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**Testimony for the Record**

Madam Chairman, Ranking Member Inhofe and members of the Committee, I am Carol Berrigan, Director of Industry Infrastructure at the Nuclear Energy Institute. I appreciate this opportunity to express the industry's views on the potential for global warming initiatives to produce green jobs.

Let me begin by thanking the Members of this Committee for their long-standing oversight of the U.S. nuclear industry and the Nuclear Regulatory Commission. The 104 reactors operating in the United States today are among the safest and most secure industrial facilities in the United States in part due to the oversight of this Committee for which the Committee is to be commended. In addition, they are the nation's lowest cost producer of base-load electricity, averaging just 1.72 cents per kilowatt-hour.

Those 104 nuclear power plants produce one-fifth of America's electricity, and U.S. utilities are preparing to build advanced-design nuclear power plants to meet our nation's growing electricity demand.

Today, nuclear energy represents over 70 percent of the nation's emission-free generation portfolio, avoiding 3.12 million short tons of Sulfur Dioxide, .99 million short tons of Nitrogen Oxide and 681 million metric tons of Carbon Dioxide compared to the fossil fuels that would have been burned in the absence of nuclear energy.

On a life-cycle basis, all energy-generation technologies emit some amount of CO<sub>2</sub> during the manufacture of components (whether it be pressure vessels, wind turbines, or photovoltaic cells) and other activities not directly associated with the production of electricity at the power plant, a number of studies by organizations such as the Organization for Economic Co-Operation and Development have concluded that nuclear energy's emissions "footprint" is comparable to renewables.

Nuclear energy holds 'great potential' for meeting our nation's future climate related goals. Climate change is increasingly important as federal, state and local policymakers consider energy supply and greenhouse gas mitigation. Given those concerns and the need for affordable and reliable base-load electricity production, policymakers and energy industry leaders are evaluating an expanded role for nuclear power. Just this morning, NRG announced that it has taken concrete steps toward this expanding role with the submission of a Combined Operating License Application for new nuclear reactors to be built in Texas.

Carbon mitigation strategies from Princeton University, Columbia University's Earth Institute, Harvard University and the Pew Center on Global Climate Change have reached a similar conclusion: A clear path toward meeting the global challenge of reducing greenhouse gases relies in part on an expanded portfolio of low-emission sources of electricity, including nuclear power.

A 2006 report by the Progressive Policy Institute states that expanding nuclear power should be part of a plan that would help avert a dangerous long-term energy crisis and address air-quality issues. The Institute's "Progressive Energy Platform" states that nuclear energy "holds a great potential to be an integral part of the diversified energy portfolio for America."

At a 2004 State of the Planet Conference at Columbia University, scientists, academics and government officials identified four essential elements for human well-being: energy, food, water and health. Maintaining access to energy, conferees said, "will require new technologies, in some combination of renewable and nuclear energy; energy conservation; and industrial carbon sequestration."

Nuclear energy also is part of the strategy for combating climate change in an energy security plan released by the Center for American Progress, a progressive think tank. The center recommends that the United States establish a "renewable portfolio standard" mandating that 10 percent to 25 percent of electricity be produced from renewable resources and nuclear energy by 2025.

The linkage between nuclear energy and the creation of green jobs was forcefully expressed on September 8<sup>th</sup> in a resolution adopted by the AFL-CIO's Building and Construction Trades Department. Let me quote "...if America wants to seriously address greenhouse gasses and global warming, then we must be serious about expanding our nuclear power generating capacity. The technology to build zero-carbon nuclear reactors is already available. Pricing new reactors is no longer unreliable. And they will fit into existing electrical grids seamlessly. America needs the power and the jobs that new nuclear generation will provide."

In a carbon controlled environment, nuclear energy offers substantial additional benefits. We all recognize that responsible climate change legislation must address the interconnection between energy costs, trade, and employment. The imposition of emission controls by some, but not all, major emitting nations may disrupt the competitive trade balance between nations and inappropriately shifts jobs to countries without emissions controls, where manufacturing costs will be less. A carbon constrained economy may lead to the use of readily deployable lower CO<sub>2</sub> emitting technologies, such as natural gas, that can have a perverse impact on our manufacturing and agricultural sectors. Nuclear power must play a role in a carbon capped economy to alleviate price pressures on natural gas supplies, and to maintain a competitive trade balance in the global economy.

Studies have generated varying estimates of the amount of new nuclear generation that will be deployed under a variety of climate change initiatives. If you refer to Chart 1, you will see a number of the different analyses depicted. Regardless of the carbon control policy selected, the preponderance of the credible analyses indicate an increasing role for nuclear energy.

I draw your attention to the EPRI analysis on the bottom of the chart. This analysis is a technology-based assessment. It indicates roughly 64 GW of new nuclear generating capacity deployment by 2030.

Since the interest of this Committee is job creation, I will describe what this 64 GW of new nuclear capacity means in terms of employment. Let me first preface my remarks by stating that for the purpose of this discussion, each new nuclear plant will be referenced at roughly a 1.4 GW. In reality, the nuclear plant designs under consideration by U.S. utilities range in size from 1.1 GW to 1.7 GW in generating capacity. The 64 GW in additional nuclear capacity translates to roughly 46 new nuclear plants.

Today, the average operating nuclear plant employs 400 to 700 people and jobs at these plants pay substantially more than the average salaries in the local area. For example, the median salary for an electrical technician at a nuclear power plant is \$67,517, for a mechanical technician, it is \$66,581 and for a reactor operator, it is \$77,782. A senior reactor operator's median income is \$85,426. Jobs in the nuclear industry are great jobs to have, they commonly include family medical benefits, pensions and generous incentive compensation plans. And, jobs in the nuclear industry are safe with fewer reported accidents than numerous other industries, including banking and other white-collar occupations.

In addition to direct employment, each plant creates economic activity that generates 400 to 700 additional jobs within the local community and produces approximately \$430 million annually in expenditures for goods, services and labor, and through subsequent spending because of the presence of the plant and its employees. The average nuclear plants also contributes more than \$20 million annually to state and local tax revenue, benefiting schools, roads and other state and local infrastructure and provides annual federal tax payments of \$75 million.

In addition to the ongoing employment at the nation's nuclear fleet, each new nuclear plant that is constructed will employ between 1,400 and 1,800 people during construction with peak employment of up to 2,800 individuals. These jobs include skilled trades such as welders, pipefitters, masons, carpenters, millwrights, sheet metal workers, electricians, ironworkers, heavy equipment operators, insulators, engineers, project managers, and construction supervisors.

These 46 additional plants will generate 64,400 to 82,800 construction jobs (with peak employment at 128,800). Once built, these 46 plants can generate 18,400 to 32,200 permanent fulltime jobs operating each plant, 18,400 to 32,200 in additional jobs in the local community, \$19.78 billion in annual expenditures for goods, services, labor and through subsequent spending, \$920 million in local state and local tax revenue and \$3.45 billion in federal tax revenues.

Beyond the jobs in construction, new nuclear plants will require components including pumps, valves, piping, tubing, insulation, reactor pressure vessels, pressurizers, heat exchangers, and moisture separators to name a few, and commodities like cement, structural steel, steel reinforcing bar, stainless steel, cable tray and cabling.

What can this Congress do to help ensure that Americans gets as many of these green jobs as possible?

The first area in which Congress can provide leadership is in the development of the work force. As you may already be aware, the nuclear industry, like many other parts of the energy sector, is seeing the leading edge of a wave of attrition due in large part to demographics. We project that as many as 35 percent of our incumbent work force may be eligible to retire within five years. Further, there are few work force training programs focused on the skills needed for successful employment in the nuclear energy industry and there has been an overall decline in high quality career and technical education.

I encourage you to develop and support work force development policies that 1) address the science, technology, engineering, and math (STEM) workforce challenges identified in the National Science Foundation's "Gathering Storm" report, and 2) address the challenges of developing a high quality technical work force with a focus on the skilled trades.

This Congress has demonstrated significant leadership in addressing some of these work force challenges. The recently enacted America Competes Act establishes a solid policy framework for addressing the challenges in the STEM workforce and we look forward to this Act's implementation. This Congress has long supported the nuclear engineering education and university programs and we thank you for your continuing support.

But there is work to be done in developing the technical and skilled trades workforce that our nation will need to deploy additional generating capacity, including nuclear. Specifically we must:

- raise awareness of the impending skilled craft labor shortage and its impact on the energy sector
- elevate the image, status and prestige of skilled craft careers in the energy sector
- attract, recruit and train workers, particularly from untapped and under-represented labor pools
- align investments and work force development initiatives to ensure collaboration and coordination of government, industry and labor efforts in the develop the energy skilled trades work force
- build partnerships that promote talent and economic development
- implement performance-based education and training programs for skilled craft workers through vocational and technical education programs in secondary and post-secondary educational environments.

The second area in which this Congress can provide leadership is in the development of nuclear manufacturing infrastructure in the U.S. When the current fleet of nuclear power plants were built from the 1960's to the 1980's, there was a substantial nuclear manufacturing infrastructure in the U.S. As new nuclear construction declined from the late 1980's through the turn of the century, the domestic nuclear industry contracted.

Congress should consider policies that will encourage investment in energy sector manufacturing to provide components to the nuclear industry, as well as other energy technologies the nation will need. The United States has long been a leader in innovation and advanced manufacturing. I encourage you to promote policies that take advantage of the growth of our energy sector, and American ingenuity, productivity and entrepreneurship by encouraging the manufacturing industries that will support future energy development to produce their products in the U.S.

This can be achieved though a number of initiatives. First, Congress should support the export of U.S. nuclear products and services by passing implementing legislation for the Convention on Supplementary Compensation. We commend this Committee for leadership on this issue.. Second, Congress should consider financial incentives for investment in manufacturing through a number of instruments including tax credits or accelerated depreciation of capital investments.

Madam Chairman, in conclusion, nuclear energy can make a significant contribution to the reduced GHG emissions goals of any global warming initiative. In fact, any credible program to reduce greenhouse gas emissions must include nuclear energy. In doing so, the industry will hire and retain tens of thousands of skilled and well-paid workers. Those jobs will be based in the United States and will contribute to two of our highest national priorities; the climate, and energy security.