

# Appendix A

## British Thermal Unit Conversion Factors

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## British Thermal Unit Conversion Factors

The thermal conversion factors presented in the following tables can be used to estimate the heat content in British thermal units (Btu) of a given amount of energy measured in physical units, such as barrels or cubic feet. For example, 10 barrels of asphalt has a heat content of approximately 66.36 million Btu (10 barrels x 6.636 million Btu per barrel = 66.36 million Btu).

The heat content rates (i.e., thermal conversion factors) provided in this section represent the gross (or higher or upper) energy content of the fuels. Gross heat content rates are applied in all Btu calculations for the *Monthly Energy Review* and are commonly used in energy calculations in the United States; net (or lower) heat content rates are typically used in European energy calculations. The difference between the two rates is the amount of energy that is consumed to vaporize water that is created during the combustion process. Generally, the difference ranges from 2% to 10%, depending on the specific fuel and its hydrogen content. Some fuels, such as unseasoned wood, can be more than 40% different in their gross and net heat content rates. See "Heat Content" and "British Thermal Unit (Btu)" in the Glossary for more information.

In general, the annual thermal conversion factors presented in Tables A2 through A6 are computed from final annual data or from the best available data and labeled "preliminary." Often, the current year's factors are labeled "estimate," and are set equal to the previous year's values until data become available to calculate the factors. The source of each factor is described in the section entitled "Thermal Conversion Factor Source Documentation," which follows Table A6 in this appendix.

**Table A1. Approximate Heat Content of Petroleum and Biofuels**

(Million Btu per Barrel, Except as Noted)

| Commodity                                     | Heat Content       | Commodity                                      | Heat Content       |
|-----------------------------------------------|--------------------|------------------------------------------------|--------------------|
| Asphalt and Road Oil                          | 6.636              | Motor Gasoline (Finished)—see Tables A2 and A3 |                    |
| Aviation Gasoline (Finished)                  | 5.048              | Motor Gasoline Blending Components (MGBC)      |                    |
| Aviation Gasoline Blending Components         | 5.048              | Through 2006                                   | 5.253              |
| Crude Oil—see Table A2                        |                    | Beginning in 2007                              | 5.222              |
| Distillate Fuel Oil—see Table A3 for averages |                    | Oxygenates (excluding Fuel Ethanol)            | 4.247              |
| 15 ppm sulfur and under                       | 5.770              | Petrochemical Feedstocks                       |                    |
| Greater than 15 ppm to 500 ppm sulfur         | 5.817              | Naphtha Less Than 401°F                        | 5.248              |
| Greater than 500 ppm sulfur                   | 5.825              | Other Oils Equal to or Greater Than 401°F      | 5.825              |
| Hydrocarbon Gas Liquids                       |                    | Petroleum Coke—see Table A3 for averages       |                    |
| Natural Gas Liquids                           |                    | Total, through 2003                            | 6.024              |
| Ethane                                        | 2.783              | Catalyst, beginning in 2004                    | <sup>a</sup> 6.287 |
| Propane                                       | 3.841              | Marketable, beginning in 2004                  | 5.719              |
| Normal Butane                                 | 4.353              | Residual Fuel Oil                              | 6.287              |
| Isobutane                                     | 4.183              | Special Naphthas                               | 5.248              |
| Natural Gasoline (Pentanes Plus)              | 4.638              | Still Gas                                      |                    |
| Refinery Olefins                              |                    | Through 2015                                   | <sup>b</sup> 6.000 |
| Ethylene                                      | 2.436              | Beginning in 2016                              | <sup>a</sup> 6.287 |
| Propylene                                     | 3.835              | Unfinished Oils                                | 5.825              |
| Butylene                                      | 4.377              | Waxes                                          | 5.537              |
| Isobutylene                                   | 4.355              | Miscellaneous Products                         | 5.796              |
| Hydrogen                                      | <sup>c</sup> 6.287 | Other Hydrocarbons                             | 5.825              |
| Jet Fuel, Kerosene Type                       | 5.670              | Biofuels, Fuel Ethanol—see Table A3            |                    |
| Jet Fuel, Naphtha Type                        | 5.355              | Biofuels, Biodiesel                            | 5.359              |
| Kerosene                                      | 5.670              | Biofuels, Renewable Diesel Fuel                | 5.494              |
| Lubricants                                    | 6.065              | Biofuels, Other                                | 5.359              |

<sup>a</sup> Per residual fuel oil equivalent barrel (6.287 million Btu per barrel).

<sup>b</sup> Per fuel oil equivalent barrel (6.000 million Btu per barrel).

<sup>c</sup> Hydrogen has a gross heat content of 323.6 Btu per standard cubic foot (at 60 degrees Fahrenheit and 1 atmosphere), and 6.287 million Btu per residual fuel oil equivalent barrel. For hydrogen, barrels can be converted to standard cubic feet by multiplying by 19,426 standard cubic feet per barrel of residual fuel oil equivalent.

Note: The values in this table are for gross heat contents. See "Heat Content" in Glossary.

Web Page: <http://www.eia.gov/totalenergy/data/monthly/#appendices>.

Sources: See "Thermal Conversion Factor Source Documentation," which follows Table A6.

**Table A2. Approximate Heat Content of Petroleum Production, Imports, and Exports**  
(Million Btu per Barrel)

|            | Production             |                                        | Imports                |                             |                             |                    | Exports                |                             |                             |                    |
|------------|------------------------|----------------------------------------|------------------------|-----------------------------|-----------------------------|--------------------|------------------------|-----------------------------|-----------------------------|--------------------|
|            |                        |                                        | Crude Oil <sup>a</sup> | Petroleum Products          |                             | Total <sup>d</sup> | Crude Oil <sup>a</sup> | Petroleum Products          |                             | Total <sup>d</sup> |
|            | Crude Oil <sup>a</sup> | Natural Gas Plant Liquids <sup>b</sup> |                        | Motor Gasoline <sup>c</sup> | Total Products <sup>d</sup> |                    |                        | Motor Gasoline <sup>c</sup> | Total Products <sup>d</sup> |                    |
| 1950 ..... | 5.800                  | 4.470                                  | 5.943                  | 5.253                       | 6.263                       | 6.080              | 5.800                  | 5.253                       | 5.751                       | 5.766              |
| 1955 ..... | 5.800                  | 4.346                                  | 5.924                  | 5.253                       | 6.234                       | 6.040              | 5.800                  | 5.253                       | 5.765                       | 5.768              |
| 1960 ..... | 5.800                  | 4.253                                  | 5.911                  | 5.253                       | 6.161                       | 6.021              | 5.800                  | 5.253                       | 5.835                       | 5.834              |
| 1965 ..... | 5.800                  | 4.197                                  | 5.872                  | 5.253                       | 6.123                       | 5.997              | 5.800                  | 5.253                       | 5.742                       | 5.743              |
| 1970 ..... | 5.800                  | 4.090                                  | 5.822                  | 5.253                       | 6.088                       | 5.985              | 5.800                  | 5.253                       | 5.811                       | 5.810              |
| 1975 ..... | 5.800                  | 3.923                                  | 5.821                  | 5.253                       | 5.935                       | 5.858              | 5.800                  | 5.253                       | 5.747                       | 5.748              |
| 1980 ..... | 5.800                  | <sup>b</sup> 3.864                     | 5.812                  | 5.253                       | 5.748                       | 5.796              | 5.800                  | 5.253                       | 5.841                       | 5.820              |
| 1981 ..... | 5.800                  | 3.860                                  | 5.818                  | 5.253                       | 5.659                       | 5.775              | 5.800                  | 5.253                       | 5.837                       | 5.821              |
| 1982 ..... | 5.800                  | 3.798                                  | 5.826                  | 5.253                       | 5.664                       | 5.775              | 5.800                  | 5.253                       | 5.829                       | 5.820              |
| 1983 ..... | 5.800                  | 3.755                                  | 5.825                  | 5.253                       | 5.677                       | 5.774              | 5.800                  | 5.253                       | 5.800                       | 5.800              |
| 1984 ..... | 5.800                  | 3.745                                  | 5.823                  | 5.253                       | 5.613                       | 5.745              | 5.800                  | 5.253                       | 5.867                       | 5.850              |
| 1985 ..... | 5.800                  | 3.752                                  | 5.832                  | 5.253                       | 5.572                       | 5.736              | 5.800                  | 5.253                       | 5.819                       | 5.814              |
| 1986 ..... | 5.800                  | 3.733                                  | 5.903                  | 5.253                       | 5.624                       | 5.808              | 5.800                  | 5.253                       | 5.839                       | 5.832              |
| 1987 ..... | 5.800                  | 3.742                                  | 5.901                  | 5.253                       | 5.599                       | 5.820              | 5.800                  | 5.253                       | 5.860                       | 5.858              |
| 1988 ..... | 5.800                  | 3.751                                  | 5.900                  | 5.253                       | 5.618                       | 5.820              | 5.800                  | 5.253                       | 5.842                       | 5.840              |
| 1989 ..... | 5.800                  | 3.764                                  | 5.906                  | 5.253                       | 5.641                       | 5.833              | 5.800                  | 5.253                       | 5.869                       | 5.857              |
| 1990 ..... | 5.800                  | 3.758                                  | 5.934                  | 5.253                       | 5.614                       | 5.849              | 5.800                  | 5.253                       | 5.838                       | 5.833              |
| 1991 ..... | 5.800                  | 3.740                                  | 5.948                  | 5.253                       | 5.636                       | 5.873              | 5.800                  | 5.253                       | 5.827                       | 5.823              |
| 1992 ..... | 5.800                  | 3.739                                  | 5.953                  | 5.253                       | 5.623                       | 5.877              | 5.800                  | 5.253                       | 5.774                       | 5.777              |
| 1993 ..... | 5.800                  | 3.735                                  | 5.954                  | 5.253                       | 5.539                       | 5.866              | 5.800                  | 5.253                       | 5.681                       | 5.693              |
| 1994 ..... | 5.800                  | 3.728                                  | 5.950                  | 5.253                       | 5.416                       | 5.835              | 5.800                  | 5.253                       | 5.693                       | 5.704              |
| 1995 ..... | 5.800                  | 3.728                                  | 5.938                  | 5.253                       | 5.345                       | 5.830              | 5.800                  | 5.253                       | 5.692                       | 5.703              |
| 1996 ..... | 5.800                  | 3.703                                  | 5.947                  | 5.253                       | 5.373                       | 5.828              | 5.800                  | 5.253                       | 5.663                       | 5.678              |
| 1997 ..... | 5.800                  | 3.686                                  | 5.954                  | 5.253                       | 5.333                       | 5.836              | 5.800                  | 5.253                       | 5.663                       | 5.678              |
| 1998 ..... | 5.800                  | 3.694                                  | 5.953                  | 5.253                       | 5.314                       | 5.833              | 5.800                  | 5.253                       | 5.505                       | 5.539              |
| 1999 ..... | 5.800                  | 3.663                                  | 5.942                  | 5.253                       | 5.291                       | 5.815              | 5.800                  | 5.253                       | 5.530                       | 5.564              |
| 2000 ..... | 5.800                  | 3.648                                  | 5.959                  | 5.253                       | 5.309                       | 5.823              | 5.800                  | 5.253                       | 5.529                       | 5.542              |
| 2001 ..... | 5.800                  | 3.652                                  | 5.976                  | 5.253                       | 5.330                       | 5.838              | 5.800                  | 5.253                       | 5.637                       | 5.641              |
| 2002 ..... | 5.800                  | 3.646                                  | 5.971                  | 5.253                       | 5.362                       | 5.845              | 5.800                  | 5.253                       | 5.517                       | 5.519              |
| 2003 ..... | 5.800                  | 3.659                                  | 5.970                  | 5.253                       | 5.381                       | 5.845              | 5.800                  | 5.253                       | 5.628                       | 5.630              |
| 2004 ..... | 5.800                  | 3.636                                  | 5.981                  | 5.253                       | 5.429                       | 5.853              | 5.800                  | 5.253                       | 5.532                       | 5.539              |
| 2005 ..... | 5.800                  | 3.638                                  | 5.977                  | 5.253                       | 5.436                       | 5.835              | 5.800                  | 5.253                       | 5.504                       | 5.513              |
| 2006 ..... | 5.800                  | 3.622                                  | 5.980                  | 5.253                       | 5.431                       | 5.836              | 5.800                  | <sup>a</sup> 5.219          | 5.415                       | 5.423              |
| 2007 ..... | 5.800                  | 3.609                                  | 5.985                  | 5.222                       | 5.483                       | 5.857              | 5.800                  | 5.188                       | 5.465                       | 5.471              |
| 2008 ..... | 5.800                  | 3.614                                  | 5.990                  | 5.222                       | 5.459                       | 5.861              | 5.800                  | 5.215                       | 5.587                       | 5.591              |
| 2009 ..... | 5.800                  | 3.598                                  | 5.988                  | 5.222                       | 5.509                       | 5.878              | 5.800                  | 5.221                       | 5.674                       | 5.677              |
| 2010 ..... | 5.800                  | 3.573                                  | 5.989                  | 5.222                       | 5.545                       | 5.892              | 5.800                  | 5.214                       | 5.601                       | 5.604              |
| 2011 ..... | 5.800                  | 3.573                                  | 6.008                  | 5.222                       | 5.538                       | 5.905              | 5.800                  | 5.216                       | 5.526                       | 5.530              |
| 2012 ..... | 5.800                  | 3.588                                  | 6.165                  | 5.222                       | 5.501                       | 6.035              | 5.800                  | 5.217                       | 5.520                       | 5.526              |
| 2013 ..... | 5.800                  | 3.629                                  | 6.010                  | 5.222                       | 5.497                       | 5.899              | 5.800                  | 5.216                       | 5.470                       | 5.482              |
| 2014 ..... | 5.800                  | 3.640                                  | 6.035                  | 5.222                       | 5.518                       | 5.929              | 5.800                  | 5.218                       | 5.369                       | 5.406              |
| 2015 ..... | 5.717                  | 3.669                                  | 6.065                  | 5.222                       | 5.504                       | 5.941              | 5.682                  | 5.218                       | 5.279                       | 5.319              |
| 2016 ..... | 5.722                  | 3.632                                  | 6.053                  | 5.222                       | 5.491                       | 5.929              | 5.724                  | 5.218                       | 5.184                       | 5.245              |
| 2017 ..... | 5.723                  | 3.612                                  | 6.050                  | 5.222                       | 5.489                       | 5.930              | 5.738                  | <sup>e</sup> 5.222          | 5.151                       | 5.258              |
| 2018 ..... | 5.706                  | 3.591                                  | 6.063                  | 5.222                       | <sup>d</sup> 5.491          | <sup>d</sup> 5.938 | 5.721                  | 5.222                       | <sup>d</sup> 5.088          | <sup>d</sup> 5.259 |
| 2019 ..... | 5.698                  | 3.607                                  | 6.061                  | 5.222                       | 5.464                       | 5.908              | 5.708                  | 5.222                       | 5.022                       | 5.263              |
| 2020 ..... | 5.691                  | 3.593                                  | 6.066                  | 5.222                       | 5.513                       | 5.927              | 5.709                  | 5.222                       | 4.924                       | 5.220              |
| 2021 ..... | 5.690                  | 3.585                                  | 6.067                  | 5.222                       | 5.508                       | 5.905              | 5.725                  | 5.222                       | 4.861                       | 5.161              |
| 2022 ..... | 5.684                  | 3.575                                  | 6.085                  | 5.222                       | 5.519                       | 5.928              | 5.721                  | 5.222                       | 4.866                       | 5.187              |
| 2023 ..... | 5.689                  | 3.575                                  | 6.064                  | 5.222                       | 5.471                       | 5.922              | 5.729                  | 5.222                       | 4.805                       | 5.174              |
| 2024 ..... | <sup>P</sup> 5.689     | <sup>P</sup> 3.577                     | <sup>P</sup> 6.062     | <sup>P</sup> 5.222          | <sup>P</sup> 5.459          | <sup>P</sup> 5.963 | <sup>P</sup> 5.719     | <sup>P</sup> 5.222          | <sup>P</sup> 4.803          | <sup>P</sup> 5.153 |
| 2025 ..... | <sup>E</sup> 5.689     | <sup>E</sup> 3.577                     | <sup>E</sup> 6.062     | <sup>E</sup> 5.222          | <sup>E</sup> 5.459          | <sup>E</sup> 5.963 | <sup>E</sup> 5.719     | <sup>E</sup> 5.222          | <sup>E</sup> 4.803          | <sup>E</sup> 5.153 |

<sup>a</sup> Includes lease condensate.

<sup>b</sup> Natural gas processing plant production of natural gas liquids (ethane, propane, normal butane, isobutane, and natural gasoline). Through 1980, also includes natural gas processing plant production of finished petroleum products (aviation gasoline, distillate fuel oil, jet fuel, kerosene, motor gasoline, special naphthas, and miscellaneous products).

<sup>c</sup> Excludes fuel ethanol, methyl tertiary butyl ether (MTBE), and other oxygenates blended into motor gasoline.

<sup>d</sup> Through 2017, the imports and exports factors are developed using old hydrocarbon gas liquids heat content values shown in Table A1 of the September 2019 *Monthly Energy Review* (MER). Beginning in 2018, the factors are developed using heat content values shown in Table A1 of the current MER.

<sup>e</sup> For 2006–2016, includes MTBE blended into motor gasoline; excludes MTBE in other years. For all years, excludes fuel ethanol and other non-MTBE oxygenates blended into motor gasoline.

P=Preliminary. E=Estimate.

Note: The values in this table are for gross heat contents. See "Heat Content" in Glossary.

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 Table A6.

**Table A3. Approximate Heat Content of Petroleum Consumption and Fuel Ethanol**  
(Million Btu per Barrel)

|            | Total Petroleum <sup>a</sup> Consumption by Sector |                         |                         |                               |                               |                      | Distillate Fuel Oil Consumption <sup>i</sup> | Hydrocarbon Gas Liquids Consumption <sup>g</sup> | Motor Gasoline (Finished) Consumption <sup>h</sup> | Petroleum Coke Consumption <sup>j</sup> | Fuel Ethanol <sup>k</sup> | Fuel Ethanol Feedstock Factor <sup>k</sup> |
|------------|----------------------------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------|----------------------------------------------|--------------------------------------------------|----------------------------------------------------|-----------------------------------------|---------------------------|--------------------------------------------|
|            | Residential                                        | Commercial <sup>b</sup> | Industrial <sup>b</sup> | Transportation <sup>b,c</sup> | Electric Power <sup>d,e</sup> | Total <sup>b,c</sup> |                                              |                                                  |                                                    |                                         |                           |                                            |
| 1950 ..... | 5.473                                              | 5.817                   | 5.927                   | 5.461                         | 6.254                         | 5.642                | 5.825                                        | 3.810                                            | 5.253                                              | 6.024                                   | NA                        | NA                                         |
| 1955 ..... | 5.470                                              | 5.781                   | 5.847                   | 5.407                         | 6.254                         | 5.581                | 5.825                                        | 3.810                                            | 5.253                                              | 6.024                                   | NA                        | NA                                         |
| 1960 ..... | 5.418                                              | 5.781                   | 5.772                   | 5.387                         | 6.267                         | 5.542                | 5.825                                        | 3.810                                            | 5.253                                              | 6.024                                   | NA                        | NA                                         |
| 1965 ..... | 5.365                                              | 5.761                   | 5.695                   | 5.386                         | 6.267                         | 5.517                | 5.825                                        | 3.810                                            | 5.253                                              | 6.024                                   | NA                        | NA                                         |
| 1970 ..... | 5.262                                              | 5.709                   | 5.579                   | 5.393                         | 6.252                         | 5.499                | 5.825                                        | 3.731                                            | 5.253                                              | 6.024                                   | NA                        | NA                                         |
| 1975 ..... | 5.255                                              | 5.649                   | 5.490                   | 5.392                         | 6.250                         | 5.489                | 5.825                                        | 3.671                                            | 5.253                                              | 6.024                                   | NA                        | NA                                         |
| 1980 ..... | 5.322                                              | 5.752                   | 5.340                   | 5.441                         | 6.254                         | 5.472                | 5.825                                        | 3.669                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.586                                      |
| 1981 ..... | 5.284                                              | 5.693                   | 5.268                   | 5.433                         | 6.258                         | 5.440                | 5.825                                        | 3.632                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.562                                      |
| 1982 ..... | 5.267                                              | 5.699                   | 5.211                   | 5.423                         | 6.258                         | 5.406                | 5.825                                        | 3.588                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.539                                      |
| 1983 ..... | 5.141                                              | 5.592                   | 5.214                   | 5.416                         | 6.255                         | 5.396                | 5.825                                        | 3.535                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.515                                      |
| 1984 ..... | 5.308                                              | 5.658                   | 5.167                   | 5.418                         | 6.251                         | 5.385                | 5.825                                        | 3.580                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.492                                      |
| 1985 ..... | 5.264                                              | 5.598                   | 5.159                   | 5.423                         | 6.247                         | 5.377                | 5.825                                        | 3.584                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.469                                      |
| 1986 ..... | 5.269                                              | 5.632                   | 5.237                   | 5.426                         | 6.257                         | 5.410                | 5.825                                        | 3.631                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.446                                      |
| 1987 ..... | 5.241                                              | 5.594                   | 5.203                   | 5.429                         | 6.249                         | 5.395                | 5.825                                        | 3.663                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.423                                      |
| 1988 ..... | 5.259                                              | 5.598                   | 5.196                   | 5.433                         | 6.250                         | 5.402                | 5.825                                        | 3.643                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.400                                      |
| 1989 ..... | 5.195                                              | 5.549                   | 5.190                   | 5.438                         | 6.240                         | 5.403                | 5.825                                        | 3.679                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.377                                      |
| 1990 ..... | 5.146                                              | 5.554                   | 5.219                   | 5.442                         | 6.244                         | 5.403                | 5.825                                        | 3.630                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.355                                      |
| 1991 ..... | 5.096                                              | 5.529                   | 5.130                   | 5.441                         | 6.246                         | 5.375                | 5.825                                        | 3.626                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.332                                      |
| 1992 ..... | 5.126                                              | 5.514                   | 5.133                   | 5.443                         | 6.238                         | 5.369                | 5.825                                        | 3.643                                            | 5.253                                              | 6.024                                   | 3.564                     | 6.309                                      |
| 1993 ..... | 5.103                                              | 5.505                   | 5.140                   | 5.413                         | 6.230                         | 5.354                | 5.825                                        | 3.628                                            | 5.217                                              | 6.024                                   | 3.564                     | 6.287                                      |
| 1994 ..... | 5.097                                              | 5.513                   | 5.115                   | 5.413                         | 6.213                         | 5.344                | 5.820                                        | 3.657                                            | 5.214                                              | 6.024                                   | 3.564                     | 6.264                                      |
| 1995 ..... | 5.0                                                |                         |                         |                               |                               |                      |                                              |                                                  |                                                    |                                         |                           |                                            |

**Table A4. Approximate Heat Content of Natural Gas**  
(Btu per Cubic Foot)

|            | Production         |                    | Consumption <sup>a</sup>     |                                    |                    | Imports            | Exports            |
|------------|--------------------|--------------------|------------------------------|------------------------------------|--------------------|--------------------|--------------------|
|            | Marketed           | Dry                | End-Use Sectors <sup>b</sup> | Electric Power Sector <sup>c</sup> | Total              |                    |                    |
| 1950 ..... | 1,119              | 1,035              | 1,035                        | 1,035                              | 1,035              | --                 | 1,035              |
| 1955 ..... | 1,120              | 1,035              | 1,035                        | 1,035                              | 1,035              | 1,035              | 1,035              |
| 1960 ..... | 1,107              | 1,035              | 1,035                        | 1,035                              | 1,035              | 1,035              | 1,035              |
| 1965 ..... | 1,101              | 1,032              | 1,032                        | 1,032                              | 1,032              | 1,032              | 1,032              |
| 1970 ..... | 1,102              | 1,031              | 1,031                        | 1,031                              | 1,031              | 1,031              | 1,031              |
| 1975 ..... | 1,095              | 1,021              | 1,020                        | 1,026                              | 1,021              | 1,026              | 1,014              |
| 1980 ..... | 1,098              | 1,026              | 1,024                        | 1,035                              | 1,026              | 1,022              | 1,013              |
| 1981 ..... | 1,103              | 1,027              | 1,025                        | 1,035                              | 1,027              | 1,014              | 1,011              |
| 1982 ..... | 1,107              | 1,028              | 1,026                        | 1,036                              | 1,028              | 1,018              | 1,011              |
| 1983 ..... | 1,115              | 1,031              | 1,031                        | 1,030                              | 1,031              | 1,024              | 1,010              |
| 1984 ..... | 1,109              | 1,031              | 1,030                        | 1,035                              | 1,031              | 1,005              | 1,010              |
| 1985 ..... | 1,112              | 1,032              | 1,031                        | 1,038                              | 1,032              | 1,002              | 1,011              |
| 1986 ..... | 1,110              | 1,030              | 1,029                        | 1,034                              | 1,030              | 997                | 1,008              |
| 1987 ..... | 1,112              | 1,031              | 1,031                        | 1,032                              | 1,031              | 999                | 1,011              |
| 1988 ..... | 1,109              | 1,029              | 1,029                        | 1,028                              | 1,029              | 1,002              | 1,018              |
| 1989 ..... | 1,107              | 1,031              | 1,032                        | <sup>c</sup> 1,028                 | 1,031              | 1,004              | 1,019              |
| 1990 ..... | 1,105              | 1,029              | 1,029                        | 1,027                              | 1,029              | 1,012              | 1,018              |
| 1991 ..... | 1,108              | 1,030              | 1,031                        | 1,025                              | 1,030              | 1,014              | 1,022              |
| 1992 ..... | 1,110              | 1,030              | 1,031                        | 1,025                              | 1,030              | 1,011              | 1,018              |
| 1993 ..... | 1,106              | 1,027              | 1,027                        | 1,025                              | 1,027              | 1,020              | 1,016              |
| 1994 ..... | 1,105              | 1,028              | 1,029                        | 1,025                              | 1,028              | 1,022              | 1,011              |
| 1995 ..... | 1,106              | 1,026              | 1,027                        | 1,021                              | 1,026              | 1,021              | 1,011              |
| 1996 ..... | 1,109              | 1,026              | 1,027                        | 1,020                              | 1,026              | 1,022              | 1,011              |
| 1997 ..... | 1,107              | 1,026              | 1,027                        | 1,020                              | 1,026              | 1,023              | 1,011              |
| 1998 ..... | 1,109              | 1,031              | 1,033                        | 1,024                              | 1,031              | 1,023              | 1,011              |
| 1999 ..... | 1,107              | 1,027              | 1,028                        | 1,022                              | 1,027              | 1,022              | 1,006              |
| 2000 ..... | 1,107              | 1,025              | 1,026                        | 1,021                              | 1,025              | 1,023              | 1,006              |
| 2001 ..... | 1,105              | 1,028              | 1,029                        | 1,026                              | 1,028              | 1,023              | 1,010              |
| 2002 ..... | 1,103              | 1,024              | 1,025                        | 1,020                              | 1,024              | 1,022              | 1,008              |
| 2003 ..... | 1,103              | 1,028              | 1,029                        | 1,025                              | 1,028              | 1,025              | 1,009              |
| 2004 ..... | 1,104              | 1,026              | 1,026                        | 1,027                              | 1,026              | 1,025              | 1,009              |
| 2005 ..... | 1,104              | 1,028              | 1,028                        | 1,028                              | 1,028              | 1,025              | 1,009              |
| 2006 ..... | 1,103              | 1,028              | 1,028                        | 1,028                              | 1,028              | 1,025              | 1,009              |
| 2007 ..... | 1,102              | 1,027              | 1,027                        | 1,027                              | 1,027              | 1,025              | 1,009              |
| 2008 ..... | 1,100              | 1,027              | 1,027                        | 1,027                              | 1,027              | 1,025              | 1,009              |
| 2009 ..... | 1,101              | 1,025              | 1,025                        | 1,025                              | 1,025              | 1,025              | 1,009              |
| 2010 ..... | 1,098              | 1,023              | 1,023                        | 1,022                              | 1,023              | 1,025              | 1,009              |
| 2011 ..... | 1,142              | 1,022              | 1,022                        | 1,021                              | 1,022              | 1,025              | 1,009              |
| 2012 ..... | 1,091              | 1,024              | 1,025                        | 1,022                              | 1,024              | 1,025              | 1,009              |
| 2013 ..... | 1,101              | 1,027              | 1,028                        | 1,025                              | 1,027              | 1,025              | 1,009              |
| 2014 ..... | 1,116              | 1,032              | 1,033                        | 1,029                              | 1,032              | 1,025              | 1,009              |
| 2015 ..... | 1,124              | 1,037              | 1,038                        | 1,035                              | 1,037              | 1,025              | 1,009              |
| 2016 ..... | 1,128              | 1,037              | 1,039                        | 1,034                              | 1,037              | 1,025              | 1,009              |
| 2017 ..... | 1,129              | 1,036              | 1,037                        | 1,034                              | 1,036              | 1,025              | 1,009              |
| 2018 ..... | 1,134              | 1,036              | 1,038                        | 1,033                              | 1,036              | 1,025              | 1,009              |
| 2019 ..... | 1,140              | 1,038              | 1,040                        | 1,034                              | 1,038              | 1,025              | 1,009              |
| 2020 ..... | 1,145              | 1,037              | 1,039                        | 1,034                              | 1,037              | 1,025              | 1,009              |
| 2021 ..... | 1,146              | 1,037              | 1,039                        | 1,034                              | 1,037              | 1,025              | 1,009              |
| 2022 ..... | 1,149              | 1,036              | 1,038                        | 1,033                              | 1,036              | 1,025              | 1,009              |
| 2023 ..... | 1,156              | 1,036              | 1,038                        | 1,033                              | 1,036              | 1,025              | 1,009              |
| 2024 ..... | <sup>E</sup> 1,156 | <sup>P</sup> 1,037 | <sup>P</sup> 1,039           | <sup>P</sup> 1,034                 | <sup>P</sup> 1,037 | <sup>E</sup> 1,025 | <sup>E</sup> 1,009 |
| 2025 ..... | <sup>E</sup> 1,156 | <sup>E</sup> 1,037 | <sup>E</sup> 1,039           | <sup>E</sup> 1,034                 | <sup>E</sup> 1,037 | <sup>E</sup> 1,025 | <sup>E</sup> 1,009 |

<sup>a</sup> Consumption factors are for natural gas, plus a small amount of supplemental gaseous fuels.

<sup>b</sup> Residential, commercial, industrial, and transportation sectors.

<sup>c</sup> Electricity-only and combined-heat-and-power (CHP) plants within the NAICS 22 category whose primary business is to sell electricity, or electricity and heat, to the public. Through 1988, data are for electric utilities only; beginning in 1989, data are for electric utilities and independent power producers.

P=Preliminary. E=Estimate. -- =Not applicable.

Note: The values in this table are for gross heat contents. See "Heat Content" in Glossary.

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 Table A6.

**Table A5. Approximate Heat Content of Coal and Coal Coke**  
(Million Btu per Short Ton)

|            | Coal                    |                                  |                                                 |                   |                    |                                      |        |         |         | Coal Coke           |
|------------|-------------------------|----------------------------------|-------------------------------------------------|-------------------|--------------------|--------------------------------------|--------|---------|---------|---------------------|
|            | Production <sup>a</sup> | Waste Coal Supplied <sup>b</sup> | Consumption                                     |                   |                    |                                      |        | Imports | Exports | Imports and Exports |
|            |                         |                                  | Residential and Commercial Sectors <sup>c</sup> | Industrial Sector |                    | Electric Power Sector <sup>e,f</sup> | Total  |         |         |                     |
|            |                         |                                  |                                                 | Coke Plants       | Other <sup>d</sup> |                                      |        |         |         |                     |
| 1950 ..... | 25.090                  | NA                               | 24.461                                          | 26.798            | 24.820             | 23.937                               | 24.989 | 25.020  | 26.788  | 24.800              |
| 1955 ..... | 25.201                  | NA                               | 24.373                                          | 26.794            | 24.821             | 24.056                               | 24.982 | 25.000  | 26.907  | 24.800              |
| 1960 ..... | 24.906                  | NA                               | 24.226                                          | 26.791            | 24.609             | 23.927                               | 24.713 | 25.003  | 26.939  | 24.800              |
| 1965 ..... | 24.775                  | NA                               | 24.028                                          | 26.787            | 24.385             | 23.780                               | 24.537 | 25.000  | 26.973  | 24.800              |
| 1970 ..... | 23.842                  | NA                               | 23.203                                          | 26.784            | 22.983             | 22.573                               | 23.440 | 25.000  | 26.982  | 24.800              |
| 1975 ..... | 22.897                  | NA                               | 22.261                                          | 26.782            | 22.436             | 21.642                               | 22.506 | 25.000  | 26.562  | 24.800              |
| 1980 ..... | 22.415                  | NA                               | 22.543                                          | 26.790            | 22.690             | 21.295                               | 21.947 | 25.000  | 26.384  | 24.800              |
| 1981 ..... | 22.308                  | NA                               | 22.474                                          | 26.794            | 22.585             | 21.085                               | 21.713 | 25.000  | 26.160  | 24.800              |
| 1982 ..... | 22.239                  | NA                               | 22.695                                          | 26.797            | 22.712             | 21.194                               | 21.674 | 25.000  | 26.223  | 24.800              |
| 1983 ..... | 22.052                  | NA                               | 22.775                                          | 26.798            | 22.691             | 21.133                               | 21.576 | 25.000  | 26.291  | 24.800              |
| 1984 ..... | 22.010                  | NA                               | 22.844                                          | 26.799            | 22.543             | 21.101                               | 21.573 | 25.000  | 26.402  | 24.800              |
| 1985 ..... | 21.870                  | NA                               | 22.646                                          | 26.798            | 22.020             | 20.959                               | 21.366 | 25.000  | 26.307  | 24.800              |
| 1986 ..... | 21.913                  | NA                               | 22.947                                          | 26.798            | 22.198             | 21.084                               | 21.462 | 25.000  | 26.292  | 24.800              |
| 1987 ..... | 21.922                  | NA                               | 23.404                                          | 26.799            | 22.381             | 21.136                               | 21.517 | 25.000  | 26.291  | 24.800              |
| 1988 ..... | 21.823                  | NA                               | 23.571                                          | 26.799            | 22.360             | 20.900                               | 21.328 | 25.000  | 26.299  | 24.800              |
| 1989 ..... | 21.765                  | <sup>b</sup> 10.391              | 23.650                                          | 26.800            | 22.347             | <sup>e</sup> 20.898                  | 21.307 | 25.000  | 26.160  | 24.800              |
| 1990 ..... | 21.822                  | 9.303                            | 23.137                                          | 26.799            | 22.457             | 20.779                               | 21.197 | 25.000  | 26.202  | 24.800              |
| 1991 ..... | 21.681                  | 10.758                           | 23.114                                          | 26.799            | 22.460             | 20.730                               | 21.120 | 25.000  | 26.188  | 24.800              |
| 1992 ..... | 21.682                  | 10.396                           | 23.105                                          | 26.799            | 22.250             | 20.709                               | 21.068 | 25.000  | 26.161  | 24.800              |
| 1993 ..... | 21.418                  | 10.638                           | 22.994                                          | 26.800            | 22.123             | 20.677                               | 21.010 | 25.000  | 26.335  | 24.800              |
| 1994 ..... | 21.394                  | 11.097                           | 23.112                                          | 26.800            | 22.068             | 20.589                               | 20.929 | 25.000  | 26.329  | 24.800              |
| 1995 ..... | 21.326                  | 11.722                           | 23.118                                          | 26.800            | 21.950             | 20.543                               | 20.880 | 25.000  | 26.180  | 24.800              |
| 1996 ..... | 21.322                  | 12.147                           | 23.011                                          | 26.800            | 22.105             | 20.547                               | 20.870 | 25.000  | 26.174  | 24.800              |
| 1997 ..... | 21.296                  | 12.158                           | 22.494                                          | 26.800            | 22.172             | 20.518                               | 20.830 | 25.000  | 26.251  | 24.800              |
| 1998 ..... | 21.418                  | 12.639                           | 21.620                                          | 27.426            | 23.164             | 20.516                               | 20.881 | 25.000  | 26.800  | 24.800              |
| 1999 ..... | 21.070                  | 12.552                           | 23.880                                          | 27.426            | 22.489             | 20.490                               | 20.818 | 25.000  | 26.081  | 24.800              |
| 2000 ..... | 21.072                  | 12.360                           | 25.020                                          | 27.426            | 22.433             | 20.511                               | 20.828 | 25.000  | 26.117  | 24.800              |
| 2001 ..... | <sup>a</sup> 20.772     | 12.169                           | 24.909                                          | 27.426            | 22.622             | 20.337                               | 20.671 | 25.000  | 25.998  | 24.800              |
| 2002 ..... | 20.673                  | 12.165                           | 22.962                                          | 27.426            | 22.562             | 20.238                               | 20.541 | 25.000  | 26.062  | 24.800              |
| 2003 ..... | 20.499                  | 12.360                           | 22.242                                          | 27.425            | 22.468             | 20.082                               | 20.387 | 25.000  | 25.972  | 24.800              |
| 2004 ..... | 20.424                  | 12.266                           | 22.324                                          | 27.426            | 22.473             | 19.980                               | 20.290 | 25.000  | 26.108  | 24.800              |
| 2005 ..... | 20.348                  | 12.093                           | 22.342                                          | 26.279            | 22.178             | 19.988                               | 20.246 | 25.000  | 25.494  | 24.800              |
| 2006 ..... | 20.310                  | 12.080                           | 22.066                                          | 26.271            | 22.050             | 19.931                               | 20.181 | 25.000  | 25.453  | 24.800              |
| 2007 ..... | 20.340                  | 12.090                           | 22.069                                          | 26.329            | 22.371             | 19.909                               | 20.168 | 25.000  | 25.466  | 24.800              |
| 2008 ..... | 20.208                  | 12.121                           | <sup>c</sup> 23.035                             | 26.281            | 22.304             | 19.713                               | 19.979 | 25.000  | 25.399  | 24.800              |
| 2009 ..... | 19.963                  | 12.076                           | 22.852                                          | 26.334            | 21.823             | 19.521                               | 19.741 | 25.000  | 25.633  | 24.800              |
| 2010 ..... | 20.173                  | 11.960                           | 22.611                                          | 26                |                    |                                      |        |         |         |                     |

<sup>a</sup> Beginning in 2001, includes a small amount of refuse recovery (coal recaptured from a refuse mine, and cleaned to reduce the concentration of noncombustible materials).

<sup>b</sup> Waste coal (including fine coal, coal obtained from a refuse bank or slurry dam, anthracite culm, bituminous gob, and lignite waste) consumed by the electric power and industrial sectors. Beginning in 1989, waste coal supplied is counted as a supply-side item to balance the same amount of waste coal included in "Consumption."

<sup>c</sup> Through 2007, used as the thermal conversion factor for coal consumption by the residential and commercial sectors. Beginning in 2008, used as the thermal conversion factor for coal consumption by the commercial sector only.

<sup>d</sup> Includes transportation. Excludes coal synfuel plants.

<sup>e</sup> Electricity-only and combined-heat-and-power (CHP) plants within the NAICS 22 category whose primary business is to sell electricity, or electricity and heat, to the public. Through 1988, data are for electric utilities only; beginning in 1989, data are for electric utilities and independent power producers.

<sup>f</sup> Electric power sector factors are for anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and, beginning in 1998, coal synfuel.

R=Revised. P=Preliminary. E=Estimate. NA=Not available.

Note: The values in this table are for gross heat contents. See "Heat Content" in Glossary.

Web Page: See <http://www.eia.gov/totalenergy/data/monthly/#appendices> (Excel and CSV files) for all available annual data beginning in 1949.

**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>i,k</sup> | Heat Content <sup>l</sup> of Electricity <sup>k</sup> |
|------------|--------------------------------------------------------------------|------------------------|--------------------------|-----------------------------------|----------------------|------------------------------------------------------------------------------|-------------------------------------------------------|
|            | Fossil Fuels <sup>b</sup>                                          |                        |                          |                                   |                      |                                                                              |                                                       |
|            | Coal <sup>c</sup>                                                  | Petroleum <sup>d</sup> | Natural Gas <sup>e</sup> | Total Fossil Fuels <sup>f,g</sup> |                      |                                                                              |                                                       |
|            |                                                                    |                        |                          |                                   | Nuclear <sup>h</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                   | b 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                                                 |
| 2025 ..... | 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.