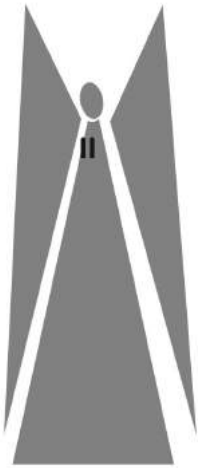
NO-NUKE Q&A



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【Introduction】

Things we should keep in mind —
"For a World Without Nuclear Power Plants - The Anglican/Episcopal Church in Japan Opposed to Nuclear Power Generation" (A resolution of the 59th General Synod of Nippon Sei Ko Kai [The Anglican Episcopal Church in Japan], May 23rd, 2012 .)

As of the writing of the Japanese edition of this second edition, three and a half years have passed since the Great East Japan Earthquake in March 2011, where a meltdown occurred at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant ("Fukushima I"). Little improvement has been seen during these two years in the circumstances of those affected by the calamities. Most of the victims, especially those evacuated from the areas adjacent to the nuclear plant, are still unable to return to their homelands. Residents who remain in areas close to the power plant, particularly children, are still continuously exposed to the hazard of radiation.
Japan's government, power companies, and its mass media claim that the meltdown is an accident of the past. They are even saying that radiation exposure should not cause serious harm, while insisting that with additional safety measures in place, nuclear power is not only safe but indispensable to Japan's economic growth. Such voices are gaining momentum.
Should we let such sentiments go unchallenged? In 2012, The Nippon Sei Ko Kai (NSKK) published a statement entitled "For a World Without Nuclear Power Plants –The Anglican/Episcopal Church in Japan Opposed to Nuclear Power Generation." The statement clarified many of the issues involved in nuclear power. The church took no particular political stance, but firmly stood on its vital mission which was to protect "lives" created and given by God. This statement, however, has yet to be fully communicated to the church's clergy and laity.

It is only natural to have a wide array of opinions on the same issue within the church. Some individuals might not be opposed to nuclear power. Regardless, further discussion is necessary for us to consider among ourselves what the Christian Gospel says about this matter which affects so many people. From this perspective, the statement is of importance to the Nippon Sei Ko Kai (NSKK).

The Project on Nuclear Power and Radiation, NSKK, has prepared this second edition of its Q&A booklet, which is a collection of common questions concerning nuclear power generation. We hope this Q&A will initiate constructive discussions on the issue among readers.

Rev. Akira Iwaki, Project on Nuclear Power and Radiation, NSKK

In this Q&A, we will address the following questions and issues

[1] Why does the church take up nuclear power as an issue?

Many say that nuclear power is an issue related to science, technology, and economy. No doubt a church cannot make any decisive, expert statement about an issue like this. Still, if it affects the lives of people as well as all the creatures of this created world, we Christians have to fight against whatever is a threat to "lives," since we believe God has created lives and is giving life to them all. One of our baptismal vows goes, "Do you renounce the evil powers of this world which corrupt and destroy the creatures of God?" (? Asera, leave the green portions as they are, since these are what we actually say.) and we respond, "I renounce them." This vow is not limited to some inner issues of the soul but actually covers the whole physical world as well. The whole world is God's creations.

The statement adopted by the General Synod of the Japanese Anglican Province points out some grave problems in nuclear power:

1. threatens God-given life
2. destroys nature created by God, and
3. destroys God-given livelihood.

Thus, the statement calls for a major transformation of energy policies, which affect our own lifestyles, in search of a world free from nuclear power.

< Anglicans' mission>

Some lay people of the Anglican Communion are engaged in the nuclear industry. Their work involves a degree of danger on a daily basis to ensure everything runs smoothly ? distressing situations and occasional exposure to radiation. Their hard work must be respected. Even if we abolish nuclear power plants, we are in need of these nuclear engineers and workers for years to come to take care of what remains after the abolishment. Well

aware of these facts, the church should still call for abolishment of nuclear power and head toward a world free of such a dangerous energy source, for the sake of the life of whole creation, both present and future.

In consensus, the Anglican Communion from all over the world has the following five objectives as their mission:

1) To proclaim the Good News of the Kingdom
2) To teach, baptize and nurture new believers
3) To respond to human need by loving service
4) To seek to transform unjust structures of society, to challenge violence of every kind and to pursue peace and reconciliation
5) To strive to safeguard the integrity of creation, sustenance, and renewal of life on earth

In accordance to these aims, Christians need to seriously consider issues about nuclear energy and radiation, and heed God's messages.

[2] What was happening at TEPCO's Fukushima Daiichi on March 11th, 2011?

What destroyed TEPCO's Fukushima Daiichi Nuclear Power Plant (NPP)? While the Japanese government and TEPCO's Accident Investigation Commissions claim the tsunami did it, the National Diet's Accident Investigation Commission says part of the destruction is ascribable to the earthquake. Since this is an issue that greatly affects the future safety measures of NPPs, as well as accountability of the national government and TEPCO, the Nuclear Regulation Authority and TEPCO are carrying on their own investigations, respectively.

Around 3:30pm, March 11th, 2011, at the Fukushima Daiichi NPP, all of the four units (reactors) at work lost their external AC power supply. Without an external supply of power, a reactor goes out of control, with its cooling water no longer running. The cooling water's temperature keeps rising and turning into steam which increases the internal pressure of the reactor. The fuel rods, no longer covered by cooling water, break down one by one. In this way, from March 11th through the 13th, a reactor core meltdown began and worsened in the NPP's Units 1, 2, and 3, one by one.

In addition, the metal covering up the fuel rods worked as a catalyst, electrically decomposing the water (steam) in the reactors into hydrogen and oxygen. This resulted in explosions which destroyed both the reactors and their external buildings. This naturally resulted in the emission of radioactive substances, which contaminated much of the Japanese Archipelago, especially eastern Japan.

It is assumed that the greatest emission of radioactive substances took place following those hydrogen explosions. The information spread by the Japanese government concerning this emission, however, was inappropriate. Also inappropriate were comments many experts made in the mass media. If such information was manipulated, the manipulators were guilty of a grave sin. Unit 4 was not in operation at that time, yet similar hydrogen explosions hit Unit 4 on March 15th, destroying its external building. The cause of those explosions has yet to be identified, though the government says that hydrogen from Unit 3 might have caused the explosions in Unit 4.

Another issue that remains to be clarified is whether or not the countermeasures taken at the NPP were adequate. NPPs can, by their very

nature, run out of control. They are dangerous. Their working mechanism relies on chain reactions of nuclear fission, which means they rely on an atomic bomb explosion slowed down. In addition, human errors can aggravate the situation. Today, the situation of Fukushima Daiichi is quite serious and its future is in the dark.

[3] Does nuclear energy alleviate global warming?

Prior to the Fukushima Daiichi meltdown, caused by the great earthquake of March 2011, some arguments were widespread that nuclear power was the key to the alleviation of global warming—for instance, in the TV commercials of power companies. Today, once again, some are spreading the propaganda that nuclear power is a "necessary evil" to alleviate global warming. True, nuclear power stations do not generate CO2 while generating power. The facts presented below, however, make it obvious that nuclear power plants (NPPs) do not alleviate global warming.

First, a NPP has to turn cooling water (primary cooling water) into steam. This water cools down the reactor, which generates high heat, which turns the water into steam. This steam, in turn, works the power generating turbine. In this process, only around 1/3 of the total heat generated produces electricity. The remaining 2/3 of the heat is transferred to the secondary cooling water by a mechanism called a steam condenser. This heated secondary cooling water is simply disposed into the sea. A 1-million kW reactor needs some 70 metric tons (some 154,355 lbs.) of cooling water every single second. If all of the 54 reactors in Japan today were fully working, they would heat up some 100 billion metric tons (220 billion lbs.) of the sea water around them by 7 degrees C (12.6 F), on average. This gigantic volume of water is equivalent to 25% of the annual

flow volume combined of all the rivers of Japan. Rather than alleviating global warming, NPPs are gigantic sea water warmers.

Also, the NPP's fuel is made from uranium ores which contain only 0.3 to 0.7 % of natural uranium. This tiny portion of natural uranium contains only 0.7% of "fissile" (usable as NPP fuel) uranium 235. Thus, they need to extract natural uranium out of uranium ores and process it into powder called "yellow cake." Then they uss centrifugal separators to increase the U235 concentration to 5 % . This concentration is further processed at a reconversion plant into uranium dioxide powder. This powder is baked into "pellets," cylinders 1cm (0.4") in diameter and 1cm in length. These pellets are assembled together to form a fuel assembly. Needless to say, each and every process described above consumes immense quantities of energy (electricity). Though there currently is no accurate data available on how much electricity these processes consume, one thing certain is that such electricity comes from thermal power stations.

The two considerations above clearly show that nuclear power generation is not the way to alleviate global warming. Power companies are saying that a NPP emits no CO2 "while it is in operation." That much is true. Yet when you look at the whole nuclear energy system, it is emitting a tremendous volume of the gas.

[4] What is the essence of nuclear power generation? ("The Peaceful use of nuclear energy" – is it possible?)

A nuclear power plant uses energy from nuclear fission to produce steam, which activates the power generator to generate electricity. A reactor consists mainly of three components: the fuel—uranium 235

(concentrated to a density of 3 to 5% , in the shape of a rod)—the control rods that control the neutrons within the reactor (inserted among the fuel rods to absorb neutrons to control the fission), and the coolant (water).

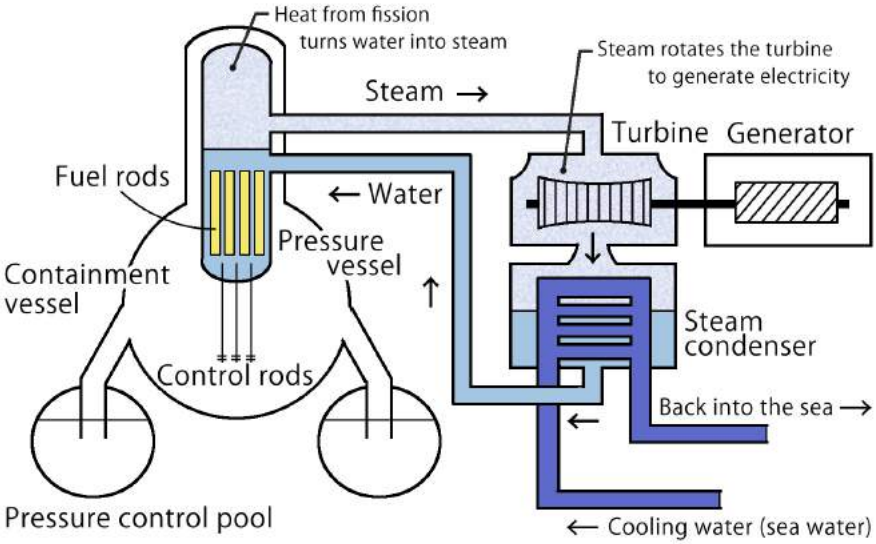
In a boiling water reactor, like Fukushima Daiichi, the water that cools down the reactor core moves directly to the power generator to activate its turbine. Thus, contaminated steam travels outside the containment. A pressurized water reactor, meanwhile, consists of the primary cooling water system, which rotates inside the reactor. Its heat is transferred by a heat exchanger to the secondary cooling water, which then travels outside the reactor. The cooling water generates steam to rotate the power generator to produce electricity.

With fossil fuels running out, nuclear power generation has enchanted people who are concerned over the remaining amounts of fossil fuels. However, we have yet to find a way to process radioactive waste. A single major accident, therefore, can lead to a catastrophe, like the one that began on March 11th, 2015, one which will impact countless people both in the present and in the future. This is something we have witnessed. In an earthquake-prone country like Japan, multiple safety mechanisms can break down, for instance, an earthquake can damage multiple joints among various machines simultaneously. This is a danger any lay person can understand.

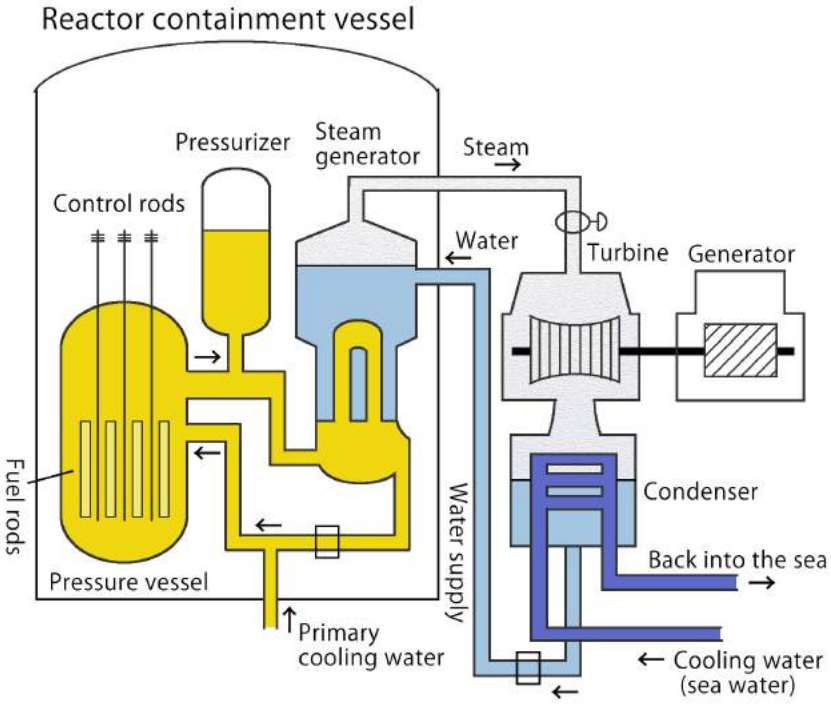
Nuclear bombs and nuclear power plants both use uranium and/or plutonium as the fuel. The uranium enrichment process, which is a must in preparing fuels for NPPs, can, if it goes on beyond the NPP fuel grade, produce weapon-grade fuel, which contain more than 90 % of fissile uranium. In short, slow down the fission and you have a NPP; let the

fission occur at once and you have an atomic bomb. Thus, if you have the technology to run a NPP, you are also capable of producing atomic bombs. One can believe that the Japanese government possesses the technology necessary to produce atomic bombs, though it has yet to produce such a bomb. Yet can the government's policy maintain the nation's security? Nuclear energy has already sacrificed the lives of countless victims. We, the church of Christ, must seek for genuine peace. Japan, a country that has experienced nuclear holocausts, must be a leader in setting the world free from the dangers of nuclear power, voluntarily abandoning any ability to arm itself with nuclear weapons.

-- A boiling water reactor's mechanism --



-- A pressurized water reactor's mechanism --



[5] Where do nuclear fuels come from? What is happening there?

Nuclear power plants uses fuel that comes mainly from uranium ores. Major producers of this raw material include Canada, Australia, and Kazakhstan; Japan utilizes imports from Australia, Canada, Namibia, and Niger to power its nuclear plants. As a result, many people in these countries are suffering from severe exposure to radiation. Most isotopes in uranium ores have a half-life of some 4.5 billion years, nearly equal to the age of our planet. Ores are mined where natives of the land have long been living with the blessings of Mother Nature. Prior to the digging process, the natives are first ousted from their land. Many are then hired as mining workers to dig for uranium. In most instances, no masks or gloves are provided to those workers, say nothing of protective suits. Therefore, their exposure to radiation often has deadly effects to personal wellbeing.

Furthermore, such deadly effects are not only limited to humans but also to nature's surroundings. The heaps of slag and disposed soil are abandoned around the mine over countless acres of land thus creating a gigantic pool of radioactive rain water and contaminating underground water. Hence, internal exposure by local residents to α -, β -, and γ -rays is inevitable, exposed to gamma rays, ingesting uranium isotopes into their bodies through contaminated food and water, and inhaling radon scattered in the atmosphere. Radiation exposure via these three routes is unavoidable in any uranium mine. These ores are refined into flakes called "yellow cake," and further processed and enriched into nuclear fuels.

< The heavy price of uranium mining>

Radioactive contamination is widespread and damage on the

environment is irreversible. There are various reported cases of mortality, including lung cancer, cardiovascular diseases, respiratory problems, congenital abnormalities, infertility, and deformities, among the residents including the natives and others. These facts show that the entire process of uranium mining and processing has a structure that exposes countless people to radiation. In other words, nuclear power cannot exist, without sacrificing impoverished people in and around mining sites.

We, as Christians, consider what is done to "the least people" are done to Christ himself (Gospel of Matthew 26:40). Nuclear power generation stands only at the sacrifice of impoverished people. This is an indisputable fact.

[6] What happens to all the nuclear waste?

The main fuel of a nuclear power plant (NPP), uranium, is mined as ore, which is then refined, converted, enriched, and re-converted. In the end, the uranium is molded into cylindrical pellets, around 1cm (0.4") in diameter and in length. These pellets are sealed inside a tube of a zirconium alloy, known as "fuel rods." A single reactor typically has about 20,000 to 60,000 fuel rods at any one time.

The huge amount of used nuclear fuel produced by NPPs has the deadliest toxicity among all the substances existent on earth. Such waste must be isolated from the environment over some 100,000 years. First, such fuel waste needs to be cooled down for several years in storage pools within the reactor's external building so that the heat, remaining in the fuel as it decays, does not melt them down. After this cooling process, the used fuel is taken out of the pools and carried into a reprocessing

plant. Here, they extract uranium and plutonium (which are usable in the production of nuclear weapons). The remaining liquid waste from the fuel is melted at a high temperature with glass and then poured into stainless steel containers (canisters). Each canister is 134cm (52.8") in height and 43cm (17") in diameter. Such waste is known as "high-level radioactive waste" and it emits powerful radiation which can kill a person nearby in a moment. High level radioactive waste also radiates considerable heat as it continues to decay.

Those canisters are temporarily stored at a storage facility for 30 to 50 years. Then, they are to be buried within rock some 300m (333 yard) below the surface of the ground until their radioactivity comes down sufficiently—for some waste this will be several dozens of millennia. Such underground repositories are the plan currently proposed for nuclear waste. Still, the final disposal technology has yet to be developed. Many experts doubt that Japan has any geological environment suitable for such a repository. Unlike Europe, the Japanese Archipelago is prone to earthquakes and the consequent eruption of underground material happens throughout Japan. In an environment like this, there can be no underground repository for high-level nuclear waste. Furthermore, claiming to be able to keep such waste safe for 100,000 years to come, which is way beyond the time scale of human history, is a sign of arrogance.

To be treated as "low-level radioactive waste" are those fuel rod tubes, control rods, waste from the piping, liquid waste, filters, protective suits, and other low-level radioactive substances that nevertheless can affect humans. They are contained within drums and sealed in cement. Then, the sealed waste is buried in holes of reinforced concrete built 4m below

the surface of the ground or deeper. Such waste is to be stored for three centuries.

Also, uranium ore must go through many processing steps to be made into nuclear fuel. As Japan imports already-enriched uranium fuel, the nation has no refinement or conversion plants. It is wholly dependent on outside processors for the treatment of radioactive wastes resulting from uranium processing.

The late Prof. Satoshi Kurata summarized these practices and plans as "throwing nuclear waste into a box called 'the future.'" Moreover, the process of extracting and enriching uranium 235 leaves behind massive amounts of waste containing non-fissile uranium 238, which U.S. forces use to produce depleted uranium ammunition. Such depleted uranium (U 238) was used in the wars in Afghanistan and Iraq, causing leukemia and birth defects in numerous people, including children.

[7] Are nuclear power plants safe, unless they are hit by an earthquake or tsunami?

The Fukushima meltdown has proven that nuclear plants can cause tremendous hazards and damage when hit by an earthquake or tsunami, and in the case of March 11, both. Even now, some pro-nukes claim that: "That disaster was beyond any expectation. With sufficient countermeasures for earthquakes, nuclear power plants (NPPs) can be made safe." The plain fact, however, is that a NPP is utterly dangerous and can stand only upon the sacrifices of the socially weak, even without an earthquake or tsunami.
Reactors have to go offline every 13 months to undergo a 3-month

routine inspection. The process requires workers to enter the reactor's containment vessel, where they are exposed to very high doses of radiation. A single routine inspection requires more than 3,000 workers. Thus, even without an accident, those workers (especially, those working for subcontractors and day workers) experience exposure to deadly doses of radiation. Though the relevant regulations have exposure limits for nuclear plant workers—not to be higher than 50mSv a year and 100mSv over a period of five years—such limits are often simply ignored at work sites. Workers first enter the containment vessel with a dosimeter and, when the meter alarm rings, they remove it, finding the noise a nuisance. The result is that we see more cancer patients among these workers than in the general public. With all things considered, these plants cannot operate without the sacrifice of the workers.

Those laborers working within a NPP are clad in a work suit and shoes which become contaminated as they work. The water with which those items are washed is also contaminated. Such water, however, is simply disposed of into the sea. After every routine checkup, several tons of contaminated water run into the sea every single minute. And we have witnesses to the fact that no adequate processing of waste water is done. Furthermore, tritium, a radioactive substance, is among the major issues at Fukushima Daiichi today. Humans have no way to process this substance. And outside the Fukushima disaster, Japan's NPPs are throwing out some 20 trillion Becquerel of this hazardous substance each year in the waste water coming from the plants. Also, the high-rising exhaust towers of NPPs emit rare radioactive gases like xenon and krypton every day. The industry has yet to develop technologies to contain all the radioactive substances within a NPP.

High-level radioactive waste from consuming nuclear fuels at a NPP is deadly. If a person gets close to it, he/she will die within 20 seconds.

And it takes some 100,000 years for the waste to reach a safe level of radioactivity. Until 1969, barrels of radioactive waste were thrown into the Pacific off the coast of Chiba Prefecture (east of Tokyo). In 1972, however, the United Nations adopted the London Convention, which prohibited such disposal. The Convention was ratified by Japan in 1980. For this reason, the nation does not throw drums of radioactive waste into the sea anymore.

Today, much of such radioactive waste is brought to the Rokkasho Reprocessing Plant instead, to be buried in containments underground (underground repository 2) later on. However, the Science Council of Japan has argued against such methods, deeming them unsuitable for Japan's earthquake-prone geology.

In addition, dismantling a NPP whose lifetime is over generates huge volumes of radioactive waste. Can such waste be buried too? As long as NPPs keep working, we will have more and more deadly radioactive waste which has nowhere to go.

1. Sievert (sV) is a unit of measurement indicating how much effect radiation has on a human body exposed to it.
2. Designed to bury such waste deep under the ground

[8] Is nuclear power really cheaper in comparison?

The costs of power generation, as announced by the Japanese government in March 2011, is 5 to 6 yen per kW-hour for nuclear power, 7 to 8 for liquefied natural gas, and 8 to 13 for hydropower. However, many experts point out that these values are estimated based on model plants and are far from the actual costs.

Professor Ken'ichi Ohshima (College of International Relations, Ritsumeikan University), has calculated the "actual" power generation costs over the time period of 1970 through 2010, arguing that the actual costs borne by the public are what we should watch out for. In short, if we include: (1) costs directly incurred by power generation operations (i.e., depreciation, fuel, maintenance, etc.) and (2) policy-related costs (i.e., the costs of technology development, the costs to win the approval of the municipality hosting the plant), the "actual" cost would be 10.25 yen for nuclear power, 9.91 for thermal power, and 7.19 for hydropower. Regardless, these values do not factor in expenses for accidents or the processing and disposal of used nuclear fuel. The professor adds that the costs should also include environmental costs, measures to prevent climate change, accident damages and compensation, the cost of controlling accidents, decommissioning reactors, recovery from accident damages, administrative fees, and etc.

Although Japanese consumers are not informed, the amount billed to be paid monthly covers:

•Power generation and transmission expenditures;

•A levy for the Renewable Energy Fund (added in 2012);

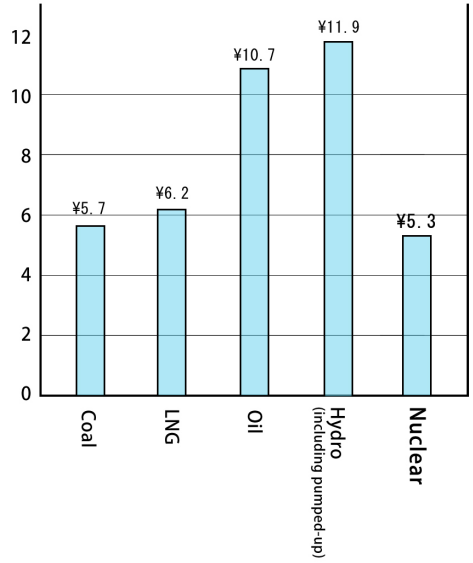
•A consumption tax and power resources development tax used to maintain and promote nuclear power plants.

The Japanese government's fiscal 2011 budget for nuclear power was 433 billion yen. Some 40% of the funds were spent on measures to build power plants, while another 40% was utilized by the Japan Atomic Energy Agency, for the Monju Power Plant, Japan's fast breeder reactor that claims to establish nuclear fuel recycling. So far, it has not yet operated commercially, while consuming some 60 million yen of taxpayers' money daily. In the current electricity billing system, a power company is allowed

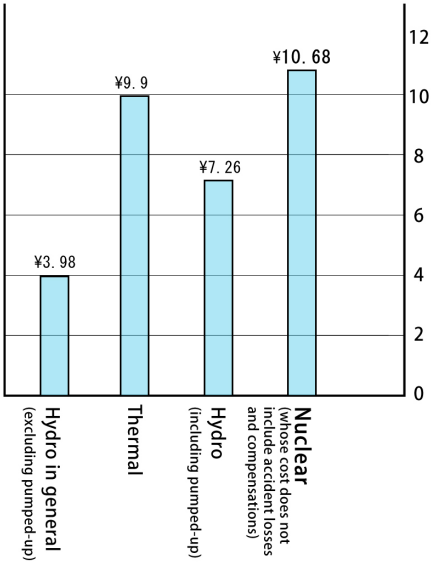
to charge consumers the total cost + profit, set to a certain ratio to the cost. Therefore, they have no need to try reducing their costs.

In this post-Fukushima era, while aware of the sufferings of many victims of nuclear power, we have not yet reached a general consensus about handling used nuclear fuel and about the aftermath of the Fukushima disaster. We have simply left these deadly issues to our descendants. We cannot remain ignorant of the government's efforts to restart nuclear plants in Japan. Everyone needs to be aware of both the financial and human costs of nuclear power, as well as the many other issues related to power generation.

Comparison of power generation costs, shown in charts (pro forma calculation by Professor Oshima)



Costs calculated by the Ministry of Economy, Trade and Industry
(yen/kW-hr, 2004)



Costs calculated by Professor Ken'ichi Oshima
(yen/kW-hr, average over 1970 through 2007)

[9] If a power company runs into the red, will we have a power rate hike?

Japan's electric power companies are protected by the Act on Compensation for Nuclear Damage of 1961. This Act has been reviewed every decade and the 2009 revision limits the compensation to be paid by a power company to 120 billion yen. The Act sets forth that, "in case of an extraordinary natural disaster or a social turmoil, the electric power company operating the nuclear power plant in question shall be held exempt from legal responsibilities."

The compensation scheme for the Fukushima disaster, officially determined on May 13th, 2011, held that the Nuclear Damage Compensation Facilitation Corporation ("the Corporation" hereafter) should be founded, if Tokyo Electric Power Company ("TEPCO") is to survive. Under the lead of the Corporation, the other power companies and the government should help TEPCO finance its compensation. The Act also contains a clause saying, "In case there is a factor affecting the stable supply of power, the national government can pay the compensations in place of TEPCO."

According to TEPCO's financial statements for 2012, the Corporation, which was established by the Act on the Nuclear Damage Compensation Facilitation Corporation (August 10th, 2011), owned some 55% of TEPCO's stock. The Corporation should provide financial help of some 3 trillion yen to TEPCO to pay the compensation due. This is a separate account from that of the 120 billion yen needed to comply with the Act on Compensation for Nuclear Damage. The 3 trillion is authorized by the "Corporation Act," which states that financial help should be granted

to a power company applying for it. In reality, TEPCO is exempted from responsibility for the Fukushima Daiichi disaster, while all the citizens of Japan are forced to pay for the compensation in the form of a hike in their electricity bills and taxation.

Furthermore, a power company is protected from going bankrupt. A power company's "full cost" is the sum of all business expenses (depreciation, operation costs, taxes, etc.) and the profit (business profits). The rates for power are determined to guarantee a return of the "full cost" to the power company. The profit is obtained by multiplying the "rate base" by the "profit rate." This "rate base" refers to the "assets" owned by the power company. And an Act concerning power companies allows "a power company to add some % of its assets to its profit." Such "assets" include, among other items, "specific investments," which covers nuclear reactors. A single reactor usually costs more than 500 billion yen to build, and nuclear fuel storage, research and development, etc., also take gigantic costs. Thus, the more nuclear power plants a power company owns and runs, the more its rate base expands resulting in greater profits, at the cost of consumers who are paying for it.

[10] Do nuclear power plants create jobs and revitalize depopulated communities?

Historically, nuclear power generation originated from a military technology: atomic bombs. Some people had introduced it to Japan. During the years of Kakuei Tanaka's tenure (1972 to 1974), the Act on the Development of Areas Adjacent to Electric Power Generating Facilities was enacted to promote nuclear energy. In 1974, Japan established the "grant system (to municipalities hosting a nuclear plant)", in compliance with the

"three Power Development Acts":

・Act on Promotion of Power Resources Development Tax

・Act on Special Accounts for Electric Power Development Acceleration Measures

・Act on the Development of Areas Adjacent to Electric Power Generating Facilities

To finance this grant system, every household in Japan pays an additional 110 yen monthly, as part of its electricity bill. 51 % of this tax money collected, some 330 billion yen annually goes to the affiliated organizations of the Japan Atomic Energy Agency, the Nuclear Regulatory Authority (formerly called the Japan Nuclear Energy Safety Organization), etc., which welcome many retired national government officials. The remaining 49% are spent to "promote the economy" of municipalities hosting nuclear plants. This system tramples on those engaged in most dangerous jobs ? those who dig for uranium ores, replaces reactor fuel rods, work on regular plant inspections, engaged in the processing of radioactive waste, and so on. This is evidence that nuclear power generation stands upon the sacrifice of those who are the poorest and most oppressed in society. At the top of this hierarchy, economic giants are the ones making money out of it.

< Nuclear power as regional discrimination>

Because of space constrains in suburbs and major cities, nuclear plants are mostly located in depopulated regions where lands are in abundance. Among other similarities, such areas are where local economies do not prosper, leaving the municipalities poorer, compared to their city counterparts. Notably, Fukui Prefecture is located some 100km away from of Osaka, having 15 nuclear reactors altogether, leaving it host of the

largest number of nuclear stations in all of Japan. The reactors are mostly concentrated in the south, suggesting a possible dispute between the northern and southern regions within the prefecture. To make matters worse, its contingency plans are deplorable ?if a major incident hits any of those reactors, the residents in its vicinities have no designated escape routes in such emergencies.

In addition, the Fukushima I meltdown has leaked so much radiation, endangering many lives and countless local communities are broken down in the process. It is eminent that nuclear plants actually exhaust and destroy the regions hosting them. Clearly, many poverty-stricken areas are hosting nuclear plants under the nuclear industry's pretense of "regional economy development".

[11] Voices from the contaminated areas -- Internal exposure to radiation and the future of children

Internal exposure takes place when radioactive substances enter your body, whether by atomic bombs, nuclear tests, nuclear plant accidents, or even though breathing, drinking, eating, and open wounds on your body. A body's exposure to radiation results in subtle cell defects, which combine with other factors to develop into complex illnesses like cancer or genetic problems. Children are the ones most at risk because while growing up, their cells are going through more frequent divisions, compared to adults. Therefore, they are more susceptible to radiation hazards.

As of December, 2013, the Citizen's Healthcare Committee issued a report about the residents' thyroid examination results. According to the report, out of 269,354 residents below 18 years of age who were inspected, 33

were diagnosed to have thyroid cancer, with 41 other cases suspected. Prior to the Chernobyl disaster, it was common knowledge that the incidence rate of thyroid cancer among children was several cases out of a million. This simple comparison shows that Fukushima is experiencing an abnormal ratio. As more surveys and inspections develop in the coming years, we need to take its results seriously. Fukushima Medical University, who jointly conducted the abovementioned survey with the Fukushima Prefectural Government, says those thyroid cancer cases detected were "not ascribable to the effects from the meltdown," leaving most parents anxious over their children's future. In the coming years, all 360,000 residents should be screened for the likehood of thyroid cancer.

< Hazards on the table —>

Risks of internal exposure are higher if you consume food contaminated with radioactive cesium. Presently, foodstuffs from Fukushima Prefecture have passed the government's radioactivity inspection. Even so, countless parents are looking out for every piece of information available about the amount of radiation in food in order to protect their children. Following the meltdown, kids are seldom seen playing outdoors in Fukushima. Needless to say, decontamination work is mostly done at public areas like parks and school yards. Some places are reportedly contaminated again only several months after their decontamination work was completed. Such places need to be decontaminated over and over again.

Fukushima City's government has been carrying out internal exposure examinations using WBCs since November 2012. This examination is provided upon request, for different age groups and areas. The Whole Body Counter (WBC) is a machine that measures radioactivity within the human body. As radioactive cesium naturally decays into barium, it also

emits some γ - rays. Financed by the reconstruction budget, free medical services are provided to children below 18 years of age, since October 2012. Nonetheless, such provisions are expected to end in six years' time. So, what should we do with the children after that? A parent's worries over their children's welfare are endless. The national and local governments, as well as TEPCO have to bear the responsibility to enable continuous radiation monitoring and communicate correct information to parents.

"Refresh (Retreat)" programs
Organized by the Project on Nuclear Power and Radiation

Many children in Fukushima cannot play outdoors due to radiation. The Project, therefore, runs retreat programs for them. Every month, children go on a day trip where they have a great time playing under the sun, unafraid of the dirt and the wind.

With more Fukushima children becoming obese, the Project considers some new forms of indoor exercises.
(Photo: Wakamatsu Seiai Kindergarten, September 2013)

At Showa Forest, Inawashiro Town
(Photo: children of St. Paul's Kindergarten, October 2013)

During the summer vacation period, the Project holds camps and travel opportune ities for Fukushima families.
(Photo: vacation in Takashima Island, Nagasaki Prefecture in southern Japan, July 2013)

[12] Radiation for medical use and radiation from nuclear plants -- How do they differ from each other?

How does exposure to medical-use radiation differ from radiation from nuclear power plants? A radial ray (radioactivity) refers to a particle beam or electromagnetic ray emitted from decay of a radioactive element. Commonly, it refers to ionized radiation. If such rays hit atoms or molecules of a substance, it ionizes them in the process. Thus, it does atomic-scale harm to genes of not just humans but to any creatures as well. Still, there have been some medical uses of radiation, since their benefits outweigh their harms. For instance, x-ray used in radiography is an electromagnetic ray of a short wave length, used to see what is inside the body. Radioactive rays are also utilized in chemotherapies, concentrated on cancerous cells to destroy it. Though it has adverse effects upon the human body, radioactivity in such medical treatments is lower compared to those emitted by nuclear power stations and the aftereffects aren't long lasting.

On the other hand, thermal energy generated by chain reactions of nuclear fission is used to produce electrical power. Nuclear fission of 1g of uranium-235 creates thermal energy equivalent to some 2,000 liter (12.6 barrels) of fossil fuel. The Fukushima I meltdown is leaking out plenty of radioactive substances into the atmosphere, whose radiation is affecting everyday life. Unlike medical-use radiation, nuclear power plants continuously emit radiation that affects lives indiscriminately.

< Precise damages yet to be confirmed>

What happens when you are exposed to different levels of radiation? Though experts are divided over this question, acute disorders usually refer to those that emerge within a short period of time after accumulated

exposure to 100 mSv or higher in a short time period. Though the body has the ability to restore itself, exposure to 100mSv or more in a short period of time has permanent effect beyond its self-healing capacity, experts say. If the exposure level exceeds 250 mSv, the white blood cell count declines temporarily, according to experts. Exposure to less than 100 mSv during a short period of time, on the other hand, raises concerns over long-term damages. In such cases, the actual results differ, depending on the radiation dose you receive. It is believed that the smaller the dose, the lesser the radiation effects. The annual dose permitted to the general public by Japan's Ministry of Health, Labour and Welfare is 1mSv. The dose received in a group radiograph inspection of the chest is 0.05mSv, and in a chest CT scan you are exposed to 6mSv. Both are temporary exposures. In normal conditions, a radiation worker's annual permitted dose is 50mSv.

While in hospitals and university labs, there are some "radiation controlled areas." These are areas with the risk of exposure to 5mSv and above, hence off-limits to the general public. After the Chernobyl nuclear catastrophe, such places are classified as an immediate evacuation zone. Following the Fukushima I meltdown, the threshold for evacuation is 20mSv a year. In this respect, it should be distinguished from medical uses of radiation. As for the effects of long-term continuous effects of low-level radiation, experts do not have sufficient case studies or data and there is no precise findings thus far.

[13] How is TEPCO's Fukushima Daiichi today?

In the bid to host the 2020 Olympiad, Japan's Prime Minister Abe claimed that "the contaminated water (from Fukushima Daiichi) is under complete control." Now, what evidence did he have, for this claim?

At the nuclear power plant (NPP), on March 11th, 2011, the earthquake and tsunami destroyed the external power supply to the NPP, disabling the reactors' containment vessel cooling systems. This led to the meltdown of the nuclear fuel, which in turn resulted in explosions in reactor buildings. A tremendous amount of radioactive substances were released, contaminating much of the atmosphere, soil, and sea around the NPP. Now, radioactive substances are being detected in rice and other cereals, beans, seafood, meat, milk, drinking water, and other foods. Such substances are being detected in many places outside Fukushima Prefecture as well.

Since then, the Japanese government has been attempting to decontaminate the affected areas. How can humans, however, decontaminate mountains and an ocean? The workers removed the surface soil from the contaminated ground, yet they have found no permanent storage for the soil, and no one knows what to do with it.

Another deadly issue is the leakage of contaminated water from the NPP, which still continues three years after the meltdown began. (Translator's note: as of 2014. In January 2016, the leakage still continues.) To cool down the nuclear fuels inside the containments, they have to keep pouring in some 370 metric tons (815,876 lbs.) of cooling water every day. To store contaminated cooling water collected from the reactors, TEPCO has built hundreds of water storage tanks, each having a capacity of 1,000 metric tons. Yet in August 2013, some 300 tons of highly contaminated water leaked out of a storage tank installed on the ground. As of 2014, TEPCO has yet to identify where this leakage took place. Some trenches around the reactors are carrying highly contaminated water, some 20 million times above the national standard, and tritium, cesium, and

other radioactive substances are running into the Pacific. Though the government is trying to surround the whole NPP premises with concrete walls to stop this leakage, this attempt to contain contamination has yet to prove successful.

The workers involved in counter-contamination efforts are also in a dangerous situation. Japan's Industrial Safety and Health Act sets the upper limit of a NPP worker's exposure dosage to 50 mSv a year, and 100 mSv over a time period of five years. In reality, however, countless workers are experiencing exposure well beyond these limits. Naturally, the work site is losing more and more experienced workers, which impedes the counter-contamination work.

Many mountains and much of the sea are contaminated. The decontamination efforts are sluggish. The counter-contamination work is progressing poorly. Numerous residents of Fukushima and the surrounding area are still exposed to radiation daily. Many of those residents' families are living separately, out of their hometowns. Many serious problems remain, and there is no clue in sight as to how to solve any of them. In spite of all this, some in the Japanese government and business world are trying to restart NPPs and export NPPs to Turkey and other countries. Their sins are grave. Also, if we remain silent about these acts, we should be held accountable as well.

[14] What problems are there with decommissioning TEPCO's Fukushima Daiichi?

A decision was made in April 2013 to decommission Units 1 thorough 4 of TEPCO's Fukushima Daiichi Nuclear Power Plant (NPP). The remaining

two reactors, Units 5 and 6, which were under a routine checkup when the tsunami hit them in March 2011, are also to be decommissioned, as determined on January 31st, 2014. Thus, all six units of the NPP are to be decommissioned. Now, safely decommissioning a NPP that caused a major disaster is much harder than decommissioning one that has safely run out its life. The meltdown has not, and shows no sign of, "settling down." One problem after another is still besetting the NPP. The work of decommissioning Fukushima Daiichi can begin only after all the used nuclear fuel that is kept in the storage pools, as well as fuel that melted down, has been collected. Many think three to four decades will be necessary to complete this decommissioning.

On November 18th, 2013, TEPCO began removal of the fuel rods (202 unused rods) stored in the used fuel storage pools. One major concern with this work is that the container holding such fuel can collapse. The pools are on the 5th floors of the buildings, which means such a collapse could damage the fuel within the container. In case the container breaks down, the fuel inside can emit an abundance of radioactive substances into the atmosphere, which would be a deadly incident. In a "normal" reactor, a fuel carrying crane automatically moves to the position right above the fuel to remove it. At Fukushima Daiichi, however, workers have to determine the crane's position visually. Moreover, all the workers wear a full-head mask which limits their sight. Thus, the workers have to work in an unusual situation which can lead to human error.

Furthermore, problems remain with maintaining workers' health, their compensation, and in securing enough workers. Some 3,000 people work every day, clad in a protective suit and a full-head mask, within an environment containing extraordinarily high doses of radiation—a no-

go zone for any unauthorized person—and almost a half of these workers are Fukushima citizens. Thus, the decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Plant is a highly dangerous project, and it must be done with strict safety measures in place.

Yet another issue is the contaminated water, the volume of which keeps expanding and expanding. At Fukushima Daiichi, they have poured a tremendous volume of water into Units 1 through 3 to cool the fuel melted down inside them. Such water, now deadly contaminated, is contained under the reactor buildings. Some of it, however, seems to have run into trenches on the seashore side of the plant. Since these trenches were damaged by the earthquake of March 2011, some of the contaminated water underground is believed to have found its way into the ocean. Though they are processing contaminated water with ALPS (Advanced Liquid Processing System, which removes multiple nuclides out of liquid), even this system is incapable of removing tritium. Thus, letting processed water into the ocean can lead to serious problems beyond our imagination. The meltdown has a long winding way to go before it "settles down" and the decommissioning will continue to face numerous difficulties.

[15] What are the realities of nuclear power plant workers?

There have been some publications documenting the lives of the workers of subcontractors serving in nuclear power plants (NPPs). Still, the majority of common people are unaware of the hardships these workers experience. Since the disaster at Fukushima Daiichi, the hardships faced by the workers have gradually been made known to the general public.
In an interview in the February 2014 edition of DAYS JAPAN, a certain

worker serving Fukushima Daiichi said, "My work site (the NPP) is a total mess. I'm often overwhelmed by hopelessness, knowing that I have to keep working like this for the rest of my life…. All the workers around me wear a full-head mask (Note 1). Highly experienced workers diminish in number, day by day (Note 2) …. The tools are outdated, and the machines are breaking down…. Before the meltdown, the (radiation exposure) limit was 120 cpm (Note 3), but the national government drastically changed it to 100,000 cpm after the meltdown. Should I not have any offspring...? (Suppose I ask a woman to marry me, and) she says no (because of my work), then where is my human right? Even today, (since the radiation level at the work site is so high,) we often work to a time limit, for instance 2 minutes (per worker)."

Japan has 54 NPP reactors, and they are currently decommissioning only four of them. Furthermore, NPP workers are in serious shortage, in part thanks to the demand for construction workers for building the infrastructure required to host the 2020 Tokyo Olympics. The shortage of workers for decommissioning a NPP will aggravate current working conditions further, trampling on the workers' human rights even more. Restarting a NPP will require even more workers, for instance, for routine checkups. Should we allow any restarts?

Note 1: This full-head mask is used in the most radioactive zones within the controlled area contaminated with radioactivity.
Note 2: Since the relevant laws set a limit to the cumulative dose of radiation exposure for NPP workers, long-time workers eventually reach this limit and are banned from working there.
Note 3: cpm – counts per minute. This refers to the times a radioactive ray detector has counted such a ray, in a minute. What the detected rays actually do to the human body is not considered.

[16] Will Japan restart its nuclear power plants?

We have yet to confirm what exactly the March 2011 earthquake and tsunami did to Fukushima Daiichi whose meltdown shows no sign of "settling down" yet. Also, many experts predict that another major earthquake will hit Japan someday. Surrounded by these facts, it is utterly absurd and unreasonable to restart any nuclear power station (NPP) in this archipelago. Also, the current reality proves that we have no power shortage in spite of the fact that NPPs are currently not operating.

Then, why are Japan's government, power companies, economic leaders, and some scholars claiming that we should restart NPPs? They claim: (1) that the nation is incapable of revolutionizing its energy system without NPPs; (2) that dependence on thermal power generation results in power cost hikes which, in turn, could drive more businesses out of Japan, causing a reduction in Japan-based industries; (3) that without NPPs, Japan's economy as well as its people's livelihood will be ruined; and (4) that fossil fuels are insecure and aggravate global warming.
Also, some argue that, as a part of its defense capabilities, Japan needs to have the capacity to build nuclear weapons any time it wants to. In spite of all those pro-nuke arguments, we have no way to safely process the radioactive waste from the NPPs operated so far, and we have yet to figure out what to do with the contamination and waste from the meltdown of Fukushima Daiichi.

At the end of 2013, a Japanese TV station called NHK BS1 aired a world documentary titled "Genshiryoku Hatsuden no Ima" (Nuclear Power Generation Now). It described how, while Germany and Switzerland abandoned nuclear power following the Fukushima disaster, France

determined to maintain its nuclear power generation. 75% of its electricity comes from nuclear power plants, and the nation had been conducting research on nuclear power as a national policy. And France does not experience many earthquakes. Thus, the nation determined that it was unable to give up its NPPs.

However, once France began decommissioning its outdated reactors, it faced serious difficulties. Those old reactors were heavily contaminated, right down to tiny bolts, and the workers engaged in the decommissioning were exposed to radiation. Thus, the decommissioning work lagged behind. The nation's NPP decommissioning budget, originally 2.8 billion yen, had reached 63 billion yen.

The U.S. is also withdrawing from nuclear power, considering the immense cost of decommissioning. Considering those issues, it is utterly absurd, both scientifically and economically, to restart a NPP in an earthquake-prone country like Japan. The top priority we have to keep in mind is that we must not leave any more negative aspects of nuclear power generation behind for our descendants.

Where the plants are in Japan (map)

[17] What about power shortages and alternative energy sources?

In modern societies, human lifestyles cannot be sustained without electricity. Therefore, a contradiction presents itself: nuclear power has sustained our life, while jeopardizing it at the same time. nuclear power has sustained our life, while jeopardizing it at the same time? In the light of the nuclear incident, many are turning to renewable energy sources, learning that they cannot depend on nuclear energy any more. We are hoping for further developments of renewable energy solutions such as:

・Energy from rivers (medium- to-small hydro power stations, rather than gigantic dams)

・Wind energy (offshore and other locations to prevent low-frequency vibration hazards)

・Ocean energy (waves, tidal, sea currents, temperature differences in the sea water)

・Solar energy (water heating, solar panels)

・Geothermal energy (power generation at hot springs)

・Biomass (firewood, corn, methane gas from excrements of livestock)

< To protect the planet>

Though there still are some uncertainties about their capacity to satisfy gigantic demand from a single source, these renewable sources can rebuild Japan's energy supply system into a more distributed one, in which regions and small-to-medium businesses meet their own need. Japan's energy system so far has been a centralized Gulliver, trampling on many victims (like those municipalities hosting a nuclear plant, etc.) A new, distributed system can help local communities develop and revitalize their own economy. Research is in progress on how to produce liquefied

natural gas from methane hydrates, which exist in abundance in the ocean areas surrounding Japan. Elsewhere, Mr. Takashi Hirose, an energy issues expert, is proposing combined cycle thermal power -- a gas turbine to generate power, whose exhaust heat from the exhaust gas is fed back into the turbine for higher efficiency -- as a new source of power to replace nuclear. Some say we will have sufficient power from thermal power plants, at least for the time being. Obviously, we should cut down our waste of electricity and strive to create a world without nuclear energy. Anyone will agree that we, humans, must not destroy this planet, created by God as something good. So, what should we do, and what should we not do? I hope to find them out by following the examples of Lord Jesus, who worked bravely on issues directly involved in life.

[18] So, what should Japan do, after it becomes free of nuclear power?

Here, we would like to introduce to you a Japanese book titled "Datsu-genpatsu no Grand Design" (Grand Design for Going Free of Nuclear Power). In this book, Professor Masaru Kaneko of Keio University's Faculty of Economics says that energy technologies are making great steps forward. For instance, today we have co-generation technology which generates power and, at the same time, uses the waste heat produced. Yet another example is combined cycle technology, which boasts very high energy efficiency. Even coal-powered power generation is gaining much better efficiency. By deregulating the electricity market and separating power generation from distribution, Professor Kaneko says that much power from self-generation technologies could be made available in the market.

The professor also notes that power companies have to keep cooling their nuclear power plants (NPPs), even while they are not operating. They cannot easily transfer NPP workers to other sites. And they have tax issues to consider. Besides, they cannot afford to make investments in safety. They, therefore, hope to restart their NPPs as they currently are.

Facing this situation, Professor Kaneko proposes that a principle, similar to the one employed in processing bad loans that haunted many financial institutions in Japan back in the 1990s, should be applied to the nation's NPPs as well. He proposes that we invest public money and separate the existing power companies, which presently control both generation and distribution, into separate generation and distribution businesses. The existing NPPs should be owned by the national government and placed under the authority of the Japan Atomic Power Company. Nationalized NPPs should then be reviewed by experts critical of nuclear power from an economic perspective. Other than plants that can be safely operated, following investment in safety measures, the remaining NPPs should be decommissioned. Based on fair rules, as with bad loans, dangerous power plants must be decommissioned—beginning with the most dangerous ones.

Also, in this book, Mr. Tetsunari Iida of the Institute for Sustainable Energy Policies says that what we really need is to reshape our industrial structure. Japan's electricity market should transform into one consisting of many smaller regional suppliers. Jobs must be created for future generations. In the development of renewable energies, a stable and efficient network needs to be built up by means of information and communication technologies. (The country which achieves this should be the future world

leader in this field.) NPPs are an obstacle to the development of safe and economical energies.

The book also proposes, as a positive means of saying farewell to nuclear power, energy businesses invested in by, built on the consensus of, and owned by local communities. Many would doubt whether such businesses will be successful. Still, says Professor Jusen Asuka of Tohoku University's Center for Northeast Asian Studies in the book's conclusion, "The heart of the issue is whether we feel responsible, as humans, for nuclear energy issues, or not." Thus, we cannot afford to only consider if such businesses can be successful or not. We, as humans, have to take steps to set ourselves free from nuclear power. Following this direction, many non-governmental and non-profit organizations (more than 55 organizations, as of October 2014), and many individuals, have joined together in a group called "e-Shift" (Society to Fulfill Denuclearization and New Energy Policy).

[19] What about other nuclear power plants in Asia?

Frighteningly, numerous nuclear power plants (NPPs) exist in Asian countries other than Japan. China has 48 reactors at 15 sites, including those decommissioned and those being built. Some of them are very old, with some standing on earthquake-prone ground. Many are concerned over accidents that can occur at such NPPs. Still, the Project on Nuclear Power and Radiation has yet to connect with any anti-nuclear movements In China.

South Korea has 32 reactors in all at its four NPPs—Hanul, Wolseong, Kori, and Hanbit. The nation is planning to build new major NPPs, such as New Wolseong, New Hanul, etc. Every one of them faces massive protests,

following the Fukushima meltdown. In October 2013, many activists, including some Christians, from many of the municipalities hosting a NPP, visited Japan to see Fukushima as well as some other NPPs, like Genkai, Ikata, Kaminoseki, and those in Fukui Prefecture. The South Koreans made friends with the residents of Japanese municipalities hosting a NPP and exchanged information.

In Taiwan, six reactors in three NPPs are currently in operation. A fourth one is currently under construction in Gongliao, Xinbei City. This one is a joint export by Hitachi, Toshiba, and Mitsubishi, and therefore, is called "Hinomaru Genpatsu" (NPP carrying the Japanese flag). Many citizens have long steadily protested against it, with support from a Presbyterian denomination. Thanks to their protests, no one today knows when, if ever, the NPP will be completed—30 years have passed since its planning began. According to a report, some Japanese who visited the NPP's construction site were asked by residents there to work against Japanese companies who export NPPs to get them to stop.

India has 25 reactors at its six NPPs, including those under construction. In India, some businesses—not just those in the NPP industry, but in others as well—do not pay due attention to the lives of residents living in their neighborhoods, as shown by the Bhopal disaster of 1984. Many residents around the NPPs are, therefore, seriously worried over possible accidents.

Four reactors are currently planned in Vietnam, and three in Turkey. Japan's NPP exporters are trying to win orders from them. Kazakhstan, Iran, Pakistan, and some other countries in Asia are also building NPPs.

Considering how hazardous a NPP accident can be, and considering that

there is no way to safely process used nuclear fuel, and in the light of many other serious issues, we know that a NPP is a "lemon" product. What does that say about the ethics of Japan, the U.S., and other "advanced economies" when they try to sell their NPPs to the countries of the world? The people of the world, especially in Asia, should work together to stop the export of NPPs.

[20] Is Germany going free of nuclear power?

In June 2011, the German government adopted, in a Cabinet meeting, legislation to stop the operation of its 17 reactors, one by one, and to "decommission all the nuclear power plants" by 2022. This decision did not come out of nowhere. German citizens had already been discussing nuclear power for decades, and the coalition government before Merkel decided to abolish nuclear power by 2022 or so. Then, Merkel took power and at once changed the nation's direction to extend the operation of its nuclear power plants (NPPs). Then came the Fukushima disaster.

Soon after the Fukushima meltdown began, Chancellor Merkel established the "Ethics Commission for a Safe Energy Supply." Its 17 members, including some religious leaders, submitted a report in May 2011. In brief, the report stated: "Even a highly safe NPP can be hit by an accident. Once an accident takes place, nuclear energy is more hazardous than any other kind of energy. Also, it is ethically impermissible to leave the processing of waste and other serious issues to future generations. We have energy sources safer than nuclear. By expanding renewable energies and promoting energy efficiency, we can gradually eliminate nuclear power. This can create great opportunities for future economic development as well." Responding to this, Chancellor Merkel said, "We have to set out on

a new way. We need to reshape our energy system radically, and we are capable of doing so. What we want is energy that is safe, reliable, and economically feasible."

Needless to say, Germany has to overcome many difficulties before it achieves this goal. For instance, the question of where and how to bury high-level radioactive waste has to be answered; questions about the power grid have to be answered; questions about buying power from France, and many other questions, have to be answered. The nation is struggling with these questions. While the world watches, Germany has to prove itself as it seeks to set itself free from nuclear power in the years to come. Citizens of the world have much to learn from our German counterparts who supported the Ethics Commission's conclusion that "humans are not allowed to do anything they want to, even when it is technically feasible." When Adam and Eve ate the forbidden fruit, God questioned them saying, "Where are you?" (Genesis 2:9) and "What have you done!" (Genesis 2:13). We too have to keep these questions firmly in mind.

[21] Our repentance and efforts

Since the late 1970s, the National Christian Council in Japan's Nuclear Committee has been busy spreading words of warning on nuclear energy, across all different denominations. Even back then, the Committee was pointing to workers' exposure to radiation at uranium mining sites and in nuclear power plants. In addition to the hazardous nuclear waste, NCC had also warned us that nuclear energy can only stand upon sacrifices of the poor and oppressed. Thus, they have been consistently appealing that Christians cannot tolerate nuclear power.

Nevertheless, this outcry of warning has been ignored not just by the Japanese government and the nation's industry leaders but by many of its churches as well. Understandably, Nippon Sei Ko Kai (NSKK, the Anglican-Episcopal Church of Japan) was no exception. Perhaps, we uncritically adopted the false logic that "Nuclear power generation, unlike nuclear weapons, is a peaceful use of nuclear energy, which is indispensable in the coming age." That myth of "cheap and safe power from nuclear energy," made up by the nuclear industry has had many of us fooled.

< NSKK's own repentance>

Back in the 1950s, when the Episcopal Church in the United States of America proposed to provide a laboratory-sized nuclear reactor to St. Paul' s University (a university in Tokyo run by NSKK), we welcomed the offer. At the reactor's opening ceremony, the "prayer for dedication of a nuclear reactor," written by then Primate of the US Episcopal Church was read aloud and we proceeded with the "peaceful use of nuclear energy."

Now, we have to face up to those regrettable facts in our own history. We made a vow to "renounce the evil powers of this world which corrupt and destroy the creatures of God" yet we were ignorant of how nuclear power was precisely part of such "evil powers." We need to repent. Some might say that it was five decades ago, making it difficult to realize the problems involved in nuclear power plants and the ways they were built up. Even so, it is obviously our task to critically analyze we did back then. We have to own up to our mistakes head on and repent. It is only then we are able to make a fresh new start. Otherwise, we might stray into the wrong path once again.

Three years have passed since the March 2011 earthquake in eastern Japan

launched a meltdown at TEPCO's Fukushima Daiichi Nuclear Power Plant (NPP). (Translator's note: The original Japanese was written in 2014.) Over these three years, the perception of many is that the rebuilding of hard-hit areas has made little progress. Especially serious is how things stand in Fukushima Prefecture. A joint opinion poll conducted by two Japanese newspapers, the Asahi Shimbun and Fukushima Minpo, discovered that 77 % of Fukushima residents surveyed thought that the general public of Japan was losing interest in those affected by the Fukushima meltdown. Also, on the question as to whether the path to rebuilding was in sight or not, 82 % of the respondents said either "Not clear" or "Not evident at all." Also, in the three hard-hit prefectures, Iwate, Miyagi, and Fukushima, 3,021 people died of causes related to the 2011 earthquake, such as stress, fatigue or sickness after the earthquake, according to statistics compiled by NHK on May 6th, 2014. Among the three, Fukushima, from which more than 130,000 residents escaped, had the greatest number of such deaths, at 1,691, more than the lives killed directly by the earthquake or tsunami, which were 1,607 in number. This shows how serious the hardships are that the lingering nuclear disaster has brought to people.

In spite of all this, Japan's government is trying to bring refugees back to their hometowns in Fukushima, claiming that "Fukushima Daiichi is now completely under control." Also, due to the gigantic budget and resources being spent on the 2020 Olympics, efforts to rebuild the areas hit hard by the earthquake and to save lives from the Fukushima meltdown are being compromised. If we are determined to protect lives, given to us by God, if we are determined to live up to the teaching of Jesus—"Love each other"—we have to see what is really happening, raise our voices, and take specific actions to help the victims.

§ Appendix §

-"For a World Without Nuclear Power Plants - The Anglican/ Episcopal Church in Japan Opposed to Nuclear Power Generation -"
-- (a resolution of the 59th General Synod of Nippon Sei Ko Kai [The Anglican Episcopal Church in Japan] --

-Books and sources consulted as we prepared this Q&A

"For a World Without Nuclear Power Plants - The Anglican/Episcopal Church in Japan Opposed to Nuclear Power Generation -"

The accident brought about in 2011 by the East Japan Great Earthquake and Tsunami at Tokyo Electric Power's 1st Fukushima Nuclear Power Plant has posed a threat to people's lives by disseminating radioactive substances not only in the immediate vicinity but in a much wider area, thus revealing that nuclear power generation is extremely dangerous in itself. It is not too much to say this is a warning from God to each of us who, having suffered from nuclear bombings, have failed to acquire sufficient knowledge about nuclear power and exposure to radiation.

There is no denying that, even without accidents, nuclear power is a real threat to people's lives in that it imposes sacrifices on socially weakened people throughout the process, from the mining of uranium to the disposal of radioactive waste. It also runs counter to the teachings of Jesus Christ as it cannot be sustained without people's sacrifices.

Nevertheless, as the House of Bishops stated in its message on March 11, 2012: "We have enjoyed materially comfortable life by allowing nuclear power plants to be built in various parts of the country to make it possible to consume more electricity. The Great Earthquake has shattered the safety myth of nuclear power under the guise of peaceful utilization of nuclear energy. We call for the conversion of Japan's energy policy, which currently depends on nuclear energy. We also strongly call on all of us to change our own lifestyle."

On the basis of our own sincere reflection, the Nippon Sei Ko Kai (Anglican Church in Japan) considers that the nuclear power generation is fraught with the following serious problems.

Nuclear Power Endangers the Life Created by God

The nuclear crisis in Fukushima threatens the life of all creatures. It endangers the physical condition of future generations through the exposure of children to radiation. A large quantity of radioactive waste, without any appropriate disposal technology, will continue to endanger people's lives for a long period of time. Besides, no one can deny that the existence of nuclear power plants in a country like Japan, which is subject to frequent earthquakes, is very likely to be the cause of serious crises in the future.

In addition, indigenous peoples are exposed to radiation in the process of the mining and enrichment of uranium abroad, while the lives of workers engaged in the maintenance of nuclear power plants at home are also threatened. Moreover, the peaceful utilization of nuclear energy is inseparable from military aims, in the sense that a large amount of plutonium created in the plants can be immediately converted into material for nuclear weapons. The nuclear power plants are also vulnerable to possible attack in case of a war or a conflict.

Nuclear Power Destroys the Nature Created by God

God created the universe and finally man, to whom He committed the safeguarding of the integrity of creation (Genesis 1). Nuclear power destroys nature beyond the limits determined by God. The technology of nuclear power tries to mine radioactive substances which have been stabilized over a long period of time and to enrich uranium 235, which is rare in nature, in order to bring about nuclear fission, thus causing serious consequences capable of destroying whole ecosystems.

It has been said that nuclear power is a clean source of energy. In fact, however, it also uses a large quantity of fossil fuels in the enrichment of uranium and the maintenance of power plants, thus emitting abundant carbon dioxide and a large quantity of heat in the environment through heated secondary cooling water.

Besides, an abundance of radioactive waste will be bequeathed as is to future

generations, as such waste cannot be disposed of nor stored safely. We are responsible for such nuclear waste.

Each one of us must turn back to God, who saw that all He created was good.

Nuclear Power Deprives People of the Peaceful Life Given by God

Nuclear power plants have been imposed on impoverished areas in Japan under the pretext of their being "absolutely safe." Though the plants have been said to create jobs and bring about prosperity, actually, they have further increased regional disparities. The nuclear crisis has caused people affected areas to lose their homes and jobs. In the absence of other major industries—such as farming and fishing—upon which to base their livelihood, they cannot afford to help their children evacuate the polluted hometown. More people are compelled to live an unstable life due to the threat of radioactive contamination and, with increased mental stress, some families are faced with disruption and collapse. We must take seriously the situation of such people.

For a World Without Nuclear Power Plants

Based on this reflection, we Anglicans in Japan believe that, first and foremost, we must pray for those people threatened by the nuclear accident as well as the whole of life on earth. And, as Christians following Jesus Christ, we must speak publicly against nuclear power.

First of all, we demand that the Japanese government be responsible for, and put an end to, the devastating consequences of this nuclear accident and we also share the responsibility. As Jesus taught us, "Whatever you want men to do to you, do also to them" (Matthew 7:12). It is not permissible for us to impose the danger and exposure to radiation on sparsely populated areas as well as to create new dangers in foreign countries to which Japan is planning to export nuclear power plants.

In solidarity with other denominations and faiths, we call for an immediate abolition of nuclear power plants and a conversion of Japan's energy policy toward the development of alternative sources of energy. We are determined to change our own lifestyle from the old one in which we have pursued only convenience and comfort. We will share pains and difficulties with those who suffer and pray for a world where we learn from, love and support one another.

May God bless this land and restore peace on earth!

May 23, 2012

The 59th General Synod of NSKK (Anglican Church in Japan)

Books and sources consulted as we prepared this Q&A

We consulted many publications, websites, and other sources as we prepared this Q&A.

All of them are available in Japanese. In case you are interested, please read the original Japanese bibliography list of this Q&A, at http://nskk.org/province/genpatsugroup/wp/wp-content/uploads/2015/04/QA.pdf

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