

COUNCIL *on*
**FOREIGN
RELATIONS**

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The Japan Studies Program, together with The Maureen and Mike Mansfield Foundation, presents a discussion on:

Long-term Effects of the Tohoku-Pacific Earthquake: Implications for U.S.-Japan Relations

Monday, April 4, 2011 — 8:30 AM to 11:00 AM

REGISTRATION & BREAKFAST RECEPTION: 8:30 AM to 9:00 AM

INTRODUCTORY REMARKS: 9:00 AM to 9:30 AM

His Excellency Ichiro Fujisaki, *Ambassador, Embassy of Japan*

The Honorable Tom Schieffer, *Former U.S. Ambassador to Japan*

DISCUSSION: 9:30 AM to 11:00AM

Akira Chiba, *Minister of Congressional Affairs, Embassy of Japan*

Charles Lake, *Chairman, Aflac Japan*

William F. Martin, *Chairman, Washington Policy and Analysis*

Sheila A. Smith, *Senior Fellow for Japan Studies, Council on Foreign Relations*

The Honorable Tom Schieffer (presider)

This meeting will be held at CFR's Washington Office at 1777 F Street, NW, Washington, DC 20006.

Amidst the crisis and uncertainty, one thing seems clear: the Japan that emerges from this series of disasters will be a changed nation. While immediate attention is rightly focused on responding to Japan's ongoing nuclear and humanitarian emergencies, it is also critical that political leaders are prepared for the changes and the choices we may face in the near to long-term. The above panelists have wide-ranging expertise in areas including Japanese politics, Asian security and the U.S.-Japan alliance, Japan's energy portfolio and nuclear power industry, and Japan's private sector. Addressing these and other related topics, this seminar will provide an opportunity for the policy community to begin a conversation on the purposeful leadership that will be necessary to aid in Japan's emergence as a stronger nation.

To attend, please contact Sophia Yang at 202.509.8449, or by email at syang@cfr.org.

This invitation is not transferable.

Long-Term Effects of the Tohoku-Pacific Earthquake:
Energy Implications for US-Japan relations

William F. Martin, former US Deputy Secretary of Energy

Presentation before the
Council on Foreign Relations and Mansfield Foundation

Washington, DC

April 4, 2011

Good morning Ambassador Fujisaki and Ambassador Schieffer. Let me first express my admiration for the endurance, perseverance and bravery of the people of Japan, especially of the Tohoku region. I've had the honor to visit Sendai for each of the last twenty-two years and enjoy the hospitality of the gracious people and the beauty of the region.

Current Situation

My topic today is the energy picture of Japan in the medium to long-term in light of the Fukushima events. But first, let me say that it is my understanding from friends in Japan that this is an ongoing crisis and, while there are some signs that progress is being made, we are far from seeing the plants in stable condition. In this environment there are moment-by-moment challenges that persist – but, as each day goes by, we hope the situation will improve. Even once the event is controlled, the enormity of the cleanup will take months and years, and we stand ready to work with Japan on that challenge too.

My thoughts and prayers go out to the many heroes we have seen and the extraordinary work of the employees of TEPCO and volunteers from other utilities that are carefully meeting this crisis as well as for the government officials who are overseeing their safety. We know that Japanese government and industry are working 24/7 on Fukushima. Japan is working hard to make all available facts known to the public as quickly and as openly as possible.

The accident also reinforces the U.S.-Japan special relationship. Our NRC, DOE, U.S. military, and the rest of our government and private sector (including through INPO) are hard at work, in Japan and in the United States, to assist by responding to Japanese technical requests or requests for material assistance. We are true friends and partners, and this is a very special relationship that we have. The U.S.-Japan partnership is stronger than ever. I believe that Japan will get past these terrible events.

Now let me turn to the medium and longer-term perspective by first reviewing a few statistics about the basic energy situation of Japan and the role of nuclear power going forward.

- First, Japan is one of the most energy efficient countries in the world with the lowest use of energy per unit of GDP. It is also the most efficient in terms of carbon as Japan produces more GDP per unit of carbon produced.
- Second, nuclear energy supplies roughly 30% of Japan's electricity from its 54 reactors. At any one time only about three quarters of Japan's nuclear reactors are being used as the remaining reactors are closed for safety inspections.
- Third, Japan's total electricity generation is approximately 158 GW(e) for a country of 130 million people. So a 1 GW(e) reactor produces enough electricity for a city of roughly a million people. Thus, the six Fukushima reactors produced enough electricity for approximately six million people.
- Fourth, thermal plants (oil, coal, gas) have also been affected by the quake--in total an additional 10 GW(e) are currently "under review" or repair. In the very short term Japan will need more refined products to generate electricity.
- Fifth, the electric grids between the West of Japan (Osaka, Nagoya) are quite different than those of the East of Japan (TEPCO, Tohoku) and only a maximum of 1 GW(e) is possible to move from West to East. But the economic impact affects all of Japan. For example, it was reported that Toyota assembly lines had to stop production in Nagoya (in the West) because of a lack of parts being delivered from the East (Tohoku region).
- Sixth, Tohoku Electric Power Company, which supplies the city of Sendai, reconnected almost all of its customers in a week.

The Implications

Japan is resilient, starting with its people, but the heavy toll on the nuclear facilities and public attitude is likely to have a long-term impact. How will Japan meet its energy security requirements? How will it be respectful of the climate issue? Importantly, what will be the role of U.S.-Japan partnership, a partnership that has undoubtedly been strengthened due to this crisis?

- Prior to the earthquake, nuclear energy in Japan was projected to go from 30% of electricity to as much as 50% by 2050. At today's juncture, I expect priority will be given to the "repowering and relicensing" of existing reactors after a careful review of safety as recently announced by the Prime Minister. The hope is that most of the 54 reactors now under operation will be relicensed in the future minus those that are not repairable.

- Another priority would be to continue construction of additional reactors in appropriate sites and to increase the flexibility of the grid by developing more compatible transmission infrastructure between the East and West of Japan.
- Finally, Japan respects the need to close the fuel cycle and reprocess nuclear fuels to extend the life of uranium reserves, as well as provide for more efficient long-term storage. Some argue that reprocessing of fuel is not necessary given adequate supplies of global uranium resources – but as a country that has no indigenous energy resources, nuclear power and recycling offer the opportunity to be partly sufficient in energy reserves – vital for the energy security and economic performance of Japan.

But realistically, nuclear power may not reach 50% of total electricity supply; a more reasonable figure might be 35 to 40%. How will Japan meet the rest of its electrical needs? There are four ways: coal; LNG; advanced renewable technologies; and the Japanese term *mottainai*, which means conservation.

- Today, coal fuels about 25% of electricity production. Under earlier policy assumptions, coal was going to be almost totally phased out but today, given its economic attractiveness and the need for Japan to maintain a balance in electrical generation, I expect that coal will be about 15% of the energy mix in 2035 and emphasis will be put on clean coal technology and burning.
- A big push will come for LNG. I expect LNG imports to Japan will increase significantly before mid century. Gas has the advantage that it is available from a variety of sources (Qatar, Russia, Indonesia and Australia) and it is considered a clean energy source. As I will discuss later, there is the possibility of greater US LNG export to Japan.
- There is also scope for advanced renewable technologies such as wind, solar and, of course, hybrid vehicles. Overall *mottainai* will remain a priority.

Japan’s Projected Electricity Supply (%)

	2009	2035 (estimate)
Nuclear	29	30
Coal	25	15
LNG	29	35
Oil	7	5
Hydro	8	5
Renewables	2	10

Bottom line: I expect that Japan will remain committed to its goal of diverse fuel sources to provide a ‘best mix’ energy policy that includes nuclear energy.

Global Energy Scenarios

Let me say that the impact on nuclear power is going to be worldwide. Prior to the earthquake there were some 442 reactors globally producing about 375 GW(e) of electricity. The IAEA had estimated this could climb to 650 GW(e) or more by 2050. This estimate may be too high in the post-Fukushima environment. It is important to note however, that Japan and the United States have roughly 40% of total world nuclear capacity. Therefore, what happens in our two countries is going to have a dramatic effect on world energy and the environment. Interestingly, while many nations have called for review of safety of existing plants in light of the lessons of Fukushima, it appears that nuclear programs worldwide are proceeding, although perhaps “new build” will be slowed somewhat.

The importance of diversity of fuels and source – a concept that is highly valued in Japan – is even more important in light of Middle East events, coupled with the Fukushima accident. These two events have fundamentally and significantly changed the world’s energy and environmental prospects. To give you an example, in order to meet “normal” energy requirements of the next twenty to twenty-five years, the IEA had estimated that nuclear energy would increase by at least 25% and world oil production would have to rise from 80 to 100 million barrels per day.

In the post-Fukushima/new Middle East world, neither of these assumptions is likely to be accurate. In light of the new developments, I expect the world is likely to become more dependent on coal – and this will require an acceleration of clean coal and carbon capture and sequestration technologies. Much of the world’s incremental increase in electricity generation will be met by natural gas/LNG, coal and renewable energy resources. Shale gas is an important new source, especially in the U.S., that could allow the U.S. to meet our own needs and also be an exporter to Japan and Europe. Renewable technologies will need to be accelerated if they are to have even a modest impact since they start from such a small base. The governments and private sectors of the U.S. and Japan as partners will have a major role in all of these areas.

US-Japan Relations

I was heartened to see the Sendai airport, seemingly washed away by the tsunami, now being partially restored and a center of humanitarian assistance led by Japanese Self Defense and U.S. forces. We have officials from DOE and NRC on the scene helping the Japanese government respond. One valuable contribution is radiation monitoring with advanced U.S. equipment. U.S. data has been an important source to confirm Japanese data, especially as it relates to radiation levels. The quick response of the United States underlines the strength and depth of the friendship between the U.S. and Japan. Ambassador Mansfield called the U.S.-Japan relationship the most important bilateral relationship in the world. He would have been proud of the Americans and Japanese confronting this crisis and, as an expert in science, he would be deeply involved in the

discussions of the post-Fukushima changes. So, let me conclude by asking how can we strengthen the U.S.-Japan relationship?

- First, the lessons learned from the experience of Fukushima should be carefully reviewed. In the first instance it is important that Japanese industry and government have their own internal review and be transparent with their results. I have been impressed with the detailed statistics and information being provided by so many sources in Japan, both public and private.
- Secondly, consultations have already begun between the Japanese and U.S. governments and I am confident that these efforts by the Department of Energy and Nuclear Regulatory Commission will proceed in the environment of positive and transparent cooperation. Engaging the private sector is also important in these deliberations. President Obama has created a blue ribbon commission to evaluate long-term storage of spent nuclear fuel. This would be a good forum for Japanese experts to testify about the situation and the lessons learned so that the U.S. can benefit from the Japanese situation in evaluating our own long-term storage of high-level waste.
- Third, we need to continue efforts to move toward a secure and environmentally sensitive energy future, an objective of both of our governments, recognizing that in the post-Fukushima world, the challenges will be greater but the effort toward energy security and environmental quality must proceed and nuclear must be part of that mix. I have earlier suggested that LNG imports will expand in Japan. The U.S. and Japan should seriously discuss the possibility of export of gas from the U.S. to Japan – in the short term from the Gulf of Mexico and over the longer term the possibility of Alaskan North Slope gas exports (a concept supported by Ambassador Mansfield during the Reagan-Nakasone energy talks in 1983). Japan and the U.S. should continue and accelerate their joint effort to find secure and environmentally friendly sources of energy. As the two most advanced technological nations in the world we can accelerate the advancement of renewable technologies. At the same time, we must be aware that energy systems change slowly and that just a small shift in our energy balances requires time, effort and capital investment – and that these decisions will be made primarily by the private sector in a highly competitive environment.
- Fourth, the world community should learn from the lessons of Fukushima. Some areas for greater consultation and cooperation might include: review of equipment available for emergency workers; review of plant details such as emergency power requirements, including the concept of “black start” – electric generating capacity resident at each power-plant so that electric service is guaranteed to be available even under the more-than-worse tsunami type conditions. In terms of spent fuel, one might review the use of dry cask storage. There is also much to be learned about radiation collection and reporting and, alongside this, better education of the public about radiation. Working together as Team U.S./Japan, we can strengthen international efforts, especially within the IEA and the IAEA, and

work together to stimulate other nations toward sustainable energy futures, of which safe and secure nuclear power will be an indispensable part.

- Fifth, a very important forum that can strengthen global nuclear safety is the Nuclear Energy Summit initiated by President Obama a year ago. Leaders from almost fifty countries gathered in Washington to look at the issue of nuclear safety, security and safeguards. The next meeting of world leaders will be in South Korea in the spring of 2012. I would hope that world leaders can use this important meeting to evaluate the lessons of Fukushima and also recommit to sustainable and secure energy resources, including nuclear power. An important objective should be to strengthen the International Atomic Energy Agency.
- Finally, over the last fifteen years I have had the privilege of convening the Santa Fe Seminar, a seminar that brings together senior Japanese government and business leaders with their American counterparts to discuss U.S.-Japan nuclear cooperation. We have routinely held these seminars every two years and hope the next meeting will be held in November as part of our continuing series. Convening U.S. and Japanese leaders together to learn the lessons of Fukushima and, at the same time, discussing the nuclear and energy situation in the medium and longer term of our nations is very timely.

As a Japanese colleague said, this is not the end of nuclear, this is the beginning of a new era of nuclear power. I would add, this is the beginning of the new energy and environmental era, a future that the U.S. and Japan can embrace, not only for our own countries, but for the whole world. It is often said that Japan respects the three E's, (energy, economy and the environment) and in terms of nuclear the three S's (safety, security and safeguards). This respectful attitude developed in Japan is a good model for the U.S. and, indeed, the world.

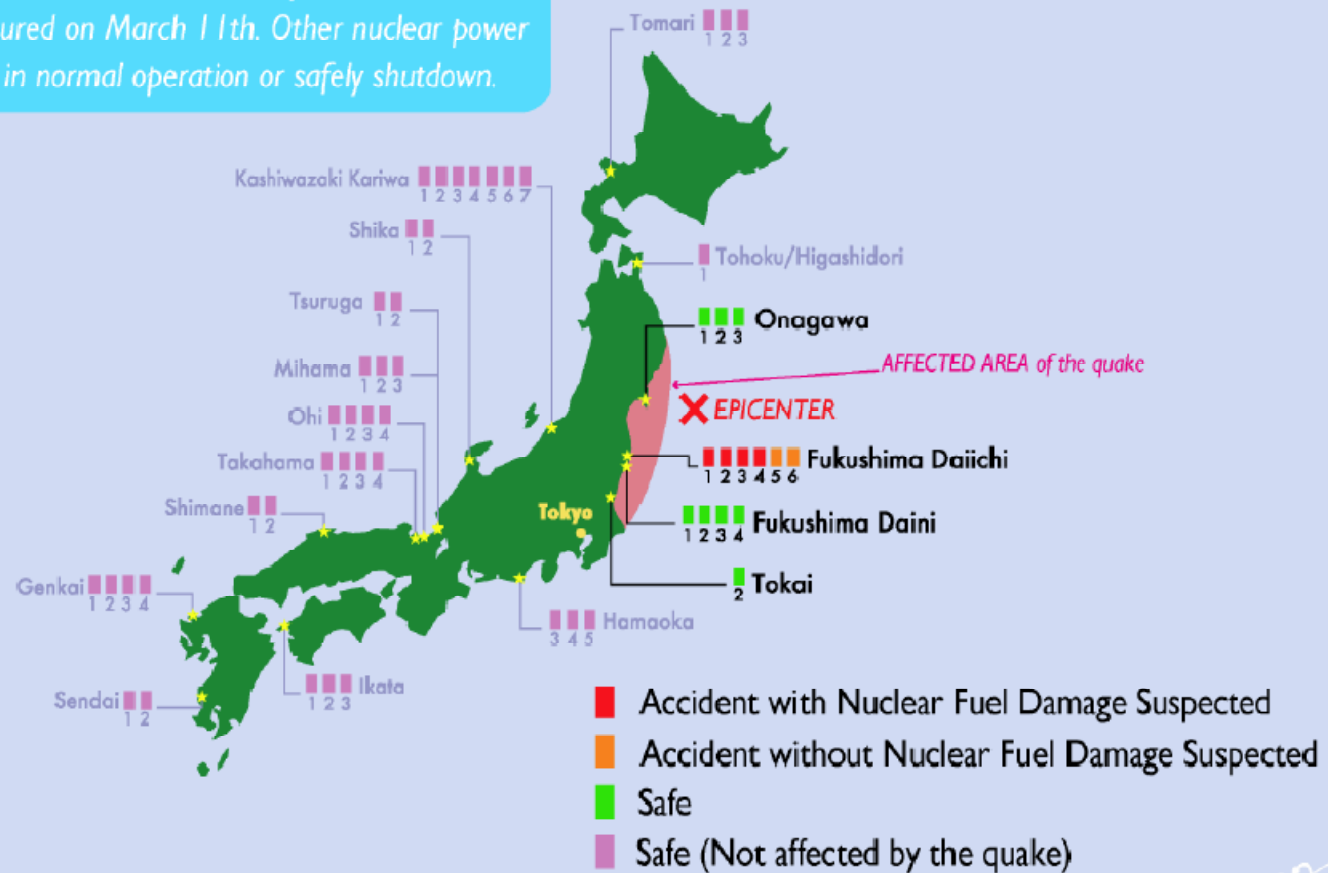
In fact, President Obama and Secretary Chu this week called attention to the importance of reducing oil imports in the U.S. and reaffirmed their support for nuclear power. Interestingly, the Japanese have long understood that reducing carbon has both energy security and environmental benefits. This is something Republicans and Democrats can come together on. Rather than divide parties and nations, energy should be a uniting feature of the global economic, energy and environmental future.

I would like to end with a personal story. My son, Chris, is pursuing his doctorate at the Primate Research Institute of Kyoto University. His research center is in Inuyama in Aichi prefecture near Nagoya. He works daily with the chimps of PRI, including the world's most famous chimp, Ai, who is a frequent guest on NHK television. She is well known for being able to remember ten numbers flashed on a computer screen and then punching out the same sequence. When the quake and aftershocks hit, Chris could slightly feel the quake but the chimps started screaming in fright. It seems chimps are, by most accounts, far more sensitive than their human counterparts. As I watch the reruns of the tsunami hitting the shores of Tohoku, I cannot forget not only the human toll, but the toll on the animals and other wildlife. I was pleased and a bit apprehensive when Chris

told me, “Dad, Professor Matsuzawa wants me to join a convoy to save the chimps in the Tohoku region.” Regrettably the roads did not allow for the expedition but it is an indication of how sensitive and respectful the Japanese people are to the environment and to all the inhabitants who live on these beautiful and fragile islands. Thank you.

Status of the Nuclear Power Plants after the Earthquake

The accident that brings environmental impact is going on at several units in Fukushima Daiichi nuclear power Station after the earthquake occurred on March 11th. Other nuclear power plants in Japan are in normal operation or safely shutdown.



As of 3/30/11