How Much Energy Does It Take to Mine One Bitcoin From the Beginning to 2025

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An in-depth analysis of Bitcoin’s energy cost over time. This article compares the early days of mining to 2025 estimates, showing how many kilowatt-hours and megawatt-hours are now required to generate one Bitcoin, along with estimated dollar costs per coin.

This webpage QR code

PDF Version of the webpage (maximum 10 pages)

Cost of Mining Bitcoin

Introduction

Bitcoin mining consumes real energy to create new coins and secure the blockchain. From the moment of its inception in 2009, each mined Bitcoin has represented not only computational work but also electrical power spent. Over time, as the network difficulty has risen and block rewards have halved, the energy per Bitcoin has skyrocketed.

This article reviews how many kilowatt-hours (kWh) of energy were needed to generate one Bitcoin in the early days compared to today (2025), and estimates the real cost of that power.

Background: Why Bitcoin Uses Energy

Bitcoin's Proof of Work (PoW) system requires miners to solve cryptographic puzzles. Each solved puzzle confirms transactions and adds a new block to the blockchain. The first miner to solve the puzzle receives a block reward—currently 6.25 Bitcoin per block as of early 2025.

Because the network adjusts the mining difficulty to keep block time near 10 minutes, more miners or higher computational power automatically increases total energy consumption.

Energy required to mine a Bitcoin: early days (2009–2012)

In the early years:

Mining was done on CPUs, GPUs, and eventually FPGAs.
The network difficulty was very low, and a home computer could mine hundreds of Bitcoin using minimal energy.

Estimates suggest that a desktop computer using about 100 watts (0.1 kilowatt) of power running continuously for three months could have mined a few hundred Bitcoin.

Assuming that computer consumed 0.1 kilowatt × 24 hours × 90 days = 216 kilowatt-hours, and produced roughly 200 Bitcoin, the energy cost per Bitcoin would have been about 1 kilowatt-hour per Bitcoin.

Even if we double that to include inefficiencies, it would still have been only a few kilowatt-hours per Bitcoin—roughly what a household light bulb consumes over a week.

Energy required to mine one Bitcoin in 2025

Fast forward to 2025.
Modern Bitcoin mining uses specialized ASIC miners that are thousands of times more efficient than early hardware—but the network difficulty has increased exponentially.

Global network energy: