

An Overview of Biomass energy in Michigan



RELIABLE



"Always-on"
renewable energy



SUSTAINABLE



Renewable
resource utilization



HOMEGROWN



Local communities,
local jobs



Supporting the grid
Supporting forests
Supporting communities

Cadillac Renewable Energy
Genesee Power Station
Grayling Generating Station
National Energy of Lincoln
National Energy of McBain

July 2023

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Biomass energy is a unique, homegrown, Michigan-made renewable energy resource that provides services to the power grid, forests, the environment, and rural quality of life.

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Bioenergy is a uniquely local resource that brings benefit to forests, the power grid, and rural communities.

For centuries, Michigan’s economy was driven by its wealth of forest resources. It still is today,¹ simultaneously protecting the waters of the Great Lakes, while providing wood goods, recreational spaces, and respite for the soul.

Producers of biomass energy support forest management by recovering energy from wood byproducts that result from human activities like habitat maintenance, wildfire mitigation, forest health and stewardship, and forest products.

Electricity generated from captured wood optimizes the value of Michigan’s forest resource by recycling it into electricity that is “always on,” which provides technical support to the power grid and offsets fossil fuel emissions. It relies on locally sourced, organic fuel resources that diversify Michigan’s energy portfolio that leads to energy resiliency and reliability.



About Michigan Biomass

Michigan Biomass is a business coalition that advocates for the state’s grid-connected, wood-fired power plants. It was formed in 2007 with the singular purpose of ensuring electricity made that from wood byproducts remains a viable energy resource as the state embarked on establishing renewable portfolio standards.² Its members are five of the state’s wood-fired, grid-connected power facilities totaling 150 megawatts (MW) of installed capacity, all selling wholesale electricity under long-term power purchase agreements (PPAs) signed in the 1980s and 1990s. (See Table 1 and Fig. 1.)

These facilities have successfully generated electricity from wood fuel for more than three decades, spurred by federal energy policy. They have navigated state energy policy changes in 2000, 2008 and 2016, and have performed well in the transition to non-fossil, low-carbon energy

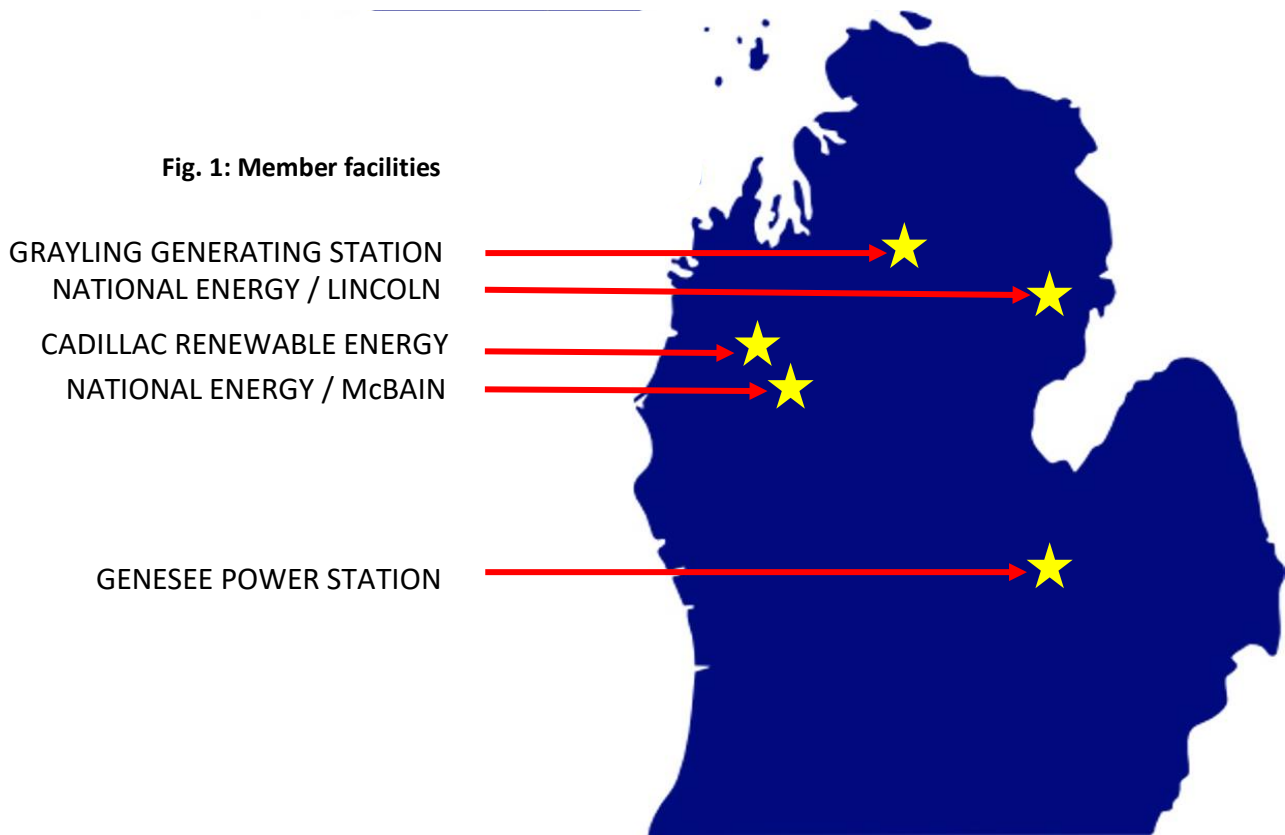
¹ Forest products economy, MDNR, <https://www.michigan.gov/dnr/managing-resources/forestry/products/econ>

² PA 295 of 2008

resources. 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 users of the state’s forest resources, and reliability to the bulk power supply system.

Table 1: Michigan Biomass member facilities

Facility	Location	Size (MW eq.)	Start date	PPA Type	Holder
1. Cadillac Renewable Energy	Cadillac	38	1992	Dispatched	CECo.
2. Genesee Power Station	Flint	38	1994	Dispatched	CECo.
3. Grayling Generating Station	Grayling	38	1992	Dispatched	CECo.
4. National Energy of Lincoln	Lincoln	18	1987	Baseload	CECo.
5. National Energy of McBain	McBain	18	1988	Baseload	CECo.



Biomass Background

Our origins

Wood was one of mankind’s original energy resources and helped fuel the beginning of the industrial age by powering steam-driven engines. In 1978 Congress passed the Public Utility Regulatory Policies Act (PURPA) that promoted wood energy as a viable source of *grid-connected* electric power, mostly generated by independent power products. PURPA diversified the nation’s energy resources, and six biomass energy plants were built in Michigan between 1985 and 1994.

Our energy role

Michigan is a national leader in the production of grid-connected electricity produced from woody biomass. (See Table 2.) It provides the state with 7% of its renewable generating capacity and produced 0.67% of the state's total power produced in 2020; 2.93% of all non-utility power generation that year.³ While those numbers may appear small, our contributions to the state's energy portfolio and the electrical grid are large.

Renewable Portfolio Standards (RPS): Biomass energy accounted for 11% of all the Renewable Energy Credits (RECs)

Michigan regulated utilities used to comply with the RPS in 2020, the last year that these records were kept.⁴ See Fig. 2. Biomass energy provided Consumers Energy Co., the Michigan Biomass members facilities' customer, with 19% of the RECs it retired for compliance that year. Wood-based energy has accounted for 20 million (17%) of the more than 117 million RECs inventoried since the program began in 2009. In other words, biomass energy provided the bulk of renewable energy for the RPS since its beginning and continues to make those contributions today.

Grid Reliability: Biomass energy is “always on” and provides tangible, measurable benefits to electric utilities and the power grid:

- Offsets generation capacity being lost to the closure of coal and nuclear plants deemed uneconomic because of age, efficiency, and changes in regulatory structures and markets.
- Dispatchable precisely when and where it's needed.
- Provides...
 - Voltage stabilization
 - Line loss mitigation
 - Technical benefits to remote areas of the grid
 - Improved system efficiency and reliability
 - Energy during weather emergencies when other resources cannot

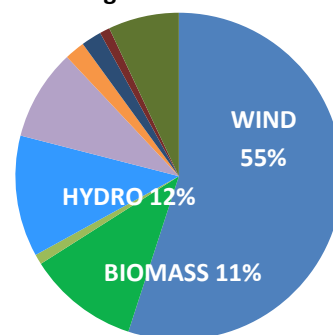
Fuel & resources

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 economic value of a whole tree is much greater than that for energy. Our fuel is sourced from wherever clean, sustainable wood *byproducts* are generated, forest to factory, cradle to grave. Biomass energy provides a market for wood and alternative fuels that wouldn't exist otherwise. *Biomass energy turns forest byproduct management costs into revenues and reduces or eliminates*

Table 2: 2020 Production (MWh)

State	Total MWh	Nat'l. Rank
CA	1,441,196	1
GA	1,131,045	2
VA	802,842	3
NH	711,158	4
ME	646,790	5
MI	546,452	6

Fig. 2: 2020 RECs



³ Source: U.S. Energy Information Administration 2020

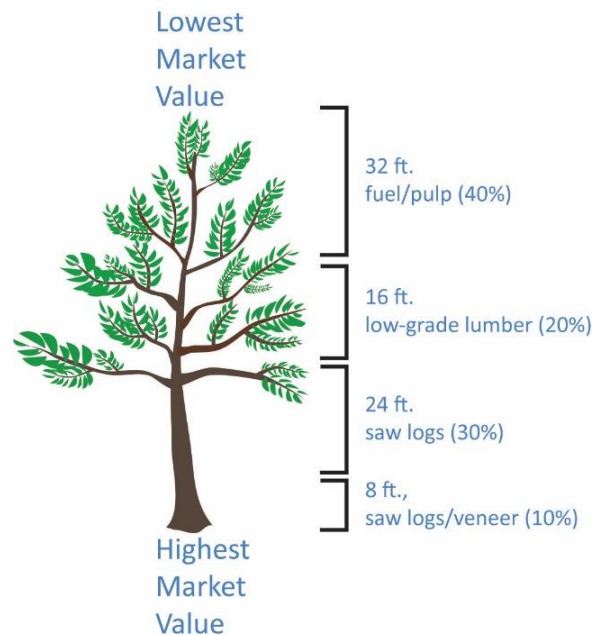
⁴ Source: MPSC Renewable Energy Report February 2022

disposal costs associated with forest management, forest products, and is an important tool in meeting zero-waste initiatives as part of the transition to a circular economy.

Simply put, biomass energy exists because these materials exist, and energy recovery is the last best use for this material.

1. Biomass energy would not exist without forest-related industries providing a sustainable, carbon-neutral, affordable supply of fuel.

Michigan has benefitted from a sustainable supply of these materials for more than 30 years, produced in part from Michigan’s 19 million acres of quality forests and a \$22 billion-per-year forest products industry. Biomass is energy recovered from the byproducts of this industry, recycling this wood into electricity. About half of the state’s biomass fuels come directly from the forest, like the tops and limbs left over from commercial harvesting, or habitat maintenance and development. The rest is largely bark, sawdust, chips and shavings from value added milling and manufacturing. Clean “industrial wood” like discarded crates and pallets, arborist debris, and urban wood like storm debris and right-of-way clearing also find their way into this fuel market.



Biomass fuel markets are a substantial part of sustainable forestry practices. Between 20% and 40% of a tree harvested for forest products is unmerchantable and needs to be removed from the forest floor to promote regeneration and reduce the risk of wildfire, disease, and infestation. 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.

Michigan biomass energy supports a wood fuel market of about 1 million tons annually.

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 invasive beetle was destroyed.

Many of the public jack pine stands managed for the threatened Kirtland warbler have little commercial value other than biomass fuel, so the Michigan Department of Natural Resources has come to rely on biomass fuel markets to remove that material that would otherwise create management costs for state forest management.

Biomass markets also support forest management activities that *don't* involve commercial timber harvests, such as thinning of red pine plantations to promote stand improvement and the removal of underbrush on U.S. Forest Service lands to reduce the risk of wildfire to neighboring private property.

2. Biomass energy provides solutions for utilizing high volume, hard-to-manage byproducts.

Wood isn't the only byproduct or material that biomass energy 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 supplements to the wood fuel, which helps to properly manage those wastes and ultimately reduces air emissions through improved combustion and reduced fuel volumes.

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 ranging from 3% to 5% by weight. It's used widely around the country and has been used in Michigan as a wood-fuel supplement since the early 1990s.

These supplemental fuels improve combustion efficiency, reduce total air emissions, and provide a market for materials that would otherwise be considered wastes.

TDF is the principal management tool for scrap tires in Michigan and across most of the country, where energy recovery has served as the best method to manage the millions of tires that come off the road each year.

Scrap tires 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 Environment, Great lakes and Energy, which regulates and manages the roughly 8 million tires that come off Michigan roadways every year.

Giant piles of scrap tires collect stagnant water that breed disease-carrying mosquitos, and when ignited by lightning strikes, spontaneous combustion, or arsonists, will burn uncontrollably for months, forming plumes of thick toxic smoke, and tax firefighting resources.

Using TDF as a biomass fuel supplement resolves those disposal problems. When blended with wood in the oxygen-rich, high temperature of a biomass boiler, none of the toxic compounds associated with uncontrolled tire fires form, and the particulate matter is collected by the plant's environmental controls. The tire is reduced to benign ash along with the wood ash and is properly disposed of in conventional landfills where it is used as daily cover.

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 byproducts into markets, keeping them out of landfills. Biomass power aids the circular economy by reducing these wastes.

Using railroad ties for energy recovery offsets the cost of replacing railroad ties, helps preserve limited space at landfills, and similarly to TDF, reduces overall air emissions versus alternative fates.

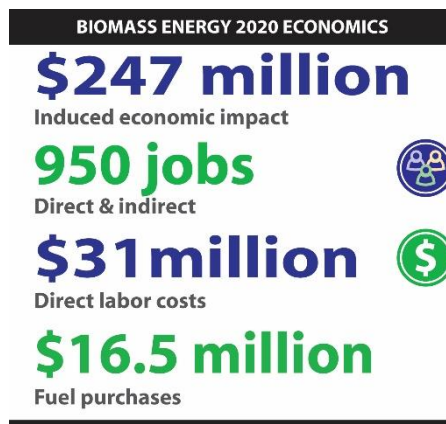
3. Biomass energy uses local resources that support rural economies while benefiting the environment.

Biomass today

Economics

Biomass remains a relevant energy resource because it provides technical benefits that other renewable resources can't. It is homegrown energy that keeps Michigan energy dollars⁵ in Michigan communities, supporting local forests and wood industries. Its economic contributions are substantial. (See Table 3.)⁶

These are resource-based jobs that can't be outsourced or exported. About 150 of these jobs are directly employed at the biomass plants, with more than 800 more dedicated to procuring, processing, and delivering fuel to the biomass plant. These are skilled and highly skill positions that provide livable wages, good benefits, and opportunities for advancement. Biomass plants are significant taxpayers in these communities and are good corporate citizens.



⁵ The [American Council for an Energy-Efficient Economy](#) estimates Michigan citizens send \$18 billion a year to other states/nations for fossil fuels.

⁶ [Forest Biomass Feedstock Availability and Economic Contribution of Biopower Facilities in the Lake States Region, 2022](#), MDNR, WDNR, MSU Forestry.

The environment

Energy from biomass resources benefits the environment on several fronts:

1. **Material utilization:** It reduces waste through energy recovery. The wood 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 beneficial use.
2. **Forest health:** Biomass energy encourages sustainable forest management by promoting the capture and use of woody debris removed during treatment and silvicultural 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^{7, 8} 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. Organic 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.

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.

Grid support

Capacity: "Capacity" is the ability to make power when it's most needed and 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. Biomass is always on and provides the same reliability that fossil plants do, but it's renewable.

Reliability: Michigan's biomass plants are utility-scale, wholesale electric generators. That means they fit seamlessly into the transmission and distribution grid, which makes the power grid more efficient and capable. System operators like biomass power plants because for more than 30 years they have provided day-to-day needs like voltage stabilization and dispatchability. They also provide continuous system support when other generating facilities must come offline for work on transmission and distribution systems.

Diversity: Biomass energy is diverse in on a variety of fronts:

⁷ [Memo](#), Nov. 19, 2014, Janet McCabe, Acting Asst. Admin., Office of Air and Radiation, U.S. EPA.

⁸ U.S. EPA 6/19/2018 40 CFR Part 60 [\[EPA-HQ-OAR-2017-0355: FRL-XXXX-XX-XXX\] RIN 2060-AT67](#)
Repeal of the Clean Power Plan.

1. *Economic diversity*: It's "homegrown, Michigan-made" and an investment that keeps energy dollars working in this state, not going to regions that produce coal and natural gas.
2. *Fuel diversity*: Wood and other biomass fuels are "non-commodity" byproducts and provide a hedge against the volatility of commodity fuel pricing, such as natural gas. Biomass fuels do not rely on pipelines or rail for transport and are less susceptible to malicious attacks.
3. *Diversity of use*: Biomass co-generation can provide thermal energy simultaneously with electricity for industrial applications, or district heat and power.

Biomass & energy policy

Michigan energy policy adopted in 2016 set new standards by which state regulators determine the course of Michigan's energy future. Power generation and delivery must now be the "most" reasonable and prudent solutions for the state's electricity customers, while at the same time mitigating climate impact and ensuring all citizens of this state benefit environmentally, socially, and economically. It's no longer just about the cheapest energy resource, but the total value of that resource realized by the citizens of Michigan. Biomass energy has played, and can continue to play, a role in meeting all these standards through the economic, technical, and environmental attributes it brings to Michigan's energy portfolio.

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

Biomass energy can switch fuel supplies when dictated by changes in the wood fiber market, such as volume or prices. It can provide electricity *and* heat energy for space heating or industrial processes. It brings reliability to generation, transmission, and distribution systems with its baseload, "always on" dispatchable power. It is affordable; proven to be cost competitive with utility baseload generation⁹, and it protects the environment by improving forest health, reducing the volume of the materials in landfills, and offsetting the air quality impact and climate impacts of fossil fuel power plants.

In short, biomass energy is a high-value energy proposition. Few other renewable energy resources can make this claim. Biomass energy provides the same power grid benefits as fossil fuel generation and keeps a portion of ratepayer energy dollars in their communities rather than spend them in other states for coal and natural gas. It mitigates climate change by offsetting fossil carbon

⁹ Rates paid to some Michigan Biomass member facilities are based on the avoided cost of Consumers Energy own coal power production. Others' rates are based on avoided costs indexed to natural gas as determined by the Michigan Public Service Commission in [Case No. U-18090](#).

emissions and the methane that the wood fuel would have created through alternative fates like decomposition or landfilling.

Ultimately, it's the locally sourced fuel that makes biomass energy special and worth pursuing as a "most reasonable and prudent" energy strategy. Biomass energy produces cost effective, reliable 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 of Michigan's natural resources.

Biomass and energy policy

Existing power purchase agreements between Michigan's biomass plants and Consumers Energy, their customer, will come to term beginning in March 2027. It comes at a crucial time for Michigan as it and the rest of the world attempt to pivot their economies away from greenhouse gas emitting energy sources and the human activities that cause them.

Michigan's biomass energy industry can continue to provide a high level of services to the energy, forestry and manufacturing sectors provided specific issues can be resolved.

Rate structures must compensate biomass power generators for the full value of what they provide.

For more than three decades, Michigan's biomass power generators have demonstrated their ability to provide sustainable, around the clock, "always on" power, and the multitude of services in provides:

Energy

- Mitigating line loss
- Voltage stabilization
- Energy resource diversity
- Reactive power (VARs)



Resources

- Forest stewardship
- Wildfire mitigation
- Wood recycling
- Materials management



Environment

- Forest stewardship
- Sustainable forestry
- Wildfire mitigation
- Disease, infestation response



Compensating non-utility generation for providing these ancillary services has been recognized in two cases before the Michigan Public Service Commission involving Consumers Energy: in an avoided cost proceeding in 2018¹⁰ that compensated some IPPs for line-loss mitigation, and in the company's most recent IRP case¹¹ that includes a settlement agreement that compensates distributed generators, i.e., rooftop solar, for avoided transmission costs. They also acknowledged the need to consider ancillary services in its last competitive solicitation process that prioritized

¹⁰ [Case No. U-18090](#)

¹¹ [Case No. U-21065](#)

generation resources that included these and other values – technical, environmental, economic, and social.

The full value of biomass makes it a “most” reasonable and prudent source of energy, and these values need to be fully and fairly considered in this process. Michigan Biomass and its member facilities have been, and will continue to be, engaged in these processes. Michigan regulators, too, must ensure that its regulatory processes account for the unique values of biomass energy in its outcomes.

Organic carbon emissions must be appropriately accounted in Michigan’s transition from “renewable energy” to “decarbonization.”

Carbon emissions (GHGs) emitted from organic sources are demonstrably different from the greenhouse gas emissions from fossil fuels. The basic premise is that climate change was brought about by fossil carbon emissions, which can be offset by appropriately sourced, sustainable biomass feedstocks as it’s practiced throughout the biomass energy industry.

GHG emissions from fossil fuel use are offset by biomass energy produced from *sustainably sourced* wood byproducts, like forest slash, sawdust, bark and chips from mills, and clean recyclable wood. Recovering energy from wood byproducts displaces the more harmful impacts of methane that would have been created anyway through decomposition.

GHG emissions created by utilization of wood debris and other organic feedstocks, such as farm manure, are manageable emissions.

Summary statements

Biomass energy is “homegrown, Michigan-made” energy from sustainably procured, local forest resources and industrial wood byproducts. It has, and can continue to be, a major contributor to a “most reasonable and prudent energy future for Michigan:

It supports more than 950 jobs, \$31.4 million in local labor, and \$247 in total induced value-added impact 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 proper utilization of these materials and byproducts and improves power plant performance and air emissions.
- It reduces waste stream volume and preserves landfill space.
- 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 that can offset capacity losses from the shutdown of coal plants and avoid the need for building new baseload generation.
- Sound energy and environmental policy recognizes the values of biomass as a “most” reasonable and prudent energy solution for Michigan.
- Organic GHG emissions are *not* the same as fossil fuels and need to be appropriately “accounted for” in Michigan’s decarbonization strategies.
- Rate structures need to be developed that acknowledge and compensate biomass power plants for the full suite of services they provide to forestry, materials management, and a robust bulk power supply system.

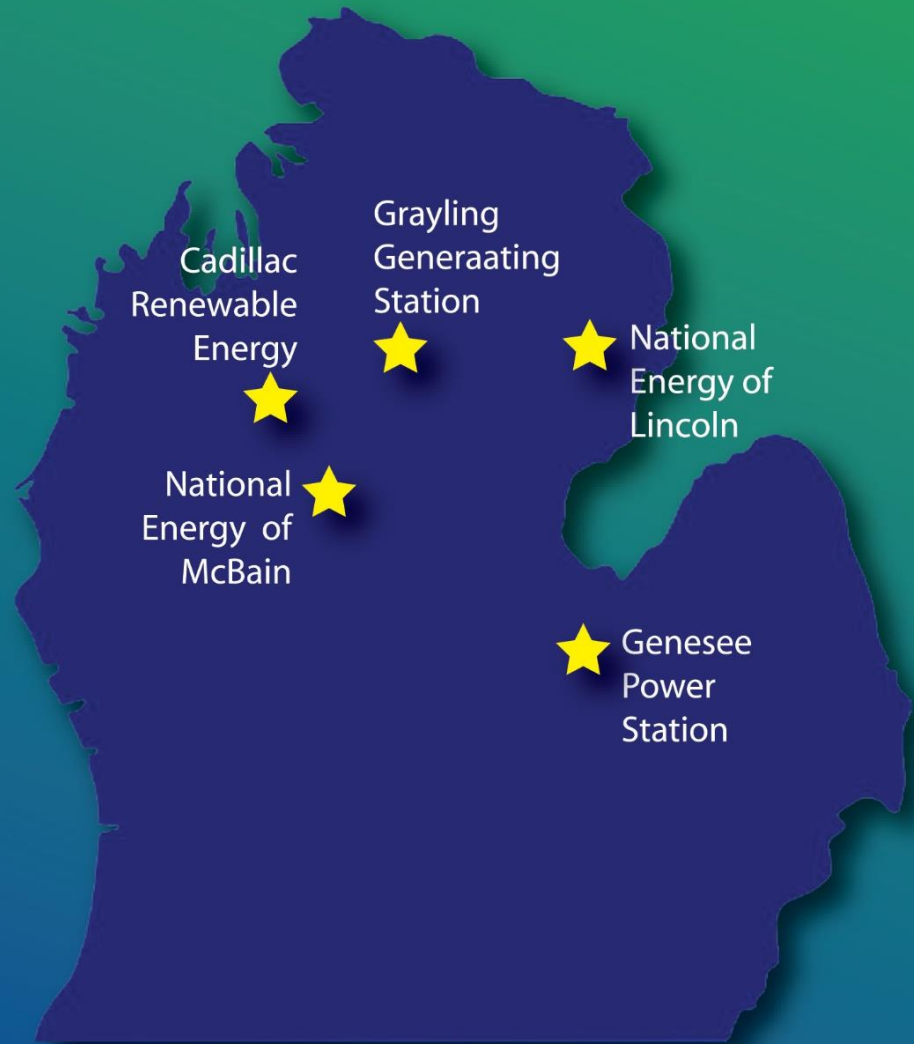
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Michigan Biomass is a business coalition of the following companies:

