



## **2018 MUNICIPAL GREENHOUSE GAS EMISSIONS INVENTORY**

January 2021

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### **SUMMARY**

The City of Chula Vista has committed to reducing greenhouse gas (GHG), or “carbon,” emissions from municipal operations, to 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 program, the Department of Economic Development’s Conservation Section completes carbon emissions inventories to identify GHG sources and to help guide policy decisions. The 2018 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.

The 2018 GHG Emissions Inventory indicates that Chula Vista’s municipal GHG levels have increased by 4.8% compared to the last 2016 inventory. GHG emissions from municipal sources (i.e. operations, facilities, and vehicle fleet) in 2018 totaled 10,207 metric tons of carbon dioxide equivalents (MT CO<sub>2</sub>e). This also represents a reduction of 67% below the initial 1990 inventory. The two largest sources of emissions were from the energy consumption at facilities (41%) and emissions from the City’s solid waste disposal (27%),

### **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 2008, 2009, 2010, 2012 and 2014 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. 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 and 2018 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 2018 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 (CO<sub>2</sub>e), which allows greenhouse gases of different strengths, or global warming potentials, to be evaluated together. When possible, past emissions for 1990, 2005, 2012, 2014 and 2016 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	<ul style="list-style-type: none"> <li>• Metered electricity &amp; natural gas use</li> <li>• Fuel shipment invoices</li> <li>• Energy consumption was categorized by buildings, outdoor lighting, and wastewater</li> </ul>	<ul style="list-style-type: none"> <li>• SDG&amp;E-specific electricity emission coefficients (CO<sub>2</sub>). 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</li> <li>• EPIC CO<sub>2</sub> emission factor provides a CO<sub>2</sub>e output that includes CH<sub>4</sub> &amp; N<sub>2</sub>O</li> <li>• Default natural gas emission coefficients</li> </ul>
Transportation	Public Works Dept.	<ul style="list-style-type: none"> <li>• Fuel consumption totals include transit and equipment use</li> </ul>	<ul style="list-style-type: none"> <li>• Default fuel (CO<sub>2</sub>/CH<sub>4</sub>/N<sub>2</sub>O per gallon) emission coefficients</li> </ul>
Solid Waste	Republic Services	<ul style="list-style-type: none"> <li>• Solid waste disposal data includes trash hauled by Republic Services and by City staff</li> </ul>	<ul style="list-style-type: none"> <li>• Default fugitive methane (CH<sub>4</sub>) emission estimates (based on ICLEI's ClearPath)</li> </ul>
Wastewater	SDG&E	<ul style="list-style-type: none"> <li>• Energy used to pump wastewater to WWTPs</li> </ul>	<ul style="list-style-type: none"> <li>• Modified SDG&amp;E emission factor (same as used in energy sector)</li> </ul>
Water (embedded energy)	Otay & Sweetwater Authority water districts	<ul style="list-style-type: none"> <li>• Amount of water used by government operations</li> </ul>	<ul style="list-style-type: none"> <li>• California Energy Commission report detailing embedded kWh per gallon of water</li> <li>• Modified SDG&amp;E emission factor (same as used in energy sector)</li> </ul>
Other	Recreation Dept.	<ul style="list-style-type: none"> <li>• pH canisters' shipment invoices</li> </ul>	<ul style="list-style-type: none"> <li>• Default fugitive carbon dioxide (CO<sub>2</sub>) emissions coefficients</li> </ul>

**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 energy factors which required for the calculations for calendar year 2018; however, if these predetermined datasets was unavailable for minor sources, the most recent data available was used as a proxy. Staff included utility-specific electricity coefficients for CO<sub>2</sub>

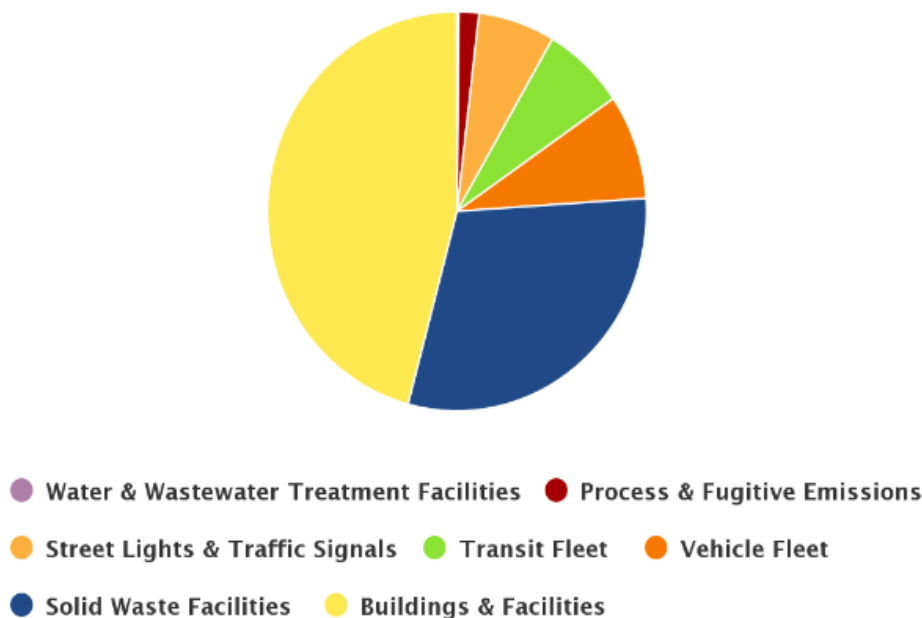


emissions in the energy analyses and default emissions coefficients and related assumptions were generally used for transportation and waste analyses. SDG&E's emission factor has not been third-party verified and reported since 2009, but the utility has significantly increased its percentage of renewable electricity to over 45% over the past few years.

## RESULTS

Chula Vista's 2018 municipal GHG emissions were 10,270 metric tons of carbon dioxide equivalents (MT CO<sub>2</sub>e). This represents a 4.8% increase in total emissions since 2016 (9,740 MT CO<sub>2</sub>e) and a 67% decrease when compared to the initial 1990 inventory (Table 2). The majority of emissions came from the building energy use (41%). Following the building energy use, the next highest emission sectors were solid-waste (27%) and vehicle fleet (17%). The energy associated with potable and recycled water usage accounted for about 8% of the total emissions. External energy use (traffic signals and streetlights) followed by 6% and emissions from wastewater pumping, making up less than 1%. Compared to 1990, total municipal operation emission levels were 67% lower, however about 5% higher than 2016 emissions. (Table 2).

### CO<sub>2</sub>e By Category

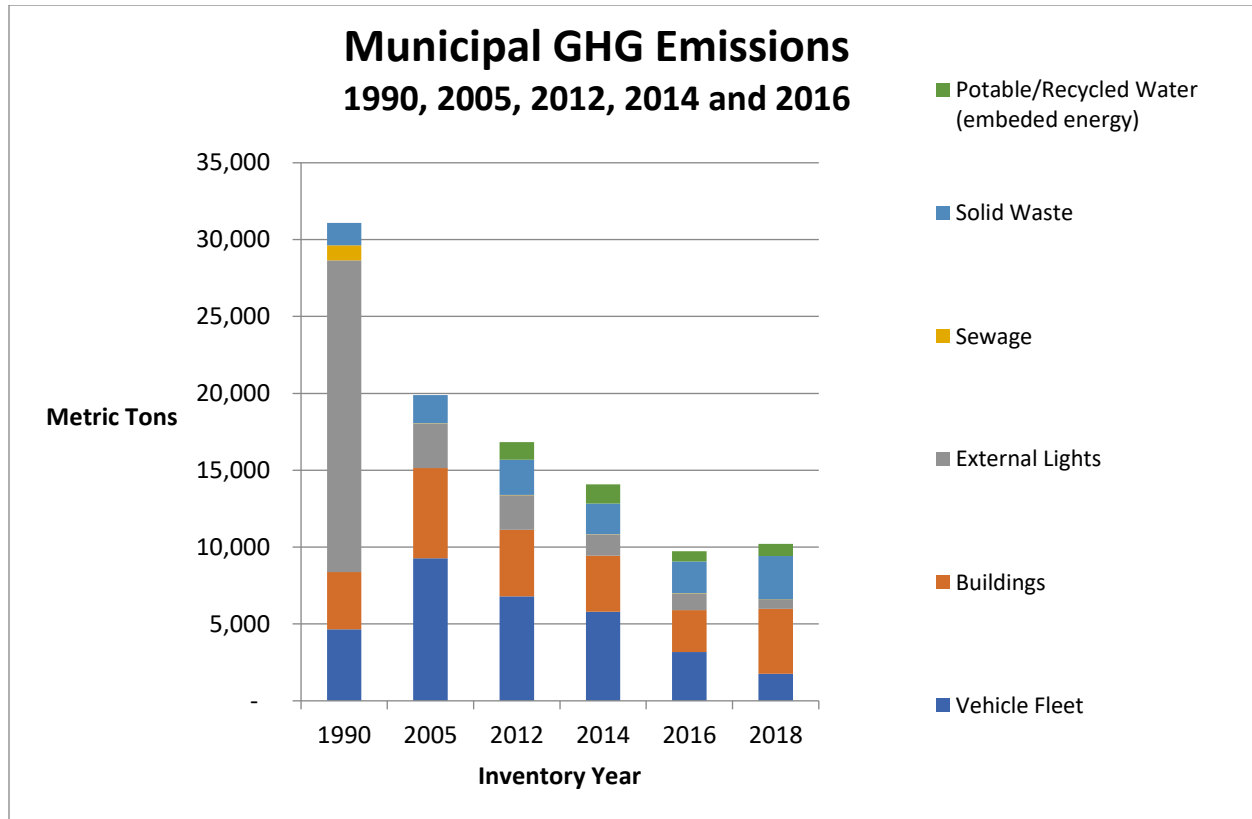




Annual Consumption (Metric Units)						Annual Greenhouse Gas (GHG) Emissions (Metric Tons CO <sub>2</sub> e)							
	1990	2016	2018	% Change (2018 vs. 1990)	% Change (2018 vs. 2016)		1990	2016	2018	% Change (2018 vs. 1990)	% Change (2018 vs. 2016)		
Employees	866	936		-100.0%	-100.0%	Per Employee	35.9	10.4		-100.0%	-100.0%		
Vehicle Fleet Fuel Use (Gallons or Equivalent)	478,344	367,365	204,417	-57.3%	-44.4%	Vehicle Fleet	4,655	3,176	1,761	-62.2%	-44.6%		
Energy Use (MMBtu)	Buildings	35,527	42,680	55,609	56.5%	30.3%	Energy Use	Buildings	3,728	2,734	4,234	13.6%	54.9%
	External Lights	147,100	15,415	15,388	-89.5%	-0.2%		External Lights	20,260	1,077	605	-97.0%	-43.8%
	Sewage	7,122	202	242	-96.6%	19.9%		Sewage	981	14	16	-98.4%	14.6%
	Total	189,749	58,297	71,239	-62.5%	22.2%		Total	24,969	3,825	4,855	-80.6%	26.9%
Solid Waste (Tons)	5,400	7,081	7,143	32.3%	0.9%	Solid Waste	1,471	2,055	2,797	90.1%	36.1%		
Potable Water (million gallons)	NA	200	253	NA	26.3%	Potable/Recycled Water (embedded energy)	NA	684	795	NA	16.2%		
Recycled Water (million gallons)	NA	233	294	NA	26.1%								
* All GHG emissions are reported in CO <sub>2</sub> Equivalent (CO <sub>2</sub> e)						Total GHG Emissions	31,095	9,740	10,207	-67.2%	4.8%		
						20% GHG Reduction Goal							
						Reductions Needed To Reach Goal					*Goal Obtained		

**Table 2:** Municipal Analysis – 1990, 2016 and 2018

The energy use for external lighting continues to be the City's largest decreasing emissions sector along with the vehicle fleet, which has decreased by 45% and 44% since 2016 respectively. Contrary to the past years, emissions from building energy use, sewage, and solid waste sectors have increased. Additionally, the City's water usage and emissions from the embedded energy associated with that water have increased.



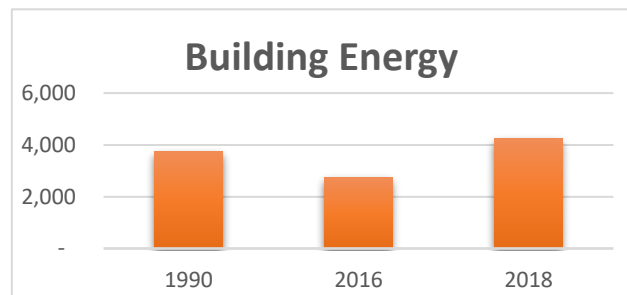
The City reached its original GHG emission reduction goal for municipal operations in 2005 and has now surpassed the primary goal by 59%.

## PRIMARY SECTORS

### *Building Energy Consumption*

Emissions from building energy use have increased 13% since 1990 and 55% since 2016.

The City started a new project to install additional solar panels in June 2018. During construction, the existing solar panels were disconnected to merge new systems with the existing systems. This increase is the result of the lost solar power generation which helps to offset building energy loads.



However, the City will increase total amount of PV installed on municipal facilities close to 5 megawatts (MW) once it's complete, so future inventories should reflect a reduction in energy use.

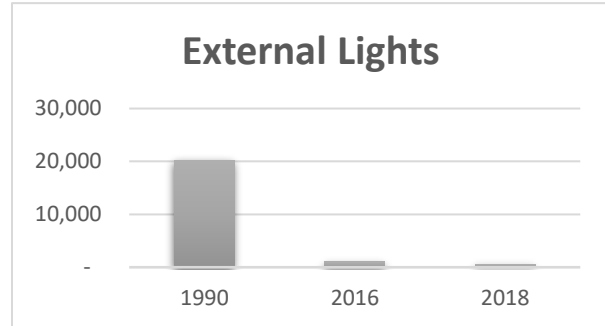


### ***External Lights***

Emissions from external lights, which consist of traffic signals and streetlights, have decreased 97% since 1990 and 44% since 2016.

Emissions from external lights have been continuously decreasing as a result of traffic signals and streetlights being retrofitted with energy-efficient LED technologies.

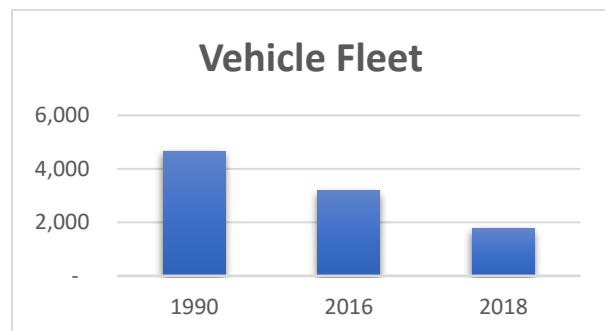
Additionally, the City Council adopted Traffic Signal Communications Master Plan in 2017 which includes smart grid streetlight system implementation.



### ***Vehicle Fleet***

Emissions from vehicle fleet have decreased 62% since 1990 and 45% since 2016.

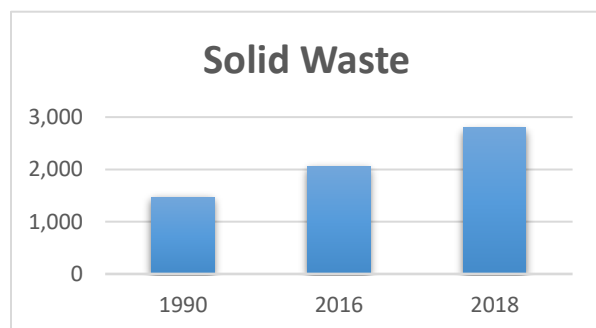
As a result of the City's Clean Fleet Policy, which prioritizes alternative fuels and hybrid technologies when selecting new vehicles, the City has been converting its municipal fleet to operate on electricity, propane, compressed natural gas or biodiesel. Over 60 vehicle chargers installed for fleet operations at three City facilities, coming online in early 2018, and the first 15 vehicles were integrated into the fleet at the same time. And later in 2018, City Council voted to acquire an additional 34 new fleet vehicles over the next two years, including 14 all-electric and 20 plug-in hybrid electric models.



### ***Solid Waste***

Emissions related to solid waste have increased 90% since 1990 and 36% since 2016.

City facilities' waste production has been increasing over the years, and currently Office of Sustainability is planning to create waste reduction plan to implement various strategies to decrease waste generation.

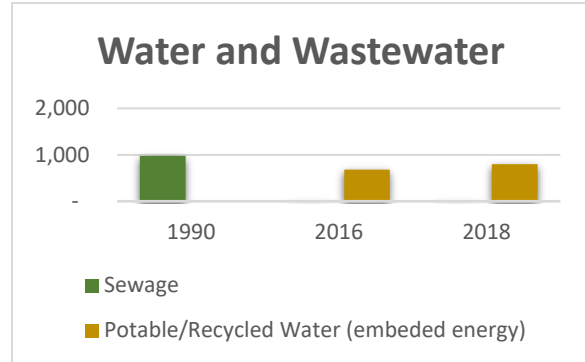


### ***Water and Wastewater Transportation (Embedded Energy)***



Emissions associated with the water usage have increased 16% since 2016. Comparison to 1990 emissions is not available due to lack of past data.

Emissions from wastewater transportation have increased 15% since 2016, however 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 an indoor 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, as well as installing battery storage in multiple facilities. To build upon past experiences and ensure that City buildings are operated in a holistic and sustainable way, the City initiated the LEED Building Operations and Maintenance certification for existing buildings at the three facilities at the City Hall campus. By striving for this third-party certification, City staff improved City's current policies which governs building operations, and implemented where needed, a comprehensive set of policies that helped reduce emissions and provided numerous co-benefits including improved indoor air quality, promoting healthy commuting options, and ensuring comfortable and productive workspaces.

The City has also 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 that will help the City achieve some of its sustainability goals and serve as a useful tool 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. Through implementation of the City Operations Sustainability Plan, the City strives to lead by example, thereby helping to ensure clean air, water, and land for the entire community.