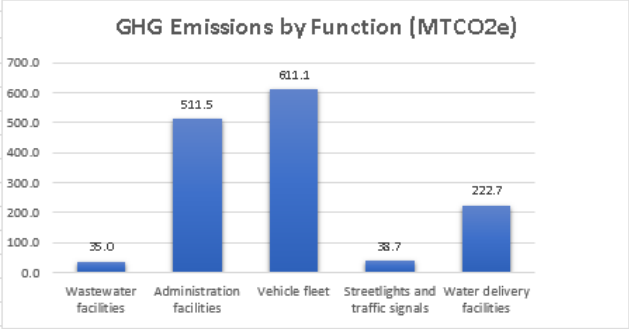
Summary of Croton's 2018 Municipal GHG inventory

Section 1:	Facility Energy Use and GHG Calculations									
		Elec. (kWh)	Gas (Thms)	Propane (gals)	oil (gals)	Elec (MT)	Gas (MT)	Prop. (MT)	Oil (MT)	Total MT
Facility / Group Name	ICLEI Category	2018	2018	2018	2018	2018	2018	2018	2018	2018
EMS House	Administration Facilities	16,265	-	91	-	4.7	-	0.53	-	5.23
Municipal Building	Administration Facilities	227,760	13,849	-	691	65.8	74.89	-	7.15	147.86
Grand St. Firehouse	Administration Facilities	96,800	7,521	-	-	28.0	40.67	-	-	68.65
Harmon Firehouse	Administration Facilities	106,720	6,902	-	464	30.8	37.33	-	4.81	72.97
Washington Firehouse	Administration Facilities	39,078	228	-	2,530	11.3	1.23	-	26.20	38.72
DPW Garage (Veterans)	Administration Facilities	70,680	15,891	1,886	-	20.4	85.94	11.07	-	117.43
New DPW Garage (Yorktown Rd)	Administration Facilities	57,000	-	-	1,882	16.5	-	-	19.48	35.95
Street & Parking Lot Lighting	Streetlights and traffic sig	134,017	-	-	-	38.7	-	-	-	38.73
Water Pumps	Water delivery facilities	691,220	-	3,907	-	199.7	-	22.93	-	222.68
Wastewater Pumps	Wastewater facilities	77,327	-	2,151	-	22.3	-	12.63	-	34.97
Parks & Rec	Administration Facilities	74,770	-	517	-	21.6	-	3.04	-	24.64

Section 2:	Fleet Energy Use and GHG Calculations				
		Gas (gals)	Diesel gals)		
Department	ICLEI Category	2018	2018	Gas (MT)	Diesel (MT)
Fleet	Vehicle Fleet	34,949	28,447	317	295
TOTALS		34,949	28,447	317	295

Section 4:	GHG Emissions By Administrative Function	
	GHG Emissions (MTCO2e)	
	2018	Average
All Municipal Operations	1418.98	1418.98
Wastewater facilities	35.0	35.0
Administration facilities	511.5	511.5
Vehicle fleet	611.1	611.1
Streetlights and traffic signals	38.7	38.7
Water delivery facilities	222.7	222.7
GHG Emission % By Function		
Wastewater facilities	2%	2%
Administration facilities	36%	36%
Vehicle fleet	43%	43%
Streetlights and traffic signals	3%	3%
Water delivery facilities	16%	16%



Narrative Description of the Municipal GHG Inventory

EXECUTIVE SUMMARY

The Village of Croton-on-Hudson (Croton) continues its decade-long efforts to find ways to cut its greenhouse gas (GHG) emissions. To assess its progress, it updated its prior 2007 GHG inventory, published in 2009. This document was first posted in late 2019 and updated in June 2020.

To do so, we collected all Scope 1 and Scope 2 municipal emissions data (e.g., electricity, fuels) and, with the assistance of Climate Action Associates, Inc., developed the ICLEI-based spreadsheet and charts seen above. As seen in the black-bordered cells, our municipal inventory was 1418.98 MT.

Boiling down the results showed the following:

- despite increases and changes to facilities, equipment, and operations, our measured emissions dropped by 15% relative to our prior inventory

- most of that reduction was due to electrical efficiency measures (e.g., LED interior and street lighting) and replacement of old equipment and facilities; those loads now account for about 36% of our GHG

- as seen in our prior inventory, the largest single contributor (43%) of GHG remains our municipal vehicle fleet

- similarly, our single largest electrical consumer remains the water supply pumps in our drinking water utility, accounting for about 16% of total emissions

- unlike many other municipalities, Croton has no wastewater treatment plants; all wastewater is pumped to a County-operated facility in nearby Ossining for treatment

- Croton does not have a landfill; its refuse is trucked to a waste-to-energy incineration plant in nearby Peekskill

- while our prior inventory included replaced refrigerants, there were no refrigerant purchases or replacements in 2018, so none appear in this inventory

- while our prior inventory attempted to include some Scope 3 emissions, we found that such inclusion did not yield reliable results (in some cases yielding negative numbers when our forested areas were included as carbon sinks) so, for reliable numbers we limited this inventory to Scopes 1 and 2.

As technology and opportunities arise, we look forward to using them to reduce emission levels. Electrical consumption of the water system was recently reduced due to installation of variable speed drives (VSD) on the pumps and changes in water rates and billing. Fuel consumption by vehicles was recently reduced slightly by replacement of two gasoline-driven cars by electric vehicles, but too late to impact the data used in this analysis.

We look forward to seeing the full impact of those recent efforts in our next GHG inventory. A more detailed description of changes occurring since our earlier inventory may be found below under “Results” and in our updated 2019 Climate Action Plan at the beginning of this document.

METHODOLOGY

Approach

Data was collected on all electric, natural gas, fuel oil, gasoline, propane, and diesel accounts for 2018. This process took several months and stretched into 2019 due to the time lag in getting it from vendors, formatting it for use in the above spreadsheet, and checking all numbers against both annual benchmarking data and our 2009 municipal GHG inventory. To that end, we appreciate the assistance provided by Jim Yienger of Climate Action Associates, Inc. and use of its ICLEI-based spreadsheet.

Scopes

As per the requirements of DEC's CSC program, this inventory covers Scopes 1 and 2. While a full inventory would include all three emission scopes, we found that the difficulty and time demands for accurately determining our Scope 3 emissions (e.g., waste management, materials usage) in our 2009 inventory were not in line with our present abilities.

In the past, we found that net Scope 3 emissions were also quite low due to the fact that all of Croton's trash is subject to mandatory separation and recycling, with other trash being incinerated in the Waste-To-Energy (WTE) facility at nearby Charles Point. Doing so yielded a GHG credit that cancelled most GHG from our other Scope 3 sources.

To better understand the Scope 3 carbon sequestration capability of the many acres of Village-owned forest land (not previously assessed), we used iTreeTools software from the National Forest Service. Doing so yielded a surprisingly large GHG credit, amounting to nearly half our total municipal carbon footprint. Until we are able to better refine that number (a process we expect to complete in 2020), it was felt that including such Scope 3 data in this inventory might inadvertently underestimate our municipal footprint, and create confusion regarding next steps for reducing it.

Methods

As described above, we used calculation-based procedures rather than attempting to measure actual carbon dioxide and other GHG gases. The Climate Action Associates spreadsheet utilized the standard ICLEI-based emission factors and the eGrid subregion value (NPCC NYCW) for electricity delivered in the Consolidated Edison territory. As such, the basic formulas involved:

Energy source unit (e.g., kWh, gallons, therms) X appropriate emission factor = GHG emissions

Results of GHG Reduction Efforts

We were happy to see a verified net 15% drop in actual GHG compared to our 2009 inventory. Much of this could be ascribed to reductions in electricity consumption due to:

- conversion of all street, parking lot, park, and traffic lights to LED

- conversion of all interior fluorescent lighting in the Village's five buildings to LED (which included addition of bi-level stairwell lighting and occupancy sensors)

- all of the large water supply pumps received variable speed drives (VSD) which reduced power consumption. Water consumption (and thus electricity for water pumping) followed a switch to quarterly water billing and increased rates for commercial customers.

Other contributors to our GHG reduction involved:

- closing the old Department of Public Works (DPW) maintenance facility at the Croton-Harmon train station, and its replacement with the new facility on Yorktown Road. Its up-to-date HVAC and lighting systems significantly reduced DPW facility energy consumption.

- conversion of the Municipal Building's boiler from oil to dual fuel allowed a switch to natural gas (with oil as a resiliency backup) and removal of its underground oil tank.

Our net GHG reduction occurred even with the acquisition of the Emergency Medical Service (EMS) house, which added electric, fuel oil, and propane consumption.

Due to those efforts, our buildings now account for only about 16% and outdoor lighting only about 3% of our total GHG.

At 43% or our total GHG, the largest single contributor of GHG remains our vehicle fleet: garbage trucks, park and road maintenance vehicles, public safety, and administrative cars. In 2019, two of the gasoline-driven cars were replaced with electric vehicles (EV). We look forward to the replacement of two police cars with hybrid units in early 2020. As EV technology continues to evolve and improve, we look forward to switching out many gasoline-driven pickup trucks (which account for the lion's share of fuel consumption) with plug-in electric models.

At 36% of our total GHG, the largest single consumer of electricity remains our water supply pumps. As the supplier of nearly all drinking water in the Village, we continue to look for ways to dispatch and operate the system to minimize its electric operating costs while maintaining the quality of that essential service. We were recently successful in getting all utility electric meters on those pumps (and our wastewater pumps) replaced with smart meters that will provide 15-minute interval data. Combined with similar time-based data for system-wide water pressure, we are looking forward to assessing options for further cutting power use and cost.

Conclusion

Our 2018 municipal GHG inventory offers verification of our GHG reduction efforts, and points us toward other steps that may be taken to further reduce it. We look forward to deploying new technologies (e.g., EV trucks) as they become available and affordable.

Further details on our GHG reduction programs and efforts may be found in our 2019 Climate Action Plan at the beginning of this document.

We are presently developing ways to use municipal resources and facilities (e.g. rooftops and parking lots) to expand community solar programs. While the use of that power will reduce our community (not municipal) GHG inventory, we nevertheless see it as part of our overall effort to mitigate climate change.