



Missoula's *draft* 100% Clean Electricity Options Report, v1

Updated with minor edits **October 30, 2018**

The following draft report is Missoula's first-ever "options report" on why and how Missoula can transition to 100% clean electricity. Here we include:

- Our Target – a transition to 100% clean electricity community-wide by 2035
- Information about our collective electricity use, jurisdiction and boundary
- Recommendations and a menu of eight possible options to move us forward
- Next steps
- List of Appendices and Resources that accompany this report.

This report, accompanying Appendices, and an online comment form to assist in updating this draft will be linked at missoulaclimate.org. Each update to this report will have a date stamp.

Report Authors:

Amy Cilimburg, Climate Smart Missoula

Tom Platt, energy consultant

Chase Jones, City of Missoula

Acknowledgements:

We thank Mayor John Engen for his leadership and encouragement. Many individuals helped us to understand the electricity landscape, refine our thinking, and provided review. We especially thank MEIC's Brian Fadie for his assistance.

Dedication. This entire 100% Initiative is dedicated to the memory of Tom Platt, who not only conducted much of the research that informs these Options and Appendix I, II and III, but also catalyzed this effort and prodded us to make it happen and take action. Tom was "all in". He passed away on October 3, 2018. He is already missed.



Missoula's 100% Clean Electricity Initiative

Overview

Welcome to Missoula's first-ever 100% Clean Electricity Initiative and "options summary" which describes why and how Missoula can best transition to 100% clean electricity, given where we are today. A city and community commitment to 100% clean electricity is a mandate for planning and action. This report begins with the recommended target and suggested date and includes background information about our geographic scope, electricity use and suggested approach to shifting our fossil fuel-based electricity load to cleaner options. We then provide a menu of options and strategies that would move us toward achieving our target. We conclude with a short list of next steps to accelerate this effort. Additional Appendices that take a "deep dive" into Missoula's electrification history, regulatory environment, and how other communities and states are meeting these goals are available as supplements to this primary report. The laws and regulations around electricity production and sales are complicated, and these Appendices are intended to help stakeholders and community members better understand the options we have put forward.

As we describe in this report, Missoula is poised to jump start our clean electricity and energy transition, and in doing so we join other cities from around the region, country and world. In fact, our initiative and this report are informed by cities and communities around the U.S. who have committed to this energy transition, and the leadership, strategies, and plans from these sister cities have been and will continue to be instrumental to our efforts (see Appendices I and IV).

We hope this report helps Missoulians better understand our clean electricity option, and how they intersect with our broader goals to be carbon-neutral, sustainable, and climate-ready. Clean electricity is just one component of reducing our fossil fuel energy use and greenhouse gas emissions. Using the information contained in this report as the starting point, we aim to solidify our commitment to transition to renewable energy and develop a robust plan with the help of a variety of community stakeholders. This effort is not our sole foray into climate change related work. We put this effort forward as we concurrently work collaboratively to create a Climate Resiliency plan for Missoula City and County, strengthening our abilities to adapt to climate change with intentional regard for vulnerable community members and issues of social equity.

Missoula's Target

Simply put, we have no choice but **100% carbon free energy**, here in Missoula and across the globe. For this initiative we focus specifically on "clean electricity." We are starting with *electricity* not all *energy*, and this distinction is important. In the Missoula community, electricity accounts for ~23% of our total energy consumption (2014 data, see below). Most of the remaining 77% is petroleum for transportation natural gas for heating, cooking and some commercial and industrial activities.

Clean electricity is most simply defined as electricity not derived from fossil fuels, which therefore does not emit greenhouse gases. Clean electricity sources include solar, wind, hydro, geothermal, nuclear, and biomass. Some of these sources have other environmental and social impacts, and ultimately we may narrow the list of sources that we count toward our 100% clean electricity target due to these considerations. In addition, new advancements or technologies may add other sources to this list. At

present we do not see carbon capture and sequestration associated with fossil fuel as providing clean energy because such systems are cost prohibitive, unproven and associated with other sources of pollution. As a community we will need to continually reassess what is considered “on” and “off” our list of clean electricity options.

We also acknowledge that building a zero-carbon electricity system across the state and country will require components not elaborated upon here, including transmission and grid upgrades, energy and battery storage, energy market coordination, smart meters, electricity use timing adjustments, and more.

Finally, our recommended target date for 100% clean electricity is 2035. We acknowledge that this is ambitious, but think this date allows sufficient time for new technologies, more funding, and state, regional and federal market transformation and expansion. It is also right around the corner and obliges us to get started today. Other cities and communities around the U.S. are making similar bold commitments, some with even more accelerated timelines. We continually review goals and targets set by other U.S. Cities (see Appendix I and associated Database) and 2035 is right in the middle—other cities are more ambitious and others less so. We offer 2035 as a starting place for discussion within our community and remain open to shifting this date.

“Ready for 100”

As mentioned, Missoula's 100% Clean Electricity Initiative draws heavily on recommendations and best practices from other communities around the country. For reference, The Sierra Club's [Ready for 100% Commitment Guidelines](#) recommends any adopted plan and goal includes the following elements:

- Community-wide Electricity Use: A full transition of the electricity sector to clean, renewable energy;
- By 2035: A target year for when this commitment will be achieved no later than 2035 for electricity and 2050 for all energy sectors;
- Ensure Justice, Equity, Affordability, and Access: A commitment should include measures that prioritize equity affordability, and access for all members of the community, prioritizing low income communities, environmental justice communities and communities burdened by the fossil fuel industry.
- Clean and Renewable Resources Only: This includes carbon and pollution free energy sustainably collected from renewable sources including wind, solar, tidal, and geothermal. Low-impact, small hydro and some forms of biomass may be included after being evaluated for sustainability and environmental justice implications. Nuclear, natural gas, coal, oil based, or any other forms of carbon-based energy production are not included as clean or renewable sources of energy.
- A Transparent and Inclusive Planning and Implementation Process ensuring that the community members and local businesses have an opportunity to participate.

We are making our own plan and guidelines; this guidance can inform our work as we move forward.

Why this effort and why now?

The impacts of climate change drive our world's urgent need to reduce greenhouse gas emissions and decarbonize our energy systems. The October 8, 2018 [Conclusions Report](#) from lead scientists with the

Intergovernmental Panel on Climate Change (IPCC) implores the world to rapidly decarbonize. According to the IPCC's [October 8 Press Release](#):

The report finds that limiting global warming to 1.5°C would require “rapid and far-reaching” transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO₂) would need to fall by about 45 percent from 2010 levels by 2030, reaching ‘net zero’ around 2050.

The press release continues:

“Limiting warming to 1.5°C is possible within the laws of chemistry and physics but doing so would require unprecedented changes,” said Jim Skea, Co-Chair of IPCC Working Group III.

This latest scientific projections and calls for rapid change cannot be ignored; they drive our initiative.

Studies suggest cities are responsible for 70% of energy-related carbon dioxide emissions that drive global warming (see [C40.org](#)). The right energy revolution will help create a clean, resilient, and affordable electricity system that produces far less pollution and climate-altering CO₂, eventually becoming carbon-free. “Clean up the grid and electrify everything” is the current mantra! This means that 1) the grid will be increasingly powered by clean, renewable energy (with storage and smart grid efficiencies added), and 2) more and more activities and sectors will shift from thermal energy to electricity (e.g., transportation, appliances, heating systems, etc.).

A transition to 100% clean electricity for Missoula is essential if we are to meet our recent climate commitments and achieve our City and Community carbon emissions reduction goals. It is an important component of specific climate and energy goals. The City of Missoula has a goal of carbon neutrality by 2025 for municipal operations ([Conservation and Climate Action Plan](#); passed Council in 2013, Resolution 7753); the community-wide goal as set forth in the 2015 [Community Climate Smart Action plan](#) is carbon neutrality by 2050 (see below).

Reaching 100% clean electricity means producing or procuring enough clean electricity to cover a city's needs. Investing in renewable energy makes increasing economic sense. First, the price of renewable energy, especially wind and solar, has seen a pronounced and steady decline in the past decade. Second, as renewable electricity is produced or installed locally, more jobs are sustained and dollars are spent locally, fostering local economic growth. Additionally, climate and energy experts and scholars increasingly argue for a “price on carbon” in which there is a specific financial price attached to fossil fuels in concert with their contribution to greenhouse gas emissions and climate pollution. California and a collation of states in the Northeast have carbon markets that impose a cost on carbon pollution. A ballot initiative in Washington State in November 2018 will decide if they have a carbon tax. Although there is no guarantee when this will occur on a nationwide or worldwide basis and the structure of such pricing schemes will vary, clean electricity and carbon-free energy are our future.

In short, reducing fossil fuel use strengthens local economies, buffers us from potential increasing costs of polluting energy and builds community resiliency; we are building the city and community of the future.

Missoula's Geographic and Jurisdictional Scope

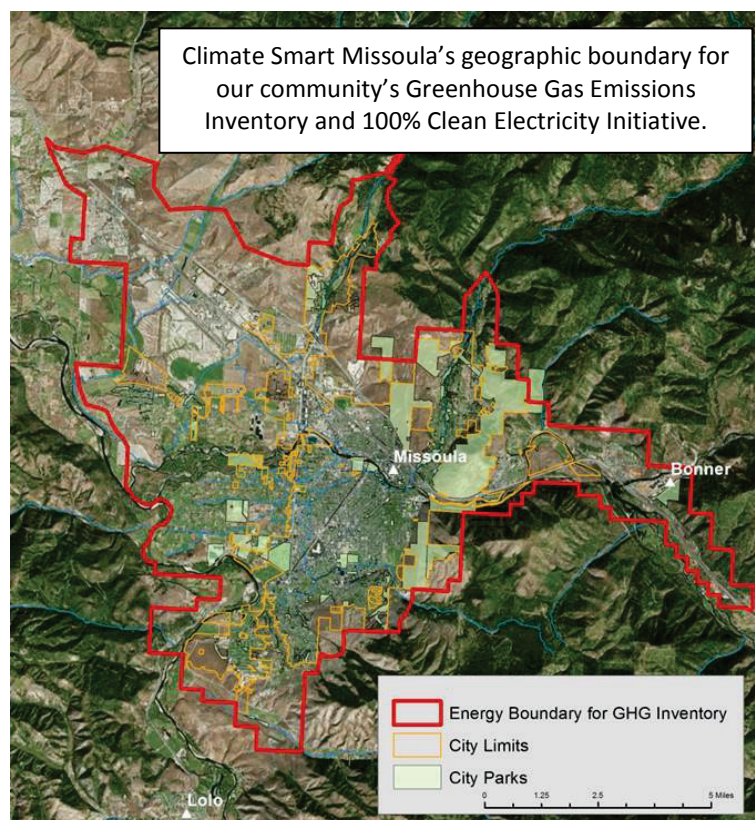
Geographic scope:

This report takes a Missoula community-wide approach, which includes the City of Missoula, the surrounding urban development area and is inclusive of the University of Montana. This is the boundary that has been utilized by Climate Smart Missoula for the [Community Climate Smart Action Plan](#) (2015) and for the [Community Greenhouse Gas Inventory](#) (released 2017). This allows electricity and emissions data from the community inventory to inform our energy reduction efforts from the outset and updated greenhouse gas inventories will provide data for this initiative moving forward.

In sum, our goal is to account for 100% clean electricity consumed within the defined boundary (Figure 1, right) in perpetuity.

We recognize that electricity generation will come from within this boundary and beyond.

The strength of this clean electricity transformation will be best realized by working with other Montana communities in order to share resources and strategies and bring proposals forward to the investor owned utilities, Montana's Public Service Commission, rural electric co-operatives, and/or our state legislature.



Jurisdictional Scope and Supporting Plans

As mentioned, this 100% transition initiative stems from commitments made by and plans crafted by local government and associated entities. Most recently, in the wake of a U.S. federal government's pull-back from commitments designed to meet obligations under the 2015 Paris Climate Accord, many cities, together with some states and many businesses, have stepped up to declare their commitment to accelerating efforts to reduce greenhouse gas emissions and meet the goals of the international treaty (see Appendix I for list of cities, states, and countries and specific commitments made). In December 2017, under the leadership of Mayor John Engen, the City of Missoula signed on to the [Chicago Climate Charter](#) at the North American Climate Summit. In addition Mayor Engen supports a community-wide transition to 100% clean, renewable energy and has pledged his support by signing on, in 2018, to [Mayors For 100% Clean Energy](#).

Several existing plans also align with and support this 100% transition. The City of Missoula's [Conservation & Climate Action Plan](#) (passed City Council by unanimous resolution in 2013) guides municipal operations and also directs the city to engage at the community scale, which includes residents, businesses, and industry. The City's plan calls for a reduction in greenhouse gas emissions with a goal of carbon neutrality by 2025 for municipal operations from all energy sources (electricity, natural gas, and transportation). This City plan laid the foundation for Missoula's [Community Climate](#)

[Smart Action Plan](#) (2015) which calls for increased renewable energy and a carbon neutral community by 2050. The Mayor endorsed this plan though it has not been officially brought before City Council.

This 100% clean electricity initiative is in alignment with other critical City plans, including the [Our Missoula Growth Policy](#) (updated 2015). This planning document includes goals related to addressing climate change, reducing reliance on carbon-based fuels, promoting energy efficiency, and increasing the percentage of renewable energy in Missoula's energy budget (see Goals EQ1-4; v).

The University of Montana (UM) in Missoula is a 2007 charter signatory of the American College and University Presidents' Climate Commitment (ACUPCC). UM has interim emissions reduction goals leading up to its 2020 carbon neutrality target. More can be found via the [UM Sustainability Office](#), with more details provided within [Operations](#).

Missoula County recently conducted a greenhouse gas inventory and is presently developing a climate action plan with specific goals and timelines for greenhouse gas reductions for County operations. In December 2017 the County hired a first-ever Energy and Sustainability Coordinator to assist in climate mitigation and adaption efforts and reducing fossil fuel energy use is a significant piece of this effort.

Missoula's Electricity Profile

The city and community of Missoula, including the University of Montana, are serviced primarily by one investor owned utility, NorthWestern Energy (NWE). Electricity is also supplied to select areas outside of NWE's service area by Missoula Electric Cooperative (MEC).

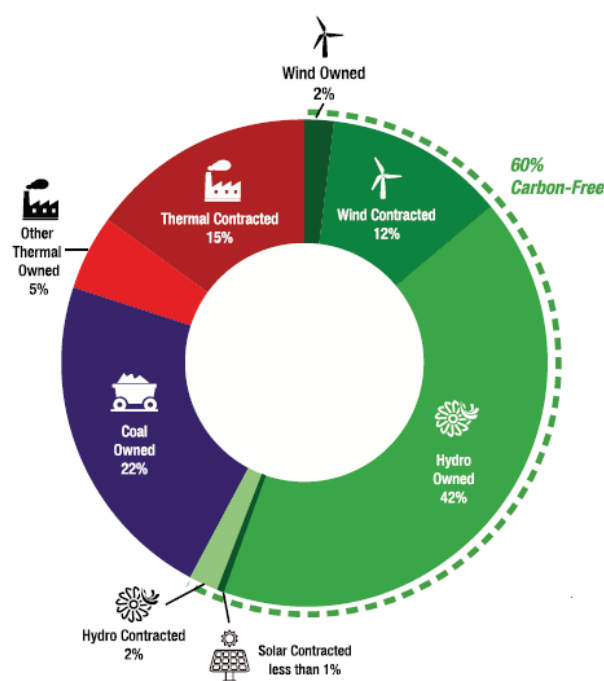
What types of energy supply the electricity used in Missoula?

To transition to 100% clean electricity we need to understand the energy mix of the electricity consumed at the community-wide scale. According to [NorthWestern Energy](#), approximately 60% of the electricity coming from power plants the company owns is generated by wind, water, and solar with the remaining ~ 40% powered by a combination of coal and natural gas. Figure2 (right) shows NWE's current electricity portfolio for power plants owned or under long term contracts. Importantly, NorthWestern purchases significant amounts of electricity from the short-term open "spot" market and does not disclose their fuel sources, making it unknown whether or how much it differs from the owned power plant mix.

Missoula Electric Cooperative provides ~ 5% of our electricity load. MEC's current portfolio consists primarily of hydro-electricity and they report presently their portfolio is 90 - 95% "clean". They purchase power from the Bonneville Power Administration whose fuel mix for the most recent calendar year is described [here](#).

We also include an estimate, based on public reporting, of the recent additional electricity load from Bonner Industrial Park via the HyperBlock (formerly Project Spokane) cryptocurrency mining operation.

NorthWestern Energy's 2017 electric supply mix portfolio based on MWh delivered.



It has been reported that they purchase power directly from Energy Keepers, INC via the Seli's Ksanka Qlispe' hydroelectric dam (see the [Missoulain](#)). Additionally, Roseburg Forest Products appears to contract with Energy Keepers for 16 MW of electricity. There may be other NorthWestern Energy "Choice" customers who purchase their electricity on the market; we will look for such customers.

The Missoula area does boast a growing number of rooftop solar arrays, both residential and commercial. Such locally produced 100% clean electricity reduces our overall demand for electricity from the Utility that is only partially clean. Climate Smart Missoula has a request in to NorthWestern Energy for the most updated data about the total energy producing capacity of these systems.

We acknowledge that there is no way to track the source of the actual electrons that feed the Missoula grid. Rather, our goal is to offset the portion of NWE's and MEC's electricity generation portfolio that is composed of fossil energy sources by deploying, either here in Missoula or elsewhere in the state, additional clean electricity generation and/or electricity conservation. In other words, our goal is to replace the fossil fuel based electricity supply that powers Missoula with new clean, renewable energy or with electricity savings.

Community of Missoula's current electricity consumption

Because the City of Missoula and Climate Smart Missoula have conducted greenhouse gas emissions inventories, we have data on our electricity usage, albeit not current. The community-wide numbers are circa 2014 and a new accounting is warranted, especially as industry and commercial businesses have grown. Within our community boundary we now have HyperBlock cryptocurrency, new and expanded breweries, and other commercial businesses and residential growth. We propose to collect these data early in 2019, using 2018 data and will need to work with the NWE and MEC to make this happen.

Table 1. Estimation of Missoula's electricity consumption

SCOPE	~ Annual electricity use (MWh)	Date of inventory
Community of Missoula	769,346	2014
<i>Subset of Community:</i>		
<i>UM-Missoula</i>	<i>32,400</i>	<i>2009</i>
<i>City of Missoula operations</i>	<i>12,878</i>	<i>2015</i>
<i>Missoula County - operations</i>	<i>7,972</i>	<i>2016</i>

We estimate that the HyperBlock cryptocurrency mining operation has increased the community's total electricity consumption by about 20%, and we expect this increase to be reflected in the 2018 inventory. HyperBlock representatives have stated publicly that they intend to triple the size (and electricity consumption) of the facility in Bonner in the near future.

For our 2014 emissions inventory we have this electricity usage divided out by sector (Table 2).

Table 2. Missoula Community Electricity Use by Sector (2014 data)

Sector	Usage (MWh)
Industrial	41,669
Residential	285,869
Commercial	441,807
Total	769,346

How much clean electricity is needed to replace the fossil fuel portion of our electricity mix?

- NorthWestern Energy. Estimated 95% of community energy consumption = 730,879 x 40% fossil fuel based = 292,351 MWh.
- Missoula Electric Cooperative. Estimated 5% of total energy consumption = 38,467 x 5% fossil fuel based = 1,923 MWh.

TOTAL: 292,566 – rounded to 300,000 MWh

How could Missoula replace this ~300,000 MWh of electricity?

With verifiable clean, renewable energy plus energy efficiency, the objective is to replace the 40% of NWE's and 5% of MEC's electricity supplies.

Hypothetical resource to replace all fossil fuel energy with clean energy	Percentage	MWh needed	MW needed
solar farm(s), 15% capacity factor	45%	135,000	103
wind farm (s), 35% capacity factor	25%	75,000	24
energy efficiency	15%	45,000	30
distributed energy - new systems, 15% capacity factor	13%	39,000	30
distributed energy - already installed	2%	6,000	N/A
TOTAL - rounded	100%	300,000	187

Clearly this is a starting point and the amount of additional clean electricity needed for Missoula's footprint will depend on, in addition to population growth and increased (or decreased) demand, the portfolio of our electricity providers. The faster NWE and MEC move away from fossil fuel based electricity, the less we have to add in order to displace this fossil fuel based electricity.

We also note that there is a real push in cities and countries across the world toward electrification of buildings and transportation, since carbon-free electricity is typically easier and more cost-effective to produce than carbon-free liquid or gaseous fuels. In Missoula, a shift away from natural gas, gasoline, and diesel in favor of electricity to heat buildings and run buses, trucks and cars would result in an increase in total electricity consumption. This will increase the need for new renewable energy development beyond the 300,000 MWh estimated here.

Recommendations and Options

Our effort to understand Missoula's electricity use and develop plans for a comprehensive clean energy transition relies on working collaboratively with our utilities, rural electric cooperatives, regulatory agencies, elected officials, local government and community members. As we demonstrate here, to move to clean electricity we need to have collated energy data. We know that official agreements or MOUs to work with NorthWestern Energy, Missoula Electric Cooperative, large commercial or industrial electricity consumers, and the City of Missoula will be critical in order to gauge our progress and drive success. In addition to these options for increasing the portion of Missoula's electricity load that is clean,

we also look to the energy providers to improve aggregated data tracking and sharing to allow us to monitor progress toward our goal.

Options for supplying the Missoula community with 100% clean electricity can be distilled into eight main possibilities or choices. At this juncture, we believe that this will primarily come from verifiable renewable energy, primarily solar within or near Missoula and wind, ideally from within Montana. Wind development is unlikely in the Missoula area since central and eastern Montana enjoy a much stronger wind energy resource than western Montana. Increasing energy efficiency and conservation (see Option 3) will shrink the overall size of our electricity demand, thereby also reducing the amount of clean electricity needed.

These are in no way the only options or the final list. We encourage all those interested to go to this website: missoulaclimate.org/100-percent where you can find this report, updated frequently, plus the four Appendices and a comment form. Please offer your input, ideas and questions.

Option 1 – Expand use of existing tools: There are several tools available under existing laws and regulations that allow Missoula to increase its renewable electricity supply mix, though these options could shift depending on actions of the utility, co-op, Public Service Commission, and legislature. Some may be relatively limited in scope at present, requiring policy change, new financing options, or additional staff to expand to them a scale sufficient to contribute meaningfully to our 100% goal.

Solar. Missoula residents, businesses and local governments can utilize the existing net metering tariff to install a significant capacity of independently financed solar energy on private and public property. For NorthWestern Energy customers, the net metering system size cap (50 kilowatts) limits the amount that any single customer can add to the energy mix, but adding solar PV arrays on many buildings may yield a significant amount of new solar energy for Missoula. Creative ownership models like third party finance can increase the financial viability of solar net metered systems on nonprofit and low income properties, but there is not a clear regulatory framework for this (discussed further in Option 7). Battery storage can add to the benefit of solar net metering, although at present the upfront cost of this technology is a barrier to widespread residential deployment. Net metering also has great potential to create local economic benefits and stimulate local jobs and investment. Missoula Electric Cooperative members also have the option to small solar electric systems sized up to 10 kilowatts; and systems between 10 and 50 kilowatts may also be permitted on a case-by-case basis ([policy is here](#)).

Shared Solar. These are also described as “Community Solar,” “solar gardens,” or “virtual net metering” installations. Shared solar is typically a large, single installation on one site and tied to the grid. Electricity customers can then “subscribe” to a portion of the installation. In doing so, they are either leasing or purchasing any number of panels from the total available, usually matching their purchase with their total energy needs. The energy produced is sent to the grid while a credit for the energy generated is applied to the subscriber’s utility bill. Since 2015 Missoula Electric Cooperative has developed three 50 kilowatt community solar facilities, with shares sold to their members. In Montana, there isn’t a clear regulatory framework for investor owned utilities to offer a shared solar option to their customers – this not a tool available in NorthWestern Energy’s service territory.

Shared solar installations can be composed of ground-mounted solar farms or solar installations on private or community buildings. Shared solar can augment net metering by utilizing larger building sites

and serving larger customer loads. Creative use of the shared solar model could add hundreds of small to medium solar electric systems sized 50 kW or larger.

Larger systems. Additionally, Missoula could help identify and facilitate the development or even construction of non-exporting on-site electricity generation at medium to large customer locations. Local government staff, Climate Smart Missoula or other community leaders could help connect interested parties, connect with system design experts, assess funding and financial options, and more. These non-exporting systems (sometimes referred to as “parallel interconnection”) allow for generation and consumption of renewable energy at a customer location as long as the energy is never exported to the utility grid. These systems are not limited by the 50kW net metering size limit; rather, their size is limited by the customer’s minimum load. The maximum allowable size for a non-exporting system interconnected with NorthWestern is 10 megawatts, per the Small Generator Interconnection Standards (more [here](#)).

Many medium to large commercial and industrial sites exist in our community where on-site non-exporting generation could be installed, especially if additional financing options were pursued or made available. This could be developed with interested individual investors (or a consortium of investors) or directly with financial institutions interested in driving the clean energy market or community goals.

Interestingly, Missoula actually has an existing municipal electric utility which was created in 1999 and never utilized (see Appendix III for details). Reviving this authority could allow the city to connect local producers with consumers seeking on-site, behind-the-meter electricity; this has yet to be explored, and the authority and legality for this utility would need to be explored.

Finally, to enable larger systems the City of Missoula could, through its government relations team, advocate for new legislation to expand opportunities for Qualifying Facilities (QFs, see Appendix III) and Community Renewable Energy Projects (CREPs) and, likewise, oppose bills that would limit these larger clean electricity projects.

Other customer purchasing options. In Montana, state law requires regulated utilities to offer customers a way to support renewable energy as an individual customer (MCA 69-8-210(2)). The current option for NorthWestern Energy customers is called the E+ Green Program, although it is not widely used. The E+ Green Program allows customers to purchase Renewable Energy Credits (RECs) that are generated at renewable energy facilities. The RECs for E+ Green Program participants are purchased from the [Bonneville Environmental Foundation](#), which does not purchase RECs from any Montana-based projects and therefore E+ Green participation does not support in-state renewable electricity development. Customers across the state have expressed interest in an improved green tariff program which would better meet the goals of increasing renewable energy on the grid while also supporting Montana-based projects (see Option 2).

Option 2 – Green tariffs: Another alternative for greening the Missoula electricity mix is to pursue creation of new renewable electricity tariffs. Green tariff models in Washington, Colorado, Minnesota, California, and elsewhere offer attractive options for adding cost-effective large local renewable electricity installations to the NorthWestern Energy supply portfolio, available for purchase at competitive rates by willing local customers. Green tariffs may be proposed by any stakeholder but they are analyzed by the affected utility and PSC before authorization, so working with NorthWestern Energy

and the PSC to prepare one or more green tariffs would be the most expedient path to approval. The advantage of green tariff models is that they can appeal to affected utilities as a natural extension of their current energy supply business model. Green tariffs offer willing customers a chance to persuade their electric service provider to become a willing seller, a solution that should appeal to all economic and political decision-makers. The current statutory requirement that NorthWestern Energy must “offer its customers the option of purchasing a product composed of or supporting power from certified environmentally preferred resources” may provide the authority necessary to implement a new green tariff (MCA 69-8-210(2)).

New green tariff programs are developing rapidly. The World Resource Institute has up-to-date and detailed information available on their website, including individual reports for the 17 U.S. states that have enabled green tariffs: [Emerging Green Tariffs in U.S. Regulated Electricity Markets](#).

Because this is such an interesting option for Missoula and other cities in Montana, here we provide more information. Tariffs are authorized utility rate structures (electricity prices) that define approved services and charges for specified energy products offered to identified customer classes. In regulated utility markets tariffs are proposed either by legislatures, utilities or customers, and reviewed and authorized by public utility commissions based on comprehensive analysis of costs and benefits to stakeholders. Green tariffs are rate structures designed to allow a specified customer class to purchase up to 100% of their electricity demand from clean energy sources, offered via specialized contracts and authorized rate structures. Green tariffs do not include green marketing programs like NorthWestern Energy's E+ Green.

Green tariffs are designed for utility customers seeking delivery of a significant quantity of renewable energy in their power supply mix, especially from newly constructed renewable energy generation in close proximity to customer demand. Since the first green tariff was adopted in 2013 over 23 green tariff programs have been proposed or approved in 17 states. In each case the green tariff includes standard cost-of-service charges, such as payment for transmission, distribution, capacity, and ancillary services, but substitutes the actual price from a specific renewable energy project as a charge that is offset by a credit for unused fuel costs from fossil fuel generation assets in the standard energy portfolio. Successful green tariffs enable customers to receive the economic and environmental values of renewable energy while ensuring that they still pay their fair share of grid costs, administration, delivery and system balancing expenses.

Currently there are two main types of green tariff programs. The first allows a negotiated, one-off arrangement between a utility and an individual large commercial or industrial customer for access to utility-brokered power purchase agreements (PPA) delivering power via existing utility transmission services. This type of tariff appears as a rider on the customer's bill and accounts for the actual cost of the green energy under contract but reduced by the cost of fossil fuel energy no longer consumed by the customer. If the renewable energy power price is lower than the fossil energy price this agreement may yield lower power bills, although in general the net price impact to the consumer is negligible or positive. This type of green tariff is designed to appeal to very large corporate and industrial customers with high demand facilities that might otherwise seek to leave a utility and purchase power directly in regional wholesale utility markets.

The second type of green tariff is a utility subscriber program. Subscriber programs are designed to allow smaller commercial and industrial customers to pool their renewable energy demand by subscribing to a portion of the production from a large renewable energy project owned or contracted by the utility. Again, the customer pays the full cost of the renewable energy generated by the project,

offset by a credit for their unused demand for fossil fuel energy from the utility's standard portfolio power mix. This is the type of program geared to local governments, businesses, and retail consumers, and is well suited for communities seeking to achieve climate and energy goals (more [here](#)).

A carefully designed green subscriber tariff could supply Missoula with a significant amount of renewable energy from regional wind farms or new community-sited solar projects that do not require expensive transmission and provide clean power, an expanded tax base, and local employment opportunities. Economic equity is maintained and cost shifting is avoided by charging green tariff subscribers for all standard grid services plus the actual power price for contracted renewable energy, less the avoided cost of the standard portfolio price of energy.

We can look to these programs for examples of green tariff program details such as pricing and contract length.

- Xcel Minnesota Renewable*Connect; for [residential](#) and [business](#)
- [Xcel Colorado Renewable Connect](#)
- [Puget Sound Energy Green Power program](#)
- Pacific Power (PacifiCorp) ["Blue Sky Select" Large Customer Program](#)

Other Montana communities have also expressed interest in learning more about green tariffs and developing a program applicable to the state as a whole. This is by no means a Missoula only option.

Option 3 – Energy Efficiency and Conservation: *Saving* electricity is often referred to as the “cheapest electricity” available. No new power plants or transmission lines are necessary and although some new or upgraded products or even systems may be necessary to increase efficiency, a switch in personal conservation habits is something accessible to all. There are a variety of means by which communities can encourage or mandate energy efficiency and although some are already utilized in Missoula, myriad additional tools and programs could be developed and supported. Options range from optimized and enforced building codes, to additional rebates for energy efficient lighting or appliances, to fully supported programs that help home owners or businesses make substantive efficiency upgrades by providing energy audits, connecting homeowners to contractors, and providing information about financing options. Robust programs that encourage the conservation of electricity by helping individuals, whether at home or work, take personal steps to reduce their use are also needed. Appendix IV discusses best practices, options and lessons learned from other cities, communities, and states. Our *Other Cities Database* also includes information about energy efficiency and conservation programs and goals that other communities have or are pursuing. See missoulaclimate.org/100-percent.html.

So much electrical savings potential exists that although one might consider this an “existing tool” (Option 1), we believe it mandates its own Option. Significantly accelerating these efforts can reduce the community's total electricity usage, the “size of our electricity pie”. To move this beyond current tools, new energy efficiency financing options and investments need to be developed at the local and state level and within the utilities and ultimately more funds need to be dedicated to these efforts.

Option 4 – New Franchise Agreements: Missoula could consider creating a municipal electric utility franchise agreement. Montana municipalities are allowed to regulate the private use of public rights-of-way within their boundaries, by establishing business practices and levying fees on utilities under

“franchise agreements.” Franchise agreements provide fees from the utility provider as “rent” for the use of public infrastructure and are presently used in Missoula with telecommunications (see Appendix III for details on how these are structured). A franchise agreement could be structured similar to the agreement established by Minneapolis, MN under its Climate Action Plan (which levies utility fees to finance conservation, encourage renewable energy, and advance equity) and Ann Arbor, MI (which mandates renewable energy targets). Other franchise options include program cost sharing and information sharing provisions such as those utilized by Billings, including fees to defray municipal oversight of activities authorized under the franchise agreement, access to planning and engineering documents, and access to facility location maps and records in GIS and paper format. Additional information the city might consider requiring NorthWestern Energy to share are details related to the operating cost, service history, and location of all street lighting in Missoula. Access to electrical usage data that informs municipal planning under the Climate and Energy action plan could be required under the franchise agreement, with information confidentiality established in the agreement. Finally, the city may seek to create a separate electric vehicle charging franchise agreement to incentivize private companies to establish a new network of charging stations.

Option 5 – Community Choice Aggregation: In other states, Community Choice Aggregation (CCA) is an option open to municipalities and local government entities interested in expanding consumer clean energy options. CCA is a regulatory framework authorized by state legislatures that enables local governments to create nonprofit public agencies to serve as a public utility provider on behalf of residents, offering an alternative to regulated utility company service to customers (see Appendix III). CCAs provide more local control and choice and when combined with amplified market power, allow for the purchase or development of renewable energy projects that respond to customer demand. CCA must be legislatively authorized at the state level so a commitment by the city to work independently or collaboratively with other municipalities at the legislature would be required in order to enable CCA. Once enabled, CCA may result in significant legal and financial startup costs and potential exit fees to compensate the regulated utility for stranded assets in the wake of CCA implementation. However, if successfully enabled, CCA offers communities such as Missoula an opportunity to become their own renewable energy supplier, resulting in greatly enhanced local control over energy purchase decisions compatible with municipal 100% clean electricity and greenhouse gas reduction goals. The pursuit of low cost renewable electricity can drive the CCA.

Option 6 – Expanded Renewable Portfolio Standard: Increasing Montana’s renewable portfolio standard (RPS) from its current 15% to a higher amount - 50% or more - would add a significant amount of new renewable energy to the grid, depending on how an updated RPS was structured and how hydroelectric power qualified or was defined (in order to spur new, additional clean energy, existing large hydro power plants, many of which have been in operation for 100 years, do not count toward satisfying the renewable requirement). Implementation of Montana’s current RPS demonstrated that regulated utilities were able to add new renewable generation assets to their supply portfolio. The 15% RPS, passed by the state legislature in 2005, required investor-owned utilities to obtain 15% of their retail electric sales from the following sources: wind, solar, biomass, hydroelectric, landfill gas, anaerobic digestion, fuel cells using renewable fuels, and geothermal (see statute 69-3-2001 et seq,

MCA, with details [here](#)); wind power was the sole source used to meet the RPS. During the 2005 legislative debate over Montana's current standard, some utilities took the position that it was not technically feasible and would be financially burdensome to add a significant amount of renewable energy to the grid, however these fears proved to be incorrect. A 2014 report by the Montana Legislative Services found "The RPS and accompanying CREP legislation in Montana has had relatively minimal rate impact on NorthWestern Energy's customers."¹ In addition, new utility data management and grid control systems combined with rapidly falling renewable energy generation prices have made it possible to balance large amounts of grid-connected renewable energy in a reliable and cost-effective manner. Increasing the RPS would drive new clean energy into the utility supply portfolio across the grid, thus offering health and economic benefits to all Montanans. Such an increase would require legislation or a statewide voter initiative.

Option 7 – Expanded funding, financing and other opportunities with investor-owned utilities.

Developing a clear regulatory framework for third party leasing of on-site electricity generation would expand opportunities for on-site renewable energy development. Other financing and funding options that if developed or enabled, could propel additional clean electricity include:

- Revolving Energy Loan Funds
- Clean energy taxing districts
- Property Assessed Clean Energy (PACE) legislation

We anticipate the next iteration of this Options Report will expand upon such finance options.

Option 8 – Municipalization: Municipalization involves forming a locally owned utility in order to have control over the sources of electrical generation. This is the option that Boulder, Colorado has taken (see <https://bouldercolorado.gov/energy-future>). It is likely that statutory changes to existing laws would be required, and this is listed as the last option for a reason—this route is fraught with challenges. Nonetheless, this could be an option worth pursuing in decades to come and depending on the success of other options described above. See Appendix III regarding Missoula's municipal electric and gas utility (Ordinance 3101, Title 12.28 of the Missoula Code).

¹ <https://leg.mt.gov/content/Committees/Interim/2013-2014/Energy-and-Telecommunications/Legislation/RPSFinal.pdf>

What's Next?

Missoula has the momentum and ability to step forward and lead. We look forward to solidifying these target goals and timelines, partner commitments, and next steps. Next steps which we plan to accomplish in 2018 include:

- Receive comments and feedback via the online comment form [here](#)
- Meet with interested parties to discuss and receive feedback on this report and options. If warranted, create fall working group to solidify plan
- Adjust Options Report based on feedback, and share Version 2
- Host public announcement of Option Report v2
- Continue to get buy-in from the community, including Climate Commitments for those Missoula-based entities wishing to sign on.
- Bring resolution to Missoula City Council to advance this goal and efforts
- Bring resolution to Missoula's Board of County Commissioners
- Work with other Montana communities to move this direction
- Receive and incorporate updated electricity use data (early in 2019, data for 2018 calendar year)
- Seek additional funding to move the effort and the new electricity initiatives forward
- Implement with easy "quick wins" and make progress on the more challenging pieces

Appendices: These are all available here: <https://www.missoulacclimate.org/100-percent.html>

Appendix I - 100% Plans from Other Cities and What We Can Learn

Appendix II -Electricity Regulatory Environment in Montana

Appendix III - FREQUENTLY ASKED QUESTIONS about Missoula Electricity Landscape and Montana laws and regulations

Appendix IV –Options and Best Practices for Energy Efficiency and Conservation

References and Sources (more will be added; thank you for your patience):

City of Missoula's Conservation and Climate Action Plan (2013):

<https://www.ci.missoula.mt.us/1709/Conservation-Climate-Action-Plan>

Climate Smart Action Plan for the Missoula Community (2015):

<https://www.missoulacclimate.org/action-plan--buckets.html>

IPCC Global Warming at 1.5 C report - <http://ipcc.ch/report/sr15/>

WRI report: <http://www.wri.org/publication/emerging-green-tariffs-us-regulated-electricity-markets>