

Report of the First Intermediate Check and Review on Fusion DEMO Reactor R&D (Summary)

On January 24, 2022, the Science and Technology Committee on Fusion Energy (hereafter, “*Committee*”) (Chairperson: Professor UEDA Yoshio from Osaka University) of the Council for Science and Technology issued the first Intermediate Check and Review Report on R&D for fusion prototype reactor "DEMO". The summary is as shown below.

Purpose

- The *Committee* analyzes the progress of R&D for fusion DEMO reactor in Japan and confirms the maturity level of technology for transition to the DEMO phase while taking into consideration the progress of investigation results by the Taskforce on DEMO Comprehensive Strategy (Taskforce) under the *Committee*.
- According to the *Committee documents*, the Intermediate Check and Review (CR) should be conducted twice before deciding the construction of DEMO. This is the first Intermediate Check and Review (CR1), and the second Intermediate Check and Review (CR2) is supposed to be conducted after the First Plasma is achieved by ITER (in 2025 or later).
- According to the *Committee documents*, the goals to be achieved at CR1 stage (the ultimate goal is to complete the basic conceptual design of DEMO) are established, and it is fundamental to confirm the progress in achieving the goals.

Summary of the goals to be achieved before CR1 (established by the *Committee* in December 2017)

- Basic conceptual design of DEMO
- Creation of a technical target achievement plan for ITER
- Establishment of manufacturing technologies for key components such as ITER superconducting coils

Main points in the Report

- The Taskforce confirmed the progress of R&D based on the “Action Plan for DEMO Development” formulated for the effective follow-up, and assessed that R&D until CR1 stage is progressing in general. Accordingly, the *Committee* confirmed the status and assessed that **the goals set up for CR1 have been achieved.**
- On the other hand, **actions to be taken for CR2** were listed. Main issues are shown below.
- There is an urgent need to **expedite the development of components for which Japan is responsible for procurement for ITER** in order to utilize them for future DEMO development.
- **Gaining essential technology** that is indispensable to achieve DEMO, i.e., fusion power generation, must be immediately addressed.
- Further investigation must be conducted to examine **whether the achievement of fusion power generation can be accelerated or not.** As the project moves forward, reconsideration of the goals to be achieved at CR2 must be conducted, and priorities in the R&D of DEMO must be re-examined. (After CR1 implementation, review must be carefully conducted for about a year taking into account the domestic and international situations.)
- A wide range of processes **from technical development to academic research** that are necessary for fusion energy must be addressed and **a wide range of human resources** that are necessary **must be fostered and secured.** Moreover, the tasks must steadily proceed while carefully gaining understanding from the society.
- It is important **to promote industry collaboration** by raising awareness of the importance of fusion energy and **to address the tasks with stakeholders from industry, government, and academia.**
- Discussions on **site location and safety must be deepened.**
- * This includes **issues that go beyond the considerations of the *Committee* and Taskforce.** The results of discussion in the *Committee* must be provided during future discussions with a wide variety of relative organizations and contribute to the deepening of discussions.