Summary of Baseline Greenhouse Gas Emissions and 2030 Forecast

City of Saco

February 2023

Introduction

The City of Saco is already experiencing the effects of climate change and is beginning to take steps to address its causes and impacts. Saco's Comprehensive Plan Update recommends the city pursue a Climate Adaption Action Plan (CAAP). Saco's community has also identified climate action planning as a priority in its City Council's Resolution Endorsing the Declaration of a Climate Emergency and Emergency Mobilization Effort to Restore a Safe Climate and has enrolled in the Governor's Office of Policy Innovation and the Future's Community Resilience Partnership.

This greenhouse gas (GHG) inventory summery establishes a baseline of GHG emissions in the City of Saco to be used in the city's CAAP. It identifies the activities and major sources of emissions, enabling the town to identify areas to focus emission reduction efforts, establish goals and track progress towards those goals, and facilitate decision-making about future policies and strategies.

Why Greenhouse Gas Inventories Matter

The City of Saco is already experiencing the impacts of climate change, including warmer air and ocean temperatures, shorter winters, and new pests and diseases.[1] These changes are primarily driven by an increase of carbon dioxide (CO_2) and other greenhouse gases (GHGs) in the atmosphere, largely due to the combustion and use of fossil fuels. These GHGs trap heat in the Earth's atmosphere. They let short-wave sunlight pass through the atmosphere but prevent some of the long-wave radiation emitted from the earth from leaving, thereby warming the atmosphere. As we burn more and more fossil fuels, GHGs continue to build up in the atmosphere, trapping an ever-greater amount of heat.

A greenhouse gas inventory is an account of all the GHG emissions from sources within a community. It is a tool to help communities:

- Understand ongoing activities and major sources of emissions

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[1] MCC STS. 2020. *Scientific Assessment of Climate Change and Its Effects in Maine*. A Report by the Scientific and Technical Subcommittee (STS) of the Maine Climate Council (MCC). Augusta, Maine. 370 pp. http://climatecouncil.maine.gov/future/sites/maine.gov.future/files/inline-files/GOPIF_STS_REPORT_092320.pdf

- Identify areas to focus emission reduction efforts
- Establish goals and track progress towards those goals
- Facilitate decision-making about future policies and strategies

An inventory is usually calculated for a specific analysis year. Subsequent inventories every 3-5 years can aid local decision-makers and municipal staff in prioritizing and evaluating emission reduction strategies.

This report contains two inventories for the City of Saco: A *community-wide inventory* and a *municipal inventory*. A community-wide GHG inventory estimates the amount of GHG emissions associated with community sources and activities, meaning those of a municipality's residents, workforce, visitors, and economy. A municipal GHG inventory estimates only the emissions occurring because of local government operations, including those from government buildings and facilities, government fleet vehicles, wastewater treatment and potable water treatment facilities, landfill facilities, and other operations.

What Greenhouse Gases are Included

The primary GHGs included in a GHG inventory are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Each GHG contributes differently to warming in the atmosphere, where some are far more potent than others in the same quantities.[2] Because CH_4 and N_2O absorb far more energy than CO_2 in the atmosphere, global warming potentials (GWP) are needed to account for the warming impact of each gas. A GWP is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO_2. To show the total emissions impact, emissions of CH_4 and N_2O are converted to metric tons of CO_2 equivalent (MT CO_2e) using each gas' GWP.

There are many other types of greenhouse gases, including perfluorocarbons, hydrofluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. This protocol does not address these gases because they occur in much smaller quantities and are difficult to estimate for community-wide and municipal sources.

Community-wide Inventory

Overview

The community-wide inventory estimates the GHG emissions due to Saco's sources and activities, including those of Saco's residents, workforce, visitors, and economy. This inventory

[2] IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

was calculated for all emissions activities occurring in 2021. In the case where 2021 data was not available, 2018, 2019, or 2020 data were used as a substitute.

Methodology

This inventory was conducted using the methodology laid out in the [SMPDC Greenhouse Gas Inventory Protocol for Southern Maine Cities and Towns](). This is a standardized and simplified protocol for community-wide GHG inventories. The ICLEI ClearPath reporting platform was used for emissions calculations and accounting.

Community-wide GHG emissions may be either directly created (e.g., through household heating or vehicle fuel combustion) or indirectly created (e.g., through grid electricity use) by community members. For the inventory, emission types are divided into different sectors and subsectors. Table 1 shows the sectors and subsectors *included* in the Saco GHG inventory.

There are several sectors and subsectors of emission sources that were *excluded* from Saco's community-wide inventory (Table 2). In some cases, it is because these categories are not applicable to the Town of Saco. In others, it is because data for emissions in those categories are less readily available, are likely inaccurate given current methodologies, and/or have little relevance to municipal climate action planning.

TABLE 1. SECTORS AND SUBSECTORS **INCLUDED** IN THE SACO COMMUNITY-WIDE GHG INVENTORY.

SECTOR	SUBSECTOR	EMISSIONS SOURCES	ENERGY TYPE/END USE
STATIONARY ENERGY	Residential	Energy used in buildings as well as losses from distribution systems	Electricity
		Energy used in buildings	Discrete Fuel and Natural Gas
	Commercial	Energy used in commercial, government, and institutional buildings as well as losses from distribution systems	Electricity
		Energy used in commercial, government, and institutional buildings	Discrete Fuel and Natural Gas
	Industrial	Energy used in manufacturing and industrial facilities as well as losses from distribution systems	Electricity
		Energy used in manufacturing and industrial facilities	Discrete Fuel and Natural Gas
TRANSPORTATION	Passenger Vehicles	Fuel combusted from all passenger vehicle trips that are attributable to the community	Gasoline, Diesel, Electricity
	Commercial Vehicles	Fuel combusted from all commercial vehicle trips that are attributable to the community	Gasoline, Diesel, Electricity
	Public Transit	Fuel combusted due to passenger miles travelled on public transit	Gasoline, Diesel, Electricity
	Marine Vessels	Fuel combusted by boats that are registered in Saco	Gasoline, Diesel

WASTE	Municipal Solid Waste - Incineration	GHG emissions resulting from the incineration of all trash generated by residential and commercial activity in the community that is sent to an incineration plant	Incineration Emissions
	Compost	GHG emissions resulting from the breakdown of all composted material generated by residential, commercial, and schools	Aerobic and Anaerobic Digestion
	Wastewater – Septic	Emissions from wastewater processed in Saco Septic Systems	Aerobic and Anaerobic Digestion
	Wastewater – Wastewater Treatment Plant	Emissions from wastewater treated at Saco WWTP	Aerobic and Anaerobic Digestion
	Wastewater-Effluent Discharge	Emissions from wastewater effluent from Saco WWTP	Aerobic and Anaerobic Digestion

TABLE 2. SECTORS AND SUBSECTORS **EXCLUDED** FROM THE SACO COMMUNITY-WIDE GHG INVENTORY.

SECTOR	SUBSECTOR	EMISSIONS SOURCES	ENERGY TYPE/ END USE	REASON
TRANSPORTATION	Passenger Rail	Fuel combusted due to passenger miles travelled on passenger rail	Gasoline, Diesel, Electricity	Data availability
	Freight Rail	Emissions from the movement of freight on rail lines through a community	Gasoline, Diesel, Electricity	Data availability, not relevant for municipalities
	Off-Road Equipment	Emissions that result from airport equipment, agricultural tractors, chain saws, forklifts, snowmobiles, etc.	Gasoline, Diesel, Electricity	Data availability
	Aviation	Fuel combusted from passenger and commercial air travel	Jet Fuel	Data availability
WASTE	Municipal Solid Waste - Landfilling	Landfill gas emissions resulting from all trash generated by residential and commercial activity in the community and sent to landfill	Landfill Gas	Not applicable in Saco
INDUSTRIAL	Industrial Process Emissions	Process and fugitive emissions from industrial facilities	Combustion and other Chemical Emissions	Data availability
	Product Use	Emissions from the use of products such as refrigerants, foams, or aerosol cans	Combustion and other Chemical Emissions	Data availability
AGRICULTURE, FORESTRY, MARINE	Livestock	Emissions from manure management and enteric fermentation	Enteric fermentation and manure management	Data availability

	Land	Emissions and sequestration of GHGs from land use changes	Soil and Land Management Changes	Data availability, methodology

Community-wide Inventory

Figure 1 summarizes Saco's 2021 community-wide GHG inventory. Community-wide emissions for 2021 were estimated as 206,545 Metric Tons CO_2 equivalent (MT CO_2e). This is equivalent to 9.99 MT CO_2e per capita based on the city's Census.gov 2021 population estimate. The largest category of these emissions (42.3%) is on-road transportation, including the emissions from passenger and commercial vehicles as well as public transit. The second largest category is residential buildings (29.6%), including emissions from electricity and energy used for home heating. The third largest category is commercial/industrial buildings (18.2%), followed by solid waste disposal (9.3%).

For comparison, the city of Biddeford's 2019 GHG inventory estimates Biddeford's community-wide emissions to be 240,692 MT CO_2e, equivalent to 10.69 MT CO_2e per capita. On-road transportation is also Biddeford's largest category of emissions, followed by energy use in residential buildings.

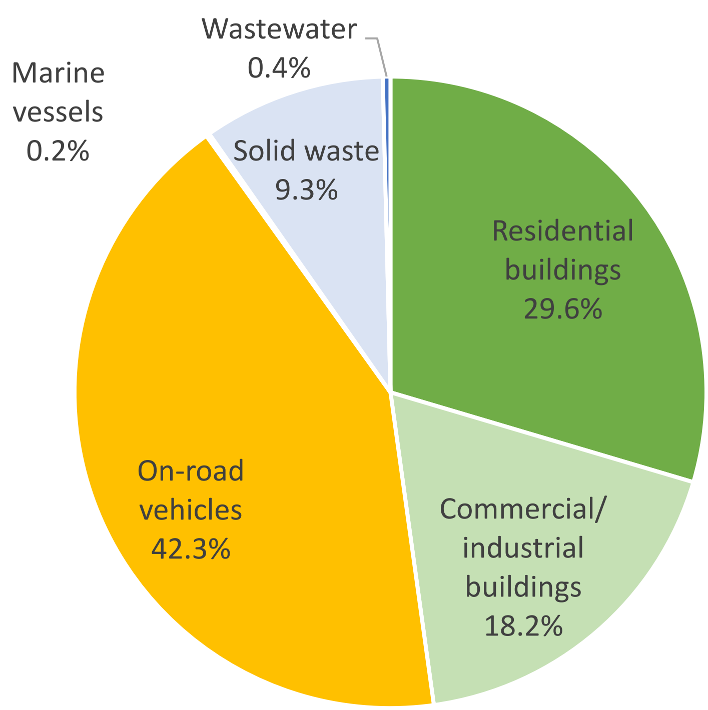

FIGURE 1. SUMMARY OF SACO'S 2021 COMMUNITY-WIDE EMISSIONS.

Figure 2 shows emissions grouped by end use or emissions source. The largest single source of community-wide emissions is passenger vehicles (31.8%) from diesel and gasoline fuel combustion. Residential heating fuels, including fuel oil, propane, and kerosene, are the second largest source of emissions (20.5%). Together, these two emissions sources account for over half of the community-wide emissions. Overall, the categories that represent the energy Saco's residents, visitors and businesses use for transportation, electricity and heating make up over 90% of Saco's community-wide emissions.

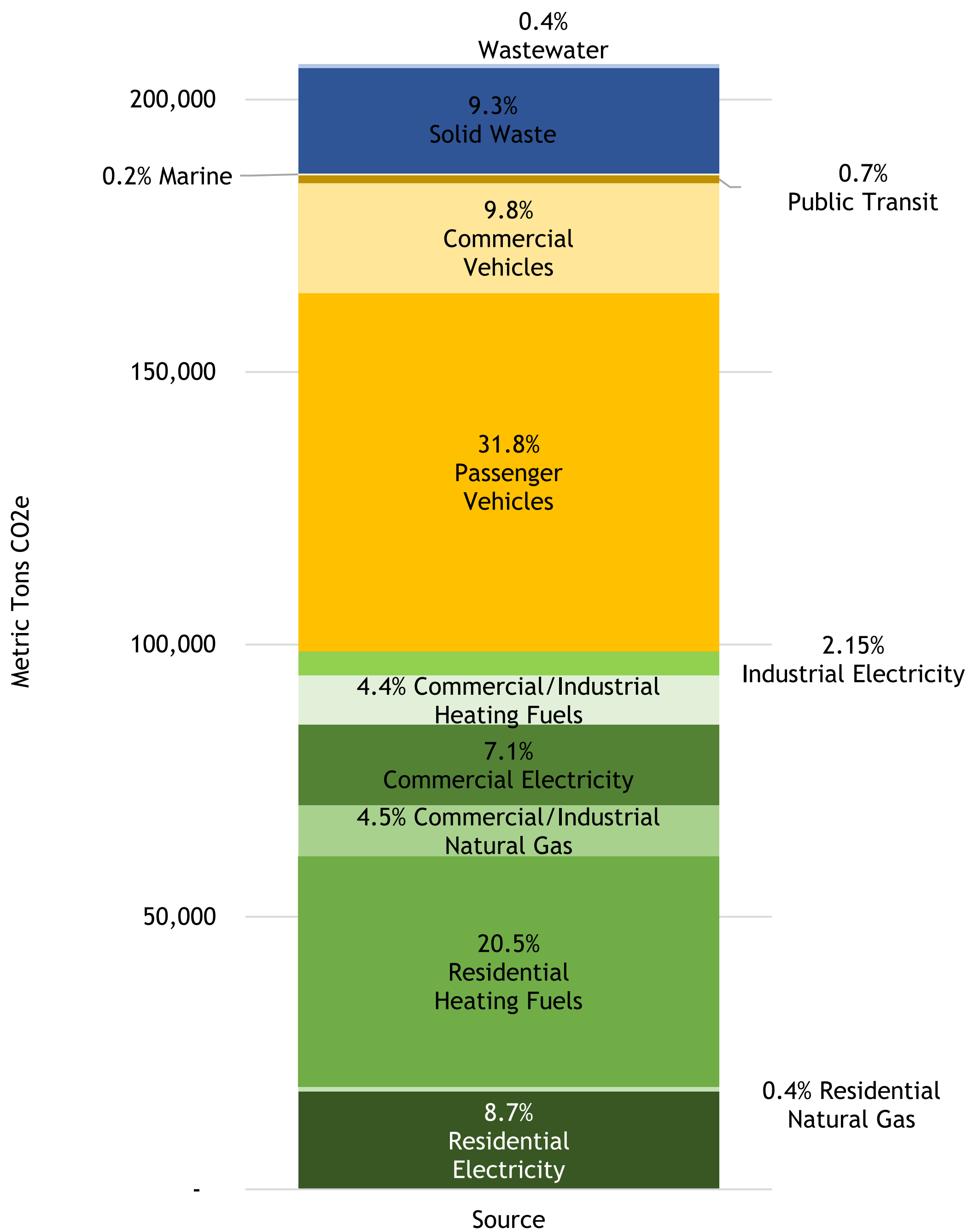

FIGURE 2. SACO'S COMMUNITY-WIDE EMISSIONS BY END USE/SOURCE.

Municipal Inventory

Overview

The municipal inventory accounts for the GHG emissions due to the municipal operations of the City of Saco, including municipal buildings and vehicles. This inventory was calculated for all emissions activities occurring in 2021. In the case where 2021 data was not available, 2018, 2019, or 2020 data were used as a substitute. The boundary of this inventory is Saco's operational control boundary. This includes any emissions sources that the municipality has full authority over their operating policies. Emissions from non-municipal public buildings (such as the school district buildings and library) are excluded from the municipal emissions inventory.

Methodology

The inventory was prepared using the Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories. Developed in partnership by the California Air Resources Board, California Climate Action Registry, and ICLEI – Local Governments for Sustainability, the protocol provides step-by-step guidance on developing a municipal GHG inventory.

Municipal GHG emissions may be either directly created (e.g., through building heating or vehicle fuel combustion) or indirectly created (e.g., through grid electricity use) by municipal operations. For the municipal inventory, emission types are divided into different sectors and subsectors. Table 3 shows the sectors and subsectors *included* in the Saco municipal GHG inventory.

There are several subsectors of emission sources that were *excluded* from Saco's municipal inventory (Table 4). Saco does not operate a transit fleet or a school bus fleet, and so these subsectors were excluded. Similarly, Saco is served by Maine Water, over which the City of Saco does not have operational control. Because of this, the water treatment subsector is excluded (although it's electricity use is captured in the community-wide inventory). Due to lack of municipally-generated waste data, the waste – municipal solid waste (MSW) subsector is also excluded. Table 5 shows the sectors excluded from Saco's municipal GHG inventory.

Collecting the data

Municipal emissions were calculated by multiplying activity data (e.g., fuel consumption) by the corresponding emission factors (e.g., tons CO_2 emitted per gallon of fuel combusted) for each activity. This activity data was compiled from vendor invoices and utility data platforms.

Table 3. Sectors and subsectors included in Saco's Municipal GHG Inventory.

SECTOR	SUBSECTOR	EMISSIONS SOURCES	ENERGY TYPE/END USE
STATIONARY ENERGY	Buildings and Facilities	Energy used in town offices, fire stations, police stations, and parks and recreation facilities	Electricity
			Natural Gas
			Discrete Fuel
	Streetlights and Traffic Signals	Energy used in town street lighting and traffic signals	Electricity
TRANSPORTATION	Vehicle Fleet	Fuel combusted by municipally-owned vehicles	Gasoline, Diesel
	Employee Commute	Fuel combusted from vehicles used by municipal employees as they commute to and from work	Gasoline, Diesel
WASTE	Wastewater Treatment	Emissions from wastewater treated at the Saco WWTP	Aerobic and Anaerobic Digestion
		Emissions from wastewater treated in community septic systems	Aerobic and Anaerobic Digestion
		Energy used in wastewater processing at the WWTP and pump stations	Electricity
		Emissions from the recycling of wastewater sludge	Sludge Recycling

Table 4. Sectors Excluded from Saco's Municipal GHG Inventory.

SECTOR	SUBSECTOR	EMISSIONS SOURCES	ENERGY TYPE/END USE	REASON
STATIONARY ENERGY	Water treatment	Emissions from energy used to treat drinking water	Electricity	Not applicable to Saco
TRANSPORTATION	Transit Fleet	Fuel combusted in transit vehicles.	Diesel	Not applicable to Saco
	School Buses	Fuel combusted in school buses	Diesel	Not applicable to Saco
WASTE AND WASTEWATER	Waste – MSW	Emissions from the incineration of municipal solid waste generated by municipal operations	Incineration Emissions	Data availability

Inventory

Figure 3 summarizes Saco's 2021 municipal GHG inventory. Municipal emissions for 2021 were estimated as 2,278 Metric Tons CO_2 equivalent (MT CO_2e). Municipal emissions are comparable to 1.1% of total community-wide emissions. The largest source of municipal emissions is the vehicle fleet (36%), followed by the emissions from heating and electrifying buildings and facilities (26%) and the energy, process, and waste disposal emissions from wastewater treatment (24%).

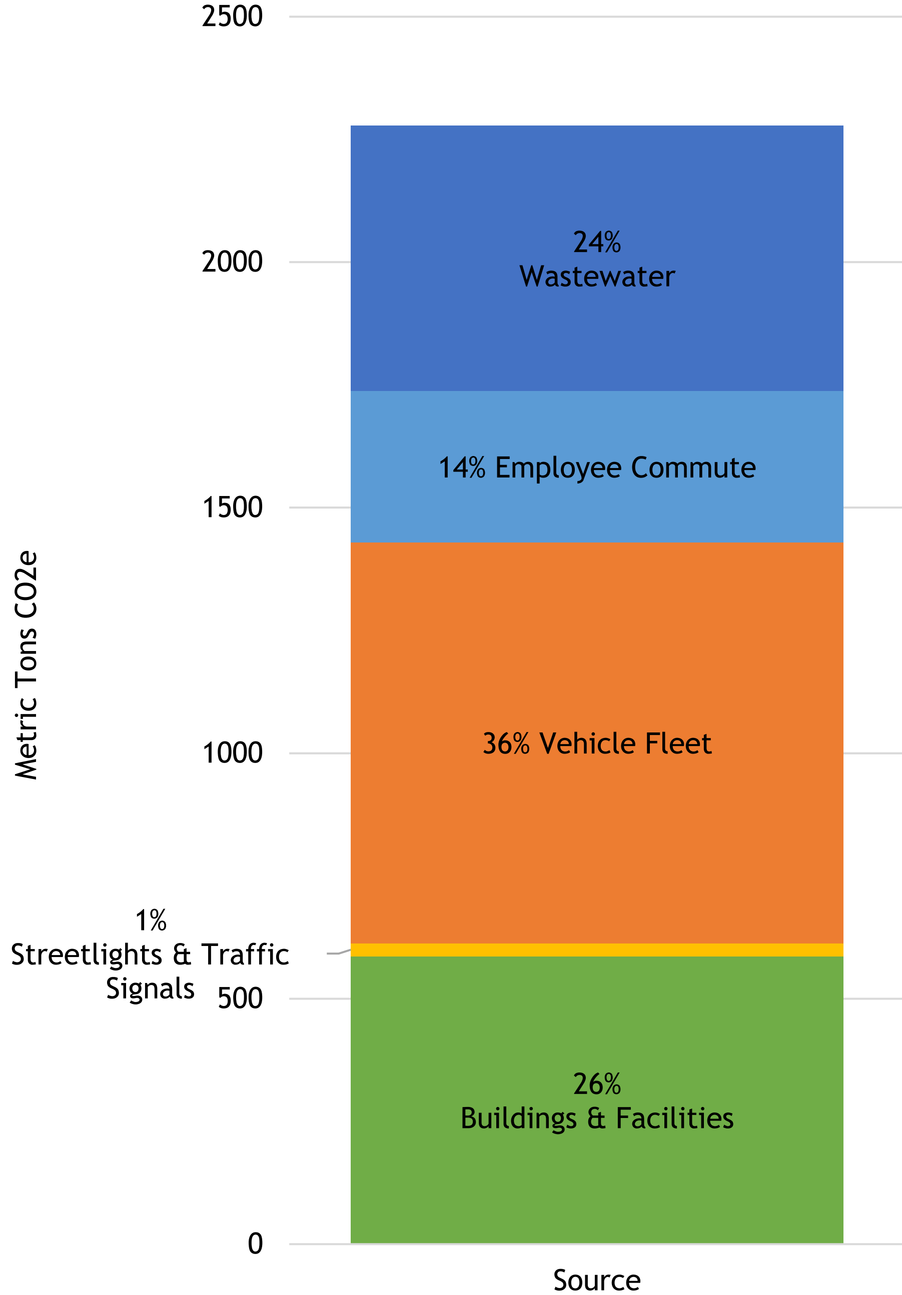

FIGURE 3. SACO'S MUNICIPAL EMISSIONS BY SOURCE.

Figure 4 shows the breakdown of Saco's municipal emissions by department. The Water Resource Recovery Department (WRRD) and Public Works each account for 26% of municipal GHG emissions. Emissions for the WWRD are primarily from electricity used at the wastewater treatment plant and at pump stations (57%). For Public Works, the largest source of emissions is diesel fuel used in public works vehicles (57%), followed by heating fuel used at buildings and facilities (23%).

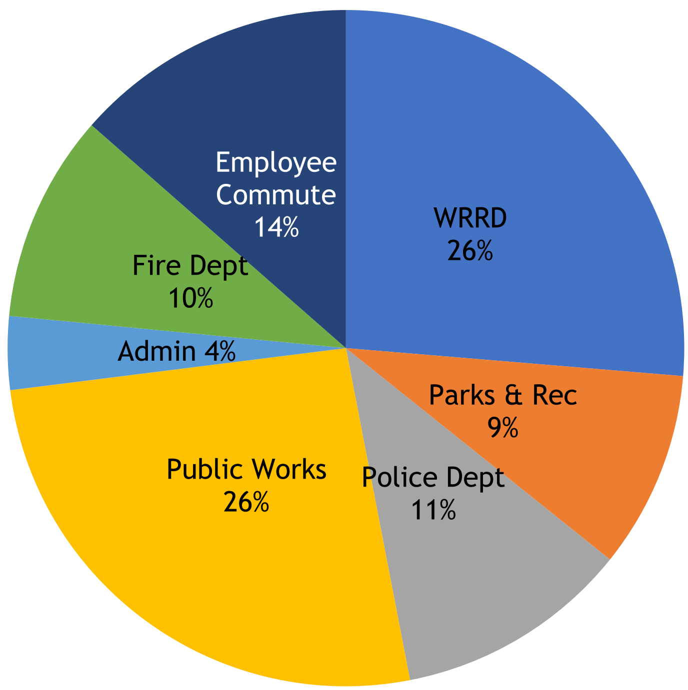

FIGURE 4. SACO'S MUNICIPAL EMISSIONS BY DEPARTMENT.

Future Emissions

Business as usual GHG emissions forecast

To understand future emissions in Saco, ICELI USA developed the Business as Usual (BAU) forecast by projecting community-wide emissions in 2030 based on the 2019 baseline inventory and anticipated demographic and economic changes (Appendix A). The BAU forecast provides the basis for developing goals, strategies, and targets addressing emissions reductions. The forecast was developed for the primary sectors in the GHG inventory which include heating and electricity from the residential, commercial, and industrial sectors as well as transportation.

Indicators for greenhouse gas emissions forecasting

For the purposes of ICLEI USA's initial analysis, 2030 community-wide and municipal emissions were estimated based on the following indicators. If Saco is interested and has access to more localized data sources, ICLEI USA can refine the forecast further.

- ICLEI USA used the projected ***annual population growth rate of 0.72% for Saco*** to estimate emissions trends in the residential, commercial and transportation sectors.
- Municipal GHG emissions will likely fall by 2030 due to more renewable energy on the electricity grid and more rigorous fuel efficiency standards for vehicles.
- GHG emissions from the New England electricity grid are expected to fall by 2030 because the states have adopted ambitious renewable energy targets and ***Renewable Portfolio Standards (RPS)***[3]. ICLEI USA used Maine's RPS requirements to estimate 2030 electricity emissions.
- Emissions from vehicle fuel use are projected to decline as a result of the ***Federal Corporate Average Fuel Economy (CAFE) standards*** adopted by the Biden Administration, which will increase fuel efficiency 8% annually for model years 2024-2025 and 10% for model year 2026.

Changes in emissions through 2030

Without taking any additional action at the community or municipal level, ***Saco's community-wide GHG emissions are expected to fall 22% by 2030*** driven by 1) increasing renewable energy sources on the electricity grid as a result of state targets and RPSs, and 2) decreasing transportation emissions due to CAFE fuel efficiency standards and electric vehicle expansion. Market forces are also expected to contribute to an overall decline in GHG emissions globally. Emissions from the burning of fossil fuels to heat buildings in the residential and commercial sectors will likely stay relatively flat, with some efficiency improvements keeping pace with population growth.

Overview of Climate Goals and Emissions Targets

Having established baseline emissions and projected BAU 2030 emissions, the next step for Saco to identify specific goals and emissions reduction targets to include in the Climate Action and Adaptation Plan. Climate goals and emissions reduction targets provide a tangible objective to guide climate action and a benchmark to track progress. Goals and targets should have clear baseline and target dates. For example, the target could be a 60% reduction in emissions by 2030 compared to the 2019 baseline. Goals can reference carbon neutrality[4], climate

[3] **Renewable Portfolio Standard (RPS)** is a state legislative mandate to increase production of electricity from renewable sources such as wind, solar, biomass and other alternatives to fossil and nuclear electric generation. Maine, Massachusetts, Vermont, Rhode Island, and Connecticut have all made commitments requiring that electricity suppliers produce 60%-100% of electricity from renewable sources by 2030.

[4] **Carbon neutrality** is the net balance between activities that emit carbon dioxide and carbon sinks that absorb carbon dioxide from the atmosphere (e.g. soil formation, forests, eelgrass beds, saltmarshes).

neutrality[5], or net-zero[6]. Goals and targets can also specifically address the types of GHG gases (e.g. carbon dioxide, methane, etc.) or the sources of emissions (e.g. transportation or residential energy).

Globally, 195 countries, including the U.S., signed the Paris Agreement, committing to keep the rise in global temperatures below 2.7°F (1.5°C). The United Nations Intergovernmental Panel on Climate Change (IPCC) estimates that we must reduce global emissions by 50% by 2030 and achieve climate neutrality by 2050 to reach this goal. The U.S. and Maine have set national and state-wide climate goals and emissions reduction targets in an effort to uphold our Paris Agreement commitment.

National targets

- Paris Agreement commitment to keep the rise in global temperatures below 2.7°F (1.5°C)
- Reduce GHG emissions to 50% below 2005 levels by 2030

Maine targets

- 80% of electricity produced by renewables by 2030[7]
- 100% of electricity produced by renewables by 2050 (Maine RPS)
- Achieve carbon neutrality by 2045
- Reduce overall GHG emissions to 45% below 1990 levels by 2030 and 80% by 2050

Meeting national and state climate goals and reduction targets requires municipal and community action. Additionally, equitably reducing global emissions by 50% requires high-emitting, wealthy nations like the U.S. to reduce their emissions by more than 50%. ICLEI USA projects that U.S. industries, communities, and individuals need to reduce GHG emissions by 60-65% to equitably achieve the Paris Agreement goals. ICLEI USA analyzed 138 community GHG Inventories, demonstrating that it is possible for most U.S. communities to reduce per-capita emissions by 63% or more by 2030.

To go above and beyond existing commitments, the City of Saco should consider setting their own GHG emissions targets. ICLEI USA performed a High Impact Action analysis for the City of Saco (Appendix A). **Based on this analysis, ICLEI suggests that Saco could reduce community-**

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[5] **Climate neutrality** refers to the emission and mitigation of all greenhouse gases (GHGs) – not just carbon dioxide. Much like carbon neutrality, climate neutrality can be achieved by emitting GHGs at an equal rate to their removal from the atmosphere.

[6] **Net-zero** means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions counterbalanced by carbon sinks such as soil formation, forests, and saltmarshes

[7] During her 2023 State of the Budget address, Gov. Mills set a new target for 100% of the electricity consumed in Maine to come from renewable energy sources by 2040, a decade sooner than previously planned.

wide GHG emissions 62.6% by 2030 by implementing ambitious but realistic emissions reduction strategies. Such an ambitious emissions reduction is achievable for Southern Maine communities. According to ICLEI USA's high-level analysis, a 62.6% reduction in emissions by 2030 could be met by:

- Reducing vehicle miles traveled (VMT) by 5%
- Increasing Electric Vehicle (EV) VMT to 22.5% of total VMT
- Increasing commercial and residential building energy efficiency for new and renovated buildings
- Increasing current residential and commercial building energy efficiency
- The electrification of current and new commercial and residential buildings

Other Southern Maine communities are setting ambitious emissions reduction targets and goals. On Dec. 6th, the Biddeford City Council passed a resolution committing to community-wide net-zero emissions by 2050, with a reduction of 62.6% below the 2019 emissions baseline by 2030.

Municipal Strategies for Reducing Greenhouse Gas Emissions

As Saco takes the next steps to set GHG reduction targets and develop a Climate Action and Adaptation Plan, there are many strategies Saco can use to reduce GHG emissions. The challenge is not figuring out what to do, but rather accelerating the change already taking place globally, nationally, and regionally to bring benefits to Saco. Below are examples of strategies that are being employed in Maine and other communities to meet ambitious climate goals.

Reducing vehicle miles traveled (VMT) - By promoting and facilitating transit systems as well as bicycle and pedestrian networks

- *Encourage residents and visitors to walk and bike.*
    - Regional employment hubs like Saco can collaborate with employers and transit systems to provide alternative transportation options. The city can also encourage employers to participate in regional initiatives like the biannual **Way 2 Go Maine** commuting challenge.
- *Adopt and implement a **Complete Streets Policy** and/or land use and development policies that reduce the need for driving and encourage the use of public transit, cycling, and walking.*
    - The City of Portsmouth has a ***Complete Streets program*** for all road upgrades.

Electric vehicles (EV) - Support the electrification of the transportation system

- *Lead by example by electrifying the public fleet*
  - Beginning in 2035, **75% of school bus acquisitions by municipalities must be electric or zero emission school buses**. Today, Maine municipalities can participate in the **EPA Clean School Bus Program**. In 2022, Wells-Ogunquit, Dayton, and RSU 57 received a total of seventeen school bus rebates. Each school system is eligible for rebates up to $375,000 per electric bus and $20,000 of charging infrastructure per bus.
- *Adopt ordinances to require or encourage EV charging infrastructure, including at multifamily dwellings, businesses, and public parking areas.*
  - SMPDC's **Municipal Electric Vehicle Readiness Toolkit** includes a Model EV Infrastructure Ordinance that municipalities can adapt to meet their community's needs.

Energy efficiency - Encourage and promote energy efficiency for residents and businesses

- *Support community weatherization programs to improve residential energy efficiency, particularly for low-income and vulnerable residents.*
  - Community groups and nonprofits like **WindowDressers** and **York County Community Action** offer programs to help homeowners increase energy efficiency.
- *Adopt 'stretch codes' setting higher standards for energy efficiency than IECC or MUBEC*
  - Adopting municipal regulations such as the **State of Maine Energy Stretch Code (IECC 2021)** can help drive residential and commercial energy efficiency. The **Cities of Portland and South Portland** have both adopted the Maine Energy Stretch Code.

Electrify heating - Help residents and businesses reduce fuel oil dependence and high energy costs

- *Encourage the adoption of heat pumps to reduce fossil fuel use in homes in businesses*
  - Efficiency Maine provides rebates for **heat pump** and **heat pump water heater** installation. Municipalities can educate residents and businesses about these opportunities, offer their own rebate programs (**like South Portland**), or implement a community bulk purchasing program with a vendor (such as **Portland's Electrify Everything Campaign**).

Renewable energy - Enable and support development of and access to zero carbon energy

- *Adopt codes and permitting practices that support and incentivize renewable energy systems in the community*

- The Town of Topsham joined **SolSmart**, a technical assistance program that helps local governments make it faster, easier, and more affordable for residents and businesses to go solar. The town created an online permitting checklist and reviewed local zoning codes to identify restrictions that prohibit solar PV development.
- **SolarAPP** (Solar Automated Permit Processing) is a no-cost software system from the National Renewable Energy Laboratory (NREL) to streamline rooftop solar permits. The city of San Jose, California increased approved permits by 600% when they switched to SolarAPP.

- *Develop renewable energy capacity targeting underutilized public properties*
  - The City of Sanford is using EPA Brownfields funds to clean up the **site of a circuit board recycling facility**. Once decontaminated, the site will be turned into a solar farm.
- *Provide access to* ***Community solar*** *for businesses, and residents to reduce their monthly electricity bill and support more solar on the New England electricity grid.*
  - The solar energy generated by the City of Sanford's Brownfield solar farm will be applied to the **Virtual Sanford Renewable Energy Corridor**. Energy that is created will be slated for use by developers in the downtown mill district, providing an additional incentive for redevelopment.

Reduce emissions AND increase community resilience

- Implement **solar + storage** located at key locations (community centers, schools, police and fire departments) to provide resilience to storms and emergency events that cause power outages.
- Increased energy efficiency in homes, particularly those of the most vulnerable residents, increases public health and residents' resilience to power outages, heat waves, and cold spells.
- Focus mixed use and transit oriented development in zones away from vulnerable areas to both reduce vehicle miles traveled and promote adaptation, especially when combined with conservation of ecosystems that increase resilience to flooding and sea level rise such as saltmarshes.

Local Government	Saco, ME2021

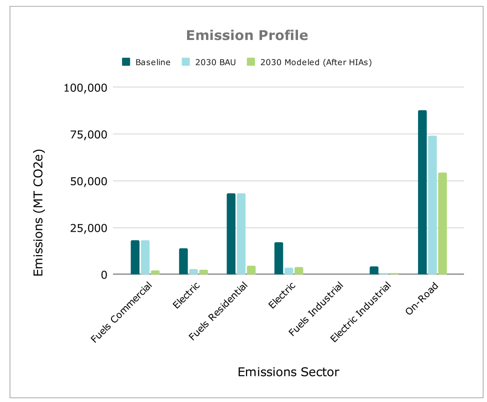
High Impact Action Analysis Summary Report: Saco, ME 2021

SBTs and Emissions Goals	Baseline Year	2030 Per Capita	2030 Absolute	Baseline Scope 1 & 2 (MT CO2e)	2030 Scope 1 & 2 (MT CO2e)
	2021	**62.9%**	**62.6%**	**185,024**	**69,122**

Growth Rates	Commercial	Residential	Industrial	On-Road Transportation	Grid Decarbonization
	Population Growth	Population Growth	Population Growth	Population Growth	CES
	0.72%	0.72%	0.72%	0.72%	-80.00%

Abbreviation Key	
SBT	Science-Based Target
HIA	High Impact Actions
VMT	Vehicle Miles Traveled
EV	Electric Vehicles
SF	Square Feet (ft^2)
EB	Existing Buildings

	Baseline & Forecasted Emissions			Modeled Emissions (After HIAs)	
	Baseline Emissions (MT CO2e)	% of total (Adjusted)	2030 Forecasted Emissions (MT CO2e)	2030 Modeled Emissions (MT CO2e)	Percent Change
Fuels Commercial	18,094	9%	18,225	1,940	-89.4%
Electric Commercial	13,814	7%	2,783	2,625	-5.7%
Fuels Residential	43,152	**21%**	43,464	4,627	-89.4%
Electric Residential	17,272	8%	3,479	4,020	15.5%
Fuels Industrial	-	0%	0	0	0.0%
Electric Industrial	4,212	2%	848	848	0.0%
On-Road Transportation	87,721	**42%**	74,144	54,589	-26.4%
Sum of Primary Sectors	184,265	89%	142,943	68,650	-52.0%
Inventory Total	**206,543**	**-**	**-**	**-**	**-**



HIA Overview

Type	Name	Net Reduction (MT CO2e)	Description	Explanation/Source
Grid Decarbonization	CES	**28,442**	Clean Energy Standard: 80% Reduction in carbon intensity (kg CO2/MWH) by 2030.	General Clean Energy Standard Goal Reduction from grid decarbonization occurs within the 2030 forecast, before other High-Impact Actions are modeled.
High Level VMT Reduction	Moderate (5% VMT Reduction)	**3,707**	5% Reduction in total VMT	Generic moderate baseline
On-Road Electric Vehicles Adoption	Moderate (4.5% Annual Growth)	**15,120**	22.5% of VMT is EV by 2030. This action influences an increase in Residential & Commericial buildings electricty emissions.	Middleground of BAU and aggressive approaches, https://evadoption.com/ev-sales/ev-sales-forecasts/
Commercial Building Efficiency	IECC New + 10% Existing	**600**	All new buildings and 1% of existing Sq FT (renovations and turnover) will meet IECC 2018 (36.95% reduction in building EUI) & 10% Existing Sq FT (renovations and turnover) EUI is reduced by 20%.	https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-28125.pdf https://www.eia.gov/consumption/commercial/data/2012/c&e/pdf/e2.pdf
Residential Building Efficiency	IECC New + 10% Existing	**750**	All new buildings and 1% of existing Sq FT (renovations and turnover) will meet IECC 2018 (36.95% reduction in building EUI) & 10% Existing Sq FT (renovations and turnover) EUI is reduced by 20%.	https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-28125.pdf https://www.eia.gov/consumption/commercial/data/2012/c&e/pdf/e2.pdf
Commercial Building Electrification	10% EB Electrified	**15,988**	10% of existing SF per year is electrified. This action influences an increase in Commericial buildings electricty emissions.	Because heating systems are replaced at a minimum of 10 years, this scenario represents an all electric replacement of heating systems. https://www.energystar.gov/campaign/heating_cooling/replace
Residential Building Electrification	10% EB Electrified	**38,128**	10% of existing SF per year is electrified. This action influences an increase in Residential buildings electricty emissions.	Because heating systems are replaced at a minimum of 10 years, this scenario represents an all electric replacement of heating systems. https://www.energystar.gov/campaign/heating_cooling/replace

2030 Outlook	2030 Absolute SBT	62.6%	2030 Per Capita SBT	62.9%
	Reduction Achieved (Abosolute)	62.7%	Reduction Achieved (Per Capita)	63.0%
	Percent To Go (Absolute)	-0.10%	Percent To Go (Per Capita)	-0.10%

Notice:

The HIA summary is a high-level analysis that represents an example pathway to achieving your Science Based Targets (based on your 2021 baseline year). This analysis uses national data and assumptions to form our preset scenarios. In short, the HIA summary should be used as an illustrative high-level, general pathway to support decision-making but should not be used as the sole influence on decision-making directly. However, the analysis remains as a demonstration of the need for swift and ambitious action.