Energy Futures: Financial Impact on Profitability and Volatility Shielding

Mining strategies are ranked from most to least effective based on Profitability, Volatility Mitigation, and Overall Value Proposition.

Scope: January 2025 - May 2025 | **Miner**: Bitmain Antminer S21 Pro

1. Curtailed Mining without Hedging | PnL*: $105.06/MWh | RAP*: 3.42

This approach yielded the highest returns, the average profit per MWh across 5 months was **$105.06/MWh**. The Curtailment Threshold was set at: Real Time Revenue per MW increased by 20%, in other words, the miners were simulated to switch off completely once the Real Time Settlement Electricity price exceeded the Curtailment Threshold. As a result, there were **70.25 hours** where the miners were switched off. Curtailment reduced price volatility by **55.12%** compared to an uncurtailed 24/7 mining operation.

2. Uncurtailed Mining without Hedging| PnL*: $101.91/MWh | RAP*: 1.49

Mining without switching off at all times despite being the simplest strategy returned the 2nd highest profits, surpassing even the risk-averse hedged mining strategies. The average profit figure was **$101.91/MWh**, only 3% less than Curtailed Mining.

3. Mining + LZ_WEST Hedging | PnL*: $88.52/MWh | PnL w/o Mining*: -$13.39/MWh | RAP*: 13.35

Out of the 4 different hedged mining strategies, LZ_WEST hedged mining came out on top but fell short compared to its Unhedged Mining counterparts. The average profit between Jan-May 2025 came out to **$88.52/MWh** if mining 24/7 over the 5 months at the average LZ_WEST hedge price, in other words, Uncurtailed mining + LZ_WEST Hedging. In addition, even Curtailed Mining with LZ_WEST hedging failed to surpass Unhedged mining profits. Curtailing miners during spikes while securing the hedge payouts returned a cumulative profit of **$91.67/MWh**.

Even when the hedge contracts were secured at the lowest possible rates, LZ_WEST hedges and all other hedging strategies played second fiddle to Unhedged Mining strategies. The average profit for mining with LZ_WEST hedges secured at the lowest observed price was **$95.32/MWh.**

The area in which hedging excelled was volatility shielding, LZ_WEST Hedging mining reduced profit volatility by **90.3%** but at the cost of anywhere between **$6.59/MW**h(Lowest Hedge prices) and **$25.11/MWh**(Highest Hedge prices).

4. Mining + HB_WEST Hedging + CRRs| PnL*: $90.00/MWh | PnL w/o Mining*: -$12.01/MWh | RAP*: 4.24

The biggest issue when using Naked Hub hedges to protect energy draw at LZ_WEST was basis risk. Utilizing instruments such as CRRs help offset some of that risk. HB_WEST hedges paired with CRRs and Uncurtailed mining returned an average profit of **$90.00/MWh** while reducing volatility by **68.97%**.

CRRs just by themselves proved to be a profitable stream of income, the average net profit from OBL CRRs was **$1.44/MWh** while the safer but more costly OPT CRRs was **$1.22/MWh**.

5. Mining + Naked HB_WEST Hedging | PnL*: $88.57/MWh | PnL w/o Mining*: -$13.34/MWh | RAP*: 3.83

Despite a much lower hedge price, coming in at an average of $44.02/MWh, 21.95% lower compared to LZ_WEST hedges. The final profit figures were very close, the average profit for this strategy was **$88.57/MWh,** albeit with lowered effectiveness with the average volatility shielding equaling 66.19%.

6. Mining + Naked HB_NORTH Hedging | PnL*: $92.56/MWh | PnL w/o Mining*: -$9.35/MWh | RAP*: 3.22

HB_NORTH hedges contracts were the cheapest with an average hedge price of $41.20/MWh. This allowed for marginally higher profits compared to other hedging strategies with the average profit being **$92.56/MWh**

These minor gains came at the cost of compromised volatility shielding, Naked HB_NORTH Hedges only reduced volatility by 58.05%, in other words, this strategy yielded a 12% drop in risk-adjusted performance compared to Naked HB_WEST Hedged mining hence its ranking.

PnL* - Profit and Loss
PnL w/o Mining* - Profit and Loss without Mining, hedging profit only
RAP* - Risk-Adjusted Performance, higher the better