

Glossary and measurement and conversion factors for gas and energy

This glossary refers to terms used in relation to the gas industry in Great Britain. Several of the terms below also have wider meanings elsewhere or in other energy industries. Such uses have not been referred to. Several usages refer to gas purchase contracts. Unless otherwise stated, these are purchase contracts between an upstream gas producer and BG or another shipper/trader, rather than the purchase contract given to final consumers. See also Appendix 7.1 for glossary of financial terms.

<i>Term</i>	<i>Abbreviation</i>	<i>Usage</i>
1-in-20 year peak day demand		The volume of demand from firm customers in a period of 24 hours which would not be expected to be exceeded in more than 1 year in 20.
1-in-50 year winter demand		The volume of winter demand from firm customers that would be expected to be exceeded in not more than 1 year in 50.
Actual peak day		The day of highest gas demand in a year.
Allocation agreement		An agreement governing the allocation of deliveries from gas fields to the beach terminal in circumstances where more than one field is delivering to the same point (eg through a common gas gathering pipeline).
Annual cap		In some gas purchase contracts there is a cap on the amount of gas the purchaser can take in any contract year. This is generally expressed as a percentage of the annual contract quantity . Caps on annual take are most common in supply contracts where the sellers of a field may have to balance their ability to perform more than one contract.
Annual contract quantity	ACQ	Target annual volume agreed under a buyer's nomination gas purchase contract. Generally it is the daily contract quantity multiplied by the number of days in the contract year. Various rights (eg make-up) and obligations (eg take-or-pay) accrue depending on the actual level of take during the contract year.
Associated gas		Gas produced in association with oil production, and not normally subject to nomination by the purchaser, because the quantity delivered is mainly determined by the amount of oil produced.
Authorisation		The formal instrument, made by the Secretary of State under section 7 of the Gas Act, for the appointment of public gas suppliers . The Authorisation may include such conditions as appear requisite having regard to the duties of the Secretary of State and the Director.
Average accounting cost	AAC	The accounting cost, including a return on net assets, of the gas transportation system, allocated to users on the basis of notional use criteria.
Average incremental cost	AIC	A simple approximation to LRMC , based on the cost of meeting general demand growth over a defined period of years.

Back-haul		The notional bulk transportation of gas between two points in the opposite direction to the actual prevailing flow.
Back-up gas		A supply of gas made available in circumstances where a shipper's source of gas is temporarily interrupted.
Banking		An arrangement whereby gas is lent by one party, which temporarily has a surplus that it cannot absorb, to another, for repayment at a later date, so shifting supplies from one period to another.
Beach gas		Gas available at the shore terminal after arriving from offshore production. Beach gas may be supplemented by other gas sources, for example stored gas.
Beach terminal		Point of entry of gas into the NTS from offshore sources. The current terminals are at St Fergus, Theddlethorpe, Easington, Bacton and Barrow.
BG Trading		BG's trading activities, comprising the supply of gas both to the tariff and non-tariff markets (under BG's proposals to be carried on by BG Public Gas Supply (BG PGS) and BG Contract Trading (BG CT) respectively).
BG Transportation and Storage	BG T&S	In BG's proposals, the business unit which would provide transportation and storage services on behalf of shippers , including BG Trading .
Blending		The mixing, either onshore or offshore, of gas, which does not meet the required quality specification, with other gas to produce a mixture which meets the required standard for distribution.
Buyer's nomination contract		In contracts of this type the buyer has the right to nominate its requirements (and the seller is obliged to deliver against the nomination) at rates up to the delivery capacity. This right and obligation may be qualified by: (a) a specified minimum (non-zero) nomination; (b) restrictions on the buyer's right to nominate zero; and (c) maintenance provisions. Daily requirements are nominated weekly in advance. The buyer has rights to vary nominations on notice, typically by up to 25 per cent at 6 hours' notice, by up to 50 per cent at 12 hours' notice, and to any extent at 24 hours' notice. The buyer also has rights to require (on a reasonable endeavours basis) rate charges at shorter notice and excess gas .
Capacity costs		Costs incurred in constructing and running the gas supply system which are necessary to ensure that the designed maximum daily quantity of gas can be supplied during periods of peak demand in exceptional weather conditions (see Commodity cost).
Capacity reservation		The advance booking by a shipper of the volume of gas necessary to ensure that gas can be transported to each of its customers.

Carry forward		If in any year a gas purchaser has taken above the ACQ then, provided that there is no accumulated make-up gas , the purchaser can accumulate the overtake as carry forward for use in future years. Subsequently the gas purchaser can use this carry forward to offset the take-or-pay obligation during a future contract year (an annual cap may limit the use of carry forward in any contract year).
Combined cycle gas turbine	CCGT	A form of gas turbine commonly used in new gas-fired power stations. It uses two types of turbine to drive the electricity generators. The first turbine, similar to an aero-engine, uses gases from fuel combustion to drive the turbine directly. The hot exhaust gases are then routed through a boiler before being discharged to the atmosphere. Heat from this boiler is used to drive a second turbine thus producing additional electricity from the same fuel and raising the overall efficiency of generation.
Combined heat and power	CHP	A process producing both useful heat (eg steam) and electricity.
Commissioning gas		Gas produced during the start-up of a new field, typically somewhat unpredictable in both quantity and timing (the term was also used to refer to gas required during the initial start-up period of power station operation-also a requirement with some variability).
Commodity cost		BG distinguishes between commodity and capacity costs . Commodity costs are those which vary in relation to the volume of gas sold or transported through the gas supply system.
Common carriage		Conveyance of gas through a pipeline system (in this context the system belonging to BG) on behalf of a third party.
Compressor station		Gas-powered installation on the national transmission system which maintains pressure during transmission, thus boosting flow and pipeline capacity. Typically a gas turbine.
Condition 13A		The condition in BG's Authorisation which regulates many aspects of the quality of service provided by BG, particularly in the tariff market .
Contract customers or market		Those gas customers supplied under the terms of special agreements (price schedules) with BG, rather than under regulated tariffs. Such customers may also be supplied by other shippers . Also referred to as the non-tariff market.
Contract year		See gas year .
Cost base		Those accounting costs, including a return on net assets, which are associated with the transportation of gas through the BG pipeline network from terminal to meter.

Cumulo rates		Certain parts of BG's property (essentially its pipes in the ground) are excluded from the valuation list for purposes of local authority rates and the rate is centrally assessed on a prescriptive basis ('The Cumulo'). The current basis was established by order in 1990 and set rateable values for England and Wales of £505 million and £26 million respectively. The rateable value is subsequently altered in line with the change in the length of mains above 7 bar pressure.
Customer Relations Manager	CRM	A manager in each BG region to whom customers may appeal if they do not obtain a satisfactory initial response to a complaint.
Daily balancing		The matching, on a daily basis, of the volume of gas put into the pipeline system and the volume taken out.
Daily contract quantity	DCQ	This is the average daily rate, in buyers' nomination contracts, against which the gas purchaser can make its daily nominations . The maximum rate at which the gas purchaser can require the sellers to deliver (the delivery capacity) is a function of the DCQ and the swing. In the case of sellers' nomination agreements there is a similar concept, the estimated daily contract quantity .
Datalogger		Equipment connected to a meter which automatically records consumption and can transmit readings to a central point if appropriate telecommunications equipment is provided.
Degree day		The cumulative sum, over a period, of the number of degrees that the temperature each day fell below the normal level-thus it takes account of both the duration and daily severity of winter conditions. In degree day terms, one very cold day would be equivalent to two cold days, whose deviation from normal temperature was half that of the former very cold day.
Delivery capacity		The maximum rate (other than excess gas) at which the gas purchaser can request gas from the sellers and for which the sellers have a firm obligation to deliver. In peak supply contracts there may be a charge payable in respect of the available delivery capacity.
Depletion contract		In gas purchase contracts, an agreement to purchase the outlet of a field over its whole lifetime.
Difficult day		A day of high demand on which BG declares that it is taking its maximum nominations under its gas purchase contracts and may, therefore, need gas from storage and seasonal sources in addition to normal beach supplies.
Distance capping		The current practice of reducing the effect of distance in calculating transportation charges when the notional path exceeds a certain threshold.
Distribution system		That part of the gas supply system which takes gas from the transmission system and carries it at relatively low pressures through the mains into the service pipes leading to customers' meters.

Diurnal matching		The service of balancing variations occurring within a day between a shipper's input and its customer's offtake.
Diurnal storage		Storage provided to meet daily variations in gas demand provided in the form of gasholders and line-packing and located close to all centres of demand.
Domestic market		That part of the energy market where energy is used within domestic premises. For gas, the main domestic uses are home heating, water heating and cooking.
Dry gas		Natural gas from fields with a low proportion of the higher liquid hydrocarbons (unlike associated gas from oil or condensate fields).
Dual-firing		In relation to equipment, the capability of using two different fuels, such as gas and oil.
`E' factor		A factor in the tariff formula designed to encourage investment in energy-efficiency projects.
Entry/exit		A simplified approximation of full matrix charging for gas transportation on the NTS . Charging is based on a fee paid to put gas into the system at a particular entry point and a further fee paid to take it out at a particular exit point.
Escalation		In gas purchase contracts, provisions covering movements in the contract price over the period of the contract, by reference to specified indices.
Established standards or standards of service		Regulatory quality of service standards established under condition 13A of BG's Authorisation .
Estimated daily contract quantity	EDCQ	In a seller's nomination contract, the EDCQ is the seller's best estimate of the anticipated average daily delivery during a contract year. On a particular day the seller will nominate a quantity for delivery. If the quantity is within a specified band of the EDCQ then the purchaser pays the prevailing contract price. Should the seller deliver below the band, the purchaser is generally entitled to an amount of gas equivalent to the seller's under-delivery, at a discount. Should the seller wish to deliver at rates above the band, the additional quantity is usually paid for at a discount. Depending upon the extent of the overdelivery, the purchaser may only have a reasonable endeavours obligation or no obligation to accept delivery.
Excess gas		In most buyers' nomination contracts the purchaser can request the sellers to deliver at rates above the delivery capacity. The sellers only have a reasonable endeavours obligation to deliver the extra quantities. In the event that they do, the purchaser usually pays a price premium. The price premium depends upon whether the excess gas counts towards the purchaser's obligation to take-or-pay (referred to in shorthand as `counts to ACQ ').

Excess quantity oftaken	EQO	A provision of a BG transportation agreement whereby, if a shipper takes more gas out than it puts in, without calling for back-up, the difference is sold by BG to the shipper at a mark-up on the back-up price.
Exploration and Production	E&P	The upstream exploration and production of gas.
Feedstock		Natural gas used as a raw material for production of ammonia and methanol by the chemical industry.
Firm capacity		Capacity (eg for supply or transportation) provided all year around (without expectation of interruption).
Firm gas		A supply of gas which the seller is contracted not to interrupt. Normally covers both tariff supplies and firm contract supplies.
Full matrix		An approach to charging for gas transportation which establishes a discrete charge for each combination of an entry with an exit point.
GasCare register		A register of elderly and disabled customers kept by BG with details of their special needs.
Gas levy		A levy, created by the Gas Levy Act 1981, as amended by the Gas Act, which applies to purchases of gas from fields, under contracts agreed before July 1975. BG currently pays the Government 4p a therm on gas purchased from such fields.
Gas oil		Oil product used in energy markets because it is relatively non-polluting and flexible. Largely free of sulphur, metals and other contaminants, gas oil is suitable for space and water heating and many industrial processes.
Gas year		BG's gas purchase contract year starts at 6.00 am on 1 October of each year. Also known as the contract year .
Gold flame		An internal award in BG for regions and districts judged on the basis of customer satisfaction and quality of service.
Heavy fuel oil	HFO	Heavy fuel oil, which contains sulphur and other impurities, is the residual product from the oil-refining process. It is used mainly for steam raising and industrial processes requiring crude bulk heat.
Intermediate-pressure system	IPS	That part of the national gas pipeline system that operates at pressures between 2 and 7 bar.
Interruptible gas sales		The sale of gas, normally at a reduced price, under arrangements which allow for the supply to be cut off for a number of days each year to assist in the balancing of total supply and demand. Normally interrupted only at times of peak usage.

Interruptible transportation		A transportation service which may not be available every day of the year and may be expected not to be provided at times of peak use.
Key standards		Those established standards that are directly linked to the tariff formula .
Line-packing		The creation of storage within the pipeline by increasing pressure above that required for transmission.
Liquefied natural gas	LNG	Natural gas which has been cooled in order to liquefy it for storage and transport. This reduces its volume to approximately one six-hundredth of the volume at standard temperature and pressure.
Liquefied petroleum gas	LPG	Propane and butane obtained from oil refining. It is a gaseous fuel, which is stored under pressure in tanks or other vessels. LPG is a fuel which can be used in any application for which natural gas would be suitable.
Load duration curve	LDC	A representation of the annual demand for gas with consumption ranked in order of daily demand. The LDC may be chosen for different levels of expected weather severity and different LDCs may show the relationship between the output requirement and the number of days for which that output is required for a year of given severity.
Load factor		The ratio between the average and the peak daily load expressed as a percentage. The lower the load factor, the greater the difference between average and peak demand and the more seasonally variable is demand. The inverse of the load factor is the swing factor . The former term tends to be used in transportation or final sales contracts and the latter in gas purchase contracts.
Long-run marginal cost	LRMC	A charging methodology based on the incremental capital and operating costs required to meet a sustained increase in demand.
Low-pressure system	LPS/LPDS	The low-pressure distribution system, comprising networks of pipes operating at a pressure of less than 75 millibar.
Make-up		To the extent that, in any contract year, a gas purchaser (in accordance with its take-or-pay obligations) pays for but does not take a quantity of gas, that quantity accumulates in a make-up bank. In subsequent years, when the gas purchaser has taken more gas than its obligation to take or pay (or in some contracts the adjusted ACQ) it receives a credit to offset payment for further deliveries in that contract year . There may be provisions restricting the amount of make-up the gas purchaser can recover in any single year or specifying the period within which the gas purchaser has to have recovered make-up. In a few contracts there are also provisions allowing the purchaser to recover a limited amount of make-up at termination of the contract.

Make-up gas		The take-or-pay terms of some gas purchase contracts give BG the right to take make-up gas in years after it has paid for gas but not taken it (see Take-or-pay).
Medium-pressure system	MPS/MPDS	The medium-pressure distribution system, comprising networks of pipes operating at pressures between 75 millibar and 2 bar.
National transmission system	NTS	Designed for the bulk transmission, from the beach terminals , of large volumes of gas at high pressure around the country to the entry points of the regional transmission system .
Nominations		Under gas supply contracts, the purchaser gives nominations in advance of the amount of gas it requires. Typically such nominations are daily and have to be within the other overall contract terms. Also nominations of new customers are to be supplied under independent shippers' transportation contracts with BG.
Notional path		An assumed route along existing pipelines in a network from the point of input of gas to the point of offtake, irrespective of the actual flow of gas in those pipelines. Usually the shortest route, which will often differ from the route actually taken by the gas.
Office of Fair Trading	OFT	The Office of the Director General of Fair Trading, established by the Fair Trading Act.
Office of Gas Supply	OFGAS	The Office of the Director General of Gas Supply, established by the Gas Act.
Peak shaving		Techniques used to manage gas supply at times of peak demand: these include the cutting of supply to customers on interruptible contracts and the use of gas stored in salt cavities or as LNG to meet the peak demand from tariff and firm contract customers.
Petroleum revenue tax	PRT	A tax imposed on the production of oil and gas. It has applied to gas production from fields whose production has commenced since 1975.
Plateau		In buyers' nomination depletion contracts , the sellers have to sustain a set DCQ for as long as possible, using the facilities installed. The period for which this set DCQ is sustained is known as the plateau. The sellers are free to install additional facilities if they wish to prolong the plateau. In most such contracts, the sellers' obligation to repair and replace facilities is absolute during the plateau. Plateau is followed by decline.
Polyethylene pipe	PE pipe	Pipe used at operating pressure up to 7 bar.

Postalization		A system of charging uniform prices to consumers of gas throughout the country as has typically been the basis of charging adopted by the postal system.
Prevailing contract price	PCP	The price that is applicable for normal deliveries under the contract. In most gas purchase contracts, the PCP applies for a full contract year . In a few contracts there is also a price formula (or bottom stop) and the contract price cannot fall below the level produced by this third formula.
Primary energy		Primary energy is finally used in the form in which it is originally produced (for example, natural gas). This may be compared with secondary energy which is manufactured from a primary energy source (for example, town gas from coal).
Process heat		Heat for direct or indirect use in an industrial process, rather than for space or water heating.
Public gas supplier		A gas supplier authorized under the terms of the Gas Act to supply gas on tariff terms in a designated area, with requirements to accept public obligations. Currently BG is the only public gas supplier authorized in Great Britain.
Purple Book		The most recent brochure, published by BG in September 1992, giving details of the gas transportation service and charges applicable until the end of September 1993.
Regional transmission system	RTS	Designed to transport gas from the NTS to the local distribution networks.
Salt cavity storage		Storage of gas in underground cavities which have been hydraulically excavated. Gas is compressed into the cavities at periods of low demand, and released when needed to meet peak demand.
Seasonal normal temperature	SNT	A method of adjusting gas use data to account for the effects expected from the deviation of seasonal conditions from average seasonal conditions.
Seasonal supplies		Supplies of gas which can be used for extended periods during the winter. At present, BG takes seasonal supplies from the South Morecambe and Sean fields and from the Rough gas storage field.
Secondary energy		Energy used after manufacturing from a primary energy form, for example, town gas made from coal.
Seller's nomination contract		In contracts of this type (normally relating to fields where gas is produced as a by-product of crude oil) the seller nominates the quantities it expects to deliver within a band around the EDCQ . The buyer is obliged to take (or if it does not take, in any event pay for) the nominated quantity on a daily basis.
Service		The portion of the gas distribution network that provides the connection between the distribution main and the consumer's meter. Some of the service pipe will typically be located on, or under, the consumer's property.

Shipper		A party on whose behalf gas is transported through the pipeline system by BG.
Short-run marginal cost	SRMC	A charging methodology based on the costs of meeting an increment in demand in the short term.
Standards of service		See Established standards .
Stand-by fuel		The fuel which an interruptible customer stores ready for use if its gas supply is interrupted.
Steam raising		Production of steam in boilers for indirect process heat or space heating.
Swing factor		In gas purchasing contracts, the seasonal flexibility agreed in the rate of supply, expressed as a ratio of peak to average supplies (the delivery capacity divided by the DCQ , expressed as a percentage). In gas purchase contracts, swing is a measure of the flexibility to vary nominations. The higher the swing factor, the greater the flexibility, under buyers' nomination contracts, in meeting seasonal demand. The inverse of the swing factor is the load factor .
Take-or-pay		In a gas purchase contract (particularly a buyer's nomination contract), an undertaking to pay for a specified annual or daily quantity, whether or not that amount is taken. Annual under- and over-takes during the life of the contract may be balanced out by the purchaser as make-up or carry forward (eg some contracts permit gas paid for but not taken to be carried forward, to be taken or credited later, termed make-up gas).
Tariff formula		The formula in BG's Authorisation which determines the maximum average price per therm for tariff gas supplies.
Tariff market		That part of the gas market where customers (including nearly all domestic consumers) pay for gas under the published tariffs. Up to August 1992 this market included all customers taking less than 25,000 therms a year. That level was reduced, by Statutory Instrument, to 2,500 therms a year thereafter.
Tariff threshold		The upper quantitative limit of the tariff market , now 2,500 therms a year.
Terminal		An installation at the point where gas from an offshore field comes ashore. The gas is treated, transferred from the producer to the purchaser, and enters the NTS .
Therm		A unit of heat, defined in the Gas Act as meaning 105.506 megajoules. It is also equivalent to 100,000 British thermal units. The Gas Act requires a public gas supplier to charge for gas according to the number of therms supplied.
Third party access		An alternative term for common carriage of gas.
Total quality management	TQM	A systematic approach designed to improve continually the quality of goods or services provided by a company.

Town gas		Gas manufactured from coal: the original basis for the production of gas in local town-based manufacturing plants.
Transfer agreement		A transfer agreement provides that when a shipper has insufficient gas available at one terminal to meet its customers' needs under the terms of a BG transportation agreement (eg when a field is shut for maintenance), gas delivered at another terminal may be deemed to have been delivered at the first terminal.
Transmission system		A system carrying gas in large volumes at high pressure. The NTS carries gas from the terminals throughout Great Britain. At offtakes, gas passes to the RTS which carries the gas onward to the main centres of demand, where it passes into the regional distribution system through pressure reduction stations.
Umbrella agreement		A gas transportation agreement that allows a shipper the right to use any terminal to supply any customer. This may be contrasted with a point to point contract between one customer and one terminal.
Unaccounted-for gas		The difference between the measured quantity of gas entering the system and the measured quantity sold to customers or used for BG's own purposes, eg in compressor stations. The difference is caused by, for example, metering errors, leakage, theft of gas and temperature variation.
UK Continental Shelf	UKCS	That area of the seabed around the UK extending either to approximately the median line between the UK and neighbouring coastal states, or to the continental slope, being the area in which the UK has sole rights of exploration and exploitation under international law.
Valley gas		During the trough in gas-field output, between periods of peak production, and once the purchaser has taken the adjusted ACQ , it is able to choose between accumulating carry forward or taking additional gas. This gas is paid for at a discount and cannot be used to reduce the purchaser's future take-or-pay obligations. This is sometimes referred to as additional gas.
Weighted cost of gas	average WACOG	The total annual average beach cost of gas supplies from all sources.

Measurement and conversion factors for gas and energy

Energy

1 therm =	100,000 British thermal units (= 10^5 BTU)
	= 29,3071 Kilowatt hours (kWh)
	= 105,506 Megajoules (MJ)
	= 25,200 Kilocalories (Kcal)

Metric multipliers

kilo	=	10^3	tera	=	10^{12}
mega	=	10^6	peta	=	10^{15}
giga	=	10^9	exa	=	10^{18}

Abbreviations for units in common use in the oil and gas industry

scf	standard cubic feet	bbl	barrel
mcf (MCF)	million (10^6) cubic feet	MMBBL	millions of barrels
bcf (BCF)	billion (10^9) cubic feet	boe	barrels of oil equivalent
tcf (TCF)	trillion (10^{12}) cubic feet	mmboe	millions of barrels of oil equivalent
mcfd	million cubic feet per day	mtoe	million tonnes of oil equivalent
mmscfd	million standard cubic feet per day		
mcm	million (10^6) cubic metres		
mcmd	million (10^6) cubic metres per day		

Physical units

1 cubic metre (cu m) = 35.31 cubic feet
1 cubic foot (cu ft) = 0.02832 cubic metres
1 US barrel (bbl) = 35 UK gallons (42 US gallons) = 5.614 cu ft
1 UK gallon = 4.546 litres
1 metric ton (tonne) = 2,204.6 pounds
1 standard atmosphere = 1.01325 bar = 14.69 pounds per square inch = 406.83 inches of water

Properties of hydrocarbon gases

Gas	Formula	Boiling point C	therms/ tonne	Volume calorific value btu/ff ³	Mass calorific value btu/lb	% in typical natural gas*
Methane	CH ₄	-161.60	525	1,014.1	23,893	90.00
Ethane	C ₂ H ₆	-88.50	492	1,788.5	22,335	5.00
Propane	C ₃ H ₈	-41.90	478	2,567.2	21,655	1.00
Butane	C ₄ H ₁₀	-0.38	470	3,387.3	21,302	0.20
Pentane	C ₅ H ₁₂	36.20	-	4,286.8	21,083	0.08
LPG (typical)	-	-26.80	470	3,086.1	21,372	-
Natural gas (typical)	-	-160.00	520†	1,039.5	22,373	-

*The balance is mainly nitrogen and carbon dioxide.

†LNG.

Energy conversions table

<i>From</i> ↓	<i>To</i> → <i>therm</i>	<i>Kilojoule</i> <i>KJ</i>	<i>Kilocalorie</i> <i>kcal</i>	<i>Kilowatt</i> <i>hour</i> <i>kWh</i>	<i>Cubic foot</i> <i>natural gas</i> <i>ft³gas</i>	<i>Cubic metre</i> <i>natural gas</i> <i>m³gas</i>	<i>1 barrel oil</i> <i>equivalent</i> <i>boe</i>	<i>1 tonne oil</i> <i>equivalent</i> <i>toe</i>	<i>1 tonne coal</i> <i>equivalent</i> <i>tce</i>	<i>1 tonne</i> <i>LNG</i>
therm	1	105,506	25,200	29.3071	100	2.75	0.017	2.4x10 ⁻³	4x10 ⁻³	1.9x10 ⁻³
kj	9.478x10 ⁻⁶	1	0.2388	2.778x10 ⁻⁴	9.5x10 ⁻⁴	2.6x10 ⁻⁵	1.6x10 ⁻⁷	2.2x10 ⁻⁸	3.8x10 ⁻⁸	1.8x10 ⁻⁸
kcal	3.968x10 ⁻⁵	4.1868	1	1.163x10 ⁻³	4.0x10 ⁻³	1.1x10 ⁻⁴	6.6x10 ⁻⁷	9.3x10 ⁻⁸	1.6x10 ⁻⁷	7.6x10 ⁻⁸
kWh	0.03412	3,600	859.845	1	3.3	0.1	5.9x10 ⁻⁴	8.0x10 ⁻⁵	1.4x10 ⁻⁴	6.6x10 ⁻⁵
ft ³ gas	0.01	1,055.06	252	0.3	1	0.02832	1.8x10 ⁻⁴	2.4x10 ⁻⁵	4.1x10 ⁻³	7.2x10 ⁻³
m ³ gas	0.364	38,404	9,173	10	35.31	1	6.3x10 ⁻³	8.3x10 ⁻⁴	1.4x10 ⁻³	7.2x10 ⁻⁴
boe	60	6.3x10 ⁶	1.5x10 ⁶	1,700	5,600	600	1	0.14	0.23	0.1
toe	425	4.5x10 ⁷	1.1x10 ⁷	12,500	42,000	1,200	7.55	1	1.7	0.8
tce	250	2.6x10 ⁷	6.3x10 ⁶	7,500	24,500	700	4.3	0.6	1	0.5
tonne LNG	520	5.5x10 ⁷	1.3x10 ⁷	1.5x10 ⁴	52,000	1,400	8.9	1.2	1.9	1

To convert the energy equivalent of a unit in the left-hand column to the unit at the top, multiply by the factor shown. Factors for gas, oil, coal and LNG are central approximations for which a range of factors are applicable. Factors are gross and take no account of the efficiency with which fuels are used.