

How Big Is a Barrel?

A barrel is a unit of volume or weight that is different depending on who uses the term and what it contains... For example:

- 1 barrel (bbl) of petroleum or related products = 42 gallons
- 1 barrel of Portland cement = 376 pounds
- 1 barrel of flour = 196 pounds
- 1 barrel of pork or fish = 200 pounds
- 1 barrel of (U.S.) dry measure = 3.29122 bushels or 4.2104 cubic feet
- A barrel may be called a "drum," but a drum usually holds 55 gallons.
- A barrel big enough to carry a man over Niagara Falls.

What Is Energy?

Energy Units Basics

Physical units reflect measures of distances, areas, volumes, heights, weights, mass, force, and energy. Different types of energy are measured by different physical units:

- Barrels or gallons for petroleum
- Cubic feet for natural gas
- Tons for coal
- Kilowatthours for electricity

To compare different fuels, we need to convert the measurements to the same units.

Units for Comparing Energy

Some popular units for comparing energy include British Thermal Units (Btu), barrels of

oil equivalent, metric tons of oil equivalent, metric tons of coal equivalent, and terajoules.

In the United States, the Btu, a measure of heat energy, is the most commonly used unit for comparing fuels. Because energy used in different countries comes from different places, the Btu content of fuels varies slightly from country to country.

The Btu content of each fuel provided below and used in the energy calculator reflects the average energy content for fuels consumed in the United States.

Btu Content of Common Energy Units

- 1 barrel (42 gallons) of crude oil = 5,800,000 Btu
- 1 gallon of gasoline = 124,238 Btu (based on U.S. consumption, 2011)
- 1 gallon of diesel fuel = 138,690 Btu
- 1 gallon of heating oil = 138,690 Btu
- 1 barrel of residual fuel oil = 6,287,000 Btu
- 1 cubic foot of natural gas = 1,023 Btu (based on U.S. consumption, 2011)
- 1 gallon of propane = 91,333 Btu
- 1 short ton of coal = 19,858,000 Btu (based on U.S. consumption, 2011)
- 1 kilowatthour of electricity = 3,412 Btu

Examples of Converting Different Energy Sources to Btu

Example 1:

You have a natural gas furnace in your home that used 81,300 cubic feet of natural gas for heating last winter. Your neighbor has an oil furnace that used 584 gallons of heating oil last winter. To determine which home used more energy for heating, you can convert the natural gas and heating oil consumption figures into Btu, as follows:

Natural Gas: 81,300 cubic feet (your house) x 1,023 Btu per cubic foot = 83,169,900 Btu

Heating Oil: 584 gallons (neighbor's house) x 138,690 Btu per gallon = 80,994,496 Btu

Answer: You used more energy to heat your house!

Example 2:

You work for an electric power company. Your company's power generators can run on one of two fuels: natural gas or residual fuel oil. Your job is to switch fuels when the cost of the fuel you are currently using becomes more expensive than the other fuel. This will keep costs down for you and your electricity customers. Your company's generators are currently using residual fuel oil, but fuel oil prices have been going up much faster than natural gas prices. Based on the fuel costs below, you need to decide if it is time to switch to natural gas:

Natural Gas: \$7.30 per thousand cubic feet \div 1.023 million Btu per thousand cubic feet = \$7.12 per million Btu

Residual fuel oil: \$57.75 per barrel \div 6.287 million Btu per barrel = \$9.19 per million Btu

Answer: When you convert the fuels into the same units, you see that residual fuel oil now costs more than natural gas. You decide to switch to natural gas to save money.