Introduction

The U.S. Energy Information Administration's (EIA) State Energy Data System (SEDS) provides Members of Congress, federal and state agencies, and the general public with comparable state-level data on energy production, consumption, prices, expenditures, indicators, and carbon dioxide emissions from energy consumption. The SEDS energy production database provides annual time series of the production of primary energy sources by state, generally for 1960 forward. EIA's Office of Energy Demand and Integrated Statistics compiles data from information collected by EIA (and its predecessor agencies) and other publicly available sources.

Purpose

Various EIA surveys collect energy production data in physical units and publish the data in reports on the EIA website. However, most EIA data are published only for the latest time period or for a shorter time series and do not include earlier historical data. Also, it is not possible to compare production across fuels that are reported in different physical units or to calculate total energy production. The SEDS energy production database converts physical unit production into common units of heat, called British thermal units (Btu), and provides a standardized set of state energy production data for comparisons over time, across fuels, and across states.

Coverage

The primary energy sources used to calculate total energy production in the state energy production database include:

- Coal
- Crude oil
- Natural gas, marketed production[1]
- Nuclear electric power
- Renewable energy

Production data for coal, crude oil, and natural gas come from EIA sources and earlier reports published by other agencies. SEDS converts the production data from physical units (short tons, barrels, and cubic feet) to British thermal units (Btu) using estimated heat content conversion factors. The EIA heat content per unit of physical unit (thermal conversion factors) represents the gross (or higher or upper) energy content of the fuel.

Nuclear electric power production in Btu, which also equals consumption, is the nuclear electricity net generation multiplied by the average heat rate of the nuclear power plants.

Renewable energy includes biofuels, geothermal, hydroelectric power, solar, wind, wood, and biomass waste. Biofuels include fuel ethanol, biodiesel, renewable diesel, and other biofuels. SEDS estimates state-level production of fuel ethanol, biodiesel, and renewable diesel in thousand barrels, using data provided by some states and plant capacity data. SEDS estimates US-level production only for other biofuels. SEDS defines biofuel production in Btu as the total heat content of biomass inputs (or feedstock such as corn and soy) used in the production of fuel ethanol and biodiesel (including losses and co-products), plus the heat content of pure renewable diesel and other biofuels liquid fuel production. SEDS assumes that production of other renewable energy equals consumption, except for wood production for 2016 forward. See Section 5 for the description of renewable energy concepts and estimation procedures.

To avoid double-counting, production (generation) of electricity, a secondary energy source, is not covered in this report (see the EIA Electricity Data Browser for state electricity generation data). SEDS counts production of domestically produced fossil fuels used for electricity generation as production in the producing state. For example, SEDS counts coal production in the state that the mine is located, even if the coal is transported to another state to generate electricity). SEDS counts production of nuclear fuels and renewable energy used for electricity generation as production in the electricity generating state.

[1] SEDS presents marketed production for natural gas, in contrast to the *Monthly Energy Review*, EIA's national energy publication, which presents production data for dry natural gas and natural gas plant liquids. See discussion in Section 3.

Sections 1 through 5 of this documentation describe the data sources and the estimation methodologies used to derive the production series for each energy source.

Comparability

To maintain internal consistency, SEDS calculates U.S. estimates as the sum of all states, District of Columbia, and federal offshore production, if any, except for other biofuels and aggregate categories that include other biofuels, because SEDS only estimates U.S.-level data for other biofuels and not state-level data. U.S. totals may not exactly equal the national data published in other EIA publications because of rounding or differences in estimation methods. The box below summarizes the differences between the U.S. production estimates in SEDS and the U.S. production data published in the *Monthly Energy Review* (MER).

Differences between U.S. production estimates in SEDS and MER

EIA's *Monthly Energy Review* (MER) and SEDS publish annual time series of production data at the U.S. level in both physical units and Btu. The differences between the physical unit production data in SEDS and MER are minor and mostly because of rounding. Because SEDS computes the Btu production of coal and natural gas using state-level conversion factors, instead of a U.S.-level factor as the MER does, the differences between the U.S. Btu production data are more noticeable for those fuels.

Coal

Using the state-level conversion factors from EIA's Office of Energy Production, Conversion, and Delivery, SEDS U.S. coal production estimates in Btu are usually within 1% of the MER estimates. For 1989 forward, the MER's coal production in Btu also includes waste coal supplied, which is not included in the SEDS estimates.

Crude oil

There is no noticeable difference in the crude oil production data presented in SEDS and MER.

Natural gas

SEDS uses state-level thermal conversion factors for dry natural gas and regional-level thermal conversion factors for natural gas plant liquids to calculate natural gas marketed production in Btu. In contrast, MER uses U.S.-level thermal conversion for dry natural gas and natural gas plant liquids. The differences between the SEDS U.S. series and the sum of the two MER series are less than 0.5% in most years. The maximum difference is 2.1% in 1997. No attempt has been made to reconcile the two sets of estimates.

Nuclear energy

The SEDS and MER U.S. production estimates are the same for nuclear-generated power.

Renewable energy

The SEDS and MER U.S. production estimates are the same for all renewable energy sources.

Total energy

The SEDS and MER U.S. production estimates are the same for all total energy sources.