

# 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: 30 °C  
Excess temp. return side: 18 °C

Heat demanded by user: 10 MW  
Supply temp. from HP: 91 °C  
Return temp. from consumer: 32 °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.

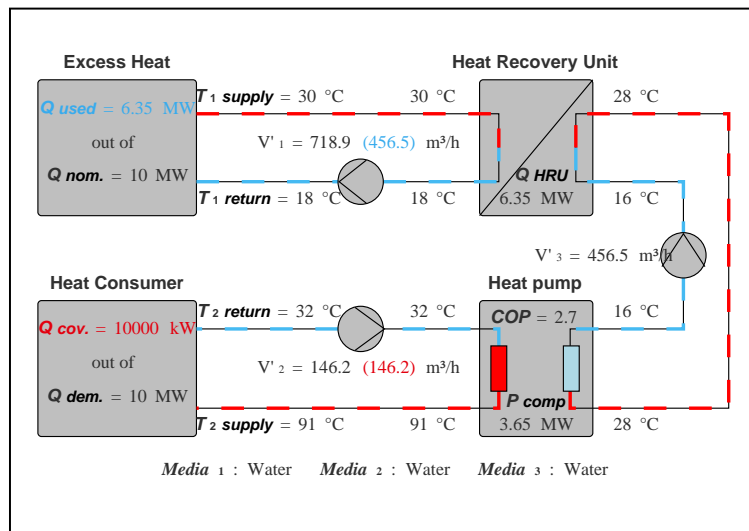
## Assumptions and methodology

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  $h_i$  [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: Sat Dec 20 2025

## System Design Conditions



## Financial: Supplier's Perspective

### CAPEX, Initial [k€]

- 1428.83 Heat recovery Unit (incl. pumps)  
- 1947.54 Hydronics cost estimate  
**- 3376.38 Total CAPEX**

### OPEX, Annually [k€]

- 12.69 Electricity for pumps  
- 19.2 Service cost Heat Recovery Unit  
+ 556.29 Recovered energy Revenue  
**+ 524.4 Annual balance**

### TCO, Cumulative [k€]

Year 1 - 2851.97  
Year 2 - 2327.57  
Year 3 - 1803.16  
Year 4 - 1278.76  
Year 5 - 754.36  
Year 6 - 229.95  
Year 7 + 294.45  
Year 8 + 818.85  
Year 9 + 1343.26  
Year 10 + 1867.66

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

6.4

## 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€]

- 24.89 Electricity for pumps  
- 2557.64 Electricity for Heat pump  
- 48 Service cost Heat Pump  
+ 4450.36 Operating cost Savings  
**+ 1819.83 Annual balance**

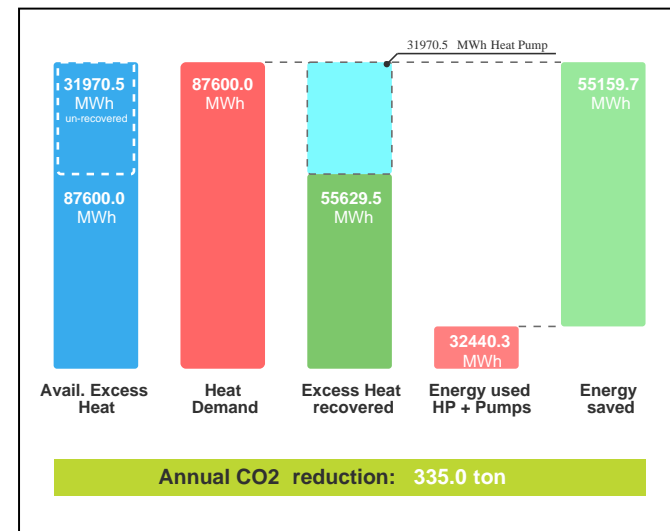
### TCO, Cumulative [k€]

Year 1 - 8197.47  
Year 2 - 6377.64  
Year 3 - 4557.82  
Year 4 - 2737.99  
Year 5 - 918.16  
Year 6 + 901.67  
Year 7 + 2721.50  
Year 8 + 4541.33  
Year 9 + 6361.15  
Year 10 + 8180.98

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

5.5

## Annual Energy and Emission



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