Personal Energy and Carbon Dioxide Calculator

Learn Your Impact!

(Approximately)

General Advice

- This energy calculator calculates both your **direct** and **indirect** energy use in different aspects of your life.

- The exercise tries to cover the many ways we use energy and don't think about it.

Convert Your Life to Energy

X Conversion Factor (kWh/action) = Kilowatt Hours per Year (KWh/yr)

Logistical Advice

- Estimate! Numbers don't have to be exact.

- Values are for the period **September 2005 through August 2006.**

- Values are for an Individual. This may mean dividing by number of people who share a resource, like a house or car.

- Conversion units are based primarily on US data. We can help with making adjustments for calculating energy use in other countries.

- Often, you will choose the conversion factor based on how energy efficient you are in your actions.

Residence - Area Heated/Cooled

$1 \text{ ft}^2 \approx 0.1 \text{m}^2$

Use a higher conversion factor if:
You live in a cold climate
You heat with oil instead of natural gas
You have an old, inefficient, or unadjustable heating system
Your building is not well insulated

space	sq. meters
dorm room	10 per person
1 bedroom apt	70
small house	150
big house (McMansion)	400 +

Residence - Area Cooled

- Calculate AC only for rooms cooled

Residence – Electricity Use

Use a higher conversion factor if:
You have many electrical appliances
Your oven and your water heater run on electricity
You use incandescent (not CFL) light bulbs
Your appliances are older or inefficient.

Residence – Indirect Energy

Use a higher conversion factor if:
Your building is made out of concrete or brick instead of wood
Your building is less than 40 years old.
Your building's construction was energy intensive, or involved lots of imported materials.

Mobility – Direct Energy

Divide all automobile calculations by number of people using it during an average or typical drive.

Fuel use

- Can estimate number of times tank is filled per week or month and multiply by tank capacity.

    | **Jeep Grand Cherokee** | 20 gal | = 76 L |
    | **Toyota Camry** | 18 gal | = 68 L |
    | **Honda Civic** | 13 gal | = 50 L |

    (Note: Gasoline and diesel have same energy content per liter)

- Can use mpg or liters/100 km, if known
- Can use g CO_2 / mile or km, if known

Mobility – Indirect Energy & Public Transport

- **km driven per year**
    - Divide car use by number of users.
    - Include taxis if you take them regularly
    - Factors influencing Conversion Factor Choice:

Use a higher conversion factor if:
You mainly drive in urban areas where highway construction is more intensive.

- **Car Weight**

|		
Jeep Grand Cherokee	4440 lbs	2000 kg
Toyota Camry	3100 lbs	1400 kg
Honda Civic	2450 lbs	1100 lbs

- **Public Transport**

Use a higher conversion factor if:
There generally aren't many people on your train or bus. Your air travel is in first or business class.

Flight Efficiency

Lots of short flights are less efficient than one long flight!

Energy consumed per hour of flight (*actual flight time*)
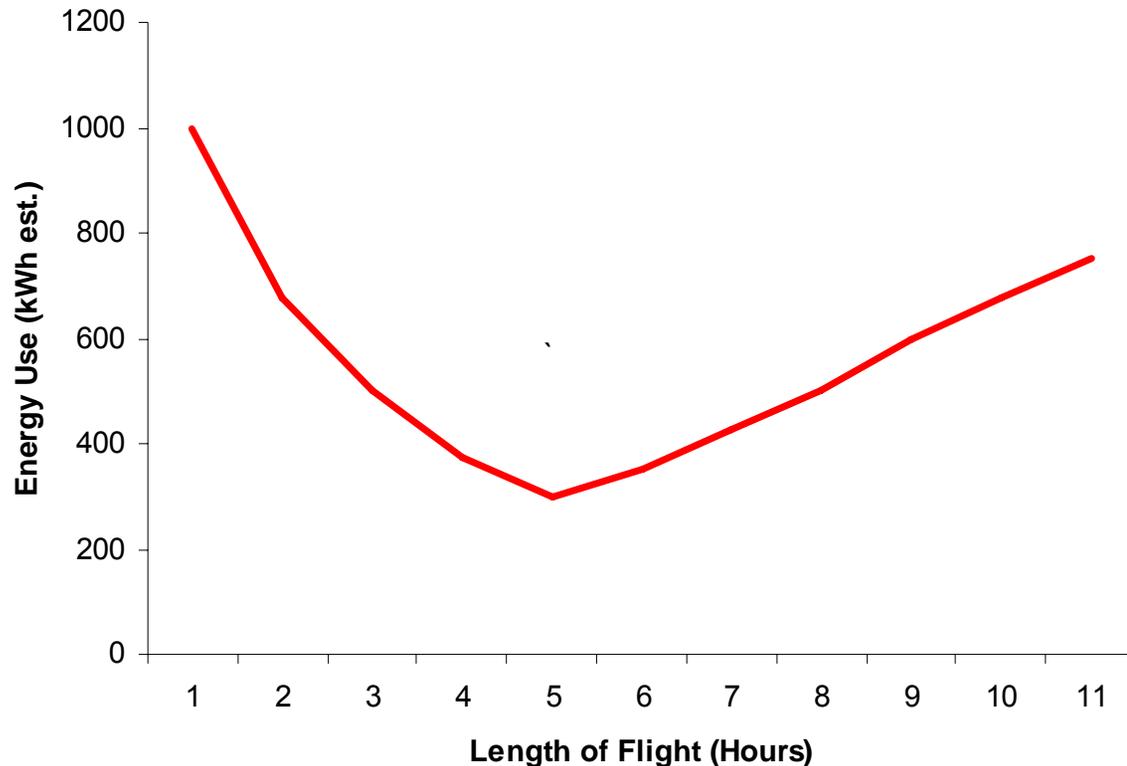
Nutrition

- Select the number that best corresponds to your eating pattern.

- "Vegetarian" includes fish, eggs, and dairy products

- Note that indirect energy required for food production is included in each category:

   -- If your food is highly processed and/or obtained primarily from restaurants or fast-food chains, use a *higher* value – for example, 20,000 kWh/year if you live exclusively on Big Macs

   -- If your food source is locally grown or derived from subsistence agriculture, use a *lower* value – for example, 5,000 or 6,000 kWh/year if you live exclusively on vegetables grown in your back yard

- Chocolate is a "free pass"

Private Consumption

Higher Education or working at MIT

- MIT's energy usage is approx. 10^9 KWH (10^6 MWH) per year, corresponding to CO_2 emissions ~ 220,000 Tonnes per year. If you were at MIT during 2005 – 06, a portion of this should be allocated to your energy / CO_2 account balance.

Furniture/Appliances

- Estimate the present value of all Furniture and Appliances in your home (What would you sell or insure it for?)
- Divide this value by the number of people using the items.
- Then divide by the average replacement time for furniture and appliances

Shoes & Clothing

- Estimate your average expenses per year

Computer and Internet Use

- Estimate hours/year you are "on line", multiply by 0.2 KW
- Includes a conservative estimate for power used to maintain servers on the Internet, wireless networks, etc., etc.
- When idle, turning off a monitor can reduce energy use by half

Public Consumption

This category accounts for energy used to produce and maintain public infrastructure (for example, maintenance of water supply infrastructure or public parks) and public systems (such as government benefits and administration, public schools, fire, police, health care, and the armed forces).

Nation	Public Consumption to Use
USA, Canada, Australia	8,000 – 10,000 kWh/y
European Countries, Japan	6,000 – 8,000 kWh/y
Rapidly Developing Countries	4,000 – 6,000 kWh/y
Less Developed Countries	1,000 – 4,000 kWh/y

What are your results?

(1) KWh you expended personally last year

(2) Your personal Kg CO_2 emission last year
Multiply KWh/year by 0.22
(varies by country from 0.1 to 0.3)

(3) How does this compare with the amount of CO_2 you emit as a living animal?
(We are each 100-Watt generators – and this is just about the same for each one of us)

BACKUP SLIDES

2003 Per Capita Consumption
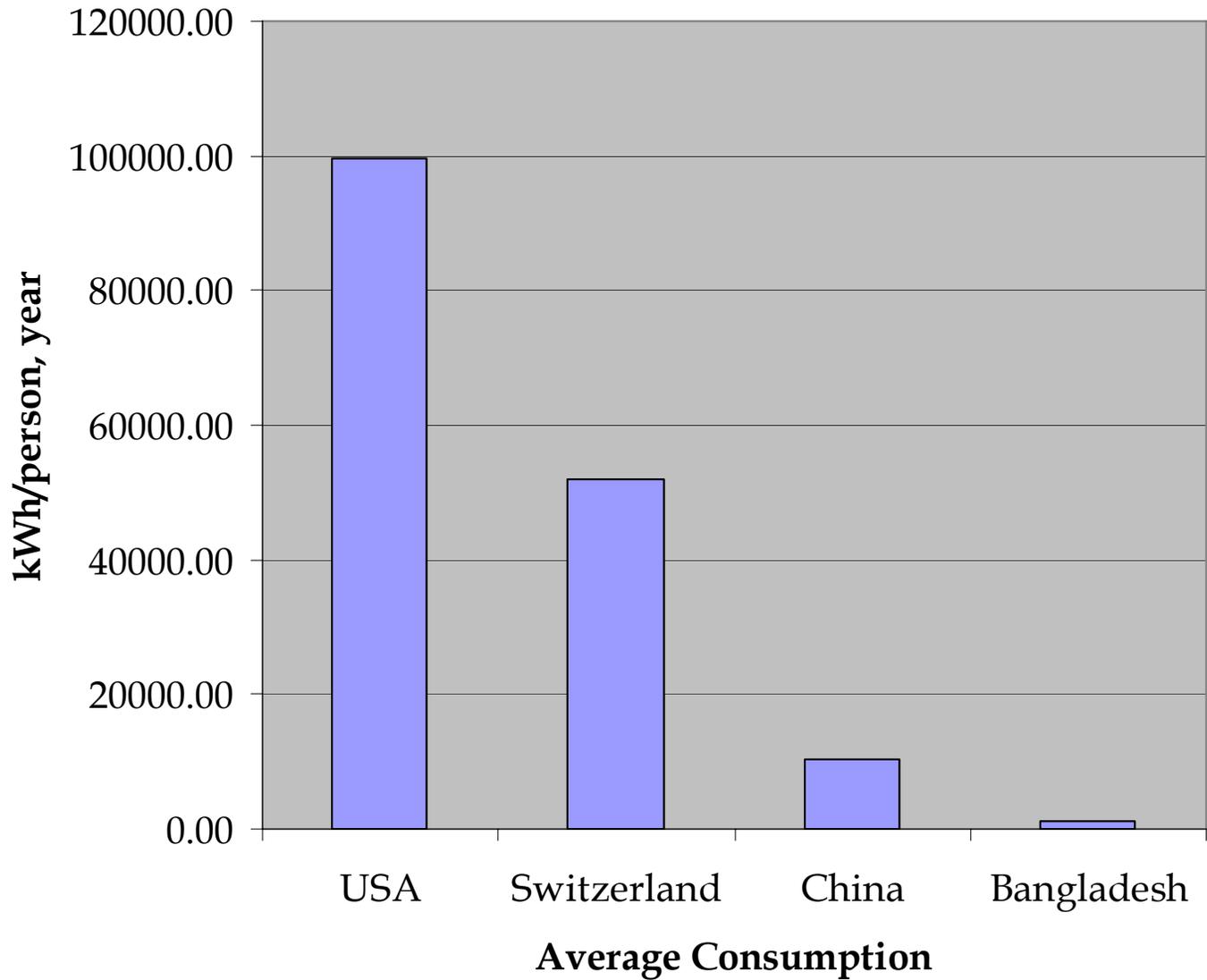
What could you do to change your total?

How many "negawatt-hours" can you generate by changing your energy use patterns and behavior?

"A 'negawatt' is a watt of electricity [or other form of power] that does not have to be generated because an energy-saving measure has eliminated the need for it."   -- Amory Lovins, RMI

What *can't* you change?