



Center for Sustainable Systems

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U.S. Environmental Footprint

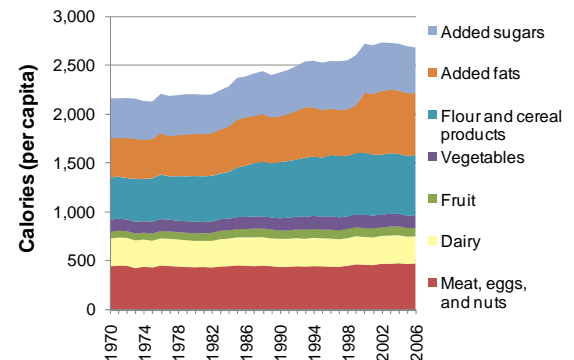
factsheets

As the U.S. population continues to grow from 305 million in 2008 to an estimated 360 million by 2030¹, the pressure on the environment will also increase, unless consumption patterns are significantly adjusted to account for the limited natural resource base. A suite of Factsheets expanding on the topics below are available at: <http://css.snre.umich.edu/facts/factsheets.html>.

Food

- The average American's daily Calorie consumption increased from 2,160 in 1970 to about 2,700 in 2006.²
- In 2001, the average American consumed 49 gallons of soft drinks - a 450% increase since 1947. Over this same period, per capita milk consumption decreased roughly 55%, down to 22 gallons per year.³
- The average American eats 32 teaspoons of caloric sweeteners- mostly sucrose and corn sweeteners – per day.⁴
- U.S. per capita consumption of fats added to food (not naturally present) increased by 48% between 1970 and 2006.²
- In 2004, 66% of U.S. adults were either overweight or obese, defined as having a body mass index of 25 or more.⁵
- 26% of available edible food is wasted at the consumer level.⁶

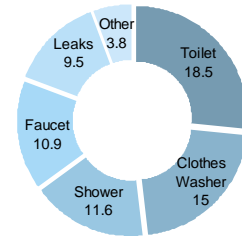
U.S. Daily Per Capita Calorie Intake by Food Type, 1970-2006²



Water

- In 2000, total water withdrawals in the U.S. for all uses were estimated to be 408 billion gallons per day.⁷ This is enough to fill more than 600,000 Olympic-size swimming pools.⁸
- Domestic water use was less than 12% of total water use. The biggest users are thermoelectric power (48%) and irrigation (34%).⁷
- The average American household uses nearly 70 gallons of water per day for bathing, cleaning, and other uses at home (see figure on right).⁹

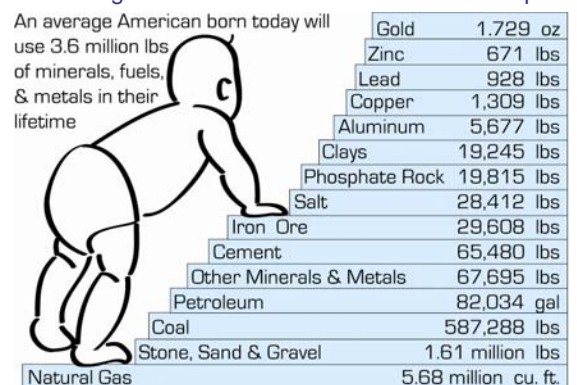
U.S. Household Water Use, gallons per capita per day⁹



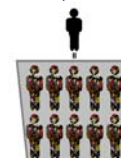
Material Use and Waste Management

- In 2000, the per capita consumption of all materials in the United States was 22.7 metric tons, 50% more than the European average.¹¹
- In the last century, raw material consumption (non-fossil fuel or food) increased 5.1 times faster than population.¹²
- In 2006, the average American generated 4.6 lbs of municipal solid waste (MSW) each day, with only 1.1 lbs recovered for recycling.¹³ For comparison, MSW generation rates (in lbs/person/day) are 2.8 in Sweden, 3.9 in Germany, and 3.7 in the UK.¹⁴
- In 2006, 32.5% of MSW generated in the U.S. was recovered for recycling or composting, diverting 82 million tons of material from landfills and incinerators – more than double the value from 15 years earlier.¹³
- 8,660 curbside recycling programs serve 144 million people in the U.S. (48% of the population).¹³

Average American Lifetime Material Consumption¹⁰



U.S. Average Annual MSW Generation, Per Capita¹³



Almost 1700 lbs, or 10 times the average person's weight, by each person, every year.

¹ U.S. Census Bureau (2008). "Population Clocks" and "Population Projections"

² USDA (2008) "Loss-Adjusted Food Availability" <http://www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm#calories>.

³ USDA (2004). "Indicators." <http://www.ers.usda.gov/AmberWaves/April04/pdf/indicators.pdf>

⁴ USDA (2003) *Agriculture Fact Book 2001-2002*. Office of Communications.

⁵ U.S. Department of Health and Human Services (2007) *National Health and Nutrition Examination Survey 2003-2004*. Centers for Disease Control and Prevention.

⁶ Heller, M.C. and G.A. Keoleian (2000) *Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System* (CSS00-04).

⁷ Hutson, S.S. et al. (2004) *Estimated Use of Water in the United States in 2000*. U.S. Geological Survey, Circular 1268.

⁸ FINA (2008). "Facilities Rules" and CSS calculation.

⁹ American Water Works Association (2008) "Water Use Statistics" <http://www.drinktap.org/consumerdnn/Default.aspx?tabid=85>

¹⁰ Mineral Information Institute (2008) "MII Baby" <http://www.mii.org/>

¹¹ World Resources Institute (2007) *Material Flows in the United States: A Physical Accounting of the U.S. Industrial Ecology*.

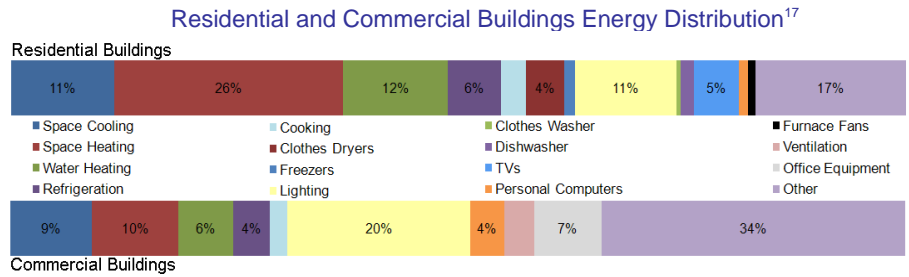
¹² U.S. Geological Survey (2007) *Effects of Regulation and Technology on End Uses of Nonfuel Mineral Commodities in the United States*.

¹³ U.S. Environmental Protection Agency (2007) *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures 2006*.

¹⁴ Organisation for Economic Co-operation and Development (2007) *OECD Key Environmental Indicators 2007*.

Residential and Commercial Buildings

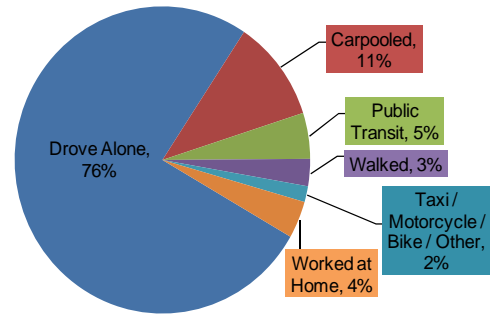
- Between 1950 and 2000 in the U.S., average residential living trends have been towards bigger homes with fewer occupants: ¹⁵
 - the number of occupants per house decreased by 22%.
 - living space per person increased by 188%.
 - home size increased by 124%
- In 1950, 9% of housing units were occupied by only one person; by 2006 this increased to 27%.¹⁶
- Significant energy savings could be realized by better insulating residential buildings to reduce the space heating and cooling loads, by utilizing energy efficient appliances, and by reducing the artificial lighting demand in commercial buildings.
- In commercial buildings, average site energy intensity per sq foot decreased by 21% between 1979 and 2003, from 115,000 BTU/sq ft to 91,000 BTU/sq ft.¹⁸



Transportation

- There were 3 trillion vehicle-miles traveled in the U.S. in 2006, a 40% increase since 1990. This is equivalent to more than 6 million round-trips to the moon.²⁰
- The average vehicle occupancy for a passenger car is 1.58, compared to 26.6 for an intercity bus. Although the bus has a lower fuel economy rating, the energy required per occupant-mile is 3.75 times higher for the car.²¹
- Compared to 1987 models, the average 2007 vehicle's weight increased by 29%; horsepower increased by 89%; acceleration increased (0-60 mph times dropped 27%); and fuel economy declined by 8%.²²

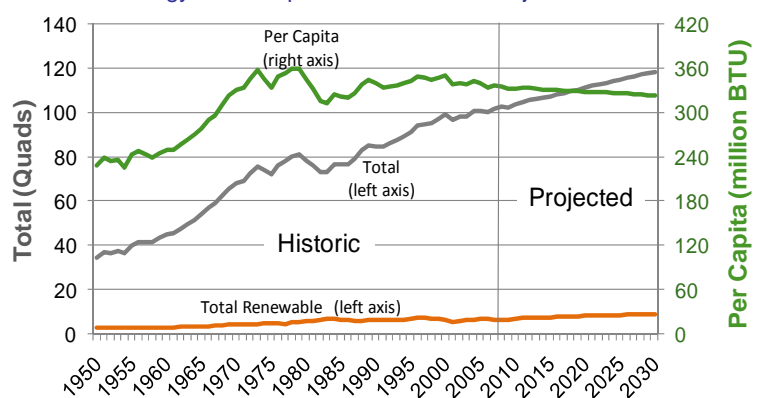
Modes of Transportation to Work in the U.S.¹⁹



Energy

- In 2005, the U.S. spent over \$1.04 trillion on energy, or 9.5% of GDP. When spread over the population, annual costs were \$3,525 per person.²³
- Each day, the U.S. per capita energy consumption includes nearly 3 gallons of oil, 21 pounds of coal, and 210 cubic feet of natural gas. Residential daily consumption of electricity is greater than 12 kilowatt-hours (kWh) per person.²³
- With less than 5% of the world's population, the U.S. consumes 22% of the world's energy and accounts for 21% of world GDP. (To compare, Europe has 7.4% of the world's population, uses 19% of its energy and accounts for 22% of its GDP, while China has 20% of the world's population, consumes 14% of its energy and accounts for 11% of its GDP).²⁴

U.S. Energy Consumption: Historic and Projected Values^{17,18}

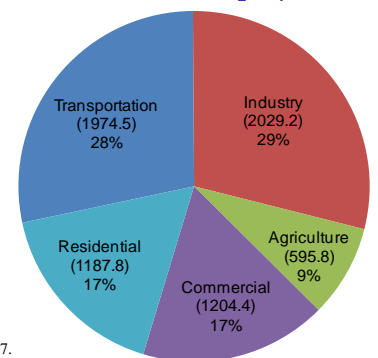


Greenhouse Gases (GHG)

By choosing energy efficient appliances and lighting to reduce electricity consumption, and making smart transportation choices, every individual can immediately help reduce the greenhouse gas emissions they are responsible for. Reduce your footprint!

- In 2006, U.S. GHG emissions were 23.6 metric tons CO₂-Equivalence per person.²⁵
- From 1990-2006, emissions from the transportation, commercial, and residential sectors each increased approximately 25%. The GHG emissions from electricity generation – about one third of the U.S. total - are allocated to sectors in the figure according to their electricity consumption.²⁵
- In 2007, the Intergovernmental Panel on Climate Change concluded that “most of the observed increase in global average temperatures since the mid-20th century is very likely (> 90% certainty) due to the observed increase in anthropogenic greenhouse gas concentrations.”²⁶

U.S. GHG Emissions, 2006 (Million Metric Tons CO₂-Equivalence)²⁵



¹⁵ National Association of Home Builders (2007) *Housing Facts, Figures and Trends*, U.S. Census Bureau, and Wilson, A. and J. Boehland (2005) “Small is Beautiful, U.S. House Size, Resource Use, and the Environment.” *Journal of Industrial Ecology*, Vol 9, No. 1-2, 277-287.
¹⁶ U.S. Census Bureau (2004) *Historical Census of Housing, Tables Living Alone and (2007) 2006 American Community Survey*.
¹⁷ EIA (2008) *Annual Energy Outlook 2008*.
¹⁸ EIA (2007) *Annual Energy Review 2007*.
¹⁹ U.S. Census Bureau (2007) *Means of Transportation to Work – 2006 American Community Survey*.
²⁰ U.S. Department of Transportation/Federal Highway Administration (2008) *Highway Statistics 2006*, and (1991) *Highway Statistics 1990* and CSS calculation.
²¹ U.S. Department of Energy, Oak Ridge National Lab (2007) *Transportation Energy Data Book: Edition 26 and Greyhound Annual 10-K Filing Report for 2002*.
²² U.S. Environmental Protection Agency (2007) *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2007*.
²³ U.S. Department of Energy, Energy Information Administration (EIA) (2008) *Annual Energy Review 2007*.
²⁴ Population figures: Central Intelligence Agency (2007) “The World Factbook – Population.” Energy and GDP figures: EIA (2006) *International Energy Annual 2004*.
²⁵ U.S. EPA (2008) *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2006*.
²⁶ IPCC (2007) *Climate Change 2007: The Physical Science Basis*. Intergovernmental Panel on Climate Change; Eds. S. Solomon et al.; Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

