

MONTANA SOLAR

MENU OF
OPTIONS

MARCH 2018

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Acknowledgments

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Executive Summary

As the cost of solar energy continues to fall, communities, utilities, and electric cooperatives across Montana are exploring options for going solar. In addition to large, central solar projects and individual homes and businesses going solar, community-scale solar options can expand solar access, educate and raise awareness of solar, and reduce costs. This guide is an introductory overview for anyone wishing to explore these options. Whether you seek to control electricity costs, invest in a local clean energy source, gain a measure of energy independence, or spur economic development, you have several solar models of community-scale solar energy to consider:

- **Shared Solar** is a solar energy system that provides power and/or financial benefits to multiple community members who buy or lease a share of the system. Montana has several examples of Shared Solar, including four electric co-ops that offer Shared Solar programs and one utility pilot program. These programs expand access to solar energy and can provide economies of scale. They rely on a strong partnership between the energy provider and the Shared Solar participants, to design, build, and enroll the project for the benefit of the community.
- **Community-Sited Solar** refers to a solar energy system hosted and owned by a community institution such as a school, local government, or other organization. Such projects help the host control electricity costs and provide an opportunity for solar energy education. If you would like to see more solar energy on display in your community, planning a Community-Sited Solar project could be a good way to get started.
- **Group Purchase of Solar**—also known as “Solarize”—refers to homeowners and/or businesses purchasing individual systems for their own rooftops through a guided group purchase process. A group purchase campaign typically provides economies of scale, contractor vetting, and step-by-step guidance to go solar. A Solarize campaign in Missoula in 2015-2016 led to the installation of 45 new solar photovoltaic (PV) systems in the area. If you would like to go solar on your own home or business, organizing a Solarize project can give you strength in numbers.



Regardless of the path you choose, the Montana Solar Community Project, sponsored by the Department of Environmental Quality's Energy Office, is building a library of resources for Montana citizens to go solar. See <http://mtsolarcommunity.com/> for more information, and good luck planning your Solar Community!

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Definitions and Acronyms

Azimuth angle – the compass direction from which sunlight is coming. Solar photovoltaic (PV) panels oriented to the optimal azimuth angle will be able to generate the maximum amount of energy.

Behind the meter – a solar photovoltaic (PV) system designed to generate power for use on-site, where the location of the system is actually “behind the meter” on the co-op member or utility customer’s property. Behind the meter solar generation is first used to meet on-site electricity demand, and excess energy may be exported to the energy provider, depending on net metering arrangements.

Community solar – a solar energy system that provides power and/or financial benefits to multiple community members who voluntarily participate in the program by buying or leasing shares of the system. Throughout this document, this type of solar project is called “Shared Solar” to distinguish it from other community-scale solar projects (i.e., Group Purchase of Solar and Community-Sited Solar).

Community-scale solar – for the purposes of this guide, “community-scale solar” refers to a broad range of solar projects deployed in the community. We look at three models: Shared Solar, Group Purchase of Solar and Community Sited Solar.

Demand charges – a charge based on the highest amount of energy used during any 15-minute average during the billing period. For example, two businesses might use the same amount of energy over a given time period, but the first business uses that amount in only 8 hours, while the second business uses that amount over a full day. The first business could incur a larger demand charge in addition to the normal cost per kilowatt-hour of electricity.

Distributed energy resources – smaller power sources that are usually physically closer to consumers and often behind the meter – as opposed to a centralized energy generating facility, such as a power plant.

Energy provider – for the purposes of this guide, an “energy provider” is either the investor-owned utility or electric co-op that provides electricity service to a home or business.

Energy use charges – the variable monthly charge on a utility bill that customers pay based on their energy consumption. This charge is determined by the cost per kilowatt-hour (rate) charged by the energy provider multiplied by the number of kilowatt-hours used by the customer in the billing period. Some utilities have different seasonal rates (e.g., a summer and winter rate), as well as different rate tiers depending on the total amount of electricity used.

Fixed charges – the recurring, monthly charge on your electric bill of a fixed amount, often labeled “Base Service Charge.” All customers pay this charge regardless of electricity use.

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DEFINITIONS AND ACRONYMS

Electric Grid (or Grid) – the network of generating plants, transmission lines, substations, transformers, and distribution lines that delivers electricity from electricity producers to consumers, including homes, businesses, and institutions.

Ground-mounted solar panels – solar photovoltaic (PV) panels that are mounted on the ground with a racking system, rather than on the roof of a house or other building.

Inverter – a device that converts the direct current (DC) output of a solar photovoltaic (PV) panel into alternating current (AC), the type of electricity used in homes and businesses for things like appliances and plug-in electronics.

Investor-Owned Utility (IOU) – a private business that provides utility services, such as electricity, that is privately owned and managed and subject to regulation. In Montana, there are two investor-owned utilities, NorthWestern Energy and Montana-Dakota Utilities.

Kilowatt (kW) and kilowatt-hour (kWh) – a kilowatt is a measure of instantaneous power, while a kilowatt-hour is a measure of power used over time. For example, a solar photovoltaic (PV) system may be capable of producing five kilowatts (5,000 watts) of power in full sun. In one hour of sunshine, the system will produce five kilowatt-hours of electricity. Utilities measure customer energy consumption or generation in kilowatt-hours.

Kilowatt DC and kilowatt AC – two ways of measuring the power generation capacity of a photovoltaic (PV) system. Kilowatt DC (direct current) is the power rating of the solar panels alone; kilowatt AC (alternating current) is the power rating of the system including inverters. Some electricity is lost when the inverter converts AC to DC, so kilowatt AC ratings are, on average, about 80% of kilowatt DC ratings.

Montana DEQ – Montana Department of Environmental Quality, which houses the Montana Energy Office (MEO).

Net metering – a billing mechanism that allows customers with energy generating systems like solar panels to earn a bill credit for excess energy they generate but do not consume on-site, by exporting the excess energy to the grid for other customers to use. On a monthly cycle, the total electricity the customer exported to the grid offsets the total electricity the customer consumed from the grid. If the net metered system generates more electricity than was consumed on-site during the month, bill credits are rolled over to the following month. Net metering customers may not use bill credits to offset fixed utility bill charges.

Off-site generation – a renewable energy-producing installation that is grid-connected and supplies energy through the grid to homes and businesses.

On-site generation – a renewable energy-producing installation at the location where the energy will be consumed.

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Payback period – the estimated period of time it will take to “break even” on an investment in a solar energy system. It can include the following components: cost of equipment and installation; available tax credits, rebates, and other incentives; average monthly electricity use; estimated electricity generation; and additional financial incentives.

Photovoltaic (PV) cell – a semiconductor that converts energy from sunlight into electrical energy.

PV array – a number of photovoltaic (PV) panels wired together into a system to generate solar power.

PV panel – also called a solar panel or module, a photovoltaic (PV) panel is a number of individual PV cells connected and sealed into a weatherproof enclosure.

PV system – photovoltaic system designed to generate solar power through the use of photovoltaic cells.

Renewable energy certificates (RECs) – a tradable asset representing the value associated with the environmental, social, and other non-energy attributes of one megawatt-hour (MWh) of renewable energy. RECs allow purchasers to claim that they have purchased renewable energy, either for the purposes of meeting regulatory requirements or reducing environmental impacts.

Roof-mounted solar panels – photovoltaic (PV) panels that are mounted on the roof of a house or other building.

Shared Solar – a solar energy system that provides power and/or financial benefits to multiple community members who voluntarily participate in the program by buying or leasing shares of the system. This type of system may also be called “community solar” or a “solar garden”, but throughout this document, this type of community-scale solar project is called “Shared Solar” to distinguish it from community-scale solar.

Time-of-use rate – a rate structure in which utilities charge a different price per kilowatt-hour depending on the time of week or day, as well as by season.

Third-party ownership model – a solar installation ownership model in which a taxable entity, such as a large solar installation company or manufacturer (e.g., SunPower), owns an on-site solar system and utilizes available tax credits and then leases the array or sells the power to the host at an advantageous rate.

Electric cooperative (co-op) – an entity that provides utility services, such as electricity, that is owned and operated by its members, who are also its customers.

Virtual net metering – a billing mechanism that allows Shared Solar customers to receive credit on their electricity bill for energy produced by their share of a system even though it is not installed on their property. As with net metering, a customer can offset up to 100% (but no more) of their electric consumption.

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Introduction

The Montana Energy Office (MEO) of the Montana Department of Environmental Quality (DEQ) received a partnership award through the U.S. Department of Energy Solar Energy Technologies Office to evaluate options for solar energy generation in the state. This first phase of that project provides a “menu of options” to increase access to community-scale solar energy projects for Montana communities by walking through the considerations and questions that a resident of Montana would need to address before pursuing a community-scale project, and then providing guidance on how to get started. This menu of options is informed by research from a Solar Market Assessment¹ of the state, as well as meetings with eight communities across Montana— with representation from community development organizers, city staff, business owners, state and local elected officials, solar installers, electricity providers, and interested citizens—about their interest, concerns, and questions related to solar energy project development.

The information in this menu of options is intended to help any interested Montana resident, especially those not already familiar with solar technology or installation processes, pursue a community-scale solar project. It is organized around three community-scale solar models: **Shared Solar**, **Community-Sited Solar**, and **Group Purchase of Solar**. Because of the large number of utilities and electric cooperatives, various legal and tax considerations, and evolving national and state policies that could impact a potential project, the menu does not attempt to cover every type of scenario one might encounter, and the information included in this report may change over time. Rather, this document outlines the high-level steps of each type of community-scale solar project and the roles that someone interested in pursuing a community-scale solar project in their community (a “solar champion”) would be best suited to fill. For each type of project, it also lays out the questions a solar champion should be asking their energy provider and their community when planning and developing such a project.

¹ <http://deq.mt.gov/Portals/112/Energy/Documents/Montana%20Solar%20Market%20Assessment%20-%20Final.pdf?ver=2017-09-15-114156-387>



MONTANA SOLAR MENU OF OPTIONS

INTRODUCTION

Why Solar in Montana?

While solar penetration in Montana is currently low compared to other states, solar energy is abundant in the state, and the cost of solar panels continues to drop nationally. Montana's solar resources are fairly typical of other areas in the U.S., and, due to its low population density and available land area, Montana has the potential to generate enough electricity to meet its needs many hundreds of times over using only solar power. The National Renewable Energy Lab (NREL) analyzed 26 communities in Montana and developed [interactive maps](http://mtsolarcommunity.com/interactive_maps)² showing potential sites for community-scale solar and the cost of energy produced by the solar arrays. These maps not only demonstrate that there is plenty of suitable land for solar development, but also provide a good starting point for evaluating potential sites for community-scale solar projects.



Montana residents are also very interested in the accompanying benefits that solar energy provides; installing solar supports energy independence, provides residents with lower and more stable energy costs, and promotes economic development and job creation. While the upfront cost and payback period of individual solar array ownership is often the biggest hurdle to greater solar adoption, community-scale solar is an alternative that allows residents, businesses, and community organizations to access these benefits and increase renewable energy generation in more cost-effective ways. The three models of community-scale solar discussed in this guide—Shared Solar, Community-Sited Solar, and Group Purchase of Solar—may allow interested residents or groups to achieve economies of scale, strengthen utility-community partnerships, and expand access to those who might otherwise be left out, including renters and community organizations.

Energy Provider Landscape in Montana

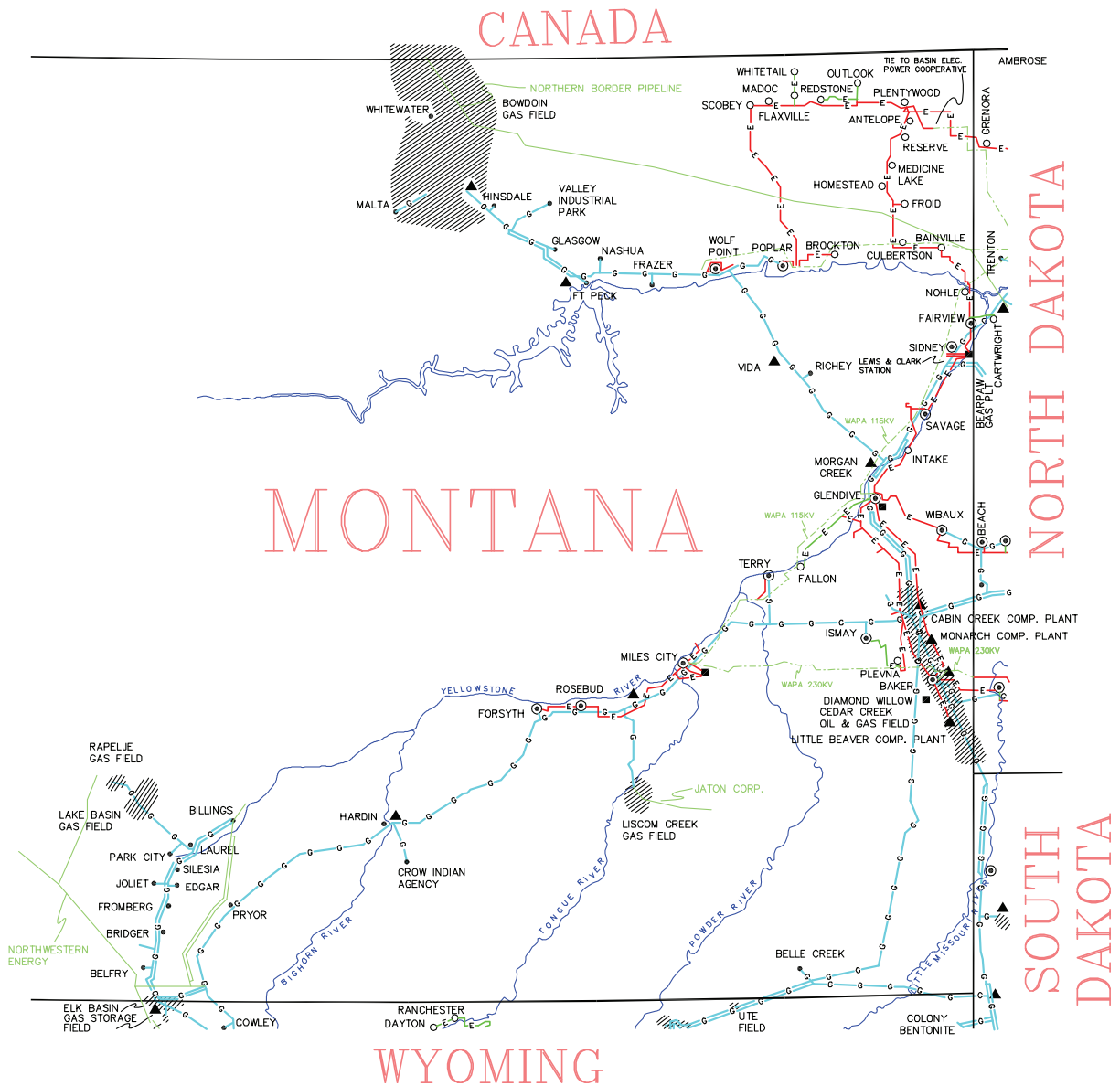
The viability of a community-scale solar project in Montana depends heavily on energy provider structure and support, which varies throughout the state. Montana has a diverse mix of electric utilities and co-ops, including two investor-owned utilities (IOUs)—Montana-Dakota Utilities (Montana-Dakota) and NorthWestern Energy (NorthWestern)—and 26 member-owned electric cooperatives (co-ops), each with different electricity rates and policies around solar. The maps on the following pages show electric utility and co-op territories within Montana.

² <http://mtsolarcommunity.com/Resources>

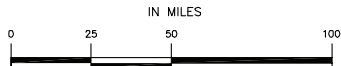
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Montana-Dakota Utilities



GRAPHIC SCALE



REVISED 1/12/17

SYSTEM MAP

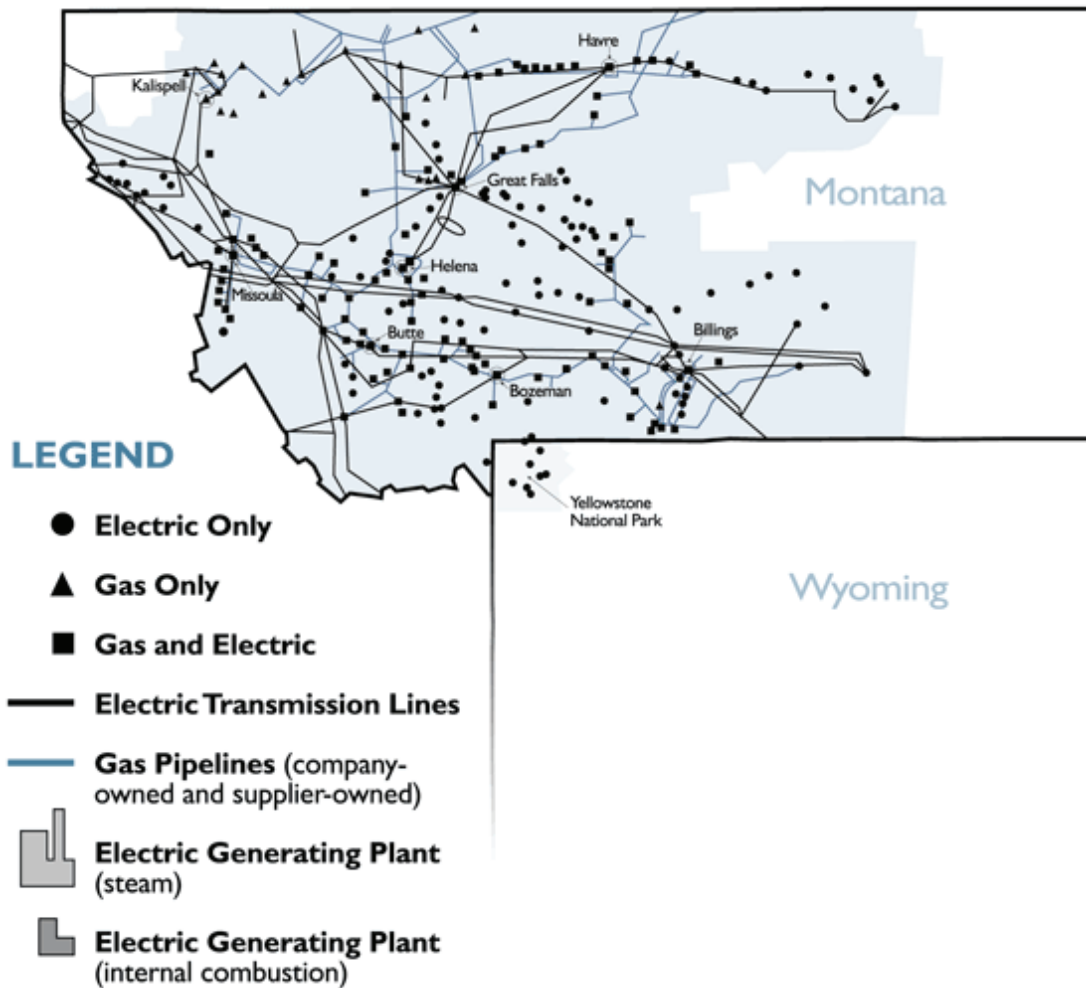
MDU RESOURCES GROUP, INC.

	WILLISTON BASIN NATURAL GAS PIPELINES		ELECTRIC TRANSMISSION LINES
	GAS COMPRESSOR PLANTS		ELECTRIC DISTRIBUTION LINES
	NATURAL GAS FIELDS		TOWNS SERVED WITH ELECTRICITY
	TOWNS SERVED WITH NATURAL GAS		TOWNS SERVED WITH ELECTRICITY & NATURAL GAS
	TOWNS SERVED WITH ELECTRICITY & PROPANE		ELECTRIC GENERATING PLANTS
	GREAT PLAINS NATURAL GAS PIPELINES		PROPOSED ELECTRIC GENERATING PLANT
	MONTANA-DAKOTA UTILITIES NATURAL GAS PIPELINES		OTHER COMPANIES ELECTRIC LINES
	OTHER COMPANIES PIPELINES		

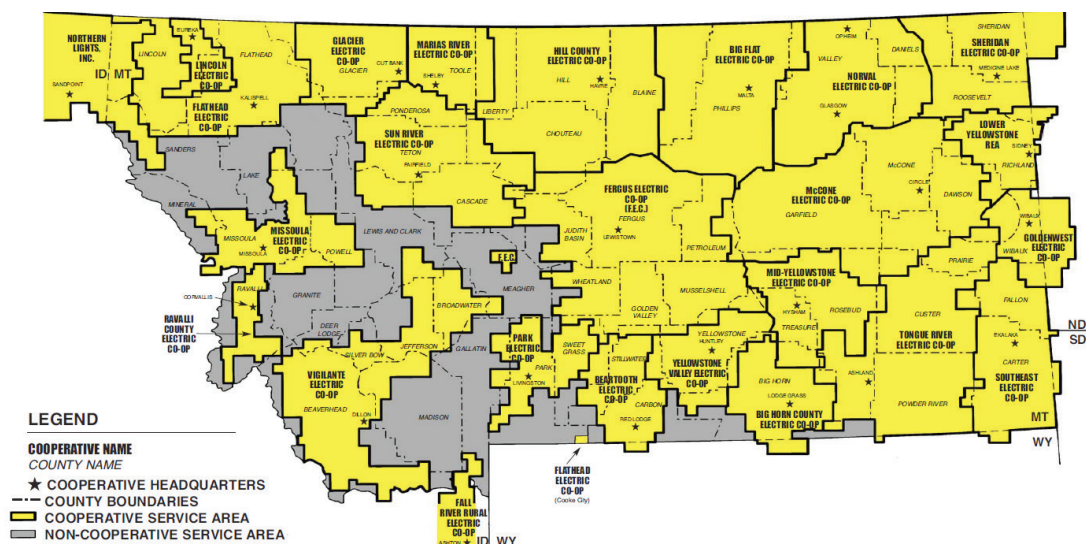
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INTRODUCTION

NorthWestern



Montana Rural Cooperatives' Service Areas



Montana does not currently have any state policies directly promoting community-scale solar. A few state programs support solar generation in general, such as state law that requires investor-owned utilities to offer net metering (crediting customers for solar generation), and co-ops have generally adopted voluntary net metering policies. However, virtual net metering, or crediting customers for generation from a shared system that is not on their own property, is not explicitly allowed, which may limit certain types of community-scale projects in NorthWestern's utility territory. In contrast, due to different regulatory considerations, net metering rules in Montana-Dakota territory allow for most types of community-scale solar projects. Within electric co-op territories, there are varying terms and restrictions, as well as electricity and net metering rates, which could affect the attractiveness of community-scale solar projects. Given the role of energy providers in implementing enabling policies, the success of most types of community-scale solar projects in Montana will depend heavily on provider engagement and support.

Existing Projects in Montana

There are several community-scale solar projects already operating or planned in Montana. Currently, four electric co-ops—Ravalli Electric Cooperative, Flathead Electric Cooperative, Missoula Electric Cooperative, and Fergus Electric Cooperative—have installed Shared Solar projects based on member interest. These projects used a model that allows participants to purchase solar panels from the co-op; in each case, the co-op was able to fully subscribe the array with interested members even though payback periods ranged from 9 to 23 years. NorthWestern has also piloted a Shared Solar project in Bozeman with a 338 kW system that provides virtual net metering, or credits on customers' electricity bill for the energy produced by their share of the system, for approximately 60 residential and commercial customers. Montana-Dakota is currently surveying customers on their interest in Shared Solar projects in order to review options for potential project development.

A community-led collective solar purchase campaign in Missoula led to the installation of 45 new PV systems in 2015 and 2016. Several communities throughout the state have also sited solar projects on schools and local government or commercial buildings, including installations on Bozeman's City Hall and Public Library, St. Jude Thaddeus School in Havre, Lewis & Clark Library in Helena, and a city-owned parking garage in Missoula.



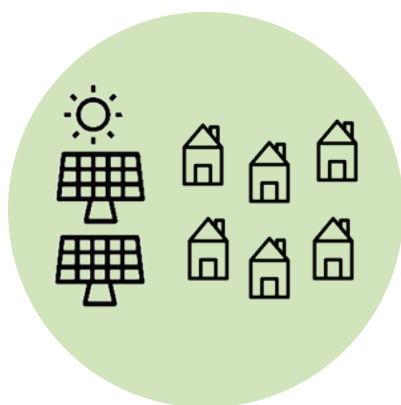
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Choosing Your Solar Pathway

How to Use This Guide

This menu of options begins with descriptions of the three types of community-scale solar projects covered in this document, described below, and includes considerations to think about as you get started, as well as some general implementation considerations that are relevant to most types of community-scale solar projects. These general sections are followed by more detailed sections on each type of project, which include case studies of successful projects in Montana for each type.

You should review the solar pathway preliminary questions and decision diagram in this section to determine the project type best suited to your community's needs. While the Introduction, Choosing Your Solar Pathway, and Implementation Considerations sections are applicable to anyone considering a community-scale solar project, once you've decided on a project type, you can skip to the corresponding section, which includes additional tools and resources to help you plan and implement your project.



SHARED SOLAR

Shared Solar, also commonly called "community solar" or "solar gardens," refers to one solar energy system installed and operated by a single entity that provides electricity credits to multiple owners or subscribers, all of whom are customers of the same energy provider. The array is generally located on a single site, and interested persons or organizations purchase or lease "shares" of the array. This type of installation can take advantage of virtual net metering (if available) to provide credits on participants' utility bills. Shared Solar projects also provide access to solar energy for those who can't install their own systems, such as renters or homeowners whose houses aren't suitable for solar panels.

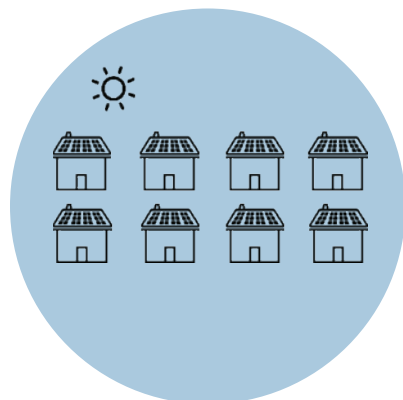


COMMUNITY-SITED SOLAR

Community-Sited Solar refers to one solar energy system hosted and owned by a community institution such as a school, non-profit, local government, or other organization, which generates electricity for the owner. This type of project allows the site owner to reduce environmental impacts and lower energy bills, and provides an educational opportunity for the surrounding community. Community-Sited Solar projects are usually led by a local champion and financed through grants, low-interest loans, private donations, and/or community fundraising.

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CHOOSING YOUR SOLAR PATHWAY



GROUP PURCHASE OF SOLAR

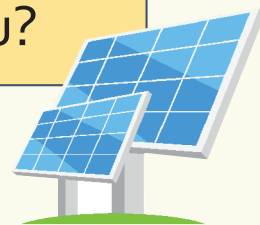
Group Purchase of Solar, commonly known as “Solarize,” refers to multiple homeowners and/or businesses purchasing solar energy systems for their own rooftops through a guided group purchase process. A group purchase campaign typically provides economies of scale, contractor vetting, and step-by-step guidance for individuals who want to go solar. This type of project works well for individuals or businesses who have the financial resources and an adequate site for a PV system.



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CHOOSING YOUR SOLAR PATHWAY

Which **SOLAR PROJECT** is right for you?



Are you interested in personally owning solar?

























NO

YES

Are you willing to invest at least \$10,000?

YES

NO

	Community-Site Solar	Group Purchase of Solar	Shared Solar
			
Motivation	 Help host reduce emissions, energy bills	 Reduce emissions, energy bills, hedge against price fluctuations	 Reduce emissions, energy bills, hedge against price fluctuations
Utility Involvement	 Medium	 Medium/low	 High
Siting	 Community building	 Single family homes, businesses	 Various (public, private, or utility property)
Ownership Term	 25 - 30 years	 25 - 30 years	 20 - 25 years
Solar Type	 Rooftop	 Rooftop	 Rooftop or ground mount
Maintenance Responsibilities	 Owner	 Owner	 Administrator
Compensation Structure	 Net metered	 Net metered	 Virtual net metered/ various

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CHOOSING YOUR SOLAR PATHWAY

Before You Begin a Project

In addition to the legal and regulatory differences of energy providers in Montana that could impact what type of community-scale solar project you can pursue, there are several aspects of a project that you should consider before moving forward. While some have similar or overlapping characteristics, there are differences that could make one type of community-scale solar project more attractive than another depending on your interest and what will work best for your community.

DEFINE YOUR GOALS

When deciding to pursue community-scale solar, you must first identify goals for the project. Are you hoping to make an investment that will generate financial benefits over time? Do you want to support a community organization in going solar? Do you want to reduce your carbon impacts and offset energy use? Are you trying to gain public visibility and expand the market for solar? Determining the answers to these questions will help you decide which kind of community-scale solar project is right for you and your community.

ENGAGE YOUR ENERGY PROVIDER

Most community-scale solar projects will require partnering with the local energy provider to navigate the process and ensure success. It is crucial to engage them early and find out what support they can provide, as well as what requirements and potential hurdles will need to be addressed when developing a project in their service territory.

GAUGE YOUR COMMUNITY RESOURCES AND APPETITE

Because different types of community-scale solar projects have different requirements for organizing, fundraising, and administration, you'll need to think about the levels of these activities that your community can sustain and for how long. A Solarize campaign can take as little as six months (though solar array ownership lasts much longer), while participation in a Shared Solar project can be as short as a one-year subscription or as long as the full life of the solar panel.

Any type of community-scale solar project will also require outreach, education, and marketing to be successful, so you will need to consider what resources are available. Is someone willing and able to lead the effort, and can you secure funding or in-kind resources for marketing materials, for example?

While community-scale solar projects often rely on one person or a small group of solar champions to spearhead the effort, a successful project will require broader support throughout the life of the project. Consider who your community allies might be—the energy provider, legal and tax professionals willing to offer *pro bono* support, solar installers, neighborhood groups, community organizations, schools, faith-based organizations, and other similar groups. The Montana Energy Office is also a resource to help you with your community-scale solar project by providing educational resources, logistical support, and technical assistance, as well as connecting individuals, municipalities, installers, and utilities to share resources and best practices on implementing community-scale solar projects.

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Additional Resources

ORGANIZATIONS

The **Montana Energy Office** provides general information on energy resources and financing, such as the Alternative Energy Revolving Loan Program: <http://deq.mt.gov/Energy>

The **Montana Solar Community Project**, sponsored by the Department of Environmental Quality's Energy Office, is building a library of resources for Montana citizens to go solar. See: <http://mtsolarcommunity.com/>



Montana Energy Office (MEO)

MEO is available to help anyone interested in a community-scale solar project through research, education, and facilitation, including:

- Connecting individuals, municipalities, installers, and utilities to share best practices and their experience conducting community-scale solar projects
- Providing technical assistance on logistics and financial elements of community-scale solar projects
- Hosting public education programs and community meetings on solar technology, installation options, the process of installing solar, and financing
- Supporting communities and local organizations (e.g., Montana Renewable Energy Association) in their efforts to adopt model ordinances for cities seeking to streamline solar permitting and review
- Serving as a clearinghouse for future community solar resources such as examples of community interest surveys, model ordinances, contract language, etc.
- Hosting targeted meetings with interested communities to educate local stakeholders about solar opportunities
- Visiting schools or other venues around community solar installations with the project team to educate residents, local decision makers and other stakeholders about renewable energy
- Quantifying the site-specific benefits and feasibility of distributed renewable energy to enhance the resilience of emergency management operations and potential applications or sites (such as hospitals, fire and police stations, senior centers, etc.).
- Conducting research into solar market barriers in areas where solar might be cost competitive due to higher local electricity prices
- Researching potential options for providing solar incentives for low-income housing and tribal and other geographically isolated communities
- Assessing utility and co-op interest in and potential barriers to community solar projects.
- Partnering with electricity providers to survey customers or members on interest

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The **Montana Renewable Energy Association** provides inspirational examples of solar projects (<http://montanarenewables.org/profiles/system-profiles/>) as well as a directory of local solar installers throughout the state (<http://www.montanarenewables.org/directory/>).

PUBLICATIONS

Montana Solar Market Assessment, prepared for the Montana DEQ by Clean Power Research and Synapse Energy Economics, provides solar growth trends, policy comparisons with other states, and examples of community-scale solar in Montana and the West. <http://deq.mt.gov/Portals/112/Energy/Documents/Montana%20Solar%20Market%20Assessment%20-%20Final.pdf?ver=2017-09-15-114156-387>

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) developed maps for the Montana DEQ that depict the solar resource in and around 25 cities and reservations in Montana. The maps show 20-year energy costs in dollars-per-kilowatt-hour for 50 kW, ground-mounted, fixed-tilt solar arrays on half-acre plots of land. <http://mtsolarcommunity.com/Resources>.

The Rocky Mountain Institute published *Progress and Potential for Community-Scale Solar: How rural electric cooperatives can use low-cost, distributed energy to save money, serve customers, and unlock billions in infrastructure spending* by Kevin Brehm, Thomas Koch Blank, and Leah Mosier. www.rmi.org/insights/reports/progress-potential-community-scale-solar

RESOURCES FROM UTILITIES

NorthWestern Energy is one of two investor-owned utilities in Montana. They provide resources for customers interested in renewable energy. <http://www.northwesternenergy.com/environment/environmental-commitment/renewable-energy>

Montana Dakota Utilities is the other regulated utility in Montana. They have a website with information about renewable energy. <https://www.montana-dakota.com/conservation/renewable-solar-energy>



Implementation Considerations

Your goals for pursuing solar energy may include education, inspiration, economic development, or energy independence, but the fact remains that most people expect a solar project to pay for itself with energy savings, and the sooner the better. This section will review the costs and savings you can expect from a typical solar installation in Montana. You should carefully consider the following financial realities before pitching a solar project to the community.

Installed Cost of Solar

The “installed cost” of a solar PV system includes every cost to get the project on the roof or in the ground, including equipment, labor, and planning/permitting. As of the end of 2017, installed costs for solar in Montana range from approximately \$2.50 - \$3.50 per watt DC, before incentives.³

Pricing varies with equipment choices and the complexity of the installation. In addition, there are economies of scale, with larger projects realizing lower costs per watt. Large projects may face tradeoffs, however, because the solar energy generated may be credited at a lower rate than smaller, residential-scale systems. Because installed costs have been trending down for many years, you should obtain current cost estimates rather than relying on historical costs for project planning. If you don't yet have a specific project in mind, you can consult the NREL Open PV Project for information on previously installed projects.⁴

The following system variations, including battery backup and tracking systems, can provide additional benefits but also add cost and complexity.



³ Solar PV installations can be measured in two ways: Direct current (DC) watts refer to the generating capacity of the panels installed. Alternating current (AC) watts refer to the output capacity of the inverters which transform the DC electricity to grid-compatible AC electricity. Because inverters are not 100% efficient, their AC wattage is lower than the DC wattage of the solar panels themselves. When you see a project size or price per watt without the AC or DC qualifier, it is usually referring to the DC wattage of the panels.

⁴ <https://openpv.nrel.gov/>

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IMPLEMENTATION CONSIDERATIONS

BATTERY BACKUP

The vast majority of solar PV systems sold in the U.S. today do not include battery backup, thus they do not function when grid power is out. If you aim to provide backup power by integrating batteries, the upfront cost will be higher. Batteries for a typical home start at \$5,000 to \$7,000, not including the cost of installation and additional necessary equipment. Battery backup for commercial-scale systems are generally larger and will therefore cost more. Despite the added cost, you may be willing to pay for the “insurance” of having backup power and use of your solar panels in the event of a blackout. For a hospital, back-up power is lifesaving; for a grocery store, it could save thousands of pounds of produce; for a homeowner, backup power may merely be a convenience. Most customers will not be able to recoup the cost of adding batteries. If solar storage is too expensive to add today, you could ask the solar installer to create a “storage-ready” solution with an inverter that works with solar batteries, so that storage can be added in the future.



TRACKING SYSTEMS

Solar panels can be installed as either “fixed” or “tracking.” Tracking systems include a mounting system with mechanical components that rotate the panels to follow the path of the sun over the day and/or year to maximize energy production. Fixed systems will generally have lower overall energy production but also cost less and have fewer moving parts that could break. Most residential and commercial systems installed today are fixed. Installers will advise on the best system type that fits your site, goals, and budget.

STRING INVERTERS VS. MICROINVERTERS

Solar systems can be designed with either of two types of inverters: string inverters or microinverters. A string inverter converts the DC energy from multiple solar panels (a “string” of solar panels”) into AC energy, so an average residential system would have just one string inverter that is mounted at ground level. A microinverter converts DC energy from a single panel (or two) into AC energy, and it is mounted on the back of the panel. An average residential system will have almost as many microinverters as panels. There are many reasons to choose one type of inverter over the other. Microinverters may better optimize power output if there is a small amount of shade on the system, but they may cost more and be more difficult to access for service. Installers will advise on the best inverter type for your installation.

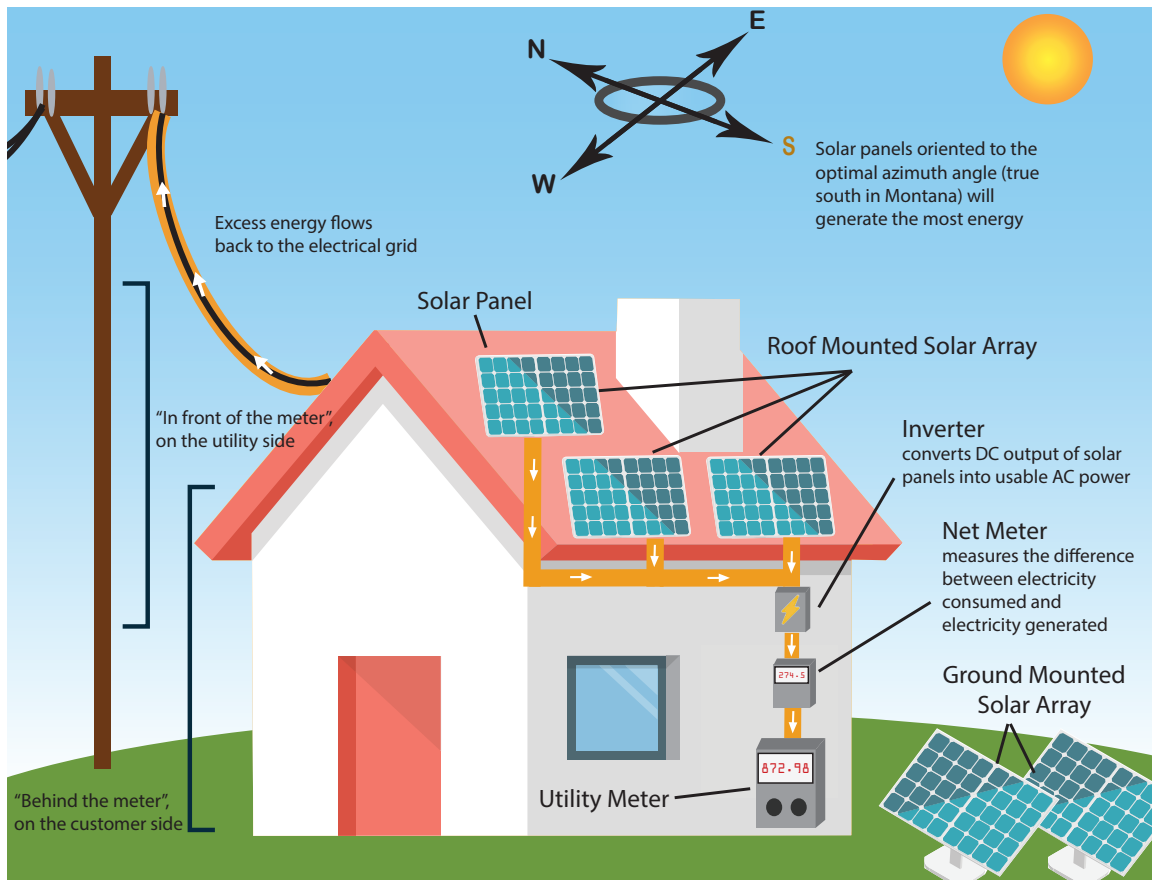
MONTANA SOLAR MENU OF OPTIONS

IMPLEMENTATION CONSIDERATIONS

Ongoing Cost of Solar Ownership

Upfront costs account for most of the cost of solar ownership over the typical 25-year lifetime. However, it is wise to proactively consider how to pay for the minimal required maintenance, including inverter replacement, and any additional costs for insurance, property taxes, or system decommissioning over the life of the system. In Montana, residential and commercial systems are not subject to property tax for ten years after installation⁵ but you should expect to pay property tax for the remaining ten to twenty years of system life. Commercial systems are subject to business property tax as Class 14 Renewable Energy Equipment. Conventional string inverters are typically warranted for 10-20 years, and will probably need replacement before the end of the panels' useful life. Microinverters may be warranted for 25 years. In addition, there may be a labor charge to replace inverters if they should fail, even while under warranty. In sum, although ongoing costs are minimal, you should understand that a successful project will incur some additional costs after installation.

Net Metering



⁵ Certain amounts (\$20,000 for a single-family residential dwelling or \$100,000 for all other structures) of the assessed value of non-fossil forms of energy generation equipment or low-emission wood or biomass combustors are exempt from property taxes for 10 years following installation. From 15-6-224 MCA on MEO website: <http://deq.mt.gov/Energy/montanasenergy/taxincentrenew#collapseTwo>

MONTANA SOLAR MENU OF OPTIONS

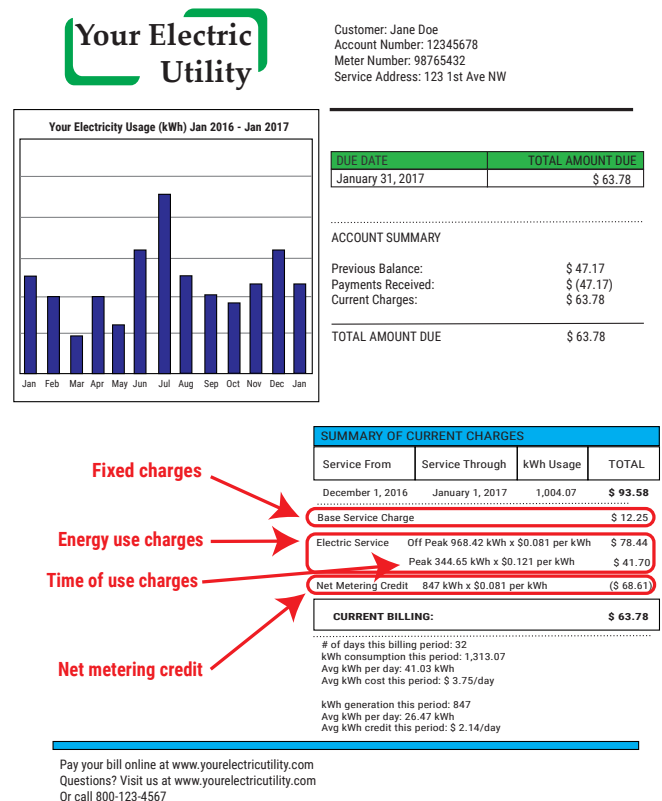
IMPLEMENTATION CONSIDERATIONS

Net metering is a billing policy that allows the host of an on-site solar installation to receive compensation for solar generation through electric bill credits. When the system is producing electricity, the electricity first goes to meet the host's electric needs; when those needs are fully met, any excess is sent to the grid so other electric customers can use the electricity. The electricity sent to the grid is metered, just like the electricity used *from* the grid, so the host can receive bill credits to offset electricity used from the grid when their use is higher than production. Net metering is available to all electric customers in Montana. The maximum net metering system size is 50 kW for NorthWestern and MDU customers. The maximum net metering system size varies for electric co-op customers. Co-op customers interested in installing a net-metered system should contact their co-op to learn more about its net metering policies. When evaluating financial benefits from net metering, you should consider the following factors.

CURRENT COST OF ELECTRICITY

Since solar energy generation offsets your electric consumption, your bill savings depend on the cost of your electricity. In 2015, the average retail price for electricity in Montana was 8.9 cents per kilowatt-hour (kWh). Rates are generally higher in NorthWestern Energy's service territory (approximately 11 cents per kWh) and lowest in co-op territory (e.g., 7 cents per kWh for Flathead Electric Customers).

Generally, the more expensive your electricity, the larger your solar savings. That said, there are nuances to consider. As seen in the sample bill to the right, an electric bill usually includes both fixed service charges and energy charges that vary by the amount of energy consumed, measured in kWh. Energy rates may vary by season, time of day, or cumulative volume of energy purchased, and residential and commercial customers may have different rates. Does your energy provider have tiered energy rates? If so, solar production may offset the most expensive energy first. Does your energy provider have time-of-use rates? If so, solar may offset the most or least expensive energy, depending upon whether rates are high or low during the middle of the day. Before embarking on a solar project, you should understand how much of a participant's electric bill could be offset by solar generation.



MONTANA SOLAR MENU OF OPTIONS

IMPLEMENTATION CONSIDERATIONS



THE HOST'S ELECTRIC CONSUMPTION

Under net metering, you generally cannot receive credit for generating more energy than you use on an annual basis. Your energy provider's net metering policy will determine how energy production is measured and credited to you. For customers of IOUs in Montana, any energy produced beyond the amount consumed in a monthly billing period will be credited to the next month. Annually—in either January, April, July or October for Northwestern customers, on a rolling monthly basis for MDU customers—any excess energy credits are forfeited to the utility. Therefore, net-metered systems are usually sized so that they do not produce more energy than the host uses in a year. Co-ops may have different net metering policies.

ANNUAL SOLAR PRODUCTION

PV installations with a sunny south-facing exposure will produce approximately 1,500 kWh per kW AC per year in Montana.⁶ Planners can use the free [PV Watts software](http://pvwatts.nrel.gov/)⁷ to calculate initial production estimates for specific GPS coordinates using standard assumptions provided in the software. These initial estimates can help planners estimate the income stream from net metering. Ultimately, the host should engage with a solar installer to do a site assessment, where the installer can use software and on-site measurements to calculate production estimates unique to the site and system design.

⁶ Montana Solar Market Assessment, Synapse Energy Economics 2017, p. 13 <http://deq.mt.gov/Portals/112/Energy/Documents/Montana%20Solar%20Market%20Assessment%20-%20Final.pdf?ver=2017-09-15-114156-387>

⁷ <http://pvwatts.nrel.gov/>

MONTANA SOLAR MENU OF OPTIONS

IMPLEMENTATION CONSIDERATIONS

VIRTUAL NET METERING

In the case of Shared Solar, a solar installation is intended to benefit multiple off-site participants who receive credit for their share of the electric production. Virtual net metering allows participants to receive bill credits as if their share of a Shared Solar system were located on their own roof. Virtual net metering is an option for interested electric co-ops and their customers and may be an option for MDU and its customers, albeit with some potential limitations. Virtual net metering is not currently an option for NorthWestern under existing Montana statute. Even in the absence of virtual net metering, Shared Solar projects may still be possible, but you should work with your energy provider to establish a fair compensation value for the electricity generated by a potential Shared Solar system.

NET METERING CREDIT RATE

The rate at which the energy provider credits the excess production from the net-metered system is an important part of the financial assessment of the system. Currently in Montana, the state's IOUs credit excess generation from net metered systems at the utility customer's retail rate for electricity, meaning that the credit you get for excess energy exported to the grid will be valued at the same rate that you pay for energy you use from the grid. This is referred to as retail rate compensation. Nationally, many states are moving to alternate credit rates, such as a wholesale rate or a value that is some percentage (e.g. 80%) of the retail rate. It is important to note that Montana statute grandfathers any net-metered customers served by an IOU to their current credit rate in the event of any future changes.⁸

Tax Credits & Other Benefits

Tax credits can be an important resource to make a solar project financially feasible for residents and businesses. The following are available in Montana:

- **Federal Residential Energy Tax Credit** – 30% of installed cost, available to residents who install solar on their own roof and in some cases to customers who own panels through a Shared Solar project. This personal income tax credit steps down to 26% in 2020, 22% in 2021 and expires in 2022. Residents should be sure they owe enough in taxes to take the tax credit, although it can be carried over to future years.
- **Federal Investment Tax Credit** – 30% of installed cost, available to businesses that own solar on their own roof. This business income tax credit steps down to 26% in 2020, 22% in 2021 and 10% in 2022 onwards.
- **Montana State Income Tax Credit** – \$500 income tax credit per taxpayer (\$1,000 for a joint-filing household) for renewable energy systems. This credit is available to residents who install solar on their own roof, but not available to residents who participate in Shared Solar.

⁸ Pursuant to MCA 69-8-612

MONTANA SOLAR MENU OF OPTIONS

IMPLEMENTATION CONSIDERATIONS

- Businesses that install solar can benefit from the Modified Accelerated Cost Recovery System (MACRS) also known as “accelerated depreciation.” Depreciation is the process by which businesses account for equipment losing value over time, and it is recorded as an expense, thereby reducing taxable income. Accelerated depreciation allows a business to depreciate the installed cost of the solar over five full years instead of over the 25-year expected life of the system, thus incurring more expense and reducing taxes owed. Businesses should consult a tax advisor to determine the value of this provision.

More specific information about tax credits available to different ownership models is provided in the sections on Shared Solar, Community-Sited Solar, and Group Purchase of Solar.

Grants

Grants are available under some circumstances and can play a crucial role in getting a project financed. Consider the following:

- **Energy provider grants:** Montana’s Universal System Benefits (USB) program requires all electric and gas utilities to establish USB funds for low-income energy assistance, weatherization, energy efficiency activities, and development of renewable energy resources. Energy Providers may make these funds available to community projects, especially where they provide some public educational benefit.
- **USDA Rural Energy for America Program (REAP) grants:** in the past, the USDA has offered REAP grants for the installation of renewable energy or efficiency for agricultural producers and rural small businesses.⁹ For Montana, rural small businesses are defined as any small businesses located outside of the communities of Billings, Great Falls, and Missoula.
- **Foundation grants:** Project planners should research the availability of community foundation grants and support from local businesses.

More specific information about grants available to different ownership models is provided in the sections on Shared Solar, Community-Sited Solar, and Group Purchase of Solar.

Loans

The Montana DEQ provides an Alternative Energy Revolving Loan Program for residential, commercial and Community-Sited Solar. They offer a fixed, low-interest rate for loans up to \$40,000 over ten years. In addition, banks and credit unions are beginning to offer energy-specific loan products with flexible repayment terms.

⁹ See www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency

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Ready to Get Started?

The following sections include more detailed information on each type of project. If you have determined the project type best suited to your community's needs, use the index below to navigate to the appropriate tools and resources to help you plan and implement your project.

Guide to Shared Solar



Guide to Community-Sited Solar



Guide to Group Purchase of Solar



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Guide to Shared Solar

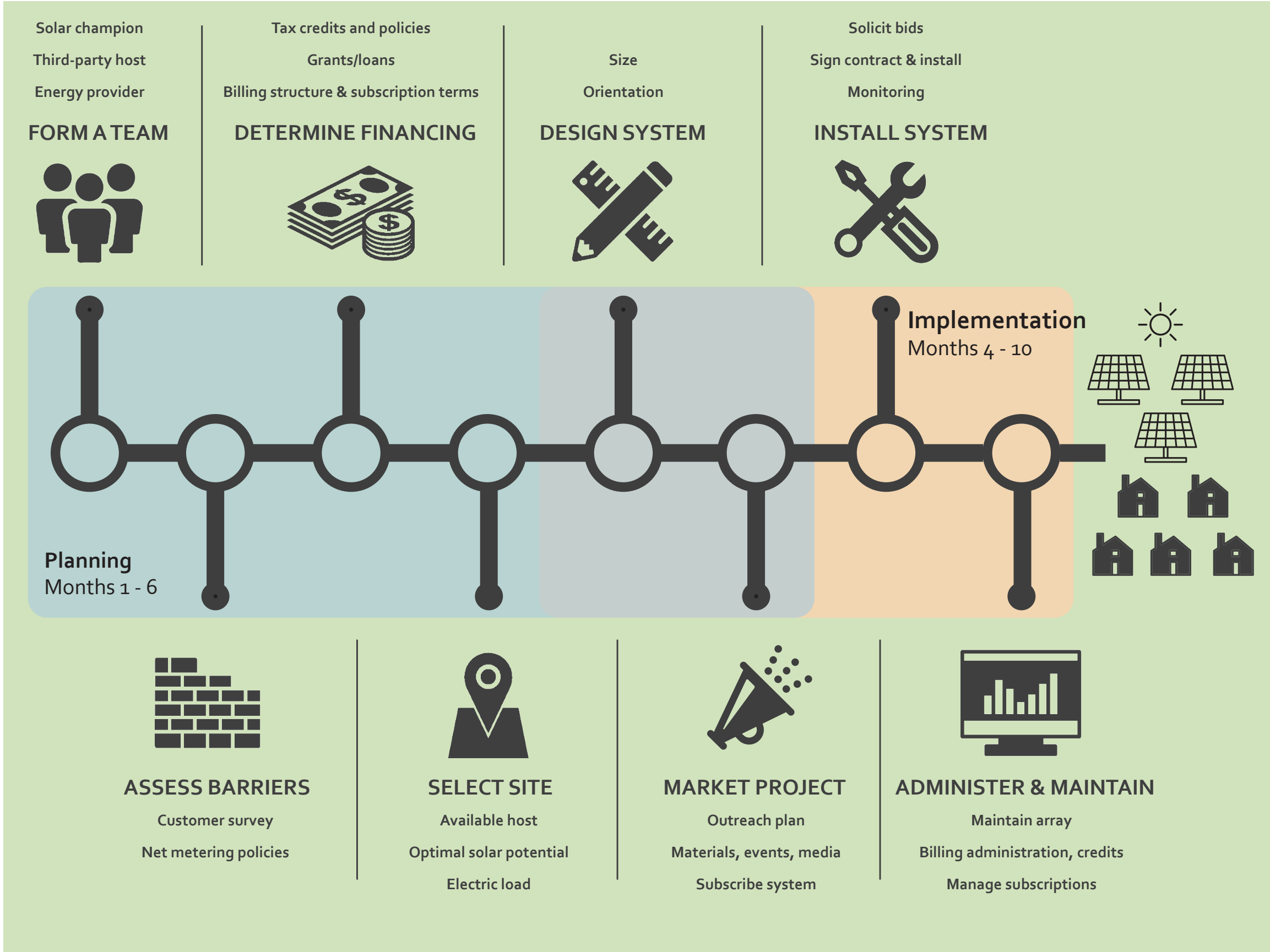
Overview of Shared Solar in Montana

Many households and businesses that lack optimal sites for a solar array on their rooftop or property may still benefit from solar through Shared Solar models. As the name implies, Shared Solar is a collective investment by members of a community in partnership with their energy provider. Shared Solar is typically developed and administered by an energy provider and individuals are invited to subscribe by purchasing or leasing one or more units—typically individual solar panels—for which they receive energy or financial credits on their energy bills. These arrays provide access to solar for renters, homeowners without optimal roof structure or exposure, and people who lack sufficient funds for the initial investment in a solar array. Additionally, each subscriber's cost for solar in a shared project will likely be lower than individual on-site installations because a shared installation does not require individual, building-specific design and installation. What's more, the larger arrays can often achieve lower costs through economies of scale, although these may be partially offset by higher administration costs.

Interested utility customers and co-op members typically work with their energy providers to develop a Shared Solar project. Four of Montana's electric co-ops have offered Shared Solar projects because of interest expressed by their members or customers, while several others are considering implementing Shared Solar projects. In addition, both MDU and NorthWestern are evaluating interest, and the regulatory hurdles that need to be overcome, for them to implement Shared Solar projects. While it is possible to form limited liability corporations or other business arrangements to develop Shared Solar arrays as an alternative to energy provider ownership, the legal costs of incorporation and site development are often prohibitive and the current legality of third-party Shared Solar is unclear in Montana.



MONTANA SOLAR MENU OF OPTIONS
GUIDE TO SHARED SOLAR



Project Pathway: Shared Solar

Although there are many potential paths to developing a Shared Solar project, Figure 5 illustrates the basic steps you should consider. A description of project steps follows along with tips for success for the Shared Solar pathway.

FORM A TEAM

Developing a Shared Solar project is complex and requires a strong relationship and communication between local community solar champions and the local energy provider. Focus your early efforts on building a partnership with the energy provider and defining each partner's role. Potential roles include:

Electric utility or co-op: May provide a suitable site; develop and maintain the array; create the subscription structure; promote the opportunity to customers; manage energy and financial billings and credits. Given the considerable role of energy providers in the Shared Solar model, the best opportunities for Shared Solar will involve energy providers with the following qualities:

- Ownership of open space – either rooftop or land near existing energy infrastructure and with good sun exposure
- Ability to manage the administrative tasks associated with selling or subscribing units of a PV array and providing credit to participants
- Capacity to educate and promote the solar installation
- Staff eager to include solar in the services they offer
- A high level of member or customer engagement and support

Third-party hosts: It is possible for entities other than energy providers to host Shared Solar, but managing subscriptions and appropriately allocating energy credits typically requires a strong partnership with the local energy provider.

Solar champion: Work with the energy provider to assess and build community support; focus outreach efforts on communities that lack optimal conditions or sufficient funds to invest in solar arrays at individual sites, including multi-family, low-income, small businesses, and other renters.

Since strong partnerships are so important to the success of a Shared Solar project, keep the following in mind as you form your team and move forward with the project:

- Work closely with the energy provider to ensure that the vision for the project is feasible. Understand energy provider concerns, and gather community input to address the concerns and support solutions.
- Work alongside the energy provider in partnership to gather support for the project. Customer interest is often the principle reason behind energy providers starting Shared Solar programs.
- The energy provider is best suited to determining the basic system parameters, such as location, generating capacity, and whether to use battery backup.
- Shared Solar project planners will need to work with both the energy provider and the installer to determine the final system design.
- You should work with your energy provider to design the program structure to maximize the community's benefit from and participation in the program.

MONTANA SOLAR MENU OF OPTIONS

GUIDE TO SHARED SOLAR

ASSESS BARRIERS

After the team is formed, gather stakeholders to assess barriers and identify solutions. While you should take care to identify obstacles unique to the project, keep in mind that most projects will, at minimum, need to assess customer interest and consider net metering policies and infrastructure.

Look to examples—you don't have to reinvent the wheel. The Montana DEQ and the Montana Renewable Energy Association have numerous case studies on their websites, and solar champions should talk with those who have already completed a Shared Solar project to gather lessons learned. See the sidebar for considerations associated with the program design.

Conduct a Customer Survey

A customer survey will gauge interest in community solar and customer priorities. This step will help shape key project details and parameters—for example, the ideal size and cost of a share. If your energy provider is still unsure about Shared Solar, a customer survey can be a good first step to determine interest.



Program Design Decisions

Ownership or Subscription

Shared Solar programs can be structured where participants own panels or subscribe to the program. Ownership means that the participant will own the panel for its useful life (typically 15-25 years) while subscription options would allow participants to increase or decrease their enrollment on a stated basis, such as annually.

Participation Size

Program requirements may stipulate participation on a panel-by-panel basis or allow participants to own or subscribe to smaller shares, such as a quarter of a panel to increase affordability and thereby the number of customer that may be able to participate. Programs may also want to limit enrollment for individuals to ensure more people are able to participate.

Requirements or Carve-Outs

Programs may set aside a portion of the array for members that meet certain criteria, such as having low- or moderate-income. Carve-outs can help the project meet equity or other goals and may help the project qualify for certain types of funding.

Ownership of RECs

Programs may stipulate that the owner retains the RECs or that RECs are retained by the participants.

MONTANA SOLAR MENU OF OPTIONS

GUIDE TO SHARED SOLAR

Review Net Metering Policies

For Shared Solar subscribers to receive financial benefits from the project, appropriate net metering policies must be in place. Net metering is the billing mechanism that allows solar owners to receive credit for energy they produce to offset energy used. With on-site solar, a physical meter measures energy both sent to and received from the grid. Because shared solar offsets multiple customer's energy use, the energy provider will need to develop virtual net metering policy and new internal administrative processes to distribute credits to subscribers. Additionally, the rates must be sufficient to attract subscribers.

Virtual net metering is based on the customer's share of the energy produced by the Shared Solar array. The value of the energy produced by the array may be equal to the per-kWh cost of electricity purchased from the energy provider—known as the retail rate—or it may be at another rate set by the energy provider when establishing the program. Residential retail rates vary by energy provider, impacting the potential payback period of a Shared Solar system. Residential rates for energy supply are generally higher in NorthWestern Energy's service territory (over eleven cents per kWh) and lowest in co-op territory (seven cents per kWh in Flathead.) In 2015, the average retail price for electricity in Montana was 8.9 cents per kWh.

DETERMINE FINANCING

Shared Solar installations are typically financed by the owner, with subscribers repaying the owner through solar panel/share purchase or subscription. If financing makes the array less expensive to install, savings can be passed on to the subscribers through lower per-unit costs. While the energy provider will likely take the lead on financing the project, you may be able to help by researching available grants to fund the Shared Solar Project. Additionally, understanding finance options for individuals may help make the case for member participation. Below is a sample of financing options for site hosts and individuals. For more information about state and federal tax incentives, please see the Database of State Incentives for Renewable Energy (DSIRE).¹⁰

Look for appropriate federal, state, and local grants for the energy provider to consider for reducing the cost of the installation. Successful projects pursue multiple sources of funding, including Rural Energy for America Program (REAP) grants and Community Development Block Grants.

Tax Credits and Tax Policy

Business Energy Investment Tax Credit: Site hosts with federal income tax liability are eligible for a 30% federal tax credit on solar installations known as the Business Energy Investment Tax Credit (ITC). The ITC credits commercial, industrial, agricultural, investor-owned utilities, and cooperative utility owners of PV systems 30% of qualified installation costs, or up to the organization's federal tax liability; unused tax credit can be carried forward up to 20 years. Investor-owned utilities likely owe enough in federal taxes to benefit from the federal tax credit. However, electric cooperatives are exempt from federal taxes if at least 85% of their income comes from members. Therefore, electric cooperatives without federal taxes are not able to benefit from the tax credit. The tax credit—as currently written—steps down to 26% Dec 31, 2019, 22% percent in 2020, and 10% in 2021. Because the Business Energy ITC has been amended many times, including, most recently, in December 2015, it would be wise to consult DSIRE for the latest tax credit information.

¹⁰ <http://www.dsireusa.org/>

MONTANA SOLAR MENU OF OPTIONS

GUIDE TO SHARED SOLAR



Modified Accelerated Cost Recovery System (MACRS): Federal tax policy allows businesses to accelerate the depreciation of their solar projects. Depreciation reflects the need to replace assets over time, thus reducing their value to the business as assets age. Accelerating the period over which the business can reflect the decreased value of their assets can allow some businesses to offset income with the loss in value, reducing the taxes they owe. Currently, under MACRS, businesses can depreciate their solar assets over five full years even though the useful life is between 15-25 years. Bonus depreciation is also currently available, to varying degrees. The Tax Reform Bill modified bonus depreciation under Code Section 168(k) to allow 100% expensing for property placed in service after September 27, 2017 and before January 1, 2023, and then phases out bonus depreciation with 20% reductions each year.

Grants

Grants to support Shared Solar projects may be available from grantors such as government and foundations. Shared Solar installations that provide access to low-income individuals may be eligible for additional grants. Grants may also be available for installations on tribal lands. Sample grants include:

Community Development Block Grant Program (CDBG): CDBG is a “flexible program that provides communities with resources to address the wide range of unique community development needs.” At least 70% of the grant funds must be used to benefit low- and moderate-income persons and the grantee must develop and follow a detailed community engagement plan that “provides for and encourages citizen participation.”

Tribal Energy Program Grant: The U.S. Department of Energy’s Tribal Energy Program awards funding through a competitive process to promote the development of renewable energy and energy efficiency technologies on tribal lands.

MONTANA SOLAR MENU OF OPTIONS

GUIDE TO SHARED SOLAR

Loans

Loans are not typically required for Shared Solar projects because participant investment covers the initial installation costs. However, it may make sense to finance a small portion of the installation if there is a local lender that wants to partner by offering a lower interest rate or longer terms that result in loan payments considerably smaller than the solar savings.

Tax Credits for Individual Participants

Interpretation of the federal Residential Investment Tax Credit (ITC) is up to each individual Shared Solar participant. Owning off-site panels that are part of a Shared Solar array may be an expense that is eligible for the 30% federal tax credit, if the member has federal income tax liability and they receive electric bill credits as if the solar were on their own roof. However, the applicability of the tax credit should be determined by individual members and their tax advisors. It is unlikely that subscribers to Shared Solar programs, in which participants rent, rather than own, the panels, are eligible for the Residential ITC.

SELECT SITE

In addition to sun, a Shared Solar site needs enough space for the planned project, appropriate zoning for a large solar array, and proximity to electric infrastructure to deliver the power to customers. Energy providers often have available land that is already zoned for energy-related business and has existing electric infrastructure.

The appropriate size of the Shared Solar project depends on host site capacity, available funds for development, and community interest. For example, Fergus Electric Co-op's Shared Solar array is 100 kW, consisting of 324 panels, and managed to sell out all the panels within weeks of committing to the project. A co-op or utility interested in developing a Shared Solar project will determine the appropriate size by assessing both the available space at potential locations, any technical limitations that might be present at the site, and the amount of community interest.

DESIGN SYSTEM

Once the site is selected, a solar installer can be selected for final design and installation of the system. The design process will determine the precise size and cost of the system so that subscriber details can be finalized and marketing can begin.

Wherever possible, support the energy provider in involving local labor. Although there may be less expensive sources from far away, over the long run, it is valuable to have expertise for maintenance and operations in the community. In addition, hiring locally raises the profile of the project locally and benefits the community. Whether the installer is local or remote, consider having the local maintenance crew on site for the installation to build enthusiasm and understanding. If an installer is travelling a long way to get to your community, make sure to schedule the site assessment(s) and installation for when weather will not prevent travel.

MONTANA SOLAR MENU OF OPTIONS

GUIDE TO SHARED SOLAR

MARKET THE PROJECT

Solar champions can work in tandem with energy providers to market the new project to potential subscribers. Energy providers can have direct access to customers through bill stuffers, email newsletters, and other outlets. Solar champions can provide a community presence at events and news interviews, and connect with community organizations. In any marketing effort, keep the following tips in mind:

- Consider timing of customer outreach: you want to show swift action from solicitation to installation, but installation may not be possible in the winter.
- Tell people about the benefits: people are more likely to contribute when they understand the benefits. Provide information in terms of time required to pay back the initial investment, and savings over time. Describe community benefits such as extending access to renters and low-income residents.
- Make a splash: Shared Solar is for the community. Celebrate the new community asset by having a party and a ribbon cutting to coincide with other community events, such as a parade or a 4th of July Energy Independence Day celebration.

INSTALL THE SYSTEM

The energy provider will lead the installation process, including obtaining bids and selecting an installer. You may want to encourage the energy provider to select a local installer or include other criteria important to the community in the selection process. As you are planning your project timeline, remember that winter weather may delay the installation of the project.

ADMINISTER AND MAINTAIN

For the life of the project, the energy provider will continue administration activities, such as managing subscriptions and crediting subscriber bills, as well as maintaining the solar installation. Grants and other funding sources may require reporting for a period of time. Project partners should plan for these ongoing administrative tasks from the early stages.



Fergus Electric Cooperative

Without a doubt, member interest inspires co-op-hosted Shared Solar projects. For several years, members of Fergus Electric Cooperative expressed interest in solar. In August 2016, the co-op conducted a phone survey of 400 members. Results were positive, and Fergus solicited bids for system installment in April 2017, broke ground in June 2017, and energized its 100-kW solar array in August 2017.

The project is located on land adjacent to the cooperative's headquarters outside Lewistown, avoiding the need to acquire additional land for the project and allowing the co-op to expand the project if there is sufficient interest for additional future phases.

The co-op sold subscriptions for individual 330W panels for \$595, limiting member purchases to their annual energy consumption. Each participant receives a \$0.10/kWh credit on their monthly billing statement, based on the electricity generation from the number of panels they purchased. A total of 80 members purchased panels, averaging 3-4 panels per subscriber. Fergus did not seek any grants for the project.

Fergus has set a 20-year length for the program, but it may extend the program depending on the performance of the array. The estimated payback period for the project is 13.2 years, or 9.4 years for participants who took the federal tax credit.



MONTANA SOLAR MENU OF OPTIONS

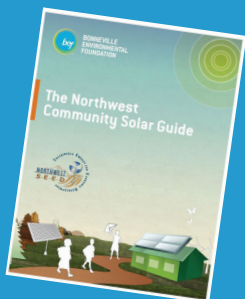
GUIDE TO SHARED SOLAR

Additional Resources for Shared Solar



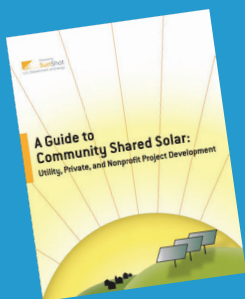
Montana Solar Community Project Website

Montana Department of Environmental Quality, Montana Solar Community Project Website: <http://mtsolarcommunity.com/>
Provides resources and case studies for going solar in Montana.



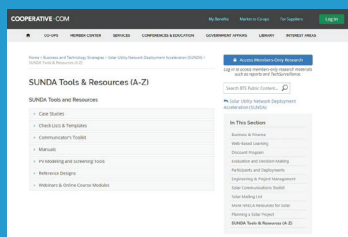
The Northwest Community Solar Guide

The Northwest Community Solar Guide: <http://sparknorthwest.org/wp-content/uploads/2013/05/NW-Community-Solar-Guide.pdf> An introduction to several different models for community organizing, with case studies.



A Guide to Community Shared Solar

A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development: <https://www.nrel.gov/docs/fy12osti/54570.pdf> Provides information organized around three sponsorship models: utility projects, special purpose entity projects, and nonprofit projects.



SUNDA program

SUNDA program: The National Rural Electric Cooperative Association leads a partnership that has developed reference materials to help co-ops analyze their solar and financing options and streamline implementation. Tools include the Community Solar Playbook and the National Rural Utilities Cooperative Finance Corporation's standardized photovoltaic system package that includes engineering designs, business models, financing and insurance options, and optimized procurement that can reduce the cost of utility-scale solar projects. The project's goal is to bring the cost of installed solar down to \$1.60/W and help co-ops develop solar at minimal cost.¹¹

11 “Electric Cooperatives light the way toward more community solar”, by Kelsey Misbrener, Nov 13, 2017.

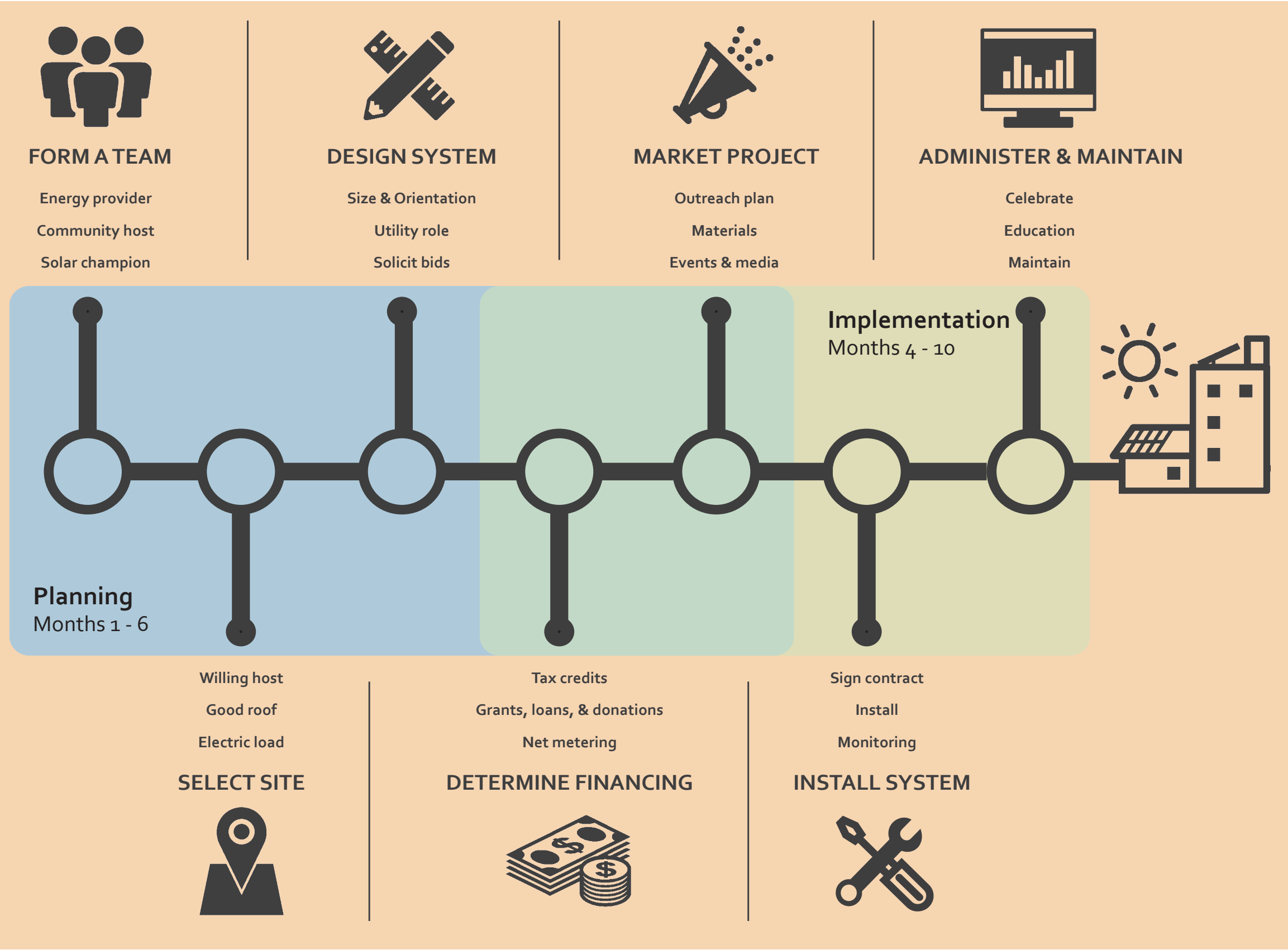
Guide to Community-Sited Solar

Overview of Community-Sited Solar in Montana

Communities wishing to build awareness of solar energy and attract solar installers to their area may consider installations on prominent public sites such as schools, libraries, local government buildings, hospitals, and places of worship. A small group of organizers can develop a project proposal in partnership with the host, and, if needed, raise funds for the installation. The installation can offer electricity and cost savings to the host while providing education and awareness to the larger community. A larger project like a community-sited installation can also act as a magnet to bring an installer into a community to deliver solar assessments for multiple smaller jobs that may not have attracted an installer on their own.



MONTANA SOLAR MENU OF OPTIONS
GUIDE TO COMMUNITY-SITED SOLAR



MONTANA SOLAR MENU OF OPTIONS

GUIDE TO COMMUNITY-SITED SOLAR

Project Pathway: Community-Sited Solar

The previous page provides a sample pathway for getting from inspiration to installation in approximately 10 months. Although each project is unique, a description of the usual project steps follows along with tips for success.

FORM A TEAM

Developing a Community-Sited Solar project is relatively straightforward. The effort can be led by a local solar champion in partnership with the site host and the utility or co-op. Partner roles include:

Energy provider (electric utility or co-op): Provide guidance on suitable sites; provide net metering and interconnection agreement; possibly provide grant funding.

Community host: Work with solar champion to plan project financing (donations, host funds, grants); procure solar installation bids and select installer; promote and maintain the solar system over time.

Solar champion: Screen potential sites with help from the electric utility or co-op; sell the idea to a potential site host; work with site host to create project funding plan; lead public fundraising for the project.

When forming your team and working with partners, keep these tips for success in mind:

- To ensure that the vision for the project is feasible, you should check in with the energy provider and site host throughout the planning process. For example, the energy provider may support site selection, especially if they need more generation at the end of a long distribution line or a place to showcase a new solar technology.
- Choose an enthusiastic host with strong community connections to ensure that a solar project is maintained over time and continues to serve as an educational resource and inspiration to the community.
- Look to examples—you don't have to reinvent the wheel. The Montana DEQ and the Montana Renewable Energy Association have numerous case studies on their websites. We also recommend talking with people who have already completed a solar project to gather lessons learned.

MONTANA SOLAR MENU OF OPTIONS

GUIDE TO COMMUNITY-SITED SOLAR

SELECT SITE

The optimal host for a Community-Sited Solar installation will have the following qualities:

- A sunny, unshaded roof in good condition (or an old roof that is slated for replacement)
- High public visibility
- Capacity to educate and promote the solar installation
- Maintenance staff eager to learn about solar energy
- Strong community support for the host organization

Local government sites, like a city hall, can be ideal for showcasing leadership and signaling government support for efforts to go solar. Schools and libraries can make good hosts because of their ability to tie the solar installation to educational curriculum and their ready-made constituency of parents who may be willing to donate to the project. Places of worship also have a natural constituency and members may be accustomed to donating for a cause. No matter the host, when choosing a site, it's important to ask how the host organization will support the installation over time. Everyone from the maintenance staff to the landscapers to the communications team can be involved in promoting solar and ensuring that the community investment continues to provide educational and electric benefits well into the future.

DESIGN SYSTEM

Once you have a site selected, you are ready to contact installers to receive bids and an initial system design. This step will help you develop your fundraising plan and apply for certain funding sources, but you may wait to select an installer and sign a contract until funding sources are secured.

The planning team will determine the basic parameters for the installation, such as location, generating capacity, and whether you want battery backup, and the installers will propose system design within those parameters. Community-sited installations come in many sizes, from small five-kilowatt demonstration systems to much larger installations that meet all of the host's electricity needs. Often, the size of the installation is constrained by the budget available, so planners should determine size based on their confidence in fundraising.

Be sure to get multiple bids, even if it means seeking bids from remote installers. If a community is remote and does not have more than one installer willing to work there, consider whether a simultaneous group purchase campaign could entice an installer to serve the area. Although you may want to prioritize working with a local installer, it's important to have cost information from multiple installers.

DETERMINE FINANCING

Look for federal, state, local, and energy provider grants to reduce the cost of the installation. Successful projects often have multiple funding sources, including REAP grants, USB grants, and local business sponsorships.

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Tax Credits

Community organizations and governments rarely owe enough taxes to benefit from tax credits. In some states, this has led to the “Third Party Owned” model in which a taxable entity, such as a large solar installation company or manufacturer (e.g. SunPower), owns the solar on the roof of the community building and takes the tax credit. They lease the array or sell the power to the host at an advantageous rate, and thus the host experiences some of the benefit of solar ownership (lower electric bills) without actually owning the solar equipment. In Montana, the status of third party ownership is unclear¹² so this section will focus on options for financing direct ownership.

Grants

Community organizations may be eligible for grants from the energy provider, government, or foundations. Sample grants include:

USB Grants: In 1997, Montana established the Universal System Benefits (USB) program. The USB legislation requires all electric and gas utilities to establish USB funds for low-income energy assistance, weatherization, energy efficiency activities, and development of renewable energy resources. For example, NorthWestern Energy’s E+ Renewable Energy Program provides custom incentives for projects that benefit community non-profit or government facilities. Projects receiving these funds often provide civic value including education and visible representation of renewable energy technologies to a broad audience. (<https://energy.gov/savings/northwestern-energy-usb-renewable-energy-fund>)

¹² DSIRE Database, accessed 1/25/18: http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/04/DSIRE_3rd-Party-PPA_April_2017.pdf



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USDA REAP grants: If the host is a for-profit rural small business or an agricultural producer, the project may qualify for a USDA REAP grant. Contact the USDA to determine project availability and for assistance with structuring the project so that it is eligible. See the Implementation Considerations section for more information.

Loans

Typically, Community-Sited Solar uses community donations or host funds in place of loan financing, because the goal is to provide the host with a stream of savings and loan payments could eat into that savings stream. However, it may make sense to finance a small portion of the installation if there is a local lender that wants to partner by offering a lower interest rate or longer terms that result in loan payments considerably smaller than the solar savings. In addition, DEQ offers loans. The Alternative Energy Revolving Loan Program (AERLP) provides a financing option to Montana homeowners, small businesses, non-profits, and government entities to install solar. Loans of up to \$40,000 are repayable over ten years. <http://deq.mt.gov/Energy/renewableenergy/altenergyloan>

Net Metering

While not a source of up-front financing, net metering can be an important source of project savings over time and as such, the host may want to understand the value of the stream of savings. Community-sited systems are eligible for net metering under the same rules as other systems. For investor-owned utility customers, systems up to 50 kW are eligible for net metering. Co-ops in Montana typically have lower limits. It's important for a host with low electric needs to ensure that they can maximize their system within the established limits, but that they don't overbuild. Any solar generation that exceeds their electric use on an annual basis is not compensated by the electricity provider. (See Implementation Considerations for a fuller discussion of net metering.)

MARKET THE PROJECT

Community fundraising will depend on having a solid marketing plan. Consider the timing of a public fundraising appeal: you want to show swift action from solicitation to installation, but installation may not be possible in the winter. Remember, people donate to people, not solar panels. Tell the story of how the host will use the dollars to provide education for kids, grow jobs, or improve housing.

INSTALL THE SYSTEM

When you have funding in hand, it's time to select a contractor, finalize system details, and begin installation.

When selecting a contractor, consider involving local labor wherever possible. Although there may be less expensive sources from far away, over the long run it is valuable to have expertise for



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maintenance and operations in the community. In addition, hiring locally raises the profile of the project and benefits the local community. Whether the installer is local or remote, consider having the local maintenance crew on site for the installation to build enthusiasm and understanding. Keep in mind that if an installer is travelling a long way to get to your community, you should schedule the site installation for when weather will not prevent travel.

You may want to organize an installation event to invite local press to attend and take photos or video as the installation progresses. If so, consider the weather: a sunny blue sky will make for better solar photos than a snowy winter day.

ADMINISTER AND MAINTAIN

Although solar maintenance is relatively simple, the host site should be prepared for ongoing maintenance and administration. Plan to add the system to the host's property insurance, and talk to the installer about what cleaning, monitoring, and inspection may be required. Consider setting aside some of the host's energy bill savings for replacing equipment, should the need arise.

One of the goals of a community-sited installation is to raise awareness. Make a splash by hosting a party and a ribbon cutting to coincide with other community events, such as a parade or a 4th of July Energy Independence Day celebration. Ongoing educational events, permanent signage, and website information will ensure that the educational impact continues. You may want to create a public web link for system monitoring so people can track how much energy the system is producing. Students can use this data for math and science projects as well.

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Case Study: Borden's Hotel¹³

How do you combine solar energy with economic development and community education? Check out Borden's Hotel in Whitehall! The nonprofit Jefferson Local Development Corporation (JLDC) purchased the historic Borden's Hotel with the goal of revitalizing downtown Whitehall. JLDC undertook a major renovation including installation of a rooftop solar system in 2015. The solar installation was funded with a combination of a REAP grant, the NorthWestern Energy USB grant, and the federal tax credits. Since the solar installation is situated on a historic building, it could not be visible from the ground, but that doesn't mean it's not having an impact on the community. The hotel now houses a Montana State University extension office that provides educational opportunities and helps the community learn about the system. The system also includes an inverter display that visually tracks the system's energy production. The installer is monitoring system performance and performing all necessary maintenance for five years after installation. One regret expressed by project planners was that they wish they had planned and scheduled time to receive more training about the operator console in order to better understand how to monitor the system and determine their savings.

¹³ Information for this case study came from the Montana Renewable Energy Association's Project Profile <http://montanarenewables.org/profiles/system-profiles/#BordensHotel> and from email correspondence with the Jefferson Local Development Corporation.

Borden's Hotel

Whitehall MT

LOCATION:

Borden's Hotel
103 W Legion Avenue
Whitehall MT

OWNER:

Jefferson Local Development Corporation

INSTALLER:

Sundance Solar Systems

OTHER CONTRACTOR INVOLVED:

Sacry Electric (Whitehall)

UTILITY/CO-OP SERVICE TERRITORY:

NorthWestern Energy

MONTH COMPLETED:

May 2015

CAPACITY:

12.24 kW

TOTAL PRE-INCENTIVE PROJECT COST:

\$42,000

INCENTIVES USED:

Rural Energy for America (REAP) grant,
NorthWestern Energy USB incentive,
federal tax credit

EQUIPMENT USED:

48 Trina Solar 2



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Additional Resources for Community-Sited Solar

Montana Department of Environmental Quality

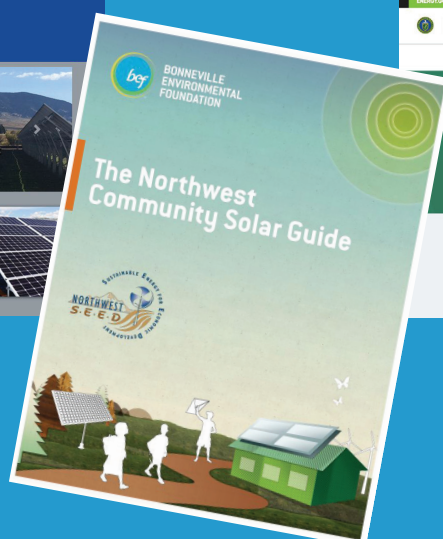
Montana Department of Environmental Quality, Montana Solar Community Project Website: <http://mtsolarcommunity.com/> Provides resources and case studies for going solar in Montana.

The Northwest Community Solar Guide

The Northwest Community Solar Guide: <http://sparknorthwest.org/wp-content/uploads/2013/05/NW-Community-Solar-Guide.pdf> An introduction to several different models for community organizing, with case studies.

Procuring Solar for Federal Government Facilities

Procuring Solar for Federal Government Facilities: <https://energy.gov/eere/solar/procuring-solar-federal-facilities> Although this guide is targeted to federal facilities, the steps to go solar are similar for local governments.



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Guide to Group Purchase of Solar

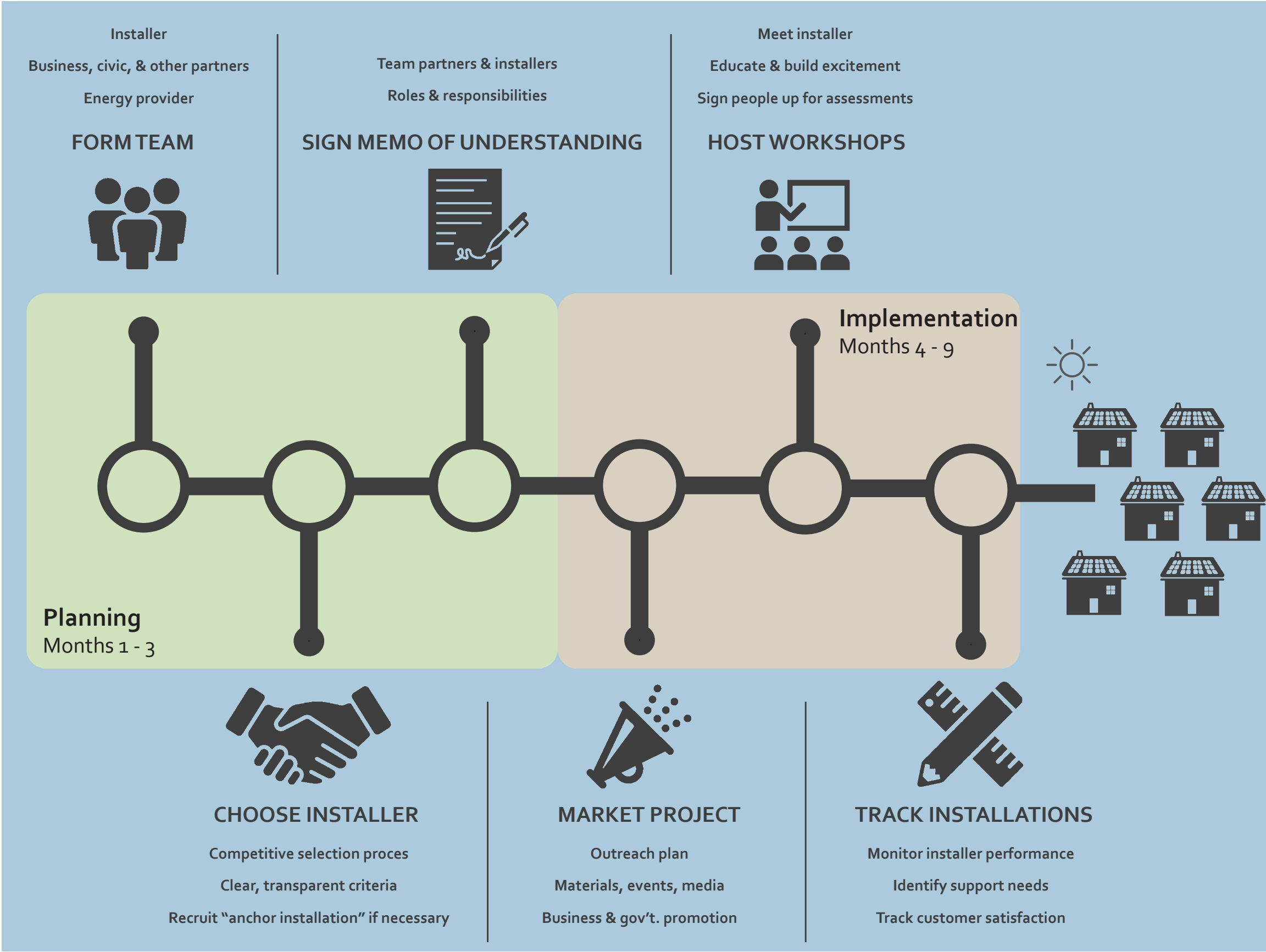
Overview of Group Purchase of Solar in Montana

Group purchase campaigns for solar installations, popularly known as “Solarize” campaigns, have taken off across the nation, with over 230 campaigns in 25 states since 2009.¹⁴ The campaigns simplify the process of going solar by providing prospective solar customers with education, a pre-screened community-selected installer(s), and transparent pricing. Education and grassroots marketing reduce customer acquisition costs for the installer; these savings can be passed on to the Solarize participants in the form of lower prices. The City of Missoula, in partnership with the Montana Renewable Energy Association, ran a successful Solarize campaign in 2015 in which 45 homes went solar together. In 2018, the Montana DEQ will be seeking to partner with Montana communities to implement Solarize programs in interested communities.

¹⁴ Benchmarking the Solarize Model: A Survey of Campaign Organizers, 2015, Ryan Cook, Meister Consultants <http://solaroutreach.org/wp-content/uploads/2015/09/Solarize.pdf>



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Project Pathway: Group Purchase

A Solarize campaign typically targets residential rooftop installations within a defined geographic area. The targeted area can be a city neighborhood, an entire small city, or rural area encompassing multiple small communities. The selected installer will assess each rooftop, and participants should meet the following criteria:

A Solarize campaign will take approximately nine months from planning through implementation. The previous page lays out the steps in the process, and descriptions of each step and tips for success follow.

FORM A TEAM

A Group Purchase campaign typically targets residential rooftop installations within a defined geographic area. The targeted area can be a city neighborhood, an entire small city, or a rural area encompassing multiple small communities. Your team will need partners that can deliver community outreach, transparent installer selection, and educational workshops. Typically, a campaign is spearheaded by a local community group or organization (the solar champion) with support from local government and the energy provider. The community group vets and selects the installer(s) and promotes the opportunity through its networks, the energy provider offers technical advice and customer interconnection, and the local government promotes the campaign and streamlines permitting of systems.



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Energy provider (electric utility or co-op): The local energy provider is critical to a successful Group Purchase campaign. In addition to the vital task of interconnecting every installation to the grid in a timely fashion, the energy provider can help in campaign planning by supporting the installer selection team with insight into installer work history. Even if they do not wish to serve on the selection team, they may coach the members on questions to ask of potential installers or provide a list of qualified local installers. In addition, energy provider presence at the educational workshops will lend credibility to the presentation and reassure potential solar customers that their system will in fact be interconnected. Energy providers may also promote the workshop to customers via a monthly bill insert or newsletter such as Rural Montana.

Solar champion: The solar champion may be a neighborhood organization, faith-based organization, service club, economic development group, or other local community organization with the staff and/or dedicated volunteers to lead the charge. They lead the planning, installer selection, and overall campaign promotion. The solar champion need not be solar savvy; their focus is on working with the energy provider and/or the DEQ to ensure that the contractor selection process yields qualified installers. The installer(s), once selected, can provide the technical information in the workshop. To avoid conflicts of interest, it is important that solar champions are not installers themselves, especially installers that may ultimately bid to participate in the program.

Installer: The selected installers play an important role in promoting the Solarize campaign. They attend all public workshops, present (limited) technical information, and use their communication channels to spread the word. The installer must follow up with all customers after workshops in a timely manner and manage customer expectations around installation timelines to avoid disappointment. Finally, they are obligated to be transparent in their pricing and adhere to the pre-set Solarize pricing schedule.

Local government: A campaign can be an opportunity for a government to act on its climate and sustainability goals and demonstrate support for community organizing. Whether it dedicates staff support to the project or merely publicizes the opportunity at a Council Meeting, the local government acts as cheerleader for the campaign and facilitates the permitting process. The permitting jurisdiction should be prepared for a higher than normal level of solar permit requests, and some Solarize campaigns have prompted local governments to streamline their permitting process.

Other local partners: Local lenders may provide workshop space or workshop refreshments, in addition to providing solar financing. In



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addition to the community group lead, other community groups may join on to broaden the outreach efforts. A Solarize campaign may negotiate that in return for hitting certain installation targets, the installer will donate a system to a local community group. That community recipient then becomes a powerful advocate for promoting the solarize campaign.

After you form your team, you may want to set targets for the campaign, such as the number of people attending workshops, the number of installations completed, and the total capacity in kW of all completed installations.

The percentage of people who end up installing a system after attending the workshop will vary with each community and campaign, but it's helpful to know that on average, 25-30% of people who attend end up installing. With that in mind, your goal for workshop attendance should be 3-4 times your goal for the number of installations.

The average size of residential systems installed in the US is 6 kW and installations typically range from 4 kW to 10 kW. As a rule of thumb, every kilowatt of solar panels requires 100 square feet of sunny roof space, so 400 square feet of south-facing roof will be more than enough for a modest system.

CHOOSE INSTALLER

Select installers in a transparent, deliberate manner by running a competitive, community-based contractor selection process. Even if there is only one installer in the area, it is important to go through the process of developing a request for proposals that reflects community values. Interview the installer(s) with a committee of volunteers (five members is typically sufficient) and make a decision based on clear criteria. Set transparent pricing and create a process to match customers to one installer, even if multiple installers participate. To avoid conflicts of interest, it is important that the team partners do not include any installers, especially ones that may bid on the program. Most Solarize campaigns require about three months of planning and installer selection.



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Because Solarize offers pricing based on a standard residential rooftop system, it is not ideally suited for unique installations such as flat roofs, ground-mounted systems, or battery backup systems. However, communities can negotiate with solar installers to provide pricing for additional items like alternative roof- and ground-mount racking and micro-inverters if Solarize campaign organizers anticipate that many participants will be interested in these types of project add-ons. Small commercial entities may also be included in the group purchase.

SIGN MEMORANDUM OF UNDERSTANDING

A Memorandum of Understanding between the key team partners, including the installers, will clarify roles and responsibilities. Although there is no binding contract between the installer and the Solarize planners, it is wise to lay out expectations and formalize them in writing.

MARKET THE PROJECT

Solarize campaigns rely on community-based social marketing to create a buzz and motivate people to come to the educational workshops. While Solarize has been successful across the nation, there are unique challenges to making it work in rural areas, of which Montana has many. In sparsely populated areas, outreach methods are different, customers must travel long distances to attend workshops, and there may be few or no local installers. Communities can overcome these barriers with creativity and careful planning.

Convene a committee of enthusiastic volunteers and create a marketing plan. Print a simple postcard with workshop information and have volunteers pass it out at community events, parades, fairs, and their favorite stores. Ask the energy provider and the local government to help promote the opportunity. Can you include a bill insert? An announcement at the City Council meeting? Also, reach out to local businesses. There may be businesses willing to promote the workshops to their customers or put up a poster in return for being listed at the Solarize workshop.

One of the most successful outreach methods is “earned media” published in local outlets. Many small papers will happily print a well-written story from a community group. Invite representatives from local news outlets to come to the first installation. Ask a local family who already has solar to be interviewed on the radio, or feature the selected installer on a call-in show.



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HOST WORKSHOPS

The Solarize workshop is the heart of the Solarize campaign, providing participants with unbiased information, a chance to meet the selected installer, and a sense of excitement at being part of a group endeavor. At the end of a successful workshop, the installer should sign people up for site assessments and strike while the iron is hot.

Workshops should be informative but not overly technical. The educational workshop should provide just enough information for a homeowner to determine whether they would like to get a site assessment and potentially go solar. While the topic of solar energy tends to attract people with a technical bent, the whole point of a Solarize campaign is to simplify the process, overcome paralysis by analysis, and make solar available to anyone who wants to save money on their electric bill.



Share the basic characteristics of a good site and average costs at the workshop. Participants can self-evaluate their homes and finances to determine if solar is a good option for them, which will save time for everyone. Participants should:

- Have a sunny, unshaded roof in good condition (or a very old roof that is slated for replacement)
- Own the home and have control of the electric bill (even if renters pay their electric bill, they will typically not want to go solar unless they can be guaranteed that they will continue to reside in the unit for at least the length of the payback period)

Remember to make workshops accessible to a variety of residents. Rural residents have to travel farther to attend workshops than their urban counterparts. Consider holding workshops at venues and events that already attract people (e.g., a house of worship, a fair, a grocery store.) Hold at least some workshops early enough in the day that people don't have to drive in the dark.

During the workshop, publicize a deadline for contracting. Nothing motivates like a deadline, and setting a deadline to get in on the deal will create a sense of urgency, while helping to avoid volunteer burnout.

Financing Options and Constraints Unique to Solarize

The workshop helps answer some of the most common questions people have about solar: what incentives and loans are available, and do I qualify? Solarize installations are typically eligible for all of the tax credits and incentives available for residential installations.

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Tax Credits

Federal: Installations on primary residences are eligible for the Federal Residential Energy Tax Credit of 30% of the installed cost of the system. This personal income tax credit steps down to 26% in 2020, 22% in 2021 and expires in 2022. Homeowners should be sure they owe enough in taxes to take the tax credit, although it can be carried over to future years.

State: Alternative Energy Systems (15-32-201, MCA) are eligible for a Montana income tax credit of \$500 per taxpayer, or \$1,000 for a joint-filing household.

Net Metering

Net metering is currently available for all residents of Montana, including homeowners who go solar through group purchase. For more details on net metering, see the Implementation Considerations section.

Grants

Residential installations are not typically eligible for grant funds. Rural businesses and agricultural producers may be eligible for USDA REAP grants, so you may want to invite USDA representatives to workshops or have relevant information on hand. See the Implementation Considerations section for more details.

Loans

Successful Solarize campaigns make financing options available. The Alternative Energy Revolving Loan Program from Montana DEQ is available to homeowners, small businesses, and others. In addition, local banks or credit unions may offer attractive rates for solar installations, and solar installers often have a relationship with a lender, such that they can handle the paperwork for the homeowner.



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TRACK INSTALLATIONS

After the workshop, pass on participant information to the installer for follow up. At this stage, organizers should track installer progress on installations to ensure timely follow-up and to measure success. If you use a customer relationship management database, or something as simple as a well designed spreadsheet, you can track customers from workshop registration through site assessment, contract, and installation, and intervene if needed.

A common customer complaint from Solarize campaigns is that the installer does not respond quickly enough to requests for site assessments and installations. Sometimes this comes from the over-performance of the program and an unexpected volume of customers. To alleviate this, campaign planners should set expectations at the workshop and implement a system to track participants throughout the process.

Tracking installations also helps you report on progress and share success with the community. Send results to the media outlets who published stories during the marketing phase, and consider hosting a community celebration.



Case Study: Solarize Missoula

Solarize Missoula illustrates the power of group purchasing to give residents a clear and simple path to solar. The campaign was a partnership of DEQ, Montana Renewable Energy Association, the City of Missoula, Climate Smart Missoula, and the Missoula Federal Credit Union in 2015-2016. The partners formed a steering committee to direct the campaign, with staff support from MREA.¹⁵ Because of the expected volume of customers from the campaign, the committee decided to work with multiple installers, instead of one single installer, by proposing a carefully researched price. Four installers responded, and the committee vetted their qualifications and chose to work with all four. The Credit Union also designed a new loan program to complement DEQ's loan program, which they have continued to offer after the campaign.

The partners held two workshops, one at the Credit Union's corporate training facility and one at the public library. Participants could also review information online instead of attending a workshop. Most people heard about the workshop through the Credit Union, an article in The Missoulian, and radio ads and interviews. The workshops were very successful, with one reaching the capacity of the venue. In fact, volunteers were overwhelmed trying to sign people up after the workshop. In all, 300 people attended workshops and 45 households ultimately installed solar.

¹⁵ Information for this case study came from the Montana Solar Community Project Presentation of Oct. 17, 2017, the news article: http://missoulian.com/news/local/missoula-program-aims-to-make-solar-simple-for-homeowners/article_a6ad90d3-5b4f-5919-b0fe-d7ef428888ee.html, and interview with MREA representatives 1/22/18.

Solarize Missoula

TYPICAL SYSTEM SIZE:

4 kilowatts

TYPICAL SYSTEM COST BEFORE INCENTIVES:

\$12,400

TYPICAL PAYBACK TIME:

12 years or less

AVERAGE SYSTEM COST BEFORE INCENTIVES:

\$3.30 / watt

SOLAR INSTALLERS:

4 cooperating installers

UTILITY SERVICE TERRITORY:

NorthWestern Energy & Missoula Electric Co-op

WORKSHOP ATTENDEES:

300

SITE ASSESSMENTS:

150

SYSTEMS INSTALLED:

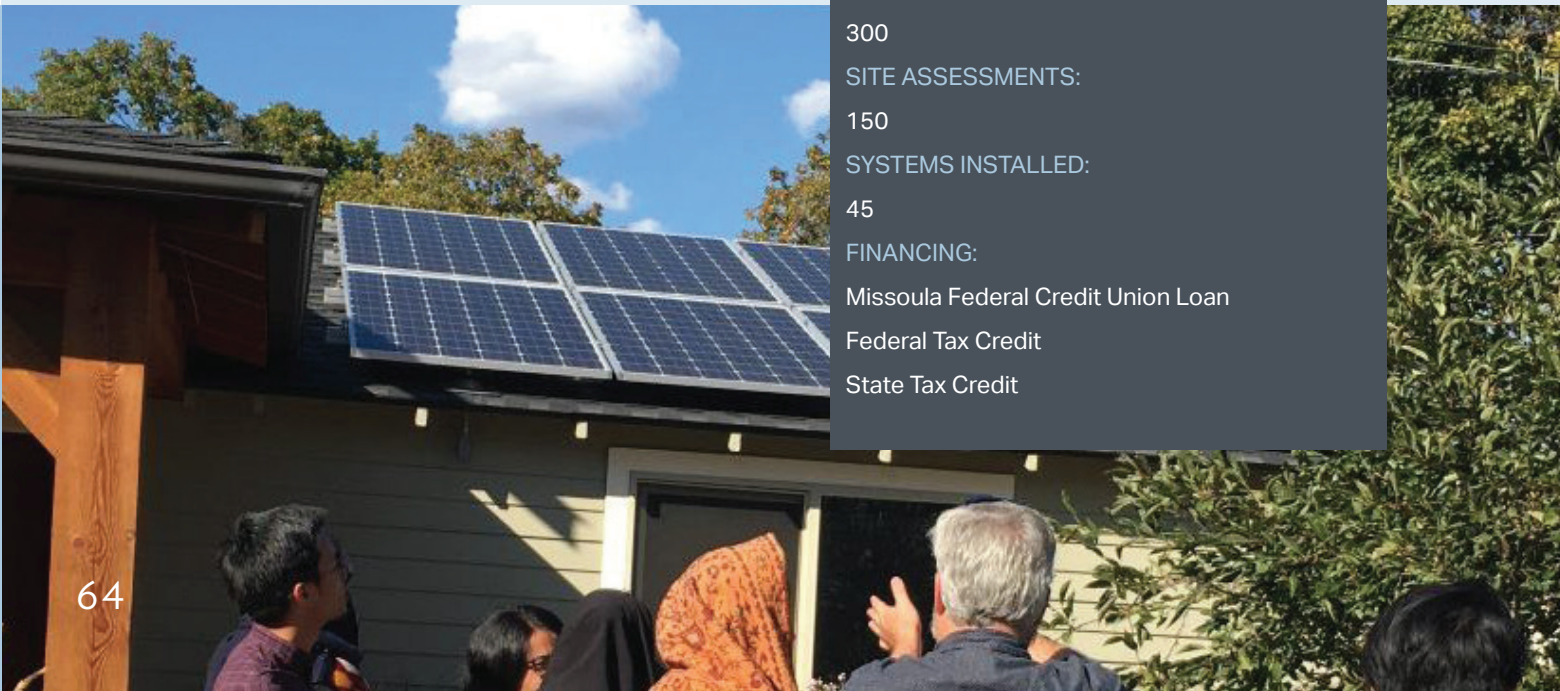
45

FINANCING:

Missoula Federal Credit Union Loan

Federal Tax Credit

State Tax Credit



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Additional Resources for Group Purchase of Solar

The Solarize Guidebook

The Solarize Guidebook, Spark Northwest, 2012 <https://solarizenw.org/solar-publications/the-solarize-guidebook-a-community-guide-to-collective-purchasing-of-residential-pv-systems-version-2-0/>

Montana Renewable Energy Association Website

Montana Renewable Energy Association Website: www.montanarenewables.org Offers information, case studies, with experience as a Solarize campaign partner.

Planning and Implementing a Solarize Initiative

Planning and Implementing a Solarize Initiative: A Guide for State Planners, CESA 2014 <http://solaroutreach.org/wp-content/uploads/2014/04/CESA-Solarize-Guide-September-2014-Final.pdf>

Solarize Your Community

Solarize Your Community: An Evidence Based Guide for Accelerating the Adoption of Residential Solar, Yale Center for Business and the Environment, 2017 <http://cbey.yale.edu/sites/default/files/Solarize%20Your%20Community%20-%20Digital.pdf>





Conclusion

Now that you have an understanding of the types of community-scale solar projects and the preliminary information you need to get started, we encourage you to take advantage of the tools and resources available through the Montana Energy Office. More information about the Montana Solar Community Project, including solar resource maps for 25 Montana communities, can be found at www.mtsolarcommunity.com. The following contact is available to answer questions and provide assistance along the way:

Garrett Martin, Senior Energy Analyst/Planner
Montana Energy Office, Dept. of Environmental Quality
GMartin@mt.gov
406-444-6582

While we have tried to make this menu as universally applicable as possible, each community-scale solar project will be different. The legal and regulatory landscape in which these projects are developed is also constantly shifting, so we encourage you stay up-to-date on the latest developments. The [DSIRE Database of State Incentives for Renewables & Efficiency](http://www.dsireusa.org/)¹⁶ is a good resource for up-to-date information on state incentives and policies around renewable energy, and the [Montana Energy Office](http://www.mtenergyoffice.com) is also a repository for useful information on renewable energy and solar project development.

Good luck!

¹⁶ <http://www.dsireusa.org/>

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