Statement of

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Mr. Chairman, Ranking Member Murkowski, members of the Committee, thank you for the opportunity to appear before you today as you consider the *Industrial Energy Efficiency Improvement Act of 2009*. While the Administration has not finished its review of this bill and has yet to take a formal position, I am pleased to offer some preliminary comments on the cutting-edge research and development activities under the Department of Energy's (DOE) Industrial Technologies Program (ITP). ITP collaborates with industry, academia, and the national laboratories to develop the next-generation technology solutions to industry's critical energy and carbon challenges.

Many types of energy efficiency improvements offer industry the fastest, lowest risk, most economical way to lower greenhouse emissions and reduce energy use. Improvements in energy efficiency can be made today, with significant benefits: the McKinsey Global Institute identified energy savings sufficient to cut world-wide consumption growth in half using only existing technologies that offer at least a 10 percent internal rate of return.[1]

The Importance of Industry

The manufacturing sector is central to the health and vitality of America's economy, contributing 12 percent to U.S. gross domestic product (GDP) in 2007. The sector directly employed 13.3 million people in 2007 and supports millions more jobs in other sectors of the economy.[2] Internationally, the United States produces nearly one quarter of the world's manufacturing output, and in terms of collective economic output,[3] U.S. manufacturers rank first in the world, though it is unclear to what extent the recent economic downturn has impacted these statistics.

To fuel the furnaces and power the engines of American factories, U.S. industry consumed 32.3 quads of energy in 2007--nearly a third of all U.S. energy consumption.[4] U.S. industry alone uses more energy than the total energy used by any other G8 nation and about half of the total energy used by China. U.S. industry is also responsible for significant greenhouse gas emissions, producing an estimated 1,640 million metric tons of carbon dioxide from energy consumption in 2007.[5]

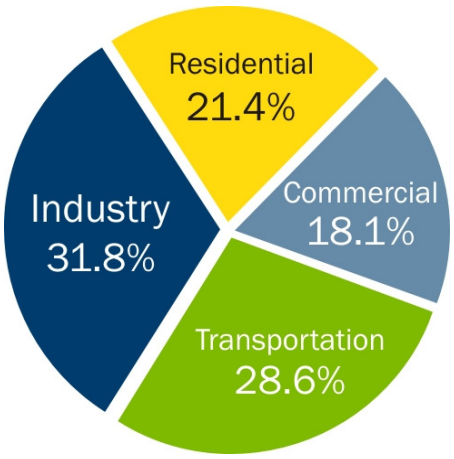

Figure 1. U.S. Industry Consumes 32 Percent of Energy

[1] McKinsey Global Institute, "Curbing Global Energy Demand Growth," May 2007.
[2] Bureau of Economic Analysis (applies both to GDP percentage and jobs), http://www.bea.gov/industry/gpotables/gpo_action.cfm?anon=91793&table_id=23975&format_type=0, http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-ds_name=EC0700CADV1&-_lang=en. Note: Indirect manufacturing support jobs removed for 13.3 million. Total is actually 14 million.
[3] United Nations Industrial Development Organization, http://www.unido.org/fileadmin/user_media/Publications/IDR/2009/IDR_2009_print.PDF; Industrial Development Report 2009, http://www.uschina.org/public/documents/2009/us_manufacturing.pdf.
[4] Energy Information Administration, Annual Energy Review 2007, http://www.eia.doe.gov/aer/pdf/aer.pdf.
[5] Energy Information Administration, Emissions of Greenhouse Gases in the United States 2007, http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2007).pdf.

Over the last several decades, U.S. industry has committed to using energy more efficiently. Although capital is tight in the current economic environment, the Department is partnering with industry to continue to invest in industrial energy efficiency. By lowering production costs, energy efficiency contributes to productivity, competitiveness, and job retention. For the long term, early action on carbon mitigation may provide a competitive advantage for some industrial companies under carbon cap-and-trade policy. With worldwide industrial energy use projected to increase 55 percent by 2030[6] (from 2005 levels), a global market for energy technology solutions is rapidly emerging. This new market presents enormous economic opportunities for American workers and scientists. U.S. industry and the American research community have the commitment, talent, and skill to lead the world in implementing energy efficiency and industrial technology innovation.

DOE's Industrial Technologies Program Strategy

The Department of Energy's Industrial Technologies Program relies on robust, collaborative partnerships to reduce energy use and carbon emissions in some of the most energy-intensive industries. The Department has built long-standing partnerships with many core industries that convert raw materials into the essential building blocks for U.S. manufacturing, such as steel and chemicals. Energy efficiency advances in these industries have a cascading effect throughout the economy. For example, chemicals are the building blocks of many products that meet our fundamental needs for food, shelter, and health; they're also essential to advanced computing, telecommunications, biotechnology, transportation, and more.

Each of our partner industries has developed a broad vision for the future and developed technology roadmaps that lay out clear pathways and priorities for research and development (R&D). Many of the priorities involve costly, complex research on basic energy-intensive processes that are integral to an entire industry—not the type of research that individual companies are willing to undertake alone. The Department brings together collaborative teams that share the costs and risks of research and draw on the diverse strengths of industry, academia, and the National Laboratories to solve these technological challenges for today and for the future.

DOE Helps Industry Save Energy Now through Outreach and Deployment

Through its Save Energy Now program DOE provides training and delivers energy savings that benefit U.S. manufacturing plants today. Our energy experts use specialized energy assessment tools and software to train plant staff in accurately identifying efficiency gains in common plant systems such as steam and heat generation, pumping, motor and fans, and compressed air systems. These tools are used by the Department's university-based Industrial Assessment Centers (IACs) energy experts on manufacturing facilities to help meet the goal in the Energy Independence and Security Act of 2007 of 25-percent reduction in industrial energy intensity by 2017 (2007 baseline). Companies nationwide can participate in no-cost energy assessments and access DOE resources to reduce unnecessary expenditures and boost productivity through improved energy efficiency. In addition, the Department's IACs also send teams of engineering

[6] Energy Information Administration, International Energy Outlook 2008. http://www.eia.doe.gov/oiaf/ieo/pdf/0484(2008).pdf.

faculty and students from 26 participating universities to local plants requesting assessments. These teams perform detailed analyses to produce specific recommendations with related cost estimates, performance and payback times. Just as importantly, the IACs serve as a training ground for the next-generation of energy-savvy engineers and provide a launching pad for many students into "green collar" energy efficiency jobs.

As of March 2, 2009, Save Energy Now has completed over 2,000 assessments with 1,873 plants reporting:[7]

- Potential energy cost savings of more than $1.2 billion, of which industry has already implemented more than 15 percent, achieving energy cost savings of more than $190 million
- Potential natural gas savings of 131 trillion Btus
- Total potential reduction in carbon dioxide emissions of 10.3 million metric tons.

DOE and Partners Developing Next-Generation Energy Technologies

DOE and its partners are bridging the divide between mission-oriented science and the applied research that leads to energy innovations in the marketplace. Collaboration among world-class scientists from industry, academia, and the Department of Energy's National Laboratories is fundamental to technology development success. Technological innovation drives economic growth, but such innovation requires sound science to serve as the springboard for market prosperity. With these realities in mind, the Department competitively awards cost-shared funding to collaborative research teams—and industry's active participation on these teams helps ensure that the technologies meet real-world criteria (e.g., effective operation in harsh industrial environments), ultimately accelerating technology commercialization.

A history of leveraging these partnerships has enabled DOE to transform innovative science into cutting-edge commercial products that improve American productivity, enhance domestic manufacturing competitiveness, and reduce national energy consumption. Since the inception of the Department's Industrial Technologies Program, DOE and its partners have successfully:[8]

- Commercialized many technologies, 104 of which are currently being followed in industrial markets to track their energy impacts
- Saved 5.6 quadrillion Btus of energy
- Achieved emissions reductions of 103 Million Metric Tons of Carbon Equivalent (MMCTe)
- Earned 48 R&D 100 Awards between 1991 and 2008 with our partners in the National Laboratories and universities representing over half of the awardees.

[7] Save Energy Now Results, Industrial Technologies Program, DOE, http://apps1.eere.energy.gov/industry/saveenergynow/partners/results.cfm.
[8] Impacts: Industrial Technologies Program: Summary of Program Results for CY2006 http://www1.eere.energy.gov/industry/about/pdfs/impacts2006_full_report.pdf.

Technological change has long been one of the most profound forces spurring productivity growth in the United States. The development of next-generation products, services, and ways of doing business are central to America's long-term prosperity. Today, the Department is forging even stronger partnerships with the National Laboratories, academia, and industry to address the Nation's energy and climate challenges. Nanotechnology and Combined Heat and Power represent two especially promising areas in which DOE and its partners are working to positively impact the energy intensity, carbon management, and competitiveness of American industry.

Near-Term and Next-Generation Industrial Technology Examples

20 % of U.S. Electricity Generating Capacity	240,900 MW
Annual Energy Savings	5.3 Quads
Annual CO_2 Reduction	848 MMT
Annual Carbon Reduction	231 MMT
Cumulative Jobs Created Through 2030	1 million

Figure 2. ORNL Report identifies potential benefits that could occur if 20% of electrical capacity was CHP by 2030.

Combined Heat and Power (CHP) solutions represent a promising near-term energy option that combines environmental effectiveness with economic viability and improved competitiveness. After years of success in this arena, DOE and its partners are poised to take CHP's potential to the next level. With targeted development and deployment efforts, the United States has the potential to save energy, reduce carbon emissions, create high-quality "green" jobs, improve the Nation's energy security, and stimulate economic growth (see Figure 2).[9] The Department's CHP partnerships have already yielded impressive returns. In December of 2008, Oak Ridge National Laboratory released a report detailing the enormous promise CHP continues to hold. The report, *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future,* suggests that with market and policy incentives, CHP could potentially (and cost effectively) reduce the projected increase in U.S. carbon dioxide emissions by 60 percent by 2030.[10]

The Department is also working to transform nanotechnology science into real-world solutions for industrial nanomanufacturing. As part of the National Nanotechnology Initiative (NNI) established in 2001, DOE worked with industry experts to identify priority needs and opportunities and worked with the National Laboratories to initiate DOE's first call for nanomanufacturing projects. Projects were judged by a diverse team of university, government, business, and consulting nanotechnology experts before the Department ultimately selected 20 projects from 8 DOE National Laboratories.

In concert with its other initiatives, DOE is providing energy technology and deployment solutions that meet industry's critical needs today and deliver the next-generation and transformational technologies that will support America's industrial leadership in the decades ahead.

[9] This level of market penetration would require significant market and policy incentives. A complete analysis of the cost of these incentives for comparison to the above potential benefits has not been completed.
[10] Combined Heat and Power: Effective Energy Solutions for a Sustainable Future, Oak Ridge National Laboratory, December 2008, http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_report_12-08.pdf

Challenges and Opportunities

While the industrial sector has made significant advancements toward more energy efficient practices, a number of barriers remain, such as tight capital markets. In addition, industrial energy efficiency at times suffers from a lack of awareness among the very private sector interests that stand to benefit from its implementation. This situation hampers sound energy management and technology investment policy from becoming implemented. Many of the benefits that industry would enjoy from improved energy management would also provide public benefits, such as reduced emissions of pollutants and greenhouse gases.

However, many of these challenges can be addressed by the type of innovation that the industrial sector has already demonstrated. DOE's Industrial Technologies Program and its partners have already broken ground on the next generation of energy technology in areas such as nanomanufacturing; and cultivating new industries of the future, such as those manufacturing wind turbines, solar panels, and advanced batteries, can contribute to energy security and economic development. By further leveraging its partnerships with industry, universities, and the National Laboratories, the Department will continue to champion collaboration that propels science from the laboratory into the marketplace and helps to meet the Nation's environmental, energy, and economic challenges.

Thank you again for the opportunity to appear before you today. I am happy to answer any questions.