GLOBAL BITCOIN MINING DATA REVIEW

Q3 2021

OCTOBER 2021

Bitcoin Mining Council

BITCOIN MINING COUNCIL

29 MINING COMPANIES REPRESENTING 33% OF THE NETWORK

argo
ATLAS MINING
atnorth
BIT5IVE
Bitfarms
BITFURY
BITQUEST
BITRIVER
BlockFi
BLOCKWARE SOLUTIONS
CCU
CANADA COMPUTATIONAL UNLIMITED
celsius network
CORE SCIENTIFIC
COMPUTENORTH
Cowa
DMG BLOCKCHAIN SOLUTIONS
DATAVENTURES
FRONTIER MINING
GALAXY DIGITAL
HIVE
HM Tech LLC
HASH WITH THE MASTER
HUT 8
MARATHON DIGITAL HOLDINGS
Managed Crypto Mining
MicroStrategy
PrimeBlock
RIOT
SBI Crypto

Bitcoin Mining Council

EXECUTIVE SUMMARY

Bitcoin mining:

1. Uses an inconsequential amount of energy.
2. Is rapidly becoming more efficient.
3. Is powered by a higher mix of sustainable energy than any major country or industry.

Bitcoin Mining Council

PRESENTATION OVERVIEW

1 BITCOIN MINING ENERGY USE VS GLOBAL ENERGY USE

2 BITCOIN MINING ENERGY USE VS UNITED STATES ENERGY USE

3 GLOBAL BITCOIN MINING ENERGY USE IS NEGLIGIBLE

4 GLOBAL BITCOIN MINING HAS THE HIGHEST SUSTAINABLE ENERGY MIX

5 GLOBAL BITCOIN MINING VS OTHER INDUSTRIES

6 IN Q3, MINING EFFICIENCY & SUSTAINABLE ELECTRICITY MIX INCREASED 23% & 3%

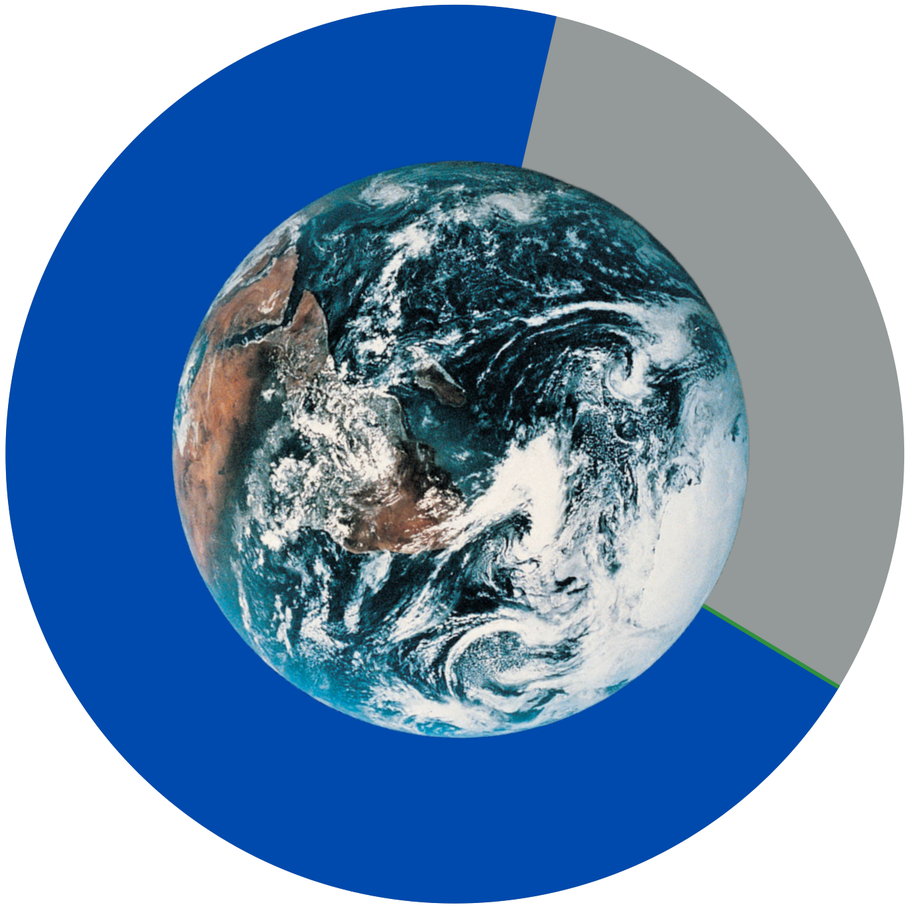
7 BITCOIN MINING IS TECHNOLOGY INTENSIVE, 42X+ IN EFFICIENCY IN 8 YEARS

8 CONCLUSION: BITCOIN MINING ENERGY EFFICIENCY IS IMPROVING, RAPIDLY

9 SOURCES AND METHODOLOGY

Bitcoin Mining Council

BITCOIN MINING ENERGY USE VS TOTAL GLOBAL ENERGY USE



154,620 TWh[i]
TOTAL ENERGY GENERATED WORLDWIDE

50,000 TWh[ii]
ENERGY LOST DUE TO INEFFICIENCIES

188 TWh[iii]
ENERGY CONSUMED BY BITCOIN MINING ON THE WORLD'S ELECTRIC GRID

GLOBAL BITCOIN MINING CONSUMES 0.12%
OF THE WORLD'S ENERGY PRODUCTION

GLOBAL BITCOIN MINING CONSUMES 0.38%
OF THE WORLD'S ENERGY WASTED

Bitcoin Mining Council

SOURCES: [i] BP STATISTICAL REVIEW OF WORLD ENERGY (2021), HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.
[ii] INTERNATIONAL ENERGY AGENCY, HTTPS://WWW.IEA.ORG/DATA-AND-STATISTICS/DATA-PRODUCT/WORLD-ENERGY-STATISTICS-AND-BALANCES.
[iii] BMC ESTIMATED BITCOIN MINING ENERGY USE (SEPT 30, 2021).

BITCOIN MINING ENERGY USE VS US ELECTRICITY GENERATION USE

10,463 TWh[i]
TOTAL ENERGY USED TO GENERATE & DISTRIBUTE ELECTRICITY IN THE US

6,800 TWh[i]
ELECTRICAL SYSTEM ENERGY WASTED OR LOST IN THE US

188 TWh[ii]
ENERGY CONSUMED BY BITCOIN MINING ON THE WORLD'S ELECTRIC GRID

65% OF ALL ENERGY
USED TO GENERATE & DISTRIBUTE ELECTRICITY IN THE US IS LOST OR WASTED

GLOBAL BITCOIN MINING CONSUMES 2.8%
OF THE ELECTRICAL SYSTEM ENERGY WASTED OR LOST IN THE US

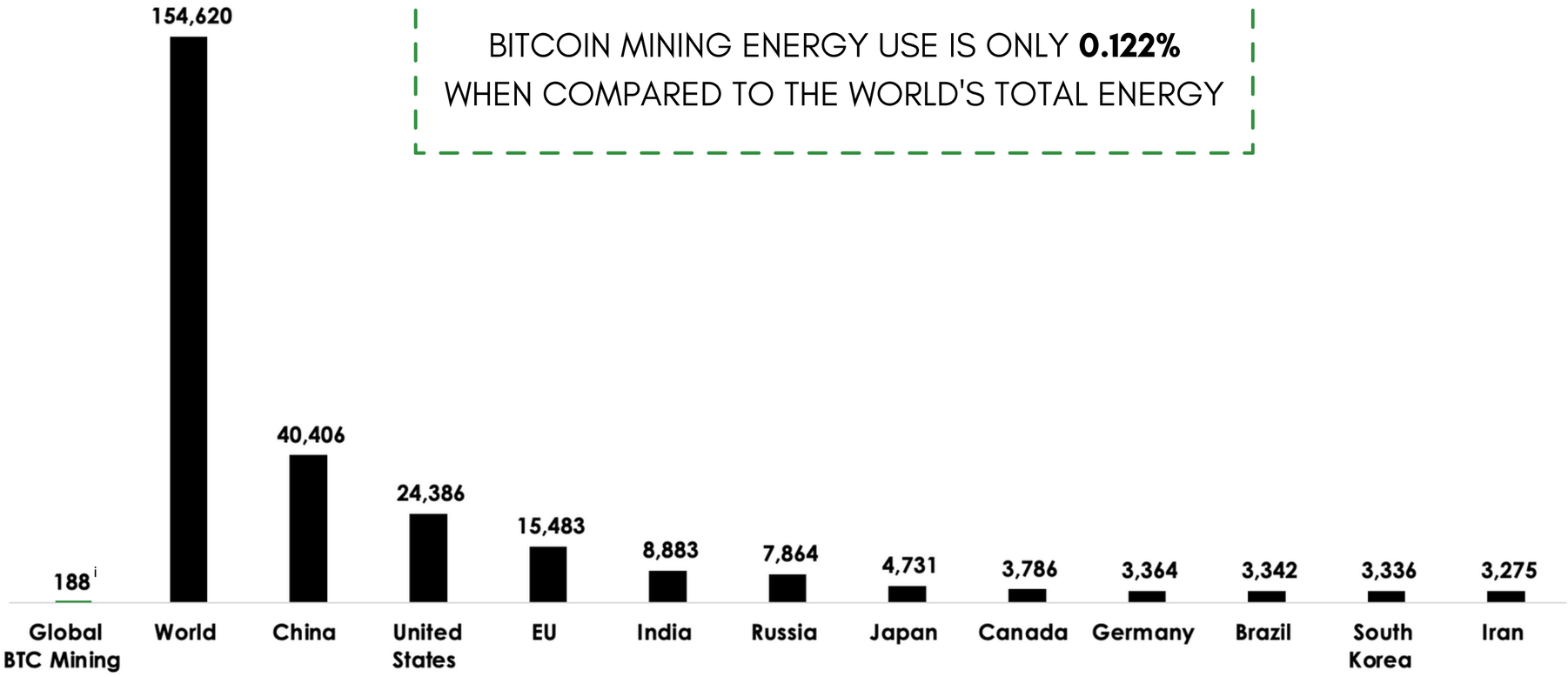
Bitcoin Mining Council

SOURCES: [i] HTTPS://WWW.EIA.GOV/TOTALENERGY/DATA/MONTHLY/PDF/FLOW/TOTAL_ENERGY_2020.PDF.
[ii] BMC ESTIMATED BITCOIN MINING ENERGY USE (SEPT 30, 2021).

GLOBAL BITCOIN MINING ENERGY USE IS NEGLIGIBLE

PRIMARY ENERGY CONSUMPTION: BITCOIN MINING VS COUNTRIES (TWh) [ii]

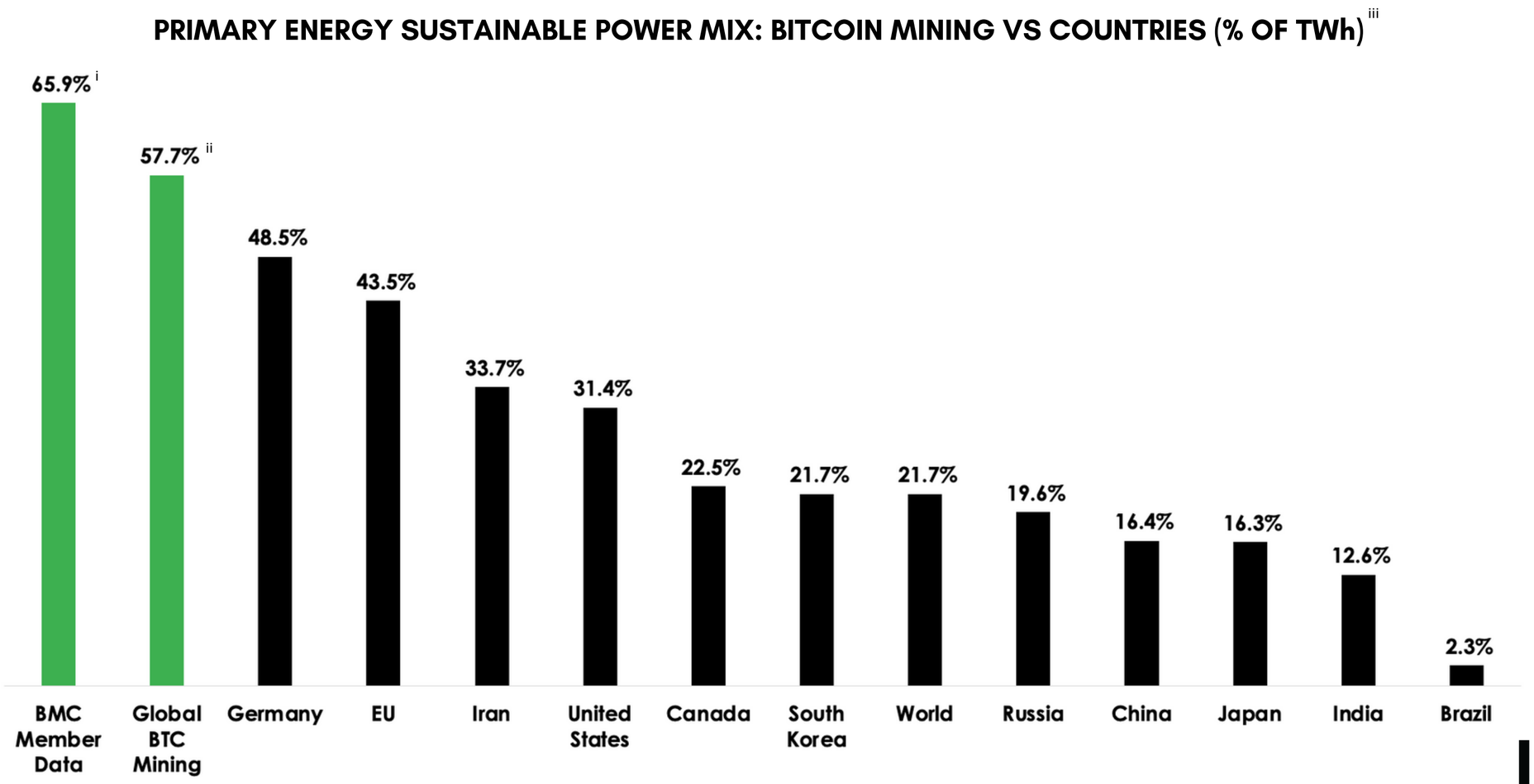
BITCOIN MINING ENERGY USE IS ONLY **0.122%**
WHEN COMPARED TO THE WORLD'S TOTAL ENERGY



SOURCES: [i] BMC ESTIMATED BITCOIN MINING ENERGY USE (SEPT 30, 2021). ANNUALIZED VALUES ARE USED FOR BITCOIN MINING ENERGY & ELECTRICITY USE.
[ii] BP'S STATISTICAL REVIEW OF WORLD ENERGY (2021). HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.

Bitcoin Mining Council

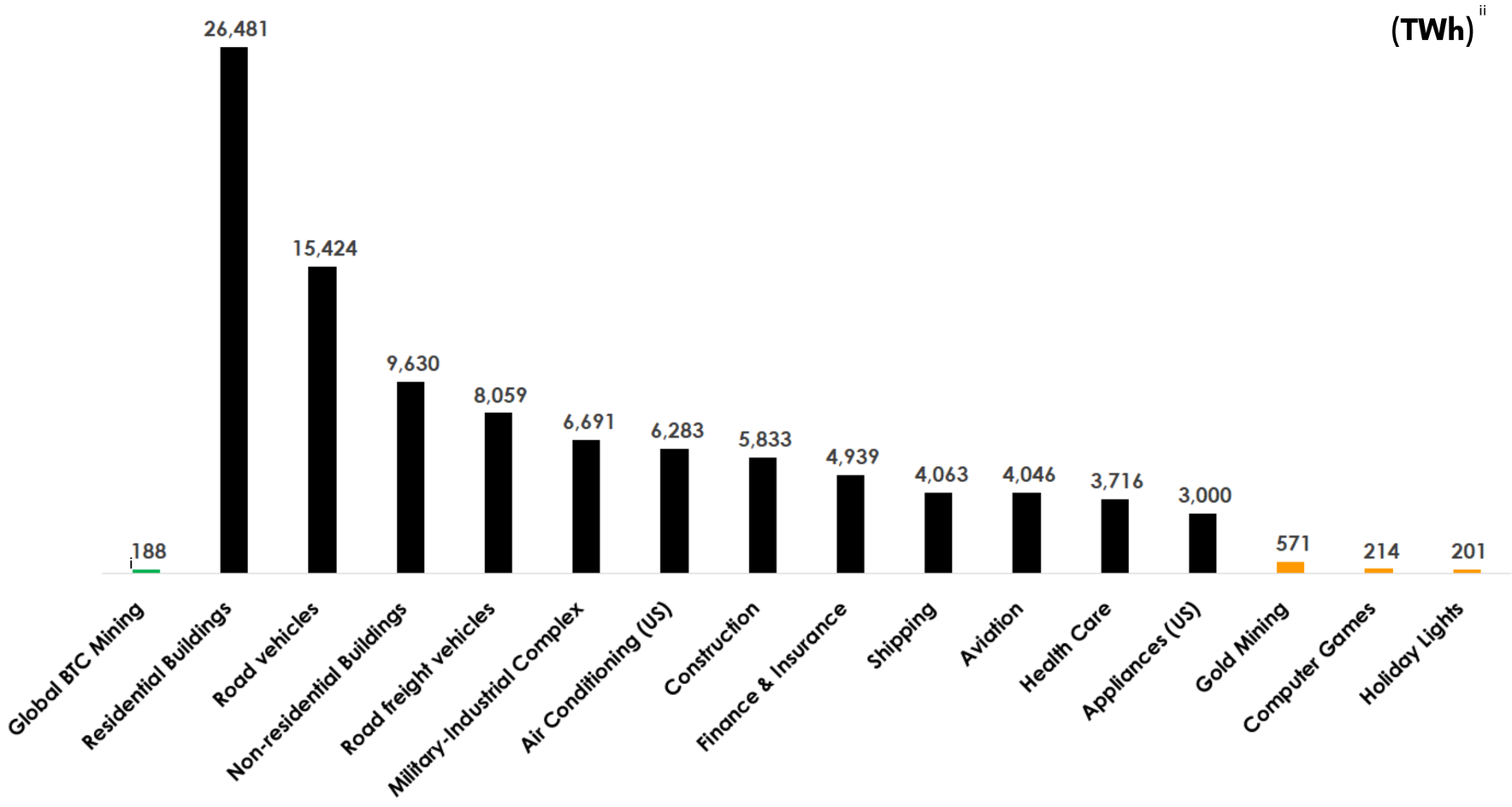
GLOBAL BITCOIN MINING HAS THE HIGHEST SUSTAINABLE ENERGY MIX



Bitcoin Mining Council

SOURCES: [i] VALUE REPRESENTS DATA COMPILED FROM BMC ADVISORY COUNCIL MINERS. ANNUALIZED PRIMARY ENERGY USE.
[ii] ESTIMATED GLOBAL BITCOIN NETWORK ANNUALIZED POWER BASED ON BMC ANALYSIS, ASSUMPTIONS AND EXTRAPOLATION. (SEPT 30, 2021)
[iii] COUNTRY DATA COMPILED FROM BP'S STATISTICAL REVIEW OF WORLD ENERGY (2021). HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.

GLOBAL BITCOIN MINING VS OTHER INDUSTRIES

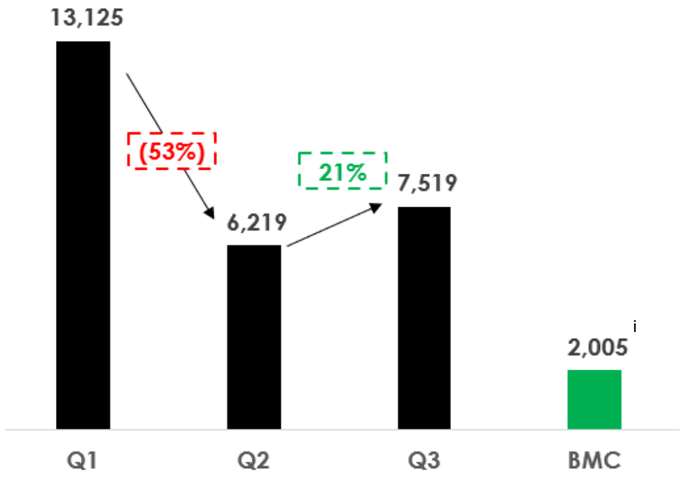


Bitcoin Mining Council

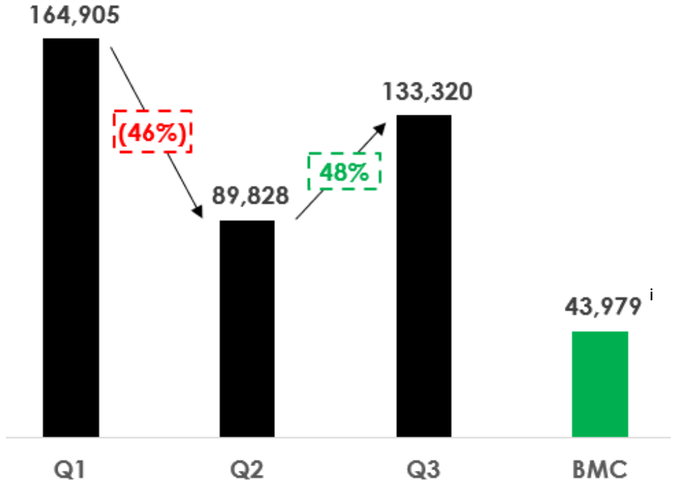
SOURCES: i BMC ESTIMATED BITCOIN MINING ENERGY USE (SEPT 30, 2021). ANNUALIZED VALUES ARE USED FOR BITCOIN MINING ENERGY & ELECTRICITY USE.
ii ESTIMATED INDUSTRY ENERGY USE BASED ON SEVERAL SOURCES: HTTPS://WWW.EIA.GOV/OUTLOOKS/IEO/PDF/TRANSPORTATION.PDF / HTTPS://ACADEMIC.OUP.COM/EURPUB/ARTICLE-ABSTRACT/30/SUPPLEMENT_5/CKAA165.843/5914601 / HTTPS://HASSMCCOOK.MEDIUM.COM/COMPARING-BITCOINS-ENVIRONMENTAL-IMPACT-F56B18014F64 HTTPS://BITCOINMAGAZINE.COM/BUSINESS/INTRODUCING-CBEI-A-NEW-WAY-TO-MEASURE-BITCOIN-NETWORK-ELECTRICAL-CONSUMPTION.

IN Q3, MINING EFFICIENCY INCREASED 23% AND SUSTAINABLE ELECTRICITY MIX INCREASED 3%

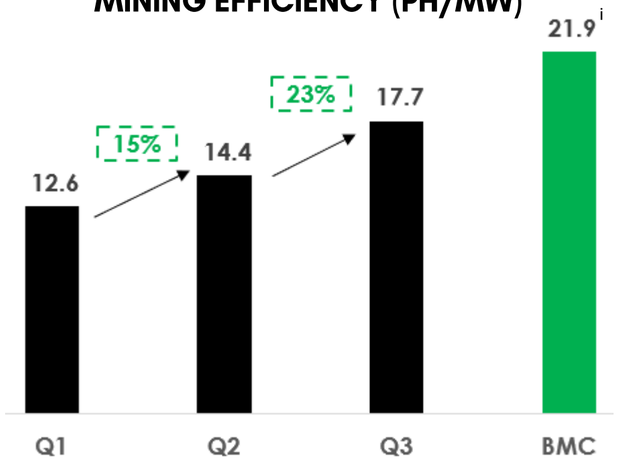
FLEET ELECTRICITY CONSUMPTION (MW) [ii]



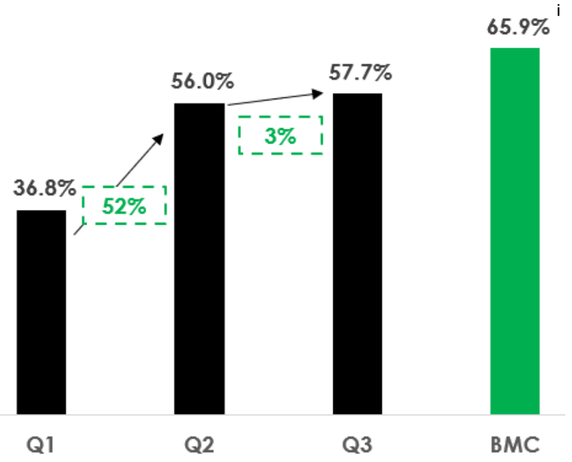
HASHRATE (PH) [ii]



MINING EFFICIENCY (PH/MW) [ii]



SUSTAINABLE ELECTRICITY (%) [ii]



Bitcoin Mining Council

SOURCES: [i] DATA COMPILED FROM BMC ADVISORY COUNCIL MEMBERS. ANNUALIZED VALUES ARE USED FOR BITCOIN MINING ENERGY AND ELECTRICITY USE.
[ii] ESTIMATED GLOBAL BITCOIN NETWORK ANNUALIZED POWER BASED ON BMC ANALYSIS, ASSUMPTIONS AND EXTRAPOLATION.

BITCOIN MINING IS TECHNOLOGY INTENSIVE, IT HAS HAS INCREASED 42X IN EFFICIENCY OVER 8 YEARS

Hardware Type	Hardware name	Date	J/Th
CPU	ARM Cortex A9	3-Jan-09	**877,193**
GPU	ATI 5870M	23-Sep-09	**264,550**
FPGA	X6500 FPGA Miner	29-Aug-11	**43,000**
ASIC - Avalon B1	Canaan AvalonMiner Batch 1	1-Jan-13	**9,351**
ASIC - Jupiter	KnCMiner Jupiter	5-Oct-13	**1,484**
ASIC - U1	Antminer U1	1-Dec-13	**1,250**
ASIC - BF864C55	Bitfury BF864C55	3-Mar-14	**500**
ASIC - RockerBox	RockerBox	22-Jul-14	**316**
ASIC - BE3000	ASICMiner BE300	16-Sep-14	**187**
ASIC - BM13850	BM1385	19-Aug-15	**181**
ASIC - PickAxe0	PickAxe	23-Sep-15	**140**
ASIC - S9	Antminer S9-11.5	1-Jun-16	**98**
ASIC - R4	Antminer R4	1-Feb-17	**97**
ASIC - Ebit 10	Ebang Ebit 10	15-Feb-18	**92**
ASIC - S15	Antminer S15	9-Apr-18	**59**
ASIC - S17	Antminer S17	9-Apr-19	**40**
ASIC - S19	Antminer S19 Pro	23-Mar-20	**29.5**

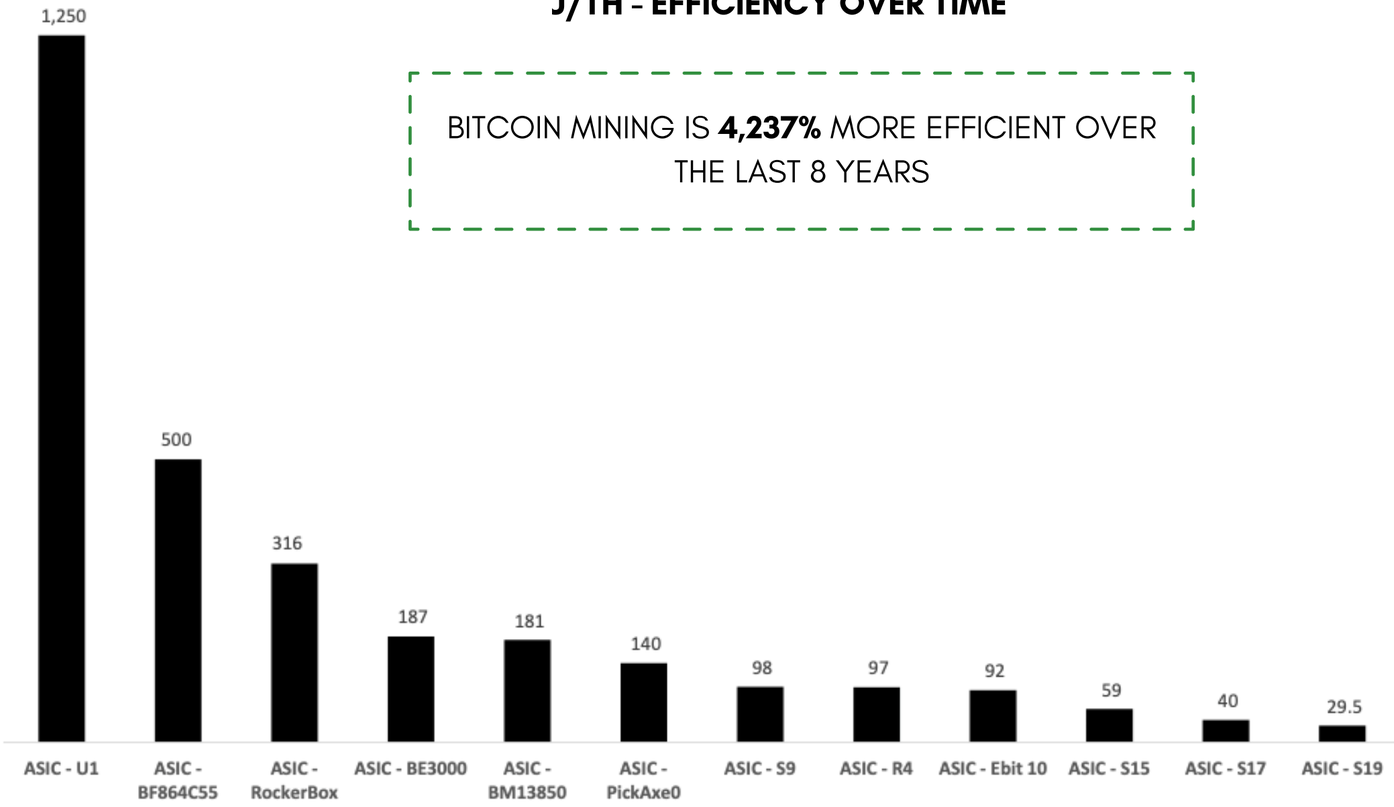
~700x

~13x

~3x

J/TH - EFFICIENCY OVER TIME [i]

BITCOIN MINING IS **4,237%** MORE EFFICIENT OVER THE LAST 8 YEARS



Bitcoin Mining Council

SOURCES: [i] HARDWARE DATA COMPILED FROM RESPECTIVE HARDWARE MANUFACTURER WEBSITES.
OLDER GENERATION MODEL EFFICIENCY DATA FROM "THE COST OF BITCOIN MINING HAS NEVER REALLY INCREASED" (2020) HTTPS://ARXIV.ORG/PDF/2004.04605.PDF.

CONCLUSION: BITCOIN MINING ENERGY EFFICIENCY IS IMPROVING, RAPIDLY

The Bitcoin Mining Council is estimating a 3x and 2x improvement in mining efficiency over the next four and following four years, respectively

6x

+

Satoshi's protocol reduces energy consumption incentives by 2x every 4 years, for the foreseeable future

4x

=

Bitcoin mining is guaranteed to be **dramatically more energy efficient** in the next eight years.

Bitcoin Mining Council

SOURCES & METHODOLOGY

BMC SURVEY METHODOLOGY:

THE BMC SURVEYED BITCOIN MINERS AROUND THE WORLD ASKING THREE QUESTIONS; 1.) HOW MUCH ELECTRICITY DOES YOUR TOTAL FLEET CONSUME TODAY?; 2.) WHAT IS THE TOTAL % OF SUSTAINABLE ELECTRICITY* WITHIN YOUR FLEET'S POWER GENERATION MIX TODAY?; 3.) WHAT IS THE TOTAL AGGREGATE HASHRATE OF YOUR FLEET TODAY?

** THE ANNOTATED TERM "SUSTAINABLE ELECTRICITY" WAS DEFINED AS ELECTRICITY GENERATED BY: HYDRO, WIND, SOLAR, NUCLEAR, GEOTHERMAL, AND CARBON-BASED GENERATION WITH NET CARBON CREDITS. BMC'S "SUSTAINABLE ELECTRICITY" DEFINITION IS BASED ON THE PRINCIPLES BROUGHT FORWARD BY THE EIA'S "NET ZERO BY 2050" REPORT. THE REPORT FOCUSES ON THE NEEDED GLOBAL ENERGY TRANSFORMATION AND RECOMMENDS THE USE OF RENEWABLE ENERGY GENERATION, NUCLEAR AND THE USE OF CREDITS TO INCENTIVIZE AND SUPPORT ADDITIONAL DEVELOPMENT OF RENEWABLE ENERGY DEVELOPMENT.*

SOURCES:

1 BP STATISTICAL REVIEW OF WORLD ENERGY (2021), HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY. INTERNATIONAL ENERGY AGENCY, HTTPS://WWW.IEA.ORG/DATA-AND-STATISTICS/DATA-PRODUCT/WORLD-ENERGY-STATISTICS-AND-BALANCES. BMC ESTIMATED BITCOIN MINING ENERGY USE.

2 VALUE REPRESENTS DATA COMPILED FROM BMC ADVISORY COUNCIL MINERS. ANNUALIZED PRIMARY ENERGY USE. ESTIMATED GLOBAL BITCOIN NETWORK ANNUALIZED POWER BASED ON BMC ANALYSIS, ASSUMPTIONS AND EXTRAPOLATION. COUNTRY DATA COMPILED FROM BP'S STATISTICAL REVIEW OF WORLD ENERGY (2021). HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.

3 BMC ESTIMATED BITCOIN MINING ENERGY USE (SEPT 30, 2021). ANNUALIZED VALUES ARE USED FOR BITCOIN MINING ENERGY & ELECTRICITY USE. BP'S STATISTICAL REVIEW OF WORLD ENERGY (2021). HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.

4 VALUE REPRESENTS DATA COMPILED FROM BMC ADVISORY COUNCIL MINERS. ANNUALIZED PRIMARY ENERGY USE. ESTIMATED GLOBAL BITCOIN NETWORK ANNUALIZED POWER BASED ON BMC ANALYSIS, ASSUMPTIONS AND EXTRAPOLATION. COUNTRY DATA COMPILED FROM BP'S STATISTICAL REVIEW OF WORLD ENERGY (2021). HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.

5 VALUE REPRESENTS DATA COMPILED FROM BMC ADVISORY COUNCIL MINERS. ESTIMATED INDUSTRY ENERGY USE BASED ON SEVERAL SOURCES: HTTPS://WWW.EIA.GOV/OUTLOOKS/IEO/PDF/TRANSPORTATION.PDF / HTTPS://ACADEMIC.OUP.COM/EURPUB/ARTICLE-ABSTRACT/30/SUPPLEMENT_5/CKAA165.843/5914601 / HTTPS://HASSMCCOOK.MEDIUM.COM/COMPARING-BITCOINS-ENVIRONMENTAL-IMPACT-F56B18014F64 HTTPS://WWW.BP.COM/EN/GLOBAL/CORPORATE/ENERGY-ECONOMICS/STATISTICAL-REVIEW-OF-WORLD-ENERGY/PRIMARY-ENERGY.

6 BMC ADVISORY COUNCIL MEMBERSHIP DATA, ANALYSIS AND EXTRAPOLATION. AS SUBMITTED AS AT SEPTEMBER 30, 2021.

7 HARDWARE DATA COMPILED FROM RESPECTIVE HARDWARE MANUFACTURER WEBSITES. OLDER GENERATION MODEL EFFICIENCY DATA FROM "THE COST OF BITCOIN MINING HAS NEVER REALLY INCREASED" (2020) HTTPS://ARXIV.ORG/PDF/2004.04605.PDF.

Bitcoin Mining Council

THANK YOU

Bitcoin Mining Council