Statement of

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Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee: thank you for inviting me to testify today on behalf of the Department of Energy (DOE) regarding energy efficiency. As Secretary Chu has said, energy efficiency is not just the low hanging fruit. It is the fruit that's lying on the ground. That is because investment in energy efficiency offers increased energy productivity, improved U.S. competitiveness, consumer savings, domestic jobs, greater reliability of our energy systems, and positive impacts on the environment.

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 Subcommittee in particular, to talk about how we can use energy efficiency as a tool to help address our Nation's energy challenges.

Today, I will discuss the Department's efforts and recent achievements to help the American people and businesses save money by lowering utility bills in buildings, to enhance American competitiveness and energy productivity through advanced manufacturing, and to reduce fuel consumption and lower the cost of transportation.

1. Homes and Commercial Buildings

Improving energy efficiency in our 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] 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 building components, 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:

- R&D on solid-state lighting under DOE's multi-year program plan 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 bulb that lasts roughly 25 times longer than traditional incandescent bulbs with lower life-cycle costs.

[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.

- New heat pump water heaters offer households large savings on water heating, more than 50% in many cases. As a nation, we spend $33 billion[4] each year on energy for water heating, 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 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.

R&D focused on whole buildings moves us toward next-generation buildings, including homes that are durable, enable smarter energy management, and offer 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 and incentivize incorporation of such technologies, which would improve indoor air quality, and make homes zero net-energy ready. DOE Challenge Homes are verified by a qualified third party and are at least 40-50% more energy efficient than a home built to recent model energy codes.[5]

To address the large stock of existing homes, we are working with organizations to demonstrate upgrade programs that offer savings of 20% or more for single family and multi-family residences. We are also developing new rating tools to help consumers understand the efficiency of their buildings and the opportunities for improvement. In addition, between 2009 and late September 2012, EERE reached the major milestone of weatherizing more than one million homes occupied by low-income families across the country, while supporting tens of thousands of jobs in local communities. Since the Weatherization Assistance Program began in 1976, more than 7.9 million homes have been weatherized, saving eligible families hundreds of dollars on their heating and cooling bills annually. 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 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.

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

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

[5] For more information on DOE Challenge Home methodology, see http://www1.eere.energy.gov/buildings/residential/pdfs/ch_label_methodology_1012.pdf.

to demonstrate advanced energy retrofits of commercial and multi-unit residential 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.

In addition to R&D and deployment efforts, the Department implements minimum energy conservation standards for more than 60 categories of appliances and equipment. As a result of these standards implemented since 1987, energy users are estimated to have saved tens of billions of dollars on their utility bills in 2010. Since 2009, 16 new or updated standards covering more than 30 products have been issued, which will help increase annual savings even further over the coming years.

Strategic collaborations across the public and private sectors are central to achieving energy efficiency goals. DOE supports lead-by-example programs across the Federal government, the development of energy efficiency-enabling state and local policies, and the establishment of replicable energy efficiency models from market leaders.

The U.S. Federal government is the Nation's single largest user of energy and has both a tremendous opportunity and an acknowledged responsibility to lead by example in saving energy. DOE has played a critical role in providing technical assistance to Federal agencies to increase understanding and accelerate cost-effective adoption of energy-saving technologies and strategies. 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 goal to reduce Federal building energy consumption per gross square foot by 30% from 2003 through 2015.

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 approximately $2 billion in private sector financing. As partners advance toward meeting their individual goals, the BBC website[6] will highlight their commitment and progress, including information on showcase projects and hundreds of replicable implementation models.

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 proposed to work with the states to achieve this goal, with Federal support for the states with the best ideas to create jobs and lower energy bills through energy efficiency in buildings. The Department is ready to support

[6] The BBC website address is www.betterbuildings.energy.gov/challenge.

this challenge, building on the success of existing partnerships with the public and private sectors.

2. Advanced Manufacturing

In the United States, manufacturing represents about 12% of the gross domestic product and 12 million high-paying jobs.[7] 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) solutions. 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.

Last month, 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 forthcoming 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.

[7] Bureau of Labor Statistics, Nov. 2012, Industries at a Glance, Workforce Statistics, http://www.bls.gov/iag/tgs/iag31-33.htm.

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 third-party services. For example, the DOE Superior Energy Performance certification program that uses the ISO 50001 energy management standard provides verification of energy performance improvement and therefore validates the benefits delivered by third party energy service providers. 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.

3. Transportation

EERE's Vehicle Technologies Office (VTO) accelerates the development of advanced, energy-efficient, environmentally-friendly transportation technologies that reduce petroleum consumption and lower greenhouse gas emissions without sacrificing vehicle performance. The VTO portfolio reflects a mix of near- and long-term technologies including advanced batteries, power electronics and electric motors, lightweight materials and propulsion materials, advanced combustion engines, advanced fuels and lubricants, and vehicle systems and enabling technologies. Program activity covers technologies applicable to a broad range of vehicles from light-duty passenger cars to heavy-duty trucks.

The Department's Clean Cities initiative, a community-based transportation deployment activity, provides technical assistance to fleets and informational resources to help consumers save money on their personal transportation, whether they are looking for a new car or tips for increasing the fuel efficiency of their current car.

In tandem with the Administration's historic new light-duty fuel economy and medium- and heavy-duty fuel efficiency standards, DOE's work in all of these areas will help enable the continued reduction in vehicle fuel consumption, provide consumers with a variety of choices to save money at the pump (or avoid the pump altogether), and strengthen our national energy and economic security by reducing our dependence on oil.

While we embrace the portfolio approach, given the potential for significant benefit to our nation and individual consumers, the Department has placed increased emphasis on vehicle electrification. Plug-in electric vehicles (PEVs) – both plug-in hybrid electric vehicles and all-electric vehicles – make sense for a number of reasons:

- Electricity is cheaper than gasoline for powering a vehicle (at about $1 per gallon equivalent gasoline price),
- PEVs allow for convenient charging at home at night, or potentially at work,
- PEVs can potentially offer the same or better driving performance compared to today's gasoline powered vehicles, and
- PEVs will reduce America's dependence on petroleum, protecting consumers from price spikes and keeping the money Americans spend on energy here at home.

Last year, the Administration launched the *EV Everywhere* Grand Challenge to bring together America's best and brightest scientists, engineers, and businesses to work collaboratively to make electric vehicles as affordable and convenient to own and drive as today's gasoline-powered vehicles within the next 10 years. In January, Secretary Chu announced the Workplace Charging Challenge, an initiative that brings us one step closer to fulfilling the *EV Everywhere* vision. The challenge aims to increase the convenience of owning a PEV by expanding drivers' access to charging stations in cities across America.[8]

Conclusion

Energy efficiency is a large, low-cost, but underutilized U.S. energy resource. 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 building and vehicle technologies, advanced manufacturing, and energy efficiency best practices will result in a more secure, resilient, and competitive energy economy.

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

[8] For more information, see the "*EV Everywhere* Grand Challenge Blueprint," January 2012, http://www1.eere.energy.gov/vehiclesandfuels/electric_vehicles/pdfs/eveverywhere_blueprint.pdf.