

Tony Pietrangelo
Senior Vice President and Chief Nuclear Officer
Nuclear Energy Institute

Committee on Environment and Public Works
United State Senate

December 3, 2014

Chairman Boxer, Ranking Member Vitter, and members of the committee, thank you for the opportunity to appear before you today.

I am Tony Pietrangelo, the Senior Vice President and Chief Nuclear Officer at the Nuclear Energy Institute.

My testimony today will cover four issues:

1. Some of the challenges we see in the nation's electricity system;
2. A view from the industry on the NRC's regulatory process;
3. An update on the industry's post-Fukushima safety enhancements; and
4. Some perspective on NRC's seismic regulations, particularly with regard to the Diablo Canyon Nuclear Power Plant.

America's 100 nuclear power plants provide approximately 20 percent of our electricity and nearly two-thirds of our carbon-free electricity.

They produce that electricity 24 hours/day and are not dependent upon wind or sun, or fuel delivered by trucks, barges, rail lines or pipelines to do so.

They produce electricity at low, stable prices and are base-load facilities that are essential to controlling voltage and frequency for the entire electric grid.

The nuclear energy industry employs over 100,000 workers, provides a significant fraction of the tax base at the state and local level, and represents hundreds of millions of dollars in both direct and indirect economic benefits to each state in which the plant operates.

Finally, nuclear power plants provide vital clean air compliance value. In any system that limits emissions – of the so-called "criteria" pollutants or carbon dioxide – the emissions prevented by nuclear energy reduce the compliance burden that would otherwise fall on emitting generating capacity.

Other sources of electricity have some of these attributes, but nuclear energy is unique in this value proposition.

With that said, some electricity markets in portions of the country are creating serious challenges for base-load generation including nuclear energy.

Since a number of states restructured their electricity markets in the late 1990s, the business of producing and transmitting electricity has evolved into two distinctly different enterprises.

In those states still using traditional cost-of-service regulation, companies and regulatory commissions use the process of integrated resource planning to evaluate resource options on a long-term basis, analyze project economics over a 40-year or 60-year time horizon, and assign value to “public goods,” such as fuel and technology diversity and forward price stability in the electric sector.

States with competitive electricity markets have not yet developed mechanisms to value these “public goods” and internalize them in their decision-making.

As a result, regulated states have been able to create the conditions under which companies can undertake long-term, capital-intensive projects and preserve fuel and technology diversity. In the South and Southeast, state legislatures and regulatory commissions provide the assurance of prudent cost recovery necessary for capital-intensive projects. This is why the Vogtle and Summer nuclear energy projects are under construction in Georgia and South Carolina.

One of the key questions first raised in the late 1990s – can restructured markets develop mechanisms to preserve fuel and technology diversity and support investment in a diverse portfolio of generating assets? – remains unanswered. Absent significant market redesign or creation of new market mechanisms, it is not clear how merchant markets will ever stimulate investment in anything but the lowest-cost, short-term option. Given today's conditions, this will be natural gas-fired generation, thanks to the relatively low initial capital outlay for a gas-fired combined cycle plant.

This and other factors have led to sustained economic stress on some existing generating capacity, particularly base-load capacity. At a time when the surplus of generating capacity in the eastern United States is decreasing, as existing generating capacity retires, effective and efficient market design and operating practices in the capacity and energy markets are more critical than ever.

At the same time the electric industry is dealing with challenging market conditions, it is also dealing with the cumulative impact of regulations produced by the NRC.

The NRC currently has more than 50 rulemakings underway in various stages. Almost all of them, if implemented, would require modifications to plant systems and operations, yet the NRC does not appear to be prioritizing or even coordinating many of its rulemakings.

Last year, Senator Vitter and House Energy and Commerce Chairman Upton requested that the Government Accountability Office review the NRC's use of cost-benefit analysis, and we look forward to the results of that analysis. For our part, we have numerous examples in which the actual cost of meeting new NRC requirements was 5 to 20 times the NRC's estimated cost. We believe that if the NRC more accurately estimated the costs of its regulatory requirements, it would find that many of its requirements do not pass a simple cost-benefit test. As a result, resources are being spent complying with requirements that have little or no safety benefit. Let me be clear: The industry will implement requirements that have a direct safety benefit. However, regulatory requirements with little or no nexus to safety result in a diversion of resources from both the industry and the NRC to higher safety-significant requirements and operational priorities – the sorts of things that keep our plants reliably producing the electricity for which they are intended.

I want to take a moment to quickly summarize the state of post-Fukushima preparedness.

After Fukushima, the industry took immediate steps to strengthen our strategies to protect our nuclear energy facilities from severe natural events like earthquakes and floods. We didn't wait for NRC requirements. Each company that operates nuclear power plants has added yet another layer of backup safety equipment to ensure that the facilities will have access to power and water that are necessary to keep reactors safe in the rare event of a severe natural event. Moreover, we developed national response centers in Memphis and Phoenix. Each of those centers is stocked with five sets of emergency equipment – backup generators, pumps, standardized couplings and connectors for hoses and cables – that are ready for delivery to any U.S. reactor in 24 hours.

The companies, using some of the nation's best experts, also are reevaluating natural hazards – like earthquakes and floods – for their sites using the latest methods and data. The next step is to review the protective and mitigating measures put in place against the latest site-specific hazard information to determine if any refinements are necessary. We are in the process of conducting those evaluations and expect to have largely completed implementation by the end of 2016.

Finally, I would like to offer a perspective on seismic regulations, particularly at the Diablo Canyon Nuclear Power Plant.

Nuclear plants have several aspects of seismic protection, including safety factors applied to the reactor designs, conservative requirements in engineering codes and standards, and specific requirements for the strength of steel and concrete used to build the plants. These design and

construction practices are above and beyond the protection needed to safely withstand significant ground motion. In addition, engineering and materials design, seismic study technologies and methodologies have evolved significantly over time, which allows for more certainty as to how a nuclear power plant's structures, systems and components will react to a seismic event, and diminishes the reliance on overly conservative techniques and assumptions. When Diablo Canyon was under construction, the nearby Hosgri fault was discovered. Because the ground motions from the Hosgri fault could exceed the double design earthquake postulated in the plant's operating license, prior to commencing operations, the plant was retrofitted to withstand the ground motions from the Hosgri fault. In addition to these retrofits, a commitment also was made to constantly study the local geologic features and global seismic events to ensure seismic safety at Diablo Canyon, referred to as the Long Term Seismic Program (LTSP) through an open-ended licensing agreement. Diablo Canyon is, therefore, a unique facility in the industry, in that it is licensed for three earthquake designs: the Design Earthquake, Double Design Earthquake (equivalent to the Safe Shutdown Earthquake), and the Hosgri Earthquake, and has continually studied the geologic features surrounding the plant through the LTSP

It is through the Long Term Seismic Program that the Shoreline fault was discovered, in cooperation with the U.S. Geological Service, in 2008. The Shoreline fault, like the San Luis Bay and Los Osos faults, are below the Hosgri ground motion levels for which the plant was retrofitted in the 1970s, prior to commencing operation. As a result, the plant is able to withstand the largest ground motions that could be expected to be generated from any of the nearby faults, because none exceed the plant's robust Hosgri Earthquake design, which was also confirmed again as a result of recently completed advanced seismic studies using state of the art two and three dimensional imaging.

I realize this issue is even more complex because some staff at the NRC filed a differing professional opinion on issues related to Diablo Canyon and the Shoreline fault. Differing professional opinions do occur among the 4,000 staff at the NRC, and the NRC has a process for addressing them. In this case, the conclusion was that, "there is not now nor has there ever been an immediate safety concern" with this issue at Diablo Canyon. In addition, the panel concluded that older analytical techniques were overly conservative and no longer technically justified since the license at Diablo Canyon allows for newer technologies to be used.

Chairman Boxer, that concludes my prepared remarks, and I look forward to answering any of your questions.