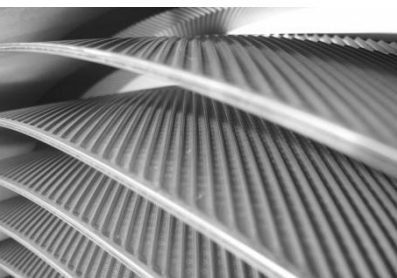


# Heat Exchangers

Design & manufacturing



## Waste Heat Recovery

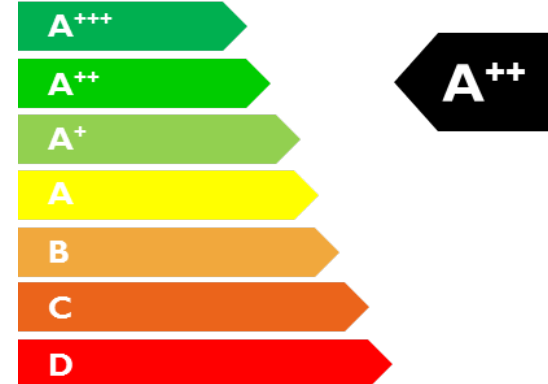
In small and medium-sized industrial processes

ACTE provides a very specific kind of annular-shaped heat exchangers dedicated to waste heat recovery from fumes and exhaust gas, especially in micro-processes.

**When innovation Acts for savings**

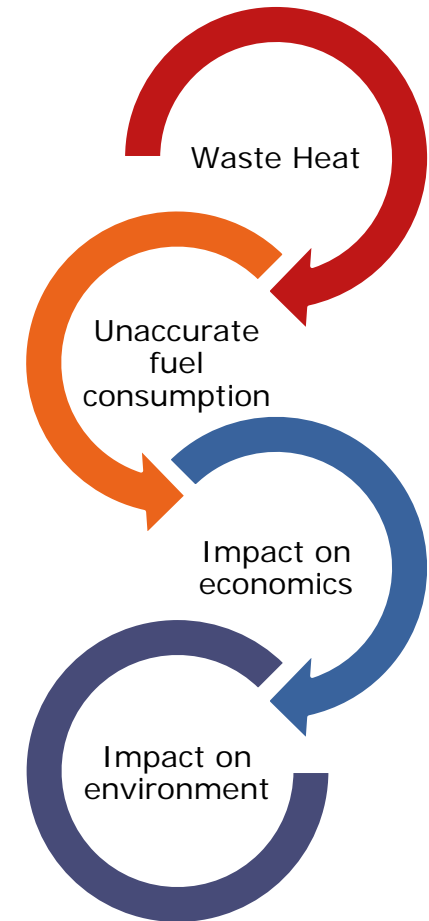


# Heat recovery is a concern for many fields of activity



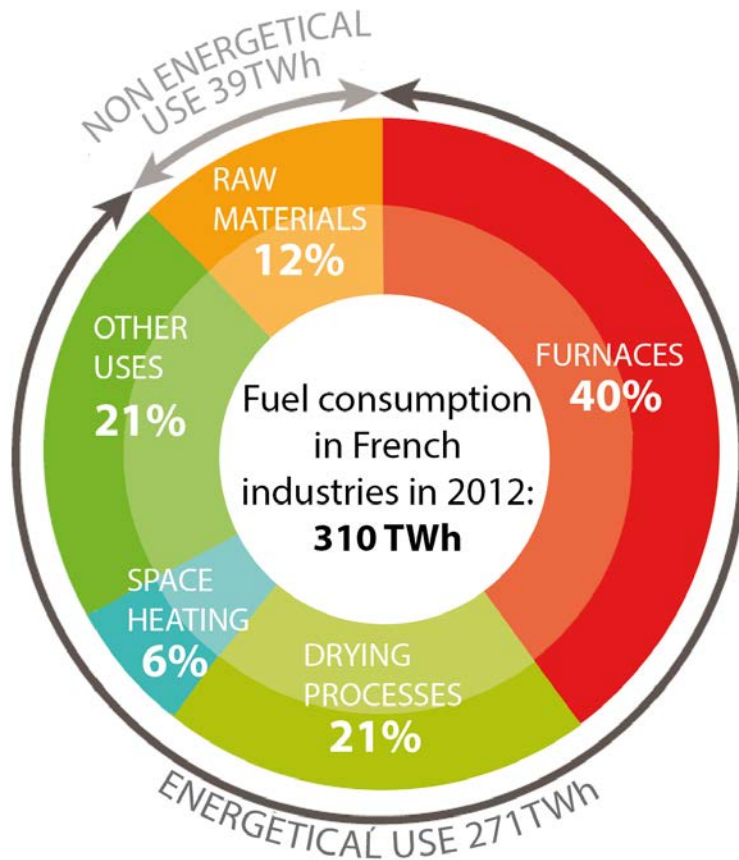


# In the industry, this concern gets various impacts

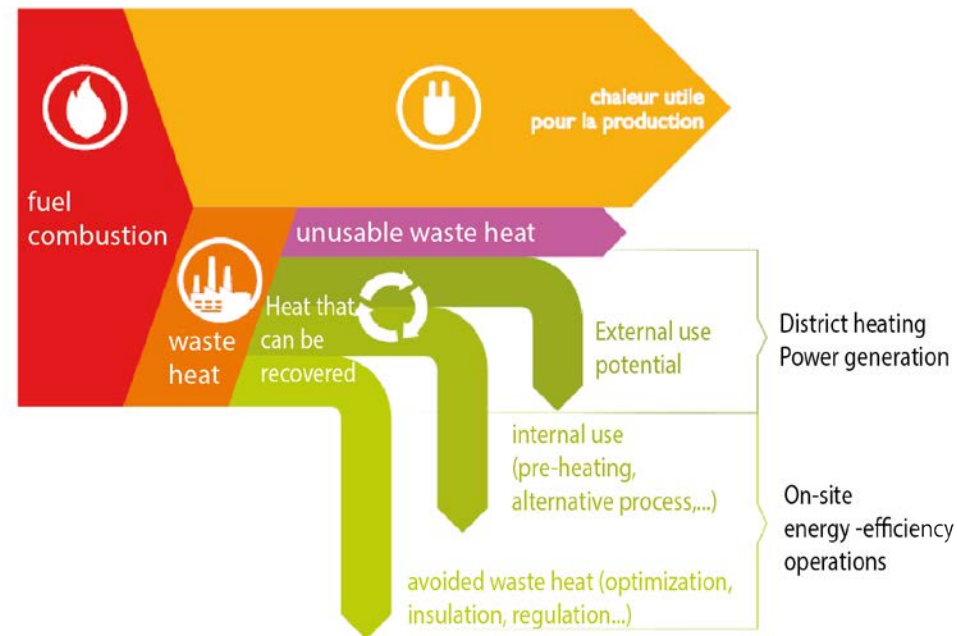




# Waste heat doesn't have to be just waste



Source :  
Chiffres clés Climat, air  
et énergie de l'ADEME,  
édition 2014

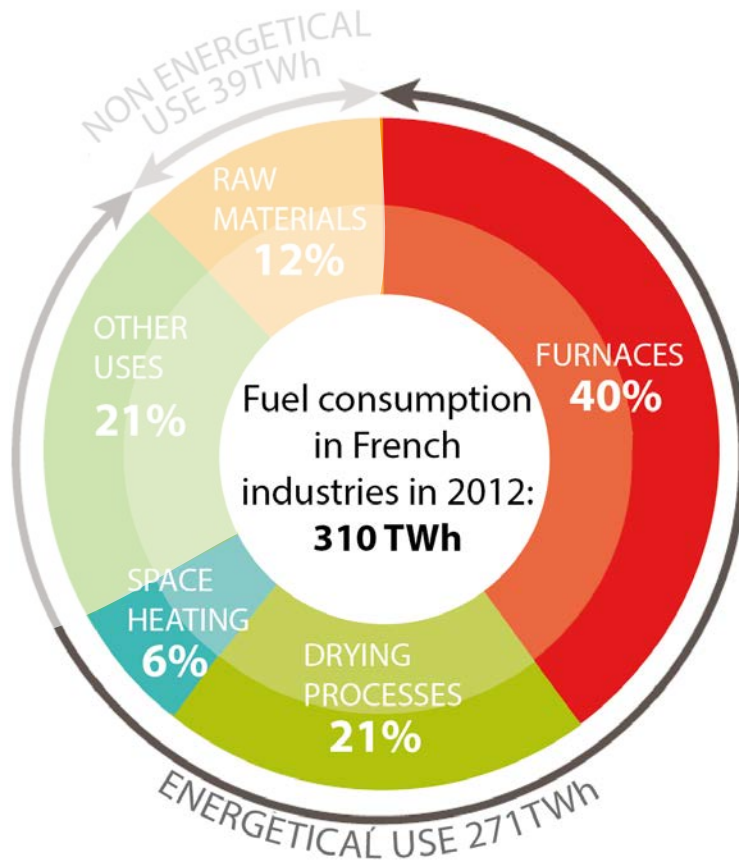


Heat is needed in many industries.  
Waste heat from a process can  
become a resource for another one.

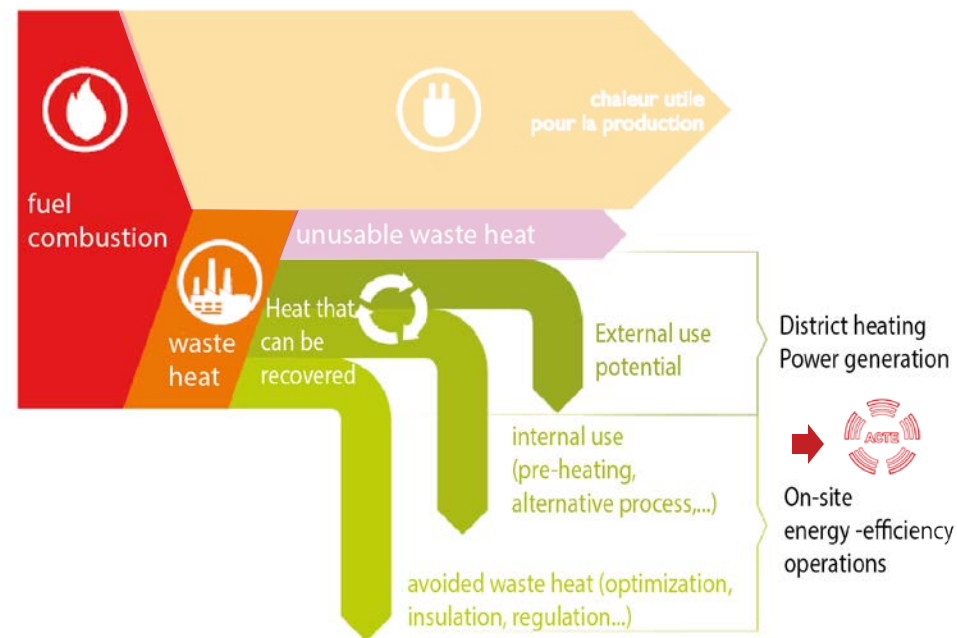




# Waste heat doesn't have to be just waste



Source :  
Chiffres clés Climat, air  
et énergie de l'ADEME,  
édition 2014



Heat is needed in many industries.  
Waste heat from a process can  
become a resource for another one.



# ACTE's answer: allow the use of the heat in another process

## Heat Source:

- Furnace
- Incinerator



## Internal needs:

- Preheating
- Temperature keeping
- Drying
- Steam
- ....
- Heating system



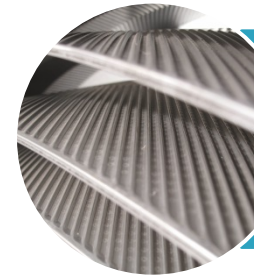
# ACTE answers to a combination of several needs in small and medium industries



GAP-TYPE  
HEAT  
RECUPERATOR



Low space  
available



Care for  
fouling



Weight  
limitation



Lifetime  
management



200 to  
650°C  
and more

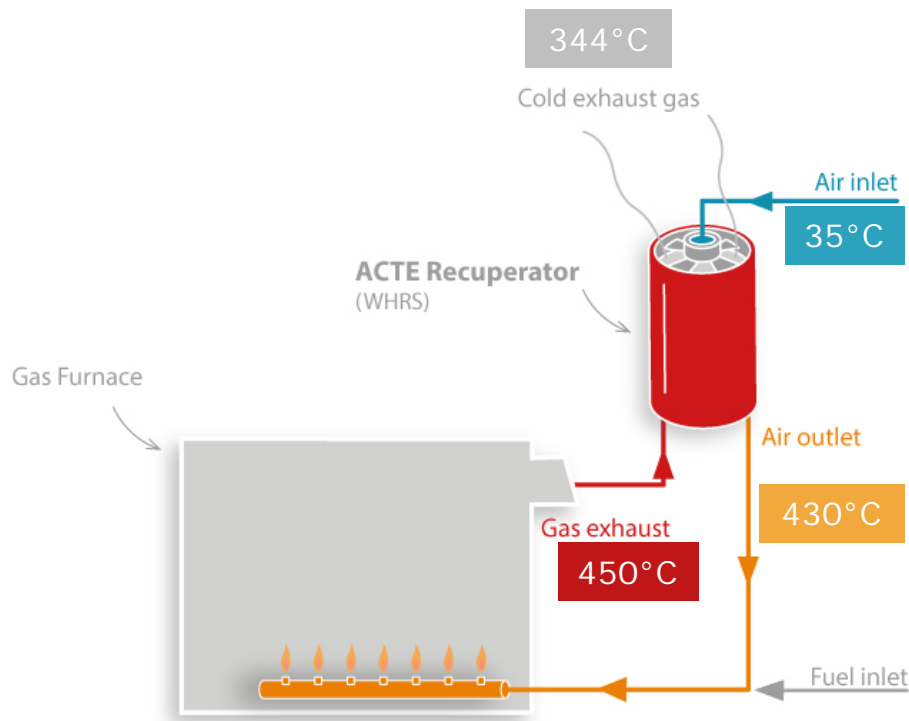


Potential  
serial  
production  
suitable



# Waste heat valorization : Many potential applications in the industry

- Use of waste heat to preheat a gas furnace

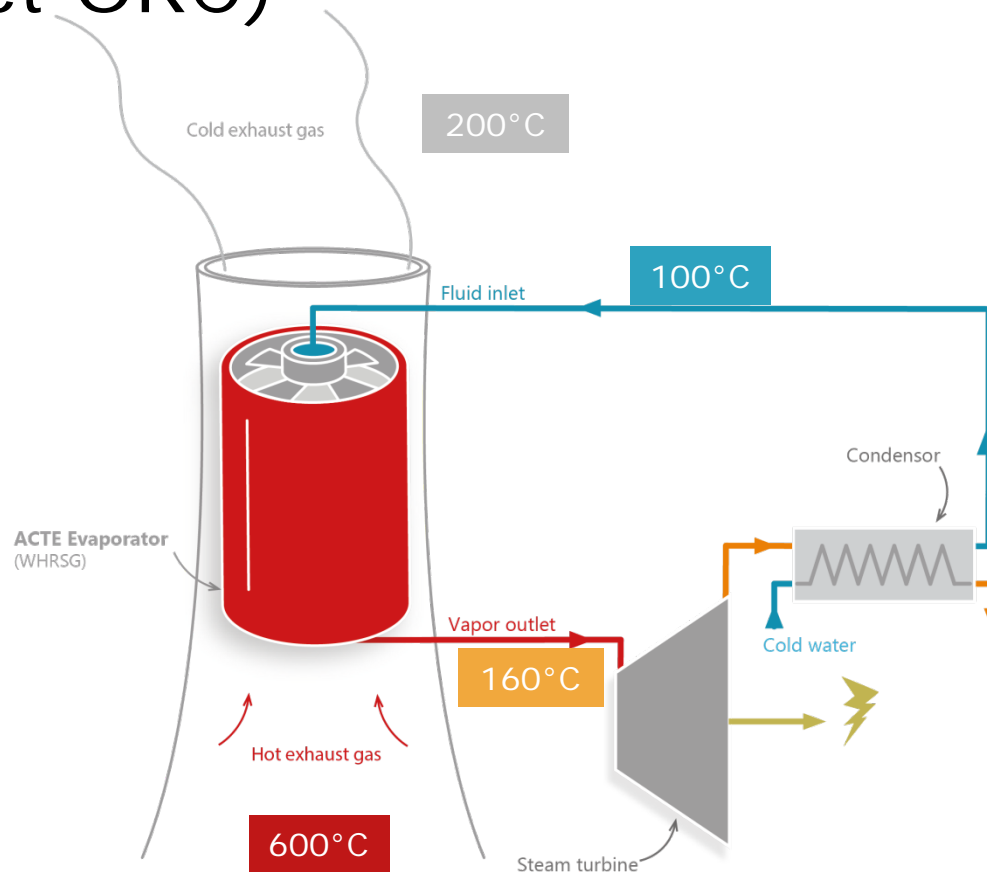






# Waste heat valorization : Many potential applications in the industry

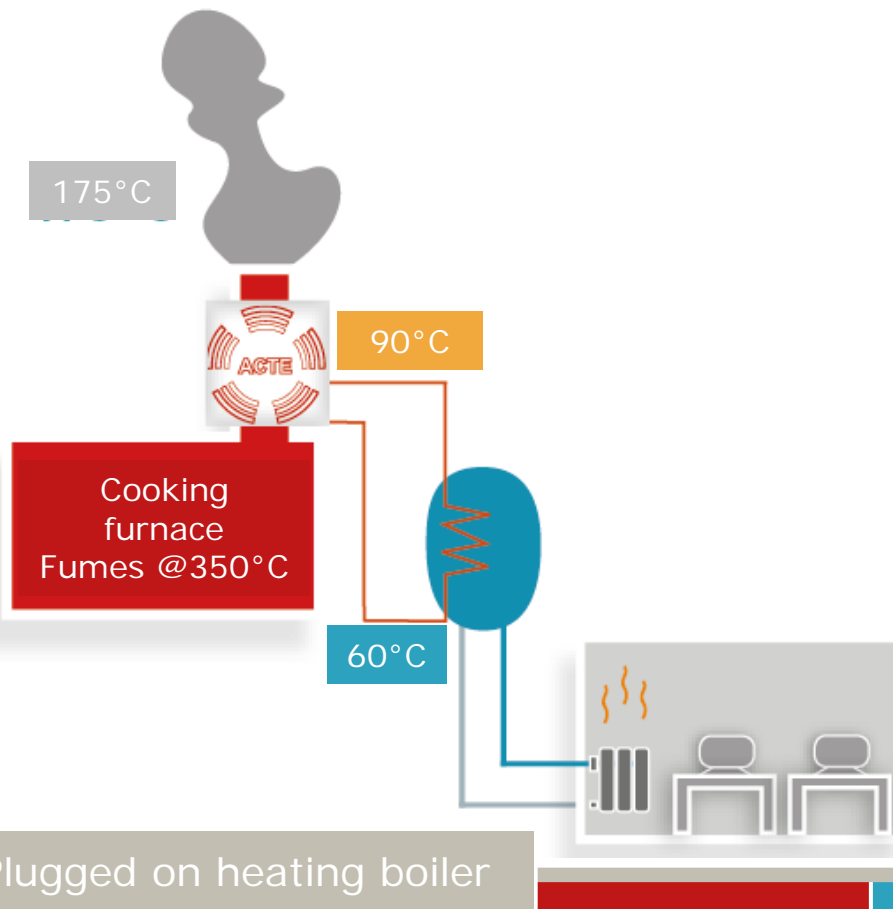
- Use of waste heat to generate power (direct ORC)





# Waste heat valorization : Many potential applications in the industry

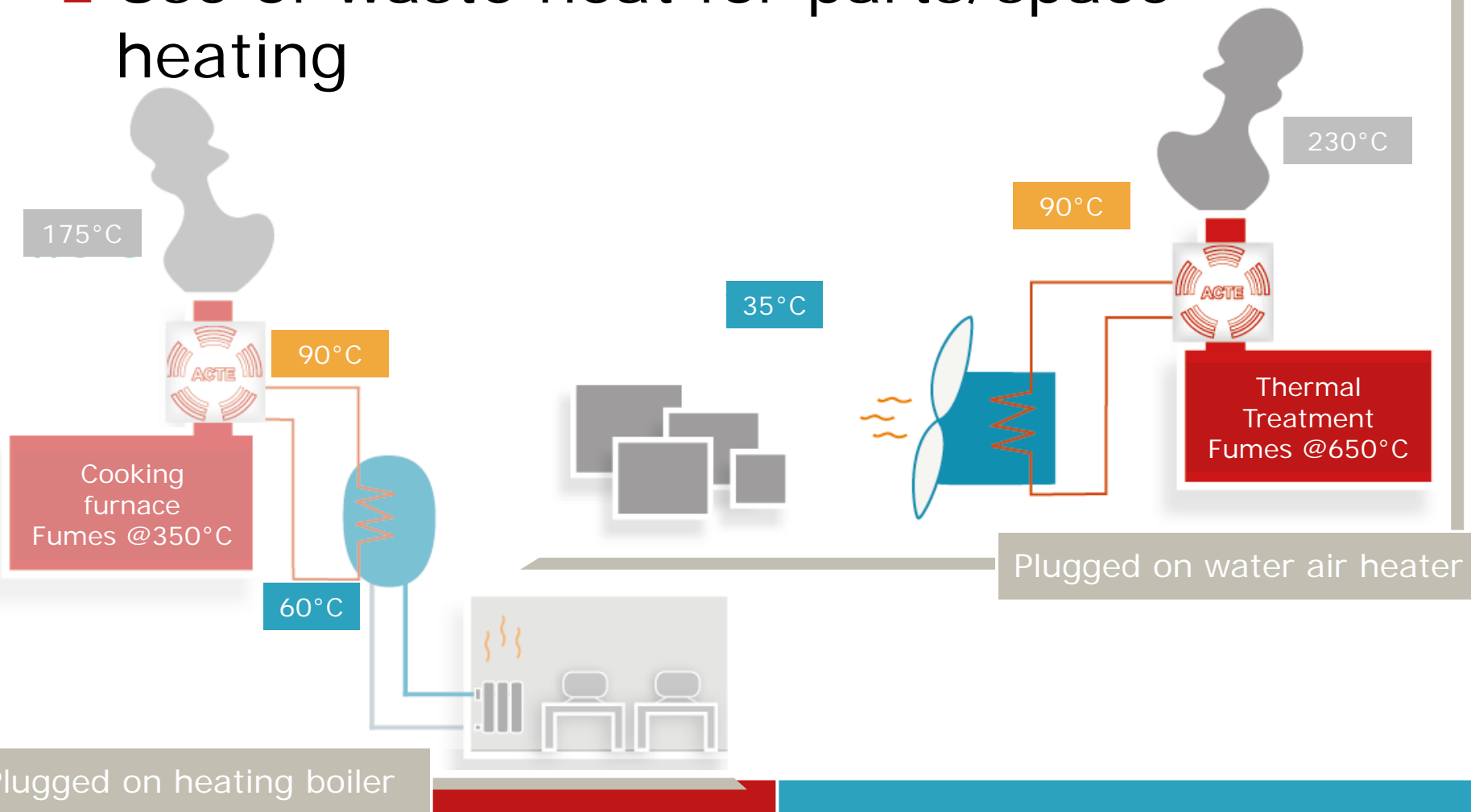
## □ Use of waste heat for space heating





# Waste heat valorization : Many potential applications in the industry

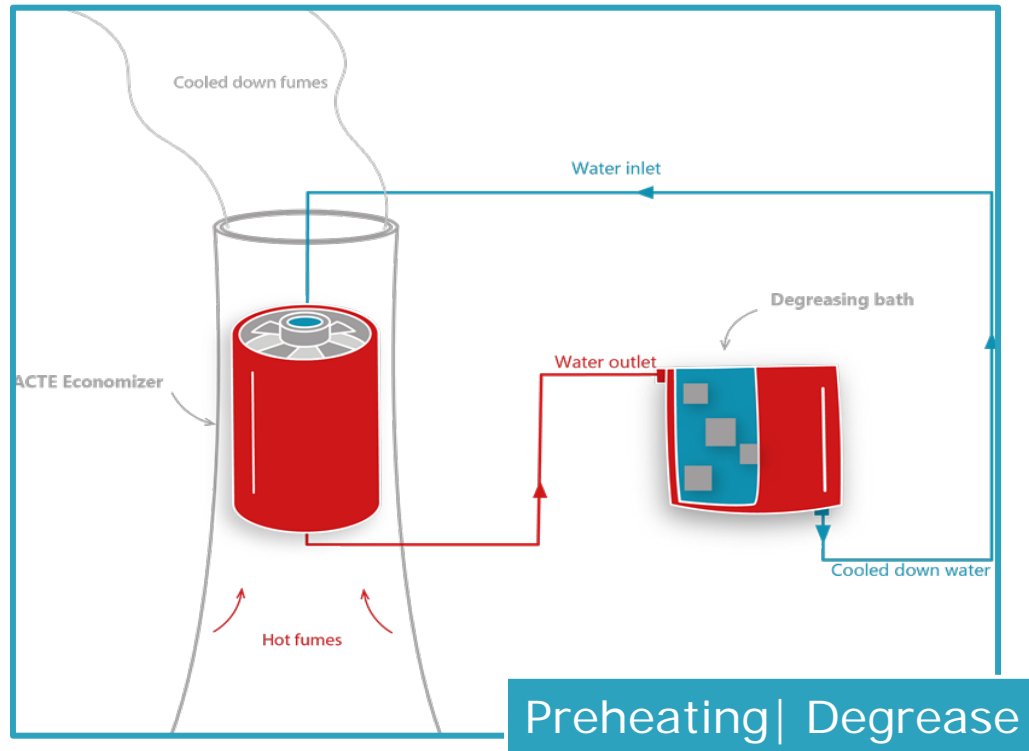
## □ Use of waste heat for parts/space heating





## Example : 1 specific application Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts

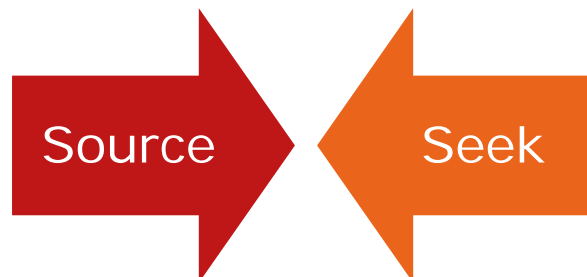




## Example : 1 specific application in the Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts

Exhaust fumes features		Degrease bath features	
Temperature	180°C	Temperature	55°C
Flow	4200 Nm <sup>3</sup> /h	Inlet Temperature	Variable (60-70°C)
Pressure	1,05 bar (a)	Total flow (5 baths)	3600 Nm <sup>3</sup> /h
Pressure drops	<50 mbar	Pressure	3 bars (a)
Fumes type	Gaz Naturel/Air	Energy used	Natural gas burners

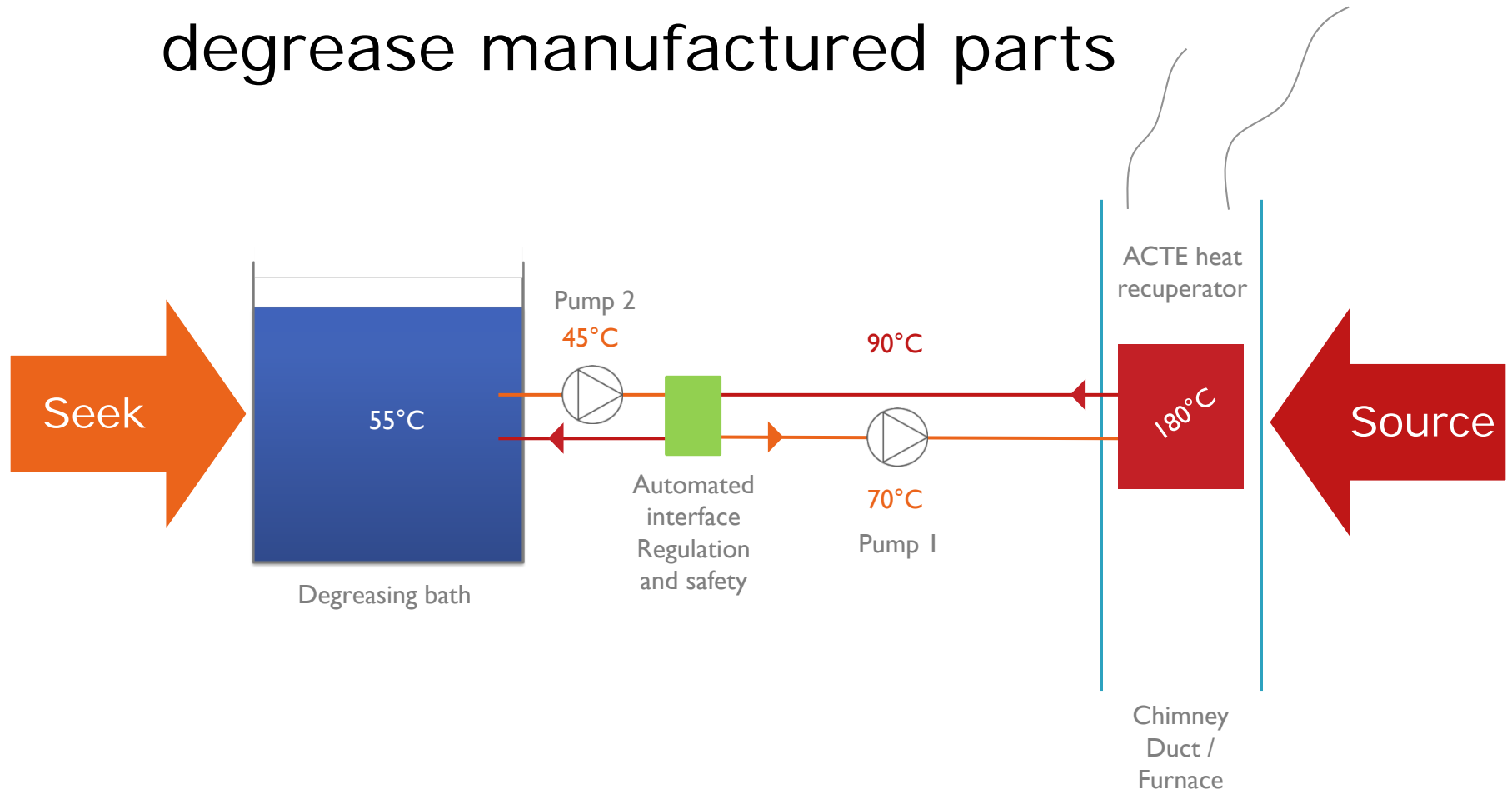






## Example : 1 specific application in the Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts





## Example : 1 specific application in the Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts

$$ROI = \frac{\text{Cost of the full system (2 loops)}}{0,03\text{€|kWh} \times \text{Recovered Energy} \times 120\text{h} \times 50 \text{ weeks}}$$

2 years

2,5 years

3,5 years



# To sum up... standardized solutions are available...

**GAP-type**  
Industrial processes  
Waste Heat Recovery  
Steam Generation



**GAP 30-3-2**  
50 to 200 kWth

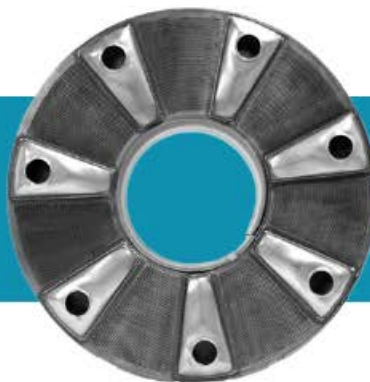


**GAP 50-3-3**  
100 to 900 kWth

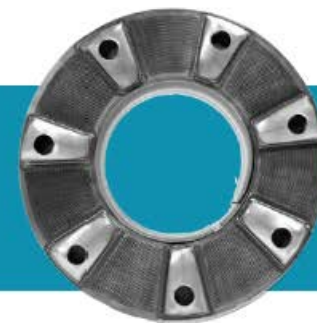
**Low impact  
on flows**



**CPT 90-9-0**  
100 to 230 kWe



**CPT 70-7-0**  
80 to 120 kWe



**CPT 55-7-0**  
20 to 35 kWe

**Regeneration**  
**Very high efficiency**

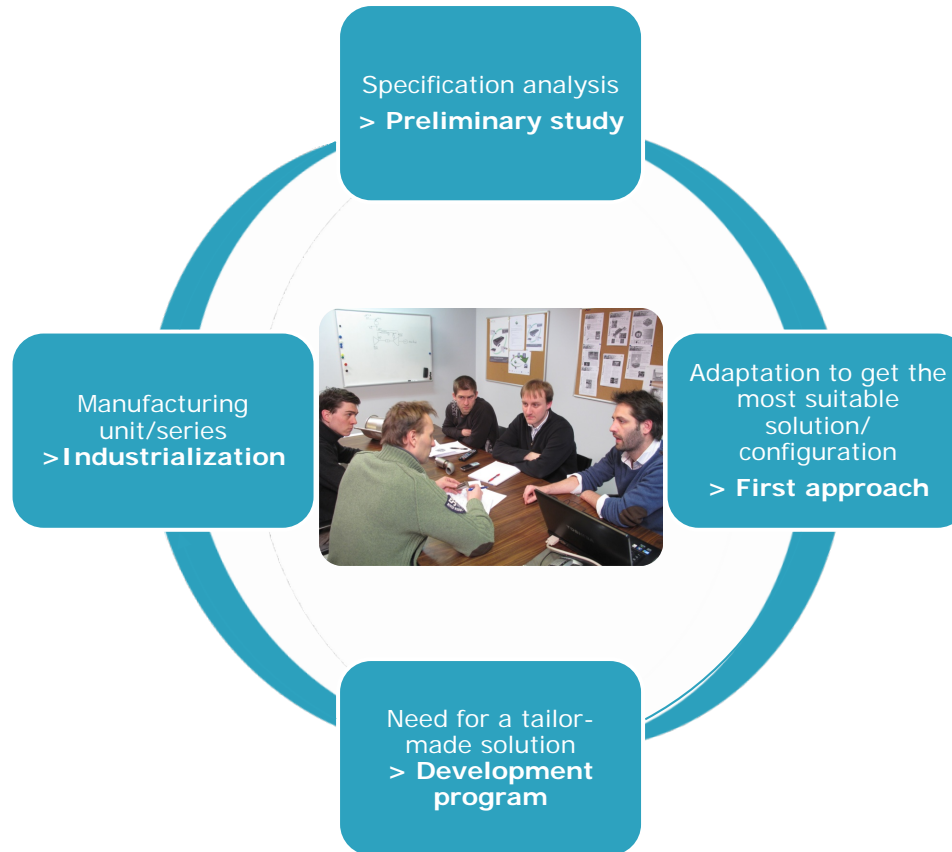
**COMPACT-type**  
Micro Gas turbines  
Heat recuperators



# ... While it is also possible to get tailor-made solutions...

The objective here :

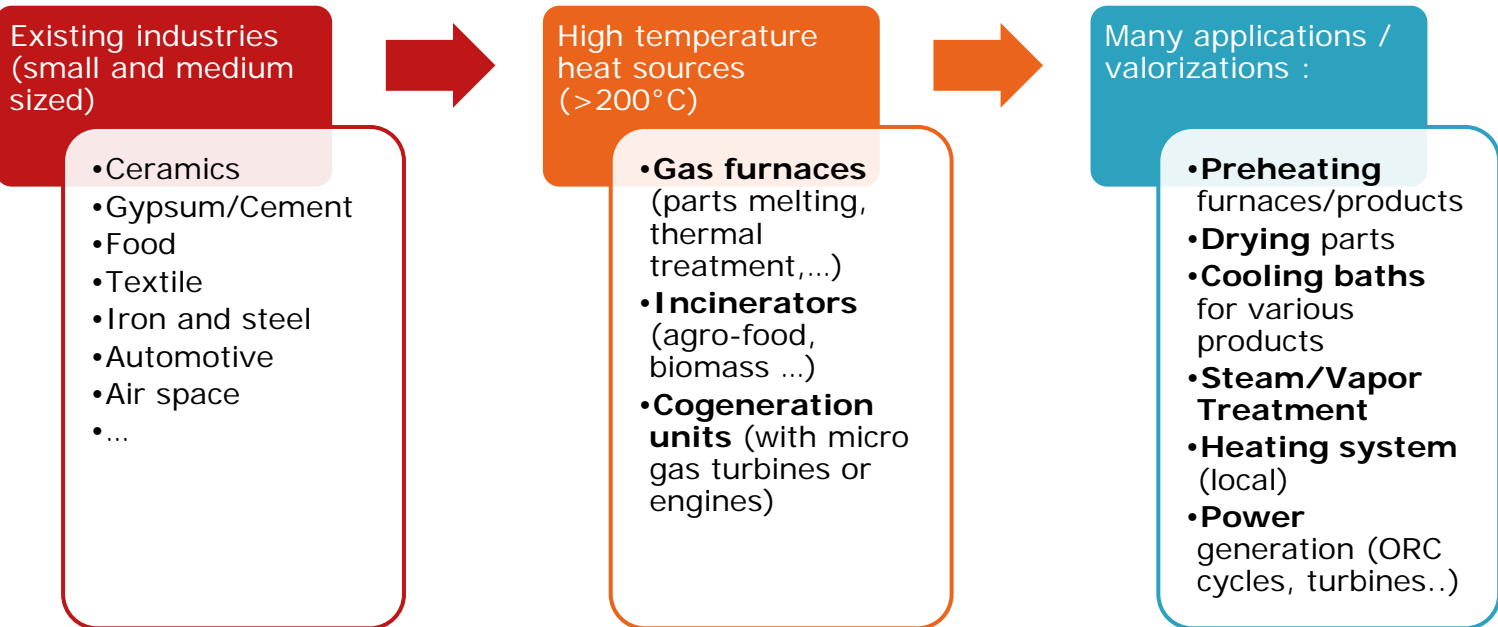
to grow together with our customers needs





# GAP-type recuperators :

## For whom, where, how ?







# *Any questions ?*

Our experts will be pleased to answer

- Business development
- Customer specification
- Partnerships design

Aude.bonvissuto  
@acte-sa.be



- Thermo-dynamic design expertise
- Study, conception and innovation

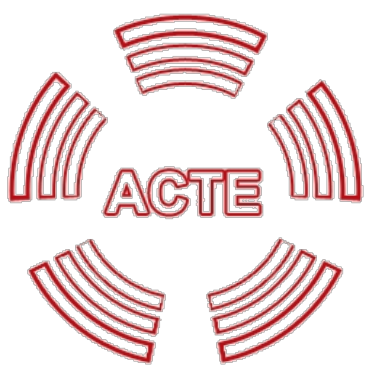
Sebastien.dubois  
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- General management
- Project follow-up from need to operations

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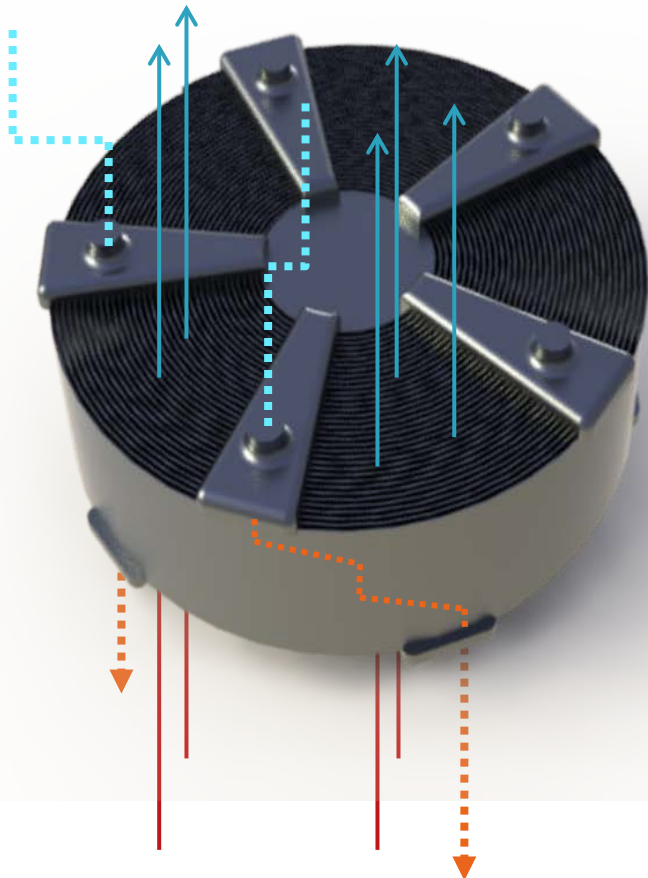
# Thank you!

**When innovation Acts for savings**



# How does the GAP type product works

The Primary fluid (fumes/exhaust gas) flows in between the plates



The secondary fluid goes inside the flat tube (combustion air, hot water, thermal oil, steam...)