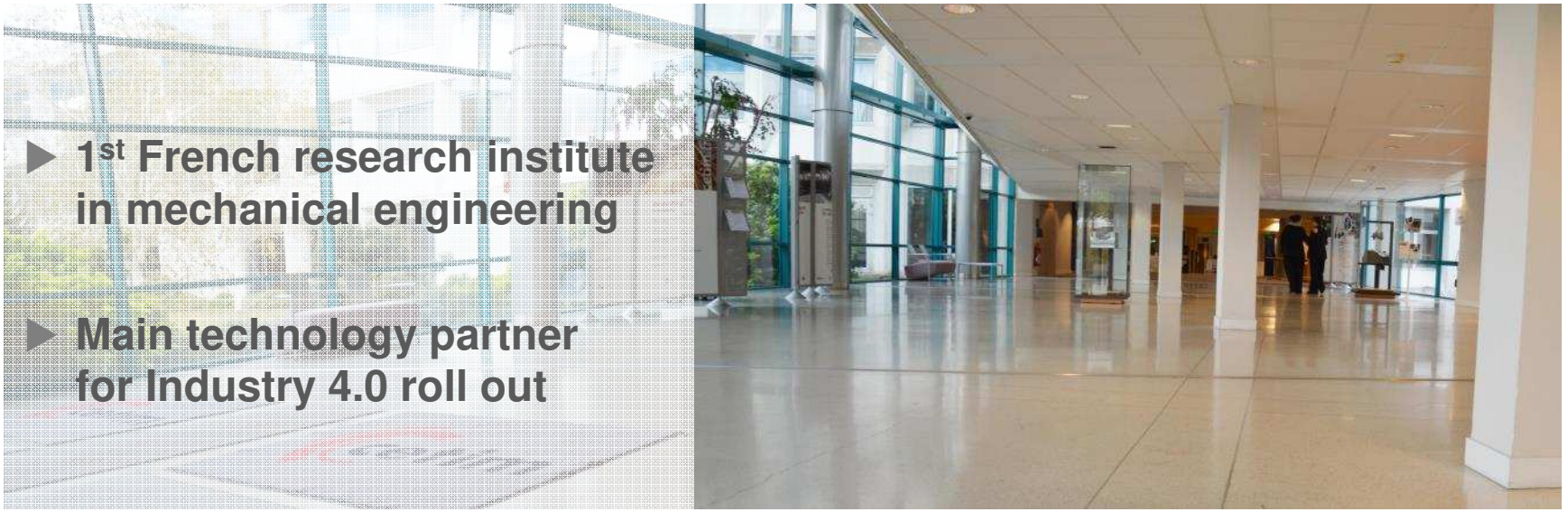
UPCYCLING for thermoplastic composites :

How to recycle with added value with **ThermoPRIME®** & **Thermosaic®** technologies

cetim Grand Est

Cetim, the Technical Centre for Mechanical Industry

established in 1965 to improve companies' competitiveness



Mechanical engineering
Test laboratory, consulting and support

Advanced manufacturing solutions and services

Transfer and industrialization of innovations

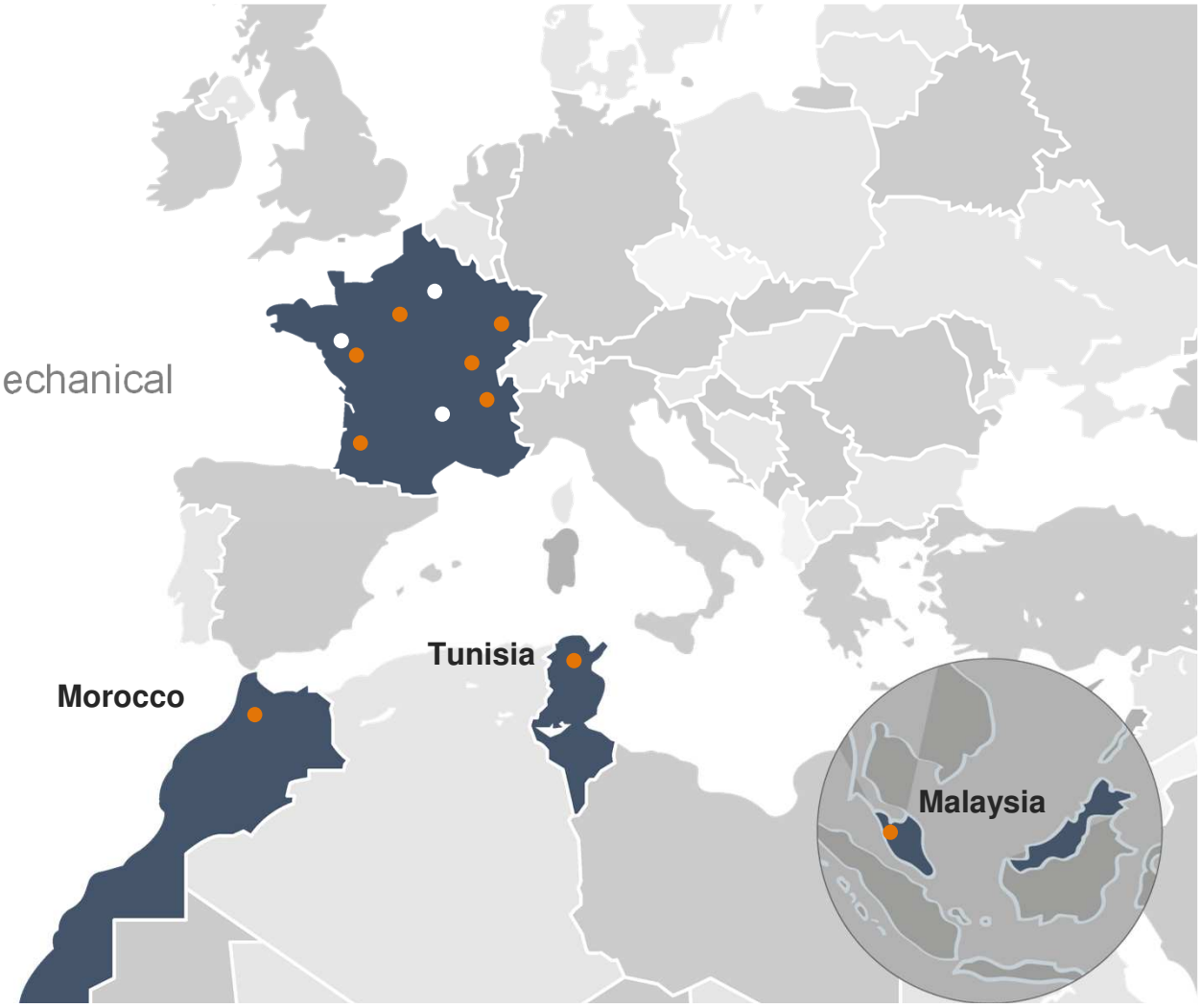
Cetim Group

Main locations

Multidisciplinary facilities
to support international mechanical industry…

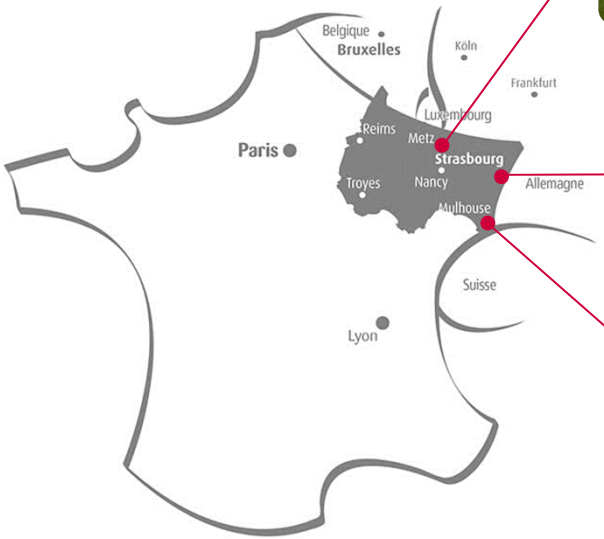
Main figures

- 1,100 employees
- 70% Engineers
- 147 M€ turn over



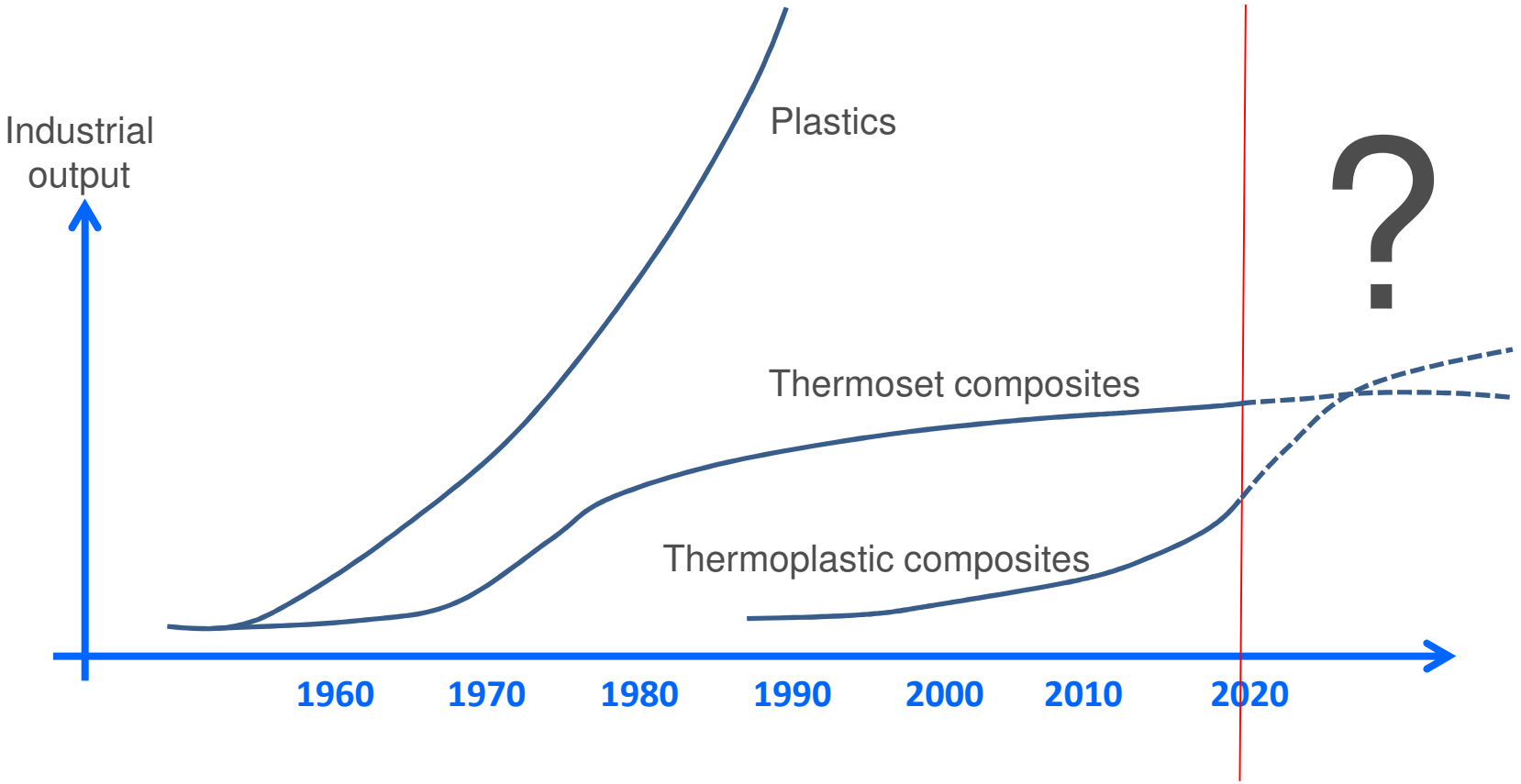
Cetim Grand Est – Identity & sites

- CRITT (Regional Innovation & Technological Transfer Center)
- Label CRT (Technological Resource Center)
- Created in 1977
- 86 people
- 3 sites
- 2 500 actions / year



- 600 companies / year
- 30% activity in R&D
- Association with Cetim group
- Member of Carnot institute MICA

Plastics and TD / TP composites : trends and opportunities ?



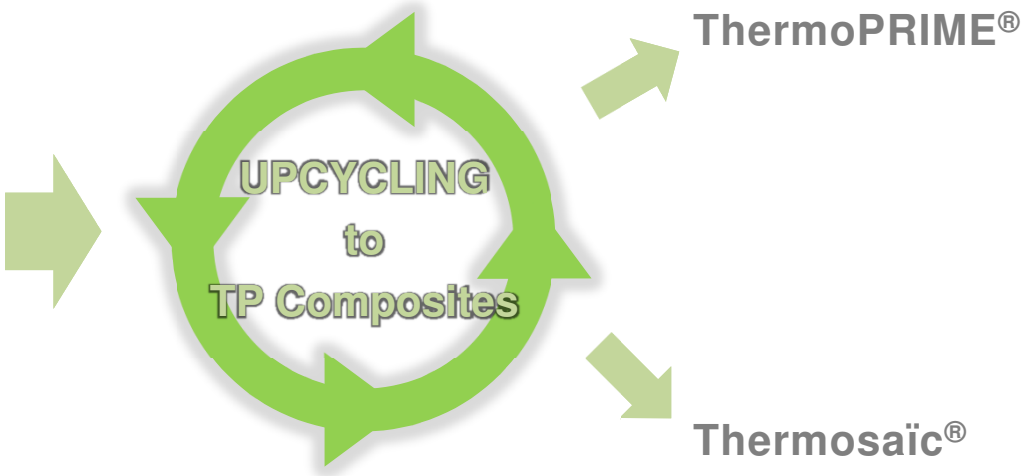
Plastics and TD / TP composites : trends and opportunities ?

Thermoplastic composite waste & existing plastic waste :

➔ **UPCYCLING** opportunities for new thermoplastic composites

Production waste
Thermoplastic composite

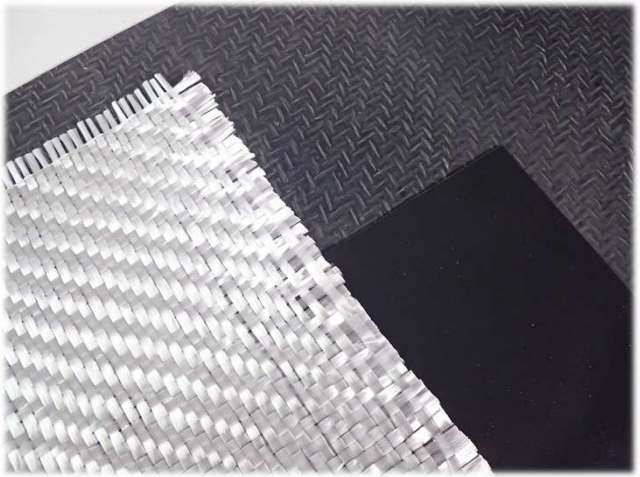
Plastic parts
End of life waste



Sources of information : Cetim, Consoglobe.com

ThermoPRIME® : an upcycling approach for plastic waste

ThermoPRIME® composite



Analogy / wood structure

Upcycling of non-reinforced thermoplastic waste

- Recycled plastic materials associated with continuous or long fiber reinforcements ⇨ composite panel ThermoPRIME®
- Mechanical performance highly enhanced
- Cost effectiveness process, low environmental impact
- Convenient for any kind of recycled thermoplastic (rPP, rPA, rPPS…)

Thermosaïc® : new recycling approach for thermoplastic composite waste

Thermosaïc® composite

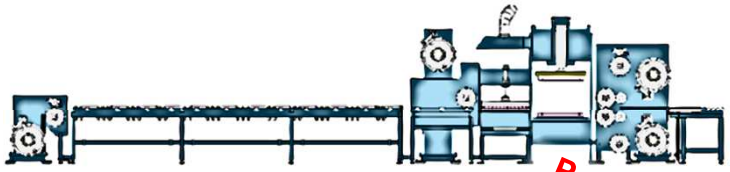
Analogy / wood structure

High value recycling of thermoplastic composites

- Recovery of thermoplastic composite production waste ⇨ composite panel Thermosaïc®
- Keep the intrinsic value of the composite
- No separation between fibre and matrix
- Cost effectiveness process, low environmental impact
- Convenient for any kind of thermoplastic composite waste

ThermoPRIME® & Thermosaïc® : pilot line in Cetim Grand Est

Continuous thermo-mechanical process ➔ recycled composite panels



Pilot line in Cetim Grand Est

Thermosaïc® composite panels

ThermoPRIME® & Thermosaïc® : pilot line in Cetim Grand Est

https://www.youtube.com/watch?v=Dp4Z0VBwDmM

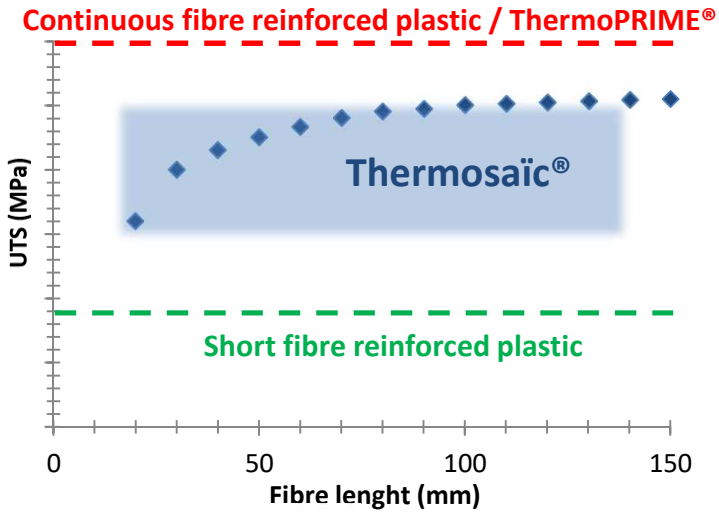
Thermosaïc® : details on this technology

Mechanical opportunities :

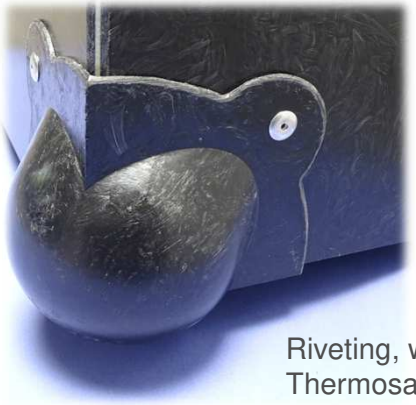
- Mechanical properties of recycled material mostly maintained
- Isotropic mechanical properties

Process opportunities :

- Cost effectiveness process
- High formability material
- Processable with traditional techniques :
  - ✓ cutting
  - ✓ folding
  - ✓ welding
  - ✓ machining
  - ✓ Thermostamping
  - ✓ Thermoforming…



Source : Global trends, from Kelly& Tison and Cox models (PP/GF)



Riveting, welding, stamping of Thermosaïc® composite panels (PP/GF)

An innovation offered by

cetim Grand Est

In partnership with

airépur industries

PAPREC PLASTIQUES

PLASTIFORM
SOLUTIONS THERMOFORMÉES

ICUBE
Laboratoire des sciences de l'ingénieur de l'informatique et de l'imagerie

IS2M

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bpifrance

GIP objectif meuse

fibres ÉNERGIVIE PÔLE
SUSTAINABLE MATERIALS AND BUILDINGS

Pôle Véhicule du Futur
Solutions pour véhicules & mobilités du futur


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WINNER
JEC
JEC Award Paris 2018
Sustainability category
Thank you for your attention
Questions & Answers

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