Michigan Renewable Energy Program:

Annual Report to the Michigan Public Service Commission

November 18, 2003
(Corrected Version: September 2004)

Case No. U-12915

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Acknowledgements

Commission staff would like to thank all those who participated in the collaborative process and development of this report. A number of representatives from utility, education, advocacy, technology, and renewable energy generation organizations, as well as staff members and other state agencies, were imperative to the completion of this initiative during the last year. Their hard work, dedication, expertise and cooperation during sometimes difficult discussions were invaluable.

1 Executive Summary

Renewable energy is poised to provide significant benefits to Michigan by delivering increased energy efficiency, reliability, and security, economic development, employment retention and attraction, and improved environmental quality. Recent natural gas price increases could be mitigated, at least in part, by deploying cost-effective renewable energy systems to help displace fossil fuels and diversify supply portfolios. Renewable energy systems can augment utility system reliability and security by diversifying energy supplies and decentralizing energy facilities. Renewable energy has proven to be an important and rapidly growing segment of the energy industry, worldwide and across the nation. A focus on the increased use and development of renewable energy resources in Michigan is already a priority of state policy-makers, as demonstrated by the establishment of Michigan's NextEnergy program, beginning in 2002 (www.nextenergy.org).

Though Michigan's renewable resources are not profuse compared to some other states, wind, solar, and hydrological resources can be used effectively if properly developed and managed and technological advancements are continually improving the prospects of additional renewable energy development. Expanded renewable energy production will result in economic development and employment. Farming and rural communities, especially, can benefit from energy generated from agriculture and forestry wastes and by leasing land to wind energy developers. In addition, Michigan should build on its inherent expertise in manufacturing and technology development to support new renewable energy technologies, both for use in meeting our own state's energy needs and as a potential export industry of great worldwide significance.

The state legislature recognized the benefits of renewable energy by directing the Michigan Public Service Commission in Section 10r of Public Act 141 of 2000 [MCL 460.10r], Michigan's Customer Choice and Electricity Reliability Act, to establish the Michigan Renewables Energy Program (MREP). The Commission, in turn, directed its Staff to establish an MREP Collaborative to analyze various regulatory and policy options with the goal of promoting the use and development of renewable energy in the state. This staff report is a result of those activities.

Some MREP Collaborative participants have been renewable energy advocates for 20 years or more. It is interesting to note that some of the policy ideas and initiatives considered by the Collaborative have been deliberated since the energy crises of the 1970s and 80s, but few programs to support renewable energy for Michigan have been enacted, and some that were enacted were short lived. Several MREP Collaborative members believe that adding more renewable energy to Michigan's energy portfolio will result in increased energy security and improvements for the environment and the overall health of Michigan citizens. They ask that state decision-makers not wait until the next crisis is upon us to take action in this area.

The crux of the difficulty in forming consensus through the MREP Collaborative, however, has been some fundamental disagreements about acceptable approaches to renewable energy policy formulation. Recent changes in the structure of Michigan's electric utility markets have created a situation characterized by: (1) modest public resources to support renewable energy research and development or demonstration projects; (2) utilities hesitating to expend resources or increase customer rates to support renewable energy, in part because of a fear that any additional costs might jeopardize their competitive position; and (3) alternative electric suppliers (AESs) not yet indicating interest in bringing renewable energy products to market.

Generally, Michigan's renewable energy advocates, environmentalists, and renewable energy suppliers and producers are seeking at least some public policies that will lead emerging markets to procure additional in-state renewable energy supplies in the near term. On the other hand, generally some customer group representatives and utilities are of the mind that no actions should be taken that will raise the cost of utility service, unless it is through the specific, voluntary choices of customers who agree on their own volition to pay higher prices for renewable energy. As long as renewable energy purchases remain above the cost of energy delivered through the utilities' existing rate-base, these customer representatives and utilities are disinterested in the production or purchase of any additional renewable energy.

The MREP Collaborative identified barriers to renewable energy development in the current regulatory environment and market structure. The most prominent of those, as alluded to above, is cost. In today's competitive market, renewable energy technologies that cost significantly more than traditional power sources will not experience major development, without some form of public policy support. Other prominent barriers include the NIMBY ("Not In My Back Yard") resistance to local siting of some renewable energy projects,[1] transmission constraints and current operating practices, and the structure of current energy prices and utility rates.

The MREP Collaborative explored two major policy options for expanded renewable energy developments that would focus largely on the roles of Michigan's regulated electric utilities. These included net metering legislation, with some proposed alterations to the bills already introduced in the Michigan House of Representatives, and an increased emphasis on voluntary customer-supported green pricing programs.

In addition, the Collaborative developed several recommendations to encourage greater renewable energy use irrespective of market structure. Those include: energy education; continued cooperation and collaboration with other like-minded interest groups; advanced development and expansion of the MREP Web site; improved renewable resource assessments and developmental research; use of renewable energy to serve State facilities; investigation of innovative financing options; and development of a renewable energy certification system that could include provisions to help industry to most economically meet required or voluntary emissions reductions.

This first annual report to the Commission on the MREP highlights several recommendations for the Commission and Legislature. These recommendations represent Staff's current thinking on policy and programmatic approaches to enhance renewable energy development in Michigan. It should be understood that these recommendations do not necessarily reflect the consensus of all members of the MREP Collaborative.

The first is education initiatives. Educating the public, school children, and encouraging curriculum development in state universities will go far to increase consumer interest and support for renewable energy (see Section 7.2).

Second, an in-depth exploration of innovative financing options, followed by implementation of the most promising approaches. Lower cost financing would significantly reduce the cost of renewable energy (see Section 7.8).

[1]See Section 6.2.

Third, net metering, especially for agricultural customers, will give customers an incentive, in the form of savings on their energy bill, to invest in on-site generation. Michigan farmers are increasingly aware of the prospect of solving multiple problems by converting agricultural and animal wastes into energy resources and other useful byproducts. Increasing the price that farmers are paid for energy they generate could serve as an important motivator for investments that can produce useful renewable energy and improve Michigan farms (see Section 7.5).

Fourth, staff recommends state facilities actively participate in renewable energy growth by agreeing to purchase a percentage of power from renewable sources, for facilities owned and operated by the state government (see Section 7.7). Staff believes this objective can be accomplished through mechanisms that combine modest levels of renewable energy purchases with improved energy efficiency, so that the State's utility bills would be reduced and not increase as a result of this effort. Furthermore, Staff believes this objective can be accomplished through creative financing mechanisms that would reduce, not increase, State expenditures.

Finally, implementation of an initiative such as a Renewable Portfolio Standard (RPS, Section 8.1), which would compel all Michigan electric suppliers to participate in renewable energy growth, even in very small amounts, or the Staff proposed Generic Framework for Michigan Utility Green Pricing Programs (Section 8.3) would greatly facilitate progress towards the goal of increasing renewable energy use.

This report is comprised of the following subject areas:

- Section 2 is an introduction to the Michigan Renewable Energy Program (MREP).
- Section 3 describes existing renewable energy use in the state, including current green power offerings of Michigan utilities.
- Section 4 reviews the Collaborative process, implemented to investigate means to promote renewable energy and create this report.
- Section 5 contains the report of Michigan renewable energy production and consumption requested by the Commission in its Orders in Case No. U-12915.
- Section 6 includes a discussion of various barriers to renewable energy growth and suggestions about how to best address those barriers.
- Section 7 details recommendations for renewable energy promotion in the state, for areas where there was a good deal of consensus among MREP Collaborative members.
- Section 8 reviews other policy and legislative options that did not receive consensus approval on the part of MREP Collaborative members but are recommended for consideration by MPSC Staff.

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2 Introduction

The Michigan Renewable Energy Program ("MREP") was established under legislative directive contained in Section 10r(6) of the Customer Choice and Electric Reliability Act, 2000 PA 141 ("Act 141"). Section 10r(6) directs the Michigan Public Service Commission ("Commission" or "MPSC") to establish the MREP: (i) to "inform [electric service] customers of the availability and value of using renewable energy generation and the potential for reduced pollution, and (ii) "designed to promote the use of existing renewable energy sources and encourage the development of new facilities." MCL 460.10r(6). Act 141, Section 10g(1)(f) defines "renewable energy source" as "energy generated by solar, wind, geothermal, biomass, including waste-to-energy and landfill gas, or hydroelectric." MCL 460.10g(1)(f). An earlier statute, MCL 460.6d(2) defines "renewable resource power production facility" to include certain electric energy production from sources using "biomass, waste, wood, hydroelectricity, wind and other renewable resources, or any combination of renewable resources, as the primary energy source."

On April 17, 2001, the Commission issued in an order in Case No. U-12915, initiating a proceeding and requesting comments on (1) the Staff proposal dated December 14, 2000, (2) design and implementation of the MREP, and (3) the appropriate performance measurement for the program.[2] On May 16, 2002, the Commission issued another order in Case No. U-12915 ("May 16, 2002 Order"), directing the MPSC Staff ("Staff") to initiate an MREP Collaborative, representing the interests of all affected persons, to assume policy analysis and recommendation functions. The May 16, 2002 Order includes discussion and findings by the Commission on certain matters addressed in comments previously submitted by various interested parties. The Commission directed Staff to work with organizations interested in renewable energy development in Michigan and address matters such as education, recommendations for incentives to promote renewable energy development and use, net metering, green tariffs, and interconnection issues. The Order further directed Staff to prepare an annual report that includes a summary of proposed legislative actions and recommendations, as well as statistics on renewable energy use and production in Michigan and other factors that will permit the Commission to monitor progress on the statutory mandate to educate consumers and promote the use of renewable energy.

The Commission issued an additional order on August 18, 2003, directing Staff to complete and submit this first annual report on MREP by November 18, 2003. Staff submits this report in response to the Commission's directive, based on its review and the input received through the MREP Collaborative process so far.

[2] See http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=12915, document number 0001.

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3 Existing Use of Renewable Energy in Michigan/Utility Green Power Tariffs

3.1 Overview

This report focuses on renewable energy from the following sources, consistent with the definitions of "renewable resources" found in 2000 PA 141, Section 10g(1)(f) [MCL 460.10g(1)(f)]: biomass, including waste-to-energy and landfill gas, solar, wind and hydroelectric. Geothermal energy, considered to be a renewable resource nationally, is not an electric generation option in Michigan.[3] Other technologies, which may be considered "green" energy due to environmental characteristics, or provide benefits from enhanced efficiency and conservation, were discussed in the Collaborative. This report focuses on the defined "renewables" using natural forces or processes in place of fossil fuels for generation. The discussion below will address the benefits of these other technologies as part of a larger strategy to promote efficiency and a clean environment.

Renewable energy represents less than 3% of the total electric generation in Michigan, most of this coming from relatively large hydroelectric and biomass facilities. The hydroelectric generating capacity has been in place for many years; for example the hydroelectric plants at the Soo Locks operated by the U. S. Army Corps of Engineers and Edison Sault Electric Company are over 50 and 100 years old, respectively. Although hydroelectric power is a small part of the total state electric generation (about 451MW total hydro capacity), for Edison Sault it provides enough energy to serve about 16,000 residential customers in the Eastern U.P. and meet 35-40% of that utility's annual power requirements. Otherwise, renewable energy in Michigan consists of about 481 MW of biomass capacity and very small amounts of solar (0.077 MW) and wind (2.4 MW) capacity. Table 1: Michigan and U.S. Electric Generation by Fuel Type shows the current mix of electric generation by fuel type in Michigan and nationally.

Significant new renewable energy facilities have not been developed in Michigan due primarily to the cost differential between those facilities and more conventional fossil fuel facilities. Lack of need for new capacity of any type is also a consideration. This is slowly changing as some of the renewable industries, particularly wind power, improve and become more cost-competitive. Large-scale solar electric production is not likely to be a significant renewable resource in Michigan in the near future due to the cost difference and the limited sunlight. New hydroelectric capacity development is limited by the lack of new, undeveloped sites and the environmental problems associated with fish and wildlife habitat. Wind and biomass appear to be the most favored options among the renewable energy technologies, considering the type of resource that might be constructed in the state. Green "tagging" and renewable energy credits in a developing multi-state market may provide the ability to contract for renewable energy from distant locations, however.

[3] To be classified as "geothermal" for some federal energy programs, the temperature of a resource underground must be a minimum of 122 degrees F. By this definition, Michigan does not have any geothermal resources. However, vendors of water source or ground-coupled heat pumps frequently refer to their products as "geothermal", even though their sources of heat in the ground in Michigan typically range between about 45 and 55 degrees F.

Table 1: Michigan and U.S. Electric Generation by Fuel Type

Fuel Type	Michigan	United States
Coal	62.6%	51.0%
Nuclear	23.3%	20.1%
Natural Gas	10.2%	17.2%
Renewable Power*	2.5%	2.1%
Petroleum	0.8%	2.8%
Hydro	0.6%	6.8%

Source: Data compiled from Electric Power Monthly, September 2003 with data through June 2003, available at http://tonto.eia.doe.gov/ftproot/electricity/epm/02260309.pdf.

*The Energy Information Administration definition of Renewable Energy includes: wood, black liquor (from paper manufacturing), municipal solid waste, landfill gas, sludge waste, tires, agricultural byproducts, biomass, geothermal, solar thermal, photovoltaic, and wind.

3.2 Detailed Description of Programs

Green tariff programs are currently in place at Consumers Energy, Detroit Edison, Edison Sault Electric Company, Lansing Board of Water and Light, Traverse City Light and Power, Upper Peninsula Power Company, We Energies and Wisconsin Public Service. A description of each program follows.

3.2.1 Consumers Energy

In July 2001, the MPSC approved an experimental Green Power Program for Consumers Energy. This program authorized Consumers Energy to contract with eligible renewable generators to supply energy to customers willing to pay a premium for cleaner energy. About 500 customers currently participate. The energy for the programs is provided by Bay Windpower, LLC, from two wind turbines located near Mackinaw City, each rated at 900 kW, which constitute the largest wind project in Michigan. Both the program and the enrollment process are easy for customers to understand and deliveries of green energy have roughly matched customer demand. Participating customers pay a surcharge based on the percentage of green power they choose as follows: $0.0032 per kWh (for 10%), $0.016 per kWh (for 50%) and $0.032 per kWh (for 100%).

Consumers Energy Green Power Pilot Program Purchases by Participating Customers and Supplier Deliveries (2001-2003)		
Year	Annual Customer Purchases (kWh)	Supplier Deliveries (kWh)
2001	0	263,015
2002	3,298,687	2,583,892
2003 (though August)	1,659,593 (total)[4]	1,641,816

3.2.2 DTE Energy

The Commission approved a rider for solar photovoltaic service for DTE Energy in July 1995 with customer subscriptions in increments of 100 watts (a $6.59 increase in each monthly electric bill). The program, named SolarCurrents®, was designed to test the market for solar electric service when the cost of solar equipment would decline to the $3 per watt projected by the solar industry to occur in the year 2000. The 28.4kW solar installation was subsidized by a grant from the U.S. Department of Energy in the amount of $4.00 per watt installed, bringing the net installed cost to approximately $3.60 per watt. The 28.4kW solar electric facility was subscribed by 194 customers spread across 87 communities in southeast Michigan, who purchased solar electric service ranging from 100 watts to 700 watts of capacity. Some customers increased their electric bill by as much as 100 percent through their participation in SolarCurrents®.

Even after several significant marketing initiatives, participation slowly declined and inclusion of the solar electric service tariff in the company's rate book mailed to its customers failed to generate enough interest to keep the program fully subscribed. In 2002, Detroit Edison suspended offering the program (and entering into its 2 year service contracts) because the cost of solar arrays had failed to decline as rapidly as the subsidy had declined. In December 2002, Detroit Edison notified its 165 remaining solar electric service customers that the program would be discontinued effective December 31, 2003.

	2000	2001	2002
Capacity Sold[5]	35,142 W	29,042 W	21,933 W
Total Usage[6]	5,599,438 kWh	3,692,838 kWh	1,384,958 kWh
Solar Generated[7]	103,313 kWh	67,011 kWh	53,064 kWh

[4] Customer purchases include 1,198,158 residential, 123,748 commercial, and 337,687 industrial.
[5] The amount of watts contracted by the solar customers
[6] The total electric consumption of the solar customers
[7] The amount allocated to solar customers and based on their solar capacity contracts (no PSCR applied)

3.2.3 Lansing Board of Water and Light

The Lansing Board of Water & Light (BWL) launched a renewable energy program in July of 2001. Marketed under the name GreenWise Electric Power®, the portfolio includes a total of one megawatt of electricity produced from renewable energy generators. Half the supply is from two small hydroelectric plants owned by Tower Kleber in Cheboygan County and the other half is from landfill gas provided by Granger Electric in Lansing.

Both power providers were required to be certified by the Michigan Independent Power Producers Association, based on criteria developed by a panel of ten state and local environmental organizations. The certification process included an audit of each facility based on PURPA's definition of "Small Power Production Facility," review of emissions and any environmental violations, and verification of fuel type and amount of power available.

The GreenWise Program allows customers to purchase 250-kilowatt-hour blocks of capacity for $7.50 per month (which equates to an additional $0.03 per kWh). There are a total of 2742 "blocks" of energy available through the program (a total of one megawatt). Sales fluctuate between 700-740 blocks, or approximately 25-27% of the renewable energy purchased. Participation has been greater in the residential sector (84% of participating customers) compared to the commercial sector (16%).

3.2.4 Traverse City Light and Power

In 1996, Light & Power became the first Michigan municipal electric utility to install a utility scale wind turbine. At the time of construction, with a blade diameter of 144 feet on a 160-foot tower, the windmill was the largest operating wind turbine in the country. It produces about 800,000 kW-hours of electricity a year, which meets the needs of the 125 residential and business customers on Light and Power's green rate. Electricity costs about 5.5 cents per kW-hour in a moderate wind regime of about 14.5 mph annual average winds at hub height. With the federal production incentive of 1.5 cents per kW-hour and the customer premium of 1.58 cents per kW-hour, this makes the cost of electricity from the wind turbine the same as the other power purchased by the utility on a wholesale basis. The typical TCLP green tariff customer pays a monthly premium of approximately $7.85.[8]

Year	Net kWh Generation from Windmill	Percent of Total TCLP Generation
2000	754,452	0.27%
2001	857,792	0.24%
2002	895,800	0.30%

[8] http://69.5.21.200/docs/wind_brochure.pdf.

3.2.5 We Energies

"Energy For Tomorrow" green tariff program is one of the largest and most successful programs of its kind in the nation as ranked by the U.S. Department of Energy's National Renewable Energy Laboratory. To date, We Energies has focused their renewable efforts in Wisconsin where they have 11,000 customers (approximately 1% of the customer base). Very few Michigan customers are currently participating (around 27 participants, or 0.1% of Michigan customers) but the numbers are expected to increase with the launch of a Michigan specific marketing campaign in October 2003 using CHOICE education funds as approved by the Commission in Case No. U-12099.

Energy for Tomorrow customers pay a premium of 2.04 cents /kWh for 100% for green power: 1.02 cents/kWh for 50%, and 0.51 cents/kWh for 25%. Business customers can also nominate to purchase green blocks of 100 kWh each, for an adder of 2.04 cents/kWh for the lesser of nominated or consumed.

3.2.6 Wisconsin Public Service Corporation

WPSC has a voluntary renewable energy program called NatureWise, implemented in Wisconsin in April of 2002 and in Michigan July of 2003. Due to the recent Michigan implementation, there are not many customers currently participating. Each 100kWh block costs a premium of $2.65 above the normal cost of electric service from WPSC. Customers can purchase as many blocks as they choose and can discontinue at any time. The renewable power comes from wind turbines located in eastern Wisconsin, power purchased from a local farmer that generates electricity from onsite manure via an anaerobic digester, and power purchased from landfill gas facilities. See www.wisconsinpublicservice.com/home/naturewise.asp.

3.2.7 New Green Power Tariffs – MEGA Companies

MEGA member electric utilities collected funds under the CHOICE education program approved by the Commission in under Case No. U-12133.[9] In addressing the refund of these funds due to lack of alternative electric suppliers in the market, the Commission encouraged these companies to develop renewable energy offerings and use some of the funds to promote renewable energy. [10] Edison Sault Electric Company filed an application to implement an experimental renewable energy rider in Case No. U-13850;[11] approved on August 26, 2003. This is a voluntary green pricing program and a portion of the CHOICE education funds will be used to promote it. Upper Peninsula Power Company and Wisconsin Public Service Corporation recently implemented a voluntary green pricing program called NatureWise; however, these companies elected to refund all of the CHOICE funds. American Electric Power is in the process of implementing a voluntary green pricing program and retained a portion of the CHOICE funds to promote it.

[9] http://www.cis.state.mi.us/mpsc/orders/electric/2001/u-12133c.htm
[10] http://www.cis.state.mi.us/mpsc/orders/electric/2003/u-12133e.htm
[11] http://www.cis.state.mi.us/mpsc/orders/electric/2003/u-13850_08-26-2003.htm

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4 MREP Collaborative Process

As a result of the May 16, 2002 Order, Staff invited all who submitted comments in the case to an initial meeting to discuss the most effective way to structure the Collaborative. This resulted in participation of a diverse group of individuals and organizations with knowledge and experience in energy production, technology, education, and policy development. The initial Collaborative meeting was held in July of 2002 with representatives of utilities, renewable energy producers, equipment manufacturers, renewable energy advocates, architects, engineers and educators. The group decided to form smaller, separate working groups to handle the following subject areas: education and communication, ratemaking, wholesale marketing, retail marketing, definitions, policy and program research, and technology. A steering committee, made up of two members from each working group, was formed to coordinate the effort.

The working groups met several times during the subsequent months and discussed an array of topics within their subject responsibilities. Due to varying viewpoints of the representatives, the meetings resulted in identification and clarification of issues rather than much consensus opinion regarding state or Commission policy. Further discussions among Staff and Collaborative participants were held at the Commission offices during the fall of 2003 to plan the form and content of this Staff report, and draft versions of this report were available to all MREP participants, whose comments and suggestions for input were invited. It was agreed that the report does not represent a consensus position of all participants and that MREP Collaborative participants are not bound in any way by the information or recommendations presented in this report. Instead, this is a Staff report that presents a summary of the subjects reviewed by MREP Collaborative work groups, and Staff's assessment of possible recommendations or policy issues for the Commission to consider. The remainder of Section 4 gives a brief synopsis of the different working groups and the subjects they addressed.

4.1 Education and Communication Working Group

A number of specific tasks from the May 16, 2002 Order were undertaken by the Education and Communication Working Group. These included: public education; building the MREP Web site; creating an email distribution list to encourage communication about renewable developments and events; possible participation in the CHOICE advisory council that was created to educate customers about electric restructuring (this initiative was ended in April 2003[12]); encouraging development of renewable energy technical education programs at Michigan institutions of higher education; incorporating electricity supply disclosure rules into the education process (see Case No. U-12487[13]); and examining possible means of certifying installers and inspectors for systems interconnected with the grid.

To date, no funds have been allotted to the MREP for any type of education initiative. However, some private and non-profit organizations have participated in education programs at various levels. Conferences, town hall meetings, K-12 education programs and initiatives at institutes of higher learning are held sporadically throughout the state, a sign that Michigan businesses and residents are interested in learning about renewable energy (see Appendix B) for more information on these activities. Such initiatives should be evaluated for effectiveness and those that are successful should be utilized for future program development. See Section 7.2 for current renewable energy education efforts.

[12] http://www.cis.state.mi.us/mpsc/orders/electric/2003/u-12133e.htm.
[13] http://www.cis.state.mi.us/mpsc/orders/electric/2001/u-12487d.htm.

4.1.1 General Public Education

Education is an issue that stakeholders generally agree will aid in renewable energy market development. Group members identified the target audiences as energy consumers, school children, businesses, farmers, and institutes of higher education. As Michigan consumers understand the security benefits of reducing dependence on foreign sources of energy, the health benefits of reduced pollution, and the opportunity to reduce energy costs in their homes, they will be more likely to support initiatives that promote renewable energy development and make that support known to their respective government officials. Special attention should focus on groups of consumers, such as farmers, who may find additional benefits to renewable energy in the form of production of crops for processing into biomass fuels, land leases for wind and/or use of farm waste products to generate their own electricity. MREP recommendations for public education can be found in Section 7.2 of this report.

4.1.2 K-12 Education

Beyond general public education, the working group recognized the importance of introducing renewable energy to school children so they learn the role of these resources in a healthy environment and strong economy. Several group members are or have been involved in activities to that end but a more centralized effort and state support would make these programs more effective.

4.1.3 Post-Secondary Education

In addition, a need for technical programs in two and four year higher education institutions was also acknowledged. There has been a recent emphasis on hydrogen and alternative energy technologies as a source for automotive fuel through the NextEnergy program, but few programs focused on renewable energy. Hydrogen is not renewable fuel per se, although it can be produced from renewable sources, and will require vast changes to the state infrastructure to be widely utilized. However, renewable sources such as biomass, solar, and wind have a place today in the state fuel mix, especially for farmers and other businesses with the space to effectively utilize these technologies.

Net metering legislation introduced in 2002, discussed later in this report (see Section 7.5), proposes that the Commission certify installers and inspectors for systems interconnected with the electric grid.[14] However, the only existing certification programs are provided through electrical worker unions, and the Great Lakes Renewable Energy Association (GLREA; www.glrea.org) offers a certification for solar photovoltaic equipment installers.

4.1.4 MREP Web Site and Email Distribution List

A Renewable Energy page was created for the MPSC Web site and went online in August 2002 (www.michigan.gov/mrep). Presently, it contains only basic information about the MREP directives from PA 141 and the May 16, 2002 Commission Order, a link to sign up for the MREP e-mail distribution list, and links to sources of renewable energy information such as the U.S.

[14] Interconnection rules were subsequently addressed by the Commission in Case No. U-13745. See http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=13745.

Department of Energy, Michigan's State Energy Office, and the GLREA. To date, 75 people are registered to receive information through the MREP email distribution list. With greater staff resources for development, this site has the potential to be a "one-stop" source for renewable energy information. See Section 7.3 for MREP Web site recommendations.

4.1.5 Disclosure Requirements

The Commission established disclosure standards for electric utilities operating in Michigan in Order U-12487 on June 5, 2001, which included bi-annual reporting of each company's generation mix (including renewable energy generated or purchased) and emissions of sulfur oxides, nitrogen oxide, and radio-nuclides.[15] Links from the MREP Web site to this published data will be added, so that interested customers can refer to this information when selecting their electric supplier.

4.2 Ratemaking Working Group

The Ratemaking Working Group was responsible for investigating net metering, time of day rates, and the possibility of new green tariff programs and/or making existing programs permanent.

4.2.1 Net Metering

Net metering is a mechanism to encourage the development and use of distributed generation, usually from renewable energy sources, by allowing consumers who generate their own on-site power to sell the unused portion back to the utility grid. Participating customers would likely be required to obtain a special electricity meter that either runs backwards when energy is going to the grid, or two separate meters to gauge the amount of energy taken from the grid and the amount sent to the grid. A credit or payment is then issued by the utility to compensate the customer for the excess power they generated.

The Ratemaking Working Group was involved in several meetings with the sponsor of HB 4015 of 2003, State Representative Chris Kolb, and his staff, to discuss the details of proposed net metering legislation in Michigan. Further discussion about this particular policy option is located in Section 7.5 of this report.

4.2.2 Green Pricing Programs

Green tariff programs allow consumers to voluntarily pay a premium to purchase some or all of their power from renewable sources. Many support these programs because they do not impose additional costs on customers who choose not to pay the premium and follow the spirit of market options dictating market development (i.e., if all customers really wanted green energy, they would pay the premium). Green tariffs support the concept of Customer Choice and add to the array of service options and energy supply offerings. But, like Customer Choice programs, green tariffs require a certain amount of customer education and marketing effort in order to establish a customer base that can support the administrative costs and specialized

[15] The Commission further refined these disclosure requirements in its May 18, 2004 Order in Case No. U-12915, pp. 3-4. See http://efile.mpsc.cis.state.mi.us/efile/docs/12915/0136.pdf.

investments in premium-priced energy supply required by these programs. Green tariff programs are discussed further in Section 3.2 and Section 7.4.

4.3 Wholesale Marketing Working Group

A number of issues arose under the heading of wholesale marketing, but the Wholesale Marketing Working Group was specifically asked to evaluate suggestions for promoting the wholesale market in renewable energy and investigate the feasibility of incorporating Renewable Energy Credits (RECs) or tradable certificates into the MREP.

When evaluating the impact of renewable energy on wholesale markets, it is important to recognize that minimizing short-term costs is but one of the primary considerations in establishing power supply procurement strategies. Social impacts, long-term/life-cycle costs, and customer wishes must also be taken into account. A well-balanced generation procurement strategy should establish a portfolio that finds an optimal balance between all such factors. It is not necessarily always the lowest cost purchase that has the greatest value to ratepayers.

If MREP is to successfully spur the use of renewable energy, a mechanism needs to be developed that allows renewable energy facilities to be financed and constructed. A first step could be bilateral contracts between developers and investor-owned utilities (see Section 7.8). Generation capacity can be shifted among programs and/or marketing campaigns can be used to increase customer participation. However, unless unencumbered generation supply exists or can be created as a part of MREP, the program has little chance of success.

4.4 Retail Marketing Working Group

The Retail Marketing Working Group was assigned to investigate retail marketing initiatives for renewable energy providers, green energy certification systems, and government incentives to assist in renewable energy growth.

There has been recent commercial and industrial customer interest in purchasing renewable energy (see U.S. EPA's Green Power Partnership program) but much of the U.S. market for green power to date has been driven by sales to consumers in states with electric customer choice programs. Large percentages of the residential customers who switched providers in states offering electric choice chose a greener electricity product. To date in Michigan, however, alternative electric suppliers (AESs) have not engaged in any mass marketing to Michigan residential or small commercial customers and no Michigan AES is marketing green power options.

4.4.1 Green Energy Certification Systems

Green Energy Certificates (also known as green tags or credits, renewable energy certificates, or tradable renewable certificates) represent the environmental attributes of power generated from renewable electric plants.[16] Certificate tracking systems are designed to clarify and

[16] See www.eere.energy.gov/greenpower/certificates.shtml. Also, the National Association of Regulatory Utility Commissioners (NARUC) recently passed two resolutions on Tradable Renewable Energy Certificates, and developed a draft Handbook for state regulators on Tradable Renewable Energy Certificates. See http://www.naruc.org/associations/1773/files/tracking_systems.pdf, http://www.naruc.org/associations/1773/files/handbook.pdf, http://www.naruc.org/associations/1773/files/interconnection.pdf, and http://www.naruc.org/associations/1773/files/supplement_handbook.pdf.

validate renewable energy purchases, and to perform an auditing type function to authenticate and track green energy credit ownership. In its December 20, 2001 Order in Case No. U-12487 (p. 35), the Commission directed Staff to further investigate the feasibility of incorporating some kind of generation information certificates in MREP.[17]

Usually, one credit is earned for each megawatt hour generated from a renewable energy resource, and each credit is tracked by some certifying organization to make sure that the green power attributes associated with each credit are used only once. The credits can then be used to verify production of renewable energy for any products that require certification. That is typically the case for some utility green pricing programs, where suppliers must verify to the utility their renewable energy deliveries. Or, credits can be sold or traded. In that case, usually the renewable energy produced is fed into the utility grid and the supplier receives a typical wholesale price for delivering the electricity. Then, the supplier can sell or trade the renewable credits to anyone who values the green attributes that the credits represent.

Already, about two-dozen organizations in the U.S. offer green energy certificates separate from electricity service. That effectively allows the certificate traders to offer customers green pricing options, without the need for the customer to switch from their current electricity supplier.

The Michigan Independent Power Producers Association received a grant from the Michigan Energy Office in 2001 to construct and operate a green energy certificate tracking and accounting system called The Green Power Exchange (www.greenpowerx.com). The basic Green Power Exchange system has been developed, but it is not yet operational.

Some MREP Collaborative members researched green certificate programs in other states, and met with Michigan Department of Environmental Quality (DEQ), Air Quality Division staff and other interested parties to discuss the possibility of establishing emissions credits associated with green energy production. Though no specific plan has been developed yet, there is significant interest in this type of approach. See Section 7.9 for further discussion on associating emissions credits with renewable energy certificates.

4.5 Definitions Working Group

The Definitions Working Group was established to review the definition of renewable energy provided in Public Act 141 to determine whether changes were necessary to realize the full potential of renewable sources. The definition (MCL 460.10g(1)(f)) provides: “Renewable energy source means energy generated by solar, wind, geothermal, biomass, including waste-to-energy and landfill gas, or hydroelectric.” The group members reviewed definitions from other states that have renewable energy legislation and determined that most were similar to the PA141 definition.

Advocates of combined heat and power (CHP) technology want to recommend that the legislature expand the definition of "waste-to-energy" to include "the extraction of energy from thermal processes or organic materials" to include non-polluting technologies. They suggest that the Commission consider how various policy proposals will support the natural synergies among all renewable energy, cogeneration, combined heat and power (CHP) and energy efficiency and pursue policies that will be mutually reinforcing. Those who support an expansion of the definition argue that CHP and other energy technologies can aid in reducing

[17] See http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=12487.

dependence on fossil fuels for meeting energy needs, the perceived intent of implementing this renewable energy program.

However, other group members contend that alternative technologies fueled by sources other than those listed in PA 141 as renewable, such as hydrogen, are already addressed by the NextEnergy initiative in 2002 PA 593, MCL 207.822, and therefore do not need to be addressed by MREP. The Commission addressed this proposed expansion of the definition in its May 16, 2002 Order in Case No. U-12915 (pp. 2-3), and concluded, "Proposals to expand the definition of renewable energy sources for purposes of the MREP must be addressed to the Legislature."

Staff acknowledges the recommendation to consider how various policy proposals support the natural synergies among all of these related energy technologies and pursue policies that will be mutually reinforcing. Staff does not believe, however, that it is necessary to formally expand the definition of "renewable energy" in order to achieve continuing progress in Michigan policies to support renewable energy, along with cogeneration or CHP, and energy efficiency.

The group also discussed whether the current definition would include biofuels such as ethanol, which grew more than 10% a year from 1996-2000.[18] Most members concluded that the current definition did not preclude considering biofuels in development of the MREP. Though it is not a large source of power generation, biofuels for new generation and automotive technologies may have the potential to significantly contribute to Michigan's renewable energy production and open new opportunities for state agribusiness.

4.6 Policy and Program Research Working Group

The Policy and Program Research Working Group was asked to review activity in other states and countries to identify options that might work well in Michigan without having to "reinvent the wheel." Thought a number of different programs in other areas were explored, most were based on resource levels and legislative climates that were vastly different from what is in Michigan. Specifically, this group was asked to report on the topics of low interest financing, tax incentives, funding for MREP development, and renewable portfolio standards (RPS). Each of these topics is addressed in more detail in Sections 7 and 8 of this report.

4.7 Technology Working Group

This group focused on establishing off-grid equipment standards and regulations for the interconnection of this type of equipment to the utility grid. Since the last Technology Working Group Meeting, the Commission has adopted rules for interconnection standards in Case No. U-13745 (see Section 7.10). The Technology Working Group identified the need for highly visible demonstration sites as an important means of promoting more renewable energy installations in Michigan. They believe that developers, architects, engineers, etc. are reluctant to incorporate new technologies into their projects until they have seen good working examples. The group recommends that the Commission continue to encourage grants under the Low-Income and Energy Efficiency fund, which can be used to demonstrate renewable resource technologies.

[18] 2001 Ethanol Report found at http://www.ethanolrfa.org/rfareport2001.html. See also http://www.ethanolrfa.org/outlook2003.shtml.

5 Michigan Renewable Energy Statistics

The Commission listed specific renewable energy data to be included in the Staff's annual MREP report in orders related to Case No. U-12915 dated May 16, 2002 and August 18, 2003. The sections that follow report this data as required by the Commission.[19]

5.1 Amount of Power Generated from Renewable Sources Within Michigan

All Michigan electric suppliers were asked to provide data on the amount of power generated from renewable sources in the state. Those who responded are listed in the table below. Some included purchased power in addition to generation.

It is important to note that under the Commission's current disclosure requirements, companies are not separately reporting renewable energy serving customers in green pricing programs. Thus, the figures presented here report renewable resources serving customers under both standard rates and green pricing tariffs. Staff recommends that the Commission consider altering its disclosure requirements so that each customer group receives a report that reflects the sources used to serve them. Customers participating in green pricing programs would thereby receive a report reflecting the green resources dedicated to their service, and standard rate customers would not get a false impression that their supply mix includes the extra renewable sources that are actually being funded only by the green pricing customers.

See Table 2: Amount of Power Generated from Renewable Sources, on the next page.

5.2 The Percentage of Power Obtained From Renewable Sources Purchased by Michigan Customers

Michigan electric suppliers provided the following data showing the percentage of renewable energy contained in their fuel mix. As stated above, these percentages may include generation resulting from green tariff programs. See Table 3 on the following page.

5.3 The Number of Customers Producing Power with Their Own Renewable Energy Installations

The Great Lakes Renewable Energy Association (GLREA) has conducted a survey of renewable energy equipment suppliers to identify the number and types of renewable systems currently selling in Michigan.[20] To accomplish this task, GLREA again surveyed sixteen renewable energy equipment suppliers that sell systems in Michigan and asked the dealers to identify the quantity and size of the systems that they sold in the state in 2002.

Seven respondents (44%) completed the survey. The responses indicate that the most common solar energy system application appears to be Solar Pool Heating, with Solar Electric systems a distant second. It appears that fewer systems were installed in 2002 than the prior year. The fact that there were fewer incentives available for smaller renewable energy installations in 2002 than 2001 may have influenced this decline.

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[19] See http://www.cis.state.mi.us/mpsc/orders/electric/2002/u-12915b.htm and http://www.cis.state.mi.us/mpsc/orders/electric/2003/u-12915_08-18-2003.htm respectively.

[20] www.glrea.org/resregistry.html.

For instance, the Michigan Energy Office implemented a $3/watt incentive program for small solar and wind systems in 2001. $300,000 from the State Energy Program grant from the U.S. Dept. of Energy was budgeted for the program. The program was expected to start slow after January 1 and end late in calendar year 2001. However, by the end of March, 18 incentives had been approved and by the end of April, 86 incentives were approved, consuming the entire $300,000 budget. The 86 incentives represented 47 kW of solar energy and 62 kW of wind energy. The Michigan Energy Office learned that 1) there was a significant amount of interest on the part of consumers, and 2) its budget was not big enough to have a program in place for a reasonable amount of time.

Table 2: Amount of Power Generated From Renewable Sources within Michigan

	2000			2001			2002		
Company	Generation	Purchases	Total (MWh)	Generation	Purchases	Total (MWh)	Generation	Purchases	Total (MWh)
Alpena Power	0	22,953	22,953	0	27,036	27,036	0	29,407	29,407
American Electric Power	62,433	1,508	63,941	72,749	1,163	73,912	61,237	964	62,201
Cloverland	0	226,060	226,060	0	226,659	226,659	0	240,788	240,788
Consumers Energy[21]	149,197	1,484,410	1,633,607	422,575	1,583,637	2,006,212	386,691	1,466,355	1,853,046
Detroit Edison		N/A		703,000		703,000	75	792,812	792,887
Edison Sault	199,642	165,086	362,728	173,992	160,371	334,363	215,390	137,022	352,412
TCLP[22]	11,332	0	11,332	12,600	0	12,600	12,858	0	12,858
UPPCO	104,144	N/A	104,144	109,355	0	109,355	162,540	0	162,540
We Energies		N/A		342,336	0	342,336	435,193	0	435,193
Wolverine Power		N/A		0	22,728	22,728	0	14,450	14,450
WPS[23]	35,325	0	35,325	33,787	0	33,787	43,351	0	43,351
Xcel Energy	21,052	0	21,052	21,879	0	21,879	26,387	0	26,387
EIA Data[24]	2,903,883	N/A	2,903,883	2,668,109	N/A	2,668,109		N/A	

Several reasons have been proposed to explain the small sample size. First, there are few resources available in Michigan to undertake the type of media campaign and survey approach needed to gather such information. That is why GLREA decided to approach the dealers instead of attempting to contact individual consumers. GLREA was minimally funded under a Million Solar Roofs Initiative (MSRI) grant to do the survey for 2001 and conducted the 2002 survey with no external funding. In addition, many consumers are leery about providing their personal information for a list of this kind due to privacy concerns. Consumers might be more willing to participate in a large data collection campaign if they were aware that it would be helpful to further renewable energy development.

Table 3: Percentage of Power Obtained from Renewable Sources Purchased by Michigan Customers

Data Source/Company	*Percentage of Fuel Mix*		
	2000	*2001*	*2002*
Alpena Power	11.2	13	13.3
American Electric Power	N/A	.1	< .1
Cloverland Electric Co-op	49.74	45.46	45.30
Consumers Energy	3.83	4.82	4.62
Detroit Edison	N/A	1.4	1.4
Edison Sault	42	38.3	39.5
Traverse City Light and Power	3.7	4.1	3.9

[21] Includes allocated share of spot purchases based on regional fuel mix. Generation data includes pumped storage.
[22] Traverse City Light and Power owns one hydroelectric facility, manages and operates two others owned by Grand Traverse County, manages and operates one that is owned by Antrim County.
[23] Only 10,000 of the approximately 400,000 WPS customers are in Michigan. This generation data includes the WPS system in Wisconsin.
[24] Data Source: Electric Power Annual Database 1990-2001 Net Generation by State by Type of Producer by Energy Source (EIA-906) available at http://www.eia.doe.gov/cneaf/electricity/epa/generation_state.xls.

UPPCO	12	12	17
WE Energies	N/A	12	16
Wolverine Power Co-op	N/A	1.05	.66
WPS	2.1	2.2	2.6
Xcel Energy[25]	13.6	15.3	14.3
EIA Data[26]	**!Unexpected End of Formula**4.1[27]	3.6[28]	N/A

Table 4: Michigan Customers Producing Power with Renewable Energy Installations

	2001		2002		2001/2002	
Technology	Number sold	Total (ft^2 or Watts)	Number sold	Total (ft^2 or Watts)	Number sold	Total (ft^2 or Watts)
Solar (Air)	6	703 ft^2	1	450 ft^2	7	1,153 ft^2
Solar (Liquid)	5	376 ft^2	1	64 ft^2	6	440 ft^2
Solar (Pool)	28	9,080 ft^2	33	5,360 ft^2	61	14,440 ft^2
Solar Electric (PV)	34	32,080 Watts	12	5,283 Watts.	46	37,363 Watts
Wind Electric	33	62,200 Watts	2	1,400 Watts	35	63,600 Watts

Michigan also has some large customers, such as paper mills, that consume on-site most or all of the power they produce from renewable energy resources; mostly biomass. Michigan Independent Power Producers Association (MIPPA) provided a list of 46 facilities that consume renewable power generated on-site; reporting a total of 1,668,693 MWh of energy in 2000.[29]

Essentially, accurate data on the number of customers producing power with their own renewable energy installations do not exist at this time. Better information might be more readily obtained in the future if (1) funding were available to conduct a large data gathering campaign, (2) dealers were encouraged to track and report information on the equipment they sell, or (3) tax incentives were implemented for these types of systems, which could allow collection of data from those who participate.

5.4 The Number and Aggregate Capacity of Renewable Energy Generators Receiving Third-Party Certification

There are currently only three companies acting in Michigan to certify renewable generators: Michigan Independent Power Producers Association (MIPPA), Environmental Resources Trust

[25] Includes generation and purchases in Wisconsin
[26] Renewable Energy Monthly, Table C13: Renewable Market Share of Net Generation by State, 2000 and 2001
[27] Includes 1.3% hydro
[28] Includes 1.4% hydro
[29] Data from U.S. DOE, Energy Information Administration (EIA-860b), on non-utility facilities with generation from landfill gas, wood waste, hydropower, and municipal solid waste for 2000. For more information on state-level data regarding renewable energy production and use, see http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/rea_sum.html#toc.

(ERT), and Green-E (which has not certified any Michigan facilities to date). MIPPA, the most active, has certified 15 renewable facilities for a total of 88,233,213 kWh (see table below).

Company	Facility	Generation Certified (kWh)
Granger	Granger #1 (Landfill Gas), Lansing, MI	4,225,000
Granger	Granger #2 (Landfill Gas), Grand Ledge, MI	7,154,000
Granger	Ottawa (Landfill Gas), Coopersville, MI	219,000
Granger	Grand Blanc (Landfill Gas), Grand Blanc, MI	4,772,000
Granger	Seymour Road (Landfill Gas), Montrose, MI	70,000
Granger	Brent Run (Landfill Gas), Montrose, MI	412,000
Tower Kleber Ltd.	Tower (Hydroelectric), Tower, MI	1,990,000
Tower Kleber Ltd.	Kleber (Hydroelectric), Tower, MI	6,010,000
NANR	White Lake (Landfill Gas), Whitehall, MI	6,484,110
NANR	Venice Park (Landfill Gas), Lennon, MI	6,477,116
NANR	People's (Landfill Gas), Birch Run, MI	19,030,814
Wolverine	Secord Dam (Hydroelectric), White Station, MI	3,914,205
Wolverine	Smallwood Dam (Hydroelectric), Smallwood Lake, MI	3,241,314
Wolverine	Sanford Dam (Hydroelectric), Sanford, MI	8,453,677
Wolverine	Edenville Dam (Hydroelectric), Edenville, MI	15,779,977
	Total	**88,233,213**

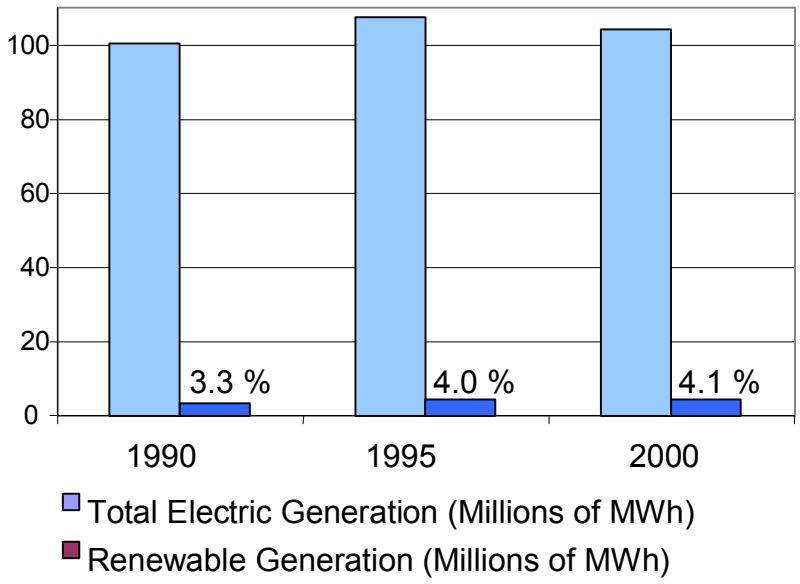
Through the first half of 2003, there has been limited third-party certification activity for renewable energy generators in Michigan due to relatively small amount of electricity sales taking place under Michigan renewable energy programs and product offerings. Thus, certification has been limited to the two Bay Windpower generators (certified by ERT) that sought agreements with Consumers Energy Company under its Green Power Pilot Program, one hydroelectric and one landfill gas generator that sought agreements with the Lansing Board of Water & Light for its GreenWise program, and a few renewable energy generators who needed certification in order to provide power in Ann Arbor. [30]

[30] The only exception is for AESs serving customers in Ann Arbor, where the city's electric franchise ordinance requires all providers to meet a resource portfolio standard (RPS).

5.5 The Percentage and Absolute Change Indicators of Renewable Penetration

The graph below depicts the total amount of utility and non-utility generation in Michigan and the related percentage of renewable energy for the years 1990, 1995, and 2000.

Figure 1: Michigan Renewable Energy and Total Electricity Generation, 1990 to 2000



The raw data for this chart, as well as the absolute change, follows:

	1990	1995	2000
Total Generation MWh[31]	100,059,737	107,444,612	104,209,594
MWh Renewable Generation[32] **(includes hydroelectric)**	3,254,442	4,252,136	4,272,593
Percentage of Renewable Energy (includes hydroelectric)	3.3 %	4.0 %	4.1 %
Absolute Change (MWh growth between reporting periods)	N/A	997,694	20,457

[31] Data Source: Electric Power Annual Database 1990-2001 Net Generation by State by Type of Producer by Energy Source (EIA-906) available at http://www.eia.doe.gov/cneaf/electricity/epa/generation_state.xls.
[32] Calculated from Renewable Energy Annual 1999, Tables C3 (1990 data) and C18 (1995 data) and Renewable Energy Annual 2001, Table C13 (2000 data).

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6 Barriers to Renewable Energy Development in Michigan

In attempting to understand the best ways to encourage more development and use of renewable energy in Michigan, it is important to investigate reasons why it is not already happening. There are several significant barriers that must be addressed in order to allow and encourage greater use of renewable sources in Michigan. Not all of these issues can be addressed by a single entity, but require various efforts on the part of the Commission, State Legislature, business and industry, and consumers.

6.1 Cost

The biggest hurdle currently facing renewable energy development is cost. Even the most cost-effective renewable energy technologies today are almost always more expensive than traditional utility generation sources. There is much debate about the levels of implicit or explicit subsidies provided to various generation technologies under current public policy. Some argue that subsidies of any kind have no place in the current competitive market structure, while others argue that subsidies have long been extended to traditional fossil fuel industries and have been instrumental in the development of those markets. In addition to holding fundamental differences in positions based on financial incentives and business models, the MREP Collaborative participants represent a wide range of philosophies about the appropriateness of government mandates, preexisting or new subsidies, and rate treatment that could result in cross-subsidies from one class of customers to another.

Proponents of increased renewable energy use, however, argue that ratepayers have long paid the costs of building and maintaining utility generating facilities that generate pollution and radioactive waste. They stress that costs associated with harmful pollutants, especially health care costs, might, if internalized into the price of traditional generating technologies, more than equalize the incremental costs associated with purchasing new renewable energy supplies. Though estimates of the magnitude vary considerably, it is difficult to dispute that there are health care costs associated with fossil fuel power plant pollution.[33] For example, the Environmental Protection Agency (EPA) estimates that the "Clear Skies" legislation will save between $21 billion and $110 billion per year in medical expenses.[34] Using this estimate, the medical expenses cited equate to between 0.56¢/kWh and nearly 3¢/kWh.[35]

Developers of renewable energy projects explain that they are unable to obtain low-interest financing for projects because utilities are unwilling or unable to enter into long-term purchase agreements at a price that would permit this type of financing. This issue is currently being addressed in Case No. U-13843[36] and is discussed further in Section 7.8.

The following table provides current and projected costs for various types of renewable energy sources:

[33] http://www.catf.us/publications/reports/NSR_benefit_cost.php
[34] See http://www.epa.gov/clearskies/ and: http://www.epa.gov/air/clearskies/benefits.html
[35] http://www.eia.doe.gov/emeu/aer/txt/ptb0801.html
[36] http://www.cis.state.mi.us/cgi-bin/mpsc/vieworder.cgi?filename=/mpsc/orders/electric/2003/u-12915_10-23-2003.htm.

Table 5: Current and Projected Costs for Renewable Energy Technologies

Technology	System Size	Installed System Costs ($/kW-year)		Operation and Maintenance Costs ($/kW-year or ¢/kWh)[1]		Key System Operating Conditions	Project Life (years)
		2003	2013	2003	2013		
Residential Photovoltaic	3 kWp[2]	9,000	5,000	15 $/kW	10 $/kW	Effective capacity factors range from 14.4% to 20.0%, including degradation for temperature and dust	25
Commercial Photovoltaic	250 kWp[2]	6,500	4,000	13 $/kW	9 $/kW	Effective capacity factors range from 14.4 % to 20.0%, including degradation for temperature and dust	25
Wind (onshore)	Turbine Size 650–1000 kWp[2]	1,000	700	22 $/kW	13 $/kW	○ Class 4 Wind ○ Capacity factor of 31% in 2003 and 37% in 2013.	15-20
Biomass– Cofiring with Coal	25–50 MW	250	200	16 $/kW	10 $/kW	○ Credit for emission reductions available ○ Capacity factor of 85%	25
Biomass– Landfill Gas	5 MW	1,200	1,000	1.5 ¢/kWh	1.5 ¢/kWh	Annual capacity factor of 85%	20
Biomass– Anaerobic Digester (animal waste)	100–200 kW	4,000	3,000	1.5 ¢/kWh	1.5 ¢/kWh	Annual capacity factor of 75%	20
Biomass– Anaerobic Digester (sewage)	2.5 MW	1,200	1,000	1.2 ¢/kWh	1.2 ¢/kWh	Annual capacity factor of 85%	20
Hydroelectric (low-impact mini)	400 kWp[2]	4,100–5,100	4,100–5,100	14 $/kW	14 $/kW	Capacity factor of 45-75%	25

Notes: [1] To convert O&M costs from $/kW-year to ¢/kWh, divide $/kW-year by [capacity factor (in percent) * 8760 hours/year]. For example, photovoltaic systems in Michigan will have an estimated capacity factor of 10-15%; producing from 876 to 1314 kWh/year. $15/kW-year, translates to between 1.1 to 1.7¢/kWh. To convert from ¢/kWh to $/kW, multiply ¢/kWh by [8760 hours/year * capacity factor (in percent), and divide by 100 (¢/$). For example, 1.5¢/kWh for a biomass system with capacity factor of 85% translates to $112/kW-year.
[2] "kWp" denotes peak kilowatts of power generation.

Source: Navigant Consulting (June 5, 2003), *The Changing Face of Renewable Energy*, Navigant Consulting Multi-Client Study, Public Release Document; www.navigantconsulting.com.

6.2 Siting Issues

A number of companies recently investigating installation of larger renewable energy systems in Michigan have experienced resistance from local communities who often express support for renewable energy, but "not in my back yard" (otherwise known as NIMBY).[37] Though some consider wind towers and large solar panels visually pleasing, as a sign of technological advancement and cleaner air and water, others find them an unappealing disruption to an otherwise beautiful landscape.

This year several Michigan wind developers have addressed local government agencies and communities at public hearings related to possible wind power projects. A few vocal residents typically attend to express concern about what the development will do to property values, the noise levels associated with working wind turbines, etc. Detroit Edison had similar difficulties with public acceptance of its installations of solar photovoltaic systems, a few years ago.

Governor Granholm commissioned the Michigan Land Use Leadership Council in Executive Order 2003-4. The Council's August 2003 final report recommended the state "pursue utilization of wind power and other renewable energy generation options by establishing state siting standards."[38]

The current situation calls for education and outreach programs to explain the benefits of renewable energy and dispel misinformation. Proposed education programs are addressed in Section 7.2 and wind energy siting concerns are discussed in more detail in Section 6.4.1.

6.3 Transmission Constraints and Operations

Transmission constraints must be taken into consideration when looking at green power expansion. In Michigan's Upper Peninsula, for example, there are three transmission circuits entering the region with a total capacity of 250 megawatts. This capacity is fully reserved, which means no additional firm power can be imported, or for that matter excess generation exported, without building new transmission lines or adding capacity on existing lines. Better transmission capacity helps not only utilities but also consumers, who would have access to more power providers under Michigan's customer choice program.

In addition, current transmission operations pose difficulties for variable output renewable energy sources, such as solar and wind, and for all small generators. The issues involve reservations for transmission capacity and scheduling power flows. For highly variable systems, the costs associated with reservations and schedule deviations can be significant. Small systems are also subject to extraordinary transmission charges, because transmission service must be purchased in increments of whole megawatt hours. For example, a landfill gas plant that typically generates 2.5 MW must schedule either 2 or 3, and may suffer significant transmission pricing penalties if it cannot operate to minimize its hourly, daily, and monthly deviations from the required schedule.

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[37] Some commenters on the MREP Report took exception to MPSC Staff's use of the term "NIMBY" to characterize local opposition to energy facility siting. Staff addressed this issue in its Reply Comments (p. 11), indicating its use of this term "was not intended to be derogatory or in any way diminish the legitimacy of citizens' concerns." Public comments and reply comments on the report are available on the Commission's Web site, at http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=12915.

[38] Michigan's Land, Michigan's Future: Final Report of the Michigan Land Use Leadership Council published August 15, 2003. See http://www.michiganlanduse.org/MLULC_FINAL_REPORT_0803.pdf.

6.4 Source Specific Issues

The barriers identified above may play a role in the deployment of any type of renewable energy resource, but several renewable energy technologies also face some specific encumbrances. The following sections on wind, solar, biomass, and hydroelectric energies discuss the specific barriers and policy issues that are preventing their more widespread implementation. Where practical, Staff's recommendations are also included, regarding policy changes to encourage greater use of each resource type in the near future.

6.4.1 Wind

The major barriers and policy issues facing wind energy development in Michigan today involve: (1) identifying the best locations for wind energy development, and related issues of land use planning, siting, and zoning; (2) the highly variable nature of wind energy production at different times; and, (3) wind energy system financing and the uncertain nature of federal wind energy production credits.

Locations for Wind Power Development – Land use issues in Michigan are decided at the local level, where townships, municipalities, and county governments make land use planning and zoning decisions. Michigan does not have any statewide siting or zoning regulations for wind energy systems. In most cases, wind energy developments require local approvals for the construction of the towers upon which wind generators will be mounted.

Wind is a very site specific energy resource. High quality wind resources are not available everywhere in Michigan. There are several areas that offer adequate wind for development, but current wind maps depict the highest average wind speeds located in Lake Michigan and generally along the coastlines of Lakes Michigan and Superior. The American Wind Energy Association ranks Michigan 14th in the nation with a potential for development of 7,460 average MW. To date, 2.4 MW have been developed at Traverse City and Mackinaw City. Wind as an energy resource is very site specific.

A few proposals for wind generator siting in Michigan have already been met by strong, vocal, local opposition, and three townships have passed zoning ordinances that would effectively ban wind energy development (these include: Bingham Twp., Leelanau County, which prohibits the sale of commercial electricity; and Eveline Twp., Charlevoix County, and White River Twp., Muskegon County, with required setbacks of towers from property lines that would effectively prohibit wind energy development on any parcels smaller than about ¾ square miles). The negative reactions have been based on concerns regarding aesthetics, noise and other potential nuisances, human safety, alleged danger to birds and other animals,[39] requirements for additional transmission or distribution lines. To be sure, modern utility-scale wind turbines are highly visible. The 900 kW machines at Mackinaw City stand 236-feet tall at the hub and each blade is 85-feet long. New utility-scale machines have even larger gearboxes and blades, and as a result have increased generation and production capacity.

[39] Some Commenters on the MREP report took exception to Staff's use of the term "alleged" in describing the potential danger to wildlife. Though there is undoubtedly some danger to *individuals* of various wildlife species, including especially birds and bats, current research indicates very little concern regarding wildlife *populations*. In fact, research data indicates that wildlife populations are at much greater risk from traditional energy systems and other energy related causes than from wind energy development. Wind developers and those who finance wind energy developments are acutely aware of reported problems with wildlife, and have undertaken extensive research efforts to try to mitigate such problems. Wind developers analyze and try to minimize risks to wildlife in their development plans, by avoiding migratory routes, etc. Public comments and reply comments on the report are available on the Commission's Web site, at http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=12915.

The Michigan Land Use Leadership Council recommended statewide zoning for wind and other renewable energy development.[40] Michigan's Wind Working Group (see sidebar, above) is developing recommended guidelines for wind energy system zoning in Michigan. The WWG plans to develop a set of guidelines that can be shared with Michigan planning and zoning officials, in order to provide some guidance about considerations for wind energy ordinances. Also, the Great Lakes Renewable Energy Association (GLREA) is hosting two Wind Town Meetings in Michigan to discuss potential benefits and concerns related to developing the state's wind energy resources. The meetings are November 18 in East Lansing and January 17 in Marquette. See www.glrea.org for details. Staff believes that a good deal of the recently expressed local opposition to wind generator siting is based on partial, inaccurate, outdated, and misleading information about various aspects of wind system development. Staff supports the existing efforts of GLREA and WWG towards encouraging dialogue about wind energy development in Michigan, and Staff recommends that the Commission support additional education and public awareness efforts regarding wind energy siting.

Sidebar: About Wind Energy…

The Global Wind Energy Market Report stated that 6,500 megawatts (MW) of new wind energy generating capacity was installed worldwide in 2001, amounting to annual sales of about $7 billion. This is the largest increase ever in global wind energy installation, well above the 3,800 MW in 2000 and 3,900 MW in 1999. The world's wind energy generating capacity at the close of 2001 stood at about 24,000 MW.[41]

Until recent years, wind electric development was limited because wind generators were not economic, compared to traditional fossil based generation. Now, however, improved technologies have made wind generators more and more reliable and allowed wind generators to capture and convert to useful electricity a larger portion of available winds. Thus, wind has become the fastest growing source of new energy supplies in the world, growing at a rate of about 30 percent per year (Brown, 2003, p. 157). In recent years wind generators have achieved commercial success by winning auctions for new utility power supplies in the U.S., open to bids by any source of electric power. Thus, when compared head-to-head against the cost of new fossil fuel generators, wind systems in good locations can be fully cost competitive.

Michigan Wind Working Group: An informal Michigan Wind Working Group (WWG) is being facilitated by the Michigan State Energy Office. Current members include representatives of Michigan wind energy developers, utilities, Michigan Public Service Commission staff, U.S. Department of Energy, National Renewable Energy Laboratory, Michigan State University, Great Lakes Renewable Energy Association, Michigan Environmental Council, Michigan Independent Power Producers Association, and other interested parties. Several representatives of the MREP Collaborative are also members of the Michigan WWG. The Michigan WWG also works closely with the Wind Powering America program of the U.S. Department of Energy. The WWG promotes Michigan wind energy development by: (1) Providing a forum for the exchange of information; (2) Creating the opportunity for members to discuss and develop joint projects; (3) Helping to increase consumer awareness; and, (4) Identifying barriers and opportunities related to wind energy development. Participation in the Michigan WWG is open to anyone who is interested. You can ask to be included in the email distribution list for WWG announcements. Contact John Sarver at the Michigan State Energy Office, mailto:jhsarve@michigan.gov or call (517) 241-6280.

A new wind resource map is being developed as a cooperative effort between the U.S. Department of Energy, Michigan's State Energy Office, and a contractor named TrueWind Solutions, LLC (www.truewind.com). TrueWind generates wind maps in a format that is

[40] http://www.michiganlanduse.org/MLULC_FINAL_REPORT_0803.pdf (page 46).
[41] Global Wind Energy Market Report, Wind Energy Turns in Strong Performance in 2001 found at http://www.awea.org/pubs/documents/globalmarket2002.pdf.

compatible with geographic information system (GIS) software. It utilizes data from satellite tracking of the movements of aerosols through the atmosphere to measure wind speeds at various heights above the earth's surface. The resulting wind maps are more accurate than those previously available, which were based on data collected primarily from weather stations located at Michigan airports. The new wind maps will show average wind speed data for individual cells on the ground that are about 200 meters square, and the data will be reported at three different typical wind generator tower heights. For wind maps of other states recently completed by TrueWind, see http://www.eere.energy.gov/windpoweringamerica/.

Although much more detailed than previously available wind resource maps of Michigan, the new map will still not be sufficient for the task of siting individual wind generators. For that purpose, developers will still need to employ on-site measurements for 12 to 18 months in order to obtain data that underwriters will consider accurate enough for decisions about financing wind-power construction projects. Nevertheless, the new maps will represent a very significant improvement in the data available for Michigan, and should assist all interested parties in understanding the nature and availability of wind resources in Michigan. Staff recommends that MREP cooperate with this effort by helping to publicize the availability of the new wind maps when they become available.

If wind energy development is going to take place offshore, in the Great Lakes, then a number of additional concerns need to be addressed. Staff recommends that MREP Collaborative members work cooperatively with the Michigan WWG and interested parties in neighboring states to develop a briefing paper on offshore wind energy development for the Great Lakes.

Variability in Wind Energy Production – Because the wind does not blow continuously, there are limitations that affect reliance on this type of generation. Utilities have raised concerns about the intermittent nature of electric production from wind turbines, and they have hesitated to give any capacity credits to wind electric systems because the wind is not dispatchable[42] and, at least in Michigan, there is no reason to assume that there is any particular relationship between wind energy productivity and the time of utility system peak demands. In fact, there is a tendency for Michigan utility system peaks to occur on the hottest days of the summer, when winds tend to be very low or even non-existent. Still, this does not mean that wind energy systems have no capacity value. People tend to think of the wind as being intermittent, almost in terms of the wind being on or off. However, some researchers and practitioners argue that wind energy is variable, rather than intermittent (see Parsons and DeMeo, 2003). The difference is more than just semantic. The value of any resource for utility planning purposes is based on a set of criteria including availability, reliability, and predictability.

Modern wind generators have very high availability, as much as 98 percent or so. Availability means being ready to produce electricity whenever the wind does blow hard enough to work the generator. Predictability increases as larger land areas are employed in wind generation. Generally, the more land area, the more wind speeds and thus electric power generation tends to average out over time. If there are enough wind generators in a particular utility territory and they are spread over a large enough land area, then the wind generation as a whole can provide significant capacity on a fairly predictable basis. The effective capacity of a set of wind generators may be only a small fraction of the total nameplate ratings of the generators, but the productivity of a set of wind generators over a large area can be predicted with a fair amount of accuracy. Some argue that by this measure, wind energy capacity is actually more predictable

[42] A power source is dispatchable if it can be controlled so it can supply power when needed to meet system needs. Because winds are not controllable, wind generators are not dispatchable.

than fossil fuel power plants, which break down unpredictably. The National Renewable Energy Laboratory has researched the variability of wind generator production and developed formulas for calculating appropriate wind system capacity credits, called effective load carrying capacity (ELCC). See www.awea.org/faq/cap.html and www.nrel.gov/docs/fy02osti/29701.pdf.

The Colorado Public Utilities Commission has adopted a utility-proposed method for calculating wind ELCC factors. See http://www.nrel.gov/docs/fy01osti/30551.pdf. The ELCC model is also being utilized in a comprehensive wind integration study for the California Energy Commission. See http://www.nrel.gov/docs/fy04osti/35947.pdf. And, Minnesota also has a study underway, to evaluate the capacity value of wind generators using ELCC methods.[43]

Studies conducted to date have shown that wind power's impacts on utility system operating costs are small at low wind penetrations (about 5% or less). At higher wind penetrations, the impact will be higher, although current results suggest the impact remains moderate with penetrations up to as much as about 20 percent. The highest penetration rates thus far are 18 percent of annual electricity use in Denmark, 22 percent in the industrial province of Navarra, Spain, and 28 percent in the German state of Schleswig-Holstein (Brown, 2003).[44]

Furthermore, various means of energy storage are being developed to address the variability of wind energy production. A recently announced project in Iowa, for example, plans to use a 100 MW wind power facility to pump air into an underground aquifer, compressing the air. During times of peak power demand, the compressed air will be supplied to 200 MW of combustion turbines that are fired with natural gas, allowing the turbines to operate at high efficiencies. See www.idea.iastate.edu/isep/index.asp. Other ideas being considered for wind energy storage include pumped-storage hydroelectric facilities, such as the Ludington facility in Michigan, and hydrogen.

In any case, the variability of wind energy production is still a significant concern for utility system operators and wind developers alike. Another aspect of this problem for wind developers is that the current rules regarding transmission grid operations were not designed to best accommodate wind energy variability. Wind developers are working with regional transmission operators, like the Midwest Independent System Operator (MISO), to try to revise tariffs. Staff recommends that the MREP Collaborative and Michigan Wind Working Group identify desired changes in MISO tariffs and operating practices, and convey that information to the Commission. In addition, Staff recommends that the Commission support efforts to educate Michigan's utilities about the contributions wind energy might make to Michigan's electricity infrastructure and the best practices for integrating wind energy with utility operations (see Section 7.2).

Financing – Michigan's potential wind developers are concerned about the problems they have experienced in obtaining financing to build wind generators. They report a need to obtain long-term, fixed-price contracts for the sale of wind-generated electricity, before lenders will offer financing for their projects. Some possible solutions to help resolve this problem are discussed in this report in Section 7.8, on Financing Mechanisms. In addition, this issue is currently being explored in Case No. U-13843, regarding an application by two Michigan wind

[43] Information about ELCC from Michael Milligan, National Wind Technology Center, personal communication, August 12, 2004. See also http://www.nrel.gov/wind/nwtc_partner.html and http://cwec.ucdavis.edu/rpsintegration/RPS_Int_Cost_PhaseI_Final.pdf.

[44] It should be noted that these percentages are of annual total electricity production. The total capacity of wind generators, as a percentage of the national and state total capacity is greater. Denmark's electric grid managers report that wind generating capacity exceeds system off-peak load (Eriksen, Peter Borre, Pedersen, Jens, and Parbo, Henning, 2002).

developers to amend and make permanent the Consumers Energy Company green power pilot program.

There is also ongoing concern regarding federal wind energy production credits, because the U.S. Congress has not implemented wind energy credits as a long-term, standing policy. Instead, the credits have been approved only on a short-term basis, and extended or renewed from time to time. Developers have responded to each extension of the production credits, but this has resulted in moderate boom and bust cycles of wind energy development in the U.S.

6.4.2 Solar

Like wind energy systems, solar technologies can be impeded by local ordinances, and a good deal of education is needed to inform Michiganders of the potential contributions solar energy can make. Staff recommends that the Commission support an MREP education program that includes a solar energy education component.

The major policy barriers facing solar energy development are in the form of local ordinances and subdivision or homeowner association construction requirements, which may prohibit everything from mounting solar collectors on buildings to the use of clotheslines for drying laundry. Some Michigan residents have encountered significant obstacles in trying to implement solar energy systems for their own homes. One way this problem has been addressed in other states is for state or local governments to establish solar access rules or easements, which generally govern the rights of property owners to develop renewable energy systems on their property. In some jurisdictions, communities have passed ordinances covering development guidelines, zoning ordinances that contain building height restrictions, and solar permits (see www.dsireusa.org). Staff recommends that an MREP Collaborative sub-committee be formed to explore and make recommendations on these issues for Michigan.

In addition, solar technologies can be hampered by concerns about financing. Net metering policies have also been proposed as a means to support the development of solar energy. Net metering is discussed in Section 7.5. Another concern is that the most cost effective solar energy systems for Michigan today are ones that do not make electricity, but rather are demand-side management options such as daylighting, solar water and space heating systems, and solar building designs. Such systems may not be eligible for the same kinds of financial support as those that directly produce electricity. Staff recommends that an MREP Collaborative sub-committee explore and recommend to the Commission how utility rate structures can be altered so that solar DSM technologies can be appropriately rewarded when they provide system benefits.

Sidebar: Solar Energy…

Most Michigan consumers are not aware that several solar energy technologies are already cost effective for applications in Michigan. These include solar air heaters, especially systems that preheat or pre-cool air for commercial or institutional buildings, solar swimming pool heaters, solar water heaters, passive and active solar building designs, and remote and portable applications for solar electricity, where the costs to extend utility power can be greater than the cost of providing a solar or combined solar and wind electric system that uses battery storage. Another very cost effective strategy for using more solar energy in Michigan is to design buildings for better daylighting, using windows and skylights to help replace or reduce the need for artificial light during daylight hours.

6.4.3 Biomass

Biomass developments face a similar set of barriers to the other renewable energy technologies. There has often been local opposition to biomass facility zoning and siting, and biomass energy systems typically face similar financial obstacles. In addition, few Michiganders have an adequate understanding of biomass energy technologies, suggesting an important role for an MREP education and awareness program. Incomplete and often incorrect public perceptions present barriers to additional biomass energy development. Many people believe biomass energy is not environmentally friendly, perhaps based on their experiences with fireplaces and wood-burning stoves. And, there may be a perception that forests are cut down to fuel wood-burning power plants, when the primary source of fuel in these facilities is waste wood. Due to the potential negative public perception and lack of understanding about biomass it is clear that some public education may need to take place before it will be more widely accepted.

Staff recommends that the MREP Collaborative form a biomass-energy subcommittee to coordinate and cooperate with the Michigan Biomass Energy Program office and other interested groups to identify appropriate recommendations for the Commission.

Sidebar: Biomass Energy…

There are extensive opportunities for energy generated from biomass resources in Michigan. Michigan's biomass resources include agricultural crops, forest products, municipal solid waste, and food processing and animal wastes. For more information, see the Michigan Biomass Energy Program Web site, at www.michigan.gov/biomass.

One area that has grown considerably in recent years is landfill gas energy generation. There are currently 53 sites in Michigan generating energy from landfill gas and another 10 in the planning stages. Landfill gas combustion does generate air emissions, but the emissions of several pollutants are significantly lower after the installation of landfill gas energy recovery systems than if the gases are simply released to the atmosphere or flared using an open, uncontrolled flame.

There are also a number of existing wood-fueled electric generators in Michigan, which produce approximately 1 percent of the state's electricity, and a few facilities burning municipal solid waste, together producing less than 1 percent of the state's total needs.

Some technologies that look very promising for additional bioenergy production in Michigan are anaerobic digesters to convert organic materials into biogas; at wastewater treatment facilities, food-processing plants, or on farms. Methane digesters can produce useful energy, and at the same time convert potentially troublesome and difficult to dispose of wastes into useful byproducts. Anaerobic digestion systems can help to reduce or eliminate many of the environmental problems facing Michigan's livestock producers. Given those environmental benefits and cost savings, it is expected that anaerobic digestion systems will increase in numbers over the next several years. However, appropriate market incentives may still be required to spur early adopters of these technologies, as long as revenues from the systems are insufficient to cover investment and operating costs.

6.4.4 Hydroelectric

The biggest barriers facing additional hydroelectric power development in Michigan stem from environmental concerns about siting new facilities. Because Michigan is not very mountainous, we do not have a large potential for hydroelectric power generation. Michigan currently obtains

about 1 percent of its electricity from hydroelectric facilities (not counting the Ludington pumped-storage facility), mostly in the Consumers Energy service territory and in Michigan's Upper Peninsula. It may prove very difficult to obtain consensus on the addition of any new dams on Michigan rivers, streams, creeks, or drains. In fact, some organizations have recommended the removal of existing hydroelectric dams, so that rivers can be returned to their pre-developed, free-flowing state. Even with such concerns, however, there may be good opportunities in Michigan for upgrading hydroelectric production facilities at existing dams and for the addition of run-of-the-river turbines that can produce electricity without damming up a body of water to create an impoundment. Staff recommends that the Commission support development and dissemination of an appropriate education component regarding hydroelectric power. Staff does not have any additional recommendations about hydroelectric power at this time.

Sidebar: Hydroelectric power…

Hydroelectric power plants can have a positive impact on the environment. No fossil fuels are required to produce the electricity, and the earth's hydrologic cycle naturally replenishes the "fuel" supply. Therefore no pollution is released into the atmosphere and no waste that requires special containment is produced. The fuel of hydropower is water and therefore it is not subject to unstable prices, transportation issues, production problems and other issues that impact other fuels.

Hydropower is very convenient because it can respond quickly to fluctuations in demand. A dam's gates can be opened or closed on command, depending on electric demand. When a facility is functioning, no water is wasted or released in an altered state; it simply returns unharmed to continue the hydrologic cycle. The reservoir of water resulting from dam construction, which is essentially stored energy, can support fisheries and preserves, and provide various forms of water-based recreation.

Hydropower can be produced in an environmentally friendly manner to maximize the environmental benefits and minimize the environmental impacts. With the current re-licensing and licensing requirements for hydropower the proper environmental balance will be achieved and therefore hydropower is truly a renewable resource.

Electric customers are familiar with hydropower and recognize it to be a source of renewable electric generation. Electric customers understand that hydropower is clean, safe, reliable and renewable way to generate electricity.

6.5 Regulatory

MREP Collaborative members identified two major aspects of Michigan's current electric utility regulatory structure that are inhibiting further development of renewable energy. They are the current market structure, which is characterized by a mixture of partially regulated and partially deregulated markets for electricity, and elements of the current tariff and rate structure.

6.5.5 Michigan's Mixed Market Structure/Customer Choice

Some utility representatives point to electric restructuring and customer choice programs as a major barrier to additional renewable energy development in Michigan. The utilities argue that any program that mandates renewable energy generation or purchases should apply equally to Alternative Electric Suppliers (AESs) and regulated utilities, to maintain price competition in the market. Otherwise, they fear that any mandates that apply only to regulated utilities would cause their costs to increase and thereby harm them in their competitive posture compared to AESs. The utilities describe a plausible scenario where they raise their rates to accommodate

added purchases of renewable energy, but then customers leave the utility in favor of lower priced service from unregulated AESs, to avoid the rate increase.

Thus, the utilities act as if Michigan's current regulatory structure will support only renewable energy programs that allow customers to voluntarily choose purchases of greater quantities of renewable energy under green pricing tariffs. Only market-driven programs that support capital expenditures based upon market demand can fit into this kind of structure. In addition, with Consumers Energy and Detroit Edison serving customers under frozen rates, the utilities have hesitated to make any expenditures on developing or marketing green pricing programs. Therefore, renewable energy entrepreneurs have been essentially on their own, to procure resources and manage risks to make renewable energy offerings attractive in an open, competitive energy market. However, the contract terms currently offered by Michigan utilities have not provided the income security required to make project financing feasible. In theory, entrepreneurs could sell renewable energy to a growing list of wholesale power marketers and unregulated AESs, based on the cost and value of their product to the consumer. But, to date no AESs in Michigan offer green pricing options to customers.[45]

As discussed in Section 8.3, Staff has tried to craft a generic framework for utility green pricing programs in order to meet the conditions imposed by Michigan's current mixed market structure.

6.5.6 Tariffs and Rates

Michigan's current rate structures do little to encourage renewable energy systems. Current rates were developed with little consideration of renewable energy technologies. Almost all customers pay average rates and are therefore sheltered from prices that would better reflect the value of electricity at specific times and in specific places. Staff recommends that the Commission invite proposals in all future rate cases, for changes in current rate structures to promote renewable energy technologies.[46] Such proposals might include, for example, more options for time of use or real time pricing, and changes in charges for standby and backup service in order to best reflect the value of distributed generation and on-site production of renewable energy. Changing the fundamental rate structures of distribution utilities is a major undertaking, but changes can and should be implemented incrementally.

De-Averaged Distribution Credits

One promising example of a tariff innovation intended to support renewable resources is de-averaged distribution credits. The National Renewable Energy Laboratory (NREL) and Regulatory Assistance Project (RAP) have prescribed de-averaged distribution credits as a means to generate better price signals regarding the location of distributed generation systems, without changing consumer pricing. The objective of de-averaged distribution credits is to use competitive market forces to help meet system requirements in the least-cost manner.

The general concept would require utilities to identify areas requiring significant distribution system expansions, upgrades, or replacements in the next couple of years. A recent NREL publication suggests creating a pilot program for areas requiring significant upgrades in the next 24-26 months (Moskovitz, et al., 2002). The utility would identify areas where distributed energy resources could play an important role in deferring or perhaps even permanently displacing

[45] The City of Ann Arbor's franchise for AESs includes a renewable energy portfolio standard.
[46] MCL 460.10b requires the Commission to establish rates, terms, and conditions of service that promote new generation, transmission, and distribution technologies.

planned infrastructure investments. Similar to the concept of a renaissance zone, some special credits would be offered to developers as an inducement to encourage the provision of distributed energy resources in specific locations. The Detroit Edison Company has started to utilize distributed generation to meet some of its needs for distribution system support and enhancement, and preliminary reports indicate significant success in these efforts.[47] Staff recommends that the MREP Collaborative form a sub-committee to investigate and make recommendations to the Commission regarding de-averaged distribution credits, and that the Commission invite utility proposals for pilot programs.

[47] Electric Utility Consultants, Inc., Detroit Edison, DTE Energy. (2003, September 17-18). Proceedings: Distributed Generation Conference, Novi, Michigan.

7 MREP Collaborative Recommendations

The following recommendations represent ideas and policies that most Collaborative members supported to some degree. These recommendations are not to be taken as support from individual Collaborative members or their respective organizations in any future action related to these suggestions. Because of the differing viewpoints and institutional needs of Collaborative members, true consensus on any issue was difficult to obtain, however, the following recommendations represent areas of least opposition among the parties. Additional policy recommendations that were not agreed upon by group members are discussed in Section 8.

7.1 Continue and Expand Coordination with Other Organizations

Continued and expanded coordination is of vital importance for the success of the MREP and so that discussions and analyses taken on by other groups are not duplicated. Members of the MREP Collaborative already include government agencies, non-government organizations, and industry representatives. MPSC Staff is committed to maintaining open channels of communication with as many groups as possible. All interested parties have been invited and encouraged to participate in the MREP Collaborative, which has functioned as an open forum for information exchange. However, the group has identified the need to include additional expertise from additional organizations in areas such as finance, land use planning, building and construction, agriculture, air and water quality to help tackle specific issues that are hindering expansion of use and development of renewable resources.

7.2 Implement Renewable Energy Education

Education has been identified as an essential element of market development of renewable energy in Michigan. There is no funding allocated for such an initiative at this time but collaborate members have suggested specific sources of potential funding and low-cost education measures. Solicitation of grants from the MPSC Low Income Energy Efficiency Fund and other agencies was suggested; however, without a specific group dedicated to undertaking such an initiative, it will be difficult for the group to develop adequate grant proposals. Public service announcement requests were also discussed as an option but again require development of a group empowered to develop such material.

A list of ongoing educational activities by organizations and educational institutions in the state can be found in Appendix B following this report. These programs are important as a foundation for renewable energy education knowledge and expertise, but are also indicative of the interest in this topic throughout the state. State government may be able to address the need for additional education by supporting some of these programs already in place.

The MREP Web site, discussed in more detail in Section 7.3, is one avenue for providing educational materials to the public. The Web site could be developed to house immense amounts of information, but will only reach those who both have Web access and are aware that the resources are available. In order for the site to be truly effective, a means must be developed to inform the public that it exists. Some believe a formalized, state education program would be most effective and reach many more consumers than a Web-based system.

Group members suggested soliciting pro bono work from marketing firms and/or enlisting university marketing programs to help find inexpensive ways to promote renewable energy use

throughout the state. The group discussed providing basic renewable energy information, through a slide show that interested parties could borrow to present to organizations and community centers. Also, the idea was raised to get local media involved, by including in weather reports the amount of energy that could be produced, based on sun intensity and/or wind speeds on a given day. These ideas may be further developed in the future.

Of all of the ideas discussed in this report, education may be the most important to make any program to promote renewable energy successful. If people are unaware of the benefits of renewable sources or there is a lack of knowledgeable tradespeople to further develop renewable technologies, any effort to expand renewable energy use will not reach its full potential.

7.3 Expand MREP Web Site

Another way that MREP can better support coordinated efforts is to expand the MREP Web site in order to provide more and better information to serve Michigan renewable energy interests. The group identified organizations that currently house this type of information, such as the Environmental Protection Agency (EPA), the State Energy Office, and the Great Lakes Renewable Energy Association (GLREA) and discussed compiling the existing web-based information on the MREP Web site. Present staffing constraints have hindered further development of the site. Some particular projects that have been identified already include the provision of a renewable energy calendar of events and database of sources of financial assistance for renewable energy projects. It was also suggested that green businesses might sponsor the Web page, in exchange for the exposure this might gain them; thus providing funds for further site development.

Beyond using the MREP site for housing information, some have suggested that the site could also be utilized as a marketing tool for businesses in the state that support renewable energy development or participate in renewable energy practices. There was also discussion about encouraging corporations to participate in "green" practices (EPA has a Green Power Partnership[48]), and then dedicate a portion of the MREP Web site to list the green companies. Promotion of businesses that are also demonstration sites for renewable energy or energy efficiency technology would also improve the consumers' exposure. Though being known as green and listed on the MREP site as such may be enough incentive for some companies to participate, resources are needed to promote the program to businesses.

Possible future additions to the site include: links to utilities and suppliers with green tariff programs, lists of companies that market renewable energy technology (solar panels, solar-powered water heaters, etc.), a link to the electric utility/supplier generation mix disclosures, sources of renewable energy education materials for all ages, information on tax incentives that may be available to consumers with renewable energy on/in their homes, and links to information on programs in other states.

7.4 Green Pricing Programs

Green pricing programs offer citizens and corporations an opportunity to act on their environmental concerns and demonstrate support for renewable energy by purchasing some amount of green power (see http://www.eere.energy.gov/greenpower/).

[48] See http://www.epa.gov/greenpower/index.htm.

In some states, customer demand expressed through green pricing programs is already driving considerable new investments in renewable energy, but Michigan green pricing programs have not been as successful, thus far. (See Section 3.2 for descriptions of Michigan programs). The most widely used model for utility green pricing programs, both in Michigan and around the country, is one where customers can agree to purchase all or a portion of their electricity from renewable sources. This is often accomplished by utility companies contracting with renewable energy suppliers to provide specific amounts of energy over a set period of time. Some utilities consider this approach high-risk because there is no guarantee that enough customers will participate in the program to fully cover the contract costs. Renewable energy developers also face barriers in this approach, if contract terms are inadequate to secure financing needed to build and maintain projects (this issue is currently being considered in MPSC Case No. U-13843).

To properly design and implement green pricing products requires a thorough understanding of the economic and customer value systems involved, just as sufficient marketing research is required for the successful introduction of any other retail products where sales must rely upon customer response.

MREP Collaborative members have not reached consensus on any particular green pricing program design. In fact, no two Michigan utility green pricing programs are alike and several Michigan utilities do not yet offer such programs for their customers. MPSC Staff has created a concept for a generic green pricing program framework that might be adopted by Michigan utilities, and that framework is presented in Section 8.3.

7.5 Net Metering

Where it is available, net-metered service is for utility customers who have their own electric generating equipment (installed and operating on the customer's side of the electric meter). Net energy metering is an accounting mechanism whereby customers are billed only for their net energy consumption during each billing period.[49] At times when the customer's generator is producing more energy than the customer is using, the excess is sold to the utility company. At other times when the customer produces less electricity than it needs, then purchases are made from their utility. With net metering, at the end of each billing period the customer is billed for consumption after subtracting the amount delivered to the utility grid.

To date, 38 states have enabled some form of net metering program (see Figure 2: Net Metering Map of U.S., below).[50] Net metering programs can serve as an incentive for consumer investment in renewable energy generation. Advocates identify public benefits of net metering, including: (1) greater use of renewable energy resources and the attendant environmental benefits that come from greater use; (2) a good match between production from some of these resources, particularly solar, and peak demand periods, (3) greater diversity of generation sources which helps with reliability issues, and (4) economic benefits including creation of jobs and substitution of local energy resources for out-of-state resources.

[49] Some states and utilities call this net billing, rather than net metering. Net billing could suggest two meters, as opposed to net metering with a single meter. However, the two terms are frequently used interchangeably. The term net metering is used in this paper, irrespective of the number of meters employed.

[50] The Database of State Incentives for Renewable Energy (www.dsireusa.org) indicates 38 states plus the District of Columbia with net metering programs as of October 2003, but it does not properly include Michigan in the list of states that allow net metering for some utilities.

In a 1982 order in Case No. U-6798, the MPSC requested that Staff and the various utilities explore alternative methods capable of minimizing cross-subsidization and high metering expenses. Alternative forms of net energy billing and other means of accomplishing the goals stated should be proposed in future rate proceedings, should they appear feasible.[51] Subsequently, Wisconsin Electric Power Company, Wisconsin Public Service Corporation, and Lake Superior District Power Company received approvals of net metering tariffs for Michigan customers, which were consistent with their offerings to their Wisconsin customers.[52] Since 1982, as revisions were made to these companies' net metering tariffs in Wisconsin, they were also applied to Michigan.[53] Wisconsin utilities are required to net meter renewable generators up to 20kW for the next 10 years. The most recent reports from Wisconsin utilities that also serve customers in Michigan indicate 161 Wisconsin customers participating in net metering (109 residential, 52 non-residential) and 4 in Michigan (2 residential, 2 non-residential).[54]

In a March 8, 1999, Order in Case No. U-11290, et al. (pp. 47-48), the Michigan Public Service Commission responded to a suggestion made by some Michigan environmental groups,[55] "that net metering should be available to all [Michigan electric utility] customers...and that net metering should be subject to a careful evaluation to determine whether and how it should be continued." The Commission noted that some Michigan utilities have offered net metering tariff provisions since 1982, and concluded, "The time has come for an evaluation of the existing net metering programs." The Commission directed the Staff to conduct an evaluation, file a report with the Commission, and provide a copy of its report to any interested party that requests one. Staff is prepared to work with MREP Collaborative members to finalize that evaluation report.

Detroit Edison implemented a Distributed Generation Rider tariff in February 2001 (MPSC Case No. U-12827).[56] This tariff, Rider-DG, uses a separate meter to measure generation that is delivered to the utility, and the payments for that generation are based on the utility's highest wholesale purchase or generation price for each hour, which is called the top incremental cost (TIC). Rider-DG is offered to customers with on-site generators of up to 100 kW. Technologies covered include reciprocating engine generator sets, fuel cells, regenerative dynamometers, and renewable resources. Customers can choose between simple energy, time-of-day, or hourly metering. Payments for generation are based on the monthly average TIC for energy meters, monthly on-peak/off-peak average TIC for time-of-day meters, or hourly TIC for hourly meters. No extra monthly service fees, standby or backup charges are associated with Rider-DG. To date, no customers are taking service under Rider-DG.

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[51] See August 27, 1982 Order, captioned "In the matter of the proceedings, on the Commission's own motion, to implement provisions set forth in Title II, Section 210, Cogeneration and Small Power Production, of the Public Utility Regulatory Policies Act (PURPA) of 1978 (PL 95-617)."

[52] Lake Superior Power Company later became known as Northern States Power Company, which recently changed its name to Xcel Energy.

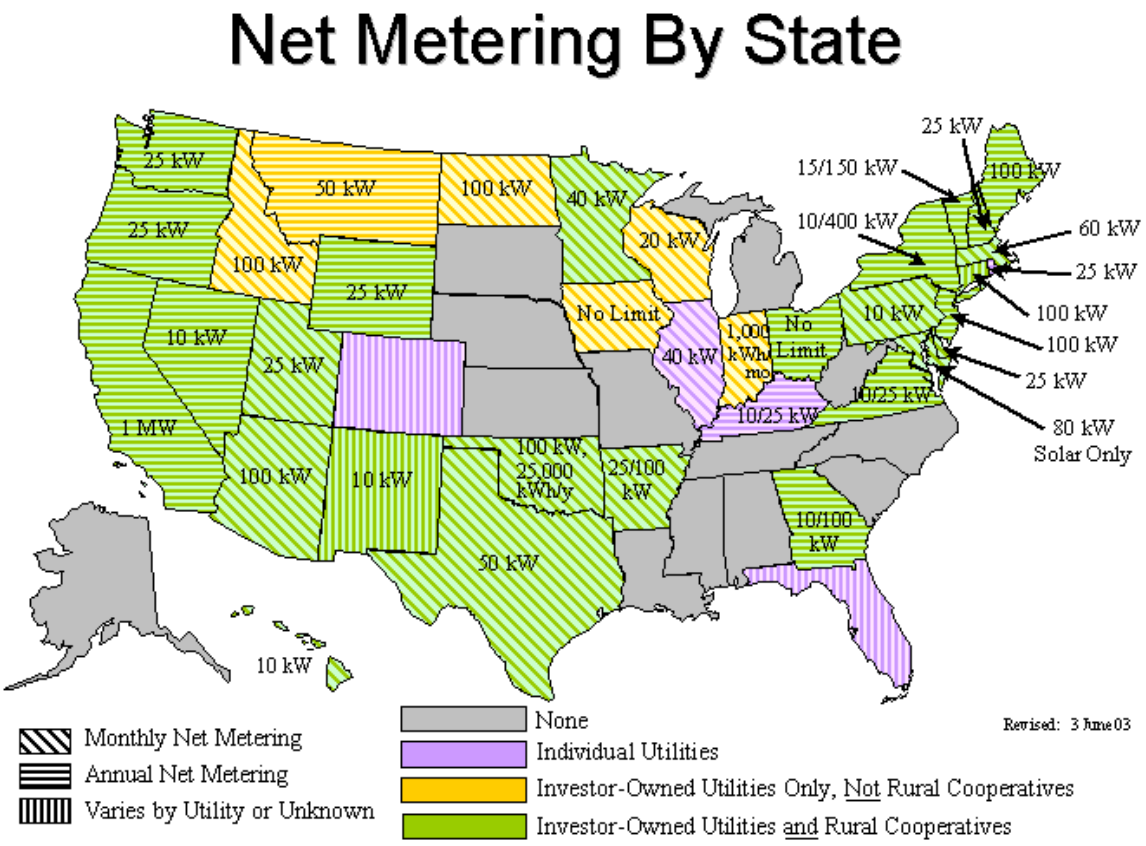
[53] All regulated Michigan electric utility companies have rates that apply to customers who generate some of their own electricity through the use of on-site renewable energy systems and wish to interconnect with the utility and sell excess energy to the utility. Available options can be found in each utility company's rate book (see http://www.dleg.state.mi.us/mpsc/electric/tariff.htm). There are also MPSC Rules governing Interconnection Standards for all of Michigan's regulated utility companies (see http://efile.mpsc.cis.state.mi.us/efile/docs/13745/0016.pdf, pp. 11-15: Exhibit A).

[54] From U.S. DOE, Energy Information Administration, Renewable Energy Annual 2002. See summary of report at http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/rea_sum.html and net metering customer data at http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/tablei2.html.

[55] The groups include Michigan United Conservation Clubs (MUCC), American Lung Association of Michigan, Michigan Environmental Council (MEC), and National Wildlife Federation Great Lakes Natural Resource Center.

[56] See http://www.dleg.state.mi.us/cgi-bin/mpsc/vieworder.cgi?filename=/mpsc/orders/electric/2001/u-12827.htm and http://www.dleg.state.mi.us/mpsc/orders/electric/2001/u-12827.exhibit.a.pdf. All Michigan electric utility companies regulated by the MPSC have tariff provisions for the interconnection of small generators, but the Detroit Edison tariff is the only one with no additional administrative fees or standby charges.

Figure 2: Net Metering Map of U.S.



Source: http://www.eere.energy.gov/greenpower/resources/maps/netmetering_map.shtml.
See also www.dsireusa.org.

Two identical bills were introduced into the Michigan House of Representatives in 2003, to establish a net metering program as an amendment to 2000 PA 141; HB 4015 and HB 4090. Both bills were introduced in January and referred to the House Committee on Energy and Technology. The MREP Collaborative had several discussions related to these bills and other concerns related to net metering. With some fairly minor changes as indicated in the following list, most Collaborative members said they believed their organizations would either support, or at least not oppose, net metering legislation. Though there was tentative agreement on these recommended changes to the net metering bills on the part of Collaborative members, perhaps even approaching consensus, several Collaborative members made it clear they could not speak for their organizations in an official capacity at the MREP Collaborative meetings and thus could not say with any certainty whether a bill with the following amendments would be supported by their organizations. This list does not necessarily represent the position of MPSC Staff, either. At any rate, the MREP Collaborative recommends the following changes to the net metering bills:

1. The legislation currently allows for systems of 100 kW or less and establishes a cap equal to the customer's anticipated power needs. Some members suggested raising the cap for different types of customer generators (such as farms and industry). Others contend the cap should be aligned with the customers' anticipated usage, so customers cannot utilize net metering as a means to enter into the business of generating electricity for profit.
2. Some suggested a buy-back rate for agricultural use at a marginal industrial rate. The suggestion is that any renewable energy that is generated on farms, or generated from agricultural wastes or residues, would be eligible for net metering treatment, much like Detroit Edison's Rider-DG tariff, but not necessarily limited to a 100 kW maximum.
3. Several sections of the bills as introduced deal with interconnection requirements. Those sections should be removed or altered as necessary to refer to the Commission's newly approved interconnection standards.
4. The bill currently includes a $100 cap on utility charges for the net metering application fee. It was suggested that this language be changed to align the fees with the provisions of the Commission's newly approved interconnection standards.
5. Utilities required to provide meters to implement net metering would like to be assured of cost recovery for the associated expenses.
6. The current language says the Commission has discretion to establish a basic service charge for customers participating in net metering. The group suggested this language be changed to direct the Commission to do so.
7. Rates should be designed for net metering that recover all fixed and unavoidable costs, yet give appropriate credit to customers for any kWh delivered to the utility system. The MPSC should have the ability to approve cost-based rates and tariff requirements for net metered customers that differ from non-net-metered customers in the same class.
8. Some argue that the customer should be responsible for transmission and distribution costs of the power going in and out of their system (not just the net amount).
9. Net metering customers should not be able to avoid non-bypassable charges.

It was also suggested that a utility that buys net metered generation from renewable sources should receive credits that will count towards any renewable portfolio standard (RPS) requirements. MREP Collaborative members generally agreed that this provision should be included in any state or federal RPS legislation, and perhaps could not be enacted in the context of a Michigan net metering bill, unless it would be passed concurrently with Michigan RPS legislation.

At this point, Staff's recommendation is to establish an MREP Collaborative sub-committee on net metering. Staff proposes to work with that sub-committee and any interested parties to finalize the evaluation report on net metering as directed by the Commission's March 1999 Order in Case No. U-11290 et al., and to provide detailed recommendations for changes in the proposed net metering bills.

7.6 Research

In order to fully utilize the resources available in Michigan, it is important to know exactly where the resources are located and the expected viability of development projects. Some information is already available through organizations like the National Renewable Energy Laboratory (NREL) and the Union of Concerned Scientists (UCS), but in-depth studies for Michigan will

make efforts at renewable promotion and development more focused and efficient. However, this additional research should not hinder development of known resources.

The Department of Energy has funded several research projects for states and continues to do so as funds are available and the Michigan Energy Office also offers grants for research periodically. Substantial research and development funding is available for renewable energy technologies through the federal Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) programs for business owners. Companies with matching funds get priority of funding and many states provide this match funding as a way to leverage federal dollars. The Small Business Association of Michigan (SBAM) has an "EnerTech" program to help small businesses get SBIR/STTR funding. The state could support this project by creating a Renewable Energy SBIR/STTR leverage fund to provide match funding for meritorious projects. More state government support to accomplish these goals will provide necessary aid to ensure that the projects are complete in the most useful and efficient way.

7.6.1 Develop Renewable Energy Atlas of Michigan

Significant discussions are already underway about renewable energy geographic information systems and maps. The goal of this effort is to promote renewable energy by providing more accurate and extensive maps of Michigan's existing and potential renewable resources and their location vis a vis Michigan's existing energy infrastructure. Experience in other states and countries shows that access to good maps will help educate planning and zoning officials, renewable energy developers, land-owners, and the general public about the potential for renewable energy development. It appears that some financial resources may be available, through the state energy office and U.S. Department of Energy to obtain a greatly improved atlas of Michigan energy resources. MREP plans to continue acting as a clearinghouse for and maintain liaison with groups working on this and other mapping projects and will keep the Commission apprised of progress and seek Commission support for this effort as needed.

7.6.2 Develop Wind Energy Map of Michigan

The National Renewable Energy Laboratory is supporting the Michigan Energy Office to increase the use of wind energy in Michigan. An updated high-resolution wind resource map of the entire state of Michigan would provide crucial information as to the best areas to develop wind energy projects. NREL and the National Wind Technology Center (NWTC), under contract with DOE, intend to award a subcontract to TrueWind Solutions, LLC as part of a cost-sharing agreement to produce a wind resource map for Michigan. TrueWind is the sole U.S. firm with extensive experience in employing a numerical prediction approach for wind resource mapping. This map should provide the necessary information to aid wind development in the state and should be completed by late 2004.

7.6.3 Prepare a Benefit/Cost analysis of the Development of Michigan's Various Renewable Energy Resources

In order to establish public policy and funding initiatives for development of Michigan's renewable energy resources, a comprehensive assessment of the costs and benefits to the state is needed. Michigan's renewable energy resources may have the potential to become a strong part of Michigan's economic future, if developed with a goal of enhancing the state's economy. The return for each dollar of investment needs to be carefully evaluated.

Michigan has the means to conduct extensive evaluations of the various renewable energy technologies, products and markets through its colleges and universities. All the state's potential renewable resources need to be considered including agricultural and industrial wastes, the potential to grow new energy crops and open new opportunities for Michigan's farmers, the accessibility and development of its extensive off-shore wind resource, and new technologies that can produce high-value low-cost energy in forms other than electricity for various applications including fuels for heating and transportation.

With this information, the Commission and Legislature can make informed decisions and set priorities for specific initiatives that will make effective use of any research and development dollars and financial incentives. To date, there has been a primary focus on renewable energy for electricity production. MREP Collaborative members generally agree that State policies should consider a larger array of renewable energy products and applications that can reduce needs for conventional electricity and fossil fuels and become a native source of supply. This will include many options that offer increased energy efficiency and demand-side energy management improvements.

7.7 Encourage Renewable Energy Use in State Facilities

State government should take a leading role in promoting growth in renewable energy use, by purchasing more renewable energy to serve its own facilities and operations. Contracting for State renewable energy purchases will demonstrate Michigan's commitment to renewable energy. One means for accomplishing this is through participation in Michigan utility green pricing programs.

7.8 Explore and Implement Innovative Financing Mechanisms to Reduce Costs

Cost was identified earlier in this report as one of the main barriers to renewable energy development. Developers claim that further cost reductions for these systems are hindered by their inability to secure low interest financing. They say they cannot obtain financing at reasonable terms if they have to rely on short-term, variable-price contracts to sell the energy they produce. This is inherently a chicken and egg problem. Their power costs more than it might otherwise because the developers cannot get financing at low interest rates, and because the power costs more they cannot obtain more favorable power purchase agreements. Collaborative participants identified low interest loans and other innovative financing options as one of the most important initiatives to address the barrier of higher cost renewable energy.

Special financing could significantly reduce interest costs and a funding source specifically targeted for renewable energy projects could help assure that loans would be readily available to developers at favorable terms. Concepts discussed included establishing Michigan renewable energy revenue bonds or performance bonds, and perhaps one or more renewable energy revolving loan funds. At least preliminary consensus was reached on the part of MREP Collaborative participants that innovative financing concepts should be explored and developed.

In its simplest form, the concept is for the state government to use its bonding authority to establish a source of special financing for renewable energy projects in Michigan. To the extent that interest charges could be reduced, the cost, and thereby the price of renewable energy additions could be reduced, making the renewable energy more cost competitive with other power supply options. With this approach, it is predicted that renewable energy projects could

become more cost competitive, perhaps even more economical than other power supply options. Some Collaborative members estimated that the availability of low-cost bond financing could effectively reduce the price of renewable energy by about a cent per kilowatt-hour, or roughly 15-20 percent.

One possibility might be for the state (or a county or municipal) government to establish a bond program, similar to the 1998 Clean Michigan Initiative bond fund.[57] In these kinds of programs, the government itself raises money in bond markets. Such bonds offer favorable interest rates because they are backed by the credit of the government, based on the idea that tax revenues can be used to repay the bonds, if necessary. It may be possible that tax-exempt bonds can be issued, further lowering the interest rate to be paid to investors. Bonds could be used to establish either a grant fund or revolving loan fund.

One current example of a state program supported by bond financing is the $5 million Small Business Pollution Prevention Loan Program, established by the Clean Michigan Initiative and administered by the Michigan Department of Environmental Quality. This revolving loan program provides low-interest loans to small businesses, for the implementation of pollution prevention projects (including energy efficiency). See http://www.michigan.gov/deq/0,1607,7-135-3307_3515_4144---,00.html.

Through a revolving loan fund, the government (or, a quasi-governmental organization such as a renewable energy trust) could loan money to various projects and be paid back over time, with interest, from the sale of green power to wholesale markets. The principle and interest paid by those who borrow money from the fund could be enough to assure the fund's continued existence. In order for the fund to be self-supporting, loans have to be repaid at an interest rate that is high enough to support the fund managers and repay the underlying bond interest. If not, tax revenues would have to be used to subsidize the fund.

At the wholesale level, however, innovative financing approaches may not be sufficient to remove enough of the cost barrier to broader electric utility acceptance of green power. There are already several jurisdictions in the U.S. where renewable power projects, especially wind power, have proven through competitive bidding processes to be the least-cost option for new power supplies. A few factors seem critical to the success of these efforts, however. They include: (1) the utility's need for new capacity, (2) new capacity increments of ample size to benefit from economies of scale in wind-farm construction and operation and maintenance (that is, tens to perhaps a couple hundred MW), (3) utilities willing to sign long-term fixed price contracts as a result of an RFP process, and (4) an area with high wind resources.

Another conceivable option is to tailor special financing options to facilitate the sale of green power into retail markets. With this approach, the project developer secures the loan with a retail power sales agreement. This retail approach could utilize energy performance contracting (sometimes called "shared savings"), or a Pay-As-You-Save (PAYS®) mechanism.[58] In a typical energy performance contract, capital for energy efficiency improvements is made available by an energy service company (ESCo), and then the capital, plus interest, is repaid to the ESCo out of positive cash flow generated by those installed capital improvements. It is

[57] It should be noted that Michigan State Senator Cameron S. Brown recently asked the Legislative Service Bureau to draft bills that would create a Michigan renewable energy bond fund for methane digesters, thermal depolymerization process (TDP) systems, and gasification technology. Senator Brown has also asked for a bill to be drafted to allow farmers to receive a general property tax exemption for the installation and use of methane digesters and for a bill, similar to net metering, to require electric companies to accept generation from methane digesters at a fair cost rather than below cost. See Section 7.5, on Net Metering.

[58] See http://www.paysamerica.org.

common for this type of contracting to be used for energy efficiency improvements by large industrial, commercial, and institutional customers. This proposal would build on the successful model of energy efficiency performance contracts by adding a renewable energy purchase component and utilizing special, dedicated sources of financing such as a renewable resource revolving loan fund as the source of capital. At least in theory, this type of program could work for any Michigan electricity customer or group of aggregated customers.

Retail renewable energy purchases could be added into a performance contract in one of two ways. A renewable power source could be integrated into a customer facility, with the power output used on-site (with or without any grid-interconnection to the customer's electric utility company), or the customer could purchase renewable energy that is produced off-site (either through the purchase of green power certificates or "tags" or via a utility green pricing program).[59] In either case, the objective would be to assemble for the customer a combined portfolio of energy efficiency improvements and renewable energy purchases, so the customer's total energy bill will stay the same or decrease after the contract is implemented. In most circumstances, a participating customer would purchase a small percentage of their total energy needs from renewable resources and some of their renewable energy purchases could be in the form of demand-side improvements (such as solar space or water heating systems, active or passive solar heating and cooling, daylighting, etc.).

There are many possible mechanisms for making available special, dedicated sources of financing. Using revenue or performance bonds is one approach (which may have important tax advantages), but another viable approach could be to develop fungible financial instruments that would allow financing to come from any available investors. The required capital could come from anywhere, as long as the cash flow from portfolios of projects will be sufficient to repay the capital invested plus a reasonable, market-based return on investment. For instance, trust or pension fund managers might be attracted to this type of investment, because it can promise a desirable combination of relatively low risks and high returns.

Staff proposes establishment of an MREP Collaborative subcommittee to work with interested parties to prepare a detailed implementation proposal for appropriate approaches to creative financing for renewable power.

7.9 Renewable Energy Credits and Emissions Credits for Renewable Energy Use

Renewable sources of electricity, in almost every commercial-scale application, produce less air pollution than fossil fuel generation. Therefore, emission reductions can be associated with renewable energy use. A market for emissions trading already exists in Michigan, to allow industrial facilities to meet regulated emissions levels.[60] It does appear possible that renewable energy production can be qualified as a U.S. EPA-approved emissions reduction practice. That way, renewable energy could be a low-cost strategy for reducing emissions under existing regulations, and would also set the stage for inclusion in voluntary emissions reduction efforts, such as the newly established Chicago Climate Exchange.[61] The U.S. EPA is already working with some states to establish acceptable means of utilizing renewable energy credits in emissions reduction programs. Though this approach appears promising, a lot of work needs to be done to make this concept a reality in Michigan. Green power certification, discussed in

[59] For more information, see Green Certificates (Section 4.4.1) and utility Green Tariffs (Section 4.2.2)
[60] See www.michigan.gov/deq/0,1607,7-135-3310_4103_4194---,00.html.
[61] See www.chicagoclimatex.com.

Section 4.4.1, is essential to developing a renewable energy emissions credit program, and implementing this initiative will require Department of Environmental Quality support. MREP Collaborative members generally agree that policies to encourage renewable energy as an optional emissions reduction strategy, along with some system to certify and monetize renewable energy emissions reductions, would help to increase the financial value of renewable energy production and thus help spur greater market penetration. Staff proposes to continue to support MREP Collaborative efforts to establish a program for renewable energy emissions credits, in coordination with Michigan's air quality regulators. Staff will keep the Commission informed of progress in this area.

7.10 Complete Interconnection Standards Rulemaking

The Commission successfully completed the development of rules governing the interconnection of independent power projects with electric utilities in Michigan. The Commission issued an Order in Case No. U-13745 on March 26, 2003, proposing interconnection standards and initiating a rulemaking procedure regarding the adoption of the proposed standards. After receiving comments from interested parties, the Commission issued another order on July 8, 2003 and an order on rehearing on September 11, 2003. Attached to the September 11, 2003, order is a copy of the Commission's Electric Interconnection Standards, Rules 460.481 through 460.489. Those Rules were transmitted to the Michigan Department of State. Documents associated with Case No. U-13745 can be found on the MPSC Web site at http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=13745.

Utilities were initially given 90 days from the effective date of the Rules, to file with the Commission applications for approval of proposed interconnection procedures pursuant to the Rules. On October 24, 2003, a Motion for Extension of the Filing Deadline for Interconnection Procedures was submitted in Case No. U-13745 by Michigan's regulated investor-owned and cooperative electric utilities. That Motion requested an extension in the utilities' filing deadline, until March 22, 2004. The Commission issued an order on November 25, 2003, granting the requested extension. The utilities filed their applications in March 2004, and they were approved by the Commission on August 10, 2004 in Cases Nos.: U-14085 for Northern States Power Company-Wisconsin, d/b/a Xcel Energy; U-14088 for Alpena Power Company, Consumers Energy Company, The Detroit Edison Company, Edison Sault Electric Company, Upper Peninsula Power Company, Wisconsin Electric Power Company, d/b/a We Energies, Wisconsin Public Service Corporation and the Michigan Electric Cooperative Association; and U-14091 for Indiana Michigan Power Company, d/b/a American Electric Power.[62]

[62] Documents associated with all three of these cases are available on the Commission's Electronic Case Filings system, at http://efile.mpsc.cis.state.mi.us/efile/electric.html.

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8 Other Legislative and Policy Options

Staff recommends that all policy options include coordinated and mutually reinforcing policies that support economic development, environmental stewardship, and technological advancement. Some MREP Collaborative participants suggest that any evaluation of additional renewable policy initiatives consider the extent to which current state and federal initiatives (environmental standards, subsidies, tax provisions, etc.) already account for costs and benefits not otherwise internalized in market prices so that an otherwise well-intentioned policy does not double-count public benefits or costs. The policy options listed below were not as well received by the MREP Collaborative as a whole and are listed for the consideration of the Commission and Legislature.

Sawin (2003) groups renewable energy policy options into five major categories: (1) regulations that govern renewable energy access to the grid and utility obligations; (2) financial incentives; (3) education and information dissemination; (4) stakeholder involvement; and (5) industry standards and permitting. As Sawin explains (pp. 106-109), the key to increasing renewable energy penetration is having "policies that are consistent, long-term, and flexible, with enough lead time to allow industries and markets to adjust." Sawin cautions against policies that "are not well formulated or are inconsistent, piecemeal, or unsustained." Those, it is feared, can actually slow the transition to renewable energy. Instead, she recommends policies that emphasize market creation, with the goal of market transformation.[63] Based on examples from other states and countries, Sawin (p. 107) recommends a combined set of policy initiatives to:

- Provide access to the electric grid and standard payments to cover the costs of renewable energy generation, similar to the fair access and standard pricing laws used in much of Europe.

- Provide financing assistance to reduce up-front costs through long-term, low-interest loans, through production payments for more advanced technologies, and through investment rebates for more expensive technologies such as solar PV, with gradual phaseout.

- Disseminate information regarding resource availability, the benefits and potential of renewable energy, capacity and generation statistics, government incentives, and policy successes and failures on local, national, and international levels.

- Encourage individual and cooperative ownership of renewable energy projects, and ensure that all stakeholders are involved in decision-making processes.

- Establish standards for performance, safety, and siting.

- Incorporate all costs into the price of energy and shift government subsidies and purchases from conventional to renewable energies.

In particular, Sawin's article (pp. 94-98) reports on Germany's success with renewable energy policies. This story, similar to that of neighboring Denmark, ought to be of great interest to Michigan, since our state has a similar climate, is highly industrialized, and is presently host to an electric utility infrastructure that is heavily dominated by coal and nuclear fuels. Sawin reports (pp. 94-95):

[63] See Midwest Energy Efficiency Alliance web page at http://www.mwalliance.org/.

> "When the 1990s began, Germany had virtually no renewable energy industry, and in the view of most Germans the country was unlikely ever to be in the forefront of these alternative energy sources. … Yet, by the end of the 1990s, Germany had been transformed into a renewable energy leader. … In the space of a decade, Germany created a new, multibillion-dollar industry and tens of thousands of new jobs."

The policies enacted in Germany included a new "Electricity Feed-In Law" that required utilities to purchase electricity from all renewable technologies in their service territories and to pay at least 90 percent of the retail price for wind and solar power.[64] In addition, Germany encouraged local communities to zone specific areas for wind power and provided income tax credits to projects and equipment that met specified performance and quality standards. The effects of these and other German renewable energy policies, altogether, has been to provide certainty that renewable energy producers will be able to sell their output into the grid at a known minimum price. In turn, that made it easier for producers to obtain financing and drew more investment money into renewable energy industries. The increased investments "drove improvements in technology…and produced economies of scale that have led to dramatic cost reductions" (Sawin, 2003, p. 97). The results, to date, have been most impressive. Sawin reports that Germany's installed wind capacity grew from 56 MW at the beginning of 1991 to 6,100 MW a decade later, and was expected to reach nearly 12,000 MW by the end of 2002. At the same time, Germany became one of the world leaders in wind power manufacturing and operations. That industry now employs about 40,000 people in Germany, and so many Germans own shares in turbines or work in the wind industry that there is now broad public support. A similar story, on a smaller scale, can be reported on Germany's solar energy policies and resulting solar industry growth.

The overriding lesson to be learned from the German experience is that a sufficient set of carefully designed policies, implemented over a sufficiently long time, can make major progress towards greater use of renewable energy. Staff recommends that the Commission and Legislature seriously consider these policy guidelines when planning changes for Michigan.

8.1 Renewable Portfolio Standard

A renewable portfolio standard (RPS) is a requirement, by statute, that utilities and suppliers incorporate a set percentage of renewable energy into their generation mix, often including financial penalties for companies that do not meet the established requirement. A couple of states have established renewable energy goals, which are set-asides for certain percentages of all new generation to be supplied from renewable resources.

The percentage of renewable energy required to meet an RPS or set-aside is generally a small incremental percentage of each supplier's portfolio. Ideally, a good RPS will establish percentages that are appropriate to the State's inherent renewable energy resource base. As a result, only a small increase in customer bills will result from suppliers acquiring the resources necessary to meet the requirements of a carefully established RPS.

Renewable Portfolio Standards (RPS) are a key driver for new renewable energy growth in many states, today. There is also a wide variation in the RPS designs used by the different states, however, and a fair amount of complexity in RPS policy.

[64] This law was amended in 1998 to set a cap of 5 percent on utility purchases of such electricity generated from renewable energy. By 2000, a new Renewable Energy Law was passed which "removed the cap on renewables, and required that renewable electricity be distributed among all suppliers based on their total electricity sales" (Sawin, 2003, p. 96).

Given the right set of resources, utility policy, and economic conditions, an RPS could be an important driver towards the development of cost effective energy supplies. Nevertheless, for a state like Michigan – where there has been little new renewable energy resource development, both regulated and unregulated energy suppliers compete in the market, and there is relatively low cost energy already available – a badly designed RPS could increase energy costs and unfairly advantage some competitors at the expense of others. Key elements of an effective RPS should be carefully analyzed and modeled prior to implementation, in order to understand the likelihood of success and magnitude of costs and benefits likely to result. An alternative approach is the type used in Germany, called a feed-in law. The major difference between and RPS and a feed-in law is that the RPS requires a percentage of renewable energy to be purchased, but does not establish the price, whereas a feed-in law establishes a price but does not require a particular percentage to be purchased. With either of these approaches, a ceiling can be set on the price or percentage to be purchased.

To date, 15 states across the nation have enacted some form of an RPS[65] and similar requirements were introduced in recent federal energy legislation (see Section 8.1.1).

Additional concerns were raised regarding the possible interaction between an RPS and current green pricing programs. If utilities are required to purchase a set amount of renewable energy, the price premium that green rate customers currently pay night no longer foster development of renewable resources in the same way it would have when customers initially subscribed to the program. Some utility representatives to the MREP Collaborative expressed concern that some customers might quit subscribing to voluntary green pricing programs if an RPS were established. Staff is not aware of any evidence of this happening elsewhere, however.

Finally, as with other policy options being considered for the promotion of renewable energy development, a main question is whether consumers in the newly restructured electricity market should be any extra amount for renewable energy, no matter how small. Some say yes and others say no.

Figure 3 shows which states currently have renewable portfolio standards or goals (states with solid shading have an RPS and cross-hatching indicates states with renewable energy goals).[66]

Most Michigan utility representatives to the MREP Collaborative have stated their companies do not support an RPS mandate because they claim it would create an artificially inflated demand for renewable energy that would result in at least a short-term increase the cost of energy. There are also some MREP Collaborative utility representatives who believe that an RPS and green pricing program ought to be mutually exclusive policy options. They fear that the cost of the commodity in the market would not fall much below the RPS established ceiling price, which would effectively set the market's price to beat. They theorize that costs of complying with an RPS would likely be considered reasonable and prudent incremental costs appropriate for recovery through the Power Supply Cost Recovery (PSCR) process in Michigan. Therefore, they believe an RPS could require a subsidy from customers who choose not to participate in renewable purchases through a green pricing program. Some utilities are also concerned that the increased cost of power associated with an RPS will put utilities at a competitive disadvantage unless it is applicable to all suppliers, including AESs.

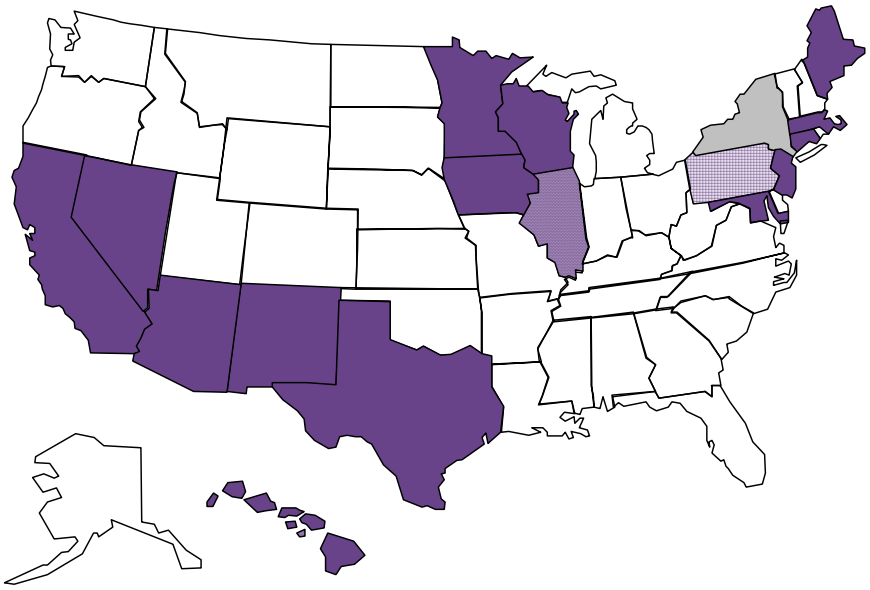
Additional concerns were raised regarding the possible interaction between an RPS and current voluntary green pricing programs. If utilities are required to purchase a set amount of

[65] See http://www.dsireusa.org/library/includes/type.cfm?Type=RPS&Back=regtab&CurrentPageID=7&Search=TableType.
[66] http://www.dsireusa.org/library/docs/RPS_Map.doc

renewable energy, the price premium that green rate customers currently pay would no longer foster development of renewable resources in the same way it might have when customers subscribed for the program. At least some utility representatives to the MREP Collaborative expressed concern that some customers might quit subscribing to voluntary green pricing programs if an RPS were established. Staff is not aware of any evidence of this happening elsewhere, however.

Finally, as with other policy options being considered for the promotion of renewable energy development, a main question is whether consumers in the newly restructured electricity market should pay any extra amount for renewable energy, no matter how small. Some say yes and others say no.

Figure 3: States with Renewable Portfolio Standards or Goals



Source: Database of State Incentives for Renewable Energy, **www.dsireusa.org**

8.1.1 Federal RPS Proposal

The Senate version of the federal energy bill currently pending in the Senate/House Conference Committee contained an RPS provision that would apply to electricity suppliers across the country. If passed and signed into law, the federal provisions would need to be considered in crafting any state renewable energy program. [67]

[67] Whether or not Michigan has enacted an RPS or similar policy may ultimately dictate the impact a federal mandate, if passed, would have on the state. For example, one of the federal proposals would give states credit for previously installed renewable energy systems. Some utilities reported to the MREP Collaborative that their companies have been unwilling to participate in additional renewable resource development, in case any newly acquired generation might not qualify under a federal RPS, if one should pass. Based on news reports from November 16, 2003, the current draft federal energy bill does not include an RPS.

8.1.2 State RPS Proposal

A Renewable Portfolio Standard was introduced by Representative Chris Kolb (D-Washtenaw County) on July 16, 2003 as House Bill 4970 and referred to the Committee on Energy and Technology. This bill would establish a target of 7% renewable energy by 2006, steadily increasing to 15% by 2013. By way of comparison, the Wisconsin RPS enacted in 1999 requires only 2.2% of all retail sales from renewable sources, by 2011.[68]

MREP Collaborative members reviewed HB 4970 in an effort to recommend changes to the bill that would increase support for its passage. Again, it must be emphasized that these recommendations do not represent any official consensus on the part of the Collaborative or the Staff. Some Michigan utilities are opposed to any mandatory portfolio directive and note that some retailers have contracts with specific suppliers, leaving them subject to liability if they are forced to purchase outside of those contracts. In lieu of mandates, they prefer the use of voluntary renewable energy targets, with financial incentives awarded to companies that meet the proposed targets. The suggestions include:

1. Reduce the portfolio percentage of required renewable energy significantly. It is generally believed that the proposed percentages are unreachable in the given time frames, given Michigan's renewable resource potential, except through the purchase of renewable resources from out of state. Michigan renewable resource potentials need to be evaluated, and any RPS should be based on a reasonable assessment of the technical and economic potential.

2. Require portfolio percentages as a set-aside for some percentages of all increased sales, rather than a percentage of the supplier's overall portfolio. The concept of this suggestion is that the percentage might be higher, as a portion of increased sales. Focusing on increased sales would help reduce utility fears that adding costs to meet a renewable energy portfolio would result in more customers switching to AESs. Some utilities felt a portfolio standard would be more acceptable to utilities if it required additional renewable energy purchases only to the extent that utility sales were increasing. If utility sales were reduced due to sales losses to competitive suppliers, then they would not face a portfolio requirement. Another variation on this approach could be to require a portfolio set-aside for both increased sales and new power supplies to replace utility plants that are retired from service. The thinking behind that variation is that a requirement for a larger portion of new renewable supplies is an appropriate policy response, as Michigan's aging coal plants eventually need to be replaced.

3. Change the definitions of renewable energy resources which qualify for the RPS to match the renewable energy definition in PA 141. As written, the HB 4970 definition does not include either hydroelectric or photovoltaic power supply options.

4. Allow currently existing renewable resources to be included to fulfill any requirement. Depending on the RPS level that would be included in any final bill, and whether the required level would be set as a percentage of total generation, new sales, or by some other mechanism, some Collaborative members felt that it would be most appropriate to give utilities some kind of credit for the renewable resources that are already included in existing portfolios. A mechanism to do this could help to level the playing field between the few Michigan utilities that already incorporate much higher percentages and those that have hardly any renewable energy resources in their current supply mix.

[68] Wis. Stat. § 196.378.

5. Remove the requirement that 5% of the amount generated or acquired during each calendar year be from solar energy, and allow companies to purchase the most cost effective alternatives available. Another variation on this concept is to allow credits for solar and perhaps other renewable energy technologies that do not generate electricity, such as daylighting or solar water and space heating.

6. Increase the terms of renewable energy contracts to not less than twenty years, instead of the ten-year minimum as provided in the bill as drafted.

Staff recommends that an important first step for Michigan in considering an RPS or related policy is for Michigan's renewable energy resource potential to be better understood. Staff proposes to work with MREP Collaborative members in order to obtain good estimates of the potential for cost-effective development of Michigan's renewable energy resources, and will make those estimates available to the Commission and Legislature for their consideration.

8.2 Tax Incentives and Renewable Energy Property Tax Reforms

Tax incentives have proven to be a successful incentive for increasing both residential and business interest in renewable energy system investments. Tax incentives are also important for large-scale systems because large capital investments often make the associated tax burdens high enough to make it difficult for an otherwise cost effective renewable energy system to compete against existing fossil fuel plants that have been depreciated. The differences in tax treatment for various energy technologies are based in part on differences between capital versus fuel and operating costs. Generally speaking, renewable energy technologies have higher capital costs and lower fuel costs. Therefore, new renewable energy systems are hampered in competition with traditional fossil fueled systems to the extent that the existing tax structure imposes greater burdens on capital costs. This is a particular problem for property taxes on energy systems.

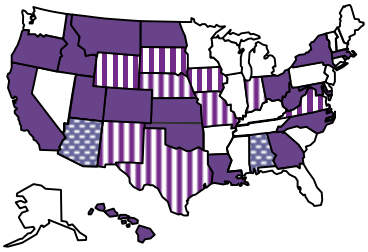
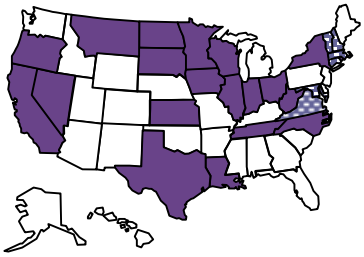
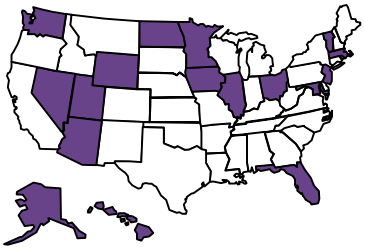
The DSIRE database lists 31 states that provide renewable energy tax incentives (either personal, corporate, or both), 20 states with property tax exemptions, and 19 with sales tax exemptions.[69]

Michigan currently provides some tax incentives to promote renewable energy businesses, but there are no existing incentives for homeowners or individuals. In addition, two bills have been introduced that would provide income tax deductions or credits for renewable energy equipment. Senate Bill 0208 of 2003 would provide a Michigan income tax deduction of up to $500.00, for the purchase of a qualifying hybrid-fueled vehicle, as that term is defined in the Michigan NextEnergy authority act (2002 PA 593, Section 2; MCL 207.822). Hybrid-fueled vehicles are not necessarily renewable energy technologies. This bill was introduced in February, and has been referred to the Senate Committee on Finance. House Bill 4092 of 2003 would provide income tax credits for residential scale wind and solar photovoltaic projects. It would provide a tax credit for taxpayers who own qualifying solar photovoltaic or wind generator property that generates electricity, and lease the equipment to another person. The taxpayer (lessor) could then claim an annual credit equal to the lease payment. This bill was introduced in January, and has been referred to the House Committee on Tax Policy.

[69] The DSIRE database has not yet been updated to include tax incentives offered through Michigan's NextEnergy program. See http://www.dsireusa.org/library/docs/Finance.doc.

House Bill 4010 of 2003 (PA 5 of 2003) was signed by Governor Granholm on April 24. It amends Section 2 of 1974 PA 198 (MCL 207.552), the Plant Rehabilitation and Industrial Development Districts Act, which provides tax exemptions for certain types of facilities. This act already included provisions for tax abatements for certain "hydro-electric dams" and "electric generating facilities fueled by biomass." HB 4010 added to the definition of qualifying "industrial property" facilities for the "creation or synthesis of biodiesel fuel."

Figure 4: DSIRE Maps of State Tax Incentives for Renewable Energy

Personal or Corporate Taxes	Property Tax Exemptions	Sales Tax Exemptions
		
= Both Personal & Corporate = Personal only = Corporate only	= State gives localities the option to offer an exemption = States with property tax exemptions or special assessments	
Source: Database of State Incentives for Renewable Energy; www.dsireusa.org		

The Michigan NextEnergy Authority (MNEA) was created to promote the development of alternative energy technologies and to provide tax incentives for business activities and property related to the research, development, and manufacturing of those technologies. The Authority is responsible for certifying taxpayers and property as eligible for tax credits against the Michigan Single Business Tax (SBT) or exemptions from the general property tax effective beginning January 1, 2003 and running through 2012 (see http://medc.michigan.org/advmfg).

Taxpayers engaged in research, development, or manufacturing of alternative energy technology and certified as eligible by the MNEA may claim a non-refundable credit against their Single Business Tax (SBT) liability. Personal property that is certified by the MNEA is exempt from personal property taxes. The exemption applies only to personal property that is new to Michigan. The MNEA may certify any of the following: alternative energy system, alternative energy vehicle, personal property of an alternative energy technology business, and personal property of a business that is not an alternative energy technology business but is used solely for the purpose of researching, developing, or manufacturing an alternative energy technology. However, these tax incentives do not always extend to include the renewable energy systems themselves.

The federal government also offers some tax incentives that can assist Michigan businesses. The federal government offers a 5-year (as opposed to 20-yr) accelerated depreciation

schedule for solar energy equipment. Eligible technologies are photovoltaic and solar thermal systems. In addition, a federal investment tax credit up to 10% can be taken on investment or purchase and installation for photovoltaic and solar thermal systems.[70]

The federal Renewable Energy Production Incentive was authorized under section 1212 of the Energy Policy Act of 1992.[71] Qualifying facilities are eligible for annual incentive payments of 1.5 cents per kilowatt-hour (1993 dollars and indexed for inflation) for the first ten-year period of their operation, subject to the availability of annual appropriations in each Federal fiscal year of operation. Qualifying facilities must use solar, wind, geothermal, or biomass (except for municipal solid waste combustion) generation technologies. Eligible electric production facilities are those owned by State and local government entities (such as municipal utilities) and not-for-profit electric cooperatives that started operations between October 1, 1993 and September 30, 2003. For example, Traverse City Light and Power reports it has received $68,804 in incentives for wind power production from 1996-2001.

The Energy Policy Act of 1992 also provides federal tax incentives to businesses for certain types of new renewable energy generation facilities. Closed-loop biomass, poultry waste, and wind are eligible for 1.5 cents per kWh credit adjusted annually for inflation (1.8 cents per kWh for 2003) for the first ten years of operation.

MREP Collaborative members generally recognize that the existing tax structure presents some significant barriers to further development of renewable energy resources, but no consensus has yet been reached on what approaches make sense to try to remedy the situation. There is a general consensus on the part of Collaborative members that the current system of property taxation is not favorable to renewable energy resources, but it remains to be seen how much consensus can be reached on specific measures. The suggestion that has been discussed, generally, is to tax renewable energy equipment for property tax purposes based not on the capital cost of the renewable energy equipment, but based on the value of the electricity or other energy produced, instead. If this type of change can be implemented rapidly without forcing changes to the way that traditional energy supply technologies are taxed, then Staff expects the MREP Collaborative would support this approach. As is typical with respect to any proposed changes in tax codes, however, it seems politically more feasible to gain consensus on adding a new tax incentive for a specific purpose, rather than more general tax reform. Staff notes a growing interest, worldwide, and some significant successes in ecological tax reform or what is termed environmental, green, or social tax shifting (see, for example, Brown, 2003, p. 210-214; and www.progress.org/banneker/shift.html). Staff recommends that these broader approaches be explored.

Staff recommends that the Commission bring the current situation regarding property taxes to the attention of the appropriate officials in State Government, and request the opening of a dialogue to search for solutions.

8.3 MPSC Staff Generic Green Pricing Program Framework

The Commission established a proceeding in Cases Nos. U-12915 and U-13843, invited the filing of company-specific renewable energy proposals from Michigan electric utility companies, and indicated it will "set forth a schedule for the Staff to bring… proposals to the Commission for its consideration" (Id.). The Commission further stated it "will take into account in its

[70] See http://www.irs.gov/pub/irs-pdf/f3468.pdf, Line 2.
[71] See http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=US13F&State=Federal&currentpageid=1.

assessment of new proposals the extent to which existing tariffs and proposals meet the goals of Act 141" (Id.). MPSC Staff presents this draft generic framework as a starting point for dialogue among interested parties. Staff believes this generic framework might form the basis for a consensus among interested parties. Staff's focus is to attempt to identify mechanisms that can be used to promote renewable energy according to the goals identified in MCL 460.10r(6), given our state's particular circumstances, including our state's utility regulatory and legislative structures.

It is important to understand that the following Staff Proposal does not represent a consensus on the part of MREP Collaborative participants. Some utility participants commented that legislative changes would be required in Michigan before any form of bidding and procurement of renewable energy could be adopted. Staff indicated that this proposal could result in voluntary renewable energy plans for all Michigan utilities, but the MREP Collaborative discussions to date have not suggested that any Michigan utilities are ready and willing to adopt a program such as the one suggested here by Staff.

In essence, the current proposal consists of mechanisms for each Michigan utility to: (1) solicit competitive bids for renewable energy production; (2) enter into long-term, fixed-price contracts with the winning bidders to purchase renewable energy; (3) offer renewable energy products and services to customers on a voluntary basis; and then (4) pass through remaining costs, if any, through a non-bypassable surcharge or via the power supply cost recovery (PSCR) process. The full proposal is located in Appendix C of this report. This issue is currently being considered in Case No. U-13843.

8.4 Utility and Supplier Incentives for Renewable Resources

Staff's final recommendation is for the Commission to consider financial incentives for Michigan utilities to provide exemplary renewable energy progress. Under the current regulatory structure in Michigan, utilities have little incentive to fully participate in increasing Michigan's use and development of renewable energy. The incentives that do exist are primarily indirect, such as improved customer relations and perhaps retention among the relatively small group of customers who participate in utility green pricing programs, and the intangible promise that renewable energy progress could eventually result in economic development and thus growth in sales for the utilities.

As Moskovitz (2000) explains, "Harnessing market forces in distribution services requires innovative policies and a distribution utility environment that encourages, or is at least neutral to, the deployment of any cost-effective resource that meets customer and utility needs." Given the present regulatory structure in Michigan, if renewable energy resources are installed on the customer's side of the utility meter then they result in lost sales and revenues to the utility. With a regulatory structure that rewards utilities for throughput, it is to be expected that utilities will be less than enthusiastic about policies to encourage this type of bypass. In fact, modeling by Moskovitz and his colleagues using data for U.S. utilities indicates that a sales reduction of just five percent will cause a drop in utility profits of over 20 percent for most companies.[72]

The Commission last explored the overall question of electric utility incentives in Case No. U-10574, in 1994, and has revisited the subject in a more targeted way in more recent cases regarding performance based regulation (PBR) and standards for utility service under

[72] The same models indicate the situation would be even worse for a utility company engaged only in distribution, not generation. For a distribution-only utility, a 5% reduction in sales results in approximately 50% reduction in profits.

MCL 460.10p(5) (see Case No. U-12270). Staff believes that the time has come to explore utility incentives and performance standards again, with a view towards enhanced development of renewable energy options for Michigan's future. Staff proposes to work with MREP Collaborative members to explore appropriate options for utility incentives and performance standards, with the hope that a consensus proposal can be developed for presentation to the Commission.

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Appendix B - Educational Activities

Public Education

Great Lakes Renewable Energy Association (GLREA)
The Great Lakes Renewable Energy Association educates the public about renewable energy and energy efficiency initiatives throughout the state as requested by community organizations. GLREA is also holding Wind Town Hall Meetings in Lansing on November 18, 2003 and in Marquette on January 17, 2004 to inform the public about the benefits and issues surrounding wind energy development.

Lawrence Technological University
Lawrence Technological University, in Southfield, Michigan, has begun a series of Alternative and Emerging Energy Studies Visiting Scholar Guest Lectures that are open to the public, as well as for Lawrence Technological University students. The first guest lecture is to be delivered by Dr. Dale Berg, a Principal Member of the Technical Staff in the Wind Energy Technology Department at Sandia National Laboratories in Albuquerque, New Mexico, on November 6, 2003. Dr. Berg's lecture topic is on *"Wind Energy 2003: A Viable and Clean Energy Source"* at the Lawrence Technological University Campus. Additional guest lectures are planned for 2004.

K-12 Educational Programs

Energy Office K-12 Education Program
The Energy Office has an ongoing grant program related to Energy Education for grades K-12. In 2002/2003 nineteen counselors, 319 teachers, and approximately 6,300 students were reached by the 4 projects that were funded. There was a total $90,000 for the four projects: $30,000 for Michigan Association of Conservation Districts and $20,000 each for Urban Options, American Association of Blacks in Energy, and Southwestern Michigan College.

Granger School Education (www.grangernet.com)
Granger Energy Company (Lansing) conducts routine tours of its landfill gas to electricity plant and resource recycling center, and educational meetings with area K-12 schools. It is a formal scripted program that has become part of the curriculum at Lansing area schools. Similar programs could be an inherent part of school curriculum around the state like recycling projects were in the past.

Lawrence Technological University Summer Science Program
Lawrence Technological University, in Southfield, Michigan, offers a summer science program each year for high school students. An Alternative Energy section (including renewable energy) is now being planned for the summer 2004 session. Dr. Robert Fletcher (professor of Mechanical Engineering at LTU) and Dr. William Madden (professor and Chair of the Chemistry Department at LTU) are developing this hands-on educational module.

Learning from Light/Learning from Wind
American Electric Power (AEP) offers a renewable energy education program called "Learning from Light" that allows teachers and students to monitor electric generation production from solar panels supplied to the schools. AEP also runs the "Learning from Wind" program which included placing small wind turbines, like those that would be installed at someone's home or business, at five locations throughout the AEP system. Customers can visit the AEP Web site to track the turbines' energy production to evaluate whether a wind turbine would help meet

their own energy needs (AEP). Similar programs should be encouraged in Michigan. See www.aep.com/environmental/renewables/wind/default.htm for more information.

SolarSchools

GLREA and DTE Energy are working together on the SolarSchools program that provides two to four week renewable energy education, to Grades 4 through 8, as part of the science curriculum. The first 50 schools to sign up for the program were financed by grants from the U.S. Department of Energy, DTE Energy, General Motors, and others. Subsequent schools enrolling may be required to provide a financial contribution to help pay for classroom materials. Oakland University and Eastern Michigan University participated in the development and testing of the SolarSchools curriculum.

SolarWise

Wisconsin Public Service Corporation (WPSC) operates SolarWise, a renewable energy education program for public and private high schools that are electric customers of WPSC. Through this program, schools receive a small solar-electric system on the roof, a three-week renewable energy curriculum package and an opportunity to participate in an annual renewable energy event called Solar Olympics.

Since the program began in 1996, 23 schools have received a total of 82 kilowatts of solar-electric capacity. Together, these systems produce about 122,000 kWh and save the schools roughly $19,000 annually in electricity bills each year. Also, 7,100 students have used the curriculum materials and 63 teachers from 28 schools have attended a one-day training curriculum workshop. Over 700 students have participated in Solar Olympics.

Funds for the solar equipment come from several sources. Nearly 5,000 customers of WPSC voluntarily donate $90,000 annually. U.S. Dept. of Energy grants totaling $227,000 and State of Wisconsin grants of $84,000 have provided additional support. All donations and grants flow through WPS Community Foundation, a nonprofit educational foundation. In addition, the utility (that is, all ratepayers) pay for the administration, promotion and delivery of the program.

Sustainability Education Handbook

Urban Options has established a Sustainability Education Handbook, a resource guide for K-12 teachers, available online at www.urbanoptions.org/SustainEdHandbook.

Zeeland Public Schools

Zeeland Public Schools erected two photovoltaic projects and a wind turbine partially funded through grants, utility donations and private donations. A 1,000 watt photovoltaic system was installed on a middle school in Zeeland in 2001. When the new 172,000 square foot high school was constructed (completed in 2002), the district chose to follow a high performance building design path. The final design includes geothermal heat pumps, energy recovery systems, daylight harvesting, Energy Star roof, high performance lighting, constructed wetlands, a 1 kW photovoltaic system, and a 10 kW wind turbine. This represents the first high school in Michigan to combine these features in a way to enhance the educational process.

GMB architects and engineers, who developed the Zeeland school project, continue to work with the educators to explore the integration of the above features into multiple areas of the curriculum. They have created an access port via the Internet that allows the students (and the general public) to see and understand the basic operation and performance of these systems. It is interesting to note that this building is toured almost weekly by other school districts, architects, engineers and large building owners that are interested in its “green” features. The

Zeeland Board of Education has since adopted a goal of sustainable operation of all facets of the school district. This project also appears to have stimulated other renewable energy efforts in the local area.

See http://www.michigan.gov/documents/CIS_EO_Inside_Zeelandhighschool_50834_7.pdf for more information.

Post-Secondary Educational Programs

DACUM

NextEnergy is funding an initiative to develop a college level curriculum on renewable and alternative energy involving five Michigan colleges and universities. Four DACUM (Developing A CurricUluM) sessions are being held to develop curricula in automotive fuel cells, renewable energy, hydrogen, and small-scale stationary fuel cells. The nine program participants are professionals currently practicing in the field of renewable energy, including a representative from NREL who is an expert on wind energy, representatives from companies in biomass and alternative energy technologies, and two MREP members.

GLREA PV Installer Certification Program

GLREA PV Installer Certification Program: provided through Michigan colleges and approved for financial assistance through UAW/Ford.

Lawrence Technological University Middle School Science Master's Degree Program

Lawrence Technological University, in Southfield, Michigan, offers a Master's Degree in Middle School Science Education and has recently received two grants from the state of Michigan in support of this program. Dr. Robert Fletcher (professor of Mechanical Engineering at LTU), Dr. William Madden (professor and Chair of the Chemistry Department at LTU) and Dr. Anthony Sky (professor or Natural Science) are collaborating to incorporate Alternative and Renewable energy into the LTU Master Degree curriculum to assure that middle school science educators are properly trained in the fundamentals of these emerging energy technologies, and are provided simple but effective laboratory experiments to convey the significance and value of these topics.

NextEnergy Grants

The State of Michigan NextEnergy initiative has awarded $750,000 to three Michigan universities and one community college for the development of a competency based curriculum in Alternative Energy Technology for accredited associate, undergraduate, and graduate degree programs. Continuing education for employees in the science and technology fields will also be a component of the curriculum. Wayne State has proposed a Master's of Science degree in Alternative Energy Engineering that is still under development and requires formal approval by the governing authorities. Alternative technology technical programs are also being developed at Lansing Community College, Kettering University, and Lawrence Technological University. See http://www.nextenergy.org/education/.

Zero Energy Home Design Competition

In 2002, the Energy Office invited accredited architectural colleges in the State of Michigan to participate in a student competition to design Zero Energy Homes. Individual students or teams of students competed for three prizes: 1st - $10,000, 2nd - $7,000, and 3rd - $3,000. A Zero Energy Home was defined as a house that does not use non-renewable, fossil fuels on a net annual basis. Energy to be used in the house was to be provided by passive solar designs, a

photovoltaic system, active solar heating systems, and/or bioenergy systems. Six entries were submitted for the design competition. An evaluation committee comprised of builders, architects, and manufacturers of energy efficiency products reviewed and evaluated the entries based on the following criteria: accuracy and adequacy of energy calculations, quality of building plans, creativity of building design, completeness of materials specifications list, cost of building the house, and the use of Michigan products. Teams from Lawrence Technological University won the 1st and 2nd prizes and Andrews University won the 3rd prize. A 2004 competition is underway. Application forms have to be submitted to the Michigan Energy Office, P.O. Box 30221, Lansing, MI 48909, by December 15, 2004. For details about the current grant cycle, see http://www.michigan.gov/cis/0,1607,7-154-25676_25692-98333--,00.html. For last year's program report, see http://www.michigan.gov/cis/0,1607,7-154-25676_25692-74812--,00.html.

Appendix C – Staff Generic Green Pricing Program Framework

Introduction

In utility integrated resource planning theory, this conundrum is the essence of arguments over precisely what tests of economic value ought to be applied when making decisions about any public utility resource acquisition. Some interest groups advocate that no new resources should be acquired and no expenditures undertaken (or, at least that the Commission should not allow any new expenditures to be passed through to customers in the form of any rate increase), unless the new expenditures meet the benefit to cost threshold of what is called the ratepayer impact measure (RIM) test, sometimes referred to as the "no losers" test. This benefit/cost test asks whether an expenditure will result in utility revenue requirements increasing or decreasing, and only expenditures that result in a decrease in utility revenue requirements are said to pass this test. In essence, passing this economic test means that the utility cost savings that result from a given investment will rapidly exceed the expenditures necessary to cause the savings. It is infrequent that any new power supply option meets this standard. That means, unless and until a utility must procure a new source of power because older units are being retired or contracts are expiring, it is not likely that any new power supply option can replace any existing one and still meet this benefit/cost test. In a very fundamental way, for the time being this means that new renewable energy technologies are being asked to compete head to head against the fleet of existing, partly or fully depreciated, utility-owned power plants.

Renewable energy advocates stress four major counter arguments to this point of view. The first is that the prices at the heart of these benefit/cost tests are not fair to renewable resources because of the effects of subsidies and negative externalities that are not included in the price of the traditional fossil fuel options. For example, burning coal, oil, and to a lesser extent natural gas generates a lot of pollution and the related costs are not included in the fossil fuel price. Similarly, nuclear power has its own set of inherent externalities and subsidies that are not built into its prices. It has been estimated that correcting the resulting price distortions would require roughly a doubling of the total current price of power from coal-burning and nuclear power plants, and adding about one-third to the total current price of power from natural gas.[73] Renewable energy advocates argue that if these current price distortions were corrected, renewable energy would already appear cheaper than fossil fuel options in the market, and therefore renewable energy growth would take off without the need for any further policy intervention. It is clear, however, that the policy changes required to change these fundamental pricing obstacles are not in the purview of the Michigan Public Service Commission.

The second major counter-argument, like a mirror image of the first, is that renewable energy systems will produce many additional positive externalities, in the forms of local self-reliance, local economic development, employment, and the like. Since such positive externalities are not embodied in the price of renewable energy systems, either, this point is very similar to the first one.

The third counter-argument is that environmental imperatives require a much greater reliance on renewable energy systems, and quickly. Many believe that the local, regional, and world environmental sinks (air, water, land, etc.) are not capable of absorbing all of the pollution associated with current, let alone future growth in, fossil fuel production and use. This argument is perhaps strongest in light of concerns about global climate destabilization as a result of

[73] See European Commission, Directorate-General for Research (2003). *External Costs: Research results on socio-environmental damages due to electricity and transport;* Report EUR 20198; http://europa.eu.int/comm/research/energy/pdf/externe_en.pdf.

increasing carbon emissions, primarily as a result of fossil fuel combustion. Irrespective of the concerns regarding global warming, however, there are similar concerns about acid rain precursors, emissions that lead to ground-level ozone formation, and hazardous or toxic emissions of other chemicals, particularly mercury.

The fourth counter argument is that renewable energy technology development is deserving of some special policy support now so that renewable resources will be ready to play a substantial role in the not-too-distant future, when we need to begin replacement of our existing fleet of aging fossil fuel plants. From this point of view, society will be better off if there is some modest level of renewable energy support for the time being, so that we can all gain experience with integrating renewable energy supplies into our utility systems and we begin to develop renewable energy expertise and infrastructure. In this way, through some government intervention in the near term, renewable energy advocates believe we will all be better off in the long term.

Proposal

(1) Soliciting competitive bids for renewable energy production

Each Michigan utility regulated by the MPSC will solicit bids for renewable energy resources. RFPs may be issued by individual utilities or groups of utilities. Depending on the schedule set for Case No. U-12915, MPSC Staff expects the first round of RFPs could be issued not later than fall 2004. The RFPs, as discussed below, could be for: (a) the purchase of specific renewable energy resources from individual project developers or suppliers; or (b) agreements with third-party suppliers who would provide for the turnkey operation of a utility or co-branded green power program.

MREP Collaborative participants generally believe that competitive market forces should be used, as much as possible, to determine which renewable energy resources are developed in Michigan. By issuing a request for proposals (RFP), and scoring proposals on a competitive basis, utilities ought to be able to obtain the maximum quantities of renewable energy at the lowest available prices. Prices are expected to fall as more competition develops for renewable energy supply in Michigan. Within this general framework, each utility company can develop details of their RFPs, to best suit their particular circumstances and needs.

In general, Staff sought MREP Collaborative consensus on the following principles, to be considered in developing and issuing Renewable Energy Resource RFPs:

(1.1) Producers or suppliers of any and all renewable energy resources, new and pre-existing, should be invited to participate in the RFP process.

(1.2) Renewable energy production should be encouraged inside the service territory of the requesting utility company. A lower level of encouragement should be offered to systems inside the state of Michigan, but outside the service territory of the requesting utility company. Systems outside of the state of Michigan may be accepted, but should receive a lower priority in the RFP process.

(1.3) Systems may be encouraged to locate where they will provide the greatest system benefits to the requesting utility. To the extent that the utility can identify areas where distributed energy systems can best contribute to the electric grid, the utility should

invite proposals for developers to locate renewable energy production in those areas.[74] In those cases, RFP's could require proposals that explicitly address the utility's articulated system benefit requirements.

(1.4) Systems should be encouraged which provide the greatest benefits to the utility service territory, in terms of job attraction and retention, economic development, pollution reduction, and so forth.

(1.5) All MPSC regulated Michigan electric utility companies will issue such RFP's in 2004, and at roughly two year intervals thereafter. Again, RFPs may be issued by an individual utility or a group. Experience with the RFPs will be reported to the MREP Collaborative, and MREP annual reports to the Commission will incorporate information about this process.

A "Single-Supplier" Alternative approach was suggested by Detroit Edison, where one or more utilities would issue an RFP seeking a contract with one supplier for the turnkey operation of a green power program. With this approach, a third party would provide a renewable energy program for one or more utility companies. The third party would be responsible for all aspects of a utility or co-branded green power program, including market research, rate design, advertising and marketing, and procuring the renewable energy necessary to serve green power program customers. In this model, the supplier bears all of the market risk, and would have to absorb any shortfalls if green power revenues do not match supplies. Reportedly, at least some green power marketers are willing to accept such risks in exchange for gaining the full cooperation of a host utility; in being able to market directly to the utility's whole customer base. The same business model would appear to be workable in competitive energy markets, but in that case the green power marketers would face much higher customer acquisition costs. This approach could raise potential conflicts with Michigan's code of conduct vis a vis an incumbent utility's competitive posture, but Staff has not yet attempted to explore that issue.

This approach has already been approved by the Oregon public utilities commission and is presently under consideration by the Connecticut department of public utility control for Connecticut Power & Light.*

Green Mountain Energy Company (www.greenmountain.com), for example, has indicated its interest in operating in this manner as a provider of green power to Detroit Edison customers (personal communications with Walter Knake and John Holtz, Green Mountain Energy Co., August & October, 2003). Advantages of this approach are thought to be the reduced implementation costs and efforts on the part of the utility, combined with the greater experience of companies whose primary interest is in developing and offering green power programs, and those companies' buying power. It is thought that green power markets will develop slowly, and a dedicated green supplier would blend renewable energy purchases from other states until Michigan markets developed. Once the Michigan markets were established, then the green supplier would work on the development of in-state renewable energy resources in order to match in state demand. Such details could be explicitly managed through the RFP and the resulting contract between the utility and any third party or parties. Staff is not opposed to this approach, by any means, but to date no Michigan utility has offered a proposal to implement a single-supplier program.

* Oregon PUC adopted a single supplier model in June 2001. See http://www.puc.state.or.us/orders/2001ords/01%2D470.pdf. For information about the Connecticut proceeding, *Investigation of Alternative Transitional Standard Offer Services…,* see http://www.dpuc.state.ct.us/dockcurr.nsf/Web+Main+View/Search+Electric?OpenView&StartKey=03-07-16. It should be noted, however, that Connecticut and Oregon are wrestling with issues different from MREP's (see www.dsireusa.org).

Some alternatives were proposed regarding the issuance of RFPs. Some Collaborative members felt that these concepts were attempting to provide too much specificity. In particular, Section (1.2) was discussed as a concept that has merit, but one which makes the staff proposal more complex and potentially difficult to implement. Similarly, some Collaborative members felt that the economic, environmental and job production benefits mentioned in

Michigan, both Oregon and Connecticut have restructured their electricity markets to offer customer choice.

Connecticut's Clean Energy Fund.

Oregon's single-supplier program was instituted in response to legislation (Chapter 819 Oregon Laws 2001) regarding utility default service provision. All Oregon utilities were required to offer customers a portfolio of cost-of-service rate options, including at least one option "that reflects significant new renewable energy resources". In the first year of these offerings in Oregon, customer participation roughly quadrupled, to a total of about 40,000 customers (Green Mountain Energy Co. Press Release, February 21, 2003). In addition, Oregon has established a non-profit "Energy Trust" to invest its 3% system benefits fund over a 10-year period. The fund totals about $60 million per year, and about $8.7 million per year has been earmarked specifically for renewable energy projects. Oregon has also passed net metering legislation (up to 25 kW), and a state law authorizing local jurisdictions the authority to establish solar and wind access property rights protections.

[74] This concept is explored in detail in the MREP report, under the topic of De-Averaged Distribution System Credits (Section 6.5.6). De-Averaged Distribution System Credits are similar, in principle, to the proposals FERC is currently considering for the transmission system for Locational Marginal Pricing (LMP) along with system planning and bidding for competitive options to relieve transmission constraints. As intended by MPSC Staff, De-Averaged Distribution System Credits will discriminate among renewable energy supply proposals and award an appropriate portion of measured system credits to producers that prove capable of providing required system benefits.

Section (1.4) would be difficult to quantify. They felt that those elements could be highly subjective and anecdotal, and would prove difficult to evaluate in competitive bids. Furthermore, some utility representatives thought that Staff's recommended requirement for RFPs to be issued at two-year intervals was too specific, might impose too much of a burden on smaller utility companies, and would not necessarily provide the benefits Staff assumed in making the recommendation. A counter proposal offered by some Collaborative members would be to issue RFP's as a one-time experimental or pilot project, with the idea that the Commission would assess the success of the pilot effort to determine whether it should be repeated and what changes, if any, would be appropriate prior to any repeat.

Staff's intent in setting out the various criteria in Sections (1.2) through (1.4) was to try to help focus attention on some of the benefits that may result from certain kinds of renewable energy systems. Though Staff agrees those specifications would increase the complexity of an RFP process, Staff recommends that some consideration be given to attempting to develop an RFP process that supports meaningful competition in these dimensions. Also, Staff notes that related MREP efforts might work towards one or more of these specific criteria, outside of the RFP process. For example, transmission costs and line losses associated with wheeling renewable power from outside of the utility service territory might automatically work to provide some extra credit for local projects, as suggested by Section (1.2); the goals of Section (1.3) could be satisfied through de-averaged distribution system credits; and Section (1.4) criteria are now met in part through NextEnergy tax incentives; available to companies that invest in renewable energy research and development and manufacturing in Michigan. Those incentives would tend to provide both a financial benefit to developers who can utilize the NextEnergy credits, and a mechanism to certify claims made by suppliers related to the qualities indicated in Section (1.4).

Staff's intent on recommending that RFPs are repeated at regular intervals is to assure continuity in renewable energy development in Michigan, and to help focus developer attention towards a regularly scheduled opportunity to have their proposed projects compete. Staff is looking for some way to insure that renewable energy development in Michigan will not stall after a single round of RFPs, and then necessitate resuscitation at irregular intervals. Staff believes those elements would be helpful to promote long-term renewable resource development in Michigan, and that the discipline of regular RFPs would help to achieve as quickly as possible the the lower prices associated with competitive markets.

(2) Contracting with winning bidders to purchase renewable energy

Utilities should identify winning bidders and work swiftly to complete contracts so that the new renewable energy resources can be brought on-line as quickly as practical.

(2.1) Contractual Provisions

Contracts should be for a reasonably long duration, such as 10-20 years, depending on the capital costs and operational qualities of the proposed technologies. If acceptable to all parties, the contract term might be matched to any relevant manufacturer's warranty on the renewable energy production equipment.

Contracts should be for a fixed rate, but may include a modest allowance for annual price escalations for O&M, if requested by the bidder. If annual price escalators are used, it has been suggested that they may be based on some commonly used index, such as the Consumer Price Index.

Staff presents these proposals for contractual provisions only as general guidelines for consideration by utilities and suppliers alike. Staff's proposal is for the details of the contracts, including the price and term, to be negotiated between the utility company and supplier, and then for the utility to bring those contracts to the Commission for approval.

(2.2) Energy and Capacity Quantities to Purchase

Staff has attempted to craft a proposal that would result in some significant additions to renewable energy production in Michigan. Any proposed minimum limits on the quantity of energy or capacity to be purchased or the dollar amount spent on renewable power would work in conjunction with utility green pricing programs (item 3, below) to insure there will be negligible, if any, rate impact on non-green rate customers. Nevertheless, Staff is mindful that at least some MREP participants, representing both utilities and customer groups, are of the opinion that there should never be any rate impact on any non-green rate customers as a result of incremental utility purchases of green power.

Staff is mindful of the need to minimize any costs of renewable energy purchases that will not be directly covered by participating green rate customers. Therefore, Staff has identified multiple approaches that utilities might use in order to try to best match quantities purchased or generated by the utility to quantities subscribed by the utility's participating green rate customers.

The two approaches that represent the minimum risk of creating any unassigned costs are for the utility to either: (1) contract with a single-supplier (as described in the text box on page C-3); or, (2) market one or more green rate options to customers, and then procure green power in order to serve the customers who subscribe. With the single-supplier option, all risk is transferred to a third-party who agrees to design, operate, and manage a green power program for the utility. That third-party would absorb any risks for unassigned costs. With the second option, the green rate customer demand leads the process and the utility's procurement of green power supplies lags. During the time lag between customer enrollment and resource procurement, green power could be supplied through the purchase of green tags. It might even be practical for utilities to serve green rate customers by at least temporarily dedicating an appropriate portion of energy produced from previously existing renewable resources to serve green rate customers. Or, another alternative, practiced by some utilities, has been to simply let green rate customers queue up, ready to subscribe when there is a large enough group of customers to support the purchasing of the next increment of green power. Marketing the green power to customers under these circumstances might be more difficult, however, because the green power sources would be less tangible in the early stages (see Bird & Swezey, 2003; Lieberman, 2002; Swezey and Bird, 2001).

Another plausible approach is for the utility to commence purchases in small enough increments that the dollar amounts at risk are very small. For example, a utility might restrict purchases to 10 MW blocks of power; roughly equivalent to 250,000 to 750,000 MWh/year, depending on the capacity factors of the technologies selected. Or, a utility might restrict purchases to a relatively small increment of energy, such as one-half percent of previous year sales. In this approach, the utility green power purchases lead and customer subscriptions lag. Depending on the rate at which new customers would be subscribing and the timing of new green power facility completion and operation, however, there might still be no costs to be assigned to non-participating customers as a result of this approach.

Some Collaborative members expressed the opinion that this type of approach will not work unless some definitive goals or targets are set, in terms of MW or MWh, as if there were a renewable portfolio standard (RPS) in place.[75] Staff does not fundamentally disagree with this point of view, but Staff has tried to craft a proposal that can be expanded to meet customer demand, irrespective of the institution of any RPS.

Another concern expressed by some Collaborative members is that Staff's proposed framework does not address what should happen if there are no acceptable bids in response to a utility RFP. Staff agrees that minimum bid requirements ought to be established in the RFP process, and Staff believes that the utilities could establish reasonable mechanisms to meet this need; perhaps including ceiling prices.

A third concern expressed by some Collaborative members is that the Staff framework does not provide any specific recognition for existing renewable energy programs or supplies, which would precede the proposed RFP process. Some utility members were concerned that utilities would not be able to receive appropriate credit for renewable resources acquired prior to the effective date of any new RPS requirement that might go into effect at either the state or federal level. Staff is certainly not opposed to any provisions that give credit, where credit is due, for utilities that have pre-selected renewable energy resources to serve their customer needs.

Finally, an alternative formally recommended by the Michigan Independent Power Producers Association (MIPPA) is for the Commission to "establish an MREP that will immediately begin a process to deliver an additional 300 MW of name plate capacity which could generate an estimated 1,200,000 MWH of new renewable, Michigan-based energy. When construction has begun on 100 MW of new capacity, an additional 100 MW should be ordered until a total of 600 MW of new capacity has been contracted." (Position Statement of the Michigan Independent Power Producers Association, Cases Nos. U-12915 and U-13843, received September 8, 2003, p. 2).

(3) Offering Renewable Energy Products and Services to Customers on a Voluntary Basis

Utilities should be encouraged to offer various green pricing options to their customers. As some experience has already shown in Michigan and other states, at least some customers may be interested in voluntarily purchasing green power, even at fairly substantial price premiums. At least some green pricing options should include voluntary long-term, fixed price contracts for those customers who prefer to purchase all or a portion of their electricity from a customer-preferred mix that incorporates extra renewable energy production. Utilities should develop a reasonable menu of choices for customers, based on the best current information about green power marketing (see www.eere.energy.gov/greenpower).

(4) New Renewable Energy Contracts in a Non-Bypassable Surcharge or the PSCR Process

Right now, four different sources of revenues have been identified through which the utility can pay for the costs of a renewable energy purchase. These include:

[75] Renewable portfolio standard legislation has been introduced in the Michigan legislature, in House Bill 4970. That legislation is reviewed and discussed in Section 8.1.2 on page 54.

(4.1) Avoided Utility Production or Purchased Power Costs

(4.2) Green Price Premiums paid by Green Rate Customers

(4.3) Emissions Credits

(4.4) System benefits

Any costs for renewable energy purchase agreements that are not otherwise recovered by the utility through one of these four categories will be included in a non-bypassable charge, or through the utility's PSCR costs and recovered from all full-service customers.

Some members of the MREP Collaborative expressed the opinion that the Commission does not have the legal authority to assign through the PSCR mechanism any above-market price costs associated with green power purchases. Staff does not necessarily agree with that point of view, but will not attempt to address those legal arguments in this discussion.

Michigan utilities appear to be united in their preference for a non-bypassable charge mechanism, in order to maintain their position in competitive energy markets. They are worried that adding any generation related charge only to full-service customers, no matter how small a charge, would serve as an encouragement to customers to switch from their incumbent utility to service from alternative electric suppliers. A possible alternative suggested by the utilities is for any new green power programs to apply equally to both regulated utilities and AESs. And, at least some utilities repeat the belief that new legislation is necessary prior to any Commission action that would require any specific green power programs on the part of either utilities or AESs.

Staff does not think that the dollar amounts under consideration as a result of the implementation of a green power program as described in this framework could rise to such a level of concern to customers. On the contrary, Staff expects the design and implementation of a good green power program along the lines described in this framework would be most likely to assist the incumbent utilities in customer retention. Green market research suggests that the most likely reason that small customers switch to an AES is explicitly because the customers want to obtain green power. Given a well-designed utility green marketing and green tariff program, the utility could attract customers into long-term contracts and thus perhaps gain competitive advantage. In any case, Staff is not opposed to a non-bypassable charge being used as a cost recovery mechanism for green power purchases, if necessary, if that is necessary to ameliorate the utilities' fears about this matter.