Guinness Global Energy

Investment Commentary – September 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
EU 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 Funds are actively managed and use the MSCI World Energy Index as a comparator benchmark only.

CONTENTS

COMMENTARY

OIL

Brent/WTI stronger on OPEC+ supply constraints

Brent and WTI spot oil prices were both up $2/bl over August as supply cuts from Russia and Saudi continued to feed through to the market and US demand remained resilient. Brent and WTI closed the month at $87/bl and $84/bl, towards the top of the YTD range. Five-year forward prices held on to last month's higher levels with Brent closing August at $69/bl and WTI at $63/bl.

NATURAL GAS

Asian and EU prices rise on Australian strike concerns

Asian and European gas prices (using UK national balancing point) both ended August around $2/mcf higher at $13/mcf and $11/mcf respectively, whilst the US spot price (Henry Hub) rose from $2.6/mcf to $2.8/mcf. In Europe, weaker gas demand was outweighed by supply concerns as threats of strike action at Australian LNG facilities put 10% of global LNG production at risk. High production keeps the US Henry Hub gas price depressed.

EQUITIES

Energy outperforms the broad market in August

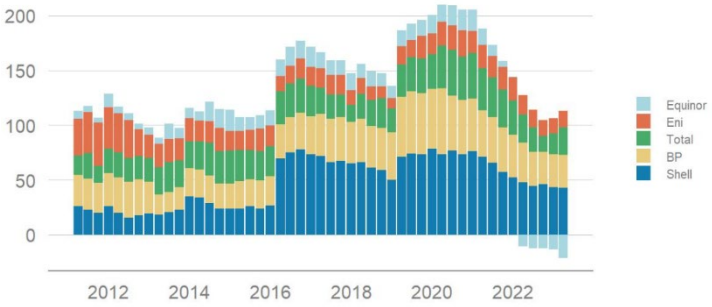
The MSCI World Energy Index (net return) rose by 1.7% in August, outperforming the MSCI World Index (net return) which fell by 2.4% over the month (all in US dollar terms).

CHART OF THE MONTH

Net debt of European majors at historic lows

The deleveraging of oil and gas producers continues, driven by strong free cash flow generation and restrained capital investment. For the European majors, net debt has halved from peak levels of over $200bn post-COVID to levels last seen in 2013. Our oil price forecasts imply either higher dividends or further deleveraging for the sector.

European majors' net debt (US$bn)



Source: Morgan Stanley, August 2023

AUGUST IN REVIEW

i) Oil market

Oil price (WTI and Brent $/barrel): February 2022 to August 2023

Source: Bloomberg; Guinness Global Investors

The West Texas Intermediate (WTI) oil price started August at $81/bl and traded in a range between $79/bl and $84/bl over the month before closing higher at $84/bl. WTI has averaged $76/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 $85/bl and trading between $84/bl and $88/bl before closing higher at 87/bl. Brent has averaged $81/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 over the month, ending August at $4.7/bl. The Brent-WTI spread has averaged $4.7/bl so far in 2023.

Factors which strengthened WTI and Brent oil prices in August:

- **Continued evidence of demand strength**

Whilst the IEA revised its 2023 global demand estimate downwards by 0.1m b/day in August (from 102.3m b/day to 102.2m b/day), this still represents growth of 2.2m b/day from 2022 levels, up from the IEA's original forecast of 1.7m b/day made at the end of last year. Non-OECD countries account for 90% of expected growth this year, with China making up 70% of gains thanks to post-COVID recoveries in transport and petrochemicals. It also appears, however, that US demand is growing more than first thought. In August, the US Department of Energy published monthly oil statistics, showing a significant draw in inventories of 10.6m barrels, much higher than expectations of a 1.6mb draw, and more than twice the 5-year average draw of 4.7m barrels. This saw crude and product inventories continue their downward trajectory towards the lower end of the 5-year range, suggesting underlying strength in US oil demand.

- **Saudi Arabia carrying out voluntary production cut, backed by Russia**

At the start of June, Saudi Arabia announced a voluntary production cut of 1.0m b/day, initially for July, but has since extended these cuts to September. Production numbers for August suggest that Saudi have followed through with the cut. Saudi have been supported by Russia, where average seaborne crude oil exports have fallen from around 3.7m b/d in June 2023 to around 2.9m b/d at the end of August. Our assumption is that the new Russian cut to their oil exports is largely voluntary (i.e. part of OPEC+'s strategy) rather than induced by sanctions.

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

The US crude rotary rig count has fallen by 115 rigs since its recent peak of 627 in December 2022 and is currently running more than 20% below pre-pandemic levels. US shale oil supply growth has been running at 0.8m – 1.0m b/day year-on-year,

but we expect this growth rate to drop sharply as the fall in rig count kicks in (typically there is a 6-9 month lag between change in rig count and production). DNB estimates that ~950 completed shale wells per month are required to keep US shale oil production flat, which compares to ~930 wells being drilled and completed in July. The current activity level in the US shale industry implies no growth over the next 12 months.

Factors which weakened WTI and Brent oil prices in August:

- **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. The US Federal Reserve continues to indicate 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. The IEA slightly trimmed its oil demand expectations in the middle of the month, forecasting a rise of 2.2m b/day and total consumption of 102.2m b/day in 2023.

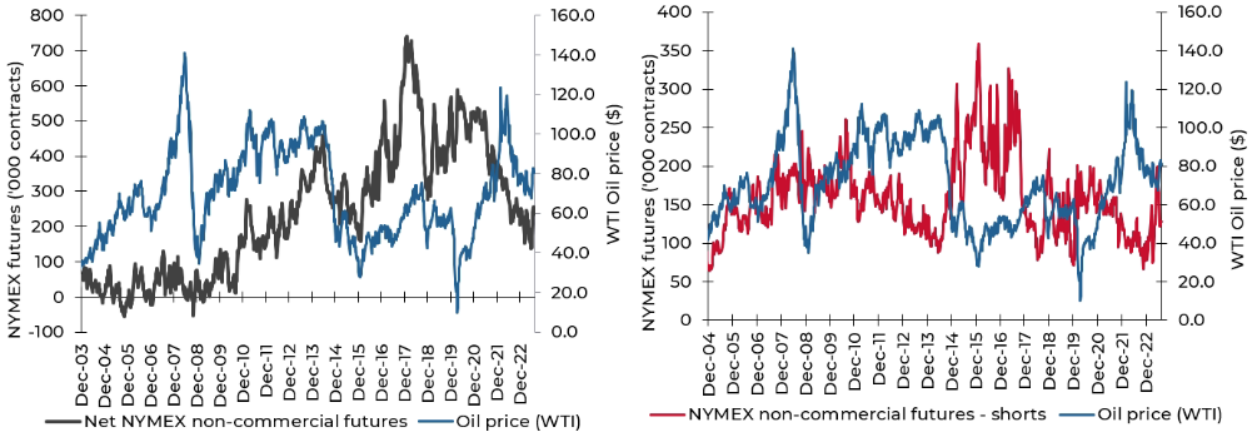
- **Growth in Iranian production**

August data confirmed Iran's claims that it had boosted its crude output to around 3.1m b/day, the highest monthly rate since President Trump imposed sanctions on the nation in 2018. Whilst Iran is still under US sanctions regarding its nuclear programme, it is thought that a significant portion of Iranian oil exports are being 'washed' through other countries before reaching the market.

Speculative and investment flows

The New York Mercantile Exchange (NYMEX) net non-commercial crude oil futures open position was 234,000 contracts long at the end of August versus 225,000 contracts long at the end of July. 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 rose to 128,000 contracts at the end of August versus 125,000 at the end of the previous month.

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

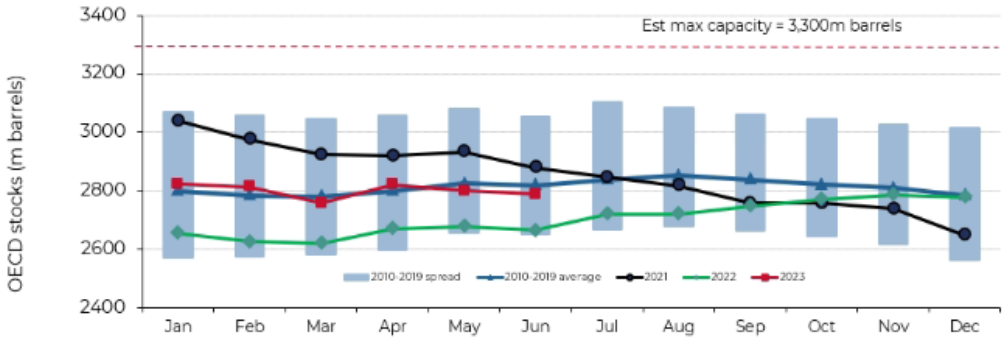


Source: Bloomberg LP/NYMEX/ICE (2023)

OECD stocks

OECD total product and crude inventories at the end of June (latest data point) were estimated by the IEA to be 2,787m barrels, down 15m barrels versus the level reported for May, with the IEA guiding that inventories fell further in July and August. This decline in June compares to a 10-year average decline of 8m barrels, implying that the OECD market was 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



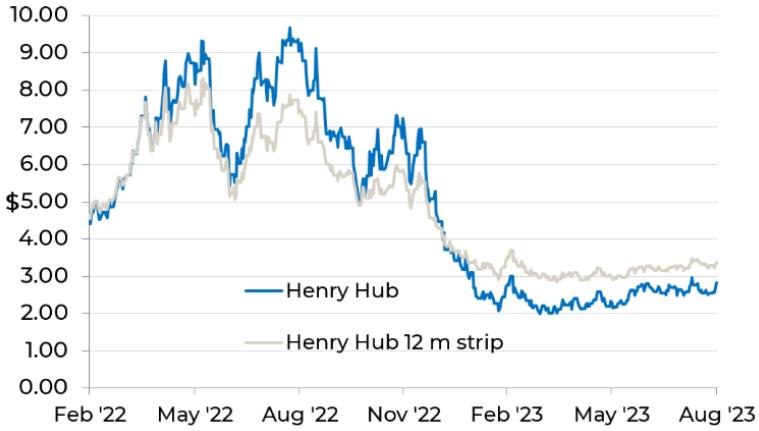
Source: IEA Oil Market Reports (August 2023 and older)

ii) Natural gas market

The US natural gas price (Henry Hub front month) opened August at $2.56/mcf (1,000 cubic feet) and rose to a high on August 9 of $2.96/mcf, before falling back to $2.50/mcf on August 23 and spiking again to close the month higher at $2.77/mcf. The spot gas price has averaged $2.57/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 $3.23/mcf, initially spiking to $3.47 before falling to $3.22, then spiking again to close the month higher at $3.33/mcf. The strip price has averaged $3.22/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): February 2022 to August 2023



Source: Bloomberg LP

Factors which strengthened the US gas price in August included:

- **Texas heatwave**

Extreme temperatures across the south of the US, particularly Texas, has led to high demand for gas for power, as air conditioning usage spiked.

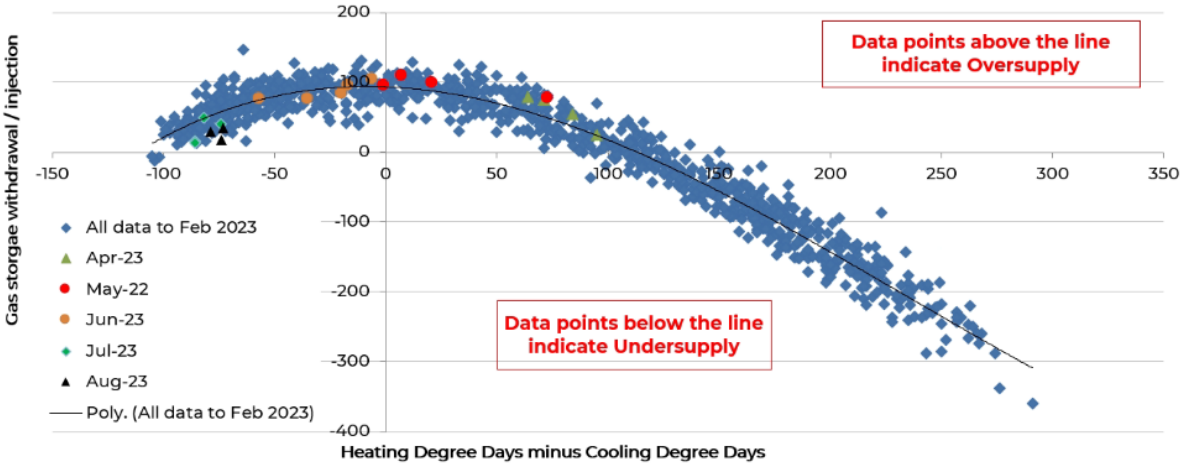
- **Falling rig count**

The number of rigs drilling for natural gas in the US has fallen from 161 at the start of the year to 115 rigs at the end of August. This has increased confidence in the market that the US will not suffer too much oversupply, with production rising in most key basins (Marcellus; Haynesville; Permian).

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

The injection season continued in the US gas market during August. Adjusting for the impact of weather, the inventory builds implied that the US gas market was, on average, around 2 Bcf/day oversupplied.

Weather-adjusted US natural gas inventory injections and withdrawals



Source: Bloomberg LP; Guinness Global Investors, to 31 August 2023

Factors which weakened the US gas price in August included:

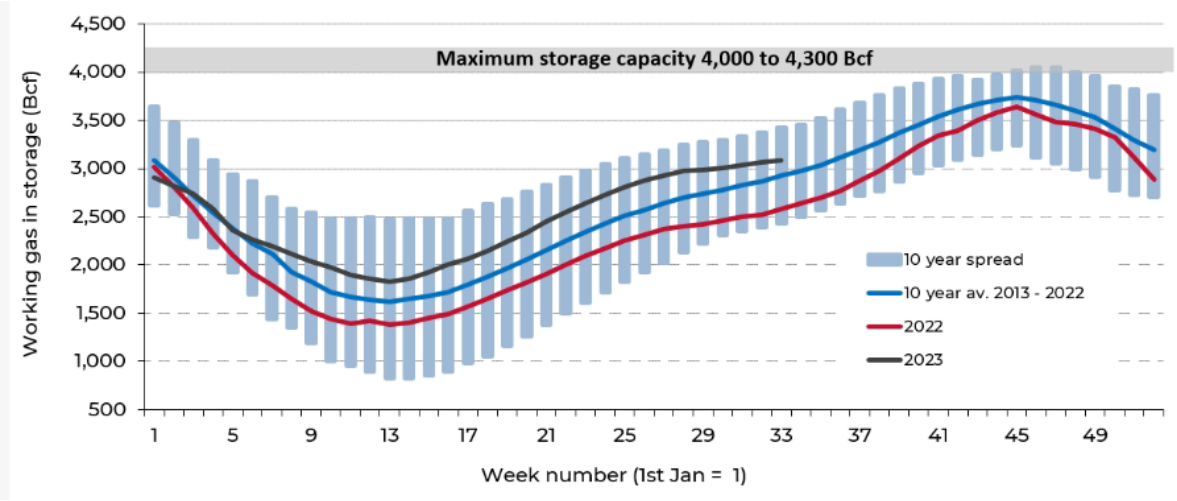
- **Coal to gas switching starting to reverse**

With the spread between US gas prices and coal prices having widened materially since the start of the year, we had seen signs of power producers switching from coal-based electricity generation to gas-based. Goldman Sachs estimate that summer switching in the US power sector might average 1.2 Bcf/day. However, with the increase in Henry Hub pricing back towards $3/mcf, plus declines in Appalachian coal prices, some of the switching will now be reversing.

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

US natural gas inventories are running higher than expected, driven by a mild 2022/23 winter and warm 2023 spring that brought lower-than-expected heating demand. Inventories levels moved towards the 5-year average during August as a result of hotter US weather, ending the month at around 3.1 Tcf.

Deviation from 10yr US gas storage norm



Source: Bloomberg; EIA (August 2023)

MANAGERS' COMMENTS

In our 'back to school' report for global energy we consider the various factors affecting global oil supply and demand and supply and conclude, with demand remaining robust, that Saudi (and OPEC+) remain in the driving seat. A $80/bl long-term Brent oil price seems plausible, giving energy equities a free cash flow yield of nearly 11% and providing around 35% upside should long-term ROCE based valuation metrics be restored.

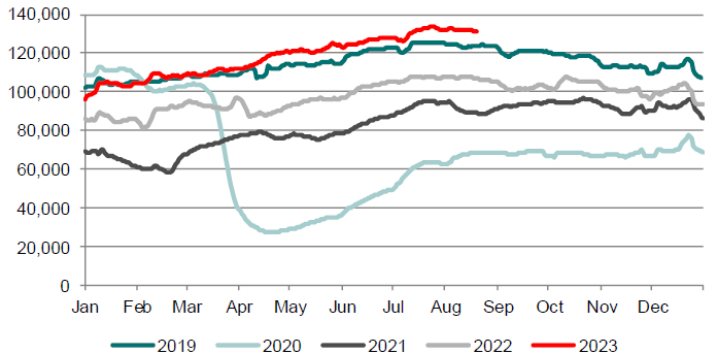
Global oil demand moving ahead of pre-COVID levels

Global oil demand growth has surprised to the upside so far in 2023, with the IEA's current 2.2m b/day growth estimate materially exceeding its forecast of 1.7m b/day made at the start of year, meaning 2023 demand should end up around 1.5m b/day greater than the 2019 record level. The strength of demand is evident in the most recent IEA Oil Market Report that showed a **new monthly global oil demand record** of ~103 mb/d in June, surpassing the previous peak of 102.9 mb/d set in August 2019.

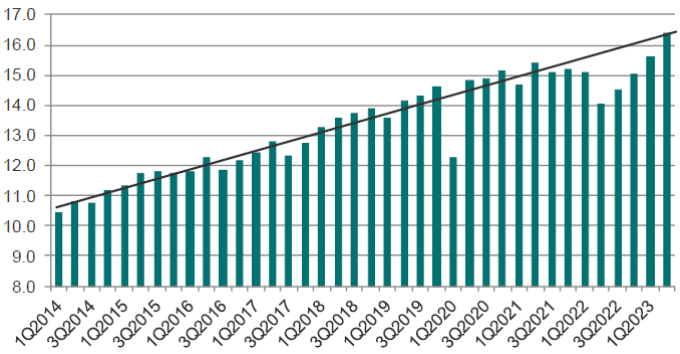
The drivers of demand growth in 2023 have been normalizing economic activity in China after COVID, underestimated demand strength in the non-OECD ex-China (especially Africa and Russia) and a continued recovery from the aviation sector globally.

While the Chinese re-opening has brought disappointing macroeconomic data, it has delivered a **return to the long-run trend for oil demand**. Chinese oil demand is currently forecast by the IEA to be a record 16.2m b/day (+1.5m b/day versus 2022) and well up from initial 2023 expectations and pre-COVID levels. We have also seen near complete recovery in demand from the global aviation industry. Commercial flights have hit all-time highs this summer, around 5% above 2019 levels and up around 20%yoy. In China, the number of domestic flights is now 35% above 2019 levels although international flights from China are still 10% lower. It seems likely that most of the aviation recovery has now been delivered although further relaxation of group travel restrictions will likely lead to higher international flights from China.

Commercial flights per day



China oil demand (mb /day)



Source: IEA; DNB, FlightRadar, August 2023

Oil demand growth is likely to return to more normal levels from 2024, with the IEA now forecasting 1.0m b/day growth to 103.2m b/day, **2.5m 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%) as countries in this region, especially China, return to the normal pace of demand growth post the COVID recovery.

OPEC+ remains in control of global oil supply

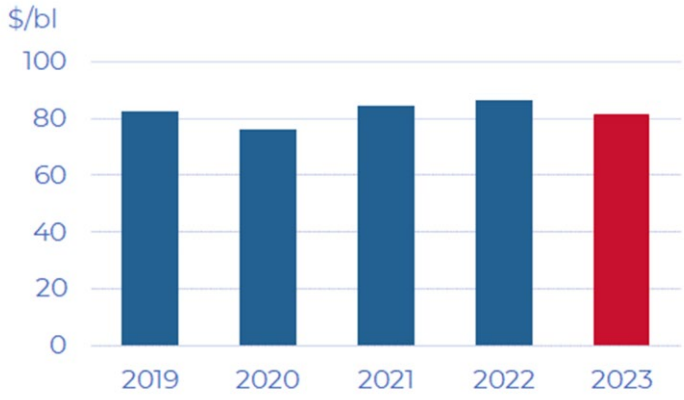
The key determinants of oil supply in the remainder of 2023 and longer-term remain the ability of Saudi and OPEC+ to honour quota levels, the ability of the US onshore shale industry to deliver growth, and the levels of investment for new growth projects in non-OPEC. We deal with each in turn here.

- The 1.2m b/day production cut from **OPEC+** in April, and Saudi's subsequent unilateral 1m b/day cuts since June, show that OPEC+ is acting to defend a Brent oil price of $80/bl or above, consistent with the **oil price required by**

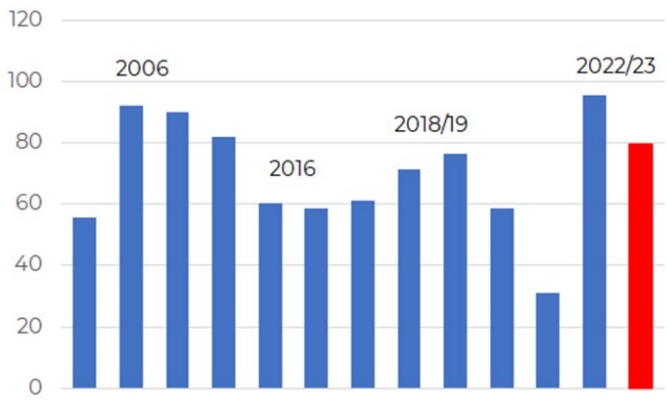
Saudi to maintain a balanced fiscal budget. We see that the group has been reasonably consistent in the last 15 years or so in defending a real oil price of $60-80/bl. The announced cuts partly offset higher production levels from Iran (which is currently outside the quota system) and bring Russian production (which has been better than expected) closer into line with agreed quota levels.

Russia and Iran remain the wild cards within the OPEC+ group. Russian government oil and gas revenues are down around 50% so far this year, leaving Russia to 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 and Russia appear to be toeing the line. 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.

Saudi fiscal breakeven oil prices* 2019-2023 ($/bl)



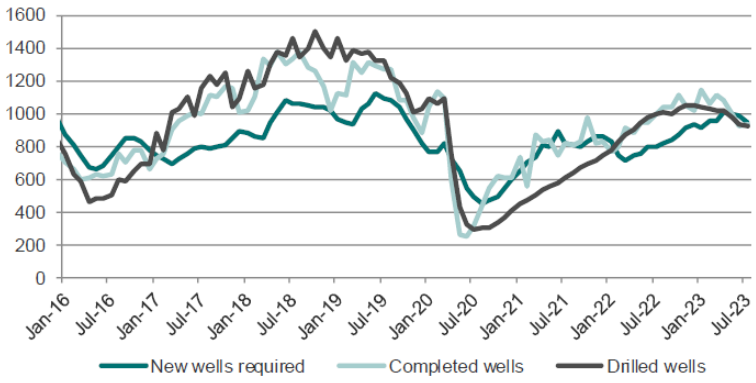
Real oil price defended by OPEC ($/bl, in 2023$)



Source: DNB; IMF; Guinness Global Investors, August 2023

- 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 512 versus a peak of 627 in December 2022. Capital discipline appears to be the main driver of lower activity levels, with around 65% of compensation incentives for E&P management teams being driven by profitability, cash flow and operational metrics (such as cost reduction) versus only 44% in 2014. Drilling productivity still remains a key question, as the best inventory has increasingly been 'drilled out' and producers have turned to second-tier acreage. According to DNB, the lower activity and lower productivity will result in **flat US shale oil production over the next 12 months**.

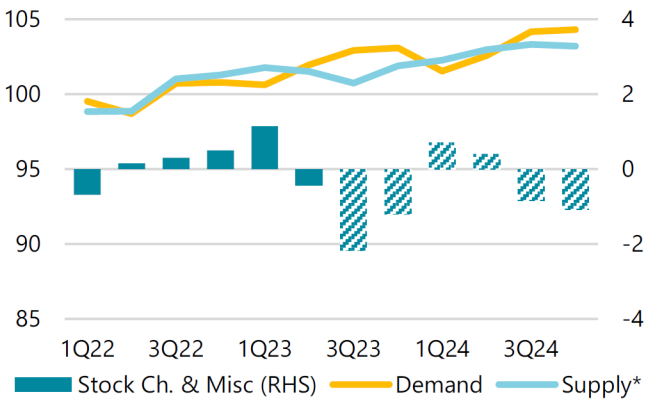
US shale oil – new wells required for flat production



Source: DNB; Guinness Global Investors, to 31 August 2023

A steadily growing oil demand outlook dominated by the non-OECD combined with a supply outlook constrained by OPEC+ leads to a global oil market that is likely more than 2m b/day undersupplied this quarter. With OPEC+ retaining its controls, this undersupply will extend (albeit at a lower level) into the fourth quarter, continuing to draw global inventories. Initial estimates for 2024 imply a slightly undersupplied market with a similar shape to 2023, oversupplied in the first half of the year and undersupplied in the second half, and appears to be supportive of oil prices in their current range.

Oil supply/demand balance (m b/day)



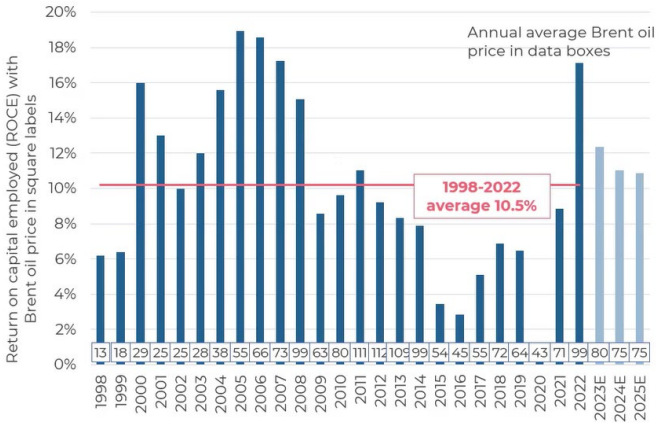
Source: IEA, August 2023

Valuation and outlook

The recent rally in Brent oil prices from mid $70s per barrel to high $80s per barrel has seen the global energy equity sector rally around 10%, taking the price-to-book (P/B) ratio to around 1.8x at the end of August 2023. On a relative P/B basis versus the S&P500 (which is now at 4.4x after its 18.7% rally in 2023), the valuation of energy equities sits at around 0.4x, still over two standard deviations below the long-term average. **Despite recent strength, the sector still exhibits deep value characteristics**.

We keep a close eye on the relationship between the P/B ratio for the energy sector and its return on capital employed (ROCE), which have historically been highly correlated. With oil prices in 2023/24/25 of $80/$75/$75/bl, the global energy sector should deliver ROCE of around 11%, in line with mid-cycle levels. If the historic relationship holds true, these ROCE levels through 2023/24/25 imply valuation upside of around 35% on a P/B basis. The current depressed P/B ratio implies that the ROCE of our companies will stay at about 4-6%, a level closer to the cyclical lows seen over the last 20 years.

ROCE of current Guinness Energy portfolio



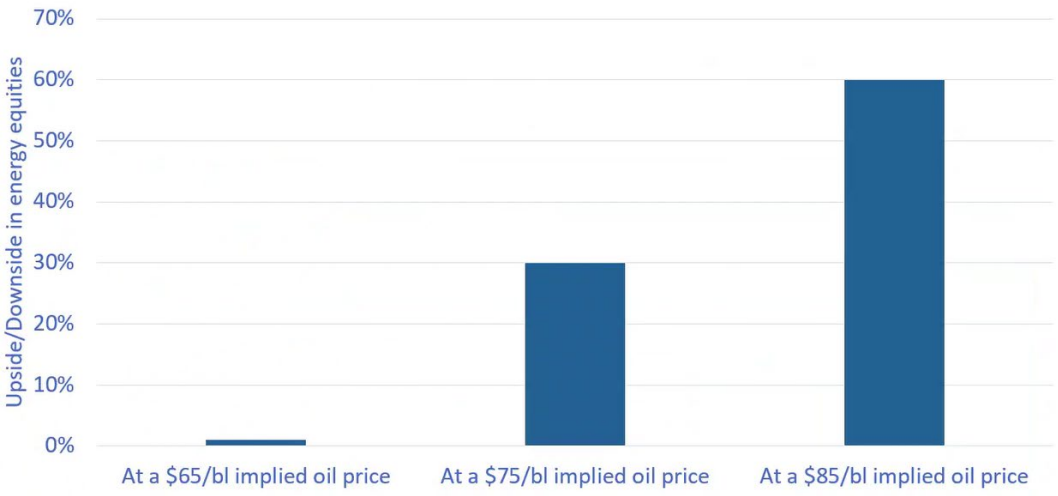
ROCE vs P/B multiple for Guinness Energy portfolio

Sources: Bernstein; Bloomberg; Guinness Global Investors

The higher ROCE is being supported by robust free cash generation. Assuming an average Brent oil price of $80/bl in 2023, we estimate a **free cashflow yield of nearly 11% for our portfolio**. This is after capital expenditure and is two and a half times greater than the 2023 estimated portfolio dividend yield of around 4.3%. 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 August, we estimate that the valuation of our portfolio of energy equities reflected a long-term Brent/WTI oil price of around $65/bl. If the market were to price in a long-term oil price of $75/bl, it would imply around 30% upside while there would be around 60% upside at a long-term oil price of $85/bl Brent.

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



Source: Guinness Global Investors estimates, August 2023

PERFORMANCE

The main index of oil and gas equities, the MSCI World Energy Index (net return), increased by 1.7% in August, while the MSCI World Index (net return) rose by 1.7% in USD.

Within the portfolio, August's strongest performers included Suncor, Canadian Natural Resources, GALP, Imperial Oil and Helix, while the weakest performers included Devon Energy, EOG, Enbridge, Kinder Morgan, and Diversified Energy.

Past performance does not predict future returns.

Guinness Global Energy Fund
Performance (in USD) as at 31.08.2023

Cumulative returns	YTD	1 year	3 years ann.	5 years ann.	Launch of strategy* ann. (31.12.98)
Guinness Global Energy Fund	4.6%	13.9%	30.4%	1.5%	7.7%
MSCI World Energy NR Index	4.1%	12.8%	32.5%	5.6%	6.2%

Calendar year returns	2022	2021	2020	2019	2018	2017	2016
Guinness Global Energy Fund	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	-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	-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	-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.

Past performance does not predict future returns.

TB Guinness Global Energy Fund
Performance (in GBP) as at 31.08.2023

Cumulative returns	YTD	1 year	3 years ann.	5 years ann.	
TB Guinness Global Energy Fund	0.0%	4.8%	33.4%	4.7%	
MSCI World Energy NR Index	-1.2%	3.6%	34.9%	6.1%	

Calendar year returns	2022	2021	2020	2019	2018
TB Guinness Global Energy Fund	49.9%	45.7%	-35.7%	12.6%	-6.3%
MSCI World Energy NR Index	64.4%	41.4%	-33.6%	7.2%	-10.6%
	2017	**2016**	**2015**	**2013**	**2012**
TB Guinness Global Energy Fund	-7.2%	65.2%	-29.6%	-26.6%	-4.7%
MSCI World Energy NR Index	-4.1%	51.0%	-18.3%	-6.1%	15.9%

Source: FE fundinfo, bid to bid, gross income reinvested, in GBP

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 0.96% 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. Fund launched 21.04.2011.

PORTFOLIO

Buys/Sells

In August 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 Guinness Global Energy Fund at **August 31 2023**.

Asset allocation as %NAV	Current	*Change*	Last year end	Last year end	Previous year ends					
	Aug-23		Dec-22	Dec-21	Dec-20	Dec-19	Dec-18	Dec-17	Dec-16	Dec-15	Dec-14
Oil & Gas	**98.2%**	***0.8%***	**97.4%**	**96.9%**	**94.8%**	**98.3%**	**96.7%**	**98.4%**	**96.7%**	**95.1%**	**93.7%**
Integrated	53.6%	*-1.1%*	54.7%	57.7%	56.3%	51.1%	46.4%	42.9%	46.4%	41.5%	37.3%
Exploration & Production	22.8%	*-0.2%*	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	11.0%	*2.0%*	9.0%	4.0%	4.6%	9.6%	8.6%	9.5%	8.6%	11.4%	13.4%
Storage & Transportation	4.4%	*-0.4%*	4.8%	4.3%	4.4%	4.0%	0.0%	3.5%	0.0%	0.0%	0.0%
Refining & Marketing	6.3%	*0.5%*	5.8%	7.2%	7.3%	3.8%	3.7%	3.7%	3.7%	4.2%	3.5%
Solar	0.3%	*-0.4%*	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	1.5%	*-0.4%*	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 August 2023 was on a price to earnings ratio (P/E) for 2023/2024 of 8.9x/8.8x versus the MSCI World Index at 17.5x/16.3x as set out in the following table:

As at 31 August 2023	P/E		
	2022	2023E	2024E
Guinness Global Energy Fund	6.6x	8.9x	8.8x
MSCI World Index	15.9x	17.5x	16.3x
Fund Premium/(Discount)	*-58%*	*-49%*	*-46%*

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 August 31 2023 the median P/E ratio of this group was 7.1x 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.23%) 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 3.5% 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 11% 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 July 31 2023 (for compliance reasons disclosed one month in arrears)

Guinness Global Energy Fund (31 July 2023)			P/E			EV/EBITDA			Price/Book			Dividend Yield		
Stock	**ISIN**	**% of NAV**	**2022**	**2023E**	**2024E**	**2022**	**2023E**	**2024E**	**2022**	**2023E**	**2024E**	**2022**	**2023E**	**2024E**
Integrated Oil & Gas														
Exxon Mobil Corp	US30231G1022	5.5%	7.7x	11.9x	12.2x	4.3x	6.2x	6.5x	2.3x	2.1x	2.1x	3.3%	3.4%	3.6%
Chevron Corp	US1667641005	5.0%	8.6x	12.5x	11.8x	4.6x	6.2x	6.3x	2.0x	1.9x	1.9x	3.5%	3.7%	3.9%
Shell PLC	GB00BP6MXD	4.9%	5.9x	6.9x	6.9x	2.9x	3.6x	3.7x	1.2x	1.0x	0.9x	3.4%	4.2%	4.7%
Total SA	FR0000120271	5.2%	4.3x	6.3x	6.6x	2.6x	3.4x	3.6x	1.3x	1.3x	1.1x	6.4%	5.3%	5.5%
BP PLC	GB0007980591	4.8%	4.2x	6.6x	6.9x	2.2x	2.9x	3.1x	1.7x	1.4x	1.3x	3.7%	4.3%	4.6%
Equinor ASA	NO0010096985	3.3%	4.5x	7.6x	7.3x	1.0x	1.7x	1.6x	2.1x	1.9x	1.8x	8.1%	11.5%	8.4%
ENI SpA	IT0003132476	3.0%	3.8x	5.6x	6.0x	2.3x	2.9x	3.1x	0.9x	0.8x	0.8x	6.1%	6.7%	6.9%
Repsol SA	ES0173516115	3.6%	3.3x	4.2x	5.4x	1.9x	2.4x	2.6x	0.7x	0.7x	0.6x	4.7%	5.1%	5.4%
Galp Energia SGPS SA	PTGAL0AM00	3.1%	12.0x	10.1x	10.3x	3.3x	3.8x	3.9x	2.6x	2.3x	2.1x	4.2%	4.5%	4.6%
OMV AG	AT0000743059	2.8%	3.0x	4.4x	5.1x	1.7x	2.7x	2.9x	0.7x	0.7x	0.7x	11.4%	9.6%	9.2%
		41.3%												
Integrated / Oil & Gas E&P - Canada														
Suncor Energy Inc	CA8672241079	3.2%	5.1x	8.6x	7.6x	2.9x	4.2x	4.0x	1.5x	1.3x	1.2x	4.5%	5.2%	5.5%
Canadian Natural Resources Ltd	CA1363851017	3.5%	7.2x	12.5x	10.4x	4.3x	6.1x	5.4x	2.4x	2.2x	2.1x	4.5%	4.5%	4.7%
Cenovus Energy Inc	CA15135U1093	3.5%	7.3x	11.1x	8.4x	3.7x	5.1x	4.3x	1.8x	1.7x	1.5x	1.6%	2.1%	2.4%
Imperial Oil Ltd	CA4530384086	3.5%	6.6x	9.4x	8.3x	4.1x	5.6x	5.3x	2.0x	1.7x	1.5x	2.0%	2.7%	2.9%
		13.7%												
Integrated Oil & Gas - Emerging market														
PetroChina Co Ltd	CNE1000003W	2.0%	6.3x	6.8x	6.9x	3.6x	3.8x	3.9x	0.7x	0.7x	0.6x	7.3%	7.3%	6.9%
		2.0%												
Oil & Gas E&P														
ConocoPhillips	US20825C1045	4.6%	8.5x	13.5x	12.0x	4.2x	6.1x	5.7x	3.1x	2.9x	2.7x	1.6%	1.7%	1.9%
EOG Resources Inc	US26875P1012	3.7%	9.6x	12.3x	11.0x	5.2x	6.3x	5.7x	3.1x	2.7x	2.4x	5.0%	3.8%	4.3%
Diamondback Energy Co	US25278X1090	3.8%	6.1x	8.7x	7.6x	4.8x	5.7x	5.3x	1.8x	1.6x	1.4x	3.5%	4.1%	4.1%
Pioneer Natural Resources Co	US7237871071	3.3%	7.3x	11.9x	10.7x	4.5x	6.3x	5.8x	2.4x	2.4x	2.1x	2.4%	2.2%	3.0%
Devon Energy Corp	US25179M1036	3.3%	6.4x	9.8x	8.7x	4.1x	5.3x	5.0x	3.2x	2.9x	2.5x	2.5%	1.8%	2.6%
		18.7%												
International E&Ps														
Pharos Energy PLC	GB00B572ZV9	0.1%	3.3x	17.3x	6.8x	0.7x	1.3x	1.2x	n/a	n/a	n/a	n/a	2.2%	2.2%
		0.1%												
Midstream														
Kinder Morgan Inc	US49456B1017	2.2%	15.4x	16.1x	14.9x	9.6x	9.4x	9.0x	1.3x	1.3x	1.3x	6.3%	6.4%	6.5%
Enbridge Inc	CA29250N1050	2.4%	17.2x	16.8x	16.7x	12.5x	11.6x	11.5x	1.7x	1.8x	1.9x	7.0%	7.3%	7.5%
		4.7%												
Equipment & Services														
Schlumberger Ltd	AN8068571086	4.2%	26.8x	19.6x	15.9x	14.2x	11.4x	9.9x	4.6x	4.2x	3.7x	1.1%	1.7%	1.8%
Halliburton Co	US4062161017	3.8%	19.2x	12.9x	11.4x	10.1x	7.9x	7.3x	4.4x	3.6x	3.0x	1.2%	1.6%	1.7%
Baker Hughes a GE Co	US05722G1004	1.8%	40.3x	23.1x	18.1x	13.4x	10.6x	9.0x	2.5x	2.3x	2.2x	2.0%	2.1%	2.2%
Helix Energy Solutions Group Inc	US42330P1075	1.3%	n/a	22.7x	15.2x	12.7x	5.6x	5.0x	1.0x	0.9x	0.9x	n/a	n/a	n/a
		11.2%												
Oil & Gas Refining & Marketing														
China Petroleum & Chemical Corp	CNE1000002Q	1.5%	6.6x	6.2x	5.9x	4.0x	4.2x	3.9x	0.6x	0.6x	0.6x	9.5%	9.9%	9.9%
Valero Energy Corp	US91913Y1001	4.8%	4.6x	5.8x	9.6x	2.9x	3.8x	5.6x	2.1x	1.7x	1.5x	3.0%	3.2%	3.3%
		6.3%												
Research Portfolio														
Deltic Energy PLC	GB00BNTY2N0	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
EnQuest PLC	GB00B635TG2	0.3%	1.3x	2.0x	1.4x	1.0x	1.3x	1.2x	0.5x	0.5x	0.4x	n/a	1.3%	4.4%
Reabold Resources PLC	GB00B95L0557	0.0%	n/a	n/a	n/a	n/a	n/a	n/a	0.0x	n/a	n/a	n/a	425.5%	922.0%
Sunpower Corp	US8676524064	0.4%	31.7x	124.9x	20.9x	16.8x	17.1x	10.0x	3.1x	3.1x	2.7x	n/a	n/a	n/a
Maxeon Solar Technologies Ltd	SGXZ25336314	0.1%	n/a	104.6x	111.7x	n/a	13.4x	10.0x	12.9x	5.0x	3.8x	n/a	n/a	n/a
Diversified Energy Company	GB00BYX7JT7	0.4%	7.7x	8.6x	15.0x	4.9x	4.9x	5.8x	3.3x	1.2x	n/a	14.0%	14.8%	14.8%
		1.3%												
Cash	Cash	0.8%												

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***	***91.8***	***97.7***	***99.9***	***102.2***	***103.2***
Non-OPEC supply (inc NGLs)	*60.3*	*59.8*	*60.8*	*63.5*	*65.6*	*63.1*	*63.8*	*65.5*	*67.3*	*68.7*
OPEC NGLs	*5.2*	*5.3*	*5.4*	*5.5*	*5.3*	*5.2*	*5.3*	*5.4*	*5.5*	*5.5*
Non-OPEC supply plus OPEC NGLs	**65.5**	**65.1**	**66.2**	**69.0**	**70.9**	**68.3**	**69.1**	**70.9**	**72.8**	**74.2**
Call on OPEC (crude oil)	**29.8**	**31.3**	**32.0**	**30.5**	**29.8**	**23.5**	**28.6**	**29.0**	**29.4**	**29.0**
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**	**22.9**	**28.0**	**28.4**	**28.8**	**28.4**

Source: Bloomberg; IEA; Guinness Global Investors, August 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 and 2m b/day respectively, leaving overall consumption in 2022 still around 1m 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 August 2023

'000 b/day	31-Dec-19	31-Jul-23	31-Aug-23	Current vs Dec 2019	Current vs last month
Saudi	9,730	9,110	**8,980**	-750	-130
Iran	2,080	2,980	**3,070**	990	90
Iraq	4,610	4,250	**4,260**	-350	10
UAE	3,040	3,090	**3,050**	10	-40
Kuwait	2,710	2,550	**2,560**	-150	10
Nigeria	1,820	1,260	**1,340**	-480	80
Venezuela	730	780	**800**	70	20
Angola	1,390	1,150	**1,130**	-260	-20
Libya	1,110	1,100	**1,140**	30	40
Algeria	1,010	970	**940**	-70	-30
OPEC-10	**28,230**	**27,240**	**27,270**	**-960**	**30**

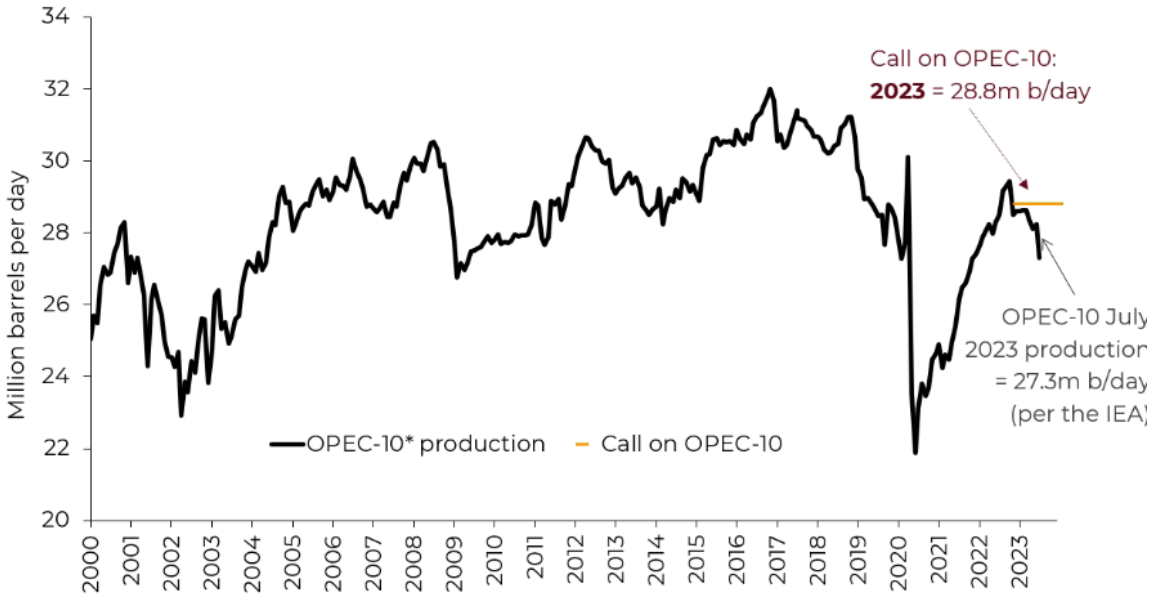
Source: Bloomberg; Guinness Global Investors

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 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.

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



Source: IEA Oil Market Report (August 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.$80/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.

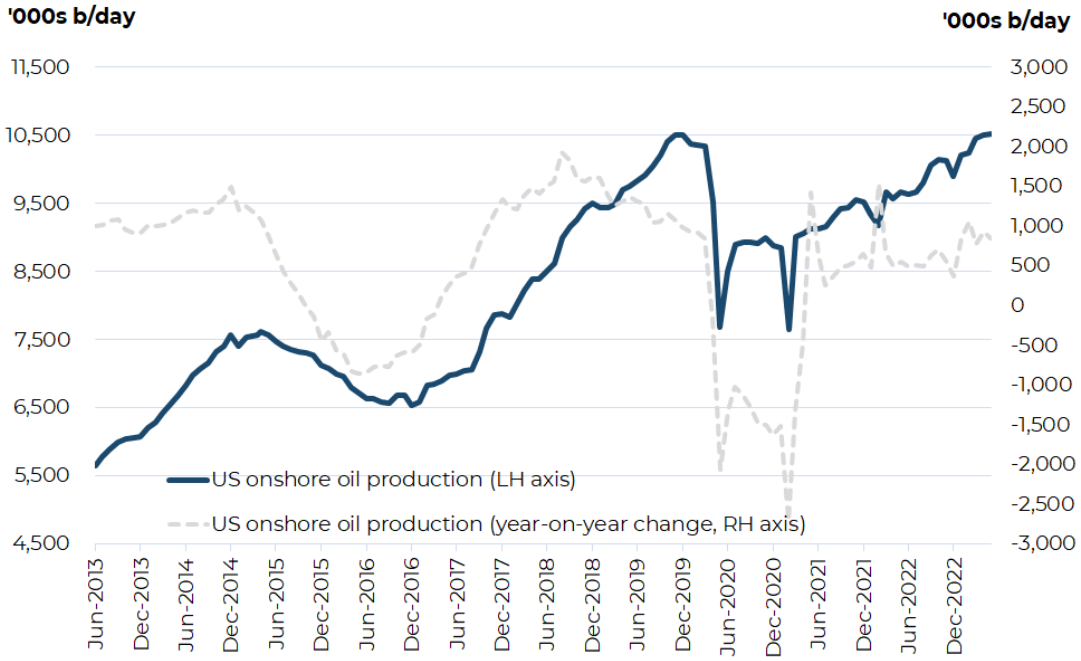
Nothing in the market in recent years has changed our view that OPEC can put a floor under the price – as they did in 2020, 2018, 2016, 2008, 2006, 2001 and 1998.

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 2008-2021.

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 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 $70 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. Shale oil production dropped by nearly 3m b/day in 2020 (peak to trough), and has taken 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, 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 2.3m b/day to 102.2m b/day, around 1.5m 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 slower economic growth and the switch to passenger EVs is 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 across the non-OECD region. 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). 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 14m, or 18% 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, August 2023

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 3.2% of 2023 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 25-35% 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 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	2024E
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	21.8	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	34.0	31.8
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	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	6.0	6.5
LNG exports	-	-	-	0.1	1.0	2.6	2.8	4.8	6.4	9.7	11.8	13.0	13.7
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	9.1
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**	**107.4**
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**	**0.5**

Source: EIA; GS; Guinness estimates, August 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 105.7 Bcf/day, up by 7.4 Bcf/day versus 2021 and 13 Bcf/day (15%) 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/mcf, to be up by around 1.2 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.

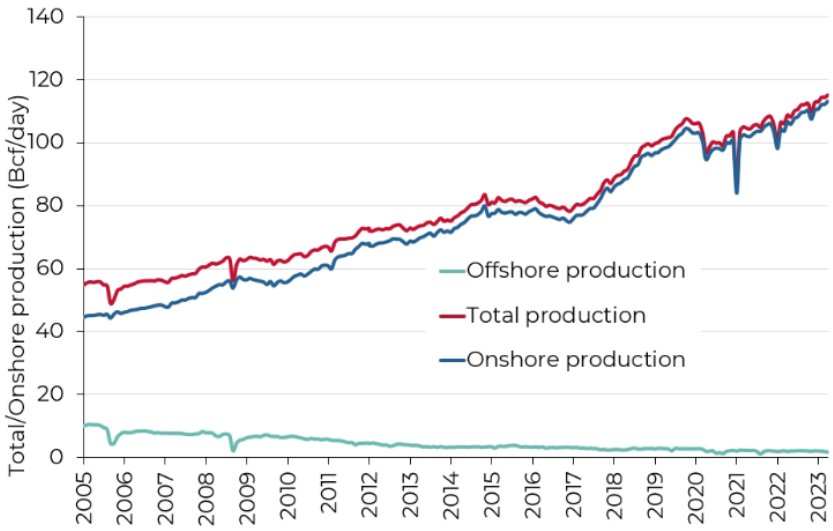
US natural gas supply

Bcf/day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023E	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	100.9	101.7
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	5.2
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**	**103.0**	**106.1**	**106.9**
Supply growth	**2.4**	**-**	**4.4**	**3.3**	**- 0.3**	**0.4**	**10.1**	**6.4**	**- 0.7**	**1.4**	**6.1**	**3.1**	**0.8**
(Supply)/demand balance	**- 0.2**	**1.7**	**- 1.5**	**- 1.8**	**0.8**	**1.2**	**-**	**- 1.0**	**- 0.5**	**1.4**	**2.7**	**0.8**	**0.5**

Source: EIA; GS; Guinness estimates, August 2023

Since 2010, 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 115 at the end of August 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 (August 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.

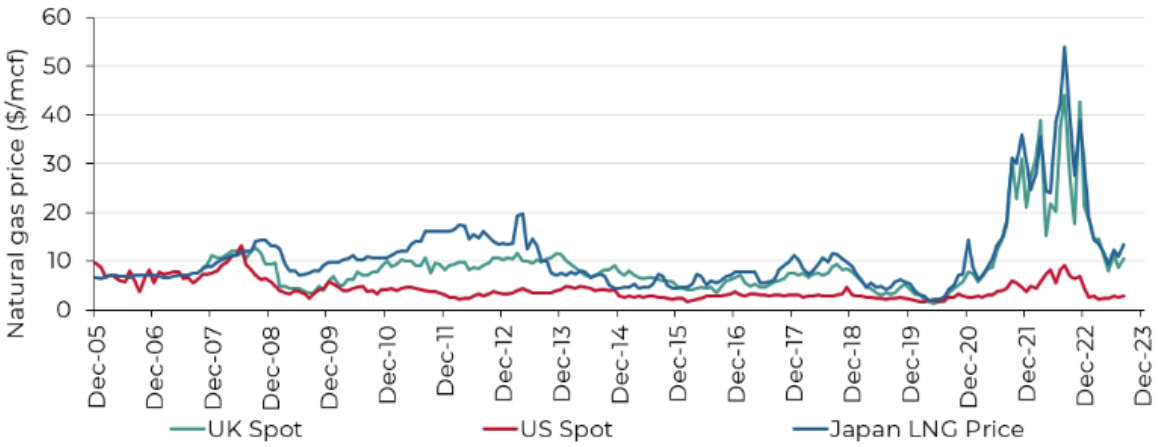
Associated gas production rebounded in 2022 and will rise again in 2023 as shale oil continues to grow. Generally, we expect to see rates of around 2-3 Bcf/day of associated gas per 1m b/day of oil production growth. The Marcellus/Utica region, which includes the largest producing gas field in the US 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 3 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.$10/mcf versus c.$2-3/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 August 2023

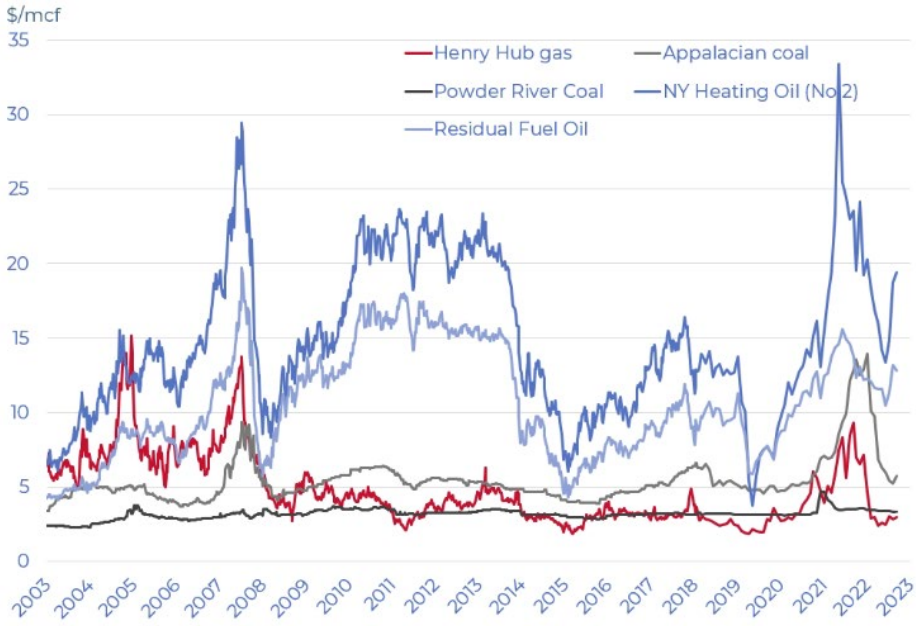


Source: Bloomberg; Guinness Global Investors (August 2023)

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 (August 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, August 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

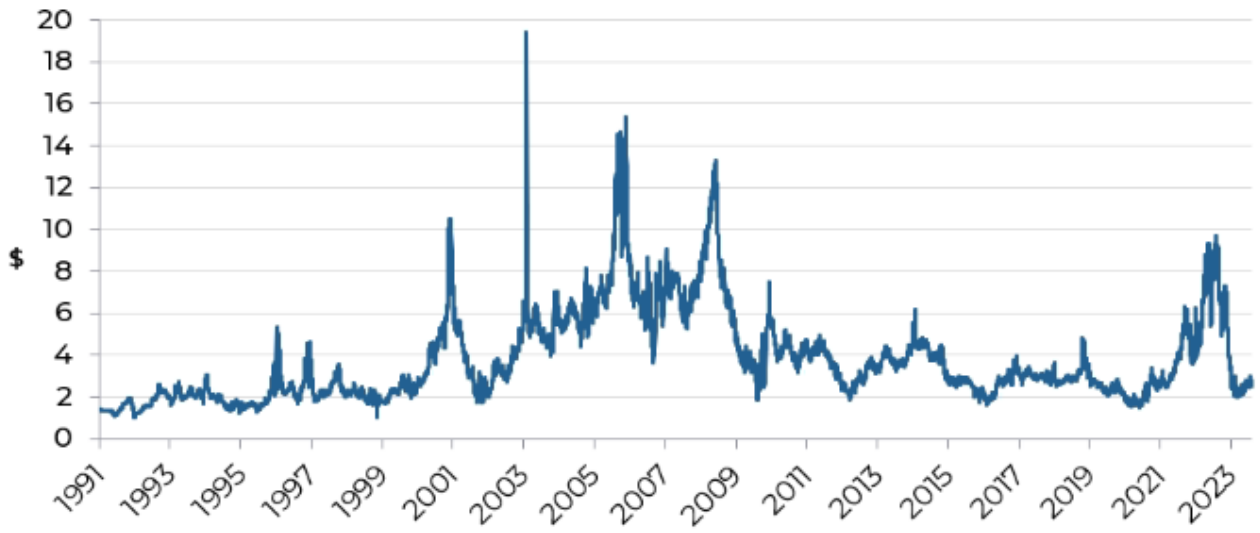
recession that followed, all of which contributed to the oil price falling back by early 2009 to just above $30. OPEC responded decisively and reduced output, helping the price to recover in 2009 and stabilise in the $70-95 range where it remained for two years.

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, August 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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