

Telecommunications, Environment/Energy and Health

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My time in Japan was a once-in-a-lifetime opportunity for my family (my Japanese wife and two boys, ages 5 and 7) and myself. I made deep and lasting friendships as well as professional relationships. Due to the closure of nuclear plants and the strong push for renewable energy, I was front-row-center during the resulting energy policy upheaval and fierce debates, which matched my interest in long term zero-carbon policy development.

In addition, Japan is on the cusp of a break-through in electric-drive transportation. Electric cars and fast-charging stations are spreading now, with large-scale hydrogen infrastructure for fuel cell vehicles being planned and built out for an initial rollout of commercial vehicles in 2015. In 2011 the number of residential fuel cells doubled to more than 12,000. Coming from three years of managing hydrogen infrastructure road mapping and R&D management at DOE (the Department of Energy), this was enormously gratifying to witness firsthand.

On a personal note, we reconnected with our Japanese family. My wife had been living outside of Japan for more than a decade and my two sons were able to emotionally connect with their grandparents and cousins. Fortunately my wife was able to make a seamless transition, continuing to work for her multinational company while living in Tokyo. My oldest son attended a Japanese public school and my younger son was at a private day care where they both became fluent in just a few months.

On return to DOE I will help evaluate how Fuel Cell Systems may accelerate grid integration of renewable energy. In addition I will be the international liaison for the Fuel Cell Technologies Program in the DOE Office of Energy Efficiency and Renewable Energy. There is a tremendous amount of international cooperative effort in hydrogen safety research where I will leverage my Mansfield Fellowship experience.

My time as a Fellow started in Arlington, Virginia with intensive Japanese language and cultural training. Everything coalesced in Kanazawa where I spoke Japanese twenty-four hours, seven days a week with my host family and total immersion at the Rifare language school. I felt like I was traveling back in time while living in Kanazawa. Through my own initiative I sought out an opportunity to study *kyudo*

(Japanese archery with an 800-year history). I also experienced living in a sixteenth-century farmhouse with a traditional fire pit where we cooked a breakfast of sea snails, which my host family and I dove for the night before.

This period of the Mansfield Fellowship was in sharp contrast to the current crisis of the tsunami and earthquake devastation and resulting energy crisis with the coming season of typhoons and unseasonal snow in downtown Tokyo. I was reunited with my family in Aoyama Tokyo, and my wife enjoyed the transition from suburban life in Maryland to vibrant city life in Tokyo. My work in Tokyo was shaped by the post-311 environment. There was strong focus on enabling modern cities to be less vulnerable to disasters and other disruptions to the grid through the use of additional renewable energy and distributed generation via fuel cells.

In Tokyo and Japan there is a strong and continuing ground swell of popular sentiment focused on the need for reliable and inherently safe energy systems. In August 2012 a public survey closed that addressed the future of Japan's twenty-year energy roadmap, and the results were overwhelmingly (70%) for zero nuclear power by 2030, with a good portion of the make up by renewable energy. However, renewable energy alone may not be sufficient, and additional fossil fuel generation will be needed.

My last two months were spent at JPower (Japan's former national utility with an expertise in coal fired power plant development and operation). I visited the largest (250MW) integrated gasification combined cycle coal power plant operated by a clean coal coalition consisting of all ten Japanese utilities (Nakoso, Iwaki-city, Fukushima Prefecture). The plant was hit by the tsunami, and the ground floor parking lot had been swept away, and then rebuilt. There were still enormous piles of debris and other reminders of the tsunami in the area. Even through day-to-day living in Tokyo, we were reminded of 311 due to radiation concerns with food sourcing and having young children in Tokyo. Food safety was one of many topics under discussion at the Japanese Diet.

As a Fellow at the Diet under Nobumori Ootani (leader of the Renewable Energy Element of the Liberal Democratic Party's Energy Project team), I observed firsthand the drafting of their party policy with respect to energy. The give-and-take of negotiations was center stage in developing effective policy with a realistic opportunity for passing. Policy formed in April 2012 while I was at the Diet is now being enacted. A dozen people met multiple times to develop renewable energy goals and general energy priorities: efficiency, biofuels, fuel cells, etc. My impression is that Japan may be better able to shift their energy policy than the U.S. I watched three diverse groups (citizens, politicians, bureaucrats-industry) hammer out a workable solution to their energy crisis.

All 50 gigawatts of Japan's nuclear power were shut down from about April to June 2012. This power was made up by fossil fuels (expensive natural gas, coal, and even oil). There was an intense interest in ramping up renewable energy and fuel cells, which matches my area of expertise in Hydrogen Storage/ Vehicle Refueling Infrastructure and Transportation, Technology and Policy. My co-workers at the Ministry of Economy, Trade and Industry and the New Energy and Industrial Technology Organization celebrated my departure with a traditional *douage*, where they tossed me in the air and cheered, which was an experience that I will never forget.

On return to DOE I will work as the international liaison for the Fuel Cell Technologies Program. Japan, Germany, and the U.S. as well as other governments are all actively pursuing the rollout of hydrogen refueling infrastructure to support major auto manufacturers' planned commercial introduction of fuel cell vehicles in 2015–2016. During my time in Japan, each country announced aggressive targets of 50 to 100 refueling stations to be commissioned by the end of 2015 to support sales of these advanced power-train vehicles. The sharing of “lessons learned,” Global Technical Regulations, and standardized refueling protocols and hydrogen specific equipment are all necessary to reduce barriers and perceived risk to ease the introduction of these new hydrogen vehicles. In Japan safety regulations are much more strict than in other parts of the world, raising the cost of the stations as much as three to six times what the capital costs are elsewhere. I also plan to aggressively promote renewable energy on return to the DOE through “grid integration of renewable energy” and thoughtfully tying energy policy and transportation policy to accelerate reaching the goals of each.

My family and I have grown immensely from this experience, which reinforced my personal conviction to follow through on enabling renewable energy and hydrogen for transportation. I expect many opportunities to collaborate with former Japan colleagues and contacts when returning to DOE and I will continue to promote the U.S.-Japanese relationship through my work towards a solution to the three Es (energy independence, economic security, environment).

Monterey Gardiner participated in the Mike Mansfield Fellowship Program as a representative of the U.S. Department of Energy from 2011–2012. During his Fellowship year in Japan, he served in full-time placements in Japan's Ministry of Economy, Trade and Industry (METI) and New Energy and Industrial Technology Development Organization (NEDO). He also completed a Diet placement in the office of the Honorable Nobumori Otani, DPJ Member, House of Representatives. He currently is a technology development manager at the U.S. Department of Energy.