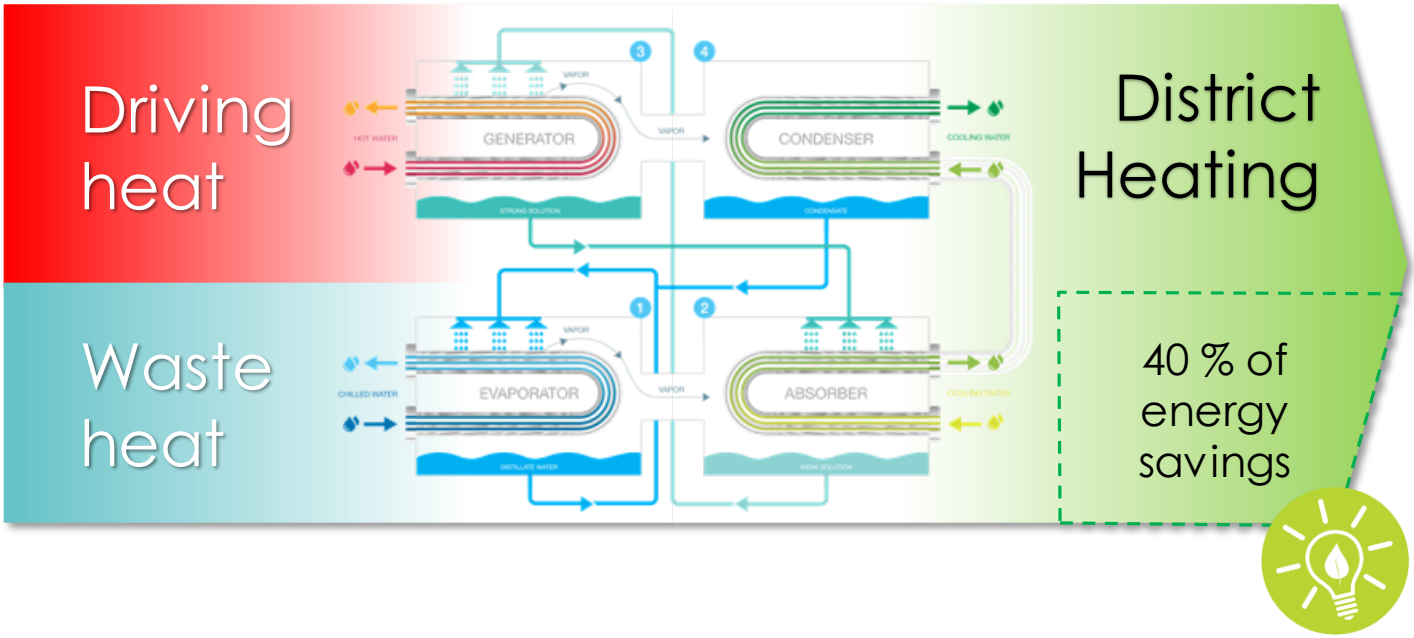
CASE STUDIES & REFERENCES

CNIM INDUSTRIAL SYSTEMS

ABSORPTION HEAT PUMPS FOR DISTRICT HEATING

ABSORPTION HEAT PUMP PRINCIPLE

Converting low temperature waste heat into valuable heat for district heating



CNIM provides absorption chillers and heat pumps, adapted to your processes and installations, to meet specifically your needs for hot & cold production.

PRINCIPLE

- The heat pump converts waste heat at low temperature into valuable heat for district heating
- The absorption heat pump uses thermal energy instead of mechanical energy

MAIN ADVANTAGES OF ABSORPTION TECHNOLOGY

- 40% of energy saved for the same amount of district heating capacity compared to a simple heat exchanger
- Low electrical consumption
- Low maintenance
- No toxic or explosive fluid, no greenhouse gas or explosive fluids
- Low noise and vibration
- Adjustable capacity from 10 to 100%

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FLUE GAS CLEANING WATER HEAT RECOVERY

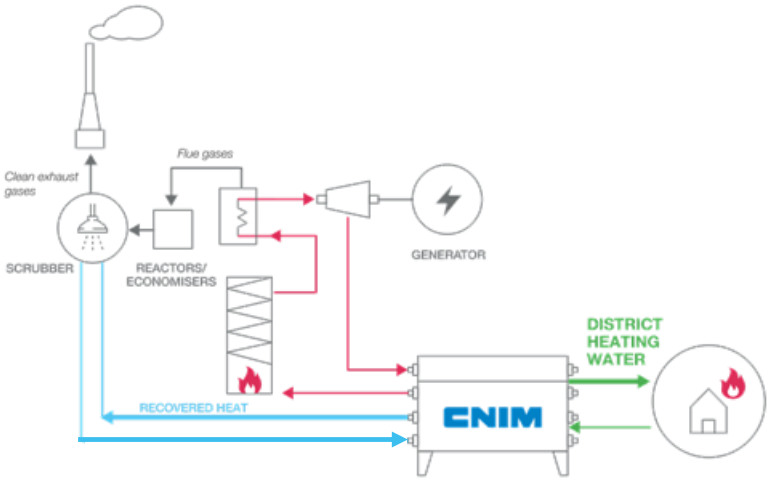
PRINCIPLE

The driving heat is usually low pressure steam, between 3 and 10 bars — Driving heat

The waste heat consists of water coming from a scrubber for flue gas cleaning. The water temperature is around 30 °C to 50 °C — Waste heat

District Heating

SCHEME



REFERENCES

CNIM's References	District heating capacity
District heating Basel *Switzerland*	30 MW
District heating Salzburg *Austria*	7MW
District heating Göteborg *Sweden*	27 MW
District heating Linköping *Sweden*	17 MW

Basel Heat pumps

Salzburg Heat pump

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TURBINE EXHAUST STEAM RECOVERY

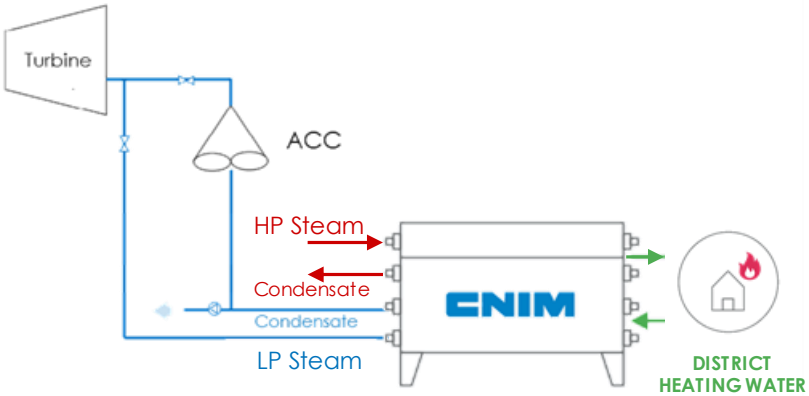
PRINCIPLE

The driving heat is usually low pressure steam, between 3 and 10 bars — Driving heat

The waste heat consists of the low pressure turbine exhaust steam, between 80 and 150 mbar. — Waste heat

District Heating

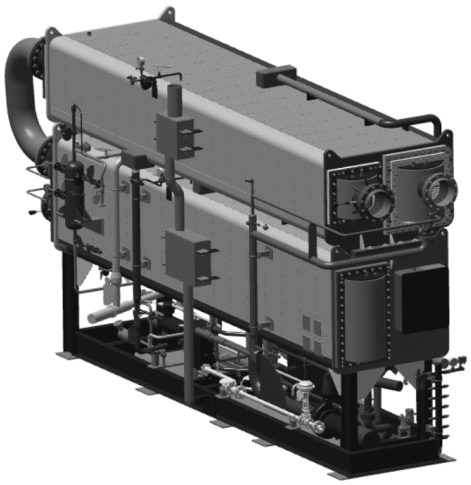
SCHEME



Brive Heat pump

REFERENCES

CNIM's References	District heating capacity
District heating Brive *France*	13 MW
District heating Nantes *France*	3,2 MW



Nantes Heat pump

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LOW TEMPERATURE GEOTHERMAL HEAT RECOVERY

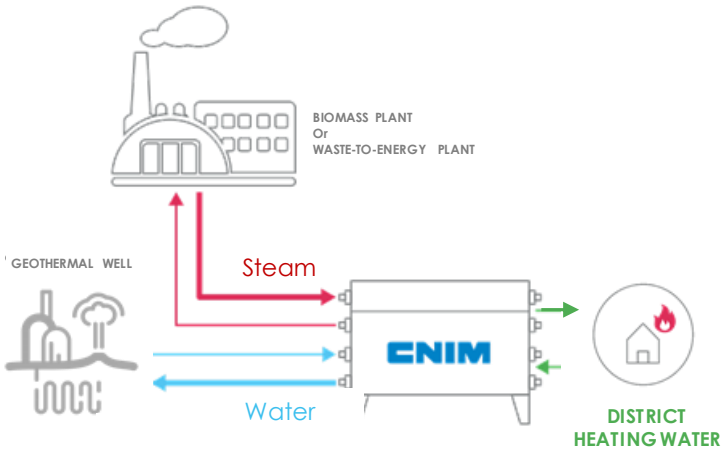
PRINCIPLE

The driving heat is usually low pressure steam, between 3 and 10 bars — Driving heat

The waste heat is water coming from a low temperature geothermal well water, between 30 to 50 °C — Waste heat

District Heating

SCHEME



Klaipedia Heat pumps

REFERENCES

CNIM's References	District heating capacity
District heating Klaipèda *Lithuania*	50 MW
District heating Erding *Germany*	6 MW

Erding Heat pump

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EXHAUST GAS DRIVEN HEAT PUMP

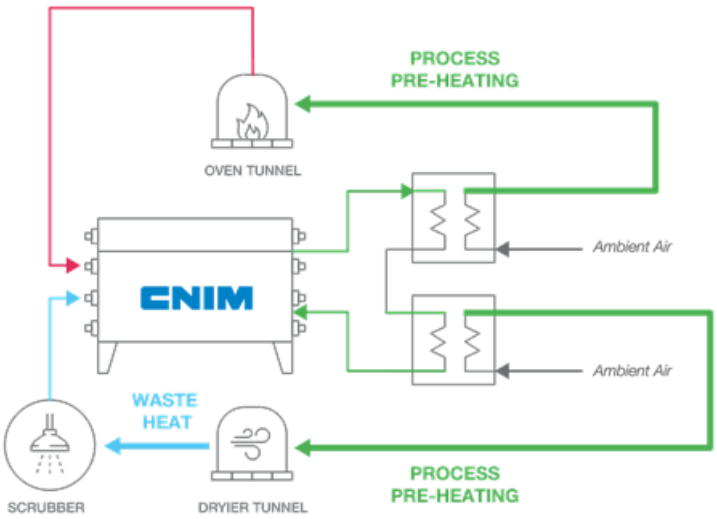
PRINCIPLE

The driving heat is exhaust gas from CHP, boiler or process — Driving heat

The waste heat can be water from exhaust gas cleaning scrubber — Waste heat

District Heating

SCHEME



Haiding Heat pumps

REFERENCES

CNIM's References	District heating capacity
Brick Plant of Haiding *Austria*	1,2 MW

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DISTRICT HEATING WASTE HEAT RECOVERY

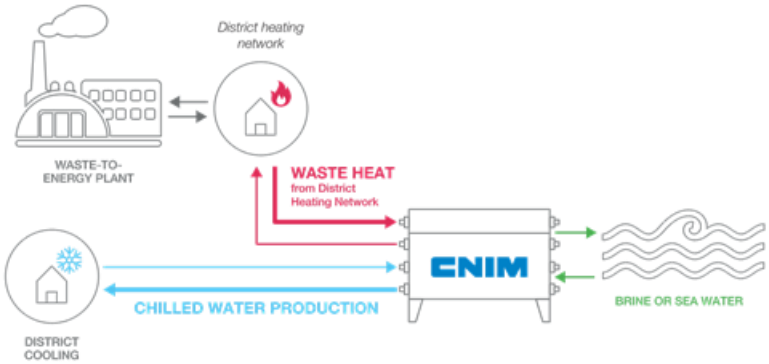
PRINCIPLE

The driving heat is the extra heat provided by the district heating in summer — Driving heat

Cooling water is sea water or cooling tower — Cooling water

District Heating

SCHEME



Helsinki's Chillers

REFERENCES

CNIM's References	District heating capacity
District cooling Helsinki *Finland*	35 MW
District cooling V ästeras *Sweden*	7 MW

Västeras' Chiller

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SEAWATER OR WASTEWATER HEAT RECOVERY

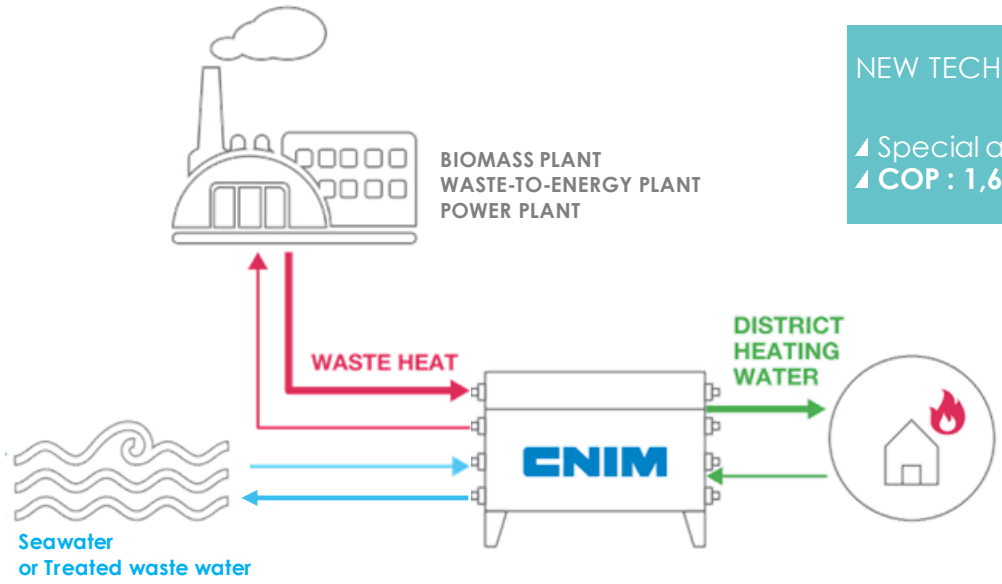
PRINCIPLE

The driving heat is steam from either a waste-to-energy or biomass or power plant — Driving heat

The waste heat is seawater or wastewater at temperature as low as 12°C — Cooling water

District Heating

SCHEME



NEW TECHNOLOGY

- Special absorption cycle
- **COP : 1,65**

TECHNOLOGY

- This machine is based on a innovative absorption cycle, allowing to have a **large temperature difference** of between the district heating, around **70°C**, and the cold source that can be as low as **12°C**.
- The COP varies from 1,3 to 1,65 depending on the available pressure of the driving steam. In order to reach a higher COP, a higher pressure steam is necessary.
- The cycle requires larger machines than a standard single effect machine

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