



2014 COMMUNITY GREENHOUSE GAS EMISSIONS INVENTORY

Cory Downs
Coleen Wisniewski

June 2018

Adopted by City Council September 2018

SUMMARY

As part of Chula Vista's climate action program and its commitment to reduce greenhouse gas (GHG) or "carbon" emissions, the Economic Development Department's Conservation Section performs emission inventories to identify GHG sources and to help guide policy decisions. The 2014 GHG Emissions Inventory is the City's latest evaluation of its progress in reaching its emissions reduction goal and builds upon past inventory efforts. The inventory's community component uses ICLEI's U.S. Community Protocol to ensure the City's GHG inventories comply with industry best practices. In an effort to ensure compliance with the protocol, community GHG emissions for the transportation sector were recalculated for 2005 and 2012 based on new guidance on how to best utilize VMT data.

The 2014 inventory indicates that Chula Vista's annual citywide GHG levels are 1,249,503 metric tons of carbon dioxide equivalent (MT CO₂e). Compared to 2005, Chula Vista's citywide GHG emissions have decreased by 5% and per capita emissions are approximately 21% below 2005 levels and 18% below 2012 levels. Looking at the activity data behind the emissions, there were mixed results with a decrease of 30% in the residential sector but a 16% increase in the combined commercial and industrial energy consumption. But largely due to a cleaner electrical grid, both sectors saw GHG emission reductions. Community transportation activity has also decreased since 2012, with vehicle miles traveled (VMT) about 9% lower than in 2012 but still 11% higher than 2005, but largely due to cleaner transportation fuels GHG emissions are only 3% higher. In order to reach the current community emissions reduction goal of 15% below 2005 emission levels, the City will have to reduce its GHG emissions by more than 131,120 MT CO₂e or about 10%.

METHODOLOGY

Chula Vista has been a regional and national leader in climate action policies and programs designed to reduce GHG, or "carbon" emissions. The City has participated in the United Nations Framework Convention on Climate Change, ICLEI Cities for Climate Protection Campaign, the Conference of Mayor's Climate Protection Agreement and the America's Pledge "We Are Still In." Through this involvement, the City has committed itself to reducing its greenhouse gas emissions.

The City's 2014 GHG Emissions Inventory was compiled and calculated using the U.S. Community Protocol (Version 1.0), which was created by ICLEI and supported by California

regulatory agencies to provide methodologies for local governments to better estimate their annual greenhouse gas emissions from community sources. In the protocol, the emissions from five main parameters – building energy consumption, transportation, water (embedded energy), wastewater, and solid waste – are evaluated. These parameters are based solely on “end use activities” and their emissions are expressed as CO₂ equivalent (or CO₂e), which allows greenhouse gases of different strengths to be added together.

SECTOR	DATA PROVIDER	ACTIVITY DATA	EMISSION FACTOR
Energy	SDG&E	<ul style="list-style-type: none"> - Metered electricity & natural gas use - Due to privacy concerns industrial and commercial sectors needed to be combined - For 2014 data SDG&E used a new data collection methodology than previous years 	<ul style="list-style-type: none"> - SDG&E-specific electricity emission coefficients (CO₂). 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	SANDAG	<ul style="list-style-type: none"> - Annual VMT data was derived from average weekday VMT values for Chula Vista. Trips that either started or ended in Chula Vista but ended or started in another jurisdiction were discounted by 50% while through trips were not included - 2012 and 2014 VMT calculations were performed by different SANDAG models and may effect the VMT results 	<ul style="list-style-type: none"> - Default fuel (CO₂/CH₄/N₂O / gallon) emission coefficients - CalTrans EmFac emission coefficients (CO₂e / mile) (community analysis only)
Solid Waste	CalRecycle	<ul style="list-style-type: none"> - Solid waste disposal data for Chula Vista residents and businesses at all California landfills 	<ul style="list-style-type: none"> - Default fugitive methane (CH₄) emission estimates (based on EPA WARM Model)
Wastewater	City Staff	<ul style="list-style-type: none"> - Wastewater totals sent to Wastewater Treatment Plants (WWTP) provided by City staff 	<ul style="list-style-type: none"> - EPIC emission factor based on Pt. Loma WWTP
Water (embeded energy)	Otay & Sweetwater Authority water districts	<ul style="list-style-type: none"> - Amount of water used by all community 	<ul style="list-style-type: none"> - California Energy Commission report detailing embedded kWh per gallon of water - Modified SDG&E emission factor (same as used in energy sector)

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

To perform emission calculations, the City utilized the ICLEI Clear Path tool provided by the Statewide Energy Efficiency Collaborative (SEEC) and an inventory tool created by University of San Diego Energy Policy Initiatives Center (EPIC). Finally, emissions for 2005 and 2012 were recalculated based on new guidance from SANDAG on how to appropriately account for VMT trips that only have Chula Vista as either the origin or destination but not both. This

change increased VMT totals and related emissions. 2005 emissions for the solid waste sector were also updated based on guidance from ICLEI and updates that were made to the ClearPath software since 2005.

With technical assistance from the EPIC, City staff collected “activity data” from a number of municipal and external data providers including SANDAG, SDG&E, CalRecycle, the Otay and Sweetwater Authority Water Districts, and City Staff (Table 1). In most cases, the data providers were able to offer aggregated data for calendar year 2014. Default emissions coefficients and related assumptions were generally used for transportation and waste analyses. However, staff included utility-specific electricity coefficients for energy sector emission analyses. SDG&E’s CO₂ emission factor has not been third-party verified and updated since 2009, yet the utility has significantly increased its percentage of renewable electricity (from 9% to 43%) over the past few years. To help account for this increased renewable energy use, EPIC created a modified CO₂e emission factor that also incorporates CH₄ and N₂O emissions. This emission factor was used in the 2012 and 2014 community inventories. EPIC has also worked with the City of San Diego to calculate GHG emissions factors related to wastewater from Chula Vista residents and business that is sent to San Diego for treatment.

RESULTS

Annual Consumption (Metric Units)						Annual Greenhouse Gas (GHG) Emissions (Metric Tons CO ₂ e)							
	2005	2012	2014	% Change (2014 vs. 2005)	% Change (2014 vs. 2012)		2005	2012	2014	% Change (2014 vs. 2005)	% Change (2014 vs. 2012)		
Population	217,543	249,382	260,765	20%	5%	Per Capita	6.0	5.8	4.8	-21%	-18%		
Housing Units	73,115	79,255	81,267	11%	3%	Per Housing Unit	18.0	18.4	15.4	-15%	-16%		
Land Area (Acres)	33,024	33,024	33,024	0%	0%	Per Acre	39.8	44.1	37.8	-5%	-14%		
Annual Vehicle Miles Traveled (VMT)	1,429,425,787	1,746,331,092	1,585,833,977	11%	-9%	Transportation (MTCO₂e)¹	717,256	851,386	740,584	3%	-13%		
Energy Use (MMBtu)	Residential	3,416,724	3,642,556	2,396,525	-30%	-34%	Energy Use (MTCO₂e)	Residential	247,559	266,438	221,923	-10%	-17%
	Commercial*	2,305,220	2,586,867	3,239,330	16%	11%		Commercial	182,951	204,818	181,115	-19%	-24%
	Industrial**	485,504	327,471					Industrial	41,670	34,055			
	Total	6,207,448	6,556,894	5,635,855	-9%	-14%		Total	472,180	505,311	403,038	-15%	-20%
Solid Waste (Tons)	217,459	193,666	257,144	18%	33%	Solid Waste (MTCO₂e)	60,780	50,717	67,245	11%	33%		
Potable Water (million gallons)	12,666	10,403	8,034	-37%	-23%	Potable Water (MTCO₂e)	50,062	40,819	30,810	-38%	-25%		
<p>* All GHG emissions are reported in CO₂ Equivalent (CO₂e) which allows emissions of different strengths to be added together. For example, one metric ton of methane emissions is equivalent to 21 metric tons of carbon dioxide (or CO₂e) in global warming potential.</p> <p>**Commercial and Industrial energy usage had to be merged in 2014 due to privacy concerns</p> <p>*** Due to better data availability methodology for calculating wastewater emission were updated in 2012.</p>						Waste Water*** (MTCO₂e)	15,457	7,962	7,826	-49%	-2%		
						Total GHG Emissions (MTCO₂e)	1,315,734	1,456,195	1,249,503	-5%	-14%		
						15% Below 2005 Reduction Goal			1,118,374				
						Reductions Needed To Reach Goal			131,129				

Table 2: Demographics, activity data and greenhouse gas emissions for 2005, 2012 and 2014

In 2014, community GHG emissions from Chula Vista totaled 1,249,504 MT CO₂e (Table 2, Figure 1). The sector with the greatest amount of emissions (59% of total) was transportation or mobile sources. The residential energy use sector was the second highest source producing a quarter (18%) of total community emissions, followed by the combined commercial and industrial energy use (14%) and solid waste (5%) sectors. Compared to 2005 and 2012, total citywide emissions in 2014 were 5% and 14% lower, respectively (Figure 1). 2014 per capita emissions are approximately 21% below 2005 levels and 18% below 2005 levels. Emissions from all energy sectors have decreased by 15% or 69,142 MT CO₂e in total since 2005, while transportation-based emissions are estimated to have increased 3% or 23,329 MT CO₂e. The solid waste sector had emissions increase 11% since the 2005 baseline and 33% since 2012. Emissions from water (embedded energy) have decreased 38% since 2005 while emissions from wastewater treatment have decreased 2% since 2012.

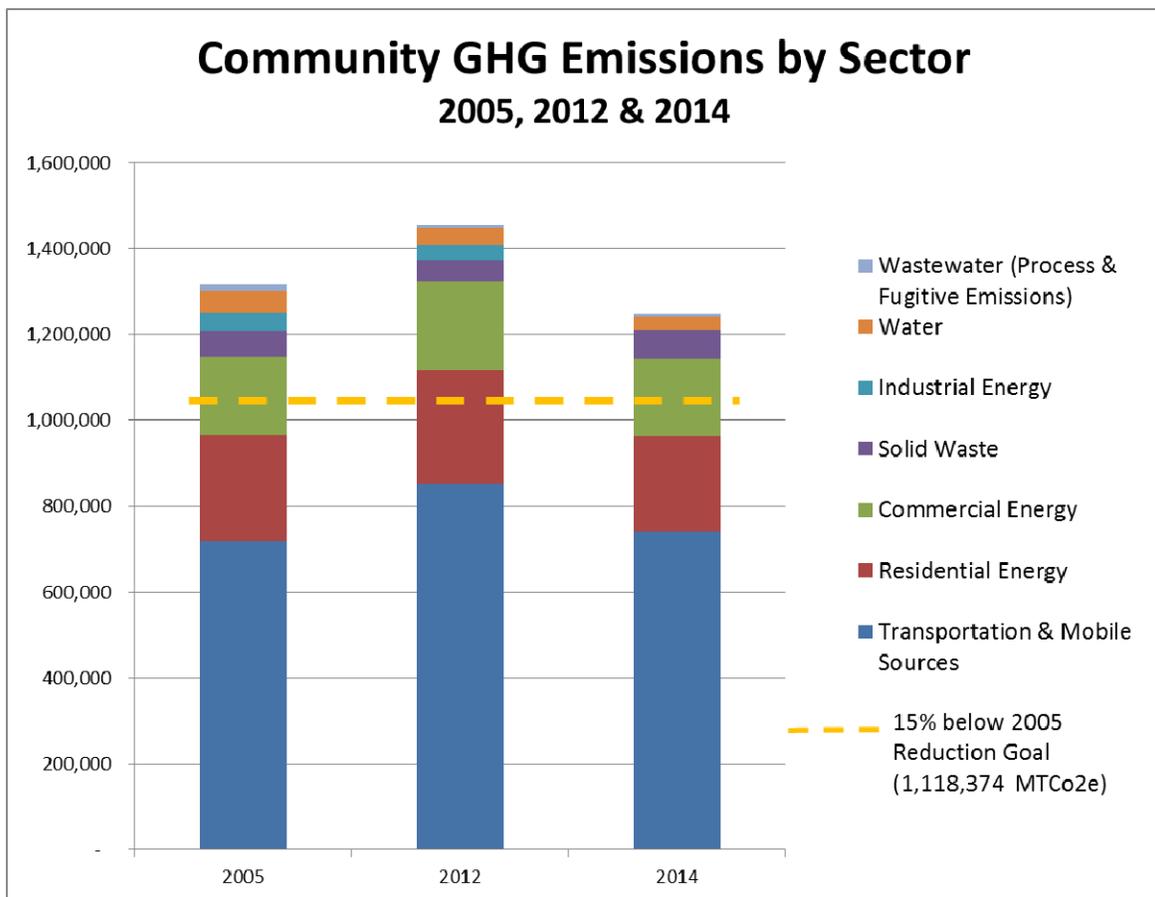


Figure 1: Total GHG emissions from community sources (by sector) in 2005, 2012, and 2014. The yellow dashed line represents the City’s carbon reduction goal

DISCUSSION

Community Emissions

As mentioned in the 2012 inventory, due to data availability and updated methodologies, the City has updated its baseline from 1990 to 2005. Unlike previous community inventories, this year saw a total GHG emission reduction of 14% from the most recent inventory (2012) and a 5% reduction from the baseline (2005). These reductions occurred in spite of the City's population growth of 5% since 2012 and 20% since 2005. Factoring that growth into emissions and looking at per capita GHG emissions this illustrates reductions of 18% since 2012 and 21% since 2005. While these reductions are good to see and significant, continued reductions will be needed in multiple inventories in order to reach our short and long-term goals. One factor that affected the 2012 emissions totals included changes in modeling and data collection that are used to estimate activity data. In the transportation sector, SANDAG updated their traffic models between the 2012 and 2014 inventories and this can affect comparisons between those two years. In the energy sector, SDG&E changed how they provided energy usage data to ensure the privacy of their users. The City worked to facilitate data sharing under a Non-Disclosure Agreement but the change may still impact data results. For both sectors, City staff will be carefully monitoring the results of the next inventory (2016) to see if the reduction trends continue.

While it is difficult to reduce transportation-related emissions due to long-standing land use form and commuting patterns, there are local, state, and federal programs that are beginning to actively target this sector by reducing the carbon-intensity of vehicle fuels, improving fuel efficiency, and promoting alternative transportation options. The City itself continues to integrate "smart growth" design principles into its development review and approval process and to facilitate the installation of alternative fuel infrastructure throughout the community, including public electric vehicle chargers at 7 City facilities, which can further help address these emissions.

When looking at the second largest sector, building energy use, Chula Vista has numerous programs and policies to expand energy efficiency and renewable energy opportunities. These include the Property Assessed Clean Energy (or PACE) programs which started in late 2014 but have since been used to finance almost 50 million dollars in energy efficiency, renewable energy, or water efficiency in Chula Vista. City staff also continued to promote energy conservation through the Local Government Partnership with SDG&E. Under this partnership, the Free Resource & Energy Business Evaluation (FREBE) program has successfully helped over 1,000 local businesses and 135 Home Upgrade Carbon Downgrade program participants identify energy-saving improvements at their buildings and homes.

NEXT STEPS

With the adoption of the City's most recent Climate Action Plan in late 2017, City staff are working to implement the 11 GHG reduction strategies. Some of the implementation actions being taken are the adoption of increased efficiency levels for commercial outdoor lighting, working to adopt an ordinance that would require solar PV on new construction, installing more than 120 electric vehicle chargers for City employees and fleets and adopting the City's Water Stewardship plan. Staff are also working with SANDAG and EPIC to create a Regional GHG Framework that will guide future GHG inventories and help ensure consistency across the

region. Additionally, in an effort to increase inventory consistency and decrease the amount of required staff time, EPIC will be undertaking efforts to conduct GHG inventories for a number of jurisdictions, including Chula Vista, starting with the 2016 inventory. This effort will help ensure a more timely and rigorous inventory while minimizing the staff time required.



2014 MUNICIPAL GREENHOUSE GAS EMISSIONS INVENTORY

Brenden Seki
Cory Downs

December 2016

Adopted by City Council September 2018

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 2014 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 2014 inventory shows that Chula Vista’s municipal GHG emissions equal 14,076 metric tons of carbon dioxide equivalents (MT CO₂e). This represents a 16% decrease in total emissions since 2012 (16,821 MT CO₂e) and a 55% decrease when compared to the initial 1990 inventory. GHG emissions from the municipal external lighting have declined every year from the initial report, with a 39% decrease since 2012 due in part to streetlight LED retrofits. The City’s vehicle fleet, building energy, and solid waste emissions have similarly lowered, decreasing 15%, 16%, and 14% respectively, from 2012. The emissions associated with the municipal sewage have increased the past two reporting years; however, it is a very small amount (less than 1%) of the City’s overall carbon emissions. Lastly, as water usage has increased, emissions from the embedded energy associated with that water have also increased since 2012.

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, and 2012 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 Department of Energy’s Better Buildings program and the steering committee for the California Statewide Energy Efficiency Collaborative (SEEC) ClearPath tool. The City has committed

itself to reducing its carbon footprint through these past actions and will continue to do so with future decision making.

PARAMETER	DATA PROVIDER	ACTIVITY DATA	EMISSION FACTOR
Energy	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"> • SDG&E-specific electricity emission coefficients (CO₂). 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.	<ul style="list-style-type: none"> • Fuel consumption totals include transit and equipment use 	<ul style="list-style-type: none"> • Default fuel (CO₂/CH₄/N₂O per gallon) emission coefficients
Solid Waste	Republic Services	<ul style="list-style-type: none"> • Solid waste disposal data includes trash hauled by Republic Services and by City staff 	<ul style="list-style-type: none"> • Default fugitive methane (CH₄) emission estimates (based on ICLEI's ClearPath)
Wastewater	SDG&E	<ul style="list-style-type: none"> • Energy used to pump wastewater to WWTPs 	<ul style="list-style-type: none"> • Modified SDG&E emission factor (same as used in energy sector)
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 • Modified SDG&E emission factor (same as used in energy sector)
Other	Recreation Dept.	<ul style="list-style-type: none"> • pH canisters' shipment invoices 	<ul style="list-style-type: none"> • Default fugitive carbon dioxide (CO₂) emissions coefficients

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

The City's 2014 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 for 1990, 2005, and 2012 were recalculated using updated emissions factors or data in

order to provide a more accurate comparison to the latest 2014 emission levels. Due to a lack of available data, 1990 and 2005 inventories do not include emissions from the water sector.

City staff collected “activity data” from a number of 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 2014; however, if 2014 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 has significantly increased its percentage of renewable electricity, to over 33%, over the past few years. To help account for this increased renewable energy supply, EPIC at the University of San Diego created a modified CO₂e emission factor that accounts for CO₂, CH₄, and N₂O, which the City incorporated into its 2014 municipal inventory. Additionally, through working with EPIC we learned that the 2005 SDG&E emission factor, as reported in the LGOP, used statewide defaults, which contributed to an artificially low emission factor. For this reason, the 2006 SDG&E emission factor was used as a proxy emission factor for 2005.

RESULTS

Chula Vista’s 2014 municipal GHG emissions were 14,076 MT CO₂e (Table 2). The majority of emissions came from the City’s vehicle fleet, accounting for 41% of total emissions. Following the vehicle fleet, the next highest emission sectors were building energy use (26%) and solid-waste related emissions (14%). External energy use (traffic signals and street lights) and the energy associated with potable and recycled water usage each accounted for about 10% of the total emissions each. Emissions from wastewater pumping were minor, making up less than 1%. Compared to 1990 and 2012, total municipal operation emission levels were 55% and 16% lower, respectively (Table 2). The energy use for external lighting continues to be the City’s largest decreasing emissions sector, which has decreased by 18,890 MT CO₂e (93%) since 1990 and 39% since 2012. Additionally, only the water (wastewater and potable/recycled water) sectors increased, 14% (3 MT CO₂e) and 10% (117 MT CO₂e) respectively, while all other sectors had lower emission in 2014 compared to 2012. The City reached its original GHG emission reduction goal for municipal operations in 2005 and has now surpassed the primary goal by over 40%.

Annual Consumption (Metric Units)							Annual Greenhouse Gas (GHG) Emissions (Metric Tons CO ₂ e)								
	1990	2005	2012	2014	% Change (2014 vs. 1990)	% Change (2014 vs. 2012)		1990	2005	2012	2014	% Change (2014 vs. 1990)	% Change (2014 vs. 2012)		
Employees	866	1,198	863	875	1.0%	1.4%	Per Employee	35.9	16.6	19.5	16.1	-55.2%	-17.5%		
Vehicle Fleet Fuel Use (Gallons or Equivalent)	478,344	1,102,823	897,603	771,410	61.3%	-14.1%	Vehicle Fleet	4,655	9,282	6,802	5,802	24.6%	-14.7%		
Energy Use (MMBtu)	Buildings	35,527	70,790	54,765	46,710	31.5%	-14.7%	Energy Use	Buildings	3,728	5,856	4,321	3,646	-2.2%	-15.6%
	External Lights	147,100	27,780	21,764	15,484	-89.5%	-28.9%		External Lights	20,260	2,896	2,247	1,370	-93.2%	-39.0%
	Sewage	7,122	257	215	240	-96.6%	11.6%		Sewage	981	19	22	25	-97.5%	13.6%
	Total	189,749	98,827	76,744	62,434	-67.1%	-18.6%		Total	24,969	8,771	6,590	5,041	-79.8%	-23.5%
Solid Waste (Tons)	5,400	6,603	7,942	6,859	27.0%	-13.6%	Solid Waste	1,471	1,830	2,296	1,983	34.8%	-13.6%		
Potable Water (million gallons)	NA	NA	260	298	NA	14.6%	Potable/Recycled Water (embedded energy)	NA	NA	1,133	1,250	NA	10.3%		
Recycled Water (million gallons)	NA	NA	342	409	NA	19.6%									
* All GHG emissions are reported in CO ₂ Equivalent (CO ₂ e)							Total GHG Emissions	31,095	19,883	16,821	14,076	-54.7%	-16.3%		
							20% GHG Reduction Goal					24,876			
							Reductions Needed To Reach Goal					0	*Goal Obtained		

DISCUSSION

The 2014 inventory results highlight Chula Vista’s continued success in reducing GHG emissions associated with its municipal operations. This significant and sustained reduction is largely due to the continued decrease in emissions from external lighting energy, building energy, and fleet sectors, which each saw reductions between 600 and 1,000 MT CO₂e since the last inventory. The external lighting sector saw the largest percent reduction by lowering usage 93% since 1990. Emissions from building energy use were at the lowest they have been since the original inventory in 1990 (2% decrease) and 38% lower than the highest reported levels in 2005 (5,856 MT CO₂e). These trends are due in large part to the lasting energy upgrade and management efforts made throughout the City. Beginning in the mid-1990s, traffic signals were retrofitted with energy-efficient LED technologies, and more recently, most streetlights were converted to LED in 2013. In the building sector, phase II of the solar photovoltaic (PV) systems was accomplished, bringing the total amount of PV installed on City facilities to 1.7

megawatts (MW) at 14 facilities. Combined with the streetlight retrofits, these two projects have saved the City enough energy to offset the annual energy use of more than 500 homes.

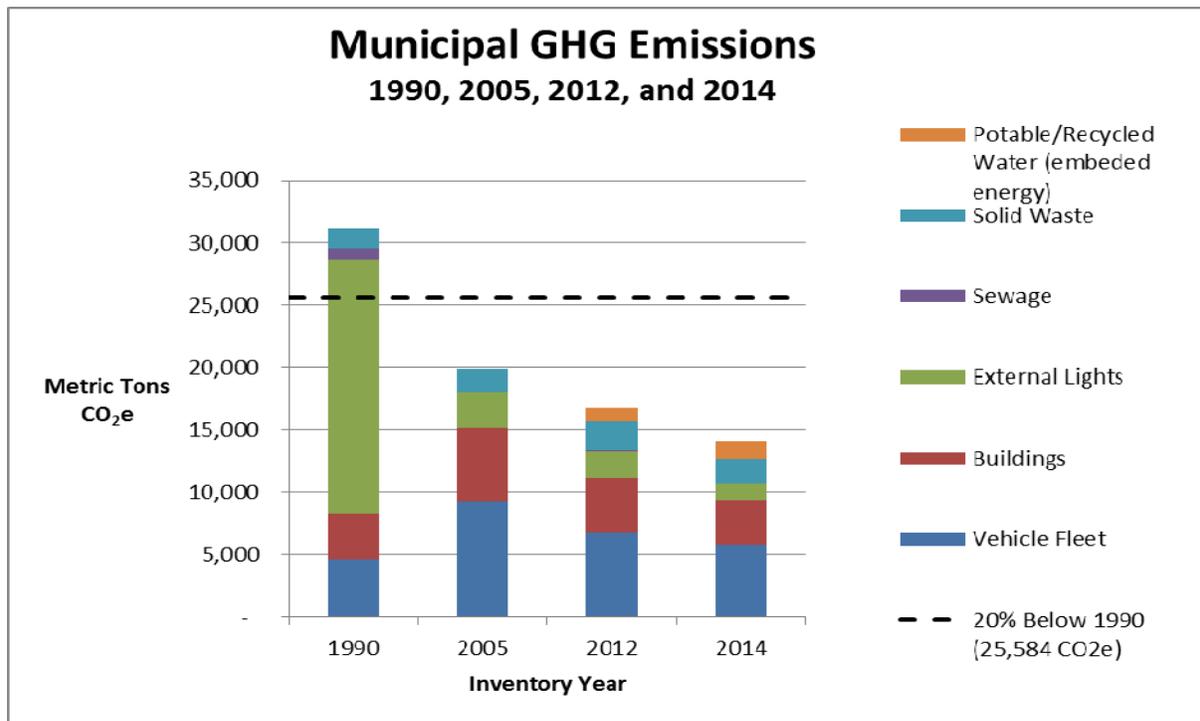


Figure 1: Total GHG emissions from municipal sources (by sector) in 1990, 2005, 2012, and 2014. The dashed line represents the City’s carbon reduction goal. Due to a lack of available data, emissions from the water sector are not included in the 1990 and 2005 inventories.

Within the municipal vehicle fleet sector, fuel usage has decreased by 14% (126,193 gallons of gasoline equivalents) since 2012 with emissions decreasing by 15% (1,000 MT CO₂e). As a result of the City’s Clean Fleet Policy, which prioritizes alternative fuels and hybrid technologies when selecting new vehicles, 31% of the municipal fleet has been converted to operate on electricity, propane, compressed natural gas, or biodiesel. Lastly, the City leverages its “purchasing power” to promote cleaner fuel sources through its contracted fleets, including the City’s trash hauler and transit company which have both completed 100% shifts to alternative fuel sources and street sweepers and tow truck services which are still working on converting to alternative fuels.

NEXT STEPS

Chula Vista’s municipal climate actions are guided by the City’s Climate Action Plan and Sustainable Operations 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, replacing turf with drought tolerant landscaping, and working with SDG&E to increase the

City's electric vehicle charging infrastructure. To build upon past experiences and ensure that City buildings are operated in a holistic and sustainable way, the City has begun to seek LEED Building Operations and Maintenance certification for one of our existing buildings. By striving for this third party certification, City staff is learning about, and implementing where needed, a comprehensive set of policies that help reduce emissions and provide numerous co-benefits including improved indoor air quality, promoting healthy commuting options, and ensuring comfortable and productive work spaces.

The City has also initiated a Smart Cities program to look at how it can incorporate new technologies to better track and manage various aspects of City operations including environmental impacts. Some proposed technologies involve smart streetlights that can dim and reduce energy usage when not needed, electronic signage that can provide environmental focused marketing while also generating revenue and building sensors and networks that better allow the City to manage resources including energy, water, and waste. 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.