climate change

WHILE GLOBAL ENERGY AND CLIMATE PROBLEMS CANNOT BE SOLVED EXCLUSIVELY AT THE LOCAL LEVEL, AND LEADERSHIP IS NEEDED FROM GLOBAL, FEDERAL, AND STATE ORGANIZATIONS, LOCALLY WE CAN IDENTIFY, PLAN FOR, AND TAKE STEPS TO ADDRESS THESE ISSUES. AND ULTIMATELY IT IS ONLY RECOGNITION AND ACTION AT LOCAL LEVELS EVERYWHERE THAT CAN ACCOMPLISH THE NEEDED CHANGES. ACTING NOW WILL PREPARE THE COMMUNITY TO BETTER ADAPT TO A RAPIDLY CHANGING CLIMATE AND TO RESPOND NIMBLY TO CHANGING ENERGY AND CLIMATE POLICY AND PROGRAM DECISIONS. COMMUNITIES THAT HAVE PREPARED FOR AN ENERGY FUTURE THAT IS CLIMATE NEUTRAL WILL BE ATTRACTIVE PLACES TO LIVE AND INVEST IN. THIS SECTION DISCUSSES TWO INTER-RELATED ASPECTS OF CLIMATE CHANGE. THE FIRST IS TO REDUCE THE MAGNITUDE OF CLIMATE CHANGE BY REDUCING THE COMMUNITY'S CONTRIBUTIONS TO GREENHOUSE GAS EMISSIONS. THE SECOND IS TO LIMIT THE COMMUNITY'S VULNERABILITY TO THE CURRENT AND FUTURE IMPACTS OF CLIMATE CHANGE.

energy and greenhouse gas emissions

The past decade has seen a dramatic change in the types of available energy sources. The expansion of new exploration techniques used to tap previously hard-to-reach fossil fuel resources, including shale gas, tar sands, and deep ocean deposits, as well as the decreasing costs of some of the traditional renewable resources, including solar and wind, have changed the way these sources are viewed. Other sources of energy are also getting a fresh look, including geothermal, hydro, tide, and wave energy. Re-localization initiatives around local food and products and reusing materials are also being embraced across the country not only as a way to enhance the resilience of a community in the face of climate change, but as a way to reduce the energy costs and associated greenhouse gas[1] emissions of transporting and manufacturing goods.

In addition to the changing global energy picture, several well-respected studies have identified how New York State could run on 100 percent renewable energy by 2050. This interest in transitioning to renewables is driven by many factors, including fear of the environmental and social costs of high-intensity fossil fuel extraction; deep concern about the future impacts of climate change; desire for energy independence from foreign powers; and New York's experience with recent disasters, such as Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee.

In response to these concerns, the community is interested in moving toward climate neutrality, or achieving net zero greenhouse gas emissions by dramatically reducing the amount of fossil fuel energy used and offsetting the remaining emissions with sequestration of greenhouse gases by natural vegetation and soils. Purchasing Renewable Energy Credits[2] to make up the difference may be employed as an interim measure while the community works towards long-term solutions.

Changing energy-use patterns is not simple, but addressing this energy challenge can provide numerous local benefits. Tompkins County can position itself as a regional leader in building a strong, local economy with the development of green jobs, local production facilities for new technologies, and sustainable agriculture and forestry. The economy can be further enhanced by investing in local energy sources that support local jobs and keep dollars circulating in the community.

PRINCIPLE

Tompkins County should be a place where the energy system meets community needs without contributing additional greenhouse gases to the atmosphere.

POLICIES

It is the policy of Tompkins County to:

- Reduce greenhouse gas emissions to reach a minimum 80 percent reduction from 2008 levels by 2050 and reduce reliance on fossil fuels across all sectors.
- Improve the energy efficiency of all components of the community energy system.
- Increase the use of local and regional renewable energy sources and technologies.
- Increase carbon capture and storage in the county's forests, wetlands, and soils.
- Reduce the amount of material disposed of in landfills.

SNAPSHOT
OF THE COUNTY TODAY

Electricity

In 2008, the community consumed approximately 780 million kWh of electricity. The bulk of that usage, 44 percent, was by the commercial sector, which includes educational and institutional users. Annual residential electricity usage averaged 7,800 kWh per household, compared to 7,300 kWh for New York State as a whole and 11,500 kWh for the United States.

Many people assume that Tompkins County's electricity is provided primarily by the Cayuga Power Plant, a 306 megawatt (MW) coal-fired power plant located in Lansing, but the county's electricity is actually generated from a diverse group of sources, most of which are located outside of the local area. According to New York State Electric and Gas (NYSEG), a mix of fuel sources is used to generate electricity for our region, with 47 percent from natural gas, 28 percent from nuclear, 13 percent from hydroelectric, five percent from wind, four percent from coal, and three percent from other sources. In addition to NYSEG, there are two other local energy providers, Cornell University and the Village of Groton Electric Department.

Cornell generates approximately 86 percent of its main campus' annual electricity needs from its 38 MW Central Energy Plants and its 1 MW hydroelectric plant on Fall Creek. In order to provide heat and electricity with the highest efficiency to its campus, in 2009 Cornell began commercial operation of its 30 MW Combined Heat and Power Plant utilizing combustion turbine technology with heat recovery steam generators, adding to the electricity production "cogenerated" from its steam turbine generators built in 1986. Cooling to the campus is provided by Cornell's Lake Source Cooling project, which has been utilizing the deep cold waters of Cayuga Lake to cool facilities at Cornell and Ithaca High School since 2000 with 86 percent less electricity than the refrigeration-based chillers it replaced. Lake Source Cooling is complemented by peaking capacity from the 4.4 million gallon Thermal Storage Tank and three high-efficiency centrifugal chillers. In September 2014, Cornell began receiving remote net metered electricity from a two MW solar photovoltaic electric installation that generates about one percent of annual needs.

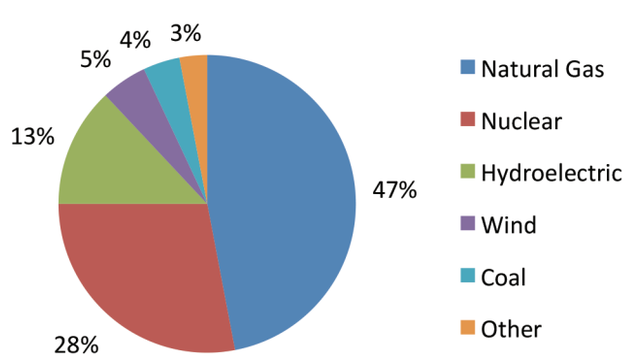
The Village of Groton has a long-term financial agreement to purchase up to 4.5 MW of low-cost power from the New York Power Authority's hydro-electric plant at Niagara Falls, with any excess demand purchased through the New York Municipal Power Agency.

Thermal Energy

In 2008, the community consumed over five million MMBtus[3] of thermal fuel, including nearly 43 million therms of natural gas, two million gallons of heating oil, and six million gallons of propane gas. The top users of thermal energy were the residential sector at 47 percent and the commercial sector at 43 percent, with the industrial sector accounting for ten percent of thermal energy use.

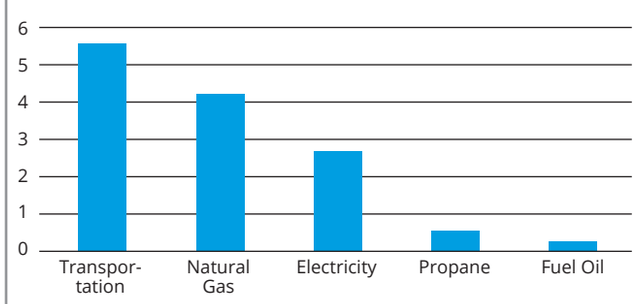
Fuel oil and propane are provided to users in Tompkins County through a series of independent distributors, and natural gas is delivered through a pipeline network. Natural

NYSEG Electricity Grid Fuel Sources (2012)



Source: New York State Electric and Gas

Community Energy Use, MMBtus (2008)



Source: Tompkins County Planning Department

gas transmission assets in Tompkins County are operated by Dominion Transmission, and the distribution system is operated by NYSEG. The two types of transmission pipelines in Tompkins County are natural gas and liquids. The natural gas pipelines transport gas to NYSEG for distribution and to main line users such as the Cornell Central Energy Plants. The liquid pipelines transport petroleum products to distributors.

Transportation*

In 2008, the community consumed nearly six million MMBtus of energy to fuel its transportation needs to drive nearly 687 million miles over the course of the year. Gasoline accounted for roughly 85 percent of fuel used at roughly 37 million gallons, and diesel accounted for 15 percent at seven million gallons.

Community Greenhouse Gas Emissions

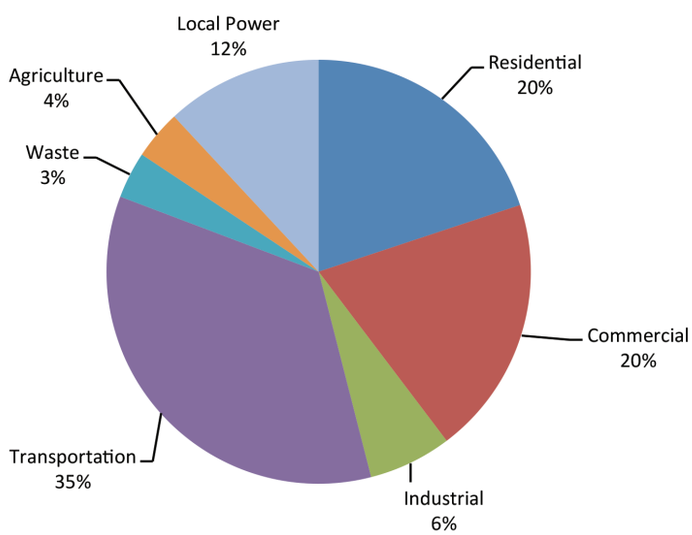
According to the most comprehensive recent greenhouse gas emissions inventory, in 2008, the Tompkins County community used over 13 million MMBtus of energy, and emitted nearly 1.2 million metric tons of carbon dioxide equivalent[4] (MTCO2e). A greenhouse gas emissions inventory was also completed using 2010 data as part of the *Cleaner Greener Southern Tier Regional Sustainability Plan*, and emissions for Tompkins County were estimated at 1.1 million MTCO2e. Since that regional methodology was somewhat different than county emissions counting, the Comprehensive Plan will focus on the finding of the Tompkins County inventory that used 2008 data.

Emissions from residential, commercial, and industrial buildings together accounted for the largest proportion of community emissions and transportation accounted for more than a third of all community emissions. Gasoline used for transportation was the largest single energy source consumed, and electricity was the second most used energy source, followed by natural gas.

It should be noted, however, these emissions are calculated using the Environmental Protection Agency's (EPA) global warming potential figure for methane that was in place when the inventory was performed and follow the 100-year Global Warming Potential (GWP) time horizon that was adopted in the Kyoto Protocol and is now used widely as the default metric. Since 2008, many scientists have focused research on methane emissions and it appears that it would be more accurate to use a much greater GWP for methane to reflect its extreme potency in the shorter duration when reductions will most help in limiting warming that may result in a cascade of uncontrollable negative impacts. Such an analysis of methane will likely be incorporated into future energy plans, and would primarily affect the waste and agriculture sectors, as they are currently the highest emitters of methane.

Community Greenhouse Gas Emissions and Energy Use (2008)

Sector	GHG Emissions (MTCO2e)	Energy Equivalent (MMBtu)
Residential	233,469	3,396,123
Commercial	232,081	3,377,933
Industrial	74,265	994,576
Transportation*	407,469	5,606,892
Waste	41,792	0
Agriculture	43,996	0
Local Power	139,846	0
Total	**1,172,918**	**13,375,524**



**Air flight emissions are tracked, but not counted in these emissions since the data is incomplete, as it does not include private air flight. Commercial flights were estimated to have released 916 tons eCO2.*

Source: Tompkins County Planning Department

** For more information see the Transportation Chapter, "Transportation's Role in Greenhouse Gas Emissions" section.*