

KEY FACTS

On the Road to 100 Percent Renewables for Michigan

Strengthening the State's Energy Transition

- ✓ **A 100 percent renewable energy future is possible by 2035.**
Chiefly by using **wind, solar, and batteries** for energy storage, Michigan can meet all its electricity needs with clean, carbon-free sources by 2035 and dramatically reduce the use of fossil fuels in vehicles and buildings.
- ✓ **More renewable energy = better health.**
A faster transition to renewable energy reduces harmful air pollutants faster, especially in environmental justice communities, saving Michigan nearly **\$15 billion** in public health costs.
- ✓ **More renewable energy = more jobs, lower energy bills, and other economic benefits.**
The transition to renewable energy will create more than **\$10 billion** in net labor income by 2040.
- ✓ **We must act now to avert the worst of climate change.**
Switching to renewable energy faster and prohibiting construction of new gas-fueled power plants leads to a **96 percent** drop in heat-trapping emissions between 2020 and 2040.
- ✓ **A clean energy future for all.**
To advance racial and economic justice in the transition to clean energy, Michigan policymakers must ensure **traditionally excluded groups**—including Black, Brown, Indigenous, immigrant and low-income communities—and fossil fuel-dependent workers **have power in decisionmaking** and receive direct benefits from the transition.



Union of
**Concerned
Scientists**

Michigan Needs a Renewable Electricity Future—and It is Possible

Demands for climate action surround us. In Michigan, the average yearly temperature has increased by up to 3°F across parts of the state, leading to changes in weather patterns that create major concerns about heat-related and respiratory illnesses, among other dangers (Michigan Department of Health and Human Services, n.d.). Further increases in extreme heat could put nearly 900,000 outdoor workers in the state at risk of losing an average of three workdays per person each year, jeopardizing \$466 million in total earnings each year (UCS 2021).

To act on climate change, Michigan must eliminate heat-trapping emissions from how the state generates electricity. It also must convert transportation, heating, and other sectors to run on carbon-free electricity instead of fossil fuels.

In considering the path forward, Michigan must account for effects of our energy choices beyond climate change so that the benefits of a cleaner electricity grid reach everyone. Specifically, the transition to clean energy must end historic inequities that have overexposed low-income communities and communities of color to air pollution.

Recognizing the urgent need for action, in 2019, under Governor Gretchen Whitmer, Michigan joined the US Climate Alliance (USCA), a group of states committed to upholding the objectives of the 2015 Paris Climate Accords. In 2020, Governor Whitmer also established a goal for the state to achieve “economy-wide carbon neutrality” by 2050. As the state decarbonizes its economy, the electricity sector plays a key role given the adverse climate and health consequences of burning coal, gas,¹ and other fossil fuels to generate electricity and given the importance of electrifying heating and transportation.

The Union of Concerned Scientists partnered with the Michigan Environmental Justice Coalition to explore potential pathways to reach 100 percent renewable electricity in Michigan on a timely basis. Using the Regional Energy Deployment System (ReEDS) electricity model from the National Renewable Energy Laboratory, we examined how a portfolio of energy resources under a strengthened renewable electricity standard (RES) could meet all of the state’s electricity needs by 2035. Our “100% RES” scenario also modeled high levels of electrification as the state works to meet its overall climate goals given the need to decarbonize transportation, heating, and other sectors. In addition, we partnered with the research nonprofit Greenlink Analytics to assess how a transition to renewable energy most directly affects everyday lives, in terms of changes in public health, jobs, and household energy bills.



As Michigan decarbonizes its economy, the electricity sector plays a key role given the adverse climate and health consequences of fossil fuel-fired power plants (such as the coal-fired Monroe plant, one of the state’s most polluting facilities). Our modeling research shows that Michigan can meet 100 percent of its electricity needs by 2035 using renewable resources.

A Faster Move to Renewable Electricity Brings Many Benefits

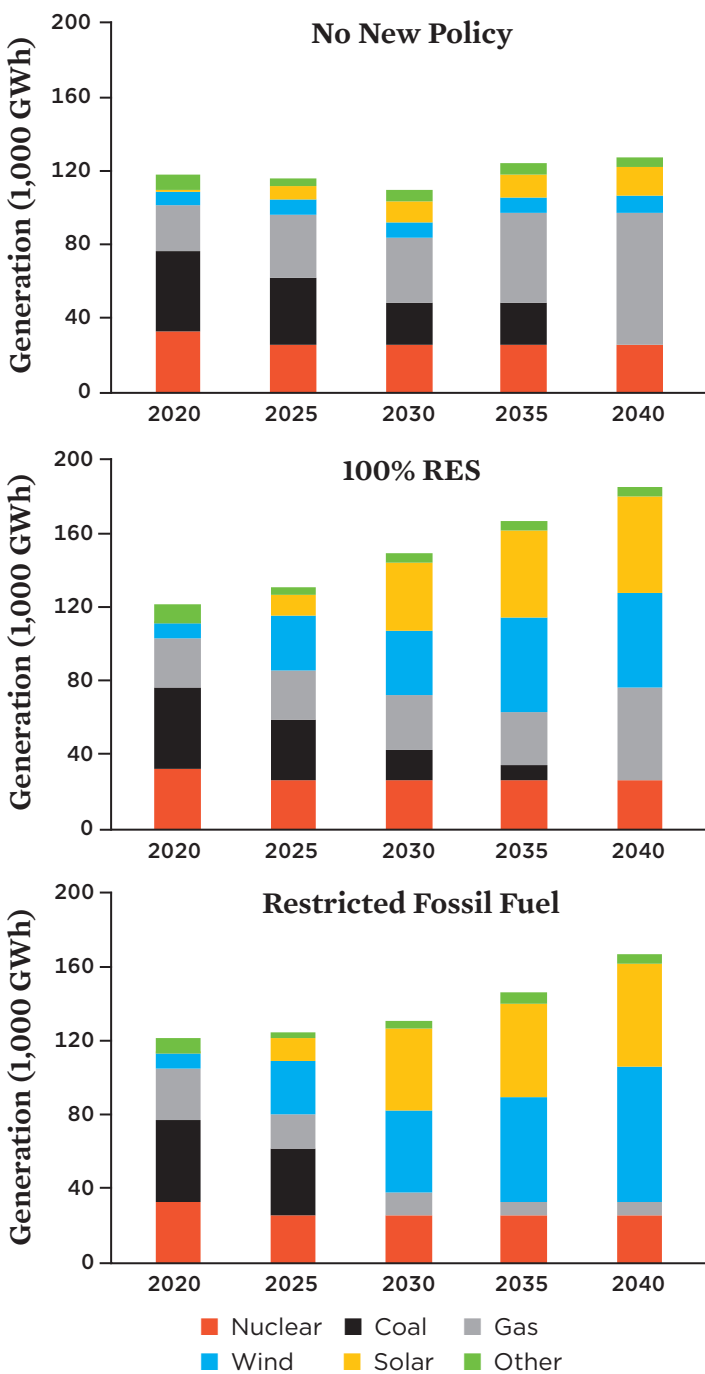
Energy Capacity and Generation

Under current policies and plans—the “No New Policy” scenario in our analysis—the state has about 3 gigawatts (GW) of wind capacity in 2040, producing about 9,600 gigawatt-hours (GWh); 8 GW of solar produces about 15,000 GWh. Wind and solar go from 7 percent of the state’s electricity generation in 2020 to 20 percent in 2040. However, that increase displaces only some fossil fuel generation. While coal generation disappears, electricity from gas nearly triples. Overall, the share of electricity from fossil fuels falls slightly, from 62 percent in 2020 to 57 percent by 2040.

By building out wind, solar, and batteries for energy storage more aggressively, Michigan can meet 100 percent of its electricity consumption with renewable energy by 2035, even with high electrification. By 2040, the 100% RES scenario yields more than 14 GW of wind, more than 24 GW of solar, and almost 6 GW of batteries. The wind and solar resources produce 51,000 GWh and 52,000 GWh in that year, respectively, going from 7 percent of electricity supply in 2020 to 57 percent by 2040—thus meeting growth in electricity demand.

While renewable resources meet all of Michigan’s electricity consumption needs in the 100% RES scenario, coal and gas plants continue operating. This is because the Midwest power grid, like grids in much of the United States, is interconnected across states and power is exported across state lines. To better reflect how Michigan might achieve its goals for carbon reduction,

FIGURE 1. Three Scenarios for Michigan Electricity Generation, 2020–2040



While the No New Policy scenario shows some growth in solar power, the 100% RES scenario leads to much more solar and wind. The Restricted Fossil Fuel scenario leads to even greater growth in renewable energy and avoids dangerous overreliance on gas.

Notes: “Solar” includes utility scale and distributed solar. “Gas” includes combined-cycle and combustion turbine. “Other” includes hydro, landfill gas, oil-gas-steam, and Canadian imports.

TABLE 1. Health Benefits from a Renewable Energy Transition in Michigan

| Health Impact | Cumulative Avoided Numbers, 2022–2040 |
|----------------------|---------------------------------------|
| Premature Deaths | 400–900 |
| Asthma Exacerbations | 9,000 |
| Lost Workdays | 43,000 |

we also modeled a “Restricted Fossil Fuel” scenario; it includes retiring all coal-fired power plants in the state by 2030 and restricting the construction of new combined-cycle, gas-fired plants.

By 2040, the Restricted Fossil Fuel scenario shows roughly 21 GW of wind, 27 GW of solar, and 9 GW of batteries. By 2040, wind produces 73,000 GWh and solar 55,000 GWh. Michigan would need to retire some remaining gas plants to fully eliminate emissions from the power sector (Figure 1).

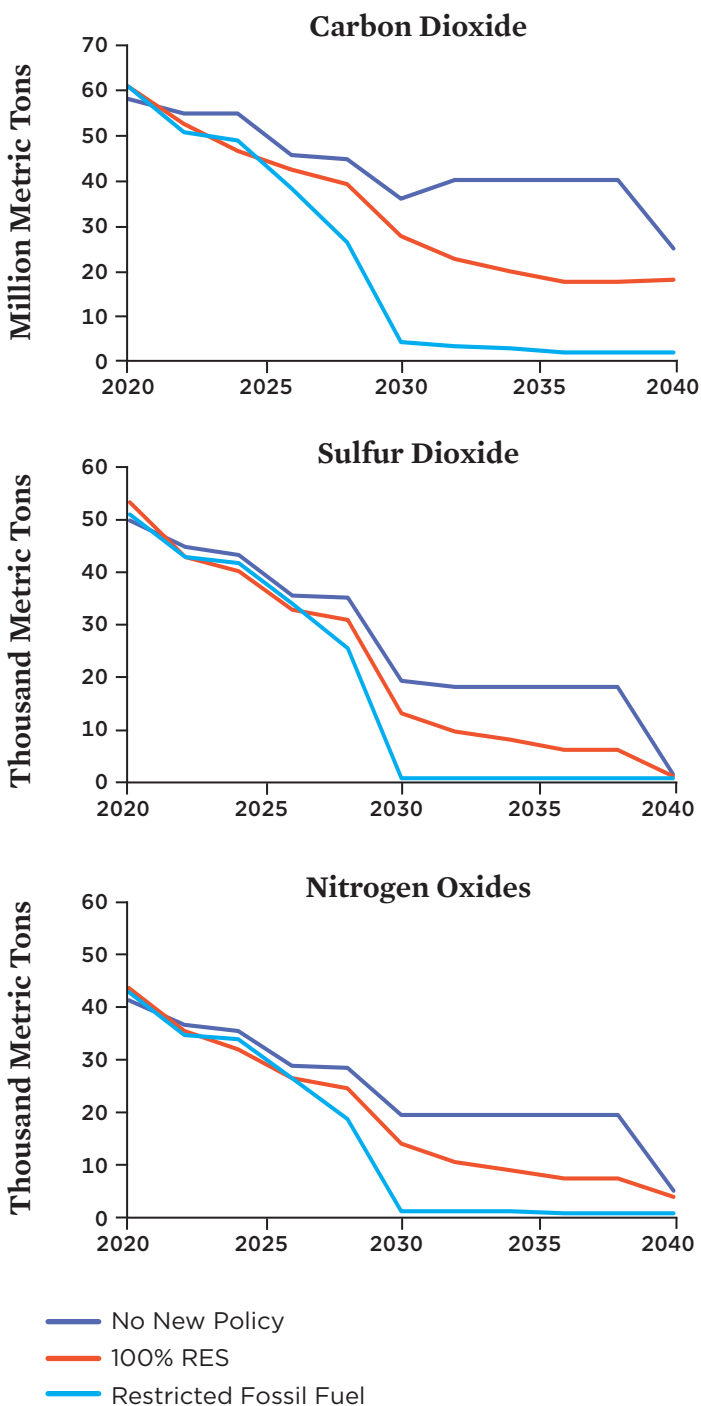
Public Health Benefits

Replacing electricity generated by burning fossil fuels with renewable electricity in the 100% RES scenario reduces the amount of air pollution that power plants and vehicles emit, such as sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter, and mercury and other toxic pollutants. Improvements in air quality yield substantial health benefits, including reductions in lung and heart ailments, asthma, diabetes, and developmental problems in children. The avoided health impacts from the electricity sector alone would save Michigan \$14.9 billion² in public health costs between 2022 and 2040, largely due to reductions in carbon dioxide (CO₂) and SO₂ pollution from power plants (Table 1). The largest benefits would accrue to Wayne County, parts of which have been out of compliance with federal SO₂ standards for several years.

Emissions Reductions

Along with reducing pollutants that directly affect public health, cleaning up the power sector can decrease emissions of CO₂, the primary heat-trapping gas contributing to global warming. While emissions from Michigan’s power sector will likely decline under current plans to retire coal plants in the No New Policy scenario, the reductions are faster and greater in the 100% RES scenario (Figure 2). Phasing out coal more quickly and limiting the construction of new gas-fueled plants while simultaneously transitioning to 100 percent renewable energy in the Restricted Fossil Fuel scenario produces even better results, saving nearly a decade’s worth of harmful pollution.

FIGURE 2. Emissions Reductions in Three Scenarios, 2020–2040



Avoiding construction of new gas plants and moving to 100 percent renewables under the Restricted Fossil Fuel Scenario keeps Michigan’s electricity sector emissions trending toward near-zero with high electrification of the transportation and building sectors.

Economic Benefits

The 100% RES scenario yields significant economic benefits, with substantial net growth in three key economic categories above those in the No New Policy scenario.

- **Jobs:** Michigan gains more than 400,000 additional job-years—meaning more than 100,000 additional jobs³—in the construction or installation of new power capacity, chiefly wind and solar, from 2022 to 2040. Thousands of additional jobs are created in most years, offsetting by far jobs lost in retiring fossil fuel power plants.⁴
- **Labor Income:** Cumulatively, labor income in Michigan increases \$10 billion more by 2040. Labor income includes wages and salaries, benefits, and payroll taxes, as well as income earned by self-employed individuals and unincorporated business owners.
- **Gross Domestic Product (GDP):** The jobs increase fuels \$20.6 billion in additional growth of the state GDP by 2040.

Affordability

Consumers must be able to afford a renewable energy transition. A key metric is “energy burden,” the percentage of income a household or individual spends on electricity and gas. In a 2021 survey, 54 percent of respondents had estimated energy burdens at or above 6 percent, a common marker for when energy burden becomes unaffordable (Our Power Michigan, n.d.). About 700 people, split between the City of Detroit and the Upper Peninsula, responded to the survey.

Considering only electricity and gas expenses, the average residential energy burden across the state drops in both the 100% RES and No New Policy scenarios, from 4.9 percent to 3.8 percent, between 2020 and 2040. Yet the strong electrification push in the 100% RES scenario brings further substantial savings not captured in that calculation, from reduced gasoline use for households switching to electric vehicles, as well as savings from reduced propane use for households adopting electric heat pumps.

Recommendations: Ensuring a Just and Equitable Energy Transition

Michigan, like other states that pledge to reduce carbon emissions, has technically feasible and highly beneficial paths to achieving 100 percent renewable energy. A transition away from fossil fuels can yield cleaner air, better health, and more jobs. However, the outcomes can be unequitable if Michigan does not implement the transition with care. We must ensure that everyone reaps the benefits and that the transition does not perpetuate historic inequities in the energy sector.

Here are key recommendations as Michigan moves away from fossil fuels and toward renewable energy, improves affordability for low- and moderate-income households, and ensures good decisionmaking throughout:

- **Target reductions in power plant pollution.** State policy should prioritize reducing pollution in already overburdened communities, deter new investments in the infrastructure for fossil fuel power, and avoid dangerous overreliance on gas. Clean energy sources, such as solar, wind, and batteries for energy storage, should replace generation from fossil fuel sources, including the Monroe coal-fired power plant, one of the state’s most polluting facilities.
- **Promote just transitions for fossil fuel workers and frontline communities.** As fossil fuel power plants close—including planned retirements of coal plants owned by Consumers Energy and DTE Energy—job training, income support, and incentives for responsibly siting infrastructure for clean energy and manufacturing at former fossil fuel sites are key to a successful transition for workers and fossil fuel-dependent communities.
- **Directly invest in communities to increase clean energy.** State policies should promote direct investments in expanding rooftop and community solar, energy efficiency, and the electrification of transportation and heating, with a priority on investments in historically underserved people and communities. Additionally, for all communities, the state should eliminate the ability of utilities to cap distributed generation resources such as rooftop solar. Currently, Michigan does not require utilities to compensate their customers for distributed generation once the total amount of that generation in a utility’s service territory exceeds 1 percent of its peak load.



Solar trainings—like this one in Highland Park, Michigan—help communities learn about how rooftop solar can reduce reliance on fossil fuels for electricity. By building out wind, solar, and batteries for energy storage more aggressively, Michigan can meet 100 percent of its electricity consumption with renewable energy by 2035.

- **Reduce energy burdens.** The move to clean energy will likely reduce average residential energy costs in most or all years, but, without due attention, it could increase burdens for low- and moderate-income households at some points. Unequal access to energy efficiency, rooftop solar, and other clean-energy strategies could keep low- and moderate-income households from enjoying reduced energy costs. Michigan should ensure that costs incurred by electric utilities for clean energy—and legacy costs spread over declining numbers of gas users (Dyson, Glazer, and Tepin 2019)—are addressed through either targeted energy rates or statewide policies, including energy-efficiency measures to reduce consumption. One approach is to enact percentage-of-income payment plans paired with energy-efficiency programs for households with energy burdens higher than 6 percent.
- **Develop workforce programs and entrepreneurship initiatives in renewable energy to foster high-quality, good-paying jobs.** The state must strive to advance a diverse, equitable, and inclusive workforce in clean energy industries. Everyone should be able to participate in and benefit from growth in the many sectors of the clean energy industry. In Illinois, for example, the 2021 Climate and Equitable Jobs Act provides for several workforce hubs across the state to expand access to quality jobs and economic opportunities, particularly for economically disadvantaged communities; it also mandates an incubator program to provide statewide training, mentorship, and recruitment opportunities for small clean energy businesses and contractors (Collingsworth 2021).
- **Ensure that frontline communities have power in decisionmaking.** Michigan’s Interagency Environmental Justice Response Team and Advisory Council on Environmental Justice, both created in 2020, are steps in the right direction. Work toward improving equity in the energy sector and meaningful frontline community involvement in decisionmaking must continue.
- **Target transmission additions and “non-wires” alternatives at reducing reliance on urban-based fossil fuel plants.** Responsibly sited electric transmission and non-wires alternatives, such as distributed generation, energy storage, and energy efficiency, are needed to expand renewable electricity, accelerate the closure of fossil plants, and mitigate the harms in communities most exposed to power plant pollution. Legislators and other state leaders should enact policies that promote equitable siting while advancing clean energy.
- **Ensure sustainable and responsible life cycles for clean energy technologies.** Michigan should encourage responsible supply chains, incentivize the use of local manufacturers

of renewable equipment, and enact policies that require recycling and reuse opportunities and make them available statewide.

- **Support strong federal policies.** State leaders should advocate for a strong national clean energy standard to accelerate decarbonization in *all* states and drive a swift transition to a clean, carbon-free electricity system.

This fact sheet is part of a multi-state analysis of the potential effects of bold clean energy action by leadership states. Learn more at www.ucsusa.org/resources/road-100-percent-renewables.

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Endnotes

1. "Gas" in this document refers to what is traditionally called natural gas.
2. Findings from our analysis are expressed in 2020 dollars.
3. A job-year is defined as a full-time position held by one person for one year. A person holds a job for an average of four years (BLS 2020).
4. Michigan's coal, gas, and oil-fired power plants employed 6,500 people in 2021 (DOE 2021).

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The Michigan Environmental Justice Coalition (MEJC) works to achieve a clean, healthy, and safe environment for Michigan residents most affected by inadequate policies. We build power and unity within our community, so we all can thrive.

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