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Development trends in Japanese nuclear policy following the Fukushima disaster

Introduction

The Fukushima disaster is continuing to exert significant influence on Japan's energy policy, however I would like to start this paper summarising the development trends in the policy-making of the past two years by presenting a brief outline of the situation regarding nuclear power stations in Japan, the founding of the Nuclear Regulation Authority and other influences on nuclear policy as these are closely linked to the development trends in energy policy.

Radioactivity and its impact on health

Hydrogen explosions at the Fukushima Daiichi nuclear power station caused radioactive material to escape resulting in widespread surface contamination. The contamination map drawn up as part of a collaboration between the Ministry for Education, Sport, Culture and Technology (MEXT) and the US Department of Energy (DOE) on the basis of aircraft monitoring[1] shows the level of surface contamination from caesium 134 and caesium 137. From this we can see that the contamination in the area to the north west of the power station is particularly high. Between the plant and the village of Iitatemura, located some 50km away, there are places where contamination from radioactive caesium exceeds 3 million Bq/m^2. Returning to these areas is problematic and so it will not be possible for people to return to their homes in these places for a long time. The decontamination process is in fact underway, however there are indications that its success in the highly contaminated areas is very limited.

In actual fact, the people in these areas should be relocated, however the competent government authorities fear that this might lead to the death of towns and villages and so they are pushing for decontamination and putting all their efforts into enabling inhabitants to return as quickly as possible. Anyone who has moved away so far has done so at their own cost. Out of the people who have moved out of the Fukushima prefecture (around 60,000 in total), some have sought state reimbursement for their relocation costs. Many families have been torn apart with women and children seeking refuge in other prefectures while men remain in the Fukushima prefecture for their work.

The Nakadōri region, which stretches from Fukushima to Kōriyama, is also badly contaminated. Around one million people live in this area and so evacuating them is extremely difficult. The level of radiation exposure suffered by the people in this region during 2011 is roughly estimated at over 10 millisieverts (based on the external radiation exposure pursuant to the aircraft monitoring map and an estimate of the internal radiation exposure in the first few days after the disaster). The fears of the local population have not been met with facts but instead through repeated statements such as: “radiation exposure under 100 millisieverts has no direct effect on health” or “radioactive exposure has no effect on people who are happy, only on those who fret and worry.” (Prof. Dr Jun’ichi Yamashita, vice president of the Medical University of Fukushima, professor at the postgraduate seminary of the University of Nagasaki, health advisor to the Fukushima prefecture for health risks caused by radioactivity). Prof. Yamashita has received extensive criticism from the public.

After the disaster occurred, both children and adults carried on with their daily activities in the area in an atmosphere of high airborne radiation exposure without protective masks. As a result, there is a fear that health problems will emerge in the future. The Fukushima prefecture has established an assessment team to “check and examine the health of the population of the prefecture” and carry out health examinations including examining the thyroid, however according to reports only three people were diagnosed with thyroid cancer and seven were suspected of having the same.[2] This was the result of examining 38,000 people in 2011. The assessment team expressed the opinion that these results were not a consequence of the Fukushima disaster although the percentage is higher than would otherwise be normal. In addition, during examinations carried out between 2011 and October 2012,

2.56% of the persons examined were found to have cysts larger than 5mm. This percentage is also higher than normal.

Examinations are being carried out sequentially on around 360,000 children under the age of 18 in the Fukushima prefecture; the examinations performed in 2011 and 2012 are classed as preliminary examinations with the actual examinations set to be carried out from 2014.

The likelihood that we will see court cases in future involving demands for compensation in relation to damage to health is high.

On the other hand, there is considerable anxiety and concern among parents with regard to the impact on the health of their children and activities are being organised to enable children who have not been able to move away to spend a couple of days or weeks in a non-contaminated area. Such activities have been implemented right across the globe since the Chernobyl disaster and we are now able to build on these experiences.

Since the disaster, foodstuffs have been affected by suspended deliveries, growing bans and other issues which have had an immediate impact on the livelihood of farmers. On the other hand, citizens' groups are disseminating initiatives among themselves requiring that foodstuffs are tested for radioactive contamination. Citizens are buying devices for measuring radioactivity and are testing food. Even government authorities are being proactive, for example in the city of Yokohama food destined for school meals is tested and the results made public.

The longer people live as evacuees, the more problems of various kinds emerge. Love of one's homeland manifests itself subtly in a whole range of different ways between generations and these different ideals produce conflict. In addition, there are also various pyschological problems such as discrimination against people from Fukushima (children who have sought refuge in other prefectures are teased for being radioactive; discrimination in the form that some people say that they will not marry anyone from the Fukushima prefecture). Life for people who have sought refuge in other areas is certainly not easy and there are also examples of psychological damage. It is definitely the case that this is a result of lessons not being learnt from the Chernobyl disaster and insufficient value being attached to the same.[3]

Even the number of cases in which reasonable compensation is demanded has increased, and will no doubt continue to do so in future. As health problems and court cases can take both take a long time to develop, the effects of the disaster at the Fukushima nuclear power plant on the world will not easily be forgotten. The impact of a disaster of this nature will definitely have an influence on Japan's nuclear and energy policy.

Causes of the disaster and lessons to be learned

The direct causes of the disaster were the strong earthquake and the tsunami triggered by it. Three factors are essential for safety: "stopping" the nuclear fission process, "cooling" the nuclear reactor and "preventing" the release of radioactive radiation. In the case of the earthquake on 11 March, nuclear fission was successfully "stopped" however cooling failed because of a power outage. Insufficient preparations for the event of the power supply failing combined with deficient operating manuals and other factors resulted in the failure to prevent the release of radioactive radiation. There were hydrogen explosions in reactor 1 and reactor 3. Reactor 4 was at the time undergoing routine maintenance, however hydrogen escaping from reactor 3 and entering reactor 4 resulted in an explosion here as well. To date, investigations regarding the disaster have been carried out by TEPCO, the government and the parliament and their respective reports have all been published. The power cut has largely been attributed to the tsunami, however the investigation committee assigned by the parliament to look at the disaster mentioned that, in addition to the tsunami, cracks had formed in the pipework as a result of the earthquakes and it is possible that cooling water leaked out as a result (based on the analysis that the emergency diesel generators had already stopped working by the time the tsunami reached the reactor building). According to the latest reports[4], TEPCO has refused to allow the members of the parliamentary investigation committee to perform an on-site examination of the isolation condenser on the fourth floor of reactor 1, which they had requested to do, due to insufficient lighting in the building. However, there are indications that the insufficient lighting excuse was a fabrication. The basis for this examination was a witness statement claiming that an employee who was on the fourth floor at the time of the earthquake had heard the noise of water gushing out. It is possible that the earthquake resulted in pipes rupturing in the isolation condenser, which is why this examination is extremely important. Nevertheless, TEPCO has refused to allow it to

take place. It is conceivable that as an energy company its intention is to make do with attributing the disaster to the effects of an unforeseeable tsunami.

Examining the causes will, without doubt, only produce a clear picture once people have gone into the building or once it has been possible for the interior of the reactor vessel to be examined. An investigation of the causes lasting over ten years would result in the energy company, which wants to leave the disaster in the past, finding its problems hanging around like a bad smell for a lengthy period of time.

In its report, the parliamentary committee investigating the disaster (chaired by Kiyoshi Kurokawa) states the following[5]:

"We recognise that the underlying cause of this disaster is to be found in the fact that there was a 'failure in the bodies tasked with inspecting and monitoring nuclear safety' due to a 'change of sides' occurring between the supervisory body and TEPCO, the inspecting and the inspected entities. If you take into account the fact that multiple chances were given for the relevant measures to be taken in advance then this incident was not a 'natural disaster' but instead was quite clearly 'caused by human hand'".

The fact that regulation did not work sufficiently is also acknowledged in the report by the government committee responsible for investigating the disaster. Hereupon, the Japanese Nuclear and Industrial Safety Agency (NISA), a special agency reporting to the Ministry of Economy, Trade and Industry (METI), and the Nuclear Safety Commission of Japan, which reports to the officer of the prime minister, were reorganised, the Nuclear Regulation Authority (NRA) was newly founded on the basis of article 3 of the administrative organisation law[6] and the nuclear regulatory authority, the executive authority responsible for regulation, was made to report to the Ministry of the Environment. In this way, regulation has ultimately become an independent and autonomous system.

Position of the National Governors' Conference

In December 2011, the "special committee for measures regarding the generation of electricity from nuclear power" of the National Governors' Conference submitted "proposals to the provincial government regarding measures relating to the generation of electricity from

nuclear power in Japan"[7]. Within these proposals, it called for, among other things, the following safety measures in regard to the generation of electricity from nuclear power: 1. All information that has been obtained from thorough investigations and inspections of the disaster at the Fukushima nuclear power station should be explained to the public in an easily-comprehensible manner; an earthquake-proof control centre should be built on the premises to react to severe accidents and perform exercises simulating the measures to be carried out in the event of a severe accident; the precautionary measures combating the leaking of contaminated water should be strengthened. 2. A fundamental review of the guidelines for examining safety and earthquake-proof design should be carried out. 3. Not only should the organisation be separated from the METI but a regulatory system for nuclear safety should be set up in which decisions are made on the basis of laws and directives, technical expertise and other specific basic principles and in which transparency is ensured through the continuous disclosure of all information, and this system should succeed in gaining the trust and understanding of the public. 4. Handling of the stress test should be articulated in a clear manner. 5. A responsible explanation should be made to the public with a request for their understanding. 6. A safety assessment should be carried out strictly on the basis of a review of the key points from an analysis of the years of high economic growth.

A political decision was made about two reactors at the Ōi nuclear power station, but for all other nuclear power stations recommissioning is conditional on passing a safety inspection based on the new criteria demanded by the National Governors' Conference. In Japan, nuclear power stations are routinely checked every 13 months by rotation. After 2009, when the law was relaxed, it became possible for plants to be in continuous operation for up to 24 months, although this has not yet occurred. Given that since the Fukushima disaster all of the nuclear power stations have been through their routine inspection and the local governments have not consented to them being recommissioned, other than the two reactors at Ōi, 48 reactors are currently offline.

Recommissioning of the two reactors at the Ōi nuclear power station

The fact that approval has only been given to run two reactors at the Ōi nuclear power station is due to the then prime minister, Yoshihiko Noda, making the political decision on 8

June 2012 to consent to them being recommissioned. What is meant by a political decision in this context is that, against the background that the new safety criteria demanded by the National Governors' Conference based on the Fukushima disaster had not yet been worked out and, furthermore, additional safety measures had not yet been implemented, a political-based decision was made without any verification of the safety issues by the responsible regulatory body. The result of the stress test was indeed also used as a criterion for the decision, however this evaluation was only carried out using the initial test.

The additional safety measures were enacted by the Japanese Nuclear and Industrial Safety Agency (NISA) following the Fukushima disaster. They were subsequently debated again by the Nuclear Regulation Authority, however in early 2012 this committee had not yet been set up. There are around 30 additional safety measures however the most significant (and those that would also require considerable time) would be the construction of an earthquake-proof control centre and the installation of valve devices equipped with filters.

According to Kansai Electric Power (KEPCO), it would take three years for valve devices equipped with filters, planned as a measure for the event of a severe incident, to be installed at the Ōi nuclear power station. As a result, the then prime minister, Yoshihiko Noda, decided it would be sufficient for their installation to be planned. On this basis, he then approved, as an exception, the recommissioning of the Ōi nuclear power station.

It was declared that the business circles in the Kansai region had a major influence on the decision to recommission the nuclear power station and that electricity generation in the summer of 2012 would be nowhere near sufficient and would lead to power cuts. Certainly, KEPCO is at the forefront of the business circles in the Kansai region which is why it can be said that it has an influence on these business circles and thus was able to exert pressure on the government to put the Ōi nuclear power station back into operation. According to Noda, "in order to safeguard the lives of the public I decided to recommission reactors 3 and 4. I have the agreement of the local government and it is on this basis that I would like to push ahead with the formalities to recommence operation." The Fukui prefecture gave its consent. However, in actual fact, there were reports of management problems at KEPCO. The proportion of KEPCO's total electricity generation that comes from nuclear power amounts to 50%, and so a longer period with the nuclear power station offline brings with it the risk

that KEPCO might no longer be able to raise the funds required to purchase fossil fuels (even with bank loans).

The establishment of the Nuclear Regulation Authority (NRA)

The Nuclear Regulation Authority, which was founded on 1 September 2012, has some major powers. These include the right to approve nuclear power stations and the authority to revoke this approval, and the retroactive application, based in law, of new scientific expertise in regard to existing nuclear power stations.

The regulatory committee is drafting guidelines for preventing nuclear disasters, new safety criteria and guidelines for safety criteria in the event of earthquakes based on a self-critical reflection on the Fukushima disaster. The new safety criteria will be drawn up by July of this year. As the deadline for implementing laws and regulations relating to the law establishing the Nuclear Regulation Authority is July 2013, everything needs to be prepared by then. Thereafter, the individual nuclear power stations will be examined based on the safety criteria and earthquake safety criteria drawn up. Once these examinations by the Nuclear Regulation Authority have taken place, the approval of the local government will be obtained and then the plants can be put back into operation. It is quite possible that the two reactors at the Ōi nuclear power station will undergo another routine inspection by rotation and be shut down.

Discussions at the Nuclear Regulation Authority are focussed on two things. Firstly, the construction of an earthquake-proof control centre and the installation of valves equipped with filters as measures designed to cope with a severe accident. The former is required for all nuclear power stations, whereas the situation regarding the latter is unclear in relation to pressure water reactors (PWR). Irrespective of this, the issue is whether these will become conditions for the recommissioning of power stations. The energy companies are vehemently demanding that these be removed from the conditions; as if they were to become conditions to be fulfilled prior to power stations being recommissioned then it would not be possible to bring power stations online for the next three years.

Secondly, focus is concentrated on the problem of active [geological] faults. The government has previously declared that there were no active faults on its terrain, however the assessment of what constitutes an active fault has changed (it was previously sufficient to look back over 10,000 years, now the assessment looks back at the past 120,000 years). As a result, faults and rupture zones are now subject to a new definition for active faults. However, once it clearly emerged that active faults do exist under the land, the government changed its standpoint and said that there was no problem so long as fault lines do not run directly beneath important installations.

The Nuclear Regulation Authority is not approving the operation of nuclear power stations if active faults run under important installations. This suggests the possibility of reactors being shut down. The faults (rupture zones) running under important installations at certain power stations (Ōi, Tsuruga, Shika, Monju, Kashiwazaki-Kariwa, Higashidōri, etc.) are currently being reassessed. So far, the power stations at Ōi and Tsuruga and been examined. These examinations are being carried out by an expert team made up of specialists in the field of geology and active faults which reports to the Nuclear Regulation Authority.

Although many of the committee's members have indicated the possibility of a connected series of movements by several active faults at the Ōi power station, this has been vehemently denied by KEPCO and the association of Japanese electricity generation companies. They claim that the existing active fault stops just before a water supply pipeline to the nuclear power station and that a fault plane could indeed be seen in front of that but this was the result of a landslide. Examinations and discussions are still ongoing.

Although all of the committee members also confirmed that there are active faults at the Tsuruga nuclear power station (which might lead to connected movements), the company Japan Atomic Power is continuing with its own investigations in order to disclaim this. Makoto Yagi, the chair of the association of Japanese electricity producers, has said that he was in fact following the investigations of Japan Atomic Power closely but wants to negotiate with the government in regard to the absorption of costs in the event that reactors are shut down[8] (*Nikkei Shinbun*, 14 December 2012).

Even if the energy companies put up fierce resistance, there is still a chance that some nuclear power stations will be shut down due to the assessment of active faults. This represents another factor that will have a decisive influence on nuclear and energy policy.

The decline in the number of reactors

The number of reactors has fallen as a result of the disaster. TEPCO also shut down the four reactors at the Fukushima Daiichi nuclear power station involved in the disaster from a legal perspective on 20 April 2012 in line with the law governing energy suppliers. However, no decision has yet been made regarding the shutting down of reactors 5 and 6. Nevertheless, the Fukushima prefecture and its local governments are demanding that all 10 reactors located within the prefecture are shut down. They have decided with the representatives of the Liberal Democratic Party (LDP) to shut down the nuclear power stations in the Fukushima prefecture. Furthermore, the prefecture has also made it a priority to "build a safe, secure and sustainable society free from nuclear power" in section 1 of its basic principles drafted in August 2011 entitled the "Vision for revitalisation in the Fukushima prefecture"[9]. As a result, it has withdrawn its application for subsidies for nuclear power stations which are distributed to local governments as part of a special Japanese system. Its motto is now "to build a new society by extensively promoting renewable energies".

Of the other nuclear power stations it is worth mentioning in particular the one at Hamaoka. At the request of former prime minister Naoto Kan, this nuclear power station was shut down and has remained offline to date. The grounds behind the request to shut down the power station were impending earthquakes in the Tōkai region. Following the earthquake on the pacific coast of the Tōhoku region (11 March 2011), the extremely strong earthquakes that hit the Nankai trough were reassessed resulting in a series of connected severe earthquakes now being forecast in the Tōkai, Tōnankai and Nankai regions. The moment magnitude (MW) for this event is estimated at 9.1. No estimates have been made as to whether the Hamaoka nuclear power plant can withstand such a strong buffeting. The neighbouring town of Makinohara cited the decision of the city council in shelving the recommissioning of the power station indefinitely. Even the mayor protested fiercely against recommissioning. The towns and communities in the local area (the mayors of the towns of Yaizu and Kosai

among others) are also against recommissioning. The town of Omaezaki which lies close to the power station would welcome the recommissioning of the plant, however given the on-going protests from the neighbouring communities it is hard for Chubu Electric Power to ignore these and force through recommissioning.

The Tōkai nuclear power station also finds itself in a situation where recommissioning is difficult. Tatsuya Murakami, mayor of the city of Tōkaimura, has explicitly declared that he would not sanction its recommissioning. He is one of the leading organisers of the network "Mayors for a Nuclear Power-Free Japan"[10] set up in the aftermath of the Fukushima disaster. This network currently comprises 70 mayors, and in addition to Murakami its organisers also include Hajime Mikami, mayor of the town of Kosai, and Katsunobu Sakurai, mayor of the town of Minamisoma.

Tōkai and Hamaoka both have difficult tasks to solve in relation to disaster prevention. The Nuclear Regulation Authority is currently drafting guidelines for extending the area for measures in the event of nuclear disasters to 30km. When they are finished, evacuation plans will have to be drawn up for 930,000 people in Tōkai, however the governor of the prefecture of Ibaragi has declared this to be impossible. For Hamaoka as well there is a requirement for an evacuation plan for 740,000 people.

If the number of reactors coming back online sinks, based on the possibility of reactors being shut down for earthquake safety, recommissioning not being possible without the consent of the local population and therefore decisions being made to shut down the reactors permanently, then this will have a decisive impact on Japanese nuclear and energy policy.

The failure of the old energy framework plan

The disaster at Fukushima, which started on 11 March 2011, shook the foundations of the energy framework plan which the government had adopted just half a year previously, i.e. in October 2010. This plan sets out to "plan the long-term, comprehensive and systematic promotion of measures regarding the supply and demand of energy" (fundamental law on energy policy paragraph 12). Once opinions from the investigation committee for natural resources and energy have been sought it will become part of the plan drafted by the minis-

ter of the METI and will then be adopted by the cabinet. It also states that “the energy framework plan must be reviewed at least every three years and amended as appears necessary.”

The plan from 2010 provided an outlook up to the year 2030, and stated that “nuclear power will be positioned as the core energy source and the nuclear fuel cycle will be promoted”. In detail, its key points called for the construction of 14 new reactors, an increase in the proportion of energy generated from nuclear power to around 50% and an increase in the capacity utilisation of the plants. Conversely, a proportion of around 20% was outlined for renewable energies including the existing hydro power plants. As hydro power accounts for 10% the proportion of energy generation from other renewable energies was expected to be increased to around 10%. Electricity generation should increase by 34.6% compared to 1990.

The government had planned to achieve the percentage reduction in CO_2 emissions that it had obligated itself to internationally (a reduction of 25% by 2020 compared to 1990) primarily through the use of nuclear power stations. As far as the original plan of building 14 new reactors was concerned, the geographic sites had already been established but no authoritative confirmation had yet been given. An even stronger preference for nuclear power stations was already implied. A system was introduced which, among other things, provided for the approval for 24-month operation and cost compensation through the creation of a reserve for the depreciation costs of the nuclear power stations from the time construction commences.

The author is of the opinion that we can say that this plan to blindly promote nuclear power stations represents one of the fundamental factors behind the Fukushima disaster, however irrespective of this, it has now become clear to everyone that this plan, as already expressed above, has failed as a result of the disaster at the Fukushima nuclear power station.

The energy framework plan would have been revised routinely in 2013, however, following the disaster at the Fukushima nuclear power station, the government was forced to review the plan again and began to revise it. This work is being carried out under the guidance of the National Policy Unit (NPU) created by the governing Democratic Party. In fact it is the Energy and Environment Council within this unit that is carrying out this work. This council

started by reviewing the costs so that, in contrast with the previous case regarding nuclear energy, they took into account the costs of the disaster plus research and development costs resulting in the value of 8.9 yen/kWh. However, this equated to the minimum costs (5.4 billion yen) limited to the damage caused by the Fukushima disaster that had been clearly recognised at this point. In addition, the damage from the disaster was assessed at 0.5 yen/kWh, however the total amount of power relating to this denominator was worked out on the assumption that electricity generation by nuclear power stations in 2010 would remain the same for 40 years which was completely unrealistic. It was a good idea to add the costs of the disaster to those for research and development, among others, however if the figures behind the calculated price were known to be adjusted in order to for the price to remain sufficiently competitive with those for other sources of electricity, then nothing could be changed in this regard. The author has estimated, based on a rough calculation of costs for the energy research centre, the decontamination plans in Iitatemura and others, that the damages from the disaster will amount to around 48 billion yen.[11] If we adopt the amount of 50 billion yen then the price would rise rapidly to 16 yen/kWh.

The Energy and Environment Council advised the METI to draft options for energy when rewriting the energy framework plan, and advised the Japanese Atomic Energy Commission to draft options for the nuclear fuel cycle. It announced that a national discourse would be held on these options and the result would be outlined in a political measure.

This commitment represented an expression of the ruling Democratic Party's intention to prioritise the debureaucratisation of its activities. It was a good attempt, however its result does not seem to have been completely successful in its aim of cutting red tape.

The various options relation to energy generation

At the METI, the research committee for natural resources and energy founded a committee for policy issues and the 25 appointed committee members started to debate the various options.[12] The previous subcommittee for framework plans was dissolved. The author was appointed as a member of the committee for policy issues and took part in the discussions.

Energy does not necessarily mean just electricity, however, as the nuclear power station disaster had triggered discussions focussing on the issue of what proportion of electricity should be generated from nuclear power. As the existing energy framework plan covered up until 2030, during our discussion we also had the task of revising this period.

Three alternative proposals for the proportion of electricity generated by nuclear power in 2030 emerged as the result of 27 meetings: 0% (the zero scenario), 15% (the 15% scenario) and 20-25% (the 20-25% scenario). In order to guarantee a reliable supply of electricity in each case, bundles were created from the proportions of renewable energies and thermal power stations to be introduced. The committee members who favoured the zero scenario, which included the author, placed an emphasis on saving energy although energy savings of 10% were planned for all three options. Economic growth of 1% is expected over the next ten years, and 0.8% for the ten years following that. Electricity consumption for 2030 was reduced by 10% compared to 2010 and estimated at 1 billion kilowatt hours. The zero scenario increases the proportion of renewable energies to 35%. This proportion sits at 30% in the 15% scenario and 25-30% in the 20-25% scenario. The remainder will comprise electricity generated from thermal power stations.

In actual fact, the 15% scenario was not initially discussed in the committee for policy issues with the following proposals originally being submitted: 0%, 20%, 25% and 35%. Based on this, Tetsunari Iida (representative of the Institute for Sustainable Energy Policy) repeatedly proposed for a 10% option to be provided, however the chair of the committee Akio Mimura (Nippon Steel & Sumitomo Metal Corporation, Chairman) completely ignored this proposal. However, shortly after the *Denki Shimbun* (The Electric Daily News) had reported that 15% was being examined as a proposed compromise, this proposal suddenly emerged in April 2012. Committee members Takeo Kikkawa (professor at the postgraduate college for advanced commercial studies at the Hitotsubashi University) and Yūko Sakita (environmental consultant) triggered a discussion. In order for the proposal to become acceptable, conditions were added to it stating that a reduction in the lifetime of nuclear power stations to 40 years and a capacity utilisation of the plants of 80% would result in the proportion of nuclear power lying at 15% in 2030. The author raised an objection that a capacity utilisation of 80% did not reflect the actual ratios and asserted that the 70% used by the Energy and Environment Council should be applied; however this point was not taken up. Committee member

Kenji Yamaji (Research Institute of Innovative Technology for the Earth (RITE), general director) and Satoru Tanaka (professor at the Graduate School of Engineering at Tokyo University) claimed that the 80% was realistic. Under the condition that a 40-year lifetime was accepted, the author eventually supported the three scenarios set out above which, in his view, represent one alternative. He did this on the basis that once the zero scenario was made public then more people would argue for this than for the other scenarios during public consultations. He sensed this based on his experiences; after all, in the first year after the disaster he had given a talk somewhere on average once every three days.

What was interesting in all of these discussions was that the committee members demanding the continued use of nuclear power stations provided completely different arguments for doing so, including the following by way of example: if the nuclear industry were to collapse then we would no longer be able to maintain safety at nuclear power stations; nuclear safety was an area in which Japan made a contribution internationally, or an area in which such contributions were expected from Japan. It was essential to be able to react to countries that wanted to introduce nuclear power stations in future; Japan pulling out of nuclear power on its own would not make sense as China and India were following an active expansion strategy. An even more remarkable argument is the claim that if electricity continued to be produced from nuclear power this would have the effect of a deterrent (committee member Jitsurō Terashima (chair of the Japan Research Institute), committee member Kenji Yamaji). This theory of a technological deterrent represented an argument never discussed before in government committees in Japan. I got the feeling that the disaster at the Fukushima power station had dragged the nuclear industry into further difficulties and now its true face was starting to appear. Yamaji, who has been carrying out research in the field of nuclear power for a long time, in particular mentioned the potential as a deterrent and let it be known that this was one of many views shared in the *nuclear power village* (the name given to the close collaboration between the nuclear industry and supervisory authorities in Japan [note added by JP-DE translator]).

Does “nuclear’s potential as a deterrent” really have a deterring effect? And how strong is this effect? Even if it were possible to manufacture atomic weapons within around six months it is still clear that we would not be able to withstand any nuclear attack. Nevertheless, there was a proposal to conduct a more in-depth discussion on this topic (committee

member Tatsuo Hatta (visiting professor at the University of Osaka), however this was not taken up.

Discussions regarding economic viability

Analyses of the economic effects of the different scenarios were carried out. The following five institutes were assigned to perform the analyses with the following models: KEO model (Keio University, Prof. Koji Nomura), AIM model (National Institute for Environmental Studies), DEARS model (Research Institute of Innovative Technology for the Earth (RITE)), JCER model (Japanese Centre for Economic Research), model from Prof. Kanemi Ban of the University of Osaka. This was in order to "ensure objectivity". However, some of these declined their tasks for the following reason: "In actual fact, the combination of energy sources with prices as the result of a solution to the equations in the models are only calculated retrospectively. However given that in these calculations the combinations of energy sources represent options themselves, the effects are assessed on actual GDP among other things depending on their exogenic input." In other words, because the proportion of nuclear power has already been established up front, the conditions are being continuously changed until the right result is achieved resulting in the endless feeding back of conditions and results.

The report summarising the different options states that "The numerical values resulting from the calculations can change depending on the hypotheses and preconditions of the models, which is why these values should not be overestimated. Instead it is essential for them to be understood as being for information purposes in order to get a rough idea of the range of effects that the different options will have on the economy. Furthermore, it is vital to acknowledge that applying the general equation model used for this analysis in an analysis of a longer period of around 20 years is hardly likely to bring to light differences between the economic effects of the individual options." It also states that "Being based on economic indicators, this analysis explains quantitatively determinable processes regarding the subject under investigation, and it is essential that attention is given to the fact that these analyses do not give any consideration to concerns regarding the generation of electricity from nuclear power and the methods for disposing of the used fuel rods, the psychological damage and grief caused in the event of a disaster at a nuclear power station, maintenance of a se-

cure energy supply, control of the problems associated with global warming and other social values." Despite these warning words, you get the impression that it is only the results of economic analyses, i.e. that the price of electricity would double in the event of the country pulling out of nuclear power, that has been focussed on. In this regard it would also almost double in the case of the 20-25% scenario.

Thus in regard to the costs of nuclear power stations, as I have already mentioned, with the amount of the associated loss being underestimated and the amount of electricity overestimated in the nominal price of 8.9 yen/kWh, this price represents a considerable underestimation of the costs of nuclear power stations; however the economic viability is assessed based on the result of analyses which are in turn based on this underestimate.

The national discourse

At the end of June, having received the report detailing the three options from the Ministry of Economy, the Energy and Environment Council presented the options to the public and started the public consultation phase. Following this, comments were sought from the public in the form of statements, consultation sessions organised by the government at eleven locations across Japan, opinion polls in the form of debates as part of a new trial and the participation of the government in driving the national discourse at meetings organised by NGOs. Furthermore, the opinion polls consulted all mass media as it came down to shortlisting the options.

In terms of statements submitted, 89,214 people recorded their opinions: 87% of these were for the zero scenario and 78% of all respondents wanted nuclear power to be shut down immediately.

Among those interviewed at the public consultations, 68% supported the zero scenario. However, the result of the opinion polls took on the appearance that although support for the zero scenario was far higher than that for the other scenarios (35% in comparison with 2% and 6% respectively), 57% in fact opted for "and others" (reluctance to give opinion for particular reasons).

Opinion polls in the form of debates, which were carried out as part of a first-time trial, took place in Tokyo. If the preparation time was too short then the researchers using this method submitted their opinion to the government in writing, however the Democratic Party-led government was striving for quick conclusions (at the time there was a rumour that a general election might be held later that year). Throughout Japan, telephone calls were made at random (to 6,849 people) to seek opinions and a two-day opinion exchange was arranged for 285 people who responded to requests to take part in a debate, where, according to surveys carried out at the end of the debates, a number of changes in opinion were recorded. The distribution of opinions among those who volunteered for the debates was as follows: 33% for the zero scenario, 17% for the 15% scenario and 13% for the 20-25% scenario. The distribution of votes in the surveys carried out before the debates in the same order was 41%, 18% and 13%. After the debate, the surveys produced the following figures: 47%, 15% and 13%. Thus, the proportion of supporters for the zero scenario increased.

All of the mass media outlets also performed several opinion polls with the following results: 12-19% for the 20-25% scenario, 7-14% for other opinions and the majority divided between the zero scenario and the 15% scenario. In some cases, the zero scenario was more favourable, in some the 15% scenario. The results of all of these public consultations and polls were analysed in meetings under the guidance of external experts in order to increase the objective nature of the report.

This report was summarised as follows: “As a primary aim, the majority of the public want, as a minimum, to create a nuclear-free society. Conversely, there was a whole range of views in regard to how quickly this goal should be achieved. The fact that many citizens explicitly expressed their desire for the zero scenario at the public consultations and through other forums is due to the actual situation that there is widespread mistrust of the manner in which political decisions relating to nuclear power are made and major concerns regarding nuclear power stations. Holding a national debate has made it obvious that the Japanese people are not interested in the breakdown of the energy mix so much as the kind of economy and society that will be created – as part of a larger orientation – and the kind of concerns that will appear depending on which strategy is chosen. It is essential that the government takes these concerns seriously and comes up with realistic solutions.”[13]

As a result of this outcome, the Democratic Party set up the research committee for energy and the environment (chaired by Seiji Maehara) and set out its political measures as a party. These were announced to the public on 6 September in the form of a proposal entitled "Striving for a 'nuclear-free society'". The aforementioned research committee comprises, among others: vice-chair Kiyomi Tsujimoto, advisor Naoto Kan, general secretary Yoshito Sengoku, administrative director Shōichi Kondō and others (there are several vice-chairs and advisors). However, as there was no consensus within the Democratic Party in regard to a path away from nuclear power, the wording of this action and the indication of the year 2030 was the result of a decision by the former Prime Minister, Yoshihiko Noda, following an extremely extensive verbal exchange within the party. It is fair to say that the result of the national debate and the people movement advocating a nuclear-free Japan have stirred the Democratic Party into action (the report also mentions the Friday protests which took place every Friday evening outside the office of the prime minister and in which, at their height, over 100,000 people took part).

Ultimately, this became the official path pursued by the Democratic Party. On this basis, the Energy and Environment Council published its "Innovative energy and environment strategy"[14] (hereinafter referred to as the New Strategy) on 14 September.

Nuclear-free by the 2030s

Summarised into straightforward language, the New Strategy drawn up following the national debate runs along the theme of "implementing various political measures and resources to enable the country to go nuclear-free by the 2030s". In relation to dealing with nuclear power stations, "3 principles" have been drawn up: 1. To strictly limit the lifetime to 40 years; 2. To only recommission those nuclear power stations confirmed as safe by the Nuclear Regulation Authority; 3. Not to build any new nuclear power stations.

An eco-energy reform is being implemented to facilitate the move to nuclear independence, and thermal power stations with fossil fuels and the high-level capacity utilisation of heat through combined heat and power generation is being promoted in order to ensure a secure energy supply. In addition, the all-round liberalisation in the energy sector and the neutralisation and expansion of electricity transportation and other reforms of the energy supply

system are also being pursued. This will enable measures countering global warming to be implemented in a reliable manner. In order to promote the uniform reviewing, verification and implementation by the government and the public, a review and verification system will be set up within the cabinet office. These represent the rough aims of the New Strategy.

The key points of the "eco-policy features" in the eco-energy reform were finalised on 27 November.[15] The cabinet also decided to promote political measures based on the New Strategy. As the cabinet decision (18 September) based on the New Strategy, "to hold a responsible discussion with the affected local authorities and the international community, and to carry out continuous flexible reviews, verifications and revisions with the consent of the Japanese people", is indirect in its wording, some people are of the opinion that the New Strategy is not a done deal. They understand it to be a formulation arising from concerns about resistance to nuclear independence. The wording is indeed very subtle but discussion about the form the system will take is being driven on the basis of this New Strategy.

The New Strategy also makes reference to the nuclear fuel cycle, nuclear policy and the Japanese Atomic Energy Commission (JAEC), however I will come to this later.

The New Strategy was not selected from three options. As mentioned above, the government considered the 15% scenario to be a good compromise and it is fair to say that the "zero" concept was brought into play as a result of the national debate. Conversely, in terms of its content, the New Strategy in fact occupies the middle ground between the zero scenario and the 15% scenario. The time until the country is definitively nuclear-free was extended by ten years, i.e. into the 2030s, and the proportion of renewable energies was set at 30% as it is in the 15% scenario, thus we can describe this result as a compromise.

There are critics who claim this is a backward step compared to the zero strategy. However, it was initially of utmost importance to decide to withdraw from nuclear power and to spread this message around. During past discussions at the METI, many people have expressed the notion that major advances in renewable energies represented a threat to nuclear power. This leads to the idea that if Japan made it clear it was moving towards becoming nuclear-free then renewable energies and other measures resulting from the same would immediately get to work. The citizens' organisation "Society for independence from nuclear power and a new energy policy", which developed from a citizens' group, has de-

manded that the committee for policy issues draw up an energy framework plan based on the New Strategy.[16]

Each of the options includes a call for a much larger uptake in renewable energies than previously. Parallel to this discussion, on 1 July 2012 the system for remunerating electricity supplied from renewable energy sources (feed-in tariffs or FITs) was introduced. By way of example, electricity generated by photovoltaic solar panels is remunerated at 42 yen/kWh. Indications of an intention to separate electricity generation from electricity transportation on the electrical energy market have also been made. Discussion about the detailed form of the system will be held in future. It is conceivable that the general direction would remain unchanged, even in the event of a change in government to the Liberal Democratic Party, however it remains to be seen to what extent this will work in the face of the strong opposition from the energy sector.

Resistance from business organisations

Three organisations representing the Japanese economy – the Japanese economic umbrella organisation *Keidanren*, the Japanese chamber of trade and industry and the Japanese committee for economic development – organised a press conference on 18 September at which they demonstrated their fierce resistance stating that as business organisations they "could not accept [the withdrawal from nuclear power] under any circumstances".[17] Their justification for this was that the move away from nuclear power would lead to a deterioration in the economy (as a result of companies relocating abroad due to rising prices for fossil fuels and thus rising electricity prices), that it would then be difficult to maintain employment levels and that there was then no longer a mutual basis for the growth strategy which was aiming for 2% growth, that the securing of the technologies and personnel for nuclear safety would be difficult and that the move would have a negative effect on relations with the USA, etc.

This line of argument is not new. However, in the document "on the results of a survey relating to the measures for energy provision for this summer" (material from the 11th meeting of the committee for policy issues[18]), which *Keidanren* carried out between September and October 2011 and for which it received responses from 87 of 152 companies, not one com-

pany, whether in the manufacturing industry or not, responded to say that it would move its commercial activities abroad. In fact, no company would simply move its commercial activities abroad for negative reasons. The decision to withdraw from nuclear power represents a blow to all energy companies, the iron and steel industry and other sectors affiliated with nuclear energy, which is why they are likely to be against it. At the 32nd meeting of the committee for policy issues, five committee members – Shōei Utsuda, Sadayuki Sakakihara, Satoru Tanaka, Masakazu Toyota and Kenji Yamaji – submitted a written statement of opinion in which they stated: "We would like to request that the committee reconsider retaining a certain degree of nuclear energy". This letter contained almost exactly the same content as that from the business organisations. However, instead of citing the deterioration of the economy it instead mentioned a reduction in competitiveness and the outflow of national wealth to other countries.

It is not the case that all business organisations are displaying resistance. In April 2012, a "Network of Business Leaders and Entrepreneurs for a Sustainable Business and Energy Future"[19] was formed by 400 managers. The foundation documents make it quite clear that "what we should leave behind for future generations is not useless and hopeless atomic waste, but hopes and dreams. … we should show that a healthier country and healthier regions can be created without nuclear power stations and then achieve this aim".

The revolt by committee chair Mimura

At the 32nd meeting of the committee for policy issues (18th September), which took place after the New Strategy was published, the chair spoke out vehemently against the New Strategy, saying specifically that the 40-year lifetime would indeed be strictly administered, however, because the law granted a one-time extension of 20 years, this equated to a contradiction and therefore he wanted to negotiate this with Minister Edano. He expressed this entirely as his personal opinion, however the following morning we were informed that the committee meeting had broken up. The author immediately sent an email to the secretariat stating that the committee chair should be disqualified if he broke up the meeting for personal reasons, however in the following two months no further meetings took place until the 33rd meeting was held on 14 November.

At the end of the meeting, the Minister of Economy, Yukio Edano, gave assurances that as it was obviously impossible for everyone within the committee for policy issues to reach agreement, he would draw up the energy framework plan in his capacity as minister. Given that, from a legal perspective, the understanding of an advisory committee was not required, the energy framework plan would be legally binding if drawn up under the responsibility of a minister and then adopted by the cabinet. The committee chair, Mimura, then asked what the point of his role as committee chair was and declared once again that he wanted to agree things with the minister. Thus the meeting was closed. It would be fair to say that the chair, Mimura, prevented Minister Edano from concluding his report by playing for time as it was anticipated that the lower house of parliament was due to be dissolved imminently (this took place on 16 November). As a result of these two actions of revolt by Mimura, the drafting of an energy framework plan based on the New Strategy remained just a vision.

Problems regarding the nuclear fuel cycle

The Japanese Atomic Energy Commission (JAEC), which was advised by the Energy and Environment Council about options for the nuclear fuel cycle, formed a subcommittee for examining technologies for generating electricity from nuclear power and the nuclear fuel cycle[20] (hereinafter referred to as the subcommittee) and set in motion a discussion about the various options. In this regard, the situation in 2030 was assessed as being that set out in the energy framework plan. As a result, the development of fast reactors was no longer even a topic for discussion as there is no prospect whatsoever of them coming into use by 2030. The discussion therefore focussed on reprocessing.

There are three different options here to choose from: to reprocess all fuel rods, to reprocess and dispose of fuel rods in parallel and to dispose of all fuel rods. To date, Japan had been in favour of reprocessing all fuel rods. Any used fuel rods which exceed the reprocessing capacities are stored. Interim storage installations for used fuel rods are in fact currently being built by TEPCO and Japan Atomic Power in the city of Mutsu in Aomori prefecture (conversion of land that was originally purchased to build a home port for the nuclear ship Mutsu), however other energy companies are a long way behind in their activities. If the

reprocessing facility at Rokkasho had been put into operation, then there would be more leeway in terms of time for construction work.

However, reprocessing is cost-intensive and the call for this to be reconsidered is ringing out loud and clear. This has brought the parallel strategy into the picture, which would represent an about-turn in policy, namely approving the commissioning of the reconditioning facility at Rokkasho and at the same time activating direct disposal. Policy had turned from complete reprocessing to a parallel strategy; however as becoming nuclear-free became a political alternative as a result of the Fukushima disaster, the complete disposal of all fuel rods was added as a further option to the measures relating to the nuclear fuel cycle.

What I cannot get out of my head in connection with this discussion is the reprocessing facility in Rokkasho. Construction on this facility began in 1994 and testing has been running since 2005, however today, eight years later, it still cannot be put into regular operation because problems have occurred with the vitrification process in which the highly radioactive wastewater is mixed with glass.

At a convention in 2005 in which the outline of the nuclear policy was sketched out, a summarising assessment of the policy regarding the nuclear fuel cycle was drawn up comprising ten aspects.[21] This assessment was made at the stage before test operations had commenced at the reprocessing plant. This was the first comprehensive assessment carried out because Eisaku Satō, the governor of the Fukushima prefecture, was pressurising the government to perform a U-turn on its reprocessing policy. To summarise the results of this discussion briefly and succinctly, the costs of reprocessing are indeed high, however if this process were stopped then relations with the Aomori prefecture, the local independent government bodies, would worsen and there would then be a requirement for the used fuel rods stored at the Rokkasho reprocessing facility to be returned to the respective nuclear power stations (in the view of Shingo Mimura, governor of Aomori prefecture), which would result in the nuclear power stations not continuing to work. Therefore the conclusion was reached that in order to avoid this scenario, there was no other choice than to continue along the reprocessing route.

The same basic discussion was also held at this point. Only this time, governor Mimura let the issue escalate further by threatening to refuse to accept returned, reprocessed, high and

low-level radioactive waste at Rokkasho not only from the nuclear power stations but also from the UK if the reprocessing facility at Rokkasho was shut down. Furthermore, he claimed that if the government were to adopt a nuclear-free policy and reprocessing were suspended then this would cause Japan Nuclear Fuel Limited (JNFL) to go bust and the government would have to take responsibility and bear the costs for this.

The subcommittee summarised the pros and cons of the 3 options and submitted its report to the Japanese Atomic Energy Commission (JAEC). On request, the JAEC held a consultation about the fast "Monju" reactors with electricity producers, reactor manufacturers and the MEXT which provisionally arose out of the discussion of the options, and a decision was made to prepare a draft with options which comprised the continuing of research and development for these reactors (21 June) and reported on this to the Energy and Environment Council[22].

The difference between the three options is the percentage of nuclear power. In the case of a withdrawal from nuclear power (the subcommittee approved the withdrawal for 2020) neither reprocessing nor the development of fast reactors would be an issue. In the case of the 15% scenario, the parallel strategy of reprocessing and disposing of used fuel rods has good prospects, and in the 20-25% scenario there are good prospects for either the parallel option or the complete reprocessing of all fuel rods. The Japanese Atomic Energy Commission appears to have planned an agreement between the ministries and authorities and the companies, and to take into consideration the interests of the Aomori prefecture under the assumption that the 15% scenario is chosen.

The interesting thing with this discussion is that it has become clear that the parallel route of reprocessing and direct disposal has good prospects as a political measure and that, over and above this, it is assumed that research will soon begin into direct disposal. Moreover, concerns have been pouring in that the previous policy in which all used fuel rods were reprocessed was not rational. This signifies a change in policy from the previous route of complete reprocessing.

The following proposal was added to the report of the Japanese Atomic Energy Commission (JAEC) on request: "Within the next few years, a comprehensive evaluation of the management and administration methods used in connection with activities relating to the nuclear

fuel cycle whereby not only Japan Nuclear Fuel Limited (JNFL), but also the Japanese organisation for nuclear research and development (the Japan Atomic Energy Agency) should be investigated as part of the study." Given that the viability of reprocessing is being called into question, this proposal carries great significance. The result of a comprehensive evaluation will probably lead to the conclusion that reprocessing is considered not to be viable.

In the options set out by the Energy and Environment Council, reprocessing would cease in the case of the zero scenario and reprocessing alongside direct disposal would be possible in the other scenarios. The proposals were submitted in a form relating to the options for nuclear power stations. The consequence was that the discussion regarding nuclear fuel cycles became mixed up with that regarding the options for nuclear power stations and ended without having been discussed as part of a national debate. In regard to the nuclear fuel cycle, the New Strategy adopted by the Energy and Environment Council states that as far as the Aomori prefecture's involvement in national policy is concerned "we are giving it due care and attention" and "while we continue to argue about reprocessing activities, following the previous path, we, the government, will in future hold a responsible discussion whereby we will endeavour to communicate with the local authorities in question, starting with the Aomori prefecture, in addition to the international community." This New Strategy also states that research into direct disposal will be taken up on this basis and that in regard to the fast "Monju" reactors "a time-limited research plan will be drawn up and implemented and, once a positive result has been affirmed, the research will be concluded". In other words, the government had no choice but to accept reprocessing as it might lead to diplomatic problems if the Aomari prefecture refused to accept returned, reprocessed waste from abroad.

The same can also be said of the USA. Once the decision to withdraw from nuclear power was made, someone obviously went to the USA to explain the decision; however this was followed by the news that Japan was advised by the USA not to withdraw from nuclear power and to continue with reprocessing (production of surplus plutonium). In actual fact this represents a contradiction. The solution should have been to strive towards being nuclear-free in the 2030s.

Citizens' groups naturally think that Japan should pull out of reprocessing, however the government conversely seems to be trying to find a solution by approving construction of the

Ōma nuclear power station. This power station can be operated using a 100% MOX fuel core. In other words, fuel containing plutonium can be used in the entire reactor core. Around a quarter of the plutonium recovered in the reprocessing facility could be used at this nuclear power station. If the capacity utilisation of the reprocessing facility sinks, then the balance of plutonium consumption can easily be maintained. The Ōma power station was under construction when the Fukushima disaster occurred but this was then suspended as a result. Construction is 36.7% complete and is still in the starting phase. However, in September 2012 the Minister of Economy and Industry, Edano, stated that there was no law to cancel the construction of a nuclear power station if this construction has already been approved and argued his opinion that this construction project was not a new build. Construction work recommenced in October. However, inspections were carried out in line with the new safety measures and it emerged that additional safety measures were required.

It is fair to say that the discussion regarding the options for the nuclear fuel cycle held by the Japanese Atomic Energy Commission (JAEC) opened the door to the direct disposal of used fuel rods. After all, the METI has included research for direct disposal in its draft budget. It is hard to imagine the Rokkasho reprocessing facility commencing operation with the capacity disclosed to the public (processing of 800 tons/year). Furthermore, the construction of a facility to process MOX fuel elements for thermal use in a light water reactor has only just started and it is possible that changes to planning will be required in line with the new safety criteria. The cost issue of reprocessing is closely linked to the problem of liberalisation in the electricity industry and will therefore become extremely difficult to shake off. Thus, the tendency to move from reprocessing to direct disposal will not change even in the event of a change in government to the Liberal Democratic Party.

As the path for the “Monju” fast reactors – to summarise the results following a 5 to 10 year research and development phase – had been determined prior to the disaster, nothing would change in this regard either in the event of a change of government. And in regard to fast reactors that follow on from “Monju”, a joint development project based on a collaboration with other countries might be worthwhile.

Coordination of important political measures in secret meetings

In regard to the meetings of the subcommittee, the *Mainichi Shinbun* declared in an exclusive report that agreements on the issues being discussed were being made in secret meetings (24 May 2012). Shunsuke Kondō, chair of the Japanese Atomic Energy Commission (JAEC), explained that these were study group meetings and Tatsujirō Suzuki, chair of the subcommittee referred to these as "working group meetings". While the subcommittee had held 15 meetings, apparently 23 of these "secret meetings" had taken place. Present at these meetings were, on nearly every occasion, some of the committee members but also electricity supplier Japan Nuclear Fuel Limited (JNFL) and other parties which is why it was impossible to avoid these being labelled "secret meetings".

For example, on the day on which the local government had been approached with a request to recommission the Ōi nuclear power station (24 April 2012), a meeting of the forum charged with drafting new underlying features was due to take place and at this time there was a desire to discuss the symbiosis between nuclear energy and local governments; however the draft law for this was postponed for political reasons which might have been the result of a secret meeting. In addition, counter measures against the opinions put forward by members of the subcommittee were also discussed at these secret meetings. Even unofficial commitments to the parallel implementation of reprocessing and direct disposal were obtained at these secret meetings from the parties involved. Moreover, the fact that written opinions from subcommittee members were also distributed at these meetings prior to their publication represented an illegal action which deviated from the handling set out in administrative documents.

The collusion between the Japanese Atomic Energy Commission (JAEC) and companies is deeply rooted. What has become clear to the author and others as a result of discussions held with the JAEC since the "secret meetings" were exposed is that shortly after the ministries and authorities were reorganised in 2001, the secretariat of the nuclear energy commission took on employees seconded from energy suppliers and entrusted them with specific tasks relating to nuclear energy. This was justified on the basis that the administration would not have been able to function otherwise.

After policy had been made through the system of collusion involving bureaucracy, business organisations and the Liberal Democratic Party, the Democratic Party, which had prioritised debureacratisation, came into power. Since them some changes have been evident. The

methods of appointing members to the advisory committee in connection with the options for generating energy and making decisions through national debates can be seen as a sign of change. However, the fact that the orientation of political decisions within the Japanese Atomic Energy Commission (JAEC) is still, unchanged from before, being determined and adopted by representatives of the interested parties in meetings held behind the scenes has now been exposed. A feeling of mistrust in regard to the work of the Japanese Atomic Energy Commission has spread among the public and has become deeply entrenched as a result of the Fukushima disaster.

In response to these secret meetings being exposed, the New Strategy states that "Nuclear energy policy is set out under the central leadership of the Energy and Environment Council. As far as the Japanese Atomic Energy Commission is concerned, we consider its function to be to review the peaceful use of nuclear energy, however we are creating a framework for its methods to be reviewed and once again are thinking seriously about dissolving or reorganising this body."

Even though the revision of the underlying features of nuclear energy policy, which had been underway since December 2010, was recommenced following a six-month pause resulting from the Fukushima disaster, it was suspended again as a result of the issue with the secret meetings. It was ultimately halted entirely without it again being taken up as a response to the New Strategy.

The future of the Japanese Atomic Energy Commission (JAEC)

Within the National Policy Unit (NPU), an "Expert forum for reviewing the Japanese Atomic Energy Commission"[23] was created on 31 October and this review was commenced. The author was appointed as a member of this forum and was involved in its work. The forum met on 6 occasions and finished its work on 12 December with a summary of its "underlying thoughts".

What left a particular impression on me at the start of these meetings was the fact that the Japanese Atomic Energy Commission had no authority whatsoever. Many readers may view

this commission as an organisation that decides political measures, however, in reality that seems not to be the case. Commission members had in fact already admitted that they had no authority both in a meeting of the forum charged with drawing up underlying features at which the problem of secret meetings was discussed and also later when the author was introduced to Mie Asaoka (representative of the climate network and lawyer) and Masaru Kaneko (professor at the faculty of economics at Keiō University), however this issue had now become public knowledge. In reality, political decisions relating to electricity generation, reprocessing and other business issues were decided by the Ministry of Economy, those relating to research and development by the MEXT and those relating to the use of radioactive radiation and similar issues by the Ministry of Agriculture, Forestry and Fisheries and so on, in other words by the relevant government departments and authorities. The Japanese Atomic Energy Commission puts together the information for these. It is conceivable that the leading role the JAEC plays at the start of the process to develop nuclear energy was larger in the past, however it might be seen that this role basically ended in the course of the reorganisation of government departments and authorities that took place in 2001.

The report examined each individual task falling under the responsibility of the JAEC and divided them into tasks that it should continue to perform and tasks that can be transferred to other government departments or authorities, etc. One task which it should continue to perform, in the unanimous view of the forum's members, is to safeguard the peaceful use of nuclear energy. This also includes political measures relating to the nuclear fuel cycle including the enrichment of uranium.

The Japanese Atomic Energy Commission has been appointed the guardian of peaceful use. In order to increase transparency, in particular in regard to the use of plutonium, it has disclosed the amount managed in kg units and actively supported the policy of not holding surplus plutonium for which there is no planned usage. It is essential that it continues to perform this task faithfully. This is because synchronously with the enactment of the law regarding the establishment of the Nuclear Regulation Authority, which resulted in laws and regulations relating to the same being amended, a change was also made to the fundamental nuclear energy law. Among its aims the words "contribute to the safety of our country" were amended to make it clear that what was meant was the protection from nuclear material. This explanation could, however, depending on who is in government, be changed to take on

a negative meaning. The current Japanese Nuclear Energy Commission is in fact threatened with being dissolved, however this action must not lead to the public promise made to the international community not to hold surplus plutonium being withdrawn. The following thoughts occur to me: the fact that the forum's members were in such agreement that the safeguarding of peaceful use should be a task to be continued might be due to a sense of crisis among its members that the situation might get worse.

Incidentally, the Ministry of Foreign Affairs has no respect for the activities of the Japanese Atomic Energy Commission with regard to the use of plutonium. It assumes that it is sufficient to publicly disclose the amounts required by the International Atomic Energy Organisation (IAEO), i.e. in 10kg units. The author has made repeated enquiries to the Ministry of Foreign Affairs as to why it does not respect the activities of the JAEC and publish the amounts in kg units, however I have ultimately not received a clear answer. However, I was successful, thanks to the support of committee member Yamaji, in eliciting a promise from the Ministry to look into publishing amounts in kg units. The fact that the Foreign Minister has formed hardly any research committees behind the protective screen of diplomacy and is displaying a distinctly passive demeanour in regard to the transparency of political decisions has also left its impression on me.

The shutting down of reactors, the processing of used fuels, processing and disposal of radioactive waste (particularly highly radioactive waste) and other things were also seen as functions that the Japanese Atomic Energy Commission should continue to perform. In this regard, the author was not entirely freed of all doubt. I was hit, in particular, by the suspicion that the Ministry of Economy which holds this position in accordance with the current state of affairs might hope to outsource this cumbersome task.

Public access to political materials and sources plus declarations made internally and externally were found to be "necessary from now on", however declarations made internally and externally are vital for all government departments and authorities. Public access in this context means that the Japanese Atomic Energy Commission collects and compiles information from all government departments and authorities. In reality, it is practical if the materials are available, however it is perhaps not possible to go so far as to say that the JAEC should retain this task. It is therefore then a case that it "is necessary from now on, but not stated, that it would be reasonable for the JAEC to transfer this task. The task of coordinating political

measures between all government departments and authorities is indeed connected to public accessibility however it has lost its original sense and, together with the associated costs, is now just a formality."

The drafting of the fundamental guidelines for nuclear policy, i.e. the drafting of its underlying features, was considered to be unnecessary and it was considered appropriate that the bodies that review all energy policy also deal with nuclear policy. Under the Democratic Party government, the system is that the National Policy Unit makes decisions on nuclear energy policy, however if no underlying features are drawn up then nuclear energy policy falls under the responsibility of the METI. If a system is developed in which the economic bureaucrats adopt all decisions regarding the generation of electricity from nuclear power, then this would trigger a solo attempt by the METI. The solution would be to introduce a system in which the energy framework plan was declared as a discussion point in parliament, however the report does not go this far.

The report also dealt with the problem of a change in the fundamental nuclear energy law. As the intention is to be nuclear-free by the 2030s, the report also features a review of the fors and againsts, pros and cons of the subsidy sections. Put briefly, a proposal was made to delete this, however as no agreement could be reached on this, a weaker expression was used instead. Nevertheless, it is good that this point succeeded in getting any mention at all. The change in the fundamental nuclear energy law was in fact mentioned in the forum to draft new underlying features for the Japanese Atomic Energy Commission, however it has now eventually ended up in a written report.

In conclusion, various proposals were made in regard to its organisational form, such as the proposal for a committee pursuant to Section 8 of the administrative organisation law, the proposal for a committee pursuant to Section 3, the distribution of tasks among the existing organisations and others. The change in the form of the administrative organisation itself represents a major problem which needs to be discussed sufficiently, however, based on the notion that there is insufficient time for dealing with the matter exhaustively (Hiroya Masuda (advisor to the Nomura research institute)), the discussion ended without a reasoned assessment being reached.

The knowledge that the role of the Japanese Atomic Energy Commission had ended had furthermore already surfaced in the news at the time of the reorganisation of government departments and authorities. It might possibly not have resulted in a proposal for a new orientation as a committee under Section 8 with a civilian in the role of chair if the JAEC had continued to play a significant role. The author is of the opinion that during the time until Japan becomes completely free from nuclear energy, a committee pursuant to Section 3 and endowed with authorities should be established and peaceful use, including of the nuclear fuel cycle, should be safeguarded.

The employees in the National Policy Unit were of the opinion that the Liberal Democrat government would consider these "underlying thoughts" to a certain degree. At this point in time, no activities can be recognised in regard to the new government's dealings with the Japanese Atomic Energy Commission. However, the tenure of the current members of the commission expired on 5 January 2013, and now the commission finds itself in a state of provisional extension in which no new members are being appointed. Some measures are certain to be taken in the not too distant future. If the Japanese Atomic Energy Commission is set to be continued then its reorganisation and repositioning in line with the report is essential.

The change in government

All of these changes from the New Strategy to the review of the Japanese Atomic Energy Commission can be classed as a result of the shock caused by the Fukushima disaster. The New Strategy and the drafting of plans based on the same and other activities listed above came about under the government of the Democratic Party and it is also fair to say that this strategy could have been brought to a successful conclusion because the Democratic Party were in power. However, the Democratic Party suffered a major defeat in the elections to the lower house in December resulting in a change in government with the Liberal Democratic Party and the New Kōmei Party coming into power.

At the elections, a large number of parties and candidates pushed for a nuclear-free Japan and this became one of the key issues. Citizens' movements that prioritised the move away from nuclear power submitted proposals for a fundamental law on the withdrawal from nu-

clear power in order to make this a key issue at the elections. We can imagine that these were successful to a certain extent, however, among the election promises there was too big a range of options in terms of going nuclear-free in the 2030s, within 10 years or immediately and so as a result votes for a withdrawal from nuclear power were split.

The catalogue of comprehensive political measures put forward by the LDP[24] (2012) represents a packet of measures published before the elections and within its content it states that: “The ‘principle that safety is paramount’ (including anti-terror measures) will form the basis of future energy policy, and, particularly in nuclear energy policy, technical assessments by the independent regulation authority for the issues relating to authorities, personnel and budget will be prioritised in whatever circumstances”. The current energy policy states that: “with a rigorous examination of all options for energy and the guaranteeing of a reliable energy supply to maintain social and economic activities, we are striving to create an economic and social structure that does not necessarily have to be dependent on nuclear energy. With this in mind we are currently planning to introduce as much renewable energy as possible as our highest priority task and to put as much energy as possible into promoting energy savings over the next three years. In regard to the pros and cons of recommissioning nuclear power stations, decisions will be made on a case-by-case basis and we will aim to have a definitive conclusion for all nuclear power plants within the next three years.” The *Asahi Shinbun* has published the analysis results indicating that 16% of those in favour of an immediate withdrawal from nuclear power and 28% of those who want a gradual route to nuclear-independence voted for the LDP[25].

However, if you look at later news reports you will find statements indicating that the LDP is “not pursuing” a nuclear-free policy (*Mainichi Shinbun*, 29 December). This will no doubt amount to a change in the policy of “striving towards becoming nuclear-free”. The National Policy Unit was dissolved. The energy framework plan was still a work in progress when the new government came into power and is still hanging in the balance. However, as organisations in the steel and electricity industries and other industrial circles have demonstrated considerable resistance against the nuclear-free policy, the energy framework plan is certain to be amended to accommodate these opinions. The committee for policy issues has been left as it was and it seems that the members appointed to the working group for energy policy will be replaced and a review of the energy framework plan will push ahead.

Given that, in spite of everything, the reality that "over half of the population want a nuclear-free society" has not changed, this cannot be completely ignored by the LDP and New Kōmei Party. However, it is premature to think that this government will immediately throw everything on its head and Japan will return to its earlier policy of promoting nuclear power.

The ten reactors at the Fukushima nuclear power station will no doubt be shut down as the LDP members in the Fukushima prefecture are also in favour of the power stations in the prefecture being closed. Even in Hamaoka, it is not possible to suppress the resistance of the local authorities and force through recommissioning of the power plants just because of a change in government. The same also applies to the nuclear power station at Tōkaimura. It is possible that depending on the course of the discussion on active faults, more nuclear power stations will have to be shut down. Someone might now say that new reactors need to be built to replace the number shut down, however this is not the case. As a result of the effects of the Fukushima disaster it is extremely difficult to obtain consent from local authorities to build new reactors.

In any case, the handling of the nuclear power stations at Kaminoseki and Sendai (new construction of reactor no 3), which have applied for building permits, is subtle. The Democratic Party government had said that it would not approve new builds which is what it classed these cases as being. The LDP government are unlikely to continue down this route. All activities on site remain as they were before, however this is perhaps because we are still in the phase in which the reactions of the new government are being fundamentally confirmed. As it is essential that these nuclear power stations meet the new safety criteria they will doubtless be forced to incorporate changes in their planning. The construction costs have been estimated at 800 billion yen (1.37 million kW x 2 reactors) for the 2 reactors in Kaminoseki and 540 billion yen (1.59 million kW x 1 reactor) for the Sendai power station, however, due to the additional measures required by the new safety criteria (for example, the incorporation of valves fitted with filters and the construction of an earthquake-proof control centre as measures for a severe accident (SA)), an increase in construction costs is unavoidable. Focus is now also concentrated on the issue of whether the energy companies will be able to bear these costs.

The feed-in tariff system for electricity generated from renewable energy introduced on 1 July 2012 has proven successful. The METI has reported that in the 2012 financial year an

increase of around 5 million kilowatt minutes is anticipated as a result of this system being introduced[26]. As the new government is endeavouring for this to be expanded as much as possible within three years, the direction in which the development of renewable energies goes will be decided on the basis of how this system is handled during this time.

The METI has set up an expert committee to reform the electrical energy system which started consultations in February 2013 and concluded a report on 15 February 2013[27]. This reported indicated a two-fold reform. The first element comprises the all-round liberalisation in regard to retail. The liberalisation of the energy market which began in 1995 has since spread to bulk-buyers of electricity of over 50kV, however its extension to normal consumers should have been investigated from 2005 but was repeatedly postponed on the grounds that it was still too early for this. Eventually it was decided that this system would be introduced in 2016. A further major reform is to separate electricity generation from electricity transportation. As there was a difference of opinion as to whether this separation should be of a functional or legal nature, a separation in regard to property rights did not make it into the final discussion. Eventually it was decided that this should be a legal separation. The period from 2018 to 2020 has been indicated as an introductory period. At the same time, tariff regulation is also being abolished. This means that regulation on the basis of the calculation of the full costs will be lifted and licence will be given for companies to set their own prices enabling competition to develop more quickly.

According to reports, the energy companies are orientating themselves towards consensus in regard to the all-round liberalisation in regard to retail. In Japan, where electricity generation and electricity transportation are performed by the same energy companies as part of what is known as vertical integration, even if the electricity market becomes fully liberalised there is very little elbowroom for independent power producers (IPP) to enter the market. Therefore separating generation from transportation is an extremely important factor for reform of the electrical energy system. Nevertheless, all nine energy companies are putting up considerable resistance. It is definitely possible that even if the system is introduced, the virtual monopoly of the nine electrical companies will continue to exist.

What I have detected from my experiences as a member of various committees and forums is that the hidden power of the *nuclear power village reaches* into every nook and cranny like a spreading mould. For those of us promoting a nuclear-free future, it is preferable that

the network “Mayors for a Nuclear Power-Free Japan”, which is pushing to go nuclear free and the “Network of Business Leaders and Entrepreneurs for a Sustainable Business and Energy Future” and other people, together with a whole range of people, do not give up trying to bring those culpable for the disaster to justice and expand the circles of their activities so that the memory of the disaster does not fade into the past. In this regard, I am also thinking about the efforts to promote energy saving and to spread the message about renewable energy.

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