

# Task 2 : Assessing heat pumps market in industry



**IEA HPT Annex 48**

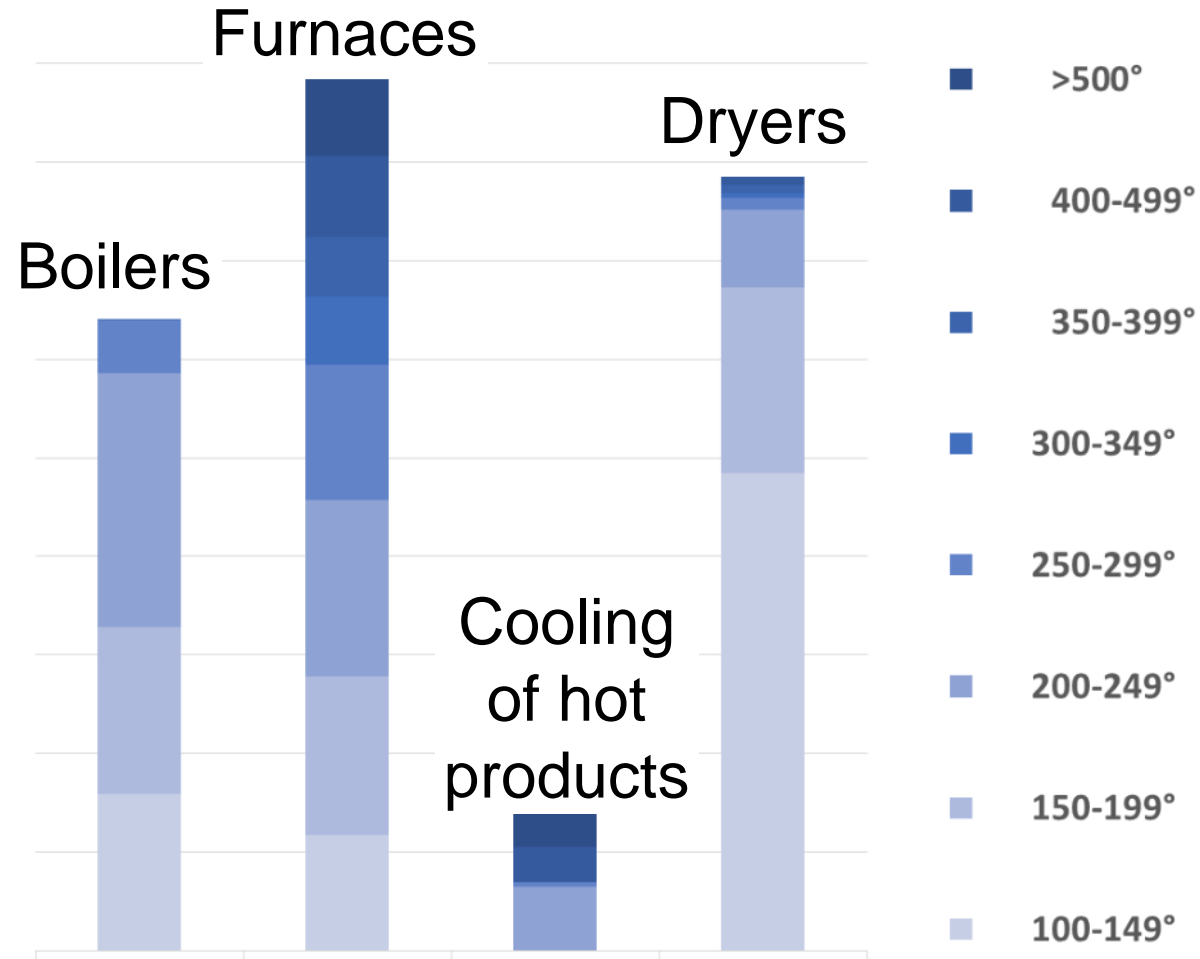
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**Jean-Marie Fourmigué** [jean-marie.fourmigue@edf.fr](mailto:jean-marie.fourmigue@edf.fr)

**EDF – R&D** **Electricité de France - Research & Development Branch**  
**TREE Division – Technologies and Research for Energy Efficiency Division**

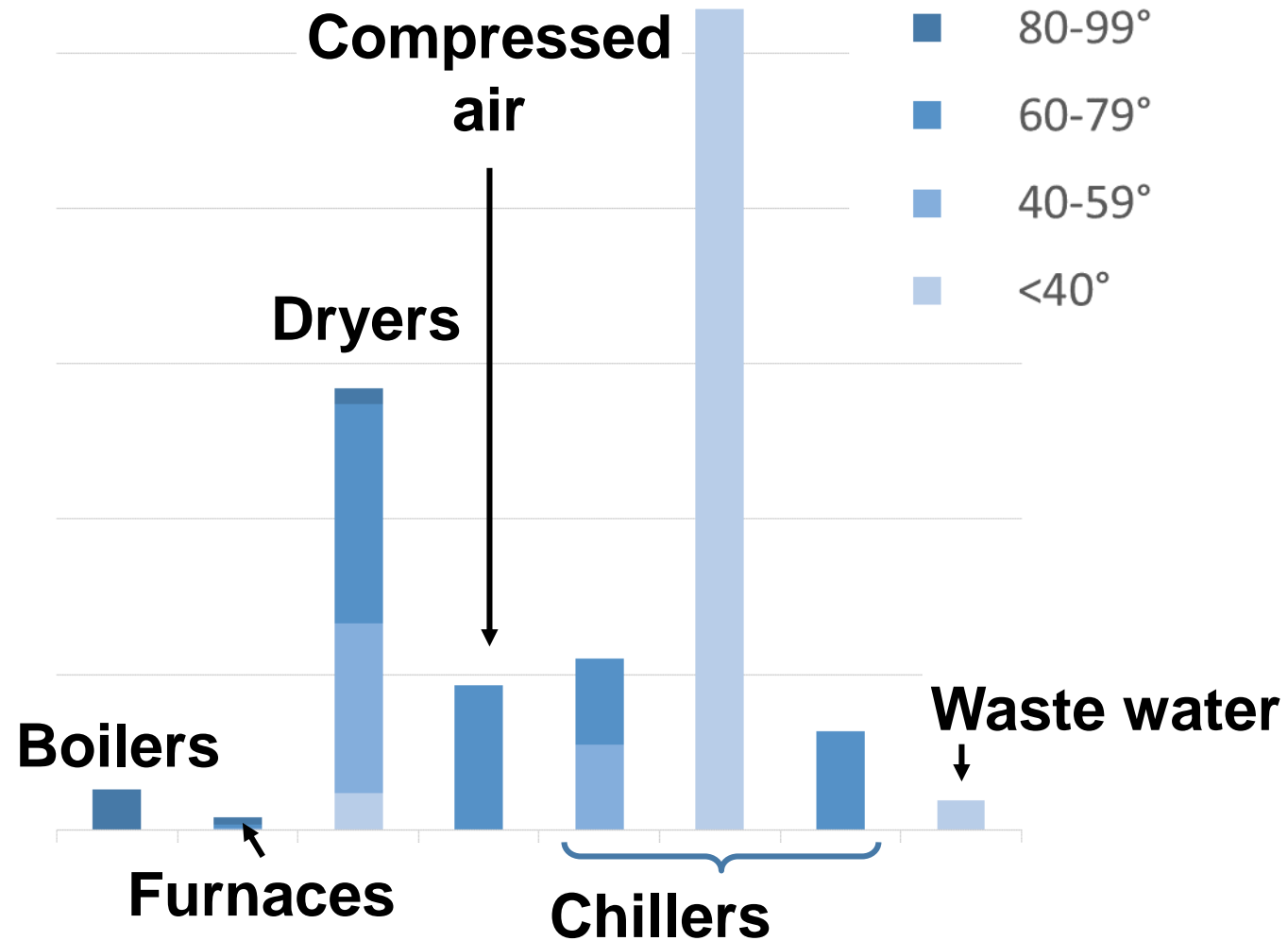
# Industrial waste heat in France 116 TWh per year

High temperature waste heat (>100°C) : 50%



## Low temperature waste heat (<100°C) : 50%

-> Heat source for heat pumps



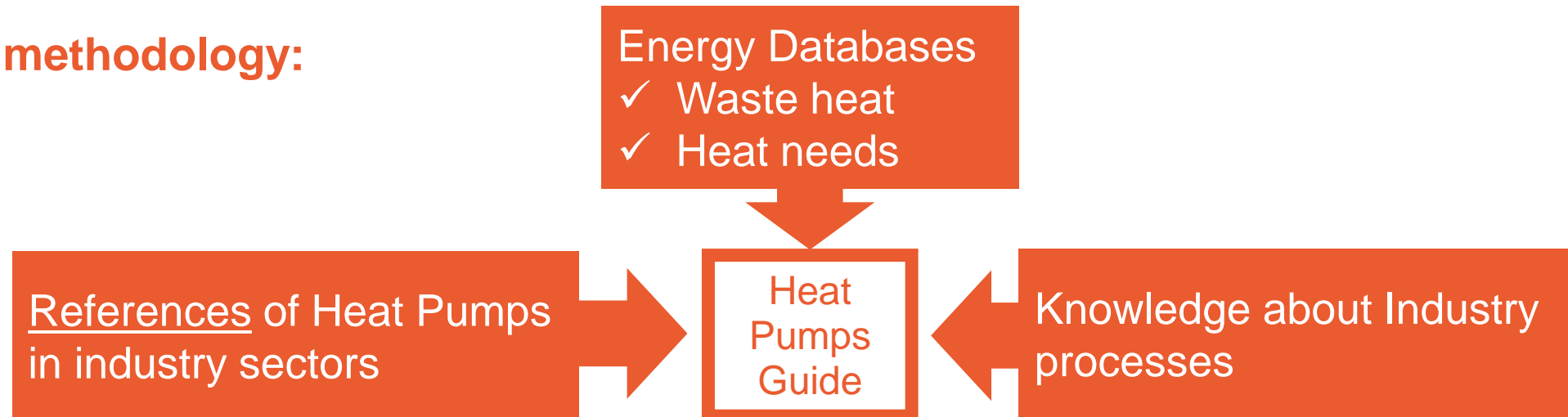
**Aim of this study :**  
**Understanding the heat pumps markets**  
**to improve their dissemination in the**  
**industry sectors**

**Objective :** Improve EDF's Sales forces communication about Heat Pumps

- ❑ HP's benefits on energy and CO2 emissions reduction and costs savings are recognized
- ❑ EDF's sales forces require innovative communication about Energy Efficiency
- ❑ HP's are considered as complex projects and Sales and Technical Forces need to be trained

**Deliverable:** Guide "how to implement Heat Pumps in industry sectors"

**General methodology:**



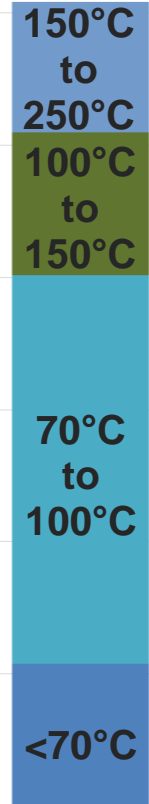
# How to use "heat needs" and "waste heat" databases to assess HP's market

# Example of the milk Industry

## Heat needs Vs. Temperature range

Evaporation concentration

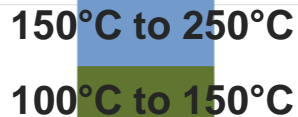
Drying of Solids and pastes



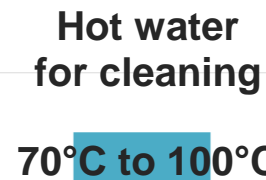
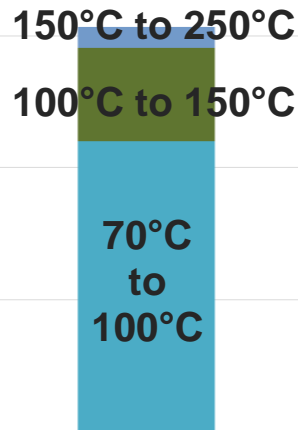
150°C to 250°C

100°C to 150°C

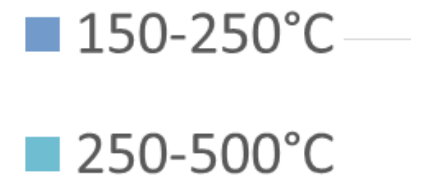
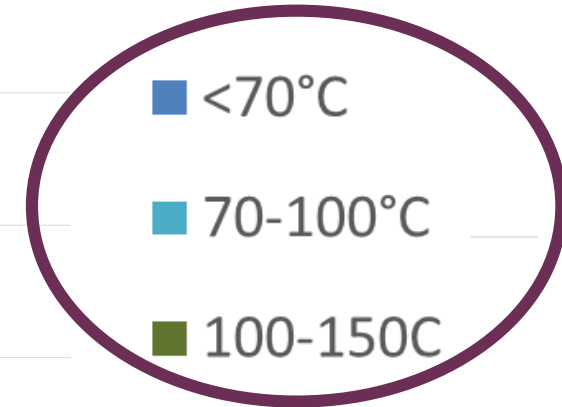
Drying of powders



Sterilisation Pasteurisation

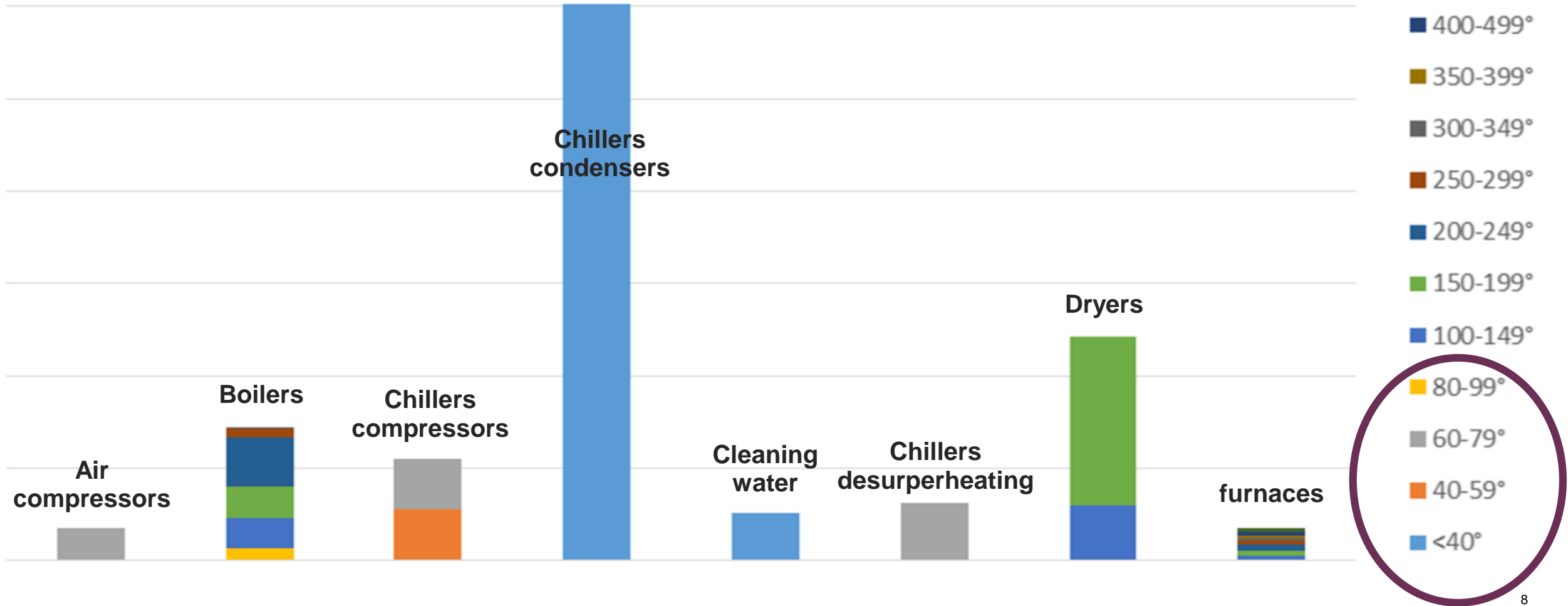


Other heating (excluding steril. and pasteur.)



# Example in the Milk Industry

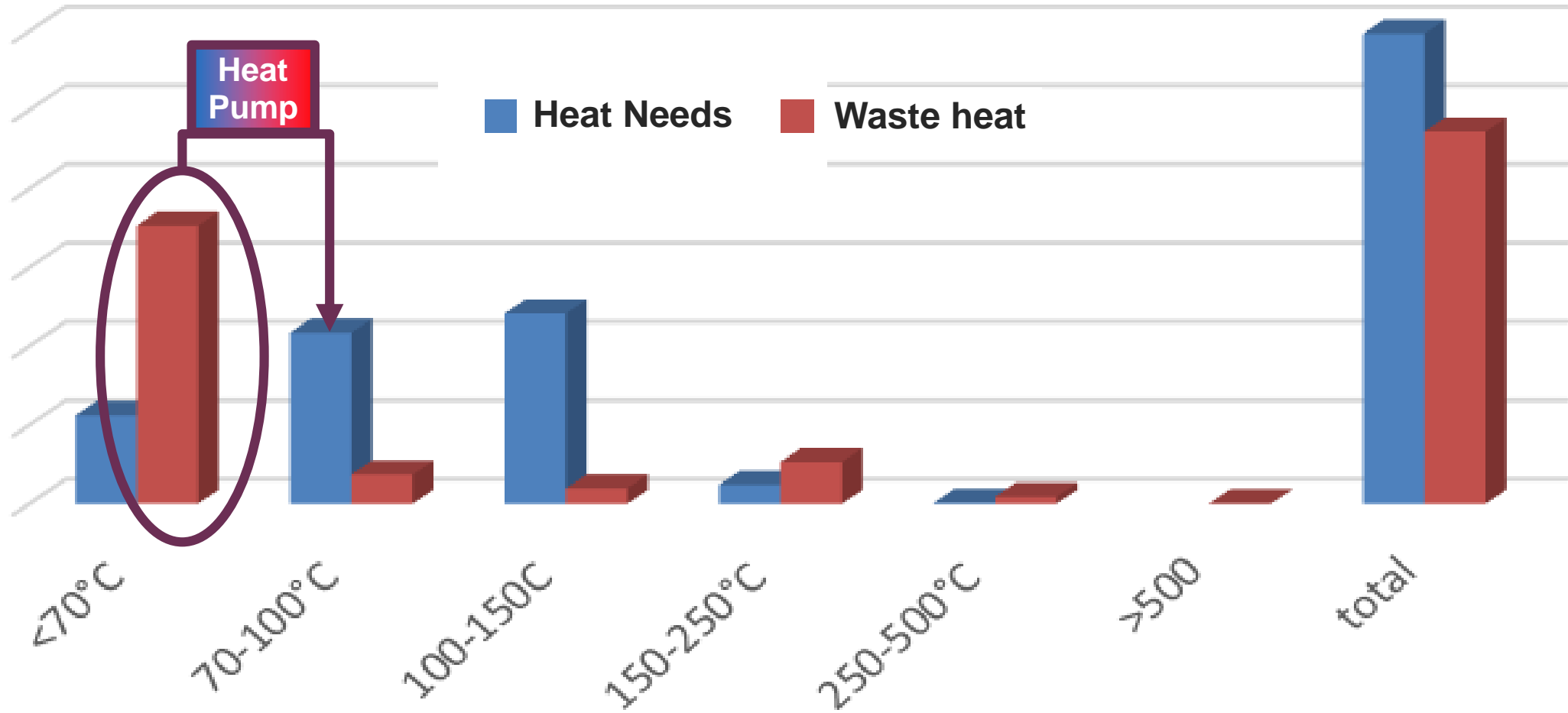
Waste heat Vs. Temperature range



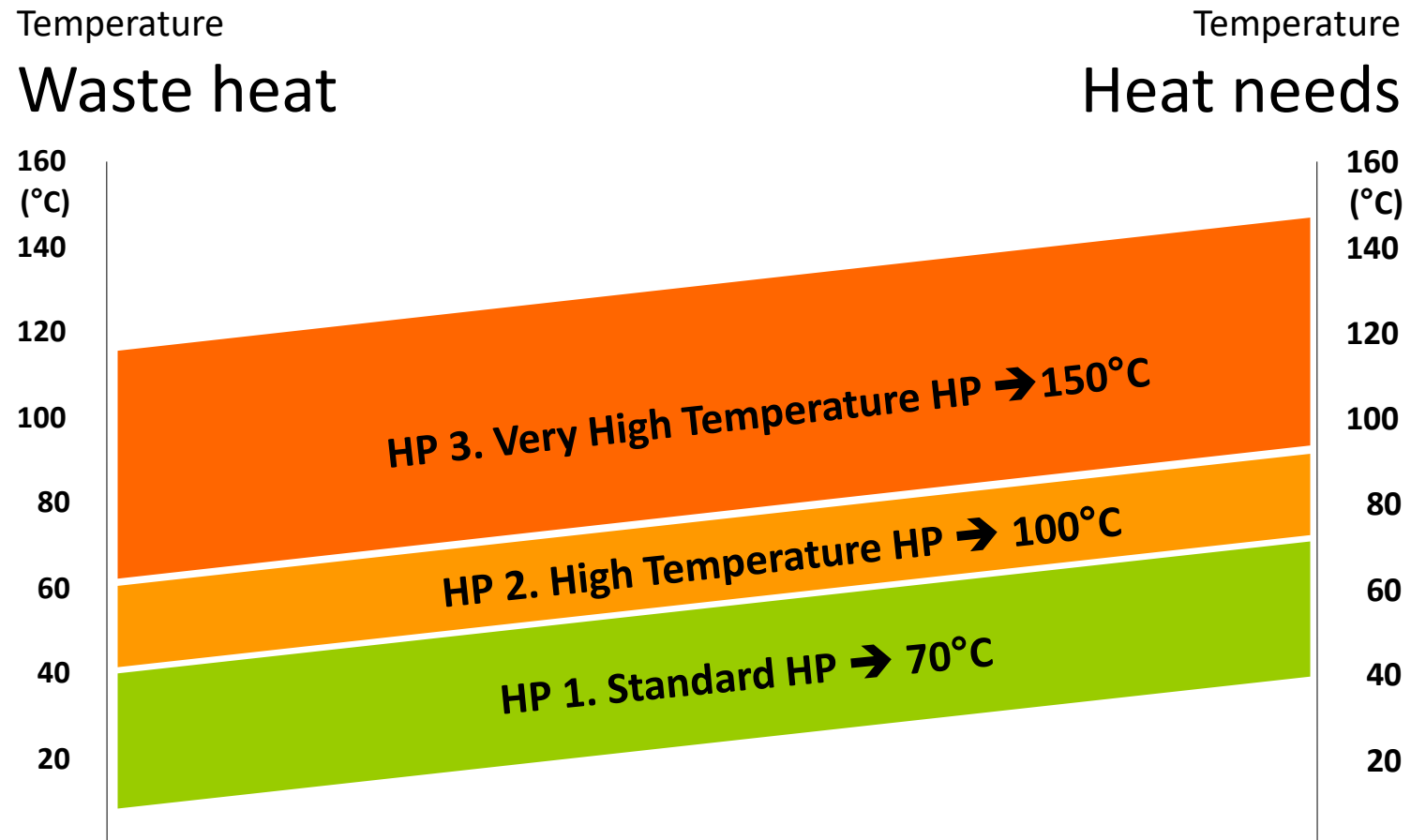


# Assessing the heat pump potential

## Example in the Brewery Industry



## Heat Pumps segmentation for the study



## Key points to assess the HP's opportunities in industry

**Key point 1**                      **Potential of Heat Pumps heat production in each industry sector**

**Key point 2**                      **In each industry sector, competition between Heat Exchangers and HP's**

# Key point 1: Potential of energy that can be produced by a heat pump

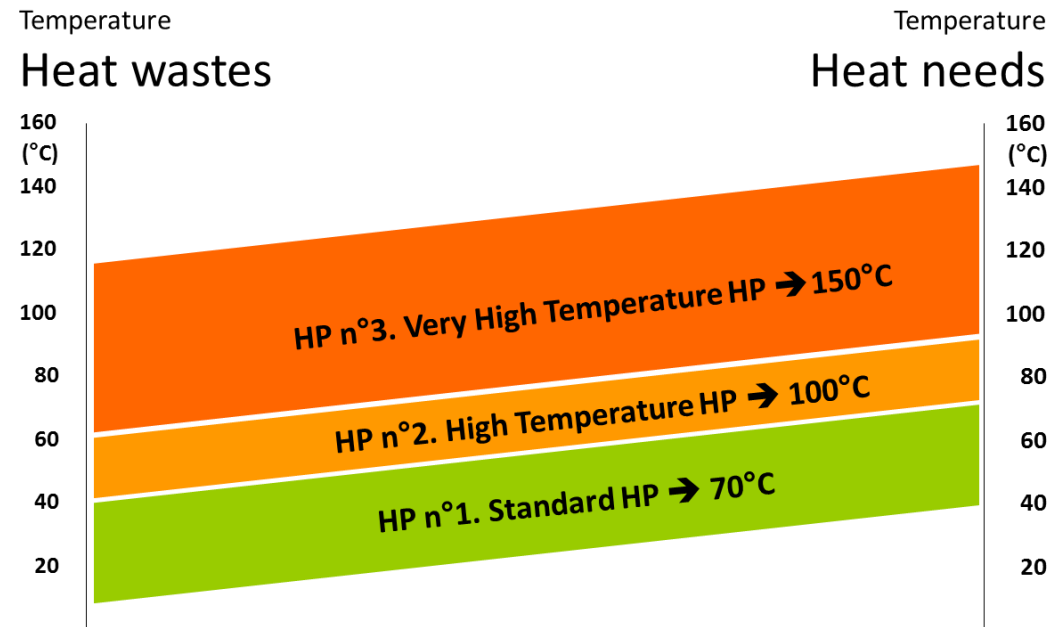
The energy production of HP is limited by

- either the energy needs
- or the energy wasted of the industry sector

**HP 3 = min ( Heat Waste [60-100°C] ; Heat Needs [100-150°C] )**

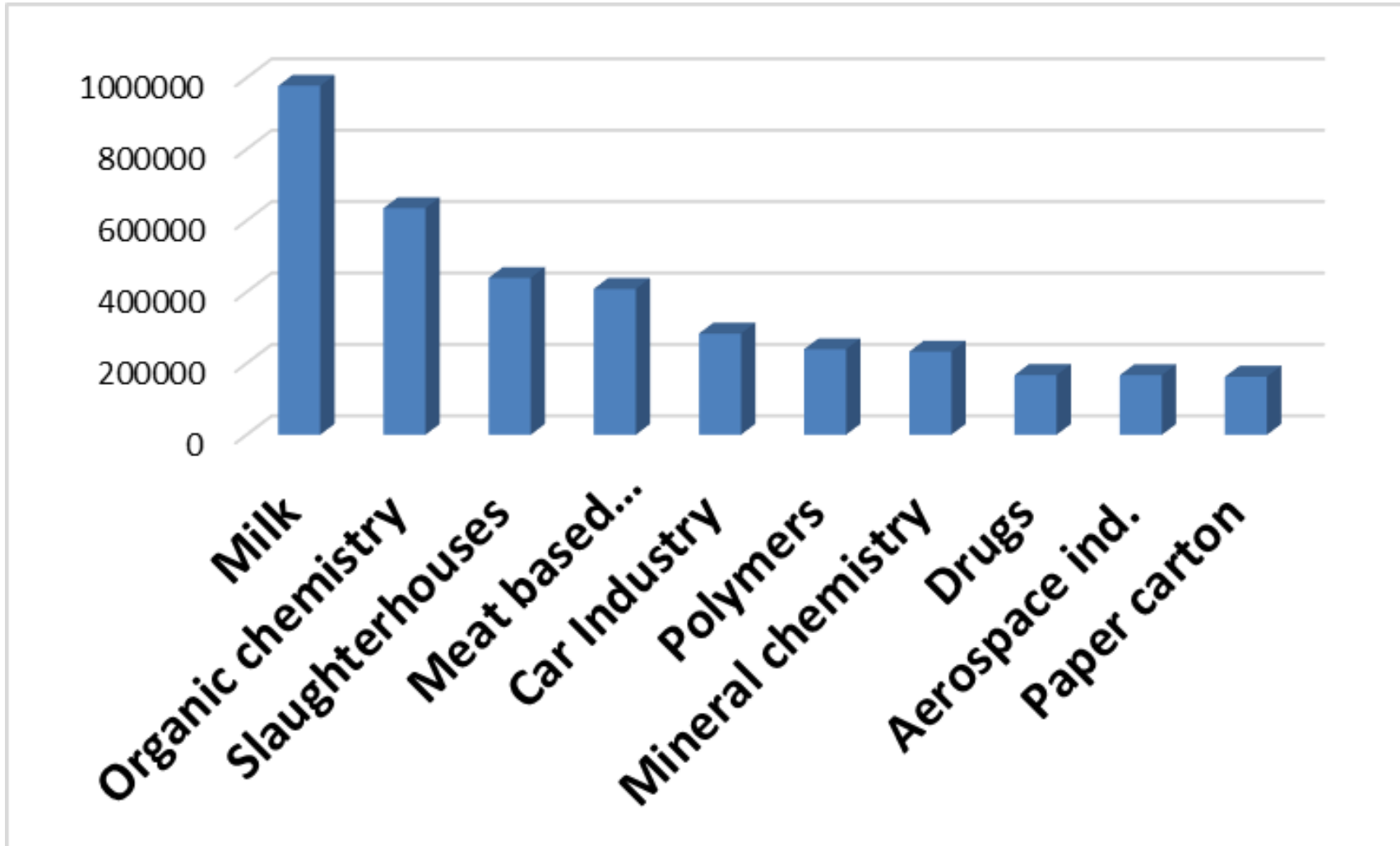
**HP 2 = min ( Heat Waste [40-60°C] ; Heat Needs [70-100°C] )**

**HP 1 = min ( Heat Waste [<40°C] ; Heat Needs [40-70°C] )**



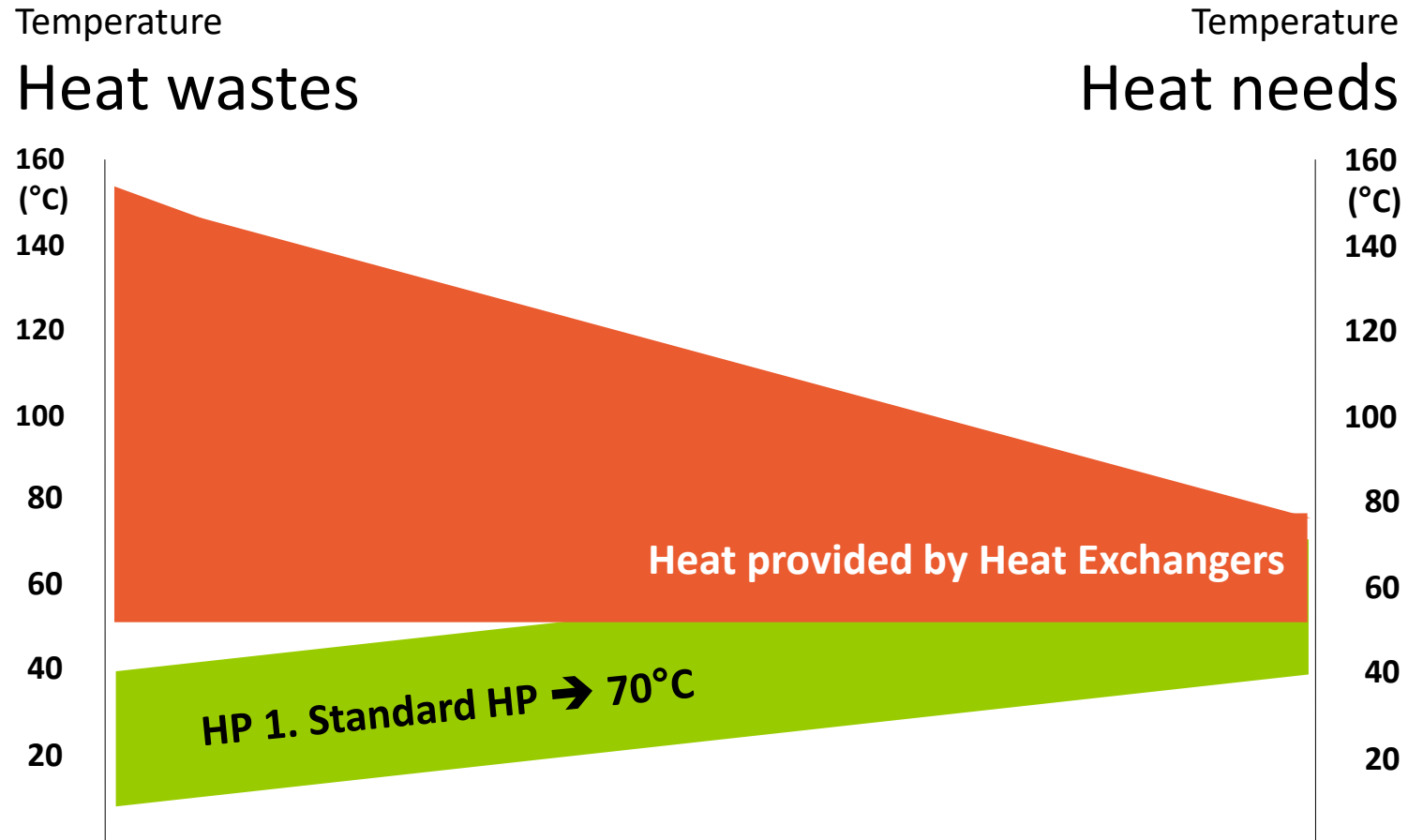
## Key point 1

Overall Potential (France) for HP 1 (heat up to → 70°C)



With Key point 2 :

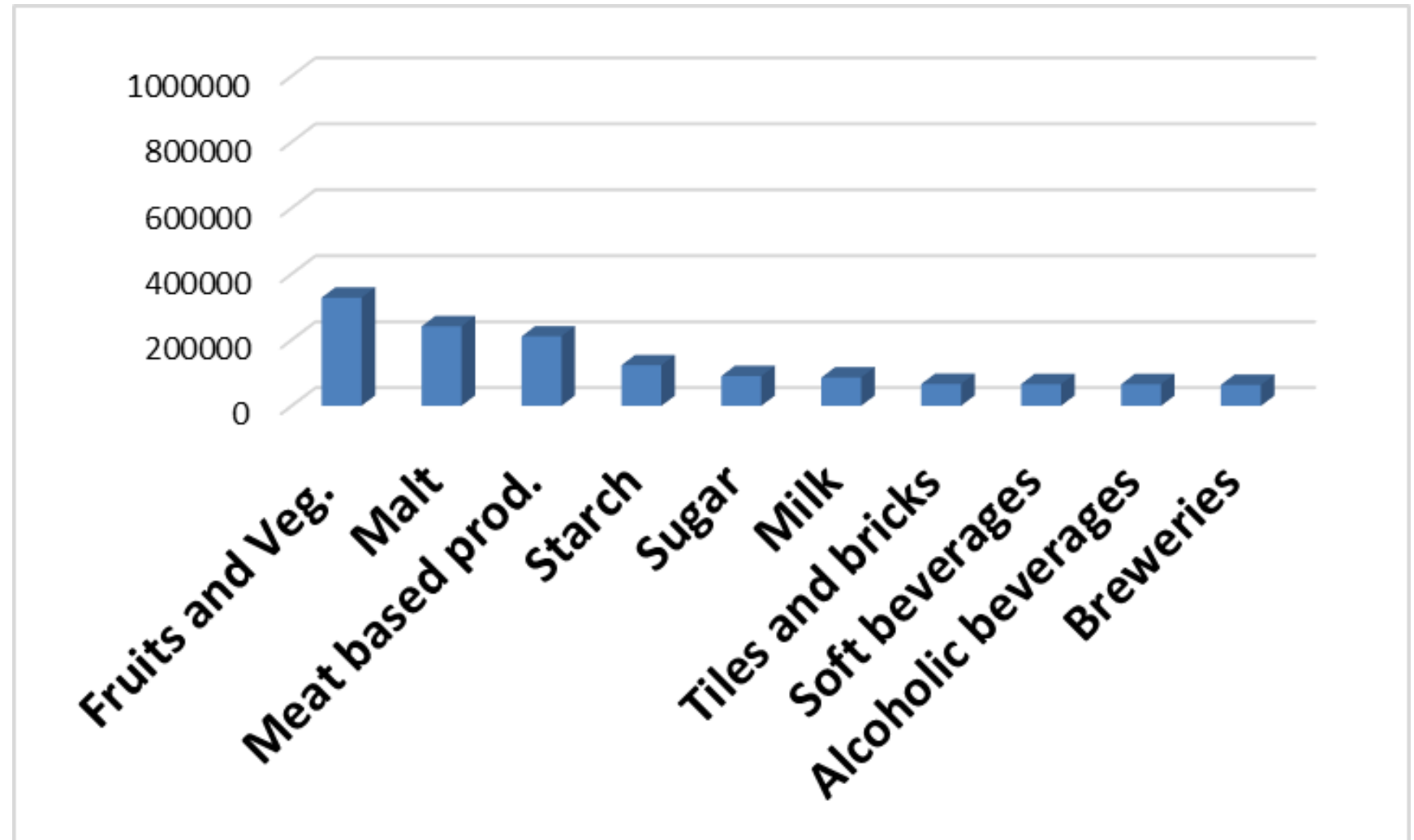
## Taking into account the competition between Heat Exchangers and Heat Pumps



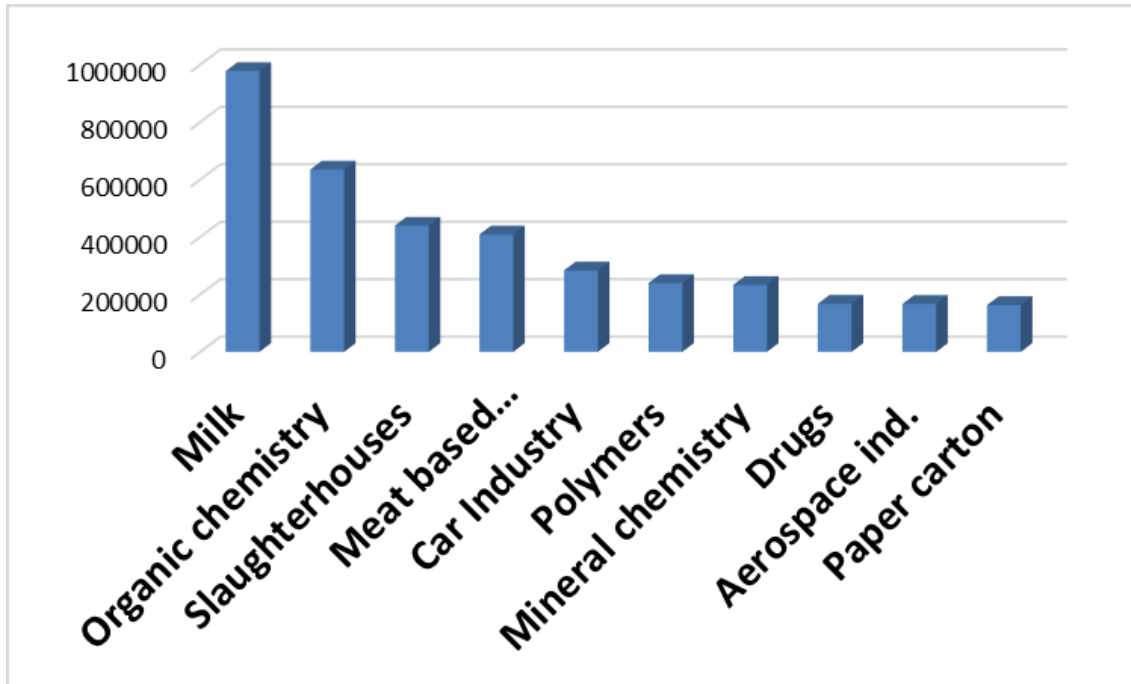
## Key point 2:

Taking into account the competition between Heat Exchangers and HP's

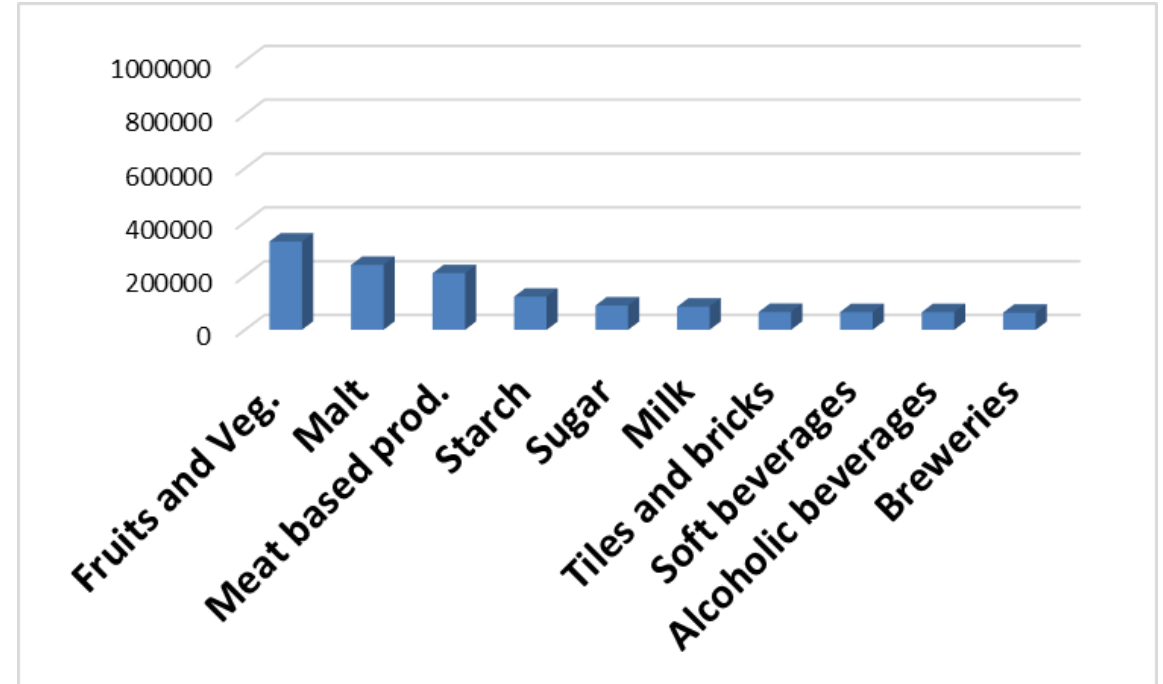
**Top 10 sectors for  
HP n°1 (→ 70°C)**



## Key point 1 : HP1 Potential in the sector



## Key point 2 : HP1 potential considering competition with heat exchangers



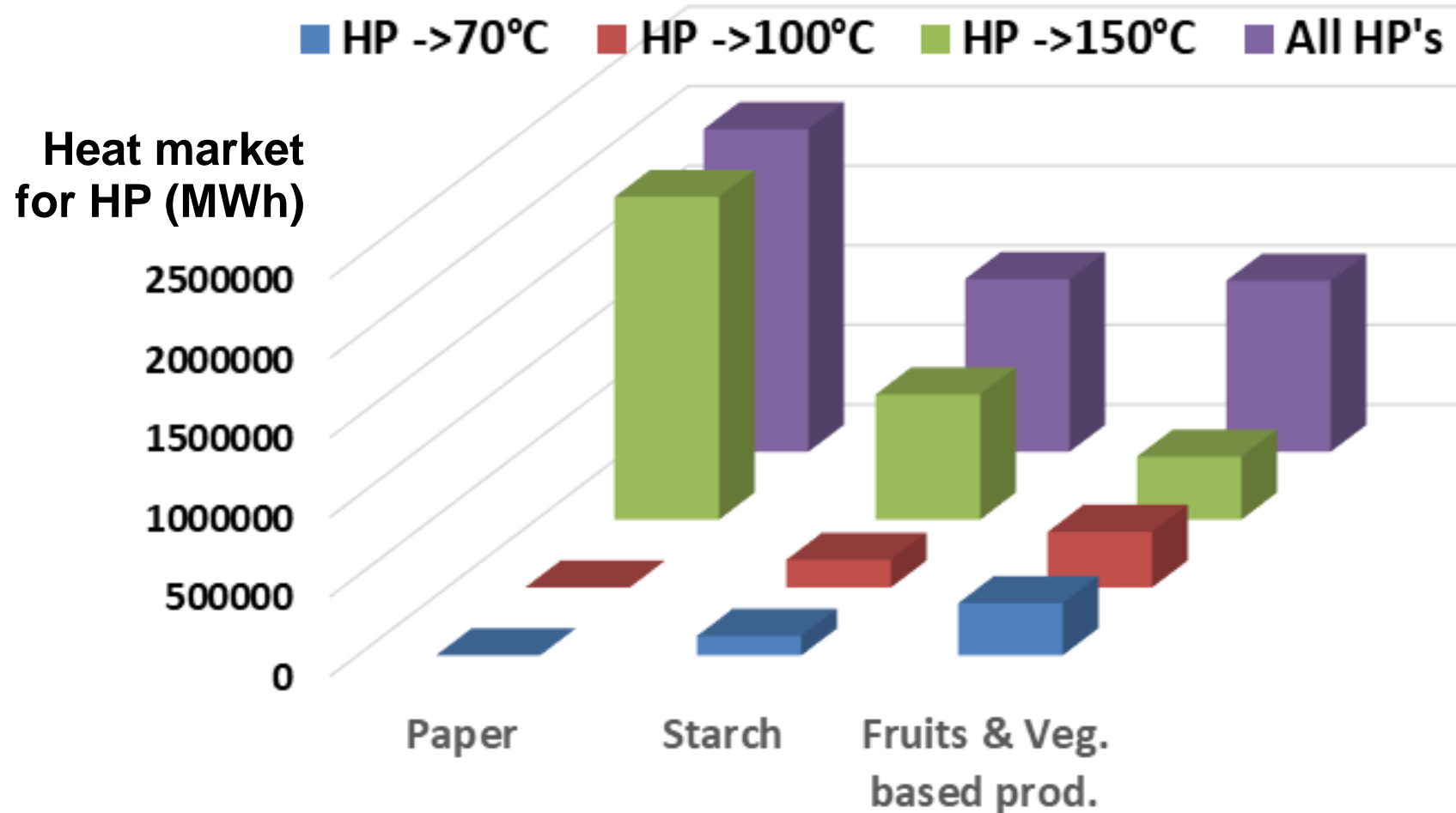
**Sectors with high temperature processes have disappeared :**

**base chemistry, plastic, mineral chemistry, paper, ...**



## Different market sizes for HP1 (70°C), HP2 (100°C) and HP3 (150°C)

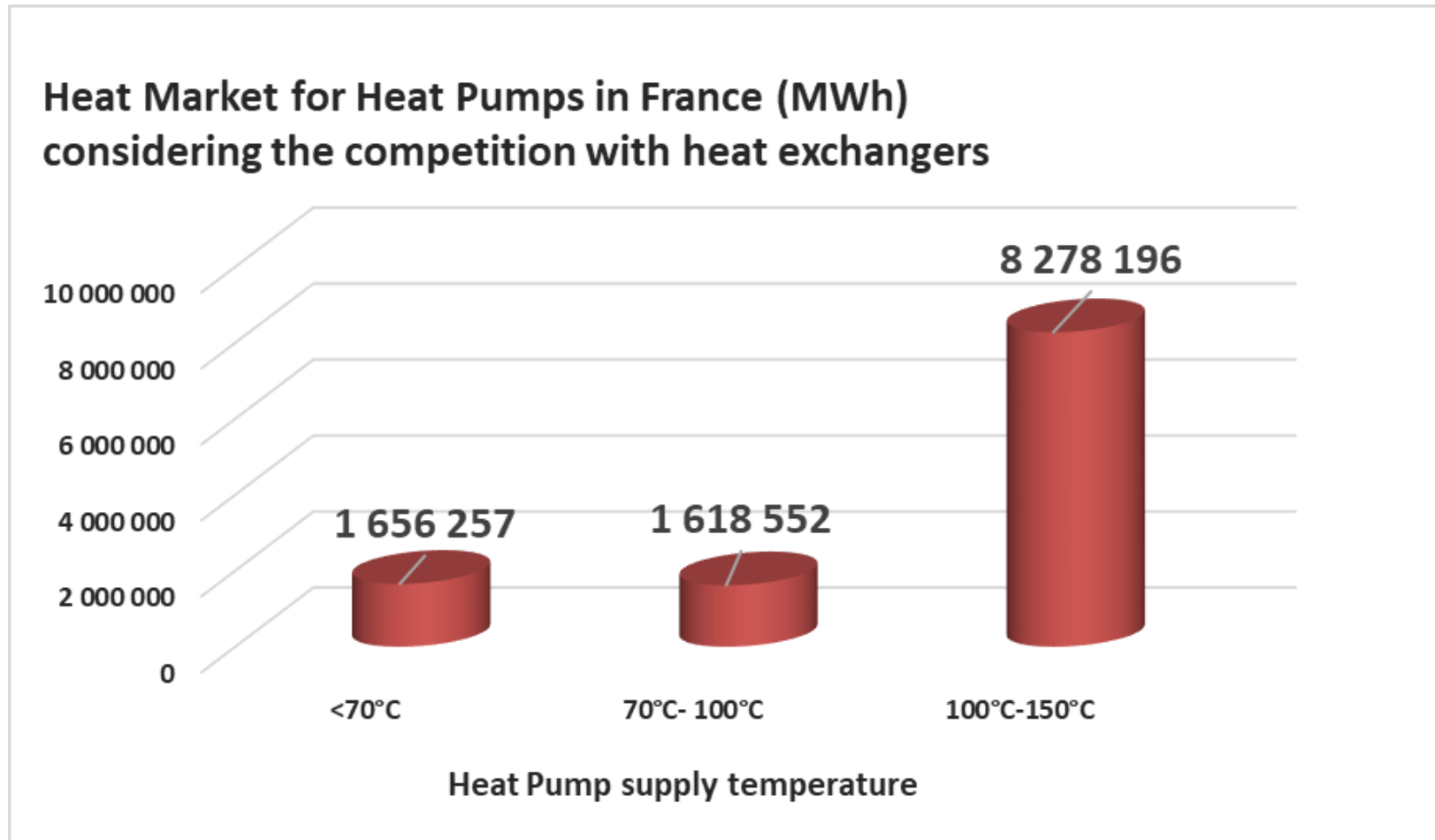
Example for 3 sectors : Paper, Starch, Fruits and Vegetables preserves and frozen products



## Industrial Heat Pumps potential market in France

Total Potential HP potential : 32 TWh of heat

Total potential found with this methodology considering heat exchangers : 11 TWh of heat



## This work could be extended to other countries

Industry sectors	Milk	Malt	Meat	Car	Pet food	Paper	Chemistry	Sugar
Size in France (random figures for example)	100	20	15	200	20	60	40	10
Size in other country (random figures for example)	80	60	30	...	...	....	...	...
HP market France	x TWh	y TWh	z TWh	...	....	...	...	...
HP market other country	$x * 0.8$	$y * 3$	$z * 2$					

# Thank you

**Jean-Marie Fourmigué**

[jean-marie.fourmigue@edf.fr](mailto:jean-marie.fourmigue@edf.fr)