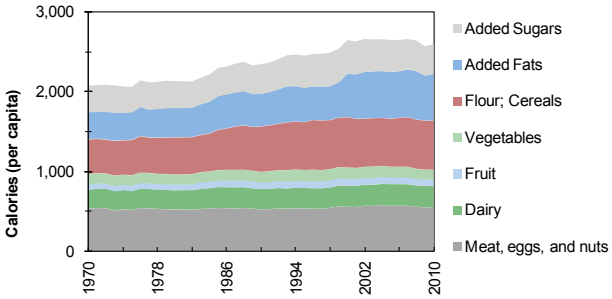
U.S. Environmental Footprint

The U.S. population is expected to grow from 321 million in 2015 to 420 million by 2060.[1,2] One way to quantify environmental impacts is by estimating how many Earths would be needed to sustain the global population if everyone lived a certain lifestyle. One study estimates it would take 5 Earths to support the current human population if everyone's consumption patterns were similar to the average American.[3] Pressure on the environment will 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 from the Center for Sustainable Systems.

Food

- The average American's daily Calorie consumption increased from 2,077 in 1970 to 2,590 in 2010.[4]
- In 2003, the average American consumed 46 gallons of soft drinks, a 330% increase since 1947. Over this same period, per capita milk consumption decreased 45%, down to 22 gallons per year.[5]
- The average American consumes about 23 teaspoons of added sugars and sweeteners per day; the American Heart Association recommends between 5 and 9 teaspoons daily for an average adult.[4,6]
- U.S. per capita consumption of added fats increased by 71% from 1970 to 2010.[4]
- More than 68% of U.S. adults are overweight or obese (body mass index of 25 or more), and approximately 17% of children age 2-19 are obese.[7,8]
- An estimated 26% of available edible food is wasted at the consumer level, 50% more compared to Americans in 1970.[9,10] This food waste accounts for roughly 15% of the municipal solid waste stream and represents a loss of $455 per person each year.[10,11]

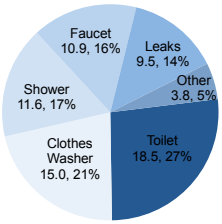
U.S. Daily Per Capita Caloric Intake by Food Type, 1970-2010[4]



Water

- In 2010, total water withdrawals in the U.S. for all uses were estimated to be 355 billion gallons per day, 13% less than in 2005. The biggest users are thermoelectric power (45%) and irrigation (33%).[12]
- Water use per person was roughly 41% higher in western states than eastern states in 2010, mostly due to crop irrigation in the west.[12] Over 50% of water withdrawals comes from 12 states, the highest from California (11%).
- Thermoelectric power, irrigation, and public supply accounted for 90% of national water withdrawals in 2010.[12]
- The average American household uses nearly 90 gallons of water per person per day for indoor and outdoor uses.[13]
- Households with more efficient fixtures and no leaks can drop their water usage to 45 gallons per person per day.[13]

U.S. Household Water Use[13]
Gallons Per Capita Per Day

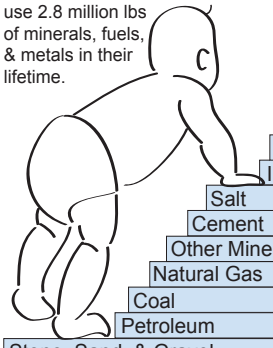


Material Use and Waste Management

- In 2000, per capita consumption of all materials in the United States was 23.7 metric tons, 52% more than the European average.[15]
- In 1900, raw material consumption (non-fossil fuel or food) was less than 2 metric tons per person. By 2010, it had grown to over 8 metric tons per person.[16,17]
- In 2013, the average American generated 4.40lbs of municipal solid waste (MSW) each day, with only 1.51 lbs recovered for recycling or composting.[11] For comparison, MSW generation rates (lbs/person/day) were 2.42 in Canada, 3.62 in Germany, and 3.2 in the UK.[18]
- In 2013, 34% of MSW generated in the U.S. was recovered for recycling or composting, diverting 87 million tons of material from landfills and incinerators—more than double the value from 1990.[11]
- Curb-side recycling programs currently serve over 70% of people in the U.S., almost two-thirds of which are single-stream, meaning materials such as glass and paper are separated at the recycling plant.[11]

Average American Lifetime Material Consumption[14]

An average American born today will use 2.8 million lbs of minerals, fuels, & metals in their lifetime.

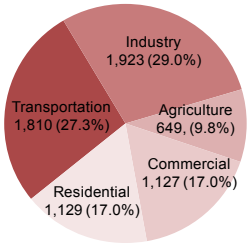


Gold	0.13	lbs
Zinc	539	lbs
Lead	903	lbs
Copper	985	lbs
Aluminum	5,214	lbs
Clays	11,427	lbs
Phosphate Rock	16,651	lbs
Iron Ore	26,010	lbs
Salt	33,193	lbs
Cement	48,483	lbs
Other Minerals & Metals	56,016	lbs
Natural Gas	348,000	lbs
Coal	452,666	lbs
Petroleum	504,805	lbs
Stone, Sand, & Gravel	1.25 million	lbs

Greenhouse Gases (GHG)

- In 2013, U.S. GHG emissions were 21.2 metric tons CO_2-equivalent per person.[19]
- From 1990-2013, total annual U.S. GHG emissions increased by 5.9%. Emissions from electricity generation, one-third of the U.S. total, are allocated to sectors in the figure (at right) according to their electricity consumption.[19]
- In 2013, the Intergovernmental Panel on Climate Change (IPCC) concluded that "It is extremely likely (>95 % certainty) that human influence has been the dominant cause of the observed warming since the mid-20th century."[20]
- By choosing energy efficient products to reduce electricity consumption and by making smart transportation choices, individuals can immediately help reduce the greenhouse gas emissions they are responsible for.

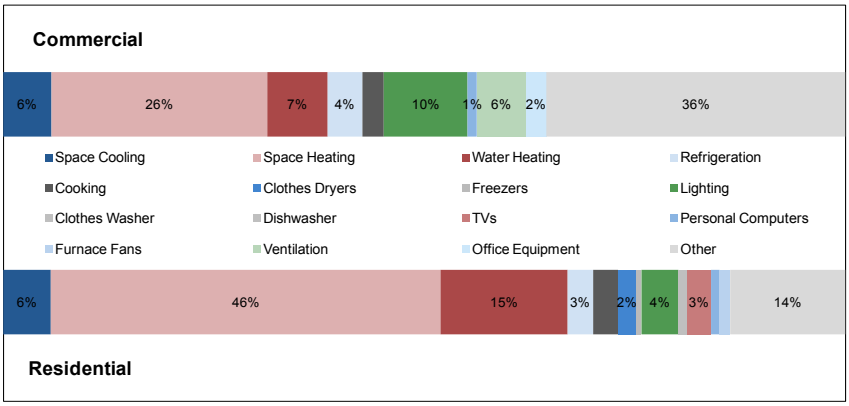
U.S. GHG Emissions, 2013[19]
Million metric tons CO_2-Equivalent



Residential and Commercial Buildings

- Since 1950, average residential living trends in the U.S. have been towards bigger homes with fewer occupants:
  - Number of occupants per house decreased 25%.[22,23]
  - Single occupant homes increased from 9% to 28%.[24,25]
  - Living space per person increased 250%.[24,26,27]
  - Home size increased 164%.[26, 27]
- Significant energy savings could be realized by: better insulating residential buildings to reduce the space heating and cooling loads; utilizing energy efficient appliances; and using more efficient lighting in commercial buildings.
- Commercial building average site energy intensity per square foot decreased 6% from 115,000 Btu/sqft in 1979 to 107,700 Btu/sq ft in 2010.[28,29]
- The amount of developed U.S. land increased by 58% from 1982 to 2010, making up 6% of total U.S. surface area in 2010.[30]

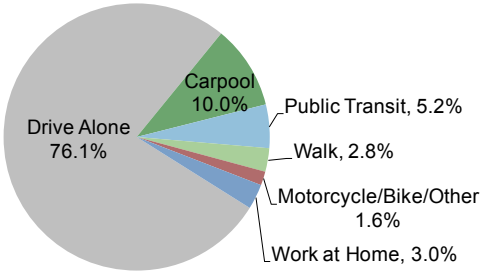
Commerical and Residential Buildings Primary Energy Distribution, 2014[21]



Transportation

- In 2013, the U.S. had 256 million vehicles, 43.7 million more than licensed drivers.[31]
- Drivers traveled nearly 3 trillion vehicle-miles in the U.S. in 2013, a 96% increase since 1980.[31] This is equivalent to more than 6 million round-trips to the moon.[32]
- Compared to 1988 models, the average 2014 vehicle's weight increased by 24%; horsepower increased by 89%; and acceleration increased (i.e. 0-60 mph times dropped) by 38%.[33]
- Fuel economy just surpassed 1988 levels in 2009 after years of decline.[33]
- The average vehicle occupancy for a passenger car is 1.55, compared to 26.7 for rail and 9.2 for a transit bus.[34]
- Congestion is a worsening urban problem, causing an additional 5.5 billion hours of travel time, 2.9 billion gallons of fuel use, and 56 billion pounds of CO_2 emissions by urban Americans in 2011.[35]

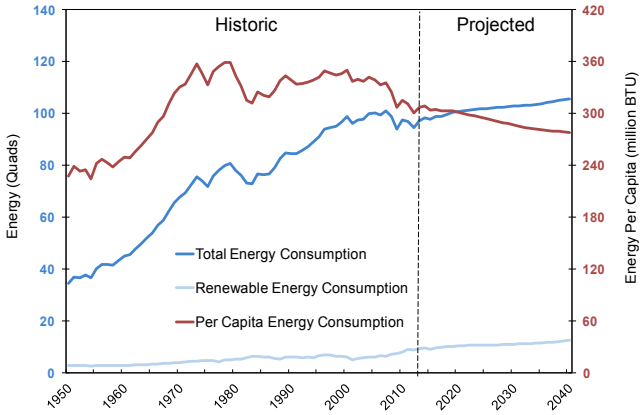
U.S. Modes of Transportation to Work in 2012.[34]



Energy

- In 2013, the U.S. spent $1.4 trillion on energy, or 8.2% of GDP.[36,37] When spread over the population, annual energy costs were $4,350 per person.[1,36]
- More U.S. energy comes from petroleum than any other source, comprising over 35% of consumption.[38]
- Each day, U.S. per capita energy consumption includes 2.5 gallons of oil, 16 pounds of coal, and 230 cubic feet of natural gas. Residential daily electricity consumption is 12 kilowatt-hours (kWh) per person.[1, 38]
- With less than 5% of the world's population, the U.S. consumes 18% of the world's energy and accounts for 16% of world GDP. To compare, the European Union has 7% of the world's population, uses 16% of the world's energy, and accounts for 16% of world GDP; China has 19% of the world's population, consumes 20% of the world's energy, and accounts for 16% of its GDP.[39,40]

U.S. Energy Consumption: Historic and Projected[21,38]



1. U.S. Census Bureau (2015) "U.S. and World Population Clocks."
2. U.S. Census Bureau (2012) Projections of the Population and Components of Change for the United States 2015 to 2060.
3. Global Footprint Network (2009) "Humanity Now Demanding 1.4 Earths."
4. U.S. Department of Agriculture (USDA) (2014) "Loss-Adjusted Food Availability."
5. USDA Economic Research Service (2011) "Beverages: Per capita availability."
6. American Heart Association (2009) "Dietary Sugars Intake and Cardiovascular Health."
7. National Center for Health Statistics (2013) "Health, United States, 2012."
8. Ogden, C., et al. (2012) Prevalence of Obesity and Trends in Body Mass Index Among U.S. Children and Adolescents, 1999-2010. Journal of the American Medical Association, 307(5): 483-490.
9. Heller, M. and G. Keoleian (2000) Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System. CSS00-04.
10. Natural Resource Defense Council (2012) Wasted How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill.
11. U.S. Environmental Protection Agency (EPA) (2015) Advancing Sustainable Materials Management: Fact and Figures 2013.
12. Maupin, Molly A., et al. (2014) Estimated Use of Water in the United States in 2010. U.S. Geological Survey. Circular 1405.
13. American Water Works Association (2010) "Water Use Statistics."
14. Mineral Information Institute (2015) "MII Baby."
15. World Resources Institute (2008) Material Flows in the United States: A Physical Accounting of the U.S. Industrial Economy.
16. U.S. Geological Survey (2012) Use of Raw Materials in the United States from 1900 Through 2010.
17. U.S. Census Bureau (2000) Historical National Population Estimates: July 1,1900 to July 1, 1999.
18. Organization for Economic Co-operation and Development (2014) Factbook 2014: Municipal Waste.
19. U.S. EPA (2015) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013.
20. IPCC (2013) Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. T.F. Stocker, et al. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.
21. U.S. EIA (2015) Annual Energy Outlook 2015.
22. U.S. Census Bureau (2015) America's Families and Living Arrangements.
23. U.S. Census Bureau (2004) Average Population per Household and Family, 1940 to present.
24. U.S. Census Bureau (2004) Historical Census of Housing Tables: Living Alone.
25. US Census Bureau (2015) 2013 American Housing Survey for the United States: Household Demographics - All Occupied Units.
26. U.S. Census Bureau (2013) Median and Average Square Feet of Floor Area in New Single-Family Houses Completed by Location.
27. Wilson, A. and J. Boehland (2005) Small is Beautiful, U.S. House Size, Resource Use, and the Environment. Journal of Industrial Ecology, 9(1-2):277-287.
28. U.S. Department of Energy (DOE), Energy Information Administration (EIA) (2012) Annual Energy Review 2011.
29. U.S. DOE, Energy Efficiency & Renewable Energy (2012) 2011 Buildings Energy Data Book.
30. USDA National Resource Conservation Service (2013) Natural Resources Inventory 2010.
31. U.S. Department of Transportation, Federal Highway Administration (2015) Highway Statistics 2013.
32. National Aeronautics and Space Administration (2013) "Earth's Moon: Facts & Figures."
33. U.S. EPA (2015) Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2014.
34. U.S. DOE, Oak Ridge National Lab (2014) Transportation Energy Data Book: Edition 33.
35. Schrank, D., et al. (2012) 2012 Urban Mobility Report. Texas Transportation Institute.
36. U.S. EIA (2015) State Energy Data System (SEDS): Total End Use Energy Expenditure 2013.
37. U.S. Bureau of Economic Analysis (2015) United States Gross Domestic Product.
38. U.S. EIA (2015) Monthly Energy Review May 2015
39. U.S. CIA (2015) The World Factbook.
40. U.S. EIA (2015) International Energy Statistics.