Overview of Biomass Power in Michigan

February 2020

Reliable baseload renewable

• Local resources
• Local jobs
• Local communities

Characteristics, perspectives and data on biomass power generation in the state of Michigan
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“Biomass power is locally sourced, Michigan-made renewable energy that brings reliability and diversity to the state’s energy portfolio.”
Biomass power is a reliable, renewable alternative to conventional forms of electric generation, and diversifies the state’s renewable energy portfolio with baseload power that’s available when intermittent resources such as wind and solar energy resources aren’t. In the process, biomass power contributes to sustainable and healthy forests, supports the electric grid with 24/7 power, and provides a market for organic materials that would otherwise go to waste.

Michigan’s biomass power plants are independent power producers (IPPs)\(^1\) that have supplied reliable, affordable wholesale electricity to Michigan’s regulated utilities since the mid-1980s. Biomass power is a mature, robust industry that optimizes the value of the state’s vast wood resources by recovering the energy from wood byproducts such as forest slash, mill byproducts, and clean wood diverted from landfills. It is home-grown, Michigan-made energy that keeps a portion of Michigan’s ratepayer energy dollars in the communities that rely on these local resources for economic prosperity and quality of life.

This document presents information and perspectives on biomass power generation in Michigan; its environmental and economic contributions, system value and policy impacts.

### About Michigan Biomass

Michigan Biomass is a coalition that advocates for the state’s grid-connected, wood-fired power plants. It was formed in 2007 as the state began work to adopt Renewable Portfolio Standards\(^2\) (RPS). Its members are six of the state’s wood-fired, grid-connected power facilities. Member facilities total 168 megawatts (MW) of installed capacity, all selling wholesale electricity under long-term power purchase agreements (PPAs) with Consumers Energy. (See Table 1 and Fig. 1.)

These facilities have a proven track record of efficient power generation from wood byproducts beginning in 1986 and have navigated broad changes in state energy policy in 2000, 2008 and 2016. Despite the many challenges of a changing energy landscape, they continue to provide jobs for generations of families, economic benefit to their communities, services to forest managers, and manufacturers that generate wood byproducts. (See Table 3, Page 6.)

### Table 1: Michigan Biomass member facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th>Location</th>
<th>Size (MW eq.)</th>
<th>Start date</th>
<th>PPA Type</th>
<th>Holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Genesee Power Station</td>
<td>Flint</td>
<td>38</td>
<td>1996</td>
<td>Dispatched</td>
<td>CECo.</td>
</tr>
</tbody>
</table>

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1. Michigan’s IPPs sell wholesale power to investor owned utilities under long-term power purchase agreements.
2. PA 295 of 2008
3. Amended 2019, terminates May 31, 2022
4. Amended 2018, terminates May 31, 2027
5. Amended 2018, terminates May 31, 2027
Biomass Background

Our origins
Historically, wood fueled the world until fossil fuels ushered in the Industrial Revolution. In 1978 when Congress passed the Public Utility Regulatory Policies Act (PURPA), wood byproducts became a viable source of grid-connected electric power, mostly generated by IPPs. PURPA’s intent was to diversify the nation’s energy resources, which it did, promoting the development of six biomass power plants in Michigan between 1985 and 1996.

Our energy role
Michigan ranks fifth nationally in grid-connected electricity produced from biomass. (See Table 2.) It produced 3.8% more biomass power than the previous year; 0.75% of the state’s total power generation in 2018 and

<table>
<thead>
<tr>
<th>State</th>
<th>Total Biomass (MWh)</th>
<th>Nat'l. Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>1,700,921</td>
<td>1</td>
</tr>
<tr>
<td>NH</td>
<td>1,247,755</td>
<td>2</td>
</tr>
<tr>
<td>VA</td>
<td>1,204,218</td>
<td>3</td>
</tr>
<tr>
<td>ME</td>
<td>1,022,537</td>
<td>4</td>
</tr>
<tr>
<td>MI</td>
<td>871,721</td>
<td>5</td>
</tr>
</tbody>
</table>
4.95% of all non-utility power that year\(^6\). While those numbers may appear small, our contributions to the state’s energy portfolio and the electrical grid is significant.

The RPS: Biomass power made up 7% of the state’s renewable generating capacity in 2018, but it accounted for 15% of the renewable power Michigan utilities used to comply with the RPS. Biomass power accounts for 16% of the 107 million Renewable Energy Credits (RECs) that have been inventoried since starting in 2009.\(^7\) (See Fig. 1 & 2.)

Grid Reliability: Biomass power generators are baseload, utility-scale electricity providers that bring more than just renewable attributes to Michigan’s energy portfolio:

- They are baseload generators, which means they can replace of coal and nuclear plants being closed by economics, age and efficiency, and changes in regulatory structures and markets.
- They are dispatchable, providing power precisely where and when it’s needed.
- They provide voltage stabilization and other technical benefits to remote areas of the grid, improving system efficiency and reliability, and easing overall grid operation.

Fuel & resources

Biomass energy producers do not harvest trees specifically for energy. That makes no economic sense, no resource sense, and it makes no environmental sense. The environmental, habitat and timber value of a whole tree is higher than that for energy. Our fuel is sourced from wherever clean, sustainable wood byproducts are generated, forest to factory, cradle to grave. Biomass power generation provides a market for wood and alternative fuels that wouldn’t exist otherwise. Biomass turns forest byproducts into revenue and reduce or eliminate disposal costs for industries and activities that produce wood byproducts, such as forest products and other industries.

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\(^6\) Source: Net Generation by State by Type of Producer by Energy Source (EIA-906, EIA-920, and EIA-923)

Simply put, biomass power exists because these materials exist, and recovering energy from these materials is the best method for managing them.

1. **Biomass power would not exist without forest-related industries providing an affordable, sustainable supply of fuel.**

A sustainable supply of these materials exists today. Michigan is home to 19 million acres of quality forests and a $23 billion-per-year forest products industry. About half of the state’s biomass fuel supply comes directly from the forest, like the tops and limbs left over from commercial harvesting. The rest is largely bark, sawdust, chips and shavings from milling and manufacturing operations. Clean “industrial wood” like discarded crates and pallets, and urban “green” wood like storm debris and right-of-way clearing also find their way into this fuel market.

Biomass markets are a substantial part of sustainable forestry practices. Between 20% and 40% of a tree harvested for forest products is unmerchantable. This material needs to be removed from the forest floor to promote regeneration and reduce the risk of wildfire. The biomass fuel market turns these production costs into revenues and adds significantly to the bottom line for loggers, and ultimately reduces the cost of retail wood goods sold to consumers.

Biomass fuel markets play a big role in offsetting the cost of forest health and stewardship activities. Removal of dead, dying or infested trees and wood is often the first step in managing forest health. As most of this material is unsuitable for wood products, biomass is often the only market available to offset treatment costs. For example, ash trees removed in attempts to eradicate the invasive emerald ash borer were burned as fuel at Genesee Power Station to ensure that the exotic beetle was destroyed.

Many of the jack pine stands cut to manage breeding habitat for the endangered Kirtland Warbler have little commercial value other than biomass fuel.
Biomass markets also support forest management activities that don’t involve commercial timber harvests, such as thinning of red pine plantations to promote quality stand development and the removal of underbrush on U.S. Forest Service lands to reduce the risk of wildfire to neighboring private property.

2. Biomass power provides solutions for disposing of high volume, hard-to-manage byproducts.

Wood isn’t the only material that biomass power generation helps manage. While raw wood makes up about 95% of the fuel going into a biomass plant, other materials that present difficult or costly disposal challenges can be used as wood fuel supplements, which helps to properly manage those byproducts and reduces biomass plant air emissions.

**TIRE-DERIVED FUEL:** Nearly all of Michigan’s biomass plants add small amounts of scrap tire chips, called tire-derived fuel (TDF), to their wood fuel, in amounts to less than 10%. It’s used widely around the country and has been used in Michigan as a wood-fuel supplement since the 1990s.

TDF is the principal management tool for scrap tires in Michigan and across most of the country.

Michigan motorists generate an estimated 10 million scrap tires annually. They are banned from landfills because they trap air and don’t stay buried. Over time, they “float” to the surface. As a result, by the 1990s, tens of millions of tires had been stockpiled across the Michigan landscape, leading to creation of the Scrap Tire Management Program under direction of the Michigan Department of Environmental, Great Lakes and Energy (EGLE), which regulates and manages scrap tire collection and disposal.

These giant piles of scrap tires are more than eyesores; they collect stagnant water that breeds disease-carrying mosquitoes, and when ignited by lightning strikes or arsonists, will burn uncontrollably for months, forming plumes of thick smoke, and taxing firefighting resources.

Using TDF in a biomass boiler makes all these problems go away.

When blended with wood in the oxygen-rich, high temperature of a biomass boiler, none of these compounds form, and the particulate matter (smoke) is collected by the plant’s environmental controls. The tire is reduced to ash along with the wood and properly disposed of in conventional type II landfills that accept non-hazardous wastes.
In 2018 Michigan’s biomass plants consumed 3.1 million scrap tires, or more than 30% of the tires that came off the road that year.⁸

**RAILROAD TIES:** Each year, U.S. railroads replace millions of wooden railroad ties along their tracks. While they are not specifically banned from landfills like scrap tires, railroad ties are suitable for fuel under state and federal “beneficial use of secondary materials” designations, which aims to put usable waste materials into a market, keeping them out of landfills.

Like other wood byproducts, the biomass fuel market offsets the cost of replacing railroad ties, helps preserve limited space at landfills, and like TDF when blended with raw wood, reduces overall air emissions.

There are three biomass power plants in Michigan permitted to use railroad ties for fuel and they consume 200,000 tons of railroad ties a year.

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3. *Biomass power uses local resources that supports rural economies while benefitting the environment.*

Michigan’s biomass power industry is uniquely situated in the 21st Century energy market that emerged with state legislation in 2008. That’s because the biomass industry developed decades ago under federal energy policy that doesn’t neatly mesh with today’s market where customer expectations and regulatory changes promote development of zero emissions technologies such as wind and solar.

**Economics**

Nonetheless, biomass remains relevant because it provides technical benefits that intermittent sources can’t. It is homegrown energy that keeps Michigan energy dollars in Michigan communities, supporting local forests and wood industries. Its economic contributions are substantial. (See Table 3.)⁹

These are resource-based jobs that can’t be outsourced or exported. About 130 of these jobs are in the biomass plants directly. They are skilled and highly skill positions that provide livable wages and benefits. Biomass plants are

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⁹ Forest Products Industries’ Economic Contributions to Michigan’s Economy in 2017, Larry A. Leefers, Associate Professor Emeritus, Department of Forestry, Michigan State University

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Table 3:

<table>
<thead>
<tr>
<th>2017 Direct Economics</th>
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<tbody>
<tr>
<td><strong>$124 million</strong></td>
</tr>
<tr>
<td>• 151 jobs</td>
</tr>
<tr>
<td>• $22.5 million labor</td>
</tr>
<tr>
<td>• $61 million value added</td>
</tr>
<tr>
<td>• $28 million fuel</td>
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</tbody>
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<table>
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<tr>
<th>Induced Economic Contribution</th>
</tr>
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<tbody>
<tr>
<td><strong>$218.6 million</strong></td>
</tr>
<tr>
<td>• 953 jobs</td>
</tr>
<tr>
<td>• 400 / fuel handling</td>
</tr>
<tr>
<td>• $59 million labor</td>
</tr>
<tr>
<td>• $117 million value added</td>
</tr>
</tbody>
</table>
significant taxpayers in these communities and are good corporate citizens. The balance of jobs supported by the industry are in the procurement of fuels.

*The environment*
Energy from biomass resources benefits the environment on several fronts:

1. **Waste elimination:** It reduces wastes and recovers its energy. The fuel is reduced to ash, some of which has further use for soil nutrients, or as daily cover at landfills. It mitigates the environmental impacts posed by scrap tires and puts byproducts to good use.

2. **Forest health:** Biomass energy encourages sustainable forest management by promoting the capture and use of woody debris removed during treatment and sylvicultural practices. Managed forests are healthy forests that are diverse, resist disease and infestation, and are highly productive at capturing and sequestering carbon from the atmosphere.

3. **Climate:** Biomass as practiced in Michigan and in most of the country is carbon neutral\(^{10}\) because it’s made from wood that, had it not gone to the power plant, would have decomposed into methane and had a greater impact on the atmosphere. Biogenic carbon is not a fossil fuel and is not “additional” carbon in the atmosphere and is not regulated the same as carbon from fossil fuels by the U.S. EPA

4. *The biomass plants are brick-and-mortar capacity that bring the same value to the power infrastructure as coal, nuclear or natural gas plants.*

*Michigan’s portfolio*

**CAPACITY:** “Capacity,” or the ability to make power when it’s most needed, is a big part of the energy world. Without enough “capacity” electric providers can’t ensure the lights will stay on during times of peak use. Because biomass is dispatchable like natural gas, it has the same capacity to ensure a reliable supply of power, offset the impact of coal plant closures and avoid the need for new power plants.

**RELIABILITY:** Michigan’s biomass plants are utility-scale, wholesale electric generators. That means they fit seamlessly into the transmission and distribution grid. And that means more reliability. System operators love biomass plant, that for more than 30 years have provided day-to-day needs like voltage stabilization and dispatchability. In some cases, biomass power plants have isolated and maintained service to tens of thousands of customers during planned and unplanned transmission outages.

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**DIVERSITY:** Biomass power provides energy diversity and resiliency crucial to reliability, as demonstrated in the 2019 Polar vortex. Michigan’s biomass plants were the *only* generation resource that was able to increase power generation and maintain grid support during an energy emergency when wind and solar generation could not operate, and natural gas generation was curtailed because of a disruption in the pipeline system.\(^\text{11}\)

1. *Economic diversity:* It’s “homegrown, Michigan-made” and an investment that keeps energy dollars working in this state, not going to states that produce coal and natural gas.

2. *Fuel diversity:* Wood and other biomass fuels are byproducts and provide a hedge against the volatility of commodity fuel pricing, such as natural gas.

3. *Diversity of use:* Unlike most other renewables, biomass co-generation can provide thermal energy simultaneously with electricity, on an industrial scale suitable for manufacturing or district heat and power. Wind and solar can’t do that.

**The value proposition**
Biomass is adaptable in its ability to adjust to shifts in the fuel supply brought on by changes in the wood fiber market and can provide electricity *and* heat energy. It brings reliability to the generation, transmission, and distribution systems with its baseload, dispatchable power. It is affordable; proven to be cost competitive with utility baseload generation, and it protects the environment by improving forest health, reducing the volume of the waste stream and resulting greenhouse gas emissions, and offsetting the air quality impact of fossil fuel power plants.

5. *The “locally grown, locally produced” attribute of biomass power makes it a reasonable and prudent energy resource for Michigan.*

In short, biomass power is a high-value energy proposition. Few other energy resources can make this claim, especially renewable resources like wind and solar, and fossil fuel generation that sends Michigan’s energy dollars to states that produce those fuels.

Ultimately, it’s the locally sourced fuel supply that makes biomass power special and worth pursuing in a “most reasonable and prudent” energy strategy. Biomass power produces cost effective, baseload power that optimizes the value of, and care for, Michigan’s forest resources. It exists because it helps mills operate more efficiently, which lowers the cost of wood products. It exists because it provides major support to the power grid and diversifies the state’s energy portfolio. It exists because there is a need for the wise management resources and byproducts.

\(^{11}\) Comment U-20464, Statewide Energy Assessment, 2019, Michigan Public Service Commission. See page 187.
Biomass and energy policy

In 2018 and 2019 the Michigan Public Service Commission finalized orders\(^\text{12}\) that set new avoided cost rates under PURPA contracts, resulting in a 30% rate reduction for three of the Michigan Biomass power plants\(^\text{13}\). These rate structures, based on the operating and capital costs of a theoretical natural gas power plant that will never be built, fail to fairly compensate these and similar baseload power generators for the reliability, resiliency and diversity they bring the state’s energy portfolio and have resulted in a high degree of uncertainty for the future of biomass power generation in Michigan. Hillman Power Co. was most severely affected and ceased production in October 2019.

At stake is baseload renewable energy that boosts reliability and resiliency in Michigan’s electric grid and portfolio, and the health and vitality of Michigan’s forest resources and the viability of the communities that depend on those resources for economic wellbeing. Michigan’s forest resource managers, including the Department of Natural Resources, rely on biomass power as an effective and affordable tool for forest management and already are being forced to look at more costly and less effective options as the biomass fuel market shrinks. To date, EGLE’s Scrap Tire Management program has not been able to develop markets for scrap tires that would replace tires that had been used by the biomass power industry.

This is an opportunity to set policy and regulations that will enable biomass power to continue its contributions to electric supply and resource management. In 2020, as a result of the Statewide Energy Assessment, the MPSC will initiate a workgroup to explore how to appropriately value the diversity that biomass and other technologies bring to the state’s portfolio, which could provide appropriate rates that will allow biomass to continue to provide its services to electricity users, forest managers and resource-dependent communities.

\(^{12}\) Docket U-18090 PURPA avoided costs and U-20165, Consumers Energy Integrated Resource Plan
\(^{13}\) Hillman Power Co., Viking Energy of Lincoln and Viking Energy of McBain, U-18090
Summary statements
Biomass power is “homegrown, Michigan-made” energy from local forest resources and industrial wood byproducts. It has, and can continue to be, a major contributor to a robust, “most reasonable and prudent” energy future for Michigan:

- It is energy diversity that provides critical support to the grid when other generation types may be curtailed due to fuel, resource or other constraints.
- It supports more than 500 jobs and nearly $60 million in direct economic activity mostly to rural communities.
- It helps maintain healthy forests with support for stewardship and sustainable management practices.
- It uses “alternative fuels” such as scrap tires and railroad ties that manage these materials and byproducts and improves power plant performance and air emissions.
- It reduces waste stream volume and preserves landfill space.
- Its on-site fuel inventory represents energy “storage,” which provides system resiliency.
- It turns production costs into revenues for producers of wood byproducts, improving their bottom line and reducing the cost to consumers for these goods and services.
- It provides dispatchable, baseload power and is well suited in providing dispatchable, baseload support for intermittent generation resources, and offsets the shutdown of coal and nuclear plants with baseload, renewable capacity.
- Appropriate energy policy is needed that recognizes the technical, resource and economic value that biomass provides to Michigan’s energy portfolio, electrical customers and rural communities.
An Overview of Biomass Power in Michigan