SUMMARY OF THE POLISH NATIONAL PROJECT: GOSPOSTRATEG-HTR

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SNETP
Sustainable Nuclear Energy Technology Platform

NATIONAL CENTRE FOR NUCLEAR RESEARCH ŚWIERK

FISA 2022 & EURADWASTE ’22- SNETP FORUM
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GOSPOSTRATEG-HTR (GoHTR)

GOSPOSTRATEG - strategic Polish program of scientific research and development (R&D) work "Social and economic development of Poland in the conditions of globalizing markets"

Title: Preparation of legal, organizational and technical instruments for the HTR implementation

(Gospostrateg1/385872/22/NCBR/2019)

Consortium: Ministry of Climate and Environment, NCBJ, ichtj

www.gohtr.pl

Phase A: Research work. Preparation of testing procedures and instrumentation necessary for their implementation(1-18M).

Phase B: Implementation procedures into approvals, especially in terms of Polish Atomic Law(19-38M).

Budget	21 370 998.00 PLN
Period	1.02.2019-31.03.2022

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- Phase A
- (2019.02.01 – 2020.07.30)

1. Development of methods for diagnostics of structural materials in the HTR construction (NCBJ);
2. Development of methods for testing of structural materials in a nuclear reactor, and equipment for the execution of tests in the core(NCBJ);
3. Research and analysis of selected chemical aspects of the production and use of TRISO fuel in the HTR nuclear reactor(ICHTJ);
4. Comprehensive analysis of the necessary changes to the legal environment and the potential benefits of social, economic and industrial units for the Polish economy(MKiŚ, NCBJ).

- Phase B
- (2020.08.01 – 2022.03.31)

5. Preparation licensing process (certification) of HTGR reactors on the example of a research reactor(MKiŚ, NCBJ, ICHTJ);
6. Preparation draft of legal regulations for the HTR investments implementation; developing a strategy in the social, economic and industrial aspects of the project(MKiŚ, NCBJ, ICHTJ);
7. Piloting of test procedures for the use of construction materials for the HTR reactor design, including tests in the Maria reactor core (NCBJ);
8. Preparation of technical and economic assumptions for the construction of a fuel production unit for high-temperature reactors(ICHTJ).

GOSPOSTRATEG-HTR: Key objectives

Preparation to the licensing process	• TERESA pre-conceptual design • Facility concept • Analysis methodology
Material tests	• Implementation of testing procedures • Identification materials for tests • Irradiations in the MARIA reactor
Legal, social, economic and industrial aspects of the project	• Legal regulations for the HTR investments implementation • Public and industrial communication

GOSPOSTRATEG-HTR Legal regulations for the HTR investments implementation

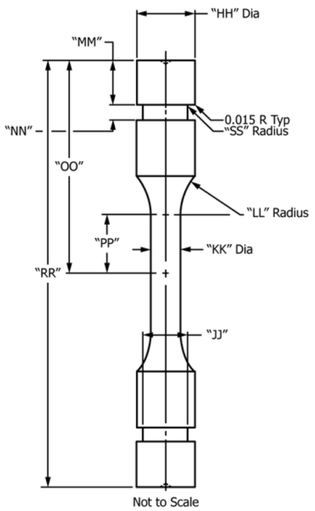
Procedure of changes in polish legal acts initiated by Ministry of Climate and Environment, started on 20-07-2021!

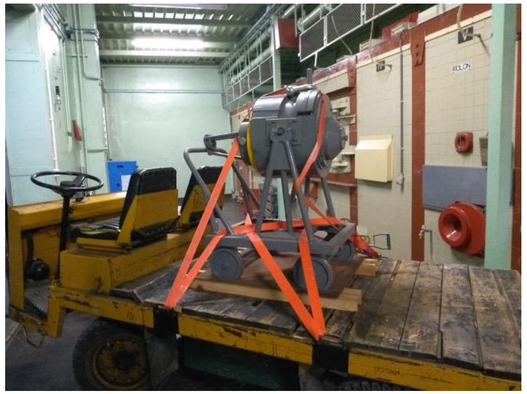
GOSPOSTRATEG-HTR *Material tests*

Identification and description of measurement procedures for testing and validation of HTR reactor construction materials

Irradiation System for High TemperAture Reactor (ISHTAR) design

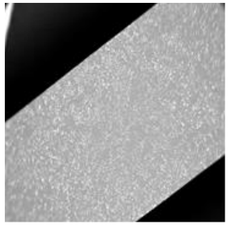
Materials: graphite (IG110, NBG-17, NCBJ facility), metal alloys (Hastelloy: X, N, B-3, C-273; Haynes 230)

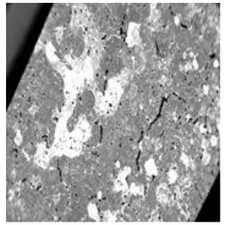




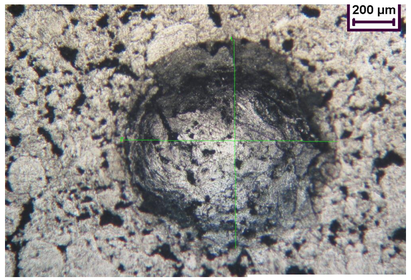
Equipment modernization

Implementation of testing procedures

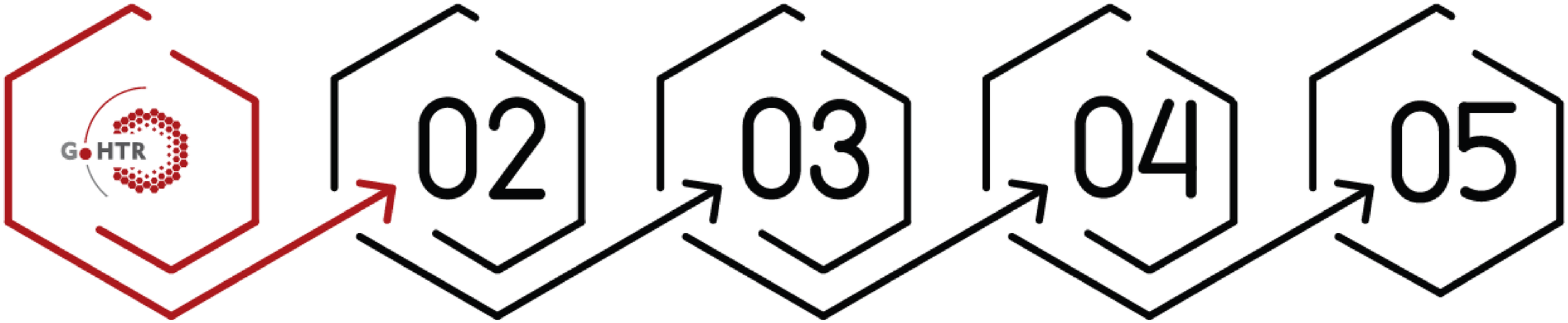




Irradiations in the MARIA reactor



GOSPOSTRATEG-HTR: TERESA pre-conceptual design



PRE-CONCEPTUAL DESIGN

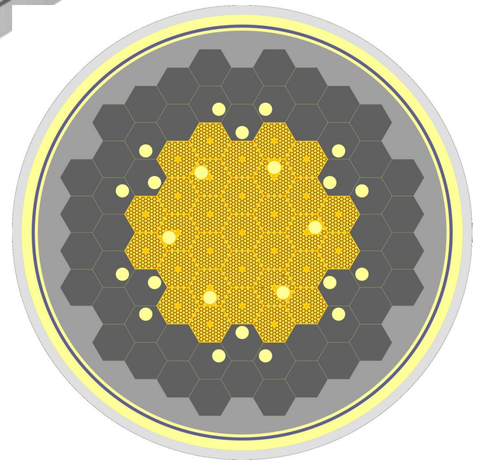
CONCEPTUAL DESIGN

PRELIMINARY DESIGN

BASIC DESIGN

EXECUTIVE TECHNICAL DESIGN

GOSPOSTRATEG-HTR



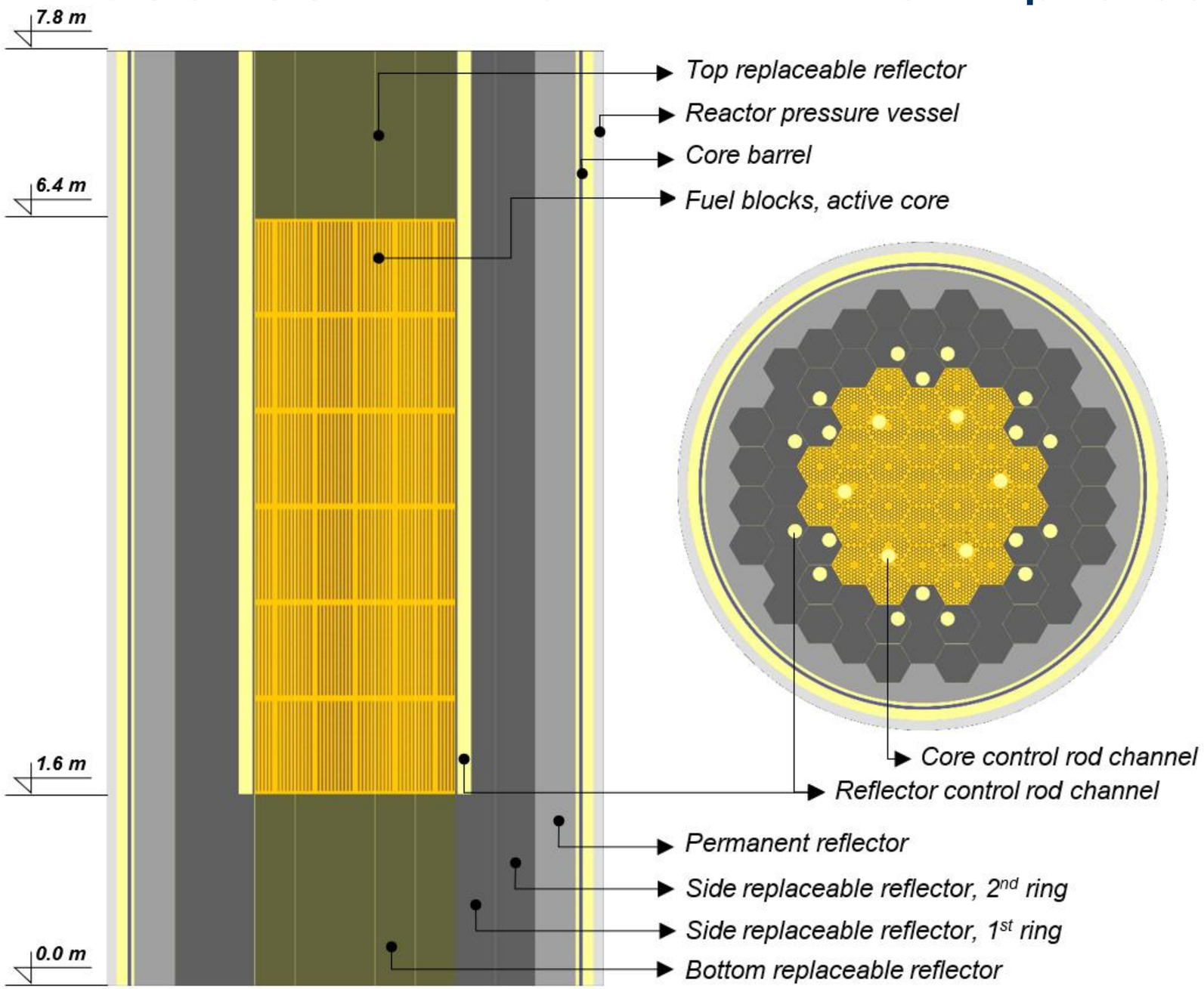
Pre-conceptual design of research HTR named TERESA

- Design based on GEMINI+ Project- down-size of HTR for Industrial application
- Safety analyses (T-H, neutronics, PSA, et. al.)
- Secondary circuit design
- System balance calculations

TERESA functions:

1. Research (e.g. passive heat removal tests, codes validation);
2. Experimental (technological appliances in micro scale - e.g. turbine);
3. Applicative (electricity and heat production for own NCBJ needs)

GOSPOSTRATEG-HTR: TERESA* pre-conceptual core design



Neutronic

T-H

PSA

*based on the GEMINI+ concept

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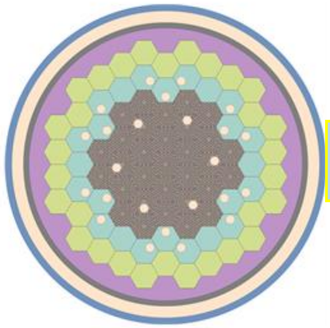
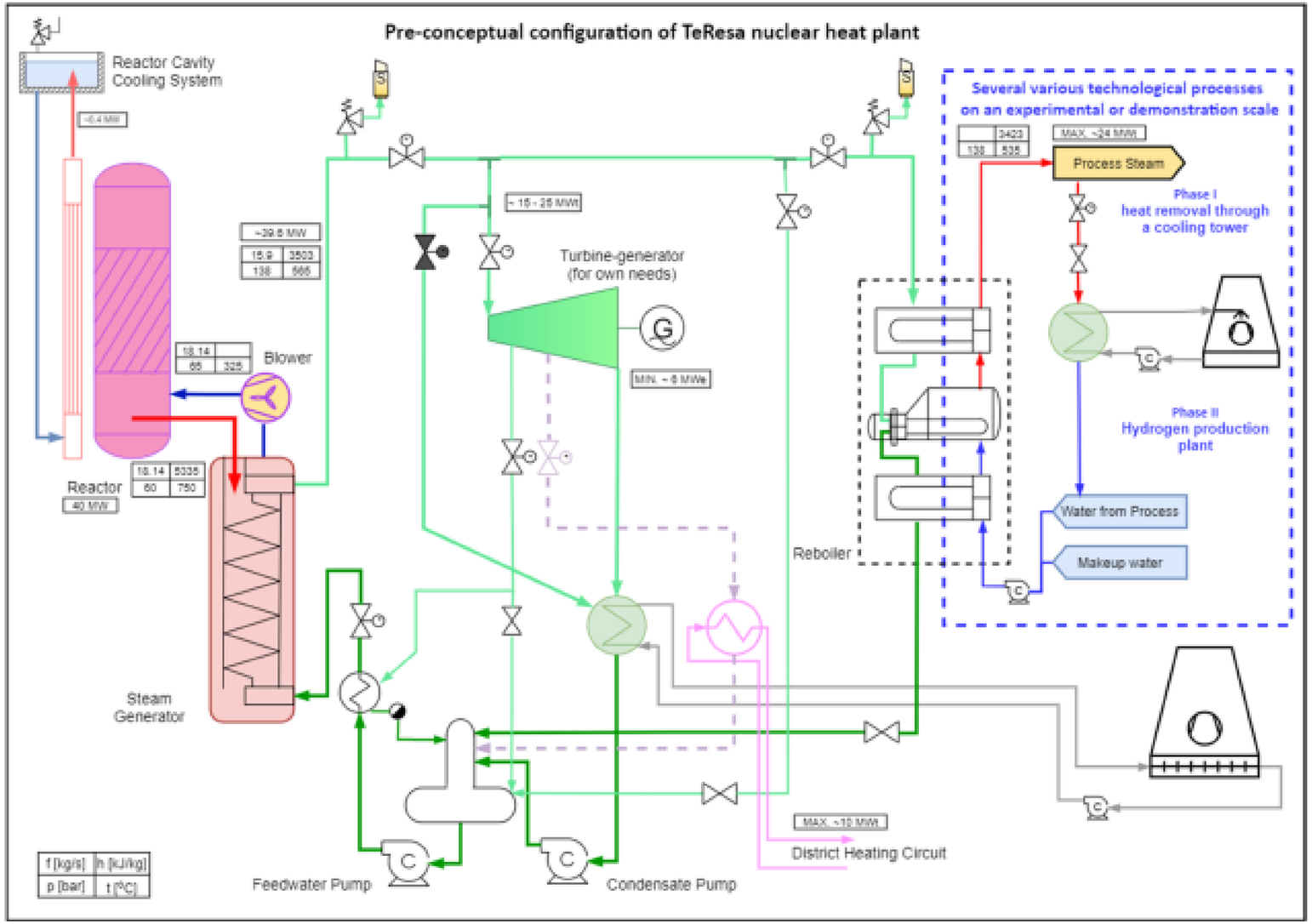
GOSPOSTRATEG-HTR: pre-conceptual TERESA facility

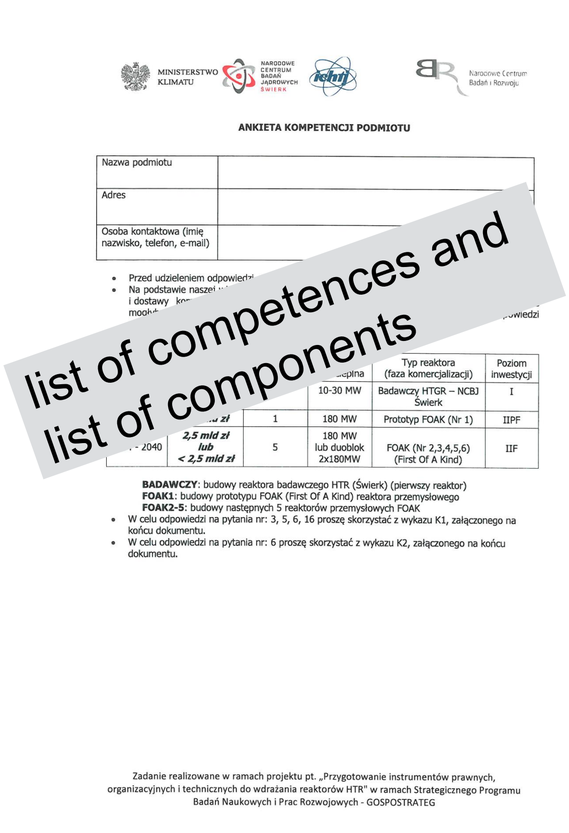




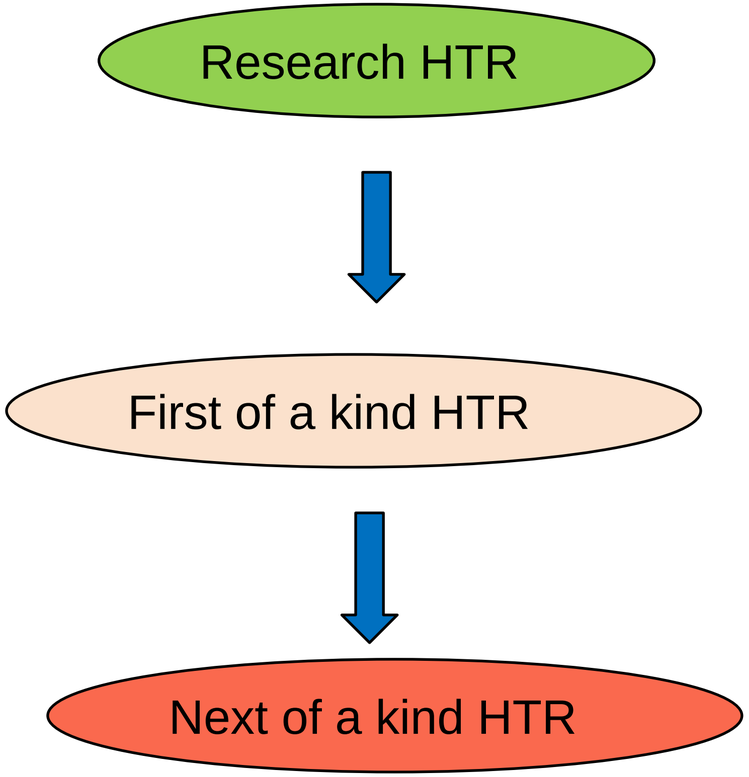
GOSPOSTRATEG-HTR Public and industrial communication

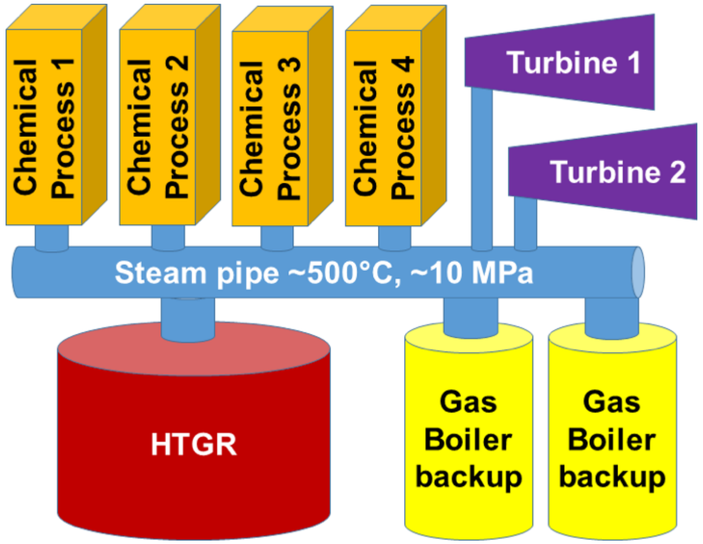
- Survey of the Polish industry capabilities

Heat demand: 6500MW (t=250-500°C)*



list of competences and
list of components





- Seminar for the Industry, 23.11.2021

*source: Report of the Committee for Analysis and Preparation of Conditions for Deployment of High-Temperature Nuclear Reactors, 2017 Warsaw

GOSPOSTRATEG-HTR Public and industrial communication

Series of expert lectures for the public

Reaktory wysokotemperaturowe (HTR) dla Polski
Wykłady eksperckie

24.11.2021 (środa), 17:00
Wacław Gudowski
Co to jest HTR i dlaczego potrzebujemy go w Polsce?
Ekonomia, przemysł, potencjalne zastosowania.

01.12.2021 (środa), 17:00
Piotr Darnowski
Zasada działania reaktora HTR.
Podstawy fizyki reaktorowej i aspekty bezpieczeństwa HTR.

08.12.2021 (środa), 17:00
Eleonora Skrzypek
Jak zbudowany jest reaktor HTR?
Podstawy techniczne.

Wykłady zostaną przeprowadzone w formie transmisji online, za pośrednictwem YouTube

Finansowanie:

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NARODOWE CENTRUM BADAŃ JĄDROWYCH ŚWIERK
ichtj
Narodowe Centrum Badań i Rozwoju

+folders
+short movies on NCBJ YouTube
+games
+WNE Paris 2021

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Thank you!

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