



# **Japan-Poland Collaboration and JAEA's Current Activities in HTGR Development**

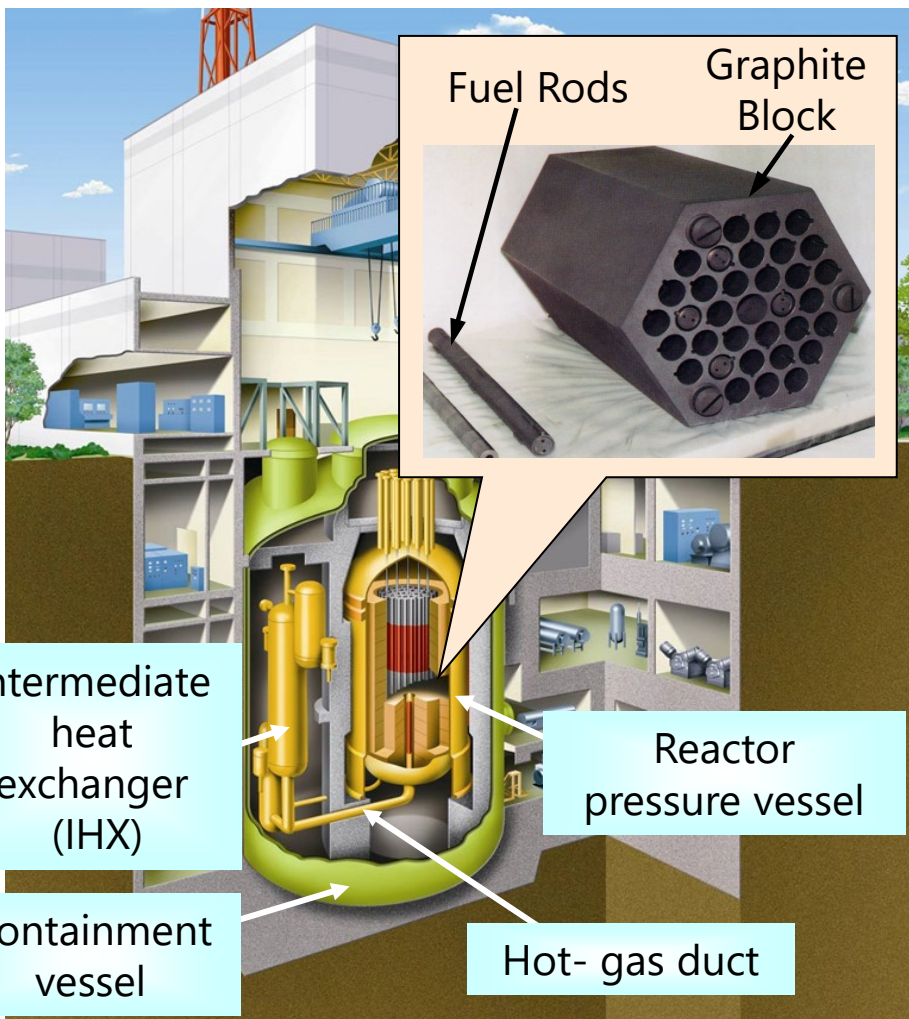
19 November 2024

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Japan Atomic Energy Agency

# **JAEA's Current Activities in HTGR Development**

# HTTR: High Temperature Engineering Test Reactor

## The only prismatic-type High Temperature Gas-cooled Reactor (HTGR) in operation in the world



### Major Specifications

Thermal power	30 MW
Fuel	Coated fuel particle / Prismatic type
Core material	Graphite
Coolant	Helium
Inlet temperature	395°C
Outlet temperature	950°C
Pressure	4 MPa

### Major Achievements

First criticality	: November 1998
Full power operation	: December 2001
50 days continuous 950°C operation	: March 2010
Obtain permission of changes to reactor installation in conformity to New Regulatory Requirements	: June 2020
Restart operation	: July 2021
Station black out test	: January 2022
LOFC test at 100% reactor power	: March 2024

# History of the HTTR Project



Construction

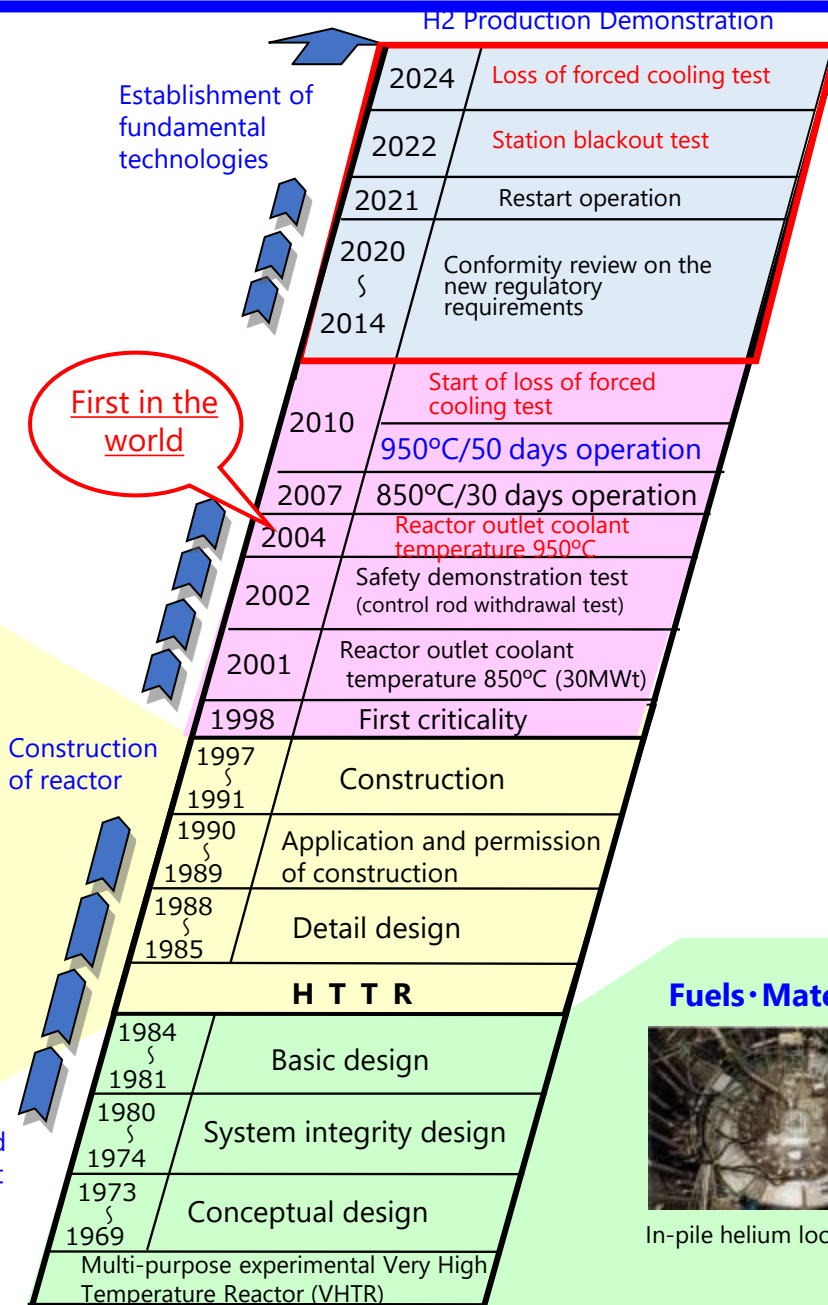


Installation of Reactor Pressure Vessel



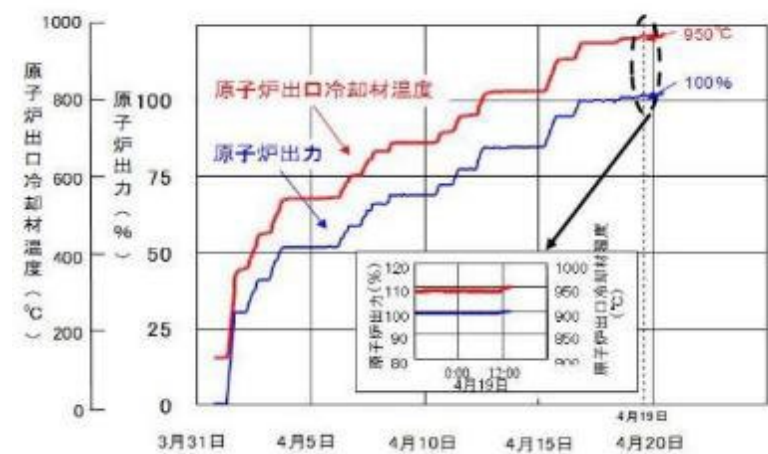
Start Construction Work

Research and development and design



First in the world

Attainment of reactor outlet temp. 950°C



Research and development

**Fuels·Materials**

In-pile helium loop (OGL-1)

**Reactor physics**

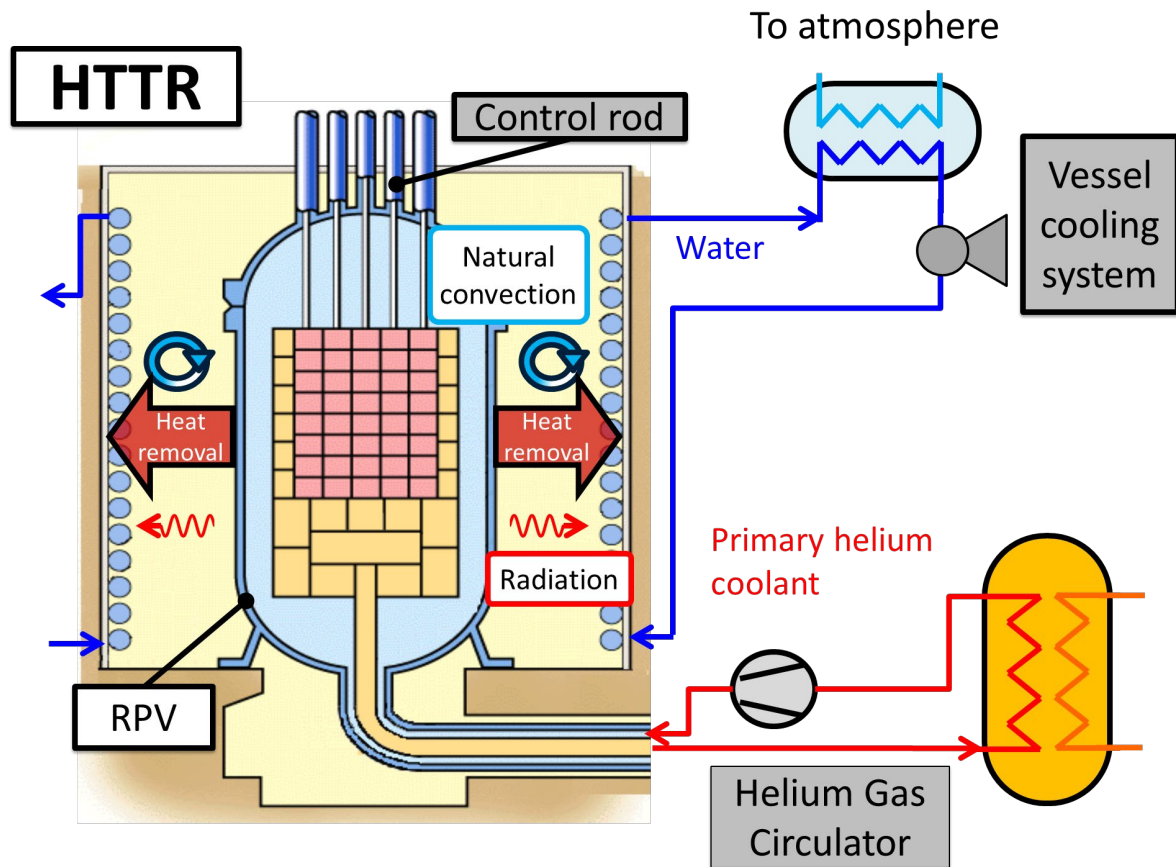
Very High Temperature Reactor Critical assembly (VHTR)

**Thermal hydraulics**

Helium Engineering Demonstration Loop (HENDEL)

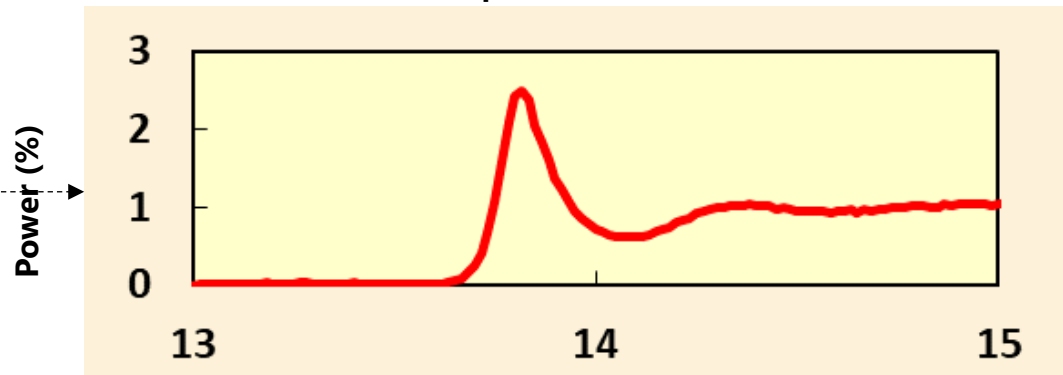
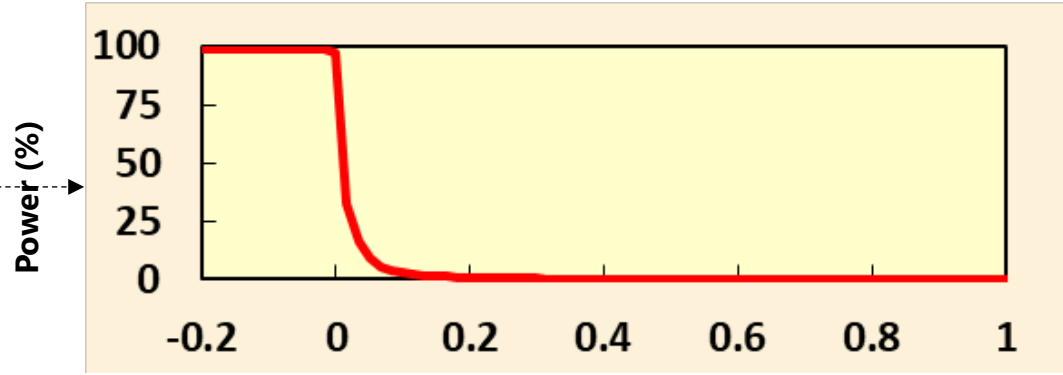
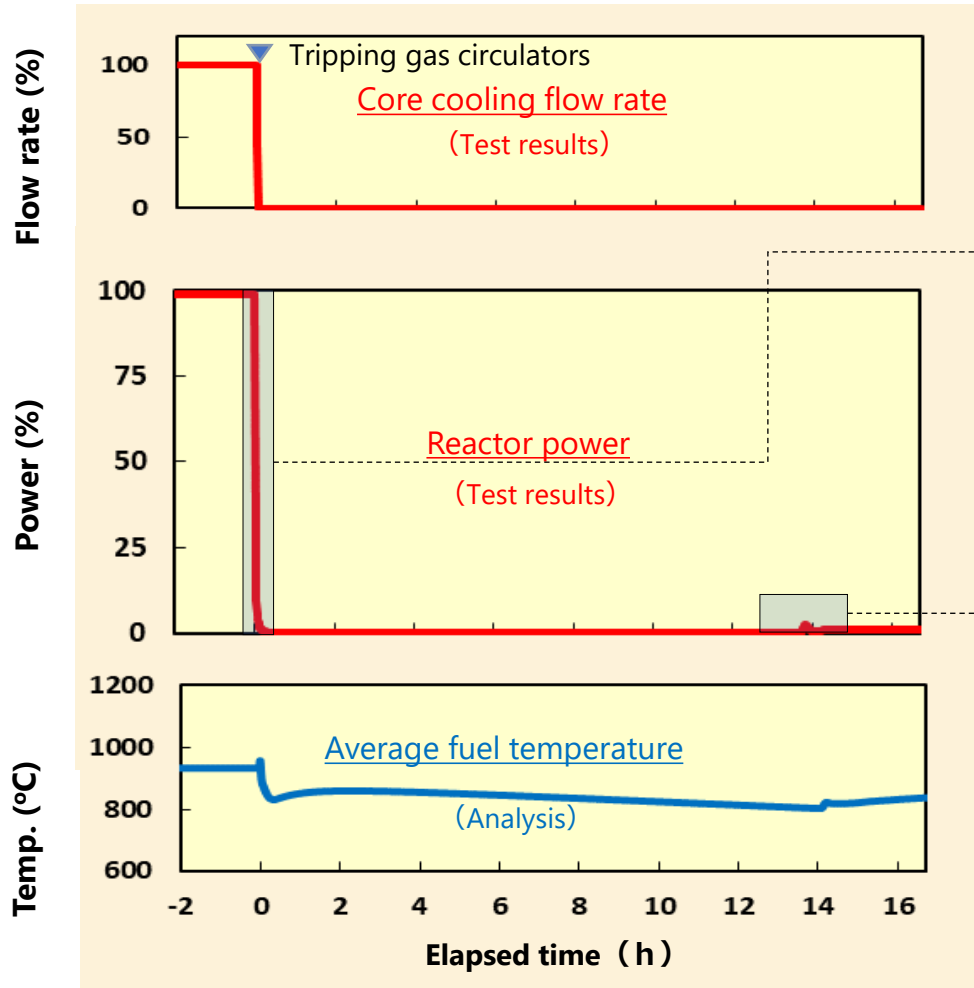
# HTTR Safety Demonstration Test

Safety demonstration tests have been carried out to confirm inherent safety features of HTGR using the HTTR under OECD/NEA framework



- Loss of forced cooling (LOFC) test  
All HGC stopped at 30% (9MWt)  
Completed in December 2010
- Station blackout test  
All HGC + VCS stopped at 30% (9MWt)  
Completed in January 2022
- **Loss of forced cooling (LOFC) test**  
**All HGC stopped at 100% (30MWt)**  
**Completed in March 2024**
  - Initial power 100% (30MWt)
  - Stop all helium gas circulators and core flow rate become zero
  - VCS operation maintained
  - No scram operation (No CR insertion)

# Results of the LOFC Test at 100% Reactor Power

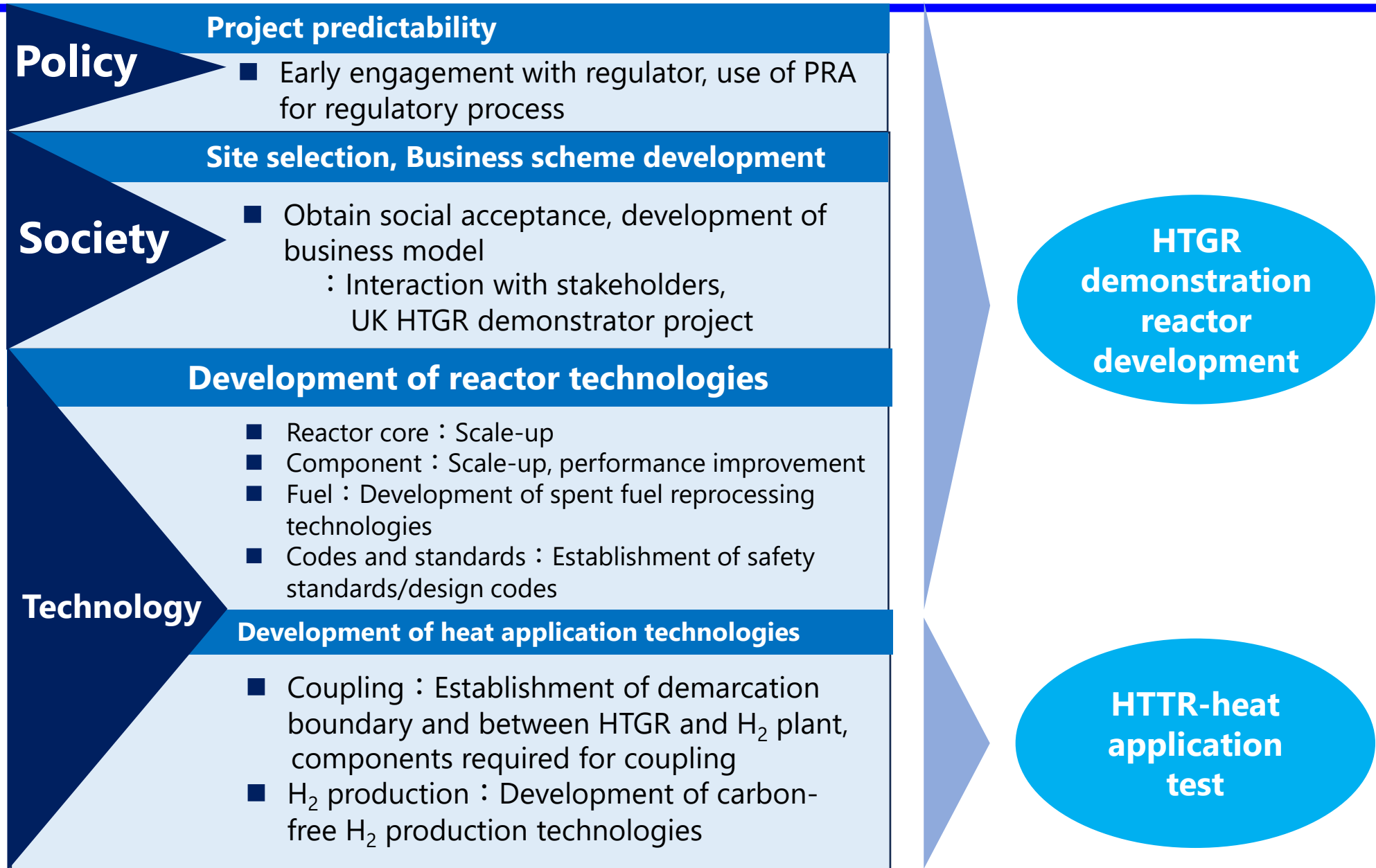


The reactor intrinsically shut down as soon as the core cooling flow rate approaches zero. The reactor is kept stable long after the loss of core cooling.



Ceremony of HTTR  
Safety Demonstration  
Test  
(LOFC Test at 100%)  
on 27<sup>th</sup> March 2024





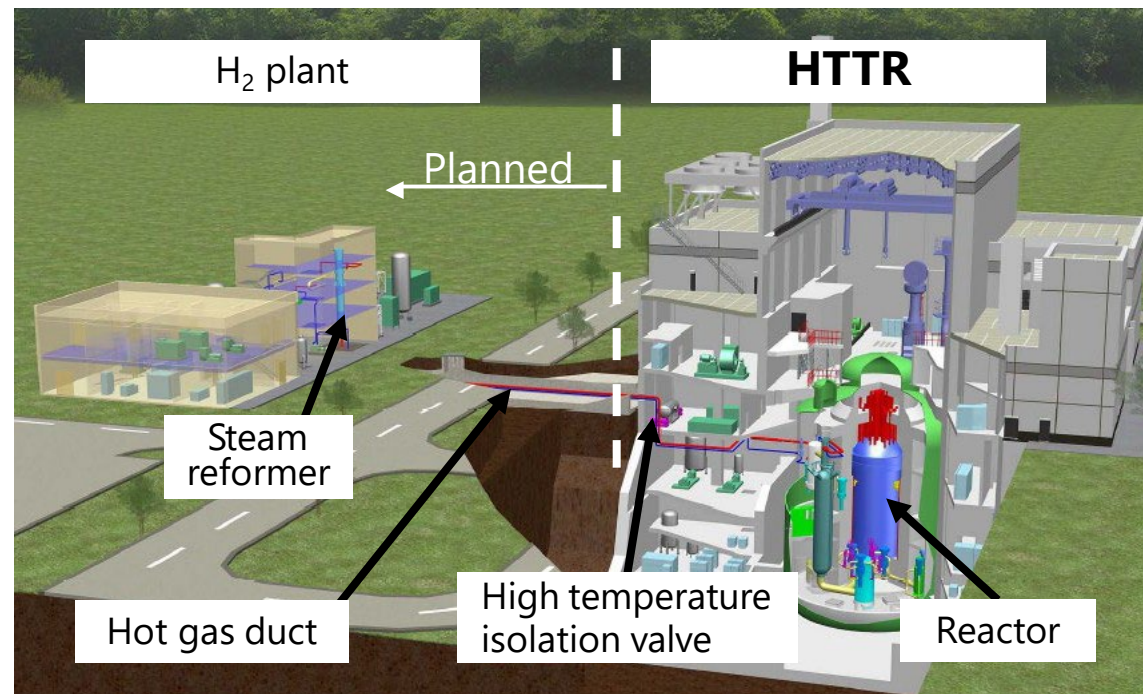


## Objective

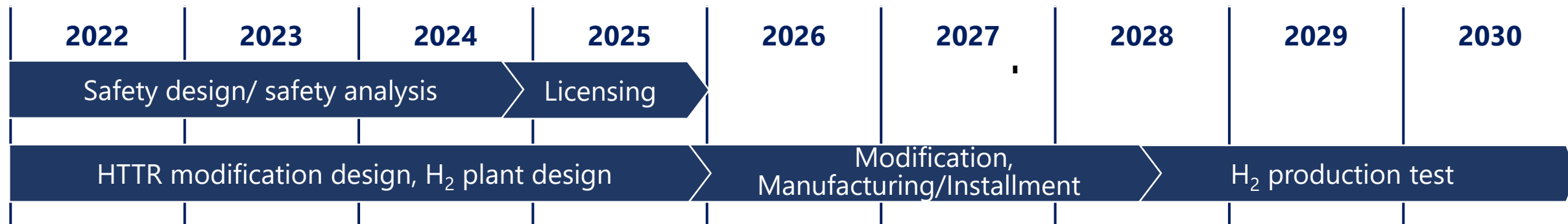
- Establish a safety design for coupling HTGR and H<sub>2</sub> plant through the licensing by Nuclear Regulation Authority.
- Demonstrate performance of components required for coupling between HTGR and H<sub>2</sub> plant e.g. high temperature isolation valves, hot gas duct, etc. using the HTTR.

## Tasks

- Construct a steam methane reforming H<sub>2</sub> plant and connect to the HTTR.
- Conduct a continuous H<sub>2</sub> production test and plant dynamic tests.



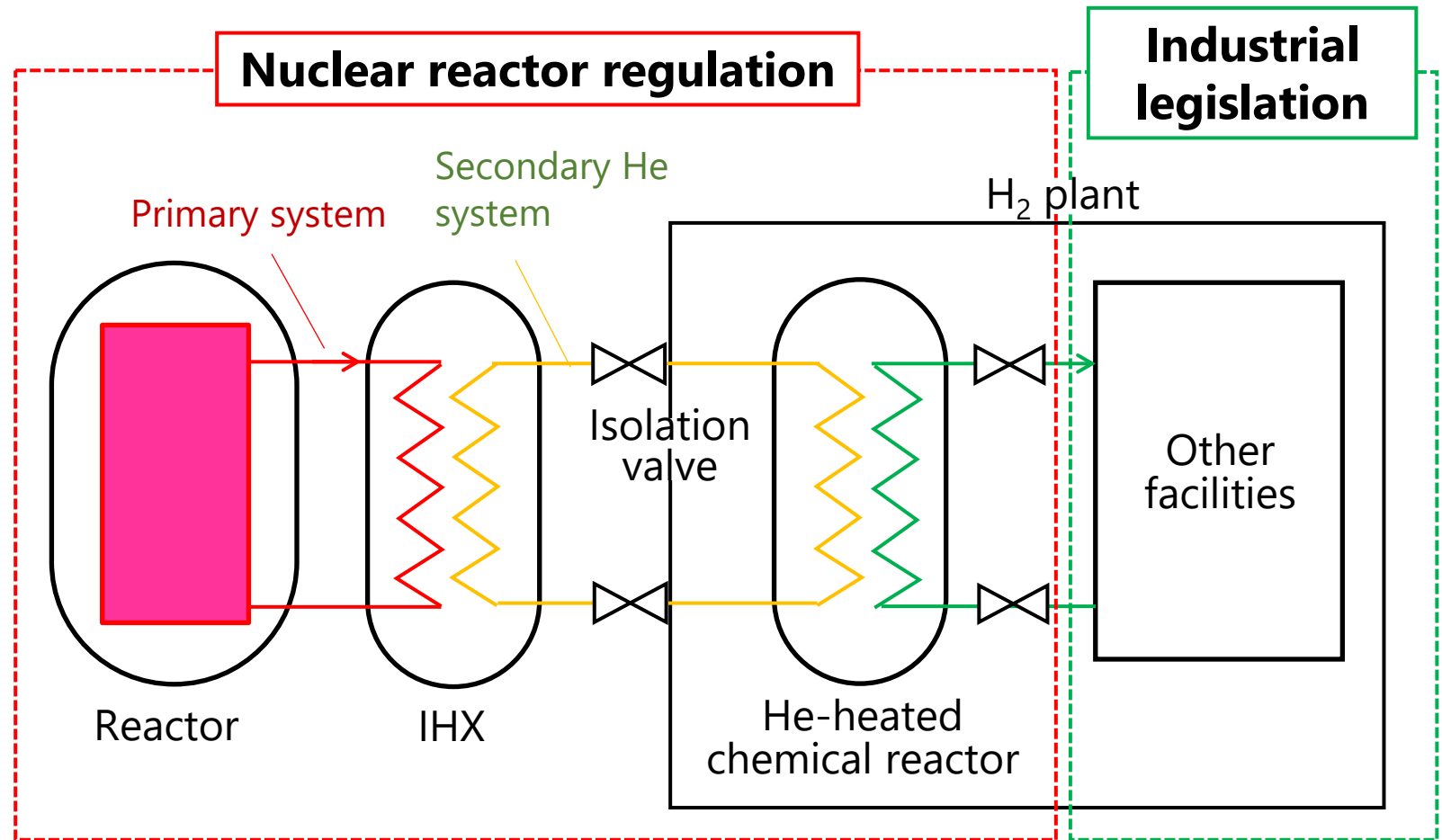
## Tentative Schedule



**Obtain installment permission of H<sub>2</sub> plant under conventional industrial law to leverage existing regulation framework and detail technical requirements to secure H<sub>2</sub> plant safety**

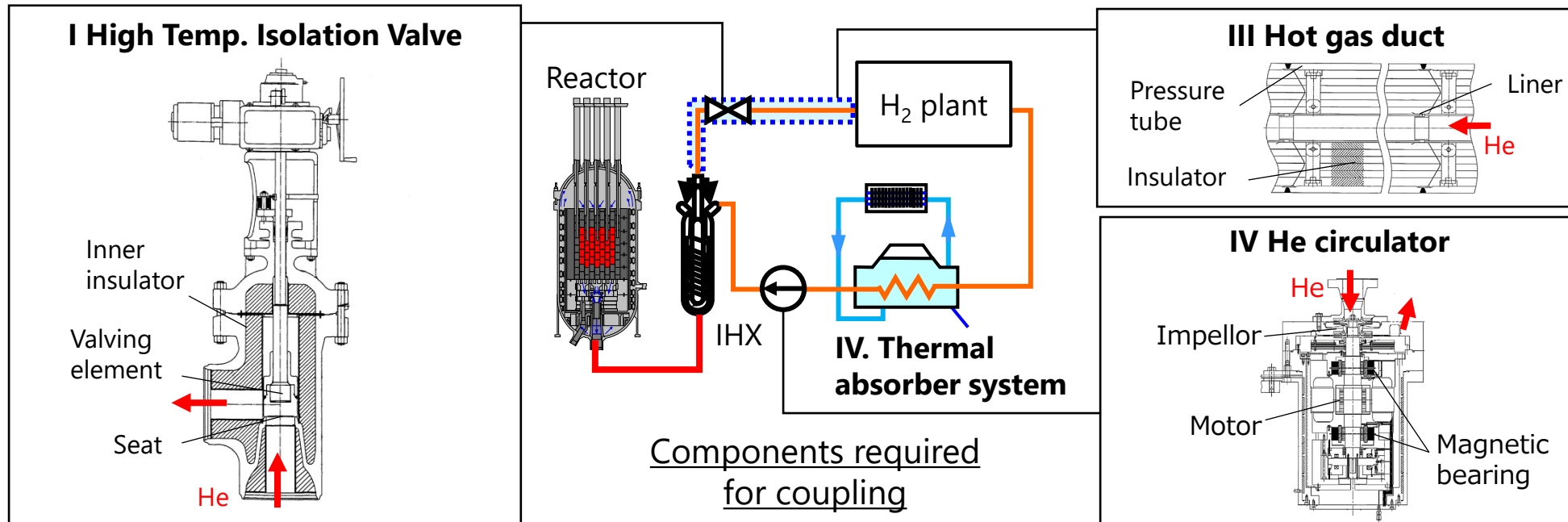
## Safety design approach

- Assurance of safety for nuclear facility against every postulated event initiated in H<sub>2</sub> plant
- Maintain normal operation of nuclear facility against temperature and pressure transients.
- Define abnormal events e.g. fire and explosion due to combustible leakages from H<sub>2</sub> plant, and operator poisoning due to toxic gas leakages from H<sub>2</sub> plant) and assure safety of nuclear facility by nuclear-grade structures, systems, and components (SSCs).



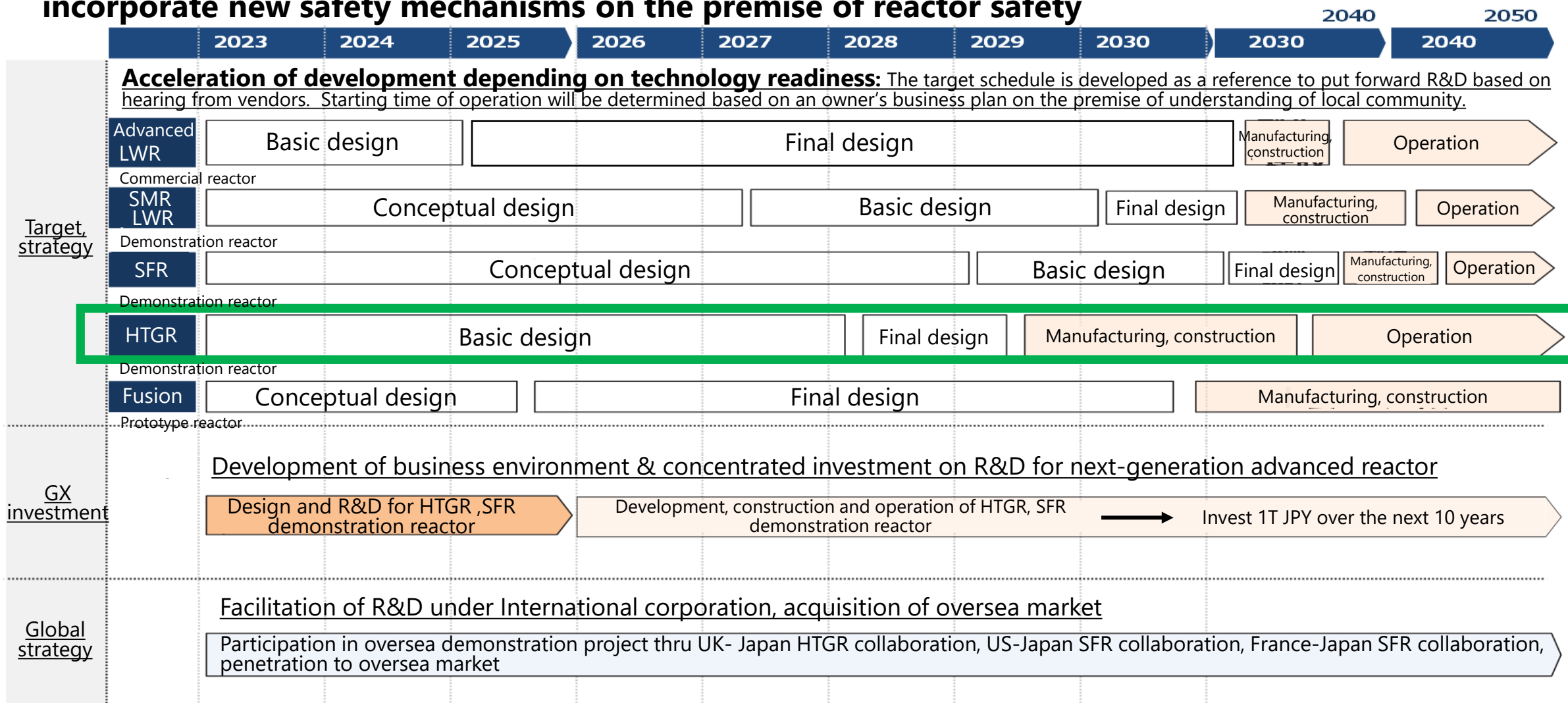
# Coupling Technologies between HTGR & H<sub>2</sub> plant

Technologies	Development items	Functions	R&D plan
System design	<ul style="list-style-type: none"> <li>System analysis code</li> </ul>	<ul style="list-style-type: none"> <li>Plant control system design</li> </ul>	<ul style="list-style-type: none"> <li>Validation using transient test data from HTTR-heat application test facility</li> </ul>
Component	<ul style="list-style-type: none"> <li>I. High temp. isolation valve</li> <li>II. Hot gas duct</li> <li>III. He circulator</li> <li>IV. Thermal absorber system</li> </ul>	<ul style="list-style-type: none"> <li>Isolation of H<sub>2</sub> plant at abnormal conditions, I</li> <li>High temp. He supply, II, III</li> <li>Mitigation of He temperature fluctuations against H<sub>2</sub> plant transients, IV</li> </ul>	<ul style="list-style-type: none"> <li>Isolation performance test, I</li> <li>Insulation performance test, II</li> <li>Magnetic bearing performance test, III</li> <li>Absorption performance test, IV</li> </ul>



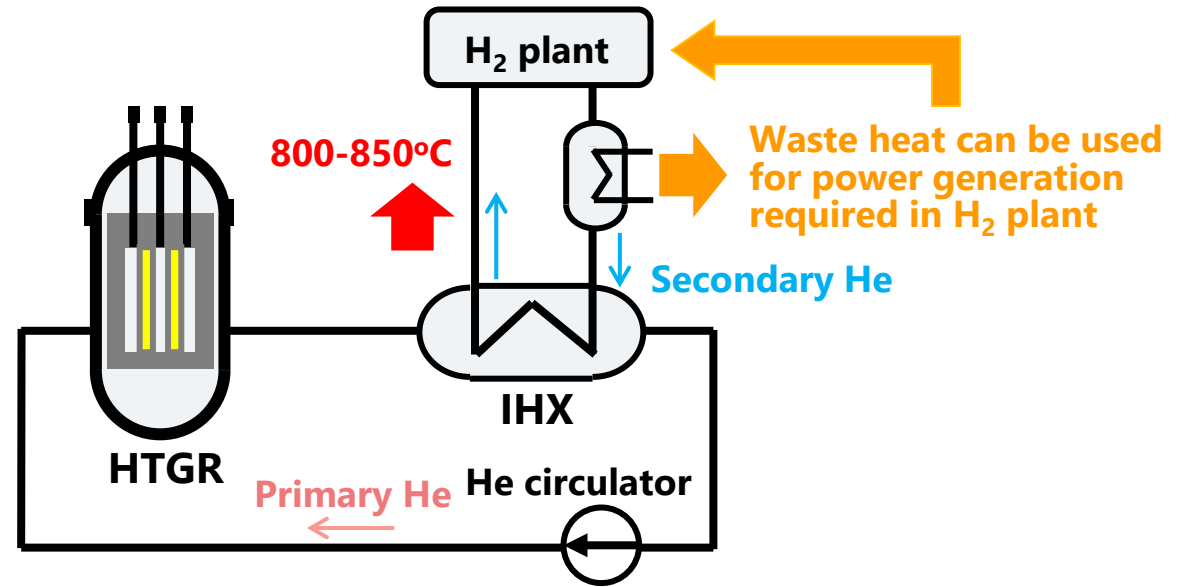
# Basic Policy for GX Implementation

Government put forward development and construction of next-generation advanced reactors that incorporate new safety mechanisms on the premise of reactor safety



**HTGR Demonstration Reactor Development Project**  
 Enacted: JPFY2023 4.8B JPY (FY2023-FY2025 43.1B JPY)  
 Enacted: JPFY2024 25.6B JPY (FY2023-FY2026 127.9B JPY)

- Reactor power will be range from 150MW-250MW.
- Supply very high temperature above 800°C to H<sub>2</sub> plant.
- Waste heat can be used for power generation to be supplied to internal load of steel making plant.
- Combination with a carbon-free H<sub>2</sub> production technology enables large-scale, low cost, carbon-free H<sub>2</sub>.

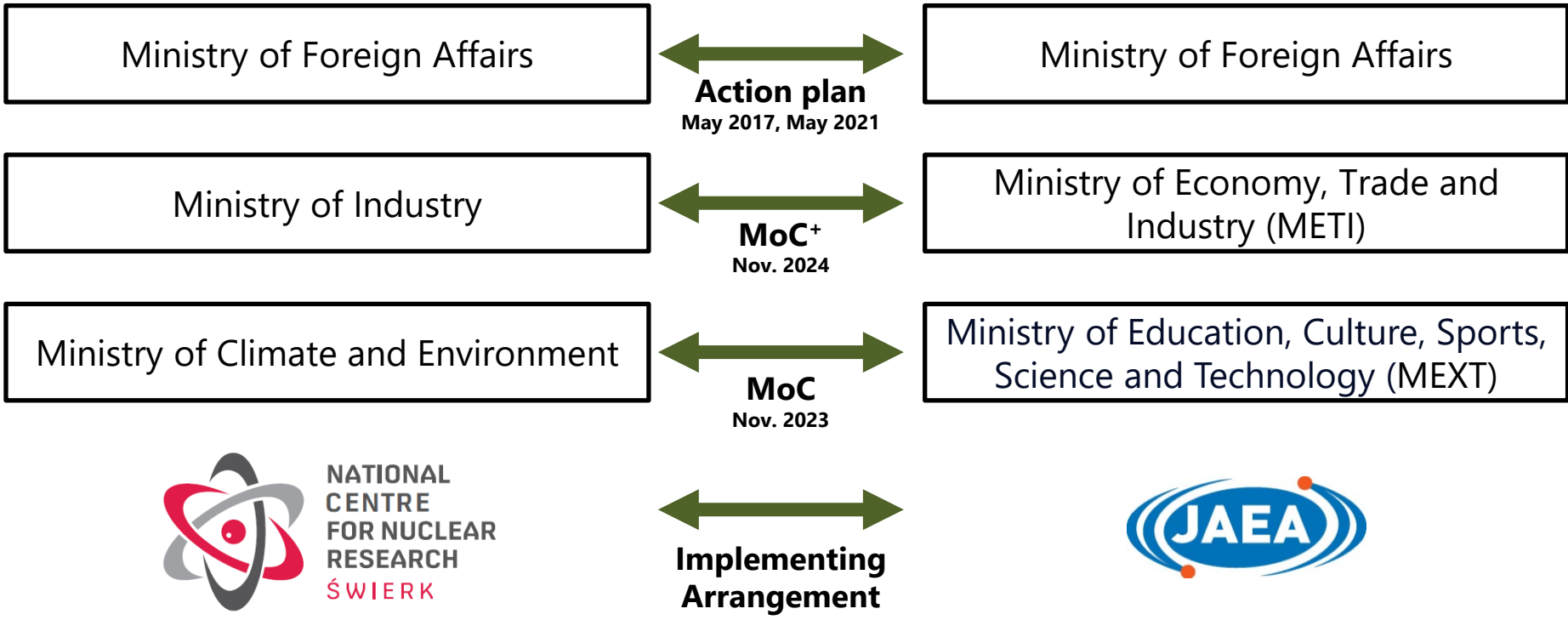


Steam methane reforming	High temperature steam electrolysis	Methane pyrolysis	IS process
<p>High temp. heat</p> <p>CH<sub>4</sub>, 2H<sub>2</sub>O</p> <p>Catalyst</p> <p>CO<sub>2</sub>, 4H<sub>2</sub></p>	<p>High temp. heat</p> <p>H<sub>2</sub>O</p> <p>&gt; 700°C</p> <p>O<sup>2-</sup></p> <p>H<sub>2</sub></p> <p>O<sub>2</sub></p>	<p>Catalyst</p> <p>CH<sub>4</sub></p> <p>High temp. heat</p> <p>&gt; 800°C</p> <p>2H<sub>2</sub></p> <p>C</p>	<p>High temp. heat</p> <p>800~900°C</p> <p>285 kJ/mol</p> <p>400~500°C</p> <p>107 kJ/mol</p> <p>106 kJ/mol</p> <p>285 kJ/mol</p> <p>Hydrogen iodide (HI) decomposition</p> <p>Sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) decomposition</p>
$\text{CH}_4 + 2\text{H}_2\text{O} \rightarrow \text{CO}_2 + 4\text{H}_2$	$\text{H}_2\text{O} \rightarrow \text{H}_2 + 1/2\text{O}_2$	$\text{CH}_4 \rightarrow 2\text{H}_2 + \text{C(s)}$	$\text{H}_2\text{O} \rightarrow \text{H}_2 + 1/2\text{O}_2$

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# **Japan-Poland Collaboration in HTGR Development**

# Japan-Poland collaboration on HTGR



Between MOFAs (May 2021)



Between MPR and METI (Nov. 2024)



Between MKiS and MEXT (Nov. 2023)



Between NCBJ and JAEA (Nov. 2022)

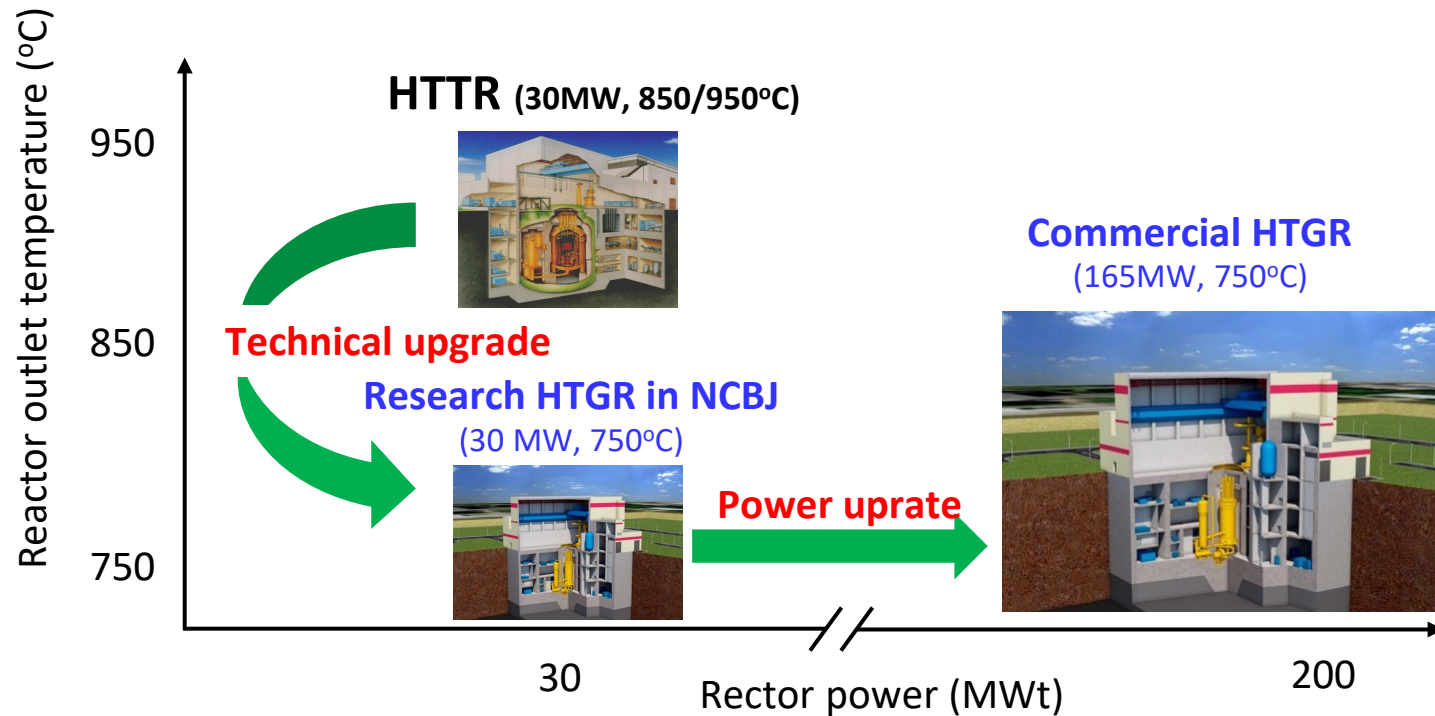
- May 2017: Signed "Memorandum of cooperation in the field of HTGR technologies"
- Sep. 2019: Signed "Implementing arrangement for cooperation in R&D in the field of HTGR technologies" (IA)
- Nov. 2022: Signed revised IA to include the collaboration on the basic design of the Research reactor in Poland

\*: Collaborating in seeking for potential of industrial diversified use of next-generation advanced reactors, such as encouraging practical discussions on non-electrical use of HTGRs among research institutes and private companies in both Japan and the Republic of Poland;

# HTGR Design by Japanese team for NCBJ

JAEA started the following works from 2018 with Japanese vendors (Toshiba ESS<sup>1</sup>, MHI<sup>2</sup>, Fuji Electric<sup>3</sup>, Obayashi<sup>4</sup>, IHI<sup>5</sup>, NFI<sup>6</sup>, Toyo Tanso<sup>7</sup>)

- Conceptual study on a 100 MWt-class commercial HTGR with steam supply system.
- Conceptual design and basic design on a research HTGR based on design, construction and operation experiences of HTTR.



1: Toshiba Energy Systems & Solutions Corporation. 2: Mitsubishi Heavy Industries, Ltd. 3: Fuji Electric Co., Ltd. 4: Obayashi Corporation  
 5: IHI Corporation 6: Nuclear Fuel Industries, Ltd. 7: TOYO TANSO CO., LTD.

Ref. H. Ohashi, et. al., A Conceptual Plant System Design Study of an Experimental HTGR upgraded from HTTR, Proc. of HTR 2018, Paper HTR 2018-104 (2018).



# Contract between NCBJ and JAEA on the basic design

CONTRACT #1: 22.11.2022 – 28.02.2023 About 4M PLN  
CONTRACT #2: 29.03.2023 – 31.03.2024 About 13M PLN

Technical workshop related to the contracts for the basic design of the Polish research HTGR

- 1<sup>st</sup> Feb. 2023 NCBJ experts in Japan
- 2<sup>nd</sup> Jun. 2023 NCBJ experts in Japan
- 3<sup>rd</sup> Aug. 2023 JAEA/Industry experts<sup>1</sup> in Poland
- 4<sup>th</sup> Nov. 2023 JAEA/Industry experts<sup>1</sup> in Poland
- 5<sup>th</sup> Feb. 2024 NCBJ experts in Japan
- 6<sup>th</sup> Mar. 2024 JAEA/Industry experts<sup>1</sup> in Poland<sup>2</sup>

1: Toshiba ESS and MHI (Fuji Electric and OBAYASHI by online)  
2: JAEA and Japanese industry experts visited to ORLEN with NCBJ to discuss about collaboration on HTGR and hydrogen production development

JAEA provided the information of the basic design to NCBJ.  
NCBJ is now preparing the technical report to the Polish Ministries.  
JAEA will support NCBJ to finalize the technical report.



1st WS in Japan (Feb. 2023)



2nd WS in Japan (Jun. 2023)



3rd WS in Poland (Aug. 2023)



4th WS in Poland (Nov. 2023)



5th WS in Japan (Feb. 2024)



6th WS in Poland (Mar. 2024)

- Oct 2016** Deputy Minister of Energy, Andrzej Piotrowski, visited HTTR. He requested future cooperation to MEXT and the President of JAEA.
- Nov 2016** Deputy Minister of Energy, Michał Kurtyka, visited HTTR. Agreed to prepare for the signing of a Memorandum of Cooperation on research cooperation in the future.
- May 2017** Ambassador Extraordinary and Plenipotentiary of the Republic of Poland to Japan, Jacek Izydorczyk, and JAEA Director, Miura, exchange information on HTGR cooperation
- May 2017** Foreign Ministers of Japan and Poland signed the **“Action Plan for the Implementation of the Strategic Partnership between the Government of Japan and the Government of the Republic of Poland”** for the period **2017-2020**.
  - In Economic, Science and Technology Cooperation, it is specified that cooperation between the Japan Atomic Energy Agency (JAEA) and the National Centre for Nuclear Research of Poland (NCBJ) for research and development of high temperature gas-cooled reactor technologies should be encouraged.
- May 2017** JAEA and NCBJ signed a **Memorandum of Cooperation on cooperation in the field of HTGR technologies under the Japan-Poland Action Plan**.



HTTR visit by Deputy Minister of Energy, Andrzej Piotrowski (October 2016).



HTTR Visit by Deputy Minister of Energy, Michał Kurtyka, in front of the primary cooling system of the HTTR, November 2016).

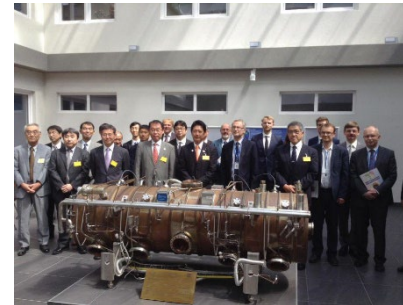


Ambassador of Poland to Japan, Jacek Izydorczyk, and JAEA Director, Miura, exchanged information on HTGR cooperation (May 2017).



Action plan was signed at the Japan-Poland Foreign Ministers' Meeting (May 2017).  
[www.mofa.go.jp/mofaj/press/release/press4\\_004624.html](http://www.mofa.go.jp/mofaj/press/release/press4_004624.html)

- June 2017** The 5th meeting of the HTGR Industry-Academia-Government Council was held. An overseas strategy working group was established under the HTGR Industry-Academia-Government Council.
- Jul 2017** Japanese delegation (MEXT, JAEA and industry) led by Parliamentary Vice-Minister for Education, Culture, Sports, Science and Technology Tanose visited Poland to discuss future HTGR cooperation with the Polish Ministry of Energy and NCBJ (Warsaw).
- July 2017** 1st JAEA-NCBJ Technical Meeting (Warsaw)
- Aug 2017** Two overseas strategy working groups were held, with MEXT, JAEA, industries and universities to develop an overseas deployment strategy for Japanese HTGR technology.
- Sept 2017** IAEA organises the HTGR side event at the 61st IAEA General Conference (Vienna)
- Sept 2017** 1st GEMINI+ project meeting (Warsaw)
- Oct 2017** Seminar on HTGRs organised by the JAEA Vienna Office (Vienna).
- Oct 2017** 2nd JAEA-NCBJ Technical Meeting (Warsaw)
- Dec 2017** Meeting of the Parliamentary Assembly for the Promotion of HTGRs



Japanese delegation (MEXT, JAEA and industry) visited Poland. Discussions with Polish Ministry of Energy and NCBJ on future HTGR cooperation (July 2017).



Director of Nuclear Energy Department, Ministry of Energy Poland, Jozef Sobolewski presented about the introduction of HTGRs in Poland contributing to an annual reduction of 14-17 million tonnes of CO<sub>2</sub>. (61st IAEA General Conference, September 2017)



Seminar on HTGRs organised by the JAEA Vienna Office. Poland, the UK, the USA and 15 other countries discussed the need for HTGRs to contribute to future CO<sub>2</sub> reduction (Oct 2017).

- Mar 2018** 3rd JAEA-NCBJ Technical Meeting (Warsaw)
- Apr 2018** 2nd GEMINI+ project meeting (Prague)
- Apr 2018** Meeting of the Parliamentary Assembly for the Promotion of HTGRs
- May 2018** JAEA Director Aoto was invited to a reception hosted by the Polish Ambassador to Japan (Tokyo).
- Jun 2018** 4th JAEA-NCBJ Technical Meeting (Warsaw)
- Aug 2018** 6th HTGR Industry-Academia-Government Council
- Aug 2018** NCBJ International Cooperation Manager, Prof. Grzegorz Wrochna, and Prof. Jacek Jagielski paid a Courtesy visit to the Oarai Town Hall. They proposed to Mayor of Oarai Town, Takaaki Kotani, a friendship city between Oarai Town and Otwock.



JAEA Director Aoto was invited to reception hosted by Polish Ambassador to Japan (May 2018).



6th HTGR Industry-Academia-Government Council (August 2018).



NCBJ International Cooperation Manager, Prof. Grzegorz Wrochna, and Prof. Jacek Jagielski visited the HTTR (Aug 2018).



NCBJ International Cooperation Manager, Prof. Grzegorz Wrochna, and Prof. Jacek Jagielski met Mayor of Oarai Town, Takaaki Kotani and proposed a friendship city between Oarai Town and Otwock. (Aug 2018).

**Aug 2018** **5th JAEA-NCBJ Technical Meeting** (Tokyo)

- The meeting was reported in several newspapers.

**Oct 2018** **International Conference on High Temperature Gas-cooled Reactors (HTR-2018)**, Warsaw

- NCBJ, MEXT, JAEA, industry and universities participated.
- More than 200 participants from all over the world.

**Oct 2018** **6th JAEA-NCBJ Technical Meeting** (Warsaw)

**Oct 2018** **JAEA visited to Otwock. Exchange information on the friendship city between Oarai Town and Otwock** (Otwock).

**Nov 2018** **Director of Nuclear Energy Department, Ministry of Energy Poland, Jozef Sobolewski, visited to Japan and met with Minister for Foreign Affairs Japan, Taro Kono.**

- Director Sobolewski requested Foreign Minister Kono to initiate cooperation on research and development of HTGRs between Japan and Poland.

**Nov2018** **3rd GEMINI+ project meeting**  
(Warsaw)



5th JAEA-NCBJ Technical Meeting (Tokyo, August 2018).  
[www.nikkan.co.jp/gnr\\_spaces/view/0014412](http://www.nikkan.co.jp/gnr_spaces/view/0014412)



International Conference on High Temperature Gas-cooled Reactors (HTR-2018, Warsaw, October 2018)



6th JAEA-NCBJ Technical Meeting (Warsaw, October 2018).



JAEA visited to Otwock. Information exchange on the friendship city between Oarai Town and Otwock (Otwock, October 2018).

**Jan 2019** **1st HTGR Seminar for human resource development co-organised by JAEA and NCBJ** (Warsaw)

- MEXT, Oarai Town, JAEA, Japanese industry and university.
- Total of 200 participants from NCBJ, Polish industry and universities

**Jan 2019** **Academic exchange agreement was signed between the University of Tokyo and NCBJ.** (Warsaw)

**Jan 2019** **Mayor of Otwock, Jarosław Margielski, and Mayor of Oarai Town, Takaaki Kotani, met in Otwock. Agreed to conclude friendship city in the next spring.**

**Jan 2019** **7th JAEA-NCBJ Technical Meeting** (Warsaw)

**Feb 2019** **The House of Representatives, Taido Tanose (Secretary-General of the Parliamentary Assembly for the Promotion of HTGRs), asked a question in the Diet regarding cooperation between Japan and Poland on HTGRs. Deputy Prime Minister, Taro Aso, replied that he would promote it.**

**May 2019** **Friendship city agreement between Oarai Town and Otwock was signed.** (Oarai)

**May 2019** **8th JAEA-NCBJ Technical Meeting** (Oarai)



The University of Tokyo and NCBJ signed an academic exchange agreement (Jan 2019).

[www.t.u-tokyo.ac.jp/foe/topics/setnws\\_201901291458192861033837.html](http://www.t.u-tokyo.ac.jp/foe/topics/setnws_201901291458192861033837.html)



Mayor of Otwock, Jarosław Margielski, and the Mayor of Oarai Town, Takaaki Kotani, met in Otwock (Jan 2019).



The House of Representatives, Taido Tanose (Secretary-General of the Parliamentary Assembly for the Promotion of HTGRs), asked a question in the Diet regarding cooperation between Japan and Poland on HTGRs. Deputy Prime Minister, Taro Aso, replied that he would promote it. (Feb 2019).

[www.tanose.com/date/2019/02/?cat=1](http://www.tanose.com/date/2019/02/?cat=1)



Signing ceremony of the friendship city agreement between Oarai Town and Otwock (May 2019).

[https://ibarakinews.jp/mobile/news.php?f\\_jun=15585263567056](https://ibarakinews.jp/mobile/news.php?f_jun=15585263567056)

- July 2019** **2nd HTGR Seminar for human resource development co-organised by JAEA and NCBJ** (Otwock).
- NCBJ, Polish industry and universities.  
A total of 130 participants
- July 2019** **9th JAEA-NCBJ Technical Meeting** (Otwock).
- Aug 2019** **Selected ten junior high school students from Oarai Town visited Otwock and engage in cultural exchange through homestays and other activities.**
- Sept 2019** **Plenary meeting of the Japanese company team for the collaboration with the Polish HTGR programme**
- Sept 2019** **63rd IAEA General Conference side event 'International deployment of SMRs based on Japanese HTGR technology and expectations from the international community', organised by JAEA** (Vienna)
- Attended by Mr Chihara, Deputy Director-General, MEXT (in charge of Research and Development Bureau); Mr Nagasawa, Director, International Nuclear Cooperation Promotion Office, Agency for Natural Resources and Energy, METI; and Mr Matsumoto, Director, International Nuclear Cooperation Office, MOFA.
  - Panellists: JAEA, MHI, Toshiba, NCBJ, Penultimate Power UK, USNC.



2nd HTGR Seminar for human resource development  
(July 2019, NCBJ Otwock)



Side event organised in the 63rd IAEA General Conference  
organized by JAEA  
(132 attendees) (Sept 2019)

**Sept 2019** JAEA and NCBJ signed the **'Implementing Arrangement for Cooperation in Research and Development in the Field of HTGR Technologies'**. (Otwock)

**Sept 2019** **IFNEC (International Framework for Nuclear Energy Cooperation), Nuclear energy beyond electricity** (Workshop on the use of heat from HTGR), Warsaw

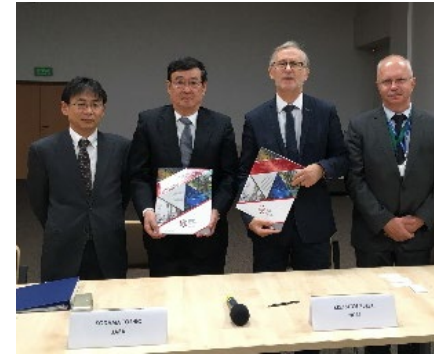
- Presented by Japan, China, UK, USA, Poland, Russia, GIF, IAEA, OEDE/NEA

**Nov 2019** **The Ministry of Energy was abolished and a new Ministry of Climate was established. The department responsible for nuclear policy is reorganised into the Ministry of Climate. Former Deputy Minister of the Ministry of Environment, Michał Kurtyka, was appointed to Minister of Climate.**

**Nov 2019** **The 3rd Overseas Strategy Working Group**

**Dec 2019** **10th JAEA-NCBJ Technical Meeting** (Otwock).

**Jan 2020** **Prime Minister, Mateusz Morawiecki, visited Japan. He requested Prime Minister Abe to cooperate with HTGR. Minister of Climate, Michał Kurtyka, Deputy Minister of Climate, Ireneusz Zyska, Deputy Minister of Science and Higher Education, Grzegorz Wrochna, visited HTTR. Public-private meetings between Japan and Poland was held.** (Tokyo, Oarai).



Signing ceremony of the JAEA-NCBJ Implementing Arrangement

(Otwock, September 2019).

From left to right: Kiyoura, Director of Atomic Energy Division, MEXT; Kodama, JAEA President; Kurek, NCBJ Director; Sobkowicz, NCBJ Deputy Director



Dialogue with Prime Minister Morawiecki (Embassy of the Republic of Poland in Tokyo, January 2020) From left, Director Aoto, Prime Minister Morawiecki and Deputy Head of Section Kunitomi.



Public-private meeting between Japan and Poland on HTGR development (January 2020, Tokyo)



Delegation of Minister of Climate, Michał Kurtyka, to visit the HTTR (January 2020, JAEA Oarai Research Institute).



**Oct 2020**     **3rd HTGR Seminar for human resource development co-organised by JAEA and NCBJ** (web).

- A total of about 180 participants from NCBJ, universities, etc.

**Mar 2021**     **11th JAEA-NCBJ Technical Meeting** (Web)

**May 2021**     **Foreign Ministers of Japan and Poland signed the “Action Plan for the Implementation of the Strategic Partnership between the Government of Japan and the Government of the Republic of Poland” for the period 2021-2025.**

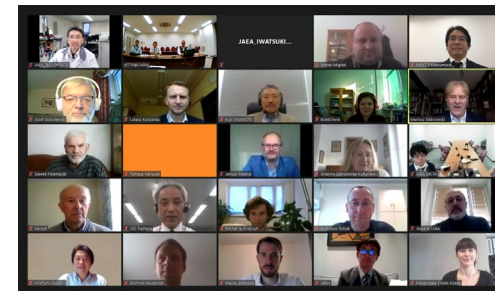
- In Economic, Science and Technology Cooperation, it is specified that cooperation between the Japan Atomic Energy Agency (JAEA) and the National Centre for Nuclear Research of Poland (NCBJ) for research and development of high temperature gas-cooled reactor technologies should be encouraged.

**Oct 2021**     **12th JAEA-NCBJ Technical Meeting** (Web)

**Jan 2022**     **4th HTGR Seminar for human resource development co-organised by JAEA and NCBJ** (web)

**Mar-Aug 2022**     **JAEA-NCBJ technical group meetings** (web, 14 meetings)

- Technical discussions for the start of cooperation on the basic design of the Polish research reactor.

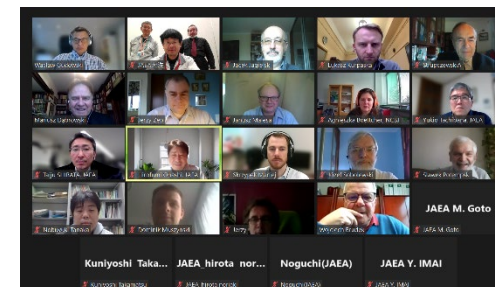


3rd HTGR Seminar for human resource development (October 2020, web).



Action plan was signed at the Japan-Poland Foreign Ministers' Meeting (May 2021).

[https://www.mofa.go.jp/mofaj/erp/c\\_see/pl/page4\\_005323.html](https://www.mofa.go.jp/mofaj/erp/c_see/pl/page4_005323.html)



4th HTGR Seminar for human resource development (January 2022, web).

**Nov 2022** JAEA and NCBJ signed the revised **'Implementing Arrangement for Cooperation in Research and Development in the Field of HTGR Technologies'**. (Tokyo)

**Nov 2022** JAEA and NCBJ signed **Contract for the basic design of the Polish research reactor #1**

**Feb 2023** **1st JAEA-NCBJ technical workshop on the basic design of the Polish research reactor** (Tokyo)

- 7 NCBJ specialists visited JAEA

**Feb 2023** **Contract for the basic design of the Polish research reactor #1 was completed.**

**Mar 2023** JAEA and NCBJ signed **Contract for the basic design of the Polish research reactor #2**

**Jun 2023** **2nd JAEA-NCBJ technical workshop** (Tokyo)

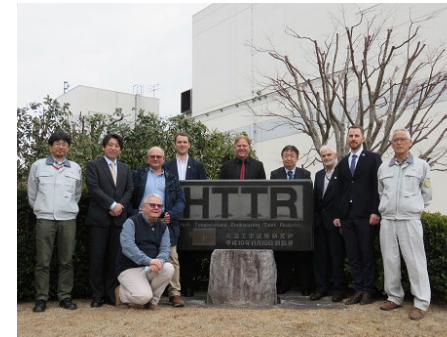
- 9 NCBJ specialists visited JAEA

**Aug 2023** **3rd JAEA-NCBJ technical workshop** (Poland)

- JAEA (3 people), Toshiba (2 people), MHI (1 person) visited NCBJ. 20 NCBJ specialists attended the workshop.



JAEA and NCBJ signed the Implementing Arrangement (November 2022).  
From left, NCBJ Director, Kurek, JAEA President, Koguchi



1st technical workshop on the basic design (Feb 2023, Japan)



2nd technical workshop on the basic design (Jun 2023, Japan)



3rd technical workshop on the basic design (Aug 2023, Poland)

**Aug 2023** **67th IAEA General Conference side event organised by JAEA** (Vienna)

- Introduction of programmes for the commercialisation of HTGRs in Japan, Poland and the UK; discussion on expectations for HTGRs from industry towards a hydrogen society.
- Panellists: JAEA, Japan Iron and Steel Federation, NCBJ (Poland), NNL (UK).



67<sup>th</sup> IAEA General Conference side event (panel discussion by NCBJ, UK NNL, Japan Iron and Steel Federation and JAEA (audience approx. 100))

**Nov 2023** **MEXT and Ministry of Climate and Environment signed a memorandum of cooperation on research and development in the field of HTGR technology.**

- Stable cooperation on research and development of HTGRs between the two countries



MEXT and Ministry of Climate and Environment signed a Memorandum of cooperation. (Nov 2023)

[https://www.mext.go.jp/b\\_menu/activity/detail/2023/20231116.html](https://www.mext.go.jp/b_menu/activity/detail/2023/20231116.html)

**Nov 2023** **4th JAEA-NCBJ technical workshop** (Poland)

- JAEA (4 people), Toshiba (2 people), MHI (2 people) visited NCBJ. 24 NCBJ specialists attended the workshop.

**Feb 2024** **5th JAEA-NCBJ technical workshop** (Tokyo)

- 10 NCBJ specialists visited JAEA
- NCBJ visited the HTGR fuel manufacturing facility at Nuclear Fuel Industries, Ltd. (Ibaraki Prefecture) and the graphite production facility at Toyo Tanso Co. Ltd. (Kagawa Prefecture).



4th technical workshop on the basic design (Nov. 2023, Poland)



5th technical workshop on the basic design (Feb 2024, Japan)

## Mar 2024 **6th JAEA-NCBJ technical workshop** (Poland)

- JAEA (5 people), Toshiba (2 people), MHI (1 person) visited NCBJ. 20 NCBJ specialists attended the workshop.
- JAEA and Japanese Industry visited the ORLEN Płoczk oil refinery to discuss about future cooperation.

## Mar 2024 **Contract for the basic design of the Polish research reactor #2 was completed.**



6th technical workshop on the basic design  
(Mar 2024, Poland)