



# Revolutionising long-duration thermal energy storage in Europe

## PROJECT TITLE

Breakthroughs in thermal bAtteries  
through Zero Emission high temperature  
static Thermal to Electric Converters

## PROGRAMME

Horizon Europe

## GRANT AGREEMENT

No. 101160724

## DURATION

July 1st, 2024 ~ December 31st, 2027

## EU FUNDING

€3 million



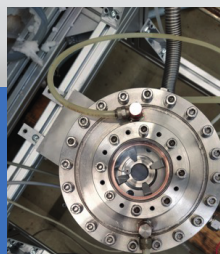
## What is BLAZETEC?

BLAZETEC is an EU-funded research project aiming to develop **next-generation thermal batteries** using **high-temperature static converters**.

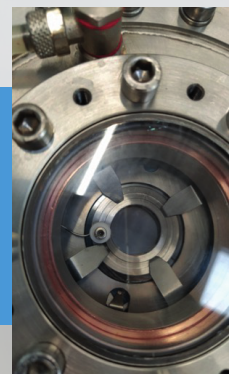
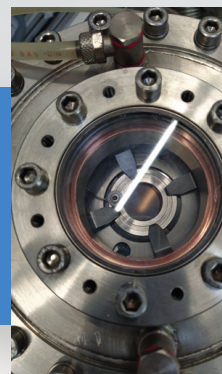
These systems are designed for **long-duration energy storage** with **zero emissions**, **high efficiency**, and **dispatchable power output**.

## Key Objectives

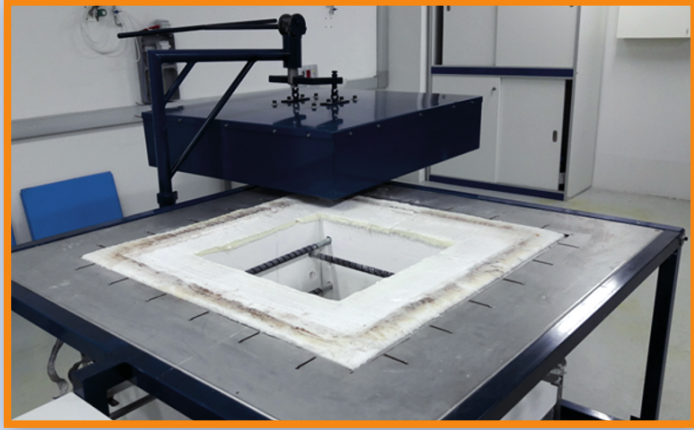
- Develop **ultra-high-temperature thermal batteries** [1200–1600°C] with long storage duration [>10 hours] and high energy density.
- Demonstrate two pilot-scale prototypes [TRL 5]:
  - **Electric-to-heat-to-electric**: storing excess renewable electricity as heat.
  - **Solar-heat-to-electric**: storing and converting concentrated solar energy.
- Integrate and advance **solid-state heat-to-electric converters**:
  - **TIG** [Thermionic Generator]
  - **TEG** [Thermoelectric Generator]
  - **TPV** [Thermophotovoltaic Converter]
  - **Hybrid systems**: **TITEG** [Thermionic-Thermoelectric generator] and **TIPV** [Thermionic-Photovoltaic converter]



TIPV







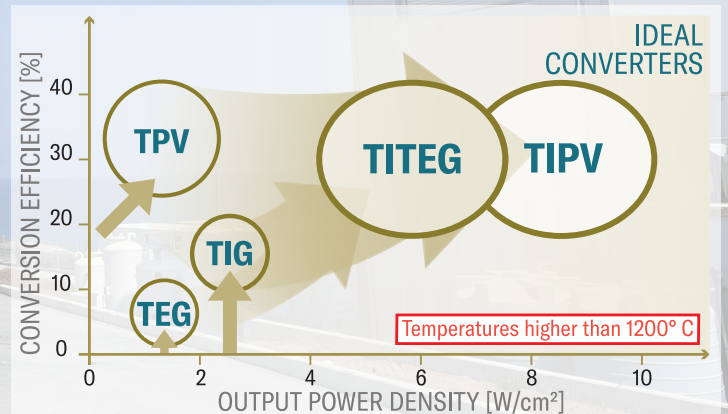
### ← Electric furnace at UPM in Spain

This is the pilot system for the “*Electric-to-heat-to-electric latent heat thermal battery*”.  
TIG, TPV and TIPV technologies will be tested here.

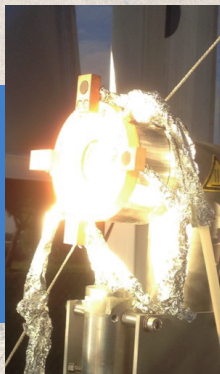
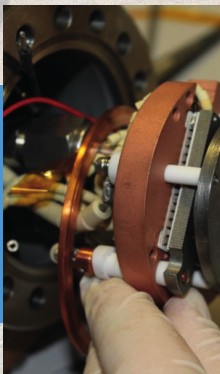


### ↑ Solar tower at PROTEAS in Cyprus

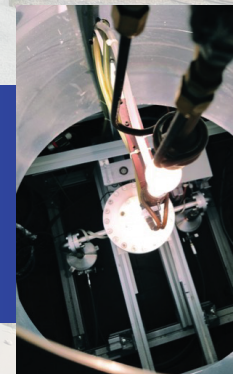
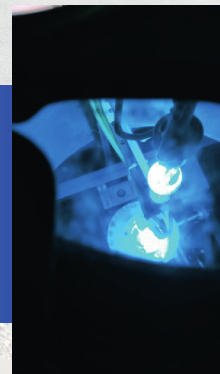
This is the pilot system for the “*Solar-to-heat-to-electric sensible heat thermal battery*”.  
TIG, TEG and TITEG technologies will be tested here.



TITEG



TIG-CSP





## Project Consortium

### COORDINATOR



CNR-ISM  
[Italy]

### PARTNERS



Universidad  
Politécnica  
de Madrid  
[Spain]



RGS  
Development BV  
[Netherlands]



Ionvac  
Process SRL  
[Italy]



The Cyprus  
Institute  
[Cyprus]

### ASSOCIATED PARTNERS



CSEM  
[Switzerland]



Thermophoton  
[Spain]

## Quick Facts

BUDGET: €3 million | DURATION: 42 months | TRL Target: 5  
CONSORTIUM: 5 partners + 2 associates | COORDINATOR: CNR-ISM

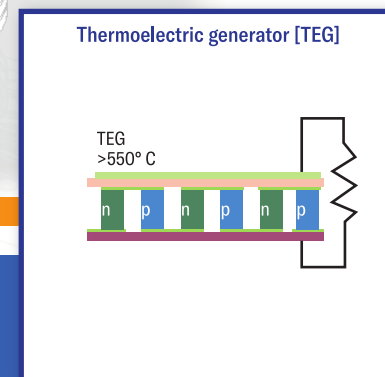
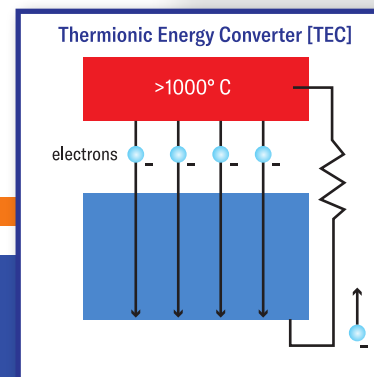
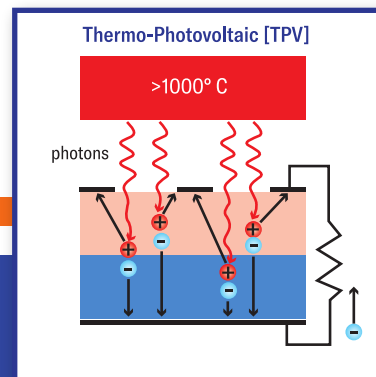
## Main Results Expected

- 5 advanced devices [stand-alone and hybrid] based on TIG, TEG, TPV
- Two pilot thermal batteries:
  - **Sensible heat** [packed bed, ultra high temperature]
  - **Latent heat** [phase-change materials]
- **Dispatchable power wall system** for 24/7 renewable energy availability
- Technology readiness level: **TRL 5**

## Impact

BLAZETEC aims to:

- Boost the integration of **renewable energy** into the power grid
- Enable **flexible and resilient** energy systems
- Support EU strategies for **climate neutrality** and **energy independence**
- Provide **sustainable alternatives** to fossil fuel-based storage and peaker plants



## Project Timeline

Period	Activities
2024–2025	System design & baseline technology R&D
2025–2026	Prototype development & integration
2026–2027	Pilot testing, validation & dissemination

## BLAZETEC targets:

- 100% zero-emission
- Long-duration, dispatchable storage
- Solid-state, scalable, reliable

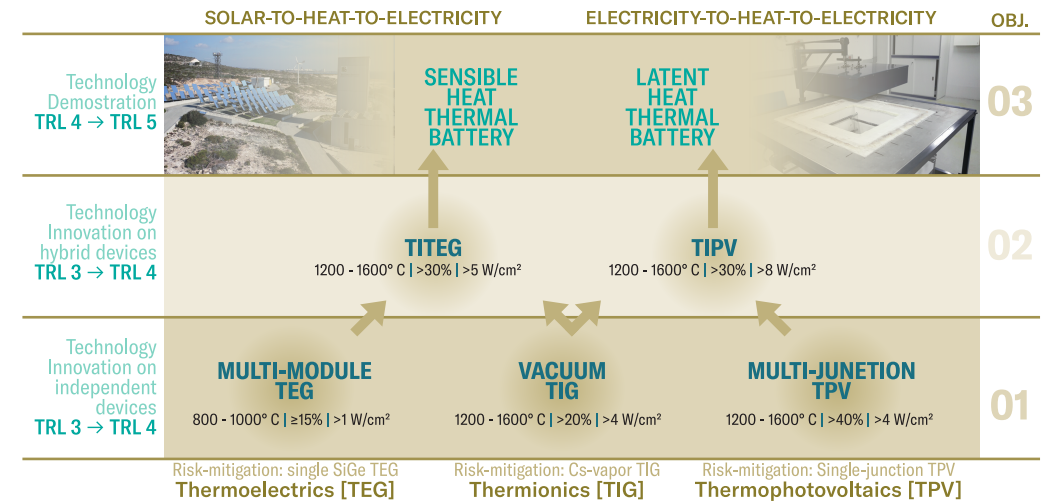
## Work Packages (WPs)

Design & Specifications  
Development of TIG, TEG, TPV technologies  
Hybridization & Prototype Integration  
Testing & Validation of Pilot Systems  
Project Management & Communication

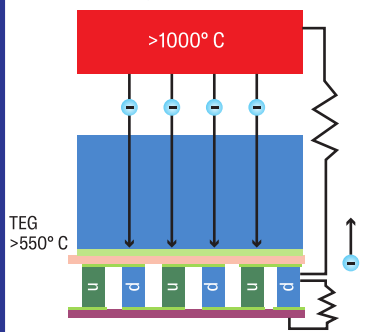
## BLAZETEC technologies

Static, solid-state | Zero moving parts  
Long lifespan [>500 hours] | Low maintenance

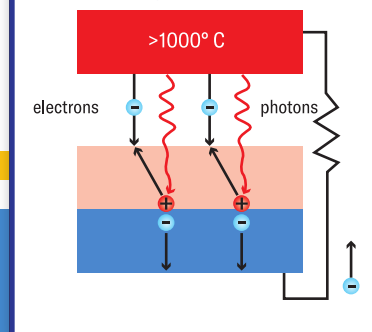
## Conversion technologies & Demonstrators



### Hybrid TITEG



### Hybrid TIPV



## BLAZETEC goals

Support 24/7 clean energy availability | Reduce fossil-based backup systems | Increase grid resilience with dispatchable power | Contribute to EU climate neutrality





## **CONTACT & INFO**

**PROJECT WEBSITE**  
[www.blazetec.eu](http://www.blazetec.eu)

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## **SOCIAL MEDIA**



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