Energy Facts

Plane © flickr/caribb. Recycling © flickr/holeymoon. Thermostat © flickr/mulmatsherm. Produce © istock/Carterdayne.

Simple and Inexpensive Actions Could Reduce Global Warming Emissions by One Billion Tons

The United States is the world's second-largest emitter of global warming pollution, currently pumping approximately 7 billion tons of greenhouse gases (GHGs) into the atmosphere every year. U.S. residents have an individual "carbon footprint" that is more than 20 times larger than people living in many developing countries. If Americans adopted a series of simple and inexpensive emissions-reducing measures in the areas of transportation, household energy consumption, diet, and waste over the next ten years, the U.S. could avoid 1 billion tons of emissions annually, beginning in 2020, and save money.[1] This sum represents nearly 15 percent of current national emissions, and is roughly equivalent to the total greenhouse gas emissions of Germany, the largest polluter in Western Europe.

Behavioral change and personal action—in addition to responsible policymaking and technological innovation—are critical to any successful effort to curb greenhouse gas pollution and avoid the worst impacts of climate change. All of the recommendations offered here are cost-effective and ready to be adopted immediately. They are simple and yet significant steps we can all take to help protect our own health, our communities, and the planet.

For more information please contact:

Sasha Lyutse
(212) 727-4603

Matthew Eisenson
(212) 727-4630

GARRISON INSTITUTE

NRDC
THE EARTH'S BEST DEFENSE

www.nrdc.org/policy
March 2010 R3

Energy Facts

Simple and Inexpensive Actions Could Reduce Global Warming Emissions by One Billion Tons

TABLE 1: Recommended Actions to Reduce GHG Emissions

The figures in this table represent emissions reductions (measured in millions of metric tons carbon dioxide equivalent, $MMtCO_2e$) achievable if these measures were adopted by 100 percent of the population, thus showcasing the power of these actions to reduce greenhouse gas emissions.

RECOMMENDED ACTION	SECTOR	TOTAL EMISSIONS REDUCTION IN 2020 ($MMtCO_2e$)
Carpool twice or telecommute once to work every week	Transportation	75
Fly once less per year: One fewer roundtrip domestic flight for those who travel more than three times per year	Transportation	55
Maintain vehicle properly: Use recommended oil grade, remove 100 pounds excess weight, keep engine tuned and tires inflated	Transportation	45
Reduce motor vehicle idling: Decrease idling duration by 50%	Transportation	40
Upgrade less frequently; when upgrading choose EnergyStar; use dryer sparingly: Extend life of personal computer by 50%, upgrade to EnergyStar refrigerator and dishwasher when replacement is necessary, hang-dry clothes rather than using a clothes dryer in the summer	Household Energy	115
Attend speedily to leaks and heat loss in the home: Caulking, weatherstripping, attic insulation	Household Energy	85
Use programmable thermostat and recommended temperature settings while at home and when away	Household Energy	80
Reduce idle, or phantom, electricity use: Unplug or shut off unused electronics more often, unplug extra refrigerator, set computer to hibernate, turn off unneeded lights	Household Energy	70
Use hot water more efficiently: Wash clothes in cold water, lower temperature settings of heater and wrap heater with insulation, use efficient faucets and showerheads	Household Energy	65
Replace incandescent bulbs with CFLs: Six interior and one exterior bulbs per household	Household Energy	30
Consume less red meat and dairy: Eat poultry in place of red meat and consume plant-based foods rather than dairy two days per week.	Food	105
Waste less food: Reduce consumer food waste by 25%	Food	65
Recycle whenever possible: Increase rates of recycling on paper, plastics, and metals by 50%	Consumption and Recycling	105
Consume paper and plastics more responsibly: Print double-sided, buy recycled products, reduce catalog subscriptions, buy less bottled water	Consumption and Recycling	60
		1,000

TRANSPORTATION

Driving Down Emissions by Changing How We Drive

Passenger transportation accounts for almost 25 percent of U.S. greenhouse gas emissions, and local transportation alone (cars, buses, and trains) accounts for 15 percent, or roughly 1 billion metric tons.[2] In this automobile-dependent nation, more than 75 percent of the workforce drives alone to work every day, with an average roundtrip commute of 24 miles.[3]

Although public transportation options are limited for many Americans, there are other ways to change behavior to save money and reduce pollution. Carpooling to work two days per week, or telecommuting one day per week, would reduce vehicle miles traveled by 20 percent and cut greenhouse gas emissions by roughly 75 $MMtCO_2e$.

Every year, we waste 5 to 8 percent of our gasoline idling, largely due to a misconception that idling causes less wear and tear, and even less fuel consumption, than shutting off and restarting a car's engine.[4] Reducing idling by 50 percent would have an immense impact, reducing greenhouse gas emissions by 40 $MMtCO_2e$.

Improper vehicle maintenance drags down vehicle fuel efficiency and wastes billions of gallons of gasoline every year. In 2005, underinflated tires alone caused more emissions than each of the 65 smallest greenhouse gas-emitting countries in the world.[5] Each of the listed measures causes a drag of 2 to 4 percent.[6] If corrected, the aggregate impact could reduce emissions by 50 $MMtCO_2e$.

Reduced idling, basic vehicle maintenance (proper tire inflation, engine tuning, using the appropriate grade of motor oil, and removing excess weight), and more frequent use of carpooling and/or telecommuting will help to cut these local emissions by more than 160 $MMtCO_2e$.

What Difference Can 340 million Americans Make?

Visit NRDC's Simple Steps website at **http://www.simplesteps.org/billion-tons** for a demonstration of how powerful your actions can be!

Flying Less

With scarcely one-fifth of Americans taking three or more roundtrip flights per year, and more than half (52 percent) not flying at all, the emissions impact of air travel is disproportionate to its overall utility.[7] The average one-way commercial flight from London to Los Angeles produces more greenhouse gas emissions per passenger than the average British commuter produces yearly by car, train, and subway combined—and this is only half of the climate change picture.[8] Due to the high altitude at which planes release the majority of their emissions, airplanes' contrails (cloud-forming vapor streams) significantly increase the heat-trapping impact. While it would be unreasonable to expect those who fly only one or two times per year to give up their flight (that flight could well be their vacation), frequent flyers, and especially business travelers, could take advantage of alternative options like telecommuting to cut down on air travel. If those Americans who fly three or more times per year give up one medium-distance domestic roundtrip, total greenhouse gas emissions savings would amount to 55 $MMtCO_2e$.[9]

HOUSEHOLD ENERGY USE

Efficient Heating and Cooling

The simplest and cheapest measures available to the individual for home weatherization—patching leaks, sealing ducts, and installing attic insulation—can cut the costs and emissions associated with heating and cooling your home by up to 20 percent, which would translate to a national savings of nearly 85 $MMtCO_2e$.

Turning down heat settings by 2°F in winter and turning up cooling settings by 2°F in summer will save 6 percent and 12 percent on energy costs respectively, and more than 35 $MMtCO_2e$ in emissions. Further, installing a programmable thermostat and using recommended nighttime and daytime (away-from-home) settings can save upwards of 1 Mt of greenhouse gas emissions per household per year in many parts of the country. Currently, fewer than 15 percent of U.S. households have adopted these non-disruptive, energy-saving measures. The remaining 85 percent can save more than 45 $MMtCO_2e$ by following suit.[10]

Improving Water Heating Efficiency

Heating water is extremely energy intensive. Fortunately, it is both easy and cost-effective to improve efficiency in this area. Washing clothes in cold water, insulating one's water heater, and setting its temperature down by 20°F (from the unnecessarily high default setting of 140°F) are easy first steps. Ninety percent of the energy consumed by a washing machine goes toward heating the water, which is often unnecessary given the effectiveness of modern detergents. Simply washing clothes in unheated water 75 percent of the time will cut 18 $MMtCO_2e$. Replacing existing faucets and showerheads (especially those manufactured before 1992) with high-efficiency units and installing faucet cap aerators—all of which reduce wasteful water flow—will cut emissions by more than 60 MMtCO2e.[11]

Responsible Upgrades and Appliance Use, Reducing Standby Power and Increasing Lighting Efficiency

Upgrading one's refrigerator and dishwasher to EnergyStar-approved models over the next 10 years (during which time many will fail anyway) will save almost 55 $MMtCO_2e$ and generate energy savings that go beyond paying for the cost of the new units. On the flipside, EPA analysis shows that if we all wait six years instead of four to replace our personal computers, we will avert emissions of 25 $MMtCO_2e$. Further, simply using our appliances less will save energy and money. For example, hang-drying clothes in the summer instead of using a drying machine will save 35 $MMtCO_2e$.

Unplugging appliances that are not in use is also an easy way to save energy and money. The average household computer is left in "idle" mode for an unconscionable 6,000 hours per year, and other "phantom" energy losses from standby consumption account for 5 to 15 percent of total household energy use. Setting one's computer to automatic hibernate, unplugging the energy-soaking extra garage refrigerator, and unplugging idle electronic devices will save almost 60 $MMtCO_2e$. In dollar terms, unplugging an extra refrigerator could easily save $200 to $300 per year.

Compact fluorescent light bulbs (CLFs) require only 25 percent of the energy of a traditional incandescent bulb to produce the same intensity of light. Replacing six interior and one exterior incandescent bulbs with CFLs will save approximately 30 $MMtCO_2e$. Today, residential lighting accounts for roughly 100 $MMtCO_2e$ of emissions, at least one-third of which is wasted. If we could cut this waste by 50 percent, we would save an additional 14 $MMtCO_2e$ after subtracting the savings for CFLs (or 18 $MMtCO_2e$ without switching to CFLs).[12]

FOOD

What We Eat Matters for the Climate

According to the United Nations, the global livestock industry is responsible for roughly 18 percent of global greenhouse gas emissions (includes emissions resulting from related deforestation). Livestock consume more than half of the grain produced in the United States and clearing space for grazing is a leading cause of deforestation in the developing world. Ruminant mammals (cows, sheep, and goats) emit large quantities of methane in digestion, a greenhouse gas 23 times more potent than carbon dioxide, and the nitrogenous fertilizers used to grow livestock feed crops emit high quantities of nitrous oxide, a gas 300 times more potent than carbon dioxide. A recent study suggested that the environmental impact of red meat production is so significant that dropping red meat one day per week would reduce GHG emissions as much as consuming only locally-grown products all week—a staggering figure considering that the average distance our food travels from farm to fork is approximately 1,500 miles.

Energy Facts

Simple and Inexpensive Actions Could Reduce Global Warming Emissions by One Billion Tons

Eat Less Red Meat and Dairy

All meats are not created equal: while the average pound of beef consumed in the United States is responsible for 20 pounds of emissions, a pound of chicken is responsible for less than two. Today's average American consumes a prodigious quantity of red meat: the equivalent of one McDonald's Angus Bacon and Cheese Burger per day. Replacing two days' servings of red meat with poultry will reduce emissions by more than 70 $MMtCO_2e$.

Dairy cattle similarly produce vast quantities of greenhouse gas emissions. Dropping dairy two days per week in favor of plant-based foods is not only healthy—animal fats are closely correlated to obesity, diabetes and many forms of cancer—but will save more than 35 $MMtCO_2e$.[13]

RECYCLING AND RESPONSIBLE CONSUMPTION

Waste Less

Despite the enormous financial and environmental costs of food production, a staggering 25 to 40 percent of food that leaves the farm in the United States is never eaten; it is instead lost as waste at the retail, distribution, and household levels. If Americans cut food waste by only 25 percent, we would save nearly 65 $MMtCO_2e$ (counting only emissions related to production and distribution, and excluding methane emissions from landfill decomposition).[14]

Buy Responsibly

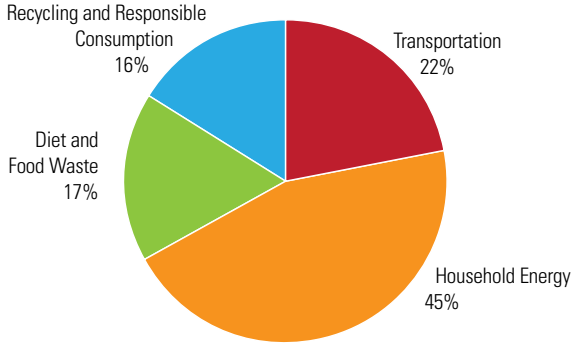
Smarter consumption of paper and plastics will also significantly reduce emissions. Buying recycled paper, stemming the flow of unwanted catalogs by two-thirds, and reducing printer paper consumption by one-third (easily achieved by printing double-sided) will save more than 50 $MMtCO_2e$.[15] Dropping bottled water consumption by 50 percent in that same timeframe will save another 8 $MMtCO_2e$.[16] Avoiding excessive packaging will have an immense impact not quantified in this research.

Recycle More

Finally, we must dispose more responsibly of our waste. The national recycling rate currently stands at a mere 33 percent. If the recycling rates of paper, glass, metals and plastics, and of composting of food (currently less than 3 percent) and yard trimmings increased by 50 percent over the next decade, we could avoid emissions of over 105 $MMtCO_2e$.[17]

Figure 1: Where in Our Lives We Can Reduce Our Impact

Share of Total Reductions, by Sector



The data in this pie chart are derived from the chart on page two.

Now that You Know, It's Time to Act

These simple measures that can bring significant reductions to our carbon footprint must be taken to avoid the worst impacts of climate change, and this transformation begins with you. Being more conscientious of the effect our daily choices have on the future of the planet is the first step; taking action is the necessary next step. While the U.S. government must act quickly to enact meaningful and comprehensive climate and clean energy legislation, American consumers should not make the mistake of waiting to act. If we step up now, as individuals and communally, we can prevent a staggering one billion tons of emissions, helping to safeguard the planet while also saving money.

[1] The billion ton reduction is not a projection of likelihood, but rather a model constructed to quantify the potential GHG benefits of collective action. Implementing widespread behavioral change is a formidable obstacle that is outside the scope of this study. The abatement calculations assume maximum participation among the eligible population for each measure. Eligibility qualifications were drawn conservatively, and count only the abatement impact of those individuals for whom the modest behavioral change is possible and applicable. We measure annual, non-cumulative reductions achievable beginning in 2020.

[2] U.S. EPA, Office Of Solid Waste And Emergency Response, September 2009, http://www.epa.gov/oswer/docs/ghg_land_and_materials_management.pdf

[3] Oak Ridge National Laboratory, *Transportation Data Energy Book*, Edition 28. Table 8.8, http://cta.ornl.gov/data/Index.shtml

[4] Michael Vandenbergh, Jake Barkenbus, and Jonathan Gilligan, "Individual Carbon Emissions: The Low-Hanging Fruit," *UCLA Law Review*, vol. 55 (2008), http://uclalawreview.org/?p=384

[5] "Underinflated Tires in the United States," *GAO* (2007). http://www.gao.gov/new.items/d07246r.pdf

[6] "Keeping Your Car in Shape," *FuelEconomy.gov*, http://www.fueleconomy.gov/feg/maintain.shtml.

[7] Joseph Carroll, "Security Hassles at Airports are Travelers Biggest Complaints," *Gallup*, Jan. 15, 2007, http://www.gallup.com/poll/26134/security-hassles-airports-air-travelers-biggest-complaints.aspx#1

[8] Elisabeth Rosenthal, "Paying More for Flights Eases Guilt, Not Emissions," *New York Times*, Nov. 17, 2009, http://www.nytimes.com/2009/11/18/science/earth/18offset.html?_r=2&hp

[9] See Bureau of Transportation Statistics, http://www.bts.gov/xml/air_traffic/src/datadisp.xml

[10] EIA Residential Energy Consumption Survey (RECS), 2005.

[11] Richard Heede, "Cool Citizens: Everyday Solutions to Climate Change: Household Solutions," *Rocky Mountain Institute*, 2002, http://www.rmi.org/rmi/Library/C02-12_CoolCitizensHouseholdSolutions

[12] "Harmony is a Dark Sky City," UNIVERSITY OF FLORIDA: http://www.wec.ufl.edu/extension/gc/harmony/darksky.htm

[13] Based on: Gidon Eshel and Pamela Martin, "Diet Energy and Global Warming," *Earth Interactions*, vol. 10 (2006).

[14] Based on: Linda Scott Canter, et al, "Estimating and Addressing America's Food Losses," USDA, *Food Review, January-April 1997*, http://www.ers.usda.gov/Publications/FoodReview/Jan1997/jan97a.pdf
"Food for Thought," *New Scientist*, http://www.newscientist.com/data/images/archive/2673/26731701.jpg

[15] Paper Calculator," *Environmental Defense Fund*, http://www.edf.org/papercalculator/

[16] P.H. Gleick and H.S. Cooley, "Energy Implications of Bottled Water," *Environmental Research Letters* (vol. 4, 2009), http://www.iop.org/EJ/article/1748-9326/4/1/014009/erl9_1_014009.pdf?request-id=0eb1f4f6-207d-4ee4-a7de-0b6ab5027a2d

[17] "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2007," *EPA*, http://www.epa.gov/waste/nonhaz/municipal/pubs/msw07-fs.pdf