

Carbon Footprint Training



Connie Morella Library
Bethesda, MD
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Sponsored by Bethesda Friends Meeting (Quakers); www.bethesdafriends.org

Presenters



Rick Morgan

- Commissioner, DC Public Service Commission, 2003-2011 (retired)
- Economist; Creator of EPA's "eGRID" database of US power plants
- Member, Unity with Nature Committee, Baltimore Yearly Meeting (Quakers)



Keith Campbell

- Data scientist specializing in transportation
- Ph.D in Systems Engineering from Univ. of Pennsylvania
- Works for MITRE Corporation

The context for carbon footprinting

- 2015 Paris Climate Accords
 - 196 nations signed
 - UN IPCC report warned last month:
 - Warming mustn't exceed 1.5°C!
 - Atmospheric CO₂ has topped 400 ppm.
- Many motivated to track carbon footprints for:
- Households, congregations, communities

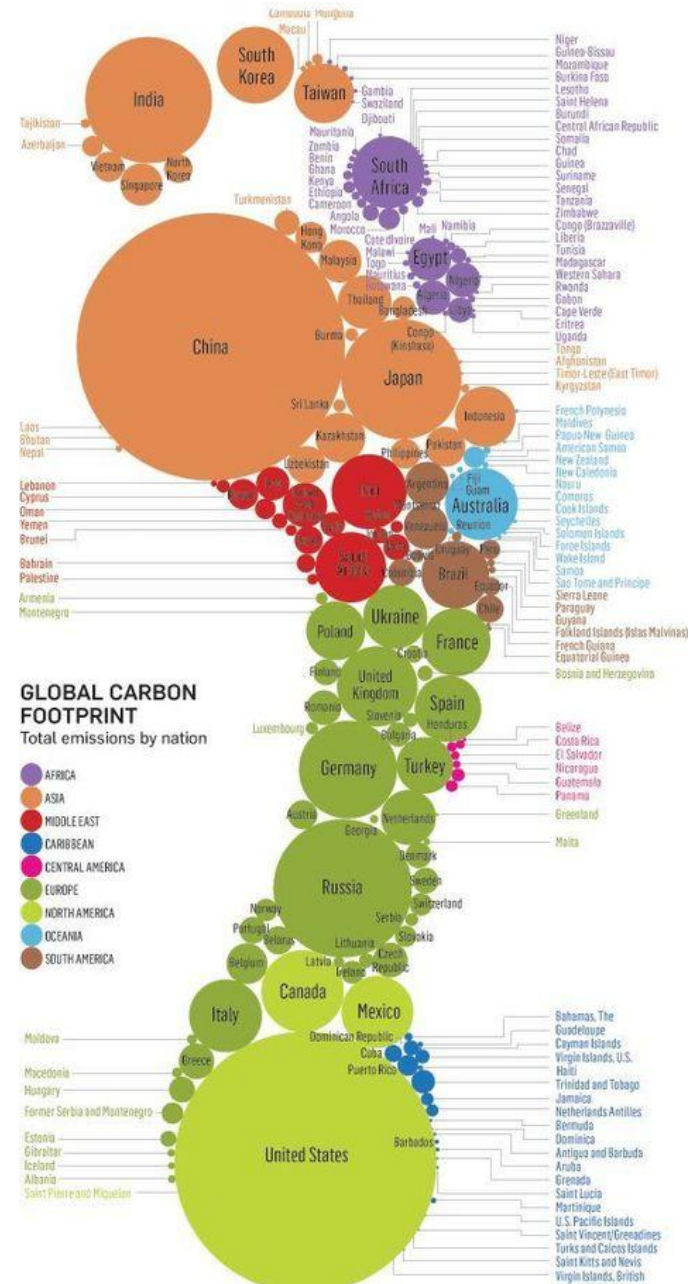


Comparing our carbon footprints worldwide

Annual U.S. per capita carbon emissions (~16 metric tons) are:

- Nearly double most European countries’.
- 4 times worldwide average (~4 metric tons per capita).
- 8 times our fair share of carbon the earth can sequester*.

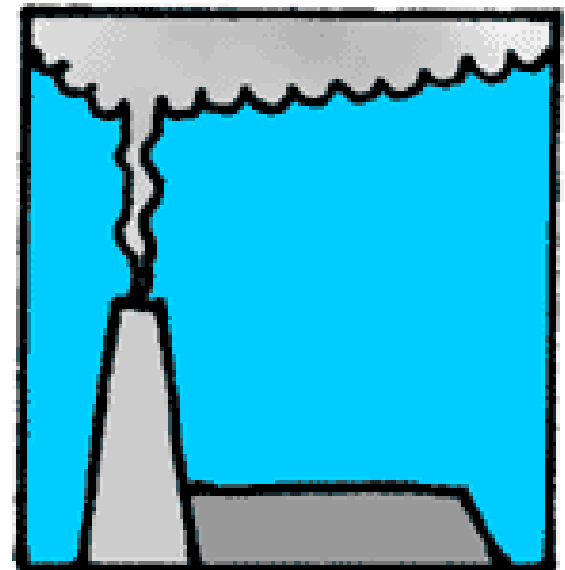
*~2.0 metric tons per capita annually, per 2015 Paris Climate Accords



Climate queries posed by Friends

- *As a human community, do we need to limit our human caused CO₂ to equal or less than what can be sequestered?*
- *Do we as individuals and nations need to share the limits of emissions fairly to avoid further CO₂ increases to the atmosphere?*

--Unity with Nature Committee
Baltimore Yearly Meeting (Quakers)



Reasons for footprinting

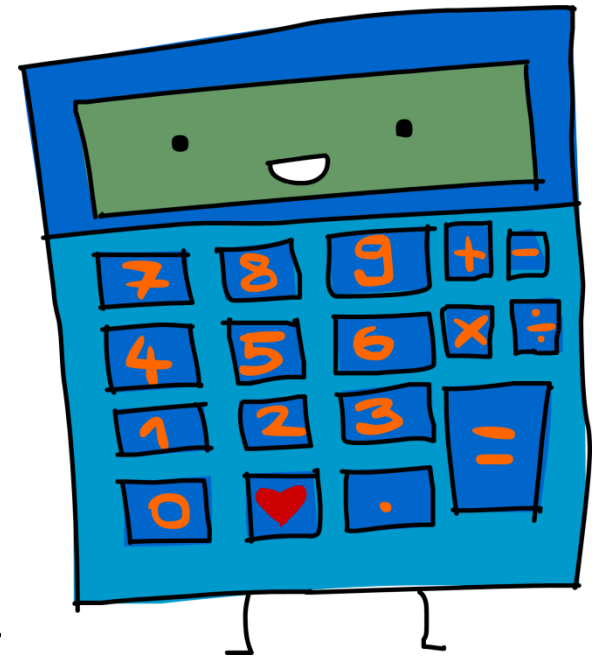
- Tracking our carbon footprints is a form of witness to our own actions that impact the earth.
- Footprinting can motivate us to:
 - make changes in our personal lifestyles.
 - work for cultural changes.
- Results are eye-opening!

“When I can see my own footprint, I can’t be silent and complicit!”



What makes a good carbon footprint calculator?

- Key attributes of a good calculator include:
 - user-friendliness --accuracy
 - robustness --usefulness of results
- No single calculator ideal in all respects.
 - Often tension between simplicity and accuracy.
- Typical features:
 - Organized by sector modules (travel, housing, diet, etc).
 - Scores generally reported by *household*, not per capita.
 - Scores expressed in *metric* tons of CO₂ annually
 - 1 metric ton = ~1.1 “short” US ton.




A leading on-line calculator: UC-Berkeley's CoolClimate*


- Precise & easy to use
- Choice of standard vs. advanced inputs
- Air travel module accounts for high-altitude emissions
- Documentation is thorough, transparent
- 'Take Action' list


* <https://coolclimate.berkeley.edu/calculator>


Phone-friendly version:


<https://www.nature.org/en-us/get-involved/how-to-help/consider-your-impact/carbon-calculator/>


Intro

Travel

Housing

Food


Shopping


Take Action

Start with a quick carbon footprint estimate

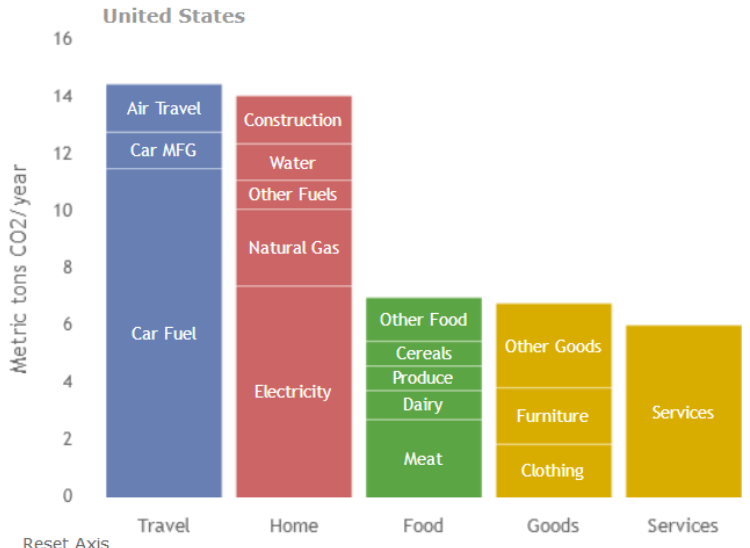
ZipcodeCityCountyState

Type your location

How Many people live in your household?
Average

What is your gross annual household income?
Average

United States



Category	Sub-category	Value (Metric tons CO2/year)
Travel	Air Travel	~1.5
	Car MFG	~1.5
	Car Fuel	~11.0
Home	Construction	~1.5
	Water	~1.0
	Other Fuels	~1.0
	Natural Gas	~1.0
	Electricity	~11.0
Food	Meat	~2.0
	Dairy	~1.0
	Produce	~1.0
	Cereals	~1.0
Goods	Other Food	~1.0
	Other Goods	~1.0
	Furniture	~1.0
Services	Clothing	~1.0
	Services	~1.0

Total
48.5
tons CO₂/year

The footprint of the average household in United States with average size and similar income.

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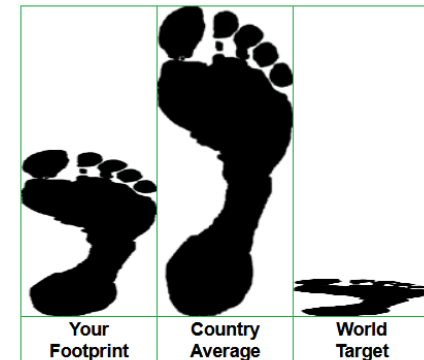
carbonfootprint.com (U.K.)

- Versatile & easy to use
 - Optional high altitude adjustment for air travel
- Score compared to your fair share of worldwide emissions target.
- Hawking of “carbon offsets” may be objectionable to some.

Your Carbon Footprint:

- ☒ House 0.00 metric tons of CO₂e
- ☒ Flights 8.89 metric tons of CO₂e
- ☒ Car 0.00 metric tons of CO₂e
- ☒ Motorbike 0.00 metric tons of CO₂e
- ☒ Bus & Rail 0.00 metric tons of CO₂e
- ☒ Secondary 0.00 metric tons of CO₂e

Total = 8.89 metric tons of CO₂e



To offset some or all of your carbon footprint, click the sections you would like to offset in the list above, and click the Offset Now button.

Total To Offset = 8.89 metric tons of CO₂e [Offset Now](#)

- Your footprint is 8.89 metric tons per year
- The average footprint for people in United States is 16.49 metric tons
- The average for the industrial nations is about 11 metric tons
- The average worldwide carbon footprint is about 4 metric tons
- The worldwide target to combat climate change is 2 metric tons

If you're using a public computer, or want to try again, you can [\[clear your carbon footprint data\]](#)

For ideas on how to reduce your carbon footprint, see the [CO₂ Reduction section](#) of our website.

Why not [sign up for our newsletter](#) to keep informed of other ways you can reduce your carbon footprint?

[< Secondary](#)




[add our CO₂ calculation tools to your website](#)

Cool Congregations*

(Interfaith Power & Light)

- Calculates footprints for religious congregations
- Accounts for energy use, staff travel
- Estimates emissions associated with food, office products, cleaning products
- Credit for congregation lands managed in their natural state

* <http://www.coolcongregations.org/calculator/>



COOL CONGREGATIONS

Brought to you by
Interfaith Power & Light
A religious response to global warming

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[Carbon Calculator Overview](#)
[Congregational Calculator](#)
[Household Calculator](#)

How Cool is Your Congregation?

What is a Carbon Footprint?

The vast majority of energy we use today is derived from the burning of fossil fuels such as oil, natural gas, or coal. A carbon footprint, as commonly known, is simply the weight of carbon or carbon dioxide emitted into the atmosphere each year from the burning of fossil fuels. The carbon footprint, however, can be expressed in other ways that are more useful and more consistent with the original ecological footprint concept: the area of the Earth's surface needed to absorb those emissions. On average, it takes roughly 41 acres to absorb one ton of carbon emissions. Other gases that contribute to global warming — such as methane from waste — are converted into "carbon equivalent" units then added to the carbon footprint.

Our Cool Congregations Calculator

Use our [Cool Congregations Calculator](#) to estimate your congregation's carbon footprint. It offers a snapshot of your carbon footprint, allowing you to look at the best places to lower your footprint and become more energy smart. We break your carbon footprint down into four sub-components:

Energy Use: We estimate the carbon emissions from your congregation's use of electricity, natural gas and other fuels.

Transportation: Carbon emissions from congregations and staff travel.

Goods and Services: Carbon emissions associated with food, office products, cleaning products, and everything else your congregation purchases.

Waste: Emissions from landfill waste (mainly methane) converted into carbon equivalent units.

Then we give credit for lands your congregation may manage in their natural state as carbon sinks and for any carbon offsets your congregation has purchased.

We provide your congregation's total footprint in both pounds of carbon and in acres.

Get Your Congregants Involved!

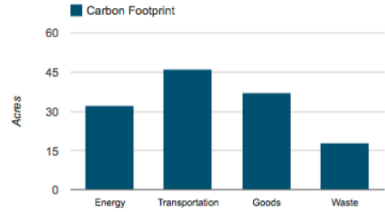
Once you calculate the footprint of your facility, what about your congregants? The "Cool Congregations" workshop is a stewardship program to help your congregants measure and reduce their household greenhouse gas emissions. It won rave reviews in Iowa where it was developed by Iowa Interfaith Power and Light. If you want to learn more about this workshop for individuals, please email us at info@InterfaithPowerandLight.org. You can also use this online [calculator for households](#) to help congregants shrink their carbon footprints.

USE THESE CALCULATORS TO SEE YOUR CURRENT CARBON FOOTPRINT AT HOME AND WITHIN YOUR HOUSE OF WORSHIP

[Congregational Calculator](#)
[Household Calculator](#)

Sample Congregation:
Blue Sky Church, CA

Gross Carbon Footprint (Acres)



CARBON FOOTPRINT COMPONENTS	CARBON (POUNDS)	ACRES
Energy Footprint	1,723.28	32.17
Transportation Footprint	2,479.06	46.28
Goods and Services Footprint	1,983.86	37.04
Waste Footprint	964.08	18.00
Gross Carbon Footprint	7,150.27	133.49

CARBON OFFSETS	CARBON (POUNDS)	ACRES
Credit for Purchased Offsets	0.00	0.00
Credit for Protected Lands	-319.23	-5.96
Total Carbon Offsets	-319.23	-5.96
This Congregation's Net Carbon Footprint	6,831.04	127.53
This Congregation's Per-Congregant Footprint	17.08	0.32
This Congregation's Developing World Index *		0.36

* This index indicates the number of developing world congregations that could be supported on this congregation's current energy use.

Takeaways re: carbon footprints

- Our carbon footprints are driven by our culture.
 - Societal infrastructure reinforces consumptive lifestyles.
 - Modifying behavior alone won't solve climate change.
 - Work for societal change!
- Still plenty of things you *can* control.
 - energy --travel
 - diet --purchases



Take action, beginning today

- Caring about this issue is not enough.
- Your individual actions are one important part of a larger solution.
- Let's look at some simple ways to cut your household's footprint by 1+, 5+ and 10+ tons per year.

Cut your footprint at least 1 ton

Switch to LED bulbs

(30+ bulbs)



Now less than \$2 per bulb.

Save money!

More comfort in summer!

Switch to Low-Flow Shower Heads



Good models provide a nice shower.

Much better than the 1980's version.

- **Cut a round-trip flight to Atlanta , Chicago or Toronto.**
- **Stop eating beef and pork in a 2-person household.**
- **Switch to high-efficiency water heater or front-load washing machine.**
- **Many more!**

Cut your footprint at least 5 tons

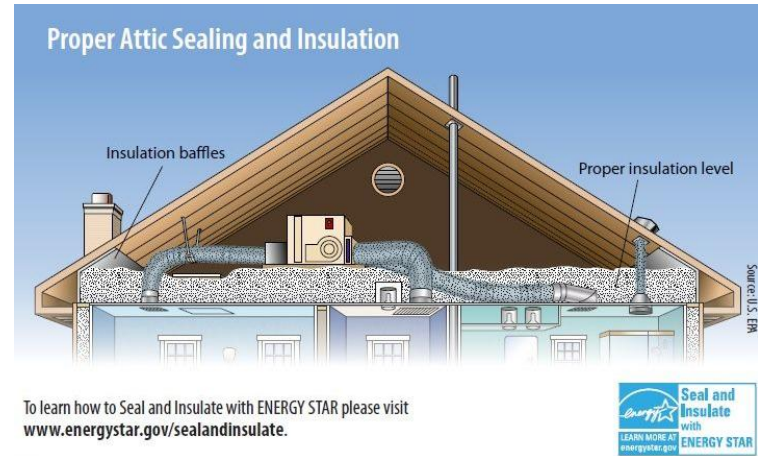
Change Electricity Provider



- e.g. solar and wind plans
- Easy to switch
- Rates very close to PEPCO's
- 10+ tons for some households

- **Cut a 2-person flight to California or Europe.**
- **Switch 2 vehicles to hybrid cars, or 1 car to transit.**
- **Install solar panels.**
- **Many more!**

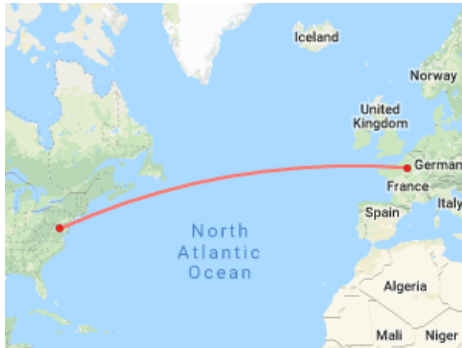
Seal and Insulate



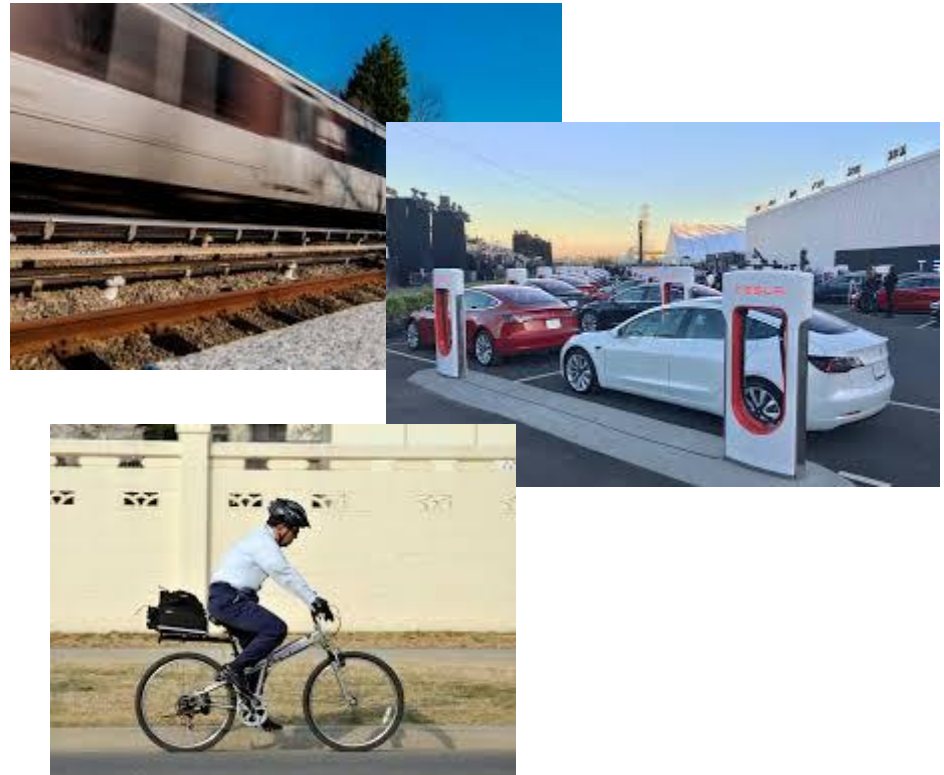
- Improves comfort too!
- Most effective for older, single family homes.

Cut your footprint at least 10 tons

Cut a 4-person trip to Europe or 2-person trip to Asia.



Switch 2 vehicles to transit, EV, or bicycle

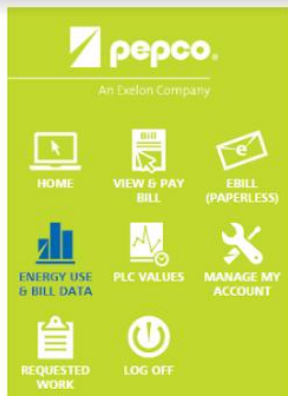


Combine Actions



- **Electrify gas appliances.**
- **Move to a smaller place.**
- **Many more!**

Sample Utility Bills for Footprint



MY ACCOUNT

[Redacted Name] (Update Profile) Service details at: [Redacted Address] BETHESDA, MD 20817

My Bill | My Energy | My Usage | Calculate Improvements | Learn About Energy

Bill History | Bill Analysis

Bill Center

Welcome Back

Account Summary

Account status as of 11/3/2016

Last Payment: \$116.28
Received 10/21/2016 - Thank you!

Account balance: \$59.77

[View & Pay Bill](#)

Bill Summary ending 11/1/2016

Previous balance: \$0.00
Total current charges: \$59.77
Amount Due 11/22/2016: \$59.77

Miscellaneous transactions not displayed here, such as budget billing, credits, refunds etc. may cause the Total Amount Due to not match the sum of the Previous Balance and Total Current Charges.

Bill Highlights

- The weather decreased your bill by \$45 - \$74.
- Your energy charges were \$56.51 lower for this bill.
- Your electric usage decreased for this bill.
- A shorter billing period decreased your Electric usage for this bill compared to the previous bill.
- Your electric rate decreased your bill \$1.91 this month.
- ☐ There were Peak Savings Days for this bill period.

[Bill Analysis](#)

When does my home use energy?

Daily Energy Use and Average

kWh

— Average — Weekday

Meter: Electric - NXA116024732

Bill to Date

- As of 11/2/2016, your bill is approximately \$10
- You are 6 days into your current billing period
- Your average daily cost is \$1.82
- As of 11/2/2016, you have used 71 kWh
- There have been no Peak Savings Days scheduled in the current bill period
- This billing period is scheduled to end on 11/25/2016
- Projected Bill: \$47 - \$70 ... assuming you use energy at your current pace

Net Energy Metering Customers, your data may not display accurately. [FAQ](#)

Energy Use Analysis

View graphs of my daily or hourly energy use. Loading your energy charts may take several seconds.

How does my home compare?

Electricity Costs 9/29/2016 to 10/27/2016

\$101 Avg. Home

Uses Least Energy | Uses Most Energy



Home > Energy Usage > Same Month Last Year

Account Holder: [Redacted] Account Number: [Redacted] Service Address: [Redacted] BETHESDA MD 21

Account Summary | Billing & Payments | **Energy Usage** | Account S

Month to Month | Same Month Last Year

Comparing: Oct 2015 : Oct 2016

	October 2015	October 2016
Gas Charges	\$46.73	\$37.16
Total Therms	37.00	25.00
Billing Days	29	29
Avg. Temp	65°F	65°F