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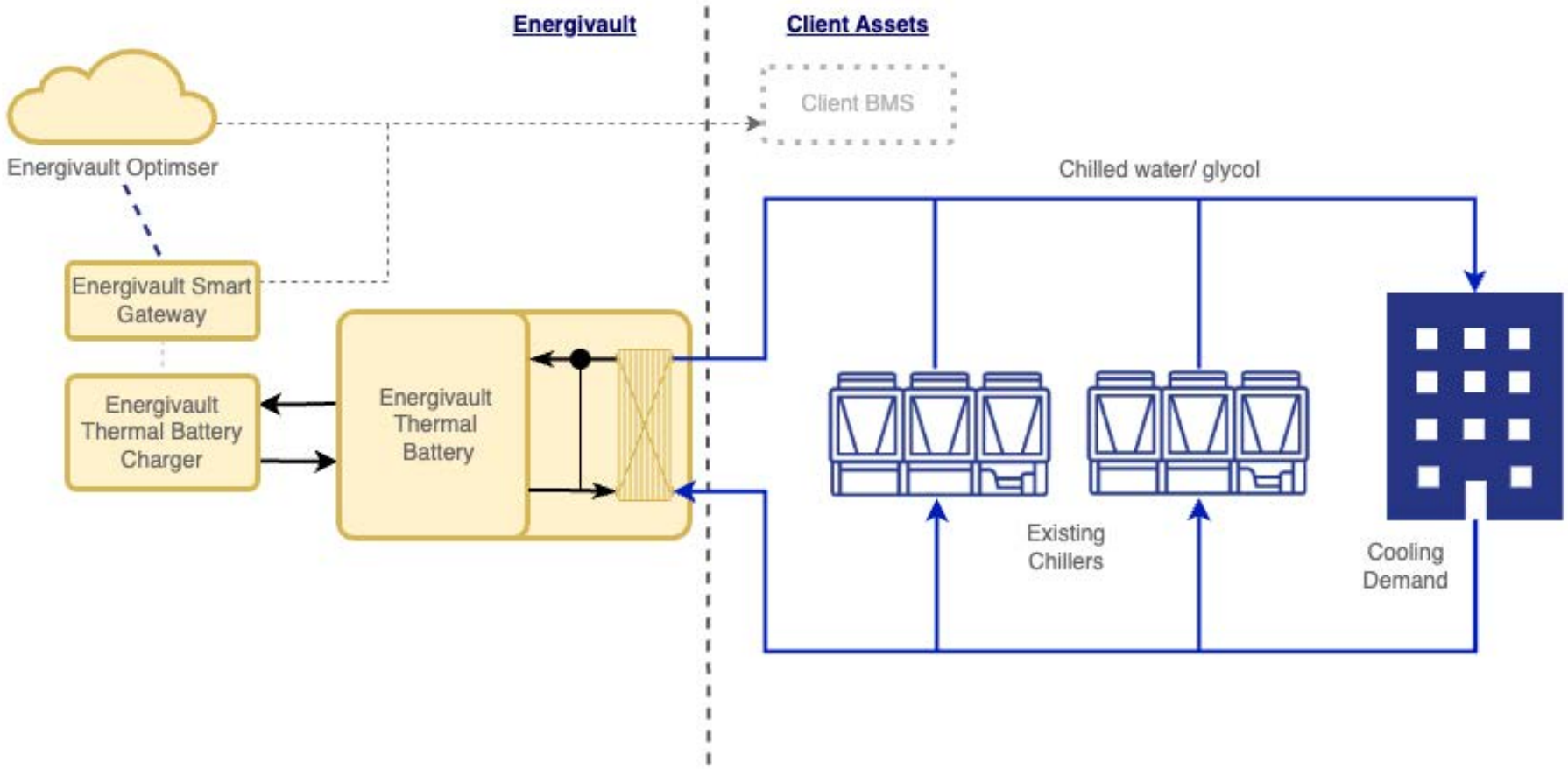
ORGANIC HEAT EXCHANGERS

ENERGIVAULT COLD THERMAL ENERGY STORAGE
Reference Configuration



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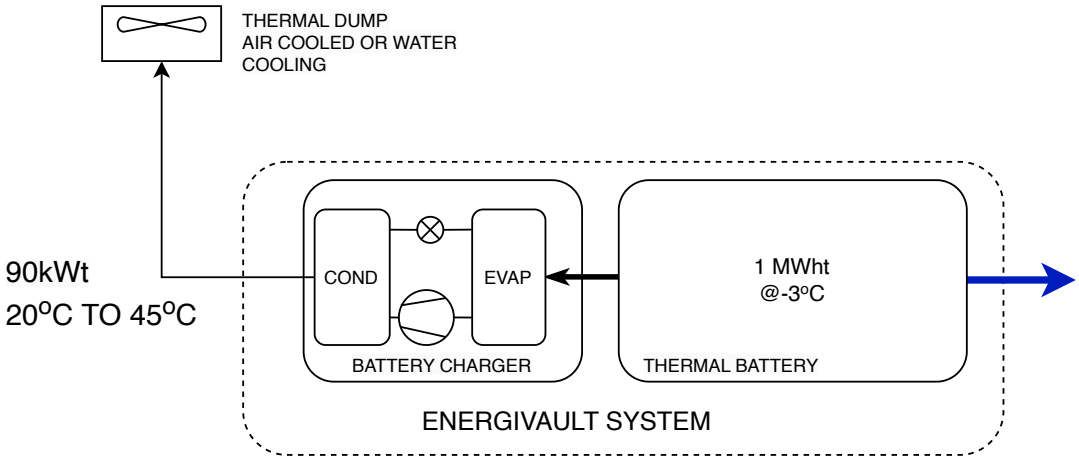
1 - ENERGIVAULT COLD THERMAL ENERGY STORAGE
Dynamic chiller cooling support



COOLING ON DEMAND
UP TO 250kWt
NOMINAL (SHORT TERM UP TO 500KW)

IN SERIES OR PARALLEL WITH EXISTING CHILLERS

VALUE ELEMENTS
- ENERGY COST REDUCTION
  - LOAD SHIFTING
  - HEAT RECOVERY
  - CHILLER OPTIMISATION
- RESILIENCE
  - PEAK SUPPORT
  - BACK UP COOLING
- CO2 REDUCTION

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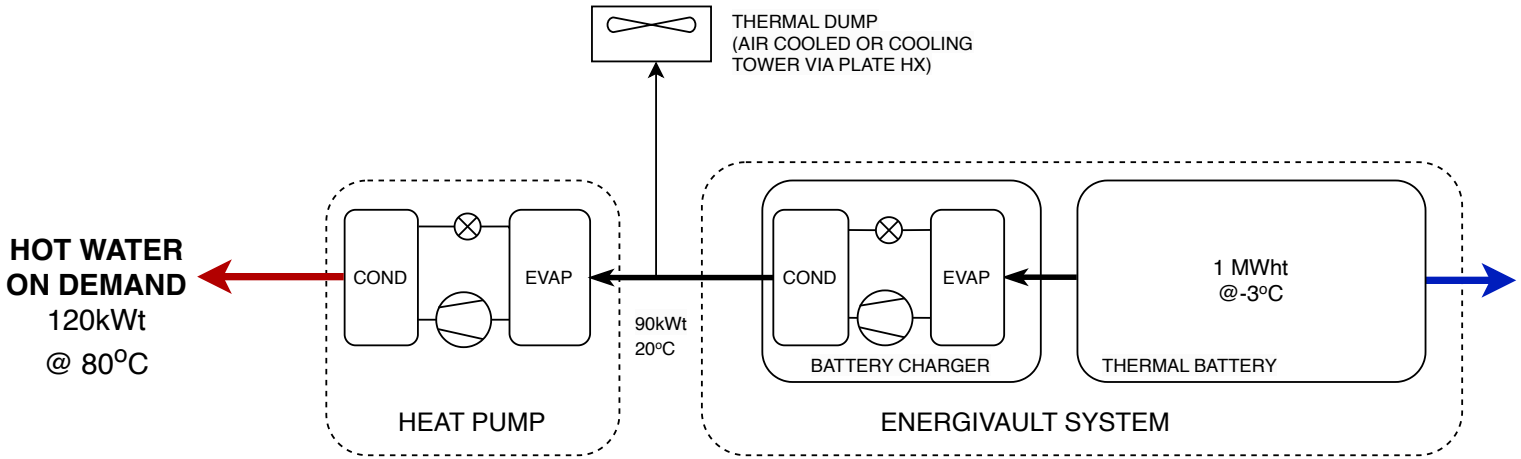
2 - INTEGRATED HEAT PUMP AND ENERGIVAULT
Balancing heat on demand with cold energy storage



COOLING ON DEMAND
UP TO 250kWt
NOMINAL (SHORT TERM UP TO 500KW)

IN SERIES OR PARALLEL WITH EXISTING CHILLERS

- LIQUID TO LIQUID HEAT PUMP
- CONSTANT LOW TEMPERATURE EVAPORATING TEMPERATURE MAXIMISES COP
- NO DEFROST NEEDED

BENEFIT:
16 hours/ day running
1920 kWh @ 80°C hot water
1000kWh @-3°C cold store

VALUE ELEMENTS
- ENERGY COST REDUCTION
  - LOAD SHIFTING
  - HEAT RECOVERY
  - CHILLER OPTIMISATION
- RESILIENCE
- PEAK SUPPORT
- BACK UP COOLING
- CO2 REDUCTION

DECOUPLED HEAT DEMAND FROM COOLING DEMAND

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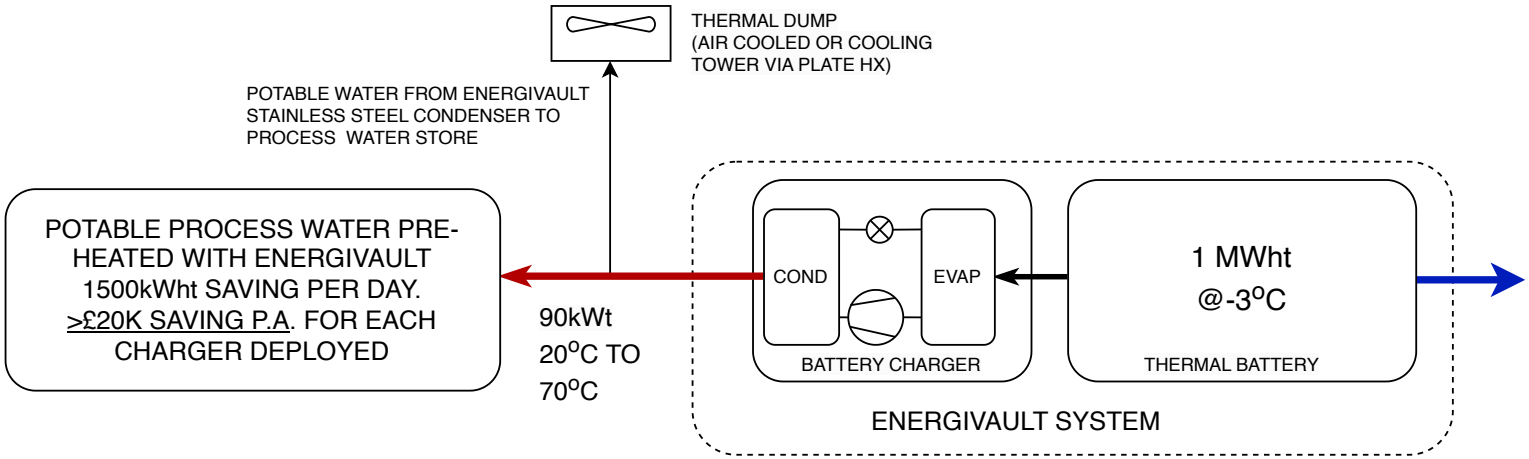
3 - INTEGRATED PROCESS WATER PRE-HEAT AND ENERGIVAULT

Preheating process water whilst Energivault charges



COOLING ON DEMAND
UP TO 250kWt
NOMINAL (SHORT TERM UP TO 500KW)

IN SERIES OR PARALLEL WITH EXISTING CHILLERS

ENERGIVAULT CHARGER AS HEAT PUMP - COOLING OF HEAT LEAD

VALUE ELEMENTS
- ENERGY COST REDUCTION
  - LOAD SHIFTING
  - HEAT RECOVERY
  - CHILLER OPTIMISATION
- RESILIENCE
  - PEAK SUPPORT
  - BACK UP COOLING
- CO2 REDUCTION

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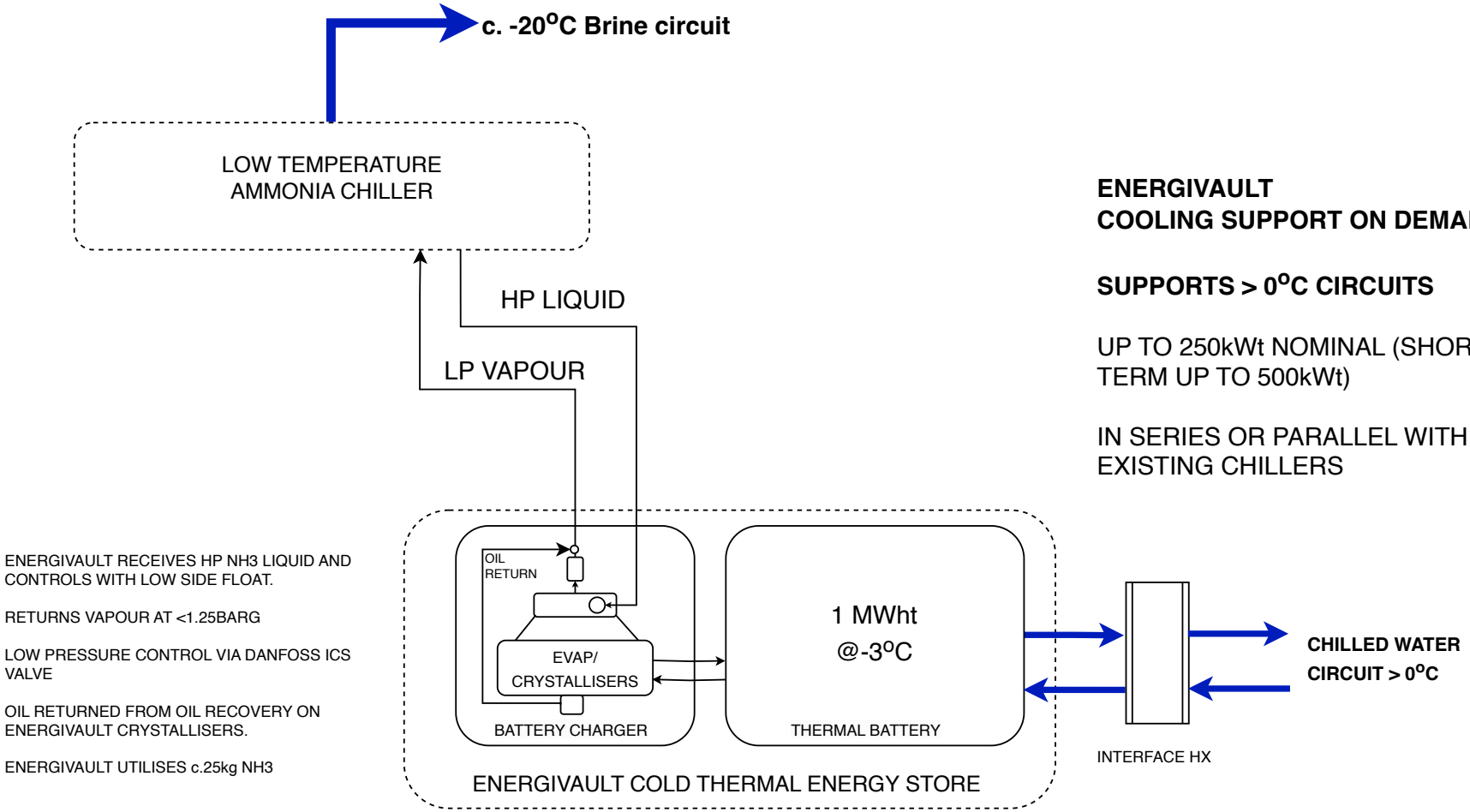
4 - INTEGRATED LOW TEMPERATURE AMMONIA CHILLER AND ENERGIVAULT COLD THERMAL ENERGY STORAGE

Utilising Excess capacity ammonia chiller to charge Energivault for chill applications



ENERGIVAULT COOLING SUPPORT ON DEMAND

SUPPORTS > 0°C CIRCUITS

UP TO 250kWt NOMINAL (SHORT TERM UP TO 500kWt)

IN SERIES OR PARALLEL WITH EXISTING CHILLERS

ENERGIVAULT RECEIVES HP NH3 LIQUID AND CONTROLS WITH LOW SIDE FLOAT.

RETURNS VAPOUR AT <1.25BARG

LOW PRESSURE CONTROL VIA DANFOSS ICS VALVE

OIL RETURNED FROM OIL RECOVERY ON ENERGIVAULT CRYSTALLISERS.

ENERGIVAULT UTILISES c.25kg NH3

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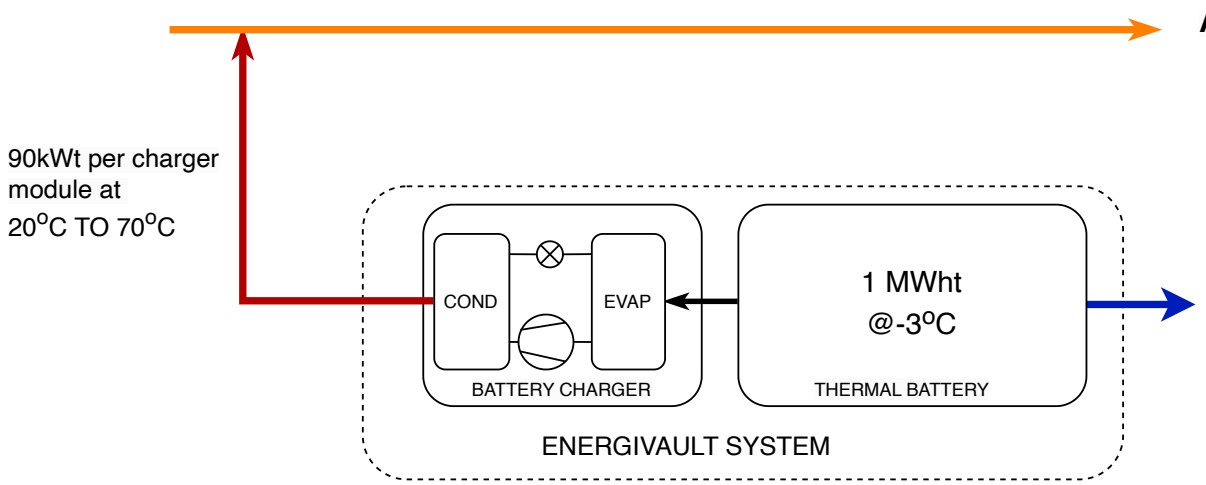
5 - ENERGIVAULT INTEGRATED WITH HEAT NETWORK
Heat Recovery into ambient loop



COOLING ON DEMAND
UP TO 250kWt NOMINAL (SHORT TERM UP TO 500KW)

IN SERIES OR PARALLEL WITH EXISTING CHILLERS

VALUE ELEMENTS
- ENERGY COST REDUCTION
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  - PEAK SUPPORT
  - BACK UP COOLING
- CO2 REDUCTION

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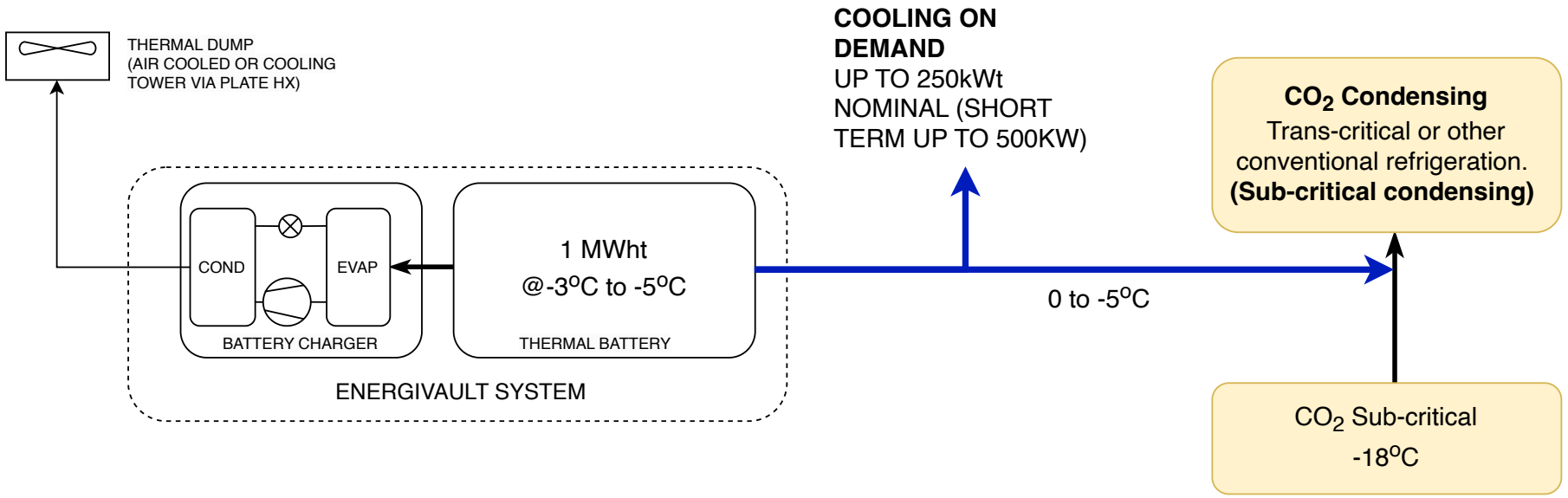
6 - ENERGIVAULT & LOW TEMPERATURE CO_2 SYSTEM

Heat Recovery into ambient loop



LOW TEMPERATURE CO2

Energivault guarantees condensing of sub-critical CO_2.

Replaces CO_2 transcritical system or other refrigeration system.

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