

Sonic Environmental Impact Report

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Introduction

Sonic is a next-generation layer-1 blockchain designed for speed, scalability, and environmental efficiency. Powered by a proof-of-stake-based consensus mechanism, Sonic achieves extremely low energy consumption while supporting high transaction throughput. This report outlines Sonic's estimated energy use and environmental impact based on current network specifications and activity levels.

Network Architecture and Validator Specifications

The Sonic network is secured by 45 globally distributed independent validators. Each validator node meets or exceeds the following specifications:

- 4 vCPUs
- 32 GB RAM
- 1 TB local SSD or NVMe storage
- 1 Gbps redundant backbone connectivity
- Estimated power consumption per node: 150W (conservative average)

This setup enables Sonic to deliver high throughput with minimal environmental footprint.

Current Network Activity

Since its launch in December 2024, Sonic has processed over 110 million transactions, averaging approximately 18 million transactions per month. Daily transaction volume typically ranges between 300,000 and 2 million transactions, depending on user demand and application activity. With network adoption accelerating, we expect these volumes to increase substantially as more builders and users leverage Sonic's capabilities.

Energy Consumption Estimates

The estimated annual energy consumption of the Sonic validator network is:

- Total validator energy use: ~59,130 kWh per year (45 validators x 150W x 24 x 365 / 1000)

Based on current and projected activity:

Daily Transactions	Annual Transactions	Estimated kWh per Transaction	Estimated grams CO2e per Transaction
300,000	109,500,000	~0.00054	~0.26
2,000,000	730,000,000	~0.000081	~0.038

For context, Sonic's per-transaction energy use at peak activity is significantly lower than that of traditional payment networks (e.g. Visa ~0.00148 kWh/tx) and orders of magnitude cleaner than proof-of-work blockchains (e.g. Bitcoin >700 kWh/tx).

Estimated Greenhouse Gas (GHG) Emissions

Due to the decentralized nature of the Sonic network, we selected a conservative global average because Sonic validators are operated independently across diverse geographic regions, and precise energy mix data for each validator location is not centrally available. While Sonic Labs does not centrally control or monitor the precise energy mix used by each validator, we are committed to providing a transparent and conservative estimate of the network's environmental impact.

To estimate the Greenhouse Gas (GHG) emissions, we apply a high-carbon intensity factor to our estimated energy consumption. For this report, we use a conservative global average grid carbon intensity of **0.475 kg CO2e/kWh** (or 475 g CO2e/kWh), representing a high-emission energy mix. This figure is based on global average electricity carbon intensities reported by the International Energy Agency (IEA World Energy Outlook 2023, global power sector averages) and supplemented by IPCC AR6 fuel-mix data. The factor assumes a significant proportion of fossil fuel-based generation.

Calculations:

- **Total Annual GHG Emissions:**
    - 59,130 kWh/year * 0.475 kg CO2e/kWh = 28,086.75 kg CO2e/year
    - **Approximately 28.09 tonnes CO2e per year**

Environmental Commitment

Sonic's architecture is designed to minimize environmental impact without compromising performance. Key efficiency features include:

- Low-power proof-of-stake consensus
- Fast finality (1 block)
- Optimized storage with live pruning

Sonic Labs is committed to transparency. All transactions and validators running can be monitored by the third-party SonicScan block explorer.

Beyond electricity consumption, Sonic's operations have no material direct consumption of natural resources (e.g., water). Hardware lifecycle and end-of-life impacts are minimized through standard data center practices. Sonic Labs will continue to assess and report on broader environmental impacts as more data becomes available.

We are actively exploring partnerships to further offset or reduce any remaining environmental impact.

Disclaimer

This report provides estimates based on current network specifications and typical infrastructure energy consumption benchmarks. Actual environmental impact may vary based on validator hardware, hosting providers, and evolving network conditions. As we gather more information, we will continue to update this report to reflect the most accurate data available. This report will be reviewed and updated at least every six months in compliance with MiCA Article 6(11)."

For further inquiries, contact legal@soniclabs.com.