



LOAN PROGRAMS OFFICE

INVESTING *in* AMERICAN ENERGY

FINANCING INNOVATION TO ADDRESS GLOBAL CLIMATE CHANGE

NOTE FROM THE EXECUTIVE DIRECTOR

Innovation drives the U.S. economy and is a key to combating the global challenge of climate change. The U.S. Department of Energy's Loan Programs Office (LPO) is helping meet this challenge by providing the critical financing needed to deploy some of the world's largest and most innovative clean energy and advanced technology vehicles manufacturing projects.

The low-carbon energy and auto manufacturing projects in LPO's portfolio currently play a significant role in addressing climate change in the U.S. by avoiding nearly 25 million metric tons of carbon dioxide emissions as of September 2015. The carbon emissions avoided by LPO's portfolio are expected to continue growing as more projects reach commercial operation and the existing projects continue to operate over the coming decades.

Projects financed by LPO are not only helping the U.S. develop a clean energy economy, but as the technologies used in these projects are proven and improved, they are being adopted globally to help reduce harmful carbon pollution.

With more than \$40 billion in remaining loan and loan guarantee authority, LPO is poised to continue financing innovative solutions to help combat climate change.

MARK A. McCALL
Executive Director

December 2015




To date, LPO-financed projects have cumulatively prevented more than 25 million metric tons of carbon dioxide emissions.

LEVERAGING INNOVATION TO COMBAT CLIMATE CHANGE

President Obama has made clear that climate change is an urgent, global challenge that demands our attention. That begins with cutting carbon pollution by changing the way we generate and use energy.

Making the significant cuts in carbon pollution needed now to address climate change requires innovation. To meet this challenge, we need to accelerate how an innovative technology moves from an idea to widespread commercial use. A large amount of capital will be needed to accelerate the commercialization of innovative technologies.

A photograph of President Barack Obama smiling and looking to the right. He is wearing a dark jacket over a dark shirt. The background shows a rugged mountain landscape with a large glacier and rocky terrain under a clear blue sky.

“Climate change is no longer some far-off problem; it is happening here, it is happening now. We’re not acting fast enough. I have come here today, as the leader of the world’s largest economy and its second-largest emitter, to say that the United States recognizes our role in creating the problem, and we embrace our responsibility to help solve it.”

PRESIDENT BARACK OBAMA

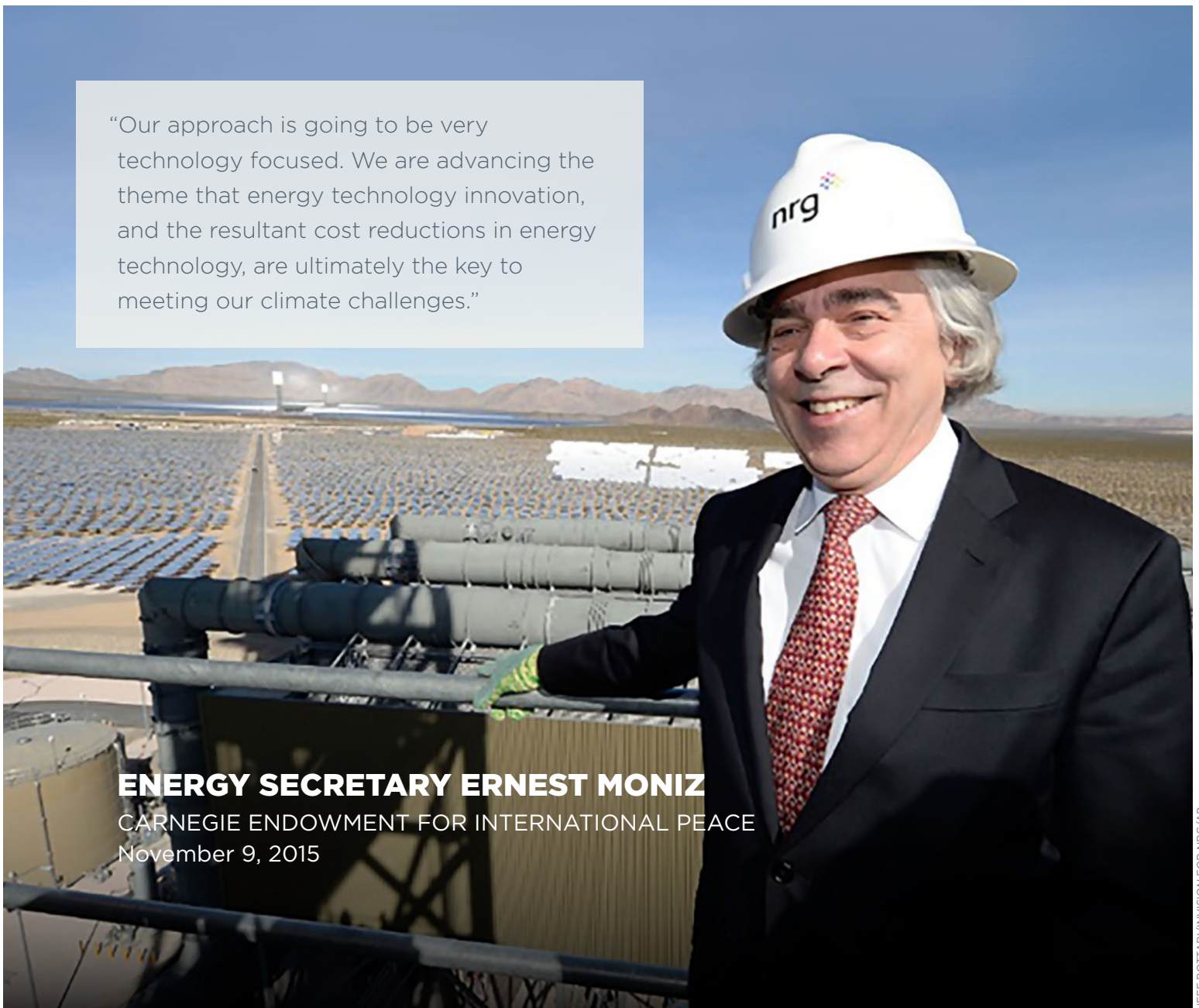
CONFERENCE ON GLOBAL LEADERSHIP IN THE ARCTIC
August 31, 2015

Unfortunately, the financing needed to rapidly deploy innovative technologies at the scale needed to make a meaningful impact in reducing carbon emissions can be difficult for businesses to obtain. Commercial banks and bondholders are often unwilling to finance the first few commercial-scale projects that use a new technology since there is not yet a history of credit performance or operation.

This is where DOE's Loan Programs Office comes in. Recognizing this critical gap in the marketplace, Congress has mandated that LPO finance early deployments of qualifying new clean energy technologies, which are often the kinds of innovative solutions needed to combat climate change. By providing a financial pathway for innovative ideas to be deployed as real-world clean energy technologies, LPO fills a critical role in U.S. efforts to combat climate change.

“Our approach is going to be very technology focused. We are advancing the theme that energy technology innovation, and the resultant cost reductions in energy technology, are ultimately the key to meeting our climate challenges.”

ENERGY SECRETARY ERNEST MONIZ
CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE
November 9, 2015



JEFF BOTTARI/INVISION FOR NRG/AP

LPO PORTFOLIO PROJECTS PREVENTING CARBON EMISSIONS

With an existing portfolio of more than \$32 billion, LPO projects are already playing a role in addressing climate change today. Through September 2015, LPO-financed projects have cumulatively prevented more than 25 million metric tons of carbon dioxide emissions.

As more projects financed by LPO come online, LPO’s carbon reduction impact will continue to grow. When the advanced nuclear reactors at Plant Vogtle in Georgia that were financed by LPO reach full operation, they are expected to prevent about 10 million metric tons of carbon emissions each year for the decades that they are expected to operate.

ENERGY GENERATION & SAVINGS

Title XVII Projects Produce Enough Clean Energy To Power More Than

1 MILLION
AVERAGE AMERICAN HOMES ANNUALLY

ATVM Projects Have Saved

1.35 BILLION
GALLONS OF GASOLINE

CLIMATE BENEFIT

Portfolio Projects Have Prevented

25 MILLION
METRIC TONS OF CO₂ EMISSIONS

Pollution Reduction Equivalent To Taking

5.28 MILLION
CARS OFF THE ROAD

ECONOMIC IMPACT

Portfolio Projects Have Saved or Created

56,000
AMERICAN JOBS

AS OF SEPTEMBER 2015

LAUNCHING LOW-CARBON INDUSTRIES

In addition to the avoided carbon emissions attributable to LPO’s existing portfolio, LPO has had a broader impact on climate change by helping to launch low-carbon power generation industries. When President Obama took office, no utility-scale photovoltaic (PV) solar projects larger than 100 MW existed in the United States and the first new concentrating solar power (CSP) plant in the United States in two decades had just begun operations. By issuing more than \$10.5 billion in loan guarantees, LPO supported 11 utility-scale solar energy projects that are expected to generate nearly 6.7 million MWh of electricity each year and prevent 3.7 million metric tons of carbon emissions annually.

These 11 early projects helped build a domestic market for utility-scale solar that is supported by commercial financing. The market has now grown to become an important contributor of low-carbon electricity. Between August 2014 and August 2015, utility-scale solar generated 24.6 million megawatt hours (MWh) of electricity in the United States and avoided 13.2 million metric tons of carbon emissions. Utility-scale solar continues to grow and more than 7,000 MW of PV solar capacity is expected to begin operating in the United States next year according to GTM Research.

LPO-financed utility-scale solar energy projects are expected to generate nearly **6.7 MILLION** MWh of electricity and prevent **3.7 MILLION** metric tons of carbon emissions annually.

LPO-FINANCED UTILITY-SCALE SOLAR

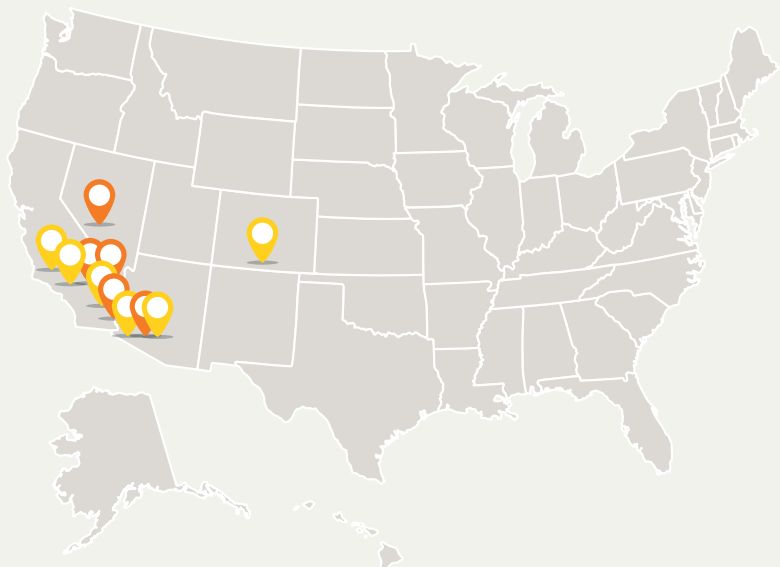
CONCENTRATING SOLAR POWER **PHOTOVOLTAIC SOLAR PROJECTS**

11 LOCATIONS

2,783 MW
GENERATION CAPACITY

6,681,000 MWh
PROJECTED ANNUAL GENERATION*

3,709,000 METRIC TONS OF CO₂ EMISSIONS PREVENTED ANNUALLY



All figures as of March 2015

* Calculated using the project’s and NREL Technology specific capacity factors. For cases in which NREL’s capacity factors do not encompass project’s specific design and operation, project specific capacity factors are used.

The LPO portfolio is not only helping to avoid emissions from the power generation sector. The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program is helping to clean up our transportation sector. By issuing loans to Ford, Nissan, and Tesla to build and retool manufacturing facilities, LPO has helped to put U.S. drivers behind the wheels of cars with improved fuel economy.

Vehicles with improved fuel economy save consumers money at the pump, but also help the United States move towards its low-carbon future. The Ford and Nissan projects that received financing from LPO have helped to remove the equivalent of 2.5 million traditional gasoline-powered cars from the road and prevent 12 million metric tons of carbon emissions. Additionally, the Tesla project supported by LPO was expected to avoid 52,000 metric tons of carbon emissions annually, as estimated at the time of the approved loan agreement.

LPO ATVM projects have prevented **12 MILLION** metric tons of carbon emissions.

LPO-FINANCED



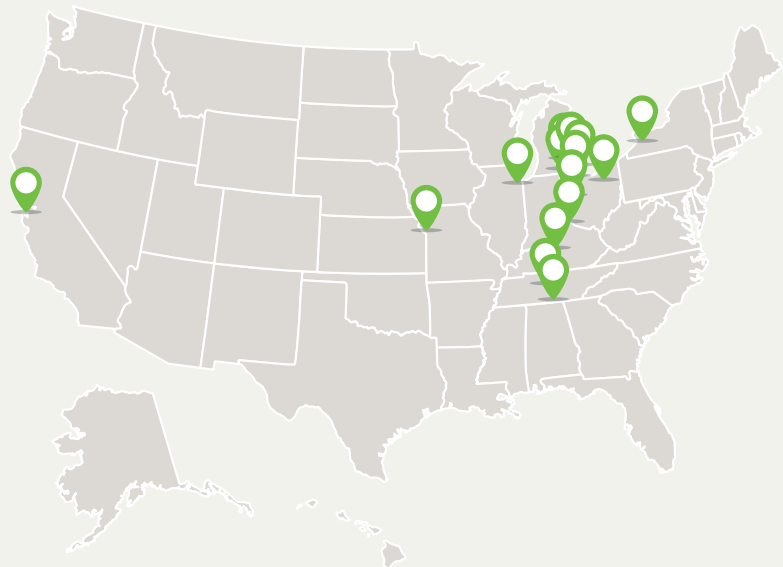
ADVANCED TECHNOLOGY VEHICLES MANUFACTURING PROJECTS

16 LOCATIONS

35,000
PERMANENT U.S. JOBS
SUPPORTED

287,370,000
GALLONS OF GASOLINE
SAVED ANNUALLY

2,552,000 METRIC
TONS OF CO₂ EMISSIONS
PREVENTED ANNUALLY



All figures as of March 2015

DEPLOYING INNOVATIVE TECHNOLOGIES GLOBALLY

LPO-financed projects are helping the United States to address climate change, and some of the technologies that LPO has helped to finance could be adopted globally.

For example, the United States remains home to many of the largest utility-scale solar projects operating in the world today, but many other projects are in development and under construction around the world. The global market for PV solar is expected to triple by 2020, while the CSP and thermal energy storage technologies deployed first in the United States with financing from LPO will likely be critical to building a global, commercial CSP industry. The CSP industry appears poised for growth in international markets such as the Middle East and North Africa, South Africa, South America, India, and China, while Saudi Arabia and Chile have made thermal energy storage mandatory for future CSP developments.

Advanced nuclear energy is an important component for reducing carbon emissions from the power sector. The reactor technology being deployed at Plant Vogtle is also being used at six additional reactors that are currently under construction in China and the United States.

LPO has more than
\$40 BILLION
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carbon emissions.

INNOVATION CONTINUES: FINANCING FUTURE PROJECTS TO HELP ADDRESS CLIMATE CHANGE

Without financing mechanisms to help them reach commercial-scale deployment with much-needed urgency, innovative technologies developed to reduce carbon emissions and address climate change could languish in the lab or as pilot projects and never become the tools we need.

LPO has more than \$40 billion in remaining loan and loan guarantee authority to help finance innovative technologies that can reduce carbon emissions. By supporting technology deployment, the United States can be a global leader in commercializing groundbreaking innovations like lightweight materials for vehicles, advanced grid integration and storage, biofuels, advanced nuclear energy, carbon capture at fossil fuel power plants, and more. Doing so will not only help meet U.S. goals, but also help other nations support their commitments to address climate change.



U.S. DEPARTMENT OF ENERGY

LOAN PROGRAMS OFFICE

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For more information, please visit: energy.gov/lpo