

# **Renewable Energy and Montana Rural Energy Needs**

Testimony of

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# **Renewable Energy and Montana Rural Energy Needs**

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Mr. Chairman, thank you for inviting me today to appear before this committee. I appreciate the opportunity to discuss the role of tax incentives in addressing rural energy needs.

## **Introduction**

Twenty-five years ago the National Center for Appropriate Technology was founded, at least in part, on E. F. Schumacher's philosophy that is often represented by the phrase "small is beautiful." We don't know if Schumacher specifically foresaw the current wave of renewable distributed generation technologies, but we believe he would approve. I am here today to explain why clean, efficient, and economical technologies such as solar electric, solar thermal, wind, and biomass can fulfill the promise of environmental stewardship and ever greater self-sufficiency for individual citizens that Schumacher advocated.

For 25 years NCAT has been serving people—particularly economically disadvantaged people—and bettering lives by promoting and demonstrating appropriate technologies. As just a small sampling, NCAT has weatherized homes, installed solar electric systems, monitored energy use, devised water and energy savings plans, trained agency staff, administered funding for community projects, and helped farmers try new crops and find new markets.

## **The Sustainable Energy Era**

During the last century world population quadrupled, life expectancy doubled, and the world economy expanded by a factor of 17. (State of the World 1999 World Watch Institute) These unprecedented improvements were powered by the harnessing of fossil fuels. However, we are only now realizing the environmental consequences of that dependence on fossil fuels. Although the air pollution impacts of fossil fuel power plants and the biological impacts of dams have been documented for decades, the significance of global warming has been widely accepted only in the last few years. A home, business, or farm that depends less on traditional central power generation and fossil fuels will cause less impact on our environment.

Electric utility restructuring, distributed generation, increasing cost of fossil fuels, and steadily falling cost of renewable technologies suggest that the new century will see a revolution in our energy infrastructure. The restructuring of the electric utility industry has led to a fundamental change in the relationships among providers, regulators, and consumers. Distributed generation technologies such as solar electric, wind, and fuel cells are emerging that allow consumers to generate their own electricity and thereby take more control of their own lives.

In Montana, restructuring of the electric utility industry will likely lead to a 50% increase in electric costs in the Montana Power Company service territory beginning in July 2002. Natural gas costs are expected to remain high or to increase, as that fuel is increasingly used to generate electricity on the national level. The best way for consumers to guard against future cost increases is to reduce dependency on purchased energy. Distributed solar and wind technologies can do just that.

The challenge is to build an economy that can sustain human progress without destroying the world's natural support systems. The shift to an environmentally sustainable economy will be as profound as the shift last century to the hydrocarbon economy.

NCAT's mission emphasizes community-based approaches that promote individual self-sufficiency. For that reason this testimony focuses on distributed small-scale renewable energy technologies

### **Subsidy Imbalance**

The United States has a long history of providing government support for the development of energy resources and the protection of the country's supply of imported fuels. This support has been justified by the importance of energy to our economy and way of life. The pattern of subsidies for traditional energy resources (i.e., coal, oil, gas and nuclear fission) has skewed the energy market against renewable resources such as wind, solar and biomass.

The pattern of support is described by one source as follows:

“U.S. energy subsidies in the mid-1990's totaled \$25 billion (range \$18-\$32 billion), equivalent to \$350 per American household...Of total energy subsidies, fossil-fuels and nuclear energy subsidies amounted to \$21 billion, or 84 percent of the total...U.S. subsidies, like those of Europe, are strongly weighted against non-polluting renewable sources of energy.”

(From Perverse Subsidies: How Tax Dollars Can Undercut the Environment and the Economy, Norman Myers and Jennifer Kent, Copyright 2001, Island Press)

The playing field needs to be leveled. Since it would be politically difficult to remove government subsidies for traditional energy sources, it is important to provide tax incentives to allow renewable technologies to compete in the energy marketplace.

### **Renewable Energy Technologies in Montana**

Self-sufficiency, electric supply reliability, and local economic growth are important reasons why renewable technologies represent an important opportunity for Montana:

*Foster Economic Growth.* Many Montana communities import fossil fuels, such as oil and natural gas, to provide heating, and fuel. Money spent on energy imports is money that the local

economy loses. Energy conservation and renewable energy resources are developed locally. Money invested in conservation and renewable energy resources stays in the local economy creating more jobs. Energy conservation and renewable energy technologies are labor intensive. Jobs evolve directly from the manufacture, design, installation, servicing, and marketing of renewable energy products. The wages and salaries from these jobs provide additional income in the local economy.

*Energy Self-Sufficiently.* The Y2K scare made many electric consumers in Montana realize just how dependent we are on centralized energy systems. Solar and wind technologies can reduce or eliminate that dependency. By reducing the use of centrally supplied energy sources, renewable distributed energy technologies can minimize the impact of cost fluctuations and increases.

*Electric Grid Reliability.* A lack of reliability in the centralized electric supply grid is motivating many homeowners and businesses to install their own electric generation systems to assure continuous power for critical electronic equipment. For most of us, a totally independent energy system is too costly but we can take steps to reduce our use of centrally distributed energy.

*International Competition.* Japan and European countries are aggressively promoting and subsidizing solar electric technologies. The United States runs the risk of falling behind in the world solar development. Kyocera (Japan), BP (Britain), and Schott Engineering (Germany) are foreign companies that have purchased domestic solar electric companies. Developing the domestic solar electric market will foster American solar technology and business.

## **Solar**

Montana has an abundant solar resource that can be used to save energy in residential and commercial buildings, farming, and ranching. Solar technologies that have been implemented in Montana include distributed solar electric systems, solar thermal systems, and passive solar building design. Although these technologies are not new, the current generation of equipment is more efficient, affordable, and reliable than the first generation of twenty years ago.

The USDOE Million Solar Roofs Initiative aims to build momentum in the United States for more widespread use of solar technologies – photovoltaics (the process that energy produces electricity directly from sunlight) and solar thermal panels, which produce heat for domestic hot water, space heating or swimming pools. In the winter of 2000 NCAT sponsored a Million Solar Roofs (MSR) Partnership in Montana that resulted in the creation of the Montana Renewable Energy Association.

The core membership of the organization is the Montana solar businesses. The Montana Renewable Energy Association is working to promote the implementation of a quality solar, wind, and micro-hydro installations. By boosting confidence in and demand for solar energy systems, the association hopes to lower the cost of these technologies, making them accessible to more people.

The solar resource in Montana is more than sufficient to support a vibrant solar industry. Eastern Montana receives an annual average of 5 hours of full sun; Western Montana receives an annual average of 4.2 hours. Insolation in Montana cities compares favorably with insolation in other locations that are encouraging solar energy technologies, such as Sacramento, California and Madison, Wisconsin. Following are insolation levels for several cities:

<u>Insolation</u>	<u>kWh/m<sup>2</sup>/year</u>
Billings, MT	1461
Helena, MT	1396
Missoula, MT	1325
Madison WI	1382
Sacramento CA	1741

Solar electric (photovoltaic) and thermal systems are mature, proven technologies already working at many sites in Montana. Solar electric systems convert sunlight directly to electricity. While off-grid solar electric applications are often cost-effective in today's market, utility-interactive solar electric systems currently produce electricity that is two to three times the cost of grid-supplied power.

Solar electric system costs have dropped at least ten-fold since 1970. NCAT's Residential Solar Electric Demonstration Project, funded by the Montana Power Company Universal System Benefits Program, has installed 40 one-kilowatt residential grid-connected systems in a two-year period. In addition, 15 schools in the Montana Power Company service area have been equipped with two-kilowatt systems. The cost of electricity produced by these systems is 24-25 cents per kWh. Grid-connected solar electric systems are not strictly cost effective versus conventional electricity, but owners place value on other characteristics of solar generation. These characteristics include environmental benefits, self-sufficiency, and reliability. The promise of solar can only be achieved if the markets develop with a sales volume great enough to drive costs down.

Montana homeowner interest in solar electric systems is high. The initial newspaper notice for the Residential Solar Electric Demonstration project drew over 800 initial responses. Over 130 homeowners completed a lengthy form in hopes of purchasing a \$10,000 solar electric system for half price.

NCAT has also been involved with several applications that utilize solar electric systems to assist stock watering. Often the stock-watering applications also benefit fish habitat by getting the cattle away from the streams. We have demonstrated this in several ranches in central and western Montana.

Solar thermal panels produce heat for domestic hot water, space heating or swimming pools. Of these applications, solar water heating offers the greatest potential. In the cold Montana climate the year-round solar hot water systems must be protected from freezing. The technology exists that can do just that. But doubts linger in the minds of consumers and consumer interest in this technology lags behind solar electric in Montana. A typical closed loop drain-back all-season water heater will cost between \$3,000 and \$4,000. Such as system in Montana could provide

about half of the hot water needs for a family of four. For a Montana Power Company customer the system would just pay for itself over its life of 15 years.

Features can be designed into buildings to collect and store solar energy for space heat. This design approach is often called solar tempering or passive solar. With knowledgeable design this approach can reduce building space heating energy consumption significantly.

Recently the Montana legislature took steps to promote renewable energy in the State. Senate Bill 506, sponsored by State Senator John Cobb (R-Augusta), is an act amending the laws relating to alternative energy and other energy systems. Among other provisions the bill provides a revolving loan fund to finance alternative energy systems, eliminates business property taxes on certain generating equipment, providing a five-year abatement of business property taxes on small generating equipment, and establishes an alternative energy revolving loan account, to issue low interest loans, up to \$10,000 for 5 years. Aimed at residences and small businesses. Although this legislation is a step in the right direction, its scale of support is not by itself adequate to stimulate the renewable industry in Montana.

## **Wind**

There is a stampede in Montana to develop wind energy. There is good reason for this enthusiasm as the state alone has enough potential energy from windy areas of class 4 and higher to supply 15% of the total 1990 electricity consumption of the 48 contiguous states. (Wind Energy Potential in the United States, D.L. Elliott and M.N. Schwartz, September 1993. PNL-SA-23109. Richland, WA: Pacific Northwest Laboratory)

However, the economic viability of wind power will vary from site to site and utility to utility. Important factors include system size seasonal production matching loads, transmission and access constraints, public acceptance, and other technological and institutional constraints.

In Montana wind is being developed at a wide range of scales. A proposed wind farm on the Blackfeet Indian reservation is projected to produce electricity that is competitive with conventional sources. For wind farm applications the cost of generating the electricity is only half of the total cost which includes transmission and ancillary services such as load following and scheduling. Current projections suggest that Montana wind farm power will cost about 6 cents per kWh. The federal production tax credit for wind is critical for the continued development of wind farms in Montana.

Distributed wind machines, because they are located at the point-of-use do not incur the transmission and ancillary costs. However there is a significant economy-of-scale to wind power. Generally, electricity generated from smaller machines will cost more. For small scale wind applications (less than 50 kilowatts capacity) the range of electricity costs is 7 to 15 cents per kilowatt-hour.

A number of irrigators in the Livingston area are contemplating installation of net-metered wind power systems of 50 kilowatts capacity. NCAT's Small Scale Distributed Wind Program, again

funded by the Montana Power Company Universal System Benefits Program, will see about 80 kW of wind generation in 10 kW or smaller machines. The cost of wind power varies with the wind machine size and the site specific wind resource.

Some ranchers are beginning to look at wind power generation as a potential cash crop to augment agricultural income. The economics of such ventures will depend on the issues such as access to transmission lines noted the discussion above regarding wind farms.

## **Biomass**

Biomass is an attractive energy source. It provides the opportunity for local and regional, energy self-sufficiency. Energy from appropriately developed biomass technologies does not have the negative environmental impact associated with non-renewable energy sources. The term “biomass” usually includes agricultural sources, animal wastes, wood waste, and forest waste. Transportation fuels derived from biomass are termed “biofuels” such as ethanol and biodiesel. The key to accessing the energy content in biomass is converting the raw material (feedstock) into a usable form, which is accomplished through combustion, or biochemical or thermochemical processes.

The nation’s potential biomass resource is great enough to meet a large part of our energy needs and holds significant potential for Montana. While NCAT supports the concept of developing energy from biomass, the scale of the resource in Montana is not clear. A major issue is the cost of competing fuels. We are aware of the significant U.S.D.O.E. research programs to determine and develop the most effective processes for converting biomass to energy and in developing hardy, high-yield crops that are designed for use as feedstocks for biofuels.

To date, growing agricultural products solely for energy production has not been cost effective. Waste products of agricultural and wood products industries do offer significant potential for affordable applications. However it is unclear whether there is sufficient wood product waste to make dedicated power generation facilities feasible. Wood waste is already used by the wood products industry to produce steam, electricity, and wood pellet fuel.

The promise of energy resources and economic activity in Montana warrants tax incentives to stimulate biomass development in the state. However, we are cautious about the potential harm to the Montana if forest wastes are collected with the purpose of energy production.

## **Tax Credits for Renewable Energy**

NCAT supports tax initiatives such as investment and production tax credits that will stimulate the fledgling renewable energy industry. We believe that distributed renewable energy is keystone of a sustainable economy. However, the key is how to stimulate the market without skewing it.

The Montana Renewable Energy Association has discussed the issue of tax breaks and the reaction has been mixed. Tax breaks might be a good place to start in promoting solar, but the group agreed that tax breaks have limited value and can backfire if the industry infrastructure does not include reliable dealers and installers who can service installed systems. While the solar industry in Montana is healthy and growing, too great an incentive could do more harm than good.

Mike Strickland, co-owner of Dearborn Electric, favors tax incentives. "I don't think there's anything priming the pump right now," he said. Strickland suggested that tax breaks might encourage the market he services: users of small systems (2-4 panels) in remote areas off the grid.

Obviously tax credits can differ in their amount and their target audience. Production tax credits are intended to encourage corporations/businesses to produce or manufacture a sustainable energy commodity. Residential and property tax credits are directed towards consumers and building owners.

Most observers believe that experience with tax credits has been mixed. Production credits have greater accountability and are easier to administer, while credits for residential solar water heaters and photovoltaic systems have been more problematic in both their impact and operation.

The success of tax credits can be increased by not limiting the credit to a fixed period. Instead the credit should be allowed to continue indefinitely. Licensing or certification for qualifying suppliers and installers should also be part of any tax credit program as a way to assure quality installations.

## **Conclusions**

- NCAT supports tax initiatives such as investment and production tax credits that will stimulate the growing renewable energy industry. We believe that distributed renewable energy is a keystone of a sustainable economy. However the key is how to stimulate the market without skewing it. Over-zealous tax incentives are not a good idea. That is a lesson we learned 20 years ago.
- During the 1970s and 1980s, Montana established a strong renewable energy tradition, focused on demonstration and outreach programs managed by the Montana Department of Natural Resources and Conservation. With the repeal of federal solar tax credits and the ending of the state renewable energy grant program, interest in renewable energy declined. This "boom and bust" approach to government support of renewables should not be repeated.
- We realize that there are pitfalls connected with tax incentives and that these need to be developed sensibly and cautiously, but it's urgently important that we develop these incentives, given the importance of renewable energy to rural areas and the current unbalanced situation where government incentives are stacked against renewables.



- We believe that the production tax credit should be expanded to include to other renewables such as biomass and solar energy. The production tax credit should also be made permanent or have a lifetime of at least five years.
- The major national energy policy issue should not be how to expand the production of fossil fuels but rather how to build a sustainable economy based on renewable energy sources. Admittedly, a sustainable energy economy cannot be created overnight, but the transition to renewable energy sources and conservation should begin now with strong steps to eliminate the imbalance of government subsidies.
- The future of renewable distributed electric generation in Montana and the nation will depend on a number of related issues such as interconnection standards, net-metering provisions, interconnection fees, consumer protection, and incentives such as production and investment tax credits. Tax credits are just a one of many key policy initiatives that must be implemented.
- NCAT has been fortunate to participate in a number of solar and wind energy demonstration projects. The interest in distributed solar and wind energy in Montana is strong and growing daily.
- NCAT has for 25 years advocated that homes and businesses strive toward self-sufficiency. This is a theme that resonates in rural Montana. Energy efficiency and distributed renewable energy resources can empower our homes, ranches, farms, and businesses to minimize our susceptibility to the price fluctuations that appear endemic to the market-driven fossil fuel economy.

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