

# **Iran and North Korea: Japan must Take the Initiative in the Peaceful Use of Nuclear Power**

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## **1. Discussions with High-Level Iranian Government Officials**

Dialogs have been held with Iran concerning projects which the Sasakawa Peace Foundation has put efforts into. I myself have also visited Tehran on 10 occasions over the past three years. Following the establishment of the Joint Comprehensive Plan of Action (JCPOA) in 2015 and the lifting of sanctions during the following year, European and Japanese firms have competed with one another to start up investment in Iran once again. However, with the electoral victory of President Donald Trump who opposed this agreement, the attitude of the companies involved has shifted towards a wait-and-see position, and following the withdrawal of the United States from the JCPOA in May 2018 and the decision to resume sanctions, one company after another has withdrawn from their investments. Once oil exports from Iran have been suspended in November, Iran from its own perspective will have no means of earning foreign currency and will therefore no longer have any reason to remain in the JCPOA. The moderate government under Hassan Rouhani has indicated that it is prepared to stay inside the JCPOA while the EU is holding negotiations with the United States, but given the pressure that the Iranian government is under from conservative religious forces, it is entirely possible that the government will cave to such pressure and that Iran itself will withdraw from the agreement. The withdrawal of Iran from the JCPOA will mean that Iran restarts its development of nuclear weapons and will increase the risk that Israel, a country which has stood firmly against such developments in Iran, could be incited to launch strikes on Iran's nuclear facilities. Should this come to pass, the Persian Gulf will be engulfed in a state of conflict that will make it impossible for oil tankers to approach the region, bringing about a situation similar to a blockage of the Strait of Hormuz. Such a scenario would truly be a nightmare. The words that I once heard from a high-ranking Iranian official have remained in my mind: "Iran wants to be the friend of Japan, Germany, India and Brazil." These four countries are nations which wish to become permanent members of the United Nations (UN) Security Council, but which all face political difficulties due to other countries which oppose their accession. Iran does not wish to become of the "five great nuclear powers" with nuclear weapons, but rather desires to be recognized as a power occupying the second tier. When I asked "So, if that is the case, does that mean that the experience of Japan, a country which has devoted itself to the peaceful use of nuclear power, can serve as a model for Iran?" I received the reply, "That is exactly it. I believe that by halting its own nuclear development and devoting itself to the peaceful use of nuclear power, the

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JCPOA has given Iran a ‘reprieve’ of 10 or 15 years, allowing us to win the world’s trust.”

## **2. The Inequality of the Nuclear Non-Proliferation Regime**

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), a nonproliferation treaty which was inaugurated in 1970, is an unequal treaty which makes a clear distinction between nuclear weapon states and non-nuclear weapon states. It prevents the proliferation of nuclear weapons by banning countries other than the United States, Russia, China, France and the United Kingdom from arming themselves with such weapons. Non-nuclear weapon states have the right to make peaceful use of nuclear power but face strict restrictions on activities such as uranium enrichment and plutonium reprocessing. The organization in charge of enforcing these regulations is the International Atomic Energy Agency (IAEA), headquartered in Vienna; Japan has gone to great lengths to cooperate with the IAEA, including undergoing inspections and covering costs associated with the organization. The selection of Yukiya Amano as Director General of the IAEA attests to the world’s recognition of Japan as a country which has devoted itself to the peaceful use of nuclear power. Furthermore, Japan enjoys the special privilege of being the only non-nuclear weapon state that is permitted to reprocess spent nuclear fuel and make use of plutonium. This privilege forms the core of the Agreement for Cooperation Between the Government of the United States of America and the Government of Japan Concerning Peaceful Uses of Nuclear Energy. However, even though Japan is permitted to undertake reprocessing of fuel in this manner, this does not mean that it has carte blanche concerning the use of plutonium. Japan possesses 47 tons of unused plutonium, including some which is stored in the UK and France, but has made little progress in the use of plutonium in light-water reactors (known as the “plu-thermal program”); this has led to suspicions among US advocates of nuclear non-proliferation that Japan intends to arm itself with nuclear weapons. Looking at history, we have seen the development of a domino effect when a country wishes to be treated equally as a nuclear weapon state and attempts to ensure this by arming itself with nuclear weapons. Russia possesses nuclear weapons in opposition to the United States, while China, France and the United Kingdom possess such weapons in opposition to the US and Russia. In addition to these “five great nuclear powers,” India, Pakistan and Israel possess nuclear weapons, and it is highly likely that North Korea has become a ninth state recently. Iran is suspected of intending to possess nuclear weapons in opposition to Israel. Should Iran possess nuclear weapons, it is likely that Saudi Arabia will do the same. The Middle East, a part of the world which has become increasingly unstable in the wake of the policies towards Saudi Arabia and Israel pursued by the Trump administration, is the region most likely to experience a domino effect in terms of nuclear weapon development. Unfortunately, it is evident that the current NPT framework is not fully functional to stop proliferation. Meanwhile, although there are more than 50 countries across the world which possess the capabilities to develop nuclear weapons, there are only nine countries which actually have nuclear weapons. Even if a country possesses nuclear weapons, the cost performance for these weapons is not necessarily good: the costs of developing such weapons are high, while maintenance is also a difficult task. When neighboring countries

become beset with doubts about one another, this can give rise to an alarming vicious cycle in the form of a nuclear arms race. Nuclear weapons have never been used anywhere other than in Hiroshima and Nagasaki. If a country were to make use of nuclear weapons, the international outrage which would greet such an act would be phenomenal. Paying high costs for something that cannot be used is an absurdity. Here lies a role for Japan, a country which has devoted itself to the peaceful use of nuclear power.

### **3. Non-Proliferation-Oriented Nuclear Reactors**

The light-water reactors which are currently the main type in use throughout the world have been converted from military technology. The power behind nuclear submarines consists of a light-water reactor which uses water as a coolant. The uranium fuel used in light-water reactors needs to be converted into low-enriched uranium; however, should it be converted into highly enriched uranium, this can serve as fuel for Hiroshima-type atomic bombs. Meanwhile, plutonium reprocessed from spent fuels can serve as a fuel for Nagasaki-type atomic bombs. There are many other types of next-generation nuclear reactors which feature improved functions in terms of safety and preventing nuclear proliferation. One of these is an American fast reactor cooled by liquid sodium, known as the Integral Fast Reactor (IFR). The characteristics of sodium make this type of technology unsuitable for use in submarines, but the enrichment of uranium fuel is unnecessary except for the initial loading fuel. Station blackout tests which were identical with the conditions of the Fukushima accident were carried out at the Experimental Breeder Reactor-II (EBR-II) (a national laboratory in Idaho in the United States) in 1976 to verify the passive safety of the reactor. Unlike the Plutonium Uranium Extraction (PUREX) process which was developed to allow chemical extraction of pure plutonium (for use in nuclear weapons) using nitric acid, the IFR uses pyroprocessing, in which plutonium and transuranium elements with high radioactivity are simultaneously extracted using electrolytic processing, which makes it harder to extract pure plutonium. Furthermore, since the reprocessing facilities and nuclear reactor are contained within the same location forming a closed system, it is difficult for terrorists to seize plutonium during transportation. Collaborative research concerning these reactors between Japan and the United States has begun in recent times, while joint research into this kind of reactor is also making progress between the United States and South Korea, based on the US-Republic of Korea Agreement for Peaceful Nuclear Cooperation. I hope that this kind of reactor will become a key asset in the development of nuclear systems without nuclear proliferation. I believe that Japan, the United States and South Korea should collaborate and invite like-minded countries into the development of technologies of this kind, wishing to engage in the peaceful use of nuclear power, and giving up weapon development. I would welcome the inclusion of North Korea and Iran. There is another proposal that could be made to North Korea: I wonder if it might be possible to propose Japan-North Korea negotiations aimed at Japan taking on the 40kg of plutonium that is held by North Korea and incinerating this as part of Japan's plu-thermal program or in small fast reactors. If 47 tons of plutonium are to be combusted in any case, the addition of 40kg or so to this amount is

no great matter. Combustion of weapons-grade plutonium in a Japanese reactor would be a robust contribution towards establishing peace. Japan can also be directly involved in the North Korean denuclearization process. Although there is no likelihood that the United States, Russia or China will abandon nuclear weapons, Japan could put forward proposals to France, UK and India in which, following the relinquishing of their weapons, progress could be made with developing proliferation resistant small fast reactors and at establishing a new nuclear non-proliferation framework. Then, if Japan could bring in pairs of countries which are locked in opposition with each other such as North & South Korea and Japan, or Iran and Saudi Arabia, or India and Pakistan, and can work in cooperation with the IAEA to create a framework for rigorously verifying the abandonment of nuclear development in both members of each pair, this could become a foundation of trust in a new NPT. At this point, Japan could perhaps ratify the Treaty on the Prohibition of Nuclear Weapons. As a country which is the only nation ever to have been the victim of nuclear weapons and which nevertheless chooses not to possess such weapons itself, Japan has the chance of seizing leadership in the field of re-establishing a new nuclear non-proliferation framework together with other non-nuclear weapon states, and of developing innovative diplomacy which sets out a course distinct from that of the United States, Russia and China (which are all nuclear weapon states).

#### **4. The Future of Nuclear Power**

According to the World Energy Outlook 2017 by the International Energy Agency (IEA), solar power will be the cheapest new electric power source in most countries by 2040. Since the Fukushima incident, the costs of large-scale light-water reactors have risen due to additional safety countermeasures, and it is unlikely that large nuclear power system will compete against combinations of natural energy sources and batteries which are rapidly going down in price. The type of nuclear reactor that is most likely to survive is the small modular reactor (SMR). As power output from SMRs can be readily adjusted, such reactors coexist easily with renewable energy (for which fluctuations in output are a weak point). In addition, with small fast reactors such as the IFR, the radiotoxicity of waste declines relatively quickly to the level of natural uranium (300 years as opposed to 300,000 in case of spent fuel from LWRs). This should make it much easier to find disposal sites for high-level radioactive waste. Such plants can also be used for processing melt-downed debris from the Fukushima Daiichi Nuclear Power Plant. Given the nature of these plants—small-scale and safe reactors based on the “local production for local consumption” model—Japan should surely form a coalition of like-minded countries across the world aimed at pursuing the development of this technology. Meanwhile, there are ways for countries to possess deterrence capacities that do not depend upon nuclear weapons. A question mark has appeared as to whether the United States will maintain extended nuclear deterrence, due to the “America First” policies pursued by the Trump administration. Should nuclear submarines be equipped with regular (for example) Tomahawk cruise missiles, this would enable deterrence capacity at the local level at low cost. The Chinese navy has recently been expanding its sphere of activities from its traditional

area of coastal defense to include the open sea. There are growing expectations that Japan will expand the presence of the Japanese Maritime Self-Defense Force (JMSDF) in the Indian Ocean, Pacific Ocean and the South China Sea which connects them both; to do this, however, requires nuclear-propulsion submarines. In the Arctic Ocean, due to global warming, short-cuts for the conveyance of liquid natural gas (LNG) from the Yamal Peninsula to Asia have opened up. Russia and China have been pushing forward the construction of large-scale nuclear-powered icebreaker ships, with the aim of securing access to the Arctic Ocean. Japan must take an interest in the safety-related and environmental issues of the Arctic Sea Lane. Constructing nuclear-powered icebreaker research vessels is one option for this. The development of small-scale light-water reactors for maritime purposes came to a halt with a minor accident which befell the “Mutsu” in the 1970s, but Japan needs to overcome this trauma and look to the future. In addition to serving as a source of electric power, nuclear power has the capacity to serve other purposes, including enhancing the nuclear non-proliferation framework, supplementing the extended nuclear deterrence of the United States, and fulfilling new roles in activities in the Arctic Ocean. For this reason, Japan needs to seek out a future for nuclear power in the realm of SMR technology. Japan has a responsibility to ensure that the technology and human resources that it has developed as a global leader in the peaceful use of nuclear power be maintained in the years to come.

#### Writer's Profile

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Mr. Tanaka has decades of experience with energy and finance since he joined the Ministry of International Trade and Industry (MITI; presently METI) in 1973. He has also worked for Japanese Embassy in Washington, D.C., and OECD. He served as Executive Director of the International Energy Agency (IEA) from 2007 to 2011. Joined IEEJ as Global Associate in 2011. Since 2015, he holds current position. He holds MBA from Case Western Reserve University, US.