The Hennepin Energy Recovery Center

and managing waste in Hennepin County

Hennepin Energy Recovery Center (HERC)

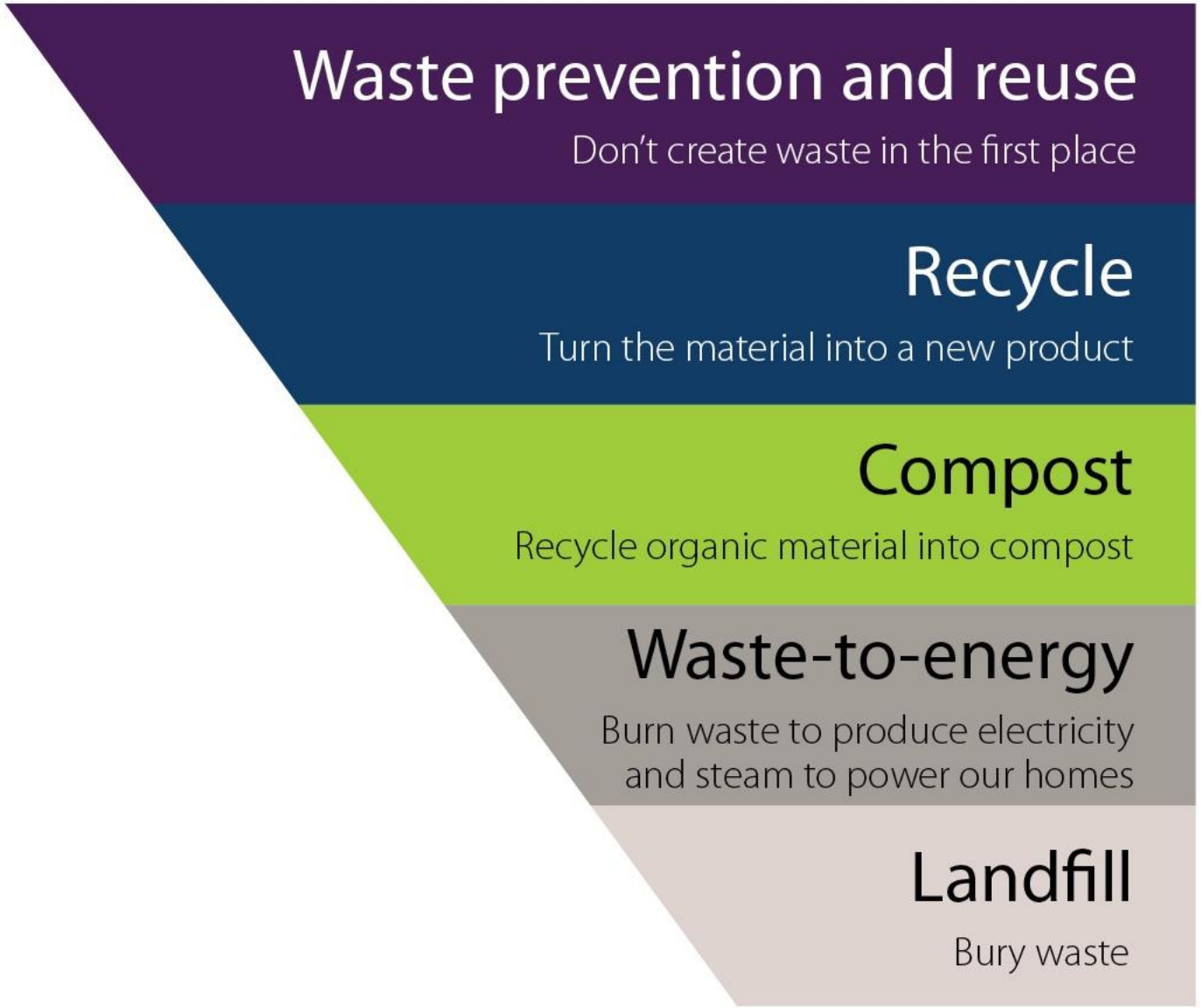
Converting waste to energy to avoid landfilling

- Located in the North Loop neighborhood in downtown Minneapolis
- Operates 24/7
- Processes 365,000 tons of waste per year
- Asset for the county - owned by Hennepin County, operated by Great River Energy

Reduce and responsibly manage waste

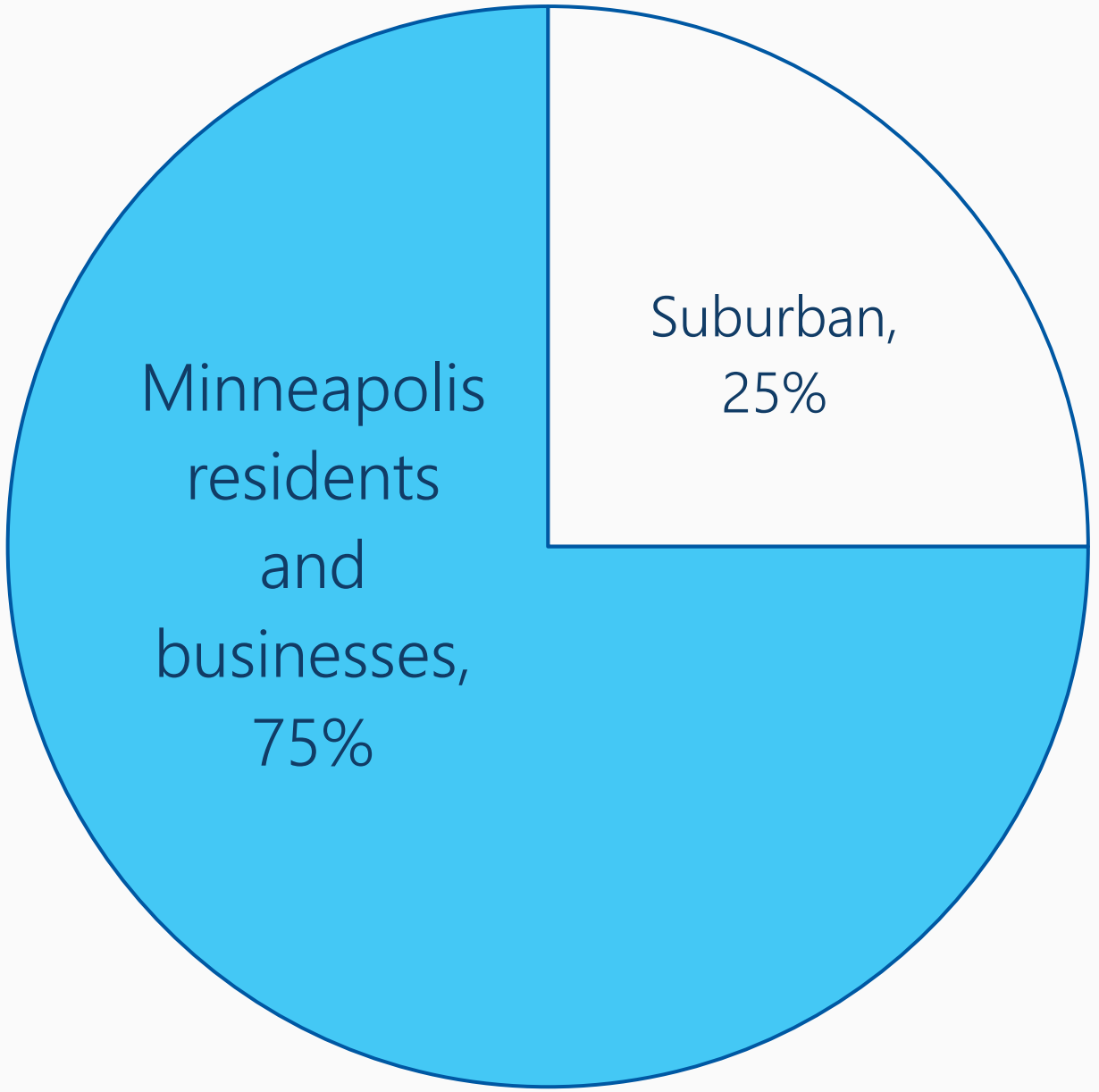
- Offer waste reduction and recycling programs, including providing technical and financial assistance for recycling and organics composting to cities, businesses, apartments and schools
- Provide disposal options for household hazardous waste
- License and inspect businesses that generate hazardous waste

State law established hierarchy for waste management

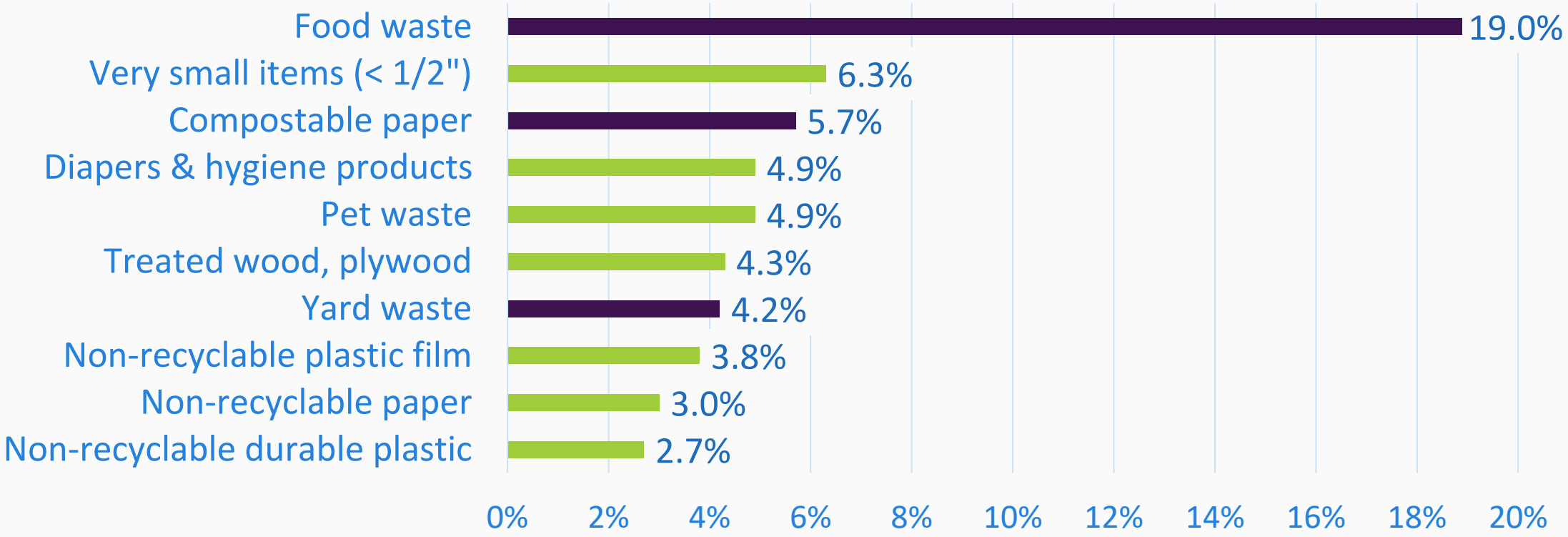


- Waste hierarchy guides preferred management practices
- Designed to protect public and environmental health, support a vibrant economy and wise use of resources.
- At least 9 times more jobs in reuse and recycling

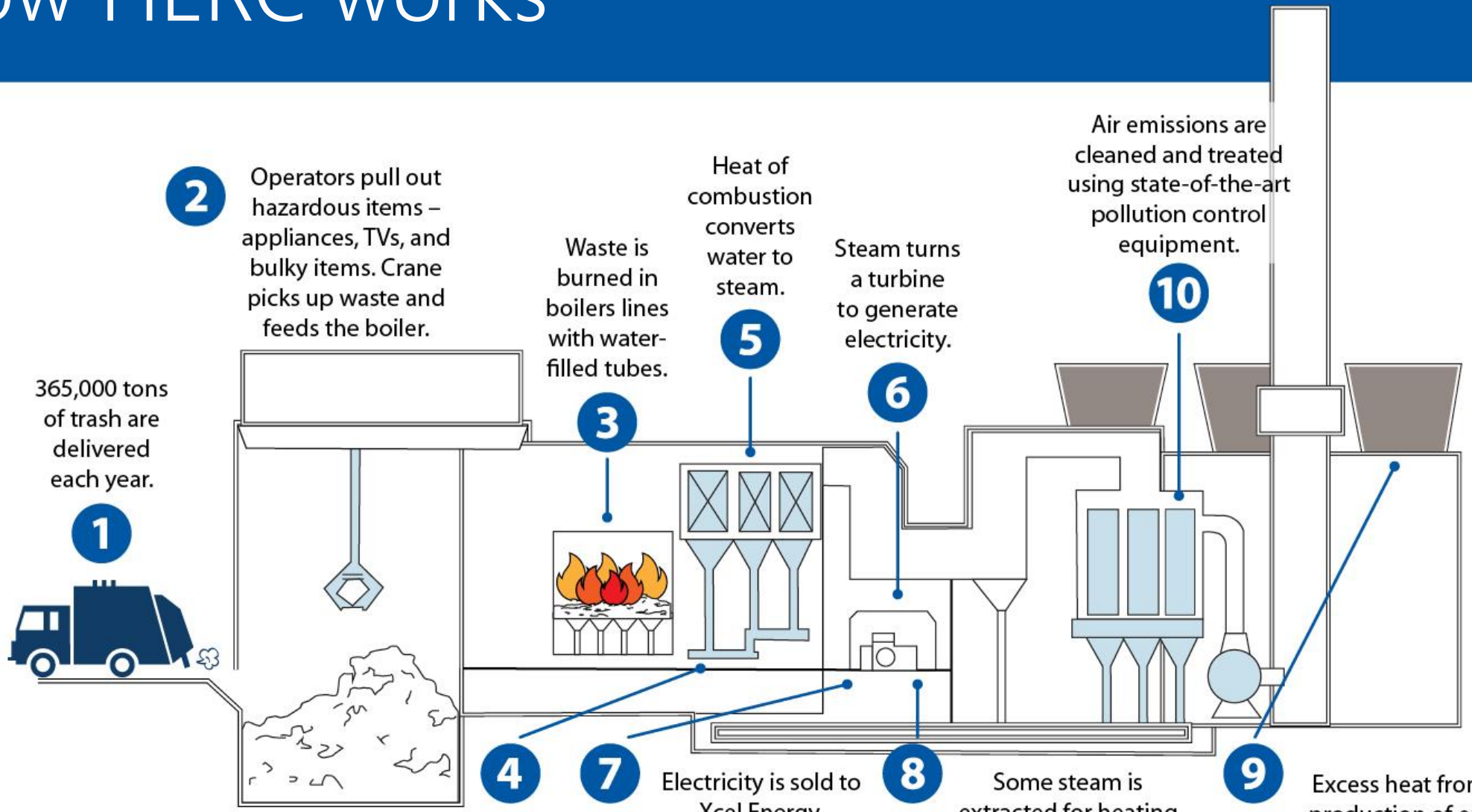
Where does trash at HERC come from?



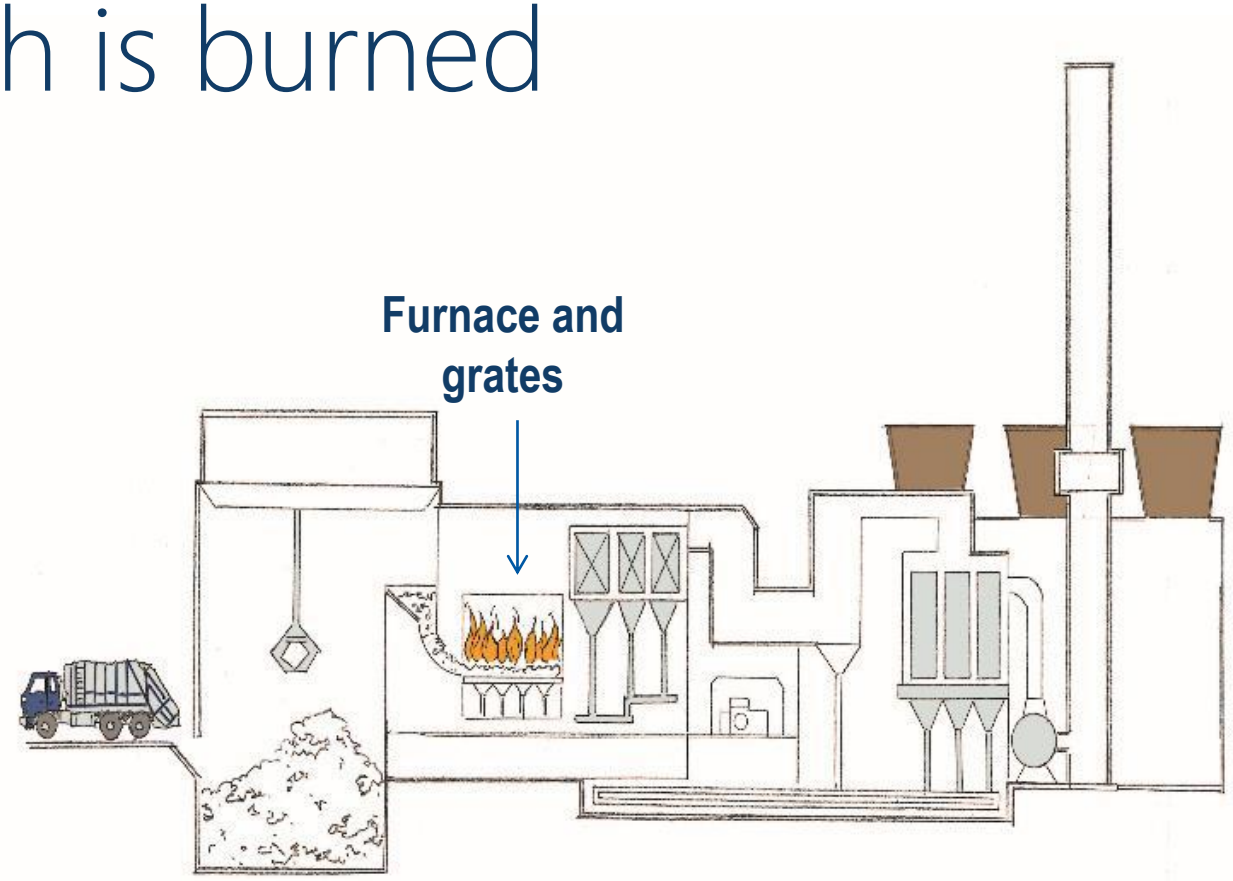
Top 10 most prevalent materials in the trash



How HERC works



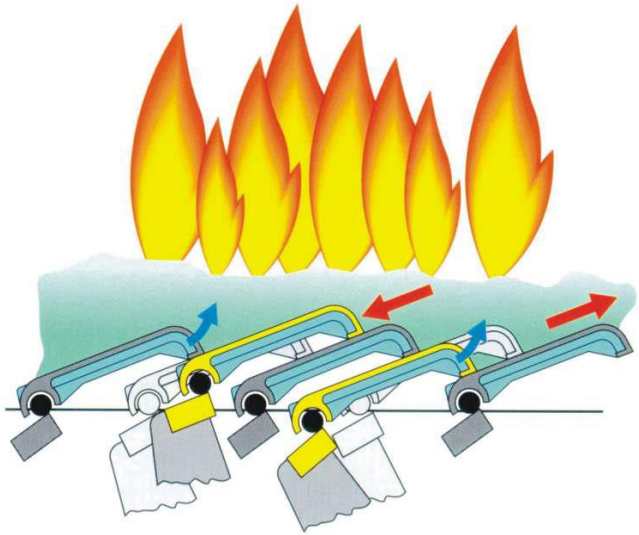
How HERC works: Trash is burned



Furnace and Grates

Courtesy - Martin Grates

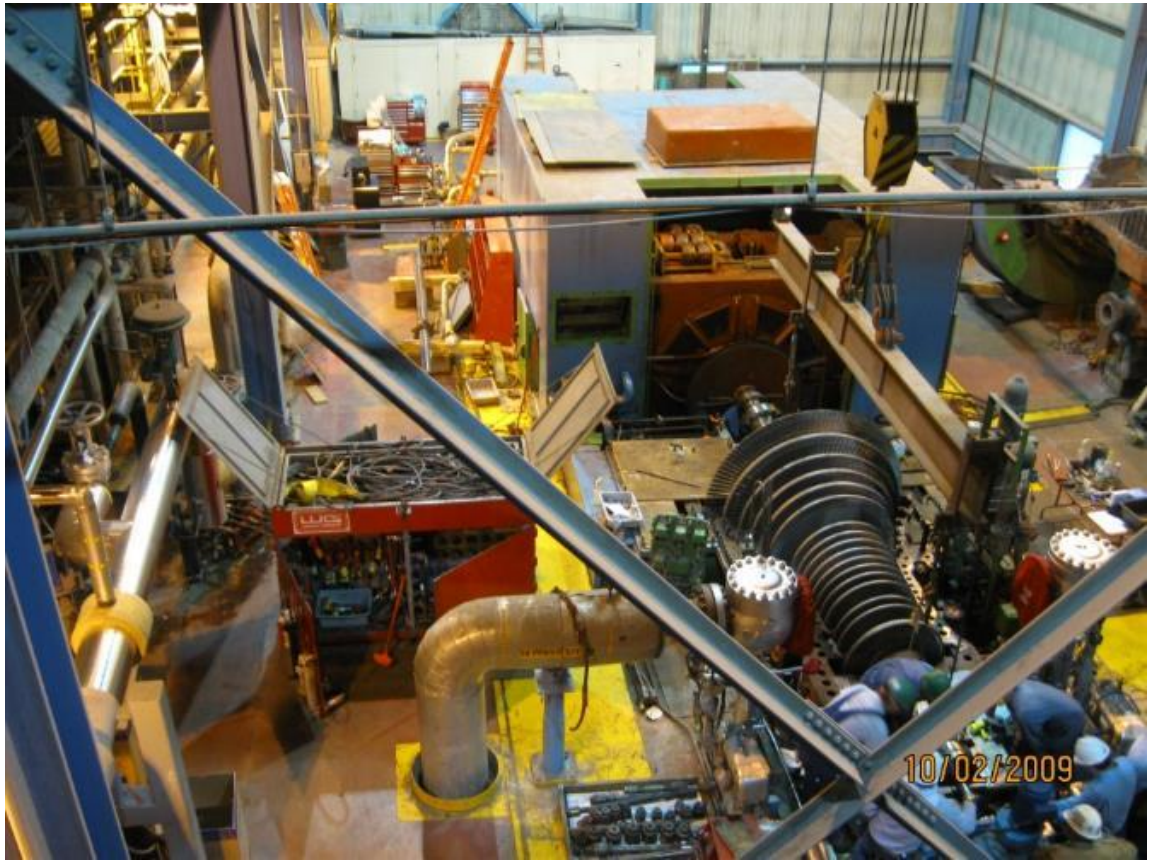
Furnace walls & ceiling are steel tubes filled with water.



Grate bars push fuel up & forward as it burns. Air injected above & below grates.

Electrical Production: turbine-generator

- 350,000 lb/hr of superheated steam (752° F, 630 psig) into ~35 MW (avg) electricity
- Turbine & Generator Shafts (rotors) coupled together – both turn @ 3,600 RPM
- ~ 4 MW of electricity used in-plant = ~ 31 MW exported to grid = ~25,000 homes



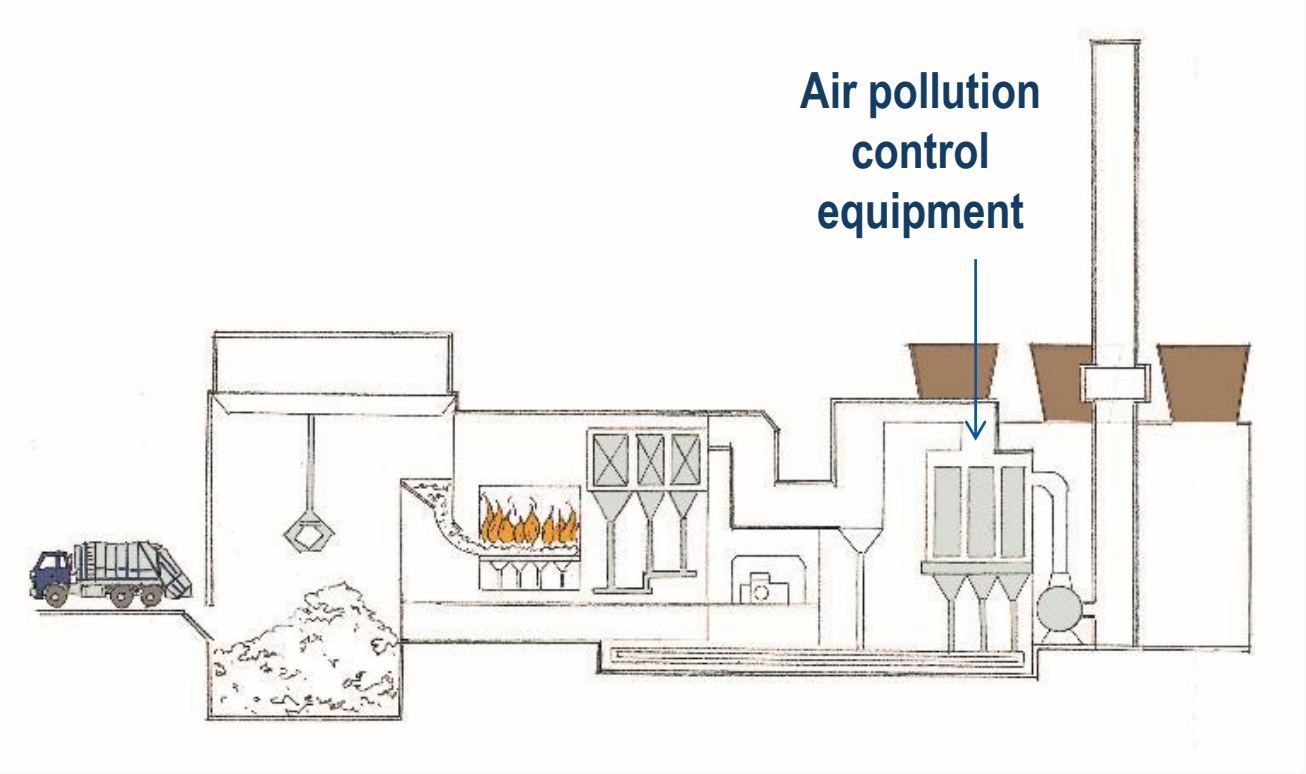
Export steam heat to Target Field and downtown buildings

- Steam line connects HERC to Target Field and NRG's downtown district energy system (100 buildings).
- More efficient than buildings operating their own boilers and chillers.

How HERC works: Pollution control

HERC uses state-of-the-art
air emission control technology

- Urea (CH_4N_2O) is injected into the furnace to control nitrogen oxides emissions.
- Powdered activated carbon is injected into exhaust gases to remove mercury & dioxins
- Exhaust gases pass through a dry scrubber, where a hydrated lime slurry (alkaline) is injected to control sulfur dioxide and hydrogen chloride (acid gases)
- Exhaust gases pass through fabric filters (3,328 teflon/fiberglass bags, 8"x20' ea) to remove particulate matter, metals and dioxins

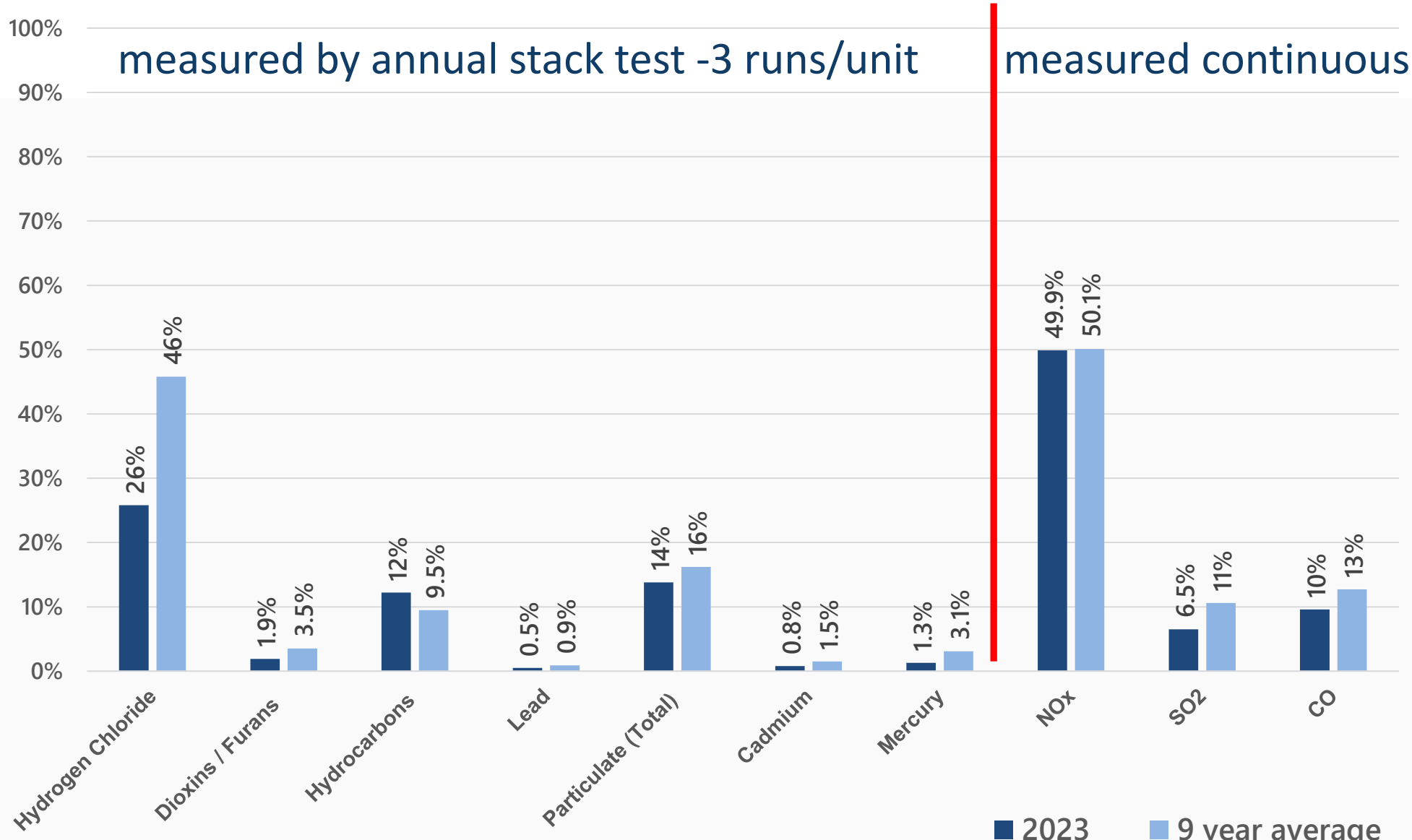


Pollution control

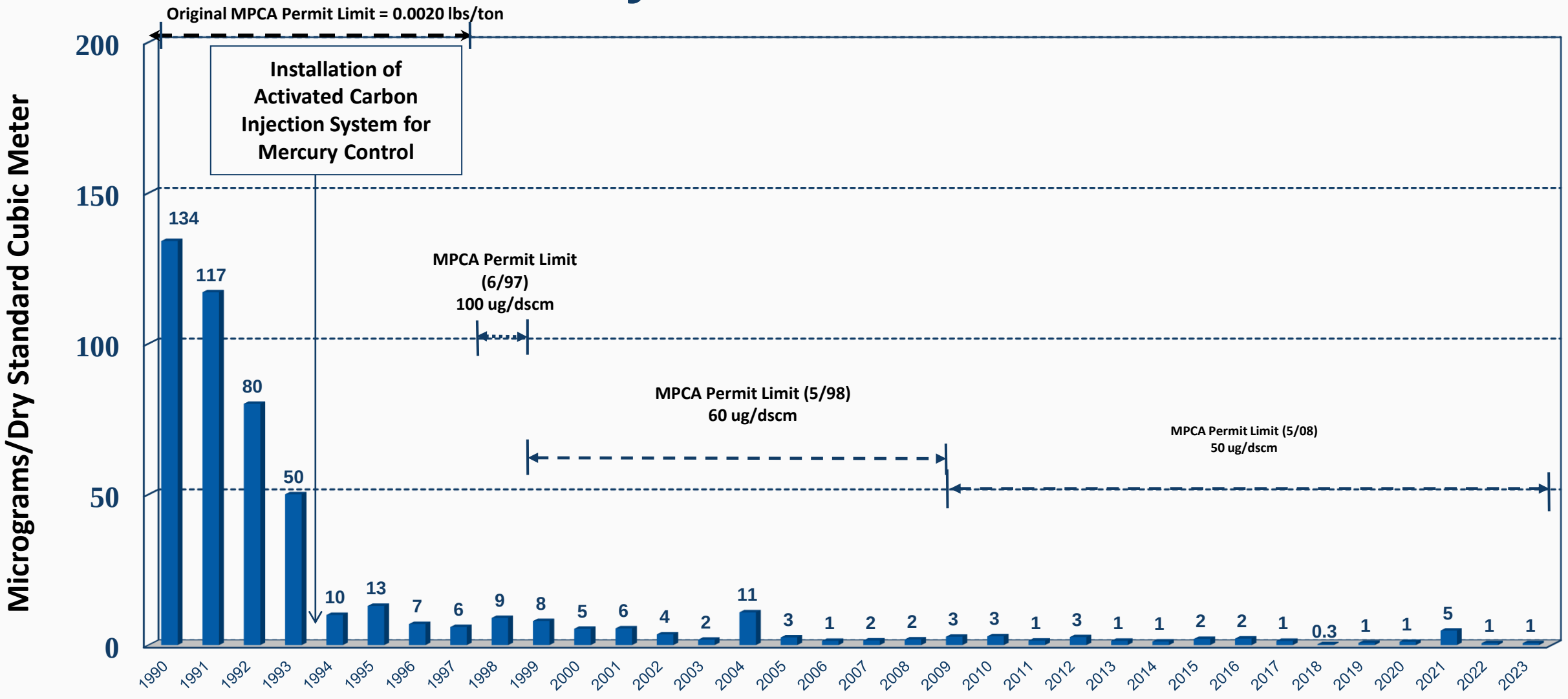
Real-time concentrations of O_2, CO, CO_2, NO_x, SO_2, and Opacity in exhaust gasses are monitored **continuously.**

Plant operators tweak controls to optimize combustion and minimize air pollutant formation.

HERC Air Emissions as % of MPCA Permit Limits



HERC mercury emissions 1990 – 2023



State-of-the-art air emission control technology

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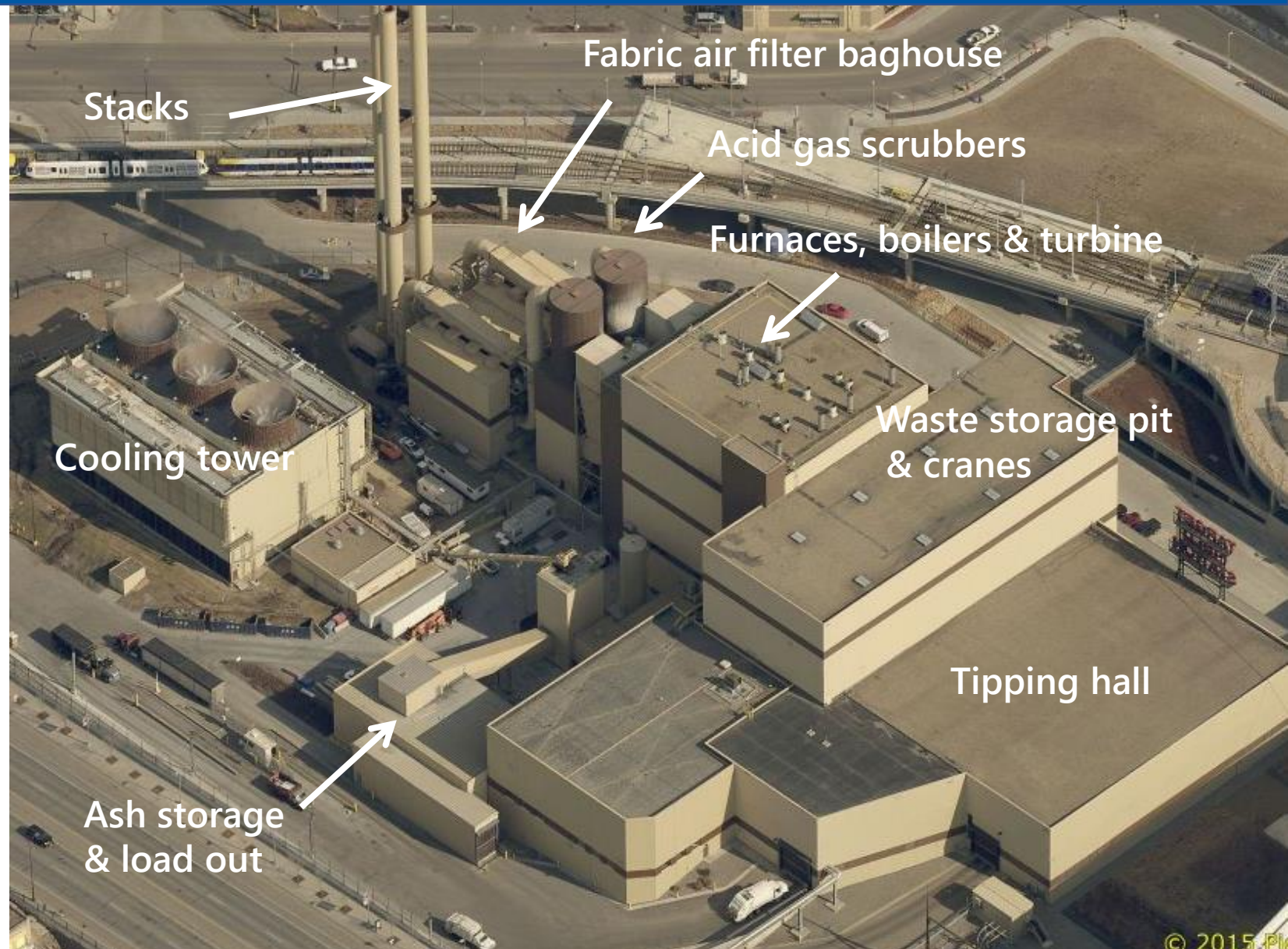

How HERC works: Managing the remaining ash

- Ash has always tested non-hazardous.
- Ash is sent to a lined, ash-only cell at industrial waste landfill for disposal.
- Leachate from ash cell is collected and sent to a sewage treatment plant.

Environmental benefits

Ash is screened to recover metals

Captures 16,000 tons of metal for recycling

More than double the amount of metal collected in curbside recycling programs

Environmental benefits

Avoids landfilling waste

- Combustion process reduces the volume of waste by 90%
- Enough to pile 15 feet of trash on top of 15 football fields each year

Community engagement

- Engage communities to understand the waste issue and reduce waste
- Provide tours to help residents visualize how much trash still needs to be managed
- Be transparent about operations