Statement of

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Chairman Wyden, Ranking Member Murkowski, and Members of the Committee: thank you for inviting me to testify today on behalf of the Department of Energy (DOE) regarding energy efficiency.

The Energy Savings and Industrial Competitiveness Act of 2013 outlines new provisions for building codes, financing building upgrades, industrial energy efficiency, and efficiency of Federal buildings among other areas. The legislation would increase DOE's role in providing technical assistance to building code bodies and would expand the type of support that DOE provides to States. It would also establish DOE-administered rebate programs for more energy efficient electric motors and transformers. The Administration is still reviewing the Energy Savings and Industrial Competitiveness Act of 2013 (S. 761) and does not have a position on the bill at this time.

The Administration does, however, support the objectives of improving energy efficiency in the residential, commercial, and industrial sectors and in the Federal government. Energy efficiency is a large, low-cost, but underutilized U.S. energy resource. Increased energy efficiency offers savings on energy bills, opportunities for more jobs, improved industrial competitiveness, and lower air pollution. This year's State of the Union address included a goal to cut the energy wasted by our homes and businesses by half over the next 20 years.

The President also called on us to build on the success of existing partnerships as well as to establish new partnerships, in particular with the States. This includes his call for a new Race to the Top for Energy Efficiency and Grid Modernization challenge. Modeled after the successful Administration approach to education reform to promote forward-leaning policies at the State-level, the President's budget includes $200 million in one-time funding for Race to the Top awards to support State governments that implement effective policies to cut energy waste and modernize the grid.

As Deputy Assistant Secretary for Energy Efficiency in the Office of Energy Efficiency and Renewable Energy (EERE), I am responsible for overseeing DOE's portfolio of energy efficiency research, development, demonstration, and deployment activities. I am pleased to be here today and look forward to working with Congress, and this Committee in particular, and discussing how we can catalyze greater energy efficiency to help address our Nation's energy challenges. My statement today will provide an update on DOE's energy efficiency portfolio, the challenges we are working to address, and the progress we are making.

Homes and Commercial Buildings

Improving energy efficiency in our homes and buildings offers a tremendous opportunity to create well-paying jobs, save money for businesses and consumers, and make our air cleaner. In the U.S., homes and buildings consume 40 percent of the Nation's total energy with an

annual energy bill of more than $400 billion.[1] DOE estimates that these energy bills can be cost-effectively reduced by 20-50%, or more, through various energy efficiency approaches.[2]

DOE uses a portfolio approach to pursue the potential energy savings in buildings. Research and development (R&D) on next-generation building technologies will lead to advances in end-uses representing the majority of building energy consumption, including efficient lighting that is cost-competitive in today's market, new technologies in heating and cooling, and windows that decrease energy demands and improve comfort. Some highlights from DOE's project portfolio include:

- DOE's R&D on solid-state lighting has the potential to reduce lighting energy usage by one-fourth, saving businesses and consumers $15 billion annually.[3] Already, new technology developed with DOE support has led to a solid state bulb with lower life-cycle costs that lasts roughly 25 times longer than traditional incandescent bulbs.
- New heat pump water heaters offer households large savings on water heating, more than 50% in many cases. As a Nation, we spend $34 billion[4] each year on energy for water heating,[5] and heat pump water heaters could free a large percentage of that cost to meet other household expenses. The first of these innovative water heaters that use a hybrid of electric heating and heat pump technologies are being commercially produced here in the United States.
- Efficient windows, pioneered with EERE funding, have played a critical role in the market shift toward double-pane windows with low-emittance coatings, which insulate three times better than typical single-pane windows. More recently, EERE has helped develop and commercialize technology to create better, more efficient windows for cold climates that will allow in more energy than they lose.

DOE also invests in whole building R&D that demonstrates how new energy efficient technologies can function together to create an efficient system, achieve greater overall savings, and inspire the next-generation of buildings. For homes, this will translate into a new generation of housing stock that is durable, uses smarter energy management systems, and offers substantial energy savings. Our recently introduced Challenge Home program is a new and compelling way to recognize builders for their leadership in increasing home energy efficiency, improving indoor air quality, and making homes zero net-energy ready. DOE

[1] *Buildings Energy Data Book*, U.S. Department of Energy. March 2012, http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.2.3.

[2] See, for example, DOE/ASHRAE's *Advanced Energy Design Guides* for commercial buildings (http://www1.eere.energy.gov/buildings/commercial/aedg.html) and DOE's Building America program (http://www1.eere.energy.gov/buildings/residential/ba_index.html).

[3] BTP ET Program Information Sheet: Solid-State Lighting, August 10, 2011.

[4] "Annual Energy Review." EERE Buildings Data Book, 2011, http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=2.3.5.

[5] "Saving Energy." EERE Buildings Technology Program, 2012, http://www.eere.energy.gov/buildings/saving_energy_ge.html.

Challenge Homes are verified by a qualified third party and are at least 40-50% more energy efficient than a typical new home.[6]

In addition to creating energy efficiency opportunities in the new buildings market, DOE invests in activities that target the large savings potential that exists across the stock of existing homes, many built before modern codes. Here, the Department is working with organizations in communities across the country to demonstrate upgrade programs that offer savings of 20% or more for single family and multi-family residences. Within this market space, effective programs are the ones that include three elements: clear, compelling information for homeowners on potential energy savings; skilled workers; and access to financing. To help improve these programs, we are developing new rating tools to help consumers understand the efficiency of their buildings and the opportunities for improvement.

In addition, in late September 2012, EERE reached the major milestone of weatherizing more than one million homes across the country since 2009, while supporting tens of thousands of jobs in local communities. These efforts save eligible families hundreds on their heating and cooling bills in the first year alone. Each year, these programs train thousands of workers in both the public and private sectors, boosting their ability to serve the home retrofit market and helping to grow the clean energy workforce. To ensure the consistency and quality of this growing U.S. workforce, the Department is leading efforts to define Standard Work Specifications for Energy Efficiency Upgrades in residential weatherization and building a foundation for the home energy industry through professional training and certification.

We have similar efforts targeting energy efficiency opportunities for commercial buildings. Two particular efforts to highlight are the Energy Efficient Buildings Hub and the Better Buildings Challenge. To accelerate the development and deployment of energy-saving solutions for commercial buildings, DOE established the Energy Efficient Buildings Hub, a Regional Innovation Cluster headquartered at the Navy Yard in Philadelphia. A key feature of the Hub is the availability of a unique set of buildings as a test bed, including a 30,000-square-foot building that will be used to demonstrate advanced energy retrofits of commercial buildings. The tools developed, lessons learned and best practices from the Hub will ultimately help enable wide-scale deployment in similar climate zones and building types nationwide.

The Better Buildings Challenge (BBC) is a signature partnership effort, with over 110 partners across the commercial, industrial, and public sectors. Together, these partners represent approximately 2 billion square feet of commercial and industrial space, 300 manufacturing plants, and $2 billion in private sector financing. As partners advance toward meeting their individual goals, the BBC website[7] will highlight their commitment and progress, including information on showcase projects and hundreds of replicable implementation models. To date, more than $1 billion of the commitment from private sector financial firms has been extended

[6] A typical new home as built to recent model energy codes. For more information on DOE Challenge Home methodology, see http://www1.eere.energy.gov/buildings/residential/pdfs/ch_label_methodology_1012.pdf.
[7] The BBC website address is www.betterbuildings.energy.gov/challenge.

to projects, and we are continuing to look for ways to expand access to private-sector financing, as this remains an important barrier cited by commercial building owners.

Further, DOE assists with the adoption and implementation of state and local building codes for both commercial and residential buildings. Building codes take advantage of the broader set of efficiency measures available during construction and major renovations. The Department emphasizes updating codes based on cost-effective savings opportunities and assisting state and local governments with ensuring code compliance so that savings are realized. To accomplish its objectives in this area, DOE has developed a suite of assistance tools it routinely provides to state and local authorities.

Advanced Manufacturing

The U.S. manufacturing sector also offers important opportunities for cutting energy waste, while improving our industrial competitiveness and promoting economic growth. In the United States, manufacturing represents about 12% of the gross domestic product and nearly 12 million jobs.[8] The Department's investments in advanced manufacturing are geared toward developing next-generation technologies, processes, and materials that offer substantial improvements in efficiency across a product lifecycle and at costs competitive with current technologies. We are also assisting industry with strategic energy management and combined heat and power (CHP). This portfolio will enhance the competitiveness of U.S. manufacturing now and for the longer term.

In the State of the Union address, President Obama called for a network of manufacturing innovation institutes that will help to support investment in U.S. manufacturers' competitiveness and accelerate innovation in manufacturing. The Department of Energy is a partner in the pilot institute, the National Additive Manufacturing Innovation Institute (NAMII), located in Youngstown, Ohio. NAMII is bridging the gap between basic research and product development for additive manufacturing, providing shared assets to help companies (particularly small manufacturers) access cutting-edge capabilities and equipment, and creating an environment to educate and train workers in advanced additive manufacturing skills. Additive manufacturing techniques create 3-D objects directly from computer models, depositing material only where required. These new techniques, while still evolving, are projected to exert a profound impact on manufacturing for high-value products. They can give industry new design flexibility, reduce energy use, and shorten time to market. To realize the full potential of additive manufacturing, the technology will need to be integrated into broad manufacturing solutions. In applications where additive manufacturing is competitive, DOE estimates that 50% or more energy savings could be realized.

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[8] Full-time and Part-time employees by industry, U.S. Department of Commerce, http://www.bea.gov/iTable/iTable.cfm?reqid=5&step=4&isuri=1&402=43&403=1#reqid=5&step=4&isuri=1&402=43&403=1
Value added by industry as percentage of GDP, U.S. Department of Commerce, http://www.bea.gov/iTable/iTable.cfm?reqid=5&step=4&isuri=1&402=5&403=1#reqid=5&step=4&isuri=1&402=5&403=1

In January, the Department announced the selection of Ames Laboratory to establish an Energy Innovation Hub that will develop solutions to help address the domestic shortages of rare earth metals and other materials critical for U.S. energy security. The Critical Materials Institute (CMI) will bring together leading researchers from academia, Department of Energy National Laboratories, and the private sector. CMI will focus on technologies that will enable the U.S. to make better use of available materials as well as eliminate the need for materials that generally must be imported from overseas and are subject to supply disruptions. These critical materials, including many rare earth elements, or the development of feasible substitute technologies are essential for American competitiveness in the clean energy industry; many materials deemed critical by the Department are used in modern clean energy technologies such as wind turbines, solar panels, electric vehicles, and energy-efficient lighting.

In addition to investments in advanced process and materials R&D, the Department has active technical assistance programs aimed at reducing manufacturing energy intensity by 25% over ten years by engaging a diverse set of industry partners in effective business models, continuous improvement in energy efficiency, modeling key processes, and supporting standards and certifications for third-party services. DOE technical assistance also supports the achievement of the national goal set by President Obama in an Executive Order last August of developing 40 gigawatts of new, cost-effective industrial CHP by 2020. And, DOE provides tools to support improvements in a number of common systems in manufacturing facilities, including motor, steam, compressed air, and pumping systems.

Appliance and Equipment Standards

In addition, the Department implements minimum energy conservation standards for more than 60 categories of appliances and equipment. As a result of these standards, energy users across all sectors are estimated to have saved tens of billions of dollars on their utility bills in 2010. Since 2009, 17 new or updated standards have been issued, which will help increase annual savings even further over the coming years.

Most recently DOE finalized a standard for three types of distribution transformers that take effect in 2016. The standard for low-voltage dry-type transformers, which are typically used by commercial and industrial users, represents 30% savings over the prior standard and provides estimated net benefits of up to $11.8 billion on equipment sold through 2045[9]. The two other types of distribution transformers that were subject to this rulemaking, liquid-immersed and medium-voltage dry-type transformers, are used primarily by electric utilities in outdoor settings as opposed to inside buildings. These two standards combined provide estimated net benefits of up to $5.7 billion on equipment sold through 2045.

Federal Lead-By-Example

Finally, DOE plays a critical role in providing technical assistance to Federal agencies to increase understanding and accelerate cost-effective adoption of energy-saving technologies and strategies. The U.S. Federal government is the Nation's single largest user of energy and has

[9] Net present value of net benefits, in 2011 dollars, estimated at a 3% discount rate.

both a tremendous opportunity and an acknowledged responsibility to lead by example in saving energy. In December 2011, President Obama signed a Presidential Memorandum directing the Federal government to enter into a minimum of $2 billion in performance-based contracts over the next two years for energy retrofits on Federal buildings. Agencies have identified a pipeline of over $2 billion in energy efficiency projects for Federal buildings that will be contract awards by December 31, 2013. These projects will use energy savings to pay for project implementation costs, achieving substantial energy savings at no net cost to the American taxpayer. More than $500 million in projects have already been awarded, which will also help agencies meet the government's goals to reduce Federal building energy consumption per gross square foot by 30% from 2003 through 2015; increase renewable energy use to 7.5% annually; reduce water use intensity by 26% from 2007 through 2020; reduce vehicle petroleum use by 2% annually; and reduce greenhouse gas emissions by 28% from 2008 through 2020.

Federal data center optimization and closures, the use of Energy Star and EPEAT-registered computers and power management also remain important opportunities for energy savings.

Conclusion

Through R&D, deployment, and collaborations at all levels of government and the private sector, the Department of Energy aims to capitalize on the opportunities that energy efficiency affords. The Department's efforts to lead in next-generation buildings and advanced manufacturing will result in a more secure, resilient, and competitive energy economy. While we are making progress, continued efforts are necessary to capture the full set of opportunities.

Thank you again for the opportunity to speak to this important issue, and I would be happy to answer any questions.