



Ulster County 2021 Climate Smart Communities Recertification Documentation

PE10 Action: GHG Tracking System

Background: Ulster County uses a spreadsheet tool for tracking activity data and calculating GHG emissions across multiple years. The spreadsheet was developed for the County's 2018 inventory and contains data from 2018 to present as well as adjusted data from the baseline year of 2012. This baseline data was input from records provided by the County's consultant, Vanasse Hangen Brustlin, Inc. (VHB), who completed the County's initial baseline GHG inventory. The spreadsheet includes mechanisms for adjusting the baseline and updating emissions factors across GHG inventory reporting years.

Documentation:

- Ulster County Government Operations GHGI Protocol
- Screenshots of spreadsheet tool for GHG tracking and inventory calculations

Ulster County Department of the Environment Government Operations GHG Inventory Protocol

Updated: 3/17/2021

Responsibility:

GHG Inventory updates will be completed by Department of the Environment staff annually by March 1st for the previous calendar year as mandated by [Resolution No. 315 of 2019](#).

The GHG Inventory annual data collection effort should be supported by the fleet manager, Public Works administration division, Sheriff's department and the UC Area Transit department.

Requirements:

Gather GHG activity data and calculate Scope 1, Scope 2 and selected Scope 3 emission values by sector, GHG and type (anthropogenic or biogenic). Until expanded further, only employee commuting will be calculated for Scope 3.

Use the file titled "Master GHG Inventory" contained in the following network subfolder:

S:\1. Project Areas\3. Energy & Climate\GHG Inventory\01_Government Operations

The file should be backed up and archived annually.

Reference and Guidance:

The annual inventory will comply with the guidance contained in the Local Government Operations Protocol V1.1, dated May 2010, to the greatest extent practicable.

Data Sources by Sector

Sector	Data Sources
Buildings and Other Facilities	EPA Portfolio Manager records
Streetlights and Traffic Signals	EPA Portfolio Manager records
Transit Fleet	UC Area Transit fueling records Wex records Green Fleet report data analysis
Vehicle Fleet	Wex records Fuelmaster records NWS reports (UC financial system) Green Fleet report data analysis
Water Delivery Facilities	EPA Portfolio Manager records
Wastewater Facilities	N/A
Airport Facilities	N/A
Port Facilities	N/A
Power Generation Facilities	N/A
Solid Waste Facilities	N/A

Emissions Factors:

Stationary and mobile combustion: Use emissions factors published by the EPA in the document titled, "Emissions Factors for Greenhouse Gas Inventories" (last modified 3/9/3018).

Electricity: Use total output emission rates from the most recent version of the US EPA [eGrid](#) database for the NYUP (NPCC Upstate NY) Subregion.

Global warming potential adjustments: use 100-year global warming potential (GWP) multipliers as published in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report

Baseline adjustments:

2012 is the baseline year. Baseline adjustments should be completed and recorded using the tracking spreadsheet in accordance with the methodology described in the 2019 Government Operations Climate Action Plan.

Reporting:

GHG inventory results will be published on the Ulster County Department of the Environment website by March 1st for the previous calendar year in the form of the Carbon Neutral Government Operations Report.

Emissions Factors

Conversions	Factor	Units	EPA Numbers	Greenhouse Gases	100-year GWP	Reference
Electricity	0.001	kWh/MWh	Reference	CH4	25	Intergov
Electricity	1000	MWh/GWh		CO2	1	
Natural Gas	102.6	kBtu/CCF		N2O	298	
#2 Fuel Oil/ULSD	138	kBtu/gal				
Propane	92	kBtu/gal				
Imperial to SI Mass	0.45359237	kg per lb				
Electricity				CO2		
				CH4		
				N2O		
lb/MWh	232.300		0.017	0.002		497.92 lb/MWh CO2
kg/kWh	0.10537		0.00001	0.00000		
				Source		
				eGRID2019 Subregion NPCC Upstate NY (NYUP)		Original Inventory used
				2/28/2021		
Stationary Combustion		kg CO2 per mmBtu	kg CH4 per mmBtu	kg N2O per mmBtu		
Natural Gas		53.06	0.001	0.0001		
Heating Oil		73.96	0.003	0.0006		
Propane		61.71	0.003	0.0006		
Generator Diesel		73.96	0.003	0.0006		
				Source		
				EPA Emissions Factors for Greenhouse Gas Inventories		
				9-Mar-18		
Mobile Combustion		kg CO2 per gal	kg CH4 per gal	kg N2O per gal		
Gasoline		8.78	See note			
Ethanol (100%)		5.75				
Diesel		10.21				
Biodiesel (100%)		9.45				

Emissions Factors Conversion Scenarios									
Scenario	Description/Fuel	GHG	Scope	Emission Source	Type	Input Unit	Conversion Factor	Output Unit	Notes
1	Electricity - Grid Supplied	CO2	2	Purchased Electricity	Anthropogenic	kWh	0.1336737	kg CO2	eGRID2016
2	Electricity - Grid Supplied	CH4	2	Purchased Electricity	Anthropogenic	kWh	0.0000095	kg CH4	eGRID2016
3	Electricity - Grid Supplied	N2O	2	Purchased Electricity	Anthropogenic	kWh	0.0000014	kg N2O	eGRID2016
4	Natural Gas	CO2	1	Stationary Combustion	Anthropogenic	kBtu	0.05106	kg CO2	
5	Natural Gas	CH4	1	Stationary Combustion	Anthropogenic	kBtu	0.000001	kg CH4	
6	Natural Gas	N2O	1	Stationary Combustion	Anthropogenic	kBtu	0.0000001	kg N2O	
7	Fuel Oil	CO2	1	Stationary Combustion	Anthropogenic	kBtu	0.07396	kg CO2	
8	Fuel Oil	CH4	1	Stationary Combustion	Anthropogenic	kBtu	0.000003	kg CH4	
9	Fuel Oil	N2O	1	Stationary Combustion	Anthropogenic	kBtu	0.0000006	kg N2O	
10	Propane	CO2	1	Stationary Combustion	Anthropogenic	kBtu	0.06171	kg CO2	
11	Propane	CH4	1	Stationary Combustion	Anthropogenic	kBtu	0.000003	kg CH4	
12	Propane	N2O	1	Stationary Combustion	Anthropogenic	kBtu	0.0000006	kg N2O	
13	Generator Fuel - Diesel	CO2	1	Stationary Combustion	Anthropogenic	kBtu	0.07396	kg CO2	
14	Generator Fuel - Diesel	CH4	1	Stationary Combustion	Anthropogenic	kBtu	0.000003	kg CH4	
15	Generator Fuel - Diesel	N2O	1	Stationary Combustion	Anthropogenic	kBtu	0.0000006	kg N2O	
16	Motor Gasoline - All	CO2	1	Mobile Combustion	Anthropogenic	gal	8.7800000	kg CO2	Reference
17	Motor Gasoline - All	CH4	1	Mobile Combustion	Anthropogenic	gal	0.0003512	kg CH4	Factor adds 0.1% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)
18	Motor Gasoline - All	N2O	1	Mobile Combustion	Anthropogenic	gal	0.0005303	kg N2O	Factor adds 1.8% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)
19	Diesel Fuel - All	CO2	1	Mobile Combustion	Anthropogenic	gal	10.2100000	kg CO2	
20	Diesel Fuel - All	CH4	1	Mobile Combustion	Anthropogenic	gal	0.0004084	kg CH4	Factor adds 0.1% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)
21	Diesel Fuel - All	N2O	1	Mobile Combustion	Anthropogenic	gal	0.0006167	kg N2O	Factor adds 1.8% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)
22	100% Biodiesel Fuel - All	CO2	1	Mobile Combustion	Biogenic	gal	9.4500000	kg CO2	
23	100% Biodiesel Fuel - All	CH4	1	Mobile Combustion	Anthropogenic	gal	0.0003780	kg CH4	Factor adds 0.1% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)
24	100% Biodiesel Fuel - All	N2O	1	Mobile Combustion	Anthropogenic	gal	0.0005708	kg N2O	Factor adds 1.8% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)
25	100% Ethanol - All	CO2	1	Mobile Combustion	Biogenic	gal	5.7500000	kg CO2	
26	100% Ethanol - All	CH4	1	Mobile Combustion	Anthropogenic	gal	0.0003300	kg CH4	Factor adds 0.1% to CO2 factor per New York Community Guidance (SEPTEMBER 2015, VERSION 1.0)

Activity Data - Input

Year	Sector	Description/Fuel	Mod #	Activity Data	Units	Notes (i.e. baseline adj.)
2018	Buildings and Other Facilities	Electricity - Grid Supplied	Baseline	11,720,965.5	kWh	PM export, Includes EVSE usage
2018	Buildings and Other Facilities	Electricity - Grid Supplied	EVSE deduction from B&OF	(38,034)	kWh	Green Fleet Report
2018	Buildings and Other Facilities	Electricity - Grid Supplied	RNEM/CDG Deduction	(908,252)	kWh	Ulster landfill production data
2018	Streetlights and Traffic Signals	Electricity - Grid Supplied	Baseline	28,291	kWh	PM
2018	Water Delivery Facilities	Electricity - Grid Supplied	Baseline	43,436	kWh	PM
2018	Buildings and Other Facilities	Generator Diesel	Baseline	50,025	kBtu	From Portfolio Manager
2018	Buildings and Other Facilities	Heating Oil	Baseline	19,930,554	kBtu	From Portfolio Manager
2018	Transit Fleet	Biodiesel	Baseline	3,521	gal	2018 Green Fleet Report
2018	All	Carbon Credits	Offsets	(7,775)	MT CO2e	1&2 (only portion needed for net carbon)
2018	Transit Fleet	Diesel Fuel	Baseline	127,655	gal	2018 Green Fleet Report
2018	Vehicle Fleet	Diesel Fuel	Baseline	148,821	gal	2018 Green Fleet Report
2018	Water Delivery Facilities	Generator Diesel	Baseline	19,734	kBtu	
2018	Buildings and Other Facilities	Natural Gas	Baseline	19,482,887	kBtu	From Portfolio Manager
2018	Employee Commute	Ethanol	Baseline	26,381	gal	Estimate based on 1263 employees
2018	Employee Commute	Gasoline	Baseline	237,429	gal	Estimate based on 1263 employees
2018	Transit Fleet	Ethanol	Baseline	3,102	gal	2018 Green Fleet Report
2018	Transit Fleet	Gasoline	Baseline	27,922	gal	2018 Green Fleet Report
2018	Vehicle Fleet	Electricity - Grid Supplied	Baseline	7,958	kWh	2018 Green Fleet Report
2018	Water Delivery Facilities	Propane	Baseline	84,732	kBtu	PM
2018	All	RECs	Offsets	(10,891,618)	kWh	CY 2018 REC Retirements (to reach 100% only)
2018	Buildings and Other Facilities	Propane	Baseline	4,041,983.2	kBtu	From Portfolio Manager
2018	Vehicle Fleet	Ethanol	Baseline	23,460	gal	Includes Non-Road ethanol / 2018 Green Fleet
2018	Vehicle Fleet	Gasoline	Baseline	209,421	gal	2018 Green Fleet Report
2018	Vehicle Fleet	Gasoline - Non-Road	Baseline	1,717	gal	2018 Green Fleet Report
2019	Buildings and Other Facilities	Electricity - Grid Supplied	Baseline	11,076,126	kWh	PM export, Includes EVSE usage
2019	Buildings and Other Facilities	Electricity - Grid Supplied	EVSE deduction from B&OF	(76,612)	kWh	Green Fleet Report
2019	Buildings and Other Facilities	Electricity - Grid Supplied	RNEM/CDG Deduction	(1,792,000)	kWh	Ulster landfill production data

GHG Calculations

Year	Sector	Description/Fuel	Mod #	GHG	on Score	Activity Data	Activity Units	GHG Emission (kg)	GWP	CO2e Emission (MT CO2e)	Scope	Emission Source	Type
2018	Transit Fleet	Biodiesel	Baseline	CH4	23	3,521	gal	1.3	25	0	1	Mobile Combustion	Anthropogenic
2018	Transit Fleet	Biodiesel	Baseline	CO2	22	3,521	gal	3371.1	1	33	1	Mobile Combustion	Biogenic
2018	Transit Fleet	Biodiesel	Baseline	N2O	24	3,521	gal	2.0	298	1	1	Mobile Combustion	Anthropogenic
2018	Transit Fleet	Diesel Fuel	Baseline	CH4	20	127,655	gal	52.1	25	1	1	Mobile Combustion	Anthropogenic
2018	Transit Fleet	Diesel Fuel	Baseline	CO2	19	127,655	gal	1305361.4	1	1,303	1	Mobile Combustion	Anthropogenic
2018	Transit Fleet	Diesel Fuel	Baseline	N2O	21	127,655	gal	78.7	298	23	1	Mobile Combustion	Anthropogenic
2018	Vehicle Fleet	Diesel Fuel	Baseline	CH4	20	148,821	gal	60.8	25	2	1	Mobile Combustion	Anthropogenic
2018	Vehicle Fleet	Diesel Fuel	Baseline	CO2	19	148,821	gal	1519462.4	1	1,519	1	Mobile Combustion	Anthropogenic
2018	Vehicle Fleet	Diesel Fuel	Baseline	N2O	21	148,821	gal	91.8	298	27	1	Mobile Combustion	Anthropogenic
2018	Buildings and Other Facilities	Electricity - Grid Supplied	Baseline	CH4	2	11,720,966	kWh	111.6	25	3	2	Purchased Electricity	Anthropogenic
2018	Buildings and Other Facilities	Electricity - Grid Supplied	Baseline	CO2	1	11,720,966	kWh	1566784.5	1	1,567	2	Purchased Electricity	Anthropogenic
2018	Buildings and Other Facilities	Electricity - Grid Supplied	Baseline	N2O	3	11,720,966	kWh	15.9	298	5	2	Purchased Electricity	Anthropogenic
2018	Buildings and Other Facilities	Electricity - Grid Supplied	EVSE deduction from B&OF	CH4	2	(38,034)	kWh	-0.362290576	25	(0)	2	Purchased Electricity	Anthropogenic
2018	Buildings and Other Facilities	Electricity - Grid Supplied	EVSE deduction from B&OF	CO2	1	(38,034)	kWh	-5084.14442	1	(5)	2	Purchased Electricity	Anthropogenic
2018	Buildings and Other Facilities	Electricity - Grid Supplied	EVSE deduction from B&OF	N2O	3	(38,034)	kWh	-0.051755797	298	(0)	2	Purchased Electricity	Anthropogenic
2018	Streetlights and Traffic Signals	Electricity - Grid Supplied	Baseline	CH4	2	28,291	kWh	0.3	25	0	2	Purchased Electricity	Anthropogenic
2018	Streetlights and Traffic Signals	Electricity - Grid Supplied	Baseline	CO2	1	28,291	kWh	3781.8	1	4	2	Purchased Electricity	Anthropogenic
2018	Streetlights and Traffic Signals	Electricity - Grid Supplied	Baseline	N2O	3	28,291	kWh	0.0	298	0	2	Purchased Electricity	Anthropogenic
2018	Vehicle Fleet	Electricity - Grid Supplied	Baseline	CH4	2	7,958	kWh	0.1	25	0	2	Purchased Electricity	Anthropogenic
2018	Vehicle Fleet	Electricity - Grid Supplied	Baseline	CO2	1	7,958	kWh	1063.8	1	1	2	Purchased Electricity	Anthropogenic
2018	Vehicle Fleet	Electricity - Grid Supplied	Baseline	N2O	3	7,958	kWh	0.0	298	0	2	Purchased Electricity	Anthropogenic
2018	Water Delivery Facilities	Electricity - Grid Supplied	Baseline	CH4	2	43,436	kWh	0.4	25	0	2	Purchased Electricity	Anthropogenic

Analysis Tables

Mod #	(Multiple Items)			
Type	Anthropogenic			
Year	2018			
Sum of CO2e Emissions (MT CO2e)				
Row Labels	Column Labels	1	2	3 Grand Total
▢ Buildings and Other Facilities				
Purchased Electricity			1,569	1,569
Stationary Combustion	2,764			2,764
Buildings and Other Facilities Total	2,764	1,569		4,334
▢ Employee Commute				
Mobile Combustion			2,127	2,127
Employee Commute Total			2,127	2,127
▢ Streetlights and Traffic Signals				
Purchased Electricity			4	4
Streetlights and Traffic Signals Total			4	4
▢ Transit Fleet				
Mobile Combustion	1,579			1,579
Transit Fleet Total	1,579			1,579
▢ Vehicle Fleet				
Mobile Combustion	3,440			3,440
Purchased Electricity			1	1
Vehicle Fleet Total	3,440	1		3,441
▢ Water Delivery Facilities				
Purchased Electricity			6	6
Stationary Combustion	7			7
Water Delivery Facilities Total	7	6		13
Grand Total	7,790	1,580	2,127	11,497

Mod #	(Multiple Items)			
Year	2018			
Sector	(All)			
Sum of CO2e Emissions (MT CO2e)				
Row Labels	Column Labels	1	2	3 Grand Total
▢ Mobile Combustion				
CH4	5.1	2.2	7.4	
CO2	5,107.8	2,236.3	7,344.1	
N2O	91.8	40.3	132.0	
Mobile Combustion Total	5,205	2,278.8	7,483.5	
▢ Purchased Electricity				
CH4		3	2.8	
CO2		1,572	1,572.4	
N2O		5	4.8	
Purchased Electricity Total		1,580	1,579.9	
▢ Stationary Combustion				
CH4	2.3		2.3	
CO2	2,763.9		2,763.9	
N2O	4.9		4.9	
Stationary Combustion Total	2,771		2,771.1	
Grand Total	7,976	1,580	2,279	11,835

Mod #	(Multiple Items)	
Scope	(Multiple Items)	
Type	Anthropogenic	
Sum of CO2e Emissions (MT CO2e)		
Row Labels		
2012	9,877	
2017	8,954	
2018	9,370	
2019	9,277	
2020	7,870	
Grand Total	45,346	

Activity Data Totals

GHG	CO2			
Mod #	(Multiple Items)			
Scope	(Multiple Items)			
Sum of Activity Data	Column Labels			
Row Labels		2018	2019	2020
Biodiesel				
gal		3,521	2,610	-
Diesel Fuel				
gal		276,476	301,466	218,628
Electricity - Grid Supplied				
kWh		11,762,617	11,099,260	10,937,314
Ethanol				
gal		26,562	27,723	24,932
Gasoline				
gal		237,343	247,430	222,691
Gasoline - Non-Road				
gal		1,717	2,083	5,473
Generator Diesel				
kBtu		19,734	48,548	360,693
Heating Oil				
kBtu		19,930,554	17,689,930	12,111,488
Natural Gas				
kBtu		19,482,887	20,815,136	23,680,739
Propane				
kBtu		4,126,715	3,279,092	3,404,386
Grand Total		55,868,125	53,513,278	50,966,344

Baseline Adjustment Records

Baseline change	Effective Year	Reporting Sector	Scope	Change to Baseline Quantity (MT CO2e)
Golden Hill Health Care Center	2012	Buildings and Other Facilities / Vehicle Fleet	1 & 2	-1,216.4
Patriot's Project—Veteran's Housing	2014	Buildings and Other Facilities	1 & 2	19.3
Sheriff's Substation Wawarsing**5	2015	Buildings and Other Facilities	1 & 2	6.5
Family and Child Advocacy Center	2016	Buildings and Other Facilities	1 & 2	10.2
UCAT Kingston Expansion of Service	2019	Transit	1	358.4

PE10 Action: GHG Tracking System

5 Points

A. Why is this action important?

To evaluate progress in reducing greenhouse gas (GHG) emissions, local governments need a data management system to calculate, forecast, and track emissions from government operations. A GHG tracking system enables local governments to evaluate the benefits of programs and compare emissions from one year to the next and against their GHG targets. Communities may choose to develop their own systems for tracking GHG emissions (which could be as simple as a spreadsheet), or they may license an existing software application. The tracking system can be used to monitor GHG emissions from buildings, vehicle fleet, waste, and other sources. Some local governments use a GHG tracking system to develop their baseline emissions inventories and then use the same tool to update their inventories in subsequent years. In other cases, local governments implement GHG tracking systems after developing their baseline inventories and realizing that they need a more robust tool for managing data, evaluating progress, and informing decisions. Developing and maintaining such a system makes future updates to GHG inventories less onerous.

B. How to implement this action

Local governments can implement this action through the following steps:

1. *Determine the goals and requirements for the system:* At minimum, the system should track Scope 1 and Scope 2 emissions from local government operations. Should the system also track some Scope 3 emissions, such as those from employee commuting? (For definitions of Scope 1, Scope 2, and Scope 3 emissions, see [PE2 Action: Government Operations GHG Inventory](#)) Should the system be able to forecast future emissions, visualize alternative planning scenarios, and/or analyze the costs and benefits of potential policies and programs?
2. *Review available tools on the market:* Analyze the functionality, price, support services, customer base, and planned improvements for the GHG emissions management tools on the market. Review reports comparing the various software packages. Larger local governments should consider the [ICLEI ClearPath tool](#); it is a comprehensive tracking system for conducting GHG inventories, forecasts, and monitoring at the community or government operations scale. Membership in ICLEI involves an annual fee based on municipal size and includes access to ClearPath.
3. *Develop a budget and a plan for managing the system:* Determine the initial budget for implementing the system, along with any budget or staff time needed to manage the system on an ongoing basis.
4. *Select the tool that best meets your requirements and budgetary constraints.*
5. *Implement the tool (including migrating data from any legacy systems).* Enter at least 12 months of GHG data into the system.
6. *Develop municipal protocols for entering data and maintaining the system:* Create user guides and/or procedures that are customized to the unique circumstances of the local government. The protocols should focus on what steps users need to take to prepare to use the tracking system, maintain it over time, and report the results. Such municipal protocols are different from any instructions issued by creators of GHG tracking software. The municipal protocols documents should lay out instructions for updating the data in a consistent manner on a defined schedule and enable local government staff (or others, such as interns or contractors) to use the system with ease.

C. Time frame, project costs, and resource needs

The time frame, costs, and resource needs for implementing a GHG tracking tool vary depending on the complexity of the selected tool and the provider. Tools may involve some upfront costs for implementation in addition to annual licensing

fees; however, some tools can simply be downloaded or used online with no implementation costs other than staff time.

D. Which local governments implement this action? Which departments within the local government are most likely to have responsibility for this?

A GHG emissions management system is often managed by the Climate Smart Communities (CSC) coordinator or staff member acting in this capacity, who could be in the chief elected official's office, the department of planning, public works, or environment.

E. How to obtain points for this action

Local governments that implement a GHG tracking system that is consistent with the guidelines described here are eligible for five points.

F. What to submit

Submit **documentation demonstrating that the GHG tracking system is operational** (such as a report from the system or a screenshot of the system in use) and contains at least 12 months of GHG data on emissions from local government operations. Also **submit a copy of the protocols developed by the local government** for entering GHG data, reporting results, and maintaining the tracking system over time.

All CSC action documentation is available for public viewing after an action is approved. Action submittals should not include any information or documents that are not intended to be viewed by the public.

G. Links to additional resources or best practices

- [ICLEI-Local Governments for Sustainability USA, ClearPath Tool](#)
- [ICLEI Emissions Management](#)
- [EPA Greenhouse Gas Equivalencies Calculator](#)

H. Recertification requirements

The recertification requirements are the same as the initial certification requirements.