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＜Report＞

A Comparison of Japanese and German Approaches to Denuclearization and the Transformation of the Energy System

――A Review of a Conference held in Berlin――

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Introduction (by Fumikazu Yoshida)

Two years after the accident at the Fukushima Nuclear Power Stations, Germany has made a final decision to phase out its use of nuclear power, and has been working towards the transformation of its energy system. Yet while nine nuclear power plants are still operating in Germany and in Japan only two nuclear power plants remain in operation and commitments to save energy have made progress, no decision has been taken to realize denuclearization. Against this background, an academic conference to compare Japanese and German approaches to denuclearization and trans-

formation of the energy system as a social science study was held in Berlin on March 11 and 12, 2013, and about 50 participants took part in active discussions.

The conference reached a consensus on the importance and necessity of conducting independent, comprehensive research in the areas of law, economics, sociology, and social psychology, as well as reaffirming the importance of research exchanges between Japan and Germany. Since the process of denuclearization and the transformation of the energy system is a long-term project that is still far from being accomplished, both countries also agreed to encourage the participation of young researchers in the conduct and development of their joint research undertakings. As my responsibility as editor, I wish in this report to briefly introduce the research achievements and the issues arising that the two countries brought to the conference by introducing the main reports in connection with the "great energy transformation".

Firstly, Professor Fumikazu Yoshida (Hokkaido University) gave an outline of his research in a paper entitled, *"A Comparative Study of Denuclearization between Germany and Japan – Why German has successfully advanced towards denuclearization but Japan has not."* Although public opinion surveys in Japan have found that 70% of the citizens support denuclearization, recent election results seem to contradict this and the views of the population are not reflected in the policies of the present government. Although nine nuclear power plants are still in operation in Germany, Germany has a clear vision and goal for ultimate denuclearization and for transformation of its energy production. The report of a "special Ethics Commission" (May, 2011) indicates that the issues were discussed thoroughly and that Christian church leaders also played an important role in the German decision.

Although the Japanese government has published the results of a parliamentary investigation into the Fukushima disasters, Japan has not been able to reach a political consensus as to the causes and the consequences of the disaster, and all discussion of the basic energy plans has been postponed; indeed, after the return of the Liberal Democratic Party to power senior governmental voices have urged the restarting of the nuclear power plants. Even further, the new Prime Minister and the Minister of Economy, Trade and Industry have spoken of their desire to build new power plants. In reality, however, not one of Japan's nuclear power plants is in full operation and energy saving efforts are being implemented at every level.

My account of the topic took as its title, *"A Comparative Study of Denuclearization between Germany and Japan – transformation from the development of nuclear power plants to denuclearization"*. Firstly, I noticed similarities and differences in postwar developments and styles of modernization. During Japan's modernization process following the Meiji Restoration, when Japan was called "Prussia of the East", Japan embraced many organizational methods and technologies modeled on those of Germany. And when, later, both countries extended their territorial ambitions, this precipitated World War II, and both experienced historical defeats; afterwards, however, the two countries went through different postwar processes: Japan came under an independent, indirect occupation by the U.S., while the former Reich was divided into East and West Germany. In what became West Germany, the postwar reforms led to a decentralized system of government, and the country was reorganized as a Federation: whereas West Germany became a Federal Republic, Japan pre-

served its the old centralized structure. In consequence, Japan's continued degree of centralization meant that the international relationships of Japan and Germany also differed greatly, and these differences have affected their responses to issues of nuclear power.

Keeping these differences in mind, I now wish to analyze the frameworks and actors involved in the development of postwar nuclear power generation. In Germany, a radical political party, the "Greens", took shape, and this party has influenced the mainstream parties, the Christian Democratic Union (Christlich Demokratische Union) and the Social Democratic Party of Germany. In Japan on the other hand campus activism has not led to social reforms, nor have political parties been oriented towards the preservation of the environment. Since many Germans feared that East and West Germany would become the front line in any future nuclear war, activist members of the anti-nuclear arms movement cooperated with activists of the movement that opposed the generation of nuclear power as a source of energy. In Japan, however, no such powerful nationwide organizations opposing nuclear power plants or alliances similar to those in Germany were formed: indeed, any political activity that opposed the development of atomic and hydrogen bombs was suppressed. In Germany, the decisions of the power generation companies themselves influenced choices to do with nuclear power, but as Japanese nuclear power companies are run privately under a national program it is not at all clear how the Japanese government and power generation companies divide their responsibilities. Thus, the contradictory organizational issues that Masao Maruyama pointed out remain unresolved.

When it comes to the promotion of nuclear power, each German state (*land*) has strong authority over granting permission for the use of nuclear power for generating energy under the system of regionalism presently established there. In Japan, on the other hand, the government has strong authority over planning and permission, while regional development (of the Kakuei Tanaka type) and the development of locations chosen as sites for nuclear power plants is promoted as a public works project under the Three Power Source Development Laws. This leads to an apparent contradiction in which prefectures closely involved in nuclear power plant projects, such as Aomori and Fukui, are strongly opposed to denuclearization. The German ideological basis for nuclear power with its slogan of "nuclear power as high-technology" is not greatly different from Japan's "atomic power as high-tech", Japan's ideological foundation represented by such mottos as "Atoms as a dream for progress" and "Astro Boy", a popular manga figure, whose name when directly translated is "Mighty Atom".

When we look at historical turning points in the development of nuclear power as a source of energy, we can find that Germany suffered domestic pollution as a result of the disaster at the Chernobyl nuclear power plant, and when the coalition government of the Social Democratic Party and the Greens took power, Germany turned towards denuclearization. Japan took no appropriate measures as a result of this serious accident, failing to learn from serious accidents in other countries. Japan must now make use of the accident at Fukushima to reflect on its nuclear policies and consider a change of course. If Japan cannot phase out nuclear power, even after the disaster at Fukushima, second only to Chernobyl in its effects, and on top of the atomic bombs dropped on Hiroshima and Nagasaki, it will be a tragedy for Japan.

While the regulatory arrangements that supported the generation of nuclear power in Japan encouraged the creation of the "safety myth", the electric power companies themselves absorbed the regulatory authority within their own management. Japan is now being tested to show if it can provide direction and substance to regulatory reform by learning from the damage that now affects such a large area around the Fukushima nuclear plant. In the relationships between nuclear power and the country's economic organizations, Germany has found economic advantages in the use of renewable energy and energy savings. Yet although Japan has developed methods of advanced technology for making use of renewable energy, it invested so heavily in nuclear energy that very powerful vested interests were brought into play and are now likely to prove difficult to resist. This explains why experts on nuclear power from the private sector were appointed committee members of the Council of Economic Advisors, while the newly installed Abe regime did not emphasize innovation since it had no intention of establishing a change of policy in the direction of denuclearization. Japan must face reality and pay note that both China and South Korea have placed strong emphasis on wind power generation while continuing to make use of nuclear power. Now China leads the world in wind-power-generation facilities (26%).

The future for Japanese society lies in energy saving, high technology, cooperation with surrounding communities, and a much better understanding of the needs of the future. It has been said that "external pressure" (opening up the country, the Meiji Restoration, defeat) and "human sacrifice" (wars and damage from pollution) were the factors that contributed to changes in Japanese society. Japan now needs to address the issue of denuclearization steadily and consistently by utilizing pressure from and cooperation with international society, and by sharing and disclosing information and full details about the disaster at the nuclear power plant.

In order to deal with an aging society with fewer children, both Japan and Germany will have to make grassroots effort to introduce measures that will enable the proper use of renewable energy, energy savings, and the creation of a sustainable society. What both countries need is the will to harbor "hope" and maintain a sense of "responsibility". Here, amongst beneficial capital investments, we must promote the building of the foundations for projects to develop regions economically and lay down the basis for a sustainable society through the use of renewable energy and energy savings. In this process we must change the approaches to investment, promote innovation that has lasting value, make sensible investments so as to build the frameworks essential for creating an infrastructure suitable for the application of renewable energy as well as for saving energy, while creating power transmission networks through joint projects involving the government and private sectors.

During the conference, Mr. Franz-Josef Schafhausen, the vice-director of the Energy system transformation project of the Federal Ministry for the Environment (BMU), Nature Conservation and Nuclear Safety, delivered a key-note speech that is directly related to the theme of this paper: "Energy system transformation in Germany: *Germany's Energy Transition: Opportunities and Challenges*". The speech elucidated the main driving forces that lie behind Germany's "Energy transformation", a policy that aims to shut down all nuclear power plants by 2022, to reduce greenhouse gases by more than 40%, and to provide 35% of electric power from sources of renewable en-

ergy. The basic points are energy security, climate preservation, and continued growth. Germany has pursued these objectives on three fronts: (1) energy supply, (2) energy security, and (3) environmental compatibility. Time, financial resources and societal acceptability are all indispensable to achieve the goals. It is important to note that the share of energy use for electricity is only one-third, while the remaining two-thirds of energy needs are for heating and transportation.

Of these, nuclear energy currently accounts for 8 to 11% of the primary energy. The main features of the German approach are that Germany has set itself ambitious targets that have been evaluated from all possible angles, and that combine policy, instruments for implementation, and monitoring of all its aspects. The policies to achieve the goals emphasize flexible and economic approaches, while improvements to transportation and the thermal insulation of buildings are key aspects for the energy savings incorporated into the goals of the energy transformation project. Among the three sectors, transportation, heat, and electricity, the greatest emphasis is given to the electricity sector. Nevertheless, because of the introduction of Feed-in Tariffs (FIT) for renewable energy, the burden on households will unfortunately increase, and since this will involve institutional reforms, the Federal Ministry of Economics and the Federal Ministry for the Environment are involved in the discussions, for if Germany hopes to realize denuclearization and energy transformation, comprehensive power grids and adequate storage facilities are of central importance. And if we wish to save energy, the renovation of buildings and improved heat insulation are also important. Energy transition requires the establishment of an electricity-capacity market and the strengthening of the power transmission network, with increased flexibility. The spot price for electricity has fallen owing to the "merit order effect" (purchasing electricity from low price suppliers) created by the use of renewable energy. At the same time, it is important to address CO_2 emissions separately from the GDP while connecting the production of renewable energy to issues of employment: in 2011, about 380,000 people were engaged in Germany's energy related industry.

In summary: (1) the German energy transition policy is a concrete programme and it is being implemented and continuously monitored; (2) the use of renewable energy has experienced strong growth, because (3) of ambitious targets, efficient policies and instruments, as well as long-term planning security; (4) the benefits of renewable energy include climate protection, job creation, economic growth, and reduction of energy imports; (5) crucial issues for the next steps include questions of cost efficiency, particularly the integration of the solar photovoltaic (PV) market and grid development for renewable energy, the expansion of the grid and its storage capacities, sustainable and efficient use of bio-energy, and global cooperation, specifically among Member States of the EU.

During the open session that followed Mr Shafhausen's speech, questions were raised about the possible influence of the use of shale gas, the prospects for EUETS (the EU Emissions Trading Scheme), and the huge compensation demands that will follow the decommissioning of nuclear reactors.

Responding to these concerns, Dr. Hans-Joachim Ziesing, a member of the Independent Energy Expert Commission and Chair of the Berlin Climate Advisory Board, reported on the approaches of "Monitoring Germany's Energy Transition", the transformation of energy generation and the distribution arrangements. His report noted that the Germany Energy Transition project considers re-

newable energy to have a great potential impact. Although electricity had to be imported when Germany discontinued the operation of eight nuclear reactors, the amount exported at present is greater than the amount imported. Phasing out nuclear energy is not difficult, but it is difficult to reduce CO_2 emissions at the same time. If this task is left to the market, it will not be successful. The Federal Ministry of Economics and the Federal Ministry for the Environment has been commissioned to write and issue a report under the title of "Monitoring Germany's Energy Transition". The Ethics Commission has emphasised the importance of this report, while The Energy Expert Commission has been deputed to add its own independent comments. The Federal Ministry of Economics and the Federal Network Agency are responsible for the expansion of the electricity supply grid, while the Federal Ministry for the Environment is responsible for the expansion of the sources for the generation of renewable energy.

The plan has two main objectives: the phasing out of nuclear energy while at the same time reducing CO_2 emissions. Since the plan will include many related intermediate targets and indicators, the transparency and resilience of the data are important, yet as all the related phenomena are related to the energy transition, it will be difficult to determine the cause-and-effect-relationships involved. The most important issues for energy saving are in the fields of transportation and buildings (construction and maintenance), but here only insufficient efforts have been made. The use of renewable energy for heating will be indispensable. The reform of the electricity market will also be necessary because of the demand for a market for the total electricity-capacity. To make use of the data that has to be available, it will be necessary to develop and improve the energy balance table.

While the main focus of attention appears to be directed towards how electricity is produced, it has to be borne in mind that the fundamental problem is how the electricity is distributed. Even if most middle-class households will be able to pay the increases in prices of electricity that arise from the FIT for renewable energy, it is necessary to consider the effects of the costs on the sectors of the population that are economically weak. Historically, the price of electricity has tended to fall, and has not increased even though there has been a reduction in the number of nuclear power plants. Since overall reductions in CO_2 will not be easy to achieve, the generation of electric power from natural gas will be necessary. Another concern is that the statistics available for energy use in buildings have not yet been fully worked out.

Further, the costs required for denuclearization that have been calculated on the basic energy generation principles (2010) are reckoned to be in the region of 15 - 16 billion-euro (about 2 trillion yen). This is a huge amount, but it is manageable when viewed on an annual basis.

Commenting on the historical significance of German denuclearization and energy transition, Professor Martin Jänicke, of the Free University of Berlin (Freie Universität Berlin) described it as "a 3rd Industrial Revolution – the Dynamism of the Green Economy". Since the 1990s, advances in information and communication technology (ICT) and progress in microelectronics and energy savings have had a rapid and powerful influence on the development of a wide range of societal systems and arrangements. In particular, the number of countries that have set and increased their targets for renewable energy has been growing in response to the global increase in the prices of

fossil fuels. Innovation and market expansion are further advancing these developments.

The rapidity in the growth of China's wind power generating capacity is far greater than anyone expected, and China today has the largest installed wind power generating capacity of any country in the world. Here we have to pay attention to the reduction in greenhouse gas emissions and the overlapping governance required to achieve it, and we need to investigate further cases in other countries that have already dealt with this issue. Countries that have started development later have advantages in speeding up the implementation of policies to reduce these emissions. In Germany, 20 million people in 132 areas are involved in projects that aim to generate all the required energy from sources of renewable energy. According to a report on the green environmental industry published by Roland Berger Strategy Consultants in 2012, the market increased from 200 billion euros in 2007 (about 20 trillion yen) to 350 billion euros in 2011 (about 35 trillion yen). If we hope to achieve denuclearization and the transformations in energy supply provisions, it will be important to use our resources with moderation, as well as to expand opportunities for employment.

Dr. Helmut Weidner of the Berlin Social Science Center, who has for many years been involved in comparing the environmental policies of Germany and Japan, has written a report on the "German Climate Policy". Dr. Weidner has conducted empirical research of the environmental policies that Germany and Japan have followed since 1975, and because he is scheduled to retire from the Berlin Social Science Center, this conference was a very opportune occasion for him to sum up his findings. Although he is not really a skeptic about the opinions of IPCC, specifically about climate change issues (the issue of global warming), he does express skepticism specifically over the clean development mechanism (CDM) and the EU ETS because these have to serve very broad public needs and are not sufficiently precise. Here, it is essential to conduct independent research studies, and since such frameworks are easily manipulated, it is necessary for us to conduct multicultural studies so that we may be able to recognize how different people(s) have different views of the world around us.

Germany sees its international duty as acting with "global public responsibility", for environmental policies cannot be established without a pioneering country leading the way, and Germany has done this through its policy of "Ecological Modernization". We are able to evaluate German climate policies as reasonably successful because it derives advantages as a forerunner, while as the forerunner it also benefits from its ability to set standards.

Globalization has both positive and negative aspects. "Global justice" and "distributive justice" are important. The EU ETS puts most emphasis on efficiency and focuses less on the matter of fairness. Sharing burdens evenly is important and it is a serious challenge to work towards achieving that aim. Additionally, there is a conflict between the approach that promotes public acceptance of renewable energy and a stress on an "elitist approach". Politics is one thing and political analysis is an entirely different matter. Establishing NGOs and networks of all kinds is cost intensive, and we are able to look at and compare the costs in Germany, Japan, and the USA.

Although, in working out its own environmental policies, Germany has learned about the Japanese development and establishment of desulfurization installations as well as having learned from Japan's damage compensation arrangements, many Japanese now visit Germany to study its envi-

ronmental policies. In response to the accident at the Fukushima Nuclear Power Station, Germany has made the decision to phase out nuclear power, so why is it that Japan herself cannot change direction? Was Germany able to proceed successfully by moving with the dynamics of the situation? Her post-war experience may have helped, for Germany was subjected to the east-west division following the war and reacted to the situation with great seriousness, while the issue of non-material values and the German student movement in the 1960s led to the formation of the "Green Party". These historical factors will have contributed to the present direction in which Germany is moving. We must recognize that every country has a different policy style and approach to transparency.

Dr. Christian Hey, Secretary General of the German Environment Advisory Council, reported on the progress of Germany's energy transition program and the key issues that it raises under the title "*Transition Crisis - Key Issues on the Way Towards 100% Renewables*". The policy purposes of the energy transition are de-carbonization, the reduction of dependence on imported fossil fuels, and the "growth of green businesses" (investment and employment). To achieve these goals, Germany must rely on technological innovation, systems integration, political agreement, and global role models. Although the scenario analysis believes that by 2050 it will be possible to guarantee that 100% of Germany's electricity supply will be provided by renewable energy, this will require investments that entail high initial costs and the establishment of off-shore wind plants. It will also require the creation of flexible power generation arrangements and the reduction of costs through energy savings and the giving up of all forms of coal-fired power generation. The idea of a 100% renewable energy generation is entirely feasible, and a learning curve model for cost reductions will serves as a key element in its implementation.

The problems that attend this scenario include the fear that the growth of renewable energy generation will be too fast to control costs, that the expansion of the power grid is already behind schedule, and that the profitability of the remaining conventional plants is falling. At the same time, it is indispensable to make the power supply secure and coordinate the various components (demand, supply, storage, the power grid). Amongst the problems related to the elements that drive costs is the question of who will pay the costs should we choose either renewable energy or fossil fuel, and whether the issues are short- or long-term concerns. The expansion of the power grid requires changes in incentive systems because early participation of the citizenry is vital. Another worry is the risks posed by conventionally fired plants.

To optimize power generation and distribution while enabling flexible plant utilization, it will be necessary for the EU to have (1) a smart flexible grid, (2) integrated regional markets, and (3) storage and a network spanning the whole of the Union. It will also be necessary to reform the payment and compensation arrangements for the parties involved, and to reduce the power consumption.

Another speaker, Dr. Lutz Mez of the Environmental Policy Research Centre, the Free University of Berlin, reported on "*Germany's Nuclear Phase Out Policy*". Germany's denuclearization policy was not decided hastily but has developed slowly in a long and time-consuming process ever since the 1980s. Germany initiated a nuclear power generation program from around 1956 to 1957, issued the Göttingen declaration opposing nuclear weapons in 1957, and established the Atom Act

in 1959, making it effective from 1960. The storing of nuclear waste in Asse commenced in 1965. The former East Germany had a uranium production mine in Wismuth, established a Nuclear Research Center in 1956, and started operating reactors in the 1970s to reduce the need for crude oil imports from the Soviet Union. While nuclear power was promoted in the former West Germany after the first oil price crisis, a strong anti-nuclear movement emerged from local resistance to the nuclear policies, leading to the foundation of the Green Party during the years 1979 and 1980. With the spread of the anti-nuclear movement in different parts of the then West Germany, antinuclear arms and anti-nuclear power plant movements were united in their goals. In the former East Germany, the environment protection movement spread.

As a result of the disaster at the Chernobyl nuclear power plant in 1986, the Social Democrats and the Trade Unions shifted their position away from nuclear power and joined forces with the anti-nuclear movement. In 1986, the Federal Ministry of the Economy investigated the effects of denuclearization in Germany, and finally decided that in 2005 further work on the nuclear fuel cycle would come to a halt. The Green party and Social Democrats formed a coalition government in 1998, and agreed to phase out all nuclear power generation by 2022.

Yet even if Germany decides to phase out nuclear power, numerous unsolved problems for industry will remain: these will include the disposal of nuclear waste (the former East Germany returned spent nuclear fuel to the Soviet Union), securing the future livelihoods of engineers and skilled workers in the nuclear power related industries, and enforcing measures to protect plants against terrorism and nuclear proliferation. In 2010, The Christian Democratic Union tried to push the deadline for the phasing-out of nuclear power, while at the same time the basic energy principles to promote the introduction of renewable energy and energy saving were being issued. After the disasters at Fukushima in March, 2011, the report by the Ethics Commission was submitted to the German government, and after a decision made in Parliament, it was decided to phase out nuclear power by 2022. The Conservative Parties also accepted this decision. However, the cost of dismantling nuclear power stations is higher than that of their construction. Although expanding renewable energy and energy saving is a challenge, the most serious challenge faced by the liberalization of the electricity industry is how to stabilize the supply.

The German approaches to denuclearization were taken up by Dr. Rosario DiNucci, The Environmental Policy Research Centre, The Free University of Berlin, who spoke of the issues related to the management and disposal of nuclear waste in a presentation entitled "*Nuclear Waste Management in Germany: Political and Societal Challenges*". She believes that the issues related to the management of nuclear waste have become political issues, and to solve the problems it will be necessary to integrate the top-down method with the bottom-up method, while, at the same time both hard and soft legislation will be necessary. In Germany, the issues that attend the disposal of nuclear waste have been considered not just a hard problem: they are almost intractable. Importantly, we must consider a "framework within which to raise concerns and issues", and the critical elements are the interests involved and basic concepts that are in conflict and those that interact. The issues fall along four axes: (1) a technological axis, (2) a political axis, (3) a total overall framework axis, and (4) a time axis. Three options are open as methods for dealing with nuclear waste: authori-

tarian, competitive, and/or cooperative methods. In Germany, non-exothermic nuclear waste has been disposed of at Asse and exothermic nuclear waste at Gorleben. The main actors who must deal with questions of nuclear waste are the national government, the state governments, counties, NGOs, industry, researchers, and the mass media. A radioactive waste management committee (Entsorgungskommission, ESK) has been established, and its eleven expert members have worked out plans: as nuclear-waste disposal sites, they have chosen Gorleben and Asse, which are close to the former East-West German border. Inevitably, perhaps, this proposal for waste disposal provoked a typical NIMBY (Not In My Back Yard) reaction. These sites will be used for dry storage until 2022, and by any time between 2030 and 2100 they are scheduled to become the final disposal sites, but before this can be settled many awkward hurdles will have to be overcome. To clear these hurdles, the project by the Environmental Policy Research Centre of the Free University of Berlin and other research institutions is scheduled to draw up a vision for multi-layered governance of the waste disposal. Dr. Dörte Ohlhorst (Free University of Berlin) spoke on the topic of "Energy Transition and Public Acceptance in Germany". Her research team has focused on achieving a general consensus on the question of energy transition in Germany, forming "the Helmholtz Association", a research organization comprised of German universities and research institutions. Although the idea of phasing out nuclear energy (one of the primary goals of the anti-nuclear power movement) is now widely accepted and the use of renewable energy is not in most cases challenged, a number of people do oppose the change to renewable energy for a variety of reasons. They oppose renewable energy because of apprehensions about its effect on the ecosystem, damage to biodiversity, bird strikes, damage to human health, fairness, and the methods used to decide locations for such plants as wind farms. These apprehensions partly originate from a failure to understand the necessity of the project, distrust of the way that decisions are made, and insufficient participation in the project. Additionally, some reactions are based more generally on NIABY (Not In Anybody's Back Yard) movements than on the more limited concerns expressed by the NIMBY (Not In My Back Yard) reaction. The construction of power lines will cause problems for the affected municipalities and individual citizens, while the burden will be borne only by some. Other protests are concerned with the protection of the natural environment. After due consideration of the reasons why some people are opposed to the idea, we have to consider how to gain people's approval of the project; we have to regard objections as offering opportunities for improved understanding by ensuring a fair participation process, by providing exhaustive information and by opening up opportunities for dialogue. We cannot decide these matters unilaterally.

At the conference in Berlin, Japanese researchers also presented reports on their studies and took part in the active discussions. The Japanese presenters included Prof. Kazuto Suzuki (Hokkaido University), "*The Myth of Safety: How Japanese Nuclear Safety Regulation was Captured*", Prof. Hiroshi Honda (Hokkai Gakuen University), "*Three Cleavages of Postwar Japanese Politics as the Context of the Anti-nuclear Movement*", Prof. Kenichi Oshima (Ritsumiekan University), "*The Cost of Nuclear Power in Japan*", and Prof. Susumu Ohnuma (Hokkaido University), "*How to Design A Decision Making Process with a Participatory Program for Radioactive Waste Management*".

Among these, Prof. Kazuto Suzuki, a member of the accident investigation committee drawn

from the private sector, emphasized that since the Japanese nuclear regulation system became "a slave to regulation" because the regulatory authorities themselves lacked knowledge and experience owing to the complicated administrative structure and frequent rotation of the regulators, the final responsibility for decision making is still unclear; ironically, too, there has been excessive regulation of hardware and equipment, which is an easy matter to oversee, and a lack of regulation over the more difficult question of how to operate the installations; another factor was the officially propagated but erroneous belief in "the myths of safety".

Professor Kenichi Oshima focused on "the cost of nuclear power in Japan" and emphasized that although Japan had promoted nuclear power under the same three goals as Germany, (1) a stable energy supply, (2) CO_2 reductions, and (3) positive economic effects, the cost of generating nuclear power had not been low when they are compared to the costs incurred by other sources of power generation, even when there have been no accidents. He also pointed out problems with the Nuclear Damage Liability Facilitation Fund Act, involving accident compensation.

Professor Hiroshi Honda reviewed the cleavages in postwar Japanese politics (political cracks), and took as a classic example of such political cleavages political disputes over issues of nuclear power. He described the formation of three political cleavages that had given rise both to cooperation and conflict between social classes where the politics and movements that have involved nuclear power have become incorporated within these cleavages: conservative inertia versus innovation, public companies versus large private companies, and a class directed by the centralized economy versus a regionally dispersed middle sized class of entrepreneurs.

Active discussion during the question-and-answer session considered the ways in which both countries deal with these issues. German topics included the present condition of the energy supply and its generation, the issue of shale gas, the low prices of the EU ETS, compensation to power companies. Japanese issues concerned the prevention of nuclear proliferation, the reactions of NGOs or the citizenry, information disclosure, and the "Nuclear Power Village". Since this was the first conference held under the conditions of academic exchange, the program focused mostly on introductory studies, yet it provided nonetheless a meaningful opportunity for experts from both countries to confirm that it will be necessary for Germany and Japan to continue research exchanges under the same theme. The issues of denuclearization and energy transformation are large and important matters that will continue to trouble us for many years and before agreement is reached the lengthy processes of exchanges and discussion that will have to take place will need to be exceptionally thorough and are bound to take a long time.

Chapter 1. The Myth of Safety: How Japanese Nuclear Safety Regulation was Captured (by Kazuto Suzuki*)

As in the European countries, doubts about safety of nuclear power plant emerged in 1970s. In 1972, the Socialist Party began to oppose the operation of nuclear power plants, an opposition fo-

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mented by the leakage of radiation from the Mutsu nuclear-powered ship in 1974. Doubt heightened with regard to the safety of nuclear power plants and questions emerged concerning safety regulations. This anti-nuclear movement was spurred in part by the rise of environmental movements in both Japan and other countries, but it continued to grow in a particular way. One opinion leader who contributed to this was Dr. Jinzaburo Takagi, of the Citizens' Nuclear Information Center, founded in 1975[1].

With the emergence of this movement, cracks began to appear in the ill-constructed edifice of the myth of nuclear safety. For a time, it appeared that such opposition might turn the tide against the developing use of nuclear energy, but the rising cost of petroleum and the energy shortages induced by the "oil shock" that began in 1973 reemphasized the importance of nuclear energy. In the same year, the Agency of Natural Resources and Energy (ANRE) was established as an extra-ministerial bureau of MITI, and took over policy matters concerning commercial reactors. Around the same time, however, the pace of nuclear power plant construction slowed because of the difficulty of finding appropriate sites after the surge in their construction during the 1960s and also because of mounting public opposition at potential sites. In response, Prime Minister Kakue Tanaka led the passage of "three electric power site laws" – the Act on Tax for Promotion of Power-Resources Development, the former Special Budget Law for the Development of Electric Power, and the Law for the Adjustment of Areas Adjacent to Power Generating Facilities – which provided subsidies to local governments that cooperated in siting nuclear power plant construction and responded to incentives to accept their construction[2]. The economic benefits to local areas that accepted the plant construction became quite meaningful even where considerable opposition continued to exist, while the subsidies provided under the three electric power site laws effectively motivated the acceptance of the nuclear sites, even by local governments that had expressed doubts about nuclear safety. As a consequence of the confrontation with those who opposed the expansion of nuclear power and after discussions over compensation with local fishermen and other affected persons, the advocates of nuclear energy in the national government and the electric power companies developed a mindset which ruled out the possibility of any accidents because they had first to convince themselves that nuclear power plants are safe. This was the foundation for their belief in the myth of nuclear safety.

Since the near-total absence of structural mechanisms for regulatory governance of nuclear safety in the nuclear administration meant that it was difficult for the authorities to argue that nuclear plants were safe, the government, in 1978, separated the Nuclear Safety Commission (NSC) from the AEC and set up an organization of experts with responsibility for safety regulations. It also established the Nuclear Safety Bureau (NSB) within STA (1976). By establishing a specialized governmental organ dedicated to nuclear safety, the government clearly demonstrated its intention to implement safety regulations. In 1980, it established the Japan Radiation Safety Technology Center (currently the Nuclear Safety Technology Center) under STA for dealing with problems

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1) *Living as a Citizen Scientist,* Jinzaburo Takagi, Iwanami Shoten, 1999.
2) Asahi Shimbun "*Nuclear Power Plant State" Kakuei Tanaka Edition*, 17 August 2011.

arising in nuclear power plants. In 1976, MITI established the Nuclear Power Engineering Test Center, known after 1992 as the Nuclear Power Engineering Corporation (NUPEC) and currently as the Japan Nuclear Safety Organization (JNES), which has provided the facilities for testing the safety of nuclear power generating equipment and instruments for the ministries responsible for nuclear regulations[3].

With the establishment of the organizational structure for the governance of safety regulations, the relationship between the agencies for the promotion of nuclear energy and those for safety regulation was changed. The responsibilities were divided among several ministries and agencies, and the overall administration of nuclear technology became even more complicated. AEC, which promotes nuclear technology, and NSC, which oversees safety regulation, were among those whose functions were separated. In effect, these changes institutionalized an even more complex system of administration, not only in the dual promotion structure composed of MITI and STA but also in the dual structure of inspection. This complexity in nuclear energy administration resulted not only in overlapping jurisdictions but also in a blurring of the lines of responsibility.

The accident aboard the Mutsu nuclear-powered maritime vessel became the occasion for widespread networking among various antinuclear groups and added momentum to the antinuclear movement in Japanese society. And though the government took various administrative measures through the reorganization and establishment of governmental agencies designed to enforce nuclear energy safety regulations, these measures were not sufficiently persuasive to act as a counterweight to this antinuclear trend. In the midst of these uncertainties, a lawsuit filed in 1973 over the safety of the Ikata Nuclear Power Plant raised a number of points that tested the validity of the government's safety inspections. The court's judgment, rendered in 1978, confirmed that approval of nuclear reactor installations lay within the scope of government discretionary power, and the government was required during the course of the trial to produce various types of documentary evidence to prove the safety of the nuclear power plant[4]. Since then, the nuclear energy safety regulatory authorities have substantially increased the number of items to be covered during inspection, have lengthened the time needed to complete inspections, and have allowed the inspectors much more time and labor to produce and process the documents.

Yet as regulatory safety governance came to require ever more rigorous inspections, the tendency to overemphasize documentation in the administration of safety regulations also grew, so that the prime objective of inspections to check on compliance with the safety regulations became on the one hand requests to improve the safety of the hardware and on the other the inception of the belief that nuclear accidents would not occur as long as the operators complied with rigorous paper-based inspections. As this kind of regulatory pattern became the widely accepted norm, so the inspection of safety regulation compliance came to be conducted in a bureaucratic manner, and the system of securing nuclear power plant safety by improvements in micro-safety became the es-

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3) *Nuclear Power Engineering Corporation Dissolution and Future Business Development*, Masanori Naito, ATOMOS Vol. 50, No. 4, 2008.

4) *Atomic Energy and Social Dispute: Criticism of Ikata Nuclear Plant Court Decision*, Nuclear Energy Technology Research Edition, Legal Defense Counsel, Technology and Humanity, 1979.

tablished practice. Consequently, inspections have endlessly focused on the micro-management of the nuclear safety regulations. While this has contributed to intensification in the specialization of small parts, it has at the same time grown into types of safety regulation that have lacked any clear means for ensuring the overall safety of nuclear plants.

This micro-management of the nuclear safety regulations also gave rise to a more unwelcome development: the growing habit of secrecy. If minor problems were to occur in the course of plant operations, the reputation of the operators would suffer and would incur higher costs for necessary adjustments. Since the plants would become a target of strong criticism from public opinion, there was a strong incentive to conceal the occurrence of problems. This tendency to cover up was first exposed in 2002, in what became known as the TEPCO "cover-up case,"[5] in which TEPCO was charged with having falsified its reports to NISA in the 1980s and 1990s. TEPCO's falsification of data may be attributed in considerable part to its fear that public disclosure of problems, even if they were small, would lead to public suspicion and a loss of public trust in nuclear plant safety, which would, of course, undermine the myth of safety.

1. The Failure to Control Risks after the Creation of NISA

As we have noted, the strongly bureaucratic nature of inspections and the state of safety regulatory governance at nuclear power plants came under strong public criticism in the wake of the Tokaimura criticality accident in 1999. The charges leveled against STA singled out its general approach, its inclination to conceal information, and the related factors that delayed the response to the criticality accident. This led to increasing distrust of STA. In response to the Tokaimura accident, the Nuclear and Industrial Safety Subcommittee of the Advisory Committee for Natural Resources and Energy issued a report in 2001 entitled, "On Securing the Nuclear Energy Safety Base", which concluded that the cause of the accident was the narrow focus of nuclear energy safety regulations on hardware. It further noted that this had been the focus ever since the occurrence of problems in the initial stages of the development of nuclear technology. It acknowledged with regret that this focus had been unable to prevent deliberate falsification such as that which occurred in the Tokaimura accident, and it advocated a more critical approach to the "culture of safety" and the strengthening of management control[6]. It urged, finally, that the safety management's longstanding narrow emphasis on hardware must give way to greater enrichment of the software aspects of organization, management, and operation[7]. From our present vantage point, we may doubt that the proposed approach was ever properly implemented and it appears that the proposal may have had no great effect. It is most important to note that these were exactly the issues discussed by those who had a role in implementing safety regulations.

In 2001, immediately after the Tokaimura accident, the central government undertook a grand

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5) *TEPCO; Conceals Nuclear Plant Damage; 29 Incidents; 11 Document Falsifications; Still Uncorrected*, Yomiuri Shimbun, 30 August 2002.

6) *On Securing the Nuclear Energy Safety Base*, Nuclear and Industrial Safety Subcommittee Report, Advisory Committee for Natural Resources and Energy, 2001.

7) *ibid.*

restructuring of the departments responsible for nuclear energy. In the process, the Atomic Energy Bureau of STA was divided and its parts transferred to AEC, thus coming under the jurisdiction of the Cabinet Office and the Agency for Natural Resources and Energy (ANRE); the Nuclear Safety Bureau was similarly divided and transferred in part to NISA, which had been newly established within METI as an "extraordinary organ" of ANRE, and in part to the Secretariat of NSC (again, within the Cabinet Office). In short, two bureaus were removed from STA. The Atomic Energy Division and the Nuclear Safety Division, however, stayed with STA and became part of the newly consolidated MEXT. This was because, even though two of STA's bureaus were to be shifted, the public-service corporations established during the age of STA remained under the supervision of MEXT. In this way, nuclear energy-related budget allocations were maintained by MEXT, as were the positions that had served as destinations for ministry personnel transfers in the longstanding *amakudari* system of late-career placement.

Some progress was made in strengthening safety regulations by increasing the importance attached to issues of "software," as the report of 2001 had proposed. In addition to safety inspections, already instituted in 2000, the new measures included the adoption in 2003 of legal provisions for periodic operator inspections and periodic examination of safety management, and in 2009, the construction of a system for the inspection of maintenance activities. In a report published in 2010, however, the NSC, after a broad overview of the inspectors' records, revealed that some inspections still focused on confirmation of hardware conditions and that further consideration was desirable with regard to the manner of confirming the operators' quality assurance activities. It further observed that at the design stage insufficient consideration was being given to the software aspects of such safety regulations as quality assurance activities[8]. In 2009, the Research Council of Legal Aspects of Nuclear Activities noted a number of problems; these included (1) a lack of clarity in the standard for installation licensing and approval, (2) a bias in the regulations toward an emphasis on structural strength, (3) a weakness in regulations regarding function and performance as compared with regulations related to structures, (4) a discrepancy between basic and particular design that had failed to keep up with technological progress, and (5) a lack of consistency in the safety regulations. All of these observations show that basic reform of safety regulations had still not been accomplished[9].

2. Risk Awareness after the Fukushima Nuclear Accident

All this makes clear why the governance mechanism of nuclear safety regulations has thrown up so many problems, for although the Mutsu and Tokaimura accidents led to the creation of new safety authorities (NSC and NISA) separated from the agencies to promote nuclear power, this resulted in the "dual promotion configuration" and "dual inspection configuration" that have complicated the locus of responsibility for nuclear safety. In addition, the distribution of responsibilities

8) *Summary of Tasks in Nuclear Energy Safety Regulation*, Nuclear and Industrial Safety Subcommittee Report, Advisory Committee for Natural Resources and Energy, February 2010.

9) Nuclear Energy Legal System Research Group, 2009.

was further blurred when NISA came to depend heavily on its public-service corporations. This has made NISA very weak in technical expertise and in dealings with nuclear power plant operators such as TEPCO and the plant builders. Before the Fukushima accident, this complicated and irresponsible system had not been regarded as a problem, but the Fukushima accident laid bare the contradictions inherent in the safety regulating systems.

When people recognized the significant size of impact of the accident at Fukushima, belief in the low probability of a nuclear accident, based on the myth of safety, totally collapsed. Of course, there had been accidents such as Mutsu or Tokaimura, but these were regarded as exceptional cases, and their effect was limited. In other words, people thought that even if there were a nuclear accident, the government would be able to control and limit its impact on society. The Japanese people knew of the severe accidents that had occurred at Three Miles Island and at Chernobyl, but they thought that these were accidents that had happened outside Japan and that the safety regulations of the United States or Soviet Union were the problem. That is to say, people believed that the Japanese safety regulations were much more sophisticated than those of other countries, and that accidents would not happen here.

But when people saw black smoke rising from the buildings of the nuclear reactors, these convictions were quickly eroded, and the myth of safety was shattered. As a result, people's understanding of the likelihood of a nuclear accident completely changed. Their understanding of the significance of the impact of a nuclear accident has also changed. Not only was the spread of radiation and radioactive material much wider than was initially supposed, but there have also been serious problems for agriculture and fishery in the local community, as well as the cost of cleaning up the soil and providing compensation for the people forced to flee from the evacuation zones. Such vivid evidence that Japan lacks a system able to respond rapidly to a nuclear disaster has made people fearful of possible future accidents.

The impact of the accident on society has created a further problem. The fear of being exposed to radiation has occasioned the spread of many unscientific rumors and baseless information about the dangers of radiation. This has led to an increase in social anxiety and extreme reactions amongst the populace. Some people believed that the rubble deposited by the tsunami in Iwate or Miyagi prefectures was contaminated with radioactive materials even after the inspection showed that there was no contamination at all. The fear also provoked distrust of the government, for, during the nuclear crisis, the government provided insufficient information and insisted that the accident was not serious. It became obvious that the government was not prepared for an accident on such a scale, while the way in which it provided information to the public was poor and misleading. Consequently, people have lost faith in government announcements, and the nuclear experts, who were primarily responsible for the technical aspects of nuclear safety, are now also distrusted. They continued to claim that the accident would not become serious because there were fail-safe measures. Yet those fail-safe measures proved insufficient to prevent the accident from becoming severe, and as a result, in the eyes of the people the experts have lost their authority. And since the people no longer trust those who claimed scientific and technological expertise, it has been difficult for the government and the experts to deny the rumors.

The change in social understanding of the nuclear risk has revolutionized public opinion. The anti-nuclear movement has become very strong and "abandon dependence on nuclear power" has become its rallying cry. Strong criticism has been directed against TEPCO, nuclear experts and the government, while a consensus has been growing among politicians, academics, the media and the public that ultimately Japan will close down all nuclear power plants, and will not depend on nuclear power ever again. Yet how to achieve a "non-nuclear" Japan is a matter of considerable debate. Some people argue that all nuclear power plants should close down immediately; others believe that reducing dependence on nuclear power should be a gradual process. Since the anti-nuclear movements that demand immediate closure have become the stronger political force, the government hesitates to restart the nuclear power reactors, although the industry and the government are eager to do so.

Chapter 2. The Ultimate Goals of Energy Policy Change and Related Challenges (by Ken-ichi Ohshima*)

1. Introduction

Following the March 11 2011 Great East Japan Earthquake and the consequent disaster at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant (referred to here as the Fukushima accident), Japan's conventional nuclear power-heavy energy policy was reviewed on a number of fronts. Energy policy change will be implemented in consideration of the review's outcomes.

The national government is deeply involved in energy utilization, and particularly in the use of nuclear power. Accordingly, political developments have a serious influence on such utilization. The change of government following the Lower House election in December 2012 from the Democratic Party of Japan (DPJ) to a coalition of the Liberal Democratic Party (LDP) and New Komeito has great significance in terms of the nation's energy policy.

2. Multifaceted Policy Review by the Energy and Environment Council

The review of the nation's energy policy following the Fukushima accident began under the DPJ government. In June 2011 three months after the disaster, the Energy and Environment Council (EEC) consisting of relevant ministers was established under the government's Council on the Realization of the New Growth Strategy. The EEC was tasked with the development of the Innovative Energy and Environmental Strategy based on short-, medium- and long-term views to correct the distortions and vulnerabilities of the energy system and meet demand for a safe and stable supply of power, efficiency and environmental conservation[1]. Although energy policy had previously been supervised by the Ministry of Economy, Trade and Industry (METI), the Minister of State for

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1) Council on National Strategy and Policy, "Meeting of the Energy and Environment Council," June 7, 2011 (http://www.cas.go.jp/jp/seisaku/npu/policy09/pdf/20110622/siryou2.pdf)

National Policy was appointed to chair the EEC. Consequently, the National Policy Unit established under the DPJ government came to play an important role in energy policy review. This was effective in extensive re-examination of the nation's energy policy from a people's viewpoint independent of METI's relations with industry groups, and stood in contrast to METI's previous policy-making process.

The National Policy Unit took the initiative to re-examine a wide range of major issues. This work involved: 1) recalculating power generation costs (because proponents of nuclear power had based their case on these figures); 2) presenting the potential inherent in renewable energy development; 3) evaluating Japan's ability to meet its power needs without the use of nuclear generation; 4) examining measures to stabilize the power demand-supply balance; 5) stimulating national debate on energy policy; and 6) reviewing the role of the Japan Atomic Energy Commission (JAEC).

The national debate implemented in July and August of 2012 was also important. It involved the development of databases containing related information, the hosting of opinion hearing sessions, the solicitation of public comments and the implementation of a deliberative opinion poll. National debate on this scale was unprecedented. The initiative was also forward-thinking, as reflected by the government's establishment of the Committee for National Debate Analysis so that experts could analyze the results of national debate and the will of the people could be reflected in energy policy. This process was wholly different from the conventional method employed to set such policy. It may even be said in this regard that the government set an example for ideal policy formation.

As a result of the national debate, the EEC adopted the Innovative Strategy for Energy and the Environment[2], which was developed with the aim of creating a society that is not reliant on nuclear power as soon as possible. The strategy document stated that Japan should put all possible policy resources into efforts to rid itself of nuclear power stations by the end of the 2030s. Although the strategy was not formalized by Cabinet approval, it was a landmark initiative representing the government's first move in the direction of abolishing nuclear power generation completely.

Although not all the National Policy Unit's efforts can be seen in a positive light, its administrative work to review energy policy independently of METI (which had previously been in charge of the policy) was generally very effective. In this context, it can be argued that future review of energy policy should involve such an administrative mechanism based on coordination among multiple government ministries and agencies.

However, in parallel with the National Policy Unit's re-examination, discussions on energy policy and nuclear power policy per se continued within the conventional METI-centered framework after the March 2011 disaster. The EEC and the National Policy Unit were abolished after the LDP returned to power, leaving behind an antiquated decision- making process that represented a major impediment to the development of new energy policy.

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2) Energy and Environment Council, "Innovative Strategy for Energy and the Environment," September 14, 2012 (http://www.cas.go.jp/jp/seisaku/npu/policy09/pdf/20120914/20120914_1.pdf)

3. Policy Formation under METI

1) Energy structure

Japan's energy policy was originally managed by METI. While the National Policy Unit took the initiative of preparing to formulate the Innovative Strategy for Energy and the Environment, energy policy per se was deliberated by METI's Advisory Committee for Natural Resources and Energy in a business-as-usual manner. In October 2011, the Fundamental Issues Subcommittee was established within the Advisory Committee to review the basic principles of energy policy.

The Fundamental Issues Subcommittee was an advisory panel, and the process involved was roughly the same as the conventional policy making process. However, it differed from conventional advisory panels in that approximately a third of its 25 members were skeptics or critics of nuclear power policy (including the author). This was extremely unusual in Japan's energy policy-making process.

The focal point at the Fundamental Issues Subcommittee was nuclear power as a percentage of the total national electricity supply. The members of the Fundamental Issues Subcommittee were deeply divided over whether Japan should continue to depend on nuclear power. As a result, rather than narrowing the options down to one, the Subcommittee came up with three scenarios featuring different energy structures based on three different ratios of nuclear power vs. total generation: 0%, 15%, and 20 – 25%. The scenarios were examined to support the development of the Options for Energy and the Environment, which had been the subject of the aforementioned national debate.

The problem with the Fundamental Issues Subcommittee was its failure to begin the process of drafting a new Basic Energy Plan immediately after the development of the Innovative Strategy for Energy and the Environment in October 2012. This was because the Strategy, which included a zero-nuclear policy, provoked fierce opposition from the business community centering on Keidanren (the Japan Business Federation) – Japan's largest business group. In the end, the DPJ government failed to beat the opposition, and consequently the Subcommittee failed to engage in any specific deliberations after the development of the Innovative Strategy for Energy and the Environment. The Lower House election was subsequently held, resulting in a change of government to the LDP and New Komeito.

The Fundamental Issues Subcommittee was abolished under the new coalition government, and it was decided that energy policy should be discussed by the Coordination Subcommittee of the Advisory Committee for Natural Resources and Energy (reorganized to form the Strategic Policy Committee of the Advisory Committee for Natural Resources and Energy in July 2013). At this time, most of the members opposing nuclear power were removed.

2) Other policy challenges

Under the DPJ government, specific energy policy matters other than the nation's future energy structure were discussed by committees and subcommittees under METI's Advisory Committee for Natural Resources and Energy.

Progress in discussions concerning electricity system reform included significant changes to conventional power supply systems and consideration of important matters that would have a decisive influence on the proliferation of renewable energy. Electricity system reform efforts continued un-

der the coalition government of the LDP and New Komeito, leading to the amendment of the Electricity Business Act in November 2013.

Meanwhile, increased thermal power output due to the suspension of nuclear power generation prompted electric utility companies to apply for approval to increase their rates. This issue was intensively examined by the Expert Committee on Reviewing Electricity Rates under the Coordination Subcommittee of the Advisory Committee for Natural Resources and Energy from May 2012, and was also handed over to the coalition government of the LDP and New Komeito. The Expert Committee clarified once again that electric utility companies had high-cost structures and sought to redress them. The deliberations were substantive in terms of improving the nature of the electricity business.

Electricity rates were examined more stringently than ever before because the Investigation Committee on TEPCO's Management and Finances revealed abnormal management conditions within the company. The Committee was established in May 2011 under the Cabinet Secretariat to determine whether TEPCO had the capacity to compensate for losses and damages caused by the Fukushima accident. In this regard too, investigation implemented under the DPJ government independently of the business community and METI played an important role.

3. Nuclear Power Policy Review

The Fukushima accident drastically shook nuclear power policy as a whole, including related safety regulations, leading to the reorganization of administrative organizations. This reorganization can be divided into the areas of nuclear power development/utilization and safety regulations.

1) Nuclear safety regulations and the restarting of halted reactors

Prior to the Fukushima accident, nuclear facility safety regulations were supervised by the Nuclear Safety Commission under the Cabinet Office and METI's Nuclear and Industrial Safety Agency (referred to here as NISA). According to government information, the former undertook the role of developing the basic principles of nuclear safety regulations and the latter took charge of actual regulations, and a system for double-checking of safety regulations was in place.

However, the Fukushima accident highlighted collusion between electric utility companies and regulatory authorities. The collusion was so great that the positions of these authorities and the industry being regulated were practically reversed, with the former becoming a captive of the latter[3]. As a result, Nuclear Safety Commission Chair Dr. Haruki Madarame even stated, "Japan's safety inspections are based on techniques from 30 years ago[4]. This was caused by the fact that the regulatory NISA was operated under METI, which promoted the development of nuclear power. As a consequence of this development, the Nuclear Regulation Authority Establishment Act was formulated in June 2012, the new independent Nuclear Regulation Authority was established.

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3) Report of The National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission, 2012, p.12 (http://warp.da.ndl.go.jp/info:ndljp/pid/3856371/naiic.go.jp/pdf/naiic_honpen.pdf)

4) Koji Okamoto, *Shogen Madarame Haruki: Genshiryoku anzen iinkai wa nani o machigaeta noka* (Testimony by Haruki Madarame: What mistakes did the Nuclear Safety Commission make?), Shinchosha Publishing Co, Ltd., 2012, p.190

The DPJ government stated in the aforementioned Innovative Strategy for Energy and the Environment that only halted nuclear power plants whose safety had been confirmed by the Nuclear Regulation Authority would be put back into operation. Even so, it was not clear whether the DPJ government would really restart these reactors because the issue became a major political hot potato. However, when the LDP returned to power, Prime Minister Shinzo Abe announced in a policy speech at the 183rd Ordinary Session of the Diet (February 28, 2013) that his government would restart nuclear power plants where safety had been confirmed.

Meanwhile, the Nuclear Regulation Authority was in a rush to develop new safety standards and regulations because the Nuclear Regulation Authority Establishment Act required the Authority to do so within 10 months of its establishment. It announced a basic draft of the new standards in February 2012 and formulated new regulatory requirements in July 2012.

However, Japan's regulatory framework for nuclear safety lags international standards significantly. It seems unlikely that a team established in December 2012 within the Nuclear Regulation Authority to study the new safety standards was able to fill the gap in the three months or so during which the new safety standards were developed, and critics have pointed out that related deliberations were rough and ready as if the restart was a foregone conclusion[5]. The political independence of the Nuclear Regulation Authority is being tested.

2) Research and development in nuclear energy

The Fukushima accident also significantly affected the direction of nuclear power development. Mid- to long-term plans for nuclear power development are formulated by the government's Japan Atomic Energy Commission (JAEC), which began the process of reviewing the existing Framework for Nuclear Energy Policy[6] in autumn 2010 and was expected to develop a new Framework for Nuclear Energy Policy (referred to here as "the new Framework") in the first half of 2011.

The preliminary talks came to be known as secret meetings, and were also seen as problematic in the Diet. This issue and other developments once again highlighted that the involvement of interested parties in the formulation of nuclear policy was a major issue.

Before the Fukushima accident, which occurred during this review, it appeared that the new Framework would be developed with an extremely optimistic view of nuclear energy. However, the process of drafting it was suspended in the wake of the accident until August 2011.

Discussions concerning the formulation of the new Framework were held by the New Framework for Nuclear Energy Policy Planning Council within JAEC and the Technical Subcommittee on Nuclear Power, Nuclear Fuel Cycle, etc. (referred to here as "the Technical Subcommittee"). The former was tasked with engaging in discussions toward the formulation of the new Framework, whereas the latter primarily assessed policy options for the nuclear fuel cycle. This was extremely significant because it allowed JAEC to present, for the first time, the options of 1) directly disposing

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5) Nuclear Regulation Authority Citizen Watchdog, New Safety Standard Oversight Project: Advisory Group Statement, 2013

6) Previously known as a long-term nuclear power utilization plan, the Framework for Nuclear Energy Policy was initially drafted in 2007. It describes basic objectives, approaches and other matters concerning the nation's utilization and development of nuclear energy.

of all spent fuel, and 2) operating a system of concurrent reprocessing and direct disposal, thereby adding to the single option of simply reprocessing all spent fuel.

The New Framework for Nuclear Energy Policy Planning Council was set to compile a draft of the new Framework in response to the assessment by the Technical Subcommittee. However, it was revealed that nuclear operators and other related parties had held informal preliminary meetings with JAEC members and secretarial staff in the operation of the Technical Subcommittee[7]. Due to this revelation, discussions by the New Framework for Nuclear Energy Policy Planning Council became tangled and could not be continued. The Council was abolished in October 2012.

5. Conclusion

Since the LDP/New Komeito coalition government took power in late 2012, the political will to restart halted reactors has become clearer than it was under the DPJ government. It seems that policy discussions on Japan's energy policy and nuclear policy have stalled since the national debate peaked in the summer of 2012.

From the viewpoint of environmental conservation, the objectives of energy policy today must be to prevent climate change and minimize the risk of radioactive contamination. The partial efforts made to convert the nation's energy policy under the DPJ government had the potential to move toward the achievement of these objectives.

With this background, why has the conversion of the nation's energy policy fallen through? Many attribute this to the DPJ government's failure to review the nation's conventional energy policy and fundamentally change the mechanism used to decide its content. Accordingly, when the EEC and the National Policy Unit were abolished following the change of government, the conventional process of energy policy formulation was revived.

The twin objectives of weaning the nation off nuclear power and preventing global warming need to be seen as an integrated set, and their materialization requires long-term policies. However, Japan lacks a forum for the drafting of new policies from a broad perspective. As a result, the government may forcibly bring the halted reactors back online.

However, even if these reactors are restarted, the fundamental problems of nuclear power will not be solved. Japan is running out of storage capacity for spent fuel from nuclear power plants, and it has become extremely difficult to build new plants since the Fukushima accident. Nuclear power facilities across Japan are aging, and the nation is rapidly heading toward a period of reactor decommissioning. It would be difficult to draft new policy for the resolution of these problems while maintaining the conventional framework. With this in mind, Japan needs to create a new framework for the promotion of energy conversion without further delay.

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7) This issue was reported in detail by the Mainichi Shimbun, one of Japan's major newspapers.

Chapter 3. Changing configurations of Japanese politics over nuclear energy[1)] (by Hiroshi Honda*)

1. The 1955-Regime and the formation of the nuclear energy complex

This chapter tries to identify the political actors who, over the past sixty years, have promoted and those who have opposed the civic use of nuclear energy in Japan. In order to do so, we must first summarize the characteristics of the so-called "1955-Regime". It grew out of the merger in 1955 of two conservative parties into the Liberal Democratic Party (LDP), and thereafter established itself in the course of the 1960s as a set of power structures for the long-term governance of Japan.

(1) With the overall support of a large element of the business community and the US government in the context of the Cold War, one-party conservative dominance was established to pursue export-oriented economic growth; (2) Labor unions and left-wing parties were excluded from the power structures; (3) Certain sections of the labor unions and small businesses were co-opted into corporate structures, thus undermining the social base of political opposition; (4) Local middle-class organizations, such as agricultural cooperatives, were also co-opted through the agency of pork-barrel politics; (5) A ministerial-industrial complex was formed within a respective policy area and determined the "national" policy.

The first initiative arose from a change of US policy towards Japan as a result of the Cold War: turning away from the process of democratization and demilitarization towards the restoration of Japan's economic and military potential. In response to this situation, the Japanese business community pushed for a merger of conservatives to exclude the Japan Socialist Party (JSP) from power. The Japan Federation of Economic Organizations (Keidanren) collected political contributions from industry for donations to the LDP.

The nuclear energy complex thus came into being as an expression of the fifth aspect of the Regime. The civilian use of nuclear energy by Japan had been enabled by US nuclear policy after December 1953, and in April 1954, the conservative parties about to merge into the LDP supported, and passed through the Diet, the first nuclear budget bill. This move was a response by both the Japanese and US governments to forestall press reports about an incident when a Japanese fishing boat was exposed to radioactive fallout from a hydrogen bomb test in the Pacific by US military forces. From December 1955 to early 1956, the government passed a series of laws that included the Nuclear Energy Basic Law and laws that led to the establishment of the Atomic Energy Commission, the Science and Technology Agency (STA), the Japan Atomic Energy Research Institute (JAERI), and the Nuclear Fuel Corporation (NFC).

Consequently, the nuclear energy development provided an opportunity for the big financial combines, which had been broken up under the Occupation, to re-assemble as enterprise groups. Reflecting the wishes of big business, the government chose to import nuclear technology without

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1) This chapter is based on Chapter 4 of Honda, Hiroshi, and Takashi Horie eds., 2014, Datsu Genpatsu no Hikaku Seijigaku. (Comparative politics of nuclear energy phase-out) Tokyo: Hosei University Press.

bothering to conduct any basic research.

The Ministry of Trade and Industry (MITI) established the power rate system, which ensured that consumers would pay for the huge investment in power plant construction. It also allowed three major nuclear industrial groups and two related industrial groups to share the market. When the power business began to search for cheaper uranium from abroad, the NFC was dissolved, while the authority of the JAERI was curtailed following a labor-management dispute. In their place, the government set up the Power Reactor and Nuclear Fuel Development Corporation (PNC) in 1967 for research and development in new reactors and such aspects of nuclear fuel cycle technology as the reprocessing of spent fuel.

2. Pork-barrel politics as a response to local opposition

The fourth feature of the 1955-Regime that emerged in the rapid economic growth in which regional economic gaps widened was the development of pork-barrel politics. Local opposition groups that emerged around 1968, initially led by fishermen's cooperatives, culminated in the 1974 protest blockading the nuclear-powered ship Mutsu, which during ocean testing had leaked radioactive material into the sea, from re-entering her home port of Ominato. In the same year, three laws relating to electric power development were passed thanks to the efforts of Kakuei TANAKA, who was soon to become Prime Minister and whose constituency invited the Tokyo Electric Power Co. (TEPCO) to build the Kashiwazaki-Kariwa nuclear power plant in Niigata. The three laws constituted a system that would provide ample grants for public works in the host communities paid out of the special accounts based on a special tax levied on power rates. To be sure, the licensing competence has been officially monopolized by the central bureaucracy, and each power plant construction plan needs to be authorized by a council chaired by the prime minister, yet before that can happen the relevant power company is required to complete negotiations with the local fishermen's cooperative over compensation for fishing rights, as well as with land owners, and must secure the governor's agreement.

3. From the Ban-the-Bomb movement to the anti-nuclear energy movement

Leftist unions and parties, excluded from power as a result of the second feature of the 1955-Regime, came to support the anti-nuclear energy movement. The JSP, the Sohyo union confederation, and the Japan Communist Party (JCP) constituted 'progressive' forces loyal to the postwar democratization process established by the Occupation and symbolized by the new liberal Constitution, while they were conciliatory to countries under communist regimes. They saw their cause given legitimacy by nationwide mobilization that culminated in the 1960 demonstrations, the largest ones in Japanese history, against the revision of the US-Japan Security Treaty.

Meanwhile, the contamination of the fishing boat by the H-bomb fallout over the South Pacific provoked a nationwide campaign, and the thirty million signatures that demanded the banning of the atomic bomb were collected. But the logic of partisan competition forced this movement to split. (1) The Japan Council against Atomic and Hydrogen Bombs (Gensuikyo), formed in 1955, eventually shrank to a group led by the JCP, which defended the nuclear weapons of the Soviet Bloc. (2) In

1961, the National Council for Peace and Against Nuclear Weapons (Kakkin Kaigi) was formed by the Democratic Socialist Party (DSP) and the large business unions, which accepted the US-Japan Security Treaty. (3) In 1965, the Japan Congress against A- and H-Bombs (Gensuikin) was initiated, mainly by the JSP and the Sohyo labor confederation, and it opposed any nuclear bomb test by any nation. In the course of anti-Vietnam war campaigns, Gensuikin opposed the use of a Japanese harbor by US navy submarines as a potential source of radioactive contamination; thereafter, it came to oppose the civilian use of nuclear power as a whole.

The JSP adopted an anti-nuclear energy policy in 1972, and together with the Gensuikin and Sohyo unions supported local groups that opposed nuclear power. After the 'Mutsu' incident in 1974, and a power rate rise following the oil crisis, anti-nuclear groups organized themselves in big cities under the leadership of consumer and anti-pollution activists, critical scientists, and lawyers working in co-operation with Gensuikin. The Citizen's Nuclear Information Center, CNIC was founded in 1975 with an office provided by Gensuikin. The Japan Scientists' Association, founded in 1965 and loosely linked with the JCP, also provided scientific support to local opposition groups. Leftist lawyers helped to build up anti-nuclear arguments, though almost all the lawsuits were defeated due to the "judicial passivism" of the higher courts.

The political situation of the 1970s facilitated the anti-nuclear movement. In prefectures and the big cities, 'progressive' governors and mayors won local elections. At the national level, Kakuei TANAKA was arrested on suspicion of accepting bribes, and the combined opposition parties matched the LDP with an equal number of Diet seats. The "Mutsu incident" forced the government to set up a special advisory panel to consider the reform of nuclear energy administration. As a result, the Nuclear Safety Commission was founded, though without the power to withhold licensing. Both the safety regulation and the promotion of nuclear energy remained in the hands of either the MITI or the STA. And though two public hearings were held on the procedures required for licensing newly constructed reactors, they turned out to be merely cosmetic ceremonies.

And overall, since conservatives dominated most of the locations chosen as host communities for nuclear power plants, the leftist opposition was unable to prevent the building of the plants. Even in a prefectural stronghold of the public sector unions such as Hokkaido, with a Socialist governor in the 1980s, the start of the first nuclear reactors there could not be prevented: In 1989, a petition with 900,000 signatures demanding a prefectural referendum on this issue was rejected by a narrow margin in the prefectural council. But this campaign fostered an alliance between the JSP, such public sector unions as the All-Japan Prefectural and Municipal Workers Union (Jichiro), and activist consumer's co-operatives, the Seikatsu Club. It helped to create a campaign to build the first citizen-funded wind power turbines in Japan in 2001.

The Japanese public reacted to the Chernobyl accident of April 1986 rather slowly. But when the imported foods were found contaminated at the start of 1987, urban housewives began to take part in the anti-nuclear movement. The "anti-nuclear new wave" came in the spring of 1988, when a protest mobilized thousands of people against a power-adjustment operation of reactors planned by Sikoku EPCO for probing the possibility of curbing overcapacity. The largest anti-nuclear rally in Tokyo in April 1988 attracted 20,000 participants to start a campaign that eventually collected

three million signatures for petitioning a bill to phase out nuclear energy.

At this time, the JSP elected Takako DOI as its first female chairperson, and the party enjoyed a brief resurgence in the 1989 upper house election. The JCP and the Komei party[2] became more critical of nuclear energy, while the LDP and the DSP remained pro-nuclear. In opinion polls organized by the Asahi newspaper, a majority of voters turned against the construction of further nuclear power plants. Although the nuclear energy complex responded with massive public relations campaigns, the number of new nuclear power plants authorized by the governmental council fell to zero between 1989 and 1993 and stagnated thereafter as well.

Nevertheless, leftist forces weakened in the 1990s, as a combined result of socialism's loss of credibility, the reorganization of labor relations, and the realignment of the party system. When the JSP joined in a governing coalition with the LDP in 1994, it had to accept the existence of the nuclear power plants already built. In 1996, the JSP renamed itself the Social Democratic Party (SDPJ), but it would soon diminish to a minor party with an anti-nuclear policy after the majority of its members defected to found the Democratic Party (DPJ).

4. The split of the labor movement on nuclear energy

With regard to the third aspect of the 1955-Regime, the division of the labor movement had important implications for the politics of nuclear energy. After the liberalization of the labor unions early in the period of the US occupation, industry-wide unions were organized. A typical case are the unions in the power industry, which is comprised of a single national company for power generation and transmission with nine regional distribution companies, and in 1947 the All Japan Electrical Workers Union (Densan) was created.

At the start of the Cold War, the occupation authority purged Communists from major workplaces, and in 1950 welcomed the formation of an anti-Communist labor confederation, Sohyo, which soon turned leftist, however. Meanwhile, the business community staged a counter-offensive in labor conflicts, and encouraged second unions to form within individual companies; consequently second unions in electric companies absorbed large parts of Densan to form the Federation of Electric Power Industry Worker's Unions (Denroren) in 1954. The electric power industry itself was reorganized into nine companies, each of which enjoyed a regional monopoly. The competition among companies undermined the effectiveness of industrial unions.

In the course of labor conflicts, competing confederations were established. In 1964, business unions such as Denroren formed the Japanese Confederation of Labor (Domei), and supported the Democratic Socialist Party (DSP), which had splintered from the JSP in 1960. Sohyo, the General Council of Trade Unions of Japan, was now led by governmental and public sector unions, although some of the private sector unions remained, along with a minority of communists.

After the first oil crisis in 1973-74, the big business unions cutting across confederations took the initiative in debates over labor reorganization. In contrast, unions in public corporations led by Na-

2) The Komei party is based on the Buddhist sect Soka Gakkai, but represents less a religious minority than a certain section of urban lower middle class.

tional Railway Workers' Union organized a strike in November 1975 to reclaim the right to strike that had been taken away from them under the Occupation in 1949. Since the media reacted harshly towards this strike, the number of strikes in Japan drastically fell after 1975.

In the midst of the second oil crisis, the LDP won the 1980 double elections of the lower and upper houses, and thereafter, the government embarked on a campaign to privatize three government corporations. Along with the privatization of the National Railway, debates over labor reorganization that in 1989 resulted in the merger of confederations into the Japanese Trade Union Confederation (Rengo) split apart the railway unions, the teachers unions and Jichiro, and thus undermined their support for the anti-nuclear movement.

Overall, the labor unions divided on the issue of nuclear energy. (1) Denroren's support for nuclear energy became unconditional in the mid-1970s, when it allowed subcontractors to do increasing amounts of work with radiation exposure. (2) A minority of electrical power unions remained members of Sohyo. Their main body, Chugoku Densan, staged the first anti-nuclear strike in 1978 to help successfully block plans for a nuclear power plant at Hohoku, Yamaguchi Prefecture. Sohyo as a whole organized a nationwide campaign in the early 1980s against the newly introduced public hearings. (3) Communist unions of JAERI, in principle positive toward nuclear energy technology, criticized Japan's nuclear policy and opposed government surveillance of workers. (4) The subcontractors formed a union in 1981, though it did not last long.

5. Political realignments and Growing dissent from governors and host communities

The 1993 election forced the LDP out of power for the first time in its history. The coalition government was made up of eight parties, excluding the LDP and the JCP. Under Prime Minister Morihiro HOSOKAWA, the electoral system of the lower house was also revised in the spring of 1994. The single-ballot non-transferable vote system with multi-member districts was changed to the single seat majority rule system combined with proportional representation from eleven small districts, which has, in effect, acted against the smaller parties. Ichiro Ozawa, defector from the LDP and the driving force in this political reform, co-founded the New Frontier Party (Shinshin To) in 1994, and was joined by Hosokawa's New Japan Party (NJP), the Komei Party, and the DSP. But, by 1997, this alliance had fallen apart. In 1998, the DSP and the NJP merged into the DPJ, and in 2003 the Ozawa group followed. The Komei Party barely recovered. In the course of the DPJ development, politicians from the JSP lost influence. In contrast, those from the DSP and the big business unions rose, along with those from the Matsushita Institute of Government and Management, founded in 1979. As a result, pro-nuclear forces based on big business dominated the DPJ when it came to power in 2009.

The LDP returned to power in 1994 and retrieved the premiership in 1996. In 1999, the LDP entered into coalition with the Komei Party to make up for a loss of majority in the upper house. The LDP only revived under the Koizumi cabinet, which governed from 2001 to 2006. Prime Minister Junichiro Koizumi promoted neo-liberal reforms further, in part aiming to bring down political rivals within and outside the LDP. But the new LDP strategy of shifting the electoral base from rural areas to urban floating votes was only successful because of Koizumi's ability to mobilize media at-

tention. Yet since each of his three successors lasted only a year, this led to the LDP defeat in the 2007 upper house and the 2009 lower house elections.

Meanwhile, after a series of accidents and scandals, the host communities of nuclear power plants began to question national policies. In December 1995, a fire occurred at the fast breeder reactor Monju in Fukui prefecture, and an attempt by the PNC to cover up unfavorable video coverage met harsh criticism. In January 1996, the three governors of Fukushima, Niigata, and Fukui prefectures, in which 33 nuclear reactors were in operation, requested the national government to reexamine its nuclear energy policy and hold public discussions in order to reach a national consensus. Then, in August 1996, Maki town (now part of the Niigata City) held a local referendum that led eventually to the abandonment of a planned nuclear power plant.

In March 1997, a fire broke out at the experimental reprocessing plant in Tokai in Ibaraki prefecture, leading to the reorganization of the PNC. In September 1999, a critical accident occurred as the result of an illegally improvised process at JCO nuclear fuel conversion plant in Tokai: two workers died of acute radiation poisoning after a radiation leak, to which about 700 local citizens were also exposed. In the same period, it was reported that a British nuclear fuel company manipulated inspection data on the plutonium-uranium mixed oxide (MOX) fuel used for power plants in Japan. In May 2001, a local referendum was conducted in Kariwa in Niigata prefecture, and rejected the use of MOX at the local nuclear plant.

From August to October 2002, cover-ups by TEPCO and Chubu Electric Co. for cracks in reactor vessels were reported, forcing them to stop all their nuclear power plants for inspection. A governor of Fukushima refused to agree to the start-up use of MOX at the Fukushima power plants, and set up a prefectural commission to examine national energy policy. In reaction to these events, the LDP and the MITI began to discuss the liberalization of the electric power market, while an extra-partisan parliamentary group was formed to promote renewable energy. Finally, in January 2003, for the first time in Japan, a lawsuit demanding an operation stop at Monju won its case against the generators of nuclear power, when a high court repealed the Monju license.

This barrage of criticism forced the LDP government to set up round tables for discussion, without changing nuclear energy policy itself, however. In the reorganization of the central bureaucracy, MITI expanded its own competence to become the Ministry of Economy, Trade and Industry (METI), under which the Nuclear and Industrial Safety Agency (NISA) was set up: safety regulation remained subordinated to the promotion of nuclear energy. In December 2000, the Diet even passed a bill to expand grants to areas surrounding the host communities. Then, in May 2005, the court decision on Monju was overruled by the Supreme Court of Japan.

Nevertheless, throughout the 2000s, awareness of the combined risks of nuclear power plants and earthquakes gradually spread among urban voters. In July 2007, a serious earthquake in the vicinity of Niigata triggered a fire at the Kashiwazaki-Kariwa nuclear power plant[3].

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3) In March 2008, Niigata Prefecture set up committees to independently examine anti-earthquake design of the plant.

6. After the Fukushima accident

At the 2009 election, Ozawa led the DPJ campaign, and enlarged the DPJ's support base overall. The DPJ-led government tried to rationalize a rigid budget, downsize excessive public works, expand social welfare, disclose diplomacy documents, and relocate US bases from the islands of Okinawa. But it failed to enforce these policy radical changes. After Yukio HATOYAMA resigned as Prime Minister in May 2010, his successor, Naoto KAN, lost the majority of the upper house as a result of the summer election. His successor, Yoshihiko NODA, further conformed to the demands of the bureaucracy and Keidanren on issues like the export of nuclear power plants.

In April 2011, a month after the accident at Fukushima, anti-nuclear demonstrations commenced in big cities, and gradually spread throughout Japan. People with children living in non-evacuation areas but still with relatively high radiation readings called for a "right to evacuate". As a partial response to this movement, the Diet passed a bill that provided for medical care to those living in these areas in June 2012. In the meantime, such companies as the mobile phone giant, SOFTBANK, began to advocate a phase-out of nuclear energy, though they remain mavericks in the business community. Local communities are also demanding a phase-out. Within three years after the Fukushima accident, some 455 out of 1742 prefectural and local councils made a resolution demanding a phase-out and presented it to the Diet.

Prime Minister Kan called for the phasing-out of nuclear energy, and pushed for a bill to promote renewable energy. After Noda succeeded Kan as prime minister, disputes on nuclear energy intensified within the DPJ[4]. In May 2012, all the nuclear power plants in Japan suspended operations, after which the Noda cabinet allowed two reactors of Oi plant in Fukui prefecture to resume operation[5]. This decision provoked a series of demonstrations that drew hundreds of thousands of citizens to protest around the Diet building every friday from June to July.

In the December 2012 lower house elections, both the DPJ and the Ozawa faction that had defected from the DPJ were heavily defeated. The LDP and the Komei Party won the election and formed a coalition government. At the upper house election of July 2013, the DPJ did not recover, while the JCP gained slightly more seats. In September, all nuclear power plants went out of service again. But the LDP-Komei government under Prime Minister Shinzo Abe decided on a new basic energy plan in April 2014 that advocates a restart of nuclear power plants. In this situation, former Prime Ministers Koizumi and Hosokawa began to call for a phase-out of nuclear power operations. But the political impact of their move remains unclear.

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4) In September 2012, the DPJ presented an "innovative energy strategy" aiming to phase out nuclear energy by the end of 2030s, considering public opinions shown in the "national debates" on energy while MITI allowed a further construction of Oma Mox-fuelled nuclear plant.

5) An epoch-making court decision of May 2014 suspended a restart of Oi plant.

Chapter 4. How to Design Decision Making Process with Participatory Programs about Radioactive Waste Management (by Susumu Ohnuma*)

This chapter aims to contribute to the discussion surrounding the disposal of nuclear waste from the perspective of social psychology. This is a crucial topic considering there is currently nowhere to dispose of High Level Radioactive Waste (HLW) in Japan.

Before I begin this chapter, I would like to state that I stand neither for, nor against nuclear power. My research interests concern which options present the best public choices, how to establish a constructive discussion platform that transcends controversy, and ultimately what kind of choice should be made considering the potential impact on future generations.

It is clear to me that decisions regarding the siting for the disposal of the nuclear waste should not be delayed and indeed, a number of surveys indicate that most people agree that this decision should not be postponed, regardless of their values and opinions concerning nuclear power (Ohnuma, 2014a). This finding suggests that people intuitively comprehend the importance of intergenerational justice, regardless of the ongoing controversy.

Consequently, I write this chapter out of a sense of responsibility for intergenerational justice: that is, we should not allow any further postponing of the discussion of radioactive waste management, regardless of any overall stance towards nuclear power.

1. Background

All forms of energy use generate emissions and produce waste of some sort, which will eventually be disposed of in the air, underground, or somewhere on the earth. For nuclear power plant the waste product is radioactive waste. It is not sustainable to employ an energy source without an adequate inspection of the relevant termination procedures, not only in terms of technological and economic factors but also social impact.

1.1. OECD report for the management of radioactive waste

The OECD is tasked with addressing not only the meaningfulness of care for significant stakeholders but also insuring the involvement of various citizens in the management of radioactive waste.

The OECD report (2010) recommends that, when dealing with the management of radioactive waste, the agents responsible for the siting should shift their approach from a “decide, announce and defend” model to one of “engage, interact and co-operate”. The report emphasizes both a “partnership approach” and a “stepwise approach”. The “partnership approach” stresses that anyone from an effected local society should have the right to express their will voluntarily and to present a motion to veto. Moreover, citizens should be provided with many opportunities to become involved in the decision making process and have choices to make, which they can decide for themselves, concerning the future of their local society, in a process that takes a long time and has multi-

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ple steps. The "stepwise approach" underlines the importance of taking enough time to insure that citizens can acquire sufficient literacy to understand, judge and evaluate the relevant issues. Moreover, the OECD stipulates that relevant agents should provide citizens with all the requisite opportunities for learning and for interaction with stakeholders and experts. In addition, the process should be transparent and adaptable. Throughout the process, all stakeholders should also be able to respect each other. In brief, the report stresses the need for all of the conditions of procedural justice to be fulfilled (Leventhal, 1980; Lind & Tyler, 1988).

Furthermore, the OECD report (2013) also remarked that the mere input of information and consultation simply constitute "tokenism", and that further efforts to ensure citizen control and partnership are necessary to enable citizen power. This is the very point that procedural justice studies have established: authorities should abandon their controlled processes, which aim to justify and promote a pre-prepared conclusion, since such control of arbitral authority diminishes the effect of procedural justice and leads to the denial of the decisions (Leventhal, 1980).

1.2. The current situation in Japan over the siting of radioactive waste

Japanese law requires three steps for the inspection of sites for HLW: inspection of the literature, inspection of an abstract of a proposal and inspection of a final proposal in detail. Although the government started to call for municipal applicants as a first step in 2002, no municipality has so far applied. Toyo-cho in Kochi prefecture intimated that it would apply in 2006, but gave up in 2007 due to strong opposition. Furthermore, this situation has not changed at all in the period after the Fukushima nuclear power plant accident.

In September 2010, six months before the accident at Fukushima, the Japan Atomic Energy Commission requested the Science Council of Japan to deliberate over the question of the disposal of HLW. In September 2012, the Science Council of Japan in response to this request made a statement regarding the disposal of radioactive waste. In the statement they recommend that a *public sphere* (see Harbermas, 1989) reflecting the diversity of opinion needs to be established. That is, the statement emphasized that multi channel dialogues should be conducted in which all stakeholders representing the diversity of opinion should be engaged with and dialogues concerned with every relevant aspect of each topics should be convened. However, despite such recommendations, the statement did not mention how such opportunities and spheres are to be established. This paper addresses this issue and discusses how such goals could be accomplished from the viewpoint of social psychology.

2. The process of citizen participation

We have to strive for a public decision-making process. In this section, I focus on citizen participation as a measure of public decision-making. We also have to recognize that citizen participation alone is not sufficient, and that an "evaluative yardstick" is required to measure the participatory program. For this purpose, procedural justice serves an important function.

2.1. Why do we need citizen participation?

There are three reasons given to advocate for citizen participation (McComas, *et al*, 2010; Hirose, 2014). The first is the normative reason of fostering democracy, the second is an instrumental rea-

son, in that it is necessary for gaining public acceptance through the legitimation process, and the third is that it improves the substantial quality of the process by making it possible to recognize good decisions through the sharing of both scientific and socio-cultural knowledge, while reflecting the diversity of values.

The next questions concern who should participate, the role of participants, and how to design the participatory programs. The classic answer typically invokes the stakeholder processes; meaning that only those who are highly interested or already involved in an issue tend to take part. Although stakeholder processes are crucial to increase representation, they often cause trouble and sometimes even prevent the achieving of consensus, instead increasing conflict between stakeholders. Furthermore, the stakeholder process also ultimately lacks processes capable of enabling the outcome to obtain social legitimation and often leads to an unbalanced decision due to the overestimation of stakeholders' interests. Such problems are the reason why there are calls for citizen panel processes, in which individuals, who are indifferent and distinct from the stakeholder groups, take part and evaluate the plan. For this reason, such people are sometimes called "value consultants". This process can prove beneficial as non-biased (i.e., randomly sampled), representative citizens assess the inclusiveness and diversity of values, under conditions that are transparent and openly disclosed. Consequently, a hybrid merging of the stakeholder process and the citizen panel process is now being recommended (Hirose, 2007; Renn, *et al*, 1993).

2.2. Gauge of public evaluation

There is a need for an effective measure to be developed to properly evaluate participatory programs. At present, one of the most widely used methods to evaluate success is to examine public acceptance: whether those who did not participate in the discussion could accept the decision. Evaluation by *non*-participants is emphasized as, despite the fact that not all (or even the majority of) citizens are able to participate in such a participatory program, every citizen is in the position to evaluate the decision process if provided with enough information. A large body of social psychology research has shown that public acceptance is primarily determined by the evaluations of distributive and procedural justice (Törnblom & Riël, 2007). Whereas distributive justice refers to evaluations of the decision and the expected outcome, procedural justice refers to evaluations of the process involved in the decision-making. Such an evaluative yardstick is usually employed when assessing citizen participation, particularly in the areas of risk communication and risk governance (McComas, *et al*, 2010).

Indeed, my research group, together with collaborators, have implemented a number of case studies and social surveys, which have demonstrated the significance of procedural fairness on public acceptance in environmental planning (Hirose, 2014; Ohnuma *et al*., 2010). These studies presented statistical evidence that the extent of information disclosure, the representativeness of participants, the opportunities to voice concerns, the inhibition of authority control, the reflection of diversity of values and the degree of inclusiveness, were all significant factors influencing the judgments of procedural justice and public acceptance in turn. These studies also revealed a robust correlation between procedural fairness and the trust in authority.

2.3. Is a citizen participation program sufficient for public acceptance?

Despite the fact that there is a substantial body of research on the significance of citizen participation on public acceptance, only a handful of studies have examined how long the public acceptance achieve by citizen participation approach lasts for. However, in research conducted by myself and collaborators (Ohnuma, 2012; Ohnuma *et al*,. 2010), the long term effects of a participatory program with panel data was explored. The results suggested that the procedural fairness of an initial participatory program did not maintain a long-term effect on public acceptance, while conversely the procedural fairness of each program was found to have robust effects on the public acceptance of each program. These results indicate that since the effect of a single program appears to fade after a short time, a one-shot participation program is an insufficient measure. Therefore we proposed that participatory programs, which present repeated, multi-layered opportunities for involvement, are necessary. Although these findings related to a case study of recycling and waste management policy planning, the findings would likely be applicable to the processes involved with making energy policy.

3. Deliberative Polling over energy policy in Japan

This section introduces a case of applied Deliberative Polling, a participatory program method, implemented by the previous Japanese government (when the Democratic Party of Japan was the ruling party) and designed for the discussion of energy policy.

3.1. What is Deliberative Polling?

The essence of Deliberative Polling (DP) is that it is considered to offer insight into the conclusion the public would reach as a result of changes in opinion, if people had the opportunity to become more informed and more engaged in the issues under consideration (Fishkin, 2009). The general procedure of DP has four steps: a) first, a random, representative sample is polled on the targeted issues; b) after this baseline poll, members of the sample are invited to gather under one roof in order to discuss the issues; c) the participants hold discussions in small groups with trained moderators and d) following these deliberations, the sample is again asked the original questions to discover whether steps b) and c) have had any effect on the panel's original opinions.

3.2. Deliberative Polling about energy policy in Japan

The previous government of Japan, in August 2012, conducted its first DP to address the public debate surrounding energy policy. The main topic addressed by the DP was the public reaction to three possible energy policy scenarios to be achieved by 2030. The different scenarios were distinguished by the proportion of nuclear power that was to contribute to Japan's energy resources with the three options being: "0%", "15%", or "20-25%". The results from the DP showed that support for the "0%" option increased from 41% to 47% following deliberations. However, other important results were found, 60% of the participants changed their opinion following discussions, which suggested that people could modify their opinion in response to the opinions of others. In addition, 25% of the participants selected "multiple options" (more than one of the three) or alternatively "none", which might be indicative of participants believing that the issue was not about a numerical goal.

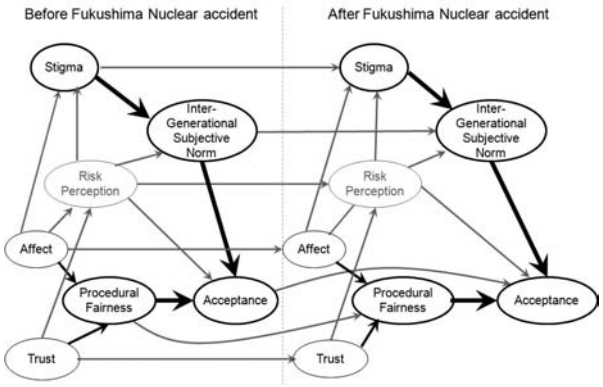

Figure 1. Determinants of public acceptance of geological disposal policy before and after Fukushima nuclear accident (modified from Ohtomo, *et al*., 2014)

Another question raised is how *non*-participants evaluated this instance of DP? In October 2012, two months after the DP was carried out, Maeda & Ohnuma (2013) conducted a survey to explore the people's evaluation of the energy policy in Japan. The results indicated a general sense of negativity but it also revealed that the level of negativity towards the policy was lower than that found in regards attitudes towards nuclear energy and trust in the government. Further explorations revealed that acceptance was significantly influenced by procedural fairness and trust, while approval was determined primarily by emotions. These results are consistent with the findings from previous studies (Ohnuma, 2014b; 2012). Collectively these findings imply that acceptance and approval are distinct concepts, and the procedures of participation (e. g. DP) might work when the degree of acceptance, including the level of inclusiveness, is the issue of concern, but will likely not work when selecting between simple dichotomies, particularly when they are related to a controversial issue. Another conclusion is that it is essential to move from a controversial to a comprehensive plan, rather than focusing on attitude change (e. g. increasing approval or disapproval) as this is not critical to acceptance. In particular with DP, it seems that efforts should be focused on measuring the depth of deliberation with procedural fairness rather than attitude change.

4. Inevitable: social stigma and intergenerational justice

This final section of this chapter seeks to tackle one of the most difficult topics explored in the social sciences: social stigma and intergenerational justice. Since all people agree that we should not ignore important decisions until the next generation, it is simply unacceptable that candidate sites for the geological disposal of radioactive waste still have not been decided. The constraining issue here is that everyone wants to avoid such material coming near their living sphere often referred to as the 'Not In My Backyard' (NIMBY) phenomenon. However, this study argues that it is also the *social stigma* involved, which represents a serious issue.

4.1. Social stigma: the barrier of public acceptance

The problem of siting for the disposal of radioactive waste could be regarded as an instance of NIMBY as while everyone recognizes the need for such sites, no one wants the waste to come into

their own neighborhood. On the other hand, even if the current population in a region would consider the possibility of housing the waste material, it is likely that they are concerned about the negative image their region would then experience from people in other places. We can understand this phenomenon as being a type of *social stigma* (Goffman 1963; Flynn *et al*, 1992). Stigmatization refers to when someone is designated as deviant, flawed, limited, spoiled, or generally undesirable in the view of some other observers (Slovic *et al*., 1991). Consequently, out of fear of social stigma, people may refuse or oppose their region becoming a candidate for siting, even though they recognize the necessity for such sites and the high level of safety of geological disposal. To make matters more complicated, social stigma is not a matter of personal feelings, but is also closely connected with intergenerational justice, including the legitimate reasoning that decisions will leave an impact on future generations. As many acknowledge, intergenerational justice is a crucial concept for the decision making process of the geological disposal of radioactive waste. No matter how many people recognize that we should not further postpone addressing the issue of radioactive waste, or how they feel themselves about whether it is acceptable for their regions to become a candidate site, they hesitate to offer their support when they consider what should be left as the inheritance of future generations. We can measure this as relating to the "perceived subjective norm of intergenerational justice": where a "subjective norm" is an expectation received from significant others, and with the significant others here being children, grandchildren, and further future generations.

My research team and other collaborators were investigating this issue even before the Fukushima nuclear accident. Ohtomo *et al*. (2014) present surveys from before and after the Fukushima nuclear accident. The first survey was conducted in Feb 2011, one month before the Fukushima nuclear accident and the second was conducted, using the same sample set in Feb 2012, one year after the Fukushima nuclear accident. A vignette (hypothetical scenario) method was used in this survey as there is no actual candidate site in Japan at present: respondents were thus asked to "imagine what you would think if your town became a candidate site". The results indicate that after the Fukushima incident the effects of emotion became stronger and the effect of trust weaker than before on procedural fairness, which was the strongest factor on acceptance of their region as a potential disposal site (Figure 1). Thus, it is clear that social stigma can subject a significant influence on the subjective norms of intergenerational justice and also impact the acceptance of proposals. This indicates a lack of understanding about the issue among the population at the national level, which causes anxiety amongst the residents at potential candidate sites, rather than the objection being due to some sense of NIMBY. Regardless of the actual motivation, it seems clear that national level dialogues are necessary.

4.2. Dialogues on radioactive waste in Japan?

Although the Agency for Natural Resource and Energy (ANRE) has organized many interactive symposiums and workshops in many regions of Japan for over ten years (ANRE, 2013), these meetings do not seem to have had any significant effect. This may be because, in the past, the organizing committee has primarily consisted of those promoting geological disposal or those who are likely to side with the ANRE and thus could be accused of being an 'echo chamber'.

However, in November 2012, a new committee was convened, in which the members consisted

not only of those promoting the geological disposal but also groups critical of geological disposal and neutral science communicators (ANRE, 2013). The first trial symposium was held in February 2013. The purpose of the symposium was to recognize the different values and to establish a "table setting" for future dialogues. Only applicants who were interested in the topic participated. The outcomes of these efforts are currently uncertain, but they should be carefully observed moving forward.

4.3. Concluding remarks: What contributes to policy making?

An appropriate candidate site for geological disposal will not be decided upon regardless of how much emphasis is placed on denuclearization and climate change, unless the related issue of social stigma is addressed. Although there is some literature discussing how to mitigate social stigma (e. g. Sjoberg, 2004), no trial has been successfully implemented in Japan yet. The present author takes a pessimistic view about public decision-making over the siting of geological disposal in Japan. However, I still dare to look on the bright side and remain cautiously optimistic. Until recently, in spite of the determined efforts of science communicators and risk communicators, technology experts still underestimated the social consequences of failing to resolve the issue of radioactive waste disposal, while the primary beneficiaries, living in large cities, displayed continual apathy. However, since the Fukushima incident, people have begun to pay more attention to the issue of radioactive waste. The present atmosphere thus represents a good opportunity to deliberate appropriately and with wide representation on the issue of radioactive waste and this opportunity should not be missed. Otherwise, the beneficiaries will rapidly forget this pressing issue, since as the old saying goes: "Vows made in storms are forgotten in calms" (Nodo-moto sugireba atsusa wo wasureru).

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Chapter 5. Nuclear Policy Change in Japan after Fukushima under the government of the Democratic Party of Japan-Crisis and Policy Change- (by Rie Watanabe*)

1. Introduction

The Fukushima nuclear disaster that took place on March 11, 2011 after an earthquake with a magnitude of 9.0 and tsunami struck the Tohoku (northeast) region of Japan, triggered several nuclear policy changes in Japan. Back in 2009, Japan experienced a historical change of governing coa-

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lition. The Democratic Party of Japan (DPJ, Minshu-to) won a majority in the House of Representatives in the August 2009 general election and formed the government in coalition with the Social Democratic Party (Shamin-to) and the People's New Party (Kokumin Shiu-to). With this governing coalition change, the dominance of Japan's policymaking by the Liberal Democratic Party (LDP, Jiyu-Minshu-to), one of the core members promoting nuclear energy, of which had last since 1955 with a short break from 1993 to 1994, ended. The political line in promoting nuclear energy was, however, maintained under the DPJ government. After being elected, the DPJ moved toward nuclear promotion as a route to achieving both climate and economic policy objectives. Immediately after his inauguration of Prime Minister, Yukio Hatoyama announced a target to reduce GHG emissions by 25% by 2020. On June 18, 2010, after Naoto Kan took over the premiership from Hatoyama, the basic energy plan toward 2030 was adopted in the Fundamental Policy Subcommittee of the Advisory Committee for Natural Resources and Energy (ACNRE) established by the Ministry of Economic Affairs, Trade and Industry (METI). Construction of nine new nuclear power plants by 2020 and a total of fourteen nuclear power plants was planned by 2030, in order to achieve the 25% GHG reduction target, energy security, and the co-existence of environmental protection and energy supply. The export of nuclear technologies also became one of the important strategies for the DPJ for achieving 3% annual economic growth, which the party set as an objective in its manifesto. In October 2010, Kan also reached an agreement to export nuclear technology from Japan to Vietnam.

After the Fukushima disaster took place, this nuclear policy direction was re-examined. The government first established the Energy-Environment Meeting under the Cabinet Office on June 27, 2011, with the aim to reduce the dependency on nuclear energy (Cabinet Office 2011). For serving debates concerning options for energy mix at the Energy-Environment Meeting, the ACNRE established the Fundamental Issue Subcommittee instead of the Fundamental Policy Subcommittee which had until 2009 been in charge of drafting the basic energy plan, invited several antinuclear experts, as a member of the Subcommittee, and reexamined the Basic Energy Play adopted in June 2010. The government also set the lifetime of nuclear power plants at 40 years, and established the Nuclear Regulation Authority (NRA) under the Ministry of the Environment (MOE). As a result, the competent authority for ensuring nuclear safety, of which the Ministry of the Economy, Trade, and Industry (METI) had been in charge, became independent of the METI, one of whose agencies, the Agency of Resources and Energy, is the competent authority for promoting nuclear power generation. Based on the options for energy mix drafted by the Fundamental Issue Committee, the nuclear energy policy guideline drafted by the Atomic, and the new guideline addressing the global warming issue drafted by the Central Environmental Council of the Ministry of Environment, the Energy-Environment Meeting developed the options for energy and environment innovative strategy, undertook deliberative polling (DP) in the summer of 2012 to discuss the best option, and finalized the strategy referring to the public debate. The strategy included the objective of a nuclear power plant phase-out in the 2030s (Cabinet Office 2012a). Although the decision to phase-out nuclear power plants in the 2030s was withheld by the LDP that won the 2012 autumn election (METI 2014), the decisions taken under the DPJ government after the Fukushima accident, in particular the latter two constitute major policy shifts from the nuclear decision-making that had previously

Table 1: Beliefs regarding nuclear policy; made by author

	Pronuclear	In-between	Antinuclear
Beliefs in nuclear risk	There is no (or negligible) risk that a nuclear accident will happen.	There is a risk that a nuclear accident will happen.	
	There is no (or negligible) risk that human life and health will be endangered due to radioactive materials.	There is a risk that human life and health will be endangered due to radioactive materials.	
Beliefs in technologies	There is a risk of accident, but even if accidents occur, modern (Western) technologies can limit their severity.		The risk of accident is uncontrollable by modern (Western) technologies.
Beliefs in management skills (training)	There is a risk of accident, but even if accidents occur, modern (Western) management skills can limit their severity.		The risk of accident is uncontrollable by modern (Western) management skills.
Beliefs in information dissemination	There is a risk of accident, but if one occurs, proper information will be provided by government or power companies to avoid the worst case. (Experts will provide proper information once an accident happens.)		There is a risk of accident, and if one occurs, , proper information will not be provided by government or power companies to avoid the worst case. (Experts will hide proper information once an accident happens.)
Beliefs in nuclear benefit	Nuclear is the only viable option for Japan, a resource-scarce country, to ensure energy security and climate protection.		Nuclear is not the only viable option for Japan to ensure energy security and climate protection. There are many renewable sources.
	Nuclear is cheaper than other fuels.		Nuclear is not cheap if back-end and accident recovery costs are taken into account.

gone on behind closed doors and the nuclear power myth that up to that time had been steadily gaining in prevalence. How did these policy changes take place? This article attempts to answer the question by focusing on the following two paths from crisis to policy change.

2. Analytical Framework

Policy change takes place through the interplay of groups of actors who share beliefs and/or interests in a specific policy domain (e.g. Sabatier and Jenkins-Smith 1993, Sabatier and Weible 2007, Baumgartner and Jones 1993). In any policy domain, the groups that installed the existing policies and institutions established to implement policies (dominant coalition), attempt to protect the status quo, while minority groups (minority coalition) seek policy change. Since an increased amount of human and financial resources is available for the dominant groups, policy change rarely takes place, or takes place only incrementally.

Japan's nuclear policy has been exactly such stable policy domain. In Japan nuclear poliymaking was dominated by a strong pro-nuclear coalition consisting mainly of politicians from the LDP, the Ministry of Industry, Trade, and Import (MITI, from 2001 METI), the Science and Technology Agency (STA), power companies, building contractors, banks, and mainstream nuclear technology researchers (e.g. Yoshioka (1999), Honda (2005)). The pronuclear coalition members promoted nuclear use for civilian objectives in order to realize their interests and beliefs regarding nuclear benefits (nuclear power appeared to be the only viable technology that would enable the reconstruction of Japan, increased production, and economic growth – which would ultimately result in a better life of the general population). By pursuing their interests and strong beliefs, they rather neglected nuclear risks, with or without being aware of them (see Table 1).

Based on the above, the first path examined in this article is as tollow. The Fukushima disaster

exposed the problems and the limitations of beliefs held by pronuclear coalition members, or changed their interests. As a result, at least parts of pronuclear coalition members altered their positions, thereby the balance of power within the nuclear policy subsystem being altered. Reflecting the changed balance of power, the DPJ, the governing party in charge of policymaking, turned the direction of nuclear policy and decided on phasing out of nuclear power plants.

In the second path, Japan's nuclear subsystem actors did not necessarily alter their beliefs, but the DPJ government had to turn to policy change by reflecting public opinion for the party's own interests. According to the existing literature, the interests of governing coalition include, the office-seeking, the policy-seeking, and the vote-seeking (vote-maximization)[1] (Mueller and Strom (1999)). representation (fulfilling their role as mediating institutions to act as representatives for the electorate) (Bruce *et al*. (1991)), and party cohesion (maximizing party unity) (Sjoeblom (1968)). These elements are sometimes in the supplementary relationship and other times in trade-off relationship.

3. Examination of the First Path: Positions of major actors after the Fukushima accident

The Fukushima accident exposed the limitations of the beliefs held by dominant coalition members; the nuclear accident, which power companies insisted on not taking place in Japan indeed took place, and once the accident takes place, inhabitants needs to evacuate, and restoring sites to its original condition is extremely difficult even with spending a huge amount of cost[2]. The Investigation Committee on the Accident at the Fukushima Nuclear Power Stations established in the Tokyo Electric Power Company attributed the fundamental cause of accident to "unexpected" tsunami and the operator's skill or the delay of information sharing did not have an influence on the response to the accident (Tokyo Power Co., Investigation Committee 2012)[3]. This discription can be interpreted that the Tokyo power company maintained its beliefs that the company had trained the operators of nuclear power plants at the level that they could have prereted severe accidents and that the probability nuclear accidents took place had stayed at very low if countermeasures against natural disasters had been taken. Moreover, as soon as the Nuclear Regulatory Authority

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1) Party leaders seek to control government for the financial benefit, power, authority, and honor that the government positions provide them but also to use the positions instrumentally to pursue policies that they prefer or they promise with their supporters – the latter case office-seeking is at the same time policy-seeking (seeking to maximize its impact on public policy). The vote-seeking parties seek to win the elections, which ultimately serves to office-seeking.

2) According to the Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company established by the government (Hatamura Committee), compensation borne by the Tokyo Power co. is currently estimated at 4540.2 billion yen for damage of evacuation order by the government (The Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company established by the government 2012).

3) This was the major difference from the Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company established in the Diet (Kurokawa Committee), Hatamura committee, and the Independent Investigation Commission on the Fukushima Daiichi Nuclear Accident (Independent), which admitted there is a high possibility that the accident took place due to tsunami, but did not deny the possibility that it took place due to earthquakes, and indicated the operators' who were not familiar with IC operation as an additional factor (Kurokawa Committee even mentioned that it was human-caused error) (Japanese Association of Science & Technology Journalists 2013).

established in September 2012, published the criteria for re-commissioning in July 2013, Hokkaido, Kansai, Shikoku, and Kyushu power co. applied for re-commissioning five nuclear power plants, which stopped for routine inspection. Even Tokyo power co. had a meeting with governor of the Niigata Prefecture in order to re-commission the Kashiwazaki-Kariwa nuclear power plants[4]. For the request of re-commissioning, interests of power companies also mattered. In order to make up for electricity supplied from nuclear power plants that stopped due to earthquakes and tsunami as well as due to regular inspections, all power companies started operating thermal power stations that had not been used. Hokkaido, Tohoku, Tokyo, Kansai, and Shikoku power companies even built new light-oil, gas, or LNG power plants as emergent electricity sources. The increased cost of fuels for running these power plants was estimated by 2300 billion yen in 2011, 3100 billion yen in 2012, and 3800 billion yen in 2013 (METI 2013).

The positions of power companies seem to be shared by other industrial stakeholders. When the innovative energy and environment strategy was published, the head of Nippon Keidanren, Hiromasa Yonekura made a statement opposing to the strategy on September 18, 2012; "It is clear that this decision (the innovative energy and environment strategies) will accelerate deindustrialization in Japan and put the maintenance of employment in difficulty. (.....) It is difficult to secure technologies and human resources to support nuclear safety once "nuclear phase-out" is announced. Furthermore, such a decision will damage the state's interest by having a negative impact on the relationship with the United States which has advanced a strong cooperation with Japan as an important partner of nuclear non-proliferation and the use of nuclear power for civilian objective. With these reasons, such strategies are unacceptable for industries" (Keidanren 2012)[5]. Yasuchika Hasegawa, the representative of Japan Association of Corporate Executives (Keizai-Doyukai)[6], also made a statement on September 4th, 2012; "the Doyukai did not change its position against the phase-out of nuclear energy" (Keizai-Doyukai 2012). These statements evidenced that most actors from the industry and energy sectors did not change their positions after the Fukushima accident.

Another core member of pro-nuclear coalitions, the LDP did not change its position, either, as evidenced in the statement of a new prime minister, Shinzo Abe at the House of Representatives. After the LDP's victory of the general election in the end of 2012 he said that, the party would undertake zero-based review on the innovative energy and environment strategies (House of Representatives January 30, 2013).

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4) The accident illuminated the cost of nuclear power plants. In order to get compensation payment support, as of June 24, 2013, Tokyo power co. borrowed 3837.3 billion yen from the Nuclear Damage Liability Facilitation Fund on August 10, 2011, which already lent to Tokyo power co. as of June 24, 2013, of which 1000 billion yen was invested as a form of purchasing preferred stock issued by the company on July 31, 2012. With this arrangement, the government acquired the company shares by 50.11%, and the company was under the control of the government. The price of stocks of Tokyo power co. dropped from 2151 yen on March 10, 2011 to 1621 yen on March 14, 2011, and to 566 yen on March 9, 2011.

5) The major industry associations, such as the Federation of Iron and Steel, the Federation of Electric Power Companies, and Japan Chemical Industry Association also made statements against the phase-out of nuclear energy.

6) Unlike the Keidanren, of which companies are members, executives participate in the Keizai-Doyukai in a private capacity.

4. Examination of the Second Path: Change of public opinions after the Fukushima accident and its impact on the interests of DPJ

As mentioned in the introduction, the DPJ government announced at the establishment of the Energy and Environment Meeting that it would conduct public debates when deciding on the future energy plan option. The public debate was undertaken in the 2012 summer as a form of the deliberative polling (DP). The government surveyed 6,849 people by phone in July 2012, of which 286 representatives were invited to debates held in Tokyo on August 4 and 5, 2012. In the debates, the participants were divided into twenty groups and discussed future energy and environment scenarios, including safety, cost, security, global warming, and finally three options for the country's future energy mix as prepared by the Energy-Environment Meeting (see Table 2). This was followed by a plenary with experts. Before and after the debates, the opinions of the participants were surveyed.

At the Energy-Environment Meeting, DPJ ministers had different views regarding options - perhaps reflecting their different political lines regarding nuclear policy but also due to considering the limitations to ask for public opinions on such specialized issues. When the Fundamental Issue Subcommittee of the ACNRE came up with four options regarding the future energy policy, including 0, 15, 20-25, 35, Takeshi Hosono, Minister of the Environment, stated that the 15% option was the base (Asahi Shimbun May 25, 2012). Acting Chairman of Policy Affairs, Yoshito Sengoku also stated in the television broadcast of August 2, 2012 that "0% in 2030 [was] unrealistic. It is difficult to achieve the phaseout of nuclear power in twenty years" (Asahi Shimbun August 3, 2012). In contrast, Minister of Economic Affairs, Industry, and Trade, Yukio Edano mentioned that they should be neutral and ask for the public opinions without leading them to any direction (Cabinet Office 2012b).

Putting different views among members aside, the 15% option was the one that is in line with the lifetime of nuclear power plants (40 years, maximum 60 years). The 15% option was the one, which was also consistent with the plan to review the options in the 2030s. Whether or not understanding this point, the percentage supporting the 0 option had drastically increased from the telephone survey to the debates (Table 2). Looking at the DP results, DPJ established the Energy and Environment Study Committee in the party in order to decide on the party's energy policy. The National Policy Unit of the Cabinet Office also held an expert meeting to discuss how to reflect the DP results, 89,000 public comments, and public hearings organized at 11 locations. The expert committee summarized the result that many people wished for a non-nuclear society, although they suggested that because those who participated in DP likely had a stronger-than-average interest in the issue, the results might not represent the will of the Japanese people, and there was the possibility that the public comments expressed only a partial range of publie opinion. Finally on September 14, 2012, the Energy-Environment Meeting adopted the innovative energy and environment strategies which was designed to phase out nuclear power plants by 2030 without ensuring consistency with the previously set 40-year lifetime of unclear power plants.

Table 2: Votes for each option

	Phone (July)	Before (Aug. 4)	After (Aug. 5)	Public hearings	Public comment	Opinion poll by Asahi Shimbun
No support	13.7	13.7	9.5			
Multiple support	23.9	13.7	15.4	5	6 (4)	
20 - 25% support	13.0	13.3	13.0	16	3 (6)	12
15% support	32.6	18.2	15.4	11	1	29
0%	16.8	41.1	46.7	68	90(87)	49

Source: Made by author based on Cabinet Office (2012b), Asahi Shimbun,The 0% option means consciously phasing-out nuclear energy. The 20 to 25% option means consciously maintain nuclear energy. The 15% option is in line with the lifetime of nuclear power plants (40 years) and means that the dependency on nuclear energy will be decided in future.

5. Conclusions

This article analyzes how the Fukushima accident triggered policy changes under the DPJ administration, focusing on the adoption of innovative energy and environment strategies mentioning the phase-out of nuclear power plants in the 2030s. The analysis undertaken in section 3 illustrates that pronuclear coalition members did not change their positions to the extent to support the phase -out of nuclear power plants in the 2030s from their interests and/or their beliefs on nuclear benefits-they may have revised their beliefs on nuclear risks, though (coming close to "in-balance" in Table1). However, there are several actors who changed their positions. For example, the Buddist Party (Komeito) had long been standing on the nuclear proposition coalition as the coalition partner of the LDP. After the Fukushima accident, however, it changed party's official position. In the 2012 general election, the party committed to creating the nuclear-zero society (Komeito 2012). Also from the internet business sector, several powerful actors joined the anti-nuclear coalition, including the President of the Rakuten, an electronic commerce and internet company, Hiroshi Mikitani, who established the Japan Association promoting e-business (renamed as Japan Association of New Economy, JANE) in June 2011, as well as the President of the Softbank corporation, telecommunications and internet corporation, Masayoshi Son, who announced to invest 1 billion yen in coustructing large-scale solar power facilities in the Tohoku region. As evidenced, the power balance in the nuclear policy subsystem slightly changed due to the Fukushima accident, but not to the extent that by itself explains the adoption of the innovative environment and energy strategy mentioning the phase-out of nuclear power plants.

The analysis in section 4 illuminates that the adoption of the innovative energy and environment strategy mentioning the phase-out of nuclear energy in the 2030s was at least partly resulting from the DPJ's interests. As explained, the DPJ members did not have unified positions regarding nuclear policy. Therefore, the decision was taken not due to the party-cohesion. Nevertheless, it was extremely important for the DPJ, which took over the government from the LDP not based on the support from specific interest groups but on a wide range of voters, and to advocate party-oriented policymaking instead of ministry-oriented policymaking behind the closed doors under the LDP, to demonstrate "representation" for vote-seeking and office-seeking.

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Chapter 6 . CO_2 reduction without nuclear power generation (by Aiko Azuma*)

1. Introduction

After the accident of the Fukushima Nuclear Power Plant, Japan faces a difficult situation of an increase in fuel cost and CO_2 emissions because electricity that was earlier generated by nuclear power plants is now substituted by that generated by thermal power plants. However, the cur-

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rently high electricity cost is the results of the past energy policy in Japan. The country was completely reliant on nuclear power and did not promote renewable energy or invest in low-carbon thermal power plants. Therefore, in addition to promoting renewable energy, it is important for Japan to invest in the thermal power sector, to promote thermal efficiency, and shift to alternative fuels to reduce both emissions and fuel cost.

This shift is stimulated by a carbon reduction policy, which includes carbon taxation and emissions trading system. Delarue et. al. (2008) and Erdmenger et al. (2008) analyzed the role of fuel switches from coal to liquid natural gas (LNG) for emissions reduction. Further, the economic effect of the introduction of a climate policy on the power generation mix and electricity price has also been well studied (Odenberger and Johnsson, 2007; Linares et al., 2006; Schumacher and Sands, 2006; Ellerman et. al., 2010; Azuma, 2012). Both Odenberger and Johnsson (2007) and Azuma (2012) considered investment behavior of the power sector, but they did not take the phasing out of nuclear power into account.

The objective of this study is to assess the required investment for fuel switches, and the effect of these costs on electricity price to meet demand and emissions reduction goals, when nuclear energy is not available.

The remainder of this paper is organized in the following manner: Section 2 briefly describes the dispatch and replacement models. Section 3 presents the data and assumptions used in the dispatch simulation as well as the short-term results. Section 4 describes the data and methodology employed for replacement simulation and a discussion of the empirical evidence. Section 5 presents the conclusion.

2. Fuel Switching Models

We use the multi-period fuel-switching decision model. The models basically follow those given in Azuma (2012), in which investigation on the fuel-switching decision process is conducted by using single period models.

2.1 Dispatch Model

The Dispatch model is a cost-minimizing model to determine the optimal output of each plant and each hour under the constraints of total hourly output y_t and annual CO_2 emission e. The utility has n power plants, x_{it} denotes plant i's electricity output per hour ($t=1\cdots T$), and w_i is the fuel cost per kWh. The utility cannot increase the capacity of plants, and hence, plant i's electricity output is limited $0 \leq x_{it} \leq X_i$, where X_i is the maximum electricity output in plant i's capacity. Let β_i be the CO_2 emissions coefficient per kWh. The utility's problem under total electricity output and plants capacity is described below:

$$\min_{x_{it}} \ TC = \sum_{i=1}^{n}\sum_{t=1}^{T} w_i x_{it}, \ \ s.t. \ y_t = \sum_{i=1}^{n} x_{it}, 0 \leq x_i \leq X_i, e = \sum_{i=1}^{n}\sum_{t=1}^{T} \beta_i x_{it}$$

2.2 Replacement Model

The replacement model is also a cost-minimizing model to determine the optimal type of fuel, capacity, and output per hour for each plant under the constraints of total output and CO_2 emission.

Let plant i's investment cost for replacement be denoted as K_i ($K_i(0)=0$, $K_i'>0$, $K_i''<0$). The utility's problem under total electricity output, plants' capacity, and CO_2 emissions constrain is described below.

$$\min_{x_{it}} TC = \sum_{i=1}^{n}\sum_{t=1}^{T} w_i x_{it} + \sum_{i=1}^{n} K_i(X_i),$$

$$s.t.\ y_t = \sum_{i=1}^{n} x_{it}, 0 \le x_{it} \le X_i, e = \sum_{i=1}^{n}\sum_{t=1}^{T} \beta_i x_{it}$$

3. Dispatch Simulation

The simulation focuses on the three big utilities in Japan; Tokyo Electric Power Company (TEPCO), Chubu Electric Power Company (CEPCO), and Kansai Electric Power Company (KEPCO). These three utilities determine the optimal level of power generation of each plant for each hours.

3.1 Data

Table 1 shows the generation profile from each power source of the three utilities based on actual data in 2010 before the Fukushima accident. The hourly electricity supply in the thermal power generation sector (y_t) is calculated by the following equation,

Hourly electricity supply in the thermal power sector

=hourly Electricity Demand − Supply from nuclear and hydro

− Power purchased from wholesale utilities + power for pumped storage type hydro

The amount of electricity needed by pumped-storage hydroelectric power stations is based on the data from ANRE(2010).

Table 1 Simulation Data

Utility	Tokyo (TEPCO)	Chubu (CEPCO)	Kansai (KEPCO)
Total electricity demand (TWh)	318	142	165
Nuclear Power (%)	26	15	41
Thermal Power (%)	57	71	37
Hydro Power (%)	3	6	7
Wholesale (%)	15	9	16

3.2 Features of Thermal Power Plants

Table 2 summarizes the features of thermal power plants in each utility as of 2010.

The fuel cost per kWh of each plant (w_i) is calculated by $w_i = p_i/h_i/TE_i \times 360$ where p_i is the fuel price given by the actual average purchase price from January 2010 to December 2010 based on the Trade Statics of Japan, h_i is the heat value of fuel used in each plant, and TE_i is the thermal efficiency of each plant based on the data provided by ANRE (2005)[1].

The CO_2 emissions per kWh of each plant (β_i) is calculated by dividing the CO_2 emissions coefficient of fuel with $TE_i \times 0.36$. The data of CO_2 emissions coefficient of each fuel is based on MOE (2002)[2].

1) I got the thermal efficiency information of new plants built after 2005 from the website of each utilities.

2) Coal: 90.0g CO_2/MJ, Heavy oil: 71.6g CO_2/MJ, Crude oil: 69.0g CO_2/MJ, LNG: 50.8g CO_2/MJ, LPG: 58.6g CO_2/MJ, Natural gas: 51g CO_2/MJ, City gas: 51.3g CO_2/MJ, Light oil: 69.2g CO_2/MJ.

3.3 Scenario settings

To analyze the impact of decrease in nuclear power generation on generation cost, CO_2 emissions, and CO_2 abatement cost, we set three core scenarios with different settings depending on the output from nuclear power plants and the CO_2 emission constraint.

Table 2 Features of thermal power plants

Utility	Fuel Type	The number of plants	Start of operation (year)	Installed Capacity (MW)	Capacity profile (%)	Thermal efficiency (%)	Fuel cost (yen/kWh)	Emission Coefficient ($kgCO_2$/kWh)
Tokyo (TEPCO)	Coal	2	2003. 98	1600	4. 1	43. 00	2. 92	0. 76
	Oil	4	1982. 14	10328	26. 2	36. 58	11. 56	0. 66
	gas	10	1991. 36	27434	69. 7	44. 06	7. 92	0. 42
	total			39362				
Chubu (CEPCO)	Coal		1996. 42	4100	17. 5	40. 14	3. 17	0. 81
	Oil		1974. 57	4650	19. 8	37. 22	11. 21	0. 68
	gas		1987. 77	14713	62. 7	43. 74	7. 77	0. 43
	total			23463				
Kansai (KEPCO)	Coal		2007. 58	1800	12. 4	40. 40	3. 11	0. 81
	Oil		1982. 05	5775	39. 9	37. 50	11. 32	0. 67
	gas		1992. 26	6892	47. 6	44. 20	7. 71	0. 42
	total			14467				

- Scenario 1: Refernce scenario. Nuclear output and the CO_2 emissions constraint set at the 2010 level, hence it represents the situation before Fukushima accident.
- Scenario 2: After the Fukushima accident scenario. Nuclear output decrease to zero and thermal power sector substitute for all nuclear generation. However, there is no CO_2 emissions restriction, hence CO_2 emissions constraint set at the 2011 level. Therefore it reflects the current situation after the Fukushima accident in Japan.
- Scenario 3: Low carbon without nuclear power generation scenario. Utilities have to decrease CO_2 emissions to the level of 2010 with zero nuclear generation.

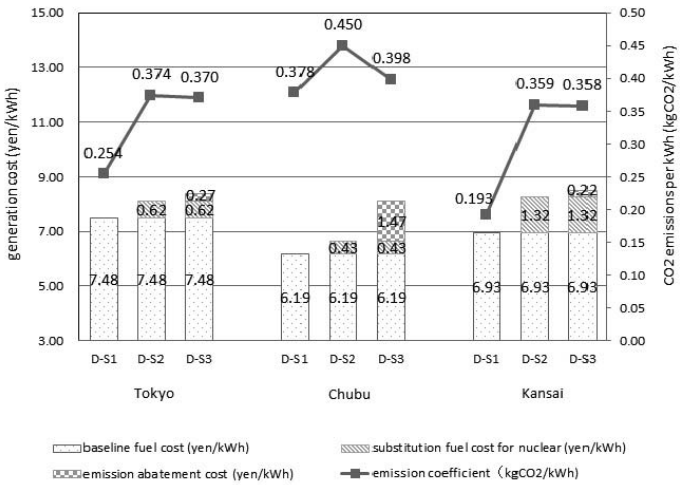

Figure 1 Comparison of fuel costs across dispatch scenarios

3.4 Results of dispatch simulation

Figure 1 compares the unit generation costs among scenarios 1, 2, and 3[3]. The costs of substituting thermal power for nuclear power can be revealed by comparing the power generation cost between scenarios 1 and 2, as well as the cost of CO_2 emission reduction holding the output level constant, by comparing the power generation cost between scenario 2 and 3. The former is called "substitution fuel cost for nuclear" and the latter "emission abatement cost". The substitution cost and emission abatement cost substantially differ among utilities according to the percentage of electricity generated from nuclear power as of 2010 generation and the capacity of coal, oil, and gas plants.

The substitution cost is the highest among utilities because KEPCO does not have a sufficient capacity of gas plants to substitute thermal power for nuclear power. On the other hand, the substitution cost of the CEPCO is relatively less, because the proportion of electricity generated by nuclear power by this company is comparatively low and it has enough capacity of gas plants to substitute for nuclear power.

Next, we compare the results of emission abatement cost between three utilities. TEPCO and KEPCO do not have much potential for CO_2 reduction by fuel shift in scenario 3 because their plants are already running to full capacity to substitute for nuclear power generation in scenario 2. Unlike these companies, CEPCO reduced 13% of emissions from scenario 2 to scenario 3 by changing the base load plant from coal to gas even after a complete substitution of thermal power for nuclear power.

To summarize, a decrease in the utilization rate of nuclear power plants induces an increase in the electricity price and CO_2 emissions in the short term because most utilities constantly use old and inefficient thermal power plants, previously utilized only during peak times, to substitute for nuclear power generation.

4. Replacement Simulation

4.1 Data

The basic data in each scenario are the same as those in the preceding section (as indicated Table 1).

The method to estimate capital cost for replacement (K_i), follows Azuma (2012). The candidate plants for replacement are thermal plants constructed before 1985.

4.2 Scenario settings

Specifically, three core scenarios with different settings depending on the output from nuclear power plants and the CO_2 emission constraint are discusses in this section:

- Scenario 1: Refernce scenario. Similar to the dispatch simulation, Nuclear output set at the level of 2010 before Fukushima accident. On the other hand, the emission constraint setting in replacement scenario 1 is different from that in the dispatch simulation. In scenario 1 in the replacement simulation, all utilities are required to comply with the CO_2 emissions less than the level of 2011 after Fukushima accident.

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3) unit generation cost = total fuel cost / the total quantity of electricity generated by thermal power sector.

- Scenario 2: Nuclear output decrease to zero and thermal power sector substitute for all nuclear generation. Utilities also have no CO_2 emissions restriction, hence CO_2 emissions constraint set at the 2011 level. Therefore scenario 2 is set to examine how decrease in nuclear power impact on the electricity generation cost in the future.
- Scenario 3: Low carbon without nuclear power generation scenario. Utilities have to decrease CO_2 emissions to the level of 2010 with zero nuclear generation. Therefore scenario 3 is set to examine how decrease in nuclear power impact on the CO_2 abatement cost in the future.

4.3 Results of the replacement simulation

Substitution costs and emission abatement costs are presented in Table 3. Figure 2 especially shows how the fuel costs have changed according to scenarios.

In the replacement simulation, substitution costs can be accurately calculated by a comparison between the power generation cost in scenario 1 and 2.

The emission abatement cost is calculated by comparing the power generation costs in scenario 2 and 3. Emissions can be stabilized almost at the 2010 level by replacing old inefficient plants with efficient gas plants at a low cost, even when thermal power completely substitutes for nuclear power.

It is evident that fuel costs of replacement scenario 2 in Figure 2 are lower than those in dispatch scenario 2 in Figure 1 because the thermal efficiency of plants improves by replacement and fuel consumption decreases. Further fuel cost in replacement scenario 3 in Figure 2 are lower compared to dispatch scenario 2 in Figure 1, even though emissions are reduced sharply by fuel switching to gas. Thus, this result shows that the introduction of an emission restriction target under a situation of decreasing nuclear power generation policy will not lead to an increase in fuel costs in the future.

Table 3 Comparison of generation costs across scenarios

Utility	Scenario	Emissions per kWh	Generation cost	Fuel cost	Capital cost	Substitution cost	CO_2 abatement cost
		$kgCO_2$/kWh	yen/kWh	yen/kWh	yen/kWh	yen/kWh	yen/kWh
Tokyo	R - S1	0. 37	7. 48	3. 47	3. 79	-	-
(TEPCO)	R - S2	0. 37	8. 09	5. 07	3. 59	1. 39	-
	R - S3	0. 28	8. 37	5. 98	3. 56	1. 39	0. 91
Chubu	R - S1	0. 45	8. 32	3. 49	4. 38	-	-
(CEPCO)	R - S2	0. 45	8. 95	4. 72	4. 23	0. 63	-
	R - S3	0. 29	10. 23	6. 05	4. 18	0. 63	1. 28
Kansai	R - S1	0. 27	8. 55	2. 95	5. 60	-	-
(KEPCO)	R - S2	0. 36	9. 48	5. 02	4. 46	0. 93	-
	R - S3	0. 30	10. 06	5. 66	4. 40	0. 93	0. 58

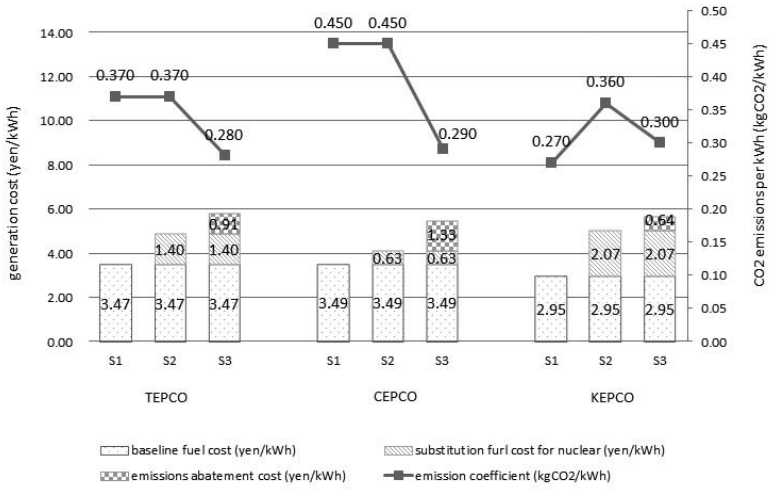

Figure 2 Comparison of fuel costs across replacement scenarios

5. Conclusion

This study investigated the effect of reduction in the utilization rate of nuclear power plants on power generation costs and CO_2 emission abatement costs. The results of the dispatch and replacement simulations show that simultaneously balancing the decrease in nuclear power generation with controlling power generation cost and stabilizing emissions at 2010 level at the same time is indeed a feasible strategy.

The results of the replacement simulation shows that some utilities face difficulties in reducing emissions to the pre-2011 level when the utilization rate of nuclear power plants became almost zero. To achieve emissions below the pre-2011 level, both a carbon pricing policy and renewable energy targets are required.

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Chapter 7. The Nuclear Disaster of Fukushima, Civil Protest and Maruyama Masao's "System of Irresponsibility (by Julia Klein*)

More than two years have passed since the earthquake and tsunami of March 11th, 2011, severely damaged the Fukushima Daiichi power plant in the Tohoku area of northeast Japan, and precipitated the nuclear disaster. Several published reports have subsequently discussed the reasons for the "3.11"catastrophe, and in December 2011 the then Prime Minister Noda Yoshihiko, a member of the Democratic Party of Japan (DPJ) which at that time was in power, officially announced that the nuclear crisis at the Fukushima nuclear power plant had been "resolved". The election in late 2012 returned Japan's long-term ruling party the LDP to power under prime minister Abe Shinzo, and the Abe government is currently planning not only to build new nuclear power plants in Japan, but even more contentiously to export Japanese nuclear technology to strengthen Japan's national economy. Such plans are diametrically opposed to the critical voices that argue that the real reasons for the Fukushima disaster have not yet even been revealed. In this sense, a restart of Japan's nuclear power plants, the construction of new plants and the export of nuclear technology abroad all lack any kind of rational legitimation.

Although the reasons for the nuclear Fukushima disaster may not yet have been completely uncovered, it can be said that this disaster was not simply some kind of unfortunate accident caused by a natural catastrophe, but that it was, even more obviously, a "man-made catastrophe". One may argue that the nuclear Fukushima disaster not only revealed the dangers of a technology widely believed until that moment to be "safe", but also revealed the irresponsible character of Japan's nuclear industry and what has been called "*genshiryoku mura*" or the "nuclear village", the "closed society" made up of Japan's nuclear industry, nuclear scientists and engineers and the media. Many discussions have now taken place to consider the responsibility for this disaster, but when we look at the close and secretive relationship between the Japanese government and Fukushima Daiichi's operating company TEPCO (*Tokyo Denryoku*), it becomes obvious that this relationship is driven by some kind of mutual dependence, a 'fuzzy' interdependence that makes it difficult to specify the actor primarily or solely responsible for this accident. In this sense, "3.11" has not only to be seen as a serious environmental problem, but even more as a "socio-cultural" problem, whose origins lie deep in the structures of Japanese society.

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Yet what are these "socio-cultural" structures that finally resulted in a nuclear catastrophe that shattered all previous risk perceptions for nuclear energy, not only in Japan, but also throughout the world? And why – as foreign media asked in the course of this crisis – did Japan not immediately decide to abandon nuclear power after this accident, as, for example, did Germany, a country that had not even been indirectly affected by this crisis? Why, many people asked, had Japan, a country that had been struck by two nuclear bombs at the end of WWII embraced nuclear power at all? And how could a nation that is continuously shaken by severe earthquakes and natural catastrophes such as tsunamis, consider nuclear power production to be a safe technology? According to opinion polls that the Asahi Shinbun conducted in 2011, around sixty percent of the Japanese population is now opposed to the production of nuclear power. Yet, in view of the victory of Japan's pro-nuclear party LDP in the elections of 2013, are we to assume that after all the majority of the Japanese people somehow still believes in the security of nuclear energy? Or might this be some kind of false conclusion, failing to deal with rising civil criticism of Japan's nuclear policy, something that is blurred by pro-nuclear government paroles? Japan's nuclear policy and particularly TEPCO's way of handling the disaster and its aftermath have been called "irresponsible". But what kind of irresponsibility is this?

Since the nuclear disaster at the Fukushima Daiichi nuclear power plant, many discussions have sought to clarify the question of "responsibility" We might, in this context, bear in mind the theories of Maruyama Masao (1914-1996), one of Japan's most famous intellectuals and political scientists, who dealt in his studies with the question of "responsibility" and "irresponsibility" in war-time Japan. In the May 2011 issue of the Japanese journal "*Gendai Shisou*" ("Contemporary Thought"), Sakai Naoki, professor of Japanese Literature and History at the University of Chicago, entitled one of his essays "*'musekinin no taikei' mitabi*" – "A system of irresponsibility for the third time"[1]. In his essay, published just two months after the Fukushima nuclear disaster, Sakai provides a critical look at the public and media discourse that followed "3.11", focusing on the question of "responsibility". When we read Sakai's conclusions, it becomes evident that the Fukushima disaster can be seen as the result of a homemade socio-cultural and political system in which several actors failed in their obligation to take a critical attitude towards nuclear energy and to inform the Japanese population about the possible risks and dangers of nuclear energy in an open-minded way. When Sakai uses the term "*musekinin no taikei*" he is directly referring to a term coined by Maruyama Masao, although, as Sakai's conclusions also suggest, the nature of the "system of irresponsibility" that can be found at work in Japanese society after the Fukushima disaster is clearly different from the system that Maruyama pointed to as operating in the 1940s to describe the inner logic of what has been called "*tennôsei fashizumu*" ("emperor fascism"). Yet when we take a rather closer look at Maruyama's concept of the "system of irresponsibility" as well as at Sakai's conclusions concerning the inner nature and logic of Japan's "nuclear village" and the problem of responsibility after "3.11", we might find some parallels between Maruyama's concept of wartime Japan and the post-

1) See Sakai, Naoki (2011): "'*Musekinin no taikei' mitabi*" in: Gendai Shisou, Vol.39-7, No.5, Tokyo: Seidosha, p.26-33.

Fukushima "system of irresponsibility". So, what did Maruyama mean by the term "*musekinin no taikei*" – "a system of irresponsibility"?

Maruyama initially conceived the theory "*Musekin no taikei*" - or "a system of irresponsibility" - to describe what was known as "the emperor system", the social structure that existed until 1945 – during the rise of Japan's "Ultra-nationalism" (another term first used by Maruyama) – and the behavior patterns that it entailed. According to Maruyama, the Japanese emperor system can be characterized as a strict hierarchical structure, in which the lower parts of that system act on behalf of the upper parts of the hierarchy, above all the emperor. Furthermore, this hierarchy can be described as a system of mutual dependencies: on one side, the lower levels of the hierarchy (mainly the normal people and the inferior military ranks) depend on the orders of the higher levels of the hierarchy (above all the upper military ranks), while on the other side the members of the higher hierarchy levels are dependent of the actions of the lower hierarchy members in times of war. Although it has generally been considered that the emperor – the "*tennô*" – is the crown of this hierarchical structure, Maruyama identified an even higher "leading force", or level, in this system, indeed a position higher even than the emperor – the concept that has been termed "*kokutai*": this can be described as the "core" of the Japanese wartime ideology, and has often been translated by such cognate terms as "national body" or "national polity". In the end, however, the real meaning of the somewhat nebulous term "*kokutai*" is hard to grasp, as it stands for a kind of mystic tradition that takes its origins in the primal myth of the Japanese nation, culture and emperor system. In simple terms, "*kokutai*" was considered to be the ultimate "good", the highest moral authority, an authority that must never be questioned. As "*kokutai*" was the "real" summit of the hierarchy within the Japanese emperor system, all members of this hierarchy finally acted on behalf of "*kokutai*". At the same time any action that one took on behalf of "*kokutai*" was automatically legitimized by the same ultimate authority, the "*kokutai*". Yet, as the real nature of the "*kokutai*" was never quite clear, all the actors finally acted on behalf of a mystic, vague tradition. The "*kokutai*" – the tradition – assumed some kind of coercive power, a kind of pseudo-religious force, driving the actions of every strata in the hierarchy: the entire population. But as the real nature of the "*kokutai*" was finally unknown even to those who acted on its behalf, no one in this hierarchy was ever able to describe the final, real motive and enforcer of his own personal actions. In addition, the fact that those giving orders and those acting on the basis of these orders were mutually dependent on each other, the ultimate responsibilities for the actions (finally, the war crimes) that had been committed within this system became impossible to ascertain. This, as Maruyama put it, created a system in which actors acted without any objective reason on behalf of an unknown authority (the "*kokutai*"), and this finally made it impossible to take responsibility for one's own actions – thus establishing a system of "irresponsibility". Maruyama located the origin of this system in the Japanese way of modernization. According to Maruyama, Japan's modernization had been "incomplete" in the sense that the concept of (political) "autonomy" or the "subjectivity" of the individual (a major concept of the modern way of western thinking) didn't really develop in Japan, a fact that caused a weakness in the individual "autonomous" decision making of the Japanese individual. Whereas modernization in the western world gave rise to the concept of an autonomous, rational individual, the society of Ja-

pan that time somehow remained stuck in the mentality of a feudal, "closed society", as Maruyama put it. This lack of individual autonomy, the inability to take decisions and actions based on one's own decisions (each of us left alone to take sole responsibility for those actions) resulted in the formation of the authoritarian state of Japanese Ultra-nationalism and that very system of irresponsibility[2]. But why is Maruyama's theory of Japan's "system of irresponsibility" becoming a topic of interest again after the nuclear disaster of Fukushima?

If we look, for example, at the reactions in the German media to the behavior of Japanese society as a whole and the individual in particular, we notice the significance that German commentators give to the "autonomy" of the individual, and to the strange lack of it that they notice in the Japanese psyche. "The Japanese still have a strong belief in authority, no one is questioning the orders or decisions of the authorities, no one is thinking about protesting against nuclear power and condemning those actors responsible for the nuclear disaster at Fukushima". "Japanese society hasn't changed at all, and the way Japanese society deals with this kind of catastrophe shows that Japanese society is still feudal at its very core" – this is to quote just two of the various voices of the German media after the Fukushima disaster. Yet can it really be said that Japanese society hasn't changed at all since the end of the Second World War? And do those patterns Maruyama described as elements of his concept of the "system of irresponsibility" still exist? Can the "feudal mind" of an individual without personal autonomy, a person *unable* to take responsibility for his own actions - like the actors in Maruyama's system of irresponsibility who were unable to take responsibility for their actions because they didn't know what they were doing - be held responsible for the Fukushima disaster? Certainly not! Although this might sound sarcastic, the logic of such a claim would lead to a conclusion that finally nobody at all can be held responsible for the Fukushima disaster, as those whose actions are "insane" (persons not knowing what they are doing) cannot be held responsible for their actions. This would be far too simplistic and would rather help to further disguise the responsibility of those actors whose failures to act responsibly led to the disaster. Yet, in the end, we might still have to admit that some of the features distinguished by Maruyama's "system of irresponsibility" may still be found even today.

If we look, for instance, at what is called "*genshiryoku mura*", Japan's "nuclear village", we shall find evidence of such patterns. We can clearly ascertain that several actors – the Japanese state, the nuclear industry, the media, scientists, and others – acted in some way irresponsibly. But what kind of irresponsibility was this? Although we can say that the actors who hid information of the

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2) The question of to what extent Maruyama's theories of the driving forces of Japan's war leaders were appropriate will be left open at this point. Although a theory that a "psychological" force was the driving force for the actions of Japan's war leaders might seem to ignore economic or political factors, we must remember that Maruyama focused on the psychological structures determining the behavior patterns of Japan's war leaders to distinguish his studies from Marxist studies that focused only on economic factors. Nevertheless, Maruyama's theories still seem to be appropriate when we look at the socio-cultural structures of (Japanese) society and its "thinking". For Maruyama's "system of irresponsibility", see Maruyama, Masao (1963): Theory and Psychology of Ultra-Nationalism. In: Maruyama, Masao: *Thought and Behaviour in Modern Japanese Politics*, London: Oxford University Press, p.1-24.

real extent of the nuclear accident behaved "irresponsibly", we can, at the same time evaluate their behavior as quite natural, as typical human behavior that might well be found in the social conduct of other countries, too. The question should rather be: does some kind of organizational irresponsibility also exist besides and in addition to such an individual irresponsibility? When we consider Japan's "nuclear village", we might conclude that the answer is "yes", for we shall notice that the several actors working within Japan's "nuclear village" are intertwined, and we could identify in this relationship the same kind of mutual dependence that Maruyama detected as operating within his "system of irresponsibility": in the case of the Fukushima disaster this would be the mutual dependence of the government and the operating company of Fukushima Daiichi, TEPCO. Japan's nuclear village can be described as a system – a tie-up, if you like – of several actors (the government, companies, scientists, technicians, the media etc.), which grew steadily after Japan's adoption of nuclear power during the post war era. Japan believed in the ideal of the "peaceful atom", as promulgated by one of the early post-war presidents of the US, General Dwight Eisenhower, what he termed his "Atoms for Peace" initiative. Japan believed in nuclear power as a clean, cheap energy source that would signify economic growth, a process that was indispensable for Japan's recovery as a defeated nation. The promotion of nuclear energy as a "national issue" created an even deeper intertwining of the state – the government – and the nuclear industry, thus creating the mutual dependence of the actors involved.

Can it be said that Japan has merely been misled – or even deceived – by the dream of the "peaceful atom", the dream – and finally the myth – of an absolutely safe source of energy, which finally led to the disaster of Fukushima? Maybe she was deceived, but we cannot conclude the discussion by simply saying that the Japanese nation has again been misled by a myth – as they had once been misled by the myth of the "*kokutai*" – for this would merely ignore or overlook the real problems that led to this accident. Furthermore, those who tell us that they have been deceived might thereby be implying that they themselves bear no responsibility for the actions of the Government or the Electricity Companies, that they had merely been misled and deceived by some higher power or malicious authority. Yet, in the end, even those who have been deceived have finally to take responsibility for their own credulity in having been deceived (to have allowed someone to deceive them), as the well-known critic Koide Hiroaki used to put it[3]. Even so, the Japanese were not alone in being so credulous. If we look at the history of the peaceful usage of nuclear power, other countries, too, have believed in this "dream" of the peaceful usage of nuclear power. Nevertheless, once the Fukushima disaster had smashed the myth of absolute safety, several countries, Germany being the most significant example, decided to refrain from further use of nuclear power. Whereas Germany is holding a debate on the realization of an energy transition ("Energiewende"), Japan, it can be said, does not have even a proposal for a potential reversal of its energy policy.

When we look again at Japan's nuclear village, we may find an explanation for this absence of

3) See Koide, Hiroaki (2012): *Damasareta anata ni mo sekinin ga aru. Datsu genpatsu no shinjitsu*. Tokyo: Gentosha

critical voices. As several of the actors – be they companies, scientists, technicians, or the media – are intertwined within this pro-nuclear "society", independent voices that are critical of nuclear power are hard to find. One might think that the influence of Japan's nuclear village would have declined after the Fukushima disaster, but Japan's plans to export Japanese nuclear technology to developing East Asian countries, might suggest that the contrary is the case. However, this does not have to mean that the Japanese public is not questioning Japan's nuclear policy and the safety of nuclear energy.

When we consider the demonstrations that followed "3.11" as well as discussions on social networks, twitter and blogs concerning the safety of food, the risks of nuclear radiation, etc., we would not be justified in saying that the greater part of the Japanese society remains ignorant of the risks of nuclear power. Thus, it would also be wrong to argue in a generalizing way that the Japanese individual lacks political autonomy or is uninterested in political decisions that affect his or her well-being. One might therefore argue that the real problem isn't any kind of political abstinence of the Japanese individual (such a lack of interest can be said to exist in other countries, too, and is nothing specific to Japanese society alone), but rather resides in the nature of Japanese politics and political ideas, as well as public discourse in general.

When we look again in particular at Japan's nuclear village, we might put the problem as follows: Japan's specific social structure may still contain elements of a "closed society" – of believing oneself to live within the framework of Japanese society as a harmonious, interdependent entity. The term "closed society" in this case might be defined – as Maruyama defined it – as a society without "criticism", or "critical voices". If one talks about Japan's nuclear village as an exclusive pool of pro-nuclear actors, one might call this "village" a closed society, while again considering Sakai's statement – that the several actors who live enclosed within Japan's nuclear village (scientists, nuclear engineers and especially the media, actors who are normally obliged to be independent because of their supposed scientific or journalistic neutrality), missed the chance to take a critical stance and inform the Japanese public about the possible risks of nuclear energy - it becomes evident that a critical discourse concerning the risks of nuclear energy could neither emerge within this group of nuclear "specialists", nor within the society of nuclear amateurs. A further look at the close linkage between Japan's nuclear industry and the Japanese government might lead one to say that the issue of "nuclear power" has been treated as the exclusive concern of a certain, closed group, namely the Japanese government and the nuclear industry.

Other countries manage the business differently. In Germany, for example, the Greens' Political Party (Buendnis 90 Die Gruenen) has been one of the most important actors in Germany's discussions over the phase-out of nuclear power. Germany's Green Party could be thought of as the "legacy" of Germany's student protests of the 1960s, when political "amateurs" created a political party that was concerned about environmental as well as peace issues. After the 1986 nuclear accident at Chernobyl and a growing public anxiety over nuclear power, Germany's "Gruene" emerged as a political party that was able to influence the country's environmental – and finally – its nuclear policy, while it was also able to coordinate Germany's movement against nuclear weapons with its movement against the (peaceful) use of nuclear energy, arguing that there is no difference to be made be-

tween the "peaceful atom" and the generation of nuclear power for military use. Although protest rallies against nuclear weapons have been held in Japan, too, while there have also been occasional protests against the "peaceful" use of nuclear energy, no such actor as the German Green Party has emerged that would have been able to connect those two movements into one solid anti-nuclear movement. Although by now a green organization of a kind has been established in Japan, too, we need to ask how influential this group – and Japan's anti-nuclear movement per se – can become while Japan's nuclear village continues to exist. When we look at Japan's current and future nuclear policies, it becomes obvious that Japan's nuclear village has not lost much of its influence on national politics. Although many Japanese may no longer believe in the "security myth of nuclear power", Japan is likely to maintain its previous pro-nuclear policy – a policy that is mainly shaped by the occupants of Japan's nuclear village and not by the Japanese citizen, the supposedly political sovereign of the nation.

If asked to answer the question whether some kind of "structural irresponsibility" is to be found within contemporary Japanese society, we are bound to say "yes" when it comes to the behavior of Japan's nuclear village, and we might argue that some elements of Maruyama's old "system of irresponsibility" are still alive and apparently well: a system in which mutual dependences make it difficult to clarify responsibilities and a "closed society" mind that hampers an open, critical discourse. In contrast to Maruyama's system, the driving force within this system of organized irresponsibility is not a vague pseudo-religious "tradition", but the clearly defined economic interests of the interested parties. It would simply be wrong to argue that the members of this organized "system of irresponsibility" didn't know what they were doing. Thus, in the end, as long as Japan's nuclear village continues to control the options, an open, critical discourse on a future without nuclear power will be hard to realize. Although awareness of the risks of nuclear power may be growing amongst the Japanese population, there will not be any change within Japanese politics and Japanese society if those structures - namely the system of organized irresponsibility and Japan's nuclear village - which led to the man-made Fukushima disaster are not abandoned and dismantled. We must get rid of the systems of mutual dependences that have grown over the last decades, we must encourage forums for public discourse and debate, led by actors with independent critical voices, and we must clarify the specific responsibilities to be borne by the persons who make the decisions. Without a change in Japan's contemporary system, any civil protest against Japan's nuclear policy seems likely to be a mere drop in the bucket and man-made disasters like that of Fukushima are likely to happen again and again.