Update on GWSA Implementation

SIPRAC
January 14, 2010

Adaptation Efforts

Implementing GWSA (Adaptation Efforts)

GSC Adaptation Subcommittee

- Formed as required by Public Act No. 08-98 An Act Concerning Connecticut Global Warming Solutions (GWSA)
- Four independent work groups tasked to determine how climate change will impact the state:
  - Agriculture workgroup
  - Natural Resources workgroup
  - Infrastructure workgroup
  - Public Health workgroup

Sources of Information

- New York City Panel on Climate
  - The NPCC models are based on sound science with methods developed by the Intergovernmental Panel on Climate Change (IPCC);
  - 100 mile radius of NYC
- Northeast Climate Impacts Assessment
  - Regional research projected for Connecticut
- Iterative process

Climate Change Projections (cont.)

- Mean annual change to baseline climate
  - Air Temperature
  - Precipitation
  - Sea Level Rise
- Extreme Events
  - Heat waves and cold events
  - Intense precipitation and droughts
  - Coastal Floods and storms

The NPCC developed NYC-specific climate change projections

TABLE 1.

Baseline Climate and Mean Annual Changes[1]

Source: Columbia Center for Climate Systems Research

	Baseline 1971-2000	2020s	2050s	2080s
Air temperature Central range[2]	55°F	+ 1.5 to 3°F	+ 3 to 5°F	+ 4 to 7.5°F
Precipitation Central range[2]	46.5 in	+ 0 to 5 %	+ 0 to 10 %	+ 5 to 10 %
Sea level rise[3] Central range[2]	NA	+ 2 to 5 in	+ 7 to 12 in	+ 12 to 23 in
Rapid Ice-Melt Sea Level Rise[4]	NA	~ 5 to 10 in	~ 19 to 29 in	~ 41 to 55 in

1 Based on 16 GCMs (7 GCMs for Sea Level Rise) and 3 emissions scenarios. Baseline is 1971-2000 for temperature and precipitation and 2000-2004 for sea level rise. Data from National Weather Service (NWS) and National Oceanic and Atmospheric Administration (NOAA). Temperature data are from Central Park; precipitation data are the mean of the Central Park and La Guardia Airport values; and sea level data is from the Battery at the southern tip of Manhattan (the only location in NYC for which comprehensive historic sea level rise data are available).

2 Central range = middle 67% of values from model-based probabilities; temperatures ranges are rounded to the nearest half-degree, precipitation to the nearest 5%, and sea level rise to the nearest inch.

3 The model-based sea level rise projections may represent the range of possible outcomes less completely than the temperature and precipitation projections. See page 18 for more information.

4 "Rapid ice-melt scenario" is based on acceleration of recent rates of ice melt in the Greenland and West Antarctic Ice sheets and paleoclimate studies.

	Baseline		Early Century					Mid-Century					Late Century				
	NPCC (1971-2000)	Northeast	NPCC	Northeast				NPCC	Northeast				NPCC	Northeast			
				Summer		Winter			Summer		Winter			Summer		Winter	
				Low	High	Low	High		Low	High	Low	High		Low	High	Low	High
Air Temperature (°F)	55	?	1.5-3	1.5-3.5	1.5-3.5	2.5-4	2.5-4	3-5	2-5	4-8	4-5	4-7	4-7.5	3-7	6-14	5-8	8-12
Days over 90°F	14	15	23-29	23	26	N/A	N/A	29-45	36	51	N/A	N/A	37-64	41	79	N/A	N/A
Days over 100°F	0.4	2	0.6-1	N/A	N/A	N/A	N/A	1-4	N/A	N/A	N/A	N/A	2-9	8	28	N/A	N/A
Precipitation	46.5 in	?	0-5%	little change		?	?	0-10%	little change		?	?	5-10%	little change		20%	30%
Sea Level Rise (in.)	N/A	relative to 2005	2-5	0.5-1				7-12	4-5				12-23	9.6-16.1			
Sea Level Rise - Rapid approx. (in.)	N/A	relative to 2005	5-10					19-29					41-55				

Assessing Risk

Risk Matrix*

		Likelihood of Occurrence			
		Low (1)	**Moderate (2)**	**High (3)**	**Virtually Certain/Already Occurring (4)**
Magnitude of Impact	**High (3)**	M (3)	H (6)	H (9)	H (12)
	Medium (2)	L (2)	M (4)	H (6)	H (8)
	Low (1)	L (1)	L (2)	M (3)	M (4)

*Risk equals the likelihood of occurrence multiplied by the magnitude of the impact, and is categorized as low (L), Medium (M) or High (H). Risk number determined by matrix multiplication.

Next Steps– Impacts Report

- Two public info meetings held:
  - Dec 17th at LOB, Hartford
  - Jan 12th at Ag Exp Station, New Haven
- Public comment period closes on Jan 17th
- Final report will be published on www.ctclimatechange.com in February

Next Steps– Adaptation Strategies

- Workgroups will determine adaptation strategies for the most imperiled planning areas or features
- Public comment on Adaptation Strategies Report in late June/July
- Adaptation Strategies Report due to the Legislature by mid-2010

Mitigation Efforts

PA 08-98 – A Framework

- 1 of only 6 state laws to mandate GHG reductions
- GHG reduction requirements:
  - By January 2020, reduce Connecticut GHG emissions to 10% below 1990 levels and
  - By January 2050, reduce Connecticut GHG emissions to 80% below 2001 levels
- Consistent w/ CCAP goals (PA 04-272)

DEP's Requirements in P.A. 08-98

- By December 2009, publish a 1990 and 2001 baseline inventory of CT GHG emissions;
  - Published at www.ct.gov/dep/climatechange
- By December 2009, publish a summary of GHG emission reduction strategies;
  - Soon to be published at www.ct.gov/dep/climatechange for public comment
- By July 2010, conduct and publish modeling of GHG reduction scenarios and evaluate economic and environmental benefits and opportunities;
  - Working with NESCAUM on this effort
  - Results will be published to www.ct.gov/dep/climatechange for public comment

DEP's Requirements in P.A. 08-98

- By July 2011, analyze GHG emission reduction strategies and make recommendations;
  - After GHG strategies finalized, we will continue working with NESCAUM on subsequent analyses
  - Results will be published electronically and public comment sought
- By July 2012 and every three years thereafter, develop a schedule of regulatory actions to show reasonable further progress towards achieving the required GHG emission reductions.
  - This process is intended to be SIP – like in nature

Implementing GWSA (Mitigation Efforts)

Requirements on other agencies

- DOT
  - Investigate GHG reducing improvements to state transportation system
  - Coordinate with NE states on regional strategies to incorporate GHG reductions into regional transportation planning (e.g., high speed rail, light-rail passenger service, and freight rail service within NE region)
- OPM (and DEP)
  - Biennial report on state agency energy saving efforts by Jan. 1, 2010
  - Triennial report on quantifiable emission reductions towards 2010, 2020 and 2050 goals by Jan. 1, 2012

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Connecticut's GHG Inventory

Pete Brunelli
Technical Services Group

What are GHG Inventories?

- Inventories are a key planning tool
  - They help us determine emission sources, prioritize efforts and assess results
- GHG Inventories assess:
  - Point Source Emissions
  - Area Source Emissions
  - GHG Uptake (Sinks)
  - Real and Potential Reductions from Law/Rule/Policy
    - (not all inventories address all of these categories)

Connecticut's GHG Inventories

- Two Separate CT Inventory Processes:
  - "Top Down" Inventory, using EPA State Inventory Tool (SIT), provides very broad coverage, not much detail. Data sources include DOE, EIA, USDOT, USDA…
  - "Bottom Up" aggregate data from point sources. This effort has focused on Title V reporters. Higher level of detail, not much coverage.

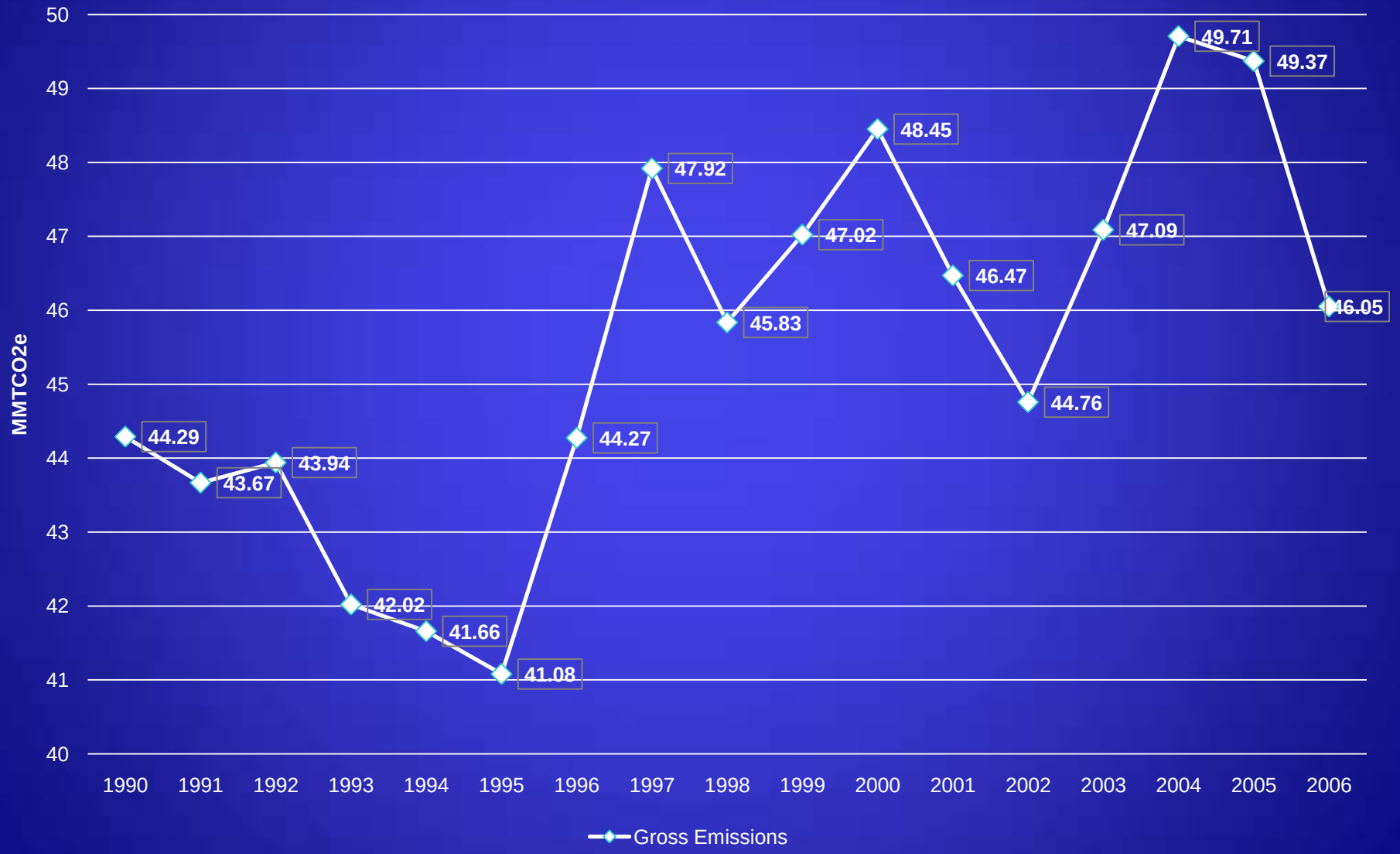
Connecticut's GHG Baselines and Targets

Greenhouse Gas Emissions/Targets	MMTCO2e
1990 Gross GHG Emissions	44.30
2020 Target (10% Below 1990)	39.90
2001 Gross GHG Emissions	46.50
2050 Target (80% Below 2001)	9.30
2007 gross GHG Emissions	46.10
2005 CCAP 2010 Goal	44.30

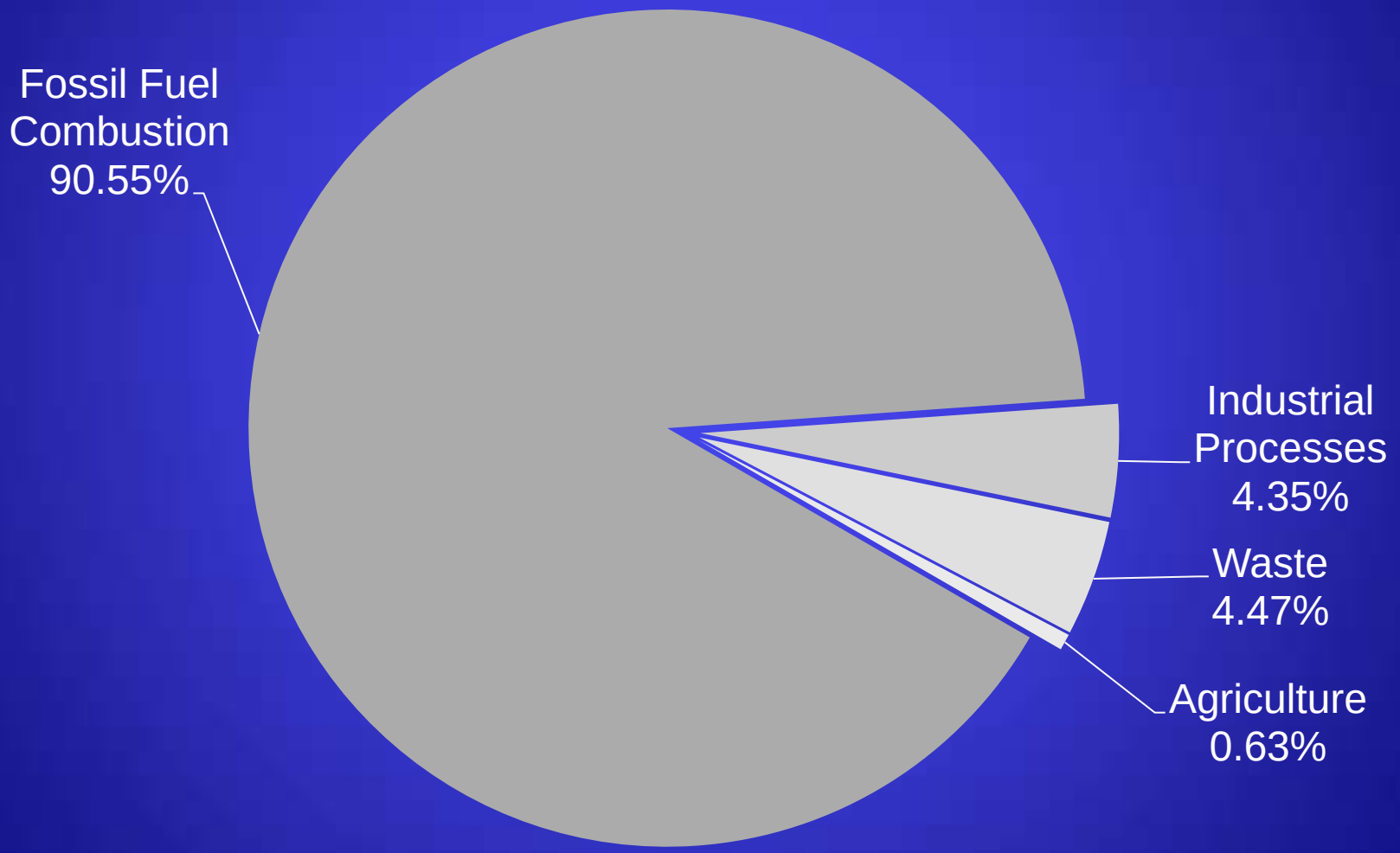
“Top Down” Inventory

- Meets requirements of CT Global Warming Solutions Act (PA 08-098)
- Based on output from EPA’s State Inventory Tool (SIT) for GHGs
- Current version
  - Completed for December 2009
  - Draft posted on DEP website
  - Final to be posted later in January 2010

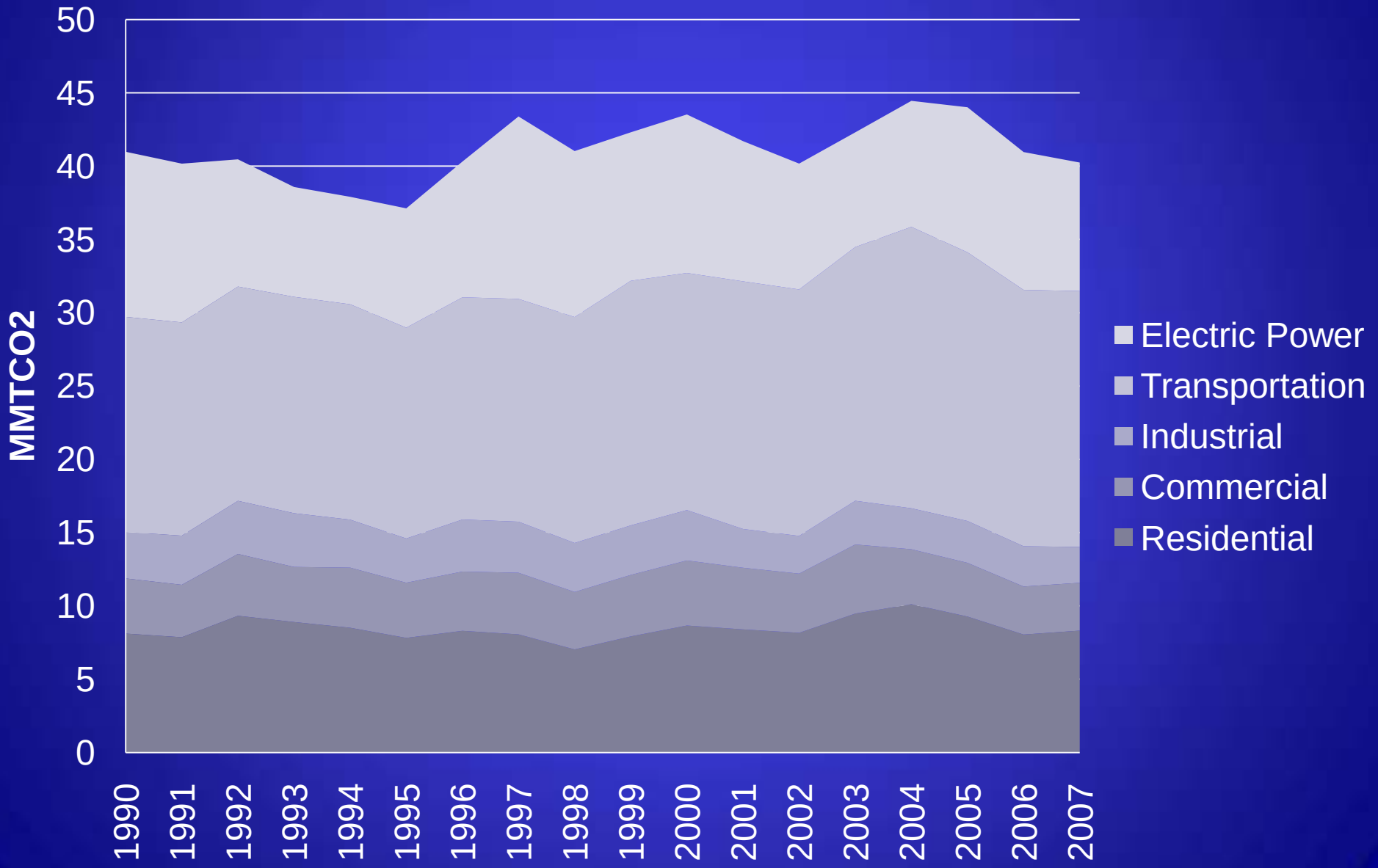
Connecticut
Gross GHG Emissions
1990 - 2006



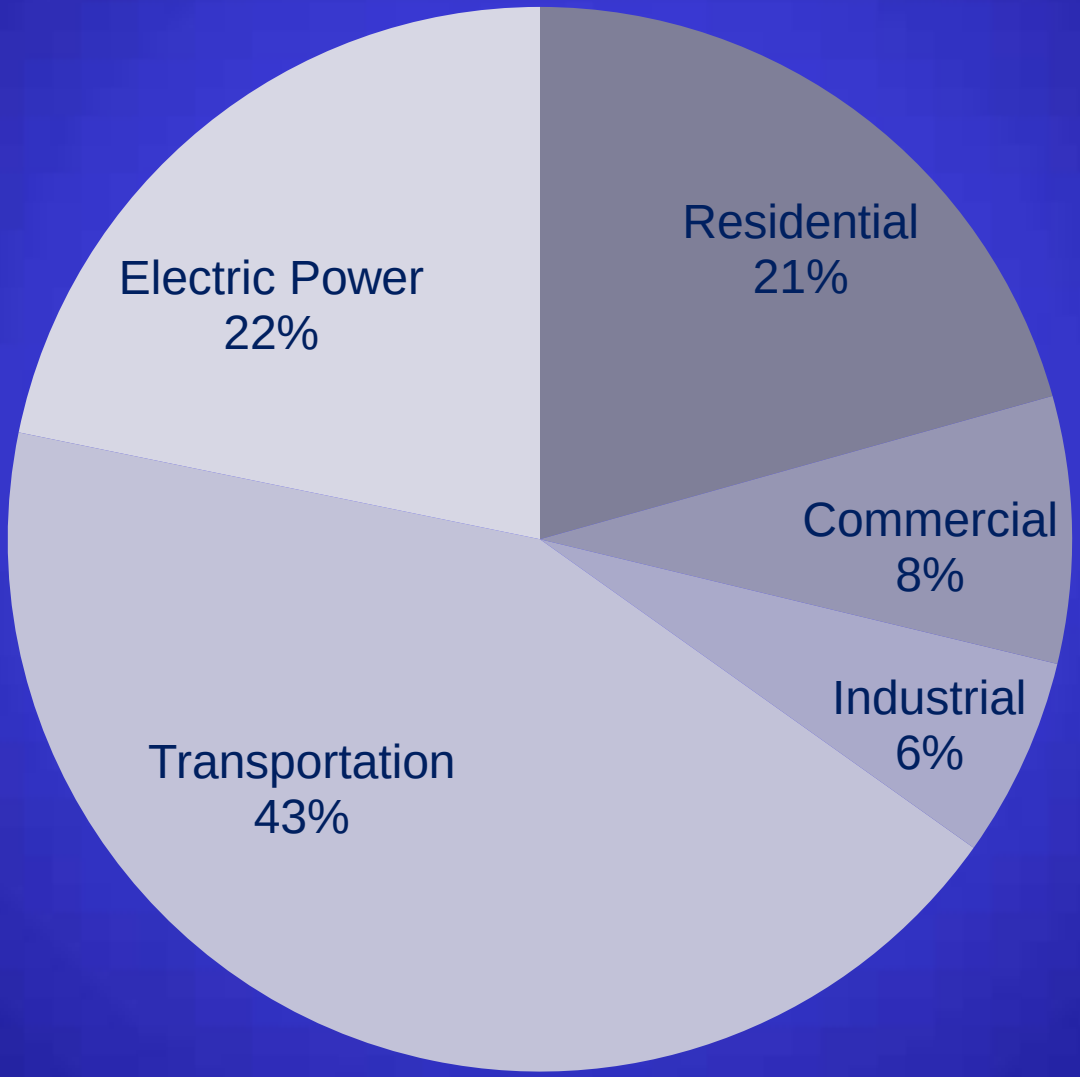
Connecticut
GHG Emissions by Source
2006



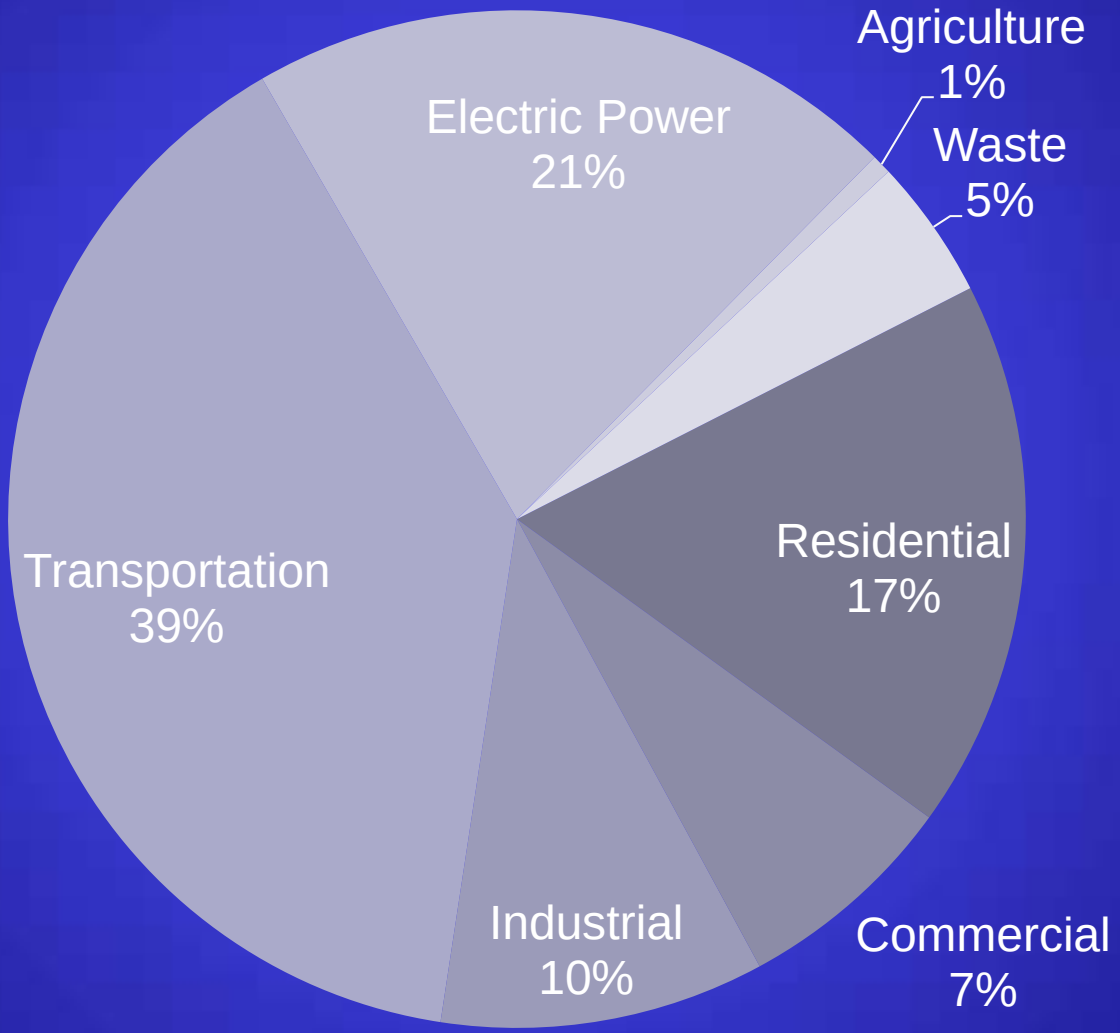
Connecticut
Fossil Fuel Combustion CO2 by Sector
1990 - 2007



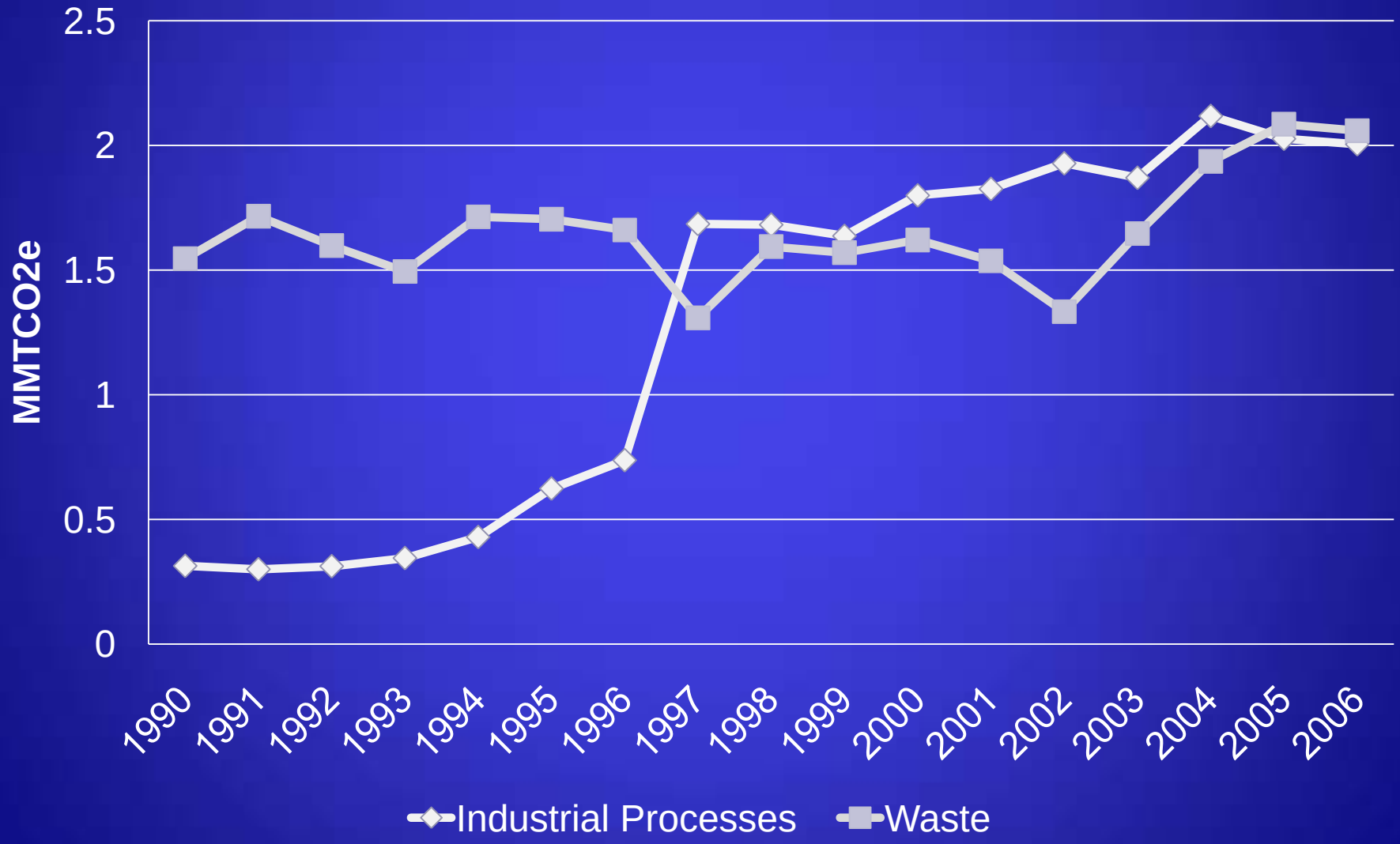
Connecticut
2007 CO2 Emissions from Fossil Fuel Combustion



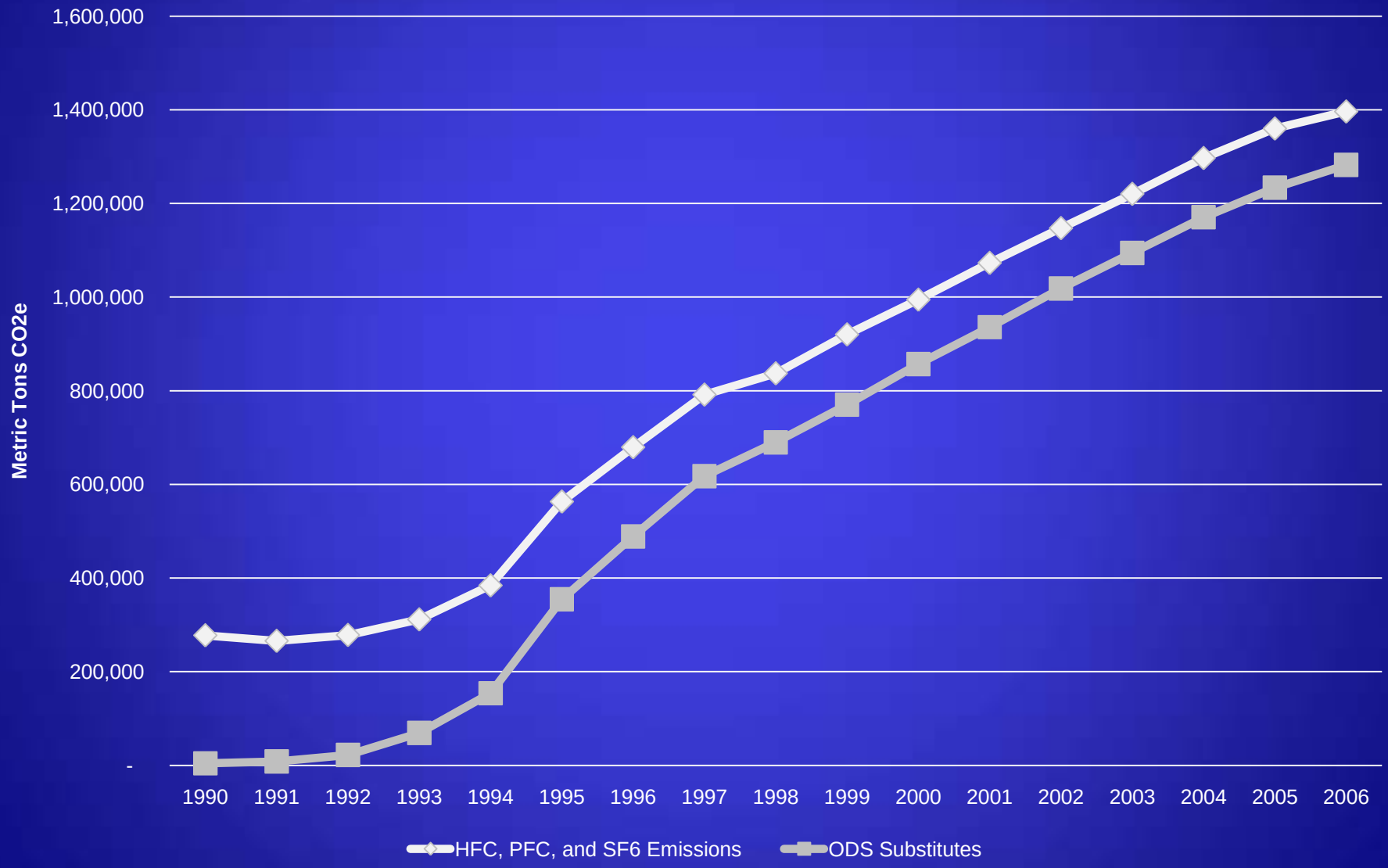
2006 Connecticut GHG Inventory



Connecticut
Industrial and Waste Sector Emissions
1990 - 2006



Connecticut
Industrial HFC, PFC, and SF6 Emissions
1990 - 2006



Connecticut Industrial Processes + Waste Combined Non-CO2FFC Emissions 1990 - 2006