



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future
(Kenichi Ohmae Live 579 recorded on March 19, 2010)

Summary

Dr. Kenichi Ohmae, known as Mr. Strategy, previously Chairman of the Japan Atomic Industrial Conference, talks on the Fukushima Daiichi nuclear accident inside out - what is happening and how Japan should cope with it.

What is happening?

The Fukushima Daiichi nuclear (power plant) accident reaches Level 6 (on the international nuclear and radiological event scale). It is worse than the Three Mile accident (Level 5) but unlikely to be devastating as the Chernobyl disaster (Level 7).

The key cause of this disaster was that both the earthquake and tsunami hit the Fukushima Daiichi simultaneously, which damaged all the backup systems and eventually its control facility.

Industrial policy that promoted nuclear energy without due national consensus made the situation worse. First, spent nuclear fuels were preserved in the same facility because an interim storage facility could not be built. Second, too many plants were built at the same site.

Tokyo Electric Power Company (Tepco), the plant operator that has a shameful record of cover-ups, now lacks the capability of managing the problem since it has no nuclear energy experts on its board. Tepco purged them in the past incidents.

The government needs to set up a "Control Tower" with nuclear energy experts to cope with the challenge. The current organisations have not functioned properly. Ministry of International Trade and Industry (MITI) cannot make sound decision because they are the one that promoted nuclear energy. Nuclear and Industrial Safety Agency (NISA) lacks experts that can manage the ground. Academic nuclear experts on the media are



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

not qualified for this role. They are nuclear engineering experts with no experience in designing a plant.

The death toll would rise to tens of thousands as I mentioned right after the earthquake. Japan can no more be proud of its capability of coping with tsunamis and earthquakes. The mega earthquake exceeded every assumptions Japan made. Proceeding for the future, we need to utilise the visual data of one of the largest tsunamis we have ever faced that were obtained for the first time.

Take Action

First of all, we need to secure enough time for the workers to operate near the nuclear plants. However, the radiation leak has made it difficult to do so. Therefore, I suggest that we build a front-line base covered with lead which absorbs radiation. The base would enable us to give more time to work there.

Then, it is urgent that we stop radiation diffusion. However, it will take 3 to 5 years for decay heat to cool down, which means that the risk of radiation leak remains for that period. In this case, a huge tent covering the whole facility would be effective. Since Japan has the most advanced technology in this field, I suggest that we build a tent in 3 months to minimise the risk of radiation.

I suggest that we form an international team of nuclear experts to come up with a global consensus on the cause and solution of this accident. This work would have an impact on not only the nuclear energy policy in Japan but also all others in the global arena. I am willing to lead the team.

Based on available information as of the 19th of March, the government policy to evacuate residents living within 30 km from the Fukushima Daiichi is considered to be reasonable. However, there is no official "control tower" that overlooks the entire evacuation zone, and this should be immediately set up.

There are two measures to secure recovery funds without issuing government bond: 1) Implementing "Disaster Recovery Consumption Tax" for a limited time and purpose only.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

2% increase in the consumption tax would generate 4 trillion yen. 2) Mandatory electricity saving and pricing review on electricity. If the government issue new bonds, then we would suffer from another meltdown, the bond crash.

We should construct a completely new Tohoku district instead of recovering it. In order to minimise the risk of tsunami, a whole new community should be built on the uplands. Turn the lower lands into green and common space. Restore few harbours and have fishers commute from the community area. Change the structure of breakwaters into the flood gate type that prevents flooding more effectively

People are seriously concerned about blackouts due to electricity shortage. But actually the key concern is meeting the peak demand. To smooth out electricity demand, I would suggest introducing summer time (day light saving), working on weekends by shifts, and shifting peak demand in the summer. The other effective measure is to align frequency of the western and eastern electricity companies so that the east can borrow electricity from the west, although it would take considerable time and cost.

[1]

Ms. Nonaka: Ohmae-san, we cannot foresee what will happen, can we?

Dr. Ohmae: Yes, that is true. The damage from the tsunami that hit the Tohoku area of Japan is devastating, but when I think about the near future, I'm very concerned about what will happen to the Fukushima Daiichi Nuclear Power Plant. The world is also watching to see how Japan will deal with this issue.

After the earthquake last Friday (3/11), there was the first hydrogen explosion at the reactor-1 building on Saturday. It has been a week and half a day since then, and I believe that people have a great deal of concern. The situation has become exactly what I predicted last Sunday. The power was completely shut down, so nobody could control anything. There is a central control room between reactor No. 1 and reactor No. 3 that controls both reactors, but it was useless because the indicators did not work correctly.



A Week After the Earthquake

The Current State of the Fukushima Nuclear Accident and the Plan for the Future

The situation is very bad. I said last Sunday that private enterprise should not continue operating the nuclear power plant anymore. I really meant that from a business standpoint. TOSHIBA has been focusing on nuclear power and semi-conductor with their strategy "Concentration in Core Competence", but I would call it "Bad Luck." We're not sure what will happen to Toshiba, but I think this will significantly affect their corporate strategy. I picked HITACHI for today's "Real Time Online Case Study". In fact, Hitachi is also heavily dependent on the nuclear power business, so they will be greatly affected too. Another Japanese firm, Mitsubishi Heavy Industries Ltd. which makes primarily the PWR type of plant will also be affected. What I mean to say is that there will be major impact to this industry.

[2]

Considering the nuclear power plant as part of Japan's industrial policy, nuclear power as a pillar of Japan's export policy, and plutonium-thermal technology as part of the nuclear policy, all these policies might forced to stop due to this incident. The reactor No.3 was an especially famous facility, being a plu-thermal reactor that mixed plutonium and uranium. The impact to the plu-thermal project would not be small. As I described in the Nikkei Business Publications (Nikkei BP), based on my last week's "Ohmae-Live" program about what was happening to the Fukushima Daiichi Nuclear Power Plant, the situation was worse than the Three Mile Island accident. Remember, last Sunday I explained that the grade should be 6. But the Nuclear and Industrial Safety Agency (NISA) said on March 18 that the grade is 5. This comment was shameful for Japan. Other countries have even thought this accident is grade 7. Other countries must think the Japanese government is not telling the truth to the own citizens, and is not trustworthy. We have heard this sort of strong reaction from them. By saying the accident is grade 5, NISA showed they do not understand the nuclear reactor. This incident is spreading far more radioactive materials than the Three Mile Island accident, and is causing panic around the world. But the Japanese government still claims this accident is the same grade as the Three Mile Island accident. In the Three Mile Island case, almost no radioactive material was released to the outside; it stayed within the containment building. Even though a core meltdown occurred, radioactive materials did NOT escape the containment building. The grade is determined by its effect on people. The Chernobyl accident was grade 7, and many people were actually exposed



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

to radiation there. The Three Mile Island accident did not have radiated victims, and only the dairy products had minor radiation reported. So that grade 5 was justified, even though a very serious incident of a core meltdown occurred. But this time, much radiation has already leaked, and people who have been working on-site, such as firefighters, TEPCO employees and Toshiba employees are being exposed to significant amounts of radiation. I am very concerned about their long term health.

[3]

Four years ago, I posted an article to Nikkei BP about the Kashiwazaki Nuclear Power Plant accident (caused by The Niigataken Chuetsu-oki Earthquake in 2007). The Japanese nuclear reactors were able to survive that severe earthquake, which I believe measured around Richter scale 7. However, that was an inland quake. The acceleration reached 3000 gal, which we had never experienced before. It was admirable that Kashiwazaki survived through such acceleration. But I also wrote there were things to be fixed as well. Some of you may remember that.

[4]

In that article I proposed three points that we learned from the Kashiwazaki accident. If TEPCO had accepted my proposals in good faith and adopted them, there would be no problem now. My proposals were as follows. First, there is no doubt that if multiple nuclear reactors are located on the same site, all would be damaged by a single catastrophic event such as a tsunami or an earthquake. Also no external electric power would be available. This is what actually happened at Kashiwazaki. The steel electricity pylons fell down.

Now, at Fukushima Daiichi, the electric power substations located in front were damaged and external electric power became unavailable. The same thing happened. Actually, in the previous case, some of the diesel generators or DG, which were intended as emergency electric power sources, started up and worked. However I pointed out that four diesel engines with dual source systems are NOT reliable as the emergency electric power source for an atomic power plant. I insisted that it is necessary to provide an on-site thermal power station, even a small one, to cool down a nuclear reactor after an emergency shut down caused by an earthquake. A small thermal power station should be operated on site at the nuclear power plant with plural reactors. Nuclear reactors are



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

quite dangerous and need to be shut down when an earthquake hits. It is absolutely necessary to have a thermal power station on site for that reason. Even though the nuclear power plant is equipped with rechargeable batteries, the batteries would only last about seven or eight hours. It is very dangerous if there is no on-site thermal power station. This is what I said in that article.

However, TEPCO did not consider what I just explained. They had 4 years to build. But they did not think about anything during that time. And now, I think they intend to produce electricity from the single electrical substation. They said something about negotiating with Tohoku Electric Power Company to bring in electric power in case of emergency. But Tohoku Electric Power Company itself does not have extra electricity. So, the electrical substation is the only way to produce the electricity. This time, all six reactors were shut down even though three of them were already suspended.

[5]

You see, we can forecast these events to some extent. If they had looked at past experience and done the right thing, and if electricity were supplied, there would be no problem. Actually, the Fukushima Daini Nuclear Power Plant was smoothly shut down and it maintained normal temperature. It was automatically shut down and stopped at the normal temperature because the power sub-systems were working. It meant emergency power was running normally. This time, the Daiichi Nuclear Power plant was drenched by the giant tsunami. Even though this is considered an unexpected event, it is necessary to learn from these events.

[6]

I am making the following proposal to the foreign media. Bring the nuclear power plant specialists from the United States and England and other countries. Then, establish a team of specialists to find solutions by watching the current situation. This team will arrive at a unified opinion on the current issue and announce a solution.

You know what is happening right now? TEPCO is lying, and the Kantei (Prime Minister) believes TEPCO's story. Therefore, American media is reporting that the Japanese government is being taken in by TEPCO and cannot protect its own people. That is why the United States government is acting independently to protect American living in Japan.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

I would call TEPCO, "TEPCO the Deceptive" because they hide the truth when accidents happen.

This problem is part of their corporate culture. Now they have encountered a series of problems and don't know what to do. Overseas media are disappointed with TEPCO's lies and CNN and BCC are exaggerating the worst case scenario. They make the situation appear worse by a factor of 100 to 1 at this time.

[7]

I propose to bring the experts to Japan. I do not mind leading the team if asked because I understand nuclear reactors, the current situation, and have many contacts in Japan with nuclear expertise. As a multi-national team, we will deliver a unified statement on how to deal with the current situation. Currently, there is no consensus between the different countries. The Chinese Government is also flying Chinese out of Japan.

I am keeping my time open for this proposal.

[8]

Ms. Nonaka: The first topic is about the earthquake.

As of today March 18, it has been a week since the earthquake and tsunami struck Eastern Japan. The damage inflicted upon the Tohoku Pacific region of Japan is devastating, leaving more victims than the Hansin earthquake. This is the biggest disaster of postwar Japan.

The damage being reported is increasing day by day. Supply shortages, such as that of fuels, have yet to be resolved. These shortages are critical factors affecting civilian life and business activity in disaster areas.

[9]

Dr. Ohmae: At first, Japanese media said that even giant tsunamis would not kill many people because the Japan has experience dealing with tsunamis and the residents could escape by moving up to higher elevations after the warning alert. However, I said that is wrong and that I was pretty sure the number of victims would reach the tens of thousands. And now it appears I was right, as estimates of dead and missing victims reached 20,000 as of today.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

Again, this earthquake and tsunami has resulted in the largest number of casualties since World War II. While the media reports indicated that the Japanese people managed well and people escaped to higher ground after hearing the warning signals--a situation a bit different from the case in Phuket--in reality, the effect was devastating. Many people were washed away and many are still missing despite desperate search efforts.

All the same, the scale of this catastrophe, in terms of physical damage, shocked the world. This is the first time the world was able to witness live images of a major tsunami from land and from the sky. Observers say this tsunami was completely different from normal tsunamis. For instance, Chilean tsunamis demonstrated the effect of tsunamis from far away hitting deeply indented coastlines and how high the waves could be. The breakwaters in areas such as Sanriku and Ofunato were built based on this experience. However, the tsunamis which occurred in coastal waters this time behaved in unexpected ways. The tsunamis were so powerful they overwhelmed conventional breakwaters and followed S-shaped and L-shaped courses, entering deeply into the inland cities. The world had never witnessed such shocking, petrifying videos. I really want to emphasize that these high quality videos, such as the one of the Natori River from the helicopter, are valuable records which we should utilize for the future.

[10]

Let us think about the new Tohoku district of Japan.

My first proposal is not to restore the area to the way it was before. Instead, create new, secure and pleasant 21st century social communities. If we try to simply restore the area, we could have the same results as in Tokyo after World War II. People looked for their old addresses and some built huts if that was all they could afford. Some of the streets are still too narrow for fire engines.

Many of the people interviewed on TV said they do not want to go back. I believe that those who currently want to go back, would not want to stay upon seeing the reality of the situation. The government states that it is a free economy, so one can do as one like. Everyone will be allowed to go back to the same place. However, many people will have limited resources. It is likely that their earthquake and tsunami damages will not be covered by insurance. Automobile insurance may be the same. Therefore, only those



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

people who have enough money will be able to return to the town. Furthermore, we recognize that buildings must be taller than three stories and must be strong architecturally, such as a ferroconcrete building. This is not practical for everyone.

[11]

Only green spaces and public buildings could be built in the low elevation areas where the tsunami struck. New communities should be built at higher elevations.

Let me tell a story called the "Method of Yanba Barrage." The people in low areas which could be submerged should be relocated to higher areas. I know the low areas because I often motorcycle there. There are many beautiful buildings in the upper areas. The lower areas remind me of the old Japan from the Edo era.

[12]

If we decide to do that, then a big issue would be how to deal with the fishermen. Until last week, they would just walk out of their homes, go to their boats, fish in the sea and sell at the fish market. They would not have thought about commuting to work. After experiencing this earthquake, I conclude that the seawalls built after the Chili tsunami did not work well. In order to deal with an emergency, a structure such as the water gates in Holland is necessary to completely protect fishing ports. However, this solution is too expensive. It is more cost effective for the fishermen to commute to the ports. Due to the cost of protecting the fishing ports, we cannot afford to rebuild the 2,950 ports which were destroyed. We should build fewer, stronger protected ports at sea level and houses for the fishermen on higher ground. This is my revival vision for the Tohoku area which I presented to the Democratic Party.

[13]

If we just let it go for several months, there would be a lot of random development, and pretty soon things would be out of control. You have got to develop a vision as soon as possible. Financial resources will be needed for that, and I would be happy to come up with ideas on how to get the financial resources. Don't even think about supplementary budget or government bonds. Over-issuing government bonds would make the nation melt down. A sharp decline in the bond prices, then a melt-down, and no



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

supplementary budget. You must use more realistic resources. That's what I'm saying.

[14]

Ms. Ohsato: Strenuous efforts are continuing. On March 17, at the Fukushima Daiichi Nuclear Power Plant, helicopters and super pumpers continued to pour water back into the spent-fuel storage pool to re-immersion the exposed fuel rods. TEPCO has also been working hard to restore power and restart the cooling system. However, on March 16, Lapin, Deputy Pentagon spokesman, announced that the U.S. military personnel were to stay at least 80 km away from the Fukushima Daiichi Nuclear Power Plant.

[15]

Dr. Ohmae: The U.S. reaction is inevitable. U.S. guidelines recommend evacuation 50 miles away, a maximum 30 millisieverts (mSv) exposure. On the other hand, in Japan, they see how things go and say "should we go with 10 miles? should we go with 20 miles?" or something like that. The U.S. decided to go with 50 miles by measuring the radiation and they followed their guidelines.

[16]

The reaction of the U.S. is based on their research on Chernobyl. Chernobyl was the Ukrainian border town, adjacent to Russia. There was a south-east wind and the nuclear plant went out of control. The graphite reactor experienced nuclear bursts in that case, and there was a nuclear reaction. The accident at Chernobyl was roughly 500 times the size of Hiroshima, and the wind spread the radioactive debris. Strontium was detected in Japan a week after the event.

In Plyusik province (now part of the Ukraine and Belarus), an area 250 km north-west of Chernobyl, the unfortunate people, especially girls from birth to 5 years of age, were contaminated by iodine. Iodine accumulates in the thyroid gland. These women are now around 25 years of age, and many of them, now at what should be one of the most beautiful times in their lives, are dying. The U.S. set the guidelines based on such data.

[17]



A Week After the Earthquake

The Current State of the Fukushima Nuclear Accident and the Plan for the Future

Fukushima case is different from the accident in Chernobyl, and what had happened to Chernobyl is not going to happen in Fukushima. Using an example from the U.S., there was a fast breeder reactor accident called EBR-2 long before Three Mile Island. A core meltdown occurred at that time. They were not able to predict how far the effect could reach, but they decided 50 miles. 50 miles meant evacuating a million people, an overwhelming number. But the situation settled down while they were discussing the evacuation program. They had a plan, although they didn't have to implement the plan.

[18]

When I designed nuclear reactors, I had to keep in mind all the previous nuclear accidents, so that we could avoid the same mistakes. That was always part of safety engineering 101 for nuclear reactors. The first example in the course was the EBR-2 accident. We learned how to inform people, how to evacuate people, and so forth. Therefore, we can hardly argue over the 80 km stated by a foreign government. On the other hand, the Japanese government does not have a rigid policy. We protect our people, and you protect your people. We need to understand that the U.S. believes they must protect their own people, and that's why they are recommending their people evacuate to 80 km.

However, the Japanese people may start worrying and suspecting that the U.S. government may be the one who is correct. They may leave Tokyo for local districts, or for the Kansai area. I hear that hotels in Osaka are fully booked this weekend. People in Osaka are surprised in some sense. I was in Fukuoka this weekend. When I was there, my wife called to tell me that I should buy D, C, AA, and AAA batteries. I went to Tokyu Hands Fukuoka Station as soon as the store opened, but the battery shelves were empty. No batteries even in Kyushu! We looked around in various stores. No luck.

[19]

Ms. Nonaka: Ah, it is not only happening in the Tokyo area.

Dr. Ohmae: It seems to be happening everywhere in Japan. Looks like there are cases where people buy locally and send to friends in Tokyo.

One of the Koken-Kai members is the CEO of a fishing gear chain called "Point." I asked him to find batteries, but he said they were all sold out in Fukuoka area. Lanterns and



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

iwatani konro (table-top propane gas cooking stoves) are also sold out in Fukuoka.
They are almost all sold out in Kyushu.

[20]

Dr. Ohmae: Japanese people are very quick to react. I noticed the gas station in Suidobashi I passed on my way here had a sign up saying "closed for the day."

Ms. Nonaka: They either have a long line of people or are closed.

Dr. Ohmae: It looks that way. All right. Let's take a look at the accident at Fukushima Daiichi nuclear power plant.

First, the initial earthquake caused major damage to the external electric power plant. High-voltage cables use thick gaishi (insulation). Actually, gaishi don't take earthquakes too well. They were damaged by the initial earthquake. And, inside the plant there was major physical damage in the areas such as motor pumps and pipes. This may explain the cause of water leakage.

[21]

I hear that there is a small water leakage from the pool of Unit 4, and this pool is very simply built, so I suspect that it has been damaged, causing the leakage.

Although it is reported that water was being lost due to evaporation, leakage could be the cause.

Those cooling pools are used for temporary storage. These used nuclear power fuel rods were eventually to be moved to Mutsu-Ogasawara interim storage once the facility had been built. You can't take them just anywhere, so they were being kept in the reactor building for the time being.

[22]

And there was the tsunami with a totally unexpected level of impact that flooded the entire electrical plant. The emergency diesel generator and other things are probably now under water. Here too, bad luck struck, as the generator was located in the basement. It should have been located on an upper floor of the building. It was Murphy's Law: if anything could go wrong, it would do so at the worst possible moment and in the place where it would be most difficult to fix.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

The open inlets are supposed to have negative pressure and are situated facing the sea to take in the air. There was an open inlet where the water surged in on a massive scale through the inlet. I suppose that was the cause of the basement being flooded. I was not there personally, but that would be my guess as to why the diesel generator didn't start up as it was supposed to. It would have been so simple to have placed the diesel generator on an upper level.

As some of you may know, storage batteries for servers or secondary batteries for the data center, which are used to prevent the servers from shutdown, were all placed in the basement. I am pretty sure that is the reason why they were damaged too. The NTT building in Ohtemachi, all of their storage batteries occupy five stories of the building. It is pointless to ask why they could not have come up with the idea of storing the batteries at a higher level after an event like this happens and basements are flooded. All I am saying is that this is a fact.

[23]

The external uptake power supply system was located outside the main building, which is where all the connections were. They say they had expected a 7m (22.97 ft) tsunami, but this was a 14 m (45.94 ft) tsunami, which they said had passed over the main building. When the external uptake power supply was submerged, it caused the power supply system to fail. People might say they should have been prepared for these circumstances, but to be honest, it is very difficult to imagine such overwhelming conditions.

Reactor Unit 2 was not damaged, so Unit 2's emergency power supply was functional. Later, when people are able to get closer to the plant, they can investigate the true cause of the failure of the power supply. At this time, I speculate that the tsunami washed over the plant and the entire power supply system was immersed.

[24]

There is yet another regrettable circumstance. GE produced reactor Unit 1, Unit 2, and Unit 3. GE was the manufacturer, but Toshiba carried out the construction for the installation. The tragedy became apparent here: the reactors were not suitable for implementation in Japan. At that time, 50 emergency power distribution vehicles were



A Week After the Earthquake

The Current State of the Fukushima Nuclear Accident and the Plan for the Future

installed there to provide the electricity used for the construction work. They weren't made for Japan, they were 400V, which does not work here. The next higher level was 6000V. Someone said today that power has finally been restored and electricity will be back by the end of the day. Take a closer look at that layout they showed and it should say 6000V. But the reality is that Japan does not normally use those voltages. But, TEPCO's business is generating and converting the power, whether it is 400V or 6000V, so they didn't take it too seriously.

However, 100V or 200V should have been used so that power supply units for construction can be utilized in an emergency. Now that this crisis has arisen, TEPCO has realized that for the first time. It is like "oops - sorry!" This is one of the many problems TEPCO is wrestling with (I suspect that there are close to one hundred issues).

[25]

Another issue is the electric power substation being located outside. The substation can pull power from an external power supply. The substation is very large. There is only one substation that transmits the enormous quantity of electricity generated by Fukushima Daiichi and Daini to the outside. If there were two or three substations, emergency efforts would have been much more helpful. If a substation could output electricity, it should also be able to input electricity. Since there was only one substation, it failed.

If the disaster was only an earthquake or only a tsunami, there might have been a way of limiting the damage. But both came at the same time. That is what I mean by a unique situation.

[26]

I would like to revisit the multi-reactor accident. Six reactors were having trouble at the same time. Reactor Unit 4 had stopped operating and the fuel inside was taken out and found to have had hydrogen detonation. It was a shocking to find that Unit 4 had hydrogen detonation in its pool. Then it was suspected that hydrogen had detonated in Units 5 and 6, since their temperature rose. All six reactors were having trouble, which means there were not enough people to deal with the problems. As it is widely alleged,



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

there is a maximum of 70 people available for emergency purposes, meaning only about 11 people are available per accident.

[27]

Furthermore, emergency personnel can stay only 7 minutes in the most severely afflicted places. This does not mean they can put in another 7 minutes the next day, because they have already been exposed to the maximum permissible level of radiation for the entire year. Thus, they are facing a critical human resource shortage for emergencies. They are also facing a shortage of space. The existing operations room is woefully inadequate; there are too many accident sites to deal with from a single operations room and they are running out of space.

I am proposing that they build a frontline base entirely covered by lead, which would enable them to operate on-site. There is very little space left at the site, but they need to build a protected area. Since lead is a very effective radiation shield, an on-site operations room protected by lead would provide the necessary facilities.

[28]

Addressing the lack of room to maneuver at the site, they thought about approaching from the ocean side. Accessing the site from the ocean involves climbing up to the top of a 100-foot cliff. This is really a very thorny problem, of which there are many, you know. Reviewing these points I just mentioned, the Fukushima nuclear power plant accident represents the perfect storm-- the case in which all power sources are lost. And the rechargeable emergency batteries last only 8 hours. And this is exactly the unimaginably critical situation that really did arise.

Well, other countries such as Germany are greatly concerned right now, but there is no earthquake, no tsunami in Germany, you know. There is no possibility in Germany that both an earthquake and a tsunami will hit like they did here. Germany is a country that rarely experiences earthquakes, and tsunamis not at all. There is no need to worry about a similar accident happening in Germany. But emotions are driving their thinking, and they are worrying that a similar accident may happen to them. So, it is clear that nuclear energy will face a very tough road ahead.

[29]



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

Well, I will briefly explain the problem that is happening right now. It results out of TEPCO's functional disorder. This is the biggest problem. TEPCO does not have any nuclear power experts on their executive boards. Even though 35% of the total electricity they generate comes from a nuclear reactor, they haven't got a single executive who is an expert on nuclear power. The reason is that at TEPCO, they hate the nuclear power experts; they say "Nuclear guys are liars. They hid the truth. There were many cracks, but they hid them. It is because of them that TEPCO's last CEO had to resign. It is all their fault." That's what TEPCO says. While the nuclear power experts were being made the targets of generalized accusations, they were treated like the lowest of the low. So when the Kashiwazaki-Kariwa accident happened, the reaction was "These guys did it again!" So that was when the ranks of executives were purged of nuclear experts.

[30]

That is why, when the executives of TEPCO show up and explain, they can apologize to the public. It is a global commonplace to start with. But they cannot explain anything about the nuclear reactor. They say, "I cannot explain in detail." So they pass the buck to the staff on site. And their attitude toward the manufacturer! Even though Toshiba formed a great team and sent it to the site, TEPCO treated them as if they were disposable contractors. This is one of the reasons why I quit Hitachi a long time ago. TEPCO regards manufacturers as their subordinates. Even though they rely very heavily on manufacturers, their attitude is something like "You guys, fix this mess!" In March 18 news, you could tell what their attitude is. It is not like "Let's work together as a team." Because manufacturers are just disposable contractors for TEPCO.

[31]

It is a fact that "This company is really rotten to its core," and I have something to say about that. Now they are being punished for their own past behavior - they have been denouncing nuclear experts as bad employees, showing neither regret nor any intention of correcting their behavior. As a result, they are facing a shortage of experts willing to take command right now. And the government is even worse. They organized something called the emergency management office inside TEPCO. They are going to TEPCO, in Hibiya, but none of them have any idea about what is really happening right now! And as



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

for those on site, we cannot expect that they would report all the detailed information to the emergency management office.

I heard that Naoto Kan went out there and yelled out to them--or something of the sort.

[32]

Also, METI, the technical Agency for Natural Resources and Energy, is by definition the industry's umbrella organization. METI is a ministry that wants to promote energy from nuclear power. What can they do in a crisis? They have no organization to work for it. That is why the U.S. said, that is enough. We will follow our own guidelines in taking care of it. 30 millisieverts? Yup: stay 50 miles away. They simply adhere to their guidelines, since they find no commander to follow in the Japanese Government.

What about the Safety Agency? This is the so-called Nuclear Safety Commission. They have no expertise in Nuclear Power at all. The Safety Agency, where bureaucrats parachute to, is just a piggy-back organization. It was March 18 that they declared Level 5. How amateurish! Moreover, the person who energetically conducted the press conferences tightly gripping a hand microphone was working for Patent Office until very recently.

[33]

And another person used to work for the Energy something Development Institute. I can recognize both of them if I look. What such people say is not convincing. If they are the watchdogs of Japan today, something is wrong. It is as if in a battle field, we receive reports from those who have no experiences in battle or military training.

And the Kan Cabinet, which I mentioned earlier, sets the control tower inside of TEPCO. What an absurd thing! Experts are stating their opinions in bits and pieces. Those experts, who come on NHK or various broadcasts, are associate professors of Engineering at some universities. They teach the theory of nuclear reactors. I assume they have neither designed plants nor seen plants, judging from what they say. They are quite knowledgeable about the radiation doses. So if we ask what this is all about or what will happen after this, they do not say more than the information formally released by the government. This is no help and the government looks more or less the same.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

[34]

They have no long-term vision. What will happen after this? Do you understand what will happen if such a situation continues? Foreign communications are dysfunctional too. Now the world is watching CNN or BBC. This is an on-site report of what has happened in Japan! This replaces Japanese spokesmen. The Japanese government takes no action on this situation.

Mass media such as the NHK, commentators, and scholars whom I mentioned earlier are making things worse; as are commentators who repeat the same explanations from morning to night, showing something like a Powerpoint presentation. I have to say STOP: this is causing increasing uneasiness and distrust in the population and creating psychological shrinkage, which will result in the economy eventually stagnating.

A friend of mine said that on March 17, he went out to Shibuya (which normally has a bustling downtown) and found it as vacant as Kanazawa, his home town. This is the situation.

[35]

Oh my Japan! Can this be Japan? This type of unique situation exists. The Sichuan Earthquake was about the same magnitude, but no tsunami followed. There are some places that have had both earthquakes and tsunamis, such as Aceh or Sumatra, but they don't have nuclear power plants. Having a massive earthquake followed by a tsunami in an area where there are nuclear power plants is unique to Japan.

[36]

Multiple nuclear power plants are built in the same location. This is because the local inhabitants were compliant. For example, if towns like Okuma and Futaba (Note: towns near Fukushima Daiichi) agree to build a plant, the residents are offered an additional nuclear power plant. If the residents reply no, then the counter offer is OK, what about if we also build a soccer field for you to practice even when it is raining? The residents reply OK fine -- it's a deal. This is what happened. With these tactics, first up to 6 plants were built, then 10 plants in one location.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

METI, a driver of Nuclear Energy, and TEPCO say that they worked pretty hard to generate electric power for the population. We cannot criticize their efforts. But we just learned for the first time after the disaster how dangerous it is to build multiple nuclear power generators in one place. We also recognized the risk at the time of the incident at Kashiwazaki-Kariwa. Now we understand what it means.

It is for reasons of efficiency that two plants are operated by a single control room. The scaling of the cooling pool is uniquely Japanese in its efficiency. Everyone was surprised that the hydrogen explosion happened in Reactor No. 4. Nobody expected so many fuel rods to be there.

[37]

There should be an interim storage facility. But there are none in Japan. If there is no interim storage facility, fuel should be stored somewhere else after it is burned. But they decided to put it inside the nuclear power plants. A temporary pool was built in each power generator building. The size of the pool is repeatedly increased. All the spent fuel is kept there.

For instance, power plant No. 4 is the 760,000 kilowatts reactor that holds 2 million kilowatts of spent fuel. There is no more extra space available to put the fuel. All of the six reactors have such pools inside the generator buildings and are all filled with spent fuel.

[38]

Why is this? They spent 20 years convincing Kochi prefecture to build an interim storage facility. TEPCO exhausted itself in its efforts, but in vain - no residents assented to their request to build an interim storage facility.

An interim storage facility is used to store spent fuel rods until reprocessing. The spent fuel rods kept in the facility, have to cool down for 10 to 50 years. We situate it deep underground, selecting a place where there are no underground streams. There is the Mutsu-Ogawara facility, which was scheduled to be completed by December of 2010. But it has not started operating yet. Once it starts operating, all the spent fuel rods kept in 6



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

power generator buildings are supposed to be moved to the facility. This is the way it has to be.

[39]

There are about 3000 nuclear fuel assemblies in total from the 6 reactors. A fuel assembly is a collection of fuel rods (pins). Each fuel rod is about 4.5 meters in length, made of a 3.7-meter-long fuel part, top part, and bottom part. Each of the 3000 fuel assemblies is a bundle of fuel rods. When I was working in this domain, each fuel assembly consisted of 6 x 6, that is, 36 fuel rods. And coolant water circulates through spaces between the fuel rods. There are more than 3000 of such fuel assemblies in the 6 reactors at that power plant.

[40]

The used fuel is temporarily stored in a container made of 5mm-thick stainless steel, right by where the reactor is located. It's just like a swimming pool you see at a hotel. One of the fuel assemblies in this "pool" melted partially, and some hydrogen leaked out into the air as a result. If enough of the used fuel assemblies were to melt in the pool, a hole would be created in the bottom of it and the fuel would drop onto the concrete below. You may wonder why this pool is so fragile. It is because the used fuel does not usually stay there for a long period of time. It was built as a "temporary" container. No serious accident was expected to happen.

[41]

If Japan is truly concerned about the safety of its own people, we must stop the use of such temporary containers for used fuel, and stop operating nuclear power generators until a new interim fuel storage facility is built. It is the same thing as a toilet: if the waste from a toilet is contaminating the land around it, take your waste elsewhere. That's what needs to happen. I'd like to remind you that no such policy was created.

Each one of the 6 reactors has a temporary storage pool for the used fuel, and what you see now is that all 6 pools are completely filled with the used fuel. This is why the non-operational #5 and #6 reactors started heating up again when there was no more water to keep them cooled down. The used fuel must stay cool for 10 to 50 years. The interim fuel storage facility is important for that reason. In Japan, there is a nuclear fuel



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

re-processing plant in Aomori prefecture. Used fuel is taken there and processed to be reused as new fuel.

[42]

Now, let's talk about the next steps.

The most important and necessary action as an emergency measure is to keep the nuclear reactors cooled down by pouring water over them. The 3rd reactor is in the greatest danger, but watching the video of the Self Defense Army dumping water over it reminded me of a cicada peeing!

"Shu..." (= sound effect of a spray from a bottle) To avoid radiation, they flew at 90m, but how effective was that? People around the world are making jokes about it. Are the Japanese in their right minds, they wonder. It was the worst scene to be shown worldwide.

[43]

Despite the fact that the water didn't reach the reactor, the heads of the Defense Army said, "One step forward." They always say that whatever the situation is. One step forward. Once you are that close to the reactor, the difference in the amount of radiation in the air is so miniscule, so come one step forward - this is what they are saying?! If power is restored to the nuclear reactor, we would be able to pour water over it with a better, more stable method.

So, how long do we need to keep the reactor cooled down? Probably 3 to 5 years. This is bad. If the top portion of the power plant remains open for the entire 3 to 5 years, nuclear radiation will keep flowing out into the air. I told our government officials this, and they were shocked. They also asked another expert, and he told them, "we are lucky if we can cool this thing off in 5 years." This is what's going on.

[44]

So far, all they can think of is this cicada peeing. Thinking only about today and tomorrow, no one is talking about long-term solutions. Under normal circumstances, we would bury the nuclear reactors under concrete. However, if we were to bury something so hot under the concrete, the concrete would melt and nuclear radiation would seep out.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

We would have to keep cooling down the reactors for at least 10 years, even if we take them to an interim fuel storage facility. Do you understand? The reactors #1, #2, and #3 were operating just fine last week, and now they are under the emergency shutdown. They must be extremely hot.

In these extremely difficult circumstances, what do we do?

I say, a tent or something similar to cover the entire plant, and a refrigeration system implemented inside the tent to keep the water cool. When it comes to utilizing tents for buildings, Japan is one of the best countries. Look at the Koraku-en Dome! Something like that that would serve the purpose well if dropped from the sky to cover the nuclear reactors. If we were to do this, we would no longer need to worry about nuclear radiation blowing in every direction.

[45]

The design and production of this tent will take at least 3 months from placement of the order. Hopefully, the current operation will go well and the reactors will cool down to a reasonable level. At that point, the tent could be installed. At least the tent would stop the radiation from flowing out.

I just happened to call the tent maker, the world's best tent maker, who is in Japan. When I asked "How much is this and how long will it take to make it?". He said it would take about 3 months after order placement. He also said he had same thoughts and was going to make some suggestions. I said "That is as it should be, since you're the expert."

So we just need to cover the reactors with this tent, otherwise the radiation will spread. If we do this, people will calm down. Residents can return home closer to the reactors. This is a very important matter.

There is another serious issue...

[46]

The repair has to take a back seat to installation of the cranes: As you know, the original cranes were blown out. As a result, when the bulk of fuel rods have cooled



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

down, there is no means of pulling them out. Has anyone here ever seen fuel rods being replaced?

First, the lid of the containment vessel needs to be opened; it probably weighs about 150 tons. Again, keep in mind that the original cranes were blown out. Next, there's a shield to the lid of the containment vessel which will need to be removed. After that, the lid to the pressure vessel. All these removal operations are rather complex processes, but will need to be undertaken. After removing all the lids, we can finally start moving the individual fuel rods to the pool, and then move them outside. There are now no working cranes.

In reactor Unit 4, we saw the crane. We can see the crane for fuel rods, but that doesn't mean it works.

In that case, we would have to either fix the crane or install a new one. The reactors that have lost their roofs, especially, will require reinstallation of the cranes.

This must be completed within the next 5 years. Although, depending on the level of radioactivity and the decay of heat, it may calm down a few years earlier. It may calm down in 3 years, and if all goes well, perhaps even in 2 years. However, reactors Unit 1, 2 and 3 had been operating until the earthquake occurred, so they will need at least 5 years, in my opinion.

[47]

In the end, the fuel should be carried out of the cooling pool to the nuclear fuel reprocessing plant in MUTSU. That is to say that if MUTSU accepts it, we will take the fuel to MUTSU. There are several thousand fuel rods at the Fukushima Daiichi plant. We would need to put each of the fuel rods in fuel casks in order to prevent radiation leaks. This operation will be difficult. The reason it will be difficult is because the zirconium-cladding tubes have been damaged; all the rods that have released hydrogen upwards are presumed to be damaged. The fuel rods need to be put in the fuel casks in order to be taken to MUSTU.

The fissionable materials will need to be cleaned up from the reactors, the cooling pool, and so on. So when I said that the nuclear reactors will go bad once seawater is poured



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

into the reactors, that was because in order to re-use the nuclear reactors, everything in the nuclear reactors will need to be cleaned. However, no human can enter the nuclear reactor buildings for a while. Probably not for at least 5 years. Thus, the idea of pouring seawater into the nuclear reactors, in essence, means losing the entire nuclear reactor.

After all that, when everything has been cleaned-up, and no more "warm stuff" exists, we will seal off the nuclear reactors with concrete forever in six years or so, for example, which would result in the gradual reduction of the contaminated areas; we will then declare the remaining contaminated area as a permanent lockdown area. We don't know yet how large it will be. But, in the case of Chernobyl, the 500 villages became completely unpopulated. The 500 villages were abandoned. Though, in the case of Japan, I believe that we'll be better off.

Regardless, this is what we are facing and have to deal with in the days ahead.
Did anyone think it would be anything like this?

[48]

Well, at least the Japanese government was astonished when they heard about this. That is because those guys have done nothing with a 5-year scope.

"Is vapor rising right now?"

"No, it's stopped? actually, no, not yet; it's still rising."

They have conversations like this. As you can see, they aren't at that stage.

Practically speaking, if it can be done with a pump permanently, then the measures I mentioned earlier should be taken.

I never exaggerate. If you see the things written here, you will have no doubt that such measures are required.

Another issue arises, the issue of emergency evacuation.

On TV, we see people asking: "I wonder if we can go home in a couple days?", but in reality, it might be a little longer.

At the current radiation level, the mandatory evacuation for the 20km area and the mandate to stay indoors for the 30km area is an appropriate assessment.



A Week After the Earthquake

The Current State of the Fukushima Nuclear Accident and the Plan for the Future

If at any point in the near future should the nuclear reactors, including Unit 1 and Unit 3, go out of control, which we cannot predict, or if the containment vessels should malfunction, again, which we cannot predict, the evacuation area would change. In my opinion, if we go with the assumption that the containment vessels will remain stable, the mandated evacuation area is an appropriate one.

[49]

The other issue is about the current evacuation areas. There is no overall central command. There is no center for support units. Therefore, the situation has become a mess, for example "Some elderly people were left there by mistake", "The situation here looks hopeless", "This area has no food", "That area has no oil." Each evacuation area is tackling issues such as humanitarian concerns or ways to make a living in an unorganized manner. This is an absolutely dreadful situation. Among those who own their own businesses, some face big trouble keeping their businesses running because they lost their CAD data, customer data and so on. They were forced to immediately evacuate and were not able to take important data. Each evacuation area has many issues like this. Therefore, somebody like a central command center has to coordinate everything including humanitarian concerns, business owner's issues, school issues, etc. They have to sort out the types of issues and coordinate what help and supplies should be sent where.

In addition, we cannot foresee whether the evacuated areas are going to become larger or smaller. That's why some people are running away even from Tokyo. This problem also needs to be solved by reliable parties. As I mentioned earlier, if we could physically cover the reactors with something like a tent, the area could become much smaller. For those areas which are exposed to radiation, protracted evacuation for several years is inevitable, residents from those areas could be permitted a short visit to collect their belongings. Transportation would be arranged and the residents could have time for 24 hours, 10 hours or only 7 hours if riskier, depending on the level of radiation. By continually denying residents the right to return home or to their places of business, the government could have riots on their hands.

It is also necessary to support factories and firms in relocating or finding temporary offices. Moreover, relocating elderly homes with bedridden seniors needs support too.



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

Over twenty people in such facilities have already died because they were left unattended. These issues are directly related to the lack of central command in Japan.

Talking about international affairs, this issue concerns the internal affairs of all countries. President Obama is most annoyed because his central policy is clean energy. To bring clean energy, he already announced the US should resume building nuclear reactors. He believed nuclear energy should be promoted whatever happens, then suddenly everything becomes unclear? I heard that President Obama called Japan's Prime Minister's Office every day. Well, his technical adviser does. The reason for the daily call is to find out whether the Japanese incident would make his fellow Democrats change their minds and become anti-atomic energy. This already affects internal affairs. Germany and China also have this type of internal concern. Almost all developed countries have Boiling Water Reactor (BWR), i.e., the same type of reactors as Fukushima. Again, there are similar issues in all of those countries. But no nuclear expert can explain what happened in Japan. Everyone wants to know whether the incident happened only due to the special circumstances in Japan, or if similar accidents could happen in other countries. This is what the other countries want to know because nuclear power is a pillar of clean energy efforts. Due to the lack of an international expert team, each country is analyzing the situation in an uncoordinated manner. Also the world has a distrust of Japan. For instance, we recently had an article that said Japan has no leadership in private firms and there is no long-term solution.

There is a Nuclear Safety Commission (NSC) in Japan, and I served as its chairman for one year. When we had a session at Kyoto with experts from all over the world, at the conclusion, I made a draft declaration saying that nuclear power is interdependent. All countries could end up failing if one of them fails. Therefore every nation must uphold reciprocal ethical practices and responsibilities. I wrote such a declaration of interdependence that year, quite a long time ago now.

'As chairman of the NSC, he is destined to get a punch in the face,' that's what I heard when I was in that position. They even throw stones at you when you show up to a public meeting... so it's not difficult to imagine how aggressive they would be if they face the president of an electric company. I ended up taking the position because the president of a certain electric company asked me. He thought I should be able to do it,



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

as I am very tough. Actually, no one punched me in the face, but you know, it really is hard to do that job. What I emphasized is the importance of 'interdependence', which means we have to keep having discussions on regular basis to avoid spreading any one of our problems to the others. Talking about the impact of problems, having accidents greater than level 5 means any nuclear power plant construction in the country will be suspended for the next 30 years.

The reason for the absence of the nuclear power industry in the United States is not because of their incompetence, but because of the circumstances after the accident of Three Mile Island. After 30 years, there aren't any engineers in that field anymore; they have all quit since then. On the other hand, Japan is very strong in that field, so is France because Japan and France keep developing the industry. Even if the actual development isn't all that great, it looks like a great achievement thanks to the fact that there was no other country to compete with... it's just like a little 'hit' somehow becoming a 'home run' in a baseball game. Germany is in the same situation as the United States, and they can't build any new plants. That was why the Siemens nuclear division was acquired by Areva. This is the situation of the nuclear power industry that we have to be aware of. Instead of thinking 'Japan is the winner in the industry', we should always remember that the United States has not been able to build new plants at all in the last 30 years. We also should be aware that Japan could get into a similar position. In this industry, things would slow down and could eventually disappear. We should think about how to keep the technology we have now without losing it for the next 30 years.

[55]

As many of you have already seen, the layout of the Fukushima nuclear power plant is unusual in placing all six reactors together. As you can see in this diagram, 'Boiling water (BWR)' is a system to run a turbine by vapor from boiling water, then put it back to a condenser to convert it to water again. It's circulating in completely closed loops like this (See Diagram xxx). However, to cool down this system after the incident, technicians made holes in the pipes connected to the core so they could pour the sea water from the holes. It's now said that a part of this container including the fuel is exposed. It is a very serious situation inside. Though the situation varies for each reactor from #1 to #6, at this moment, we are having serious problems with the #3 reactor as it is still belching vapor as of this morning. The #4 reactor seems to have the same problem, which means



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

they need more water. These problems in Japan widely affect the policies of other countries. In the United States, they have held a public hearing asking for further inspections. In Germany, they found it's difficult to keep the old type reactors active anymore. This means that Chancellor Merkel had to change her policy on this industry. In Switzerland, they decided to suspend new construction. China intended to keep going, but on March 17, the government announced that they temporarily suspended the approval process for nuclear power projects. This decision is a result of many people's concerns expressed on the Internet, such as that Japan has had such an accident despite their advanced technologies. In China, our industry is far behind... should we really continue? It's easy to see how big the influence is when you see all these examples.

[56]

Ms. Nonaka: Tokyo is in confusion. TEPCO announced a plan that would enforce scheduled blackouts from the 14th in Tokyo and its eight surrounding prefectures. They divided the area into 5 groups and each group would have blackouts in rotation. This plan has created confusion as TEPCO changed the schedule everyday and some of the actual blackouts did not match the announced schedule.

Dr. Ohmae: It shows us clearly how things are messed up with TEPCO. This plan does not make sense and it is ridiculous. They have no idea that we live in a society where everything is dependent on computer technologies. It may take hours to shut down or start up systems. The government announced the plan this Monday as per TEPCO's request. The government shouldn't have accepted the request that easily without thinking through the consequences. Another thing I noticed is that TEPCO picks on 'weak' areas such as Yamanashi and Gunma for blackouts but not Chiyoda-ward which is a more difficult area to deal with. Many major companies including TEPCO have their main office in Chiyoda-ward. The whole scheme shows the company's real nature - they are not fair. They announced the plan to the public on Monday and even while discussing which areas should or should not have scheduled blackouts, they had decided to cut power from rural areas such as Gumma prefecture.

[57]

It is clear that neither TEPCO nor the Prime Minister Kan understands that blackouts occur at peak hours. The government created a new position 'minister of saving power'



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

to encourage people to save power but this is not the point. The point is to lower the power consumption at peak hours to avoid blackouts. Even though you turn off the heater and freeze yourself, it won't help if it's at midnight when nobody uses power. Of course you save money and that is good; however in this case, the essential thing is not to save power but to lower the peak power consumption.

[58]-[60]

Scheduled blackouts are absurd. It is important to reduce the use of power at peak hours to stop scheduled blackouts. My suggestion is to implement the following three initiatives. Each initiative cut 15% of peak power consumption.

Firstly, why not start the daylight saving in Japan in April? Let's have the sun do the work. After April, areas such as Hokkaido are bright from 4:00am. Some areas TEPCO covers are bright from 4:30am. So let's shift time from 4:30am to 6:30am in those areas during summer. It would save 15% of power at peak hours.

Secondly, we ask people to work five days a week out of seven days from Monday to Sunday. You know how passengers in a plane are seated. They are distributed evenly so the plane is well balanced. Load rebalancing is what I am thinking of. We would ask people to distribute the work days to balance the loads and we would cut another 15% by doing so.

Thirdly, announce the cancelation of the annual summer Koushien high school baseball tournament. The summer Koushien tournament is held during the season when electric power is most needed. Everyone turns on AC and TV to watch the tournament in between 2pm and 3pm during the peak hours. Canceling the summer tournament would contribute to cut 15% of peak power consumption. The annual spring Koushien tournament will remain as it is.

Another measure which should be taken as soon as possible is to have the full linkage of the eastern and western grids. The eastern grid runs on a 50hz system and the western grid runs on a 60hz system. The existing transformer substations connecting the grids can only handle 1 million kilowatts per day. A more powerful substation is urgently needed to connect the grids so we can easily transfer as much power as as needed from



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

west to east in the situation we are facing now. It is estimated to cost 100 billion yen to build such a substation but so what? In future if the west grid needs to borrow power from the east, we can do so through the substation. Having several power plants in the eastern grid damaged and destroyed by the earthquake, TEPCO has lost 20% of its power capacity for 3 to 5 years. It is critical to have the eastern and the western grids fully linked.

Let's see this power supply chart. About 30% of electric power is produced by nuclear plants. Both TEPCO and Tohoku Electric Power Company had a number of thermal power stations damaged by the earthquake.

This is a monthly demand of electric power. What do you think? Look at August when the summer Koushien tournament is held. Wouldn't my idea of canceling the tournament lower the demand quite a bit? An hour between 2pm and 3pm in August is the highest peak hours in Japan because of the Koushien tournament.

If you take a look at this daily demand of power for a week in August of 2007, you can see the demand is low on weekends. This shows that load rebalancing mentioned earlier would be effective. I expect to have overall decrease in power consumption by 7% during the peak hours even for the month of August. To use load rebalancing within a company for example, the amount of utility power consumed each day from Monday to Sunday needs to be almost the same. So workers might be asked to shift work days and perhaps holidays. When the load rebalancing method is used, some inconvenience can be expected. In spite of the expected inconvenience, the load balancing method is better than rotating blackouts.

[61]

This is the hourly demand of electric power on a typical day in summer. The daylight saving system will lower the consumption at the peak time. We will be essentially getting help from the sun. You would be able to cut power consumption by 4-5%.

[62]

Let's talk about energy demand and economic growth next. I have good news for you. Because Japan isn't growing economically, there is no need to build more nuclear



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

reactors. By utilizing the nuclear reactors currently available, by cooperating in cutting power consumption by 5-10%, by cutting power consumption by 15% on an individual basis, everything will work. I believe if we have a good leader in this country who could ask the public for their cooperation, then the public would be willing to do what has been discussed right away.

[63]

I mentioned money for rebuilding Tohoku. We know that it will cost a lot. We will not be raising national bonds. Instead, I suggest applying a temporary consumption tax for a limited time for the limited purpose of rebuilding a disaster area. Last week, I suggested applying a 1% tax, raising 2 trillion yen for one year. I would like to make a modification and I am now suggesting a 2% tax raising 4 trillion yen for one year. The rate will be kept below 2%. Applying the tax from next year would be possible. Two trillion yen will be used to help sufferers in Tohoku area and the rest of money will be used for rebuilding public and industrial infrastructures.

[64]

Be encouraged to spend money so more tax money goes to Tohoku area. That would improve the economy. It is usually said that increasing the tax on alcohol consumption discourages people from spending money and thus the economy slows down. But I believe this tax initiative in combination with the right messages from a leader will motivate people to go out and drink to contribute to Tohoku area. This is another leadership issue.

[65]

My plan imposes a 15% cut in power consumption. You may disagree with this proposal but I would like to suggest that we levy a certain amount on the electricity bill. Usually major customers consuming a lot of electricity get a good rate. But under these circumstances, it will be changed. Customers with high consumption should pay a higher rate, or at least the same as other customers. A second suggestion is that the 15% rule be applied to everyone. Based on your last three-month of usage, you would be charged differently. The average for the last three months would be calculated. If you succeed in reducing your power consumption by 15%, your rate will stay same for the next billing cycle. But from 85% to 94%, your rate will be increased by 10%; from 94% to 100%,



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

your next rate will be raised by 15%; for those over 100%, 20% up as a penalty. This will make a difference. Even though people don't usually pay attention to the government's messages pleading for reduced consumption, this plan directly affects your own wallet. People whose contribution is larger would get rewards while people who don't contribute much would pay more. Put the money from this plan into Tohoku.

.....

Open Translation Project についての一般的な説明

General Description of Open Translation Project

Open Translation Project は、大前研一ライブのうち、2011年3月11日の東北・関東大震災に引き続いて起こった福島原発事故について、株式会社ビジネス・ブレイクスルー(BBT)より YouTube で公開された大前研一ライブから抜粋された動画より、無償のボランティアの参加者の貢献によって書き起こし、翻訳、編集を行うプロジェクトであり、その編集方針、プロジェクトとしての運営方針などもボランティアの議論によって決められています。

Open Translation Project is a volunteer project and is established for dictation, translation, and editing by volunteers from video published to YouTube which is an excerpt from Kenichi Ohmae Live, a program broadcasted by Business Breakthrough (BBT). Its editorial policy and operating policy as a project is determined by discussion by volunteers.

プロジェクトへの参加資格は BBT 関係者または BBT が運営するプログラムに参加しているか以前参加したことがある者、もしくはその関係者となっています。参加者には一定期間または一定量の貢献をすることなどの義務はありません。

Eligibility to become a member to this project is students or participants for a program operated by BBT and BBT employees, or their concerned parties. No obligation for certain term or amount of contribution.

Contributors

(Order by alphabet)

Akio Yamane

Ariko K



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

Clyde Higaki
fiona fincannon
Fumitake Uno
Fumito Yasuda
Ian Kerr
Itsuro Yoshimoto
Jason Wallace
Joyce DeMattei
Joyce Lau
Kaori Mizukoshi Lee
Kaori Murahashi
Kazuyasu Osanai
Kazuyo Tanimoto
Keiichi Miyao
Kenichi Taniguchi
Koichi Okabe
Kouji Mikami
Kumiko
Masako Shirai
Munehiro Endo
Naohisa Inoue
Naoki Takeda
Naoko Yoshida
Naomi Mita
Noriyoshi Komatsu
Nozomi Muto
Robbin Kawabata
Sato Hideko
Satoshi Kobayashi
Seizo Sakurai
Shigeru Nagasawa
Shin Yamasaki
Shunsuke Imamura
Shusaku Sumida

RELEASE

Translated by Open Translation Project
Visit at <http://opentranslationproject.blogspot.com>
[Draft Version4.1]
2011/03/27



A Week After the Earthquake
The Current State of the Fukushima Nuclear Accident and the Plan for the Future

Tadahiro Wakasugi

Tai Nizawa

Takashi Fujikawa

Takayuki Fujiwara

Takayuki Maehara

Tomoki Inada

Tonakai

Toshi Kosugi

Yasuro Yoshida

Yasuyo Shiraishi

Yoshihide Kurihara

Yukio Fujiwara