

Greenhouse Gas Emissions Inventory for Metro Government & Nashville Community



Global Covenant of Mayors

Mayor Cooper signed Global Covenant of Mayors, December 2019

- An agreement by city networks and their members to reduce city-level emissions to reduce vulnerability and to enhance resilience to climate change, consistent and complimentary to national level efforts
- Compliance with the GCoM requires reporting through ICLEI & the Carbon Disclosure Project's (CDP) unified reporting system.
- “Local governments **shall** compile GHG emissions inventories on a regular basis (at least every two years), to enable monitoring of the impact of climate actions, also to support continuous improvement in data quality and accuracy of the inventories.



GLOBAL COVENANT
of MAYORS for
CLIMATE & ENERGY



Global Covenant Compliance: as of 2019

Mitigation Badge

Awarded as soon as one of the steps (i.e. Inventory, Target, or Plan) is accomplished



Inventory



GHG baseline emissions inventory submitted and validated (including all mandatory criteria)

Target



GHG emissions reduction/low emissions development target set and validated

Plan



Separate or integrated climate action plan for climate change mitigation submitted and validated

Adaptation Badge

Awarded as soon as one of the steps (i.e. Assessment, Goal, or Plan) is accomplished



Assessment



Climate risk & vulnerability assessment (RVA) submitted and validated

Goal



Goal(s) for climate change adaptation goal(s) submitted and validated

Plan



Separate or integrated climate action plan for climate change adaptation submitted and validated

Compliance Badge



The 'Compliance' badge is awarded to cities that have accomplished all steps under all three pillars: mitigation, adaptation, and access to energy*. They will keep the badge as long as they keep submitting progress monitoring reports within the required timeframe, validated for meeting GCoM requirements.

*Please note: GCoM has not yet formalized the energy access pillar. Until its requirements have been adopted, full badge compliance is already achieved once all requirements under the mitigation and the adaptation pillars have been fulfilled.



History of Nashville's GHG Inventories

2005

Mayor's Climate Protection Agreement

2011

Mayor's Climate Protection Agreement

2014

Compact of Mayors

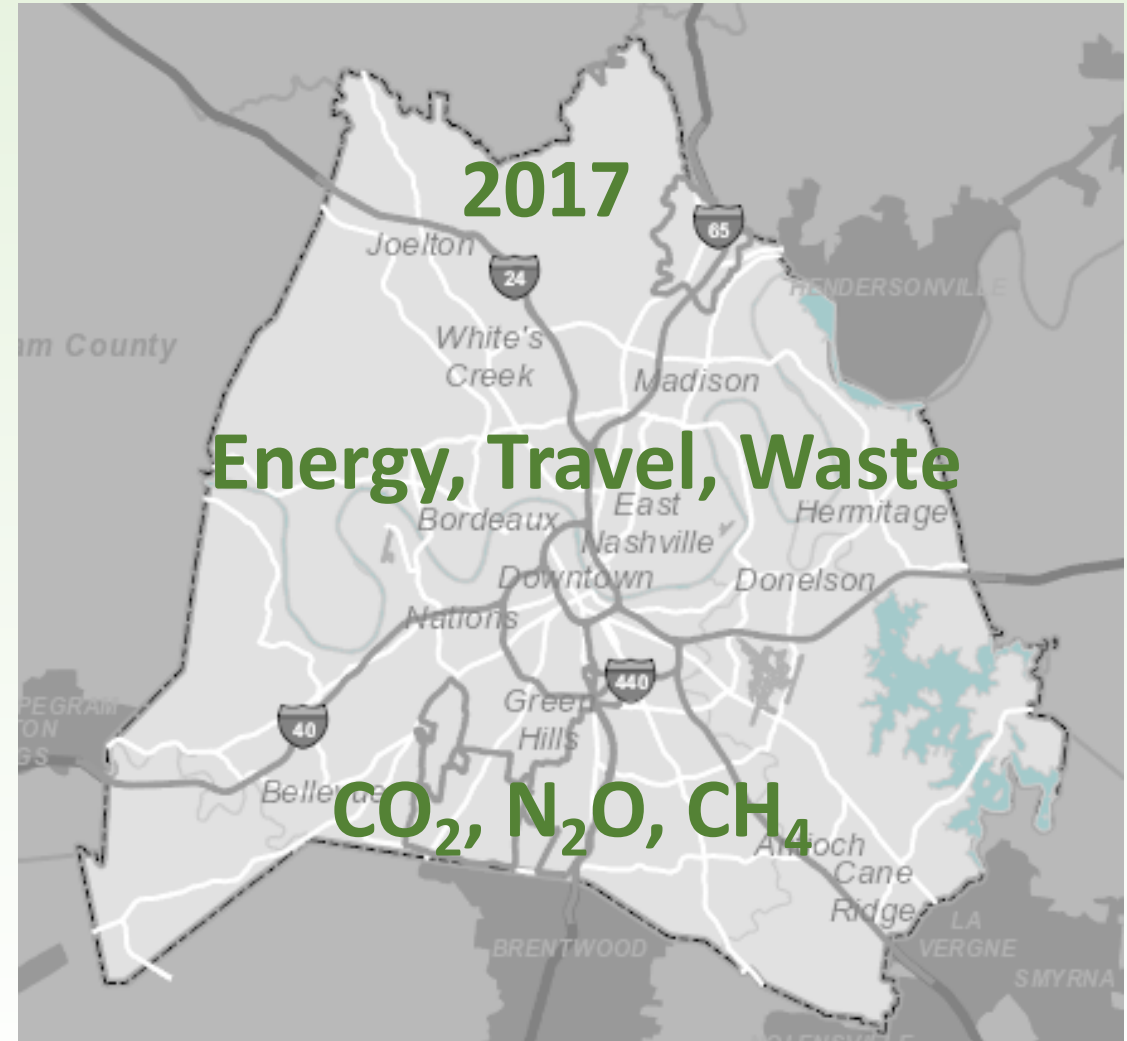
2017

Global Covenant of Mayors



Overview of Nashville's GHG Inventory

- Community Inventory & Metro Operations
- Inventory Year: 2017
- Geographic Boundary: Metro Nashville/Davidson County
- Data Boundary: Stationary Energy Use, In-boundary Travel, Waste
- Gases Included: CO₂, N₂O, CH₄ from waste and NG pipeline leakage
- HFCs, PFCs, SF₆ and NF₃ not included – data not required per GCoM, not easily available



Reporting Method: ICLEI's ClearPath Software

Common Reporting Framework: GCoM
standard for
community level
GHG reporting
Sources / Sectors

ICLEI ClearPath:
Database for
Members' data
management

Sectors and sub-sectors	Included?		Note	IPCC ref. no.
	Direct emissions	Indirect emissions		
<i>Stationary energy</i>				
Residential buildings	Required	Required	This covers emissions from fuel combustion and use of grid-supplied energy by buildings, equipment and facilities within city boundary (including transportation and waste facilities), as well as fugitive emissions from production, transformation and distribution of fuels. Emissions from sources covered by a regional or national emissions trading system should be identified and described. See section 3.6.1 for detailed guidance and requirements.	1A4b
Commercial building and facilities	Required	Required		1A4a
Institutional buildings and facilities	Required	Required		1A4a
Industrial buildings and facilities	Required	Required		1A1, 1A2
Agriculture	Required	Required		1A4c
Fugitive emissions	Required			1B1, 1B2
<i>Transportation</i>				
On-road	Required	Required	This covers emissions from fuel combustion and use of grid-supplied energy for all modes of transportation activities within city boundary (for waterborne and aviation, cities only need to report journeys fully confined within the city boundary). On-road and rail travel should additionally be disaggregated by municipal fleet, public transport, private and commercial transport. See section 3.6.2 for detailed guidance and requirements.	1A3b
Rail	Required	Required		1A3c
Waterborne navigation	Required	Required		1A3d
Aviation	Required	Required		1A3a
Off-road	Required	Required		1A3e
<i>Waste</i>				
Solid waste disposal	Required		This covers non-energy related emissions from disposal and treatment of waste (incl. wastewater) generated within the city boundary, as a result of aerobic or anaerobic decomposition of waste, or incineration. Emissions from waste-to-energy, where waste/wastewater material is used directly as fuel or converted into a fuel, should captured under the Stationary Energy sector. See section 3.6.3 for detailed guidance and requirements.	4A
Biological treatment	Required			4B
Incineration and open burning	Required			4C
Wastewater treatment and discharge	Required			4D



CO2e Emissions Comparisons of 2005, 2011, 2014 & 2017 Community GHG Inventories

Community Inventories

Sectors	2005	2011	2014	2017
<i>Transportation & Mobile Sources</i>	4,673,831	4,489,677	5,015,806	5,610,743
<i>Solid Waste</i>	722,897	342,791	530,723	406,068
<i>Commercial Energy</i>	3,969,299	3,723,787	3,003,329	2,407,955
<i>Industrial Energy</i>	1,599,172	1,365,688	992,843	934,431
<i>Residential Energy</i>	3,425,508	3,323,045	2,604,297	1,919,763
<i>Process & Fugitive Emissions</i>	-	-	105,427	151,791
Total CO2e Emissions (metric tons)	14,390,707	13,244,988	12,252,425	11,430,751
<i>Community emissions per person</i>	26.17	20.84	18.33	16.54

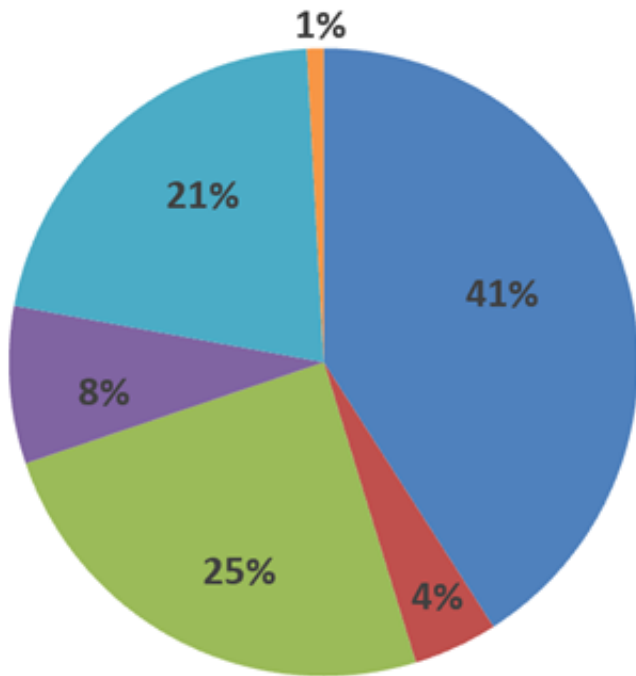
CO2e Emissions Comparisons of 2005, 2011, 2014 & 2017 Municipal GHG Inventories

Municipal Inventories

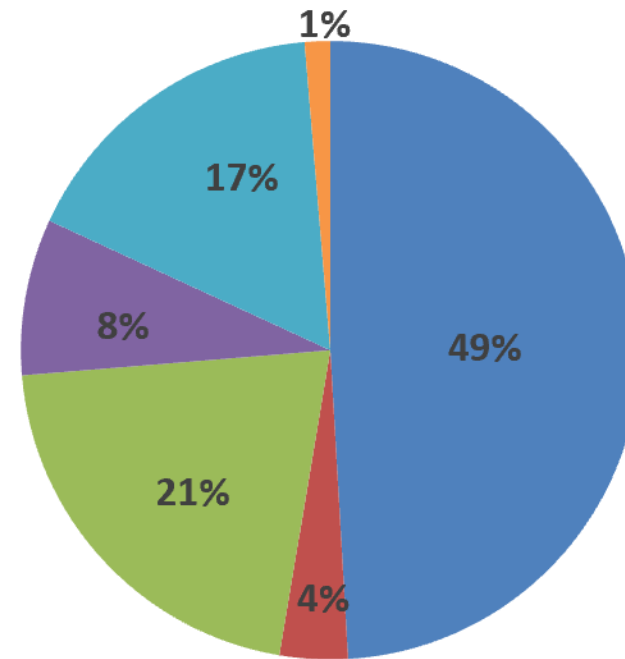
Sectors	2005	2011	2014	2017
<i>Buildings & Facilities</i>	282,436	253,846	334,030	259,455
<i>Street Lights & Traffic Signals</i>	3,306	80,332	28,313	21,723
<i>Vehicle Fleet</i>	75,805	51,382	41,088	34,835
<i>Transit Fleet</i>	-	-	34,096	34,060
<i>Employee Commute</i>	99,227	54,663	20,731	57,432
<i>Solid Waste Facilities</i>	100,507	90,859	81,224	48,590
<i>Water & Wastewater Treatment Facilities</i>	139,403	143,072	114,819	95,723
<i>Process & Fugitive Emissions</i>	48	1,422	5,979	8,299
Total CO2e Emissions (metric tons)	700,732	675,576	660,280	560,117

Community Inventory: 2014 vs 2017 Comparison

Nashville 2014 Emissions



Nashville 2017 Emissions



■ Transportation ■ Solid Waste ■ Commercial ■ Industrial ■ Residential ■ Fugitive Emissions

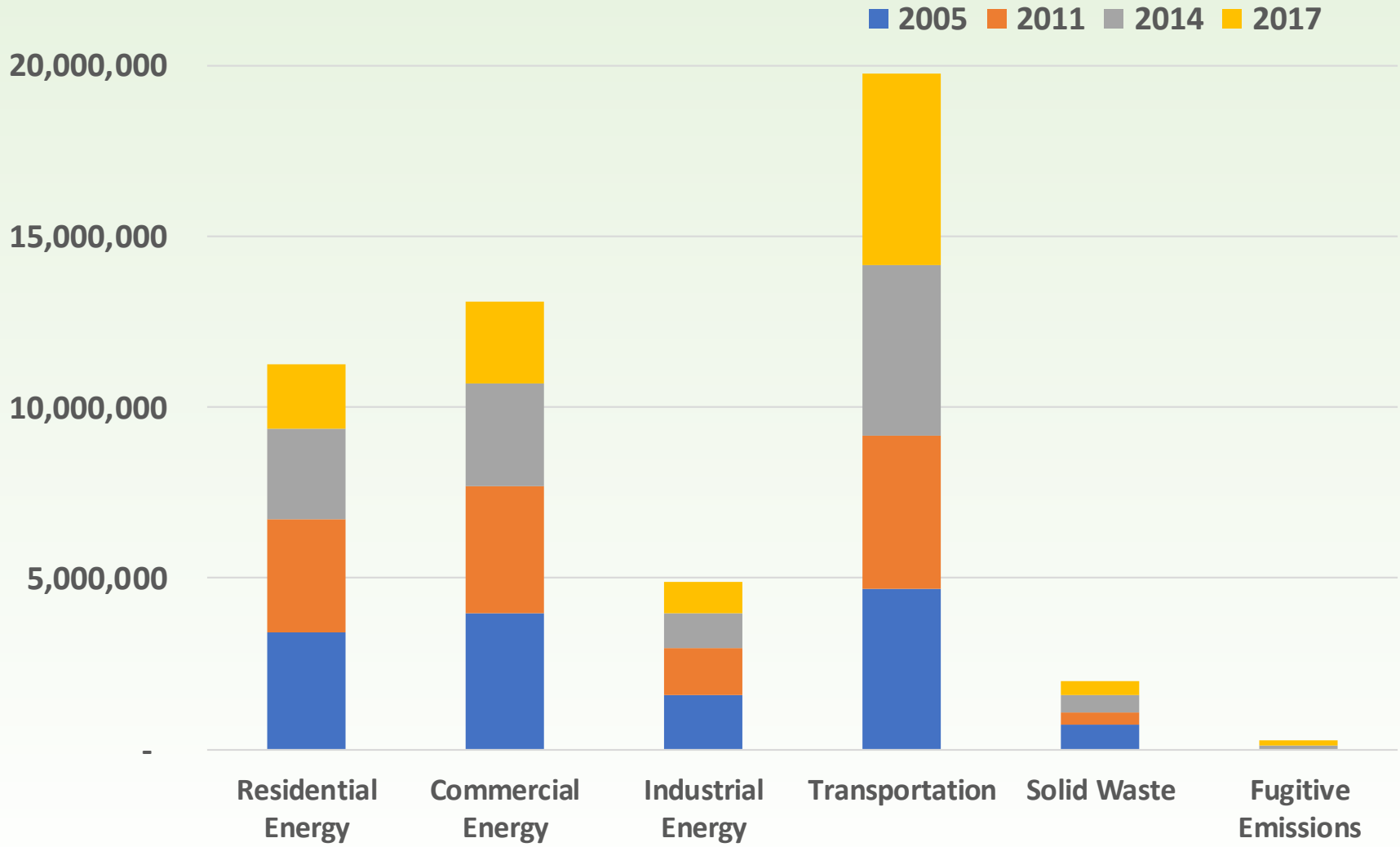


Community Inventory: Total Emissions by Sector

Sectors	2014	2017	Difference
Transportation	5,015,806	5,610,743	11.9%
Solid Waste	530,723	406,068	-23.5%
Commercial	3,003,329	2,407,955	-19.8%
Industrial	992,843	934,431	-5.9%
Residential	2,604,297	1,919,763	-26.3%
Fugitive Emissions	105,427	151,791	44.0%
Total CO2e Emissions (metric tons)	12,252,425	11,430,751	-6.7%
Community emissions per person	18.33	16.54	-9.8%



Community Inventory Self Comparison



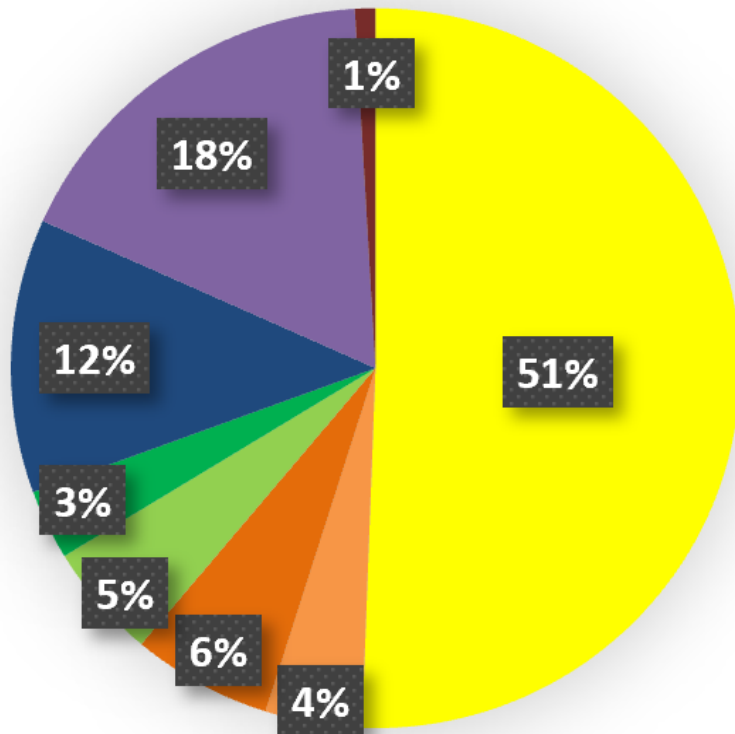
Community Inventory Data Sources

- Health Department: stationary fuel combustion, rail, waterborne
- NES
- Piedmont Natural Gas
- GNRC: transportation emissions, Music City Star
- Metro Nashville Airport Authority: BNA, John C. Tune flights
- Metro Public Works: annual solid waste, Bordeaux landfill
- TVA: electricity emissions factor

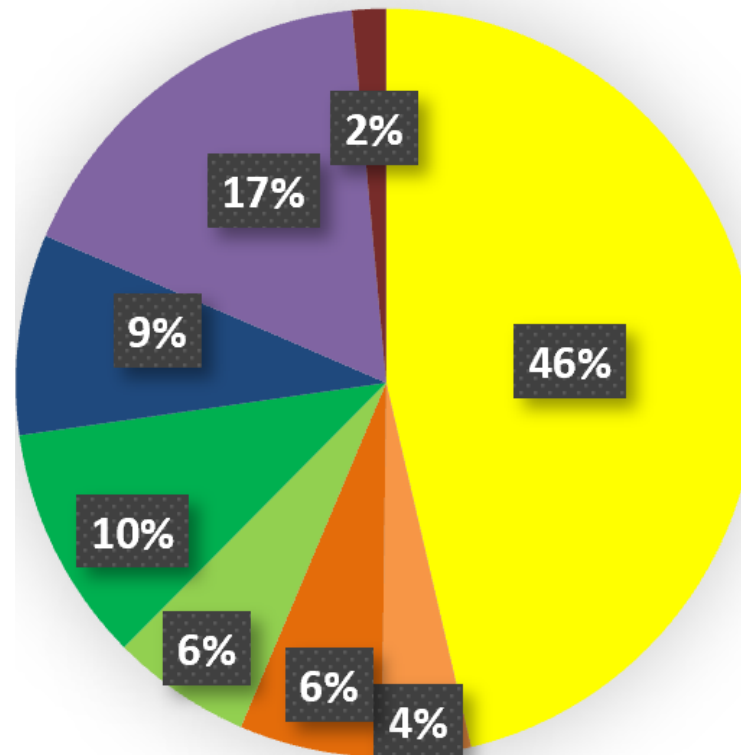


Metro Government Operations Comparison

2014 Municipal GHG



2017 Municipal GHG Inventory



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

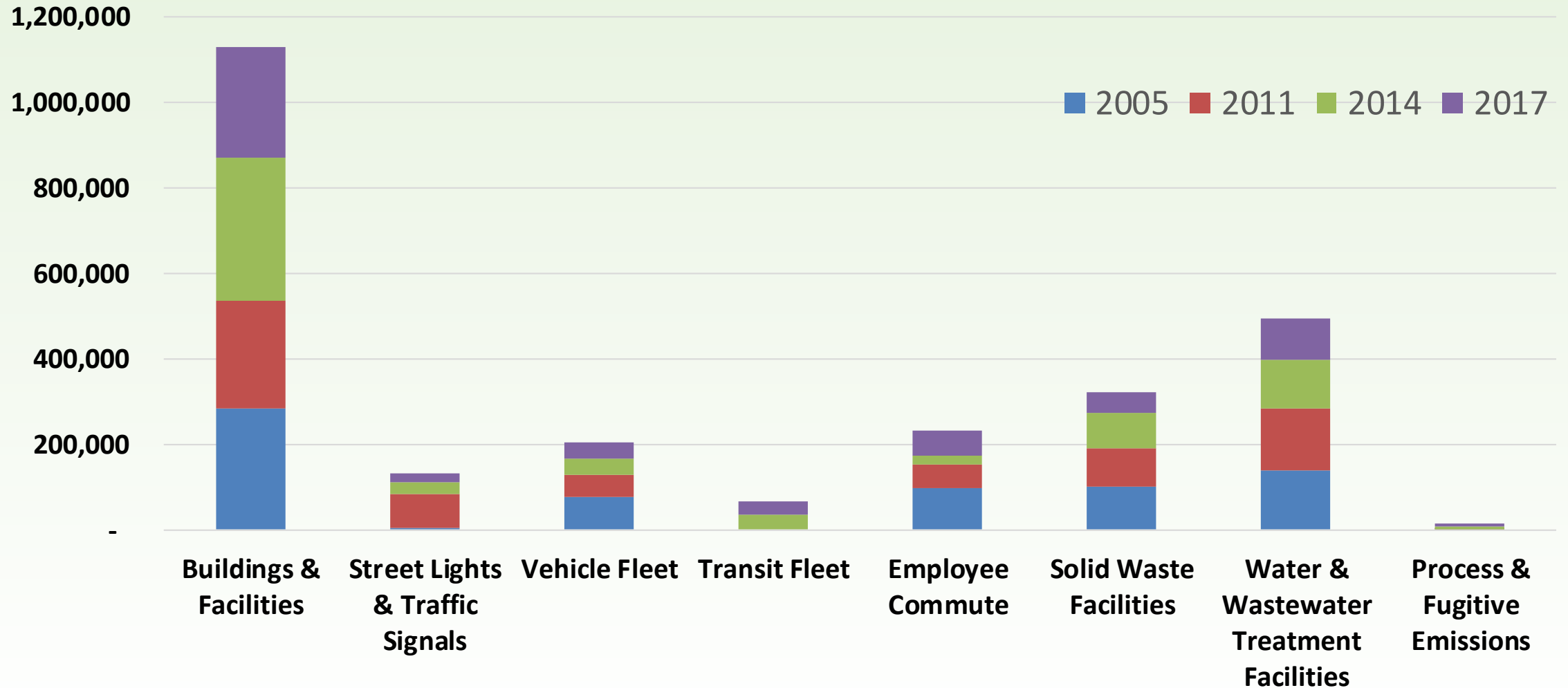


Municipal Inventory: Total Emissions by Sector

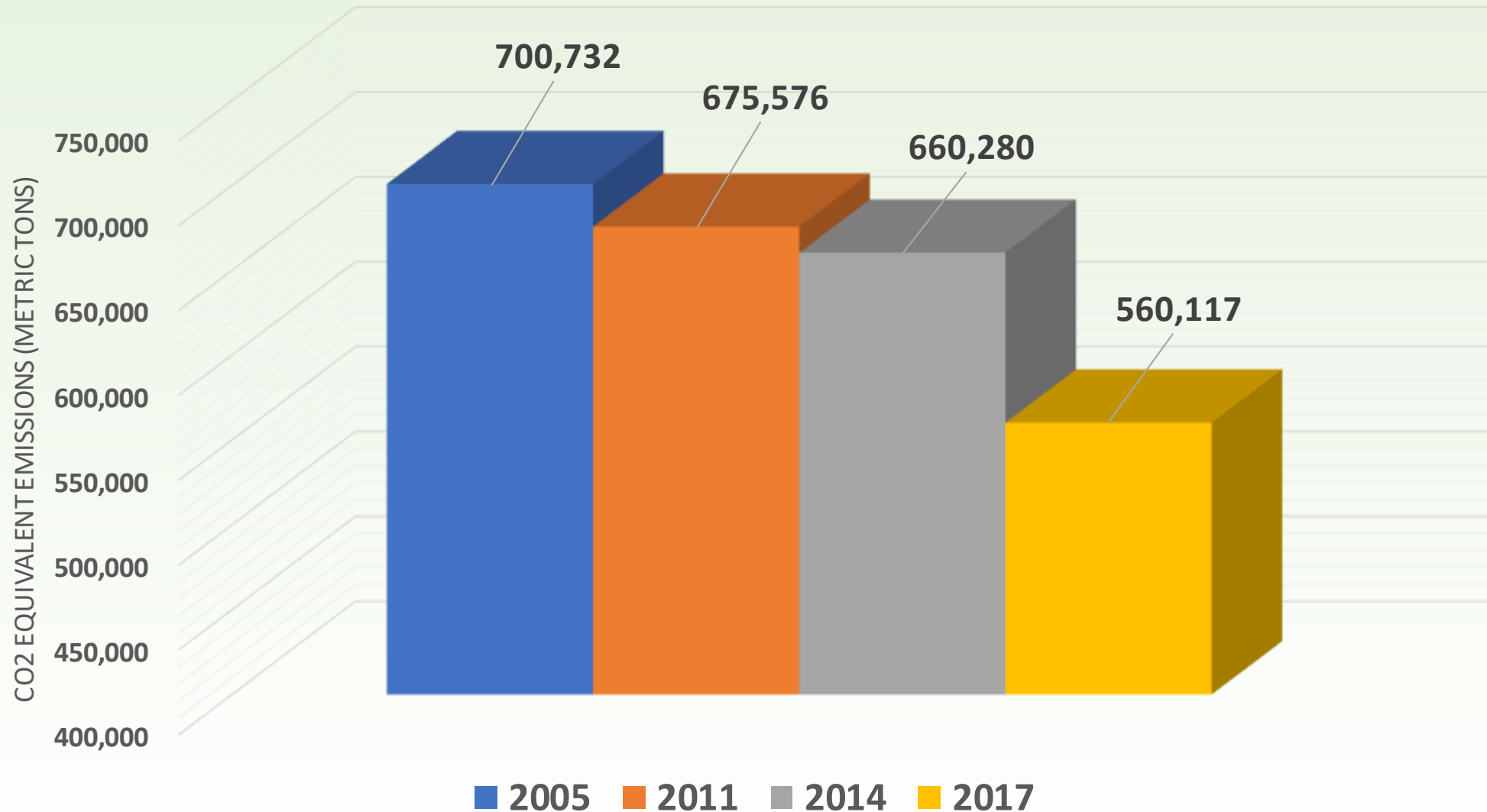
<u>Sectors</u>	<u>2014</u>	<u>2017</u>	<u>% Difference</u>
Buildings & Facilities	334,030	259,455	-22.3%
Street Lights & Traffic Signals	28,313	21,723	-23.3%
Vehicle Fleet	41,088	34,835	-15.2%
Transit Fleet	34,096	34,060	-0.1%
Employee Commute	20,731	57,432	177.0%
Solid Waste Facilities	81,224	48,590	-40.2%
Water & Wastewater Treatment Facilities	114,819	95,723	-16.6%
Process & Fugitive Emissions	5,979	8,299	38.8%



Municipal Inventory: Self Comparison by Sector



Municipal Inventory: Total Emissions By Year



Municipal Inventory: Emissions Source Data

Buildings & Facilities:

Nashville Electric Service
Piedmont/ Duke Natural Gas
District Energy System

Water & Wastewater Treatment: Metro Water Services

Waste: Metro Public Works

Transportation: Employee Commuter Survey

Vehicle Fleet:

Metro General Services
All Metro Agencies

Transit Fleet: WeGo

Process & Fugitive Emissions:

US DOT Pipeline and Hazardous
Materials Safety Administration

Streetlights & Traffic Signals:

Nashville Electric Service





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