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OPPORTUNITIES NOW

An Analysis of Priority Issues and Actions
for Wisconsin's Natural Resources

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The Future is Now – Creating a 21st Century Energy Policy

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The Future is Now – Creating a 21st Century Energy Policy

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About this Work:

Opportunities Now is an issue paper series published by *Wisconsin's Green Fire* that summarizes the science and background of key conservation and environmental issues and makes policy recommendations that support pro-conservation outcomes. Each of the papers in our *Opportunities Now* series is the product of an analysis of current literature, interviews with agency staff and experts, and the consensus of our subject matter teams. Policy makers, conservation organizations, and concerned citizens are all welcome to use and distribute our papers without restrictions.

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Cover photo: Butler Ridge Wind Energy Center, Dodge County
Photo credit: Don Behm

Transmission lines in Wisconsin. Photo credit: Wisconsin Public Service Commission

The Future is Now – Creating a 21st Century Energy Policy

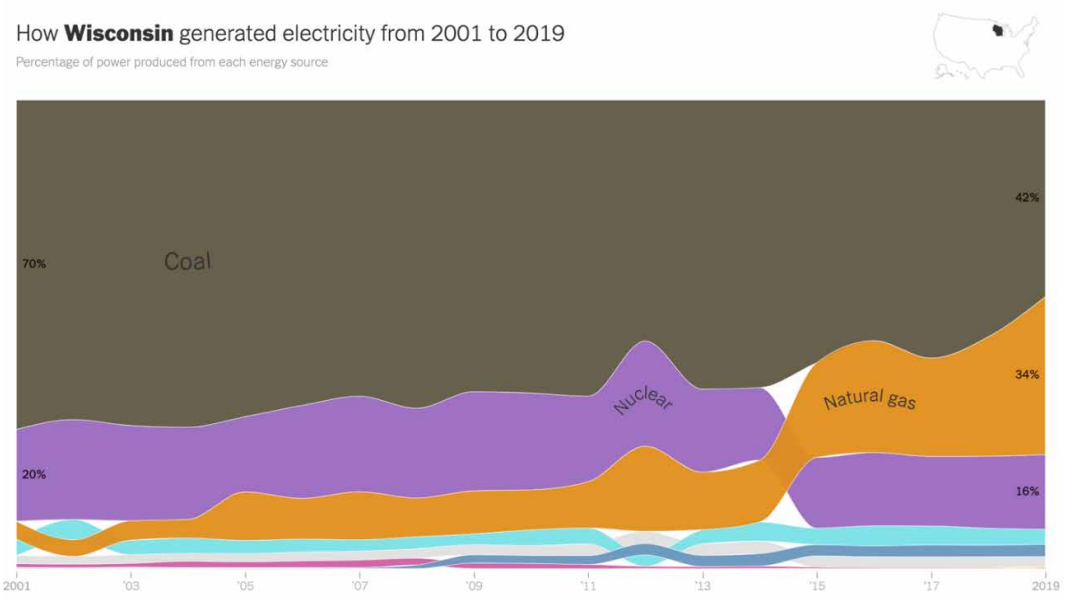
Wisconsin is falling behind neighboring states in renewable energy production and energy efficiency[1]. Wisconsin needs an energy policy to reduce our dependence on a century-old and inefficient energy system built around large fossil-fueled power plants that use a regional transmission and distribution grid. Long distances between power sources on this grid make it vulnerable to frequent disruptions of life-saving service to customers when high winds and ice storms damage the wires.

Critically important and integral to this progress is addressing energy inequities head-on. Low income and BIPOC (Black, Indigenous, People of Color) across Wisconsin face many barriers to accessing clean, affordable energy. Governor Tony Evers' 2021-2023 state budget emphasizes the importance of addressing environmental injustices and for the first time has recommended creating an Office of Environmental Justice within the Department of Administration. This office will work hand-in-hand with environmental justice advocates on a myriad of environmental issues facing front-line BIPOC communities, including energy inequities.[2]

This report describes the measures available for establishing a Wisconsin energy system that is cleaner, more reliable, more equitable, and increasingly decentralized with local generation and local ownership of power sources.

Background

Wisconsin primarily relies on coal and natural gas for electricity generation. Burning coal to generate electricity leads to a loss of about 68% of the energy as waste heat, meaning these plants run at 32 percent efficiency. Natural gas does a little better with 45 percent efficiency, or 55 percent wasted energy.[3] In addition, the grid of transmission and distribution lines loses another 5 percent of the energy carried on the wires.[4]



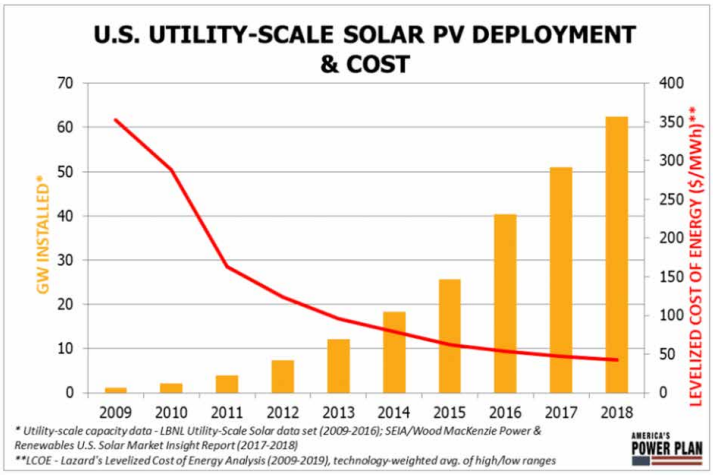
The makeup of electricity generation in Wisconsin 2001-2019. light blue is hydroelectric, dark blue is wind, pink is petroleum, and light grey is other. Source: New York Times

Burning fossil fuels for electricity burdens the state's economy since Wisconsin has long depended on, and paid other states for, imported coal and natural gas. In 2019, coal-fired power plants provided 42% of the electricity generated in Wisconsin while natural gas fueled 34%, a total of 76% coming from imported fossil fuels.[5]

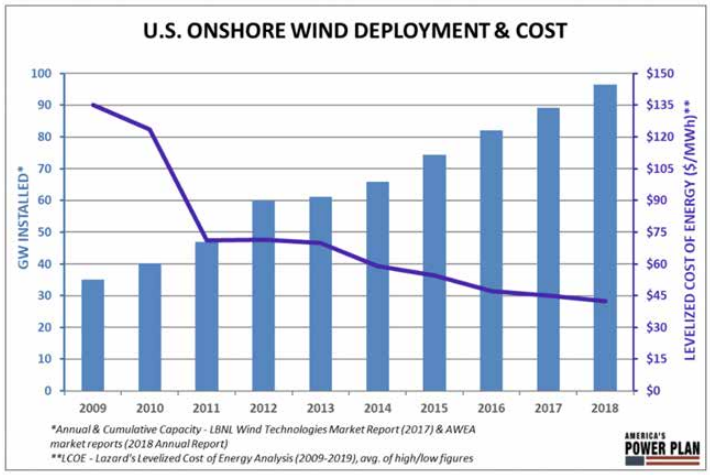
In addition to bolstering local energy generation, job growth in the clean energy sector, particularly in Wisconsin's sensors and controls industry, presents a significant economic opportunity. Wisconsin could support an annual average of 44,000 advanced energy sector jobs through 2030.[6]

Wisconsin has an opportunity now to restructure this outdated energy system by embracing recent developments and innovations. Among them:

- Since at least 2018, it has become less expensive to generate electricity from renewable sources such as wind and solar than from coal and natural gas.[7]
- Utilities serving Wisconsin consumers are shutting down coal-burning power plants and planning for an increase in clean energy production by up to 50%.[8]
- The list of what is possible includes distributed energy resources (DERs) capable of competing with large utilities.[9] DERs are small-scale, consumer-owned, and other third-party businesses which can generate electricity or store energy.
- The growth of DERs in local communities creates the opportunity for innovation in power distribution when developed with battery storage. Also known as microgrids, these systems are smaller in scale than traditional regional grids, and they are designed to distribute electricity from a local power generating facility. If a hospital, small village, urban neighborhood, university, or large industrial employer own and control a source of power, they can use the microgrid to serve themselves if the larger regional grid is disrupted by weather or natural disasters.



U.S. solar cost decline and capacity additions 2010-2018 ENERGY INNOVATION

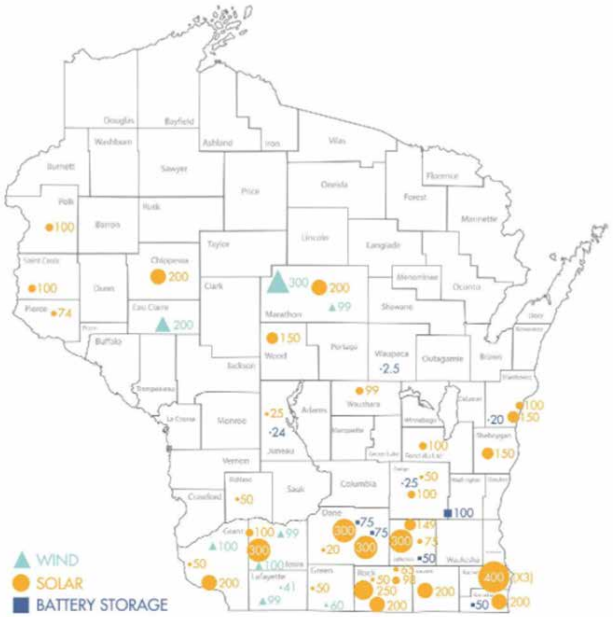


U.S. wind cost decline and capacity additions 2010-2018 ENERGY INNOVATION

Wind and solar deployment and cost from 2010-2018. Source: Forbes Magazine

In 2020, the Wisconsin Department of Natural Resources (WDNR) made use of these new opportunities when it partnered with Alliant Energy to install a solar array coupled with battery storage as the heart of a microgrid serving the Black Hawk Ridge Recreation Area of the Lower Wisconsin Riverway.[10]

In 2019, Governor Tony Evers set Wisconsin on the path to an updated state energy policy by setting a goal for state utilities of distributing "100 percent carbon-free" electricity to Wisconsin customers by 2050.[11] Evers' order directed state agencies to partner with utilities to meet that goal and created an Office of Sustainability and Clean Energy to manage a multi-agency effort to ensure the state meets carbon reduction goals set out in the 2015 Paris Climate Accord. Electric utilities serving the state have set a mid-century target for achieving an 80 percent cut in carbon emissions from power generation.[8]



Map of large-scale wind and solar farms, and battery storage in Wisconsin, as of April 2020 – numbers in the map denote project size in megawatts. Map by: RENEW Wisconsin

Utilities across Wisconsin are setting voluntary renewable commitments. For example, Xcel Energy is confident it will reach an 80 percent cut in carbon dioxide emissions by 2030, when compared to a baseline from 2005. On February 2nd, 2021, Alliant Energy announced plans to retire the Columbia Generating Station, the second largest coal plant in Wisconsin, in 2025.

Boosting energy efficiency and lowering demand will be part of a broader strategy needed to reach 100 percent carbon-free electricity.

Allowing local governments and school districts to use third-party financing to establish their own rooftop solar energy projects is one of the tools state leaders could adopt to spur the growth of more energy sources.

In addition to assisting a transition from fossil fuels to clean, renewable sources for providing energy, Wisconsin also needs to work on its transmission and distribution sectors to modernize the system.

Alliant Energy and it's operating partners have announced the 2025 closure of the Columbia Energy Center near Portage. Columbia is currently the second largest coal-fired power plant in Wisconsin. Photo credit: Wisconsin State Journal

Demand Management

A carbon-free future for Wisconsin's electrical energy needs will depend on state leadership to improve energy efficiency and manage energy demand. Significantly increasing the development of renewable energy sources, energy storage, and advanced energy systems management are critical elements to achieving those goals.

Boosting the efficient use of energy in all buildings – homes, businesses, and industries – as well as appliances and vehicles, coupled with the use of technologies to reduce peaks in demand for energy at certain times of day, will help guide utilities and consumers to a more sustainable future.

Better energy systems management will create substantial reductions in greenhouse gas emissions because less fossil fuel will be needed to meet demand. Energy savings would come from reduced fuel purchases and through limited need to build additional power plants and transmission lines.

According to the American Council for an Energy-Efficient Economy, Wisconsin lags behind neighboring states Minnesota, Illinois, Michigan, and Iowa, ranking 25th out of 50 states in energy efficiency.[1] Increased energy efficiency translates directly to energy cost savings for users and reduced emissions.

A linchpin program in advancing energy efficiency is Wisconsin's Focus on Energy, a statewide energy efficiency and renewable energy resources program established in 2001.[12] Boosting Focus on Energy funding is a recommendation of the Governor's Task Force on Climate Change.[13] Additional funding will give the program a role in supporting electrification of vehicles, battery storage technologies, cold climate heat pumps, microgrids, and distributed renewable resources, as well as providing more low-income households with assistance and incentives to install energy efficiency measures.

Focus on Energy can also deliver incentives for utilities to develop demand-side management efforts, also known as load management, aimed at reducing customer energy use.[12]

Butler Ridge Wind Energy Center, Dodge County WI. Photo credit: Don Behm

Performance-based Ratemaking

Performance-based ratemaking is a policy option that links electric utility revenue to specific performance goals, thereby shifting from the traditional cost-of-service model that ties revenue to capital investments. Minnesota is currently studying the use of performance metrics in setting rates, while Illinois began exploring performance-based ratemaking in 2011.[14] Wisconsin has no policies requiring utilities to establish performance-based rates.

Performance-based rates for electric utilities are designed as incentives to achieve energy efficiency and reliability standards along with greenhouse gas emission reductions and stable costs for consumers.[15] These rates will promote demand management tools, curtailing electricity use during peak demand times of day with smart technologies, such as smart thermostats and electric thermal-storage heaters.[16] These innovations will provide consumers with the flexibility to shift times of energy consumption for air conditioning, water heating, and charging of electric vehicles.[15]

Goals for increasing energy efficiency, reducing energy emissions, and reducing energy user costs can all be advanced substantially using performance-based ratemaking. Utility compensation for performance should depend on the reporting of verifiable data that shows a utility met the metrics contained in energy efficiency and other state policy goals.[15]

Integrated Resource Planning

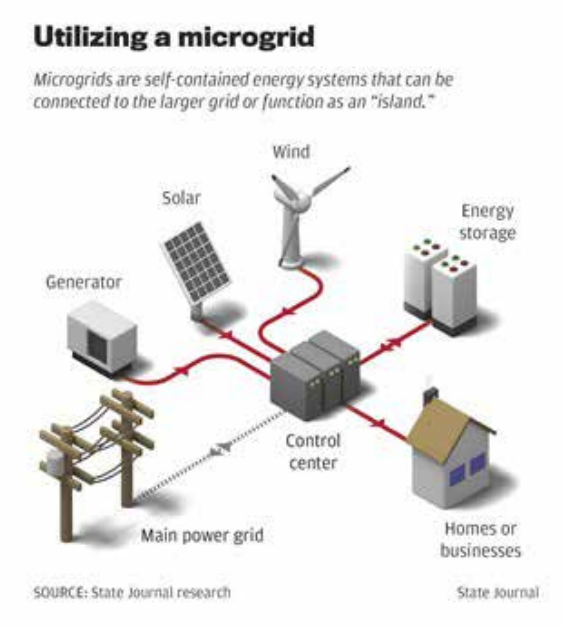
The Wisconsin Public Service Commission (PSC) enacted integrated resource planning in the mid-1980s. This process has since been replaced by non-regulatory biennial reports known as Strategic Energy Assessments produced by the Wisconsin PSC.

Wisconsin's current Strategic Energy Assessments evaluate future electric energy needs and the associated resources available to meet those needs but do not include orders or decisions that require actions by utilities.[7]

In cooperation and coordination with local consumers, Wisconsin can reestablish integrated resource plans (IRPs) to ensure cost-effective electricity generation, transmission, and distribution along with a greater emphasis on energy efficiency, reliability, and reduced greenhouse gas emissions. Incorporating performance-based ratemaking into IRPs will also help achieve reductions in electricity demand during peak energy periods.

Distributed Energy Resources

The development of local distributed energy resources, or DERs, will become a key component of any integrated planning effort. DERs are small-scale, consumer-owned, and other third-party businesses that can generate electricity or store energy. Examples of these small-scale energy endeavors include roof-top solar, hydroelectric dams, and biogas generators.[17] DERs create local jobs and provide benefits such as reducing the need for investor-owned utilities to upgrade regional transmission and distribution facilities, and substations.



Depiction of a microgrid. Source: Wisconsin State Journal

DERs also meet local demand during peak times of day by selling electricity to the large utilities or directly to consumers in the immediate area.[18] Recent actions by the PSC will make it easier for customer-owned energy to proliferate in the state. In late 2020, the PSC approved parameters for revising administrative codes that govern distributed energy facilities, or DERs.[17] The update will be made to 17-year-old rules related to customer-owned energy.

Most importantly, DERs allow the creation of microgrids – smaller segments of the utility grid that can be managed using advanced technology. Microgrids are smaller in scale than traditional, regional grids and are designed to distribute electricity from a local power generating facility. Elements of a microgrid could include solar or wind projects, biomass, hydro, geothermal, waste-to-energy, or combined heat and power systems. A microgrid is capable of disconnecting from the main grid if the power goes out on the regional distribution system so that it continues to serve a local area, such as a small community, a neighborhood, hospital, industry, or university.

A solar farm at Gordon Bubolz Nature Preserve, which comprises part of its microgrid in Appleton, WI. Photo credit: Gordon Bubolz Nature Preserve

The Gordon Bubolz Nature Preserve in Appleton has been served by a microgrid since 2018. It carries electricity generated by solar panels located on the property. Extra energy from the solar array charges a storage battery and powers an electrolyzer to create hydrogen from water for a fuel cell. This primary system is coupled with a specially designed microturbine capable of burning natural gas or biogas to generate electricity and heat for the building when needed. A backup generator that burns natural gas to produce electricity is onsite if one of the other components fails.[19]

In 2020, the Federal Energy Regulatory Commission (FERC) issued an order enabling DERs to compete on a level playing field with regional grid operators.[9] Use of DERs can reduce or eliminate the need for additional transmission lines and large-scale power plants. However, the extent of the build-out needed to optimize energy efficiency is still being studied. Overall, DERs have the high potential to help Wisconsin meet its goals for reducing greenhouse gas emissions.[15]

Energy Democracy in Wisconsin

Since the era of rural electrification, public energy has been considered a universal good. As the understanding of the environmental, economic, and social costs of energy has grown, so too has public interest in renewable energy development and energy policy.

Citizen Engagement in Energy

Community interest in the formation of energy districts is an example of how citizens can take ownership of energy resources with at least some independence from large utilities and increased opportunities for local consumers to access clean energy options.

This increased citizen awareness and interest in community entrepreneurship is leading to greater public participation in state-level energy policy and decision-making. Public involvement can occur through citizen regulatory reform study groups, as well as committees to advise the Wisconsin PSC on issues including utility oversight, compliance monitoring, performance-based rates, grid modernization, energy equity, and energy efficiency programs.

Involving local communities in infrastructure decisions also helps address inequities in the location of energy resources that now commonly impact low-income, BIPOC, and rural communities.

The final report of the Governor's Task Force on Climate Change states: "Low-income households face higher energy burdens (the portion of income spent on energy bills) and greater energy insecurity than higher-income households, and also face disproportionately high health impacts from indoor and outdoor air pollution."[13] It is imperative that the planning, design, and implementation of energy efficiency programs be done with input from vulnerable communities.

Citizens line up at a hearing before the Wisconsin PSC in Madison. Photo credit: Wisconsin State Journal

Local Government Leadership

By 2020, more than 140 local governments in Wisconsin passed 'Energy Independent Community' resolutions and made a commitment to obtain at least 25 percent of the energy needed for their operations from local renewable sources by 2025.[20]

Allowing local governments to participate directly as stakeholders in planning for electricity generation projects, transmission lines, and changes to the distribution grid will bring multiple benefits and help ensure that the interests of local citizens are better reflected in energy system planning and development. In addition, allowing municipalities and school districts to work with non-utility third-party businesses to finance solar energy and battery storage projects could significantly quicken the pace of renewable energy development in Wisconsin and lower energy costs to consumers.

In Iowa County, WI, residents are studying the feasibility of a county-wide energy district that would serve as the local owner of solar, wind, or other renewable energy projects. The energy district would then be authorized by the county to operate as an energy provider and sell power to consumers within the county.

Additional opportunities exist for Wisconsin to consider adopting an energy usage model known as Community Choice Aggregation (CCA) through enabling legislation. CCA programs authorize local governments to buy electricity and sell it directly to their residents at a lower cost while utilities remain responsible for operating transmission lines and the distribution grid.[21] CCA programs allow communities to choose the source of the energy they want, aggregate the buying power of numerous customers, and negotiate energy contracts with utilities. Currently, only eight states across the U.S. have approved CCA legislation, including California and Illinois.[22]

Conclusion

Falling costs of installing solar and wind energy projects, closing of coal-fired power plants, and pursuing opportunities for developing distributed energy resources in local communities are just a few of the reasons why now is the time for Wisconsin to remake its 20th century energy system.

Wisconsin's failure to keep pace with changes in energy technology and advancements in energy policies is costing consumers more money for an inefficient system that pollutes the air, wastes energy, and depends on a grid that is vulnerable to disruptions. We see many promising signs of renewable energy investment. However our out-dated policies are standing in the way of new investments, especially in third-party-owned energy development that could significantly advance our path toward a carbon-free energy future.

Wisconsin can follow the lead of other states that have given local governments the ability to step into the energy marketplace and directly choose the type of energy power they use, negotiate purchase contracts, and buy power for their residents. By promoting this innovation through a CCA program, coupled with support for expanding the numbers of energy districts, Wisconsin's modern system would ensure equal access to clean and reliable power.

Wisconsin's Green Fire is encouraged to see proposals in Governor Tony Evers' fiscal year 2021-2023 budget aimed at promoting clean energy. Noteworthy proposals include requiring the PSC to reevaluate the appropriate social cost of carbon on a biennial basis, establishing an Innovative Technologies Pilot Program aimed at innovative storage solutions and microgrid expansion, and doubling the required utility contribution for the Focus on Energy program to generate additional funding for the program.[2]

Recommended Actions

= Executive Action = Budget = Policy

1. Accelerate the Increase in Energy Efficiency and Energy Demand Management

Establish greater energy efficiency standards for utilities to better control power demand and reduce carbon emissions.

a. Increase funding for Wisconsin's Focus on Energy and expand its energy efficiency programs to offer support for the electrification of vehicles, battery storage technologies, microgrids, and distributed renewable resources, as well as provide more low-income households with assistance and incentives to install energy efficiency measures.

b. Adopt energy policy sections of the December 2020 Governor's Task Force on Climate Change Report and Gov. Tony Evers' 2019-21 Budget Bill Energy Issues.

c. Establish study groups on strategic demand reduction, nonenergy benefits of these programs, and how best to implement them in Wisconsin.

d. Direct the Wisconsin PSC to establish demand-side management programs aimed at reducing consumer energy use.

2. Adopt Utility Performance-based Ratemaking

Establish incentives for performance-based ratemaking or a similar system to prod investor-owned utilities to comply with clean energy goals.

a. Set up rewards for a variety of policies such as energy efficiency, affordability, greenhouse gas emission reductions, and resiliency.

b. Establish clear policy targets and related data metrics to make sure utility compensation for meeting policy goals is based on transparent and objective performance measures.

3. Support Integrated Resource Planning (IRP)

Include the public in IRP encompassing long-term resource generation, transmission, and distribution.

a. Create study groups on how to establish IRP in Wisconsin. Consider the Minnesota Integrated Distribution Planning as a model.

b. Require detailed studies of where distributed energy resources (DERs) can be used as alternatives to more transmission, large-scale generation, and new sub-stations.

c. Examine how the DERs can help the state meet its greenhouse gas reduction targets as well as energy efficiency goals while saving customers money.

d. Increase funding to the PSC Office of Energy Innovation to help local communities develop green energy infrastructure such as microgrids.

= Executive Action = Budget = Policy

4. Involve the Public and other Stakeholders in Energy-related Decisions

As public interest in utility projects and their impacts is steadily increasing, identify the public and other stakeholders as equal partners in Wisconsin's energy future.

a. Increase funding and promotion of Wisconsin's home energy assistance program to help low-income families save energy and decrease energy bills as part of a larger effort to address energy inequity.

b. Establish a stakeholder advisory committee to the Wisconsin PSC to research and comment on grid modernization, energy efficiency, and energy equity.

c. Establish citizen study groups to evaluate existing energy programs.

5. Empower Local Government

Include local government in planning electricity generation, transmission, and distribution currently controlled by utilities.

a. Enact state legislation allowing third-party financing of renewable energy resources – specifically solar and battery storage – at municipal and school district buildings.

b. Commission studies for establishing Community Choice Aggregation (CCA) and expanding the creation of county-based energy districts in Wisconsin. Establishing local energy systems is one step in modernizing the electrical grid by reducing its vulnerability to disruption by storms.

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