

Oil Benchmarks and European Power Markets

This report compares regional Brent and WTI spot observations on common observed dates. We describe the official oil reference basket and standard Brent contract properties. We then examine European electricity time units, calendar arithmetic and separately reported annual exchange turnover. Both parts ask what a published price, contract term, time unit or volume figure does and does not measure.

SUBJECT

Oil benchmarks and European electricity markets

EVIDENCE

Records from EIA, S&P Global, ICE, EPEX, NEMO and EU calendar rules.

DOCUMENT TYPE

Private research

Brent and WTI spot prices: levels and changes

Across 1,473 common-date EIA spot observations from 2020 to 2025, Brent and WTI price levels have $\rho = 0.993$. This is descriptive, not a contract comparison: ICE specifies EFP delivery with an option to cash settle against the ICE Brent Index, and successive dates are not guaranteed 24-hour intervals. ^{[01] [04]}

0.9933

Pearson correlation of spot price levels (unitless)
1,473 common-date observations, January 2020 to December 2025.



Measure	Value
Common dates	1 473
Observation window	2020–2025
Change pairs	1 472

EIA reports Brent and WTI as regional crude-oil spot assessments in dollars per barrel. The level statistic is Pearson correlation across 1,473 retained common dates. It describes observed price levels only. It does not establish substitution, hedge effectiveness, or a physical link. EIA spot assessments are not futures settlements or executed transactions. ^{[01] [02]}

For first differences, each pair is the change between successive retained common dates: 1,472 pairs in USD/bbl, with Pearson $\rho = 0.575$. There are 326 gaps longer than one calendar day. That count describes spacing; it does not explain the correlation or make each change a 24-hour return. ICE’s Brent futures terms do not show same-clock tradability or hedge performance. ^{[01] [04]}

Spot correlations only. They do not measure hedge effectiveness, substitution, physical linkage, or same-clock execution. ^{[01] [02] [04]}

Six eligible streams in Platts Dated Brent

The basket combines named grades with a specified Midland delivery month. ^[03]

6 Eligible crude streams
Count of named streams, not their blend weights or physical identity. ^[03]

Brent	Forties	Oseberg
Ekofisk	Troll	WTI Midland

Origin	Count
North Sea	5
United States	1

Platts names six eligible crude streams: Brent, Forties, Oseberg, Ekofisk, Troll and WTI Midland. Five are North Sea streams; Midland is the one US stream. The basket broadens the common pricing reference across origins. Its count identifies eligible streams, not their weights or physical identity. ^[03]

May 2, 2023 was the first calendar date when a buyer and seller could bid, offer and/or transact on a WTI Midland cargo for June 2023 delivery and have its value inform the Platts Dated Brent assessment. ^[03] That date sets eligibility timing. It does not estimate a causal pre/post effect or residual mispricing, and calendar alignment does not establish synchronized trading times.

Platts Dated Brent is a price assessment. EIA Brent - Europe is a regional spot-price series. ICE Brent is a standard futures contract. These are distinct reference types. ^{[01] [03] [04]}

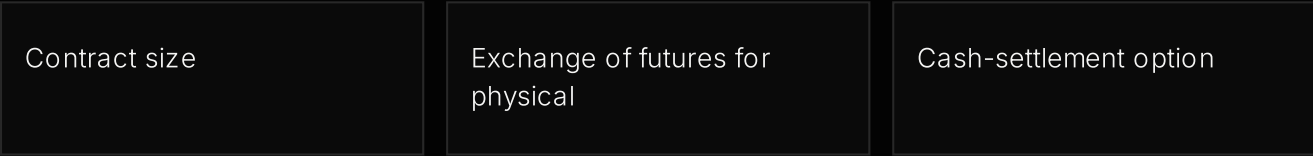
ICE Brent: contract terms and tick value

ICE Brent’s specification sets the contract size, minimum price movement and EFP-based delivery terms, with an option to cash settle against the ICE Brent Index. ^[04]

10.00

Value of one minimum price tick per contract (USD)
Calculated as 1,000 barrels × USD 0.01 per barrel. This is tick value, not contract price. ^[04]

Field	Specification
Contract size	1 000
Quotation / price unit	US dollars per barrel
Minimum tick	0.01
Settlement type	Deliverable based on EFP, with cash -settlement option



ICE specifies a standard contract size of 1,000 barrels and a minimum price fluctuation of USD 0.01 per barrel. Quotation is in US dollars and cents per barrel. ^[04] The tick value follows from multiplying the minimum price change by the contract size. It is not the price of a barrel or of the contract.

The contract is deliverable based on an exchange of futures for physical (EFP), with an option to cash settle against the ICE Brent Index price for the contract’s last trading day. ICE states that it publishes that cash settlement price on the next trading day. ^[04] The diagram separates three documented properties. They are not sequential routes, and the labels do not imply an automatic cargo allocation.

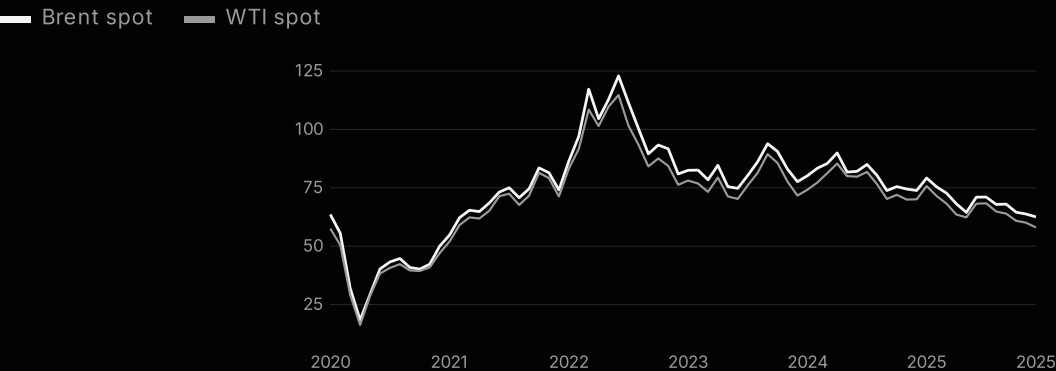
Tick value is a contract-level calculation. It is not a Brent market price or settlement price. ^[04]

Brent and WTI across shared dates

Two spot series, one shared calendar. Each point is a monthly arithmetic mean across retained common dates; the chart describes price levels, without presenting a futures curve or testing physical substitutability.

1 473 Common-date daily observations
Count of retained matched daily marks, in observations.

USD/bbl



Monthly arithmetic means across retained common dates, 2020-2025. Both series use the same daily date set ^{[01][02]}.

Year	Common observations
2020	249
2021	246
2022	245
2023	243
2024	246
2025	244

These are spot marks. EIA labels the series Brent-Europe and WTI-Cushing and defines a spot price as one for a specified quantity and location, purchased for immediate delivery at current market rates ^{[01][02]}. Each monthly point averages the two series separately over the same retained dates; EIA's published method uses an unweighted average of daily closing spot prices ^{[01][02]}.

The source window contains 1,518 Brent and 1,500 WTI marks. Their date intersection retains 1,473 observations; 72 workbook dates fall outside that common set. No prices were filled. The annual rows count retained observations by year.

EIA marks are regional spot assessments, not futures settlements or executed transactions. Date matching does not establish clock synchronization, correlation, hedge effectiveness, or physical substitutability. The excluded workbook dates describe sample alignment, not a cause of price movement ^{[01][02]}.

Brent-WTI Spot Basis Across 72 Months

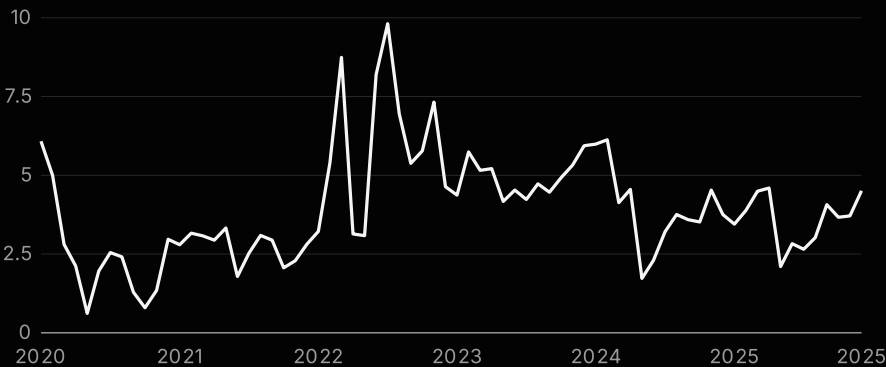
The daily mean basis was 3.94 USD/bbl across 1,473 common-date observations; the minimum was -5.66 on 2020-03-31 and the maximum 54.34 on 2020-04-20. The chart shows 72 monthly means, distinct from daily extrema. Exact clock metadata are unknown. ^[01]

3.94

Mean daily Brent-minus-WTI spot price difference
USD/bbl across 1,473 common-date daily observations, Jan 2, 2020-Dec 31, 2025. ^[01]

USD per barrel

■ Brent minus WTI



72 monthly common-date means of Brent minus WTI, Jan 2020-Dec 2025; zero line shown. Daily extrema are listed separately. ^[01]

Statistic	USD per barrel	Date or period
sample mean	3.94	2020–2025
daily minimum	−5.66	2020-03-31
daily maximum	54.34	2020-04-20

For each shared date, the calculation subtracts the WTI-Cushing spot assessment from Brent-Europe, then averages the daily differences within each calendar month. EIA labels the series Brent-Europe and WTI-Cushing, reports crude-oil spot prices in dollars per barrel, and defines monthly prices as unweighted averages of daily closing prices. ^{[01] [02]}

Dates align on a calendar. That alignment does not establish synchronized clock times, and the observations cannot test executable arbitrage, freight terms, or causality. Daily extremes remain individual-date statistics, separate from monthly chart points. ^{[01] [02]}

Regional spot assessments, not futures settlements or records of executed transactions. ^{[01] [02]}

April 2020: a negative WTI spot mark

On April 20, 2020, the EIA daily spot series records WTI at -\$36.98 per barrel and Brent at \$17.36. The same-date difference is \$54.34 per barrel. ^[01]

-36.98 WTI spot price, April 20, 2020
USD per barrel. EIA spot mark, not a basis value or futures settlement. ^[01]

USD per barrel

— Brent spot — WTI spot



Daily April 2020 spot marks on common dates. Calendar spacing shows the interval between available observations, not the cause of gaps.

April 20 observation USD per barrel

WTI spot	-36.98
Brent spot	17.36
Price difference	54.34

Across 1,473 common-date daily observations from January 2, 2020, through December 31, 2025, this is the sole negative WTI spot mark. The largest Brent-minus-WTI price difference in the sample also occurs on April 20, 2020. ^[01] The chart retains April's available common-date marks for both series.

EIA labels the series WTI at Cushing, Oklahoma, and Brent in Europe. ^[01] Its separate April 2020 article concerns the front-month WTI futures event. That context does not make the -\$36.98 spot assessment a futures settlement or evidence of an executed trade. ^[08] Same-date marks do not establish synchronized observation times.

The difference is descriptive, calculated from same-date regional spot marks. This sheet does not measure substitution, hedge effectiveness, clock-level execution, or a physical link. EIA values are spot assessments, not transaction records or futures settlements. ^[01] ^[08]

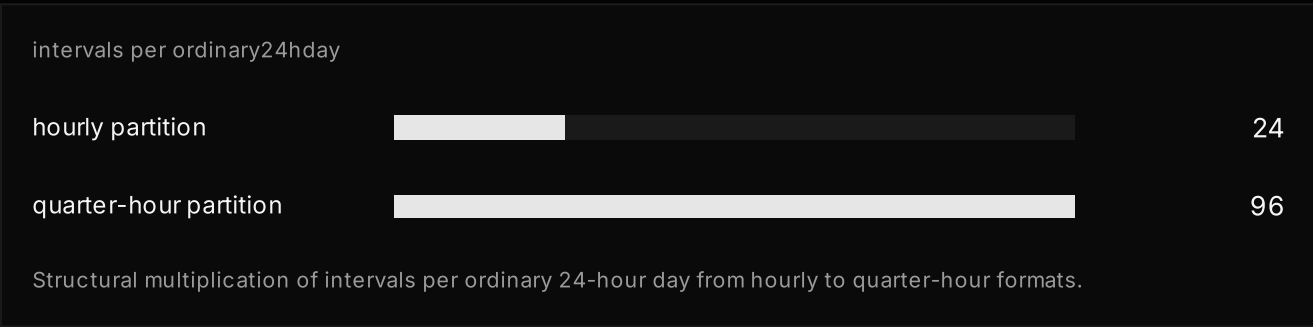
Coupled Day-Ahead Market Transitions to 15-Minute Intervals

The report turns from oil to European power, where a figure’s meaning likewise depends on its definition, here the market time unit. The single day-ahead coupling shifted from hourly to quarter-hour market time units. Trading began September 30, 2025. Deliveries started October 1. An ordinary day contains 96 intervals.

4x

Temporal Partition Ratio

Ratio of ordinary-day interval counts, a fourfold temporal partition. This describes the multiplication factor, not the 96 daily interval count.



powerMW	durationhours	energyMWh
1	1.00	1.00
1	0.25	0.25

The coupled day-ahead market operates on a 15-minute time unit ^[07]. Trading started on September 30, 2025. Deliveries began October 1 ^[05]. This splits the hour into four blocks. An ordinary day expands from 24 to 96 intervals. We calculate the resulting energy using constructed unit arithmetic because the primary documents lack any exchange-measured execution volumes for these isolated periods. A 1 MW load running for one hour equals 1 MWh. A 0.25-hour interval yields 0.25 MWh.

Our primary metric tracks this exact ratio. It measures a fourfold temporal partition. The supplied evidence did not measure computational load or compulsory independent orders. We simply document the formal multiplication of market intervals from 24 to 96 per ordinary day, strictly limiting our observations to the stated rules without assessing any potential changes to market behavior. The primary texts confirm the transition dates. We do not track real liquidity depth.

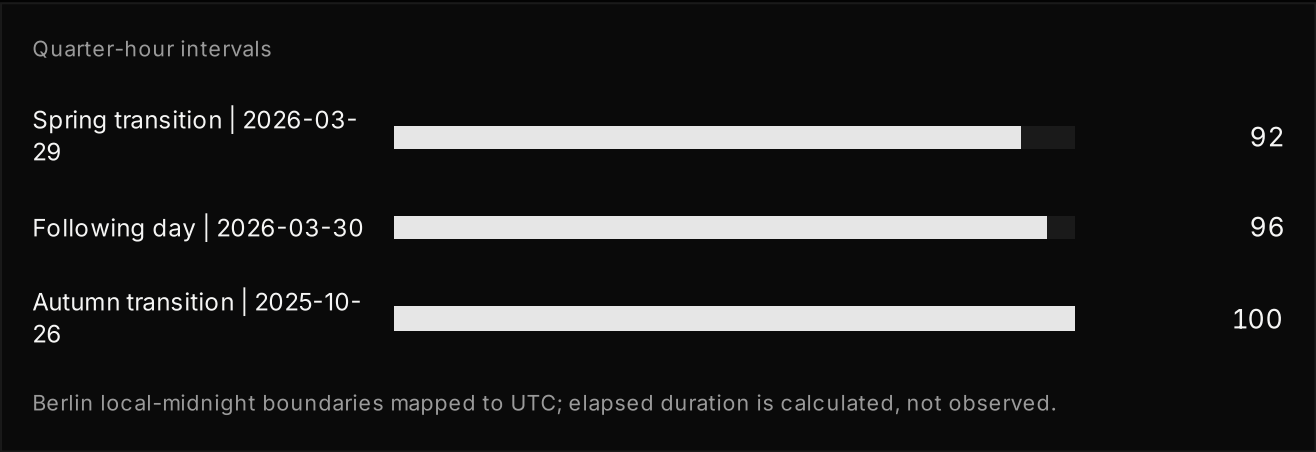
Calculations describe constructed unit arithmetic, not exchange measured volumes. The evidence did not measure computational load, real liquidity depth, or compulsory orders. ^[05]^[07]

Berlin civil-day spans after the 15-minute MTU change

SDAC's 15-minute MTU went live on 30 September 2025 for delivery on 1 October. ^[07] This sheet calculates three Europe/Berlin civil-day spans from consecutive local midnights.

92 / 96 / 100

Quarter-hour intervals per calculated civil day
Counts are calculated from each civil day's elapsed span at quarter-hour resolution.



Civil date	UTC start	UTC end	Local offsets	Elapsed hours
2026-03-29	2026-03-28 23:00	2026-03-29 22:00	1 / 2	23
2026-03-30	2026-03-29 22:00	2026-03-30 22:00	2 / 2	24
2025-10-26	2025-10-25 22:00	2025-10-26 23:00	2 / 1	25

Each scenario converts consecutive Europe/Berlin local midnights to UTC. The day begins at local 00:00 and ends at the next local 00:00. The elapsed span follows from those boundaries. Calendar arithmetic only. Directive 2000/84/EC defines summer time as clocks advanced by 60 minutes. It sets the period's start and end at 01:00 GMT on the last Sundays in March and October. ^[06]

On 2026-03-29, the interval is 23 hours; on 2026-03-30, 24. The 2025-10-26 interval is 25 hours, as the local offset shifts from UTC+02:00 to UTC+01:00. The calculated counts are 92, 96, and 100 quarter-hour intervals, in date order. ^[07] records the MTU go-live for delivery on 1 October 2025.

Calendar spacing alone does not show synchronized clocks, correlation, substitution, hedge effectiveness, or a physical link. No exchange identifiers, traded-contract observations, or measured losses are included. ^[06] ^[07]

Intraday turnover grew fastest in 2025

EPEX SPOT reported higher day-ahead and intraday turnover and a record total in 2025; OTC registration fell. Intraday recorded the largest percentage increase. ^[05]

12.49%

Reported intraday turnover growth, 2024 to 2025 (%)

EPEX-reported exchange turnover. Auction volume is one-sided; continuous buy and sell volumes are averaged. ^[05]



segment	2024 (TWh)	2025 (TWh)	growth (%)
Total	868.21	917.52	5.68
Day-ahead	653.75	676.29	3.45
Intraday	214.46	241.24	12.49

EPEX SPOT reported total turnover of 868.21 TWh in 2024 and 917.52 TWh in 2025, a 5.68% rise. Day-ahead volume moved from 653.75 to 676.29 TWh, up 3.45%. ^[05] Intraday rose from 214.46 to 241.24 TWh, a 12.49% increase. Its share of reported total grew from 24.70% to 26.29%. ^[05]

These figures describe reported exchange turnover. For auctions, EPEX lists one-sided market-clearing volume. For continuous trading, it divides aggregated buy and sell volume by two. ^[05] Turnover does not measure order-book depth or bid-ask spread, and these annual totals do not establish strategy profitability. The reported comparison also covers two annual observations, not a clock-synchronized study.

OTC registration was 0.0024 TWh in 2024 and 0.0001 TWh in 2025. Displayed values are rounded; totals include OTC registration, so category sums may differ. Baltic intraday continuous trading enters the 2025 scope, while SIDC auction coverage is partial in 2024. Growth cannot be attributed to the 15-minute product change. ^[05]

What the records show, and what they do not

Brent and WTI spot levels moved closely together from 2020 to 2025 (rho 0.993), daily changes much less so (rho 0.575), and the daily basis ranged from -5.66 to 54.34 USD/bbl. In power, the day-ahead time unit became four times finer from 1 October 2025; EPEX turnover rose, but the records do not attribute the rise to that change. ^{[01] [05] [07]}

60.00

Daily observed sample basis range (USD/bbl)
Sample maximum less minimum: 54.34 - (-5.66) = 60.00 USD/bbl. Historical range, not profit, fee, spread or risk bound.

Evidence	Limit	Operating implication
6 · Platts lists the eligible crude streams ^[03] .	Membership says nothing about equal quality, barrel weights or depleted production.	Compare delivery terms stream by stream.
10.00 · ICE sets a per-barrel fluctuation, converted at contract level ^[04] .	A contract tick and barrel price use different units.	Keep contract valuation separate from spot levels.
4× · The published rule defines market-time granularity ^[07] , ^[05]	Intervals reveal no orders, depth or execution timing.	Align comparisons to a consistent time unit.

In both markets a figure depends on how its reference is defined. Platts Dated Brent, EIA Brent-Europe and ICE Brent are distinct reference types, so a statistic from one does not transfer to another. ^{[01] [03] [04]} Around clock changes a Berlin civil day holds 92, 96 or 100 quarter-hour intervals, so interval counts compare only within a consistent time unit. ^[06]

The 60.00 USD/bbl range subtracts the lowest daily basis from the highest and is set by March and April 2020 observations. It is neither profit, fee, spread nor a future risk bound, and the 3.94 USD/bbl sample mean is no stable limit. ^[01] No hedging or execution design is tested; that would need timestamped bids, offers and fills, transport and imbalance charges, and point-in-time vintages.

Correlation does not establish substitution. Turnover is not order-book depth. ^{[01] [05]}

The documents behind the analysis

These records do different work. Read each within its stated scope.

8**Selected primary sources**

Direct source documents selected for this report; count.

- | | |
|------|--|
| [01] | EIA daily spot prices for crude oil and petroleum products
Daily WTI at Cushing and Brent spot series in USD per barrel. The frozen workbook covers 2020–2025; historical publication vintages were not reconstructed. |
| [02] | EIA spot-price definitions, sources and notes
Defines spot price as a one-time open-market transaction for immediate delivery at a specific location. Weekly, monthly and annual prices use unweighted averages of daily closing spot prices. |
| [03] | Platts Dated Brent reflects WTI Midland
S&P Global's release records the six-stream basket and the first date a WTI Midland cargo for June delivery could inform the assessment. It lists approved terminals and points to a separate methodology guide; detailed grade eligibility and location-normalization rules are not included. |
| [04] | ICE Brent Crude Futures contract specifications
Product terms specify a 1,000-barrel contract and a deliverable EFP structure with an option to cash-settle against the ICE Brent Index. |
| [05] | EPEX SPOT annual power trading results for 2025
Annual traded-volume figures for 2024 and 2025 cover Day-Ahead, Intraday and OTC registration. The report gives annual volumes, not daily liquidity. |
| [06] | Directive 2000/84/EC on summer-time arrangements
Articles 1–3 define the summer-time period and set its start at 01:00 GMT on the last Sunday in March and its end at 01:00 GMT on the last Sunday in October. Autumn clocks move back. |
| [07] | Successful implementation of the 15-minute MTU in SDAC
NEMO Committee notice records the go-live on trading date 30 September 2025 for delivery day 1 October 2025. |
| [08] | EIA account of the April 2020 WTI futures event
Describes negative prices in the May 2020 NYMEX front-month futures contract. It concerns a futures-expiry event, not a substitute WTI spot series. |

The register combines observations, definitions, product terms, annual turnover figures, calendar rules and an account of a futures event. The EIA workbook is a frozen extract, not a reconstruction of what users saw at each historical date.

EPEX reports annual traded volumes, not daily liquidity. The summer-time directive sets calendar rules, while the NEMO notice records implementation dates. These documents do not measure cross-market substitution or establish a physical link.

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