

# Opportunities for Energy Technology Program Graduates in Montana’s Energy Industry

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## Summary

The Energy Technology Program at the University of Montana’s College of Technology in Missoula, Montana, is a two-year Associate of Applied Science degree program intended to train students for careers in the energy industry, with an emphasis on renewable energy and energy efficiency. The purpose of this study was to assess Montana’s energy industry with a focus on potential job opportunities for graduates of the Energy Technology Program. The study involved interviews with representatives of 36 energy-related companies in the state, including renewable energy system installers, wind farm operators, manufacturers of renewable systems and components, energy efficiency companies, utilities/electric cooperatives, and power plants. Based on these interviews, the study concludes that there will be an estimated 150-250 job openings over the next two years in Montana’s energy industry that graduates of the Energy Technology Program will be eligible for, though many of these positions will be highly competitive. The sector with the greatest number of job openings will be energy efficiency. Program graduates that wish to pursue further training or education will find that either apprenticeships in electrical fields or bachelor’s degrees will enhance their job prospects in the energy industry. Finally, as policies and incentives for energy efficiency and renewable energy expand in future years, increased opportunities are anticipated.

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## Introduction

As the United States struggles with volatile and rising energy prices, the political instability of energy rich nations, and the threat of climate change, the benefits of energy efficiency and renewable energy are increasingly widely recognized. Energy efficiency is the least-cost, cleanest way of meeting rising energy demand, while renewable sources such as solar, wind, geothermal, and hydropower can provide clean, domestic energy at stable prices while supporting local economies.

Both federal and state lawmakers are responding to these realities by enacting legislation to encourage energy efficiency and renewable energy. While the federal government considers climate change legislation, more than half of the states, including Montana, have implemented Renewable Portfolio Standards requiring utilities to procure a certain percentage of their electricity from renewable sources.<sup>1</sup> An increasing number of states have also adopted aggressive energy efficiency policies and goals. Energy efficiency and renewable energy were major emphases of the 2009 American Recovery and Reinvestment Act, and in Montana, federal, state, and utility incentives are available to support renewable energy and energy efficiency.<sup>2</sup>

As markets for renewable energy and energy efficiency continue to expand, there will be an increasing need for workers trained in the design, installation, operation, and maintenance of renewable energy and energy efficiency systems. The Energy Technology Program at the University of Montana's College of Technology was initiated in 2007 to help meet this need. Since then, similar programs have been created elsewhere in the state.<sup>3</sup> However, an understanding of Montana's energy industry is needed to quantify employment opportunities and to ensure that graduates of the Energy Technology Program and similar programs will be well-prepared for jobs in their chosen field. The purpose of this study, therefore, was to assess the energy industry in Montana (and, to a lesser extent, northern Idaho and eastern Washington) with a focus on job opportunities for graduates of the Energy Technology Program. This report is based on 36 conversations with representatives of energy companies in the region.

## Montana's Energy Industry

I spoke with a wide variety of companies in Montana's energy industry (as well as a few firms in northern Idaho and eastern Washington), ranging from one-person firms that install solar PV systems to NorthWestern Energy, which employs 1,000 people in the state. The companies I spoke with can be divided into six broad categories: (1) small firms that install renewable systems; (2) companies that develop and/or operate large wind farms; (3) companies that manufacture and supply renewable energy

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<sup>1</sup> Montana's Renewable Portfolio Standard, enacted in 2005, requires that utilities and competitive electricity suppliers procure at least 15 percent of their power from renewable sources by 2015. For more information, see <http://deq.mt.gov/Energy/renewable/taxincentrenew.mcp#69-8-1001>.

<sup>2</sup> A complete list of policies and incentives for renewable energy and energy efficiency by state is available at <http://www.dsireusa.org>.

<sup>3</sup> The Sustainable Energy Technology A.A.S. Program began in 2009 in Butte and Havre, and will expand to Billings and Great Falls in the fall of 2010. In addition, Montana State University plans to expand its weatherization training program to include a two-year weatherization degree.

systems and components; (4) companies that provide energy efficiency services such as energy audits, weatherization, and energy efficiency upgrades; (5) companies that deliver power, including investor-owned utilities, electric co-operatives, and wholesale power suppliers; and (6) companies that own and operate power plants and large hydroelectric dams.<sup>4</sup> The table below lists the companies that I spoke with in each of these sectors, and the appendix includes contact information for each company.

<b>Type of Company</b>	<b>Companies Interviewed</b>
Renewable Installers*	Big Sky Custom Solar
	Big Sky Solar and Wind
	Bozeman Green Build
	Independent Power Systems
	Oasis Montana
	Solar Montana
	Solar Plexus
	Sunelco
Wind Farm Developers/Operators	Sustainable Building Systems
	Invenergy
	Montana Wind Resources
Renewable Component Manufacturers/Suppliers	Naturener
	GT Solar
	REC Advanced Silicon Materials
Energy Efficiency	Wind Turbine Tools
	Human Resource Council District XI
	Johnson Controls
	KEMA
	McKinstry
	National Center for Appropriate Technology
	New Horizons Technology
Rocky Mountain Development Council	
Utilities/Co-ops/Power Wholesalers	Avista Utilities
	Bonneville Power Administration
	Flathead Electric Cooperative
	Inland Power and Light
	Missoula Electric Cooperative
	NorthWestern Energy
	Ravalli Electric Cooperative
Power Plants/Generators	PPL Montana
	US Army Corps of Engineers
	US Bureau of Reclamation
Other	Montana Dept of Environmental Quality
	Sage Mountain Center
	Sustainable Business Council

\* Some of these companies also provide energy efficiency services.

<sup>4</sup> The transportation fuel sector was not included in this study. Refineries and biofuel companies in Montana are located far from the Missoula area and were judged to be less significant potential employers of Energy Technology Program graduates than the other energy sectors. It is recommended that job opportunities with these companies be investigated in the future.

Each of these sectors, and its potential for hiring Energy Technology Program graduates, is described in the sections that follow.

## **Renewable Installers**

There are more than two dozen firms that install small renewable systems in Montana. They install solar PV, solar thermal, small wind, geothermal, and small hydroelectric systems. Some companies focus on one technology, and others work with two or more. They range in size from one-person operations to companies like Independent Power Systems, which has 10-12 employees in Bozeman and another office in Boulder, Colorado. Much of the market for small renewable systems is made possible by Montana's net-metering law, which allows customers of the state's investor-owned utilities (NorthWestern Energy and Montana-Dakota Utilities) to connect renewable systems up to 50 kilowatts (kW) to the electric grid, and requires that customers' bills be reduced based on the value of their excess generation.<sup>5</sup> In addition, financial incentives for small renewable systems are available from several sources. NorthWestern Energy's Universal System Benefits program, funded through a surcharge on electric bills, provides incentives for renewable systems, and tax credits are available from both the state and the federal government. The state also offers loans for renewable energy systems.

However, despite these incentives, the market for small renewable systems in Montana is limited by several factors. First, though NorthWestern Energy's 50 kW net-metering limit is more than adequate for residential systems (which are typically smaller than 5 kW), it limits the size of commercial and industrial renewable energy systems and thus limits the market for installers. Second, despite the financial incentives, costs are high and most small renewable systems in Montana have long payback periods. Other states have created flourishing markets for small renewable systems by implementing more aggressive incentive programs. The goal of such programs is to transform the market by supporting renewable technologies until such time as economies of scale and technological improvement make them economically competitive in their own right.

Despite the challenges facing the market for small renewable systems in Montana, several new renewable installers have recently entered the market, and most renewable installers expect their companies to grow in the coming years. Most of the firms that I spoke with expect to hire 1-2 installers/technicians in the next two years. Statewide, there may be 20-40 job openings in this sector over this period, and Energy Technology Program graduates will be contenders for these positions. Companies are generally looking for mechanically-minded employees, ideally with hands-on installation training or experience and knowledge of renewable energy. Entry-level jobs with renewable installers are likely to pay in the range of \$25-35,000 per year.

## **Wind Farms**

Montana has the third largest wind resource in the nation,<sup>6</sup> but ranks just 18<sup>th</sup> in terms of installed wind power capacity.<sup>7</sup> Global wind companies have begun building large wind farms in Montana, and with

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<sup>5</sup> Some form of net-metering is also available in most of the state's 26 electric cooperatives.

<sup>6</sup> According to data released by the National Renewable Energy Laboratory in February 2010 and available at [http://www.windpoweringamerica.gov/wind\\_maps.asp#potential](http://www.windpoweringamerica.gov/wind_maps.asp#potential), Montana has the second largest land area, after Texas, with a wind capacity factor of at least 30 percent at 80 meters above ground. Montana ranks third,

the development of new transmission lines from Montana to more populous states in the West and Southwest, the state's wind industry is poised for substantial growth in the coming decades. There are currently two large wind farms in the state: Judith Gap has a capacity of 135 megawatts (MW) and is operated by the Chicago company Invenergy, and Glacier Wind Farm has a capacity of 210 MW and is operated by the Spanish company Naturener. Naturener is also building a 309 MW wind farm, Rim Rock, just north of Glacier Wind Farm.

Given the amount of energy generated by large wind farms, however, employment opportunities are relatively few. Judith Gap provides enough electricity for about 50,000 households but is expected to employ just nine people over the long term. Naturener expects to employ about 60 people at Glacier and Rim Rock Wind Farms when both are fully operational. Wind farms are typically maintained by the turbine manufacturer while the turbines are under warranty, after which time the wind farm operator (e.g. Invenergy or Naturener) hires technicians to staff the facility. Both Invenergy and Naturener plan to hire technicians at their Montana wind farms this year as their turbine warranties expire.

Naturener currently employs five technicians at Glacier Wind Farm, and expects to hire 10-15 more by the end of the year. Invenergy currently employs just one person at the Judith Gap wind farm, and will begin recruiting for technicians within the next few months. Both companies prefer to hire technicians with prior wind farm experience, but will also consider applicants that are skilled with their hands (such as through experience as a mechanic) and that have received training in wind energy. Ideally such training should include safety, climbing, rigging, and basic programming, among other skills. It is recommended that Energy Technology Program management and staff work closely with large wind companies such as Invenergy and Naturener to ensure that the program provides the appropriate training to students that aspire to be wind farm technicians. Starting salaries for wind farm technicians at Naturener are approximately \$35,000.

I also spoke with Montana Wind Resources, which is working with a Minnesota-based wind developer to develop community-based wind farms in Montana. According to Montana Wind Resources, there are very few positions with wind developers (as opposed to wind farm operators) in the state, and there are unlikely to be opportunities for Energy Technology Program graduates with these companies.

## **Renewable Energy Component Manufacturers and Suppliers**

Upstream of the companies that install and operate renewable energy systems are companies that manufacture and supply those systems and their components. I spoke with three such companies. GT Solar is a New Hampshire-based company that designs and produces equipment used in the manufacture of solar cells and has 62 employees in Missoula. The Renewable Energy Corporation (REC) is a large Norwegian company that employs 300 people at its silicon manufacturing facility, called REC Silicon, in Butte. Finally, Wind Turbine Tools supplies tools to the global wind industry and employs 12 people in Lincoln. A fourth company of interest is Applied Materials, formerly Semitool, which makes semiconductor manufacturing equipment and employs 550 people in the Flathead Valley. I was unable

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following Texas and Kansas, when protected lands (such as national parks) and incompatible land uses are excluded.

<sup>7</sup> American Wind Energy Association, Year End 2009 Market Report.

to reach Applied Materials in the course of this project, and future contact with this company is recommended.

GT Solar's Missoula office is engaged primarily in engineering and research and development, and most of their employees are engineers. The company may at some point hire a few non-engineers to work on research and development at their test facility, but at present they do not have any opportunities available for Energy Technology Program graduates.

Energy Technology Program graduates are eligible for positions at both REC Silicon and Wind Turbine Tools, though these are generally relatively low-skilled jobs that would not give graduates much opportunity to use their knowledge of energy systems. For instance, graduates would be eligible to apply for "Product Finishing Operator" positions at REC Silicon, which involve handling, sorting, and shipping of finished materials. Similarly, graduates would be eligible for positions assembling and shipping tool sets at Wind Turbine Tools. In total, there may be 15-20 job openings of this type over the next two years, most of them at REC Silicon. Product Finishing Operators at REC Silicon earn \$30-40,000 per year.

## **Energy Efficiency**

There is enormous potential for cost-effective energy efficiency improvements in Montana's residential, commercial, and industrial sectors. The Northwest Power and Conservation Council, which is required by federal law to produce a power plan for the region every five years, found in its 2010 plan that 85 percent of the Northwest's increased electricity demand over the next 20 years can be met with energy efficiency rather than new power plants, and that energy efficiency is by far the least-cost way to meet new electricity demand.<sup>8</sup> The Plan predicts that this increase in energy efficiency could create 3,500 jobs in the energy and energy-services industries in the four Northwest states (Idaho, Montana, Oregon, and Washington) over the next 20 years.<sup>9</sup>

I spoke with several companies that do energy efficiency work in Montana. These included two of Montana's eleven Human Resource Development Councils (HRDCs), which are nonprofit organizations that are responsible for implementing the federal low-income weatherization program. I also spoke to two energy service companies that design and install energy efficiency upgrades for public and commercial buildings: Johnson Controls and McKinstry, both large multinational corporations with offices in Montana. Other companies I spoke with include the consulting firm KEMA and the nonprofit National Center for Appropriate Technology, both of which provide energy efficiency/auditing services funded by NorthWestern Energy. Construction firms that specialize in green building were judged to be

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<sup>8</sup> Sixth Northwest Power Plan, p. 10-4: "The average levelized cost of the efficiency developed in the resource strategy is \$36 per megawatt-hour. The comparable estimated cost of a natural gas-fired combined-cycle combustion turbine is \$92 per megawatt-hour, and Columbia Basin wind costs \$104 per megawatt-hour. Improved efficiency also costs less than the forecast market price of electricity." See <http://www.nwcouncil.org/energy/powerplan/6/default.htm>.

<sup>9</sup> The Sixth Power Plan also projects that an additional 43,500 jobs will be created in the four Northwest states by 2030 as a result of decreased electricity bills, which will allow for increased spending and investment elsewhere in the economy. However, since these jobs will not be created in the energy sector, they are not considered in this study.

beyond the scope of this study, though I did speak with a few firms that do both green building and renewable installations; they are included in the discussion of renewable installers above.

Together, the eleven HRDCs employ about 200 people, most of them energy auditors and weatherization technicians, in their low-income weatherization programs. Combining this with the employees of the other energy efficiency firms I spoke with, I estimate that the energy efficiency industry employs at least 400 people in Montana. This estimate does not include employees of construction firms that specialize in green building. Moreover, most of the energy efficiency companies that I spoke with reported that they are growing, and many of the new positions that become available in the next few years may be of interest to graduates of the Energy Technology Program. In total, there are likely to be 60-100 job openings in this sector in the next two years that Energy Technology Program graduates will be qualified for. Most of these are jobs as Energy Auditors, Installers, and Technicians; examples include Energy Auditor and Weatherization Technician positions with the HRDCs and Energy Auditor positions with KEMA. In most of these companies, starting salaries are in the range of \$25-40,000 per year.

Based on the past experience of the companies I spoke with, jobs in the energy efficiency industry are likely to be very competitive. Several companies reported that they favor applicants with construction experience. Some, though not all, reported that Home Energy Rating System (HERS) rater certification would increase Energy Technology Program graduates' chances of being hired. In general, courses and training in building energy conservation, HVAC systems, and energy auditing principles will enhance students' preparation for jobs in the energy efficiency industry.

## **Utilities and Electric Cooperatives**

There are two investor-owned utilities in Montana: NorthWestern Energy and Montana-Dakota Utilities. In addition, much of rural Montana is served by a network of 26 electric cooperatives. For this study I spoke with NorthWestern Energy and a few of the electric cooperatives.<sup>10</sup> I also spoke with one utility and one electric co-op that serve eastern Washington and northern Idaho (Avista Utilities and Inland Power and Light, respectively), as well as with the Bonneville Power Administration, the federal agency that is responsible for marketing power from the federally-owned hydroelectric dams in the Northwest to wholesale customers such as electric co-ops.

NorthWestern Energy is the largest utility in Montana and has more than 1,000 employees in the state, while Montana's electric co-ops employ an average of about 30 people each. Many utility and co-op employees are nearing retirement, and there will likely be many job openings at these companies over the next decade. However, the vast majority of these positions will be union craftsmen (e.g. linemen and gasmen) that have completed the apprenticeships required to enter those professions, and the majority of the non-craft positions will require engineering degrees or other four-year degrees. Thus, Energy Technology Program graduates will need further education or training in order to be eligible for the majority of utility and co-op positions.

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<sup>10</sup> I did not speak with Montana-Dakota Utilities, since it serves only a relatively small portion of eastern Montana and was judged not to be a major potential employer of graduates of the Energy Technology Program.

In addition to providing energy to their customers, both NorthWestern Energy and many of the co-ops offer energy efficiency and renewable energy programs. Through the Universal System Benefits (USB) and Demand Side Management (DSM) programs, NorthWestern Energy spends nearly \$20 million per year on incentives for renewable energy and energy efficiency. However, only five people are employed in these programs, and those positions require four-year degrees. The majority of NorthWestern Energy's energy efficiency and renewable energy work is contracted out to other firms.<sup>11</sup> At most of the co-ops, one person (at most) is responsible for energy efficiency and renewable energy programs, and few job openings in this area are likely. The possible exception is Flathead, the largest co-op in the state, which has 150 employees total and five in energy efficiency programs. There may be one or two job openings over the next few years in Flathead's efficiency program, and Energy Technology Program graduates would be eligible for these jobs. Similarly, Inland Power and Light, an electric co-op with 112 employees that serves eastern Washington and Northern Idaho, may hire one or two people in its energy efficiency program over the next couple of years. However, these positions are likely to be very competitive, and are typically filled by people with experience in the industry.

Energy Technology Program graduates that are interested in working at NorthWestern Energy without pursuing additional education or training have one other option available to them: the customer service call center, which employs 60-100 people in Butte. Energy Technology Program graduates would likely be strong applicants for the call center positions, particularly if they have computer skills and some knowledge of how utilities operate. Call center positions pay \$25-30,000 per year.

Employment prospects at Avista Utilities, which employs nearly 2,000 people in eastern Washington, northern Idaho, and parts of Oregon, are similar to prospects at NorthWestern Energy. The majority of Avista employees are union craftsmen, and while Avista does have a demand-side management program, there are no entry-level positions in that department. Energy Technology Program graduates would be eligible for positions as customer service representatives and meter readers, which do not require post-high school education.

In addition to electric utilities and cooperatives, I spoke with the Bonneville Power Administration (BPA), which is a federal agency responsible for marketing power from the federally-owned hydroelectric dams in the Northwest. As a wholesale power marketer, BPA sells electricity to electric cooperatives, public utility districts, and municipalities in the Northwest, and operates high-voltage transmission lines in its service territory. BPA has about 3,000 employees, including 70-80 employees in the energy efficiency program. None of the energy efficiency programs are located in Montana, but seven energy efficiency employees work in Spokane, Washington. Energy Technology Program graduates may be eligible for some of these positions, though others require a four-year degree. Energy Technology Program students would also be eligible to apply for BPA's apprenticeship program to train to become linemen, electricians, or substation operators. The apprenticeship program is only open to students enrolled in a degree program in the electrical field, so students that are interested in BPA's apprenticeship program

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<sup>11</sup> Consulting firm KEMA conducts NorthWestern Energy's free energy audit program for residential and small business customers, and the National Center for Appropriate Technology (NCAT) conducts NorthWestern Energy's energy efficiency program for large companies. These firms are included in the energy efficiency section above.

must begin the program prior to completing the Energy Technology degree. BPA hires 10-30 apprentices per year from a pool of 500 applicants.

## **Power Plants / Generators**

I spoke with three large organizations that operate power plants in Montana: PPL Montana, the US Bureau of Reclamation, and the US Army Corps of Engineers. PPL Montana, a subsidiary of PPL Corporation of Pennsylvania, operates most of Montana's power plants, including two coal-fired plants (Colstrip and Corette, accounting for more than 90 percent of Montana's coal-fired generating capacity) and 11 hydroelectric power plants. PPL purchased this generating capacity from the Montana Power Company in 1998 during the deregulation of Montana's power sector. PPL Montana employs 500 people in the state, and much of its workforce is nearing retirement. PPL Montana does not have a department or program focused on energy efficiency. The company anticipates hiring 25-50 workers in Montana in the next two years, and Energy Technology Program graduates would be qualified for entry-level positions as utility workers and operators. These positions require apprenticeships and typically pay \$40-50,000 per year.

PPL Montana hires many of its entry-level employees from the A.A.S. degree programs in Power Plant Technology and Process Plant Technology at the MSU-Billings College of Technology. These programs focus heavily on power plant safety and equipment, and also include training in instrument and control systems. Energy Technology Program students that are interested in careers with PPL Montana are encouraged to take advantage of course offerings on these topics to the extent that they are available at the UM College of Technology.

The US Bureau of Reclamation owns and operates 58 hydroelectric power plants in the western United States, including three in Montana: Hungry Horse in Flathead County, Canyon Ferry in Lewis and Clark County, and Yellowtail in Big Horn County. Many Bureau of Reclamation employees are also nearing retirement, but most job openings with the Bureau require experience in the industry. The best way for entry-level candidates to start their careers at the Bureau is through the Student Career Experience Program (SCEP), through which the Bureau hires students for a one-year mentoring program. Students that complete the program become regular Bureau employees; job titles include Power Plant Operator and Electronics Technician. There will likely be 7-10 openings for students in the Bureau's Pacific Northwest region over the next two years. SCEP is only open to current students, so Energy Technology Program students interested in jobs with the Bureau are encouraged to pursue this opportunity prior to graduation.

Finally, the US Army Corps of Engineers operates 75 hydroelectric power plants nationwide, including three in the Seattle district which encompasses most of Washington, northern Idaho, and western Montana. One of these is Libby Dam in Montana. Like the Bureau of Reclamation, the Army Corps of Engineers does not have many positions for people with two-year degrees; they hire experienced electricians, mechanics etc. to work at the hydroelectric dams, and other positions require four-year or advanced degrees in fields such as engineering. However, a handful of students are hired at the hydroelectric dams each summer, and Energy Technology Program students may be interested in summer positions at Libby Dam.

## **Apprenticeships**

Graduates of the Energy Technology Program may also consider careers in the professions that traditionally deliver energy-related services to residential and commercial buildings, such as electrical contractors, heating and air conditioning contractors, and building contractors. State licensure and union apprenticeships are required to enter many of these fields. For instance, the Montana Electrical JATC offers apprenticeship programs for aspiring electricians, including inside wiremen (who work on commercial and industrial buildings) and residential wiremen. Apprenticeship periods are three years for residential wiremen and five years for inside wiremen, and include both on-the-job and classroom training. Apprentices' salaries start at 45-50 percent of the full journey-level salary, and the percentage increases over time to reach 100 percent upon completion of the apprenticeship. The Montana Electrical JATC will offer Energy Technology Program graduates credit toward completion of the apprenticeship program as a result of their degree; the amount of credit will vary based on the students' coursework and their score on the apprenticeship entrance exam. Students interested in pursuing electrical apprenticeships are encouraged to contact Montana Electrical JATC (see contact information in the appendix).

Other apprenticeship programs that Energy Technology students may be interested in include outside lineman, HVAC (Heating, Ventilation, and Air Conditioning), and carpentry programs. These programs were not investigated in the course of this project, but a few observations will inform further investigation of these opportunities.

First, while the Montana Electrical JATC offers inside wiremen and residential wiremen apprenticeships, it does not offer apprenticeships for a third type of electrical worker: outside linemen. Outside linemen install and maintain transmission and distribution lines, and the outside lineman apprenticeship program in Montana is offered by Mountain State Line Constructors JATC. As discussed above, the Bonneville Power Administration also offers a lineman apprenticeship program.

Second, students interested in energy-efficient and sustainable building practices are encouraged to investigate courses offered by the College of Technology's Carpentry Program, which is delivered through a partnership with the Montana Building Industry Association. Closer collaboration between the Carpentry Program and the Energy Technology Program is recommended to expand opportunities for students in both programs.

Finally, it is recommended that the College of Technology initiate discussions with the HVAC industry to investigate potential opportunities for Energy Technology Program graduates.

## **Internships**

Twenty of the companies I spoke with expressed interest in the Energy Technology Program's internship program. The list below will help guide students toward those companies that may be open to accepting interns. Please note that companies listed here are not committed to hiring interns, and that this is not an exhaustive list of potential internship opportunities for Energy Technology Program students. Company contact information is available in the appendix.

<b>Companies Potentially Interested in Interns</b>	
Renewable Installers	Big Sky Solar and Wind
	Independent Power Systems
	Oasis Montana
	Solar Montana
	Solar Plexus
	Sunelco
	Sustainable Building Systems
Wind Farm Developers/Operators	Naturener
	Montana Wind Resources
Energy Efficiency	Rocky Mountain Development Council
	Johnson Controls
	McKinstry
	KEMA
	National Center for Appropriate Technology*
Utilities/Co-ops/Power Wholesalers	Bonneville Power Administration*
	Missoula Electric Cooperative
Power Plants/Generators	US Bureau of Reclamation*
	Army Corps of Engineers*
Other	Montana Department of Environmental Quality
	Sustainable Business Council

\* Through established internship program; see information on the company website as listed in the appendix.

## Conclusions

Based on my conversations with more than thirty Montana energy firms, I estimate that there will be 150-250 job openings in the state's energy industry over the next two years that graduates of the Energy Technology Program may be eligible for. As shown in the table below, the sector with the largest number of openings is predicted to be energy efficiency. Since these estimates are extrapolated from conversations with a subset of Montana's energy firms, and many firms are unable to predict job openings with confidence, there is significant uncertainty associated with these estimates. Starting salaries for most of these positions are in the range of \$25-40,000, though power plant positions pay slightly more.

<b>Sector</b>	<b>Estimated Job Openings</b>	<b>Sample Job Titles</b>
Renewable Installers	20-40	Installer, Technician
Wind Farms	15-30	Technician
Manufacturing	15-20 *	Product Finishing Operator
Energy Efficiency	60-100	Auditor, Installer, Technician
Utilities/Co-ops	15-30 **	Customer Service Call Center
Power Plants/Generators	30-60	Operator, Utility Worker, Technician

\* The majority of manufacturing positions will be relatively low-skilled jobs that may not allow students to make full use of their Energy Technology Program training.

\*\*In the Utility/Co-op sector, many more jobs are available to graduates that choose to pursue additional training as linemen/gasmen.

Many of these job openings will be highly competitive, and Energy Technology Program graduates are likely to face competition for jobs from more experienced candidates as well as graduates of similar degree programs in Montana. Energy Technology Program management is encouraged to collaborate with other Colleges of Technology in the state to maximize the employability of graduates of all programs. In addition, the following suggestions are designed to enhance Energy Technology Program graduates' likelihood of landing jobs in Montana's energy industry. First, energy companies in all sectors emphasize the importance of basic writing, grammar, mathematics, and interpersonal skills. Beyond this, marketable skills and experience vary by sector and by firm within each sector. For example, the energy efficiency industry tends to value training in building energy conservation, construction experience, and (for some firms) HERS rater certification. Students pursuing positions with renewable installers will be well-served by hands-on experience or training, safety training, and understanding of renewable systems.

In addition, Energy Technology Program graduates can expand their job prospects by pursuing further education or training. Many jobs in the energy sector, particularly at the utilities and co-ops, require training as an electrician or lineman, and graduates that complete apprenticeships in these professions will have additional opportunities available to them. Electrical training may also expand opportunities for students that wish to pursue careers as renewable system installers. In addition, students that obtain bachelor's degrees will find additional opportunities in such sectors as utilities, energy efficiency firms, and renewable component manufacturing, research, and development.

Finally, it is important to note that the estimated job openings shown above are short-term projections and do not consider future policy changes. In the longer term, as state and national policies shift in favor of renewable energy and energy efficiency, Montana's energy sector may expand dramatically. For example, if Montana implements a feed-in tariff (a guaranteed, above-market price for renewable power), the market for renewable energy systems will expand rapidly and, with it, job opportunities in the renewable energy field. Federal climate change and energy policy may also result in a significant expansion of Montana's renewable energy and energy efficiency industries.

## Appendix: Alphabetical List of Companies Interviewed

Avista Utilities

Contact: Kimberly Lukes

PO Box 3727, Spokane WA 99220

(509) 495-2340

[www.avistautilities.com](http://www.avistautilities.com)

Big Sky Custom Solar

Contact: Lee Bowers

PO Box 184, East Helena MT 59635

(406) 439-2838

[www.bigskycustomsolar.com](http://www.bigskycustomsolar.com)

Big Sky Solar and Wind

Contact: Michael Sudik

PO Box 1285, Missoula MT 59806

(406) 360-5148

[www.bigskysolar-wind.com](http://www.bigskysolar-wind.com)

Bonneville Power Administration

Contact: Mary Beth Evans

707 W Main, Suite 500, Spokane WA 99201

(509) 625-1306

[www.bpa.gov](http://www.bpa.gov)

Internship information: [http://jobs.bpa.gov/Just\\_For\\_Students/StudentPrograms.cfm](http://jobs.bpa.gov/Just_For_Students/StudentPrograms.cfm)

Bozeman Green Build

Contact: John Palm

350 Heidner Trail, Bozeman MT 59718

(406) 580-6068

[www.bozemangreenbuild.com](http://www.bozemangreenbuild.com)

Flathead Electric Cooperative

Contact: Ross Holter

2510 Highway 2 East, Kalispell MT 59901

(406) 751-4433

[www.flathead.coop](http://www.flathead.coop)

GT Solar

Contact: Sandy Sept

101 E Front St, Suite 401, Missoula MT 59802

(406) 728-6200

[www.gtsolar.com](http://www.gtsolar.com)

Human Resource Council District XI  
Contact: Jim Wilson  
1801 S Higgins, Missoula MT 59801  
(406) 532-8232  
[www.hrcxi.org](http://www.hrcxi.org)

Independent Power Systems  
Contact: Conor Darby  
810 N. Wallace Ave, Suite A, Bozeman MT 59715  
(406) 587-5295  
[www.solarips.com](http://www.solarips.com)

Inland Power and Light  
Contact: David Driscoll  
10110 W. Hallett Rd, Spokane WA 99224  
(509) 747-7151  
[www.inlandpower.com](http://www.inlandpower.com)

Invenergy  
Contact: Sara Zalno  
1 S. Wacker Dr, Suite 1900, Chicago IL 60606  
(312) 582-1479  
[www.invenergyllc.com](http://www.invenergyllc.com)

Johnson Controls  
Contact: Dan Lee  
(406) 671-8755  
[www.johnsoncontrols.com](http://www.johnsoncontrols.com)

KEMA  
Contact: Taffy Miller  
303 Irene St, Helena MT 59601  
(406) 443-9264  
[www.kema.com](http://www.kema.com)

McKinstry  
Contact: Eric Weckenbrock  
135 W Main St, Missoula MT 59802  
(406) 214-3506  
[www.mckinstry.com](http://www.mckinstry.com)

Missoula Electric Cooperative  
Contact: David Lopez  
1700 W Broadway, Missoula MT 59808  
(406) 541-4433  
[www.missoulaelectric.com](http://www.missoulaelectric.com)

Montana Electrical JATC  
Contact: Mitch Hegman  
2615 Bozeman Ave, Helena MT 59601  
(800) 685-2821  
[www.mtelectricaljatc.org](http://www.mtelectricaljatc.org)

Montana Wind Resources  
Contact: Rhyno Stinchfield  
(406) 651-8898  
[www.montanawindresources.com](http://www.montanawindresources.com)

Montana Department of Environmental Quality  
Contact: Georgia Brensda  
1100 North Last Chance Gulch  
PO Box 200901, Helena, MT 59620  
(406) 841-5240  
[www.deq.mt.gov](http://www.deq.mt.gov)

National Center for Appropriate Technology  
Contact: Dave Ryan  
PO Box 3838, Butte MT 59702  
(406) 494-8644  
[www.ncat.org](http://www.ncat.org)  
Internship information: <http://www.ncat.org/jobs.php#intern>

Naturener  
Contact: Rosaura Velasquez  
394 Pacific Ave, Suite 300, San Francisco CA 94111  
(415) 217-5500  
[www.naturener.net](http://www.naturener.net)

New Horizons Technologies  
Contact: John McBride  
3040 Continental Dr  
PO Box 5000, Butte MT 59702  
(406) 494-4577  
[www.newhorizontech.com](http://www.newhorizontech.com)

NorthWestern Energy  
Contact: John Campbell  
40 E Broadway St, Butte Montana 59701  
(406) 497-3364  
[www.northwesternenergy.com](http://www.northwesternenergy.com)

Oasis Montana  
Contact: Chris Daum  
436 Red Fox Lane, Stevensville MT 59870  
(406) 777-4309  
[www.oasismontana.com](http://www.oasismontana.com)

PPL Montana  
Contact: Christine Shandy  
303 N Broadway, Suite 400, Billings MT 59101  
(406) 237-6913  
[www.pplmontana.com](http://www.pplmontana.com)

Ravalli Electric Cooperative  
Contact: Jim Maunder  
1501 Eastside Highway  
PO Box 190, Corvallis MT 59828  
(406) 961-3001  
[www.ravallielectric.com](http://www.ravallielectric.com)

REC Advanced Silicon Materials  
Contact: Ed Stepan  
119140 Rick Jones Way, Silver Bow MT 59750  
(406) 496-9851  
[www.recgroup.com](http://www.recgroup.com)

Rocky Mountain Development Council  
Contact: Gail Anderson  
200 South Cruse, Helena MT 59624  
(406) 447-1680  
[www.rmdc.net](http://www.rmdc.net)

Sage Mountain Center  
Contact: Chris Borton  
79 Sage Mountain Trail, Whitehall MT 59795  
(406) 494-9875  
[www.sagemountain.org](http://www.sagemountain.org)

Solar Montana  
Contact: Jackson Isbell  
330 Fuller Ave, Suite 1, Helena MT 59601  
(406) 459-9460  
[www.solarmontana.com](http://www.solarmontana.com)

Solar Plexus  
Contact: Lee Tavenner  
1605 Stephens Ave, Missoula, MT 59801  
(406) 721-1130  
[www.solarplexus1.com](http://www.solarplexus1.com)

Sunelco

Contact: Tom Bishop

2086 US HWY 93 N., Suite 130, Victor MT 59875

(406) 642-6422

[www.sunelco.com](http://www.sunelco.com)

Sustainable Building Systems

Contact: Jeffrey Crouch

140 South 4th St West Unit #2, Missoula MT 59801

(406) 541-8410

[www.sustainablebuildingsystems.com](http://www.sustainablebuildingsystems.com)

Sustainable Business Council

Contact: Lisa Swallow

111 N. Higgins Ave, Suite 504, Missoula MT 59802

(406) 243-7810

[www.sustainablebusinesscouncil.org](http://www.sustainablebusinesscouncil.org)

United States Army Corps of Engineers, Seattle District

Contact: Alice Stull

4735 E Marginal Way South, Seattle WA 98134

(206) 764-6833

[www.nws.usace.army.mil](http://www.nws.usace.army.mil)

Student and Intern Positions:

[http://www.nws.usace.army.mil/PublicMenu/Doc\\_List.cfm?sitename=PUBLICAFFAIRS&pagename=Student and Intern](http://www.nws.usace.army.mil/PublicMenu/Doc_List.cfm?sitename=PUBLICAFFAIRS&pagename=Student_and_Intern)

United States Bureau of Reclamation, Pacific Northwest District

Contact: Luz Moreno

1150 North Curtis Road, Suite 100, Boise ID 83706

(208) 378-5160

[www.usbr.gov/pn](http://www.usbr.gov/pn)

Student Career Experience Program information: <http://www.usbr.gov/pn/about/hr/student.html>

Wind Turbine Tools

Contact: Damon Kegel

129 Sucker Creek Rd, Lincoln MT 59639

(406) 362-4449

[www.windturbinetools.com](http://www.windturbinetools.com)