
When there's a huge solar energy spill,
it's just called a "nice day"

Arizona State University
SES 194

Energy in Everyday Life

Specific Energy Densities

Frank Timmes

ftimmes@asu.edu

When chemicals burn, combine with oxygen in the air, they form bonds and release energy.

The heat of combustion is the amount of energy given off per mass of the substance when it burns.

Let's look at how much energy we get from various fuels, food and other stuff that burns.

Fuel	Energy in MJ/kg
Crude Oil	45.0
Fuel Oil	45.1
Gasoline	46.9
Kerosene	46.7
Average Coal	26.0
Ohio Coal (bituminous)	29.5
North Dakota Coal (lignite)	13.9
Fuel Alcohol	27.5
Hydrogen to Water	141.9
Methane (Natural Gas)	55.2

Foods	Energy in MJ/kg
Butter	45.0
Average Animal Fats	45.1
Egg White	46.9
Egg Yolk	46.7
Linseed Oil	26.0
Olive Oil	29.5

Other	Energy in MJ/kg
Sugarcane bagasse	16.9
Oak Wood	16.7
Pine Wood	18.5
Dynamite	5.4
Iron	6.6

We can break the chemical bonds if we pay a high enough energy price. Such a reaction sucks in energy from the surroundings, perhaps even lowering the temperature, in order to break the chemical bonds.

Such reactions are called endothermic.

When ammonium chloride is dissolved in water, the temperature of the mixture decreases. The mixing absorbs so much energy from the surroundings that any water touching the vessel may freeze.

Water can be broken up into its constituents, H and O, when an external energy source is available. If electrical energy is supplied, the process of water breakup is called electrolysis.