Prologue: Why Should We Aim for a Nuclear-Free Society?

INTRODUCTION

The Citizens' Commission on Nuclear Energy (CCNE) was founded in April 2014. As we had planned at the outset, we were able to publish our Japanese *Policy Outline for a Nuclear Phaseout* exactly one year later. This *Policy Outline* consists, as far as possible, of a comprehensive overview of a public policy framework that we, CCNE, believe to be necessary to achieve, in the shortest time possible, a nuclear-free society in Japan. We are confident that we have been able to cover most of the important facets of nuclear power policy. Since this document is an *Outline*, we have, on principle, avoided setting down the details of specific policies, but even so, it has turned out to be a substantial document, larger than would normally be expected for an *Outline*. This is due to the enthusiasm of the authors to produce, as far as possible, a document that is a complete statement of the issue. However, for the convenience of readers who may not have time to read the whole document, we have prepared an executive summary at the beginning of the book. Our hope is that this *Policy Outlines for a Nuclear Phaseout* will be of use as a springboard for discussion when a future Japanese government draws up a "Basic Plan for a Nuclear Phaseout" after the enactment of a "Basic Act on a Nuclear Phaseout".

We do not believe that the contents of this *Policy Outline for a Nuclear Phaseout* are perfect. In the first place, manpower and time restrictions have meant that a number of themes have not been touched upon at all. We would be delighted if readers from a wide range of viewpoints would inform us of their opinions concerning the large number of points at issue mentioned in this *Policy Outline*. CCNE also intends to hold a large number of public meetings, incorporating a two-way dialogue, on the contents of this *Policy Outline*, and we encourage everyone to participate. We welcome, of course, participation by people who are basically in favour of the standpoint of this Commission, but also look forward to engaging in dialogues with people who are opposed to or who are hesitant about the abolition of nuclear power generation, or those who, while sympathising with the direction of a future nuclear phaseout, have concerns about side effects that might accompany an immediate or early decommissioning. Intending to learn from the negative example of the government's rigid nuclear power policies, we believe that it is vital for people who hold differing views on nuclear power to engage in repeated discussion, and we wish to deepen mutual understanding while improving and bringing about a flexible evolution of the contents of the *Policy Outline*. We believe that this holds the possibility of causing the government's nuclear power policies to become more flexible.

Policy Outline for a Nuclear Phaseout consists of a Prologue, six chapters and an Epilogue. In this Prologue, firstly, we indicate our grounds for thinking why we should aim for a nuclear-free society.

In Chapter 1: *An Overview of the Damage Caused by the Fukushima Nuclear Power Plant Accident and the "Restoration of Humanity"*, we firstly give an outline of the characteristics of the suffering caused by the nuclear accident in 12 sections. We then present a multifaceted analysis and evaluation of various aspects of the suffering caused by the accident, after which we offer policy proposals for compensation and support to the victims based on the principle of "Restoration of Humanity".

In Chapter 2: *The Actual State of the Fukushima Daiichi Nuclear Power Plant Reactors and Issues Surrounding the Accident Settlement*, while placing great emphasis on the need to focus fully on investigating the progression and cause of the nuclear accident, which are still not yet well understood, we give an overview of the current on-site state of Tokyo Electric Power Company's (TEPCO's) Fukushima Daiichi Nuclear Power Plants and indicate measures to minimise the radioactive exposure of workers and

releases of radioactivity to the environment. We also propose management and disposal methods for containment of the radioactivity of the reactors.

In Chapter 3: *Treatment and Disposal of Radioactive Wastes*, while calling for the abolition of the main nuclear fuel cycle-related activities (nuclear fuel reprocessing, the fast breeder reactor, and uranium enrichment), from the standpoint of viewing all nuclear materials (including separated plutonium) deriving from nuclear power generation-related activities as "nuclear wastes," we make proposals concerning the nature of the treatment and disposal of these materials. The basic principle in doing this is "just and fair burden-sharing".

In Chapter 4: *Technical Grounds for Keeping Reactors from Restarting*, we clarify that the new safety standards formulated by the Nuclear Regulation Authority of Japan still contain serious flaws from the viewpoint of securing the safety of nuclear power facilities. Moreover, we indicate systematically, in the light of the current inadequate state of disaster control plans, that nuclear reactor restarts can never be accepted due to the difficulties of securing safety.

In Chapter 5: *Steps to a Nuclear-Free Society*, we indicate a roadmap for Japan's orderly withdrawal from nuclear power generation by the enactment of a "Basic Act for a Nuclear Phaseout", based on the national consensus formed during the 2009-2012 administration of the Democratic Party of Japan (DPJ), and along the lines of a "Basic Plan for a Nuclear Phaseout". It goes without saying that TEPCO should immediately undergo legal liquidation (bankruptcy procedures), and we indicate that this is also necessary for the post-accident cleanup and victim compensation and support.

In the Chapter 6, *Defects in the Nuclear Power Complex-Led Decision-Making System and the Path to Democratic Policy Decisions*, we highlight the fact that the established nuclear power policy decision-making mechanism has been dominated by the "nuclear power complex", and the many serious issues that this has given rise to. We then describe ethical principles and a direction for system reform toward a mechanism we believe is most appropriate for democratic decision-making. We also discuss political strategies for the realisation of a nuclear-free society. As the specific contents of these nuclear phaseout policies will have already been indicated in the previous chapters, it will not be repeated again in Chapter 6.

In the Epilogue, we, the members of the Citizens' Commission on Nuclear Energy, state the will and determination we have shared and the tasks we would like to tackle in the future.

0-1 Weaknesses in the Financial Management of Nuclear Power Generation

Nuclear power generation is a private business activity although conducted in Japan as national policy, and it is only possible for power companies to pursue this business under the premise of generous government protection. However, this entails the following economic and financial weaknesses.

(1) A severe accident would result in irreparable losses to the power company. Even the government of a major economic power would be unable to make good losses on this scale. Moreover, external factors such as large-scale natural disasters and terrorist attacks may also result in severe accidents in nuclear facilities.
(2) The treatment and disposal of nuclear wastes is an intractable problem. Downstream costs (the costs of the nuclear fuel cycle back end, and the demolition, removal and decontamination of nuclear facilities) are uncertain, and large cost overruns on the original estimates are also possible.
(3) Nuclear power generation is socially and politically vulnerable to changes in public opinion resulting

from accidents and disasters.

(4) In normal times, the cost of nuclear power generation, if capital investment costs are included, is unfavourable when compared with thermal power plants (coal thermal and natural gas thermal) and other power generation methods (oil thermal has been almost phased out in the main developed countries due to the unprecedented rise in crude oil prices since the turn of the century). With the advance of power deregulation, the financial management risk of capital investment will also be high.

(5) The wishes of an extremely large number of stakeholders have to be respected (for example, the government and local municipalities) with regards to the siting and operation of nuclear power plants, narrowly restricting the freedom of power companies to carry out strategic decision-making in their financial management operations.

Since the pioneer days in the 1950s, nuclear power has attracted high hopes from those involved. They saw it as having great potential for future development as a source of cheap and abundant electrical power, and it therefore became the target of priority investment for power companies. With the oil crisis of the early 1970s, nuclear power achieved rapid expansion under robust national policy support as a substitute energy source for oil, and the position of nuclear power was established in the 1980s as one of the major power sources in Japan.

It is clear that in the background to the expansion of nuclear power in Japan, the political motivation for a display of national prestige in diplomatic and national security aspects was strongly at work. Nuclear power technology, as a symbol of advanced technology, was a virtual *sine qua non* for the world's developed industrial countries. In addition, as a country that did not possess nuclear weapons, Japan was allowed unprecedented privileges (the right to develop and use sensitive nuclear technologies such as uranium enrichment, reprocessing and the fast breeder reactor, for which the risk of diversion to military use is high) by the United States and the international community. Thus there was an extremely strong political motivation to develop nuclear power in Japan.

However, as mentioned above, nuclear power generation has long been a high-risk business for power companies. Naturally, it has also been a high-risk business for the government. Moreover, it also became clear as time went by that the future expectations for nuclear power were greatly exaggerated. Nevertheless, over the years a vested interest group (the nuclear power complex[1]) grew up and, with the passing of time it has become more and more difficult to make choices other than to maintain the current policy line.

The Fukushima nuclear power plant accident occurred right on the extrapolation of that policy line and, as a consequence, a policy switch to a nuclear-free society has become necessary.

0-2 Problems Caused by the Fukushima Nuclear Power Plant Accident

All the nuclear power plants located along Japan's eastern Pacific coastline fell into a critical condition as a result of the Great East Japan Earthquake, which occurred at 2:46 p.m. on 11 March 2011. TEPCO's Fukushima Daiichi Nuclear Power Plant Units 1, 2 and 3 later released large amounts of radioactivity to the environment from their nuclear reactors. Unit 4 also suffered major damage to its reactor building (see Section 2-1). Large amounts of radioactivity were dispersed over a wide area of east Japan, not only

[1] The "nuclear power complex" is a collective term for the individuals and organisations that have a direct or indirect interest in promoting nuclear power, such as those belonging to industrial circles, political circles, bureaucratic circles, academic circles and media circles, and who engage in mutual co-ordination to further those interests. We have decided to use the term "nuclear power complex" to emphasise the analogy with the "military-industrial complex," but the popular term "nuclear village" (*Genshiryoku mura* in Japanese) could also be used if one wished to emphasise the feudal nature of the cultural environment. (See Section 6-1)

Fukushima Prefecture, placing at least several hundred thousand people at risk of exposure to high doses of radiation. Approximately 160,000 evacuees were forced to flee from their hometowns. Moreover, even now [as of March 2014], three years after the accident, roughly 140,000 people are still living as evacuees [Note on translation: This figure does not include those who took refuge from prefectures other than Fukushima. Nine months after the publication of this report, the figure has not changed much. As of January 2015, Fukushima prefecture officially says that 118,862 Fukushima people are still in refuge. Adding the refugees from other prefectures, the total figure would be roughly estimated around 130,000. See footnotes 9 and 10 in Chapter 1.]. The problem of releases of radioactivity has also resulted in serious international impacts. While the nuclear fission reactions of the reactors themselves have been brought under control, additional releases of radioactivity continue to occur from the nuclear reactor facilities.

This *Policy Outline* will, in principle, use the term "Fukushima nuclear accident" to express this situation, but will also use the terms "Fukushima Daiichi Nuclear Power Plant Accident"[2], "Fukushima nuclear disaster"[3], and "Fukushima seismic-nuclear disaster"[4] when necessary.

This Fukushima nuclear accident has resulted in great suffering and damage, which are still ongoing, and will continue for a long time into the future.

A detailed overall view of the damage will be given in Chapter 1, so only a simple enumeration of the characteristics of the impacts that have arisen as a result of the Fukushima nuclear accident will be given here, in order to indicate the gravity and multifaceted nature of the damage caused by the accident.

(1) A nuclear power plant earthquake disaster as a part of a complex disaster has become a reality.
(2) Multiple nuclear reactors were destroyed at one time.
(3) Large numbers of people were exposed to radiation, with the risk of subsequent health effects.
(4) Radioactive pollution to the land has brought about serious impacts.
(5) Radioactive pollution of the ocean is also severe, and the pollution is still expanding.
(6) Various kinds of social divisions and antagonisms have resulted.
(7) A large number of nuclear power plant accident-related deaths have resulted.
(8) A large number of both tangible and intangible assets that once supported the life of communities have been suddenly lost, and the dignity of human beings has been damaged.
(9) There is as yet no end to the accident in sight.
(10) Large numbers of workers, who are being exposed to high doses of radioactivity, are needed to cope with the post-accident cleanup and to bring the accident to an end.
(11) From a financial perspective alone, huge losses have resulted from the accident.

The above can be considered to be the inevitable consequences of any severe nuclear accident. In addition, the Fukushima accident has

(12) the additional characteristic that insufficient and inappropriate disaster responses by the national and prefectural governments have exacerbated the impacts, with the result that the situation remains serious to this day (see Section 1-1).

[2] A "nuclear power plant accident" refers to harm done in general to nuclear power station personnel or local residents due to abnormalities in the plant equipment or human error, etc.
[3] "Nuclear disaster" is a term used to emphasise that immense impacts have been suffered by local society and people as the result of a nuclear power plant accident.
[4] The term "seismic-nuclear disaster" is used to emphasise the point that a broad disaster-affected region suffered impacts from the earthquake and tsunami simultaneous to suffering impacts from the nuclear power plant accident as a result of the earthquake and tsunami, i.e. that the region suffered a complex disaster (see 1-1-1).

0-3 Ethical Disqualifications of Nuclear Power

The impacts of the Fukushima nuclear accident have been extremely grave, and are also of a quality that sets them apart from impacts caused by ordinary natural or human disasters. Nuclear power has long been considered an activity which would result in impacts of an overwhelming scale should a severe accident occur. Further, it has been argued that the equation "risk = scale of impact × event probability" should not be applied to such catastrophic accidents, and that such a risk should not be permitted however small the probability may be.

For example, in *Kyodai Jiko no Jidai* (The Era of Gigantic Accidents) (Kobundo, 1989) Jinzaburo Takagi stated:

> I term the total catastrophe that makes life meaningless in its wake "apocalypse", and I believe that we should absolutely not allow such an "apocalyptic" accident to happen. If we are to employ the concept of probability, then the probability of massive and catastrophic accidents occurring should be held to the minimum, but the possibility of a "downfall" accident occurring must be absolutely zero. That is, any technology that entails even the slightest potential for "downfall" is a "culture of death" of the most extreme nature, and that technology should not be selected for use. (p. 210)

The argument that technology could be banned or regulated on ethical grounds has existed for a long time. At its oldest, the record dates back to the formative period of modern society, but movements for realistic bans or regulation heightened with the coming of the 20th century. Poison gas appeared during the First World War, and atomic bombs in the Second World War, when the indiscriminate massacre of large numbers of people was carried out through strategic bombing, and experiments on the human body were performed on a large scale for medical purposes. Since the birth of the hydrogen bomb (nuclear fusion bomb) in the 1950s, it has become possible to think in real terms about the extinction of humanity itself. These ghastly experiences and the fear of final doom have led the people of the world to reach a common awareness that the use of such weapons of mass destruction, with nuclear weapons at the top of the list, is opposed to humanitarian principles. These movements can be understood as the forerunners of efforts to ban or regulate powerful technologies according to ethical judgments. The 1979 Three Mile Island and the 1986 Chernobyl nuclear accidents have given rise to the appearance of people who believe that nuclear power, despite dissimilarities in character and degree, is also a technology that is opposed to humanitarian principles. As we have now come to know through the Fukushima nuclear power plant accident, which occurred against this historical background, the possibility of a "downfall" accident is in fact a reality, and the view that nuclear power is incompatible with human society has become influential. From this viewpoint, regardless of how superior nuclear power generation may be in terms of economy or the provision of a stable power supply, its use is ruled out on ethical grounds.

On 30 May 2013, the report entitled "Germany's energy transition—A collective project for the future", was submitted to Chancellor Angela Merkel by the "Ethics Commission for a Safe Energy Supply". Precisely as suggested by the title of the Ethics Commission itself, the report incorporated an ethical viewpoint as an essential component of its argument. The basic premise of this report is that the scale of impacts from a severe nuclear accident are immeasurably large, and since the dispersed radioactive materials would also force burdens on future generations, nuclear power was therefore impermissible from an ethical point of view.

Its use should thus be permitted for the limit of a decade, until an energy transition strategy that is environmentally, economically and socially favourable can be successfully implemented. The report thus came to the conclusion that, from the perception that there was strong potential for a successful energy transition strategy in Germany, it was reasonable for all nuclear power plants to be shut down within ten years. We share this ethical position. Nonetheless, having experienced the horror of the atomic bomb, and now experiencing the ordeal of a severe nuclear accident, it is appropriate that Japan's ethical judgment on nuclear technology be even more firm and precautionary than Germany's. CCNE believes that it is Japan's historic duty to work toward the construction of a nuclear free society, and, as we shall explain below, we believe that this is achievable. This resolve would make an immeasurably great contribution to international society given the current environment in which countries in Asia and the Middle East are now planning to introduce nuclear power plants for the first time.

0-4 NUCLEAR POWER PLANT SHUTDOWN BY LEGAL MEANS

The following two policy options appear to be available for shutting down nuclear power plants: (1) removal of government protection and support policies, and (2) nuclear power plant shutdown by legal means. We believe that Japanese society should choose the policy option of (2) "nuclear power plant shutdown by legal means".

The realisation of a nuclear phaseout would also be possible, of course, if the neo-liberalistic reform of (1) "removal of the government's protection and support policies" were to be decisively carried through. What is meant by neo-liberalistic reform here is the removal, to the greatest extent possible, of laws prohibiting the free market activities of private corporations and the termination, to the minimum extent possible, of government interference in the market. Under this regime, the golden rule is liberalisation, privatisation and competition in the marketplace, and the framework of "national policy with private management", in which private corporations obey government commands, could no longer exist. All activity would take place according to the "self-determination and self-responsibility" of private corporations. Taking into account the high-risk nature of the business aspects of nuclear power generation, as already mentioned above, under such a neo-liberalistic reform, nuclear power, especially development and use of the nuclear fuel cycle, would become a huge burden for the power companies. Other than to attempt to prolong the life of existing nuclear power plants, it is difficult to imagine that there would be any incentive for power companies to pursue nuclear energy. Furthermore, if power companies were to judge the merits or demerits of nuclear power plants merely from a financial management viewpoint, there would be the danger that safety would be pushed aside for cost-cutting purposes. This is one of the reasons why (2) "nuclear power plant shutdown by legal means" should be chosen.

At present, as a reward for "national policy cooperation", nuclear power business is operated under the premise that the government will shoulder all financial risks related to nuclear power generation, and the sudden withdrawn of this support would be a nightmare scenario not only for the power companies but for all those that have had a vested interest in the promotion of the use of nuclear power. When considering the fierce struggle and ensuing confusion that is likely to occur in such an eventuality, an orderly withdrawal from nuclear power would result in far less social friction. There is also the merit for the power companies that, provided the cost burden associated with early nuclear power plant shutdown were to be alleviated by the government, they would be liberated from this unconscionably high-risk business.

0-5 Comprehensive Evaluation of Nuclear Power

Of all evaluation criteria, the greatest importance should be attached to ethical criteria. Nonetheless, if there were the danger that shutting down all nuclear power plants would cause serious energy supply problems, or bring about severe losses in terms of the economy or environment, although the construction of new nuclear power plants would not be permitted, it is possible that a judgment could be made that existing reactors should be allowed to operate to provide energy for a transition period. It is from these considerations that Germany has given nuclear power a 10-year grace period. To examine the merits and demerits of such a grace period, it is first necessary to carry out a comprehensive evaluation of nuclear power generation in comparison with other means of power generation. Without this it would be impossible to estimate the impact of shutting down nuclear power plants.

Among the various evaluation criteria, those referred to as "3E"—*E*nergy security, *E*conomy, and *E*nvironment—are considered to be especially important indices. Further, a technology will not be socially acceptable for commercial use unless a sufficient level of safety is secured. With the addition of safety to "3E", this is often referred to as "3E+S". These four criteria are applied to all energy systems, not only nuclear power. At the same time, "security" (sufficient protection against criminal or subversive activities, military attack, and so on) and "safeguards" (monitoring to ensure that nuclear materials cannot be diverted for military purposes) are special conditions for nuclear power generation. With the addition of these two conditions to safety, this is sometimes referred to as "3S". In summary, the important criteria for nuclear power generation are "3E + 3S".

0-6 The "3E" Arguments Totally Undermined

The major grounds for the expansion of nuclear power generation put forward by the government are that nuclear power has superior "3Es". That is, nuclear power generation has been thought to have advantages in stability of supply, environmental conservation and economy. Government documents conclude from this the necessity for immediate expansion of nuclear power, the realisation of which has been used to justify any and all policy measures. The Fukushima nuclear disaster has brought about a definitive denial of nuclear power generation's supposedly superior stability of supply, environmental conservation and economic efficiency.

Looking first at stability of supply, a severe power shortage was brought about for several months in the TEPCO and Tohoku Electric Power Company's regions, the disaster-affected areas, by the Fukushima nuclear power plant accident. Stability of supply effectively disappeared overnight. As it has not been possible to gain consent of the residents of host areas for the restart of halted nuclear power plants, a situation where there is only a slim margin of power supply capacity has continued for three years. When accidents, disasters and incidents occur, multiple nuclear power plants may be shut down at one time, and since restarting operations take time, this may easily lead to power supply instability. Thus the Fukushima accident has highlighted anew the vulnerabilities with respect to the stability of power supply. It is not unfair to assert that of all the main energy sources, nuclear power generation has the worst performance in terms of stability of supply.

Secondly, the advantage of nuclear power from the viewpoint of environmental conservation is that emissions of harmful chemical substances and greenhouse gasses (GHGs) per unit of energy produced are far lower than those of thermal power generation. Nuclear power, on the other hand, involves the risk of large releases of radioactivity to the environment in the case of an accident, and also produces a variety of

radioactive wastes. We can now consider that the question of which is more serious has been resolved by the Fukushima nuclear accident. The discourse of nuclear power plants being more environmentally-friendly, or green, has been transformed into a black joke. It is inevitable that the human and financial burden of the removal of radioactive pollution will be placed on the shoulders of our descendants.

Lastly, with regard to economic efficiency, estimates that purport to show the superiority of nuclear power generation have been published by the government and the power industry, but these are almost totally unreliable. They are meaningless unless they indicate the results of calculations based on actual performance data. Furthermore, the losses due to the Fukushima nuclear disaster are estimated to be at least 13 trillion yen, and this is probably set to reach several tens of trillions of yen in the long term (see Section 1-1-10). This will greatly increase the cost price of nuclear power.

Thus the Fukushima accident has totally undermined the arguments used as grounds to promote nuclear power.

0-7 THE FOUR PRINCIPLES OF SOCIAL REASONABILITY

The orthodox method of arguing the relative merits of nuclear power generation by comparison with other means of power generation is to carry out a comprehensive comparative evaluation through the use of various criteria with "3E+S" as their core. However, one meaningful alternative method to this comprehensive evaluation would be to examine whether nuclear power can be accepted from the viewpoint of social reasonability, as discussed below. Here, nuclear power is examined in the light of the four principles of "safety", "fairness", "justice" and "sustainability".

(1) Safety: Avoiding health effects and environmental pollution from radioactivity should be the most important criterion when evaluating nuclear power policy. All stages of nuclear power, including the construction, operation, accident handling and decommissioning of nuclear power plants, and the management of nuclear fuels from mining of the raw materials to fuel fabrication and waste disposal, should prioritise the avoidance of exposure of both local residents and workers and pollution of the local environment. Research into the health impacts of radiation from a position other than promotion of nuclear power should also be guaranteed, and there must be evaluation and open discussion by general public and knowledgeable people from other fields.

(2) Fairness: From an ethical point of view, it is desirable to have fairness in burdens and benefits across regions and generations. In Japan, however, by shifting the environmental burden associated with the use of nuclear power to locations remote from the beneficiaries, the siting of nuclear power plants and facilities related to radioactive wastes has been pushed forward under the premise of a structure of unfair burdens across regions and generations. This has given rise to a social mechanism that promotes the use of nuclear power while playing down the "negative consequences". We must be very prudent about the introduction, expansion and continuation of the kind of science and technology that forces certain groups of people to shoulder exceptionally large risks. For a concrete realisation of fairness in the shouldering of the burden of environmental loads, the principle should be adopted of having the people who site and operate nuclear power facilities and their beneficiaries shoulder the burdens.

(3) Justice: Justice here means that in the process of policy formulation and decision-making, all stakeholders have adequate opportunities to state their views and the power to make decisions, and that there is transparent disclosure of the information relating to decisions. Further, there must not be any information management or one-sided "PR" from a specific position that overestimates safety. In order to

achieve that, the "fair and open deliberations" should be promoted and various mechanisms should be created to reflect the "voice of the people" accurately in policy formation. In particular, it is necessary that people who may potentially suffer, or who have already suffered, the "negative consequences" of nuclear power use have sufficient right to speak and power to make decisions. The realisation of just disclosure of information and information sharing and just decision-making procedures are indispensable for securing safety, ensuring fairness in benefits and cost burdens, and avoiding distress.

(4) Sustainability: Production and consumption that is premised on a limited global environment requires moderation, and resource depletion and the accumulation of pollutants must not be foisted on future generations. If the use of the science and technology of nuclear power is continued, it will bring about huge, long-term risks for people's daily lives and the environment on the scale of several tens of thousands of years, and impose upon them the onerous burden of management of those risks. Changes that make it difficult for future generations to continue to live must not be created on Japan's soil or anywhere on the Earth. The use of nuclear power, which involves pollution, the possibility of accidents, and radioactive waste must be considered with these points in mind.

The above four principles are all ethically important and can be referred to collectively as "social reasonability".

Of these, (1) and (4) are included in "3E+S", but since the viewpoint of social reasonability differs from the viewpoint of the comprehensive comparative evaluation, there is no serious problem about having an overlap in some of the aspects to be considered.

0-8 The Problems of a Tight Power Supply-Demand Balance and Cost Increases

When evaluating the impact of decommissioning nuclear power plants, it is necessary to consider the issue of the risk of a tight power supply-demand balance. The risk of a tight power supply-demand balance is that the shutdown of all nuclear power plants could result in a critical situation for power supply stability. If this risk is seriously large, the merits of immediate shutdown of all nuclear power plants need to be reconsidered.

Looking at the actual performance during the three years following the accident, we cannot necessarily say that power supply stability itself has experienced any serious crises. The concerned increase of coal thermal did not take place, but a large-scale rise in the use of oil and natural gas was necessary to avoid power shortage in the summer and winter of 2012 (with 2 nuclear reactors in operation), the summer of 2013 (also 2 nuclear reactors in operation) and the winter of 2013 (all nuclear reactors shut down) [translation note: the 2014 summer also successfully went without any nuclear reactor in operation]. Even if all of Japan's nuclear power plants remain shut down for the next several years, there will be no power shortage provided thermal power plants are operated at a high capacity factor. A further margin of safety would be available if a number of up-to-date (i.e. high-efficiency) thermal power plants were constructed.

At the same time, as discussed in detail in Chapter 5, the cost of burning increased amounts of fossil fuels has a certain economic impact, but this cannot necessarily be said to constitute a serious macroeconomic issue. To defray the added costs associated with the shutdown of nuclear power plants, it is possible that laws could be enacted to grant state compensation to power companies and others in the case where the use of nuclear reactors and nuclear fuels, which are private assets of the power companies, were banned. It is possible that this would amount to a huge sum of money. We believe that it is appropriate to pay this

compensation to achieve the immediate closure of all nuclear power plants, but it is first crucial that a national consensus be achieved and a political decision be made to opt for a nuclear-free future. The merits and demerits of a grace period should be left to a subsequent national debate.

0-9 POLICY REFORM THAT REFLECTS THE WILL OF THE PEOPLE

To realise a nuclear-free society, it is indispensable that the will of the people exercise persistent and robust political influence. The result of the national debate in the summer of 2012, during the Democratic Party of Japan administration (2009-2012), and according to later opinion polls in the mass media and elsewhere, it appears that the majority of the people of Japan are in favour of a future nuclear phaseout. Unfortunately, the coalition administration of the Liberal Democratic Party and the Komeito Party (2012-20015+) are not formulating nuclear power policy in a manner that respects this national public sentiment. This situation could be altered if a wide range of people from all sectors of Japanese society were able to exercise powerful political influence. The way could then be opened for the enactment of a "Basic Act on Nuclear Phaseout". Several ideas for strategies to achieve this goal are discussed in the Epilogue. We hope you will find them informative and useful.

0-10 OUR VIEW ON THE NUCLEAR RESTART ISSUE

The nuclear power plant restart issue is certain to be the most serious controversy surrounding Japan's nuclear power in 2014. On this matter, we believe that restart should not be permitted even for nuclear power plants that have been judged as passing the screening for compliance with the new safety standards issued by the Nuclear Regulation Authority (NRA) (the so-called "restart screening"). Our grounds for believing this consist of the following four points.

Firstly, in their current state, the new safety standards themselves are extremely deficient. Especially important is that, since the causes of the Fukushima nuclear power plant accident have not yet been clearly determined, there is uncertainty about just where the former safety standards (regulatory criteria) went wrong, and therefore it is impossible to judge the adequacy of the new safety standards. (See Chapter 4 for a detailed discussion.)

Secondly, we find it impossible to believe that in the event of a severe accident the countermeasures will function effectively to control impacts on local residents and people throughout Japan to a minimum. (See Section 4-8 for a detailed discussion.)

Thirdly, the victims of the Fukushima accident are even now being forced to endure a very harsh daily existence. This signifies that in the event of further severe accidents, the compensation and support for the victims will remain at an exceedingly inadequate level. It is inappropriate to allow resumption of nuclear power plant in such a situation.

Fourthly, following the Fukushima nuclear power accident, it would appear that the majority of the people of Japan believe that Japan's future nuclear power generation should be phased out to zero, but political decision-making is not being carried out in line with the view of the people. To push forward towards nuclear power resumption in such a situation is to attempt to gradually enforce a reinstatement of the position of nuclear power as it existed before the Fukushima accident without first gaining a national consensus on the end state of Japan's nuclear power. We find this totally unacceptable.

0-11 Realisation of a Nuclear-Free Society is not Difficult

The proportion of Japan's energy provided by nuclear power generation was around 10% at the turn of the century, and this has greatly decreased since the Fukushima nuclear power plant accident. Provided the loss of this power supply is balanced out by other means, then a phaseout of nuclear power plants is not something that is hard to achieve.

It is thought that a natural decline in energy consumption will take place in Japan's society in the future. Among the causal factors of this are a declining population, the phasing out of highly energy-intensive manufacturing industries due to deindustrialisation, demand-side economising due to the rising prices of fossil fuels, and consumer thrift due to declines in household income (not national income), and so on. It can be estimated that within the next dozen years or so the loss in power supply caused by a nuclear phaseout will be balanced out just by this natural decline alone. At the end of the 1960s, critiques of rapid economic growth appeared in Japan, as elsewhere, and the newspapers were full of slogans such as "Get lost, GNP!" This criticism of economic growthism still holds a certain impact today, having been taken over by the ecology movement and others. These were pioneering days, but in recent years it is no longer necessary to get very worked up about energy use since the country has now entered the era of the natural decline of energy consumption, which is expected to continue for some considerable time.

Furthermore, there is still a great margin for the development of energy conservation (for example by improvements in energy conversion ratio and optimisation of energy use) and the expansion of renewable energy. It would be extremely meaningful for the whole of Japanese society to put as much effort into achieving this as possible, because it would also enable the achievement of great reductions in the consumption of fossil fuels. Seen from the citizens' side, the promotion of energy conservation and the trend towards renewable energy is helpful in building the awareness that citizens can exercise direct control over energy production and consumption. This would give citizens not only the power to change energy policy in their communities, but would also lead to citizens playing a central role in actively determining the state's energy policies. The slogan of "large-scale centralisation to small-scale decentralisation", more than just a change in the technological system, expresses a revolution in awareness of citizens who hold the sovereign power to bring about their own energy transformation.