



HASHRATE
INDEX

Hashrate Index

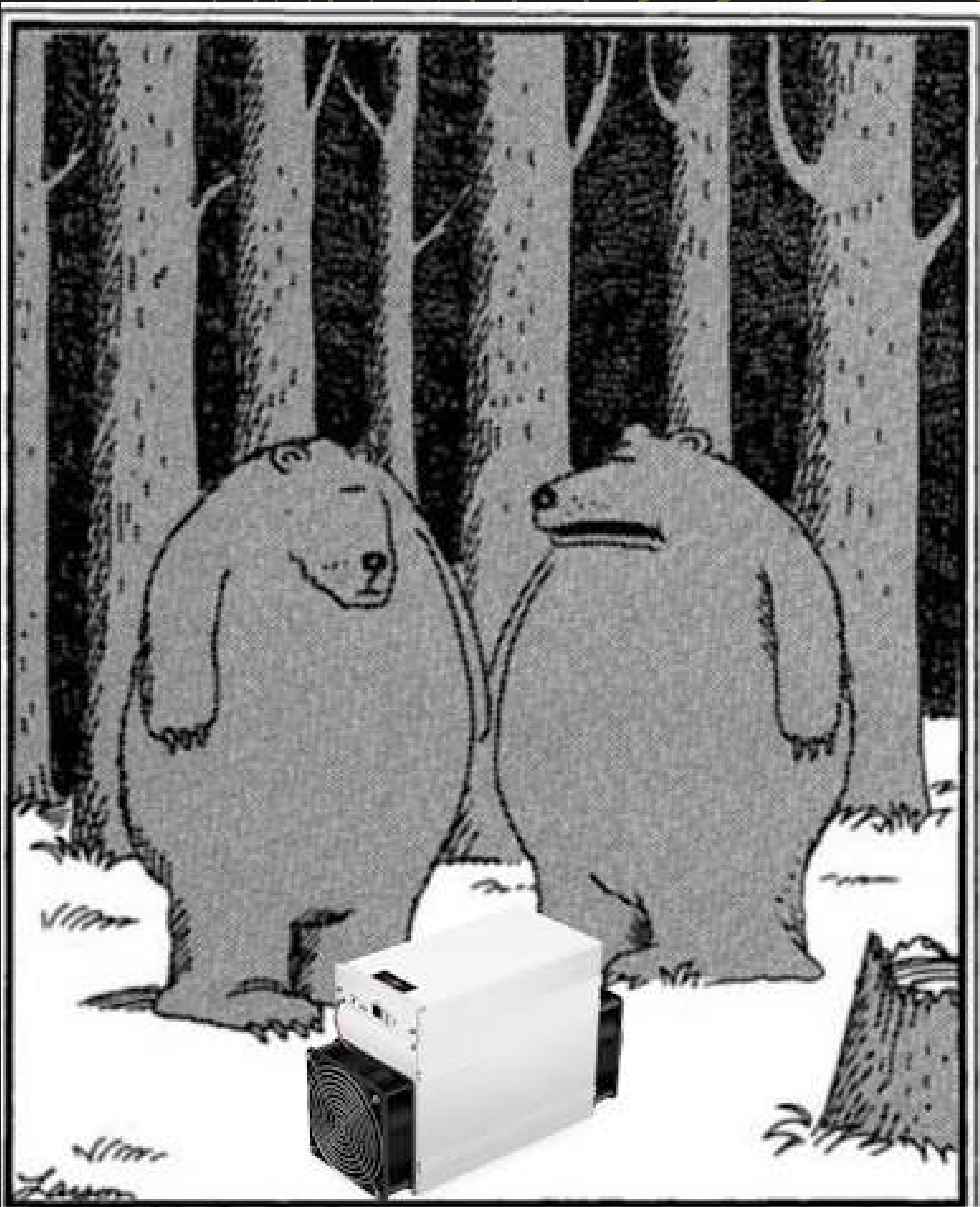
Q1, 2022 Report

Luxor 

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About Hashrate Index

Hashrate Index is a Bitcoin mining data, analytics and research platform. Our platform offers novel data sets that enable miners, traders, content creators, and investors to gain key insights into the mining industry and generate alpha. Hashrate Index is a product from Luxor Technology, a mining software and services company.



**"Thunderstick? ... You actually said, 'Thunderstick?' ...
That, my friend, is an Antminer S9**



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Q1-2022 Stats (and % Change from Q4-2021)

EoQ Hashrate 7-Day Average
204 EH/s (+16%)

Q1-2022 Total Mining Rewards
\$3,474,062,426 | 84,074.96 BTC mined

EoQ USD Hashprice:
\$0.2121/TH/day (-15%)

EoQ BTC Hashprice
451 sats/TH/day (-15%)

Average Q1 2022 Hashprice (USD)
\$0.2382/TH/day (-18%)

Average Q1 2022 Hashprice (BTC)
479 sats/TH/day (-18%)

2022 is a year that began with supercharged expectations. Public Bitcoin miners spent 2021 announcing 8-to-10 figure ASIC purchases. El Salvador started mining bitcoin with a volcano. Bitcoin miners that had no brand presence a year ago were going public, one after the other.

China's Bitcoin mining ban sent North America's digital gold rush into a frenzy, opening the opportunity for green and veteran bitcoin miners alike to aggressively expand operations.

But Q1 reminded us that, no matter how "precise" your models are for building out a mine (or how fervent a miner's enthusiasm), reality has a different schedule. Or to put it in popular military adage, "No plan survives contact with the enemy."

For miners, the enemies are supply chain snags, raw material/labor shortages, and time. We're nearly a year removed from China's historic mining ban, but the wakes of the Great China Migration are still shifting the global Bitcoin mining landscape. Bitcoin mining ASICs are now more readily available to miners outside of China (particularly those in North America) than before, and Bitcoin mining demand is surging in the West.

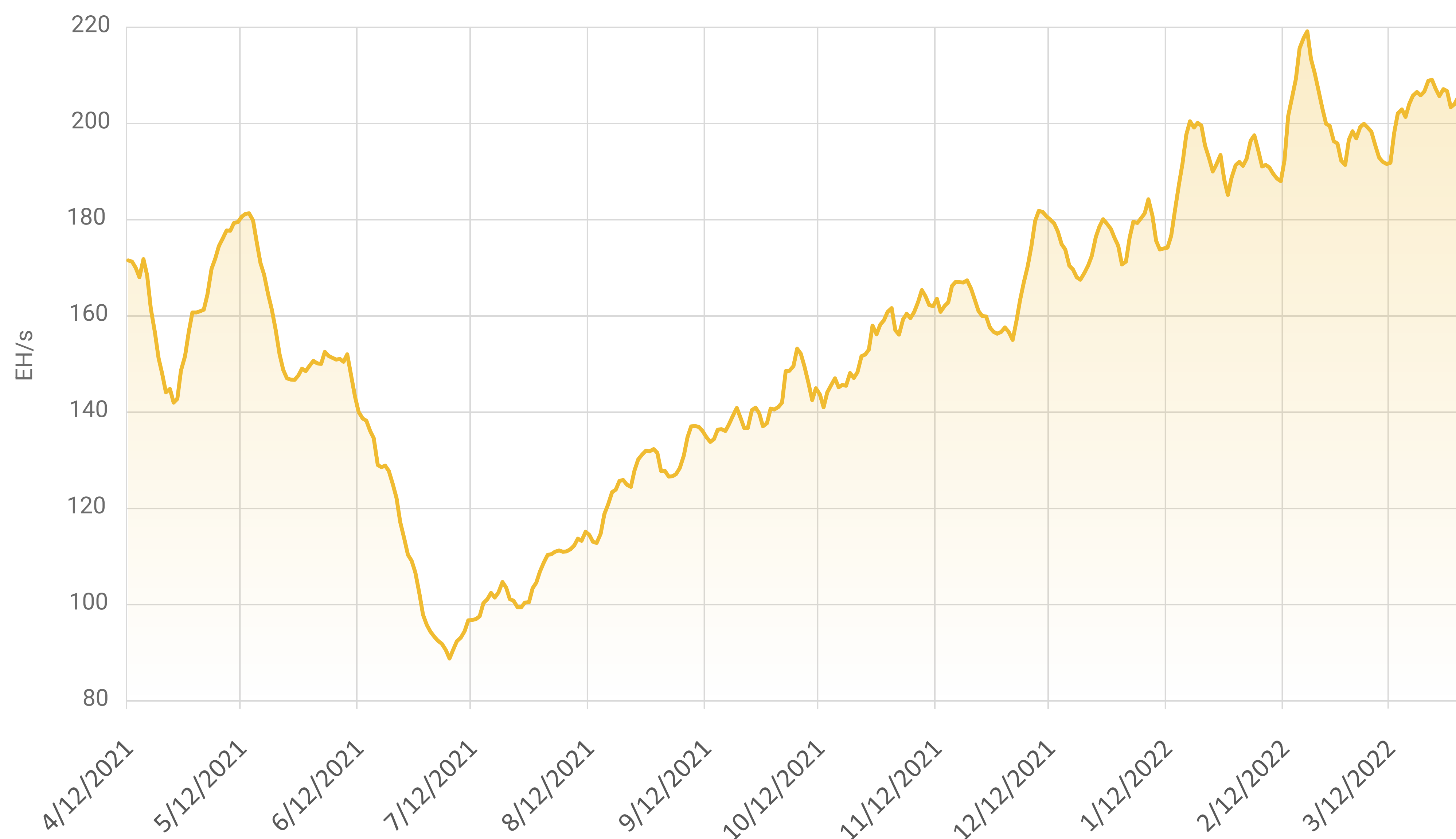
Only, there's currently not enough fully-equipped warehouse and rack space available to host the million or so ASICs looking for homes.

As a result, hashrate is growing more slowly than most Bitcoin miners anticipated. At the end of Q1, Bitcoin's 7-day hashrate was 204 EH/s, just 16% more than January 1's 176 EH/s.

Bitcoin 7 - Day SMA Hashrate



Bitcoin 7 - Day SMA Hashrate



With no place to plug in machines, hashrate is growing slower than we expected, and ASIC prices are taking a hit as a result. With the current supply glut, the ASIC resale market has become something of a buyer's market—flipping last year's trend on its head, a time when S19's fetched \$10-12k at all-time highs.

Hashprice is down over the quarter, but it's not as bad as it could be given the rack space crunch. Seeing as Bitcoin is having trouble staying aboard \$40k, hashprice is still relatively juicy—both in USD and BTC terms.



1

Bitcoin's Hashprice Falls, But Doesn't Falter

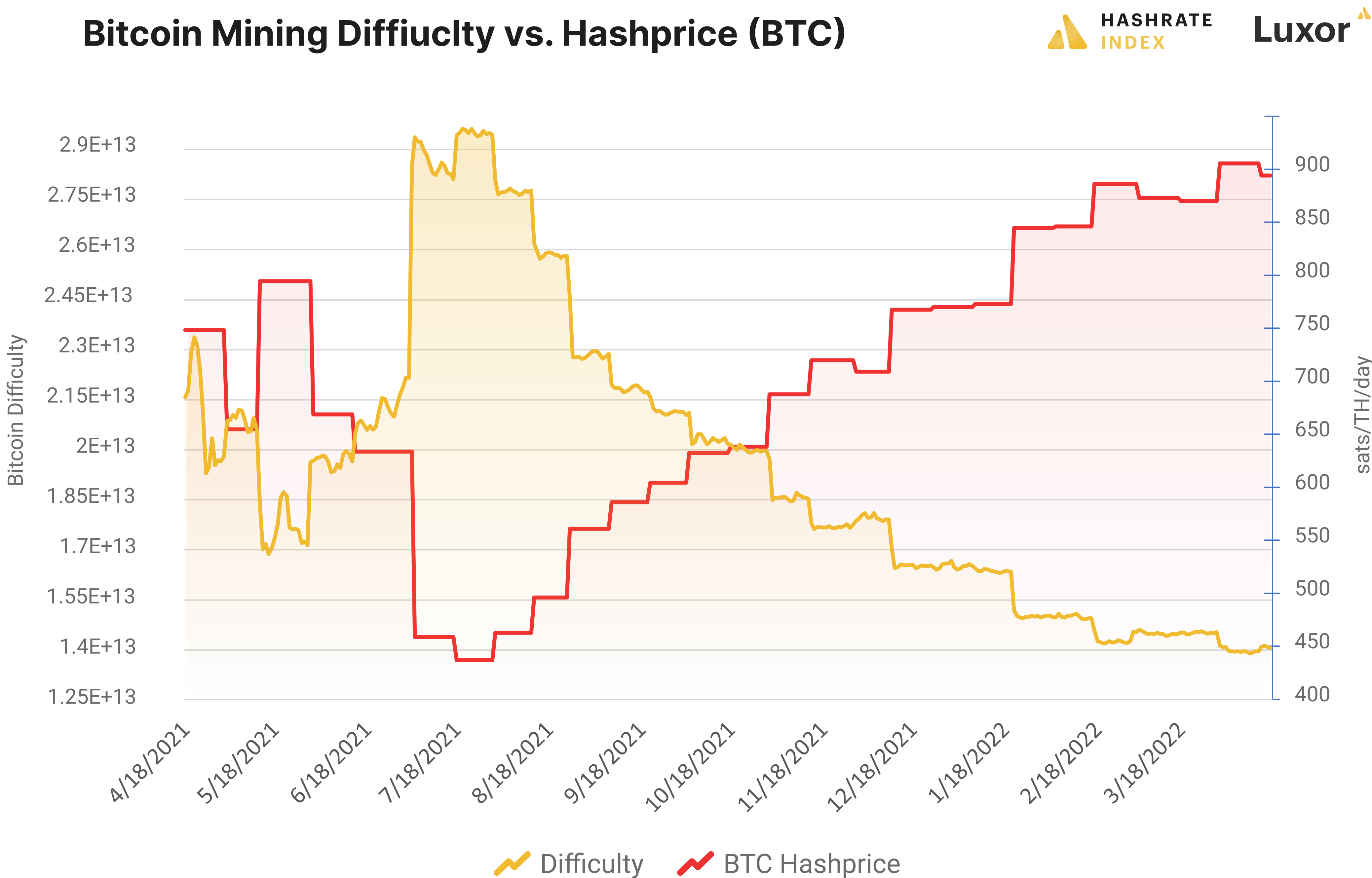
Semi-favorable as mining economics are right now, it's highly likely that 2021 was the hashprice high for this halving epoch.

Last year's USD hashprice average was \$0.31/TH/day. Q1-2022's average was \$0.20/TH/day, a 40% decrease from Q4-2021's average of \$0.33/TH/day and a 33% decrease from Q1 2021's average of \$0.30/TH/day.



Still, it's incredible that Q1's average was \$0.20/TH/day considering how many ASICs some of the largest miners have waiting on the sidelines. Mining economics are a lot healthier than they would be if these miners (particularly, the big public companies) were plugging in rigs on schedule.

Bitcoin-denominated hashprice fell 14% over the quarter to 450 sats/TH/day. The BTC hashprice average for Q1-2022 was 479 sats/TH/day, an 18% reduction from Q4, 2021's average of 586 sats/TH/day.



A rising difficulty has clipped hashprice for sure, but considering where we could be if more machines were being plugged in and raising difficulty, BTC hashprice is holding up relatively well.

In Q1, Bitcoin’s difficulty adjusted downward twice and upward five times. The average for these upward adjustments comes out to 3.76%, while the two negative adjustments average out to 0.92%. Small as the negative adjustments were, they still stanchied the Bitcoin’s slowbleeding of BTC-denominated hashprice. Put another way, every downward adjustment keeps BTC-denominated hashprice from failing even further.

Assuming Bitcoin’s price stays suppressed for the remainder (or most of) 2022, we expect Hashprice to trend towards \$0.10/TH/day, particularly as new machines come online en masse in the second half of the year.

Hashprice trades in backwardation: the future value of hashprice will be lower than the current price on a mid-to-longterm timeframe. Taking one look at a hashprice chart (for BTC or USD denominated hashprice) makes this trend obvious.

Swing Low, Sweet Fee Market

Ever since China’s sweeping mining and crypto bans, Bitcoin’s transaction and fee volumes are low, low, low.

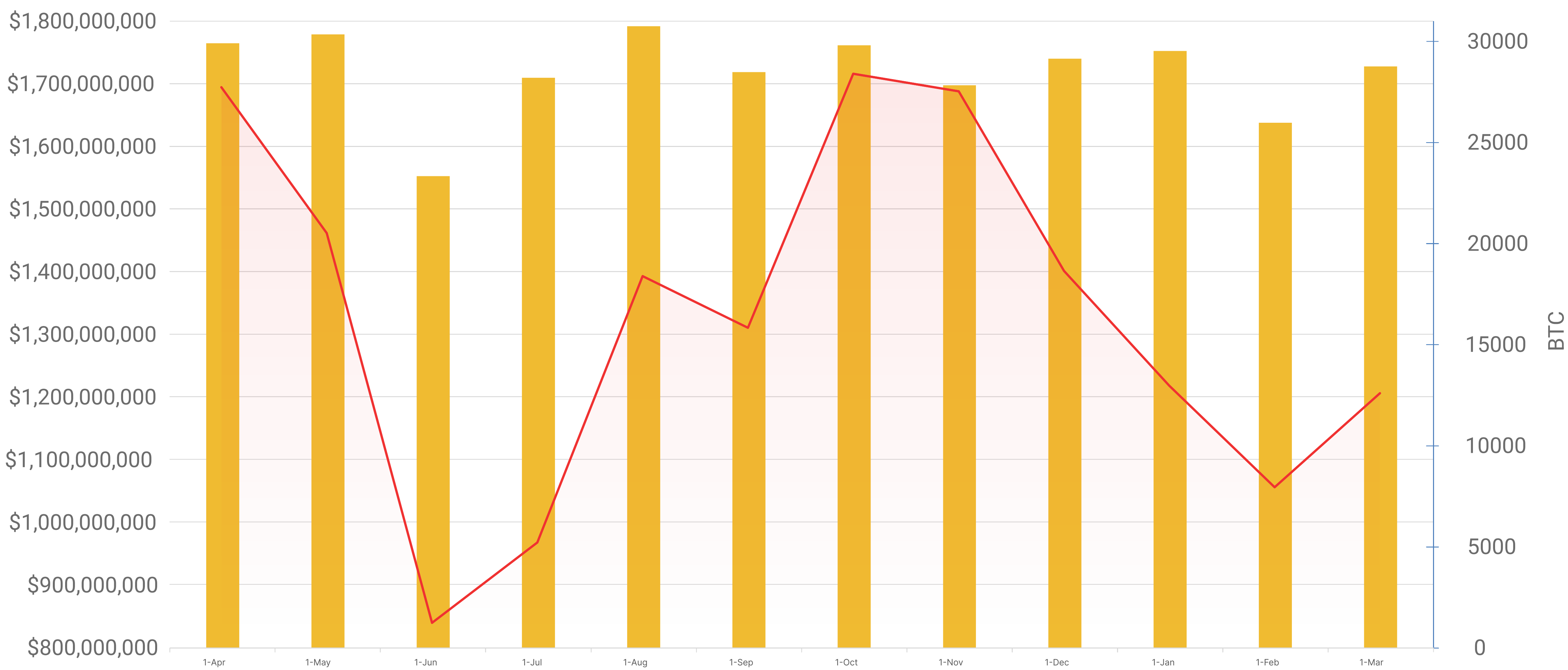
Fees were 1.25% of block rewards on average in Q1, down 15.5% from Q4’s average of 1.48%.



With fees down, there's been plenty of chatter from bitcoin miners and analysts about Bitcoin's future security budget. As miners, we sure would like to see higher transaction fees, but on the subject of network security, miners made more in USD terms last year than ever before

Even with USD hashprice down, monthly Bitcoin miner USD revenue is juicy, much juicier than pre-bul market conditions (late 2018-late 2020).

Bitcoin Miner Monthly Rewards (USD vs BTC)



	4/1/2021	5/1/2021	6/1/2021	7/1/2021	8/1/2021	9/1/2021	10/1/2021	11/1/2021	12/1/2021	1/1/2022	2/1/2022	3/1/2022
Monthly Mining Rewards (BTC)	29834.65	30270.64	23289.30	28131.59	30683.62	28417.40	29736.46	27760.77	29077.71	29456.57	25920.44	28697.94
Monthly Mining Rewards (USD)	\$1,692,305,031	\$1,459,706,032	\$837,765,610	\$965,881,758	\$1,391,145,297	\$1,308,528,024	\$1,713,968,859	\$1,686,037,488	\$1,399,411,558	\$1,215,925,202	\$1,054,139,853	\$1,203,997,370

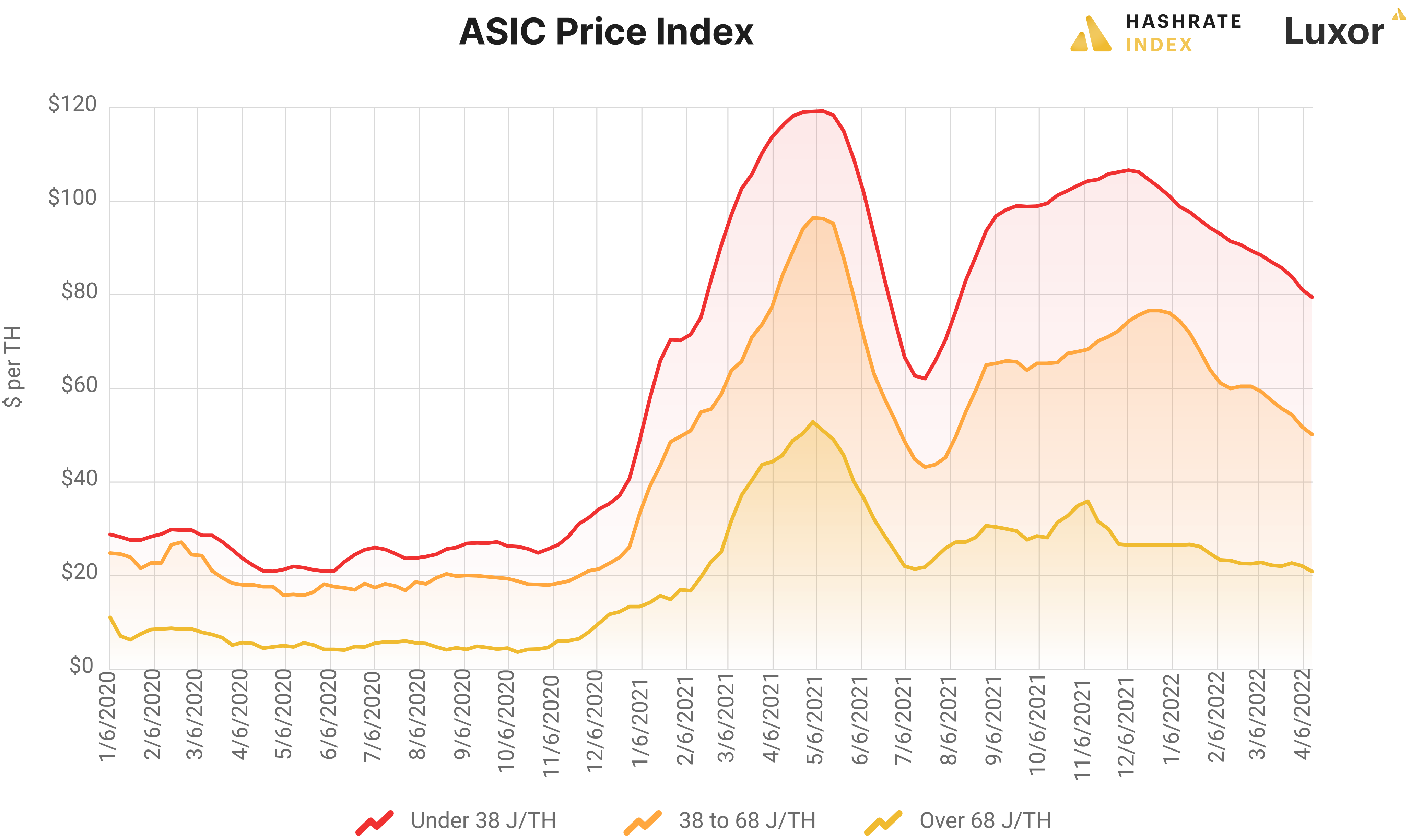
Monthly Mining Rewards (BTC) Monthly Mining Rewards (USD)

2

Mining Rig Price Are On a Come Down

Values for Bitcoin mining ASICs were on the downtrend all quarter.

New generation and mid-generation hardware failed to transcend their all-time high values in Q4 of 2021, even as Bitcoin itself hit an all-time high. They came close in December 2021, but prices have been in a downtrend since.



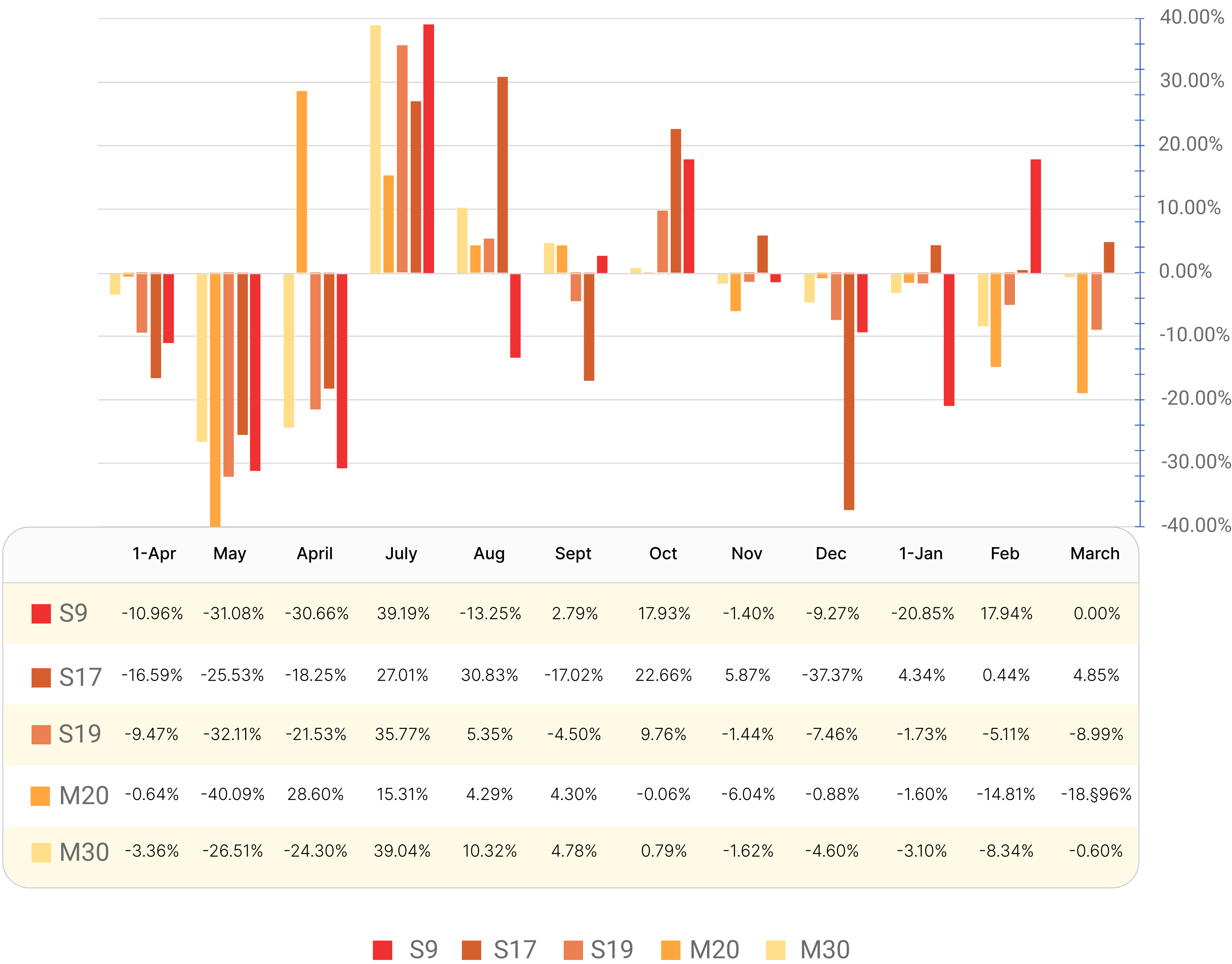
Typically, Bitcoin's price is the primary catalyst behind Bitcoin miner appreciation, but other, secondary forces can accelerate or dampen buying/selling as well. In the summer of 2021, for example, China's crypto mining ban tanked rig prices as Chinese miners liquidated inventory.

Prices snapped back quickly as miners (particularly in North America) purchased overseas rigs. But many miners overbought and can't find power/build rack space quickly enough to plug in all of these machines, so some of these ASICs are finding their way back onto the resale market. This supply glut (in addition to Bitcoin's price drag in 2022) is weighing ASIC prices down.

Unlike China's mining ban, which sent ASIC prices into a firesale over a matter of weeks, the current sell-off is a slow bleed. A Bitcoin bull run notwithstanding, we expect more red in the months to come, particularly considering:

- ASIC financiers are tightening up lines of liquidity. Some deals for new hardware are offering \$30/TH, while these models are selling for \$79/TH currently. We expect prices will come down to close this spread.
- New ASIC chips from Intel this year (and Blockstream's forthcoming 2023 miner) will pump even more machines into the market and give buyers greater diversity of options.
- Warehouse buildouts, by combination of supply chain hiccups, labor difficulties, and other snafus, are taking longer than many anticipated.

Monthly Change in USD Price of Popular Bitcoin Mining Rigs





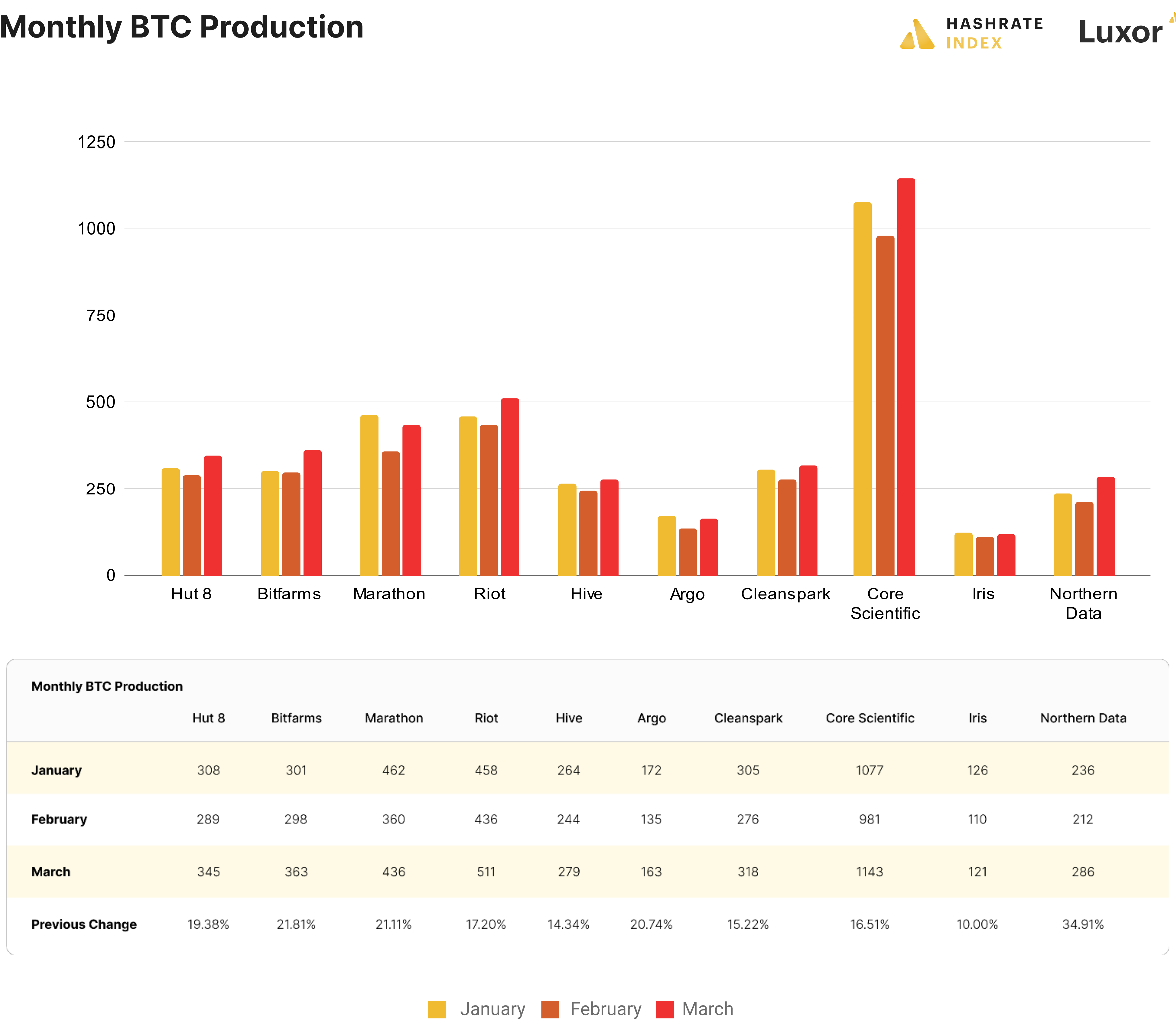
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Public Bitcoin Miners Are In a Hashrate Arms Race

Some of the largest Bitcoin miners in the world, those publicly traded on North American stock exchanges, forecasted significant hashrate growth coming into 2022.

Most miners have added hashrate so far this year. But given how many rigs these miners have waiting in storage, public bitcoin miners added much less hashrate to the network than they otherwise would have if more rack space were available.

In February, none of the large public miners exceeded their January productivity, though most all of the miners charted below mined more Bitcoin in March than January or February.



Looking beyond BTC production, we can also analyze the following metrics to gauge public bitcoin miner performance:

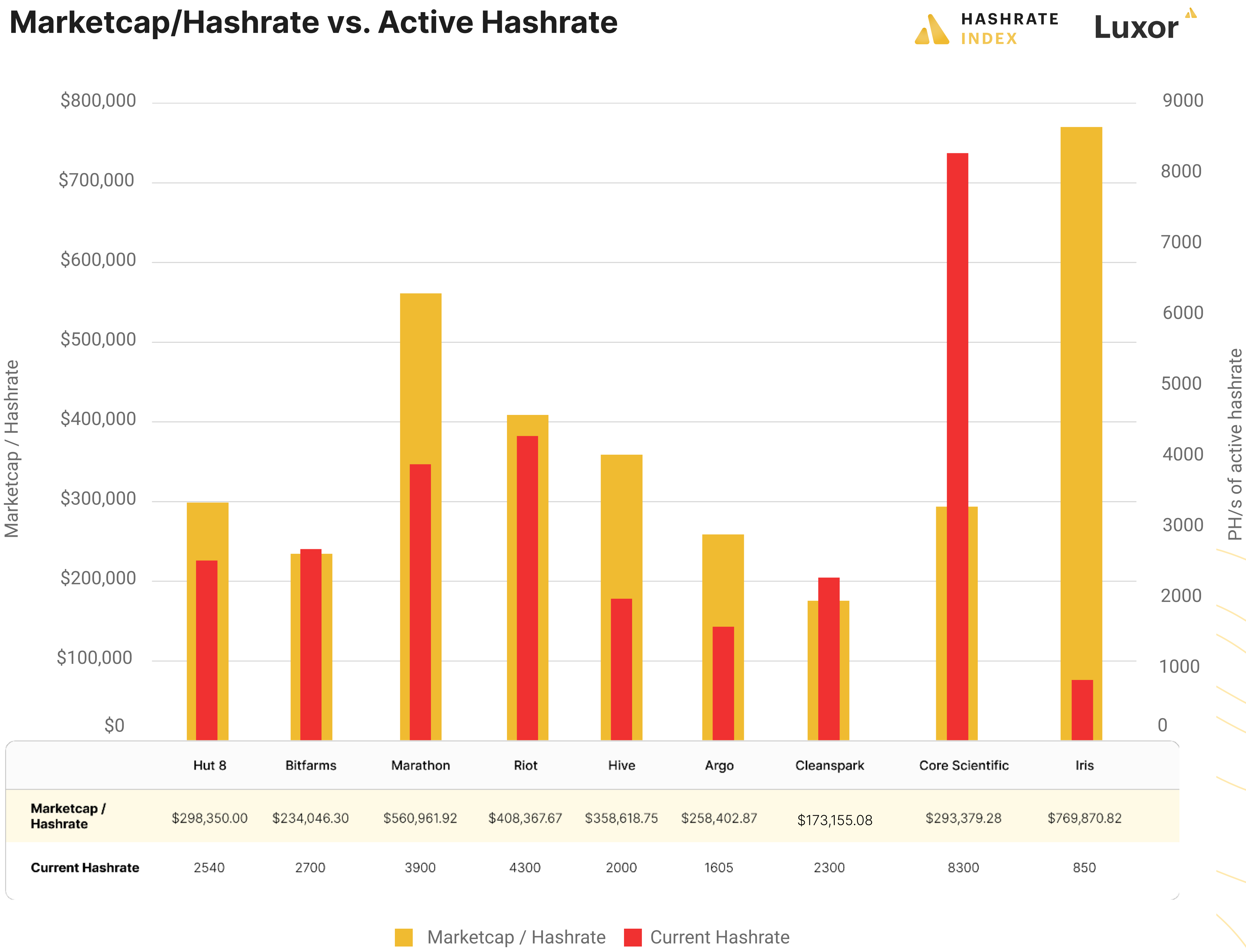
Price-to-Hodl Ratio: a ratio for valuing a bitcoin mining company by measuring its current market capitalization to its total fair market value bitcoin treasury. The Price-to-Hodl ratio provides investor insights into the relative balance sheet strength and liquidity amongst bitcoin mining peers.

Price-to-ASIC-Value Ratio: a ratio for valuing the underlying active, electrified mining rig hashrate value to a companies total market capitilization. If the ratio is low, investors are getting a discount to market value for active hashrate. If the ratio is high, investors are paying a premium for racked mining hashrate and future expansion.

	Hut 8	Bitfarms	Marathon	Riot	Hive	Argo	Cleanspark	Core Scientific	Iris
Current Hashrate (PH/s)	2540	2700	3900	4300	2000	1605	2300	8300	850
Power Capacity	109	116	117	132	N/A	N/A	70	250	26
J/TH Efficiency	43	43	30	30	N/A	N/A	30	30	30
Market Cap April 14	\$ 757,809,000	\$ 631,925,000	\$ 2,187,751,500	\$ 1,755,981,000	\$ 717,237,500	\$ 414,736,600	\$ 398,526,700	\$ 2,435,048,000	\$ 654,390,200
Shares Outstanding	171,450,000	201,250,000	103,050,000	117,300,000	409,850,000	46,810,000	41,470,000	316,240,000	53,030,000
Share Price	4.42	3.14	21.23	14.97	1.75	8.86	9.61	7.7	12.34
Price-to-Hodl ratio	2.94	3.02	5.84	7.25	6.99	3.85	23.76	7.18	16386.38
Marketcap / Hashrate	\$298,350.00	\$234,046.30	\$560,961.92	\$408,367.67	\$358,618.75	\$258,402.87	\$17,327.25	\$293,379.28	\$769,870.82
Total ASIC Value March	\$127,381,000	\$135,405,000	\$309,855,000	\$341,635,000	\$0	\$0	\$182,735,000	\$659,435,000	\$67,532,500
Spot ASIC Tier \$/TH	50.15	50.15	79.45	79.45	N/A	N/A	79.45	79.45	79.45
Price to ASIC Value	5.95	4.67	7.06	5.14	N/A	N/A	2.18	3.69	9.69

Additionally, we can evaluate public company values based on their market capitilization / hashrate ratio. This ratio shows you how much investors are paying for exposure to a company’s hashrate relative to its peers. It’s important to note that each miner has varying leves of vertical integration, so miners who own their power generation infrastructure, for example, or their own warehouses may have a weak marketcap/ hashrate ratio because these assets are driving up their valuations.

Marketcap/Hashrate vs. Active Hashrate





4

Trends to Watch in Q2 and Beyond

2022—and to a greater degree, 2023—could be a washout year for some Bitcoin miners.

With the hashrate growth projected for the second half of the year, barring another Bitcoin bull spurt, hashprice will trend towards \$0.10/TH/day. Miners who did not plan carefully enough, particularly those higher up both the CAPEX and OPEX ladder (those with unfavorable hosting services, for example), may have a hard time staying profitable.

As makers and fakers begin to distinguish themselves, we expect 2022 to be the industry's watershed year for mergers and acquisitions. If we approach a prolonged bear market, we anticipate many more M&A deals will come in 2023 as miners without long-term vision bottom out.

We also expect bitcoin mining ASIC prices to revisit their post-China ban prices (again, like with most analysis, this assumes Bitcoin doesn't explode upward in the next few quarters). So many machines are already sidelined for lack of rack space. Combine this with the entry of Blockstream and Intel into the ASIC miner manufacturing game, and it seems reasonable that prices will fall further still (especially if Bitcoin does).

Despite supply chain snafus and slow-build times, we also expect substantive hashrate growth in the months to come. Give or take 5%, Bitcoin's hashrate could end the year around 275 EH/s.