U.S. DEPARTMENT OF ENERGY

Report on the Status of Applications for, and Projects Receiving Guarantees under the Title 17 Loan Guarantee Program

Report to Congress
March 2023

United States Department of Energy
Washington, DC 20585

Message from the Secretary

This report, *Report on the Status of Applications for, and Projects Receiving Guarantees under the Title 17 Loan Guarantee Program*, is provided pursuant to section 9010(a)(4) of Division Z of the Energy Act of 2020, included in the Consolidated Appropriations Act, 2021 (P.L. 116-260).

Please note that because certain requested information may constitute trade secrets or confidential business information under the Trade Secrets Act, 18 U.S.C. § 1905, an appendix to this report has been prepared. This appendix is being provided to Congress only and is not for public distribution; neither the Department of Energy (DOE) nor the companies are waiving of any privileges which may exist for such information.

Pursuant to statutory requirements, this report is being provided to the following members of Congress:

- **The Honorable Joe Manchin**
  Chairman, Senate Committee on Energy and Natural Resources

- **The Honorable John Barrasso**
  Ranking Member, Senate Committee on Energy and Natural Resources

- **The Honorable Frank Lucas**
  Chairman, House Committee on Science, Space, and Technology

- **The Honorable Zoe Lofgren**
  Ranking Member, House Committee on Science, Space, and Technology

- **The Honorable Cathy McMorris Rodgers**
  Chair, House Committee on Energy and Commerce

- **The Honorable Frank Pallone, Jr.**
  Ranking Member, House Committee on Energy and Commerce

If you have any questions or need additional information, please contact me or Ms. Becca Ward, Deputy Assistant Secretary for Senate Affairs, or Ms. Janie Thompson, Deputy Assistant Secretary for House Affairs, Office of Congressional and Intergovernmental Affairs, at (202) 586-5450.

Sincerely,

Jennifer M. Granholm

Executive Summary

The Energy Act of 2020, included as Division Z of the Consolidated Appropriations Act, 2021 (P.L. 116-260), was signed into law on December 27, 2020. This piece of bipartisan legislation included a series of reforms to the Loan Programs Office (LPO) Title 17 Loan Guarantee Program (Title 17), including mandatory reporting requirements on the status of applications for, and projects receiving, guarantees under Title 17. This report includes the latest information as of the end of fiscal year (FY) 2022, unless otherwise noted.

Please note that because certain requested information may constitute trade secrets or confidential business information under the Trade Secrets Act, 18 U.S.C. § 1905, an appendix to this report has been prepared. This appendix is being provided to Congress only and is not for public distribution; neither DOE nor the companies are waiving of any privileges which may exist for such information.

Title 17 of the Energy Policy Act of 2005 (42 USC Sec. 16511, et. seq.) provides broad authority for the Department of Energy to guarantee loans for energy projects. LPO administers the Title 17 program pursuant to its regulations set forth at 10 CFR part 609, as required by the authorizing statute. LPO maintains a public list of its active project portfolio on its website, including information about the borrower, solicitation, technology sector, repayment status, and other information. LPO also has a robust active applicant pipeline: as of November 30, 2022, there were 98 applications requesting $98.7 billion in loan authority, including over $70 billion in Title 17 applications.

To fulfill the reporting requirements in Sec. 9010(a)(4) of the Energy Act of 2020, this report is broken into six sections: Project Data (Active Loan Portfolio), Data on Air Pollutant or Greenhouse Gas Emissions Avoided/Reduced, Data on Direct and Indirect Jobs, Technology Deployment, Projection of Future Guarantees, and Outreach and Pipeline Data.

REPORT ON THE STATUS OF APPLICATIONS FOR, AND PROJECTS RECEIVING GUARANTEES UNDER THE TITLE 17 LOAN GUARANTEE PROGRAM

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I. Legislative Language

This report responds to legislative language set forth in Sec. 9010(a)(4) of Division Z of the Energy Act of 2020, page 1231, wherein it is stated:

> ``(q) Report.--Not later than 2 years after the date of the enactment of this subsection [December 27, 2022] and every 3 years thereafter, the Secretary shall submit to Congress a report on the status of applications for, and projects receiving, guarantees under this title, including--
>
> ``(1) a list of such projects, including the guarantee amount, construction status, and financing partners of each such project;
>
> ``(2) the status of each such project's loan repayment, including interest paid and future repayment projections;
>
> ``(3) an estimate of the air pollutant or greenhouse gas emissions avoided or reduced from each such project;
>
> ``(4) data regarding the number of direct and indirect jobs retained, restored, or created by such projects;
>
> ``(5) identification of--
>
> ``(A) technologies deployed by projects that have received guarantees that have subsequently been deployed commercially without guarantees; and
>
> ``(B) novel technologies that have been deployed by such projects and deployed in the commercial energy market;
>
> ``(6) the number of new projects projected to receive a guarantee under this title during the next 2 years and the aggregate guarantee amount;
>
> ``(7) the number of outreach engagements conducted with potential applicants;
>
> ``(8) the number of applications received and currently pending for each open solicitation; and
>
> ``(9) any other metrics the Secretary finds appropriate."

II. Project Data (Active Loan Portfolio)
(paragraphs (1), (2))

As of the end of FY2022, the Loan Programs Office Title 17 loan portfolio included 15 projects with 22 loans representing $22.6 billion in total loans. Please note that because information requested in paragraphs (1) and (2) may contain items constituting trade secrets or confidential business information under the Trade Secrets Act, 18 U.S.C. § 1905, an appendix (labeled **Confidential Appendix A**) to this report has been prepared. This appendix is being provided to Congress only and is not for public distribution; neither DOE nor the companies are waiving of any privileges which may exist for such information.

III. Data on Air Pollutant or Greenhouse Gas Emissions Avoided/Reduced (paragraph (3))

Paragraph (3) of the legislative language requires DOE to report "an estimate of the air pollutant or greenhouse gas emissions avoided or reduced from each such project" under Title 17. **Table 1** provides estimates of CO_2 avoided as a result of Title 17 projects as of FY 2022.

"CO_2 avoided" is defined as estimated annual CO_2 emissions reductions of projects receiving Title 17 loans that have achieved commercial operations. Estimates are based on quarterly reports from borrowers on the electricity generation derived from their projects. LPO multiplies the reported electricity generation for the projects in its portfolio by a "CO_2 avoidance conversion factor." The CO_2 avoidance conversion factor LPO utilizes is based on the U.S. Energy Information Administration (EIA) estimate of annual CO_2 emissions from Emissions from Energy Consumption at Conventional Power Plants and Combined-Heat-and-Power Plants[1] divided by EIA's estimate Total Generation at Utility Scale Facilities.[2, 3] LPO revises the conversion factor annually. To validate the performance and performance reporting of electricity generation, engineers within LPO's Technical Project Management Division (TPMD) verify the electricity generation derived from the borrowers' projects during on-site visits and monitor generation through monthly reporting to LPO to ensure that generation targets are being met. However, it is worth noting that the reported electricity generation from borrowers are real time, whereas the data used to calculate the CO_2 avoidance conversion factor are actuals from the prior year because at the time of reporting only estimates for the current year are available. Note that LPO discontinues tracking this data for certain projects – including Alamosa, Blue Mountain, Crescent Dunes, Genesis, Granite Reliable, and Kahuku below – when they exit the portfolio; for these projects, a process is in place to collect relevant publicly reported information.

[1] *See* Table 9.1 - Emissions from Energy Consumption at Conventional Power Plants and Combined-Heat-and-Power Plants.
[2] *See* Table 1.1 - Total Electric Power Industry Summary Statistics.
[3] While the C02 avoidance conversion factor provides an average annual factor for national emissions, it does not account for local variations in the generation affected by seasonal, geographic, and displacement (i.e., the type of generation displaced locally by a project) factors.

Table 1: CO_2 Avoided by Title 17 projects as of FY2022 (Data reported as of September 30, 2022)

Project Name	Emissions Avoided (Tonnes CO_2)
Agua Caliente	3,383,635
Alamosa	298,066
Antelope Valley Solar Ranch (AVSR)	2,514,459
Blue Mountain	1,410,913
California Valley Solar Ranch (CVSR)	2,825,377
Crescent Dunes	241,924
Desert Sunlight	4,917,215
Genesis	2,390,818
Granite Reliable	1,085,061
Ivanpah	2,760,391
Kahuku	333,764
Mesquite 1	1,957,561
Mojave	1,962,130
One Nevada Line	N/A
Ormat Nevada	3,901,073
Record Hill	615,068
Shepherds Flat	8,287,384
Solana	2,869,688
USG Oregon	787,437
Vogtle	0[4]
Total	**42,541,963**

[4] Note that project is in construction and not yet operational. Estimates for emissions avoided is 10,000,000 tonnes CO2 annually.

IV. Data on Direct and Indirect Jobs (paragraph (4))

Paragraph (4) requires DOE to report "data regarding the number of direct and indirect jobs retained, restored, or created by such projects." While a project is active, the project periodically reports direct jobs created to LPO. Direct jobs created are measured through two components:

1. *Peak Construction Jobs* – the highest number of actual construction jobs reported during the construction phase of a project, which is reported monthly by active projects, and
2. *Permanent Jobs* – The actual number of full-time permanent jobs supported by the project once in operation, which is reported as frequently as monthly by projects, but usually reported by projects only if there are changes in staffing.

Data for active projects in LPO's portfolio are actively monitored and collected; however, for projects that have left the program, a process is in place to collect the data based on publicly reported information.

LPO is exploring how to collect data from projects as we see increasing interest in projects that would create new opportunities for workers in energy industries. In addition, LPO projects currently do not report indirect jobs created, but LPO estimated indirect jobs created using employment multipliers from an Input-Output (I-O) model that measures the ripple economic effects of one direct job created. Indirect jobs estimation makes use of the methodology and employment multipliers in the "Updated Employment Multipliers from the U.S. Economy," as published by the non-profit Economic Policy Institute (2019),[5] modified to concentrate on backward (supplier) industry interconnectivity.

As a result, the estimated indirect jobs in Table 2 represent estimated indirect jobs that could be created in economic sectors that provide the materials used as inputs to produce the industry's output to which LPO projects are likely to contribute: electric power generation, transmission, and distribution; and construction.

Table 2 is responsive to paragraph (4) of the legislative language, including the direct jobs of all Title 17 projects (active, fully repaid, or exited the portfolio early), and the estimated indirect jobs associated with all Title 17 projects. Note that LPO projects are comprised of novel technologies that may not exactly fit into a standard industry group, and therefore the estimated indirect jobs reported below should be considered an approximation based on the standard industry group that is nearest in relevance.

Table 2: Title 17 Portfolio Projects: Direct and Indirect Jobs

Description	Peak Construction Jobs	Permanent Jobs	Total
Direct Jobs	24,017	1,549	25,566
Est. Indirect Jobs	21,135	6,182	27,317
Total Jobs	**45,152**	**7,731**	**52,883**

Note: Direct jobs reported as of 09/30/2022.

[5] *See* https://files.epi.org/pdf/160282.pdf

V. Technology Deployment (paragraph (5))

Paragraph (5) of the legislative language requires DOE to identify both "(A) technologies deployed by projects that have received guarantees that have subsequently been deployed commercially without guarantees," and "(B) novel technologies that have been deployed by such projects and deployed in the commercial energy market."

LPO fills the gap in commercial deployment, where technology that has not been deployed at commercial-scale and often faces difficultly accessing debt from private lenders, by serving as a bridge to bankability for innovative and high-impact energy technologies and providing borrowers with access to flexible capital on their way to full market acceptance. Through section 1703, Title 17 supports new projects that will employ technologies that are not yet commercially deployed. For this reason, LPO has historically played a role in providing debt capital to first movers in a number of clean energy technology sectors. Under Title 17, an innovative technology is defined as a technology that is not in commercial use[6] and, with limited exceptions for regional variation,[7] is one of the first three commercial projects of its kind in the United States. Most projects funded under the 1703 program must be innovative, however those funded under the section 1705 (Recovery Act) program were not subject to this requirement.[8,9]

Table 3 is responsive to paragraph (5) of the legislative language. For subparagraph (A), DOE lists technologies that were in commercial use and supported by projects receiving loans under Title 17 that have subsequently been deployed commercially without DOE support. The legislative language does not include the "novel" requirement in subparagraph (A), so this list shows technologies deployed by projects funded under the section 1705 program. The list in response to subparagraph (B) shows innovative, or "novel," technologies. Please note that each technology listed under (B) has also gone on to be deployed commercially in a project that did not receive an LPO loan.

Table 3: Title 17 Technologies Deployed Commercially, Including Without Title 17 Loans

(A) Technologies Deployed in Title 17 Projects Subsequently Deployed without Guarantees
Commercial scale onshore wind
Geothermal (non-contiguous plants)
Geothermal (plant, substation, and transmission interconnect)
Solar photovoltaics
Concentrating solar power

[6] *See* 10 CFR 609.2(a) "Commercial Technology"

[7] *See* 42 U.S.C. §16513(f)

[8] The Section 1705 Loan Program authorized loan guarantees for U.S.-based projects that commenced construction no later than September 30, 2011, and involved certain renewable energy systems, electric power transmission systems, and leading-edge biofuels. The program did not require innovation. The Section 1705 Loan Program expired on September 30, 2011.

[9] Note that, in addition to exceptions related to innovative projects listed above, the Infrastructure Investment and Jobs Act (IIJA) waived the innovation requirement for Title 17 projects receiving financial support or credit enhancements from a state energy financing institution (SEFI) under section 1703. In addition, the Inflation Reduction Act of 2022 (IRA) authorized a new program, the Energy Infrastructure Reinvestment (EIR, Section 1706) program, intended to support energy infrastructure projects, that does not contain the innovation requirement. As of the end of FY 2022, no loans have been made to these two types of projects.

(B) Novel Technologies Deployed in Title 17 Projects and Deployed in Commercial Energy Markets
Battery energy storage system and wind turbines
Commercial scale direct steam solar power tower
Commercial scale to utilize thermal energy storage
Parabolic trough concentrating solar power plant with thermal energy storage
Nuclear AP1000 technology/reactor design
Flywheel energy storage
High concentration photovoltaics with triple-junction solar cell panels controlled by a dual-axis tracking system
Innovative design of transmission towers
Innovative solar collector assembly (SCA) space-frame technology
Innovative tracking, monitoring, and control system
Inverters with Fault Ride Through (FRT) and Dynamic Voltage Regulation (DVR)
Supercritical Rankine cycle plant
Transformerless, liquid-cooled inverter
Turbine load control

VI. Projection of Future Guarantees (paragraph (6))

Table 4 is responsive to paragraph (6) of the legislative language requiring DOE to report on estimates for future Title 17 loans, specifically, "the number of new projects projected to receive a guarantee under this title during the next 2 years and the aggregate guarantee amount." Projections for FY2023 are derived from projects published in the President's FY2023 Budget Request. Projections for FY2024 are best estimates as of December 2022 based on the current pipeline for projects that will move to financial close.

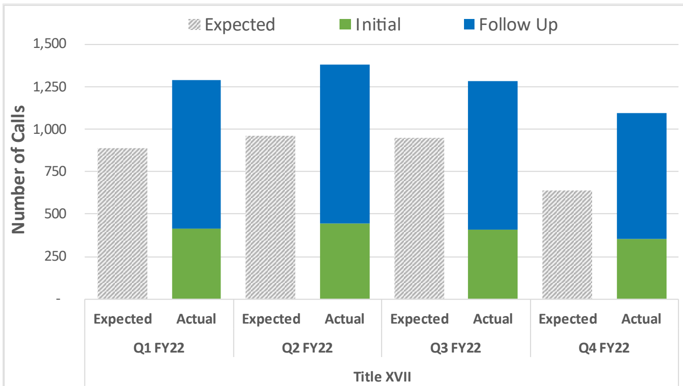
Table 4: Projected Number of New Title 17 Projects and Estimated Aggregate Guarantee Amount

Fiscal Year	Number of Projects Projected	Aggregate Guarantee Amount Projected Est.
FY 2023	7	$4.51B
FY 2024	20	$29.79B

VII. Outreach and Pipeline Data (paragraphs (7), (8))

Paragraph (7) requires DOE to report on "the number of outreach engagements conducted with potential applicants" with respect to Title 17. LPO's outreach engagements with potential applicants are conducted through its Outreach & Business Development Division (OBD), which became fully operational in 2021. OBD brings together an internal team of energy experts with extensive experience across the financial, technical, legal, risk, and environmental fields to help borrowers move through pre-application consultations and the application process. **Figure 1** is responsive to paragraph (7) of the legislative language and reports OBD's quarterly expected and actual calls with potential applicants during FY2022. Expected calls are those planned by OBD for each quarter.

Figure 1: LPO Engagement in FY2022 – Number of Calls Made with Potential Applicants



In addition, paragraph (8) of the legislative language requires DOE report on "the number of applications received and currently pending for each open solicitation" under Title 17. As of the end of FY2022, there were 82 Title 17 applications, with a total loan amount requested of $73 billion. **Figure 2** is responsive to paragraph (8) of the legislative language, demonstrating the number of active Title 17 applications for each of the open Title 17 Solicitations, shown cumulatively by fiscal quarter:

- Fossil: Innovative Clean Energy – Fossil Solicitation
- REEE: Innovative Clean Energy Solicitation
- Nuclear: Innovative Clean Energy – Nuclear Solicitation

Figure 2: Title 17 Loan Application Pipeline the end of FY2022 (Data as of Sept 30, 2022)