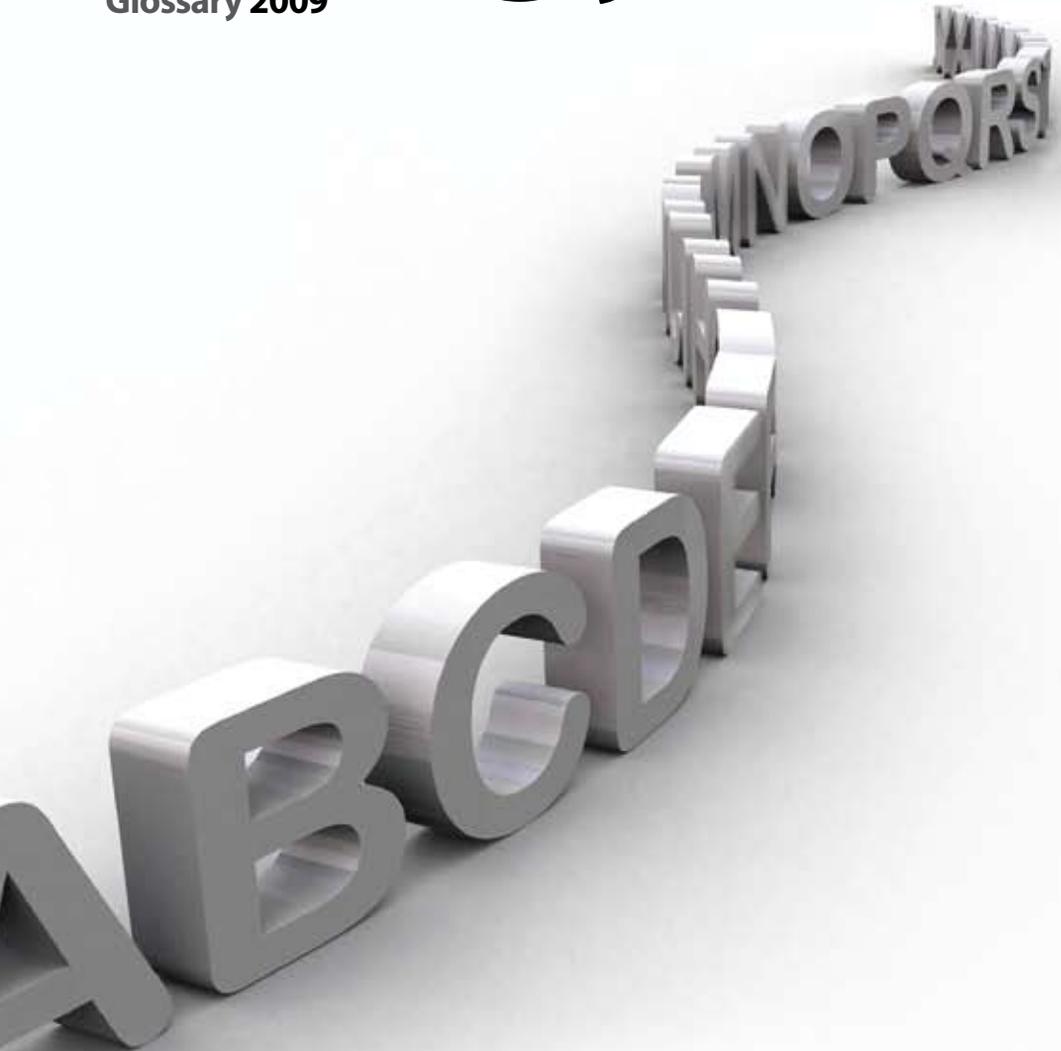


The energy risk glossary: the most comprehensive reference source for anyone involved in the global energy markets

# energy risk

Glossary 2009



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# A

## Abandonment

Permission given to US interstate pipelines by the Federal Energy Regulatory Commission (Ferc) allowing for the discontinuation of sales, storage or transportation service along any portion of the pipeline system. The necessity for Ferc permission derives from Section 7 of the *Natural Gas Act of 1938*. Permission is sought when utility companies want to replace, update or sell their facilities.

## Absolute pricing

Pricing an asset using reference only to its exposure to fundamental sources of risk. Most common in academia.

★ *see also relative pricing*

## Acid rain

Forms of precipitation (such as rain, snow or sleet) containing high levels of sulphuric or nitric acids (with pH levels below 5.5–5.6). Also includes dry deposited gases and particles that fall back to earth from the atmosphere. According to the US Environmental Protection Agency, approximately two-thirds of all SO<sub>2</sub> and one-quarter of all NO<sub>x</sub> in the US come from electric power generation that burns fossil fuels such as coal.

★ *see also sulphur oxides and nitrogen oxides*

## Accrual accounting

When swaps are used to hedge specific on-balance-sheet exposures, they are often accounted for on an accrual basis. Under the accrual method, the net payment or receipt in each period is accrued and recorded as an adjustment to income or expense.

★ *see also hedge accounting, mark-to-market*

## Actual peak day

The day during which the greatest demand occurs in a one-year period.

## Actuals

The physical commodity underlying a futures contract. Also referred to as the cash commodity or the physicals.

## AGA

★ *see American Gas Association*

## Aggregator

A company that consolidates the energy requirements of a number of buyers and/or sellers in order to buy or sell power in bulk.

## AICPA

An acronym for the American Institute of Certified Public Accountants, a professional association representing certified public accountants in the US.

## Algorithm

A defined, finite set of steps, operations or procedures that will produce a particular outcome (e.g., computer programs, mathematical formulas and recipes).

## Alpha

A measure of the difference between a fund's actual returns and its expected returns given its risk level as measured by its beta. The alpha is a measure of risk-adjusted performance. An alpha is usually generated by regressing the security, portfolio or mutual fund's excess return relative to a benchmark index. The beta adjusts for the systemic risk (the slope co-efficient). The alpha is the intercept and is also known as the Jensen Index.

## Alligator spread

Another name for butterfly spread.

**Allocation agents**

(Gas) independent agents, paid for by shippers, who calculate how much of the gas input at a terminal belongs to each shipper.

**American Gas Association (AGA)**

Founded in 1918, the AGA represents companies involved in all areas of the transmission and distribution of natural gas in the US.

**American Petroleum Institute (API)**

The trade association of the US petroleum industry. The API publishes weekly information on US petroleum stock figures, refinery throughput, imports, exports and stock levels. This information is divided into five geographical areas known as Petroleum Administration for Defence Districts. The API established the system for grading crude oils by specific gravity (API gravity).

★ *see also Energy Information Administration (EIA)*

**American-style option**

An American-style option may be exercised at any time during its lifetime, up to and including on the expiration date.

★ *see also European-style option*

**Ancillary services**

Services are designed to maintain the reliability of power supply to end-users. Ancillary services can include regulation, spinning reserve, non-spinning reserve and replacement reserve. Independent system operators create a market for buying and selling ancillary services, which help control the flow of electricity and provide energy 'reserves' to maintain reliability.

**Annual cap**

In a gas buyer's purchase agreement, there is often a limit higher than the annual contract quantity (ACQ), above which the seller is not liable to sell. This is the annual cap and is usually stated as a percentage of the ACQ. Also known as the maximum annual quantity.

★ *see also MAQ*

**Annual contract quantity (ACQ)**

The amount of gas specified in a buyer's nomination purchase contract for one year. Some rights, such as make-up gas and take-or-pay, may need to be taken into account depending on the amount of gas taken versus the amount contracted for.

**Annual delivery programme (ADP)**

A long-term schedule commonly used in the liquefied natural gas industry for optimising inventory and delivery planning (may also be referred to as the annual operating plan).

**API**

★ *see American Petroleum Institute*

**API #2**

All Publications Index #2: a price index for coal supply cost insurance and freight Amsterdam-Rotterdam-Antwerp.

**API #4**

All Publications Index #4: a price index for coal shipments free-on-board Richards Bay.

**API gravity**

One of the main quality indicators for pricing crude oil – the higher the API gravity, the lighter the crude.

API gravity = 141.5/specific gravity of crude at 60° Fahrenheit – 131.5

**API regions**

Also known as Petroleum Administration for Defence Districts (Padd). The US is divided into five Padd for administration purposes: Padd 1, eastern seaboard; Padd 2, Midwest; Padd 3, southern area (Gulf Coast); Padd 4, Rocky Mountains; and Padd 5, far west.

**Application service provider (ASP)**

A company offering access to its software applications over the internet, rather than requiring software to be located on personal computers or internal servers. Often a less costly way of using software and an approach used by some technology vendors for the energy sector.

**APX**

APX Group, a European energy exchange, operating markets for electricity and natural gas in the Netherlands, the UK and Belgium. In September 2008 a merger took place between APX and the European Energy Derivatives Exchange (Endex), with Endex becoming a subsidiary of APX B.V. and part of the APX Group.

**ARA**

Amsterdam-Rotterdam-Antwerp area – a port and refining area in the Belgian-Dutch region. A cargo or barge of a refined product traded on a cost, insurance and freight ARA basis means that ports within this area are covered in the cost. A cargo traded on a free-on-board basis means the oil can come from any of these ports.

**Arbitrage**

- 1) A trading strategy to profit from market inefficiencies in price differences of a given commodity either in the same location or in different geographical locations. Grade arbitrage is trading the difference in the price of a commodity in the same location – e.g., the difference in the prices of two sweet crudes in north-west Europe. Geographical arbitrage is trading the difference in the price of the same grade in different locations. Often grade and geographical arbitrage are combined – e.g., in transatlantic arbitrage, which is trading the price difference between, for example, Brent crude in Europe and West Texas Intermediate in the US. This calculation will include the cost-of carry as well as the cost of the alternative crude in the US.
- 2) A term specific to US stock markets, where a speculative position is built up in shares in a particular company that is thought likely to become a takeover candidate.

**Arbitrage-free model**

Any theoretical model that does not allow arbitrage on the underlying variable.

**ARCH**

An acronym for autoregressive conditional heteroskedasticity.

**Area price**

The price of electricity in one particular region within an integrated grid, such as Nord Pool.

★ *see also system price*

**Argus**

An independent energy news and price reporting agency. [www.argusmediagroup.com](http://www.argusmediagroup.com)

**Aromatics**

Compounds produced by the fractionation of petroleum above 80° Celsius. The most important aromatics are benzene and toluene, which are used as chemical feedstocks and in gasoline production.

**ASCC**

Alaskan Systems Co-ordinating Council – a North American Electric Reliability Corporation affiliate.

**Asian option**

Asian (or average) options have payoffs that depend on an average of prices for the underlying commodity over a period of time, rather than on the price of the commodity on a single date. The averaging period may correspond to the entire life of the option or may be shorter.

**Ask**

The level at which sellers are willing to sell.

★ *see also bid/ask*

**Asset sweating**

Increasing the efficiencies of an existing plant in order to avoid the need to build new infrastructure. This strategy was pursued throughout the 1990s in the UK power sector and the oil refining and producing sector in the West.

**Associated gas**

Natural gas found in a crude oil reservoir, separate from or in solution with the oil.

**Atlantic Basin**

The geographical region that can be considered as comprising all land masses (including islands) that lie adjacent to or within the Atlantic Ocean and adjacent waters, including the Baltic Sea, North Sea, Black Sea, Davis Strait, Denmark Strait, part of the Drake Passage, Labrador Sea, Mediterranean Sea, Norwegian Sea, most of the Scotia Sea, Baffin Bay, Hudson Bay, Gulf of St Lawrence, the Gulf of Mexico, Caribbean Sea and the Weddell Sea. As applied to the energy market, the Atlantic Basin liquefied natural gas (LNG) market encompasses LNG producers and consumers in or adjacent to the Atlantic Basin geographical area noted above.

The Atlantic Basin LNG markets can be considered to specifically include the LNG producers (current and projected): Abu Dhabi, Algeria, Angola, Egypt, Equatorial Guinea, Iran, Libya, Nigeria, Norway, Oman, Qatar, Russia, Trinidad & Tobago, Venezuela and Yemen. The current and likely future LNG consuming countries: Argentina, Belgium, Brazil, Canada, Cyprus, Dominican Republic, France, Germany, Greece, Italy, Mexico, the Netherlands, Poland, Portugal, Puerto Rico, South Africa, Spain, Turkey, the UK, the US and possibly the Bahamas and Jamaica.

Note that an Atlantic Basin LNG producer might not be physically located in the Atlantic Basin itself.

★ *see also Pacific Basin*

**At-the-beach**

(UK) when gas has been brought ashore to a terminal by producers but is not yet in the national transmission system, the gas is called at-the-beach.

**At-the-money**

- 1) At-the-money spot – an option whose strike is the same as the prevailing market price of the underlying rate or price.
- 2) At-the-money forward – an option whose strike is at the same level as the prevailing market price of the underlying forward contract.

★ *see also in-the-money*

**Auctioning**

As applied to the energy sector, auctions as a pricing mechanism have been used or have been planned for liquefied natural gas storage capacity, emission allowances and transmission capacity, in order to manage congestion.

**Autocorrelation**

The correlation between a component of a stochastic process and itself lagged a certain period of time.

**Available transfer capability (ATC)**

A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. ATC is defined as the total transfer capability, less the transmission reliability margin, less the sum of existing transmission commitments (which includes retail customer service) and the capacity benefit margin.

★ *see also capacity benefit margin*

**Average options**

Average rate option or average price option – a form of Asian option whose payoff is linked to the average value of the underlying asset over a specified period of time. Although somewhat more complex to price relative to traditional European or American option structures, average rate options are popular since they provide a price hedge that better matches price exposures that are based on daily averages, such as purchase/consumption of energy on a daily basis. Also referred to as an APO.

★ *see Asian option*

**Aviation gasoline (AVGAS)**

A high-octane aviation fuel used for aircraft and racing cars.

**B****Back month**

Back-month contracts are those exchange-traded derivatives contracts with the most distant delivery dates or expirations. For a suite of 12 monthly contracts, for example, the last three months might be back months. Also referred to as deferred months.

**Backwardation**

When the price of nearer (typically prompt or spot) crude or another underlying commodity or instrument trades at a premium to the same commodity or instrument traded further forward. Also known as an inverse.

★ *see also contango*

**Balancing mechanism**

In an electricity grid or natural gas pipeline network, the means of ensuring that supply does not outstrip demand, or vice versa.

**Baltic Exchange**

A membership exchange located in London for the maritime bulk freight market.

**Banking**

A procedure by which excess gas that one shipper cannot use is lent to another shipper to be returned at a later date.

**Bare-boat charter**

A chartering arrangement whereby a vessel is contracted for without crew or provisions, and can have distinctions or implications in terms of legal responsibility relative to other types of charter arrangements.

**Barge**

Motored or motorless vessel used to carry oil products, often along a river. Barges vary in capacity, usually from 1,000 to 5,000 tonnes.

**Barrel**

Standard measure of quantity for crude oil and petroleum products. Barrel, US barrel and standard barrel are all equal to 42 US gallons.

**Barrels of oil equivalent (BOE)**

Volume of natural gas expressed in terms of its energy equivalent to oil. About 6,000 cubic feet of gas equals one barrel of oil equivalent.

**Barrier option**

Barrier options are exotic options that either come to life (are 'knocked-in') or are extinguished ('knocked-out') under conditions stipulated in the option contract. The conditions are usually defined in terms of a price level (barrier, knock-out or knock-in price) that may be reached at any time during the lifetime of the option.

There are four major types of barrier options: up-and-out, up-and-in, down-and-out and down-and-in. The extinguishing or activating features of these options mean they are usually cheaper than ordinary options, making them attractive to buyers looking to avoid high premiums.

**Baseload**

The minimum expected customer power requirements at a given time. Baseload power is generally supplied from larger plants, which cannot be ramped up and down as quickly as peaking generation plants. As baseload demand is generally predictable and steady, it is less expensive than peak power.

**Baseload generation**

Electricity-generating equipment normally operated to serve loads on an around-the-clock basis.

**Basis**

The differential that exists at any time between the cash – or spot – price of a given commodity and the price of the nearest futures contract for the same (or related) commodity. The basis may reflect different time periods, product forms, qualities or locations. The cash price minus the futures price equals the basis.

**Basis risk**

Basis risk is the risk that the value of a futures contract (or an over-the-counter hedge) will not move in line with that of the underlying exposure. Alternatively, it is the risk that the cash-futures spread will widen or narrow between the times at which a hedge position is implemented and liquidated.

There are various types of basis risk. For example, a heating oil wholesaler selling its product in Baltimore will be exposed to basis risk if it hedges using New York Harbor heating oil futures contracts listed by Nymex. This is a 'locational' basis risk.

Other forms of basis risk include 'product' basis, arising from mismatches in type or quality of hedge and underlying (e.g., hedging jet fuel with heating oil); and 'time' or 'calendar' basis (e.g., hedging an exposure to physical prices in December with a January futures contract).

**Basis swap**

Basis swaps are used to hedge exposure to basis risk, such as locational risk or time-exposure risk. For example, a natural gas basis swap could be used to hedge a locational price risk: the seller receives from the buyer a Nymex division settlement value (usually the average of the last three days' closing prices) plus a negotiated index basis, and pays the buyer the published index value of gas sold at a specified location.

**Basis trading**

A trading strategy whereby trades are placed simultaneously in a derivative contract, normally a future, and the underlying asset. The purpose is either to cover derivatives sold or to attempt an arbitrage strategy. This arbitrage can either take advantage of an existing mispricing (in cash-and-carry arbitrage) or be based on speculation that the basis risk will change.

**Basket option**

An option that enables the purchaser to buy or sell a basket of commodities. The value of a basket option is dependent on both the volatility of the individual commodities and the correlation between the prices of commodities in the basket.

**Basket swap**

A swap in which the floating leg is based on the returns on a basket of underlying commodities.

**Basra Light**

A crude oil produced in southern Iraq that contains approximately 2% sulphur by weight with an API gravity of about 34.

**Bbl**

Abbreviation for barrel.

**Bcf**

Billion cubic feet (of gas).

**B/d, bd or bpd**

Barrels per day. Used to express crude oil production, refinery throughput capacity (i.e., capacity of the crude distillation unit), liftings, forward demand projections and crude consumption rates.

**Beach gas**

(UK) gas produced offshore and brought onshore to the shore/beach gas terminal, but not yet part of the national transmission system.

**Bear market**

A market in which the trend is for prices to decline.

**Bear spread**

An option spread trade that reflects a bearish view on the market, usually the purchase of a put spread.

★ *see also bull spread, call spread, put spread*

**Benchmark crude**

Synonymous with reference crude or marker crude. A crude oil whose price is used as a reference against which other crudes are priced. Because of their liquidity, the Nymex West Texas Intermediate and IntercontinentalExchange/ICE Futures' Brent crude oil futures contracts are used as global benchmarks. Dubai crude is widely used as a benchmark for Middle Eastern crudes, especially for sale to Asian markets.

★ *see also marker crudes*

**Beta**

The beta (or beta co-efficient) of a rate or price is the extent to which that rate or price follows movements in the overall market. If the beta is greater than one, it is more volatile than the market; if the beta is less than one, it is less volatile.

**Betta**

British Electricity Trading and Transmission Arrangements – arrangements designed to draw Scotland into the British wholesale market for trading power and create a single, integrated British-wide competitive wholesale electricity market. Betta was implemented on April 1, 2005. It gives renewable generators in Scotland better access to the Anglo-French interconnector, making it easier to sell power in continental Europe.

★ *see also new electricity trading arrangements*

**BFO**

★ *see Brent, Forties, Oseberg*

**Bid/ask**

A measure of market liquidity, also known as bid/offer. The bid is the price level at which buyers are willing to buy, and the ask is the price level at which sellers are willing to sell. The thinner the spread, the higher the liquidity.

**Bilateral contract**

A contract directly between a consumer and a broker or supplier.

**Bilateral netting**

An agreement between two counterparties to offset the value of all in-the-money contracts with all out-of-the-money contracts, resulting in a single net exposure amount owed by one counterparty to the other.

★ *see also netting, multilateral netting*

**Bill of lading (b/l)**

A shipowner's receipt for its cargo, which includes cargo details, such as loading times.

**Binary option**

★ *see digital option*

**Binomial model**

Any model that incorporates a binomial tree, also called a binomial lattice. A binomial model describes the evolution of a random variable over a series of time steps, assigning given probabilities to a rise or fall in the variable.

After the initial rise or fall, the next two branches will each have two possible outcomes, so the process will continue, building a 'tree' over time. The process is usually specified, so that an upward movement followed by a downward movement results in the same price, so the branches recombine.

Binomial trees are of interest because they can be used to deal with American-style features; the early-exercise condition can be tested at each point in the tree.

**Biodiesel**

An alternative fuel generally blended with petroleum diesel to create a cleaner-burning biodiesel blend. A typical US blend might be 20% biodiesel to 80% petroleum.

**Biomass energy**

Energy produced by the combustion of plants, vegetation or agricultural waste – for example, rice husks.

**Blackout**

A total loss of power caused by the failure of the generation, transmission or distribution system.

**Black-Scholes model**

An option-pricing model initially derived by Fischer Black and Myron Scholes in 1973 for securities options and later refined by Black in 1976 for options on futures.

**Blending**

(Gas) mixing gases of different specifications to produce one within the required gas specification. (Crude) sometimes crudes are blended near source when the same storage terminal or pipeline is used. An example is Brent blend – a blend of crudes from various fields in the East Shetland Basin. Also used to create components for gasoline.

**Bloomberg**

An information service, news and media company that provides business and financial professionals with the tools and data on a single, all-inclusive platform. [www.bloomberg.com](http://www.bloomberg.com)

**BOE**

★ *see barrels of oil equivalent*

**Boil-off**

Gas vapour that is typically produced during liquefied natural gas (LNG) ship unloading or LNG transport or storage phases as a result of heat input or pressure variations.

**Boiling point**

The temperature at which a liquid becomes a gas.

**Book**

The total of all forward positions held by a trader or company.

**Book transfer or booking out**

The transfer of title of a cash commodity to the buyer without a corresponding physical movement.

**Bottleneck**

Caused when the flow of electricity is greater than the system capacity between two connected grids. Bottlenecks can lead to an area becoming isolated. In an exchange, this can cause attendant price imbalances between the area price and system price.

**Box**

To buy/sell mispriced options and hedge the market risk using only options, unlike the conversion or the reversal, which use futures contracts. If a certain strike put is underpriced, the trader buys the put and sells a call at the same strike, creating a synthetic short futures position. To get rid of the market risk, the trader sells another put and buys another call, but at different strike prices.

★ *see also conversion, reversal*

**Box spread**

An options market arbitrage, in which both a bull spread and a bear spread are established for a riskless profit.

**Brent blend crude oil**

UK Brent blend is a blend of crude oil from various fields in the East Shetland Basin between Scotland and Norway in the North Sea. The crude is landed at the Sullom Voe terminal and is used as a benchmark for the pricing of much of the world's crude oil production.

★ *see also dated Brent*

**Brent, Forties, Oseberg (BFO)**

Information provider Platts' replacement for the traditional Brent price index, intended to widen the number of crude oil grades used to determine the price of the key North Sea benchmark. It was launched in 2002 – as liquidity in Brent markets reduced, Platt's introduced the changes to limit potential manipulation of the index.

**British thermal unit (Btu)**

The amount of heat required to raise the temperature of 1lb of water by 1° Fahrenheit (technically from 60°F to 61°F). It is used to compare the heat-producing value of different fuels.

**Broker**

An intermediary between traders for physical, futures and over-the-counter deals. Brokers receive a fixed commission, predetermined between the broker and his/her client.

**Brownfield**

Abandoned or unused industrial and commercial sites that may be used for redevelopment or expansion. Such use, however, may be complicated by environmental contamination.

**Brownout**

A partial loss of power caused by unexpectedly high demand or problems with the physical delivery of electricity. A brownout may result in lights dimming or electrical machinery slowing down.

**Btu**

★ *see British thermal unit*

**Bulk power supply**

The infrastructure and generating plant that generates power for a region's wholesale power supply.

**Bull market**

A market in which the trend is for prices to increase.

**Bull spread**

An option spread trade that reflects a bullish view on the market, usually the purchase of a call spread.

★ *see also bear spread, call spread*

**Bundesnetzagentur (BnetzA)**

The German Federal Network Agency for electricity, gas, telecommunications, post and railway, headquartered in Bonn, provides for the further development of the electricity, gas, telecommunications and postal markets and, since 2006, also of the railway infrastructure market. In order to implement effective regulations, the agency has the authority to obtain information and conduct investigations, as well as the right to impose graded sanctions: [www.bundesnetzagentur.de](http://www.bundesnetzagentur.de)

**Bundeskartellamt**

The German Federal Cartel Office. Enforcing the ban on cartels is one of the prime functions of the Bundeskartellamt, including combating such practices as agreements between companies on the setting of prices or sales quotas and market sharing. [www.bundeskartellamt.de](http://www.bundeskartellamt.de)

**Bundled derivative**

A derivative contract that combines two or more commodities to manage a number of related risks. For example, coal for power linked to pollution credits, where the contract compensates the coal user for any extra charges arising from the coal containing more than a certain level of sulphur. The counterparties to a deal agree to settle any differences between the delivered sulphur content of the coal and an agreed benchmark in emission allowances. The coal user is paid when the sulphur content is above the benchmark and pays out when it is below.

**Bundled rate**

A combined charge for the provision of two or more services – e.g., gas transportation and storage, or electricity generation and transmission.

**Bundled services**

Two or more electricity or gas services provided at a combined charge – e.g., gas transportation and storage; electricity generation and transmission.

**Bunker C**

A heavy fuel oil used to power ships, for electricity generation and for large-scale industrial use. It is often the residue from vacuum distillation blended with lighter components.

**Business day**

(US) for electricity utilities, as determined by the North American Electric Reliability Corporation (Nerc), the business day typically begins at 6:00am for a 24-hour period. Holidays are also determined by Nerc and may be separate from US-designated holidays.

**Butterfly spread**

The simultaneous purchase of an out-of-the-money strangle and sale of an at-the-money straddle. The buyer profits if the underlying remains stable, and has limited risk in the event of a large move in either direction.

**Buyer's nomination contract**

A gas contract where the buyer has the option to nominate the delivery requirements up to the predefined delivery capacity. The seller is obliged, under this type of contract, to deliver as requested, although limits are often built into the contract.

# C

## C and F

Cost and freight. The price includes the cost of the cargo and the freight/vessel hiring costs, but not the insurance. Also referred to as CAF.

## Calendar spread

Calendar, or time, spreads describe the price differential – or spread – that may arise between differently dated futures contracts. For example, the price difference between contracts for first- and second-month light, sweet crude offered on Nymex.

Time spreads can be mitigated by purchasing options on the difference between average annual prices. In effect, such options provide protection against a reshaping of the forward price curve.

The term is also used for trading in which the parties buy a certain number of futures contracts for a specific month and simultaneously sell the same number of futures contracts for a different month.

## California-Oregon border (COB)

Area where the utilities of the north-west US connect to those of California, and an electric power price index point.

## Call option

An option that gives the buyer (holder) the right, but not the obligation, to buy a futures contract (enter into a long futures position) or physical commodity for a specified price within a specified period of time in exchange for a one-time premium payment.

It obligates the seller (writer) of the option to sell the underlying futures contract (enter into a short futures position) or commodity at the designated price, should the option be exercised at that price.

★ see also *put option*

## Call spread

An options position formed by the purchase of a call option at one level and the sale of a call option at some higher level. The premium received by selling one option reduces the cost of buying the other, but participation is limited if the underlying goes up.

★ see also *bear spread, bull spread, put spread, vertical spread*

## Callable swap

A swap in which the fixed-rate payer has the right to terminate the swap after a certain time if rates fall. Often done in conjunction with callable debt issues, where an issuer is more concerned with the cost of debt than the maturity. In some definitions of a callable swap, the fixed-rate receiver has the right to terminate the swap. Also known as a cancellable swap.

## Calorific value (CV)

A measure of the energy released as heat when a fuel is burned. It may be measured wet (with water vapour) or dry (after the water vapour has been removed). It may also be measured gross or net – gross includes the heat produced when the water vapour is condensed into a liquid, and net does not. Generally, CV is measured gross and dry.

## Cancellable swap

★ see *callable swap*

## Cap

A supply contract between a buyer and seller, whereby the buyer is assured that he or she will not have to pay more than a given maximum price. This type of contract and a call option are analogous.

## Capacity

(Electricity) the rated load-carrying capability of electrical equipment such as generators or transmission lines, typically expressed in megawatts or megavoltamperes.

(Gas) the rated transportation volume of natural gas pipelines, typically expressed in millions of cubic feet per day.

### Capacity benefit margin (CBM)

The amount of transmission transfer capability reserved by load-serving entities to ensure access to generation from interconnected systems to meet generation reliability requirements.

Reservation of CBM by a load-serving entity allows that entity to reduce its installed generating capacity below a level that may otherwise have been necessary without interconnections to meet its generation reliability requirements.

★ *see also available transfer capability*

### Capacity charge

In gas or electricity markets, a price based on reserved capacity or measured demand and irrespective of energy delivered. Also known as demand charge.

### Capacity factor

The amount of energy that a power generation plant actually generates compared to its maximum rated output, expressed as a percentage.

### Capacity options

The right to access the output of a plant, whose generation is specifically earmarked.

### Capacity purchase agreement (CPA)

A legal document for transferring transmission capacity for a defined period.

### Capacity trading

Where a gas shipper with spare capacity in a transportation system – e.g., the UK's national transmission system – sells or leases its rights to transport gas in a pipeline.

(US) trading of transportation rights that has been facilitated through the use of electronic bulletin boards or electronic data interchange.

### Capital adequacy

An estimate of the capital required to maintain a business.

### Capped swap

A commodity swap in which the floating payments of the swap are capped at a certain level. A floating-rate payer can thereby limit its exposure to rising commodity prices.

### Captive customer

One who has no practical means of buying power or gas from a source other than the local utility, even if in theory the customer is based in a competitive energy market.

### Carbon dioxide (CO<sub>2</sub>)

A gas produced by the burning of fuel. Many scientists believe it to be a major contributor to the greenhouse effect.

### Carbon-dioxide equivalent

The accepted measurement unit for greenhouse gases under the Kyoto Protocol.

### Carbon sequestration

Capturing carbon dioxide in carbon sinks, thus limiting its presence in the atmosphere.

### Carbon sinks

Forests, soils or oceans that store more carbon dioxide than they release, thereby limiting the gas' contribution to the greenhouse effect. Carbon sinks can be used as part of an emissions trading system.

### Carry forward

(Gas) if, in a given contract period (often a year), a buyer has taken more than the annual contract quantity then, if there is no accumulated make-up gas, the buyer can carry forward this excess for future use. The buyer may use the carry-forward to offset the take-or-pay obligation, although there may be a limit to the amount of carry-forward allowed in any given contract period.

**Carrying charge**

The total cost of storing a physical commodity, including storage, insurance, interest and opportunity cost.

**Cascading**

The conversion of a forward contract into a series of shorter-term contracts on maturity.

**Cash-and-carry arbitrage**

A strategy whereby a trader generates a riskless profit by selling a futures contract and buying the underlying to deliver into it. The futures contract must be theoretically expensive relative to the underlying. If the futures are theoretically cheap compared to cash, the trader could sell the underlying and buy the futures – in reverse cash-and-carry arbitrage.

**Cashflow hedges**

In US accounting terminology, a hedge of a forecasted asset and liability acquisition, for which the gain or loss on the hedging instrument will remain in equity when the asset or liability is acquired. That gain or loss will subsequently be included in net profit or loss in the same period as the asset or liability affects net profit or loss.

★ See also FAS 133

**Cashflow-at-risk**

Value-at-risk (VaR) calculated in terms of earnings or cashflow, giving a probability that business targets will be met. A useful VaR tool for non-financial institutions.

**Cash market**

★ see spot market

**Catalyst**

A substance that accelerates or facilitates a chemical reaction without changing the substance itself – e.g., the use of platinum in reformers to convert naphtha into gasoline.

**Cat cracking**

Catalytic cracking is a refining process that breaks down heavier crude oil fractions into motor spirit and gasoil/heating oil blending components by passing them over a suitable catalyst.

**Certified Emission Reduction (CER)**

The right to emit 650,000 tonnes of CO<sub>2</sub>. CER is the technical term for the output of Clean Development Mechanism (CDM) projects, as defined by the Kyoto Protocol. A unit of greenhouse gas reductions that has been generated and certified under the provisions of Article 12 of the Kyoto Protocol, the CDM.

**CCGT**

★ see combined-cycle gas turbine

**CDM**

★ see Clean Development Mechanism

**Centistoke**

One of the many ways of expressing the viscosity of fuel oil.

**Certified Emission Rights (CER)**

The right to emit 650,000 tonnes of CO<sub>2</sub>.

**CFD**

★ see contract for differences

**Chain**

A forward contract for the delivery of a commodity that has been traded many times by several parties, thereby forming a chain between the final buyer and the initial seller.

**Charter party**

A contract by which the owner of a vessel (aircraft or ship) leases his craft to or hires a charterer for a fixed period of time or a set number of voyages. Normally, the vessel owner retains rights of possession and control while the charterer has the right to choose the ports of call. It also goes under the name of charter agreement or charter contract.

**Charter rate**

The shipping rate agreed between the owner of a vessel and the person or firm wanting to use the vessel in a charter party agreement.

**Chartist**

A market participant who uses technical analysis to chart the price patterns of commodities, stocks and bonds to make buy and sell decisions based on this analysis. Chartists believe recurring patterns of trading can help them forecast price movements.

**Charterer**

A person or firm who enters into a charter party agreement with the owner of a vessel for the transportation of cargo for a set period of time or number of voyages.

**Chicago Climate Exchange (CCX)**

Greenhouse gas emissions trading exchange; designed for voluntary emissions reductions and trading for all six greenhouse gases. The CCX administers the first multinational and multisector market for reducing and trading greenhouse gas emissions. CCX is a self-regulatory, rules-based exchange designed and governed by CCX members that have made a voluntary, legally binding commitment to reduce their emissions of greenhouse gases.

**Chicago Mercantile Exchange (CME)**

Established in 1898 as the Chicago Butter and Egg Board, it became incorporated as the CME in 1919. The CME offers futures and

options on futures based on indexes of heating degree days (HDDs) and cooling degree days (CDDs) for selected population centres and energy hubs with significant weather-related risks throughout the US. Cities are chosen based on population, the variability in their seasonal temperatures and the activity seen in over-the-counter trade in HDD/CDD derivatives.

These are the first exchange-traded, temperature-related weather derivatives. These contracts are designed to help businesses protect their revenues during times of depressed demand or excessive costs because of unexpected or unfavourable weather conditions.

**Chooser option**

The holder of a chooser option can choose, after a predetermined period, between a put and a call option. Similar to a straddle, but cheaper, because the holder must choose between the put or the call before the instrument expires.

★ *see also forward start option*

**CHP**

★ *see combined heat and power*

**CIF**

★ *see cost, insurance and freight*

**Clean coal technology**

Methods of burning coal with reduced emissions.

**Clean dark spread**

Refers to the profit realised by a power generator after paying for the cost of coal fuel and carbon allowances.

**Clean Development Mechanism (CDM)**

The Clean Development Mechanism (CDM), defined in Article 12 of the Kyoto Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such projects can earn saleable Certified Emission Reduction credits, each equivalent to one tonne of CO<sub>2</sub>, which can be counted towards meeting Kyoto targets.

**Clean spark spread**

The spread equal to the regular (or 'dirty') spark spread minus the CO<sub>2</sub> emissions cost for gas-fired power plants. This spread then represents the net revenue on power sales after gas costs and emissions allowance costs. An analogous spread for coal-fired generation plants is typically referred to as a clean dark spread or a dark green spread.

★ *see also spark spread, dark spark spread*

**Clearing**

A mechanism by which transactions are settled through an organisation that assures settlement.

**Clearing members**

Members of an exchange who accept responsibility for all trades cleared through them.

**CNG**

An acronym for compressed natural gas – natural gas that has been compressed under high pressure (typically 2,000–3,600psi).

★ *see compressed natural gas*

**CNS**

Central North Sea.

**CNSE**

★ *see Comisión Nacional de Sistema Eléctrico*

**Coal freight rates**

Used to express coal transportation cost. Usually listed as dollars/tonne or dollars/tonne-mile.

**Coal gasification**

A process for converting coal partially or completely into combustible gases, for use as fuels or chemical feedstocks.

**Co-efficient of determination**

A measure of the proportion of variance in  $y$  which can be explained by  $x$ .

★ *See also  $r^2$*

**Co-firing**

Burning natural gas as well as another fuel type (usually coal) in order to decrease the amount of air pollutants and/or use the most competitively priced fuels available.

★ *see also dual-firing*

**Co-generation**

★ *see combined heat and power*

**Co-generator**

A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam), used for industrial, commercial, heating or cooling purposes.

**Collar**

A supply contract between a buyer and a seller of a commodity, whereby the buyer is assured that he will not have to pay more than some maximum price and whereby the seller is assured of receiving some minimum price.

**Collateral**

An obligation or security linked to another obligation or security to secure its performance.

**Combined-cycle gas turbine (CCGT)**

An energy-efficient gas turbine system, where the first turbine generates electricity from the gas produced during fuel combustion. The hot gases pass through a boiler and then into the atmosphere. The steam from the boiler drives the second electricity-generating turbine.

**Combined heat and power (CHP)**

The production of two forms of energy, such as high-temperature heat and electricity, from the same process. For example, the steam produced from boiling water could be used for industrial heating. In the US, the term typically used for this process is co-generation.

**Combustion turbine**

An electricity generator that uses a jet engine as the prime mover. Often fuelled by natural gas or petroleum products and used as peaking generation.

**Co-mingled**

When a gas or crude oil outside contract specifications has been mixed with another gas in order to bring it within the required quality specifications.

**Comisión Nacional de Sistema Eléctrico (CNSE)**

A regulatory commission for the Spanish power industry. Attached to the ministry of industry and energy, the Madrid-based CNSE has regulatory and executive powers to regulate operation of the industry and supervise industry practices.

**Commission de Régulation de l'Énergie (CRE)**

The French regulatory agency for energy. Acts as the guarantor of the right of access to public electricity grids and to natural gas facilities and systems. [www.cre.fr](http://www.cre.fr)

**Commissioning gas**

Gas produced when a new field starts up, or the gas needed during the start-up of a power station. In both cases, the amount and timing of the requirements are not exact.

**Commodity**

1) a physical good, typically produced in agriculture or mining, that can be the object of a commercial transaction.

2) any index, rate, security or physical commodity that is or could be the underlying instrument or price determinant of a futures contract or other financial instrument.

**Commodity future**

A futures contract on a commodity. Unlike financial futures, the prices of commodity futures are determined by supply and demand rather than the cost-of-carry of the underlying. Commodity futures can, therefore, either be in contango (where futures prices are higher than spot prices) or backwardation (where futures are lower than spot prices).

**Commodity Futures Modernisation Act**

US legislation designed to re-invigorate the derivatives sector by modernising the law for futures, swaps and other derivatives. The legislation has caused some controversy among US energy exchanges in that it excludes some electronic trading systems from regulatory oversight under the Act.

**Commodity Futures Trading Commission (CFTC)**

An independent agency of the US government, that has the authority to regulate the US futures markets. The commission is composed of five commissioners and is responsible for assuring fairness, transparency and well-functioning of the markets.

**Commodity swap**

Commodity swaps enable both producers and consumers to hedge commodity prices. The consumer is usually a fixed payer and the producer a floating payer. If the floating-rate price of the commodity is higher than the fixed price, the difference is paid by the floating payer, and vice versa. Usually only the payment streams, not the principal, are exchanged, although physical delivery is becoming increasingly common.

Swaps are sometimes done to hedge risks that cannot readily be hedged with futures contracts. This could be a geographical or quality basis risk, or it could arise from the maturity of a transaction.

### Common carriage

★ *see third-party access*

### Component value-at-risk

An approximation to value-at-risk, whereby the calculation is based on the principal components of a portfolio.

### Compound option

An option allowing its holder to buy or sell another option for a fixed price. For example, the purchase of a European-style 'call on a put' means that the compound option buyer obtains the right to buy on a specified day (when the overlying option expires) a put option (the underlying option) at the overlying option's strike price.

### Compressed natural gas (CNG)

A product consisting of natural gas that has been compressed under high pressures, typically between 2,000 and 3,600psi, and is held in a hard container. It is used mainly as an alternative fuel for internal combustion engines (such as automobile engines). It generates low hydrocarbon emissions but a significant quantity of nitrogen-oxide emissions. CNG's volumetric energy density is about 42% of liquefied natural gas's and 25% of diesel's.

### Compressor station

Gas loses pressure as it travels over long distances. A compressor station – usually a gas turbine engine – is an installation that recompresses the gas to the required pressure.

### Compulsory stocks

Crude oil and product stocks that an oil company is obliged to hold by the consuming government.

### Condensates

Mixtures of liquid hydrocarbons mainly recovered from gas reservoirs. They may include liquefied petroleum gases (propane and butane), naphtha and gasoil or only some of the above fractions. Condensates are used both as refinery and petrochemical feedstocks.

### Confidence interval

A confidence interval for an unknown population parameter is an interval constructed from a given set of sample data in such a way that the probability that the interval contains the true value of the parameter is a specified value.

### Congestion

Physical constraints at certain points on electricity transmission networks.

### Contango

Term used to describe an energy market in which the anticipated value of the spot price in the future is higher than the current spot price. When a market is in contango, market participants expect the spot price to go up. The reverse situation is described as backwardation.

★ *see also backwardation*

### Contingency order

An order that becomes effective only upon the fulfilment of a predefined condition.

### Contingent claim

A term used in theoretical models to refer to derivative contracts, typically options, which entitle a payoff provided some other related market conditions occur.

### Contingent premium option

An option for which the buyer pays no premium unless the option is exercised. As a rule of thumb, the premium eventually paid is equal to the premium payable on a normal option, divided by the option delta. Hence, the price increases dramatically for out-of-the-money options.

**Contingent swap**

A swap that is only activated when rates reach a certain level or a specific event occurs. For example, drop-lock swaps only activate if rates or prices drop to a certain level or if a specified level over a benchmark is achieved.

**Contract customer**

A gas buyer who negotiates terms with the seller, unlike small, domestic users who pay by fixed tariff.

**Contract for differences (CFD)**

- 1) a long-term swap agreed bilaterally, generally between generators and electricity supply companies, and referenced to prices in the relevant pool.
- 2) a short-dated swap agreement used to minimise the basis risk between the daily published Platt's quote for dated or physical Brent in a specific time window in the future and the forward price quote for a specific month. Settlement of a CFD is based on the published price difference at a designated time.

**Contract month**

★ *see delivery month*

**Contract path**

Electricity transmission path for a generation transaction that is specified by contract but that may not take into account loop flows through neighbouring systems.

**Control area**

(US) a large geographic area within which a utility, or group of utilities, regulates electricity generation in order to maintain scheduled interchanges of power with other control areas and to maintain the required system frequency.

**Control area operator**

(US) an electricity entity that operates generating capacity to meet area demand, monitors actual interchange (electricity flowing between control areas) and can dispatch generating resources to ensure that actual interchange equals scheduled interchange.

**Convenience yield**

According to the modern theory of term structures in commodity prices, convenience yield describes the yield that accrues to the owner of a physical inventory but not to the owner of a contract for future delivery. It represents the value of having the physical product immediately to hand and offers a theoretical explanation, albeit of limited predictive value, for the strength of backwardation in the commodity markets.

**Conversion**

A delta-neutral arbitrage transaction involving a long futures contract, a long put option and a short call option. The put and call options have the same strike price and same expiration date.

★ *see also box, reversal*

**Conversion factors**

These depend on the specific gravity of the crude oil. As a general guide:

- 1 tonne of crude = 7.5 barrels
- 1 barrel of crude = 5,604 cubic feet of
- natural gas, 0.996 barrels of gasoil or 1.446 barrels of liquefied petroleum gas
- 1 US barrel = 42 US gallons = 158.978 litres
- 1 million barrels of crude a day = 50 million tonnes a year
- 1 megajoule = 947.81 British thermal units = 238.85 Kcal
- 1 cubic foot = 0.0283 cubic metres

★ *see also cubic foot*

**Conversion rate**

1 therm = 29,307 kWh

**Cooling degree day**★ *see degree day***Co-operative**

(US) a group organised under law into a utility company that will generate, transmit or distribute supplies of electricity to a specified area not being served by another utility. Typically, a co-operative is a not-for-profit organisation where the customers are also owners.

**Co-ordination transactions**

These are short-term transactions undertaken chiefly to maintain the integrity of an electricity system.

**Correlation**

A measure of the degree to which changes in two variables are related. Correlation ranges between plus one (perfect correlation – the same amount of movement in the same direction) and minus one (perfect negative correlation – the same amount of movement in opposite directions). Like volatility, it can be calculated from historical data, but such calculations are not necessarily good predictors of behaviour.

If the correlation between markets is known, an option position in one market can be offset against another with similar direction and volatility. This is advantageous, because it can circumvent difficult hedging environments and can reduce costs.

Correlation is also important for the pricing of some options, particularly those offering exposure to more than one market variable. The payout of a spread option or a yield curve option is based on the correlation between two underlyings separated by space, time or asset, while that of a quanto product will depend on the extent of the relationship between movements in the underlying and movements in the exchange rate.

**Correlation co-efficient**

The correlation co-efficient (also referred to as  $r$ ) provides an index of the degree to which variables co-vary in a linear fashion.

**Corridor**

The buyer of a corridor purchases a cap with a lower strike while selling a second cap with a higher strike. The premium earned from the sale of the second cap reduces the total cost of the corridor. The buyer is protected from rates rising above the first cap's strike, but exposed again if they rise past the second cap's strike. This liability can be limited by selling a knock-out cap, rather than a conventional cap.

**Corridor floater**

A corridor floater – also known as a range note, fairway note or accrual note – is a structured note paying an above-market rate for each day the underlying spot rate stays within a specified range (the accrual corridor). This higher yield is achieved by effectively selling an embedded corridor option. The corridor may be reset on given dates, either by the buyer or according to the prevailing value of the reference rate.

If the underlying trades outside the corridor, the investor receives no interest for that day. Alternatively, the instrument may be knocked out altogether – this is a barrier floater or knock-out range note. The holder will therefore benefit in stable market periods when volatility is low and the underlying is more likely to stay within the corridor.

**Corridor option**

The holder of a corridor option receives a coupon at maturity, the magnitude of which depends on the behaviour of a specified spot rate during the lifetime of the corridor. For each day on which the spot rate (typically an official fixing rate) remains within the chosen spot range (the accrual corridor), the holder accrues one day's worth of coupon interest. A variation is the knock-out corridor option. In this structure, the holder ceases to accrue coupon interest as soon as the spot rate leaves the range. Even if the spot rate subsequently re-enters the range, the holder does not continue to accrue coupon interest.

A wall option is a special type of corridor option, where the accrual corridor is one-sided. Another relative is the range binary, a digital option that pays a fixed-coupon amount if the rate stays within the range, but pays nothing if the range is breached.

★ *see also range binary, trigger condition*

**Cost base**

(UK) the initial capital and running costs of the national transmission system, used by National Grid Transco in order to work out third-party system transportation charges.

**Cost, insurance and freight (CIF)**

A CIF shipping cost means the cost of cargo, insurance and travel/freight to a named destination are all included in the price.

**Cost-of-carry**

The cost-of-carry is the difference between the cost of financing an asset and the interest received on that asset. If the financing cost is lower than the interest, the asset is said to have a positive cost-of-carry; if higher, the cost-of-carry is negative.

**Counterparty**

A participant in a physical or financial contract.

**Counterparty risk**

The risk that a counterparty to a transaction or contract will default (fail to perform) on its obligation under the contract. Counterparty risk is not limited to credit risk (the risk that the counterparty cannot fulfil its contractual obligations for payment) but may also result from other problems associated with a counterparty unwilling to honor the contract.

**Counter-purchase market**

In a counter-purchase market, the system operator buys excess power from the grid when there is a surplus and sells reserve power to the grid when there is a shortfall. Costs to the system operator are recouped through tariffs charged to users of the system.

**Covariance**

A measurement of the relationship between two variables. The arithmetic mean of the products of the deviations of corresponding values of two quantitative variables from their respective means.

**Covariance matrix**

A square, symmetrical matrix in which the rows and columns are variables, and the entries are covariances. The diagonal elements (the covariance between a variable and itself) will equal the variances.

**Covariant options**

Options that give the holder the choice of delivering power in a variety of forms – e.g., electricity, natural gas or fuel oil.

**Covered option**

A covered call option is one whereby the writer owns the underlying asset on which the option is written. Generally, a covered call would only be written if the writer believed volatility to be overpriced in the market – the lower the volatility, the less premium the writer gains in return for giving up their upside in the underlying.

A covered put option is one whereby the writer sells the option while holding cash. This technique is used to increase income by receiving option premium. If the market goes down and the option is exercised, the cash can be used to buy the underlying to cover.

Covered put writing is often used as a way of target buying. If an investor has a target price at which he wants to buy, he can set the strike price of the option at that level and receive option premium to increase the yield of the asset. Investors also sell covered puts if markets have fallen quickly but seem to have bottomed, because of the high volatility typically received in the option.

★ see also *naked option*

### Cox-Ross-Rubenstein model

An option-pricing model developed by John Cox, Stephen Ross and Mark Rubinstein that can be used to address factors not included in the Black-Scholes Model, such as early exercise.

### Cracking

A refining technique that uses high pressures and temperatures to crack heavy hydrocarbons into lighter products. This process is more advanced than the simple distillation of crude oil.

### Crack spread

A calculation of the worth of a barrel of crude oil in terms of the value of its refined products, such as gasoline and heating oil. Crack spreads may be based on a variety of refinery models and also depend on the type of crude input. They are usually expressed in dollars and cents per barrel of crude.

To calculate the spread, the cents-per-gallon product prices are multiplied by 42 (the number of gallons per barrel) and subtracted from the crude oil price. For example, when heating oil futures cost \$0.60 per gallon and Nymex division light, sweet crude oil is priced at \$22 a barrel, the heating oil crack spread in dollars per barrel =  $\$0.60 \times 42 = \$25.20 - \$22 = \$3.20$ .

### Credit default swap

A risk management product that allows the transfer of third-party credit risk from one party to another. In case of default, the insurer must buy the defaulted asset from the insured and must pay the insured the remaining interest and principal on the debt. Also called a credit swap.

### Credit derivative

Credit derivatives' payouts depend in some way on the creditworthiness of an organisation (which could be a sovereign state, a government body, a financial firm or a corporate). This creditworthiness is gauged by objective financial criteria or a third-party evaluation from a recognised credit rating agency, such as Moody's Investors Service or Standard & Poor's.

Credit derivatives might not appear to have an underlying in the conventional sense. But it is often argued that they are based on the cost of a credit event or, equivalently, the premium that would have to be paid to transfer the credit risk of a given transaction to a third party. Most importantly, these derivatives unbundle credit risk from other risks. For example, the holder of a floating-rate note issue can separate the credit risk (that the issuer will default) from the interest rate risk (that the coupon will fall).

There are two main types of credit derivative. The first, which includes credit default swaps and put options, activates in the event of a credit event, such as a default or downgrade of debt. A second type of credit derivative is the credit spread forward or option. The underlying for these contracts is the spread between two otherwise identical securities, which depends only on the creditworthiness of the issuer. Swaps under which the total rate of return on an index is swapped for some reference rate are sometimes also referred to as credit derivatives.

### Credit-linked note

A credit-linked note – also known as a credit default note – is created by the securitisation of a credit default swap.

**Credit risk**

Credit risk, or default risk, is the risk that a financial loss will be incurred if a counterparty to a (derivatives) transaction does not fulfil its financial obligations in a timely manner. It is therefore a function of the following: the value of the position exposed to default (the credit or credit risk exposure); the proportion of this value that would be recovered in the event of a default; and the probability of default.

Credit risk is also used loosely to mean the probability of default, regardless of the value that stands to be lost.

★ *see also settlement risk*

**Credit value-at-risk**

The credit value-at-risk (CVaR) of a portfolio is the worst loss expected to be suffered due to counterparty default over a given period of time with a given probability. The time period is known as the holding period and the probability is known as the confidence interval. CVaR is not an estimate of the worst possible loss, but the largest likely loss.

For example, a company might estimate its CVaR over 10 days to be \$100 million with a confidence interval of 95%. This would mean there is a one-in-20 (5%) chance of a loss larger than \$100 million in the next 10 days.

★ *see also value-at-risk*

**Critical day option**

An option structure used for weather derivative transactions where the option payoff is based on defined critical conditions being met for a specified number of days.

**Cross default**

A cross default is a provision within a loan or swap contract stating that any default on another loan or swap will be considered a default on the original contract. It is designed to protect creditors or counterparties from favouring another credit.

**Cross subsidisation**

Where certain customers or customer groups are subsidised by one party or group that is required to pay a disproportionate share of the service costs. In the UK, a principle whereby utilities are not allowed to use profits or debt from their core regulated business for other non-regulated activities.

**Crude oil**

A full-ranging hydrocarbon mixture produced from a reservoir after any associated gas has been removed. Among the most commonly traded crudes are the North Sea's Brent blend, the US's West Texas Intermediate and UAE's Dubai.

**Cubic foot**

One of the standards used to measure a volume of gas.

★ *see also conversion factors*

**Cumulative degree days**

The sum of heating degree days or cooling degree days over a specified period.

**Cumulative probability distribution function**

The cumulative distribution function of a random variable is the chance that the random variable is less than or equal to  $x$ , as a function of  $x$ .

**Cushion gas**

The minimum volume of gas required in an underground storage reservoir to provide the necessary pressure to deliver working gas volumes to customers. Known as 'pack the line' or linepack gas when related to pipelines.

**Cylinder**

A cylinder, also known as a range forward or risk reversal, is the simultaneous purchase of an out-of-the-money put option and sale of an out-of-the-money call option at different strike prices. The buyer can hedge its downside at reduced cost, since the purchase of the put is partly financed by the sale of the call, but at the cost of relinquishing any upside beyond the higher strike.

# D

## Daily balancing

Balancing, on a day-by-day basis, the amount of gas a shipper puts into a pipeline system.

## Daily call option

Allows a buyer of natural gas to take additional volumes on one day's notice.

## Daily contract quantity (DCQ)

In a buyer's nomination contract, this is the average amount the buyer can have in its daily nominations. The maximum rate at which the buyer can ask the seller to deliver (*see delivery capacity*) is a function of the DCQ and the swing. A similar rule exists in a seller's nomination contract, where it is called the estimated daily contract quantity.

## Daily earnings-at-risk

A one-day value-at-risk calculation, typically with a 95% confidence level over a 24-hour period.

## Daily metered sites

Supply points/sites with meters that read natural gas volume either on a continuous or daily basis. Indicate the daily volume consumption needed for daily balancing. The sites are at large input and offtake points on a gas system, typically for large industrial gas end-users.

## Daisy chain

Term sometimes used for the paper chain formed by the passing of a 15-day Brent cargo – that is, 15 working days ahead of its loading date – from the equity holder through a sequence of deals.

★ *see also dated Brent, five o'clocking*

## Dark spread

The spread between the fuel and power price for a generator. The term spark spread is used for gas-fired, and, similarly, dark spread is used for coal-fired generation. Like a spark spread, the measure of the fuel efficiency of the conversion process in generation.

## Dashboard

In risk management, trading and financial applications, a consolidated report and/or graphical display highlighting key financial results and control metrics, such as current and trending level of value-at-risk, current trading positions against established limits and daily mark-to-market gains and losses.

## Dated Brent

A term for a physical cargo of Brent blend crude that has received its loading date range. This occurs 15 days ahead of loading (not including weekends and bank holidays).

★ *see also daisy chain, Brent blend crude oil*

## Day-ahead market

The market trading for the day before the operating day.

## DCQ

★ *see daily contract quantity*

## Deepwater port

An offshore terminal for liquefied natural gas (LNG) or energy product loading/unloading, or alternatively used to describe a seaport that can accommodate a fully loaded Panamax-class ship. For LNG operations, a deepwater port is essentially a connection to an ocean floor natural gas pipeline using a turret-loading buoy, which serves as the LNG tanker's mooring. Deepwater ports may also be considered to be offshore structures that are used as a port or terminal for loading or unloading other energy products, such as the Louisiana Offshore Oil Port (Loop) in the US.

★ *See also Loop*

**Debt trigger**

An event such as a credit rating downgrade that triggers further guarantee requirements on a loan or swap contract.

**Default risk**

★ *see credit risk*

**Deferred swap**

A swap under which the payments are deferred for a specified period, usually for tax or accounting reasons. Not to be confused with a forward swap, where the entire swap is delayed.

★ *see also forward swap*

**Degree day**

A measure of the variation of one day's temperature against a standard reference temperature, typically 65° Fahrenheit (18° Celsius). Degree days are used as a basis for temperature-related weather derivative deals. There are both cooling degree days (CDDs) and heating degree days (HDDs). For example, a firm takes out a 30-day CDD swap with a reference temperature of 65°F, and the average temperature on each day is 70°F. The company is then due 150 (30 × 5) degree days multiplied by the sum of money agreed for each degree day. If the firm had taken out an HDD swap, it would have owed the same amount of money.

**Deliverability**

The rate at which gas can be supplied from a reservoir – such as salt cavity storage – in a given period. In a salt cavity storage facility, for example, the rate would depend on a number of factors, including reservoir pressure, reservoir rock characteristics and withdrawal facilities such as pipeline capacity. The term is also used for the volume of gas that a field, pipeline, well, storage or distribution system can supply in a single 24-hour period.

**Delivery capacity**

The maximum rate at which a natural gas buyer can request the seller to deliver gas (other than excess gas) into the pipeline and which the seller has a firm obligation to deliver. In peak-supply contracts, there may be a charge payable in respect of the available delivery capacity.

**Delivery facility operators**

(UK) companies that operate the natural gas processing facilities at gas terminals before the gas is passed on either into storage or to the national transmission system.

**Delivery month**

The month in which a futures contract matures and can be settled by physical delivery. Also known as the contract month.

**Delta**

Option risk parameter that measures the sensitivity of an option price to changes in the price of its underlying instrument.

**Delta hedging**

An option is delta hedged when a position has been taken in the underlying that matches its delta. Such a hedge is only effective instantaneously, because the option's delta is itself altered by changes in the price of the underlying, interest rates, the option's volatility and time to expiry. A delta hedge must thus be rebalanced continuously to be effective.

★ *see also dynamic replication*

**Delta neutral**

A position for an options portfolio such that the overall delta of the portfolio is zero.

**Demand charge**

★ *see capacity charge*

**Demand day**

The level of demand over a 24-hour period.

**Demand-side management**

Activities carried out to control the level and type of demand for electricity.

**Demurrage**

The cost, or the delay period resulting in the cost, charged when a vessel fails to unload or load within the allotted time period, or laytime, provided by contract. Essentially a liquidating damages charge for contract breach for detention of the ship.

**Deregulation**

The halting or reduction of government regulations.

**Derivative**

A financial instrument derived from a cash market commodity, futures contract or other financial instrument. Derivatives can be traded on regulated exchange markets or over-the-counter. For example, energy futures contracts are derivatives of physical commodities, and options on futures are derivatives of futures contracts.

**Diesel**

A middle distillate fuel used in diesel engines.

**Difference option**

An option that pays the price difference between two assets. The strike price provides the initial reference point for valuing the option. A buyer's profit or loss will depend on how the current price differential between the two assets compares with the differential when the option was launched.

**Differential Swap**

A quanto swap.

**DIG**

An acronym for the Financial Accounting Standards Board's (FASB's) Derivatives Implementation Group, which is a task

force that was created by the FASB in 1998 concurrent with their issuance of FASB Statement No. 133, *Accounting for Derivative Instruments and Hedging Activities*, to assist the FASB in providing guidance on questions that companies would face when they began implementing FAS 133.

**Digital option**

Digital – or binary – options pay either a fixed sum or zero depending on whether the payoff condition is satisfied – e.g., cash-or-nothing options and asset-or-nothing options.

★ see also *digital swap*

**Digital swap**

The fixed leg of a digital swap is only paid on each settlement date if the underlying has fulfilled certain conditions over the period since the previous settlement date. The premium for such a swap is paid in instalments at each payment date.

★ see also *digital option*

**Direct current**

The unidirectional flow of electric charge. High-voltage DC is a technique often used for undersea cables connecting different countries. Power transmitted in this way suffers less reactive power loss than an alternating current line. It also allows connection of two asynchronous alternating current networks.

**Dispatchable generation**

Generation available physically or contractually to respond to changes in system demand or to respond to transmission security constraints.

**Dispersion**

The distribution pattern of measurements. The Standard Deviation is the most common measure of dispersion.

**Displacement**

Where natural gas is input into a pipeline system at one end and the same amount of gas is delivered at another point, although the gas may not have been transported between the two points.

**Distillate oil**

Any distilled product of crude oil. A light petroleum product used for home heating and most machinery.

**Distillates**

Oil products obtained by distillation, including gases, gasoline, naphthas, jet fuel, gasoil and waxy distillates. Atmospheric distillates boil at around 370° Celsius, and vacuum distillates at between 370° and 525°C.

**Distillation**

The simple refining of oil by boiling.

**Distributed generation**

A distributed generation system is characterised by a number of smaller, interlinked generators, rather than one central generator.

**Distribution**

- 1) the probability distribution of a variable describes the probability of the variable attaining a certain value. The distribution assumed by an option pricing model is crucial to that model's predictions, since it determines the likelihood of the option being exercised.
- 2) the delivery of electricity to the retail customer's home or business from the main grid through low-voltage distribution lines. Low voltages range from 2,300 to 69,000 volts.

★ *see also transmission facility*

**Diurnal matching**

The daily balancing of the difference between a shipper's gas input volume and its customers' offtake.

**Diurnal storage**

Storage located close to all gas demand centres that is used to meet the daily peaks in demand. Such storage is provided in the form of gas holders and line-packing.

**Diversion**

In the context of energy markets, generally refers to the diversion of cargoes from the original intended destination as may be allowed under contract provisions, in order to maximise price arbitrage opportunities.

**Divestiture**

The process of requiring monopolistic utilities to spin off one segment of their business. Done to ensure that uncompetitive advantages created by former government actions are removed, so that competition can develop. A utility with generation, transmission and distribution facilities, for example, might be forced to sell off its generation. Also known as vertical disaggregation.

**DoE**

(US) Department of Energy.

**Domestic market**

The section of the energy market that covers energy requirements for domestic premises.

**Done**

Term used to indicate that a deal has been completed. For example, a broker might tell a trader that he is 'done', meaning his buy/sell requirements have been matched precisely.

**Double-down**

A swap with an embedded option that permits the writer of the swap to halve the agreed volume once, and once only, at or before an agreed date. In return, the buyer of the swap obtains a more favourable price.

**Double-up**

The exact reverse of double-down, with the writer of the swap having the option to double the agreed volume.

**Dow Jones**

A leading provider of global business news and information services. Among other publications, its consumer media group publishes *The Wall Street Journal* and *Barron's*. [www.dowjones.com](http://www.dowjones.com)

**Downside risk**

★ *see upside/downside risk*

**Downstream**

Activities in the oil and natural gas industry from a refinery onwards – e.g., the distribution and marketing of hydrocarbon products.

★ *see also upstream*

**Dry dock**

A large dock in the form of a basin, which can be flooded to float in vessels and then drained to create a dry area around the vessel. It is used for building or repairing a ship below its water line.

**Dry gas**

Gas with a low liquid content, usually below two gallons per 1,000 cubic feet. This may happen naturally, as in most of the fields in the southern North Sea, or the water content may be reduced by a dehydration process. Also known as lean gas.

★ *see also wet gas*

**DTI**

(UK) Department of Trade and Industry.

**Dual-firing**

Where two different fuels – say, gas and oil – can be used to generate energy in one piece of equipment.

★ *see also co-firing*

**Dubai**

A benchmark crude produced in Dubai, one of the United Arab Emirates. Dubai is commonly used as a reference price for the Asia-Pacific region.

**Dynamic hedging**

★ *see delta-hedging*

**Dynamic replication**

Replication of an option payout by buying or selling the underlying (or futures, where cheaper) in proportion to an option's delta. Dynamic replicators are exposed to increases in volatility, which may increase the costs of the necessary hedge.

★ *see also delta-hedging, static replication*

# E

**ECC**

★ *see European Commodity Clearing*

**ECX**

European Climate Exchange

**E&P**

Exploration and production.

**EDCQ**

(Gas) estimated daily contract quantity.

**Edison Electric Institute (EEI)**

The Washington, DC-based EEI is an association of US shareholder-owned electricity companies, international affiliates and industry associates worldwide. In 2008, its US members served more than 95% of customers in the shareholder-owned segment of the industry and generated almost 70% of the electricity produced by US power utilities in total. It was formed in 1993.

**EEX**

★ see *European Energy Exchange*

**EFP**

★ see *exchange of futures for physicals*

**EFS**

★ see *exchange of futures for swaps*

**EFET Master Agreement**

A standardised master agreement developed by the European Federation of Energy Traders for the delivery and acceptance of electricity, providing a similar structure to the International Swaps and Derivatives Association by containing a General Agreement and Election Sheet for agreed revisions to the General Agreement.

[www.efet.org](http://www.efet.org)

**EITF**

An acronym for the Emerging Issues Task Force, a unit of the Financial Accounting Foundation that addresses accounting issues not yet addressed by a published Financial Accounting Standards Board *Statement of Financial Accounting Standards*.

**EIA**

★ see *Energy Information Administration*

**El Niño**

A periodic warming of the tropical Pacific Ocean that affects weather around the world. Typical consequences of El Niño include increased rainfall in the southern US and drought in the western Pacific. Winter temperatures in the north-central states of the US are typically warmer than normal in El Niño years and cooler than normal in the southeast and southwest of the country.

However, its effects outside the tropical Pacific are unpredictable and almost any definition would be disputed by meteorologists. The warmest and coldest winters in the north-east US since 1950 have both occurred during El Niño periods. The name of the phenomenon derives from the fact that it tends to appear around Christmas – El Niño means ‘little boy’ in Spanish, the name commonly given to the infant Christ.

A 1997/1998 El Niño winter gave a boost to the weather derivatives market by prompting energy companies to hedge against mild winter weather that would decrease energy demand.

**Electric power trading day**

For trading purposes in designating hours traded, the 24-hour period beginning at midnight and ending at the following midnight.

**Electric Utilities Industry Law**

A law that was amended in 1995 to open the Japanese electricity market to competition. Implementation of the March 2000 stage, opened up the country’s high-voltage sector – 30% of the electricity market – to competition.

**Electricity forward market**

A brokered over-the-counter market in the UK for short- to medium-term electricity derivative instruments, of which the most widely used is the electricity forward agreement.

**Electricity utility**

An enterprise engaged in the generation, transmission and/or distribution of electricity primarily for use by the public, which is the major power supplier within a designated service area. Electricity utilities include investor-owned, publicly owned, co-operatively-owned and government-owned entities.

★ see also *power marketer*

**Electronic bulletin board**

A system whereby US gas industry participants, such as pipeline companies, advise on their transport, storage and delivery capacity availability. Under Federal Energy Regulatory Commission rules, all pipelines are obliged to post information on electronic bulletin boards in order to allow open access.

**Electronic trading**

Internet-based trading on a real-time basis.

**Embedded costs**

The cost of all the facilities in an electricity or natural gas supply system.

**Embedded derivatives**

Within a US accounting context of FAS 133, portions of contracts that meet the definition of a derivative when the entire non-derivative contract cannot be considered a financial instruments derivative.

★ see also FAS 133

**Embedded option**

An option, often an interest rate option, embedded in a debt instrument that affects its redemption. Embedded options are usually, but not always, interest rate options; some are linked to the price of an equity index (e.g., Nikkei 225 puts embedded in Nikkei-linked bonds) or a commodity (usually gold, but sometimes oil). Embedded options may be embedded in physical commodity contracts or commodity derivatives such as extendible swaps.

**Emissions credits**

The instruments created by regulations in the US market to encourage market-driven reductions of pollution.

**Emission reduction units (ERUs)**

Represents one tonne of CO<sub>2</sub> equivalent reduction of greenhouse gas emissions, particularly as achieved through a joint implementation project. ERUs can be used as the unit of trade in greenhouse gas emissions trading systems, or to meet an Annex B Party's emission commitment.

**Emissions trading**

Emissions trading, as set out in Article 17 of the Kyoto Protocol, allows countries that have emission units to spare – emissions permitted them but not ‘used’ – to sell this excess capacity to countries that are over their targets.

Thus, a new commodity was created in the form of emission reductions or removals. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity. This is known as the ‘carbon market.’

**Energimarknadsinspektionen/  
Energy Markets Inspectorate (EI)**

The Swedish regulatory authority that works for efficient energy markets through supervision and monitoring of markets. [www.ei.se](http://www.ei.se)

**Energy Brokers Association**

A Washington, DC-based initiative launched in 2002 with the aim of more clearly defining the role of over-the-counter brokers in energy markets and of recommending and introducing best processes throughout the industry.

**Energy Information Administration (EIA)**

A US government agency that produces reports on US energy supply and demand, most notably a weekly report detailing crude and product inventories in various areas of the US. The report covers US refinery throughput, as well as crude and product imports and exports. Information is also provided on natural gas and electricity.

★ see also American Petroleum Institute

**Endex**

European Energy Derivatives Exchange

**Enterprise-wide risk management**

An integrated approach to risk management. For example, defining a framework to identify and anticipate all kinds of risk that can affect an organisation.

**Entry cost**

(UK gas) tariff for using the UK's national transmission system.

**EPA**

The US Environmental Protection Agency.

**Ercot**

Electric Reliability Council of Texas – a North American Electric Reliability Council for the Texas Interconnection.

**Ethanol**

Ethyl alcohol (CH<sub>3</sub>CH<sub>2</sub>OH), often derived from corn, that can be blended with gasoline to make the fuel burn more cleanly. Several US states are phasing-in the use of ethanol in gasoline to replace methyl tertiary butyl ether, which has been blamed for water pollution incidents. Ethanol may also be referred to as grain alcohol.

**EUA**

European Union Allowances (EUAs)  
– nationally secured rights to emit a certain amount of greenhouse gases. 1 EUA = 1 tonne CO<sub>2</sub>

**Eurelectric**

Is the association of the electricity industry in Europe, including electricity producers, suppliers, traders and distributors. The current association was created in December 1999 as a result of a merger in December 1999 of the sister sector bodies Unipede and Eurelectric.  
[www.eurelectric.org](http://www.eurelectric.org)

**European Commodity Clearing AG**

European Commodity Clearing AG (ECC) operates a clearing house for energy-related commodities and their derivatives. Currently, ECC provides clearing services for contracts traded on the European Energy Exchange, the European Energy Derivatives Exchange and the Powernext SA, as well as for over-the-counter trades registered via these exchanges. ECC is supervised by the German Federal Financial Supervisory Authority. Founded in 2006, ECC currently offers clearing services for the following commodities: German, French, Austrian, Swiss, Belgian and Dutch power, emissions allowances, coal and natural gas.

**European Energy Exchange (EEX)**

The EEX was founded in August 2000 and merged with its rival, the Leipzig Power Exchange, in early 2002. Today, with more than 200 trading participants from 19 countries, the energy exchange has become the most important energy exchange in continental Europe. EEX offers futures and spot markets in electricity and, in March 2005, began trading and settlement of CO<sub>2</sub> emissions allowances. In 2008 the merger of EEX and Powernext created a common spot and futures market in power.

★ *see also Powernext*

**European Emissions Allowances (EUA)**

Represents a permit to emit one tonne of carbon under the European Union Emissions Trading System. Since one EU Allowance Unit of one tonne of CO<sub>2</sub>, or 'EUA', is equivalent to one 'assigned amount unit' of CO<sub>2</sub> defined under Kyoto, it is possible to trade EAUs and United Nations Framework Convention on Climate Change-validated CERs on a one-to-one basis within the same system.

### European Federation of Energy Traders (EFET)

EFET is a group of more than 90 energy trading companies from 23 European countries dedicated to improving conditions for energy trading in Europe and providing an exchange for non-commercially sensitive information between organisations and members of the developing pan-European energy industry. EFET is complementary to existing industry organisations in European organisations as it is solely dedicated to energy trading issues.

[www.efet.org](http://www.efet.org)

### European Regulators' Group for Electricity and Gas (ERGEG)

ERGEG is an advisory group of independent national regulatory authorities. ERGEG was established on 11 November, 2003, pursuant to Directive 2003/796/EC, to assist the Commission in consolidating the internal market for electricity and gas. Its members are the heads of the national energy regulatory authorities in the 27 EU Member States.

[www.energy-regulators.eu](http://www.energy-regulators.eu)

### European-style option

An option that may only be exercised on its expiration date.

★ see *American-style option*

### European Transmission System Operators (ETSO)

Was created following the development of the Internal Electricity Market for the EU, as an association to support EU-wide harmonisation of network access and conditions for usage, especially for cross-border electricity trading. The networks represented by ETSO supply more than 490 million people with electric energy. The consumption of electric energy amounts to approx. 3,200TWh per year. The length of HV (400 and 220kV) lines covered by ETSO exceeds 290,000km.

[www.etsa-net.org](http://www.etsa-net.org)

### European Union (EU)

The EU is an organisation of 27 Member States designed to promote economic and social progress. Through its executive body, the European Commission, the EU makes policy that is legally binding in its Member States.

### European Union Electricity Directive

The European parliament and council directive 96/92/EC concerning common rules for the internal market in electricity. Its aim is to ensure the free movement of electricity by defining common rules for production, transmission and distribution across EU Member States.

Under the terms of the directive, which came into effect in 1999, customers using 40GWh of electricity a year – about 25% of the market – were able to choose their supplier. From July 2007, at the latest, consumers in all Member States will be able to freely choose their gas and electricity suppliers.

### European Union Natural Gas Directive

The European parliament and council directive 98/30/EC concerning common rules for the internal market in natural gas. Its aim is to create a single Europe-wide gas market by reducing barriers to trade and encouraging new entrants into the market.

Under the terms of the directive, which came into force in August 2000, customers using 25 million cubic metres a year (cm<sup>3</sup>/y) – about 25% of the market – are able to choose their supplier. The threshold fell to 15 million cm<sup>3</sup>/y – covering 28% of the market – in 2003.

### EXAA

An acronym for Energy Exchange Austria, the Austrian energy exchange that operates an electronic platform for trading the Austrian spot market for electricity. EXAA plans to add over-the-counter clearing for electricity contracts and futures trading.

**Excess cargo**

As used in the liquefied natural gas (LNG) market, the cargoes in excess of long-term contracted quantities of LNG, which are typically either offered to existing long-term buyers or alternatively auctioned in the spot market.

**Excess gas**

A natural gas buyer may ask the seller to deliver above the delivery capacity rate. The seller does not have to do so but, if it does, the buyer will pay a premium over the main contract price.

**Exchange**

Any trading arena where commodities and/or securities are bought and sold – for example, Nymex or the International Petroleum Exchange.

**Exchange of futures for physicals**

The conversion of a futures position into a physical position via simultaneous buy/sell transactions. Also referred to as exchange of futures for product.

**Exchange of futures for swaps (EFS)**

The conversion of a futures position into a swaps position via simultaneous buy/sell transactions.

**Exchange option**

An option giving the buyer the right to exchange one asset for another. For example, the purchaser of a euro-oil exchange option would have the right to exchange a certain amount of euros for a certain number of barrels of oil.

★ *see also integrated hedge*

**Exchange rate agreement**

A synthetic agreement for forward exchange, whereby the two counterparties agree a rate based on forward foreign exchange rates. Unlike a forward exchange agreement, it is settled without reference to the spot rate.

**Exchange-traded option**

An option traded and cleared on an organised securities or derivatives exchange. Such options are usually, but not always, standardised by strike, maturity and underlying.

**Exercise**

The process of converting an options contract into a futures or physical position.

**Exercise price**

★ *see strike price*

**Exit charge**

(UK) tariff for exiting the national transmission system at a specified exit point and for a certain volume of gas.

**Exotic option**

Any option whose payout structure is more complicated than a plain-vanilla put or call option. Examples of exotic options include Asian options, barrier options, digital options and spread options.

★ *see also option, vanilla options*

**Expiration date**

The last day on which an option may be exercised.

**Ex-ship**

A shipping delivery provision whereby cargo responsibility and risk resides with the shipper until the ship has arrived at designated port and cargo is available for delivery.

**Extendible swap**

A swap with an embedded option constructed on a similar principle to a double-up swap. An extendible swap allows the provider to extend the swap, at the end of the agreed period, for a further predetermined period.

**Extrinsic value**

The amount of money the buyer of an option is willing to pay in anticipation that a change in the underlying futures price will cause the option to increase in value. Also known as time value.

**F****Fair value**

In the pricing of financial instruments, the value determined by mathematical modelling of the instruments value.

Also used as a defined term in US accounting standards as 'fair-value accounting' and 'fair-value hedges' as in Financial Accounting Standards Board Statement FAS 133. A fair-value hedge is a hedge of the exposure to changes in the fair value of a recognised asset or liability, or of an unrecognised firm commitment, which are attributable to a particular risk.

**FAS 133**

★ *see Financial Accounting Standards Board Statement 133*

**Fat tails**

On a distribution curve, a fat-tailed distribution has a greater-than-normal chance of a big positive or negative realisation.

**Federal Energy Regulatory Commission (Ferc)**

The US government body that regulates US interstate energy markets.

**FEED contracts**

An acronym for front-end engineering and design typically referring to planning and design (with defined groups of activities or segments) in the early stage of a project, especially for the process industry.

**Feedstocks**

Crude products, natural gas, chemicals or raw material used in a refinery, liquefied natural gas liquefaction plant, or petrochemical plant for processing into a finished output product or products.

**Ferc**

★ *see Federal Energy Regulatory Commission*

**Ferc order 636**

A Federal Energy Regulatory Commission order issued in 1992 to restructure the US gas pipeline industry. It relaxed service requirements on pipeline firms and gave customers greater flexibility as to whom they could buy from by separating gas sales from transportation. This 'unbundling' of sales and transportation also involved the extension of transportation to include storage and allowed end-users with firm transport contracts to sell unused capacity.

**Ferc order 888**

A Federal Energy Regulatory Commission order issued in 1996 to restructure the US wholesale electricity industry. It required all utilities that owned transmission lines to provide open-access, non-discriminatory service for all wholesale transactions (including their own wholesale transactions) and allowed utilities to seek recovery of the stranded costs associated with providing open access.

**Ferc order 2000**

A Federal Energy Regulatory Commission order issued in February 2000, which clears the way for the formation of regional transmission organisations.

**FCM**

Futures Commission Merchant – an individual or organisation accepting orders to buy or sell futures or futures options. A person or organisation in this role needs to be certified by the Commodities Futures Trading Commission.

### Financial Accounting Standards Board (FASB)

Private-sector organisation responsible for establishing standards of accounting and financial reporting in the US.

### Financial Accounting Standards Board Statement 133 (FAS 133)

FAS 133 obliges US firms to put all financial derivative instruments that are not used to hedge exposure on the balance sheet at market value. Companies, therefore, disclose unrealised gains and losses on derivatives, rather than accounting for them only at maturity.

### Financial products mark-up language (FPML)

FPML is a standardised language designed for sharing information on, and dealing in, swaps, derivatives and structured products across software and hardware systems.

### Firm capacity

An amount of natural gas in a buyer's contract that is guaranteed not to be interrupted, or a liquefied natural gas (LNG) terminal access capacity contractually guaranteed by the terminal operator or guaranteed capacity by LNG shippers or sellers.

### Firm energy

Electricity transmission service offered to customers under a filed rate schedule that anticipates no planned interruption.

### Firm service

Gas or electricity sales that are guaranteed not to be interrupted.

★ *see also non-firm service, interruptible service*

### Firm (uninterrupted)

Natural gas for which the full price has been paid on the understanding it will be delivered continually through the contract period.

★ *see also interruptible service*

### Five o'clocking

Twenty-one days before a cargo of Brent blend crude oil loads at the Sullom Voe terminal, the details of the cargo are passed through the paper chains. If the cargo has not been kept by 17:00 hours local UK time, then the last participant to receive a call with the cargo details owns the physical cargo and has been 'five o'clocked'. Normally this is seen as a bearish sign, as it usually happens in a market with low crude demand.

★ *see also daisy chain*

### Flexibility bid

In the gas market, where the system needs to buy or sell gas to keep it in balance, a shipper may put in a flexibility bid. The shipper specifies whether it is a buy or sell, the date or dates to which it applies, the amount of gas, the calorific value of the input gas, how quickly it could be implemented, how and where it would be implemented and the price.

### Floating liquefaction

Technology used for new types of liquefied natural gas facilities and vessels that have on-board liquefaction plants. Such technology provides an alternative for developing otherwise stranded natural gas reserves.

### Floor

1) the main trading area of an exchange.  
2) a supply contract between a buyer and seller of a commodity, whereby the seller is assured that it will receive at least some minimum price. This type of contract is analogous to a put option, which gives the holder the right to sell the underlying at a predetermined price.

### FOB

★ *see free-on-board*

### FOD

★ *see fuel oil domestique*

**Force majeure**

A contract clause that allows the supplier to forego his obligation to supply in extreme circumstances, such as a political crisis, war or strikes that disturb production. It also applies to a buyer that is unable to take delivery of product – for example, a refiner whose refinery is shut down following a fire or disaster.

**Forward contract**

A supply contract between a buyer and seller, whereby the buyer is obligated to take delivery and the seller is obligated to provide delivery of a fixed amount of a commodity at a predetermined price on a specified future date. Payment in full is due at the time of, or following, delivery. This differs from a futures contract, where settlement is made daily.

**Forward freight agreement (FFA)**

FFAs are derivatives instruments used to hedge risk in the tanker freight sector.

**Forward price curve**

A list or graph of the future value of a commodity or financial instrument over time.

**Forward rate agreement**

An agreement between two parties to exchange a rate differential during a predetermined time period, based on an agreed future rate during that period.

**Forward start option**

An option that gives the purchaser the right to receive, after a specified time, a standard put or call option. The option's strike price is set at the time the option is activated rather than when it is purchased and is usually set with reference to the prevailing spot rate when the option is activated.

★ *see also chooser option*

**Forward swap**

A swap in which payments are fixed before the start date – used when one party expects market rates to rise soon, but will not need funds until later.

★ *see also deferred swap*

**Fossil fuels**

Buried deposits of organic materials that have been compressed over millions of years into crude oil, coal or natural gas.

**FRCC**

Florida Reliability Co-ordinating Council – a North American Electric Reliability Council within the Eastern Interconnection.

**Free-on-board (FOB)**

Under an FOB contract, the seller provides the crude oil, oil product or liquefied natural gas at a lifting installation, so that all loading costs to put the commodity on board a carrier have been paid, but the buyer takes responsibility for shipping and freight insurance.

★ *see also CIF*

**Freight derivatives**

Derivatives instruments used to hedge risk in the tanker freight markets. Tankers are one of the most common means of transporting commodities such as oil and coal. Freight derivatives, such as swaps or forward freight agreements, can be used to protect ship owners against changes in freight rates.

**Frequency**

The number of cycles per second of electromagnetic waves, as measured in hertz.

**Front month**

★ *see prompt month*

**Front quarter**

Quarterly contract that begins at the start of the following quarter.

**Front year**

Typically refers to the first year of a long-term, such as that for liquefied natural gas or other energy products contract (for example CAL 09).

**Fuel cell**

A device that converts fuel energy to electrical energy by means of an electrochemical process. Fuel cells chemically combine the molecules of a fuel (most commonly hydrogen) and an oxidiser (e.g., air) to create heat without burning, thereby reducing the thermal inefficiencies and pollution that characterise traditional means of combustion.

**Fuel gas**

Various gases that may be burned to produce thermal energy, including natural gas, propane, butane, liquefied natural gas or hydrogen.

**Fuel oil**

Heavy refined distillates. Used to fuel power stations and in ships and industry. The different fuel oil grades are classified according to their viscosity and sulphur content.

**Fuel oil domestique**

Gasoil of a particular specification used for end-user central heating in France.

**Fundamental analysis**

Analysis of supply and demand factors that could influence the direction of price of a commodity.

For example, electricity traders, using fundamental analysis, consider weather patterns, transmission constraints and unexpected power plant outages to calculate the demand for power and the amount of generation available in the region.

★ *see also technical analysis*

**Fungibility**

A product is fungible if it can be exchanged. Futures contracts for the same commodity and delivery month are said to be fungible due to their standardised specifications.

**Futures contract**

An exchange-traded supply contract between a buyer and a seller, whereby the buyer is obligated to take delivery and the seller is obligated to provide delivery of a fixed amount of a commodity at a predetermined price at a specified location. Futures contracts are traded exclusively on regulated exchanges and are settled daily based on their current value in the market.

**Futures option**

An option on a futures contract.

# G

**Gamma**

The sensitivity of an option's delta to changes in the price of the underlying futures contract.

**Garch**

General autoregressive conditional heteroscedasticity. A statistically advanced method for measuring time-varying volatility.

**Gas**

- 1) Natural gas covers a range of gases that occur naturally and are composed mainly of methane (CH<sub>4</sub>) and ethane. In the UK gas supply industry, it refers to the gas supplied through the mains system (mainly CH<sub>4</sub>). North Sea gas usually has a declared heating value of 1,035 British thermal units per cubic foot.
- 2) North American abbreviation for gasoline.

**Gas Industry Standards Board**

A US industry forum that aims to develop and promote standards that will lead to a seamless market for natural gas.

**Gas nominations**

In the US, nomination deadlines are where each pipeline has a scheduled deadline before which shippers must book gas for the following month.

**Gasoil**

A middle distillate and form of heating oil used primarily in heating and air-conditioning systems. One of the most actively traded oil products, gasoil is the underlying in a key International Petroleum Exchange futures contract. In refining terms, gasoil comes between fuel oil and the lighter products such as naphtha and gasoline. In its broader definition, it covers the oil products used for diesel automotive fuel and jet fuel.

**Gasoline**

A light-end hydrocarbon distillate used for internal combustion engines, actively traded as futures and options contracts on Nymex. Also known as petrol.

**Gas year**

In the UK, the gas year begins at 0600 on October 1. This is also known as the contract year, as it is when purchase contracts begin.

**GCC**

(UK) Gas Consumers Council, known as Energywatch.  
(Middle East) Gulf Co-operation Council.

**GCV**

Gross calorific value.

★ *see also calorific value*

**Gearing**

The gearing of a derivative is the price of the underlying divided by the price of the derivative. This can be used for crude assessments of leverage and option pricing. A more sophisticated measure is effective gearing (or lambda), which is the traditional gearing multiplied by the derivative's delta.

★ *see also leverage*

**Generating availability database**

The generating availability database (Gads) collects, records and retrieves operating information about the performance of electricity-generating equipment. More than 180 generating facility operators in the US and Canada voluntarily participate in Gads.

**Generation**

The process of producing electrical energy by transforming other forms of energy. The amount of energy produced is expressed in watt hours.

**Geometric return**

Log return.

**Geometric Brownian motion**

★ *see stochastic process*

**Geothermal energy**

Energy derived from the heat of the earth's core. Geothermal energy sources include steam, hot water or hot rocks lying close to the earth's surface.

**German Power Index**

An electricity price index for the whole of Germany, launched by Dow Jones in January 2001. Created through the merger of the Central European Price Index and the Electricity Index South.

**Gestore del Mercato Elettrico (GME)**

The Italian electricity market operator that was set up by the independent transmission system operator (GRTN) and operates the Italian wholesale electricity market. GME is responsible for issuing the electricity market rules, subject to input from the electricity and gas regulator (AEEG) and approval by the Minister of Industry. GME is also responsible for managing the Italian electricity market to promote competition between producers, to ensure an adequate availability of power reserves, enforcing merit-order economic dispatch and managing the Italian power exchange. It became operational in 2004 and it is owned by the Italian Ministry of Finance and the economy.

**Gielda Energii**

★ *see Polish Power Exchange*

**Gigajoule**

1 billion joules, approximately equal to 948,000 British thermal units.

**Gigawatt (GW)**

1 billion watts

**Gigawatt hours (GWh)**

1 billion watt hours

**Global warming**

Global warming is the progressive gradual rise of the earth's surface temperature, thought by many scientists to be caused by the greenhouse effect and responsible for changes in global climate patterns.

**GME**

★ *See Gestore del Mercato Elettrico*

**Good till the close (GTC)**

An order given to a futures broker that stays live until fulfilled, or until the close of the market, whichever is sooner.

**Grandfather clause**

In the US, a clause in a contract that allows a prior law to take precedence over newly introduced legislation.

**Greeks**

A measure of the sensitivity of an option's value to changes in the parameters used to value it. Greek measures include delta, gamma, rho, theta and vega.

**Greenhouse effect**

An increase in global temperature caused when the earth's atmosphere traps solar radiation. It occurs due to the presence in the atmosphere of gases such as carbon dioxide, water vapour and methane, which allow incoming sunlight to pass through, but trap heat radiated back from the earth's surface. The burning of fossil fuels is thought by many scientists to be a major contributory cause of the greenhouse effect.

**Greenfield**

Previously undeveloped site considered suitable for commercial development or industrial projects, but currently in its natural state or used for agriculture.

**Grid**

An electricity transmission system.

**Grid operator**

★ *see system operator*

**GTC**

★ *see good till the close*

# H

## Head and shoulders

A three-peak pattern resembling the 'head and shoulders' outline of a person, which is used to chart stock and commodity price trends. The pattern indicates the reversal of a trend.

As prices move down to the right shoulder, a head and shoulders top is formed, meaning prices should be falling. A reverse head and shoulders pattern has the head at the bottom of the chart, meaning prices should be rising.

## Heat rate

A measure of how efficiently an electricity generator converts thermal energy into electricity, and a key determinant of the spark spread. More precisely, the heat rate is the ratio of British thermal units of fuel consumed to kilowatt hours of electricity produced. Hence, the lower the heat rate, the higher the conversion efficiency.

## Heating degree day

★ *see degree day*

## Heavy

Typically crude oil with an API gravity of less than 28 degrees.

## Heavy fuel oil

A heavy refined distillate consisting largely of residues from crude oil refining that are blended with gasoil fractions. The heaviest grade fuel oils tend to be used in ships' boilers, while lighter fuel oil grades are used in industry, such as in steel manufacture.

## Heavy-tailed distribution

(fat-tailed) – a distribution in which the extreme portion of the distribution (the part furthest from the median) spreads out further relative to the width of the centre (middle 50%) of the distribution than is the case for the normal distribution. For a symmetric heavy-tailed distribution, the probability of observing a value far from the median in either direction is greater than it would be for the normal distribution. Heavy-tailed describes a distribution with excess kurtosis.

## Hedge

The initiation of a position in a futures or options market that is intended as a temporary substitute for the sale or purchase of the actual commodity. For example, the sale of futures contracts in anticipation of future sales of cash commodities as a protection against possible price declines, or the purchase of futures contracts in anticipation of future purchases of cash commodities as a protection against the possibility of increasing costs.

## Hedge accounting

Hedge accounting is the practice of deferring gains and losses on financial market hedges until the corresponding gain or loss in the underlying exposure is recognised. It allows companies to incorporate the cost of hedging into the cost of the exposure. Gains are thereby offset against losses. This reduces the volatility of earnings.

★ *see also accrual accounting, mark-to-market*

## Hedge effectiveness

In US accounting terminology, a criteria that must be met in order to use hedge accounting for US financial reporting. This provision has at times proven problematic in the energy industry where partial hedges for such exposure components as basis risk are widely used. Under the rules of FAS 133 when testing for hedge effectiveness, only interest rate exposures can be broken down into their component parts.

★ *see also FAS 133*

**Hedge fund**

A private pool of assets, which is often managed aggressively. Hedge funds have long been active in speculative trading on crude oil markets.

**Hedge ratio**

The ratio, determined by the option's delta, of futures to options required to establish a position involving no price risk.

**Heel**

The small amount of liquefied natural gas (LNG) remaining on board a vessel (or storage) after discharge of the regular LNG cargo, and is used to insulate the LNG storage tanks and is also available as fuel for carrier ship. The heel is considered to exist both before and after discharge, as the minimum quantity of LNG necessary to be retained in holding tanks, and also includes LNG that is consumed en route to the discharge destination as fuel.

**Henry Hub**

The delivery point for the largest Nymex natural gas contract by volume. Henry Hub is in Erath, Louisiana, and is a large system of pipeline interconnects.

**Heren**

ICIS Heren is a world-leading publisher of gas, power and carbon market information. In 2008, ICIS, part of Reed Business Information UK, acquired Heren Energy (now ICIS Heren).  
*www.heren.com*

**Hertz**

A unit of frequency equal to one cycle per second and measured by changes in cycles or state.

**Historical simulation**

A method of calculating value-at-risk (VaR) that uses historical data to assess the impact of market moves on a portfolio. A current portfolio is subjected to historically recorded market movements; this is used to generate a distribution of returns on the portfolio. This distribution can then be used to calculate the maximum loss with a given likelihood – that is, the VaR.

Because historical simulation uses real data, it can capture unexpected events and correlations that would not necessarily be predicted by a theoretical model.

**Historical volatility**

The annualised standard deviation of percentage changes in futures prices over a specific period. An indication of past market volatility.

**Hot LNG**

Liquefied natural gas with a British thermal unit content that is higher than the standard on US and Canadian pipelines, since it contains small amounts of natural gas liquids (NGLs), and may also be referred to as Rich LNG. The NGLs, which are typically ethane, propane and butane, can be extracted following regasification and used as petrochemical feedstocks.

★ *see also lean LNG*

**Houston ship channel**

A major US oil refinery centre in Texas on the US Gulf Coast. It is also a pricing and major market point for natural gas in the US.

**HSFO**

High-sulphur fuel oil.

**Hydrocarbons**

Organic compounds consisting of hydrogen and carbon. They may exist as solids, liquids or gases.

**Hydropower**

Electrical energy produced by flowing water. A hydroelectric power plant uses the movement of water to spin a turbine generator that produces electricity.

**I****IAS 39**

An accounting standard, titled *Financial Instruments: Recognition and Measurement*, issued by the International Accounting Standards Committee. IAS 39 is similar, but much less complex, than the US Financial Accounting Standards Board FAS 133.

**ICE**

★ see *IntercontinentalExchange*

**IEA**

★ see *International Energy Agency*

**Imbalance energy**

The difference between hourly scheduled electricity deliveries and hourly metered deliveries. Typically, energy imbalances are eliminated during a future period by returning energy in kind under conditions similar to those when the initial energy was delivered. When energy imbalances exceed a prespecified threshold (for example,  $\pm 1.5\%$  of the scheduled transaction), imbalances are resolved through monetary payments.

**Implied volatility**

The volatility level that, assuming a certain pricing model, equates the calculated value of the option to its current market price.

★ see also *volatility skew, volatility smile, volatility term structure*

**Inadvertent energy**

The imbalance of routine energy flows back and forth between a power generator and the centres of demand. These imbalances are typically settled through exchanges of physical product.

**Independent power producer**

A non-utility power generating company.

**Independent system operator (ISO)**

(US) entity responsible for ensuring the efficient use and reliable operation of the transmission grid and, in some cases, generation facilities. Individual ISOs cover either a single state (e.g., the California ISO) or a region (e.g., the Midwest ISO). ISO responsibilities vary by jurisdiction, but can include co-ordinating scheduling for transmission transactions; overseeing the instantaneous balancing of generation and load; managing and redispatching generation in system emergencies; managing operating reserves; ensuring new transmission facilities are built when and where needed; and co-ordinating transmission payments. In some cases, ISOs are also responsible for managing power exchange activities.

**Index**

A numerical value assigned to a group of commodities, stocks or prices in order to give an indication of market trends.

**Injection**

The process of placing natural gas in underground storage or the producing reservoir in order to maintain pressure.

**Inside Ferc**

A weekly newsletter produced by publishing company Platt's that covers the activities of the Federal Energy Regulatory Commission.

**Installed capacity obligation**

A US term that refers to the amount of generation that meets load plus a certain percentage or margin set using a probabilistic model. The extra margin ensures reliability during a maximum emergency.

**Integrated hedge**

A hedge combining more than one distinct price risk. For example, crude oil is usually priced in US dollars. A producer of crude oil whose home currency is, say, the pound sterling would be exposed to both US dollar currency risk and crude oil price risk. A possible integrated hedge would be a quanto product, which would hedge the price of crude oil in pounds sterling.

★ *see also exchange option*

**Interconnector**

A gas pipeline running from Bacton in Norfolk, England, to Zeebrugge in Belgium. It opened in October 1998 and allows Britain to export gas to, or import gas from, continental Europe for the first time.

**IntercontinentalExchange (ICE)**

Atlanta, Georgia-based Intercontinental-Exchange is an internet-based market place for the trading of over-the-counter (OTC) energy, metals and other commodity products. It represents a partnership of the leading energy companies and financial institutions and was launched in August 2000. It also now offers clearing-house services for clearing of OTC trades through the London Clearing House Limited. The exchange is also referred to by its acronym ICE.

**Interdelivery spread**

Futures or options trading techniques that entail buying one month of a contract and selling another month of the same contract. For example, buying a June electricity contract and simultaneously selling a September electricity contract. A market participant can profit (or lose out) as the price difference between the contracts widens or narrows.

**Intermediate generation (cycling generation)**

Power-generating equipment that can vary its level of output in response to changes in electricity demand. Normally operated on a daily cycle to serve on-peak loads during the day but not off-peak loads during nights and weekends.

**International Energy Agency (IEA)**

The International Energy Agency (IEA), based in Paris, is an intergovernmental organisation that acts as energy policy adviser to 28 member countries. Founded during the oil crisis of 1973–74, the IEA's initial role was to co-ordinate measures in times of oil supply emergencies. Its mandate has broadened to incorporate the 'three Es' of balanced energy policy making: energy security, economic development and environmental protection. Current work focuses on climate change policies, market reform, energy technology collaboration and energy research.

**International Petroleum Exchange (IPE)**

Formerly an independent London energy exchange, in June 2001 the IPE became a wholly owned subsidiary of IntercontinentalExchange. In 2005 its name was changed to ICE Futures and trading was shifted onto an electronic trading platform. This exchange has futures and options contracts for energy products including Brent blend crude oil, gasoil natural gas, electricity (baseload and peakload), coal contracts and carbon emission allowances.

**Interruptible service**

Gas or electricity sales that are subject to interruption for a specified number of days or hours during times of peak demand or in the event of system emergencies. In exchange for interruptibility, buyers pay lower prices.

★ *see also firm service, firm (uninterrupted), non-firm service*

**In-the-money**

An option that can be exercised and immediately closed out against the underlying market for a cash credit. The option is in-the-money if the underlying futures price is above a call option's strike price or below a put option's strike price.

★ *see also at-the-money, out-of-the-money*

**Intrinsic value**

The difference between the underlying price and the strike price of an option.

**Investment Services Directive (2nd)**

A European Union proposal in 2002 to upgrade the 1993 Investment Services Directive, which covers investment services and regulated markets. The updated proposal would require energy firms wishing to trade financial products and certain cash-settled commodity derivatives instruments to be authorised as investment firms.

**Investor-owned utility**

An electricity utility owned by a group of investors, the shares of which are traded on public stock markets.

**IPE**

★ *see International Petroleum Exchange*

**IPP**

★ *see independent power producer*

**Isda master agreement**

The International Swaps and Derivatives Association (Isda) over-the-counter derivatives

master agreement was drawn up by the New York-based trade association in 1987 and revised in 1992 and 2002. The agreement is commonly used for contracts in various energy derivatives markets, especially the US gas market.

**ISO**

★ *see independent system operator*

**J****Japanese Crude Cocktail (JCC)**

A commonly used reference price index for long-term liquefied natural gas contracts in Japan, as well as Taiwan and South Korea, and is published monthly by the Japanese government representing the average crude oil import price into Japan.

**Jet**

Jet fuel available in various grades as Jet-A, Jet A-1 and Jet B.

★ *see kerosene*

**Joint implementation**

A mechanism defined in Article 6 of the Kyoto Protocol, allows a country with an emission reduction or limitation commitment under the Kyoto Protocol (Annex B Party) to earn emission reduction units (ERUs) from an emission reduction or emission removal project in another Annex B Party, each equivalent to one tonne of CO<sub>2</sub>, which can be counted towards meeting its Kyoto target. Joint implementation is intended to offer parties a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments, while the host party benefits from foreign investment and technology transfer.

**Joule**

A metric unit of energy equal to one watt-second.

**Jump-diffusion model**

A method of pricing contracts that includes occasional moves larger than traditional random processes would generate.

**K****Kansas City Board of Trade**

Kansas City, Missouri-based exchange that lists natural gas futures and options contracts based on delivery in the Permian Basin, Texas.

**Kappa**

A value representing the expected change in the price of an option. Also known as Lambda.

**Kerosene**

Medium-light distillate used as fuel for jet engines, with a boiling range of 150°–260° Celsius. Also called jet kerosene.

**Kholodnyi model**

A valuation model developed by the mathematician Valery Kholodnyi for use in valuing and hedging electric power price risks in environments of extreme price spikes.

**Kilowatt (KW)**

1,000 watts.

**Kilowatt hour (KWh)**

Unit of electricity equivalent to the power of one kilowatt operating for one hour. For example, 10 100-watt light bulbs burning for one hour would consume one kilowatt hour of electricity.

**Kurtosis**

A parameter describing the peakedness and tails of a probability distribution relative to the benchmark log normal distribution.

**Kyoto Protocol on Climate Change**

An agreement made in Kyoto, Japan, in December 1997 under which industrialised countries agreed to adopt specific goals and timelines for nationwide reductions of greenhouse gas emissions between 2008 and 2012. The two major mechanisms for achieving this established under the protocol are emissions trading and the Clean Development Mechanism.

The EU and its Member States ratified the Kyoto Protocol in May 2002. The EU has a target goal of 8% reduction in greenhouse gases and Japan's goal is a 6% reduction. The Protocol came into effect for all signatory countries on February 16, 2005.

As of December 2008, the US had not ratified the Kyoto Protocol.

**L****La Niña**

The name given to the periodic cooling of the tropical Pacific Ocean, hence the name: it means 'little girl' in Spanish, the opposite of El Niño. La Niña occurs after some, but not all, El Niños. During a La Niña year, US winter temperatures are warmer than normal in the southeast and cooler than normal in the northwest.

**Lambda**

★ *see gearing*

**Laytime**

The amount of time specified as allowable in a shipping charter contract for loading and unloading of cargo. Demurrage is incurred if the laytime is exceeded.

**LCH**

★ *see London Clearing House*

**LDC**

★ *see local distribution company*

**LDZ**

★ *see local distribution zones*

**Lean LNG**

Liquefied natural gas (LNG) that is of a specification with very low high heating value (HHV). Lean LNG liquid stream is predominately methane with some minor quantities of ethane. Lean LNG may be required to meet fuel quality specifications and standards required by LNG-powered vehicles and other LNG-fuelled equipment. Leaner LNG can be produced through the extraction of the heaviest components, namely the LPGs, propane and butane. Rich LNG, or Hot LNG, with high HHV also produced for some market segments.

★ *See also Hot LNG*

**Legal risk**

The risk that a counterparty to a transaction will not be liable to meet its obligations under law. Such difficulties may arise from a number of causes, one of the most common being that the transaction was not sufficiently well documented to be legally enforceable.

**Leptokurtosis**

The property of a statistical distribution to have more occurrences far away from the mean than would be predicted by a normal distribution. Also referred to as 'fat tails'.

**Letter of credit**

Instrument or document issued by a bank guaranteeing the payment of a customer's drafts up to a stated amount for a specified period. It substitutes the bank's credit for the buyer's and eliminates the seller's risk.

★ *see also performance letter of credit*

**Leverage**

The ability to control large amounts of an underlying variable for a small initial investment. Futures and options are leveraged products, because the initial premium paid is usually much smaller than the nominal amount of the underlying. Leverage is usually measured as the effective gearing.

★ *see also gearing*

**LF**

★ *see load factor*

**Libor**

The London Interbank Offered Rate. The rate of interest at which banks borrow funds from other banks, in marketable size, in the London interbank market.

**Lifting**

The loading of crude oil or oil products on to a vessel.

**Light**

Typically crude oil with an API gravity of more than 28 degrees.

**Light ends**

Volatile hydrocarbon products, such as propane, butane, gasoline and naphtha.

**Linear least squares**

The principle or method by which the fit of a function to data is such that the sum of the squared residuals is minimised. In linear regression, the function is a line.

The sum of the squares of the residuals is used instead of the absolute values because this allows the residuals to be treated as a continuous differentiable quantity. However, because squares of the residuals are used, outlying points can have a disproportionate effect on the fit, a property that may or may not be desirable depending on the particular problem being considered.

**Line losses**

The difference between the quantity of electricity generated and the quantity delivered at some point in the electricity system. Losses vary depending on temperature, voltage level and load levels.

**Line packing/filling**

Raising the pressure within a gas pipeline system in order to increase the system's storage capability – important for system operation.

**Liquidated damage clause**

This clause allows a counterparty that is owed power to charge the defaulting counterparty for the price of having to buy elsewhere. The higher the price, the higher the charge when a company defaults on its supply obligations.

**Liquidity**

A market is liquid when it has a high level of trading activity.

**Liquidity risk**

The risk that a firm unwinding a portfolio of illiquid instruments may have to sell them at less than their fair value. An illiquid market may be defined as one characterised by wide bid/ask spreads, lack of transparency and large movements in price after any sizeable deal.

**Liquefied natural gas (LNG)**

LNG is compressed natural gas (mainly methane and ethane), which (unlike liquefied petroleum gas) is reduced to a liquid form by cooling it to -258° Fahrenheit. The volume of LNG is 1/600th of its volume as gas vapour. It is odourless, colourless, non-toxic and non-corrosive. LNG is much easier and more cost-effective to store and to transport, especially where pipelines do not exist.

**Liquefied petroleum gas (LPG)**

A light hydrocarbon composed mainly of propane and butane, occurring naturally in crude or from refining processes such as crude distillation, catalytic reforming or hydrocracking. Gaseous at atmospheric pressure and temperature, LPGs are liquefied by reducing temperature or increasing pressure for ease of transportation and storage.

**Liquefaction plant**

A facility that converts natural gas from its natural gaseous state to a liquid state. The gas is first cleaned of all traces of CO<sub>2</sub>, water, mercury and sulphur. It is then cooled to -160°C in cold boxes until it becomes liquid. In this form, it is stored in tanks.

**LLS**

★ See *Louisiana light sweet*

**LNG**

★ see *liquefied natural gas*

**LNG chain**

The components in the liquefied natural gas process for transporting from producing areas to consuming regions, typically comprising stages for liquefaction, transportation and regasification.

**LINGRV**

An acronym for a liquefied natural gas regasification vessel.

**Load**

The amount of power carried by a utility system or sub-system, or the amount of power consumed by an electrical device, at a specified time. Load is also referred to as demand.

**Load factor**

The ratio between average and peak usage for electricity or gas customers. The higher the load factor, the smaller the difference between average and peak demand.

**Load following**

Continuous balancing of generation and load accomplished by committing online generation whose output is raised or lowered as necessary to follow moment-by-moment changes in load.

**Load shape**

A combination of electricity contracts covering a period of weeks or months, which reflects the profile of the daily power requirements of a customer or distribution of energy requirements over time.

★ *see also load shape 44*

**Load shape 44**

A benchmark load shape traded on the UK electricity forward market. It comprises 5 megawatts (MW) of baseload power and 5MW of additional power between 0700 hours and 1900 hours UK time on week days.

★ *see also load shape*

**Load shedding**

The process of removing certain sections of customer demand from the supply system in response to a shortfall.

**Local distribution company**

A company that operates or controls the retail distribution system for the delivery of natural gas or electricity.

**Local distribution zones**

The zones into which National Grid Transco has divided the UK for the purpose of calculating shippers' charges for transporting gas within the national transmission system.

**Locals**

Members of a futures exchange who trade exclusively on their own account.

**Location spread**

The differential between the prices quoted for the same commodity at two locations.

**Locational marginal pricing (LMP)**

A method of pricing the cost of congestion into electricity prices. The Federal Energy Regulatory Commission is introducing LMP under its standard market design proposals. LMP aims to encourage the efficient use of the transmission system by assigning costs to users based on the way energy is actually delivered.

**Log normal distribution**

A probability distribution such that the natural logarithm of the variable is normally distributed.

**London Clearing House (LCH)**

A member-owned clearing house that merged with Clearnet.SA to form the LCH.Clearnet Group. In October 2008, LCH.Clearnet signed a new clearing arrangement with LIFFE, the international derivatives market of NYSE Euronext (NYX).

**Long**

The buyer of a financial contract.

**Long position**

A position that appreciates in value if the value of the underlying instrument or market price increases.

**Lookback option**

A lookback call (put) option grants the right to buy (sell) the underlying energy commodity at the lowest (highest) price reached during the life of the option. Effectively, the best price from the point of view of the holder becomes the strike price.

**Loop**

Louisiana Offshore Oil Port. A US deepwater port that can accommodate vessels as big as ultra-large crude carriers with a loaded weight of over 200,000 deadweight tons.

**Loop flows**

Unintended flows on electricity transmission systems that occur as a by-product of the dispatch of electricity down an intended path.

**Lot**

The unit size for transactions on a given futures exchange.

**Louisiana light sweet (LLS)**

A low viscosity ('light'), low sulphur ('sweet') crude oil produced in the Gulf of Mexico.

**LPG**

★ *see liquefied petroleum gas*

# M

**M**

Symbol in the energy market denoting one thousand – e.g., mbbl = 1,000 barrels.

**MA**

Moving average.

**McCloskey (Coal)**

A premier source of news, analysis and data on the international coal industry.

[www.mccloskeycoal.com](http://www.mccloskeycoal.com)

**Mm**

Symbol in the energy market denoting one million – e.g., mmBtu = million British thermal units.

**Make-up gas**

In a gas buyer's contract there are often terms that allow the buyer to take make-up gas in contract periods after it has been paid for but not taken.

There may be a limit to the amount of make-up the buyer can recover in any given period.

★ *see also take-or-pay*

**MAQ**

(Gas) maximum annual quantity.

★ *see annual cap*

**Margin**

Cash deposits required for a futures contract that serve as a good-faith deposit guaranteeing that both parties to the agreement will perform the transaction at some point in the future.

**Margin call**

A call from a clearing house to a clearing member or from a broker or firm to a customer, to bring margin deposits up to a required minimum level.

**Margin risk**

The risk that a company will fail to make a margin call.

**Marginal cost**

The change in cost resulting from production of a single additional unit of production.

**Mark-to-market**

To mark-to-market is to calculate the value of a financial instrument (or portfolio of such instruments) at current market rates or prices of the underlying. Marking-to-market on a daily (or more frequent) basis is often recommended in risk management guidelines.

★ *see also accrual accounting, hedge accounting*

**Mark-to-model**

A means of calculating the value of a financial instrument by using standard models to value both the price of the underlying commodities and also the risk metrics of the financial instruments themselves. Mark-to-model is generally used when the underlying price is not easily observed in the market and/or where the financial instrument is a complex combination of standard products.

**Marker crudes**

Crudes against which other crudes are priced. Widely used marker crudes include West Texas Intermediate (for US destinations), Brent blend (for European destinations) and Dubai (for Far Eastern destinations).

★ *see also benchmark crude*

**Market-maker**

An energy trader or energy trading firm that is prepared to buy and sell in the derivatives market to provide a two-sided (bid/ask) market and greater liquidity.

**Market-on-close**

An order to buy or sell a specified amount of futures contracts at the price when the market closes.

**Market risk**

Market risk is the risk that value will be lost due to a change in some market variable, such as commodity or equity prices, interest rates or foreign exchange rates. The market risk of a derivatives position may arise from a change in the value of the underlying or from other sources such as implied volatility or time decay (theta).

**Market value**

★ *see replacement cost*

**Master agreement**

The model master power purchase and sale agreement is an attempt to standardise the core terms and conditions needed to establish trading relationships in the US power markets by providing standard documentation for all trading agreements. The master agreement was developed by Washington, DC-based Edison Electric Institute, an association of US electricity companies, and implemented in spring 2000.

★ *see also model master power*

**Material adverse change**

Any negative event affecting a company that is deemed to be material by a creditor. Such events can either be defined or undefined in the contract between the company and its creditors.

**Mcf**

Thousand cubic feet.

**MDQ**

Maximum daily quantity. The upper limit for the amount of gas a buyer may take in a single 24-hour period.

**Mean**

Often considered as the simple arithmetic average of the sum of the observed values divided by the number of observations. It is customary to represent the mean by  $\mu$ .

**Mean reversion**

A tendency for a stochastic process to revert over time to an equilibrium level, such as the average (the mean) of historical prices, or some other variable. Interest rates, stock returns, price-earning ratios, and implied volatilities tend to exhibit mean reversion. The concept of mean reversion has been much discussed in energy markets with reference to how to best model forward prices in markets such as deregulated power.

**Megajoule (MJ)**

1 million joules (sometimes MMJ).

**Megawatt (MW)**

1 million watts (sometimes MMW).

**Megawatt hour (MWh)**

1 million watt hours. The multiple of the power in megawatts times the time in hours and is the measurement unit commonly used in electric power trading and supply markets.

**Meters**

Equipment used to measure the movement of gas or electricity flowing across various points in the system. Where meters giving daily volume consumption are used, the sites are known as daily metered (DM) sites. At smaller supply points, readings are taken at longer intervals and are called non-DM sites.

**Methyl tertiary butyl ether (MTBE)**

A substance that can be added to gasoline to increase its oxygen content and thereby make it burn more cleanly. MTBE has been used in some areas of the US since 1990, from which time the *Clean Air Act* required the use of gasoline with a 2% oxygen content in areas of high pollution. More recently, MTBE has been linked to water pollution incidents and is being phased out in favour of ethanol in many areas.

**Metric ton (tonne)**

A metric ton is 2,204.62 pounds.

**Mibel**

An acronym for Mercado Iberico de Electricidad, the joint Spanish-Portuguese electricity market that came into effect in 2005 and allows participants to buy and sell power on either side of the Spain/Portugal border to create a pan-Iberian market with more than 28 million business and domestic customers.

**Middle distillates**

Oil products in the boiling range of between 160° and 360° Celsius – i.e., between gasoline and heavy fuel oil. These include gasoil, diesel and jet fuel (kerosene).

**Minneapolis Grain Exchange**

Established in 1881 as the Minneapolis Chamber of Commerce. Became the Minneapolis Grain Exchange (MGE) in 1947. In addition to trading wheat and shrimp futures contracts, on September 14, 1998, MGE launched its twin-cities generation region electricity futures and options contracts. It is the first futures exchange to list electricity futures with an upper US Midwest delivery point. It is also the first to list off-peak electricity futures and options contracts.

**MmBtu**

Millions of British thermal units.

**Mmscfpd**

Millions of cubic feet of gas per day.

**Model master power**

Purchase and sale agreement.

★ *see also master agreement*

**Moments [of a statistical distribution]**

The shape of any distribution can be described by its various 'moments'. The first four moments are:

- The mean [see *Mean*], which indicates the central tendency of a distribution.
- The second moment is the variance, which indicates the width or deviation.
- The third moment is the skewness, which indicates any asymmetric 'leaning' to either left or right.
- The fourth moment is the Kurtosis, which indicates the degree of central 'peakedness' or, equivalently, the 'fatness' of the outer tails.

**Monte Carlo simulation**

A method of pricing derivatives by simulating the evolution of the underlying variable (or variables) many times over. The average outcome of the simulation is an approximation of the derivative's value. Monte Carlo is useful in the valuation of complex derivatives for which exact analytical solutions have not been found, but it can be very computationally intensive. Monte Carlo simulation can also be applied to a portfolio of instruments, rather than a single instrument, to estimate the value-at-risk of that portfolio.

**Most-favoured nation clause**

Originally a provision of international treaties providing that one or both of the parties to the treaty would be granted the same terms as that of the most favourable terms provided any other country, currently or in the future, for some stipulated aspect such as tariffs. Now also a feature used in commercial contracts guaranteeing the recipient the best price or terms offered to any other counterparty.

**Moving average**

The average of commodity prices constructed for a period as short as a few days or as long as several years, which shows trends for the latest interval. For example, a 30-day moving average includes yesterday's figures; tomorrow, the same average will include today's figures and will no longer show those for the earliest date included in yesterday's average. Every day it records figures for the latest day and drops those for the earliest day.

**Moving strike option**

Any option whose strike is reset over time.

**MTBE**

★ see *methyl tertiary butyl ether*

**Mtpa**

An acronym for metric tonnes per annum, which is a typical measurement unit in liquefied natural gas markets for production and facility capacity.

**Multi-factor model**

Any model in which there are two or more uncertain parameters in the option price (one-factor models incorporate only one cause of uncertainty: the future price).

Such models can be more realistic than one-factor models, particularly in modelling complex variables, such as interest rates. Other problems, such as modelling spread options, automatically require a multi-factor model.

**Multi-factor option**

Any option, such as a spread option, whose payout is linked to the performance of more than one asset. Its value is usually strongly dependent on the correlation between underlying assets.

**Multilateral netting**

An arrangement between a number of parties, in which each pays into a clearing house for net obligations due to other parties. Multilateral netting is a way of reducing credit risk.

★ see also *bilateral netting, netting*

**Mutual offset system**

A margining system for derivatives exchanges, in which positions on different exchanges can be offset with each other. If a participant has a long position on one exchange but a short position on another in a fungible (compatible) contract, he can reduce (or eliminate) margin payments on one exchange because overall exposure has been reduced by netting over the two exchanges.

**MW**

Megawatt (1,000 kilowatts).

# N

## **Naked option**

An option bought or sold without an offsetting position in the underlying.

★ *see also covered option*

## **Naked swap**

A swap position without a corresponding asset or liability.

## **Naphtha**

A refined product, between jet and gasoline in specific gravity, which is used as a feedstock for the petrochemicals industry – such as for ethylene manufacture or aromatics production – and as a refinery feedstock for reforming. Comprises material in the 30°–210° Celsius distillation range or part of this range.

## **National allocation plan (NAP)**

A plan to establish the emissions target for the covered sectors, as well as deciding how this target is divided among the various installations covered by the system. Article 9 of the Emissions Trading Directive established that each member state periodically has to develop such a national allocation plan.

## **National balancing point (NBP)**

The national balancing point, commonly referred to as the NBP, is a virtual trading location for the sale and purchase of UK natural gas. It is the most liquid gas trading point in Europe. Gas at the NBP trades in pence per therm.

## **National Electricity Code**

The National Electricity Code contains the rules for the running of the Australian wholesale national electricity market. It sets out the objectives of the market and the rights and responsibilities of market participants.

## **National Electricity Code Administrator**

Made up of the five participating jurisdictions of the Australian national electricity market (NEM). The aim of the organisation is to promote the effectiveness, efficiency and equity of the NEM to push the market towards more competition and market-orientated outcomes in order to deliver a viable market that benefits customers.

## **National electricity market**

The market for the wholesale supply and purchase of electricity in the Australian states and territories of Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria, together with the transmission and distribution networks in those states and territories.

## **National Electricity Market Management Company (Nemmo)**

In Australia, the organisation responsible for the administration and operation of the wholesale national electricity market in accordance with the National Electricity Code. Nemmo's aim is to provide an effective infrastructure for the efficient operation of the Australian wholesale national electricity market.

## **National Grid Transco**

An international energy delivery business, whose principal activities are in the regulated electricity and gas industries. It owns and operates the high-voltage electricity transmission network in England and Wales and the UK's natural gas transportation system. In July 2005 its shareholders agreed to change its name to National Grid plc.

## **National transmission system (NTS)**

The UK high-pressure pipeline system, owned by National Grid Transco, used to transport gas between terminals, storage facilities, large consumers and regional sites. When the gas leaves the NTS at an offtake, it goes through a series of pressure-reducing tiers before it reaches the consumer.

**Natural gas**

Gas consisting mainly of methane and ethane that occurs naturally in the earth's crust. It is often found in association with crude oil, when it is called associated gas. Futures and options contracts are traded on Nymex, International Petroleum Exchange and Kansas City Board of Trade.

**Natural gas liquids (NGLs)**

Liquids produced along with natural gas. They consist mainly of propane, butane, natural gasoline and condensate.

**Natural hedge**

A natural hedge is the reduction in risk that can arise from an institution's normal operating procedures. A company with significant sales in one country holds a natural hedge on its currency risk if it also generates expenses in that currency. For example, an oil producer with refining operations in the US is (partially) naturally hedged against the cost of dollar-denominated crude oil. While a company can alter its operational behaviour to take advantage of a natural hedge, such hedges are less flexible than financial hedges.

**NBP**

★ *see national balancing point*

**Nemmco**

★ *see National Electricity Market Management Company*

**Nerc**

★ *see North American Electric Reliability Corporation*

**NetConnect Germany**

NetConnect Germany is a joint company established 2008 by bayernets GmbH and E.ON Gastransport for the merged H-gas market area in Germany. The company's business activities, which include balancing group management, operation of the virtual trading point and the online provision of information including billing and control energy data, are geared towards serving network operators and shippers alike. [www.net-connect-germany.de](http://www.net-connect-germany.de)

**Net position**

The difference between the entity's open long contracts and open short positions in any one commodity.

**Net present value**

A technique for assessing the worth of future payments by looking at the present value of those future cash flows discounted at today's cost of capital.

**Neta**

★ *see new electricity trading arrangements*

**Netback**

A provision in a physical power contract that allows the bearer to net a debt position with one counterparty by offsetting it with a credit position with another counterparty.

**Netback price**

A pricing assessment or pricing formula based on the effective price to the producer or seller at a specific location or defined point. For example, liquefied natural gas netback prices may be determined by the market natural gas price at market destinations less the cost of pipeline transportation, regasification, waterborne shipping and liquefaction. Crude oil may be priced on the market value of its refined products, or natural gas priced based on the natural gas market price less the cost for delivering from the defined point to the market location.

**Netting**

An agreement that offsets the value of contracts by creating a single net exposure between counterparties.

★ *see also bilateral netting, multilateral netting*

**Network code**

(UK) the rules governing relations between National Grid Transco, as operator of the national transmission system, and shippers who use the system.

**Newcastle coal**

Typically, Newcastle thermal coal prices as traded for Australia's Newcastle port in New South Wales, which is the world's largest coal export harbour.

**New electricity trading arrangements (Neta)**

Neta is a system of bilateral trading between generators, suppliers and consumers on the UK market, the aim of which is to reduce wholesale electricity prices.

★ *see also Beta*

**New gas trading arrangements (NGTA)**

The new gas trading arrangements were introduced in the UK in October 1999 in an attempt to improve the efficiency of the balancing system. The arrangements consist of the on-the-day commodity market, auctions of entry capacity and improved incentives for shippers to balance their own positions.

**New York Mercantile Exchange (Nymex)**

US futures exchange, consisting of two divisions: the Nymex division and the Comex division. Along with metals futures and options, the exchange offers trading for energy futures and options in crude oil, heating oil, gasoline, natural gas and electricity, as well as propane futures and options on the crude oil/gasoline and crude oil/heating oil crack spreads. In August 2008, Nymex Holdings, the parent company of Nymex was acquired by CME Group. The exchange also operates the Nymex ClearPort® Services for clearing trades, as well as the Nymex ACCESS® system for after-hours trading when the open-outcry trading floor is not open.

*www.nymex.com*

**NGTA**

★ *see new gas trading arrangements*

**Nitrogen oxides (NO<sub>x</sub>)**

A gas produced by burning fossil fuels in power plants or automobile engines. Nitrogen oxides are pollutants that contribute to the formation of smog. A nitrogen oxide allowance trading market exists across 11 US states under the *US Clean Air Act*.

★ *see also sulphur oxides*

**Nomination**

The notification to put into effect a contract or part of a contract. For example, a gas flow nomination from a shipper to advise the pipeline owner of the amount of gas it wishes to transport or hold in storage on a given day.

**Nomination deadlines**

(US) the deadline for nominations for gas supply, transportation and storage volumes given to the pipeline owner for a full month in the last week of the previous month. This happens around the time of the expiry of the futures contract on Nymex; the actual day varies between pipelines.

**Non-attainment area**

A US geographic area in which air quality is worse than that allowed by the US federal air pollution standards.

**Non-firm service**

Electricity transmission service offered to customers that anticipates possible interruption of deliveries.

★ *see firm service, interruptible service*

**Non-jurisdictional gas operations**

(US) gas sales and transportation outside Federal Energy Regulatory Commission regulations.

**NOPR**

★ *see notice of proposed rulemaking*

**Nord Pool**

Nordic electric power exchange that provides market places for trading in physical and financial contracts in the Nordic countries (Finland, Sweden, Denmark, Iceland and Norway), which listed the world's first exchange-traded electricity futures contract in October 1995. It now operates the world's largest power derivatives exchange and also provides a carbon market for trading contracts on emission allowances and carbon credits. In 2002, Nord Pool's physical market was organised into a separate company, Nord Pool Spot AS.

**Normal Distribution**

A continuous probability distribution whose probability density function has a 'bell' shape. A normal distribution is symmetric, and has zero skewness. A normal distribution is fully described with two parameters: its mean and standard deviation.

**North American Electric Reliability Corporation (Nerc)**

A group formed in 1968 by US utilities, after blackouts struck the east coast, to promote the reliability and adequacy of bulk power supply in the electricity utility systems of North America.

**Northeast Power****Co-ordinating Council (NPCC)**

A North American Electric Reliability Council within the Eastern Interconnection.

**Notice of proposed rulemaking (NOPR)**

A Federal Energy Regulatory Commission document outlining proposed rules and soliciting comments from affected parties.

**Notional**

The underlying principal value of either an exchange-traded or over-the-counter transaction, referred to as the notional value.

**Notional path**

(Gas) usually the shortest route along which gas would travel from entry point to exit point.

**Novation**

The substitution of a new contract for an old one or the substitution of one party in a contract with another party.

**NO<sub>x</sub>**

★ *see nitrogen oxide*

**NTS**

★ *see national transmission system*

**Nymex**

★ *see New York Mercantile Exchange*

# O

## Oasis

(US) open-access same-time information system. Electronic information system that the Federal Energy Regulatory Commission requires all transmission operators to create or participate in to provide transmission customers with non-discriminatory information about available capacity, prices and other information.

## OCM

★ *see on-the-day commodity market*

## Oco

★ *see one cancels the other*

## Octane

An octane number or octane rating is a value used to indicate the resistance of a motor fuel to knock (ping). Octane numbers are based on a scale on which isooctane is 100 (minimal knock) and heptane is 0 (bad knock). For example, a gasoline with an octane number of 92 has the same knock as a mixture of 92% isooctane and 8% heptane.

## Odds (betting)

As typically used in wagering outcomes, the odds of success/winning are expressed in the form 'r:s' ('r to s') and correspond to the probability of succeeding/winning [ $P=s/(r+s)$ ]. Therefore, given a probability P, the odds of succeeding/winning are  $(1/P)-1:1$ .

## Odorant

(Gas) mercaptan added to natural gas to give it smell so that gas escapes (leaks) can be detected.

## Off-peak

Times of relatively low energy demand, typically nights and weekends.

## Off-specification

Oil product or gas that does not meet specification. Refers either to contract specification or those benchmark specifications generally used in the physical market.

## Offsetting

Matching two financial transactions on a regulated exchange with the same delivery, time and volume against one another to reduce financial obligations.

## Offtake

(UK) gas removed from the national transmission system at reduced pressure.

## Oil products

★ *see refined products*

## Oil tanker freight derivatives

Oil tanker freight derivatives are over-the-counter trades bought and sold in terms of worldscale prices and settled against 11 key tanker routes listed on the London-based Baltic Exchange. The worldscale system (worldwide tanker nominal freight scale) is a system of pricing tanker freight as a percentage of expected freight rates as published by the non-profit WorldScale Association in a table listing the price in dollars per tonne of oil for standard routes, and there is a flat rate for each route. Rates listed – flat rates – are termed WS100, which is the amount needed for a standard vessel to make a profit. Similarly, WS175 means 175% of the published rate.

## Omel

Compañía Operadora del Mercado Español de Electricidad (Omel) has been responsible for the organisation and regulation of the Spanish wholesale electricity pool since its launch in 1998.

**On-board regasification**

Technologies and capabilities on liquefied natural gas (LNG) vessels for vaporisation of LNG after transport to its destination, in order to directly deliver natural gas to downstream markets.

**On-the-day commodity market (OCM)**

Part of the new gas trading arrangements introduced in the UK in October 1999, the OCM is a screen-based, within-day gas market that allows shippers to fine-tune their daily gas positions.

**One cancels the other**

Where a broker is given two alternative orders. As soon as one is executed, the other order is cancelled.

**One day in 10 years**

Reliability standard often applied to electricity generation systems. Under this standard, a combination of forced and planned outages would leave the system without enough generation to meet load on a probabilistic basis on only one day in every 10 years.

**One-factor model**

A model or description of a system where the model incorporates only one variable, or uncertainty – the future price.

**One in twenty (1 in 20)**

Peak-day demand – the highest gas demand expected on any given day over a 20-year period. The UK gas network is designed to cope with this calculated level of demand.

**One in fifty (1 in 50)**

The highest gas demand expected in a single year out of 50 years. The UK gas pipeline system is designed to cope with this calculated level of demand.

**One-touch option**

★ see *digital option*

**On-peak**

Refers to hours of the business day when demand is at its peak. In the US, physical market, on-peak definitions vary by North American Electric Reliability Councils.

**Opec**

Vienna-based Organisation of Petroleum Exporting Countries. Opec members are: Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, Venezuela and United Arab Emirates.

Opec member states have two regular meetings a year, but may call further meetings if crude oil prices are significantly outside of Opec's targeted levels. At the meetings, they may review both individual and group production quotas. Although Opec is a dominant force in international oil markets, growth in world demand for oil has at times pushed production to near-capacity limits, seemingly reducing Opec's ability to contain oil prices below the cartel's announced target range, which is intended to sustain world economic growth and limit development of substitute energy sources. This has been evident with the surge in crude oil prices in 2008, before prices collapsed due to the global economic downturn.

**Open-access transmission**

The provision of electricity transmission to third parties on a non-discriminatory basis.

**Open-access transportation**

The transportation of gas or electricity for third parties on a non-discriminatory basis.

**Open interest**

The volume of contracts, long or short, open on an exchange-traded contract.

**Open outcry**

Trading by means of shouting bids and offers across a trading floor. This traditional method of trading is increasingly being replaced by electronic trading.

**Operational risk**

The risk that a firm's internal practices, policies and systems are not adequate to prevent a loss being incurred, either because of market conditions or operational difficulties. Such deficiencies may arise from failure to measure or report risk correctly, or from a lack of controls over trading staff. Although operational risk is harder to define precisely than market or credit risk, it is considered by many to have been a contributor to some of the highly publicised losses of recent years.

**Option**

A contract that gives the purchaser the right, but not the obligation, to buy or sell the underlying commodity at a certain price (the exercise, or strike, price) on or before an agreed date.

★ *see also exotic option, vanilla option*

**Option on future**

★ *see futures option*

**Option replication**

★ *see replication*

**Option premium**

The amount that an option buyer pays to the seller.

**OTC**

★ *see over-the-counter*

**Outages**

A planned outage is the shutdown of a generating unit, transmission line, or other facility for inspection and maintenance, in accordance with an advance schedule.

A forced outage is the unplanned loss of service of a generating unit, transmission line or other facility for purposes other than inspection and maintenance.

**Out-of-the-money**

An option with no intrinsic value. For calls, an option with an exercise price above the market price of the underlying future. For puts, an option with an exercise price below the futures price.

★ *see also in-the-money*

**Outliers**

Probabilistically remote events that are often viewed as statistically independent as well. Various techniques can test if actual data differs in a statistically significant manner from the benchmark or normal distribution.

**Over-the-counter (OTC)**

An over-the-counter deal is a customised derivatives contract usually arranged with an intermediary such as a major bank or the trading wing of an energy major, as opposed to a standardised derivatives contract traded on an exchange. Swaps are the commonest form of OTC instrument.

**Own-use gas**

The gas taken from a pipeline to drive compressors or to preheat gas.

**Oxygenate**

A gasoline fuel additive containing hydrogen, carbon and oxygen. The oxygen content promotes more complete combustion of gasoline, which reduces exhaust emissions of carbon monoxide.

# P

## Pacific Basin

The geographical region of the land mass, including islands, bordering the Pacific Ocean. As applied typically in liquefied natural gas (LNG) trading, the Pacific Basin LNG market consists of present and future producers: Abu Dhabi, Australia, Brunei, Indonesia, Iran, Malaysia, Oman, Papua New Guinea, Peru, Qatar, Russia, the US and Yemen; and current and future LNG consumers: China, India, Indonesia, Japan, Pakistan, Mexico's West Coast, Singapore, South Korea, Taiwan, Thailand and the US West Coast.

Note that a Pacific Basin LNG producer might not be physically located in the Pacific Basin itself.

★ *see also Atlantic Basin*

## Padd

★ *see API regions*

## Palo Verde

Site of the high-voltage switchyard in Arizona linking the utilities of the southwest US with those of California.

## Paper market

A market for contracts where delivery is settled in cash, rather than by delivery of the physical product on which the contract is based.

## Parametric

A term used to classify curves for which the path is described by a mathematical function rather than a set of co-ordinates.

## Path-dependent option

A path-dependent option has a payout dependent on the price history of the underlying over all or part of the life of the option. The most common form of option in over-the-counter energy risk management (the Asian option) is a path-dependent option, as are lookback and barrier options.

## Payoff diagram

A graph of a transaction's payoff as a function of the value of the underlying at expiration.

## Pay-later option

Any option for which a premium is not paid at the time the option is purchased. Payment of the premium may be deferred until expiry, when it may be deducted from any payout.

## Peak load

Periods during the day when energy consumption is highest. The introduction of additional gas or electricity to cover this demand is known as peak shaving.

## Peak shaving

During times of peak demand, supplies from sources other than normal suppliers are used to reduce demand on the system – for example, storage from a salt cavern.

## Peaking generation

Electricity-generating equipment normally operated to serve loads only during annual peak loads or during system emergencies. Often combustion turbines.

## PEG (France)

An acronym for points d'échange de gaz, which are trading hubs for the wholesale natural gas markets and are virtual points in each balancing zone.

**Performance letter of credit**

Letter of credit used to guarantee performance under a contract.

★ *see also letter of credit*

**Petrochemicals**

Chemicals produced from hydrocarbons used, for example, in the manufacturing of products such as plastics.

**Phelix**

The Phelix or Physical Electricity Index is the reference price for power in Germany and large parts of central Europe. It is calculated daily as the average price for base load (Phelix Day Base) and peak load (Phelix Day Peak) electricity traded on the European Energy Exchange Spot Market.

**Phelix base**

Hourly weighted average index price per day for the hours 1–24

**Phelix peak**

Hourly weighted average index price for the hours 9–20 (8:00am–8:00pm)

**Physical**

Synonymous with wet. Crude oil or oil product with a precise loading window attached to it. For crude, the loading window is normally three to five days.

**Pipeline imbalance**

Companies that transport and use storage facilities in a pipeline system are obliged by the pipeline operator to keep their input and offtake volumes in balance (within tolerance limits). If there is a positive or negative pipeline imbalance, the transporting firms are heavily financially penalised by the pipeline.

**Pipeline interconnect**

Where large pipelines meet and gas can be switched from one pipeline to another, such as Henry Hub in the US.

**PJM**

The PJM Interconnection electricity market for Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Washington, DC. The Nymex trades a PJM Electricity Futures – Monthly Contract.

**Platt's**

Energy price information provider, specialising in news, prices, data, analysis, analytical tools, research and consultancy services.

**Polish Power Exchange**

Warsaw-based electricity exchange operating a day-ahead spot market for companies trading on the Polish power market. The Polish Power Exchange was launched in July 2000.

**Pollution credits**

Monitored by the US Environmental Protection Agency, US-based companies have a limit on the various types of pollution they can produce. If the actual pollution they produce is below this level, they have pollution credits they can trade. This process is known as emissions trading. An example of a US-based emissions market is SO<sub>2</sub> allowances trading.

**Pooling point**

A switching and interconnection facility in a physical location through which counterparties connect.

**Portfolio**

The collective term for an owner's holdings of assets, liabilities, transactions and/or trades.

**Portfolio optimisation**

Use of a linear or quadratic model to structure a portfolio to maximise or minimise yield and long-term rate sensitivity, or to increase or reduce exposure to certain industries, market sectors or macro-economic factors, subject to pre-specified constraints.

**Postage stamp rate**

Rate structure in which each customer in a given class is charged the same rate for a commodity as every other customer, regardless of the cost of serving different customers in the same class. Also refers to rates set for all customers in a given territory, regardless of their distance from the point where the given service or commodity is supplied.

**Power**

Another word for electricity.

**Power exchange**

An entity set up to provide an efficient, competitive trading arena, open on a non-discriminatory basis to all electricity suppliers, which meets the loads of all exchange customers at efficient prices.

**Power marketer**

(US) wholesale power entity that has registered with the Federal Energy Regulatory Commission to trade wholesale power with other power marketers and public entities at market-based prices. Power marketing companies include investor-owned, utility-affiliated companies; natural gas marketing companies; financial intermediaries; independent power producers; and entrepreneurs. Typically power marketers do not own generating facilities.

★ *see also electricity utility*

**Powernext**

A Paris-based company operating a European energy exchange that provides an electronic market for the trading of energy contracts in Europe. It was created in 2001 with the opening of the European electricity market, and encompasses a network of over 75 European members, including energy producers such as RWE, EDF, Gaz de France, Electrabel and Endesa, as well as end-users, banks, brokers, traders and retailers.

[www.powernext.fr](http://www.powernext.fr)

**Power pool**

A system of trading wholesale electricity that determines which generating sets or plants are called to meet demand for power at any particular time and sets the price of power for that period. Pools are deemed necessary by their proponents because electricity generally cannot be stored easily and demand has to be met through simultaneous production.

**Precipitation swaps**

Instruments linked to the degree of rainfall or snowfall. The party taking out a precipitation swap would receive payment for precipitation above a certain level.

**Pre-FEED contracts**

Referring to pre-Front End Engineering and Design, for pre-project planning.

**Premium**

★ *see option*

**Premium-reduction device**

A strategy that aims to reduce the cost of an option or other derivative. There are three main ways to achieve this: selling a second derivative to reduce the overall cost of a strategy; limiting the payout profile of the derivative; or accepting payments below market rates.

**Pre-schedule**

To schedule for delivery of physical power on a day-ahead basis.

**Price cap**

Price control over electricity or gas prices.

**Price risk**

Potential fluctuations in the price of the underlying energy commodity.

**Primary market**

A market where new securities are traded.

**Print**

The last traded price at any given time for a given futures contract.

**Profit-at-risk (PaR)**

Designed to help energy companies develop strategies to protect their earnings. PaR extends quantitative market risk management beyond speculative trading operations, to cover all physical energy activities.

**Project financing**

Involves a corporate sponsor investing in and owning a single-purpose industrial asset – usually with a limited life – through a legally independent entity financed with non-recourse debt.

**Prompt barrel**

Physical crude for immediate delivery.

**Prompt month**

The first month forward for which a futures contract is being traded. Also known as the front month.

**Proprietary trading**

Entering into a standardised contract to take a view, capture market price changes or put capital at risk. Prop trading is conducted through trades in a bank or energy firm's own account rather than with customer capital.

**Public Utilities Commission (PUC)**

Regulates intrastate electricity transactions and retail electricity service. Although the various PUCs work independently of the Federal Energy Regulatory Commission (Ferc), they must still abide by Ferc guidelines, as established by various federal statutes. They are also commonly known as Public Service Commissions or PSCs.

**Public Utility Holding Company Act (PUHCA)**

US federal act of 1935 that grants the Securities and Exchange Commission, a US financial regulator, the power to prevent electric public utility holding companies from having generation assets in two areas of the US that are not geographically adjoining.

In August 2005, the *Energy Policy Act of 2005* repealed PUHCA, effective in February 2006. It was replaced by a much weaker set of laws called the *Public Utility Holding Company Act of 2005*.

**Public Utility Regulatory Policies Act (Purpa)**

US federal act passed in 1978 that requires electricity utilities to buy wholesale power from certain types of independent power producers that produce electricity with renewable resources. Although still important, open access to electric power transportation has reduced the significance of Purpa.

**PUHCA**

★ see Public Utility Holding Company Act

**Purchased capacity**

The amount of electricity and capacity available for purchase from outside a utility system.

**Purpa**

★ see Public Utility Regulatory Policies Act

**Put-call parity**

Put-call parity states that the payout profile of a portfolio containing an asset plus a put option is identical to that of a portfolio containing a call option of the same strike on that same asset (with the remainder of the money earning the risk-free rate of return). This can be used to arbitrage a position.

**Put option**

An option giving the buyer, or holder, the right, but not the obligation, to sell a futures contract at a specific price within a specific period of time in exchange for a one-off premium payment. It obligates the seller, or writer, of the option to buy the underlying futures contract at the designated price, should the option be exercised at that price.

★ *see also call option*

**Put spread**

An options position comprised of the purchase of a put option at one level and the sale of a put option at some lower level. The premium received by selling one option reduces the cost of buying the other, but participation is limited if the underlying goes down.

★ *see also bear spread, bull spread, call spread, vertical spread*

**Q****Qualifying facility (QF)**

(US) a generator or small power producer that meets certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission (Ferc) and that has filed with Ferc for QF status or has self-certified. QFs are physical generating facilities.

**Quant**

A quantitative analyst who applies mathematical and statistical techniques.

**Quantile**

A notion from probability. Generally, the specific value of a variable that divides the distribution into two parts, those values greater than the quantile value and those values that are less. For instance,  $p$  percent of the values are less than the  $p$ th quantile.

**Quanto product**

An asset or liability denominated in a currency other than that in which it is usually traded. Since the combined exposure to the asset and to the foreign exchange rate will change continuously, the structures must be dynamically hedged.

★ *see also delta hedging, guaranteed exchange rate option, integrated hedge*

**Quartile**

Of the three quartiles, the first or lower quartile of a list is a number (not necessarily a number in the list) such that at least one-quarter of the numbers in the list are no larger than it, and at least three-quarters of the numbers in the list are no smaller than it. The second quartile is the median. The third or upper quartile is a number such that at least three-quarters of the entries in the list are no larger than it, and at least one-quarter of the numbers in the list are no smaller than it.

# R

## r

The correlation co-efficient, which provides an index of the degree to which paired measures co-vary in a linear fashion. It is the square root of the co-efficient of determination, described below. The correlation co-efficient can range in value between -1 and 1.

## r<sup>2</sup>

The co-efficient of determination, which varies between 0 and 1. It is loosely interpreted as 'the proportion of variance in  $y$  which can be explained by  $x$ '.

It is the percentage of the total sum of squares of the dependent variable that the independent variable explains, after one optimises the intercept and the slope co-efficient of the independent variable. In other words,  $r^2$  is the percentage by which volatility of a linear combination of the dependent and independent variables and a constant declines after choosing the optimal intercept and slope co-efficient.

## Rainbow option

An option in which the underlying factors are referred to as colours. Hence, a two-factor option, such as a spread option, would be a two-colour rainbow option.

## Range binary

A range binary pays out if a specified spot rate trades within a given range over a specified period of time, in exchange for payment of a premium. The lower the volatility of the spot rate, the more likely the buyer is to benefit.

★ see *corridor option, trigger condition*

## Range forward

★ see *cylinder*

## Raroc

★ see *risk-adjusted returns on capital*

## Rating trigger

Any number of contractual clauses that call for some change in the counterparty relationship, given a change in the debt rating.

## Ratings cliff

The point at which a company may be spiralling towards further rating downgrades once a rating trigger has been initiated.

## Ratio spread

A ratio spread involves buying different amounts of similar options with differing strike prices. The purchase of an in-the-money option is financed by the selling of out-of-the-money options. Conversely, the out-of-the-money options are financed by selling in-the-money options.

## Real option

A non-traded asset or liability whose profit-and-loss sensitivity to a commodity price or other market variable mimics that of an option contract. Extracting oil from an oilfield is a classic example of a real option. If oil prices remain low, the field can be left dormant at no additional cost. If oil prices rise sufficiently, the profits earned on the sale of the oil will more than outweigh the costs of extraction.

## Real-time pricing

Up-to-date prices for commodities, moving with every purchase or sale.

## Rebate

A rebate is paid to the holder of a derivative, such as a barrier option, if the instrument is knocked out or is never activated.

**Red**

Exchange notation for contracts trading beyond the next 12 months. For example, in November 2005, 'red December' refers to December 2006.

**Reference price**

In an energy derivatives contract, the market price reference based on a particular location or specified grade or blend of the commodity, which is used for settlement of the contract.

**Reference temperature**

A typical index variable in weather derivative transactions.

**Refined products**

The products derived from crude oil that has been processed in a refinery.

**Refinery**

A plant where crude oil is separated into various components, such as usable products or feedstocks.

**Reforming margins**

The uplift obtained – usually expressed in cents per barrel – from reforming naphtha into gasoline.

**Reformulated gasoline (RFG)**

A cleaner form of gasoline, providing significant reductions in emissions of ozone-forming and toxic air pollutants.

**Regasification**

The vaporisation of liquefied natural gas (LNG) after transport to its destination, in order to directly deliver natural gas to downstream markets. Regasification traditionally has been done by the LNG ships offloading their cargo as liquid into tanks at on-shore terminals, which then convert it to natural gas, however, the technology now exists for regasification on board specially designed vessels such as Energy Bridge LNG ships so that natural gas can be delivered directly into the natural gas pipelines. Similarly, dockside regasification can be done at specially equipped seaports such as the GasPort now operational in the UK.

**Regional transmission organisations (RTOs)**

Organisations to administer the electricity transmission grid on a regional basis throughout North America (including Canada). Creation of RTOs was encouraged by the Federal Energy Regulatory Commission (Ferc) under the terms of Ferc order 2000.

**Regression analysis**

An analysis to relate one or more dependent variables to one or more independent variables.

**Reinvestment risk**

The risk that an asset manager will be unable to match the yield from an interest rate instrument (such as a swap or bond) when reinvesting its coupon payments and principal repayments.

**Relative performance option**

An option giving the buyer the right to the return from a single asset from a basket of two or more, either as a cash settlement or by physical delivery. The asset selected may be the best- or worst-performing of the assets in the basket, as measured against a common or independent benchmark.

**Renewable energy**

Any form of energy that is replaced by nature, with or without human assistance. Common forms of renewable energy include wind, solar, geothermal and tidal energy.

**Replacement cost**

The replacement cost of a financial instrument is its current market value. In credit risk terms, it is the cost of replacing a given contract if the counterparty defaults.

**Replication**

To replicate the payout of an option by buying or selling other instruments. In the case of dynamic replication, this involves dynamically buying or selling the underlying (or futures, where transaction costs are cheaper) in proportion to an option's delta. In the case of static replication, the option is hedged with a basket of standard options whose composition does not change with time.

**Repo agreement**

To buy (or sell) a security while at the same time agreeing to sell (or buy) the same security at a predetermined future date. The price of the second transaction determines the repo rate, the interest rate earned on the security between the two transactions. In a reverse repo, the buyer sells cash in exchange for a security.

**Reserve margin**

The amount of reserve capacity set by the North American Electric Reliability Corporation that needs to be on the accounting books of an electricity utility. It has to have a certain specified amount of capacity above the utility's peak requirements, which are calculated using probabilistic models.

**Reserves**

Back-up power that must be made available at all times to meet fluctuations in system demand within a given range, to ensure smooth, continuous delivery of energy at proper voltage and current levels.

**Residual fuel oil**

Heavy fuel oil produced from the residue in the fractional distillation process rather than from the distilled fractions.

**Retail wheeling**

The use of gas or electricity transmission facilities to "wheel in" energy from various suppliers to local customers.

**Reuters**

Thompson Reuters is a leading source of news and information for businesses and professionals. [www.reuters.com](http://www.reuters.com)

**Reverse crack**

The sale of crude oil against the purchase of the refined products. In futures trading, it is the simultaneous sale of crude oil futures versus the purchase of heating oil and gasoline futures.

**Reversal**

To take advantage of mispriced options by creating a synthetic long futures position and hedging it by selling futures contracts against it.

A trader may buy an undervalued call, at the same time selling a fairly valued put and buying a futures contract. The same strategy could be applied if the put was undervalued. The ability to undertake this riskless arbitrage relies on put-call parity.

★ *see also box, conversion*

**RHO**

A measure of an option's sensitivity to a change in interest rates; this will affect the future price of the option and the time value of the premium. Its impact increases with the maturity of the option.

**Risk-adjusted return on capital (Raroc)**

A technique of risk analysis that assumes a higher return for a riskier project than a less risky one.

**Risk capital**

Funds at risk in a company or trading business.

**Risk management**

Control and limitation of the risks faced by an organisation due to its exposure to changes in financial market variables, such as foreign exchange and interest rates, equity and commodity prices or counterparty creditworthiness. It may be necessary because of the financial impact of an adverse move in the market variable (market risk); because the organisation is ill-prepared to respond to such a move (operational risk); because a counterparty defaults (credit risk); or because a specific contract is not enforceable (legal risk). Market risks are usually managed by hedging with financial instruments, although a firm may also reduce risk by adjusting its business practices (see natural hedge). While financial derivatives lend themselves to this purpose, risk can also be reduced through judicious use of the underlying assets – for example, by diversifying portfolios.

**Risk measurement**

Assessment of a firm's exposure to risk.

**Risk premium**

A payment that factors in the inherent risk of a trade.

**Risk policies and procedures**

The fundamental control documents in most corporate risk management programmes.

**Roll-lock swap**

A swap that enables futures traders to lock-in their roll-over costs by paying the average difference between near and far contracts.

**Roll-over clause**

A clause in a contract that allows the contract to be extended beyond the initially agreed termination date.

**Roll-over risk**

The risk that a derivative hedge position will be at a loss at expiration, necessitating a cash payment when the expiring hedge is replaced with a new one.

**Rotterdam market**

A term sometimes used to describe the oil market in northwest Europe. There is no Rotterdam trading floor, as oil business is transacted electronically, by telephone or on the futures markets in New York, London or Singapore.

**Round-trip trade**

An outlawed trade in which two counterparties trade the same asset at the same price to effectively boost their trading volume figures and artificially inflate revenues. Also known as wash trade.

**RTOs**

★ *see regional transmission organisations*

# S

## Sarbanes-Oxley Act (SOX)

US legislation enacted in response to the accounting and corporate scandals of 2001–2002, including Enron’s collapse. The Act was named after Senator Paul Sarbanes and Representative Michael Oxley and is arranged in 11 titles. Compliance with provisions of the Act is mandatory. The *Sarbanes-Oxley Act of 2002* established the duties of a firm’s board of directors, as well as advising on auditing and other business requirements.

The *Sarbanes-Oxley Act of 2002* is generally considered the single most important piece of legislation affecting corporate governance, financial disclosure, and public accounting since the US securities laws enacted in the 1930s. The Act is often referred to variously as SOX, S-O or SOA.

## Scenario planning

A methodology that attempts to build plausible views of a small number of different possible futures for an organisation operating in conditions of high uncertainty.

## Scheduling co-ordinator

An entity certified by California’s independent system operator to provide schedules for electricity deliveries within the state’s market.

## Seasonal supplies

Supplies of gas used for winter demand. This often includes gas from storage systems.

## Seasonality

All commodity futures markets are affected to some extent by an annual seasonal cycle or ‘seasonality’. This cycle of pattern refers to the tendency of market prices to move in a given direction at certain times of the year.

## Secondary CDM market

The secondary market that encompasses all subsequent transactions following the primary sale within the Clean Development Mechanism.

★ See also *Clean Development Mechanism*.

## Securitisation

The packaging of assets (normally debt of some description) into securities. These may be higher-yielding and more freely tradable than the unpackaged assets. Securitising production revenues has become increasingly popular among commodity producers over the past few years. Electricity utilities have also started securitising their retail revenue.

## Seller’s nomination contract

(Gas) the seller nominates the amount of gas it expects to deliver in a range around the estimated daily contract quantity. The buyer is obliged to take or pay for the nominated quantity on a daily basis.

## SERC

SERC Reliability Corporation – a North American Electric Reliability Council within the Eastern Interconnection.

## Settlement risk

The risk that arises when payments are not exchanged simultaneously. The simplest case is when a bank makes a payment to a counterparty but will not be recompensed until some time later; the risk is that the counterparty may default before making the counterpayment. Settlement risk is most pronounced in the foreign exchange markets, where payments in different currencies take place during normal business hours in their respective countries and can therefore be made up to 18 hours apart, and where the volume of payments makes it impossible to monitor receipts except on a delayed basis. This type of risk afflicted counterparties of Germany’s Bank Herstatt in 1974, which closed its doors

between receipt and payment on foreign exchange contracts. As a result, settlement risk is sometimes called Herstatt risk.

★ *see also credit risk*

### Shipper

A company that transports gas along a pipeline system. Shippers need to be registered with the local regulatory body. In UK gas market terms, a shipper is a company that buys gas 'at the beach' and pays Transco to transport the gas along the pipeline system.

### Short

The seller of a financial contract.

### Short position

A position that increases in value if the value of the underlying instrument or market price decreases in value.

### Short ton

Equal to 0.9072 tonnes. A measure of weight used in the coal industry.

### Shrinkage

- 1) gas losses in the transportation and distribution systems.
- 2) gas volume lost through the extractions of liquid gases and the removal of water and other impurities.

### Shrinkage allowance

The percentage of gas expected to be lost during the transportation and distribution of gas.

### Singapore Exchange (SGX)

The SGX was established in 1999 by the merger of the Stock Exchange of Singapore and the Singapore International Monetary Exchange. It is the Asia-Pacific's first demutualised and integrated securities and derivatives exchange.

### Skew

Skew is a measure of the asymmetry of a distribution. A perfectly symmetrical distribution has zero skew, while a distribution with positive (or negative) skew is one where outliers above (or below) the mean are more probable. An example is the distribution implied by the presence of a volatility skew between out-of-the-money call and put options.

### Sleeving

A transaction whereby two counterparties, which do not have credit with each other, ask a third party that has credit with both to be a middleman to facilitate a trade. This practice achieved some notoriety in 1998, when it emerged that the collapsed US power marketer Power Company of America had been regularly sleeving forward electricity deals.

### SMEs

★ *see superconducting magnetic energy storage*

### SO<sub>2</sub>

Sulphur dioxide.

### SO<sub>2</sub> allowance trading

Allowance trading is the centrepiece of the US Environmental Protection Agency's acid rain programme. Allowances are the currency with which compliance with SO<sub>2</sub> emission requirements is achieved. They authorise a unit within a utility or industrial source to emit one US ton of SO<sub>2</sub> during a given year or any year thereafter.

Utilities that can use high-sulphur coal – which commands a lower price per British thermal unit than low-sulphur coals – can buy an SO<sub>2</sub> allowance and bundle it with a high-sulphur coal purchase to produce more energy.

### Sour crude

Crude oil containing a relatively high percentage of sulphur by weight, typically more than 0.5%.

**Sour gas**

Natural gas with a high sulphur content, which requires treatment before use.

**SOX**

★ *see Sarbanes-Oxley Act*

**SOx**

★ *see sulphur oxides*

**Spark spread**

The difference between the price of electricity sold by a generator and the price of the fuel used to generate it, adjusted for equivalent units. The spark spread can be expressed in dollars per megawatt hour (\$/MWh) or dollars per million British thermal units (\$/mmBtu) or other applicable units. To express it in \$/MWh, the spread is calculated by multiplying the price of gas, for example (in \$/mmBtu), by the heat rate (in Btu/kilowatt hour), dividing by 1,000 and then subtracting the electricity price (in \$/MWh). Also called a spark arbitrage.

**Specific gravity**

The ratio of the mass of a given volume of liquid at 60° Fahrenheit to the mass of an equal volume of water at the same temperature. This is used to calculate the API gravity.

**Specific risk**

Specific risk is the portion of a security's market risk that is unique to that security. For example, the risk that an individual stock's price may vary because of its industrial sector rather than the broader equity market.

**Speculation**

The opposite of hedging. The speculator holds no offsetting cash market position and deliberately incurs price risk in order to reap potential rewards.

**Spinning reserves**

Any back-up energy production capacity that can be made available to a transmission system at 10 minutes' notice and can operate continuously for at least two hours once it is brought online.

**Spot cargo**

A cargo that is available for immediate loading.

**Spot market**

In the energy sector, the spot market is the physical/cash crude, refined product, gas or electricity market. The market for immediate delivery rather than future delivery.

**Spot price**

The price of a security or commodity in the cash market.

**Southwest Power Pool (SPP)**

A North American Electric Reliability Council within the Eastern Interconnection.

**SPR**

★ *see strategic petroleum reserve*

**Spread**

The difference between the bid and ask price. Liquid markets are characterised by narrow bid/ask spreads.

**Spread option**

An option written on the differential between the prices of two commodities. Spread options may be based on the price differences between prices of the same commodity at two different locations (location spreads); prices of the same commodity at two different points in time (calendar spreads); prices of inputs to, and outputs from, a production process (processing spreads); and prices of different grades of the same commodity (quality spreads). Nymex offers the only exchange-traded options on energy spreads: the heating oil/crude oil and gasoline/crude oil crack spread options.

**Standard deviation**

Statistical measure of the degree to which an individual value in a probability distribution tends to vary from the mean of the distribution. Indicates probability of a variable or price falling within a certain band around the mean.

**Standard European coal agreement**

The standard European coal agreement is a physical contract for coal delivered free-on-board into the Amsterdam-Rotterdam-Antwerp area. It is traded in contracts (lots) of 5,000 tonnes for delivery and priced at 6,000 kilocalories per kilogram.

Although it is primarily a physical contract, counterparties have the option, where mutually agreed, to close out the position should neither party want to make or take delivery of the coal.

**Standard market design**

Designed by the US Federal Energy Regulatory Commission, in light of market manipulation of energy prices, to standardise all US wholesale power markets.

**Static replication**

★ *see dynamic replication*

**Stochastic process**

A stochastic process is one that can be described by the evolution of some random variable over some parameter such as time. One example is geometric Brownian motion, which is commonly used to describe the movements of asset prices.

**Stochastic volatility**

The Black-Scholes model of option pricing assumes stock prices follow geometric Brownian motion with constant volatility and interest rates. But the assumption of constant volatility fails for real markets, prompting a number of attempts to model volatility as a stochastic process. The most notable of these is the Heath-Jarrow-Morton framework.

**Storage capacity**

The amount of gas that can be stored to cover peak demand. The main types of storage (apart from pipeline storage) are:

- 1) Liquefied natural gas – gas cooled until in liquid form at  $-162^{\circ}$  Celsius and stored in insulated metal tanks.
- 2) Salt cavities (caverns) – many cavities have been created underground by dissolving layers of salt.
- 3) Aquifers (porous rocks).
- 4) Depleted gas fields now converted into storage facilities.

**Storage gas**

Gas kept in storage in order to balance supply and demand over time.

**Storage manager**

A company operating a storage facility where gas can be stored during periods of low demand for use in times of greater demand.

**Straddle**

The combination of a put and a call option with the same expiration date and strike price. A buyer of a straddle hopes the volatility of the underlying prices will increase, thereby creating profit opportunities.

**Stranded cost recovery**

During the period of power deregulation in the late 1990s and early 2000s, many electricity utilities in the US have tried to recover stranded costs by pushing their state government to impose a tariff charge on all the state's electricity consumers to pay for stranded costs. This process is known as stranded cost recovery.

**Stranded costs**

The costs accumulated by electricity utilities that have built expensive power plants and entered into high-priced power purchase agreements, which are no longer commercially viable when competition forces prices down and reduces market share.

**Strangle**

An options position consisting of the purchase or sale of put and call options that have the same expiration, but different strike prices.

**Strategic petroleum reserve (SPR)**

Stockpiles of crude oil owned and controlled by the US government. The SPR exists to protect the US from the effects of interruptions in the supply of oil and can only be accessed by order of the US President. As of October 2008, the SPR consisted of around 701 million barrels of oil stored in underground salt caverns along the coast of the Gulf of Mexico. In May 2008, the US Congress voted to temporarily suspend shipments to the SPR.

**Stress-testing**

To stress-test is to simulate an extreme market event and examine what happens to prices under the 'stress' of that behaviour.

**Strike price**

The price at which the underlying futures contract is bought or an option is exercised. Also called an exercise price.

**Structured note**

An over-the-counter product, which may incorporate several individual instruments – generally options embedded in a debt instrument, such as a medium-term note. The aim is generally to construct a payout profile that is attractive to a specific investor or group of investors, because of their risk-reward preferences and/or opinions on the market.

**Structured transaction**

Non-standard contracts not associated with owned or leased assets and involving tailoring of terms to fulfil client needs.

**Sulphur oxides (SO<sub>x</sub>)**

Gases formed principally by the burning of fossil fuels containing sulphur, such as coal and oil. Sulphur oxides, such as sulphur dioxide (SO<sub>2</sub>)

and sulphates, are pollutants that contribute to the formation of smog. Since SO<sub>2</sub> dissolves in water vapour to form acid and interacts with other gases in the atmosphere to form sulphates and other products that can be harmful to the environment, ambient air-quality standards have been adopted in many areas to regulate sulphur oxides emissions.

★ see also nitrogen oxides

**Sunshine option**

A corollary to the precipitation swap, this instrument is linked to the number of hours of sunshine. The party taking out a sunshine option would be compensated if the number of hours of sunshine fell below a certain level.

★ see also weather derivatives

**Superconducting magnetic energy storage (SMES)**

A method of storing energy within a superconducting magnetic field.

**Supply point nomination**

The nomination a gas shipper gives the pipeline owner when the shipper signs up a new customer. The pipeline owner then works out the charge for transporting gas to the new supply point. Once the shipper accepts this charge, he takes responsibility for transportation charges to that supply point.

**Swap**

An agreement whereby a floating price is exchanged for a fixed price over a specified period. It is an off-balance-sheet financial arrangement involving no transfer of physical energy – both parties settle their contractual obligations by means of a transfer of cash. The agreement defines the volume, duration and fixed reference price. Differences are settled in cash for specific periods – monthly, quarterly or six-monthly.

Swaps are also known as contracts for differences and fixed-for-floating contracts.

**Swaption**

An option to buy (call option) or sell (put option) a swap at some future date.

**Sweet crude**

Crude oil containing a relatively low percentage by weight of sulphur – typically less than 0.5%.

**Swing**

Variations in gas demand.

**Swing factor**

In gas purchase agreements, the swing factor is a measure of the flexibility to vary nominations and is expressed as a ratio of peak to average supplies.

**Swing option**

The right to take more or less of a specified commodity. The opportunity to swing up is effectively a call option on the commodity specified in the contract, and the opportunity to swing down is a put option on the commodity, subject to obligations to take certain quantities over the entire life of the contract. Swing options are most commonly used in the gas market.

**Swing producer**

A company or country that changes its crude oil output to meet fluctuations in market demand. Saudi Arabia is seen as the world's major swing producer, as it deliberately limits its crude oil production in an attempt to keep supply and demand roughly in balance.

**Swiss Electricity Price Index (Swep)**

Launched in 1998, Swep was the first ever electricity index in continental Europe. It is based in the Swiss town of Laufenburg, a major hub for power supplies between Switzerland and Germany.

**Sydney Futures Exchange (SFE)**

The SFE lists electricity futures contracts based on the markets of the Australian states of New South Wales and Victoria.

**Syndication of risk**

A method of splitting risk among several counterparties.

**Synthetic credit rating**

An internal rating based on factors that are deemed the most important for establishing counterparty credit quality.

**Synthetic option**

Also known as portfolio insurance, this is a technique for replicating an option payout by buying or selling the underlying or futures contracts in proportion to movements in the theoretical option's delta. Essentially, it is delta hedging with nothing to hedge. Those trying to replicate a long option position lay themselves open to increases in market volatility, but benefit if volatility declines. Synthetic replication is generally used if implied volatility of options is thought to be too high.

**System operator**

A body responsible for operating and maintaining the physical electricity network. For the US, see independent system operator

**System price**

The benchmark price for all electricity sold within an integrated grid system, calculated on the basis of all transactions within the area disregarding price fluctuations caused by bottlenecks. The system price is used as a reference for financial settlements.

★ *see also area price*

### Systemic risk

The risk that the financial system as a whole may not withstand the effects of a market crisis. In recent years, attention has been focused on emerging derivatives markets, where a handful of players dominate trading. The concern is that the failure of any of these might have serious and widespread consequences for others in the market. The economic crisis and credit market contraction that developed in 2008 raised concerns about financial institution collapses and resulting systemic risk.

# T

### Take or pay

In a buyer's contract, take or pay is the obligation to pay for a specified amount of gas, whether this amount is taken or not. Depending on the contract terms, under-takes or over-takes may be taken as make-up or carry-forward into the next contract period. When it is credited into another contract period, this is called make-up gas.

★ *see also make-up gas*

### Tapis

A crude oil produced in Malaysia and used as a reference crude for Far East light oil.

### Tariff

Public schedules detailing utility rates, rules, service territory and terms of service that are filed for official approval with a regulatory agency.

### Technical analysis

Technical analysis is based on the assumption that price takes into consideration all factors that could influence the price of the commodity. It is, therefore, broader than fundamental analysis, which looks at supply and demand. Past price movements can be analysed for indications of future commodity price movements.

★ *see also fundamental analysis*

### Technical rally

A short rise in commodity futures prices within a general declining trend. Such a rally may result from bargain hunting by market participants or because technical analysts have noticed a particular support level at which the commodity price is expected to increase.

### Technical sign

A significant short-term trend identified through technical analysis of a commodity's price movement.

### Tenor

The time to maturity of an asset, liability, trade, transaction or portfolio.

### Terawatt (TW)

1,000 gigawatts (1 trillion watts).

### Terawatt hour (TWh)

1,000 gigawatt hours.

### Therm

The imperial unit of measurement for a quantity of gas, equivalent to 100,000 British thermal units.

### Theta

Option risk parameter that measures the speed of time decay of the option premium.

**Third-party access (TPA)**

Where the owner of a pipeline or electricity network is obliged to transport gas, crude or electricity in a non-discriminatory way – i.e., for any third party at the same rate as all other users. Third-party access can either be regulated by a separate agency or law, or negotiated between the incumbent and the new entrant. Also called common carriage.

**Tick**

The minimum price movement of a financial contract, expressed in fractions of a point.

**Time decay**

★ *see theta*

**Time charter**

Charter party agreement for a fixed period of time instead of for a certain number of voyages. In this type of agreement usually loading and unloading costs are not included in the charter rate.

**Time value**

Part of the option premium that reflects the excess over the option's intrinsic value, or the entire premium, if there is no intrinsic value. At given price levels, the option's time value will decline until expiration.

**Title Transfer Facility (TTF)**

A virtual trading point for natural gas in the Netherlands, created in 2003 by Gasunie in order to facilitate trading in the Dutch market.

**TOE**

Tonnes of oil equivalent.

**Tokyo Commodity Exchange**

The exchange that regulates trading of futures contracts and option products of all commodities in Japan. Since July 1999, this exchange has listed yen-based gasoline and kerosene futures based on the Japanese market.

**Tolling agreement**

A processing agreement for the conversion of an input product for a fee. In the energy sector, tolling agreements are contracts where one party – the toller – provides a company with one form of fuel to be converted into another form of fuel on their behalf. In particular, in the liquefied natural gas (LNG) industry, tolling is a common method for financing liquefaction plants or regasification terminals. In the former case the tollers are natural gas owners who wish to convert their natural gas into LNG for transportation and storage purposes, in the latter, the tollers are LNG owners who wish their LNG to be converted into gas for distribution into the relevant end-market. In the electric power market, tolling agreements are typically between a power buyer and a power generator, under which the buyer supplies the fuel and receives an amount of power generated based on an assumed heat rate at an agreed cost.

**Tonne, metric**

A unit of measure that represents the measurement of mass equal to 1,000 kilograms, or 2204.6226 pounds.

**TPA**

★ *see third-party access*

**Trading around assets**

Used in tandem with hedging, this activity involves selling more production or buying back more volumes than are currently hedged.

**Train (liquefaction)**

Liquefied natural gas production units; liquefaction facilities.

**Transco**

US industry jargon for transmission facilities, or for a company engaged almost exclusively in the provision of transmission service.

**Transmission facility**

Equipment used to deliver power at high voltages in bulk quantity, from generating facilities to local distribution facilities, for final retail use.

★ *see also distribution*

**Transmix**

A by-product of refined petroleum products pipeline operations. Transmix of refined petroleum products is created by the mixing (co-mingling) of different specification products during pipeline transportation.

**Transportation capacity**

The capacity of the UK natural gas system, which is assessed by the National Grid in three places:

- 1) The entry capacity at the entry to the national transmission system (NTS).
- 2) The exit capacity at the NTS offtakes.
- 3) Local distribution zone (LDZ) capacity within the LDZs.

**Trigger condition**

The payout of path-dependent options, such as barrier options and digital options, depends on a specified market variable satisfying a specific trigger condition. The most common condition is that the spot rate (or price) of the underlying must trade through a specified level before the option becomes active (or inactive), but many other types of condition are possible.

★ *see also corridor option, range binary*

**U****UKPX**

An electronic exchange that launched electricity futures in June 2000. Trading includes spot physical electricity contracts, prompt power contracts and cleared forward contracts, and is open to companies active in the UK power market. In 2003 it has been bought by APX Group, the energy exchange for gas and power.

**Unaccounted-for gas**

Gas lost through leakage or errors in measurement.

**Unbundling**

The separating of the various components of electricity production, supply and service, in order to introduce greater elements of competition to these segments of the industry.

'Functional unbundling' would require monopolistic utilities to provide access to their transmission and distribution network in exchange for an access fee. 'Structural unbundling' would require complete vertical disaggregation, so that monopolistic utilities would be required to divest either their generation assets or their transmission/distribution assets.

**Underlying**

The variable on which a futures, option or other derivatives contract is based.

**Upside/downside risk**

A short forward position taken without an offsetting long physical position in the underlying commodity is said to have upside risk. This means the trader is speculating that the price of the commodity will decline.

A long forward position taken without an offsetting short physical position in the underlying commodity is said to have downside risk. This means the trader is speculating that the price of the commodity will increase.

**Upstream**

Oil and gas exploration and production, as opposed to downstream, which refers to the areas of refining and marketing.

★ *see also downstream*

**V****Value-at-risk**

The value-at-risk (VaR) of a portfolio is the worst loss expected to be suffered over a given period of time with a given probability. The time period is known as the holding period, and the probability is known as the confidence interval. VaR is not an estimate of the worst possible loss, but the largest likely loss. For example, a firm might estimate its VaR over 10 days to be \$100 million, with a confidence interval of 95%. This would mean there is a one-in-20 (5%) chance of a loss larger than \$100 million in the next 10 days.

In order to calculate VaR, a firm must model both the way the relevant market factors will change over the holding period and the way, if any, these changes are correlated between market factors. It must then evaluate the potential effects of these changes on its portfolio at the desired level of consolidation (by asset class, group or business line, for example).

★ *see also credit value-at-risk*

**Vanilla option**

A standard transaction that is not tailored to the needs of either party. A plain-vanilla option pays out the difference between the strike price of the option and the spot price of the underlying at the time of exercise.

★ *see also exotic option, option*

**VaR**

★ *see value-at-risk*

**Variance**

A measure of volatility, risk, or statistical dispersion. It is the square of the standard deviation.

**Variance-covariance**

Linear value-at-risk.

**Variation margin**

The margin on a derivatives contract whose value varies in line with levels of volatility in the market. The higher the fluctuations in daily prices, the higher the variation margin.

**Vega**

Option risk parameter that measures the sensitivity of the option price to changes in the price volatility of the underlying instrument.

**Vertical disaggregation**

★ *see divestiture*

**Vertical spread**

An option strategy relying on the difference in premium between two options that share a common underlying and maturity but are struck at different prices.

★ *see also call spread, put spread*

**VIK**

An acronym for Verband der Industriellen Energie- und Kraftwirtschaft e.V., the German association of industrial energy users and self-generators. This association represents the interests of industrial energy users in Germany for whom energy is a major cost component, with current members accounting for the majority of industrial energy consumption. [www.vik.de](http://www.vik.de)

**Viscosity**

A measurement of a liquid's resistance to flow. As temperature increases, viscosity decreases.

**VLCC**

An acronym for very large crude carrier; the super-tankers used for transporting crude oil that are capable of carrying more than 200,000 metric tons.

**Volatility**

A measure of the variability of a market factor, most often the price of the underlying instrument. Volatility is defined mathematically as the annualised standard deviation of the natural log of the ratio of two successive prices. The actual volatility realised over a period of time (the historical volatility) can be calculated from recorded data.

Volatility is one of the variables that must be specified in the Black-Scholes model of option pricing: a vanilla option will cost more when volatility is high than when it is low. However, volatility is the only one of these variables whose value must be estimated.

The estimate used (known as the implied volatility) can be derived from the prices of options in the market and the known input variables. However, the Black-Scholes model also assumes that volatility is constant, which is not true. New techniques have been developed to cope with volatility's variability, including mean-reverting models (such as Garch) and stochastic volatility models.

**Volatility skew**

The difference in implied volatility between out-of-the-money puts and calls. The origins of the volatility skew are not always clear, but factors may include reluctance to write calls rather than puts, sentiment about market direction, and supply and demand.

★ *see also implied volatility*

**Volatility smile**

If the implied volatility of an option is plotted against its strike on a graph, the chart is typically shaped like a smile (less often a frown). This curve is known as the volatility smile. It may reflect the fact that out-of-the-money events are more common than geometric Brownian motion would predict. This leads to extra value for out-of-the money options.

★ *see also implied volatility*

**Volatility term structure**

The term structure of volatility is the curve depicting the differing implied volatilities of options with differing maturities. The term structure is curved, because the volatility implied by short-dated option prices changes faster than that implied by longer-term options, but other effects, such as mean reversion, may also play a part.

★ *see also implied volatility*

**Volatility trading**

Trading, usually through the options markets, based on the belief that implied volatility will not match the volatility actually realised over a given period, or that the difference in implied volatility between different options will alter over a given period. Options are used because of their sensitivity to volatility.

**Volumetric risk**

The effect of fluctuations in demand for a product or service on revenue.

**Vv2**

★ *see Verbandvereinbarung*

# W

## WACC

★ *see weighted average cost of capital*

## Wacog

Weighted average cost of gas.

## War premium

A price that factors in the risk associated with war – particularly relevant for the oil market.

## Warrant

A certificate giving the buyer the right, but not the obligation, to buy a specified amount of an asset at a certain price over a specified period of time. Warrants differ from options only in that they are usually listed.

## Wash trade

★ *see round-trip trade*

## Watt (W)

Unit of electrical power equivalent to one joule per second.

## Watt hour (Wh)

Unit of electrical energy equivalent to the power of one watt operating for one hour.

## Weather derivatives

Forward instruments used to hedge against or speculate on weather. Virtually all the instruments are based on degree days, although precipitation swaps and sunshine options are among other possible instruments.

★ *see also sunshine option*

## Weather-linked bonds

The payout of weather-linked bonds, commonly known as nature-linked bonds, is linked to weather conditions. The return on the nature-linked bond is pegged to a suitable meteorological index. A trigger level is defined, which remains active during the exposure period. If this trigger is hit by the index, the issuer of the bond is allowed to default. Suitable indexes might include rainfall or temperature. Insurance companies commonly issue these bonds to hedge against high weather damage claims.

## Weighted average cost of capital (WACC)

The sum of the market returns of each component of a corporate capitalisation, weighted by each component's share of the total capitalisation.

## Wellhead price

Price of natural gas at the wellhead.

## West Texas Intermediate (WTI)

US crude oil used as a benchmark for pricing much of the world's crude oil production. WTI is a relatively low specific gravity 'intermediate' crude with low sulphur content ('sweet').

## Western Systems Power Pool (WSPP)

The Western Systems Power Pool, now typically referred to just by its acronym WSPP, is an organisation of more than 300 electricity utilities and power marketers throughout the US operating under an umbrella marketing agreement. The WSPP Agreement is open to power sellers and customers, though it provides only for wholesale and not retail sales. It established the WSPP electricity spot market contract, the standard contract for short-term power trading across the US. The contract traded on a trial basis in May 1987 and was given final approval on July 1991 by the Federal Energy Regulatory Commission.

**Wet gas**

- 1) methane (dry gas) mixed with other hydrocarbons.
- 2) gas with a high liquid content, which often needs to be dried using a dehydration process.

★ *see also dry gas*

**Wholesale**

Energy supplied by one producer or marketer to another for eventual resale to consumers.

**Wholesale wheeling**

The transmission of gas or electricity to bulk distributors.

**Wobbe Index**

An index to indicate the interchangeability of fuel gases and is the best indicator of the similarity between natural gas and a specific propane-air mixture. Since this index relates heating characteristics of blended fuel gases, it can also be used to obtain constant heat flows from gases of varying compositions. The Wobbe Index, however, does not relate flame temperatures, heat transfer co-efficients or temperature gradients.

**Working gas**

(US) the amount of gas in a storage facility above the amount needed to maintain a constant reservoir pressure (the latter amount is known as cushion gas).

**Wiener Process**

A type of Markov Stochastic process. It refers to changes in value over small time periods. Sometimes, this process is also called Brownian motion.

**Writer**

The seller of an option.

**WRMA**

The Weather Risk Management Association is a Washington, DC-based trade association representing the interests of the global weather derivatives market.

**WECC**

Western Electricity Co-ordinating Council – a North American Electric Reliability Council for the Western Interconnection.

**WTI**

★ *see West Texas Intermediate*

# Y

**Year spread**

Spread between two-year contracts.

**Yield**

The interest rate that will make the net present value of the cash flows from an investment equal to the price (or cost) of the investment.

The net present value is the present value of future cash flows, discounted at the present cost of capital.

The current yield relates the annual coupon yield to the market price by dividing the coupon by the price divided by 100, neglecting the time value of money or potential capital gains and losses.

The simple yield-to-maturity takes into account the effect of the capital gained or lost at maturity, as well as the current yield.

**Yield curve**

The yield curve is a graph of the term structure of interest rates. It is usually given in terms of the spot yields on bonds with different maturities but the same risk factors (such as creditworthiness of issuer), plotted against maturity. In general, yields will increase with maturity and with the riskiness of the debt. Yield curves can be plotted for default-free bonds. Bonds that may default will fall on another yield curve at some spread to the default-free curve.

**Yield curve option**

An option whose underlying is the shape of the yield curve, normally defined as the yield of a longer-maturity bond minus the yield of a shorter-maturity bond. This allows investors to take a view on interest rates without taking a view on the bond market's direction. The value of a call yield curve option appreciates as the curve flattens, whereas a put's value decreases.

**Yield curve swap**

A swap in which two interest rate streams are exchanged, reflecting different points on the yield curve.

**Z****Z-score**

A statistical measure that quantifies the distance (measured in standard deviations) a data point is from the mean of a data set. The terminology is also used to refer to the output from a credit-strength test that gauges the likelihood of bankruptcy, more precisely known as the Altman Z-score.

**Zero-cost option**

An option strategy under which one option is bought by simultaneously selling another option of equal value.

★ *see also collar, cylinder*

