



Member of
SÜDZUCKER
SUGAR DIVISION

Implementation of a 4 MW high-temperature heat pump in a sugar factory

Bart Aerts

23.09.2025

EHPA





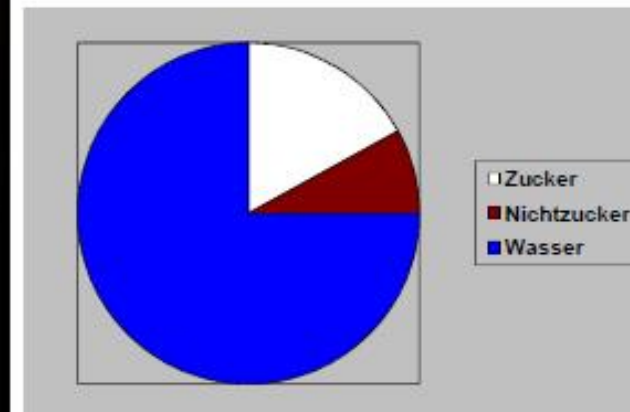
Ideal sugar production



SUGAR DIVISION



Current sugar production





Our climate impact

Our emission reduction targets



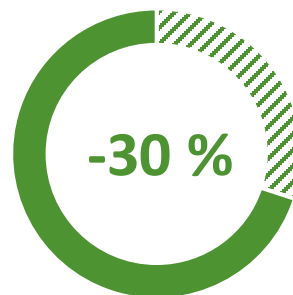
- *Validated by Science Based Targets initiative (SBTi)*

Südzucker Group is the first European sugar producer with validated emission reduction targets (Scope 1 & 2) in line with the 1.5-degree target

- The validation of our emission reduction targets by the SBTi is an important milestone in the impact area “emissions reduction” of our sustainability strategy.
- SBTi is a joint initiative of CDP, the United Nations Global Compact, the World Resources Institute and the World Wide Fund for Nature, and an internationally recognized gold standard for corporate climate targets.



Emissions Scope 1 & 2 by 2030
(starting from 3.7m t CO₂ in 2018)

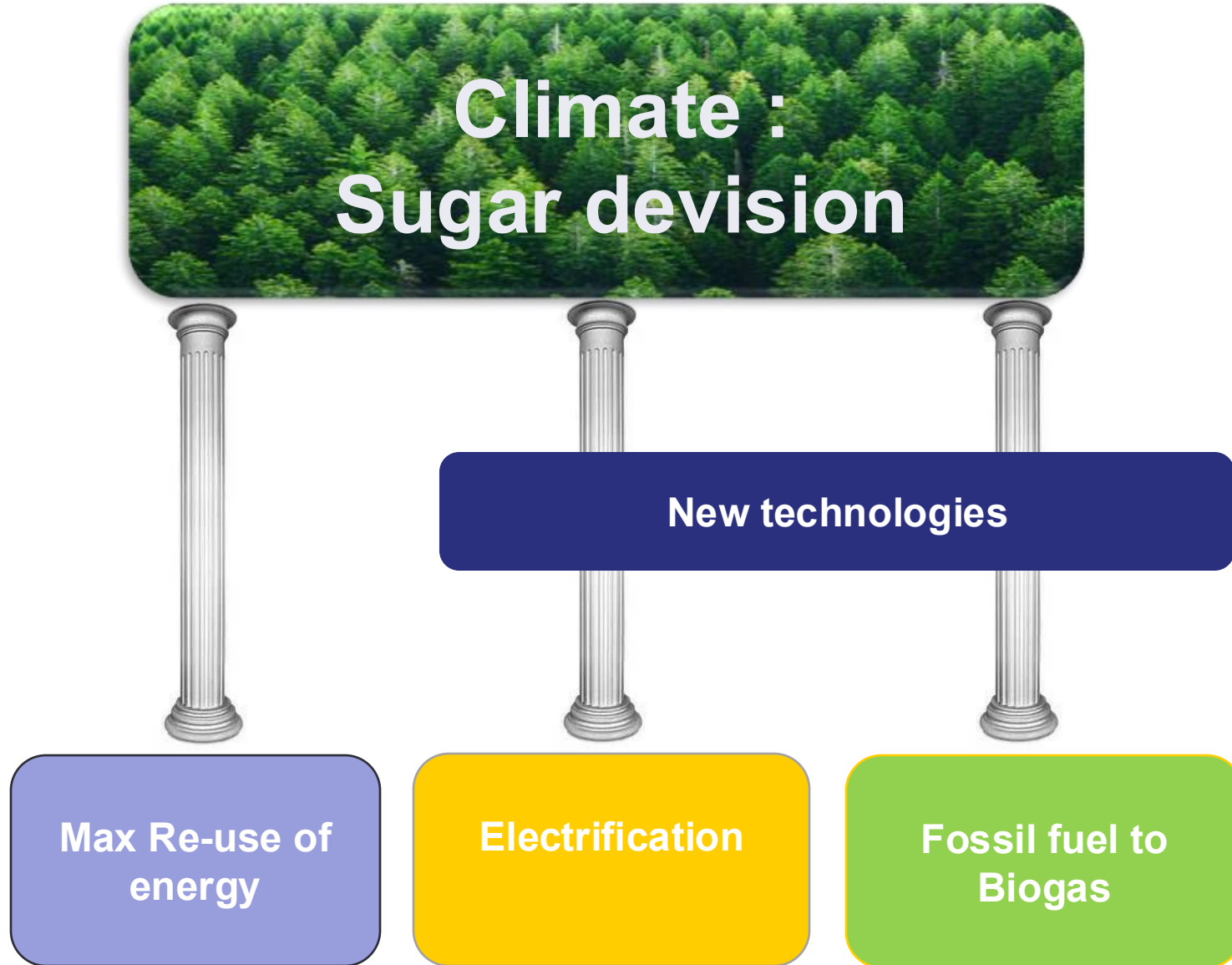


Emissions Scope 3 by 2030
(starting from 9.4m t CO₂eq in 2018)



Climate neutrality of Südzucker Group by 2050
(Scope 1, 2 & 3)

Climate: strategy





Heat pump



Heat pump

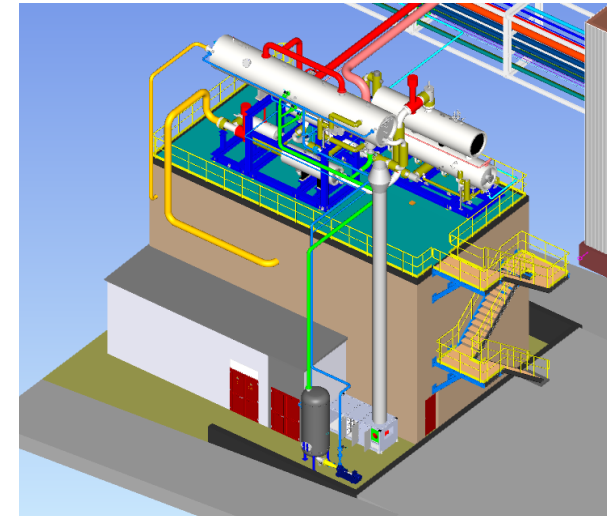
Demo site of European Spirit project

Goal: production of live steam in parallel with boiler

- Coolant fluid: **n-Pentane (R-601)**
- Heatpump capaciteit: **4 MW**
- Heat source : **Vacuum steam (80 °C)**
- Heat sink: **Steam T_{sat} (138/114 °C)**



Demo-site 2
Sugar factory in
Belgium



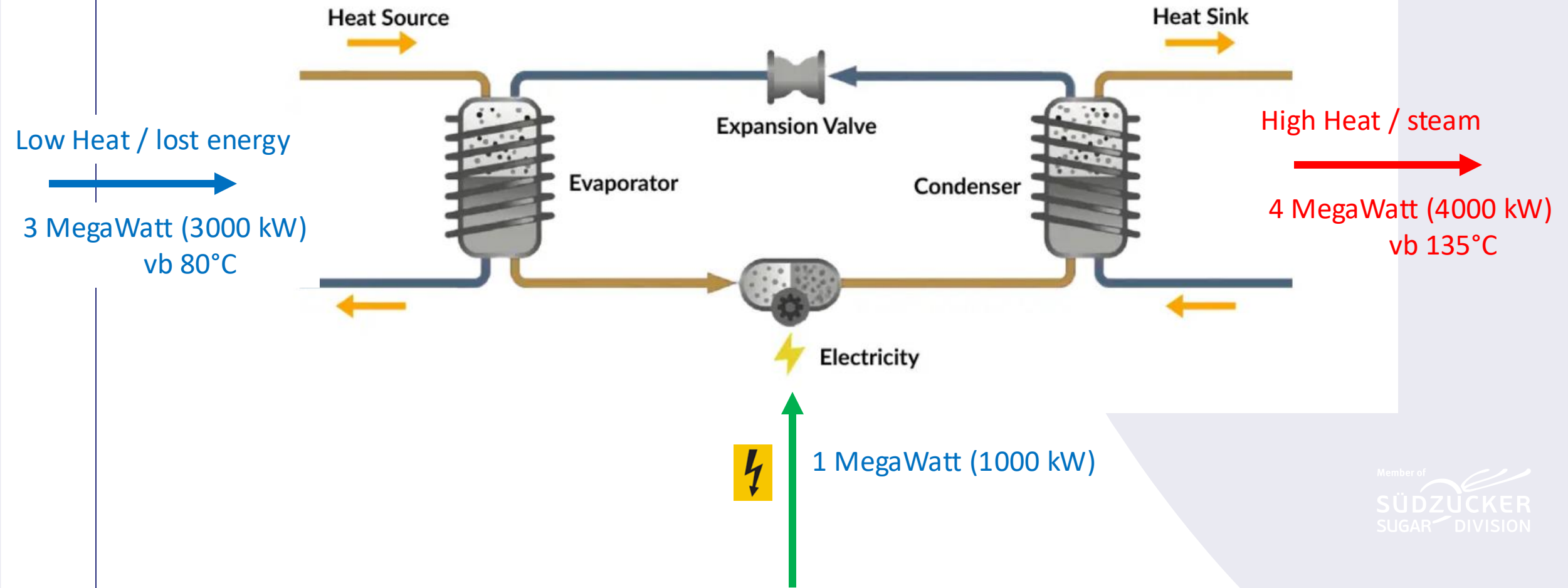
Funded by
the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



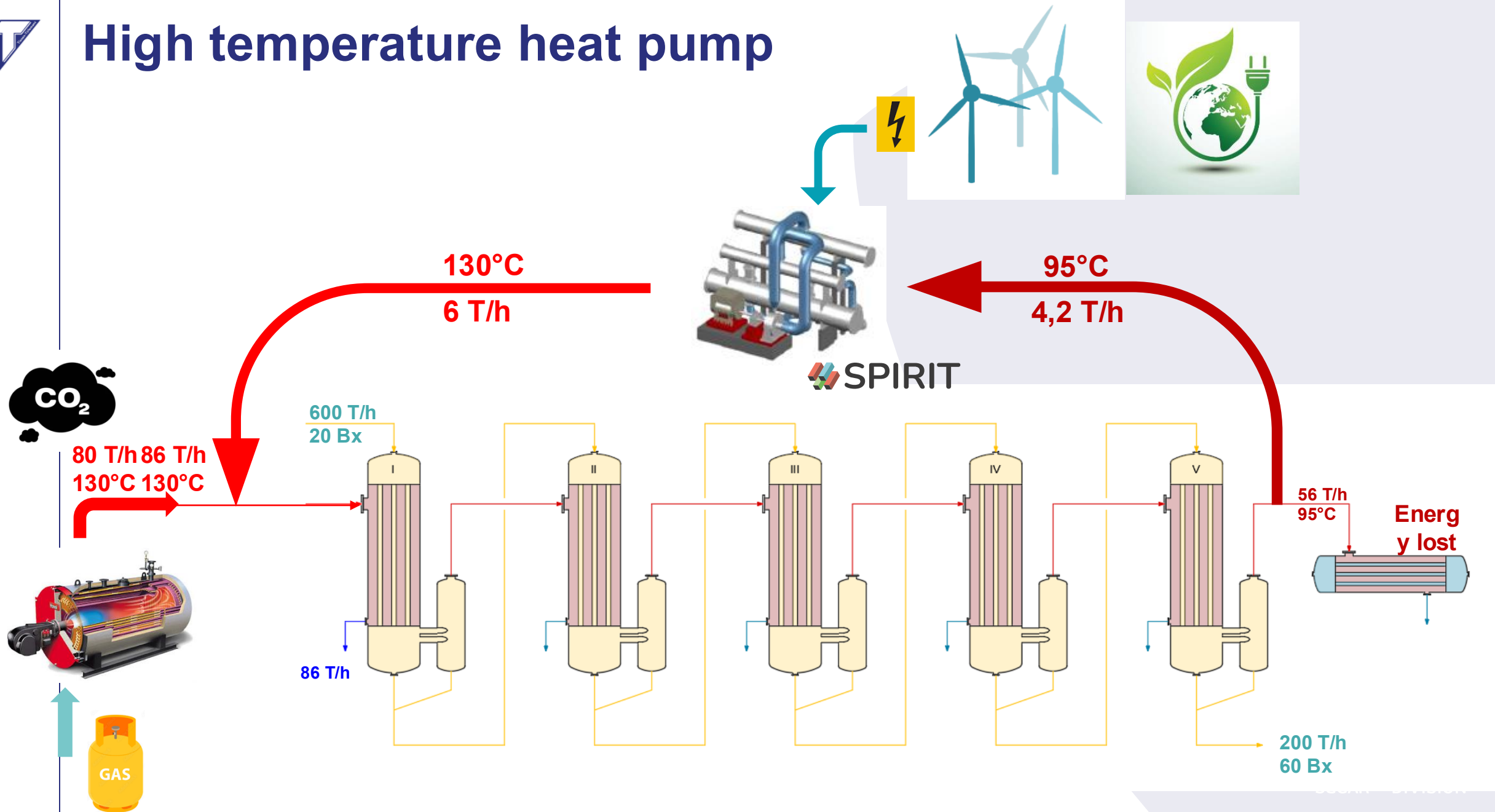


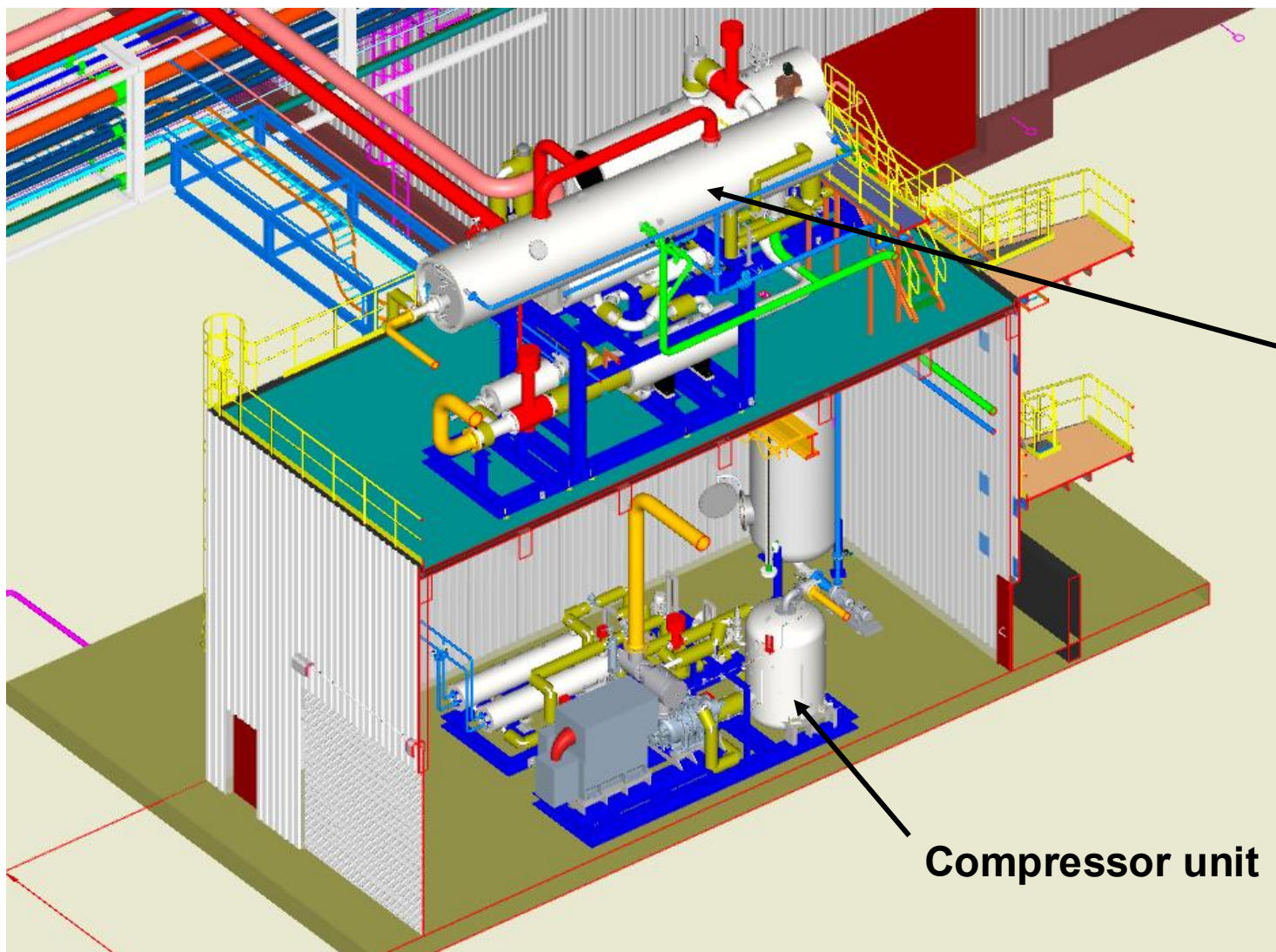
Working principle heat pump





High temperature heat pump





Sink & source heaters

Compressor unit

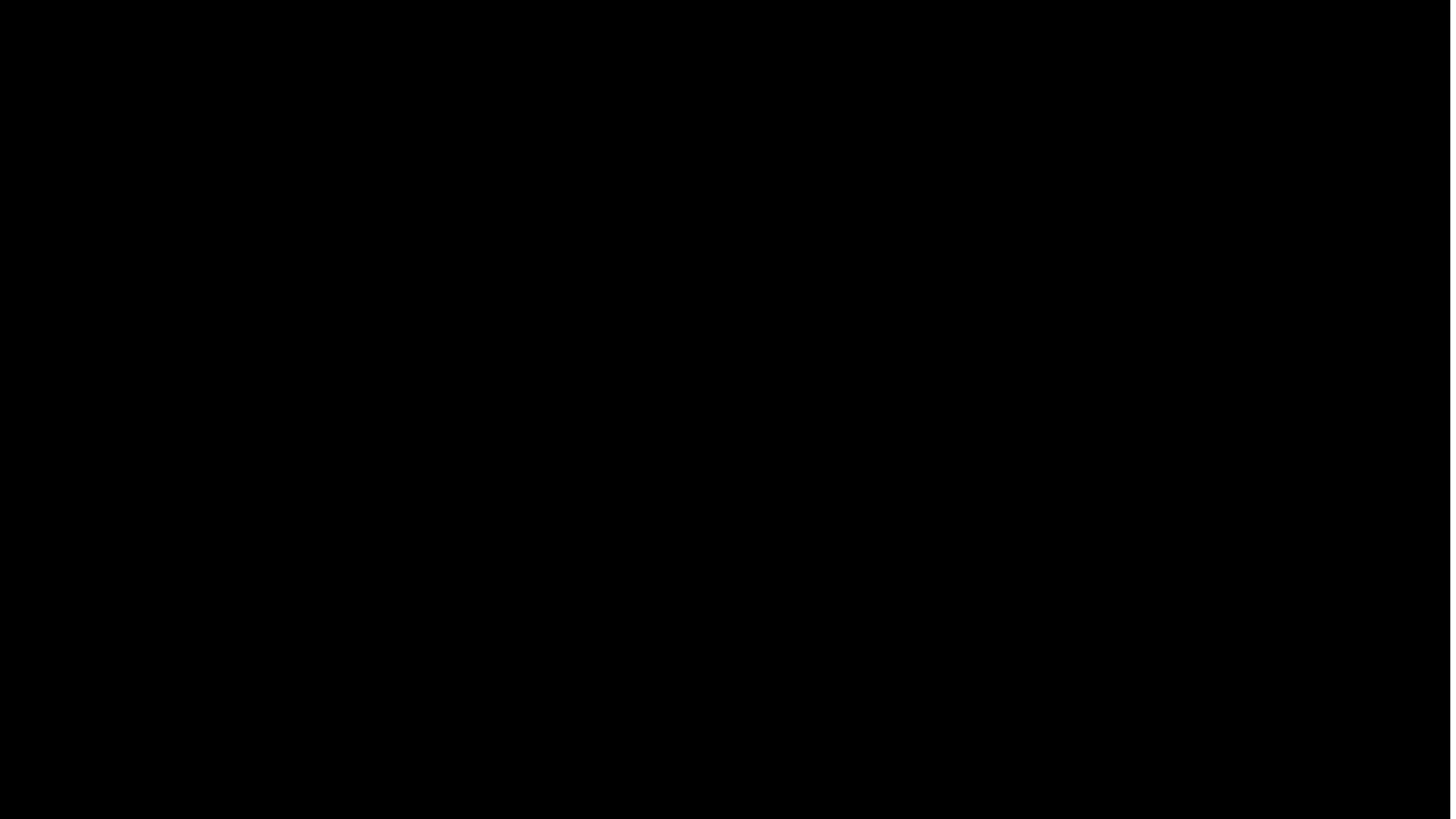






Challenges & risks: high temperature heat pumps @ sugar production plants

Challenges		Risks		Consequences
Use of explosive cooling fluids (Butane, Pentane, ...)	→	Additional safety measures, gas detections, alarms	→	Higher costs
	→	ATEX zoning		
	→	Non-food products		Food risk analyse
High energy demand (thermic & electric)	→	High Investment Costs (Capex)		
	→	Less electricity production of CHP	→	More electricity to purchase (Opex)
Different heating applications	→	Standardisation is difficult	→	Expensive tailor made heat pumps.



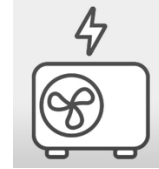


Learnings



Electricity price

- A low electricity price will facilitate heat pump projects



Heat pumps

- Heat-exchangers are challenging, due to low delta T very, very big heaters with high footprints
- Difficult to standardize, high capex



Electrical connection

- Higher power consumption out of the grid
- New grid connections needed.



Costs (Capex - Opex)

- Find the right technology
- Low Electricity price (opex) is needed for the capex



Member of
SÜDZUCKER
SUGAR DIVISION

**Thanks
For your attention.**

Tiense suikerraffinaderij N.V.
Aandorenstraat 1
BE-3300 Tienen

+32 16 801 211
info@raftir.be
tiensesuikerraffinaderij.com