

WattCoin: An Energy Monetary Standard

Technical Paper (Whitepaper)

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Abstract

This document describes WattCoin, a monetary standard whose unit of account is electrical energy: 1 WattCoin corresponds to 1 MWh and 1 even to 1 kWh. The standard is implemented by a Federation of national WattCoins. Two external parameters are defined for each country: the supply cap, equal to the country's annual total final energy consumption (all energy carriers in MWh), and the average wholesale electricity price over 365 days. The coin price is the product of the price of 1 MWh and the dimensionless WattCoin factor, an increasing convex function of the share of the cap in circulation. A coin comes into existence only at the moment of purchase; the funds paid form a reserve consisting of energy bonds (90%) and a USDT buffer (10%). The document states the conditions the factor satisfies and derives the properties of the system: a lower price bound, monotonicity, path independence of cost, full coverage of redemption liabilities under constant external parameters, and the sensitivity of coverage to changes in the energy price and the cap. Risks, limitations and open questions are listed separately.

Keywords: energy monetary standard; asset-backed digital currency; supply cap; pricing curve; reserve; energy bonds; WattCoin Federation.

1. Introduction

1.1. Problem statement

Modern monetary systems have three structural properties that this document treats as the initial problem.

1. **Unlimited issuance of fiat money.** Since the convertibility of the US dollar into gold ended in 1971, the amount of money in circulation has had no physical limit and is determined by decisions of central banks and governments. The consequence is a systematic decline in the purchasing power of the monetary unit.
2. **Fixed issuance without backing.** Cryptocurrencies with a hard cap remove unlimited issuance, but when demand grows the entire change is transferred to the price. This creates an advantage for early participants and high volatility, which limits the medium-of-exchange function.
3. **Price impact of large participants.** In order-book markets a large order moves the price for all participants; liquidity is determined by the current opposing orders rather than by a rule.

1.2. Principle

Energy cannot be created by an issuer's decision: it can only be produced. It is an input to practically all production and services, is measured in standard physical units and has a public market price. WattCoin uses two observable indicators of a country's energy sector — the **price** of a kilowatt-hour of electricity and the **volume** of annual final energy consumption — as the external parameters of the monetary system. The US dollar (via USDT) serves as the settlement unit of the transitional stage.

1.3. Contribution and structure of the document

The document: (a) defines the units of account and the issuance rule (Sections 3–4); (b) specifies the price model through conditions on the WattCoin factor (Section 5); (c) derives the properties

of the system (Section 6); (d) describes the reserve and its sensitivity to external parameters (Section 7); (e) describes the energy price methodology, the structure of the Federation and the technical implementation (Sections 8-10); (f) lists risks, the work plan and open questions (Sections 11-13).

2. Terms and notation

Table 1. Notation

Symbol	Meaning	Unit
E	average wholesale electricity price of the country over 365 days	USD/kWh
Q	the country's total final energy consumption in the previous calendar year (all energy carriers; 1 MWh = 3.6 GJ)	MWh
N	supply cap of the national WattCoin	coins
n	number of coins in circulation, $0 \leq n < N$	coins
$x = n/N$	share of the cap in circulation	—
$C(x)$	the WattCoin factor	MWh per coin
p_k	price of the k -th coin, $k = 1, \dots, N$	USD
$L(n)$	redemption liabilities: the amount needed to redeem all n coins	USD
R	value of the reserve	USD
$\kappa = R/L$	coverage ratio	—
β	share of the USDT buffer in the reserve; $\beta = 0.10$	—
δ	relative change in E	—

WattCoin Standard

the set of rules in this document: units, issuance, price model, reserve, data methodology, audit.

National WattCoin

a coin issued in one country under the Standard; it has its own E , N and reserve.

National operator

the licensee that issues the national WattCoin and runs its reserve, exchange and wallet.

WattCoin Federation

the set of national WattCoins operating under one Standard.

Floor

the lower bound of the coin price: the price of 1 MWh, i.e. $1000 \cdot E$.

Energy bond

an obligation of a power generating company to deliver a specified amount of electricity.

3. Units of account

Definition 1. 1 WattCoin corresponds to 1 MWh of electrical energy. 1 evan = 0.001 WattCoin and corresponds to 1 kWh. The smallest accounting unit is 0.001 evan = 10^{-6} WattCoin, corresponding to 1 Wh.

Table 2. Units of account

Unit	Energy	In coins	Price at the floor*
1 WattCoin	1 MWh	1.000000	\$161.60
1 evan	1 kWh	0.001000	\$0.1616
0.5 evan	0.5 kWh	0.000500	\$0.0808
0.001 evan	1 Wh	0.000001	\$0.00016

* at $E = \$0.1616$ per kWh (snapshot of 01.10.2026, Section 8).

3.1. Notation and rounding rules

1. Fractions of an evan are written as decimals (0.5 evan; 0.2 evan), not as percentages, to avoid confusion with an interest rate.
2. Accounting is kept in whole smallest units: 1 Wh for coins and 10^{-6} USDT for settlements.
3. Rounding is always in favour of the reserve: the amount payable by a buyer is rounded up, the amount payable to a seller is rounded down.
4. Wholesale markets publish the electricity price per 1 MWh, so the coin price at the floor is numerically equal to the exchange price of energy.

4. Issuance

Definition 2 (cap). The supply cap of a national WattCoin equals the country's total final energy consumption in the previous calendar year expressed in megawatt-hours: $N = Q$.

Final consumption covers all energy delivered to end users: electricity, gas, oil products, coal, heat and bioenergy; each carrier is converted to megawatt-hours (1 MWh = 3.6 GJ). The coin price is still set by the electricity price E . The sum of the caps of all national WattCoins does not exceed world total final energy consumption. According to the IEA [1], in 2024 it amounted to 452.7 EJ, i.e. 125,750 TWh, which corresponds to an upper bound of 125,750,000,000 coins for the Federation as a whole.

4.1. Issuance rules

1. **Issuance on demand.** A coin comes into existence only at the moment of purchase and ceases to exist at the moment of redemption. There is no pre-issuance, no mining reward and no coins reserved for any party.
2. **The cap is a limit, not a plan.** The cap bounds the number of coins in circulation from above and creates no obligation to reach it.
3. **Annual update.** N is recalculated once a year from a single data source after the annual statistics are published.

4. **Lower bound of the cap.** A new value of N cannot be lower than the number of coins in circulation with a set margin.
5. **No double counting.** Price and volume are taken for the same country; one kilowatt-hour is counted in the cap of only one national WattCoin.

5. Price model

5.1. General form

The coin price is the product of two independent multipliers — the price of 1 MWh on the country's energy market and the WattCoin factor:

$$P(n) = 1000 \cdot E \cdot C(x), \quad x = n / N \quad (1)$$

The first multiplier sets the value and moves with the energy market. The second shows how many megawatt-hours correspond to one coin at a given share of the cap in circulation and does not depend on the energy price.

5.2. Conditions on the WattCoin factor

The factor $C(x)$ is defined on the interval $0 \leq x < 1$. It is a continuously differentiable function satisfying four conditions.

Condition 1 (normalisation). $C(0) = 1$.

Condition 2 (monotonicity). $C'(x) > 0$ for all x .

Condition 3 (convexity). $C''(x) > 0$ for all x .

Condition 4 (unboundedness near the cap). $C(x) \rightarrow \infty$ and $\int_0^x C(s) ds \rightarrow \infty$ as $x \rightarrow 1$.

The closed form of the function C and the values of its parameters are know-how of the WattCoin Standard. They are provided to national operators under licence and are identical for all national WattCoins. All propositions in Section 6 follow from Conditions 1-4 alone and can therefore be verified independently of the specific form of the function.

5.3. Price of an individual coin

The price is set per whole coin. The price of the k -th coin equals the mean value of formula (1) over the segment that this coin occupies on the issuance axis:

$$p_k = 1000 \cdot E \cdot N \cdot \int_{(k-1)/N}^{k/N} C(s) ds \quad (2)$$

Inside a coin the price is constant: each of the 1000 evans of the k -th coin costs $p_k/1000$. The rate changes only at the boundary between coins.

5.4. Cost of a trade

Let $G(x) = \int_0^x C(s) ds$. The cost of buying m whole coins from position n is the sum of the prices of the corresponding coins:

$$V(n, m) = \sum_{k=n+1}^{n+m} p_k = 1000 \cdot E \cdot N \cdot [G((n+m)/N) - G(n/N)] \quad (3)$$

Selling m coins from position n returns $V(n-m, m)$. An order of any size is executed immediately and in full: the first coin of the order receives the best price, the last the worst. No queues, order-size limits or opposing orders are required: the counterparty of every trade is the reserve. Redemption liabilities equal $L(n) = V(0, n)$.

5.5. Demonstration values

Table 3. Demonstration WattCoin EU

Share of the cap in circulation, x	Factor $C(x)$	Coin price, USD	Liabilities L , USD bn
0 %	1.0000	161.60	0.00
10 %	1.0078	162.86	181.14
25 %	1.0236	165.41	455.94
50 %	1.0719	173.22	927.11
75 %	1.2229	197.63	1,436.76
90 %	1.7032	275.24	1,812.85

The parameters are for demonstration: $E = \$0.1616$ per kWh, $N = 11,167,000,000$ coins, a demonstration factor parameter. Working parameters differ; the table illustrates the shape of the dependence, not future prices.

6. Properties of the system

In this section E and N are assumed constant unless stated otherwise.

Proposition 1 (floor). For every coin $p_k \geq 1000 \cdot E$: no coin is bought or redeemed below the price of 1 MWh.

Justification. Conditions 1 and 2 imply $C(x) \geq 1$, so the mean value of C over any segment is at least 1.

Proposition 2 (monotonicity). $p_{k+1} > p_k$: each next coin bought is dearer than the previous one, each next coin sold is cheaper.

Justification. Directly from Condition 2 and formula (2).

Proposition 3 (path independence). The total cost of moving from position n_1 to position n_2 depends only on n_1 and n_2 and not on the number or order of intermediate trades. In particular, buying m coins and immediately selling the same m coins returns an amount not exceeding the amount paid; the difference is due only to rounding and does not exceed $2 \cdot 10^{-6}$ USDT.

Justification. Formula (3) is the difference between the values of a single function G at the end and start points. Rounding is in favour of the reserve (Section 3.1).

Proposition 4 (full coverage). If initially $R \geq L(n)$, all buyers' payments enter the reserve and all payouts to sellers are made from the reserve, then after any sequence of trades $R \geq L(n)$, i.e. $\kappa \geq 1$.

Justification. On a purchase the reserve grows by no less than the increase in L ; on a sale it decreases by no more than the decrease in L (Proposition 3 and the rounding rule).

Proposition 5 (price impact of an order). The relative change in the rate after a purchase of m coins equals $C((n+m)/N) / C(n/N) - 1$ and is determined solely by the share of the cap m/N taken by the order and the current x . It does not depend on the liquidity of opposing orders.

Table 4. Impact of a large order (demonstration parameters of Table 3)

Current share x	Order	Cost, USD bn	Rate change: purchase	Rate change: sale
10 %	1% of the cap (111.7M coins)	18.19	+0.087%	-0.085%
50 %	1% of the cap (111.7M coins)	19.37	+0.280%	-0.269%

Proposition 6 (consequence for a large seller). The average execution price of a large sale is below the rate before the sale began, and this difference falls entirely on the seller: after the sale the remaining holders own coins whose liabilities remain covered by the reserve (Proposition 4).

Justification. From Propositions 2 and 3.

7. Reserve

7.1. Composition

Every buyer's payment is credited in full to the reserve of the national WattCoin and divided into two parts:

1. **$1 - \beta = 90\%$** — energy bonds: obligations of power generating companies to deliver electricity. This part is accounted in kilowatt-hours, so its dollar value changes in proportion to E .
2. **$\beta = 10\%$** — a USDT buffer for immediate payouts to sellers. If a payout exceeds the buffer, the bonds cover the difference. The value of β will be refined from the actual daily trading volume.

7.2. Sensitivity to the energy price

Liabilities L are proportional to E (formula 3), whereas the USDT buffer does not depend on E . If, at $\kappa = 1$, the energy price changes by a fraction δ , the coverage ratio without intervention becomes:

$$\kappa(\delta) = [(1 - \beta)(1 + \delta) + \beta] / (1 + \delta) = 1 - \beta\delta / (1 + \delta) \quad (4)$$

Table 5. Coverage sensitivity at $\beta = 0.10$

Change in E , δ	Coverage without intervention, κ	Required contribution, share of the reserve
−30 %	104.29%	—
−10 %	101.11%	—
+10 %	99.09%	1.0%
+30 %	97.69%	3.0%
+100 %	95.00%	10.0%

The required contribution equals $\beta\delta$ of the reserve value before the change. Because E is a 365-day moving average, the change is gradual: a one-day deviation of the exchange price changes E by no more than 1/365 of that deviation.

7.3. Sensitivity to the cap

Proposition 7. At constant n and E , an increase in the cap N reduces both the rate and the liabilities L ; a decrease in the cap increases them.

Justification. The rate equals $1000 \cdot E \cdot C(n/N)$ and decreases in N by Condition 2. The derivative of L with respect to N is proportional to $G(x) - x \cdot C(x)$, which is negative because C is increasing.

Table 6. Annual cap update (demonstration parameters)

Share x	Change in the cap	Change in the rate	Change in liabilities L
10 %	+1.9%	−0.016%	−0.008%
10 %	−5.0%	+0.046%	+0.021%
50 %	+1.9%	−0.251%	−0.080%
50 %	−5.0%	+0.763%	+0.236%

7.4. Restoring coverage

1. If, after a change in E or N , $\kappa < 1$, the national operator contributes the shortfall to the reserve from its own margin.
2. When κ exceeds 1 again, the contribution is returned to the operator within the surplus.
3. The operator publishes the coverage ratio daily. In settlements between countries the coin of an operator with $\kappa < 1$ is valued lower (Section 9).

The operator's source of income is margin: the difference between the average price E at which the rate is calculated and the price at which the operator acquires energy bonds.

8. Energy price

The parameter E of a national WattCoin is calculated by a published methodology:

1. **Source.** The day-ahead wholesale price of the country's energy market.
2. **Currency.** Conversion into US dollars at the official central bank rate on the price date [3].
3. **Smoothing.** A 365-day moving average recalculated daily.
4. **Openness.** The inputs and the calculation are published for independent verification.

The demonstration value $E = \$0.1616$ per kWh (\$161.60 per MWh) is a simple average across 22 EU countries and Ukraine [2]. The version 0 snapshot combines a one-day price for EU countries (01.10.2026) with the average for 1–20 August 2026 for Ukraine and is therefore illustrative; in the working system all markets are calculated according to items 1–4.

The table of markets and the detailed methodology: [the “Energy price” page](#) [4].

9. The WattCoin Federation

9.1. Three levels

1. **The WattCoin Standard** — the brand, the technology, the WattCoin factor, the data methodology (daily E and annual N for each country), reserve and audit rules, the bridge between countries, licensing.
2. **The national operator** — a legal entity with the required permits; it issues the national WattCoin, runs the exchange and the wallet, contracts with generators, builds the reserve and publishes coverage. There is one operator per country.
3. **Participants** — generators, consumers and users within the country.

9.2. Participants and interaction

1. **Generators** — nuclear, thermal, hydro, solar and wind power plants, as well as households and cooperatives with their own generation. They back the reserve with obligations to deliver energy.
2. **Consumers** — households and legal entities that pay for electricity in WattCoin: 1 evan pays for 1 kWh.
3. **Users** — individuals and companies that keep assets in WattCoin and settle with it.

Settlements take place directly between wallets or through the national operator as a clearing centre. Buying, selling and exchanging the coin take place only on the operator's exchange; the wallet is intended for storage, transfers and paying for energy.

9.3. The bridge between countries

National WattCoins are exchanged through the Federation bridge at the ratio of the energy prices of the respective countries, taking the coverage ratio into account: the coin of an operator with an incomplete reserve is valued proportionally lower. The exact exchange rule will be given in the next revision (Section 13).

9.4. Operator licence

The licence gives the operator the right to use the brand, the technology and the WattCoin factor in its country under the control of the Standard. Payment consists of a one-time opening fee and a fixed monthly subscription fee that does not depend on the operator's turnover or profit. The amounts are set by contract.

10. Technical implementation

1. **Trade accounting** is kept on a blockchain. The working example is Ethereum; the final choice of network has not been made.
2. **The token** has 6 decimal places: the first three correspond to evans, the next three to fractions of an evan.
3. **The exchange** of the operator executes instant and pending orders by formulas (2)–(3) without an order book, leverage or margin trading.
4. **The wallet** stores WattCoin and USDT, performs transfers and energy payments; it is linked to the exchange only by transfers.
5. **Immutability of the rule.** No party can change the price by hand: only E and N change, by the published methodology.

11. Risks and limitations

The properties in Section 6 are derived at constant E and N and on the assumption that all parties duly perform their obligations. The factors below lie outside these assumptions.

1. **Energy price risk.** The dollar rate of the coin changes in proportion to E . A fall in the energy price lowers the dollar price of the coin; the amount of energy it corresponds to does not change.
2. **Buffer risk.** When E rises, coverage temporarily falls (formula 4) and is restored by the operator's contribution. The sufficiency of the operator's margin is an assumption of the model.
3. **Credit risk of the bonds.** The value of 90% of the reserve depends on power generating companies performing their obligations.
4. **Settlement unit risk.** The buffer is denominated in USDT; the risks of the USDT issuer are transferred to the buffer.
5. **Data risk.** The parameters E and N depend on external sources; an error or delay in publication affects the rate and coverage.
6. **Operational and technical risk.** Errors in software, the network or the operator.
7. **Regulatory risk.** The legal status of the coin and the operator is determined by the law of each country and may change.
8. **Limitations of the document.** Numerical examples are computed on demonstration parameters; the model has not been tested by real trading.

12. Work plan

1. The portal, the demonstration exchange and wallet, the community — in progress.

2. Public discussion of this document.
3. Registration of the brand and a legal entity, contracts with power generating companies, the founders' pool.
4. The first national WattCoin: exchange, wallet, first trading.
5. Opening the Federation to operators in other countries.

No dates are set for the stages; they depend on the results of the preceding stages.

13. Open questions

1. **Exchange spread or fee.** The value has not been approved. Protection against arbitrage on the predictable change in the 365-day average depends on it.
2. **Cap update.** The date and the single data source for the annual recalculation of N ; the margin between the cap and the coins in circulation.
3. **Energy price sources.** The list of exchanges for each country and the procedure when data are missing.
4. **Buffer share β .** Refinement from the actual trading volume.
5. **Bridge rule.** The exchange formula between national WattCoins taking coverage into account.
6. **Network.** The final choice of blockchain.
7. **Privacy.** The model for protecting wallet holders' data.
8. **Audit.** The procedure for independent verification of the reserve and calculations.

Comments on the document are accepted at watt4coin@gmail.com.

Legal notice

This document is for information purposes and describes a concept under development. It is not a public offer, a securities prospectus, or investment, financial, tax or legal advice. Calculations are made on demonstration parameters; they are not a price forecast. At the time of publication WattCoin has not been issued and is not offered for sale. [Full text of the notices](#).

References

1. International Energy Agency (IEA). World Energy Outlook 2025, Annex A, Table A.24 "Total final consumption". World total final energy consumption in 2024: 452.7 EJ (125,750 TWh); European Union: 40.2 EJ (11,167 TWh).
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3. European Central Bank. Euro foreign exchange reference rates, 01.10.2026. National Bank of Ukraine. Official hryvnia exchange rate, 01.10.2026.
4. WattCoin. Energy price: methodology and table of markets. watt-coin.org/en/energy-price/

Version history

Version	Date	Changes
3.0	02.10.2026	The “Energy of the world” model: 1 WattCoin = 1 MWh, 1 evan = 1 kWh, the cap equals electricity generation.
3.1	02.10.2026	The Federation of national WattCoins; the operator licence.
3.1, revision 2	05.10.2026	Formal presentation: notation, conditions on the factor, propositions with justification, reserve sensitivity, risks, references. The substance of the model is unchanged.
3.2	26.10.2026	The supply cap equals the country’s total final energy consumption (all energy carriers in MWh) instead of electricity generation; the coin price is still set by the electricity price. Federation cap — 125,750,000,000 coins (IEA, 2024), demonstration WattCoin EU — 11,167,000,000 coins; Tables 3, 4 and 6 recalculated.

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