2020 MUNICIPAL GREENHOUSE GAS EMISSIONS INVENTORY

June 2022

SUMMARY

The City of Chula Vista has committed to reducing greenhouse gas (GHG), or "carbon," emissions from municipal operations, so as to lead by example and to demonstrate that businesses can reduce emissions while not sacrificing the quality of services they provide. As part of the City's climate action program, the Department of Economic Development's Conservation Section completes carbon emissions inventories to identify GHG sources and to help guide policy decisions. The 2020 Municipal GHG Emissions Inventory utilizes the ICLEI Local Government Operations Protocol and serves as the City's latest assessment of all past inventory efforts and its progress in reaching its municipal emissions reduction goals for City operations.

METHODOLOGY

Chula Vista has been at the forefront of climate action policies and programs designed to reduce greenhouse gas (GHG) or "carbon" emissions. As a municipality, the City utilized the industry adopted GHG inventory methodologies and has independently reported its municipal emissions to the Climate Registry, North America's leading voluntary greenhouse gas reporting system, with the purpose of archiving the City's actions taken to reduce GHG emissions. The City reports annually on CDP's global platform to measure, manage and disclose our environmental data and to track progress towards our climate goals. Additionally, Chula Vista has participated in the United Nation's Framework Convention on Climate Change, the Conference of Mayor's Climate Protection Agreement, the United States Department of Energy's Better Building program and the steering committee for the California Statewide Energy Efficiency Collaborative (SEEC) ClearPath tool. For the 2016, 2018 and 2020 inventories, the City utilized only the SEEC - ClearPath tool provided by ICLEI to report the municipal inventory. The City has committed itself to reducing its carbon footprint through the past actions and will continue to do so with future decision making.

The City's 2020 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 five primary parameters – building energy consumption, transportation, water (embedded energy), wastewater and solid waste. These parameters 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, to be evaluated together. When possible, past emissions were recalculated using updated emissions factors or data in order to provide a

more accurate comparison to the latest 2018 emission levels. Due to a lack of available data, 1990 and 2005 inventories do not include emissions from the water sector.

PARAMETER	DATA PROVIDER	ACTIVITY DATA	EMISSION FACTOR
Energy	SDG&E	• Metered electricity & natural gas use • Fuel shipment invoices • Energy consumption was categorized by buildings, outdoor lighting, and wastewater	• SDG&E-specific electricity emission coefficients (CO_2). Because the most recent 3rd party verified emission factor is from 2009, calculations were made by EPIC (USD) to estimate the impacts of the increased power from renewable sources • EPIC CO2 emission factor provides a CO2e output that includes CH4 & N2O • Default natural gas emission coefficients
Transportation	Public Works Dept.	• Fuel consumption totals include transit and equipment use	• Default fuel (CO_2/CH_4/N_2O per gallon) emission coefficients
Solid Waste	Republic Services	• Solid waste disposal data includes trash hauled by Republic Services and by City staff	• Default fugitive methane (CH_4) emission estimates (based on ICLEI's ClearPath)
Wastewater	SDG&E	• Energy used to pump wastewater to WWTPs	• Modified SDG&E emission factor (same as used in energy sector)
Water (embeded energy)	Otay & Sweetwater Authority water districts	• Amount of water used by government operations	• California Energy Commission report detailing embedded kWh per gallon of water • Modified SDG&E emission factor (same as used in energy sector)
Other	Recreation Dept.	• pH canisters' shipment invoices	• Default fugitive carbon dioxide (CO_2) emissions coefficients

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

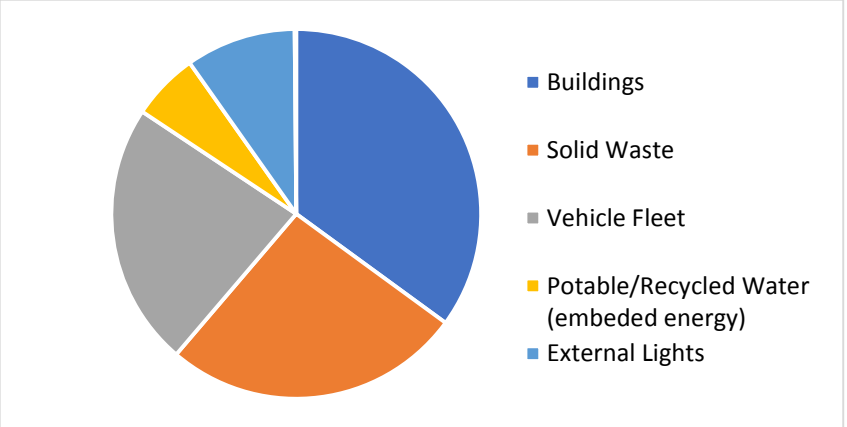
City staff collected "activity data" from several municipal and external data providers including multiple Chula Vista Departments, SDG&E, Otay and Sweetwater Authority Water Districts and Republic Services (Table 1). Staff was able to separate potable water emissions from recycled water emissions and utilized energy factors from the California Energy Commission to quantify the different amounts of energy embedded in each. In most cases, the data providers were able to offer aggregated empirical data for calendar year 2020; however, if 2020 data was unavailable for minor sources the most recent data available was used as a proxy. Staff included utility-specific electricity coefficients for CO2 emissions in the energy analyses and default emissions coefficients and related assumptions were generally used for transportation and waste analyses. SDG&E's emission factor has not been third-party verified and reported since 2009, but the utility reported 31% of the energy they provide coming from renewable sources, plus their purchase of additional Renewable Energy Credits to bring their total to around 40%.

RESULTS

Chula Vista's 2020 municipal GHG emissions were 11,191 metric tons of carbon dioxide equivalents (MT CO2e).

Here are the breakdown of the City's 2020 GHG emission sources:

Buildings……	35.03%
Solid Waste……..	26.22%
Vehicle Fleet ……...	23.08%
External Lights……	9.64%
Potable/Recycled Water (embedded energy) ……	5.89%
Sewage……	0.14%



This represents a 9.6% increase in total emissions since 2018 (10,207 MT CO2e) and a 67% decrease when compared to the initial 1990 inventory.

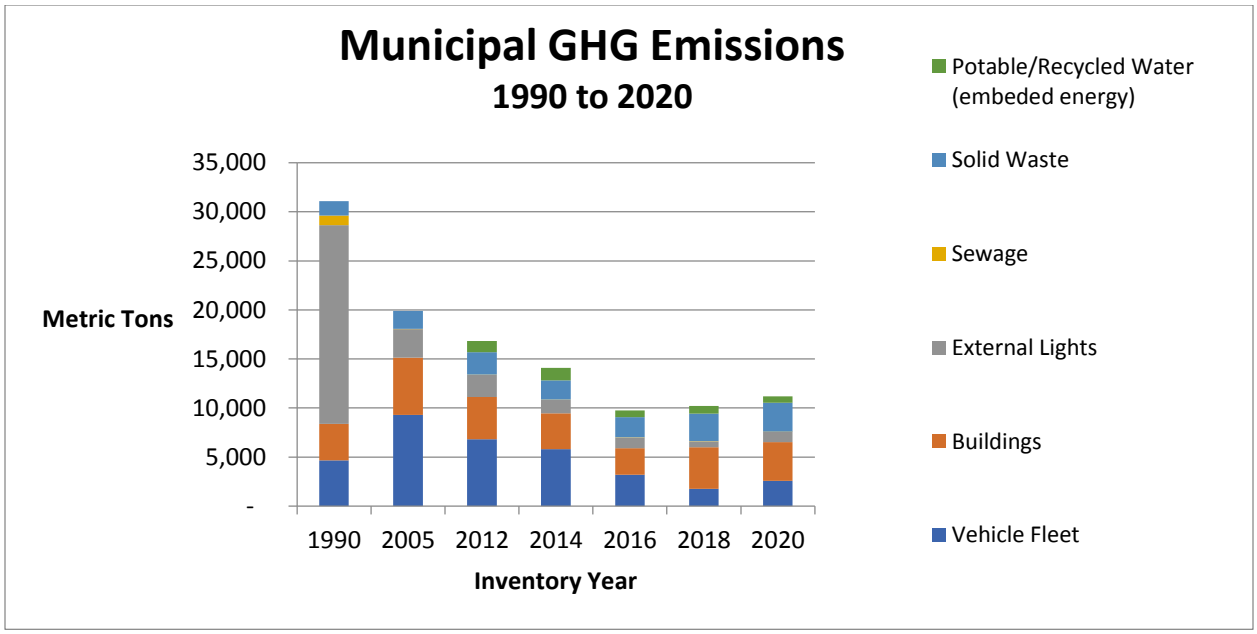
Total GHG Emissions

1990 Inventory…….....	31,095 MT CO2e
2018 Inventory…….....	10,207 MT CO2e
2020 Inventory …….....	11,191 MT CO2e

Table 2: MUNICIPAL ANALYSIS - 1990, 2018 and 2020													
Annual Consumption (Metric Units)							Annual Greenhouse Gas (GHG) Emissions (Metric Tons CO_2e)						
		1990	2018	2020	% Change (2020vs. 1990)	% Change (2020 vs. 2018)			1990	2018	2020	% Change (2020vs. 1990)	% Change (2020 vs. 2018)
Employees		866	993		-100.0%	-100.0%	Per Employee		35.9	10.3		-100.0%	-100.0%
Vehicle Fleet Fuel Use (Gallons or Equivalent)		478,344	204,417	306,229	-36.0%	49.8%	Vehicle Fleet		4,655	1,761	2,583	-44.5%	46.7%
Energy Use (MMBtu)	Buildings	35,527	55,609	51,684	45.5%	-7.1%	Energy Use	Buildings	3,728	4,234	3,920	5.2%	-7.4%
	External Lights	147,100	15,388	15,735	-89.3%	2.3%		External Lights	20,260	605	1,079	-94.7%	78.3%
	Sewage	7,122	242	229	-96.8%	-5.3%		Sewage	981	16	16	-98.4%	-2.2%
	Total	189,749	71,239	67,648	-64.3%	-5.0%		Total	24,969	4,855	5,015	-79.9%	3.3%
Solid Waste (Tons)		5,400	7,143	7,493	38.8%	4.9%	Solid Waste		1,471	2,797	2,934	99.4%	4.9%
Potable Water (million gallons)		NA	253	201	NA	-20.4%	Potable/Recycled Water (embeded energy)		NA	795	659	NA	-17.1%
Recycled Water (million gallons)		NA	294	290	NA	-1.1%							
							Total GHG Emissions		31,095	10,207	11,191	-67.2%	9.6%
* All GHG emissions are reported in CO_2 Equivalent (CO_2e)							20% GHG Reduction Goal						
							Reductions Needed To Reach Goal					*Goal Obtained	

Table 2: Municipal Analysis – 1990, 2018 and 2020

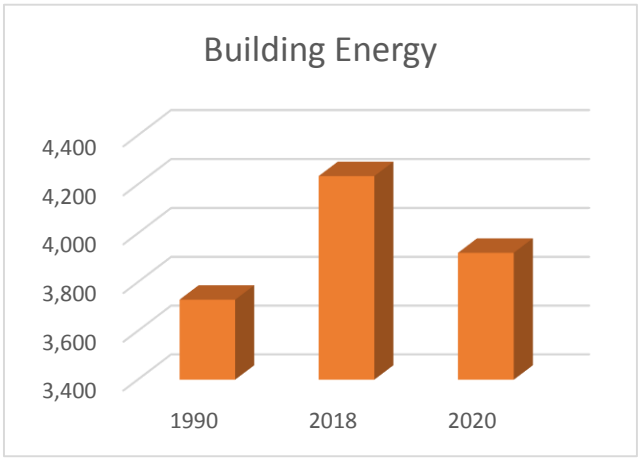
The energy use for potable water transportation is the City's largest decreasing emission source followed by the building energy usage along with the vehicle fleet, which has decreased by 17% and 7% since 2016 respectively. Contrary to the past years, emissions from external lights, solid waste and vehicle fleet sectors have increased. Covid-19 has influenced our GHG inventory in 2020. Since the City had many employees working from home much of the year and a few facilities were closed, we experienced a lower water consumption in our facilities. However, at the same time we realized an increase in our solid waste sector, as we disposed additional products such as cleaning products and gloves. Vehicle fleet emissions are also increased due to car sharing restrictions.



The City reached its original GHG emission reduction goal for municipal operations in 2005 and has now surpassed the primary goal by 59%.

PRIMARY SECTORS

Building Energy Consumption



Emissions from building energy use have increased 5% since 1990.

1990 Inventory…….....	3,728 MT CO2e
2018 Inventory…….....	4,234 MT CO2e
2020 Inventory …….....	3,920 MT CO2e

The City entered into a contract with Johnson Controls (JCI) to install additional solar panels in June 2018. During construction, the existing solar panels were disconnected to merge new systems with the existing systems. In 2020, eight of the twelve project sites started producing solar power. The rest of the systems also started production towards the second half of the year. The batteries installed at three locations were not activated in the system due to delayed processes through SDG&E. With this project working nearly at full capacity, the City increased its total amount of PV systems installed on municipal facilities to 4.5 megawatts (MW), so future inventories are expected to reflect a reduction in energy use.

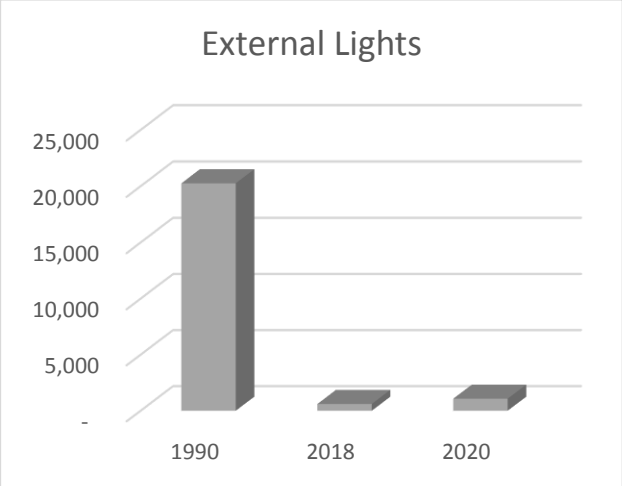
External Lights

Emissions from external lights, which consist of traffic signals and streetlights, have decreased 95% since 1990.

1990 Inventory……..... 20,260 MT CO2e

2018 Inventory……..... 605 MT CO2e

2020 Inventory ……..…… 1,079 MT CO2e



Increases in electricity consumption in external lights sector is primarily due to the addition of new streetlights and new traffic signals. In the last couple of years, the City has updated streetlight installation standards which resulted in essentially requiring more streetlights in the City, especially in the "west side." Prior to the change, we had different streetlight spacing standards for the "east side" vs. "west side" which resulted in fewer lights in the west. As a result, we've been adding about 12-15 new streetlights per year in the west and many new streetlights in the east primarily due to new development.

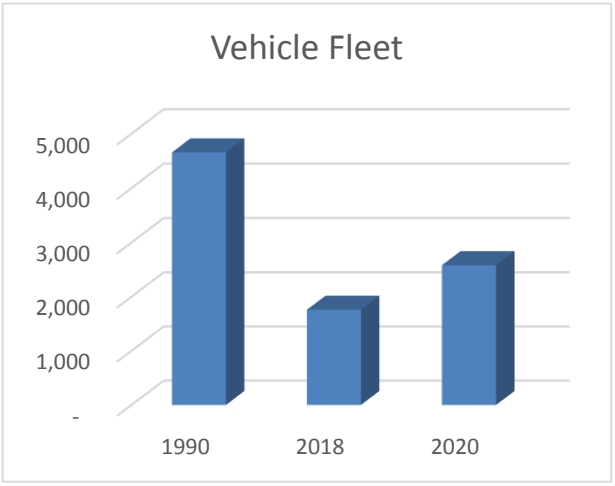
Vehicle Fleet

Emissions from vehicle fleet have decreased 45% since 1990.

1990 Inventory……..... 4,655 MT CO2e

2018 Inventory……..... 1,761 MT CO2e

2020 Inventory ……..…… 2,583 MT CO2e



We have been experiencing the benefits of City's Clean Fleet Policy, which prioritizes alternative fuels and hybrid technologies when selecting new vehicles. The City has been converting its municipal fleet to operate on electricity, propane, compressed natural gas or biodiesel. However, the Covid-19 pandemic has negatively affected certain emission sources and our fleet is one of them. The City had to enforce a restriction on carpooling and car sharing to facilitate physical distancing for employee health. As a result, we have seen more vehicle usage by City staff and this resulted an increase in our emissions.

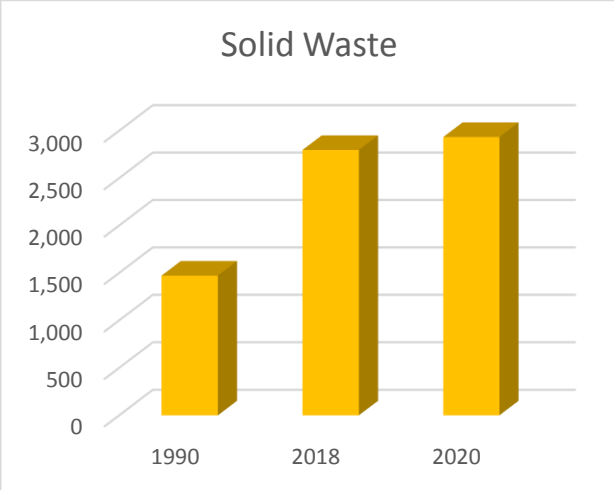
Solid Waste

Emissions related to solid waste have increased 99% since 1990 and 5% since 2018.

1990 Inventory……..... 1,471 MT CO2e

2018 Inventory……..... 2,797 MT CO2e

2020 Inventory ……..…… 2,934 MT CO2e



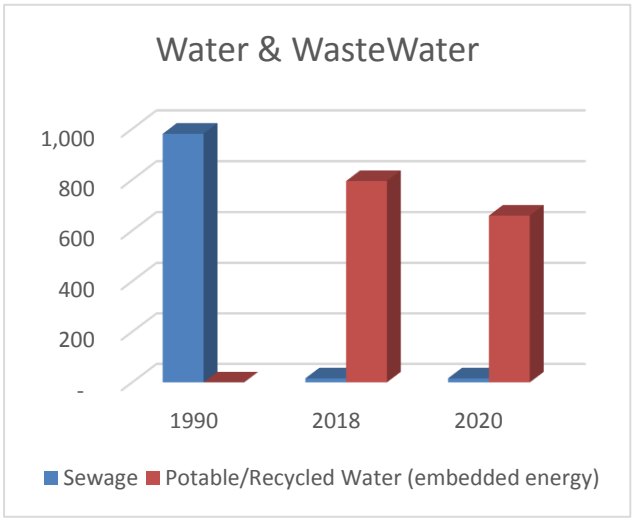
City facilities' waste production has been increasing over the years, and in 2020 we had the Covid-19 pandemic to contribute to this increase. We had additional products in our waste stream compared to previous years. Items such as masks, cleaning wipes and gloves increased our waste even though the City was practicing a hybrid work schedule. The Office of Sustainability is creating a Zero Waste Plan to create a road map to waste reduction.

Water and Wastewater Transportation (Embedded Energy)

Emissions associated with the water usage have decreased 17% since 2018. Comparison to 1990 emissions is not available due to lack of past data.

2018 Inventory……..... 795 MT CO2e

2020 Inventory ……..…… 659 MT CO2e



The City implemented a hybrid work schedule in 2020 and as a result, our potable water consumption decreased about 20%.

Emissions from wastewater transportation haven't changed since 2018, however it decreased 98% since 1990. Over the years, there were changes regarding to how SDG&E classified sewer accounts, therefore the difference between 2018 and 1990 emissions is greater.

NEXT STEPS

Chula Vista's municipal climate actions are guided by the City's Climate Action Plan and City Operations Sustainability Plan. The operations plan outlines goals and strategies for seven key sustainability areas with the objective of integrating innovative sustainable practices throughout the City's procedures and facilities. This outline includes actions related to energy, water and transportation upgrades, such as Phase II of the LED lighting upgrade at multiple City facilities, upgrading the City's irrigation system with smart technologies, increasing the amount of PV panels installed on City facilities and installing battery storage in multiple facilities.

In October 2020, the Office of Sustainability partnered with the Energy Coalition (TEC) for the Energy Goals Campaign to improve operational sustainability at the City facilities. Through this campaign, the City demonstrated its stewardship and environmental responsibility by motivating its employees to learn and take actions to reduce energy use at work and at home. TEC and the City developed robust virtual resources to engage all the City's workforce as it navigated the changing landscape related to the Covid-19 pandemic. Enabling employees to apply their knowledge by taking identifiable, energy saving actions was an essential component of this campaign. 112 employees submitted 626 actions—proving the campaign's ability to inspire behavior change. Energy Goals resulted in energy savings at work, but also provided a valuable opportunity for City employees to engage their families with behavior change opportunities, furthering the potential impact for energy savings.

In September 2019, the city councils of the cities of San Diego, La Mesa, Encinitas, Imperial Beach and Chula Vista all voted to work together to form the San Diego Community Power (SDCP) and worked to form a board and create an implementation plan. The City is a member and all municipal accounts will be operating on 100% renewable energy with the transition of accounts in 2021-2022.

The City has adopted the Smart City Strategic Action Plan to create a connected, responsive, transparent and innovative city. The result is a set of goals and corresponding initiatives around which City leaders will organize their efforts over the next few years. Implementation of the Traffic Signal Communications Master Plan helps guide the City towards effective modernization of a comprehensive traffic signal communications network which will support cutting-edge transportation systems and serve as a guiding foundation for the City's deployment of Smart City technologies. As a continuation of the City's Smart City efforts, the Data Governance Committee was formed and is a group of City employees responsible for overseeing the open data program. The Committee manages the City's data inventory, prioritizes datasets for publication and performs quality assurance to ensure all data is complete, up to date and in compliance with all laws and policies related to privacy and security. Additionally, the Committee makes high-level decisions about data creation, curation and consumption in the City. Prioritizing data inventories will lead to decisions by management to result increased efficiency in operations.