Climate Action Plan

This document provides information for community members who are interested in the City of Gresham's Climate Action Plan. This document contains detailed an overview of the underlying rationale of climate action and a complete glossary of terms used in the Gresham Climate Action Plan.

Climate Action Plan

Climate 101 and Glossary of Terms

CITY OF GRESHAM

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Gresham's Climate Action Plan was developed to guide the City of Gresham and Gresham Community as we work together to respond to climate change. The strategies within the plan address major sources of greenhouse gas emissions in the community, as well as support opportunities for building resilience to climate hazards and extreme weather.

This document provides an overview of the underlying rationale for a climate action plan. Here, you'll find an overview of what a climate action plan is, what greenhouse gases are, and a detailed glossary of the terminology used throughout the plan.

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Appendix A: Climate 101 and Glossary of Terms

What is the Climate Action Plan?

The Climate Action Plan is a comprehensive work plan that guides the City of Gresham and Gresham Community in reducing greenhouse gas emissions and adapting to changing climate conditions. This plan provides strategies that will reduce Gresham's carbon footprint and build resilience in the face of extreme weather and hazardous climatic conditions. While the Climate Action Plan is its own plan, it also borrows from other City plans to unite their efforts and place a climate lens on the work that is already happening. Essentially, the Climate Action Plan creates a shared vision of what a more sustainable future in Gresham looks like and how that vision can be made a possible reality.

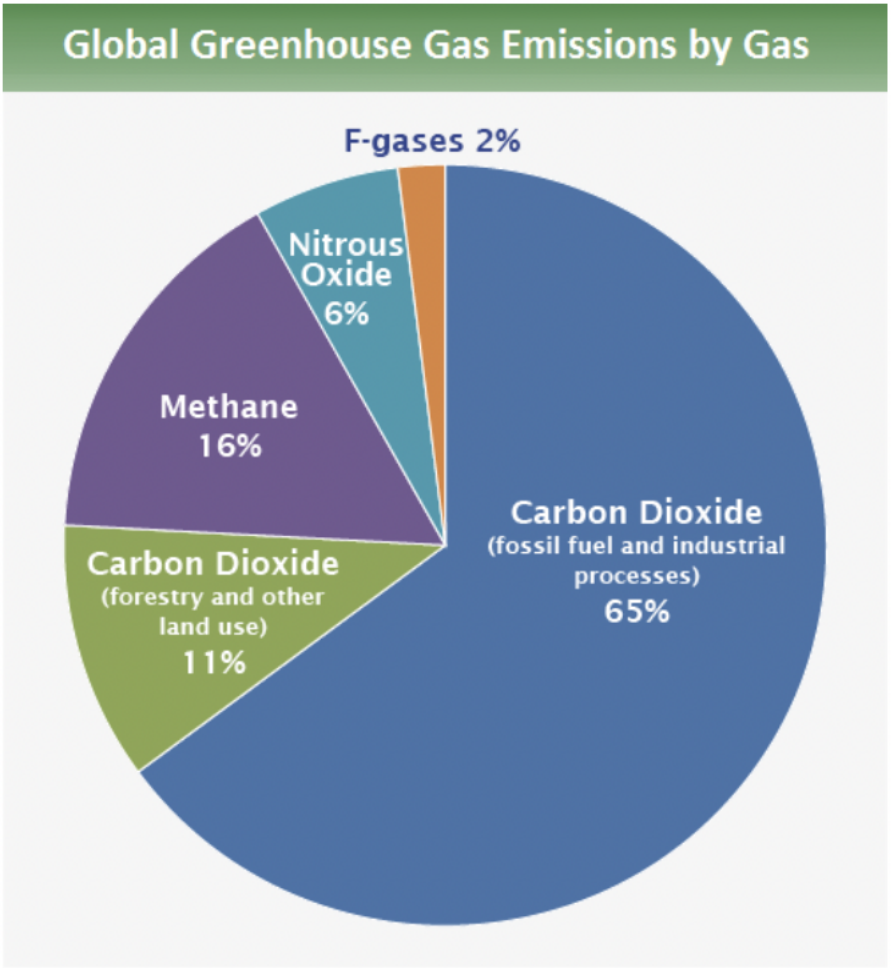
While the Climate Action Plan is a policy, it is not a regulation that seeks to burden the community with additional costs or requirements. As a policy, it is a commitment to the journey towards a safer, resilient future, and doing so in an inclusive manner.

This plan builds on the successes of City of Gresham's 2011 Sustainable Gresham Initiative, which set the first emissions reduction targets for City operations. Here, those emissions reduction efforts are broadened to support projects throughout the community that provide further benefits of cost savings, energy efficiency, community safety, and environmental health.

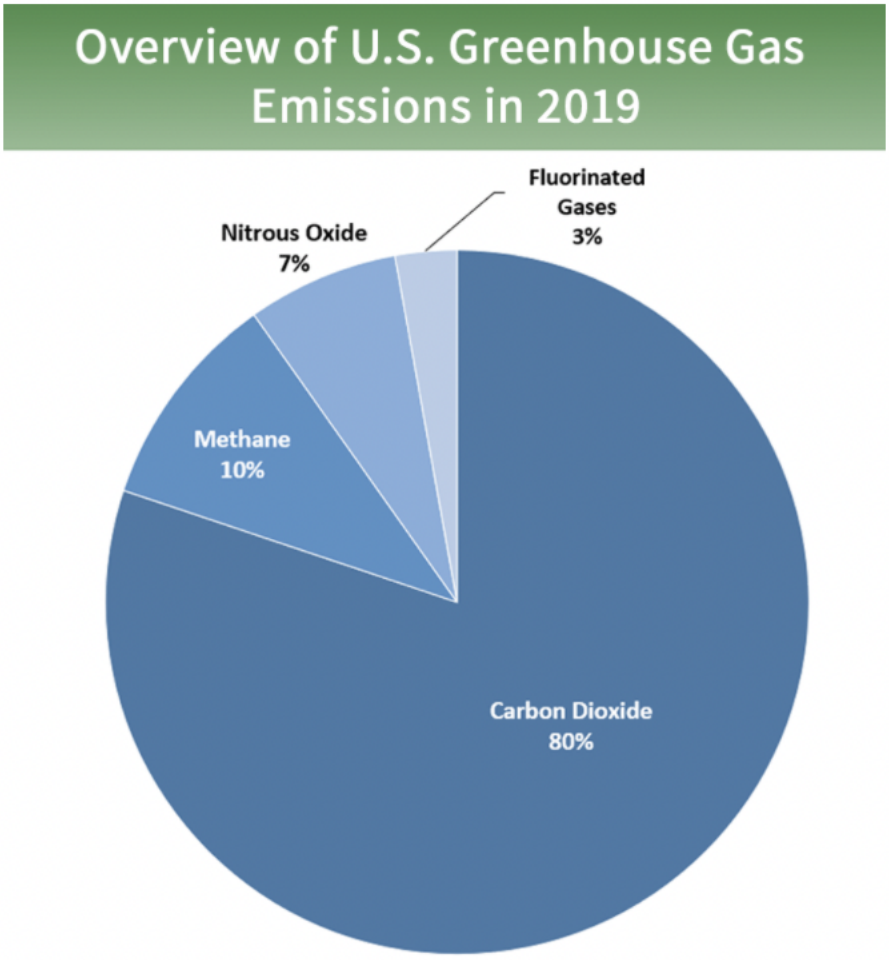
What are Greenhouse Gases?

Greenhouse gas emissions are gases that are released by both natural processes and human activities that become trapped in the Earth's atmosphere. These gases are the primary drivers of climate change, as they are highly effective in absorbing and storing heat and can remain in the atmosphere long after they are released.

Carbon dioxide (CO2) is the most common and plentiful greenhouse gas released into the atmosphere and has shown to contribute to climate change more than other greenhouse gases.



Source: IPCC (2014) EXIT Exit based on global emissions from 2010. Details about the sources included in these estimates can be found in the *Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* EXIT. Exit



Total U.S. Emissions in 2019 = 6,558 Million Metric Tons of CO2 equivalent (excludes land sector). Percentages may not add up to 100% due to independent rounding.

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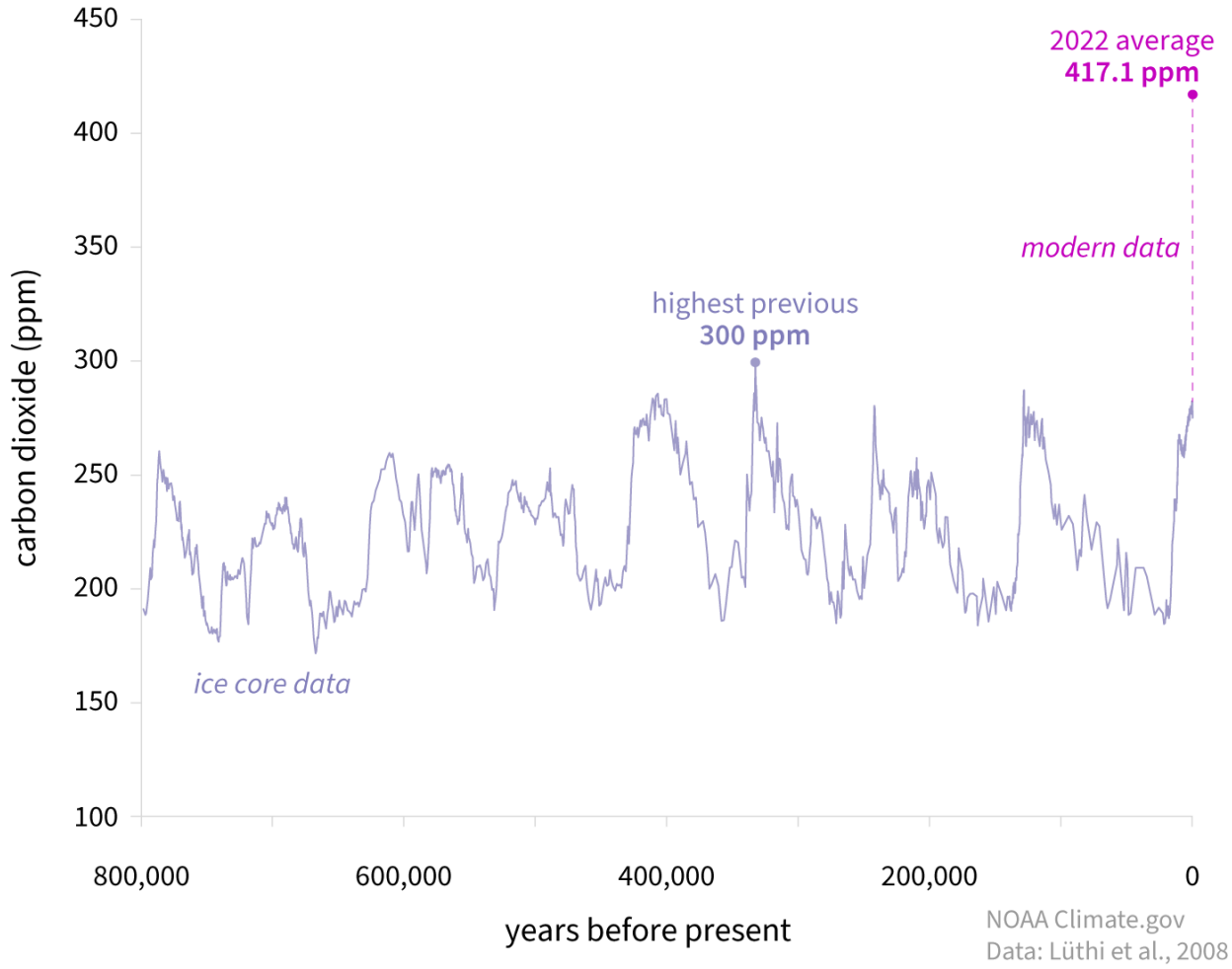
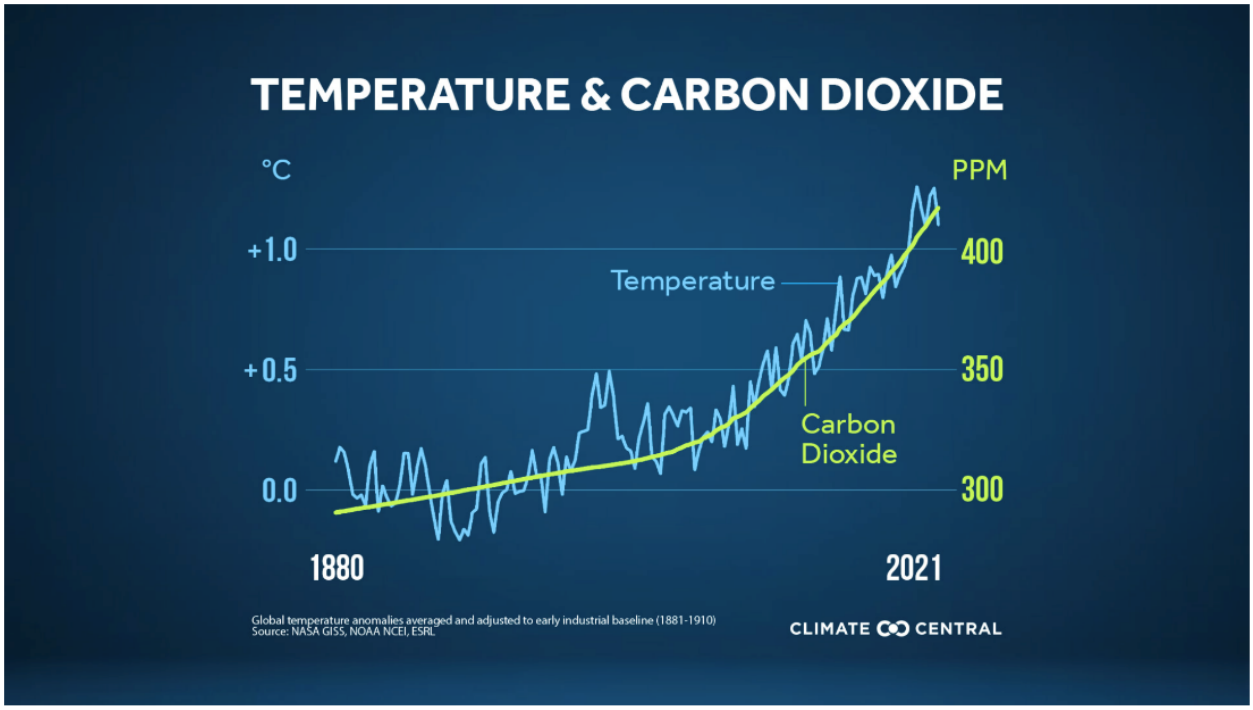
CO2 molecules have been found to be particularly efficient in retaining heat for long periods of time and can remain in the atmosphere for several decades to several hundred years. Though CO2 is released into the atmosphere through natural processes and circulated through the air, oceans, and soils as a part of the Earth's carbon cycle, studies have shown human activities have changed the carbon cycle by emitting increasingly high quantities of CO2.

CARBON DIOXIDE OVER 800,000 YEARS



This change in atmospheric concentrations of CO2 is represented in studies where data was collected from air and water samples found in glacial ice cores. CO2 becomes trapped in glacial ice when water absorbs it from the air and then freezes near the Earth's poles. In studies conducted in partnership between the National Oceanic and Atmospheric Administration (NOAA) and the United Nations, data samples showed that concentrations of CO2 in the atmosphere have risen to record levels not seen in over three million years (NOAA, 2022). The scientific community has largely come to agree that this trend has been primarily driven by the intense use of high-carbon fossil fuel energy sources for human activities related to industry, agriculture, transportation, generating electricity, and changes in land use.

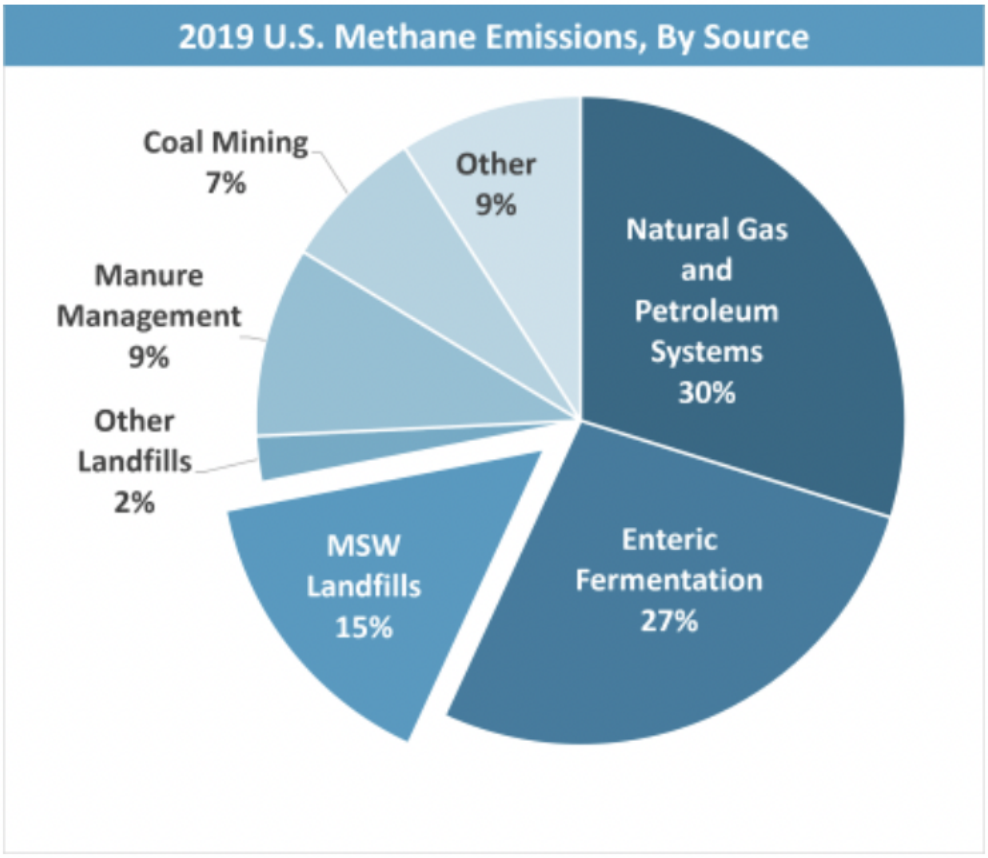


Annual CO2 Peak and Temperature

In addition to CO2, concentrations of other greenhouse gases in the atmosphere have been found to also be increasing as a result of high-carbon fossil fuels. These gases include methane, nitrous oxide, and fluorinated gases.

- **Methane (CH_4)**: Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous oxide (N_2O)**: Nitrous oxide is emitted during agricultural, land use, industrial activities, combustion of fossil fuels and solid waste, as well as during treatment of wastewater.
- **Fluorinated gases**: Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

Of these gases, methane is understood to be particularly potent in increasing global average temperatures. Studies have shown that for the first twenty years that methane particles are in the atmosphere, they are ten times more effective in retaining heat than CO2. After this time, methane begins to break down, making its presence brief but impactful.



Note: All emission estimates from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2019*.

Methane has also been found to be problematic in how well its presence in the atmosphere can be measured, or how much of it is currently being released, as it mixes well with other gases and is easily transported by wind.

What is a Greenhouse Gas Emissions Inventory?

A greenhouse gas emissions inventory is a thorough study of how greenhouse gases are released in a community by daily activities – such as energy use, operation of buildings, use of transportation, and disposal of waste. Greenhouse gas emissions inventories are important because identify where emissions are coming from and give first measurement of those emissions that progress can be compared to – often referred to as a ***baseline***.

Scope 2 and 3 Scope 1

Figure 1: City of Gresham's 2019 Community Greenhouse Gas Emissions

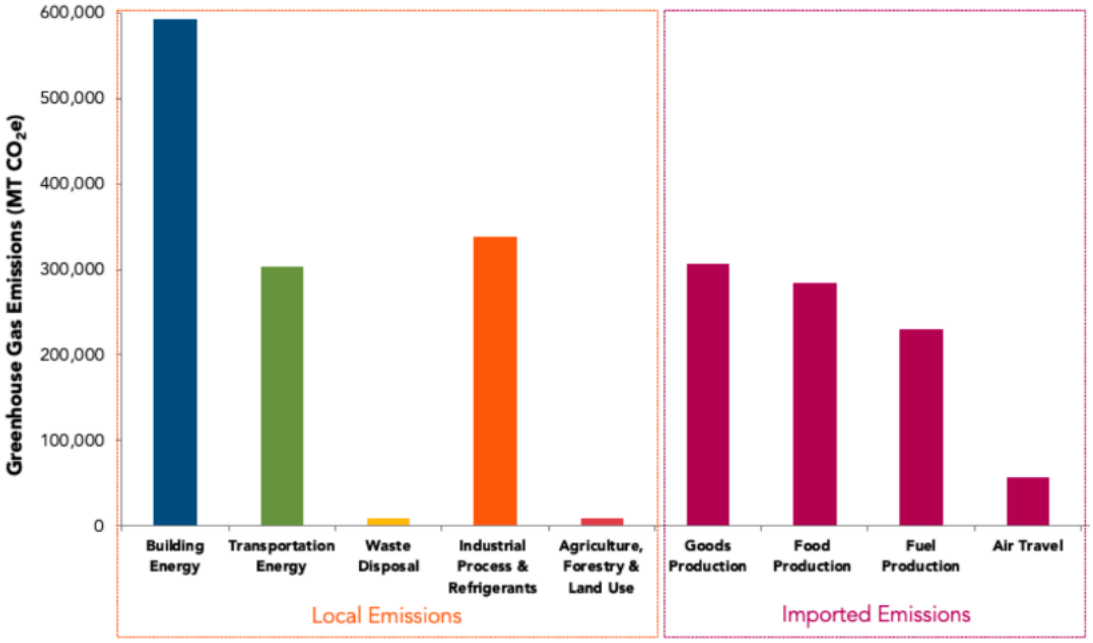
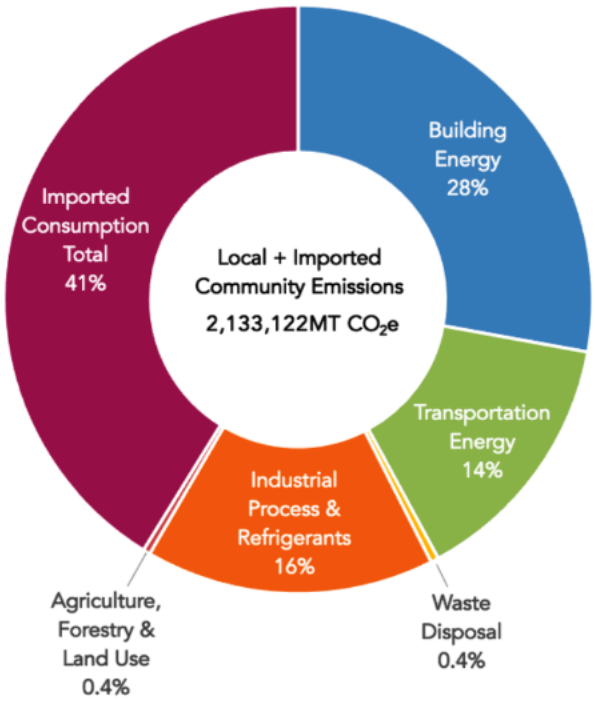


Figure 8: 2019 Community Local + Imported Emissions



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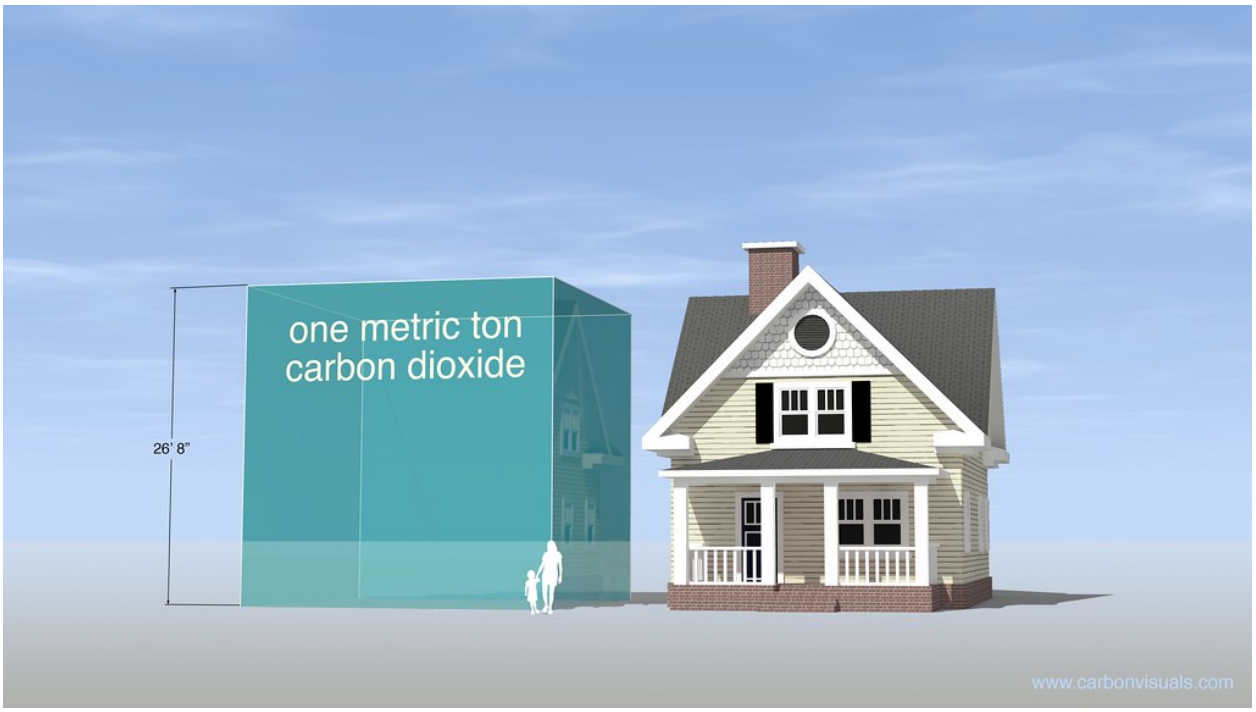
Emissions in an inventory are organized by their ***source activity***, or the activity that caused them to be released – again, such as energy use, transportation, agriculture, or industry. These source activities are further organized by whether they ***are local emissions*** – emissions that occur directly within a community's geographic boundary – or they are ***imported emissions*** – emissions that occur outside a community's geographic boundary for producing goods that are consumed by that community within its geographic boundary.

Local emissions are commonly referred to as ***Scope 1 emissions***, in that a community has more direct influence over the source activities of these emissions, and therefore have a greater ability to reduce these emissions.

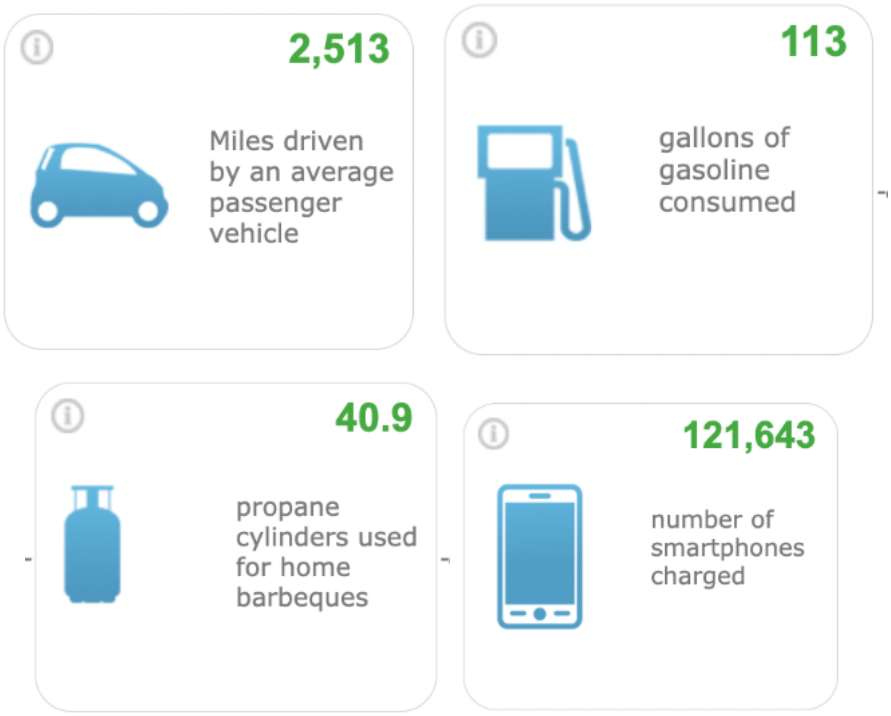
Imported emissions, on the other hand, are commonly referred to as ***Scope 2 and 3 emissions***, in that a community has less influence or ability to reduce these sources because they occur outside that community's boundary. This often requires that communities collaborate with one another at a regional scale to make progress. For example, emissions from growing the food that is eaten in Gresham are generally generated outside of Gresham in nearby agricultural communities. This requires Gresham to collaborate with Portland, Multnomah County, and the State of Oregon to reduce emissions from food production.

Emissions in an inventory are measured in ***Metric Tons of CO2 Equivalent or MTCO2e***. MTCO2e creates a consistent unit to measure gases that have different climate impacts – or global warming potentials - by standardizing them into that of one metric ton of CO2 – this is where the 'equivalent' comes from. ***Global warming potential (GWP)*** is the measure of how much heat energy a ton of gas particles will absorb and retain over 20 years. A ton of CO2 will retain a different amount of heat energy than a ton of methane, and therefore has a different GWP from methane. MTCO2e converts the GWP of a ton of methane into that of a ton of CO2 to create a consistent measurement.

For reference, one metric ton of CO2 – or 2,200 lbs – of CO2 is roughly the size of a 1,500 square foot home, or a 27 ft x 27 ft x 27 ft cube (Climate Visuals, 2015).



Emitting this single ton is roughly equivalent to driving a car 2,500 miles, using 113 gallons of gasoline, using 40 tanks of propane, or charging 121,000 cell phones (EPA Greenhouse Gas Emissions Calculator, 2022).



What are Mitigation and Reduction Strategies?

Mitigation and reduction strategies are actions that reduce or prevent greenhouse gas emissions by shrinking or eliminating their sources in a community. Strategies that support the use of renewable energy sources or zero-emissions vehicles are examples of this.

What are Adaptation and Resilience Strategies?

Adaptation and resilience strategies are actions that reduce a community's vulnerability to climate hazards and severe weather. Essentially, they improve a community's ability to prepare for, withstand, and recover from hazardous conditions while preventing injury and damage. These strategies also support a community's ability to flourish and maintain its standards of well-being, health, safety, and economic opportunity in the face of uncertain climate conditions. Preserving or increasing tree canopy in urban spaces to better regulate air temperature and shade buildings during extreme heat is an example of this.

It's important to note here that Mitigation and Reduction strategies can have outcomes that support adaptation or boost community resilience, while Adaptation and Resilience Strategies also have outcomes that can reduce greenhouse gas emissions.

Glossary of Terms

Access
The ability of an individual or community to obtain and use resources and services. Communities or populations who currently and have historically experienced discrimination of any kind and encounter barriers to accessing goods and services are acknowledged as having inequitable access and as being underserved. See ***Equity*** and ***Underserved***.

Action
The specific steps, activities, or final products necessary to carry out a strategy or complete a project.

Active Transportation
The transport of people and goods without the use of motorized transportation, such as walking and biking.

Adaptation / Adapt
Adjustments made in policies and practices that reduce a community's vulnerability to harmful conditions. This is done by taking actions that minimize risk by either removing potential hazards or improving a community's ability to respond to them. Related to ***Resilience*.**

Baseline
A starting measurement that is compared to measurements made later to determine progress.

Bicycle & Pedestrian Infrastructure
Sidewalks, marked crosswalks, bike lanes, crossing lights, and low-speed greenways.

Biogas Co-Generators
Power Generators that produce energy by flaring or burning biogas that comes from the decomposition of organic matter in a wastewater treatment plant.

Carbon Intensity
Carbon intensity is a measure of how much CO2 is released to produce a single kilowatt hour of electricity. Electricity that is produced by fossil fuels has a higher carbon intensity than electricity produced by renewable sources.

Carbon Neutral
An organization, building, or equipment becomes carbon neutral when the CO2 that is released from producing the energy it uses is 'offset' or balanced by actions that prevent or absorb an equal amount of CO2. This can be achieved by installing enough solar on a building to produce an amount of renewable energy that is equal to the energy the building uses that comes from non-renewable sources, such as coal or natural gas. This can also be achieved by planting approximately 6 trees for every ton of CO2 that is produced to power that building. Carbon

neutral is used interchangeably with net-zero emissions. See ***Carbon Offsets*** and ***Net-Zero Emissions.***

Carbon Emissions Offsets

Actions that prevent or absorb CO2 that an organization will use to reduce or balance the CO2 that is either produced to power its buildings, or by the fossil fuels burned to power equipment. An organization can balance just some or all the CO2 it produces with a variety of carbon offsets, such as planting trees or installing solar panels. For example, planting approximately 6 trees 'offsets' 1 ton of CO2 as they absorb carbon over their lifespan.

Carbon Sequestration

Processes that absorb CO2 out of the atmosphere. This occurs naturally as trees absorb carbon as they grow, making reforestation an essential part of climate action. Because natural sequestration occurs slowly over the lifespan of trees, it must be done along with actions that reduce the amount of CO2 being released into the atmosphere.

Civil Infrastructure & Natural Spaces

The physical elements of a community that include natural spaces, urban canopy, stormwater infrastructure, and hard surfaces. This also includes the programs and policies that maintain and fund this type of infrastructure.

Climate Hazards

An event or process that takes place in the natural environment, such as severe weather, that can harm human health, livelihood, and access to resources.

Climate Justice

Action that acknowledges that climate change can have disproportionate social, economic, and health impacts on communities that are underserved, underrepresented, and/or have fewer economic resources and opportunities. See ***Vulnerable Communities & Populations***.

CO2 / Carbon Dioxide

A gas made of molecules that each have one carbon atom bonded to two oxygen atoms; A gas made of dark particles that is released through the burning of fossil fuels and is highly effective at absorbing and trapping heat in the atmosphere. CO2 is the most common greenhouse gas released into the atmosphere. See ***Greenhouse Gases***.

Community-Based Organizations

Not-for-profit organizations that provide resources or specific services to the general community or a specific population within the community. Examples include faith-based organizations, food donation pantries, cultural centers, and community health centers.

Consumption-Based Emissions

Emissions that result from the consumption of goods and services. Generally, consumption-based emissions are generated outside of a community's geographic boundary to produce

goods that will be brought into that community for consumption and disposal. Emissions outside of Gresham for growing food that will be eaten in Gresham is an example of imported emissions. Used interchangeably with ***Imported Emissions***.

Cost Burden

The percentage of a household's income that is spent on rent, utilities, health care costs, or other essential services. A household is considered cost-burdened when it spends 30% of its income on rent and utilities, and severely cost-burdened when it spends more than 50% on these expenses.

Critical Infrastructure

Features of a community that are essential for the functioning of government, society, and economy. Examples include roads, sidewalks, bridges, utilities, buildings, supplies of food and water, sources of shelter, healthcare services, and public services provided by local governments.

Displacement

The movement of communities out of neighborhoods that they have historically occupied, had established relationships in, and called home into areas that are unfamiliar and/or where they do not have existing relationships.

Displacement occurs because of: natural disasters that damage homes and infrastructure; political and social unrest that create risks to physical safety and damage to property; and from increases in costs of living that drive out communities with limited income and economic opportunities. See ***Gentrification***.

Diversity

A range of characteristics represented throughout a community or organization.

Diverse characteristics include, but are not limited to, age, gender, ethnicity, race, sexual orientation, lived experience, geographical background, education, social backgrounds, economics, religious or non-religious backgrounds, disability, and neurodiversity.

Economic Infrastructure

The local government and community-based programs that provide, support, maintain, and fund economic development, business ownership, employment, and workforce development.

Electric Vehicles

Vehicles that can be powered by an electric motor that draws electricity from a battery and is capable of being charged by connecting to an electrical outlet.

Electricity Supply
The combination of energy sources used by utilities to generate electricity, and the equipment used to deliver that electricity to customers. Excludes the delivery of natural gas. Related to ***Energy Supply***.

Emissions
The release of greenhouse gases into the atmosphere, such as carbon dioxide and methane.

Energy Burden
The percent of total household income that is spent on energy costs, such as electricity and natural gas bills. Typically, communities and individuals with limited income and economic opportunities experience a greater energy burden.

Energy Efficiency
The use of less energy than it might otherwise take to perform the same task. For example, LED lightbulbs are more energy efficient than regular bulbs because they use less energy to provide the same amount of light.

Energy Source
The source that energy is produced from, such as solar, wind, hydropower, biomass, oil, coal, and natural gas.

Energy Supply
The combination of energy sources used by utilities to generate electricity, and the equipment used to deliver that electricity ***and*** natural gas to customers. Related to ***Electricity Supply***.

Equity
The fair and just treatment of all people. Equity recognizes that individuals or whole communities have not started from the same place and have had vastly different access to opportunities. Thus, those individuals or communities need sufficient and appropriate resources to reach their full potential. It is the design and execution of fair policies, processes, training, systems, and structures. It also consists of deliberate actions to remove barriers and adjust imbalances.

To be ***equitable*** is to have or show fairness or impartiality. It is equity in action. To be equitable is to be mindful and intentional about creating outcomes and opportunities that support thriving individuals or communities and removing barriers when they are identified.

Extreme Heat Events
A series of days with unusually hot temperatures over 90 degrees F.

Extreme Precipitation
Storms with rain or snow that substantially exceeds normal levels of rainfall or snowfall.

Fossil Fuels
Materials that are rich in hydrocarbons that formed in the Earth's crust from the remains of plants and animals that are extracted and burned as a fuel. The main fossil fuels are coal, oil, and natural gas. Fossil fuels are *finite*, in that there is a limited supply of them in the Earth and are gone once completely used. The burning of fossil fuels is the main source of greenhouse gases, such as CO2 and methane.

Fugitive Emissions
Gases or vapors released by leaks in pressurized supply lines, pipes, and containers. Fugitive emissions typically come from natural gas supply systems, and from industrial processes & refrigerants, which use gases that can be thousands of times more damaging to the climate than CO2. Examples of fugitive emissions are CFCs, HFCs, PFCs, SF6, and NF3.

Gentrification
The changing of a lower-income neighborhood, that takes place when wealthier residents move in, attracted by the lower property values. As new businesses and land developers follow, property values and costs of living in that neighborhood increase to become unaffordable for the original residents. These increases in cost force the original residents to move, in search of more affordable housing, goods, and services.

Gentrification is a leading cause of displacement of BIPOC communities, and communities with limited income and economic opportunities. See ***Displacement.***

Global Average Temperature
The number calculated by averaging all daily air temperatures and ocean surface temperatures that are officially recorded around the Earth.

Goal
The final result that an action or series of actions seek to achieve.

Greenhouse Gas Emissions Inventory (GHGI)
A list of an organization's or community's emissions that is organized by source, or where the emissions came from. Categories of sources can be broad, such as buildings or transportation, or specific, such as vehicle fuel use.

Greenhouse Gases (GHG)
Gases that trap heat in the atmosphere, such as CO2 and methane. GHGs are primarily produced by the production and use of fossil fuels, such as natural gas and oil. See ***CO2*** and ***Methane***.

Greenspaces
An all-inclusive term for any area that includes grass, trees, or other vegetation set apart for recreation, community gathering, and visual appeal in an otherwise urban environment.

Imported Emissions
Emissions generated outside of a community's geographic boundary to produce goods that will be brought into that community for consumption and disposal. Emissions outside of Gresham for growing food that will be eaten in Gresham is an example of imported emissions. Used interchangeably with ***Consumption-Based Emissions.***

Inclusion
The practice or policy of removing barriers to equal access to opportunities and resources for people who might otherwise be excluded or who identify with groups or people who are excluded.

To be ***inclusive*** is to take deliberate actions that result in individuals and groups feeling accepted, safe, valued, and able to bring their whole, unique selves to their work and their community.

Interconnected
Where two or more things are linked and influence one another.

Interrelated
Where two or more things are bound to each other, depend on each other, and have an equal impact on each other.

Intersectional / Intersectionality
The recognition that all oppression and all vulnerabilities are linked and compounded by overlapping marginalized identities that 'intersect' in some way.

Land-use Planning & Practices
The regulation and use of land for economic and cultural activities that are allowed in a given place. Examples of land-use include, but are not limited to, agriculture, industry, mining, recreation, commercial activity, and residential living space.

Local Emissions
Greenhouse gas emissions that are the direct result of activities within a community's geographic boundary. Local emissions commonly include energy use in buildings, emissions from transportation, and processes for producing goods and providing services.

Low-Carbon Concrete & Asphalt
Concrete and asphalt mixes that produce fewer carbon emissions in their production and application.

Marginalized Groups
Groups of people who are excluded from mainstream social, economic, cultural, and/or political life.

Marginalized groups include, but are not limited to, groups excluded due to race, religion, political or cultural group, age, gender, gender identity, sexual orientation, or financial status.

Methane
A gas made of molecules that each have one carbon atom bonded to four hydrogen atoms, released by the production and use of fossil fuels, and by natural processes; A gas that is high effective at trapping heat in the atmosphere longer than CO2. See ***CO2***.

Microgrid
A local source of energy generation and supply that is attached to a centralized grid but is able to operate independently. Microgrids generate and supply energy when centralized grids fail and cannot supply energy to utility customers.

Micro-mobility
Transportation using bicycles and scooters, especially electric ones that are borrowed or a self-service rental program for short-term use within a city or town, designed to reduce a community's dependence on vehicles.

Mitigation / Mitigate
Reducing, avoiding, and preventing greenhouse gas emissions by reducing or eliminating their sources.

Mixed-Use Developments
A building or groups of buildings that are pedestrian-friendly, and combine two or more residential, commercial, or cultural uses. Uses can be combined within the same building or within the same parcel of land.

MTCO2e
The units used to measure metric tons of carbon dioxide. 1 metric ton is equivalent to 2,204 lbs.

Net-Zero Emissions
An organization or building has net-zero emissions when all the CO2 it produces in its operations and activities are completely balanced by actions that absorb or prevent CO2. No more CO2 is produced than prevented, and therefore it 'nets' to zero: +/- 0. Net-zero emissions is used interchangeably with carbon neutral. See ***Carbon Neutral***.

Parts Per Million (PPM)
The number of CO2 molecules per million molecules of dry air. PPM provides a consistent measurement of how much greenhouse gas molecules are circulating in the global atmosphere. It is a generally agreed upon fact by the global scientific community that increases in PPM from greenhouse gas emissions have a causal relationship with increases in global average temperatures.

Precautionary Principle
An approach that is widely used to protect people and the environment. Essentially, it states that where there are threats of serious or irreversible damage to the environment, a lack of complete, exhaustive scientific certainty should not be used as a reason to prevent actions that protect the environment.

Pollution Burden
The negative economic, environmental, and health impacts that a community experiences by being located in areas with high levels of pollution or areas close to sources of pollution. Pollution burden is measured by air quality, presence of toxins, water quality, presence of illness and disease that result from exposure to toxins and pollutants, and the health care costs associated with treating those conditions.

Public Works Standards
Standards that regulate the construction of capital improvement projects, such as improved sidewalks, roads, water pipes, and sewer pipes.

Renewable Energy
Energy that comes from sources that are replenished by natural processes and are not depleted when used, such as wind and solar.

Resilience
The ability to anticipate, prepare for, absorb, and recover from hazardous conditions brought on by climate change. Related to ***Adaptation***.

Resilience Hub
Buildings, spaces, or structures that provide a variety of essential services to the community during climate hazards. Resilience hubs are powered by onsite renewable energy sources so that essential services can continue to be provided when the local electricity grid is down.

Social Infrastructure
The local government and community-based programs that provide, support, maintain, and fund community health and safety.

Source Activity
The activities in a community that cause greenhouse gas emissions, such as transportation, building operation, energy use, and waste.

Strategy
The approach to solving a specific problem or meeting a specific need, often a project that is a part of achieving a larger, overarching goal.

Target
Like a ***Goal,*** it is the result that an action or series of actions seek to achieve. In terms of climate action, a target is typically a higher level of performance that a community or organization seeks to reach as a steppingstone towards a greater goal. Progress towards reaching a target helps measure one's progress towards achieving the greater goal.

Threshold
The point at which there is abrupt and permanent change in the patterns or characteristics of an ecosystem.

In terms of climate, it is the atmospheric temperature that serves as the boundary for 'normal' climate patterns and conditions. Once this boundary is passed, the climate patterns change to become unstable and produce weather that is more extreme in terms of heat, cold, rain, and drought.

Transit Connectivity
How well different types of transportation and transit connect with each other and reach each other's stops. A transit system has high connectivity when passengers are able to easily move between buses and trains, and can easily reach destinations at both the center and edge of a community.

Underserved
Communities or populations who currently and have historically experienced discrimination of any kind and encounter barriers to accessing goods and services.

The discrimination could stem from, though is not limited to, race, ethnicity, gender, sexual orientation, economic, cultural, or linguistic characteristics.

Understory
The vegetation beneath the main canopy of a tree or forest.

Urban Canopy
The area of an urban space that is covered by trees that provide shade, regulation of air temperatures, and habitat to wildlife.

Urban Heat Island
When an urban area is significantly warmer than its surrounding rural areas, particularly at night when temperatures are typically lower. This occurs due to the large amounts of hard surfaces, such as concrete, that are highly effective in trapping and storing heat for long periods of time.

Urban Renewal
The redevelopment and improvement of old neighborhoods and areas within a city. When done correctly using an equity-informed approach, urban renewal is driven by the current residents of the neighborhood under redevelopment to ensure that they are not displaced by gentrification. See ***Gentrification***.

Vehicle Miles Travelled (VMT)
The total miles vehicles have been driven on a road or in a community during a certain time period. VMT can be measured annually, quarterly, or monthly, and can be represented as VMT per capita.

Vulnerable Communities & Populations
The people most likely to experience hardship because of climate change due to a lack of resources, living in areas close to hazards, being marginalized and/or underserved.