



AMADEUS

ultra high temperature energy storage



The AMADEUS Project is funded by the European Union's Horizon2020 research and innovation program under grant agreement 737054.

NEXT GENERATION MATERIALS AND SOLID STATE DEVICES FOR ULTRA HIGH TEMPERATURE ENERGY STORAGE AND CONVERSION

AMADEUS Scope

AMADEUS project is exploring new materials and devices to enable the storage of energy at extremely high temperatures ($>1000^{\circ}\text{C}$), well beyond the current technological limits. Based on these novel materials and devices, a new kind of ultra-compact LHTES (Latent Heat Thermal Energy Storage) device with unprecedented high energy density will be developed. In this way, AMADEUS addresses a new technology that is beyond the state of the art and is not currently foreseen by technology roadmaps. Being the first project of this kind, AMADEUS aims to kick-start an emerging research community around this new technological option.

AMADEUS Activities

The AMADEUS project is divided in four work packages (WPs):

- WP1 - Management, communication and exploitation of the project results.
- WP2 - Energy storage module (PCMs, containers, and thermal insulation)
- WP3 - Energy conversion module (thermionic & photovoltaic converters)
- WP4 - Final proof of concept experiment of a novel LHTES system

AMADEUS Objectives

- Develop novel phase change materials (PCMs) based on silicon and boron, with latent heat near or beyond 2 MJ/kg , and melting temperatures in the range of $1000\text{--}2000^{\circ}\text{C}$.
- Fabricate an optimal PCM casing and container enabling high thermal insulation and long term reliability at temperatures up to 2000°C .
- Demonstrate the proof of concept of a novel hybrid thermionic-photovoltaic device for the direct conversion of heat into electricity at ultra high temperatures.
- Demonstrate the proof of concept of a new LHTES system that integrates all the components developed during the project.

AMADEUS Impact

- Initiating a baseline of feasibility for a new energy storage technology and its future uses.
- Enabling a next generation of CSP (Concentrated Solar Power) systems.
- Enabling new devices for energy storage in buildings.
- Enabling new devices for energy storage and waste heat recovery in high temperature industries.
- Making cutting-edge research more open, collaborative, creative and closer to society.

Abbreviations

LHTES: Latent Heat Thermal Energy Storage

CSP: Concentrated Solar Power

PCM: Phase Change Material

Project Consortium

IES-UPM: Solar Energy Institute of the Technical University of Madrid (Spain)

CERTH-CPERI: Centre for Research and Technology Hellas - Chemical Process Engineering Research Institute (Greece)

FRI: Centre for High Temperature Studies, Foundry Research Institute (Poland)

NTNU: Norwegian University of Science and Technology, Department of Materials Science and Engineering (Norway)

CNR-ISM: Consiglio Nazionale delle Ricerche - Institute of Structure of Matter (Italy)

USTUTT: Research and Testing Centre of Thermal Solar Systems at the Institute for Thermodynamics and Thermal Engineering of the University of Stuttgart (Germany)

IONVAC: Ionvac Process Srl. (Italy)

Project Details

Duration: 36 months

Start date: 01-01-2017

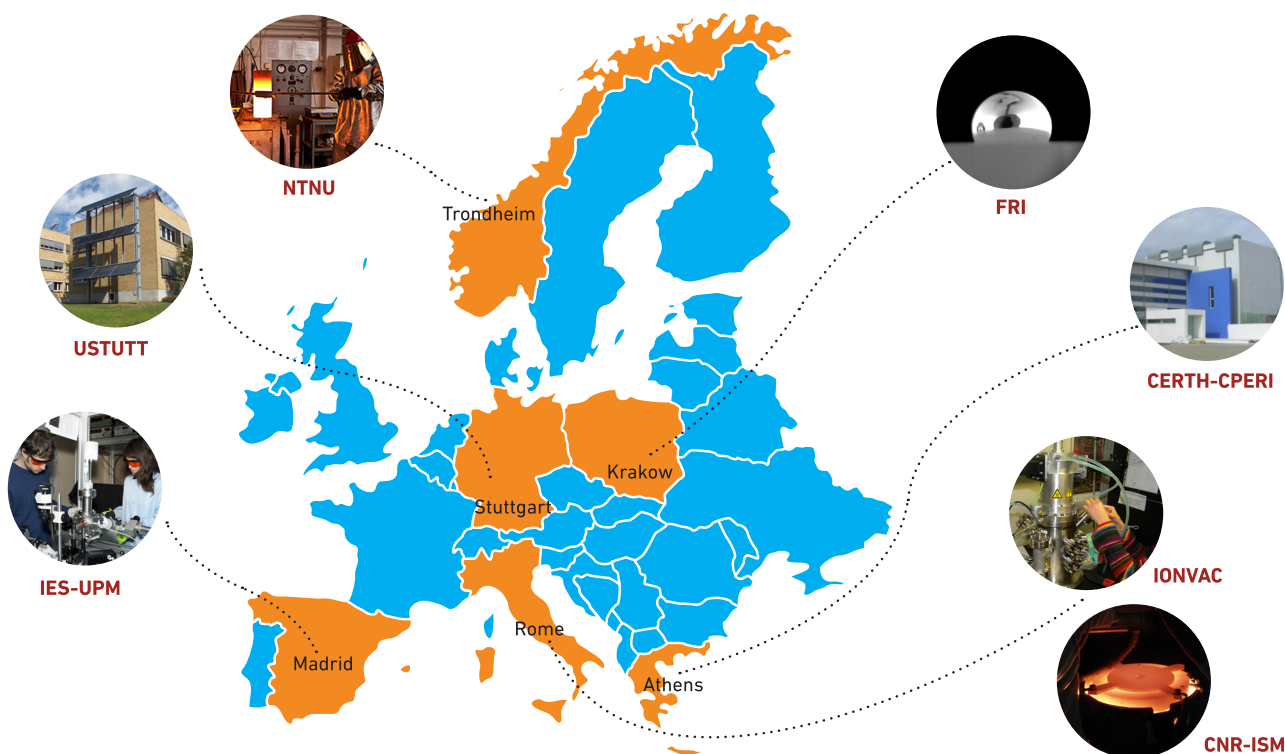
End date: 31-12-2019

Composition

- 7 partners from 6 countries
- 3 R&D Centers
- 3 Universities
- 1 SME

Budget: 3.270.496,25 €

For more information, visit:
www.amadeus-project.eu



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