

REGULATION OF RENEWABLE ENERGY RESOURCE SYSTEMS

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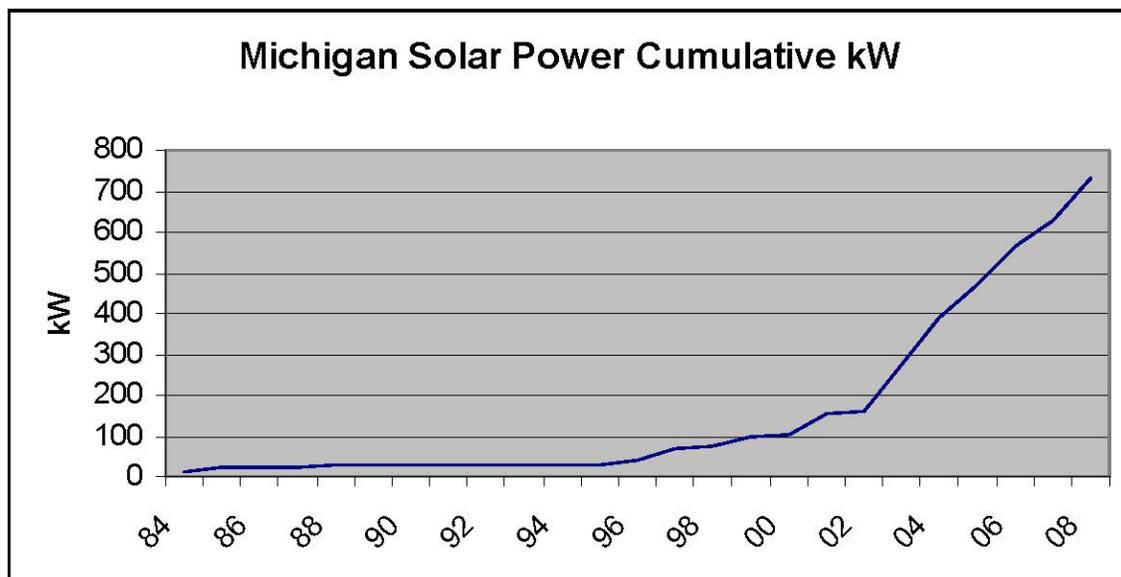
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On April 6, 2006, Governor Grandholm issued Executive Directive No. 2006-2 entitled the “21st Century Energy Plan.” This directive ordered the Chairman of the Michigan Public Service Commission to prepare an Energy Plan for the State of Michigan that utilized Renewable Energy Technologies and included standards requiring that a portion of the energy consumed in our State be derived from Renewable Energy Resources. Those standards became law in October of 2008 when the Governor signed into law the Clean, Renewable and Efficient Energy Act, MCL 460.1001 et seq. This Act has four stated purposes:

1. Diversify resources to reliably meet the energy needs of State residents,
2. Provide greater energy security through the use of indigenous energy resources available within the State,
3. Encourage private investment in renewable energy and energy efficiency, and
4. Provide improved air quality and other benefits to energy customers and citizens of this State.

In furtherance of Executive Directive No. 2006-2, the Clean, Renewable and Efficient Energy Act created a Renewable Energy Standard that requires Michigan electric providers to generate 10% of their retail electricity sales from Renewable Energy Resources by 2015. This requirement is being phased in by the use of annual interim compliance requirements beginning in 2012.

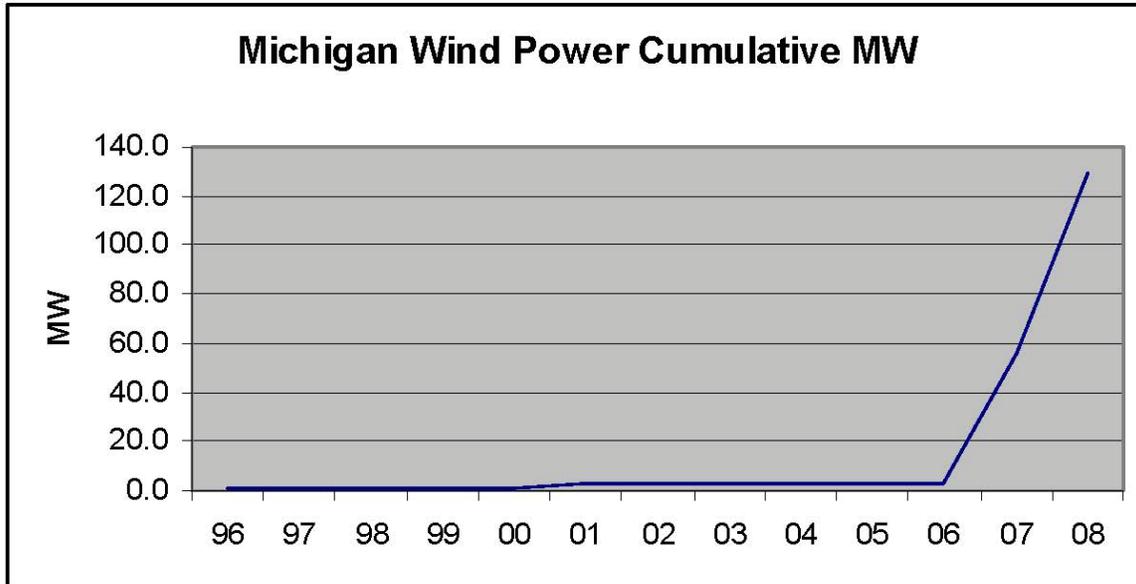
Fortunately, for investor owned utilities subject to the Renewable Energy Standard, the amount of electricity generated from Renewable Energy Resources has been on the rise in Michigan. The amount of solar systems being installed in our State began to rise in 1996 and has continued to increase, as is shown below.



Source: Michigan Department of Energy, Labor and Economic Growth¹

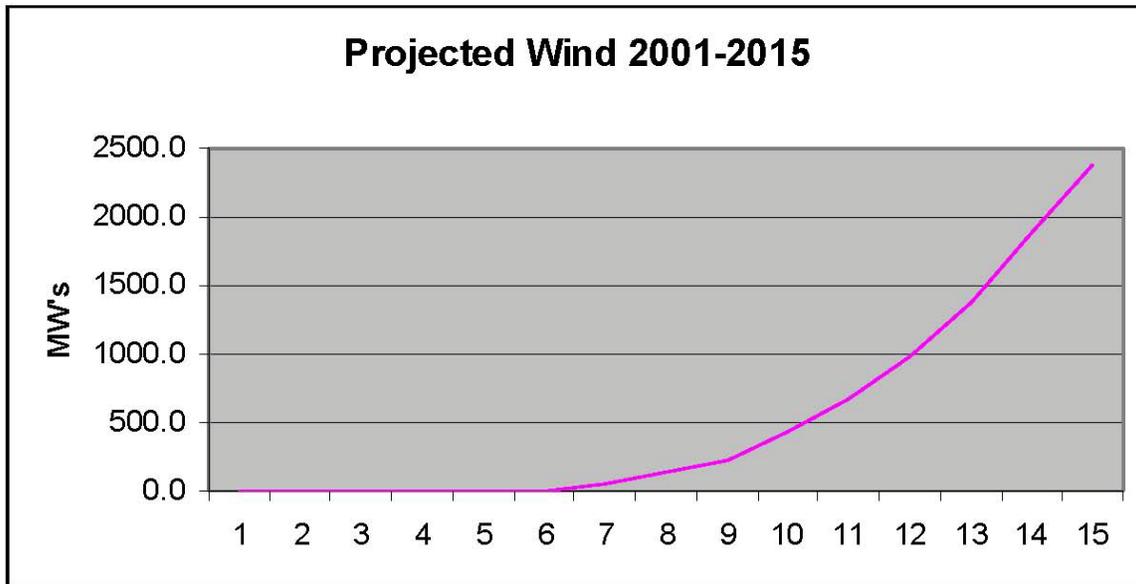
¹ Wind and Solar Energy Website

The same trend applies to electricity generated using wind energy systems. The chart below indicates that 130 MW of wind power has been installed in Michigan as of the end of 2008.



Source: Michigan Department of Energy, labor and Economic Growth²

The amount of wind energy systems is also projected to increase dramatically in the upcoming years, as is shown below.



Source: Michigan Department of Energy, Labor and Economic Growth³

² Wind and Solar energy Website.

³ Id.

A. WHY RENEWABLES

The generation of electricity is responsible for (1) 36% of all carbon dioxide pollution, (2) 64% of all sulfur dioxide pollution, (3) 26% of all nitrogen dioxide pollution and (4) 34% of all mercury pollution⁴. Electricity generated from clean renewable resources reduces air pollution, increases fuel diversity, saves natural resources and provides a hedge against increases in the price of fossil fuels used to generate electricity. It is estimated that construction of 1,000 megawatts of new wind power in Michigan would result in a carbon dioxide reduction of 2.9 million tons every year.

Construction of Renewable Energy Resource systems can also result in substantial economic benefits. It is estimated that the cumulative economic benefit from construction of 1000 MW of new wind energy systems in Michigan would total \$1.3 billion dollars.⁵ Included in this amount are \$18.6 million dollars in new local property tax revenues, 2,830 construction jobs and 507 long-term jobs.⁶

The Land Policy Institute of Michigan State University conducted a similar study.⁷ It concluded that approximately 1,100 construction jobs per year will be generated for the next two decades due to anticipated utilization of wind energy systems. Approximately three thousand permanent jobs will be created to manage and maintain wind installations by 2029. The earnings associated with these jobs are projected to be 96 million dollars by 2029. These numbers could increase dramatically if Michigan could attract businesses manufacturing the individual components of wind energy systems to the state.

B. WHAT IS A RENEWABLE

The Clean, Renewable and Efficient Energy Act, MCL 460.1001 et seq, provides the benchmark for what constitutes a Renewable Energy Resource in the State of Michigan:

A Renewable Energy Resource = a resource that naturally replenishes over a human, not a geological, timeframe and that is ultimately derived from solar power, water power, or wind power. Renewable Energy Resource does not include petroleum, nuclear, natural gas, or coal. A Renewable Energy Resource comes from the sun or from thermal inertia of the earth and minimizes the output of toxic material in the conversion of the energy.

Specific examples of Renewable Energy Resources include, but are not limited to:

- (i) Biomass.
- (ii) Solar and solar thermal energy.

⁴ “Michigan Siting Guidelines for Wind Energy Systems,” Michigan Department of Energy, Labor & Economic Growth, March 5, 2007.

⁵ “Economic Benefits, Carbon Dioxide Emissions Reductions, and Water Conservation Benefits from 1,000 Megawatts of New Wind Power in Michigan,” U.S. Department of Energy.

⁶ Id.

⁷ “Project Impacts of Renewable Portfolio Standards on Wind Industry Development in Michigan,” Dr. Soji Adelaja and Dr. Yohannes Hailu, Land Policy Institute, Michigan State University.

- (iii) Wind energy.
- (iv) Kinetic energy of moving water, including all of the following:
 - (a) Waves, tides, or currents.
 - (b) Water released through a dam.
- (v) Geothermal energy.
- (vi) Municipal solid waste.
- (vii) Landfill gas produced by municipal solid waste.

Not all Renewable Energy Resources are readily available in the City of Flint. Those having potential for use in the City of Flint, and hence, the need for regulation, are discussed below.

1. BIOMASS

Biomass is organic matter available on a renewable basis. It can be generated through natural processes or as a by-product of human activity. The Clean, Renewable and Efficient Energy Act, MCL 460.1001 et seq., defines Biomass as:

Organic matter that is not derived from fossil fuels, that can be converted to usable fuel for the production of energy, and that replenishes over a human, not a geological, time frame, including, but not limited to, all of the following:

- (i) Agricultural crops and crop wastes.
- (ii) Short-rotation energy crops.
- (iii) Herbaceous plants.
- (iv) Trees and wood, but only if derived from sustainably managed forests or procurement systems.
- (v) Paper and pulp products.
- (vi) Precommercial wood thinning waste, brush, or yard waste.
- (vii) Wood wastes and residues from the processing of wood products or paper.
- (viii) Animal wastes.
- (ix) Wastewater sludge or sewage.
- (x) Aquatic plants.
- (xi) Food production and processing waste.
- (xii) Organic by-products from the production of biofuels.

The production of energy from this Biomass requires that it be subjected to some physical, chemical or biological conversion process such as combustion, gasification, fermentation or anaerobic digestion.

The Michigan Department of Energy, Labor & Economic Growth has created a Biomass Energy Program with the express goal of encouraging the production and use of energy derived from the State's biomass resources. Through a variety of research and funding initiatives, it focuses primarily on anaerobic digestion, biodiesel, energy crops and ethanol.

The City of Flint has already begun the process of utilizing biomass as a Renewable Energy Resource. The City has partnered with Swedish Biogas International to produce biogas from sludge generated at its Wastewater Treatment Plant. The CEO of Swedish Biogas International was recently in town to answer questions poised by residents living near the wastewater treatment plant. Those neighbors expressed concerns typical of people living near industrial facilities including those relating to safety, impact on property values and the use of hazardous substances.⁸

Biomass needs to be subjected to a physical, chemical or biological process to allow utilization of its stored energy. Some of these processes have the potential to negatively impact local residents. Consider the issue of Outdoor Wood Boilers ('OWB').

An OWB is a wood fired furnace housed in a freestanding structure resembling a small shed. Wood is by definition, biomass. In fact, it is the most commonly used biomass resource.⁹ Although designed for rural use, OWBs are becoming more common in residential and populated areas. They are also becoming a leading cause of citizen complaints lodged with governmental agencies.

The two major components of an OWB are the firebox and water reservoir. Wood is burned in the firebox to heat water. The heated water is then pumped to the house and circulated through the home's heating system. A thermostat installed in the house controls the fire. When the desired thermostat temperature is reached, the firebox is intentionally deprived of oxygen causing the fire to smolder. A smoldering fire is an inefficient one. Smoldering fires generate large amounts of smoke. They also emit high concentrations of particulate matter.

According to the EPA, OWBs burn at half the efficiency of a typical indoor wood-burning stove. This low efficiency translates into the need to burn more wood to generate heat. The more wood burned, the more smoke generated.

Unlike indoor wood stoves, the EPA does not regulate OWBs. To put the emissions generated from an OWB into perspective, one OWB generates as much air pollution as (1) 12 EPA certified indoor wood stoves, (2) 1,000 homes with oil heat, or (3) 1,800 homes heated with natural gas.

⁸ "Biogas chief tells Flint Township residents new process completely safe if done properly," Teri Banas, MLive, November 2, 2009.

⁹ "Clean Energy from Wood Residues in Michigan," Michigan Biomass Energy Program, Discussion Paper, June 2006.

Many scientific studies have shown wood smoke negatively affects human health. The smoke generated from an OWB contains a complex mixture of gases and particulate matter. Once inhaled, these particles can affect the heart and lungs as well as aggravate existing diseases.

The Michigan Department of Environmental Quality (“MDEQ”) has performed several studies on the emissions released from OWBs. One such study compared the 24-hour average of particulate matter downwind of an OWB near Mass City to the highly urbanized area of Allen Park. Mass City is about 15 miles southeast of Ontonagon in Michigan’s Upper Peninsula. The MDEQ found that the concentration of particulate matter in the air around Mass City was over two times the amount detected in Allen Park. In fact, the concentration of particulate matter in the air in the tiny municipality of Mass City was almost double the short term National Ambient Air Quality Standard for particulates.

The MDEQ has created a Model Ordinance to regulate all outdoor burning.¹⁰ It contains an entire Section devoted to OWBs. The Model Ordinance provides a municipality with three options. It can ban OWBs outright, prohibit any installation until Federal guidelines pertaining to the manufacturing of these devices are created, or limit their use to designated zoning districts with a 300-foot (or greater) minimum setback from any adjacent buildings.

While beneficial for the creation of energy, biomasses feed stocks are no different than any other Renewable Energy Resources. To minimize detrimental impacts on surrounding neighborhoods, the process used to generate the energy must be done correctly using proper practices and best available technologies. Large-scale biomass energy production facilities would use scrubbers or other air pollution control technologies to capture particulates and reduce emissions. OWBs contain no such control technologies therefore if their impacts are going to be controlled, it must be accomplished through governmental imposed restrictions. Because the State has chosen not to involve itself directly with the regulation of OWBs, the matter must be addressed at a local level.

2. WIND

Wind energy has received a lot of media attention lately and is plentiful in some areas of our State. Michigan ranks 14th among the states in terms of its potential for wind power capacity.¹¹

The Michigan Wind Energy Resource Zone Board commissioned a study to identify areas of the State with the highest wind energy harvest potential for the possible placement of Wind Energy Conversion Systems.¹² The Board identified four regions in (1) Allegan County, (2) Antrim and Charlevoix Counties, (3) Benzie, Leelanau and Manistee Counties, and (4) Bay, Huron, Saginaw, Sanilac and Tuscola Counties. Before

¹⁰ “Model Ordinance for Outdoor and Open Burning,” MDEQ, September 2006.

¹¹ “20% Wind Energy by 2030:Increasing Wind Energy’s Contribution to U.S. Electricity Supply,” U.S. Department of Energy, 2008.

¹² “Final Report of the Michigan Wind Energy Resource Zone Board,” October 15, 2009. The Clean, Renewable, and Efficient Energy act defines a Wind Energy Conversion System as one or more wind turbines with a capacity to generate 100 kilowatts or more of electricity. MCL 460.1013(e).

reaching its conclusion, the Board deemed all urban areas as undesirable locations to support the placement of wind farms.¹³

The spectrum of wind energy harvest potential is divided into classes based on wind speed. The classes range from Class 1 (the lowest) to Class 7 (the highest). Exhibit 1 shows the wind classification of the State of Michigan. In general, a wind power of Class 4 or higher is considered ideal for powering large wind turbines. Advances in technology may make a number of locations in Class 3 areas suitable for utility scale wind development. Flint is located in an area designated as Class 1 thus, limiting its suitability for large utility scale Wind Energy Conversion Systems.¹⁴ While the prospect of large-scale wind farms may be remote, there is the potential for the installation of single wind turbine systems. The Michigan Wind Energy Resource Zone Board study cautioned that identification of the four regions with the highest wind energy harvest potentials does not mean that all wind development will necessarily occur in those areas. In fact, the Board pointed out that there are existing Wind Energy Conversion Systems currently operating outside of the identified regions including the Stoney Corners wind project that was placed into commercial service in 2008.¹⁵

The Michigan Wind Energy Resource Zone Board Final Study identified the Bay, Huron, Saginaw, Sanilac and Tuscola counties as one of the four regions having the highest wind energy harvest potential. The largest wind farm in Michigan, the Harvest Wind Farm, is comprised of 32 wind turbines scattered this region. Prior to publishing the Final Report, the Wind Energy Resource Zone Board held a public hearing in Bad Axe to hear the public's comments on locating additional wind turbines in the area. One neighbor of a wind turbine described the experience of residing next to a large wind turbine as "a living nightmare."¹⁶ Repeated negative references were made to the noise generated by these turbines. One resident compared the sound of an operating wind turbine to that of a hovering helicopter.¹⁷ Many residents spoke of disrupted sleep patterns and changed lifestyles. Some residents claimed they were forced to run air conditioners or fans in an attempt to mask the noise generated by nearby turbines.

Information on the safety records of wind turbines is hard to come by.¹⁸ The most common type of accident associated with wind turbines is blade failure. Pieces of broken blades have been known to travel over 1,200 feet from a wind turbine. Incidents have been reported where pieces of blades have gone through roofs and/or walls of nearby buildings.¹⁹ The second leading cause of accidents associated with wind turbines is fire. Because of their height, there is little a local fire department can do except watch the fire burn out. The third leading cause of accidents associated with wind turbines is structural failure. Despite being engineered to detailed specifications, wind turbines do collapse on occasion. There are several video clips on You-Tube showing the collapse of wind turbines.

¹³ Id. at p. 6.

¹⁴ "Michigan 50-Meter Wind Resource Map," U.S. Department of Energy.

¹⁵ "Final Report of the Michigan Wind Energy Resource Zone Board" at p. 7.

¹⁶ Transcript of Wind Energy Resource Zone Board, Public Hearing 1, August 24, 2009 at p. 9.

¹⁷ Id. at pp. 10-11.

¹⁸ "Summary of Wind Turbine Accident data to November 1, 2006," Caithness Windfarm Information Forum, www.caithnesswindfarms.co.uk.

¹⁹ Id.

The Final Report of the Michigan Wind Energy Resource Zone Board notes that the availability of specific zoning requirements governing the siting and construction of wind turbines (and associated infrastructure) will affect the deployment of wind energy systems. As Federal and State policies become more supportive of the use of Renewable Energy Resources, the need for local regulation becomes critical for protecting the safety of citizens.



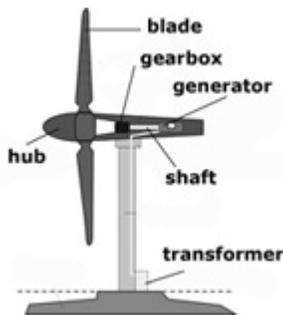
Figure 1-Commercial Wind Farm

The siting of a wind turbine creates a multitude of issues. The more common include:

- Access. Restrictions are required to limit direct contact to the interior of the wind turbine tower, electrical equipment and climbing apparatus.²⁰
- Appearance. The goal is to limit aesthetic displeasure and ensure design uniformity.
- Electrical. Electrical transmission wires must be managed properly
- Height. Wind speeds vary by height with the faster speeds generally occurring at higher elevations. Thus, there is potential conflict between the need to restrict the height and the developers desire to maximize energy production.
- Lighting. Compliance with FAA regulations generates light pollution.
- Noise. One of the most controversial aspects of siting a wind turbine.

²⁰ The system should be constructed to prevent unauthorized access.

- Restoration requirements. How will the site be restored after the turbine's useful life or abandonment.
- Shadow Flicker. Shadow Flicker is the strobe light effect created by light passing through rotating blades of a wind turbine.
- Signage. A wind energy system can easily become a billboard thus signage should be discouraged while at the same time providing for warning and identification signs
- Signal interference. Consideration should be given to potential interfere with television, microwave, navigational or radio reception in neighboring areas.
- Space and Density. How many wind energy systems are allowable in a given area.



The Michigan Department of Energy, Labor & Economic Growth (“DELEG”) identified factors commonly arising from the siting of wind energy systems for both small and large systems.²¹ Due to the relatively low wind energy harvest potential in the Flint area, smaller residential systems are the most likely to crop up. The DELEG concluded that wind energy systems primarily intended to serve the needs of the consumer should be subject to the following requirements:

1. A minimum setback distance of at least 1 ½ times the height of the wind systems tower from the owner's property lines.
2. The sound level shall not exceed 55 decibels at the property line closest to the wind energy system.²²
3. In addition to safety concerns dealt with by the state construction and safety codes,²³ wind systems are required to have automatic braking or other means to prevent uncontrolled rotation of the blades.

²¹ “Michigan Siting Guidelines for Wind Energy Systems,” Michigan Department of Energy, Labor & Economic Growth, March 5, 2007.

²² Smaller wind turbines tend to be noisier for their size than larger versions because the blades rotate at a higher speed and most of the research to lower the noise has been focused on larger systems. See, “Feasibility of Residential Wind Energy: The Lack of Regulatory Integration for Local Communities,” David Mears, Real Estate Law Journal, Vol. 37:133 2008 at p. 144.

²³ Additional statutes or agencies come into play when siting a wind energy system. They include the Federal Aviation Administration, Michigan Airport Zoning Act, MCL 259.431, Michigan Tall Structures Act, MCL 259.481 and any local jurisdiction airport overlay zone regulations. Any system interconnected to the utility grid must comply with Michigan Public Service Commission and Federal Energy Regulatory Commission Standards.

4. All towers should have lighting protection.
5. A wind system using a tower less than 20 meters should be a Permitted Use in all zoning classification where structures of this sort are allowed.²⁴ A wind energy system with a tower higher than 20 meters should be considered a special land use.

The DELEG established detailed provisions deemed necessary to regulate larger wind energy systems. Typically, a wind assessment is conducted to determine the feasibility of a given site prior to erecting a large wind energy system. This involves installation of a tower for placement of an anemometer, a device for measuring wind. The provisions that pertain to the placement of a large-scale wind energy system should be applied to placement of any anemometer and associated structures.

If the data from the wind assessment supports construction of a large wind system, the DELEG recommends that the first step be submittal of a detailed application. The DELEG promulgated a list of the type of information that should be provided in such an application²⁵

The larger the wind energy system, the more intensive scrutiny required. Like smaller systems, property setback and sound pressure levels will have to be controlled. In addition, the taller the unit, the more likely it will be subject to FAA lighting requirements. Consideration will have to be given to how to shield and reduce (to the extent possible) the lighting hitting the ground.

²⁴ Mounting of wind turbines directly on a rooftop is highly discouraged due to the vibrations encountered during operation. "Small Wind Electric Systems," U.S. Department of Energy

²⁵ The DELEG recommends that pertinent information on this application should include:

- Project description including legal description and anticipated construction schedule.
- Site plan showing project area boundaries, location, height and dimension of all structures and fencing, the location, grades and dimension of access roads, topography, water bodies and new infrastructure related to the project.
- Proof of insurance.
- Consent documents showing written waivers from neighboring property owners.
- Sound pressure level modeling and analysis report.
- Visual impact-renderings of what the project will look like.
- Avian and wildlife impact analysis.
- Shadow flicker analysis.
- MSDS sheets of materials used in the construction and operation including lubricants and coolants. Spent lubricants and cooling fluids should be removed offsite in a timely manner.
- Decommissioning plan showing how the system will be disassembled when its not used anymore.
- Complaint Resolution procedures.

Visual impacts presented by large wind turbines are highly subjective. Today's wind turbines bear no resemblance to the windmills dotting the Dutch countryside. The DELEG recommended that turbines should be finished with a single non-reflective color. No lettering or advertising should be allowed on any part of the tower, hub or blades with the exception of emergency contact information, which should be displayed in a predominant location. Signs warning of the potential for falling ice should also be required.

Utilizing its siting guidelines, the DELEG prepared a Sample Zoning Ordinance for Wind Energy Systems. The setback requirements in the Sample Ordinance were reduced from 1½ times the height of the system tower to the actual height of the tower as measured from the top of the blade at its vertical position.

Building upon the Sample Zoning Ordinance created by the DELEG, Ottawa County prepared a more comprehensive Model Wind Energy Ordinance. The Ottawa County Ordinance differentiates between four types of wind systems: (1) Small Structure-Mounted Wind Energy Turbines, (2) Small Tower-Mounted Wind Energy Turbines, (3) Medium Wind Energy Systems, and (4) Large Wind Energy Turbines. The classification of an individual wind system incorporates the amount of capacity a system can generate electricity. A system with a capacity of 10 or less kilowatts is considered to be a Small Structure-Mounted Wind Energy System. In contrast, a Large Wind Energy Turbine will have a capacity to generate 250 kilowatts or more.

In contrast to the DELEG Sample Ordinance, the Ottawa County Model Ordinance does not set a specific decibel level to control noise. The noise allowable from every type of wind energy system is limited to the lowest ambient sound level present between the hours of 9:00 p.m. and 9:00 a.m. at any property line of a residential parcel, park, school, hospital or church. If the property adjoins a non-residential use parcel, the noise level is limited to the lowest ambient noise level plus 5 decibels.

The Ottawa County Model Ordinance also differs from the DELEG Sample Ordinance in that it includes specific limitations for the height of most wind energy systems. The DELEG Sample Ordinance classifies tower heights by those 20 meters or less in height and those that are higher. The Ottawa County Model Ordinance establishes a stepped up height system based on the capacity of the system. A 10-kilowatt system is limited to a height of 15 feet from the highest point of a roof. A 30-kilowatt system is limited to a total height of 120 feet or less. Wind Energy Systems up to 250 kilowatts of capacity are restricted to a total height of 150 feet. The height requirement for a Large Wind Energy System appears to be negotiable.

The Ottawa County Model Ordinance also includes detailed decommissioning requirements. There are also detailed provisions to address noise and shadow flicker complaints. The provisions to address a noise complaint deserve mention. If a noise complaint is received, the municipality will request that the aggrieved property owner deposit funds in an amount sufficient to pay for a noise level test. If that test determines that the wind turbine is operating in violation of the Ordinance's noise provisions, the deposit will be returned to the aggrieved property owner. If the noise level is below that allowed by the Ordinance, the aggrieved property owner forfeits the deposit.

Taking the DELEG Sample Ordinance and the highly detailed Ottawa County Ordinance as the two opposite ends of the spectrum, a number of local governmental units in Michigan have created new ordinances (or modified existing ones) to regulate the siting of wind energy systems. These Ordinances usually contain more than the minimum detail set forth in the DELEG Sample Ordinance but fall short of the detailed provisions of the Ottawa County Model Ordinance. Municipalities with ordinances falling into this category include Oliver Township, the City of Holland and Huron Township.

3. SOLAR ENERGY

Despite the recession, the solar business is booming. Americans are becoming more in tune with utilizing their rooftops as a means to lower their electric bills. The amount of roof top solar systems installed in the United States in 2008 rose by 63% over 2007 levels.²⁶ The cost of these systems ranges from \$20,000 to \$30,000 and have a payback time of five to 10 years.²⁷ In terms of power production, the amount generated by these new rooftops systems is more than 10Xs the amount added by larger utilities in the same timeframe. It has been suggested that large scale utilities view roof systems as a threat to their monopoly over the power grid and will take measures to limit future growth.²⁸



Figure 2 - Example of a roof mounted solar energy system

Solar energy can be collected and used in many ways. While most people are familiar with photovoltaic cells that convert sunlight into electricity, the most common use of solar energy is for the heating of swimming pools. The second largest use of solar energy is for residential water heating. The use of solar energy to heat water is a conservation measure. Instead of generating electricity, it reduces the demand for it.

California is the solar capital of the U.S. and has established state initiatives to promote its use. The state allows local governments to finance the installation of solar

²⁶ "Taking a Dim View of Solar Energy," Matthew Phillips, Newsweek, August 25, 2009.

²⁷ "Extreme Green Goes Mainstream," Josh Garskof, CNN Money, September 8, 2009.

²⁸ Id.

systems on private property. This allows homeowners to overcome the hurdle of the high upfront cost of installing a solar system. The amount of the system is added to the property owner's assessment and paid back with their property tax payments.

Some California counties have developed local incentive programs to encourage the use of solar systems. The County of San Bernardino has created an array of incentives including (1) building permit waivers, (2) permit streamlining, (3) priority field inspections and (4) guaranteed timelines²⁹. Under its program, if a backlog of building inspections occurs, the County will give top priority to the inspections associated with green projects. The County guarantees that any required inspection will be performed on the next workday following receipt of an inspection request. The County also guarantees that site plan reviews will occur within thirty days of submittal of an application for installation.

Ordinances regulating the use of solar power are not as common as those for wind power systems. Solar energy systems make better neighbors than wind energy systems. From a code enforcement perspective, common problems include the exceedence of roof loads, improper wiring and unauthorized tampering with potable water supplies.

The International Association of Plumbing and Mechanical Officials has promulgated detailed standards for the regulation of solar systems with enactment of its Uniform Solar Energy Code. The current version of the code was promulgated in 2006 but an updated version is slated for publication at any time. As one would expect, the code contains detailed provisions relating to piping, joint connections, ductwork and electrical components associated with these systems. However, the code provisions dealing with siting of these systems is rudimentary.

A literature review only identified a limited number of municipalities that have enacted some form of regulation addressing the installation of solar systems. The Township of East Pennsboro in Cumberland County Pennsylvania is an example of a governmental unit that has adopted a comprehensive ordinance to promote the use of and regulate installation of solar systems. Pertinent provisions of its Ordinance include:

1. Installation of a solar system is allowed in every zoning districts,
2. The height of a roof mounted system cannot extend more than three feet above the roof upon which it is installed,
3. No portion of a system can extend beyond the edge of the roof,
4. The height of a ground mounted system cannot exceed 18 feet,
5. Setbacks of 15 feet are required from any property line,
6. Installation of a system in a front yard is prohibited, and
7. No more than 20% of a lot can be covered by a ground-mounted solar system.

²⁹ "New Solar Homes Partnership," Case Study, Gosolar California.org

The City of Oakland California has a similar approach. Under it's Ordinance:

1. A system cannot extend more that two feet above the roof plane,
2. A system cannot encroach within three feet of the rear and side property lines,
3. Freestanding devices cannot extend more that six feet above a finished grade,
4. A system cannot be located within the half of the lot closest to the front property line, and
5. A system has to be placed, screened or designed in such a way to avoid casting an unreasonable amount of glare into the windows of any residence located within one hundred fifty feet of the property line.

Similar to wind energy systems, many municipalities deem it necessary to distinguish between small and large projects. Kittitas County in the State of Washington distinguishes between Minor Alternative Energy Facilities and Solar Farms. A Minor Alternative Energy Facility is a facility that (1) uses solar power, (2) is located on the beneficiary's premises, (3) is intended primary to offset part or all of the beneficiary's requirements for electricity, and (4) is secondary to the beneficiary's use of the premises for other lawful purposes. Minor Alternative Energy facilities are permitted uses in all zoning districts. In contrast, a Solar Farm is classified as a Major Alternative Energy facility and limited to agricultural areas as a limited conditional use.

Solar systems come in all sizes and shapes. Some are used to generate electricity. Many find use in heating water. Solar systems come in roof and ground mounted configurations. Some are even built into the structure they are intended to serve. The City of Woodbury, Minnesota crafted its Alternative Energy Systems Ordinance to differentiate between the different types of solar devices. There are four classifications of solar systems under its Ordinance:

1. A Building Integrated Solar Energy System is a solar system that is an integral part of a principal or accessory building rather than a separate device, and replaces or substitutes for an architectural or structural component of the building including, but not limited to, photovoltaic or hot water solar systems contained within roofing materials, windows, skylights and awnings.
2. A Passive Solar Energy System is a system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.
3. A Photovoltaic System is a solar energy system that converts solar energy directly into electricity, and

4. A Solar Energy System is a device or structural design feature, a substantial purpose of which is to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating, cooling, electricity generation or water heating.

Passive and Building Integrated Solar Systems are exempt from regulation under the Woodbury Alternative Energy Systems Ordinance. Photovoltaic and Solar Energy Systems are subject to the following conditions:

- Both systems are permitted accessory uses in all zoning districts,
- Roof mounted systems must be flush mounted unless the roof pitch is inadequate for optimum performance. In such a case, the pitch of the solar collector may exceed the pitch of the roof by 5% but in no case shall be 10 inches above the roof,
- All solar systems must use colors that blend with the color of the roof or structure and materials that minimize glare, and
- If the solar energy system remains nonfunctional or inoperative for a continuous period of one year, the system shall be deemed to be abandoned and is deemed to constitute a public nuisance.

The Woodbury Ordinance contains several provisions applicable to ground mounted solar systems:

- A minimum lot size of 8,000 square feet is required for a ground mounted solar system,
- In an urban district, a ground mounted solar energy system shall be limited to a maximum of 200 square feet. In other residential areas, it cannot be more than 25 percent of the rear yard,
- A ground mounted solar energy system shall not exceed 15 feet in height,
- In residential areas, ground mounted solar energy systems are limited to the rear yard, and
- Ground mounted solar energy systems require a set back of 15 feet from all property lines.

Solar systems can be expensive and landowners have a vested interest in protecting that investment. Some municipalities have addressed the issue of “solar easements” in their Ordinances regulating the use of solar systems. Solar easements relate to the continued ability of a landowner to receive unobstructed access to sunlight. An example of any Ordinance protecting solar access was enacted by the City of Boulder Colorado. The degree of solar access protected by the Boulder Ordinance can be thought

of as either a 12' or 25' hypothetical "solar fence" on the property line of a protected building.³⁰ The Township of East Pennsboro also addressed solar easements in its Ordinance. It requires easements to be placed on any lot utilized for a solar system to regulate the placement of structures and vegetation. For new subdivisions contemplating the use of solar systems, deeds restrictions to regulate obstructions are required on the lot proposed for installation of the solar system and adjoining lots.

C. RECOMMENDATIONS

The use of Renewable Energy Resources provides an appearance of a progressive and environmentally sensitive community. In addition to producing electricity, a wind turbine makes a statement about the level of economic savvy and environmental awareness possessed by its developer.

Developers are beginning to use their experience in green construction as marketing tools to separate themselves from their competitors.³¹ Green homes may even be more marketable than conventional ones due to their potential to save on energy and consumer's preference to buy a product branded as Green.³² Corporate America is also beginning to pay attention to the benefits of branding their products or company as Green. In short, the Green Revolution will come to Flint whether are not Flint is ready for it. To become a willing participant in the Green Revolution, the City should take the following steps.

First, the City should implement an ordinance addressing the use of Outdoor Wood Boilers. Until the technology is improved to reduce their emissions to acceptable levels, they should be banned from operation within the City limits. They simple have no purpose in a highly urbanized environment like the City of Flint.

The City should implement Ordinances promoting and regulating the use of Renewable Energy Resources. While it remains unlikely that large utility wind farms will be located in the City of Flint due to its limited wind energy harvest potential, advances in wind turbine technology will make once marginal sites attractive. Flint also has an electrical transmission and distribution system in place already thereby avoiding any costly upgrades necessary to convey electricity from the source of generation. Enacting Ordinances regulating the use of Renewable Energy Resources will accelerate the use of these technologies, avoid future incompatible land uses and help position Flint to partake in the State's push for a Green Economy.

The use of Renewable Energy Resources has the real potential to create jobs. These technologies are more efficient at creating jobs that other types of energy. In a report prepared for the Environment Michigan Research & Policy Center,³³ the authors concluded that for every \$1 million dollars spent on constructing wind and solar energy system in Michigan, 15.1 jobs would be created. In contrast, investing the same sum of

³⁰ City of Boulder Revised Code, Chapter 9-9-17.

³¹ "Green Building Ordinances: Municipal Experiences from Across America," Rockingham Planning Commission, City of Portsmouth, New Hampshire.

³² Id.

³³ Energizing Michigan's Economy, Travis Madsen, Timothy Telleen-Lawton and Mike Shriberg, Environment Michigan research & Policy Center, February 2007.

money in oil and gas extraction would only create 7.9 jobs. Putting \$1 million into natural gas distribution would generate even less jobs.³⁴

The use of Renewable Energy Resources has the potential to help the City attract more businesses involved in the manufacturing of renewable energy equipment. The City of Flint lies between two of the world's most important solar related manufacturing companies. United Solar Ovonics is located in Auburn Hill near the Palace. United Solar Ovonics operates the largest thin-film solar photovoltaic manufacturing line in the world.³⁵ To the North, Dow Corning's Hemlock Semiconductor, located in Hemlock Michigan, is the world's leading producer of polycrystalline silicon, one of the primary ingredients of solar panels. Authors Adelaja and Hailu concluded that the employment opportunities and income impact of attracting businesses involved in the manufacturing of the components utilized in renewable energy technologies would be "huge."³⁶

Finally, a number of state and federal incentives have been created to promote the use of Renewable Energy Resources. Developers and municipalities are not forced to go at it alone. A partial list of these incentives is set forth in Exhibit 2. The City may wish to lead by example and secure incentives to construct its own renewable energy system.

Taking it a step further, the City may wish to create a Green Enterprise Zone to enhance the "green" character of the City. The City of Wilmington Ohio created such a zone. Its purpose was threefold: 1) promote the retrofitting of businesses in the community to promote sustainability and energy efficiency, 2) attract green collar jobs in research and sustainable energy production and services, and 3) assist its citizens in capitalizing on the above by receiving green training.

The MEDC claims that Green is the new gold. The above steps will go along way to position the City to reap the benefits created by this new gold rush.

³⁴ Id. at p. 15.

³⁵ Id. at p. 18.

³⁶ Project Impacts of Renewable Portfolio standards on Wind Industry Development in Michigan, Dr. Soji Adelaja and Dr. Yohannes Hailu, Land Policy Institute, Michigan State University, p. 4.

EXHIBIT ONE

WIND CLASSIFICATION OF THE STATE OF MICHIGAN

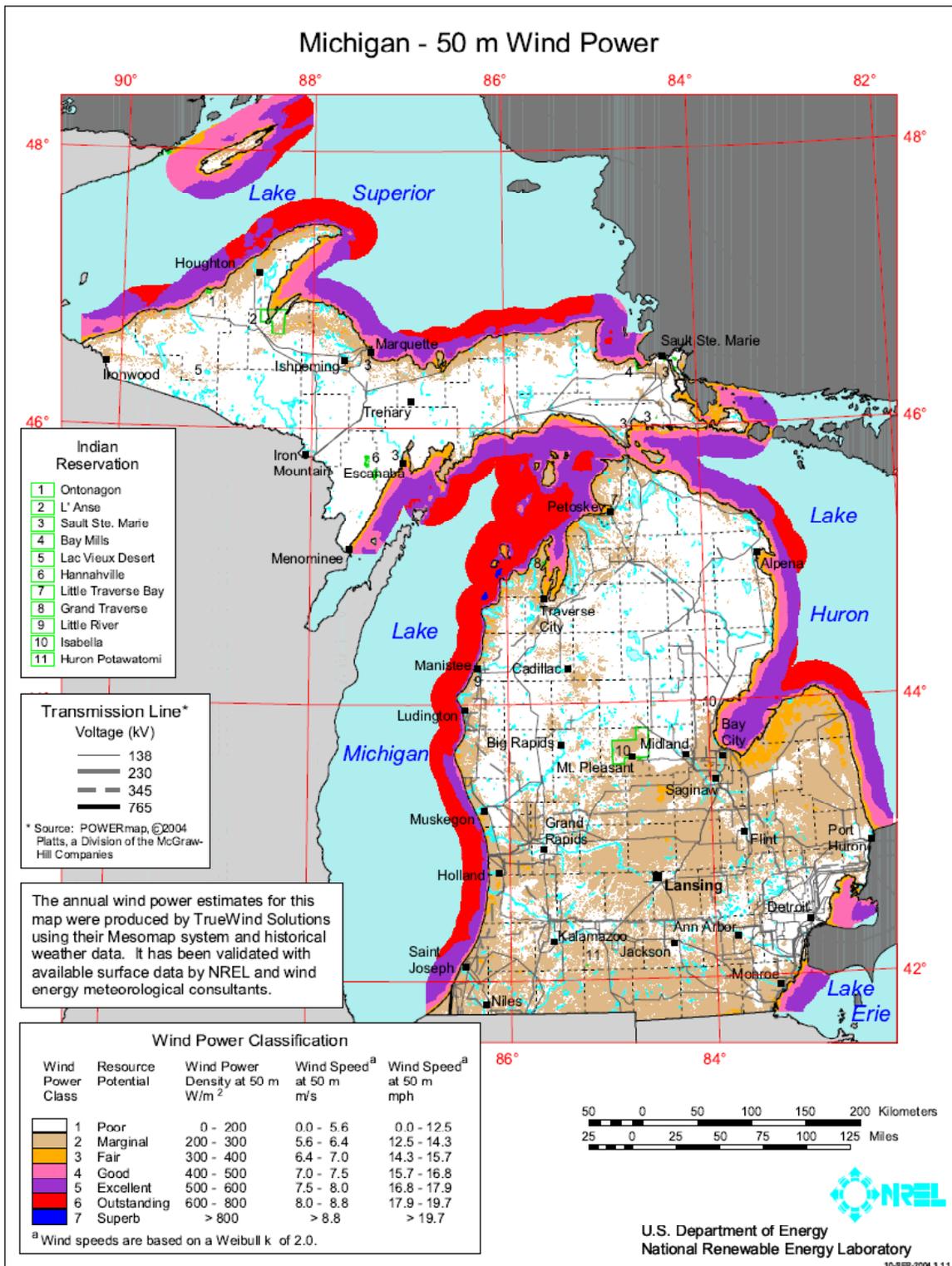


EXHIBIT TWO

RENEWABLE ENERGY RESOURCE INCENTIVES

LIST OF RENEWABLE ENERGY RESOURCE INCENTIVES

- The 21st Century Jobs Fund will invest more than \$1 Billion over 10 years in alternative energy and other high-tech industries in Michigan, providing funding for research and commercialization activities.
- The Michigan Next Energy Authority (MNEA) provides tax incentives for business activities and property related to the research, development, and manufacturing of alternative energy technologies.
- Renewable Energy Renaissance Zones are designated areas that are virtually free of state and local taxes for renewable energy facilities located within their boundaries.
- The Venture Michigan Fund and the 21st Century Investment Fund are two “Fund of Fund” programs with combined capital of over \$300 Million. Both were established to augment the growth of alternative energy and other technology sectors by investing in or alongside qualified venture capital and private equity funds. Credit Suisse is the fund manager for both programs.
- The SBIR/STTR Emerging Business Fund provides matching grants to companies that receive funding through the federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.
- High-Tech MEGA Job Creation Tax Credits may be awarded against Michigan’s Single Business Tax (SBT) for high-tech companies that are looking to expand or locate in Michigan rather than another state. To be eligible, companies must be involved in technology fields with at least 25% of operating expenses to R&D. Each credit may be awarded for up to 20 years and for up to 100% of the tax related to the project.
- The Ethanol and Biodiesel Matching Grant Program provide incentives to service stations and bulk plants to convert existing fuel delivery systems or create new fuel delivery systems for the distribution of E85 fuel and biodiesel blends.
- Energy Efficiency and Renewable Energy Outreach Grants may be available through the Michigan Energy Office to non-profit or public organizations for marketing and promotion efforts. Funding categories have included: (1) Solar Energy, (2) Wind Energy, (3) ENERGY STAR Products, and (4) ENERGY STAR Homes.
- Community Energy Project Grants may be available through the Michigan Energy Office to non-profit and public organizations. Funding categories have included: (1) Solar and/or wind energy education, (2) Bioenergy/biofuels/bioproducts education, (3) Green commuting projects, (4) Green building projects, and 5) Statewide energy conferences.
- Large-Scale Photovoltaic Demonstration Project Grants may be available through the Michigan Energy Office to public and non-profit organizations for the installation and demonstration of new photovoltaic (PV) systems with a minimum capacity of 10 kilowatts.
- The Michigan Biomass Energy Program regularly provides funding for state bioenergy and biofuels projects. Funding categories typically include biofuels and

bioenergy education, biofuels infrastructure, and biomass technology development and demonstrations.

- The Low-Income and Energy Efficiency fund, administered by the Michigan Public Services Commission, provides grants for the implementation of energy-efficiency projects and renewable-energy projects in the state.

ATTACHMENT

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EDUCATION

University of Michigan (B.S., 1980)

Illinois Institute of Technology (M.S. in Environmental Engineering, 1983)

Detroit College of Law (J.D., *magna cum laude*, 1988)

WORK EXPERIENCE

1990- Present. Gault Davison P.C.

PROFESSIONAL MEMBERSHIPS

Genesee County Bar Association

State Bar of Michigan (Sections: Environmental Law and Real Property)

American Bar Association (Sections: Environment, Energy and Resources)

U.S. District Court – Western District of Michigan

U.S. District Court – Eastern District of Michigan

APPELLATE CASES

Attorney General ex rel. Department of Environmental Quality v. Richfield Iron Works, Inc., unpublished opinions per curiam of the Court of Appeals, issued Oct. 9, 2001 (Docket No. 219654 & 224318) [Scope of contribution protection afforded to PRPs entering into consent decrees with the State of Michigan].

Farm Bureau Mutual Insurance Company of Michigan v. Porter & Heckman, Inc., 220 Mich. App. 627 (1996) [Seminal case of operator and arranger liability under the Michigan Environmental Response Act].

Freeport-McMoran Resource Partners Ltd. Partnership v. B-B Paint Corp., 56 F.Supp.2d 823 (1999) [Level of proof necessary to support a contribution claim under the Comprehensive Environmental Response, Compensation, and Liability Act].

Hicks Family Limited Partnership v. 1st National Bank of Howell, unpublished opinion per curiam of the Court of Appeals, issued Oct. 3, 2006 (Docket No. 268400) [Elements necessary to assert a valid claim for cost recovery under Part 201 of NREPA].

Hicks Family Limited Partnership v. 1st National Bank of Howell, unpublished opinion per curiam of the Court of Appeals, issued July 15, 2008 (Docket No. 276575) [Plaintiff's status as a PRP does not preclude it from bringing a cost-recovery action under Part 201 of NREPA].

PUBLICATIONS

- *Desulfobacter Biocatalyzed Reduction of Gypsum Wastes: Applications to Phosphoric Acid Manufacturing* M.S. Thesis, 1983.
- Co-Author: *Management of Industrial Pollutions by Anaerobic Processes*. United States Environmental Protection Agency, 1984.
- *Groundwater Contamination: Removal of the Constraints Barring Recovery for Increased Risk and Fear of Future Disease*. Detroit College of Law Review. Volume 1988 – Issue 1.
- *Federal and State Laws Which Impact on Groundwater Considerations at Solid Waste Disposal Facilities*. Great Lakes International Solid Waste Management Forum, March 1991.
- *Underground Storage Tank Update*. Genesee County Bar Association Bar Beat, July 1991.
- *Use of Baseline Environmental Assessment to Avoid Cleanup Liability*. 2005.

ACTIVITIES

- Detroit College of Law Review – 1986 to 1988.
- Commentator for the following ICLE programs:
 - Representing Owners and Operators Under Act 307;*
 - The New Michigan Environmental Cleanup Legislation: Liability, Remediation and Real Estate Transfers;* and
 - Baseline Environmental Assessments: BEA's from A to Z.*
- AYSO soccer coach

