The direction for “Nuclear power and Energy policy” after 3.11
-Six strategies to prevent tragedy again-

The earthquake and consequent massive tsunami that hit the Tohoku and the Kanto region on March 11, 2011 caused incalculable damage. Most notably, the natural disasters were the catalyst of the currently unresolved crisis of Fukushima Daiichi nuclear power plant of Tokyo Electric Power Co. (TEPCO). Fukushima Daiichi fell into a dire situation after all of its power supplies were lost and its reactor cooling systems were knocked out, triggering a core meltdown that emitted radioactive materials into the air.

As we look toward settling the crisis, we submit this paper in order to raise public opinion by instituting direction for the new “Nuclear Power and Energy Policy” and presenting the issues that should be discussed in further investigations.

【 summary 】

1. Exit strategy of nuclear power plant crisis.

Safety is the top priority, as it may take years to cool and confine the reactors, and take centuries to achieve a final resolution to the crisis.

(1) Integration of management by appointing "Chief Nuclear Crisis Officer (tentative name)"
(2) Quick shift to “Stone coffin enclosure method”
(3) Extend the coverage of radioactivity monitoring points (air, water, soil, and food) thoroughly
(4) Complete review of evacuation district and measures based on survey and forecast data.
(5) System for long-term tracking and care for the nuclear exposure victims.
(6) Establishment of a permanent accident management organization.
(7) Review industry damage and take necessary actions.
(8) Compensation by all liabilities and nuclear power plant deposition (about three trillion yen) of TEPCO.

2. Strategy of learning from nuclear power plant crisis

With the aim of eliminating nuclear accidents, not only in Japan, but also in our international society, we should investigate the causes and structure of the accident by establishing an "Accident Investigation Committee". The committee would cover from technology to the policy decision process.

(1) Establishment of an independent "Accident Investigation Committee" that excludes persons concerned and stake holders.
(2) Thorough investigation with no exception even in the area of government policy.
(3) Complete disclosure of information and findings.

3. Strategy to reestablish nuclear power safety administration

Drastic change is essential to the existing nuclear power safety administration since it did not work to prevent the crisis, in spite of prior warnings from many experts and accusations of hiding nuclear accidents. New administration should be independent and must have a new mind set.

(1) Urgent stop instructions to plants that are potential risks in case of an earthquake. (Hamaoka nuclear power plant etc.)
(2) Establishment of independent safety restriction organizations by dissolving existing organizations (Nuclear and Industrial Safety Agency and Nuclear Safety Commission)

(3) Change "Law on Compensation for Nuclear Damage" in order to bear unlimited responsibility covering total risk.

4. Strategy to change nuclear power and energy policy

Current energy policy based on large-scale nuclear power plant construction has been revealed to be completely unrealistic and should be drastically revised.

(1) Immediately freeze new nuclear plant construction (including those under construction) and the nuclear fuel cycle business.

(2) Installation of new energy policy organization which are geared towards environment and open to the public, and the abolition of existing closed organizations (Nuclear Energy Commission, Agency of Natural Resources and Energy, and Advisory Committee for Natural Resources and Energy)

(3) Establishment of a nationwide power transmission company and drastic reform of electric power market.

(4) Set natural energy and energy efficiency (gross reduction) as the core of the policy

(5) Integration of policies for climate change and low carbon society.

(6) National debate on nuclear energy policy for referendum.

5 Strategy for urgent energy investment

As a short-term policy, execute accelerated investment for power supply, temporal nationalization of TEPCO, and renewable energy.

(1) Utilize strategic demand side management, instead of rolling blackout

(2) Concentrated investment for natural energy and transmission facilities and utilization of regional money backed up by public debt guarantee.

(3) Power grid of Tokyo and Tohoku Electric Power Co to be publicly-owned.

6. Strategy for low carbon society and climate change consistent with the reduction of nuclear power.

Set policies for climate change and low carbon society construction as the corner stone of new energy policy. And establish climate change policy consistent with nuclear power plant reduction.

(1) Effective support policy targeting 30% of renewable energy share by 2020 and 100% in 2050.

(2) Energy conservation pulled by demand management and gross reduction of GHG by 50% in 2050.

(3)Planning and announcement of effective strategy for climate change and low carbon society construction consistent with phased nuclear power plant reduction.

1. Exit strategy from the nuclear power plant crisis

During the three weeks since the initial response to the crisis of Fukushima Daiichi nuclear plant aftermath of the March 11 earthquake-tsunami disaster, the responses have repeatedly created new situations: "a new challenge occurred, a makeshift response was then provided, which in turn created another phase in which a more serious challenge occurred".

It will be absolutely necessary to take decades to remedy the worst nuclear crisis in the history of Japan, moreover it is inevitable that this crippled facility will need to be monitored and managed for hundred of years into the future.

On that premise, we propose the following specific measures:

(1) Appointing "Chief Nuclear Crisis Officer (tentative name)" to establish integrative risk management and permanent accident management system

As a long-term response to TEPCO's nuclear accident would be inevitable, we believe that the existing framework of the cabinet initiative will hardly manage to take urgent strategic countermeasure. It is clear that in addition to being an interested party, the TEPCO's poor performance, the Nuclear and Industrial Safety Agency (NISA)'s lack of a sense of responsibility and lack of capacity as a regulatory authority, and the "politician initiative" of politicians without professional knowledge and experience have all worked together to cause reactive, frantic, and confused responses. It must be alarming to the OECD that the regulatory agency, NISA, does not have an independent monitoring system and has analyzed in a reactive manner by fully depending on the data provided by the responsible party, TEPCO.

Therefore, it is necessary to appoint a person as "Chief Nuclear Crisis Officer" with capability of crisis management and strategic thought, and sensitivity to the disaster site. After delegating authority to this person, it is necessary to establish an integrated formation in full cooperation with public sector (NISA, the Nuclear Safety Commission of Japan (NSC), the Japan Nuclear Energy Agency (JAEA) and the Self-Defense Forces), private sector (TEPCO, Toshiba Corp., Hitachi Ltd., the University of Tokyo and the Tokyo Institute of Technology, etc.), international institutions, and research institutions abroad in order to provide prompt and strategic risk management as well as quick response to a nuclear power plant accident.

Considering that frustration and aggrievement over the inadequate information disclosure throughout the nation and abroad was originally a result of the confusion within governance, we believe that integrating Chief Nuclear Crisis Officer with organizations involved in information transmission and management can gradually deal with this frustration.

(2) Quick shift to “Stone coffin enclosure” to end the abnormal situation

At this time (April 4, 2011), despite continuing to inject water into the plant's Nos. 1-3 nuclear reactor and Nos. 3/4 spent fuel pool to cool, the evaporation of water by heat from the melted core and the leakage of water contaminated with high levels of radioactive material in turbine buildings and ocean have been found .

The complete repair cannot start unless the highly radioactive water is discharged. Thus, discharge of the contaminated water is being planned, even though the plant workers would be exposed to the maximum level of radiation. If successful, the operational tests of the recirculation pumps and other equipment may be conducted. However, there is little hope of operation after the hit by the great earthquake, massive tsunami and a series of hydrogen explosions or reactor melt-down. Furthermore, the contaminated cooling water leaking from the pressure vessels and the containment vessels makes it difficult to start repair work under such high levels of radiation.

Continuation of existing measures in this situation will increase radiation exposure risk for the workers and spread more radioactive pollution. Although injection of water is imperative as an immediate measure, the exit strategy must be shifted to a stone coffin enclosure method immediately. Since enormous decay heat is still being released by the Fukushima Daiichi nuclear plant, it cannot be covered by the same concrete stone coffin as the Chernobyl nuclear accident site. Therefore, stone coffin enclosure with resistance to residual heat (metal enclosure or slurry) must be researched and developed as quickly as possible. A world-class team of R&D experiment is vital to develop new measure, because it has never been done anywhere else in the world.

(3) Intense and exhaustive coverage of radioactivity monitoring points and strengthening of forecast simulation and public awareness

The coverage of radioactivity monitoring points (air, water, soil, and food) around the site should be extended as quickly as possible. Providing real-time information from monitoring, continuous predictive simulation can be used in precautionary efforts to minimize collective radiation dosage.

Online monitoring posts should be installed within 100 kilometers radius of the Fukushima Daiichi nuclear plant. Along with conducting exhaustive monitoring of fallout on the surrounding soil, sampling in sea and ground water, sample collection from the upper air and inspection of distributed food should be also conducted exhaustively and systematically. And that information, including predicted data and possible influence, should be provided broadly to the people.

Manpower and materials for those activities should be managed from the nuclear research institution of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) which does not function due to so-called vertically divided administration.

(4) Reevaluate evacuation district and measures with a scientific basis of actual data and prediction, and care of affected people

There is no point carrying out the existing measure of evacuation districts within radium of the site and indoor evacuation districts. This could not only threaten the health and safety of the local residents, but also inflame more anxiety.

Hereafter, new evacuation districts and measures should be reevaluated on a scientific basis of actual data and prediction, and be ensured to implement the new measure as well as provide follow-up and care to the affected people.

(5) Establish a system of long-term tracking, monitoring, and care for the workers and surrounding communities possibly exposed to radioactivity

The plant workers who are bound to have been largely exposed to radiation and the surrounding communities which are concerned for latent radiation influence must be provided with long-term follow-up and care after establishing a system of long-term tracking survey.

Thus, we propose that "Fukushima radiation-exposure certificate (tentative name)" should be provided to the workers and surrounding communities and the certificated people could receive medical treatment with no charge.

(6) Establishment of permanent accident management organization.

The Fukushima nuclear crisis inevitably requires a long timeframe, several decades to settle the ongoing nuclear crisis as well as hundreds of years to manage this crippled facility. Therefore to establish permanent accident management organization to deal with the accident is necessary.

The fund should be managed not only from TEPCO, but also from the government by apportioning national budget for nuclear plant, such as 原子力発電施設解体引当金 【the fund for decommissioning of nuclear facilities】 or the fund spent for fuel reprocessing, given that the existing budgets for nuclear plants such as the budget of the Japan Nuclear Energy Agency (JAEA) that operates the Monju fast-breeder reactor with 200 billion yen annually must be transferred.

As for manpower, usage from the existing organizations like JAEA is fundamental. There is a need to create the governance that clarifies that "Chief Nuclear Crisis Officer" has the top responsibility and authority, and design more functional framework in cooperation with the top class of international research institutes.

(7) Review industry damage and take necessary actions

The Fukushima crisis has brought surrounding agricultural products out of the domestic market. In overseas markets, material industrial products such as iron and steel, or mechanical products and others as well as agricultural products have been forced to be prohibited from import, or else each product inspected solely because it was made in Japan. Some ships with those products were forced to return to Japan when radiation levels exceeded the allowable limits. In another case, some flights and ships were shut down due to dramatic decrease of tourists from abroad. This shows that the nuclear plant accident is threatening Japanese industries in whole and hurting its global competitiveness. It will enormously affect job stability.

Overseas concern over Japanese products could not be eliminated by explaining that they "do not reach the level to affect human health immediately" and the principle of WTO free trade agreement could not be useful. It is vital to conduct the measures (1)-(6) listed above.

(8) Compensation by all liabilities of TEPCO and use of nuclear power plant deposition (about three trillion yen fund reserved for fuel reprocessing) for shortfall

As for the compensation to victims for health and property damaged by the Fukushima nuclear crisis, TEPCO's liability is a major premise as the plant's operator and the government should support the victims.

When the government provides compensation, the fund reserved for nuclear fuel reprocessing (about three trillion yen as of April 2011) must be used as a priority, which is

reserved in Radioactive Waste Management Funding and Research Center (RWMC), in order to cover shortfall. In addition, the subsidies for nuclear facilities should be pulled out as a whole by reviewing the budgets for nuclear related organizations--incorporated administrative institutions or public interest corporations--and allot all other funds, if any.

2. Strategy of lesson learned from nuclear power plant crisis

In order to prevent another nuclear disaster in the nation and abroad, an integrated "Accident Investigation Committee" that covers from the technologies to policy decision process should be established to investigate the cause and structure of the accident. The information gained and findings should be fully disclosed throughout the nation and abroad.

(1) Establishment of an independent "Accident Investigation Committee" that excludes interested party and stakeholders

The investigation for the nuclear power plant accident should not be conducted by law enforcement agency and prosecutors; this is not kind of an investigation designed to find out cause of accident, whether it occurred by accident or design of certain person, nor to prosecute perpetrator as necessary. The integrated accident investigation committee as an accident investigation agency which plays a role to conduct investigation, analysis, adversary and other actions as neutral agency or government agency would identify the structure of the accident in terms of prevention of recurrence of similar accident.

The collusive ties between the government and utilities have hollowed out the role of conventional nuclear safety administration and energy policy/nuclear energy policy, and caused functional failure. This is also one of the human-made disaster factors in this accident.

Therefore, it is necessary to exclude the policy makers who have been involved in conventional policy decision and stakeholders concerned in the selection of members of committee.

In addition, the committee should be controlled directly by the prime minister, because the subject of investigation must include existing nuclear related administrations such as NSC and Ministry of Economy, Trade and Industry (METI). The committee secretariat should exclude any person who belongs to those related administrations and be composed by the people from public and private who are not involved in the existing nuclear administration or nuclear industry.

The new committee would be an organization which has investigational authority such as accident scene preservation, collection of reports, question, entry, collection of goods, requests for the offering of material, preservation of and requests for prohibition against displacement of related accident goods, restrictions on access to the accident site and autopsies. The committee should promote the cooperation with investigating authorities as necessary.

(2) Analysis of the structural cause of accident, covering safety standards framework and nuclear energy policy without exceptions

The accident investigation committee should be requested to analyze the direct causes of the accident, and also, thoroughly examine the hidden fundamental causes of the accident by studying the structural factors without exceptions. This committee should conduct further

investigation into the role of safety standards and that of nuclear power/energy policies as well as analyze the direct causes of the accident.

(3) The complete disclosure of information and findings by investigation

Information and findings gained by the accident investigation committee should be shared throughout the nation and abroad in order to prevent similar accident. Thus, information and findings should be disclosed completely. All information and findings should be translated into at least English to be available for the international society as Global Commons.

3. Strategy to reestablish nuclear power safety administration

The existing nuclear power safety administration received significant indication of a possible nuclear accident which could be caused by an earthquake prior to this accident at the diet and a trial. And it was also revealed that they had hidden a number of incidents. Despite many indications, existing nuclear power safety administration could not prevent the nuclear power plant accident, and they failed at a prompt recovery.
We should abolish the existing nuclear power safety administration since it didn't work to prevent accident, and establish independent safety restriction organizations with all new components.

(1) Urgent stop instructions to plants that are potential risks in case of an earthquake. (Hamaoka nuclear power plant etc.)

Nuclear and Industrial Safety Agency (NISA) endorsed Fukushima Daiichi nuclear plant and Fukushima Daini nuclear power plant to be safe according to new safety standards to withstand earthquakes in June, 2009. However, by this accident, it has revealed that there are many problems with the nuclear power safety administration and the new safety standards to withstand earthquakes.

Fukushima nuclear power plant and a nuclear reactor of the same type in addition to the nuclear power plants that are potential risks in the case of an earthquake and tsunami (Hamaoka nuclear power plant etc.) should be stopped immediately. Then the administration of nuclear safety must be improved radically, and it is necessary to review the safety level and to carry out a back-check.

(2) Set up new nuclear safety administration organization with high independency and complete change of people concerned in order to secure substantial safety

Both Nuclear and Industrial Safety Agency(NISA) and Agency of Natural Resources are part of Ministry of Economy, Trade, and Industries(METI) which promotes nuclear energy, had been questioned about neutrality long before. It is not sufficient to separate NISA from METI in order to set up functioning organizations for nuclear regulation and planning. Nuclear Energy Commission and Advisory Committee for Nuclear Safety also should be reorganized, even though both are independent formally.

"Nuclear Safety and Regulation Committee (tentative name)" should be established like the Fair Trade Commission as a model which has high independency, based on the article 3 of National Government Organization Law with complete change of the people concerned in order to build up nuclear safety administration with discipline and efficiency

and respond to climate change and energy risk. That creates a complete change of the administrative organization of former energy and nuclear administration formation and staff which have been hollow by the collusive ties between the government and utilities.
The existing nuclear safety organizations (Advisory Committee for Nuclear Safety, NISA, and Japan Nuclear Energy Safety Organization) should be completely abolished.
These reforms can establish nuclear safety administration with discipline and efficiency, mature from a safety administration with a "cozy" relationship to the nuclear power businesses, and set up new standards to secure substantial safety and measure nuclear safety by completely independent investigation regulation organization.

4. Strategy to transform nuclear power and energy policies

The nuclear energy policy assuming the construction of a large number of nuclear power plants decided by "Basic Energy Plan" is completely unrealistic. Nuclear power and energy policies must be drastically reconstructed.

(1) Immediate freeze of new nuclear power plant construction and the nuclear fuel cycle business

The construction of a new nuclear power plant and nuclear fuel cycle business should be frozen until a nuclear energy policy and the nuclear energy safety administration are reviewed radically and the new direction is set. All public money for nuclear power plant construction should be used as expenses to resolve the accident.

(2) Installation of new energy policy organization geared toward environment and open to the public

All the existing energy policy administration (Nuclear Energy Commission, Agency for Natural Resources and Energy, Advisory Committee for Natural Resources and Energy) are abolished to clarify responsibility, which have been in defiance of the risk of the nuclear power plant accident and enforced a nuclear energy policy forcibly and closely.
To change energy policy inline with an environmental viewpoint and open to the public, "Consolidated Energy Strategy Council (tentative name)" should be held as an important policy scheme under Cabinet Office like Council for Science and Technology Policy. And "Environment and Energy Agency" is set up under the council as an organization to carry it out. All the members such as experts and bureaucrats who participate in the council are newly appointed excluding the people who have carried out conventional energy policy.

(3) Establishment of nationwide power transmission company and drastic reform of electric power market.

The accident of Fukushima Daiichi nuclear power plant brought to light the weakness of the closed regional electricity business system which has grown by monopoly. Though a power station of West Japan operates stably, it is a problem that the electricity supply and demand of the East Japan is tight. This is caused by a lopsided power grid owned by each electric power company. This problem has been interfering with the spread of

renewable energy for a long time and a fatal defect in the steady supply of the electricity. Assuming that TEPCO will be no longer be capable of restoring its business nor provide even stable supply of electricity on its own, embracing the compensation for Fukushima nuclear power disaster and abolition of reactors, the new electric power policies should be established including separation of power generation and transmission businesses and creation of an open and environmentally conservatory market.

(4) Establishment of new energy policy based on the renewable energy and energy efficiency (gross reduction).

In the future most of the supply of electricity and energy of Japan are made by renewable energy based on regionally distributed manors and energy efficiency which lead to gross savings. In addition, utilizing "Feed-In-Tariff" law which was decided at the cabinet meeting on the same day of East Japan Massive Earthquake Disaster, aiming at accelerated and thorough diffusion of renewable energy and avoiding medium – long term energy risk and climate change risk, will, within the short-term recovery, revitalize the economy in the aftermath of the earthquake.

(5) Synergistic integration of climate change policy and low carbon society vision into the new energy policy

It became clear that a large quantity of energy consuming society and use of the nuclear energy did not create a solution for the climate change policy（global warming countermeasures）. The energy policy should also be pursued in terms of climate change policy, not as "cooperation between environment and economy" which suppresses effective climate change countermeasures based on conventional economy and energy policies. And the energy policy should become mail pillars backing energy efficiency, fuel conversion, and renewable energy enhancement as the mainstream for climate change policy such as emission trading system with GHG gross reduction, and resulting substantial and synergetic integration of these policies.

(6) National debate on nuclear energy policy for referendum

The accident of Fukushima Daiichi Nuclear Plant has been destroying industrial activity of Japan widely and causing fatal damage to export competitiveness of the manufacturing industry and tourism industry. These risks have never been taken into account until now; based on insufficient nuclear power plant construction standard in defiance to the concerns and warnings of scientists about a vulnerability to earthquake and tsunami, and blind trust to the emergency core cooling system it was concluded that an accident would never happen. It is necessary to evaluate an accident risk again now that the destructive power has been made clear, keeping in mind that the severe examination must be conducted, including alternatives of complete withdrawal from nuclear power generation.

Concrete measures should be carried out after having obtained the consensus of the nation to minimize a nuclear energy risk. This also includes discussing revision of the nuclear fuel cycle, abandon of new or additional nuclear power plant construction, gradual reduction of existing nuclear power plant, compensation to the local government where a nuclear power plant is located, and the handling of the nuclear waste disposal

including the high level radioactive waste.

The concrete examination matters are as follows:

- ・A review of the Nuclear Energy Basic Act, the Nuclear Energy Commissions is unified into "general energy strategy council". The law review is necessary in particular for research and development, and promotion of utilization of nuclear power (Article 1).
- ・ It is also necessary to obtain the confidence of the nation about the future direction for nuclear energy policy by carrying out a referendum about the way of the nuclear energy policy from the viewpoint of energy policy.
- ・ Radical review of the nuclear energy promotion plan should be done including a review of the fund for subsidy to nuclear power plant location, money spent from the special account for power sources development. For example, considerable measures will be necessary for the local governments which choose to abolish the reactor of the nuclear power plant ahead of schedule.

5. Strategy for urgent energy investment

Investment for energy system reform could be the main stream to recover economy and society, while minimizing adverse effects to economy by the failure of the power supply policy including the planned power outage and the lack of power supply. And the power grid of Tokyo and Tohoku Electric Power are to be publicly owned so that public fund can be invested in a smooth manor.

(1) **The short-term electricity supply and demand management instead of rolling blackout** The below countermeasures are necessary since electricity shortage continues in the metropolitan area until this coming summer.

- ・ At the supply side of the electricity, thermal power plant currently in a rest condition, private power generation of electricity, power supply from other electric power companies are utilized to the maximum
- ・ At the demand side, Electricity Business Act Article 27(Restriction on Use of Electricity) should be carried out while the lifelines such as public transport or the medical institution are given priority of electricity supply, wide range of voluntary energy reduction is encouraged, and flexible measures should be carried out by utilizing market mechanism of supply-demand contracts like making priority contract in which electricity supply will cut off at peak time and rewards will be paid and compensated by the government.
- ・ Diagnosis for energy reduction of factory and building for business use, and shutdown of over specifications facilities should be done broadly with a well designed plan.
- ・ No rolling blackout is executed.

(2) Concentrated and prompt investment for renewable energy and transmission with utilizing regional money sustained by debt guarantees systems.

Renewable energy should be bound for rapid expansion so that it can create substantial demand in a short term.

・Power grid

- ✓ Investment to expand frequency conversion facilities between east and west Japan from current 1000MW to 5000MW, and aiming at 10,000MW.
- ✓ Reinforcement of power transmission line capacity from Hokkaido and Tohoku to Kanto using High Voltage Direct Current Transmission Line (HDVC) (from current 600MW to as much as 5,000MW)
- ✓ Enhancement of transmission lines and transforming station to avoid bottlenecks in cases where large-scale wind force power generation and photovoltaic power generation will be introduced.

・Renewable energy

- ✓ Set the payment amount of FIT high enough to the extent that investment will be activated, and additional cost (excluding avoided cost) shall be beard as public financial burden.
- ✓ Newly introduced transmission company is obliged to buy renewable energy by priority.
- ✓ For renewable energy power producers who meet certain criteria, the government will provide debt guarantee.
- ✓ Transition to low carbon society and economy should be strategically carried forward and renewable energy industries and energy efficiency industries be pulled by the market.

(3) The nationalization of transmission facilities leading to public investment.

Climate change policies are to be realized by enhancing energy efficiency, fuel conversion and renewable energy.

- ✓ GHG reduction target ; 25% reduction in 2020 from 1990 level and 80-90% reduction in 2050 from 1990 level with domestic measures
- ✓ Primary energy supply target in 2020 should be set without utilizing nuclear power generation, joined by all the stakeholders and newly appointed formation excluding conventional nuclear community members.
- ✓ Climate change policy (global warming counter policy) and energy policy should be aggressively integrated without conditions of mass energy consumption and nuclear power enhancement in the past.
- ✓ Promote strategic transition to low carbon economy and society, and develop renewable energy industries and energy efficiency industries pulled by the market.