GREENHOUSE GAS (GHG) INVENTORY METHODOLOGY AND TRENDS

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Air and Climate Public Advisory Committee (ACPAC) Meeting
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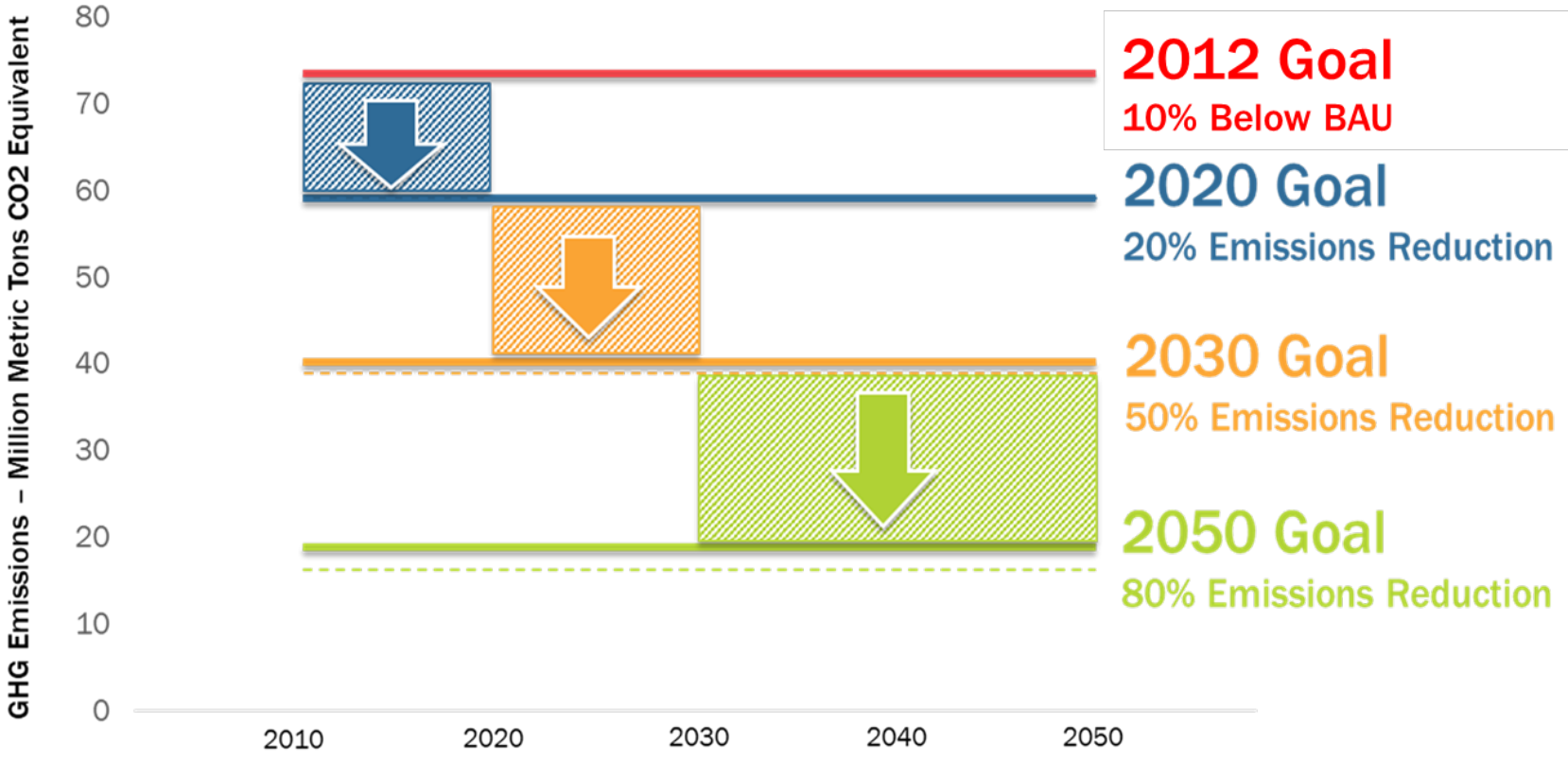
Metropolitan Washington
Council of Governments

Regional GHG Reduction Goals



GHG Goals and Methodologies

- ***Inventory Goals***
  - Develop relevant, robust sets of inventories that strive for completeness, consistency, accuracy, replicability, transparency, and quality control.
  - Support COG's Climate, Energy and Environment Policy Committee (CEEPC) and member local governments track progress towards GHG emission reduction goals
  - Support decision-making around policies and programs that support emission reduction
  - Meet U.S. and Global Protocol Standards
- ***GHG Protocols/Resources***
  - ICLEI US Communities Protocol (USCP) for Accounting and Reporting of GHG Emissions
  - Global Protocol for Community-Scale GHG Inventories (GPC)
  - ICLEI Renewable Energy Credit (REC) Guidance *(new, not applied in COG inventories)*

Regional GHG Emission Trends

Emissions Types	COG Inventory?	USCP Required?	GPC Required?
Built Environment	√	√	√
Some Process and Fugitive	√	X	√
Transportation and Mobile	√	√	√
Solid Waste Treatment	√	√	√
Wastewater Treatment	√	√	√
Agriculture	√	X	X
Forests and Trees Outside of Forests	√	X	X

CONTRIBUTING TECHNICAL EXPERTS

- COG Member Local Governments
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- Tim Canaan, COG DTP
- Nicole McCall, COG DTP
- Zhou Yang, COG DTP
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- Melissa Adams, Washington Gas
- John Friedman, Washington Gas
- Alexander Miller-Brown, Washington Gas
- Stephen Holcomb, Columbia Gas
- Erin Marinello, Columbia Gas
- Johnnie Long, Columbia Gas
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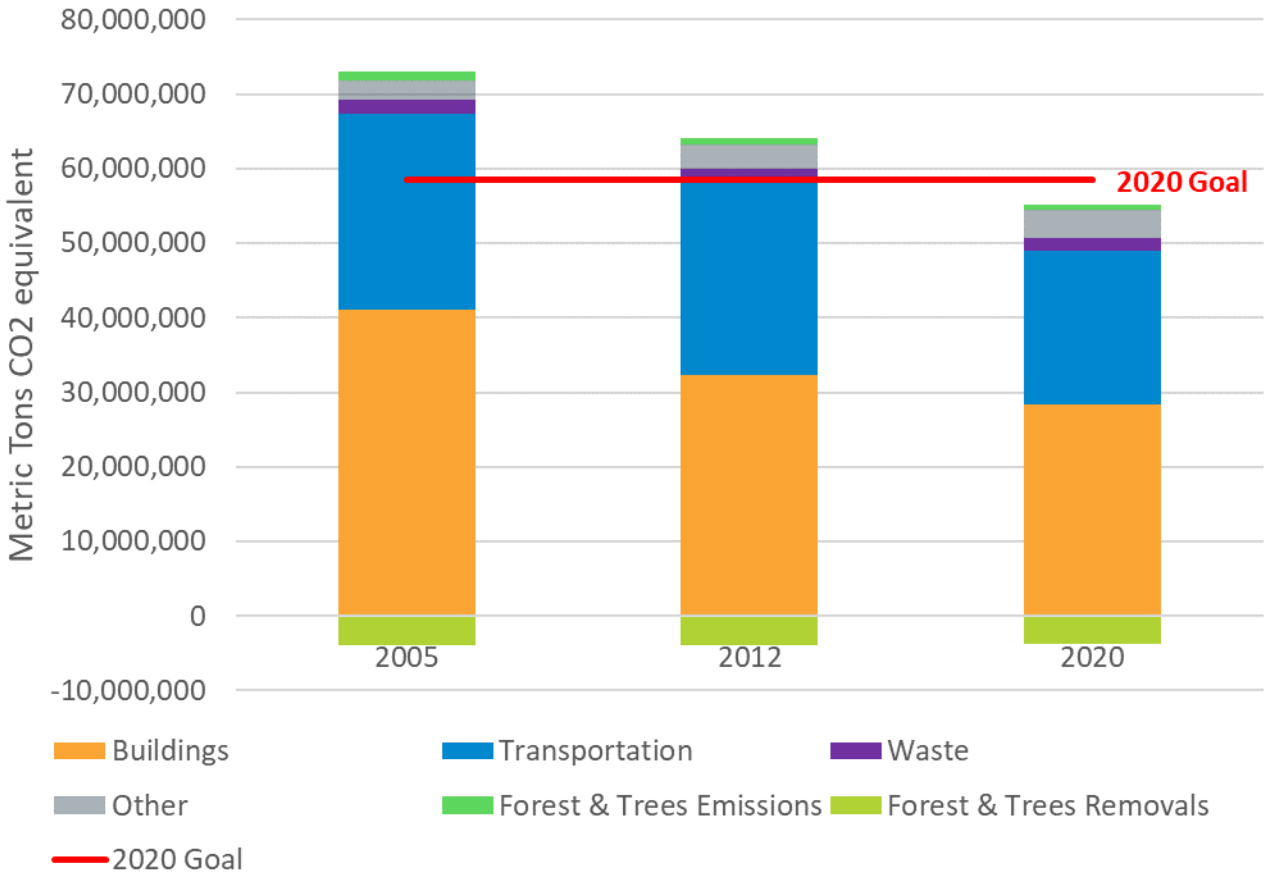
- Eli Yewdall, ICLEI
- Tom Herrod, ICLEI
- Calyn Hart, ICLEI
- Anne Marie Cleary Rauker, ICLEI
- Donna Lee, Climate and Land Use Alliance
- Richard Birdsey, Woods Hole Research Center
- Nancy Harris, World Resources Institute
- Shreekar Pradhan, Cadmus
- Lindsey Popkin, Cadmus

Regional GHG Emission Trends

Gross GHG emissions decreased by **24 percent** from 2005 to 2020 in metropolitan Washington.



Regional GHG 2020 Gross Stats

17.3

million metric tons CO2 equivalent emissions reduced from 2005-2020

This is the equivalent to taking 3.3 million homes off the grid for one year.

52

percent total GHG emissions from energy consumption in 2020

31% from commercial energy consumption and 21% from residential energy consumption

38

percent total GHG emissions from transportation in 2020

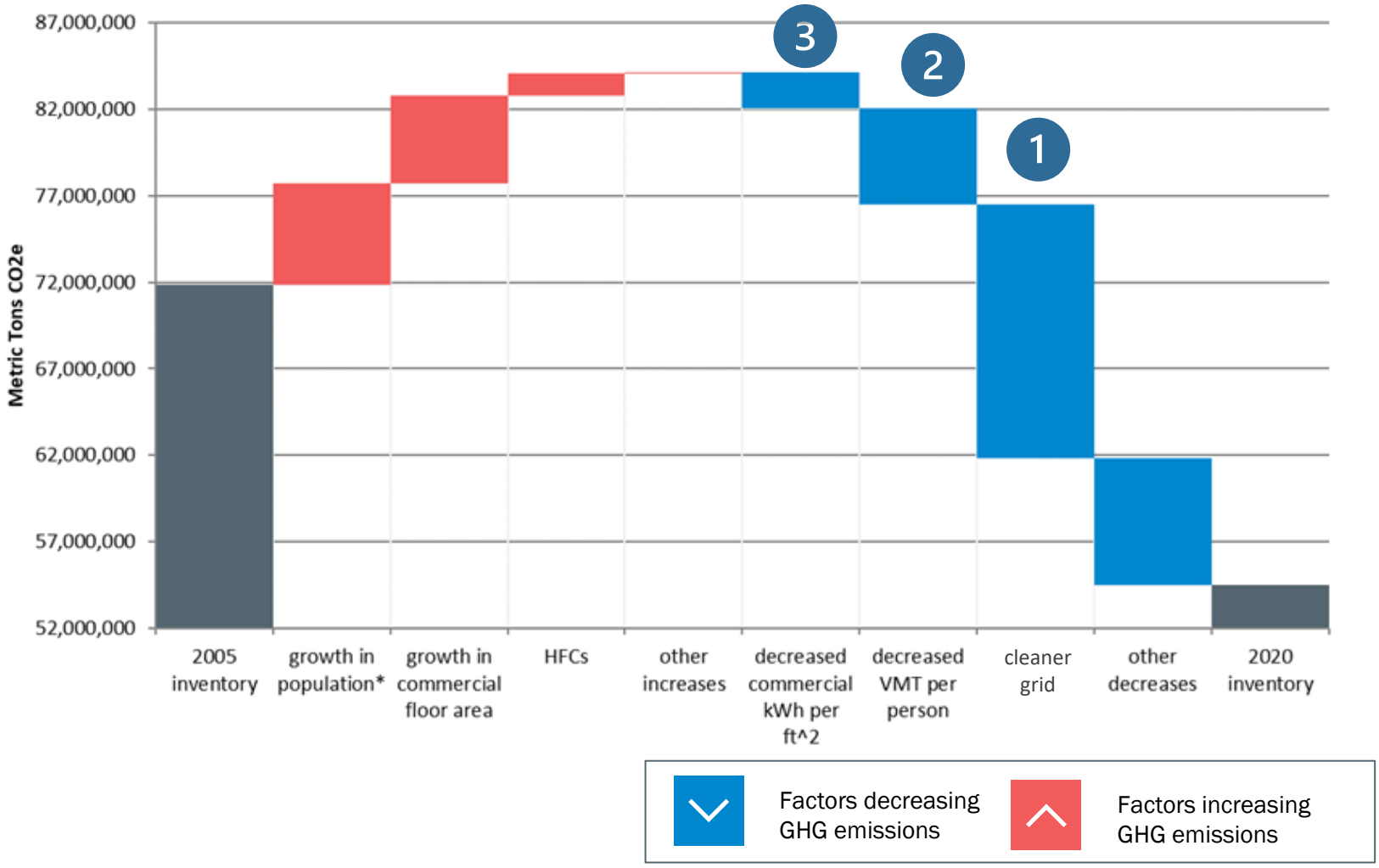
31% from on-road, 3% from off-road, 3% from air passenger travel, <1% from commuter rail

37

percent reduction of per capita emissions from 2005-2020

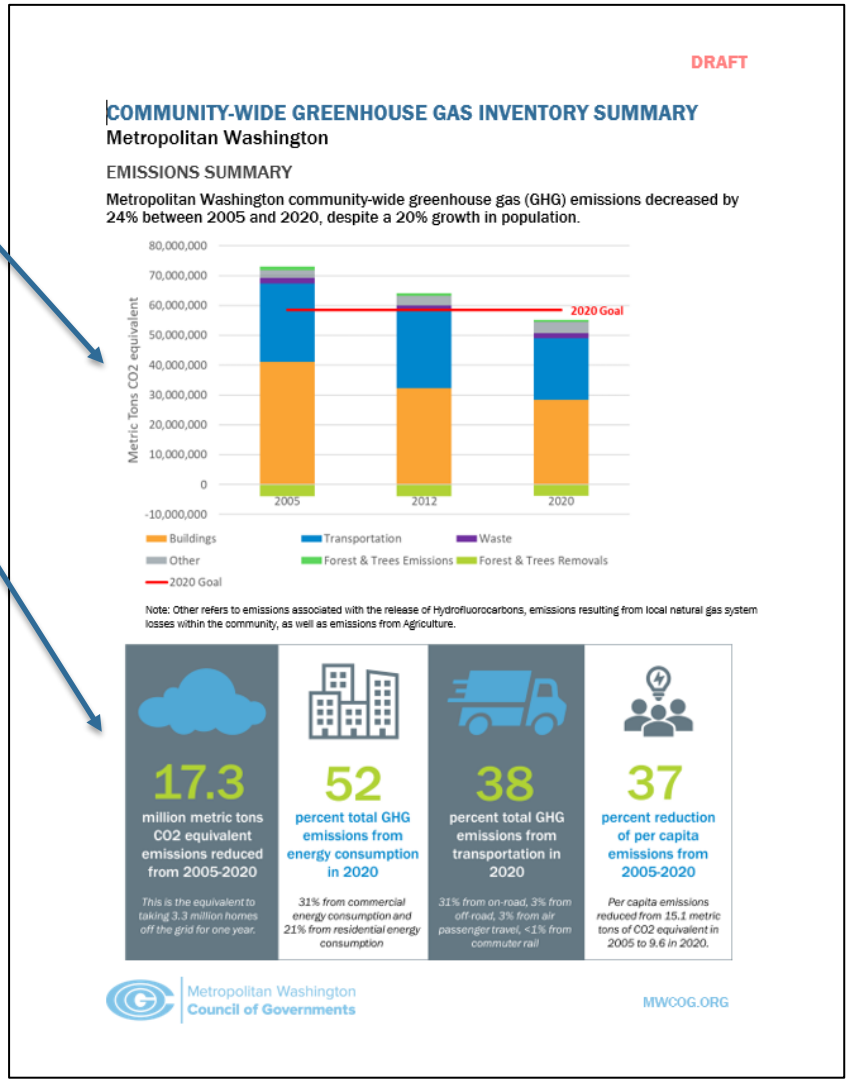
Per capita emissions reduced from 15.1 metric tons of CO2 equivalent in 2005 to 9.6 in 2020.

Gross Drivers of GHG Change, 2005-2020



DRAFT GHG Summary Fact Sheet

- Highlights forest/trees emissions and removals in the bar chart
- Emission reductions and per capita trends exclude forests and trees
- Makes a brief statement on COVID impacts. Methodology Report will link to more information.
- All local government and regional fact sheets posted to the *COG GHG Inventories webpage*.

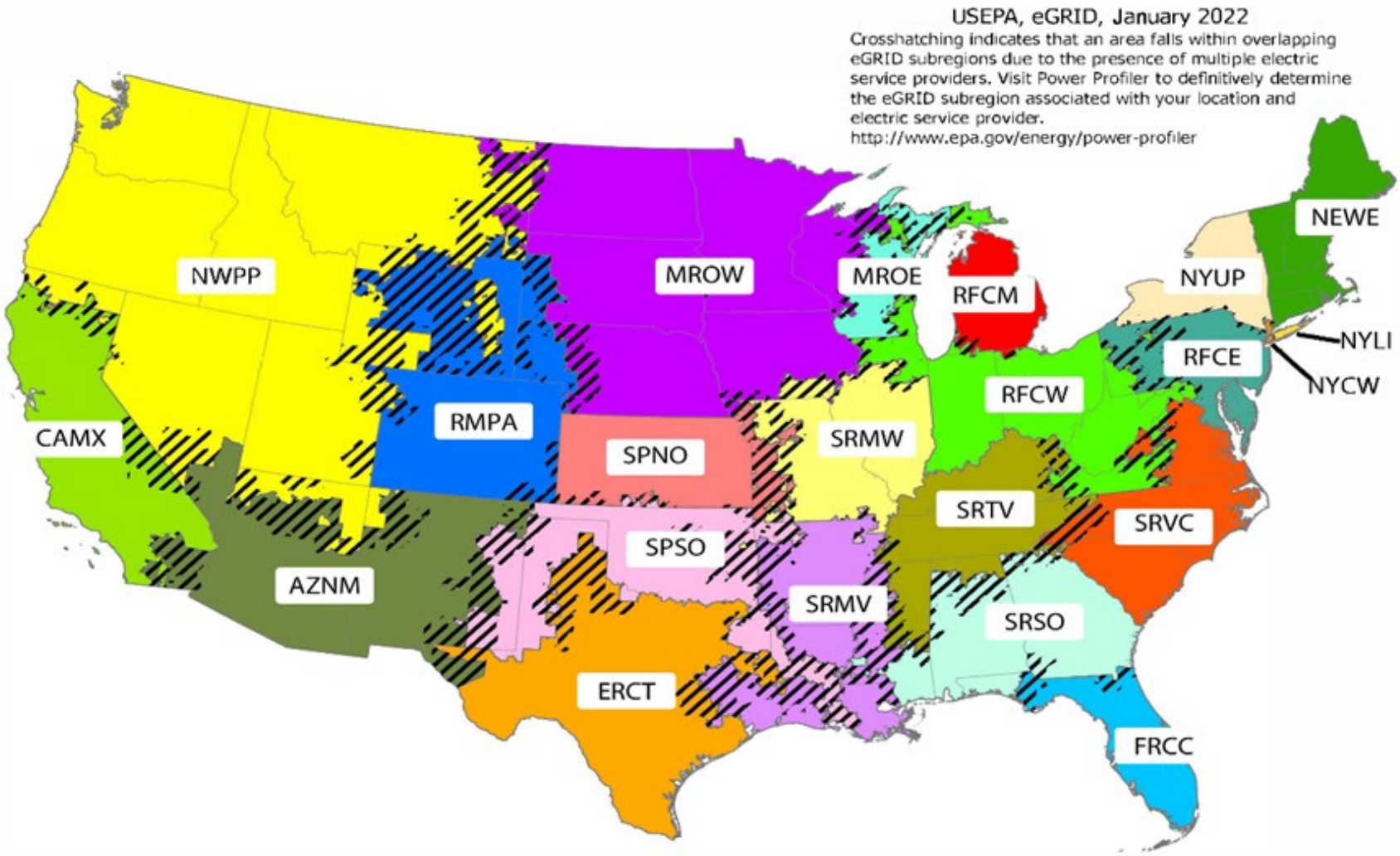


Local Gross GHG % Changes 2005-2020

Jurisdiction	2005-2020 GHG changes
District of Columbia	↓ 36%
Charles County, MD	↓ 23%
Frederick County, MD	↓ 43%
City of Frederick, MD	↓ 22%
Montgomery Co, MD	↓ 30%
Gaithersburg, MD	↓ 33%
Rockville, MD	↓ 34%
Takoma Park, MD	↓ 27%
Prince George's, MD	↓ 25%
Bladensburg, MD	↓ 27%
Bowie, MD	↓ 27%
College Park, MD	↓ 26%

Jurisdiction	2005-2020 GHG changes
Greenbelt, MD	↓ 31%
Hyattsville, MD	↓ 19%
Laurel, MD	↓ 28%
Alexandria, VA	↓ 31%
Arlington County, VA	↓ 37%
Fairfax City, VA	↓ 39%
Fairfax County, VA	↓ 30%
Falls Church, VA	↓ 22%
Loudoun County, VA	↑ 54%
Manassas, VA	↓ 22%
Manassas Park, VA	↓ 22%
Prince William Co, VA	↑ 6%

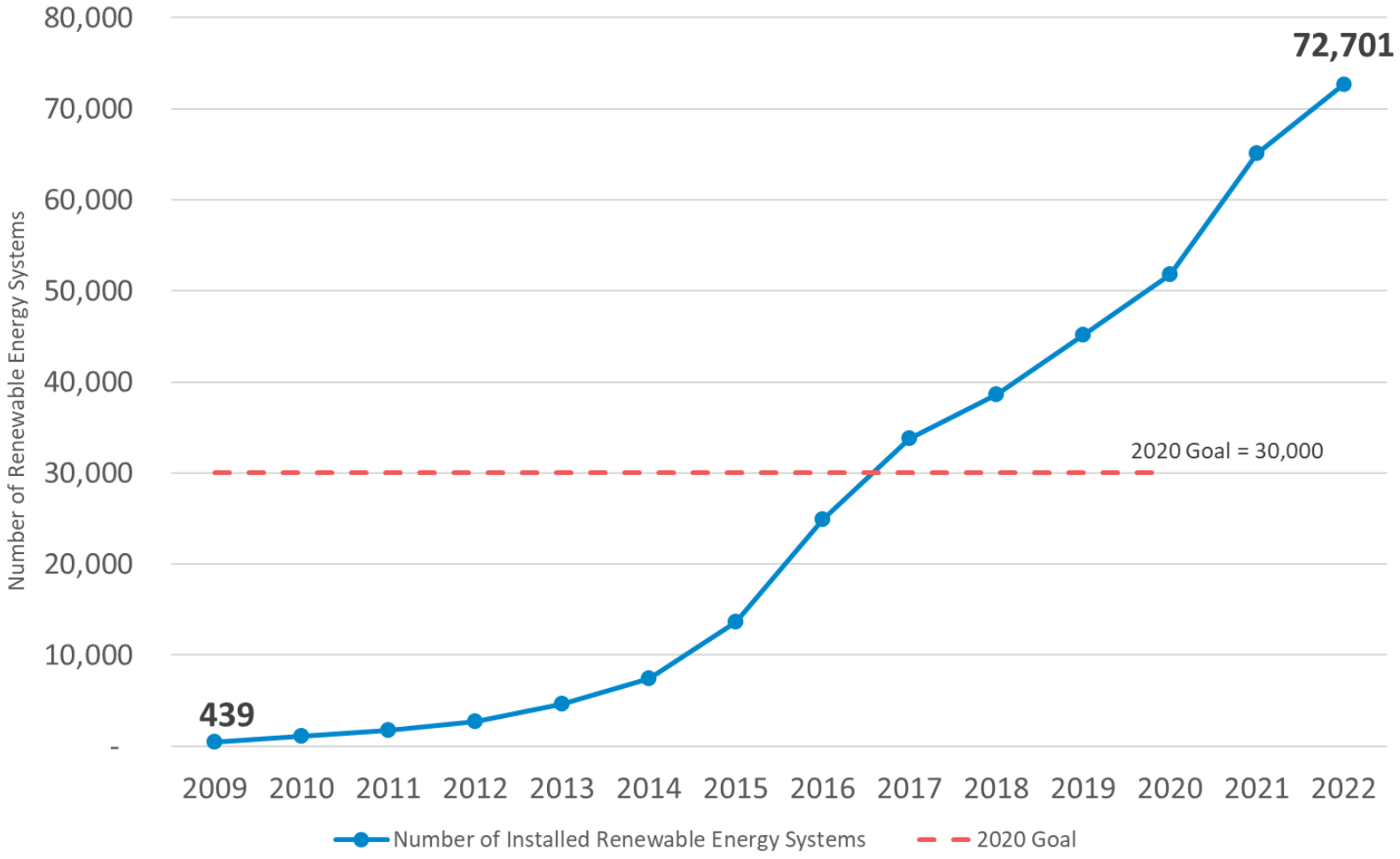
eGRID GHG Subregions



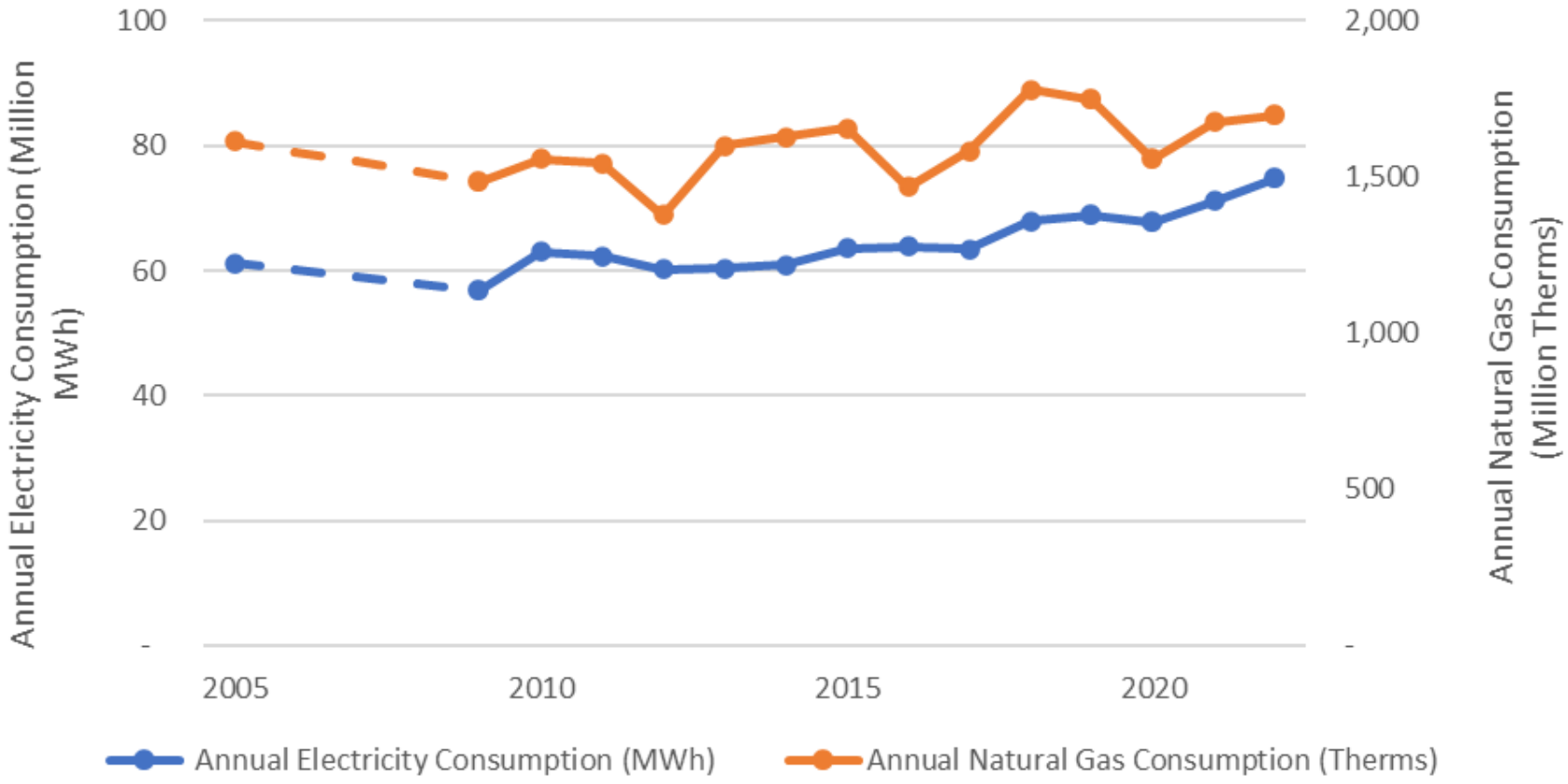
eGRID GHG Subregion Emission Rates

Year	RFCE – Serving DC/MD			SRVC – Serving VA		
	CO_2 (lbs/MWh)	CH_4 (lb/GWh)	N_2O (lb/GWh)	CO_2 (lbs/MWh)	CH_4 (lb/GWh)	N_2O (lb/GWh)
2005	1,139.1	30.3	18.7	1,134.9	23.8	19.8
2012	858.6	26.4	11.5	932.9	24	14.6
2016	758.2	50	9	805.3	67	11
2018	716.0	61	8	743.3	67	9
2020	652.5	45	6	623.1	50	7

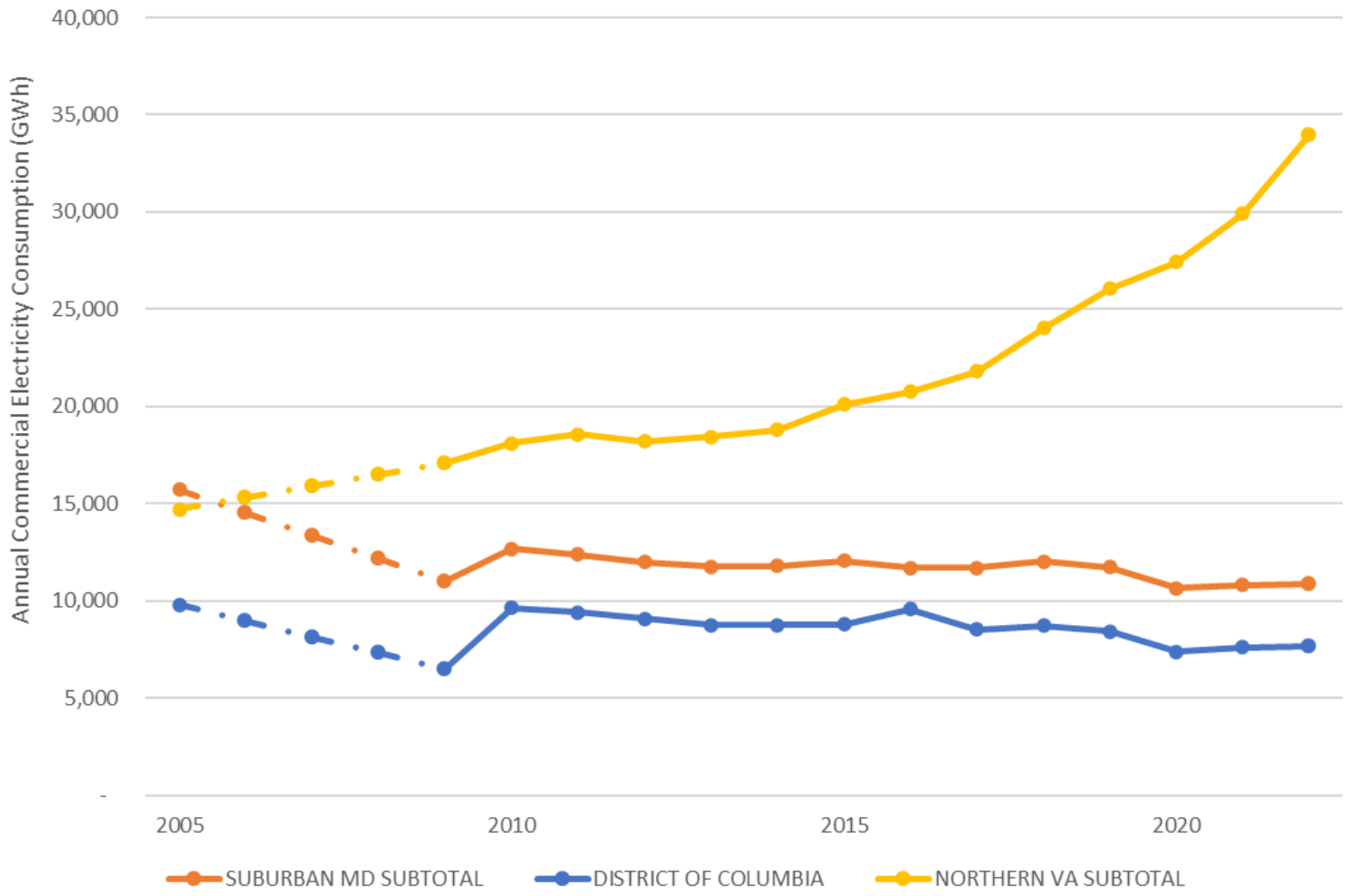
Grid-Connected Renewables Trends



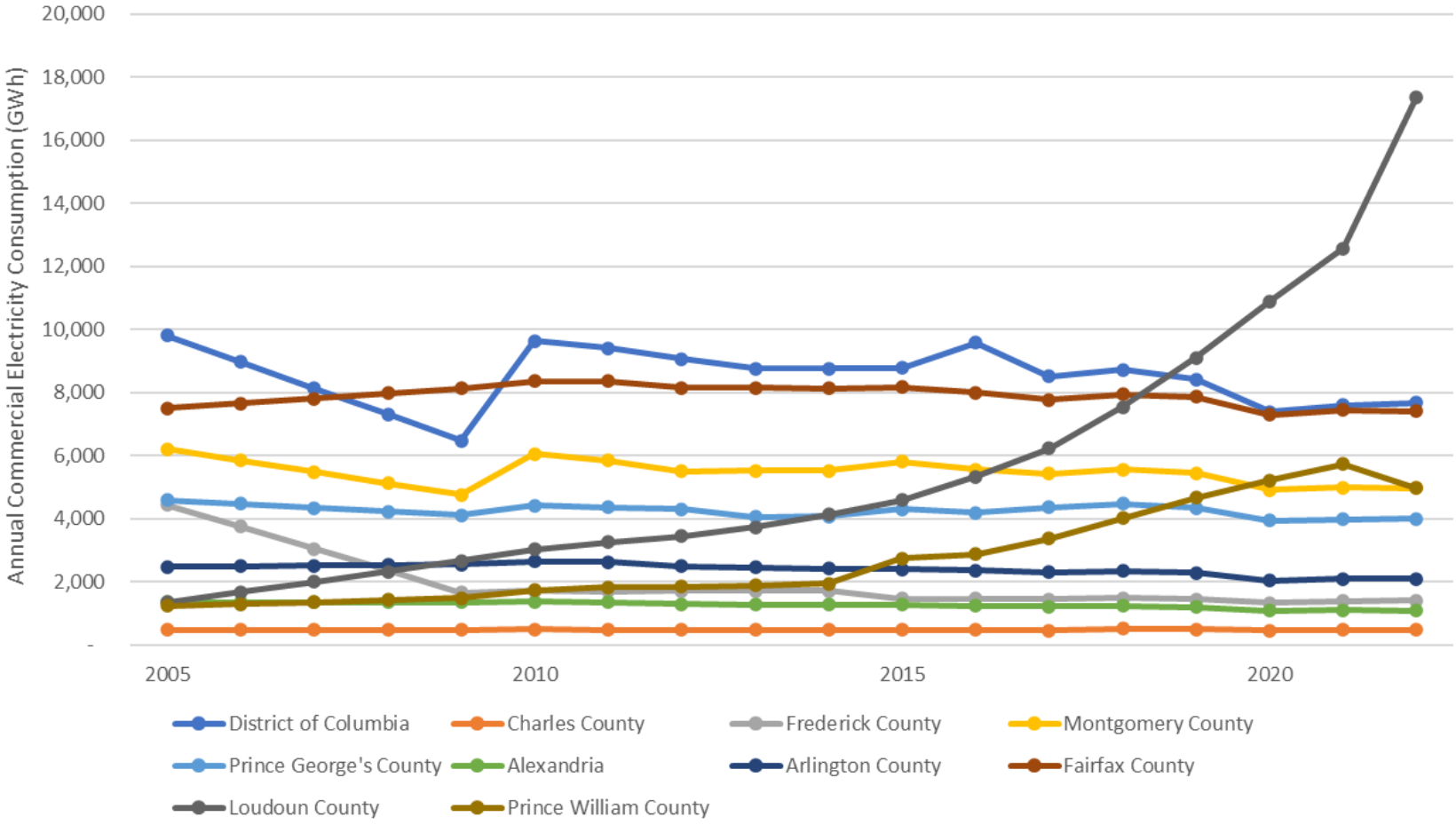
Regional Energy Consumption Trends



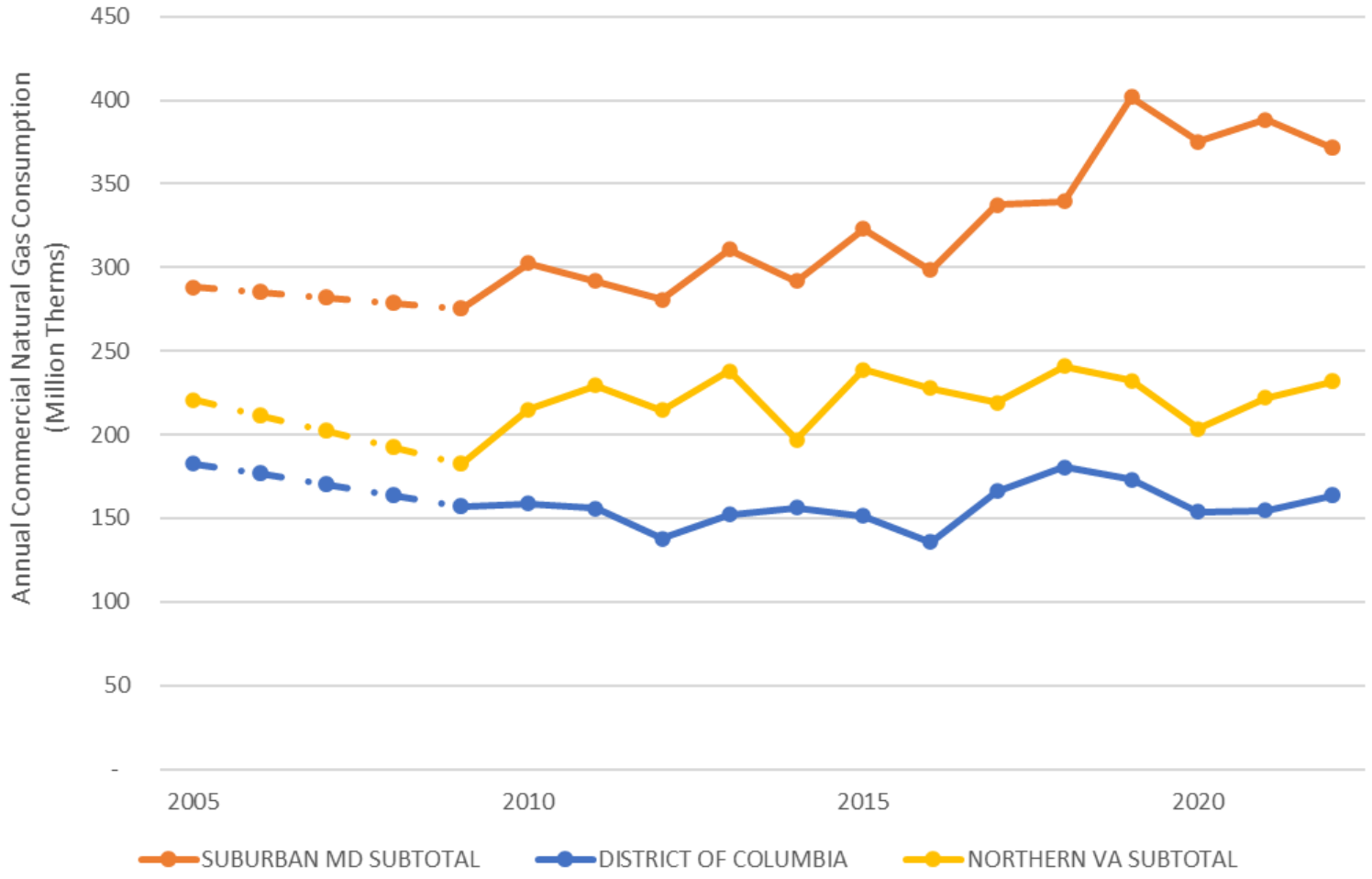
Commercial Electricity Trends



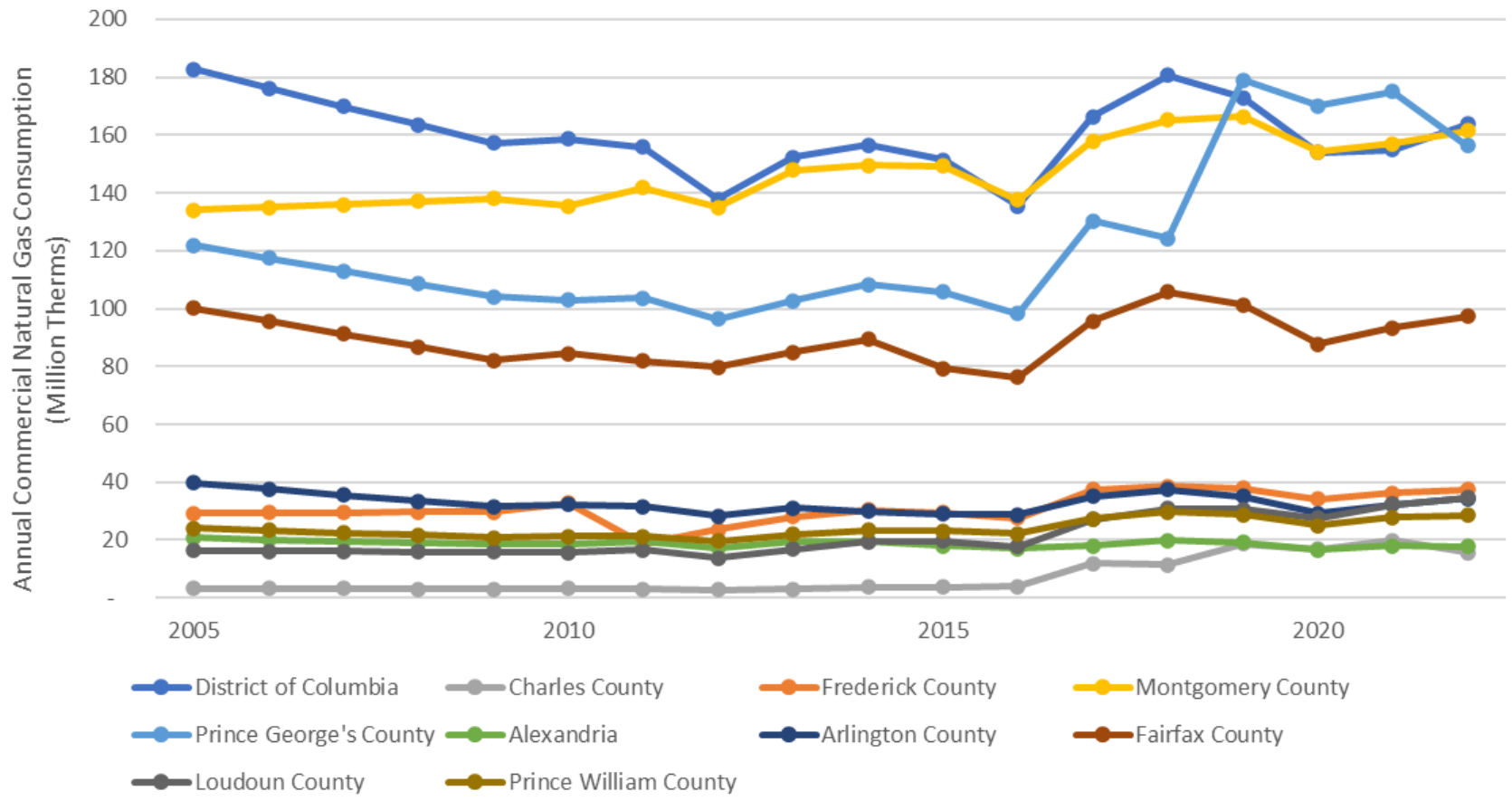
Local Commercial Electricity Trends



Commercial Natural Gas Trends



Local Commercial Natural Gas Trends



Regional Emissions Subtotals

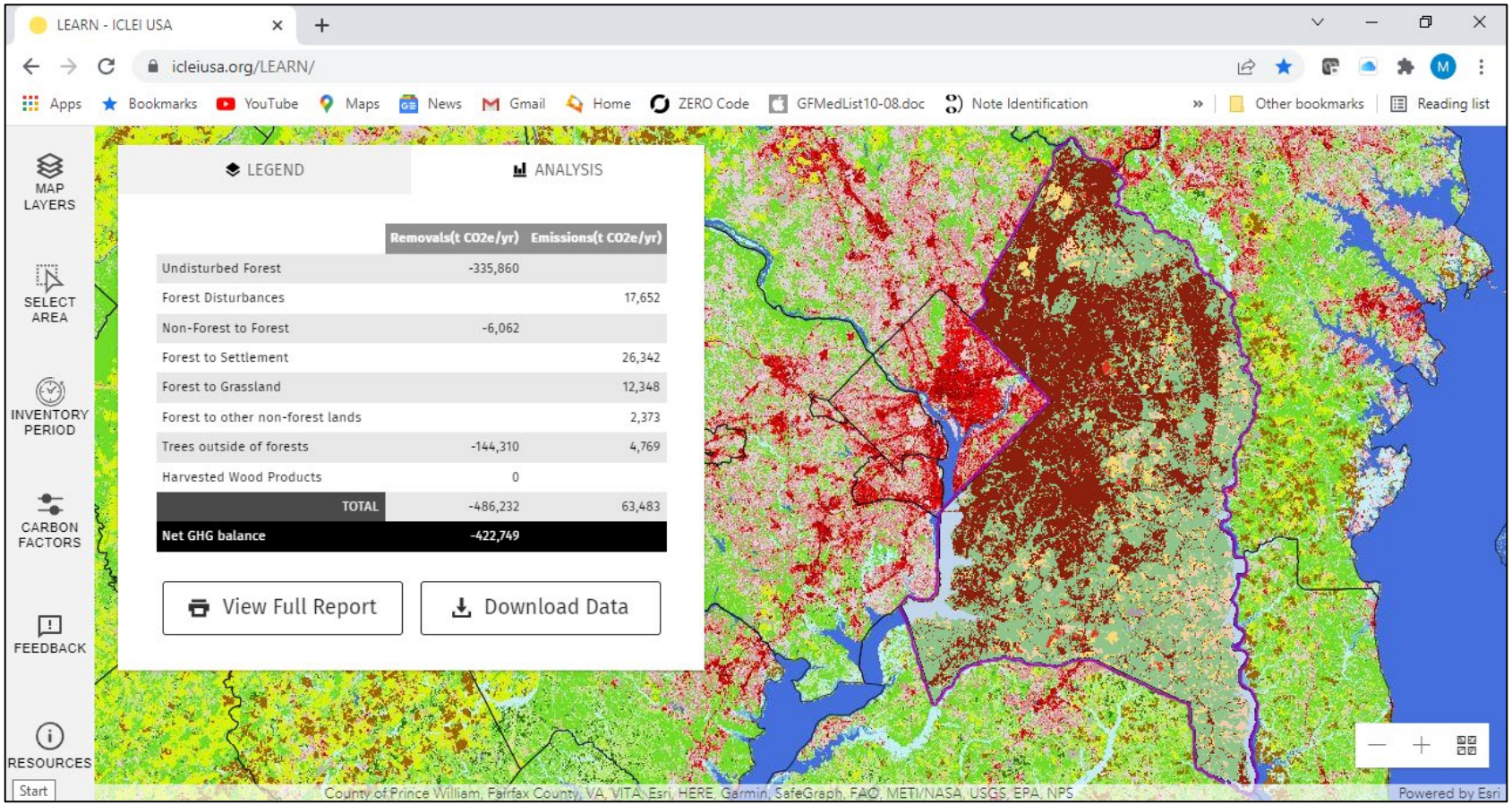
NEW! Forest and Trees

Emissions Type	Emissions ($MTCO_2e$)					
	2005	2012	2015	2018	2020	% Change, 2005-2020
BUILT ENVIRONMENT						
Residential and Commerical Energy Emissions Subtotal	41,017,644	32,295,328	31,843,126	32,462,283	28,396,391	-31%
Process and Fugitive Emissions Subtotal	2,038,406	2,666,107	3,054,730	3,170,235	3,315,690	63%
TRANSPORTATION AND MOBILE						
Transportation and Mobile Emissions Subtotal	26,341,879	25,913,695	25,484,234	24,963,629	20,511,013	-22%
WASTE						
Waste Emissions Subtotal	1,906,619	1,783,637	1,794,378	1,791,577	1,781,094	-7%
LAND USE						
Agriculture Emissions Subtotal	546,502	535,949	474,877	436,380	521,366	-5%
Forest and Trees Net Greenhouse Gas Flux	(2,675,705)	(2,949,362)	(2,949,362)	(3,109,524)	(3,109,524)	16%
GROSS GREENHOUSE GAS EMISSIONS (ALL SECTORS)	73,048,156	64,186,226	63,642,855	63,462,906	55,164,355	-24%
NET GREENHOUSE GAS EMISSIONS (ALL SECTORS)	69,175,344	60,245,355	59,701,983	59,714,581	51,416,030	-26%

Regionwide in 2020, forests and trees offset more than 3 $MMTCO_2e$ or 6% of total emissions.

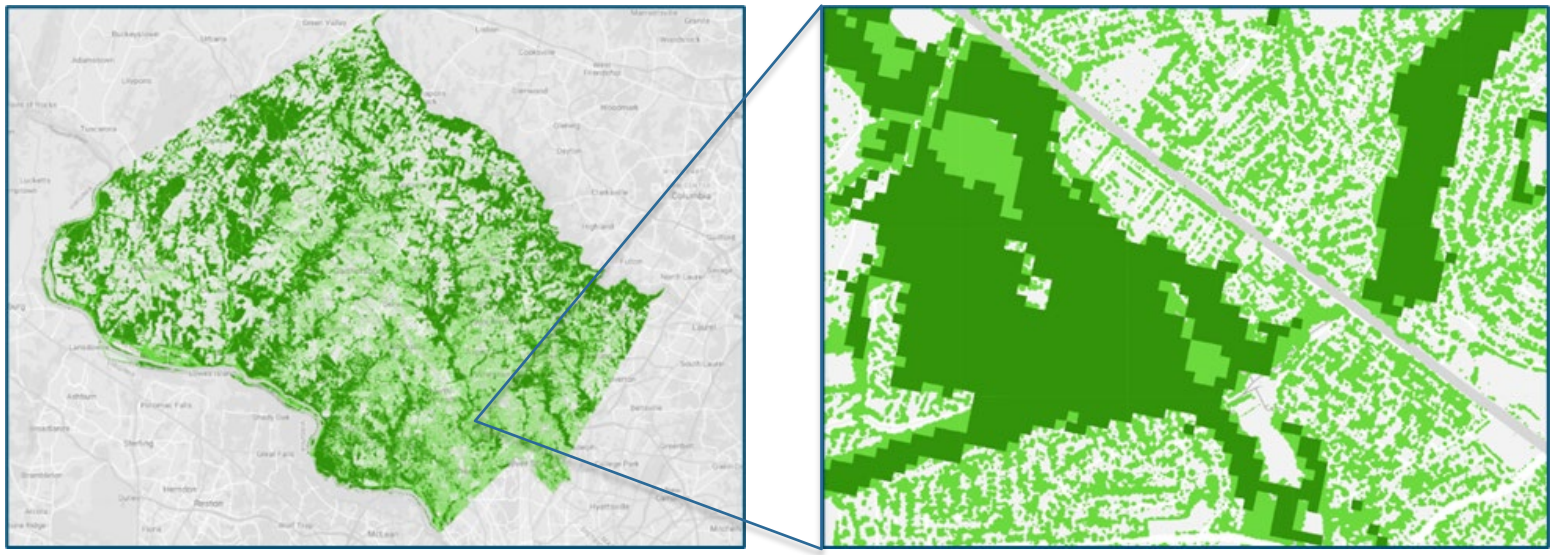
Land Use – Forests

ICLEI/WRI LEARN Tool, 30-meter resolution data for forests



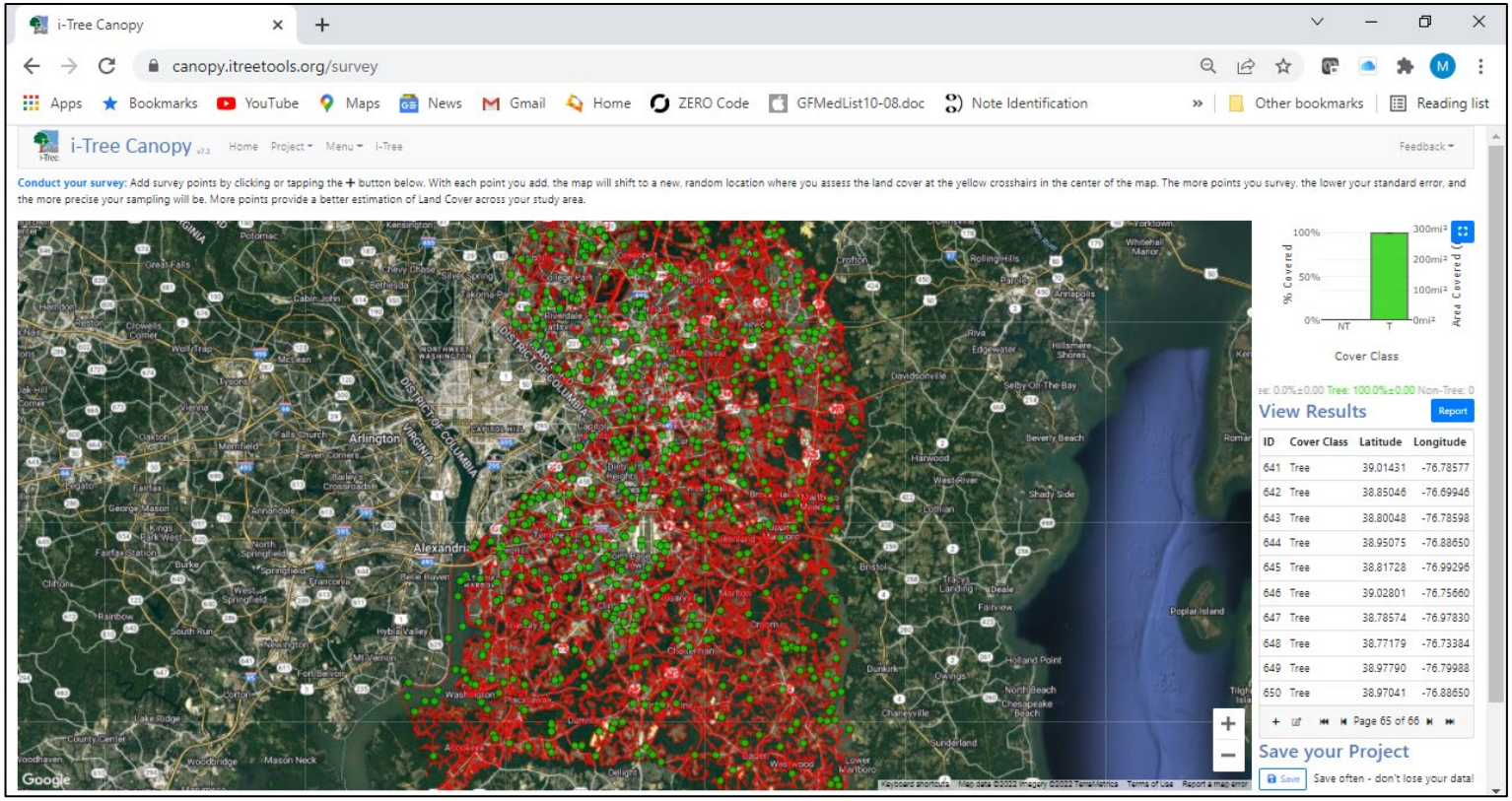
Land Use – Trees Outside of Forests

LEARN Tool integrates Chesapeake Bay High Resolution Data (1-meter, high resolution data)



Land Use – Trees Outside of Forests

Used for Trees Outside of Forests Base Years and Quality Control Checks: i-Tree Canopy and Google Earth Pro Tools

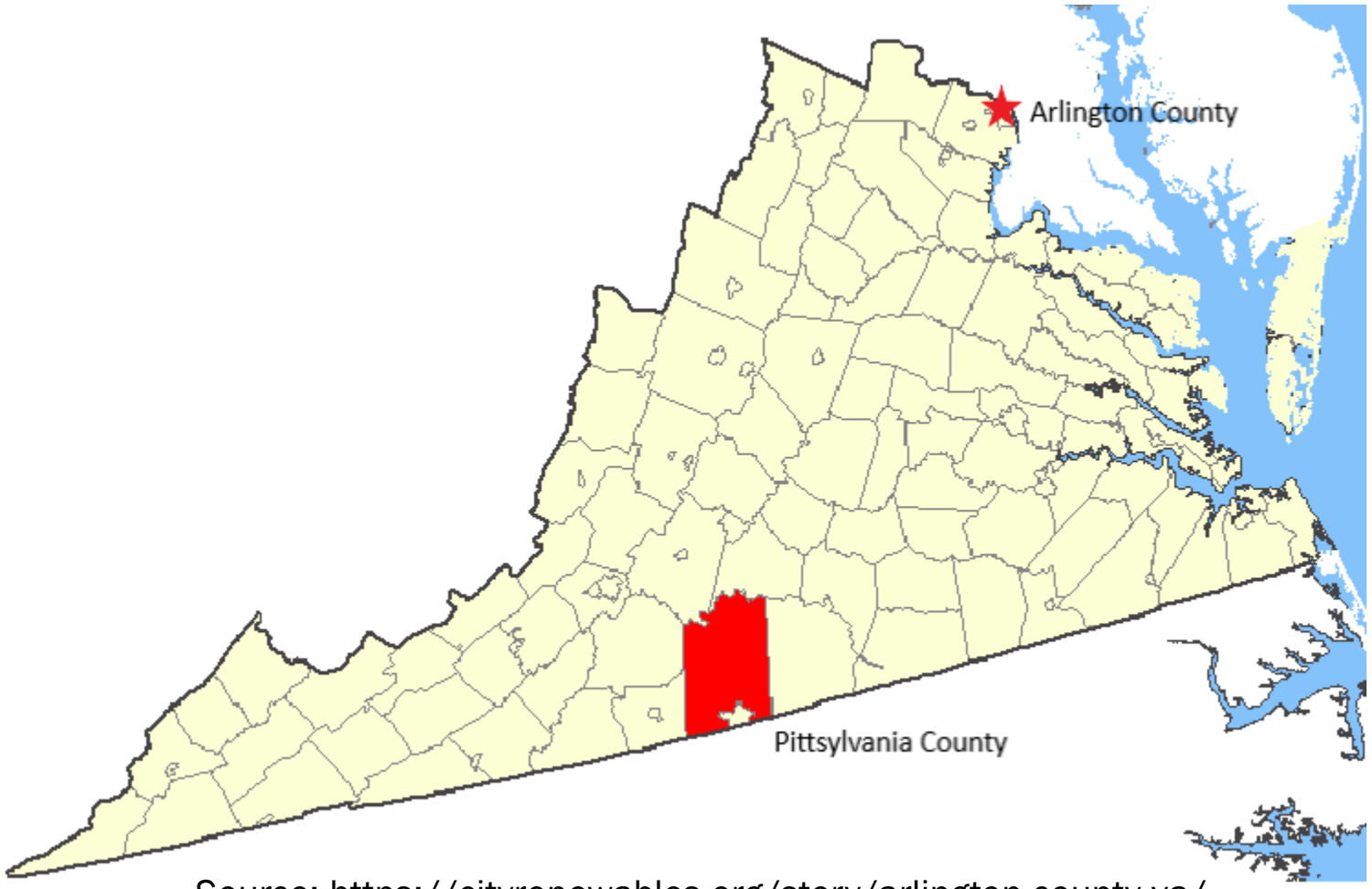


ICLEI GHG INVENTORY REC GUIDANCE

DO	PROCEED WITH CAUTION	DON'T
Build new renewable generation in your community. **Advocate** for more renewable generation in your state and grid region.	Use a PPA or virtual PPA to purchase bundled RECs and electricity. Participate in a utility green power or green tariff program, *if* the program builds new renewable generation in or near the utility service area.	Purchase unbundled RECs.
Benefits will be captured in GHG inventory; no additional accounting needed.	RECs can be counted for local GHG inventory, but total gross emissions with RECs excluded must also be reported	Do not count for local GHG inventory.

REC = Renewable Energy Credit

Amazon Arlington Solar Farm Virginia



Source: https://cityrenewables.org/story/arlington-county-va/

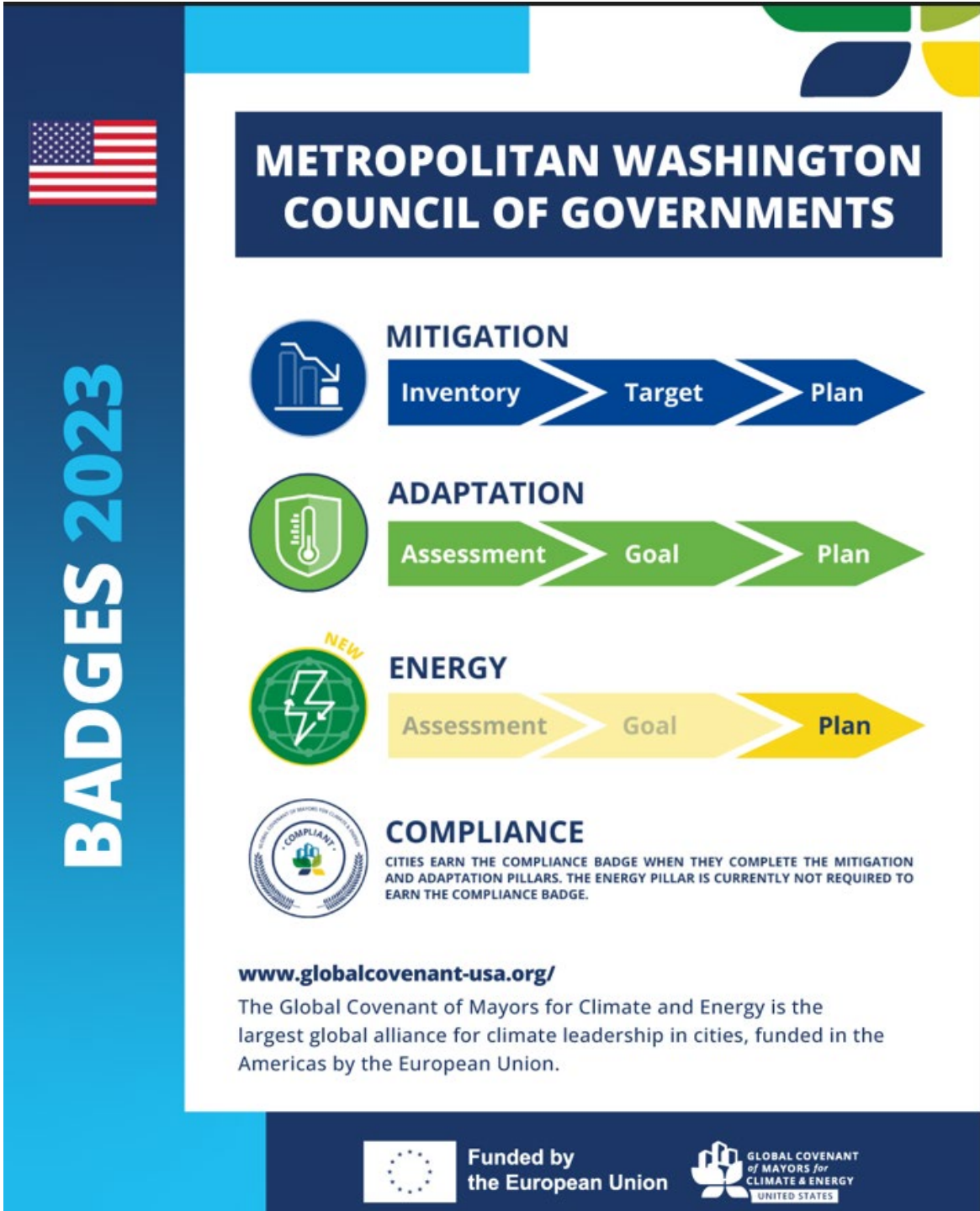
2023 GHG Inventory Timeline

Tasks	Fall 2024	Winter 2024	Spring 2025	Summer 2025	Fall 2025	Winter 2025
Utility Energy Data						
Non-Utility Fuel						
Fugitive						
On-Road						
Off-Road						
Air Passenger Travel						
Commuter Rail						
Waste						
Agriculture						
Forestry						
Draft Deliverables						
Comment Period & 1-on-1s						
Contribution Analyses						
Final Deliverables						

Global Covenant of Mayors for Climate and Energy

COG Badges

Metropolitan Washington
Council of Governments



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2020, COVID-19 and GHGs

- **Buildings**: Emissions were lower than projected for 2020, in part due to the pandemic; however, the grid getting cleaner and weather impacts also played a role.
- **Transportation**: Emissions were lower than previously projected for 2020 because less people were on the roads and flying during the height of the pandemic.
- **Waste**: Solid waste emissions were overall lower than projected for 2020. Waste that would have been generated and collected from businesses were generated within individual residences during the height of the pandemic.