

Alternative Energy Revolving Loan Program

Outcomes Report, Fiscal Year 2023



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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 2022 at 3.0% and increased slightly to 3.5% for calendar year 2023.

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 2023 (FY23), which started July 1, 2022, and ended June 30, 2023. 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 FY23-funded projects (clockwise from top left): roof mount solar array in Stevensville; ground mount solar array in Helena; battery bank in Lavina, woodstove in Florence.

II. LOAN PROGRAM ACTIVITY & HIGHLIGHTS

Loan applications and loans issued

A total of seventy-one applications were received, reviewed for technical and financial feasibility, and funded in FY23. Ten applications were withdrawn by the applicant and one application was declined on financial merit. The seventy-one loans closed for a total of \$2,105,908 (Figure 1).

Figure 1: Loans issued in FY23

	Number of loans	Amount of loans	Average Loan
State funds	61	\$1,819,850	--
DOE funds	10	\$286,058	--
TOTAL	71	\$2,105,908	\$29,661

Figure 2: Total loan amounts issued by fiscal year



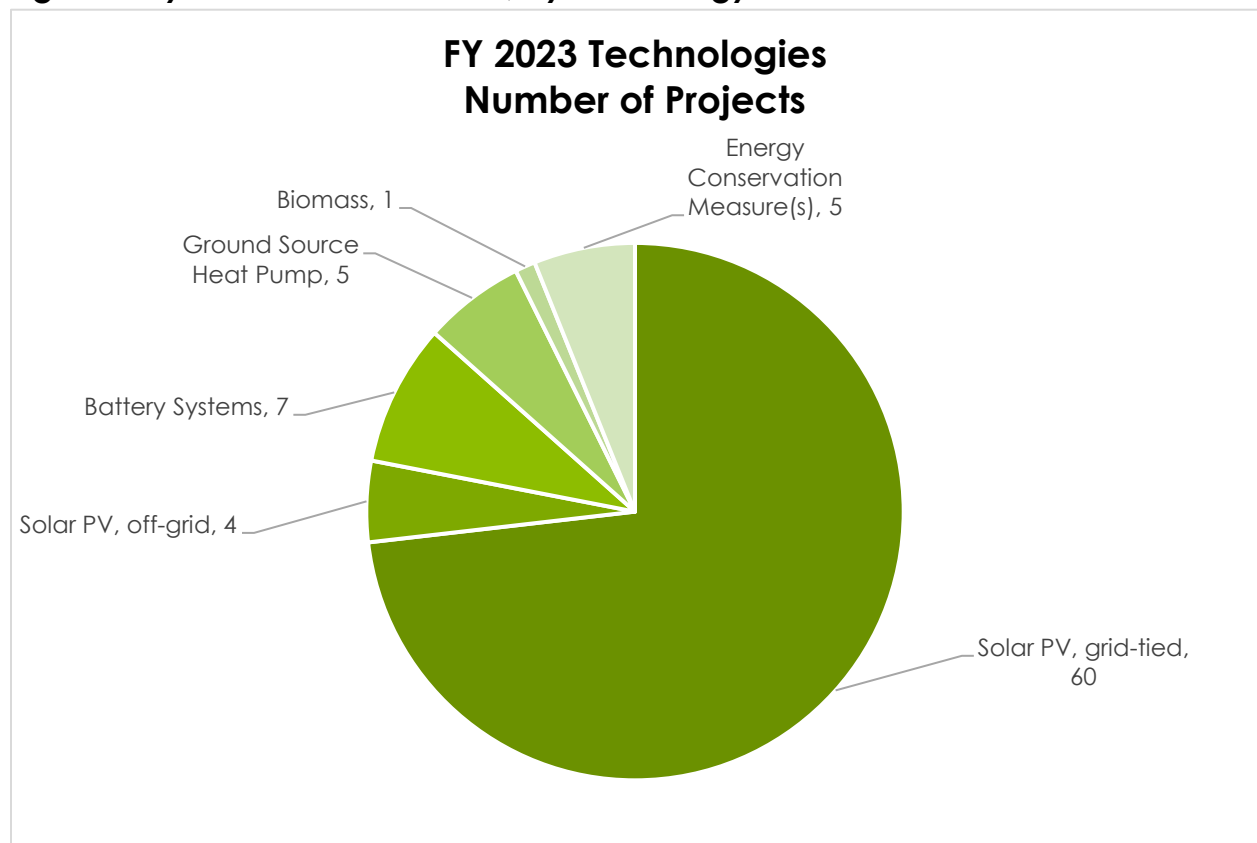
Borrowers

Similar to previous years, the majority of AERLP borrowers in FY23 were individuals (70 loans), followed by businesses (1 loan). There were no loans given to non-profit organizations, local governments, or units of the university system. The non-residential loan was for a dental office in Bozeman.

Technologies funded

In FY23 there were sixty loans issued for grid-tied solar photovoltaic (PV) arrays, and four loans issued for off-grid solar arrays. There were seven systems that included batteries and five loans that included energy conservation measures installed in conjunction with one or more alternative energy systems. Figure 3 charts the number of energy systems funded in FY23. Please note that because 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 FY23, by technology



Project Locations

In FY23, loans were issued for projects in fifteen counties across Montana. See the table below (Figure 4) for a summary of the number of loans in each community.

Figure 4: Locations of FY23 AERLP projects by county and city

County	City	Number of loans
Broadwater	Townsend	1
	Winston	1
Carbon	Bridger	1
Cascade	Cascade	1
Flathead	Kalispell	2
	Lakeside	1
	Marion	2
	Whitefish	1
Gallatin	Belgrade	3
	Bozeman	20
	Gallatin Valley	1
	Manhattan	2
Golden Valley	Lavina	1
Lake	Polson	1

County	City	Number of Loans
Lewis & Clark	Helena	10
Lincoln	Libby	1
Mineral	Alberton	1
Missoula	Florence	1
	Missoula	10
Park	Livingston	2
Ravalli	Corvallis	1
	Hamilton	1
	Stevensville	3
Sanders	Thompson Falls	1
Yellowstone	Billings	1
	Laurel	1

III. LOAN-LOSS RATIO

A total of ten loans have defaulted over the program's two-decade history with one loan defaulting in FY23. Loan balances are not written off and considered a loss until all efforts to collect the loan balance and fees have been exhausted. Seven loans have been written off as losses. Funds have been recovered through collection on three loans, and one loan is in active collections. Statute requires the loan-loss ratio for the program to remain under five percent (75-25-103(1), MCA). The total amount of funds written off as losses is \$154,129, which amounts to a loan-loss ratio of 0.83 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 (\$18,475,492).

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 FY23 were solar PV arrays, which is likely due to the availability of the technology, the cost of the technology, 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 Photovoltaic (PV) system installed costs for residential PV consumers increased 3% from 2022 to 2023 for systems ranging from 2.5 kW to 10 kW, and increased 7% for systems ranging from 10 kW to 100 kW according to data sourced by the National Renewable Energy Laboratory (NREL) from five major PV markets (Arizona, California, Connecticut, Massachusetts, and New York) not including Montana¹. Adjusting for inflation, there was a decrease of 2% for 2.5 kW to 10 kW systems and a smaller increase of 2% for systems ranging from 10 kW to 100 kW. The NREL data show pricing averages of \$4.31/watt for systems 2.5 kW to 10 kW, and \$3.85/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 \$2.90/watt in FY23, up slightly from \$2.68/watt in FY22, and far below the \$8 - \$10/watt average when the AERLP was established in 2001. The AERLP systems included in the FY23 solar PV cost analysis were all grid-tied, and ranged in size from 3.90 kW to 34.50 kW, with an average size of 12.03 kW. Despite the increase in cost, demand was still very strong for solar PV systems.

Utility incentives have largely been phased out for residential and commercial solar PV systems in Montana, however 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 to solar PV systems often make solar a better choice at the residential and small

¹ National Renewable Energy Laboratory. Summer 2023 *Solar Industry Update*: [Summer 2023 Solar Industry Update \(nrel.gov\)](https://www.nrel.gov/news/solar/2023/07/27/summer-2023-solar-industry-update)

business scale for generating electricity. The AERLP received no applications for wind energy systems in FY23.

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 FY23 (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 FY23 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. 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.

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

Figure 5: Projected generating capacity and energy output of FY23 projects

	Solar PV	GSHP	Biomass	TOTAL
# of systems funded	64	5	1	70
Generating capacity	753 kW	22 tons	55,000 Btu/hr.	--
kWh/year	1,004,098	141,583	14,100	1,159,781
MMBtu/year	3,426	483.1	48.11	3,957.21

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. FY23 administrative costs totaled \$257,309, equivalent to 6.45 percent of the total outstanding loan balance (\$3,991,066), which is below the statutory 10 percent cap.