APRIL 2025

RESEARCH BRIEF

Clean Wisconsin Environmental Health Initiative

Health Benefits of Renewable Energy in Wisconsin

By Brooke Hrdlicka & Paul Mathewson, Ph.D.

April 2025

SUMMARY – There are important health benefits from renewable energy development. Electricity generation in Wisconsin is currently dominated by coal and methane gas, both of which release harmful air pollutants in addition to climate-warming carbon dioxide. In contrast, wind and solar produce no emissions while generating electricity, and there are little established direct health effects from the solar panels or wind turbines. Thus, by displacing fossil fuel-based electricity generation, renewable energy not only mitigates climate change but also results in improved air quality, providing a health benefit to everyone.

Key Takeaways

- Air pollution from fossil-fuel based electricity generation currently leads to hundreds of early deaths in Wisconsin each year and thousands of asthma incidences and other respiratory issues resulting in 29,000 days of missed school and 11,000 days of missed work every year.
    - Total health burden in Wisconsin from electricity production is valued at $2.1-3.6 billion annually.
- Importantly, the air quality benefits of wind and solar are greatest here in the Upper Midwest and Great Lakes regions of the United States, where there is a larger reliance on coal and closer proximity to population centers.
- Public health benefits from improved air quality from wind and solar deployment in Wisconsin are valued at approximately $60 per megawatt-hour (MWh) of electricity production (range: $30 to over $100 per MWh).
- These public health benefits are more valuable than the cost of producing the electricity, which is $30-50 per MWh.
- In contrast to these substantial public health benefits, there is no established evidence of direct negative health effects to those living near solar panels or wind turbines.

Definitions

- **Renewable Energy:** natural sources such as sunlight, water, wind, the heat from the Earth's core, and biomass that can be converted into several types of clean, usable energy. These sources can be used for electricity generation, heating and cooling, transportation, and more to provide numerous economic, health, environmental, and social benefits.[1]
- **Clean Energy:** Renewable energy sources that produce no climate-warming greenhouse gas emissions in their operation.[2]
- **Megawatt-hour**: Unit of measure for electrical energy, typically abbreviated as "MWh". This unit indicates how much electricity is delivered through an electric system in an hour. For context the typical annual residential electricity consumption is about 8 MWh.[3]

Contents

cleanwisconsin
your environmental voice since 1970

[1] U.S. Department of Energy. Renewable energy. https://www.energy.gov/topics/renewable-energy
[2] MIT Climate. What is Clean Energy? https://climate.mit.edu/ask-mit/what-clean-energy-any-kind-energy-completely-clean
[3] United States Energy Information Administration. 2024. Electric Sales, Revenue, and Average Price. Table 5a. https://www.eia.gov/electricity/sales_revenue_price/

Introduction

Increasing electricity production from renewable energy, like solar and wind farms, is a critical part of addressing climate change. However, there are also important health benefits from transitioning to renewable energy.[4] Currently, electricity generation in Wisconsin is dominated by coal and methane gas, both of which release harmful air pollutants in addition to climate-warming carbon dioxide. In contrast, wind and solar farms produce no emissions while generating electricity. Thus, by displacing fossil fuel-based electricity generation, renewable energy not only mitigates climate change but also results in improved air quality, providing immediate and local health benefits.

In this brief we look at the health burden of the current fossil-fuel dominated electricity production system and the public health benefits of wind and solar farms here in Wisconsin. Finally, we examine common health-related concerns expressed about solar farms and wind turbines.

Public Health Burden of Fossil Fuel Electricity Generation

To understand how renewable energy such as wind and solar provides a public health benefit, it is helpful to first look at the health burden of the status quo of electricity generation largely coming from fossil fuel sources.

Wisconsin's current electricity generation relies heavily on fossil fuel combustion. As of 2022, 36% of the state's electricity generation came from coal combustion (11th highest in the country) and 74% coming from combined coal and gas (14th highest in the country).[5]

Burning coal releases large amounts of hazardous pollution that poses an invisible threat to human health. Some of the harmful pollutants that are released into the air when coal is burned and used for electricity are: fine particulate matter ($PM_{2.5}$), nitrogen oxides (NO_x), and sulfur dioxide (SO_2).[6]

Gas combustion, while cleaner than coal particularly with respect to $PM_{2.5}$ and SO_2 but still releases NO_x and volatile organic compounds, which are harmful air pollutants on their own but also contributors to the formation of secondary PM2.5 and ozone.[7] VOCs emitted from gas combustion also include potent carcinogens like formaldehyde and benzene. Indeed, as coal combustion has declined in the United States, gas's share of premature death from stationary source air pollution nationally has risen from 12% in 2008 to 21% in 2017.[8] In the United States, Annually, combined oil and gas production emissions result in an estimated 7,500 early deaths (76 in Wisconsin), 2,200 new cases of childhood asthma, and 410,000 asthma exacerbations (1,550 in Wisconsin) every year, among other health impacts.[9] Total health burden in Wisconsin is estimated to be $77 billion annually. This illustrates how replacing one polluting fossil fuel (coal) for another (gas) is not a pathway to a healthy energy system.[10]

[4] Gallagher and Holloway. 2020. Integrating air quality and public health benefits in U.S. decarbonization strategies. Frontiers in Public Health 8: 563358.
[5] USEPA. EGRID. Data Explorer | US EPA
[6] Markandya et al. 2007. Electricity generation and health. The Lancet, Volume 370, Issue 9591, 979-990.
[7] Markandya et al. 2007.
[8] Buonocore et al. 2021. A decade of the U.S. energy mix transitioning away from coal: historical reconstruction of the reductions in the public health burden of energy. Environmental Research Letters 16: 054030
[9] Buonocore et al. 2023. Air pollution and health impacts of oil & gas production in the United States. Environmental Research Health 1: 021006.
[10] Buonocore et al. 2021. A decade of the U.S. energy mix transitioning away from coal: historical reconstruction of the reductions in the public health burden of energy. Environmental Research Letters 16: 054030

Fine particulate matter exposure is the biggest environmental pollution risk to public health.[11] The United States Environmental Protection Agency's health assessment determined a causal link between $PM_{2.5}$ exposure and premature death. [12] Underscoring this point, Vohra et al. (2021) found that 9,842 premature deaths in Wisconsin were attributable to $PM_{2.5}$ every year from all sources of fossil fuel combustion[13]. Exposure to $PM_{2.5}$ is associated with cardiovascular problems (e.g., heart disease, COPD, chronic bronchitis, lower respiratory infection), cancer, and nervous system damage.

Ozone is associated with causing acute respiratory symptoms in people without preexisting conditions and adverse outcomes for those with existing conditions such as asthma and emphysema.[14] The short-term health effects of ozone include the exacerbation of COPD, respiratory infections, and increased respiratory symptoms. Long-term effects include the onset of new asthma cases, worsened symptoms in children and adults with asthma and emphysema, and premature death.[15]

Nitrogen oxides irritate the respiratory system and are associated with incident pediatric asthma cases as well as aggravation of existing cases causing hospital visits and missed school or workdays, decreased lung function, intensified allergic responses, and cardiopulmonary effects.[16] Nitrogen oxides also react with other air pollutants to form fine particulate matter and ozone.

Sulfur dioxide can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO_2. SO_2 emissions can also lead to the formation of can react with other compounds in the atmosphere and contribute to particulate matter and ozone formation. [17]

The most vulnerable in the state to this air pollution are developing fetuses and young children, who are more biologically and neurologically susceptible to the adverse effects of air pollutants from fossil-fuel combustion than adults. This differential susceptibility to air pollution is due to their rapid growth, developing brain, and immature respiratory, detoxification, immune, and thermoregulatory systems[18] Children also breathe more air per kilogram of body weight than adults and are therefore more exposed to pollutants in air[19].

Wisconsin-Specific Health Burden of Electricity Generation

Most studies reporting the health burden of air pollution from electricity generation focus on premature mortality. There have been substantial reductions in air pollution from electricity generation units and subsequent reductions in early deaths from electricity generation air pollution in the past 20

[11] Global Burden of Disease. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet 396: 1223-1249.
[12] United States Environmental Protection Agency. 2019. Integrated Science Assessment for Particulate Matter. December 2019. EPA/600/R-19/188
[13] Vohra et al. 2021.
[14] EPA. 2016. Ozone Pollution. Ozone Basics | Ozone Pollution | US EPA
[15] EPA. 2016. Ozone Pollution. Ozone Basics | Ozone Pollution | US EPA
[16] Anenberg et al. 2022. Long-term trends in urban NO_2 concentrations and associated paediatric asthma incidence: estimates from global datasets. Lancet Planet Health 6:e49-e58; California Air Resources Board. 2024. Nitrogen dioxide & health. Available at: https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health
[17] EPA. 2024. Sulfur Dioxide Basics. Sulfur Dioxide Basics | US EPA
[18] Bateson & Schwartz. 2008. Children's response to air pollutants. J Toxicol Environ Health A. 71:238-43.
[19] Vohra et al. 2021. Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem. Environmental Research 195: 110754.

years. However, fossil fuel-based electricity generation is still causing hundreds of early deaths each year in the state.

Air pollution from electricity generation caused an estimated 750[20]-981[21] early deaths in Wisconsin in 2005. Analyses using more recent air quality and emissions data have found the following health burden in Wisconsin from electricity generation:

- 162 premature deaths attributable to PM2.5 exposure in 2014[22]
- 110 premature deaths (valued at $1.1 billion) attributable to PM2.5 exposure from coal- and gas-based electricity generation in 2017[23]
- 172 premature deaths in 2018[24]
- 130-240 cases of premature mortality in 2023 [25]

Note that these studies are reporting the health burden within Wisconsin from national electricity generation because pollution from electricity generation in other states impacts air quality and, subsequently, health burden in Wisconsin.[26] When looking only at electricity generation in Wisconsin, EPA's COBRA model estimates 25-41 premature deaths per year in Wisconsin due to related air pollution.

Furthermore, the health effects of air pollution from electricity generation extend far beyond the premature mortality that most studies focus on. For example, in addition to the early death, EPA's COBRA model estimates that in 2023, pollution from nationwide electricity generation is responsible for 87,000 incidences of asthma symptoms, 520 incidents of asthma onsets, 180 respiratory ER visits, 29,000 days of missed school, and 11,000 days of missed work in Wisconsin, among other impacts. The total public health burden in Wisconsin of electricity generation is estimated to be $2.1-3.6 billion.[27]

100% renewable electricity generation in Wisconsin is anticipated to have environmental justice benefits as well, with Milwaukee County—home to about 40% of Wisconsin's non-white population—predicted to have the largest increase in air quality.[28]

Renewable Energy Health Benefits

In contrast with fossil fuel combustion, wind and solar generate electricity without any emissions of harmful air pollutants. Therefore, in addition to the climate benefits of renewable energy, there are substantial public health benefits to displacing our current electricity generation with wind and solar.

Cumulative wind and solar air quality benefits in the United States in 2015 were estimated at $29.7-112.8 billion mostly from 3,000 to 12,700 avoided premature mortalities.[29] Another study found that in 2022, wind and solar generation provided $16 billion and $2.2 billion worth of air quality benefits in the U.S., respectively due to avoiding 1,200-1,600 premature mortalities.[30] These benefits corrspond to $36 per MWh for wind and $17 per MWh for solar.

[20] Dedoussi and Barrett 2014
[21] Caizzo et al. 2013. Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005. Atmospheric Environment.
[22] Thind et al. 2019. Fine particulate air pollution from electricity generation in the US: Health impacts by race, income, and geography. Environmental Science & Technology 53: 14010–14019.
[23] Buonocore et al. 2021.
[24] Dedoussi et al. 2020.
[25] EPA COBRA Web Edition: zeroing out emissions from the electricity generation sector.
[26] E.g., Penn et al. 2017. Estimating state-specific contributions to PM2.5- and O3-related health burden from residential combustion and electricity generating unit emissions in the United States. Environmental Health Perspectives 125: 324-332.
[27] When looking only at electricity generation in Wisconsin, the health burden in Wisconsin is: 18,000 incidences of asthma symptoms, 110 incidents of asthma onsets, 39 respiratory ER visits, 7,000 days of missed school, and 1,700 days of missed work, among other impacts. The total health effects are valued at $390-620 million annually.
[28] Gallagher et al. 2021. Air quality, public health and environmental justice outcomes from 100 percent clean electricity in Wisconsin. University of Wisconsin Nelson Issue Brief Volume 2, Number 2. March 2021.
[29] Milstein et al. 2017.
[30] Milstein et al. 2024. Climate and air quality benefits of wind and solar generation in the United States from 2019-2022. Cell Reports Sustainability 1: 100105

Importantly, these benefits are greatest when renewable energy is deployed in the Upper Midwest and Great Lakes regions of the country due to the higher use of coal-fired electricity generation in the region and the proximity of downwind cities (Fig. 1).[31] For example, the air quality benefits of installing renewable energy in the Great Lakes and Upper Midwest are four times higher than in places like California and the Southwest.[32]

SOLAR AIR QUALITY HEALTH BENEFIT ESTIMATES

- In 2017, the Upper Midwest and Great Lakes regions (which Wisconsin straddles) would see $52-85 in health benefits per MWh from deploying utility-scale solar (Figure 1)
- In 2015 air quality benefits from utility-scale solar generation in the Upper Midwest and Great Lakes regions was $57-104 per MWh[33].
- Air quality benefits of $92-194 per MWh for solar energy production in 2014 in the Upper Midwest and Great Lakes regions.[34]
- The EPA estimates health benefits of $30-60 per MWh for utility-scale and distributed solar generation in the Midwest region (encompassing Wisconsin)[35]

These studies indicate that the air quality benefits from solar exceed the cost to generate electricity, which is currently $30-40 per MWh for utility-scale solar photovoltaic systems.[36]

WIND AIR QUALITY HEALTH BENEFITS

- In 2017, the Upper Midwest and the Great Lakes regions would see $67-82 in health benefits per MWh from deploying wind energy the highest benefit among US regions[37].
- In 2015, based on central estimates, air quality benefits from wind generation in the Upper Midwest and Great Lakes regions was $58-110 per MWh[38].
- The EPA estimates health benefits of $30-$60 per MWh for onshore wind in the Midwest region (encompassing Wisconsin) [39]
- Qiu et al. estimate a lower value of air quality benefits from wind in the Midcontinent Independent System Operator region (which includes Wisconsin) of $25-30 per MWh in 2014.[40]

As with solar generation, compared to the cost of generating the electricity, which is currently $26-50 per MWh for on-shore wind systems,[41] most studies indicate air quality benefits from wind exceed the cost to generate the electricity.

[31] Buonocore et al. 2019. Climate and health benefits of increasing renewable energy deployment in the United States. Environmental Research Letters 14: 114010; Siler-Evans et al. 2013. Regional variations in the health, environmental, and climate benefits of wind and solar generation. Proceedings of the National Academy of Sciences, USA 110: 11768-11773

[32] EPA, 2024.

[33] Milstein et al. 2017

[34] Wiser et al. 2016. On the Path to SunShot: The Environmental and Public Health Benefits of Achieving High Penetrations of Solar Energy in the United States. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-65628. http://www.nrel.gov/docs/fy16osti/65628.pdf.

[35] US EPA. 2024. Estimating the health benefits per kilowatt-hour or energy efficiency and renewable energy. Available at: https://www.epa.gov/statelocalenergy/estimating-health-benefits-kilowatt-hour-energy-efficiency-and-renewable-energy

[36] Lazard. 2021. Lazard's Levelized cost of energy analysis-Version 15.0.

[37] Buonocore et al. 2019.

[38] Milstein et al. 2017

[39] US EPA. 2024. Estimating the health benefits per kilowatt-hour or energy efficiency and renewable energy. Available at: https://www.epa.gov/statelocalenergy/estimating-health-benefits-kilowatt-hour-energy-efficiency-and-renewable-energy

[40] Qiu et al. 202. Impacts of wind power on air quality, premature mortality, and exposure disparities in the United States. Science Advances 8: eabn8762

[41] Lazard. 2021. Lazard's Levelized cost of energy analysis-Version 15.0.

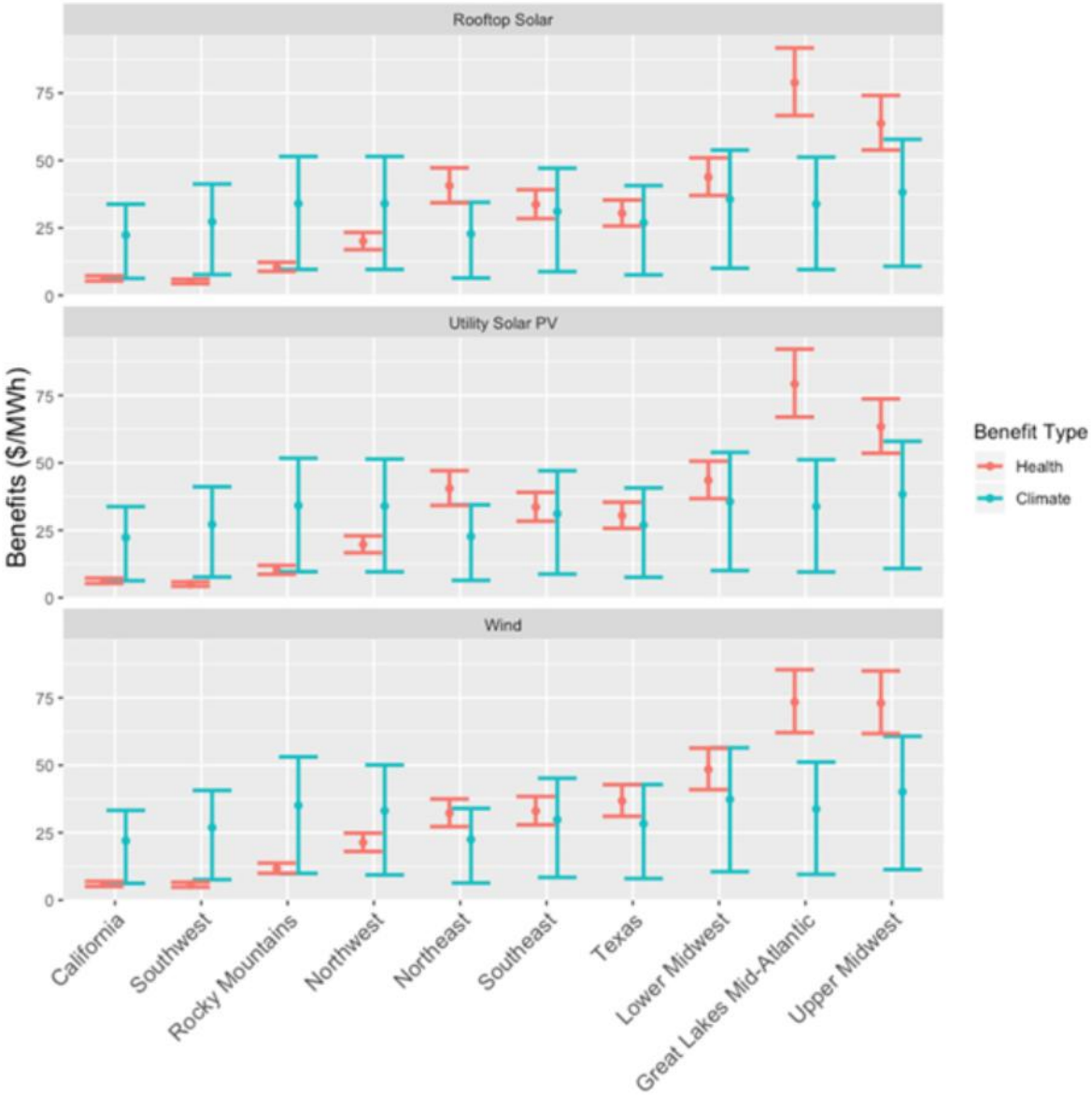

Figure 1 (from Buonocore et al. 2019): Mid (point), and high and low (whiskers) estimates of health and climate benefits per MWh for each renewable energy type and location. Middle estimates are represented by points, with low and high represented by error bars.[42]

[42] Buonocore et al. 2019. Climate and health benefits of increasing renewable energy deployment in the United States. Environmental Research Letters 14: 114010

No Available Evidence of Direct Negative Health Effects From Renewable Energy

In contrast to the air quality benefits of renewable energy deployment, there is no evidence that its deployment has any direct negative public health consequences.[43]

1. Utility-Scale Solar

A study from North Carolina State investigated common concerns with utility-scale solar, including toxins found in panels, electromagnetic field (EMF), and fire.[44] This is the only study we are aware of that evaluates safety concerns from solar, and it concluded that public health risks are "extremely small" and safety concerns are negligible.

Any toxic components in solar panels are sealed and do not pose a risk during operation. Environmental exposure is possible during panel disposal in landfills, but efforts to increase recycling of retired panels and eliminate toxic leaching address this concern. Since about 75% of the solar panels can be recycled[45], the likelihood that decommissioning procedures would ignore these cost saving benefits in favor of disposal in landfills further reduces the possibility of toxic leaching.

Crystalline silicon and cadmium telluride panels comprise the vast majority of solar panels, and there's no evidence that they contain arsenic, allium, geranium, hexavalent chromium or PFAS, despite claims and concerns of exposure to such toxic compounds from solar panels.[46] The cadmium telluride compound in cadmium telluride panels (currently 3% of panel market share) is highly stable and thus does not pose the same risk as elemental cadmium.[47] The only potential toxic compound of health concern in commercially produced solar panels is the trace amount of lead contained in some solder, but this risk is reduced as manufacturers are looking to transition to lead-free solder.[48]

The North Carolina study also found EMF concerns from solar arrays were negligible, as EMF levels drop below typical everyday exposure levels. Even within a few feet of a utility-scale inverter, which is fenced off to prevent close access to, EMF levels are well below exposure limits.[49] Similarly, EMF levels at the edge of facilities are well below the levels that medical devices like pacemakers are tested for regarding EMF interference.

Finally, fire concerns were found to be minimal, since only a small amount of solar panel materials are flammable and thus would pose no additional risk if safety protocols are followed. The study concluded that the greatest health concerns with utility-scale solar were the increased traffic during project construction and dangers to trespassers from the high voltage equipment, which should be avoided with proper signage.

2. Wind

Wisconsin law requires an evaluation of available peer-reviewed literature on the human health impacts of wind energy.[50] The most recent assessment, submitted in 2024, concluded that most individuals living near wind turbines do not experience health effects directly caused by the turbines.[51] Studies included in this evaluation looked at the potential for noise, infrasound or shadow flicker to impact sleep, cardiovascular health, and other health effects like vertigo, brain fog, and

[43] Collie-Akers et al. 2024. A review of potential public health impacts related to industrial scale wind and solar energy. Lawrence-Douglas County (KS) Pubilc Health and University of Kansas Medical Center-Department of Population Health. February 2024. Available at: https://www.dgcoks.gov/sites/default/files/2024-03/LDCPH.%20Assessment%20of%20industrial%20scale%20wind%20and%20solar.V1.pdf

[44] NC Clean Energy Technology Center. 2017. *Health and Safety of Solar Photovoltaics*. https://content.ces.ncsu.edu/health-and-safety-impacts-of-solar-photovoltaics

[45] U.S. EPA. 2024. Solar panel recycling. https://www.epa.gov/hw/solar-panel-recycling

[46] Mirletz et al. 2023. Unfounded concerns about photovoltaic module toxicity and waste are slowing decarbonization. Nature Physics 19: 1376-1378.

[47] Mirletz et al. 2023

[48] Mirletz et al. 2023.

[49] See also, Tell et al. 2015. Electromagnetic fields associated with commercial solar photovoltaic electric power generating facilities. Journal of Occupational and Environmental Hygiene 12: 795-803.

[50] Wis. Stat. s. 196.378(4g)(e)

[51] Public Service Commission of Wisconsin. 2024. Wisconsin Wind Siting Council: Wind turbine siting-health review and wind siting policy update. May, 2024. Available at: https://psc.wi.gov/SiteAssets/windSitingReport2024.pdf

headaches. The primary negative health effect identified in the review was the correlation between concern and annoyance regarding the turbines with self-reported health outcomes. In contrast to a lack of direct negative health effects from the turbines, there was strong evidence of numerous health benefits resulting from replacing fossil fuel electricity generation with emission-free wind energy. This assessment is consistent with prior assessments.[52]

Public health Benefit of Climate Change Mitigation

We note that there are additional public health benefits of renewable energy from mitigating climate change. Climate change impacts public health in Wisconsin through increased heat stress, increased vector-borne disease transmission, longer allergy seasons, and increased water-borne illnesses, among other health-related impacts.[53] However, climate benefits are quantified using a social cost of carbon approach, where total economic damages for each ton of carbon emissions is estimated. This includes things like economic productivity and thus is not limited to public health impacts. Furthermore, these estimates often incorporate global costs, limiting their applicability to Wisconsin. Finally, they largely consider future impacts, extending out to the year 2100 or further. In contrast, the public health benefits of switching from fossil fuel-based electricity generation to renewable energy are immediate and local.

For these reasons, we are not including these quantifications in this brief. However, we did want to acknowledge the public health burden of climate change in Wisconsin even if it cannot be quantified at this point. The climate change mitigation benefit of renewable energy deployment is particularly important in Wisconsin, as the state has the 9th highest carbon intensive electricity generation of all states at 1,171 pounds of CO_2 per MWh, 40% higher than the national average of 823 pounds CO_2 per MWh.[54]

Policy Implications & Recommendations

The health benefits of renewable energy can inform public and environmental health policy decisions at the local, state, and federal level in the Unites States. Energy policy should consider human health to effectively reduce environmental burden in the U.S.[55] Policy recommendations include the following:

- Uphold federal policies such as the Inflation Reduction Act and the Bipartisan Infrastructure Law that aims to increase renewable energy opportunities for individuals, communities, and businesses.
- Expand and improve energy efficiency efforts and programs such as Focus on Energy.
- Implement statewide community solar policies that increase access to solar energy for communities and businesses that cannot otherwise implement solar projects.
- Build renewable energy policy in ways that ensure engagement with communities who are disproportionately impacted by fossil fuels and energy inefficiency – particularly communities of color due to redlining. [56]

[52] Environmental Health Sciences Research Center, University of Iowa College of Public Health. 2019. Wind turbines and health. Available at: https://ehsrc.public-health.uiowa.edu/wp-content/uploads/2019/01/IEC_Wind_Health_Paper_2019_FINAL.pdf; Knopper, et al. 2014. Wind Turbines and Human Health. *Frontiers in Public Health* 2: 1-20.

[53] Patz et al. 2020. Medical alert! Climate change is harming our health in Wisconsin. University of Wisconsin-Madison. Access at: https://ghi.wisc.edu/health-climate-cities/

[54] USEPA. EGRID. Data Explorer | US EPA

[55] Buonocore et al. 2021; Gallagher & Holloway 2020

[56] The Sierra Club. 2024. Climate & energy policies: Renewable energy project siting policy. Policy for Siting of Renewable Energy, Transmission, Storage, and Related Infrastructure.

- Allocate funding for low-cost monitors, especially in communities facing environmental justice challenges.
- Increase funding for research on technologies that could contribute towards the goal of net zero.
- Codify a binding, economy-wide net zero target by 2050.
- Codify a 100% electricity standard by 2050 in statute.
- Pass legislation requiring a robust, formal Integrated Resource Planning process developed by the Public Service Commission (PSC).
- Require independent economic analyses of each coal power plant to understand optimal retirement dates.
- Establish strict emissions limits on existing gas generation at the state level. Specifically, older, less efficient plants should be prioritized for retirement to protect human health and reduce carbon emissions.[57]
- Increase support led by communities for large-scale solar and wind energy that drives a transition away from fossil fuels.
- Advocate for policies that allow for responsible development of transmission needed to scale renewable energy.
- Reduce barriers and increase opportunities for small-scale renewable energy generation.

Additional Resources

Clean Wisconsin: Clean Water, Clean Air, Clean Energy

Healthy Climate Wisconsin: Health Resources

Wisconsin Department of Health Services Climate and Health Program: Climate and Health

Union of Concerned Scientists: Benefits of Renewable Energy Use

United States Department of Energy: Renewable Energy

University of Wisconsin: Climate Solutions for Health Lab

UW Madison Holloway Lab: The Holloway Group @ SAGE

[57] Evolved Energy Research et al. (2022). Wisconsin's roadmap to net zero by 2050 summary report. Clean Wisconsin. Final-Evolved-Energy-Research_100-percent-in-Wisconsin-Summary.pdf