Week 7 Term Project Checkpoint C

Reilly Hammond

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Dr. Thomas Miller

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Introduction

Our investment fund is centered on the energy sector, leveraging its long-established role in global markets and the rich history of price and volume data available for robust technical modeling. The portfolio combines individual stocks and exchange-traded funds (ETFs) spanning both traditional and renewable subsectors, offering diversified exposure across technologies and energy sources.

Our investment philosophy is rooted in technical analysis, guided by defined trading rules for security selection, entry points, and exit timing. The objective is to deliver above-average income and long-term wealth creation through disciplined, data-driven decisions, pursued both independently and in collaboration with institutions. Based on backtested results using momentum strategies and Monte Carlo simulations, we project an expected return of 50% over 10 years.

Rather than a pure buy-and-hold approach, the strategy employs trend-following and momentum indicators to identify medium- to long-term opportunities. Rebalancing occurs quarterly, using signal confirmation to filter market noise while remaining responsive to shifting conditions. Over time, these rules will be automated within a programmatic trading framework to ensure consistency and reduce behavioral bias. While initially launched as a long-only strategy, we evaluated shorting and hedging but determined they were less effective for a growth-focused mandate during periods of volatility.

Ultimately, this fund is designed for investors seeking targeted energy exposure through a tactical, ESG-aware, and technically disciplined lens, built to navigate a complex, fast-evolving sector with both purpose and precision.

Literature Review

As recommended by Dr. Thomas Miller, I explored Virtual Barrels: Quantitative Trading in the Oil Market by Ilia Bouchouev. One of the biggest takeaways for me was how quantitative models can be applied to the oil market in a meaningful way. The book shows how low-risk arbitrage opportunities allowed quants to bring mathematical theory into real-world trading strategies—and build successful careers doing so. It also walks through how oil trading shifted from a closed, exclusive market to something much more publicly accessible. What stood out most is how complex the oil market really is and the need to understand that oil goes beyond just models and correlations, you have to consider different types of volatility (like local, realized, and implied) and have some level of fundamental understanding to make sense of how the market behaves. My next deep dives will be with Gray (2023) and Quant (2024) to evaluate alternative investment strategies and trading rules.

Methods

The investment fund leverages multiple data sources, including the SEC Edgar Database, Yahoo Finance (yfinance), and Morningstar, to retrieve daily stock prices, company fundamentals, and news coverage ranging from analyst reports to corporate disclosures.While many ETFs concentrate on a single theme, this fund intentionally blends non-renewable and renewable energy exposures. The rationale stems from the recognition that renewable energy sectors are typically more sensitive to monetary policy conditions, such as changes in money supply and interest rates, due to their reliance on capital investment and government subsidies. By contrast, non-renewable energy (oil, natural gas, coal) tends to be influenced more directly by

macroeconomic demand cycles and commodity price movements, given its foundational role in industrial production and global supply chains.

This balance is designed to enhance resilience: during periods of volatility, traditional energy assets can help counteract potential drawdowns in renewable holdings, while renewables provide long-term growth potential aligned with the global energy transition. Non-renewable sources continue to serve as the backbone of the energy sector, and combining them with renewables ensures diversified exposure across both the legacy infrastructure and emerging technologies that define today's energy landscape.

The Energy Select Sector SPDR (XLE) is used as the benchmark for our fund given its strong historical performance and attractive dividend yield relative to the S&P 500 Index (SPX). Benchmarking against XLE provides investors with clear context on expected returns across different horizons, from short-term (1 year) to long-term (20+ years).

Unlike broader energy ETFs that include 70+ holdings, XLE is concentrated in 34 core stocks. Our fund builds on this approach by selecting the top 10 XLE constituents as its foundation to establish a strong, risk-averse base. These holdings are: Exxon Mobil, Chevron, ConocoPhillips, The Williams Companies, EOG Resources, Kinder Morgan, Marathon Petroleum Corporation, ONEOK, Schlumberger Limited, and Phillips 66.

In addition to the fund's core holdings, unique positions outside the top 10 are incorporated through Monte Carlo simulations and comparative analysis against XLE's weighting structure. This disciplined process ensures diversification while maintaining alignment with the sector's strongest performers.

To further strengthen the portfolio, I've added four additional stocks based on a blend of external recommendations and my own research. Three stocks, Brookfield Renewable (BEP), NextEra Energy (NEE), and Enbridge (ENB), come from Motley Fool, a source I trust given their strong track record and presence since 1993. The fourth, Clearway Energy, Inc. (CWEN), was identified through my independent research, particularly due to their strong performance in Q2 2025.

I ran a Monte Carlo simulation using historical data dating back to 2001, incorporating stress periods such as the 2008 financial crisis and the 2020 COVID-19 market peak. This analysis helps validate the resilience of these additions under varying market conditions. I'm currently setting up my model and running backtests.

	Annual Return	Annualized Std Dev
BEP	13.79%	30.37%
NEE	15.88%	24.96%
CWEN	12.95%	34.12%
ENB	8.27%	26.23%
XOM	10.21%	27.96%
CVX	12.19%	29.69%
COP	14.37%	38.67%
WMB	14.89%	40.91%
EOG	13.70%	39.80%
KMI	5.55%	31.28%
MPC	22.78%	40.93%
OKE	20.14%	41.75%
SLB	0.81%	39.77%
PSX	13.80%	34.99%

12-Month Rolling Correlation Matrix
(as of 2025-08-14)

	BEP	NEE	CWEN	ENB	XOM	CVX	COP	WMB	EOG	KMI	MPC	OKE	SLB	PSX
BEP	1.0	0.43	0.52	0.21	0.24	0.19	0.24	0.16	0.22	0.1	0.22	0.24	0.26	0.26
NEE	0.43	1.0	0.55	0.32	0.25	0.23	0.2	0.16	0.21	0.2	0.16	0.3	0.23	0.27
CWEN	0.52	0.55	1.0	0.39	0.26	0.26	0.25	0.36	0.19	0.34	0.24	0.41	0.22	0.26
ENB	0.21	0.32	0.39	1.0	0.28	0.28	0.24	0.49	0.22	0.48	0.16	0.42	0.28	0.18
XOM	0.24	0.25	0.26	0.28	1.0	0.83	0.81	0.34	0.8	0.39	0.68	0.62	0.78	0.71
CVX	0.19	0.23	0.26	0.28	0.83	1.0	0.81	0.34	0.8	0.4	0.7	0.63	0.8	0.75
COP	0.24	0.2	0.25	0.24	0.81	0.81	1.0	0.39	0.86	0.41	0.71	0.69	0.78	0.75
WMB	0.16	0.16	0.36	0.49	0.34	0.34	0.39	1.0	0.4	0.87	0.33	0.72	0.34	0.31
EOG	0.22	0.21	0.19	0.22	0.8	0.8	0.86	0.4	1.0	0.44	0.65	0.68	0.77	0.7
KMI	0.1	0.2	0.34	0.48	0.39	0.4	0.41	0.87	0.44	1.0	0.37	0.74	0.39	0.36
MPC	0.22	0.16	0.24	0.16	0.68	0.7	0.71	0.33	0.65	0.37	1.0	0.56	0.66	0.88
OKE	0.24	0.3	0.41	0.42	0.62	0.63	0.69	0.72	0.68	0.74	0.56	1.0	0.61	0.61
SLB	0.26	0.23	0.22	0.28	0.78	0.8	0.78	0.34	0.77	0.39	0.66	0.61	1.0	0.73
PSX	0.26	0.27	0.26	0.18	0.71	0.75	0.75	0.31	0.7	0.36	0.88	0.61	0.73	1.0

Results

From my recent analysis and research, I've come to realize that oil trading is a complex and dynamic segment within the broader energy sector. The level of volatility and the range of arbitrage opportunities across global markets demand a combination of both short-term and long-term trading strategies.

Given the sector's complexity, I plan to approach this with a risk-averse mindset, though this, too, presents its own set of challenges. Balancing caution with growth potential will be key.

To estimate the fund's fees, I'll likely follow the suggested breakdown: 1 to 4 percent for management, and 5 to 25 percent for performance exceeding the benchmark (alpha). My overall strategy is aimed at achieving high-growth potential while integrating effective risk management throughout the portfolio design.

Conclusion

Overall, the energy sector is highly cyclical and sensitive to market conditions, so being strategic in how the fund is balanced will be crucial to managing volatility. I also need to recognize that many investors may be hesitant to support coal and oil, which could limit broader appeal compared to other industries.

That said, I'm still figuring out how to build a model that can effectively rebalance itself. It's a complex space, and I sometimes feel overwhelmed given that my expertise in this area is still developing. The model cannot solely be based on historical prices given the nature of the industry sector and will need to rely on future signals that will be tested this week as well.

References

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