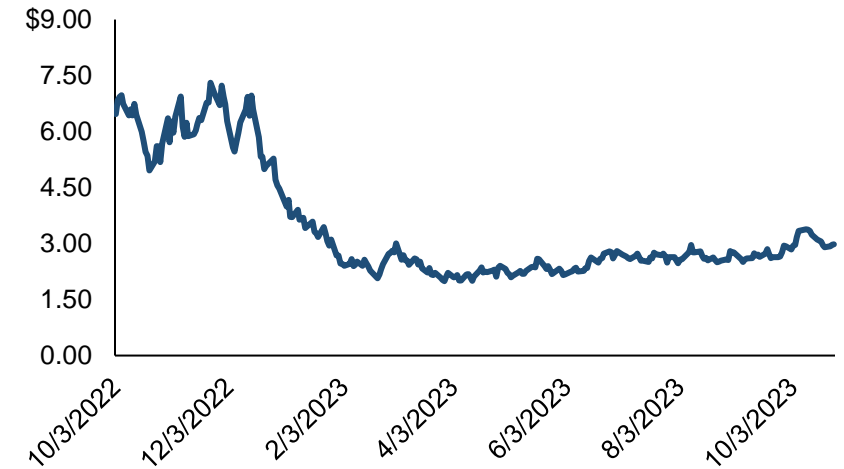


Natural Gas | 1-Year Price Chart



Position Details

- Natural Gas | NGF24
- Underlying Price: \$3.65
- Bear Put Spread
- December 27, 2023

Energy Sector

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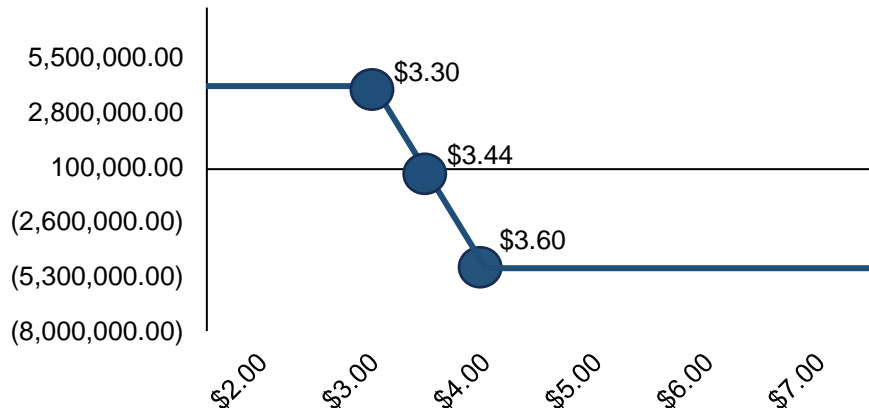
I. Product & Position Overview

Product & Position Overview

Product Description

- **Natural Gas**
 - Natural gas is a fossil fuel energy source containing many different compounds, composed primarily of methane, a hydrocarbon gas. It also contains small amounts of natural gas liquids (NGLs), and nonhydrocarbon gases
 - It is used as a fuel and as an ingredient to make different materials and chemicals. Most commonly, it is used for heating, electricity generation, and fuel for vehicles
 - Typically, it is extracted from underground reservoirs and is often a byproduct of fracking. Natural gas is considered a more environmentally clean fuel than coal or oil because it produces fewer greenhouse gas emissions
 - Natural gas prices are heavily affected by supply and demand, petroleum prices, and weather conditions

Payoff Diagram



Trade Breakdown

- **Bear Put Spread**
 - This strategy benefits when the price of the underlying asset decreases
- **Setup**
 - We Sell – 3.00 k OTM \$3.30 Puts | NGF24
 - We Buy – 3.00 k OTM \$3.60 Puts | NGF24
 - Max Loss: (\$4,890,000.00)
 - Max Profit: \$4,110,000.00
- **Expiration**
 - Date: December 27, 2023

Exit Strategy & Potential Hedge Strategy

- **Bull Base & Bear Case**
 - \$3.29 / \$3.35 / \$3.60
 - Breakeven – \$3.44
- **Methodology**
 - The Sector believes that the underlying asset will trade down due to heavy supply and weak demand
- **Hedge Strategy**
 - If the underlying asset does not undergo bearish price movements as expected, The Sector will look to reverse trade. Our overweight position in natural gas would allow us to minimize losses against adverse price movements



II. Macroeconomic Thesis

Macroeconomic Thesis

Macroeconomic Summary

High Storage Volumes As Winter Approaches

- Storage sites in Germany, France, and Italy are around 98.00% full. Europe has exceeded its target of 90.00%
- The volume of U.S. natural gas in storage is 5.10% above the five-year seasonal average and up 8.50% y/y
 - Gas inventories for California, Washington, and Oregon, which were at a deficit of over 50.00% in March, have now risen to a surplus

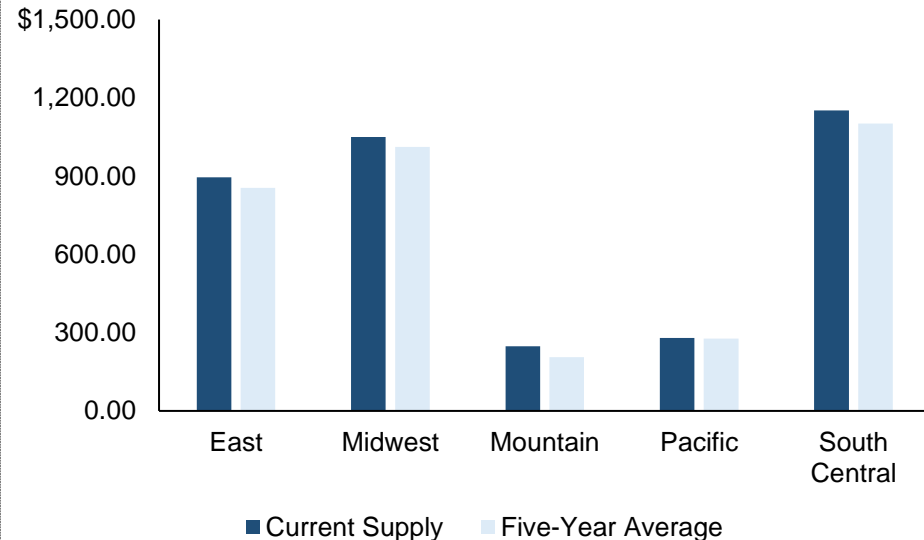
Improved Gas Routes Are Increasing Global Production

- Argentina's natural gas production has risen from 141.20 mm cf/d y/y to 144.40 mm cf/d, with help from Vaca Muerta
- The number of U.S. natural gas drilling rigs rose by one to 118.00 after a 19.00-month low of 113.00 in September
- Permian gas flow to California is expected to increase now that a major Kinder Morgan pipeline is back in service
 - Part of the Aliso Canyon natural gas storage facility reopened and is now allowed to store up to 68.60 bn cf- the previous cap was 41.10 bn cf

Weak Global Demand

- Total U.S. electricity output fell 1.80% y/y in the 52.00-week period ending October 14
 - In 2Q2023, EU gas demand was down 19.00% below the 2019-2021 average, with gas demand for power generation down 17.00%
- The Council of the EU set a voluntary target for member states to reduce their natural gas consumption by 15.00% between April 2023 and March 2024

U.S. Natural Gas Storage vs Five-Year Average By Region in Bn cf



Market Pros & Cons

- Mild temperatures
- Mexican natural gas imports remain stunted
- Israel-Hamas conflict elevates
- Strengthening of the Euro



III. Risk Analysis

Risk Analysis

Directional & Magnitude Risk

- **Delta Analysis**

- The Delta value for this trade is (0.2222)
- This trade has a negative Delta due to the nature of the trade, which causes the option's price to rise as the underlying price falls
- For every \$1.00 increase in the underlying asset, the option value decreases (\$0.22)

- **Gamma Analysis**

- This trade has a Gamma value of 0.2009
- Changes in the option value will be faster than typical when the underlying changes, giving this trade a high Gamma

Implied Volatility Risk

- **Vega Analysis**

- The trade has a Vega value of 0.0015
- Implied volatility input for the trade is 33.00%
- The potential risk of implied volatility is hedged by the fact that the option requires to both buy and sell a put
- If the underlying price is approaching or below \$3.30, our trade would benefit from Vega decreasing, however, if the stock price is approaching or above \$3.60, an increase in Vega would be beneficial for the trade

Time Risk

- **Theta Analysis**

- This trade has a Theta value of (0.0014)
- If the underlying price is at or approaching the strike price of the long put, \$3.60, the price of the strategy will decrease as time passes. If the underlying price is approaching or below the strike price of the short put, \$3.30, then the strategy makes money with the passing of time

Interest Rate Risk

- **Rho Analysis**

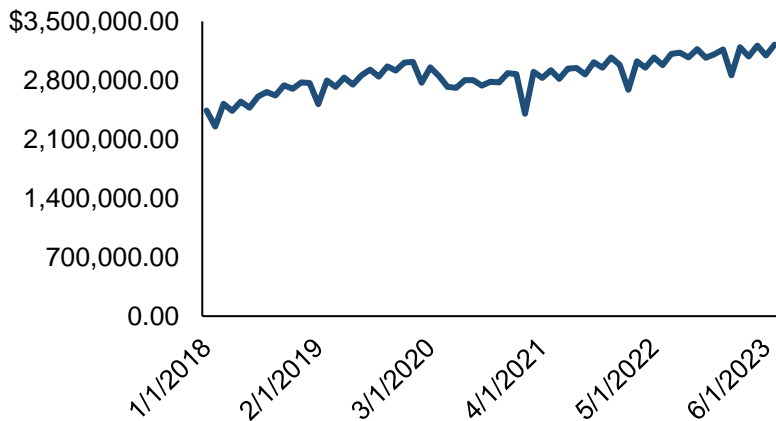
- The Rho value for this trade is (0.0002)
- Rho is negative, resulting in rising interest rates hurting the position, and vice versa
- The impact of Rho is minimal due to the short expiration date of the option



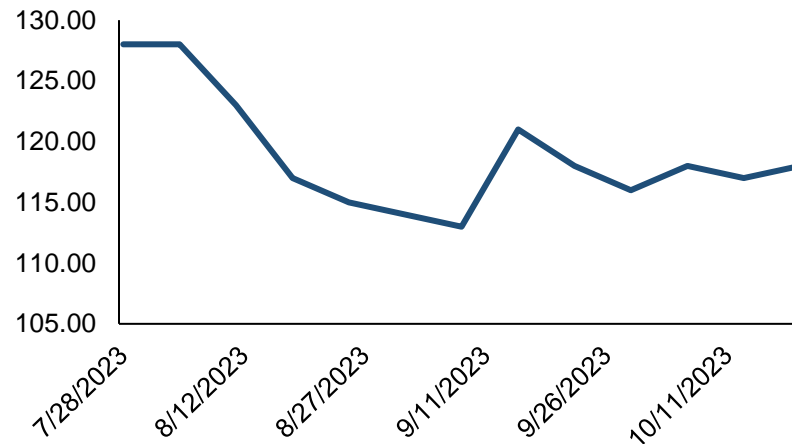
IV. Technical Bias & Fair Value

Technical Bias & Fair Value

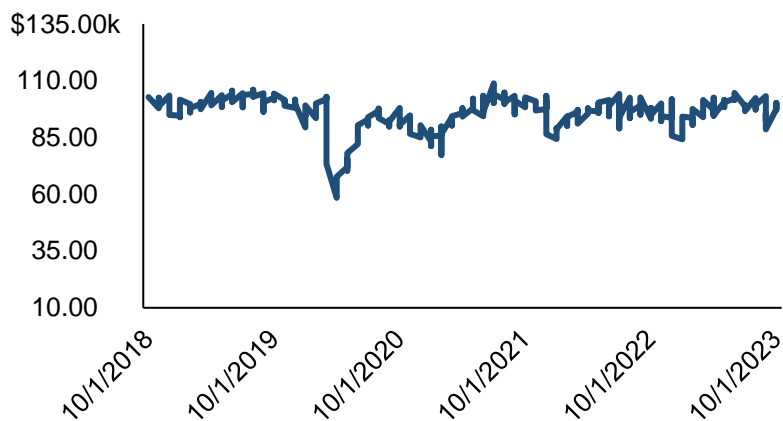
U.S. Dry Natural Gas Production in mm cf | Five-Year Chart



U.S. Natural Gas Rig Count | Three-Month Chart



DOE Motor Gas Output Implied Demand | Five-Year Chart



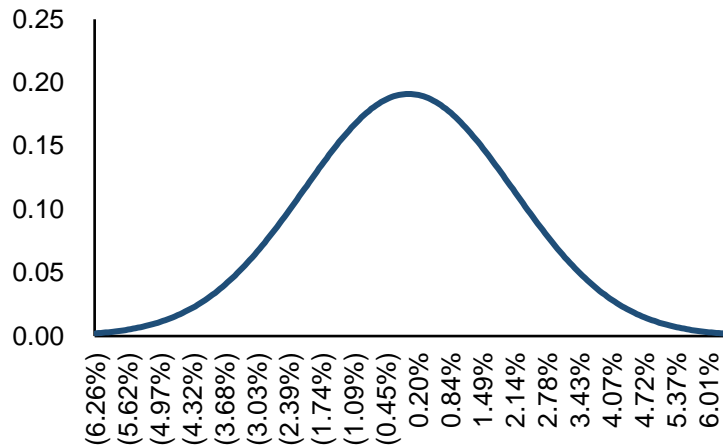
Synopsis

- U.S. dry natural gas production has continued its upward trend since around 2021. Production has been driven by increased drilling activity throughout recent years and has supported lower prices
 - 97.00 bn cf produced for the week ended October 13 was above expectations of 83.00 bn cf and above the five-year average for this time of year at 85.00 bn cf
- The number of operating U.S. gas rigs declined sharply into September, but has increased since. Historically, the number of operating U.S. gas rigs increase in the winter
- Gasoline demand tends to slow down in the winter months, causing less demand for oil, in turn lowering both oil and natural gas prices

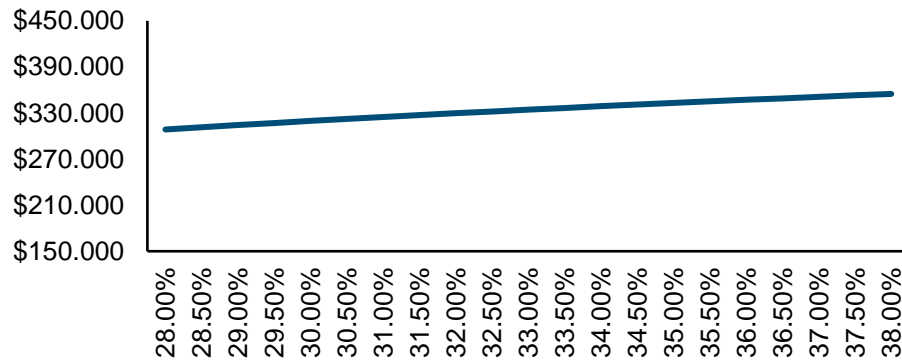
V. Volatility Analysis

Volatility Analysis

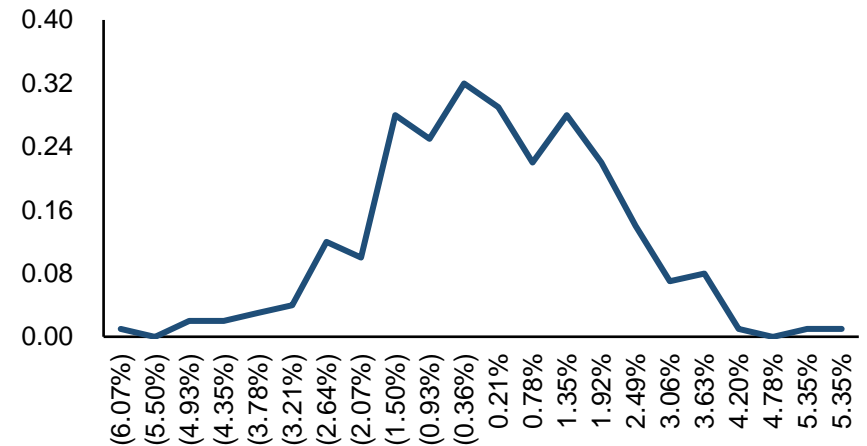
Expected Theoretical Daily Return Distribution



Position Volatility Sensitivity



Historical Daily Return Distribution



Synopsis

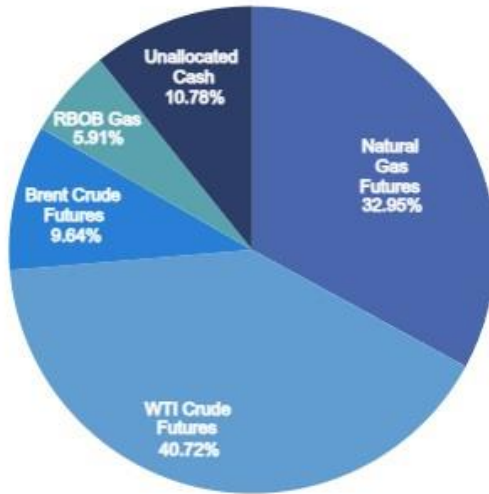
Asset Description	Option Premium
Theoretical Long Put	\$0.1769
Actual Long Put	\$0.3770
Theoretical Short Put	\$0.0655
Actual Short Put	\$0.2140
Theoretical Long Put Adj. for DV1	\$17.6900
Actual Long Put Adj. for DV1	\$37.7000
Theoretical Short Put Adj. for DV1	\$6.5500
Actual Short Put Adj. for DV1	\$21.4000
Theoretical Edge (LP) Assuming 100.00 k Contracts	(\$60,030.0000)
Theoretical Edge (SP) Assuming 100.00 k Contracts	\$44,550.0000
Total Theoretical Edge	(\$15,480.0000)



V. Capital Allocation

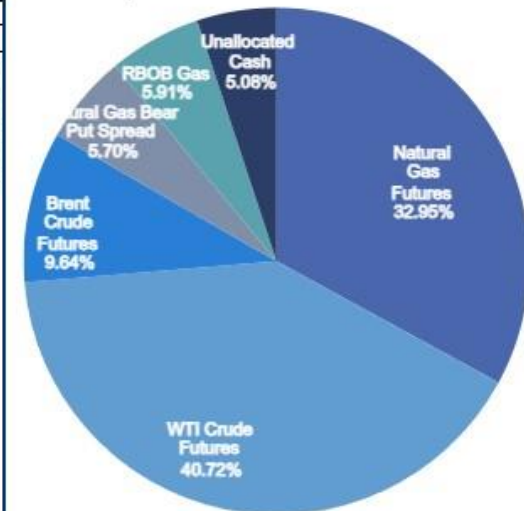
Capital Allocation

Current Portfolio Allocation

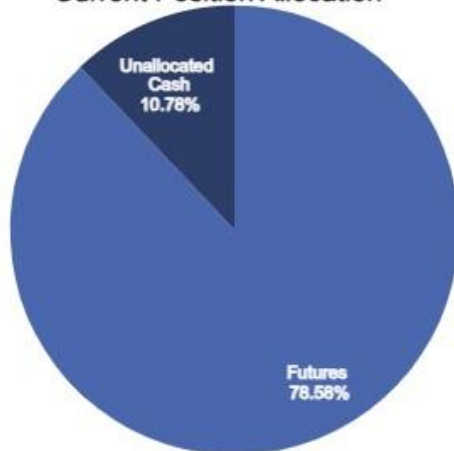


Ticker	Position Change		Allocation
	Contracts	Allocation	
Brent Crude Futures	0	\$0.00	
Natural Gas Futures	0	\$0.00	
WTI Crude Futures	0	\$0.00	
RBOB Gas	0	\$0.00	
NG Bear Put Spread	+ 3000	\$4,890,000.00	
Allocation Change			\$4,890,000.00

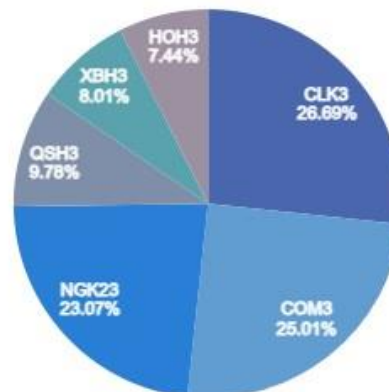
Proposed Portfolio Allocation



Current Position Allocation



Benchmark Allocation



Proposed Position Allocation

