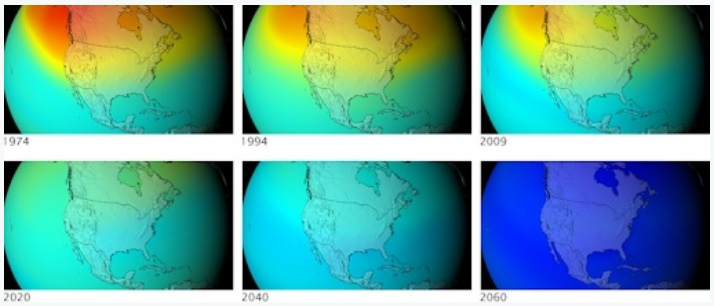
Refrigerants, Climate Change, and Municipal Solid Waste

Refrigerants and the Harm They Cause

Refrigerants are components in refrigerators, freezers, air conditioners (including in cars), heat pumps, dehumidifiers, vending machines, water coolers, and many other appliances and machines. All of these are part of the City's public and/or commercial solid waste streams.

Refrigerants have contributed to two environmental problems that threaten all life on earth: ozone depletion and climate change. When ozone depletion became an existential threat in the 1980s, world leaders united to transition to alternatives that did not harm the ozone layer. But climate change had not yet become a public issue and was not included in decision-making. CFCs (the first refrigerants) and HCFCs (the transitional replacements for CFCs) are both ozone depleters and greenhouse gases (GHGs). HFCs (the newest replacements), don't deplete ozone but are GHGs. New alternatives are safer for both the ozone layer and the climate, but the US lags behind Europe in instituting them.

Ozone Layer 1974-2060 if there had been NO CFC phase out[1]



As GHGs, refrigerants are thousands of times more damaging than carbon or even methane. The common refrigerant R410A has a Global Warming Potential (GWP—the measure of a gas relative to CO2) of 2088; over a 100-year timeframe, one pound of R410 has the same global warming effect as 2088 pounds of CO2. Drawdown.org, a comprehensive science-based plan to reverse climate change, rates Refrigerants Management and Alternative Refrigerants as two of the top ten climate solutions, out of 82 solutions.[2]

Refrigerants in a Zero Waste Framework

- **Refrigerant Management** includes leak prevention for machines in use, sequestration of refrigerants, and, when machines are disposed of, capture of refrigerants for reuse, recycling or safe destruction.
- **Alternative refrigerants** can reduce global warming by 1 degree Fahrenheit by the end of the century. Effective refrigerant management can add even more benefit.

The Supply Chain: The tip of refrigerant-use—the seen part—consists of both consumer and industrial air conditioners and refrigerators, that is, the machines that we see in our own homes, businesses, and public places. The unseen part consists of refrigerants used all along the production chain to keep food products frozen or cold before purchase, or control temperature for

a range of products, from medications to art works.

Even if we in the United States and other industrialized developed nations have a handle on CFCs and HCFCs in our own countries, our consumer demand drives production in countries that use the most damaging refrigerants, including those phased out under the Montreal Protocol. It is crucial that we examine the entire supply chain and disposal system to reduce refrigerant releases.

Leaks: When refrigerants remain sealed in home appliances or large stationary HVACR equipment used in industry and business, they do not damage the environment. But when refrigerant coils rupture or leak, the gases are released and cause tremendous damage. Refrigerants are also released upon disposal of equipment, unless refrigerant recovery is carefully included in the disposal process.

New York City's Local Law 69 (2015): Local Law 69 is an Extended Producer Responsibility (EPR) law; the original maker of a refrigerant-containing appliance is responsible for capture of refrigerants for reuse or recycling before the emptied appliance is disposed of. Under this law, all companies what sell refrigerant-containing appliances must indicate whether they will (a) establish their own refrigerant recovery program; (b) participate with other responsible parties in a recovery program; or (c) participate in the Refrigerant Recovery Stewardship Program of DSNY's Department of Recycling and Sustainability.

Whatever they choose to do, brand owners and manufacturers are required by DSNY to submit an annual report with data, including (a) the number and models of appliances collected; (b) the tonnage of appliances; and (c) the volume and type of refrigerants recovered. DSNY then charges the brand owner or manufacturer $15 per appliance and sends a biannual bill. A fine of $500 must be paid by any responsible party that disposes of a refrigerant-containing appliance without arranging for the lawful recovery of refrigerants.

Significant questions remain about the efficacy of these programs. Only a very small fraction of refrigerants disposed of in the City are collected. We have a long way to go. One way to do a better job with Local Law 69 is for the City to improve data collection, transparency and enforcement.

Local Law 69 currently captures about 10% of the appliances disposed of by City residents. Stronger enforcement could potentially increase recovery from 10% to 50% of appliances disposed of.

Local Law 69 does not address commercial machines; businesses use commercial waste haulers to dispose of these. But commercial refrigeration and A/C systems contain roughly 70% of refrigerants in NY State.

For a deeper dive into this important Muncipal Solid Waste issue please see the following document "Refrigirants 101" .

To learn WHAT YOU CAN DO: General Public and Businesses please follow the this link to the MSWAB fact sheet
"Recycling Refrigirants in NYC: What You Can Do"