Testimony of
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Chairman Issa, Ranking Member Cummings, and Members of the Committee, thank you for the opportunity to appear before you today to discuss the Department of Energy's (DOE) programs to strengthen our energy security, to advance clean energy innovation, to create jobs for the American people, and to make the U.S. more competitive in the global economy.

In the U.S., we spend more than a trillion dollars a year on primary energy.[1] Worldwide, between five and ten trillion dollars are spent on energy every year. Energy represents a large and growing segment of the global economy.

The demand and corresponding markets for energy worldwide are expected to increase dramatically as the economies and the middle classes in countries like China and India continue to grow. As global demand for energy grows, the need to secure affordable energy resources will continue to drive demand for clean energy technologies in nations around the world.

This is not just something that will happen five, ten, or twenty years down the line. This is happening today. Countries are moving aggressively to develop and deploy the clean energy technologies that will transform the global energy economy in the coming decades.

Global investment in clean energy reached $243 billion in 2010, up 50 percent from 2009.[2] And the pace of growth shows no signs of slowing.

Take the solar energy industry for example, just one segment of the broader clean energy economy. The International Energy Agency projects that solar power will grow steadily, and could grow to produce nearly a quarter of the world's electricity within four decades.[3] That would require the manufacturing of trillions of dollars-worth of equipment in solar technologies, including more than $3 trillion in solar panels alone — a significant economic and employment opportunity to be seized by the companies and countries that successfully innovate and compete.

This is a race. It is a race to capitalize on the tremendous economic and job growth potential in these industries. It is a race to develop the technologies and the manufacturing capacity that will be a foundation for the future prosperity of the United States.

[1] http://www.eia.gov/totalenergy/data/annual/txt/ptb0105.html
[2] Pew Charitable Trusts (2011), "Who's Winning the Clean Energy Race? 2010 Edition."
[3] http://www.iea.org/papers/2010/pv_roadmap.pdf and http://www.iea.org/papers/2010/csp_roadmap.pdf

Our competitors are stepping up and they are playing to win. The United States once led the world in clean energy investments. Now we rank third, behind China and Germany.[4] So we have a choice to make today -- we can compete successfully in the global marketplace — creating American jobs and selling American products — or we can resign ourselves to importing more of the technologies of tomorrow from abroad.

We are therefore taking measures to successfully compete in these emerging global industries and to diversify our energy portfolio by investing in clean energy. We are deploying American assets, innovation, and technology so that we can safely and responsibly develop more energy here at home, be a leader in the global energy economy, and compete for the new jobs of today and of tomorrow.

Over the past two and a half years, under President Obama's leadership, we have taken unprecedented steps to begin building America's clean energy economy.

This is a race, and it is a race we can and should win. But we must also recognize that this is not a race that can be won over night. It is going to take a sustained commitment for the U.S. to build a competitive foundation in the clean energy economy.

And we must recognize that in many cases, American companies are forced to compete against foreign companies with significant state support. China, for example, is providing considerable financing and other support to Chinese solar manufacturers, and Germany, Italy, and other countries are using a range of other policies to promote renewable deployment.

That is why our efforts at the Department of Energy and across the federal government play such an important role in helping our companies succeed and growing our economy.

It is why we have supported a broad portfolio of energy technologies that are creating jobs for U.S. workers and strengthening our energy security. This includes efforts across the Administration to safely expand access to oil and natural gas resources; to restart our domestic nuclear industry; to support the launch of new carbon capture and storage projects; to deploy a new fleet of electric and alternative-fuel vehicles; to develop advanced biofuels and more efficient engines to reduce our dependence on oil; to improve the efficiency of America's homes, buildings and factories to save money for consumers and businesses; to deploy renewable energy resources like wind and solar that will diversify America's energy portfolio; and to modernize this country's electrical grid.

These clean energy investments by the federal government and the private sector are building the foundation for new industries in America and improving our ability to take a leadership role in defining the future of the world economy.

[4] Pew Charitable Trusts (2011), "Who's Winning the Clean Energy Race? 2010 Edition."

Role of Government

Some have questioned what role, if any, government should play in the development of new energy technologies. After all, the fountainhead for innovation and entrepreneurial activity is the private sector, not government. And the vast majority of energy assets — from power generation and our air, sea and land transportation fleets to the manufacturing base that builds them and the service sector that operates them — lie in private hands.

But there are certain things the private sector cannot reasonably be expected to do in a free market economy, including undertaking investments in clean energy research and development that have high technology risks, or pursuing projects that primarily confer national benefits beyond the return to shareholders, such as enhancing national security or decreasing pollution.

Smart government policies can play a crucial catalyzing role in promoting research and development and supporting emerging technologies. Research and development creates knowledge whose benefits are not fully captured by the individuals and businesses who pay for the research. Government investments in early-stage technologies, which private investors are often unwilling to fund due to technology and market risks and long payback periods, therefore have played an important and accepted role in American innovation. By supporting this innovation through grants and other programs, government can help secure broader benefits for the economy as a whole.

For example, the Department of Energy invested over a hundred million dollars in developing technology to unlock unconventional gas from shale deposits in the late 1970s and early 1980s when private companies showed little interest in that opportunity; this nation now is more secure as a result, obtaining over a quarter of our natural gas supplies from shale deposits.

And while venture capital and private equity have invested in innovation and the development of some clean energy technologies, commercial lenders have been generally unwilling or unable to underwrite the large-scale, risky, long-payback loans that are necessary for first movers to deploy and validate clean energy technologies at scale. Government policies – in the form of grants, tax credits, and loan guarantees – can help address the market and technology risks of bringing innovative technologies to scale by supporting projects that demonstrate the real-world feasibility of a new technology to potential financers.

Congress has long recognized the compelling policy rationale of investing in early stage energy technologies. Indeed, Congress recognized the need to help overcome the market barriers to investment in innovative energy technologies by creating DOE's Title XVII loan programs in the Energy Policy Act of 2005 and subsequently creating and funding the 1705 program in the American Recovery and Reinvestment Act of 2009.

To be clear, the private sector will ultimately make the decisions and investments that will drive the transformation to a clean energy future for America. But the public sector has a role to play, as it always has, as a leader by example in implementing clean energy and deploying energy efficient technologies, and as a catalyst in unlocking the ingenuity and capital of the American marketplace.

Not all of the energy technology endeavors we invest in will succeed. This is expected. Innovation requires an inherent risk due to the newness of technology and the difficulties scaling up and overcoming market barriers. But we must innovate. Innovation is the key to competitiveness. By pursuing a diverse portfolio of technologies, we work to identify promising innovative technologies and bring them online to address the energy challenges we have and to meet demand around the world.

By advancing innovation through research and development, supporting commercialization of new technologies, promoting American manufacturing capacity, and enabling the deployment of innovative clean energy technologies at commercial scale, we can create a strong and successful clean energy industry in America that will support new jobs and industries in the years ahead.

Innovation

As Bill Gates, the Founder and Chairman of Microsoft, said recently, "We have seen time and again the catalyzing role the federal government can play in technological breakthroughs — GPS, the Internet, and commercial aviation to name a few — with important societal and economic benefits. Today, there is no more important issue deserving of increased government research funding than clean energy."

I could not agree more. The federal government has a critical role to play spurring innovation and supporting research and development efforts for the technology breakthroughs needed to win the clean energy race.

The private sector is generally not willing to invest in early-stage innovative technologies without a strong signal of market demand. These are technologies, however, that could create entire new industries and generate enormous benefits for the country, just as the Defense Advanced Research Projects Agency's (DARPA) investments led to the Internet, which along with subsequent technology and business developments drove enormous gains in our productivity and economic growth by changing the way we lead our lives.

That is why, as part of the Obama Administration's renewed commitment to research and development, the Department of Energy launched the Advanced Research Projects Agency-Energy (ARPA-E) to develop game-changing clean energy technologies. Based on the DARPA model, ARPA-E invests in cutting-edge, high-risk technologies that, if successful, could transform the global energy economy by fundamentally changing the way we use and produce energy.

To date, the Department of Energy has supported more than 120 individual projects under ARPA-E, including projects to develop improved energy storage devices for the grid; intelligent building systems; next generation vehicle batteries that could make longer range electric cars that are cheaper than today's gasoline cars; and groundbreaking new liquid fuels that could be produced by bacteria from a combination of carbon dioxide and chemical energy or electricity.

Even after just two years, many of ARPA-E's projects are already generating additional private sector investment. For example, eleven of the projects receiving $39.1 million in ARPA-E

funding have collectively garnered more than $200 million in follow-on funding. Also, several new ventures have already formed spin-off companies from ARPA-E-funded projects, creating yet more new technologies, products, and jobs.

The Department of Energy is also focused specifically on advancing innovation in the solar energy sector, where we face some of the toughest competition from abroad. Building on the success of some of the Department's previous solar energy research investments, this year Secretary Chu launched the SunShot Initiative, an ambitious effort to make solar energy technologies cost-competitive with fossil energy by the end of the decade. Whoever can bring installed solar energy to a competitive price point relative to other sources of power generation will gain a major competitive edge in solar manufacturing. We want that competitive edge to propel companies to invest in production capacity and research laboratories here in the U.S.

By focusing on the full solar energy system, from solar cells and modules to the mounting devices and the permits that are needed for installation, the SunShot Initiative will help spur American technology innovation, while developing ways to help keep solar manufacturing here in America.

An example to show you what I mean:

Through the Photovoltaic — or PV— Incubator program, the Department of Energy invested relatively modest sums — $56 million between 2007 and 2010 — in twenty innovative solar energy start-up companies. Those investments enabled technical advances that helped the companies to scale their technologies and, to date, these same firms have attracted more than $1.3 billion in private investment — a 25-to-1 leveraging of the Department's contribution. According to information provided by these companies, they already employ more than 1,200 people in high-tech jobs — a number that is poised to grow rapidly as new manufacturing facilities come online.

Another example: Semprius is a solar startup company based in Durham, North Carolina, that manufactures high-concentration photovoltaic solar modules. It got its start with a DOE-supported research project at the University of Illinois. It was awarded a $3 million PV Incubator grant in 2010. Earlier this summer, the company announced its plans to build a new high-tech manufacturing facility in Henderson, North Carolina, which is expected to create more than 250 full-time jobs over the next five years. The announcement of the new facility followed on the heels of news that Siemens recently participated with others in a $20 million investment in the company, bringing needed private capital off the sidelines and into the economy.

The success of the company so far and the hundreds of jobs it is creating in a hard-hit community in North Carolina shows the tremendous benefits that can come with strategic federal investments in innovation.

Manufacturing

As Secretary Chu often says, our motto can and must be, "Invented in America, made in America, and sold around the world." While the United States has long been the world's leader

in manufacturing, we have lost the lead in some areas such as clean energy manufacturing, where other countries have invested heavily. With strong leadership, we can regain lost ground and establish new footholds in the competition for clean energy manufacturing. That is why the President has focused on expanding U.S. manufacturing capacity by launching the Advanced Manufacturing Partnership and other programs so that the products we develop here are built here.

The investments that we made under the Recovery Act have played a critical role in rebuilding U.S. manufacturing, reviving supply chains across the country, and putting people back to work. Take the example of the domestic battery manufacturing sector for electric vehicles. As part of the President's efforts to dramatically reduce America's dependence on oil through vehicle electrification, alternative fuels, and increased fuel efficiency, the Department of Energy made key investments in advanced battery and component manufacturing plants across the country, along with a select number of electric vehicle manufacturing facilities. These plants, all of which are under construction now, are responsible for thousands of construction jobs. Once complete, they will support thousands of direct manufacturing jobs in their communities, according to recipient companies' estimates.

In 2008, the United States was producing virtually zero batteries for electric vehicles. As a result of the investments we have made, by 2015 the U.S. will have the capacity to produce enough batteries and components to support one million plug-in hybrid and electric vehicles per year, approximately 40 percent market share in this emerging automotive industry, which employs Americans all across the country.

In addition to creating manufacturing jobs and expanding the supply chain, these investments have also helped cut the cost of producing electric vehicle batteries, a key factor in reducing the overall cost of electric vehicles. Because of new high-volume manufacturing and technological improvements, 100-mile range batteries that cost $33,000 in 2008 are anticipated to cost about $16,000 by the end of 2013 and $10,000 by the end of 2015.[5]

It was by no means a given that these companies were going to establish their manufacturing facilities in the U.S. In fact, we faced tough competition from many of our European and Asian competitors. For many of these companies, it was the support from the federal government through DOE grants under the Recovery Act and through the Advanced Technology Vehicle Manufacturing (ATVM) Loan program that helped these and other companies make the decision to bring their commercial-scale manufacturing facilities to America.

As an example of the impact of DOE grants, Mary Ann Wright, Vice President and Managing Director of the Business Accelerator Project at Johnson Controls, Inc., testified before the House earlier this year and said, "In August 2009 we were awarded a Recovery Act matching grant to create an advanced battery manufacturing industry in the United States. This grant, along with significant incentives from the State of Michigan, played a key role in our decision to build a manufacturing plant for advanced batteries in this country. Without this support from the DOE, we would have likely expanded our manufacturing footprint in Europe or Asia. As a result of the

[5] http://www.whitehouse.gov/files/documents/Battery-and-Electric-Vehicle-Report-FINAL.pdf

Recovery Act grant, we also re-located our electronics engineering from France to Holland, MI creating new, high quality jobs."[6]

And she's not the only one. David Vieau, the Chief Executive at A123 Systems, a DOE grant recipient, told a reporter, "This money was instrumental in the decision to put manufacturing in North America. We think that without this, it's very unlikely that plants of this size and nature would have been happening in the U.S."[7]

Based on numbers from the company, there are now more than 1,000 Michigan-area residents trained and working at two new A123 Systems facilities. It's easy to forget that each of these 1,000 workers has their own story of the impact this has had on their lives. Today we are releasing a video based on an interview with one of the A123 Systems employees, Annette Herrera. She talks about her struggles finding a job, her gratitude to have found one, and the joy she finds in this new profession. Her story is available on the Department's website, and there are workers like Annette all across the country.

In addition, Nissan received an ATVM loan to build a new manufacturing facility for the all-electric Nissan Leaf vehicle in Smyrna, Tennessee. The company reports that between 700 and 800 construction workers are on the job building the facility. The retooling work is just starting to modify an existing vehicle assembly line to enable the assembly of up to 150,000 Nissan Leafs annually in addition to the other Nissan vehicles currently being assembled in Smyrna, Tennessee. Once construction is completed, Nissan expects that the plant will support more than 1,300 permanent jobs.

The workers at each of these manufacturing plants are doing their part to rebuild America's automotive industry, reduce our dependence on oil, and help U.S. companies to succeed in the global market.

Supporting Private Sector Commercialization Efforts

In addition to investing in research and development and helping to expand U.S. manufacturing capacity, the government often has a role to play in commercializing emerging technologies, particularly where private financing is not sufficiently available to support investment at commercial scale.

The Department of Energy has undertaken a number of steps to help the private sector successfully move technologies from the laboratory to the market, to create new jobs, and to get capital flowing back into the economy.

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[6] Testimony of Mary Ann Wright, Vice President and Managing Director, Business Accelerator Project, Johnson Controls, Inc. Johnson Controls, Inc. before the United States House Select Committee on Energy Independence and Global Warming (March 10, 2010): http://globalwarming.house.gov/files/HRG/031010recovery/wright.pdf

[7] http://www.wilx.com/news/headlines/102780214.html)

Here are just some of the many actions we are taking to facilitate the growth and success of America's clean energy companies, to support private sector efforts to commercialize new products, and to address ongoing challenges faced by clean energy investors and entrepreneurs:

- **Spurring the deployment of commercial-scale manufacturing and power generation projects through loan programs**

In nascent industries, there are often technology and market risks that private sector lenders cannot or will not underwrite. As mentioned above, Congress recognized the need to help overcome the market barriers to investment in innovative energy technologies by creating DOE's Title XVII loan programs in the Energy Policy Act of 2005 and subsequently creating and funding the 1705 program in the American Recovery and Reinvestment Act of 2009. This program offers loan guarantees to innovative clean energy manufacturing or power generation projects in those instances where private financial markets have been unwilling in many cases to take the risks associated with bringing innovative technologies to scale and has been crucial to the deployment of renewable energy technologies. Additionally, the 1703 loan program also supports nuclear and advanced fossil energy projects, and the ATVM program provides loans for more efficient vehicles and components as previously mentioned.

Our loan programs are today supporting a diverse portfolio of more than 40 companies that plan to employ more than 60,000 Americans directly and give us a chance to compete and succeed in the global clean energy race.

The projects are spread across the country, and reflect an array of clean energy and automotive technologies, including wind, solar, advanced biofuels, geothermal, transmission, battery storage, and nuclear. They include:

- Three solar manufacturing projects;
- Two electric vehicle manufacturing facilities in the U.S.;
- The world's largest wind-farms;
- Two of the world's largest concentrated solar power facilities;
- The first new nuclear power plant expected to begin construction in the U.S. in the last three decades; and
- The world's first flywheel energy storage plant.

Cumulatively, these projects will generate more than 35 million MWh of clean energy each year — enough to power over three million households, or more than all the households in Arizona.[8] And they will avoid over 20 million tons of CO_2 annually — more than is produced by the nearly four million registered vehicles in Louisiana.[9] These environmental and national security benefits come hand in hand with job creation.

[8] Sources: EIA 2005 Residential Energy Consumption Survey, Table US8; U.S. Census Bureau, American FactFinder, 2010.

[9] Sources: U.S. Environmental Protection Agency, Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle; U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2008, Table MV-1 (December 2009).

- **Promoting capital investments in renewable energy projects**

Imagine being eligible for a tax credit to deploy renewable energy technologies that would contribute to our national security, reduce emissions, and create jobs, but you could not receive the credit because you did not owe enough in taxes. That was the situation for many developers interested in investing in American renewable energy projects who could not claim the investment tax credit or production tax credit for otherwise eligible projects, thus inhibiting economic activity. In response, Congress created the 1603 program under the Recovery Act, which provides payments-in-lieu-of-tax credits for renewable energy projects. The program, which is administered by the Treasury with support from the Department of Energy, has spurred investment in a broad range of renewable energy projects — from large-scale wind farms to a small solar array on the top of a dentist's office, and everything in between. Since 2009, the program has catalyzed $20 billion in private capital to support nearly 20,000 renewable projects, with projects in place in every state in the nation and the District of Columbia. All told, these projects are generating enough clean energy to power more than 3 million homes, or enough energy to power all the homes in Virginia.

It is important to recognize that these projects would have been eligible for the existing investment tax credit or production tax credit, but through the 1603 program, investors without a current tax liability can receive an immediate payment that frees up capital once a project is completed, instead of carrying over the tax credit to a subsequent year. And in many cases, we have seen developers reinvest the capital back into projects, further stimulating the economy and creating more jobs.

- **Promoting energy efficiency and clean energy improvements**

As part of the Better Buildings Initiative, President Obama set an ambitious goal of reducing energy use in the commercial buildings sector 20 percent by 2020. This could generate nearly $40 billion in savings every year. [10] The Initiative, which is co-led by the President's Council on Jobs and Competitiveness and former President Clinton, calls for tax incentives, innovative financing, increased training and better policies, codes and regulations, and performance standards.

President Obama also issued a challenge to university presidents and private sector CEOs across the country to come together to invest in the energy efficiency of their facilities. These investments are good for their bottom-line, good for the economy, and good for the planet.

The President also is leading by example. As the largest U.S. energy consumer, the Federal Government has a tremendous opportunity to reduce energy consumption in the approximately 500,000 buildings it owns and more than 600,000 fleet vehicles it operates. That is why the President signed Executive Order 13514 to help move the nation towards a clean energy economy by practicing what we preach and improving the government's energy efficiency while expanding our use of clean energy, further driving market demand to support clean energy jobs.

[10] http://www.whitehouse.gov/the-press-office/2011/02/03/president-obama-s-plan-win-future-making-american-businesses-more-energy

Energy efficiency improvements in the industrial and residential sectors also can deliver tremendous savings and economic benefits while creating jobs that cannot be off-shored.

For example, the Texas Medical Center in Houston, the world's largest medical center, recently celebrated the completion of an energy-efficient, 48 megawatt combined heat and power system, which channels energy that conventional electricity generation plants would waste as heat back into the system to power things like the air conditioning, space heating, chilled water – or even to generate additional electricity. The Medical Center projects that the new system, which was funded in part by a $10 million Recovery Act grant, will help save about $200 million in energy costs over the next 15 years. According to the electricity company on site, the Thermal Energy Corporation, the project supported approximately 400 jobs directly associated with construction of the combined heat and power plant.[11]

In addition, DOE's Weatherization Assistance Program uses best practices and technologies to help low-income households save money by saving energy. Since 2009, DOE has already helped make the homes of more than 500,000 low-income families more energy-efficient. On average, these families save more than $400 on their energy bills in just the first year, in addition to providing significant non-energy benefits like keeping homes warmer in the winter and cooler in the summer.[12] Program recipients in all 50 states and the U.S. territories reported over 14,000 jobs across the country with additional jobs generated in the supply chain.

- **Streamlining processes to move technologies to market faster and cheaper**

Earlier this year, the Department launched the "America's Next Top Energy Innovator" challenge, which gives start-up companies the opportunity to exercise options agreements to license groundbreaking technologies developed by the Department of Energy's national laboratories for $1,000 each and to build successful businesses. As part of this effort, the Department reduced both the cost and the paperwork requirements for start-up companies to obtain licensing agreements for the thousands of patents and patent applications held by our 17 national laboratories.

As Vice President Biden explained when announcing the first commercial agreement under the program, "Now, more than ever, America's future competitiveness depends on our ability to innovate and our capacity to live up to our rich history of technological advancement. This kind of public-private partnership fosters extraordinary innovation, allows brilliant ideas to develop, and gives businesses the tools they need to bring technology to the market."[13]

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[11] http://energy.gov/articles/world-s-largest-medical-center-now-among-most-energy-efficient, http://www.texasmedicalcenter.org/root/en/TMCServices/News/2009/11-15/10+Million+Awarded+for+TECO's.htm

[12] http://weatherization.ornl.gov/pdfs/ORNL_TM-2010-66.pdf

[13] http://energy.gov/articles/vice-president-biden-visits-national-renewable-energy-laboratory-announces-first-agreement

The Colorado-based startup US e-Chromic, LLC, will be using a technology developed at the Department's National Renewable Energy Laboratory (NREL) to create a new thin-film window material that makes windows more energy-efficient while reducing cooling costs for consumers.

Supply Chains

In both manufacturing and large-scale deployment, the indirect jobs created can be at least as significant as the direct jobs that result from a specific grant or loan. As a result of the Administration's comprehensive approach to building America's clean energy future, we have seen supply chains across the country reenergized in new ways.

When we discuss supply chains, we are referring to the entire flow of commerce among manufacturers and their suppliers. This includes equipment and product suppliers that provide materials, software, hardware, etc., for a specific project.

For example, last year the Department awarded a $117 million loan guarantee to build the Kahuku wind farm in Hawaii that will supply clean electricity to roughly 7,700 Oahu households per year. The project employed 200 workers during construction, using wind turbines that were built in Cedar Rapids, Iowa. The project also features a state of the art energy storage system supplied by a company in Texas. All told, the supply chain reached 104 U.S. businesses in 21 states.

Additional economic development also results from new workers joining a community or having additional resources to spend.

That's what we see happening in Gila Bend, Arizona, a town of about 2,000 residents that sits nearby three large-scale solar facilities under construction. So far, about 850 construction workers are working near the town, bringing with them millions of dollars in economic benefits. One of the owners of a local lunch spot in town — Little Italy — explained that because of the work, the restaurant's business is up at least 20 percent from the previous summer.

Policy Direction

The government also has an important role to play setting policies that can provide direction and signal stability to the market.

For example, since 2009, President Obama has led the effort to establish aggressive fuel efficiency standards for vehicles that will dramatically reduce the amount of oil and gasoline needed to power America's cars and trucks. By working in partnership with auto manufacturers, autoworkers, environmental groups and other stakeholders, the Department of Transportation (DOT) and the Environmental Protection Agency (EPA) have been able to propose and implement a series of historic standards, the first of which are already in effect for the cars and trucks rolling off assembly lines now.

These standards establish a framework for the private sector to succeed. They encourage manufacturers and auto companies to continue to innovate by providing clear direction for the

market. With that policy direction, companies can move forward with investments that make commercial sense and create jobs.

For instance, with the certainty of new fuel efficiency levels in the coming years, Ford Motor Company has begun the process of retrofitting and upgrading 13 factories across Illinois, Kentucky, Michigan, Missouri, and Ohio to produce more fuel-efficient vehicle models. The company is employing 33,000 people in these efforts.

And earlier this summer, President Obama took the additional step of announcing fuel efficiency standards for passenger vehicles out through 2025, which would provide the market with policy certainty over the medium and long-term. Under the President's leadership, DOT and EPA, along with the State of California and thirteen of the world's largest auto companies, worked together to forge an agreement that will require performance equivalent to 54.5 miles per gallon by 2025. This agreement represents the single most important step the nation has taken to reduce our dependence on oil. Together with the standards signed last year, the new fuel economy standards will save American families $1.7 trillion dollars at the pump over the lifetime of the programs. And they will save consumers thousands of dollars at the pump. It will help spur American innovation and exports and create new jobs here at home.

Similarly, minimum efficiency standards for residential and commercial appliances have helped to drive innovations in product design and manufacturing that reduces the energy used in a particular product, and saves money for consumers on their energy bill. Since 2009, the Department of Energy has finalized new efficiency standards for more than thirty household and commercial products, which are estimated to save consumers a total of $300 billion through 2030.[14]

Conclusion

Today, we find ourselves in challenging times, facing hard budget choices, and we must act to reduce the federal deficit. As a result, some people argue that we should reduce our investments in clean energy. Others argue that the best thing the government can do is "get out of the way" of business, and let the free market work.

However, the government can and should play an important role in supporting and catalyzing the private sector in the circumstances I have described today. The government's role in investing in science and innovation applies even – or at times especially – in times of national stress. And even as we focus on job creation now, we must do so with an eye to the future. This is part of America's heritage and part of what makes America great.

Let me give a few examples. The Civil War threatened to sunder the Nation, and produced the greatest threat we have ever faced to our Nation's survival. And yet, even during its darkest hours, we planned for the future.

[14] http://energy.gov/articles/department-energy-joins-manufacturers-environmentalists-announce-new-efficiency-standards

The Congress passed the Morrill Land-Grant Colleges Act in 1862. States were given federal lands whose sale or income would be used to support educational institutions for agriculture and industrial learning.

Much of the support went to colleges that helped improve agricultural productivity. What was later to become Iowa State University was the first institution, followed by others. There is now at least one land-grant institution in every state and territory of the United States, as well as the District of Columbia.[15]

Also in 1862, President Lincoln signed the Pacific Railway Act. Substantial public financing was given to two private companies — Union Pacific Railroad Company and Central Pacific Railroad Company — to lower the investor risk in building railroads in unsettled territories. In 1869, the first Transcontinental Railroad was completed at Promontory Summit, Utah.

In 1863, Lincoln signed the law that created the National Academy of Sciences. The bill stated "The Academy shall, whenever called upon by any department of the Government, investigate … and report upon any subject of science …" Even in a time of the gravest national challenge, President Lincoln recognized that we needed our best scientific minds working to make sure that we have the knowledge base to innovate and compete. Science and these investments and policies paved the way for an economic boom that enabled us to become an economic superpower. Science and investment in research and development continue to be critical to our economic competitiveness today.

Other countries are now moving to try and pass us, and they have identified the clean energy economy as holding greatest prospects for the future. But we should not surrender our economic leadership in these industries to foreign competitors.

No one can match the American innovation machine, but we need to make sure that our universities, labs, companies, and their workers have a fighting chance to translate that potential into productivity.

As the President has said, "The countries that lead the 21st century clean energy economy will be the countries that lead the 21st century global economy. I want America to be that nation."

Maintaining our leadership in research and development and making investments in clean energy are critical to winning the future. To vouchsafe our future prosperity and the U.S. jobs that depend on it, America can and must win the clean energy race.

By supporting the President's vision to out-educate, out-innovate, and out-build the rest of the world, we can assure our leadership in the global clean energy economy and leave a better world for our children and our children's children.

[15] http://ext.wvu.edu/about_extension/land_grant_system