

Roanoke Carbon Footprint Calculator (Household)

spm 9/8/17

Address:

Year:

2016

Categories (hover cursor over cells below for detailed instructions)	Enter Data in This Column	CO2 Emission Factors	Emission Factor Units	Carbon Footprint (lbs. CO ₂)	CO2 Emissions Reference
UTILITIES					
Electricity Used Annually (kWh)		1.77	lb CO ₂ /kWh	-	Appalachian Power Company - 2016 data
Natural Gas Used Annually (Therms)		11.7	lb CO ₂ /therm	-	www.eia.gov/environment/emissions/co2_vol_mass.php
Propane Used Annually (gallons)		12.7	lb CO ₂ /gallon	-	www.eia.gov/environment/emissions/co2_vol_mass.php
Heating Oil Used Annually (gallons)		22.4	lb CO ₂ /gallon	-	www.eia.gov/environment/emissions/co2_vol_mass.php
			Subtotal	-	
TRANSPORTATION					
Vehicle 1 Gasoline Used Annually (gallons)		19.6	lb CO ₂ /gallon	-	www.eia.gov/environment/emissions/co2_vol_mass.php
Vehicle 2 Gasoline Used Annually (gallons)		19.6	lb CO ₂ /gallon	-	
Vehicle 3 Gasoline Used Annually (gallons)		19.6	lb CO ₂ /gallon	-	
Vehicle Diesel Fuel Used Annually (gallons)		22.4	lb CO ₂ /gallon	-	
Airline Travel (Passenger Miles)		0.143	lb CO ₂ /pass. mile	-	Air Travel Emission factors - medium distance. EPA Climate Leadership Carbon Emissions Factors 2015
			Subtotal	-	
WASTE AND RECYCLING					
Landfill Waste (lbs)		0.39	lb CO ₂ /lb waste	-	EPA Warm v14 for Mixed Municipal Solid Waste (MSW)
Recycled Waste (lbs)		-3.11	lb CO ₂ /lb recycling	-	EPA Warm v14 for Mixed Recyclables - www.epa.gov/warm
			Subtotal	0	
CO₂ OFFSETS (lbs)					
		1.00	lb CO ₂	-	Purchased carbon offsets
TOTAL CARBON FOOTPRINT (tons CO₂ equivalent - annual)				-	Sum column E and divide by 2000 for tons

*See notes and instructions by hovering over specific cells in Excel

INSTRUCTIONS FOR USING THE CARBON FOOTPRINT CALCULATOR:

Carbon footprints are a quantitative estimate of the total carbon dioxide emitted to the atmosphere associated with some activity. Carbon dioxide survives in Earth's upper atmosphere for decades and is considered a greenhouse gas (GHG) since it absorbs some radiation and warms the atmosphere. Carbon dioxide is not the only GHG, but is the gas that contributes the most to atmospheric warming. Methane, another common GHG, is the primary component of natural gas and is also given off from biological processes like the anaerobic digestion of food and plants in landfills.

A household carbon footprint analysis estimates the total carbon dioxide emitted over the course of a year by activities associated with a person or household. The primary sources of carbon dioxide emissions at the household level are due to the combustion of fuels for energy for electricity, heating, and transportation. The burning of coal, oil, natural gas, gasoline and all carbon-based fuels produces carbon dioxide. These activities are the primary contributions for a residential carbon footprint and are included in this analysis.

The household data is entered in the second column in the spreadsheet. It is important to use the correct units. Estimates can be made if data is not available. The third column has the carbon emissions factors which convert the household values to carbon dioxide emissions. References for these values are provided in the last column. Multiply the values in the second and third columns and enter the values in the fifth column labeled carbon footprint.

UTILITIES:

Electricity - Enter the total electricity in **kilowatt hours (kWh)** used annually. This can be found on your monthly electricity bills and should be summed for the year.

Natural Gas - Enter the total natural gas in **therms** used annually. This can be found on your monthly gas bills and should be summed for the year. Some gas companies report values in units of hundred cubic feet (CCF) or BTUs which then need to be converted. (1 therm = 100,000 BTU) (1 therm = 96.4 cubic feet or 0.964 CCF)

Propane - Enter the amount of propane in **gallons** used annually. Propane is used in RVs, outdoor grill, and some heating systems.

Heating Oil - Enter the amount of home heating oil in **gallons** used annually. Heating oil is common fuel for heating systems.

TRANSPORTATION:

Gasoline - For each gasoline vehicle, enter the total **gallons** of gasoline used annually. If total gallon data is not available, divide the total miles driven in a year (from weekly estimates or odometer readings) by the vehicle fuel economy (miles/gallon) to estimate the gallons of gasoline used. Fuel economy estimates can be found at www.fueleconomy.gov/ or other sites.

Diesel - For each diesel vehicle, enter the total **gallons** of diesel used annually. If total gallon data is not available, divide the total miles driven in a year (from weekly estimates or odometer readings) by the vehicle fuel economy (miles/gallon) to estimate the gallons of diesel used. Fuel economy estimates can be found at www.fueleconomy.gov/ or other sites.

Airline Travel - Enter the total **passenger miles** flown during the year which is equal to the number of passengers multiplied by the number of round trip miles for each trip. For example, three people taking a round trip flight to a destination 500 miles away equals $500 \times 2 \times 3 = 3000$ passenger/miles. Medium length flights are assumed for the carbon emissions coefficient.

WASTE & RECYCLING:

Landfill Waste - Estimate the total mass in **pounds** of household waste sent to the landfill for the year. The carbon emissions factor for this category includes average EPA values for transporting the waste, handling it, and the methane emissions from the organic fraction of the waste.

Landfill Waste - Estimate the total mass in **pounds** of all household materials (paper, aluminum, plastic) recycled during the year. This analysis will subtract from your footprint the carbon dioxide saved due to recycling. The carbon emissions factor for this category is therefore negative and includes average EPA values for transporting the recycling, handling it, and the carbon emissions saved since new raw materials are not required.

CARBON OFFSETS:

Carbon Offsets - Enter amount in **pounds** for any carbon dioxide offsets purchased. Do not double count carbon dioxide reductions from home renewable energy systems (solar panels or wind turbines) since these savings are already considered in other energy or fuel not used.

TOTAL CARBON FOOTPRINT - the total carbon footprint is the sum of the subtotals for each section minus any carbon offsets. To report the carbon footprint in tons of carbon dioxide, which is typical, divide the value of this sum in pounds by 2000.

