

## Cryptocurrency Markets

### JPM Bitcoin Mining Monthly

Bitcoin mining stocks climbed higher in March. Bitcoin fluctuated between \$20,000 and \$29,000 (highest price since June '22), before exiting the month around \$28,000. The average daily network hashrate rose for the third consecutive month, averaging a record 332 EH/s in March. Network difficulty increased ~9% during the period, also reaching an all-time high. Our sense is that the network hashrate will remain tightly correlated to bitcoin prices over the coming months, which could grind higher given the volatility in the banking system and approaching halving event. We note the rise in the network hashrate outpaced bitcoin in March. We estimate bitcoin mining was less profitable in March than February (daily revenue per EH/s declined 6% month-over-month), but the aggregate market cap of the 13 U.S.-listed miners we track rose 43% to \$5.4bn.

- **Bitcoin Soars, Volatility High.** Bitcoin average price was ~\$25,000 in March, up 8% from February, exiting the month at a ~\$27,700 seven-day rolling average, up 18% from the comparable February figure. We note bitcoin's annualized volatility was 71% in March, compared to 46% last month.
- **Record High Network Hashrate.** The network hashrate, a proxy for industry competition, rose to a record high for the third consecutive month, up 12% from February to an average of 332 EH/s in March. We note the month's-end seven-day moving average network hashrate stood higher at 344 EH/s.
- **News Update.** Bitcoin rallied on volatility in the banking system, reaching prices last seen in June 2022, though the full impact from the collapse of Silvergate Bank, which was an active lender to the crypto industry, remains to be seen. In other news, Terawulf began mining at their behind-the-meter, nuclear powered Nautilus facility in Pennsylvania, which the Company says should help them reach 5.5 EH/s in 2Q22 (2.6 EH/s reported in February month-end), and Marathon announced their CFO will be stepping down in May.
- **Stock performance.** The group of 13 U.S.-listed bitcoin miners had an aggregate market cap of \$5.4bn as of March 31st (up 43% for the month), representing 58% of the annualized block reward revenue opportunity, by our estimate. The best and worst performing stocks for the month were Riot Platforms (RIOT), up 60%, and Greenidge Generation, down 13%.

#### Payments, Processors & IT Services

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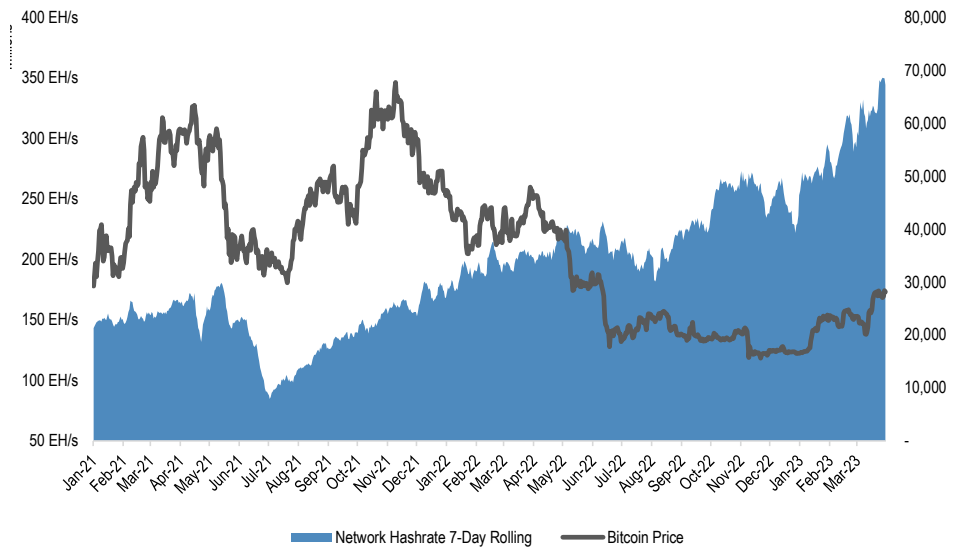
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### Bitcoin Price and Hashrate 7-Day Rolling Averages

Bitcoin prices rose 19% in March (though average price in March was up 8% from the comparable February figure), while the average daily network hashrate increased 12% from the prior month. Figure 1, below, plots the seven-day rolling average bitcoin price and network hashrate as estimated by Nasdaq Data Link.

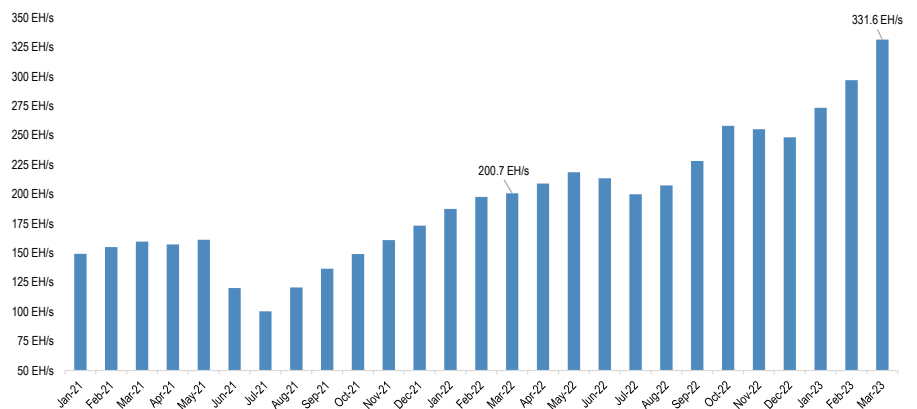
Figure 1: Bitcoin vs Network Hashrate



Source: Nasdaq Data Link and Bloomberg Finance L.P.

Figure 2, below, shows the average daily network hashrate by month, as estimated by Nasdaq Data Link. The average daily network hashrate reached record highs for a third consecutive month, coming in at 331.6 EH/s in March, up 12% from February.

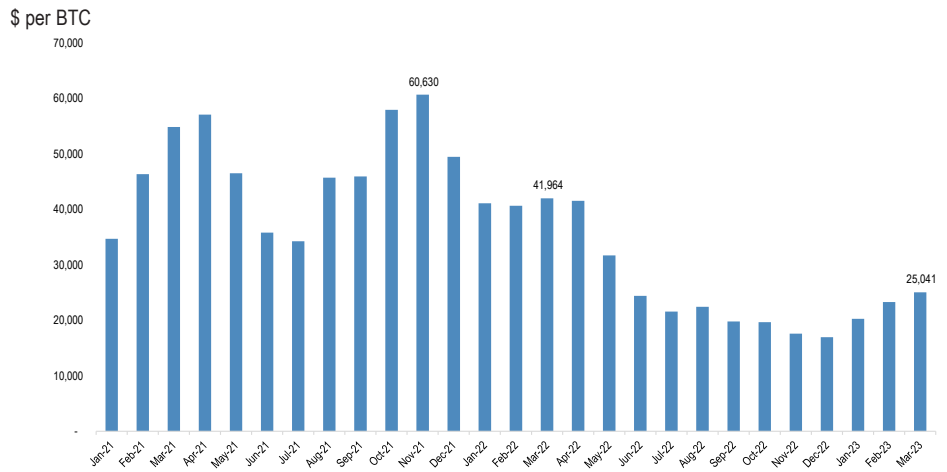
Figure 2: Monthly Average Network Hashrate



Source: Nasdaq Data Link and J.P. Morgan calculations.

Figure 3, below, shows the monthly average bitcoin price. Average bitcoin price in February was ~\$25,000, up 8% from February (~\$23,300). Prices rose towards the end of the month, with the seven-day rolling average price of ~\$27,800 as of March 31st.

Figure 3: Monthly Average Bitcoin Price

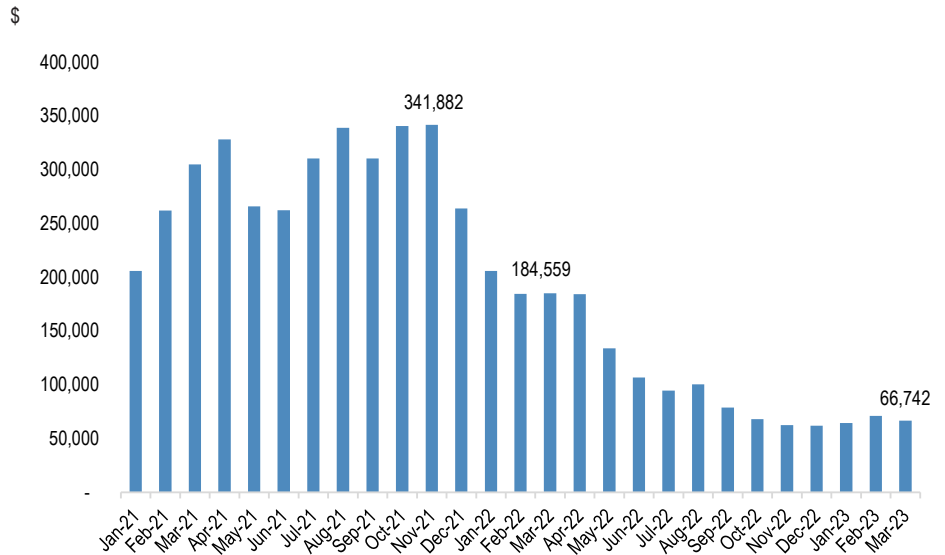


Source: Bloomberg Finance L.P. and J.P. Morgan calculations.

### Daily Block Reward Revenue per Exahash of Mining Capacity

Figure 4, below, plots the average daily bitcoin block reward revenue per exahash of mining capacity over time, a miner profitability proxy that incorporates the current block reward (6.25 BTC per block), the average block time (10 minutes), bitcoin price, and the network hashrate. In March, we estimate one exahash of mining capacity generated ~\$66,742 in daily block reward revenue, down 6% from the prior month, as network hashrate growth outpaced bitcoin.

Figure 4: Average Daily Block Reward per EH/s (by month)

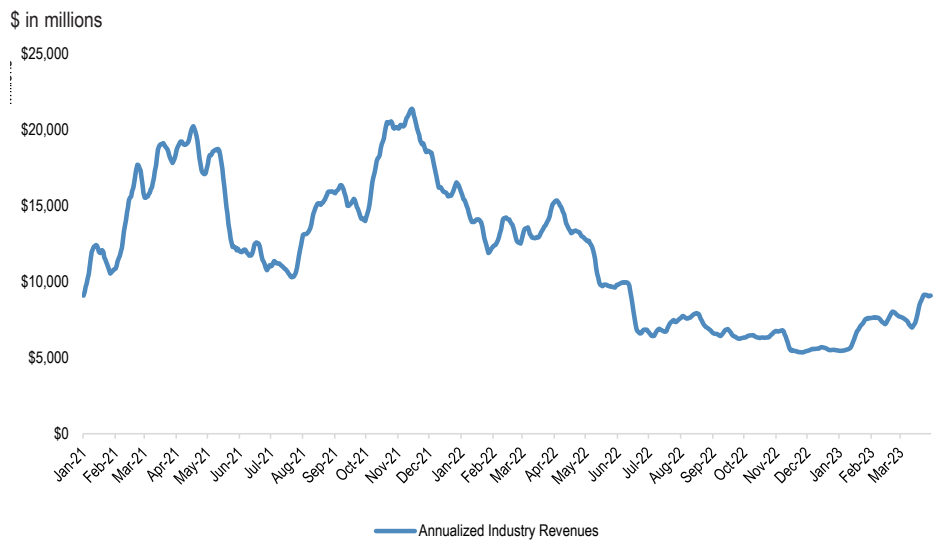


Source: Bloomberg Finance L.P., Nasdaq Data Link, J.P. Morgan calculations.

### Annualized Block Reward Revenue Opportunity

Figure 5, below, shows the annualized bitcoin block reward revenue opportunity over time, calculated by multiplying bitcoin’s trailing seven-day moving average by 328,500, the number of bitcoin mined/created per year based on the block reward schedule. This is a measure of industry-wide revenue potential and, in theory, should inform stock prices. Based on bitcoin’s seven-day moving average as of March 31st (\$27,800), we size the annualized block reward revenue opportunity at \$9.1bn, up 18% from \$7.7bn as of prior month’s end.

Figure 5: Annualized Block Reward Revenue Opportunity



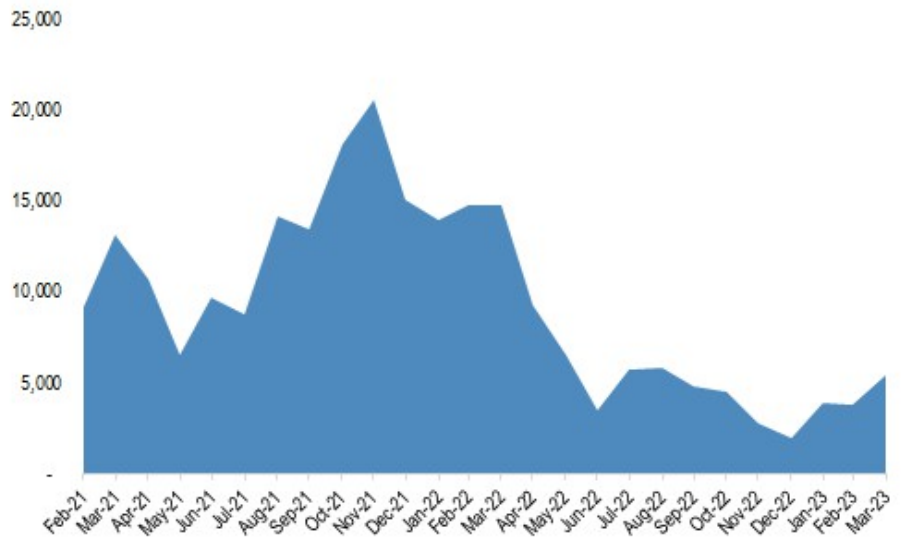
Source: Bloomberg Finance L.P., Nasdaq Data Link, J.P. Morgan calculations.

## U.S.-Listed Bitcoin Miner Market Cap & Stock Performance

The group of 13 U.S.-listed bitcoin miners had an aggregate market cap of \$5.4bn (up 43% for the month) as of March 31st, representing 58% of the annualized block reward opportunity.

Figure 6: U.S.-Listed Bitcoin Miner Aggregate Market Cap

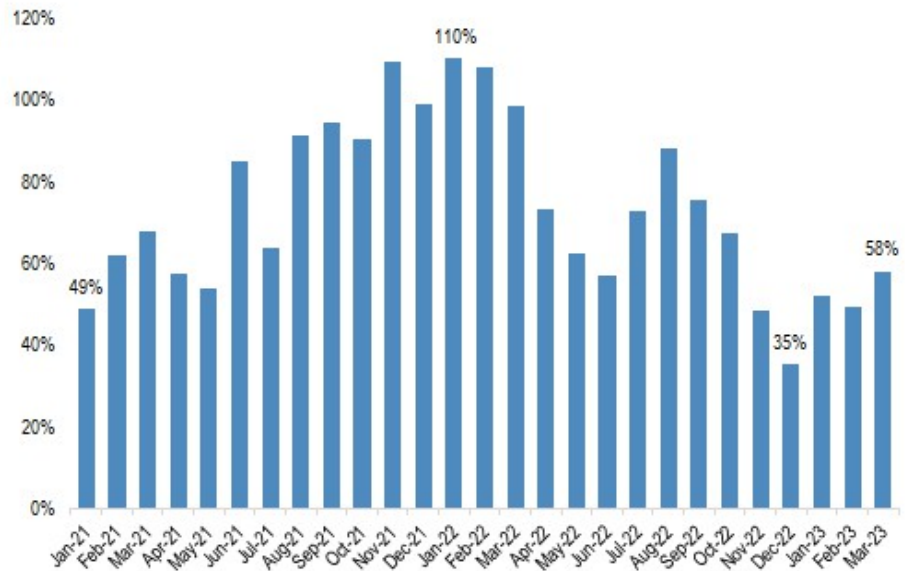
\$ in millions



Source: Bloomberg Finance L.P.

Figure 7, below, plots the aggregate market cap of the 13 U.S.-listed miners against the annualized block reward revenue opportunity, which provides historical context and is a good valuation sanity check, in our view. This ratio peaked at 110% in January 2022 and stood at 58% at month-end March 2023.

Figure 7: Aggregate Market Cap to Annualized Revenue Opportunity

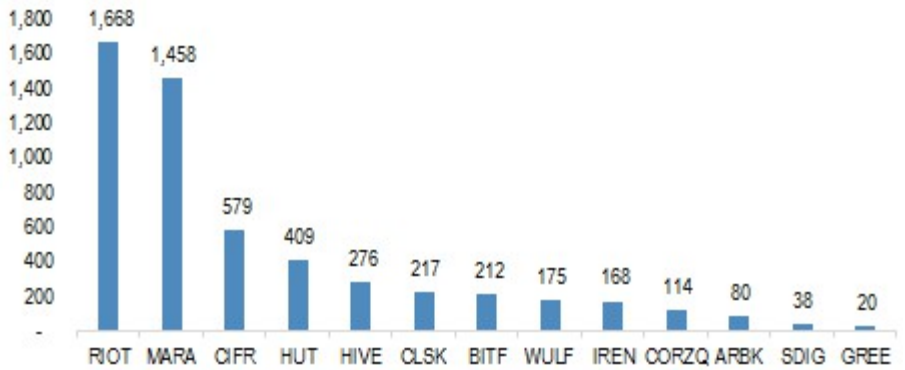


Source: Bloomberg Finance L.P., J.P. Morgan calculations.

Figure 8, below, ranks U.S.-listed bitcoin miners by market cap as of March 31st.

Figure 8: U.S.-Listed Bitcoin Miner Market Capitalization

\$ in millions

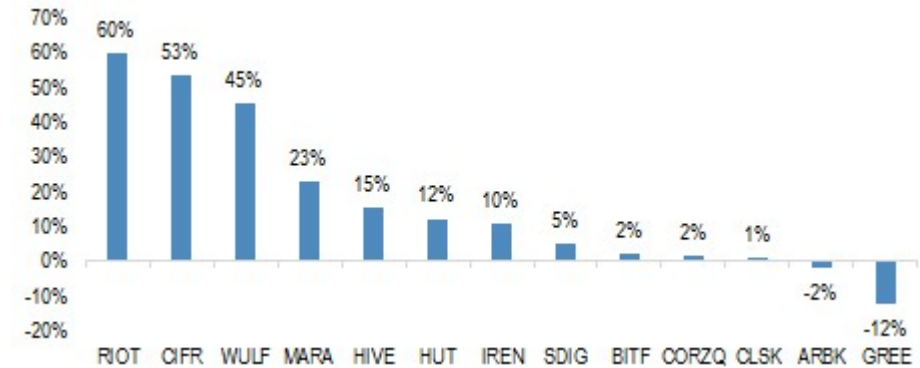


Source: Bloomberg Finance L.P.

Note: Market Capitalization as of 3/31/2023.

Figure 9, below, ranks the publicly traded bitcoin miners by March stock performance. We note the best and worst performing mining stocks for the month were Riot Platforms and Greenidge Generation, respectively.

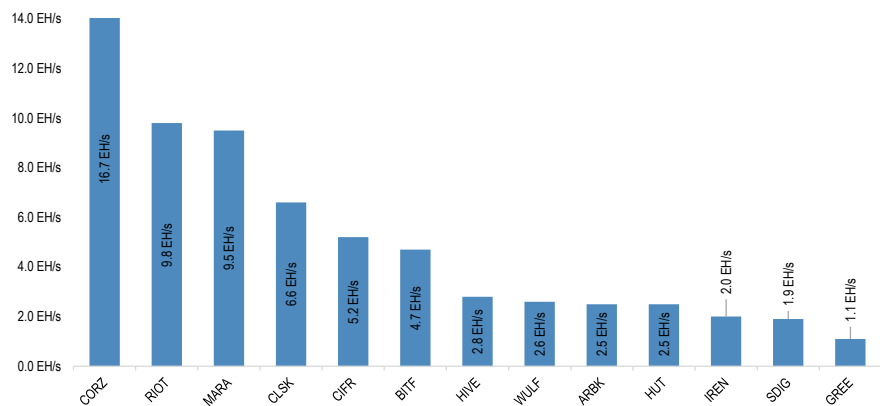
Figure 9: Bitcoin Miner March Stock Performance



Source: Bloomberg Finance L.P.

Figure 10, below, ranks publicly traded miners by their last reported hashrate. In general, a company’s reported (and target) hashrate should inform its market cap and enterprise value.

Figure 10: Bitcoin Miners Last Reported Hashrate



Source: Company reports.

Table 1, below, shows the equity and enterprise valuation multiples for the 13 largest U.S.-listed miners, which trade on average 78 and 111 times their current hashrate on an equity and enterprise value basis, respectively.

**Table 1: U.S.-Listed Bitcoin Miner Operator Comp Sheet**

\$ in millions

Company	Ticker	Rating	Last Price	Mkt Cap	EV	Hashrate		Mkt Cap/Hashrate		EV/Hashrate	
						Current	Target	Current	Target	Current	Target
Argo Blockchain	ARBK	NC	\$ 1.67	80	173	2.5 EH/s	3.2 EH/s	32	25	69	54
Bitfarms	BITF	NC	\$ 0.97	212	246	4.7 EH/s	5.4 EH/s	45	39	52	46
Cipher Mining	CIFR	NC	\$ 2.33	579	572	5.2 EH/s	6.0 EH/s	111	96	110	95
Cleantalk	CLSK	NC	\$ 2.78	217	240	6.6 EH/s	8.7 EH/s	33	25	36	28
Core Scientific	CORZQ	NC	\$ 0.30	114	1,135	16.7 EH/s	n/a	7	n/a	68	n/a
Greenidge Generation	GREE	NC	\$ 0.45	27	96	1.1 EH/s	3.6 EH/s	25	8	87	27
Hive Blockchain Technologies	HIVE	NC	\$ 3.29	276	299	2.8 EH/s	4.5 EH/s	98	61	106	66
Hut 8	HUT	NC	\$ 1.85	409	569	2.5 EH/s	6.0 EH/s	163	68	228	95
Ins Energy	IREN	N	\$ 3.06	168	238	2.0 EH/s	5.4 EH/s	84	31	119	44
Marathon Digital	MARA	NC	\$ 8.72	1,458	2,087	9.5 EH/s	23.3 EH/s	154	63	220	90
Riot Platforms	RIOT	NC	\$ 9.99	1,668	1,462	9.8 EH/s	12.5 EH/s	170	133	149	117
Stronghold	SDIG	NC	\$ 0.62	38	153	1.9 EH/s	3.0 EH/s	20	13	81	51
TeraWulf	WULF	NC	\$ 0.94	175	297	2.6 EH/s	5.5 EH/s	67	32	114	54
<b>Total</b>				<b>5,419</b>	<b>7,567</b>	<b>67.9 EH/s</b>	<b>87.1 EH/s</b>	<b>78</b>	<b>49</b>	<b>111</b>	<b>64</b>

Source: J.P. Morgan calculations, Company data, Bloomberg Finance L.P. NC=not covered.

Note: Stock prices as of 3/31/2023. Current and target hashrate as of last public disclosure.



**Correction:** Text to be filled by SA

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