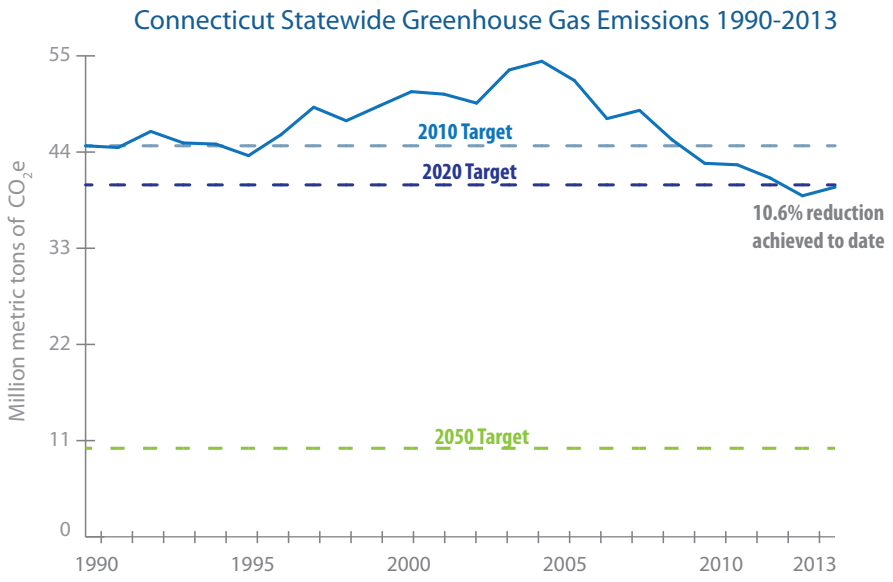
2013 Connecticut Greenhouse Gas Emissions Inventory

This summary provides an overview of the state's greenhouse gas (GHG) emissions from 1990 to 2013, the most recent year for which full data are available.[1] The statewide GHG emission inventory is an important tool for tracking Connecticut's progress toward the goals set by the Global Warming Solutions Act (GWSA) of 2008. This law set targets of reducing emissions 10 percent below 1990 levels by 2020 and 80 percent below 2001 levels by 2050. **Connecticut's GHG emissions in 2013 were 40 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), 10.6 percent below 1990 levels,** meaning that for the second year in a row emissions were below the 2020 target set by the GWSA.[2]



[1] The Department of Energy and Environmental Protection (DEEP) greenhouse gas inventory relies in part on emissions data from U.S. EPA's State Inventory Tool. EPA released data from January-December 2013 in April 2016.

[2] Emissions are reported in terms of carbon dioxide equivalence (CO_2e).Carbon dioxide is the primary greenhouse gas. Emissions of other chemicals are expressed on the basis of their potential to contribute to global warming, relative to carbon dioxide's potential.

Governor's Council on Climate Change (GC3)

On Earth Day 2015, Governor Malloy issued Executive Order 46, creating the Governor's Council on Climate Change (GC3). The Council is composed of 15 members from state agencies, quasi-state agencies, companies, and nonprofits. Governor Malloy tasked the Council with:

- establishing interim goals that will guide the state to the 2050 emission reduction target;
- annually monitoring statewide GHG emissions to determine if the state is poised to meet its 2050 target and any established interim goal(s);
- examining the efficacy of existing policies and regulations designed to reduce GHG emissions; and
- recommending new policies, regulation, or legislative actions that will assist in achieving established emission reduction targets.

The Council's current efforts are focused on analyzing greenhouse gas emission reduction scenarios to inform its recommendations on strategies that lead to long-term emission reductions, ensuring the state is on a path to meet its Global Warming Solutions Act goal of 80 percent below 2001 levels by 2050.

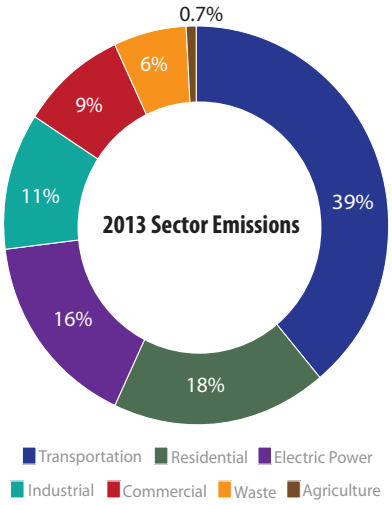
For more information on GC3 activities: www.ct.gov/deep/GC3

Connecticut Department of Energy and Environmental Protection
Office of Climate Change, Technology and Research

Connecticut's largest reduction has occurred in the electric power sector, where emissions decreased 46 percent since 1990. This reduction correlates with state policies and programs that encourage investment in energy efficiency in homes and businesses, a shift to cleaner fossil fuels and generators, and increased deployment of renewable energy sources. Between 2008 and 2013, Connecticut invested more than $77 million of proceeds from the Regional Greenhouse Gas Initiative in energy efficiency and clean energy. Investments through the Energy Efficiency Fund in 2013 alone were expected to yield a lifetime reduction of 2.3 million tons of carbon dioxide.

Connecticut Emissions by Sector ($MTCO_2e$)

	1990	2001	2013
Transportation	15.6	17.8	15.5
Residential	8.3	8.5	7.3
Electric Power	11.9	12.8	6.5
Industrial	3.3	4.6	4.4
Commercial	3.8	4.3	3.6
Waste	1.5	2.3	2.4
Agriculture	0.34	0.32	0.27
Total	**44.7**	**50.6**	**40.0**
	% change from 1990		**-10.6%**
	% change from 2001		**-21%**



Additional improvements in this sector will come from further reducing reliance on oil and coal during periods of extreme electricity demand, from continuing improvements in the efficiency with which electricity is consumed, and through deploying additional renewable energy.

The transportation sector continues to be the single largest source of emissions in the state, contributing 39 percent, principally from the use of fossil fuels in passenger cars and light trucks. Despite substantial improvements in vehicle efficiency, these emissions have dropped less than one percent since 1990 as the number of vehicle miles driven has increased. In the coming decades, improvements in vehicle fuel economy for all class sizes, deployment of low-emission vehicles, increased car and ride sharing, and expanded use of mass transit will be needed to significantly reduce emissions from this sector.

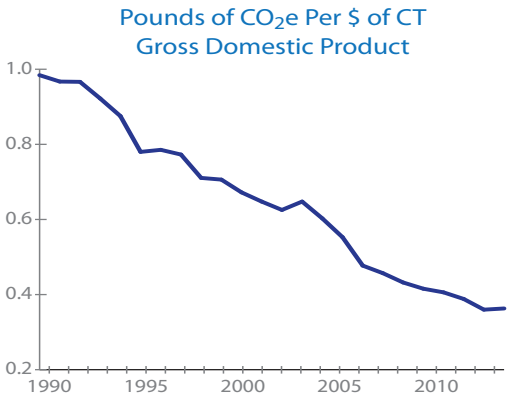
Between 2012 and 2013, there was a slight uptick in economy-wide emissions. This is attributable primarily to increases in three sectors: residential (increased from 6.7 MTCO2e in 2012 to 7.3 MTCO2e in 2013), commercial (increased from 3.3 MTCO2e in 2012 to 3.6 MTCO2e in 2013), and industrial (increased from 4.1 MTCO2e in 2012 to 4.4 MTCO2e in 2013). The emission increases in the residential and commercial sectors are almost entirely from increased heating demand, which is strongly influenced by winter weather. The winter of 2012 was the mildest since recordkeeping began in 1905 — with 19 percent fewer "heating degree days" than the winter of 2013.

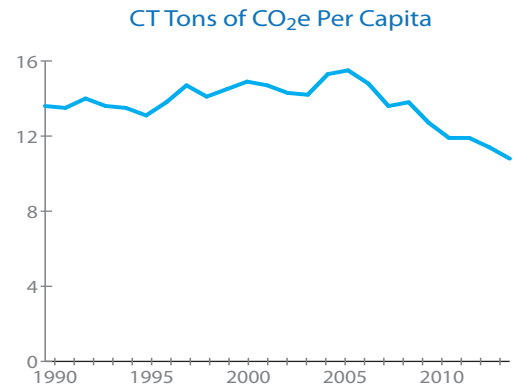
Overall, the residential and commercial sectors — whose emissions come primarily from burning fossil fuels for space heating and cooking[3] — have decreased 11 and 6 percent, respectively, since 1990. Further improvement will be achieved through programs encouraging investment in insulation and weatherization and deeper penetration of highly efficient equipment for space and water heating.

[3] For the purposes of this inventory, GHG emissions from generating the electricity consumed by residences and businesses are attributed to the electric power sector.

Overall trends in the inventory demonstrate that the carbon intensity of Connecticut's economy has declined dramatically, from nearly 1 pound of CO_2e per dollar of state gross domestic product in 1990 to less than 0.4 pounds per dollar of state gross domestic product in 2013. This demonstrates significant decoupling of economic activity and carbon pollution.

Connecticut's 2013 per capita emissions were 10.8 metric tons per person, which compares favorably with other northeastern states and is well below the national average of 16.7 tons per person. Connecticut's per capita emissions have declined 28 percent since 2000 and an average of 0.8 percent per year since 1990. Connecticut's commitment to cutting carbon pollution through energy efficiency, switching to low-carbon fuels, increasing use of renewable energy, and other means is transitioning the state to a low-carbon economy.





Inventory Methodology

Like several states across the country that regularly perform GHG inventories, Connecticut relies heavily on the U.S. Environmental Protection Agency's State Inventory Tool (SIT). The tool calculates sector-by-sector GHG emissions based on numerous state-level data sets (e.g., number of gallons of fuel oil sold in CT), including energy-related data provided by the Energy Information Administration. In its guidance documents on SIT, EPA recommends that states employ their own data when these are likely to be more reliable than the tool's default figures. For the waste sector, the state's inventory is based on wastewater data from SIT; but the 2013 inventory for the first time draws on solid-waste data collected by the Department of Energy and Environmental Protection's municipal waste program, data that the agency believes to be more accurate than the default SIT data. Also, for the first time, a consumption-based accounting approach for the electric power sector was applied. In prior GHG inventories, emissions from the electric power sector were based on direct emissions from the generation of electricity by power plants operating within the state. As described in detail below, the new approach is based on the amount of electricity consumed within the state rather the amount of electricity generated in the state. Finally, because SIT data on land use, land use change, and forestry appear unreliable, they have not been included in the inventories of emissions in 2013 and prior years. The state aims to develop an alternative means to estimate GHG impacts of land use and forestry for use in preparing future inventories.

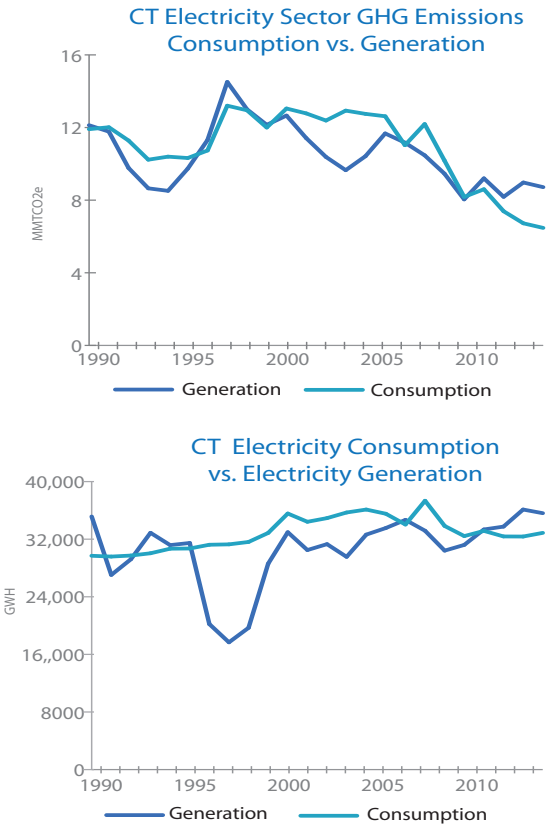
GHG emissions per capita

	2000	2006	2013
Connecticut	14.9	14.8	10.8
Massachusetts	13.0	11.8	9.7
New York	11.2	10.0	8.1
Rhode Island	11.2	9.8	9.5
New Hampshire	14.1	14.7	10.5
Vermont	11.0	10.6	8.9
Maine	17.5	15.9	12.2
California	11.2	10.9	9.2
National Average	20.7	19.6	16.7

Improved Calculation of Electricity Sector Emissions

In prior GHG inventories, electricity sector emissions have been accounted for by calculating GHGs emitted by power plants operating within the state. However, based on emerging best practices among states that regularly report their GHG emissions, and due to the regional nature of the electric grid, the Governor's Council on Climate Change recommended employing a consumption-based accounting approach: calculation of emissions from electricity consumed in-state, rather than electricity generated in-state.[4] The state has adopted this approach for the 2013 inventory and is retrospectively applying it to estimate emissions in the period 1990-2012. The consumption-based approach more accurately reflects significant historical and ongoing change in the mix of fuels used to generate electricity in New England. It also better aligns Connecticut's GHG inventory with actions the state has taken and can take to reduce emissions by promoting energy efficiency within our borders and increasing generation of electricity from renewable energy sources both within the state and regionally through policies such as the Renewable Portfolio Standard and long-term contracting. A number of other states, including Massachusetts, Rhode Island, Maryland, and Oregon, have adopted a similar consumption-based approach for the electricity sector.

While the consumption-based approach will be the primary method for calculating emissions from the electricity sector, DEEP will continue to track emissions associated with in-state electric power generation for the purposes of comparison. The two methods produce estimates that are roughly parallel: emissions were almost identical in 1990 (the baseline year for the GWSA's 2050 goal), peaked in the mid-1990s, and then significantly declined. Notably, however, the generation



and consumption lines diverge significantly during some periods, including 2011-13, when emissions from consumption were well below emissions from generation.

In conducting the consumption-based inventory, DEEP draws on two data sources: Energy Information Administration data on Connecticut electricity consumption and regional-grid carbon intensity data developed by the Massachusetts Department of Environmental Protection (MA DEP).[5] MA DEP's data take into account the carbon intensity of electric generation within the ISO New England grid as well as electricity imported into the region from Canada, New York, and other jurisdictions.[6] This approach more accurately reflects the emission profile of the regional electric grid.

[4] Governor's Council on Climate Change Exploratory Report http://www.ct.gov/deep/lib/deep/climatechange/gc3/gc3_exploratory_report_2016.pdf

[5] EIA CT electric consumption 1990-2013, http://www.eia.gov/electricity/state/connecticut/ (Table 10).

[6] MA DEP's approach takes into account the Renewable Portfolio Standard of each New England state. For further details on how the regional emission factor were calculated see "Statewide Greenhouse Gas (GHG) Emissions Baseline & Projection Update " and Appendices L-P, http://www.mass.gov/eea/agencies/massdep/news/comment/ghg-emissions-update.html