

# Carbon Offsets

## Epidemiology & Biostatistics Green Committee

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We are all familiar with concern over global warming. Carbon offsets are a potentially useful tool for mitigating this problem.

### Why discuss here?

Discussion of carbon offsets seems particularly relevant because  
**Academic medicine involves a lot of air travel**

**Air travel contributes to global warming** In fact, it has a surprisingly large impact. For example,

- **Taking one East coast trip exceeds the impact of your annual residential electricity consumption** This is just your share of the flights' emissions. With PG&E's generation mix (which produces 0.52 pounds of CO<sub>2</sub> per KWh), you would need to consume almost double the national average per person (74% more than average) to match the flight's impact in a year. Look on your electricity bill for KWh/day and then divide that figure by the number of people in your household. If you get less than 21 KWh/day, the flight's impact is greater.
- **Study of UC Berkeley's carbon footprint: work-related air travel exceeded commuting**

Since we probably can't eliminate work-related air travel any time soon, it's worth considering ways to mitigate this negative impact.

**Offsets can mitigate this negative impact of our work**

### Outline

Why use offsets  
Types available  
What to look for  
Controversy  
Some specifics  
Recommendations

## Why use carbon offsets?

Not practical to avoid having any impact at all

- For example, need air travel to attend conferences, meet with colleagues, serve on committees, etc.
- Need to use a computer
- Need to get to the office

But it is feasible to neutralize impacts in efficient ways

Offset providers facilitate this

- Tools for calculating impact
- Options for efficiently (and cheaply!) preventing or neutralizing equivalent impact

Offsets are surprisingly cheap. They vary in price, but even at the higher prices, offsetting the entire country's CO<sub>2</sub> emissions would cost less than current spending on the Iraq war. This may be because there is still a lot of low-hanging fruit, very cost-efficient ways of reducing emissions. It's not clear that this would be true at much greater amounts, but for now this fruit should be picked.

## Major types of offsets

### Purchase Renewable Energy Certificates (REC's) also known as green tags

- REC's are created when energy is generated from renewable sources  
They represent the environmental attributes of 1 MWh of "green" electricity and are sold separately from the electricity itself.
- Often counted as replacing coal generation
- Actual impact is to create a market for REC's, which promotes more renewable energy projects

### Subsidize new renewable energy projects

- Like an investor, get a share of future REC's instead of future profits
- Often counted as replacing coal generation (and can be sited where this is likely to be true)
- Future REC's counted now

### Methane capture

- Methane is 20+ times more warming than CO<sub>2</sub>
- Burn methane that would have entered the atmosphere (converts it to CO<sub>2</sub>)
- Sources: landfills, manure
- Digesters for manure also generate heat which can be used to avoid some other energy consumption
- Burning can generate electricity which offsets the CO<sub>2</sub> that burning creates

[Note for posting but not discussion?] Although manure projects use the heat and generate electricity more often than landfill projects, this makes them more economically viable, which in turn makes it less clear whether they would eventually happen anyway without investment from offset purchases. At least one offset provider (NativeEnergy) applies a future discount rate to account for this possible "mainstreaming" of the technology. This can have the ironic effect of making the more efficient manure-based projects appear to be less effective offsets than landfill-based ones.

### Tree planting

- Trees absorb CO<sub>2</sub> as they grow much faster in tropic than temperate regions
- But vulnerable to fire
- May not be effective in temperate climates

### Others

- Energy efficiency
- Purchase emission allowances to reduce caps in cap-and-trade systems
- Many others for overview see

[http://www.ecobusinesslinks.com/carbon\\_offset\\_wind\\_credits\\_carbon\\_reduction.htm](http://www.ecobusinesslinks.com/carbon_offset_wind_credits_carbon_reduction.htm)

## What to look for

**Additionality**—offset would not have happened without your purchase

**Side effects** These can be either good or bad

- **Tree planting that displaces people** This is alleged to have happened for some projects in the tropics, where tree planting is most effective
- **Income or improved living conditions for disadvantaged people**  
NativeEnergy.com is native American majority owned and supports projects on native lands or small family farms. sustainableTravel.com offers projects designed to have side benefits in the developing world.
- **Reduced acid rain**

**When will the offset actually happen**

- **More than 20-30 years from now may be too late** Much of the carbon absorption from planting Douglas Fir trees in California, for example, would happen many decades after they are planted.  
Longer times also impact the next consideration, risk.

**Risk** Offsetting projects may not work as expected.

- **trees might burn**
- **methane capture might become mainstream in a few years** Because the future context of energy economics and policy is so uncertain, many types of projects may turn out not to be additional, or to be additional only in the sense that they occur a few years earlier because of offset purchases.

**Certification** The carbon offset market is unregulated, so certification systems are developing to ensure that purchases are likely to perform as intended. In particular, it is important to ensure that benefits are not exaggerated and that the money is spent as promised.

- **Accuracy**
- **Honesty**

**Tax deductibility, convenience, price (?)** These practical considerations may be important. Tax deductibility makes the government share the cost. NativeEnergy.com and PG&E's new climateSmart program allow for automatic monthly payments. Prices vary from about \$5 to \$15 per ton, but the uncertainty concerning the quality of the offsets and the accuracy of the projected amounts of CO<sub>2</sub> actually prevented or neutralized means that cheaper may not really be better.

## Controversy

The most prominent criticisms in the popular press have essentially been about how distasteful or absurd it is to try to use money as a substitute for virtue.

### Comparison to indulgences in the middle ages

- Pay money instead of repenting and changing
- Satirized with analogies about adultery, diet, etc. A website called [cheatNeutral](#) allows those who cheat on their spouses to offset their infidelity by paying a small amount to have someone else pledge to be faithful to their spouse

From a strictly physical viewpoint, the analogies fail

- CO<sub>2</sub> really is fully interchangeable
- Emitting 1 ton and preventing 1 other ton is exactly the same as not emitting 1 ton and not preventing the other ton

From other viewpoints, the picture is murkier

### Fig leaf for wasteful lifestyle

- Rich folks use offsets to avoid their fair share of necessary sacrifices One could argue that offsetting is similar to paying money to be excused from a military draft, for example

Much more morally palatable if used for impacts that are very hard to avoid

One provider's slogan is:

“Reduce what you can, offset what you can't”

Despite the above moral dimension, physical reality should count for something.

Wasting and offsetting still seems better than wasting and not offsetting

If all US CO<sub>2</sub> emissions were offset, impact would be huge One way to assess the acceptability of an action is to ask, “what if everyone did it?” Carbon offsetting seems to pass this simple test.

The uncritical acceptance of doubtful analogies as outlined above is clearly not a legitimate reason to avoid offsetting. The satires seem to me like a “swift-boat” style disinformation campaign. If our primary concern is with mitigating global warming rather than passing judgment on people's virtue, then offsets are a useful tool.

## Controversy

Two real and very important dangers are:

**Could compete with direct reductions, which are better** Actually reducing your impact on the climate is like a perfect offset (immediate, with no risk of later turning out to be ineffective), and offsets alone without direct reductions seem unlikely to be able to produce as much change as is needed. So we need to be vigilant about preventing an offset purchase from becoming an excuse for not making reasonable efforts to reduce our impact.

**Could compete with policy changes, which are crucial** Similarly, we will need policy changes, so purchasing offsets should not be a substitute for advocating change.

These seem like legitimate concerns, but we should be able to recognize and avoid the temptation.

Finally,

**Some offsets have later proven to be ineffective, not additional, or to have bad side effects**

- **tree planting in temperate climates** A study concluded that this is not effective, because of slow growth rates and reduced reflection of solar heating
- **buying and retiring emissions allowances** Offsets designed to effectively reduce the cap in Europe's cap and trade system failed, because the caps were too high

The fact that there is some risk is a reason to be careful but not a reason to cynically assume that all offset purchases will have no effect.

Turning to some specifics:

## For work-related travel

Easy to calculate the offset needed for a trip using online calculators

- [nativeEnergy.com](http://nativeEnergy.com)
- [carbonFund.org](http://carbonFund.org) Scroll down to the calculator specifically for air travel.

These two are fairly easy to find and use, and they include, or give you the option to include, additional warming effects of air travel caused by release of water vapor at high altitude. For details, see <http://www.grida.no/climate/ipcc/aviation/083.htm>.

Cost of offsets is comparable to value of the frequent flier miles you get

- could use personal funds, still break even
- may be possible to use unrestricted funds
- can't (yet) use grant or State funds This should change. It is certainly allowable to take a taxi instead of public transportation and to be reimbursed for the extra expense. Preventing damage to the climate seems as legitimate as saving a few minutes and enjoying the added convenience of a taxi ride. And the cost of offsets is probably less than that of the four taxi rides on a typical trip.

## Other impacts

Calculators can also estimate impacts of driving and other travel, electricity, and natural gas consumption, in addition to air travel

For electricity and natural gas, PG&E will now add offset charges to your bill if you so request. Unfortunately, tree planting in California is one of only two types of offset projects that will initially be funded. For details see [http://www.pge.com/about\\_us/environment/features/climatesmart.html](http://www.pge.com/about_us/environment/features/climatesmart.html)

But these account for less than half of the CO<sub>2</sub> emissions in the US

- Everything you buy, eat, or use has an impact Meat from mammals is particularly energy intensive and the Department is no longer serving this at official function
- [carbonFund.org](http://carbonFund.org) has option to multiply by 2.5 This may or may not approximate your actual total carbon footprint. Your total impact is difficult to define and estimate accurately, and there may not be much point in doing so.

No need to tie offsetting to your own carbon footprint (Or if you do, you could consider going "lifetime carbon neutral")

- could just treat "offset" purchases as a form of charitable giving

Although the idea of going "carbon neutral" may be good marketing, in some ways the term "offset" is unfortunate. Just as some people go beyond just paying the ticket price and donate extra money to the ballet, symphony, museums, etc., purchasing carbon reductions well beyond what you are personally responsible for may be a worthwhile expense if you can afford it and you care a lot about the environment and the future. If we think of offset purchases as a voluntary carbon tax, then perhaps it should be progressive like income tax, with wealthier individuals paying more. This might alleviate some of the controversy about offsets being like indulgences and rich folks getting off too easy. If corporate CEO's promised to offset 20 times their own carbon footprints, it might not seem so bad for them to have huge footprints.

## Conclusions and recommendations

Offsetting work-related travel (and other things) is worth doing, but be careful

Some good choices These providers seem reliable

- [nativeEnergy.com](http://nativeEnergy.com) Benefits native Americans and Alaska natives
- [sustainableTravel.com](http://sustainableTravel.com) Offers projects designed to have side benefits in developing countries
- [terraPass.com](http://terraPass.com)

You can find a directory of many other providers at

[http://www.ecobusinesslinks.com/carbon\\_offset\\_wind\\_credits\\_carbon\\_reduction.htm](http://www.ecobusinesslinks.com/carbon_offset_wind_credits_carbon_reduction.htm).

An in-depth review of providers can be found at:

<http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf>

Take other action, too Don't let offsets displace other needed action

- Minimize air travel, don't just offset
- Support replacing in-person meetings with alternatives such as video conferencing

Will talk about next month