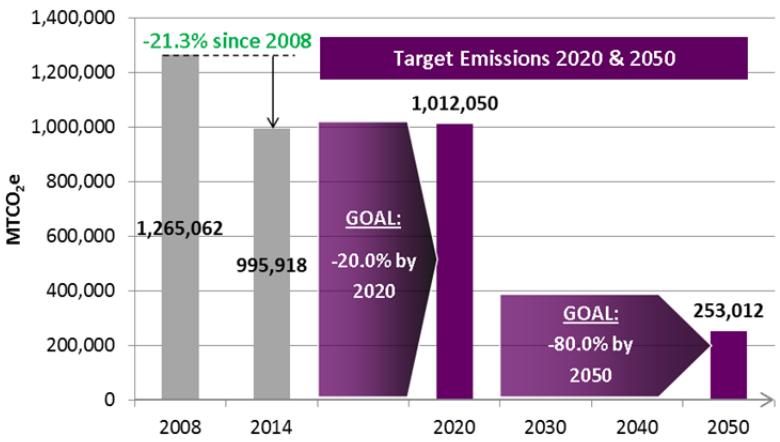
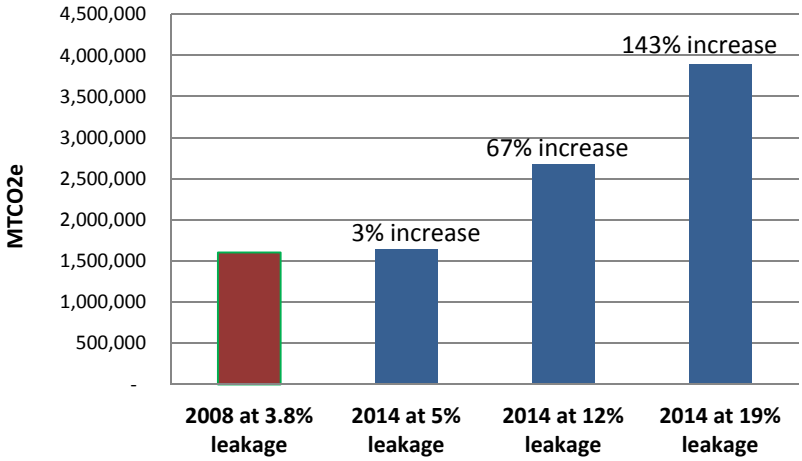
Executive Summary

2014 Tompkins County Community GHG Emissions and Energy Use Inventory



GHG Emissions Goals and Progress - Currently Accepted Accounting

The Tompkins County Community has reduced greenhouse gas (GHG) emissions 21% from 2008 levels by 2014. This is six years ahead of the target goal of a 20% reduction by 2020 and puts the community on a good path to achieve its goal of reducing emissions at least 80% from 2008 levels by 2050. While this is extremely positive news, it must be tempered by the fact that 11% of this reduction has been achieved through a major shift from coal to natural gas to power the electric grid, and there are growing concerns about the impact of natural gas extracted using high-volume hydrofracking techniques on total GHG emissions, including methane.



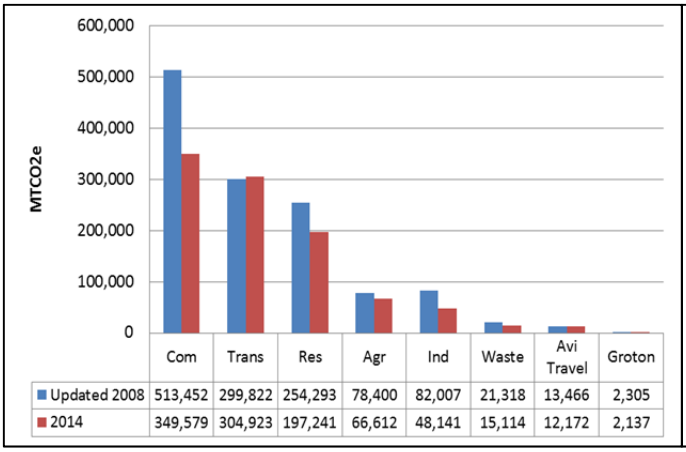
GHG Emissions – New Shale Gas Accounting

Between 2008 and 2014 the source of natural gas used in the community likely transitioned from wells drilled through conventional methods to fracked gas, primarily coming from the Marcellus Shale in Pennsylvania. Emissions associated with fracked shale gas are calculated extremely differently depending on whether one uses currently accepted GHG accounting, or if the findings of evolving climate science on methane are applied. **If the new science is applied, the community has not seen a remarkable 21% reduction in emissions, but instead seen a 67% *increase* in total GHG emissions** between 2008-2014 if the 20-year global warming potential and mid-range overall leakage rate of 12% are applied for methane emissions. Even at the lower-end estimate of 5% leakage, methane impacts would offset any other gains in reducing emissions and the higher leakage range of 19% would result in a 143% increase in emissions. While all recent local studies have pointed to the need to wean ourselves from natural gas regardless of accounting methods, the conclusion that emissions are sharply increasing due to reliance on fracked gas calls for making that transition to renewable energy much more quickly.

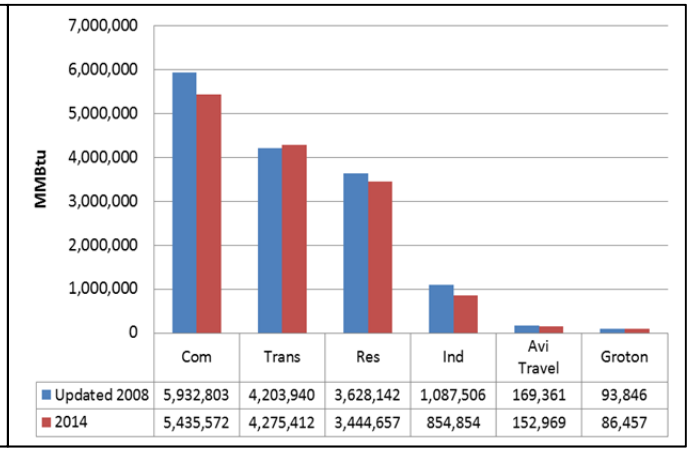
While this tension between two GHG accounting methods runs throughout this document, the main focus is on presenting the results using generally accepted GHG accounting methodologies and calling out differences with new climate science accounting in separate sections of the report. In order to be able to compare the new 2014 GHG Emissions and Energy Use Inventory, it was necessary to prepare a full Updated 2008 Inventory, which substantially revised the Original 2008 Inventory that was released in 2010.

Results: Comparison of Emissions and Energy Use 2008-2014

Energy consumption and GHG emissions were down in all sectors except for a slight rise in the transportation sector due to an increase in the numbers of vehicle miles traveled and a reduction in national on-road vehicle fuel efficiency.



GHG Emissions (MTCO2e)



Energy Use (MMBtu)

The commercial sector saw a significant reduction in emissions, largely due to Cornell's decision to stop using coal and begin using natural gas to produce its heat and electricity. It is notable that Cornell's Central Energy Plant used 27.4 million therms in 2014, accounting for 59% of all natural gas used in the commercial sector.

Emissions continue to remain closely correlated with energy use as energy used in the community is still largely supplied by fossil fuels. There was, however, substantial growth in development of local renewable energy generation between 2008 and 2014, with 3.3 MW of solar coming online and hydro power generation increasing at the Cornell hydro plant. The community saw an overall increase in renewable energy of 136%.

kWh	Updated 2008	2014	% Change
Solar	474,311	4,043,323	753%
Small-Scale	474,311	3,382,993	613%
Large- and Utility-Scale	0	660,330	NA
Hydro – Large-Scale	3,100,000	4,400,000	42%
Micro-hydro	0	0	NA
Wind	0	0	NA
Total Generation	**3,574,311**	**8,443,323**	**136%**

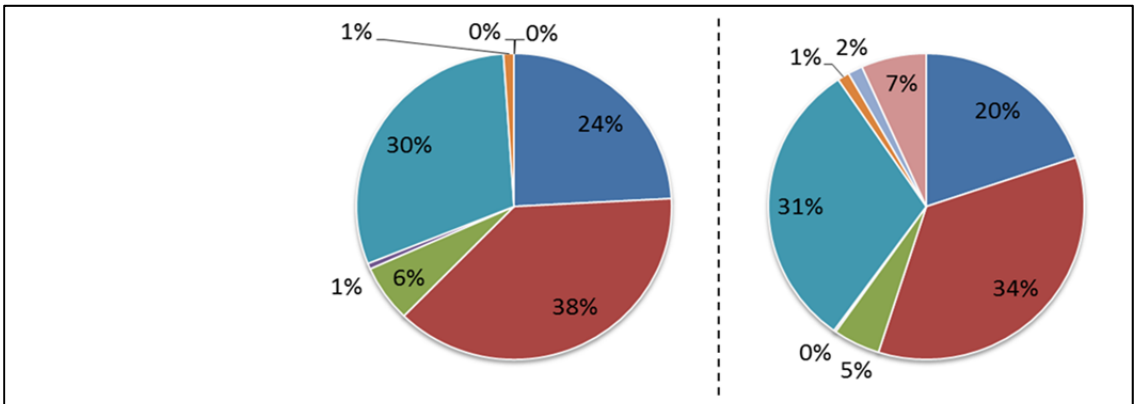
Local Renewable Energy Generation: 2008-2014

Although population has remained relatively flat, the community saw a decrease in energy consumption and emissions on a per person basis across the board, with a 24% reduction in GHG emissions per person between 2008 and 2014.

	Updated 2008	Updated 2008 Per capita	2014	2014 Per capita	% Change 2008-2014
Population (1-yr ACS estimates)	101,136	NA	104,691	NA	NA
Emissions (MTCO2e)	1,265,062	12.51	995,918	9.51	**-24%**
Electricity (kWh)	1,063,778,666	10,518,30	1,068,224,116	10,203.59	**-3%**
Thermal Energy (MMBtu)	7,252,136	71.71	6,313,608	60.31	**-16%**
Transportation (MMBtu)	4,203,940	41.57	4,275,412	40.84	**-2%**

Per Capita Energy and Emissions: 2008-2014

Results: 2014 Emissions and Energy Use



Sectors	Energy in MMBtu	% of Total	Emissions MTCO2e	% of Total
Residential	3,444,657	24%	197,241	20%
Commercial	5,435,572	38%	349,579	35%
Industrial	854,854	6%	48,141	5%
Groton Electric	86,457	1%	2,137	0%
Transportation	4,275,412	30%	304,923	31%
Air Travel	152,969	1%	12,172	1%
Solid Waste	0	0%	15,114	2%
Agricultural Livestock	0	0%	66,612	7%
TOTAL	**14,249,922**	**100%**	**995,918**	**100%**

Summary of 2014 GHG Emissions and Energy Consumption by Sector

Greenhouse Gas Emissions. The total GHG emissions in the county in 2014 were estimated to be 996,000 metric tons of carbon dioxide equivalent (MTCO2e[1]), with 92% of those emissions from fossil fuel consumption and the remainder from landfilled solid waste and agricultural livestock.

Electricity. The total electricity consumed in the community in 2014 was estimated to be 1,068,224,000 kWh[2]. Nearly 90% of that electricity was generated in nearly equal amounts using natural gas, hydro and nuclear power.

Thermal Energy. The total amount of energy consumed for space and water heating in the county in 2014 was estimated to be 6,314,000 million British Thermal Units (MMBtu[3]). In 2014, natural gas provided the overwhelming majority of thermal energy to the community, comprising roughly 79% of the fuel mix.

Transportation. In 2014, the community consumed an estimated 4,275,000 MMBtus of energy to fuel its transportation needs with an estimated 673,174,000 miles traveled over the course of the year. Gasoline accounted for roughly 86% of fuel used with 29 million gallons, and diesel accounted for 14%.

Next Steps. The results of this Inventory will be used to inform development of the update to the 2020 Energy Strategy, as well as future efforts to reduce GHG emissions and reduce consumption of energy in the community.

[1] MTCO2e – a measure of the combined ability of emitted GHGs to trap heat.
[2] kWh – kilowatt hour – a measure of electricity.
[3] MMBtu – a measure of the energy content in fuel; used as a basis for comparing the energy content of various fuels.