Ulster County Benchmarking Report

Ulster County purchases over 100% green electricity from sustainable sources through a combination of renewable energy credits (RECs) and utility green power products. In addition, the County also purchases carbon credits to offset emissions associated with the heating and cooling of buildings. For 2016, Ulster County purchased RECs of 18,000,000 kWh and 10,500 MTCO2e carbon credits to offset all electricity and fuel usage by the county.

Analysis and Data Compilation Factors and Conversions

Monthly usage data for Ulster County owned properties electricity and natural gas data were downloaded from the Facility Dude utility track application from data compiled and uploaded by Ulster County Department of the Environment in conjunction with Department of Public Works. Annual usage data for properties leased by Ulster County was obtained from the utility provider where available. No data was collected for properties where Ulster County leases office space in facilities where there is no separate metering. Electricity usage was measured in kWh and natural gas usage was recorded in CCF. Usage data for fuels delivered in bulk (propane, heating oil) were collected from yearly delivery reports and not proportioned by month.

Conversions into kBtu were achieved using the following equivalencies:

Fuel Type	Input Unit	Conversion Factor to kBtu	Heat Content
Electricity (Grid Purchase)	kWh	3.412	n/a
Natural Gas	CCf	102.6	1026 Btu/cf
Propane	Gallons	92	0.092 MBtu/gal.
Fuel Oil (No. 2)	Gallons	138	0.138 MBtu/gal.

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The EPA Energy Star Program distinguishes between **primary energy**, derived from fuels burned onsite (natural gas, oil, propane), and **secondary energy**, which has already been converted from a raw source offsite (electricity)[i]. This distinction was retained in calculation, and annual energy usage totals for primary and secondary energy are listed separately.

The Energy Star Program also distinguishes between **site** and **source energy**. **Site energy** is the usage as measured exclusively from the building, which is the quantity recorded in utility bills, while **source energy** also accounts for the additional energy expenditures associated with production, transmission, and delivery, according to the fuel. The use of source energy allows the energy efficiencies of buildings to be compared without imparting a bias based on the type of fuel they consume[ii]. Primary and secondary energy usage totals are therefore expressed both as site energy consumption and source energy consumption.

Conversions from site energy to source energy usage were achieved using the following source-site ratios:

Fuel Type	Source-Site Ratio
Electricity (Grid Purchase)	3.14
Natural Gas	1.05
Heating Oil (No. 2)	1.01
Propane	1.01

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These figures represent the average national source-site ratios as calculated by the EPA's Energy Star Program, and were most recently revised in 2013. The use of national metrics is intended to prevent any individual buildings energy use efficiency from being penalized or credited due to the relative efficiency of its energy provider[iii].

Energy Use Intensity (EUI) was calculated for all buildings according to the method specified by the EPA's Energy Star Program. The total site energy usage and source energy usage for every building was calculated in kBtu by summing the consumption of primary and secondary energy. These totals were then divided by the gross square footage of the building to yield a site EUI and a source EUI for every building[iv].

Greenhouse gas emission estimates were obtained using metrics provided by the EPA Energy Star Program. Site energy usage totals in MBtu for each fuel type were multiplied by their corresponding conversion factors to determine CO_2-equivalent GHG emissions. The conversion factors were calculated to account for the production of three gases (CO_2, CH_4, N_2O) in the quantities associated with the combustion of each fuel type, as well as the relative global warming potential of each gas as compared to CO_2. The figures provided therefore represent the amount of CO_2 that would equal the warming potential of the mix of gases resulting from the use of the specified amount of each fuel type. Emissions are subdivided into direct and indirect emissions, corresponding to fuels that are combusted onsite and fuels that are converted from their raw form offsite and distributed, respectively. Total emissions were calculated as the sums of direct and indirect emissions for each building[v].

Conversions from energy usage in MBtu to CO_2-equivalent emissions in kg were achieved using the following factors:

Fuel Type	Conversion Factor
Electricity (NYUP eGRID Region)	54.54
Natural Gas	53.11
Heating Oil (No. 2)	74.21
Propane	64.25

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