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REPORT



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Pratt's Energy Law Report

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ISBN: 978-1-6328-0836-3 (print) ISBN: 978-1-6328-0837-0 (ebook) ISSN: 2374-3395 (print) ISSN: 2374-3409 (online)

Cite this publication as:

[author name], [article title], [vol. no.] PRATT'S ENERGY LAW REPORT [page number] (LexisNexis A.S. Pratt);

Ian Coles, Rare Earth Elements: Deep Sea Mining and the Law of the Sea, 14 Pratt's Energy Law Report 4 (LexisNexis A.S. Pratt)

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Editorial Office 230 Park Ave., 7th Floor, New York, NY 10169 (800) 543-6862 www.lexisnexis.com

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POSTMASTER: Send address changes to Pratt's Energy Law Report, LexisNexis Matthew Bender, 121 Chanlon Road, North Building, New Providence, NJ 07974.

2020 Clean Energy Outlook

By Taite R. McDonald and Michael Obeiter*

The activity in late 2019 demonstrates that congressional support for clean energy research and development remains strong, as evidenced by level or increasing budgets for most of the relevant programs at federal agencies, especially the U.S. Department of Energy. This article provides an overview of funding opportunities available this year, and looks ahead to future opportunities that companies can try to help shape over the coming months.

The flurry of activity at the end of 2019 demonstrates that congressional support for clean energy research and development ("R&D") remains strong, as evidenced by level or increasing budgets for most of the relevant programs at federal agencies, especially the U.S. Department of Energy ("DOE")—meaning billions of dollars are available through grants, cooperative agreements, loans, procurements and other transactions. And while prospects for comprehensive energy legislation or a major infrastructure package remain slim in this presidential election year, congressional committees are laying the groundwork for advancing such bills should the political stars align in 2021 and beyond. This article provides an overview of DOE funding opportunities available this year, and looks ahead to future opportunities that companies can try to help shape over the coming months.

U.S. DEPARTMENT OF ENERGY

Office	FY20 Funding (\$millions)	FY19 Funding (\$millions)	Difference (\$millions)
Energy Efficiency and Renewable Energy			
Advanced Manufacturing	395	320	75
Bioenergy Technologies	259.5	226	33.5
Building Technologies	285	226	59
Geothermal Technologies	110	84	26
Fuel Cell Technologies	150	120	30

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Solar Energy Technologies	280	246.5	33.5
Vehicle Technologies	396	344	52
Water Power Technologies	148	105	43
Wind Energy Tech- nologies	104	92	12
Other DOE Programs and Agencies			
Carbon Capture and Storage	217.8	198.8	19
Energy Storage	56	46	10
Nuclear Energy— Advanced Reactor RD&D	497	323.5	173.5
Electricity Grid (Transmission & Distribution)	102	79	23
ARPA-E	425	366	59

As illustrated by the summary table, every DOE program dedicated to clean energy R&D received an increase in fiscal year ("FY") 2020, some of which were substantial. More notably, many of these programs' authority has been expanded beyond the traditional funding mechanisms to provide opportunities that extend beyond what's contained in budgetary language and dollar figures. Below are expectations and insights into what some of these numbers mean for companies.

ADVANCED MANUFACTURING OFFICE: \$395 MILLION

The Advanced Manufacturing Office's ("AMO") 23 percent increase in funding over the FY19 level—and 53 percent increase over FY17—is a clear indication of Congress acknowledging the need for the federal government to play an active role in ensuring that the United States remains a leader in the manufacturing of next-generation materials and equipment. Many anticipate that AMO will make at least 50 awards this year through competitive solicitations for advanced manufacturing technology development in combined heat and power, water and wastewater efficiency, and industrial drying technologies, among other priorities.

Further, it is expected that the uptick in grants ranging from \$3 million to \$5 million for manufacturing assistance will continue beyond 2020 for a variety of reasons associated with the market and U.S. competitiveness. And because AMO's purview overlaps with many of the other programs here—for example,

AMO can make awards for the manufacture of lightweight vehicle components, solar modules, wind turbine blades, etc.—companies should pay close attention to AMO's annual multi-topic solicitation.

BIOENERGY TECHNOLOGIES OFFICE: \$259.5 MILLION

While some of the awards the Bioenergy Technologies Office ("BETO") has offered in the past are eye-popping, no project has received more than \$10 million in BETO grant funding since the end of the stimulus program. But the increased activity from BETO through 2018 and 2019, along with the 15 percent increase in funding for FY20, demonstrate the alignment between the Trump Administration's focus on rural development and the congressional focus on broader climate initiatives. Relative to last year, BETO will devote more funding to feedstock supply and logistics, advanced algal systems, and an equivalent amount (\$45 million) to fund pre-pilot, pilot and demonstration projects.

BUILDING TECHNOLOGIES OFFICE: \$285 MILLION

Given its mandate, solicitations from the Building Technologies Office ("BTO) can be broad, creating opportunities for a wide array of companies with applications that can be used to increase energy efficiency. A recent sample of solicitations illustrates the breadth of BTO's purview, with announcements of grant opportunities for grid resilience, air-sealing technologies, solid-state lighting, advanced building materials, and building energy modeling.

BTO is also committed to bringing innovative technologies from the DOE's National Laboratories to the marketplace through funding, strategic partnerships, and policy initiatives that align with cities and states. Companies of all types and sizes seeking government collaboration should look not just for direct funding from DOE, but should also look to DOE as a potential partner in forging key strategic relationships at all levels of government and with strategic partners.

GEOTHERMAL TECHNOLOGIES OFFICE: \$110 MILLION

As is becoming increasingly common for programs within the Office of Energy Efficiency and Renewable Energy at DOE, and in a new development for the office, Geothermal Technologies is directed to fund at least two demonstration projects, at least one in each of two different research areas. Further, Congress specifies that geothermal R&D undertaken with DOE funds should be in the pursuit of an accelerated pathway to commercialization for companies employing novel technologies.

FUEL CELL TECHNOLOGIES OFFICE: \$150 MILLION

New in this year's appropriations bill is a focus on hydrogen infrastructure R&D, which receives \$25 million, a sign of increased progress in moving

hydrogen and fuel cell technologies into the marketplace. Further evidence is the increased amount of funding for safety, codes, and standards, which received a 43 percent increase to \$10 million in 2020.

It is also worth noting that fuel cell research, development and demonstration ("RD&D") is an area with increased cross-collaboration with the U.S. Department of Defense ("DoD"). This program has historically flown underthe-radar compared to other clean energy programs within DOE, but given the increased market interest in both fuel cells and hydrogen, it is expected that this program will be increasingly active and offer cross-government collaboration assistance in these areas in 2020 and beyond.

SOLAR ENERGY TECHNOLOGIES OFFICE: \$280 MILLION

Following the successful achievement in 2017 of the SunShot Initiative's 2020 goal of reducing the cost of solar power by 75 percent below 2011 levels, the Solar Energy Technologies Office ("SETO") has set a new goal—to cut the cost of solar by an additional 50 percent by 2030. Each of the subprograms within SETO—concentrating solar power, photovoltaics, systems integration, and innovations in manufacturing competitiveness—received at least \$50 million for FY20 to advance R&D toward that goal.

Many believe that SETO funding will remain strong in the years to come, for several reasons. First, with the Trump Administration's tariffs turning out to be less effective at increasing domestic solar manufacturing capacity than initially hoped, there is a growing push to commercialize new, proven innovative technologies. Second, the phasedown of the investment tax credit ("ITC") for solar energy means there will be less federal government support for consumers looking to install solar panels, as well as an increased focus on bringing down soft costs to make solar more competitive, and SETO is expected to continue to play an integral role in that process. Third, solar's recent and projected growth means that systems integration is going to become a frontline issue for utilities across the country, and SETO's R&D in that area will be increasingly important.

VEHICLE TECHNOLOGIES OFFICE: \$396 MILLION

No longer seen as a niche market or a far-off development, the electrification of the vehicular transportation sector is approaching a tipping point. Moreover, utilities now view electric vehicle ("EV") deployment as central to their future business model. The legacy auto manufacturers are churning out more and more electric models in order to not lose market share to EV newcomers. And both policymakers and industry experts expect batteries to be the next frontier in the clean energy revolution, hopefully following the same downward cost trajectory that has been seen in wind and solar energy over the last decade.

All of this points to continued interest in vehicle technologies for the foreseeable future, particularly in advanced battery technologies. But technologies that can accelerate deployment of EVs and other advanced vehicles, such as fast-charging infrastructure and lightweight materials, will also be well-positioned to take advantage of the Vehicle Technologies Office ("VTO") grants in the year(s) to come. For example, not only is DOE funding battery technology at a higher rate than ever before but the Trump Administration is actively focusing on securing a supply chain for critical battery materials from mineral to product. This means that there are numerous cross-agency initiatives that are further supporting and funding these technologies as well.

WATER POWER TECHNOLOGIES OFFICE: \$148 MILLION

The language in the FY20 appropriations bill for Water Power—which includes marine and hydrokinetic technologies in addition to conventional hydropower—goes further than most other programs in promoting the commercialization of innovative technologies. By specifically supporting the funding of "systems at a variety of scales, including full scale prototypes" and requiring awards for projects "across the high- and low-technology readiness spectrum," Congress is explicitly looking beyond early-stage R&D in a way that should present increased opportunities to companies looking for demonstration-scale funding.

WIND ENERGY TECHNOLOGIES OFFICE: \$104 MILLION

The Wind Energy Technologies Office ("WETO") has steadily shifted its resources toward offshore wind, and FY20 funding is no different. Moreover, appropriators gave additional direction to the office to require at least \$10 million for a solicitation in support of offshore wind demonstration projects, an implicit acknowledgement of the increasing maturation of offshore wind technologies.

CARBON CAPTURE AND STORAGE: \$217.8 MILLION

Congress has identified some of the priority areas in which DOE is likely to make funding awards in 2020, including carbon capture at natural gas power plants and industrial facilities, and carbon use and reuse. Although these programs received a more modest increase than other DOE clean energy R&D programs, the broad base of support for carbon capture and storage ("CCS") in Congress suggests that funding will remain robust for the foreseeable future. Accordingly, DOE will continue to grant funding to ensure the successful commercialization of CCS projects. For example, in 2019 DOE awarded \$75 million to facilitate large-scale development of CCS technologies, and announced a solicitation for another \$35 million. And with even more funding allocated to CCS in FY20 than in FY19, it is expected that DOE will continue its strong support of these newer technologies.

ENERGY STORAGE: \$56 MILLION

Despite the vast majority of energy storage funding set aside for research, Congress has directed DOE to devote at least \$5 million for demonstration projects in rural areas where wind power is constrained due to grid capacity constraints. That said, companies interested in funding for battery research, development and demonstration should look to VTO and Advanced Research Projects Agency-Energy ("ARPA-E") first.

NUCLEAR ENERGY ADVANCED REACTORS AND REACTOR CONCEPTS: \$497 MILLION

For FY20, Congress kept funding level for Reactor Concepts RD&D, with the exception of \$55 million that went to Advanced Reactor Technologies in FY19 as a sort of down payment for a new, \$230 million Advanced Reactor Demonstration Program for FY20. As the appropriators put it, "the primary goal of this new program is to focus Department and non-federal resources on actual construction of real demonstration reactors that are safe and affordable (to build and operate) in the near and mid-term," and they allocated \$160 million for two such demonstration projects. In case there were any doubts as to Congress' recognition of the need for advanced nuclear energy in the future U.S. energy mix, hopefully this new funding should help put any concerns to rest.

ADVANCED RESEARCH PROJECTS AGENCY-ENERGY: \$425 MILLION

ARPA-E is unique in many ways, including its focus on transformational change, its open-ended solicitations, its willingness and ability to issue grants worth millions of dollars to the most promising technologies, and its broad (and growing) bipartisan support. Awards from ARPA-E rightly bring a certain amount of cachet and validation of a company's technology, but they are also highly competitive. In addition, companies often struggle to reach commercialization even after they successfully complete a program with ARPA-E. As a result, in 2019 the program re-evaluated its programmatic authority and has now released a first-of-its-kind funding opportunity to assist ARPA-E awardees with obstacles associated with commercializing their technology. In true ARPA-E fashion, the agency has chosen an appropriate acronym for this solicitation (SCALEUP, or Seeding Critical Advances for Leading Energy technologies with Untapped Potential), and has allocated \$50 million for awards that will vary between \$2 million and \$20 million.

LOAN PROGRAMS OFFICE

Beyond the fact that Congress has decided to keep the loan guarantee programs around in their current form—a somewhat noteworthy development

in itself—buried within the FY20 conference report is this sentence under the Advanced Technology Vehicles Manufacturing Loan Program: "The agreement directs the Department to expeditiously evaluate and adjudicate all loan applications received." While such language in an appropriations bill is not in itself a substitute for meaningful programmatic reform, many are nevertheless encouraged that Congress is taking note of the growing backlog of applications within the program's pipeline.

CONGRESSIONAL OUTLOOK

In addition to the annual appropriations bills that included the funding increases described above, Congress also used that opportunity to extend a number of tax provisions that benefit clean energy technologies, including wind power, advanced biofuels, and energy efficient appliances, homes, and commercial buildings.

There remains strong bipartisan support for comprehensive legislation to update federal energy policy, which was last addressed in 2007 when the energy landscape and outlook were completely different than they are today. The contours of such a bill would likely look similar to the Energy and Natural Resources Act of 2017,¹ a previous version of which passed the Senate with 85 votes. However, whether there is the political will to pass this sort of compromise legislation this year remains to be seen; next year's appropriations bills may be the only opportunity that members of Congress will have to affect energy policy.

There is little doubt that broad climate proposals will fail to get traction this year; nevertheless, Democrats in the House and Senate are laying the groundwork for sweeping bills that they could enact in 2021 should they win the presidency, retain control of the House and regain the majority in the Senate.

The most fully formed proposal² to date was released in early January by the Democrats on the House Energy and Commerce Committee. Intended to be a substitute for an economy-wide price on carbon and Green New Deal-like policies, the proposal sets a target of net-zero emissions by 2050, to be achieved through a clean energy standard, emissions standards for transportation and manufacturing, a national climate bank and other programs.

https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=971C76DE-860F-4518-AD5F-8115D64382F3.

² https://energycommerce.house.gov/sites/democrats.energycommerce.house.gov/files/documents/CLEAN%20Future%20Act%20Memo%2001.08.20.pdf.

CONCLUSION

In sum, 2020 is shaping up to continue to show a lot of upward momentum given the increasingly bipartisan perspective on clean energy technology. With Congress appropriating almost \$650 million more for clean energy programs across DOE than they did last year, funding opportunities will be larger, and potentially more frequent, than they have been in the past. DOE also appears to be getting the message that demonstration and deployment funding is at least as important as early-stage R&D, when it comes to ensuring that U.S.-developed technologies and companies keep their operations and their intellectual property here. And on the congressional front, while more inaction is expected on the issues that matter to clean energy companies, at least it will be a kind of meaningful and productive inaction that will allow the next Congress to hit the ground running on making incremental and far-reaching changes to U.S. climate and clean energy policy in 2021 and beyond.