



2022 MUNICIPAL GREENHOUSE GAS EMISSIONS INVENTORY

October 2024

SUMMARY

The 2022 Municipal greenhouse gas (GHG) Emissions Inventory shows a reduction of 92% below 1990 levels and 67% below 2020 levels. This reduction exceeds the most recent GHG reduction goal of 20% below 1990 levels and puts the city on the path for achieving net zero emissions by 2045. There were two significant sources of new GHG reductions. First, the transition to clean fuels for fleet vehicles, including electric vehicles and renewable diesel in heavy duty vehicles, has reduced fleet emission by 77% since 1990. The other large reduction came from enrolling in San Diego Community Power's (SDCP) 100% renewable electricity rate, Power100. This eliminates GHG emissions from electricity because the electricity is now coming from wind and solar.

INTRODUCTION

The City of Chula Vista has committed to reducing greenhouse gas (GHG), or "carbon," emissions from municipal operations, to protect Chula Vista's environment, lead by example and demonstrate that businesses can reduce emissions while not sacrificing the quality of services they provide. As part of the City's climate action programming, the Office of Economic Development's Conservation Section completes GHG emissions inventories every other year to identify GHG sources, track GHG reduction efforts and to help guide policy decisions.

METHODOLOGY

Chula Vista has long been at the forefront of climate action policies and programs designed to reduce GHG emissions. As a municipality, the city utilized the industry-adopted GHG inventory methodologies with the purpose of archiving the City's actions taken to reduce GHG emissions. The City reports its GHG inventories on American Council for an Energy-Efficient Economy (ACEEE) and Carbon Disclosure Project's (CDP) global platform to measure, manage and disclose our environmental data and to track progress towards our climate goals transparently. Additionally, Chula Vista has participated in the United Nation's Framework Convention on Climate Change, the Conference of Mayor's Climate Protection Agreement and the United States Department of Energy's Better Buildings and Better Climate Challenge Programs.

The City's 2022 Municipal GHG Inventory was collected and calculated using the Local Government Operations Protocol (LGOP, Version 1.1) and the SEEC – ClearPath tool, which were created by ICLEI, with support from California regulatory agencies, to provide methodologies for local governments to better estimate their annual greenhouse gas emissions from municipal operations. These ICLEI protocols evaluate emissions from four primary sectors including building energy consumption, transportation, water (embedded energy) and wastewater. These sectors are mainly based on "end use activities" and the emissions are expressed in terms of carbon dioxide equivalents (CO₂e), which allows greenhouse gases of different strengths, or



global warming potentials, such as methane (CH₄) and nitrous oxide (N₂O) to be evaluated together. To better quantify emissions that organizations can control, GHG emissions are broken out into three scopes, including:

- Scope 1: Direct emissions from sources owned or controlled by a company, such as emissions from fuel combustion in vehicles, boilers and furnaces
- Scope 2: Indirect emissions from purchased electricity, steam, heat or cooling
- Scope 3: Indirect emissions from sources not owned or controlled by the company, but that the company indirectly impacts, typically by purchasing a product or service

All significant scope one and two emissions are included in the municipal inventory. Delivered water and sewage treatment are the only scope three emission included. To add more detailed information about emission sources, emissions from the energy and transportation sectors were broken apart by fuel type. When possible, past emissions from these sectors were recalculated using original emissions factors and data to provide a more accurate comparison to this year's inventory. Due to lack of available data, 1990 and 2005 inventories do not include emissions from the water sector.

Table 1: Data sources and emissions factors used for municipal emissions analyses.

SECTOR	DATA PROVIDER	ACTIVITY DATA	EMISSION FACTOR
Energy	San Diego Gas and Electric (SDG&E)	<ul style="list-style-type: none"> • Metered electricity & natural gas use • Fuel shipment invoices • Energy consumption was categorized by buildings, outdoor lighting, and wastewater 	<ul style="list-style-type: none"> • SDCP - specific electricity emission coefficients (CO₂). Premium Power100 service provides 100% renewable and carbon-free electricity resulted from Power Content Label 2022 • Default natural gas emission coefficients
Transportation	Public Works Dept.	<ul style="list-style-type: none"> • Fuel consumption totals include transit and equipment use • Electricity use data gathered from Chargepoint Portal 	<ul style="list-style-type: none"> • Default fuel (CO₂/CH₄/N₂O per gallon) emission coefficients • SDG&E emission factor resulted from Power Content Label 2022
Wastewater	SDG&E	<ul style="list-style-type: none"> • Energy used to pump wastewater to WWTPs 	<ul style="list-style-type: none"> • SDCP - specific electricity emission coefficients (CO₂). Premium Power100 Service
Water (embedded energy)	Otay & Sweetwater Authority water districts	<ul style="list-style-type: none"> • Amount of water used by government operations 	<ul style="list-style-type: none"> • California Energy Commission report detailing embedded kWh per gallon of water • SDG&E emission factor resulted from Power Content Label 2022



Other	Recreation Dept.	• pH canisters' shipment invoices	• Default fugitive carbon dioxide (CO ₂) emissions coefficients
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City staff collected “activity data” from several municipal and external data providers including multiple Chula Vista Departments, San Diego Community Power (SDCP), San Diego Gas & Electric (SDGE) and Otay and Sweetwater Authority Water Districts (Table 1). Staff was able to separate potable water emissions from recycled water emissions and utilized energy factors from the California Energy Commission to quantify the different amounts of energy embedded in each.

The solid waste sector was removed due to data quality because solid waste usage is measured based on full-service capacity and does not directly represent the amount of trash sent to the landfill from city operations. The large reductions in the building and fleet sectors emissions would have left the solid waste sector as the largest emission sector and because staff know that those emissions are overstated, it was not representative of actual emissions. Because solid waste is sent to a landfill that is outside of Chula Vista’s jurisdiction, these emissions are labeled as scope three and optional to include in our municipal inventories. Solid waste reduction efforts will continue and staff will evaluate better data sources that would allow the sector to be included in future inventories. Emissions from community waste are still included in the community GHG inventory.

In most cases, the data providers were able to offer aggregated empirical data for calendar year 2022; however, if 2022 data was unavailable for minor sources, the most recent data available was used as a proxy. Staff included utility-specific electricity emissions factor in the energy analysis and default emissions factor and related assumptions were used for transportation analysis. The emission factor used for electricity came from [SDCP’s 2022 Power Content Label](#) and [SDG&E’s 2022 Power Content Label](#). All City-controlled accounts are on the Power100 rate which has an emission factor of 0 lbs. CO₂e/MWh since the electricity comes from renewable sources of wind or solar.

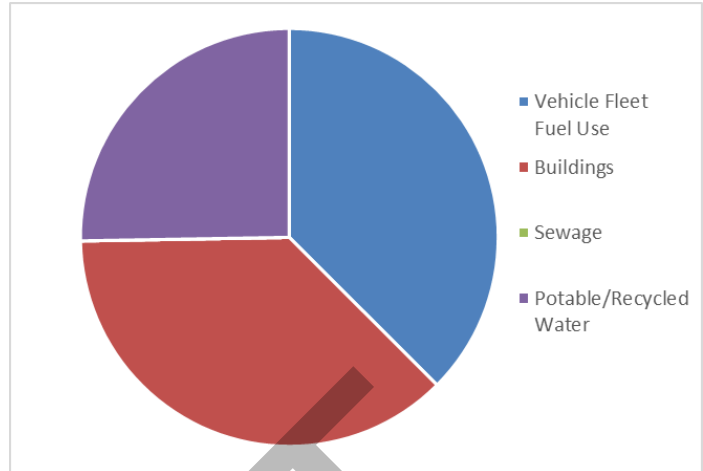
RESULTS

Chula Vista’s 2022 municipal GHG emissions were 2,850 metric tons of carbon dioxide equivalents (MT CO₂e).

Breakdown of the City of Chula Vista Municipal Operations 2022 GHG emission by sources:



Vehicle Fleet.....	37%
Buildings.....	37%
Potable/Recycled Water (embedded Energy)	25%
Sewage.....	0.009%



This represents a 67% decrease in total emissions since 2020 and 92% decrease from the 1990 baseline.

Total GHG Emissions

1990 Inventory	34,201 MT CO2e
2018 Inventory	7,733 MT CO2e
2020 Inventory	8,533 MT CO2e
2022 Inventory	2,850 MT CO2e

The City’s building electricity use remained relatively steady (Table 2) compared to the previous inventory; however, with the City’s switch to SDCP and its Power100 rate providing 100% GHG-free electricity and the transition to renewable diesel, the City saw a substantial drop in total GHG emissions, dropping 67% since 2020. Natural gas usage increased compared to the 2005 baseline but was 25% below 2020 levels. Energy use for potable water and sewage increased by 4% and 21% respectively since the last inventory in 2020. This is a result of reopening all City facilities after Covid-19 restrictions were lifted and the grand opening of Fire Station 10 and rebuilding of Stations 5 and 3. However, The City’s vehicle fleet has reduced its gasoline, CNG and diesel consumption by 39%, 69% and 100% respectively.



Table 2: MUNICIPAL ANALYSIS - 1990, 2018, 2020 2022

Annual Consumption (Metric Units)								
		1990	2018	2020	2022	% Change (2022 vs. 1990)	% Change (2022 vs. 2020)	
Employees		866	993	993	1093	26%	10%	
Vehicle Fleet Fuel Use	Gas (gal)	182,580	123,687	196,513	120,605	-34%	-39%	
	Renewable Diesel (Gal)	0	15,462	21,003	185,690	NA	784%	
	Diesel (gal)	290,325	77,309	84,012	0	-100%	-100%	
	CNG (Gal equivalent)	922	3,420	4,700	1,439	56%	-69%	
	Electricity (MWh)	0	5	13	15	NA	14%	
Energy Use	Buildings	Electricity	6,359	9,881	8,040	8,011	26%	-0.4%
		Natural gas	127,093	219,202	259,820	193,726	52%	-25%
	External Lights	Electricity	43,017	4,510	4,612	4,609	-89%	-0.1%
	Sewage	Electricity	2,083	71	67	81	-96%	21%
		Natural gas	0	2	0.4	4.8	NA	1100%
Potable Water (million gallons)		NA	253	201	209	-17%	4%	
Recycled Water (million gallons)		NA	294	290	290	-1%	0%	

*Notes - Water baseline is 2018 not 1990.

The switch to SDCP Power100 had a significant impact on the building electricity and external lights emissions, which dropped to zero for these sections of City operations. Even though the switch to SDCP resulted in zeroing out emissions for electricity controlled by the City, the sectors of Potable/Recycled Water and Vehicle Fleet still produce emissions from electrical usage. This is because those sectors still utilize grid-provided electricity that is not utilizing solely renewable sources. The water distribution within the City is controlled by local water agencies, Sweetwater Authority and Otay Water District, while the electricity to the electric vehicle chargers via ChargePoint is controlled and supplied by SDG&E.

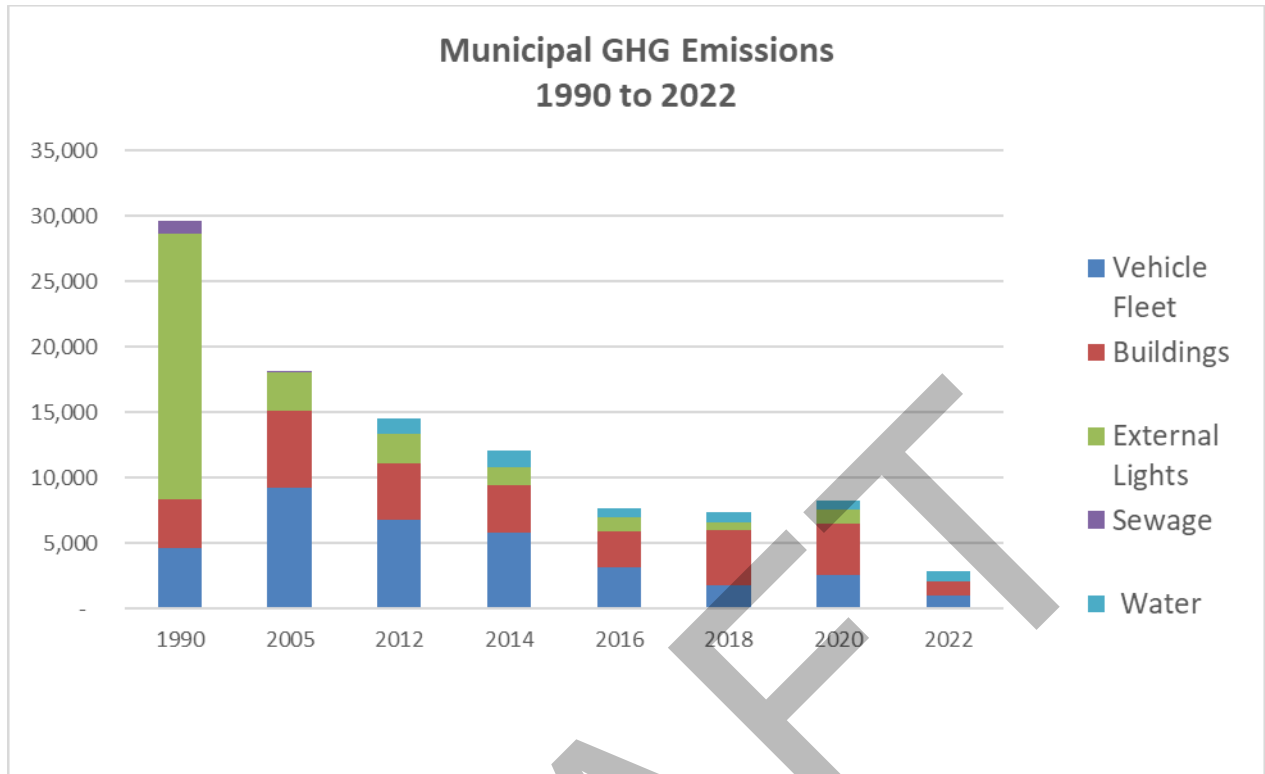


Table 3: MUNICIPAL ANALYSIS - 1990, 2018, 2020 2022

Annual Greenhouse Gas Emissions (Metric Tons CO₂e)

		1990	2018	2020	2022	% Change (2022 vs. 1990)	% Change (2022 vs. 2020)	
Per Employee		36	10	11	8	-78%	-29%	
Vehicle Fleet Fuel Use	Gasoline	1,603	1,086	1,725	1,059	-34%	-39%	
	Renewable Diesel	0	146	198	0	NA	-100%	
	Diesel	2,964	789	858	0	-100%	-100%	
	CNG	6	22	31	9	50%	-71%	
	Electricity	0	1	2	3	NA	50%	
Energy Use	Buildings	Electricity	3,576	2,538	2,319	0.00	-100%	-100%
		Natural Gas	696	1,201	1,423	1,061	52%	-25%
	External Lights	Electricity	24,191	1,158	1,330	0	-100%	-100%
	Sewage	Electricity	1,171	18	19	0	-100%	-100%
		Natural Gas	0	0.01	0.02	0.26	NA	1200%
Potable/Recycled Water		NA	795	659	720	-9%	9%	
Total GHG Emissions		34,207	7,755	8,564	2,852	-92%	-67%	

*Notes - Water baseline is 2018 not 1990. Renewable Diesel is now 100% Biogenic



The city reached its previous GHG emissions reduction goal for municipal operations in 2005 and is now aligning with state goals to reach net-zero emissions by 2045.

EMISSION SECTORS

Building Energy Consumption

Emissions from building electricity use have decreased by 100% since 1990, while emissions from building natural gas use increased by 52% since 1990.



1990 Inventory

- Electricity: 3,576 MT CO₂e
- Natural Gas: 696 MT CO₂e

2018 Inventory

- Electricity: 2,538 MT CO₂e
- Natural Gas: 1,201 MT CO₂e

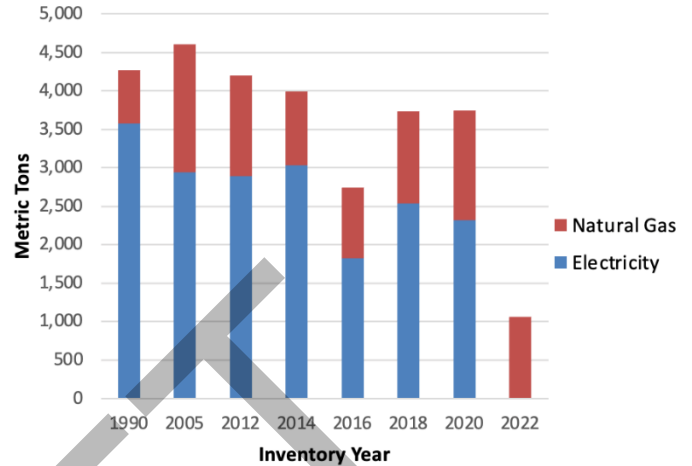
2020 Inventory

- Electricity: 2,319 MT CO₂e
- Natural Gas: 1,423 MT CO₂e

2022 Inventory

- Electricity: 0 MT CO₂e
- Natural Gas: 1,061 MT CO₂e

**Building Emissions
1990 to 2022**



In spring 2021, the city transitioned to SDCP’s Power100 product which provides 100% carbon-free electricity on an annual basis, allowing the city to report zero carbon emissions for the electricity used by its municipal buildings. SDCP Power100 rates do cost more than the standard SDCP rates, but those costs are offset by previous energy efficiency improvements such as indoor and outdoor LED light retrofits and high efficiency HVAC equipment that decreased electricity usage.

External Lights

Emissions from external lights, which consist of traffic signals and streetlights, have decreased 100% since 1990.

1990 Inventory

- Electricity: 24,191 MT CO₂e

2018 Inventory

- Electricity: 1,158 MT CO₂e

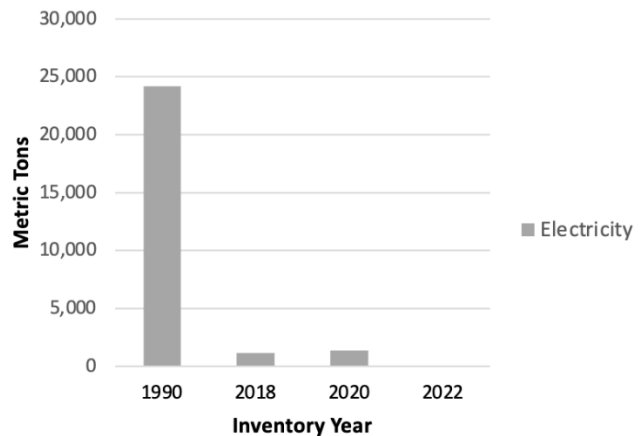
2020 Inventory

- Electricity: 1,330 MT CO₂e

2022 Inventory

- Electricity: 0 MT CO₂e

**External Lighting Emissions
1990 to 2022**

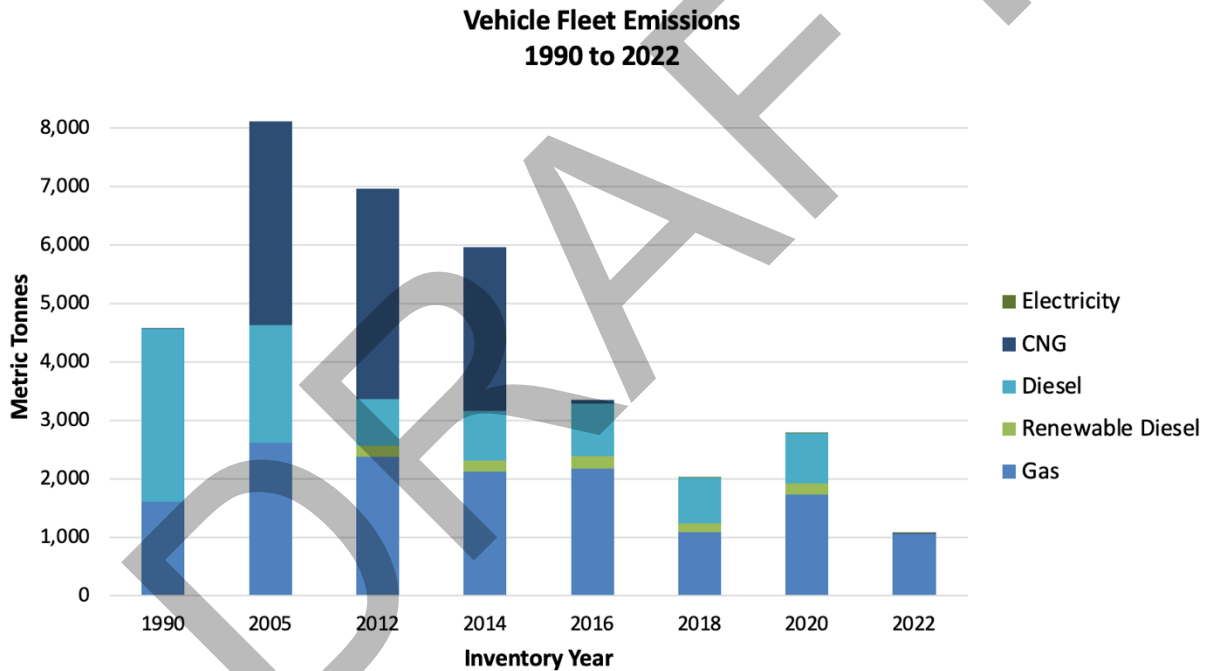


Due to conversion to LED technology, the electricity consumption by traffic and street lighting has significantly been reduced. Even with the addition of new light installations as the City grows, energy consumption has been flat. Additionally, like the building sector above, external lighting is enrolled in SDCP’s Power100 rate which eliminated annual GHG emissions.



Vehicle Fleet

Emissions from vehicle fleet have decreased 77% since 1990 and 62% since 2020. The City has seen the benefits of its Clean Fleet Policy, which prioritizes alternative fuels and hybrid technologies for new vehicles. The City is transitioning its fleet to zero emission vehicles and currently has 33 EVs that make up 7% of the fleet (including 2 trucks) with another 17% made up of hybrid vehicles and 27% of the fleet using renewable diesel. Fleet staff have phased out diesel and B20 bio-diesel, which is 80% regular diesel and 20% plant based diesel, to 100% renewable diesel, which is a 100% plant-based fuel. Although burning plant-based or biogenic¹ fuels still creates GHG emissions, those emissions were recently absorbed from the atmosphere by plants so do not contribute to climate change like fossil fuels that come from underground and, once burned, add to the amount of GHGs in the atmosphere. This conversion allowed the City to reduce a significant source of GHG emissions, although the vehicles still emit local air pollution, so staff will continue evaluating zero emission options for heavy-duty vehicles.



1990 Inventory

- Gasoline..... 1,603 MT CO₂e
- CNG..... 6 MT CO₂e
- Diesel..... 2,964 MT CO₂e
- Renewable Diesel..... NA
- Electricity..... NA

2020 Inventory

- Gasoline..... 1,725 MT CO₂e
- CNG..... 31 MT CO₂e
- Diesel..... 858 MT CO₂e
- Bio Diesel*..... 198 MT CO₂e
- Electricity..... 2 MT CO₂e

¹ LGOP Section 4.5 - https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/lgo_protocol_v1_1_2010-05-03.pdf



2018 Inventory

- Gasoline..... 1,086 MT CO2e
- CNG..... 22 MT CO2e
- Diesel..... 789 MT CO2e
- Bio Diesel*..... 146 MT CO2e
- Electricity..... 1 MT CO2e

2022 Inventory

- Gasoline..... 1,059 MT CO2e
- CNG..... 9 MT CO2e
- Diesel..... 0 MT CO2e
- Renewable Diesel*..... 0 MT CO2e
- Electricity..... 3 MT CO2e

* Bio Diesel and renewable diesel a plant-based fuel and creates GHG emissions, but because they are not fossil fuels, they are not included in our GHG Inventory totals.

As the COVID-19 pandemic restrictions began to ease, the option for carpooling and car sharing resumed which decreased fleet usage. Unlike building electricity accounts, the fleet EV chargers are not controlled by the City and utilize electricity from SDG&E which uses fossil fuels and has a GHG footprint. That results in GHG emissions associated with the fleet electricity usage but not with buildings. As a result of alternative modes of transportation and alternative fuels, a significant reduction in emissions from the vehicle fleet is being realized.

Water and Wastewater Transportation

Emissions associated with the water usage have decreased 9% since 2018 and emissions from wastewater pumping have been reduced to almost zero. Comparison of water usage to 1990 emissions is not available due to lack of 1990 data. The city saw a 3% increase in water consumption since 2020, which is a result of many departments ending hybrid work schedules toward the end of the calendar year 2022 compared to 2020.

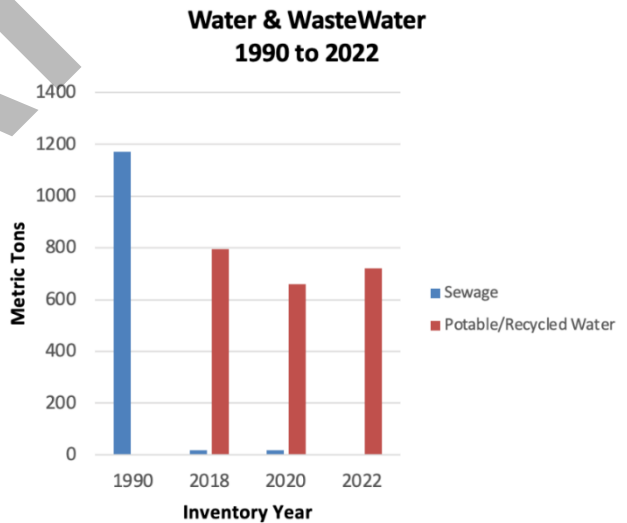
Emissions from wastewater pumping have reached near zero due to the switch to SDCP Power100. However, emissions associated with potable and recycled water increased by about 9% due to increased usage. The potable and recycled water is provided by water districts and not affected by the City’s switch to SDCP Power100.

1990 Inventory

- Sewage..... 1,171 MT CO2e
- Potable/Recycled Water (embedded Energy) NA MT CO2e

2018 Inventory

- Sewage 18 MT CO2e
- Potable/Recycled Water (embedded Energy)..... 795 MT CO2e



2020 Inventory

- Sewage 19 MT CO2e
- Potable/Recycled Water (embedded Energy).....659 MT CO2e

2022 Inventory

- Sewage 0 MT CO2e
- Potable/Recycled Water..... **720 MT CO2e**



Next Steps

To continue to reduce GHG emissions, utility bills and pollution, the city is working to continue implementing the multiple sustainable actions listed below.

To help reduce energy usage at City facilities, staff have partnered with two external organizations to utilize grant funding to pilot two new technologies. The first is a thermal solar system paired with PV solar to boost the electrical PV output and utilize the thermal output for pool heating. The second is a solar and battery power path LED lighting project at a city park. These projects will reduce utility bills, decrease grid stress, and reduce pollution. Another major project related to the building sector is the finalization of the large solar/battery storage project where 2.3 kW of solar and 180 kw of battery storage was installed at 11 facilities. This project should be completed in 2024, and plans are being developed to bring previously installed solar systems into an Operations and Maintenance and Repair contract in 2025. This should bring all solar sites up to full capacity, reducing utility costs and our need for grid power.

The Office of Sustainability has adopted a Zero Waste Plan and is currently working to increase organic food waste collection at City facilities and increase recycling. Staff have increased outreach for food waste collection by distributing food waste caddies and larger collection bins in break rooms for employees. Educational signs are provided to help teach staff what can and cannot be put in this new organic food waste collection. Staff is updating the City's procurement policy to increase recycled content products and materials purchasing, to add the use of repairable equipment and reduce the City's reliance on disposable goods. Staff is also researching data collection programs that allow for tracking of waste sent to landfills to re-introduce those figures in future inventory reports.

As mentioned above the city has already transitioned a significant portion of its fleet to alternative vehicles and are looking to continue that transformation with an expected at least 3 new alternative fuel vehicles being purchased in the next 3 years. Some of the funding for these new vehicles and EV chargers will be provided by federal Energy Efficiently Conservation Block Grant funds. Staff will also be working towards developing a fleet electrification plan.

To help plan for future GHG reductions, the Climate Action Plan (CAP) and the City Operations Sustainability Plan (COSP) are being updated. The updated CAP includes new GHG reduction goals to align with state goals for net-zero emission by 2045 and will include measures for decarbonizing the City's fleet and facilities. After the CAP is updated, Sustainability staff will work with internal stakeholders to update the COSP and incorporate the new GHG emission reduction goals included in the CAP. By providing a roadmap to net zero emissions by 2045, this update will be an important tool to reaching the City's sustainability goals.