

# Fukushima and the Future of Nuclear Energy

*A panel session during the 7<sup>th</sup> Columbia University Energy Symposium,  
“Rhetoric vs. Reality”*

*November 18, 2011*



As part of the 7<sup>th</sup> annual Columbia University energy symposium, the Center on Japanese Economy and Business (CJEB) co-sponsored a panel discussion on the economic and political affects that the Fukushima Daiichi nuclear disaster had on the nuclear energy industry. Panelists included Chris Gadowski, Lead Analyst, Nuclear at Bloomberg New Energy Finance; Patrick Haischer, partner at A.T. Kearney and member of the firm’s Global Energy Practice; Carol Kessler, chair of the Nonproliferation and National Security Department at the Department of Energy’s Brookhaven National Laboratory; Guy Lembach, partner in Deloitte’s Capital Projects Services practice; David Saltiel, Advisor to the CEO and Director of Strategy for North America, AREVA; and Kiichiro Sato, president of the Japan External Trade Organization (JETRO) New York. Brooks J. Klimley, president of Brooks J. Klimley & Associates and adjunct professor at Columbia Business School, moderated the discussion.

Mr. Sato first expressed his deep gratitude to Americans, and particularly members of Columbia University, for their help following the Tohoku disaster. Regarding the accident itself, Mr. Sato said that although the reactors at Fukushima Daiichi successfully shut down, the subsequent tsunami destroyed the cooling system, which led to the accident. Authorities then mandated a 30-km (18-mile) evacuation zone. At this point, authorities have stabilized the power plants to a level of “cold shutdown,” in which the reactor’s temperature and radiation levels have fallen to safer ranges.



*Kiichiro Sato*

However, Mr. Sato observed that the Japanese population’s support for nuclear power is indeed falling, so the Japanese government is reviewing its energy policy. There are now only 11 nuclear reactors online, with more reactors due to shut down for inspection in the coming months. These reactors will only reopen with the approval of local authorities, which is now in doubt; if none are approved, Japan will have no reactors operating by May 2012. Considering that a partial shutdown over the summer required 15% energy savings by consumers, this would be very difficult to handle. However, Prime Minister Noda has stated that he would like to restart reactors on the condition that they’re safe and receive approval from local citizens and officials. Mr. Sato hopes that these plants can indeed be safely reopened, but acknowledged that any new policy will require extensive sources of renewable energy.



*Guy Lembach*

Mr. Lembach sketched out a status of the nuclear industry today. The United States, Japan, Russia and South Korea have the most reactors. Germany and Switzerland will phase theirs out by 2022 and 2034 respectively, and Italy has instituted a one-year moratorium with a subsequent review of whether to restart their program. China, India, Russia, and the United States continue to support building new reactors, and 149 reactors are now being built in various parts of the world. The issue of emergency readiness has become much more important, and existing and planned reactors, especially in coastal

areas, will have to meet a higher threshold of safety. However, closing reactors would have significant affects in their local areas since there is a extensive infrastructure to support these huge projects. And at this point, sustainable energy is not a viable alternative.

Mr. Haischer asserted that nuclear energy has a future, though there will be large differences throughout the world. The “BRIC” countries – Brazil, Russia, India, and China – have a very aggressive plan to ramp up their capacities, particularly China. China is currently ranked only 10<sup>th</sup> in the world with respect to nuclear capacity, but its 10 Gigawatts (GW) of existing capacity are projected to increase to 90 GW by 2020, which is about equivalent to the current nuclear

fleet in the United States (98 GW), and to 200 GW by 2030. On the other hand, France, which generates 75-80% of its energy from nuclear sources and has always been at the forefront of nuclear development, is now debating the future of nuclear energy.

In light of the fact that Japanese support for nuclear energy has gone from 80% support pre-disaster to 20% support post-disaster, Mr. Haischer bemoaned the lack of a rational, unemotional debate about nuclear energy. For example, while nuclear



*Patrick Heischer*

accidents are rare but very dramatic, coal-fired energy has thus far killed more people through chronic diseases such as asthma and mining accidents, not to mention its impact on climate change. However, denial of the possibility of nuclear incidents and their dramatic effects isn't appropriate either; a rational debate should be about the benefits and risks involved, particularly relative to other generation technologies. As a final note, he compared nuclear energy to renewable sources that also require specific locations that are often remote from power consumers. He suggested moving new nuclear plants to out-of-the way and less populated places as opposed to the current situation in which 100 million Americans live within 50 miles of a plant.



*David Saltiel*

Mr. Saltiel similarly lamented the energy debate in the United States, with slogans like “drill baby drill” and other frivolous or short-term arguments, when in reality we are discussing our infrastructure for future generations. Thus far, our policy has really been to focus on cheap energy, and at this point alternative energies will cost more; so the debate is really about whether we're willing to pay for these methods or not. Furthermore, the media confuses this debate by sensationalizing issues like the Fukushima disaster. There was the same risk from nuclear energy on March 11 as there was on

March 10; the disaster shouldn't change the fundamentals of the argument. This risk needs to be balanced with the risks and costs of using other energy sources, including climate effects, the depletion of finite resources, health effects, and cost.

Ms. Kessler noted that having excellent nonproliferation credentials is also an important element of a successful nuclear energy program. The public is focused on the potential of nuclear material to be used as weapons. Japan has an excellent nonproliferation reputation, even in the shadow of North Korea's belligerence, which should help it sustain international support for its nuclear energy program. Iran, on the other hand, has not complied with inspections by the International Atomic Energy Agency which are mandated by the Nonproliferation Treaty, to which it is committed. Thus, Iran has a very poor reputation and

many countries do not support its “alleged” nuclear energy program. From an observer’s perspective, part of the problem with the Japanese government’s response to Fukushima was that the Japanese nuclear regulatory authority did not have sufficient authority within the Japanese government to act effectively. Tepco maintained too much control of the accident clean-up and information despite the fact that it needed help from the regulatory agency. Furthermore, the International Nuclear Safety Convention, of which Japan is a member, details the need for a strong regulatory authority.



Mr. Gadomski reported that a prominent oil analyst had recently remarked that “the 21<sup>st</sup> century is going to be a nuclear century.” He thinks this is because it is such a powerful energy source, and considering global warming, “Why would we take the biggest carbon-free energy source off the table?” The impact of Fukushima and related disasters will have an effect on this concept, but it is too early to tell exactly the effect on global markets. Crucial questions will concern the future viability of alternative energy sources, especially their cost.



*Top: Carol Kessler; Bottom: Chris Gadomski*

### **Question and answer session**

**Q:** Professor Klimley then presented the panelists with a question: “Does the world have the capacity to construct anticipated plants, containment vessels, etc., both physically and intellectually?”

**A:** Mr. Lembach believed that manpower was the biggest obstacle facing new construction of nuclear plants. Mr. Saltiel said that the supply chain and human capital in the United States is not sufficient to support the construction of a large number of new units today. To ensure that this capacity is available when we need to replace the existing fleet in 2025, we must start building a few new units to develop capabilities. Ms. Kessler said that the U.S. government is now funding more training for nuclear engineers. One trigger for this was recognizing that the Nuclear Regulatory Commission (NRC) is losing 50% of its people in the next 20 years due to age. Mr. Gadomski said that China and other countries have an abundance of engineers.

**Q:** Professor Klimley then asked about the viability of new technologies, such as the recycling of spent energy.

**A:** Mr. Saltiel said that the technology is getting better, and investors are getting smarter about risk assessment. Every major industrial country besides the United States recycles used fuel.



**Q:** Professor Klimley then asked how new nuclear power plants could be financed.

**A:** Mr. Gadomski replied that the Tennessee Valley Authority will complete the \$2.5 billion “Watts Bar 2” project by 2013. Georgia Power, a unit of Southern Company, is also preparing a twin project (Vogtle 3 & 4) in Georgia with a federal loan guarantee which should go online around 2016. SCANA is proceeding with a similar project without a federal loan guarantee which should come online 2016-2017. However, the falling price of natural gas could make it harder to justify and hence finance additional new nuclear plants.



*Prof. Hugh Patrick during Q&A*

**Q:** Professor Hugh Patrick, director of CJEB, observing that Fukushima had made apparent the real risks involved, as well as the true cost of the lifecycle, asked if any of the panelists were in favor of phasing out nuclear power.

**A:** Mr. Sato stated that Japan should maintain its 54 nuclear plants, while ensuring their safety.

**Q:** Another questioner asked about nuclear waste – shouldn’t we build the cost of disposal into the reactors? He

also asked about the viability of thorium as a substitute for uranium.

**A:** Mr. Saltiel responded that the cost of geologic disposal is already factored into the cost of electricity produced by nuclear power plants (making nuclear the only source of energy that internalizes the cost of managing its waste) and that the cost of recycling could also be included without having any significant impact on the price paid by consumers for electricity. Recycling used nuclear fuel reduces the volume of waste that ultimately needs to be disposed, but a geologic repository will still be needed. Used fuel management is not a fiscal or technological problem, but a political problem. Mr. Gadomski, having been inside Yucca Mountain, said he was satisfied with the safety of the site, and lamented that the technical and scientific analysis of the repository was curtailed by politicians apparently reluctant to approve it.

Regarding thorium, Mr. Gadmoski said there is not much venture capital investment in the technology as of yet, so that indicates that there is not much substantive interest in it. He added that, since we already have the technology to produce nuclear power, there’s isn’t a compelling reason to make the shift. Furthermore, added Mr. Gadomski, the NRC is challenged by the regulatory approval process of issuing new combined construction and operating licenses as well as the examination of small modular reactors, and isn’t capable of investing the man-hours necessary to support this kind of transition.

This symposium was presented by the Energy Club at Columbia Business School and the Energy Association at the School of International and Public Affairs.