

**SPIRE and
Catalysing the
Circular Economy
BROKERAGE EVENT**
3-4 October 2017

**MICROWAVE PLASMA TORCH
HEATING UNITS FOR GAS-FIRED
INDUSTRIAL FURNACES
RETROFITTING.**

***Eduard Piqueras Jover, MscEng**
eduard.piqueras@eurecat.org*

SPIRE-02-2018

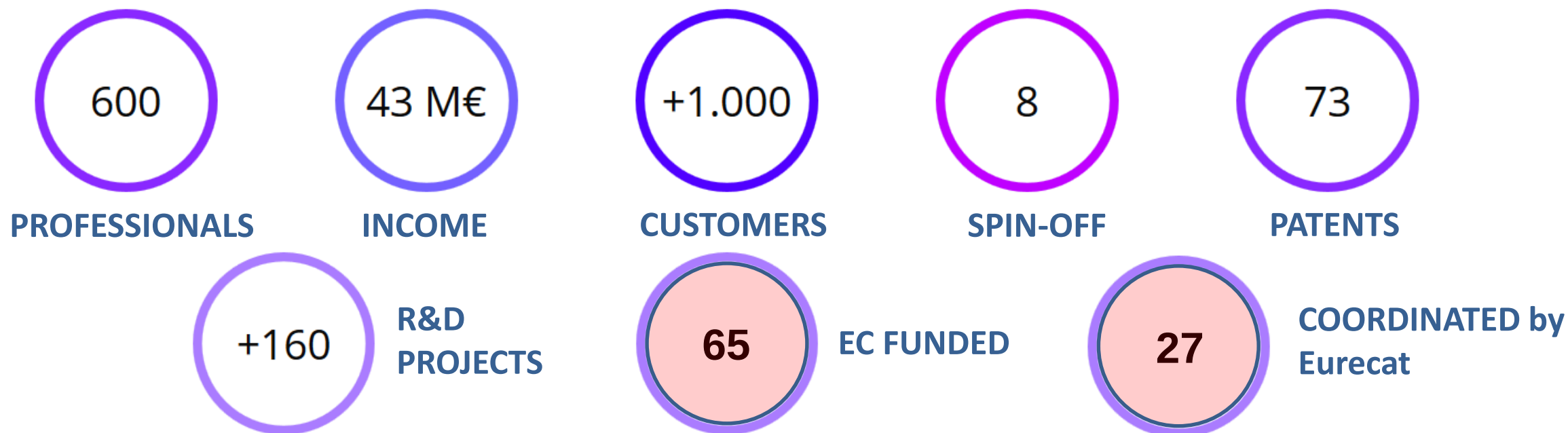
ORGANISATION:



- **RTO private non-profit foundation**
- **Result of the merging process of the main Catalan Technology Centers, started in 2015 and still ongoing.**



Located in **BARCELONA** Area



SPIRE 2018 COMPETENCES:

- **DIGITAL** partner in your SPIRE projects

Big Data & Data Analytics
Smart Management Systems (algorithms, methods, artificial intelligence)
Digital Humanities
IT-Security

SPIRE – 04 – 05 – 06 - 10

- **ULTRASOUNDS** applied to

SPIRE - 02

Design of **Sonotrodes**

Ultrasonic Micromolding (USM).
Polymers Thermoforming

Spin-off SME



Molten Metal (Al) degassing



- **MICROWAVES** and **PLASMA** applied to industrial processes.

SPIRE - 02

MW in **COMPOSITES**:

RTM (faster resin curing)

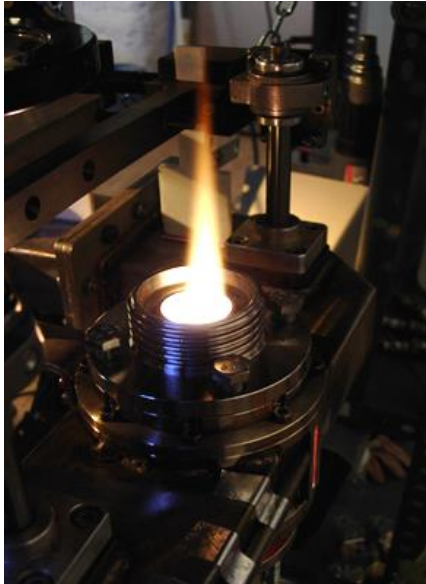
Thermoforming (as preheating step)



- **REVALORIZATION OF FIBERS** obtained from **COMPOSITES RECYCLING** processes.

SPIRE - 10

SPIRE-02: Application of MicroWave Plasma Torch in gas-fired industrial furnaces



Atmospheric MIP
plasma torch

Developing **microwave plasma torch add-ons for continuous industrial processes** to be integrated into existing gas-fired industrial furnaces such as **METALLURGY, CERAMICS...**

- Processing of material feedstock using **plasma torch as a convective heating source complementing gas heating.**
- Secondary functionality: **surface treatment.**

At present, Eurecat own self-designed and self-manufactured **Microwave induced plasma generators** (circular type) providing a torch-like plasma.

TRL4, technology have been validated in lab (200 cm³, 300-700 °C, low consumption magnetron of 1-1,3 kW) → **TRL6 Industrial Demo**

SPIRE key component: 2. PROCESS – solutions for more efficient processing

SPIRE key action: KA 2.1: Novel advanced energy technologies.

SPIRE H2020 Topic: SPIRE-02-2018 Processing of material feedstock using non-conventional energy sources.

EXPECTED IMPACT

- **Gas consumption will be reduced at least by a 20%**, mainly due to the new heating plasma source but also enhanced by a plasma side effect of increasing the gas combustion efficiency.
- **Reduction of CO₂** and industrial air pollution emissions (NO_x and CO).
- **Suitable for connection to the electricity grid** - potential for **integration in a renewable energy grid**.
- **Solutions compatible with existing production lines** for a wide adoption.

The solutions may be modular applied to **different sectors using industrial furnaces** such as METALLURGY, CERAMICS, etc.

SPIRE Roadmap:

- Permit a **combination of fossil fuels (gas) with renewable sources** (renewable energy grid).
- **Optimize the output from existing gas resources**.
- **Increase the energy efficiency** of existing processes.

LOOKING FOR PARTNERS

ORGANISATION	ROLE
 Technology Centre of Catalonia	Development of add-ons unit with plasma torch.
¿RTO?	Metallurgy & Ceramics process
¿RTO?	Integration in fluctuating electricity stream
¿SME / LE?	Equipment / furnaces manufacturer
¿SME / LE?	Industrial demo in Ceramics
¿SME / LE?	Industrial demo in Metallurgy

THANK YOU!



CONTACT DETAILS:

Eduard Piqueras Jover, MscEng
Project Coordinator | Public Programmes
eduard.piqueras@eurecat.org

