



Local Governments
for Sustainability



Climate Action Planning Institute Dutchess County

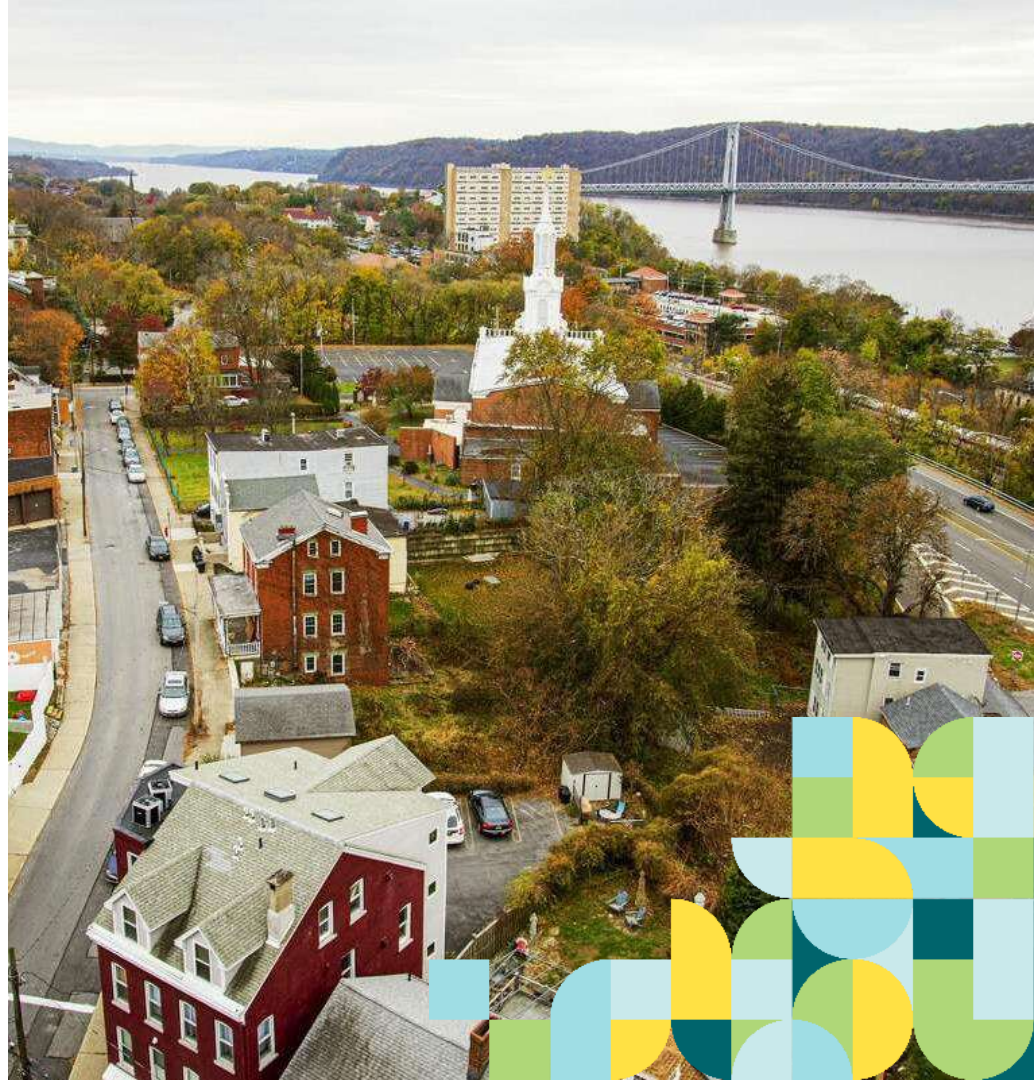
Session 2: Government
Operations GHG Inventories:
Data Collection

February 15, 2023



Department of
Environmental
Conservation

CAPI Dutchess is funded by the NYS Department of Environmental Conservation and the and is a partnership between Dutchess County, HVRC, and ICLEI.



Agenda



- Key Concepts

Global Warming Potentials, Emissions Factors, Scopes and Data Sources

- GHGI Process

- Data collection

- Starting your climate story

Climate & Sustainability Storytelling



- **Start with people, stay with people.**



Photo by
PennLive

Climate & Sustainability Storytelling



- Start with people, stay with people.
- **Climate and sustainability communications is storytelling!**

Name _____

Plot Organizer

RISING ACTION

(all examples that create complications or suspense)

CLIMAX

Plot

TITLE: _____

AUTHOR: _____

FALLING ACTION

CONFLICT



EXPOSITION

Setting:

Situation/Climate:

Characters:

PROTAGONIST vs. ANTAGONIST

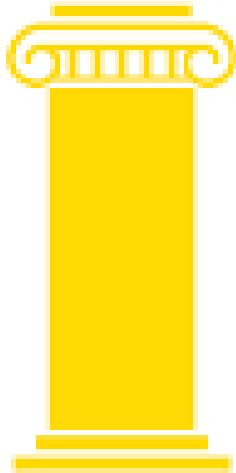
_____ vs. _____

RESOLUTION

THEME

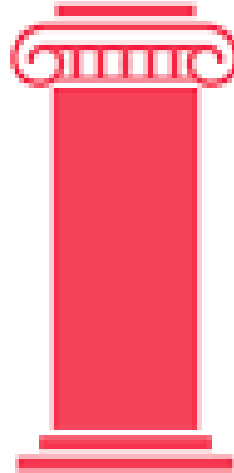
Assessing the “3 pillars” of climate action planning

GHG
Inventory



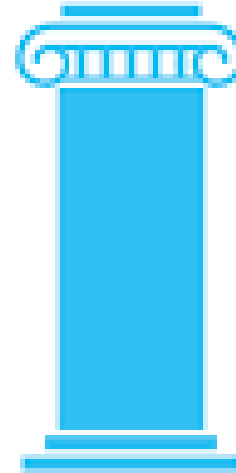
Mitigation

Vulnerability
Assessment

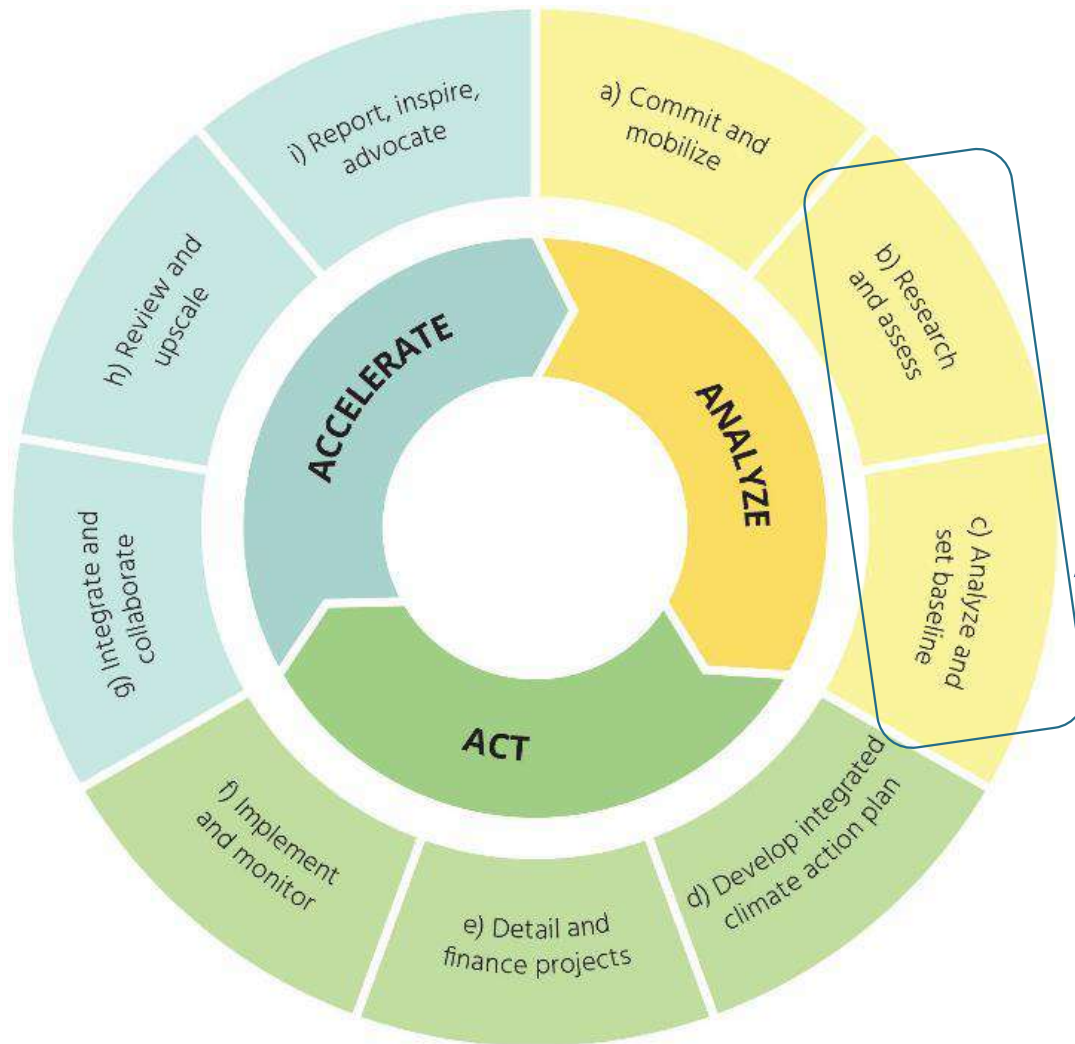


Adaptation

Spectrum of
Community
Empowerment



Equity



CAPI months 1-5: Assess a baseline for the “three pillars” of adaptation, mitigation, and equity is among the first steps.

Climate Science 101



Greenhouse gases

**CO₂ – Carbon
Dioxide**

CH₄ – Methane

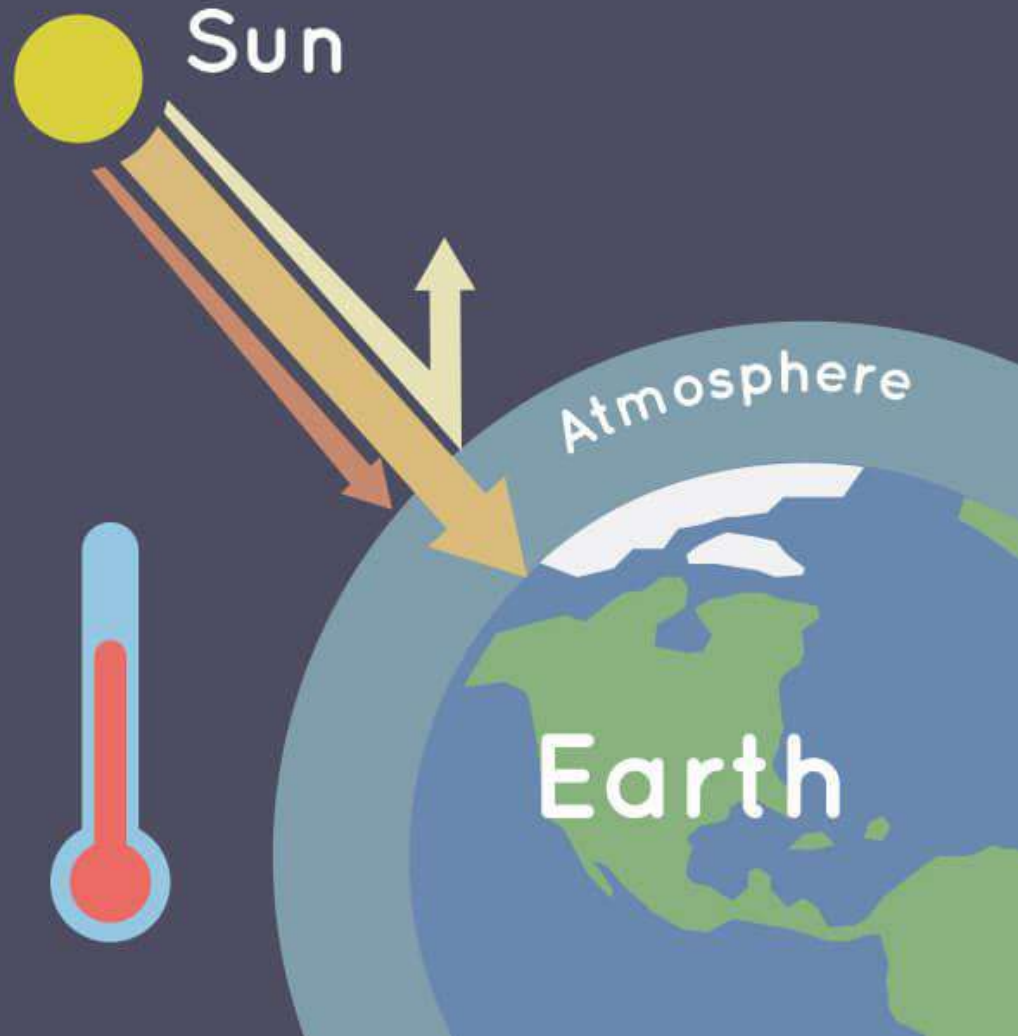
**NO₂ – Nitrous
oxide**

Others:

*HFCs –
hydrofluorocarbons*

Soot

Water vapor



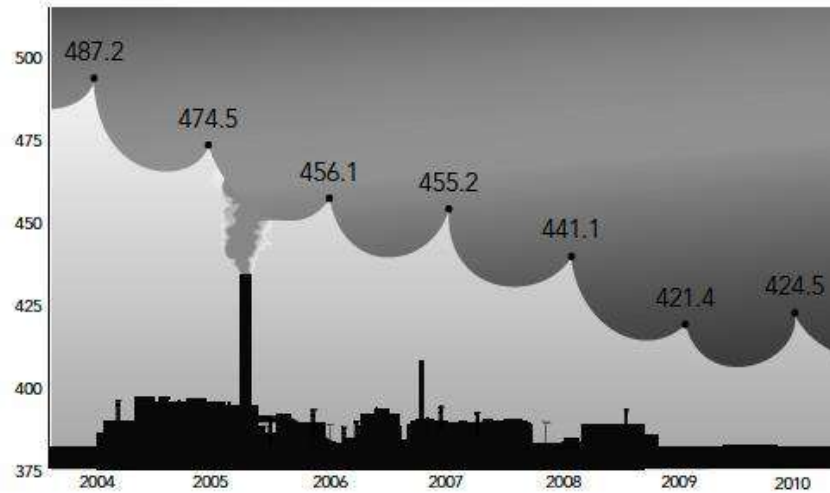
Global Warming Potentials (GWP) indicate the warming intensity of various GHGs

Greenhouse Gas	100-Year Time Period				20-Year Time Period			
	AR4 2007	AR5 2014	AR6 2021		AR4 2007	AR5 2014	AR6 2021	
	<i>Feedback Not Included</i>		<i>Feedback Included</i>		<i>Feedback Not Included</i>		<i>Feedback Included</i>	
CO ₂	1	1	1	1	1	1	1	1
CH ₄ fossil origin	25	28	34	29.8	72	84	86	82.5
CH ₄ non fossil origin				27.2				80.8
N ₂ O	298	265	298	273	289	264	268	273

IPCC's Sixth Assessment Report was
released in 2021

How are GHG emissions calculated?

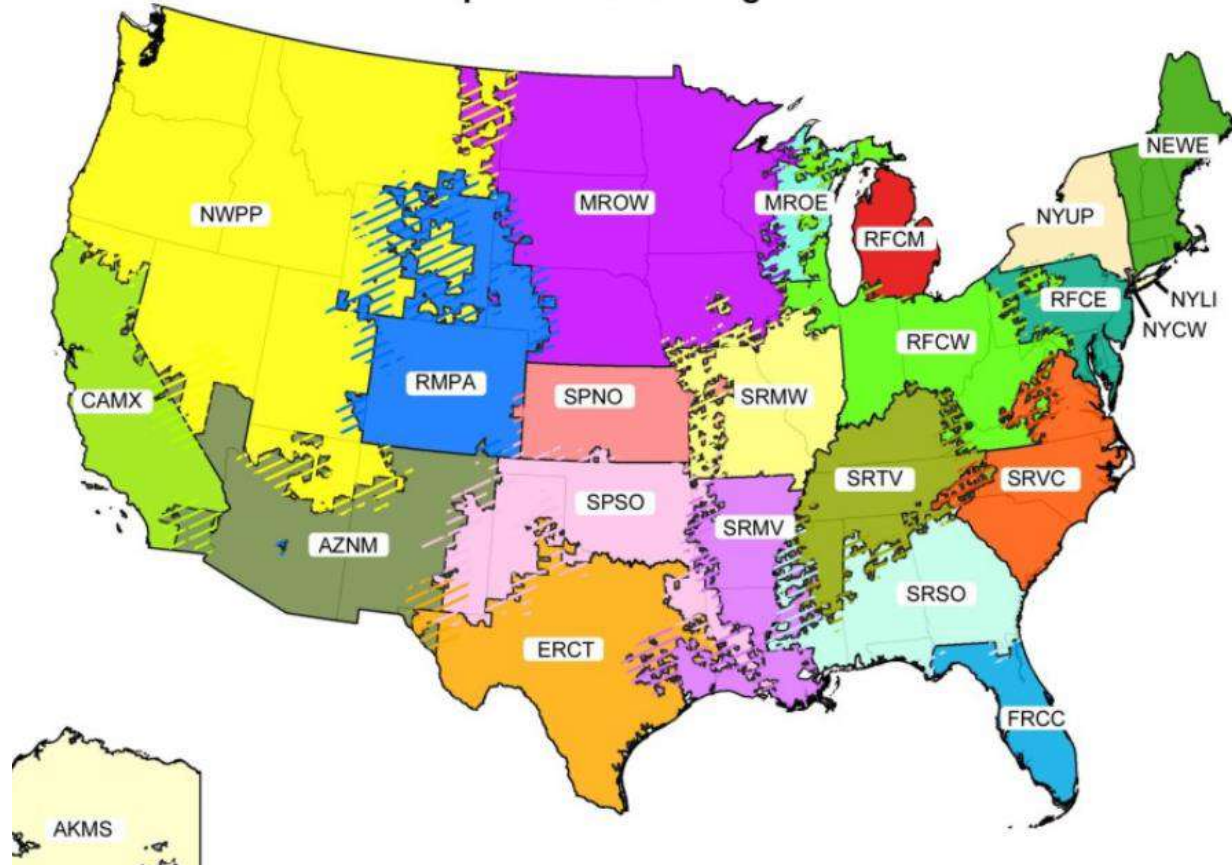
Activity Data x Emissions Factor = Emissions Estimate



Source: U.S. Energy Information Administration

Emissions factors for electricity refer to the grid's carbon intensity

Map of eGRID Subregions



Grid intensity varies widely by region

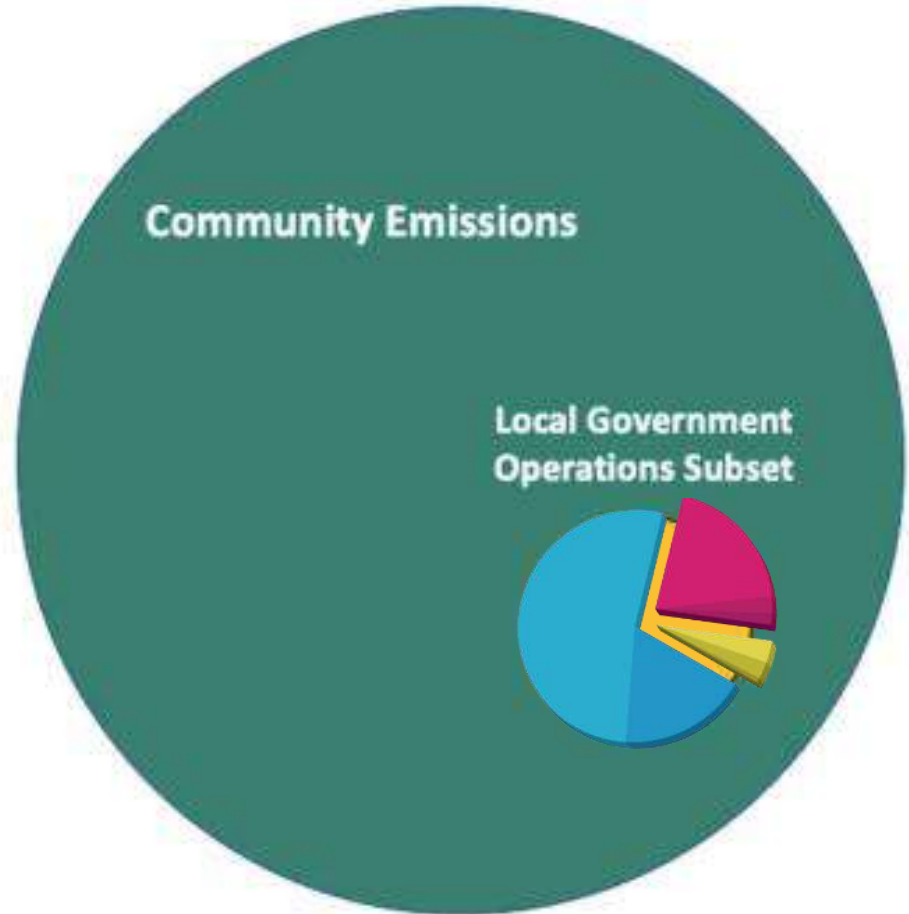
eGRID subregion acronym	eGRID subregion name	Total output emission rates						
		lb/MWh						
		CO ₂	CH ₄	N ₂ O	CO ₂ e	Annual NO _x	Ozone Season NO _x	SO ₂
AKGD	ASCC Alaska Grid	1,114.4	0.098	0.013	1,120.8	6.2	6.1	0.7
AKMS	ASCC Miscellaneous	549.3	0.026	0.004	551.3	8.1	7.8	0.7
AZNM	WECC Southwest	952.3	0.068	0.010	956.9	0.6	0.6	0.2
CAMX	WECC California	453.2	0.033	0.004	455.3	0.4	0.4	0.0
ERCT	ERCOT All	868.6	0.057	0.008	872.4	0.5	0.5	0.6
FRCC	FRCC All	861.0	0.055	0.007	864.5	0.3	0.3	0.2
HIMS	HICC Miscellaneous	1,185.6	0.143	0.022	1,195.6	8.1	8.4	4.1
HIOA	HICC Oahu	1,694.5	0.185	0.028	1,707.6	3.7	4.1	7.0
MROE	MRO East	1,502.6	0.147	0.022	1,512.6	0.8	0.9	0.4
MROW	MRO West	1,098.4	0.119	0.017	1,106.4	0.8	0.8	1.1
NEWE	NPCC New England	488.9	0.077	0.010	493.8	0.3	0.3	0.1
NWPP	WECC Northwest	715.2	0.068	0.010	719.9	0.6	0.6	0.4
NYCW	NPCC NYC/Westchester	553.8	0.021	0.002	555.1	0.2	0.2	0.0
NYLI	NPCC Long Island	1,209.0	0.157	0.020	1,218.9	0.9	0.9	0.2
NYUP	NPCC Upstate NY	232.3	0.017	0.002	233.0	0.1	0.1	0.0
PRMS	Puerto Rico Miscellaneous	1,537.3	0.084	0.013	1,543.3	3.5	3.9	3.2
RFCE	RFC East	695.0	0.053	0.007	698.5	0.3	0.3	0.3
RFCM	RFC Michigan	1,189.3	0.114	0.016	1,197.0	0.7	0.7	1.0
RFCW	RFC West	1,067.7	0.099	0.014	1,074.4	0.8	0.6	0.7
RMPPA	WECC Rockies	1,242.6	0.117	0.017	1,250.6	0.7	0.6	0.4

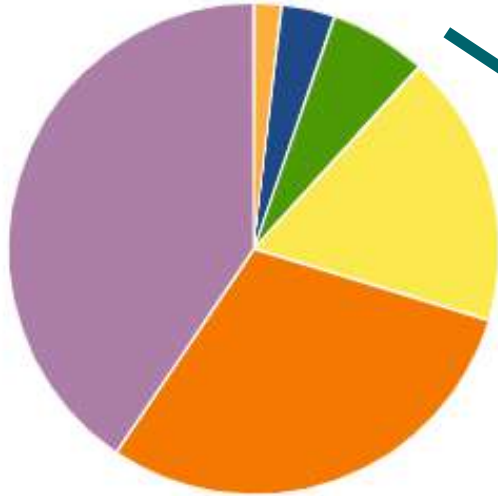
How are GHG emissions calculated?

Activity Data x Emissions Factor = Emissions Estimate

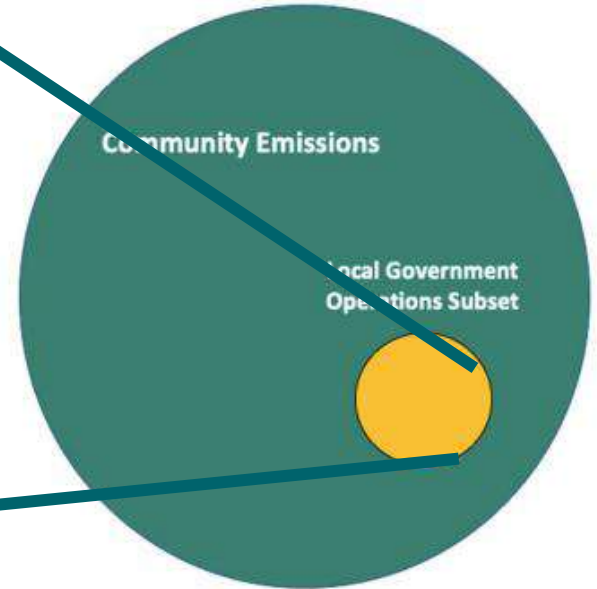
Activity Data	Emissions Factor	Emissions
Electricity Consumption (kilowatt hours)	CO ₂ emitted/kWh	CO ₂ emitted
Natural Gas Consumption (therms)	CO ₂ emitted/therm	CO ₂ emitted
Gasoline/Diesel Consumption (gallons)	CO ₂ emitted /gallon	CO ₂ emitted
Solid Waste Generated (tons)	CH ₄ emitted/ton of waste	CH ₄ emitted

Municipal operations are an important piece of a community-wide emissions profile





- Street Lights & Traffic Signals
- Employee Commute
- Water & Wastewater Treatment Facilities
- Solid Waste Facilities
- Buildings & Facilities
- Vehicle Fleet



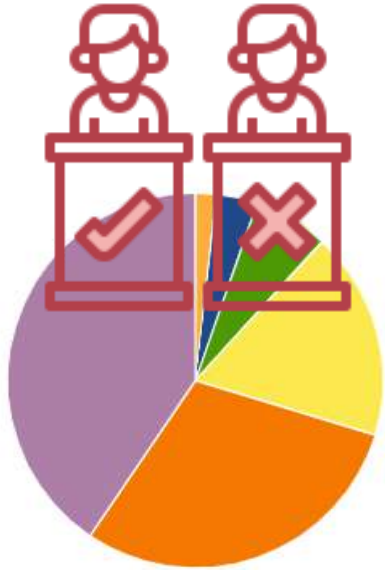
Operational Control

- Wholly owning an operation, facility or source
- Authority to introduce/implement operating policies
- Joint Powers Authorities and Special Districts not included

Financial Control

- Operating leases or Capital Leases included
 - Short term leases (car rentals) need not be included

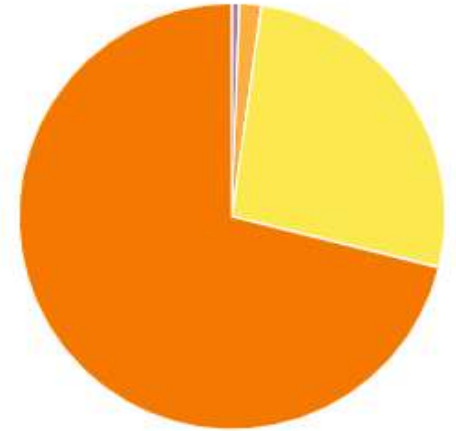
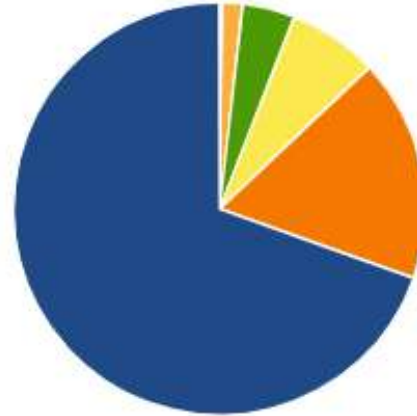
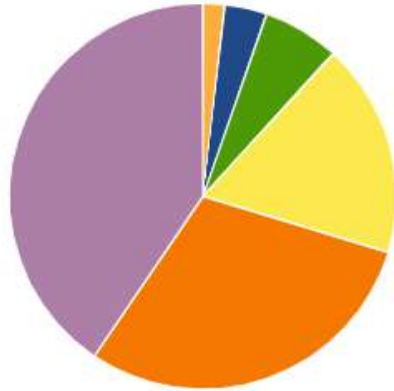
- Street Lights & Traffic Signals
- Solid Waste Facilities
- Employee Commute
- Buildings & Facilities
- Vehicle Fleet
- Water & Wastewater Treatment Facilities



Guess Whose Inventory!



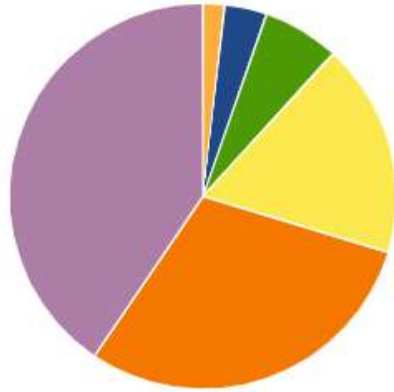
- Street Lights & Traffic Signals
- Solid Waste Facilities
- Employee Commute
- Buildings & Facilities
- Vehicle Fleet
- Water & Wastewater Treatment Facilities



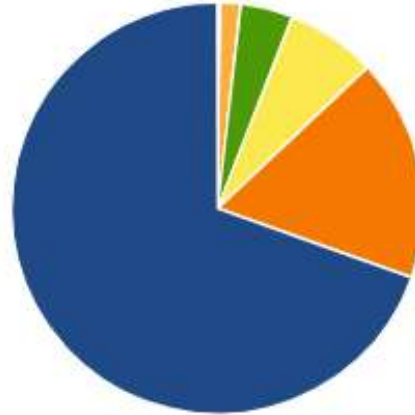
Albany
Beacon
New Paltz



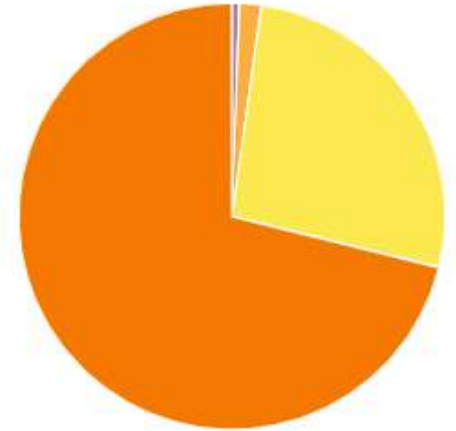
- Street Lights & Traffic Signals
- Solid Waste Facilities
- Employee Commute
- Buildings & Facilities
- Vehicle Fleet
- Water & Wastewater Treatment Facilities



Beacon



Albany



New Paltz

GHGI Process

Phase 1

Formation of Project Team (if needed)

Research Data Providers

Phase 2

Data Collection

Data Entry

Data Quality Control/ Assurance

LG Staff Led

ICLEI USA Staff Led

LG/ ICLEI

Phase 3

Final Deliverables Discussion

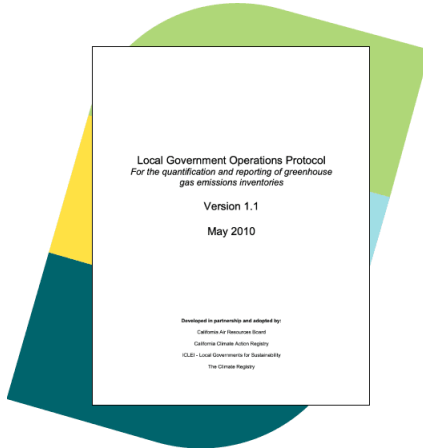
Provide Final Deliverables

Sector by Sector

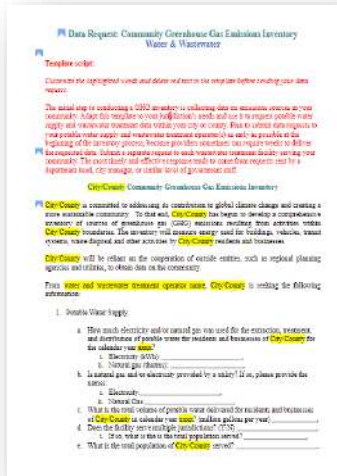


GHG Inventory Support Resources

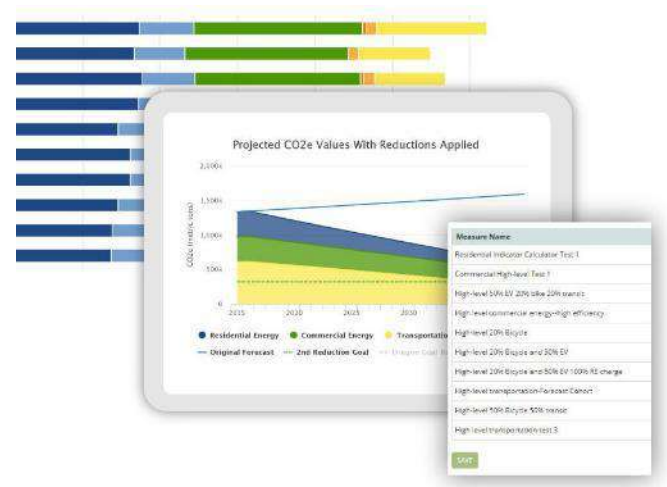
LGO Protocol



Data-request templates



ICLEI ClearPath Climate Planner Tool



Buildings and Facilities + Street Lights

WHAT

- Owned and leased office space
- Police and fire stations
- Recreation centers and facilities
- Transportation facilities
- Warehouse, fleet and equipment yards, service facilities
- Traffic signals, streetlights, utility lighting
- Wastewater and water facilities
- Solid waste management facilities

WHO

Facilities manager;
Finance

HOW

Data-request Template



Data Overview

Vehicle Fleet

WHAT

- Passenger fleet vehicles
- Light, medium, and heavy-duty trucks
- Police and fire equipment
- Transit vehicles
- Sanitation and street sweeping equipment
- Port and airport on and off-road vehicles
- Aircraft and maritime equipment
- Grounds keeping equipment

WHO

Fleet Manager

HOW

Data-request Template



Data Overview

Employee Commute

WHAT

- Employee vehicle fuel economy
- Employee daily commute distance (miles per day)
- Note seasonal or part-time staffing
- Employee commuting preferences (optional but useful)
- Business travel (air, rail)

WHO

Human Resources; All staff (varies)

HOW

Survey



Employee Commute Survey

What is the average number of days you work per week? *

Short answer text

Approximately how many miles do you travel to work? (one way) *

Short answer text

On average how much vacation or sick leave do you use? *

Short answer text

What type of fuel does your vehicle use? *

- Gasoline
- Diesel
- Hybrid gasoline
- Hybrid diesel
- Biodiesel/ethanol
- Electric
- I do not own a vehicle.
- Other...

Data Overview

Employee Commute

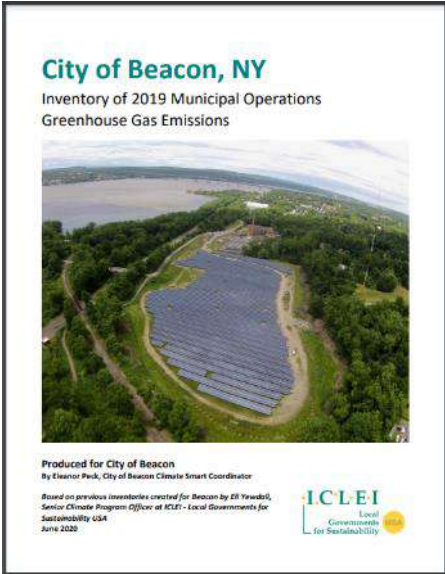
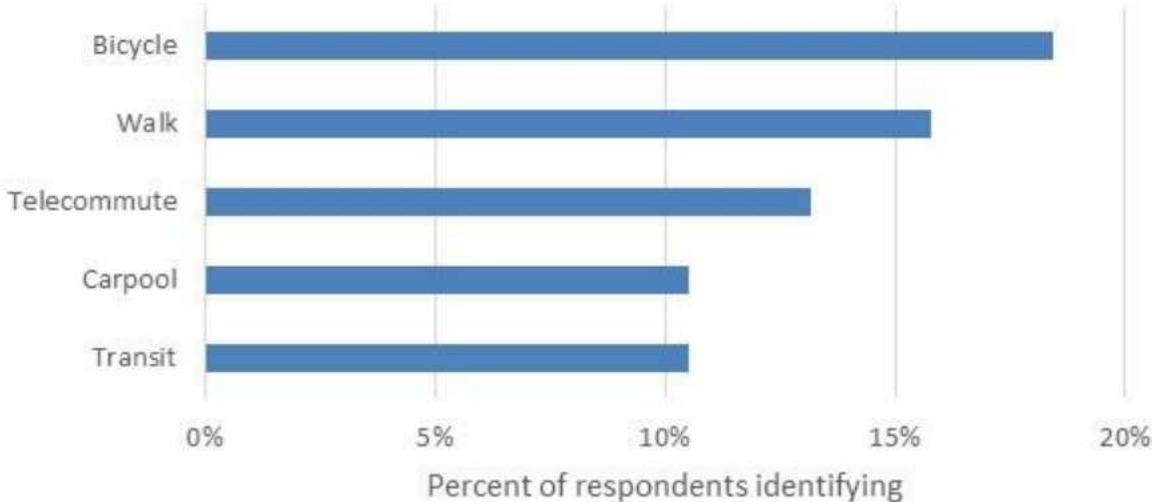


Figure 5: Percent of employees who would consider alternate commute modes



Data Overview

Employee Commute

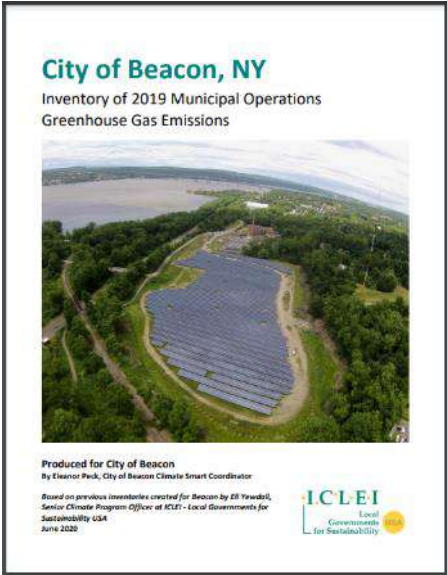
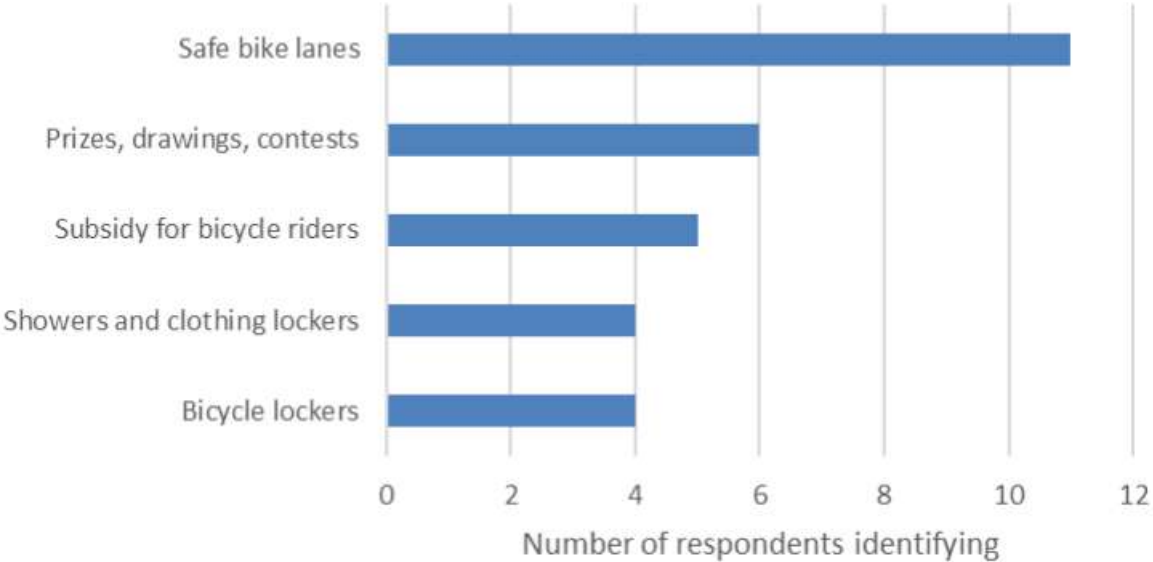


Figure 6: Top five ways to encourage bicycling to work



Data Overview

Solid Waste

WHAT

- Office Solid waste
- Park and Public Works
Green Waste
- Construction and Demolition
- Other Operations Solid Waste

WHO

Landfill operator (for communities with landfill)
Solid waste hauler (all others)

HOW

Data request template



Data Overview

Water + Wastewater

WHAT (No wastewater treatment plant)

- Energy associated with running pump stations
- If you do not operate a wastewater treatment plant, you are done!

WHO

Facilities

HOW

Data request template



Data Overview

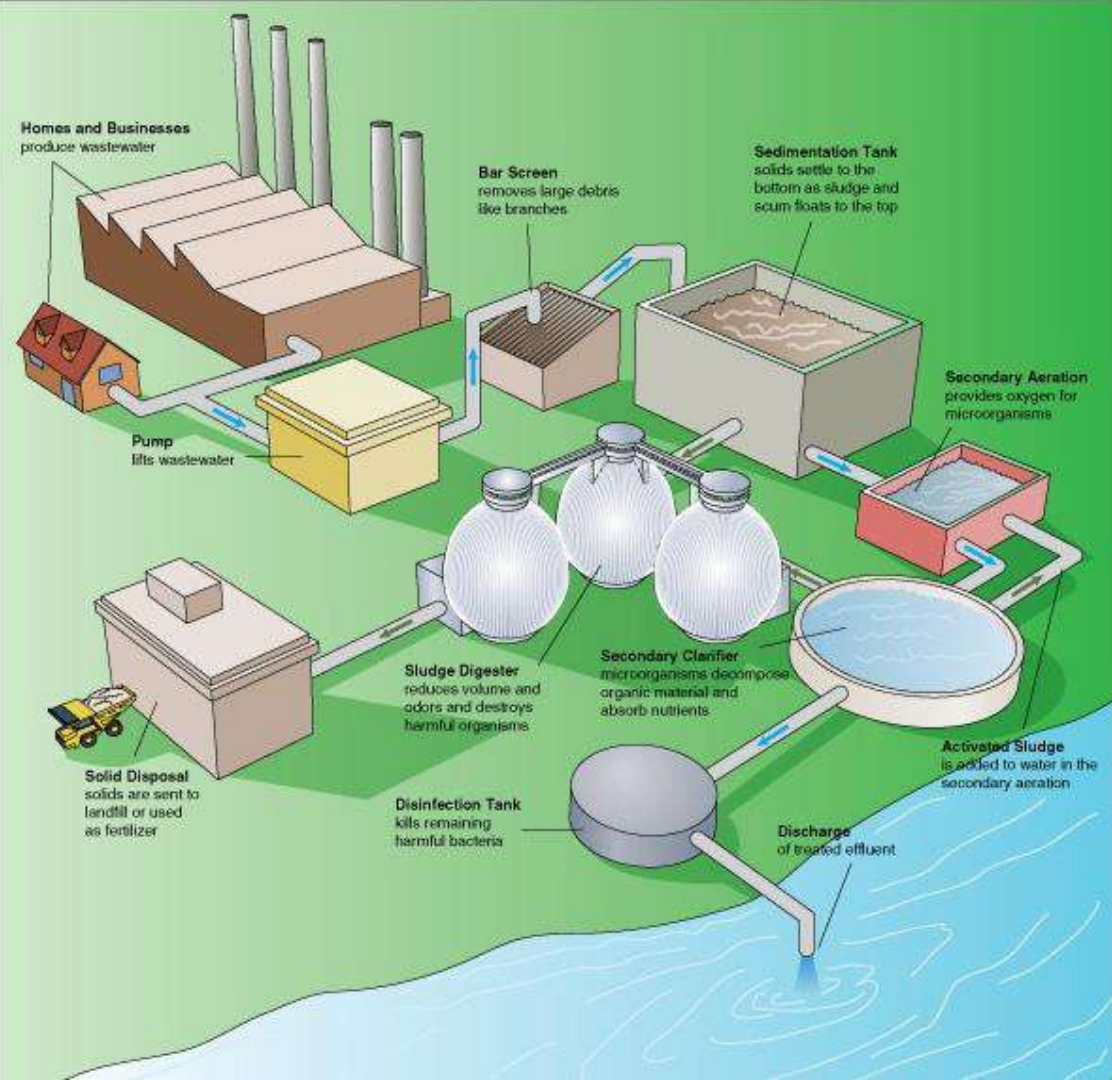
Water + Wastewater

WHAT (No wastewater treatment plant)

- N₂O Emissions will be occurring from one or more process steps.
- Nitrification-Denitrification is a step to reduce N pollution in receiving water, by volatilizing it into various N gases including N₂O.
- W/o the process, more N is in the effluent and is released as N₂O as a result of natural nitrification-denitrification.
- In either case, some N₂O comes from both in-plant and in-stream processes

WHO
Water plant operator

HOW
Data request template



**The GHG Inventory is a chapter in
your community's climate story.**



Communication Goals



Science Communication:

- **A**wareness
- **E**njoyment
- **I**nterest
- **O**pinion-forming
- **U**nderstanding

Climate & Sustainability Communication:

- **A**wareness
- **U**nderstanding
- **P**ersuading
- **C**are
- **A**ct

Climate and sustainability communications are specifically geared towards engaging, informing, advocating, and mobilizing sustainability and climate change initiatives.

Remember to keep your overall goal in mind when creating communication plans and content.

Climate & Sustainability Storytelling

"Protect and serve" messaging

Embrace	Replace	Because...
Local/locally made clean energy, home-grown energy, clean energy, made right at home	Renewable energy, green energy, domestic energy	"Local" folds in community empowerment without directly stating it. "Homegrown" implies accessible wind and solar energy. "Clean" reinforces health benefits and positions fossil fuels as "dirty."
Attract new business	Good for the economy	Attracting new businesses implies the promise of new jobs and opportunities, as well as of putting more dollars in the pockets of residents in your community.
Good for [city or state], good for the people	Good for the country	Americans are more personally attuned to their local communities and personal well-being these days. They are less satisfied with how things are going in our country and thus do not respond as strongly to "good for the country" messages.



[Let's Talk Communities](#) [ecoAmerica + ICLEI USA, 2016]

The Communications Equation



Objective

Audience

Unique Value
Proposition

Channels

Facts

= good (effective, interesting, funny, thought-provoking, life-changing) communications

Great examples of GHG data storytelling



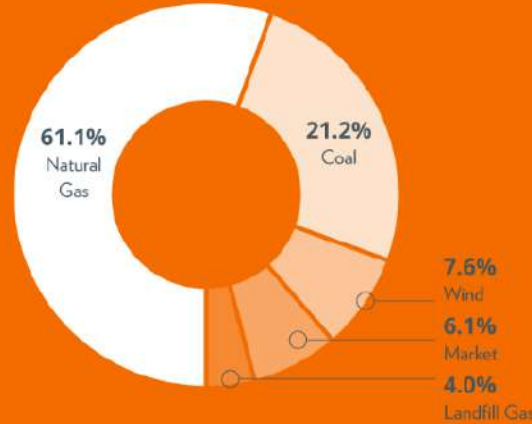


Smart Energy

Our way of living requires a stream of energy to operate personal and infrastructure devices. We know that energy is produced with scarce resources and the byproducts impact our environment. We need to use both conservation and efficiency measures to manage the resources we have to provide access to reliable and cost effective energy.

↑ NEXT ↓

ELECTRICAL MAKEUP IN 2019



Source: HEPW

HOLLAND ENERGY FUND

\$1 million

in loans through the On-Bill Loan Program, which allows city homes for energy improvements.

Source

ENERGY LABELS (2018)

74

Homes with Deep Energy Retrofit. \$19,240 average project cost. \$1. million invested in Energy Conservation and Home Improvements.

HOLLAND BOARD OF PUBLIC WORKS KILOWATT HOURS SAVED THROUGH EFFICIENCY PROGRAMS IN 2019 (RESIDENTIAL AND BUSINESS SECTORS)

10,449,063

The equivalent of what more than 1,400 homes use per year.

18,731,099 (2017); 10,336,004 (2016); 12,865,357 (2015); 16,385,024 (2014)

Source: HEPW

AVG SAVINGS 2014

\$17.60 saved on average per household vs 2013 for electric service.

AVG SAVINGS 2015

\$14.63 saved on average per household vs 2014 for electric service.

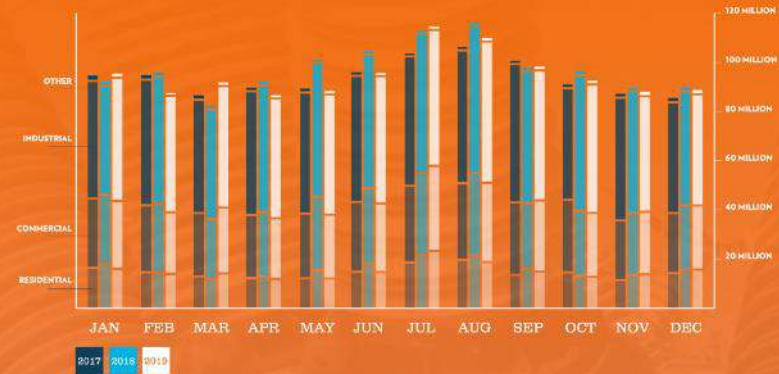
ENERGY STAR® CERTIFIED BUILDINGS IN HOLLAND

4

Source: City of Holland



ELECTRICAL USAGE (KWH)



The Ulster County Carbon Neutral Government Strategy

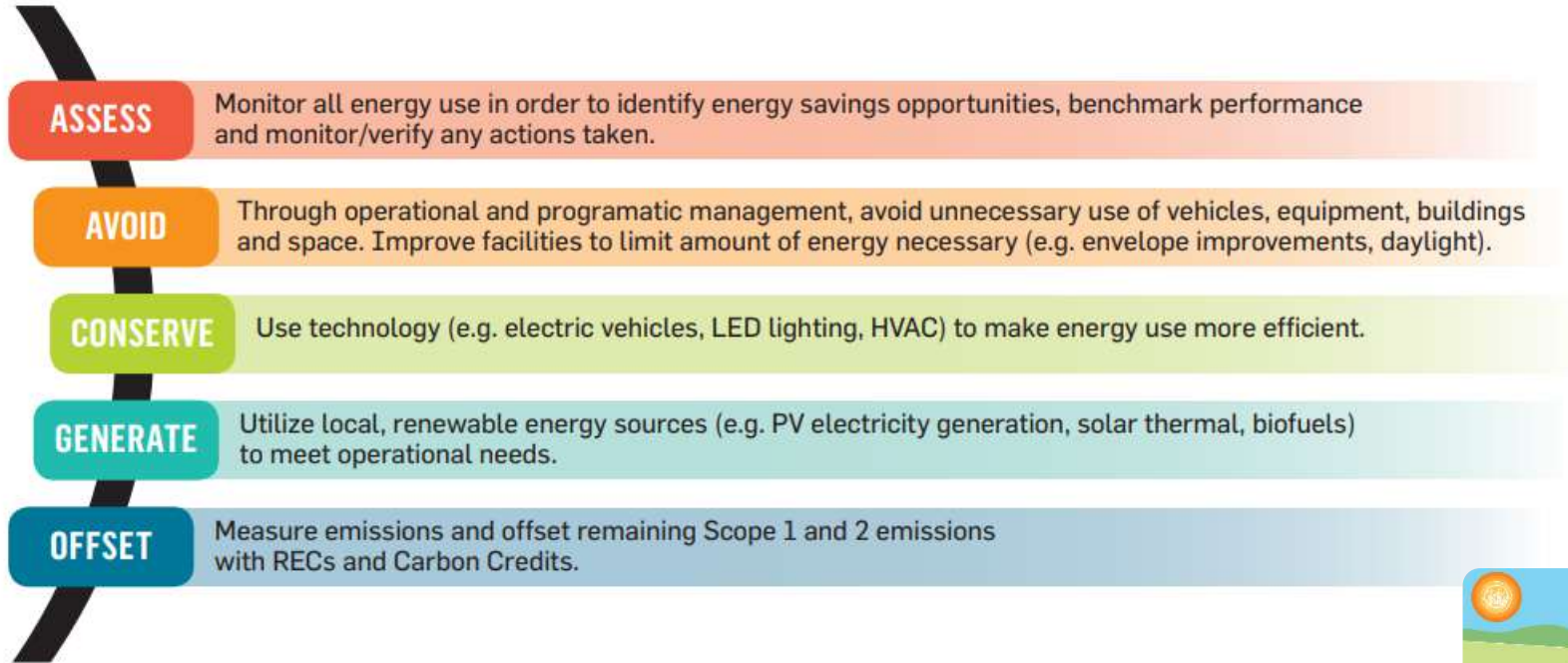


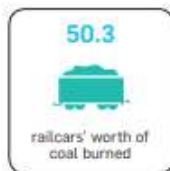
Figure 3. The Five Elements of the Strategy



Progress towards Goals

In 2018, Ulster County government operations emitted 9,238 metric tons of CO₂e.¹

This is the equivalent to:



Between the baseline year of 2012 and the most recent GHG inventory for 2018, Ulster County's actual emissions from government operations decreased by 2.4%.

Emissions Trends by Sector

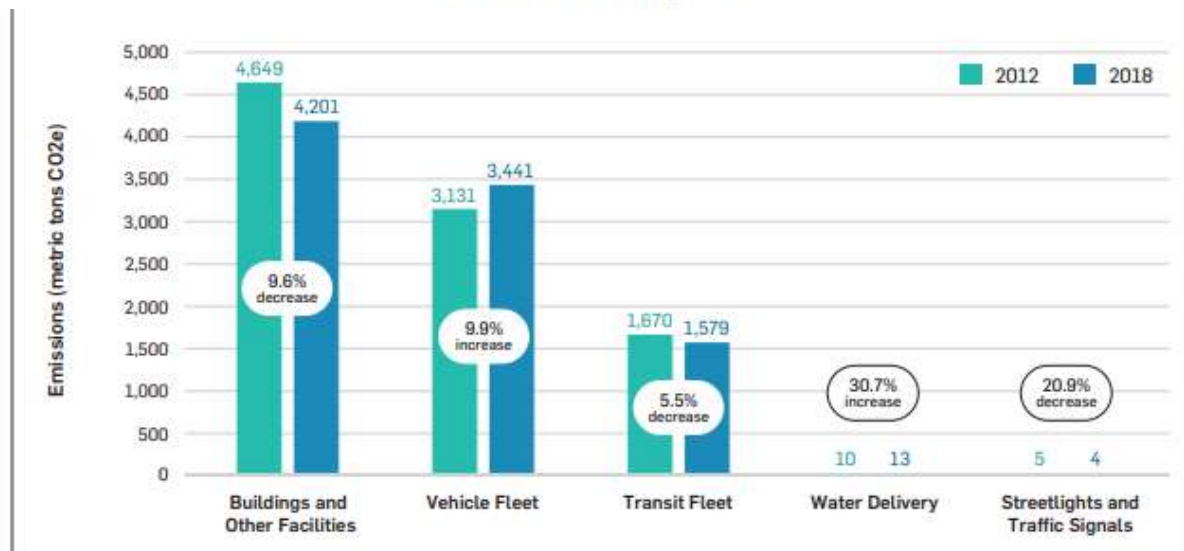


Figure 7.

Climate & Sustainability Communications Resources



[Climate & Sustainability Communications Member Toolkit](#)

FROM THE COMMUNITY / GOVERNMENT INNOVATION AND LEADERSHIP

9 min read

6 tips to make climate communication less awful

If you want to stop climate change, it's time to start memeing



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This article is written by Dr. Michael Shank, communications director for the Carbon Neutral Cities Alliance and adjunct faculty at New York University's Centre for Global Affairs.

Recommended for you

Tap into your global government community

[6 tips to make climate communication less awful](#)

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