

Quantifying the Economic Impacts of Net Metering in Montana

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Senate Joint Resolution No. 12 requires the Energy and Telecommunications Interim Committee (ETIC) to examine economic development impacts of net metering systems by reviewing revenue generated by businesses that sell and install net metered systems in Montana, analyzing employment statistics for businesses that sell and install net metered systems in Montana, and reviewing tax revenue generated by net metering systems, including the increased taxable value of residential and commercial properties with net metered systems. The analysis in this report relies on relevant studies conducted by Synapse Energy, the National Renewable Energy Laboratory, and renewable energy groups that have conducted related reviews in other states. The studies cited employ a range of methods for determining economic impacts, which makes direct comparisons of numbers challenging. The review also focuses solely on the contributions of net metering in Montana. It is not intended to be used to compare employment created by meeting electricity demand using fossil versus renewables-based electricity generation. In addition, ETIC staff contacted renewable energy businesses that install distributed generation systems in Montana. Those businesses provided their thoughts on the economic contributions of Montana's net metering policy.

Net metering contributes to jobs and economic output, but capturing the specific number of jobs created or tagging exact property and income tax benefits in Montana requires extensive modeling and analysis. Certain baseline economic impacts can be established by accounting for changes in employment and tax revenues that are influenced by net metering in Montana.

Jordan Solar, Charlo, MT
Jordan Solar installs renewable energy systems for homes and businesses in Montana, Idaho, and Washington. They have been in business for 8 years. Jordan Solar employs four full-time employees and one part-time employee. They employ licensed electricians and regularly subcontract with other businesses in the construction trades. Over the lifetime of the business, Jordan Solar has installed about 150 systems at a total capacity of more than 600 kilowatts. "Montana's net metering law is critically important to our business. By guaranteeing utility customers a fair credit for extra energy they generate, the law gives households and businesses the certainty they need to invest in solar power."

According to the Solar Energy Industries Association, which advocates for solar energy in the U.S., "net metering provides substantial statewide economic benefits in terms of jobs, income, and investment. Net metering increases demand for solar energy systems, which in turn creates jobs for the installers, electricians, and manufacturers who work in the solar supply chain. Today, the solar industry employs

nearly 174,000 American workers in large part due to strong state net metering policies which have allowed the solar industry to thrive.”¹

Revenue Generated by Businesses that Sell and Install

The Solar Energy Industry Association (SEIA) analyzes state-level solar jobs in existence for each state. In 2014, SEIA determined that \$4 million was invested on solar installations in Montana. They found that there are 37 solar companies working in Montana that employ about 300 people. “These companies provide a wide variety of solar products and services ranging from solar system installations to the manufacturing of components used in photovoltaic panels. Solar firms in this state can be broken down across the following categories: 5 manufacturers, 27 contractor/installers, 2 distributors, and 3 engaged in other solar activities including financing, engineering and legal support.”²

The Montana Renewable Energy Association (MREA) estimates the monetary value of net metering and includes tax credits, avoided carbon dioxide emissions and property values. “MREA’s preliminary analysis shows the net monetary value to Montana’s economy from the net metering systems installed to date is more than \$19,699,732.” **Table 1** outlines the economic impacts. The table does not account for wind installations and focuses only on NorthWestern Energy’s service territory. A net present value estimate would be significantly higher. For example, the MREA analysis does not account for the benefits over the lifetime of a system or bill savings noted in the chart. “The additional economic impact of returning these bill savings to the Montana economy is not accounted for in this analysis but should not be ignored by the Legislature,” according to MREA.

Benefits and Costs	2014	2000-2014
Benefits		
Bill savings, 2014	\$597,650	---
Bill savings, 2000-2014	---	\$2,673,305
Installation sales revenue, 2014	\$3,538,384	---
Installation sales revenue, 2000-2014	---	\$29,949,178
Increased residential property value, 2014	\$2,830,707	---
Increased residential property value, 2000-2014	---	\$9,987,000
Value of avoided CO2 emissions, 2014	\$125,337	---
Costs		
Montana income tax credits, 2014	(\$161,000)	---
Montana income tax credits, 2000-2014	---	(\$1,095,000)
USB renewable energy and R&D allocations, 2014	(\$1,427,821)	---
USB allocations, renewable energy and R&D, 1999-2014	---	(\$19,141,446)
Totals		
Total Benefits	\$6,494,428	\$39,936,178
Total Costs	(\$1,588,821)	(\$20,236,446)
Net Economic Impact	\$4,905,607	\$19,699,732

Table 1: Source: MREA Net Metering Questionnaire, September 2015

¹ <http://www.seia.org/policy/distributed-solar/net-metering>

² <http://www.seia.org/state-solar-policy/montana>

The installation sales revenue is estimated by multiplying the average installed cost, based on an assessment by the National Renewable Energy Laboratory (NREL) by total installations each year. MREA finds that revenue enters Montana’s economy through wages, equipment purchases, office rentals, building permits, corporate and payroll taxes, and other means.

The IMPLAN model is often used to determine economic impacts. The U.S. Forest Service in the 1970s developed IMPLAN for community impact analysis. It is an input-output database and model maintained and sold by MIG Inc. in Minnesota. The Rhode Island Office of Energy Resources and Commerce in 2014 evaluated the economic impacts of distributed generation. They used the IMPLAN model to determine economic output, employment, and state tax revenue. They found that the value of the economic output impacts for 160 MW of distributed generation standard contracts would be \$556 million. On average, they found that about 246 full-time equivalent jobs would be created annually.

NREL also has examined the effects of state policies on the development of solar markets. They found that states experienced more robust markets with the implementation of interconnection and net metering. “Although these policies alone are not usually sufficient to spur solar markets, they are foundational for distributed generation market growth.” They found rapid increases in solar markets in states that had best practices for net metering and interconnection and implemented additional set-asides or programs to promote solar.³

Employment Statistics

In December 2014 MREA surveyed renewable energy installation businesses and identified at least 92 full-time jobs and 71 part-time or seasonal jobs. The median salary for full-time jobs was \$40,000 to \$49,000, and the median wage for part-time positions was at \$20-\$29/hour. “The respondents hired a total of 284 subcontractors each year, including electricians, roofers, engineers, architects, excavators, and concrete contractors.”

In 2013, the Solar Foundation found solar industry employment grew by 53%, with nearly 50,000 new solar jobs since tracking started in 2010. Their research indicated that 77% of the 24,000 new solar

Green Build, Bozeman, MT
Bozeman Green Build has been in business for 24 years. They employ 3 full-time employees and subcontract with about 20 different businesses. The business also hires local electricians for projects. They have installed about 100 systems at a total capacity of more than 500 kilowatts. Owner John Palm said that with a higher cap on net metering, the business would see bigger projects, more wages, more taxes paid to the state, and more energy savings. At an average hourly rate of \$75, the projects are an infusion of funds to communities, he said. Larger systems often expend \$3,500 (labor only) in electrical work. “Our business also yields the benefit of relatively high wages. Our employees earn from \$21 to \$35/hour while also receiving health insurance (paid 100% by BGB) and other benefits,” he said. “Montana’s net metering policies enable business like mine to exist.”

³ “The Effect of State Policy Suites on the Development of Solar Markets,” Steward and Doris, National Renewable Energy Laboratory, U.S. Department of Energy, November 2014.

workers since September 2012 were new jobs, as opposed to existing positions that added solar responsibilities. In terms of wages, “The typical solar installer is reported to earn between \$20.00 (median) and \$23.63 (mean) per hour, which is commensurate with wages paid to skilled electricians and plumbers and significantly higher than roofers, carpenters, and other construction laborers.”⁴

The U.S. Bureau of Labor Statistics estimates 5,170 solar photovoltaic installers are employed across the country with a mean hourly wage of \$20.08. The geographic profile for solar installers, however, does not include Montana. The U.S. Energy Information Administration in December 2014 found, “All four categories (solar, wind, biomass, geothermal) of non-hydro renewables have seen gains in power generation jobs since 2011. Solar has led the way, with the number of jobs related to the operation of solar generation installations in the electric power sector more than tripling in that timeframe.”⁵

Specific data for Montana concerning employment statistics and potential employment is offered in a report prepared by the Montana Environmental Information Center and Sierra Club. “Employment Effects of Clean Energy Investments in Montana” was released in June 2014 and prepared by Synapse Energy Economics, Inc. based in Massachusetts. In the report, employment is assessed in terms of jobs created per “average megawatt” (aMW) of energy produced over the next 20 years. The report found that for initial construction and installation, “Solar PV generates the largest job impact per aMW, by far, with 136 job-years for small-scale projects”. Synapse also determined jobs associated with annual operations and maintenance of various resources measured in jobs per aMW. Small-scale solar again was the leader in job creation at 2.4 jobs per aMW.⁶

Solar Plexus, Missoula, MT
 Solar Plexus has been in business for 21 years. Six people work for the company. On-grid solar systems, off-grid solar systems, and hydroelectric systems are sold. The company has installed about 2 MW of on-grid and off-grid solar and hydro. About two-thirds is residential and about one-third is commercial. Solar Plexus does its own residential electrical work and hires contractors for commercial electrical work. Solar Plexus also hires engineers, architects, concrete services, equipment rental, and accountants. In 2015 Solar Plexus has installed 73.5 kW of grid-tie and 12.7 kW of off-grid solar systems.

Jobs/aMW	Construction	O&M	Total
Small PV	6.8	2.4	9.2
Large PV	3.5	1.5	5.0
Wind	0.7	0.7	1.5
Energy Efficiency	0.9	0.2	1.2

Table 2: Source: Synapse and NREL JEDI Model (industry spending patterns), IMPLAN (industry multipliers).

Synapse ultimately combined the construction jobs and operation and maintenance jobs into one cumulative employment impact per aMW. **Table 2** prepared by Synapse provides “start to finish”

⁴ <http://pre.thesolarfoundation.org/sites/thesolarfoundation.org/files/TSF%20Solar%20Jobs%20Census%202013.pdf>

⁵ <http://www.eia.gov/todayinenergy/detail.cfm?id=19271#>

⁶ “Employment Effects of Clean Energy Investments in Montana,” Prepared for Montana Environmental Information Center and Sierra Club, Comings, Fields, Takahashi, Keith, June 2014.

measure of the 20-year annual average jobs created per aMW. Small solar PV was the leader generating 9.2 jobs per aMW per year on average.

Employment statistics also don't simply include industries that own solar installation businesses. Engineers, marketing and sales associates, project managers and electricians are also part of the mix. In 2011, Solar Plexus, LLC provided an example of employment. They said that the company employs three full-time employees and two part-time employees, also covering 100% of the employee's benefits.

The company said that it subcontracts with the following Montana-based companies and contractors: three engineering firms; two architecture firms; five insurance companies, including state fund; two accounting firms; two law firms; two phone companies; two IT firms; two printing and office companies; a local bank; two local auto repair and dealers; 18 electricians; two roofing companies; two remodeling companies; two metal fabrication companies; an energy modeling company; and two energy efficient lighting companies. The also said that they rent equipment from rental shops and purchase wire, conduit, and other electrical components from Missoula distributors.

Tax Revenue Generated by Net Metering

Montana-specific information concerning increased property values based on net-metered generation is not available. The Montana Department of Revenue (DOR) does not have specific information on the valuation of homes with rooftop solar. The DOR indicates that at this time it is not aware of appraisers adding value as a result of solar PV systems.

DOR indicates that the modeling used for most appraisals is based on comparative sales. At this time in Montana, there are not enough solar installations to necessarily change the model that is used by the department to incorporate solar systems. In some southwestern states, where solar installations are much more common than in Montana, appraisers are grappling with appraisal challenges, including homes with PV leases or power purchase agreements. The Appraisal Institute offers some information on the subject. In 2012 the Institute expressed its support for developing tools to assist appraisers. "Finding a way to value residential and commercial properties with PV installations is a growing challenge facing the nation's real estate industry. As more homes and businesses turn to solar power, the need grows for ways to develop reliable and credible opinions of value of the installations and the power they generate."⁷

Sundance Solar, Billings, MT

Owned by Henry and Barbara Dykema, Sundance Solar Systems provides solar and wind energy products. Since 1994 they have offered off-grid or grid-tie backup systems. Employment is variable, but the company subcontracts electrical work to electrical contractors throughout the state. "I believe that the legal mandate for our state's utilities to provide net-metering to their customers is a net economic benefit to the state through employment, taxes, and business."

⁷ <http://www.appraisalinstitute.org/appraisal-institute-announces-support-for-new-solar-valuation-form/>

Fannie Mae also is addressing increased solar values. They have offered a guideline that specifies that if a home has a solar system that is owned as opposed to leased, appraisers should analyze the system and the market where the system is located to determine if it adds value.⁸

A study, conducted by the Lawrence Berkeley National Laboratory in California and released in 2013, however, includes an analysis of potential tax impacts in terms of potential resale values and home values. Researchers reviewed sales data for about data on 1,894 PV homes sold in California from 2000 through 2009, and 70,425 non-PV homes sold over the same time frame and in the same neighborhoods of the PV homes. They determined that premiums in California were strongly correlated with PV system size and weakly correlated with PV system age. “We estimate that each 1-kW increase in size equates to \$5,911 higher premium and each year systems age equates to \$2,411 lower premium.”⁹

An Arizona study found that a critical element in the discussion is whether the panels are owned or leased. A news report stated that real-estate agents noted an increase in 4% to 6% in the value of a home when solar panels were owned, but homes with leased panels sold for less money.¹⁰ Fannie Mae says in its guidance to appraisers that leased solar panels should not be included in appraisal values.

Based on the national studies, MREA has calculated potential property value increases in Montana. “For example, a 5 kW solar PV system would increase the sale price of the home by \$15,000. Residential solar PV installations in Montana total 3,329 kW, which translates to increased home values of \$9,987,000.” In the net metering discussion that value is solely based on solar installations and doesn’t account for net metered wind systems.

In a report prepared by Clean Power Research for New Jersey and Pennsylvania, tax revenue enhancements from jobs created due to PV-induced economic development were considered. “In Pennsylvania and New Jersey, this low estimate amounts to respectively \$39 and \$40 per MWH, even under the very conservative, but thus far realistic, assumption that 80% of the PV manufacturing jobs would be either out-of-state or foreign.”¹¹

When contemplating taxes, various tax incentives also must be considered. In California, for example, property tax increases resulting from adding solar are prohibited, based on California tax law. Montana provides a partial abatement of property tax attributable to a solar installation using various assessment methods.

At least 30 states offer a type of property tax incentive for solar installations. In many places the incentives simply exclude the added value of distributed generation equipment, like solar panels, from the value of the property for taxation purposes. Montana offers tax exemptions for certain types of

⁸ <https://www.fanniemae.com/content/guide/selling/b2/3/04.html>

⁹ “Exploring California PV Home Premiums,” SunShot , U.S. Department of Energy, Hoen, Klise, Graff-Zivin, Thayer, Seel, and Wiser, Ernest Orlando Lawrence Berkeley National Laboratory, December 2013.

¹⁰ <http://www.azcentral.com/story/money/real-estate/2015/07/17/solar-raise-home-values-system/30296123/>

¹¹ “The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania,” Clean Power Research, Mid-Atlantic Solar Energy Industries Association and Pennsylvania Solar Energy Industries Association, Perez, Norris, Hoff, November 2012.

energy investments. The total amount of exemption is not estimated by the DOR because they are made up elsewhere in local mills.

Montana offers a property tax exemption for buildings using renewable energy, with certain amounts of residential and nonresidential structures exempted from property tax increases resulting from the installation of a renewable energy system. The exemption is for 10 years, based on an investment of \$20,000 for single family homeowners and \$100,000 for multi-family and non-residential facilities.¹² Generating facilities that are smaller than 1 MW and use renewable resources also are exempt from property taxes for 5 years after the system's installation.¹³ The DOR has indicated that very few taxpayers use the exemptions. For example, two properties claimed the first exemption in 2013 and 2014. In 2015, only one property claimed the investment exemption.

In Montana an alternative energy systems credit also allows residential taxpayers who install renewable energy systems, such as net metered systems, on their property to seek a tax credit equal to the investment and installation cost, up to \$500 per individual.¹⁴ The amount of this credit in 2013 was \$4.6 million, and in 2014 it was \$4.4 million. An alternative energy production credit allows commercial and net metering alternative energy investments of \$5,000 or more to seek a personal or corporate tax credit of up to 35%, against taxes on income generated by the investment. The incentive includes investments in renewable energy equipment, manufacturing plants, and business facilities that supply basic energy needed from renewable generation on a direct contract sales basis. Unused credit may be carried over for 7 years.¹⁵ In 2013 fewer than 10 individuals claimed the credit on their personal income tax records for a total of \$56. For 2013, S Corps and partnerships claimed \$25,590 using the alternative energy production credits.

A federal tax credit is also available offering an energy tax credit of 30% of the total expenses, which include installation of residential or commercial renewable systems and labor expenses. There is no maximum limit for solar electric and thermal systems, and if there is excess federal tax credit, it may be carried over to the subsequent taxable year. The federal credit may continue on through consecutive years until 2016, when the residential credit is expected to expire.

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¹² 15-6-224, MCA

¹³ 15-6-225, MCA

¹⁴ 15-32-201 MCA

¹⁵ 15-32-401, MCA