

SNETP Forum

THE GEMINI+ SYSTEM FOR POLYGENERATION OF POWER, PROCESS HEAT AND HYDROGEN

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~1 mm



OBJECTIVE: Support the industrial demonstration of a cogeneration High Temperature Gas Cooled Reactor (HTGR) for Electricity, Process Heat and Hydrogen Production

FUEL, REACTOR, THERMAL CYCLE DESCRIPTION



In H2020, an Euratom funded project, GEMINI +, developed the design of a high temperature helium-cooled reactor meant at cogeneration of **high temperature steam** (550°C) and **electricity** for decarbonizing industry. Then the GEMINI4.0 project enhances the potential of the GEMINI+ reactor by aiming at fulfilling the following objectives:

1. The chosen configuration of the nuclear system allows addressing versatile heat and power needs of industry with the same standard design.

2. Suitable for competitive CO2 free hydrogen production preferably through high temperature Solid Oxide Electrolysis with electricity and high temperature heat supplied by the reactor.

3. European TSOs continued their efforts in interaction with regulators to build a licensing approach for such a nuclear system, focusing in particular on new questions raised by the interaction of the coupled nuclear plant and industrial non-nuclear production.

4. Safety studies resulted in improved reactor and core design. It provides enlarged margins to design and safety limits in operation and accident conditions.

5.the conditions for establishing a TRISO fuel supply chain and a fuel cycle for the GEMINI+ reactor in Europe shows that the HTGR fuel cycle of the GEMINI+ system is flexible enough to allow the use of different fissile resources and to adapt to different fuel back-end strategies, from direct disposal to recycling.



MARKET: POLY-GENERATION ELECTRICITY, HEAT, HYDROGEN



From "Market study on energy usage in European heat



APPLICATIONS





CONCLUSIONS

Achieved results of the project allow beginning works on commercial design and deployment for industrial applications.

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PROJECT PARTNERS



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