Enabling Industrial Decarbonisation

The vital role of solar thermal and geothermal for the energy transition in industry

11 October 2023

Hosted by MEP Beatrice Covassi

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Welcome

Beatrice Covassi

Member of the European Parliament and Co-chair of the Sustainable, Long-term Investments & Competitive European Industry Group

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Keynote

Lukasz Kolinski

Head of Unit, Renewables and Energy System Integration, DG ENER, European Commission

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Case studies

Geothermal

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Geothermal energy: a case study from Tuscany, Italy

Adele Manzella
CNR-Istituto di Geoscienze e Georisorse, Pisa
adele.manzella@cnr.it

Consiglio Nazionale delle Ricerche

Istituto di Geoscienze e Georisorse igg

A long tradition in geothermal

19° century:

Borax from geothermal fluids: the largest production in the World

20° century

Tuscany teaches to the World how to produce electricity from geothermal energy

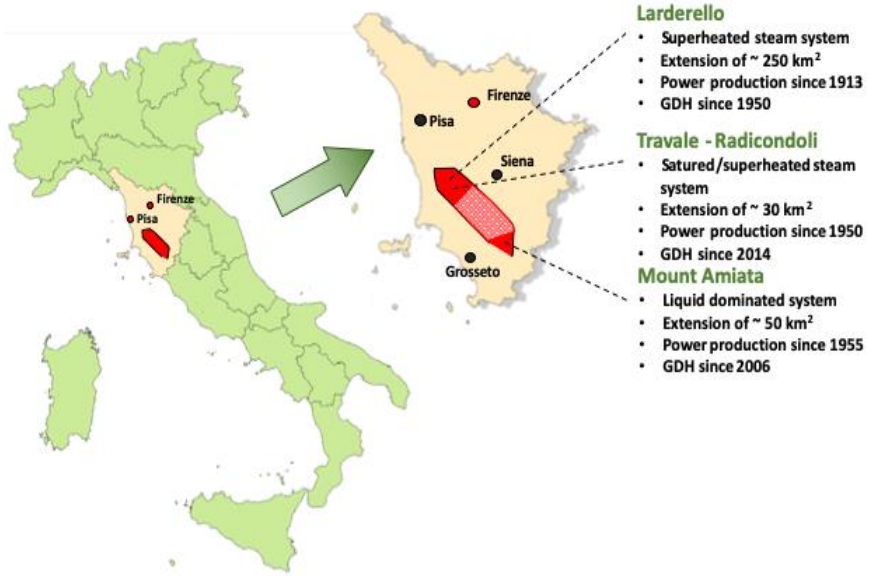
Over 1 century of geothermal power production

A number of other application for heating and cooling follows, starting with district heating (1960')

… and a large production

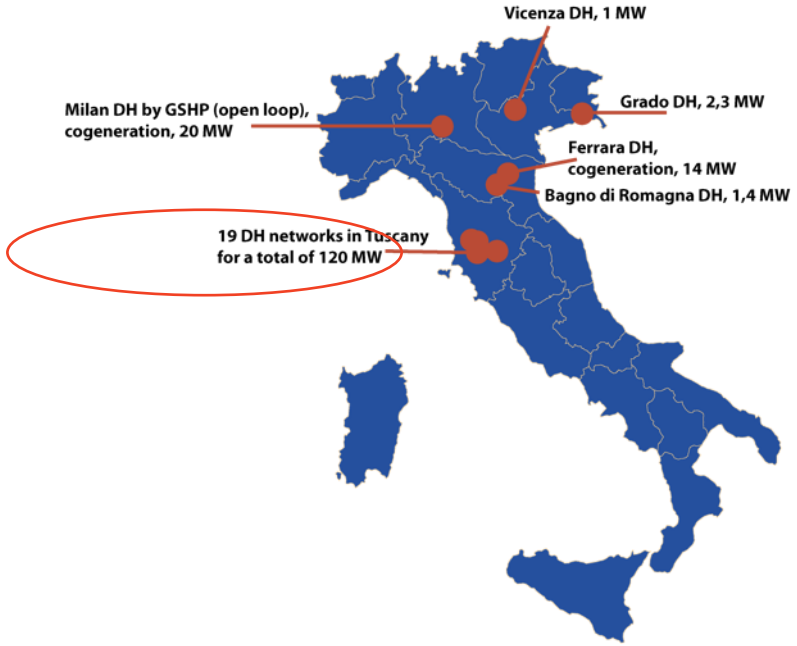
All (34) Italian **geothermal power plants** in operation are located in Tuscany. They supply 6 TWh/y, representing

- 6% of the global geothermal electricity production,
- 5,8% of the national production from RES
- 2% of the national electricity consumption



19 **geothermal district heating networks** are the main source of geothermal heating and cooling for buildings in Tuscany and provide 142 GWh/y.

Other uses are H&C to buildings by GSHP and for heating various processes



Of the 3000 direct and indirect jobs in the geothermal sector estimated for Italy, 2/3 (about **2000 jobs)** refer to the sole Tuscany.

Agriculture and food processing

Wine production (cooling by geothermal heat pumps)

Cheese production
"free" heat from geothermal networks and electricity.

Beer production
"free" heat from geothermal networks plus electricity for heating and cooling.

Agriculture and food processing

Greenhouses
Heat in the winter to produce basil all year round

Greenhouses
Heat and CO2 to produce spirulina
A number of derived products (cookies, crackers…)

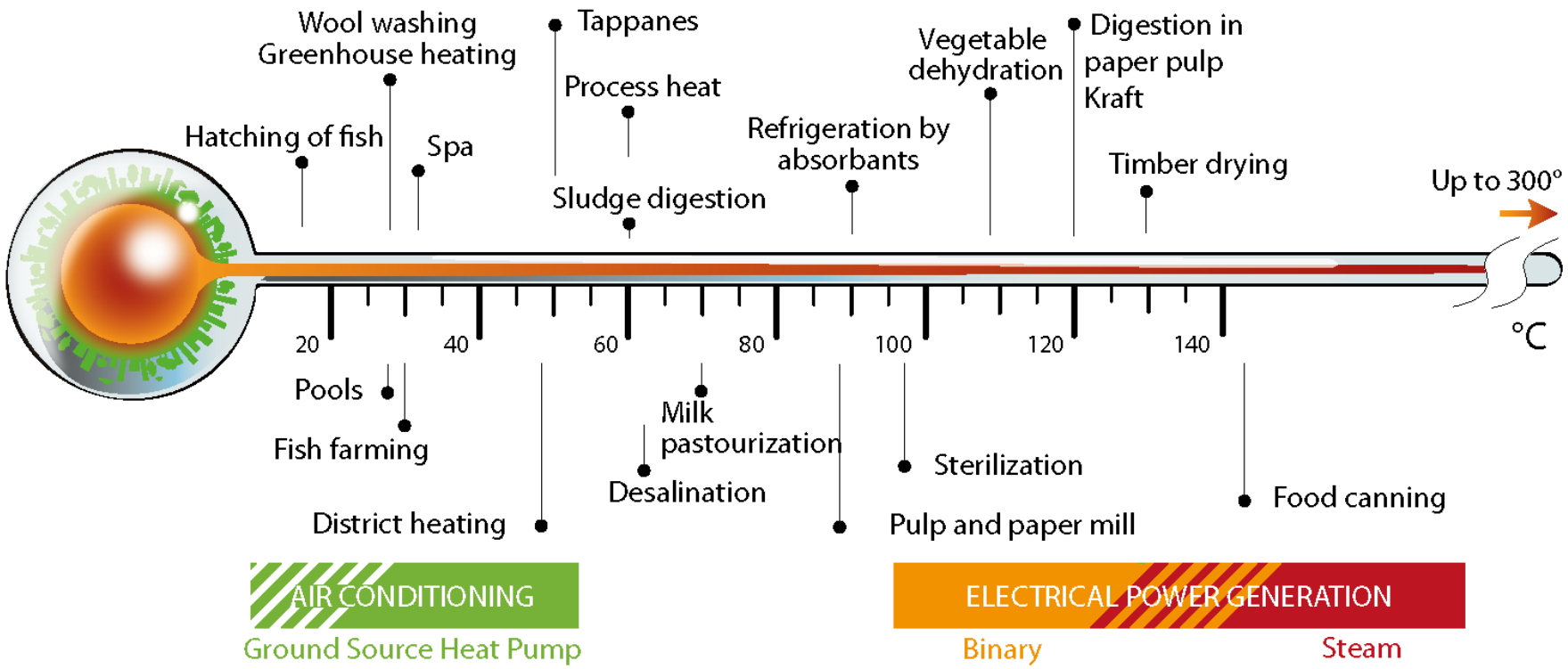
Tuscany hosts a cluster of SMEs that produce food utilising only renewable energy sources (Comunità del Cibo ad Energie Rinnovabili), also linked to Slow Food.
Agrifood is a large economy in Tuscany

From agriculture to industrial processes

Carbon-free plant production of ornamental plants

Other small applications and attempts: meat factory, cured pork, leather production, vegetable and timber dehydration.

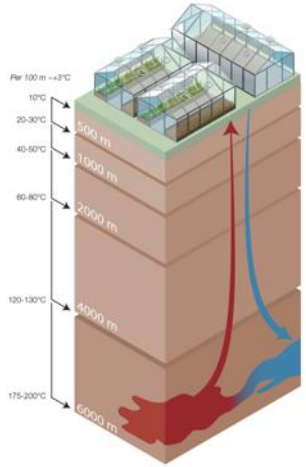
A variety of applications



Those from Tuscany are just some examples of the numerous demonstrated applications of geothermal energy for heating and cooling.

Beside energy production, an important aspect is the possibility of **storing heat underground and optimizing the production**, also jointly with other technologies

Other examples



Horticulture in the Netherlands – The Dutch horticulture sector accounts for about 400,000 jobs and yearly production valued around €8 billion.

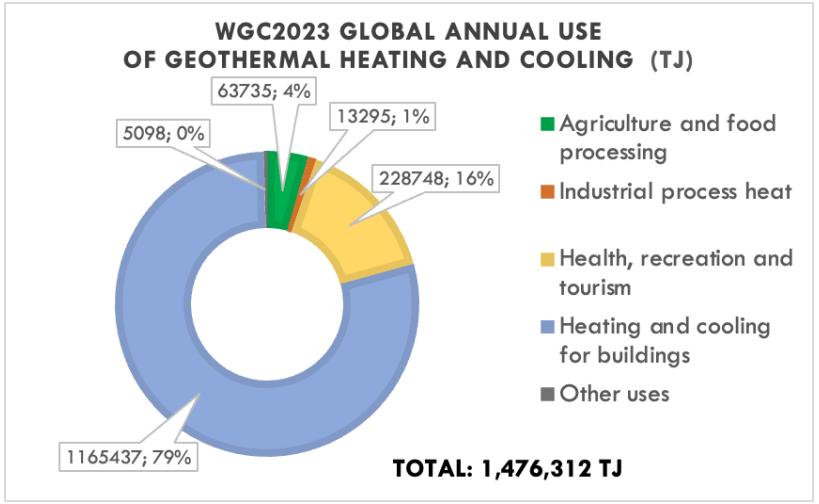
It relied extensively on fossil methane. Energy costs represent about 20-30% of total production costs. Geothermal systems, with an installed capacity of nearly 300 MW_{th} (26 projects), contributes significantly to lowering energy costs and protect companies from volatile gas prices. This model facilitated the rise of the Dutch geothermal heating and cooling industry.

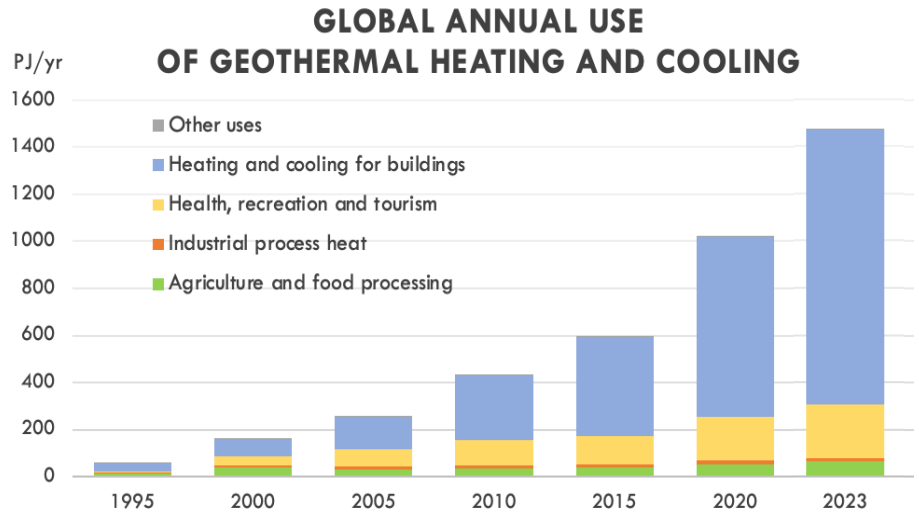
ECOGI is a joint venture between *Electricité de Strasbourg Group* (supplier), *Roquette Frères* (industrial heat consumer), and the *Caisse des Dépôts* (public infrastructure fund) to supply geothermal heat which is used for industrial processes to turn plant-based raw materials into products for the pharma, nutrition, food, and selected industry markets.

ECOGI
L'alliance de la géothermie et de l'industrie

The **Rittershoffen geothermal plant in France** provides 25% of the heat required by the bio-refinery. The €55 million project also received €25 million from the *Fonds Chaluer* operated by ADEME, the French environment agency. This included a €13 million guarantee fund to de-risk the project during the project development phase. A 15 km loop was created between the geothermal plant and the bio-refinery.

A global and national perspective





Electricity has been, for a long while, the main focus in the geothermal sector.
In the last decade, the interest in heating and cooling for buildings has grown very rapidly. Other applications, including industrial processes, require support to become mainstreamed.

In the Italian vision for geothermal development prepared by the sector associations, the potential development and the proposed action for the NREAP in preparation are focused only on power and H&C for buildings and, recently, on critical raw material extraction.

There is a lack of initiatives and proposals for supporting other applications, that would require:

- **Financing** the first stage of projects and building well-known **demonstration projects**
- Increased **awareness** of the large potential and readiness of technologies
- **Training** of a skilled workforce for transforming current networks and appliances (e.g., low T°)
- **RI&D** to improve economics, also by joining technologies (hybrid, cascade etc.)

Recommendations for the European Parliament

- Geothermal does not have the political visibility across Europe that it has in Tuscany. We need the European Parliament to ensure geothermal is included in **EU energy, climate, regional and agricultural policy**.

- We need a **European Geothermal strategy** to help the rest of Europe develop mature regulatory frameworks. We welcome Professor Krasnodębski's Own-Initiative Report to deliver this.

- The Commission must establish a **European financial risk scheme** to provide guarantees for industrial, local authority and business consumers invest in geothermal heating, cooling, power and storage solutions.

- The European Commission should provide guidance to develop **Heat and Cold Purchase Agreements** to make this market accessible for industry.

Some documents of reference for Italy

- Proposals by the Italian Geothermal Association https://www.unionegeotermica.it/pdfiles/PNIEC_Geotermia_2023_signed.pdf
- Position paper from IT associations https://www.unionegeotermica.it/pdfiles/PNIEC_Geotermia_2023_signed.pdf
- And other proposals https://www.unionegeotermica.it/le-nostre-proposte/

Case studies

Solar thermal

Solar Heat Europe
ESTIF

EGEC
GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS &
COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Boortmalt – Who are we ?

1200
Masters of Malt

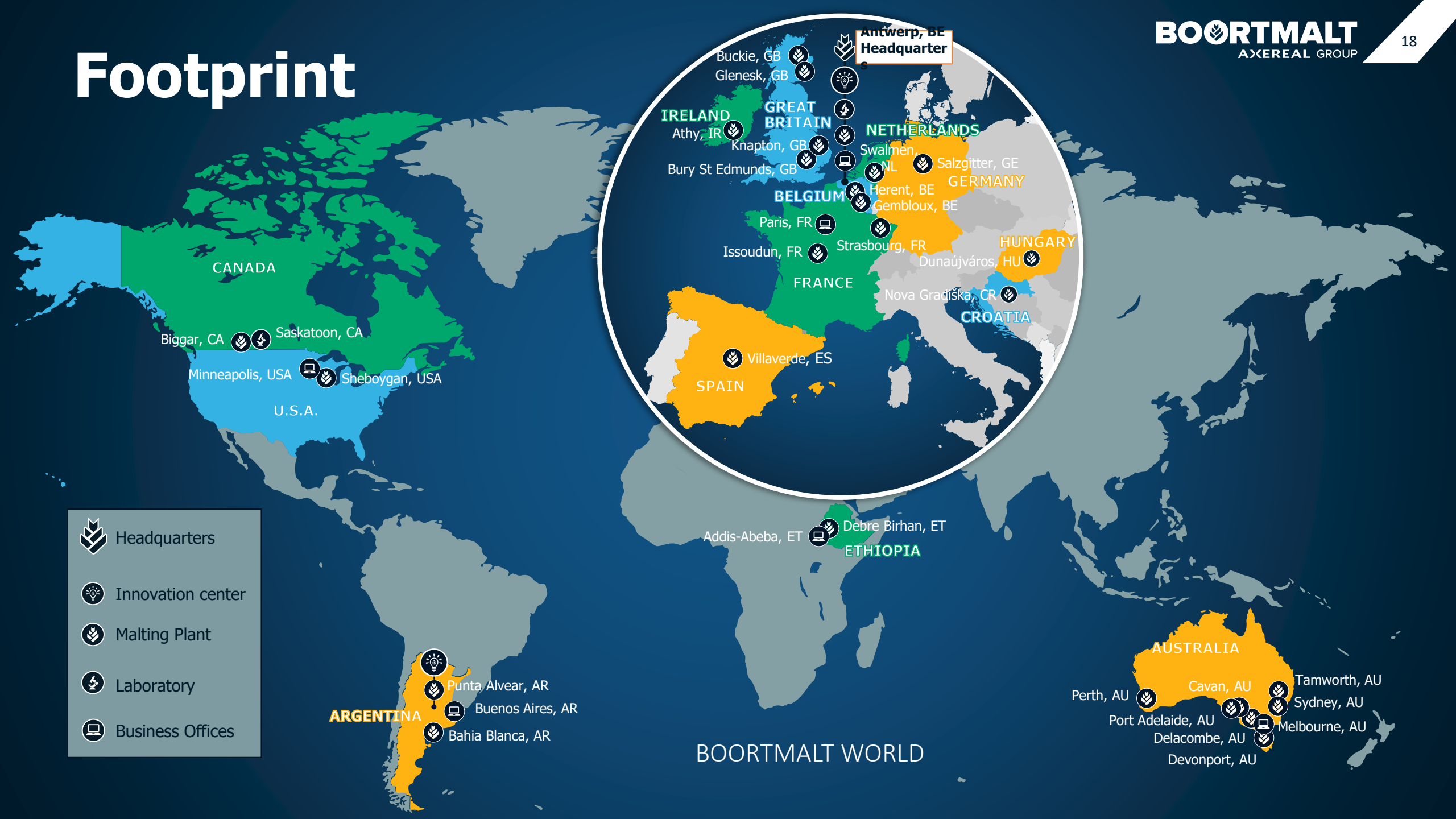
27
Malting plants

5
Continents

3Mt
Production capacity

1st
Global Maltster

Footprint


Antwerp, BE
Headquarters
Buckie, GB
Glenesk, GB
IRELAND
Athy, IR
GREAT BRITAIN
Knapton, GB
Bury St Edmunds, GB
NETHERLANDS
Swalmen, NL
Salzgitter, GE
GERMANY
BELGIUM
Herent, BE
Gembloux, BE
Paris, FR
Issoudun, FR
Strasbourg, FR
FRANCE
HUNGARY
Dunaújváros, HU
Nova Gradiška, CR
CROATIA
SPAIN
Villaverde, ES
CANADA
Biggar, CA
Saskatoon, CA
Minneapolis, USA
Sheboygan, USA
U.S.A.
Addis-Abeba, ET
Debre Birhan, ET
ETHIOPIA
ARGENTINA
Punta Alvear, AR
Buenos Aires, AR
Bahia Blanca, AR
AUSTRALIA
Perth, AU
Cavan, AU
Tamworth, AU
Sydney, AU
Port Adelaide, AU
Melbourne, AU
Delacombe, AU
Devonport, AU
Headquarters
Innovation center
Malting Plant
Laboratory
Business Offices
BOORTMALT WORLD

Purpose of malting

to achieve the correct modification in the grain to be able to release fermentable sugars

Steeping

The barley is subjected to single or multiple phases of steeping in water in a specially designed steeping vessel.

Germination

The chitted barley is placed on perforated floors to promote germination of the grain. This is controlled (t° > 15° to 18° C, humidification, ventilation) and the complete bed of grain is turned at regular intervals to prevent matting.

Kilning

The green malt is placed on a perforated floor and the grain is dried by blowing controlled volumes of heated air through the grain, following a product specific kilning recipe.

60-90 °C Heat requirement

4 CORE OBJECTIVES

BUSINESS AMBITION FOR 1.5°C

Health & Safety

0 injury

through excellent health & safety programmes.

Water conservation

30% water reduction

per MT of malt produced through conservation and efficiency.

Sustainable farming

67% of barley base

By engaging in one or more sustainable farming practices.

Energy use & Emissions reduction

50% emissions reduction

through reduced consumption & renewable energy sources.

5 SUPPORTING OBJECTIVES

No waste to landfill

packaging footprint reduced by 50%.

Full traceability

and where customer requires, using blockchain.

Every plant to be engaged...

in one or more local community initiatives.

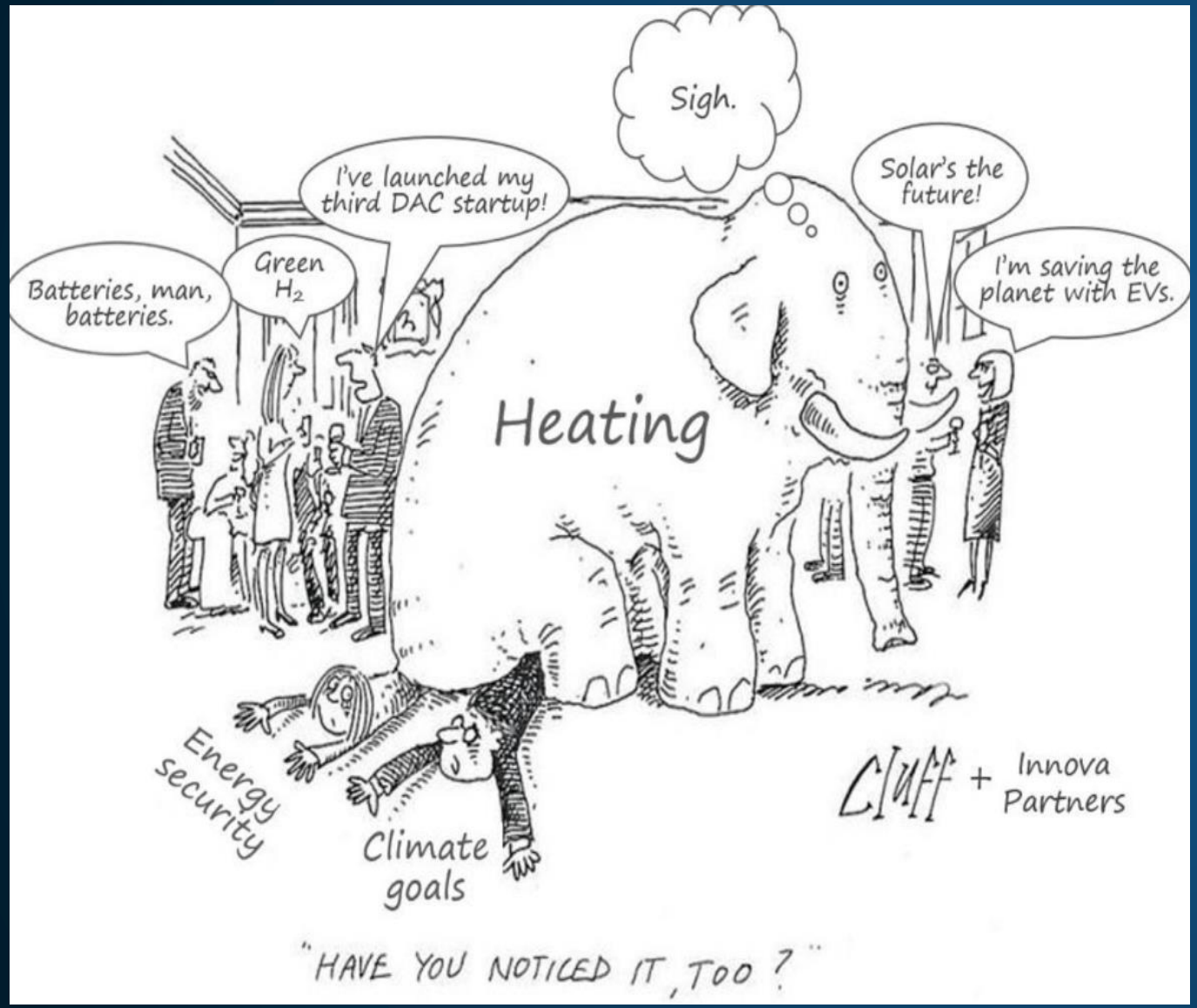
All employees to respect...

our business ethics manual & our supplier code of conduct.

Equal pay & opportunity across all sites

Diversity and inclusion in line with UN guidelines.

Decarbonisation of heat

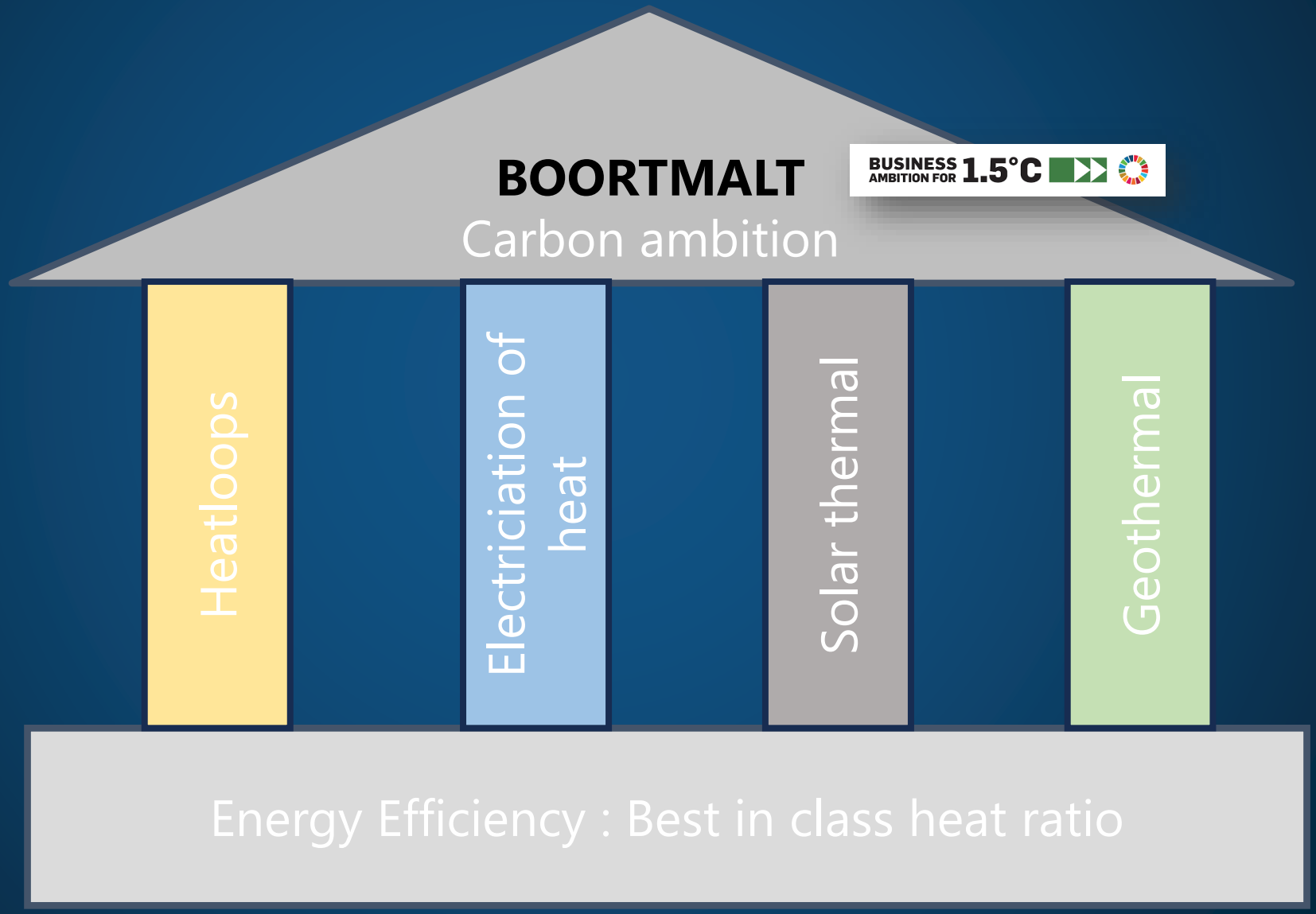


- Our main challenge!
- 1,5TWh yearly (= City of Antwerp)
- 90% of our carbon emissions (Scope 1)

Strategy – We know the technologies, we just to accelerate …

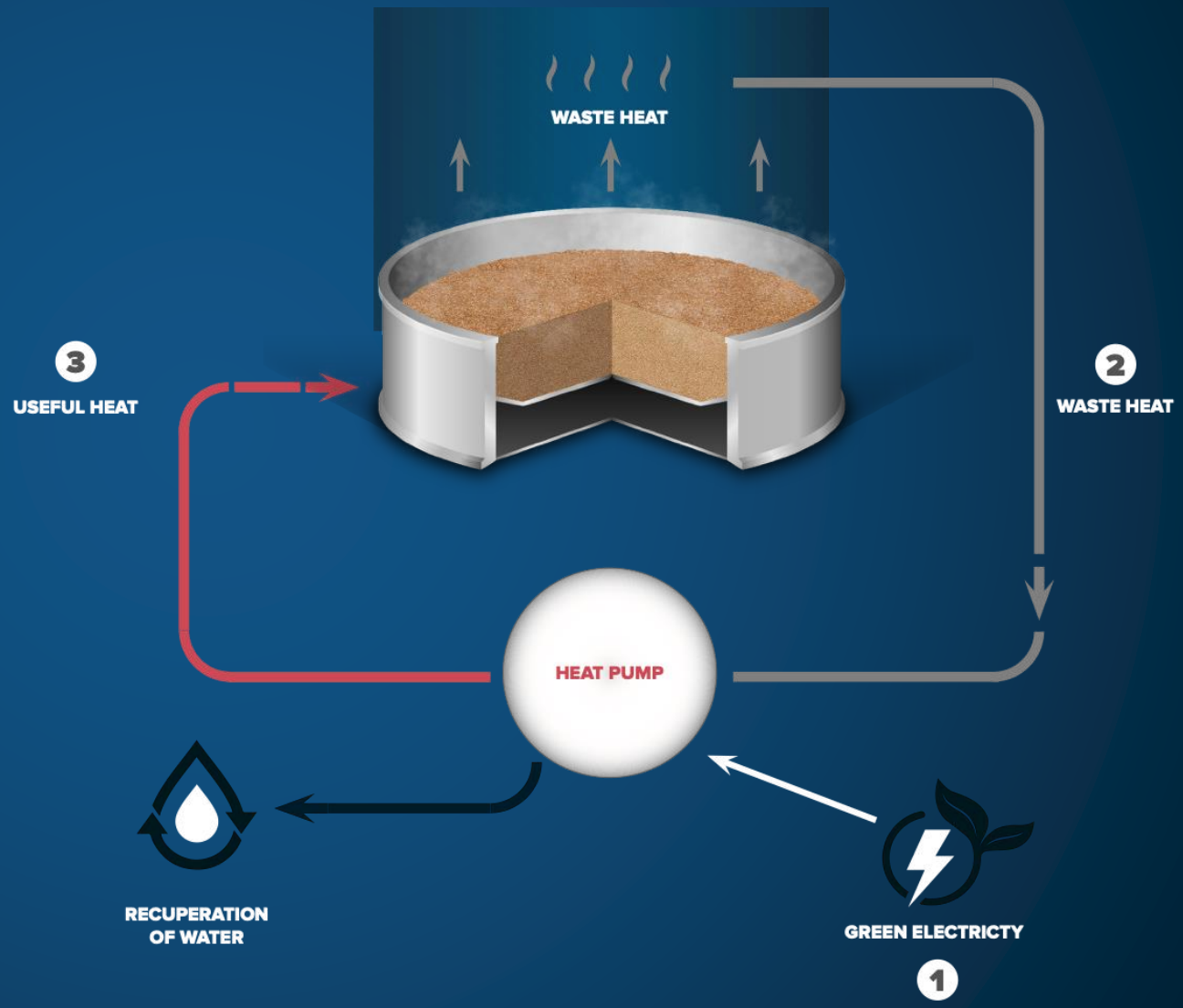
To accelerate

- Detailed engineering
- Financing structure
- Identify subsidies
- …



Electrification of heat – First large scale heatpump project in Maltings will be operational in February 2025

- 8 MWth capacity
- Internal standardised design
- Overal COP of 350%



Antwerp North Heat Network – Operational October 23

CARBON-FREE HEAT NETWORK

Boortmalt will save the gas consumption equivalence of 10,000 homes per year

WARMTENETWERK ANTWERPEN NOORD

The 12km heatloop will bring waste heat from Indaver incineration plant to the Boortmalt maltings

Scheldt River

Port of Antwerp

INDAVER

BOORTMALT MASTERS OF MALT

With the heat network Boortmalt will save ±30,000 tons of CO_2/year

temperature of heatloop 100°C

Rozemaai

Antwerp City

Luchtbal

Antwerp Maltings energy mix

Cogeneration	Heat network	Natural gas
30%	50%*	20%

Port of Antwerp · INDAVER · fluvius · BOORTMALT MASTERS OF MALT · woonhaven antwerpen

*Possible extension to 75% by 2026

Case study : large scale solar thermal

European Parliament Event

October 11th, 2023

newheat
fournisseur de chaleur renouvelable

Case study – large scale solar thermal for industrial sites

"Malteries Franco-Suisses" Malthouse (Issoudun, France - Boortmalt Group)

- **Commissioning in April 2021**
- **Largest solar thermal plant for industrial process in Europe**

Key indicators

- **Power peak:** 10 MW_{th}
- **Solar collectors' area:** 14 250 m^2
- **Total land area:** 3,2 ha
- **Storage capacity:** 3 000 m^3
- **Annual energy delivery:** ~8 600 MWh pa
- **CO2 emissions avoided:** ~2 000 Tonnes pa

Specificity of the site

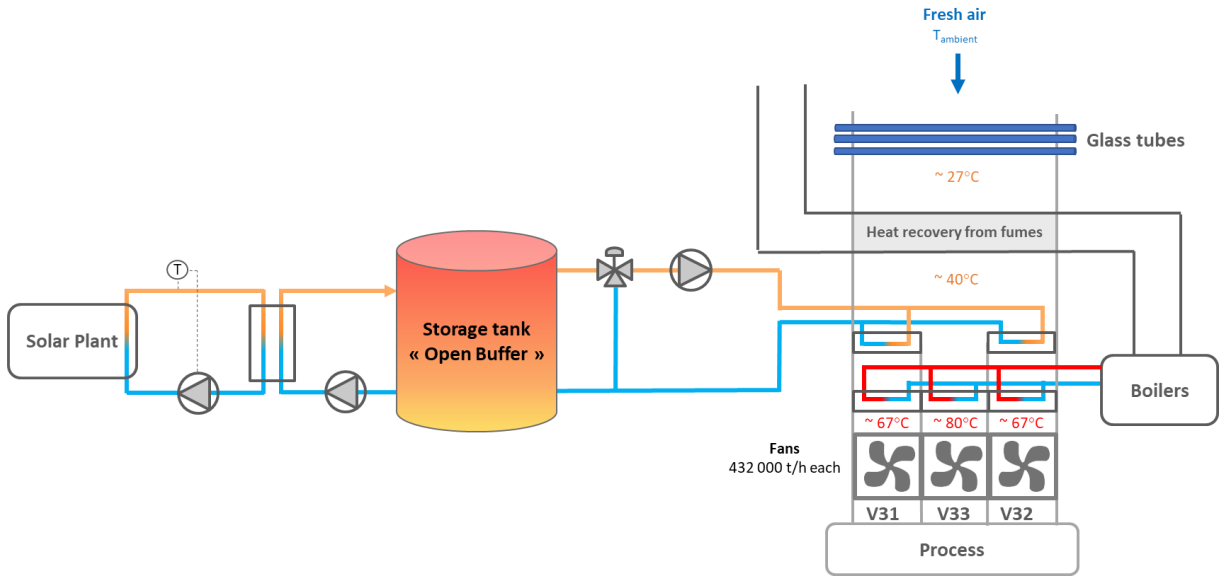
- 80GWh of Heat consumption (30% Biomass / 70% gas before the project)
- Preheating of the drying air in the kiln
- Implementation of the solar field over 3 different zones

Project actors and respective roles

- **Grants:** French Energy Agency (ADEME)
- **Co-developer, third-party investor:** Kyotherm
- **Co-developer, Engineering and O&M :** Newheat

Case study – large scale solar thermal for industrial sites

"Malteries Franco-Suisses" Malthouse (Issoudun, France - Boortmalt Group)



- **Commissioning in April 2021**
- **Largest solar thermal plant for industrial process in Europe**

Key indicators

- **Power peak:** 10 MW_{th}
- **Solar collectors' area:** 14 250 m^2
- **Total land area:** 3,2 ha
- **Storage capacity:** 3 000 m^3
- **Annual energy delivery:** ~8 600 MWh pa
- **CO2 emissions avoided:** ~2 000 Tonnes pa

Specificity of the site

- 80GWh of Heat consumption (30% Biomass / 70% gas before the project)
- Preheating of the drying air in the kiln
- Implementation of the solar field over 3 different zones

Project actors and respective roles

- **Grants:** French Energy Agency (ADEME)
- **Co-developer, third-party investor:** Kyotherm
- **Co-developer, Engineering and O&M :** Newheat

Case study – large scale solar thermal for industrial sites

"Malteries Franco-Suisses" Malthouse (Issoudun, France - Boortmalt Group)

- **Commissioning in April 2021**
- **Largest solar thermal plant for industrial process in Europe**

Key indicators

- **Power peak:** 10 MW_{th}
- **Solar collectors' area:** 14 250 m^2
- **Total land area:** 3,2 ha
- **Storage capacity:** 3 000 m^3
- **Annual energy delivery:** ~8 600 MWh pa
- **CO2 emissions avoided:** ~2 000 Tonnes pa

Specificity of the site

- 80GWh of Heat consumption (30% Biomass / 70% gas before the project)
- Preheating of the drying air in the kiln
- Implementation of the solar field over 3 different zones

Project actors and respective roles

- **Grants:** French Energy Agency (ADEME)
- **Co-developer, third-party investor:** Kyotherm
- **Co-developer, Engineering and O&M :** Newheat

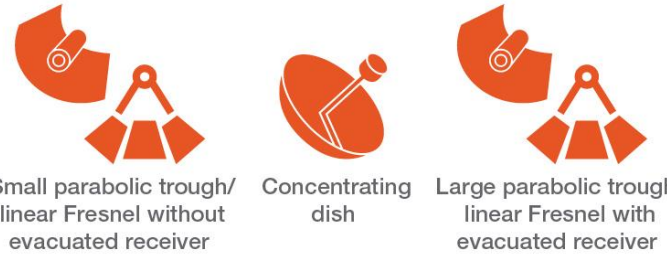
Solar thermal: For buildings, district heating networks and industry From 30 to 400°C

SECTOR	LOW		MEDIUM
	Below 75 °C	75 to 150 °C	150 to 400 °C
Agriculture	• Greenhouse heating • Drying		
Buildings	• Space heating • Washing • Showering • Cleaning		• Cooking
District heating	• Feeding into new, forth generation heat networks	• Feeding into existing heat networks	
Industry	• Washing • Heat treatment • Drying	• Boiling • Bleaching • Pasteurising • Dyeing • Sterilising	• Distilling • Pulping • Nitrate melting • Drying of paint

50%

of all industry's HEAT needs

COLLECTOR TYPE



Learn more about Solar Heat for Industrial Processes.

Recommendations for the European Parliament

- Provide awareness and concrete support for **solar thermal technology**.
- Promote the **effective implementation and monitoring of the revised RED (Renewable Energy Directive) at national level**, namely the sub-targets for RES-H&C and RES in industry.
- Increase the **funding and support for solar thermal** in the industrial sector:
  - Prepare to discuss, under the next framework programme, options to increase funding through the European Structural and Investment Funds (ESIF) or Structural, cohesion and Strategic Technologies for Europe (STEP), and other instruments (a new Renewables in Industry Fund).
  - Support a dedicated call for solar thermal commercial-scale demonstration projects in the EU's Innovation Fund to enable solar thermal heating
  - Provide EU guidance to develop Heat and Cold Purchase Agreements
- Support a **European financial risk scheme** which provides insurance for industrial consumers, local governments, business, and public sector buildings to invest in solar heating, cooling, and storage solutions.

Panel discussion

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Intervention

Professor Zdzisław Krasnodębski

Member of the European Parliament

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Closing

Guglielmo Cioni

President of Solar Heat Europe

Beatrice Covassi

MEP & Co-chair Intergroup Industry

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP

Thank you !

Event followed by Networking Drinks

Solar Heat Europe ESTIF

EGEC GEOTHERMAL

SUSTAINABLE, LONG-TERM INVESTMENTS & COMPETITIVE EUROPEAN INDUSTRY INTERGROUP