

Methodology and specifications guide

European electricity assessments and indices

Latest update: October 2017

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INTRODUCTION

Platts methodologies are designed to produce price assessments that are representative of market value, and of the particular markets to which they relate. Methodology documents describe the specifications for various products reflected by Platts assessments and indexes, the processes and standards Platts adheres to in collecting data, and the methods by which Platts arrives at final assessment values for publication. These guides are freely available on Platts website for public review.

Platts discloses publicly the days of publication for its price assessments and indexes, and the times during each trading day in which Platts considers transactions in determining its assessments and index levels. This schedule of publication is available on Platts website, at the following link: <http://www.platts.com/HolidayHome>.

The dates of publication and the assessment periods are subject to change in the event of outside circumstances that affect Platts ability to adhere to its normal publication schedule. Such circumstances include network outages, power failures, acts of terrorism and other situations that result in an interruption in Platts operations at one or more of its worldwide offices. In the event that any such circumstance occurs, Platts will endeavor, whenever feasible, to communicate publicly any changes to its publication schedule and assessment periods, with as much advance notice as possible.

All Platts methodologies reflect Platts commitment to maintaining best practices in price reporting.

Platts methodologies have evolved to reflect changing market conditions through time, and will continue to evolve as markets change. A revision history, a cumulative summary of changes to this and future updates, is included at the end of the methodology.

How this methodology statement is organized

This description of methodology for indexes and assessments is divided into seven major parts (I-VII) that parallel the entire process of producing the end-of-day price values.

- Part I describes what goes into Platts assessments, including details on what data market participants are expected to submit, the process for submitting data and criteria for timeliness of market data submissions.
- Part II describes any security and confidentiality practices that Platts uses in handling and treating data.
- Part III is a detailed account of how Platts collects bids, offers, trades and other market data. This section describes how and when judgment is applied in this process, the basis upon which transaction data may be excluded from a price assessment, and the relative importance assigned to each criterion used in forming the price assessment.
- Part IV outlines Platts Editorial Standards.
- Part V lays out the verification and correction process for revising published prices and the criteria Platts uses to determine when it publishes a correction.
- Part VI explains how users of Platts assessments and indexes can contact Platts for clarification of data that has been published, or to register a complaint. It also describes how to find out more about Platts complaint policies.
- Part VII is a list of detailed specifications for the trading locations and products for which Platts publishes indexes or assessments in this commodity. This section describes why specific units of measurement are used, and what conversion factors are used to move between units of measurement, where relevant.

PART I: DATA QUALITY AND DATA SUBMISSION

Platts objective is to ensure that the submission of transactional information and other data inputs that reporters use as the basis for their price assessments is of the highest quality. High-quality data is crucial to maintaining the integrity of Platts various price assessment processes.

Platts encourages entities that submit any market data for consideration in its assessment processes to submit all market data that they have which may be relevant to the assessment being made. Platts aim is to determine the full circumstances surrounding all reported transactional data, including details of trade volume, order (bid/offer) volume and locational and delivery period information. Platts uses that information to determine a typical and repeatable market level for the commodity and product being assessed.

Platts seeks to survey as broad a cross-section of the market as possible. This can include brokers, traders at utilities and financial institutions and other market participants. In addition, Platts may also observe activity on trading platforms such as broker screens. Platts welcomes information from all recognized market participants to contribute to its price assessments and encourages those active in the market to contribute information on trading activity.

What to report

- Firm bids that are open to the marketplace as a whole.
- Firm offers that are open to the marketplace as a whole.
- Confirmed trades, including time of trade and volume size
- Indicative values, clearly described as such
- Reported transactional activity heard across the market, clearly described as such

- Other data that may be relevant to Platts assessments

How to report

The following reporting methods are accepted by Platts editorial staff:

- Commonly used Instant Messaging software
- Telephone
- Email

PART II: SECURITY AND CONFIDENTIALITY

Data is stored in a secure network, in accordance with Platts policies and procedures. Platts European electricity assessments are produced in accordance with Platts assessment methodology. This means that all data for use in Platts assessments may be published by Platts editorial staff while assessing the value of the markets.

Platts does not have confidentiality agreements for information provided for use in its European electricity assessments.

PART III: CALCULATING INDEXES AND MAKING ASSESSMENTS

The following section describes how Platts uses reported data to formulate its price assessments. Additionally, this section describes other information, including the normalization of market data, assumptions and extrapolations that are considered when making a final assessment.

Price assessment principles

Platts considers market information gathered throughout the

normal trading day. Platts analyzes all admissible information in determining its final published price assessments.

Through the assessment process, Platts seeks to establish and publish the value of markets that prevail at the close of the assessment period. Platts has aligned the timestamps reflected in its assessments with what typically is a period of high activity in the markets that Platts observes. Platts believes that this alignment provides a robust basis upon which to derive a reliable assessment of market value.

The time that a bid or offer is shown to the market, or a transaction concluded, is vitally important in understanding the market value of the respective commodity. By clearly reflecting value at a defined point in time Platts is able to properly reflect outright and spread values during times of high volatility equally well as in times of modest volatility. By ensuring that all assessments within a region reflect market value at the same moment in time, spreads that exist between those products are also reflected. For example, comparing the value of German to French electricity is possible when both values have been determined at the same moment in time. By contrast, comparing the price of German electricity in the morning to French electricity in the afternoon might deeply impair the relationship between the products – particularly when the respective market prices move independently during the intervening period.

Platts does not specify a minimum amount of transaction data, or a transaction data threshold, for the publication of its price assessments. Physical commodity markets vary in liquidity. Any particular market analyzed on its own will typically demonstrate rising and falling levels of transactional activity through time. Platts is committed to providing an assessment of value for every market that it covers, equally well in times of heightened or reduced liquidity.

Normalization price adjustment techniques

Platts seeks to align the specifications for the European

electricity markets it assesses and the timestamps reflected in its assessments with standard industry practice. However, where delivery location, delivery period and other specific terms of trade vary from Platts standard assessment specifications, Platts applies a process called normalization, most frequently normalizing for time and location.

Normalization for time may be done by analyzing movement in a related market or contract observed through time. That movement may provide a basis by which to align market value of an earlier reported bid, offer or transaction to market value at the close.

Normalization for location typically involves analyzing location spreads between national electricity markets.

Prioritizing data

Platts assessment process considers firm bids, firm offers and transactions that are open to the marketplace. Platts considers changes to bids or offers in normal increments.

Platts may not consider bids, offers or transactions that are the result of market gapping, i.e. changes that are in excess of normal market practice.

When determining a final assessment, Platts gives the greatest priority to fully verifiable market information.

If there is a prevailing bid/offer spread open to the market at the close of the assessment period, Platts will typically assess market value somewhere between the best bid and best offer. This ensures that Platts assessments reflect the transactable value of the commodities it is assessing at the specified timestamp.

Confirmed transactions are important in helping establish where trading interest prevails in the market, and may help determine where, in a bid/offer spread, Platts assesses value for

publication. Firm bids and offers that are available to the entire market take precedence over trades that have been concluded earlier in the assessment process when establishing value.

The final assessment value should be above firm bids and below firm offers that stand at the close of the assessment period. This is true for outright values and differentials. In the event of an observed conflict between outright values and differentials, outright values prevail in Platts final published assessments.

When no bid, offer or transaction data exists, Platts may consider other verifiable data reported throughout the day, including partially confirmed trades, indicative trading values and other market information. Under such circumstances, Platts may also consider the effect of adjacent markets.

Inputs that are not verifiable and “one-off” or unrepeatable transaction data may be disregarded from the price assessment process. Single transactions may be a reflection of market value. However single transactions need to be measured against the broad span of market activity.

Assessment conversions

Platts publishes its assessments reflecting the currencies and units of measurement in which the products typically trade.

Electricity is generally traded in euro for most European markets. Applicable European markets are therefore assessed in euro. The UK market is generally traded in British pounds and is assessed in that currency.

European electricity is typically traded in megawatt-hours (MWh), and Platts publishes its assessments using these units of measurement as they prevail in practice.

Platts converts its UK electricity assessments from GBP/MWh to Eur/MWh to allow for ease of comparison or analysis in regional markets. Such conversions are done using published exchange rates.

Assessment process

Platts reporters follow specific methodology and apply editorial judgment during the assessment process. The exercise of judgment includes but is not limited to: determining whether information is suitable for publication; normalizing values to reflect differences in time and other trading terms; and determining where to assess final value of market.

Where editorial judgment is exercised, all information available is critically analyzed. All such judgment is subject to review by Platts editorial management for adherence to Platts methodology.

To ensure the assessments are as robust as possible, Platts editorial systems are backed by a strong corporate structure that includes managerial and compliance oversight. To ensure reporters follow Platts methodological guidelines in a consistent manner, Platts ensures that reporters are trained and regularly reviewed in their own and other markets.

Platts manages and maintains internal training guides for European electricity assessments which aim to assist reporters and ensure Platts price assessments are produced consistently. Platts price assessments are reviewed prior to publication and exercise of editorial judgment is further discussed and verified during this process.

Reporters are trained to identify potentially anomalous data. We define anomalous data as any information, including transactions, which is inconsistent with or deviates from our methodology or standard market conventions.

As a publisher owned by S&P Global, independence and impartiality are at the heart of what Platts does. Platts has no financial interest in the price of the products or commodities on which it reports.

Platts overall objective is to reflect the transactable value of the commodity assessed. In cases where

the apparent value of the commodity is deemed to include extra optionalities, the intrinsic value of the commodity may be masked. In such cases, Platts may use its editorial judgment to factor out such extraneous elements from the value of the commodity, or it may decide not to use the bid, offer or transaction in its assessment process.

PART IV: PLATTS EDITORIAL STANDARDS

All Platts employees must adhere to the S&P Global Code of Business Ethics (COBE), which has to be signed annually. The COBE reflects S&P Global's commitment to integrity, honesty and acting in good faith in all its dealings.

In addition, Platts requires that all employees attest annually that they do not have any personal relationships or personal financial interests that may influence or be perceived to influence or interfere with their ability to perform their jobs in an objective, impartial and effective manner.

Market reporters are mandated to ensure adherence to published methodologies as well as internal standards that require accurate records are kept in order to document their work.

S&P Global has a Compliance function that is independent of the editorial group. Compliance is responsible for ensuring the quality and adherence to Platts policies, standards, processes and procedures. The Compliance team conducts regular assessments of editorial operations, including checks for adherence to published methodologies.

S&P Global's internal auditor, an independent group that reports directly to the parent company's board of directors, reviews the Platts risk assessment programs.

PART V: CORRECTIONS

Platts is committed to promptly correcting any material errors. When corrections are made, they are limited to data that was available when the index or assessment was calculated.

PART VI: REQUESTS FOR CLARIFICATIONS OF DATA AND COMPLAINTS

Platts strives to provide critical information of the highest standards, to facilitate greater transparency and efficiency in physical commodity markets.

Platts customers raise questions about its methodologies and the approach taken in price assessments, proposed methodology changes and other editorial decisions in relation to Platts price assessments. Platts strongly values these interactions and encourages dialogue concerning any questions a customer or market stakeholder may have.

However, Platts recognizes that occasionally customers may not be satisfied with responses received or the services provided by Platts and wish to escalate matters. Full information about how to contact Platts to request clarification around an assessment, or make a complaint, is available on the Platts website, at: <http://www.platts.com/ContactUs/Complaints>.

PART VII: DETAILED SPECIFICATIONS

The following European electricity specifications guide contains the primary specifications and methodologies for Platts European electricity assessments. The various components of this guide are designed to give Platts subscribers as much information as possible about a wide range of methodology and specification issues.

This methodology is current at the time of publication. Platts may update this methodology guide. Any and all changes will be announced to subscribers through Platts usual publications of record. Platts editorial staff and managers are available to provide guidance when assessment issues require clarification.

A revision history, a cumulative summary of changes since August 2016, is included at the end of this section. The revision history also highlights selected changes since November 2013.

Platts European electricity standard specifications

Platts market-on-close assessments reflect market value at the end of the normal trading cycle. For European power we define this as:

All day-ahead contracts – 11:00 am London time.

All daily prompt and forward contracts – 16:30 London time. (Forward time stamp alignment to 16:30 London time as of November 1, 2009.)

Day-ahead assessments are published after 16:30 London time alongside Platts other European electricity assessments.

On certain days ahead of some UK Bank Holidays, such as Christmas Eve and New Year's Eve, Platts assesses the 16:30 market-on-close price earlier than normal, at 12:00 noon London time. This is to take account of typically much lower liquidity and the earlier end of trade.

Units: All prices are in Eur/MWh. All UK prices are quoted in GBP/MWh with Eur/MWh equivalents.

Unless otherwise stated, contract definitions for all European power assessments are as follows:

Timing: Baseload = 00:00-24:00 CET, Peak = 08:00-20:00 CET.

Day-ahead = Delivery next day from day of assessment.

Weekend = Baseload for delivery each day Saturday-Sunday.

Week-ahead = Delivered each day Monday-Sunday the following week for baseload and delivered each day Monday-Friday the following week for peak.

All forward months are calendar months.

All forward years are calendar years.

Platts assessment ranges

Platts publishes a single value for each of its European electricity assessments in European Power Daily and on European Power Alert.

Platts also publishes a low-high range around its assessments for European electricity symbols in Market Data categories EE and PE, unless otherwise stated. The low and high reflect a fixed value either side of the assessment. Low-high ranges are standardized as follows:

- Primary assessments in Eur/MWh: +/- 25 euro cent.
- Primary assessments in GBP/MWh: +/- 15 pence.

Standard contract definitions

Platts assessments are based on standard contract definitions and volumes, as outlined in subsequent sections of this document. These vary according to the market.

When Platts assessments are published

Platts day-ahead assessments are databased both by trade date and by flow date.

For applicable continental European power markets, Platts publishes a day-ahead assessment for each day of the year. For German power, Platts publishes Saturday, Sunday and Monday assessments each Friday and assessments for bank holidays are published on the last working day before the bank holiday.

For France and UK, Platts publishes day-ahead power market assessments for Monday to Friday and a single weekend assessment for Saturday and Sunday. On Fridays, the day-ahead price reflects Monday's delivery date. Assessments for UK bank holidays and the first working day following a UK bank holiday weekend are published on the last working day before the bank holiday.

French and Spanish week-ahead contracts are published each Friday or, in the event of a bank holiday, on the last working day of the week.

Platts publishes forward power assessments for the UK, Germany, France, Spain and Italy on all UK working days. Platts publishes weekly assessments for the Netherlands and Belgium on applicable UK working days.

European Power Daily: Monthly Averages

Platts publishes monthly averages for day-ahead and month-ahead. For day-ahead, monthly averages are calculated on a flow-date and trade-date basis.

For a flow-date monthly average an August 1 day-ahead assessment would be included in the August average, although the contract traded on July 31. UK and French flow-date averages calculate Saturday and Sunday values based on Friday assessments of weekend delivery.

The day-ahead trade-date averages are based on Monday-Friday day-ahead prices and do not include Friday assessments of Sunday and Monday delivery for most of continental Europe. UK and French day-ahead assessments cover working days only and the trade-date monthly averages

therefore include Friday assessments of Monday delivery but do not include weekends. The trade-date calculations do not include day-ahead+1, day-ahead+2, day-ahead+3 and day-ahead+4 prices assessed ahead of UK bank holidays.

Roll dates

All weekly, monthly, quarterly, seasonal and annual power contracts roll on the first working day of each new calendar period.

PLATTS UK ASSESSMENTS (GTMA, GBP/MWh)

	Base	Peak	--Euro Equivalents--	
	Base	Peak	Base	Peak
Day ahead	AADET00	AADFC00	AADEY00	AADFE00
Day ahead + 1	AADET27	AADFC27	AADEY27	AADFE27
Day ahead + 2	AADET28	AADFC28	AADEY28	AADFE28
Weekend	AADNN00		AADNP00	
Month ahead	AADGP00	AADGV00	AADGT00	AADIJ00
Month ahead + 1	AADNS00	AADXH00	AADNU00	AADXJ00
Month ahead + 2	AADXL00	AADXP00	AADNX00	AADXR00
Quarter ahead	AADXU00	AADXZ00	AADW00	AADYB00
Quarter ahead + 1	AADYD00	AADYK00	AADYF00	AADZP00
Season ahead	AADZS00	AAEYV00	AAESW00	AAEZB00
Season ahead + 1	AAEZD00	AAFPM00	AAFPL00	AAFPN00
Season ahead + 2	AAIJX00	AAIJY00	AAIKB00	AAIKC00
Season ahead + 3	AAIJZ00	AAIKA00	AAIKD00	AAIKE00
Season ahead + 4	AASTR00	AASTT00	AASTQ00	AASTS00
Year ahead	FUKZY01	FUKYY01	FUKXY01	FUKWY01

UK ELECTRICITY MARKET COVERAGE

Platts assesses over-the-counter trade under the Grid Trade Master Agreement contract for the day ahead, weekend, next three months, next two quarters, next five seasons and the year ahead.

Specifications

Delivery: Prices are for firm delivery on the high-voltage grid network of England, Wales and/or Scotland. This includes the Scotland-Northern Ireland interconnector but not Northern Ireland itself. Distribution network costs are not included. All prices are for physically delivered trades.

Lot size: Qualifying trades are 50-100 MW for prompt (day-ahead and weekend delivery) and 5 MW-20 MW for forwards.

Timing (London time): Baseload = 23:00-23:00, Peak = 07:00-19:00.

EFA Block definitions (London time)

Block 1 = 23:00-03:00

Block 2 = 03:00-07:00

Block 3 = 07:00-11:00

Block 4 = 11:00-15:00

Block 5 = 15:00-19:00

Block 6 = 19:00-23:00.

Day-ahead = Baseload for delivery from 23:00 the day of trade

until 23:00 the day after. Peaks for delivery 07:00-19:00 the day following trade.

NOTE: In the event of no confirmed peakload UK day-ahead trades before the 11:00 am London time market close, Platts will assess the implied value of the day-ahead peakload contract using OTC prices for Block 3+4 (07:00-15:00) and Block 5 (15:00-19:00).

Weekend = Baseload for delivery from 23:00 Friday until 23:00 on Sunday.

Winter = The period from October-March.

Summer = The period from April-September

NOTE: The UK market also has off-peak contracts (19:00-07:00 London time) and overnight contracts (23:00-07:00 London time). These contracts do not form part of Platts assessments.

CONTINENTAL EUROPEAN POWER COVERAGE

Platts German Assessments (Eur/MWh)

	Base	Peak
Day ahead	AACTG00	AACTK00
Day ahead + 1	AACTG27	AACTK27
Day ahead + 2	AACTG28	AACTK28
Day ahead + 3	AACTG29	AACTK29
Day ahead + 4	AACTG30	AACTK30
Weekend	AADZR00	
Week ahead	AACTI00	AACTM00
Month ahead	AACRY00	AACSB00
Month ahead + 1	AACTY00	AACTZ00
Month ahead + 2	AACTY00	AACTZ00
Month ahead + 3	AACTY00	AACTZ00
Quarter ahead	AACTY00	AACTZ00
Quarter ahead + 1	AACTY00	AACTZ00
Quarter ahead + 2	AACTY00	AACTZ00
Quarter ahead + 3	AACTY00	AACTZ00
Quarter ahead + 4	AACTY00	AACTZ00
Year ahead	AACTY00	AACTZ00
Year ahead + 1	AACTY00	AACTZ00
Year ahead + 2	AACTY00	AACTZ00

Platts French Assessments (Eur/MWh)

	Base	Peak
Day ahead	AAHNO00	AAHXG00
Day ahead + 1	AAHNO27	AAHXG27
Day ahead + 2	AAHNO28	AAHXG28
Day ahead + 3	AAHNO29	AAHXG29
Day ahead + 4	AAHNO30	AAHXG30
Weekend	AAHNO42	
Week ahead	AAHNP00	AAHXZ00
Month ahead	AAHNQ00	AAHXC00
Quarter ahead	AAHNS00	AAHJ00
Quarter ahead + 1	AAHNT00	AAHYR00
Year ahead	AAHNU00	AAHYU00

Platts Spanish Assessments (Eur/MWh)

	Base
Week ahead	AADIR00
Month ahead	AADIY00
Quarter ahead	AADJG00
Quarter ahead + 1	AADJL00
Year ahead	AAHQY00

Platts Italian Assessments (Eur/MWh)

	Base
Month ahead	IPBTM10
Quarter ahead	IPBTQ01
Quarter ahead + 1	IPBTQ02
Year ahead	IPBTY01

Platts Dutch Weekly Assessments (Eur/MWh)

	Base	Peak
Month ahead	AADMN00	AADMP00
Quarter ahead	AADNA00	AADNC00
Year ahead	AADNI00	AADNK00
Year ahead + 1	AAETK00	AAETL00

Platts Belgian Weekly Assessments (Eur/MWh)

	Base
Month ahead	AAMLZ00
Quarter ahead	AAMMF00
Year ahead	AAMMI00
Year ahead + 1	BPWEY02

CONTINENTAL EUROPEAN POWER COVERAGE

Specifications

Germany

Delivery: Prices are for firm delivery on the German high-voltage grid network. Distribution network costs are not included. All prices are for physically delivered trades.

Lot size: Qualifying trades are 25-50 MW for prompt (day-ahead, weekend and week-ahead delivery) and 5-25 MW in 5 MW increments for forwards.

France

Delivery: Prices are for firm delivery on France's high-voltage electricity network. Distribution network costs are not included. All prices are for physically delivered trades.

Lot size: Qualifying trades are 25-50 MW for prompt (day-ahead, weekend and week-ahead delivery) and 5-25 MW in 5 MW increments for forwards.

All forward month and year peak assessments include public holidays.

The Netherlands

Delivery: Prices are for firm delivery on the Dutch high-voltage electricity network. Distribution network costs are not included. All prices are for physically delivered trades.

Lot size: Qualifying trades are 5-25 MW in 5 MW increments.

NOTE: The Dutch market also has peak contracts. These do not form part of Platts assessments.

Belgium

Delivery: Prices are for firm delivery on the Belgian high-voltage grid network. Distribution network costs are not included. All prices are for physically delivered trades.

Lot size: Qualifying trades are 5-25 MW in 5 MW increments.

NOTE: The Belgian market also has peak contracts. These do not form part of Platts assessments.

Spain

Delivery: Prices are for firm delivery on Spain's high-voltage electricity network. Distribution network costs are not included.

Lot size: Qualifying trades are 25-50 MW for prompt (day-ahead and week-ahead delivery) and 5-25 MW in 5 MW increments for forwards.

NOTE: The Spanish market also has peak contracts. These do not form part of Platts assessments.

Italy

Delivery: Prices are for firm delivery on Italy's high-voltage electricity network. Distribution network costs are not included. All prices are for physically delivered trades.

Lot size: Qualifying trades are 5-25 MW in 5 MW increments for forwards.

NOTE: The Italian market also has peak contracts. These do not form part of Platts assessments.

PLATTS DAILY SPARK SPREADS

	45% Efficiency	50% Efficiency
UK (GBP/MWh)		
Day ahead	UKHDA00	AAKBA00
Month ahead	UKHMA00	AAKBC00
Month ahead + 1	UKHM200	UKFM200
Month ahead + 2	UKHM300	UKFM300
Quarter ahead	UKHQ100	UKFQ100
Quarter ahead + 1	UKHQ200	UKFQ200
Season ahead	UKHS100	UKFS100
Season ahead + 1	UKHS200	UKFS200
Season ahead + 2	UKHS300	UKFS300
Season ahead + 3	UKHS400	UKFS400

	45% Efficiency	50% Efficiency
UK (Eur/MWh)		
Day ahead	UEHDA00	UEFDA00
Month ahead	UEHMA00	UEFMA00
Month ahead + 1	UEHM200	UEFM200
Month ahead + 2	UEHM300	UEFM300
Quarter ahead	UEHQ100	UEFQ100
Quarter ahead + 1	UEHQ200	UEFQ200
Season ahead	UEHS100	UEFS100
Season ahead + 1	UEHS200	UEFS200
Season ahead + 2	UEHS300	UEFS300
Season ahead + 3	UEHS400	UEFS400

	45% Efficiency	50% Efficiency
German (Eur/MWh)		
Day ahead	GEHDA00	AAKBI00
Month ahead	GEHMA00	AAKBK00
Month ahead + 1	GEHM200	GEFM200
Quarter ahead	GEHQ100	GEFQ100
Quarter ahead + 1	GEHQ200	GEFQ200
Year ahead	EHYA00	GEFYA00
Italian (Eur/MWh)		
Month ahead	ITKMA00	ITFMA00
Quarter ahead	ITKQA00	ITFQA00
Spanish (Eur/MWh)		
Month ahead	SPHMA00	SPFMA00
Quarter ahead	GAPDA00	GAPDB00
Quarter ahead + 1	GAPEA00	GAPEB00
Year ahead	GAPFA00	GAPFB00

SPARK SPREADS

Platts spark spreads are indicative prices giving the average difference between the cost of gas and the equivalent price of electricity.

Prices are quoted daily for the UK German, Italian, and Spanish markets and weekly for the Belgian and Dutch markets and reflect a High Heating Value (HHV).

Spark spreads for each country are based on Platts assessments of relevant national power and gas contracts with the exception of Germany which is based on TTF gas assessments.

The day-ahead gas and power assessments used to calculate the UK and German day-ahead spark spreads reflect the next UK working day.

Platts calculates the spark spread for gas-fired plants with efficiencies of 45% and 50% for all of the markets listed above, and 60% for all markets except Spain.

The full formula is as follows: Power price – (Gas price/fuel efficiency)

PLATTS DAILY CLEAN SPARK SPREADS

	--Clean spark spread--		--Euro Equivalents--	
	45% Efficiency	50% Efficiency	45% Efficiency	50% Efficiency
UK (GBP/MWh)				
Day ahead	UEIDA00	CKFDA00	CKHDA00	CKGDA00
Month ahead	UEIMA00	CKFMA00	CKHMA00	CKGMA00
Month ahead + 1	UEIM200	CKFM200	CKHM200	CKGM200
Month ahead + 2	UEIM300	CKFM300	CKHM300	CKGM300
Quarter ahead	UEIQ100	CKFQ100	CKHQ100	CKGQ100
Quarter ahead + 1	UKIM200	CKFQ200	CKHQ200	CKGQ200
Season ahead	UKIQ100	CKFS100	CKHS100	CKGS100
Season ahead + 1	UEIQ200	CKFS200	CKHS200	CKGS200
Season ahead + 2	UKIM300	CKFS300	CKHS300	CKGS300
Season ahead + 3	UEIS400	CKFS400	CKHS400	CKGS400
UK (Eur/MWh)				
Day ahead	UKIDA00	CEFDA00	CEHDA00	CEGDA00
Month ahead	UKIMA00	CEFMA00	CEHMA00	CEGMA00
Month ahead + 1	UKIQ200	CEFM200	CEHM200	CEGM200
Month ahead + 2	UEIS300	CEFM300	CEHM300	CEGM300
Quarter ahead	UEIS100	CEFQ100	CEHQ100	CEGQ100
Quarter ahead + 1	UEIS200	CEFQ200	CEHQ200	CEGQ200
Season ahead	UKIS100	CEFS100	CEHS100	CEGS100
Season ahead + 1	UKIS200	CEFS200	CEHS200	CEGS200
Season ahead + 2	UKIS300	CEFS300	CEHS300	CEGS300
Season ahead + 3	UKIS400	CEFS400	CEHS400	CEGS400
German (Eur/MWh)				
Day ahead	GEIDA00	CGFDA00		
Month ahead	GEIMA00	CGFMA00		
Month ahead + 1	GEIM200	CGFM200		
Quarter ahead	GEIQ100	CGFQ100		
Quarter ahead + 1	GEIQ200	CGFQ200		
Year ahead	GEIYA00	CGFYA00		
Italian (Eur/MWh)				
Month ahead	ITIQA00	CIFMA00		
Quarter ahead	ITIMA00	CIFQA00		

PLATTS DAILY CLEAN SPARK SPREADS

Spanish (Eur/MWh)

Month ahead	SPGMA00	SPIMA00
Quarter ahead	GAPDC00	GAPDD00
Quarter ahead + 1	GAPEC00	GAPED00
Year ahead	GAPFC00	GAPFD00

PLATTS WEEKLY SPARK SPREADS

	--Spark spread--		--Clean spark spread--	
	45% Efficiency	50% Efficiency	45% Efficiency	50% Efficiency
Dutch (Eur/MWh)				
Month ahead	DEHMA00	AAOAC00	DEIMA00	CDFMA00
Quarter ahead	DEHQ100	DEFQ100	DEIQ100	CDFQ100
Year ahead	DEHYA00	DEFYA00	DEIYA00	CDFYA00
Belgian (Eur/MWh)				
Month ahead	BEHM100	AAOAA00	BEIM100	CBFMA00
Quarter ahead	BEHQ100	BEFQ100	BEIQ100	CBFQ100

CLEAN SPARK SPREADS

Platts clean spark spreads are indicative prices giving the average difference between the cost of gas and emissions, and the equivalent price of electricity on a HHV basis.

Prices are quoted daily for the UK, German, Italian and Spanish markets and weekly for the Belgian and Dutch markets.

German clean spark spreads are based on TTF gas assessments, equivalent German power assessments and third-party EU emissions Allowance (EUA) prices.

All other clean spark spreads are based on Platts assessments of relevant national power and gas contracts and third-party EUA prices.

Platts calculates the clean spark spread for gas-fired plants with efficiencies of 45% and 50% for all markets, and 60% for all markets excluding Spain, and an emissions intensity of 0.053942 tCO₂e/MMBtu HHV (thermal basis, before combustion).

The full formula for Belgian, Dutch, German, Italian and Spanish clean spark spreads is as follows: Platts spark spread – (EUA emissions price * emissions intensity factor 0.053942 * energy conversion 3.412141 / fuel efficiency)

The full formula for UK clean spark spreads is as follows: Platts UK spark spread in GBP/MWh - (EUA emissions price in euro/mt converted to GBP * emissions intensity factor 0.053942 * energy conversion 3.412141 / fuel efficiency)

Platts also publishes UK CPS clean spark spreads that incorporate the cost of the UK government's Carbon Price Support (CPS) levy at the following confirmed rates:

Year	Levy in GBP/mt
April 1, 2014 - March 31, 2015	9.55
April 1, 2015 - March 31, 2016	18.08
April 1, 2016 - March 31, 2017	18.00
April 1, 2017 - March 31, 2018	18.00
April 1, 2018 - March 31, 2019	18.00
April 1, 2019 - March 31, 2020	18.00

The full formula for UK CPS clean spark spreads is: Platts UK spark spread in GBP/MWh - (EUA emissions price in euro/mt converted to GBP + CPS levy in GBP/mt * emissions intensity factor 0.053942 * energy conversion 3.412141 / fuel efficiency)

Emissions roll dates

The EUA component of Platts clean fuel spreads reflects a December annual expiry date. Platts clean fuel spread calculations will typically reference the emissions contract most relevant to the delivery period for the fuel legs of the spread. In the UK, seasonal clean fuel spreads that include delivery during winter periods which touch on two calendar years will use an average of two emissions contracts for the 'clean' component of the spread.

Platts clean fuel spread calculations incorporate three emissions contracts ahead with specifications and roll dates as listed on the European Energy Exchange (EEX).

PLATTS DAILY DARK SPREADS

35% Efficiency		35% Efficiency		35% Efficiency	45% Efficiency
UK (Eur/MWh)		UK (GBP/MWh)		German (Eur/MWh)	
Month ahead	CDUTM00	Month ahead	CDUZM00	Month ahead	CDGTM00
Month ahead + 1	CDUTM27	Month ahead + 1	CDUZM27	Month ahead + 1	CDGTM27
Quarter ahead	CDUTQ00	Quarter ahead	CDUZQ00	Quarter ahead	CDGTQ00
Quarter ahead + 1	CDUTQ27	Quarter ahead + 1	CDUZQ27	Quarter ahead + 1	CDGTQ27
Season ahead	CDUTS00	Season ahead	CDUZS00	Year ahead	CDGTY00
				Year ahead + 1	CDGTY27
				Year ahead + 2	CDGTY28

DARK SPREADS

Platts dark spreads are indicative prices giving the average difference between the cost of coal and the equivalent price of electricity on any given day.

UK and German dark spreads are based on Platts CIF ARA coal assessments and UK and German electricity assessments.

The formula for UK and German dark spreads uses an energy conversion factor of 6.978 (converting 1 metric ton of coal into MWh) and a fuel efficiency factor (coal) of 35% and 45% (Germany only).

The full formula is as follows: Baseload power price in euro – (((coal price in US dollar ÷ exchange rate) ÷ energy conversion factor) ÷ fuel efficiency factor)

PLATTS DAILY CLEAN DARK SPREADS

	35% Efficiency	CPS
UK (Eur/MWh)		
Month ahead	CCUTM00	CCHTM00
Month ahead + 1	CCUTM27	CCHTM27
Quarter ahead	CCUTQ00	CCHTQ00
Quarter ahead + 1	CCUTQ27	CCHTQ27
Season ahead	CCUTS00	CCHTS00

	35% Efficiency	CPS
UK (GBP/MWh)		
Month ahead	CCUZM00	CCHZM00
Month ahead + 1	CCUZM27	CCHZM27
Quarter ahead	CCUZQ00	CCHZQ00
Quarter ahead + 1	CCUZQ27	CCHZQ27
Season ahead	CCUZS00	CCHZS00

	35% Efficiency	45% Efficiency
German (Eur/MWh)		
Month ahead	CCGTM00	CCGUM00
Month ahead + 1	CCGTM27	CCGUM27
Quarter ahead	CCGTQ00	CCGUQ00
Quarter ahead + 1	CCGTQ27	CCGUQ27
Year ahead	CCGTY00	CCGUY00
Year ahead + 1	CCGTY27	CCGUY27
Year ahead + 2	CCGTY28	CCGUY28

CLEAN DARK SPREADS

Platts clean dark spreads are indicative prices giving the average difference between the cost of coal and emissions, and the equivalent price of electricity on any given day.

Prices are quoted for the UK and German markets.

UK and German clean dark spreads are based on Platts CIF ARA coal assessments, UK and German electricity assessments and third-party EUA prices.

The formula for the UK and German clean dark spreads uses an energy conversion factor of 6.978 (converting 1 metric ton of coal into MWh), a fuel efficiency factor (coal) of 35% and 45% (Germany only) and an emissions intensity factor of 0.973 mtCO₂/MWh.

The full formula is as follows: Baseload power price in euro –

$$\left(\frac{\text{coal price in US dollar} \div \text{exchange rate}}{\text{energy conversion factor}} \right) \div \text{fuel efficiency factor} - (\text{EUA price in euro} \times \text{carbon intensity factor})$$

Platts also publishes UK CPS clean dark spreads that incorporate the cost of the UK government's Carbon Price Support (CPS) levy at the following confirmed rates:

Year	Levy in GBP/mt
April 1, 2014 - March 31, 2015	9.55
April 1, 2015 - March 31, 2016	18.08
April 1, 2016 - March 31, 2017	18
April 1, 2017 - March 31, 2018	18
April 1, 2018 - March 31, 2019	18
April 1, 2019 - March 31, 2020	18

The full formula for UK CPS clean dark spreads is: Platts UK dark spread in GBP/MWh at 35% fuel efficiency - (EUA emissions price in euro/mt converted to GBP + CPS levy in GBP/mt * emissions intensity factor 0.973).

Emissions roll dates

The EUA component of Platts clean fuel spreads reflects a December annual expiry date. Platts clean fuel spread calculations will typically reference the emissions contract most relevant to the delivery period for the fuel legs of the spread. In the UK, seasonal clean fuel spreads that include delivery during winter periods which touch on two calendar years will use an average of two emissions contracts for the 'clean' component of the spread.

Platts clean fuel spread calculations incorporate three emissions contracts ahead with specifications and roll dates as listed on the European Energy Exchange (EEX).

PLATTS COAL SWITCHING PRICE INDICATOR (CSPI)

	UK (p/th)	UK (Eur/MWh)	Netherlands (Eur/MWh)
Month ahead	EUKVM00	EUKTM00	EDUTM00
Quarter ahead	EUKVQ00	EUKTQ00	EDUTQ00
Year ahead	EUKVY00	EUKTY00	EDUTY00

COAL SWITCHING PRICE INDICATOR (CSPI)

Platts Coal Switching Price Indicator (CSPI) calculates the threshold at which gas prices are more competitive than coal prices as input fuel in power generation. When the gas price is higher than the CSPI, CCGT generation is more expensive than coal-fired generation and vice versa.

Platts CSPI data is quoted for the UK and the Netherlands and is expressed in Eur/MWh and for the UK only in p/th.

Platts CSPI data is based on the Platts CIF ARA coal forward curve assessment that corresponds to each CSPI delivery period and on third-party EUA prices (see “Emissions roll dates” above).

For the UK CSPI, Platts incorporates the cost of the UK government’s CPS levy (see table in CPS clean dark spreads section above) For the calendar year ahead UK CSPI, a time-weighted average of the CPS will be used to reflect the presence of two confirmed UK CPS rates for any given calendar year.

For the Dutch CSPI, Platts incorporates the cost of the Dutch coal tax at Eur0.00/mt, reflecting the introduction of a tax

exemption on coal-fired power plants with an efficiency of 38% or higher from 2016 onward and following Platts analysis of minimum operating efficiencies of the Dutch coal-fired power plant fleet.

Previous Dutch coal tax rates were Eur14.40/mt for calendar year 2015 and Eur14.27/mt for calendar year 2014

Platts calculates the CSPI using the following carbon emission factors: gas 0.18404 mtCO₂/MWh; coal 0.34056 mtCO₂/MWh (thermal basis, before combustion).

Platts calculates the CSPI using the following efficiencies: UK CCGT 45% and 50% HHV; UK coal 35% LHV; Dutch CCGT 45% and 50% HHV; Dutch coal 40% LHV.

The full CSPI formula is as follows:

$$\text{UK CSPI_EUR (Eff = 50\%, Eff = 45\%)} = \text{Eff} * [\text{Coal_Price}/35\% + (\text{EF_Coal}/35\% - \text{EF_CCGT}/\text{Eff}) * (\text{EUA_Price} + \text{UK_CPS})]$$

$$\text{UK CSPI_p (Eff = 50\%, Eff = 45\%)} = \text{UK CSPI_EUR (Eff = 50\%, Eff = 45\%)} * \text{EURGBP} * 2.9307$$

$$\text{Dutch CSPI (Eff = 50\%, Eff = 45\%)} = \text{Eff} * [\text{Coal_Price}/40\% + (\text{EF_Coal}/40\% - \text{EF_CCGT}/\text{Eff}) * (\text{EUA_Price} + \text{Dutch_CT}/40\%)]$$

Formula Definitions:

Coal_Price = Platts CIF ARA coal price assessment as quoted in USD/mt and converted into Eur/MWh

EUA_Price = EUA prices as listed on EEX and quoted in Eur/mt

EF_CCGT = Emissions factor CCGT

EF_Coal = Emissions factor coal

UK_CPS= UK Carbon Price Support

Dutch_CT= Dutch coal tax

UK CSPI_EUR = UK Coal Switching Price Indicator, quoted in Eur/MWh

UK CSPI_p = UK Coal Switching Price Indicator, quoted in p/th

Dutch CSPI = Dutch Coal Switching Price Indicator, quoted in Eur/MWh

GENERATING FUEL COST COMPARISONS

	/MWh	Plus CO2	Total /MWh	GBP	--Profit/loss-- Eur	\$
UK baseload (GBP)						
Gas						
Next month	AANFJ00	AANFK00	AANFL00	AANFM00	AANFN00	AANFP00
Next quarter	AANFW00	AANFX00	AANFY00	AANFY00	AANFZ00	AANGA00
Coal						
Next month	AANGG00	AANGH00	AANGJ00	AANGK00	AANGL00	AANGM00
Next quarter	AANGU00		AANGV00	AANGW00	AANGX00	AANGY00
Fuel oil 1%S (peak load)						
Next month	AANHE00	AANHF00	AANHG00	AANHH00		
Next quarter	AANH00c		AANHP00	AANHQ00		
NW Europe baseload (Eur)						
Gas						
Next month	AANFQ00	AANFR00	AANFS00	AANFU00	AANFT00	AANFV00
Next quarter	AANGB00		AANGC00	AANGE00	AANGD00	AANGF00
Coal						
Next month	AANGN00	AANGP00	AANGQ00	AANGS00	AANGR00	AANGT00
Next quarter	AANGZ00		AANHA00	AANHC00	AANHB00	AANHD00
Fuel oil 1%S (peak load)						
Next month	AANHJ00	AANHL00	AANHK00		AANHM00	
Next quarter	AANHR00		AANHS00		AANHT00	

CROSS-FUEL COMPARISONS

Platts cross-fuel comparisons are indicative prices of the costs of burning oil, gas and coal in power stations. In each case, the price of the fuel for spot and forward delivery is converted into an equivalent electricity price, quoted in Eur/MWh, GBP/MWh and \$/MWh. The conversions assume the following plant efficiencies:

Natural Gas: 50%, Coal: 35%, Fuel Oil: 32%.

The data uses the following kg CO2/MMBtu rates: 53.937 for natural gas, 99.64 for coal, and 72.5 for oil.

Coal and distillates are priced at ARA.

The standard specifications and sources of each fuel type can be found in the following documents listed on <http://www.platts.com/methodology-specifications>:

Natural gas - Platts European Natural Gas Methodology and Specifications

Coal - Platts Coal Methodology and Specifications

Fuel oil - Platts European Oil Products Methodology and Specifications

REVISION HISTORY

October 2017: Platts launched Spanish spark and clean spark spreads for the Quarter-ahead, Quarter-Ahead +1 and Year-ahead, with both 45% and 50% efficiency.

October 2017: Platts discontinued French Month-ahead+1, Month ahead+2, Year ahead+1, and Year ahead+2 base and peak power assessments. Platts also replaced French Saturday and Sunday power prices with the Weekend assessment for the flow date price data set. In addition, Spanish Day-ahead, Weekend, Month-ahead+1 and Quarter-ahead +2 baseload assessments were also discontinued. From October 2, French and Spanish Week-ahead contracts are only assessed on the last working day of the week.

May 2017: Platts updated the clean fuel spread sections of this methodology guide to change the source of European emissions prices from Platts assessments to third-party exchange.

February 2017: Platts removed references to duplicate UK index symbols which were discontinued on February 3, 2017.

January 2017: Platts completed an annual update to the European Electricity methodology and specifications guide. In this update, Platts revamped the guide to introduce greater consistency of layout and structure across Platts' published methodology guides. Platts also reviewed all content during this update and introduced code lists. Methodologies for market coverage were not changed.

January 2017: Platts discontinued prompt power assessments for Switzerland, the Netherlands and Belgium. Platts also discontinued forward assessments of Dutch peakload contracts and Dutch quarter-ahead + 1 baseload and moved to weekly reporting for remaining Dutch and Belgian power

assessments and associated spark and clean spark spreads. Platts discontinued the following calculated indices: Platts Power Index (German PPI); Continental European Forward Power Price indices; PEP and CONTI indices.

November 2016: Platts clarified the day-ahead definition for European spark spreads.

October 2016: Platts discontinued UK week-ahead and week-ahead+1 base and peak power assessments.

October 2016: Platts updated the Spark Spreads section of this guide to reflect the renaming of its Spanish gas assessments to PVB (formerly AOC).

September 2016: Platts updated the Currency conversions section of this guide. The source and timestamp for the foreign exchange data used to convert Platts European electricity assessments to foreign currency equivalents was revised from Tullett Prebon at 16:00 London time to Platts 16:30 London time assessment. Platts also removed references to the previous calculations for exchange rates. Prior to June 2014, exchange rates were published with a working-day time lag, with the previous day's exchange rate close used in calculations.

August 2016: Platts updated this guide to remove references to CEE and Turkish power assessments and to Turkish dark and spark spreads. Platts discontinued assessments of the Czech, Hungarian, Polish and Turkish power markets. Turkish dark and spark spreads were also discontinued. Price history remains available in Market Data categories EE, PE and EM.

November 2015: Platts introduced additional German dark spread indicators, with a fuel efficiency factor of 45%.

September 2015: Platts discontinued its assessments of

German month-ahead+4 and month-ahead+5 baseload and peakload electricity contracts.

March 2015: Platts discontinued publishing cross-fuel comparisons containing Gasoil 0.1% sulfur content and Fuel Oil 3.5% sulfur content.

December 2014: Platts updated the plant efficiencies and rates in its cross-fuel comparisons on December 16, 2014. Previous plant efficiencies were: Gas 49% (UK) and 54% (western Europe), Fuel Oil: 32%, Gasoil: 32%, Coal: 34%. Previous kg CO₂/MMBtu rates were 101.5 for coal, 55 for natural gas and 72.5 for oil.

April 2014: Platts revised the emissions intensity factor used in its spark spreads to 0.053942 tCO₂e/MMBtu HHV from 0.055 with effect from April 1, 2014. The energy conversion factor (coal) used in dark spreads was revised to 6.978 from 7.1 and the emissions intensity factor used in clean dark spreads was revised to 0.973 mtCO₂/MWh from 0.96.

March 2014: Platts discontinued its assessment of the UK April Annual contract.

January 2014: Platts moved its day-ahead timestamp to 11:00 am from midday as of January 2, 2014.

November 2013 – September 2014: Platts transitioned its UK forward power assessments to the Gregorian calendar from the EFA calendar. The last EFA roll date was September 29, 2014, and the first Gregorian roll date was November 3, 2014.

November 2013: Platts launched assessments of EFA-Gregorian "gap" products covering the following dates: September 29-30, 2014 and March 30/31, 2015. Assessments were only published in the event of trade or firm and verifiable indications of market value.