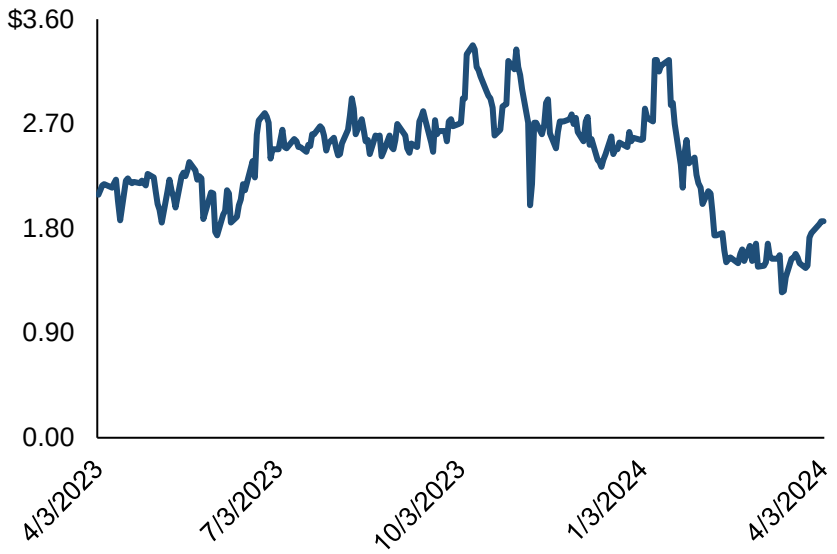
Natural Gas | One-Year Price Chart



Position Details

- Henry Hub Natural Gas | NGV4
- Underlying Price: $1.86
- Bull Call Spread
- September 25, 2024

Energy Sector

Analyst
Aidan Murphy
aidanjm13@gmail.com

President
Phil Sullivan
philsullivan10@gmail.com

Vice President
Owen Perry
owenperry0429@gmail.com

Chief Investment Officer
Adi Wodeyar
adiwodeyar@gmail.com

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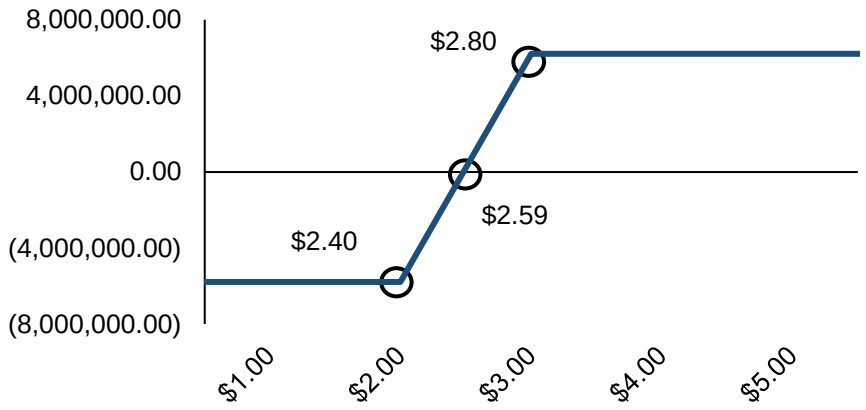
I. Product & Position Overview

Product & Position Overview

Product Description

- **Natural Gas**
  - Natural gas is a fossil fuel composed primarily of methane and other hydrocarbons such as ethane, propane, and butane. It is often extracted from underground reservoirs
  - Natural gas is used for commercial, residential, industrial, and electricity purposes. Natural gas accounts for 42.00% of total United States power generation; the next is coal at 17.00%
  - Natural gas is extracted on its own and alongside the production of oil. Shale accounts for the majority of associated production
  - Natural gas prices mean revert in the short-term and trend in the long-term. Natural gas is heavily influenced by supply and demand, geopolitical tensions, and weather

Payoff Diagram



Trade Breakdown

- **Bull Call Spread**
  - The trade benefits from bullish price action in the commodity
- **Setup**
  - We Buy – 3.00 k ITM $2.40 Calls | NGV4
  - We Sell – 3.00 k OTM $2.80 Calls | NGV4
  - Max Profit: $6,210,000.00
  - Max Loss: $(5,820,000.00)
- **Expiration**
  - Date: September 25, 2024

Exit Strategy & Potential Hedge Strategy

- **Bull Base & Bear Case**
  - **$2.80** / **$2.68** / **$2.40**
  - Breakeven – $2.59
- **Methodology**
  - The Energy Sector expects natural gas to rise near year-end. The strategy is fueled by tightening supply, new catalysts for demand, and altering weather patterns
- **Hedge Strategy**
  - If this strategy were to see continued bearish price action, The Sector would look to reverse trade. The Sector would also look to decrease exposure to natural gas

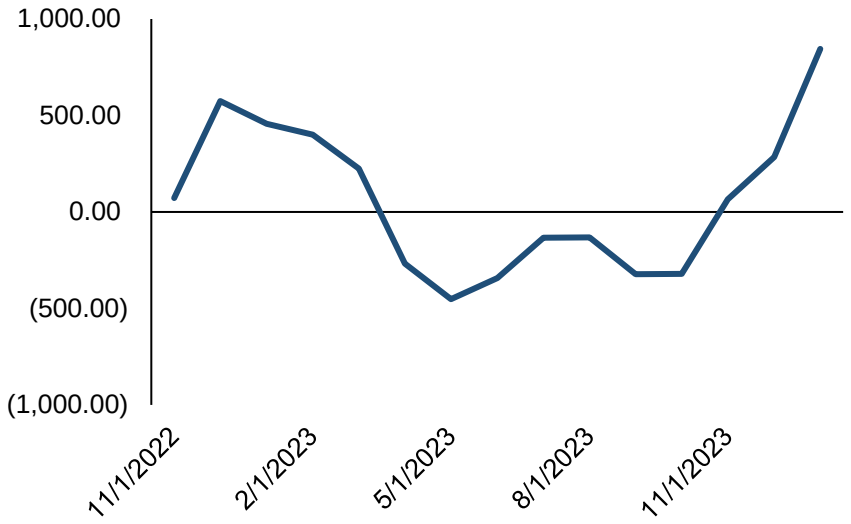
II. Macroeconomic Thesis

Macroeconomic Thesis

Macroeconomic Summary

- **Tightening of U.S. Supply**
  - Pipeline takeaway capacity within key regions has been reached
    - The Appalachian region accounts for 29.00% of total U.S. production is nearing maximum capacity at 37.70 Bcf/d
  - Natural gas rigs are being retired at record rates, during 2023 natural gas rigs fell 30.90%, and last week, rigs fell 3.40%
  - Large U.S. natural gas producers have announced production cuts; Chesapeake Energy cut production 2.40 Bcf/d through 2024, and EQT extended production cuts 1.00 Bcf/d through March
- **Increase in Demand for Natural Gas**
  - New technology demands a significant amount of electricity
    - Hyperscalers need 10.00-14.00 kW per rack in traditional data centers; AI-ready racks require 40.00-60.00 kW
    - Electricity demand for data centers is set to increase 13.00%-15.00% compounded annually through 2030
  - Hydropower electricity generation fell ~3.50 T Btu from December 2022 to December 2023; droughts continue to affect hydropower
  - Globally, 22.92 k MW of coal plant electricity is set to be retired in 2024. Historically, natural gas replaces the baseload source
- **Altering Weather Dynamics**
  - NOAA places an 83.00% chance of ENSO-neutral by April-June and a 62.00% chance of La Niña by June-August
    - In 2011-2012, the La Niña episode northern average temperatures were 5.30° F below normal
  - Atlantic Ocean temperatures are 1.08° F above historical highs; La Niña averages 8.70 hurricanes relative to 5.00 of El Niño

U.S. Net Working Storage Withdrawals (MMcf) | Two-Year Chart



Market Pros & Cons

- Rise in global geopolitical tensions
- Global central banks begin cutting early 3Q2024
- Natural gas working storages remain high
- Significant rise in associated oil production

Bloomberg, EIA, S&P Global, IEA, NOAA

III. Risk Analysis

Risk Analysis

Directional & Magnitude Risk

- **Delta Analysis**
  - The Delta value for this trade is 0.1243
  - For every $1.00 change in the underlying asset, the contract will gain $0.1243
  - The trade is long Delta and benefits from bullish price action in the underlying as the trade moves into expiration
- **Gamma Analysis**
  - This trade has a Gamma value of 0.2265
  - Gamma is high due to the breakeven being relatively at the money. As the underlying moves in either direction, the gamma value will decrease

Time Risk

- **Theta Analysis**
  - The option's Theta has a value of (0.0007)
  - As time passes, the trade will lose money due to the strategy moving closer to expiration
  - The value of Theta can increase as the price of the underlying moves above the breakeven

Implied Volatility Risk

- **Vega Analysis**
  - The trade has a Vega value of 0.0016
  - Implied volatility input for the trade is 42.00%
  - The Vega is positive due to the strikes having similar implied volatility, which means the net Vega is low
  - The current market volatility for NGV4 is 45.00%, Historically this ranges between 39.00%-43.00%. The current high volatility is due to the recent spikes in natural gas in recent weeks

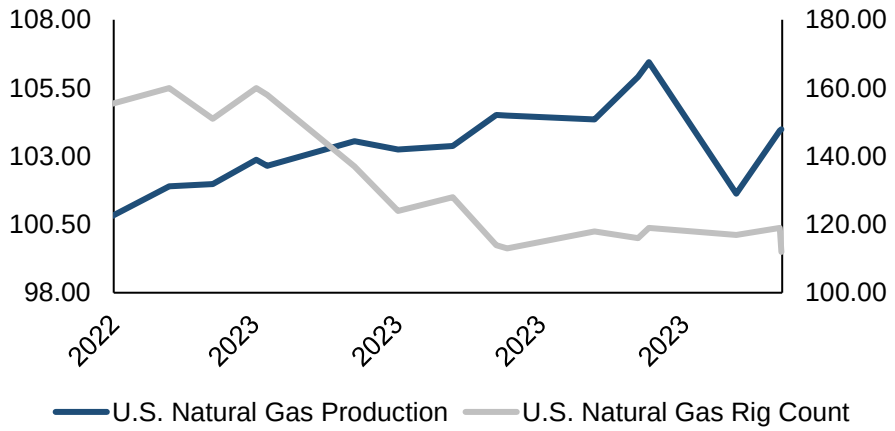
Interest Rate Risk

- **Rho Analysis**
  - The Rho value for this trade is (0.0002)
  - This strategy has a low net Rho due to the negligible effects of interest rate changes on the underlying

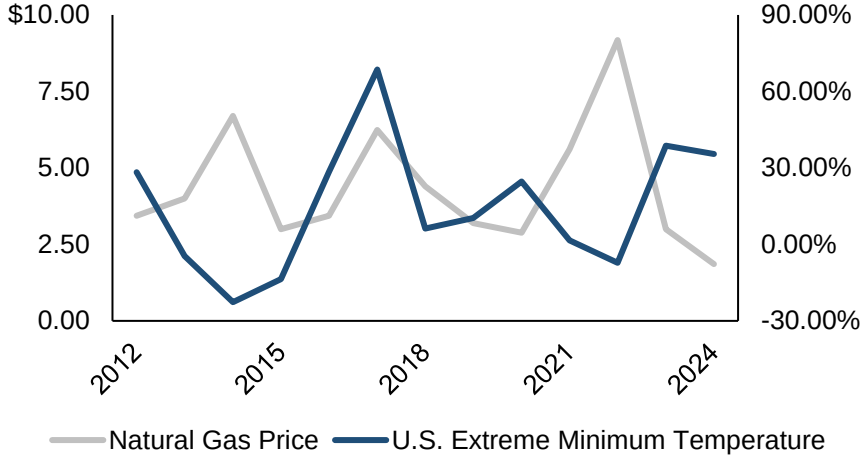
IV. Technical Bias & Fair Value

Technical Bias & Fair Value

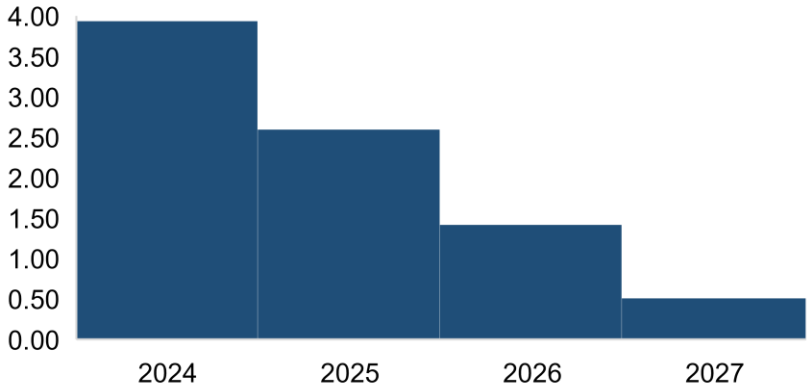
U.S. Natural Gas Production (Bcf) vs U.S. Natural Gas Rig Count



U.S. Extreme Minimum Temperatures vs Natural Gas Price



Natural Gas Interstate and Intrastate Capacity Additions (Bcf)



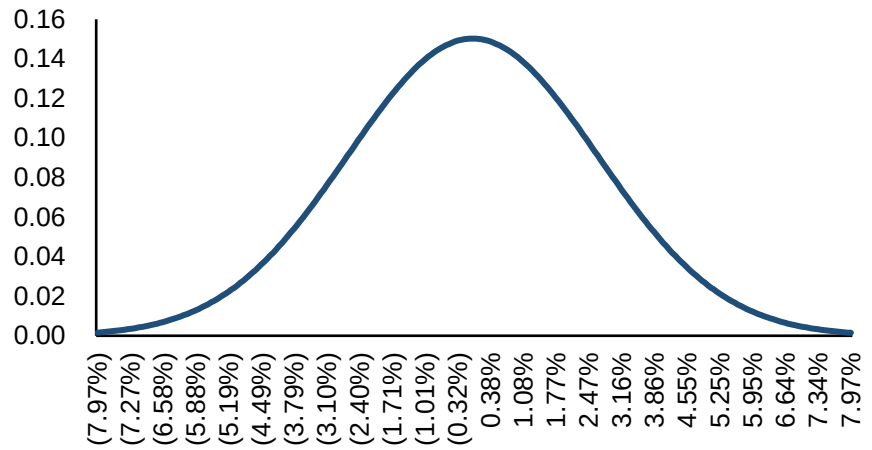
Synopsis

- U.S. natural gas rigs have been falling due to government legislation supporting renewable energy sources rather than fossil fuels. However, unlike oil production, which has seen rigs fall and production rise, natural gas production has remained flat and recently fallen, demonstrating the inefficiencies of natural gas drills
- Weather is a significant driver of natural gas due to its residential applications. In 2014 and 2022, there were significant rises in natural gas prices due to abnormally cold winters
- Capacity additions to interstate and intrastate pipelines are falling. For context, the 2024 capacity additions is ~12.00 bn Bcf less than 2011. This is the result of project delays due to higher for longer interest rates and government legislation discouraging fossil fuel development

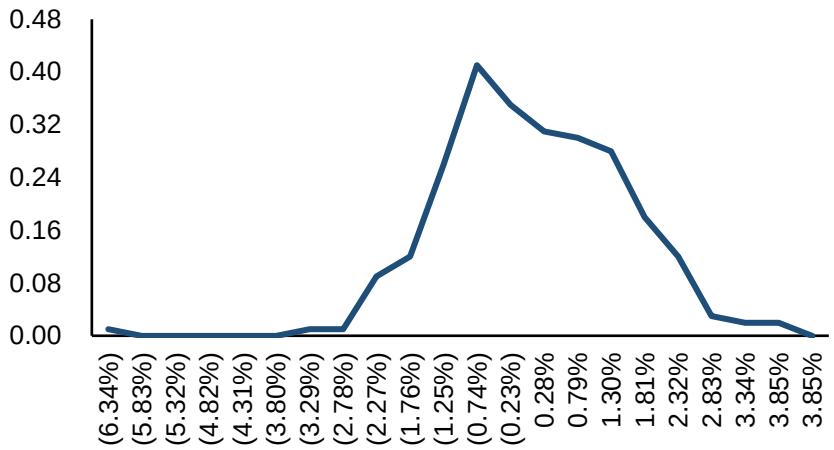
V. Volatility Analysis

Volatility Analysis

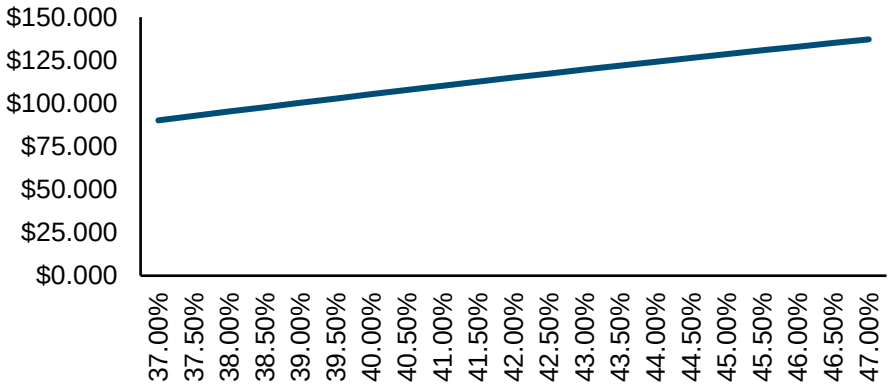
Expected Theoretical Daily Return Distribution



Historical Daily Return Distribution



Position Volatility Sensitivity



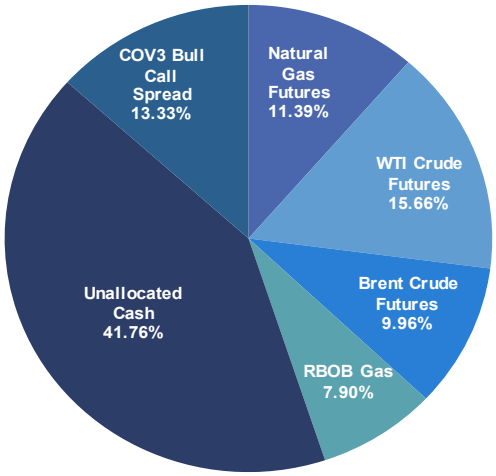
Synopsis

Asset Description	Option Premium
Theoretical Long Put	$0.0609
Actual Long Put	$0.0613
Theoretical Short Put	$0.0226
Actual Short Put	$0.0228
Theoretical Long Put Adj. for DV1	$608.8000
Actual Long Put Adj. for DV1	$613.0000
Theoretical Short Put Adj. for DV1	$226.0000
Actual Short Put Adj. for DV1	$228.0000
Theortical Edge (LP) Assuming 100.00 k Contracts	($12,600.0000)
	-
Theortical Edge (SP) Assuming 100.00 k Contracts	$6,000.0000
Total Theoretical Edge	($6,600.0000)

V. Capital Allocation

Capital Allocation

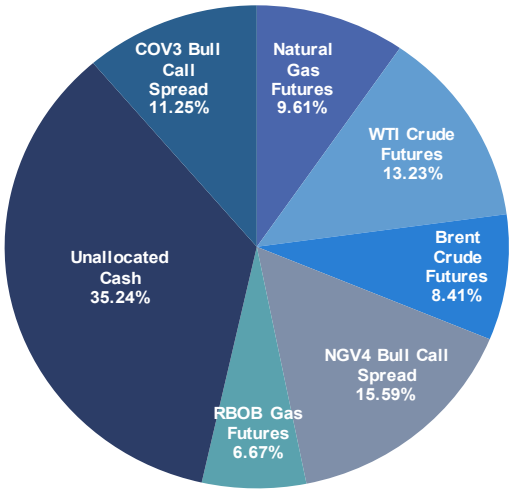
Current Portfolio Allocation



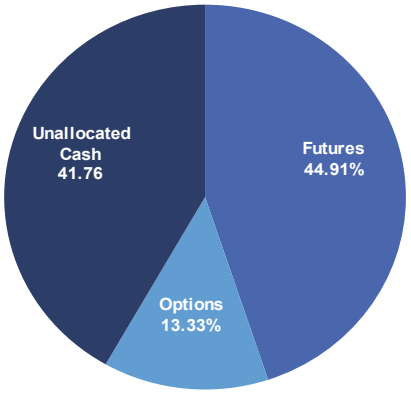
Transaction Summary

Ticker	Position Change Contracts	Allocation
Brent Crude Futures	0	$0.00
Natural Gas Futures	0	$0.00
WTI Crude Futures	0	$0.00
RBOB Gas Futures	0	$0.00
COV3 Bull Call Spread	0	$0.00
NGV4 Bull Call Spread	+ 3000	($5,820,000.00)
Allocation Change		$5,820,000.00

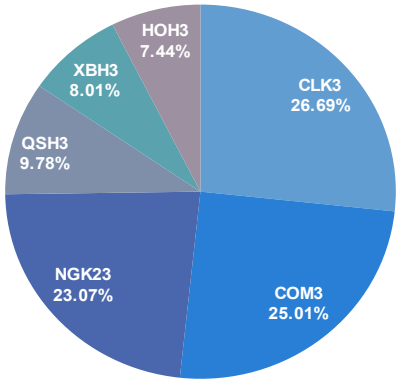
Proposed Portfolio Allocation



Current Position Allocation



Benchmark Allocation



Proposed Position Allocation