

BBN BTC / ENERGY BASKET BENCHMARK

PUBLIC METHODOLOGY

VERSION 1 · INAUGURAL RELEASE

A weekly relative-performance series comparing Bitcoin with a diversified, weight-fixed basket of five exchange-traded energy contracts: NYMEX WTI Crude (CL), ICE Brent Crude (B), NYMEX Henry Hub Natural Gas (NG), NYMEX RBOB Gasoline (RB) and NYMEX NY Harbor ULSD (HO). The headline is a rebased ratio of a Bitcoin price index over a price-relative energy basket, anchored to a fixed base date, designed to show whether Bitcoin is gaining or losing strength against the energy complex that drives inflation, industrial costs, transport-fuel demand and geopolitical risk pricing.

< 100 BTC UNDERPERFORMS	100 BASE ANCHOR	> 100 BTC OUTPERFORMS
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BENCHMARK FAMILY	BBN Benchmarks · Bitcoin Macro Benchmarks
BENCHMARK NAME	BBN BTC / Energy Basket Benchmark
PRIMARY OBJECTIVE	Measure Bitcoin's relative performance versus a diversified five-component energy commodity basket
UPDATE FREQUENCY	Weekly — one end-of-week observation
HEADLINE UNIT	Base-100 BTC-to-basket rebased ratio
HEADLINE BOUNDS	Unbounded above; bounded below by zero (the basket is structurally positive via the back-adjusted continuous method)
BASE DATE / VALUE	Tuesday, 2 January 2018 · headline = 100.00
BASKET COMPONENTS	5 — crude 55% (WTI 30% + Brent 25%), natural gas 20%, refined products 25% (RBOB 15% + ULSD 10%)
MATERIAL REVISION THRESHOLD	0.5 index points (headline)
METHODOLOGY VERSION	Version 1 — inaugural public release
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HOW TO READ IT — AND WHAT 100 MEANS

A headline above 100 means Bitcoin has outperformed the energy basket since the base date; below 100 means the energy complex has outpaced Bitcoin. Unlike a BBN Index, which is scored around a 50 mid-point, the 100 here is not a neutral or trailing-norm point — it is a fixed anchor. A headline of exactly 100 would mean Bitcoin and the basket have moved by identical proportional amounts since 2 January 2018.

POSITIONING

This is the inflation-sensitive energy-commodity signal in the BBN Bitcoin Macro Benchmarks family, complementing BTC/Copper (single-flagship industrial metal) and BTC/Agriculture Basket (consumption-linked real assets). It is a proprietary, directional benchmark for editorial, research and commercial data use — not an IOSCO-aligned regulated financial benchmark, not a tradable instrument, not a commodity total-return index, and not an investment recommendation.

01 WHAT THE BENCHMARK MEASURES

The benchmark answers one cross-asset question: is Bitcoin gaining or losing strength versus the energy commodity complex — the markets that set transport-fuel prices, heating costs, industrial inputs and inflation pass-through — measured from a fixed historical anchor? A single oil quote can be distorted by contract-specific events (U.S. shale cycles, Cushing storage constraints, Gulf hurricanes, OPEC+ decisions that move Brent more than WTI, or refinery-turnaround timing). A fixed-weight five-contract basket spanning crude (55%), natural gas (20%) and refined products (25%) reduces single-contract distortion and produces a broader, inflation-sensitive energy signal.

ELEMENT	WHAT IS MEASURED
BTC leg	U.S. dollar price of Bitcoin from the CME CF Bitcoin Reference Rate (BRR) — an institutional-quality reference price
Energy basket leg	Weighted, price-relative basket of five exchange-traded energy futures, all USD-denominated, across crude, gas and refined products
Headline benchmark	BTC price index ÷ energy basket index, both rebased to 100 on 2 January 2018, then multiplied by 100
Weekly change	Week-on-week percentage change in the headline — a momentum and outlier-review diagnostic
Basket purchasing power	BTC price ÷ basket index, published for scale reference only — a constant multiple of the headline that cannot disagree with it directionally

02 BASKET CONSTRUCTION

The basket is built from five liquid, USD-denominated, exchange-traded energy futures. Each component is normalised to the common base date before weighting, so no commodity dominates on account of its quoted unit or nominal price level.

COMMODITY	EXCHANGE & CONTRACT	WEIGHT	CATEGORY
WTI Crude Oil CL	NYMEX Light Sweet Crude Oil	30%	Crude — U.S. benchmark
Brent Crude Oil B	ICE Brent Crude	25%	Crude — global seaborne

COMMODITY	EXCHANGE & CONTRACT	WEIGHT	CATEGORY
Henry Hub Natural Gas NG	NYMEX Henry Hub Natural Gas	20%	Natural gas
RBOB Gasoline RB	NYMEX RBOB Gasoline	15%	Refined — gasoline
NY Harbor ULSD H0	NYMEX NY Harbor Ultra-Low Sulfur Diesel	10%	Refined — distillate

Crude accounts for 55% of basket weight, natural gas 20% and refined products 25%; the weights sum exactly to 100%. All contracts trade on NYMEX or ICE Europe and are quoted in USD per their standard unit, so no FX conversion is required.

CONTINUOUS-PRICE CONSTRUCTION AND ROLL

Each component is a monthly-expiry futures contract, so the weekly series uses a back-adjusted continuous price built from the active front month by the Panama (ratio-preserving) method. A roll from the front month to the next consecutive month occurs five trading days before the rolled-out contract's Last Trading Day — a uniform rule applied to all five contracts despite their differing LTD conventions. On each roll, all historical prices of the rolled-out contract are shifted by the price difference to the rolled-in contract at the roll-date close, preserving percent changes and preventing artificial jumps. The active month is always the next consecutive month (no skipping, no quarterly cycle), and no smoothing or look-back averaging is applied.

THE APRIL 2020 NEGATIVE-PRICE EPISODE

On 20 April 2020 the NYMEX WTI May-2020 contract settled at −\$37.63 per barrel on its final trading day. The back-adjusted continuous method handles this automatically: by that date the continuous series had already rolled to June 2020 (five trading days before the May contract's LTD), so the negative settlement never entered the WTI continuous series used in the basket. The print is preserved in the underlying contract record but does not appear in the rolled series.

03 ELIGIBILITY AND EXCLUSIONS

The five named components satisfy the eligibility standard below. New components may enter only through the annual review, and only if they meet every criterion.

CRITERION	PUBLIC STANDARD
Economic relevance	A meaningful energy market with global or large-regional price discovery, not purely local pricing
Exchange-traded	Priced through a centrally cleared futures contract on a recognised exchange (NYMEX/CME Group, ICE Europe, ICE Futures U.S.)
USD-denominated	Quoted in U.S. dollars per its standard unit (barrel, MMBtu, gallon); non-USD contracts are ineligible

CRITERION	PUBLIC STANDARD
Liquidity floor	90-day average trading volume $\geq$ 10,000 contracts per day across the front three active months
Continuity floor	At least seven years of continuous back-adjusted price history available at the base date
Data quality	Public exchange daily settlement prices, free of systematic reporting lags beyond one trading day
Non-equity exposure	The commodity itself — not producer shares, ETFs, leveraged or inverse products, or energy-company equities

EXCLUDED BY DESIGN

EXCLUDED CATEGORY	REASON FOR EXCLUSION
Energy-company equities & ETFs (XOM, CVX)	Embed corporate margins, leverage and management strategy — not pure energy-commodity exposure
Leveraged or inverse energy products	Path-dependent returns and daily-rebalancing decay are unsuitable for a long-horizon benchmark
Carbon credits, emission allowances	Distinct economic logic, fragmented regional markets and regulatory-driven pricing
Uranium, regional coal prices	Thinly traded as futures, or quoted in regional cash markets without sufficient global price discovery
Electricity benchmarks (PJM, ERCOT)	Highly regional and fragmented, with extreme short-term volatility unrepresentative of broad energy
TTF, JKM regional gas benchmarks	Regional gas references; the basket uses Henry Hub as its named U.S./global gas anchor
ICE Gasoil	Tracked indirectly through NY Harbor ULSD to avoid double-counting the distillate complex
Spot/cash markets, ETF NAVs, OTC	Not exchange-traded futures with transparent daily settlement

04 DATA SOURCES AND SOURCE TIERS

Both legs use named source hierarchies; any substitution is a documented methodology change. All legs are USD-denominated, so no FX conversion enters the headline.

BITCOIN PRICE LEG

TIER	SOURCE	WHEN USED
Primary	CME CF Bitcoin Reference Rate (BRR), 16:00 London fix	Headline source — identical to the BTC leg of the other BBN Macro Benchmarks
Fallback 1	CME CF BRR — New York variant (BRRNY), 16:00 ET fix	Used if BRR is unavailable for the observation date
Fallback 2	Bloomberg BNY Mellon or Galaxy Bitcoin Index, end-of-day NY value	Used only if both BRR and BRRNY are unavailable; logged in the release note

ENERGY BASKET COMPONENTS

TIER	SOURCE	WHEN USED
Primary	Official daily exchange settlements — CME Group (NYMEX) for CL, NG, RB, HO; ICE Futures Europe for B	Headline source for each component
Fallback 1	Bloomberg or Refinitiv continuous series reproducing exchange settlements with documented Panama back-adjustment	Used if an exchange settlement is delayed
Fallback 2	Direct exchange API or printed exchange daily bulletin	Used only if both primary and Bloomberg/Refinitiv feeds fail; logged in the release note
Not used	Spot physical prices, regional cash markets, ETF NAVs, single-dealer or OTC quotes	Never eligible for the headline basket

05 OBSERVATION RULE AND CALENDAR

Bitcoin trades continuously while NYMEX and ICE energy contracts settle on exchange calendars, so the benchmark fixes a common weekly observation with explicit timestamps for each leg.

OBSERVATION DAY	Friday
BTC TIMESTAMP	CME CF BRR fix, 16:00 London time
NYMEX LEGS (CL, NG, RB, HO)	Daily settlement 14:30 Eastern Time, normally published 15:00 ET
ICE BRENT (B)	Daily settlement 19:30 London time (= 14:30 ET), normally published 20:00 London — so NYMEX and Brent settle simultaneously
ALIGNMENT	BTC and all five energy contracts are taken on the same calendar Friday; all legs are USD-denominated

If a single commodity is unavailable on Friday, its nearest prior valid settlement is used while the BTC leg and the other commodities stay on the standard Friday; multiple missing commodities are each handled by the nearest-prior rule before basket coverage is checked. If Bitcoin is unavailable, the BTC fallback chain applies; if both BRR and BRRNY fail, the entire observation moves to the nearest prior Friday with a valid BTC value and all commodity legs are aligned to it. A forward-fill of any component beyond five calendar days is not permitted — past that point the component is treated as missing for the week and the reweighting rule applies.

06 MISSING COMPONENTS, REWEIGHTING AND PUBLICATION

The basket preserves continuity through a deterministic, fully documented reweighting rule. When a subset S of components is missing, the surviving weights are scaled pro rata so they again sum to one; the original weights are restored once all components return.

PRO-RATA REWEIGHTING

$$w'_i = w_i / (1 - \sum_{j \in S} w_j) \text{ for each surviving component } i$$

$$\text{EnergyBasket}_t = \sum_{i \in \text{surviving}} w'_i \times \text{CommodityIndex}_{i,t}$$

S is the set of missing components; the surviving weights w' sum to 1 by construction.

Crude presence is mandatory. WTI and Brent together are 55% of basket weight and the dominant signal in the energy complex, so missing either crude leaves the basket structurally unrepresentative. Missing any non-crude component (NG, RB, HO) is recoverable through reweighting; missing either crude is not. Every weekly release falls into exactly one publication layer:

LAYER	CONDITION AND OUTPUT
Full publication	BTC from tier-1 BRR and all five components from tier-1 settlement, with no fallback beyond a single calendar day. Publishes the headline, weekly change, the purchasing-power diagnostic, a per-component contribution table and a release note.
Provisional	BTC from a tier-2 fallback, OR exactly four of five components present with both crude contracts included, OR a forward-fill of two to five days, OR reweighting applied. Same outputs with a "Provisional" label and a deviation note; revisable when missing components return.
No publication	Either crude (CL or B) missing beyond the five-day limit, OR fewer than four components present, OR both BTC sources unavailable beyond Friday + five days. A short coverage note is issued; the next valid Friday resumes the series, with no back-fill.

07 CALCULATION METHODOLOGY

The headline is built in deterministic steps from the weekly observation set. Values are held to four decimals internally and reported to two; $P_i(0)$ and $BRR(0)$ denote the fixed 2 January 2018 base levels.

STEP 1 – COMPONENT PRICE INDICES

$$\text{CommodityIndex}_{i,t} = 100 \times P_{i,t} / P_{i,0} \text{ for } i \in \{ \text{CL, B, NG, RB, HO} \}$$

STEP 2 – ENERGY BASKET INDEX

$$\text{EnergyBasket}_t = \sum_{i=1..5} w_i \times \text{CommodityIndex}_{i,t} \text{ with } w = [0.30, 0.25, 0.20, 0.15, 0.10]$$

A weighted arithmetic average of the five component indices; each equals 100 on the base date, so the basket = 100 on 2 January 2018.

STEP 3 – BITCOIN PRICE INDEX

$$\text{BTCIndex}_t = 100 \times \text{BRR}_t / \text{BRR}_0$$

STEP 4 – HEADLINE BENCHMARK

$$\text{BBN BTC/En}_t = 100 \times \text{BTCIndex}_t / \text{EnergyBasket}_t$$

Equals 100 on the base date; bounded below by zero and unbounded above.

STEP 5 – WEEKLY CHANGE & SCALE DIAGNOSTIC

$$\text{WeeklyChange}_t = [\text{BBN BTC/En}_t / \text{BBN BTC/En}_{t-1\text{wk}} - 1] \times 100\%$$

$$\text{BasketPurchasingPower}_t = \text{BRR}_t / \text{EnergyBasket}_t$$

WORKED EXAMPLE – ILLUSTRATIVE FRIDAY OBSERVATION

COMPONENT	P(0) BASE	P(T) WEEK	INDEX	WEIGHT	CONTRIBUTION
NYMEX WTI (CL)	\$60.42/bbl	\$78.00/bbl	129.10	0.30	38.73
ICE Brent (B)	\$66.57/bbl	\$82.50/bbl	123.93	0.25	30.98
NYMEX Henry Hub (NG)	\$2.95/MMBtu	\$2.65/MMBtu	89.83	0.20	17.97
NYMEX RBOB (RB)	\$1.78/gal	\$2.42/gal	135.96	0.15	20.39
NYMEX ULSD (HO)	\$2.07/gal	\$2.50/gal	120.77	0.10	12.08

COMPONENT	P(0) BASE	P(T) WEEK	INDEX	WEIGHT	CONTRIBUTION
Energy basket index				1.00	120.15

With $BRR(t) = \$66,250.00$ and $BRR(0) = \$13,412.44$, the BTC index is $100 \times 66,250.00 / 13,412.44 = 493.94$. The headline is therefore $100 \times 493.94 / 120.15 = 411.10$, and the purchasing-power diagnostic is $66,250.00 / 120.15 = 551.39$.

A reading of 411.10 means that since the anchor Bitcoin has appreciated by about 4.94× while the energy basket has appreciated by about 1.20×, so Bitcoin has outperformed the energy complex by about 4.11× over the period. This places the benchmark in the "Strong BTC outperformance versus energy" band. The composition shows the basket led by WTI (contribution 38.7) and RBOB gasoline (20.4), with natural gas the only component below its base value (89.8 versus 100), reflecting structural gas weakness over the period.

08 INTERPRETATION FRAMEWORK AND BANDS

The benchmark does not claim Bitcoin is outperforming the real energy economy; it says Bitcoin is gaining or losing strength relative to the energy basket since the base date. A rising headline means BTC is gaining against an inflation-sensitive commodity complex; a falling headline means that complex is leading BTC. The four price combinations distinguish risk appetite strong enough to outpace energy-linked inflation (both rising), energy-driven inflation or commodity rotation pulling capital from BTC (BTC down, basket up), digital-asset demand outrunning an easing inflation-input complex (BTC up, basket down), and broad cross-asset risk-off in which BTC draws no defensive flow (both falling).

VOLATILITY BALANCE

Bitcoin runs at roughly 60–80% annualised volatility against the basket's 35–45% — a less extreme dominance ratio (about 1.5–2×) than the agriculture or emerging-market benchmarks. Natural gas in particular has BTC-comparable volatility (50–80%), so headline variance reflects both legs more evenly here, though BTC still dominates the typical weekly move. The underlying component levels published with each release show which leg drove a given week.

The bands partition the full positive range with no gaps or overlaps; each boundary is a threshold, so a band runs from its lower figure up to (but not including) the next. They are asymmetric around 100 because BTC volatility exceeds the basket's, so over multi-year horizons the headline drifts upward whenever BTC appreciates and the upper bands widen geometrically.

HEADLINE	BAND	MEANING
≥ 500	Severe BTC outperformance	BTC has appreciated dramatically more than the energy basket since the base
250 – <500	Strong BTC outperformance	Pronounced BTC strength relative to the energy complex
150 – <250	Moderate BTC outperformance	BTC has clearly outpaced the energy basket
>100 – <150	Slight BTC outperformance	BTC has marginally outperformed the energy basket

HEADLINE	BAND	MEANING
100	On the base-date anchor	Identical proportional moves since the base
75 – <100	Slight BTC underperformance	The energy basket has tightened slightly faster than BTC has risen
40 – <75	Moderate BTC underperformance	The energy complex has materially outpaced BTC
20 – <40	Strong BTC underperformance	Pronounced relative weakness of BTC versus energy
< 20	Severe BTC underperformance	BTC has lost dramatically relative to energy

09 STRUCTURAL FEATURES, SCOPE AND LIMITATIONS

The basket carries structural features the headline mechanically reflects but that readers should not read as a Bitcoin signal; the benchmark discloses rather than adjusts for them. Crude dominates at 55% of weight, so the basket tracks crude oil more closely than gas or distillates, and the WTI–Brent spread (which has ranged from a WTI premium to a large Brent premium over the past decade) registers as internal basket variance unrelated to BTC. Henry Hub natural gas adds strong winter/summer seasonality; refined products (RBOB, ULSD) sit downstream of crude and carry independent information through refining cracks; and energy benchmarks are uniquely sensitive to single-event geopolitical shocks (OPEC+ decisions, conflict, sanctions, Gulf hurricanes) that can move components double digits in a week. Since 2020 the economic reading of the basket has shifted with electrification and EV-transition expectations, and because energy is a headline-CPI input excluded from core CPI/PCE for its volatility, the benchmark measures BTC against energy commodities, not against core inflation. As a back-adjusted continuous series it reflects price change only — no collateral, roll yield, storage or contango/backwardation effects — so it is a directional indicator, not a tradable basket or commodity total-return index. It has no internal diversification beyond five contracts, all on U.S./U.K. exchanges (Dubai crude, JKM LNG, TTF gas and ICE Gasoil are not in the headline); its level depends mechanically on the fixed, disclosed base date; and the weekly cadence captures intraweek events such as the Wednesday EIA inventory release only at the next Friday.

10 QUALITY CONTROL, MAINTENANCE AND GOVERNANCE

On every publication each component settlement is cross-checked against the tier-2 Bloomberg or Refinitiv feed (a discrepancy beyond 0.25% triggers manual review); each unit and contract specification is validated; every roll is logged with the rolled-out and rolled-in contracts, the back-adjustment factor and the close prices; the single Friday alignment and USD denomination are confirmed; and the series is checked for missing weeks, duplicates and consistent base-date application, with each release appended to an immutable archive carrying reweighting flags. A weekly headline change of 12% or more forces re-verification of all legs against tier-2 sources, and a single-commodity daily change of 10% or more (higher than the 8% used elsewhere in the family, reflecting energy's structurally higher volatility, especially natural gas) cross-checks that leg before inclusion. For stale prices, two consecutive unchanged settlements are flagged, three trigger manual review against the exchange bulletin, and five exclude the component for that week, after which reweighting applies.

Maintenance. Composition and weights are reviewed in the first two weeks of January each year, with no change as the default outcome. A component is replaced only if its 90-day front-three-month volume stays below 10,000 contracts/day for 90 consecutive trading days, the exchange announces delisting or a material rule change, or data quality fails for three consecutive months; the replacement is the highest-volume eligible contract in the same sub-category, and if none qualifies the affected weight is reallocated pro rata and the basket reduces in size. Changes apply prospectively, with no retrospective restatement of past headline values.

Revisions and versioning. A material revision is a change of 0.5 index points or more to a published headline, or any methodology change that would have produced such a difference; smaller corrections are archived without notice. Revisions are triggered by republished exchange data, a unit or contract-specification error, an incorrect roll, a calendar-alignment error, a stale-data violation or an undisclosed source-tier fallback. This is the inaugural publication, Version 1. Any change to the base date, the primary BTC source, basket composition or weights, the roll methodology, the reweighting rule or the headline formula is a material methodology change, carrying at least 30 calendar days' public notice, a parallel-published transition of at least four weeks, a versioned changelog entry and a new version number.

Construction and roll conventions follow established energy-index practice (S&P GSCI Energy and the Bloomberg Commodity energy sub-index) and the CME, ICE and CF Benchmarks rulebooks; IOSCO's principles are treated as a transparency reference, not a compliance claim.

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