

# Heat recovery by Danfoss

ENGINEERING  
TOMORROW



## 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)  
 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: 43 °C  
 Return temp. from consumer: 31 °C

Availability and demand match: See diagram Energy & Emission

Current type of heating: Gas Boiler  
 Cost of current type of heating: .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.

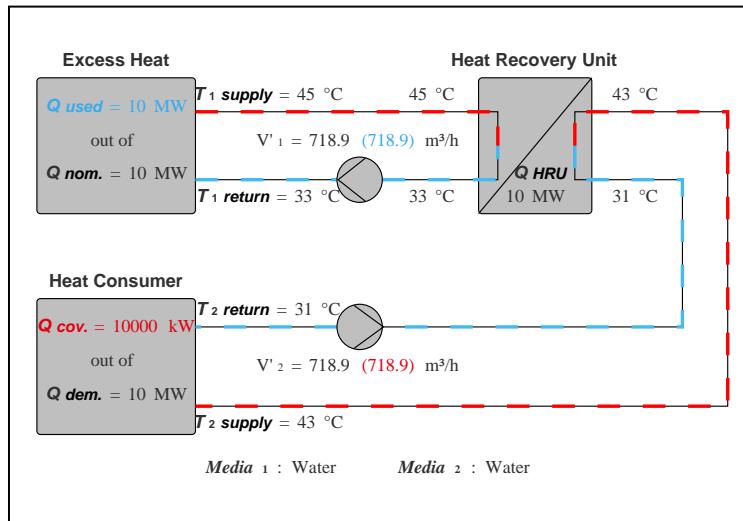
## Assumptions and methodology

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.

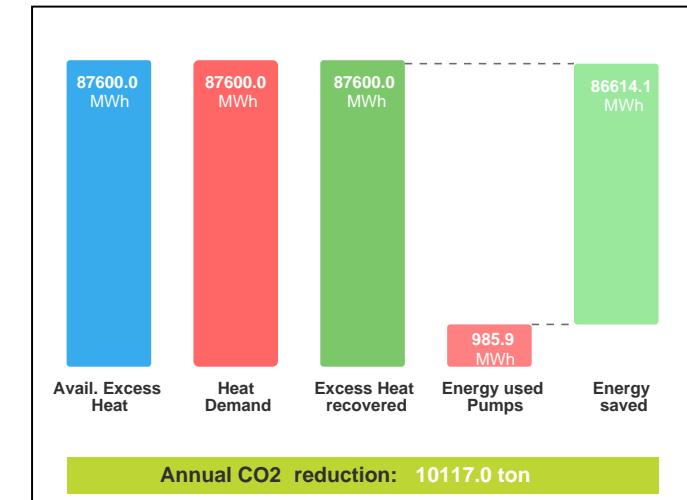
## Other

SW Build: 1.1.0 Release 2025  
 Date of report: Tue Dec 09 2025

## System Design Conditions



## Annual Energy and Emission



## Financial: Supplier's Perspective

### CAPEX, Initial [k€]

- 2051.15 Heat recovery Unit (incl. pumps)  
 - 1025.57 Hydronics cost estimate  
**- 3076.72 Total CAPEX**

### OPEX, Annually [k€]

- 19.72 Electricity for pumps  
 - 19.2 Service cost Heat Recovery Unit  
 + 876 Recovered energy Revenue  
**+ 837.08 Annual balance**

### TCO, Cumulative [k€]

Year 1 - 2239.64  
 Year 2 - 1402.56  
 Year 3 - 565.48  
 Year 4 + 271.60  
 Year 5 + 1108.68  
 Year 6 + 1945.76  
 Year 7 + 2782.84  
 Year 8 + 3619.92  
 Year 9 + 4457.00  
 Year 10 + 5294.08

Simple payback estimate excl. depreciation [Years]

**3.7**

## Financial: Consumer's Perspective

### CAPEX, Initial [k€]

- 1025.57 Hydronics cost estimate  
**- 1025.57 Total CAPEX**

### OPEX, Annually [k€]

- 59.15 Electricity for pumps  
 + 7027.2 Operating cost Savings  
**+ 6968.05 Annual balance**

### TCO, Cumulative [k€]

Year 1 + 5942.48  
 Year 2 + 12910.52  
 Year 3 + 19878.57  
 Year 4 + 26846.62  
 Year 5 + 33814.66  
 Year 6 + 40782.71  
 Year 7 + 47750.76  
 Year 8 + 54718.80  
 Year 9 + 61686.85  
 Year 10 + 68654.90

Simple payback estimate excl. depreciation [Years]

**0.1**