EUROPEAN HEAT PUMP SUMMIT

POWERED BY CHILLVENTA

SYMPOSIUM + EXPO
NUREMBERG, 20–21.10.2015

Industrial | Commercial | Residential
Heating & Cooling | Components & Equipment

hp-summit.de

NÜRNBERG MESSE

Large Scale Absorption Heat Pumps

For Industry, Data Center and District Heating

Based on Lithium Bromide units

Presentation overview

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1. Different types of absorption heat pumps and heat transformer

2. Difference between absorption heat pumps Class I, Class II and heat transformer

3. Application and site experience of class I heat pumps

4. Application and site experience of class II heat pumps

5. Heat transformer

6. Thank you & contact information

Different types of absorption heat pumps and heat transformer

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We are classifying the Absorption Heat Pumps and Heat Transformers into 3 categories

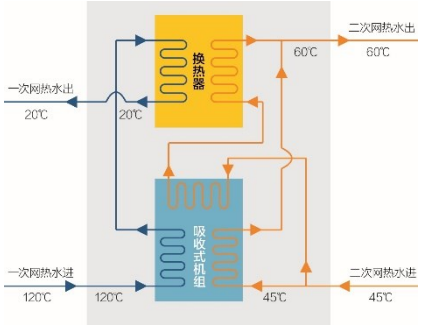
- Heat pumps driven by external heat source such as steam, flue gas, gas burner etc.
  The capacity range from 1MW to 90MW
  max. supply heat 100°C
  COP 1.4 to 2.4

- Heat pumps driven by heat source
  The capacity range from 1MW to 10MW
  max. supply heat 160°C
  COP 0.4 to 0.6

- Heat transformers
  The capacity range from 2MW to 20MW
  Primary 120 to 20°C
  Secondary 45 to 60°C

Heat Pump Class I

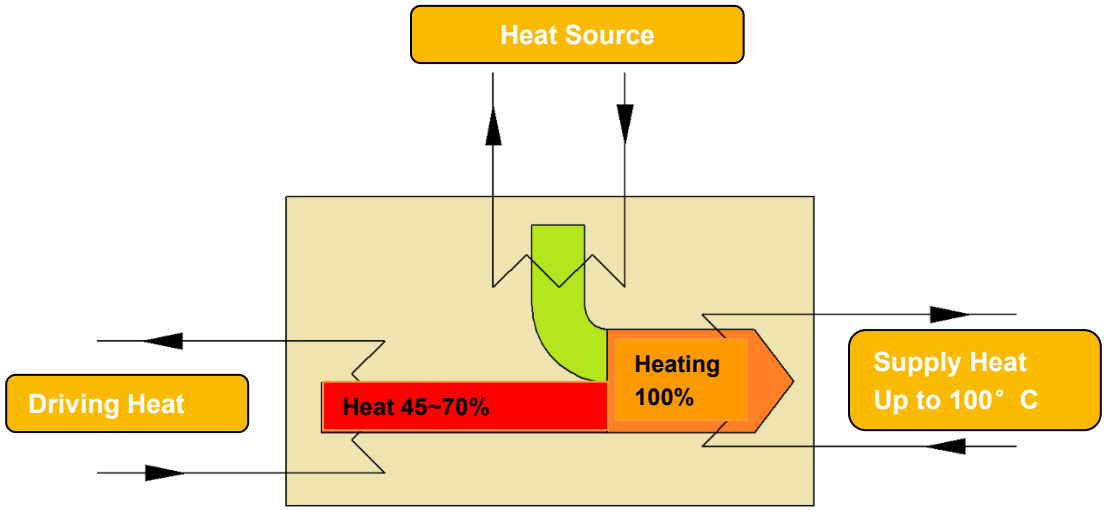
Heat Pump Class II



Heat Transformer

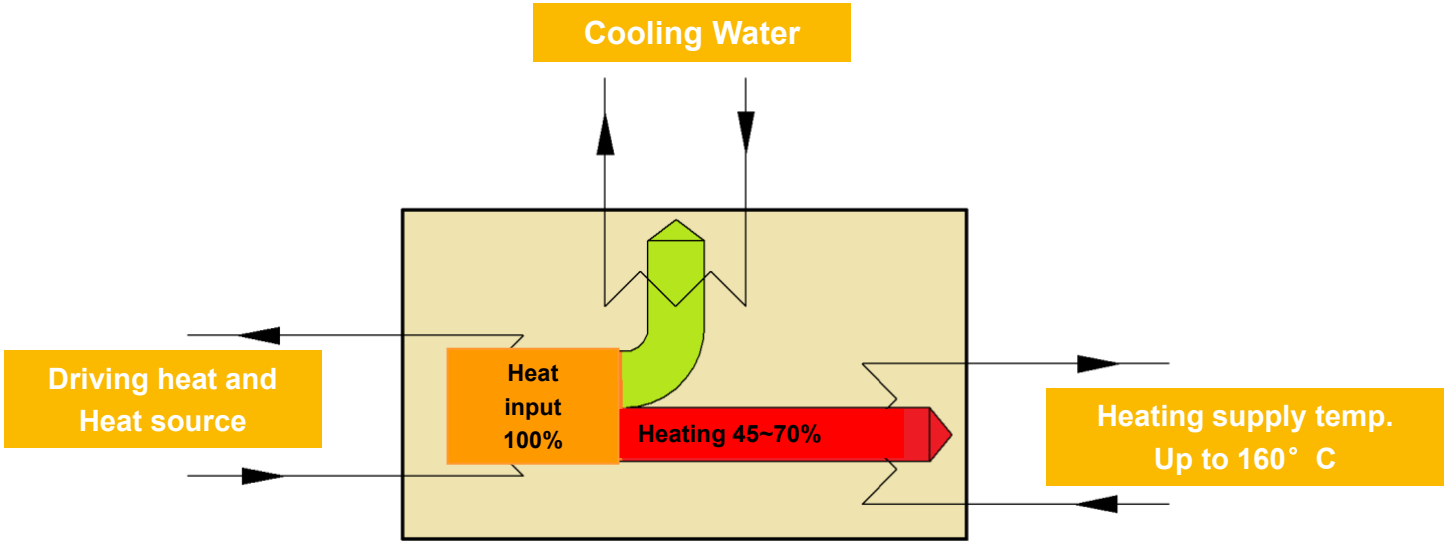
Absorption Heat Pump Category I

- **The COP of category 1, heat pumps ≙ 1.4~2.3 (Medium temperature – heating / high temperature heat source)**
- **Double effect: ca. 2.4, Single effect: ca. 1.7, 2 Stage (Cascade): ca. 1.4**



Absorption Heat Pump Category II

COP of category II heat pumps ≅ 0.32~0.6 （High temp. heating/ Mediumtemperature）
Double effect ca. 0.6, Single effect ca. 0.48,2-stage (cascade) ca. 0.32



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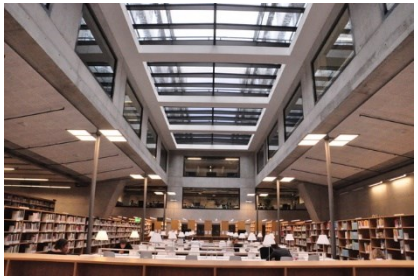
The Building is according to Swiss Standarts Minergie-P (30kWh/m^{2}J)



Original Design for heating was the use of district heating
The cooling for data centre by chillers and free cooling.

To increase the efficency the solution was

Heat Pump Class I

District heating
100%
Driving heat

160 / 125°C

15 / 11°C

Data Center
70%
Heat source

30 / 70°C

Heating 170%
of Driving heat

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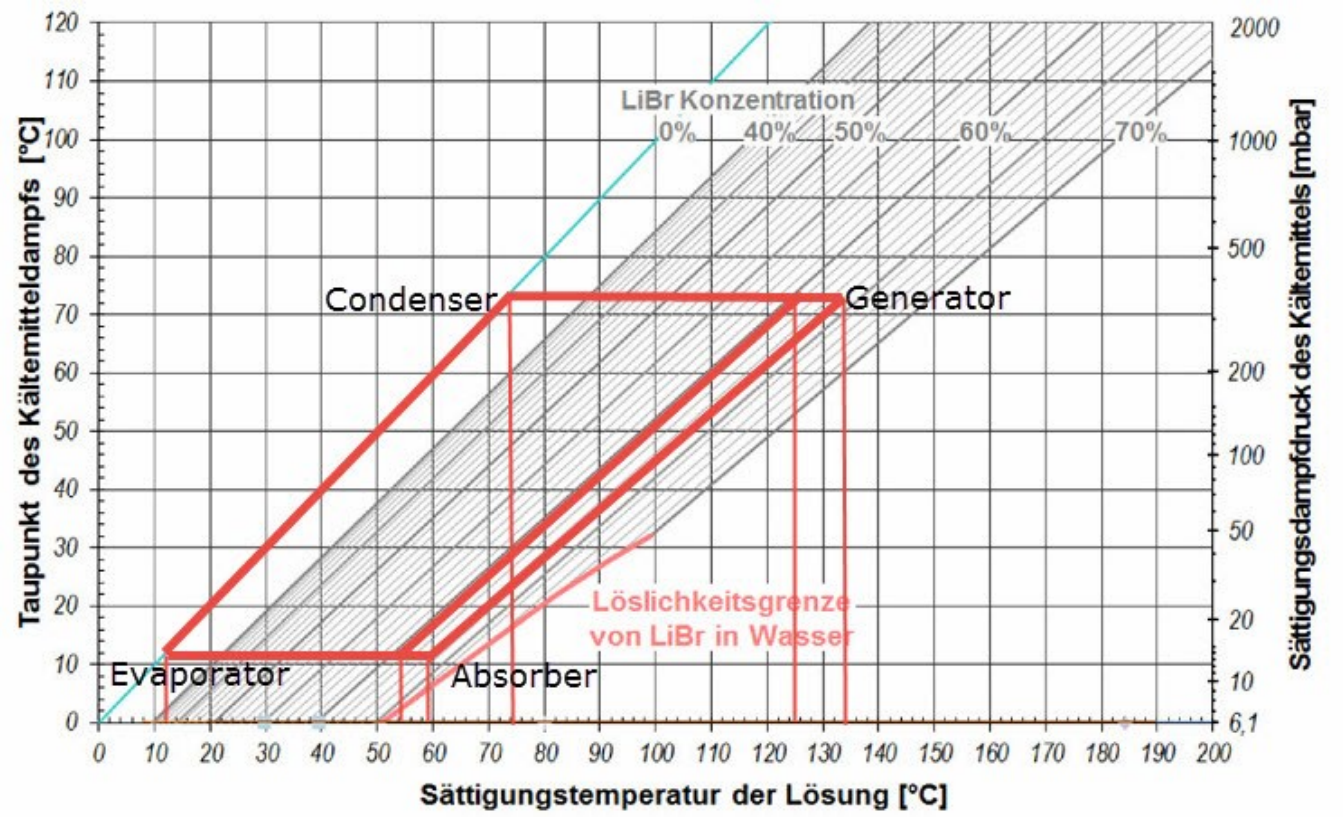
As in many case the Absorption units are running at the limit of crystallisation it is very important that all the controls and flow rates are operating in their limits



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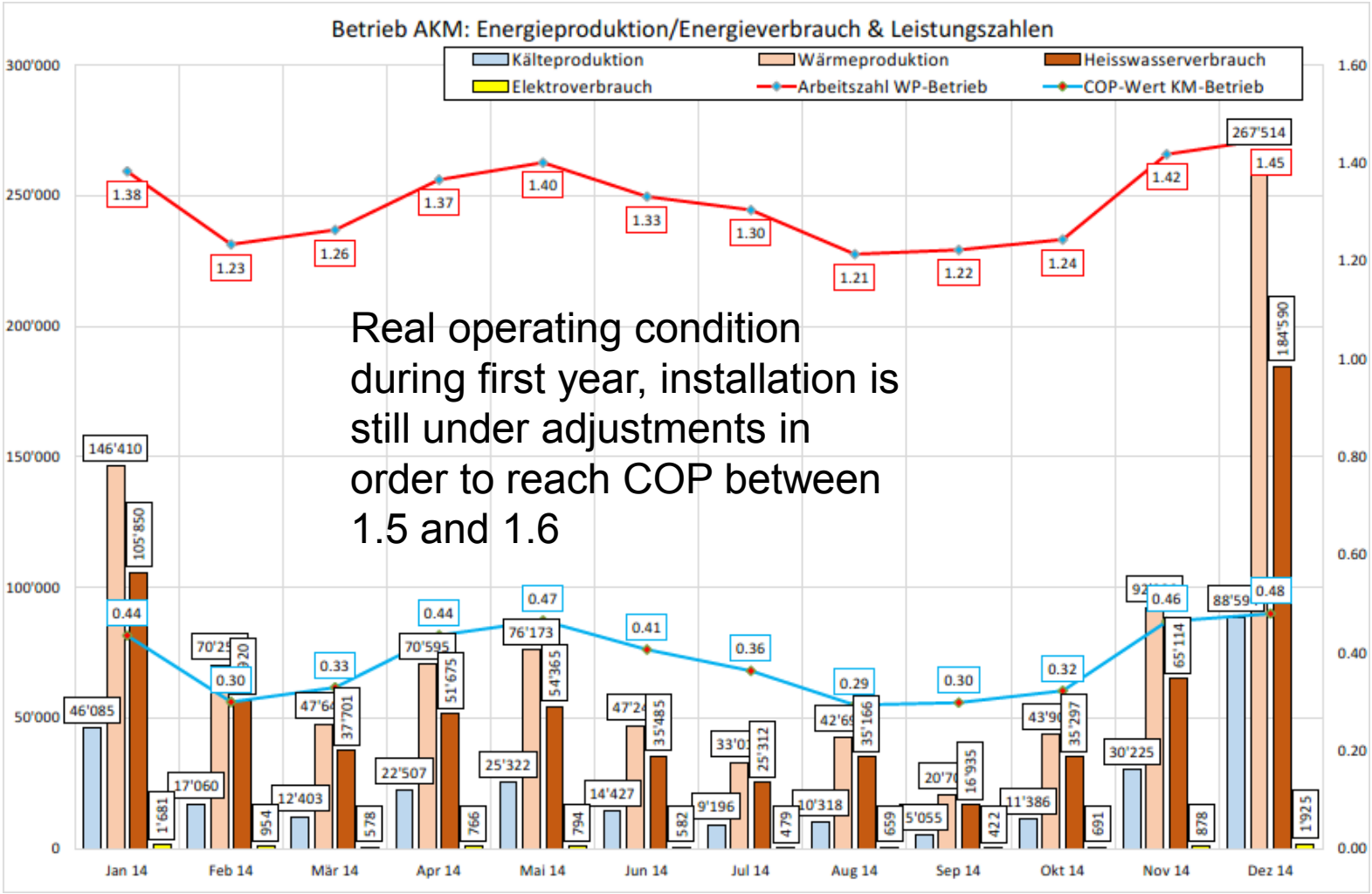

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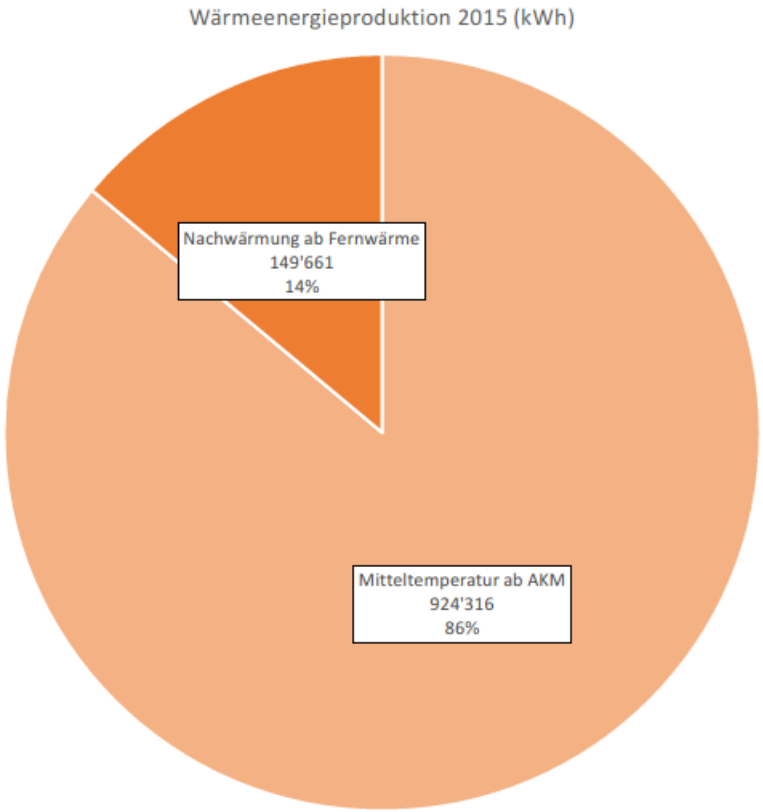
Heat coverage by Absorption heat pump 86%



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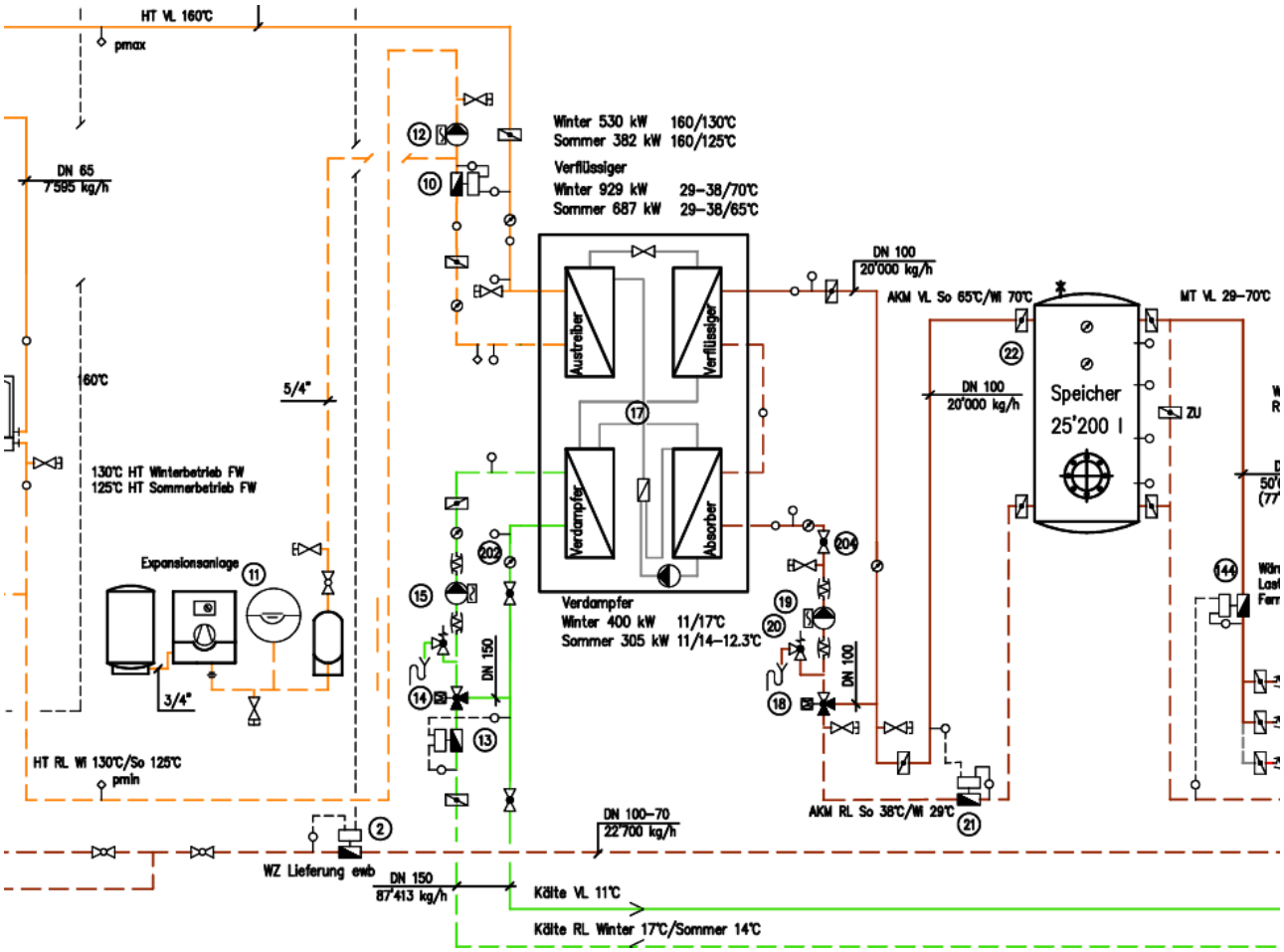

Applicatation with high temperature geothermal heat

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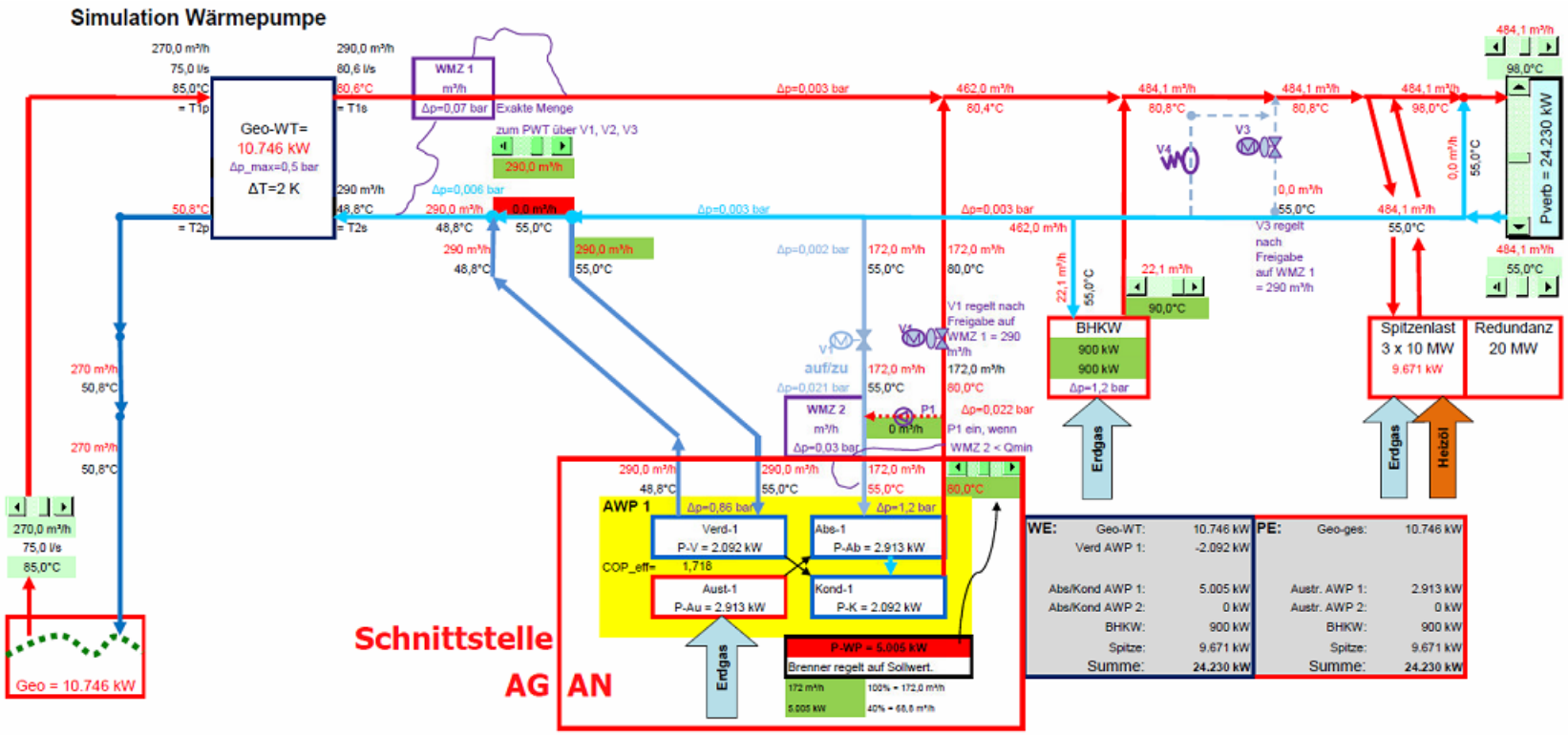
Geothermal source with 10MW. To use more energy of heat source the return will be cooled down to get more energy



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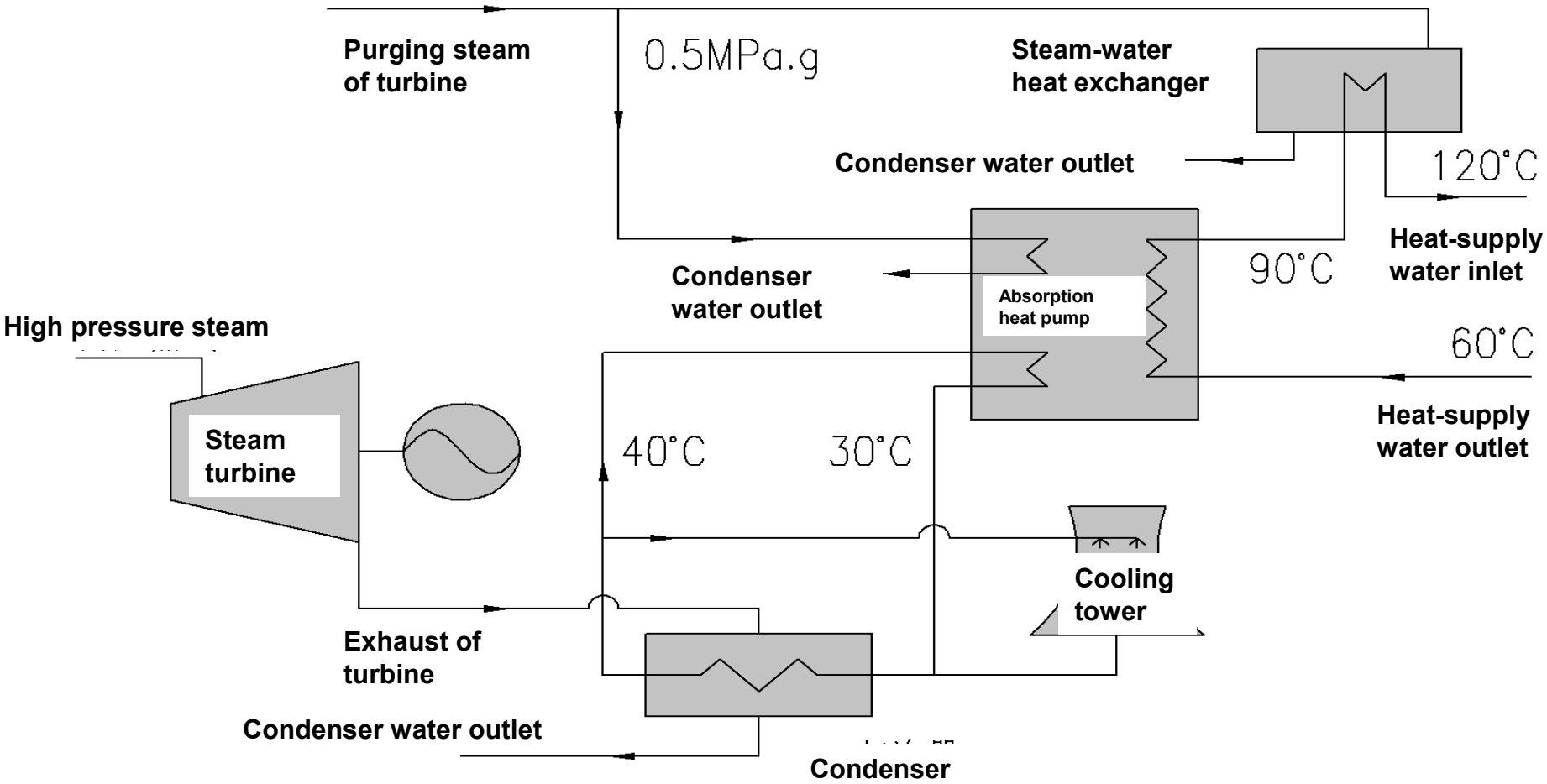
Applicable industries and processing positions of the 1st category heat pump—Centralized heating supply

Application of heat pump in power plant --- Water-cooling system (2)



Absorption Heat Pump Category II

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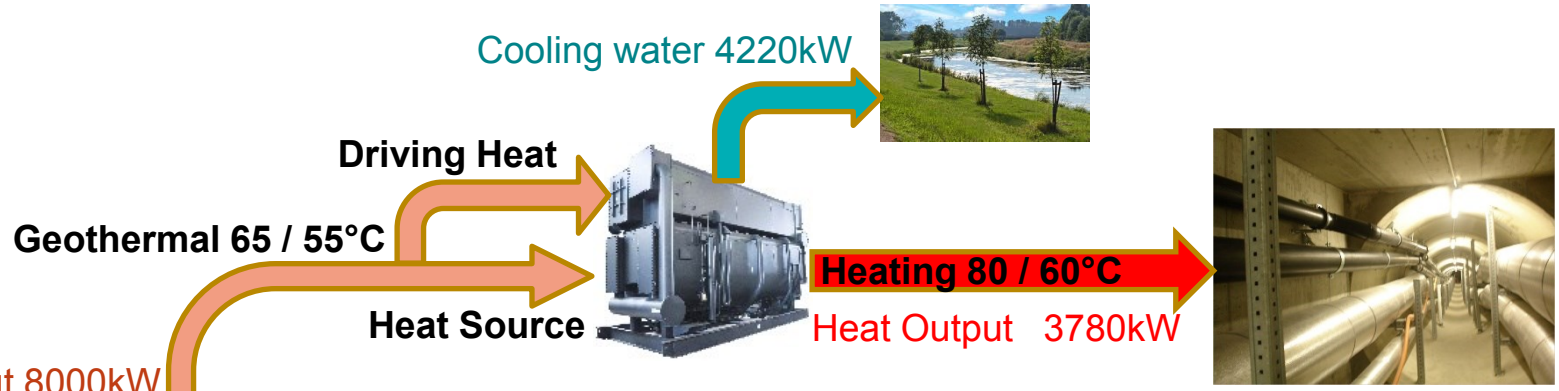
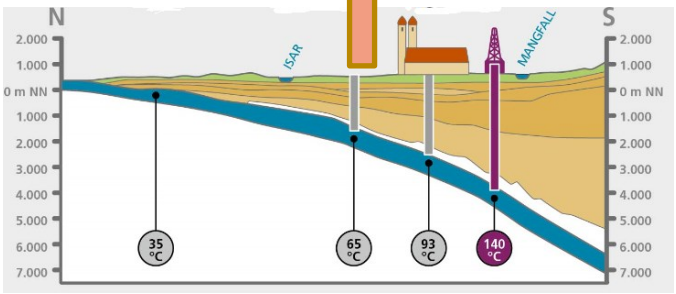
Practical application



Heat Input 8000kW



Heat PumpClass II

Electrical Input 20kW

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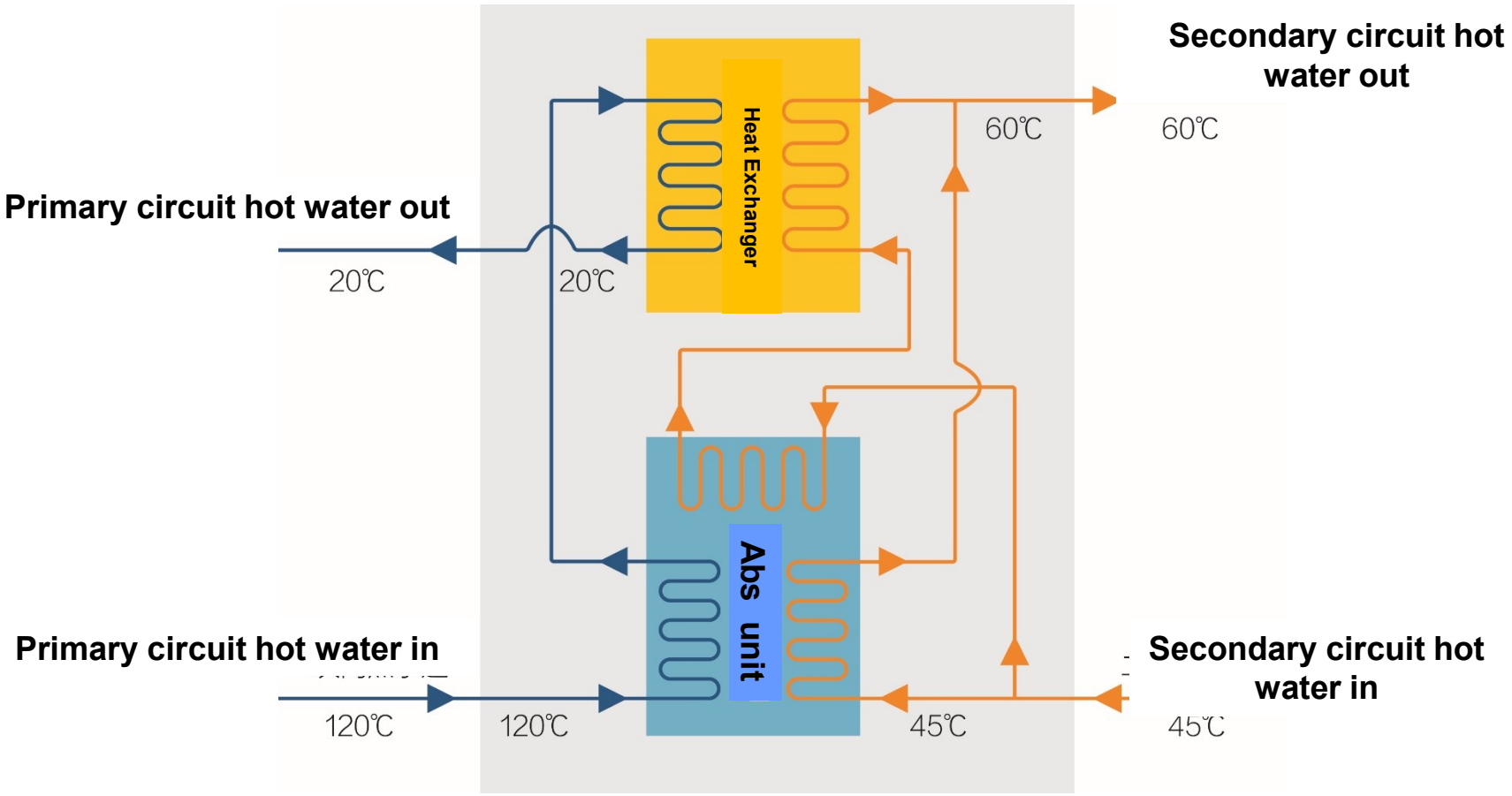
Working Principle



Capacity starts from 2MW

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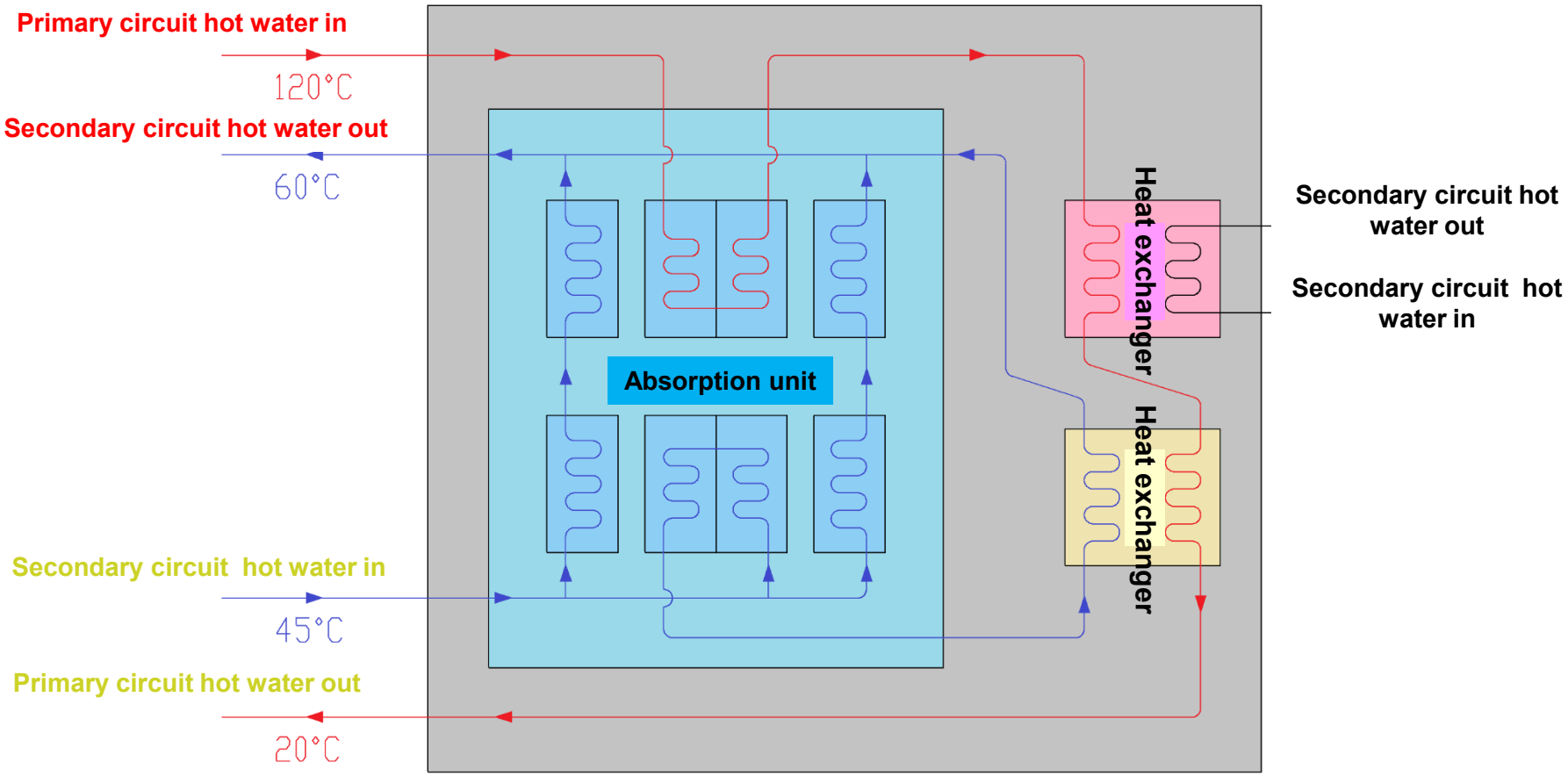
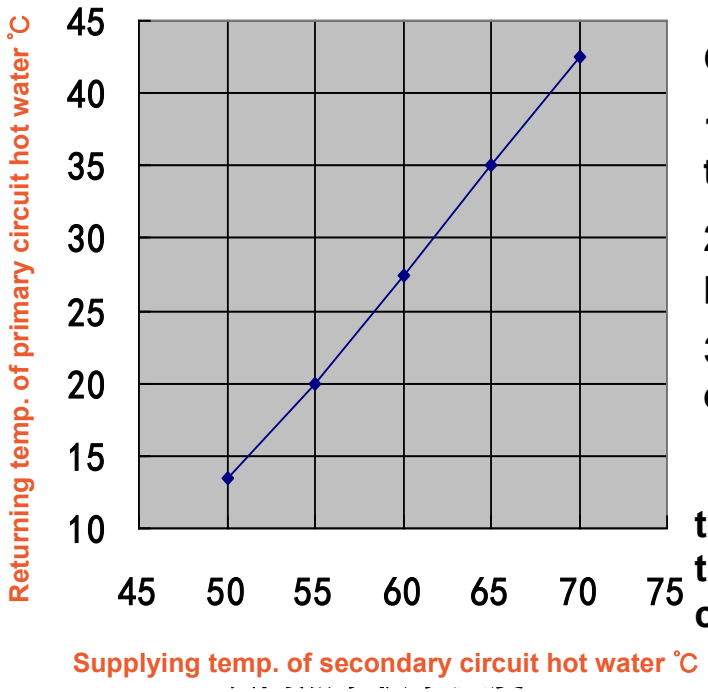
Structure of SL patent heat exchanging module — Two set of secondary hot water piping net



Characteristic curve of SL patent heat exchanging module — Without burner type

a. Relation curve between returning temp. of primary circuit hot water and supplying temp. of secondary circuit hot water



Conditions:

1.Primary circuit hot water piping net supplying temp.:120℃

2.Temp. difference of secondary circuit hot water piping net supplying and returning :10℃

3. Heat exchanging capacity of the secondary heat exchanger station:100%

（For reference only，by increasing the heat transferring area of module，returning water temp. of the primary circuit can be further lower at same conditions）

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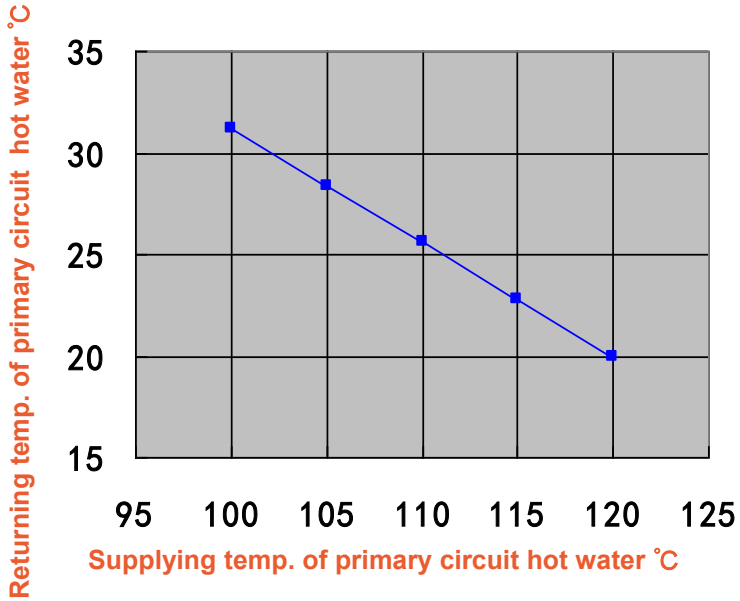
Characteristic curve of SL patent heat exchanging module — Without burner type

b. Relation curve between returning temp. of primary circuit hot water and supplying temp. of primary circuit hot water

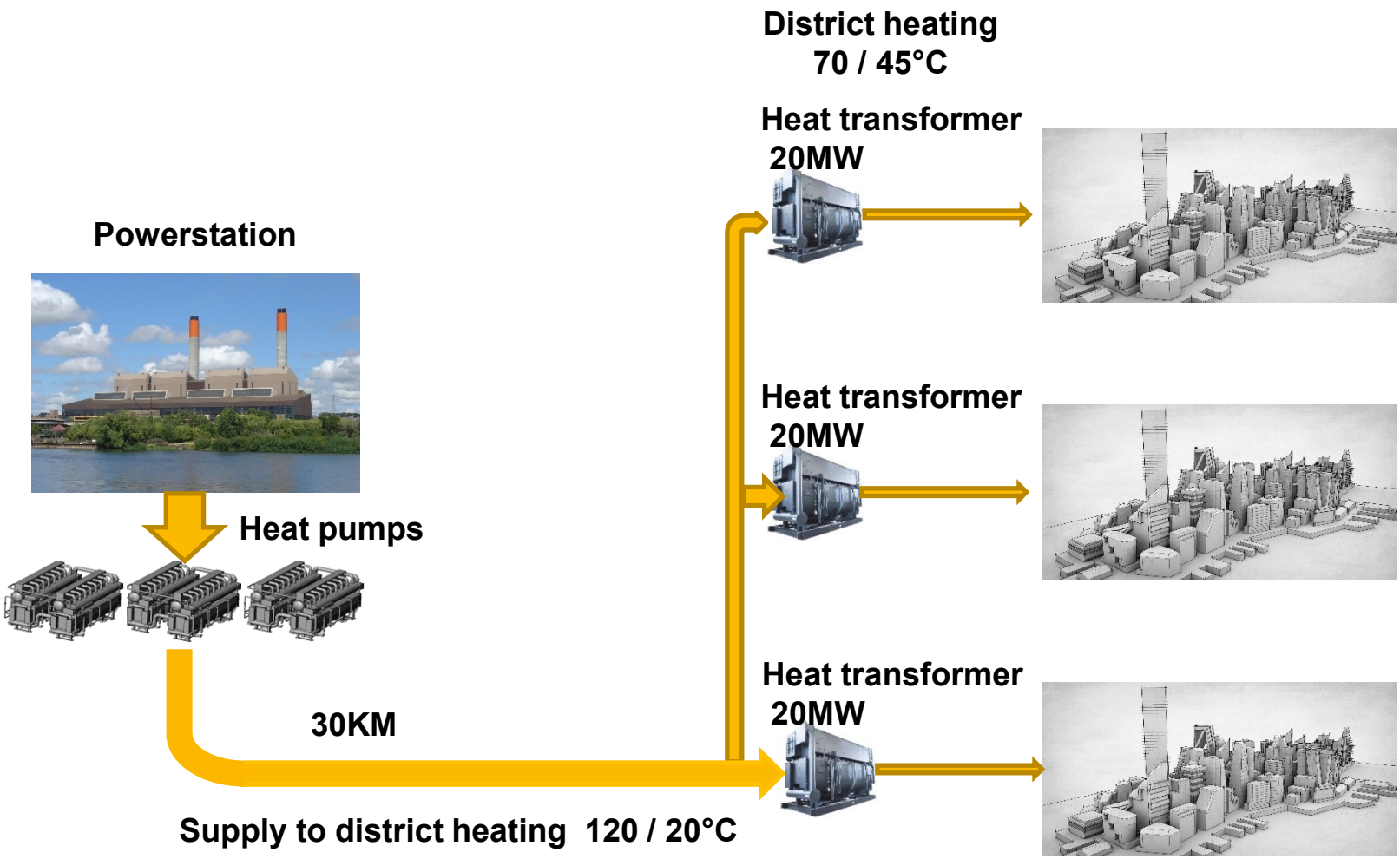


Conditions:

1.Secondary circuit hot water supplying and returning temp. :55/45℃

2.Heat exchanging capacity of the secondary heat exchange station:100%

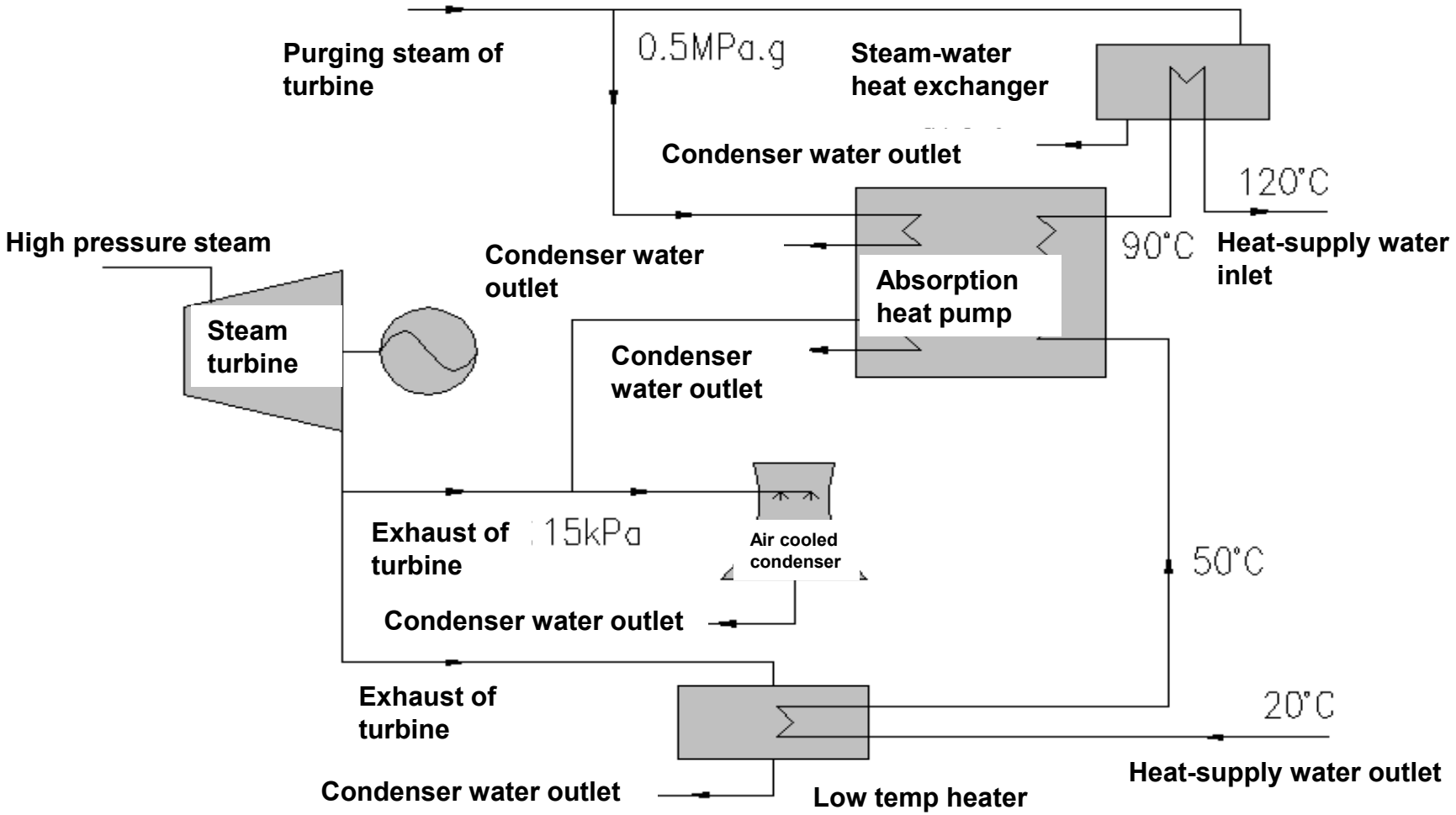
Heat Transformer



Power Plant and return from heat transformer

11. Applicable industries and processing positions of the 1st category heat pump—Centralized heating supply

Application of heat pump in power plant --- Air cooled without condenser system (3)



For more Information

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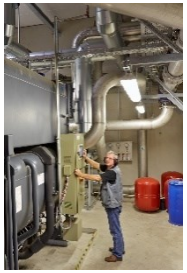
Complete range in absorption technology

The European Know How in Absorption Technologies

SHUANGLIANG ECO-ENERGY



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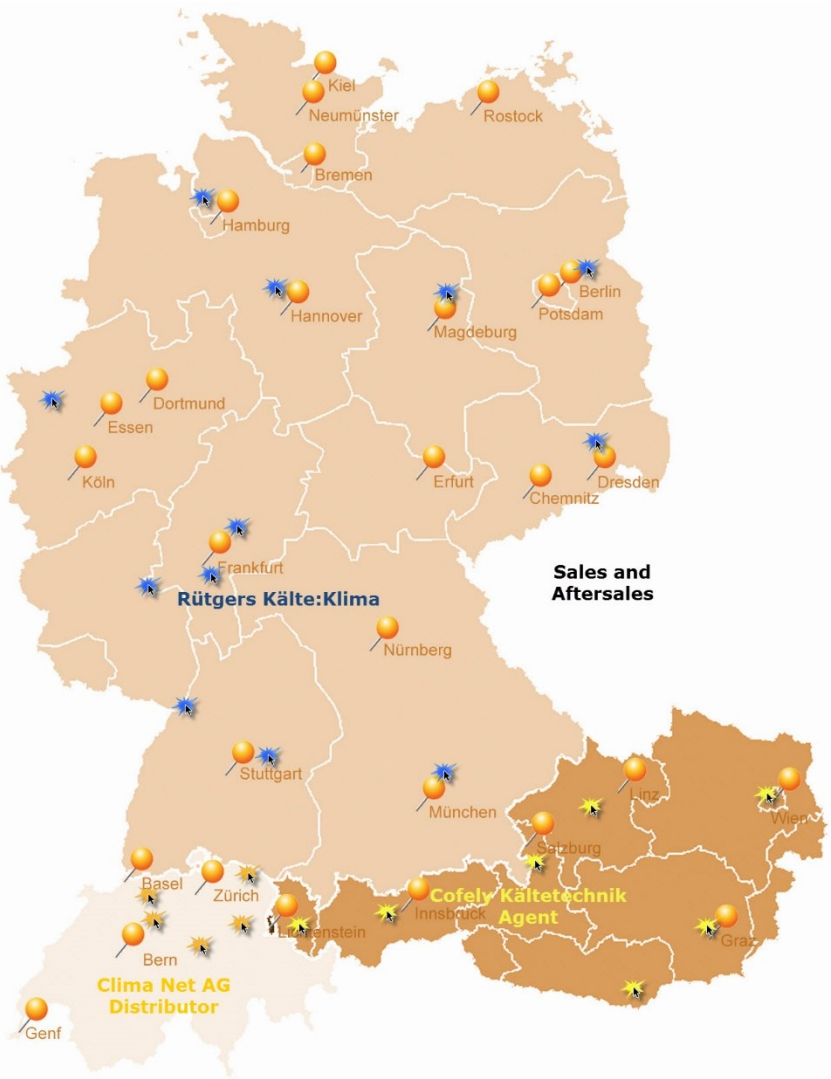

I thank you very much for your attention

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The European Know How in Absorption Technologies
SHUANGLIANG ECO-ENERGY