

# GEMINI 4.0

## GEMINI For Zero Emission

### OBJECTIVES

The objective of the GEMINI 4.0 project is to demonstrate that the high temperature nuclear cogeneration system developed in GEMINI+ can provide a global solution for the competitive and safe decarbonization of industrial activities. The project aims to achieve this objective through four main steps:

1. Consolidate the GEMINI+ system safety demonstration and ensure that its licensing readiness is assessed by regulators and TSOs including the scenario in which it is used in poly-generation mode.
2. Develop the capability of the GEMINI+ system to operate in a cost-effective way in poly-generation mode.
3. Plan for the development of a consistent fuel cycle for high temperature reactors with respect to fissile resources as well as a safe, and an acceptable back-end.
4. Implement an ambitious communication plan aimed towards political stakeholders, industry stakeholders and the general public, with the goal of removing obstacles to nuclear solutions for the decarbonisation of industry.

### DESCRIPTION OF WORK

The GEMINI 4.0 project will build on the groundwork laid by GEMINI+ and earlier projects carried out by NC2I, which defined the bases for the design and licensing framework of a HTR addressing European industry needs of process heat reliant on steam distribution networks that are already operated presently on many European industrial sites.

### EXPECTED OUTCOMES

- **Validation of safety options** of high temperature reactors as candidate reactors for cogeneration initiatives for high energy-consuming industries
- **Demonstration of the feasibility of coupled nuclear cogeneration** technologies and installations at industrial scale
- **Confirmation of whether a generic design for a high temperature reactor can be proposed for licensing**, with the early involvement of regulators, and how a licensing process can be launched at the European level
- **Socio-economic evaluation of the introduction of cogeneration** with temperatures relevant to high temperature reactors in the industrial landscape of European regions with high energy-consuming industries.

### DURATION

June 2022 – May 2025  
3 years

### CONTACTS

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### PARTNERS

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