Appendix: formulas used to calculate pounds of carbon dioxide emissions avoided

kW = kilowatt = 1000 watts

kWh = kilowatt hour = "the electricity consumed by running a 1,000-watt device (for instance, a hair dryer) for one hour or the equivalent; if you kept a 100-watt lightbulb on for ten hours, it would use 1 kilowatt-hour's worth of electricity" (*Cooler Smarter*, p. 114)

A "1" or a "2" after "kW" or "kWh" is used to denote specific values, that is old amount used and new amount used, respectively.

1.014 lbs. of CO_2/kWh = the local power company's estimate based on the fuel it uses to produce electricity. The local power company is PEPCO.

A. TO CALCULATE HOW MUCH CARBON DIOXIDE A PERSON AVOIDS BY REDUCING HAIR DRYER USE

$$\frac{\text{hair dryer wattage}}{1000} = kW1$$

$kW1 \times$ the old amount of time in hours you used your hair dryer = kWh1

$kW1 \times$ the new smaller amount of time in hours you use your hair dryer = kWh2

[kWh1 $\times$ 1.014 lbs. of CO_2/kWh] - [kWh2 $\times$ 1.014 lbs. of CO_2/kWh] = amount of CO_2 in pounds avoided

B. TO CALCULATE HOW MUCH CARBON DIOXIDE A PERSON AVOIDS BY REPLACING OLD LIGHT BULBS WITH MORE ENERGY-EFFICIENT ONES

$$\frac{\text{Watts of the old bulb}}{1000} = kW1$$

$$\frac{\text{Watts of the new bulb}}{1000} = kW2$$

$kW1 \times$ amount of time in hours you used the old bulb per week = kWh1

$kW2 \times$ amount of time in hours you use the new bulb per week = kWh2

[kWh1 $\times$ 1.014 lbs. of CO_2/kWh] - [kWh2 $\times$ 1.014 lbs. of CO_2/kWh] = amount of CO_2 in pounds avoided

C. TO CALCULATE HOW MUCH CARBON DIOXIDE A PERSON AVOIDS BY REDUCING THE USE OF THE SAME LIGHTBULB

$$\frac{\text{Watts of the bulb}}{1000} = kW1$$

$kW1 \times$ amount of time in hours you used to use the bulb per week or day = kWh1

kW2 × smaller amount of time in hours you now use the bulb per week or day =kWh2

[kWh1 × 1.014 lbs. of CO2/kWh] - [kWh2 × 1.014 lbs. of CO2/kWh] = amount of CO2 in pounds avoided

D. TO CALCULATE HOW MUCH CARBON DIOXIDE A PERSON AVOIDS BY STUDYING AT SCHOOL AND THEREFORE NOT USING LIGHTS AT HOME

Use the same formulas in C.

E. TO CALCULATE HOW MUCH CARBON DIOXIDE A PERSON AVOIDS BY REDUCING CAR USE

miles used to travel = old gallons of gas used
    mpg

fewer miles now traveled = new gallons of gas used
    mpg

old gallons of gas used × 25 lbs. of CO2/gallon of gasoline = old pounds of carbon dioxide emitted

new gallons of gas used × 25 lbs. of CO2/gallon of gasoline = new pounds of carbon dioxide emitted

(approximately 25 pounds of carbon dioxide from oil drilling, refining, and distribution of gasoline and burning a gallon of gasoline Source: Union of Concerned Scientists, *Cooler Smarter*)

old pounds of carbon dioxide emitted - new pounds of carbon dioxide emitted = amount of CO2 in pounds avoided

TO CALCULATE HOW MUCH CARBON DIOXIDE A PERSON AVOIDS BY CARPOOLING

Use the same formulas as in E. above for your car and the other cars in the carpool. Add all cars' old gallons of gas used together and multiply by 25. Add all cars' new gallons of gas used and multiply by 25. Find the difference.

Alternatively, compare your old pounds of carbon dioxide emitted just from your car and find the difference between that and what your car now emits.