# Appendix E

## Alternative Measures for the Energy Content of Noncombustible Renewables

# Alternative Measures for the Energy Content of Noncombustible Renewables

Energy sources are measured in different physical units: liquid fuels in barrels or gallons, gases in cubic feet, coal in short tons, and electricity in kilowatthours. EIA converts each source into common British thermal units (Btu) to allow comparison among different types of energy and to calculate total energy concepts.

Noncombustible renewables (hydroelectric, geothermal, solar, and wind energy) are resources from which energy is extracted without burning or combusting fuel. When noncombustible renewables generate electricity, there is no fuel combustion and, therefore, no set Btu conversion factors for the energy sources.[1]

There are three broadly accepted ways to convert electricity generated from noncombustible renewables into Btu of primary energy—the captured energy, fossil fuel equivalency, and incident energy approaches. Each of these methods are described in detail below.

### *Captured Energy Approach*

The captured energy approach converts primary energy consumption of noncombustible renewables from kilowatthours (kWh) to Btu using the constant conversion factor representing the heat content of electricity—3,412 Btu per kWh. Captured energy reflects the primary energy captured for economic use and does not include losses. In other words, it represents the net energy available for direct consumption after the transformation of a noncombustible renewable source of energy into electricity, where captured energy is the energy measured as the "output" of a generating unit, such as electricity from a wind turbine or solar plant.

The captured energy approach is often used to show the economically significant portion of the energy transformation associated with renewable energy sources. There is no market for the resource-specific energy apart from its immediate, site-specific energy conversion, and there is no substantive opportunity cost to its continued exploitation.[2] This approach is preferred by the *UN International Recommendations for Energy Statistics* (IRES) because the detailed data needed to estimate quantities of incident energy are not available now and are not likely to develop soon. This approach is also more closely tied to a physical market commodity, that is, electricity net generation, than the conceptual measure derived using the fossil fuel equivalency approach.

### *Fossil Fuel Equivalency Approach*

The fossil fuel equivalency approach converts the consumption of noncombustible renewable electricity (in kWh) to Btu by applying a fossil fuel equivalency factor, based on the fossil-fuels heat rate (Table A6). The fossil-fuels heat rate is equal to the average thermal efficiency across fossil-fueled fired generating plants based on fuel consumption and net generation data reported to EIA. The fossil fuel equivalent consumption represents the energy consumed as if the electricity were generated by fossil fuels and is useful for analysis when considering the amount of primary fossil fuel energy displaced by renewable energy sources.

However, unlike the captured energy approach, the fossil fuel equivalency approach is not as directly tied to any real market or physical quantity. The fossil fuel equivalency approach measures neither primary energy consumption nor fossil fuels actually displaced. Additionally, its use becomes increasingly problematic as noncombustible renewables begin to displace other renewables instead of fossil fuels.

### *Incident Energy Approach*

Incident energy is the mechanical, radiation, or thermal energy that is measurable as the "input" of the device. EIA defines "incident energy" for noncombustible renewables as the gross energy that first strikes an energy conversion device:

- For hydroelectric, the energy contained in the water passing through the penstock (a closed conduit for carrying water to the turbines)
- For geothermal, the energy contained in the hot fluid at the surface of the wellbore
- For wind, the energy contained in the wind that passes through the rotor disc
- For solar, the energy contained in the sunlight that strikes the panel or collector mirror

The incident energy approach converts noncombustible renewable electricity to Btu by accounting for the "losses" that result from an inability to convert 100% of incident energy to a useful form of energy. EIA has not published total primary energy consumption statistics based on this approach because it is difficult to obtain accurate estimates of input energy without creating undue burden on survey respondents and possible concern about the quality of the resulting data. Few renewable electricity power plants track cumulative input energy due to its lack of economic significance or other purpose. In addition, estimated energy efficiencies of renewable conversion technologies vary significantly across technologies, site-specific configurations, and environmental factors.[3]

## EIA now using the captured energy approach

Starting with the September 2023 *Monthly Energy Review* (MER), EIA began converting electricity generation from noncombustible renewables into Btu using the captured energy approach rather than the fossil fuel equivalency approach in its main data tables (reflected in MER Sections 1, 2, and 10). The Btu values of hydroelectric, geothermal, solar, and wind energy consumption and, consequently, total primary energy consumption and total energy production are lower for all time periods because of the new conversion factor (the heat content of electricity from Table A6).

After a thorough review of the alternative approaches, EIA made the change for two primary reasons. First, adopting the captured energy approach promotes international comparability in energy statistics by adopting the standards provided in IRES. Second, as renewable energy continues to represent an increasingly larger portion of U.S. energy consumption over time, the fossil fuel equivalent values of generation from renewable sources become less relevant to our data users than the electrical energy provided by renewable sources.

Some analysts may still prefer to use the measures based on the fossil fuel equivalency approach, which was previously used by EIA. MER Tables E1–E4 present noncombustible renewable energy statistics using the fossil fuel equivalency approach.

---

[1]Direct use of noncombustible renewables in the form of heat (e.g., solar thermal heating) is estimated separately and is measured in Btu.
[2]There is an initial opportunity cost when a facility is first built: water behind a dam might flood land that could have been used for other purposes, or a solar panel might shade an area that could have used the sunlight. But that is a "fixed" opportunity cost that does not change during the operation of the plant.
[3]Based on EIA research conducted in 2016, engineering estimates of conversion efficiencies for noncombustible renewables range from less than 20% for solar photovoltaics and geothermal to 90% for large-scale hydroelectricity plants. Those estimates are notional indications of the energy output as a percent of energy input at each technology based on typical equipment operating within the normal operating range for that technology.

# Table E1. Primary Energy Overview, Fossil Fuel Equivalency Approach

(Quadrillion Btu)

| | Production | | | | Trade | | | Stock Change and Other[d] | Consumption | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fossil Fuels[a] | Nuclear Electric Power | Renewable Energy[b] | Total | Imports | Exports | Net Imports[c] | | Fossil Fuels[e] | Nuclear Electric Power | Renewable Energy[b] | Total[f] |
| **1950 Total** | **32.553** | **0.000** | **2.978** | **35.531** | **1.913** | **1.465** | **0.448** | **-1.380** | **31.615** | **0.000** | **2.978** | **34.599** |
| **1955 Total** | **37.347** | **.000** | **2.784** | **40.131** | **2.790** | **2.286** | **.504** | **-.457** | **37.380** | **.000** | **2.784** | **40.178** |
| **1960 Total** | **39.855** | **.006** | **2.928** | **42.789** | **4.188** | **1.477** | **2.710** | **-.458** | **42.091** | **.006** | **2.928** | **45.041** |
| **1965 Total** | **47.205** | **.043** | **3.396** | **50.644** | **5.892** | **1.829** | **4.063** | **-.754** | **50.515** | **.043** | **3.396** | **53.953** |
| **1970 Total** | **59.152** | **.239** | **4.070** | **63.462** | **8.342** | **2.632** | **5.709** | **-1.354** | **63.501** | **.239** | **4.070** | **67.817** |
| **1975 Total** | **54.697** | **1.900** | **4.687** | **61.284** | **14.032** | **2.323** | **11.709** | **-1.062** | **65.323** | **1.900** | **4.687** | **71.931** |
| **1980 Total** | **58.979** | **2.739** | **5.428** | **67.147** | **15.796** | **3.695** | **12.101** | **-1.227** | **69.782** | **2.739** | **5.428** | **78.021** |
| **1985 Total** | **57.502** | **4.076** | **6.084** | **67.661** | **11.781** | **4.196** | **7.584** | **1.088** | **66.035** | **4.076** | **6.084** | **76.334** |
| **1990 Total** | **58.523** | **6.104** | **6.040** | **70.668** | **18.817** | **4.752** | **14.065** | **-.299** | **72.281** | **6.104** | **6.040** | **84.433** |
| **1995 Total** | **57.496** | **7.075** | **6.557** | **71.129** | **22.180** | **4.496** | **17.684** | **2.118** | **77.162** | **7.075** | **6.559** | **90.931** |
| **2000 Total** | **57.307** | **7.862** | **6.102** | **71.271** | **28.865** | **3.962** | **24.904** | **2.528** | **84.620** | **7.862** | **6.104** | **98.702** |
| **2005 Total** | **54.995** | **8.161** | **6.221** | **69.377** | **34.659** | **4.462** | **30.197** | **.527** | **85.623** | **8.161** | **6.233** | **100.101** |
| **2010 Total** | **58.159** | **8.434** | **8.312** | **74.906** | **29.866** | **8.176** | **21.690** | **.916** | **80.723** | **8.434** | **8.266** | **97.512** |
| **2011 Total** | **60.529** | **8.269** | **9.306** | **78.104** | **28.748** | **10.373** | **18.375** | **.389** | **79.263** | **8.269** | **9.210** | **96.868** |
| **2012 Total** | **62.298** | **8.062** | **8.890** | **79.249** | **27.068** | **11.267** | **15.801** | **-.670** | **77.304** | **8.062** | **8.853** | **94.380** |
| **2013 Total** | **64.180** | **8.244** | **9.438** | **81.862** | **24.623** | **11.788** | **12.835** | **2.433** | **79.224** | **8.244** | **9.464** | **97.130** |
| **2014 Total** | **69.599** | **8.338** | **9.795** | **87.732** | **23.241** | **12.270** | **10.971** | **-.409** | **80.017** | **8.338** | **9.758** | **98.294** |
| **2015 Total** | **70.171** | **8.337** | **9.760** | **88.267** | **23.794** | **12.902** | **10.892** | **-1.761** | **79.090** | **8.337** | **9.743** | **97.398** |
| **2016 Total** | **65.442** | **8.427** | **10.468** | **84.337** | **25.378** | **14.119** | **11.259** | **1.776** | **78.319** | **8.427** | **10.399** | **97.372** |
| **2017 Total** | **68.488** | **8.419** | **11.250** | **88.158** | **25.458** | **17.946** | **7.512** | **1.971** | **77.901** | **8.419** | **11.129** | **97.641** |
| **2018 Total** | **75.798** | **8.438** | **11.571** | **95.807** | **24.833** | **21.224** | **3.610** | **1.815** | **81.281** | **8.438** | **11.361** | **101.232** |
| **2019 Total** | **81.405** | **8.452** | **11.619** | **101.476** | **22.865** | **23.476** | **-.610** | **-.396** | **80.425** | **8.452** | **11.460** | **100.470** |
| **2020 Total** | **76.155** | **8.251** | **11.577** | **95.983** | **19.988** | **23.464** | **-3.476** | **.487** | **73.169** | **8.251** | **11.412** | **92.993** |
| **2021 Total** | **77.987** | **8.131** | **12.209** | **98.327** | **21.455** | **25.071** | **-3.616** | **3.054** | **77.454** | **8.131** | **12.046** | **97.765** |
| **2022 Total** | **82.225** | **8.061** | **13.240** | **103.526** | **21.507** | **27.335** | **-5.828** | **2.057** | **78.529** | **8.061** | **13.024** | **99.755** |
| **2023** January | 7.208 | .741 | 1.078 | 9.027 | 1.853 | 2.275 | -.422 | .249 | 7.043 | .741 | 1.059 | 8.854 |
| February | 6.501 | .636 | 1.053 | 8.190 | 1.747 | 2.216 | -.470 | .274 | 6.315 | .636 | 1.037 | 7.994 |
| March | 7.336 | .657 | 1.171 | 9.163 | 1.789 | 2.647 | -.858 | .268 | 6.753 | .657 | 1.155 | 8.574 |
| April | 6.990 | .592 | 1.150 | 8.732 | 1.754 | 2.380 | -.626 | -.496 | 5.875 | .592 | 1.137 | 7.611 |
| May | 7.262 | .639 | 1.184 | 9.085 | 1.810 | 2.454 | -.643 | -.667 | 5.948 | .639 | 1.179 | 7.775 |
| June | 7.047 | .677 | 1.087 | 8.811 | 1.825 | 2.398 | -.572 | -.340 | 6.138 | .677 | 1.077 | 7.899 |
| July | 7.271 | .730 | 1.116 | 9.117 | 1.804 | 2.472 | -.668 | .028 | 6.645 | .730 | 1.098 | 8.477 |
| August | 7.408 | .729 | 1.105 | 9.242 | 1.915 | 2.567 | -.652 | .021 | 6.781 | .729 | 1.096 | 8.610 |
| September | 7.202 | .685 | 1.026 | 8.913 | 1.785 | 2.441 | -.656 | -.476 | 6.087 | .685 | 1.009 | 7.782 |
| October | 7.383 | .642 | 1.071 | 9.095 | 1.705 | 2.534 | -.830 | -.346 | 6.216 | .642 | 1.061 | 7.920 |
| November | 7.242 | .651 | 1.043 | 8.936 | 1.818 | 2.465 | -.647 | -.087 | 6.525 | .651 | 1.023 | 8.201 |
| December | 7.405 | .720 | 1.092 | 9.216 | 1.853 | 2.807 | -.954 | .471 | 6.946 | .720 | 1.063 | 8.733 |
| **Total** | **86.255** | **8.099** | **13.175** | **107.529** | **21.658** | **29.656** | **-7.998** | **-1.102** | **77.271** | **8.099** | **12.994** | **98.429** |
| **2024** January | 7.123 | .722 | 1.061 | 8.906 | 1.899 | 2.559 | -.660 | 1.140 | 7.619 | .722 | 1.040 | 9.387 |
| February | 6.945 | .675 | 1.118 | 8.739 | 1.710 | 2.546 | -.837 | .237 | 6.362 | .675 | 1.101 | 8.139 |
| March | 7.244 | .662 | 1.255 | 9.161 | 1.736 | 2.641 | -.906 | -.051 | 6.310 | .662 | 1.234 | 8.205 |
| April | 6.913 | .602 | 1.244 | 8.760 | 1.772 | 2.389 | -.618 | -.492 | 5.819 | .602 | 1.230 | 7.650 |
| May | 7.187 | .679 | 1.247 | 9.112 | 1.934 | 2.540 | -.606 | -.528 | 6.056 | .679 | 1.243 | 7.978 |
| June | 7.100 | .713 | 1.244 | 9.056 | 1.814 | 2.604 | -.790 | -.186 | 6.134 | .713 | 1.228 | 8.080 |
| July | 7.336 | .730 | 1.179 | 9.246 | 1.964 | 2.537 | -.573 | -.039 | 6.728 | .730 | 1.167 | 8.634 |
| August | 7.422 | .729 | 1.187 | 9.338 | 1.783 | 2.628 | -.845 | .102 | 6.691 | .729 | 1.168 | 8.595 |
| September | 7.129 | .655 | 1.083 | 8.867 | 1.725 | 2.518 | -.793 | -.288 | 6.057 | .655 | 1.068 | 7.787 |
| October | 7.396 | .614 | 1.167 | 9.177 | 1.722 | 2.563 | -.841 | -.363 | 6.198 | .614 | 1.154 | 7.973 |
| November | 7.111 | .647 | 1.143 | 8.900 | 1.745 | 2.680 | -.934 | .046 | 6.244 | .647 | 1.119 | 8.012 |
| December | 7.438 | .744 | 1.152 | 9.334 | 1.860 | 2.716 | -.856 | .591 | 7.196 | .744 | 1.123 | 9.070 |
| **Total** | **86.344** | **8.173** | **14.081** | **108.598** | **21.663** | **30.921** | **-9.258** | **.170** | **77.415** | **8.173** | **13.875** | **99.510** |
| **2025** January | R7.329 | .750 | 1.194 | R9.273 | R1.894 | 2.551 | -.656 | R1.357 | 8.056 | .750 | 1.157 | 9.973 |
| February | R6.652 | .646 | 1.113 | R8.411 | R1.607 | R2.425 | R-.818 | R.917 | R6.771 | .646 | 1.087 | R8.511 |
| March | 7.603 | .653 | 1.350 | 9.606 | 1.664 | 2.708 | -1.044 | -.197 | 6.388 | .653 | 1.320 | 8.364 |
| **3-Month Total** | **21.584** | **2.049** | **3.657** | **27.290** | **5.165** | **7.684** | **-2.518** | **2.076** | **21.215** | **2.049** | **3.565** | **26.847** |
| **2024 3-Month Total** | **21.313** | **2.059** | **3.435** | **26.807** | **5.345** | **7.746** | **-2.402** | **1.326** | **20.291** | **2.059** | **3.376** | **25.731** |
| **2023 3-Month Total** | **21.045** | **2.033** | **3.302** | **26.380** | **5.388** | **7.138** | **-1.750** | **.791** | **20.111** | **2.033** | **3.251** | **25.421** |

[a] Coal, natural gas (dry), crude oil, and natural gas plant liquids.
[b] See Table E4 for notes on series components and estimation.
[c] Net imports equal imports minus exports.
[d] Includes petroleum stock change and adjustments; natural gas net storage withdrawals and balancing item; coal stock change, losses, and unaccounted for; fuel ethanol stock change; and biodiesel stock change and balancing item.
[e] Coal, coal coke net imports, natural gas, and petroleum.
[f] Also includes electricity net imports.
R=Revised.

Notes: • See "Primary Energy," "Primary Energy Production," and "Primary Energy Consumption," in Glossary. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#appendices (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: • **Production:** Table E2. • **Trade:** Tables 1.4a and 1.4b. • **Stock Change and Other:** Calculated as consumption minus production and net imports. • **Consumption:** Table E3.

# Table E2. Primary Energy Production by Source, Fossil Fuel Equivalency Approach

(Quadrillion Btu)

| | Fossil Fuels | | | | | | Renewable Energy[a] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coal[b] | Natural Gas (Dry) | Crude Oil[c] | NGPL[d] | Total | Nuclear Electric Power | Hydro-electric Power[e] | Geo-thermal | Solar | Wind | Bio-mass | Total | Total |
| **1950 Total** | **14.060** | **6.233** | **11.447** | **0.813** | **32.553** | **0.000** | **1.415** | **NA** | **NA** | **NA** | **1.562** | **2.978** | **35.531** |
| **1955 Total** | **12.370** | **9.345** | **14.410** | **1.223** | **37.347** | **.000** | **1.360** | **NA** | **NA** | **NA** | **1.424** | **2.784** | **40.131** |
| **1960 Total** | **10.817** | **12.656** | **14.935** | **1.447** | **39.855** | **.006** | **1.608** | **(s)** | **NA** | **NA** | **1.320** | **2.928** | **42.789** |
| **1965 Total** | **13.055** | **15.775** | **16.521** | **1.853** | **47.205** | **.043** | **2.059** | **.002** | **NA** | **NA** | **1.335** | **3.396** | **50.644** |
| **1970 Total** | **14.607** | **21.666** | **20.401** | **2.478** | **59.152** | **.239** | **2.634** | **.006** | **NA** | **NA** | **1.431** | **4.070** | **63.462** |
| **1975 Total** | **14.989** | **19.640** | **17.729** | **2.338** | **54.697** | **1.900** | **3.155** | **.034** | **NA** | **NA** | **1.499** | **4.687** | **61.284** |
| **1980 Total** | **18.598** | **19.908** | **18.249** | **2.225** | **58.979** | **2.739** | **2.900** | **.053** | **NA** | **NA** | **2.475** | **5.428** | **67.147** |
| **1985 Total** | **19.325** | **16.980** | **18.992** | **2.204** | **57.502** | **4.076** | **2.970** | **.097** | **(s)** | **(s)** | **3.016** | **6.084** | **67.661** |
| **1990 Total** | **22.488** | **18.326** | **15.571** | **2.138** | **58.523** | **6.104** | **3.046** | **.171** | **.059** | **.029** | **2.735** | **6.040** | **70.668** |
| **1995 Total** | **22.130** | **19.082** | **13.887** | **2.398** | **57.496** | **7.075** | **3.205** | **.152** | **.068** | **.033** | **3.099** | **6.557** | **71.129** |
| **2000 Total** | **22.735** | **19.662** | **12.358** | **2.551** | **57.307** | **7.862** | **2.811** | **.164** | **.063** | **.057** | **3.006** | **6.102** | **71.271** |
| **2005 Total** | **23.185** | **18.556** | **10.974** | **2.280** | **54.995** | **8.161** | **2.703** | **.181** | **.058** | **.178** | **3.101** | **6.221** | **69.377** |
| **2010 Total** | **22.038** | **21.806** | **11.610** | **2.705** | **58.159** | **8.434** | **2.539** | **.208** | **.090** | **.923** | **4.553** | **8.312** | **74.906** |
| **2011 Total** | **22.221** | **23.406** | **12.012** | **2.890** | **60.529** | **8.269** | **3.103** | **.212** | **.110** | **1.168** | **4.712** | **9.306** | **78.104** |
| **2012 Total** | **20.677** | **24.610** | **13.849** | **3.162** | **62.298** | **8.062** | **2.629** | **.212** | **.156** | **1.340** | **4.554** | **8.890** | **79.249** |
| **2013 Total** | **20.001** | **24.859** | **15.868** | **3.451** | **64.180** | **8.244** | **2.562** | **.214** | **.225** | **1.601** | **4.835** | **9.438** | **81.862** |
| **2014 Total** | **20.286** | **26.718** | **18.590** | **4.005** | **69.599** | **8.338** | **2.466** | **.214** | **.337** | **1.727** | **5.049** | **9.795** | **87.732** |
| **2015 Total** | **17.946** | **28.067** | **19.682** | **4.476** | **70.171** | **8.337** | **2.320** | **.212** | **.427** | **1.776** | **5.025** | **9.760** | **88.267** |
| **2016 Total** | **14.667** | **27.576** | **18.534** | **4.665** | **65.442** | **8.427** | **2.471** | **.210** | **.570** | **2.095** | **5.122** | **10.468** | **84.337** |
| **2017 Total** | **15.625** | **28.325** | **19.551** | **4.987** | **68.488** | **8.419** | **2.765** | **.210** | **.777** | **2.342** | **5.156** | **11.250** | **88.158** |
| **2018 Total** | **15.363** | **31.882** | **22.825** | **5.727** | **75.798** | **8.438** | **2.661** | **.209** | **.915** | **2.481** | **5.306** | **11.571** | **95.807** |
| **2019 Total** | **14.256** | **35.187** | **25.610** | **6.352** | **81.405** | **8.452** | **2.562** | **.201** | **1.016** | **2.633** | **5.207** | **11.619** | **101.476** |
| **2020 Total** | **10.703** | **35.062** | **23.585** | **6.805** | **76.155** | **8.251** | **2.501** | **.203** | **1.211** | **2.963** | **4.700** | **11.577** | **95.983** |
| **2021 Total** | **11.596** | **35.807** | **23.485** | **7.099** | **77.987** | **8.131** | **2.225** | **.205** | **1.518** | **3.345** | **4.916** | **12.209** | **98.327** |
| **2022 Total** | **12.043** | **37.560** | **24.880** | **7.742** | **82.225** | **8.061** | **2.245** | **.205** | **1.872** | **3.827** | **5.090** | **13.240** | **103.526** |
| **2023** January | 1.037 | 3.277 | 2.224 | .669 | 7.208 | .741 | .196 | .018 | .105 | .331 | .428 | 1.078 | 9.027 |
| February | .931 | 2.953 | 2.006 | .612 | 6.501 | .636 | .172 | .016 | .123 | .357 | .384 | 1.053 | 8.190 |
| March | 1.057 | 3.315 | 2.260 | .704 | 7.336 | .657 | .184 | .018 | .162 | .376 | .430 | 1.171 | 9.163 |
| April | .955 | 3.179 | 2.164 | .691 | 6.990 | .592 | .171 | .017 | .194 | .369 | .399 | 1.150 | 8.732 |
| May | .981 | 3.324 | 2.245 | .712 | 7.262 | .639 | .239 | .017 | .221 | .278 | .429 | 1.184 | 9.085 |
| June | .959 | 3.205 | 2.196 | .687 | 7.047 | .677 | .186 | .016 | .224 | .238 | .423 | 1.087 | 8.811 |
| July | .950 | 3.319 | 2.281 | .721 | 7.271 | .730 | .190 | .017 | .236 | .242 | .432 | 1.116 | 9.117 |
| August | 1.030 | 3.342 | 2.301 | .735 | 7.408 | .729 | .184 | .016 | .224 | .245 | .436 | 1.105 | 9.242 |
| September | .986 | 3.238 | 2.249 | .729 | 7.202 | .685 | .146 | .017 | .197 | .245 | .421 | 1.026 | 8.913 |
| October | .967 | 3.342 | 2.319 | .754 | 7.383 | .642 | .135 | .018 | .180 | .311 | .427 | 1.071 | 9.095 |
| November | .967 | 3.280 | 2.267 | .727 | 7.242 | .651 | .147 | .018 | .137 | .315 | .427 | 1.043 | 8.936 |
| December | .932 | 3.390 | 2.347 | .737 | 7.405 | .720 | .164 | .018 | .121 | .328 | .460 | 1.092 | 9.216 |
| **Total** | **11.752** | **39.164** | **26.858** | **8.480** | **86.255** | **8.099** | **2.114** | **.205** | **2.125** | **3.634** | **5.097** | **13.175** | **107.529** |
| **2024** January | .912 | E 3.325 | E 2.214 | .672 | 7.123 | .722 | .189 | .018 | .129 | .301 | .424 | 1.061 | 8.906 |
| February | .910 | E 3.185 | E 2.162 | .689 | 6.945 | .675 | .174 | .016 | .159 | .359 | .411 | 1.118 | 8.739 |
| March | .866 | E 3.298 | E 2.323 | .758 | 7.244 | .662 | .201 | .017 | .204 | .394 | .440 | 1.255 | 9.161 |
| April | .740 | E 3.163 | E 2.261 | .748 | 6.913 | .602 | .167 | .017 | .239 | .409 | .412 | 1.244 | 8.760 |
| May | .814 | E 3.263 | E 2.328 | .782 | 7.187 | .679 | .195 | .016 | .272 | .334 | .429 | 1.247 | 9.112 |
| June | .890 | E 3.197 | E 2.260 | .753 | 7.100 | .713 | .183 | .016 | .291 | .329 | .425 | 1.244 | 9.056 |
| July | .898 | E 3.347 | E 2.327 | .765 | 7.336 | .730 | .183 | .017 | .292 | .241 | .446 | 1.179 | 9.246 |
| August | .973 | E 3.313 | E 2.357 | .780 | 7.422 | .729 | .184 | .017 | .287 | .248 | .451 | 1.187 | 9.338 |
| September | .943 | E 3.167 | E 2.250 | .768 | 7.129 | .655 | .144 | .016 | .246 | .250 | .427 | 1.083 | 8.867 |
| October | .915 | E 3.308 | E 2.372 | .802 | 7.396 | .614 | .137 | .016 | .232 | .346 | .437 | 1.167 | 9.177 |
| November | .846 | E 3.204 | E 2.279 | .782 | 7.111 | .647 | .158 | .016 | .171 | .353 | .445 | 1.143 | 8.900 |
| December | .883 | E 3.394 | E 2.370 | .791 | 7.438 | .744 | .176 | .017 | .158 | .348 | .452 | 1.152 | 9.334 |
| **Total** | **10.591** | **E 39.164** | **E 27.501** | **9.088** | **86.344** | **8.173** | **2.090** | **.199** | **2.680** | **3.913** | **5.199** | **14.081** | **108.598** |
| **2025** January | .912 | RE 3.355 | RE 2.317 | .744 | R 7.329 | .750 | .183 | .017 | .182 | .377 | .435 | 1.194 | R 9.273 |
| February | .799 | RE 3.049 | RE 2.109 | .695 | R 6.652 | .646 | .167 | .016 | .196 | .340 | .394 | 1.113 | R 8.411 |
| March | .963 | E 3.449 | E 2.379 | .812 | 7.603 | .653 | .190 | .018 | .274 | .437 | .431 | 1.350 | 9.606 |
| **3-Month Total** | **2.674** | **E 9.854** | **E 6.805** | **2.251** | **21.584** | **2.049** | **.540** | **.051** | **.652** | **1.154** | **1.260** | **3.657** | **27.290** |
| **2024 3-Month Total** | **2.688** | **E 9.808** | **E 6.698** | **2.118** | **21.313** | **2.059** | **.564** | **.051** | **.492** | **1.054** | **1.275** | **3.435** | **26.807** |
| **2023 3-Month Total** | **3.025** | **9.545** | **6.490** | **1.986** | **21.045** | **2.033** | **.553** | **.052** | **.391** | **1.065** | **1.242** | **3.302** | **26.380** |

[a] Most data are estimates. See Table E4 for notes on series components and estimation.

[b] Beginning in 1989, includes waste coal supplied. Beginning in 2001, also includes a small amount of refuse recovery. See Table 6.1.

[c] Includes lease condensate.

[d] 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).

[e] Conventional hydroelectric power.

R=Revised. E=Estimate. NA=Not available. (s)=Less than 0.5 trillion Btu.

Notes: • See "Primary Energy Production" in Glossary. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#appendices (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: • **Fossil Fuels** and **Nuclear Electric Power:** Table 1.2. • **Renewable Energy:** Table E4. • **Total:** Calculated as the sum of Fossil Fuels, Nuclear Electric Power, and Renewable Energy.

# Table E3. Primary Energy Consumption by Source, Fossil Fuel Equivalency Approach

(Quadrillion Btu)

| | Fossil Fuels[a] | | | | | Renewable Energy[b] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coal | Natural Gas[c] | Petroleum[d] | Total[e] | Nuclear Electric Power | Hydroelectric Power[f] | Geothermal | Solar | Wind | Biomass | Total | Total[g] |
| **1950 Total** | **12.347** | **5.968** | **13.298** | **31.615** | **0.000** | **1.415** | **NA** | **NA** | **NA** | **1.562** | **2.978** | **34.599** |
| **1955 Total** | **11.167** | **8.998** | **17.225** | **37.380** | **.000** | **1.360** | **NA** | **NA** | **NA** | **1.424** | **2.784** | **40.178** |
| **1960 Total** | **9.838** | **12.385** | **19.874** | **42.091** | **.006** | **1.608** | **(s)** | **NA** | **NA** | **1.320** | **2.928** | **45.041** |
| **1965 Total** | **11.581** | **15.769** | **23.184** | **50.515** | **.043** | **2.059** | **.002** | **NA** | **NA** | **1.335** | **3.396** | **53.953** |
| **1970 Total** | **12.265** | **21.795** | **29.499** | **63.501** | **.239** | **2.634** | **.006** | **NA** | **NA** | **1.431** | **4.070** | **67.817** |
| **1975 Total** | **12.663** | **19.948** | **32.699** | **65.323** | **1.900** | **3.155** | **.034** | **NA** | **NA** | **1.499** | **4.687** | **71.931** |
| **1980 Total** | **15.423** | **20.235** | **34.159** | **69.782** | **2.739** | **2.900** | **.053** | **NA** | **NA** | **2.475** | **5.428** | **78.021** |
| **1985 Total** | **17.478** | **17.703** | **30.866** | **66.035** | **4.076** | **2.970** | **.097** | **(s)** | **(s)** | **3.016** | **6.084** | **76.334** |
| **1990 Total** | **19.173** | **19.603** | **33.500** | **72.281** | **6.104** | **3.046** | **.171** | **.059** | **.029** | **2.735** | **6.040** | **84.433** |
| **1995 Total** | **20.089** | **22.671** | **34.341** | **77.162** | **7.075** | **3.205** | **.152** | **.068** | **.033** | **3.101** | **6.559** | **90.931** |
| **2000 Total** | **22.580** | **23.824** | **38.152** | **84.620** | **7.862** | **2.811** | **.164** | **.063** | **.057** | **3.008** | **6.104** | **98.702** |
| **2005 Total** | **22.797** | **22.565** | **40.217** | **85.623** | **8.161** | **2.703** | **.181** | **.058** | **.178** | **3.114** | **6.233** | **100.101** |
| **2010 Total** | **20.834** | **24.575** | **35.321** | **80.723** | **8.434** | **2.539** | **.208** | **.090** | **.923** | **4.506** | **8.266** | **97.512** |
| **2011 Total** | **19.658** | **24.955** | **34.639** | **79.263** | **8.269** | **3.103** | **.212** | **.110** | **1.168** | **4.616** | **9.210** | **96.868** |
| **2012 Total** | **17.378** | **26.089** | **33.833** | **77.304** | **8.062** | **2.629** | **.212** | **.156** | **1.340** | **4.517** | **8.853** | **94.380** |
| **2013 Total** | **18.039** | **26.805** | **34.398** | **79.224** | **8.244** | **2.562** | **.214** | **.225** | **1.601** | **4.861** | **9.464** | **97.130** |
| **2014 Total** | **17.998** | **27.383** | **34.658** | **80.017** | **8.338** | **2.466** | **.214** | **.337** | **1.727** | **5.013** | **9.758** | **98.294** |
| **2015 Total** | **15.549** | **28.191** | **35.368** | **79.090** | **8.337** | **2.320** | **.212** | **.427** | **1.776** | **5.008** | **9.743** | **97.398** |
| **2016 Total** | **14.226** | **28.400** | **35.712** | **78.319** | **8.427** | **2.471** | **.210** | **.570** | **2.095** | **5.053** | **10.399** | **97.372** |
| **2017 Total** | **13.837** | **28.049** | **36.043** | **77.901** | **8.419** | **2.765** | **.210** | **.777** | **2.342** | **5.035** | **11.129** | **97.641** |
| **2018 Total** | **13.252** | **31.163** | **36.892** | **81.281** | **8.438** | **2.661** | **.209** | **.915** | **2.481** | **5.096** | **11.361** | **101.232** |
| **2019 Total** | **11.316** | **32.264** | **36.866** | **80.425** | **8.452** | **2.562** | **.201** | **1.016** | **2.633** | **5.048** | **11.460** | **100.470** |
| **2020 Total** | **9.181** | **31.669** | **32.331** | **73.169** | **8.251** | **2.501** | **.203** | **1.211** | **2.963** | **4.535** | **11.412** | **92.993** |
| **2021 Total** | **10.549** | **31.711** | **35.243** | **77.454** | **8.131** | **2.225** | **.205** | **1.518** | **3.345** | **4.753** | **12.046** | **97.765** |
| **2022 Total** | **9.888** | **33.379** | **35.319** | **78.529** | **8.061** | **2.245** | **.205** | **1.872** | **3.827** | **4.874** | **13.024** | **99.755** |
| **2023** January | .750 | 3.428 | 2.868 | 7.043 | .741 | .196 | .018 | .105 | .331 | .409 | 1.059 | 8.854 |
| February | .582 | 3.057 | 2.678 | 6.315 | .636 | .172 | .016 | .123 | .357 | .368 | 1.037 | 7.994 |
| March | .620 | 3.129 | 3.006 | 6.753 | .657 | .184 | .018 | .162 | .376 | .415 | 1.155 | 8.574 |
| April | .500 | 2.499 | 2.878 | 5.875 | .592 | .171 | .017 | .194 | .369 | .386 | 1.137 | 7.611 |
| May | .550 | 2.386 | 3.014 | 5.948 | .639 | .239 | .017 | .221 | .278 | .425 | 1.179 | 7.775 |
| June | .705 | 2.445 | 2.991 | 6.138 | .677 | .186 | .016 | .224 | .238 | .412 | 1.077 | 7.899 |
| July | .913 | 2.760 | 2.975 | 6.645 | .730 | .190 | .017 | .236 | .242 | .414 | 1.098 | 8.477 |
| August | .903 | 2.773 | 3.108 | 6.781 | .729 | .184 | .016 | .224 | .245 | .427 | 1.096 | 8.610 |
| September | .716 | 2.464 | 2.911 | 6.087 | .685 | .146 | .017 | .197 | .245 | .404 | 1.009 | 7.782 |
| October | .628 | 2.523 | 3.067 | 6.216 | .642 | .135 | .018 | .180 | .311 | .418 | 1.061 | 7.920 |
| November | .629 | 2.920 | 2.978 | 6.525 | .651 | .147 | .018 | .137 | .315 | .407 | 1.023 | 8.201 |
| December | .676 | 3.300 | 2.975 | 6.946 | .720 | .164 | .018 | .121 | .328 | .431 | 1.063 | 8.733 |
| **Total** | **8.172** | **33.683** | **35.448** | **77.271** | **8.099** | **2.114** | **.205** | **2.125** | **3.634** | **4.916** | **12.994** | **98.429** |
| **2024** January | .877 | 3.856 | 2.886 | 7.619 | .722 | .189 | .018 | .129 | .301 | .403 | 1.040 | 9.387 |
| February | .559 | 3.076 | 2.728 | 6.362 | .675 | .174 | .016 | .159 | .359 | .394 | 1.101 | 8.139 |
| March | .491 | 2.899 | 2.924 | 6.310 | .662 | .201 | .017 | .204 | .394 | .418 | 1.234 | 8.205 |
| April | .466 | 2.482 | 2.876 | 5.819 | .602 | .167 | .017 | .239 | .409 | .398 | 1.230 | 7.650 |
| May | .563 | 2.416 | 3.080 | 6.056 | .679 | .195 | .016 | .272 | .334 | .425 | 1.243 | 7.978 |
| June | .720 | 2.518 | 2.901 | 6.134 | .713 | .183 | .016 | .291 | .329 | .409 | 1.228 | 8.080 |
| July | .835 | 2.843 | 3.052 | 6.728 | .730 | .183 | .017 | .292 | .241 | .434 | 1.167 | 8.634 |
| August | .815 | 2.812 | 3.068 | 6.691 | .729 | .184 | .017 | .287 | .248 | .432 | 1.168 | 8.595 |
| September | .663 | 2.504 | 2.893 | 6.057 | .655 | .144 | .016 | .246 | .250 | .411 | 1.068 | 7.787 |
| October | .591 | 2.517 | 3.092 | 6.198 | .614 | .137 | .016 | .232 | .346 | .424 | 1.154 | 7.973 |
| November | .571 | 2.807 | 2.869 | 6.244 | .647 | .158 | .016 | .171 | .353 | .421 | 1.119 | 8.012 |
| December | .746 | 3.473 | 2.981 | 7.196 | .744 | .176 | .017 | .158 | .348 | .423 | 1.123 | 9.070 |
| **Total** | **7.896** | **34.205** | **35.349** | **77.415** | **8.173** | **2.090** | **.199** | **2.680** | **3.913** | **4.992** | **13.875** | **99.510** |
| **2025** January | .941 | 4.058 | 3.058 | 8.056 | .750 | .183 | .017 | .182 | .377 | .398 | 1.157 | 9.973 |
| February | .737 | 3.352 | 2.682 | R 6.771 | .646 | .167 | .016 | .196 | .340 | .369 | 1.087 | R 8.511 |
| March | .598 | 2.840 | 2.951 | 6.388 | .653 | .190 | .018 | .274 | .437 | .401 | 1.320 | 8.364 |
| **3-Month Total** | **2.277** | **10.251** | **8.691** | **21.215** | **2.049** | **.540** | **.051** | **.652** | **1.154** | **1.168** | **3.565** | **26.847** |
| **2024 3-Month Total** | **1.927** | **9.832** | **8.539** | **20.291** | **2.059** | **.564** | **.051** | **.492** | **1.054** | **1.215** | **3.376** | **25.731** |
| **2023 3-Month Total** | **1.952** | **9.614** | **8.552** | **20.111** | **2.033** | **.553** | **.052** | **.391** | **1.065** | **1.191** | **3.251** | **25.421** |

[a] Includes non-combustion use of fossil fuels.
[b] Most data are estimates. See Table E4 for notes on series components and estimation.
[c] Natural gas only; excludes supplemental gaseous fuels. See Note 3, "Supplemental Gaseous Fuels," at end of Section 4.
[d] Petroleum products supplied; excludes biofuels. Biofuels are included in "Biomass."
[e] Includes coal coke net imports. See Tables 1.4c.
[f] Conventional hydroelectric power.
[g] Includes coal coke net imports and electricity net imports, which are not separately displayed. See Tables 1.4c.
R=Revised. NA=Not available. (s)=Less than 0.5 trillion Btu.

Notes: • See "Primary Energy Consumption" in Glossary. • See Table D1 for estimated energy consumption for 1635–1945. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.
Web Page: See http://www.eia.gov/totalenergy/data/monthly/#appendices (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.
Sources: • **Fossil Fuels** and **Nuclear Electric Power:** Table 1.3. • **Renewable Energy:** Table E4. • **Total:** Calculated as the sum of Fossil Fuels, Nuclear Electric Power, Renewable Energy, and Electricity Net Imports (see Table 1.4c).

# Table E4. Renewable Energy Production and Consumption by Source, Fossil Fuel Equivalency Approach (Trillion Btu)

| | Production[a] | | | | Consumption | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Biomass | | | Total Renewable Energy[e] | Noncombustible (Fossil Fuel Equivalent) | | | | Biomass | | | | Total Renewable Energy |
| | Wood[b] | Biofuels[c] | Total[d] | | Hydroelectric Power[f] | Geothermal[g] | Solar[h] | Wind[i] | Wood[j] | Waste[k] | Biofuels[l] | Total | |
| **1950 Total** | **1,562** | **NA** | **1,562** | **2,978** | **1,415** | **NA** | **NA** | **NA** | **1,562** | **NA** | **NA** | **1,562** | **2,978** |
| **1955 Total** | **1,424** | **NA** | **1,424** | **2,784** | **1,360** | **NA** | **NA** | **NA** | **1,424** | **NA** | **NA** | **1,424** | **2,784** |
| **1960 Total** | **1,320** | **NA** | **1,320** | **2,928** | **1,608** | **(s)** | **NA** | **NA** | **1,320** | **NA** | **NA** | **1,320** | **2,928** |
| **1965 Total** | **1,335** | **NA** | **1,335** | **3,396** | **2,059** | **2** | **NA** | **NA** | **1,335** | **NA** | **NA** | **1,335** | **3,396** |
| **1970 Total** | **1,429** | **NA** | **1,431** | **4,070** | **2,634** | **6** | **NA** | **NA** | **1,429** | **2** | **NA** | **1,431** | **4,070** |
| **1975 Total** | **1,497** | **NA** | **1,499** | **4,687** | **3,155** | **34** | **NA** | **NA** | **1,497** | **2** | **NA** | **1,499** | **4,687** |
| **1980 Total** | **2,474** | **NA** | **2,475** | **5,428** | **2,900** | **53** | **NA** | **NA** | **2,474** | **2** | **NA** | **2,475** | **5,428** |
| **1985 Total** | **2,687** | **93** | **3,016** | **6,084** | **2,970** | **97** | **NA** | **(s)** | **2,687** | **236** | **93** | **3,016** | **6,084** |
| **1990 Total** | **2,216** | **111** | **2,735** | **6,040** | **3,046** | **171** | **59** | **29** | **2,216** | **408** | **111** | **2,735** | **6,040** |
| **1995 Total** | **2,370** | **198** | **3,099** | **6,557** | **3,205** | **152** | **68** | **33** | **2,370** | **531** | **200** | **3,101** | **6,559** |
| **2000 Total** | **2,262** | **233** | **3,006** | **6,102** | **2,811** | **164** | **63** | **57** | **2,262** | **511** | **236** | **3,008** | **6,104** |
| **2005 Total** | **2,137** | **561** | **3,101** | **6,221** | **2,703** | **181** | **58** | **178** | **2,137** | **403** | **574** | **3,114** | **6,233** |
| **2010 Total** | **2,217** | **1,868** | **4,553** | **8,312** | **2,539** | **208** | **90** | **923** | **2,217** | **468** | **1,821** | **4,506** | **8,266** |
| **2011 Total** | **2,213** | **2,037** | **4,712** | **9,306** | **3,103** | **212** | **110** | **1,168** | **2,213** | **462** | **1,941** | **4,616** | **9,210** |
| **2012 Total** | **2,151** | **1,936** | **4,554** | **8,890** | **2,629** | **212** | **156** | **1,340** | **2,151** | **467** | **1,899** | **4,517** | **8,853** |
| **2013 Total** | **2,338** | **2,000** | **4,835** | **9,438** | **2,562** | **214** | **225** | **1,601** | **2,338** | **496** | **2,026** | **4,861** | **9,464** |
| **2014 Total** | **2,398** | **2,135** | **5,049** | **9,795** | **2,466** | **214** | **337** | **1,727** | **2,398** | **516** | **2,099** | **5,013** | **9,758** |
| **2015 Total** | **2,305** | **2,201** | **5,025** | **9,760** | **2,320** | **212** | **427** | **1,776** | **2,305** | **518** | **2,185** | **5,008** | **9,743** |
| **2016 Total** | **2,290** | **2,329** | **5,122** | **10,468** | **2,471** | **210** | **570** | **2,095** | **2,217** | **503** | **2,333** | **5,053** | **10,399** |
| **2017 Total** | **2,254** | **2,407** | **5,156** | **11,250** | **2,765** | **210** | **777** | **2,342** | **2,176** | **495** | **2,364** | **5,035** | **11,129** |
| **2018 Total** | **2,348** | **2,471** | **5,306** | **11,571** | **2,661** | **209** | **915** | **2,481** | **2,254** | **487** | **2,355** | **5,096** | **11,361** |
| **2019 Total** | **2,333** | **2,432** | **5,207** | **11,619** | **2,562** | **201** | **1,016** | **2,633** | **2,229** | **442** | **2,376** | **5,048** | **11,460** |
| **2020 Total** | **2,066** | **2,194** | **4,700** | **11,577** | **2,501** | **203** | **1,211** | **2,963** | **1,960** | **440** | **2,136** | **4,535** | **11,412** |
| **2021 Total** | **2,112** | **2,374** | **4,916** | **12,209** | **2,225** | **205** | **1,518** | **3,345** | **1,992** | **430** | **2,331** | **4,753** | **12,046** |
| **2022 Total** | **2,167** | **2,511** | **5,090** | **13,240** | **2,245** | **205** | **1,872** | **3,827** | **2,029** | **412** | **2,433** | **4,874** | **13,024** |
| **2023** January | 174 | 219 | 428 | 1,078 | 196 | 18 | 105 | 331 | 166 | 35 | 208 | 409 | 1,059 |
| February | 155 | 198 | 384 | 1,053 | 172 | 16 | 123 | 357 | 147 | 31 | 189 | 368 | 1,037 |
| March | 176 | 221 | 430 | 1,171 | 184 | 18 | 162 | 376 | 161 | 34 | 220 | 415 | 1,155 |
| April | 156 | 212 | 399 | 1,150 | 171 | 17 | 194 | 369 | 148 | 32 | 207 | 386 | 1,137 |
| May | 168 | 228 | 429 | 1,184 | 239 | 17 | 221 | 278 | 157 | 34 | 234 | 425 | 1,179 |
| June | 162 | 229 | 423 | 1,087 | 186 | 16 | 224 | 238 | 150 | 32 | 231 | 412 | 1,077 |
| July | 167 | 232 | 432 | 1,116 | 190 | 17 | 236 | 242 | 157 | 33 | 224 | 414 | 1,098 |
| August | 173 | 230 | 436 | 1,105 | 184 | 16 | 224 | 245 | 159 | 33 | 235 | 427 | 1,096 |
| September | 165 | 226 | 421 | 1,026 | 146 | 17 | 197 | 245 | 152 | 31 | 222 | 404 | 1,009 |
| October | 162 | 232 | 427 | 1,071 | 135 | 18 | 180 | 311 | 151 | 33 | 234 | 418 | 1,061 |
| November | 164 | 230 | 427 | 1,043 | 147 | 18 | 137 | 315 | 155 | 33 | 219 | 407 | 1,023 |
| December | 176 | 248 | 460 | 1,092 | 164 | 18 | 121 | 328 | 160 | 36 | 235 | 431 | 1,063 |
| **Total** | **1,998** | **2,705** | **5,097** | **13,175** | **2,114** | **205** | **2,125** | **3,634** | **1,863** | **394** | **2,659** | **4,916** | **12,994** |
| **2024** January | 165 | 225 | 424 | 1,061 | 189 | 18 | 129 | 301 | 157 | 34 | 212 | 403 | 1,040 |
| February | 153 | 227 | 411 | 1,118 | 174 | 16 | 159 | 359 | 142 | 31 | 221 | 394 | 1,101 |
| March | 166 | 241 | 440 | 1,255 | 201 | 17 | 204 | 394 | 153 | 33 | 233 | 418 | 1,234 |
| April | 159 | 222 | 412 | 1,244 | 167 | 17 | 239 | 409 | 148 | 31 | 219 | 398 | 1,230 |
| May | 165 | 232 | 429 | 1,247 | 195 | 16 | 272 | 334 | 153 | 33 | 240 | 425 | 1,243 |
| June | 157 | 237 | 425 | 1,244 | 183 | 16 | 291 | 329 | 146 | 30 | 233 | 409 | 1,228 |
| July | 163 | 252 | 446 | 1,179 | 183 | 17 | 292 | 241 | 151 | 32 | 251 | 434 | 1,167 |
| August | 169 | 250 | 451 | 1,187 | 184 | 17 | 287 | 248 | 156 | 31 | 244 | 432 | 1,168 |
| September | 163 | 235 | 427 | 1,083 | 144 | 16 | 246 | 250 | 151 | 30 | 231 | 411 | 1,068 |
| October | 158 | 247 | 437 | 1,167 | 137 | 16 | 232 | 346 | 146 | 32 | 246 | 424 | 1,154 |
| November | 163 | 251 | 445 | 1,143 | 158 | 16 | 171 | 353 | 151 | 31 | 239 | 421 | 1,119 |
| December | 168 | 253 | 452 | 1,152 | 176 | 17 | 158 | 348 | 156 | 32 | 235 | 423 | 1,123 |
| **Total** | **1,949** | **2,871** | **5,199** | **14,081** | **2,090** | **199** | **2,680** | **3,913** | **1,811** | **379** | **2,802** | **4,992** | **13,875** |
| **2025** January | [R] 168 | 235 | 435 | 1,194 | 183 | 17 | 182 | 377 | 155 | 32 | 210 | 398 | 1,157 |
| February | 151 | 214 | 394 | 1,113 | 167 | 16 | 196 | 340 | 139 | 30 | 201 | 369 | 1,087 |
| March | 165 | 234 | 431 | 1,350 | 190 | 18 | 274 | 437 | 153 | 32 | 216 | 401 | 1,320 |
| **3-Month Total** | **483** | **683** | **1,260** | **3,657** | **540** | **51** | **652** | **1,154** | **447** | **94** | **627** | **1,168** | **3,565** |
| **2024 3-Month Total** | **484** | **693** | **1,275** | **3,435** | **564** | **51** | **492** | **1,054** | **451** | **98** | **666** | **1,215** | **3,376** |
| **2023 3-Month Total** | **504** | **638** | **1,242** | **3,302** | **553** | **52** | **391** | **1,065** | **474** | **100** | **618** | **1,191** | **3,251** |

[a] For hydroelectric power, geothermal, solar, wind, and biomass waste, production equals consumption.
[b] Wood and wood-derived fuels. Through 2015, wood production equals consumption. Beginning in 2016, wood production equals consumption plus densified biomass exports.
[c] Total biomass inputs to the production of fuel ethanol and biodiesel. Beginning in 2011, also includes production of renewable diesel fuel. Beginning in 2014, also includes production of other biofuels.
[d] Includes biomass waste.
[e] Hydroelectric power, geothermal, solar, wind, and biomass.
[f] Conventional hydroelectricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).
[g] Geothermal electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), and geothermal heat pump and direct use energy.
[h] Solar photovoltaic (PV) and solar thermal electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6), and solar thermal direct use energy.
[i] Wind electricity net generation (converted to Btu by multiplying by the total fossil fuels heat rate factors in Table A6).
[j] Wood and wood-derived fuels.
[k] Municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, and other biomass. Through 2000, also includes non-renewable waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).
[l] Fuel ethanol (minus denaturant), biodiesel, renewable diesel fuel, and other biofuels consumption; plus losses and co-products from the production of fuel ethanol and biodiesel.

R=Revised. NA=Not available. (s)=Less than 0.5 trillion Btu.

Notes: • Production data are estimates. Consumption data are estimates, except for hydroelectric power in 1949–1978 and 1989 forward, and wind. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 states and the District of Columbia.

Web Page: See http://www.eia.gov/totalenergy/data/monthly/#appendices (Excel and CSV files) for all available annual data beginning in 1949 and monthly data beginning in 1973.

Sources: • **Biomass:** Table 10.1. • **Hydroelectric Power** and **Wind:** Calculated as electricity net generation (see Table 7.2a) multiplied by the total fossil fuels heat rate factors (see Table A6). • **Geothermal:** Calculated as geothermal electricity net generation (see Table 7.2a) multiplied by the total fossil fuels heat rate factors (see Table A6); plus geothermal heat pump and direct use energy in the residential, commercial, and industrial sectors (see Tables 10.2a and 10.2b) .• **Solar:** Calculated as solar electricity net generation (see Table 7.2a) multiplied by the total fossil fuels heat rate factors (see Table A6); plus solar thermal direct use energy (see Table 10.5). • **Total Production:** Calculated as the sum of biomass production and noncombustible consumption. • **Total Consumption:** Calculated as the sum of biomass consumption and noncombustible consumption.

THIS PAGE INTENTIONALLY LEFT BLANK