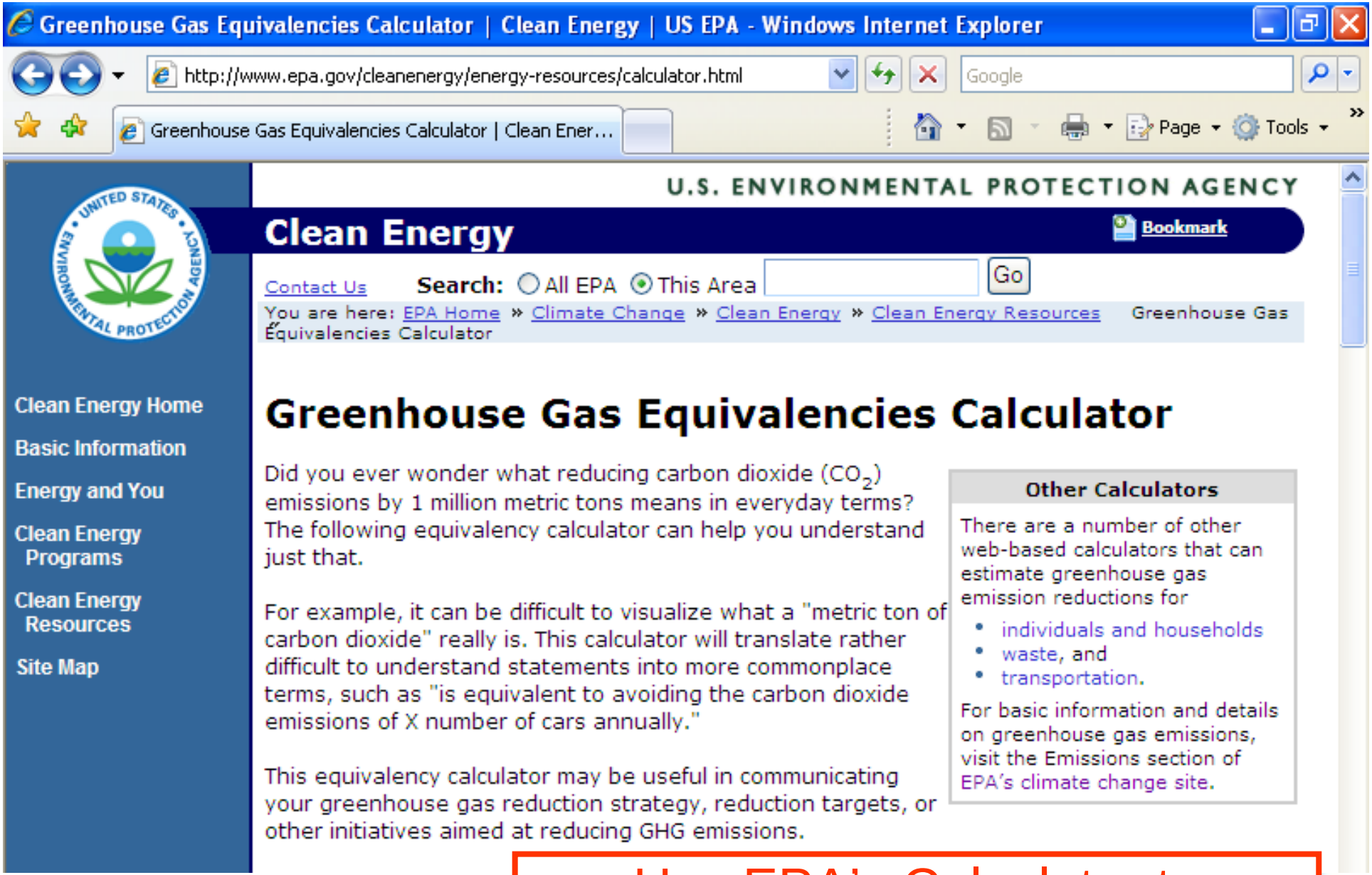
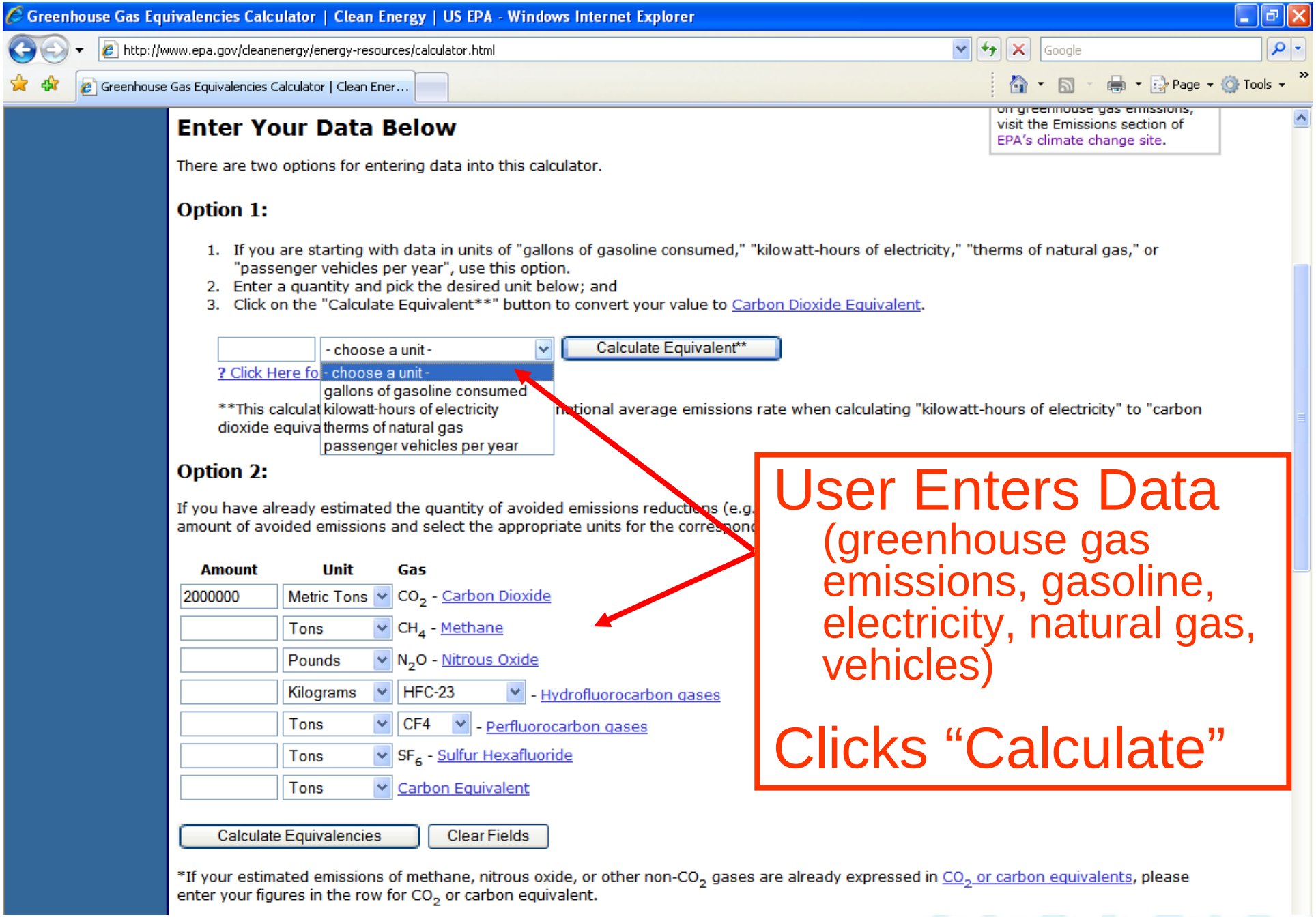
US EPA's Greenhouse Gas Equivalencies Calculator

September 2008



Use EPA's Calculator to communicate the magnitude of GHG emission reductions


Greenhouse Gas Equivalencies Calculator | Clean Energy | US EPA - Windows Internet Explorer
http://www.epa.gov/cleanenergy/energy-resources/calculator.html
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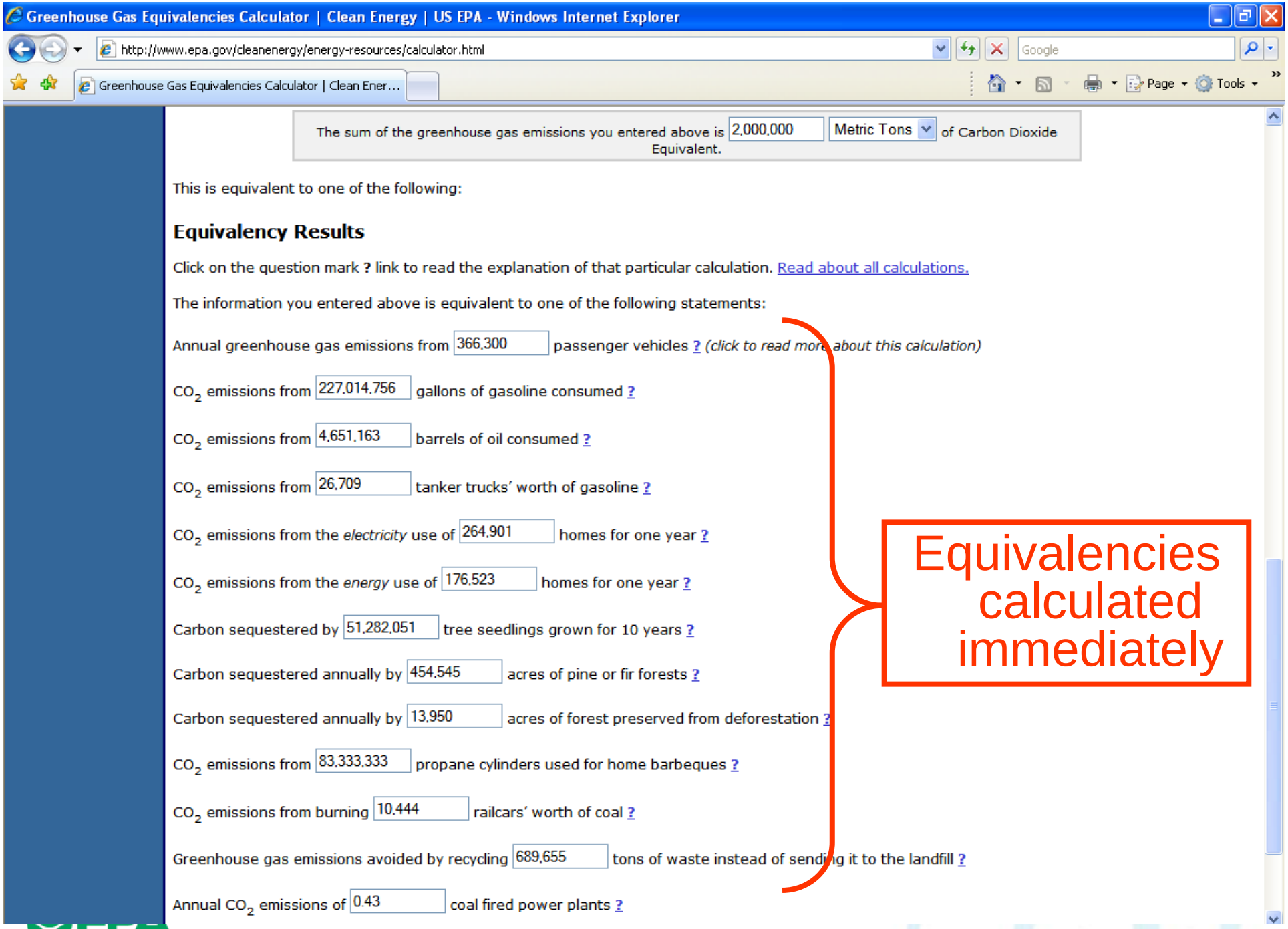
Tools
visit the Emissions section of
EPA's climate change site.
Enter Your Data Below
There are two options for entering data into this calculator.
Option 1:
1. If you are starting with data in units of "gallons of gasoline consumed," "kilowatt-hours of electricity," "therms of natural gas," or "passenger vehicles per year", use this option.
2. Enter a quantity and pick the desired unit below; and
3. Click on the "Calculate Equivalent**" button to convert your value to Carbon Dioxide Equivalent.
- choose a unit -
Calculate Equivalent**
? Click Here fo
- choose a unit -
gallons of gasoline consumed
kilowatt-hours of electricity
therms of natural gas
passenger vehicles per year
**This calculat
national average emissions rate when calculating "kilowatt-hours of electricity" to "carbon dioxide equiva
Option 2:
If you have already estimated the quantity of avoided emissions reductions (e.g.
amount of avoided emissions and select the appropriate units for the correspond
Amount
Unit
Gas
2000000
Metric Tons
CO2 - Carbon Dioxide
Tons
CH4 - Methane
Pounds
N2O - Nitrous Oxide
Kilograms
HFC-23
- Hydrofluorocarbon gases
Tons
CF4
- Perfluorocarbon gases
Tons
SF6 - Sulfur Hexafluoride
Tons
Carbon Equivalent
Calculate Equivalencies
Clear Fields
*If your estimated emissions of methane, nitrous oxide, or other non-CO2 gases are already expressed in CO2 or carbon equivalents, please enter your figures in the row for CO2 or carbon equivalent.
User Enters Data
(greenhouse gas emissions, gasoline, electricity, natural gas, vehicles)
Clicks "Calculate"
EPA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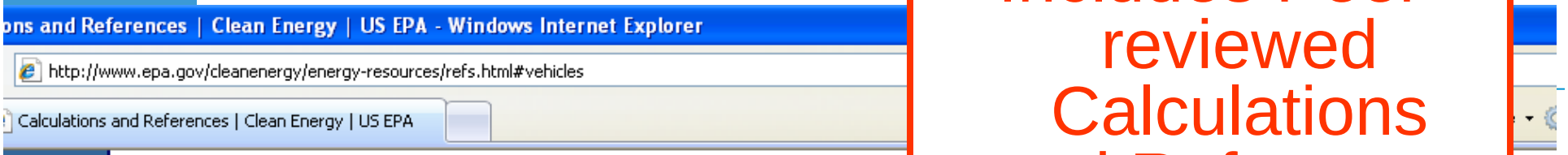
Tools
The sum of the greenhouse gas emissions you entered above is 2,000,000 Metric Tons of Carbon Dioxide Equivalent.
This is equivalent to one of the following:
Equivalency Results
Click on the question mark ? link to read the explanation of that particular calculation. Read about all calculations.
The information you entered above is equivalent to one of the following statements:
Annual greenhouse gas emissions from 366,300 passenger vehicles ? (click to read more about this calculation)
CO2 emissions from 227,014,756 gallons of gasoline consumed ?
CO2 emissions from 4,651,163 barrels of oil consumed ?
CO2 emissions from 26,709 tanker trucks' worth of gasoline ?
CO2 emissions from the electricity use of 264,901 homes for one year ?
CO2 emissions from the energy use of 176,523 homes for one year ?
Carbon sequestered by 51,282,051 tree seedlings grown for 10 years ?
Carbon sequestered annually by 454,545 acres of pine or fir forests ?
Carbon sequestered annually by 13,950 acres of forest preserved from deforestation ?
CO2 emissions from 83,333,333 propane cylinders used for home barbeques ?
CO2 emissions from burning 10,444 railcars' worth of coal ?
Greenhouse gas emissions avoided by recycling 689,655 tons of waste instead of sending it to the landfill ?
Annual CO2 emissions of 0.43 coal fired power plants ?
Equivalencies calculated immediately

Includes Peer reviewed Calculations and References



Passenger vehicles per year

Passenger vehicles are defined as 2-axle 4-tire vehicles, including passenger cars, vans, pickup trucks, and sport/utility vehicles.

In 2005, the weighted average combined fuel economy of cars and light trucks combined was 19.7 miles per gallon (FHWA 2006). The average vehicle miles traveled in 2005 was 11,856 miles per year.

In 2005, the ratio of carbon dioxide emissions to total emissions (including carbon dioxide, methane, and nitrous oxide, all expressed as carbon dioxide equivalents) for passenger vehicles was 0.971 (EPA 2007).

The amount of carbon dioxide emitted per gallon of motor gasoline burned is $8.81*10^{-3}$ metric tons, as calculated in the "Gallons of gasoline consumed" section.

To determine annual GHG emissions per passenger vehicle, the following methodology was used: vehicle miles traveled (VMT) was divided by average gas mileage to determine gallons of gasoline consumed per vehicle per year. Gallons of gasoline consumed was multiplied by carbon dioxide per gallon of gasoline to determine carbon dioxide emitted per vehicle per year. Carbon dioxide emissions were then divided by the ratio of carbon dioxide emissions to total vehicle greenhouse gas emissions to account for vehicle methane and nitrous oxide emissions.

Calculation

Note: Due to rounding, performing the calculations given in the equations below may not return the exact results shown.

$$8.81*10^{-3} \text{ metric tons } CO_2/\text{gallon gasoline} * 11{,}856 \text{ VMT}_{\text{car/truck average}} * 1/19.7 \text{ miles per gallon}_{\text{car/truck average}} * 1 \; CO_2, CH_4, \text{ and } N_2O/0.971\ CO_2 = \mathbf{5.46 \text{ metric tons } CO_2E \text{ /vehicle/year}}$$

Sources

- EPA (2007). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005. U.S. Environmental Protection Agency, Washington, DC. USEPA, Table 3-7 (p.3-9) (PDF) (59 pp, 1.47MB, About PDF) and Table A-108 (p.A-127) (PDF) (169 pp, 1.27MB, About PDF)
- FHWA (2006). *Highway Statistics 2005*. Office of Highway Policy Information, Federal Highway Administration. Table VM-1.

EPA