



# Eco-Tech Ceram

The carbon free energy





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17/07/2024



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# 1-Eco-Tech Ceram

17/07/2024



## Part 1 - Eco-Tech Ceram

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# The ETC mission: decarbonisation the industry



“ *Industry is responsible for 20 % of the CO<sub>2</sub> emissions.*

*More than the third of the consumed energy is lost in the form of heat, equivalent to 2450 Mt of CO<sub>2</sub> per year on a global scale.*

*We can profitably decarbonise the industry by recovering this waste heat.*

**Antoine Meffre**, founder and CEO of Eco-Tech Ceram

All committed to decarbonisation





# Our shareholders



An independent French management company founded in 2013 by N. Rochon and a company with a mission, RGREEN INVEST specialises in investing in and financing the energy transition and adaptation to climate change.



Bpifrance finances businesses through loans, guarantees and equity. It supports them in their innovation and international projects. Bpifrance also supports their export activities through a wide range of products.



Created as part of the PIA programme, it is 100% owned by the French government. Its aim is to provide equity financing for innovative infrastructure projects in the field of energy and ecological transition, alongside private-sector players.



The Captain Watt Group (formerly Qair), owned by the Bouchet family, invests in companies involved in the transition to energy, the environment and the sea. It supports the development of 15 companies, mainly in the Occitanie region.



In the field of renewable heat, Johes is the family office of the Vaury family, specialising in the energy transition.



The Occitanie Regional Climate and Energy Agency creates solutions to facilitate the energy and climate transition in the regions. It operates across the entire energy transition value chain.



# ETC: decarbonising industry



## Climate change

**30-50**

% of ecosystems under threat

**3 billion**

people at risk

**+ 2°C**

maximum to limit global warming by 2100

\*Global figures - IPCC 2022 report



## CO2 emissions

**78 million**

tonnes of CO<sub>2</sub> emitted every year in France by industry



**20**

% of CO<sub>2</sub> emissions come from industries

**20 million**

fewer tonnes of CO<sub>2</sub> emitted by industry by 2032 - a French government requirement

\*Haut Conseil pour le Climat figures, Sept. 2022 and Citepa, Secten inventory, ed. 2022 / Speech by E. Macron, Nov. 2022



## Lost energy

**50**

% of energy is consumed as heat



**1/3**

of the energy consumed is lost as heat

**100 = 2.4**

TWh of heat is lost in France each year

million French people for their annual consumption

\*ADEME figures Dossier waste heat recovery 2020



## The ETC solutions

**+20**

% gains with energy sobriety and efficiency

**+20**

% gains with heat recovery with or without storage

**+30**

% gains with the electrification of heat

**1000 tonnes**

of CO<sub>2</sub> avoided each year

\*ETC figures based on feedback from infrastructures installed on industrial sites



# Context & challenges: an opportunity to seize now



World

Paris agreements: < 2°C



Europe

Fit for 55 %: 1990 vs 2030



France

SNBC: -35 % to -50 % 2015 to 2030



Carbone quotas

Banks will no longer finance industries that do not have a decarbonisation strategy (ESG, environmental standards).



Efficient, cost-effective and sustainable technology solutions.  
Associated financing solutions with our partners.





# From idea to production: from R&D to your factories



2011

2013

- Antoine Meffre thesis (CNRS PROMES): High temperature **energy storage**.

- The ETC concept:

Design of a thermal storage unit to recover waste heat from factories.

**Design and production of prototypes** for public research and higher education.



2014

2021

- Creation of Eco-Tech Ceram**
- Three-time winner of the Global Innovation Contest
- Prototypes** and industrial sales
- Fundraisings** (40 M€)
- Creation of ETC Invest
- 5 patents**
- 50 scientific publications



2023 ...

Today:

- 25 employees** experts in sobriety, energy efficiency and energy recovery.
- Contracts with industries and major industrial groups** (5M€)
- Contracts with public research laboratories**
- Active R&D thanks to a major scientific network





# Your contact for a complete expertise

We understand every stage and every element of **industrial processes**, in ceramics and metallurgy to provide the most cost-effective and sustainable **decarbonised heat** possible.



Project management



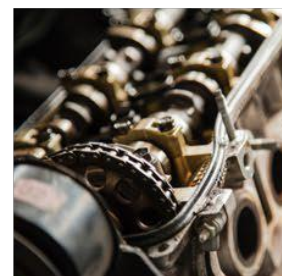
Materials



Thermics



Process



Mecanics



Automation



Digitalisation



Funding

⇒ From design to implementation

⇒ From experimental laboratory bench to industrial infrastructure: **from TRL2 to TRL9**

⇒ All the necessary scientific and technical skills



## 2- Our solutions to decarbonise



### Part 2 - Our solutions to decarbonise industry

- [Eco-Stock® and PTH](#)
- [Solutions for profitable decarbonisation](#)
- [Pragmatism and cost-effectiveness](#)
- [Proven decarbonisation strategy](#)
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# Eco-Stock<sup>®</sup> + PTH: our innovative solutions



The Eco-Stock<sup>®</sup> is certified by the Solar Impulse Foundation since 2018.

Eco-Tech Ceram has developed the Eco-Stock<sup>®</sup>, which can be combined with power to heat, a **low-carbon heat production duo**. With Eco-Stock<sup>®</sup>, high-temperature storage **captures** the plant's heat source at over 300°C, **stores** its energy and **reinjects** it into the processes.



**TEMPERATURE**  
300 - 1500°C



**YIELD**  
> 90 %



**POWER**  
200 at 3000 kW



**CAPACITY**  
Up to 3 MWh



**MODULAR**  
Many applications



**ROBUST**



**MOVABLE**  
Movable on site



**ECO-DESIGNED**  
0.14 MWhth/m<sup>2</sup> footprint



**REDUCTION**  
Up to 1000 t / year





# Solutions for cost-effective decarbonisation

The **Villeroy & Boch** exemple:

**8 GWh** in **energy** savings and **1400 tonnes of CO2** avoided each year.







# Pragmatism and cost-effectiveness

1



Identifying energy consumption

5 % potential savings



Cost effectiveness +++

2



Sobriety and energy efficiency

20 % potential savings



Cost effectiveness +++

3



Heat recovery with or without storage

20 % potential savings



Cost effectiveness ++

4



Heat electrification

30 % potential savings



Cost effectiveness +



# Proven strategy decarbonisation

## Step 1

Find out about your consumption

## Step 2

Global energy efficiency

## Step 3

Renewable energies

1  
Target

2  
Measure

3  
Visualize

4  
Analyze

5  
Action plan

6  
Sufficiency

7  
Efficiency

8  
Recover

9  
Substitute

Eco-Tech Ceram = 1 single point of contact to draw up your decarbonisation strategy

⇒ [ADEME methodology](#)

⇒ Scientific and rational approach- Pragmatism

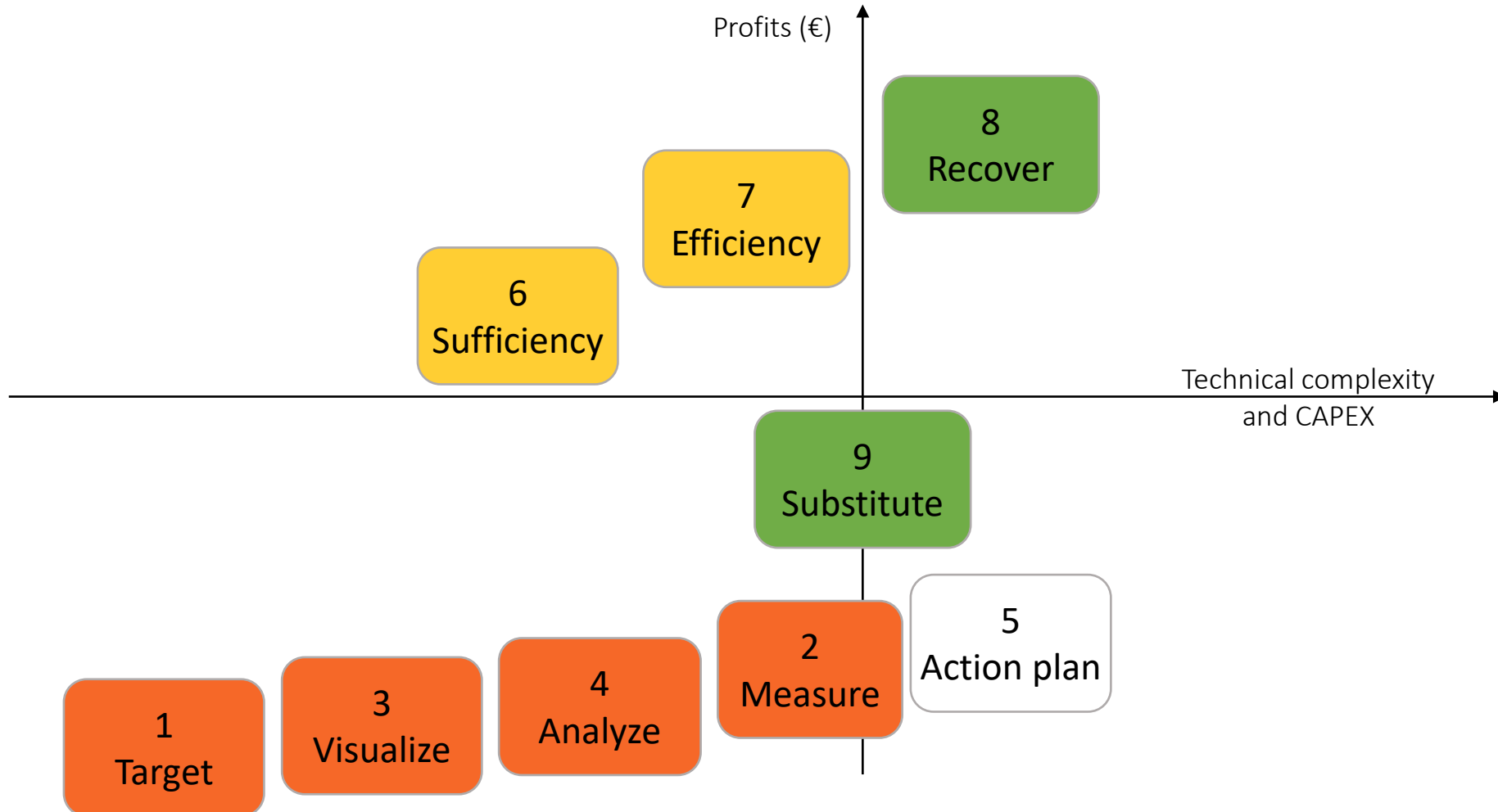
⇒ State of art T0

- Action plan ranked by increasing ROI
- CAPEX or OPEX implementation (over a maximum of 15 years) depending on your finances and the maximum ROI you can accept



# Profits / Efforts matrix

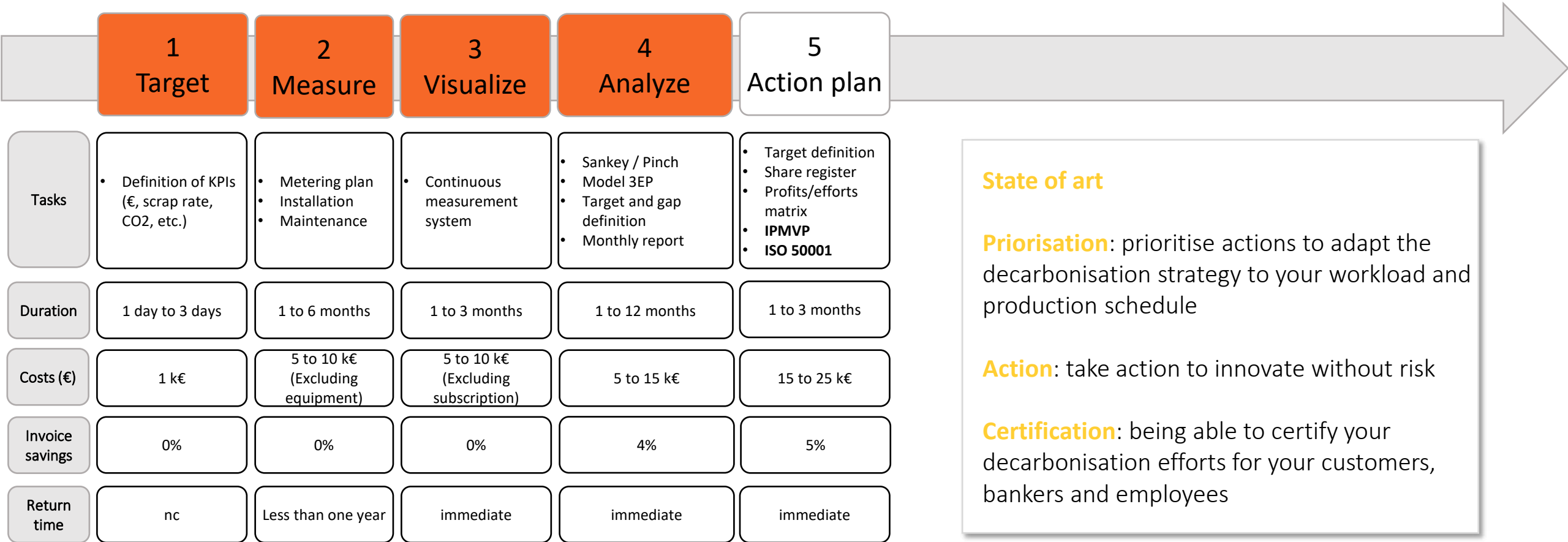
A logical, pragmatic approach to maximising your profits and prioritising the actions you need to take.





# Proven strategy decarbonisation - step 1

## 1- Find out about your consumption



### State of art

**Priorisation:** prioritise actions to adapt the decarbonisation strategy to your workload and production schedule

**Action:** take action to innovate without risk

**Certification:** being able to certify your decarbonisation efforts for your customers, bankers and employees





# Proven strategy decarbonisation - step 1

1- Find out about your consumption pour so you can really manage the energy consumption of your processes

## Diagnosis

Online self-diagnosis or a course supervised by a referenced service provider



**bpi**france

## Pact (studies)

Course supervised by an approved provider



## Decision support

Your choice of design office and scope of work





# Proven strategy decarbonisation - step 2

| 2 – Global energy efficiency |  |   |   |
|------------------------------|--|---|---|
|                              | 6<br>Sufficiency   | 7<br>Efficiency   | 8<br>Recover  |
| Tasks                        | <ul style="list-style-type: none"><li>Energy and production management</li><li>Heat transfer modelling</li></ul> | <ul style="list-style-type: none"><li>Burner adjustment</li><li>Pressure adjustment</li><li>Light revamping</li></ul> | <ul style="list-style-type: none"><li>Resource requirements</li><li>Scenario selection</li><li>Technical and economic study</li><li>Sizing</li><li>Implementation</li></ul> |
| Duration                     | 3 to 12 months   | 3 to 12 months  | 6 to 18 months  |
| Costs (€)                    | 2 to 40 k€   | 2 to 40 k€  | Study: 50 k€<br>200 k€ to 2 000 k€  |
| Invoice savings              | 5 to 10%   | 10 to 20%   | 10 to 30%   |
| Return time                  | 1 to 6 months  | 6 to 12 months  | 36 to 120 months  |

**Concrete results:** the most effective and rapid method of achieving concrete results at the lowest possible cost

**ROI** < 1 year

**Beskop solutions:** our design office specialising in thermal engineering adapts to your processes and the characteristics of your manufacturer's site

**Efficiency:** increase your efficiency to reduce your waste heat



# Proven strategy decarbonisation - step 3

## 3 - Renewable energies

### 9 Substitute

|                 |   |
|-----------------|---|
| Tasks           | <ul style="list-style-type: none"><li>• Scenario selection</li><li>• Technical and economic study</li><li>• Sizing</li><li>• Implementation</li></ul> |
| Duration        | 12 to 24 months   |
| Costs (€)       | Study: 50 k€<br>200 k€ to 2 000 k€  |
| Invoice savings | 20 to 50%   |
| Return time     | 60 à 120 months   |

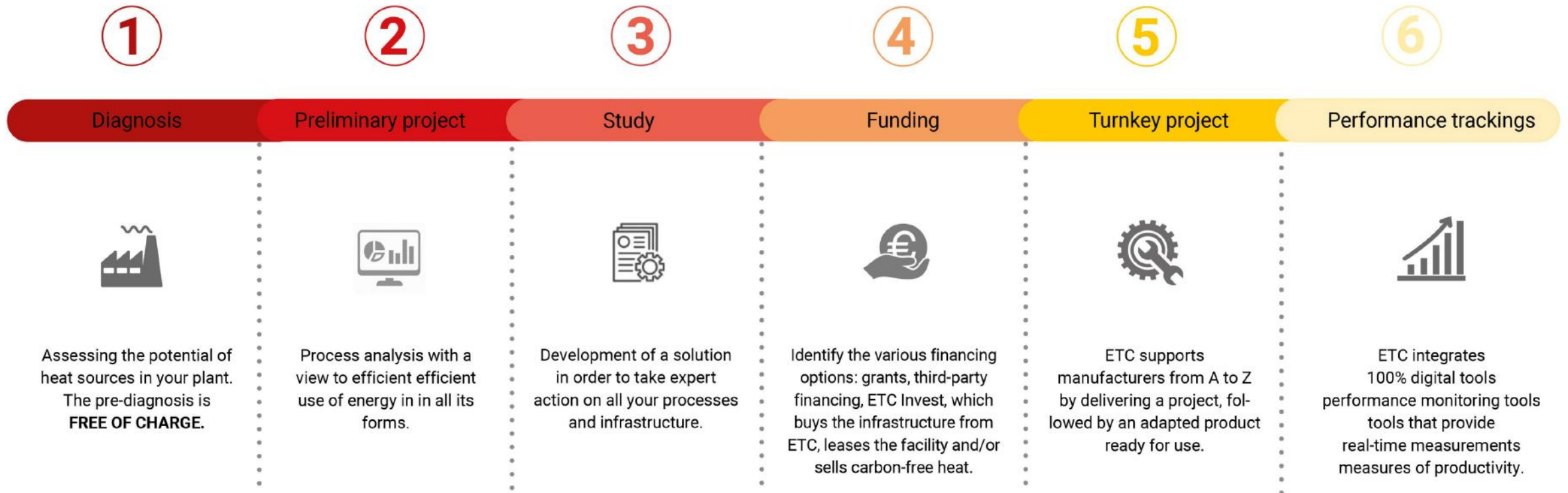
**PTH:** decarbonised heat revolution on a manufacturer scale

**References:** at major industries such as Villeroy & Boch, Wienerberger and ArcelorMittal

**Innovations:** proven maturity on industrial sites to reduce your energy consumption by up to 10%



# Our turnkey offer to recover and substitute







# Solutions 100 % OPEX

Do you want to retain your investment capacity for other projects? And are you looking for a short return on investment (max 5 years)?

The OPEX offer is for you!



- Assistance in obtaining government aid
- Financing facilities on behalf of industries
- Operation and maintenance



- Zero CAPEX
- Savings from the first year
- You buy low-carbon heat at a competitive and constant price over the duration of the contract (tariff shield)





# In short, ETC's services enable you to:

## ↑ Improvements ↑



Competitiveness and resilience



Quality and productivity

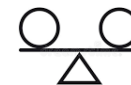


Employer branding

## ↓ Discounts ↓



CO<sub>2</sub> emissions



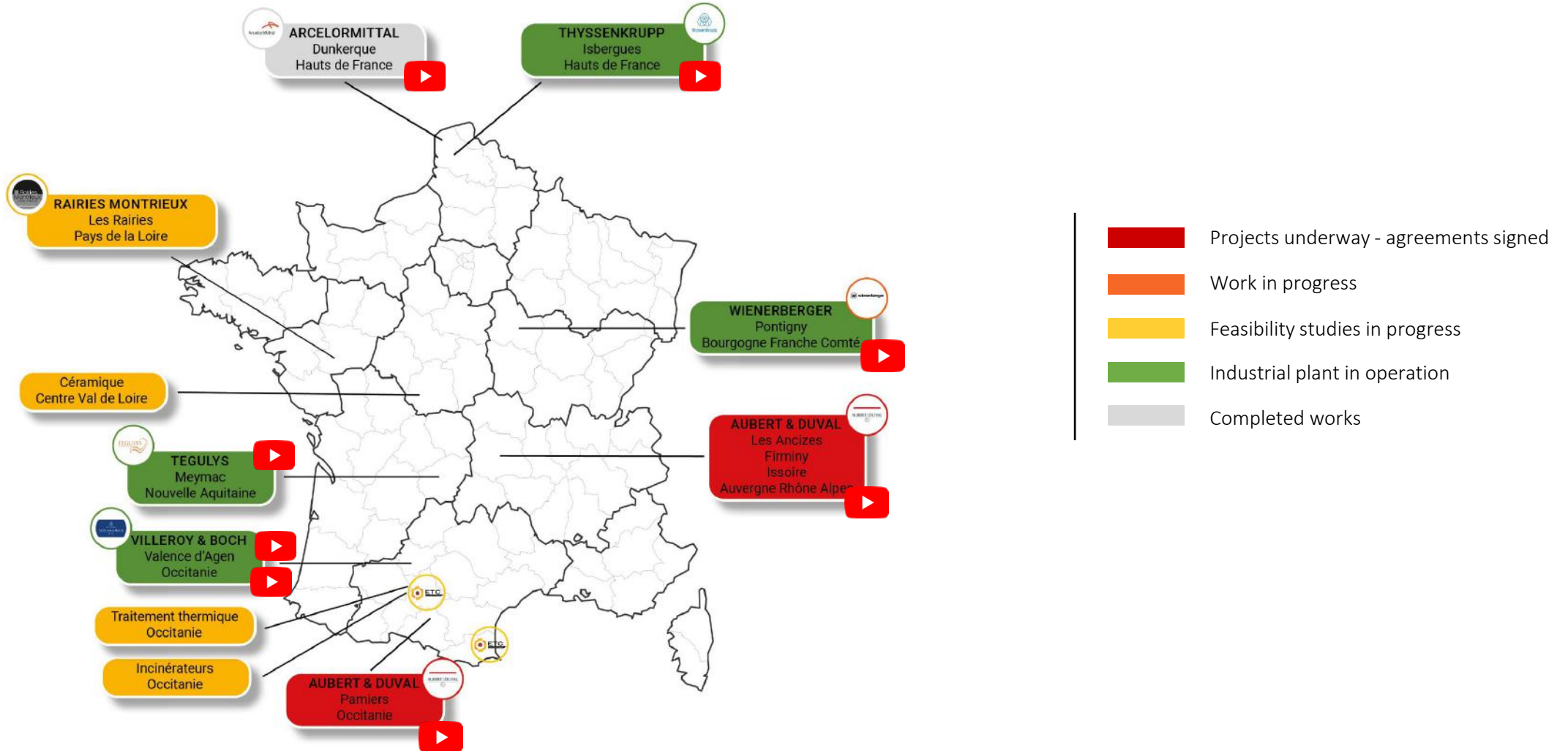
Energy volatility



Investment







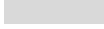
# They trust us in France





# They trust us in Europe



-  Projects underway - agreements signed
-  Work in progress
-  Feasibility studies in progress
-  Industrial plant in operation
-  Completed works



# They trust us: Teguly's



## Recovery of waste heat



- Recovery of high-temperature (> 500°C) waste heat from a kiln.
- Heat recycled to the plant's dryer.
- The Eco-Stock® captures and stores waste heat from the kiln so that it can be used in the dryer and pre-cooking chamber at the desired moment.



### Industrial plant in operation



Ceramics



364 MWh saved / year  
equivalent to 10%



75 tonnes of CO<sub>2</sub> saved / year



5% productivity increase



1300 kWh storage capacity





# They trust us: Villeroy & Boch 1



## Exchanger from the kiln to the dryers



- Recovery of high-temperature waste heat (> 250°C) from the kiln.
- Heat recycled to the plant's dryers.
- 100% carbon-free drying process.



### Industrial plant in operation



Top-of-the-range ceramics



3000 MWh saved / year  
equivalent to 10%



500 tonnes of CO<sub>2</sub> saved / year



17% productivity increase

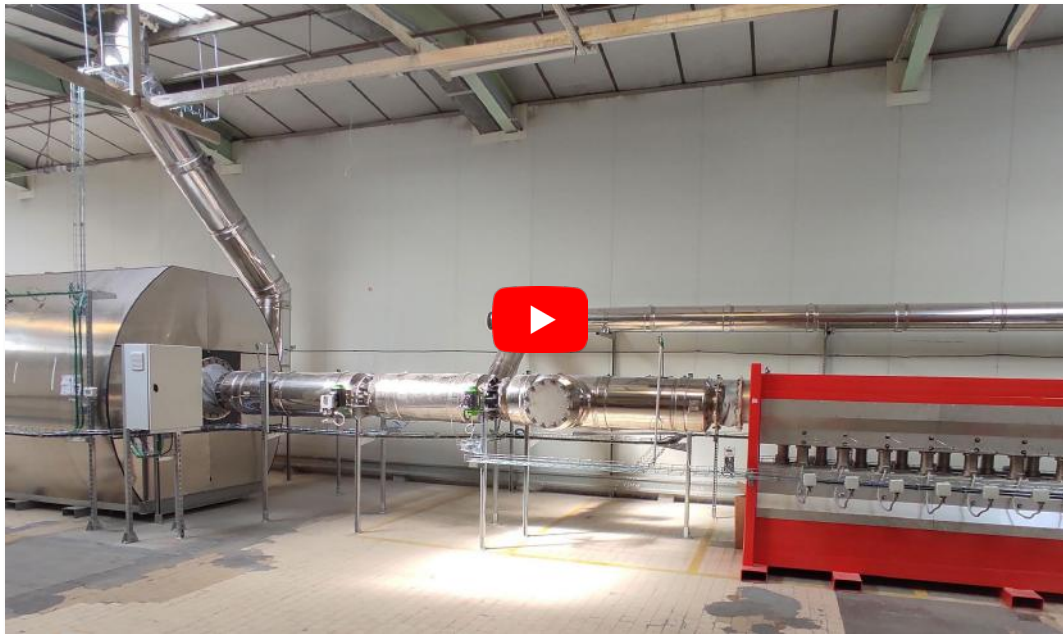


# They trust us: Villeroy & Boch 2



## Storage unit on a continuous tunnel kiln with power to heat

- Recovery of high-temperature waste heat (> 500°C), which goes to the power to heat unit via fans.
- Power to heat raises the temperature with low-carbon electricity.
- At off-peak times, the heat from the flue gases is stored in the Eco-Stock® and at the same time recovered at the furnace inlet.
- At peak times, only the heat stored in the Eco-Stock® is used in the tunnel kiln.



### Industrial plant in operation



Top-of-the-range ceramics



3000 MWh saved / year  
equivalent to 10%



2.3 MWh storage capacity



# They trust us: Wienerberger



## Exchanger/storage system from 6 kilns to 6 dryers



- Recovery of high-temperature (>500°C) waste heat from 6 kilns.
- Heat recycled to the plant's 6 dryers.
- The Eco-Stock® system captures and stores waste heat from baking ovens so that it can be used in the dryers when required.



### Industrial plant in operation



Ceramics



2200 MWh saved / year  
equivalent to 10%



500 tonnes of CO<sub>2</sub> saved / year



5% productivity increase



1300 kWh storage capacity



# They trust us: Thyssenkrupp



Recycled waste heat from the flue gases of 1 furnaces to preheat the water used by the boiler



- Installation of flue gas / water exchangers.
- Hybridisation of the boiler producing the superheated water needed for the process.
- One furnace was studied and integrated into a waste heat recovery solution to pre-heat the water loop at the boiler return.



Industrial plant in operation



metallurgy



6 GWh saved / year  
equivalent to 10%



1450 tonnes of CO<sub>2</sub> saved / year





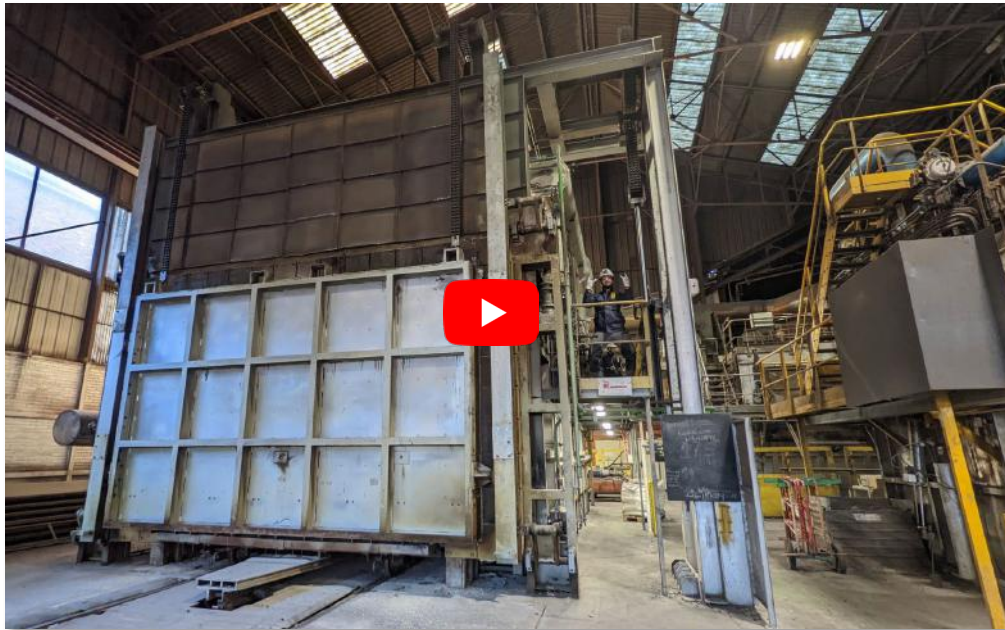
# They trust us: Aubert & Duval



## Exchanger/storage



- The hot fumes from the metallurgist's furnaces will be directed towards a heat exchanger.
- The decarbonised hot air will feed the burners.



### Projects underway



metallurgy



1200 MWh saved / year  
equivalent to 10%



240 tonnes de CO<sub>2</sub> saved / year





# They trust us: ArcelorMittal



## Pilot plant for drying agglomeration sludge



- Pilot project to avoid using fossil fuels to dry agglomeration sludge.
- Pilot scheme for eliminating the additional cost of transporting wet sludge (20%).
- This pilot plant can be used in a variety of industrial applications: recovery of waste heat from industrial furnaces, drying of materials from all types of industry, pre-heating of materials from all types of industry, production of hot water, production of electricity, recovery of heat from solar power plants.



Completed work



Metallurgy



360 kWh storage capacity at  
600°C



# They trust us

## Feasibility studies

- ArcelorMittal
- Acappi
- ADEME
- Aperam
- Ascométal
- Bernardaud
- Ceramique & Développement
- DSF Refractories
- EDF
- Faïencerie de Gien
- Ferroglobe
- Forges de Courcelle
- Geberit
- GRT Gaz
- IFB Refractories
- IMT Albi
- Industeel
- Leroy Somer
- Montupet
- Pall Exekia
- Patapain
- Rairie
- Roca
- Runeo
- SMA
- Tembec Tartas
- ThyssenKrupp
- TRB Neufchâtel
- Villeroy&Boch
- Wienerberger



# For more information



[All our detailed customer references can be found on our website](#)



[All Antoine Meffre's press interviews](#)



[All about our industrial sites and 3D videos can be found on our YouTube channel](#)



The carbon free energy

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