Guinness Global Energy

Investment Commentary – July 2023

RISK

This is a marketing communication. Please refer to the prospectuses, KIDs and KIIDs for the Funds, which contain detailed information on their characteristics and objectives, before making any final investment decisions.

The Funds are equity funds. Investors should be willing and able to assume the risks of equity investing. The value of an investment and the income from it can fall as well as rise as a result of market and currency movement, and you may not get back the amount originally invested. Further details on the risk factors are included in the Funds' documentation, available on our website.

Past performance does not predict future returns.

ABOUT THE STRATEGY

Launch	31.12.1998
Index	MSCI World Energy
Sector	IA Commodity/Natural Resources
Managers	Will Riley Jonathan Waghorn Tim Guinness
Irish Domiciled	Guinness Global Energy Fund
UK Domiciled	TB Guinness Global Energy Fund

INVESTMENT POLICY

The Guinness Global Energy Funds invest in listed equities of companies engaged in the exploration, production and distribution of oil, gas and other energy sources. We believe that over the next twenty years the combined effects of population growth, developing world industrialisation and diminishing fossil fuel supplies will force energy prices higher and generate growing profits for energy companies. The Fund is actively managed and uses the MSCI World Energy Index as a comparator benchmark only.

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COMMENTARY

OIL

Brent/WTI up as supply cut outweighs demand concerns

Brent and WTI spot oil prices were up $2/bl and $1/bl over June, with the positives of slowing shale supply and OPEC production cuts outweighing concerns around the Chinese recovery and further interest rate hikes. Brent and WTI closed the month at $76/bl and $71/bl. Five-year forward prices also closed slightly higher with Brent closing at $66/bl and WTI at $59/bl.

NATURAL GAS

European gas prices rally on news of Norwegian outages

Asian and European gas prices (using UK national balancing point) both ended June around $3 higher at $12 and $11/mcf respectively, whilst the US spot price (Henry Hub) rose from $2.3/mcf to $2.8/mcf. In Europe, prices rose on news of deeper than expected production maintenance in Norway, trumping elevated inventories. Despite a pick-up in June, the US price remains depressed, driven by US gas inventories that are also elevated.

EQUITIES

Energy outperforms the broad market in June

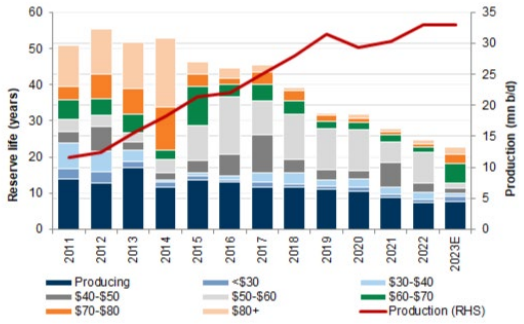
The MSCI World Energy Index (net return) rose by 6.5% in June, outperforming the MSCI World Index (net return) which rose by 6.0% over the month (all in US dollar terms).

CHART OF THE MONTH

Top Projects reserve life falls >50% over last decade

According to Goldman Sachs, seven years of low investment in oil exploration have seen the industry's reserve life for large projects fall since 2013 by 56% to 23 years. Large projects still need to come through to replace existing supply that is in natural decline.

'Top Projects' reserve life

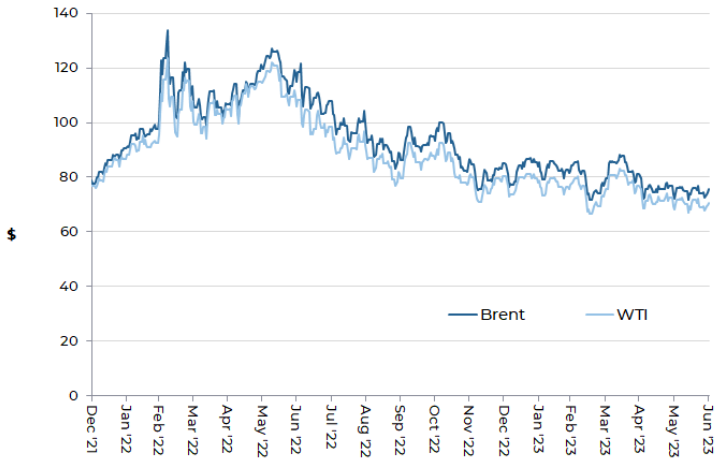


Source: Goldman Sachs

JUNE IN REVIEW

i) Oil market

Oil price (WTI and Brent $/barrel): December 2021 to June 2023



Source: Bloomberg; Guinness Global Investors

The West Texas Intermediate (WTI) oil price started June at $70/bl and traded in a range between $67/bl and $73/bl, before closing a little higher at $71/bl. WTI has averaged $75/bl so far this year, having averaged $95/bl in 2022 and $68/bl in 2021.

Brent oil traded in a similar shape, opening at $74/bl and trading in a range between $71/bl and $77/bl before closing the month higher at $76/bl. Brent has averaged $80/bl so far in 2023, having averaged $100/bl in 2022 and $70/bl in 2021. The gap between the WTI and Brent benchmark oil prices widened slightly over the month, ending June at $5.0/bl. The Brent-WTI spread has averaged $4.9/bl so far in 2023.

Factors which strengthened WTI and Brent oil prices in June:

- **Continued evidence of demand strength**

The IEA revised its 2023 global demand estimate upwards by 0.2m b/day to 102.3m b/day, a new record. This represents growth of 2.4m b/day from 2022 levels, up from the IEA's original forecast of 1.7m b/day at the end of last year. Non-OECD countries account for 90% of expected growth this year, with China making up 60% of gains thanks to post-COVID recoveries in transport and petrochemicals leading domestic demand to new highs of 16.3m b/day in April. As a reminder, China consumed around 15m b/day in 2022, which was the first year of negative demand growth in over 30 years. Should Chinese consumption revert to its pre-COVID trend we see scope for 1.5m - 2m b/day positive swing in global oil demand.

- **Saudi Arabia announced unexpected voluntary production cut**

At the conclusion of the OPEC meeting at the start of June, Saudi Arabia announced a voluntary production cut of an additional 1.0m b/day for at least the month of July. Saudi was alone in doing so; no other OPEC+ country changed its production levels for H2 2023. In addition, the voluntary cuts of various OPEC+ members that were announced on April 2nd (totaling 1.66 mb/d) were extended from the end of 2023 to the end of 2024. While this is not likely to impact near-term production levels, the group also reset base production levels for member countries. The announcement is a clear indication from Saudi that they are not willing to tolerate lower prices and are attempting to micro-manage the market through any short-term imbalance.

- **Signs of slowing supply from US shale**

The US crude rotary rig count has fallen by over 80 rigs since its recent peak of 627 in December 2022 and is currently running 20% below pre-pandemic levels. The historic correlation between WTI and rig count appears to have broken down,

with significantly fewer rigs added than predicted by the spot price since mid-2020 as shale E&Ps focus on capital discipline over growth. DNB estimates that c.976 completed shale wells per month are required to keep production flat, which compares to c.1,000 wells being completed, and c.970 wells being drilled in May. This, combined with emerging signs that shale well oil productivity is starting to decline – with production per new well falling from c.650kb/d at the end of 2022 to c.610-kb/d in May – may suggest that US shale production could start to flatten over the next few months.

Factors which weakened WTI and Brent oil prices in June:

- **Inflation and broader macro concerns temper demand expectations**

The persistence of inflation and the hawkish response of central banks to combat the lingering effects of excess money supply continued to pressure developed world economic growth expectations. This month, the US Federal Reserve indicated further monetary tightening in the second half of the year and European macroeconomic data continued to signal an economic slowdown. Some commentators therefore have been pointing to slower growth in oil demand in the second half of the year, and a shallower oil deficit than had previously been expected. Nonetheless, the IEA increased its oil demand expectations in the middle of the month, forecasting a rise of 2.4m b/day and total consumption of 102.3m b/day in 2023.

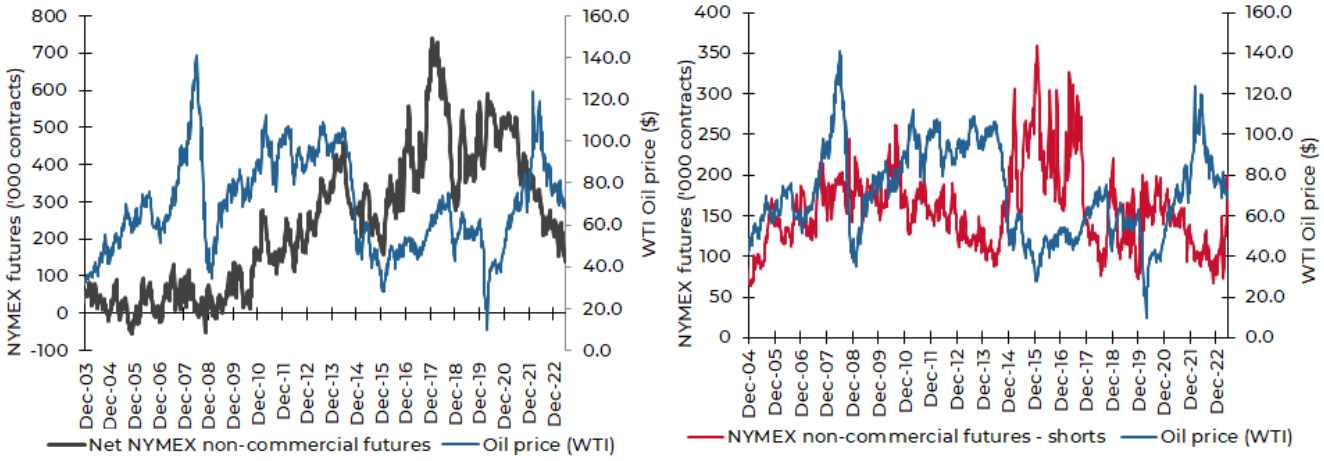
- **OPEC+ exports resilient, no cuts from Russia and Iran production hits new highs yet**

Russian crude oil and oil products exports continue to remain elevated at 7.8m b/day in May despite falling from post-invasion highs of 8.1m b/day in April. The IEA upgraded expectations for Russian supply in 2023 again from 9.4m b/day to 9.5m b/day, representing the most recent sign of Russia's non-compliance with its pledge to cut production by 0.5 m b/day from February 2023 levels. Meanwhile, Iran's crude exports hit new highs in 2023 of 1.5m b/day, the highest monthly rate since President Trump imposed sanctions on the nation in 2018. The country also claimed to have boosted its crude output to over 3.0m b/day in May, exceeding the IEA's production estimate for Iran at 2.9m b/day.

Speculative and investment flows

The New York Mercantile Exchange (NYMEX) net non-commercial crude oil futures open position was 138,400 contracts long at the end of June versus 162,600 contracts long at the end of May. 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 199,700 contracts at the end of June versus 159,500 at the end of the previous month.

NYMEX Non-commercial net and short futures contracts: WTI January 2004 – June 2023



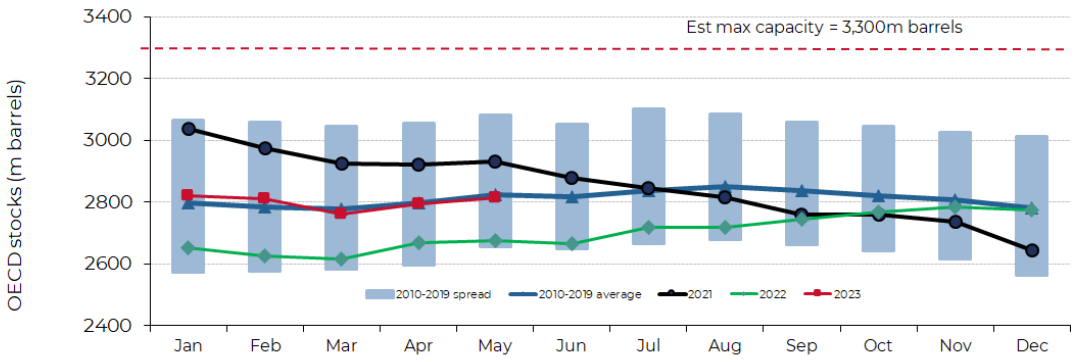
Source: Bloomberg LP/NYMEX/ICE (2023)

OECD stocks

OECD total product and crude inventories at the end of May (latest data point) were estimated by the IEA to be 2,816m barrels, up 21m barrels versus the level reported for April. This compares to a 10-year average build for April of 26m barrels, implying that the OECD market was slightly undersupplied. The significant oversupply situation in 2020 pushed OECD

inventory levels close to maximum capacity in August 2020 (c3.3bn barrels), with subsequent tightening taking inventories below normal levels. Despite remaining flat for the first half of 2022, inventories began to build again from June onwards, leading to levels currently sitting close to the 10-year average.

OECD total product and crude inventories, monthly, 2010 to 2023



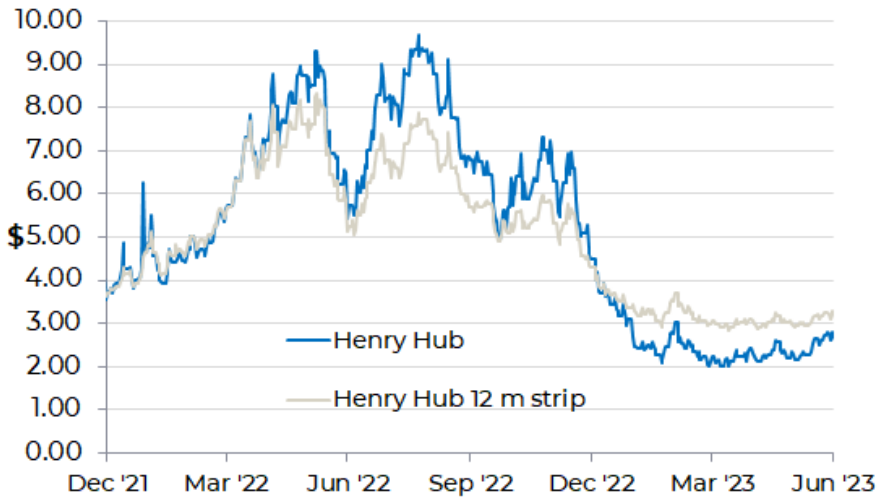
Source: IEA Oil Market Reports (June 2023 and older)

ii) Natural gas market

The US natural gas price (Henry Hub front month) opened June at $2.16/mcf (1,000 cubic feet) and strengthened throughout the month to close at $2.80/mcf. The spot gas price has averaged $2.55/mcf so far in 2023, having averaged $6.52/mcf in 2022 and $3.71/mcf in 2021.

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 $2.91/mcf, rising throughout the month and closing higher at $3.27/mcf. The strip price has averaged $3.21/mcf so far in 2023, having averaged $5.90 in 2022 and $3.52 in 2021.

Henry Hub gas spot price and 12m strip ($/Mcf): December 2021 to June 2023



Source: Bloomberg LP

Factors which strengthened the US gas price in June included:

- **Coal-to-gas switching economics**

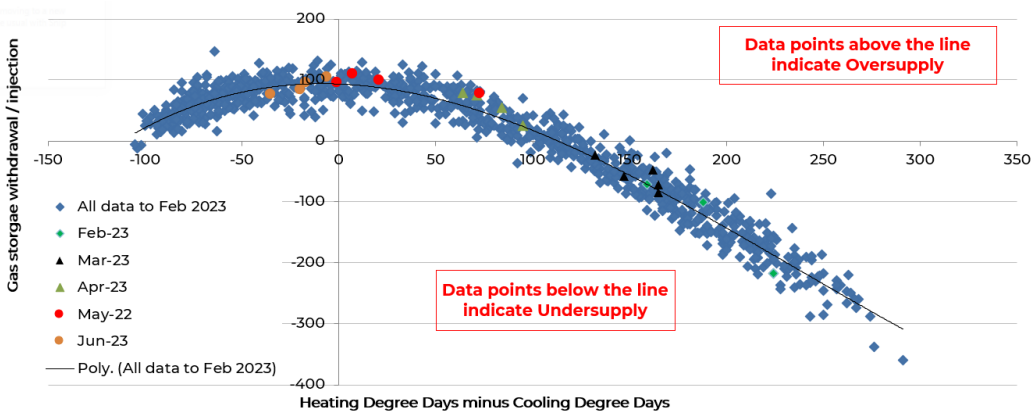
With the spread between US gas prices and coal prices having widened materially since the start of the year, we are starting to see the first signs of power producers switching from coal-based electricity generation to gas-based. Goldman Sachs expects gas demand from the US power sector to rise by 1.2 Bcf/day on average this summer due to switching.

Factors which weakened the US gas price in June included:

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

The injection season continued in the US gas market during June. Adjusting for the impact of weather, the inventory builds implied that the US gas market was, on average, around 1.2 Bcf/day oversupplied.

Weather-adjusted US natural gas inventory injections and withdrawals

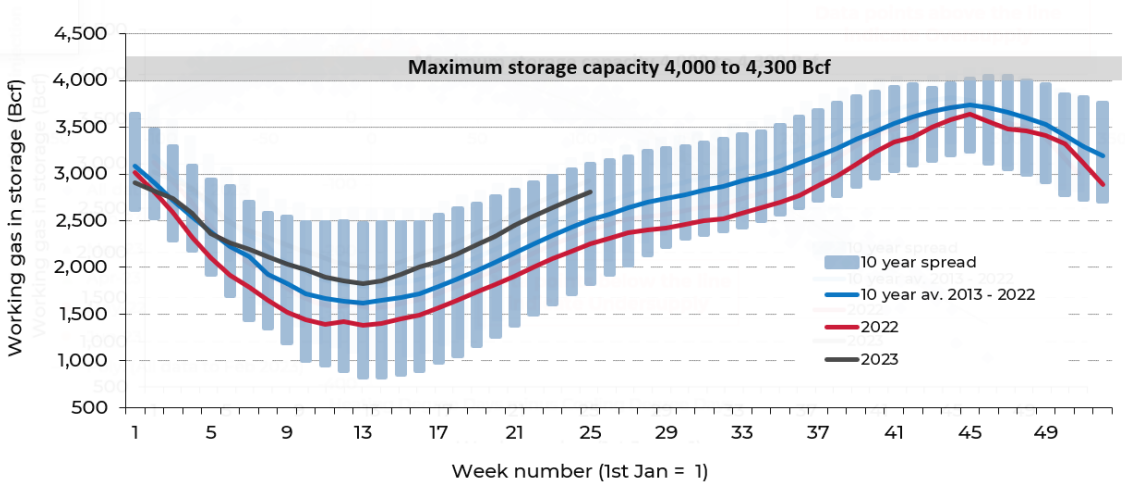


Source: Bloomberg LP; Guinness Global Investors

- **Excess gas in inventories in the US and Europe**

US natural gas inventories are running higher than expected driven by a mild winter followed by a warm spring leading to lower-than-expected heating demand. Inventories at the end of June are reported to be around 2.8 Tcf, which is 0.3 Tcf higher than the five-year average. Inventories are also towards the higher end of the seasonal range (c.77% total) in Europe owing to a combination of high LNG imports and a mild winter leading to lower-than-expected gas demand.

Deviation from 10yr US gas storage norm



Source: Bloomberg; EIA (June 2023)

MANAGERS' COMMENTS

The year so far has seen strong global oil demand growth, particularly from areas of the market still recovering from COVID (China; aviation). Demand growth has been matched by a robust supply response, with Russia continuing to divert its oil to the east, and Iran raising production to a four-year high. Oil prices have been fairly subdued, trading mainly around $75-80/bl, a level which coincides with the long-term incentive price and the 'floor' which Saudi are seeking. Gas prices have somewhat normalized after the extraordinary highs of 2022, helped by warmer weather and price-induced switching to other fuels. Oil and gas equities have underperformed the broader market so far this year, despite rising dividends. Here, we explore the key developments in energy markets over the period, the impact on energy equities and the funds, and consider the outlook.

Review of 1H 2023

Having peaked in early summer 2022 at over $120/bl, oil prices drifted lower to $80/bl over the second half of last year as extended COVID lockdowns in China and the resilience of Russian oil supply resulted in some of the worst fears around market tightness falling away. Lower prices suited OPEC+, which sought a price not so high that it damaged global GDP but high enough that it satisfied the fiscal needs of its members. The outcome was broadly successful for OPEC+, with Brent averaging $99/bl in 2022 – a level representing an oil spend of around 4% of world GDP, which is comfortable compared to recent history. By the start of 2023, the narrative in oil markets was shifting to one of China re-opening versus expectations of sluggish GDP, and therefore oil consumption, in North America and Europe.

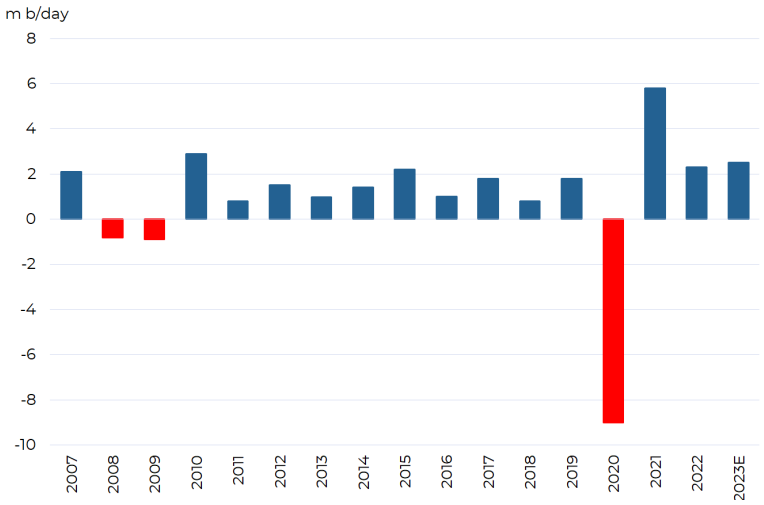
The Brent oil price started the year at $80/bl and, with a slight loosening in inventories in January and February, fell towards $70/bl. The announcement in early April of an OPEC+ quota cut resulted in a rebound, with Brent reaching a high for the year on 12th April of $83/bl. Brent then fell again, trading in May and June in a fairly tight range between $72 and $77/bl. On the one hand, the demand story looked robust through this period, with the IEA posting several upgrades to its global demand forecast for 2023. Set against this, stronger-than-expected production from Russia, Iran and the US kept a lid on price.

Brent oil price: spot vs five year forward ($/bl)

Source: Bloomberg; Guinness Global Investors. Data to 30.06.2023

Global oil demand in 2023 was forecasted in January by the IEA to be up 1.7m b/day versus 2022, putting demand around 1m b/day ahead of its previous peak in 2019. Today, the forecast for 2023 demand growth has been upgraded to 2.4m b/day, a function of normalizing economic activity in China after COVID, underestimated strength in Russian and African consumption, and a continued recovery from the aviation sector globally.

Global oil demand growth (m b/day)

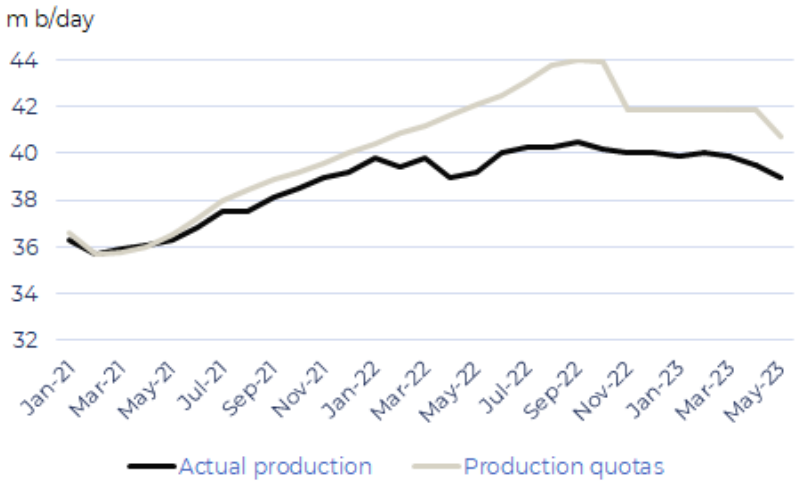


Source: IEA; Guinness Global Investors

Despite the upgrades to demand, **OPEC+** opted in April to reduce its production quotas by 1.2m b/day, effective for the rest of this year. The group's actions were supplemented by a further unliteral cut announced by Saudi in early June of 1m b/day. OPEC+'s actions appeared to be defending a Brent oil price of $80/bl+, though Saudi tend not be explicit in their messaging.

How to explain the apparent disconnect, then, between rising demand forecasts and deeper OPEC+ cuts? The answer appears to lie mainly with stronger production from various OPEC+ members operating under sanctions. At the start of the year, Russian oil supply was expected to fall by 0.8m b/day in 2023 as G7 sanctions in relation to the invasion of Ukraine started to bite. The reality has been quite different, with most Russian oil being diverted to Eastern consumers, albeit under a price cap. Production from Iran has also been strong, reported for May to be running over 3m b/day, up from 2.6m b/day in January. Iranian oil exports are thought to have reached 1.5m b/day in May, their highest level since 2018.

OPEC+ production vs quotas (m b/day)



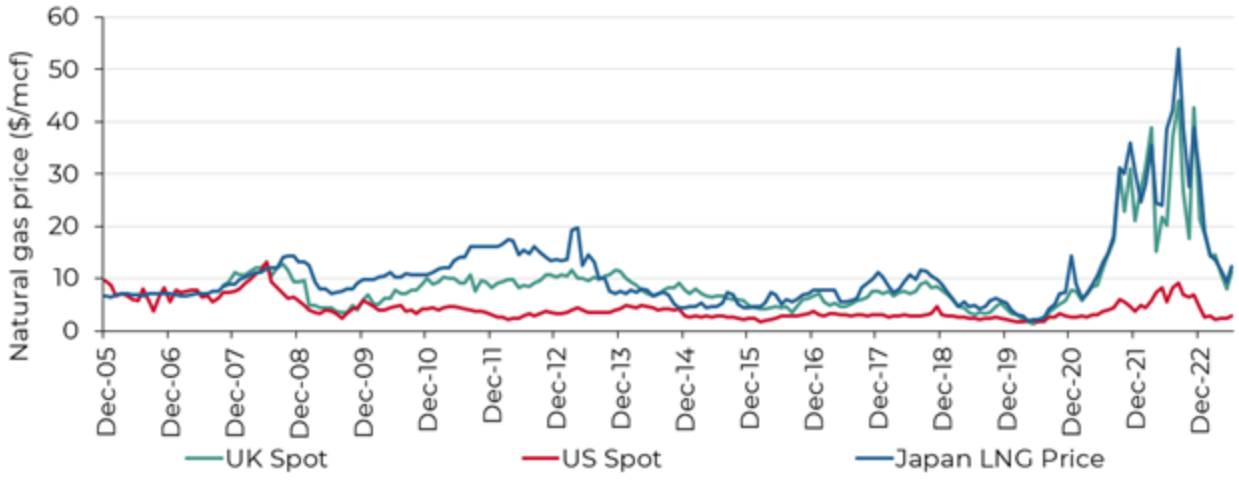
Source: DNB; Guinness Global Investors

As expected, there has also been reasonable growth in supply from **US shale oil**, which looks to be up by around 0.4m b/day since the start of the year. Production in the US is being hampered somewhat by slowing drilling productivity, as some producers start to exhaust their most productive acreage. Offsetting this, we have seen continued reliance on wells that

were previously drilled but left uncompleted (DUCs), which have formed a meaningful proportion of completed wells this year.

For **natural gas**, the year started with prices outside the US near record highs, driven by the limiting of flows of Russian gas into Europe after the Russian invasion of Ukraine. Europe had spent several months having to outbid other parts of the world for marginal LNG cargoes to ensure that gas in storage was sufficient through the winter. The last six months have seen a sharp reversal, with European and Asian prices dropping to around $10/mcf, still c.50% above pricing before COVID, but welcome relief when compared to peak prices at $40-50/mcf+. The turnaround can be explained by an unseasonably warm winter, particularly in Europe, which dampened heating demand for gas, and a concerted effort to swap gas for cheaper substitutes, such as gasoil. A normalizing of the supply/demand balance for gas in international markets helped to lower US natural gas prices, which dropped from $4.50/mcf in January to $2.75/mcf by the end of June.

Global natural gas prices (US$/mcf)



Source: Bloomberg; Guinness Global Investors

Given the weaker oil and gas price environment, the first half of 2023 has seen underperformance for energy equities. The sector (MSCI World Energy Index net return in USD) returned -3.9%, behind the broad market (MSCI World +15.1%). The Guinness Global Energy Fund produced a total return of -4.9% (in USD).

Generally, companies in the fund that underperformed over the six months were those with greatest operational leverage to falling oil and gas prices. Three of our US shale oil-biased E&P companies (Devon Energy Corp -19%; EOG Resources -10%; Conocophillips -10%) were amongst the weaker performers for this reason. Amongst our European holdings, Equinor (-14%) had the highest leverage to falling international gas prices.

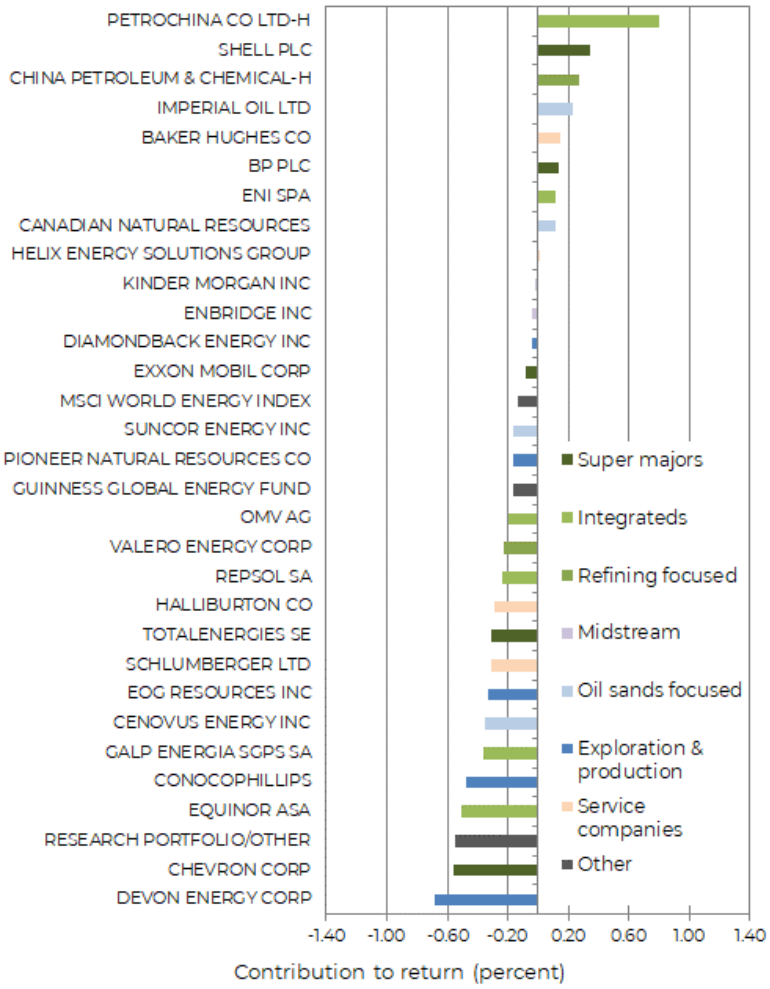
We saw relative strength from our Canadian holdings, in particular Imperial Oil (+7%) and Canadian Natural Resources (+4%). Canadian oil benchmarks (Western Canadian Select) started the year at an unusually wide discount to US benchmarks (WTI). That gap closed over last few months as demand for heavier Canadian crude improved, benefitting Canadian producers.

Larger European integrateds (BP +4%; Shell +8%) also outperformed, with the market warming to both companies announcing greater focus on oil and gas production when compared to long-term plans previously announced. The European majors also enjoyed 10-15% dividend increases, whilst maintaining very high dividend cover.

China was also a stronger area, with Petrochina shares up 50% over the period. Petrochina benefitted from both the fall in oil prices, which boosted the company's refining profits, and the fall in natural gas prices, which improved midstream earnings (Petrochina had been importing Russian gas at a loss).

The estimated contribution of each position held in the fund over the period (total return in USD) can be seen in the chart below.

Estimated contribution by position for Global Energy Fund, H1 2023



Source: Bloomberg; Guinness Global Investors

Outlook

Given the state of the world economy, and uncertainties around some fringe members of OPEC, the outcomes for spot oil prices in the short term are hard to predict. What is clearer is that the incentive price for new supply has risen to around $75-80/bl, which coincides with the 'floor' for oil which Saudi are looking to defend in the longer term. We see a disconnect between this longer-term floor and the oil price currently being reflected in energy equity valuations, which is closer to $60-65/bl.

Whilst global **oil demand** is expected to rise 2.4m b/day this year, the shape of demand growth looks skewed to the second half of the year. 1H 2023 demand looks to be up 2.1m b/day on 1H 2022, whereas 2H 2023 is expected to rise by 2.9m b/day. The IEA have recently published their first forecast for global oil demand in 2024, up by 0.8m b/day versus 2023 and taking demand to 103m b/day, over 2m b/day higher than the previous peak in 2019. This expectation is consistent with the IMF's current global GDP growth forecast for 2024 of 3.0%. The outlook for demand in the OECD in 2024 (-0.4m b/day) is on trend with a gradual improvement in the efficiency of oil use since peak OECD demand in 2007. By contrast, non-OECD oil demand is due to be up 1.2m b/day next year, putting demand in the region 8% higher than before COVID (vs OECD -4%).

OPEC+ continues to be led by Saudi, who are seeking still to micromanage the market through temporary surpluses. We see Saudi as a rational and intelligent operator in the oil market, targeting an oil price that provides them with a fiscal surplus ($80/bl+), but one that does not stress the world economy. Saudi's sweet spot for oil, therefore, appears to be in the $80-100/bl range. The main wildcards within the OPEC+ group remain Russia and Iran. With Russian government oil and gas revenues down around 50% so far this year, Russia can either take the path of ignoring quotas and keeping production as

high as possible, or falling into line with OPEC+ quotas in the hope that oil prices rise. We believe Saudi are pressuring Russia to pursue the latter course. For Iran, if a deal can be achieved with the US, it opens to the door to around 0.5m b/day of additional exports, but not much more given the recovery in Iranian exports already achieved.

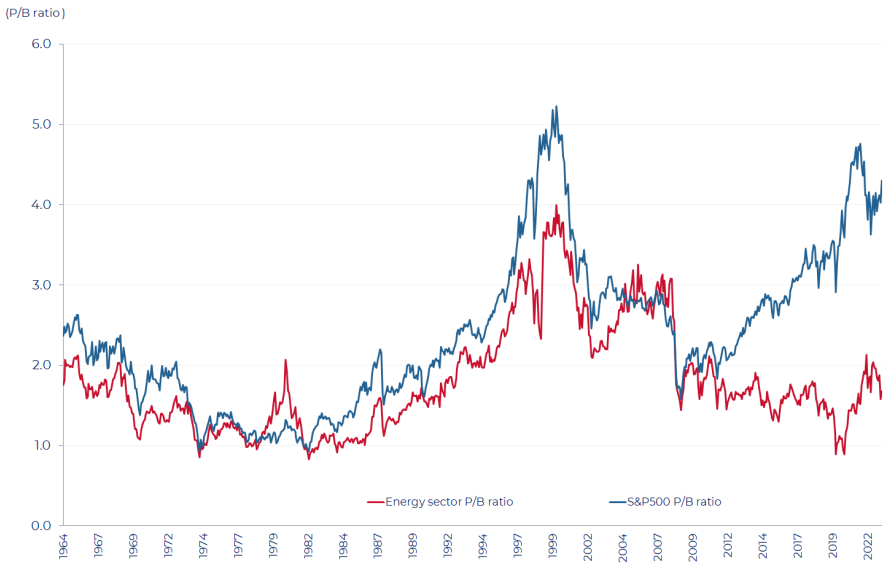
In the **non-OPEC world (ex US shale),** capital spending is starting to pick up again, with money in particular being directed towards deepwater projects in Brazil and Guyana. That said, the low level of CAPEX being committed for the largest non-OPEC oil projects around the world in 2016-21 (averaging around $35bn, compared to around $100bn in 2010-14) is likely to lead to anaemic growth or stagnation in non-OPEC (ex shale) supply for some time to come. Any uptick in spending in 2022-24 will take a number of years to feed through to improved supply. And considering the oil cost curve, it appears that industry inflation, higher taxes and an increasing cost of capital for hydrocarbon projects have pushed the marginal incentive price (i.e. 75th percentile of the cost curve) to around $80/bl, up from $70/bl a year or two ago.

For **US shale oil**, activity has been slowing this year in the face of lower prices. The number of onshore rigs drilling for oil in the US has fallen nearly every week so far this year and is now at 545 versus a peak of 627 in December 2022. Furthermore, it seems that drilling productivity is falling (recent EIA data shows a sharp decline in new oil per rig) as the best inventory is 'drilled out' and producers move increasingly to second-tier acreage. This points to growth in US shale oil over the next 12 months of 0.2-0.3m b/day (and virtually all that growth coming from the Permian basin) versus growth over the last 12 months of closer to 0.8-0.9m b/day. Should demand grow as expected, sluggish growth from the US points to a higher call on OPEC to balance the market.

For international **natural gas** markets, the reduced flow of Russian gas into Europe continues to pose a major challenge. On the one hand, reduced demand over the winter (via price induced demand destruction and warm weather) has left gas in storage in Europe at comfortable levels, setting it up well for next winter. Against this, global demand for LNG has risen this year with the re-opening of the Chinese economy post COVID, meaning it will be more difficult for Europe to attract LNG cargoes should the region experience, for example, a colder 2023/24 winter. Longer-term, we see international gas prices settling in a $11-13/mcf range. This price range should be sufficient to incentivise marginal sources of LNG to be developed and shipped to the European market, which by 2025/26 should have sufficient LNG import capacity. It would also allow Europe to displace permanently almost all its Russian gas imports. An international gas price in the $11-13/mcf is well down on the highs seen in 2022, but is c.50% higher than in the few years prior to COVID and the Russian invasion of Ukraine.

Lower oil and gas prices so far this year have been accompanied by a decline in oil & gas equities. The fall in energy equities leaves the price-to-book (P/B) ratio for the energy sector at the end of June at around 1.7. This compares to the S&P 500 which, after the rally this year, trades at 4.3. On a relative P/B basis versus the S&P500, therefore, the valuation of energy equities sits under 0.4, still over two standard deviations below the long-term average.

Price to book ratio of S&P 500 vs energy sector (1965-2023)

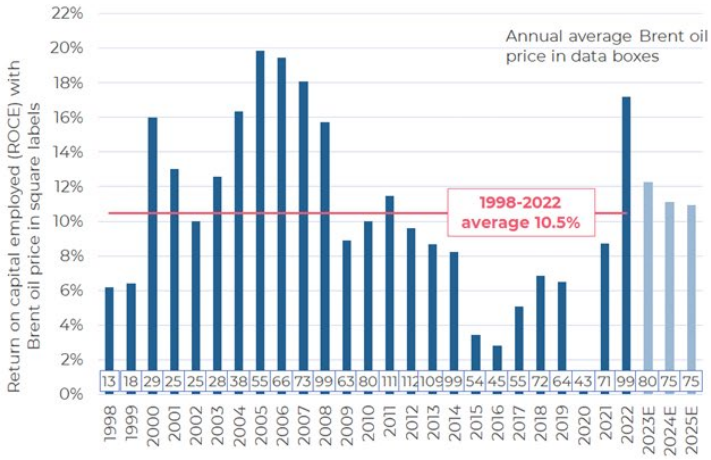


Sources: Bernstein; Bloomberg; Guinness Global Investors

We keep a close eye on the relationship between the P/B ratio for the energy sector and return on capital employed (ROCE), which historically show high correlation.

With the Brent oil price averaging $99/bl in 2022, return on capital employed (ROCE) rose to 17%, whilst using more conservative long-term oil prices in 2023/24/25 of $80/$75/$75/bl brings ROCE back to 10-11%, in line with mid-cycle ROCE which we peg at a similar level. In all of these scenarios (2023/24/25), the ROCE generated implies strong upside still on a P/B basis:

ROCE of current Guinness Energy portfolio



ROCE vs P/B multiple for Guinness Energy portfolio

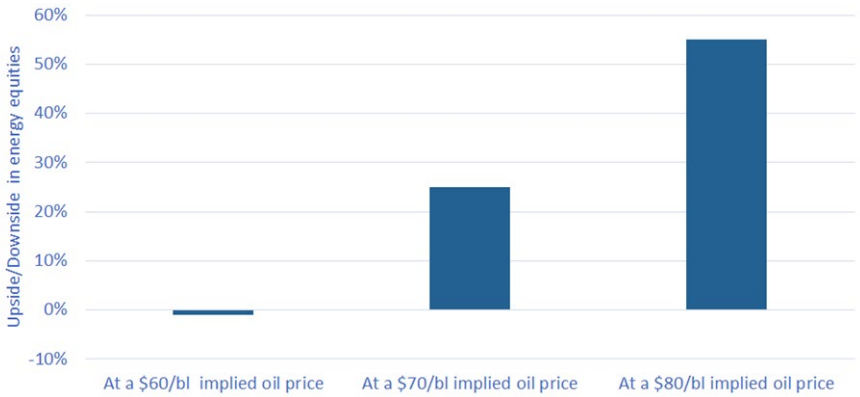
Sources: Bernstein; Bloomberg; Guinness Global Investors

Current valuation implies that the ROCE of our companies will stay at about 4-6%. If ROCE stays at 10-11% and the market were to pay for it sustainably, it would imply an increase in the equity valuation of around 35%.

The higher ROCE is being supported by robust free cash generation. Assuming an average Brent oil price of $80/bl in 2023, we estimate the free cashflow yield of our portfolio, after capital expenditure, to be around 12% and note that the 2023 estimated dividend yield of the portfolio currently sits at around 4.7%. Fixed dividends in the portfolio have generally been growing, and have ample room to run further, given the high free cashflow yield.

To consider valuation another way, we are often asked what oil price is implied in the portfolio, as a barometer of the expectation priced into the equities. At the end of June, we estimate that the valuation of our portfolio of energy equities reflected a long-term Brent/WTI oil price of around $63/bl. If the market were to price in a long-term oil price of $70/bl, it would imply around 25% upside while there would be around 55% upside at a long-term oil price of $80/bl Brent:

Upside/downside for Guinness energy portfolio (1 year forward view)



Source: Guinness Global Investors

PERFORMANCE Guinness Global Energy Fund

Past performance is not a guide to future returns.

The main index of oil and gas equities, the MSCI World Energy Index (net return), increased by 6.5% in June, while the MSCI World Index (net return) rose by 6.0% in USD.

Within the Fund, June's strongest performers included Helix, Baker Hughes, Halliburton, Schlumberger and Equinor while the weakest performers included Sinopec, Total, Diamondback and Conocophillips.

Performance (in USD) as at 30.06.2023

Cumulative returns	YTD	1 year	3 years ann.	5 years ann.	Launch of strategy* ann. (31.12.98)
Guinness Global Energy Fund (Class Y, 0.99% OCF)	-4.9%	9.6%	26.3%	-1.1%	7.7%
MSCI World Energy NR Index	-3.9%	13.2%	27.9%	3.5%	5.9%

Calendar year returns	2022	2021	2020	2019	2018	2017	2016
Guinness Global Energy Fund (Class Y, 0.99% OCF)	32.4%	44.5%	-34.7%	9.8%	-19.7%	-1.3%	27.9%
MSCI World Energy NR Index	46.0%	40.1%	-31.5%	11.4%	-15.8%	5.0%	26.6%
	2015	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**
Guinness Global Energy Fund (Class Y, 0.99% OCF)	-27.6%	-19.1%	24.4%	3.0%	-13.7%	15.3%	61.8%
MSCI World Energy NR Index	-22.8%	-11.6%	18.1%	1.9%	0.2%	11.9%	26.2%
	2008*	**2007***	**2006***	**2005***	**2004***	**2003***	**2002***
Guinness Global Energy Fund (Class Y, 0.99% OCF)	-48.2%	37.9%	10.0%	62.3%	41.0%	32.3%	6.7%
MSCI World Energy NR Index	-38.1%	29.8%	17.9%	28.7%	28.1%	25.9%	-6.4%
	2001*	**2000***	**1999***				
Guinness Global Energy Fund (Class Y, 0.99% OCF)	-4.1%	39.6%	22.5%				
MSCI World Energy NR Index	-7.2%	6.0%	22.0%				

Source: FE fundinfo, Guinness Global Investors and Bloomberg, bid to bid, gross income reinvested, in US dollars

Calculation by Guinness Global Investors, *Simulated past performance prior to 31.3.08, launch date of Guinness Global Energy Fund. The Guinness Global Energy investment team has been running global energy funds in accordance with the same methodology continuously since December 1998. These returns are calculated using a composite of the Investec GSF Global Energy Fund class A to 29.2.08 (managed by the Guinness team until this date); the Guinness Atkinson Global Energy Fund (sister US mutual fund) from 1.3.08 to 31.3.08 (launch date of this Fund), the Guinness Global Energy Fund class A (1.49% OCF) from launch to 02.09.08, and class Y (0.99% OCF) thereafter. Returns for share classes with a different OCF will vary accordingly.

Investors should note that fees and expenses are charged to the capital of the Fund. This reduces the return on your investment by an amount equivalent to the Ongoing Charges Figure (OCF). The fund performance shown has been reduced by the current OCF of 0.99% per annum. Returns for share classes with different OCFs will vary accordingly. Performance returns do not reflect any initial charge; any such charge will also reduce the return.

PORTFOLIO Guinness Global Energy Fund

Buys/Sells

In June there were no buys or sells of full positions, but the portfolio was actively rebalanced.

Sector Breakdown

The following table shows the asset allocation of the Fund at **June 30 2023**.

Asset allocation as %NAV	Current	*Change*	Last year end	Last year end	Previous year ends					
	Jun-23		Dec-22	Dec-21	Dec-20	Dec-19	Dec-18	Dec-17	Dec-16	Dec-15	Dec-14
Oil & Gas	**97.6%**	***0.2%***	**97.4%**	**96.9%**	**94.8%**	**98.3%**	**96.7%**	**98.4%**	**96.7%**	**95.1%**	**93.7%**
Integrated	54.1%	*-0.5%*	54.7%	57.7%	56.3%	51.1%	46.4%	42.9%	46.4%	41.5%	37.3%
Exploration & Production	22.0%	*-1.0%*	23.1%	23.7%	22.2%	29.6%	35.8%	36.9%	35.8%	36.5%	36.2%
Drilling	0.0%	*0.0%*	0.0%	0.0%	0.0%	0.1%	2.2%	1.9%	2.2%	1.5%	3.3%
Equipment & Services	10.0%	*1.0%*	9.0%	4.0%	4.6%	9.6%	8.6%	9.5%	8.6%	11.4%	13.4%
Storage & Transportation	5.0%	*0.1%*	4.8%	4.3%	4.4%	4.0%	0.0%	3.5%	0.0%	0.0%	0.0%
Refining & Marketing	6.4%	*0.6%*	5.8%	7.2%	7.3%	3.8%	3.7%	3.7%	3.7%	4.2%	3.5%
Solar	0.5%	*-0.2%*	0.7%	1.0%	1.8%	0.7%	0.9%	1.4%	0.9%	4.7%	3.7%
Coal & Consumable Fuels	0.0%	*0.0%*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Construction & Engineering	0.0%	*0.0%*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash	1.9%	*0.0%*	1.9%	2.1%	3.3%	1.1%	2.4%	0.2%	2.4%	0.2%	2.6%

Source: Guinness Global Investors. Basis: Global Industry Classification Standard (GICS)

The Fund at end of June 2023 was on a price to earnings ratio (P/E) for 2023/2024 of 7.8x/8.0x versus the MSCI World Index at 17.5x/16.3x as set out in the following table:

As at 30 June 2023	P/E		
	2022	2023E	2024E
Guinness Global Energy Fund	6.0x	7.8x	8.0x
MSCI World Index	15.9x	17.5x	16.3x
Fund Premium/(Discount)	*-62%*	*-55%*	*-51%*

Source: Bloomberg; Guinness Global Investors

Portfolio holdings

Our integrated and similar stock exposure (c.54%) is comprised of a mix of mid-cap, mid/large-cap and large-cap stocks. Our five large caps are Chevron, BP, ExxonMobil, Shell and TotalEnergies. Mid/large and mid-caps are ENI, Equinor, GALP, Repsol and OMV. At June 30 2023 the median P/E ratio of this group was 6.3x 2023 earnings. We also have three Canadian integrated holdings, Suncor, Cenovus and Imperial Oil. All three companies have significant exposure to oil sands in addition to downstream assets.

Our exploration and production holdings (c.22%) give us exposure most directly to rising oil and natural gas prices. We include in this category non-integrated oil sands companies, as this is the GICS approach. The stock here with oil sands exposure is Canadian Natural Resources. The pure E&P stocks have a bias towards the US (EOG, Diamondback, Pioneer and Devon), with one other name (ConocoPhillips) having a mix of US and international production. One of the key metrics behind a number of the E&P stocks held is low enterprise value / proven reserves.

We have exposure to two emerging market stocks, Petrochina and Sinopec, which in total represent around 4% of the portfolio.

The portfolio contains two midstream holdings, Enbridge and Kinder Morgan, two of North America's largest pipeline companies. With the growth of hydrocarbon demand expected in the US and Canada over the next five years, we believe both companies are well placed to execute their pipeline expansion plans.

We have reasonable exposure to oil service stocks, which comprise around 10% of the portfolio. The stocks we own provide exposure to both North American and international oil and natural gas development.

Our independent refining exposure is currently in the US in Valero, the largest of the US refiners. Valero has a reasonably large presence on the US Gulf Coast and is benefitting from a recovery in refining margins.

Portfolio at May 31 2023 (for compliance reasons disclosed one month in arrears)

Guinness Global Energy Fund (31 May 2023)			P/E			EV/EBITDA		
Stock	**ISIN**	**% of NAV**	**2022**	**2023E**	**2024E**	**2022**	**2023E**	**2024E**
Integrated Oil & Gas								
Exxon Mobil Corp	US30231G1022	6.2%	7.3x	10.5x	11.1x	4.1x	5.5x	5.7x
Chevron Corp	US1667641005	5.1%	7.9x	10.7x	10.4x	4.3x	5.6x	5.5x
Shell PLC	GB00BP6MXD84	5.3%	5.3x	5.6x	5.7x	2.7x	3.2x	3.3x
Total SA	FR0000120271	5.8%	4.0x	5.4x	5.8x	2.4x	3.0x	3.2x
BP PLC	GB0007980591	5.5%	3.8x	5.6x	5.7x	2.3x	2.9x	3.1x
Equinor ASA	NO0010096985	3.5%	3.8x	5.6x	5.7x	0.9x	1.3x	1.4x
ENI SpA	IT0003132476	3.0%	3.3x	4.8x	5.2x	2.0x	2.7x	2.9x
Repsol SA	ES0173516115	3.9%	2.9x	3.7x	4.9x	1.7x	2.2x	2.5x
Galp Energia SGPS SA	PTGAL0AM0009	3.0%	9.5x	8.3x	8.2x	2.8x	3.2x	3.3x
OMV AG	AT0000743059	2.9%	2.9x	4.2x	5.0x	1.7x	2.5x	2.8x
		44.1%						
Integrated / Oil & Gas E&P - Canada								
Suncor Energy Inc	CA8672241079	2.9%	4.6x	6.6x	6.2x	2.7x	3.6x	3.4x
Canadian Natural Resources Ltd	CA1363851017	3.4%	6.4x	10.3x	8.9x	3.9x	5.3x	4.5x
Cenovus Energy Inc	CA15135U1093	3.1%	6.2x	8.4x	6.7x	3.1x	3.9x	3.4x
Imperial Oil Ltd	CA4530384086	3.5%	5.5x	7.5x	7.0x	3.4x	4.5x	4.5x
		12.9%						
Integrated Oil & Gas - Emerging market								
PetroChina Co Ltd	CNE1000003W8	2.3%	5.6x	6.0x	6.2x	3.5x	3.7x	3.7x
		2.3%						
Oil & Gas E&P								
ConocoPhillips	US20825C1045	4.6%	7.2x	10.6x	9.6x	3.5x	4.8x	4.7x
EOG Resources Inc	US26875P1012	3.4%	7.8x	9.2x	8.5x	4.1x	4.7x	4.4x
Diamondback Energy Co	US25278X1090	3.7%	5.3x	6.9x	6.3x	4.3x	4.9x	4.6x
Pioneer Natural Resources Co	US7237871071	3.3%	6.5x	9.6x	9.0x	4.0x	5.2x	5.0x
Devon Energy Corp	US25179M1036	3.1%	5.5x	7.7x	7.0x	3.5x	4.3x	4.1x
		18.1%						
International E&Ps								
Pharos Energy PLC	GB00B572ZV91	0.1%	3.0x	8.2x	3.4x	0.6x	0.9x	0.9x
		0.1%						
Midstream								
Kinder Morgan Inc	US49456B1017	2.3%	14.0x	14.5x	13.4x	9.2x	8.9x	8.6x
Enbridge Inc	CA29250N1050	2.6%	16.5x	16.6x	16.4x	12.5x	12.0x	11.9x
		4.9%						
Equipment & Services								
Schlumberger Ltd	AN8068571086	4.0%	19.7x	14.2x	11.5x	10.8x	8.6x	7.4x
Halliburton Co	US4062161017	1.7%	14.1x	9.2x	7.8x	7.8x	6.0x	5.3x
Baker Hughes a GE Co	US05722G1004	1.7%	30.7x	17.8x	13.6x	10.6x	8.4x	7.1x
Helix Energy Solutions Group Inc	US42330P1075	1.0%	n/a	14.9x	10.1x	8.2x	3.8x	3.3x
		8.4%						
Oil & Gas Refining & Marketing								
China Petroleum & Chemical Corp	CNE1000002Q2	1.7%	7.5x	6.8x	6.5x	4.1x	4.2x	4.0x
Valero Energy Corp	US91913Y1001	4.5%	3.8x	4.9x	7.8x	2.5x	3.2x	4.7x
		6.2%						
Research Portfolio								
Deltic Energy PLC	GB00BNTY2N01	0.1%	n/a	n/a	n/a	n/a	n/a	n/a
EnQuest PLC	GB00B635TG28	0.3%	1.1x	1.3x	1.1x	1.0x	1.2x	1.2x
Reabold Resources PLC	GB00B95L0551	0.0%	n/a	n/a	n/a	n/a	n/a	n/a
Sunpower Corp	US8676524064	0.5%	34.1x	32.2x	18.2x	17.4x	13.1x	8.8x
Maxeon Solar Technologies Ltd	SGXZ25336314	0.1%	n/a	n/a	231.6x	n/a	14.6x	10.2x
Diversified Energy Company	GB00BYX7JT74	0.4%	6.7x	n/a	12.3x	4.6x	4.5x	5.4x
		1.4%						

The Fund's portfolio may change significantly over a short period of time; no recommendation is made for the purchase or sale of any particular stock.

OUTLOOK

i) 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	2023E	2024E
								IEA	*IEA*	*IEA*
World Demand	***95.3***	***96.4***	***98.2***	***99.5***	***100.7***	***91.7***	***97.5***	***99.8***	***102.3***	***103.1***
Non-OPEC supply (inc NGLs)	*60.3*	*59.8*	*60.8*	*63.5*	*65.6*	*63.1*	*63.7*	*65.5*	*67.2*	*68.3*
OPEC NGLs	*5.2*	*5.3*	*5.4*	*5.5*	*5.3*	*5.2*	*5.2*	*5.3*	*5.4*	*5.4*
Non-OPEC supply plus OPEC NGLs	**65.5**	**65.1**	**66.2**	**69.0**	**70.9**	**68.3**	**68.9**	**70.8**	**72.6**	**73.7**
Call on OPEC (crude oil)	**29.8**	**31.3**	**32.0**	**30.5**	**29.8**	**23.4**	**28.6**	**29.0**	**29.7**	**29.4**
Congo supply adjustment	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
Eq Guinea supply adjustment	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Call on OPEC-10 (crude oil)	**29.2**	**30.7**	**31.4**	**29.9**	**29.2**	**22.8**	**28.0**	**28.4**	**29.1**	**28.8**

Source: 2006 - 2014: IEA oil market reports; 2015 - 20: Mar 2023 Oil market Report
OPEC-11 = Algeria; Angola; Iran; Iraq; Kuwait; Libya; Nigeria; Saudi Arabia; UAE; Venezuela

Source: Bloomberg; IEA; Guinness Global Investors, as of 30.06.2023

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 recovered in 2021 and 2022 by around 6.0 and 8.0m b/day respectively, leaving overall consumption in 2022 still around 1.0m b/day below the 2019 peak.

OPEC

The last few years have proved testing for OPEC. They have tried to keep prices strong enough that OPEC economies are not running excessive deficits, whilst not pushing the price too high and over-stimulating non-OPEC supply.

The effect of $100+/bl oil, enjoyed for most of the 2011-2014 period, emerged in 2014 in the form of an acceleration in US shale oil production and an acceleration in the number of large non-OPEC (ex US onshore) projects reaching production. OPEC met in late 2014 and responded to rising non-OPEC supply with a significant change in strategy to one that prioritised market share over price. Post the November 2014 meeting, OPEC not only maintained their quota but also raised production significantly, up by 2.5m b/day over the subsequent 18 months. This contributed to an oversupplied market in 2015 and 2016.

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, opting for a new production limit of 32.5m b/day. 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-10 oil production to June 2023

'000 b/day	31-Dec-19	31-May-23	30-Jun-23	Current vs Dec 2019	Current vs last month
Saudi	9,730	9,960	**9,960**	230	0
Iran	2,080	2,890	**2,830**	750	-60
Iraq	4,610	4,140	**4,180**	-430	40
UAE	3,040	3,130	**3,070**	30	-60
Kuwait	2,710	2,550	**2,570**	-140	20
Nigeria	1,820	1,380	**1,420**	-400	40
Venezuela	730	740	**780**	50	40
Angola	1,390	1,110	**1,110**	-280	0
Libya	1,110	1,120	**1,150**	40	30
Algeria	1,010	970	**960**	-50	-10
OPEC-10	**28,230**	**27,990**	**28,030**	**-200**	**40**

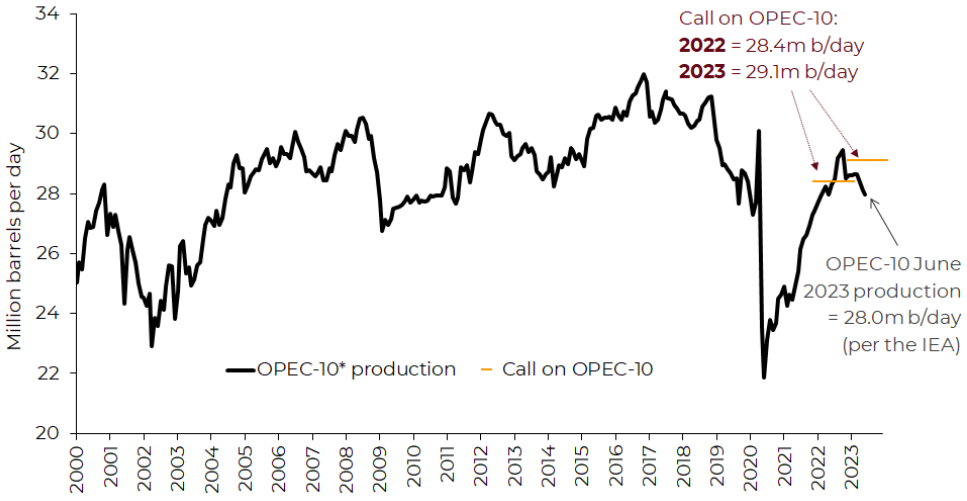
Source: Bloomberg; Guinness Global Investors

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 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 9.7m b/day, relative to their 'baseline' production level of October 2018.

In July 2021, the OPEC+ group agreed to taper their quota cuts at 0.4m b/day each month until September 2022, whilst still meeting monthly to ratify each production increase in light of the prevailing conditions. The agreement gave us confidence that OPEC was looking to do 'what it takes' to keep the market in balance, despite extreme challenges.

OPEC-10 apparent production vs call on OPEC 2000 – 2023



Source: IEA Oil Market Report (June 2023 and prior); Guinness 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 incentivise 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.$75/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.

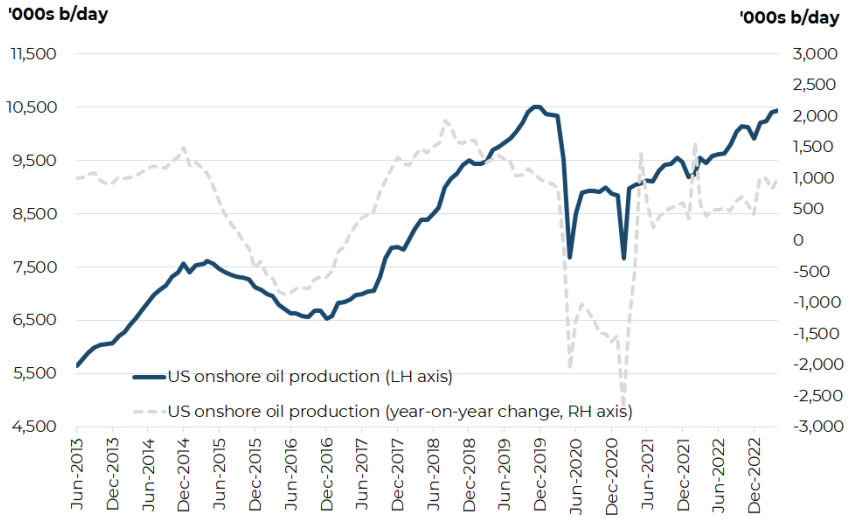
Nothing in the market in recent years has changed our view that OPEC can put a floor under the price – as they did in 2020, 2018, 2016, 2008, 2006, 2001 and 1998.

Supply looking forward

The non-OPEC world has, since the 2008 Financial Crisis, grown its production more meaningfully than in the seven years before 2008. The growth was 0.9% p.a. from 2001-2008, increasing to 1.8% p.a. from 2008-2019.

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 7m b/day between 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 Global Investors

The growth in US shale oil production, in particular from 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 a capital-intensive source of oil but one where some growth is viable, on average, at around $50 oil prices. In particular, there appears to be ample inventory in the Permian basin to allow growth into the mid-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 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. Despite a stronger oil price since then, the overall reduction in activity caused average US shale supply to decline in 2021. Production growth returned in 2022, albeit slower than the previous cycle, as the Russia/Ukraine crisis creates greater space temporarily for US shale barrels in the world market.

Non-OPEC supply growth outside the US has been sustained in recent years, despite lower oil prices, with projects that were sanctioned before 2014 (when oil was $100/bl+) continuing to come onstream. However, with a lack of major project additions post 2020, new supply is only strong enough to offset the decline profiles of existing production, causing overall supply to stagnate.

Demand looking forward

The IEA estimate that 2023 oil demand will rise by around 2.4m b/day to 102.3m b/day, around 1.6m b/day ahead of the 2019 pre-COVID peak. The spread of the COVID virus globally initiated major restrictions on the movement of people which have now been largely reversed, but higher oil prices and slower economic growth are curtailing demand growth in certain sectors.

Post the COVID demand recovery and assuming typical economic growth, we expect the world to settle back into annual oil demand growth of plus or minus 1m b/day, led by increased use in Asia. Historically, China has been, and continues to be, the most important component of this growth although signs are emerging that India will also grow rapidly.

The trajectory of global oil demand over the next few years will be a function of global GDP, the pace of the 'consumerisation' of developing economies, the development of alternative fuels and price. At a $75/bl oil price, the world oil bill as a percentage of GDP is around 3% and this will still be a stimulant of further demand growth. If oil prices were in a higher range (say around $100/bl, representing 4% 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) but see little that makes a significant dent on the consumption of gasoline and diesel in the next few years. Sales of electric vehicles (pure electric and plug-in hybrid electrics) globally were around 10m in 2022, up from 6.1m in 2021 and 3.1m in 2020. We expect to see strong EV sales growth again in 2023, up to around 12.5m, or 16% of total global sales. Even applying an aggressive growth rate to EV sales, we see EVs comprising only around 3% of the global car fleet by the end of 2023. 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 summarises our view by showing our oil price forecasts for WTI and Brent in 2023 versus recent history.

Average WTI & Brent yearly prices, and changes

Oil price (inflation adjusted)																	*Est*
12 month MAV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WTI	82	104	68	84	99	94	98	93	49	45	51	65	57	40	68	95	77
Brent	82	103	67	84	115	112	108	99	52	45	54	72	60	42	70	100	80
Brent/WTI (12m MAV)	**82**	**104**	**68**	**84**	**107**	**103**	**103**	**96**	**51**	**45**	**53**	**68**	**59**	**41**	**69**	**98**	**79**
Brent/WTI y-on-y change	9%	26%	-35%	24%	27%	-4%	0%	-7%	-47%	-11%	17%	30%	-14%	-30%	68%	41%	-19%
Brent/WTI (5yr MAV)	61	75	79	82	89	93	93	99	92	80	69	63	55	53	58	67	69

Source: Guinness Global Investors estimates, Bloomberg, as of 30.06.2023

We believe that Saudi's long-term objective remains to maintain a 'good' oil price, something north of $75/bl. The world oil bill at around $75/bl represents 3.0% of 2022 Global GDP, under the average of the 1970 – 2021 period (3.4%).

ii) Natural gas market

US gas demand

On the demand side for the US, industrial gas demand and power generation gas demand, each about 25-30% 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 coldness of winter weather can be marked.

US natural gas demand

Bcf/day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023E
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	23.3	21.9
Power generation	24.9	22.3	22.3	26.5	27.3	25.3	29.0	30.9	31.7	30.9	33.1	33.8
Industrial	19.7	20.3	20.9	20.6	21.1	21.6	23.0	23.1	22.3	22.5	23.0	23.1
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	6.0
LNG exports	-	-	-	0.1	1.0	2.6	2.8	4.8	6.4	9.7	11.8	13.1
Pipeline/plant/other	6.1	6.7	6.3	6.5	6.4	6.5	7.0	7.8	7.7	7.8	8.8	9.0
Total demand	**71.7**	**73.6**	**74.8**	**77.8**	**80.1**	**80.9**	**89.8**	**95.2**	**95.0**	**98.3**	**105.7**	**106.9**
Demand growth	**3.1**	**1.9**	**1.2**	**3.0**	**2.3**	**0.8**	**8.9**	**5.4**	**- 0.2**	**3.3**	**7.4**	**1.2**

Source: Guinness estimates; MS. (June 2023)

Industrial demand (of which around 35% comes from petrochemicals) tends to trend 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 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 2022 (including Mexican and LNG exports) was around 103.7 Bcf/day, up by 5.4 Bcf/day versus 2021 and 12 Bcf/day (13%) higher than the 5-year average. The biggest contributors to the growth in demand in 2022 were Power Generation and Residential/Commercial. LNG exports were also a large contributor but were hampered by operational issues at some key export facilities.

We expect US demand in 2023, assuming prices average around $3-4/mcf, to be up by around 1.6 Bcf/day. Looking further ahead to 2025, we believe that gas will take a good share of incremental power generation growth in the US and continue to take market share from coal. Our working assumption is for gas fired power generation to grow 0.8-1.2 Bcf/day per year, although this will be affected by actual gas prices. Beyond the mid-2020s, we expect power generation from gas to face stronger competition from renewables.

US gas supply

Overall, whilst 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.

The supply side fundamentals for natural gas in the US are driven by three main moving parts: onshore and offshore domestic production, pipeline imports of gas from Canada, and LNG imports. Of these, onshore supply is the biggest component, making up over 90% of total supply.

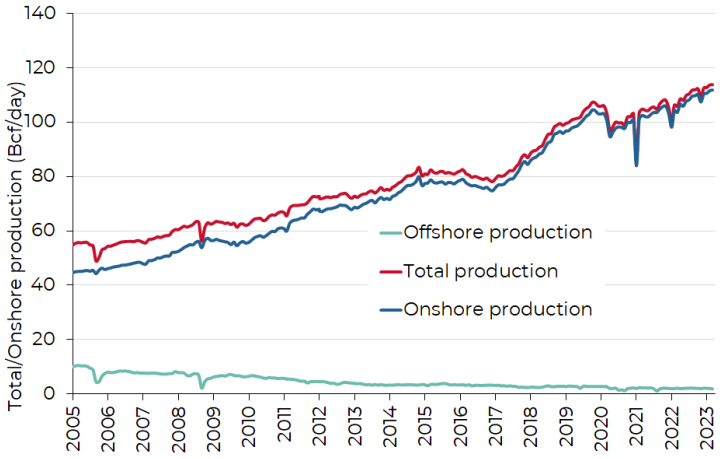
US natural gas supply

Bcf/day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023E
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	97.3	101.1
Net imports (Canada)	5.4	5.0	4.9	4.9	5.5	5.8	5.4	4.7	4.4	5.1	5.5	5.5
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**	**102.9**	**106.6**
Supply growth	**2.4**	**-**	**4.4**	**3.3**	**- 0.3**	**0.4**	**10.1**	**6.4**	**- 0.7**	**1.4**	**6.0**	**3.7**

Source: EIA; MS; Guinness estimates, as of 30.06.2023

Over the last 14 years or so, the weaker gas price in the US reflects growing onshore US production driven by rising shale gas and associated gas production (a by-product of growing onshore US oil production). Interestingly, the overall rise in onshore production has come despite a collapse in the number of rigs drilling for gas, which has dropped from a 1,606 peak in September 2008 to a trough of 68 in July 2020, before recovering to around 124 at the end of June 2023. However, offsetting the fall, the average productivity per rig has risen dramatically as producers focus their attention on the most prolific shale basins, whilst associated gas from oil production has grown handsomely.

US natural gross gas production 2005 – 2023 (Lower 48 States)



Source: EIA 914 data (June 2023 data)

The outlook for gas production in the US depends on three key factors: the rise of associated gas (gas produced from wells classified as oil wells); expansion of the newer shale basins, principally the Marcellus/Utica, and the decline profile of legacy gas fields.

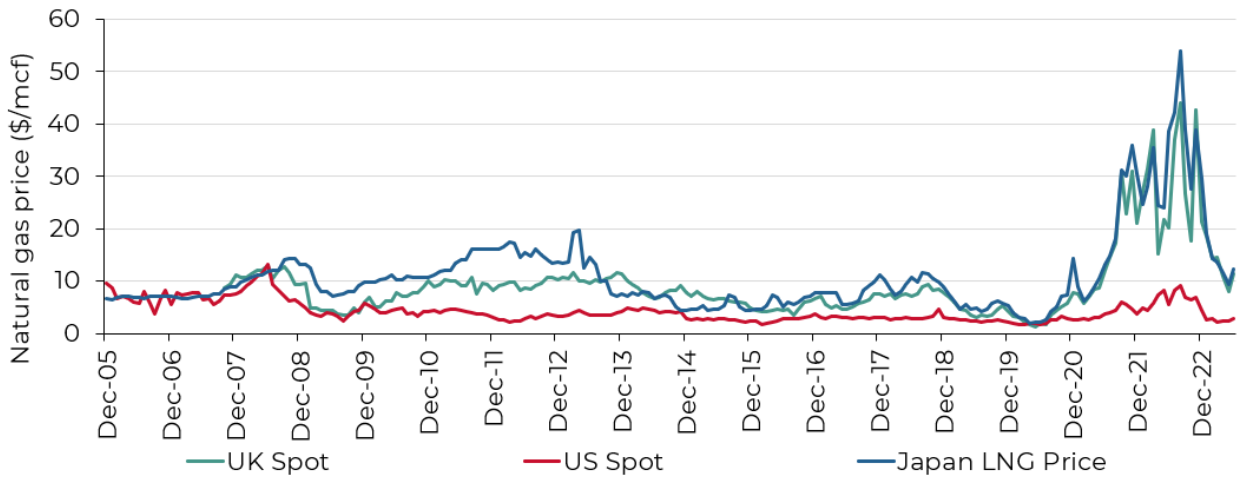
Associated gas production rebounded in 2022 and will rise again in 2023 as shale oil continues to grow. Generally, we expect to see rates of around 2-3 Bcf/day of associated gas per 1m b/day of oil production growth. The Marcellus/Utica region, which includes the largest producing gas field in the US and the surrounding region, reached production of around 29 Bcf/day in 2022. Moderate growth is likely in 2023.

Overall, if the price averages in the $3-4/mcf range, we expect a rise in average onshore gas supply in 2023, up by around 4 Bcf/day versus 2022.

Outlook for US LNG exports – global gas arbitrage

The prospects for US LNG exports depend on the differentials to European and Asian gas prices, and whether the economic incentive exists to carry out the trade. The UK national balancing point (NBP) gas price – which serves as a proxy to the European traded gas price – has moved to a significant premium to the US gas price (c.$9-15/mcf versus c.$2-4/mcf). Asian spot LNG prices have also been extraordinarily strong, averaging over $34/mcf in 2022 and over $16/mcf on a spot basis at the end of December 2022. There have been many factors at play, in particular the strong post-COVID demand recovery, and a shortage of Russian imports into Europe. The implied economics for US LNG exports into Europe and Asia are attractive assuming international prices are at least $5/mcf higher than Henry Hub.

International gas prices to June 2023

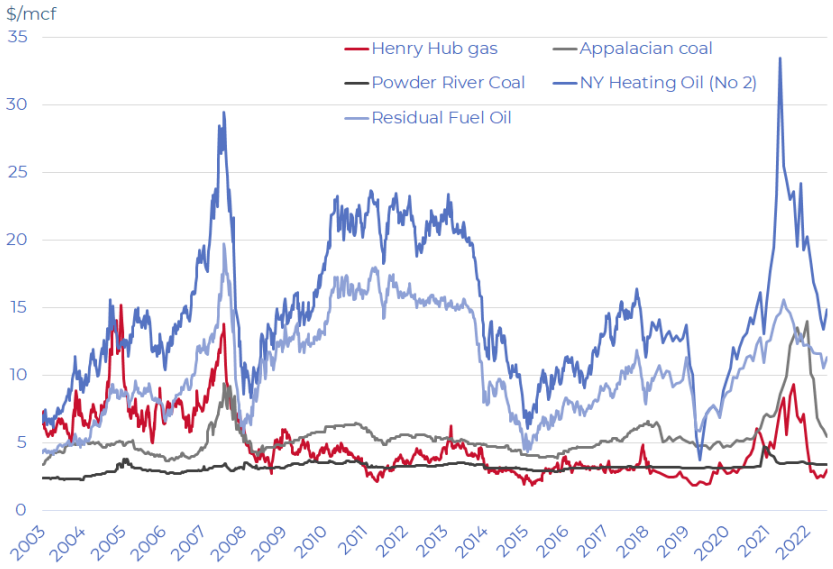


Source: Bloomberg; Guinness Global Investors (June 2023)

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)



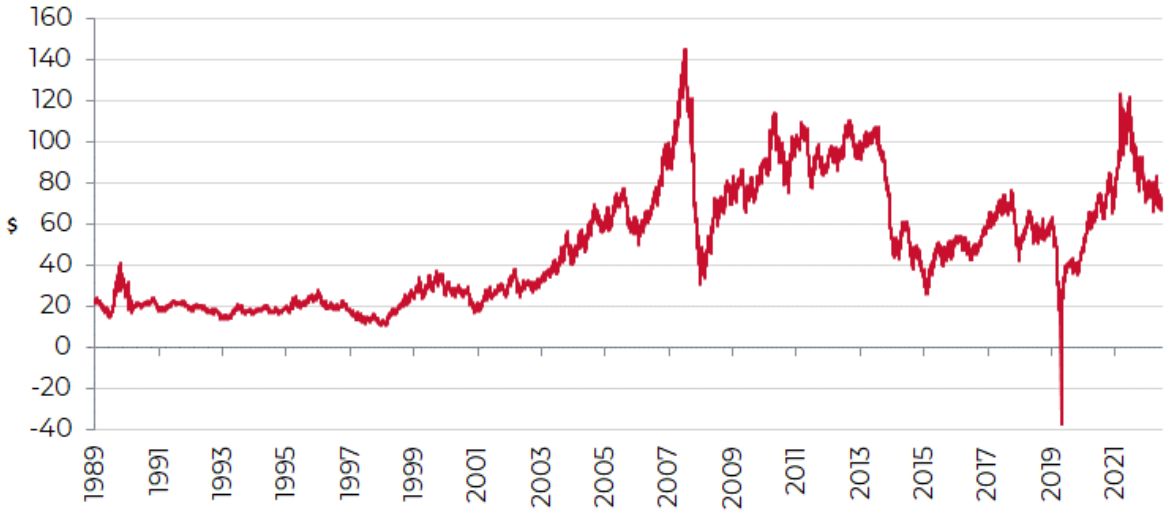
Source: Bloomberg; Guinness Global Investors (June 2023)

Conclusions about US natural gas

The US natural gas price was held back in the 2010s by continued strength in gas supply, particularly from the Marcellus/Utica and from gas produced as a by-product of shale oil. Natural gas prices averaged $6.52/mcf in 2022, up from $3.71/mcf in 2021, and we suspect that the (full cycle) marginal cost of supply is now around $3.50-4/mcf. More controlled growth in associated gas supply over the next couple of years should allow gas prices to stay closer to the full cycle cost level.

APPENDIX: Oil and gas markets historical context

Oil price (WTI $) since 1989



Source: Bloomberg. Data to 30 June 2023

For the oil market, the period since the Iraq/Kuwait war (1990/91) can be divided into four distinct periods:

1) **1990-1998:** broadly characterized by decline. The oil price steadily weakened 1991 – 1993, rallied between 1994 – 1996, and then sold off sharply, to test 20-year lows in late 1998. This latter decline was partly induced by a sharp contraction in demand growth from Asia, associated with the Asian crisis, partly by a rapid recovery in Iraq exports after the UN Oil for food deal, and partly by a perceived lack of discipline at OPEC in coping with these developments.

2) **1998-2014:** a much stronger price and upward trend. There was a very strong rally between 1999 and 2000 as OPEC implemented 4m b/day of production cuts. It was followed by a period of weakness caused by the rollback of these cuts, coinciding with the world economic slowdown, which reduced demand growth and a recovery in Russian exports from depressed levels in the mid 90's that increased supply. OPEC responded rapidly to this during 2001 and reintroduced production cuts that stabilized the market relatively quickly by the end of 2001.

   Then, in late 2002 early 2003, war in Iraq and a general strike in Venezuela caused the price to spike upward. This was quickly followed by a sharp sell-off due to the swift capture of Iraq's Southern oil fields by Allied Forces and expectation that they would win easily. Then higher prices were generated when the anticipated recovery in Iraq production was slow to materialise. This was in mid to end 2003 followed by a much more normal phase with positive factors (China demand; Venezuelan production difficulties; strong world economy) balanced against negative ones (Iraq back to 2.5 m b/day; 2Q seasonal demand weakness) with stock levels and speculative activity needing to be monitored closely. OPEC's management skills appeared likely to be the critical determinant in this environment.

   By mid-2004 the market had become unsettled by the deteriorating security situation in Iraq and Saudi Arabia and increasingly impressed by the regular upgrades in IEA forecasts of near record world oil demand growth in 2004 caused by a triple demand shock from strong demand simultaneously from China; the developed world (esp. USA) and Asia ex China. Higher production by OPEC has been one response and there was for a period some worry that this, if not curbed, together with demand and supply responses to higher prices, would cause an oil price sell off. Offsetting this has been an opposite worry that non-OPEC production could be within a decade of peaking; a growing view that OPEC would defend $50 oil vigorously; upwards pressure on inventory levels from a move from JIT (just in time) to JIC (just in case); and pressure on futures markets from commodity fund investors.

   Continued expectations of a supply crunch by the end of the decade, coupled with increased speculative activity in oil markets, contributed to the oil price surging past $90 in the final months of 2007 and as high as $147 by the middle of 2008. This spike was brought to an abrupt end by the collapse of Lehman Brothers and the financial crisis and

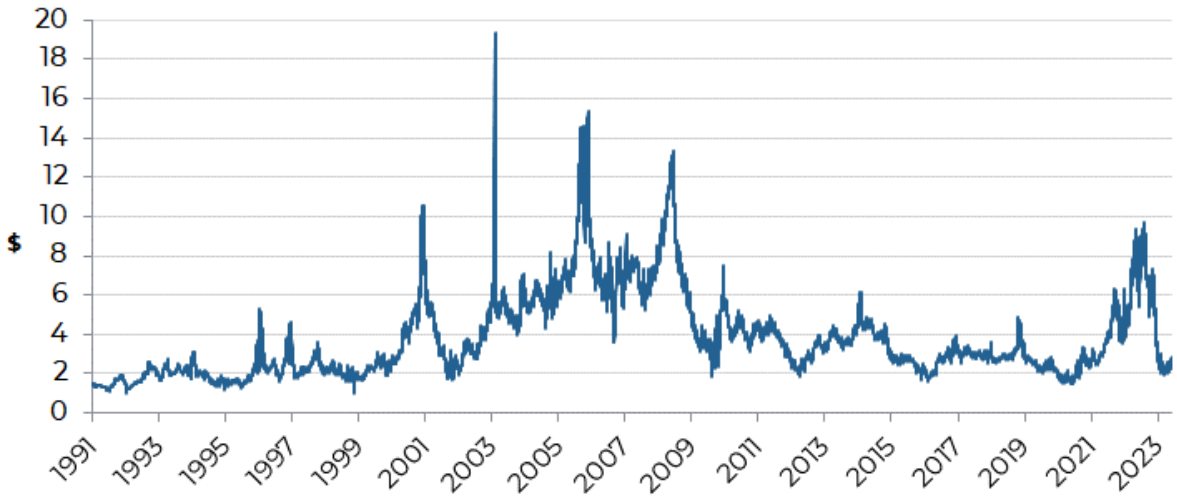
recession that followed, all of which contributed to the oil price falling back by early 2009 to just above $30. OPEC responded decisively and reduced output, helping the price to recover in 2009 and stabilise in the $70-95 range where it remained for two years.

Prices during 2011-2014 moved higher, averaging around $100, though WTI generally traded lower than Brent oil benchmarks due to US domestic oversupply affecting WTI. During this period, US unconventional oil supply grew strongly, but was offset by the pressures of rising non-OECD demand and supply tensions in the Middle East/North Africa.

3) **2014-2020:** a further downcycle in oil. Ten years of high prices leading up to 2014 catalysed a wall of new non-OPEC supply, sufficient that OPEC saw no choice but to stop supporting price and re-set the investment cycle. Oil prices found a bottom in 2016 (as a result of OPEC and non-OPEC partners cutting production again), but its recovery was capped by the volume of new supply still coming into the market from projects sanctioned pre the 2014 price crash. Average prices were pinned 2017-19 in the $50-70/bl range, with prices at the top end of this rang stimulating oversupply from US shale. The alliance between OPEC and non-OPEC partners fell apart briefly in March 2020 and, coupled with an unprecedented collapse in demand owing to the COVID-19 crisis, oil prices dropped back below $30/bl, before recovering to around $50/bl by the end of 2020 thanks to renewed OPEC+ action.

4) **2021 onwards:** Underinvestment in new oil capacity in the 2015-2020 period catalysed the start of a new cycle in 2021, pushing prices above $75/bl.

North American gas price since 1991 (Henry Hub $/Mcf)



Source: Bloomberg LP. Data to 30 June 2023

With regard to the US natural gas market, the price traded between $1.50 and $3/Mcf for the period 1991 - 1999. The 2000s were a more volatile period for the gas price, with several spikes over $8/mcf, but each lasting less than 12 months. On each occasion, the price spike induced a spurt of drilling which brought the price back down. Excepting these spikes, from 2004 to 2008, the price generally traded in the $5-8 range. Since 2008, the price has averaged below $4 as progress achieved in 2007-8 in developing shale plays boosted supply while the 2008-09 recession cut demand. Demand has been recovering since 2009 but this has been outpaced by continued growth in onshore production, driven by the prolific Marcellus/Utica field and associated gas as a by-product of shale oil production.

North American gas prices are important to many E&P companies. In the short term, they do not necessarily move in line with the oil price, as the gas market is essentially a local one. (In theory 6 Mcf of gas is equivalent to 1 barrel of oil so $60 per barrel equals $10/Mcf gas). It remains a regional market more than a global market, though the development of the LNG industry is creating a greater linkage.

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GUINNESS GLOBAL ENERGY FUND

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