Fusion Energy Innovation Strategy

～Japan's First National Strategy for Fusion Energy～

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CAO (Cabinet Office) &

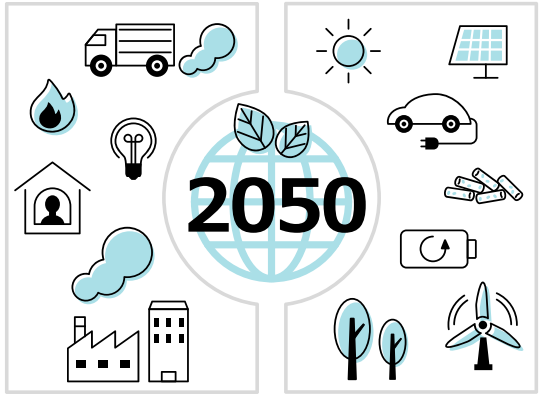
MEXT (Ministry of Education, Culture, Sports, Science and Technology)

Overview of Fusion Energy Innovation Strategy①

- ✓ **Seeing fusion energy as a new industry**, Japan will not miss the opportunity to **enter the burgeoning global fusion supply chain competition**.
- ✓ In addition to subsequent approach; the ITER Project/BA Activity, and DEMO development, Japan will accelerate the realization of fusion energy through a multifaceted approach such as commercialization.
- ✓ **Japan will establish Fusion Industry Council, support start-up and others' R&D, hold discussions on safety regulations, strengthen its support to emerging technologies, develop educational programs, etc**.

Fusion energy as a solution for energy and environmental problems

- Carbon neutrality by 2050
- International energy situation greatly impacted by Russia's aggression against Ukraine
- Ensuring energy security



- Benefits of fusion energy:

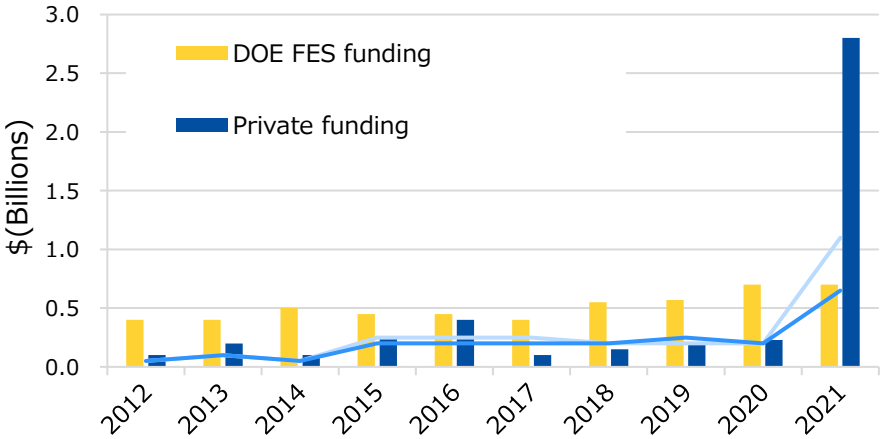
  ❶carbon neutral ❷abundant fuel supply

  ❸inherent safety ❹environmental protection

- Paradigm shift of energy hegemony from countries with resources to those with technology

Fusion energy as a new industry

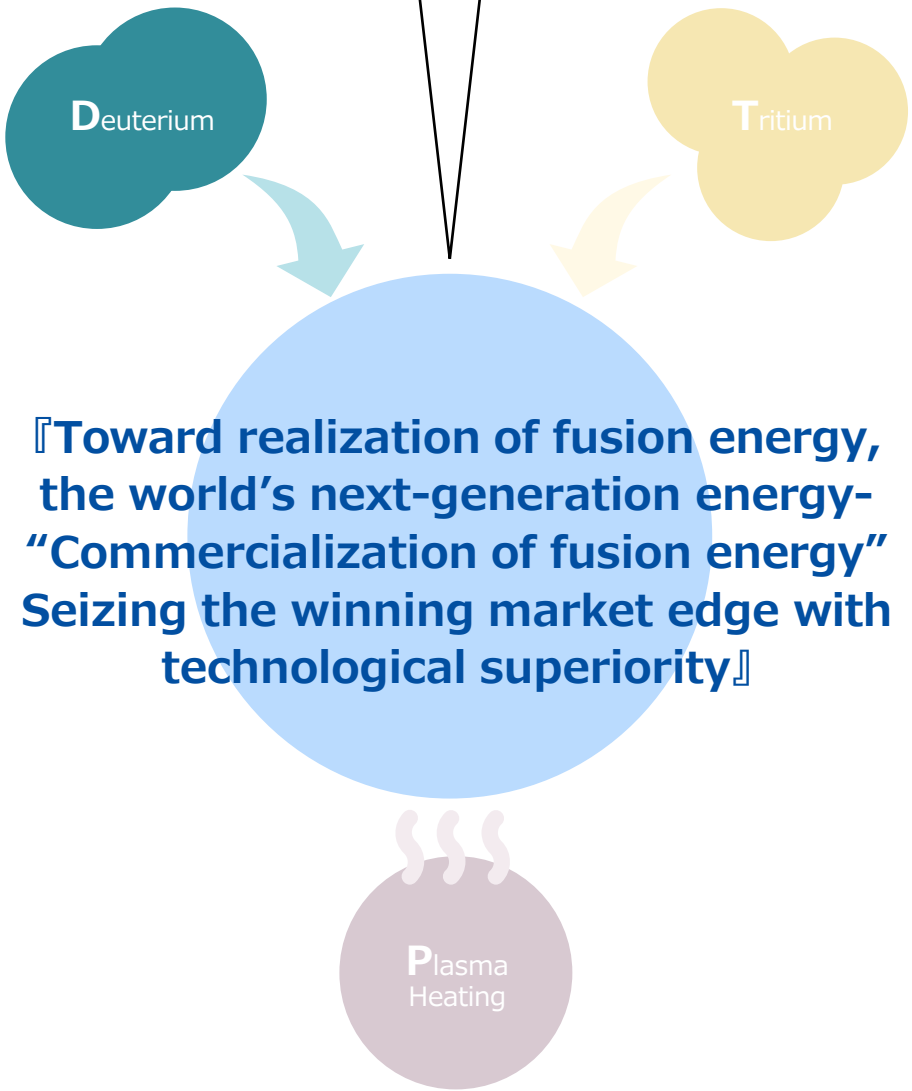
- Increased private-sector investment in fusion energy development in other countries
- US, UK have national strategies aiming at commercialization of fusion energy (starting confining technologies to own countries).
- Japan may win in technology but lose in business, although it has technological advantages and reliability.
- Japan is a strong partner for other countries; good chance to get overseas markets.



Reference : https://science.osti.gov/-/media/fes/pdf/fes-presentations/2022/Wurzel---PPP-Lighning-round-talk.pdf

Overview of Fusion Energy Innovation Strategy②

Achieving a national vision by : Developing industry + Technology strategy × Promotion



Developing the Fusion industry

Visualization

- Early realization of DEMO by accelerated R&D
- **Clarification of targets** with technology, market opportunity maps

Connections

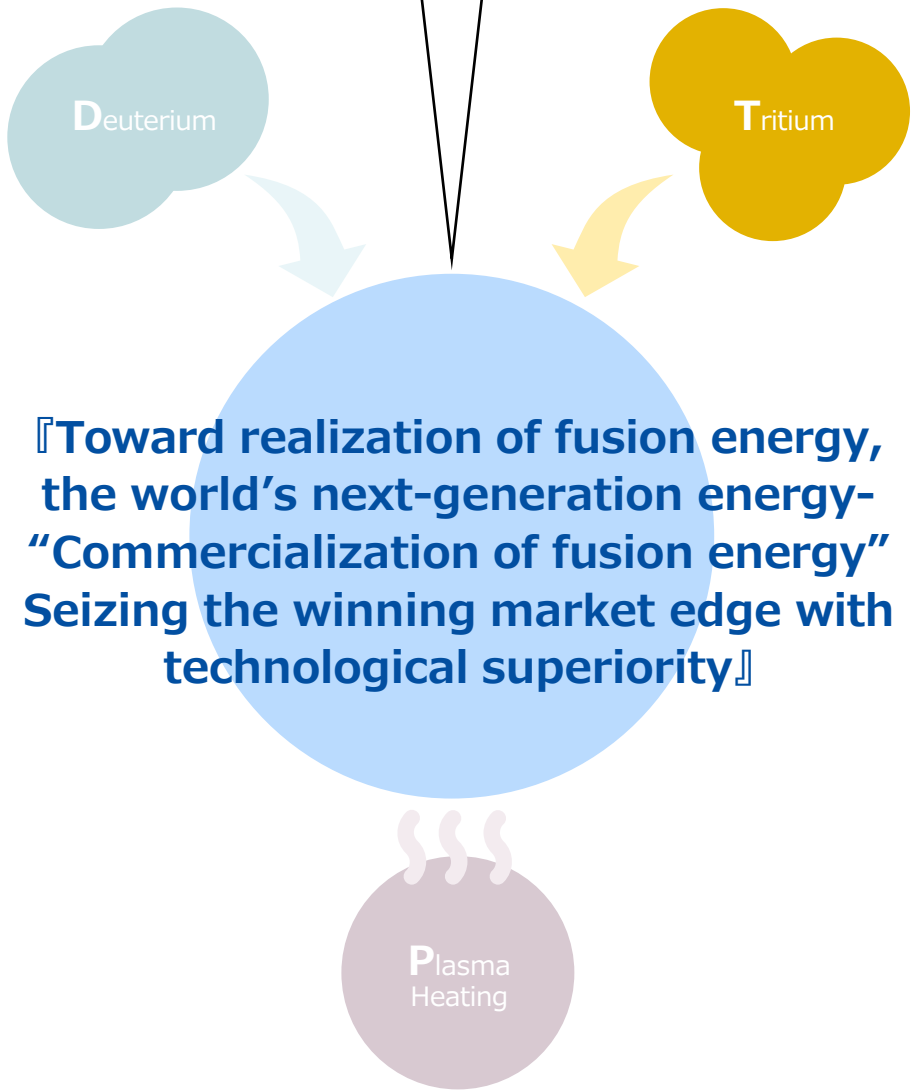
- Matching of companies by **establishment of Fusion Industry Council of Japan aiming at FY2023**

Fostering

- **Greater support to private companies from FY2023 for reducing gap between industry needs and technology seeds possessed**
- Participation in discussion between like-minded countries on safety regulations and standardization
- **Formulation of basic ideas on ensuring safety** based on inherent safety of fusion energy

Overview of Fusion Energy Innovation Strategy③

Achieving a national vision by : (D)eveloping industry + (T)echnology strategy × (P)romotion

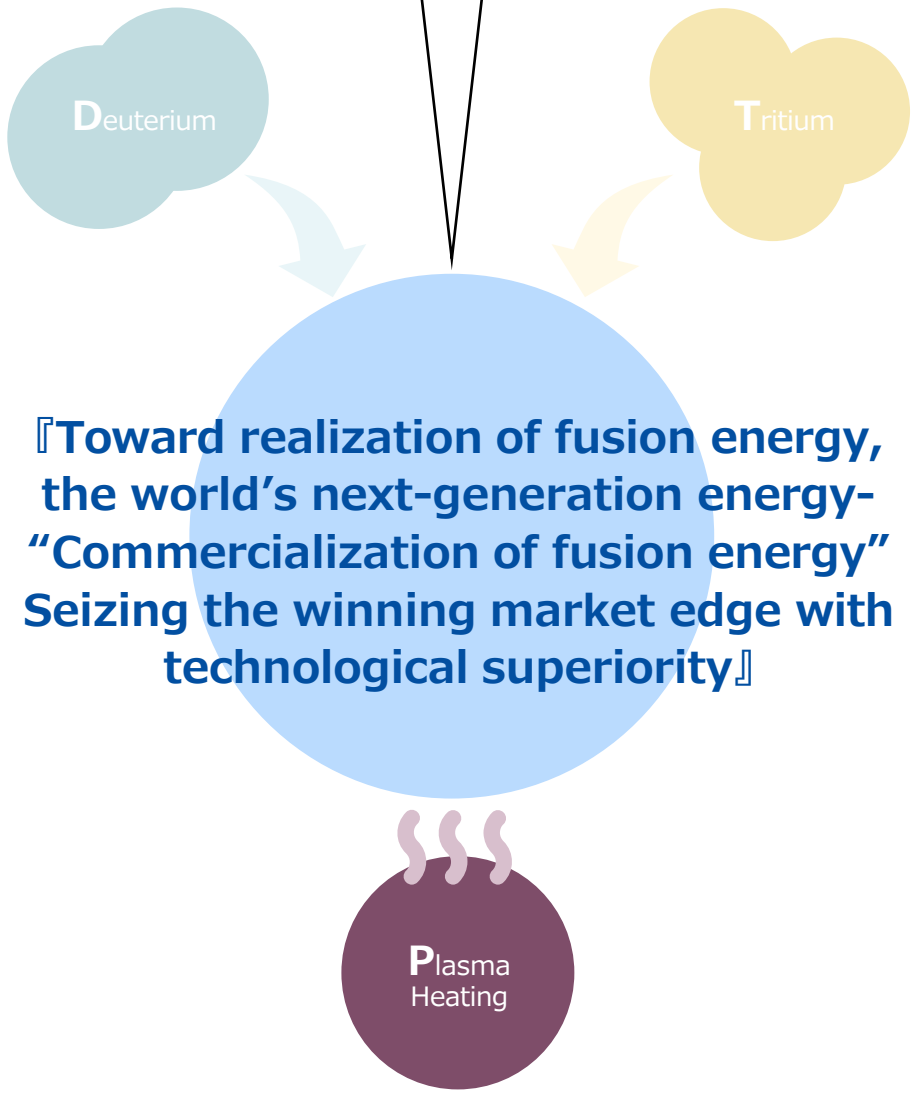


Developing Fusion Technology

- Enhanced support measures for emerging technologies such as **miniaturization and high-performance technologies** as a game-changer
- **Acquisition of key technologies** through ITER Project/BA Activity
- **Acceleration of R&D anticipating** future **development of DEMO**
- Promotion of academic research on fusion energy
- **Promotion of Action Plan** for DEMO development by incorporating new technologies

Overview of Fusion Energy Innovation Strategy④

Achieving a national vision by : Developing industry + Technology strategy × Promotion

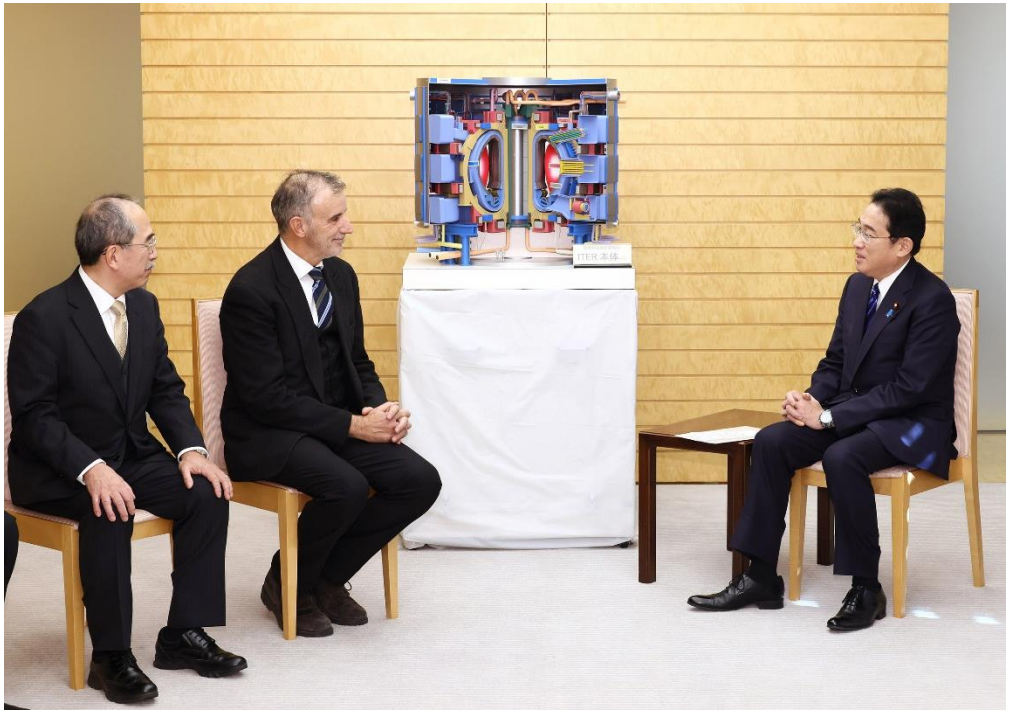


Framework for Promoting Fusion Energy Innovation Strategy

- With Cabinet Office as "control tower," advancing strategy together with relevant ministries, agencies
- Establishing framework for conducting R&D by bringing together, centering on QST, academia and private companies for DEMO development **(establishment of fusion technology innovation hub)**
- Clarifying future career paths, systematically fostering by industry-academia-government HR engaged in fusion energy
- Strengthening HR development at universities, acquiring excellent HR from other fields, countries **(provision of fusion energy educational programs)**
- Conducting outreach activities to deepen understanding of citizens

ITER Organization DG Barabaschi's Visit to Japan①

Remarks by Prime Minister Kishida at the meeting with IO-DG Barabaschi



I would like to extend my sincere congratulations on the achievement of the first plasma at the experimental fusion reactor JT-60SA.

In Japan, we are promoting the industrialization of fusion energy based on the "Fusion Energy Strategy" formulated in April.

We intend to accelerate our efforts toward the early realization of fusion energy by making maximum use of the technologies and human resources we have cultivated through the ITER Project, in collaboration with industry, and considering safety regulations.

at the Prime Minister's Office of Japan on 11/30, 2023

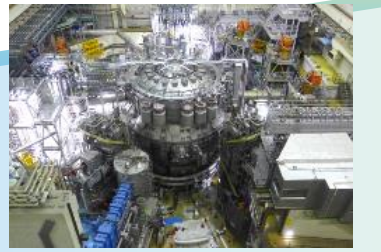
Toward the Realization of Fusion Energy

Current Stage

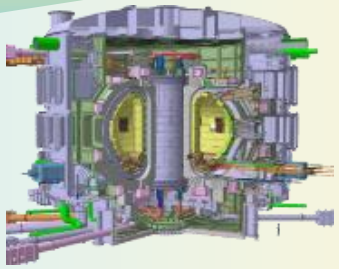
Scientific Feasibility → Scientific & Technological Feasibility → Technological Demonstration & Economic Feasibility → Practical

JT-60
(JAEA)

JT-60SA
(QST)



ITER
(ITER Organization)



JA-DEMO
Reactor

Mid 21st century
Practical goal

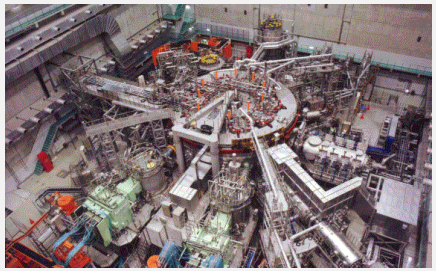
BA Activities

ITER Project

go-no-go decision
in 2030s

Academic Research

GEKKO XII, LFEX
(Osaka Univ.)



Large Helical Device (LHD)
(NIFS)

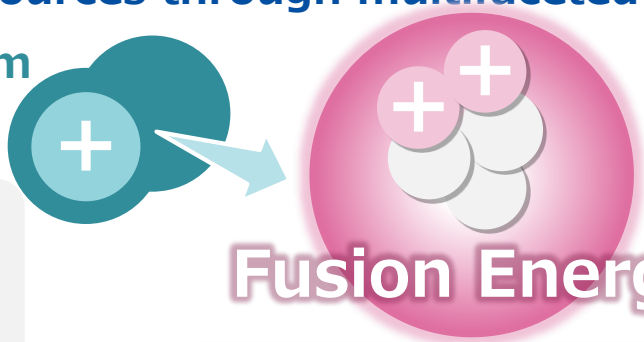
Moonshot Research and Development Program

MOONSHOT
RESEARCH & DEVELOPMENT PROGRAM

- **The government sets ambitious goals and concepts as Moonshot Goals.**
- **Opens call for domestic and foreign top-class researchers as Project Managers.**
- **The Japanese government has decided to add another Moonshot Goal regarding Fusion Energy in 2023 and the open call will start in March.**

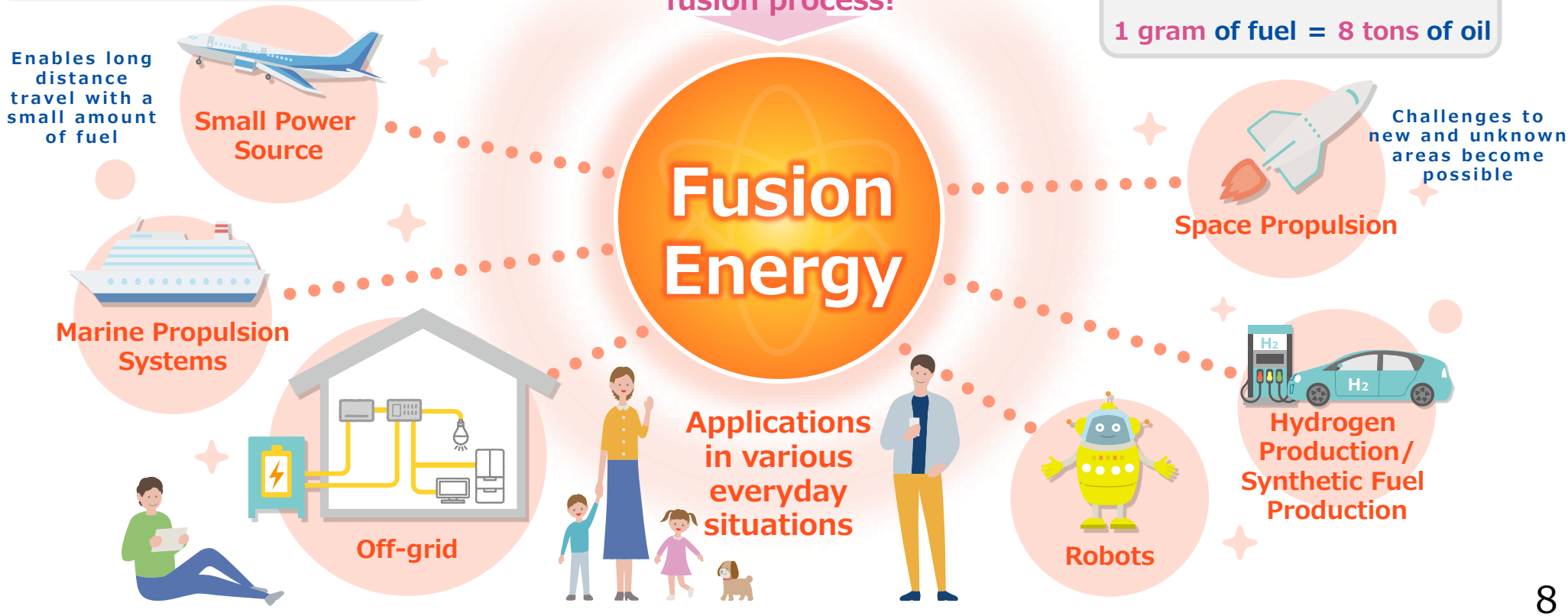
The new goal of Moonshot R&D Program for Fusion Energy

Realization of a vibrant society in harmony with the global environment and in being free from constraints on resources through multifaceted utilization of fusion energy by 2050.



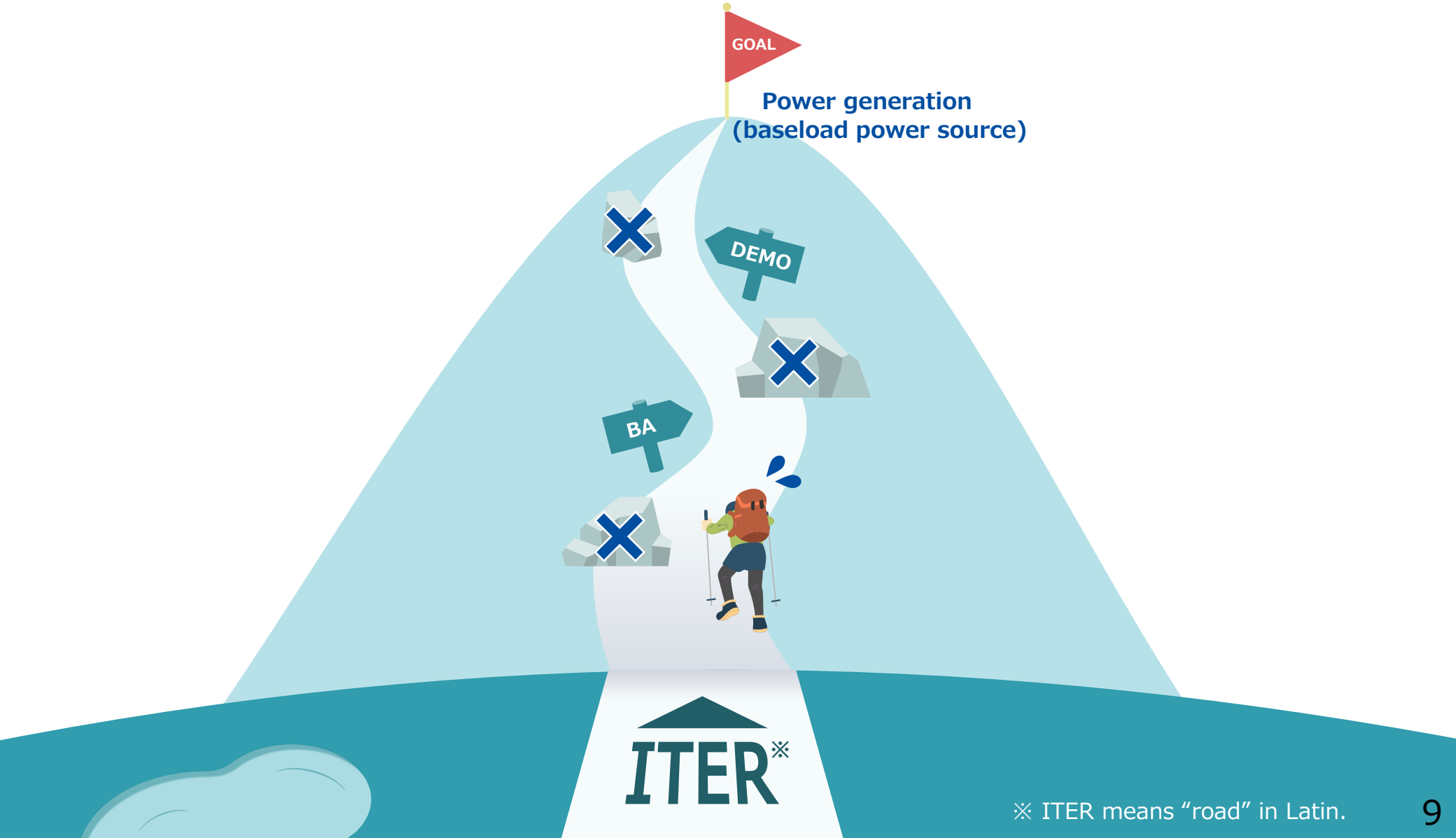
Fusion Energy
Energy released when light nuclei (deuterium and tritium) fuse into another nucleus (helium). It is also the energy that makes the sun and stars shine.

Fusion energy is generated by the fusion process!



Without Cooperation with the Moonshot R&D Program

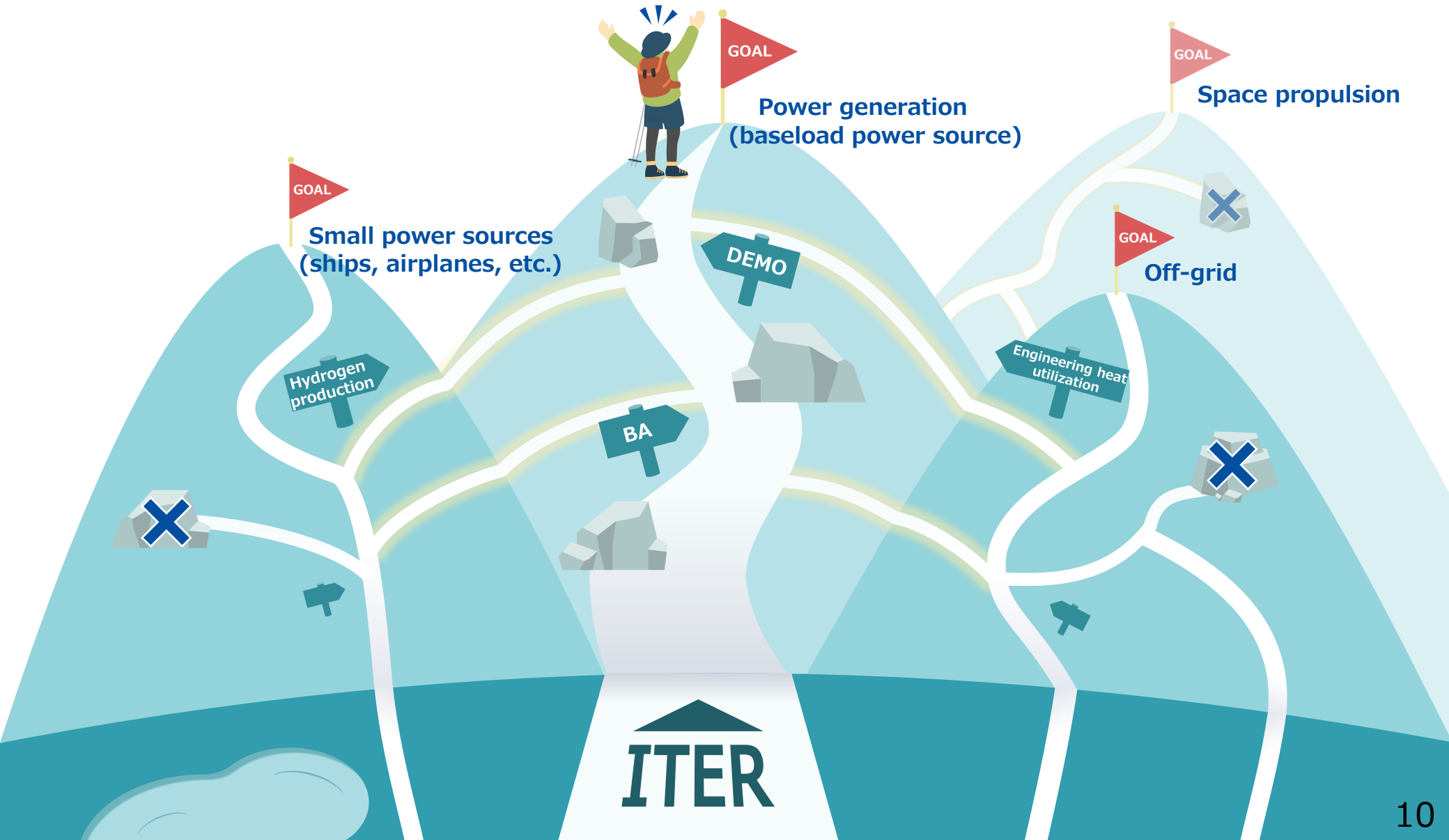
When difficulties arise along the path from ITER※/BA/DEMO to power generation, social implementation will be delayed due to lack of alternatives.



※ ITER means “road” in Latin.

When Collaborating with Moonshot R&D Program

Research aimed at innovative social implementation can create results ahead of time to better secure the path from ITER/BA/DEMO to power generation.



Summary (for the Commercialization of fusion energy)

Achieving a national vision by : (D)eveloping industry + (T)echnology strategy × (P)romotion

1 Establishment of the Fusion Industry Council of Japan

✓ Encouraging private companies, including start-ups, to create ecosystem

2 Enhanced support measures for emerging technologies

✓ Potential of Moonshot R&D, Promotion of academic research on fusion energy

3 The Importance of International Collaboration

✓ Strengthening multilateral and bilateral cooperation, including ITER/BA Activity

Policy Speech by Prime Minister Kishida to the 213th Session of the Diet, January 30, 2024

Taking a medium- to long-term view, we will undertake initiatives in biotechnology, quantum technology, and **fusion energy**, among other technologies, while promoting investment and pursuing regulatory reforms.