

PUBLIC PERCEPTIONS ON CLIMATE CHANGE AND HOW THEY CAN HELP LOCAL GOVERNMENT PREPARE FOR IT



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Tiffany Speir, Long Range & Strategic Planning Manager

tspeir@cityoflakewood.us | 253.983.7702

Energy & Climate Change Chapter – Lakewood Comprehensive Plan

It is increasingly evident that there are dramatic relationships between greenhouse gas emissions and local transportation and land use patterns. Lakewood has opportunities to build higher density, mixed-use projects around existing public transit infrastructure, schools, parks and neighborhoods. Energy efficiency and sustainability can be further enhanced by incorporating green materials and construction practices into buildings and streetscape improvements. Sustainable development concepts such as natural resource conservation, transit-oriented development, multimodal transportation access and the encouragement of green building are integrated throughout this Comprehensive Plan Chapter.



Figure 1 (ART DAILY, June 2019)

In 2021, the City of Lakewood adopted a new Comprehensive Plan Energy and Climate Change Chapter and is currently engaged in collecting public perception feedback about climate change in order to inform its implementation planning. Specific effort has been made to gather perception results from a wide range of City residents, including those with BIPOC and/or military backgrounds and connections.

One-on-one interviews, surveys and other public outreach are all being conducted to gather reactions to questions asking:

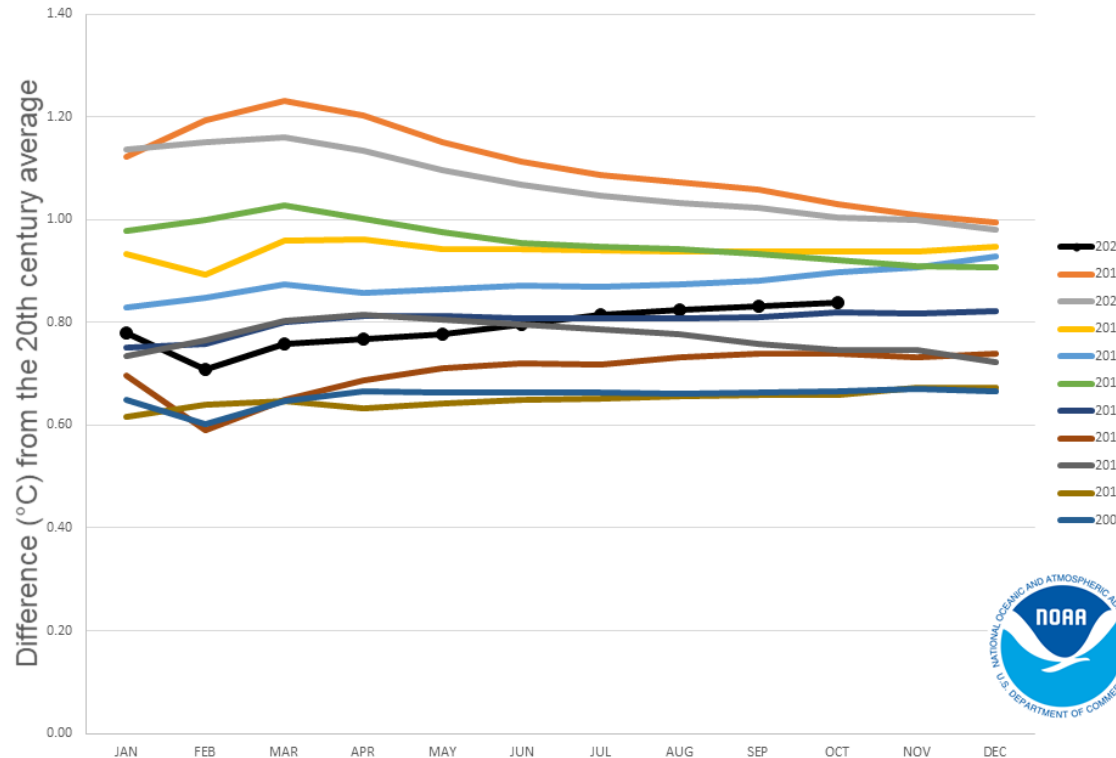
- whether it is the result of human activities;
- whether it can be affected by community and local government actions;
- what type of actions can individuals take to mitigate and/or prepare for the results of climate change; and more.

This session will provide a summary of the City's Comprehensive Plan Chapter, which was based in part on ICLEI and Google EIE data collection, then focus on the information gathered from the public and what actions can be taken by local government and utilities in response to both.

Background

Year-to-Date Global Temperatures

for 2021 and the ten warmest years on record



Global Year to Date Temperature Anomalies

This graphic compares the year-to-date temperature anomalies for 2021 (black line) to what were ultimately the ten warmest years on record: 2016 (1st), 2020 (2nd), 2019 (3rd), 2015 (4th), 2017 (5th), 2018 (6th), 2014 (7th), 2010 (8th), 2013 (9th), and 2005 (10th). Each month along each trace represents the year-to-date average temperature anomaly. In other words, the January value is the January average temperature anomaly, the February value is the average anomaly of both January *and* February, and so on.

The average global land and ocean surface temperature for January - October 2021 was 0.84°C (1.51°F) above the 20th century average of 14.1°C (57.4°F), the sixth warmest such period on record.

Selected Significant Climate Anomalies and Events: December 2021



GLOBAL AVERAGE TEMPERATURE
The December 2021 average global surface temperature tied with 2016 as the fifth highest for December since global records began in 1880.

ARCTIC SEA ICE EXTENT
The December 2021 Arctic sea ice extent was 5.1% below the 1981-2010 average – the 13th smallest December extent on record.

SWEDEN
A minimum temperature of -43.8°C (-47.2°F) was recorded on December 6 in northern Lapland – Sweden's coldest December night in 35 years.

ASIA
This was Asia's 17th-warmest December on record.

EUROPE
Although Europe's December temperature was above average, it was the coldest December since 2016.

TYPHOON RAI
Strong and destructive Typhoon Rai made landfall in the southern Philippines on December 16, wreaking havoc across the region.

NORTH AMERICA
North America had its coldest December since 2016, despite its temperature being above average.

AFRICA
Africa had its sixth-warmest December on record.

SOUTH AMERICA
December 2021 was South America's third-warmest December on record, behind 2013 and 2015.

AUSTRALIA
Australia had its ninth-warmest December in the nation's 112-year record.

OCEANIA
Eighth-warmest December on record for Oceania.

ANTARCTIC SEA ICE EXTENT
The Antarctic sea ice extent for December 2021 was 11.6% below average and was the third-smallest December sea ice extent in the 43-year record, behind 2016 and 2018.

Please note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: <http://www.ncdc.noaa.gov/sotc>

The Greenhouse Effect

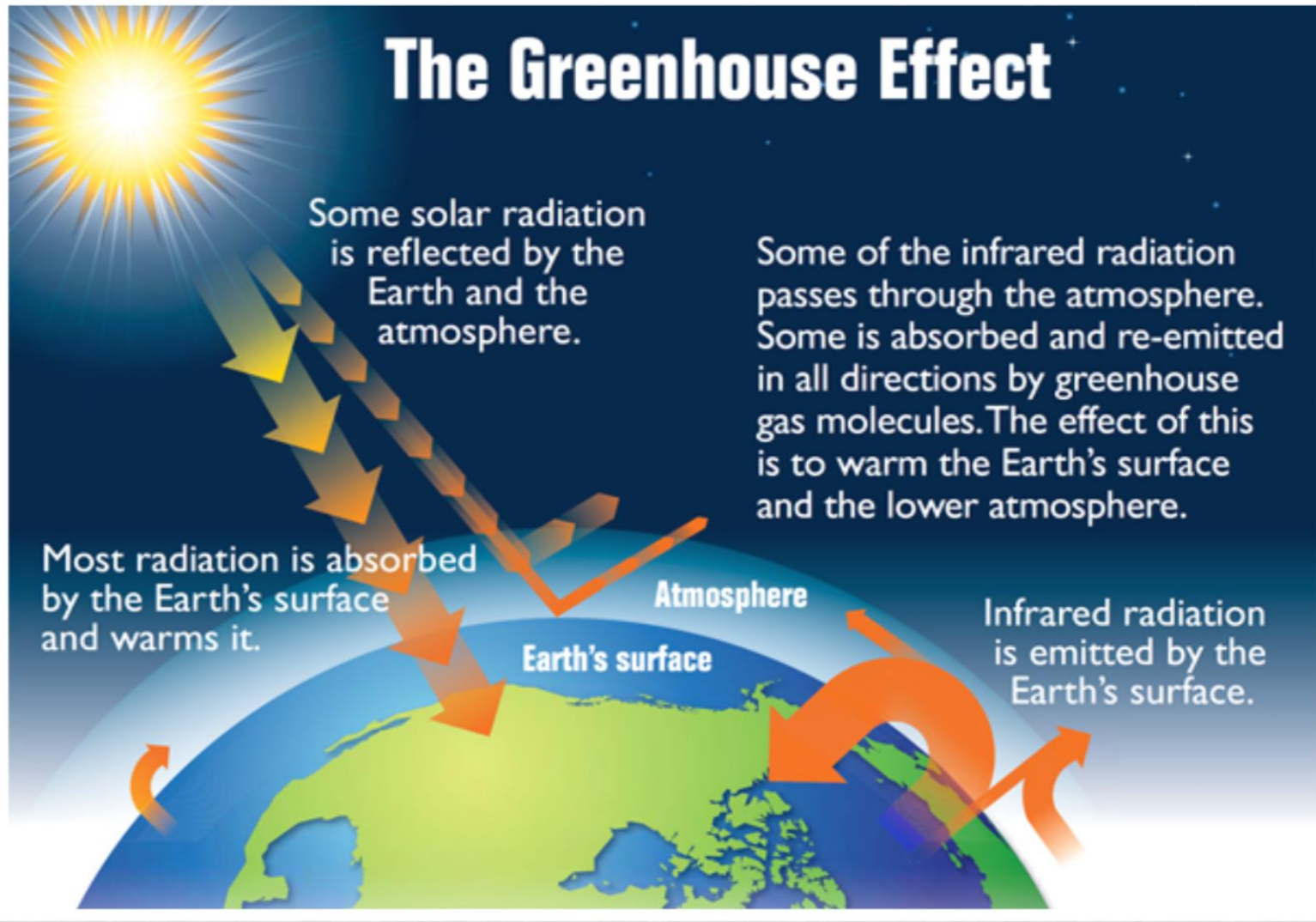
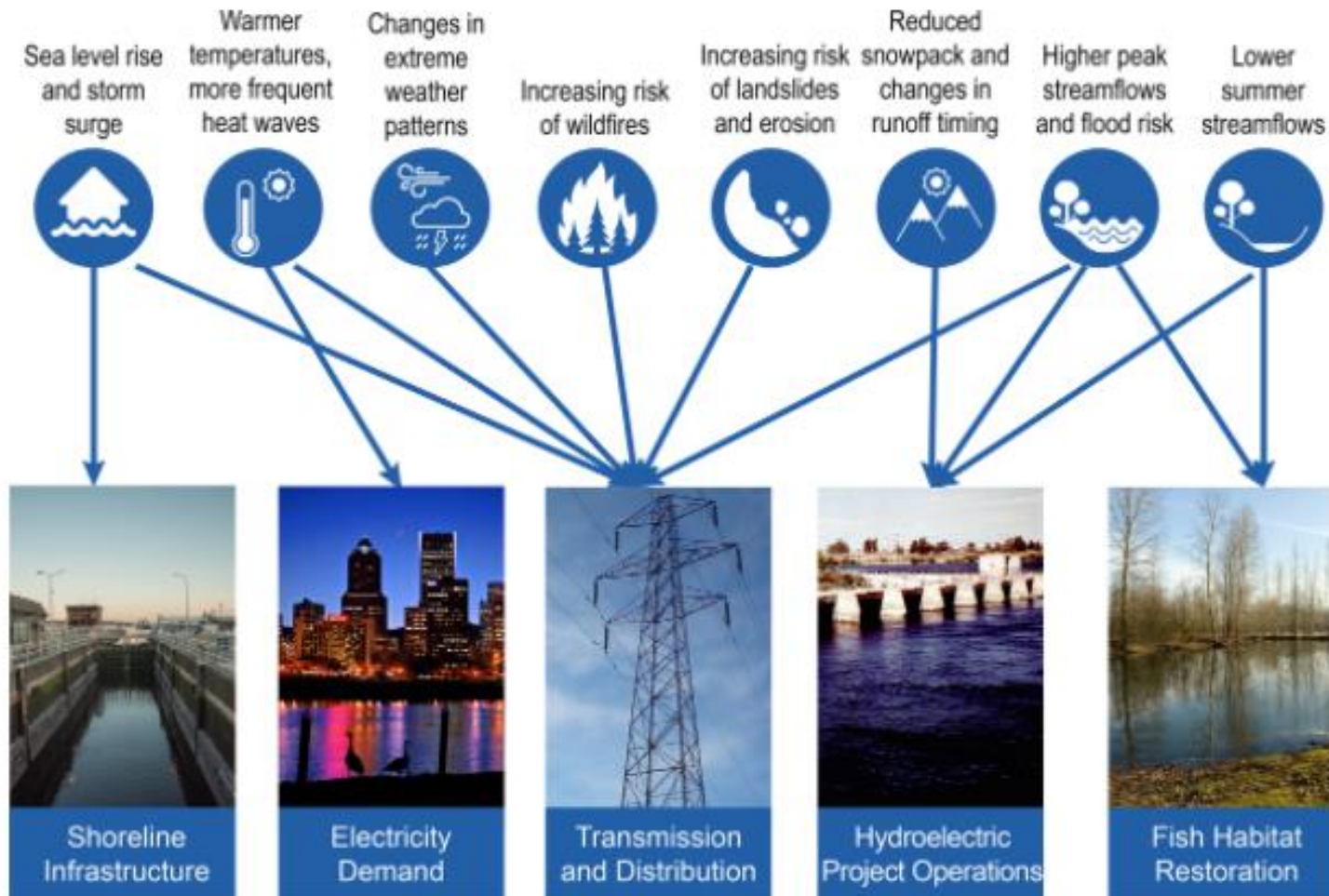


Figure 2 (EPA 2012)

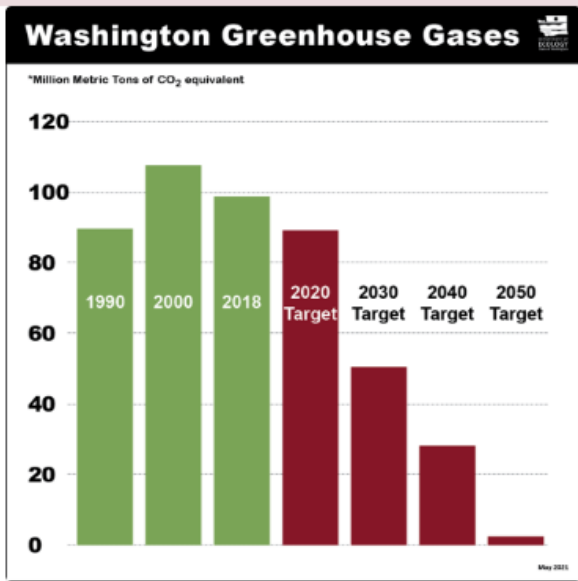
Figure 24.11: Multiple Climate Stressors Affect Vulnerable Infrastructure



Greenhouse gas emission limits

In 2020, the Washington Legislature set new greenhouse gas emission limits in order to combat climate change. Under the law, the state is required to reduce emissions levels:

- 2020 - reduce to 1990 levels.
- 2030 - 45% below 1990 levels.
- 2040 - 70% below 1990 levels.
- 2050 - 95% below 1990 levels and achieve net zero emissions.



WA Greenhouse gas emissions for 2016-2018

Ecology data shows that Washington's greenhouse gas emissions *increased* in the years 2016-2018:

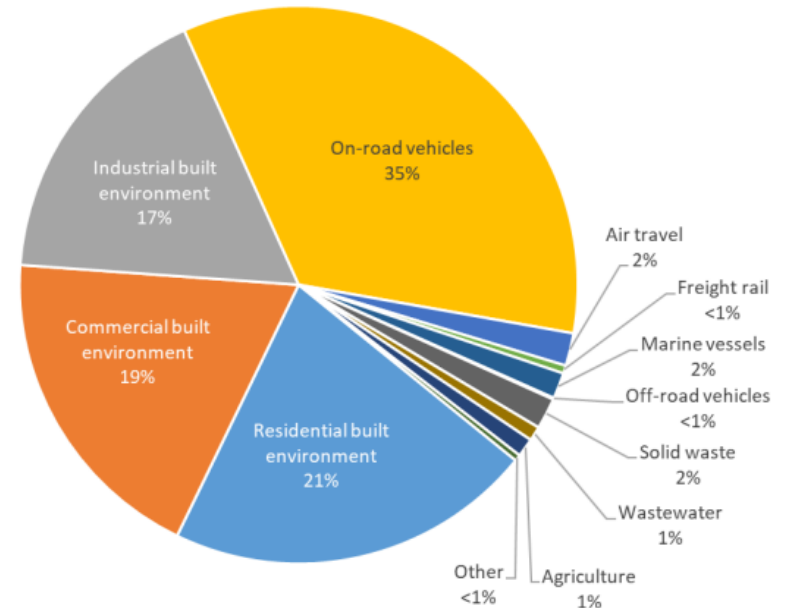
- 2016 total emissions — 97.9M metric tons
- 2017 total emissions — 98.3M metric tons
- 2018 total emissions — 99.6M metric tons

Figure 1. Sources of greenhouse gas emissions for the PSCAA area in 2015, in million MgCO₂e (total = 34.4 million MgCO₂e).

The Puget Sound Clean Air Agency Board recently adopted regional targets for reducing greenhouse gas emissions. The targets are to reduce emissions:

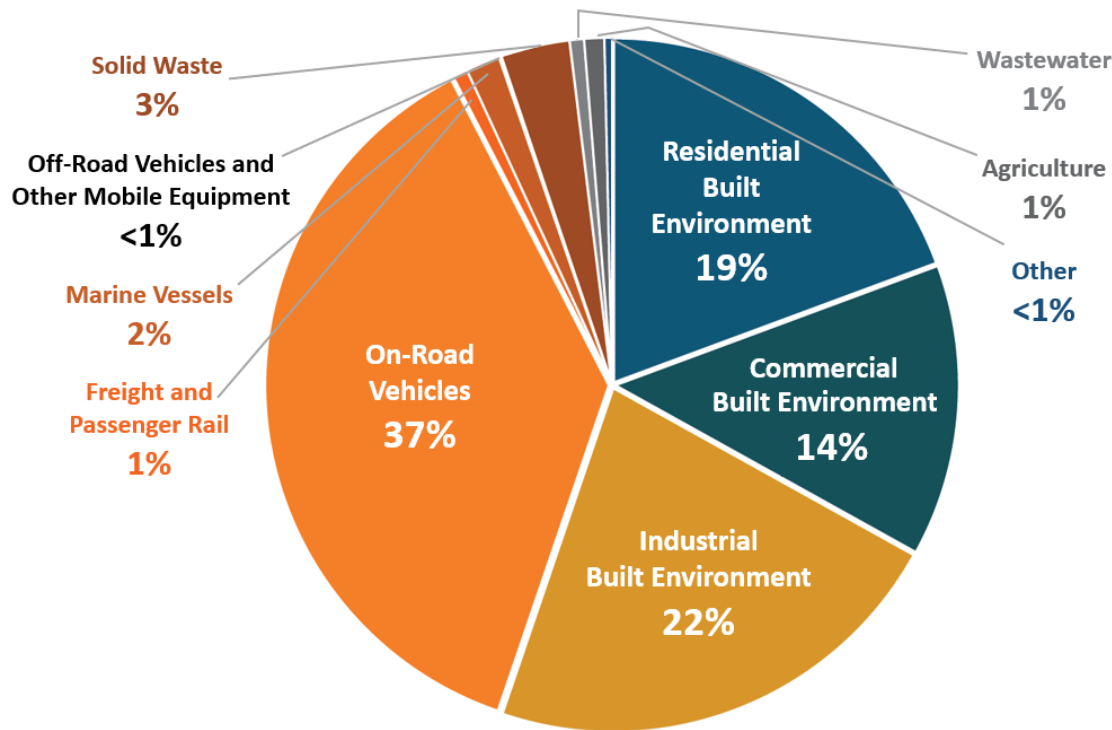
- 50% below 1990 levels by 2030; and
- 80% below 1990 levels by 2050.

Almost half of all GHG emissions in Puget Sound region are from the transportation and mobile sector.



2015 Geographic GHG Emissions Sources in Pierce County (Puget Sound Clean Air Agency, 2018)

Greenhouse Gas (GHG) Contributors in Pierce County



New data coming summer 2022:

2019 geographic emissions (new)

2015 geographic emissions (updated)

2015 and 2019 operational emissions (new)



State and Regional Legislative and Regulatory Focus on Climate Change

State Legislative Action related to GMA 2024 Periodic Update: [HB 1099](#) and [HB 1117](#) introduced, integrating climate change and salmon recovery into the GMA, respectively.

Brief Summary of HB 1099 (As Amended by Senate) – [Did not pass](#) on last day of '22 Session:

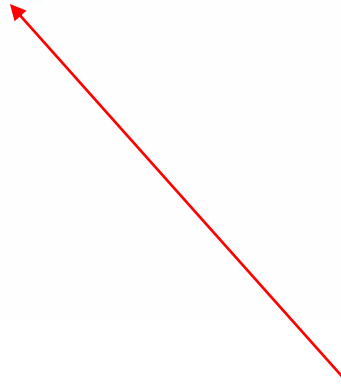
- Adds a goal of environmental resiliency to the listed goals of the Growth Management Act (GMA).
- Adds an environmental resiliency element to the list of elements that must be included within the comprehensive plans certain counties and cities must adopt under the GMA.
- Requires the environmental resiliency element of the comprehensive plan of certain counties and cities to address the environmental related problems specific to a jurisdiction.
- Requires Commerce to adopt guidance that creates a model environmental resiliency element. Requires the Department of Ecology to update its Shoreline Master Program guidelines to require Shoreline Master Programs to address the impact of sea level rise and increased storm severity.
- Adds consideration of changing conditions impacts to the list of elements that must be contained in optional comprehensive flood control management plans

VISION 2050 is the shared regional plan for moving toward a sustainable future in King, Kitsap, Pierce, and Snohomish counties. VISION 2050 sets forth a pathway that strengthens economic, social, and environmental resiliency, while enhancing the region's ability to cope with adverse trends such as **climate change** and unmet housing needs.

Key Policy Themes



-  Increase **housing** choices and affordability
-  Provide **opportunities** for all
-  Sustain a strong **economy**
-  Significantly reduce greenhouse gas **emissions**
-  Keep the region **moving**
-  Restore the health of **Puget Sound**
-  Protect a network of **open space**
-  Growth in **centers** and near **transit**
-  Act **collaboratively** and support **local efforts**



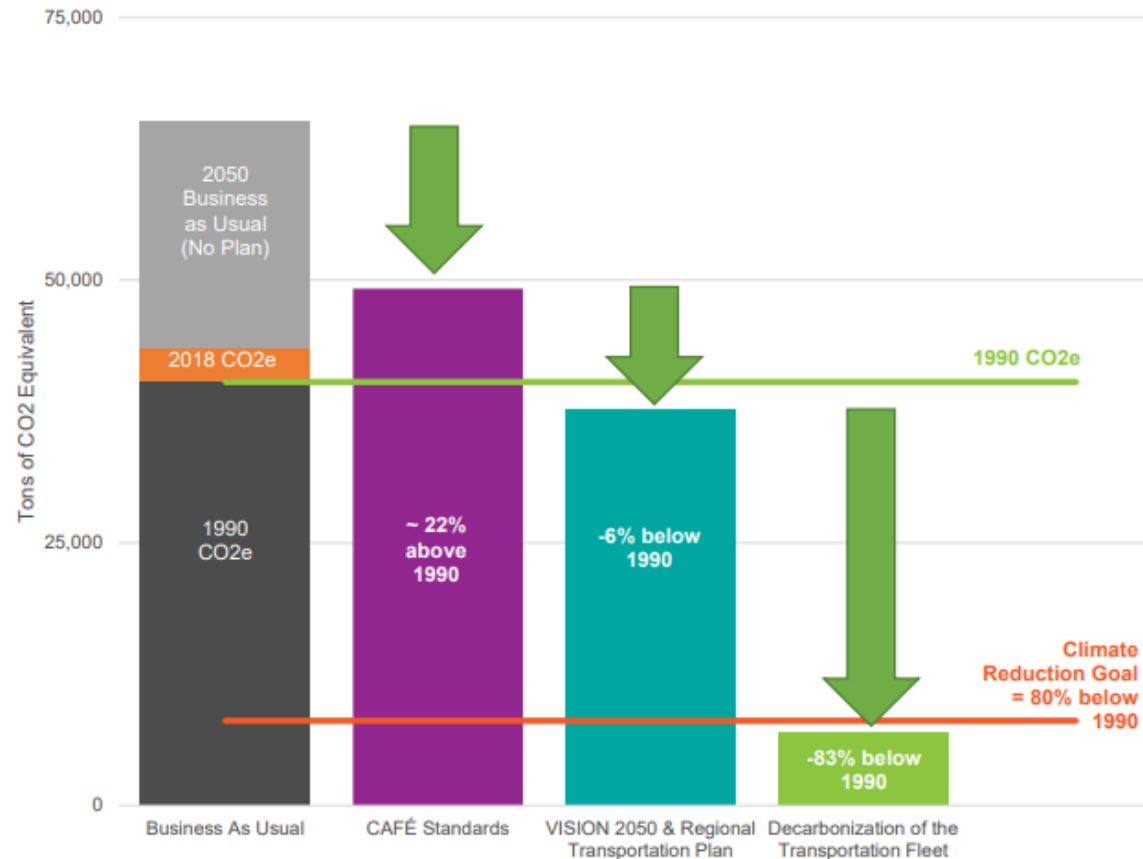
Significantly reduce greenhouse gas emissions. Climate change is an urgent environmental, economic, and equity threat being addressed at all levels, from the local to an international scale. VISION 2050 outlines how state, regional and local partners can act in coordination to reduce emissions in the region and prepare for climate impacts. View the **climate change analysis** completed for the 2018 Regional Transportation Plan.

REGIONAL TRANSPORTATION PLAN 2022-2050

The adopted **Four-Part Greenhouse Gas Strategy**, recognizing that decisions and investments in the categories of [Land Use](#), [Transportation Choices](#), [Pricing and Technology/Decarbonization](#) are the primary factors that influence greenhouse gas emissions from on-road transportation and are factors for which PSRC's planning efforts have either direct or indirect influence.

With full implementation of the Greenhouse Gas Strategy, the region is on track to achieve the climate goals with a forecasted -83% reduction in GHG emissions below 1990 levels by 2050. Figure 33 highlights the impacts of the various steps required to meet the regional climate goals.

Figure 33 - Steps to Meet Greenhouse Gas Reduction Goals



VISION 2050 Climate Change Policies

MPP-CC-1: Advance the adoption and implementation of actions that substantially reduce greenhouse gas emissions in support of state, regional, and local emissions reduction goals, including targets adopted by the Puget Sound Clean Air Agency.

MPP-CC-2: Reduce building energy use through green building and retrofit of existing buildings.

MPP-CC-3: Reduce greenhouse gases by expanding the use of conservation and alternative energy sources, electrifying the transportation system, and reducing vehicle miles traveled by increasing alternatives to driving alone.

MPP-CC-4: Protect and restore natural resources that sequester and store carbon such as forests, farmland, wetlands, estuaries, and urban tree canopy.

MPP-CC-5: Pursue the development of energy management technology as part of meeting the region's energy needs.

MPP-CC-6: Address impacts to vulnerable populations and areas that have been disproportionately affected by climate change.

MPP-CC-7: Advance state, regional, and local actions that support resilience and adaptation to climate change impacts.

MPP-CC-8: Increase resilience by identifying and addressing the impacts of climate change and natural hazards on water, land, infrastructure, health, and the economy. Prioritize actions to protect the most vulnerable populations.

MPP-CC-9: Identify and address the impacts of climate change on the region's hydrological systems.

MPP-CC-10: Address rising sea water by siting and planning for relocation of hazardous industries and essential public services away from the 500-year floodplain.

MPP-CC-11: Support achievement of regional greenhouse gas emissions reduction goals through countywide planning policies and local comprehensive plans.

MPP-CC-12: Prioritize transportation investments that support achievement of regional greenhouse gas emissions reduction goals, such as by reducing vehicle miles traveled.

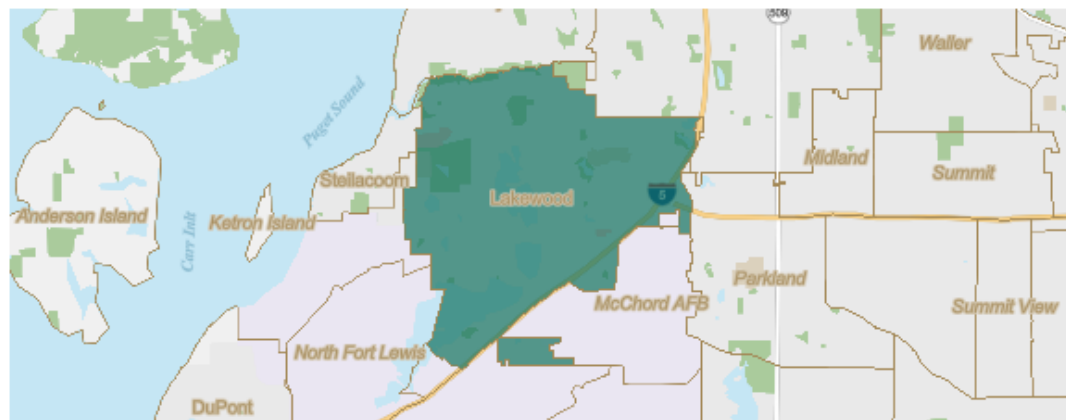
Pierce County Countywide Planning Policies' update for consistency with VISION 2050 pending review at Pierce County Regional Council, then adoption by Pierce County Council

About Lakewood

- Incorporated in 1996
- 2nd largest city in Pierce County (2020 Census Population: 63,612)
- Very diverse economically (“barbell community”), racially, and culturally
- Host City to: Joint Base Lewis McChord (JBLM); Western State Hospital; Fort Steilacoom Park and Summerfest; Clover Park Technical College; Pierce College; Pierce Transit; Sounder Station

Lakewood city, Washington

Place in Washington



Total Population
63,612



Median Household Income
\$55,723



Bachelor's Degree or Higher
22.2%



Employment Rate
55.0%



Total Housing Units
26,999



Without Health Care Coverage
10.2%



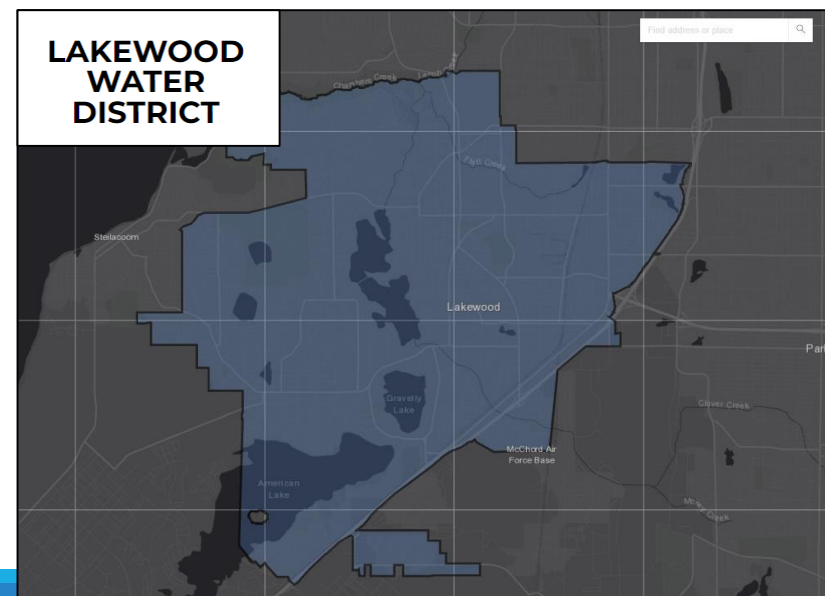
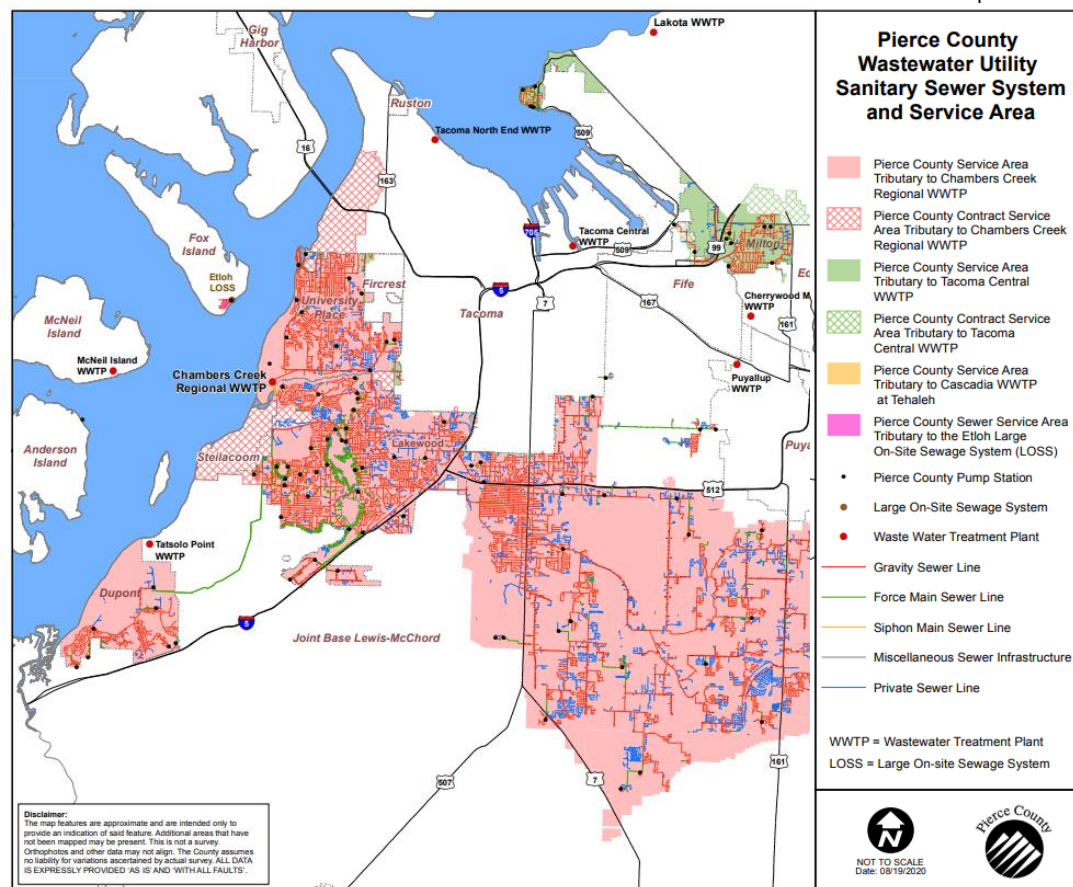
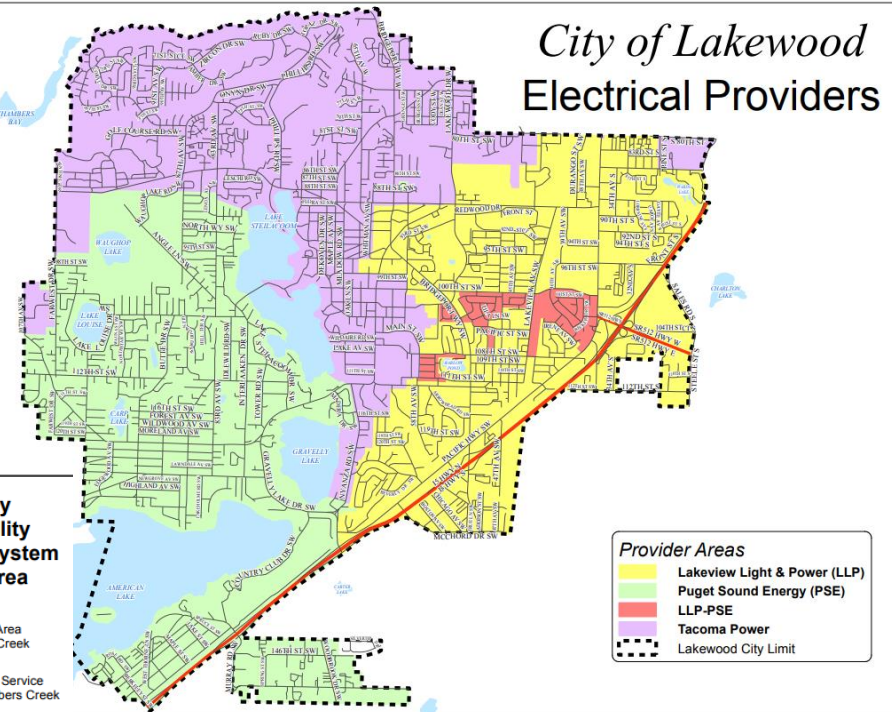
Total Households
24,821



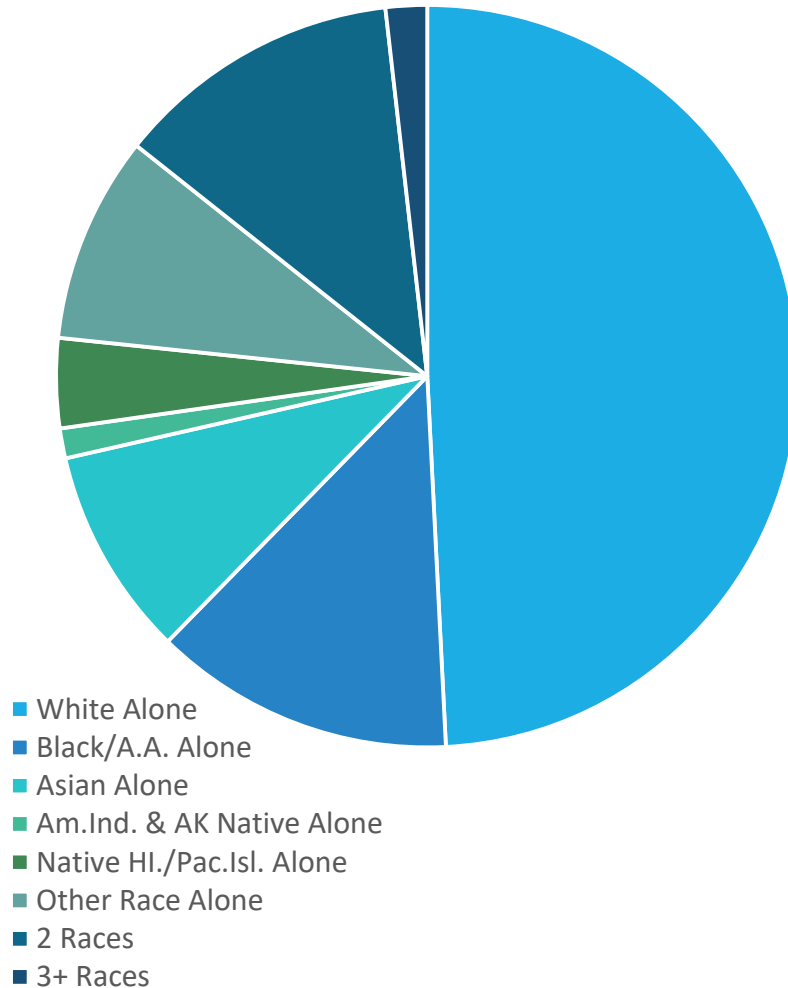
Hispanic or Latino (of any race)
11,516

Lakewood contracts for water, sewer, and power from multiple utilities and agencies, which affects and complicates City's ability to set climate change policies and long range planning goals

City of Lakewood
Electrical Providers



Population by Race



Lakewood is one of 15 Washington cities with a majority population of people of color; 51.9% of Lakewood's population is BIPOC. The city has a 14.7% poverty rate.

Poverty Data

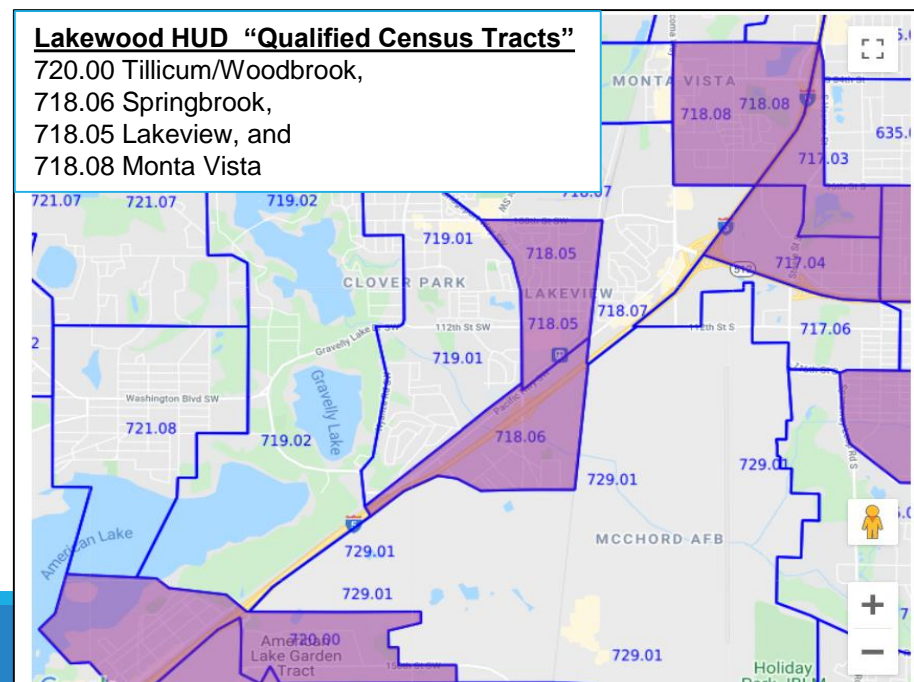
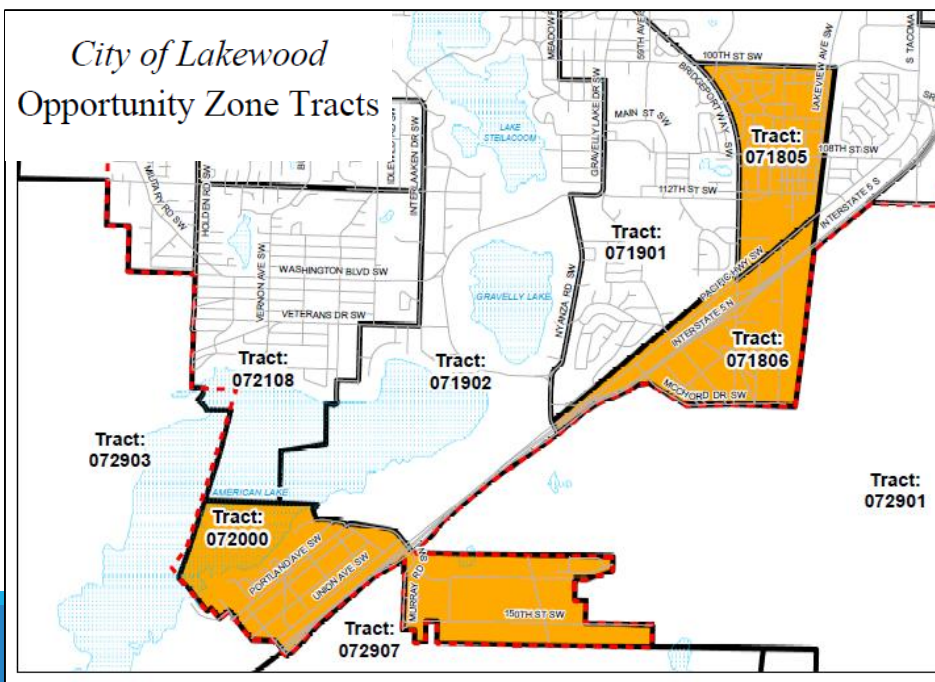
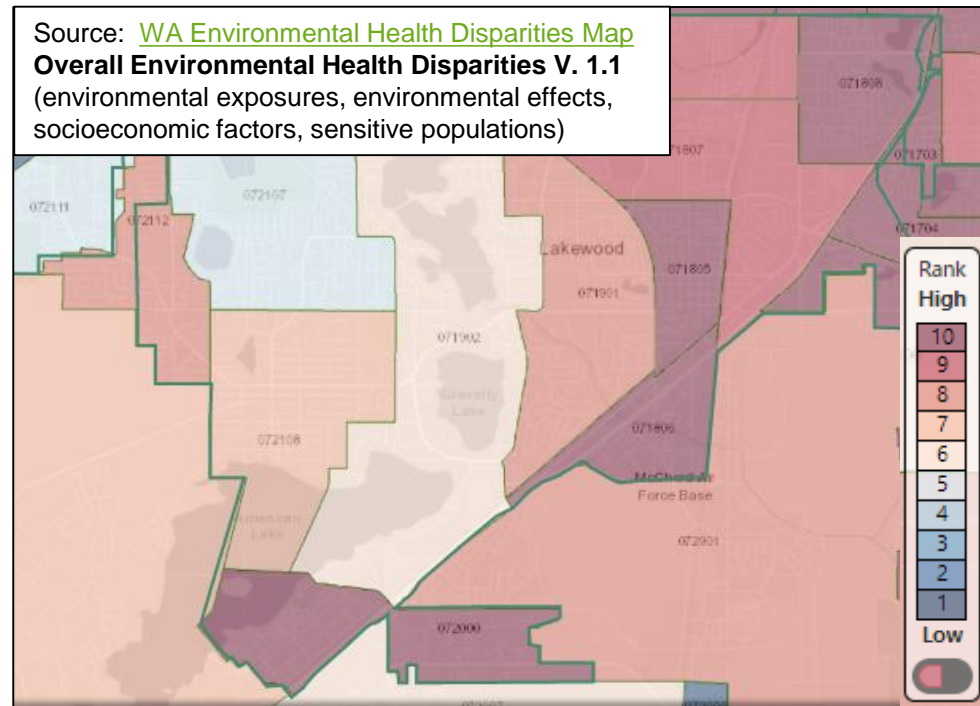
	Percent below poverty level
Label	Estimate
▼ RACE AND HISPANIC OR LATINO ORIGIN	
White alone	14.1%
Black or African American alone	18.7%
American Indian and Alaska Native alone	36.9%
Asian alone	10.6%
Native Hawaiian and Other Pacific Islander alone	7.8%
Some other race alone	19.6%
Two or more races	13.6%
Hispanic or Latino origin (of any race)	17.2%
White alone, not Hispanic or Latino	12.9%

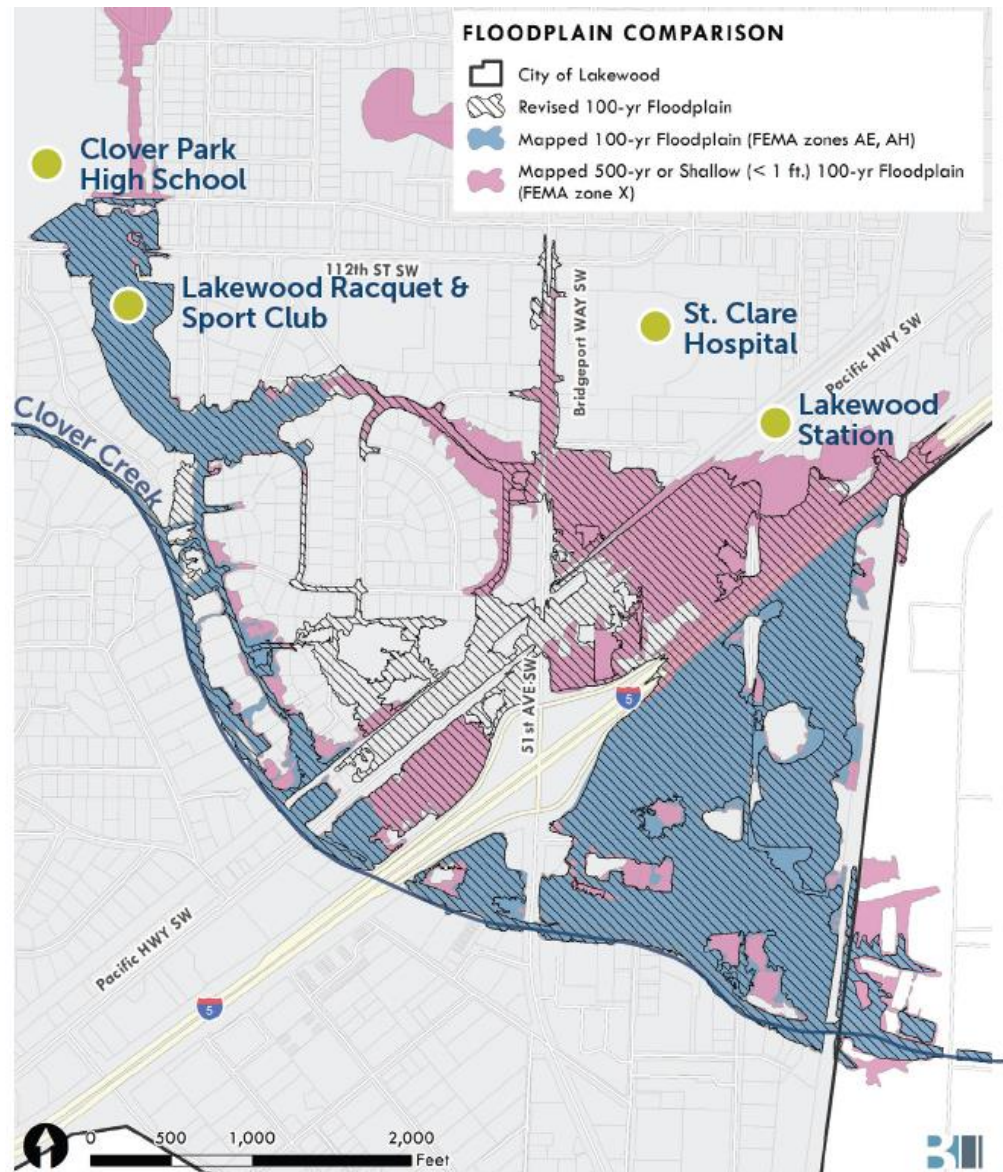
	Percent below poverty level
Label	Estimate
▼ Population for whom poverty status is determined	14.7%
▼ AGE	
▼ Under 18 years	17.1%
Under 5 years	18.3%
5 to 17 years	16.6%
Related children of householder under 18 years	16.9%
▼ 18 to 64 years	15.3%
18 to 34 years	16.2%
35 to 64 years	14.6%
60 years and over	12.0%
65 years and over	9.4%

Source: [WA Environmental Health Disparities Map](#)
Overall Environmental Health Disparities V. 1.1
 (environmental exposures, environmental effects,
 socioeconomic factors, sensitive populations)

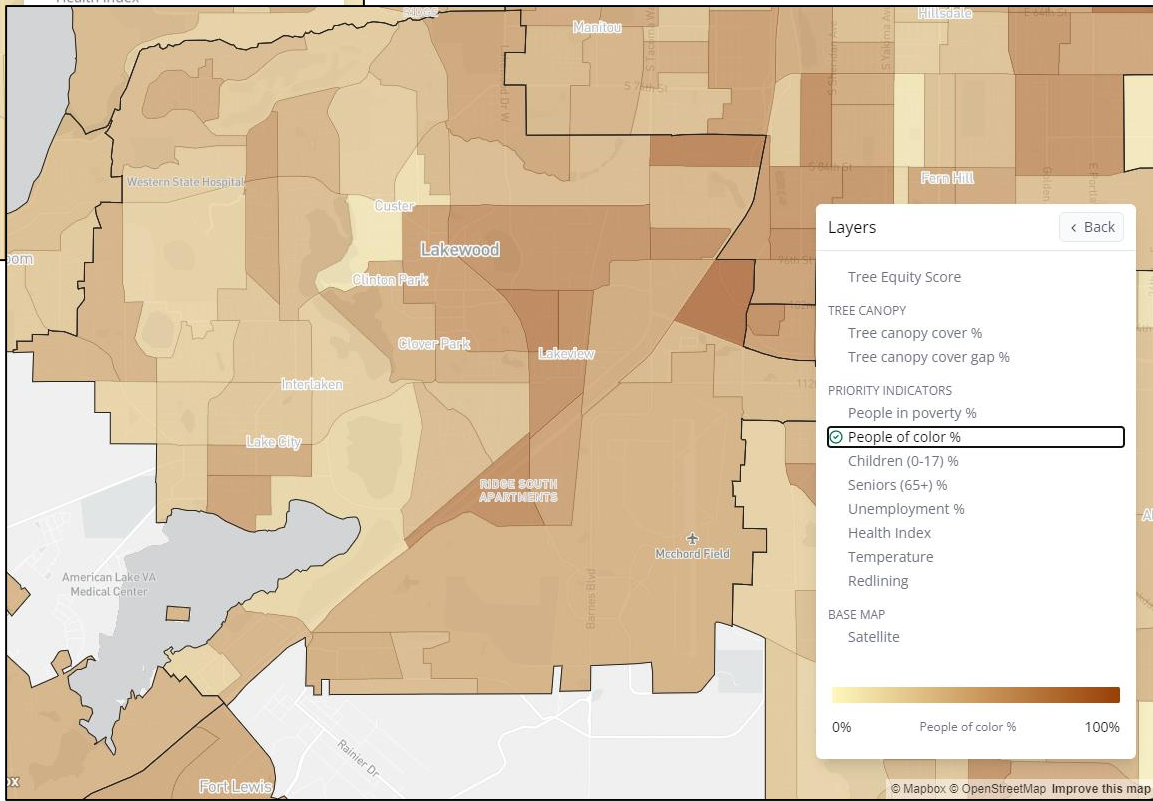
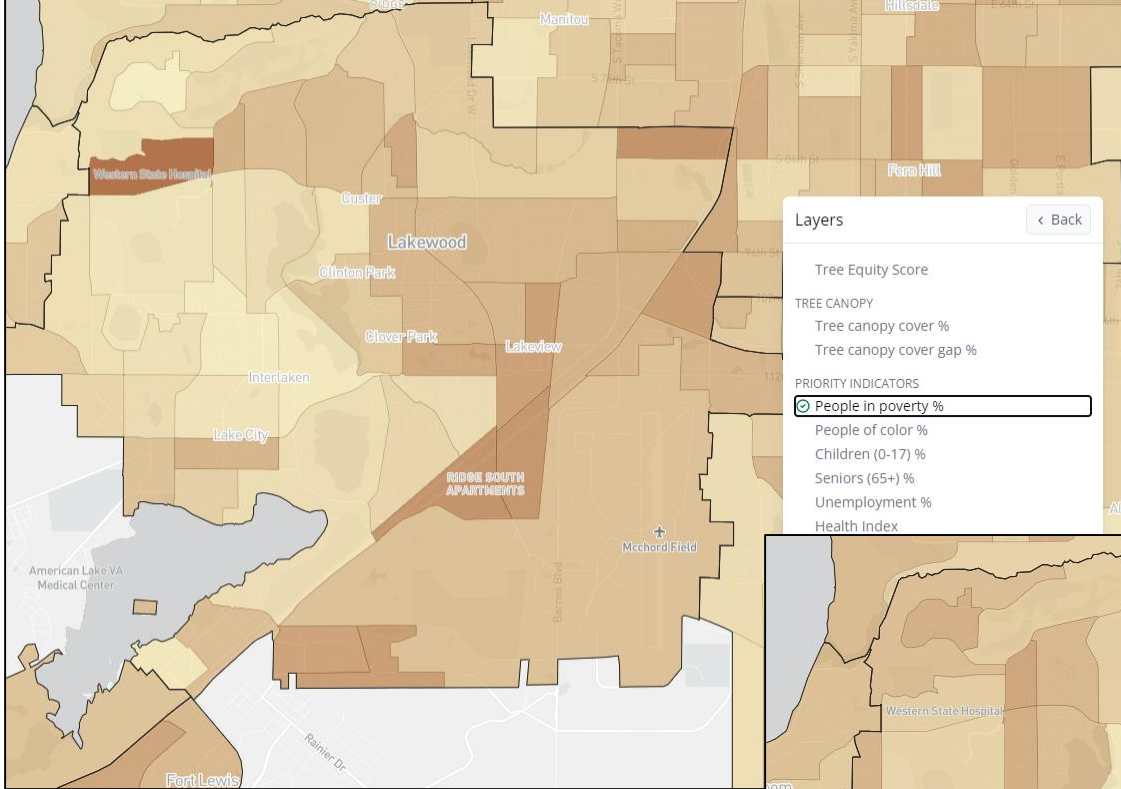
City areas with:

- Federal Opportunity Zone ID
- HUD Qualified Census Tract ID
- WA Environmental Health Disparities High Scores





People in Poverty and People of Color
mapping results similar to
Opportunity Zone, HUD, & WA HEAL Act
Mapping results





A Statement on Equity by the Lakewood City Council

The Lakewood City Council acknowledges that equity is essential to a healthy community.

We are committed to identifying and eliminating systemic racism. We intend to lead by example in the advancement of equity and the deliberate practice of inclusion.

The City Council commits to the following practices:

- Instilling equity as a priority of policy and the delivery of services.
- Enacting initiatives that support and celebrate the diversity of the community.
- Ensuring equity in municipal planning.
- Identifying and dismantling preconceived prejudices.
- Increasing sensitivity to social norms and cultural expectations.
- Pursuing justice and equity for all residents.

We recognize the critical role that city leaders have in removing barriers to opportunity. We recognize that systemic inequality has endured, but commit that it shall not persist.

The City Council will not tolerate *intolerance*.

It is unconscionable that some members of our community fall victim to acts of hate. Acts of hate based upon race, creed, ancestry, disability, sex, sexual orientation, gender identity and/or socioeconomic status are unwelcome in Lakewood, Washington.

The Lakewood Police Department shall be vigilant in its investigation and prosecution of crimes of hate.

These intentional practices will inform our decision-making on policing, zoning, capital investment and all other matters of the City Council. Our objective is to create a more diverse, equitable and inclusive Lakewood community for all residents and we invite all Lakewood organizations and residents to join us in this effort.

In anticipation of state and regional mandates, Lakewood began investigating local government climate change best practices, resources, and data sources in 2020. The intent was to proactively develop policies, incentives and voluntary actions, and potentially regulations before mandates came into effect.

This comprehensive plan chapter, along with its implementation program, imbeds environmental justice/equity policies and programs. These are marked by the blue arrow – “→”

Given causes of GHG in City, what are most effective actions to take

Given perception of residents, how to be most effective in garnering support for actions (citizen action, taxes or other \$ support, etc.)

What is Lakewood unable to do/unable to affect regardless?

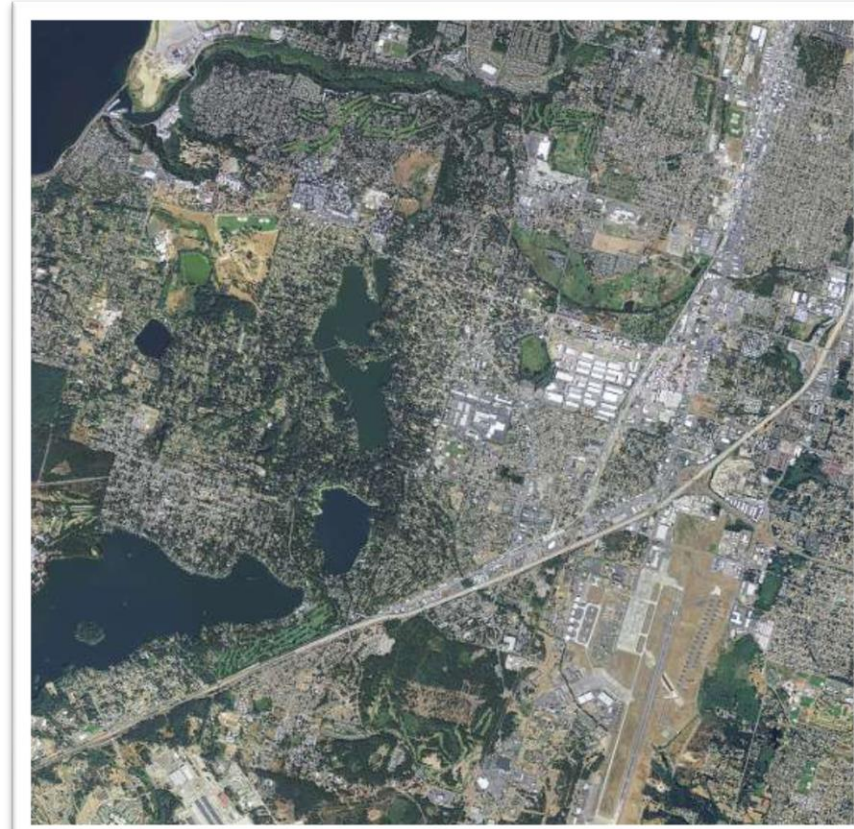
What must City rely on others to do (e.g., electrical grid, car manufacture, employment location & travel trends, utility power sources, etc.)

What can City do with public perception?

Climate Change Impacts to Lakewood

Local impacts are not fully set, but Lakewood could experience:

1. Changes to local weather patterns leading to more frequent peak storm events;
2. Rising Puget Sound water levels, which could influence Chambers Creek Dam at high tides and eventually lead to overtopping;
3. Intermittent lakes, such as Carp Lake are likely to become more intermittent, or may disappear;
4. Areas with steep slopes, such as Chambers Creek Canyon, with heavy rainfall events, could lead to increased landslides.
5. Increased flood risk in the Clover Creek watershed; rising flood waters could impact I-5 between Highway 512 and Bridgeport Way;
6. Additional pollutant loading from peak storm events and higher summer temperatures are likely to make existing water quality issues in the city's numerous lakes and streams worse (expect depleted oxygen levels and more algae bloom events); and
7. Potential for fires in Fort Steilacoom Park, the open space areas behind Western State Hospital, JBLM lands adjacent to the city limits, and vacant lands within the I-5 and Highway 512 Corridors. Loss of vegetation and impacts to air quality are at risk.



Collecting GHG emissions data for Lakewood

Local Governments for Sustainability

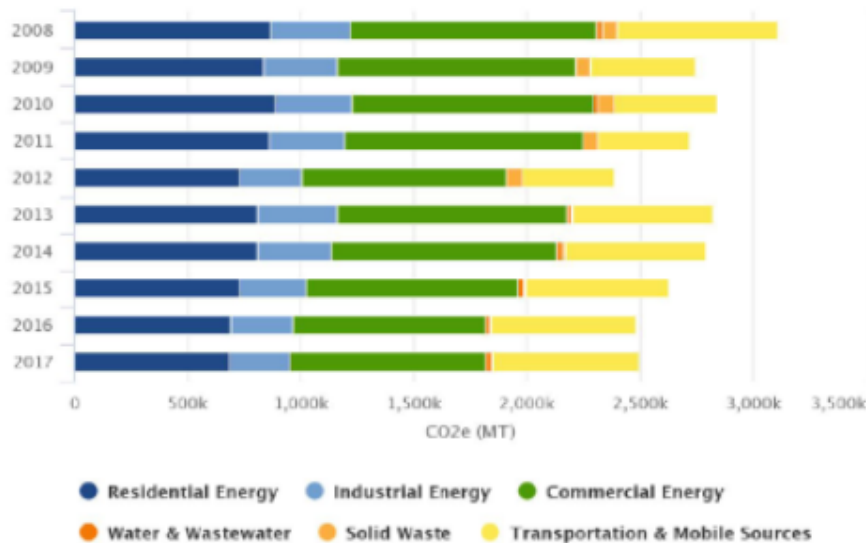
It's in our name.

Since our founding three decades ago, when a group of impassioned mayors asserted their role in fighting environmental pollution at the United Nations—a gathering that came to be known as the “international council for local environmental initiatives”—ICLEI has been the leading network of local governments dedicated to sustainability.



Stay on track

Once you have developed a plan, use the monitoring module of ClearPath to track implementation status of each action, as well as to track energy savings and emissions reductions achieved. The monitoring reports will allow you to compare actual emissions from new inventories to your planning scenario, and to compare actual performance of actions to expected performance.



Streamline Your Emissions Management

Engineered for your full mitigation journey.



Set Baseline

Create a baseline inventory of GHG emissions from your community, operations, or region



Forecast Emissions

Produce business-as-usual scenarios based on custom factors



Explore Actions

Plan using over 60 calculators modeling GHG reductions from specific actions



Monitor Progress

Track each action and the energy savings and emissions reductions achieved

Free with Membership

ICLEI members receive free access to ClearPath along with dedicated technical assistance and an in-depth library of ClearPath trainings.

Track emissions direct and indirect from



Energy



Transportation



Waste



Consumption



Forests and Trees

Output community inventory results for



U.S. Community Protocol



GCOM Common Reporting Framework



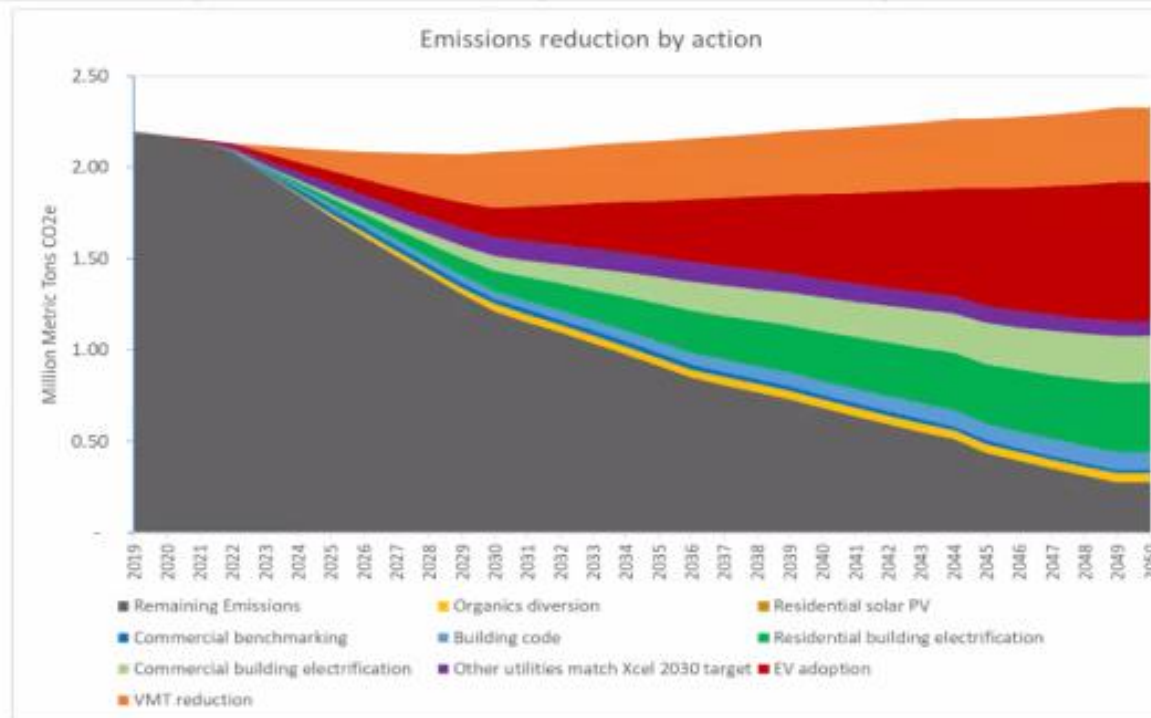
Global Protocol (GPC)

<https://vimeo.com/438996341>

<https://icleiusa.org/clearpath/>

Wedge Analyses

Sector	2019 Baseline (MT CO ₂ e)	2030 Business-as-Usual (MT CO ₂ e)	2050 Business-as-Usual (MT CO ₂ e)
Residential Energy	533,881	478,403	505,757
Commercial Energy	641,490	432,671	296,871
Industrial Energy	38,324	45,144	59,904
Transportation & Mobile Sources	914,066	1,046,538	1,356,105
Solid Waste	66,495	78,312	103,887
Water & Wastewater	2,244	2,643	3,508



Type	Net Reduction (MT CO ₂ e) in 2030	Level of Impact
VMT Reduction	304,465	Very High Impact
Electric Vehicle (EV) Adoption	162,521	Very High Impact
Other Utilities Match 2030 Target	103,292	High Impact
Commercial Building Electrification	77,488	High Impact
Residential Building Electrification	112,735	High Impact
Building Energy Code Update	40,301	Medium Impact
Commercial Benchmarking	28,920	Medium Impact
Organics Diversion	36,496	Medium Impact
Residential Solar PV Adoption	4,565	Low Impact

Citywide Greenhouse Gas Emissions Calculation*

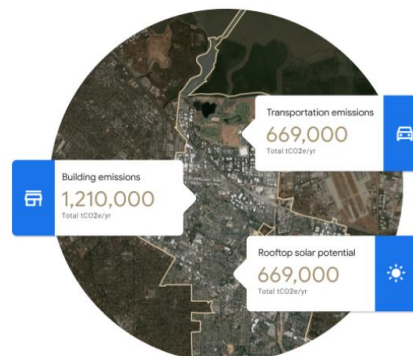
Google Environmental Insights Explorer Methodology Labs

Find your city or region

Access to Google's mapping data and ML capabilities

The Environmental Insights Explorer (EIE) uses exclusive data sources and modeling capabilities in a freely available platform to help cities measure emission sources, run analyses, and identify strategies to reduce emissions — creating a foundation for effective action.

Learn more in [Methodology](#).



Google, through its **Environmental Insights Explorer (EIE)** program, currently offers a means by which cities can calculate GHG emissions. Lakewood became a member of the EIE program in October 2020. Greenhouse emissions data has been analyzed by Google and provided to Lakewood.

For each city, Google uses a blended average of the nearest available emission factor data.

*There are data elements missing in Lakewood's GHG calculations: water, wastewater, and solid waste. Because Lakewood is a "contract city", it has not been easy to collect data to perform a GHG analysis in these areas. The City relied on estimates that may not necessarily be fully descriptive of Lakewood.

Because city-specific fuel mix for on-site combustion is not available and is highly variable across cities, **EIE assumes a default 50/50 mix of natural gas and diesel oil**. The factors also take into account all GHGs produced for electricity generation, including CO₂, methane and others.

Core Insights



Building Emissions

Estimated emissions from buildings in the city boundary, based on Google Maps data.



Transportation Emissions

Estimated emissions of all trips that start or end within the city boundary based on aggregated, anonymized location history data.



Rooftop Solar Potential

Estimated solar production potential of all buildings, based on total sunshine exposure, weather patterns, roof size, and orientation.

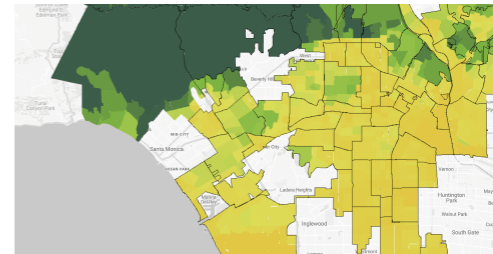
New Insights BETA



Air Quality

Currently available in Copenhagen, Amsterdam, and London: hyperlocal, street-by-street, air quality data from mapping street-level air pollution with mobile air sensors.

[Explore air quality data](#)

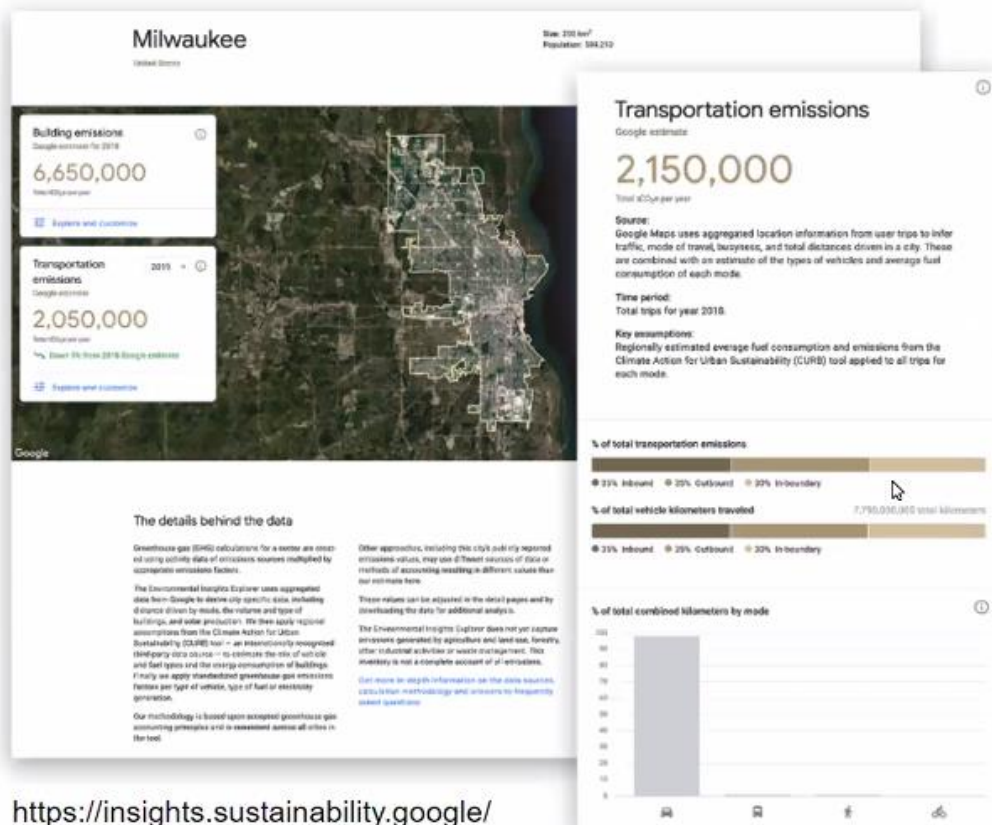


Tree Canopy

Currently piloting in select US cities: mapping tree canopy to increase tree coverage and improve urban ecosystems.

[Explore tree canopy data](#)

New Data: Google Environmental Insights Explorer



- 2018, '19, '20 Data Available
- Integrated into ClearPath for easy integration
- 2021 Data available soon
- Tree Canopy Data

<https://insights.sustainability.google/>

What economic sectors and emission sources are included?

There are many activities that may occur within city boundaries that generate greenhouse gas (GHG) emissions: energy production, transportation, and industrial activities. (As of summer 2021, EIE did not include waste management, agriculture, forestry, other land uses, or carbon sequestration.)

The Environmental Insight Explorer focuses on two sectors that represent the two most important contributors in the total GHG inventory of most cities: road transportation (“transportation”) and electricity consumed in residential and commercial buildings (“buildings”).

Building emissions

Estimated fuel and electricity consumption in commercial and residential buildings, based on Google Maps data.

Transport emissions

Estimated emissions of all trips within the city boundary based on aggregated anonymized location history data.

Solar potential

Estimated solar production potential of all buildings, based on total sunshine exposure, weather patterns, roof size, and orientation.

Air quality

Street level air quality measurements from mobile sensors collected by Google.

Calculating Carbon Emissions: Transportation

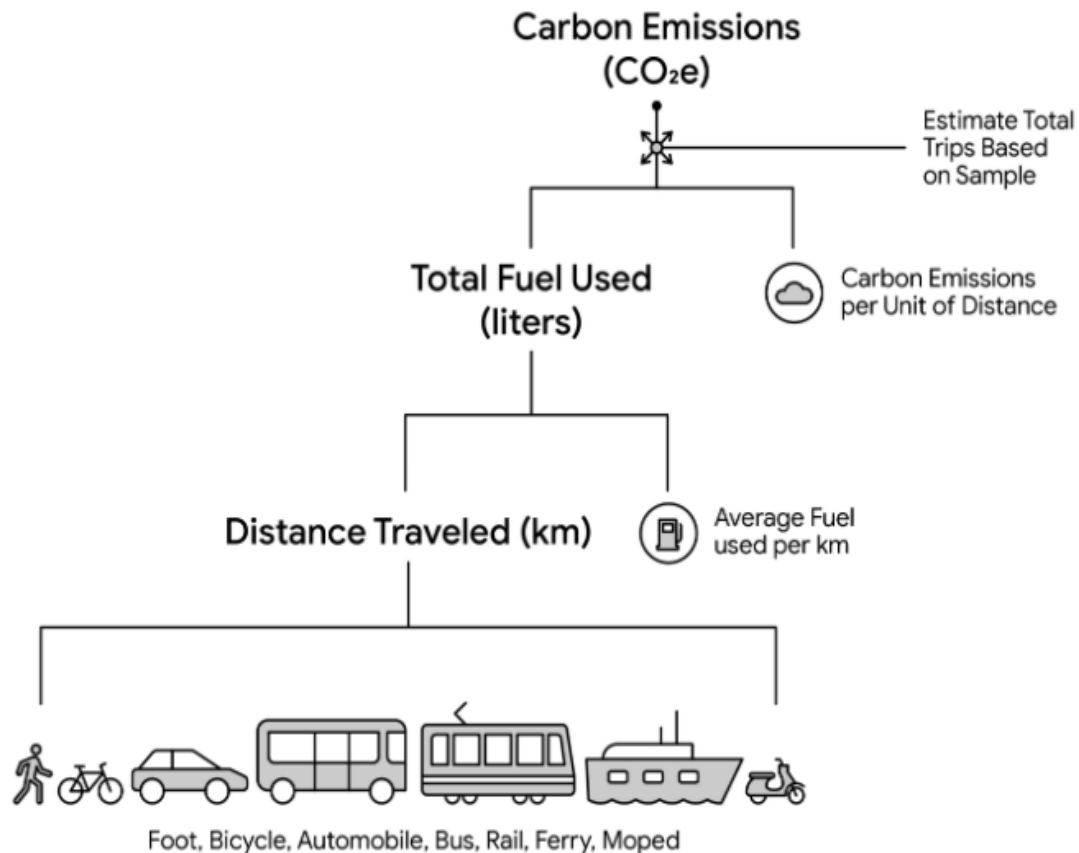


Figure 8 (Google EIE)

Calculating Carbon Emissions: Buildings

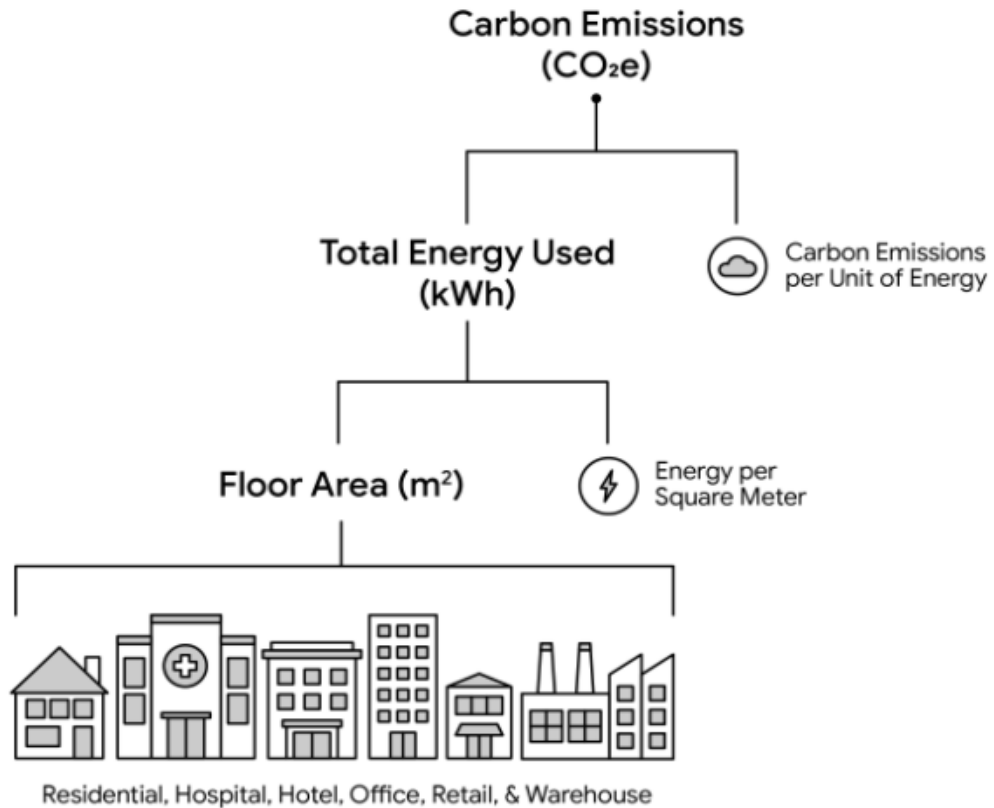


Figure 9 (Google EIE)

Table 1 Lakewood GHG Emissions in 2019

Emission-Type	City of Lakewood 2019 Emissions (MgCO ₂ e)	Percent of Total
Residential		
Residential electricity	72,121	11%
Residential natural gas	59,071	9%
Sub-total	131,192	21%
Commercial/Industrial		
Non-residential electricity	110,746	17%
Non-residential natural gas	35,629	6%
Sub-total	146,375	23%
Transportation		
On road vehicles - cross boundary inbound	156,997	25%
On road vehicles - cross boundary outbound	158,353	25%
On road vehicles - in boundary	34,216	5%
Bus VMT - cross boundary inbound	5,274	<1%
Bus VMT - cross boundary outbound	5,955	<1%
Bus VMT – in boundary	1,048	<1%
Sub-total	361,843	57%
Grand Total	639,410	

SPECIAL NOTES:

1. For 2020, transportation emissions are down 27 percent, from 361,843 to 267,000, total tCO₂e. The change in numbers is a reflection in the reduction of VMT associated with COVID-19.
2. Transportation emissions are overstated since it includes I-5 and Highway 512 emissions, but it is difficult to determine emissions using the Google EIE model.
2. Residential & non-residential emissions are also overstated since Google uses a 50/50 mix of electricity to carbon fuels. In actuality, the mix is closer to 80/20. If the 80/20 split is used, MgCO₂e emissions are calculated at 194,297 for both residential and non-residential.

Source: 2019 Google EIE and ICLEI (Local Governments for Sustainability) Clearpath software.

Solar

Renewables and zero-carbon energy sources, including solar, can reduce and offset the emissions from fossil fuel electricity generation.

The Environmental Insights Explorer is built upon Google's Project Sunroof tool, which estimates the technical solar potential of all buildings in a region. The current EIE system uses Google Earth imagery to analyze roof shape and local weather patterns to create an aggregated solar potential estimate.

Lakewood Google EIE Rooftop Solar Potential

The rooftop solar potential for Lakewood is a reduction of 223,000 MgCO₂e annually, or a **35% reduction in total GHG emissions**.

For Lakewood, the average value of the threshold is 843.20 kWh/kW. The number of existing solar arrays within the city is 57, less than 1% of the total solar potential.

Potential emissions reductions equivalent to 47,200 passenger cars taken off the road for one year or 5,730,000 tree seedling grown for 10 years.

Table 2 Total Solar Potential					
Carbon Offset Metric Tons	(Property) Count Qualified	KW Median	KW Total	Percent Covered	Percent Qualified
223,313.88	14,589	11.75	331,289.5	97.5266	80.2608

However, there are technical challenges that may affect results by 25% or more. Based on Google's definition of "technical potential," installations must meet the following criteria:

- Sunlight: Every included panel receives at least 75% of the maximum annual sun in the area;
- Installation size: Every included roof has a total potential installation size of at least 2kW;
- Space and obstacles: Only areas of the roof with enough space to install 4 adjacent solar panels are included. Obstacles like chimneys are taken into account.

Lakewood Energy Generation and Use

As provided in Table 1 above, approximately 44% of the city's 2019 emissions came from Residential, Commercial, and Industrial Built Environment. Changes to power utility fuel sources can have significant impact to the city's GHG emissions.

Table 3 Utility Fuel Mix – 2019			
	Lakeview Light & Power	Puget Sound Energy	2019 Tacoma Power
Fuel	% Share	% Share	% Share
Biogas	-	0.14%	-
Biomass	-	0.06%	0.57%
Coal	-	31.98%	-
Geothermal	-	0.02%	-
Hydro	83.16%	17.17%	82.33%
Natural Gas	-	27.92%	-
Nuclear	11.45%	0.27%	7.10%
Other biogenic	-	-	-
Other non-biogenic	-	-	-
Petroleum	-	0.04%	0.03%
Solar	-	0.87%	0.01%
Waste	-	-	-
Wind	-	8.26%	6.62%
Unspecified	5.39%	13.27%	3.34%

The Washington Clean Energy Transformation Act, requires the state's electric utilities to fully transition to clean, renewable power by 2045. To-date, Washington electric companies have surpassed conservation and renewable energy requirements, although the impact of COVID-19 may have slowed efforts in 2020 and could further impact efforts in 2021. The City of Lakewood GHG emission inventory may not fully identify the impact of utility companies move to renewable sources until 2025 or even 2030.



Clean energy milestones

The electricity PSE supplies is generated from a mix of resources. Today, over 30% of PSE's electric energy supply comes from clean sources like wind and hydroelectric facilities that don't emit greenhouse gas emissions. Our shared goal is to reach 100% clean electricity by 2045.



2025

Coal-free electricity



2030

Carbon-neutral electric system



2045

100% clean electricity

Clean energy milestones

The electricity PSE supplies is generated from a mix of resources. Today, over 30% of PSE's electric energy supply comes from clean sources like wind and hydroelectric facilities that don't emit greenhouse gas emissions. Our shared goal is to reach 100% clean electricity by 2045.

Equity in energy

We're working to ensure all customers benefit from the transition to clean electricity, which requires a dedicated effort to consider the benefits and burdens to highly impacted and vulnerable populations.

In this work, we embrace the principles of energy equity by addressing accessibility, affordability and accountability.



Integrated Resource Plan (IRP)

20+ year resource plan identifying PSE customer future energy needs.



Clean Energy Action Plan (CEAP)

10-year strategy to meet customer needs and transform electric energy supply, filed jointly with IRP.

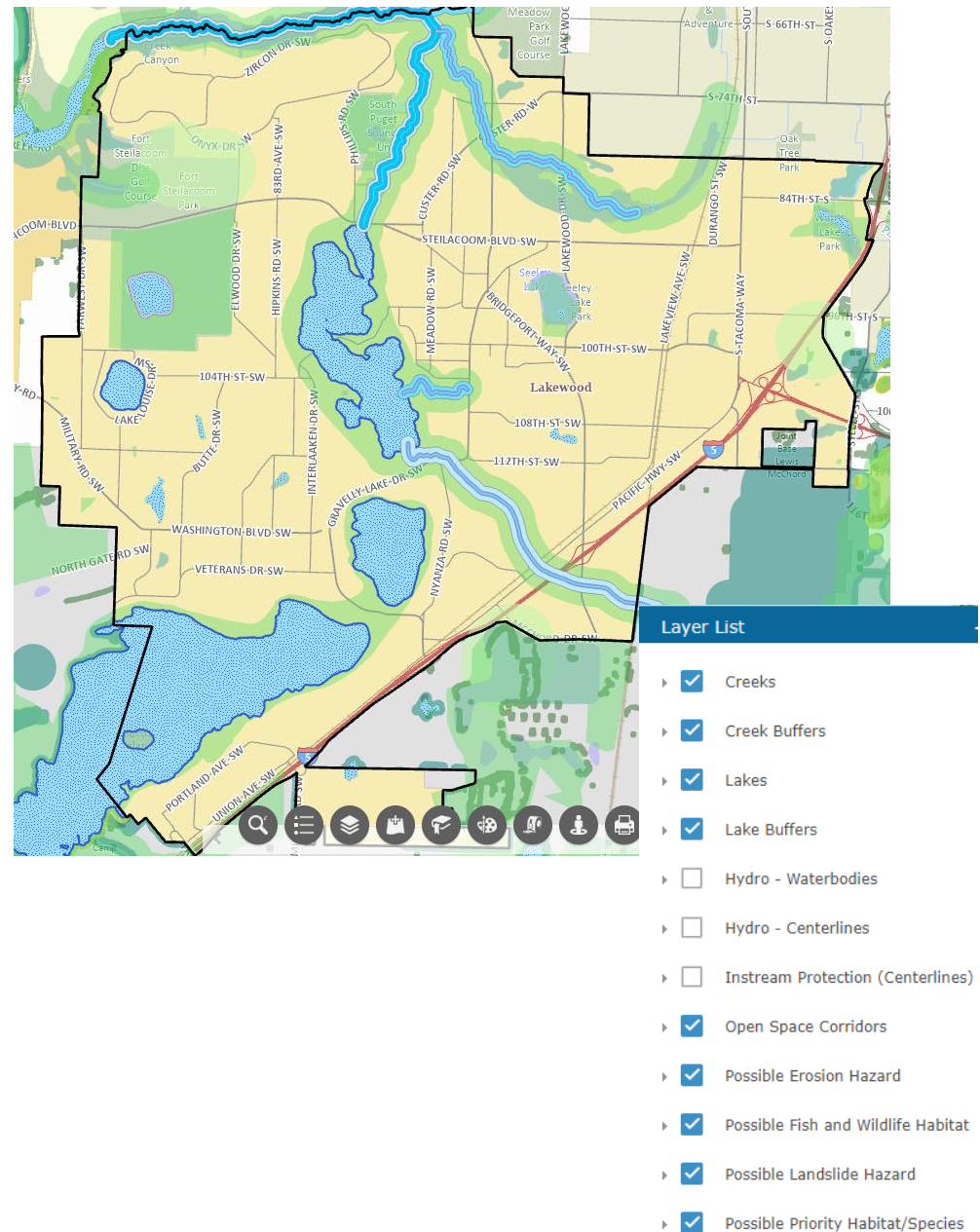


Clean Energy Implementation Plan (CEIP)

4-year roadmap on specific targets and actions to meet customer needs and transform electric energy supply.

In addition to reducing GHG emissions, the City of Lakewood has the ability to remove carbon emissions from the atmosphere.

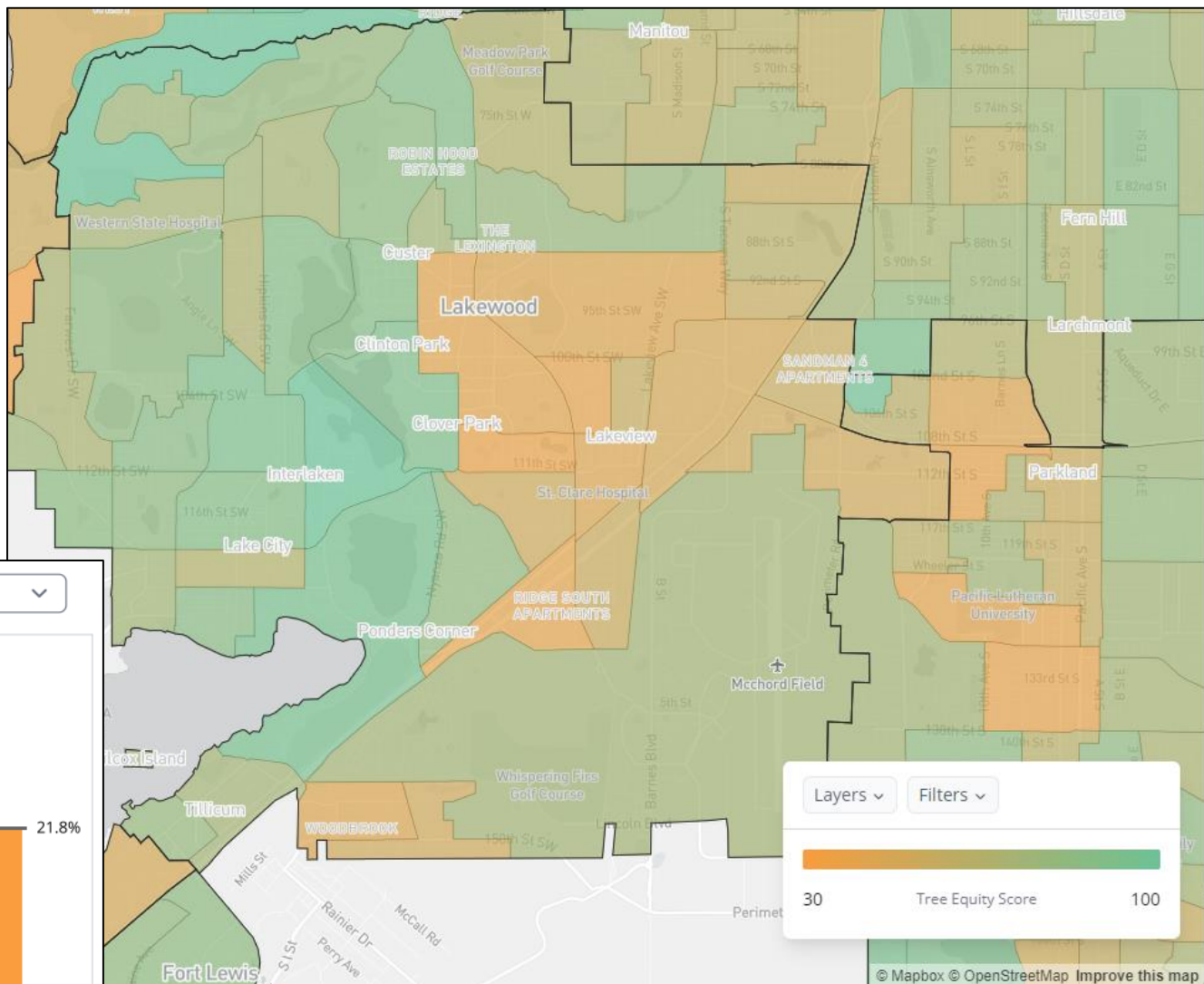
Lakewood's inventory estimates of the amount of carbon removed from the atmosphere are unknown as of 2021. Wetlands in particular, specifically the Flett Creek Complex, can store a significant amount of carbon.





NATIONAL
EXPLORER

Lower tree canopy located in many of the same areas as poverty, higher % of BIPOC population

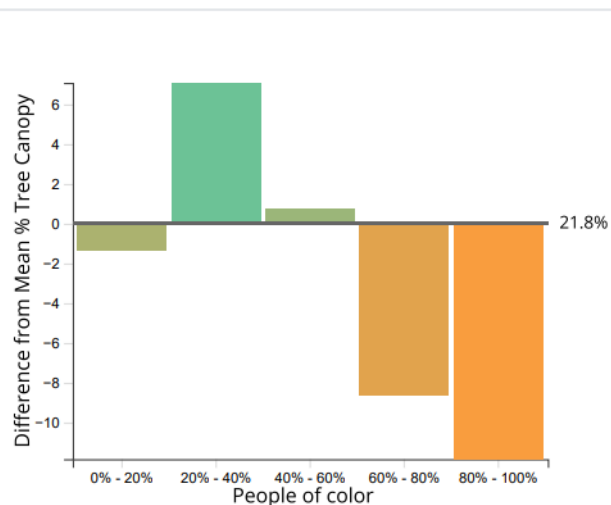


% Tree Canopy vs.

% People of Color



Difference from Mean % Tree Canopy

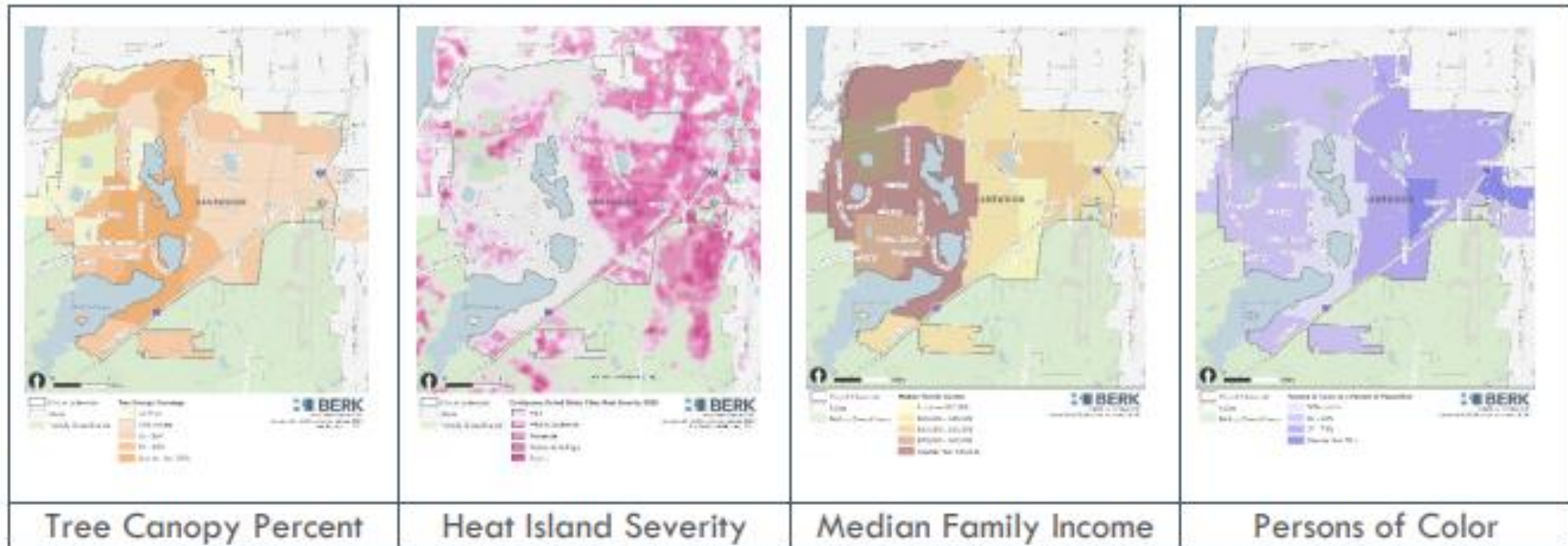


What is the state of tree canopy in Lakewood?

Lakewood's citywide urban tree canopy equals about 26% of lands. About 72% of the tree canopy is on private lands. (PLANIT GEO, 2022)

Lakewood is an urban community with a mall, commercial corridors, and industrial parks, as well as residential districts. Most of the tree canopy is within the City's residential districts. Where there is more pavement and less trees, there can be a "heat island" effect, that can increase temperatures. These conditions can be found predominantly in eastern Lakewood where there also tends to be a higher proportion of Persons of Color and lower income households. The City is considering developing a tree canopy goal that could address overall canopy shares and greater equity in its distribution.

Tree Canopy and Community Demographics (Note: More Intense Colors are Greater Amounts)



American Forest, 2021

Trust for Public Lands 2022

US Census 2020

US Census 2020

Key Findings and Recommendations

An adequate and timely response to climate change will require collective action and sustained effort from public and private sectors. Local and regional initiatives should be coordinated to protect environmental and human health.

If residents, businesses and city officials are committed to environmental responsibility in planning for Lakewood's future, **the City can assume a leadership role in responding and adjusting to the potential impacts of climate change.**

Greenhouse gas emissions in the city are primarily generated by motor vehicles and largescale commercial and industrial operations. The city is also traversed by Interstate 5 and State Highway 512; both freeways experience substantial congestion during peak commute hours. Lakewood's utilities are owned and operated by other agencies/companies.

The City's GHG emissions and natural environment reflect the need to incorporate racial and economic equity into all climate change policies and actions.

Therefore, reduction measures must involve residents, local businesses and neighboring jurisdictions and agencies.



KEY CLIMATE CHANGE FINDINGS

Finding 1: Lakewood can provide leadership and engagement.

Finding 2: Lakewood can actively regulate land uses to reduce greenhouse gas emissions.

Finding 3: Lakewood can improve upon its active modes of travel.

Finding 4: Restoring and protecting the natural environment will help to mitigate impacts of climate change.

Finding 5: Preparing for potential climate change impacts is as critical as reducing greenhouse gas impacts and planning for long-term sustainability.

Energy & Climate Change, Goals, Policies, & Actions

The following energy and climate change goals, policies, and specific actions build off the Key Findings.

City departments and non-City organizations will play important roles in the implementation of the described actions the approximate timeframes of action implementation and developing priorities.

Goal EC 1: Provide Leadership in Managing Climate Change

Goal EC 2: Improve Clean and Efficient Transportation Options

Goal EC 3: Increase Sustainable and Energy-Efficient Systems

Goal EC 4: Encourage Sustainable Development

Goal EC 5: Develop a Hazards Management Plan (developing a climate-resilient community)

Lakewood's 2021 Energy & Climate Change Comprehensive Plan Chapter:

- a. Aligns with Washington State greenhouse gas policies.
- b. Aligns with the Puget Sound Clean Air Agency adopted greenhouse gas emission reduction targets for the four-county central Puget Sound region.
- c. Generally aligns with PSRC's four-part greenhouse gas strategy (land use, user fees, transportation choices, & technology).

Lakewood's document does not include policies on user fees specific to regional transportation systems. User fee systems are in place on several facilities in the region, including State Route 167, Interstate 405, State Route 520, the Tacoma Narrows Bridge and the State Route 99 tunnel through downtown Seattle.)

- a. Addresses 10 of the 12 PSRC-adopted climate change policies. It does not address impacts of climate change on:
 - i. the region's hydrological systems; or
 - ii. the siting and planning for relocation of hazardous industries and essential public services due to sea water rise.

Implementation

Establishing Climate Change Metrics

Used metrics in combination:

- monetary value;
- number; difficulty;
- priority; and
- timing.

Under these categories, were also sub-categories.

From these sub-categories a score sheet was developed using numeric ratings.

A chart was created that assigned numbers to the measurements, with the lower the number, the higher the value.

So, what does it look like?

Difficulty

High	1
Medium	2
Low	3

Priority

Critical	1
Important	2
Normal	3
Low	4

Timing

Not started	1
In process	2
Continual	3
Completed	4

Budget

NOT budgeted	1
In budget with new FTE (as part of adopted biennial budget)	2
In budget	3

89-item implementation action list has been prioritized and monetized.
32 items now targeted on 3-year Implementation Plan under review.

ATTACHMENT 3
Climate Change Metric Analysis

Work Plan Topic	Difficulty			Priority				Timing				Financial Impacts		
	High 1	Medium 2	Low 3	Crit 1	Imp 2	Normal 3	Low 4	Progress	Freq	Start Date	Comple- tion Date	Within current City budget	In budget with new FTE ¹	Requires consulting services
Incorporate an environmental justice assessment into the climate change work plan.	X	-	-	-	X	-	-	Not started	Unique	Aug 22	Dec 22	-	X	-
Prepare a comprehensive greenhouse gas emissions inventory and forecast.	-	X	-	X	-	-	-	Completed	Annual	2020	2024	X ²		\$2,000 annually
Establish emissions reduction goals for Lakewood ³ .	X	-	-	X	-	-	-	Not started	Every 3 years	Aug 22	Aug 23	-	X	-
Develop a public engagement plan for climate change.	X	-	-	X	-	-	-	In process	Unique	Dec 21	Jun 23	X	-	-
Amend/revise the current strategic plan that will help guide and focus city resources and program initiatives to: reduce greenhouse gas production and the carbon footprint of city government and the Lakewood community; and, reduce and minimize the potential risks of climate change.	-	X	-	-	-	X	-	Not started	Unique	Jun 22	Dec 24	X	-	-
Provide monitoring and implementation reports; add goals/objectives and progress to the existing Lakewood dashboard.	-	X	-	-	-	X	-	Not started	Annual	Sep 22	Dec 24	-	X	-
Proactively work with energy providers (Puget Sound Energy, Lakeview Light & Power, and city of Tacoma Power) to market existing energy conservation programs with Lakewood property owners. Where appropriate propose new programs to better fit Lakewood's needs. Consider the use of HUD grants and low interest loans to encourage	X	-	-	X	-	-	-	Not started	Unique	Jan 23	Unknown	-	X	-

ATTACHMENT 4

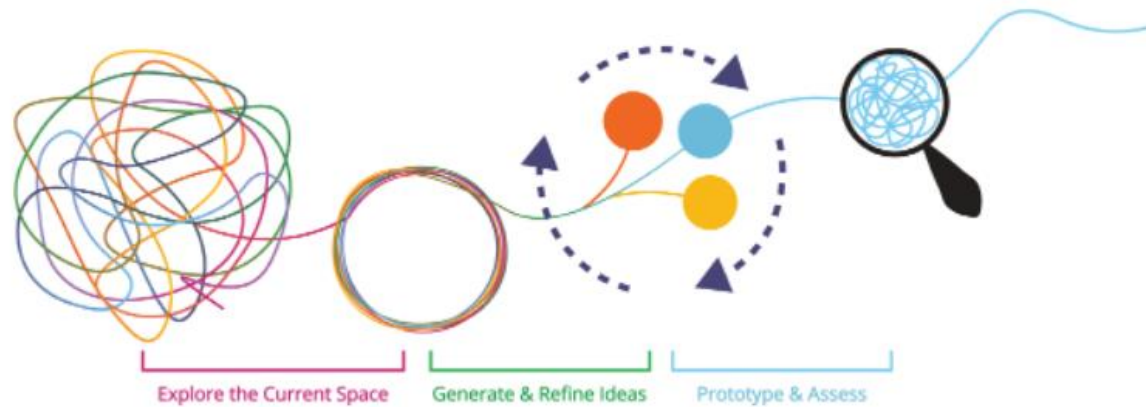
Work Plan Items Sorted by Importance (lower the number the higher the importance)

Work Plan Items	Difficulty	Priority	Timing	Budget	Totals (the lower the no. the higher the level of importance)
Establish a trip reduction policy that includes a remote work strategy, and appropriate technology. Consider incorporation into the city's land use and development code.	2	1	1	2	6
Promote/encourage green development standards (e.g., LEED and equivalent, and low impact development) in both public and private development and operations.	1	2	1	2	6
Lakewood, as a member of the South Sound Military Communities Partnership SSMCP), advocate at both the state and federal levels, improvements to the I-5 Nisqually Corridor. These improvements would restore impaired ecosystems, and mitigate the flood risk to I-5 future flood events.	1	2	2	1	6
Develop a public engagement plan for climate change.	1	1	2	3	7
Proactively work with energy providers (Puget Sound Energy, Lakeview Light & Power, and city of Tacoma Power) to market existing energy conservation programs with Lakewood property owners. Where appropriate propose new programs to better fit Lakewood's needs. Consider the use of HUD grants and low-interest loans to complement energy provider conservation programs.	1	2	2	2	7
Update/review existing mixed-use and infill development incentives (fee waivers, density bonuses, development impact fee, tax benefits, etc.).	1	3	1	2	7
Use a supplemental greenhouse gas/climate change impact worksheet of climate change impacts and potential mitigation when conducting an environmental review process under the State Environmental Policy Act	2	2	1	2	7

Ensuring Public Participation and Equity Considerations
are included in Implementation



EVANS POLICY INNOVATION COLLABORATIVE





Tree Advisory Committee

City Council has convened a committee to review tree preservation code and suggest improvements. The committee will work together and factor community opinion to form a consensus on code amendments.

[**Agenda & Schedule**](#)[**Membership**](#)[**Related Links**](#)[**Tree Fact Sheet**](#)

<https://cityoflakewood.us/tree-committee/>

Next Steps

- Receive and analyze Climate Change Perception Study results
- Incorporate results into Implementation Plan and Action Steps
- Coordinate climate change and tree regulation policies and actions
- Determine ways to maximize collaborations with utilities, other governments, residents, and businesses
- Incorporate implementation into City Budget as needed
- Track GHG emissions over time through Google EIE, ICLEI, and other data sources to verify effectiveness of prioritized actions
- Regularly update City residents and businesses about progress on implementation

Resources

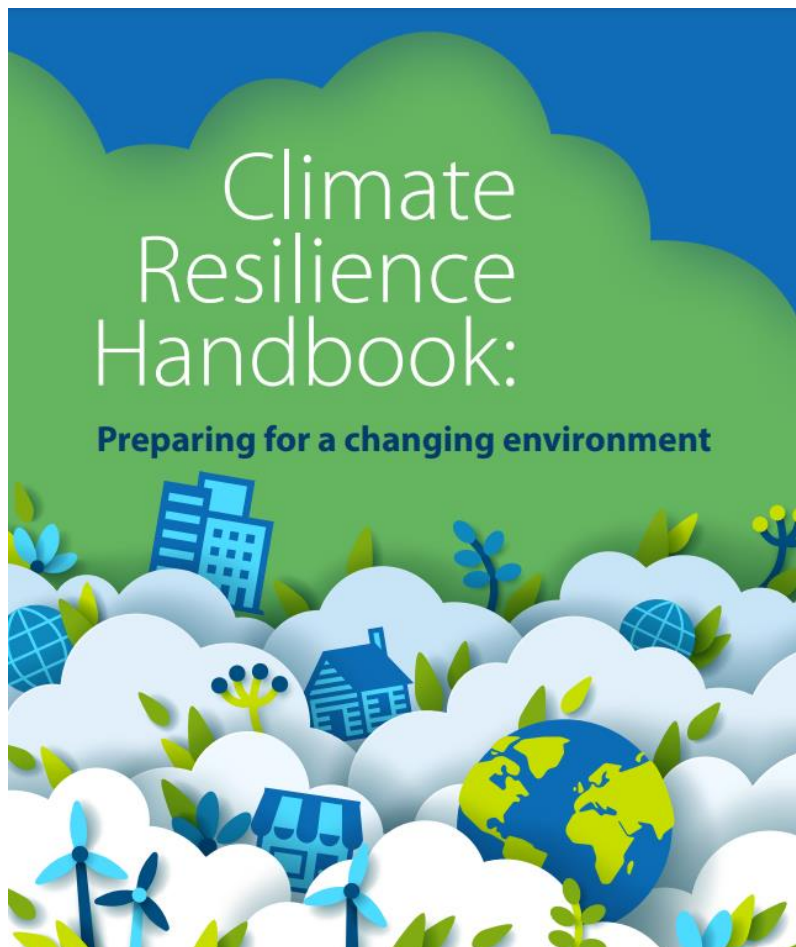


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Resources:

<https://www.cfqc.org/wp-content/uploads/2021/11/ClimateHandbook2021.pdf>

<https://mrsc.org/Home/Stay-Informed/MRSC-Insight/July-2021/MRSC-Launches-Local-Climate-Response-Project.aspx>

https://irp.cdn-website.com/dc0dca78/files/uploaded/2022_0201_Chapter1.pdf

<https://apps.ecology.wa.gov/publications/documents/2002022.pdf>

<https://cig.uw.edu/>

<https://icleiusa.org/why-iclei/local-governments/>