

Alternative Energy Revolving Loan Program Outcomes Report, Fiscal Year 2019



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I. INTRODUCTION

The Alternative Energy Revolving Loan Program (AERLP) was established in 2001 by the Montana Legislature to provide low-interest loans for the purpose of building alternative energy systems (75-25-101, et seq., Montana Code Annotated (MCA)). Individuals, small businesses, units of local government, units of the university system, and nonprofit organizations are eligible borrowers. In addition to alternative energy systems, capital investments for energy conservation purposes may be financed through the program when those measures are installed in conjunction with an alternative energy system funded by the AERLP.

Loans are limited to a maximum of \$40,000 with a maximum term of ten years (75-25-101 (4), MCA). The interest rate was fixed for calendar year 2018 at 3.50%, and for 2019 at 3.25%.

The AERLP is managed by the Montana Energy Office at the Department of Environmental Quality (DEQ). Loan underwriting, origination, and servicing are provided by a contracted financial institution, the Montana Business Assistance Connection (MBAC). Pursuant to MCA 75-25-101(2), the AERLP is capitalized by air quality penalties collected by DEQ. In addition, the program received a one-time grant in 2010 from the U.S. Department of Energy (DOE) through the federal American Recovery and Reinvestment Act (ARRA). State and DOE funds are tracked and reinvested separately.

This report summarizes loan program activity and reports outcome measures of the AERLP in fiscal year 2019 (FY19), which started July 1, 2018 and ended June 30, 2019. DEQ policy EPP-AERLP-04-03 establishes the content of the annual outcome report. DEQ is required by statute to assess the following outcome measures, at a minimum (75-25-103, MCA):

- 1) a loan loss ratio of under 5%;
- 2) the types of alternative energy systems that provided the best overall results for residences and those for small businesses; and
- 3) a determination of the amount of energy that was produced because of participation in the program.

Cover page photos of FY19-funded projects (clockwise from top left): rooftop solar array on senior housing in Livingston, photo credit William Campbell; rooftop solar array in Roundup; off-grid battery bank in Wolf Creek; high-efficiency heat pump in Missoula.

II. LOAN PROGRAM ACTIVITY & HIGHLIGHTS

Loan applications and loans issued

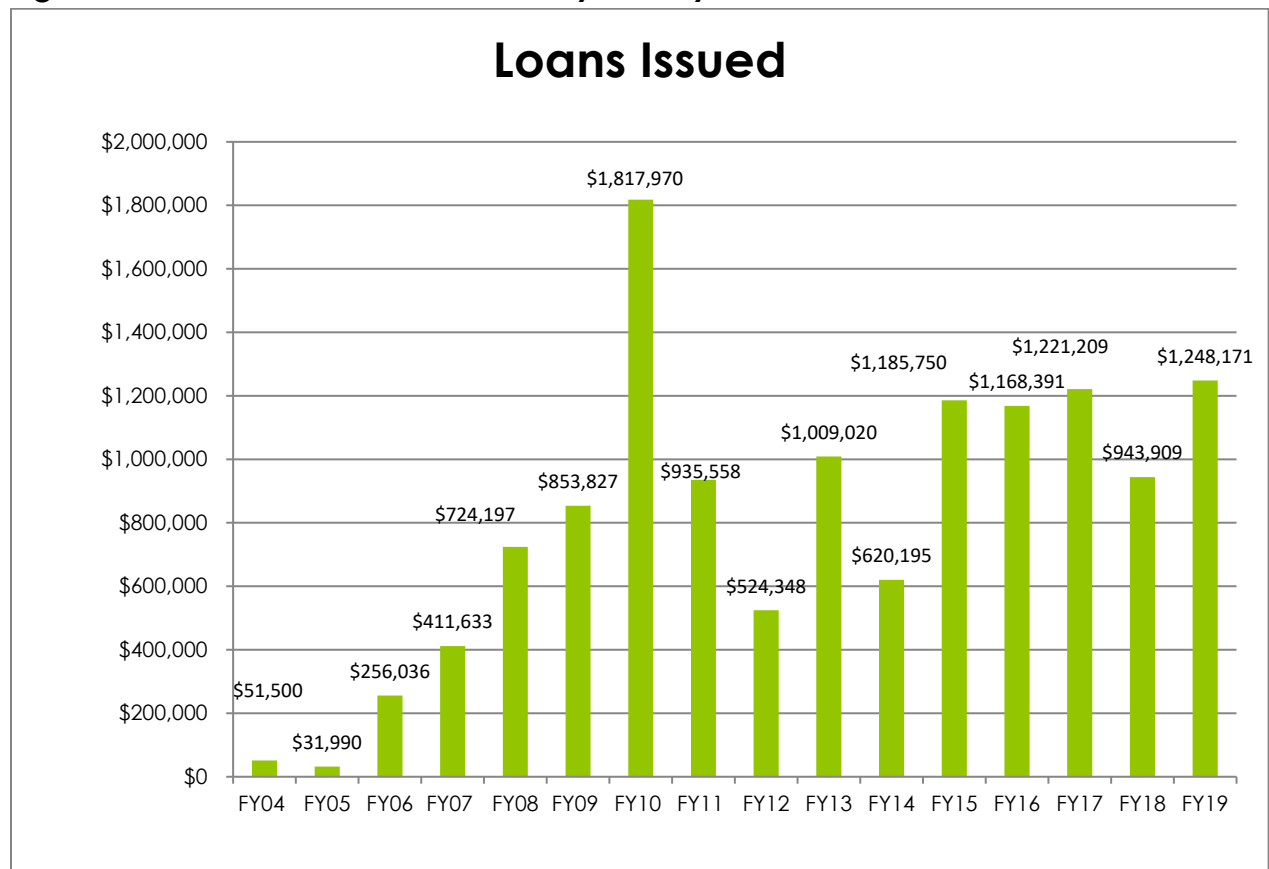
A total of seventy-two applications were received and reviewed for technical and financial feasibility in FY19. One application was withdrawn by the applicant and zero applications were declined on financial merit. Fourteen applications received and reviewed in FY19 were still pending at the close of FY19. Sixty loans closed for a total of \$1,248,171 (Figure 1), including three loans received and reviewed in FY18.

Figure 1: Loans issued in FY19

	Number of loans	Amount of loans
State funds	59	\$1,228,053
DOE funds	1	\$20,118
TOTAL	60	\$1,248,171

The total loan amount was higher than recent years, and the second highest year on record since FY10 (Figure 2).

Figure 2: Total loan amounts issued by fiscal year



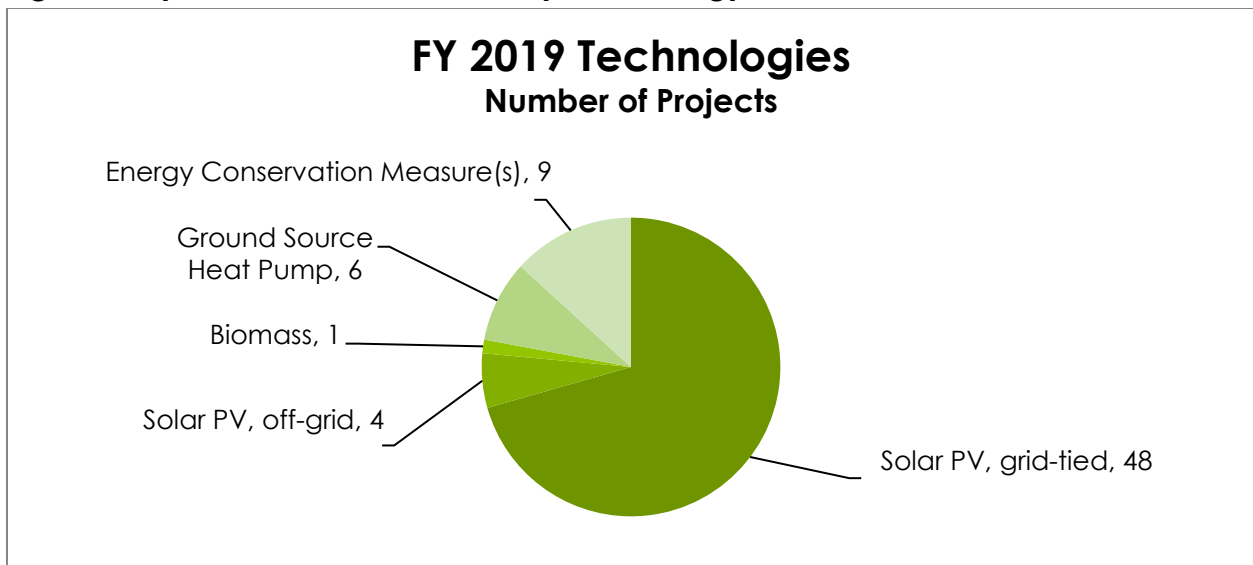
Borrowers

Similar to previous years, the majority of AERLP borrowers in FY19 were individuals (57 loans), followed by businesses (2 loans). There was one loan given to a non-profit organization and no loans given to local governments or units of the university system. The non-residential loans were for a senior housing facility in Park County, and an apartment building and therapy practice in Missoula County.

Technologies funded

Most of the loans issued in FY19 were for grid-tied solar photovoltaic (PV) arrays (48), followed by ground source heat pumps (6), off-grid solar PV arrays (4), and woodstoves (1). Nine loans were issued for energy conservation measures installed in conjunction with one or more alternative energy system(s). Figure 3 charts the number of energy systems funded in FY19. Please note that because several loans were issued for multiple energy systems, and/or energy conservation measures, the count of systems funded exceeds the total number of loans issued.

Figure 3: Systems funded in FY19, by technology



Project Locations

In FY19, loans were issued for projects in thirteen counties across Montana. See the table below (Figure 4) for a summary of the number of loans in each community.

Figure 4: Locations of FY19 AERLP projects by county and city

County	City	# of loans
BROADWATER	East Helena	1
FLATHEAD	Kalispell	1
GALLATIN	Belgrade	1
	Bozeman	8
	Gallatin Gateway	1
	Manhattan	1
JEFFERSON	Basin	1
	Clancy	2
JUDITH BASIN	Geyser	1
LAKE	Polson	3

County	City	# of loans
LEWIS & CLARK	East Helena	1
	Helena	11
	Wolf Creek	1
MADISON	Ennis	1
	Pony	1
MINERAL	Superior	1
MISSOULA	Florence	2
	Missoula	13
MUSSELSHELL	Roundup	1
PARK	Livingston	4
RAVALLI	Florence	1
	Hamilton	1
	Stevensville	2

III. LOAN-LOSS RATIO

A total of eight loans have defaulted over the program's history (no loans defaulted in FY19), however loan balances are not written off and considered a loss until all efforts to collect the loan balance and fees have been exhausted. Four loans have been written off as losses, three loans are in active collection proceedings, and funds were recovered through collection on one loan. Statute requires the loan-loss ratio for the program to remain under five percent (75-25-103(1), MCA). The four loans written off as losses totaled \$74,555, which amounts to a loan-loss ratio of 0.58 percent, well below the statutory guideline. The loan-loss ratio is calculated based on the total amount of loans issued over the life of the program (\$12,944,330).

The combined balance of the three loans currently in collections is \$72,443. Therefore, the total potential loss (loans that have been written off plus loans currently in collection) is \$146,998. The total potential loan-loss rate is 1.14 percent, based on total loans issued (\$12,944,330) and the potential loan loss amount (\$146,998).

IV. BEST OVERALL RESULTS

The type of alternative energy system that provides the best overall results for Montana residences and small businesses varies by site and by the amount and type of energy used by the building's occupants. However, the majority of projects funded by the AERLP in FY19 were solar PV arrays, which is likely due to the availability of the technology, recent technology cost reductions, minimal maintenance requirements, long useful life of the equipment (20-30 years), and adaptability of the equipment to a variety of building types and applications. The attributes of solar PV and other technologies funded by the AERLP are discussed below.

Solar electric (photovoltaic, or PV) system installed costs for residential and small commercial PV consumers dropped a few percentage points from the first half of 2018 to the first half of 2019, according to data sourced by the National Renewable Energy Laboratory (NREL) from three major PV markets (New York, California, and Massachusetts) not including Montana¹. The NREL data show pricing averages of \$4.17/watt for systems 2.5 kW to 10 kW, and \$3.52/watt for systems 10 kW to 100 kW. By contrast, the pre-incentive installed costs for PV systems connected to the grid and funded by the AERLP averaged \$2.61/watt in FY19, up slightly from \$2.56/watt in FY 18, and far below the \$8 - \$10/watt average when the AERLP was established. The systems included in the FY19 solar PV cost analysis were all grid-tied, without batteries, and ranged in size from 50 kW to 2.8 kW, with a median size of 7.2 kW. Utility incentives have largely been phased out for residential and commercial solar PV systems in Montana, however the combination of state and federal tax incentives results in a simple payback of 8-15 years in many applications.

Wind turbines continue to spark interest in some parts of the state and can be effective for off-grid applications, when combined with a solar photovoltaic array, however high maintenance costs for small-scale wind generators relative

¹ National Renewable Energy Laboratory. 2019. *Q1 2019/Q2 2019 Solar Industry Update*. Accessed September 30, 2019 at <https://www.nrel.gov/docs/fy19osti/74585.pdf>

to solar PV systems often make solar a better choice at the residential and small business scale for generating electricity. The AERLP received no applications for wind energy systems in FY19.

Ground source heat pumps (GSHPs) continue to be a popular choice for heating systems where the technology can replace higher cost heat sources (electric resistance heat or propane), and in electric service territory where volumetric electric rates are low. Heat pump systems move heat from the ground into buildings and can provide water heating and air conditioning as well.

Solar water heating can be a cost-effective energy supply, however very few businesses in the state offer solar thermal installation services. The technology is a particularly good match for car washes, laundries, hotels and other buildings that use large quantities of hot water.

Biomass heating systems are widely available, as is fuel in forested areas of the state. Low-emission wood or biomass combustion devices (15-32-102 (6), MCA), including pellet stoves and wood stoves certified by the U.S. Environmental Protection Agency, are eligible for funding through the AERLP.

V. ENERGY PRODUCTION

The amount of energy produced by projects financed by the AERLP in FY19 (Figure 5) is determined based on standard engineering calculations and assumptions. The calculations are for projected energy production in the first year of operation, based on the installed generating or energy output capacity of each technology type.

The projected output of all the solar PV systems funded in FY19 is estimated using the National Renewable Energy Laboratory's "PV Watts" program², with default system parameters, and is based on the average solar radiation in Great Falls, an area that receives average solar radiation for Montana. Ground source heat pump estimates are calculated based on the equipment specifications, location and building type. Solar thermal output is estimated using the National Renewable Energy Laboratory's System Advisor Model³. The annual output of biomass-fueled wood stoves is calculated based on the efficiency rating of the

² National Renewable Energy Laboratory, *PV Watts*. <http://pvwatts.nrel.gov/>

³ National Renewable Energy Laboratory, *System Advisor Model*. <https://sam.nrel.gov/>

individual wood stoves financed in FY19, projected fuel usage in cords as reported by the borrower in the loan application, and energy content per cord of lodgepole pine, a typical firewood in Montana. The energy output of each technology has been converted to kilowatt hours (kWh) and millions of British thermal units (MMBtu) per year for comparison purposes.

Figure 5: Projected generating capacity and energy output of FY19 projects

	Solar PV	Biomass	GSHP	TOTAL
# of systems funded	53	1	6	36
Generating capacity	421.68 kW	39,519 Btu/hr	32 tons	--
kWh/year	557,076	24,754	235,488	817,318
MMBtu/year	1899	84.4	802.9	2,786

VI. ADMINISTRATIVE COSTS

Administrative costs for the AERLP include staff and program support salaries, promotional materials and ads, printing, travel, and contracted financial services. Contracted financial services include loan underwriting, origination, and servicing. Montana statute caps administrative costs of the program at 10 percent of the total loans (75-25-102 (3), MCA). DEQ policy EPP-AERLP-01-02 further elaborates that the administrative costs ratio be calculated based on the total loans outstanding at the beginning of the fiscal year. FY19 administrative costs totaled \$276,234, equivalent to 6.51 percent of the total outstanding loan balance (\$4,242,641), which is below the statutory 10 percent cap.



DEQ staff visit FY19-funded off-grid array under construction outside Helena