

Valmet

Flue gas condensing
solutions

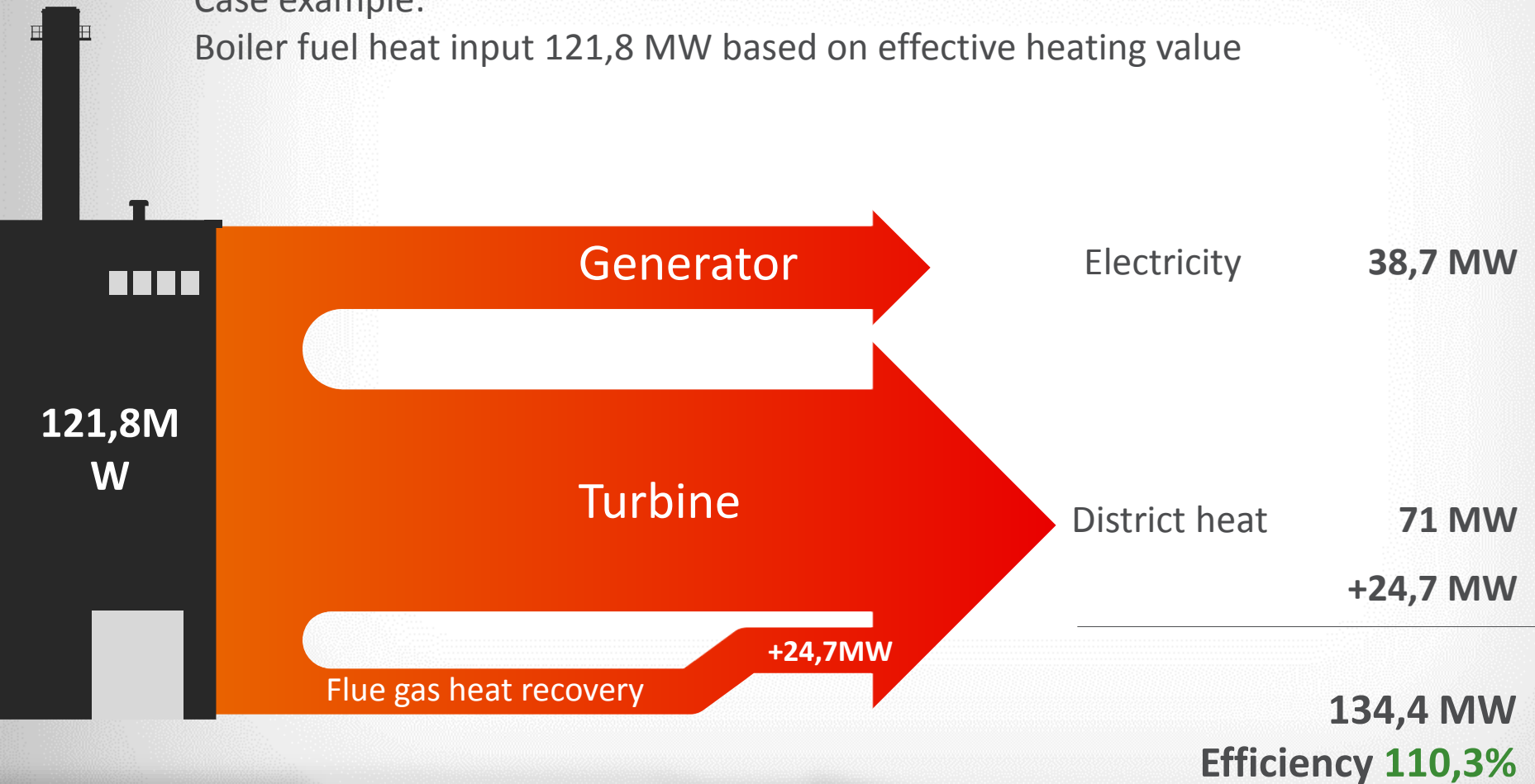


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Flue gas condensing improves plant efficiency

Case example:

Boiler fuel heat input 121,8 MW based on effective heating value

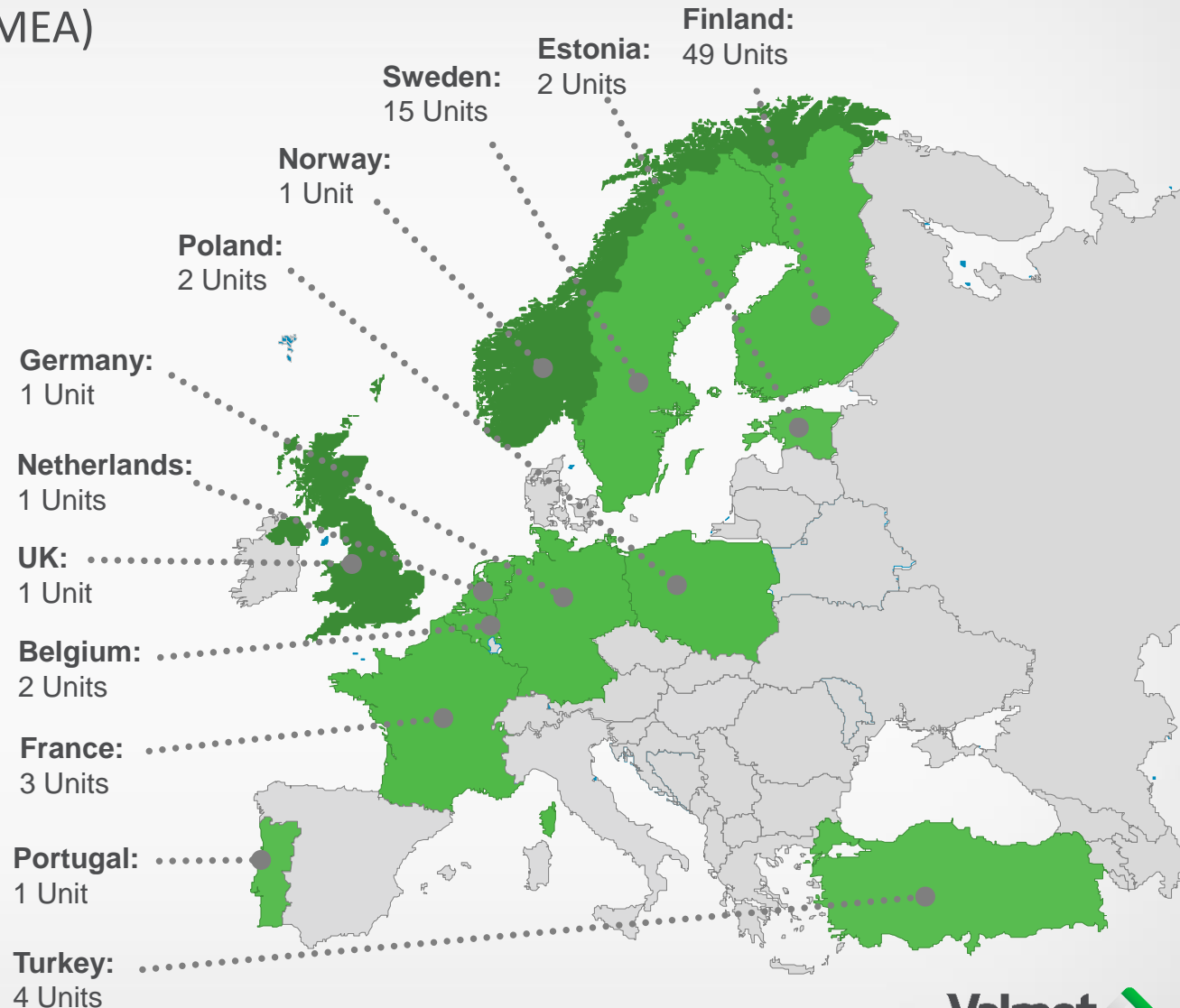


Flue gas scrubbers and condensors

93 installed units(EMEA)

Outside of EMEA:

Austria: 2 Units
China: 1 Unit
China(Taiwan): 1 Unit
Guatemala: 1 Unit
India: 1 Unit
Russia: 5 Units



Flue gas scrubber

Multi-pollutant control and heat and water recovery in one process

Near **100%** reduction of:

SO₂

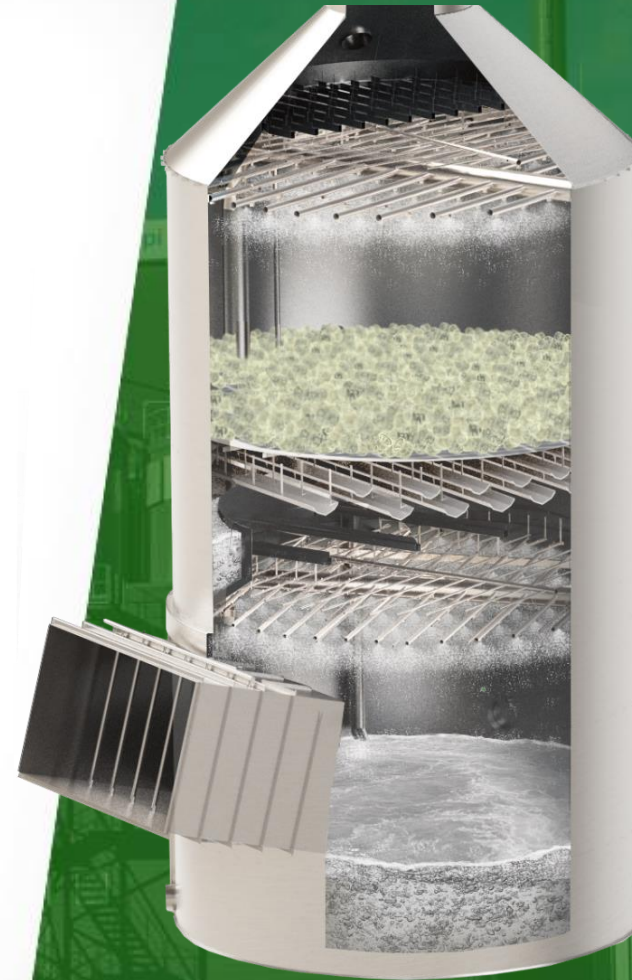
Dust

HCl

NH₃

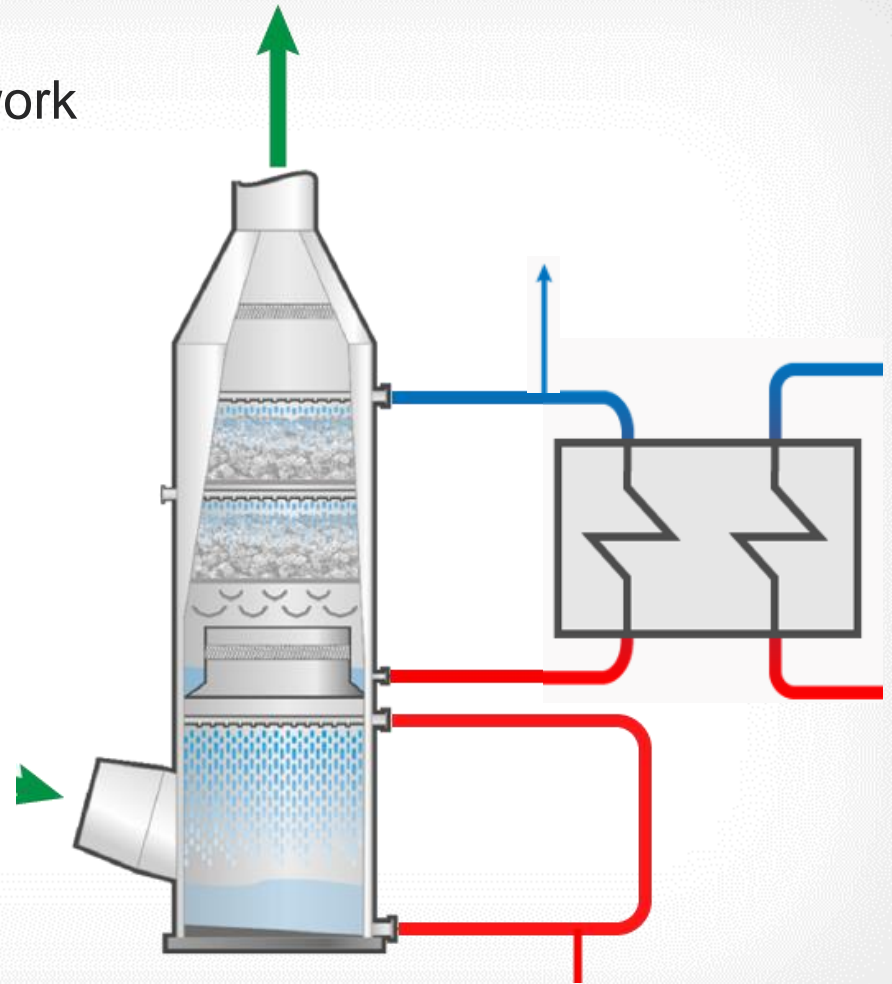
NO_x

- **30%** more energy from fuel
 - District heating
 - Hot water
 - Combustion air heating
 - Paper mill circulation water heating
 - Etc.
- **~1m³/h** reusable water from each MW heat recovered



Flue gas scrubbing process

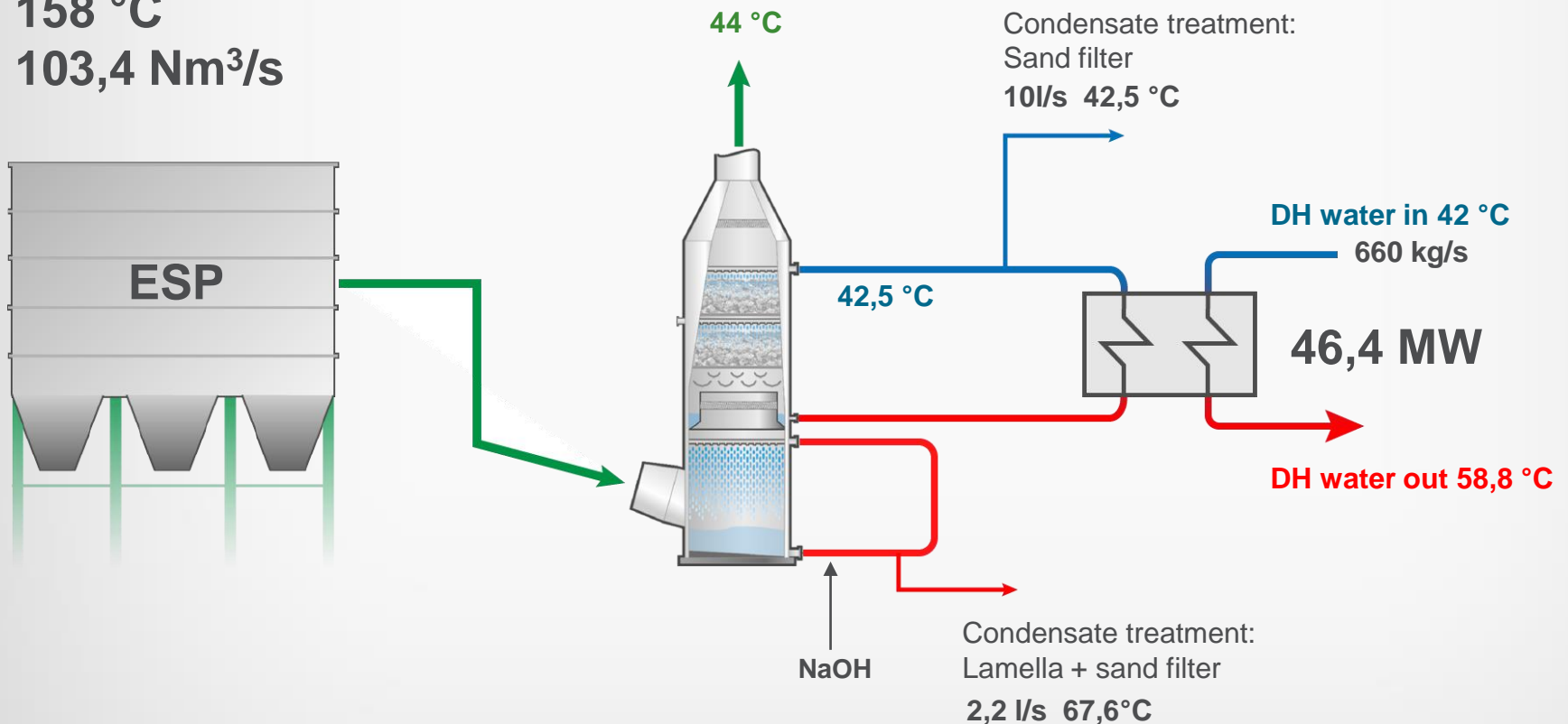
- Heat recovery to e.g. DH-network
 - Increase plant efficiency
 - Lower the need of auxiliary boilers
- Two stage scrubbing
- Two phase heat transfer
 - Packed bed
 - Heat exchanger



Example: Increasing efficiency by optimizing condensate removal

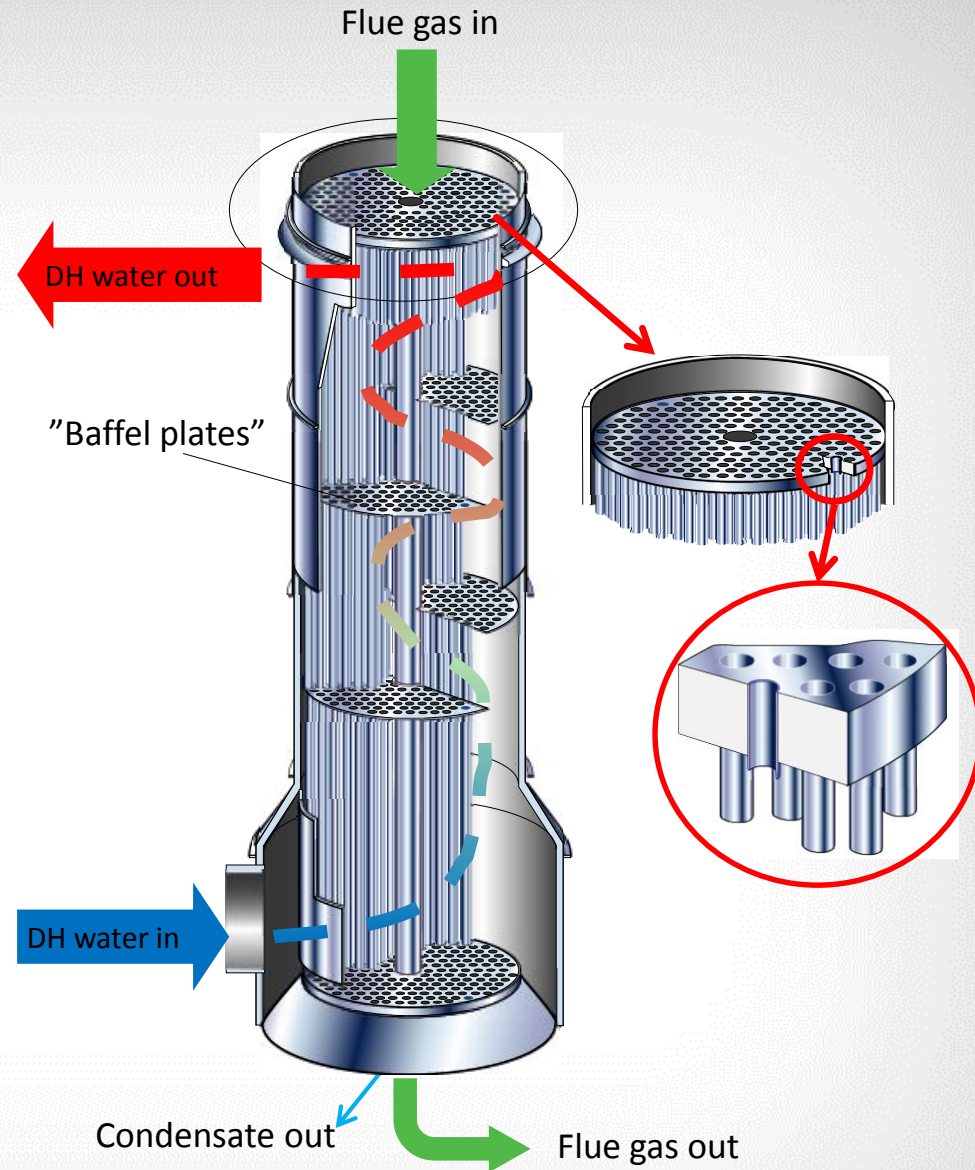
- Condensate taken out in two different places and temperatures
- Achieved benefit even 1 MW

Exhaust gas
158 °C
103,4 Nm³/s



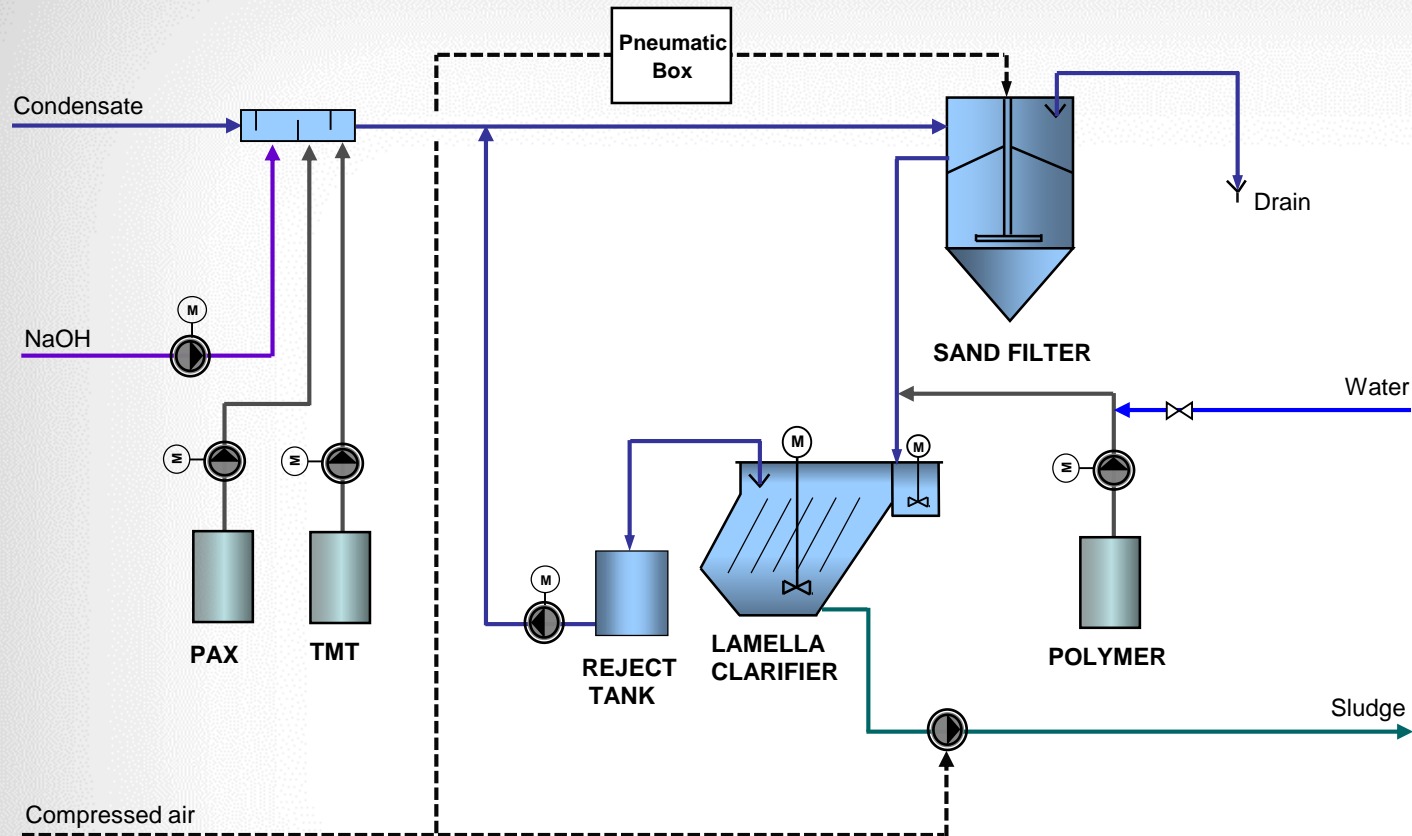
Tube condenser

- Excellent heat recovery
- Flue gas flows inside the tubes and district heating water outside

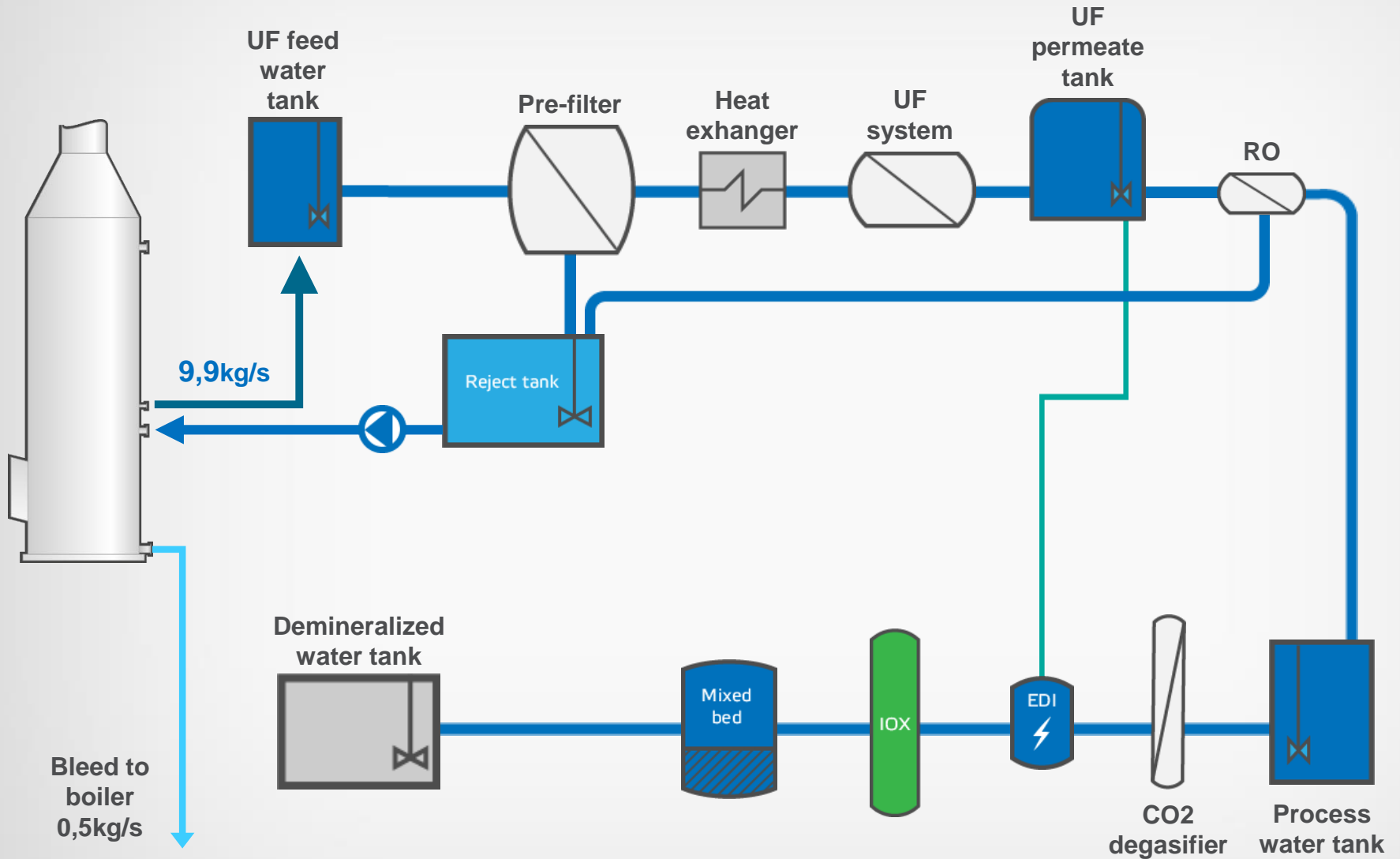


Traditional flue gas condensate treatment

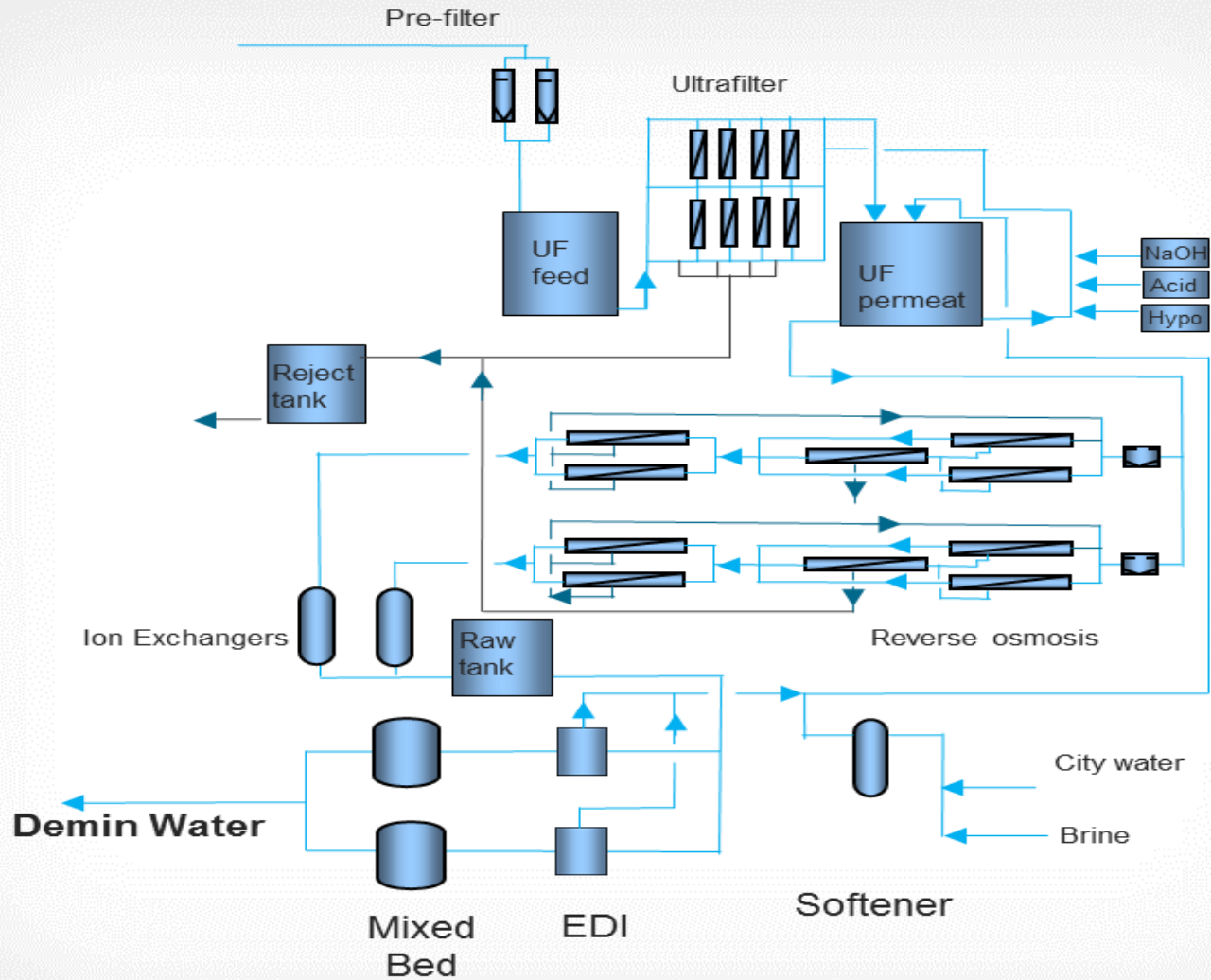
Solid removal



Producing demin water to boiler



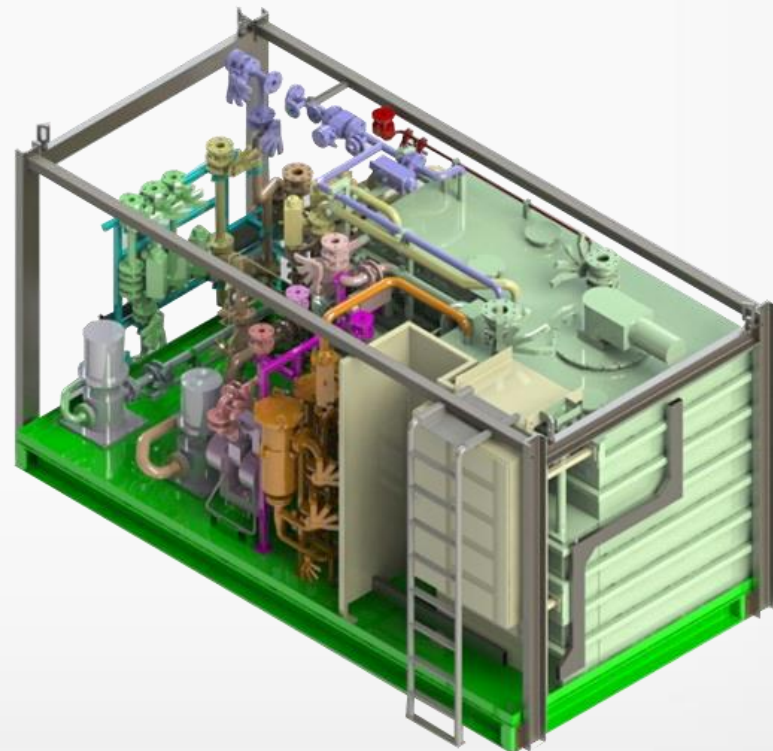
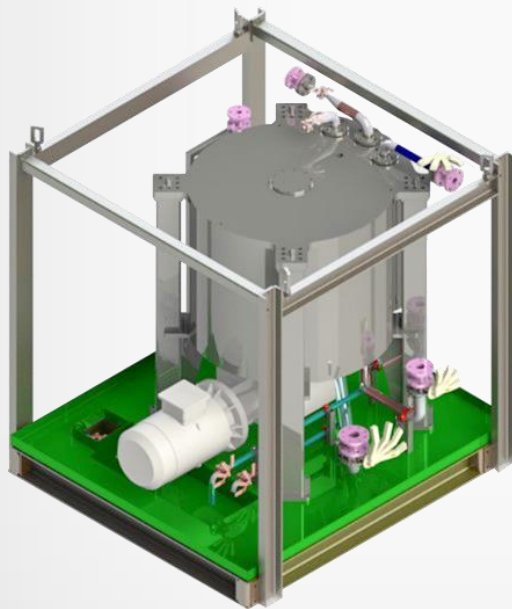
Producing demin water to boiler



Valmet Optifilter

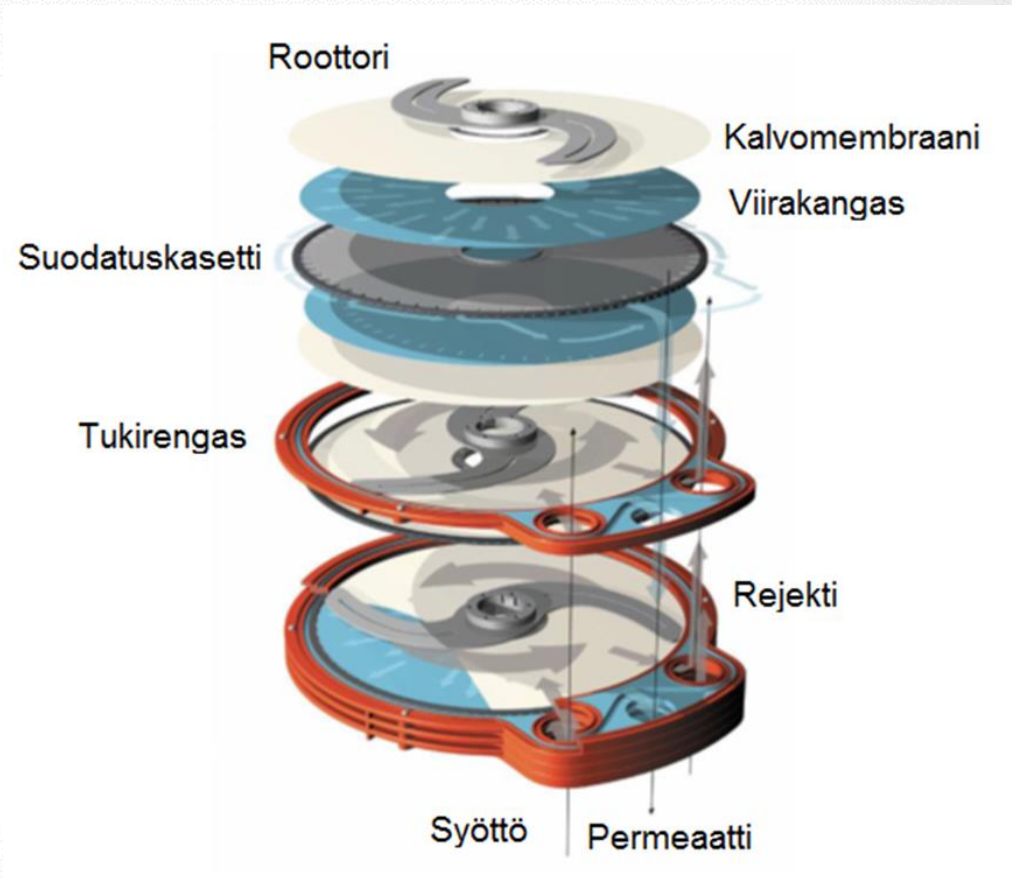
Modular UF-solution for water treatment

- Optifilter can be equipped depending on the application:
 - Ultrafiltration membranes (removal of solids and solid heavy metals)
 - Nanofiltration membranes (salt reduction)



Valmet Optifilter CR technology

- Flat membrane
- Rotor enhanced Cross-flow filtration
- Tolerates high solids and high temperature
- Low pressure with nanomembranes



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