



## Agenda for Side Event of 63rd IAEA GC organized by JAEA

10:00 - 11:30, Wednesday, 18 September 2019  
Room M7, M Building, Ground Floor, VIC

*The path to the global deployment of Small Modular Reactor (SMR) based on  
Japan's High Temperature Gas-cooled Reactor (HTGR) technology and the  
expectation from the global nuclear community  
-Toward forging international partnership-*

### Outline:

Japan Atomic Energy Agency (JAEA) has been performing R&D for SMR. HTGR design which Japan has developed as an SMR is mature enough for the near-term deployment. This side event aims to trigger off HTGR deployment plan through international partnership. Presentations and a panel discussion will focus on unique features of HTGR and what international collaborators can expect from the Japan's technologies.

### Agenda:

Moderator: Mr. N. Kobayashi, Director, JAEA Vienna Office

#### **10:00 Opening and Welcome Remarks**

Mr. T. Kodama	President, JAEA
Mr. D. Hahn	Director, Division of Nuclear Power, Department of Nuclear Energy, IAEA
Mr. Y. Chihara	Deputy Director General, Ministry of Education, Culture, Sports, Science and Technology, Japan
Mr. T. Nagasawa	Director, Office for International Nuclear Energy Cooperation, Office for Nuclear Technology and Human Resources, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, Japan
Mr. K. Matsumoto	Director, International Nuclear Cooperation Division, Disarmament, Non-Proliferation and Science Department, Ministry of Foreign Affairs, Japan

#### **10:15 Panel discussion - Deployment of HTGR as an SMR**

Moderator: Mr. N. Sakaba, Deputy Director, Strategy and Planning Office, Sector of Fast Reactor and Advanced Reactor Research and Development, JAEA

Presentations: 35 min

- HTGR development in Japan and excellent HTGR technology basis obtained from design, construction and operation of the HTTR
- Development experience through HTTR construction and future plan of the HTGR deployment
- Deployment activity in each country

Panel discussion: 30 min

- Requirement on HTGR for power generation and heat utilization, Expectation to Japan's HTGR technology, Attractive points and hurdles for HTGR deployment, etc.
- Possible cooperative R&D theme by using JAEA's facilities

Mr. K. Kunitomi	Deputy Director General, Sector of Fast Reactor and Advanced Reactor Research and Development, JAEA
Mr. J. Miyaguchi	Deputy General Manager, Nuclear Energy System Division, Power Systems, Mitsubishi Heavy Industries, Ltd.
Mr. H. Usui	Technology Executive, Toshiba Energy Systems & Solutions Corporation
Mr. G. Wrochna	International Cooperation Manager, National Centre for Nuclear Research (NCBJ), Poland
Ms. C. Whitmill	Managing Director, Penultimate Power UK Limited, UK
Mr. M. Richards	Senior Technical Advisor, Ultra Safe Nuclear Corporation, USA

#### **11:20 IAEA's activities on HTGR technology development, information dissemination and support to new-comer countries that wish to deploy nuclear power**

Mr. F. Reitsma	Team Leader (SMR Technology Development) Nuclear Power Technology Development Section, Division of Nuclear Power, Department of Nuclear Energy, IAEA
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#### **11:25 Closing Remarks**

Mr. T. Shibata	Group Leader, International Cooperation Group, Sector of Fast Reactor and Advanced Reactor Research and Development, JAEA
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#### **11:30 Reception**

## Various HTGR systems

**Hydrogen production system**

hydrogen

**GTHTR300C**

Fuel cell vehicles

Iron making

- Thermo-chemical water splitting process (IS process) or steam methane reforming process for hydrogen production

**High temperature steam for industry**

Process heat

Electricity

**HTR50S**

Chemical plant

- Process heat can be supplied to chemical plant, petroleum refining plant, etc. and power can be produced by steam turbine

**Hybrid system with renewable energy**

Constant power to grid

Hydrogen production

**GTHTR300C**

- Renewable power variation may be absorbed by simple and efficient load following of HTGR power and additional hydrogen cogeneration

**Multipurpose cogeneration**

Hydrogen, desalination, electricity, etc

**GTHTR300C**

hydrogen town

- Cogeneration (power generation, hydrogen production, desalination, etc.) can achieve 80% of heat utilization rate

## Japan's mature HTGR technologies; HTRR

**HTRR(High Temperature Engineering Test Reactor)**  
Graphite-moderated and helium-cooled VHTR

Fuel Rods

Graphite Block

Intermediate heat exchanger (IHx)

Reactor pressure vessel

Hot-gas duct

Containment vessel

**Major specification**

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

**First criticality : 1998**  
**Full power operation : 2001**  
**50 days continuous 950°C operation : 2010**  
**Loss of forced cooling test at 9MW : 2010**

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