

## Developments and trends for investors in the global energy sector

This is a marketing communication. Please refer to the prospectus and KIID for the Fund before making any final investment decisions. Past performance does not predict future returns.

June 2022

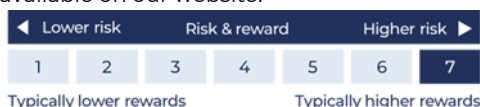
### GUINNESS GLOBAL ENERGY FUND

The Guinness Global Energy Fund invests 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.

The Fund is run by co-managers Will Riley, Jonathan Waghorn and Tim Guinness, supported by Jamie Melrose (analyst). The investment philosophy, methodology and style which characterise the Guinness approach have been applied to the management of energy equity portfolios since 1998.

### RISK

The Guinness Global Energy Fund is an equity fund. 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. The Fund invests only in companies involved in the energy sector; it is therefore susceptible to the performance of that one sector, and can be volatile. Details on the risk factors are included in the Fund's documentation, available on our website.



The risk and reward indicator shows where the fund ranks in terms of its potential risk and return. The fund is ranked as higher risk as its price has shown high fluctuations historically. This is based on how investments have performed in the past and you should note that the fund may perform differently in the future and its rank may change. Historic data may not be a reliable indicator for the future.

### HIGHLIGHTS FOR MAY

#### OIL

##### Brent/WTI up as oil and product inventories continue to decline

Brent and WTI oil prices rose in May. Brent closed May at just under \$120/bl, up by \$13/bl over the month, while WTI closed up \$10/bl at nearly \$115/bl. Five-year forward prices increased a little, Brent closing at \$74/bl and WTI at \$68/bl. OECD inventories for oil and oil products remain close to the bottom of the ten-year range. Inventories for oil products look particularly tight, helping to drive refining margins to record highs. OPEC+ met at the start of June and resolved to pull forward quota increases by a month, but in reality, spare capacity across the group is hard to come by.

#### NATURAL GAS

##### US gas prices rise; European and Asian gas prices remain elevated

The European and Asian gas prices (using UK NBP) closed May at \$22/\$24/mcf, whilst the US spot price (Henry Hub) rose a little to \$8.1/mcf. Russian gas continued to flow into Europe, helping to boost inventories to more comfortable levels. Global economic slowdown has tempered demand, improving the supply/demand balance. US gas prices are being pulled higher by rising thermal coal export prices.

#### EQUITIES

##### Energy outperforms the broad market in May

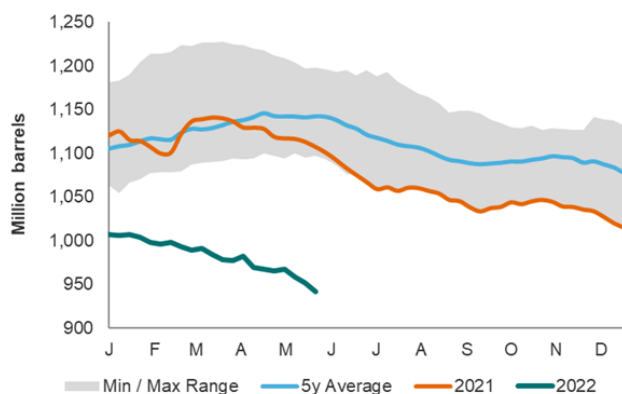
The MSCI World Energy Index (net return) rose by 13.3% in May, outperforming the MSCI World Index (net return) which rose by 1.1% over the month (all in US dollar terms).

#### CHART OF THE MONTH

##### US oil and product inventories running low

Inventories of crude oil and oil products (gasoline, distillates, jet fuel and residual) have drawn consistently over the first five months of 2022, consistent with the pattern reported in 2021. This leaves inventory levels at unusually low levels, a major contributor to higher prices. The most acute inventory shortages are being experienced in middle distillate products.

US oil and product inventories (mcm/day)



Source: DNB

# The Guinness Global Energy Report

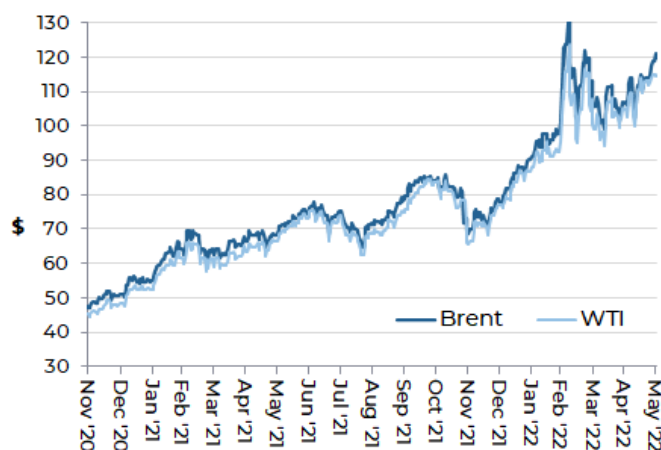
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## 1. MAY IN REVIEW

### i) Oil market

Oil price (WTI and Brent \$/barrel): Nov 2020 to May 2022



Source: Bloomberg; Guinness Global Investors

The West Texas Intermediate (WTI) oil price started May at \$104.7/bl and rose steadily throughout the month to a peak on May 27 of \$115.1, before closing slightly lower at \$114.7/bl. WTI has averaged \$99/bl so far this year, having averaged \$68/bl in 2021, \$40/bl in 2020 and \$58/bl in 2019.

Brent oil traded in a similar shape, opening at \$106.6/bl, peaking at \$121.2/bl and closing the month at \$119.9/bl. Brent has averaged \$103/bl so far in 2022, having averaged \$70/bl in 2021, \$42/bl in 2020 and \$64/bl in 2019. The gap between the WTI and Brent benchmark oil prices widened over the month, ending May at just over \$5/bl. The Brent-WTI spread averaged \$2.4/bl in 2021.

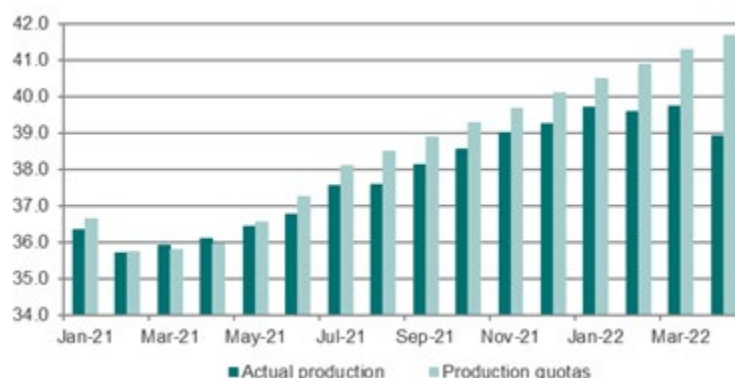
#### Factors which strengthened WTI and Brent oil prices in May:

- **OPEC+ output struggling to grow**

In theory, OPEC+ production should have grown by 2m b/day so far this year, representing quota increases of 0.4m b/day per month. In reality, the group's production is about flat, with declines from Russia and anaemic growth from many OPEC members contributing to the result. At the start of June, OPEC+ resolved to accelerate its production quota increases within the existing framework. Instead of monthly increases of 0.4m b/day from July to September, OPEC+ are now targeting two increases of 0.6m b/day in July and August, then no increase in September. That Russia has been allocated an increased quota of 0.4m b/day, when its production is falling, highlights the 'optical' nature of the increases – a bullish indicator for oil prices.

## The Guinness Global Energy Report

### OPEC+ production



Source: DNB

- **European ban on imports of Russian oil and refined products**

At the end of May, it was announced that the EU would ban Russian seaborne oil by the end of 2022, with a temporary exemption for Russian pipeline oil. Poland and Germany have pledged to stop importing pipeline oil from Russia by the end of the year, bringing total coverage of the ban to 90% of Russian oil imports into the EU. We expect much of the crude oil imports being banned by the EU to be diverted to other buyers, but the redistribution of refined products is more challenging, and likely results in shut-ins of some Russian refining capacity.

- **OECD inventories close to bottom of 10-year range**

OECD total product and crude inventories at the end of April (latest data point) were estimated by the IEA to be 2,630m barrels, up by 5m barrels versus the level reported for March. The inventory level reported for April is around 6% below the 10-year average, and close to the bottom of the 10-year range. Low inventories were a key catalyst for the US and other IEA members in March to announce record releases from Strategic Petroleum Reserves.

#### Factors which weakened WTI and Brent oil prices in May:

- **High prices contributing to demand destruction**

With Brent oil prices reaching around \$120 per barrel at the end of May, the burden of high oil prices is impacting demand. A price of \$120 per barrel translates into the world paying around 5% of GDP for its oil. This is still not extreme versus history, but represents a level that is causing demand destruction at the margin. The IEA currently estimate Q4 2022 demand to be flat with Q4 2021.

- **COVID surge in China**

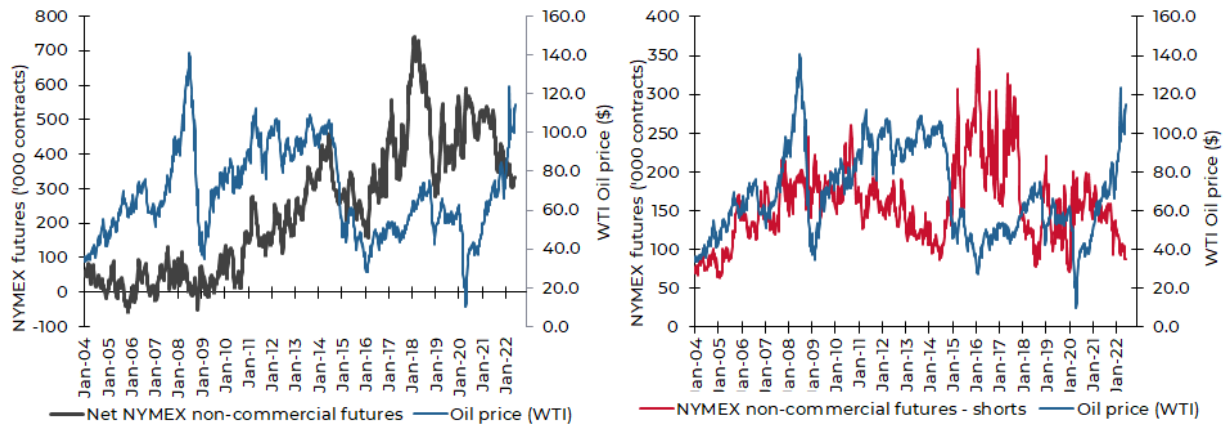
The current surge of COVID in China has impacted local refined product demand. Data released in May showed China refinery runs declining 1.2m month-on-month and 1.5m year-on-year, taking refinery output to its lowest level since March 2020. At the time of writing, however, the lifting of lockdowns implies that we will see a swift recovery.

#### Speculative and investment flows

The New York Mercantile Exchange (NYMEX) net non-commercial crude oil futures open position was 333,000 contracts long at the end of May versus 316,000 contracts long at the end of April. The net position peaked in February 2018 at 739,000 contracts long. Typically, there is a positive correlation between the movement in net position and movement in the oil price. The gross short position expanded slightly to 115,000 contracts at the end of May versus 102,000 at the end of the previous month.

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**NYMEX Non-commercial net and short futures contracts: WTI January 2004 – May 2022**

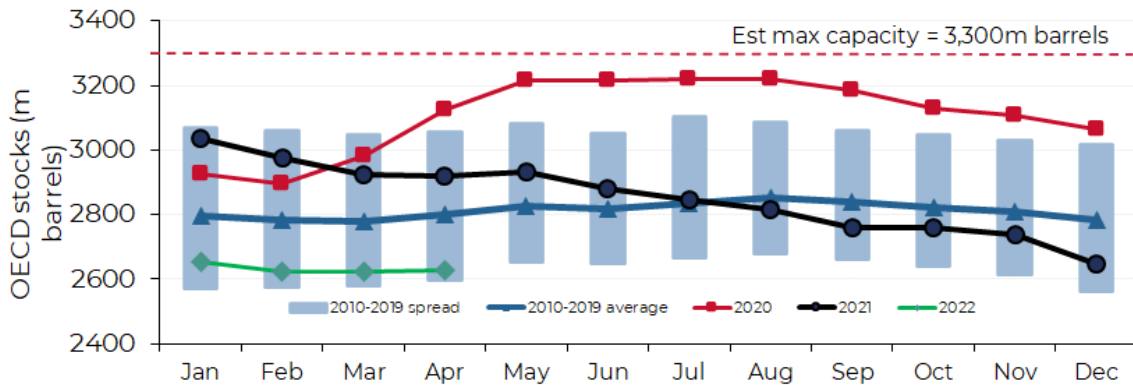


Source: Bloomberg LP/NYMEX/ICE (2022)

## OECD stocks

OECD total product and crude inventories at the end of April (latest data point) were estimated by the IEA to be 2630m barrels, up by 5m barrels versus the level reported for March. This compares to a 10-year average build for April of 20m 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 persistent tightening thereafter taking inventories well below normal levels.

**OECD total product and crude inventories, monthly, 2004 to 2022**



Source: IEA Oil Market Reports (May 2022 and older)

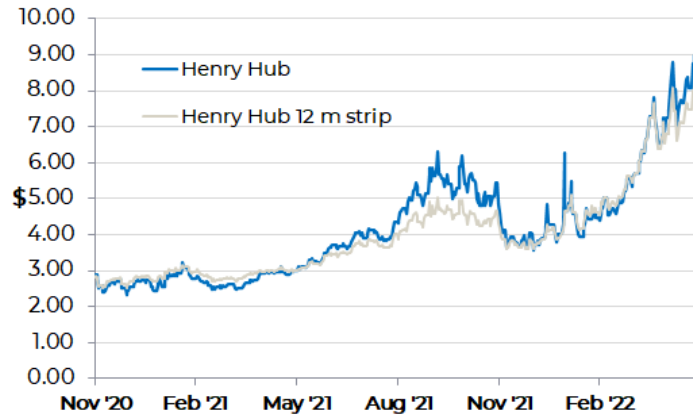
## ii) Natural gas market

The US natural gas price (Henry Hub front month) opened May at \$7.24/mcf (1,000 cubic feet) and rose over the month to a peak on May 25 of \$8.97, before closing at \$8.15/mcf. The spot gas price has averaged \$5.71/mcf so far in 2022, having averaged \$3.70/mcf in 2021, \$2.13/mcf in 2020 and \$2.53/mcf in 2019.

The 12-month gas strip price (a simple average of settlement prices for the next 12 months' futures prices) also rose over the month, rising from \$6.80/mcf to \$7.32/mcf. The strip price has averaged \$5.57/mcf so far in 2022, having averaged \$3.52 in 2021, \$2.54 in 2020 and \$2.60 in 2019.

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**Henry Hub gas spot price and 12m strip (\$/Mcf): Nov 2020 to May 2022**



Source: Bloomberg LP

**Factors which strengthened the US gas price in May included:**

- **Higher thermal coal prices**

Thermal coal prices in the north-east of the US rose again in May, as coal supply is pulled into a strong export market. This in turn has raised the switching price for US utilities between natural gas and coal.

- **Lower than normal international gas inventories and stronger international demand**

High gas demand and low inventories in Europe and Asia held international gas prices at around \$20-25/mcf during the month. This in turn is maximising demand for exports of LNG from the US. The EIA forecasts that US LNG exports will remain elevated, growing to 13 bcf/day at the end of the year.

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

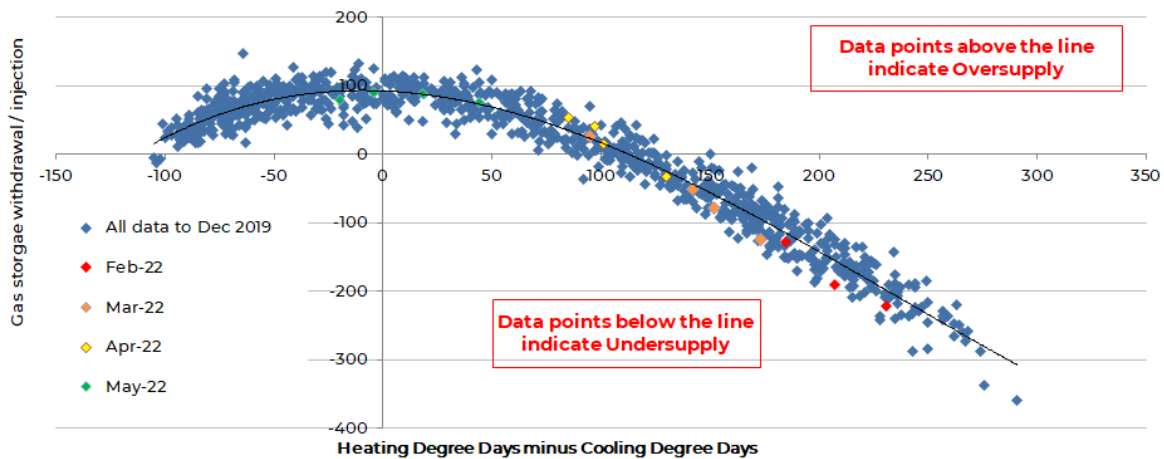
Builds into US natural gas inventories during May were slightly lower than expected for the time of year. Adjusting for the impact of weather, the builds implied that the US gas market was, on average, nearly 0.5 Bcf/day undersupplied.

**Factors which weakened the US gas price in May included:**

- **Higher onshore supply**

Latest supply data (for March) suggests that production grew by 1.7 Bcf/day (1.6%), a recovery after production dipped in late winter thanks to cold weather and wellhead 'freeze offs'. Supply is still down since the start of 2022 by around 1.6 Bcf/day, though we expect a turnaround to growth for the rest of the year.

**Weather adjusted US natural gas inventory injections and withdrawals**



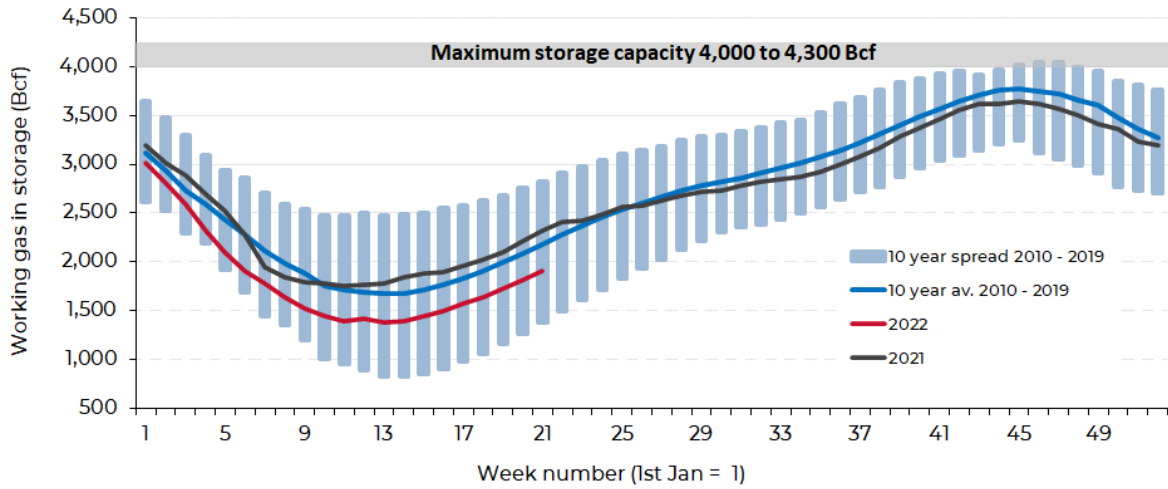
Source: Bloomberg LP; Guinness Global Investors

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## Natural gas inventories

Swings in the balance for US natural gas should, in theory, show up in movements in gas storage data. Natural gas inventories at the end of May were reported by the EIA to be 1.7 Tcf. Current gas in storage is around 0.3 Tcf below the 10-year average.

**Deviation from 10yr gas storage norm**



Source: Bloomberg; EIA (June 2022)

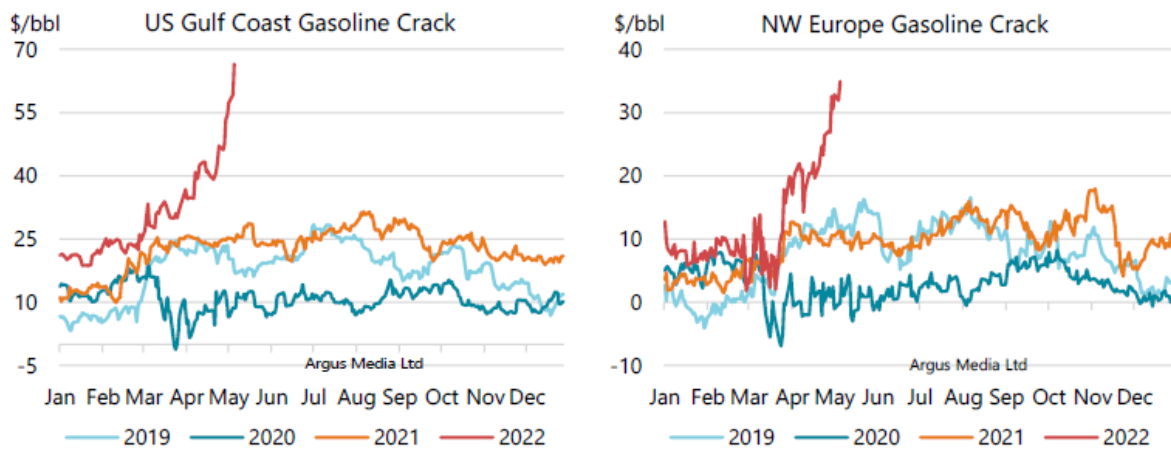
2. MANAGER’S COMMENTS

Much of the focus in energy markets in recent months has been on the rise in spot oil prices. However, there has also been a notable increase in refining margins, causing the prices of refined products (e.g. gasoline and diesel) to rise faster than the price of crude oil. Here, we explore the drivers behind the spike in refining margins, and the implications for the Guinness Global Energy portfolio.

Record refining margins & low inventories

The last three months have seen consistent downgrades to global oil demand forecasts, led by high prices and slowing global economic growth. In these circumstances, we would normally expect a bearish outcome for refinery margins and refining activity. In reality, the disruption of Russian oil and refined product exports, capacity constraints and low inventories indicate continued tightness in global product markets. These factors have driven global refining margins to unusually high levels.

US Gulf Coast and NW European refining margins (“crack spreads”)

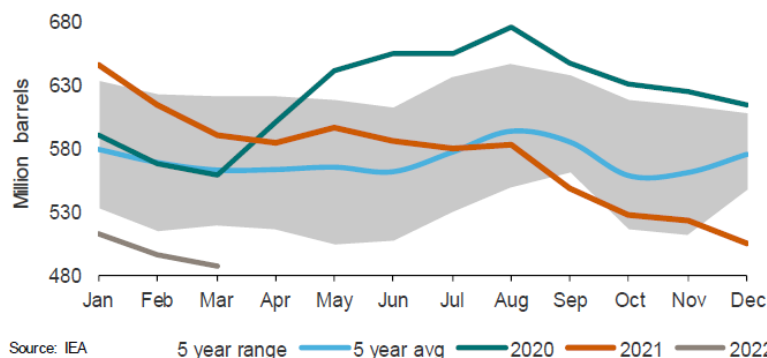


Source: International Energy Agency

A sharp widening of refining margins has led to the price of oil products rising faster than the price of crude oil. Gasoline, diesel and jet fuel prices sit close to record highs. Gasoil in Europe, for example, now trades at around \$175/bbl, an unprecedented spread over the Brent front month oil price (\$121/bbl).

One key driver of the high product prices is tightness in oil product inventories. Observable inventories of middle distillates (e.g. gasoil/diesel and jet fuel) as well as light ends (e.g. gasoline and naphtha) have continued to decline. This trend is especially strong for middle distillates, where inventories are now low in nearly all the main demand centres.

OECD total industry middle distillate stocks



Source: DNB

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With refined product demand recovering close to pre-pandemic levels, this is resulting in very high refinery utilisation. Valero in the US, for example, has recently been running at 93% utilisation and as the company itself has admitted, that high level cannot be sustained for long periods of time.

## EU Russian oil ban

The recent EU action against Russian oil is especially relevant when thinking about refining margins. At the end of May, it was announced that the EU would ban Russian seaborne oil by the end of 2022, with a temporary exemption for Russian pipeline oil. Poland and Germany have pledged to stop importing pipeline oil from Russia by the end of the year, bringing total coverage of the ban to 90% of Russian oil imports into the EU. Importantly, the EU's import ban also applies to oil products, such as diesel. Here, there is an important difference to crude oil. Whereas crude oil is a truly global market (more than 50% of global crude oil supply flows via the seaborne market), only 25% of the world's middle distillates, including diesel, move in this way. So when the EU stops its Russian middle distillate imports, those supplies are likely to be much harder than crude oil to divert in a meaningful way. The result will be Russian refineries running at lower capacity, unable to divert distillate elsewhere, and diesel inventories running even lower.

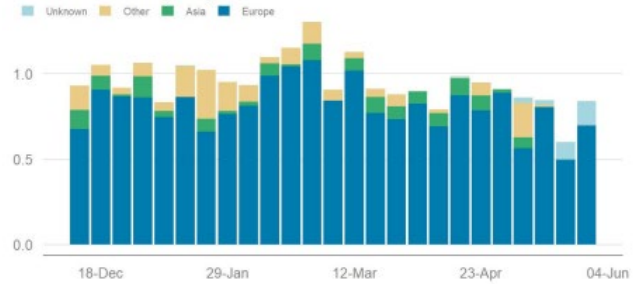
**Seaborne oil exports from Russia**

Of crude oil and condensate (mb/d)



**Seaborne oil exports from Russia**

Of middle distillates (mb/d)



Source: Morgan Stanley

Whilst India, for example, has taken an additional 1m b/day of crude oil from Russia in April and May, there is no flow of middle distillate from Russia to India.

How does the EU compensate for a loss of Russian refined oil products? One option, of course, is for existing refineries to run harder. There is in theory a small amount of slack still in the European system, but with recent reductions in capacity, not much to rely on. The alternative is to attract seaborne refined product cargoes from other suppliers. However, with inventories low and falling in nearly all main demand centres around the world, pulling in marginal product into the EU will be an expensive exercise.

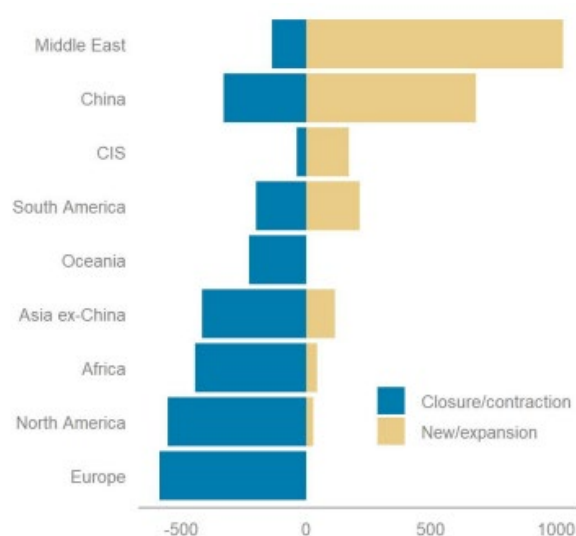
## Refining capacity

A lack of refining capacity is also a major contributing factor here. In another example of underinvestment in the oil and gas industry, global refining capacity fell in 2021 by 0.75m b/day – the first decline in 30 years, according to the International Energy Agency. In the US, capacity is down nearly 1m b/day from 2019 levels. New capacity has been added in the China and Middle East, but this has not translated into additional exports of refined products. The Russian refining system has seen around 1.3m b/day of capacity taken out of the system since late February, which is 0.6m b/day more than would be expected seasonally. In aggregate, Morgan Stanley estimate that global refining capacity may be down by as much as 2.7m b/day since the start of COVID.



## The Guinness Global Energy Report

### Change in atmospheric distillation capacity since start of 2020 (000s b/day)



Source: Morgan Stanley

Typically, the supply of refining capacity is inelastic. New refining operations have a high capital intensity and take many years to pass regulatory and permitting hurdles. There is some new capacity scheduled to come onstream later this year, notably the Al-Zour refinery in Kuwait (0.6m b/day), but in general, the appetite for making significant investments into long-life refining assets remains low. Solving any structural shortage in global refining capacity, therefore, is not easy.

As we now come out of refinery maintenance season, refineries globally have extremely strong incentives to maximise crude runs. As refineries ramp up, we should see some relief for spot refining margins, though we expect forward refining margins to remain elevated when compared to recent years.

In the Guinness Global Energy portfolio, we have good exposure to international refining, spread across each of the main demand centres. In North America, our exposure comes most directly via Valero, and indirectly via Exxon, Chevron, Imperial Oil and Suncor. In Europe, we see our holdings in Repsol, ENI, Shell and BP as having material refining businesses, whilst exposure in China comes via Petrochina and Sinopec. We see these companies, especially the European holdings, as trading at attractive valuations versus expectations for refining (and other) profits over the next few years.

## The Guinness Global Energy Report

### 3. 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), rose by 13.3% in May, while the MSCI World Index (net return) rose by 0.1% in USD.

Within the Fund, May's strongest performers included Devon Energy, Cenovus, Diamondback, Pioneer and Total while the weakest performers included Enquest, Repsol, Enbridge, Sinopec and Canadian Natural Resources.

#### Performance (in USD) as at 31.05.2022

The value of this investment and any income arising from it can fall as well as rise as a result of market and currency fluctuations as well as other factors. You may lose money in this investment.

Cumulative % returns	YTD	1 year	3 years ann.	5 years ann.	Launch of strategy* ann. (31.12.98)		
<b>Guinness Global Energy Fund (Class Y, 0.99% OCF)</b>	36.1%	50.0%	10.1%	5.2%	8.9%		
<b>MSCI World Energy NR Index</b>	45.9%	59.0%	14.0%	8.5%	6.7%		
<b>Calendar year</b>							
% returns	2021	2020	2019	2018	2017	2016	2015
<b>Guinness Global Energy Fund (Class Y, 0.99% OCF)</b>	44.5%	-34.7%	9.8%	-19.7%	-1.3%	27.9%	-27.6%
<b>MSCI World Energy NR Index</b>	40.1%	-31.5%	11.4%	-15.8%	5.0%	26.6%	-22.8%
	2014	2013	2012	2011	2010	2009	2008*
<b>Guinness Global Energy Fund (Class Y, 0.99% OCF)</b>	-19.1%	24.4%	3.0%	-13.7%	15.3%	61.8%	-44.8%
<b>MSCI World Energy NR Index</b>	-11.6%	18.1%	1.9%	0.2%	11.9%	26.2%	-32.8%

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.

#### TB Guinness Global Energy Fund

UK investors should be aware that the Guinness Global Energy Fund is now available as a UK domiciled fund denominated in GBP. The TB Guinness Global Energy Fund is available from 0.96% OCF. The historical performance of this fund will differ from the Guinness Global Energy Fund as the TB Guinness Global Energy fund has only been recently brought into line with the Guinness Global Energy Fund. The documentation needed to make an investment, including the Prospectus, the Key Investor Information Document (KIID) and the Application Form, is available from the website [www.guinnessgi.com](http://www.guinnessgi.com) Please contact [info@guinnessgi.com](mailto:info@guinnessgi.com) or +44 (0) 20 7222 5703 for more details.

**Returns stated above are in US dollars; returns in other currencies may be higher or lower as a result of currency fluctuations. Investors may be subject to tax on distributions. The Fund's Prospectus gives a full explanation of the characteristics of the Fund and is available at [www.guinnessgi.com](http://www.guinnessgi.com).**

## The Guinness Global Energy Report

### 4. PORTFOLIO Guinness Global Energy Fund

#### Buys/Sells

In May, we purchased new positions in Cenovus Energy (Canadian integrated oil & gas) and Kinder Morgan (North American midstream).

#### Sector Breakdown

The following table shows the asset allocation of the Fund at **May 31 2022**.

Asset allocation as %NAV	Current	Change	Last year end	Previous year ends				
	May-22		Dec-21	Dec-20	Dec-19	Dec-18	Dec-17	Dec-16
<b>Oil &amp; Gas</b>	<b>97.2%</b>	<b>0.3%</b>	<b>96.9%</b>	<b>94.8%</b>	<b>98.3%</b>	<b>96.7%</b>	<b>98.4%</b>	<b>96.7%</b>
Integrated	53.8%	-3.8%	57.7%	56.3%	51.1%	46.4%	42.9%	46.4%
Exploration & Production	24.5%	0.8%	23.7%	22.2%	29.6%	35.8%	36.9%	35.8%
Drilling	0.0%	0.0%	0.0%	0.0%	0.1%	2.2%	1.9%	2.2%
Equipment & Services	7.8%	3.8%	4.0%	4.6%	9.6%	8.6%	9.5%	8.6%
Storage & Transportation	5.2%	0.9%	4.3%	4.4%	4.0%	0.0%	3.5%	0.0%
Refining & Marketing	5.8%	-1.4%	7.2%	7.3%	3.8%	3.7%	3.7%	3.7%
Solar	0.7%	-0.3%	1.0%	1.8%	0.7%	0.9%	1.4%	0.9%
Coal & Consumable Fuels	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%
Cash	2.1%	0.0%	2.1%	3.3%	1.1%	2.4%	0.2%	2.4%

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

The Fund at end of May 2022 was on a price to earnings ratio (P/E) for 2021/2022 of 15.4x/7.6x versus the MSCI World Index at 18.5x/16.2x as set out in the following table:

As at 31 May 2022	P/E		
	2020	2021E	2022E
Guinness Global Energy Fund	93.2x	15.4x	7.6x
MSCI World Index	34.1x	18.5x	16.2x
Fund Premium/(Discount)	173%	-17%	-53%

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, Royal Dutch Shell and Total. Mid/large and mid-caps are ENI, Equinor, GALP, Repsol and OMV. At May 31 2021 the median P/E ratio of this group was 12.0x 2021 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.25%) 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, in the portfolio and in total represent around 3% of the portfolio.

The portfolio contains two midstream holdings, Enbridge and Kinder Morgan, two of North America's largest pipeline company. 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 8% of the portfolio. The stocks we own are mainly diversified internationally (Helix and Schlumberger).

## The Guinness Global Energy Report

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 April 30 2022 (for compliance reasons disclosed one month in arrears)

Guinness Global Energy Fund (30 April 2022)			P/E			EV/EBITDA			Price/Book		
Stock	ISIN	% of NAV	2020	2021E	2022E	2020	2021E	2022E	2020	2021E	2022E
<b>Integrated Oil &amp; Gas</b>											
Exxon Mobil Corp	US30231G1022	5.2%	n/a	16.3x	9.0x	20.1x	7.4x	4.7x	2.2x	2.2x	2.0x
Chevron Corp	US1667641005	5.3%	n/a	18.3x	10.4x	18.7x	7.7x	5.3x	2.2x	2.2x	2.0x
Shell PLC	GB00BP6MXDE	4.5%	43.7x	11.6x	6.0x	7.9x	4.9x	3.4x	1.3x	1.3x	1.1x
Total SA	FR0000120271	4.5%	34.5x	7.6x	4.5x	8.6x	4.1x	2.8x	1.2x	1.2x	1.0x
BP PLC	GB0007980591	4.1%	n/a	7.9x	5.0x	11.4x	4.1x	3.2x	1.4x	1.3x	1.2x
Equinor ASA	NO0010096985	4.4%	61.5x	11.1x	6.3x	5.9x	2.4x	1.5x	3.2x	2.8x	2.3x
ENI SpA	IT0003132476	2.9%	n/a	10.4x	5.4x	5.8x	3.5x	2.5x	1.0x	1.1x	1.0x
Repsol SA	ES0173516115	4.0%	59.6x	8.8x	5.2x	6.6x	4.1x	3.1x	0.8x	0.9x	0.8x
Galp Energia SGPS SA	PTGALOAM0001	3.2%	n/a	19.0x	10.0x	6.6x	4.7x	3.4x	2.3x	2.6x	2.7x
OMV AG	AT0000743059	3.0%	20.5x	5.4x	4.4x	7.0x	3.4x	2.8x	1.0x	1.0x	0.9x
		<b>41.1%</b>									
<b>Integrated / Oil &amp; Gas E&amp;P - Canada</b>											
Suncor Energy Inc	CA8672241079	5.4%	n/a	17.4x	7.0x	17.3x	6.2x	4.2x	2.0x	1.9x	1.6x
Canadian Natural Resources Ltd	CA1363851017	4.9%	n/a	13.1x	7.0x	18.0x	6.7x	4.4x	2.9x	2.5x	2.2x
Imperial Oil Ltd	CA4530384086	5.1%	n/a	17.3x	7.9x	50.1x	8.7x	4.9x	2.1x	2.1x	1.8x
		<b>15.4%</b>									
<b>Integrated Oil &amp; Gas - Emerging market</b>											
PetroChina Co Ltd	CNE1000003W8	1.6%	30.3x	6.1x	5.4x	4.7x	3.5x	3.3x	0.5x	0.4x	0.4x
		<b>1.6%</b>									
<b>Oil &amp; Gas E&amp;P</b>											
ConocoPhillips	US20825C1045	4.1%	n/a	15.8x	7.2x	23.6x	6.3x	3.8x	3.4x	2.8x	2.2x
EOG Resources Inc	US26875P1012	3.4%	106.5x	13.5x	7.7x	14.0x	6.3x	4.3x	3.3x	3.0x	2.4x
Diamondback Energy Co	US25278X1090	3.4%	42.1x	11.4x	5.1x	13.2x	6.8x	3.9x	2.0x	1.9x	1.5x
Pioneer Natural Resources Co	US7237871071	3.5%	148.8x	18.1x	7.4x	25.7x	8.6x	4.5x	3.3x	2.4x	2.1x
Devon Energy Corp	US25179M1036	3.7%	n/a	17.2x	7.1x	26.6x	7.5x	4.3x	6.9x	4.1x	3.2x
		<b>18.1%</b>									
<b>International E&amp;Ps</b>											
Pharos Energy PLC	GB00B572ZV91	0.1%	n/a	n/a	6.6x	1.8x	2.1x	1.1x	n/a	n/a	n/a
		<b>0.1%</b>									
<b>Midstream</b>											
Enbridge Inc	CA29250N1050	4.1%	22.6x	19.8x	18.4x	13.9x	13.3x	12.3x	1.9x	2.0x	2.0x
		<b>4.1%</b>									
<b>Equipment &amp; Services</b>											
Schlumberger Ltd	AN8068571086	3.9%	60.7x	30.8x	20.8x	15.8x	13.6x	11.2x	4.5x	4.0x	3.3x
Halliburton Co	US4062161017	1.5%	57.4x	33.4x	18.9x	16.1x	14.2x	10.3x	5.9x	5.3x	4.0x
Baker Hughes a GE Co	US05722G1004	1.4%	112.0x	47.1x	26.7x	16.1x	13.7x	11.2x	3.2x	2.0x	2.1x
Helix Energy Solutions Group Inc	US42330P1075	0.6%	n/a	n/a	n/a	4.6x	7.0x	9.4x	0.4x	0.4x	0.4x
		<b>7.4%</b>									
<b>Oil &amp; Gas Refining &amp; Marketing</b>											
China Petroleum & Chemical Corp	CNE1000002Q2	1.2%	11.0x	5.3x	5.5x	5.9x	3.7x	3.7x	0.5x	0.5x	0.5x
Valero Energy Corp	US91913Y1001	5.1%	n/a	63.6x	9.3x	55.6x	13.7x	6.1x	2.7x	2.5x	2.1x
		<b>6.4%</b>									
<b>Research Portfolio</b>											
Deltic Energy PLC	GB00B65YK01	0.2%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
EnQuest PLC	GB00B635TG28	0.5%	n/a	6.1x	1.4x	3.0x	2.1x	1.5x	2.9x	20.5x	n/a
Reabold Resources PLC	GB00B95L0551	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sunpower Corp	US8676524064	0.7%	n/a	93.8x	61.1x	94.9x	43.1x	31.1x	235.9x	7.4x	4.9x
Maxeon Solar Technologies Ltd	SGXZ25336314	0.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.4x	2.7x
Diversified Energy Company	GB00BYX7JT74	0.5%	6.4x	31.1x	9.6x	7.5x	6.4x	4.7x	1.1x	1.2x	1.4x
		<b>1.9%</b>									
Cash	Cash	3.8%									
<b>Portfolio</b>		<b>100.0%</b>	<b>85.0x</b>	<b>13.8x</b>	<b>7.4x</b>	<b>11.6x</b>	<b>5.8x</b>	<b>4.0x</b>	<b>1.9x</b>	<b>1.8x</b>	<b>1.6x</b>

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.

## 5. 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	2022E
							<i>IEA</i>	<i>IEA</i>
<b>World Demand</b>	<b>95.3</b>	<b>96.4</b>	<b>98.2</b>	<b>99.5</b>	<b>100.5</b>	<b>91.9</b>	<b>97.5</b>	<b>99.4</b>
Non-OPEC supply (inc NGLs)	60.3	59.8	60.8	63.5	65.6	63.0	63.7	64.5
OPEC NGLs	5.2	5.3	5.4	5.5	5.4	5.1	5.1	5.4
<b>Non-OPEC supply plus OPEC NGLs</b>	<b>65.5</b>	<b>65.1</b>	<b>66.2</b>	<b>69.0</b>	<b>71.0</b>	<b>68.1</b>	<b>68.8</b>	<b>69.9</b>
<b>Call on OPEC (crude oil)</b>	<b>29.8</b>	<b>31.3</b>	<b>32.0</b>	<b>30.5</b>	<b>29.5</b>	<b>23.8</b>	<b>28.7</b>	<b>29.5</b>
Congo supply adjustment	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
Eq Guinea supply adjustment	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>Call on OPEC-10 (crude oil)</b>	<b>29.2</b>	<b>30.7</b>	<b>31.4</b>	<b>29.9</b>	<b>28.9</b>	<b>23.2</b>	<b>28.1</b>	<b>28.9</b>

Source: Bloomberg; IEA; Guinness Global Investors

Global oil demand in 2019 was 13m b/day higher than the pre-financial crisis (2007) peak. The demand picture for 2020, down by nearly 9m b/day, was heavily clouded by the impact of the COVID-19 virus and efforts to mitigate its spread. The IEA's best estimate is that demand recovered in 2021 by around 5.6m b/day, leaving overall consumption still around 3.0m b/day below the 2019 peak.

### OPEC

The last five years have proved a testing time 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+ bbl 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 over 18 months by 2.5m b/day. 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 represented a cut of 1.2m b/day. There was also an understanding that non-OPEC, including Russia, would cut production by 0.6m b/day, taking the total reduction to 1.8m b/day.

## The Guinness Global Energy Report

### OPEC-10 oil production to May 2022

('000 b/day)	31-Dec-19	30-Apr-22	31-May-22	Current vs Dec 2019	Current vs last month
<b>Saudi</b>	9,730	10,380	<b>10,430</b>	700	50
Iran	2,080	2,580	<b>2,580</b>	500	0
Iraq	4,610	4,460	<b>4,430</b>	-180	-30
UAE	3,040	3,010	<b>3,040</b>	0	30
Kuwait	2,710	2,610	<b>2,690</b>	-20	80
Nigeria	1,820	1,370	<b>1,490</b>	-330	120
Venezuela	730	700	<b>680</b>	-50	-20
Angola	1,390	1,140	<b>1,160</b>	-230	20
Libya	1,110	900	<b>760</b>	-350	-140
Algeria	1,010	990	<b>1,020</b>	10	30
<b>OPEC-10</b>	<b>28,230</b>	<b>28,140</b>	<b>28,280</b>	<b>50</b>	<b>140</b>

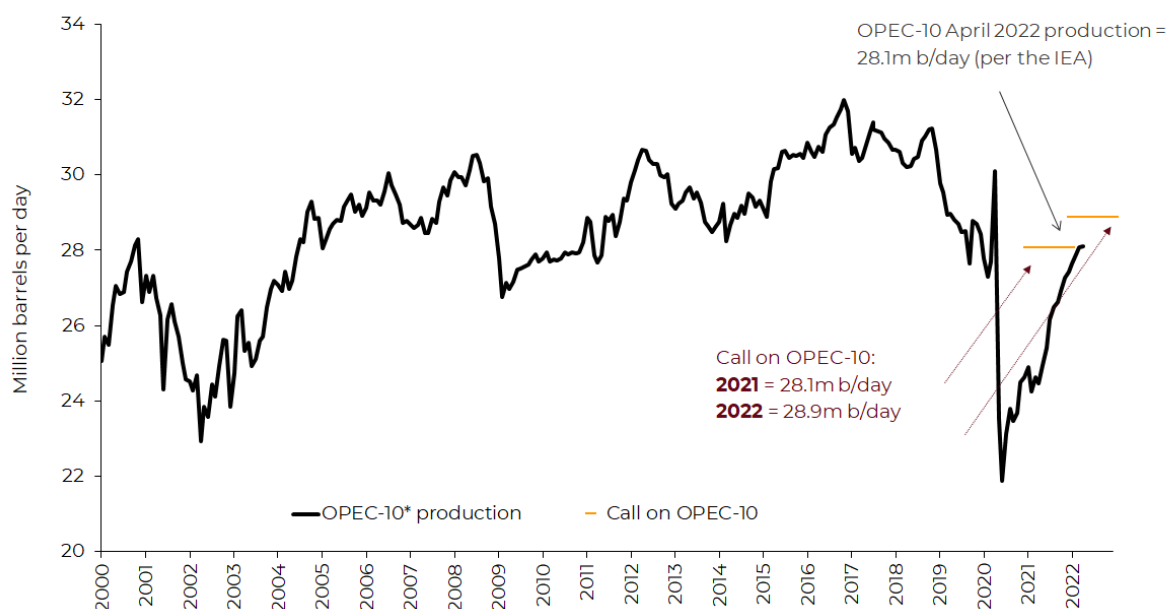
Source: Bloomberg; Guinness Global Investors

The 2017-19 period continued to see a volatile time 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 until September 2022, whilst still meeting monthly to ratify each production increase in light of the prevailing conditions. The agreement gives us confidence that OPEC is looking to do 'what it takes' to keep the market in balance, despite extreme challenges in the shorter term.

### OPEC-10 apparent production vs call on OPEC 2000 – 2022



Source: IEA Oil Market Report (May 2022 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.

## The Guinness Global Energy Report

In the shorter term, the COVID-19 and Russia 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

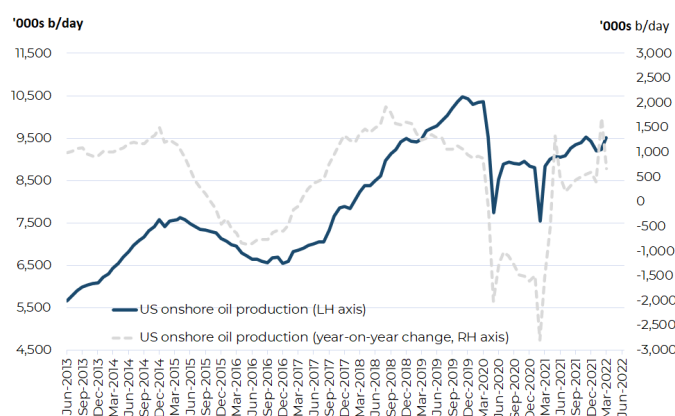
Nothing in the market in recent years has changed our view that OPEC can put a floor under the price – as they did in 2020, 2018, 2016, 2008, 2006, 2001 and 1998.

### 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 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 well into the 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. During 2019 and 2020, we started to see increased pressure on US E&P companies to improve their capital discipline and to cut their reinvestment rates, and this is evidenced by higher costs of capital being charged to the US E&P companies.

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 significantly reducing capital spending as they attempt 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 is returning in 2022, albeit slower than the previous cycle, as the Russia/Ukraine crisis creates greater space again 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 2022 oil demand will rise by around 1.9m b/day to 99.4m b/day, still around 1m b/day below the 2019 pre-COVID peak. The spread of the COVID virus globally caused major restrictions to the movement of people, which has now largely reversed, but high prices and slower economic growth are curtailing demand growth in certain sectors.

## The Guinness Global Energy Report

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

In the US, the sharp fall in gasoline prices since 2014 has stimulated a reversal in improving fuel efficiency, as drivers switch back to purchasing larger vehicles, and a rise in total vehicle miles travelled. Total vehicle miles travelled had stalled between 2007 and 2014, after two decades of growth, and are now growing again (ex-COVID effects) at a rate of around 1% per year.

The trajectory of global oil demand over the next few years will be a function of global GDP, pace of the 'consumerisation' of developing economies, the development of alternative fuels and price. At a \$50/bl oil price, the world oil bill as a percentage of GDP is around 2.0% and this will still be a stimulant of further demand growth. If oil prices persist in a higher range (say around \$75/bbl, representing 3%+ of GDP), we probably return to the pattern established over the past 5 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 6.1m in 2021, up from 3.1m in 2020. We expect to see strong EV sales growth again in 2022, up to around 9m, or 10% of total global sales. Even applying an aggressive growth rate to EV sales, we see EVs comprising only around 2% of the global car fleet by the end of 2022. 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 70%), 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 2022 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
WTI	82	104	68	84	99	94	98	93	49	45	51	65	57	40	68	92
Brent	82	103	67	84	115	112	108	99	52	45	54	72	60	42	70	95
<b>Brent/WTI (12m MAV)</b>	<b>82</b>	<b>104</b>	<b>68</b>	<b>84</b>	<b>107</b>	<b>103</b>	<b>103</b>	<b>96</b>	<b>51</b>	<b>45</b>	<b>53</b>	<b>68</b>	<b>59</b>	<b>41</b>	<b>69</b>	<b>94</b>
<b>Brent/WTI y-on-y change</b>	9%	26%	-35%	24%	27%	-4%	0%	-7%	-47%	-11%	17%	30%	-14%	-30%	68%	36%
Brent/WTI (5yr MAV)	61	75	79	82	89	93	93	99	92	80	69	63	55	53	58	66

Source: Guinness Global Investors, Bloomberg

We believe that Saudi's long-term objective remains to maintain a 'good' oil price, something north of \$70/bl. The world oil bill at around \$70/bl represents 2.8% of 2021 Global GDP, under the average of the 1970 – 2015 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.



# The Guinness Global Energy Report

## US natural gas demand

Bcf/day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022E
<b>US natural gas demand:</b>											
Residential/commercial	19.2	22.4	23.4	21.4	20.5	20.9	23.4	23.5	21.3	22.2	21.9
Power generation	24.9	22.3	22.3	26.5	27.3	25.3	29.0	30.9	31.7	30.3	30.5
Industrial	19.7	20.3	20.9	20.6	21.1	21.6	23.0	23.0	22.6	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	6.1	6.3
LNG exports	-	-	-	0.1	1.0	2.6	3.4	5.7	7.3	10.3	12.6
Pipeline/plant/other	6.1	6.7	6.3	6.5	6.4	6.5	7.1	7.6	7.7	7.8	8.1
<b>Total demand</b>	<b>71.7</b>	<b>73.6</b>	<b>74.8</b>	<b>77.8</b>	<b>80.1</b>	<b>80.9</b>	<b>90.5</b>	<b>95.8</b>	<b>96.0</b>	<b>99.7</b>	<b>102.5</b>
<b>Demand growth</b>	<b>3.1</b>	<b>1.9</b>	<b>1.2</b>	<b>3.0</b>	<b>2.3</b>	<b>0.8</b>	<b>9.6</b>	<b>5.3</b>	<b>0.2</b>	<b>3.7</b>	<b>2.8</b>

Source: Guinness estimates; GS (May 2022)

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 2021, 33% 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 2021 (including Mexican and LNG exports) was around 99.7 Bcf/day, up by 3.7 Bcf/day versus 2020 and 11 Bcf/day (12%) higher than the 5-year average. The biggest contributors to the growth in demand in 2020 were residential/commercial and LNG exports (opening of new export terminals). Power generation for gas was lower, however.

We expect US demand in 2022, assuming prices remain around \$4-6/mcf, to be up by around 3 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	2022E
<b>US natural gas supply:</b>											
US (onshore & offshore)	65.7	66.3	70.9	74.2	73.4	73.6	84.0	92.3	92.1	103.0	105.8
Net imports (Canada)	5.4	5.0	4.9	4.9	5.5	5.8	5.4	4.7	4.4	5.3	5.6
LNG imports & other	0.8	0.6	0.5	0.5	0.4	0.3	0.1	0.1	-	-	0.1
<b>Total supply</b>	<b>71.9</b>	<b>71.9</b>	<b>76.3</b>	<b>79.6</b>	<b>79.3</b>	<b>79.7</b>	<b>89.5</b>	<b>97.1</b>	<b>96.5</b>	<b>98.3</b>	<b>101.5</b>
<b>Supply growth</b>	<b>2.4</b>	<b>-</b>	<b>4.4</b>	<b>3.3</b>	<b>- 0.3</b>	<b>0.4</b>	<b>9.8</b>	<b>7.6</b>	<b>- 0.6</b>	<b>1.8</b>	<b>3.2</b>
<b>(Supply)/demand balance</b>	<b>- 0.2</b>	<b>1.7</b>	<b>- 1.5</b>	<b>- 1.8</b>	<b>0.8</b>	<b>1.2</b>	<b>1.0</b>	<b>- 1.3</b>	<b>- 0.5</b>	<b>1.4</b>	<b>1.0</b>

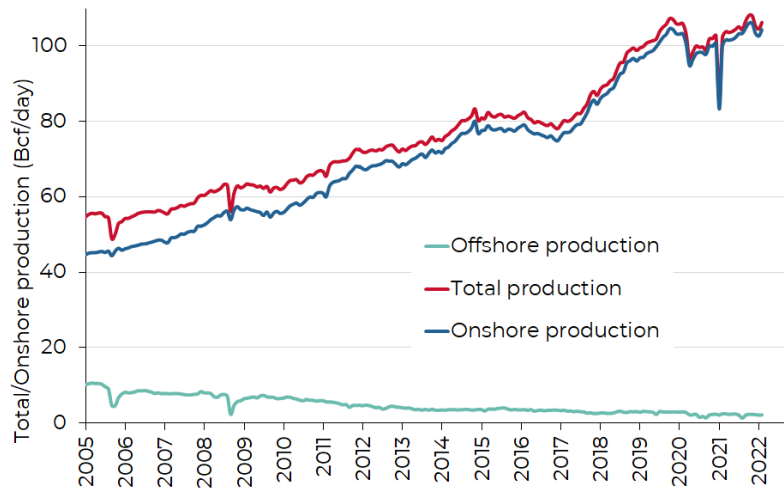
Source: EIA; GS; Guinness estimates

Over the last 10 years, 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 138 at the end of March 2022. However, offsetting the fall, the average

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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 – 2022 (Lower 48 States)**



Source: EIA 914 data (June 2022 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.

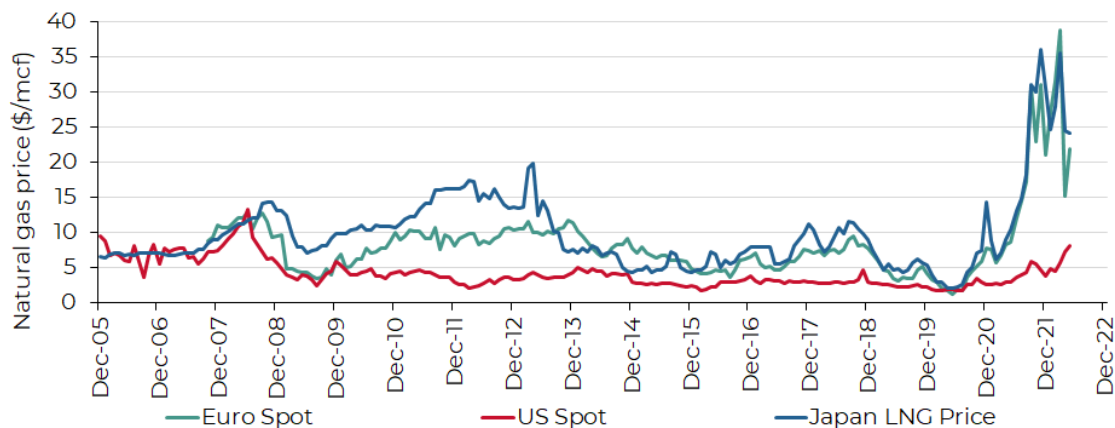
Associated gas production declined in 2021 with the fall of shale oil production, but will rise again in 2022 as shale oil grows again. Generally, we expect to see rates of around 2-3 Bcf/day of associated gas per 1m b/day of oil production growth. The Marcellus/Utica region, which includes the largest producing gas field in the US and the surrounding region, reached production of around 32 Bcf/day in 2021. Moderate growth is likely in 2022.

Overall, if the price averages in the \$4-\$6/mcf range, we expect a rise in average onshore gas supply in 2022, up by around 2-3 Bcf/day versus 2021.

### 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.\$20-25/mcf versus c.\$7-8/mcf). Asian spot LNG prices have also been extraordinarily strong, averaging over \$10/mcf in 2021 and up over \$24/mcf on a spot basis at the end of May. There have been many factors at play, in particular the strong economic recovery which is driving demand, 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 over \$8/mcf.

**International gas prices to May 2022**



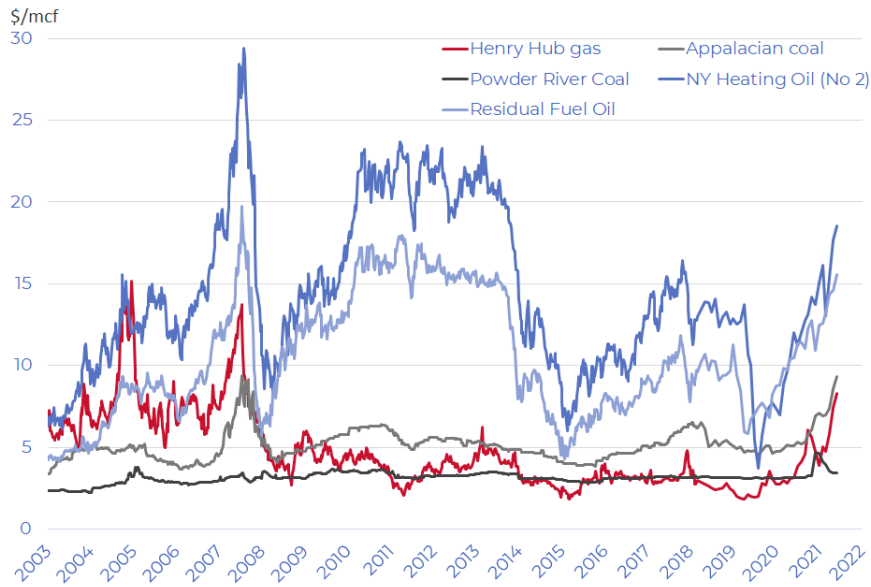
Source: Bloomberg; Guinness Global Investors (May 2022)

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## 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 2022)

## 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 \$3.71/mcf in 2021, up from \$2.13/mcf in 2020, and we suspect that the (full cycle) marginal cost of supply is now around \$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.

## 6. APPENDIX Oil and gas markets historical context

**Oil price (WTI \$) since 1989**



Source: Bloomberg LP

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's 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.

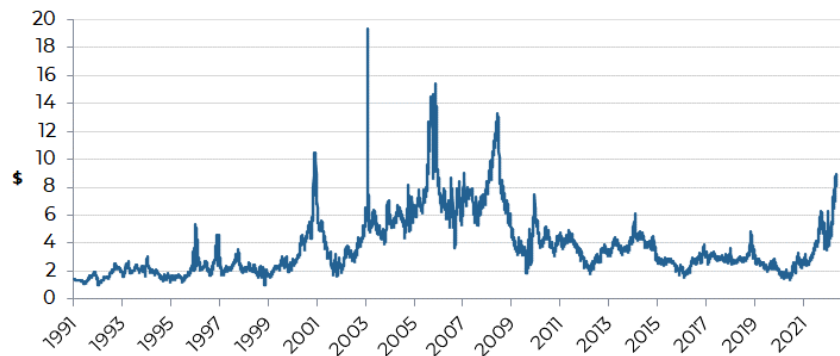
Prices during 2011-2014 moved higher, averaging around \$100, though WTI generally traded lower than Brent oil benchmarks due to US domestic oversupply affecting WTI. During this period, US

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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 range 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-:** 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

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.

# The Guinness Global Energy Report

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The documentation needed to make an investment, including the Prospectus, the Key Investor Information Document (KIID) and the Application Form, is available in English from [www.guinnessgi.com](http://www.guinnessgi.com) or free of charge from:-

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- the Promoter and Investment Manager: Guinness Asset Management Ltd, 18 Smith Square, London SW1P 3HZ.

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**Telephone calls** will be recorded and monitored.