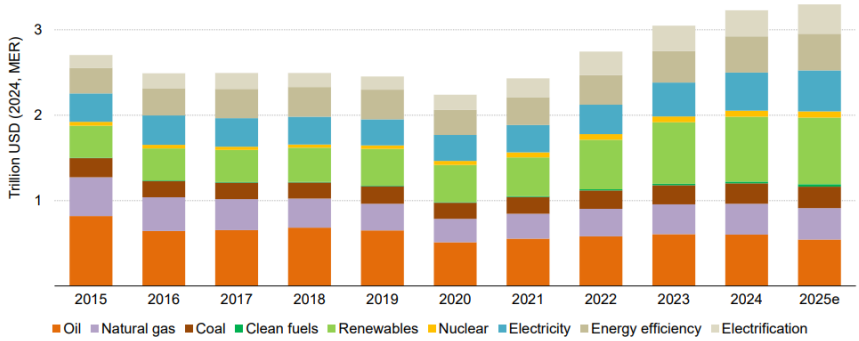
CHART OF THE MONTH

Global investment in energy

According to the IEA's World Energy Investment 2025, global energy investment is projected to rise by 2% (in real terms) year-on-year in 2025 to US$3.3trn. Upstream oil and gas investments are expected to fall 4% year-on-year (oil down 6% and gas flattish) in 2025 to just under $570bn, the first drop since the pandemic. This fall in upstream investment comes despite continued growth in global oil and gas demand.

Global investment in energy (2015-2025e)



Source: IEA, DNB, May 2025

OIL

Spot prices rose slightly in May

Brent and WTI spot oil prices rose during the month on news that US President Trump's global tariff program was being postponed. The International Energy Agency (IEA) maintained its global demand forecast for 2025 from at 0.7m b/day. OPEC+ confirmed plans to increase their production in both June and July by 0.4m b/day. Brent and WTI closed the month at $65/bl and $61/bl respectively.

NATURAL GAS

International gas prices rose

International gas prices rose in May, with the UK National Balancing Point price up by $0.5/mcf to $10.8/mcf and Japanese liquefied natural gas up $1.0/mcf to $12.2/mcf. Similar to oil prices, gas prices saw something of a relief rally after Trump's softening stance on tariffs.

EQUITIES

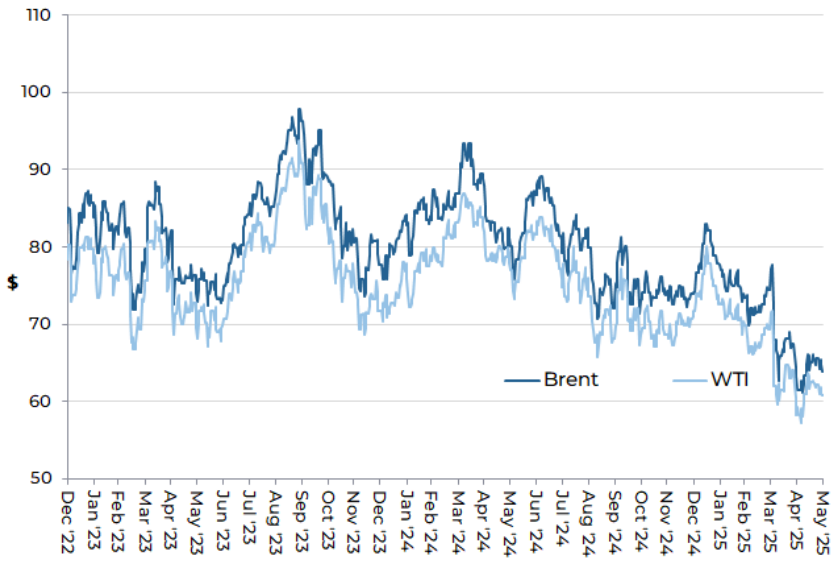
Energy underperforms the broad market in May

The MSCI World Energy Index (net return) rose by 1.9% (USD) in May, underperforming the MSCI World Index (net return) which rose by 5.9%.

May in Review

OIL MARKET

Oil price (WTI and Brent $/barrel)
December 2022 to May 2025



Source: Bloomberg, Guinness Atkinson Funds. Data as of May 2025.

The West Texas Intermediate (WTI) oil price began May at $58/bl and, after rising to a high of $64/bl on May 13th, settled back to close the month at just under $61/bl. WTI has averaged just over $67/bl so far this year, having averaged $76/bl in 2024 and $78/bl in 2023. Brent oil traded in a similar shape, opening at $63/bl and moving slightly higher, to close at $64/bl. Brent has averaged $71/bl so far in 2025, having averaged $80/bl in 2024 and $83/bl in 2023. The gap between the WTI and Brent benchmark oil prices narrowed over the month, ending May at $3.1/bl. The Brent-WTI spread averaged $5/bl in 2024 after averaging a similar amount in 2023.

Factors which strengthened WTI and Brent oil prices in May:

- **Stronger near-term demand growth**

  Near-term global oil demand has been strong. The IEA reported in May that Q1 2025 oil consumption is expected to be up by around 1.0m b/day year-on-year, up from annual growth in 2024 of 0.8m b/day. Some of this higher demand was transitory, as a relatively cold end to the Northern Hemisphere winter season in key regions boosted the demand for heating oil. Stronger demand growth is also showing up in the Organisation for Economic Co-operation and Development (OECD) oil and oil product inventories. Latest data published by the IEA for April implies OECD inventories at around 2.74bn barrels, 6% below the 5-year average.

- **Some relief around US tariffs**

  Early in April, President Trump announced a swathe of tariffs to come into immediate effect across the world. These actions, part of a broader strategy to address trade imbalances and protect US industries, brought into question whether world GDP and oil demand would slow as a result. May saw some relief around tariffs, in particular with a 90-day rollback announced on May 12 between US and China. The situation remains fluid, but compared to the situation in April, optimism grew that cuts to global GDP

growth as a result of President Trump's policies may not be as severe as first feared. Accordingly, global oil demand forecasts looked slightly better than a month before.

Factors which weakened WTI and Brent oil prices in May:

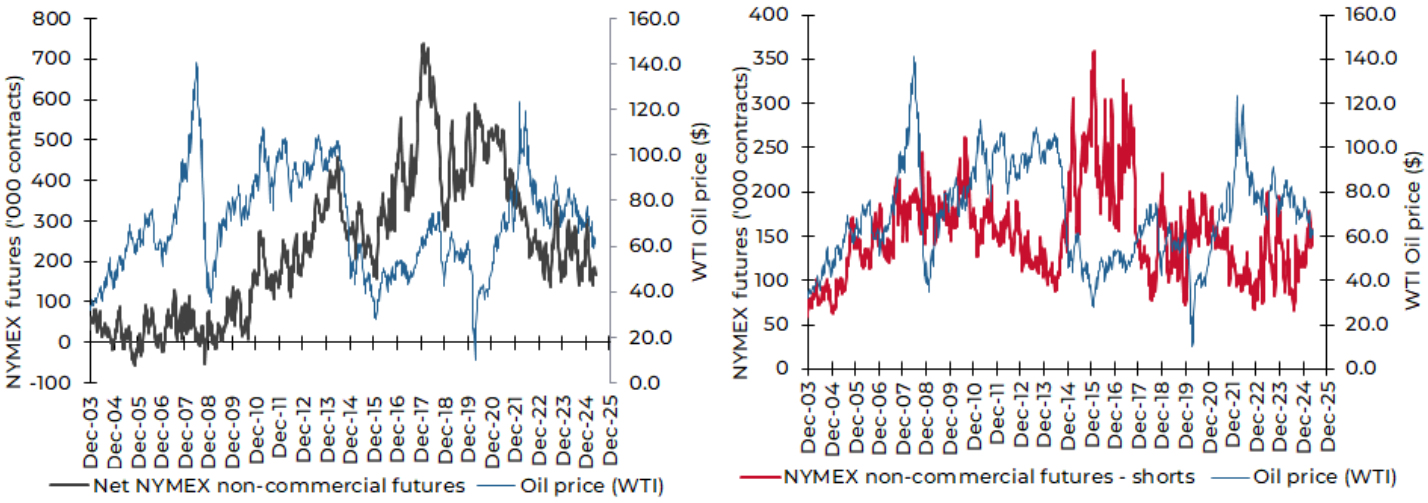
- **OPEC+ production increases**

  In April, the OPEC+ group announced its intention to increase (from May) the rate at which it returns withheld oil to the market, up to around 0.4m b/day. The group met again at the end of May, confirming their intention to return a further 0.4m b/day to the market in both June and July. We believe that a driver of this increase is a signal from Saudi to overproducing OPEC+ members, especially Kazakhstan, that continued overproduction will not be tolerated. Saudi are also unwilling to cede further market share to non-OPEC suppliers. That said, the OPEC+ group has stressed that it could be reversed at any time, should market conditions become materially looser.

- **Speculative and investment flows**

  The New York Mercantile Exchange (NYMEX) net non-commercial crude oil futures open position was 166,000 contracts long at the end of May versus 171,000 contracts long at the end of April. 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 increased to 157,000 contracts at the end of May versus 137,000 at the end of the previous month.

NYMEX Non-commercial net and short futures contracts:
WTI January 2004 – June 2025



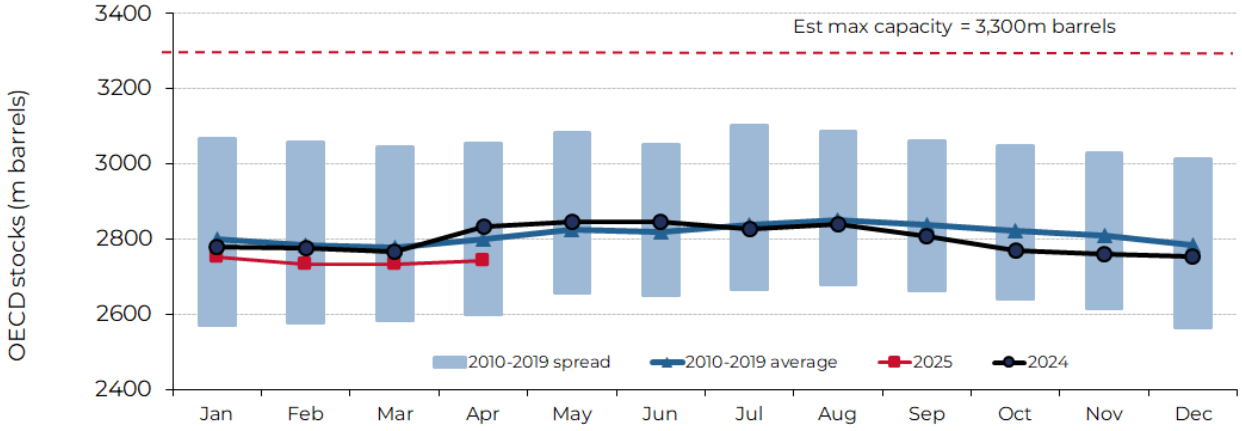
Source: Bloomberg LP/NYMEX/ICE (2025)

OECD Stocks

OECD total product and crude inventories at the end of April (latest data point) were estimated by the IEA to be 2,744m barrels, up 10m barrels versus the level reported for the previous month. The rise in April compares to a 10-year average (pre COVID-19) build of 20m barrels, implying that the OECD market was

tighter than normal. The significant oversupply situation in 2020 pushed OECD inventory levels close to maximum capacity in August 2020 (about 3.3bn barrels), with subsequent tightening taking inventories below normal levels.

OECD Total Product & Crude Inventories
Monthly, 2010 to April 2025



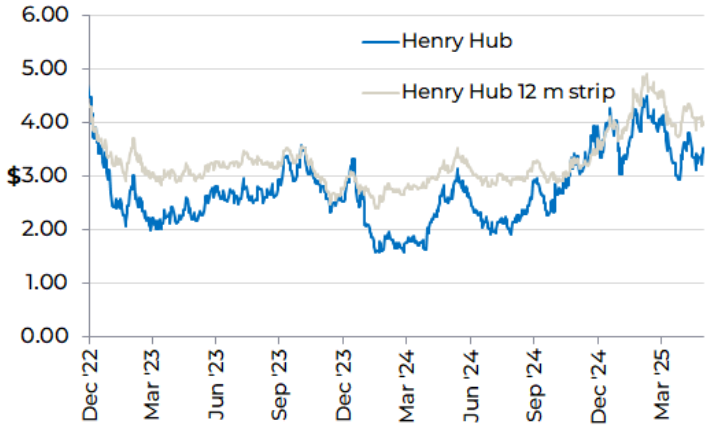
Source: IEA Oil Market Reports (May 2025 and older)

NATURAL GAS MARKET

The US natural gas price (Henry Hub front month) opened May at $3.33/Mcf (1,000 cubic feet), rose sharply over the first few days of the month to reach $3.80/Mcf on May 11, before settling lower at $3.45/Mcf. The spot gas price has averaged $3.69/Mcf so far in 2025, having averaged $2.41/Mcf in 2024 and $2.67/Mcf in 2023.

The 12-month gas strip price (a simple average of settlement prices for the next 12 months' futures prices) traded in a different pattern, opening at $4.04/Mcf but closing weaker at $3.97/Mcf. The strip price has averaged $4.15/Mcf so far in 2025, having averaged $2.98 in 2024 and $3.19 in 2023.

Henry Hub gas spot price and 12m strip ($/Mcf) December 2022 to May 2025



Source: Bloomberg LP. Data as of May 2025.

Factors which strengthened the US gas price in May included:

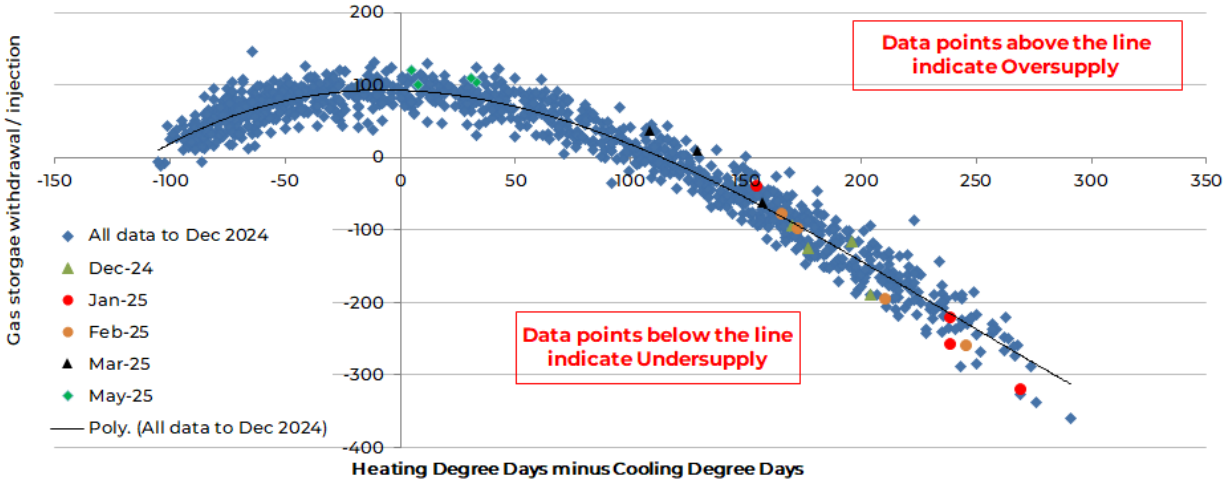
- **High gas demand year-to-date**
  Natural gas demand in the US (ex Liquefied Natural Gas exports) was at a record high during the first quarter of 2025, driven by a cold end to winter and strong economic growth. Gas demand for May has moderated to the seasonal range, and down 1% year-on-year.

- **Anemic rig count**
  The number of rigs drilling for natural gas in the US fell from 160 in the middle of 2022 to a low of 94 in mid-September 2024. It has since averaged around 100 rigs and was reported at 99 rigs operating at the end of May 2025. Overall, the low number of gas rigs operating has slowed gas production growth, though 'associated gas' production (a by-product of shale oil) has continued to grow from the Permian basin.

Factors which were negative for the US gas price in May included:

- **Market over supplied (ex-weather effects)**
  Adjusting for the impact of weather, the US gas market was, on average, in oversupply during May. This is a change to the sharply undersupplied markets earlier in the year, as illustrated in the chart below.

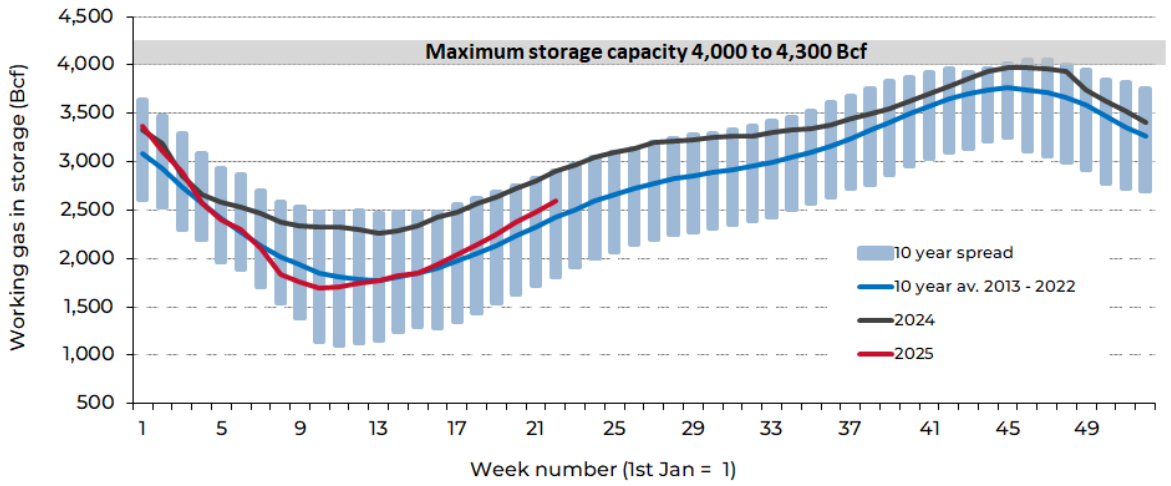
Weather-adjusted US natural gas inventory injections and withdrawals



Source: Bloomberg LP, Guinness Atkinson. Data as of May 2025.

- **Natural gas in inventories climbing back to the 10-year average**
  US natural gas inventories ran 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 Q4 2024 and further in Q1 2025 as very cold weather arrived. At the end of May 2025, US natural gas inventories stood at around 2.6 Tcf, just above the 10-year average.

Deviation from 10yr US gas storage norm



Source: Bloomberg, Energy Information Administration (EIA). Data as of May 2025.

Manager's Comments

This month, we review the European gas market in light of current low gas inventories and the need for higher prices to incentivize increased liquified natural gas (LNG) imports in summer 2025. Without developing conventional resources, Europe is destined to be even more reliant on global LNG, especially from the US and Qatar, to replace the volumes and flexibility that it has lost from Russia.

European gas demand still under pressure

The European gas market has witnessed significant demand destruction in recent years due to rising gas prices after COVID-19 and the spike in gas prices after the Russian invasion of Ukraine. Despite some strength in demand over the 2024/25 winter period as a result of colder than expected temperatures, European gas demand still remains at these depressed levels, around 24% lower than they were pre-invasion. All aspects of European gas demand being affected: industrial gas demand; power generation; residential and commercial (predominantly heating) demand.

European gas supply down around 20%, increasing reliance on LNG

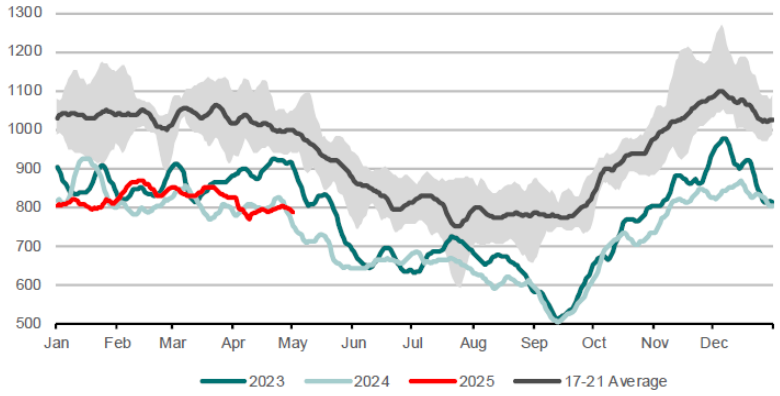
In the five years prior to the invasion, Russia supplied around 11-18 Bcf/day of gas to Europe, making it the biggest – and arguably the most flexible and therefore useful – supplier. Since the invasion, Europe has steadily lost nearly all of its Russian natural gas imports, leaving European gas supply at 28 Bcf/day (down around 20% from pre-invasion levels) with little flexibility in its various pipeline supply routes.

Today, the main suppliers to Europe are Norway (around 10.5 Bcf/d via pipelines), liquified natural gas (LNG, also around 10.5 Bcf/day from various countries), UK/Dutch production (around 3.5 Bcf/day), North Africa (around 2 Bcf/day) and around 1.5 Bcf/day coming from Russia into Turkey via the Turkstream gas pipeline.

TurkStream is the only remaining corridor for Russian gas into Europe after the transit agreement between Russia and Ukraine ended at the end of 2024.

In the absence of Russia, LNG is the only significant source of supply flexibility for the European market but LNG requires substantially higher prices to incentivize its import. Over the last two years, high prices have facilitated the import of LNG – to keep inventories full and provide energy security – but they have also caused the significant demand destruction mentioned above.

Total European gas supply (million cubic metres per day)
1mcm/d = 0.0353 Bcf/d

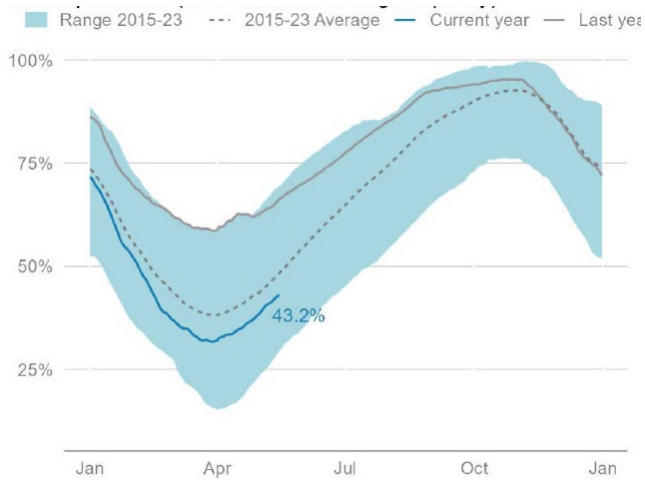


Source: DNB, Carnegie, April 30, 2025

European gas inventories at low levels, more LNG needed

Post-invasion, the EU mandated that gas inventories are kept at elevated levels versus history to ensure the region is able to survive the peak winter demand period, when gas demand is around double the level seen in the summer. This was achieved in 2023 and 2024 immediately post-invasion, but a colder 2024/2025 winter took inventories to a low of around 34% utilization at the end of March 2025 (versus 58% in 2023 and 2024). While storage has risen to just over 40% now, the levels are still below the 10-year average level and dramatically lower than the levels seen in 2023/2024.

European gas inventory utilization (% of capacity)



Source: Morgan Stanley, May 2025

Muted demand and high LNG deliveries have allowed some storage rebuild in the last few weeks but it seems that available LNG cargoes in the near term are increasingly being diverted to Asia, leaving Europe with a large storage refill job this summer. Morgan Stanley estimates that European LNG imports this summer will

need to be 45% higher than 2024 in order to reach targeted storage levels. This will require European prices to average around $13/mcf in summer 2025, around 20% higher than current prices.

Europe's reliance on imported LNG will continue for many years beyond summer 2025 and the region will be reliant on an LNG export market that is increasingly being dominated by the United States. The US has gone from exporting zero LNG to being the world's largest exporter in 2024 (with a 22% market share) in less than 10 years, exceeding Qatar and Australia (at 18% market share each) and Russia (at 8% market share).

In the near term, the US likely becomes even more dominant in global LNG as the Plaquemine LNG scheme (now over 2.5 Bcf/day) has ramped up quickly in early 2025 and Corpus Christi 3 (1.3 Bcf/day) will commence later in the year. With the Trump administration lifting the US Department of Energy (DOE) export license ban in January, it is not surprising that around half of the 185mtpa (24.5 Bcf/day) of new projects under construction globally are in the United States. It is clear that more plentiful and cheap US shale gas will be consumed globally in the coming years, at international gas prices. The US is well placed to deliver this, and we note that, despite the sharply higher levels of US natural gas production for LNG export, the inventory position in the US remains right in the middle of the seasonal range.

Together with new supply from Qatar, a 'wave' of new LNG supply has been long anticipated but its arrival has been steadily delayed. This likely allows the LNG market to be undersupplied again in 2025, allowing LNG prices to hold up better than would have otherwise been expected. The new 'wave' is now expected to impact the market in the 2027-2028 period and, after allowing for legacy field declines, Morgan Stanley forecast global LNG supply will rise by 165mtpa (22 Bcf/day) in the 2025-30 period. This new LNG supply will be well timed to help generate additional electricity, to satisfy sharply increasing electricity demand forecasts resulting from the onshoring of manufacturing, the electrification of transportation and rapid growth in the use of Artificial Intelligence.

OUTLOOK

Oil market

The table below illustrates the difference between the growth in world oil demand and non-OPEC supply since 2015:

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025E
											IEA
World Demand	***95.3***	***96.4***	***98.2***	***99.5***	***100.7***	***91.8***	***97.4***	***100.2***	***102.3***	***103.2***	***103.9***
Non-OPEC supply (inc NGLs)	*62.1*	*61.5*	*62.5*	*65.0*	*67.0*	*64.4*	*65.0*	*66.9*	*69.3*	*70.2*	*71.5*
OPEC NGLs	*5.2*	*5.3*	*5.4*	*5.5*	*5.3*	*5.2*	*5.3*	*5.5*	*5.5*	*5.5*	*5.7*
Non-OPEC supply plus OPEC NGLs	**67.3**	**66.8**	**67.9**	**70.5**	**72.3**	**69.6**	**70.3**	**72.4**	**74.8**	**75.7**	**77.2**
Call on OPEC (crude oil)	**28.0**	**29.6**	**30.3**	**29.0**	**28.4**	**22.2**	**27.1**	**27.8**	**27.5**	**27.5**	**26.7**
Congo supply adjustment	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Gabon supply adjustment	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Eq Guinea supply adjustment	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Call on OPEC-9 (crude oil)	**27.4**	**29.0**	**29.7**	**28.4**	**27.8**	**21.6**	**26.5**	**27.2**	**26.9**	**26.9**	**26.1**

Source: Bloomberg; IEA; Guinness Atkinson, June 2025

Global oil demand in 2019 was 13m b/day higher than the pre-Financial Crisis (2007) peak. The demand picture for 2020, down by around 9m b/day, was heavily clouded by the impact of the COVID-19 virus and

efforts to mitigate its spread. Demand rebounded between 2020 and 2024 by over 11m b/day, leaving overall consumption in 2024 at 2.5m b/day higher than the 2019 peak.

OPEC

In late 2016, faced with sharply lower oil prices, OPEC stepped back from their market share stance, announcing plans for the first production cut since 2008. The announcement included a cut in production from Russia (a non-OPEC country), creating for the first time the concept of an OPEC+ group.

OPEC-9 oil production to May 2025

('000 b/day)	31-Dec-19	30-Apr-25	31-May-25	Current vs Dec 2019	Current vs last month
Saudi	9,730	8,970	**9,080**	-650	110
Iran	2,080	3,390	**3,360**	1,280	-30
Iraq	4,610	4,180	**4,180**	-430	0
UAE	3,040	3,300	**3,310**	270	10
Kuwait	2,710	2,430	**2,440**	-270	10
Nigeria	1,820	1,500	**1,530**	-290	30
Venezuela	730	880	**870**	140	-10
Libya	1,110	1,270	**1,320**	210	50
Algeria	1,010	910	**920**	-90	10
OPEC-9	**26,840**	**26,830**	**27,010**	**170**	**180**

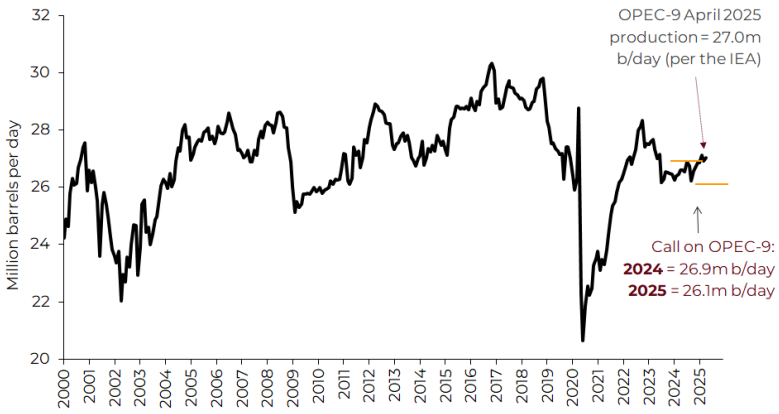
Source: Bloomberg; Guinness Atkinson, 5.31.2025

The 2017-19 period continued to be volatile for OPEC, with further production cuts necessary to balance ongoing non-OPEC supply growth.

The challenge for OPEC+ then ballooned in 2020 with the onset of COVID-19 around the world. Initially, OPEC and their non-OPEC partners failed to reach agreement around their response to demand from the spread of the virus, precipitating a fall-out between participants and a short-lived price war. In light of extreme oil market oversupply, OPEC and non-OPEC partners reconvened in April 2020 and confirmed a deal to cut their production by nearly 10m b/day.

In July 2021, with demand largely recovered after COVID, the OPEC+ group agreed to taper their quota cuts at 0.4m b/day each month until September 2022. The actions of OPEC through the pandemic gave us confidence that OPEC was looking to do 'what it takes' to keep the market in balance, despite extreme challenges. Since the end of 2022, OPEC have adjusted their production to match closely the prevailing call on the group.

OPEC-9 apparent production vs call on OPEC 2000 – 2025



Source: IEA Oil Market Report (May 2025 and prior); Guinness Atkinson estimates

OPEC's actions in recent years have generally 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 (about $95/bl is needed to close the gap fully), whilst not spiking the oil price too high and over-stimulating non-OPEC supply.

In the shorter term, the COVID-19 and Russia/Ukraine crises have created particularly challenging conditions, adding to oil price volatility. Longer-term, we believe that Saudi seek a 'good' oil price, one that satisfies their fiscal needs. Overall, we reiterate two important criteria for Saudi:

1. Saudi is interested in the average price of oil that they get; they have a longer investment horizon than most other market participants.

2. Saudi wants to maintain a balance between global oil supply and demand to maintain a price that is acceptable to both producers and consumers.

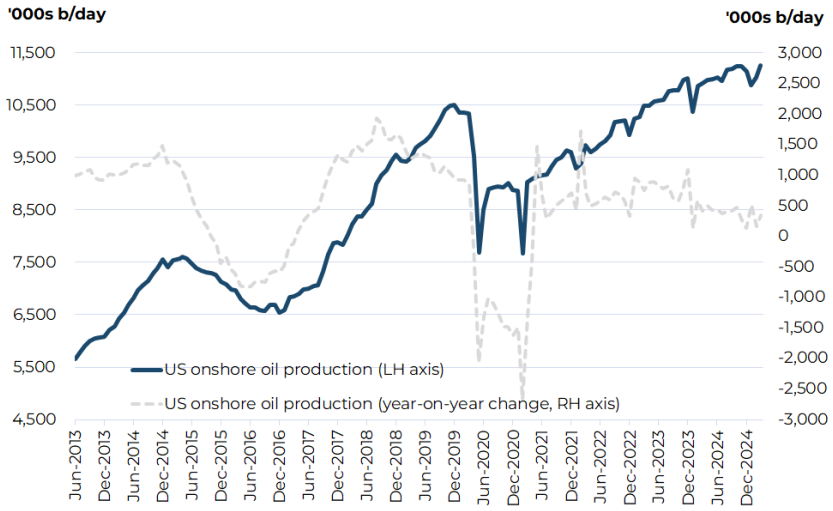
Nothing in the market in recent years has changed our view that OPEC can put a floor under the price – as they did in 2020, 2018, 2016, 2008, 2006, 2001 and 1998.

Supply looking forward

The non-OPEC world has, since the 2008 financial crisis, grown its production more meaningfully than in the period before 2008. The growth was 0.9% per year, from 2001-2008, increasing to 1.7% per year, from 2009-2024.

Growth in the non-OPEC region since the start of the last decade has been dominated by the development of shale oil and oil sands in North America (up around 8m b/day since 2010), implying that the rest of the non-OPEC region has barely grown over this period, despite the sustained high oil price until mid-2014.

US onshore oil production



Source: EIA; Guinness Atkinson, May 2025

The growth in US shale oil production, especially the Permian Basin, raises the question of how much more there is to come and at what price. Our assessment is that US shale oil is capital-intensive but some growth is viable, on average, at around $70 oil prices. In particular, there appears to be ample inventory in the

Permian Basin to maintain volumes into the late-2020s. The rate of development is heavily dependent on the cashflow available to producing companies, which tends to be recycled immediately into new wells, and the underlying cost of services to drill and fracture the wells. Since 2019, we have seen increased shareholder pressure applied to US exploration and production (E&P) companies to improve their capital discipline and to cut their reinvestment rates.

The collapse in oil prices at the start of 2020 to a level well below $50/bl changed the landscape, with US E&P companies reducing capital spending further as they attempted to live within their cashflows. Shale oil production dropped by nearly 3m b/day in 2020 (peak to trough) and took nearly three years to recover to the previous peak of late 2019.

Non-OPEC supply growth outside the US has been sustained in recent years, by a handful major project additions, notably in Guyana and Brazil. Net growth remains sluggish, however, as much of the new oil has been required to offset natural declines in more mature basins.

Future demand

The IEA estimated that 2025 oil demand will rise by around 0.7m b/day to 103.9m b/day, over 3m b/day ahead of the 2019 pre-COVID peak. Post COVID-19 demand recovery, the world is settling back into annual oil demand growth of plus or minus 1m b/day, led by increased use in the non-OECD region. China has been, and continues to be, a key – although no longer major - part of this growth and signs are emerging that India will also grow well.

Table 1
WORLD OIL SUPPLY AND DEMAND
(million barrels per day)

	2022	2023	1Q24	2Q24	3Q24	4Q24	2024	1Q25	2Q25	3Q25	4Q25	2025	1Q26	2Q26	3Q26	4Q26	2026
OECD DEMAND																	
Americas	24.7	25.0	24.4	25.0	25.2	25.1	24.9	24.9	25.0	25.2	24.9	25.0	24.8	24.9	25.2	24.9	24.9
Europe	13.6	13.5	12.9	13.6	14.0	13.5	13.5	12.9	13.6	14.0	13.4	13.5	12.8	13.4	13.9	13.3	13.4
Asia Oceania	7.3	7.2	7.5	7.0	6.9	7.4	7.2	7.3	6.9	6.9	7.2	7.1	7.3	6.8	6.8	7.2	7.0
Total OECD	**45.6**	**45.7**	**44.8**	**45.6**	**46.2**	**46.1**	**45.7**	**45.2**	**45.4**	**46.0**	**45.6**	**45.6**	**44.8**	**45.1**	**45.9**	**45.4**	**45.3**
NON-OECD DEMAND																	
FSU	4.9	5.0	4.8	4.9	5.1	5.1	5.0	4.8	4.9	5.2	5.1	5.0	5.0	5.0	5.2	5.2	5.1
Europe	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
China	15.2	16.5	16.6	16.7	16.7	16.6	16.6	16.7	16.8	16.9	16.7	16.8	16.7	17.0	17.0	16.9	16.9
Other Asia	14.1	14.5	15.0	15.1	14.5	15.3	15.0	15.3	15.4	14.9	15.5	15.3	15.7	15.8	15.3	16.0	15.7
Latin America	6.1	6.3	6.2	6.4	6.5	6.4	6.3	6.3	6.5	6.6	6.5	6.5	6.4	6.6	6.7	6.6	6.5
Middle East	9.0	9.1	8.8	9.1	9.7	9.1	9.2	8.8	9.3	9.8	9.3	9.3	9.0	9.5	9.9	9.3	9.4
Africa	4.5	4.6	4.5	4.5	4.6	4.7	4.6	4.7	4.7	4.8	4.8	4.7	4.8	4.8	4.8	4.9	4.8
Total Non-OECD	**54.6**	**56.7**	**56.7**	**57.5**	**57.9**	**57.9**	**57.5**	**57.3**	**58.4**	**58.9**	**58.8**	**58.4**	**58.4**	**59.5**	**59.8**	**59.7**	**59.4**
Total Demand[1]	**100.2**	**102.3**	**101.5**	**103.1**	**104.1**	**104.0**	**103.2**	**102.5**	**103.9**	**104.9**	**104.3**	**103.9**	**103.2**	**104.6**	**105.7**	**105.2**	**104.7**
OECD SUPPLY																	
Americas	25.8	27.5	27.6	28.2	28.4	29.0	28.3	28.4	28.7	28.8	29.2	28.8	28.8	28.9	28.8	29.2	28.9
Europe	3.2	3.2	3.2	3.2	3.1	3.2	3.2	3.3	3.2	3.2	3.5	3.3	3.5	3.4	3.2	3.3	3.3
Asia Oceania	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total OECD[2]	**29.5**	**31.1**	**31.3**	**31.8**	**31.9**	**32.6**	**31.9**	**32.1**	**32.4**	**32.4**	**33.0**	**32.5**	**32.8**	**32.7**	**32.5**	**32.9**	**32.7**
NON-OECD SUPPLY																	
FSU	13.9	13.8	13.7	13.5	13.4	13.3	13.5	13.5	13.7	13.8	13.7	13.7	13.8	13.7	13.7	13.7	13.7
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	4.2	4.3	4.4	4.4	4.3	4.3	4.3	4.5	4.5	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5
Other Asia	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.5
Latin America	5.7	6.2	6.5	6.4	6.4	6.5	6.4	6.6	6.6	6.8	7.0	6.8	7.1	7.1	7.2	7.2	7.1
Middle East	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Africa	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Total Non-OECD[2]	**32.3**	**32.7**	**32.9**	**32.6**	**32.4**	**32.4**	**32.6**	**32.9**	**33.1**	**33.3**	**33.4**	**33.2**	**33.7**	**33.6**	**33.6**	**33.6**	**33.6**
Processing Gains[3]	2.3	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5
Global Biofuels	2.9	3.1	2.8	3.5	3.8	3.3	3.3	2.9	3.5	3.8	3.4	3.4	3.0	3.6	3.9	3.5	3.5
Total Non-OPEC	**66.9**	**69.3**	**69.4**	**70.3**	**70.5**	**70.6**	**70.2**	**70.3**	**71.4**	**72.0**	**72.3**	**71.5**	**71.9**	**72.3**	**72.4**	**72.4**	**72.3**
OPEC																	
Crude	27.7	27.4	26.9	27.4	27.5	27.2	27.3	27.5									
NGLs	5.5	5.5	5.5	5.6	5.6	5.6	5.5	5.6	5.6	5.7	5.7	5.7	5.8	5.9	5.9	6.0	5.9
Total OPEC[4]	**33.1**	**33.0**	**32.5**	**32.9**	**33.1**	**32.8**	**32.8**	**33.1**									
Total Supply	**100.1**	**102.3**	**101.9**	**103.2**	**103.6**	**103.4**	**103.0**	**103.4**									

The trajectory of global oil demand over the next few years will be a function of global GDP, the pace of the 'consumerization' of developing economies, the development of alternative fuels, and price. At $80/bl, the world oil bill as a percentage of GDP is around 2.7%, and this will still be a stimulant of further demand growth. If oil prices were in a higher range (say around $115/bl, representing 3.8% of GDP), we would probably return to the pattern established over the past five years, with a flatter picture in the OECD more than offset by growth in the non-OECD area. Flatter OECD demand reflects improving oil efficiency over time, dampened by economic, population and vehicle growth. Within the non-OECD, population growth and rising oil use per capita will both play a significant part.

We keep a close eye on developments in the 'new energy' vehicle fleet (electric vehicles; hybrids etc). Sales of electric vehicles (pure electric and plug-in hybrid electrics) globally were around 17m in 2024, up from 14m in 2023. We expect to see strong EV sales growth again in 2025, up to around 20m, exceeding 20% of total global sales. Even applying an aggressive growth rate to EV sales, we see EVs comprising only around 5-6% of the global car fleet by the end of 2025. Looking further ahead, we expect the penetration of EVs to accelerate, causing global gasoline demand to peak at some point in the middle of the 2020s. However, owing to the weight of oil demand that comes from sources other than passenger vehicles (around 75%), which we expect to continue growing linked to GDP, we expect total oil demand not to peak until around 2030.

Conclusions about oil

The table below summarizes our view by showing our oil price forecasts for WTI and Brent in 2025 versus recent history.

Average WTI & Brent yearly prices, and changes

																			Est
Oil price ($/bl)	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
WTI	72	100	62	80	95	94	98	93	49	43	51	65	57	39	68	94	78	76	67
Brent	73	99	63	80	111	112	109	99	54	45	55	72	64	43	71	99	83	81	70
Brent/WTI average	**73**	**99**	**62**	**80**	**103**	**103**	**103**	**96**	**51**	**44**	**53**	**68**	**61**	**41**	**70**	**97**	**80**	**78**	**69**
Brent/WTI y-on-y change	-3%	37%	-37%	28%	29%	0%	0%	-7%	-47%	-13%	19%	29%	-11%	-32%	68%	39%	-17%	-2%	-13%
Brent/WTI (5yr MAV)	59	72	75	78	83	89	90	97	91	80	70	63	55	53	58	67	70	73	79

Source: Guinness Atkinson estimates, Bloomberg, May 2025

We believe that Saudi's long-term objective remains to maintain a 'good' oil price, something north of $80/bl. The world oil bill at around $80/bl represents 2.7% of 2024 global GDP, well under the thirty-year average level of around 3%.

Natural gas market

US gas demand

On the demand side for the US, industrial gas demand and power generation gas demand (each about 25-35% of total US gas demand) are key. Commercial and residential demand, which make up a further quarter, have been fairly constant on average over the last decade – although yearly fluctuations due to the severity of winter weather can be marked.

US natural gas demand

Bcf/day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025E
US natural gas demand:														
Residential/commercial	19.2	22.4	23.4	21.4	20.5	20.9	23.4	23.5	21.5	21.5	23.2	21.5	21.0	22.6
Power generation	24.9	22.3	22.3	26.5	27.3	25.3	29.0	30.9	31.7	30.9	33.1	35.3	36.8	35.0
Industrial	19.7	20.3	20.9	20.6	21.1	21.6	23.0	23.1	22.3	22.5	23.2	23.3	23.7	23.7
Pipeline exports (Mexico)	1.8	1.9	1.9	2.7	3.8	4.0	4.6	5.1	5.4	5.9	5.7	6.1	6.4	6.7
LNG exports	-	-	-	0.1	1.0	2.6	2.8	4.8	6.4	9.7	12.0	12.7	12.6	15.9
Pipeline/plant/other	6.1	6.7	6.3	6.5	6.4	6.5	7.0	7.8	7.7	7.8	7.4	8.2	8.3	7.9
Total demand	**71.7**	**73.6**	**74.8**	**77.8**	**80.1**	**80.9**	**89.8**	**95.2**	**95.0**	**98.3**	**104.6**	**107.1**	**108.8**	**111.8**
Demand growth	**3.1**	**1.9**	**1.2**	**3.0**	**2.3**	**0.8**	**8.9**	**5.4**	**- 0.2**	**3.3**	**6.3**	**2.5**	**1.7**	**3.0**

Source: EIA; GS; Guinness Atkinson estimates, May 2025

Industrial demand (of which around 35% comes from petrochemicals) trends up and down depending on the strength of the economy and the differential between US and international gas prices. Electricity gas demand (i.e. power generation) is affected by weather, in particular by warm summers, which drive demand for air conditioning, but the underlying trend depends on GDP growth and the proportion of incremental new power generation each year that goes to natural gas versus the alternatives of coal, nuclear and renewables. Gas has been taking market share in this sector: in 2022, 38% of electricity generation was powered by gas, up from 22% in 2007. The big loser here is coal, which has consistently given up market share.

Total gas demand in 2024 (including Mexican and LNG exports) was around 108.8 Bcf/day, up by 1.7 Bcf/day versus 2023 and 13 Bcf/day higher than the pre-COVID level in 2019. The biggest contributor to the growth in demand in 2024 was power generation.

We expect US demand growth in 2025 of 3.0 Bcf/day, similar to the average growth seen between 2021 and 2024. Growth is expected to be driven by higher LNG exports and greater power generation demand. Beyond 2025, we expect to see a material increase in US LNG export capacity as higher international gas prices incentivize new LNG export investment. Proposed projects imply capacity growth of around 3 Bcf/day by the end of 2025 and a further 5-6 Bcf/day in 2026-2028, bringing total export capacity to over 20 Bcf/day by 2028.

US gas supply

Overall, while gas demand in the US has been strong over the past five years, it has been overshadowed by a rise in onshore supply, holding the gas price lower.

Bcf/day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025E
US natural gas supply:														
US (onshore & offshore)	65.7	66.3	70.9	74.2	73.4	73.6	84.3	91.4	91.1	91.8	97.4	102.4	101.6	104.6
Net imports (Canada)	5.4	5.0	4.9	4.9	5.5	5.8	5.4	4.7	4.4	5.1	5.6	5.2	5.8	5.9
LNG imports & other	0.8	0.6	0.5	0.5	0.4	0.3	0.1	0.1	-	-	0.1	-	-	-
Total supply	**71.9**	**71.9**	**76.3**	**79.6**	**79.3**	**79.7**	**89.8**	**96.2**	**95.5**	**96.9**	**103.1**	**107.6**	**107.4**	**110.5**
Supply growth	**2.4**	**-**	**4.4**	**3.3**	**- 0.3**	**0.4**	**10.1**	**6.4**	**- 0.7**	**1.4**	**6.2**	**4.5**	**- 0.2**	**3.1**
(Supply)/demand balance	**- 0.2**	**1.7**	**- 1.5**	**- 1.8**	**0.8**	**1.2**	**-**	**- 1.0**	**- 0.5**	**1.4**	**1.5**	**- 0.5**	**1.4**	**1.3**

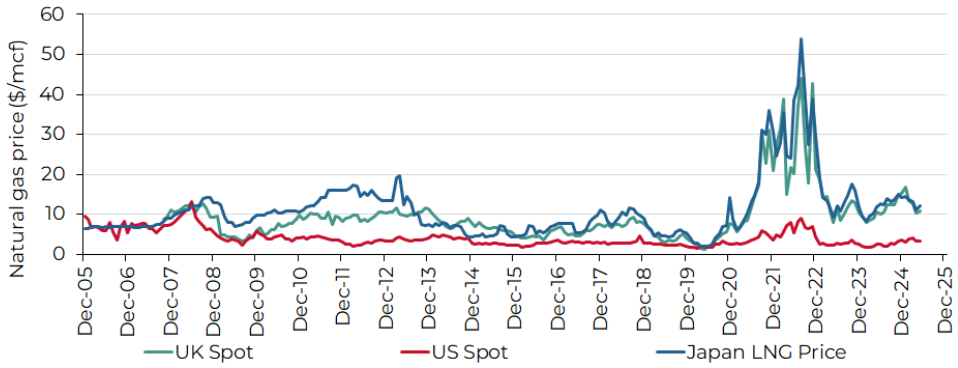
Source: EIA; GS; Guinness Atkinson estimates, May 2025

Outlook for US LNG exports – global gas arbitrage

We expect the LNG market is going to be quite finely balanced over the next couple of years. In the event of moderate Chinese LNG demand and "normal" European winters, LNG supply and demand appear to be roughly in balance and global LNG prices appear to be fairly priced at around $10/mcf. However, stronger Asian demand (including South Korea and Japan as well as China) or a colder than expected European winter could easily see LNG in tight supply and cause international gas prices spike, although it is unlikely that they revert to the $40-$50 levels seen in winter 2022/2023.

Looking further ahead, we see international gas prices settling in a $9-11/mcf range. This price range should be sufficient to incentivize new US LNG supply to come online from 2025. It would also allow Europe to displace permanently almost all its Russian gas imports. An international gas price in the $9-11/mcf is well down on the highs seen in 2022, but would leave the market at a higher price point than that seen in the few years prior to COVID-19 and the Russian invasion of Ukraine.

Global gas prices

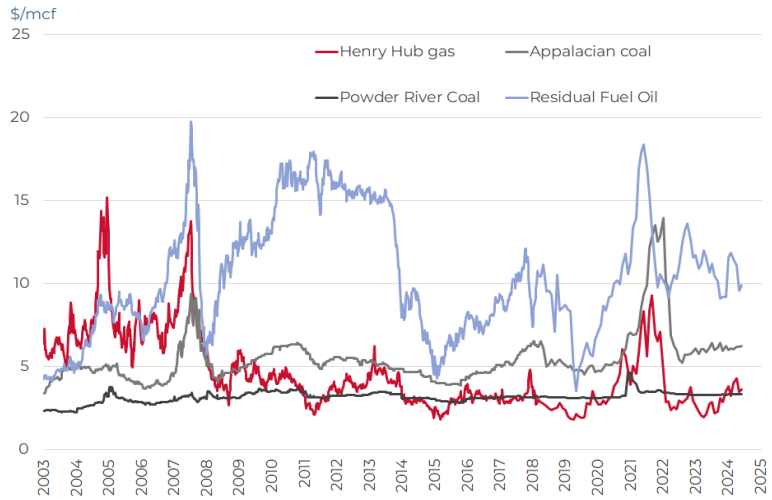


Source: Bloomberg; Guinness Atkinson, May 2025

Relationship with oil and coal

The following chart of the front month US natural gas price against heating oil (No 2), residual fuel oil (No 6) and coal (Sandy Barge adjusted for transport and environmental costs) seeks to illustrate how coal and residual fuel oil switching provide a floor and heating oil a ceiling to the natural gas price. When the gas price has traded below the coal price support level (2012 and 2016), resulting coal-to-gas switching for power generation was significant.

Natural gas versus substitutes (fuel oil and coal) - Henry Hub vs residual fuel oil, heating oil, Sandy Barge (adjusted) and Powder River coal (adjusted)



Source: Bloomberg; Guinness Atkinson, June 2025

Conclusions about US natural gas

The US natural gas price since 2010 has mainly fluctuated between $2 and $4/mcf. The extremes of this range have tended to coincide with warm and cold winters, and any sustained recovery over $3.50/mcf has generally been muted by strength in gas supply. With inflationary pressures, we estimate that new onshore supply has an incentive price of around $3.50/mcf. Assuming normal weather in 2025, we expect a Henry Hub price at around this level.

GUINNESS ATKINSON FUNDS

Performance

as of 5/31/2025	YTD	1 Year	3 Years	5 Years	10 Years
GAGEX	- 0.42%	- 13.30%	- 0.34%	17.08%	0.45%
MSCI World Energy Index NR	- 0.38%	-7.34%	1.64%	17.72%	3.65%

as of 3/31/2024	YTD	1 Year	3 Years	5 Years	10 Years
GAGEX	9.18%	- 2.62%	6.71%	22.72%	1.83%
MSCI World Energy Index NR	10.08%	3.01%	9.01%	24.09%	4.99%

All returns after 1 year annualized.

Inception 06.30.2004 Expense ratio* 1.46% (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, 2028. 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 5/31/2025:

1.	Shell PLC	6.07%
2.	Chevron Corp	5.41%
3.	TotalEnergies SE	5.39%
4.	Exxon Mobil Corp	5.26%
5.	Kinder Morgan Inc	4.49%
6.	Valero Energy Corp	4.24%
7.	Imperial Oil Ltd	4.20%
8.	BP PLC	4.19%
9.	Suncor Energy Inc	4.18%
10.	Enbridge Inc	4.16%

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).

The International Energy Agency (IEA) is an international intergovernmental organization based in Paris that was established in 1974. Its stated mandate is to maintain the stability of the international oil supply, although its mission has expanded to emphasize the promotion of renewable energy sources

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.

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.

Distributed by Foreside Fund Services, LLC