BITCOIN: ANALYSIS OF ENVIRONMENTAL IMPACT

ABOUT BITCOIN

- Emerged 2009, value has gone from less than a dollar to $50,000

- Valuation driven by

  Scarcity-Must be mined

  Anonymity and security thanks to distributed leger

  Decentralized ledger creates inefficiency driving up cost

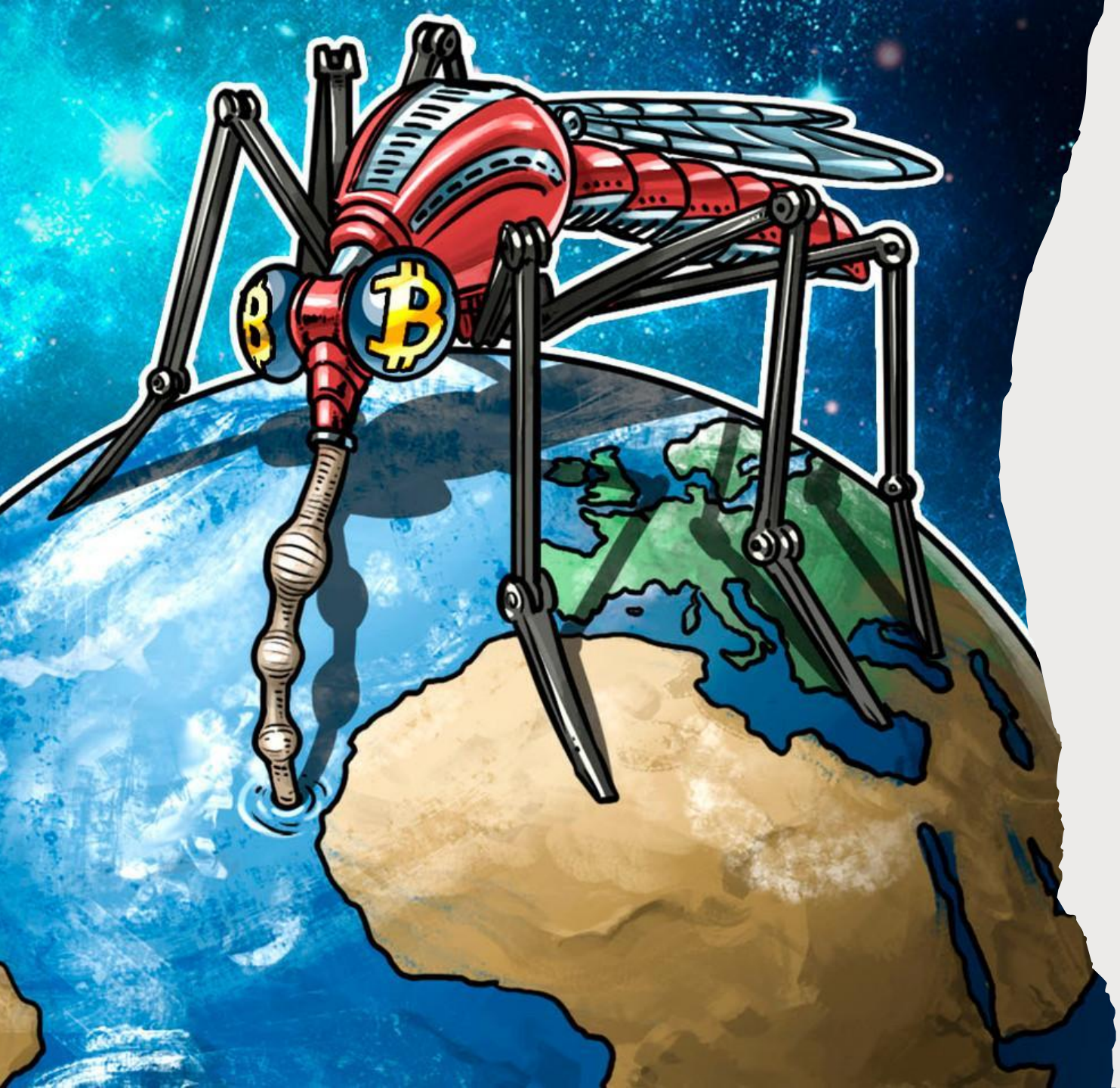
HYPOTHESES:

- *Null Hypothesis:* Bitcoin has no difference in environmental impact compared with legacy digital financial transactions methods.
- *Alternative Hypothesis:* Bitcoin's environmental impact, as proxied by carbon emission from energy consumption, differs from that of traditional financial transaction methods.

Suspect Bitcoin uses vastly more energy than legacy digital transfer methods

THE PRICE OF SECURITY

- Mining facilitates verification of transactions.
- New coins created when a “hash” 64 hexadecimal number is found. Probability is 1 in 16.7 trillion
- The high security of Bitcoin transactions also bears a high cost in energy and climate externalities



ANNUAL CARBON FOOTPRINT OF 37 MILLIONS TONS

- Same carbon footprint as New Zealand
- Bitcoin is very computationally intensive to mine(make more)
- Gets harder to mine the more are made
- Has become very power intensive, from 9.6 twatt-hrs to as high as 108.4 twatt-hrs
- Half of mining in southwest China from Coal and hydropower

Electricity Consumption:

Traditional Banking:

82 million Kwh

0.02%
of US Energy Consumption

Bitcoin Network:

592 Quadrillion Kwh

15,586%
of US Energy Consumption

Based on 550 billion transactions

Carbon Emissions:

Traditional Banking:

344 million KgCO2

0.005%
of US Annual Emissions

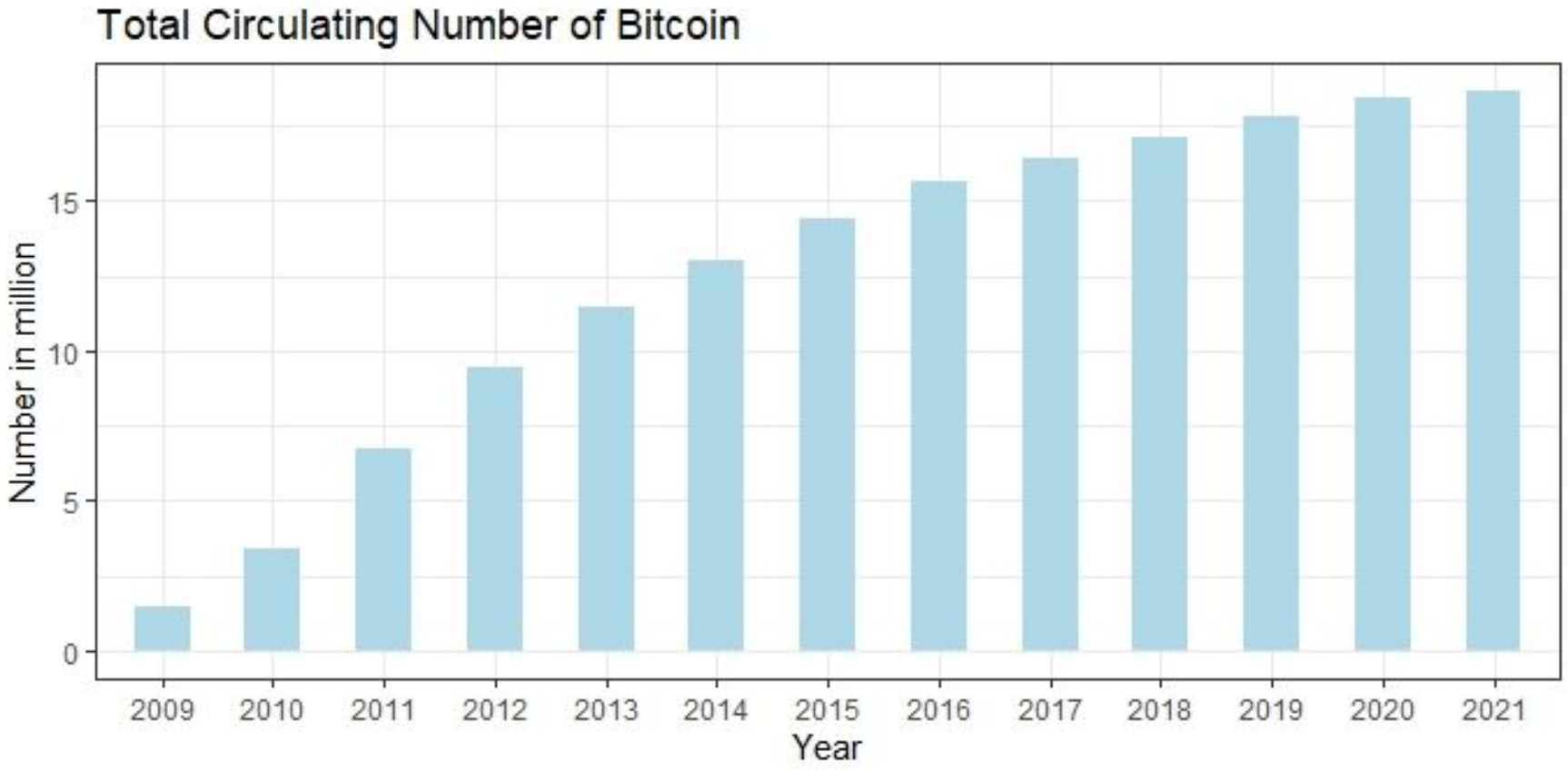
Bitcoin Network:

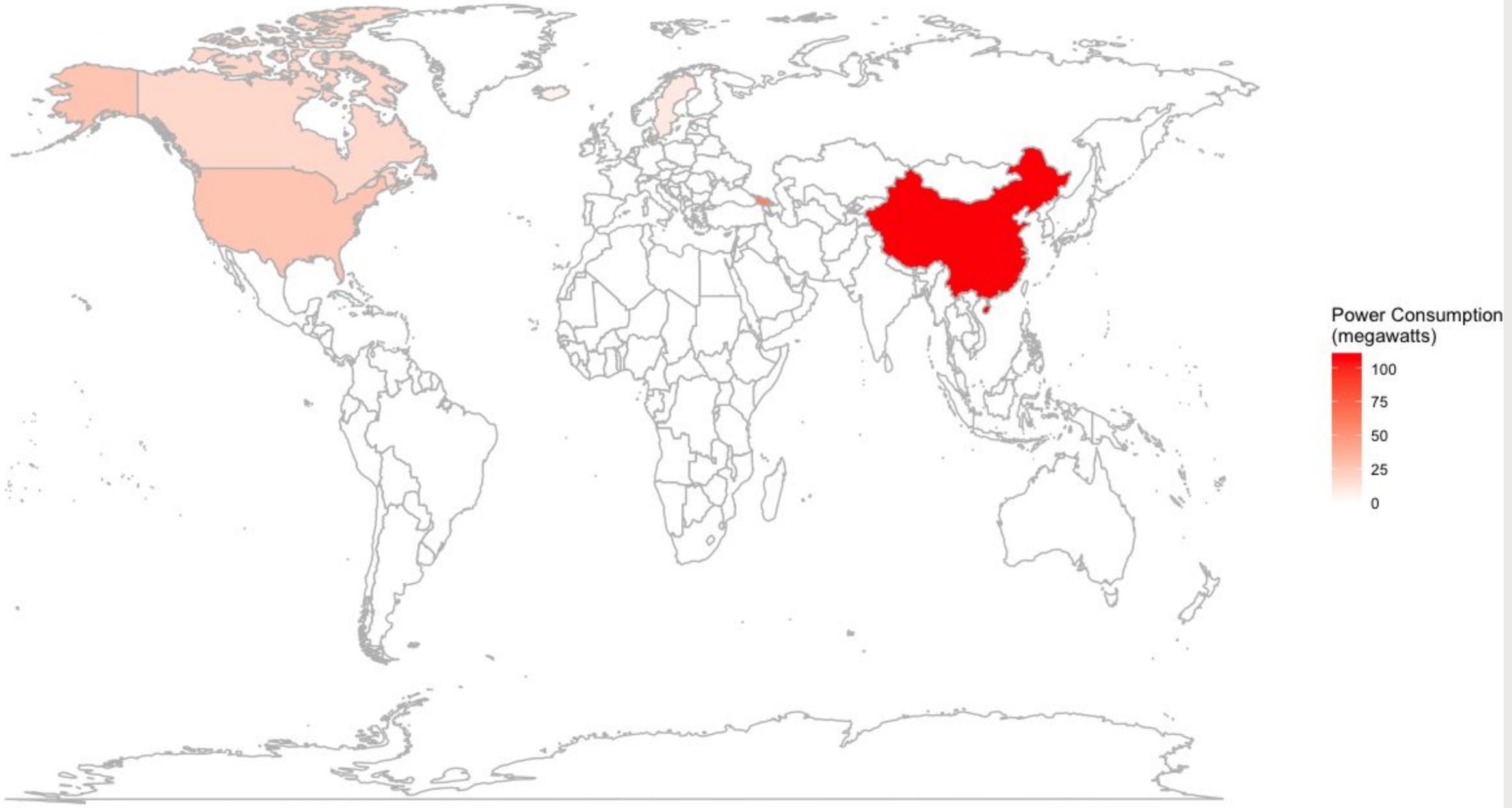
248 Quadrillion KgCO2

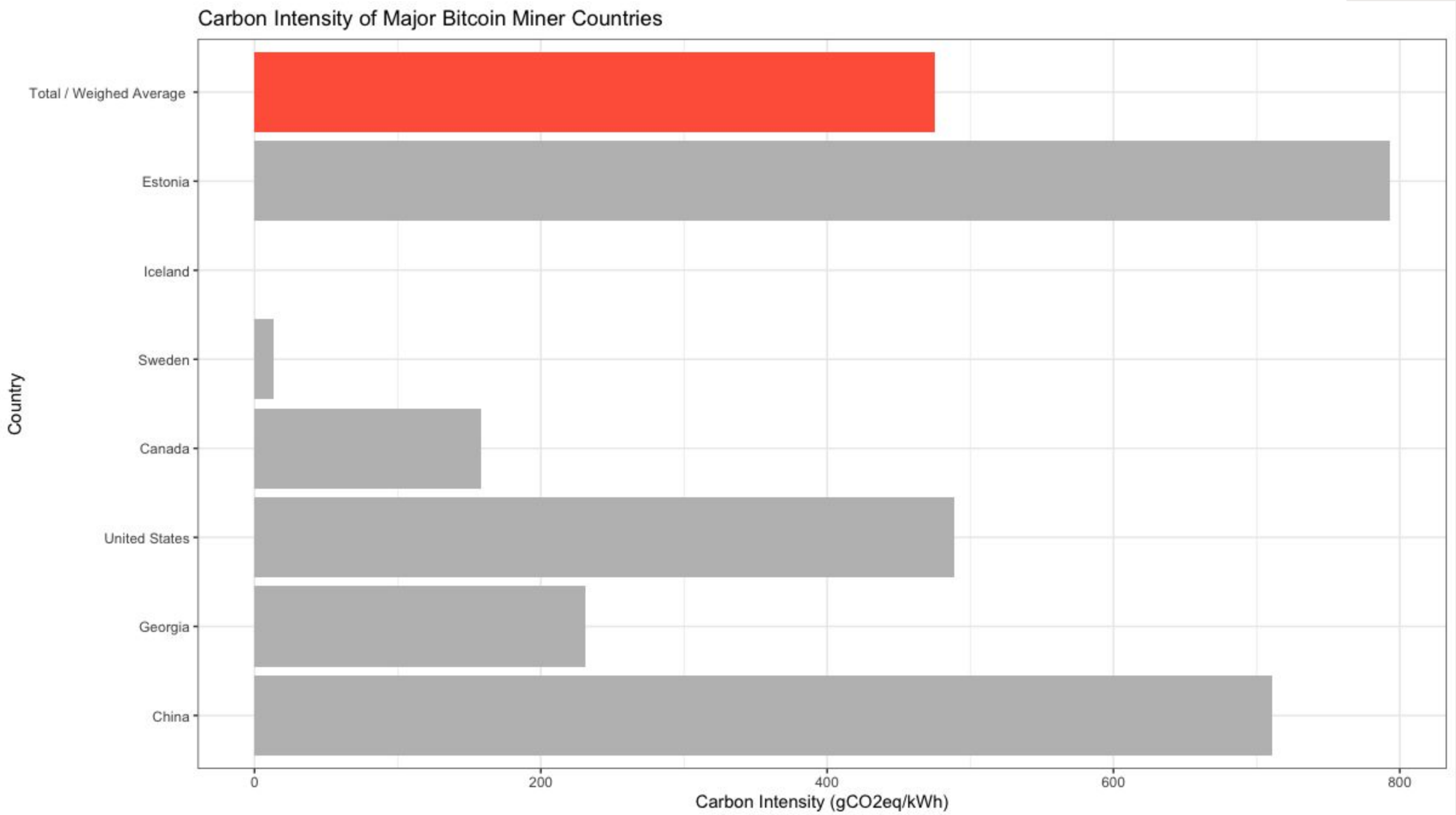
3798%
of US Annual Emissions

Based on 550 billion transactions

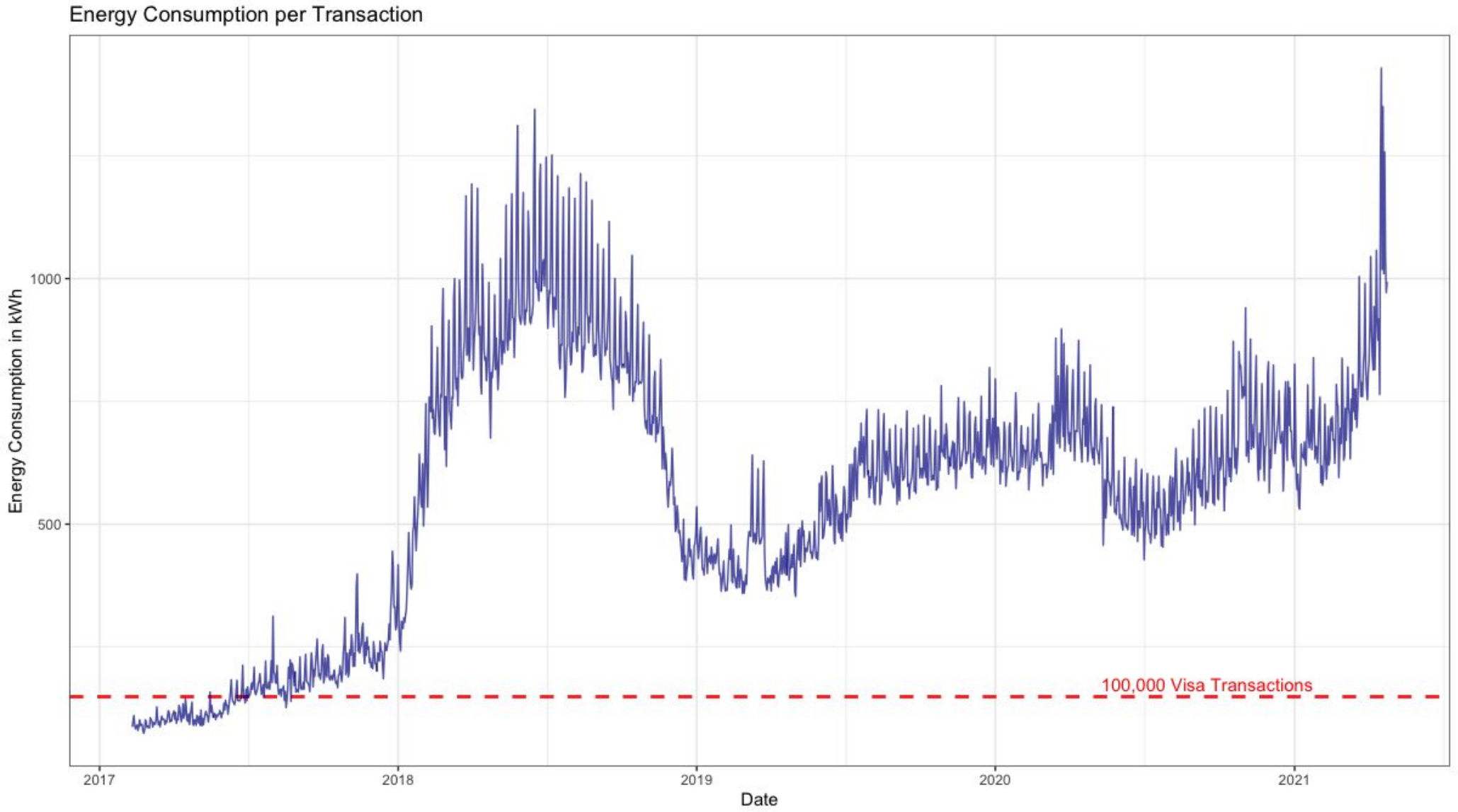
The number of Bitcoin circulating through mining.

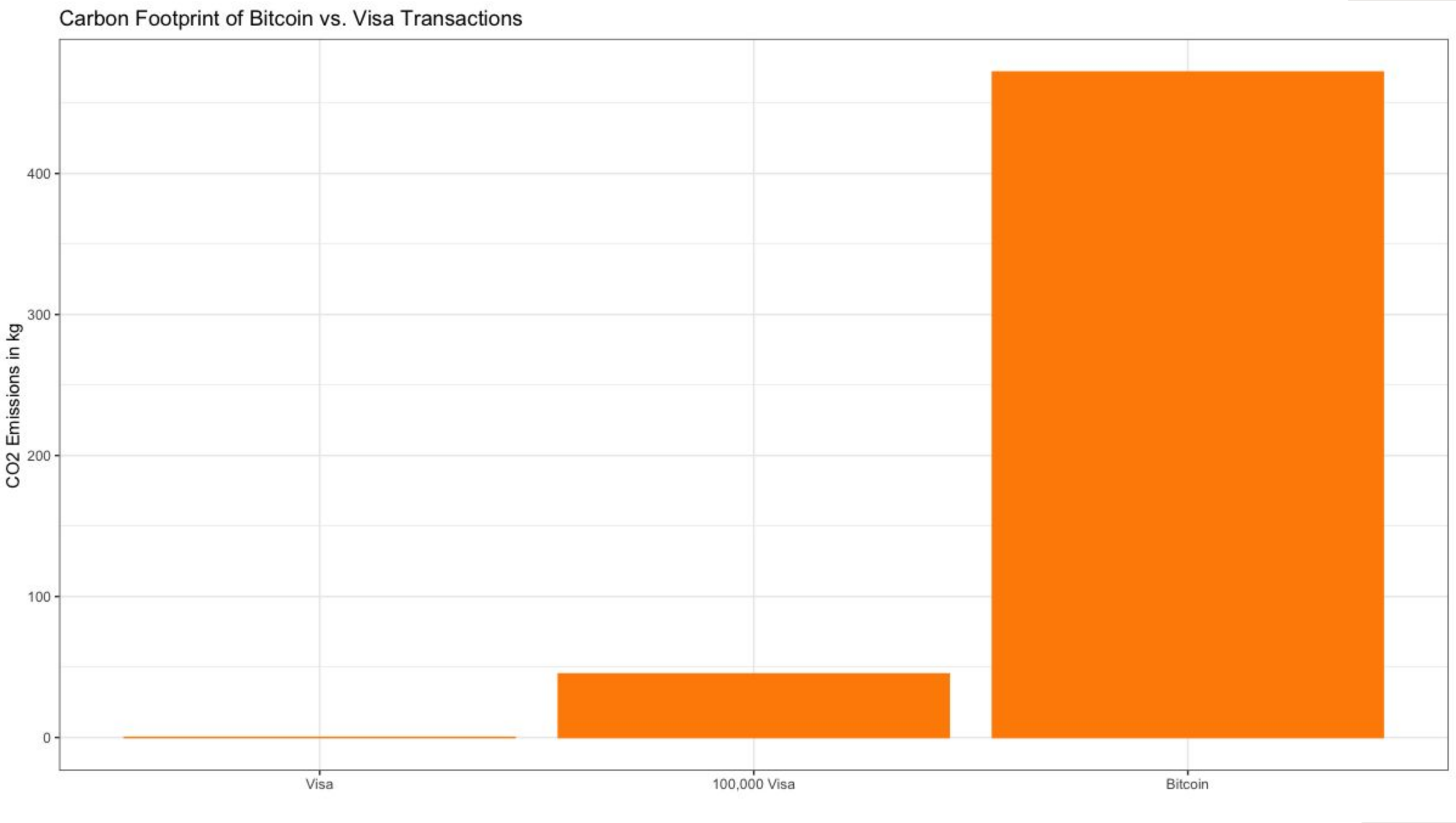


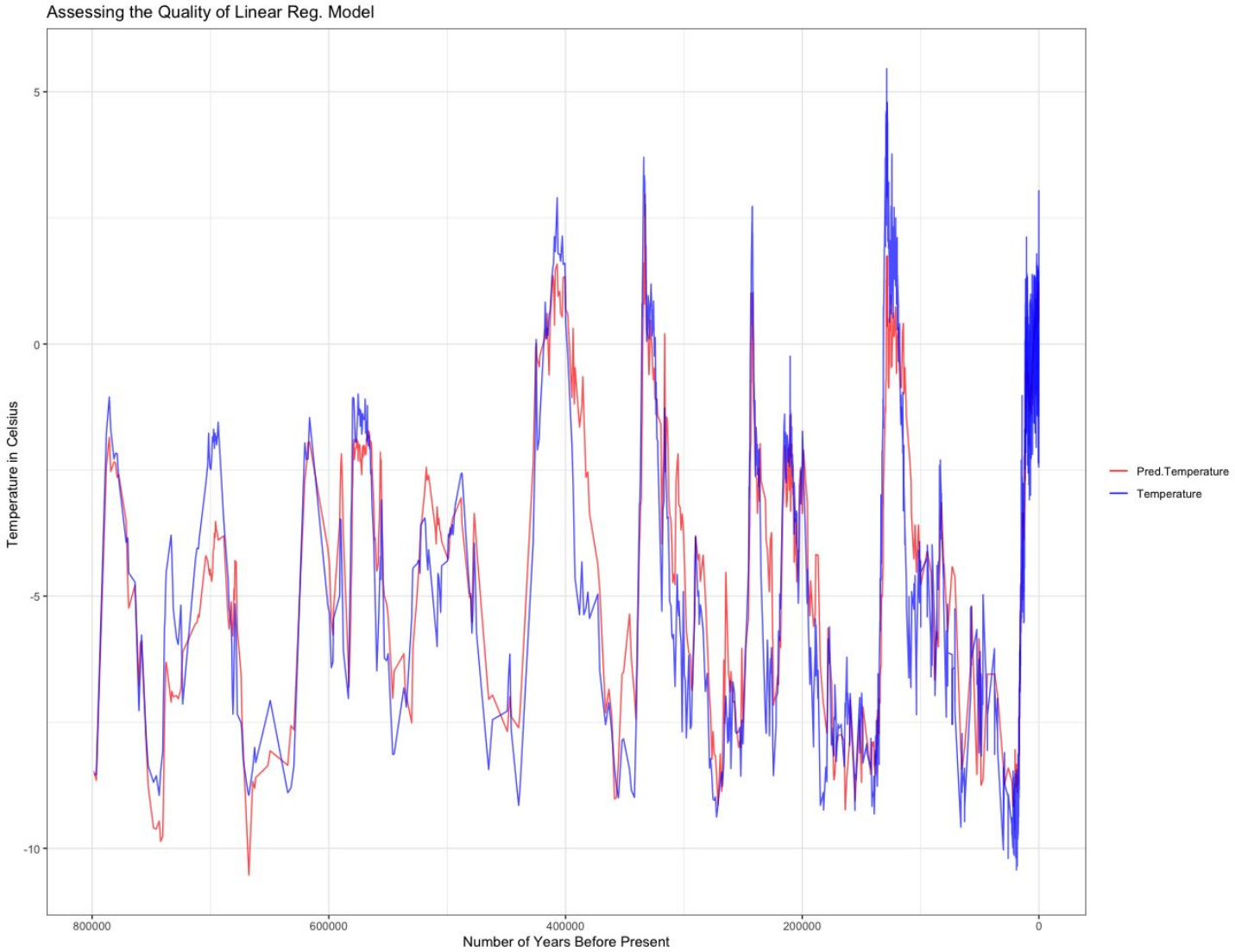

Power Consumption
(megawatts)
100
75
50
25
0


Carbon Intensity of Major Bitcoin Miner Countries
Total / Weighed Average
Estonia
Iceland
Sweden
Canada
United States
Georgia
China
Country
0
200
400
600
800
Carbon Intensity (gCO2eq/kWh)

741,148x MORE ENERGY USE THAN A CREDIT CARD SWIPE



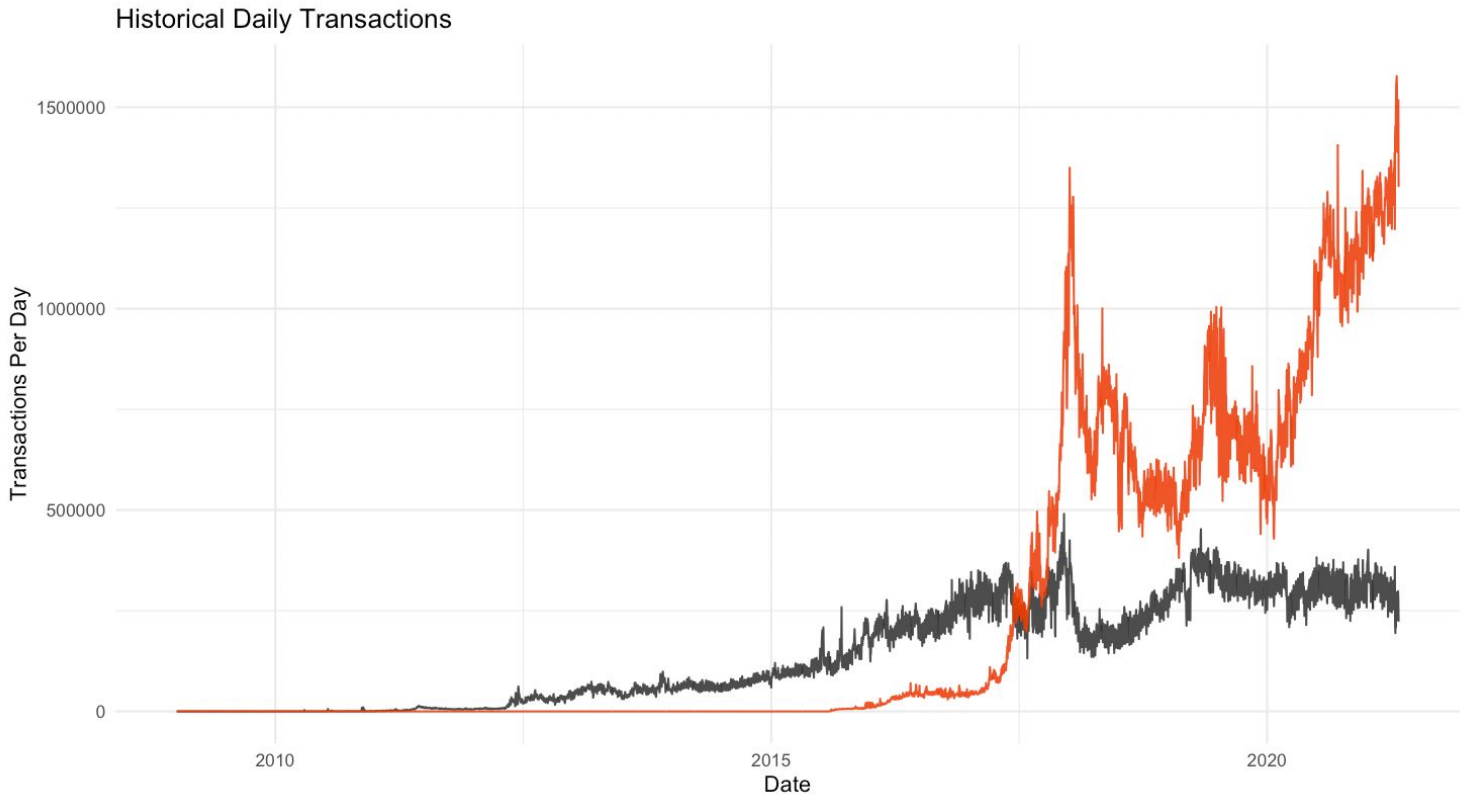

Carbon Footprint of Bitcoin vs. Visa Transactions
CO2 Emissions in kg
400
300
200
100
0
Visa
100,000 Visa
Bitcoin


Assessing the Quality of Linear Reg. Model
Temperature in Celsius
5
0
-5
-10
800000
600000
400000
200000
0
Number of Years Before Present
Pred.Temperature
Temperature

Daily Transactions of Other Cryptocurrencies

Select crypto to compare with Bitcoin:

ETH



1 Bitcoin = **37.76** U.S. Households

1 Ethereum = **2.58** U.S. Households

… for a full day

source: Digiconomist

IMPROVING CRYPTOCURRENCY EFFICIENCY

- Proof of Stake instead of Proof of Work (Cardano)
- Block Lattice Technology (Nano)

Can improve efficiency by 10,000 times

CONCLUSION

Underlying fundamentals about efficiency must change for Bitcoin or other cryptocurrencies to achieve mass adoption

QUESTIONS?