

**Table A6. Approximate Heat Rates for Electricity, and Heat Content of Electricity**  
(Btu per Kilowatthour)

|            | Approximate Heat Rates <sup>a</sup> for Electricity Net Generation |                        |                          |                                   |                      | Thermal Conversion Factor for Noncombustible Renewable Energy <sup>k</sup> | Heat Content <sup>l</sup> of Electricity <sup>k</sup> |
|------------|--|------------------------|--------------------------|-----------------------------------|----------------------|--|---|
|            | Fossil Fuels <sup>b</sup>  |                        |                          |                                   | Nuclear <sup>h</sup> |  |   |
|            | Coal <sup>c</sup>  | Petroleum <sup>d</sup> | Natural Gas <sup>e</sup> | Total Fossil Fuels <sup>f,g</sup> |                      |  |   |
| 1950 ..... | NA   | NA                     | NA                       | 14,030                            | --                   | 3,412  | 3,412   |
| 1955 ..... | NA   | NA                     | NA                       | 11,699                            | --                   | 3,412  | 3,412   |
| 1960 ..... | NA   | NA                     | NA                       | 10,760                            | 11,629               | 3,412  | 3,412   |
| 1965 ..... | NA   | NA                     | NA                       | 10,453                            | 11,804               | 3,412  | 3,412   |
| 1970 ..... | NA   | NA                     | NA                       | 10,494                            | 10,977               | 3,412  | 3,412   |
| 1975 ..... | NA   | NA                     | NA                       | 10,406                            | 11,013               | 3,412  | 3,412   |
| 1980 ..... | NA   | NA                     | NA                       | 10,388                            | 10,908               | 3,412  | 3,412   |
| 1981 ..... | NA   | NA                     | NA                       | 10,453                            | 11,030               | 3,412  | 3,412   |
| 1982 ..... | NA   | NA                     | NA                       | 10,454                            | 11,073               | 3,412  | 3,412   |
| 1983 ..... | NA   | NA                     | NA                       | 10,520                            | 10,905               | 3,412  | 3,412   |
| 1984 ..... | NA   | NA                     | NA                       | 10,440                            | 10,843               | 3,412  | 3,412   |
| 1985 ..... | NA   | NA                     | NA                       | 10,447                            | 10,622               | 3,412  | 3,412   |
| 1986 ..... | NA   | NA                     | NA                       | 10,446                            | 10,579               | 3,412  | 3,412   |
| 1987 ..... | NA   | NA                     | NA                       | 10,419                            | 10,442               | 3,412  | 3,412   |
| 1988 ..... | NA   | NA                     | NA                       | 10,324                            | 10,602               | 3,412  | 3,412   |
| 1989 ..... | NA   | NA                     | NA                       | 10,432                            | 10,583               | 3,412  | 3,412   |
| 1990 ..... | NA   | NA                     | NA                       | 10,402                            | 10,582               | 3,412  | 3,412   |
| 1991 ..... | NA   | NA                     | NA                       | 10,436                            | 10,484               | 3,412  | 3,412   |
| 1992 ..... | NA   | NA                     | NA                       | 10,342                            | 10,471               | 3,412  | 3,412   |
| 1993 ..... | NA   | NA                     | NA                       | 10,309                            | 10,504               | 3,412  | 3,412   |
| 1994 ..... | NA   | NA                     | NA                       | 10,316                            | 10,452               | 3,412  | 3,412   |
| 1995 ..... | NA   | NA                     | NA                       | 10,312                            | 10,507               | 3,412  | 3,412   |
| 1996 ..... | NA   | NA                     | NA                       | 10,340                            | 10,503               | 3,412  | 3,412   |
| 1997 ..... | NA   | NA                     | NA                       | 10,213                            | 10,494               | 3,412  | 3,412   |
| 1998 ..... | NA   | NA                     | NA                       | 10,197                            | 10,491               | 3,412  | 3,412   |
| 1999 ..... | NA   | NA                     | NA                       | 10,226                            | 10,450               | 3,412  | 3,412   |
| 2000 ..... | NA   | NA                     | NA                       | 10,201                            | 10,429               | 3,412  | 3,412   |
| 2001 ..... | 10,378   | 10,742                 | 10,051                   | 10,333                            | 10,443               | 3,412  | 3,412   |
| 2002 ..... | 10,314   | 10,641                 | 9,533                    | 10,173                            | 10,442               | 3,412  | 3,412   |
| 2003 ..... | 10,297   | 10,610                 | 9,207                    | 10,125                            | 10,422               | 3,412  | 3,412   |
| 2004 ..... | 10,331   | 10,571                 | 8,647                    | 10,016                            | 10,428               | 3,412  | 3,412   |
| 2005 ..... | 10,373   | 10,631                 | 8,551                    | 9,999                             | 10,436               | 3,412  | 3,412   |
| 2006 ..... | 10,351   | 10,809                 | 8,471                    | 9,919                             | 10,435               | 3,412  | 3,412   |
| 2007 ..... | 10,375   | 10,794                 | 8,403                    | 9,884                             | 10,489               | 3,412  | 3,412   |
| 2008 ..... | 10,378   | 11,015                 | 8,305                    | 9,854                             | 10,452               | 3,412  | 3,412   |
| 2009 ..... | 10,414   | 10,923                 | 8,160                    | 9,760                             | 10,459               | 3,412  | 3,412   |
| 2010 ..... | 10,415   | 10,984                 | 8,185                    | 9,756                             | 10,452               | 3,412  | 3,412   |
| 2011 ..... | 10,444   | 10,829                 | 8,152                    | 9,716                             | 10,464               | 3,412  | 3,412   |
| 2012 ..... | 10,498   | 10,991                 | 8,039                    | 9,516                             | 10,479               | 3,412  | 3,412   |
| 2013 ..... | 10,459   | 10,713                 | 7,948                    | 9,541                             | 10,449               | 3,412  | 3,412   |
| 2014 ..... | 10,428   | 10,814                 | 7,907                    | 9,509                             | 10,459               | 3,412  | 3,412   |
| 2015 ..... | 10,495   | 10,687                 | 7,869                    | 9,314                             | 10,458               | 3,412  | 3,412   |
| 2016 ..... | 10,493   | 10,811                 | 7,863                    | 9,228                             | 10,459               | 3,412  | 3,412   |
| 2017 ..... | 10,465   | 10,834                 | 7,803                    | 9,208                             | 10,459               | 3,412  | 3,412   |
| 2018 ..... | 10,481   | 11,095                 | 7,811                    | 9,098                             | 10,455               | 3,412  | 3,412   |
| 2019 ..... | 10,551   | 11,205                 | 7,725                    | 8,899                             | 10,442               | 3,412  | 3,412   |
| 2020 ..... | 10,655   | 11,259                 | 7,725                    | 8,767                             | 10,446               | 3,412  | 3,412   |
| 2021 ..... | 10,583   | 11,224                 | 7,689                    | 8,844                             | 10,429               | 3,412  | 3,412   |
| 2022 ..... | 10,689   | 11,166                 | 7,740                    | 8,813                             | 10,448               | 3,412  | 3,412   |
| 2023 ..... | 10,745   | 11,465                 | 7,721                    | 8,630                             | 10,452               | 3,412  | 3,412   |
| 2024 ..... | E 10,745   | E 11,465               | E 7,721                  | E 8,630                           | E 10,452             | 3,412  | 3,412   |

- <sup>a</sup> The values in columns 1–5 of this table are for net heat rates. See "Heat Rate" in Glossary.
- <sup>b</sup> Through 2000, heat rates are for fossil-fueled steam-electric plants at electric utilities. Beginning in 2001, heat rates are for all fossil-fueled plants at electric utilities and electricity-only independent power producers.
- <sup>c</sup> Includes anthracite, bituminous coal, subbituminous coal, lignite, and, beginning in 2002, waste coal and coal synfuel.
- <sup>d</sup> Includes distillate fuel oil, residual fuel oil, jet fuel, kerosene, petroleum coke, and waste oil.
- <sup>e</sup> Includes natural gas and supplemental gaseous fuels.
- <sup>f</sup> Includes coal, petroleum, natural gas, and, beginning in 2001, other fossil gases (blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels).
- <sup>g</sup> Through 2000, used as the thermal conversion factor for wood and waste electricity net generation at electric utilities; beginning in 2001, Btu data for wood and waste at electric utilities are available from surveys.
- <sup>h</sup> Used as the thermal conversion factor for nuclear electricity net generation.
- <sup>i</sup> Technology-based geothermal heat rates are no longer used in Btu calculations in this report. For technology-based geothermal heat rates for 1960–2010, see the *Annual Energy Review 2010*, Table A6.
- <sup>j</sup> See "Heat Content" in Glossary.
- <sup>k</sup> The value of 3,412 Btu per kilowatthour, which is the heat content of electricity, is a constant. It is used as the thermal conversion factor for electricity net generation from noncombustible renewable energy (hydro, geothermal, solar thermal, photovoltaic, and wind), electricity sales to ultimate customers, and electricity imports and exports.
- <sup>l</sup> E=Estimate. NA=Not available. —=Not applicable.
- Web Page: See <http://www.eia.gov/totalenergy/data/monthly/#appendices> (Excel and CSV files) for all available annual data beginning in 1949.
- Sources: See "Thermal Conversion Factor Source Documentation," which follows this table.