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# Ranking Public Bitcoin Miners

## 4th Quarter 2022 Update

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# Executive Summary



In February 2023, Blockware Intelligence released the pilot version of “Ranking Public Bitcoin Miners” using financial data from mostly the 3rd quarter of 2022. That report caught fire, as it introduced an innovative new framework to quantify the financial health of public miners and calculated a “**Miner Score**” to rank them based on the following criteria:

1. **Breakeven Cost to Produce Bitcoin** - Divides Cost of Mining Revenue by the quantity of BTC mined over the same period to estimate the total production cost of 1 Bitcoin.
2. **Current Ratio** - Divides Total Current Assets by Total Current Liabilities to estimate the ability of a company to cover its short-term financial obligations.
3. **Debt-to-Equity Ratio** - Divides Total Liabilities by Total Shareholders Equity to show how much a company relies on debt vs. equity financing.
4. **Cash Ratio** - Divides Total Cash and Cash Equivalents by Current Liabilities to estimate the ability of a company to repay short-term debt obligations solely using cash on-hand.

**This version of “Ranking Public Bitcoin Miners” has been updated to use data from the Q4 10K’s largely released in March 2023.** Note that for this version, DMG Blockchain (DMGGF) has been added. Also, Bit Digital (BTBT), Cathedra Bitcoin (CBTTF), Cipher Mining (CIFR), and Argo Blockchain (ARBK) were not included due to not having reported a 10K at the time of writing, or having implemented a change in reporting practices.

*This analytical framework is limited by the timing of available data and is only intended to be used for education. The results of this study are solely based on subjective data and are not an advertisement to buy, sell or hold any particular security.*

# The 4th Quarter at a Glance



Publicly traded Bitcoin miners massively outperformed in Q1 2023. Analyzing this price action within the context of each company's change in financial health (Miner Score) can provide valuable insights.

The table to the right lists these companies from highest to lowest Q4 miner score. Notably, 8 of the top 10 miner scores recorded 100%+ returns in Q1.

Core Scientific is the obvious outlier. Despite receiving the lowest miner score in both periods, it was the 2nd best performing stock last quarter. This is likely a function of basic market dynamics. CORZQ was aggressively oversold in Q3 and Q4, 2022 as a result of solvency concerns surrounding their Chapter 11 bankruptcy filing. Sentiment has shifted in CORZQ's favor recently, as they've made material efforts to repay their creditor, driving liquidity back into the name.

Ticker	Miner Score (Last Period)	Q4 Miner Score Change	Q1 Stock Price Change
RIOT	80.56	11.11	195%
HUT	72.22	4.44	118%
DGHI	61.11	8.89	361%
BITF	51.39	16.94	120%
HIVE	65.28	3.06	128%
IREN	66.67	-5.00	145%
CLSK	62.50	-12.50	36%
DMGGF	-	-	130%
ANY	55.56	-10.56	28%
MIGI	19.44	23.89	125%
MARA	59.72	-21.39	155%
SDIG	15.28	21.39	29%
BTCM	36.11	-1.11	56%
CORZQ	5.56	16.11	304%
WULF	11.11	8.89	41%
GREE	20.83	-4.17	56%

# Breakeven Using Cost of Mining Revenue

$$\text{Breakeven BTC Price} = \text{Cost of Mining Revenue} \div \text{Quantity of BTC Mined}$$



The Cost of Revenue (CoR) is reported on the income statement of public companies. For firms who solely mine BTC, we either used the CoR given at face value if depreciation was already removed, or subtracted the depreciation expense provided in the filing. Companies who have other revenue sources generally describe their Cost of Revenue by revenue source in the footnotes.

By dividing the direct Cost of Mining Revenue by the quantity of BTC mined over a given period, we can approximate the breakeven (BE) price of the BTC mined. In theory, if BTC is above their BE price, then that firm is in profit on the BTC mined over the period. It should be noted, however, that numbers used in financial statements are backward-looking estimates. Furthermore, solely looking at the Cost of Mining Revenue does not take into account other operating costs such as depreciation, impairment, and administrative expenses.

The table on the right shows the breakeven Bitcoin price for Q4 using CoR. This data is sorted lowest to highest by BE price, and includes a red line to show companies with a BE below BTC's 12/30/22 closing price of \$16,600.10. The furthest right column shows how their breakeven price changed in Q4, compared to their last reporting period.

Public Miner Breakeven Bitcoin Price (Cost of Revenue)						
All Values Are in USD and Based on the Most Recent Financial Report						
Company	Ticker	Reporting Period	Cost of Mining Revenue (Less Dep/Amort)	Quantity of BTC Mined	Breakeven BTC Price	Breakeven Price Change
Iris Energy	IREN	Q4 2022	\$7,362,000.00	722.00	\$10,196.68	\$923.40
Riot Blockchain	RIOT	Q4 2022	\$18,753,000.00	1689.00	\$11,103.02	-\$2,370.69
DMG Blockchain	DMGGF	Q4 2022	\$3,252,365.86	273.53	\$11,890.34	-\$364.56
Mawson Infrastructure	MIGI	Q4 2022	\$6,759,938.00	530.83	\$12,734.66	-\$20,527.98
Bitfarms LTD	BITF	Q4 2022	\$18,344,000.00	1434.00	\$12,792.19	\$1,769.96
Cleanspark	CLSK	Q4 2022	\$20,416,000.00	1530.00	\$13,343.79	\$2,354.01
HIVE Blockchain	HIVE	Q4 2022	\$10,702,734.00	784.80	\$13,637.53	\$5,409.99
TeraWulf	WULF	Q4 2022	\$5,279,000.00	378.00	\$13,965.61	-\$22,309.39
Core Scientific	CORZQ	Q4 2022	\$47,506,000.00	2791.00	\$17,021.14	-\$29,708.72
Hut 8 Mining	HUT	Q4 2022	\$11,952,215.40	698.00	\$17,123.52	\$446.20
Marathon Digital	MARA	Q4 2022	\$29,736,000.00	1562.00	\$19,037.13	\$2,390.76
Digihost Technology	DGHI	Q4 2022	\$3,810,252.00	190.00	\$20,053.96	-\$1,675.85
Greenidge Generation	GREE	Q4 2022	\$14,089,000.00	683.00	\$20,628.11	-\$7,230.29
Stronghold Digital Mining	SDIG	Q4 2022	\$11,929,469.00	447.00	\$26,687.85	-\$18,339.11
Sphere 3D	ANY	Q4 2022	\$2,044,000.00	39.14	\$52,222.79	\$35,606.90
BIT Mining	BTCM	Q4 2022	\$5,100,000.00	65.00	\$78,461.54	-\$208,205.13
<b>Median</b>					<b>\$15,493.37</b>	<b>-\$1,020.20</b>
<b>Average</b>					<b>\$21,931.24</b>	<b>-\$16,364.41</b>

Data Sources: SEC EDGAR, Investor Relations, NASDAQ Data Link

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# Current Ratio



$$\text{Current Ratio} = \text{Total Current Assets} \div \text{Total Current Liabilities}$$

The Current Ratio divides total current assets by total current liabilities to measure the ability of a company to pay its short-term financial obligations. Current assets include things such as cash, accounts receivable, inventory, and short-term investments. Examples of current liabilities would be accounts payable, notes payable, and other short-term debt.

The traditional benchmark for the Current Ratio is 2.0 or greater. This implies that the company has double the amount of current assets than liabilities, and indicates a strong ability to cover short-term debts. But, companies with extremely high Current Ratios are likely not effectively allocating their assets, or don't have profitable ventures to do so.

The table to the right shows the Current Ratio of public miners, sorted highest to lowest. It also shows how much their Current Ratio grew last quarter, and a red line showing the median Current Ratio.

Public Bitcoin Miners - Current Ratio							
All Values Are in USD and Based on the Most Recent Financial Report							
Company	Ticker	Reporting Period	Current Assets	Current Liabilities	Current Ratio	Current Ratio (Last Period)	CR Change
Marathon Digital	MARA	Q4 2022	\$277,548,000.00	\$26,113,000.00	10.629	5.272	5.356
Hut 8 Mining	HUT	Q4 2022	\$181,196,087.10	\$22,229,114.10	8.151	9.567	-1.416
Riot Blockchain	RIOT	Q4 2022	\$443,381,000.00	\$121,543,000.00	3.648	4.455	-0.807
DMG Blockchain	DMGGF	Q4 2022	\$13,578,758.33	\$4,466,953.50	3.040	3.267	-0.228
HIVE Blockchain	HIVE	Q4 2022	\$63,860,028.00	\$22,318,198.00	2.861	3.749	-0.888
Digihost Technology	DGHI	Q4 2022	\$6,129,853.00	\$3,225,293.00	1.901	1.093	0.808
Sphere 3D	ANY	Q4 2022	\$10,284,000.00	\$6,200,000.00	1.659	7.158	-5.499
BIT Mining	BTM	Q4 2022	\$34,369,000.00	\$30,839,000.00	1.114	1.966	-0.852
Bitfarms LTD	BITF	Q4 2022	\$69,088,000.00	\$67,244,000.00	1.027	1.253	-0.225
Stronghold Digital Mining	SDIG	Q4 2022	\$35,641,670.00	\$60,412,158.00	0.590	0.502	0.088
Mawson Infrastructure	MIGI	Q4 2022	\$20,339,268.00	\$35,513,408.00	0.573	0.602	-0.029
Iris Energy	IREN	Q4 2022	\$74,645,000.00	\$140,234,000.00	0.532	1.883	-1.351
Cleantalk	CLSK	Q4 2022	\$21,186,000.00	\$41,600,000.00	0.509	1.492	-0.982
Core Scientific	CORZQ	Q4 2022	\$85,102,000.00	\$186,789,000.00	0.456	0.166	0.290
Greenidge Generation	GREE	Q4 2022	\$33,058,000.00	\$98,722,000.00	0.335	0.554	-0.219
TeraWulf	WULF	Q4 2022	\$14,144,000.00	\$126,019,000.00	0.112	0.153	-0.040
<b>Median</b>					<b>1.071</b>	<b>1.687</b>	<b>-0.227</b>
<b>Average</b>					<b>2.321</b>	<b>2.696</b>	<b>-0.375</b>

Data Sources: SEC EDGAR, Investor Relations, NASDAQ Data Link

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# Debt-to-Equity Ratio



$$\text{Debt-to-Equity Ratio} = \text{Total Liabilities} \div \text{Total Shareholders Equity}$$

The Debt-to-Equity (D-E) Ratio divides total liabilities by total shareholders equity to show the amount of debt compared to equity financing and retained earnings. Highly leveraged firms will have high D-E Ratios as the total value of liabilities vastly outweighs the value of their equity.

A D-E Ratio in the range of 0.5-1.5 is considered ideal among financial analysts as it shows a healthy reliance on debt supported by significant equity. Generally speaking, a low D-E Ratio indicates a low likelihood of default, but extremely low (<0.1) D-E Ratios could indicate an unhealthy reliance on equity financing.

For example, in January 2023 Greenidge Generation (GREE) announced a second debt restructuring. Their over reliance on debt financing was evident by a D-E ratio over 2x greater than the next highest in the group in Q4.

The table to the right shows the D-E Ratios of public miners, sorted lowest to highest. It also shows the change in their D-E Ratio over Q4, and includes a red line to show the median D-E Ratio.

Public Bitcoin Miners - Debt-to-Equity Ratio							
All Values Are in USD and Based on the Most Recent Financial Report							
Company	Ticker	Reporting Period	Total Liabilities	Total SH's Equity	Debt-to-Equity Ratio	(Last Period)	D-E Change
Core Scientific	CORZQ	Q4 2022	\$1,217,032,000.00	-\$409,346,000.00	-2.973	1.361	-4.334
DMG Blockchain	DMGGF	Q4 2022	\$5,227,426.30	\$62,699,430.53	0.083	0.136	-0.052
Digihost Technology	DGHI	Q4 2022	\$5,424,569.00	\$47,174,992.00	0.115	0.119	-0.004
Cleanspark	CLSK	Q4 2022	\$59,754,000.00	\$427,035,000.00	0.140	0.060	0.080
Riot Blockchain	RIOT	Q4 2022	\$168,522,000.00	\$1,151,442,000.00	0.146	0.218	-0.072
Hut 8 Mining	HUT	Q4 2022	\$45,403,221.90	\$259,220,403.00	0.175	0.117	0.058
Bitfarms LTD	BITF	Q4 2022	\$87,531,000.00	\$255,567,000.00	0.342	0.025	0.317
HIVE Blockchain	HIVE	Q4 2022	\$48,522,354.00	\$140,873,677.00	0.344	0.221	0.123
Sphere 3D	ANY	Q4 2022	\$11,984,000.00	\$34,565,000.00	0.347	0.433	-0.086
Iris Energy	IREN	Q4 2022	\$141,832,000.00	\$270,123,000.00	0.525	1.394	-0.869
Mawson Infrastructure	MIGI	Q4 2022	\$57,162,945.00	\$77,072,024.00	0.742	0.942	-0.200
BIT Mining	BTCM	Q4 2022	\$33,676,000.00	\$40,802,000.00	0.825	0.304	0.521
Stronghold Digital Mining	SDIG	Q4 2022	\$122,176,250.00	\$83,025,144.00	1.472	0.120	1.351
TeraWulf	WULF	Q4 2022	\$199,933,000.00	\$117,754,000.00	1.698	18.226	-16.528
Marathon Digital	MARA	Q4 2022	\$809,301,000.00	\$385,943,000.00	2.097	2.432	-0.335
Greenidge Generation	GREE	Q4 2022	\$210,814,000.00	\$47,047,000.00	4.481	1.543	2.938
<b>Median</b>					<b>0.346</b>	<b>0.263</b>	<b>-0.028</b>
<b>Average</b>					<b>0.660</b>	<b>1.728</b>	<b>-1.068</b>

Data Sources: SEC EDGAR, Investor Relations, NASDAQ Data Link

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# Cash Ratio



$$\text{Cash Ratio} = \text{Total Cash and Cash Equivalents} \div \text{Total Current Liabilities}$$

The Cash Ratio is found by dividing the sum of cash and cash equivalents by current liabilities. This ratio measures the firm's ability to repay short-term obligations solely using cash on-hand.

A Cash Ratio of 1.0 is the benchmark to signify strong liquidity. Extremely high Cash Ratios could indicate that the company has underallocated cash into investments, or that the company has no profitable projects to utilize their cash. A low Cash Ratio tells us that the firm is currently unable to cover short-term liabilities without selling assets or liquidating receivables.

CORZ, WULF, and MIGI all struggled to repay creditors in 2022 and early-2023, which resulted in bankruptcy or restructurings to avoid bankruptcy. These names had some of the lowest Cash Ratios in the group. CLSK, on the other hand, is a firm whose generally considered healthy, and their low Cash Ratios is evidence of undergoing new projects to expand hashrate in Q4.

Public Bitcoin Miners - Cash Ratio							
All Values Are in USD and Based on the Most Recent Financial Report							
Company	Ticker	Reporting Period	Cash & Cash Equivalents	Current Liabilities	Cash Ratio	Cash Ratio (Last Period)	CR Change
Marathon Digital	MARA	Q4 2022	\$103,705,000.00	\$26,113,000.00	3.971	1.215	2.756
Riot Blockchain	RIOT	Q4 2022	\$230,328,000.00	\$121,543,000.00	1.895	1.188	0.707
Hut 8 Mining	HUT	Q4 2022	\$22,510,915.50	\$22,229,114.10	1.013	2.382	-1.369
Digihost Technology	DGHI	Q4 2022	\$1,850,622.00	\$3,225,293.00	0.574	0.232	0.342
Bitfarms LTD	BITF	Q4 2022	\$30,887,000.00	\$67,244,000.00	0.459	0.344	0.115
HIVE Blockchain	HIVE	Q4 2022	\$8,611,396.00	\$22,318,198.00	0.386	1.835	-1.449
Iris Energy	IREN	Q4 2022	\$40,661,000.00	\$140,234,000.00	0.290	1.013	-0.723
Stronghold Digital Mining	SDIG	Q4 2022	\$13,296,703.00	\$60,412,158.00	0.220	0.378	-0.158
Sphere 3D	ANY	Q4 2022	\$1,337,000.00	\$6,200,000.00	0.216	0.436	-0.221
BIT Mining	BTCM	Q4 2022	\$5,448,000.00	\$30,839,000.00	0.177	0.130	0.047
Greenidge Generation	GREE	Q4 2022	\$15,217,000.00	\$98,722,000.00	0.154	0.019	0.135
DMG Blockchain	DMGGF	Q4 2022	\$504,440.00	\$4,466,953.50	0.113	1.292	-1.179
Core Scientific	CORZQ	Q4 2022	\$15,884,000.00	\$186,789,000.00	0.085	0.601	-0.516
Cleanspark	CLSK	Q4 2022	\$2,061,000.00	\$41,600,000.00	0.050	0.023	0.027
Mawson Infrastructure	MIGI	Q4 2022	\$946,265.00	\$35,513,408.00	0.027	0.285	-0.258
TeraWulf	WULF	Q4 2022	\$1,279,000.00	\$126,019,000.00	0.010	0.042	-0.032
<b>Median</b>					<b>0.218</b>	<b>0.407</b>	<b>-0.095</b>
<b>Average</b>					<b>0.602</b>	<b>0.713</b>	<b>-0.111</b>

Data Sources: SEC EDGAR, Investor Relations, NASDAQ Data Link

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The table to the right shows the cash ratios of public miners, sorted highest to lowest. It also shows their Q4 Cash Ratio growth and includes a red line to show the median Cash Ratio.

# The “Miner Score” Framework



To aggregate this data, and rank the public miners included in this report, our team assigned each company a “Miner Score”. This score calculates the company’s average percentile ranking across the 4 categories: Breakeven Price using Cost of Revenue, Current Ratio, Debt-to-Equity Ratio, and Cash Ratio.

For example, BITF had the 3rd lowest breakeven BTC price, therefore BITF received a score of 13/15 (0.87 or 87) in this category. MIGI had the highest BE price, giving it a score of 0/15 in this category. A perfect Miner Score of 100 would mean that company held the #1 ranking across all 4 categories.

The table below breaks down the percentile rankings (category score) across each of the 4 categories. They were then averaged to calculate the “Total Miner Score” for each company. Cells with red text show instances when scores were adjusted to remove misleading results. Firms who had a Current Ratio >10.0, D-E Ratio <0.10, or Cash Ratio >5.0 were adjusted downwards.

"Miner Score" Category Breakdown															
Company Name	Ticker	BE Price	Ranking	Score	Curr. Ratio	Ranking	Score	D-E Ratio	Ranking	Score	Cash Ratio	Ranking	Score	Total Miner Score	MS Change
Riot Platforms	RIOT	\$11,103.02	2	0.933	3.648	2	0.933	0.146	3	0.867	1.895	2	0.933	91.7	30.6
Hut 8 Mining	HUT	\$17,123.52	10	0.400	8.151	1	1.000	0.175	4	0.800	1.013	3	0.867	76.7	-3.9
Digihost Technology	DGHI	\$20,053.96	12	0.267	1.901	5	0.733	0.115	1	1.000	0.574	4	0.800	70.0	-2.2
Bitfarms LTD	BITF	\$12,792.19	5	0.733	1.027	8	0.533	0.342	5	0.733	0.459	5	0.733	68.3	16.9
HIVE Blockchain	HIVE	\$13,637.53	7	0.600	2.861	4	0.800	0.344	6	0.667	0.386	6	0.667	68.3	3.1
Iris Energy	IREN	\$10,196.68	1	1.000	0.532	11	0.333	0.525	8	0.533	0.290	7	0.600	61.7	-5.0
Cleanspark	CLSK	\$13,343.79	6	0.667	0.509	12	0.267	0.140	2	0.933	0.050	14	0.133	50.0	-12.5
DMG Blockchain	DMGGF	\$11,890.34	3	0.867	3.040	3	0.867	0.083	16	0.000	0.113	12	0.267	50.0	-
Sphere 3D	ANY	\$52,222.79	15	0.067	1.659	6	0.667	0.347	7	0.600	0.216	9	0.467	45.0	-10.6
Mawson Infrastructure	MIGI	\$12,734.66	4	0.800	0.573	10	0.400	0.742	9	0.467	0.027	15	0.067	43.3	-16.4
Marathon Digital	MARA	\$19,037.13	11	0.333	10.629	16	0.000	2.097	13	0.200	3.971	1	1.000	38.3	23.1
Stronghold Digital Mining	SDIG	\$26,687.85	14	0.133	0.590	9	0.467	1.472	11	0.333	0.220	8	0.533	36.7	0.6
BIT Mining	BTM	\$78,461.54	16	0.000	1.114	7	0.600	0.825	10	0.400	0.177	10	0.400	35.0	15.6
Core Scientific	CORZQ	\$17,021.14	9	0.467	0.456	13	0.200	-2.973	15	0.000	0.085	13	0.200	21.7	0.8
TeraWulf	WULF	\$13,965.61	8	0.533	0.112	15	0.000	1.698	12	0.267	0.010	16	0.000	20.0	8.9
Greenidge Generation	GREE	\$20,628.11	13	0.200	0.335	14	0.133	4.481	14	0.000	0.154	11	0.333	16.7	11.1
<b>MEDIAN</b>		<b>\$15,493.37</b>			<b>1.071</b>			<b>0.346</b>			<b>0.218</b>				
<b>AVERAGE</b>		<b>\$21,931.24</b>			<b>2.321</b>			<b>0.660</b>			<b>0.602</b>				

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# Plotting the Miner Score



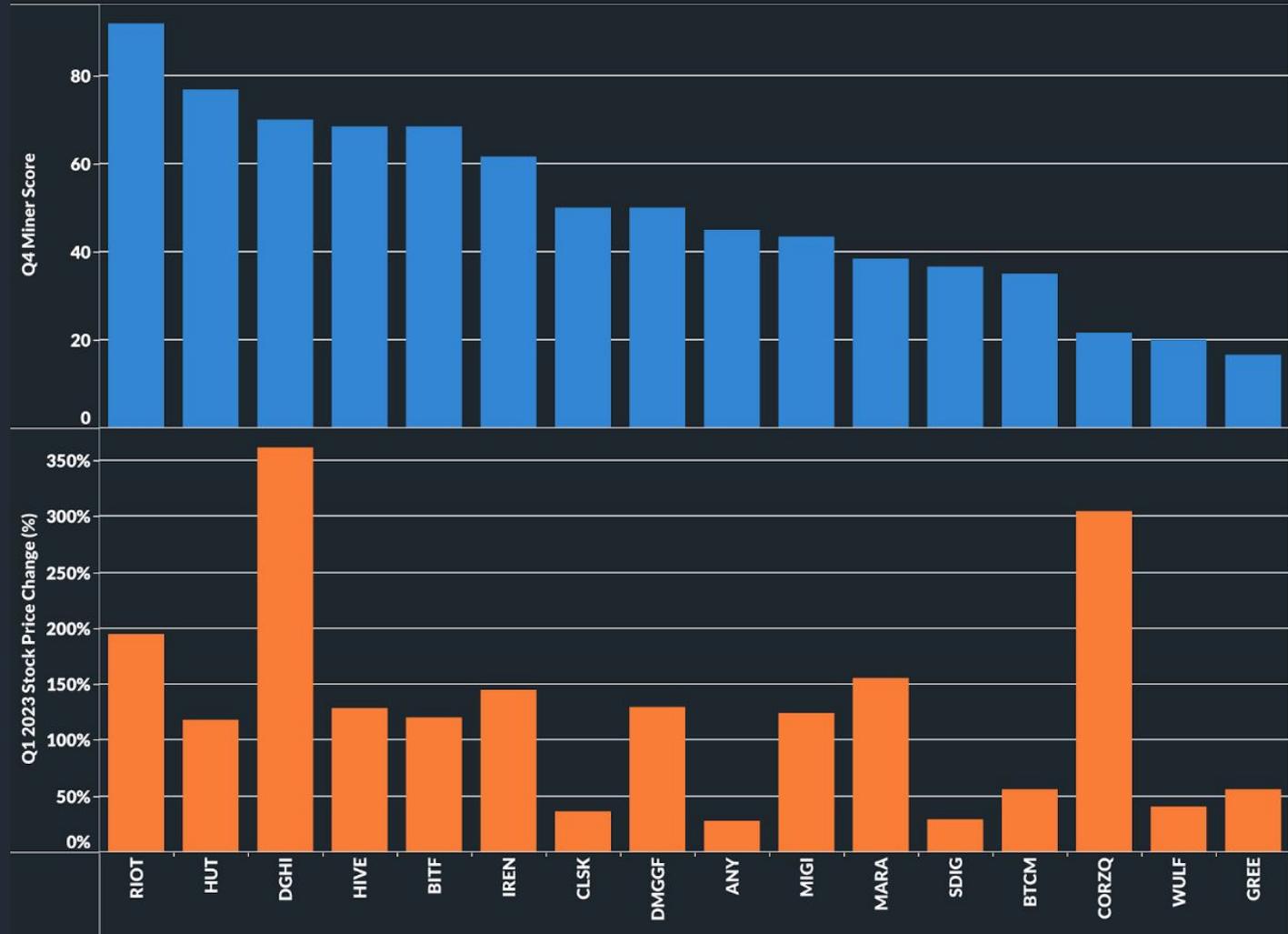
The chart on the right displays the Q4 Miner Score of each company overlaid with their stock price return in Q1 2023. As you can see, price action from this industry group was largely strong in the 1st quarter. This was in accordance with Bitcoin having one of the best quarters of any asset.

In the 1st quarter of 2023, we saw continued contagion in some names. GREE, SDIG, and WULF, all announced a new round, or continuation, of restructuring. CORZ also continued its sale of assets to repay creditors. These names were all in the bottom-half of miner scores in Q4. MIGI remained overall unhealthy, but performed a reverse stock split, which is why their share price was up ~125% last quarter.

Other names, such as CLSK, announced large plans to capitalize on low ASIC prices and increase hashrate. This may have hurt their miner score if significant current assets were expended. **This is why it's important to view miner scores in the context of the firm's overall financial standing and general market conditions.**

We elected to leave our valuation framework subjective, and not artificially boost scores to reflect expansion plans.

Public Bitcoin Miner Q4 2022 "Miner Score", Q1 2023 Stock Price Percent Change



# Conclusion



Using any single accounting ratio, solely looking at breakeven prices, or only viewing Miner Scores is generally not the most practical way to apply financial analysis in the real world. The fundamental analysis highlighted in this report uses backward-looking data, while equity price action is based on forward-looking mechanisms. Understanding the financial health of the firms is certainly important, but we must also utilize technical analysis within the greater macroeconomic context to understand how institutions are currently viewing risk.

This report proves that despite all operating with essentially the same objective, to mine Bitcoin at the lowest possible cost, not all public miners are created equal. Investing in public miners is just one of the many avenues to gain directional exposure to Bitcoin, but we prefer to mine Bitcoin for ourselves. Mining Bitcoin can allow you to earn cash flow while eliminating much of the counterparty, market, and credit risk associated with simply buying shares of public miners.

Market contagion from the forced selling of ASICs by large miners, and overall high fear levels, have led to Bitcoin price growth outpacing historically highly-correlated ASIC pricing. These discounts provide a great opportunity to **start mining now.**

Having sold over 350,000 ASICs since 2017, Blockware Solutions played a pivotal role in bringing Bitcoin mining to North America. Buying or hosting rigs with Blockware Solutions eliminates the difficulty of sourcing scalable energy, procuring ASICs, and building large facilities all by yourself.

**If you're an individual or institution interested in buying or hosting rigs with a trusted partner like Blockware Solutions, or would simply like to learn more, you can [request a quote here](#) or reach out to the team at [sales@blockwaresolutions.com](mailto:sales@blockwaresolutions.com).**