Three Years after the Earthquake and the Nuclear Accident

Where Energy Policies Will Go from Here — A Conversation about the Basic Energy Plan

Dialogue between UETA Kazuhiro and SUZUKI Tatsujiro

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[Introductory notes by the Editorial Department of *Science Journal Kagaku*]

The Basic Act on Energy Policy stipulates the formulation of the Basic Energy Plan (a basic plan for energy supply and demand). In formulating the Plan, the Minister of Economy, Trade and Industry is asked to listen to the opinions of the Advisory Committee for Natural Resources and Energy, an advisory council for the Agency of Natural Resources and Energy under the Ministry of Economy, Trade and Industry. The Subcommittee on Basic Policies presented Opinions on the Basic Energy Plan (hereinafter referred to as the "Opinions")[i] to the Advisory Committee for Natural Resources and Energy on December 13, 2013. The secretariat for the Advisory Committee had suddenly submitted the Opinions during a Committee meeting on December 6, 2013. Even though the Opinions were still a proposal, public comments on them were sought from that day. (The period for accepting the comments was initially announced to end on January 4, 2014, but it was later extended to January 6, 2014.)

Ueta acted as a member of the Subcommittee on Basic Policies (which held its first meeting on July 24, 2013, and its 13th meeting on December 13, 2013)[ii] and as a member of the Committee on Basic Issues, an organ that had performed roles similar to the Subcommittee before a government changeover (and held its first meeting on October 3, 2011, and its 33rd meeting on November 14, 2012)[iii].
In the meantime, the Japan Atomic Energy Commission (JAEC) published Views on Opinions on the Basic Energy Plan (hereinafter referred to as the "Views"; refer to the Appendix for details)[iv] on January 9, 2014.
Science Journal Kagaku asked Ueta, who had taken part in these discussions, and Suzuki, the JAEC vice-chairman, to come to its office and discuss where Japan's energy policies will go from here.

Original Problems with the Committee on Basic Issues and the Subcommittee on Basic Policies

Ueta: Needless to say, the substance of energy policies is crucial, but I feel that how decisions are made about the policies is an extremely big issue related to their substance. I wrote that in my book [*Midori-no enerugii genron* (The Principles of Greening Energy) published by Iwanami Shoten, Publishers]. I feel this way based on my own experience as a member of the Committee on Basic Issues and the Subcommittee on Basic Policies.

Looking back, the Committee on Basic Issues was established in response to the Fukushima Nuclear Accident. At the time when the Committee was launched, some of its members asked if it was all right for this Committee to have its secretariat located where it was (at the Agency of Natural Resources and Energy under the Ministry of Economy, Trade and Industry) in the first place. They also questioned if it was OK for a stakeholder of this kind to become the chairman of this Committee (aside from the question of personal qualifications) and for individuals involved in past policies to serve as members of the Committee.

There is a tendency for the secretariat to decide who will be members of these panels. As reported in the mass media, the composition of panel members changed considerably when the Committee on Basic Issues dissolved as a result of a government changeover and the Subcommittee on Basic Policies was born. (There were reports that Committee members critical of nuclear power plants fell substantially in number.) I think the change in members caused a considerable difference in the substance of published energy policies.

Personally, I felt the change in the panel members gave Japanese citizens doubts and caused them to wonder if the Subcommittee on Basic Policies could really come up with energy policies that are trustworthy.

The Committee on Basic Issues had problems in the first place, but there was a feature of its panel composition that permitted Committee members to lock horns with each other. Additionally, the Committee was originally designed to propose choices of a certain kind regarding energy policies. The Committee had an established process through which those choices were submitted to national debate. The Committee on Basic Issues was limited in many ways, but I give it high marks on this point.

What surprised me about the Subcommittee on Basic Policies was that the Opinions were explained for the first time in the latter half of its meeting on December 6, 2013, and became finalized before long on

December 13. This seems excessively fast to me. I also felt public comments were not sought sufficiently.

I think we can say whether or not trustworthy energy policies will be formulated based on lessons learned from the Fukushima Nuclear Accident for the first time when a trustworthy process to form decisions becomes available. In my view, the Opinions have a considerably big problem from that viewpoint. The Subcommittee on Basic Policies must have a great deal of discussions on the substance of energy policies. At the same time, the Subcommittee must build a process for discussing a fair way to form decisions that can ultimately convince citizens. I think things will go wrong unless the Subcommittee does that.

The JAEC's Views Point Out a Lack of Explanations to Citizens

Suzuki: The JAEC stated that the Subcommittee on Basic Policies should carefully explain the Opinions to Japanese citizens in Point 1 of the Views, and discuss Views on Initiatives for Building the Confidence of Citizens (issued on December 25, 2012) in Point 8 of the Views. These points are close to what Mr. Ueta said. In the Views, the JAEC mentioned transparency, fairness, and citizens' participation in the decision-making process as principles for building citizens' confidence. The three members of the JAEC share the view that the Opinions do not take these principles into consideration.

Process transparency does not simply mean providing information. The point is that the type of information sought by people who wish to verify a process must be provided in a manner that permits its verification.

The JAEC also received criticism regarding the issue of fairness. Fairness in this context means how to take various opinions into account and how to listen to the opinions of people who occupy different positions.

We also stated public participation is essential in the Views. We asked the Subcommittee to give Japanese citizens opportunities to gain knowledge and express opinions through a decision-making process.

The Opinions published on this occasion are extremely insufficient in these respects. That is the shared opinion of the JAEC members. I agreed with Mr. Ueta precisely as I listened to his opinions just now.

The Opinions were decided on abruptly and quickly. The way they were decided came from public comments that were extremely large in number. The number of comments surpassed 10,000[v]. There were national debates about it when the Democratic Party of Japan was in power, though these were insufficient. There must have been both good and bad sides to those debates as a matter of course. But I think discussions were insufficient this time around.

My impression is that the substance of the Opinions is inclined toward positioning nuclear power as an important baseload power source, though there are many opinions about nuclear power. Granted that such positioning is accepted as one view, the Opinions offer no sufficient explanation for nuclear power's positioning as an important baseload power source under the policy (stated by Prime Minister Abe Shinzo) of lowering the degree of reliance on atomic power generation as much as possible. There is no explanation about the expression "important baseload power source" written in the Opinions, either.

We invited a METI official to a regular meeting of the JAEC and asked the official how an important

baseload power source differs from a key power source, an expression that had been used to describe atomic power generation. An important baseload power source is positioned slightly lower than a key power source, if we understood the official's explanation correctly. A key power source means the most important power source. In the meantime, a baseload power source is but one of the important power sources. Using baseball players in the same club as an example, a base power source is one of the starting pitchers. The official didn't say exactly this, but that's how I interpreted the explanation the official supplied.

If that is the case, the positioning must be written exactly as such and its meaning must be explained accurately. Unless that is done, citizens do not understand how a baseload power source is positioned and what it means.

The Opinions also say the period for checking the structure of energy supply and demand is about twenty years. I think the statement means that twenty years is the time for positioning energy policies that originally adopt long-term perspectives. I feel the Opinions do not give sufficient explanations. The period for reducing reliance on nuclear power and positioning it as an important base power source is set at twenty years this time around. However, the Opinions left unknown what would happen after this period ends.

In concrete terms, the question is whether or not to build and expand nuclear power plants. The Opinions say nuclear power plants will be positioned as a baseload power source, and their scale will be kept at the required level. Doing so requires replacement (of old nuclear power plants with new ones). However, Prime Minister Abe said Japan will not build or expand nuclear power plants for the foreseeable future. The Opinions say nothing about their replacement, either. Explanations have been insufficient. We wrote that in the Views.

Ueta: Frankly speaking, the Opinions are not written in language that is easy to understand. Sections of the Opinions that demand explanations increase in number as we discuss them more and more. It may be my shrewd guess, but I think explanations for the Opinions ended quickly to prevent such sections from further increasing.

As Mr. Suzuki said, the Opinions positioned nuclear power as an important base power source. The Opinions also stated Japan should lower the degree of reliance on nuclear power plants, but their scale should be maintained at a required level. How do these three statements connect to each other? That is an essential question. I think people who read the Opinions did not understand them. I feel the incomprehensibility of the Opinions strengthened Japanese citizens' feeling of doubt about nuclear power.

It is often said that the restoration of public confidence is essential for energy policies. My impression is that the Subcommittee adopted an approach that was not sufficient for restoring public confidence.

What Kind of Society Should Japan Aim to Realize with March 11 as the Starting Point?

Editorial Department: Thinking about energy over the long-term amounts to thinking about how a society should be, doesn't it?

Suzuki: I think many opinions, such as energy, which should be discussed within the framework of a long-term vision, came out while the Committee on Basic Issues was at work. I believe the Basic Energy Plan lacks such a way of thinking. If energy is discussed as part of a long-term vision, the discussion should take place somewhere other than where the Basic Energy Plan is formulated. The previous name for the panel in charge, Committee on Basic Issues, was certainly a good one. The new name, the Subcommittee on Basic Policies, works to limit discussions of policies. Discussions depend on how an agenda is set and how missions are positioned. These points decide who sits around a discussion table. Participants will change from a panel that is formed for discussing an energy vision to a deliberative council working on policies. I think experts comprise the Subcommittee because it discusses policies.

Ueta: I think discussions have been that way. There was the argument that we should consolidate our opinions as experts because we are experts. But the understanding of a large framework must have something to do with the direction energy policies will take in the future. I believe the future image of the Japanese economy and society lie in the background of how each expert thinks about energy policies.

I came to feel strongly that way through my involvement in power supply and demand verification. We think it is risky to ignore maximum demand when we assume the size of demand. A participant from Europe said the Japanese people should leave work during the peak hours of the summer heat because reducing demand was what needed to be done. I heard this comment when I reported on Japanese power supply and demand after the nuclear accident at a conference in Vienna. What this person said was convincing. People in Japan may view the idea as imprudent. But I thought about what the participant proposed. We must really change our lifestyles and work-life balance, consider how Japan's technology and society should be or how well-being and energy should relate to each other, instead of limiting the impact of the Fukushima Nuclear Accident to the level of mere technical safety.

Suzuki: That's exactly what you wrote in your book, isn't it? I agree with your opinion completely. But I'm a member of the JAEC now. How to deal with key issues in nuclear power policies is a pretty difficult question. The JAEC stated how to reflect on Fukushima in people's thoughts about reconstruction and evacuees' opinions on energy policies as being an important viewpoint in Point 2 of the Views. Such a viewpoint inevitably brings us back to the questions of why we choose nuclear power and what we build nuclear power plants for. It's not simply the matter of cleaning up and asking people to come back. We affected their lives that much and changed their course by promoting nuclear power and causing that accident.
The Views state in Point 2 that the accident imposed restrictions on people's right to live. JAEC Chairman Kondo Shunsuke wrote these words. This observation has been the basis for our discussions at the JAEC. We cannot help thinking that way as individuals who have visited disaster areas. I believe we should position this observation as the starting point for discussing energy policies beyond March 11, 2011.

Ueta: Committee members expressed the opinion that the Committee should hold meetings in Fukushima when the Committee on Basic Issues was in charge. However, the Committee did not take up this opinion. I believe members of the Subcommittee on Basic Policies lack such a way of thinking in the first place.

Damage caused by the Fukushima Nuclear Accident is the starting point for both the Committee on Basic Issues and the Subcommittee on Basic Policies. I believe how to position that damage is important for that reason. I feel discussions by the Committee and the Subcommittee have drifted toward technicalities of a kind. In my opinion, what the Views state in Point 2 is the most important thing.

Prerequisites for Restarting Nuclear Power Plants

Ueta: We drew up a proposal and listed conditions for restarting nuclear power plants during the last meeting of the Subcommittee on Basic Policies (held on December 13, 2013). As safety is positioned as a basic assumption for restarting nuclear power plants, there are many things that should be discussed about this point. But there are at least two more points that should be discussed. The first point is the establishment of a method for disposing of radioactive wastes. The radiation exposure of workers is the second point. In the proposal, we asked the government to adopt all these three points, rather than just safety, as prerequisites, and to at least confirm their fulfillment before choosing to restart nuclear power plants.

The Fukushima Nuclear Accident certainly called into question the safety of the technology known as atomic power generation. But I think there was also an aspect to the accident that strictly questioned whether or not this technology called atomic power generation can coexist with our society in a broader sense.

This question concerns several areas, but we cannot avoid the two issues of radioactive wastes and radiation exposure when we think about the problem of coexistence. For this reason, I would like the government to include them as prerequisites from the start. That is my opinion. The problem is that Subcommittee members and the secretariat have not supplied a single view or counterargument in response to this opinion. I feel a decision will be unreasonable and regrettable if it is made with no such action.

I received a few comments against my stated opinion about the assumed conditions regarding wastes and exposure. These comments were that viewing operating costs as low would be wrong.

I believe that the Subcommittee and the Committee must, as experts, present these matters to citizens, and clearly distinguish between points that should be commonly understood and points on which judgment will be divided. I feel Subcommittee members have put the Opinions together without performing these roles sufficiently. My impression is that they wanted to put the Opinions together quickly.

I think the Subcommittee and the Committee must have discussions to enrich their information base, which citizens need for considering energy policies. I believe the role of experts is to present their good judgment in the course of such discussions. I feel Subcommittee members were a little weak in that area.

Suzuki: The JAEC set three conditions for restarting nuclear power plants as part of basic policies for the atomic energy budget it formulated last year.

The first condition set by the JAEC is the fulfillment of regulatory standards, more specifically,

international regulatory standards.

The second condition is that business operators keep risks sufficiently low. Increasing safety over time is one approach. However, we think safety declines over time with risks such as the ordinate ones. Statements about the highest standard belong to the notion that safety rises continuously. It is a way of thinking that a safety ceiling exists and things will be OK when the ceiling is satisfied. We take a different view. We think business operators should reduce risks to the lowest level possible in addition to satisfying standards as a matter of course. In this approach, business operators lower risks by taking costs into consideration. However, they should not be satisfied with just that, and must show their intention to minimize risks (even though risks will never be eliminated completely). We tell the operators to do these things properly. We ask them to clarify their approach by always introducing new knowledge and best practices from abroad. We ask them if they have established such systems.

Disaster prevention plans are our third condition. The Nuclear Regulation Authority sets standards and inspects the safety of nuclear power plant designs. However, disaster prevention plans are not included in items inspected by the Authority. The government cannot win the confidence of residents without disaster prevention plans. We wrote that and asked the government to establish the plans properly in the Views. The Opinions did not say much about this point. I believe disaster prevention plans are a requirement for winning the confidence of citizens regarding the restart of nuclear power plants.

With regard to high-level radioactive wastes, discussions are still in progress at this point by a working group (the Radioactive Wastes Working Group of the Nuclear Energy Subcommittee under the Electric and Gas Industry Committee of the Advisory Committee for Natural Resources and Energy). However, the Opinions already have sentences that were taken from the State of Examination, a document issued in the name of the Working Group chairman. The Subcommittee on Basic Policies submitted the Opinions containing such sentences to the Ministerial Conference on Nuclear Power prematurely. The Basic Energy Plan is not finalized as a policy until the Minister of Economy, Trade and Industry decides on it. However, things that have been decided at a ministerial conference have a certain meaning. I think what happened has surprised members of the Working Group still discussing the issue. I feel the Subcommittee of Basic Policies could have waited until the Working Group had completed the discussions.

It is a good idea for the government to come to the front and advance matters as the first step toward making a disposal plan. However, only a proposal (for the document studies of candidate disposal sites) has been made so far. We have an extremely long way to go from here. As we stated many times in the Views and other places, we should always verify and evaluate initiatives in terms of both scientific and social rationality from the standpoint of a third party. We should set up organizations for such activities and build systems for exchanging opinions with citizens. Unless such actions are taken, things will not advance smoothly even if the government comes to the front. We have said this repeatedly.

Clarifying the establishment of technologies needed for disposing of high-level radioactive wastes is not enough. A Science Council of Japan recommendation (Response: Disposal of High-Level Radioactive Wastes)[vi] identified the radioactive waste disposal process as the greatest problem. Such a process has not

been established. Developing a system for listening to citizens' opinions is essential. We included this point in the Views.

Possibility of a Different Way to Decide Policies

Editorial Department: Do we really need the current Basic Energy Plan?

Suzuki: Where should we have such fundamental discussions? This question caused distress to JAEC immediately after the accident. The JAEC decided that the Energy and Environment Council, the highest council on energy policies set up when the Democratic Party of Japan was in power, would decide on the Basic Energy Plan after finding out that the New Nuclear Policy-Planning Council could not handle the matter. Then, the Energy and Environment Council assigned to the JAEC individual missions, such as the presentation of the nuclear fuel cycle cost and policy options for the nuclear fuel cycle.

Cabinet ministers can make decisions by taking political responsibilities in this way. That is one approach. There is no deliberative council in Britain, where this approach is used. State secretaries make decisions in Britain. A process for doing so is entirely stipulated in law in exchange for this practice. There is a British law that prescribes a public consultation process and all tasks that an office must perform.

With regard to energy policies, the secretariat for the Department of Energy and Climate Change (DECC) prepares draft reports in Britain. The DECC publishes these drafts. Anyone can comment on them. All draft reports are published. The DECC rewrites its draft reports by clearly stating which and how comments are incorporated. The state secretary in charge makes decisions based on these reports.

Moreover, there is a verification process in Britain. This is a critical point. How to choose members of the verification committee is set by law. A lawsuit can be instituted when the process is found insufficient after verification by the committee. This is possible even if a deliberative council is absent.

If anything, countries with a system of deliberative councils have been falling in number. This has been the case because the representativeness of deliberative councils is questioned.

Discussions inevitably reach fundamental reviews when we start discussing how to decide energy policies. The Basic Act on Energy Policy was decided in the Diet without national debate in the first place.

The Ministry of Economy, Trade and Industry (known as the Ministry of International Trade and Industry until the reorganization of government offices) had taken full charge of Japan's energy policies for many years. This situation began to change with global warming. Because of the issue of global warming, the Ministry of Environment (formerly known as the Environment Agency) got involved. I think the Energy and Environment Council of the Democratic Party of Japan had a good system. The Council asked the Ministry of Economy, Trade and Industry, the JAEC, and the Ministry of Environment to supply data and decided energy policies at a high level. I think it reasonable that the government should think again about how to decide high level energy policies.

The latest government led by the Liberal Democratic Party set up the Ministerial Conference on Nuclear Power and the Ministerial Conference on Final Disposal. Things may become difficult unless an organization

that supports ministerial conferences is established if the JAEC changes its character as an organization[vii] and ministerial conferences assume the same position (of deciding policies at a high level) because then there will be no place to discuss nuclear power policies horizontally. The JAEC may start supporting the ministerial conferences, but I don't know how the Commission's roles will change.

In any case, a process for making decisions is a big problem.

Costs: Problems Involving the Difficulty to Understand and the Absence of Upper Limits

Suzuki: My understanding is that the secretariat made a counterargument about costs. The greatest problem with costs is that we don't know them well.

The cost of a power plant now in operation is different from the cost of a power plant to be built. A model plant to be built has been used for estimating costs up to this point. Assumptions have been used for the calculation of cost. The Cost Verification Committee estimated the cost of a new plant within a reasonable range to a certain extent[viii]. There is no upper limit for the cost of nuclear power generation. No ceiling has been set on the cost of nuclear power generation because the cost depends on the size of an accident if it happens. This is important. The cost of nuclear power generation is estimated as roughly the same as the cost of power generation using fossil fuels in case no accident takes place.

The cost of an existing power plant is clearly lower than the cost of a model plant. Old plants are inexpensive while new plants are costly. There have been no published data about cost distribution among existing plants. Oshima Kenichi of Ritsumeikan University calculated costs, but they were averages for existing plants[ix]. Costs differ from one plant to another (even though such costs are not known at this point). I would like to know if the operating costs of a power plant now in operation are really low. Basically, we are now studying financial statements and discussing fuel cost differences. They are the facts. But long-term costs are different. The cost of building a new power plant is different, too. Nuclear power generation is certainly stable when we consider how much cost fluctuates because fuel cost accounts for only a low ratio of the nuclear power generation cost. There is no doubt that nuclear power generation is inexpensive from the viewpoint of power companies. But there are no data that support this.

We took note of the promotion of energy information transmission by a third-party organ through improved access to objective information and data, as stated on page 60 in Paragraph 9 of the Opinions. I think the inclusion of these words was excellent. I want the Subcommittee on Basic Policies to realize this statement exactly. If that is done, I believe the quality of energy policies will improve considerably.

Editorial Department: We believe the third-party organ must be such an organ in the true sense of the word.

Suzuki: I think the model for the third-party organ is the Energy Information Agency of the United States

Department of Energy (DOE). Whether the DOE can be called objective or not is another topic for discussion. But an unprecedented database will be built when the third-party organ is created properly according to these words. At least the Opinions state such an organ will be established separately from a promotion organ.

Ueta: A third-party organ carries a heavy weight.

I think the Cost Verification Committee's report was meaningful, too. There is a British approach known as a call for evidence. The approach allows all people to access a cost calculation program. Values shift when a parameter is changed. The approach enables us to calculate values in such a way. Using this method, we can tell what is affecting cost. I think a call for evidence is a well-designed approach.

As Mr. Suzuki said, the lower limit for the cost of nuclear power generation was 8.9 yen per kilowatt-hour (at the time when the Cost Verification Committee submitted its report). The lower limit is 9.0 yen per kilowatt-hour now. It will keep rising (due to compensation and decontamination expenses). There are upper limits for the costs of other power sources, but no cost ceiling exists for nuclear power generation. It means that nuclear power generation is structured in a way that makes its undertaking as a private business extremely difficult. Such a structure was expressly stated for the first time.

Suzuki: Yes, that was stated for the first time.

Ueta: It was a big achievement. Nuclear power has had myths accompanying it about its safety and low cost from the beginning. We did what we did to clearly show whether the low cost myth about nuclear power is true or not.

In so doing, we positioned the Energy and Environment Council at the top, and transferred the authority to make the highest decisions from the Agency of Natural Resources and Energy to the Energy and Environment Council. However, as discussed by the Accident Investigation Commission, the Energy and Environment Council had no capability to gather information that supports such authority. For that reason, it is essential for other concerned parties, such as the Diet, to have greater investigational capacity.

Japanese systems have a built-in tendency to hide information in administration. What should we do about this tendency? I believe it is crucial to know how to build systems that transform information into the proper kind for people and how to turn such information into a base for thinking together and discussing matters.

Need for Trustworthy Third-Party Eyes

Ueta: Another important thing here is an approach called third-party inspections, which have been a weak point that has not been addressed very much in Japan. Ishigai Seikan (1917–2011) used to talk about this approach. It surprised me when I experienced it in Germany. Lead was flying over to a surrounding pasture when a battery manufacturer recycled the substance. Both the company and dairy farmers requested a third party to investigate the problem. They have extremely strong faith in third-party investigations. Findings

through the investigations become the basis for their discussions. The United States Nuclear Regulatory Commission (NRC) operates in the same way.

A third-party organ of a specialized nature prepares the base and provides information for solving problems, even if the organ may not offer their solutions directly. I believe this approach has been a weak point for Japan. I think it will be good if what is written in the Opinions is realized in a concrete manner.

However, reality has moved in the opposite direction. I have verified the supply and demand of electricity as a member of the Vertification Committee on the supply and demand of electricity under the Energy and Environment Council . The Committee is now an internal committee of the Agency of Natural Resources and Energy. Its positioning has changed. The Agency of Natural Resources and Energy appears to be incorporating many attempts to deal with the problem. The Agency may be working once again to develop a system under which it handles all matters.

But the Ministry of Environment and other parties, such as the Ministry of Agriculture, Forestry and Fisheries, are getting involved in global warming and renewable energy, respectively. That is the current picture of energy issues. Their involvement has created the need for an approach that is a little more cross-sectional.

Editorial Department: In connection with the third-party organ, the Agency of Natural Resources and Energy requested the Seismological Society of Japan to recommend experts as members for the Working Group on Geological Disposal Techniques. In response to the request, the Seismological Society of Japan asked the Agency of Natural Resources and Energy to clarify whether this working group has the status of a third-party organ or not, taking a proposal made by the Science Council of Japan (refer to Footnote 6) into consideration. (Refer to an essay by Kato that appeared in the February 2014 issue of *Science Journal Kagaku* for details.) However, the Agency of Natural Resources and Energy has ignored this request and provided no reply to the Society whatsoever. Is this working group a third-party organ?

Suzuki: This working group is positioned under the Ministry of Economy, Trade and Industry at present. For that reason, there are people who view the working group as something other than a third-party organ.

Editorial Department: The Agency of Natural Resources and Energy does not contribute to problem solution when it acts as the secretariat, does it?

Suzuki: It is hard for the Agency to make contributions through this arrangement. However, the Agency is acting in compliance with the law. First, we must change laws and systems when they have fundamental problems.

Is It All Right to Consider Cost from the Perspective of Power Companies?

Ueta: Cost becomes totally different depending on calculation purposes and methods. Statements about cost should not end with one phrase, such as "operating cost is low." The Subcommittee on Basic Policies must say what cost means exactly.

The argument made against my opinion was that 8.9 yen per kilowatt-hour as reported by the Cost Verification Committee was agreeably low. In reply, I said that it was the lower limit based on a certain assumption and that the upper limit was impossible to know. The inability to decide the upper limit is a big characteristic of the nuclear power generation cost. Valuable information was not understood accurately.

As Mr. Suzuki said, it is natural for the operating cost of an existing nuclear power plant to decrease as a result of its operation because depreciation for the power plant will come to an end. This is inevitable from the perspective of the current management framework. The Opinions, a government document, appears to incorporate such perspective as a natural consequence. There is a big problem with this practice.

There will be sections of existing nuclear power plants that will require safety measures because we live in the period after the Fukushima Nuclear Accident. Should power companies operate a nuclear power plant by going to the trouble of taking safety measures when the plant's operating period is forty years? Doesn't the operation of a nuclear power plant become meaningless when its remaining operating period of three years makes the cost of safety measures irrecoverable? As these questions suggest, this issue needs to be sorted as power companies rationally consider the need for operating a nuclear power plant when the cost of safety measures is high. To tell the truth, I believe we must evolve our discussions by putting risks and costs of each nuclear power plant properly on the table.

The Opinions say the operating cost of a nuclear power plant is generally low, but I think such low cost will not be actualized. I feel the Opinions were put together without solving doubts about points like this.

Suzuki: Power companies stop publishing their costs if and when competition results from electric power deregulation. The government must take steps to prevent such a response. Ideas for doing so include the proper publication of transaction data for future transactions and security provisions with greater market transparency.

In Point 6 of the Views, the JAEC said nuclear power generation would be positioned differently from a base power source under the traditional fully distributed cost method when electric power deregulation takes place. I believe that whether or not nuclear power generation could be maintained as a base power source under the existing operating system has not been discussed sufficiently. We are asking the Subcommittee on Basic Policies to give a second look at this point.

Let me share my personal opinion here. There are talks about lowering the degree of reliance on nuclear power generation, but our reliance on nuclear power is zero percent at the moment. In other words, the original policy discussion was about to what level we could increase our reliance in the future because the ratio of reliance is zero now. Such discussions are impossible unless nuclear power plants truly pass safety reviews and a prospect for operating a specific number of them is established. How to lower our reliance on nuclear power generation without those requirements is a desktop discussion.

It will be honest to say energy policies cannot be drafted unless it is known what number of nuclear power

plants will be brought back into operation by 2030. In the meantime, there is a gap between Japanese citizens' awareness and the idea of maintaining nuclear power generation as a baseload power source even though our reliance on nuclear power generation is zero now. How much does power supply cost at present? How will we get through the period until 2030? In the nature of things, we must ask these questions and discuss our short-term strategies through 2030 if we cannot discuss how many nuclear power plants can be restarted by 2030 because no nuclear power plant is in operation now. We must urgently discuss how to get through this period for real, instead of talking about something like a base power source. The government talks about responsible energy policies. But the government will not be able to perform its responsibilities if it leaves the policies in the hands of business operators. Discussions may produce the same result, but there have been none of them so far.

The government has positioned electric power deregulation as one of three key economic measures, though it remains unimplemented. Point 6 of the Views means it will be difficult to keep nuclear power generation as an important baseload power source unless a policy measure of some kind is taken. I believe the deregulation is difficult to realize because such a measure has not yet been discussed.

Editorial Department: The Citizens' Commission on Nuclear Energy said the restart of nuclear power plants should be thoroughly discussed by freezing the idea for three years because no plant was in operation in the proposal issued in June 2013[x]. What do you think of this proposal?

Suzuki: I think that was a good proposal.

Editorial Department: Do you mean the management of power companies can be considered a separate issue?

Suzuki: Energy issues are all connected to each other. It is not right to treat one of them as a separate issue. It's not right to stop discussing just one energy issue. As a system, the whole is affected when one place is touched.

Editorial Department: We understand that. But Japanese citizens are viewing policies implemented now as temporary remedies for the management of power companies.

Suzuki: That is probably true. But those policies are part of energy policies, too. To state it the other way around, we must properly discuss the impact power companies cause with their failures. I think we should discuss the impact. It is wrong to say that nuclear power is not necessary while it is OK for power companies to fail without such discussions. At the same time, it is unreasonable to say nuclear power is necessary by speaking as if our lives will be thrown into trouble if power companies become bankrupt.

Airplanes fly even if airline companies fail. Power plants operate even if power companies go under.

However, their operating cost may change as a result of bankruptcies. The government must take policy measures for filling the gap until other parties take over. The government must provide security without leaving the situation as it is. But doing so is not only connected to the question of whether we should restart nuclear power plants or not. I think the management of power companies and energy policies should be discussed in combination because a security provision is connected to the policies.

Power Companies' Management Responsibility

Editorial Department: How should we think about the power companies' management responsibility?

Ueta: The truth is we can't think about energy policies without discussing future visions for our economy and society. The application of this understanding to the management of power companies teaches us that the Japanese economy and society may change considerably as a result of deregulation and power system reforms. Business conditions for power companies may change. I believe this is a big problem.

The Opinions offer no clear statement with regard to this point. The Opinions say power system reforms will be advanced and the scale of nuclear power generation will be maintained at a required level. These two statements produce a contradiction under normal circumstances. In the meantime, there are important discussions about the separation of power generation and transmission that normally deprives nuclear power generation of its competitiveness and ways to cope with such an outcome.

The latest nuclear accident was so huge in scale that it could cause a big, global company called Tokyo Electric Power Company to fail if decontamination and compensation are assumed as its responsibilities. The accident showed that.

The government is assumed to have decided to continue compensation by keeping Tokyo Electric Power Company alive at too early a stage. I believe the decision produced a contradiction.

What kind of contradiction is this? Damage compensation is rising in value as the actual conditions of the Fukushima Nuclear Accident become more and more known. Where to go for securing funds for compensation becomes a problem under the circumstance. One approach is to obtain the funds by raising power rates. Another approach is to secure the funds by restarting nuclear power plants. The third approach is to build up the funds by asking to reduce damage compensation. There are no other alternatives. All these three approaches appear in the business plans of Tokyo Electric Power Company.

The government is enabling power companies to easily take these steps. That's another point I'm concerned about. This tendency manifests itself in practices such as the considerable size of government spending on secondary contamination, such as countermeasures for contaminated water, and changes in nuclear power plant decommissioning accounts. The government is shifting the burden to power rates and taxes after all. As for the fourth approach, the government is taking over compensation by using tax revenues. The government is continuing to take steps that leave citizens unconvinced.

At the earliest point, there was an approach called bankruptcy procedures, which could be used depending on clarification of the responsibility of Tokyo Electric Power Company. There are many

approaches. They require separate discussions. But this earliest approach was to spend government money after clarifying Tokyo Electric Power Company's management responsibility if doing so was absolutely necessary. The government is taking a different approach now. Many strange things appear to be happening because keeping Tokyo Electric Power Company alive has been positioned as an assumption.

A similar structure is visible in the Opinions. The question is if nuclear power generation should be undertaken as a private business. There are private companies that implement a national policy. In several places, the Opinions say the government comes to the front. I think the government must deal with nuclear power generation responsibly in many respects. That is true. Factors in the background and the substance of initiatives are what matter. The government may end up with an extremely big problem if their substance changes to keep the management of power companies above water.

Suzuki: The question of responsibility for the Fukushima Daiichi Nuclear Power Plant Accident comes down to how to compensate for damages. Under existing laws, power companies are fully liable for accidents at nuclear power plants. Starting this year, the government began partially covering the cost of Tokyo Electric Power Company's reconstruction plan. The government chose to do things Tokyo Electric Power Company could not do alone to ensure proper implementation of decommissioning measures. That was one objective. Reconstruction and compensation are connected in a delicate way. The government chose to pay part of the reconstruction cost, to be exact, the intermediate storage cost, on this occasion.

This point boils down to government roles in energy policies. Why does the government guarantee cost payment for an accident? Nuclear power plants have been built on the assumption that the government needs them. Otherwise, the government will tell business operators to pay for nuclear power plant accidents because they operate nuclear power plants on their own responsibility. The current Act on Compensation for Nuclear Damage is strange. Under the Act, private companies compensate all damages caused by nuclear power plants, which they operate according to a state policy. There are historical reasons for this arrangement, but I believe we must change the structure. In the nature of things, business operators decide whether to build power plants or not in a deregulated environment. There may be no need for the government to decide on the Basic Energy Plan or the best mix of power sources. It may be OK to leave compensation to business operators when accidents take place. But we must change the framework for damage compensation if that is not the case, if energy is in the public interest, and if the government must involve itself in energy issues in one way or another[xi].

The JAEC has asked the government to take on the responsibilities for measures for decommissioning the Fukushima Daiichi Nuclear Power Plant because such measures are to be done over a long period and have considerable costs. However, bills for these measures are currently sent to Tokyo Electric Power Company because it has the legal responsibilities as the business operator in charge. Bills for measures regarding contaminated water are sent to Tokyo Electric Power Company, but the government pays for the bills for research and development. The government has been doing so before the contaminated water came into question.

Cost burdens are not the only problem. My impression is that the party that is to make the final decisions has not been made clear. It's not clear whether or not the government will decide on specific technologies after integrating various councils and task forces. After all, this role will fall on Tokyo Electric Power Company.

The government should move the task of decommissioning the Fukushima Daiichi Nuclear Power Plant out of Tokyo Electric Power Company and finally assume it as its own long-term project. The government established the Power Reactor and Nuclear Fuel Development Corporation in 1967. The Corporation was born through a national project that involved both public and private sectors. I think it is OK for the government to set up another organization like that. The new organization should include the JAEC, which is spending a considerable portion of its budget on research and development for decommissioning the Fukushima Daiichi Nuclear Power Plant. Needless to say, power companies should take part in this organization, too. I feel that investing tax revenues in the organization in charge of decommissioning is inevitable in a sense.

Compensation is difficult. The government must keep Tokyo Electric Power Company alive because damage compensation without an upper limit is impossible unless Tokyo Electric Power Company continues to exist. Otherwise, we must revise the law and decide the exact scopes of responsibility for Tokyo Electric Power Company and for the government. As a matter of fact, the Nuclear Damage Compensation Facilitation Corporation Act prescribes these points should be discussed within one year. But no discussion has yet taken place. We must discuss these points.

Editorial Department: Nuclear power makes us uneasy in many ways. Spending tax revenues on the decommissioning project and damage compensation, whose costs are impossible to know, may be inevitable at some point, but we feel there are things to do before taking such a step, such as bankruptcy procedures for Tokyo Electric Power Company. It comes down to the issue of a third-party organ. How will the monitoring of state projects including research be done? Is there any state project that has succeeded? (Refer also to an essay by Makino that appeared in the September 2012 issue of *Science Journal Kagaku* for these points.)

Suzuki: As you said, an advisory committee of the JAEC requested the government to set up a third-party organ in charge of decommissioning in its proposal issued in December 2011 (Results of Investigation into Medium- and Long-Term Measures at the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Company). The commitment of tax money to decommissioning was considered inevitable at that point. Someone has to check the fairness of such a decision even if a power company engages in decommissioning because the job is related to damage compensation as a matter of course.

Establishing a specialist body and developing a verification system are essential points because decommissioning is a project that will cost much money and take a period of thirty to forty years to complete. The Nuclear Decommissioning Authority (NDA) of Britain is one model for such a body. The British Parliament is inspecting the NDA and saying transparency is the most crucial requirement for the NDA. A British equivalent to the Board of Audit of Japan is the one performing audits on the NDA.

I understand Tokyo Electric Power Company will set up a separate company for decommissioning

operations on this occasion. I think it is a good idea to keep money and personnel in separate places. It will be desirable to have a decommissioning organ that is highly transparent in the end. That is my opinion.

Ueta: I believe the government should have advanced matters after clarifying original management responsibility so that Japanese citizens could be convinced that the direction the government was taking was the only course possible. In my opinion, bankruptcy procedures were an easy-to-understand example of such management responsibility. I think execution by a government-controlled company is a possibility when there are many big tasks to be performed and there is no other alternative to do it. Things grew extremely complicated and state actions became hard for all citizens to understand because the government went to the next stage with the first button kept in the wrong buttonhole.

The Opinions say the government must come to the front. But the government must provide clear answers to the two big questions of responsibility and cost coverage. The State's answers to these questions have been hard to understand. People may think they must ask the government to perform tasks because they cannot leave them to power companies alone when the government says tenacious efforts must be made. But what does that mean? Does that mean spending tax money? The answers have been unclear. It's our task to clarify the governance structure,especially the responsibility and cost burdens for the disposal of radioactive wastes and decommissioning. I believe this is a task that will grow larger and larger from now on.

Toward a Desirable Society in the Future

Editorial Department: Please share your personal view for a desirable society in the future, for example, such a society fifty years from now.

Suzuki: I think discussions about the future differ a lot when we look at Japan only and when we consider the world. Talks about stable energy supply and demand in Japan, which is fairly affluent, will be different from talks about the supply and demand in nations with no energy and hundreds of millions of people. There are also countries where global warming will cause damages greater than those expected in Japan.

We are discussing Japan's energy policies, but we must always think how things will be on a global scale. I think global warming is one of the most critical issues in energy policies. I consider nuclear proliferation a big issue, too.

I think we must discuss matters from the viewpoint that the world is always studying how Japan will reduce the use of fossil fuels and move toward a low-carbon society and how Japan is approaching this issue.

We must change the relationship between energy and economic growth fundamentally to move ourselves toward a low-carbon society. I believe that is the most important point. To achieve this point, carbon dioxide emissions may decrease sufficiently and a low-carbon society may come about that does not rely on nuclear power too heavily even if renewable energy does not increase that much.

How to consider the relationship between an affluent society and energy supply and demand is the

greatest issue. We must discuss this issue somewhere. There are many points to discuss, including quantitative technical and economic analysis, technology assessment, and social equality. The issue offers good opportunities for discussion. I mentioned earlier an informal gathering for discussing an energy vision, but the forum could be the Science Council of Japan or any other organ. I think this relationship must be discussed over a long period, instead of over the shorter span of energy plan reviews.

The supply of unbiased information is vital because discussions become one-sided when the information used contains a bias. Scientists and experts have important roles to play in this respect. When many types of people supply data for discussion, some of that data can be odd data and needs to be screened. I believe energy policies that can convince citizens will result even if they are not perfect when discussions take place on such a way. The important thing is to convince citizens. I think the government should have opportunities for reviews and always take approaches that convince citizens because its choices cannot be correct at all times. That's impossible. There is no perfect answer. Dissatisfaction with a governmental choice will always arise.

Editorial Department: What do you think about the idea of keeping the number of operating nuclear power plants at zero?

Suzuki: I think all options should be ready for use. Keeping their number at zero involves high public cost. I will accept this option if citizens choose it. Looking at what is happening in the world, I personally feel difficult conditions will emerge when their number is kept at zero. I think, though, it is important to have the option of keeping at zero the number of nuclear power plants. There is no operating nuclear power plant in Japan now. But I think keeping nuclear power generation as an option is good from a long-term viewpoint.

Editorial Department: When taking the nuclear issue into consideration, don't you think keeping the possibility of nuclear power on earth for mankind is enough?

Suzuki: My position is close to that. I think breaking with nuclear power generation is possible in Japan, but whether that is right or wrong is a different matter.

Countries around the world are engaging in research and development of the nuclear fuel cycle, fast reactors, and next-generation light-water reactors. I believe it is unwise for Japan to stay out of these activities. Regardless of engaging in them or not, I think it will be a long-term loss for Japan to say it will not take part in their research or development. Germany is working to break with nuclear power generation. But German companies and researchers are taking part in studies. This is an important point.

Editorial Department: Does Japan have to maintain nuclear power generation as an industry? Isn't it possible to separate technology for it?

Suzuki: Personally, I think that is possible. But reducing the nuclear power industry to zero is difficult now,

looking at what is happening in the world. My feeling is that Japan can make contributions to efforts in that direction. But I think reducing the nuclear power industry to zero on a global scale is difficult. The elimination of the nuclear power industry resembles the abolition of nuclear weapons. They are parallel issues.

In my opinion, there is absolutely no need to maintain nuclear weapons on a long-term basis. Problems for nuclear power generation and nuclear weapons are similar. There is a view that we will feel lost when nuclear weapons are eliminated, we will have no technology for them, and then someone may try to have such weapons. Discussions of a world free of nuclear arms lead to a question. What should we do when someone obtains a nuclear weapon under such a condition? Discussions of a world without nuclear power generation bring a similar question, too. How can someone use atomic energy for generating power safely after such a choice is made? There may be no need to worry about these possibilities now, but I think these questions should be discussed from the standpoint of our vision for the future. I think we should discontinue more and more nuclear power plants because their number would not become zero anytime soon. But I feel the global community should keep nuclear power as an energy policy option.

Ueta: I think U.S. President Dwight Eisenhower's Atoms for Peace speech in 1953 was the starting point for nuclear power generation. The speech was originally delivered to produce a contrast with the notion of atoms for the military. I believe this expression, Atoms for Peace, is linked to the extremely essential question of whether nuclear power generation can be called the peaceful use of atomic energy or not.

I feel uneasy about the export of nuclear power generation technologies because they are purchased not only for addressing energy issues, but also for their potential application in nuclear weapon production in the future and the idea of maintaining national strength.

Energy issues are downright complex. It may sound like an exaggeration, but they are connected to the questions of how to realize world peace and how to approach the elimination of nuclear weapons. We cannot simply cut and divide nuclear power generation, saying it is only for the peaceful use of atomic energy. Steps for eliminating nuclear arms are not advancing sufficiently based on the understanding that the maintenance and promotion of nuclear power generation without serious discussions represent grave problems. This is also a problem. In connection with military technologies, one newspaper said in an editorial, after the Fukushima accident, that Japan should keep nuclear power plants because they are a nuclear deterrent. This argument weighed heavily on my mind

The number of nuclear power plants in the world will not decrease so easily. That's true. I think one approach is to keep technological capabilities and, at the same time, work to reduce the number of the plants.

Personally, I think finding the solution for the North-South problem and global environmental issues at the same time will be a challenge for mankind in the twenty-first century. Energy has elements that occupy the basis of these problems. We must solve environmental issues while reducing poverty. As a vision for such an economy and society, I'm thinking about sustainable development. To put it simply, that is the development of communities that enrich all members and that can be evaluated from a viewpoint called subjective well-being under the condition of no material and energy consumption growth.

I believe the idea of green growth lies in the process of transition to this stage for Japan and for the world. Green growth means developing the economy while reducing energy consumption and waste discharges.

Globally, Japanese and domestic regional issues are involved in the discussions on green growth. We must think about green growth at each level. Speaking of energy policies, they are state policies to an excessive degree. Energy for a region is energy for each and every one of us. I think that is an important territory renewable energy cuts open. Nuclear power generation inevitably brings local residents the question of whether or not to accept technologies they do not understand. Renewable energy opened up the different field of developing technologies, which are appropriate and suitable for some locations, and of developing regional resources. This field leads to low-carbon development by extension.

I believe the seeds of social innovations lie around these matters. Japan can offer the possibility for low-carbon development to the rest of the world in the technological sense, too. I think the potentials for new businesses will emerge if and when this practice takes place. I hope to see such a course of development.

***Note*:** Completed with additions and corrections made to the dialogue recorded on January 11, 2014.

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Ueta Kazuhiro

Born in Kagawa Prefecture in 1952, Ueta is a professor at Kyoto University's Graduate School of Economics. Ueta holds doctorate degrees in economics and engineering. His field of specialization is environmental economics. His latest work is *Midori-no enerugii genron* (The Principles of Greening Energy) published by Iwanami Shoten, Publishers. Ueta has acted as a member of the Committee on Basic Issues under the Advisory Committee for Natural Resources and Energy, a member of the Subcommittee on Basic Policies, the chairman of the Energy Strategy Council of Osaka Prefecture and Osaka City and the member of the Cost Verification Committee. Ueta is at present occupying the position of the chairman at the Procurement Cost Assessment Committee.

Suzuki Tatsujiro

Born in Osaka Prefecture in 1951, Suzuki was the vice-chairman of the Japan Atomic Energy Commission (JAEC), and currently a Professsor, Vice Director of Research Center for Nuclear Weapons Abolition (RECNA) at Nagasaki University. Suzuki holds a doctorate degree in engineering. His fields of specialization

are policies on nuclear power and policies on science and technology. Suzuki took office as the vice-chairman of the JAEC in 2010 after serving in other posts, including a research fellowship at the Central Research Institute of Electric Power Industry and as a visiting professor at the University of Tokyo's Graduate School of Public Policy. Suzuki co-wrote *Enerugii gijutsu-no shakai ishi kettei* (Determination of Collective Will on Energy Technologies) published by Nippon Hyoron Sha. He has been a member of the Pugwash Conferences on Science and World Affairs. Suzuki focuses on the nuclear nonproliferation issue, as his participation in the International Panel on Fissile Materials (IPFM) demonstrates.

[Appendix]

Views on Opinions on the Basic Energy Plan

January 9, 2014
The Japan Atomic Energy Commission

The Japan Atomic Energy Commission (JAEC) received explanations for topics centered on nuclear power generation in connection with the Opinions on the Basic Energy Plan (hereinafter referred to as the "Opinions"), which the Subcommittee on Basic Policies under the Advisory Committee for Natural Resources and Energy had put together, from the Ministry of Economy, Trade and Industry at an extraordinary meeting held on Friday, December 20, 2013.
The JAEC evaluates that the basic policy for state policies on the research and development of atomic energy stated in the Opinions should properly address priority issues which the government should work on urgently. Based on such evaluation, the JAEC expects the Japanese government to give consideration to the following points when the government implements the Basic Energy Plan based on the basic policy.

(1) Japanese citizens' interest in energy issues is extremely high, compared with the situation before the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station. The citizens have expressed many opinions on nuclear power generation in particular. These opinions range from negative standpoints, including Japan should stop using atomic energy for generating power immediately, Japan should totally abolish nuclear power plants if doing so is possible, and Japan needs no large-scale centralized power supply system such as nuclear power plants. Responding to this situation squarely and seriously, the Japanese government has stopped operating all nuclear power plants in Japan. However, the Opinions positioned nuclear power generation as an important base power source under the policy of reducing the degree of reliance on nuclear power as much as possible over the period of the next twenty years or so. The Subcommittee on Basic Policies should carefully explain to Japanese citizens the details of its deliberation that led to this decision.

(2) In making all possible efforts to restore and rebuild Fukushima, such as compensation for damages caused by the nuclear accident, decontamination operations, and intermediate storage projects, as top priorities, the Japanese government should not even for a moment lose the awareness that the accident imposed restrictions on people's right to live, always take the position of sufferers, discuss matters with members of local communities, and address issues, such as the early resolution of the state of evacuation, and support for people trying to restart their lives in a new environment according to circumstances, and, therefore, give consideration to matters in all these directions.

(3) The Japanese government should firmly recognize that nuclear reactors where accidents took place are the subjects of decommissioning steps and measures taken against contaminated water and that these activities continue for a long time at facilities where their operations keep changing conditions. Based on this awareness, the Japanese government should control risks by continuously studying and analyzing the possibility that the facilities may negatively affect areas inside and outside them. The Japanese government should also continuously study and analyze the size of such effects, and steadily advance efforts to ensure safety management systems. At the same time, the Japanese government should gather intelligence extensively and worldwide, train workers for the operations of nuclear reactors, and advance the required research and development without delay. In addition, the Japanese government should enhance the transparency of these initiatives, and carefully share information and advance dialogues for building the confidence of local residents.

(4) Nuclear power operators should realize their primary responsibility is to reduce citizens' life and health risks attributable to severe accidents and nuclear security phenomena, and constantly review their initiatives for meeting the responsibility, taking international safety standards into consideration, and incorporating the effects of new information through risk assessment and other means. The Japanese government should ask nuclear power operators to step up programs for evaluating and promoting these initiatives among themselves, and have efforts to train workers required for the initiatives, establish technological standards, and advance research and development. In cooperating with initiatives on nuclear power generation overseas, the Japanese government should transfer the initiatives and position the pursuit of the relationship of mutual benefit as one of the most important approaches, with the prevention of nuclear proliferation as a major premise.

(5) We may be able to or need to change technologies, restrictions, relationships with society and the like that are assumed for establishing systems related to initiatives that address the aging of nuclear reactors, decommissioning, and the management and disposal of spent nuclear fuels and radioactive wastes as a result of innovations achieved in technologies, restrictions, and society. Accordingly, the Japanese government should give consideration to uncertainty over the future of these initiatives, read widely to find new information in Japan and abroad, promote research and development, and establish a system for constantly and responsibly pursuing rational approaches to targets such as technologies and taking the achievements of research and development and new social conditions into consideration. With regard to the completion of the Rokkasho Reprocessing Plant, the Japanese government should respect its promise to the concerned local government, and adopt a flexible operation plan, taking effects on the

global community into consideration.

(6) Business conditions for nuclear power generation are expected to change as a result of electric power system reforms. The future scale of nuclear power generation is anticipated to differ from the previous assumption, too. For these reasons, the existing administration system for nuclear power generation cannot be called the best system from the perspective of maintaining and using nuclear power generation as an important base power source in such a new environment. Accordingly, the Japanese government should clarify points that should be kept or changed, and perform reviews.

(7) The Japanese government must repeat opinion exchanges with concerned local governments regarding an actual research organization, a system for explaining research findings, and efforts for securing the balance of social values and benefits that result from disposal of nuclear waste. It must discuss and establish a codetermination system with the Nuclear Waste Management Organization of Japan (NUMO) and basic municipalities and wide-area municipalities in order to set candidate areas judged to have the scientific aptitude for accommodating high-level radioactive wastes disposal plants. The government must ask local governments in the areas to discuss the acceptance of location feasibility surveys. It is also essential to develop systems for constantly assessing the scientific and social rationality of these initiatives from a third-party position and for exchanging opinions with Japanese citizens.

(8) In using nuclear power generation, relationships are extremely important among local governments in areas where nuclear power facilities are located, among residents in those areas, the Japanese government, and electric power companies. The Opinions said it is essential for all these parties to have careful dialogues on how to deal with risks involved in nuclear power facilities and their effects and how to take countermeasures; in addition to offering scientifically verified information about those risks and effects based on actual conditions in those areas. For such dialogues, the Japanese government should adopt a system based on four principles, which the JAEC stated in Views on Initiatives for Building the Confidence of Citizens (issued on December 25, 2012), particularly transparency, fairness, and citizens' participation in the decision-making process.

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[i] http://www.enecho.meti.go.jp/info/committee/kihonseisaku/report-1.pdf (http://www.enecho.meti.go.jp/committee/council/basic_policy_subcommittee/pdf/basic_policy_subcommittee_001.pdf [Japanese only])

[ii] http://www.enecho.meti.go.jp/info/committee/kihonseisaku/ (http://www.enecho.meti.go.jp/committee/council/basic_policy_subcommittee/ [Japanese only])

[iii] http://www.enecho.meti.go.jp/info/committee/kihonmondai/ (http://www.enecho.meti.go.jp/committee/council/basic_problem_committee/ [Japanese only])

[iv] http://www.aec.go.jp/jicst/NC/about/kettei/140109.pdf (Japanese only)

[v] Notes by the Editorial Department: The summaries of public comments and responses to them have not been published as of

February 3, 2014. Public comments on the Opinions reportedly totaled about 19,000, according to a remark an Agency of Natural Resources and Energy official in charge made at a preparatory meeting of the Parliamentary Research Committee on Energy on February 6, 2014 (organized by the Zero Nuclear Power Plant Society formed by a suprapartisan group of Diet members and a team of experts).

[vi] http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-22-k159.1.pdf Refer also to an essay by Juraku in the October 2013 issue of Science Journal Kagaku for a commentary on the recommendation.

[vii] The government has held discussions for reviewing the way the JAEC should be. Based on the discussions, the government submitted a proposal for restructuring the Commission to the Diet on January 31, 2014.

[viii] The Cost Verification Committee, an organ established within the Cabinet Secretariat, when the Democratic Party of Japan was in charge of the government, reported costs by power source (http://www.cas.go.jp/jp/seisaku/npu/policy09/archive02_hokoku.html) on December 19, 2011.

[ix] Note by the Editorial Department: Refer to *Genpatsu-no kosuto* (Costs of Nuclear Power Generation) published by Iwanami Shoten, Publishers. Oshima concluded that the actual cost of nuclear power generation was high when research, development, and policy expenses for nuclear power generation borne by the government are taken into consideration.

[x] The Citizens' Commission on Nuclear Energy is a civic group for proposing the Framework for Nuclear Energy Phaseout Policy (in response to the Framework for Nuclear Energy Policy prepared by the JAEC) from the side of citizens. Refer to http://www.ccnejapan.com/2013-06-19_CCNE_01.pdf for its proposal issued in June 2013.

[xi] Notes by the Editorial Department: As the Ethics Commission for a Safe Energy Supply of Germany indicated, the view is that energy is of public interest but that it is possible nuclear power generation does not suit the public interest.