

Cumulative Burden Analysis for Zip Codes 55407 & 55411

FACTSHEET

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Minnesota's Hennepin county is home to several polluting power plants and industrial operations, including the Hennepin Energy Recovery Center (HERC), which may contribute to adverse health outcomes in communities already experiencing high social and environmental burdens. Thus, we evaluated the cumulative impact profiles of census tracts within zip codes 55407 and 55411, which are adjacent to the HERC facility. Additionally, we identified the top five stationary criteria air pollution sources in Hennepin county and their combined impact on health.

Cumulative Impacts

Cumulative Impact refers to the combined effects of multiple environmental stressors on a community, particularly those overburdened by health and socioeconomic inequities. The impacts can result from a combination of sources, such as exposure to pollutants from industrial facilities, transportation, land uses, and other environmental factors that affect health. Cumulative impacts are of concern because they can lead to environmental injustices and further exacerbate health¹ and socioeconomic disparities. Thus, multiple states, including New York,² California,³ and Oregon,⁴ have recently implemented Cumulative Impacts laws or pilot projects requiring environmental regulatory agencies to evaluate and address the cumulative impacts of environmental stressors on overburdened communities.

1 Prevalence and risk for diseases such as asthma, cardiovascular disease, diabetes, cancer, and others.

2 S.B. S1031C, 2021-2022 Legislative Session (NY 2021). <https://www.nysenate.gov/legislation/bills/2021/S1031>

3 S.B. 673, 2015-2016 Legislative Session (CA 2015). https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB673

4 Cumulative Health Risk Pilot (2018). Oregon Department of Environmental Quality. <https://www.oregon.gov/deq/air-toxics/Pages/CHRP.aspx>

Last year, the U.S. Centers for Disease Control (CDC) released the **Environmental Justice Index (EJI)**,⁵ a framework and data tool to help identify priority communities based on cumulative impacts. The framework compiles data on **environmental burdens**, along with **social** and **health vulnerabilities**, to rank census tracts based on the cumulative burden they face—the higher the rank, the higher the cumulative burden. Census tracts in the highest percentiles (~ 75th) of the CDC EJI are considered overburdened priority communities. We leveraged this new framework and the compiled data to estimate statewide EJI percentile rankings for census tracts in Minnesota, highlighting the findings in zip codes 55411 and 55407.

Zip Code Findings:

Approximately 31,185 people live in zip code area **55411**. This zip code encompasses fourteen census tracts and small portions of two others. **Thirteen of the sixteen census tracts rank in the top 90th percentile of the EJI statewide** (nine at the top 70th percentile nationwide), as shown in **Figure 1**. This means that in this index, these thirteen census tracts rank higher than 90 percent of the other census tracts in the state.

Zip code area **55407** comprises approximately 40,741 people. This zip code encompasses seven entire census tracts and portions of nine others. Overall, the north side of the zip code (closer to Minneapolis) has higher EJI rankings than the southern area (see **Figure 1**). For example, on the south side, EJI ranks range from the 23rd to the 64th percentile; however, on the north side, census tracts have **EJI ranking at or above the 80th percentile**.

Next, we describe the results from the environmental, health, and socioeconomic components comprising the CDC EJI.

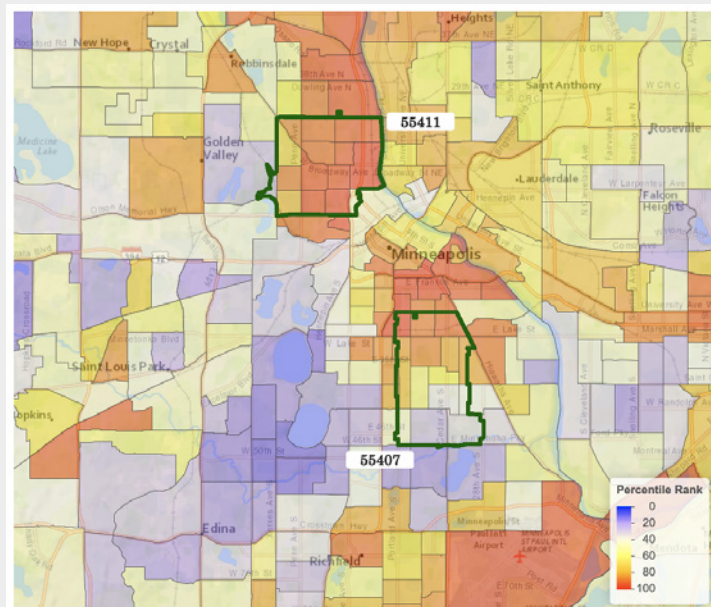


Figure 1: Environmental Justice Index for census tracts in the Minneapolis area highlighting the locations of zip codes 55411 and 55407.

Environmental Burden: The environmental burden was estimated using seventeen indicators, including air and water pollution, proximity to hazardous sites, and built environment characteristics.⁶ The data indicate that census tracts in the Minneapolis metropolitan area, where zip codes 55411 and 55407 are located, have some of the state’s highest environmental burden percentile rankings (**Figure 2A**). Many census tracts in this area have an environmental burden ranking at or above the 75th percentile. Significant contributors to the high environmental burden rankings include proximity to highly trafficked highways, railroads, and toxic and hazardous sites (e.g., sites listed through the EPA’s Toxic Release Inventory or the National Priority List).

⁵ Agency for Toxic Substances and Disease Registry, Environmental Justice Index (2022). Center for Disease Control. <https://www.atsdr.cdc.gov/placeandhealth/eji/index.html>

⁶ Agency for Toxic Substances and Disease Registry, Environmental Justice Index Indicators (2022). Center for Disease Control. <https://www.atsdr.cdc.gov/placeandhealth/eji/indicators.html>

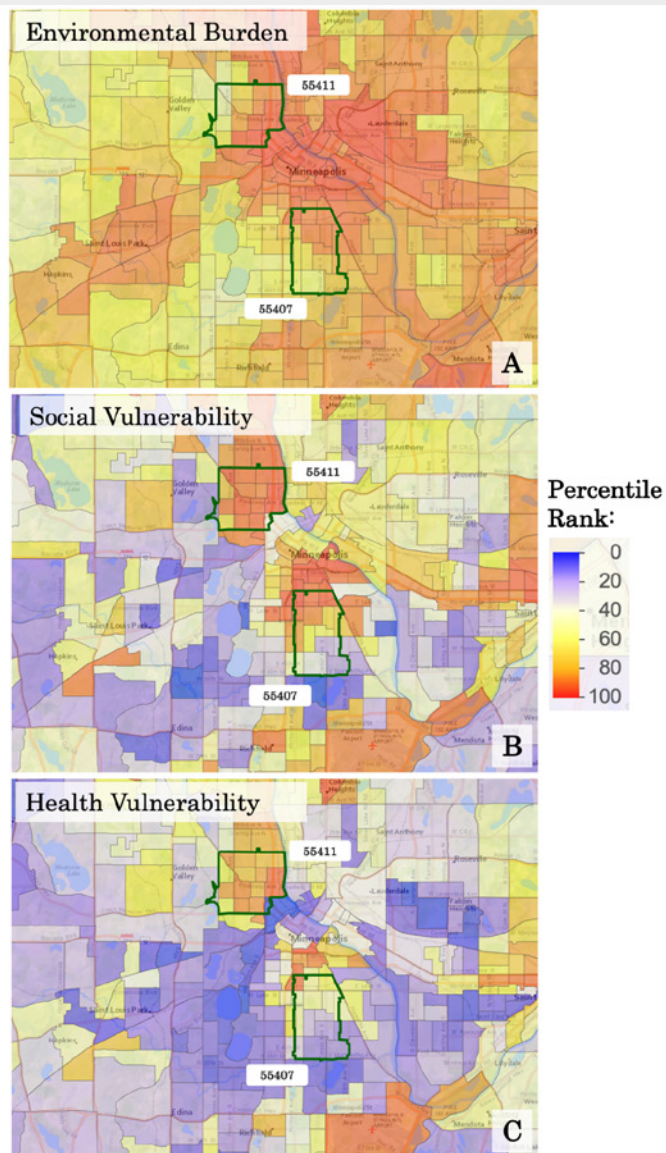


Figure 2: Census tracts percentile ranks for the three domains that comprise the environmental justice index. The map is zoomed in on the Minneapolis area and highlights the locations of zip codes 55411 and 55407.

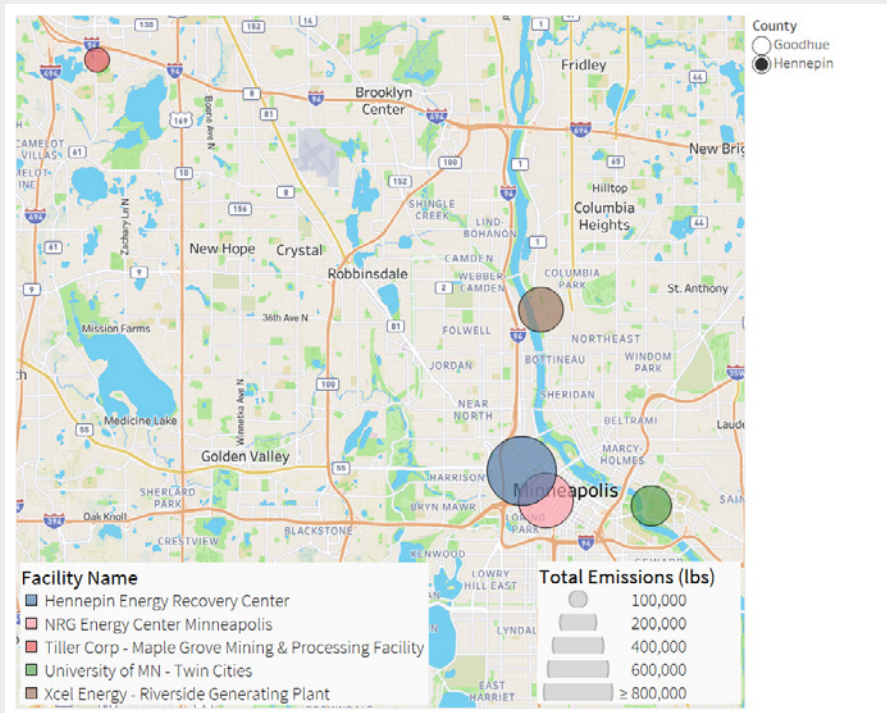
Social Vulnerability: Social vulnerability was estimated using fourteen demographic and socioeconomic indicators (e.g., unemployment, poverty, lack of internet access and health insurance, etc.) to characterize how equipped communities are to deal with the negative impacts of environmental hazards. Thirteen of sixteen census tracts in zip code 55411 ranked in the top 75th percentile of social vulnerability. In the case of zip code 55407, fourteen of the seventeen tracts are ranked in the top 75th percentile of social vulnerability (**Figure 2B**). Most census tracts in the Minneapolis downtown area have environmental burden ranks above the 70th percentile. However, communities with high social vulnerability, such as those in zip code 55411 and portions of 55407, may have less access to resources, making it harder for them to mitigate the adverse effects of pollution on their health and well-being.

Health vulnerability: Environmental hazards can significantly affect human health, particularly for vulnerable populations such as those with pre-existing health conditions. Thus, considering health vulnerability in environmental assessments helps protect the most at risk and mitigate existing health disparities. The prevalence of asthma, cancer, high blood pressure, diabetes, and poor mental health was used to characterize health vulnerability. In zip code 55411, twelve of the sixteen census tracts rank in the top 75th percentile of health vulnerability and two of sixteen in zip code 55407 at or above the 70th percentile (**Figure 2C**).

The Five Most Polluting Facilities and Their Health Cost

Health impacts from environmental hazards like air pollution can include asthma, heart attacks, decreased respiratory function, lost work days, hospitalizations, and even deaths. The effects of these impacts can be estimated and quantified in terms of a financial loss that is borne by society at large. We used the EPA's Co-Benefits Risk Assessment (COBRA) tool to assess the health impacts of polluting facilities in Hennepin County. COBRA





takes data on county-level emissions of NO_x , SO_2 , $\text{PM}_{2.5}$, VOCs, and NH_3 , and outputs health impacts distributed throughout the state, both as number of incidences and in terms of a dollar cost (or benefit) to society.⁷ These financial valuations are based on factors like insurance costs, lost work days, decreased productivity, hospital costs, etc. Using COBRA and emissions data from Minnesota Pollution Control Agency’s (MPCA) Point Source Air Emissions data tool, we identified the **five most polluting facilities in Hennepin County**, some of which are adjacent to zip codes 55407 and 55411, and assessed their overall health impacts.

The top five polluting facilities in Hennepin County are: HERC, NRG Energy Center Minneapolis, Tiller Corp asphalt processing facility, University of Minnesota Twin Cities, and Xcel Energy Riverside Generating Plant. Together, these facilities emitted over **1.6 million pounds of nitrogen oxides** and **tens of thousands of pounds**

of sulfur dioxides, particulate matter, and volatile organic compounds (VOCs) in 2021,^{8,9} which represents over 50 percent of NO_x emissions and nearly 40 percent of SO_2 emissions from all facilities in the county. All of these pollutants can impact cardiovascular and respiratory health, contribute to premature deaths, and cause other adverse health outcomes.

Three power plants (HERC, NRG, and Xcel Riverside), had the greatest total emissions, primarily of nitrogen oxides, sulfur dioxide, and VOCs. HERC and NRG Energy Center are also directly adjacent to the zip codes 55407 and 55411, with the Xcel Riverside Plant located just upstream.

The pollution from these five facilities is associated with roughly **\$50 million in health damages**—including mortalities, hospital admissions, asthma incidences, and lost work days.¹⁰ HERC is the most impactful facility in Hennepin County, contributing roughly \$16 million in

7 Co-Benefits Risk Assessment Tool. (2022). U.S Environmental Protection Agency. <https://www.epa.gov/cobra>

8 Point Source Air Emissions Data, (2021). Minnesota Pollution Control Agency. https://public.tableau.com/app/profile/mpca.data.services/viz/Pointsourceairemissionsdata_v10_5-11130/Byfacility

9 All facilities with air permits must report their emissions to MPCA. These emissions are reported post-pollution controls and include accidental or fugitive emissions.

10 Co-Benefits Risk Assessment. (Accessed February 2023). Environmental Protection Agency. <https://www.epa.gov/cobra>

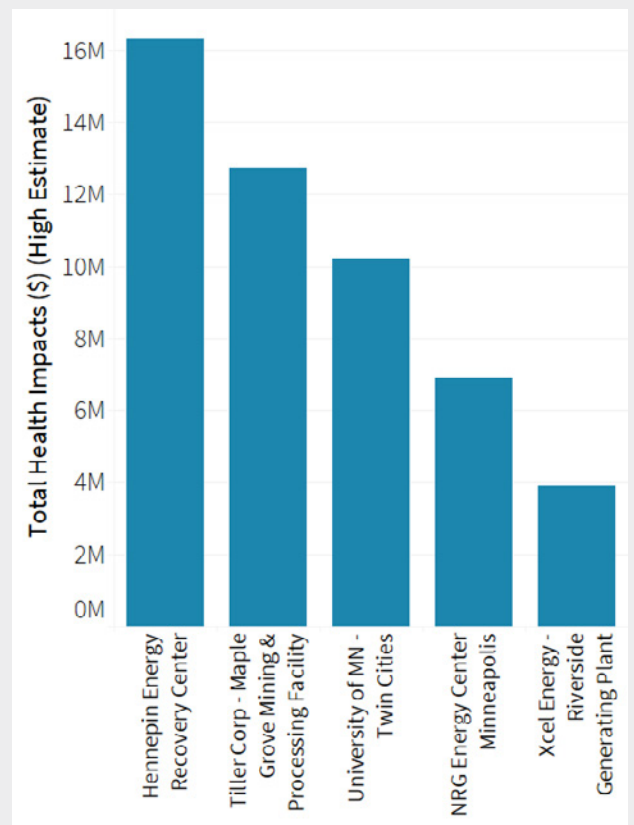
health damages, and an estimated 1-2 deaths annually due to air pollution.¹¹ Its counterpart in Goodhue County, Xcel Energy’s Red Wing Generating Plant, has even higher emissions and health impacts. While the effects of air pollution from these plants will be felt throughout the region and state, they are likely to affect neighboring communities the most.¹² These impacts are estimated solely from primary and secondary PM_{2.5}, and are not accounting for direct health effects of nitrogen oxides, sulfur dioxide, and VOCs. The estimates also do not account for hazardous air pollutants, or air toxics, emitted by these facilities, which can cause additional adverse health impacts. We also only considered the top five stationary air-polluting sources, while the cumulative emissions from other facilities, as well as from mobile sources of pollution (cars, trucks, rail, etc.) can also be significant. Therefore, the health impacts shown in this analysis are likely to be underestimated.

Key Take-Aways and Recommendations

Overall, zip codes 55407 and 55411 in the Minneapolis area have many neighborhoods that rank highly in environmental burdens, and social and health vulnerability within the state. Many communities in the Minneapolis area are exposed to a number of environmental hazards, such as polluting facilities, highways, superfund sites, and more. Power plants and waste incinerators like HERC, NRG Energy Center, and the Xcel Riverside Station are associated with tens of millions of dollars in health impacts, which are generally borne by taxpayers, businesses, and hospitals. Furthermore, many neighborhoods within 55407 and 55411 also struggle with existing health burdens and socioeconomic inequities, which compound the effects of pollution.

11 Co-Benefits Risk Assessment. (Accessed February 2023). Environmental Protection Agency. <https://www.epa.gov/cobra>

12 Air dispersion modeling was beyond the scope of this analysis, and factors like geography and regional weather and climate patterns can affect how pollutants are dispersed through the area.



There are several initiatives policymakers and residents can take to protect themselves and their communities:

- In collaboration with community members, develop and implement a robust community notification program that informs people about the existence of highly polluting facilities in their neighborhoods. This may be in the form of interactive web tools, bilingual pamphlets, or other community accessible formats.
- Ensure the existence of a dense real-time air monitoring network, particularly in the vicinity of highly polluting sources, and make the collected data publically available. PurpleAir networks in the Minneapolis region are a good example that need to be expanded upon.¹³
- Implement cumulative impacts legislation to ensure existing socioeconomic vulnerabilities and health disparities are evaluated and considered during the permitting process of environmental facilities. Other states have already adopted such legislative action. For example, the newly signed New York State Senate Bills S8830¹⁴ and A2103D¹⁵ which will ensure that permits consider the impacts facilities will have in economically distressed and disadvantaged communities. In addition, permitting processes for new and existing facilities should receive greater input from adjacent communities, who should in turn be made aware of permitting processes in advance.
- Based on their health impacts both locally and throughout the region, policymakers should consider reducing reliance upon or phasing out HERC and the gas power plants NRG Energy Center Minneapolis and Xcel Energy Riverside Generating station. Electricity can be replaced by building out solar or wind power, and capacity can be increased by building more energy storage, like batteries, to help provide power during times of peak demand. For example, a 40 megawatt battery at HERC's site could adequately provide power while taking advantage of established infrastructure. Multiple smaller batteries distributed throughout the area could provide resilience during outages.^{16,17}
- In addition to the five facilities listed above, there are a number of other polluting sources in the Minneapolis area, some of which already have growing community resistance. These include Bituminous Roadways and the Smith Foundry, both of which emit criteria and hazardous air pollutants and could have detrimental effects on local air quality. Future assessments can focus on these facilities in addition to other sources, like the Minneapolis-St. Paul International Airport.¹⁸

13 Interactive Real-time Air Quality Map. (Accessed February 2023). PurpleAir. <https://map.purpleair.com/1/mAQI/a10/p604800/cc0#10.59/44.947/-93.261>

14 S.B. S8830, 2021-2022 Legislative Session (NY 2021). <https://www.nysenate.gov/legislation/bills/2021/S8830>

15 A.B. A2103D, 2021-2022 Legislative Session (NY 2021). <https://www.nysenate.gov/legislation/bills/2021/A2103>

16 PSE Healthy Energy, HERC Fact Sheet. <https://drive.google.com/file/d/11ulyO-6L9qXaLOpvmUJWdta9Gkipl/view?usp=sharing>

17 For additional recommendations around HERC, see PSE's [fact sheet](#) highlighting the impacts of HERC and recommendations on how to phase the facility out.

18 National Emissions Inventory (NEI), (2017). Environmental Protection Agency. https://edap.epa.gov/public/extensions/nei_report_2017/dashboard.html#table-db

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