

# Heat pump integration in a plant-based meat solution factory

Vincent Grass, Nestlé

euramm<sup>o</sup>n Symposium, 2022



# Nestlé at a glance in 2021

Providing  
safe, quality  
nutrition  
over more than  
**155 years**

**2 000 +**  
**brands**  
worldwide

Around  
**276 000**  
employees

Number  
of countries  
we sell in  
**186**

**354**  
**factories**  
in 79 countries

**CHF 87.1**  
**billion**  
Group sales  
in 2021

**1 billion**  
**Nestlé**  
**products**  
**sold**  
**every day**

# Our net zero roadmap

## Net zero by 2050

**20%**

emissions reduction by 2025

All sites with 100% Renewable Electricity

**50%**





emissions reduction by 2030

**Net zero**

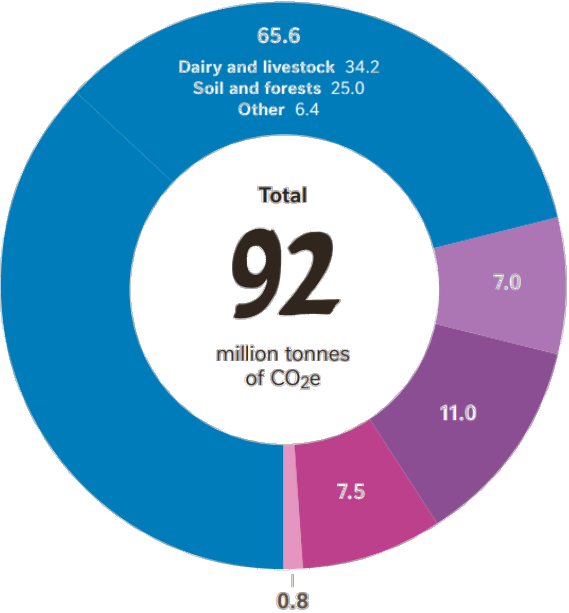
emissions by 2050 at the latest

### Nestlé’s in-scope GHG emissions by operation (92 out of 113)

million tonnes of CO<sub>2</sub>e, in 2018

Scope 3	 <b>Sourcing our ingredients</b>	<b>65.6</b>	<b>71.4%</b>
Scope 1, 2 & 3	 <b>Manufacturing our products</b>	<b>7.0</b>	<b>7.7%</b>
Scope 3	 <b>Packaging our products</b>	<b>11.0</b>	<b>11.9%</b>
Scope 3	 <b>Managing logistics</b>	<b>7.5</b>	<b>8.2%</b>
Scope 3	 <b>Travel and employee commuting</b>	<b>0.8</b>	<b>0.8%</b>

Figures have been rounded.



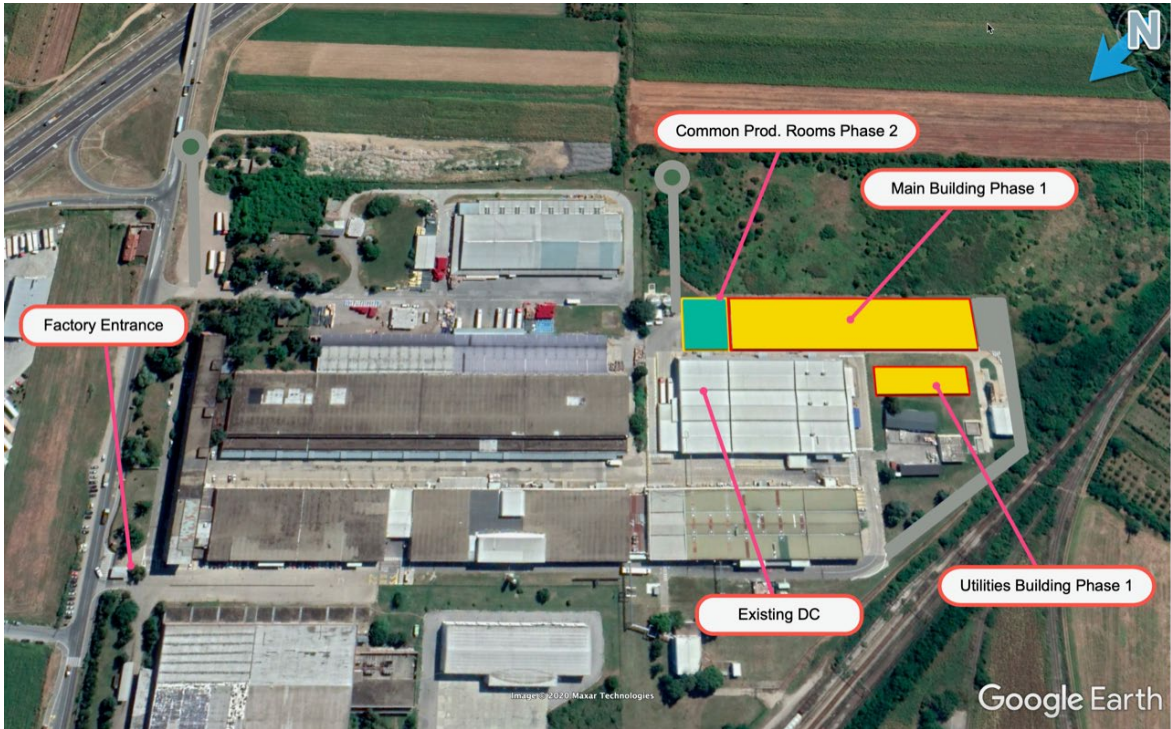
# Creating new, low-carbon and plant based products



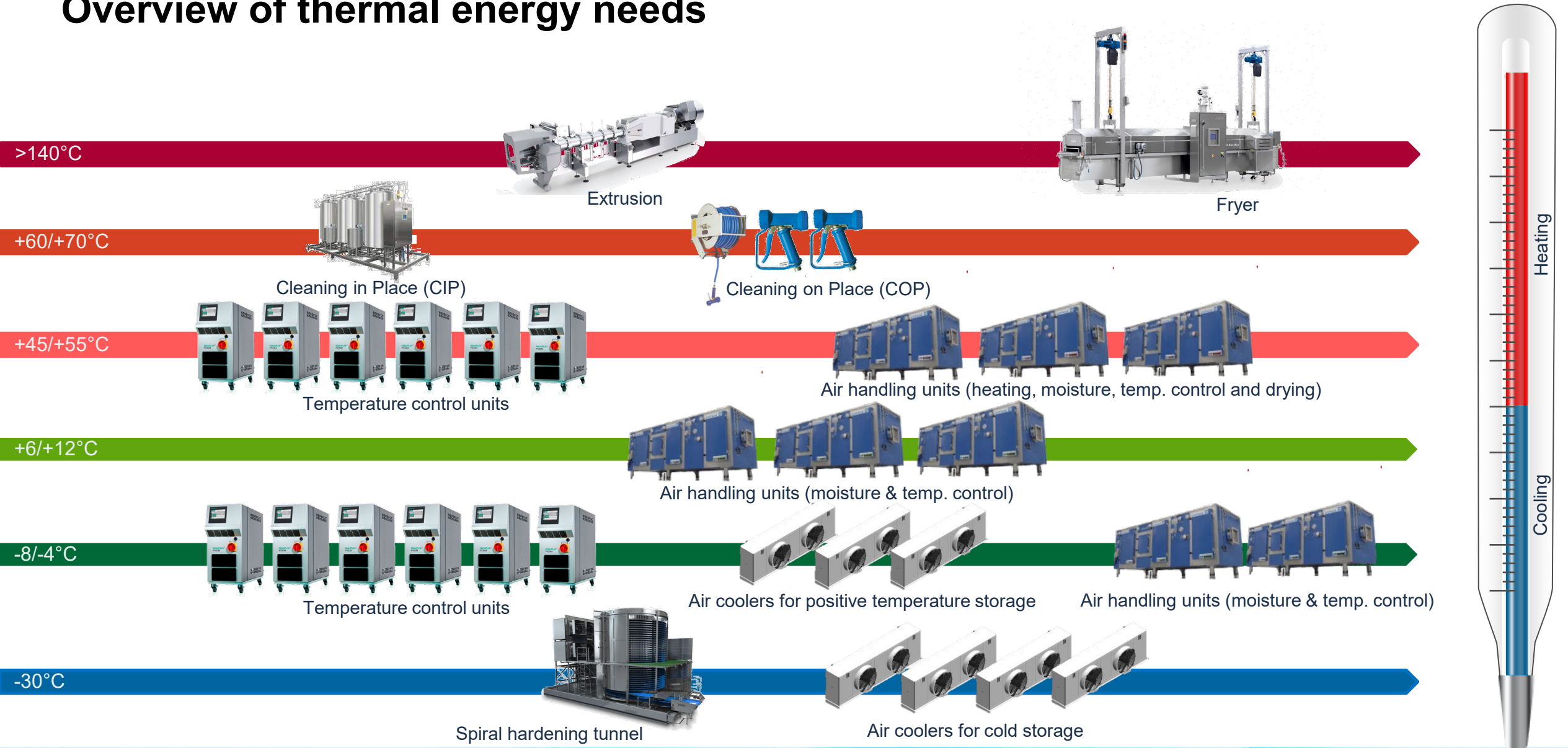
# Building a low carbon Plant Based Meat Solutions facility in Serbia



Nestlé Factory in Surčin, SERBIA



# Overview of thermal energy needs



# Our approach to select the appropriate design

## Nestlé

Defines the refrigerant strategy

Provides the requirements:

- Process data
- Room conditions
- Specific design requirements

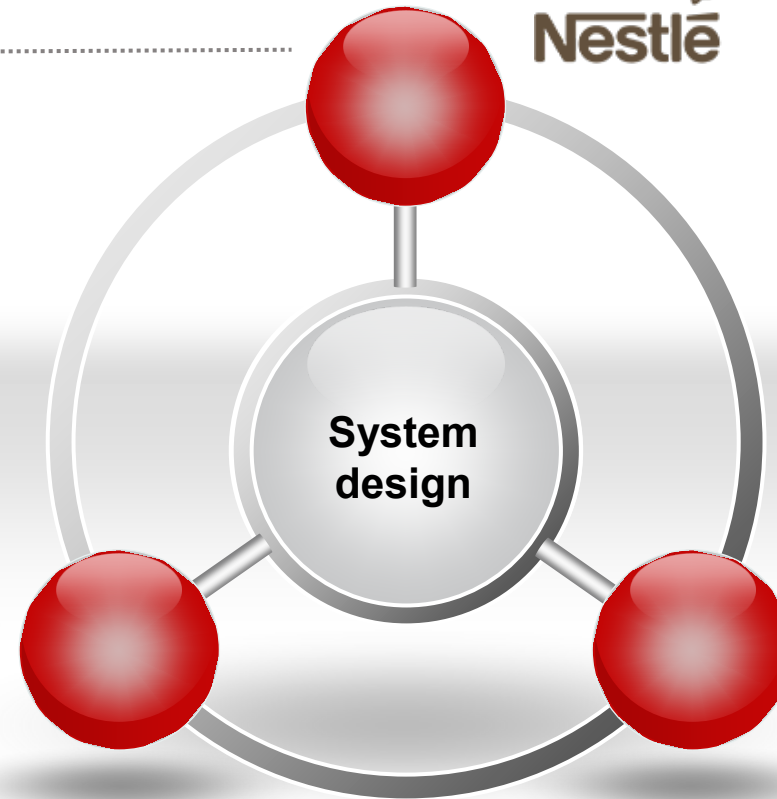


Atlantic Refrigeration Consulting

## Consultant

Propose multiple system concepts and energy networks as well as proposals to reduce temperature differentials.

Together with the project team verifies that the system is properly sized for all operating modes (seasonal, weekends, etc.).



## Suppliers

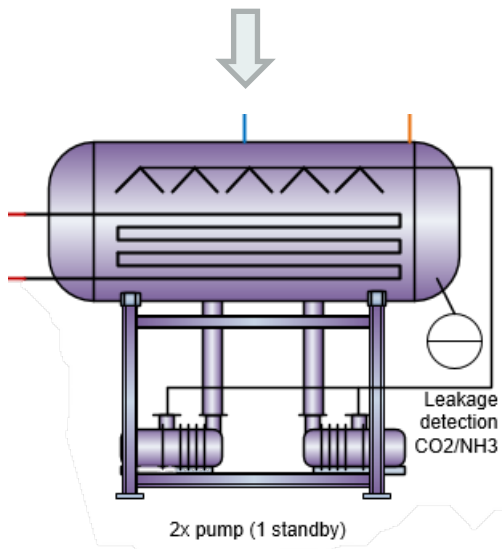
Provide the detail design,  
Equipment and on-site erection  
Comissioning, Training





# Some specific design features

Spray chillers have been selected as NH<sub>3</sub>/CO<sub>2</sub> cascade heat exchanger to reduce the approach temperature and leakage risks.

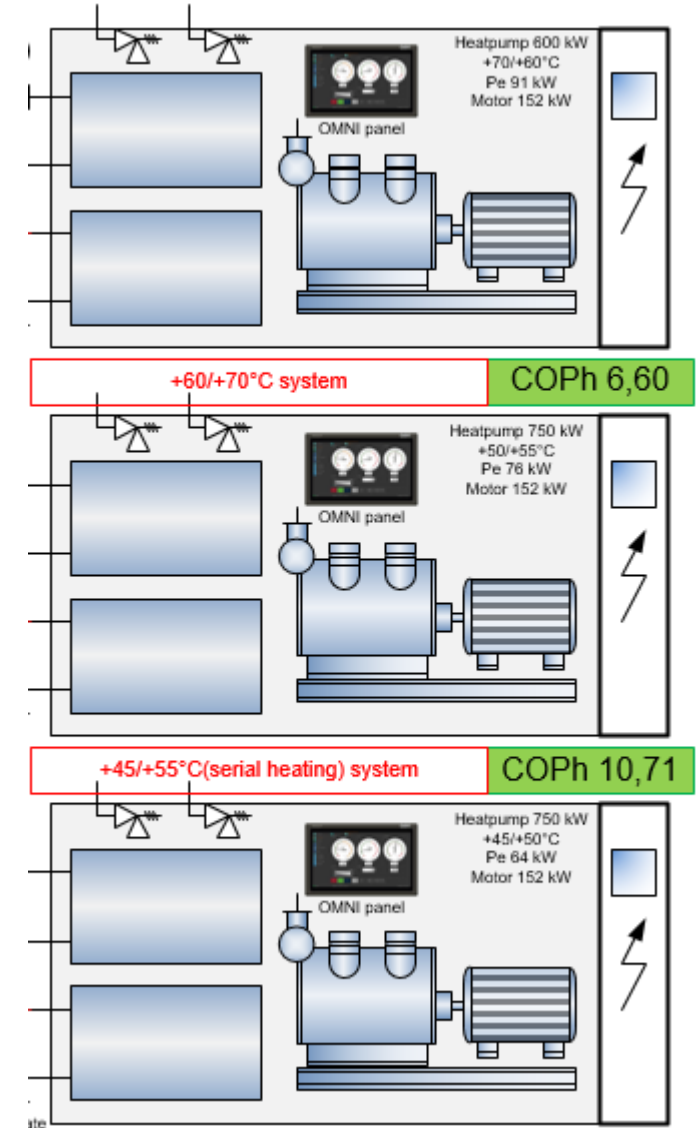


3 heat pumps have been added to cover all hot water heating needs which reduces as well:

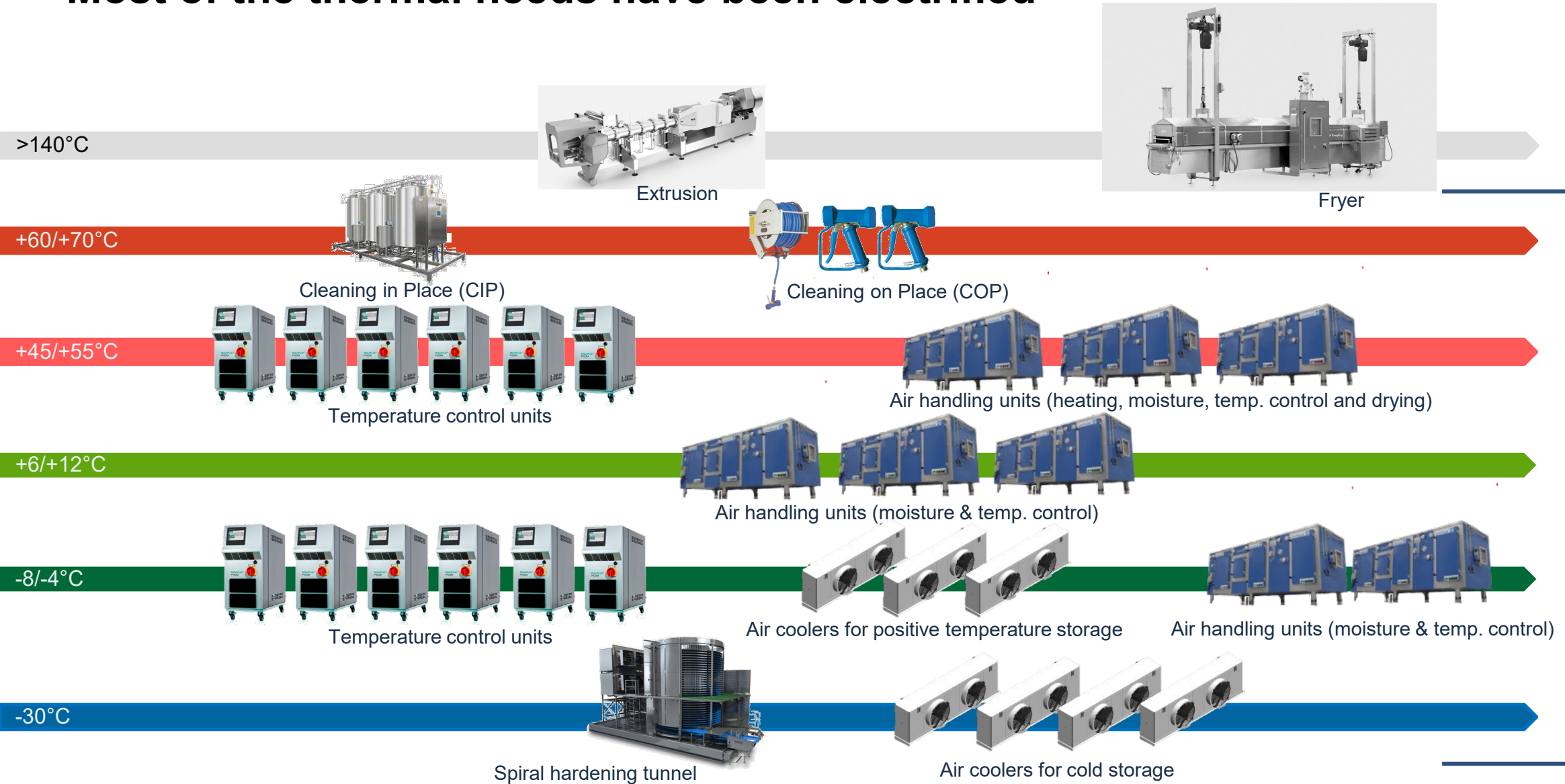
- Heat rejection to atmosphere
- Water consumption
- Chemical consumption and wastewater treatment.



A storage tank of 100m<sup>3</sup> is being used to store the energy and respond to the variation of heating demand.



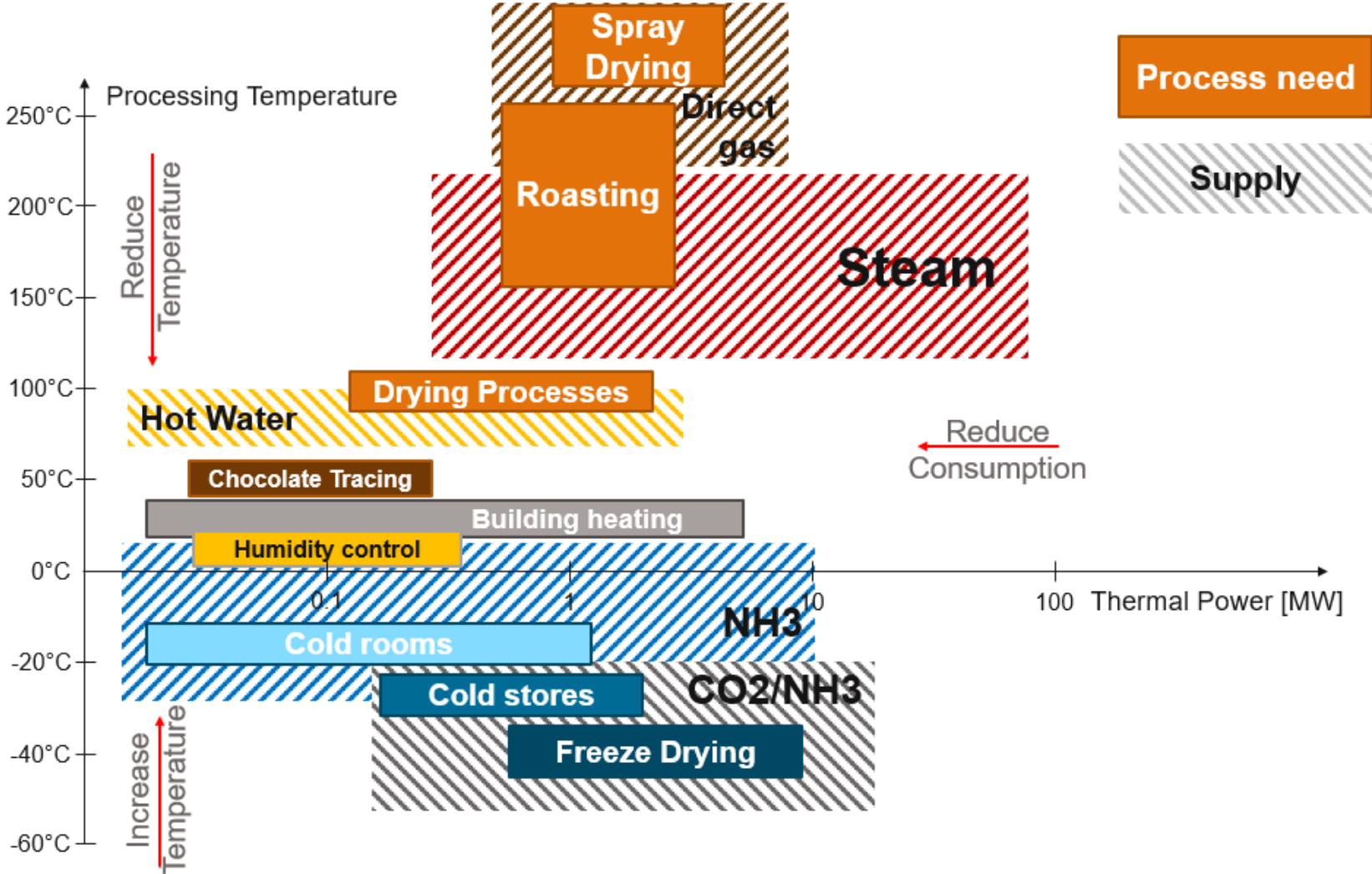
# Most of the thermal needs have been electrified



Powered by renewable electricity

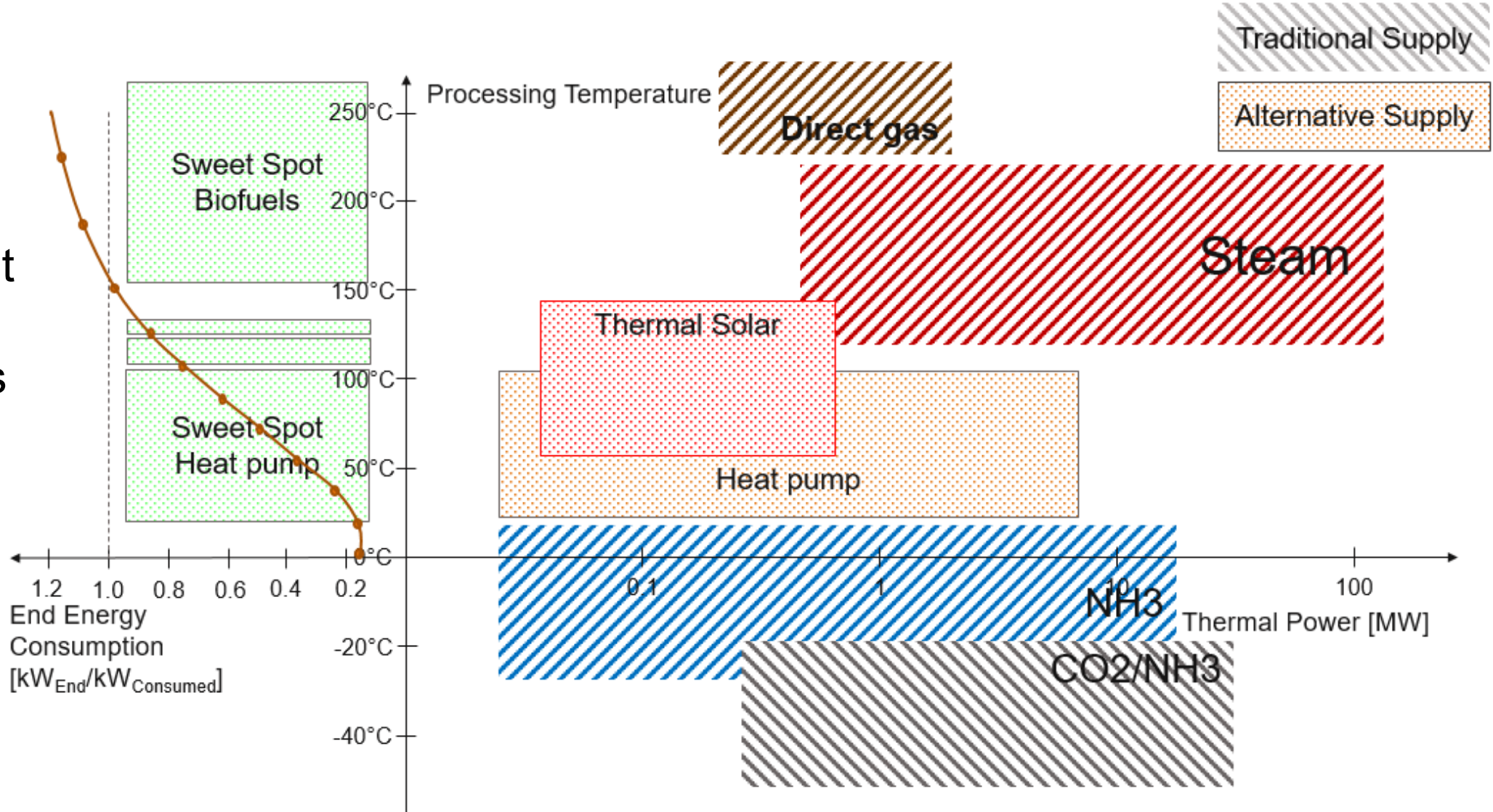
# Needs to achieve decarbonization from an End-User perspective

Nestlé food processing

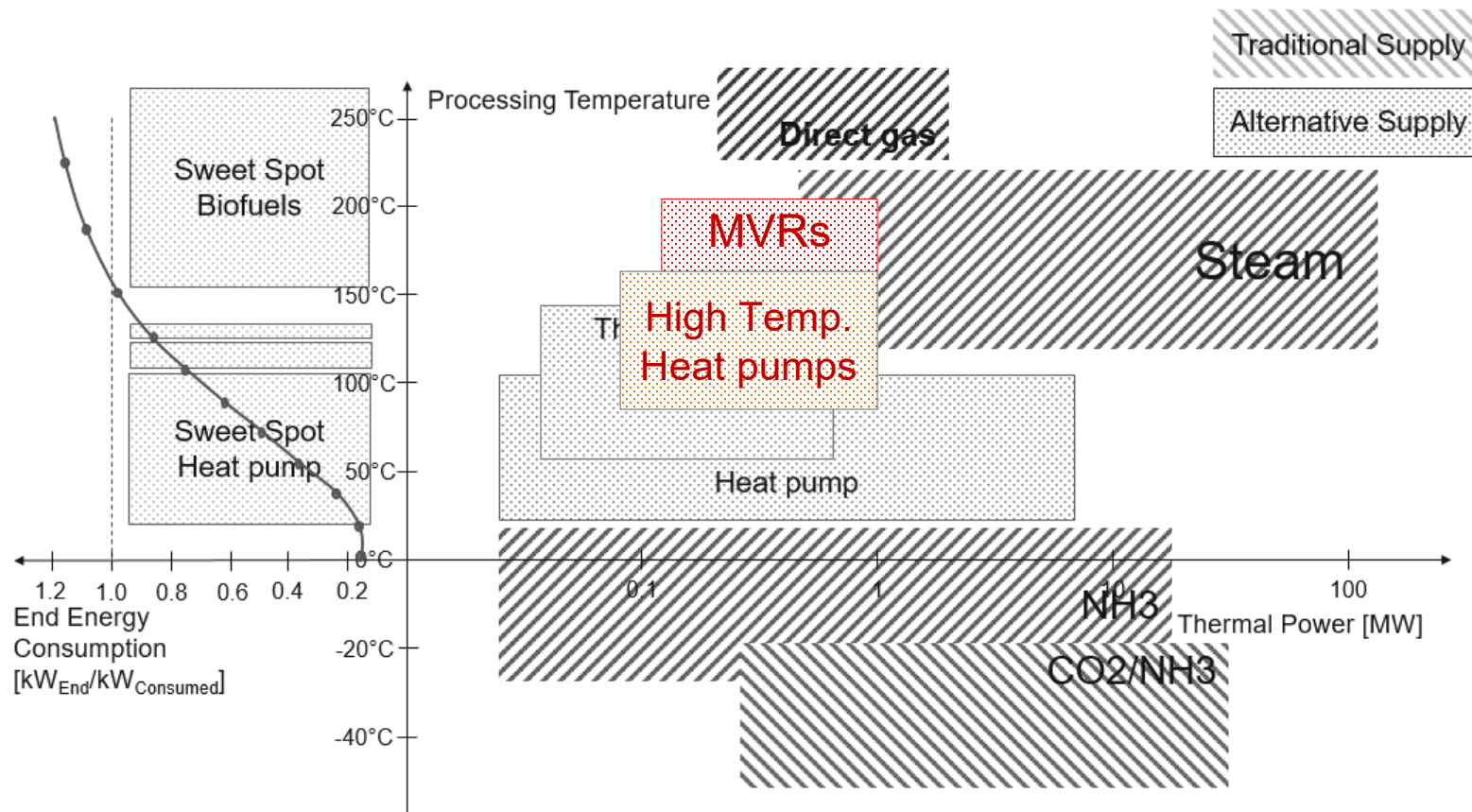


# Needs to achieve decarbonization from an End-User perspective

Sweet spot of energy generators



# Needs to achieve decarbonization from an End-User perspective



What we need to achieve our goals and close our gaps are:

- High temperature heat pumps to generate low pressure steam (hydrocarbons as refrigerant)
- More affordable steam compressors (MVR) and for low capacities

**eurammon e. V. is always available as a sparring partner for questions on refrigeration with natural refrigerants.**

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