

DAY ONE PROJECT

Revitalizing the DOE Loan Program Office to Support Clean Infrastructure Development

David Foster
Michael Kearney
Christopher Knittel

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Summary

The Biden-Harris Administration should expand the focus of the Department of Energy's (DOE) Loan Program Office (LPO) to meet the demands of a changing energy industry. The LPO was established to serve as a backstop to private-sector financing for large-scale energy projects with embedded technology risk. The program's success in scaling large scale power plants and manufacturing plants for next generation energy technologies is well documented.¹ However, the energy industry has changed since the program's beginning, and the needs for support from the Federal Government have evolved. For example, technology areas that were deemed risky in 2009 are now mature, and in some circumstances, for example in electricity generation, the industry structure that was historically highly centralized has become much more distributed. Modernizing the LPO is a critical means for advancing the Biden-Harris Administration's climate agenda because the Office supports the development of clean energy projects at commercial scale, leverages private sector capital, and creates middle-class jobs.

This memo recommends three important changes to the DOE LPO:

1. The aperture of the LPO must be expanded to include a much larger set of technology areas. In particular, energy storage, hydrogen production and carbon capture, utilization and storage, among other nascent fields, should be supported. Authorizing legislation should be changed to give the Program Office the opportunity to support a technological area at its discretion.
2. The Loan Program must reduce the cost of application to incentivize more deployment of smaller projects. This will expand the potential set of projects to be supported and align the Office with overarching trends in the energy sector.
3. The Loan Program should expand its purview to support projects impeded by other financing risks in the energy system. These could include grid modernization, system hardening or smart grid updates (which often do not pass traditional cost-benefit analyses), and electric vehicle infrastructure deployment.

Challenge and Opportunity

The proposed solution solves two impending challenges to the President's climate agenda. First, while innovation is necessary to meet climate goals, the private sector is reluctant to fund first generation projects for novel clean energy technology. As the US embarks on a pivotal decade with respect to managing the national carbon budget, deploying new technology at scale will become even more critical. In particular, reaching 2050 carbon goals will require successfully innovating in hydrogen production, carbon capture, energy storage, and load-following electric

¹ See, for example: Mark Paul and Nina Eichacker, "Why we should be funding more Solhydras," *MIT Technology Review*, November 19, 2020, <https://www.technologyreview.com/2020/11/19/1012302/solyndra-climate-change-industrial-policy-opinion/>.

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power -- most of which cannot be currently supported under the Loan Program's authorization. Second, the nation's overall infrastructure deficit has been estimated to require an additional \$2 trillion of spending by the American Society of Civil Engineers in their most recent 2017 assessment. In the energy sector, ASCE estimated the requirement for additional electricity infrastructure alone to be \$177 billion. Simultaneously, the economic returns to investing in our nation's infrastructure are significant. Recent studies suggest that for every \$1 million invested in energy infrastructure, the Recovery Act created 15 durable jobs.² The multiplier effect from infrastructure spending varies based on economic conditions, but as the country emerges from the COVID-19-induced recession, enabling the LPO to fund a broad swath of energy infrastructure would be a viable asset for job creation in the coming years.

Currently, the LPO is restricted to financing only the first three deployments of new technologies, and new technologies that are highly capital intensive, such as concentrated solar power. The LPO exists to absorb financing risk for the private sector, risks which often stem from capital intensity or technology uncertainty. As we consider the energy transition in the coming decades, a new set of technologies needs support for initial commercial deployment. Additionally, however, a broad array of infrastructure investments continue to go unfunded by the private sector for other reasons as well, particularly in geographies where commercial markets for off-takers are not fully developed. Expanding the technology and stage aperture of the LPO to include a broader array of projects would attract private capital and accelerate the transition to a decarbonized future.

Plan of Action

The Biden-Harris Administration should expand the DOE's Loan Program Office (LPO) to enable the Federal Government to quickly make investments in a broad range of infrastructure categories through the pre-existing contracting authorizations at the LPO. Accordingly, we propose three changes to the DOE's LPO. First, the technology aperture of the Loan Program should be expanded to include a broader set of technologies, including but not limited to energy storage, hydrogen production, carbon capture, utilization and storage, and carbon dioxide removal. Program staff should be granted the flexibility to support a wide range of technology areas at their discretion, in a manner not dissimilar to ARPA-E in the breadth of technical fields within staff purview.

Second, the Loan Program must be adjusted to account for a more distributed energy industry by reducing the cost of application and the corresponding size of project to be supported. For example, the first deployment of a novel grid-scale energy storage technology could be financed at the \$10+ million level rather than the \$100+ million level. A company looking to deploy that technology would be currently discouraged from applying as a result of the upfront cost of

² David Popp, Francesco Vona, Giovannai Marin, and Ziqiao Chen, "The Employment Impact of Greeg Fiscal Push: Evidence from the American Recovery Act," *NBER Working Paper Series 27321*, National Bureau of Economic Research, 2020.

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application. The Loan Program should support projects across the capital scale, with flexible application requirements depending on the order of magnitude of public support being requested.

Finally, the Loan Program should expand to support projects impeded by other financing risks in the energy system. These risks could include high-risk project cash flows from uncertain off-take agreements, as for example with public transportation infrastructure or grid modernization, system hardening, and electric vehicle infrastructure deployment. A comprehensive list of infrastructure to support should include:

- Existing planned projects and deferred maintenance on public transit systems;
- Identified grid modernization or hardening programs in state resource plans;
- Accelerated smart grid expansion;
- Building retrofits for both energy efficiency and carbon emissions reduction;
- Electric charging stations; and
- Addressing methane leakage in pipeline systems.

Conclusion

At the Roosevelt Project, we are developing action plans for communities that experience significant industrial upheaval, particularly in the context of forthcoming energy transitions. Though these transitions will vary in their nature as a result of local socio-economic realities, access to or distance from natural resources, and exposure to various climate risks, the transitions will most acutely affect communities of working-class, low-income, under-educated Americans. Federal support for the deployment of shovel-ready energy infrastructure can support the creation of high-quality jobs. For infrastructure deployment to positively contribute to both decarbonization and job creation, projects must be targeted to regions that are likely to be affected by the transition. The adjustments to the DOE LPO proposed here offer one important tool for quickly deploying infrastructure in the next four years.

Frequently Asked Questions

How do you address the potential for failure when the LPO grants funding and additional private capital cannot be raised?

The LPO application process requires that private capital has already been assembled and included in the LPO application itself, though it may be contingent on the allocation of a loan guarantee.

Does the LPO have the track record of expertise and talent to build out?

The LPO has a remarkably positive track record. In fact, on net it has returned capital to the Federal Government, rather than lost it. This may actually be a signal that the program is not taking enough risk. For more discussion on this, see the recent article “Why we should be funding more Solyndras” from the MIT Technology Review.³

How will the LPO coordinate with other federal agencies?

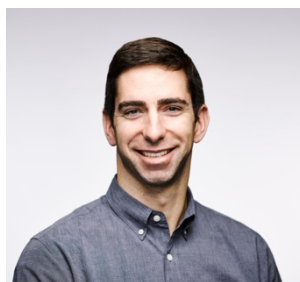
While the LPO sits within the Department of Energy, LPO-backed projects could be regulated across the Federal Government with specific overlap with the Federal Energy Regulatory Commission, the Environmental Protection Agency and the Department of the Interior. Coordination through the White House is critical to ensure that these agencies are aligned in their efforts.

³ Paul and Eichacker, 2020, <https://www-technologyreview-com.cdn.ampproject.org/c/s/www.technologyreview.com/2020/11/19/1012302/solyndra-climate-change-industrial-policy-opinion/amp/>.

About the Authors



David Foster is currently a Visiting Scholar at MIT and previously served as Senior Advisor to U.S. Secretary of Energy Ernest Moniz from 2014-2017 on energy, environmental, climate, economic development, workforce development and labor relations issues. During that period, he designed and implemented the creation of the Department of Energy's Jobs Strategy Council, an initiative that linked the department's technical and financial resources to a wide group of external stakeholders including state and local governments, private sector energy and manufacturing businesses, non-profits, academic institutions, and labor unions. He led the interagency effort to create the Energy and Advanced Manufacturing Workforce Initiative, which formally linked the DoE with the Departments of Labor, Education, Commerce, Defense, and the NSF on workforce development issues.



Michael Kearney is an economist at MIT. Michael's experience spans operations, investment and research on climate and energy issues. Michael's background combines training in economics and systems engineering with expertise in energy technology and market development. Mike holds a Ph.D. from the MIT Sloan School of Management, where his research focused on frictions in the commercialization of science, regulatory barriers to innovation and entrepreneurial strategy. Michael received an M.S. in Technology and Policy from MIT and a B.A. from Williams College.



Christopher R. Knittel is the George P. Shultz Professor of Applied Economics at the Sloan School of Management, Director of the Center for Energy and Environmental Policy Research, and Co-Director of the MITEL Low-Carbon Energy Center for Electric Power Systems Research at the Massachusetts Institute of Technology. He joined the faculty at MIT in 2011, having taught previously at UC Davis and Boston University. Professor Knittel received his B.A. in economics and political science from the California State University, Stanislaus in 1994 (summa cum laude), an M.A. in economics from UC Davis in 1996, and a Ph.D. in economics from UC Berkeley in 1999. His research focuses on environmental economics, industrial organization, and applied econometrics.



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