

A demonstration of nuclear poly-generation in Europe

Jozef Sobolewski¹, Michel Pasquet², Michael Fütterer³ and Dominique Hittner⁴

¹National Centre for Nuclear Research (NCBJ), ul. A. Soltana 7, 05-400 Otwock-Świerk, Poland
²Framatome, 2 rue du Professeur Jean Bernard, 69007 Lyon, France

³European Commission – JRC, Westerduinweg 3, NL-1755 LE Petten, The Netherlands
⁴Hit Tech Relay, 38, rue des caves du roi, 92310 Sèvres, France



SCOPE

NC2I is the pillar of SNETP focusing on the use of nuclear energy to cogenerate electricity, high temperature heat and hydrogen to address industry needs (cogeneration and poly-generation).

NC2I gives priority to HTGR technology, the only one **mature enough** to provide large quantities of energy and hydrogen needed by industry early enough **to contribute significantly to the net zero 2050 objective**. Other AMR technologies could also contribute, but in the longer -term.

With the legacy of the past German HTGR programme and the continuous effort performed in the last 25 years through many Euratom funded projects launched by NC2I, Europe is ready for a first demonstration of nuclear industrial cogeneration:

- The last two Euratom funded HTGR projects, GEMINI+ and GEMINI 4.0
 - ✓ Developed the conceptual design of a standard small modular HTGR, the **GEMINI reactor** (180 MWth) flexible enough to adapt to versatile industrial needs,
 - ✓ Defined with European TSOs and regulators the bases for licensing such an SMR and its coupling with industrial process heat applications, including hydrogen production.
- In Poland, the basic design of a small HTGR demonstrator for cogeneration (30 MWth), **HTGR-POLA**, based on the GEMINI design options is completed.

YESTERDAY IN EUROPE



THTR plant in Germany, industrial 300 MWe prototype

NOW IN CHINA

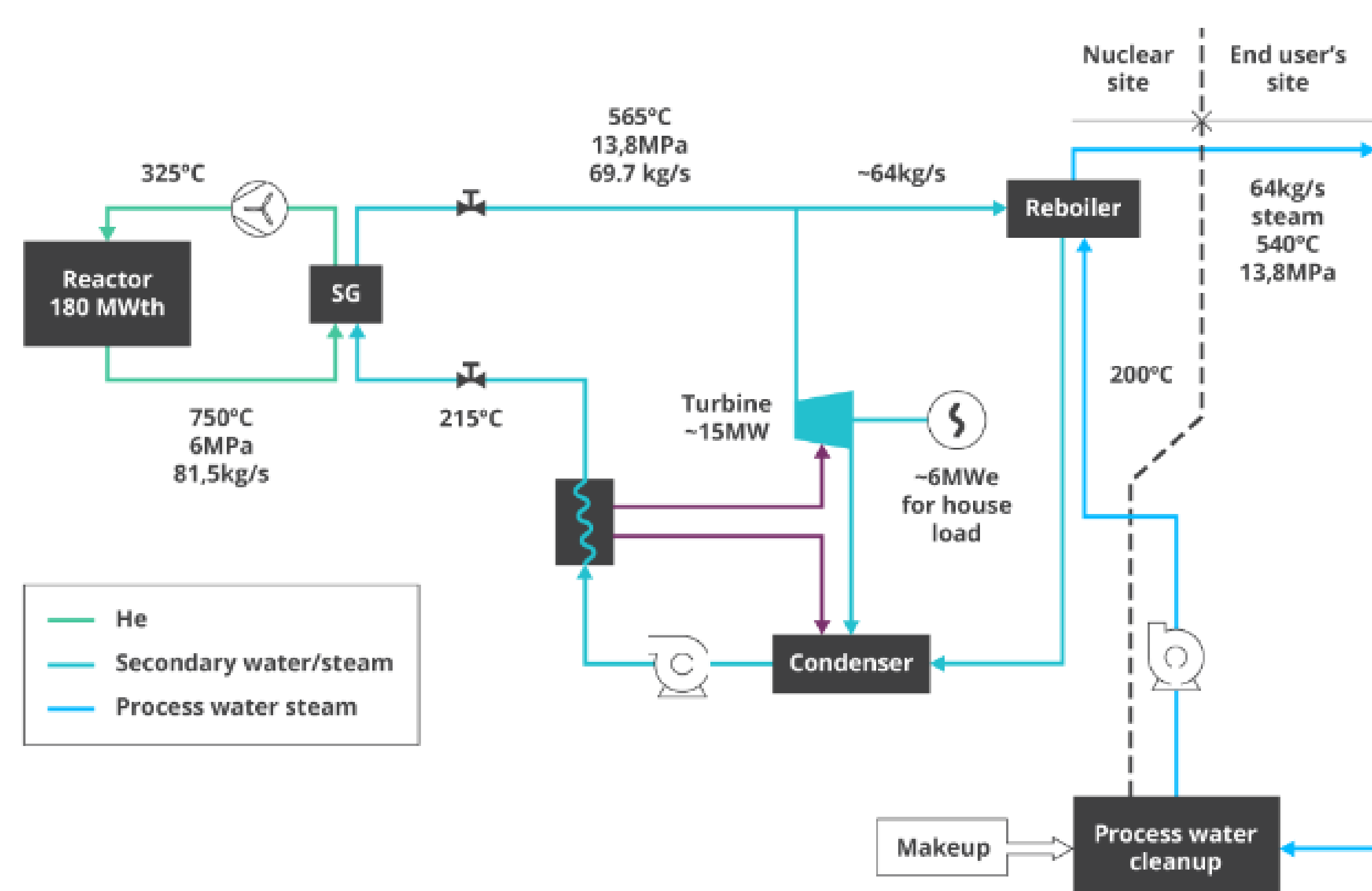


Two 250 MWth HTR-PM modules coupled to the grid since December 2023

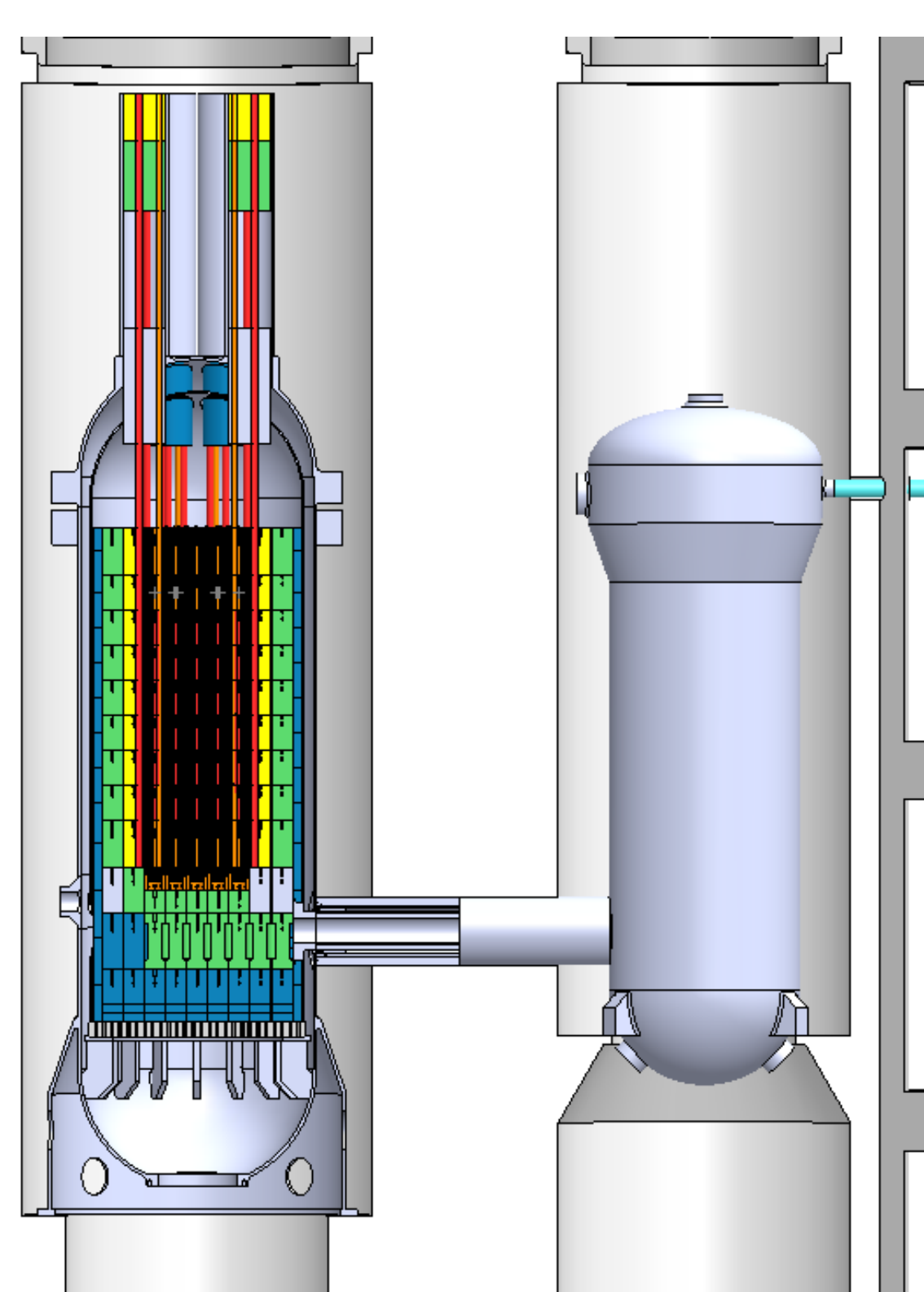
HTR-PM 600S: 6 HTR-PM modules to supply electricity and high temperature steam to a petrochemical plant
Construction start: 2025
Operational: 2030



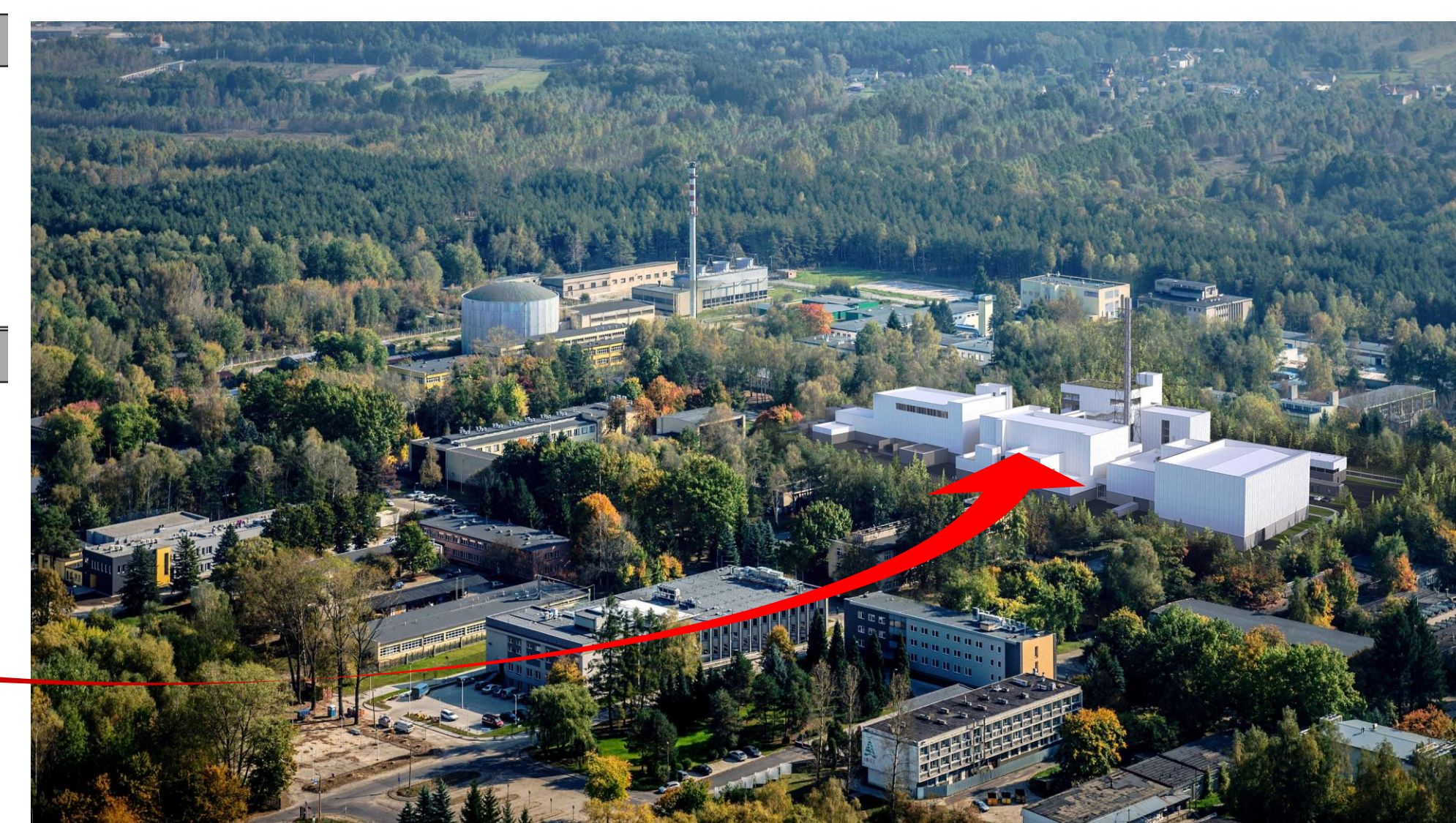
NOW IN EUROPE



The GEMINI design, a standard flexible design to adapt to versatile industry needs



HTGR-POLA



TOMORROW IN EUROPE

- A project for construction and operation of a European demonstration plant based on HTGR-POLA design will be proposed to the European Industrial Alliance on Small Modular Reactors.
- Deployment of a poly-generation HTGR fleet to decarbonize European industry.

CONTACT

NC2I chairman

Józef Sobolewski (NCBJ)
Email: jozef.sobolewski@hotmail.com

NC2I vice-chairman

Dominique Hittner (Hit Tech Relay)
Email: htr92@outlook.com

