

**Summary of
“White Paper on Nuclear Energy 2019”
published in 2020**

Japan Atomic Energy Commission



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The White Paper consists of the Special Report and Chapters (Chapters 1 to 8) following the outline of the “Basic Policy for Nuclear Energy approved by the Cabinet in July 2017,” and was edited through collaboration with the related ministries.

[Special Report]: Development of human resources who will play an active role in the nuclear field

This report **outlines human resource development policies** carried out by foreign governments, research institutes and industrial circles who have pursued the use of nuclear energy, and summarizes useful information to be referred to in future efforts in Japan.

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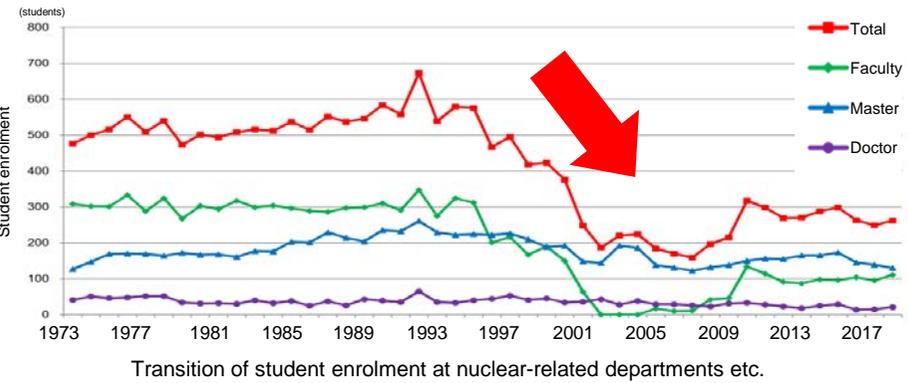
* In addition to “human resource development,” described in the Special Report, the course of direction of R&D and efforts to build a knowledge base through collaboration with the relevant institutes are also described.

Special Report: Development of human resources who will play an active role in the nuclear field

- ◆ To **maintain and further develop the nuclear utilization in Japan**, it is necessary to **secure and develop human resources** who will be engaged in nuclear field, while securing its safety.
- ◆ **It is important to build a virtuous cycle where excellent human resources are produced**, through **role sharing and collaboration among the sectors related to the field**, while learning good practices in Japan and abroad.

Present state in Japan

- **Good practices at universities**
 - ✓ Education through collaboration across different levels ranging from faculties to graduate schools
 - ✓ Strengthening of collaboration between nuclear-related and radiation-related teachers, etc.
- **Problems and required efforts**
 - ✓ Increasing international presence of research and education
 - ✓ Coping with decreased popularity of nuclear-related faculties among students, and productive education in these faculties
 - ✓ Succession of experience and knowledge through work, etc.



Efforts made in overseas countries

- ✓ Analyzing case examples of efforts, made by universities and governments in the United States and Europe, for human resource development

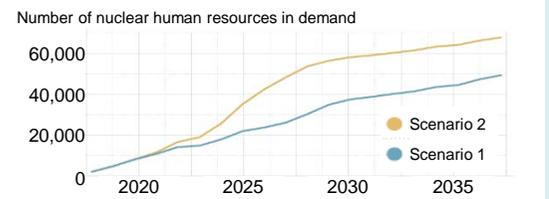
[United States]
Supports nuclear education and facility renovation at universities using the Nuclear Energy University Program (NEUP), etc.

[France]
Has established a hub body (I2EN), which consolidates educational programs provided in the country, with collaboration between industrial, governmental and academic stakeholders.



Promotion of human resource development through industry-government-academia collaboration

[United Kingdom]
Working on efforts for predicting, analyzing and responding to the demand for nuclear human resources in the future for each nuclear energy output scenario, while centering on the industrial circles.



Examples of course of direction for efforts to be made in the future

- 1 Increasing the international presence** of research and education, **maintaining/strengthening nuclear education** at universities, and developing human resources after graduating from universities
- 2 Attractive publicity** of nuclear energy to the public, including students
- 3 Improving the quality of education with collaboration between industrial circles, national research institutes and universities**

Chapter 1: Steady reconstruction and revival of Fukushima, and tireless safety improvement with lessons seriously learned

- Introduces efforts related to **measures to cope with radiation effects** (e.g., efforts such as response to the situation in the evacuation order zones and food products, steady progress of decontamination and waste treatment, and a verification project for volume reduction and recycling of removed soil, etc.) toward the reconstruction and revival of Fukushima.
- Introduces tireless efforts for safety improvement and prevention of severe accidents, such as the **voluntary and continuous safety enhancement activities** by nuclear operators, and a future course of direction.
- Introduces various efforts such as those to strengthen a framework related to nuclear emergency responses, local nuclear emergency preparedness, conducting comprehensive nuclear emergency drills and environmental radiation monitoring, based on the lessons learned from the accident.

Chapter 2: Nuclear energy use addressing global warming issues and people's livelihood and the economy

- Promotes the use of nuclear energy while considering **issues such as coping with the global warming, and stable supply of energy, on the premise of securing safety.**
- Introduces **reports of international bodies on the effectiveness of nuclear energy**, such as **substantial contribution to the reduction of greenhouse gas emissions**, and efforts made in overseas countries.
- Introduces **efforts to complete construction of facilities such as the Rokkasho reprocessing plant.**

Focused efforts in the nuclear utilization in Japan and their courses of direction [Chapters 3 to 6]

Chapter 3: Efforts at home and overseas in the global context

- Describes recent situation in major nuclear power generating countries and international bodies (e.g., IAEA, OECD/NEA). Also mentions the **current international cooperation and collaboration** between Japan and other countries.

Chapter 4: Peaceful use, non-proliferation, and ensuring nuclear security

- On July 31, 2018, Japan Atomic Energy Commission released the “**Basic Principles on Japan’s Utilization of Plutonium.**”
- The “Principles” specifies matters such as **a policy for reducing plutonium stockpiles** under the principle of “**not possessing plutonium without specific purpose.**”
- The total amount of separated plutonium in Japan was **approximately 45.5 tons** as of the **end of 2019.**

				As of end of 2019
Total amount (in Japan + abroad)				Approx. 45.5 t
Break-down	In Japan			Approx. 8.9 t
	Abroad	(Total amount)		Approx. 36.6 t
		Break-down	United Kingdom	
		France		Approx. 15.4 t

Chapter 5: Rebuilding public trust as a precondition for using nuclear energy

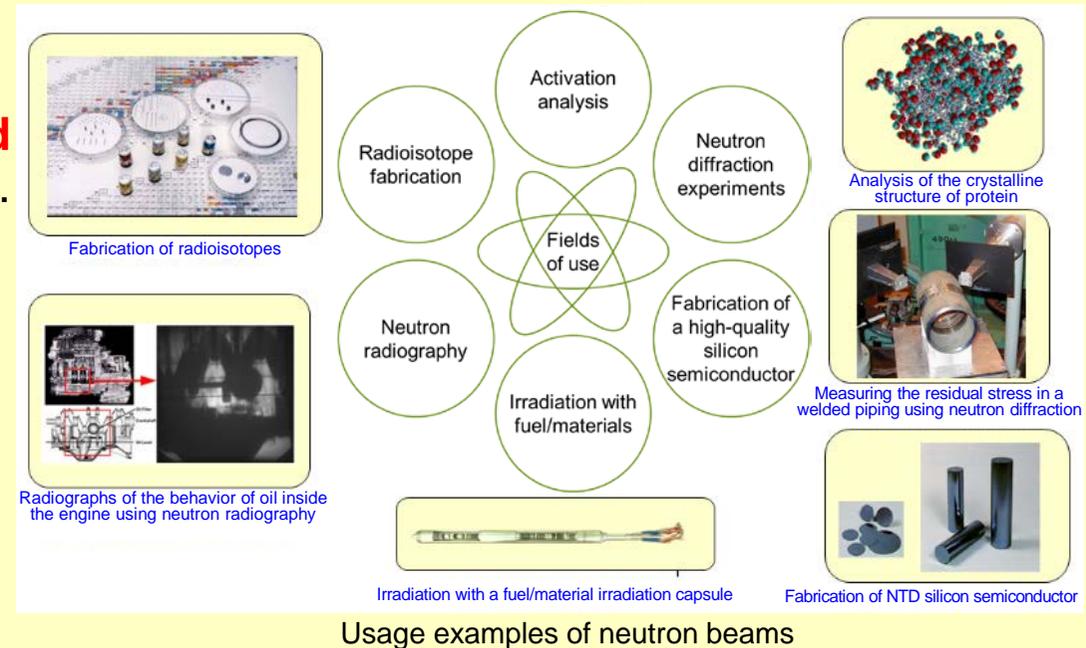
- It is essential **to improve an environment** where the public can deepen their understanding and **form opinions** based on scientifically accurate information and objective facts or grounds. This chapter introduces efforts made in Japan and abroad.

Chapter 6: Decommissioning and the management of radioactive waste

- Introduces the progress of the decommissioning of TEPCO’s Fukushima Daiichi Nuclear Power Station, and a basic policy for the decommission of commercial nuclear facilities etc.
- Describes efforts for the treatment/disposal of low-level radioactive waste and geological disposal of high-level radioactive waste.

Chapter 7: Promoting the utilization of radiation and radioisotopes

- The use of radiation and radioisotopes shares a common foundation with the use of nuclear energy. **Radiation and radioisotopes are used in a broad range of fields, and deeply related to people's lives.**
- The business scale of the use of radiation has expanded in the past decade, **especially in the fields of healthcare and medical science.**
- This chapter introduces the efforts of the Japanese Society for Neutron Science, the state of the development of a compact accelerator, and the present state of synchrotron radiation facilities, etc.



Chapter 8: Strengthening the foundation for using nuclear energy

- Mentions the importance of a foundation buildup for knowledge in collaboration with nuclear-related institutes, and **the necessity of reforming the core R&D organization** to strengthen the foundation for the use of nuclear energy in Japan as a whole and its international competitiveness.
- Concerning the strengthening of the basic foundation and the pursuit of nuclear innovations, the chapter introduces **efforts intended to promote continuous innovations from basic research to practical use** in close and substantive collaboration between entities involved in the development at the related ministries/agencies based on JAEC's "**Basic Policy for Nuclear Research and Development.**"
- It also describes matters such as the present state of R&D of nuclear energy in the light of basic/fundamental research.