ENERGY

ABBREVIATIONS AND DEFINITIONS

Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ADO	automotive diesel oil
AGA	Australian Gas Association
ANZSIC	Australian and New Zealand Standard Industrial Classification
APEC	Asia Pacific Economic Cooperation
BTRE	Bureau of Transport and Regional Economics
DITR	Department of Industry, Tourism and Resources
FOE	fuel oil equivalent
GDP	gross domestic product
IDF	industrial diesel fuel
LNG	liquefied natural gas
LPG	liquefied petroleum gas
NECA	National Electricity Code Administrator
NEMMCO	National Electricity Market Management Company
NGL	natural gas liquids
ORF	other refinery feedstocks
CO	carbon monoxide
CO_2	carbon dioxide
CH_4	methane

Definitions

bagasse The fibrous residue of the sugar cane milling process which is used as a fuel in sugar mills.

biomass gas Landfill (garbage tips) gas and sewage gas

coal byproducts Byproducts such as coke oven gas, blast furnace gas (collected from steelworks blast furnaces), coal tar and benzene/toluene/xylene (BTX) feedstock. The latter two are both collected from the coke making process.

conversion The process of transforming one form of energy into another before use. Energy consumed in conversion is the energy content of fuel consumed by energy producing industries – such as natural gas and liquefied petroleum gas used in gas manufacturing, petroleum products used in oil refineries, and all fuels (including electricity) used in power stations – plus the energy lost in the production, conversion and transport of fuels such as electricity and natural gas transmission losses and leakages, natural gas used in pipeline compressors, and energy lost in coke production – plus energy used in pumped storage, less the energy produced.

derived fuels Fuels produced from primary or other derived fuels by conversion processes to provide the energy forms commonly consumed. They include petroleum products, thermal electricity, town gas, coke, coke oven gas, blast furnace gas and briquettes.

natural gas Gases that include commercial quality sales gas, liquefied natural gas, ethane, methane (including that from coal mines, garbage tips and sewage plants) and plant and field use of noncommercial quality gas. Indigenous production of natural gas in this report includes proposed imports of natural gas into Queensland from Papua New Guinea.

oxidation The process by which fuel is consumed by burning with oxygen. The proportion of fuel totally consumed by burning is the oxidised component, while a nonoxidised component remains as products such as soot, ash or, in the case of liquid and gas fuels, as nonoxidised liquid or gaseous components resulting from insufficient oxygen.

petroleum products Crude oil and condensate used directly as fuel, liquefied petroleum gas, refined products used as fuels (aviation gasoline, automotive gasoline, power kerosene, aviation turbine fuel, lighting kerosene, heating oil, automotive diesel oil, industrial diesel fuel, fuel oil, refinery fuel and naphtha) and refined products used in nonfuel applications (solvents, lubricants, bitumen, waxes, petroleum coke for anode production and specialised feedstocks).

primary fuels The forms of energy obtained directly from nature. They include nonrenewable fuels such as black coal, brown coal, uranium, crude oil and condensate, naturally occurring liquid petroleum gas, ethane and natural gas, and renewable fuels such as wood, bagasse, hydro-electricity and solar energy.

total energy consumption (also termed total domestic availability) The total quantity (in energy units) of primary and derived fuels consumed, less the quantity of derived fuels produced. If a derived fuel is exported from Australia, only the energy used in its production is included in total energy consumption. It includes the consumption of petroleum in nonfuel uses.

total final energy consumption The total amount of energy consumed outside the energy conversion sector. It is equal to total energy consumption less energy consumed or lost in conversion, transmission and distribution.

town gas All manufactured gases that are typically reticulated to consumers. These include synthetic natural gas, reformed gas, tempered liquid petroleum gas and tempered natural gas.

Units

J	joules
L	litres
t	tonnes
g	grams
Wh	watt-hours
b	billion (or 1000 million), used only in money quantities ($b)

Standard metric prefixes

kilo (k)	10^3 (thousand)
mega (M)	10^6 (million)
giga (G)	10^9 (1000 million)
tera (T)	10^{12}
peta (P)	10^{15}
exa (E)	10^{18}

Standard conversions

1 barrel = 158.987 L

1 kWh = 3600 kJ

Indicative conversion factors for fuel energy contents are given in tables 1–3 on the following pages.

Conventions used in tables

0.0 is used to denote a negligible amount.

Small discrepancies in totals are generally the result of the rounding of components.

Indicative energy content conversion factors

The factors listed in tables 1 to 3 below are to be used when converting individual types of fuel from volume or weight to energy equivalence, or vice versa. The values are indicative only, because the quality of any fuel varies with such factors as location, air pressure and temperature. Values given here apply at a temperature of 15° Celsius and pressure of 1 atmosphere (101.3 kilopascals). The values are the gross energy content of the fuel – that is, the total amount of heat that will be released by combustion.

1 Energy content of solid fuels

	Energy content
	GJ/t
Black coal	
New South Wales	
Exports – coking coal	29.0
– steaming coal	27.0
Electricity generation	23.5
Steelworks	30.0
Washed steaming coal	27.0
Unwashed steaming coal	23.9
Queensland	
Exports – coking coal	30.0
– steaming coal	27.0
Electricity generation	21.4
Other	23.0
South Australia	15.2
Western Australia	19.7
Tasmania	22.8
Brown coal	
Victoria	
Coal	9.7
Briquettes	22.1
Coke	27.0
Wood (dry)	16.2
Bagasse	9.6

Sources: BHP; State Electricity Commission of Victoria; ABARE.

2 Energy content of liquid fuels

	Energy content		
	By volume	**Specific volume**	**By weight**
	MJ/L	L/t	GJ/t
LPG			
– propane	25.4	1 960	49.6
– butane	28.0	1 760	49.1
– mixture	26.2	1 890	49.4
– naturally occurring (average)	26.5	1 866	49.4
Aviation gasoline	33.1	1 412	46.8
Automotive gasoline	34.2	1 360	46.4
Power kerosene	37.5	1 230	46.1
Aviation turbine fuel	36.8	1 261	46.4
Lighting kerosene	36.6	1 270	46.5
Heating oil	37.3	1 238	46.2
Automotive diesel oil	38.6	1 182	45.6
Industrial diesel fuel	39.6	1 135	44.9
Fuel oil			
– low sulfur	39.7	1 110	44.1
– high sulfur	40.8	1 050	42.9
Refinery fuel (fuel oil equivalent)	40.8	1 050	42.9
Naphtha	31.4	1 534	48.1
Lubricants and greases	38.8	1 120	43.4
Bitumen	44.0	981	42.7
Solvents	34.4	1 229	44.0
Waxes	38.8	1 180	45.8
Crude oil and other refinery feedstocks			
– indigenous (average)	37.0	1 250	46.3
– imports (average)	38.7	1 160	44.9
Orimulsion	na	na	28.0
Ethanol	23.4	1 266	29.6
Methanol	15.6	1 263	19.7
Tallow	na	na	35.0
Liquefied natural gas (NW Shelf)	25.0	2 174	54.4

Sources: Department of Industry, Tourism and Resources; Woodside Petroleum.

3 Energy content of gaseous fuels

	Energy content
	MJ/m^3
Natural gas (sales quality)	
Victoria	38.8
Queensland	38.8
South Australia, New South Wales	38.8
Western Australia	40.8
Northern Territory	40.6
Ethane (average)	41.7
Town gas	
Synthetic natural gas	39.0
Reformed gas	20.0
Tempered LPG	25.0
Tempered natural gas	25.0
Coke oven gas	18.1
Blast furnace gas	4.0

Sources: Department of Industry, Tourism and Resources; BHP.