

METHODOLOGY + TRANSPARENCY — FULL DOCUMENT (English Version)

1. Objective

Ensure full auditability, guarantee the reproducibility of the model, and allow independent review.

2. Mathematical Formulas

For each region r :

E = Power consumption (TH/s \times W/TH).

Cooling factor C depends on temperature:

$$C = 1 + \alpha \times (T_{\text{ext}} - T_{\text{ref}}).$$

$$\text{Electricity cost} = \text{Price_kWh} \times (E \times 24 / 1000).$$

$$\text{Hardware depreciation} = \text{ASIC_price} / \text{depreciation_duration}.$$

$$\text{Total cost_r} = \text{Cooling} + \text{Electricity} + \text{Depreciation}.$$

Aggregation:

$$\text{GHI} = \Sigma (\text{Cost_r} \times \text{Hashrate_r}).$$

3. Assumptions

- Regional temperature = 10-year NOAA average.
- Cooling factor adjusted according to climate.
- Hardware depreciation: 18 to 36 months.
- Energy mix based on official sources.

4. Digital Sources

Complete tables including:

- electricity price datasets,
- NOAA weather series,
- regional hashrate,
- ASIC manufacturer data,
- BTC price via Kaiko/CoinMetrics.

5. Update Process

- daily ingestion,
 - consistency checks,
 - manual validation by the maintainer,
 - automatic publication in the API.
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6. Auditability

- public Python engine,
 - recalculation instructions,
 - recalculation examples to replicate the historical series,
 - analysis scripts.
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7. Institutional Transparency

- public version registry,
- publication of adjustments,
- full documentation of assumptions.

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