Summary of Baseline Greenhouse Gas Emissions & 2030 Forecast

Kennebunkport

2019 Baseline Greenhouse Gas Inventory

One of the first steps in developing emissions reduction goals, targets, and strategies is selecting a baseline year against which future greenhouse gas (GHG) emissions will be compared. For this climate action planning process, 2019 will serve as the baseline year. The baseline GHG inventory identifies the major sources of emissions in Kennebunkport, enabling the town to identify areas to focus emissions reduction efforts, establish goals and track progress towards those goals, and facilitate decision-making about future policies and strategies.

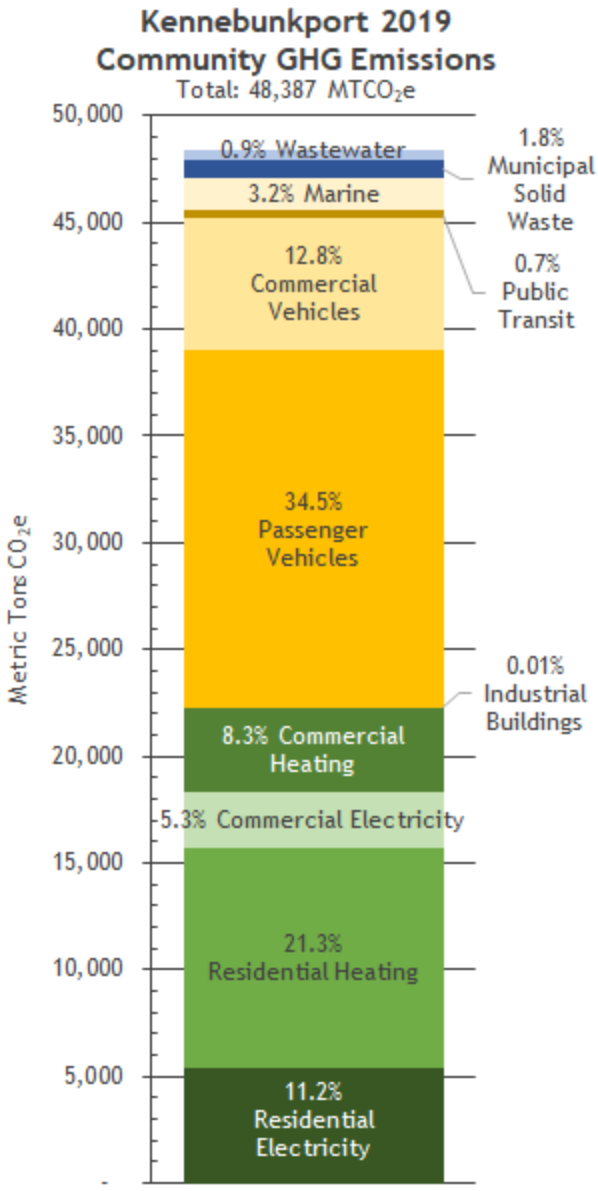
Key Terms

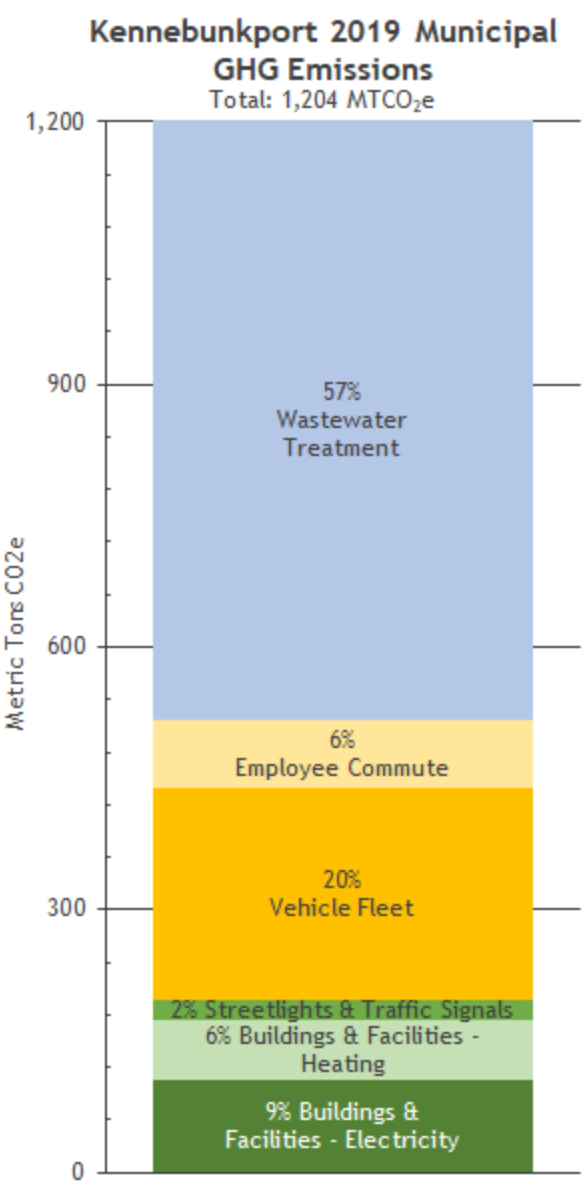
- *Community-wide GHG Inventory:* Accounts for GHG emissions produced by Kennebunkport's residents, workforce, visitors, and the economy. Municipal emissions are included in the community-wide inventory.
- *Municipal GHG Inventory:* Accounts for GHG emissions produced by the Town of Kennebunkport's municipal operations which include municipal buildings, vehicles, and employee activities. Municipal GHG emissions are a component of community-wide emissions.
- *$MTCO_2e$:* Metric tons (MT) of carbon dioxide equivalent (CO_2e) is a metric used to compare the emissions from various GHGs based on their global-warming potential, by converting amounts of other GHGs to the equivalent amount of carbon dioxide with the same global warming potential.

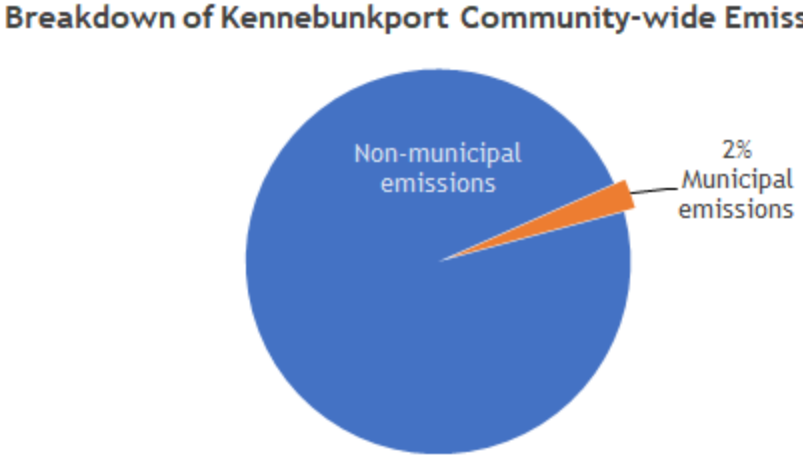
Emissions Sources

In Kennebunkport, GHG emissions are produced by three sectors, each of which can be broken down into specific subsectors.

- *Transportation:* Includes emissions from all on-road transportation sources, including passenger vehicles, commercial vehicles, and public transit.
- *Heating & Electricity - Residential & Commercial:* Includes emissions from the generation of electricity that is used to power commercial and residential buildings and the burning of fossil fuels used to heat those buildings.
- *Waste:* Includes emissions from septic tanks, the Kennebunkport Wastewater Treatment Plant, and the incineration of all trash generated by residential and commercial activity in the community that is sent to the EcoMaine waste-to-energy plant.


Kennebunkport 2019
Community GHG Emissions
Total: 48,387 MTCO2e
Metric Tons CO2e
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0.9% Wastewater
1.8% Municipal Solid Waste
3.2% Marine
12.8% Commercial Vehicles
0.7% Public Transit
34.5% Passenger Vehicles
0.01% Industrial Buildings
8.3% Commercial Heating
5.3% Commercial Electricity
21.3% Residential Heating
11.2% Residential Electricity


Kennebunkport 2019 Municipal
GHG Emissions
Total: 1,204 MTCO2e
Metric Tons CO2e
1,200
900
600
300
0
57% Wastewater Treatment
6% Employee Commute
20% Vehicle Fleet
2% Streetlights & Traffic Signals
6% Buildings & Facilities - Heating
9% Buildings & Facilities - Electricity


Breakdown of Kennebunkport Community-wide Emissions
Non-municipal emissions
2% Municipal emissions

Key Takeaways from the Greenhouse Gas Inventory

Community-wide emissions trends

- The largest source (34.5%) of estimated community-wide GHG emissions is passenger vehicle fuel use by visitors and residents.
- 51.2% of estimated community-wide emissions are produced by the transportation sector, including passenger and commercial vehicle fuel use, public transit, and marine vessels.
- 46.1% of estimated community-wide emissions are produced by combined heating and electricity consumption from the residential and commercial sectors, 29.6% are produced by combined heating from both sectors, and 16.5% from combined electricity consumption.
    - 62% of residential heating emissions are produced by burning fuel oil.

Municipal emissions trends

- Municipal GHG emissions are a small subset of community-wide emissions, accounting for 2% of estimated community-wide emissions.
- Strategies focused on reducing municipal emissions will have less impact than those focused on community-wide emissions, however, balancing feasibility and impact is an important part of strategy prioritization.
- There is great value in municipalities leading by example and adopting emissions reduction strategies that address the largest sources of municipal emissions (i.e. wastewater treatment, vehicle fleet, or building energy).
- The largest source (57%) of estimated municipal emissions is from wastewater emissions, both from the Kennebunkport Wastewater Treatment Plant and from septic systems.

Business as Usual Greenhouse Gas Emissions Forecast

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. 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 and commercial 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 Kennebunkport 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 0.88% for Kennebunkport*** 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)***[1]. 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, ***Kennebunkport's community-wide GHG emissions are expected to fall 23% 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 is to identify specific goals and emissions reduction targets to include in the Climate Action 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,[2] climate neutrality,[3] or net-zero.[4] 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

[1] **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.

[2] **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).

[3] **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.

[4] **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.

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 (Maine RPS)
- 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.[5]

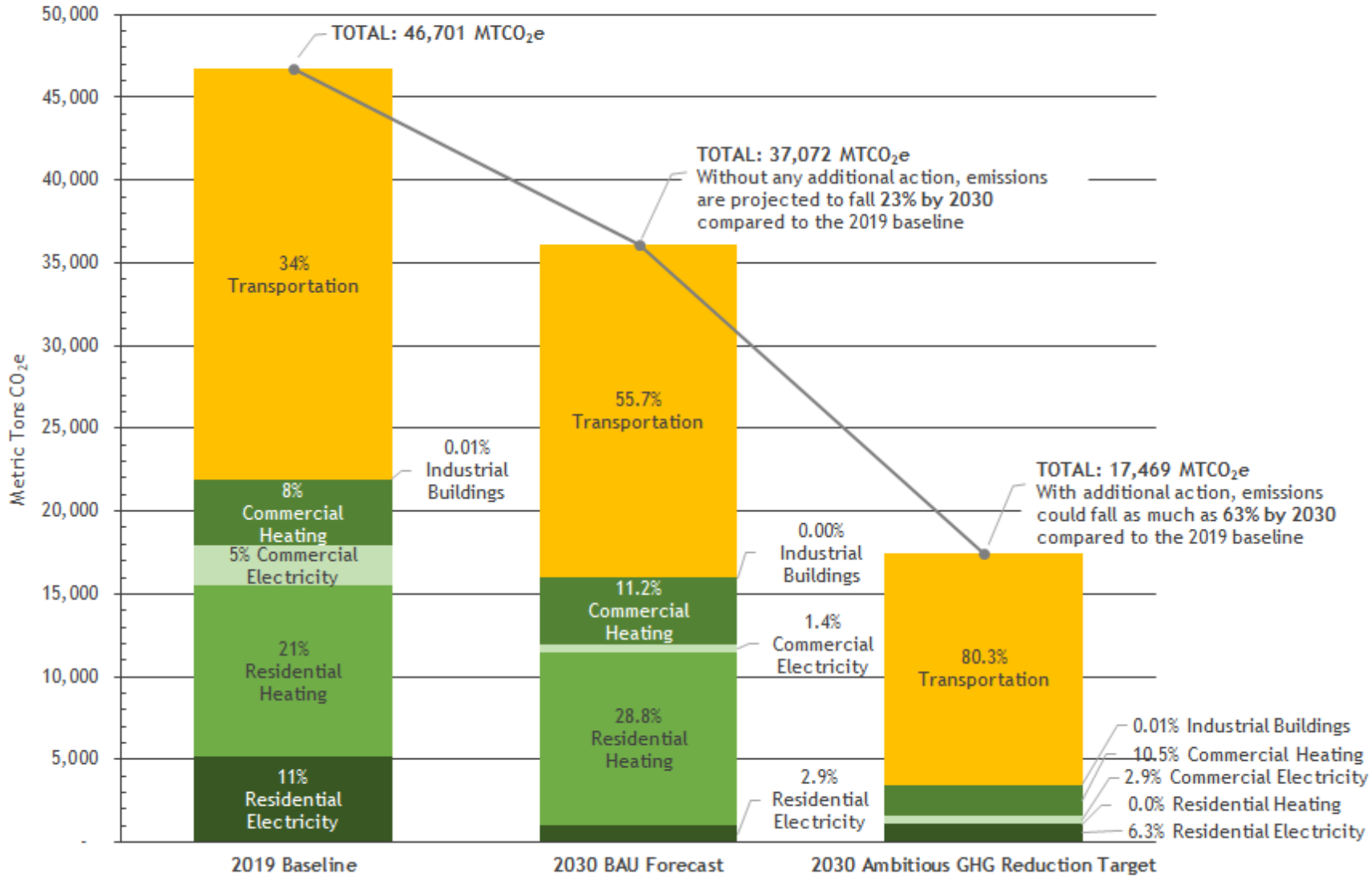
To go above and beyond existing commitments, ***ICLEI USA suggests that Kennebunkport could reduce community-wide GHG emissions 63% by 2030 by implementing ambitious but realistic emissions reduction strategies.*** Such an ambitious emissions reduction is achievable for Southern Maine communities. According to ICLEI USA's high-level analysis, a 63% reduction in emissions by 2030 could be met by:

- Reducing vehicle miles traveled (VMT) by 10%
- Increasing Electric Vehicle (EV) VMT to 22% 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

A more detailed analysis is presented in the ***Appendix: High Impact Action Analysis Summary Report.***

[5] **Analysis of U.S. Local Government Science-Based Targets and Pathways to Achieve Them in the Race to Zero**

Kennebunkport Primary Sectors 2030 GHG Emissions Forecast Under the Business as Usual (BAU) and Ambitious GHG Reduction Target Scenarios



Municipal Strategies for Reducing Greenhouse Gas Emissions

Once goals and targets are established, the next step is to begin to identify strategies to reduce emissions. There are many strategies Kennebunkport 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 Kennebunkport. 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.*
    - Tourism based economies like Kennebunkport tend to have higher transportation emissions because visitor travel increases overall community VMT. **Ski towns in Colorado** have been at the forefront of this issue and have actively engaged businesses to help develop and implement critical strategies.
- *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	Kennebunkport, ME2019

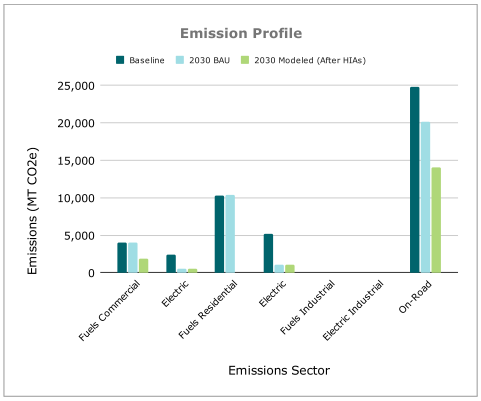
High Impact Action Analysis Summary Report: Kennebunkport, ME 2019

SBTs and Emissions Goals	Baseline Year	2030 Per Capita	2030 Absolute	Baseline Scope 1 & 2 (MT CO2e)	2030 Scope 1 & 2 (MT CO2e)
	2019	62.8%	62.5%	47,141	17,681

Growth Rates	Commercial	Residential	Industrial	On-Road Transportation	Grid Decarbonization
	Population Growth	Population Growth	Population Growth	Population Growth	CES
	0.88%	0.88%	0.88%	0.88%	-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	4,001	8%	4,036	1,836	-54.5%
Electric Commercial	2,424	5%	489	511	4.5%
Fuels Residential	10,311	**21%**	10,402	0	-100.0%
Electric Residential	5,171	**11%**	1,043	1,101	5.5%
Fuels Industrial	-	0%	0	0	0.0%
Electric Industrial	4	0%	1	1	0.0%
On-Road Transportation	24,790	**51%**	20,101	14,020	-30.3%
Sum of Primary Sectors	46,701	96%	36,072	17,469	-51.6%
Inventory Total	**48,395**	-	-	-	-



HIA Overview				
Type	Name	Net Reduction (MT CO2e)	Description	Explanation/Source
Grid Decarbonization	CES	**6,133**	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	Aggressive (10% VMT Reduction)	**2,010**	10% Reduction in total VMT	Generic aggressive baseline
On-Road Electric Vehicles Adoption	Moderate (4.5% Annual Growth)	**3,887**	22.5% of VMT is EV by 2030. This action influences an increase in Residential & Commericial buildings electiricty emissions.	Middleground of BAU and aggressive approaches, https://evadoption.com/ev-sales/ev-sales-forecasts/
Commercial Building Efficiency	5% EB Renovated	**54**	5% of all SF (existing) per year is reduced by 20% (energy)	https://www.eia.gov/consumption/commercial/data/2012/c&e/pdf/e2.pdf .
Residential Building Efficiency	IECC New + 10% Existing	**275**	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	5% EB Electrified	**2,161**	5% of existing SF per year is electrified. This action influences an increase in Commericial buildings electiricty emissions.	Because heating systems are replaced at a minimum of 10 years, this scenario represents half replacement with all electric heating systems. https://www.energystar.gov/campaign/heating_cooling/replace
Residential Building Electrification	New + 11% EB Electrified	**10,216**	All new buildings & 11% Existing Sq FT per year are electrified. This action influences an increase in Residential buildings electiricty emissions.	Based on a combination of other scenarios: 1. All new buildings & 1% Existing Sq FT per year are electrified- Based on % of building stock experiencing major retrofit or replacement each year. https://www.schroders.com/en/sysglobalassets/digital/real-estate-de/publications/2.-pages-from-property-chronicle-q6_online-2.pdf 2. 10% EB Electrified- 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	62.5%	2030 Per Capita SBT	62.8%
	Reduction Achieved (Abosolute)	62.6%	Reduction Achieved (Per Capita)	62.9%
	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 2019 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.