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# Health Impacts of a Natural Gas Power Plant: Lessons from a Health Impact Assessment of the Proposed Nemadji Trail Energy Center in Douglas County, Wisconsin

March 2025


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# The Renewable Energy Transition in Rural America: A Policy & Action Lab

# Health Impact Assessment of a Natural Gas Power Plant:

## *Lessons Learned from the Proposed Nemadji Trail Energy Center in Douglas County, Wisconsin*

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*This report is the result of a ten-week course offered to graduate students, guided and funded by Stanford Law School, the Center for Human and Planetary Health, and Stanford Medical School. Importantly, the contents of this report are student-produced and do not feature direct research by Stanford faculty or staff. The course was taught by teaching team members: Professor Lisa Patel (Medical School), Professor Deborah Sivas (Law School), Lecturer Luciana Herman (Law School), Education Adviser Katie Vogelheim (Human and Planetary Health), and Special Adviser in Public Health Kate Hoppe (Medical Society Consortium).*

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# Executive Summary

This joint policy memo and health impact assessment (HIA) recommends that the Rural Utility Service (RUS) should not approve a loan to construct the Nemadji Trail Energy Center (NTEC). This natural gas power plant, planned for Superior, Wisconsin, is inconsistent with federal and state climate goals, presents significant health, environmental, and economic risks, and fails to serve the best interests of the local community, as well as Dairyland Power Cooperative and broader Wisconsin stakeholders. A comprehensive evaluation of its policy, environmental, health, economic, and community impacts demonstrates that renewable energy alternatives provide a more sustainable and economically beneficial path.

Natural gas power plants, including NTEC, are major contributors to environmental harms, emitting substantial amounts of carbon dioxide ($CO_2$), methane ($CH_4$), and other pollutants. Over its projected lifetime, NTEC is expected to emit over 109 million tons of $CO_2$, undermining emissions reductions achieved by renewable energy programs like the Inflation Reduction Act's (IRA) New ERA funding. These emissions carry significant global warming potential and substantial costs, with the project's social cost of carbon estimated at $1.8-14.6 billion, potentially reaching $436.8 billion in regional impact. NTEC would lock in fossil fuel dependency during a critical period when federal and state policies prioritize transitioning to clean energy.

The health impacts of NTEC are equally concerning. The 625 MW plant is projected to annually emit 90 tons of fine particulate matter (PM 2.5), 83 tons of nitrogen oxides ($NO_x$), and 16 tons of sulfur oxides ($SO_x$). These pollutants are well-documented contributors to respiratory and cardiovascular diseases, cancer, and adverse maternal and infant health outcomes. The Health Impact Assessment (HIA) revealed that NTEC's operations would significantly increase respiratory illnesses and mortality rates in the surrounding community, exacerbating health inequities. In an area with limited healthcare infrastructure, adding a gas plant to the already existing gas terminal and oil refinery puts vulnerable communities at a disadvantage and worsens existing environmental injustices.

NTEC also poses serious risks to local Tribal Nations by threatening cultural properties and treaty rights. Dairyland Power Cooperative's failure to conduct meaningful consultations with affected tribes has disregarded their concerns, contributing to the plant's lack of alignment with community and stakeholder priorities.

NTEC also contradicts state and federal climate policies. Both Wisconsin and Minnesota have set ambitious goals to reduce greenhouse gas emissions and achieve carbon-free electricity by 2050. Investing in renewable energy not only aligns with these policies, but also supports supply chain jobs, strengthens local economies, and enhances energy resilience in rural communities.

Economically, NTEC would be a poor investment. Declining costs of renewable energy technologies such as solar, wind, and battery storage make them increasingly competitive with fossil fuels. Furthermore, the volatility of natural gas prices and growing regulatory pressures heighten the risk of NTEC becoming a stranded asset, jeopardizing loan repayment and exposing taxpayers to potential financial losses. Clean Energy Portfolios (CEPs), which combine renewables and storage, already outperform natural gas plants like NTEC in terms of cost-effectiveness and reliability in the Midwest.

Given these critical considerations, RUS should deny the loan for NTEC. Approving this project would undermine climate goals, economic competitiveness, and community well-being, while perpetuating environmental and health injustices. Renewable energy alternatives represent a better path forward when considering the health and economic benefits.

# The Rural Utility Service Should Deny the NTEC Loan

## Background on Nemadji Trail Energy Center

The Nemadji Trail Energy Center is a proposed natural gas plant located in Superior, Wisconsin. The plant is proposed by Dairyland Power Cooperative, located in Wisconsin, which will use 80% of the power, along with Minnesota Power, which services Minnesota, and Basin Electric Power Cooperative, which services nine states west of the Mississippi River.

In 2020, Dairyland made their initial request for a loan to complete the project. The loan request led to an Environmental Assessment (EA) conducted by Dairyland. RUS reviewed the EA and made a Finding of No Significant Impact (FONSI). Following the RUS finding, advocacy groups, including Clean Wisconsin and the Sierra Club, advocated for a Supplemental Environmental Assessment (Supplemental EA). Dairyland completed the Supplemental EA in June 2022 and received comments from the public on the document. In response to those comments, Dairyland revised the Supplemental EA in July 2023 and released a Final Supplemental Environmental Assessment (Final Supplemental EA) in December 2023. RUS reviewed the Final Supplemental EA and issued a Supplemental Finding of No Significant Impact (Supplemental FONSI).

While the request for the loan was pending with RUS, Dairyland submitted requests to the Public Service Commission (PSC) in Wisconsin to obtain a construction permit. The PSC approved the project, and in response, environmental groups, including Clean Wisconsin, sued the PSC to rescind the permit. The court had ruled in favor of the PSC. However, while the construction permit was challenged in court, Dairyland withdrew their air permit, stopping the NTEC construction process.[1]

[1] In March 2025, the Wisconsin Supreme Court denied the petition for review, ending the legal challenge to the PSC approval. The applicants still require an air permit and local permits to proceed with construction.

## United States Climate Policy Goals

Even as federal priorities shift with changing administrations, national policy on climate goals remains important. The United States has committed to reduce emissions by 50% by 2030 and reach net zero by 2050 in Executive Order #14057.[2] Although these commitments are likely to shift significantly with the new administration, they inform the climate goals adopted by Minnesota and Wisconsin, which will remain even as President Trump takes office.

In addition to informing state-level policy decisions, these commitments represent the science-backed need to reduce global greenhouse gas emissions to address the effects of climate change and a warming planet. To keep the increase in global temperatures from reaching irreversible impacts on the planet, the United Nations set a goal to keep the increase in global temperatures below 1.5°C. To achieve that goal, global emissions will need to peak by 2025 and reduce by at least 43% by 2030.[3]

Renewables are still consistent with several of President Trump's stated goals for United States climate policy. President Trump has cited a desire to prioritize energy independence. Renewable energy sources like wind and solar provide fully independent energy sources.[4] A continued focus on fossil fuels leaves the door open for reliance on other producers, especially in their ability to manipulate energy prices. President Trump has also highlighted a desire to reduce energy costs. Investments in renewables, especially in rural America, are projected to cut energy prices significantly. Renewable energy continues to become more competitive, and in some cases, is even able to produce energy cheaper than fossil fuels.[5]

## Wisconsin and Minnesota Climate Goals and Inconsistency with NTEC

NTEC is also fundamentally at odds with the climate and clean energy goals established by Wisconsin and Minnesota, jeopardizing their progress toward a sustainable future. In Wisconsin, Governor Tony Evers' Executive Order #38 sets a clear path for the state to achieve 100 percent carbon-free electricity by 2050, aligned with the carbon reduction goals of the Paris Climate

[2] Executive Order #14057, 2021.
[3] Paris Agreement.
[4] Bowman, 2022.
[5] McMahon, 2024.

Agreement.[6] NTEC directly undermines these efforts by committing Wisconsin to a fossil fuel project with a 40-year operational life during the critical decades when the state is striving to transition to carbon-free energy.

Similarly, Minnesota's Climate Action Framework, adopted into statute in 2023, aims to reduce greenhouse gas emissions by 50 percent by 2030 (from 2005 levels) and achieve net-zero emissions by 2050.[7] NTEC represents a major step backward for both states, introducing a significant source of emissions at a time when the power sector should be working toward rapidly transitioning to renewable energy and energy storage solutions. NTEC locks in fossil fuel dependency, obstructing Minnesota and Wisconsin's ability to meet their statutory goals and undermining their objective to combat climate change. By emitting millions of tons of greenhouse gases annually, NTEC entrenches reliance on natural gas baseload power and delays the transition to cleaner energy sources.

## Investing in NTEC is Inconsistent with Recent Investments in Rural Communities

In recent years, the U.S. made significant strides to update the energy profile of rural America, with the Rural Utilities Service (RUS) spearheading efforts to electrify rural America. Under the Rural Electrification Act, RUS has the authority to operate its Electric Program, which makes direct loans, loan guarantees, grants, and energy project financing to electric utilities. Established during the New Deal, the Rural Electrification Act is one of the integral pieces of legislation that brought electricity to rural America. Since then, the Inflation Reduction Act ("IRA") has been the largest investment in rural electrification.[8] The IRA provides numerous grant and loan opportunities and incentives to bolster clean energy, economic growth, and job opportunities in rural America.[9]

There are four programs under the IRA dedicated to building out clean energy: grants for biofuel infrastructure, Powering Affordable Clean Energy ("PACE"), Rural Energy for America

[6] State of Wisconsin, Executive Order #38.
[7] Minnesota, "Climate Action Framework."
[8] USDA Rural Development, "Inflation Reduction Act Funding for Rural Development."
[9] USDA Rural Development, "Inflation Reduction Act Funding for Rural Development."

("REAP"), and Empowering Rural America NEW ERA ("NEW ERA").[10] PACE has $1 billion in funding and is used to forgive up to 60% of loans for renewable energy projects that use wind, solar, hydropower, geothermal, or biomass.[11] REAP has directed over $145 million in project funding to rural recipients.[12] Projects include building out solar arrays, rooftop solar, and upgrading lighting systems to become energy efficient.[13] The New ERA program, the largest RUS-administered program under the IRA, designates $9.7 billion to rural co-ops to build or buy more than 10 gigawatts ("GW") of clean energy from renewable sources, including wind, solar, and battery storage.[14] The program's goals include improving health outcomes and lowering energy costs in rural communities.

Though the future of the IRA may be in question, the investments made in rural America will be difficult to reverse. The New ERA funding, which specifically affects policy choices in energy supply for rural cooperatives, is focused primarily in states where Republicans did well in the 2024 election. And rural communities in those states are eager for funding opportunities. RUS received a multitude of NEW ERA applications, nearing $46 billion of project tasks, which is about five times the amount of funding available.[15] RUS Administrator Andrew Berke says, the applications "[show] the future of co-ops. [Applicants have] shown us what the clean energy transition looks like and what [their] imagination has spurred."[16] IRA funding is in demand in rural America, making it more likely that the program will continue under a Republican administration.

Dairyland is a recipient of New ERA funding, receiving $579 million to develop projects that will result in power purchase agreements for wind and solar energy.[17] The funding is planned to be leveraged for $2.1 billion in total funding. The investment is expected to lower electricity

[10] USDA Rural Development, "Inflation Reduction Act Funding for Rural Development."
[11] USDA Rural Development, "Powering Affordable Clean Energy PACE Program."
[12] USDA Rural Development, "Rural Energy for America Program."
[13] USDA Rural Development, "Rural Energy for America Program."
[14] Edwin, 2024.
[15] Kelly, 2024.
[16] Sukow, "RUS's Berke: Funding Programs Provide a Look Into the Rural Electric Cooperative Future."
[17] Dairyland Power Cooperative, "Dairyland Awarded Half-Billion Dollar New ERA Program Grant."

rates by 42% and emissions by 3 million tons of greenhouse gas annually (90 million tons of greenhouse gas emissions over the lifetimes of the projects).[18]

Even if the new administration has new priorities for energy policy in rural America, this massive investment in renewables in Wisconsin represents a shift in the trajectory of Dairyland and how it sources energy. The gains in emissions reductions from the New ERA would be entirely wiped out by developing NTEC. The estimated emissions of the plant over its lifetime are 109 million tons, which would surpass the projected emissions reductions of 90 million tons from Dairyland's New ERA funding.[19]

## NTEC is a Poor Economic Investment

The rapidly changing economic landscape for energy production highlights why NTEC would be a poor investment decision, especially given the availability and competitiveness of renewable energy alternatives. Over the past two years, the costs associated with renewable energy technologies, including firming costs for ensuring consistent power supply, have declined. This decline enhances the economic viability of renewables compared to traditional fossil fuel-based power generation.

For instance, the cost of electricity for utility-scale solar photovoltaics (PV) projects was 56% less than the weighted average fossil fuel-fired alternatives in 2023.[20] The significant reduction for utility-scale solar PV underscores the increasing competitiveness of solar energy. And the costs of battery storage projects dropped by 89% between 2010 and 2023, allowing for better integration of intermittent renewable sources by providing reliable energy during periods of low generation.[21]

In the Rural Utilities Service (RUS) Environmental Assessment (EA) for NTEC, there appears to be a lack of comprehensive consideration regarding the anticipated future declines in renewable energy costs. This oversight is significant, as it may lead to an underestimation of the economic

[18] USDA Rural Development, "Empowering Rural America Program: Project Announcements."
[19] USDA Rural Development. "Empowering Rural America Program: Project Announcements."
[20] International Renewable Energy Agency (IRENA), "Renewable Power Generation Costs in 2023."
[21] International Renewable Energy Agency (IRENA), "Renewable Power Generation Costs in 2023."

feasibility of renewable alternatives. The EA's analysis primarily focuses on current cost metrics without adequately accounting for the rapid cost reductions projected in renewable technologies. By not incorporating these trends, the assessment may present a skewed comparison, favoring traditional fossil fuel projects over more economically viable renewable options.

The failure to consider the declining costs of renewables in the EA can result in suboptimal investment decisions, potentially locking stakeholders into higher-cost, higher-emission energy sources. Acknowledging and integrating these cost trends would support a transition toward more sustainable and economically advantageous energy infrastructure.

## Clean Energy Portfolios are Better Alternatives for Dairyland

Clean Energy Portfolios (CEPs), which combine solar, wind, battery storage, energy efficiency, and demand flexibility, have increasingly become a cost-effective alternative to natural gas plants like NTEC. Analysis from RMI demonstrates that CEPs can meet the same grid reliability and energy needs as gas plants at a lower cost, even under conservative assumptions.[22] Specifically, CEPs designed for NTEC's projected services are cheaper on a levelized cost of energy (LCOE) basis across a range of scenarios, including varying tax credits and gas price projections.[23]

The IRA further tilts the economic scales in favor of CEPs by providing substantial tax incentives for renewable energy projects. With Investment Tax Credits (ITCs) and Production Tax Credits (PTCs) factored in, CEPs can achieve significant cost reductions, making them an economically superior option compared to NTEC's reliance on volatile natural gas prices.[24]

Case studies provide compelling evidence for the economic and operational superiority of CEPs over natural gas plants. In regions like Minnesota and New Mexico, CEPs clean energy portfolios have successfully replaced proposed gas projects, achieving lower costs and reduced emissions while creating local economic benefits.[25]

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[22] Rocky Mountain Institute, 2021.
[23] Levelized Cost of Energy (LCOE) is a measure of the average cost per unit of electricity generated over the lifetime of an energy-generating asset, accounting for capital, operational, and maintenance costs, as well as fuel costs and financing.
[24] See more on RMI's analysis in the appendix.
[25] Rocky Mountain Institute, 2022.

## Rising Cost Risk of Natural Gas Plants

Natural gas plants like NTEC face increasing economic risks due to rising gas prices and the uncertain future of fossil fuel infrastructure. Historical trends show that gas price volatility has frequently exceeded projections, with recent estimates suggesting gas prices are likely to rise further due to geopolitical tensions, weather related disruptions, and supply constraints.[26] These dynamics would raise the marginal cost of energy for gas plants, making them less competitive against renewables.

Additionally, the costs associated with ensuring a firm gas supply—particularly during extreme weather events—are often not accounted for in initial investment calculations. For NTEC, incorporating the cost of fuel supply reliability would render it even less economically viable compared to renewable alternatives.

## NTEC Presents a Stranded Asset Risk

A stranded asset refers to an investment that has become obsolete or non-performing earlier than expected due to external factors. These factors may include changes in market conditions, regulatory shifts, technological advancements, or societal transitions, such as the shift to low-carbon energy. Stranded assets often manifest for power generation when fossil fuel plants are retired prematurely because renewable energy sources become more cost-effective or regulatory frameworks mandate decarbonization. NTEC's proposed RUS loan presents a stranded asset risk that poses a significant threat to the repayment of the loan, as underutilization of the plant due to market shifts toward cheaper renewables and stricter emissions regulations could severely reduce its revenue generation. NTEC's financial instability may jeopardize the borrower's ability to meet loan obligations, exposing RUS and taxpayers to potential losses.

NTEC is at risk of becoming a stranded asset for the following reasons:

1. As explained above, Clean Energy Portfolios (CEPs) combining wind, solar, battery storage, and demand response are increasingly cost-competitive compared to natural gas plants like NTEC.

[26] Enverus, 2024

2. NTEC's reliance on natural gas exposes it to volatile gas prices, further reducing its economic viability compared to renewables whose costs are steadily declining. See analysis above.
3. NTEC is a regulatory and policy risk. Federal and state climate policies aim to reduce greenhouse gas emissions, targeting net-zero goals by mid-century. The Biden administration has introduced stricter NEPA guidelines and executive orders that reduce health-harming pollution from fossil fuel infrastructure that can be expensive to implement.
4. Utilities in the midwest are rapidly deploying battery storage and renewable capacity. Wisconsin alone has announced over MW of new battery projects by 2025, offering a viable alternative to gas plants like NTEC.[27]

These factors collectively highlight that NTEC's reliance on fossil fuel infrastructure is increasingly incompatible with the accelerating transition to a low-carbon energy future and could lead to a stranded asset.

## Clean Energy is More Attractive to New Customers

The rapid expansion of data centers, driven by the growing demand for cloud computing and artificial intelligence, has significantly shifted projections for energy demand. Hyperscalers like Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), and Meta plan to build thousands of servers in data centers across the country to meet growing computer demand.[28] Data centers are some of the most energy-intensive operations globally.[29] Recognizing the impact of their energy consumption, hyperscalers have committed to aggressive clean energy targets as part of their sustainability strategies.

Most hyperscalers have pledged to source 100% of their energy from renewable sources within the next decade, aligning their growth with global decarbonization goals. For instance, AWS has committed to operating on 100% renewable energy by 2025, and Google has pledged to run

[27] ESS News, November 6, 2024; Energy-Storage News, October 8, 2024; Daily Reporter, August 10, 2023.
[28] Ashare, Matt. "Cloud Data Center Spending Hits Record in Q3 as AWS and Microsoft Bolster Capex," Construction Dive, November 6, 2023,
[29] Matthew Gooding, "Global Data Center Electricity Use to Double by 2026: Report," *Data Center Dynamics*, November 10, 2023

entirely on carbon-free energy by 2030.[30] These commitments are not just environmental statements, but are driven by business imperatives as customers, investors, and regulators increasingly demand cleaner and more sustainable practices. Hyperscalers now prioritize locating data centers in regions where renewable energy is abundant, reliable, and cost-effective to ensure alignment with their clean energy goals.[31]

This shift presents a unique challenge and opportunity for utility providers. Service territories reliant on fossil fuels, like those served by Dairyland Power Cooperative, may find themselves at a disadvantage in attracting these hyperscalers. If NTEC is built, it could solidify Dairyland's reliance on natural gas. In contrast, territories that embrace renewable energy infrastructure stand to benefit from the economic advantages of hosting hyperscale data centers, which bring significant investment and job creation to local economies.

By prioritizing renewable energy projects instead of NTEC, Dairyland could be a leader in supporting clean energy growth, aligning with hyperscalers' needs, and boosting regional competitiveness. Dairyland's $579 million grant for renewable power aligns with the sustainability objectives of potential large-scale customers, such as data centers and other enterprises with stringent clean energy targets. Shifting away from fossil fuel investments like NTEC could make Dairyland's territory a more attractive hub for the booming data center industry, aligning economic growth with environmental sustainability.

## Clean Energy is More Attractive to Investors

The utilities building NTEC have complex ownership structures, but their shareholders are not all in favor of building NTEC. ATLAS Infrastructure, a minority investor in Minnesota Power's parent organization, was a vocal critic of NTEC. Before ALLETTE was acquired in May 2024, ATLAS owned approximately 3% of ALLETE's outstanding share capital. The firm has actively engaged with Minnesota Power management and formally submitted comments to the Minnesota Public Utilities Commission opposing NTEC. ATLAS is a signatory to various climate initiatives, including the Institutional Investor Group on Climate Change and the Net Zero Asset

[30] See hyperscale plan additional detail in the Appendix
[31] Phaidra. "Hyperscale Data Centers: Sustainability Goals vs. Operational Reality." *Phaidra Blog*. Accessed December 13, 2024

Managers initiative. The firm's analysis shows that building NTEC would be inconsistent with carbon reduction targets. Building a new fossil fuel plant contradicts the parent companies' commitments to reduce carbon emissions and invest in renewable energy.

Minnesota Power's ownership structure includes a number of actors whose goals do not align with the proposed construction of NTEC in Wisconsin. Minnesota Power is a subsidiary of ALLETE. ALLETE was acquired by Global Infrastructure Partners (GIP) and the Canada Pension Plan Investment Board for $6.2 billion in May 2024. Today, GIP is in the process of being acquired by BlackRock for $12.5 billion.[32] BlackRock has pledged to facilitate billions in investments into climate-related projects.[33] BlackRock's focus on climate-friendly investments contradicts the development of new fossil fuel infrastructure.

The proposed construction of NTEC in Wisconsin may face significant future opposition from the new parent owners due to their climate commitments and the potential financial risks associated with investing in new fossil fuel infrastructure.

## Renewable Energy Projects Provide Greater Job Stability

Dairyland projects NTEC will generate approximately 350 jobs during its construction phase and just 25 permanent operational jobs.[34] By contrast, renewable energy projects of equivalent capacity—such as solar or wind—would create significantly more employment opportunities.[35] The manufacturing of renewable energy components, such as solar panels and wind turbines, supports high-value supply chain jobs. In contrast, natural gas plants like NTEC rely heavily on automation and centralized operations, offering minimal long-term employment benefits. Renewable energy jobs are inherently distributed across local communities due to ongoing maintenance and periodic upgrades, unlike natural gas plants, which rely heavily on centralized operations and automated systems. Renewable energy creates sustained job opportunities for

[32] BlackRock. "BlackRock Completes Acquisition of Global Infrastructure Partners." *BlackRock Newsroom*. Accessed December 13, 2024
[33] Johnson, Lamar. "BlackRock Updates Climate Stewardship Policies, Targeting $150B ESG Funds." *ESG Dive*. September 12, 2023
[34] Wisconsin Public Radio, 2024.
[35] Hanna et al., 2024.

electricians, technicians, and engineers in regions adopting renewable energy projects, directly supporting local economies.

Wei, Patadia, and Kammen's analysis shows that renewable energy sources like solar and wind energy create substantially more jobs per unit of energy produced compared to fossil fuels.[36] Solar PV generates approximately 0.87 jobs per gigawatt-hour (GWh) of energy, while onshore wind produces 0.17 jobs per GWh, compared to just 0.11 jobs per GWh for natural gas plants. Over its operational lifespan, NTEC, expected to produce 4,375 GWh annually, would generate about 613 job-years. In contrast, a solar PV project of the same capacity would create 3,806 job-years, and a wind project would generate 744 job-years, significantly outpacing NTEC in employment.[37]

# NTEC Negatively Impacts Local Health and Environment

NTEC will negatively impact both human health and the environment, leading to millions of dollars in mortality-related damages for Douglas County. According to Dairyland's own analysis, the NTEC will emit a little over 2.2 million tons of $CO_2$ per year, and approximately 2.7 million tons of $CO_2e$ per year.[38] Over its lifetime, NTEC is projected to emit over 109 million tons of $CO_2$. [39]

Direct construction impacts are approximately 297,701 short tons of $CO_2e$ per year.[40] Upstream emissions due to methane leakage would be approximately 162,132 tons of $CO_2e$ per year. Methane is an extremely potent greenhouse gas (GHG) that is ten times more powerful than $CO_2$ at warming the atmosphere.[41] Methane also contributes to the formation of ground-level ozone, a dangerous air pollutant that causes approximately half a million premature deaths per year.[42]

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[36] Wei, Patadia, and Kammen, 2010.
[37] Other studies have confirmed these findings. A Stanford University study evaluated job creation estimates for different power sources Solar PV was found to create about 7.8 times more jobs per unit of energy generated compared to natural gas. Wind power created about 1.5 times more jobs than natural gas per unit of energy. See also research from WRI that saw dollar for dollar, investing in clean energy creates more jobs than traditional fossil fuel investments.
[38] Dairyland Power Cooperative, 3-20, 2023.
[39] Telos Energy, 3, 2022.
[40] Dairyland Power Cooperative, 3-20, 2023.
[41] UN Environment Programme, 8, 2021.
[42] UN Environment Programme, 8, 2021.

Human activities cause over half of global methane emissions, with oil and gas extraction, processing, and distribution accounting for 23 percent of human-caused methane emissions.[43] The United Nations Environment Programme identified that because of methane's short atmospheric lifetime, it is critical to reduce methane concentrations, slow warming, and stave off the health impacts caused by ground level ozone.[44]

NTEC is expected to release nitrous oxides ($NO_x$), volatile organic compounds (VOCs), sulfur dioxide ($SO_2$), which are all precursors to ground-level ozone, as well as fine particulate matter (PM 2.5).[45] All of these pollutants are known to be harmful to human health.[46] Ground-level ozone is known to cause respiratory diseases and impact maternal and infant health, while PM 2.5 is linked to increasing the incidence of premature mortality, cancer and cardiovascular diseases, and impacts maternal and infant health.[47]

Dairyland's analysis of emission numbers assumes that in the case of no action (NTEC is not built), NTEC would be substituted by operating outdated coal plants. This assumption is not consistent with either the policy priorities of the state, nor the current options being considered and results in a skewed analysis. For example, Dairyland draws the erroneous conclusion that because coal plants would produce 122,145 tons more of $CO_2e$, and NTEC is expected to produce 964,000 tons per year of $CO_2$, NTEC will still reduce overall emissions. But Dairyland provides no evidence that NTEC will be replaced by coal power.

One of the clearest demonstrations of the negative climate impacts of building NTEC is the social cost of carbon of the project. The social cost of carbon is an estimate of economic damages that would result from emitting one additional ton of carbon dioxide into the atmosphere.[48] RUS, in their Final Finding of No Significant Impact (FONSI), calculated NTEC's social cost of carbon at different discount rate scenarios in 2025 dollars for the NTEC Project (Table 1) and the entire MISO West Region (Table 2):

[43] UN Environment Programme, 6, 2021.
[44] UN Environment Programme, 8, 2021.
[45] Wisconsin DNR, 101, 2024.
[46] Figure 2 Pathway Diagram.
[47] See HIA Section page 31-32.
[48] Rennert, Kingdon, 2019.

**Table 1. Total Social Cost of $CO_2$ for 2025-2050 in 2025 Dollars (in billions).[49]**

| Discount Rate | 5% Average | 3% Average | 2.5% Average | 3% 95th Percentile |
|---|---|---|---|---|
| 2025-2050 SC-CO2 (Cost in 2025 dollars) | $1.80 | $4.80 | $6.60 | $14.6 |

**Table 2. MISO West Region Total Social Cost of $CO_2$ for 2025-2050 in 2025 Dollars.[50]**

| Discount Rate | 5% Average | 3% Average | 2.5% Average | 3% 95th Percentile |
|---|---|---|---|---|
| Proposed Action Alternative SC-CO2 | $53.4 billion | $143.2 billion | $198.1 billion | $436.8 billion |

RUS estimates show the Project will have damages to the climate ranging from $1.8 to $14.6 billion. The cost of these damages grows when analyzing impacts to the entire MISO West Region, ranging from $53.4 billion to $436.8 billion. Dairyland and RUS attempt to explain these numbers by comparing them to the social cost of carbon in a scenario where NTEC is replaced with coal. Again, this is an inappropriate assumption for which Dairyland offers no evidentiary support.

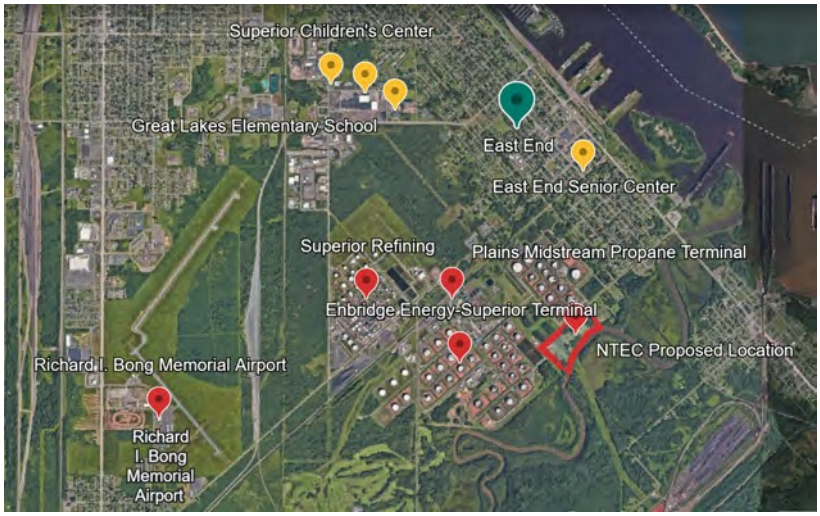
In addition to the social cost of carbon damages, NTEC is expected to cause health-related damages in the millions. According to our health impact assessment, the damages from diseases, mortality, and hospitalizations are estimated to be $5 to $19 million for Douglas County alone.[51] Douglas County also has a shortage of healthcare services,[52] and a lack of care can excerbate negative health impacts of increased pollution by creating an increased risk of poor health outcomes and mortality.[53] As a result, these costs are likely higher than what is modeled in the HIA, making the actual health damages of NTEC even greater.

[49] Rural Utilities Service, 20.
[50] Rural Utilities Service, 21.
[51] Table 14 Total Mortality Incidence from NTEC Operation (57%-100% Capacity Factor).
[52] See HIA Section page 27.
[53] Douthit, et al., 2015; National Association of Community Health Centers, 2007.

# The local community does not want NTEC

Residents of the surrounding communities have been vocal in their opposition to NTEC. One of the primary concerns is the cumulative health impacts caused by the numerous large sources of air pollution located near local communities. As shown in Figure 1, an airport, oil refinery and storage facilities, and major highways surround the local community.

**Figure 1: Map of Existing Industry and Impacted Demographics in Superior, WI[54]**




The Climate and Economic Justice Screening tool ("CEJST") identifies two nearby census tracts in Superior as disadvantaged communities. Disadvantaged communities are communities overburdened by pollution and underserved.[55] The nearby tracts qualify as disadvantaged

[54] Map Link 2024.
[55] Council on Environmental Quality, "Explore the map."

because they are in the 91st or 93rd percentile for proximity to risk management plan facilities and have significant low-income households.[56] Risk management facilities handle substances with significant environmental and public health risks, like oil refineries.[57]

When NTEC was first proposed to the surrounding community, they did not question a gas plant coming in because of how much industry was already there. City Council member Jenny van Sickle said that "[o]ur neighborhood felt like, of course you would put [a gas plant] here. Where else would you put it? You can't put it in the nice neighborhood next door."[58] Many community members felt like a gas plant coming into their community made sense—until they realized that the health costs of multiple industries would be far too steep. Another resident commented, "[y]ou get used to living around this stuff and then you don't stop and think, 'What is this doing to my health?'"[59]

Community members have protested against NTEC coming in, making the project a highly contested one.[60] The Superior City Council has also denied necessary approvals of the plant.[61] The mayor of Superior, who at one time supported NTEC, no longer does, "I still support the plant that they're describing—a plant that has zero health effects, a plant that improves the climate, a plant that will benefit Superior economically. *But that's not the plant they're building*."[62] NTEC would compound the existing health impacts experienced by the surrounding community, imperiling their health and environment.

[56] Council on Environmental Quality, "Explore the map." (These census tracts are also listed as disadvantaged because they meet the significant threshold for underground storage tanks and releases and low income households.).
[57] Council on Environmental Quality, "Metholodogy."
[58] Interview with Jenny van Sickle, conducted November 14th, 2024.
[59] Interview with Rebecca Blake, conducted November 14th, 2025.
[60] Kaeding, 2024; Hollingsworth, 2024.
[61] Kaeding, 2024.
[62] Kaeding, 2024 (emphasis added).

# NTEC Perpetuates Generational Harms on Local Tribal Nations

## Nearby Tribal Nations say NTEC will have negative effects on reserved treaty rights and traditional cultural property

One of NTEC's most significant impacts will be to the nearby St. Francis Cemetery. This Cemetery has been identified by the Fond du Lac Band of Lake Superior Chippewa ("Fond du Lac Band") as tribal cultural property. St. Francis Cemetery is the site of a mass grave of nearly 200 Ojibwe people, who were exhumed and removed from their initial burial place for an iron ore dock. This project was never completed. The city recently transferred land ownership back to the Fond du Lac Band. But the pain of this grave removal is still fresh for the Fond du Lac Band. Tribal Chairman Kevin Dupuis says, "The pain is real. And it really hurts. But this might be an opportunity that we have…to start our healing process."[63]

NTEC threatens to disrupt the Band's healing, as the project site will be directly adjacent to the St. Francis Cemetery. Fond du Lac has identified St. Francis Cemetery as a Traditional Cultural Property (TCP), and Dairyland acknowledged this in their Final Supplemental Environmental Assessment.[64] Dairyland claims no direct impacts to tribes or TCPs are anticipated. However, as Red Cliff Band of Lake Superior Chippewa ("Red Cliff Band") has stated in previous comments, this is not Dairyland's decision.[65] As Red Cliff Band's Vice Chair Richard Peterson writes, "[o]nly the Tribe(s) that have recognized a site or landscape can appropriately assess if a site or landscape will be impacted by a proposed activity."[66]

In addition to impacting Fond du Lac Band's traditional cultural property, NTEC will also impact Red Cliff Band's reserved treaty rights. Dairyland explicitly stated that the project would

[63] Kraker, 2022.
[64] Dairyland Power Cooperative, 3-38, 2023.
[65] Peterson, 2, 2023.
[66] Peterson 2, 2023; National Park Service, 1992 ("It is vital to evaluate properties thought to have traditional cultural significance from the standpoint of those who may ascribe such significance to them, whatever one's own perception of them, based on one's cultural values, may be.").

curtail Red Cliff Band's access to ceded lands for hunting, fishing, and gathering.[67] This is an impact on a Tribe, contradicting their previous statement that no impacts to tribes were anticipated.[68] Red Cliff Band also points out in their comments that another consideration that Dairyland or RUS failed to make was how Wisconsin's Criminal Trespass to an Energy Provider Property law would impact their access to land on which they are permitted to exercise their Treaty Rights.[69]

## NTEC's inadequate Tribal consultation

Despite Dairyland's claims, and RUS' approval of those claims, an analysis of communications between Dairyland and Red Cliff Band reveals an inadequate consultation process for NTEC. RUS' response to comments takes care to document the letters sent to both Red Cliff and Fond du Lac Bands during the initial stages of the project in 2017. Dairyland and other NTEC Owners met with Red Cliff Band in 2017 to discuss the project. The Tribal Historic Preservation Office of the Fond du Lac Band sent Dairyland and other Owners information regarding cultural sites. No further discussion appears to have occurred between the Owners and Red Cliff and Fond du Lac Bands. RUS mentions that they did not receive comments from either Band during the comment period on the Supplemental Environmental Assessment in 2022.

Sending letters and brief exchanges of information does not constitute adequate tribal engagement. Not receiving comments from a Tribe does not allow Dairyland nor RUS to claim that the consent of a Tribe was granted.[70] Red Cliff Band has stated that RUS has not contacted their Tribal Historic Preservation Office for NHPA Section 106 review or consultation. And it does not appear that Fond du Lac, despite having TCPs directly adjacent to the Project Site, was contacted for consultation either. Federal guidance provides that agencies should, at the minimum, contact Tribes that will be substantially affected by agency action.[71] RUS' lack of engagement with affected tribes also goes against USDA's Departmental Regulation on Tribal

[67] Dairyland Power Cooperative, 3-47, 2023.
[68] Dairyland Power Cooperative, 3-47, 2023.
[69] Peterson, 4, 2023.
[70] Peterson, 2, 2023.
[71] U.S. Department of the Interior Indian Affairs.

Consultation, which recommends USDA agencies "develop protocols for consultation with Tribes…[and] establish regular, meaningful consultation and collaboration relationships."[72]

Further, USDA has no tribal liaison and only has Tribal Relations for when RUS works with Tribes directly. Tribes do not have a direct point of contact within RUS for questions regarding RUS loans and its regulatory process. A lack of Tribal Liaison represents another burden for Tribes who want to engage with these processes. In the case of NTEC, the lack of consultation and adequate engagement with affected Tribes shows that this project did not fully consider the impacts on Tribes' cultural property and reserved treaty rights.

# Health Impact Assessment (HIA)

## Goal

This HIA assesses the health implications of proceeding with the construction and operation of NTEC, a proposed natural gas power plant in Superior, WI, within Douglas County. Our assessment will evaluate the health considerations resulting from the increase in air pollution due to the plant's operation. This HIA will not include an assessment of the impact of constructing and decommissioning the plant on local health outcomes. The assessment aims to provide stakeholders with data-driven insights into the health consequences of the plant's operation to aid in decision-making. HIA insights will support local policymakers, health advocates, and community members in making informed decisions about the project.

## Scoping

For the purposes of this assessment, analysis was constrained accordingly:

Population focus: The analysis focuses on Douglas County residents, with particular attention to at risk subgroups:

[72] U.S. Department of Agriculture, 4, 2024.

- Children and older adults, who are at greater risk for respiratory and cardiovascular impacts from air pollution.
- Low-income populations and racial minorities, who may live closer to pollution sources and have less access to healthcare.
- Pregnant people, with a focus on maternal and infant health outcomes due to potential pollution exposure.

Geographic Boundaries: Douglas County is the primary area of interest, with comparisons drawn to Wisconsin, neighboring Minnesota, and U.S.-wide data for broader context.

Data Sources: This HIA utilizes:

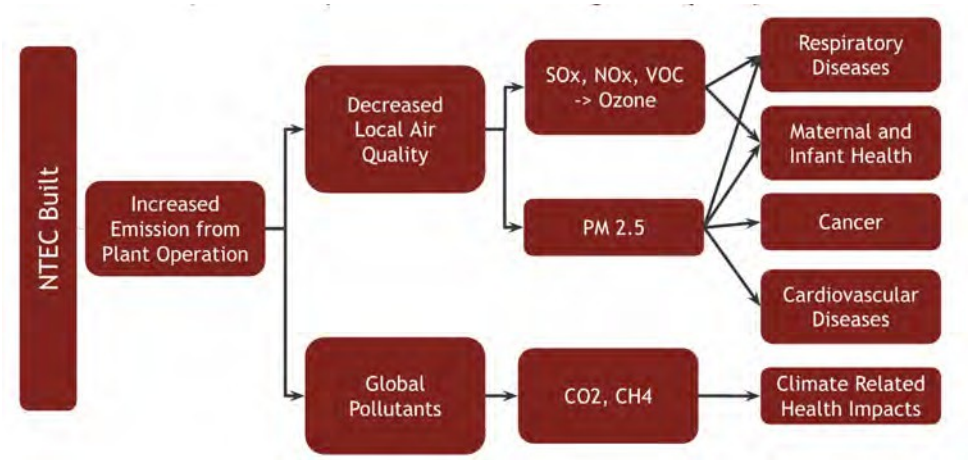
- Nemadji Trail Energy Center Air Permit submitted to the Department of Natural Resources (DNR)
- US Census data for demographic insights.
- CDC Places and Wisconsin Public Health Data Profiles for health indicators.
- Wisconsin Department of Health Services for local health data.
- EPA's EJScreen for assessing environmental justice impacts.

Assessment Methods: To evaluate projected emissions and health impacts, we employed air quality and health impact models including:

- EASIUR, INMAP, and EPA's COBRA, CAMPD, and EJScreen

Health Impacts to be Evaluated: This HIA focuses on the impacts of air pollution on key health indicators. Emissions like nitrogen oxides (NOx), sulfur oxides (SOx), particulate matter (PM 2.5), and volatile organic compounds (VOCs) are associated with respiratory risks, cardiovascular risks, cancer, and impacts on maternal and infant health. The pathway diagram (Figure 2) shows the relationship between NTEC being built and associated pollutants and health outcomes. For the purposes of this assessment, analysis is focused on the first branch in the pathway diagram. The second branch, increased global pollutants like carbon dioxide ($CO_2$) and methane ($CH_4$) are not being examined due to the global scope of impact from these pollutants.

**Figure 2: Pathway Diagram**




# Background Information and Baseline Data

Understanding the demographics and baseline data for Douglas County is crucial for evaluating the potential health impacts of the proposed NTEC. Baseline data provides a snapshot of the community's current socioeconomic conditions, healthcare access and environmental exposures. This information is essential for identifying vulnerable populations and existing disparities. For example, demographic factors such as age and race can influence susceptibility to health risks associated with air pollution, including respiratory and cardiovascular diseases.[73,74,75] Additionally, socioeconomic indicators like poverty levels and access to healthcare shape a community's resilience to environmental stressors.[76] Finally, the city of Superior has a history of industrial presence that is important to factor into the analysis of the impact of NTEC's operation.

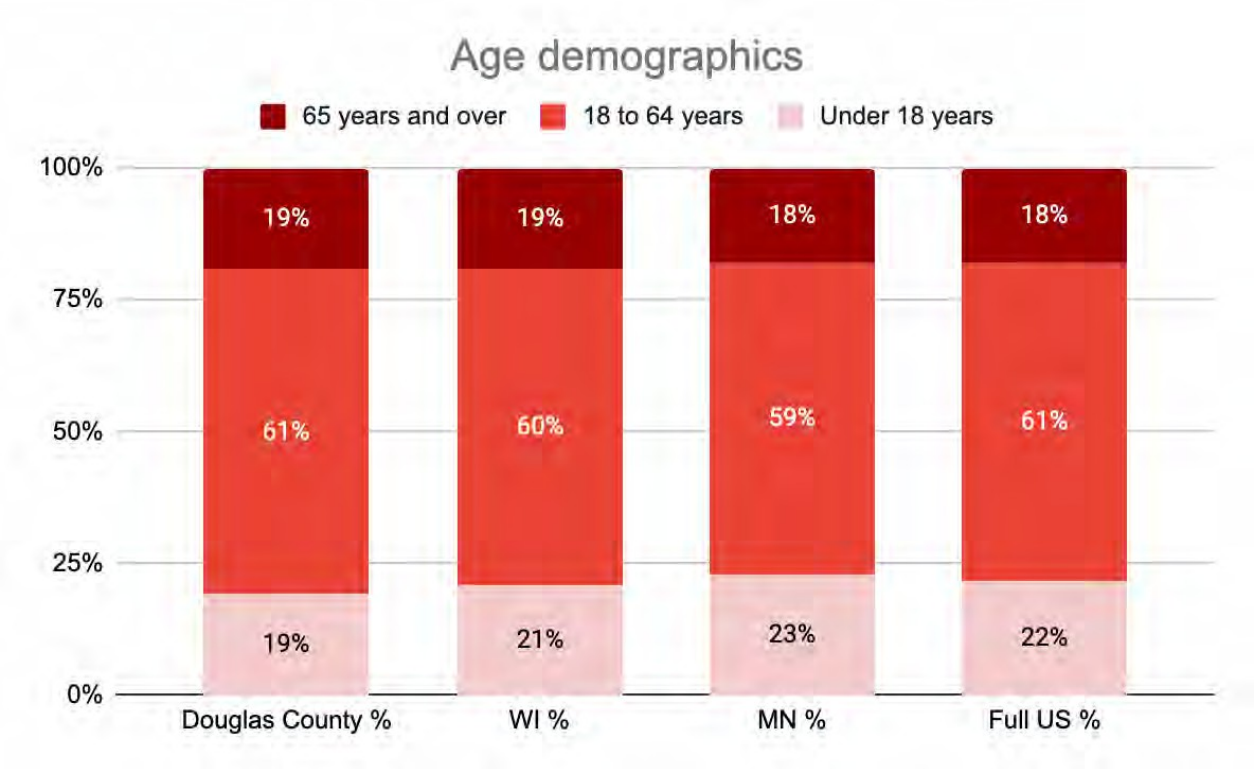
[73] Gaige Hunter Kerr et al. 2024.
[74] Aithal, Sachdeva, and Kurmi 2023.
[75] Simoni et al. 2015.
[76] Di et al. 2017.

# Community Demographics

## Age, Race and Ethnicity

In terms of age, Douglas County has a sizable older population, with 19% of residents aged 65 and over (Figure 3). Older adults are particularly sensitive to pollution-related health conditions such as respiratory and cardiac issues. On the other end of the continuum, 19% of Douglas County residents are under the age of 18 (Figure 3). Children and adolescents are particularly vulnerable to the adverse health effects of pollution due to their more rapid breathing rate, longer periods of time spent outdoors, and developing lungs, brain, and immune system.[77, 78]

**Figure 3: Age distribution in Douglas County, the state of Wisconsin, the state of Minnesota and the US[79]**




[77] Salvi 2007.
[78] Manisalidis et al. 2020.
[79] U.S. Census Bureau, 2023.

The racial makeup in Douglas County is predominantly White (89%), with smaller minority populations, including 2% American Indian or Alaska Native, 2% Hispanic or Latino residents, and 1% Black or African American (Table 3).

**Table 3: Race distribution in Douglas County, the state of Wisconsin, the state of Minnesota and the US[80]**

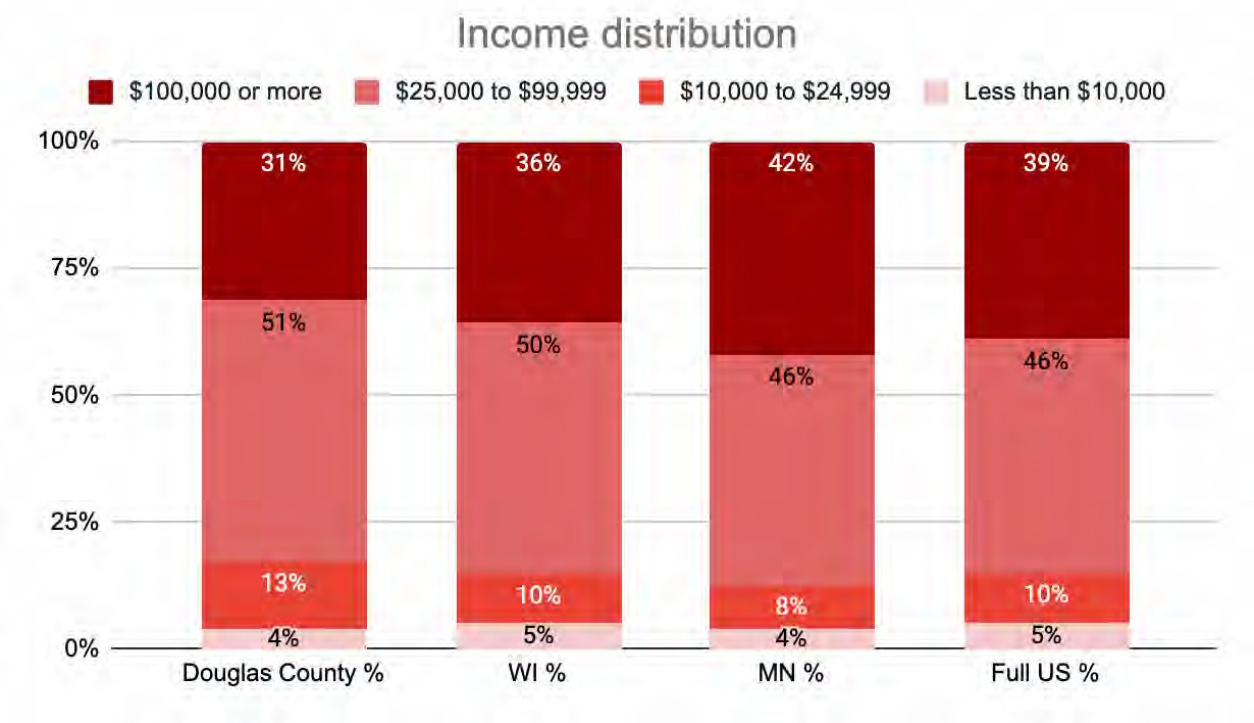
| | Douglas County | Wisconsin | Minnesota | US |
|---|---|---|---|---|
| Hispanic or Latino | 2% | 8% | 6% | 19% |
| Not Hispanic or Latino | 98% | 92% | 94% | 81% |
| White alone | 89% | 79% | 76% | 58% |
| Black or African American alone | 1% | 6% | 7% | 12% |
| American Indian and Alaska Native alone | 2% | 1% | 1% | 1% |
| Asian alone | 1% | 3% | 5% | 6% |
| Native Hawaiian and Other Pacific Islander alone | 0% | 0% | 0% | 0% |

## Socioeconomic Status

Douglas County, with a population of ~44 thousand people, reveals certain populations at increased risk of pollution-related health impacts. Around 17% of residents have a household income of less than $25,000 (Figure 4) and just over 11% are below the Federal Poverty Line (Appendix: Table G) indicating that a meaningful proportion of the county may be at disproportionate health risk. With an overall median income of $64,682 in Douglas County (Appendix: Table G) —lower than both state and national averages—residents may experience economic barriers to healthcare and housing quality, which is compounded by environmental harms from existing pollution-emitting industries.

[80] U.S. Census Bureau, 2020.

**Figure 4: Income distribution in Douglas County, the state of Wisconsin, the state of Minnesota and the US[81,82,83]**




Douglas County's unemployment rate is 2.2%, same as the state average of 2.2% and lower than the national average of 4.3%.[84] Above the national average for high school graduation, Douglas County reports a lower rate for higher education attainment (27.8%) as compared to state (32.8%) or national rates (36.2%).[85] Educational attainment—which strongly correlates with socioeconomic status, income, and less hazardous working conditions—is known to be strongly associated with positive health and well-being outcomes, such as reduced risk for premature death, cardiovascular disease, and diabetes.[86]

[81] U.S. Census Bureau, 2023. (1)
[82] U.S. Census Bureau, 2022.
[83] U.S. Census Bureau, 2022. (1)
[84] U.S. Census Bureau, "Selected Economic Characteristics," 2023.
[85] U.S. Census Bureau, "Educational Attainment," 2023.
[86] The Lancet Public Health. 2020.

## Healthcare Access

In Douglas County, 95.3% of residents are covered by some form of health insurance, comparable to state and national coverage rates.[87] Due to a long-standing and strong union presence in the state, the majority of Wisconsin residents have private employer-sponsored health insurance.[88,89]Although the population is well-insured, Douglas County—and Wisconsin more broadly—are experiencing a shortage of healthcare services, especially primary and maternal care. Health Professional Shortage Areas (HPSAs), as designated by Health Resources and Services Administration (HRSA), represent areas where medical providers are significantly scarce. In Wisconsin, there are 7,543 primary care HPSAs, only 64.82% of primary care needs are met, and an estimated 135 practitioners are needed to address the shortage.[90] The entire Douglas County is designated as a HPSA, and is estimated to have 0 to 15 physicians per 10,000 people across the county, which is considered insufficient for the overall population size.[91] Shortages cause a significant delay in obtaining timely health services, limit delivery of consistent preventative care, and are overall associated with poorer health outcomes, especially in rural and low-income communities which face other healthcare challenges, such as limited access to specialists.

Moreover, Douglas County is designated as a maternity care desert: a county that does not have any hospitals that provide obstetric care, no birth centers, no OB/GYNs, and no certified midwives.[92] Women in maternity care deserts are more likely to have asthma and hypertension—which both heighten risk of pregnancy complications and pregnancy-related death—than women in counties with full access to maternity care.[93] [94] [95] In Douglas County, this lack of primary care and maternal care access may compound the impacts of pollution-exposure on maternal and infant health.

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[87] U.S. Census Bureau, "Selected Characteristics of Health Insurance Coverage in the United States," 2023.
[88] Coughlin et al., 1998.
[89] U.S. Census Bureau, "Types of Health Insurance Coverage by Age," 2023.
[90] Bureau of Health Workforce. 2024.
[91] Health Resources and Services Administration. 2023.
[92] Fontenot et al. 2023
[93] Wallace et al. 2021.
[94] Stoneburner et al, 2024.
[95] Fontenot et al. 2024

## History of Industrialization

In the U.S., discriminatory housing policies such as redlining have historically created and perpetuated residential segregation, which concentrates racial and ethnic minoritized groups into economically and politically disempowered areas.[96] [97] Due to historic disinvestment, these areas often have lower commercial and residential property values, attracting industrial acquisition and development of nearby lands.[98] Industrial development, in turn, exposes surrounding communities to high levels of harmful air pollutants and toxic chemicals.[99] [100] In the city of Superior, there is already a long standing history of industrial operations, especially in the predominantly low-income East End neighborhood, where NTEC is proposed to be built.

### Environmental justice mapping

In Douglas County, the most northwestern regions, surrounding the city of Superior, report the highest environmental burden and lowest socioeconomic status. Figure A in the Appendix shows spatial mapping in Douglas County of EPA Environmental Justice (EJ) Indexes, which combine demographic and environmental data to display disproportionate burden of the following known environmental harms: Superfund Proximity, Risk Management Program (RMP) Facility Proximity, Underground Storage Tanks, and Wastewater Discharge. Compared to national percentiles, this mapping suggests that low-income and communities of color in Superior may face disproportionate exposure to existing environmental pollution in the region, and therefore may experience greater risk for associated adverse health outcomes.

However, not well-captured by the EPA EJ mapping, for generations the city of Superior has been home to existing industrial entities, such as Superior Refinery Company, Plains Midstream Propane Terminal, and Enbridge Energy Superior Terminal, all concentrated in the area directly adjacent to the East End neighborhood (Figure 1). Figure 1 depicts that NTEC, joining existing industrial operations, will be built within a 2 mile radius of a daycare facility, elementary school, preschool, and a senior center. In other words, NTEC represents another industrial acquisition in

[96] Egede et al, 2023
[97] Rothstein, 2017
[98] Gee and Payne-Sturges, 2004
[99] Gee and Payne-Sturges, 2004
[100] Lord et al, 2023

an already heavily industrialized neighborhood, which will disproportionately impact the surrounding community, especially children, older adults, and low-income residents. Overall, NTEC is posed to only contribute to health disparities in Superior, which is already burdened by significant environmental pollution.

## Air Quality Baseline

Douglas County is among several counties in Wisconsin that lack air quality monitoring tools, leading to data discrepancies that complicate accurate assessments. To address this gap, we used the Environmental Protection Agency's (EPA) Environmental Justice Screening and Mapping Tool (Version 2.3)[101] to estimate the baseline pollution levels in the county. Using the most recent data available (2020), we compared air quality in Douglas County to averages for the broader state of WI, Minnesota, and the US overall.

Key air quality indicators, including PM 2.5, ozone and nitrogen dioxide ($NO_2$), were selected due to the significant health risks they pose.[102] PM 2.5, or fine particulate matter, consists of particles 2.5 micrometers or smaller, capable of penetrating deep into the lungs and entering the bloodstream. These particles, often originating from sources such as vehicle emissions and industrial processes, are linked to respiratory issues, cardiovascular problems, and premature death. According to the National Ambient Air Quality Standard (NAAQS), the EPA defines the annual PM 2.5 standard to be 9.0 micrograms per cubic meter ($ug/m^3$) annually, and 35 $ug/m^3$ for 24 hours.[103] The EPA tightened the standard in 2024, to better protect human health.

Ground-level ozone, formed when pollutants like nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in sunlight, can irritate the respiratory system, damage lung tissue, and exacerbate conditions such as asthma and chronic bronchitis. The NAAQS standard for Ozone is 0.07 parts per million (ppm) as the daily maximum 8-hour concentration, averaged across three consecutive years.[104] Nitrogen dioxide ($NO_2$) is a highly reactive gas emitted into air through the

[101] EPA EJScreen, 2020.
[102] NOAA, 2021.
[103] EPA, 2024.
[104] EPA, 2024 (1).

burning of fossil fuels.[105] Vulnerable populations, including children, the elderly, and individuals with pre-existing health conditions, are especially at risk from these pollutants.

**Table 4** shows better overall air quality in Douglas County compared to the state of Wisconsin and national averages. However, Wisconsin's air quality, on average, fares worse than Minnesota's and is much closer to the NAAQS limit. The only indicator where Douglas County air quality is far below the NAAQS limit is nitrogen dioxide. To supplement more recent data from the EPA's EJScreen tool, we utilized the Purple Air Monitor tool for localized measurements of air quality in Douglas County. For 2023, the Purple Air Monitor reported a PM 2.5 annual average of 7.2 µg/m³, indicating an increase in PM 2.5 levels in the county (Appendix: Figure B).[106]

**Table 4: Air Quality in Douglas County, the state of Wisconsin, the state of Minnesota and the US[107]**

| Indicator | Douglas County | Wisconsin | Minnesota | Federal | NAAQS |
|---|---|---|---|---|---|
| PM 2.5 (Annual Average, ug/$m^3$) | 4.88 | 7.9 | 6.63 | 8.45 | 9 |
| Ozone (ppm) | 0.0516 | 0.0646 | 0.0558 | 0.0618 | 0.07 |
| Nitrogen Dioxide (ppbv) | 2.7 | 8.1 | 8.4 | 7.8 | N/A |

This assessment shows that Douglas County has a good overall air quality compared to the Wisconsin average values. However, Douglas County is also smaller than neighboring counties which could contribute to the lower overall air pollution level. This baseline status could change if NTEC was to be implemented.

# Impact of Natural Gas Plants on Health

The state of Wisconsin houses 77 power plants, as of 2022, comprising coal, gas, biomass, nuclear, and other renewable power plants. Thirty-five of these are natural gas power plants. If

[105] EPA, 2024 (2).
[106] PurpleAir, 2024.
[107] EPA EJScreen, 2020.

NTEC were to be operated, it would add 625 MW capacity to the existing 8,171.4 MW of natural gas capacity in the state.[108]

Extensive literature highlights that while natural gas power plants are often considered cleaner alternatives to coal, they still contribute significantly to adverse health outcomes in nearby communities.[109] Emissions from natural gas plants, including nitrogen oxides (NOx), fine particulate matter (PM 2.5), and volatile organic compounds (VOCs), are known to harm human health. These pollutants can lead to a wide range of health issues, including respiratory and cardiovascular diseases, increased cancer risk, and adverse maternal and infant health outcomes. This section of the HIA will focus on highlighting negative health impacts contributed by natural gas plants as seen in other cases and literature.

## Natural Gas and Respiratory Health

Nitrogen oxides (NOx), fine particulate matter (PM 2.5), and ozone ($O_3$) emitted from natural gas power plants significantly impact respiratory health. A study in New York State (1993–2008) found that individuals over 10 years of age living in ZIP codes containing fuel-fired power plants experienced 11%, 15%, and 17% increases in hospitalization rates for asthma, acute respiratory infections (ARI), and chronic obstructive pulmonary disease (COPD), respectively, compared to areas without such plants.[110] Another study found that these pollutants have contributed to 7,500 excess deaths, 410,000 asthma attacks, and 2,200 new cases of childhood asthma nationally– which are associated with the health costs of $77 billion annually.[111] Children, in particular, are the most vulnerable population. A study on exposure to community level of PM 2.5 found that children who were exposed to PM 2.5 of 2 ug/$m^3$ or higher are associated with 2.35-fold higher risk in early childhood asthma.[112] While outside of this assessment scope of study, it is important to note that upstream impact of natural gas power plants including the drilling and transporting of natural gas are also associated with mild to severe exacerbation of asthma rates in the impacted communities[113] as well as contribution to climate warming due to methane leakages.

[108] EPA, 2024. (3)
[109] Clemons et al., 2022.
[110] Lui et al., 2012.
[111] Brandom, 2023.
[112] Rice et al., 2018.
[113] Rasmussen et al., 2016.

## Natural Gas and Cardiovascular Health

The mechanisms by which air pollution affects cardiovascular health are complex and multifaceted. PM 2.5 exposure can lead to systemic oxidative stress and inflammation, direct toxicity to cardiovascular tissues, atherosclerosis progression, increased blood pressure, and prothrombotic states, ultimately contributing to cardiovascular events and mortality[114].
There is significant evidence that exposure to increased concentrations of PM 2.5 increases cardiovascular disease risk and mortality. A review of 56 papers shows effects related to stroke, cardiovascular disease mortality and cardiovascular disease morbidity. Short-term exposures to PM 2.5, PM 10, and $NO_x$ were consistently associated with increased risks of hypertension and triggering of myocardial infarction (heart attack) and stroke. Long-term exposures to PM 2.5 were associated with increased risk of atherosclerosis, incident myocardial infarction, hypertension, and incident stroke and stroke mortality.[115]

To quantify this impact, a study of 3.7 million adults in California showed a 12% increased risk of acute myocardial infarction (heart attack), a 21% increased risk of ischemic heart disease mortality, and an 8% increased risk of cardiovascular disease mortality with a 10 µg/m3 increase in yearly PM 2.5. Risk was also found to be higher with exposure to concentrations of PM 2.5 above 10 µg/m3 compared to concentrations below 8 µg/m3.[116] These effects can happen rapidly as well. Studies show that risk of myocardial infarction (heart attack), stroke, arrhythmia, and heart failure are exacerbated within hours to days of exposure.[117]

## Natural Gas and Cancer

Gas power plant emissions, including PM 2.5, benzene, and $NO_x$, are associated with increased cancer risk and incidence in nearby populations. Benzene, a known human carcinogen, is present in gas power plant emissions.[118] Studies conducted on gasoline and gas station workers in Thailand, Turkey, and South Africa all show an increased cancer risk (to around 1 in 10,000) with Benzene exposure. In particular, a study on workers in Thailand showed that chronic

[114] Usman Sagheer et al., 2024
[115] Bont et al., 2022.
[116] Alexeeff et al. 2023.
[117] Brook et al., 2010.
[118] EPA, 2024.(4)

Benzene exposure below the US National Institute Occupational Safety and Health (NIOSH) limit (OEL) of 0.1 ppm still resulted in increased cancer risk (from ~1 in 100M to ~1 in 10K).[119] This suggests that even low-level chronic exposure to benzene from a gas power plant could increase cancer risk for nearby residents.

In addition to benzene, there is a studied relationship between increased PM 2.5 exposure and lung cancer risk and mortality. A meta-analysis found that for every 10 $\mu g/m^3$ increase in PM 2.5 exposure in North America, lung cancer incidence increased by 11% and lung cancer mortality increased by 15%.[120]

Air pollution has also been linked to other types of cancer beyond lung cancer. A large study of Medicare beneficiaries found that long-term (10-year) exposure to PM 2.5 and $NO_2$ was associated with increased risks of colorectal and prostate cancers. For every 1 $\mu g/m^3$ increase in PM 2.5 exposure over 10 years, there were an estimated 705 additional cases of colorectal cancer and 460 cases of prostate cancer annually within the study cohort. For $NO_2$, the study found an increase of 95 cases of colorectal cancer and 223 cases of prostate cancer. Notably, these associations were evident even at concentration levels below current air quality guidelines.[121] Another study, focused on women in the US, found a 10 $\mu g/m^3$ increase in PM 2.5 was linked to an 8% higher overall breast cancer risk.[122]

These findings highlight the potential for gas power plant emissions to increase cancer risk across multiple organ sites through chronic exposure to air pollutants like PM 2.5 and benzene. On top of this, these effects appear to be present even at relatively low exposure levels, underscoring the importance of consideration of public health impacts when siting new gas power facilities.

## Natural Gas and Maternal and Infant Health

Emerging evidence suggests that exposure to natural gas pollutants may negatively impact maternal and infant health outcomes. $NO_x$, $SO_x$, and PM 2.5 are associated with increased

[119] Chaiklieng, Suggaravetsiri, and Autrup, 2019.
[120] Huang et al., 2017.
[121] Wei et al., 2023.
[122] White et al. 2023

maternal mortality risk factors such as hypertensive disorders of pregnancy (HDP), such as chronic hypertension, gestational hypertension, preeclampsia, and eclampsia.[123] HDPs themselves are strongly associated with increased infant and maternal morbidity and mortality[124,125], and higher risks of preterm delivery, low birthweight, and hospitalization for a wide range of neonatal diseases[126,127]. A meta-analysis found that for every 5 $\mu g/m^3$ increase in PM 2.5, risk of HDP consistently increased, ranging from 14% to 389%.[128] For each 10 $\mu g/m^3$ increase in NO2, HDP risk increased between 1% and 85%.[129]

Research shows associations between PM 2.5, $NO_x$, and VOCs and low birthweight and preterm birth[130,131,132,133]. Birthweight is a key indicator of fetal growth, development, and nutritional status. As such, low birthweight is an important risk factor for infant mortality, as well as later morbidity in adulthood. Those who are born with low birthweight may be predisposed to developing chronic conditions such as hypertension, type 2 diabetes, and heart disease in adulthood.[134] [135] Another key indicator, preterm birth is the main cause of death in newborn babies and associated with a high risk of childhood disability.[136] Ha et al. (2015) found that, compared with pregnant women who did not live within a 20 km radius of a gas power plant, women living near at least one gas plant had a 7% increased odds of term low birthweight, 5% increased odds of preterm delivery, and 13% increased odds of very preterm delivery.[137] Meta-analyses have shown an association between PM 2.5 exposure and low birthweight, with odds ratios ranging from 1.02 to 1.13 per 10 $\mu g/m^3$ increase; further, these meta-analyses report that

[123] Hu et al. 2014
[124] Duley. 2009.
[125] Lo et al. 2013.
[126] Allen et al. 2004.
[127] Wu et al. 2009
[128] Pederson et al. 2014
[129] Pederson et al. 2014
[130] Ballester et al. 2010
[131] Dadvand et al. 2013.
[132] Llop et al. 2010
[133] Mendoza-Ramirez et al. 2018
[134] Bale et al. 2003
[135] Barker et al. 2002.
[136] Howson et al. 2013.
[137] Ha et al. 2015.

birthweight decreased 10–16 g per 10 μg/m$^3$ increase in PM 2.5.[138,139,140] For preterm births, odds ratios range from 1.02 to 1.14 per 10 μg/m$^3$.[141,142,143]

Evidence shows a significant increase of infant mortality with the increase of PM 2.5, NO2, and SO2 exposure during either the pregnancy period or the first year of a newborn's life.[144] A meta-analysis found that risk of respiratory post-neonatal death and Sudden Infant Death Syndrome (SIDS) increased with a 10 μg/m$^3$ increase in PM 2.5 for long-term exposure.[145] Overall, these findings highlight the potential for natural gas plant emissions to negatively impact maternal and infant health outcomes.

# HIA Assessment Methodology and Data

In assessing the health impacts of the proposed NTEC natural gas plant, this health assessment utilized multiple health impact assessment tools including:

- *Clean Air Markets Program Data (CAMPD)*[146] is provided by the Environmental Protection Agency (EPA). This tool gathers comprehensive carbon dioxide ($CO_2$), nitrogen oxides (NOx), and Sulfur Oxide (SOx) from power plants around the country and makes it publicly available. This HIA assessment utilizes CAMPD to collect emissions data between 2020 to 2024 from Wisconsin, Minnesota, and Michigan gas plants in order to find the average emissions for a plant in the region as a comparison data point to the emission data provided by NTEC DNR Air Permit.[147]
- *CO-Benefits Risk Assessment (COBRA)*[148] is provided by the EPA. Utilizing this tool, this HIA analyzes the health impacts from increases in PM 2.5, $NO_x$, $SO_x$, and VOC on the selected health indicators. COBRA allows for analysis of changes in health endpoint

[138] Lamichhane et al. 2015
[139] Tapia et al. 2020.
[140] Sun et al. 2016
[141] Lamichhane et al. 2015
[142] Tapia et al. 2020.
[143] Sun et al. 2016
[144] Luben et al. 2023.
[145] Kihal-Talantikite et al 2020.
[146] EPA CAMPD, 2024.
[147] Wisconsin DNR, 2024.
[148] EPA COBRA, 2021.

cases and the monetary values associated with willingness-to-pay, cost of illnesses, value of a statistical life and direct medical costs. The HIA utilizes COBRA to both quantify health impacts from NTEC operation and compare those impacts across different scenarios. The scenarios analyzed were the potential emissions given by NTEC DNR Air Permit operating at 57% capacity factor for 40 years of operations (see Table 5), the regional average of similar plants, and the worst case scenario which assumes NTEC operates at a 100% capacity factor. The 57% capacity factor is chosen based on the average U.S. natural gas capacity factor.[149]

- *Estimating Air pollution Social Impact Using Regression (EASIUR)*[150] is a model derived from CAMx[151], a state-of-the-art chemical transport model, that can predict the social costs of emissions without the high computational costs associated with a full CAMx simulation. EASIUR predicts marginal damages of primary PM 2.5 or elemental carbon (EC) and secondary PM 2.5 or sulfur dioxide ($SO_2$), nitrogen oxides ($NO_x$), and ammonia (NH3). EASIER can model impacts of ground-level, 150 m stack height and 300 m stack height emissions. Social costs are based on relative risk of 1.06[152] increased mortality per each increase of PM 2.5 10 $\mu g/m^3$.
- *Intervention Model for Air Pollution (InMAP)* is another model for estimating the air pollution health impacts of emissions changes. InMAP models annual-average changes in primary and secondary PM 2.5 concentrations using a state-of-the-science chemical transport model and a variable spatial resolution computational grid to perform simulations. The model then outputs both the resulting number of deaths due to the pollution and the associated social cost using $9M for the Value of a Statistical Life. The InMap model deploys two different chemical transport models[153,154] as well as two different estimates for the mortality rate associated with an increase of PM 2.5 10 $\mu g/m^3$

[149] EIA, 2023.
[150] EASIUR, 2024.
[151] CAMx, 2024.
[152] Krewski et al. 2009.
[153] Heo, Adams, and Gao 2017.
[154] Goodkind et al., 2019.

(an estimate of 1.06[155] and an estimate of 1.14[156]) to give a range of mortality and social cost estimates.

- *Environmental Justice Screening and Mapping Tool (EJScreen)* is provided by the EPA. EJScreen offers a nationally consistent dataset and methodology for combining environmental and socioeconomic indicators. EJScreen maps environmental justice indexes onto a given geographical area, highlighting Census block groups with the highest intersection of low-income populations, people of color, and a given environmental indicator. To calculate a given environmental justice index for one block group, EJScreen multiplies the environmental indicator percentile by the demographic index (average of percent of low-income and percent of people of color) of the block group.

**Table 5: NTEC planned emissions (annual tons)[157,158]**

| | NOx | SOx | PM 2.5 |
|---|---|---|---|
| Emissions (tons / yr) | 83.6 | 16 | 90.6 |
| Emissions (Annual Average) | 55.9 ug/$m^3$ | 0.0029 ug/$m^3$ | 9.3 ug/$m^3$ |

# Results

## Impacts on Respiratory Health

Before assessing the impact of the operation of NTEC on respiratory health indicators, it is important to understand the baseline of affected areas. Table 6 shows that Douglas County has the highest prevalence of asthma rate among adults (10.8%), similar to the Wisconsin state prevalence (10.9%). These levels are higher than neighboring Minnesota (9.9%) and the federal

[155] Krewski et al. 2009.
[156] Lepeule et al. 2012.
[157] Wisconsin DNR, 2024.
[158] RUS USDA, 2023.

level (8%). Douglas County also has the highest level of chronic obstructive pulmonary disease prevalence (7%) compared to the state and federal levels. The mortality rates related to respiratory health in Douglas County, while slightly lower than the federal level, are much higher than Minnesota and Wisconsin levels, signifying the existing disproportionate respiratory burden on this community.

**Table 6: Respiratory health disease rates for Douglas County, Wisconsin, Minnesota and the US in 2022[159],[160],[161]**

| | Douglas County | Wisconsin | Minnesota | Federal |
|---|---|---|---|---|
| Prevalence of Current Asthma among Adult | 10.80% | 10.90% | 9.90% | 8.00% |
| Age-adjusted Asthma Emergency Department Visit Rates (cases per 10K) | 26 | 28.5 | 29.8 | 29.8 |
| Age-adjusted Asthma Hospitalization Rates (cases per 10K) | 2.2 | 2.4 | 2.4 | 2.6 |
| Chronic Obstructive Pulmonary Disease (%, crude current prevalence) | 7% | 5.60% | 4.70% | 6.20% |
| Age-Adjusted Chronic Lower Respiratory Disease Mortality (per 100,000) | 36.7 | 35.2 | 31 | 36.9 |

The COBRA model assessed the potential respiratory health impacts of NTEC operation based on 57% capacity factor and 100% capacity factor or the worst case scenario (Table 7). The 57% capacity factor results are bolded and represent the lower range of impact while the 100% capacity factor represents the upper range of impacts. The results showed that operating NTEC would lead to an overall increase of 89 to 132 cases of respiratory disease with a focus on cases associated with asthma symptoms like coughing, chest tightness, albuterol use, and shortness of breath. The impacts are primarily driven by an increase in PM 2.5 in the air. The total monetary cost of respiratory disease impact for Douglas County could range between $45,000 to $60,000.

[159] HD Pulse, 2022.
[160] Wisconsin DHS, 2022.
[161] CDC Places, 2022.

When comparing this impact to the estimate for an average power plant in the area, there is potential for an even higher incidence of asthma onset and asthma symptoms totalling 142 increased respiratory disease cases and up to $110,898 in monetary cost. The results for an average gas plant in the region can be seen in Table A, Appendix for comparison.

**Table 7**: **Respiratory health impact from NTEC Operation (57%-100% Capacity Factor)**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| Total Hospital Admits | **0.12** - 0.2 | **$446** - $714 |
| Total Emergency Room Visits | **0.14** - 0.19 | **$234** - $316 |
| Total Asthma Onset | **0.48** - 0.7 | **$37,202** - $53,301 |
| Total Asthma Symptoms | **85** - 126 | **$4,670** - $6,875 |
| Total Hay Fever/Rhinitis | **3** - 4.38 | **$3,420** - $4,877 |
| **Total Respiratory Health Cases** | **89** - 132 | **$45,973** - $59,290 |

## Impacts on Cardiovascular Health

Existing health indicators for cardiovascular disease in Douglas County and broader Wisconsin are both in line with national averages but higher than neighboring Minnesota (Table 8). While rates are in line with national averages, Figure C (Appendix) shows that the midwest overall has much higher rates of heart disease mortality than other regions. With NTEC located in Wisconsin, the impacts of its emissions could fall on not only local residents in Douglas County, Wisconsin and Minnesota but also the region more broadly.

**Table 8: Heart disease and stroke prevalence, 2022**[162]

| | Douglas County | Wisconsin | Minnesota | US |
|---|---|---|---|---|
| Coronary heart disease among adults (% age-adjusted prevalence) | 5.6 | 5.2 | 5.6 | 5.7 |
| Stroke among adults (% age-adjusted prevalence) | 2.8 | 2.7 | 3.0 | 3.1 |

[162] CDC Places, 2022.

Table 9 shows a relatively small increase in incidences of cardiovascular disease from NTEC operation but it does show an increase. Given the high cardiovascular disease death rates in the midwest, this increase in incidences could be exacerbated. The total monetary cost of cardiovascular diseases range between $14,000 to $24,000 for 40 years of its operation. Table B in the Appendix shows a 2 times lower emission for an average gas plant in the region compared to NTEC.

**Table 9**: **Cardiovascular health impact from NTEC Operation (57%-100% Capacity Factor)**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| Nonfatal Heart Attacks | **0.15 - 0.25** | **$446** - $714 |
| Hospital Admits, Cardio Cerebro/Peripheral Vascular Disease | **0.02 - 0.03** | **$234** - $316 |
| Stoke | **0.01 - 0.02** | **$37,202** - $53,301 |
| Cardiac Arrest, Out of Hospital | **0 - 0.004** | **$4,670** - $6,875 |
| Emergency Room Visits | **0.05** - 0.08 | **$166** - $178 |
| **Total Cardiovascular Diseases** | **0.23 - 0.40** | **$14,040 - $24,051** |

## Impacts on Cancer

The baseline rates of lung and bronchus cancer, the indicator most strongly linked to increased air pollution, are already higher in Douglas County than the broader state of Wisconsin and higher in Wisconsin than the US as a whole. As Table 10 shows, Douglas County has a lung and bronchus cancer incident rate of ~67 cases per 100K compared with ~56 cases in Wisconsin and ~54 cases in Minnesota. Indeed Figure D (See Appendix) shows that Douglas County's incident rate is one of the highest in the state.

Across other cancers shown to be impacted by increased pollution emissions, Douglas County shows slightly lower incident rates than the US. While Douglas County shows slightly lower incident rates, Minnesota and Wisconsin both have elevated rates of breast cancer and prostate cancer compared to national averages.

Based on these baselines, it is important to note that any increases from NTEC operation to lung and bronchus, prostate and female breast incidents will further exacerbate the already elevated health impact of these cancers on Douglas County, Wisconsin and Minnesota residents.

**Table 10: Cancer incidence rates for Douglas County, Wisconsin, Minnesota and the US 2017-2021**[163]

| | Douglas County | Wisconsin | Minnesota | US |
|---|---|---|---|---|
| Female Breast Cancer Age-Adjusted Incidence Rate (cases per 100,000) | 108.5 | 137.0 | 140.4 | 129.8 |
| Colorectal Cancer Age-Adjusted Incidence Rate (cases per 100,000) | 23.3 | 34.6 | 36.1 | 36.4 |
| Prostate Cancer Age-Adjusted Incidence Rate (cases per 100,000) | 107.1 | 122.2 | 117.0 | 113.2 |
| Lung & Bronchus Cancer Age-Adjusted Incidence Rate (cases per 100,000) | 66.7 | 55.7 | 54.4 | 53.1 |

The COBRA assessment shows (Table 11) a small increase in cancer health impacts. However, since lung and bronchus cancers are already high in Douglas County compared to Wisconsin, Minnesota, and the federal level, any increase is additional harm made on the already vulnerable community of Douglas County. See Table C, Appendix for comparison to an average gas plant in the region.

**Table 11**: **Cancer impact from NTEC Operation (57%-100% Capacity Factor)**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| **Lung Cancer** | **0.13 - 0.22** | **$567** - $974 |

[163] National Cancer Institute, 2024.

## Impacts on Maternal and Infant Health

Table 12 indicates that Douglas County has an elevated prevalence of preterm births (10.8%), similar to Wisconsin state level (10.26%). These levels are higher than neighboring Minnesota (9.56%) and national levels (8.6%). Douglas County has a slightly lower low birthweight prevalence (7.30%) as compared to state (8.02%) and national levels (10.40%). Infant mortality in Douglas County is also lower (4.9 per 1,000 live births) than state (5.8) and national levels (5.9). It is key to note that disaggregating infant mortality rates by race and ethnicity reveals significant disparities. Although data for Douglas County is limited, in Wisconsin overall, infant mortality rates for Black (12.9) infants are over double the state average; infant mortality among American Indian or Alaska Native (6.8) infants and Hispanic (6.5) infants are also higher than the state average.[164]

**Table 12: Adverse Infant Health Outcomes Douglas County, Wisconsin, Minnesota and the US 2022** [165] [166] [167] [168] [169] [170] [171]

| | Douglas County | Wisconsin | Minnesota | US |
|---|---|---|---|---|
| **Low birthweight (live births, % prevalence)** | **7.30%** | **8.02%** | **7.23%** | **10.40%** |
| **Preterm birth (live births, % prevalence)** | **10.80%** | **10.26%** | **9.56%** | **8.60%** |
| **Infant mortality - All (per 1,000 live births)** | **4.9** | **5.8** | **4.5** | **5.6** |

Although Table 13 indicates a small increase in infant mortality incidence, the monetary cost associated with medical costs and the willingness-to-pay to avoid infant mortality is extremely high. The total monetary cost of respiratory diseases for Douglas County could range between $17,600 to $30,000. Critically, Wisconsin residents experiencing these higher infant mortality rates are those most likely to be impacted by lack of healthcare infrastructure, poverty, food and housing insecurity, and systemic racism. Douglas County, especially the community surrounding

[164] Wisconsin Department of Health Services. 2022.
[165] Martin and Hamilton. 2023.
[166] Centers for Disease Control and Prevention. "Infant Mortality." 2022.
[167] Centers for Disease Control and Prevention. "Preterm Birth." 2023.
[168] Minnesota Department of Health. 2021.
[169] Centers for Disease Control and Prevention. "Minnesota: State Profile." 2022.
[170] Centers for Disease Control and Prevention. "Wisconsin: State Profile." 2022.
[171] Wisconsin Department of Health Services. 2022.

the proposed NTEC site, will bear disproportionate harm to health and wellbeing. The state averages on Table D in Appendix shows a lower cost compared to the NTEC estimates.

**Table 13**: **Infant Mortality Incidence from NTEC Operation (57%-100% Capacity Factor)**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| **Infant Mortality** | **0.001 - 0.002** | **$17,676** - $30,229 |

## Impacts on Mortality and Associated Social Costs

Table 14 shows the increase in mortality incidences in Douglas county as a result of NTEC operation. While there is less than 1 person increase in mortality rate, the associated cost is extremely high, from $4 million in the states averages (See Table E in Appendix) up to $9 million for 40 years of operation for NTEC estimation.

**Table 14**: **Total Mortality Incidence from NTEC Operation (57%-100% Capacity Factor)**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| **Total Mortality** | **0.38 - 0.63** | **$5,531,761** - $9,151,077 |

In addition to increased mortality and associated social costs within Douglas County, the emissions NTEC would release each year would impact geographies and populations beyond Douglas County. To understand the total social cost associated with NTEC operation across the United States, two different data points were compared:

- First, the EASIER model was applied to the anticipated emissions from operation of NTEC at 57% capacity. The model outputs a marginal social cost due to increased mortality across four pollutants (Primary PM 2.5, Sulfur Dioxide (SO2), Nitrogen Oxides (NOx), Ammonia (NH3)) as well as different potential stack heights. For this HIA, the analysis focused only on PM 2.5, SO2, and NOx and leveraged a stack height of 150m which resulted in marginal social costs indicated in Table 15. A stack height of 150m was closest to the planned stack height of 190m.[172] When applying these marginal costs

[172] Wisconsin DNR, 2024.

to the emissions predicted for NTEC operation (Table 5), the result is a total social cost of ~$18M per year (Table 16)

**Table 15: Marginal social cost per ton of annual emissions at the NTEC location**

| | NOx | SOx | PM 2.5 |
|---|---|---|---|
| Winter (150m stack height) | $27,100 | $30,000 | $111,000 |
| Spring (150m stack height) | $5,070 | $36,500 | $55,300 |
| Summer (150m stack height) | $2,810 | $36,000 | $52,200 |
| Fall (150m stack height) | $7,560 | $29,000 | $89,600 |

**Table 16: Total social cost of increased mortality across the US per year of NTEC emissions assuming constant operation year-round based on EASIUR model**

| | NOx | SOx | PM 2.5 |
|---|---|---|---|
| Winter | $2,266,538 | $479,347 | $10,059,550 |
| Spring | $106,009 | $145,801 | $1,252,912 |
| Summer | $58,754 | $143,804 | $1,182,677 |
| Fall | $158,072 | $115,842 | $2,030,035 |
| Total | **$2,589,374** | **$884,795** | **$14,525,175** |

- Second, the InMAP simulation was run. When run on the above emissions indicated in Table 5, the simulation produces four different estimates for total social cost annually. These estimates are produced using different models of emission dispersion and different

estimates for associated mortality. The results of this simulation are in Table 17 and result in a range of $4-20M per year in total social costs.

**Table 17: Total social cost of increased mortality across the US per year of NTEC emissions based on InMAP simulation scenarios**

| Model | Krewski Mortality Rate (1.06) | LePeule Mortality Rate (1.14) |
|---|---|---|
| 1 | $3,972,332 | $8,935,820 |
| 2 | $8,775,609 | $19,735,210 |

# Conclusion

This report examines the local and federal energy policy landscape surrounding NTEC, including the motivations and goals of various stakeholders. The Health Impact Assessment (HIA) contained within this report evaluates the potential health impacts of NTEC on the residents of Douglas County, Wisconsin, and the surrounding regions. The HIA focuses on emissions and their associated risks to respiratory, cardiovascular, cancer-related, and maternal and infant health outcomes. The HIA also considers the social determinants of health that may exacerbate vulnerabilities in specific subpopulations, including children, the elderly, and low-income communities. Both the findings of the policy discussion and the HIA support continuing to pursue renewable energy sources instead of building NTEC.

First and foremost, local stakeholders do not support the plant's development. Among their reasons, health and potential cumulative impacts are paramount. For local Native communities, there are also significant cultural ramifications to the development of the plant, especially the disruption to St. Francis Cemetery.

The energy landscape looks far different today than it has even in the very recent past. Both the United States and states including Wisconsin and Minnesota have made ambitious emissions reductions and clean energy commitments that reflect the scientific realities of climate change. The Rural Utility Service has taken large steps to move the rural energy grid towards clean

energy in service of those clean energy commitments. Recent investments from the New ERA program, including in Dairyland's energy supply, have focused on wind and solar projects. The emissions reductions from these investments would be wiped out by the increased emissions from NTEC.

The traditional economic advantages of fossil fuels are no longer nearly as palpable or persuasive. Energy costs for renewables continue to decrease and have reached parity with natural gas. Those costs are projected to continue dropping, making it increasingly likely that NTEC will become a stranded asset. Similarly, renewables provide more potential upside for long-term jobs. While other communities dealing with decommissioning fossil fuel plants have to worry about retraining workers, here, renewables represent new jobs rather than replacing old jobs, making renewables the better choice for power. In addition to the cost benefits, ownership for Minnesota Power and technology firms interested in buying additional capacity from power cooperatives have their own climate commitments, which will be far better served by renewables than by natural gas.

The findings of this HIA underscore the need for careful consideration of the plant's potential health impacts in decision-making processes. Emissions from the plant, particularly nitrogen oxides ($NO_x$), particulate matter (PM 2.5), and volatile organic compounds (VOCs), pose measurable risks to air quality and health. Vulnerable populations may face disproportionate risks due to existing inequities in health determinants such as socioeconomic status and access to healthcare.

In conclusion, this report highlights the full policy landscape and the health impacts. The aim is that these findings will provide actionable insights for stakeholders, including policymakers, health professionals, and community leaders, to ensure informed decision-making that balances energy development with the health and well-being of Douglas County residents.

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# Appendix

## Policy Brief Appendix

Rocky Mountain Institute (RMI) Analysis[173]

RMI's analysis of midwest gas plants highlights the clear economic advantages of Clean Energy Portfolios (CEPs) over gas-fired power plants, particularly in terms of marginal costs and levelized cost of energy (LCOE). Here is an explanation of the key findings:
Levelized Cost of Energy (LCOE) Comparison - The LCOE metric represents the total cost of building and operating a power plant over its lifetime, divided by the total electricity it produces. It is a standard way to compare the economic viability of different energy sources. RMI's modeling shows that CEPs—combinations of solar, wind, battery storage, energy efficiency, and demand response—are consistently cheaper on an LCOE basis than midwest gas plants, even under a range of gas price and tax credit scenarios. For example:

- Under IRA-enhanced tax credits, CEPs achieve significant cost reductions, particularly when incorporating incentives like the Investment Tax Credit (ITC) and the Production Tax Credit (PTC).
- In the base case, the LCOE of CEPs is lower than NTEC's LCOE by approximately $5–$15 per MWh, depending on the assumed gas price and tax credit levels

Marginal Cost of Energy (MCOE) - Marginal costs represent the expense of generating an additional unit of energy once a facility is operational. RMI's analysis reveals that CEPs can deliver the same services as NTEC at a lower MCOE because renewable energy resources like wind and solar have no fuel costs, and batteries efficiently balance peak demand. This means that renewables will become even cheaper than operating existing gas plants. If gas prices rise beyond base projections—a plausible scenario given historical volatility—the MCOE of NTEC could surpass that of CEPs even further, exacerbating the cost disparity(RMI Natural Gas).
Competitiveness of CEPs

CEPs were modeled to meet or exceed the service requirements of midwest gas plants, including:

1. **Monthly Energy Needs:** CEPs provide equivalent total energy over a given month as NTEC.

[173] Rocky Mountain Institute. Clean Energy Portfolios: A Framework for Evaluating Investments in Clean Energy Solutions. Boulder, CO: RMI, 2021. https://rmi.org/wp-content/uploads/2021/12/clean_energy_portfolios_2021.pdf.

2. **Peak Capacity Needs:** CEPs are designed to match the output of NTEC during the top 50 peak load hours of the year, ensuring reliability.
3. **Flexibility Requirements:** CEPs incorporate storage and demand flexibility to manage sudden shifts in grid demand, performing the same ramping and load-following functions as NTEC(RMI NTEC Deck).

Scenarios Modeled by RMI

RMI examined multiple scenarios for NTEC's competitiveness, including:

1. **Gas Price Sensitivities:** If gas prices were to align with historical highs or projections beyond the base case, the cost advantages of CEPs would grow significantly. In such cases, the LCOE of NTEC could be up to $10–$20 higher per MWh than CEPs.
2. **Tax Credit Availability:** Under the IRA's prevailing wage and domestic content requirements, the cost reductions for CEPs are substantial, further widening the economic gap with NTEC.
3. **Environmental Compliance Costs:** If NTEC were required to adopt carbon capture and storage (CCS) or co-fire with hydrogen to meet future emissions regulations, its costs would increase dramatically, potentially making it uneconomical

Hyperscale plans:

1. **Amazon Web Services (AWS):** Committed to achieving 100% renewable energy usage by 2025 and investing in wind and solar projects.
2. **Microsoft Azure:** Pledged to become carbon negative by 2030, with significant investments in renewable energy and carbon removal technologies.
3. **Google Cloud Platform (GCP):** Plans to operate entirely on carbon-free energy by 2030 and has already matched 100% of its energy use with renewable purchases.
4. **Meta (Facebook):** Achieved net-zero emissions for its operations and sources 100% renewable energy for its data centers.
5. **Alibaba Cloud:** Aims for carbon neutrality in its operations by 2030 with increasing reliance on renewable energy.
6. **IBM Cloud:** Targets 90% renewable electricity by 2030 and is transitioning its data centers to cleaner energy sources.

# HIA Appendix

**Figure A: EPA Environmental Justice Index Mapping in Northwest Douglas County, WI**

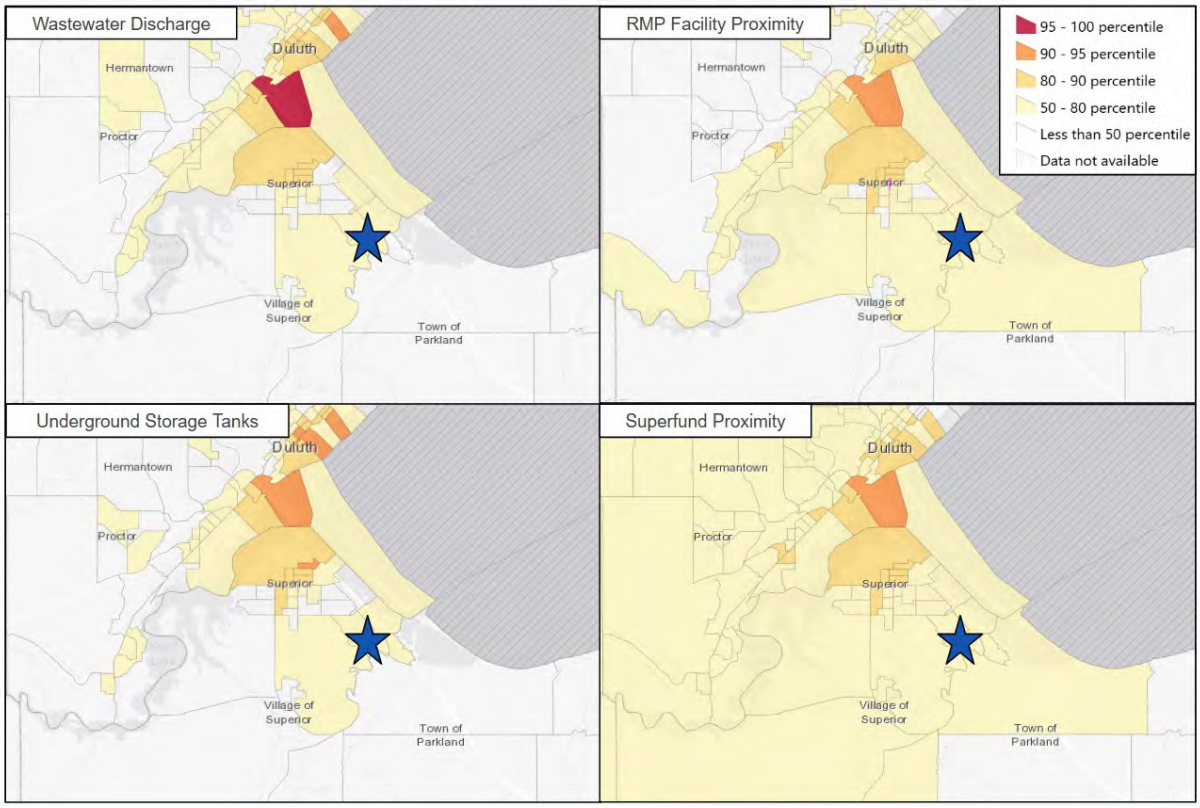
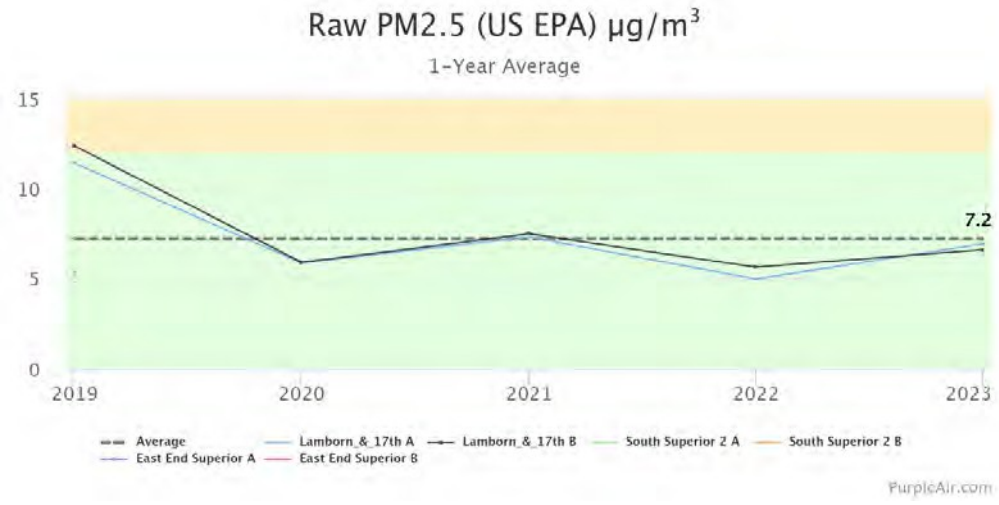



**Figure B: Annual average PM 2.5 in Douglas County (2023)[174]**




[174] PurpleAir, 2024.

**Figure C: Heart disease mortality by state, 2022[175]**

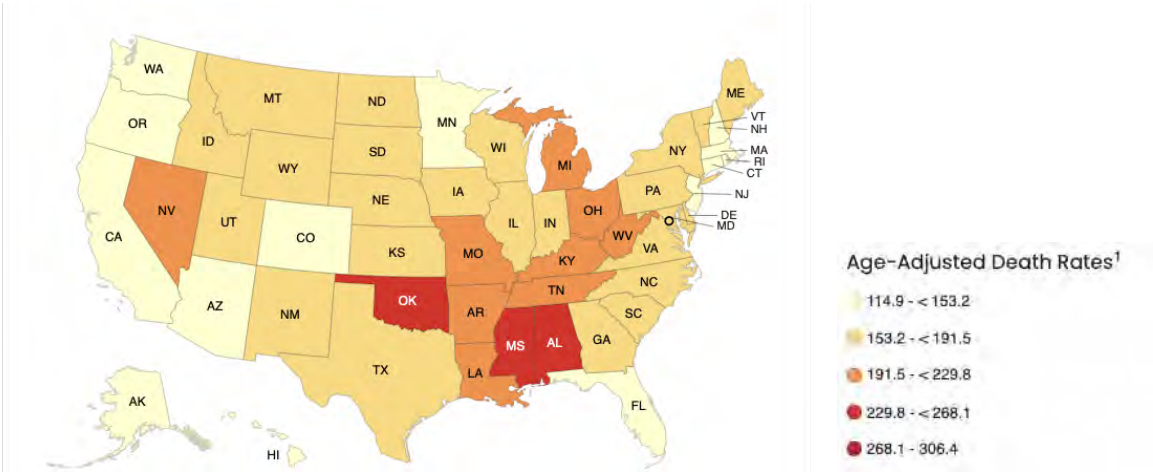
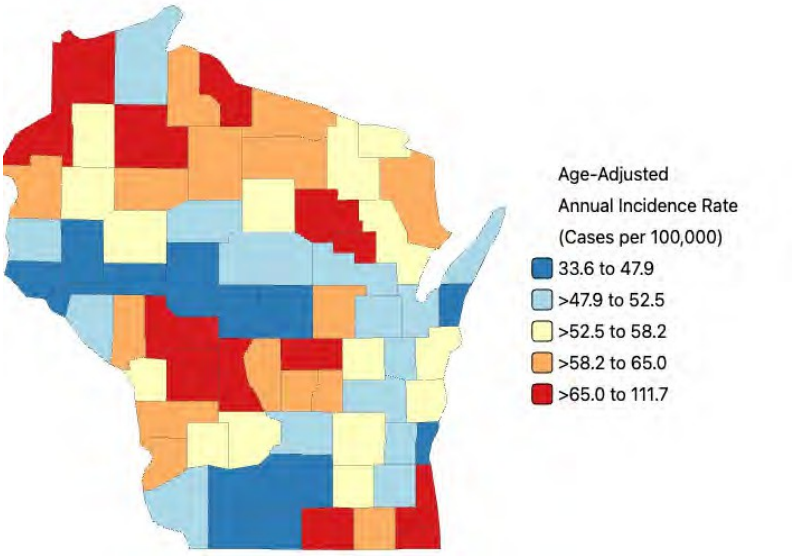



**Figure D: Lung and bronchus cancer incidence rates for Wisconsin by county, 2017-2021[176]**




[175] CDC WONDER, 2022.
[176] National Cancer Institute, 2024.

**Table A: COBRA Respiratory Health Impact from NTEC Operation base on states' averages**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| Total Hospital Admits | 0.018 | $449 |
| Total Emergency Room Visits | 0.3 | $497 |
| Total Asthma Onset | 0.87 | $66,533 |
| Total Asthma Symptoms | 135 | $37,292 |
| Total Hay Fever/Rhinitis | 5.5 | $6,126 |
| **Total Respiratory Health Cases** | **142** | **$110,898** |

**Table B: COBRA Cardiovascular Health Impact from NTEC Operation base on states' averages**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| Nonfatal Heart Attacks | **0.08** | $6,598 |
| Hospital Admits, Cardio Cerebro/Peripheral Vascular Disease | **0.01** | $337 |
| Stoke | **0.01** | $399 |
| Cardiac Arrest, Out of Hospital | **0.00** | $88 |
| Emergency Room Visits | 0.03 | $55 |
| **Total Cardiovascular Diseases** | 0.12 | **$7,477** |

**Table C: COBRA Cancer Impact from NTEC Operation base on states' averages**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| **Lung Cancer** | **0.007** | **$302** |

**Table D: COBRA Infant Mortality Impact from NTEC Operation base on states' averages**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| **Infant Mortality** | **0.0006** | **$9,423** |

**Table E: COBRA Total Mortality Impact from NTEC Operation base on states' averages**

| Indicator | Incidences | Monetary Values |
|---|---|---|
| **Total Mortality** | **0.30** | **$4,335,984** |

**Table F: Age distribution in Douglas County, the state of Wisconsin, the state of Minnesota and the US[177]**

| | Douglas County | Wisconsin | Minnesota | US |
|---|---|---|---|---|
| Under 5 years | 5% | 5% | 6% | 6% |
| 5 to 14 years | 11% | 12% | 13% | 12% |
| 15 to 17 years | 4% | 4% | 4% | 4% |
| 18 to 24 years | 9% | 9% | 9% | 9% |
| 25 to 29 years | 6% | 6% | 6% | 7% |
| 30 to 34 years | 6% | 6% | 7% | 7% |
| 35 to 39 years | 6% | 6% | 7% | 7% |
| 40 to 44 years | 6% | 6% | 7% | 7% |
| 45 to 49 years | 6% | 6% | 6% | 6% |
| 50 to 54 years | 7% | 6% | 6% | 6% |
| 55 to 59 years | 7% | 7% | 6% | 6% |
| 60 to 64 years | 8% | 7% | 7% | 7% |
| 65 years and over | 19% | 19% | 18% | 18% |

[177] U.S. Census Bureau, 2023.

**Table G: Income distribution in Douglas County, the state of Wisconsin, the state of Minnesota and the US[178,179,180]**

| | Douglas County | Wisconsin | Minnesota | US |
|---|---|---|---|---|
| Less than $10,000 (%) | 4% | 5% | 4% | 5% |
| $10,000 to $14,999 (%) | 5% | 3% | 3% | 4% |
| $15,000 to $24,999 (%) | 8% | 7% | 6% | 6% |
| $25,000 to $34,999 (%) | 10% | 7% | 6% | 7% |
| $35,000 to $49,999 (%) | 13% | 11% | 10% | 10% |
| $50,000 to $74,999 (%) | 16% | 18% | 16% | 16% |
| $75,000 to $99,999 (%) | 13% | 14% | 14% | 13% |
| $100,000 to $149,999 (%) | 20% | 19% | 19% | 17% |
| $150,000 to $199,999 (%) | 7% | 9% | 10% | 9% |
| $200,000 or more (%) | 4% | 9% | 12% | 12% |
| Median income ($) | $64,682 | $74,631 | $85,086 | $77,719 |
| Persons at or below 100% of FPL* (%) | 11.2% | 10.7% | 9.6% | 12.6% |

***** *Federal Poverty Line*

[178] U.S. Census Bureau, 2023. (1)
[179] U.S. Census Bureau, 2022.
[180] U.S. Census Bureau, 2022. (1)