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DOE Loan Program Helps Move State-of-the-Art Technology From Concept to Market

Federal investment in scientific discovery and technology is a vital factor in maintaining U.S. economic leadership globally and in growing key emerging sectors such as clean energy

Overview

From early stage research to commercialization, innovation contributes significantly to industrial growth—boosting U.S. companies and jobs. Maturation and deployment of new products and processes is a crucial component of the clean energy economy. But this process is challenging, and typically capital-intensive. Cutting-edge products can struggle to secure the necessary investment because funders often view these ventures as higher risk.

The U.S. government helps companies overcome financial barriers to innovation by investing in early stage and applied research and providing access to such instruments as direct loans and loan guarantees issued by the Department of Energy's Loan Programs Office for renewable resource and efficiency projects. The Loan Programs Office makes low-cost capital available to encourage full-scale growth of domestic energy technologies, including concentrated solar, combined heat and power, electric vehicles, high-efficiency vehicle components, and more. For the United States to compete in the rapidly emerging global clean energy sector, this type of support is essential to encouraging and speeding technological advancement, gaining market share, creating jobs, and attracting additional private money.

Stages of Innovation

The introduction of advanced ideas, devices, or processes drives the emergence and creation of market sectors and supports the U.S. economy. The three stages of progression for discovery and invention are:

- **Basic science and early stage R&D.** Fundamental exploration to acquire new knowledge of materials and processes leading to novel theories and products.
- **Applied research.** Establishment of state-of-the-art concepts and prototype advancements, and exploration of the feasibility of scaling up these modern commodities.
- **Technology maturation and deployment**. Evaluation of materials, components, and efficiencies to optimize performance, demonstrate concepts, and support market adoption.

Loan Programs Office supports clean energy projects

Since its inception, the Loan Programs Office has been critical to advancing technologies in emerging industries by providing direct loans and guarantees to qualifying applicants. These instruments give private lenders certainty: If the borrower defaults, the Energy Department will repay the loan.[1] DOE's loans and guarantees are helping U.S. companies transition new products and processes from research and testing to commercial development by reducing the risks associated with investing in innovation.[2]

The first "solicitation," or request for proposals, was initiated in 2005 during President George W. Bush's administration. To qualify for a loan under Section 1703 of the Energy Policy Act of 2005, technologies must reduce pollutants or greenhouse gases and can include clean power generation, electricity delivery and reliability mechanisms, alternative-fuel vehicles, and industrial efficiency devices. Section 1705, another solicitation that ran from 2009 to 2011 and was authorized as part of the 2009 economic stimulus, helped finance transmission systems, advanced biofuels, and renewable energy systems, including some of the largest such facilities in the world.[3]

Thanks to Loan Programs funding, 20 projects are operational and generating revenue nationwide. Borrowers have repaid $3.5 billion on these long-term loans, and the federal government has earned more than $810 million in interest.[4] These returns help offset losses inherent in lending to high-risk, prototype research. Overall, DOE expects more than $5 billion in total interest payments over the full term of the loans—all of which is returned to taxpayers.[5]

> "The loan guarantee program has been successful in bringing to market good projects with good credit support that absolutely would not have been built."
>
> — NRG Energy

Source: Reuters

Loan program funds innovative wind project

Record Hill Wind, a developer in Maine, received a $102 million Section 1705 loan guarantee in 2011 for a wind installation in Roxbury.[6] The first of its kind in the U.S., the 50-megawatt facility deploys dynamic oversight concepts, which allow operators to respond to changes in wind conditions, reducing downtime even during extreme wind events. Operational since January 2012, it generates enough electricity each year to power over 8,500 homes.[7]

Supplying low-cost capital to bridge the gap from pilot to commercialization is just one way DOE's Loan Programs Office is encouraging scientific discovery. Another is through education and outreach. The office actively engages state and local government agencies, colleges and universities, trade associations, and business leaders across the country in discussions of the importance of clean energy investment and opportunities for companies to gain financing.[8]

Federal support for state-of-the-art vehicles

The Advanced Technology Vehicle Manufacturing Program (ATVMP), also created during George W. Bush's administration, provides direct loans to producers of vehicles and components that achieve emissions reductions of 25 percent, compared with traditional cars and trucks. With more than $8.3 billion in funding to build or modernize 15 facilities, ATVMP backs projects in eight states: California, Illinois, Kentucky, Michigan, Missouri, New York, Ohio, and Tennessee.[9] By encouraging an advanced-technology U.S. auto industry, the program helps researchers and businesses achieve strong fuel economy results, meet the rising demand for fuel-efficient vehicles, and spur the domestic market.

Tesla's success catalyzed by DOE loan

Among the accomplishments of the Advanced Technology Vehicle Manufacturing Program is a $465 million loan to Tesla Motors in California. Producing plug-in electric cars and trucks, the company used the 2010 investment to open and operate a vehicle assembly plant in Freemont. Tesla's rapid expansion allowed it to repay its loan

> The Department first offered loans to Tesla and other auto manufacturers in June 2009, when car companies couldn't get other financing, and many people questioned whether the industry would survive. Today, Tesla employs more than 3,000 American workers and is living proof of the power of American innovation."
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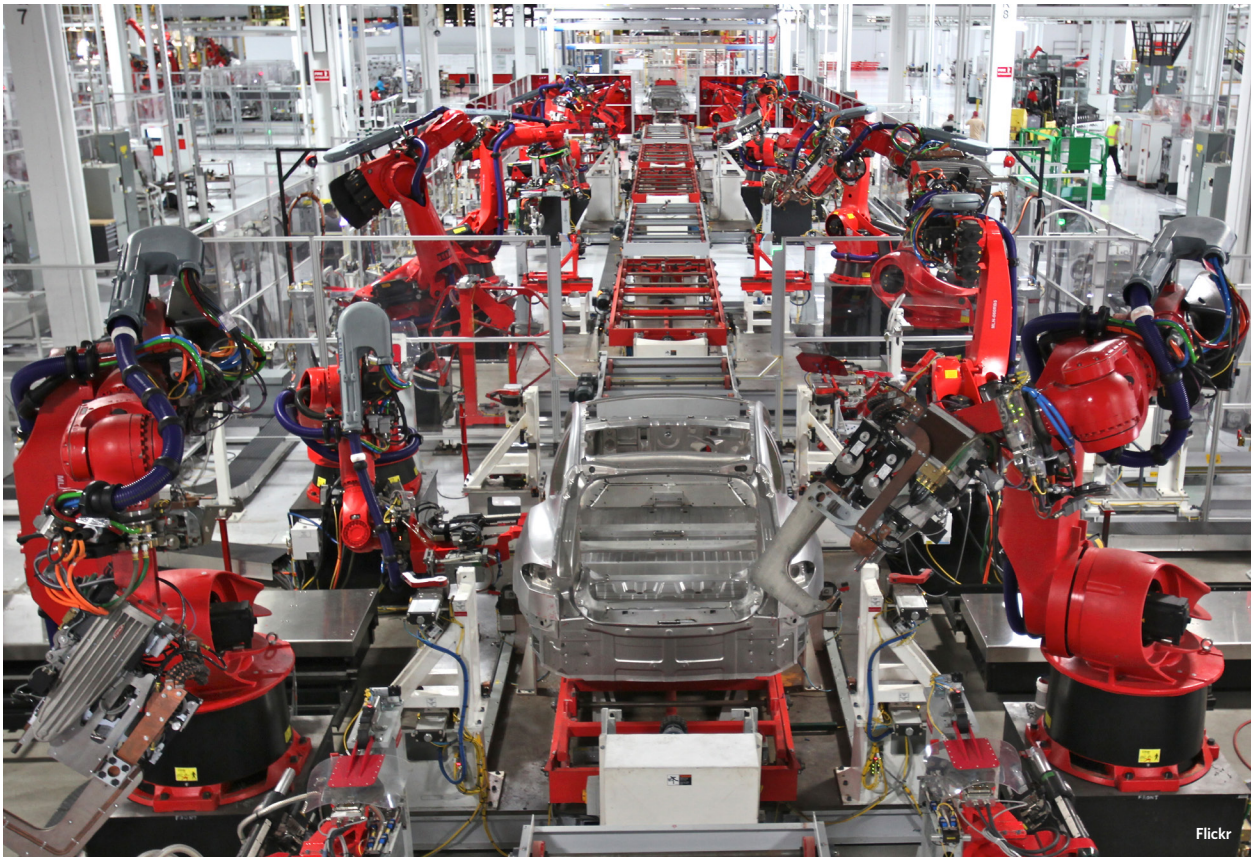
> — U.S. Energy Secretary Ernest Moniz (March 2013)

Source: U.S. Department of Energy

ahead of schedule and expand its employee base to more than 6,000 globally.[10] In 2013, the Model S, which boasts a 300-mile range due to its larger battery, was named *Motor Trend's* car of the year and was awarded the highest safety rating of any passenger vehicle ever tested by the National Highway Traffic Safety Administration, setting a record for the lowest likelihood of injury to occupants.[11]

Tesla has had significant success deploying its cars in the United States and now sells its design in Europe and Asia as well. In the summer of 2014, CEO Elon Musk made the company's patents public to encourage other firms to start building charging stations and products that would boost the electric vehicle industry.[12] To spur additional growth, Tesla announced that it would construct the world's largest advanced battery manufacturing facility near Reno, Nevada, supporting another 6,500 direct jobs.



The Tesla Motors Model S is assembled at the company's plant in Freemont, California.

Loan guarantees are imperative to the future of energy innovation

Investment in manufacturing emerging technologies encourages the growth and competitiveness of the country's clean energy industry. With ongoing funding, DOE can continue to assist cutting-edge projects in securing low-cost private capital and complete a transition to commercialization. The department is poised to build on its impressive record and help companies secure cheaper, highly efficient and reliable resources. Federal support of all stages of discovery and development is essential for securing the U.S. position as a global leader in the energy economy.

For more information on the role the Department of Energy plays in attracting private capital to deploy clean energy and strengthen U.S. manufacturing competitiveness, see the following links:

- **Section 1703 Loan Program**
- **Advanced Technology Vehicle Manufacturing Program**
- **Loan Programs Office Projects**

Endnotes

1 U.S. Department of Energy, "Glossary of Terms," http://energy.gov/lpo/about-us/glossary-terms.

2 Solar Energy Industries Association, "Loan Guarantee Program," http://www.seia.org/policy/finance-tax/loan-guarantee-program.

3 U.S. Department of Energy, "Loan Programs Office: Projects," http://energy.gov/lpo/projects.

4 U.S. Department of Energy, "Energy Department's Loan Portfolio Continues Strong Performance While Deploying Innovation" (Nov. 12, 2014), http://energy.gov/articles/energy-department-s-loan-portfolio-continues-strong-performance-while-deploying-innovation; U.S. Department of Energy, "Moniz: Tesla Repayment Shows the Strength of Energy Department's Overall Loan Portfolio."

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6 Loan Programs Office, "Record Hill Wind," U.S. Department of Energy, http://energy.gov/lpo/record-hill-wind.

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8 U.S. Department of Energy "Keeping America Informed About Open Loan Guarantee Solicitations" (2014), http://energy.gov/lpo/articles/keeping-america-informed-about-open-loan-guarantee-solicitations.

9 BlueGreen Alliance, "The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: A Success Building the Next Generation of Technology in America" (June 2014), http://www.bluegreenalliance.org/news/publications/document/AVTM-Fact-Sheet-vFINAL.pdf.

10 Tesla Motors (2014), http://www.teslamotors.com/sites/default/files/blog_attachments/gigafactory.pdf.

11 Tesla Motors, "Tesla Model S Achieves Best Safety Rating of Any Car Ever Tested" (Aug. 19, 2013), http://www.teslamotors.com/about/press/releases/tesla-model-s-achieves-best-safety-rating-any-car-ever-tested.

12 Elon Musk, "All Our Patent Are Belong to You," Tesla Motors (June 12, 2014), http://www.teslamotors.com/blog/all-our-patent-are-belong-you.

For further information, please visit:

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