Heat recovery by Danfoss

Contact Data

Company Name:	Orbital Farm
Country:	NL
Contact Person:	Bryson
Contact information:	scot.bryson@orbital.farm

Technical input

User of Excess heat is:	External use
Type of heat recovery:	HEX (separation) and HP (boost)
Agreed Heat sales price:	Data center cooling (fluid)
Excess heat available capacity:	10 MW
Excess temp. supply side:	45 °C
Excess temp. return side:	33 °C
Heat demanded by user:	10 MW
Supply temp. from HP:	45 °C
Return temp. from consumer:	35 °C
Availability and demand match:	See diagram Energy & Emission
Current type of heating:	Gas Boiler
Cost of current type of heating:	0.08 EUR/kWh
Cost of electricity:	0.08 EUR/kWh
Agreed Heat sales price:	0.01 EUR/kWh

Disclaimer

These are calculated values for guideline purposes and as such is not guarantee. Danfoss A/S cannot be held responsible for the stated energy- or emissions saving, they are intended only for indicative purpose, before an actual project is defined.

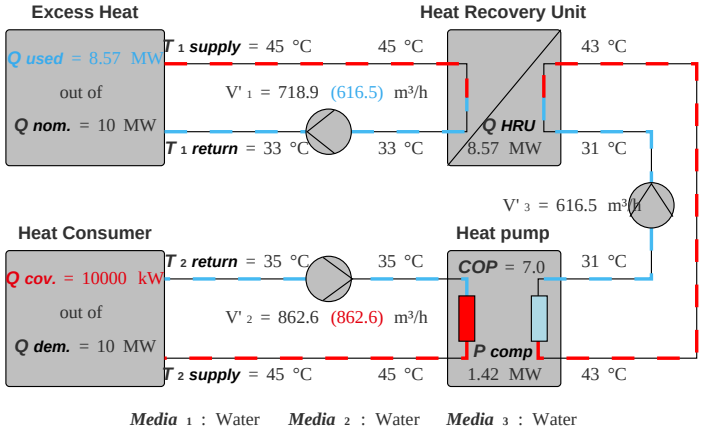
Assumptions and methodology

A simple numerical method is used, which doesn't take into account transient behaviour. Pump power calculations are based on affinity laws and typical efficiencies on pumps & motors. Heat pump performance is based on empirical knowledge from applications with medium density refrigerants and using centrifugal compressors and shell & tube evaporators. Where separation heat exchangers are used, we have assumed a 2K approach temperature. CO2 emission factor for gas, oil and electric energy is based on 2021 EIA data. For gas and oil boilers we have assumed a total efficiency of 90% based on hi [kJ/kg without condensation]. Heatloss in distribution lines are not included in calculation. Service cost estimated as a fixed percentage of CAPEX.

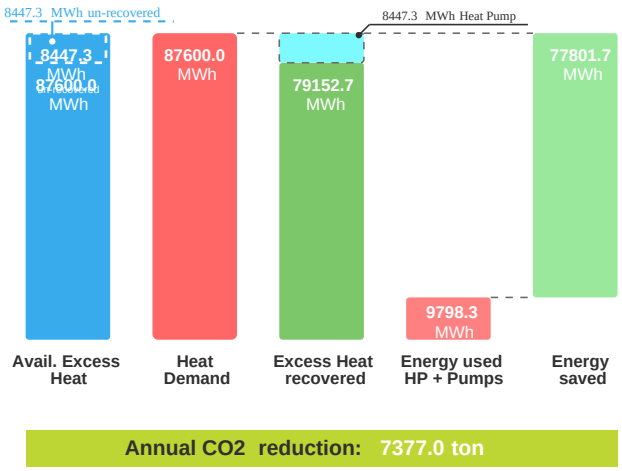
Other

SW Build:	1.1.0 Release 2025
Date of report:	Tue Dec 16 2025

System Design Conditions



Annual Energy and Emission



Financial: Supplier's Perspective

CAPEX, Initial [k€]

- 2033.03	Heat recovery Unit (incl. pumps)
- 2771.08	Hydronics cost estimate
- 4804.11	**Total CAPEX**

OPEX, Annually [k€]

- 18.06	Electricity for pumps
- 19.2	Service cost Heat Recovery Unit
+ 791.53	Recovered energy Revenue
+ 754.27	**Annual balance**

TCO, Cumulative [k€]

Year 1	- 4049.85
Year 2	- 3295.58
Year 3	- 2541.31
Year 4	- 1787.04
Year 5	- 1032.77
Year 6	- 278.51
Year 7	+ 475.76
Year 8	+ 1230.03
Year 9	+ 1984.30
Year 10	+ 2738.56

Simple payback estimate excl. depreciation **[Years]**

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Financial: Consumer's Perspective

CAPEX, Initial [k€]

- 3883.65	Heat Pump (incl. pumps)
- 6133.65	Hydronics cost estimate
- 10017.3	**Total CAPEX**

OPEX, Annually [k€]

- 90.02	Electricity for pumps
- 675.78	Electricity for Heat pump
- 48	Service cost Heat Pump
+ 6332.22	Operating cost Savings
+ 5518.41	**Annual balance**

TCO, Cumulative [k€]

Year 1	- 4498.89
Year 2	+ 1019.52
Year 3	+ 6537.94
Year 4	+ 12056.35
Year 5	+ 17574.76
Year 6	+ 23093.17
Year 7	+ 28611.59
Year 8	+ 34130.00
Year 9	+ 39648.41
Year 10	+ 45166.82

Simple payback estimate excl. depreciation **[Years]**

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