



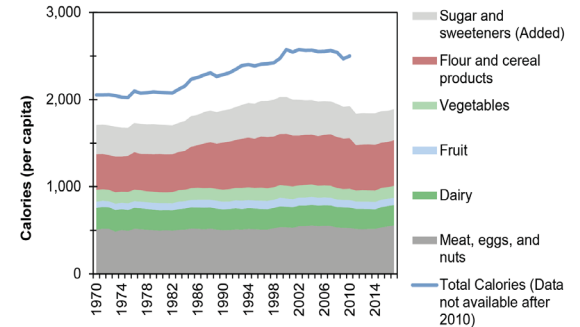
# U.S. Environmental Footprint

The U.S. population is expected to grow from 329 million in 2020 to 404 million by 2060.<sup>1,2</sup> One way to quantify environmental impacts is by estimating how many Earths would be needed to sustain the global population if everyone lived a particular lifestyle. One study estimates it would take 5 Earths to support the human population if everyone's consumption patterns were similar to the average American.<sup>3</sup> Pressure on the environment will increase unless consumption patterns are significantly adjusted to account for the finite natural resource base. Factsheets expanding on the topics below are available from the Center for Sustainable Systems.

## Food

- The average American's daily Calorie consumption increased from 2,054 in 1970 to 2,501 in 2010.<sup>4</sup>
- In 2003, the average American consumed 46 gallons of soft drinks, a 330% increase since 1947.<sup>5</sup> Between 1970 and 2017, per capita milk consumption decreased 46%, down to 12 gallons per year.<sup>4</sup>
- The average American consumes about 356 calories of added sugars and sweeteners per day. The American Heart Association recommends limiting added sugars to between 100 and 150 calories daily for an average adult.<sup>4,6</sup>
- U.S. per capita consumption of added fats increased by 66% from 1970 to 2010.<sup>4</sup>
- Approximately 40% of U.S. adults and over 18% of adolescents age 12-19 are obese (BMI > 30).<sup>7</sup>
- The EPA estimated that in 2017, more food was landfilled than any other trash material; around 22% of food ends up in landfill.<sup>8</sup> The average American wastes 50% more food than in 1970.<sup>9</sup> This waste accounts for roughly 15% of the municipal solid waste stream and represents a loss of \$450 per person each year.<sup>9,10</sup>

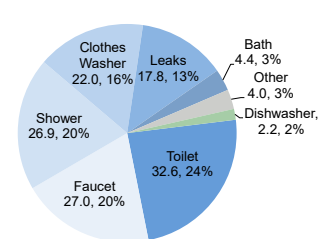
U.S. Daily Per Capita Caloric Intake by Food Type, 1970-2017<sup>4</sup>



## Water

- In 2015, total water withdrawals in the U.S. for all uses were estimated to be 322 billion gallons per day, 9% less than in 2010. The biggest uses are thermoelectric power (41%), irrigation (37%), and public supply (12%).<sup>11</sup>
- Water use per person was roughly 48% higher in western states than eastern states in 2015, mostly due to crop irrigation in the west.<sup>11</sup> Over 50% of water withdrawals occur in 12 states, 9% in California.<sup>11</sup>
- The average North American household uses roughly 240 gallons of water daily for indoor and outdoor uses.<sup>12</sup>
- Households with more efficient fixtures and no leaks can drop their water usage to 40 gallons per person per day.<sup>12</sup>

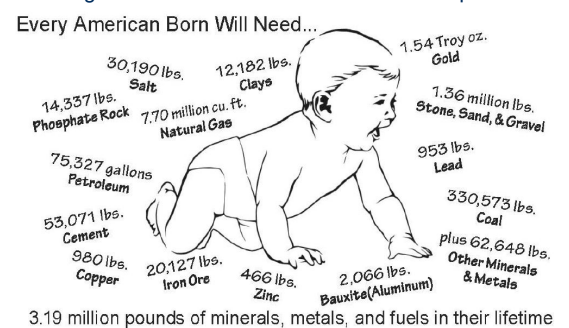
North American Household Water Use<sup>12</sup>  
Gallons Per Household Per Day



## 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.<sup>14</sup>
- In 1900, raw material consumption was less than 2 metric tons per person. At its peak in 2006, it had grown to over 13 metric tons per person.<sup>15,16</sup>
- In 2017, the average American generated 4.5 lbs of municipal solid waste (MSW) each day, with only 1.6 lbs recovered for recycling or composting.<sup>10</sup> For comparison, MSW generation rates (lbs/person/day) were 2.20 in Sweden, 2.98 in the U.K., and 3.71 in Germany.<sup>17</sup>
- In 2017, 35.2% of U.S. MSW was recovered for recycling or composting, diverting 94 million tons of material from landfills and incinerators—more than double the value from 1990.<sup>10</sup>
- Only 53% of Americans are automatically enrolled in curbside recycling programs. 82% of cities with curbside recycling collect material single-stream, meaning materials such as glass and paper are separated at the recycling plant.<sup>18,19</sup>

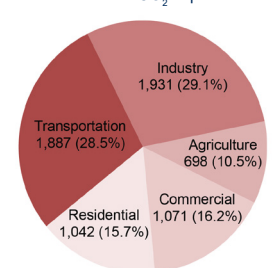
Average American Lifetime Material Consumption<sup>13</sup>



## Greenhouse Gases (GHG)

- In 2018, U.S. GHG emissions were 20.4 metric tons CO<sub>2</sub>-equivalent per person.<sup>20,21</sup>
- From 1990-2018, total annual U.S. GHG emissions increased by 3.7%. Emissions from electricity generation, 27% of the U.S. total, are included by sector in the figure (at right).<sup>20</sup>
- 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-20<sup>th</sup> century."<sup>22</sup>
- By choosing energy efficient products to reduce electricity consumption and by making smart transportation choices, individuals can immediately reduce the greenhouse gas emissions they are responsible for.

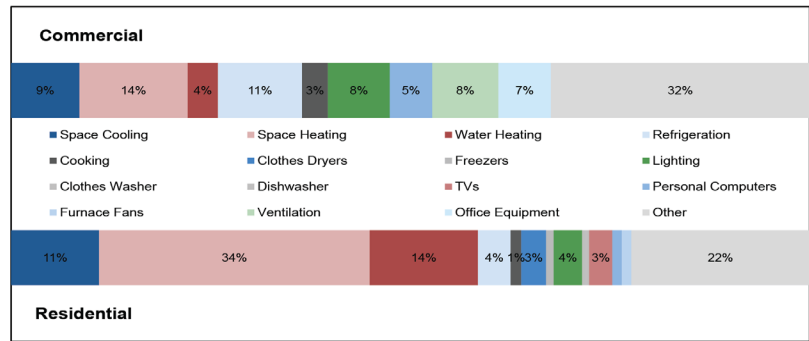
U.S. GHG Emissions, 2018<sup>20</sup>  
Million metric tons CO<sub>2</sub>-Equivalent



## Residential and Commercial Buildings

- Since the 1970's, average residential living trends in the U.S. have been towards bigger houses with fewer occupants:
  - U.S. home size increased 41%.<sup>24,25</sup>
  - Number of occupants per home decreased 15%.<sup>26,27</sup>
  - Living space per person increased 66%.<sup>24,25,26,27</sup>
- Significant energy savings could be realized by better insulating residential buildings to reduce the space heating and cooling loads, using energy efficient appliances, and using more efficient lighting in commercial buildings.
- Commercial building average site energy intensity per square foot decreased 13% from 115,000 Btu/sqft in 1979 to 100,200 Btu/sqft in 2019.<sup>23,28</sup>
- The amount of developed U.S. land increased by 60% from 1982 to 2015, making up 6% of total U.S. surface area in 2015.<sup>29</sup>

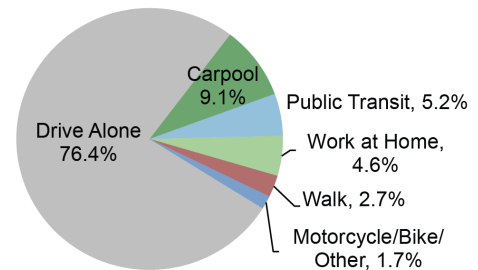
Commercial and Residential Buildings Primary Energy Distribution, 2019<sup>23</sup>



## Transportation

- In 2018, the U.S. had 273.6 million vehicles, 46.0 million more than licensed drivers.<sup>30</sup>
- Drivers traveled over 3.2 trillion vehicle-miles in the U.S. in 2018, a 112% increase since 1980.<sup>30</sup> This is equivalent to more than 6.5 million round-trips to the moon.<sup>31</sup>
- Compared to 1988 models, the average 2018 vehicle's weight increased by 26%, horsepower increased by 96%, and acceleration increased (i.e., 0-60 mph times dropped) by 40%.<sup>32</sup>
- Fuel economy surpassed 1988 levels in 2009 after years of decline.<sup>32</sup>
- The average vehicle occupancy for a passenger car is 1.5, compared to 8.0 for a transit bus and 25.8 for a train.<sup>33</sup>
- Congestion is a worsening urban problem, causing an additional 8.8 billion hours of travel time, 3.3 billion gallons of fuel use, and 64.7 billion pounds of CO<sub>2</sub> emissions by urban Americans in 2017.<sup>34</sup>

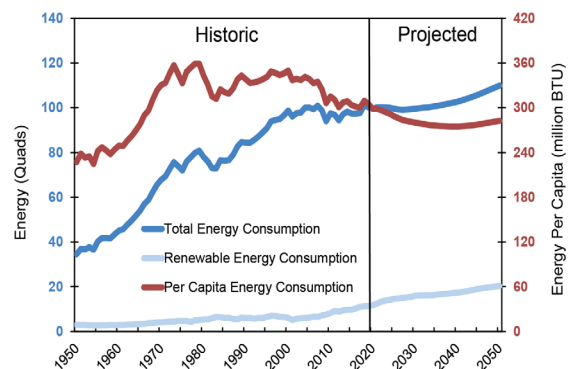
U.S. Modes of Transportation to Work in 2018<sup>33</sup>



## Energy

- In 2018, the U.S. spent \$1.3 trillion on energy, or 6.2% of GDP. When spread over the population, annual costs were \$3,891 per person.<sup>36</sup>
- More U.S. energy comes from petroleum than any other source, comprising nearly 37% of consumption.<sup>35</sup>
- Each day, U.S. per capita energy consumption includes 2.6 gallons of oil, 9.7 pounds of coal, and 255 cubic feet of natural gas. Residential daily electricity consumption is 11.8 kilowatt-hours (kWh) per person.<sup>35,37</sup>
- With less than 5% of the world's population, the U.S. consumes 17% of the world's energy and accounts for 15% of world GDP. In comparison, the European Union has 6% of the world's population, uses 11% of the world's energy, and accounts for 16% of world GDP; China has 18.1% of the world's population, consumes 24% of the world's energy, and accounts for 18% of world GDP.<sup>37,38</sup>

U.S. Energy Consumption: Historic and Projected<sup>23,35</sup>



1. U.S. Census Bureau (2020) "U.S. and World Population Clock."
2. U.S. Census Bureau (2018) "Projected Population Size and Births, Deaths, and Migration Main Projections Series for the United States, 2017-2060."
3. Global Footprint Network (2019) Public Data Package.
4. U.S. Department of Agriculture (USDA), Economic Research Service (ERS) (2019) Loss-Adjusted Food Availability.
5. USDA, ERS (2016) "Beverages: Per capita availability."
6. American Heart Association (2018) "Sugar 101."
7. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) (2018) "Health, United States, 2018."
8. U.S. Environmental Protection Agency (EPA) (2020) "United States 2030 Food Loss and Waste Reduction Goal."
9. Natural Resource Defense Council (2017) "Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill."
10. U.S. EPA (2019) Advancing Sustainable Materials Management: 2016 and 2017 Tables and Figures.
11. Dieter, C., et al. (2018) "Estimated use of water in the United States in 2015." U.S. Geological Survey Circular 1441.
12. Water Research Foundation (2016) Residential End Uses of Water, Version 2 Executive Report.
13. Mineral Education Coalition (2019) "Mineral Baby."
14. World Resources Institute (2008) Material Flows in the United States: A Physical Accounting of the U.S. Industrial Economy.
15. U.S. Geological Survey (2017) Use of Raw Materials in the United States from 1900 Through 2014.
16. U.S. Census Bureau (2000) Historical National Population Estimates: July 1, 1900 to July 1, 1999.
17. Organization for Economic Co-operation and Development (2015) Factbook 2015: Municipal Waste.

18. The Recycling Partnership (2020) 2020 State of Curbside Recycling Report.
19. U.S. EPA (2017) The 2016 State of Curbside Report.
20. U.S. EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018.
21. U.S. Census Bureau (2020) Annual Estimates of the Population for the United States.
22. 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.
23. U.S. Energy Information Administration (EIA) (2020) Annual Energy Outlook 2020.
24. U.S. EIA (2017) Residential Commercial Building Survey, 2015.
25. U.S. Census Bureau (2020) Quarterly Starts and Completions by Purpose and Design.
26. U.S. Census Bureau (2017) Historical Household Tables.
27. U.S. Census Bureau (2019) America's Families and Living Arrangements: 2019.
28. U.S. Department of Energy (DOE), EIA (2012) Annual Energy Review 2011.
29. USDA National Resource Conservation Service (2018) Natural Resources Inventory 2015.
30. U.S. Department of Transportation, Federal Highway Administration (2020) Highway Statistics 2018.
31. National Aeronautics and Space Administration (2013) "Earth's Moon: Facts & Figures."
32. U.S. EPA (2020) 2019 Automotive Trends Report.
33. U.S. DOE, Oak Ridge National Lab (2020) Transportation Energy Data Book: Edition 38.2.
34. Texas A&M Transportation Institute (2019) 2019 Urban Mobility Report.
35. U.S. EIA (2020) Monthly Energy Review August 2020.
36. U.S. EIA (2020) State Energy Data 2018: Prices and Expenditures.
37. U.S. Central Intelligence Agency (2020) The World Factbook.
38. U.S. EIA (2020) "International Energy Statistics - Total Energy Consumption."