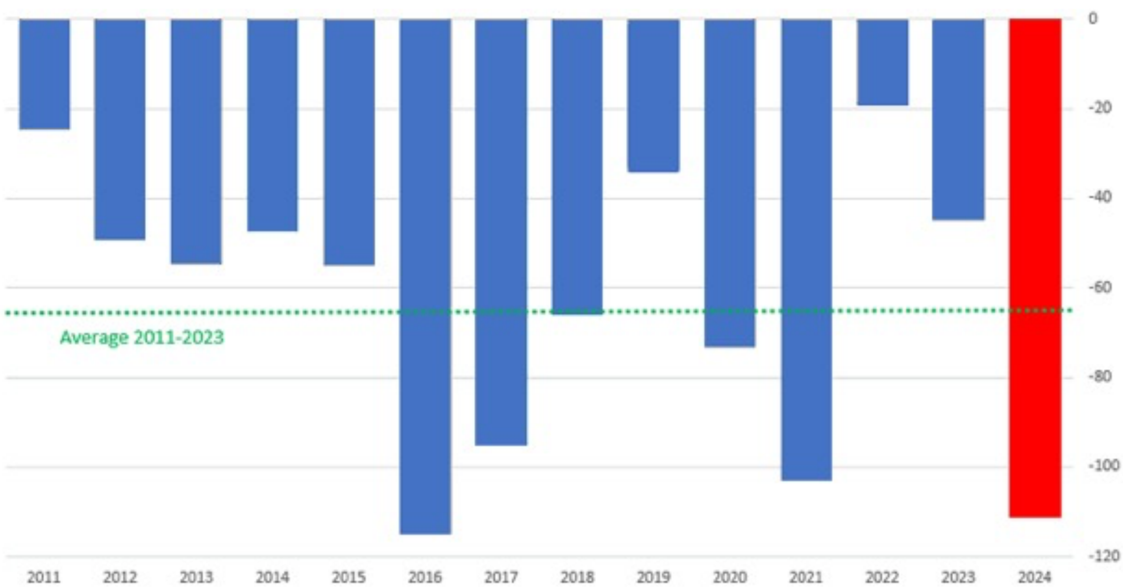
CHART OF THE MONTH
Sharp draw in European gas inventories in November

A combination of cold weather and low wind speeds across Europe in late October and November resulted in a hike in the demand for gas for power and heating. Total gas in storage remains at a comfortable level, but Europe remains vulnerable to spiking prices through the winter.

European gas withdrawal from storage (Nov, TWh)



Source: Bloomberg. Data as of December 2024.

OIL
Spot prices broadly flat in November

Brent and WTI spot oil prices ended flat to up $1/bl (barrel) in November with WTI closing the month at $69/bl and Brent at $74/bl. Tensions in the Middle East eased somewhat as there were steps towards an Israel-Lebanon ceasefire. Meanwhile all eyes were on OPEC+ in the run-up to their December 5 meeting, at which the decision was taken to delay any production increases for a further three months.

NATURAL GAS
International gas prices move higher

International gas prices rose in November, with UK NBP up by $2/mcf (one thousand cubic feet) to $14.9/mcf and Japanese LNG up $1.3/mcf also to $14.9/mcf. Higher European demand, combined with concerns around Russian gas availability into Eastern Europe in the new year, combined to push prices higher.

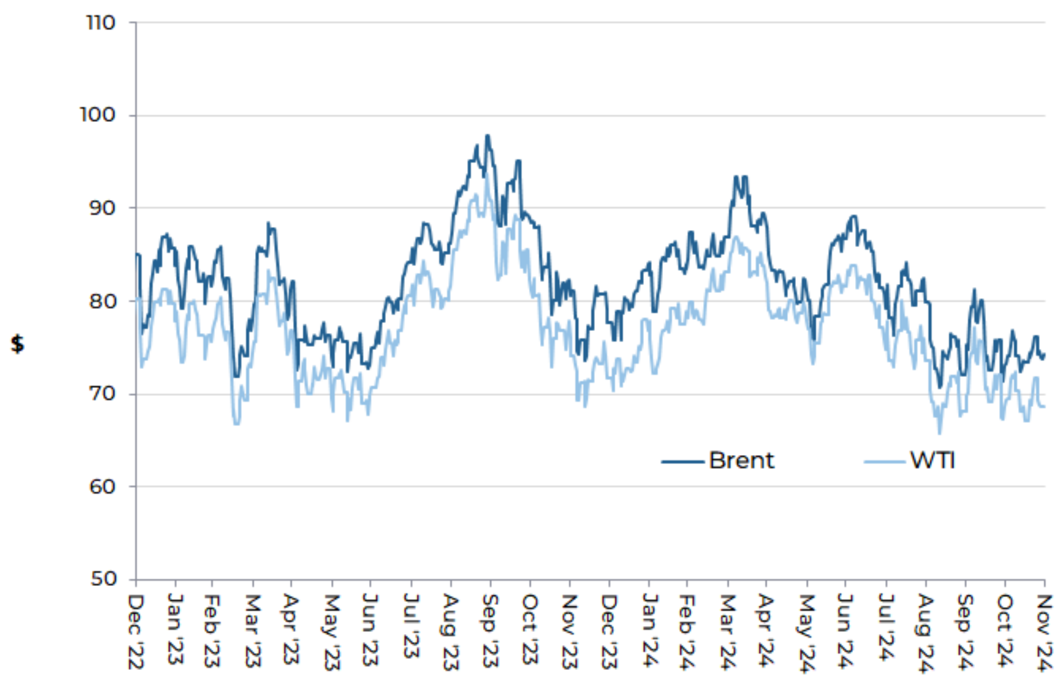
EQUITIES
Energy outperforms the broad market in November

The MSCI World Energy Index (net return) rose by 5.06% in November, beating the MSCI World Index (net return) which rose by 4.59%. Year-to-date, MSCI World Energy is up by 11.22% vs the MSCI World Index up 21.85%

November in Review

OIL MARKET

Oil price (WTI and Brent $/barrel)
December 2022 to November 2024



Source: Bloomberg, Guinness Atkinson Funds. Data as of November 2024.

The West Texas Intermediate (WTI) oil price began November at $69/bl and traded in a $67/bl to $71/bl range through the month, ending unchanged at $69/bl at the end of the month. WTI has averaged around $76/bl so far this year, having averaged $78/bl in 2023 and $95/bl in 2022. Brent oil traded in a similar shape, opening at $73/bl and trading in a $72/bl to $76/bl range, before closing at $74/bl. Brent has averaged $81/bl so far in 2024, having averaged $83/bl in 2023 and $100/bl in 2022. The gap between the WTI and Brent benchmark oil prices widened over the month, ending November at $5/bl. The Brent-WTI spread has averaged $5/bl so far in 2024 after averaging a similar amount in 2023.

Factors which were neutral or strengthened WTI and Brent oil prices in November:

- **Iranian oil supply / sanctions**

All eyes remain on the Trump administration and what President Trump's attitude to Iran might be once he takes office in January. Iran and the so-called E3 grouping of the UK, France and Germany have agreed to continue holding talks in the near future in an attempt to find a way out of an impasse over Tehran's nuclear program, but assuming a breakthrough is not achieved, there is an expectation that President Trump will revert to the pursuit of "maximum economic pressure" against Iran, as he followed during his first term.

The latest data suggests that Iran is producing around 3.3m b/day of oil, up significantly from 12 months ago. Any disruption to Iranian oil exports would clearly have a tightening effect on the world market.

- **Global oil demand growth of 1m b/day expected in 2025**

Despite softness in Chinese oil demand (see below), the International Energy Agency (IEA) published in November an unchanged forecast of world oil demand growing by 1m b/day in 2025. We regard this as "normal" post-COVID demand growth. The IEA are expecting OECD (Organization for Economic Cooperation and Development) oil demand next year to decline slightly (-0.1m b/day), while non-OECD demand grows by 1.1m b/day. The biggest contributors to growth next year are expected to be China (+0.2m b/day), India (+0.2m b/day) and other parts of Asia (+0.3m b/day). Within the OECD, the US is forecast to grow its demand slightly, while European demand contracts.

Factors which weakened WTI and Brent oil prices in November:

- **Easing of Middle East conflict tensions**

In late November, an Israel-Lebanon ceasefire was announced, in theory ending more than 13 months of fighting between the Israeli military and Hezbollah. This has eased tensions in the region somewhat, and associated fears around the disruption of oil supply. However, both sides have already accused the other of breaching the terms of the ceasefire, so we wait to see if it becomes more established.

- **Weaker Chinese demand data**

Chinese demand data has been running weaker for a number of months, though the latest data for October shows a return to year-on-year growth, aided by diesel demand. Data released in mid-November suggests year-on-year growth in October of around 0.3m b/day. Chinese oil demand is currently forecast by the IEA to grow by 0.2m b/day in 2024 to 16.7m b/day, representing only 20% of global demand growth both this year and next year, compared to almost 70% in 2023.

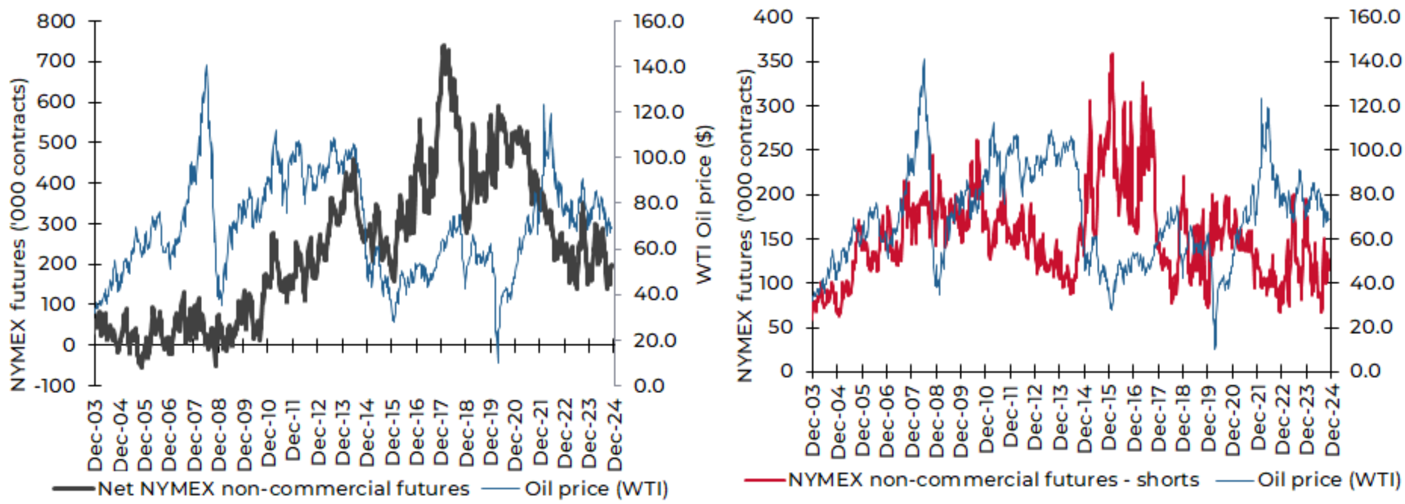
- **Solid non-OPEC supply growth**

Non-OPEC supply growth for 2024 is forecast by the International Energy Agency (IEA) to be around 1.0m b/day. While this figure has been revised lower since the start of the year, it still implies that the "call on OPEC" to balance the market has shrunk versus 2023. Data from the IEA showed a small increase in US onshore oil production in September, up 0.05m b/day versus August, to reach 11.2m b/day (vs 11.0m b/day at the start of the year). The key driver of the growth was the Permian basin.

Speculative and investment flows

The New York Mercantile Exchange (NYMEX) net non-commercial crude oil futures open position was 200,000 contracts long at the end of November versus 159,000 contracts long at the end of October. The net position peaked in February 2018 at 739,000 contracts long. Typically, there is a positive correlation between the movement in net position and movement in the oil price. The gross short position fell to 114,000 contracts at the end of November versus 133,000 at the end of the previous month.

NYMEX Non-commercial net and short futures contracts:
WTI January 2004 – November 2024

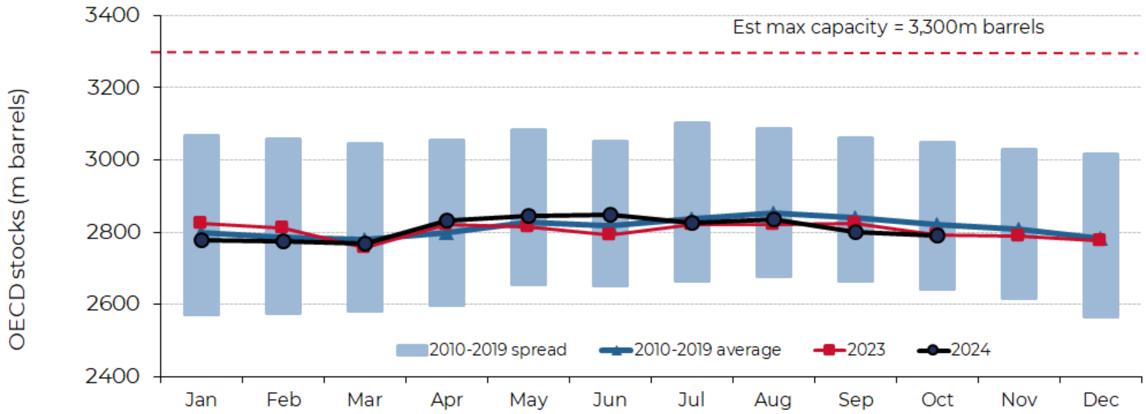


Source: Bloomberg LP/NYMEX/ICE (2024)

OECD Stocks

OECD total product and crude inventories at the end of October (latest data point) were estimated by the IEA to be 2,790m barrels, down by 9m barrels versus the level reported for the previous month. The fall in October compares to a 10-year average (pre COVID) fall of 17m barrels, implying that the OECD market was looser than normal. The significant oversupply situation in 2020 pushed OECD inventory levels close to maximum capacity in August 2020 (c.3.3bn barrels), with subsequent tightening taking inventories below normal levels.

OECD Total Product & Crude Inventories
Monthly, 2010 to October 2024



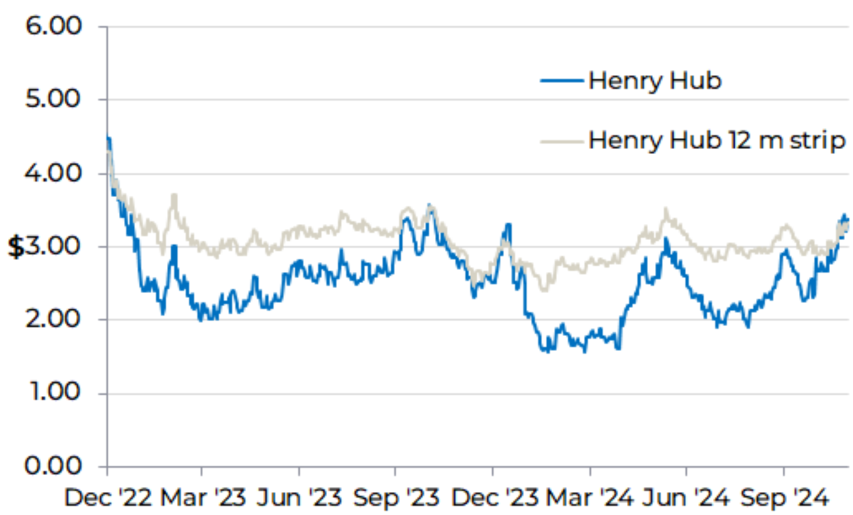
Source: IEA Oil Market Reports (November 2024 and older)

NATURAL GAS MARKET

The US natural gas price (Henry Hub front month) opened November at $2.71/Mcf (1,000 cubic feet) and traded steadily higher over the month to reach $3.43/Mcf on November 26, before slipping to close at $3.36/Mcf. The spot gas price has averaged $2.32/Mcf so far in 2024, having averaged $2.67/Mcf in 2023 and $6.52/Mcf in 2022.

The 12-month gas strip price (a simple average of settlement prices for the next 12 months' futures prices) traded in a similar pattern, opening at $2.93/Mcf and closing the month at $3.32/Mcf. The strip price has averaged $2.93/Mcf so far in 2024, having averaged $3.19 in 2023 and $5.90 in 2022.

Henry Hub gas spot price and 12m strip ($/Mcf)
December 2022 to November 2024



Source: Bloomberg LP. Data as of November 2024.

Factors which strengthened the US gas price in November included:

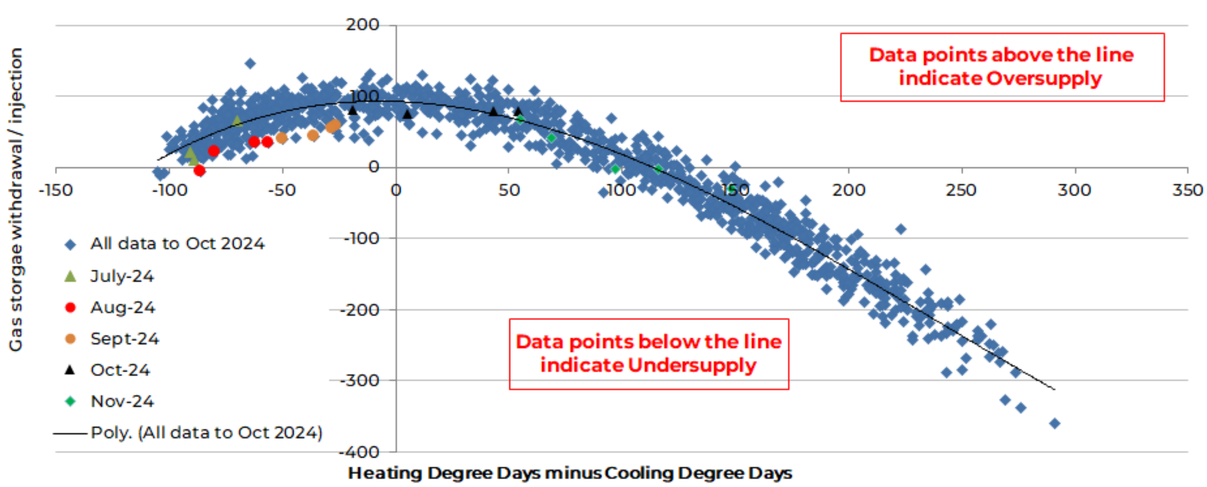
- **Falling rig count**

The number of rigs drilling for natural gas in the US has fallen from 160 rigs in the middle of 2022 to a low of 94 rigs in mid-September, before increasing to 100 rigs at the end of November 2024. This has slowed gas production growth, though "associated gas" production (a byproduct of shale oil) has continued to grow this year from the Permian basin.

- **Market undersupplied (ex-weather effects)**

Adjusting for the impact of weather, the US gas market was, on average, around 0.5 Bcf (billion cubic feet) per day undersupplied during November. This is less than the undersupply for October, as illustrated in the chart below.

Weather-adjusted US natural gas inventory injections and withdrawals



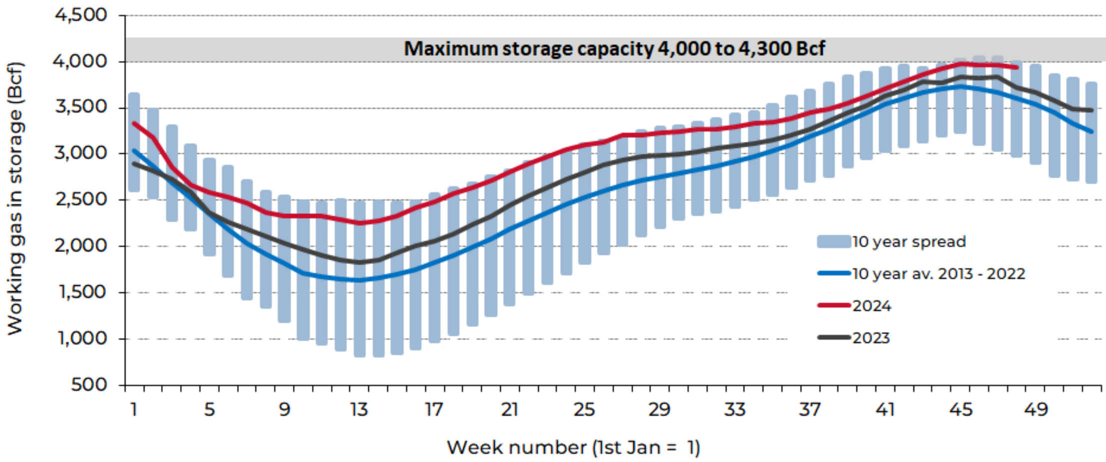
Source: Bloomberg LP, Guinness Atkinson Funds. Data as of December 2024.

Factors which weakened the US gas price in November included:

- **Natural gas in inventories towards the top of the historic range**

US natural gas inventories have been running higher than seasonal norms throughout 2024, driven by a warmer-than-expected 2023/24 winter and early spring that brought lower-than-expected heating demand. Inventory levels moved to the top of the 10-year range but tightened in the third quarter ending November, and the 2024 natural gas injection season, at around 3.94 trillion cubic feet (around 0.3 Tcf above the 10-year average).

Deviation from 10yr US gas storage norm



Source: Bloomberg LP, EIA. Data as of December 2024.

Manager's Comments

This month, we assess the outcomes of the recent OPEC+ meeting, exploring what was announced, the rationale behind the group's actions, and consideration of the group's longer-term ambitions.

What was announced?

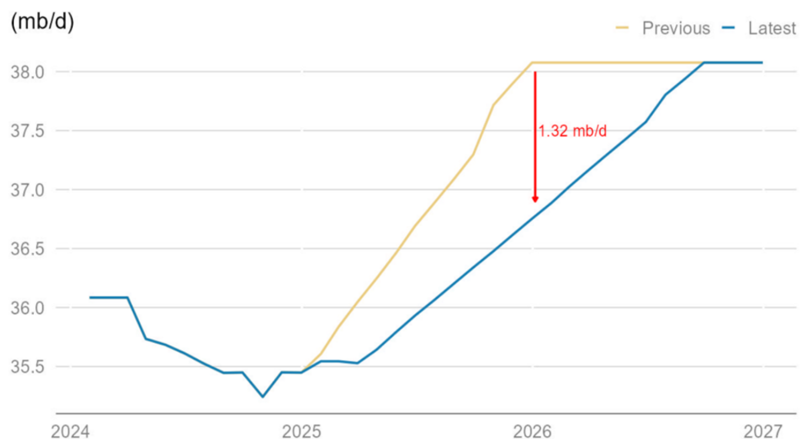
In June 2024, the OPEC+ group announced their plan to reverse existing production quota cuts, starting in September. The plan to grow production was delayed twice, first in September, then in November. On December 5, OPEC+ met formally and announced a revised plan, incorporating four elements:

- The start of the unwinding of "voluntary" quota cuts (2.2m b/day) was delayed until the end of Q1 2025.
- The unwinding of the "voluntary" quota cuts was adjusted to taking place over an 18-month timeline, instead of the original 12 months. Hence, future production increases are slated to be in increments of 120k b/day per month rather than 180k b/day per month.
- Any additional quota cuts in place (set in April 2023) are maintained until at least December 2026.
- The UAE accepted a lower ramp-up of the 0.3m b/day quota increase that had separately been agreed between the country and the rest of the OPEC+ group.

Little commentary was provided by the OPEC Secretariat to explain the cuts, beyond the perpetual aim of "supporting the stability and balance of the oil markets". That said, in the press release that accompanied these announcements, the OPEC+ group explained that the monthly production increases "can be paused or reversed subject to market conditions".

While the three-month delay to any production increase from the OPEC+ group was generally expected, the quota changes thereafter imply significantly less oil coming into the market than previously announced. The average OPEC+ quota is around 0.8m b/day lower than the previous plan, with the point of "peak revision" coming at the end of 2025, when around 1.3m b/day of production is withheld versus the prior production schedule:

OPEC+ quota changes (announced December 2024)



Source: OPEC, Morgan Stanley, Guinness Atkinson Funds. Data as of December 2024.

Why have OPEC+ taken this action?

This latest move from OPEC+ comes at a time when core "OPEC-9" production (26.4m b/day) looks to be about in line with the average "call on OPEC" for 2024 (26.4m b/day), implying a balanced market, but it is towards the lower end of their range of production (ex-COVID) over the past 10 years. With their production being in line with the "call" on OPEC-9 in 2024, it seems clear that 2024 has been another year of careful oil market micromanagement by OPEC+.

OPEC-9 apparent production vs call on OPEC 2000 – 2024

Source: Guinness Atkinson Funds estimates, IEA Oil Market Report. November 2024 and prior.

Looking ahead into 2025, it remains to be seen whether the OPEC+ group follows through with additional supply as announced. Where the group must be especially vigilant is on the balance between global oil demand growth and non-OPEC supply growth over the next 12 months. Global oil demand is due to grow in 2025 by around 1.0m b/day, while non-OPEC supply looks likely to expand by at least a similar amount. The group will also keep a close eye on President Trump's policy proposals, from the impact on oil supply caused by his approach to Iranian sanctions, through to the impact of proposed tariffs on China, Canada and Mexico.

OPEC+ will also remain vigilant around quota compliance within their own group, a topic that has caused some friction over the past year. Recent data suggests that the group "laggards" (Russia, Kazakhstan and Iraq) reduced their production in November by around 0.5m b/day versus Q3 2024 levels. Nevertheless, we note that OPEC have chosen to extend the existing compensation scheme (requiring overproducing members to underproduce by an equivalent amount) from 12 to 18 months in duration.

OPEC's actions in recent years have demonstrated a commitment to delivering a reasonable oil price to satisfy their own economies but also to incentivize investment in long-term projects. Saudi's actions at the head of OPEC have been designed to achieve an oil price that to some extent closes their fiscal deficit (c.$96/bl is needed to close the gap fully), while not spiking the oil price too high and over-stimulating non-OPEC supply.

As ever, spot oil prices over the next 12 months will be volatile, and with a good amount of non-OPEC supply next year, it is plausible that the spot oil price remains below $80/bl for a period. However, we maintain our long-term oil price average of $80/bl, being a price that incentivizes sufficient oil supply over the next few years, while being "good enough" for OPEC+ balance sheets. The world oil bill at around $80/bl represents 2.7% of 2025 Global GDP, well under the average of the 1970 – 2021 period (3.4%).

Overall, the adjustments to OPEC+ policy announced this month indicate a desire from the group to maintain a balanced market, something that would have been challenging with the amount of supply previously slated to be returned in 2025. We also note the relative ease with which this agreement was reached between members, underscoring cohesion in the group.

GUINNESS ATKINSON FUNDS

Performance

as of 11/30/2024	YTD	1 Year	3 Years	5 Years	10 Years
GAGEX	5.09%	4.66%	14.95%	8.23%	0.89%
MSCI World Energy Index NR	11.22%	11.17%	20.01%	10.98%	4.29%

All returns after 1 year annualized.

Inception 06.30.2004 Expense ratio* 1.47% (net); 2.13% (gross)

Performance data quoted represents past performance; past performance does not guarantee future results. The investment return and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. Current performance of the Fund may be lower or higher than the performance quoted. Performance data current to the most recent month end may be obtained by visiting www.gafunds.com or calling 800-915-6566.

* The Advisor has contractually agreed to reduce its fees and/or pay Fund expenses (excluding Acquired Fund Fees and Expenses, interest, taxes, dividends on short positions and extraordinary expenses) in order to limit the Fund's Total Annual Operating Expenses to 1.45% through June 30, 2027. To the extent that the Advisor absorbs expenses to satisfy this cap, it may recoup a portion or all of such amounts absorbed at any time within three fiscal years after the fiscal year in which such amounts were waived or absorbed, subject to the expense cap in place at the time recoupment is sought, which cannot exceed the expense cap at the time of the waiver. The expense limitation agreement may be terminated by the Board of the Fund at any time without penalty upon 60 days' notice.

Top 10 Fund Holdings as of 11/30/2024:

1. Chevron Corp 6.02%
2. Exxon Mobil Corp 5.54%
3. Shell PLC 5.43%
4. TotalEnergies SE 4.87%
5. ConocoPhillips 4.67%
6. Suncor Energy Inc 4.27%
7. Valero Energy Corp 4.17%
8. Kinder Morgan Inc 4.14%
9. BP PLC 4.11%
10. Imperial Oil Ltd 3.98%

MSCI World Energy Index is designed to capture the large and mid cap segments across 23 Developed Markets countries. All securities in the index are classified in the Energy sector as per the Global Industry Classification Standard.

MSCI World Index captures large and mid cap representation across 23 Developed Markets countries. With 1,546 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

Brent Crude is the price benchmark used for the light oil market in Europe, Africa, and the Middle East, originating from oil fields in the North Sea between the Shetland Islands and Norway.

West Texas Intermediate (WTI) is the price benchmark for the US light oil market and is sourced from US oil fields.

Long futures position in oil is when a trader buys an oil futures contract in the belief that the price of oil will increase.

Short futures position in oil is when a trader sells an oils future contract in the belief that the price of oil will decrease before the contract expires.

Organization for Economic Cooperation and Development (OECD) is an intergovernmental organization with 38 member countries meant to stimulate economic progress and world trade.

OPEC+, or the Organization of the Petroleum Exporting Countries Plus, is a loosely affiliated entity consisting of 12 OPEC members and 10 of the world’s major non-OPEC oil-exporting nations.

Permian Basin is a large oil and gas-producing area in the United States that spans parts of West Texas and southeastern New Mexico.

New York Mercantile Exchange (NYMEX) is the world's largest physical commodity futures exchange.

Henry Hub is a natural gas pipeline located in Erath, Louisiana, that serves as the official delivery location for futures contracts on the New York Mercantile Exchange (NYMEX).

Free cash flow represents the cash that a company generates after accounting for cash outflows to support its operations and maintain its capital assets.

Capital Expenditure (CapEx) are payments that are made for goods or services that are recorded or capitalized on a company's balance sheet rather than expensed on the income statement.

Return on Capital Employed (ROCE) is a financial ratio that measures a company’s profitability in terms of all of its capital.

Net Debt/EBITDA is a debt ratio that shows how many years it would take for a company to pay back its debt if net debt and EBITDA are held constant.

Fund holdings and/or sector allocations are subject to change at any time and are not recommendations to buy or sell any security.

One cannot invest directly in an index. Dividends are not guaranteed and dividend payments, if any, may fluctuate.

Earnings Growth is not a measure of future performance. Dividends are not guaranteed and dividend payments, if any, may fluctuate.

Opinions expressed are subject to change, are not guaranteed and should not be considered investment advice.

The Guinness Atkinson Global Energy Fund's investment objectives, risks, charges and expenses must be considered carefully before investing. The statutory and summary prospectuses contain this and other important information and can be obtained by calling 800- 915-6565 or visiting www.gafunds.com. Read and consider it carefully before investing.

The Fund invests in foreign securities which will involve greater volatility and political, economic and currency risks and difference in accounting methods. The risks are greater for investments in emerging markets. The Fund also invests in smaller and mid-cap companies, which will involve additional risks such as limited liquidity and greater volatility than larger companies. The Fund's focus on the energy sector to the exclusion of other sectors exposes the Fund to greater market risk and potential monetary losses than if the Fund's assets were diversified among various sectors.

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