

Leading from the Heartland

Midwest Progress Toward Equitably Eliminating Emissions from the Power Sector

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Introduction

This analysis provides a snapshot of main sources of emissions from the electric power sector in the RE-AMP footprint, their impacts, and strategies to address them. As of this writing, the RE-AMP states are Illinois, Iowa, Kansas, Michigan, Minnesota, North Dakota, Ohio, South Dakota, and Wisconsin.

Key Takeaways

1. The racial inequities in the Midwest are drastic, and lead to disproportionate harm to Black, Indigenous, and other People of Color (BIPOC).
2. Consumption of electricity and emissions from electricity are disproportionately high in the Midwest compared to similar geographies.
3. The power sector is still the largest source of emissions in the Midwest. Ohio, Michigan, and Illinois are the states with the most greenhouse gas (GHG) emissions from the power sector.
4. Despite the many obstacles that remain to equitably eliminate greenhouse gas emissions from the power sector by 2050, we have made tremendous progress.
5. Current data collection and analysis is not sufficient to fully assess the scope of harm to BIPOC communities, especially in the Midwest.
6. Too few people are protected from disconnection from their utility service, and not enough data is collected to fully assess the scale of disconnections.
7. Since RE-AMP began, CO₂ emissions from the power sector are down 37 percent, SO₂ emissions are down 89 percent, and NO_x emissions are down 76 percent.
8. Coal use for electricity has decreased by nearly 50 percent since RE-AMP began in 2005 and renewables comprise the second-strongest growth category for fuels, after gas. Renewables are also the second highest level of planned capacity.
9. Strong renewable growth can occur in states without strong policy.
10. The use of gas as a fuel for electric generation is way up since RE-AMP began, and more gas is scheduled to be built than renewables. Ohio, Illinois, and Michigan are key to stopping the growth of gas plants.
11. The Midwest has fallen behind most of the country in energy efficiency policies, and many of the existing policies privilege those who are already advantaged.
12. Each of the RE-AMP strategic priorities has a vital role to play in equitably eliminating emissions from the power sector, however, our members are not sufficiently resourced to prioritize the important task of stopping the gas rush.
13. Environmental Justice offices could help states stay on task to equitably eliminate pollution, as would other policies that deal with the racist reality of our power sector.



Regional Overview

Overviews can obscure how impacts are distributed. Decisions about where to site power generation, how to price it, and how to regulate it all impact communities differently. The decisions have been, and continue to be, steeped in racism. We therefore begin with some context about the racism that pervades our RE-AMP footprint.

Racial Inequities in the Midwest

Key takeaway #1: The racial inequities in the Midwest are drastic, and lead to disproportionate harm to Black, Indigenous, and other People of Color.

An understanding of the pervasiveness of racism is necessary to comprehend how polluting systems have survived into an era where clean energy, energy efficiency, mass transit, and other solutions could meet so many of our needs. As will be seen in more detail in each section, people withstanding the worst of pollution are disproportionately Black, Indigenous, and other People of Color (BIPOC), while those who consume the most energy are disproportionately of white settler culture. So long as the perceived needs of people from white settler culture pervade policymaking to the detriment of other Midwesterners, these patterns of injustice will prevail and act as enabling factors in polluting forms of energy. Deeply engrained racism in the Midwest results in a challenging economic landscape for Black, Indigenous, and other People of Color to live. In 2018, one index used eight criteria related to housing, education, income, and employment to measure gaps between White and Black Americans in urban areas. The findings: our RE-AMP footprint is home to eleven of the fifteen worst places for Black people to live. Six of these cities are in Illinois alone, and all five of the very worst places for Black people to live are in our region: Peoria (#5); Minneapolis-St. Paul (#4); Racine (#3); Milwaukee-Waukesha-West Allis (#2); and Waterloo-Cedar Falls (#1). In the Waterloo-Cedar Falls metro area, people who identify as Black made only 47 percent as much as those who identify as white, and the unemployment for Black people was 24 percent as opposed to the 4.4 percent unemployment rate among white residents.¹

As we will discuss more below, the problems extend into the very air Midwesterners breathe. Black people, for example, have the highest risk for premature death from power plant emissions of fine particulate matter in the footprint of MISO and PJM (the two regional transmission organizations that serve most of the Midwest).²

We know that existing technologies such as solar and wind could have begun to drastically reduce the amount of pollution from our energy supply by the 1970s or even earlier. Yet, polluting plants continue to operate, particularly in Black and Brown communities or in rural job-starved locations. If decision-

A WORD ON THE DATA IN THIS REPORT

Throughout this report, we have pulled from a range of data sources to reflect the most up to date information. One result is that we can't always compare apples to apples. For example, in some cases we show data specific to carbon dioxide, in other cases we refer to the broader category of greenhouse gas emissions. In some cases, we cannot disaggregate data in a way specific to the RE-AMP footprint. We have scrupulously cited sources and units of measure and trust the reader to manage the nuances.



makers, and the environmental advocates who influence them, fully valued BIPOC lives and the lives of people living on low incomes, these polluting sites could not have been built. The fact that fossil fuel generation is so prevalent despite the availability of other technologies is down to the fact that certain communities—BIPOC communities in particular—have been viewed as sacrifice zones.

We will come back to this theme many times in the text below, and we encourage the reader to educate themselves not just on the injustices, but the innovative and democratic solutions that frontline communities are finding to these problems. We believe the most impacted communities should be centered in a rapid transition to an equitable clean energy economy for a healthy climate, people, and other living beings.

Consumption and Emissions

Key takeaway #2: Consumption of electricity and emissions from electricity are disproportionately high in the Midwest compared to similar geographies.

The RE-AMP footprint of nine states represents 16 percent of the country's population³ and generates roughly 20 percent of the country's carbon dioxide emissions⁴ and about 22 percent of the country's electric power sector GHGs.

Per capita consumption

Three of our states (North Dakota, Iowa, and South Dakota) rank in the top ten of states that consume the most energy per capita. The other states rank from 16 to 30.⁵

Table 1: The national ranking of RE-AMP states in terms of per capita energy consumption (Source: EIA, 2018).

Rank	State	Total Energy Consumed per Capita, million BTU
3	ND	872
5	IA	513
9	SD	452
16	KS	390
18	MN	341
22	WI	325
23	OH	322
25	IL	315
30	MI	290

While it might be tempting to think our high consumption has to do with the wintry weather we have here, it's worth noting that nearly all of the New England states consume less than 250 million BTUs per capita.

Greenhouse gas emissions

Greenhouse gases include Carbon Dioxide (CO₂), methane (CH₄), Nitrous Oxide (N₂O), Hydrofluorocarbons (HFCs), and others. Taking the total GHGs into account, the electric power sector contributes 28 percent of emissions in RE-AMP footprint, as seen in Figure 1, below.

Midwest Greenhouse Gas Emission Analysis: Electric Power Sector October 2021

RE-AMP region 2018 total GHGs

Power Transport Agriculture and waste Industry Buildings

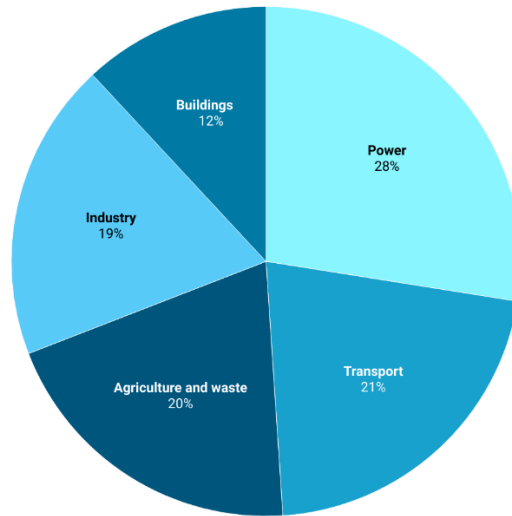


Chart: RE-AMP • Source: Rhodium Group Climate Deck • Created with Datawrapper

Figure 1: Total GHGs in RE-AMP footprint, 2018 (source: Rhodium Group, 2021; Chart: RE-AMP)

Through the rest of this report, we will explore the power sector in our region—that is, the sector that generates and transmits electricity. Nearly all the emissions related to coal and much of the emissions related to so-called natural gas arise from this sector.

Electric Power Sector

The electric power sector accounts for roughly 30 percent of the greenhouse gas emissions in our region, as well as a large percentage of the mercury, nitrogen oxides, sulfur oxides, and particulate matter pollution we experience. In the sections below, we explore the types of utilities, how people are impacted by this sector, emissions, and relevant strategies for equitably decarbonizing.

Overview of Power Sector

Key takeaway #3: The power sector is still the largest source of emissions in the Midwest. Ohio, Michigan, and Illinois are the states with the most greenhouse gas (GHG) emissions from the power sector.

Key takeaway #4: Despite the many obstacles that remain to equitably eliminate greenhouse gas emissions from the power sector by 2050, we have made tremendous progress.



Electricity is generated by a range of fuels, including fossil fuels, renewables, and nuclear. Most electricity is generated at power plants, wind farms, dams, or utility-scale solar arrays, and then dispatched onto a grid that carries the power to its end use, such as homes and businesses. Some electricity comes from distributed generation, such as personal generators or home solar panels.

Electric utilities in our footprint fall into three categories: Investor-Owned Utilities (IOUs), which are regulated corporate monopolies that earn money for their stakeholders; Rural Electric Co-ops (RECs), which are owned by the customers they serve; and municipally-owned utilities (munis), which are often also called public utilities.

Electricity is dispatched through regional transmission organizations (RTOs). In the RE-AMP footprint, the two main such organizations are MISO and PJM.

Investor-Owned Utilities

Investor-Owned Utilities (IOUs) are monopolies that are owned by shareholders who by law receive a guaranteed rate of return. In exchange for their ability to be the sole provider of electricity (or other essential service) in a service territory, prices and other important decisions that businesses would usually make on their own must instead be approved by regulators. IOUs are regulated by state commissions, which go by various names such as Public Service Commission, Public Utility Commission, and others. In our region, the commissioners are appointed rather than elected. The level of regulation varies by state, and two states in our region, Illinois, and Ohio, are often considered unregulated, while Michigan is often described semi-unregulated, though in reality the regulation in those states is simply different than other states.

In the nine RE-AMP states, 49 IOUs serve roughly 15 million customers and bring in more than \$6 billion

“According to our research, at least 32 [IOUs] have made some form of greenhouse gas reduction commitment. ... It’s important to note, however, that the pledges are not enforceable by the power of law.”

in revenue.⁶ According to our research, at least 32 have made some form of greenhouse gas reduction commitment. The most ambitious commitment comes from Xcel (also called Northern States Power), which says it plans to provide 100 percent carbon-free electricity by 2050. The utilities that have made carbon-reduction pledges are typically among the largest in the region, and these pledges cover the service of more than 11 million customers. It’s important to note, however, that the pledges are not enforceable by the power of law. While some utilities are taking actions more-or-less in line with their stated pledges, others have not gone far beyond creating a web page telling people about their good intentions.

A NOTE ON ELECTRIFICATION:

People working on reducing greenhouse gas pollution are, generally, in favor of electrifying more parts of our lives: transportation; space heating; water heating; and lawn care. This might seem strange, since the power sector is currently the largest source of climate change pollution. However, the power sector is becoming cleaner, and has the potential to become far cleaner still through increased energy efficiency and renewable fuels. In contrast, internal combustion engines or gas combustion heat sources cannot reduce their emissions to zero.

Rural Electric Co-ops

Rural Electric Co-ops (RECs) have a proud history of making electricity possible in rural parts of the country. In the 1930s, an executive order and two pieces of New Deal legislation created financial mechanisms and the overall framework to enable RECs.

Customers of RECs are also owners, though in many cases people served by RECs face significant barriers to exercising their decision-making power. Regulation of RECs varies from state to state, but they are far less regulated overall than Investor-Owned Utilities (IOUs).

235 RECs serve roughly 2.6 million people in RE-AMP states. The highest percentage of people served by RECs in our region are in Kansas (56 percent), North Dakota (33 percent), Minnesota (30 percent), Iowa (21 percent), and South Dakota (18 percent).⁶

Municipally-Owned Utilities

Municipally-owned utilities (munis), like RECs, have a proud history of providing power as a service rather than as a product to generate profit. Regulation of munis varies from state to state and municipality to municipality, but in general they face far fewer regulations than IOUs. In theory, munis are accountable to the taxpayers they serve, though the realities of such accountability vary widely.

Two hundred and seventy-three municipally owned utilities provide electricity to 1.5 million customers in the RE-AMP region. Most of these have small customer bases of less than 5,000. The largest, in Lansing, serves roughly 85,000 customers.⁶

How People Are Impacted

We all rely on air and water that are clean enough to sustain our lives. We depend on electricity to power our lights, heat, and appliances. But we don't all have equal access to these things, and race is one of the biggest indicators of who has access. It's also one of the main indicators of who will suffer the most harm from power plant pollution.

Key takeaway #5 Current data collection and analysis is not sufficient to fully assess the scope of harm to BIPOC communities, especially in the Midwest.

Key takeaway #6: Too few people in the Midwest are protected from disconnection from their utility service, and not enough data is collected to fully assess the scale of disconnections.

Health

The negative health impacts of pollution from fossil fuel are well known and broad. They include heart and respiratory diseases, cancer, miscarriages, and neurological diseases.⁷ The report *Coal Blooded*—authored by the NAACP, the Indigenous Environmental Network, and the Little Village Environmental Justice Organization—found that the concentration of coal plants in five Midwestern states (Ohio, Michigan, Indiana, Illinois, and Wisconsin) were particularly burdening low-income communities and communities of color.⁸

“...pollution entering a moderately well-off community will not be as detrimental as the same amount entering one with greater vulnerabilities.”

The health consequences go beyond the contamination of the immediate environs. Public health experts now understand that there are underlying social determinants of health that affect health outcomes in non-linear ways. The CDC defines the social determinants of health as “conditions in the places where people live, learn, work, and play that affect a wide range of health risks and outcomes.”⁹ These include economic stability; education; social and community context; health and health care; and neighborhood and built environment. All these factors interact with each other, so that lack of access to one impacts access to the others.

Because race and income are two indicators that correlate strongly with overall health, tools like the EPA’s EJSCREEN use them to conduct limited analyses of environmental justice.¹⁰ Race represents an indicator separate from income that can be used as a surrogate for the ability to secure housing, employment, and quality education. The interplay between the vulnerabilities that are caused by the inaccessibility of multiple social determinants of health partially accounts for the discrepancy in health outcomes when polluting infrastructure is placed in a community already bifurcated by highways, without access to fresh food, and with crumbling schools versus the same polluting infrastructure in a community that has not faced discrimination in housing, employment, education, and health care. That’s why pollution entering a moderately well-off community will not be as detrimental as the same amount entering one with greater vulnerabilities.

Some communities—particularly majority Black, Indigenous, or People of Color—have especially significant negative health outcomes from polluting infrastructure because siting requirements typically do not take the cumulative impacts of multiple pollution sources into effect. Not only does a gas fired plant, for example, add another source of pollution to an overburdened area, but people who have already been overburdened will be more susceptible to the harm caused by this new plant. Additionally, several types of pollution and other impacts may interact with each other in ways that are not yet fully understood.

In fact, if one thing has stood out to the authors, it is that there is not enough data readily available to fully assess the scope of the impact of electric generation, consumption, availability, and regulation on human health, and this is particularly true in communities burdened by multiple sources of pollution and the effects of racism and discrimination. The lack of readily available data is one reason why it is so important to listen to the voices of BIPOC communities rather than relying solely on data to make decisions.

“The lack of readily available data is one reason why it is so important to listen to the voices of BIPOC communities rather than relying solely on data to make decisions.”

Access

Nearly everyone has an electric bill to pay. In some cases, that bill contributes to cooperatively owned utilities (RECs), or to the public domain (munis). In other cases, the bill contributes to shareholder profits (IOUs). In this section, we examine electric billing rates and disconnections.



Rates

Information on utility rates is accessible and is analyzed here. However, it is important to note that rates don't tell the full story of how affordable an electricity bill is. Utilities are often successful in implementing fixed charges that increase their overall revenue and the amount customers pay without increasing the rate per kilowatt hour itself.

The rates for residential customers are typically around twice as much for industrial customers, with commercial customers paying something in between. Michigan has the highest residential rates in our region.

Average Price of Electricity (2018)

cents/kilowatt hour

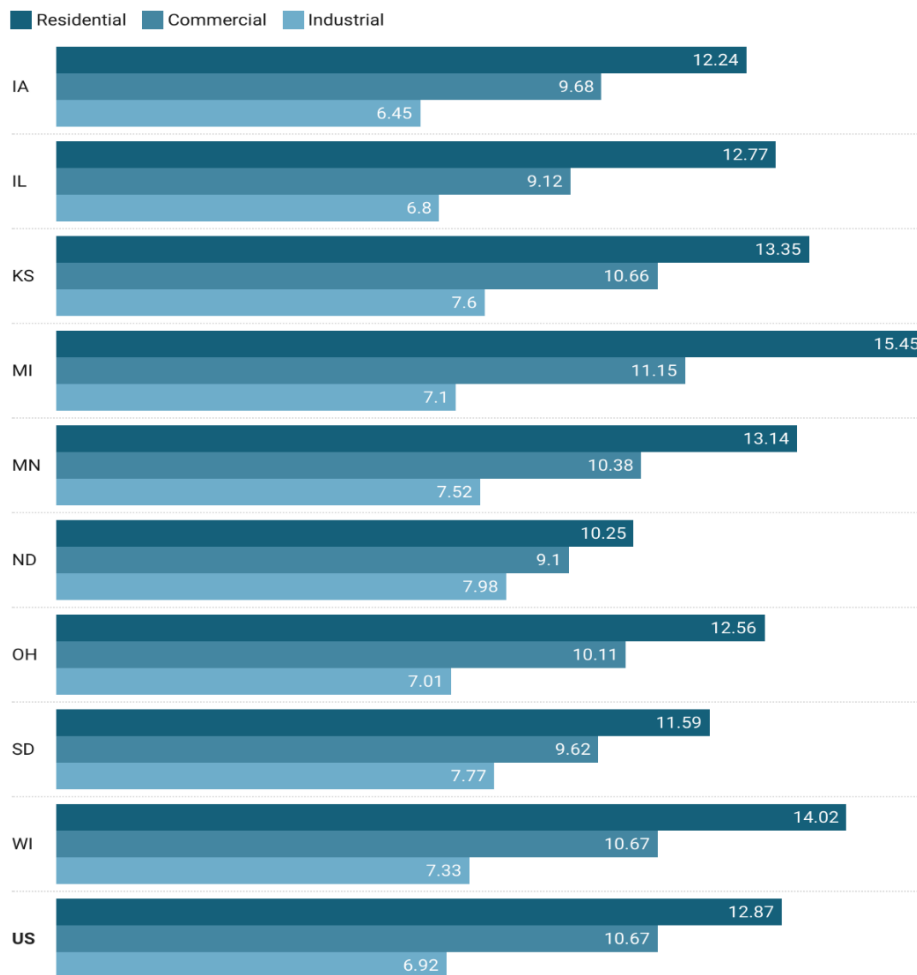


Chart: RE-AMP • Source: EIA Average Price (Cents/kilowatthour) by State by Provider, 1990-2018

Figure 2: Average rates per kilowatt/hour in the RE-AMP region

Midwest Greenhouse Gas Emission Analysis: Electric Power Sector
October 2021

Residential Rates for Utilities with 1,000-150,000 Customers

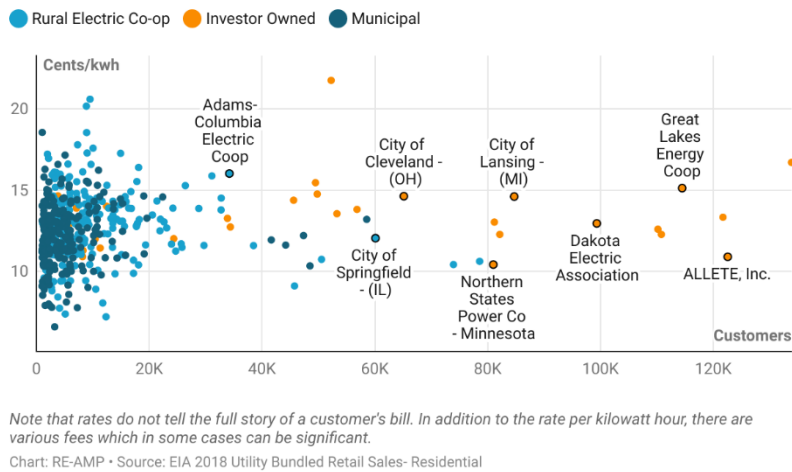


Figure 3: Residential rates in RE-AMP states for utilities with fewer than 150,000 customers

In 2018, nearly six million people in our network’s footprint were residential customers of the 55 utilities that charged more than 15 cents per kilowatt hour. On the other end of affordability, more than 700,000 people paid less than ten cents per kilowatt hour for their power in 2018. Of the 63 utilities with these lower rates, 44 were munis, 18 were RECs, 5 were IOUs, and one is a political subdivision (this refers to power imported from Nebraska).

RECs have the widest variation in rates, while most IOUs fall in the middle band. Figure 4 shows the rates for all the utilities with fewer than 150,000 customers, while Figure 5 shows just the largest utilities, with more than 150,000 customers.

Residential Rates for Utilities with 1,000-150,000 Customers

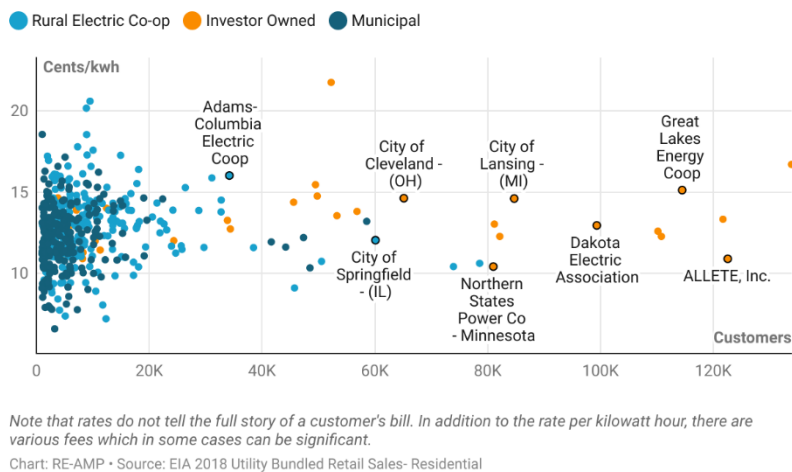
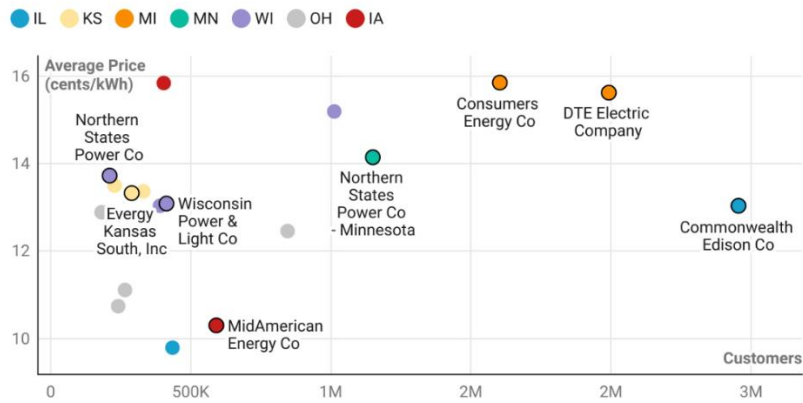


Figure 4: Residential rates in RE-AMP states for utilities with fewer than 150,000 customers



Residential Rates for Utilities More than 150,000 Customers



All of the utilities with a customer base of 150,000 or more in our footprint are IOUs.
 Chart: RE-AMP • Source: EIA

Figure 5: Residential rates for customers of large utilities

Of the large utilities, Michigan’s two largest IOUs have the highest rates (Figure 5). These data lead us to ask why a person using their toaster in Michigan must pay so much more for the privilege than someone making toast in Iowa. Or, more seriously, why a person on the verge of heat stroke being served by Consumers Energy may be unable to afford to turn on an air conditioner, while a customer of MidAmerican can afford to.

Disconnections

Disconnections are the deliberate interruption or limitation of a customer's utility service by a utility company. Some states offer certain protections against disconnections. These include temperature-based protections and date-based protections, which prevent shutoffs during certain times or during certain weather. Some states also disallow reconnection fees. These fees can make it hard for a family to restore service once their power is cut.

It is important to note that in most cases, whatever legal protections do exist only apply to IOUs and not to munis or RECs.

Table 2 provides an overview of the types of protection in each RE-AMP state that apply to customers of IOUs. Most policies contain nuances, based on considerations such as whether someone receives federal/state assistance, whether they are enrolled in a payment plan, their age, health, and income.

Midwest Greenhouse Gas Emission Analysis: Electric Power Sector October 2021

Table 2: Policies to protect against disconnections for customers of IOUs.

	Temperature Based Protection (Fahrenheit)¹¹	Reconnection Fees¹²	Date-based protection¹¹
Illinois	Yes (below 32/above 95)	No	Yes (Dec. 1 – Mar. 31)
Iowa	Yes (below 20)	Yes	Yes (Nov. 1 – Apr. 1)
Kansas	Yes (below 35)	Yes	Yes (Nov. 1 – Mar. 31)
Michigan	No	Yes	Yes (Nov. 1 – Mar. 31)
Minnesota	Yes (summer)	Yes	Yes (Oct. 15 – Apr. 15)
North Dakota	No	Yes	No
Ohio	No	Yes	Yes (Oct. 20 – Apr. 15)
South Dakota	No	No	Yes (Nov. 1 – Mar. 31)
Wisconsin	Yes	Yes	Yes (Nov. 1 – Apr. 1)

In addition to the protections above, some states have implemented temporary protections related to the pandemic (often only benefiting customers of IOUs). However, a recent analysis by the Center for Biological Diversity found that between February 2020 and June 2021, utilities in certain states continued to disconnect services despite receiving sufficient funding from the CARES Act to completely cover the cost of unpaid bills.¹³ Shockingly, some states don't require even regulated utilities to report on disconnections. Among those that do, Midwestern states, especially Michigan, are reporting high levels of disconnection. See the map created by the Center for Biological Diversity placed here as Figure 6.

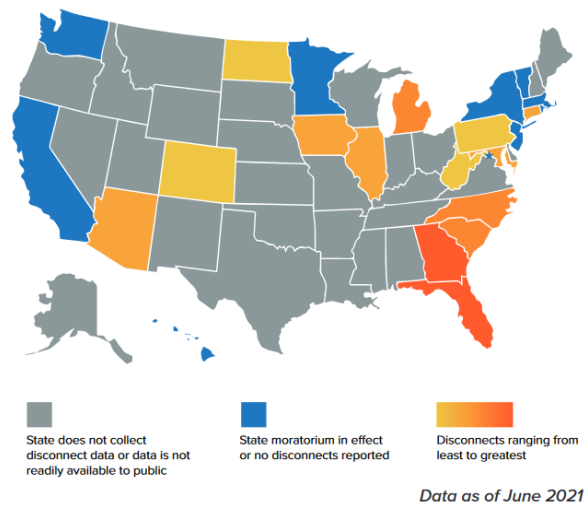


Figure 6: Map of disconnections from February 2020-June 2021.¹³

Jobs

Across the country, more than 384,000 people work in electric generation, transmission, and distribution. About 30 percent of these work in installation, maintenance, and repair occupations. Just over nine percent work as plant and system operators.¹⁴

Our region has a high concentration of power plant operators. In 2019 Michigan had the fourth highest number of people in this occupation in the country, earning an average of nearly \$85,000 per year. North Dakota has almost 3.5 times the national average concentration of power plant operator jobs, with .81 power plant jobs for every thousand. In South Dakota, power plant operators are paid more than in any other state, averaging more than \$95,000 per year.¹⁵

Our nine states' energy efficiency industry employs more than 400,000 people. Renewable energy jobs employ nearly 65,000 people. Clean grid and storage jobs are undertaken by more than 19,000 people.¹⁶

We lack sufficient data on how that employment breaks down along racial, gender, and class lines in the Midwest, but anecdotal evidence suggests that higher wage jobs are going disproportionately to white men.

Emissions

Key takeaway #7: Since RE-AMP began, CO₂ emissions from the power sector are down 37 percent, SO₂ emissions are down 89 percent, and NO_x emissions are down 76 percent.

Key takeaway #8: Coal use for electricity has decreased by nearly 50 percent since RE-AMP began in 2005 and renewables comprise the second-strongest growth category for fuels, after gas. Renewables are also the second highest level of planned capacity.

Key takeaway #9: Strong renewable growth can occur in states without strong policy.

Key takeaway #10: The use of gas as a fuel for electric generation is way up since RE-AMP began, and more gas is scheduled to be built than renewables. Ohio, Illinois, and Michigan are key to stopping the growth of gas plants.

Key takeaway #11: The Midwest has fallen behind most of the country in energy efficiency policies, and many of the existing policies privilege those who are already advantaged.

Midwest Greenhouse Gas Emission Analysis: Electric Power Sector
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Levels of Emissions

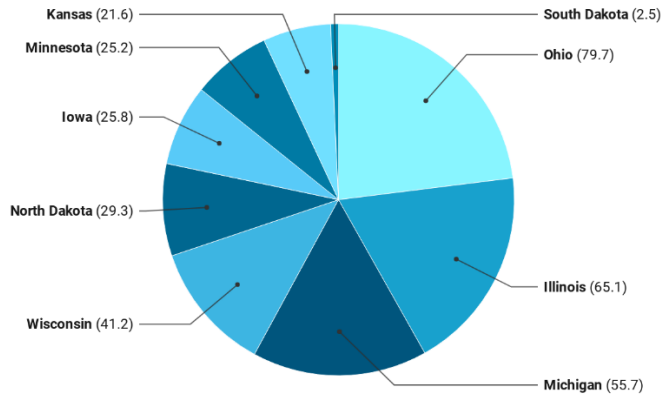
Besides the climate change inducing CO₂, NO_x and SO₂ emissions are air pollutants that harm human health and natural ecosystems. While net generation has remained about the same since RE-AMP began, SO₂ and NO_x have decreased substantially in our footprint (89 percent and 76 percent respectively). CO₂ emissions are also down 37 percent. See Figure 8 and Figure 9.

In 2017, Illinois, Michigan, and Ohio together comprised the majority of our region’s carbon dioxide emissions from the electric power sector, as can be seen in Figure 7.¹⁷ Because they are all created from the same fossil fuel combustion, it’s not surprising that Illinois, Michigan, and Ohio see the worst power-plant-related NO₂ and SO_x emissions as well, see Table 3.

Nearly all direct power sector emissions are CO₂, as other emissions such as methane leaks along pipelines or emissions from mining are attributed to other sectors.

State Electric Power Sector Emissions (2017)

Ohio, Illinois, and Michigan together had the majority of carbon dioxide emissions from the power sector.



Million metric tons, CO₂
Chart: RE-AMP - Source: EIA - Created with Datawrapper

Figure 7: States' share of CO₂ emissions from the power sector.

Table 3: Pollutants from the power sector in the Midwest in 2019.

State	Annual NO _x emissions (tons)	Annual SO ₂ emissions (tons)	Annual CO ₂ emissions (tons)	Annual CH ₄ emissions (lbs.)	Annual N ₂ O emissions (lbs)	State annual net generation (MWh)
Iowa	17,478	27,331	26,798,118	5,492,118	793,351	62,649,564
Illinois	29,438	68,583	66,437,065	12,967,063	1,868,654	184,292,979
Kansas	15,577	4,888	22,573,282	4,823,359	699,009	50,887,993
Michigan	42,174	52,307	58,743,607	11,379,312	1,626,474	116,689,224
Minnesota	16,366	9,687	25,971,446	5,401,178	775,928	59,379,025
North Dakota	29,245	32,045	29,552,935	6,657,474	966,837	41,147,324
Ohio	59,789	70,967	73,758,798	12,498,704	1,785,694	119,407,794
South Dakota	1,368	1,060	3,547,235	655,089	94,357	14,506,647
Wisconsin	14,213	6,999	37,999,728	6,989,650	1,004,550	62,021,341
RE-AMP Totals	225,646	273,867	345,382,214	66,863,947	9,614,852	710,981,891



Midwest Greenhouse Gas Emission Analysis: Electric Power Sector October 2021

Carbon Dioxide Emissions and Net Generation of Power Sector in RE-AMP Footprint 2005 -2019

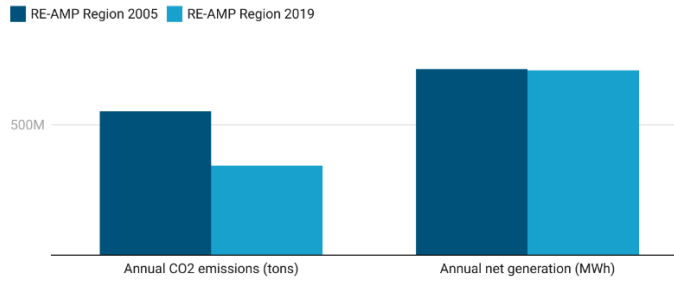


Chart: RE-AMP • Source: EPA Emissions & Generation Resource Integrated Database (eGRID) • Created with Datawrapper

Figure 8: Carbon dioxide and net generation of power sector, 2005-2019

Other GHGs from Power Sector in RE-AMP Footprint 2005 -2019

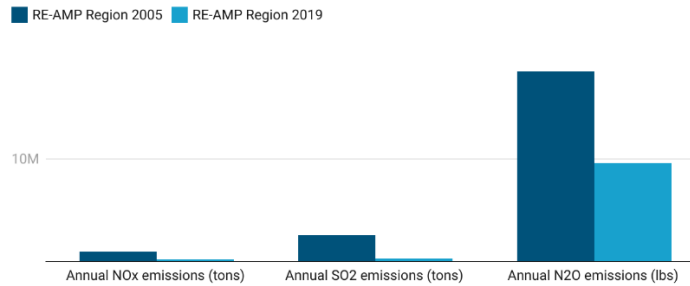


Chart: RE-AMP • Source: EPA Emissions & Generation Resource Integrated Database (eGRID) • Created with Datawrapper

Figure 9: Other GHGs from Power Sector in RE-AMP footprint, 2005-2019.

Fuel Sources

About 14 percent of electricity generated within the region in 2019 came from wind, solar, and biomass. Gas, coal, nuclear, and hydro comprise the remainder of energy sources for generating electricity.¹⁸ Between 2005 and 2019, coal use has declined by 49 percent, while gas-fired plants are more numerous and running more. Renewable usage is also up significantly, see Figure 10.

Electric Power Fuel Source from 2005-2019

Change in generation from 2005 to 2019 in megawatt hours.

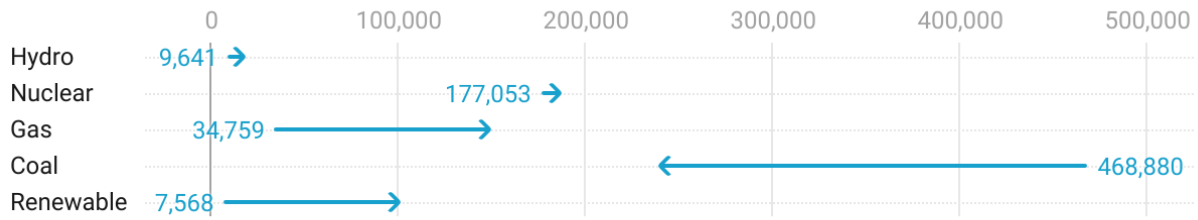


Chart: RE-AMP • Source: EIA • Created with Datawrapper

Figure 10: Change in electric power fuel sources from 2005 to 2019.

Planned Capacity

According to the Energy Information Administration, most of the new generation being built is for gas, followed by wind and solar.¹⁹ Figure 11 shows the planned nameplate capacity as of 2020. Nameplate capacity refers to the total amount of energy that a plant could theoretically produce, though no plant ever actually generates that amount.

New Capacity Planned in RE-AMP Region by Technology

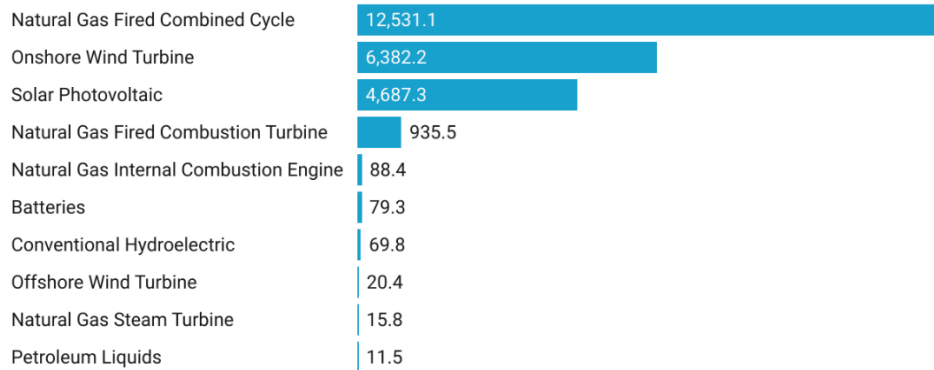


Chart: RE-AMP • Source: EIA • Created with Datawrapper

Figure 11: Nameplate capacity (in megawatts) for planned generation in 2020.

Coal

In 2005, coal fueled 67 percent of electricity generated in our footprint. In 2019, that was down to 34.5 percent. That's important because of all the fuel sources for our electric power, coal contributes the most CO₂, particulate matter, mercury, SO₂, and NO_x. This pollution creates major problems for the climate, ecosystems and for communities around coal plants—particularly those communities that are already overburdened by hosting other polluting infrastructure such as highways, incinerators, or heavy industry. Black, Indigenous, and other People of Color are disproportionately impacted by these emissions.

“In 2005, coal fueled 67 percent of electricity generated in our footprint. In 2019, that was down to 34.5 percent.”

Because of coal's massive contribution to climate change, RE-AMP members used the Network in the early years of RE-AMP to undertake a massive and successful effort to stop a planned coal rush. Other members worked to facilitate the closure of existing coal plants through a focus on clean energy, energy efficiency, and through working to shutter the most polluting plants.

Gas

Nationally, about 37 percent of gas is used in generating electricity (not including the amounts that are exported or sent to storage). Another 33 percent goes to industry, and 27 percent to residential and commercial buildings.²⁰ As described in the sections above, the use of gas as a fuel for electricity has vastly increased, with still more gas generation capacity being planned.

Non-Hydro Renewables

The renewable energy portfolio of utilities in our region has increased significantly in recent years. In 2005, just over one percent came from wind, solar, or biomass. In 2019, that amount grew to 14.5 percent, with most of the increase coming from wind generation.

“In addition to the utility-scale renewable generation, the distributed generation of renewables is on the rise. Nationally, installed residential solar capacity is roughly 123 times what it was in 2006.”

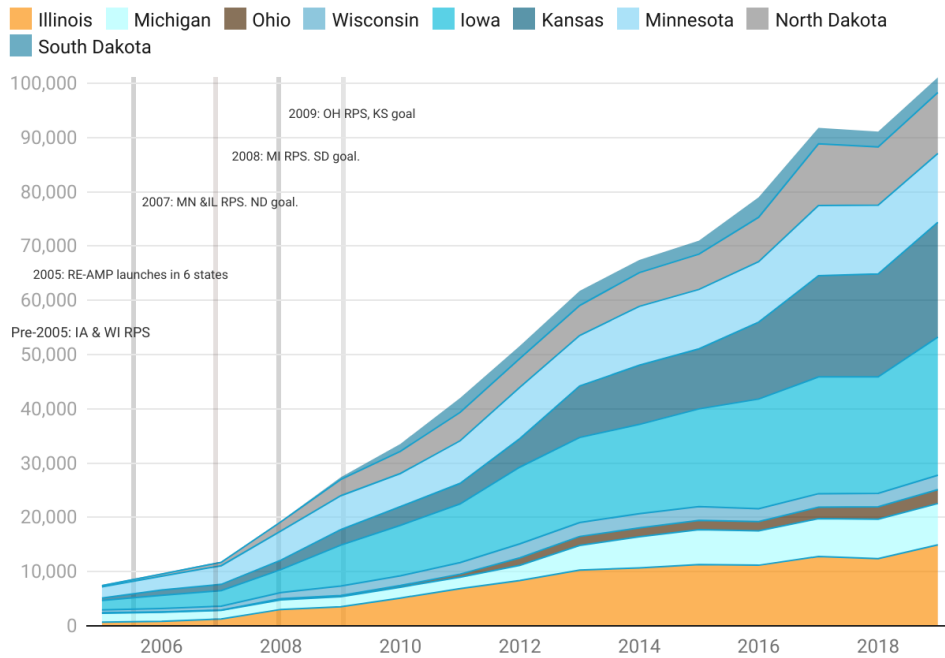
Although little of the growth has occurred in Ohio, South Dakota, or Wisconsin, significant increases are to be found in the rest of the RE-AMP states. Iowa and Kansas have seen a remarkable growth in wind generation, even without strong policy support. In many other cases, increases first became noticeable after legislation was enacted requiring a portion of generation to come from renewable sources. These policies go by different names in each state, but in general they are called Renewable Portfolio Standards (RPS).

Although in most states those policies have been updated since that time, only one state has gone backward: Ohio. In 2014 that state froze its renewable energy policy for two years. In 2019, they reduced the requirements.

Figure 12 shows the growth of renewables in the RE-AMP region, and when RPS or goals were adopted.

Non-Hydro Renewables in RE-AMP States

Amount of generation in thousand megawatt hours of non-hydro renewables since 2005.



*Although each state has its own name for the policies enacted, in this chart, we refer to them all as an RPS, short for renewable portfolio standard. If the state does not have an RPS, but rather an unenforceable goal, that is also noted.

Chart: RE-AMP • Source: EIA • Created with Datawrapper

Figure 12: Growth of non-hydro renewables in RE-AMP states from 2005 to 2019

In addition to the utility-scale renewable generation, the distributed generation of renewables is on the rise. Nationally, installed residential solar capacity is roughly 123 times what it was in 2006.²¹

Although the opportunities distributed generation affords for clean, reliable power are transformative, the benefits don't accrue equally to all individuals and communities. One study found significant disparities in solar adoption between majority-white communities, majority-Black communities, and majority-Hispanic/Latinx communities, with White communities having much higher rates of residential rooftop solar.²² These disparities persisted even after adjusting for income and household ownership. However, the effect diminished significantly when Black or Latinx communities were "seeded" with solar—in other words, having some amount of solar introduced.

This seeding effect is not surprising, since earlier research had shown that the social element of solar—actually seeing it at work in one's own community—is one of the most significant reasons people choose to install solar themselves.²³ One study found that a likely reason adoption is so much lower in

communities of color, except when seeded, is that implicit bias may be leading installers to market disproportionately in White communities.²⁴

In some communities, people are beginning to form their own solar cooperatives, to both save money on their bills and create wealth for their neighborhoods. In others, people are organizing for solar on public housing. And many BIPOC leaders are starting their own solar companies. These are examples of how communities that are the most impacted by high bills and elevated levels of pollution are also driving solutions.

Nuclear

The use of nuclear reactors for the generation of electricity has remained fairly stable during the period covered in this report. From 2005 to 2019, nuclear energy went from providing about 25 percent of the electricity to about 27 percent¹⁸ of the region's electricity. However, changes may be on the horizon.

Nuclear energy poses complex questions about how to equitably decarbonize the Midwest, because although the storage of nuclear waste is an unethical offloading of radioactive poison onto future generations, and poses risks to surrounding communities in the mining of uranium and where waste sites are proposed (both often in proximity to indigenous communities), it's also the case that if existing nuclear capacity is replaced with fossil fuels rather than energy efficiency and renewables, we will see prevailing disproportionate harm to BIPOC communities extended and the likelihood of catastrophic climate change impacts increased. The obvious and ideal solution is to replace nuclear energy with clean energy and energy efficiency. But it's not always the case that those resources are available to be deployed when a nuclear plant closes, whereas fossil fuel plants can often be ramped up to cover some of the energy needs.

According to a 2018 report by the Union of Concerned Scientists (UCS), about a third of nuclear reactors are unprofitable and/or scheduled to close.²⁵ In the RE-AMP footprint, it's the inverse. According to the UCS analysis of the nuclear power plants in our footprint (see Figure 13), only about a third of nuclear power plants are profitable and the rest are unprofitable or marginal.

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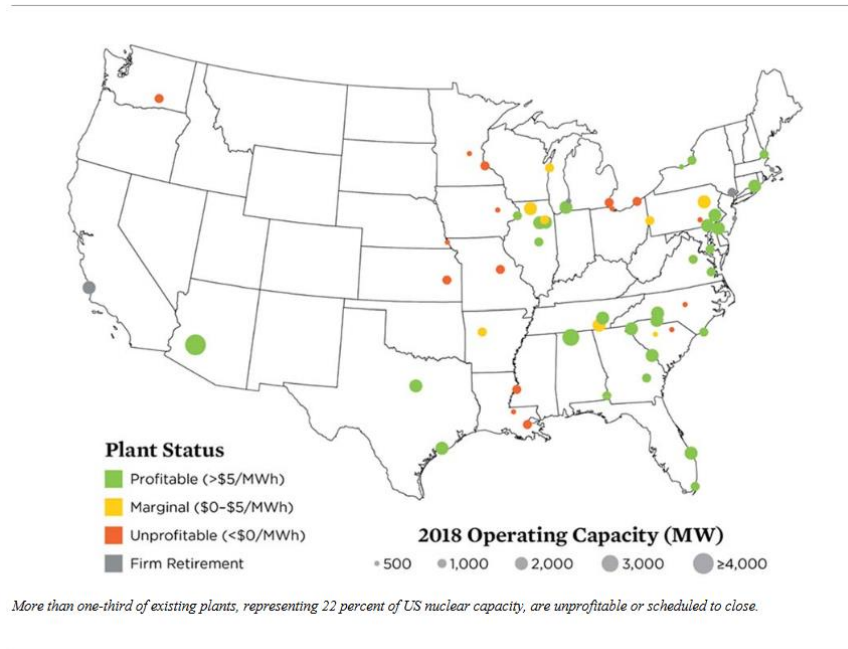


Figure 13: Profitability of nuclear power plants (image: UCS)²⁵

Two RE-AMP states, Ohio and Illinois, approved bailouts in recent years for some of their uneconomic nuclear power (2018 and 2016 respectively). In the case of Illinois, these bailouts came as part of a compromise with climate and energy advocates, who viewed the extension of these plants as buying time to replace that capacity with clean energy and energy efficiency.²⁶ In Ohio, however, the bailouts were not part of a larger package and were vigorously opposed by clean energy and consumer advocates.

In both Ohio and Illinois, serious bribery charges have been made and investigations are ongoing. The Republican former speaker of the Ohio house has been arrested²⁷ and an advisor close to the Democratic Illinois house speaker has been indicted.²⁸

Hydro

As a share of overall generation in our region, hydroelectric power is small. It rose from roughly 1.4 percent to 2.5 percent between 2005 and 2019. However, it comprises the majority of generation in South Dakota, and contributes eight percent and four percent of power in North Dakota and Michigan, respectively.¹⁸

Storage

Storage is the ability to store electricity and use it later. The source for the stored energy can be any fuel, but in terms of decarbonization, storage of power from renewables is of most interest. By storing solar power generated during the day, it can be used at night, for example. Currently, most storage and storage planning concern this kind of short-term fluctuation, but as renewable energy grows to a larger percent of generation, we will also need to consider seasonal storage, since there are months when there is more sun or wind and months when there is less.

The United States has 191,152 MW of storage capacity, the RE-AMP states have 2,100 MW as of 2019, or just over one percent of the national capacity.²⁹ The vast majority (89 percent) of the energy storage in our footprint is at a pumped hydro facility in Ludington, Michigan. Smaller amounts of storage are found in Illinois, Ohio, Minnesota, and Wisconsin.

Energy Efficiency

As transportation and space and water heating become electrified, energy efficiency is key to keeping the sector from becoming overwhelmed and extending reliance on fossil fuels. It is also a crucial factor in making buildings more comfortable and less costly to occupy.

The American Council for an Energy Efficient Economy (ACEEE) issues a score card each year for all 50 states and the District of Columbia, based on utility and public benefits programs and policies; transportation policies; building energy efficiency policies; policies encouraging combined heat and power systems; state government–led initiatives around energy efficiency; and appliance and equipment standards.

Table 4: National ranking of RE-AMP states with respect to energy efficiency (ACEEE's 2020 scorecard).

State	ACEEE 2020 National Ranking
MN	9
MI	13
IL	15
WI	26
IA	36
OH	37
SD	45
KS	47
ND	50

The 2020 ACEEE scores (see Table 4) list Minnesota as 9th in the nation. Michigan is 13th and Illinois is ranked 15th. After that, RE-AMP states drop sharply in their performance, with Wisconsin ranked 26th, Iowa 36th, Ohio 37th, South Dakota 45th, Kansas 47th, and North Dakota 50th.³⁰

The RE-AMP footprint is woefully underinvested in energy efficiency policies that would reduce our collective economic and environmental burden, while increasing comfort and convenience.”

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The RE-AMP footprint is woefully underinvested in energy efficiency policies that would reduce our collective economic and environmental burden, while increasing comfort and convenience. This is true across all sectors ACEEE assesses (utilities, buildings, transportation, appliances, and state initiatives).

In the case of utilities (which includes gas utilities in the ACEEE analysis), only a third of our states managed to achieve more than ten of available 20 points. The most common score was a four out of 20 and Kansas and North Dakota each earned less than one point. Compare this to the Northeast, where half the states had more than ten points.

Table 5: Comparison of 2020 ACEEE scorecard between RE-AMP footprint and the Northeast region

	RE-AMP Region	Northeast Region
Percent of states with 10 or more points for utility energy efficiency (scale 1-20)	33percent	50percent
Most common state score (scale 1 – 20)	4	19.5 and 13.5 (tie)
Lowest score	<1	3.5

RE-AMP’s Vision and Strategic Priorities

Key takeaway #12: Each of the RE-AMP strategic priorities has a vital role to play in equitably eliminating emissions from the power sector, however, our members are not sufficiently resourced to prioritize the important task of stopping the gas rush.

Key takeaway #13: Environmental Justice offices could help states stay on task to equitably eliminate pollution, as would other policies that deal with the racist reality of our power sector.

The motto of our RE-AMP Network is “Think systemically, act collaboratively.” This means that instead of trying to take on each of the issues raised here singly, we look for underlying patterns that can be changed so that the energy system produces an array of better results. It also means that we believe that no one of us is smarter than all of us. We work together to create strategies that have a long-lasting impact.

We envision a Midwest in which we all have access to the energy we need to live, move, work and play; we produce and use it in an equitable and just way that protects our health, wellbeing, and environment. Those who are most impacted from its production and consumption are centered in those decisions and we generate climate solutions rooted in our collective values that spread across our country and the world.

In September 2021, the network set five strategic priorities to guide our work for the next two to three years, as we work toward our North Star goal of equitably eliminating greenhouse gas emissions in the Midwest by 2050. These priorities are agriculture, buildings, energy democracy, integrated voter engagement, and transportation. This final section of our report on the electric power sector explains some of the relevant actions we can take in the near term in each of these areas to improve access to electricity while reducing pollution. In other words, how we can get well on our way to equitably eliminating greenhouse gas emissions from the power sector.



Before we discuss each specific priority and its relevance to the power sector, we describe two efforts that would be cross-cutting in their impacts across all our strategic priorities: the use of cumulative impact studies and creating environmental justice offices.

Cumulative Impact Studies and Permitting

One of the key impediments to measuring progress toward our goal of equitably eliminating greenhouse gas emissions in the Midwest is that not enough data exists to measure the unequal impacts of fossil fuel infrastructure, the impacts of climate change, and the impacts of potential solutions. This is one reason that the recent Wisconsin Governor’s Task Force on Climate Change urge that a study on racial disparity impacts be mandated.³¹

It’s also why environmental justice advocates in Minnesota have supported a bill in the legislature to analyze and consider the cumulative impact of pollution before issuing air quality permits.³² In other words, before agreeing to allow a polluter to pollute, it ought to be established whether the people being polluted have already been over-burdened.

“...before agreeing to allow a polluter to pollute, it ought to be established whether the people being polluted have already been over-burdened.”

As of this writing, no state in the RE-AMP footprint has established legislation on cumulative impacts. The Minnesota Pollution Control Agency has created an interactive map with some overlay of air quality and demographic data³³ and other states have conducted limited analyses,^{34,35} but currently to our knowledge, no statute requires a study of how electricity generation, transmission, or consumption impact various populations differently.

It’s critical to note that fulfilling the need for more studies and data should **not** be used as an excuse for inaction on reducing the disparate impacts that have already been well-documented, or that are plain to the naked eye. Rather, the lack of data should be used as a reason to slow down or disallow applications from polluters to continue or increase pollution.

Environmental Justice Offices

One step that policymakers can take towards accountability to those who have been most impacted by pollution and high costs of electricity is to bring the kind of expertise that comes from lived experience into all levels of decision-making. This helps reframe issues to more clearly identify what problems people in burdened communities are truly facing, and what solutions can look like.

Some states are realizing that institutional support must be given to communities that are disproportionately impacted by pollution, but only a few. Table 6 shows that only Illinois, Michigan, and Minnesota have institutional positions to guide policy to reduce environmental injustice.

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Table 6: RE-AMP states with an office for environmental justice

State	Environmental Justice Office	Notes
IL	Commission on Environmental Justice at the IL EPA ³⁶	The Commission contains three RE-AMP members
IA	None	
KS	None	
MI	Office of Environmental Justice Public Advocate ³⁷	Michigan also has an interagency EJ response team and an advisory council. Environmental Justice Public Advocate is a former RE-AMP member.
MN	EJ Advisory Group to the Minnesota Pollution Control Agency ³⁸	
ND	None	
OH	None	
SD	None	
WI	None	Recommended by 2020 Governor's Task Force on Climate Change

Strategic Priority: Energy Democracy

We believe in investing in community-driven solutions to create energy system transformation toward clean and democratically owned energy.

Key ways that RE-AMP members can contribute to energy democracy include:

- Building community-owned power such as solar co-ops, contributing to policies that support community-owned power, or providing technical assistance.
- Supporting the efforts of rural electric co-op members who want to reinvigorate the democratic spirit of RECs and advocate for clean electricity.
- Advocating for access to clean energy as a human right. This can include fighting against disconnections, fighting for lifeline rates, and fighting for assistance programs that are inclusive of all, regardless of immigration status. When we assert that clean energy is a right rather than a product, we work against corporate power and stand with community solutions.
- Working against efforts to prioritize investors' profits and executive salaries over the rights of people to have access to clean energy. This includes fighting against rate recovery for certain costs, fixed fees for service, restrictions on net metering, or other efforts by utilities to stymie the growth of locally owned clean energy.
- Exploring city-level options for ending franchise agreements with IOUs and creating a municipal utility instead.

Strategic Priority: Buildings

We all deserve affordable, healthy, and comfortable places to live, work, play, and pray. RE-AMP members can help make this a reality by:

- Supporting energy efficiency that focuses on the most burdened communities first. Too often, energy efficiency policies offer the most benefit to those already holding a fair amount of wealth in the form of a home. The cost of programs is distributed across all households, but disproportionately benefit wealthier customers.



- Advocating for inclusive financing or providing technical assistance when inclusive financing policies are in place. Engaging in community organizing to ensure the benefits go to those who are most burdened by high energy costs.
- Supporting efforts for whole-home improvements that can be accessed through a single resource center. Currently, some efficiency upgrades can't be made unless a home is in sufficient state of repair. Rather than passing over such homes, resources should be engaged to bring the home up to a good condition, whenever feasible. Even when such programs exist, accessing them can present a maze of agencies and forms that must be sequenced in a certain way, making it a big obstacle for the average person to navigate.
- Advocating for electrifying space and water heating, prioritizing assistance for those who would otherwise be unable to afford the upgrade, and prioritizing locales where the switch would result in overall savings on energy bills.

Strategic Priority: Transportation

We believe in enabling people to get where they need to go without having to drive as much and making all transportation options cleaner.

We are amidst a shift from internal combustion engines to electric vehicles, however, this necessary shift is insufficient on its own to meet our goal of equitably eliminating greenhouse gas emissions.

There are two main reasons that electrification of vehicles is not sufficient for meeting our North Star goal of equitably eliminating greenhouse gas emissions in the Midwest. The first is that there are so many inequities built into our transportation infrastructure, that we cannot claim to be equitably eliminating emissions without undoing the harm caused by highways, accidents, or redlining; and without taking into account the many people who are unable to obtain a driver's license or have access to a vehicle.

The second reason is that according to a recent analysis by the National Renewable Energy Laboratory (NREL), 79 percent of the increased demand on the power sector in a high-electrification scenario will come from transportation. That is, of the roughly 3,000 additional TWh that NREL models show will need to be generated if we electrify transportation, water heating, space heating, industrial uses, and cooking, about 2,370 of those TWh would be to fuel electric vehicles.³⁹ For that energy to be produced by renewables would require a buildout of more than 14 times the existing renewable resources in short order.⁴⁰ Considering the strong pushback from rural communities who feel their way of life being threatened by wind and solar farms, as well as from ideological opponents to clean energy, this buildout seems unrealistic unless somehow clean energy advocates gain a lot more power and choose to use it against people with concerns about preserving the landscape.

Fortunately, there are many practical ways that RE-AMP members can work to reduce the number of trips taken by car, and therefore reduce pollution, accidents, and the need for more electric generation. These include:

- Promoting high quality and affordable transit. At the local level, this can include advocating for free fares, more routes, greater frequency runs, and transit ambassadors rather than transit police. At the state level this can include increasing funding and working to create champions for transit within the state department of transportation.

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- Integrating transportation goals in city and state climate plans, specifically including a reduction of vehicle trips.
- Championing complete streets—that means streets that have protected bike lanes, and sidewalks in good repair for all users. It also means that the sidewalks are cleared of snow and ice and other hazards year-round. Many states have passed complete street policies, but the implementation has often been lacking.
- Recognizing that highways are to transportation what coal plants are to generation. Highways are sited in BIPOC and low-income areas and have often been built in ways that destroy existing communities. They are of limited use to people who don't drive, and many studies show that they actually increase traffic problems. Across our network, there are movements to stop highway expansions and even to take down existing highways so that communities can reconnect, and transportation options can be more inclusive.
- Fighting petroleum infrastructure. In the Midwest, extracting, transporting, and refining oil are incredibly detrimental to the health and well-being of many Indigenous and Black communities, as well as posing huge risks of explosions, spills, or other major events. RE-AMP members can support Water Protectors and others working against these types of fossil fuel infrastructure.

Strategic Priority: Agriculture

Our work in RE-AMP is to transform food and agricultural systems so that they nourish the land and people and pull carbon from the air.

A forthcoming report on climate and agriculture in the Midwest will share the work of a team of RE-AMP members that has worked together to develop recommendations for how the Midwest can equitably reduce greenhouse gas emissions from the agricultural sector.

Ways that RE-AMP members can work at the nexus of agriculture and the power sector include:

- Co-locating Solar Energy with Agriculture. Installing conventional, utility-scale, solar arrays requires a lot of land area and often is proposed on farmland near urban centers. Many farmers and communities perceive the planned conversion of farmland to energy production as “energy sprawl,” pitting solar developers against farmers and farming communities. But an emerging practice that co-locates agriculture and solar photovoltaic infrastructure, called agrivoltaics, could reduce land use conflicts and competition, while also providing synergistic benefits.
- Promoting Pollinator-Friendly Solar. Most often, large solar systems are constructed on land that is leveled after the topsoil and vegetation is removed. With low-impact solar, the topsoil is preserved and native plants and other beneficial vegetation to bees and other pollinators can be planted on the minimally disturbed ground after panels are installed. The deep roots of native vegetation retain more water than turf grass and gravel during heavy storms and periods of drought, preventing erosion. They also improve soil health over time, which may allow for carbon sequestration.
- Expanding the Rural Energy for America Program (REAP). Protect and expand the \$50 million mandatory funding included in the current farm bill, and work to maintain or increase the \$30.4 million appropriated by the Agriculture Committee FY 2022 over the next ten years. REAP helps farmers, ranchers, and rural businesses reduce their emissions by providing grants and loans to farmers and rural businesses interested in energy audits; energy efficiency improvements; and renewable energy development.



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- Reducing Food Waste. Total emissions from our food system are hard to estimate, but recent studies suggest that the production of food and emissions from processing, transportation, packaging, and disposal in the U.S. represent about 25 percent of the country's total carbon footprint, with significant amounts coming from the power sector for food processing and packaging. Adopt policies and/or programs that decrease food waste. Require or provide incentives to compost, and ensure compost is used to produce food in residential and community gardens and farms.
- Incentivizing Soil Health. Help develop, pass, and promote soil health legislation in RE-AMP states that pays producers who adopt practices to improve soil health. Such practices reduce the overall power needs of the agricultural sector.

Strategic Priority: Integrated Voter Engagement

Integrated voter engagement is about ensuring our governments are accountable to we the people. It's nonpartisan work to make democracy live up to its name. RE-AMP is forming a planning committee to explore what this can look like among our members, but possibilities include:

- Expanding leadership and engagement in BIPOC communities.
- Voter registration and mobilization.
- Building the capacity of grassroots groups to influence policy decisions.

One Noteworthy Omission from Our Strategic Priorities

The analysis contained in this report clearly shows the need to deal with growth of gas as a fuel for our electricity. Yet our members tell us they are unable to find funding to work on this pressing issue. As a Network, we will continue to explore how we can connect with each other to create strategies to stop the gas rush.



Summary of Electric Power Sector

The racial inequities in the Midwest are drastic, and lead to disproportionate harm to Black, Indigenous, and other People of Color. Power plant emissions are both an extension of and contributor to these inequities. Current data collection and analysis is not sufficient to fully assess the scope of harm to BIPOC communities, but we know there are major health impacts and that too few people are protected from disconnection from their utility service.

There is insufficient protection for people to have reliable access to electricity year-round, and a vast range of utility rates exists across our region.

The power sector is still the largest source of emissions. Ohio, Michigan, and Illinois are the states with the most GHG emissions from the power sector. Since RE-AMP began, CO₂ emissions from the power sector are down 37 percent, SO₂ emissions are down 89 percent, and NO_x emissions are down 76 percent.

The use of gas as a fuel for electric generation is way up since RE-AMP began, and more gas is scheduled to be built than renewables. Ohio, Illinois, and Michigan are key to stopping the growth of gas plants. Nearly half of remaining coal plants are in IL and OH, which are the same states where corruption is alleged to be a factor in bailouts for utilities.

Renewables comprise the second-strongest growth category for fuels, after gas. They are also the second highest fuel source for planned capacity.

Strong renewable growth can occur in states without strong policy, but the Midwest has fallen behind most of the country in energy efficiency policies, and many of the existing policies privilege those who are already advantaged.

Each of the RE-AMP strategic priorities has a vital role to play in equitably eliminating emissions from the power sector. However, our members are not sufficiently resourced to prioritize the important task of stopping the gas rush.

Environmental Justice offices could help states stay on task to equitably eliminate pollution, as would other policies that deal with the racist reality of our power sector.

Despite the many obstacles that remain to equitably eliminate greenhouse gas emissions from the power sector by 2050, we have made tremendous progress. By continuing to be a network that embraces tough challenges, and by acting collaboratively, we can achieve our goal.

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