

HENNEPIN ENERGY RECOVERY CENTER

Fact Sheet

Public Health, Environmental, and Energy Equity Implications of the HERC

November 2022

Background

The Hennepin Energy Recovery Center (HERC)[1], located near Minneapolis' Target Field, burns garbage collected from across Minneapolis and the surrounding county to provide electricity to Xcel and steam for heating and cooling to nearby buildings and the stadium [2]. This trash incineration emits health-damaging air pollutants in the middle of a dense, urban community, predominantly made up of low-income households of color. Replacing it would require finding alternative disposal sites for the trash as well as a replacement for the electricity and steam heat that the plant currently provides.

Findings: Facility Emissions

HERC burns trash to produce electricity and steam, which results in air pollutants emitted from its stacks and additional waste ash that must be disposed of in a landfill. Below we summarize some of the emissions from HERC and how these emissions compare to the other 223 facilities in the county. Unless otherwise noted, data are from the Minnesota Pollution Control Agency [3].

- **Waste burned (2018-2020 annual average):** 342,722 tons [4]
- **Carbon dioxide [5] (2019):** 173,254 tons (3rd in county)
- **Lead (2019):** 12.1 lbs (3rd in county)
- **Nitrogen oxides (2019):** 404 tons (1st in county)
- **Sulfur dioxide (2019):** 12 tons (2nd in county)
- Particulate matter:
 - **PM_{2.5} (2019)** 21 tons (2nd in county)
 - **PM₁₀ (2019)** 23 tons (4th in county)





Findings: Pollution and Health

HERC is one of the primary sources of facility pollutant emissions in Hennepin County:

It is responsible for **25 percent of the total nitrogen oxide emissions** reported from 223 reporting stationary facilities, **14 percent of sulfur dioxide emissions**, and **7 percent of particulate matter emissions**.

Nitrogen oxides and sulfur dioxide react in the atmosphere to form secondary particulate matter, which can contribute to **cardiovascular and respiratory disease and premature death**.^[6]

Using the U.S. Environmental Protection Agency’s CO-Benefits Risk Assessment Health Impacts and Mapping Tool (COBRA)^[7], we estimate that particulate-matter related health impacts from HERC’s 2019 emissions resulted in **1 - 2.2 premature deaths and \$11 - 24 million per year in health impacts**.^[8] Health impacts can stretch for hundreds of miles from a facility, but tend to be highest per capita near and downwind from the emission source.

This modeling does not capture all of the health hazards associated with HERC. The facility emits hazardous pollutants that are harder to model, such as **dioxins**—which are **carcinogens**—and **lead**, which can cause **organ and brain damage**, particularly in children.^[9]

Delivering waste to HERC requires heavy-duty trucks to pass through the neighborhood, which produces diesel particulate matter and other health-damaging air pollutants. On average, more than **200 trucks every weekday** pass through to deliver waste to the facility, and nearly another **100 over each weekend**.^[10]

SNAPSHOT

HERC'S POLLUTION IMPACT

What are the **environmental pollution concerns?**

Of total emissions in Hennepin County, HERC contributes
25% Nitrogen Oxides
14% Sulfur Dioxide
7% Particulate Matter

What are **health concerns** from HERC?

Emissions can increase cardiovascular, respiratory, organ, and brain damage.





Neighborhood Around HERC

Who lives nearby?

24,000 people live within a one-mile radius of HERC [12], and more than 230,000 people live within a three-mile radius of HERC.[13] The demographics are as follows:

- The population within a three-mile radius is 49 percent **low-income** and 49 percent **population of color**.
- This area has a higher concentration of low-income households than 89 percent of the state, and higher percentage of people of color than 90 percent of the state.
- It has more **linguistically isolated people** than 91 percent of the state, and more **people without a high school diploma** than 86 percent of the state.
- The zip codes just north (55411) and just east (55415) of HERC have the **second and third highest rates of asthma** in the Minneapolis metropolitan area [14], meaning these populations are particularly vulnerable to additional pollution.

Plant Operations

What does the plant do?

HERC is relatively small on the scale of power plants. It has a capacity of 40 megawatts (MW), generates approximately 190,000 megawatt-hours (MWh) per year and runs at a capacity factor of 54 percent (meaning it generates 54 percent [15] of the electricity it would use if it ran at maximum capacity all-day every day). It sells this electricity to Xcel, and provides additional steam for heating buildings nearby. To replace the plants' current services, an alternative would have to be found for the waste incinerated, for the energy being supplied to Xcel, for the capacity (40 MW) HERC provides to meet local demand on the grid, and for the heat to nearby buildings. Next, we discuss a few options to replace these.

HIGH CUMULATIVE ENVIRONMENTAL BURDEN

HERC is not the only source of pollution in this community. There are numerous sources of pollution that, when added all together, contribute to a high cumulative environmental burden on nearby communities. The areas within a three-mile radius of HERC have a higher concentration of particulate matter than 95 percent of the state, greater risk from diesel particulate matter than 98 percent of the state, and greater traffic nearby than 96 percent of the state, as well as high concentrations of superfund sites and other toxic facilities.[11]





Recommended Alternatives

Where should the waste go?

Retiring HERC would require finding an alternative disposal for the waste currently burned at the facility. Some of this waste could be mitigated by increasing efforts to divert waste out of the garbage disposal stream. According to HERC, the waste it receives, by weight, is 16 percent paper, 2 percent glass, 5 percent metals, 15 percent plastic, 32 percent organics, and 30 percent other.[16] The paper, glass, metals, and some of the plastic could all be recycled if diverted (up to 38 percent); the organics could be composted. The remaining 30 percent would have to be diverted to a landfill. The plant already delivers approximately 23 percent of the tonnage it receives to landfills in the form of ash.[17] In addition, waste reduction strategies would help reduce the stream of garbage.

How does the energy and capacity get replaced?

This question is hard to answer precisely without detailed data on what the power plant is providing to the grid, but there are a few options. The total amount of electricity will have to come from somewhere else, and additional local capacity might have to be replaced. This capacity is the value of having a local power plant to help meet the maximum electricity demand at any point in time. If HERC is being used, for example, to meet air conditioning loads when demand is highest in the middle of the summer, some other source will need to be on-call to replace this power. The electricity provided currently could be offset by building out solar power (including on local rooftops), or bringing in wind power along transmission lines from other parts of the state or outside.

However, if there are not enough transmission lines in place, some of the capacity will have to be replaced locally. Typically, for peak demand, energy storage such as batteries can help meet peak demand. For example, California recently put in a 400 MW battery system (four-hour discharge time) to meet peak demand.[18] This battery system is ten times larger than what would be needed to replace HERC. A 40 MW battery at HERC's current site could take advantage of existing power infrastructure. If some of this energy storage were distributed throughout the community at homes and commercial buildings, it could also contribute to resilience in the case of electricity outages. A suite of technologies—likely solar, battery storage, and imported wind—can likely replace HERC's current electricity services on the grid.

How does the steam get replaced?

The steam provided by the plant currently heats nearby buildings. A few options could replace this heating. High-efficiency electric cold-climate heat pumps may provide a climate-friendly efficient replacement for this heating. Alternatively, given that there may be significant district heating infrastructure already in place, there is a possibility that this heating could be replaced by efficient geothermal heat pumps, which take advantage of relatively constant temperature of the ground to provide heating in the middle of the winter.[19] Geothermal heat pumps can be expensive up-front, but a large system for multiple buildings may help reduce overall lifetime costs.





Employment

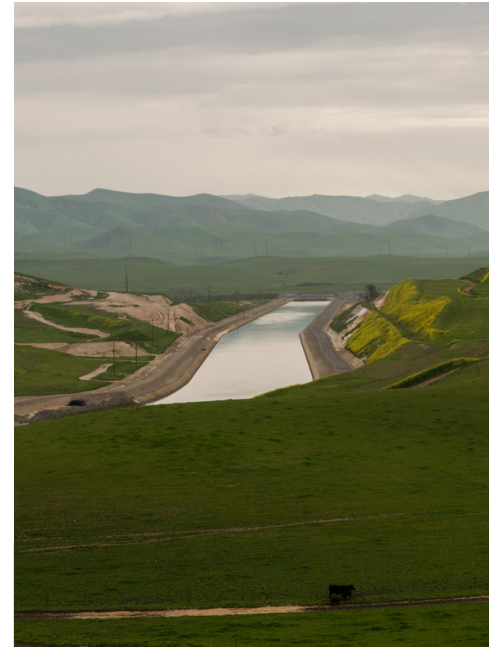
What about jobs?

HERC claims it has 45 jobs associated with it.[20] While the build-out of alternative energy infrastructure and site remediation [21] will create jobs, they likely will not require the same skillsets as to currently operate HERC, and a transition or training plan may help ease this transition.

Sources and Notes

- [1] Also known as the Covanta Hennepin Energy Facility (Federal Facility Plant ID # 10013)
- [2] <https://www.hennepin.us/your-government/facilities/hennepin-energy-recovery-center>
- [3] Operational year 2019 was used to reflect a status quo and functional economy. Year 2020 data may be impacted by COVID-19 disruptions, leading to an underestimation of emissions due to limited or paused operation.
https://public.tableau.com/app/profile/mpca.data.services/viz/Pointsourceairemissionsdata_v10_5-11130/Byfacility
- [4] <https://www.eia.gov/electricity/data/browser/#/plant/10013>
- [5] CO₂ equivalent
- [6] <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>
- [7] <https://www.epa.gov/cobra>
- [8] Health impacts were estimated from the EPA COBRA desktop version (model ran in November 2022), and that model utilized 2016 incidence, population, and valuation data. HERC was classified under Incinerator and waste disposal. Emission data inputs from 2019 MCPA.
- [9] <https://www.cdc.gov/niosh/topics/lead/health.html>
- [10] https://legalectric.org/f/2011/01/herc_eaw_1210-completereduced.pdf (p. 5)
- [11] <https://ejscreen.epa.gov/mapper/>
- [12] <https://ejscreen.epa.gov/mapper/>
- [13] <https://www.epa.gov/airmarkets/power-plants-and-neighboring-communities>
- [14] <https://mndatamaps.web.health.state.mn.us/interactive/asthma.html>
- [15] <https://www.eia.gov/electricity/data/browser/>
- [16] <https://www.hennepin.us/-/media/hennepinus/your-government/facilities/documents/herc-factsheet.pdf>
- [17] https://legalectric.org/f/2011/01/herc_eaw_1210-completereduced.pdf (p. 5)
- [18] <https://www.nsenergybusiness.com/projects/moss-landing/>
- [19] <https://www.energy.gov/energysaver/geothermal-heat-pumps>
- [20] <https://www.hennepin.us/-/media/hennepinus/your-government/facilities/documents/herc-factsheet.pdf>
- [21] The site will likely need investments to remediate pollution before transitioning to a new application.

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ABOUT PSE HEALTHY ENERGY

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