

SOL02: Microinverter Market Dynamics

Technical Analysis Report | February 01, 2026

1. Data Overview

Subject: Enphase Energy (ENPH)
Analysis Period: 2016-02-03 to 2026-01-30 (~10.0 years)
Total Observations: 13,760 rows across 4 datasets
Stock Data: 2,513 daily OHLCV observations
Data Sources: Yahoo Finance API (yfinance), synthetic operational metrics

2. Methodology

2.1 Metrics Computed

- Microinverter shipment volumes
- Revenue per unit economics
- Gross margin by product line
- Storage attachment rates
- Installation base growth
- Geographic expansion metrics
- Customer NPS tracking

2.2 Risk Analytics (CFA Standards)

- Sharpe Ratio:** (Return - Rf) / Volatility (Rf = 0 for relative comparison)
- Sortino Ratio:** Return / Downside Deviation
- Value at Risk (VaR):** Historical 95% and 99% confidence levels
- Maximum Drawdown:** Largest peak-to-trough decline in cumulative returns

2.3 Technical Indicators

- Moving Averages:** SMA/EMA (20, 50, 200 day)
- Volatility:** Rolling standard deviation (20, 60, 252 day)
- Momentum:** RSI-14, Price momentum (20-252 day)

3. Risk Metrics Summary

| Ticker | Total Return | Ann. Return | Volatility | Sharpe | Max DD |
|--------|--------------|-------------|------------|--------|--------|
| ENPH | 1500.9% | 32.1% | 77.7% | 0.41 | -92.2% |

4. Detailed Risk Profile

Return Distribution

| Metric | Value |
|---------------|---------|
| Positive Days | 50.8% |
| Best Day | 42.44% |
| Worst Day | -28.14% |
| Sortino Ratio | 0.63 |

Value at Risk

| Confidence | Daily VaR |
|------------|-----------|
| 95% | -6.68% |
| 99% | -11.80% |

VaR indicates expected maximum daily loss at given confidence level.

5. Data Quality Assessment

Completeness: All trading days covered for analysis period
Adjustments: Prices adjusted for splits and dividends
Validation: Stock data cross-referenced with Yahoo Finance

Processing: Pandas DataFrame operations with NumPy calculations

Disclaimer: Operational metrics are synthetic/illustrative for portfolio demonstration

6. Key Observations

- Solar sector exhibits higher volatility than broad market indices
 - Strong correlation with energy sector and interest rate movements
 - Policy sensitivity (IRA, tax credits) impacts valuation multiples
 - Technology improvements driving efficiency gains and cost reductions
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Data Source: Yahoo Finance (stock), Synthetic (operational) | Report Code: SOL02

Portfolio Sample - Demonstrates data engineering methodology, not investment advice

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