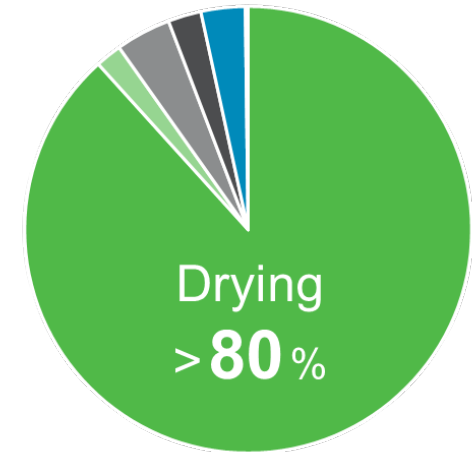
Thermal energy consumption distribution

Drying is the most energy-intensive process

Low temperature, potential to be utilized by heat pump



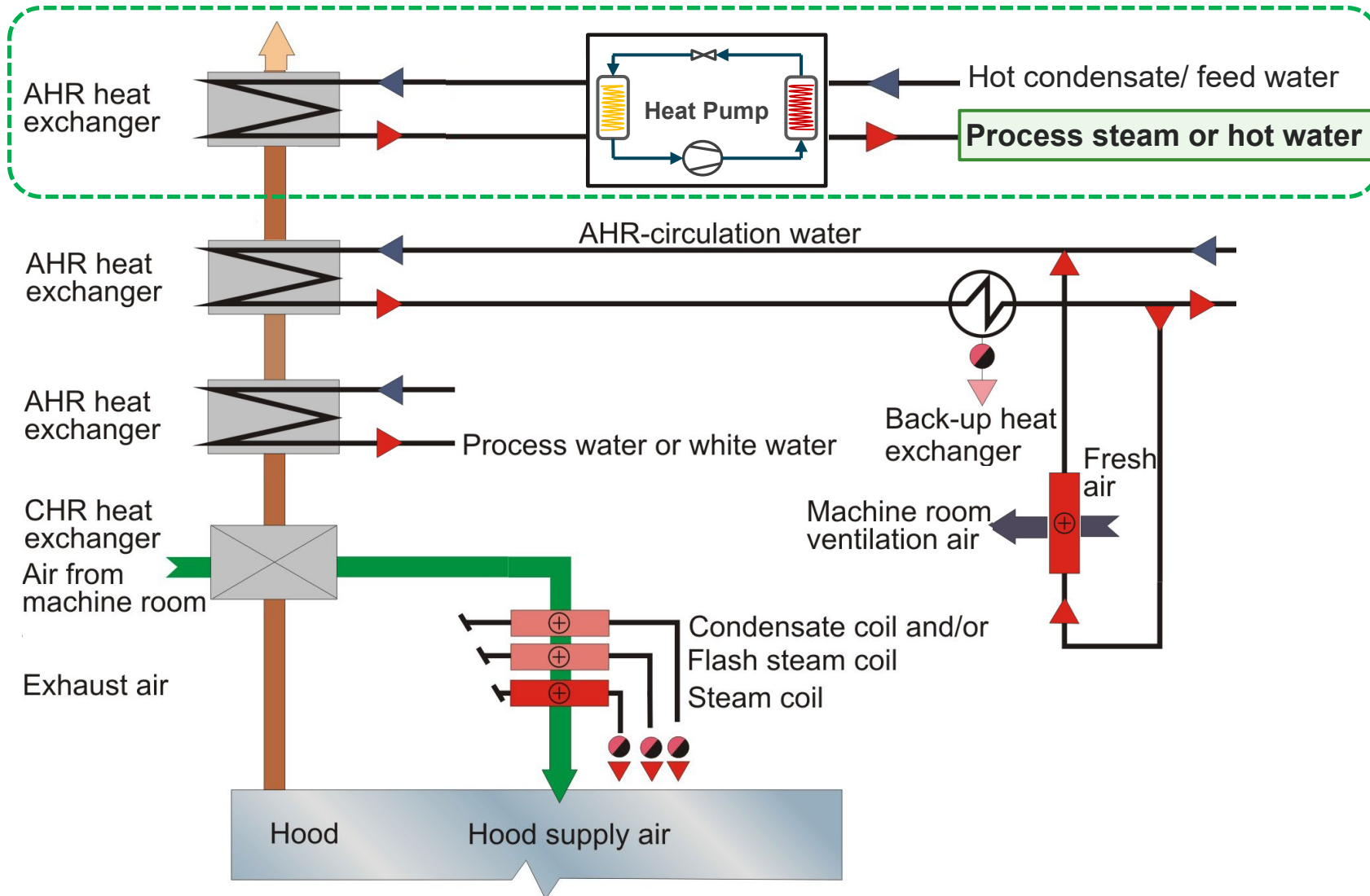
Thermal energy consumption of a papermaking line



- Drying
- White water heating
- Warm water heating
- Press section steambox
- Starch cooking
- Others

Principle of heat recovery system with heat pump addition

Heat sinks e.g. lower temperature district heating, or high temperature steam

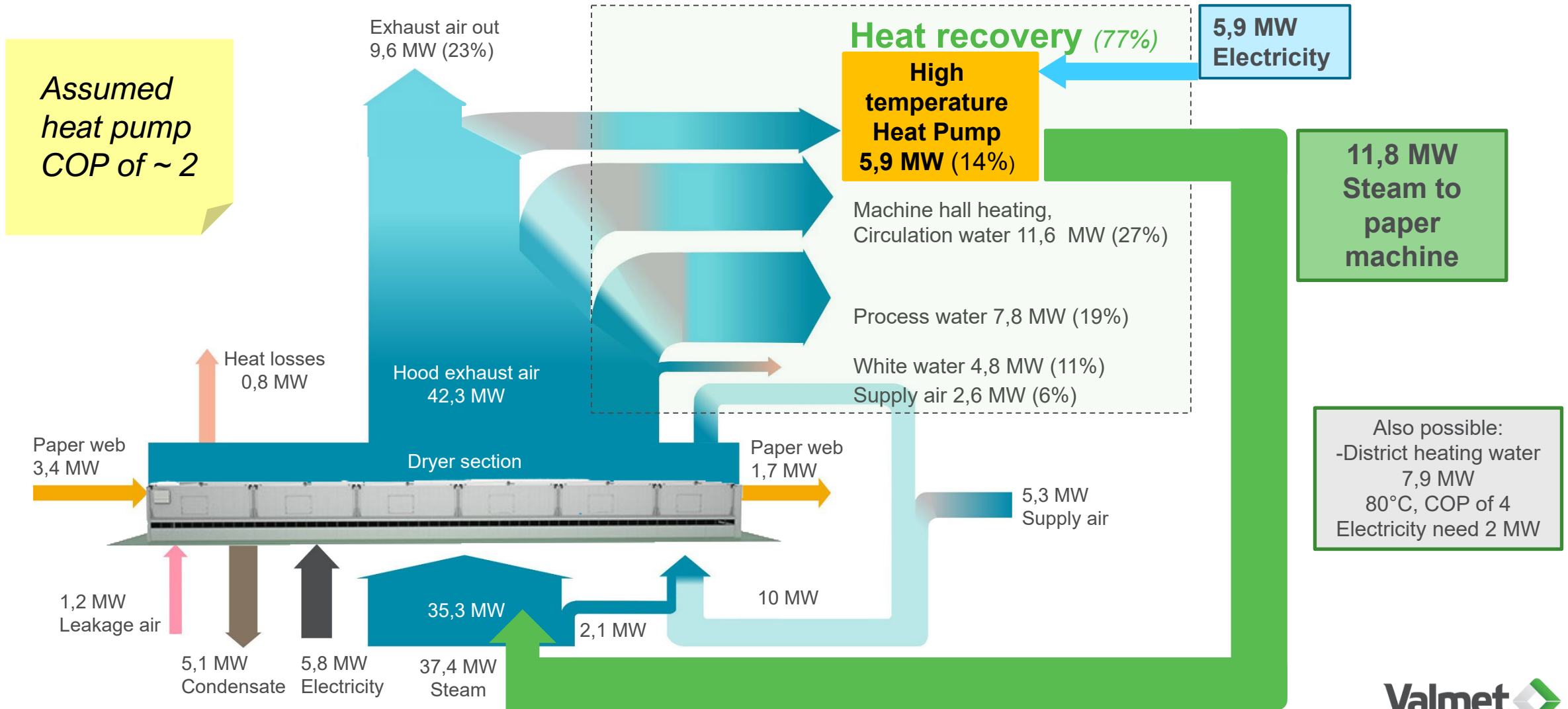


Added AHR heat exchanger to be used as heat pump heat source

- An additional AHR unit would be installed after or before existing heat recovery units.

Heat flows in the dryer section with steam-generating heat pump

Example Sankey diagram evaporating 11.6 kg/s H₂O (~41 t/h) => potential for water circulation



Sähköistys

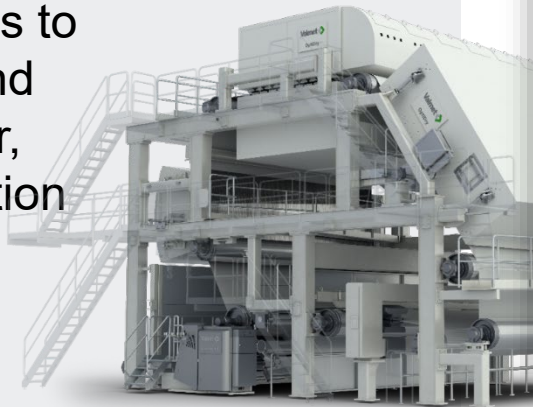
Päällystetyn paperin ilmakeivaus

Energy saving actions are important part of CO₂ emission decreasing

Infra red dryer replaced by air dryer

Energy savings up to **50%**

Less losses to exhaust and ambient air, less reflection losses



Gas burner replaced by electric heater & optimizing process

Energy savings **10...20%**

Better air balance; no water from burning process to be exhausted, no need for combustion air, process optimized



Utilization of exhaust air by heat recovery or cascading

Energy savings **10%**

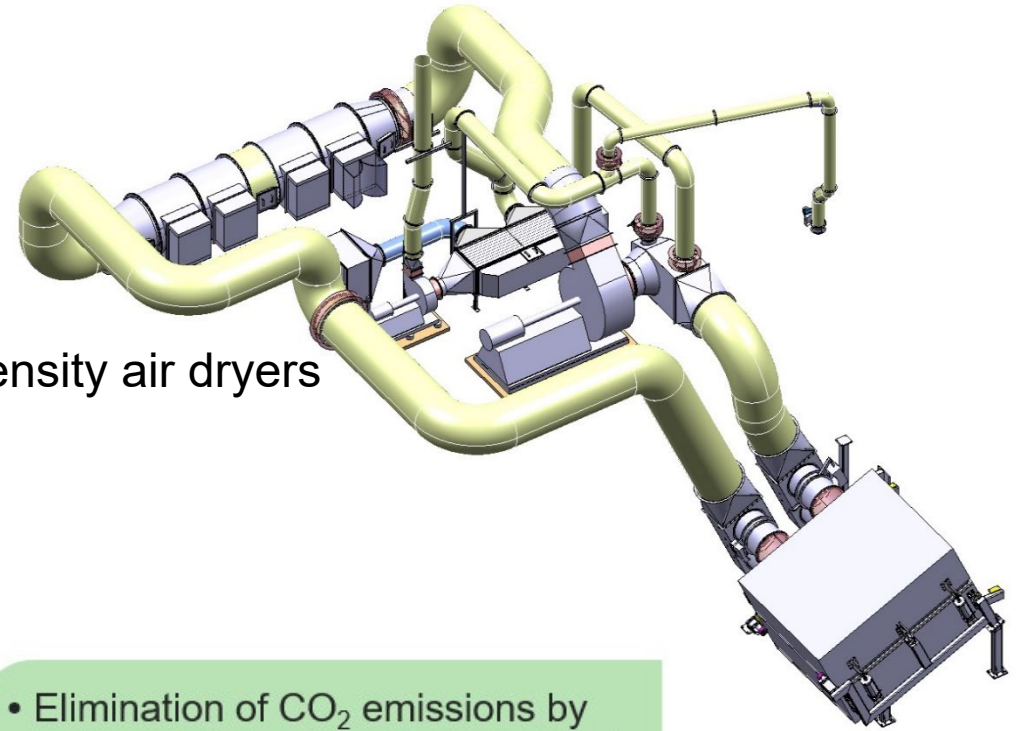
Heat recovery to make-up air

Exhaust air to lower temperature dryers

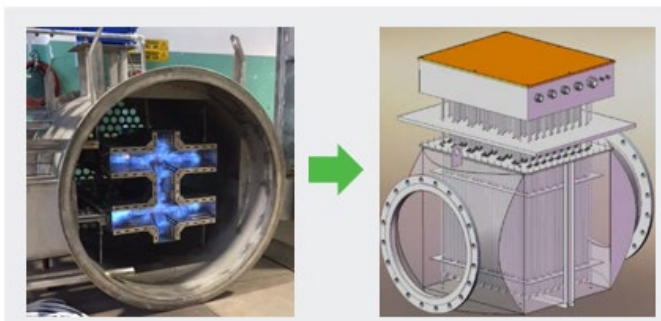


Gas vs electric coating air drying

- KW power needed 10 % lower than with gas heated high intensity air dryers
- Start up speed – no difference
- From gas to electricity heated
 - Gas burners changed to electricity heaters
 - Pressure losses increasing which might effect motor size
- Maintenance perspective and other notes
 - No annual changing wearing parts like with gas burner
 - Dimensioning need to be right for resistors
- Expected life time > 100 000 h
- High cost of electrical heater



- Elimination of CO₂ emissions by using fossil free electricity instead of gas
- Also existing heating systems can be replaced by electrical heaters



Digitalisaatio



Air System Advisor

By help of the instructions given by application, the operators can utilize and optimize the full potential of hood, heat recovery and the ventilation control

The advisory view:

- Indicates how the system is operated compared to the dimensioned operating window
- Humidity, temperatures, leakage air

You can see the status and trend for each screen for further analysis

