Department of Commerce

Clean Energy Fund

Program Status per 2EHB1115 (2015), Section 1028(11)

April 2017
Report to the Legislature
Brian Bonlender, Director

Acknowledgements

Washington State Department of Commerce
State Energy Office

Jill Nordstrom	Supervisor, Data and Contracts
Carolee Sharp	Editor

Washington State Department of Commerce
State Energy Office
1011 Plum St. SE
P.O. Box 42525
Olympia, WA 98504-2525
www.commerce.wa.gov/growing-the-economy/energy/

Table of Contents

Executive Summary

The 2013 Legislature appropriated $36 million for the creation of a new Clean Energy Fund, as a part of the Energy Freedom Program, to expand clean energy projects and technologies statewide (Engrossed Senate Substitute Bill 5035, Chapter 19, Laws of 2013, Section 1074[1]). The fund was designed to "provide a benefit to the public through development, demonstration, and deployment of clean energy technologies that save energy and reduce energy costs, reduce harmful air emissions or otherwise increase energy independence for the state." This initial round of appropriations is called Clean Energy Fund 1 (CEF1).

In 2015, the Legislature appropriated $40 million for Clean Energy Fund 2 (Second Engrossed House Bill 1115, Chapter 3, Laws of 2015, Section 1028(11)[2]). CEF2 programs incorporated stakeholder outreach and advisory panels input into the goals, solicitation, and outcomes for the program. Commerce created a competitive grant process for all CEF2 programs, as required by the legislation.

Most of the projects funded under CEF1 are still in active construction or research and development, and Commerce will be collecting the data for those projects at the time of completion. However, using federal job calculations it is estimated that the funds provided in CEF1 will generate as many as 391 jobs.

The majority of funds for the CEF2 programs have yet to be expended and job creation data is not yet available. However, using federal job estimate calculations it is estimated that the funds provided in CEF2 will generate as many as 430 jobs.

This report fulfills the reporting requirements of Second Engrossed House Bill 1115, and includes updates on the relevant performance metrics we have identified to date on both the CEF1 and CEF2 appropriations.

Commerce has requested funding for Clean Energy Fund 3 in the 2017-19 Biennium for continued support of the deployment of clean energy technology, grid modernization, and vehicle electrification. The Governor's budget included a $60 million CEF3 appropriation. Continuation of the Clean Energy Fund is contingent on legislative funding.

[1] http://leap.leg.wa.gov/leap/budget/lbns/1315Cap5035-S.SL.pdf
[2] http://lawfilesext.leg.wa.gov/biennium/2015-16/Pdf/Bills/Session%20Laws/House/1115.SL.pdf

Clean Energy Fund 1

Background

The 2013 Legislature appropriated funding for creation of a new Clean Energy Fund as a part of the Energy Freedom Program to expand clean energy projects and technologies statewide. The fund was designed to "provide a benefit to the public through development, demonstration, and deployment of clean energy technologies that save energy and reduce energy costs, reduce harmful air emissions or otherwise increase energy independence for the state."

Section 1074 of the 2013-2015 capital budget appropriated $36 million of the state taxable building construction account for three programs. An additional $4 million of Federal Energy Recovery Act funds were also appropriated.

- **Energy Revolving Loan Fund Grants –** $15 million to provide competitive grants to create a Revolving Loan Fund to support the widespread use of proven building energy efficiency and renewable energy technologies now inhibited by lack of access to capital. Funds are leveraged against private fund sources by up to 20:1.[3]
- **Smart Grid Grants to Utilities –** $15 million provided solely for grants to advance renewable energy technologies by public and private electrical utilities that serve retail customers in the state.
- **Federal Clean Energy Matching Funds –** $6 million provided solely for grants to make Washington more competitive in attracting federal clean energy grants through state matching funds.

This report provides updates on the relevant performance metrics we have identified to date. The majority of projects funded through CEF1 are in their final phases and, as such, jobs information is incomplete. However, using federal job calculations it is estimated that the funds provided in CEF1 will generate as many as 391 jobs.[4]

[3] Puget Sound Cooperative Credit Union leverages funds at a ratio of 20:1, Craft3's commercial lending ratio is 4:1, and Craft3's residential lending ratio is 1:1.

[4] Based upon American Recovery and Reinvestment Act job creation calculations where $92,000 in direct government spending creates one full time job, www.whitehouse.gov/administration/eop/cea/Estimate-of-Job-Creation

Energy Revolving Loan Fund Grants ($15 million)

Funding Purpose: These grants finance the use of proven building energy efficiency and renewable energy technologies that currently lack access to capital, and include residential and commercial sectors.

Program Status: Commerce conducted a competitive solicitation for nonprofit lenders to create and operate revolving loan programs. Three applications were received and reviewed by a team of Commerce staff and non-state representatives. Two financial institutions were awarded funds, and contracts were negotiated and signed in April 2014. Craft3 ($8.7 million for commercial sector; $2.9 million for residential sector) and Puget Sound Cooperative Credit Union (PSCCU) ($2.9 million for residential sector) were the recipients. Craft3 and PSCCU anticipate they will leverage over $100 million for residential loans, and Craft3 estimates $60 million on the commercial side. So far nearly $16.5 million in residential loans and $8.5 million in commercial loans have been made. The residential loans have created 68,604 job-hours while commercial lending has created or retained 324 jobs.[5] Residential and commercial energy savings totaled 82,932 MMBtu, enough energy to power 2,250 homes per year while reducing greenhouse gas emissions by more than 13,000 tons.

Total State Capital Allocation	$15,000,000
Award Funds Available (less 3 percent)	$14,550,000
Awards (funds obligated)	$14,550,000
Program Implementation Budget (3 percent)	$450,000
Expenditures through Dec. 16, 2016	$15,000,000
Job hours (residential lending)[6]	68,604
Jobs retained (commercial lending)	78
Jobs created (commercial lending)	99
Construction jobs created (commercial lending)	147
Estimated Energy Savings (residential) (enough to power 1,205 homes per year)	44,422 MMBtu
Estimated Energy Savings (commercial) (enough to power 1,045 homes per year)	38,510 MMBtu
Estimated Greenhouse Gas Savings (commercial)	13,131 tons CO_2e

[5] The funding for these projects has been fully expended, so job creation figures are exact.
[6] Job data reported by grant recipients.

Smart Grid Grants to Utilities ($15 million)

Funding Purpose: Grants have been provided to competitively selected consortia of utilities, utility vendors, and researchers. Projects are using funds to demonstrate how to:

- Improve reliability and reduce costs of intermittent renewable and distributed energy through energy storage and information technology.
- Dispatch energy storage resources from utility control rooms.
- Use the thermal properties and electric load of commercial buildings and district energy systems to store energy.
- Otherwise improve the reliability and reduce the costs of intermittent or distributed renewable energy.

Program Status: Four applications were received and reviewed by a panel of utility and private sector experts in smart grid and clean technology projects. Commerce contracted in June 2014 with three utilities for projects selected for funding.

- **Avista:** Awarded $3.2 million to field test a 1 MW, 3.2 MWhr UniEnergy vanadium-flow battery assembly in a three-year demonstration project at a substation in Pullman.
- **Puget Sound Energy:** Awarded $3.8 million to help deploy a 2 MW, 4.4 MWhr lithium-ion/phosphate battery assembly at a yet-to-be announced location.
- **Snohomish PUD:** Awarded $7.3 million for two demonstration projects. The PUD has been working with Seattle-based 1Energy Systems for the past two years to implement *Modular Energy Storage Architecture*, a set of nonproprietary design and connectivity standards that provide a scalable approach for energy storage control system integration and optimization.
- **Smart Grid Use Case Analysis Project:** Commerce has established a memorandum of understanding with the U.S. Department of Energy (DOE) to have the Pacific Northwest National Laboratory characterize and analyze the technical and economic attributes of the smart grid utility projects listed above.

Total State Capital Allocation	$15,000,000
Award Funds Available (less 3 percent)	$14,550,000
Awards (funds obligated)	$14,550,000
Program Implementation Budget (3 percent)	$450,000
Expenditures through December 16, 2016	$10,008,388
Direct and Indirect Job Estimate[7]	158

[7] Based upon American Recovery and Reinvestment Act job creation calculations where $92,000 in direct government spending creates one full time job www.whitehouse.gov/administration/eop/cea/Estimate-of-Job-Creation

Federal Clean Energy Matching Funds ($6 million)

Funding Purpose: These funds were available to Washington research institutions. The program was designed and selection criteria for the grants were developed in close consultation with universities and research laboratories. Eligible projects had to show either the development or demonstration of clean energy technologies shown to be viable in prior published work, yet not commercially available. Additionally, projects had to depend on approval of funding from a federal source or sources.

Program Status: Applications were received on a rolling basis until all funds were obligated. Eight projects were selected:

- **Pacific Northwest National Lab (PNNL):** The *Clean Energy and Transactive Campus* project with the University of Washington (UW) and Washington State University (WSU) was awarded a total of $2.25 million ($1.1 million to WSU, $783,000 to UW, $367,000 to PNNL). This project creates a modern, intelligent electrical distribution system that could change the way consumers interact with their utility and help realize significant efficiency savings.
- **Pacific Northwest National Lab:** Awarded $695,000 for a *Use Case Analysis Project* designed to add to the resources targeting energy storage and grid integration by providing a framework for evaluating the technical and financial benefits of energy storage, and exploring the role of energy storage in delivering value to utilities and the citizens they serve. This framework, and the tools used to implement it, will evaluate a number of use cases as applied to energy storage projects deployed by three utilities: Avista, Puget Sound Energy, and Snohomish County Public Utility District. The methodologies that emerge for evaluating multiple storage benefits, and the detailed operational results from utility utilization of energy storage, will have broad national relevance and applicability.
- **Pacific Northwest National Lab:** Awarded $145,000 for a joint project with Avista for the development of energy storage control strategies. This study is designed to add to the resources targeting energy storage integration into the grid by providing a complete and accurate characterization of the potential values that storage can provide and control strategies that can be integrated into grid operational software and supervisory control of the storage unit. Through development of energy storage control strategies for Avista, the methodologies that emerge for evaluation of multiple storage benefits and optimization of energy storage operation will have broad national relevance and applicability
- **Composite Recycling Technology Center**: Awarded $1 million to renovate its industrial and workforce training facility used to recycle composite materials. This project attracted multiple partners, including the U.S. Department of Commerce and the Institute for Advanced Composites Manufacturing Innovation. The center purchased advanced manufacturing equipment to help demonstrate viable commercial processes

to create recycled carbon fiber materials with comparable strength and weight to virgin material for a fraction of the cost. This phase of the project is complete.

- **Snohomish County PUD**: Awarded $1 million for a joint project with Bonneville Power Administration (BPA) called the *Technology Innovation Project*. The objective of this project is to demonstrate a software system that creates new value streams for distribution utilities, making energy storage more cost effective. Additionally, the project will align BPA and distribution-level grid operators, incentivizing an actively managed system while respecting local decision making and control.
- **University of Washington:** Awarded $518,000 for the National Marine Renewable Energy Center to support next-generation array development and demonstration through the *Advance Laboratory and Field Arrays* project. Commerce's Federal Clean Energy Matching Funds are being used to acquire a Particle Imaging Velocimetry system and to modernize their Hydrokinetic Turbine Test Platform.
- Two additional projects are currently under negotiation.

Federal Clean Energy Matching Funds have been leveraged, along with DOE Energy Storage Program funding, to add value to the overall program. The DOE Energy Storage Program of the Office of Electricity Delivery and Energy Reliability is focused on accelerating the development, demonstration and deployment of new and advanced energy storage technologies to enhance the stability, reliability, resilience and economics of the future electric grid. This includes substantial contribution of intermittent renewable energy resources, such as wind and solar power generation. The DOE Energy Storage Program addresses three key challenges to widespread adoption of energy storage technologies, including improved economics through advancements in materials engineering and device architecture; field validation of first-of-a-kind systems in operational environments; and modeling and analysis of storage systems, to assess costs and benefits and develop tools for grid operators and users.

Total State Capital Allocation	$6,000,000
Award Funds Available (less 3 percent)	$5,820,000
Awards (funds obligated)	$5,820,000
Program Implementation Budget (3 percent)	$180,000
Expenditures through Dec. 16, 2016	$3,572,872
Direct and Indirect Job Estimate[8]	63

[8] Based upon American Recovery and Reinvestment Act job creation calculations where $92,000 in direct government spending creates one full time job www.whitehouse.gov/administration/eop/cea/Estimate-of-Job-Creation

Clean Energy Fund 2

Background

The 2015 Legislature appropriated $40 million for Clean Energy Fund 2. The CEF2 programs incorporated stakeholder outreach and advisory panels input into the goals, solicitation, and outcomes for the program. Commerce has created a competitive grant process for all CEF 2 programs. The four programs funded by this appropriation were:

- **Energy Revolving Loan Fund Grants –** $10 million to provide competitive grants to create a Revolving Loan Fund to support the widespread use of proven building energy efficiency and renewable energy technologies now inhibited by lack of access to capital.
- **Grid Modernization Grants to Utilities –** $13 million provided solely for grants to advance renewable energy technologies by public and private electrical utilities that serve retail customers in the state. These funds will be used to advance integration of renewables through energy storage and information technology, improved reliability, and reduced costs of intermittent renewable or distributed energy.
- **Research, Development and Demonstration Matching Funds –** $10 million provides matching funds for public and private investments in RD&D that will drive the future of energy efficiency, energy storage, and clean energy technology.
- **Credit Enhancement for Renewable Energy Manufacturing Funds –** $6.6 million provides reimbursement of up to 80 percent of interest payments for qualifying loans backed by the Washington Economic Development Finance Authority.

The majority of funds for these programs have yet to be expended. Therefore, job creation data is not yet available. However, using federal job estimate calculations it is estimated that the funds provided in CEF2 will generate as many as 430 jobs.[9]

Energy Revolving Loan Fund Grants ($10 million)

Funding Purpose: These matching grants finance loan-loss reserves or interest-rate buy downs for proven building energy efficiency and renewable energy technologies that currently lack access to capital, generating opportunities within the residential and commercial sectors. The funds have allowed lenders to leverage other private financing from utilities, contractor incentives, and other sources to allow homeowners and businesses to complete projects that install efficient windows, insulation, ventilation, and high-efficiency water heaters, seal ducts, and replace boilers.

[9] Based upon American Recovery and Reinvestment Act job creation calculations where $92,000 in direct government spending creates one full time job www.whitehouse.gov/administration/eop/cea/Estimate-of-Job-Creation

Program Status: Commerce conducted a competitive solicitation for nonprofit lenders of these funds. Three applicants were approved by a team of Commerce and non-state representatives and were awarded funds. Contracts were negotiated and signed in May and June 2016 with Craft3, Puget Sound Cooperative Credit Union (PSCCU), and the Washington State Housing Finance Commission. Craft3, PSCCU, and the Housing Finance Commission anticipate they will leverage over $108 million in non-state funds, an 11:1 match for state funding.

Total State Capital Allocation	$10,000,000
Award Funds Available (less 3 percent)	$9,700,000
Awards (funds obligated)	$9,700,000
Program Implementation Budget (3 percent)	$300,000
Expenditures through Dec. 16, 2016	$3,449,598

Grid Modernization Grants to Utilities ($15 million)

Funding Purpose: Grants are provided to advance integration of renewables through energy storage and information technology, improved reliability and reduced costs of intermittent renewable or distributed energy.

Program Status: Sixteen applications were received and reviewed by a panel of utility and private-sector experts in smart grid and clean technology projects. Negotiations with five utilities are currently underway and contracts are expected to be signed in February 2017.

Total State Capital Allocation	$15,000,000
Award Funds Available (less 3 percent)	$14,550,000
Awards (funds obligated)	$14,550,000
Program Implementation Budget (3 percent)	$450,000
Expenditures through Dec. 16, 2016	$337,717

Research, Development and Demonstration Grants ($10 million)

Funding Purpose: Matching grants are awarded to Washington research institutions through a competitive process to support clean energy research and development. The program design and selection criteria were developed in close consultation with Pacific Northwest National Lab, University of Washington, and Washington State University. Eligible projects must develop or demonstrate clean energy technologies shown to be viable in prior published work, but not yet commercially available. Eligible projects must depend on approval of funding from a federal source or sources.

Program Status: The first and second competitive rounds of this grant program were completed in 2016. Nine projects were selected for funding and eight companies have chosen to move forward with contract negotiations. The grants total $6.8 million and will be matched by another $12 million in non-state funding detailed in the winning project proposals. Grant recipients will be allowed to request reimbursement of eligible project costs as specified deliverables and milestones are accomplished.

A third competitive funding round will open January 2017, and all remaining unobligated funds will be awarded by the end of the 2015-2017 Biennium. Projects currently under contract are:

- **Composite Recycling Technology Center (CRTC) –** Awarded $1.7 million for continued support for a project that has attracted the support of multiple partners including the U.S. Department of Commerce and the Institute for Advanced Composites Manufacturing Innovation. CRTC will purchase advanced manufacturing equipment and demonstrate viable commercial processes to create recycled carbon fiber materials with comparable strength and weight to virgin material for a fraction of the cost. CRTC will create new opportunities to drive energy efficiency through lightweight materials for a variety of industries. The U.S. Department of Commerce awarded a$500,000 i6 Challenge grant to the CRTC. Funding is part of the *Regional Innovation Strategies* program, an initiative to spur innovation capacity-building activities in regions across the nation.
- **Edaleen Cow Power –** This Lynden-based dairy has been awarded $273,360 to install an advanced solids/nutrient recovery system at its anaerobic digester. This project will demonstrate and evaluate an emerging technology that extracts up to 35 percent nitrogen and 90 percent phosphorus from cattle waste. The opportunity to develop value-added products, such as fertilizers from waste, represents a major benefit to the dairy industry across the state and the nation.

Awards of the remaining funds are conditional, pending execution of performance-based contracts with Commerce.

- **Battelle Memorial Institute (Pacific Northwest Division Operator of Pacific Northwest National Laboratory) –** By continuing to support this ongoing DOE-funded *Transactive Campus* project, Washington state is on the leading edge of efforts to develop a modern, intelligent electrical distribution system that could change the way consumers interact with their utility and help realize significant efficiency savings. The project will provide the infrastructure required to further integrate the campuses of Washington State University, University of Washington, and PNNL under a transactive energy framework.
- **Battery Informatics –** This start-up spun out of the University of Washington is working on battery storage control systems that will greatly enhance the efficiency and lifespan

of energy storage systems. Battery informatics will acquire the capability to model and test the internal state of lithium-ion batteries under various applications and conditions.

- **Demand Energy Networks –** This project will deliver a scalable, state-of-the-art hardware and software platform at PNNL in Richland. It is capable of assessing multiple critical aspects of energy storage systems necessary to evaluate new battery technologies, including advanced lead battery improvements from two Washington-based companies: EnerG2 and NextWatts. Demand Energy's platform will also optimize in real time the economic and environmental benefits of combining energy storage and intermittent renewable energy in the electrical grid.
- **Dresser-Rand –** Dresser-Rand will develop their HydroAir test facility in Redmond. The project will demonstrate, fabricate, and assemble a Pneumatic Ocean Wave Test Facility to test HydroAir, a variable radius turbine system that generates electric power from ocean waves.
- **Microsoft –** In partnership with McKinstry, Microsoft is developing a fuel cell data center lab. The facility, located at McKinstry's Seattle Innovation Center, will test and demonstrate highly efficient distributed fuel cell systems to power data centers and accelerate development of distributed fuel cell technology.
- **PolyDrop –** Spun out of the University of Washington, this women-owned entrepreneurial company is developing lightweight conductive polymers as anti-static additives for coatings and plastics. This project will allow for the acquisition of equipment to characterize and test carbon fiber reinforced composite components to increase fuel efficiency of airplanes and automobiles.

Total State Capital Allocation	$10,000,000
Award Funds Available (less 3 percent)	$5,820,000
Awards (funds obligated)	$0
Funds Committed	$6,783,684
Program Implementation Budget (3 percent)	$180,000
Expenditures through Dec. 16, 2016	$565,487

Credit Enhancement for Renewable Energy Manufacturing ($6.6 million)

Funding Purpose: Matching grants for loan-loss reserves, interest-rate buy downs, and other credit support mechanisms for development of new or expansion of existing in-state renewable energy manufacturing.

Program Status: These competitive grants provide interest-rate reimbursement for projects approved by the Washington Economic Development Finance Authority (WEDFA) for economic development bonds. Once a project is pre-qualified by WEDFA, it is reviewed by a Commerce-sponsored committee for ranking and approval. Commerce may reimburse borrowers for up to 80 percent of the interest payments they make on their qualifying loan.

There is currently one application before WEDFA that will be reviewed for funding by March 31.

Total State Capital Allocation	$6,600,000
Award Funds Available (less 3 percent)	$6,402,000
Awards (funds obligated)	$0
Funds Committed	$0
Program Implementation Budget (3 percent)	$198,000
Expenditures through Dec. 16, 2016	$65,009