Goldman Sachs | Commodities Research

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Oil Analyst

A Longer Road to Higher Prices

- Oil prices have plunged despite the China demand boom given banking stress, recession fears, and an exodus of investor flows. Historically, after such scarring events, positioning and prices recover only gradually, especially long-dated prices. We incorporate this market feature in our framework, and nudge down our Brent forecasts to $94/bbl for 12 months ahead, and $97/bbl in 2024H2 (vs. $100 previously for both), accordingly.
- Our adjustment also reflects somewhat softer fundamentals, namely higher-than-expected near-term inventories, moderately lower demand, and modestly higher non-OPEC supply. We, however, still believe that sharp rises in EM demand will outweigh moderate declines in DM demand, pivot the market back into deficits from June onward, and drive the recovery.
- We have lowered our demand projections for Europe and North America in 2023 and 2024 incorporating softer realized data, and slower US GDP growth. In contrast, we have further front-loaded the recovery in Eastern demand, especially in China. On net, our annual average demand estimates are unchanged for 2023, but lower (-0.6mb/d) for 2024.
- We have raised our non-OPEC supply estimates in 2023 (+0.3mb/d) and 2024 (+0.2mb/d), incorporating several upside surprises, most notably in Russia. We still assume that Russia gradually implements its announced 0.5mb/d production cut in the context of OPEC+ coordination. However, following the decline in prices, we have nudged down our US supply path, and now think OPEC will only increase its output in 2024Q3.
- We conclude with a hypothetical moderate OECD-centric recession scenario. If OECD and non-OECD growth are 4pp and 1pp below our baseline in 2023Q2-2024Q1, respectively, then our timespreads model implies a hit to Brent prices of $22/bbl by 2024Q1. However, the estimated immediate price hit is just $4/bbl because spot oil markets generally price the near-term outlook for inventories, which only reach high levels after multiple quarters of demand damage. While stylized, this estimate increases our conviction that oil markets have turned excessively pessimistic about the outlook, and that oil prices should recover in most of the likely growth scenarios.

Daan Struyven
+1(212)357-4172 |
daan.struyven@gs.com
Goldman Sachs & Co. LLC

Callum Bruce
+1(212)902-3053 | callum.bruce@gs.com
Goldman Sachs & Co. LLC

Yulia Zhestkova Grigsby
+1(646)446-3905 | yulia.grigsby@gs.com
Goldman Sachs & Co. LLC

Romain Langlois
+1(212)357-6395 |
romain.langlois@gs.com
Goldman Sachs & Co. LLC

Jeffrey Currie
+44(20)7552-7410 |
jeffrey.currie@gs.com
Goldman Sachs International

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Exhibit 1: We Have Nudged Down Our Oil Price Forecasts

GS Crude Price Foreasts, $/bbl

	Brent spot			WTI spot			Brent-WTI		
	New	Prior	Fwd	New	Prior	Fwd	New	Prior	Fwd
2023	85	92	74	79	87	69	5.3	5.3	5.3
2024	95	100	70	90	95	65	5.1	5.1	5.1
1Q23	82	84	80	76	79	75	5.7	5.7	5.8
2Q23	83	90	73	78	84	68	5.2	5.2	5.3
3Q23	85	95	72	80	90	67	5.2	5.2	5.0
4Q23	89	99	72	84	94	67	5.1	5.1	5.0
1Q24	92	100	71	87	95	66	5.1	5.1	5.0
2Q24	97	100	70	91	95	65	5.2	5.2	5.1
3Q24	97	100	70	91	95	65	5.1	5.1	5.2
4Q24	97	100	69	91	95	64	5.1	5.1	5.1
Jan-23	84	84	84	78	78	78	5.7	5.7	5.7
Feb-23	84	84	84	78	78	78	5.7	5.7	5.7
Mar-23	79	86	74	73	80	68	5.7	5.7	6.0
Apr-23	81	88	73	76	83	68	5.2	5.2	5.5
May-23	83	90	73	78	84	68	5.2	5.2	5.2
Jun-23	84	92	73	79	87	68	5.2	5.2	5.1
Jul-23	85	94	73	79	89	68	5.2	5.2	5.1
Aug-23	85	96	72	80	90	67	5.2	5.2	5.0
Sep-23	86	97	72	81	92	67	5.2	5.2	5.0
Oct-23	88	98	72	83	93	67	5.1	5.1	5.0
Nov-23	89	99	72	84	94	67	5.1	5.1	5.0
Dec-23	90	100	71	84	95	66	5.1	5.1	5.0
3m	84	92	73	79	87	68	5.2	5.2	5.1
6m	86	97	72	81	92	67	5.2	5.2	5.0
12m	94	100	71	89	95	66	5.1	5.1	5.0

The timing of our forecasts matches the month of trading. For instance, our Dec-23 row is associated to the Jan-24 contract traded in Dec-23.

Source: CME, Bloomberg, Goldman Sachs Global Investment Research

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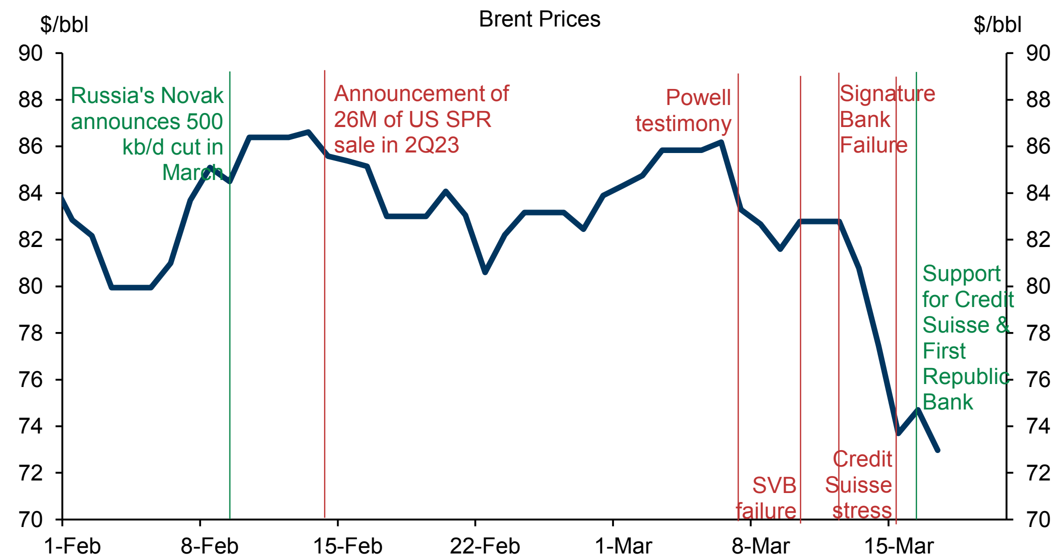
A Longer Road to Higher Prices

Last month we introduced a monthly forecast for oil prices. While the Brent February average of $84/bbl modestly exceeded our forecast, and timespreads firmed through March 6 on rising China demand, oil prices have sold off 15% since then (Exhibit 2). What to make of the collapse in oil prices to $73/bbl, and where do oil prices go from here?

Oil Plunges on Recession Fears

Over the past 12 days, rising near-term recession concerns, and an exodus of investors flows have pushed oil prices sharply lower. The first leg down in oil prices followed Chairman Powell's hint at a potential return to 50bp hikes on March 7th, which revived recession worries. The second sharper leg down in oil prices coincided with signs of stress in the banking system and a sharp decline in bank equities and interest rates.

Exhibit 2: Oil Prices Have Fallen 15% As Banking Stress Has Increased Recession Fears



Last data point is March 17th, 2023.

Source: Bloomberg, Goldman Sachs Global Investment Research

Given elevated recession fears, it is remarkable that long-dates prices have also significantly contributed to the selloff along with timespreads, which tend be more closely related to spot demand (Exhibit 3). Specifically, three-year forward Brent prices have fallen to c.$68/bbl, versus their January peak of c.$75/bbl.

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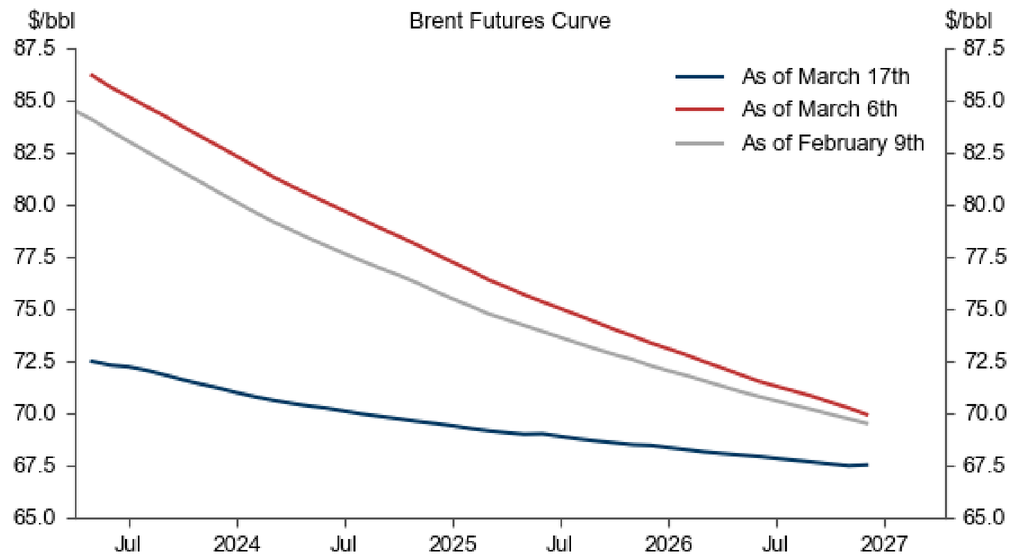
Exhibit 3: Large Contributions From Long-Dates Prices and Timespreads to the Selloff



Source: Bloomberg, Goldman Sachs Global Investment Research

While triggered by recessionary concerns about oil demand, we believe that the jump in interest rate volatility, and related VAR-driven liquidity shocks have exacerbated the selloff, as investors took off losing oil positions. Exhibit 4 shows that declines in long-dated oil prices have recently coincided with increases in the MOVE measure of interest rate volatility, which has jumped to a post-2008 high. The interaction of negative gamma effects in options markets and banking-sector stress has likely also amplified the selloff.[1]

[1] Negative gamma effects are amplification effects resulting from producer hedging flows. Hedging often takes the form of put options, where market-making banks are short puts (i.e. long oil), and delta-hedge their exposure via futures. As prices fall, the put options move more in-the-money, leaving banks under-hedged unless they sell more futures. This leads to increasing selling of futures as prices decline, reinforcing the selloff. While the sharpness and intra-day pattern of the selloff, occurring through strikes of large contracts, hint at some negative gamma effects, relatively moderate levels of producer hedging suggest the impact is relatively limited.

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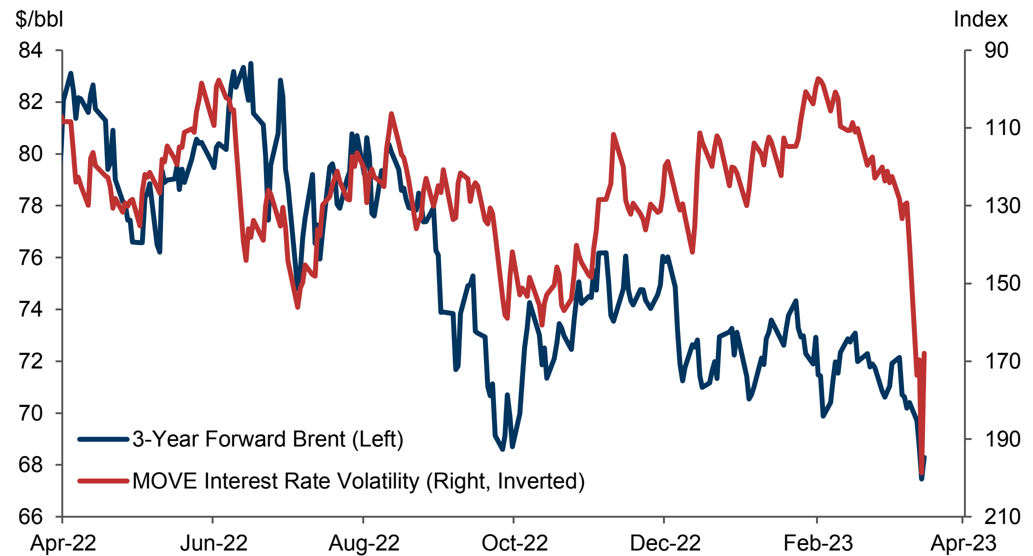
Exhibit 4: Higher Interest Rate Volatility and Lower Oil Prices



Last data point is March 17th, 2023.

Source: Bloomberg, Goldman Sachs Global Investment Research

Nudging Down Our Price Forecast

Historically, after such scarring events amid high uncertainty, positioning and prices recover only gradually, especially long-dated prices. We incorporate this empirical market feature into our oil pricing framework, and nudge down our Brent forecasts to $90/bbl in December 2023, $94/bbl for 12 months ahead, and $97/bbl in 2024H2 (vs. $100 previously for all three), accordingly.

Our adjustment also reflects somewhat softer fundamentals: 1) a higher starting point for inventories and the announcement of an additional SPR release, 2) lower OECD demand, and 3) moderately higher non-OPEC supply.

However, our economists still believe that the US and Europe will avoid recession given relatively elevated capital buffers in the banking system, and ongoing policy support. While we incorporate this week's downgrade to GS US GDP growth estimates, our 2023 and 2024 GS global growth assumptions remain close to potential at around 2½%. We still expect that sharp rises in EM oil demand will outweigh modest declines in DM demand, push the market back into deficits from June onward, and drive an oil price recovery. As Exhibit 5 shows, we expect rises in both long-dated prices and timespreads to fuel this recovery.[2]

[2] Our March 2023 average Brent forecast of $79/bbl assumes that prices for the remainder of March average last week's average value of $76/bbl.

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Exhibit 5: We Expect a Gradual Recovery in Oil Prices on Rising Timespreads and Long-Dated Prices

	1M/3Y Timespreads ($/bbl)	Brent 36M ($/bbl)	Front Brent
Dec-22	**9**	**73**	**81**
Jan-23	11	73	84
Feb-23	12	72	84
Mar-23	9	70	79
Apr-23	11	70	81
May-23	13	71	83
Jun-23	13	71	84
Jul-23	13	72	85
Aug-23	13	72	85
Sep-23	13	73	86
Oct-23	14	73	88
Nov-23	15	74	89
Dec-23	**15**	**74**	**90**
Jan-24	16	75	90
Feb-24	17	75	92
Mar-24	19	76	94
Apr-24	21	76	97
May-24	21	76	97
Jun-24	21	76	97
Jul-24	21	76	97
Aug-24	21	76	97
Sep-24	21	76	97
Oct-24	21	76	97
Nov-24	21	76	97
Dec-24	**21**	**76**	**97**

Source: Goldman Sachs Global Investment Research

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Long-Dated Prices Recover Only Gradually

We still expect long-dated prices to gradually rise to our fair value estimate of $76/bbl in 2024, but now believe it will take longer to get there given today's low starting point.

Our long-dated fair value estimate of $76/bbl is consistent with the average breakeven cost estimate of the one third most expensive global Top Projects from our energy equity analysts.[3] Focusing on US shale, which remains the key marginal supplier, we find it remarkable that long-dated prices are now below pre-war levels, and similar to levels in mid-2018. Our estimated marginal cost of US shale projects is now significantly higher than five years ago. In fact, input costs are c.30% above 2018 levels, geological trends are unfavorable, and the estimated cost of capital has risen by around 5pp. With US shale rig counts already declining at c.$85/bbl Brent, it is unclear how current long-dated prices are sustainable in a market that still needs shale to grow, given the lack of long-cycle investment since 2014 and rising global oil demand.

Nevertheless, the burden of proof remains on the market to pivot into a deficit, showing that marginal supply is needed. This recovery in long-dated prices will likely take time because we find that deviations from fair value historically tend be more persistent for long-dated prices then for timespreads. This reflects that long-dated prices are harder to 'arbitrage' without the prompt convergence mechanism related to near-term inventories. Moreover, in the current market environment, it is particularly unclear which buyers will push up the back-end, given the lack of liquidity and financial capital. This strengthens our view that the recovery of the back-end will require a return to deficits, that we expect from June onward.

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[3] The estimated incentive pricing for long-cycle oil Top Projects stands at $90/bbl using a 20% cost of capital and at $67/bbl using a 15% cost of capital.

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Somewhat Softer but Still Firming Fundamentals

While the scarring effect of plunging long-dated prices is a key driver of our forecast adjustment, we next review the three fundamental contributing factors: higher near-term inventories, moderately lower demand, and modestly higher non-OPEC supply.

Factor 1: Higher Near-Term Inventories

This week's IEA release of inventory data and the February announcement of an additional SPR release both imply slightly higher-than-expected near-term inventories.

OECD commercial inventories rose by 55mb in January, 45mb above our expectations, reflecting larger builds in the US and Europe. Last month, the Biden administration announced another sale from the SPR, with 26mb to be delivered to the market from April 1 to June 30, which will take the number of SPR barrels to a four-decades low. Because our monthly average WTI price forecast remains above $72/bbl, we assume SPR refills only gradually at a 60mb annual pace from October 2023 onward. Using this combined peak surprise to OECD commercial inventories and our timespreads model, we estimate a peak near-term drag on Brent prices of $3/bbl.

Factor 2: Downgrade to Western OECD Demand Slightly Outweighs Pull-Forward of Eastern Demand

The major 2023 demand theme is the contrast between softness in Western OECD countries and strength in the East. In fact, we now predict non-OECD demand to grow by 2.3mb/d on a Q4-Q4 basis this year, while OECD demand will likely decline by 0.5mb/d (Exhibit 6).

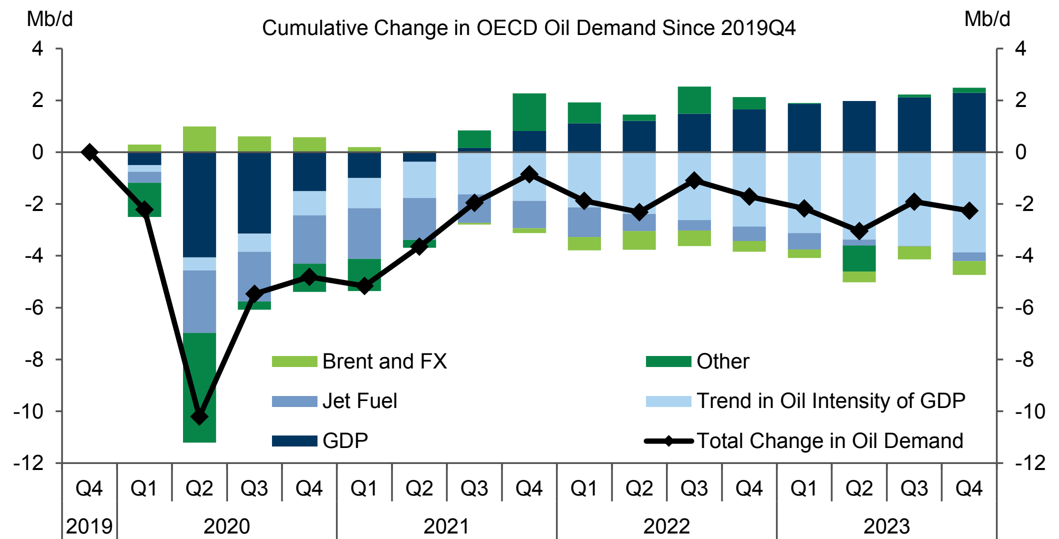
Exhibit 6: Sluggish Demand in the West vs. Booming Demand in the East

GS Oil Supply and Demand Outlook (mb/d, except where noted)	2023 avg.			2023	2024 avg.			2024	Quarterly Levels				
									2022	2023			
	Level	YoY	Δ	Q4-Q4	Level	YoY	Δ	Q4-Q4	Q4	Q1	Q2	Q3	Q4
World Supply	**101.5**	**1.3**	**-0.2**	**0.7**	**102.2**	**0.7**	**-0.8**	**1.2**	**101.2**	**101.2**	**101.4**	**101.7**	**101.9**
Non-OPEC Supply	66.9	1.3	0.3	0.8	67.2	0.2	0.2	0.5	66.4	66.7	66.8	67.0	67.2
Total US	20.0	1.1	-0.1	0.9	20.5	0.5	-0.1	0.4	19.4	19.7	20.1	20.1	20.3
Russia	10.8	-0.3	0.1	-0.4	10.5	-0.2	0.0	-0.1	11.0	11.1	10.7	10.6	10.6
Non-OPEC ex US ex Russia	39.6	0.6	0.3	0.3	39.6	-0.1	0.3	0.1	39.5	39.4	39.6	39.8	39.8
OPEC Supply	34.6	0.0	-0.5	-0.1	35.1	0.5	-0.9	0.8	34.8	34.4	34.6	34.7	34.7
World Demand	**101.6**	**1.4**	**0.0**	**1.8**	**102.8**	**1.2**	**-0.6**	**0.9**	**100.6**	**100.6**	**100.9**	**102.4**	**102.4**
OECD Demand	45.4	-0.6	-0.4	-0.5	45.2	-0.1	-0.6	0.1	46.0	45.5	44.7	45.8	45.5
US	20.0	-0.5	-0.3	-0.4	19.8	-0.2	-0.4	-0.1	20.3	20.0	19.9	20.1	19.9
OECD Europe	13.2	-0.3	-0.2	-0.2	13.2	0.0	-0.2	0.1	13.3	13.0	13.1	13.6	13.2
OECD ex US ex Europe	12.2	0.1	0.1	0.0	12.2	0.1	0.0	0.1	12.3	12.5	11.7	12.0	12.4
Non-OECD Demand	56.2	2.0	0.4	2.3	57.6	1.4	0.0	0.8	54.6	55.1	56.3	56.6	56.9
China	15.9	1.0	0.3	1.3	16.5	0.7	-0.1	0.4	14.9	15.3	16.0	16.0	16.2
Non-OECD ex China	40.4	1.0	0.1	1.0	41.1	0.7	0.1	0.5	39.7	39.8	40.3	40.6	40.7
Imbalance (=Supply-Demand)	**-0.1**	**-0.1**	**-0.2**	**-1.1**	**-0.6**	**-0.5**	**-0.2**	**0.3**	**0.6**	**0.5**	**0.5**	**-0.7**	**-0.5**

Source: IEA, Goldman Sachs Global Investment Research

We have lowered our 2023 and 2024 demand estimates for the US and Europe. We incorporate softer realized oil demand data, reduced US GDP growth forecasts (given tighter small bank lending standards), and our refined OECD demand model estimates. Consistent with the East-West divergence, we have raised our Asia OECD demand estimates slightly. Overall, our model suggests that OECD demand will remain well below its pre-pandemic level because the hits from the structural decline in oil intensity of GDP, and from higher oil prices and a stronger dollar outweigh the boost from GDP growth (Exhibit 7).

Exhibit 7: The Hit to Oil Demand From the Trend Decline in Oil Intensity Outweighs the Boost From GDP



The "Trend in Oil Intensity of GDP" corresponds to the contribution from the intercept in our quarterly growth model, and largely captures the structural decline in the oil intensity of GDP.

Source: IEA, OAG, Bloomberg, Haver Analytics, Goldman Sachs Global Investment Research

In contrast to softness in the West, we further front-load the recovery in the East, especially in China. The 0.3mb/d upgrade to our China 2023 annual average demand forecast reflects the strength in our China oil demand nowcast, consistent with the faster-than-expected recovery in services output (Exhibit 8). Specifically, our nowcast suggests that China demand has already recovered by 1mb/d from its 15mb/d 2023Q3 level, and we expect demand to rise further to 16.6mb/d by 2024Q4. With traffic measures already well above 2019 levels, we believe that jet fuel and petchem demand will drive a growing share of the remainder of the China recovery.

On net, our annual average global demand estimates are unchanged for 2023, but 0.6mb/d lower for 2024.

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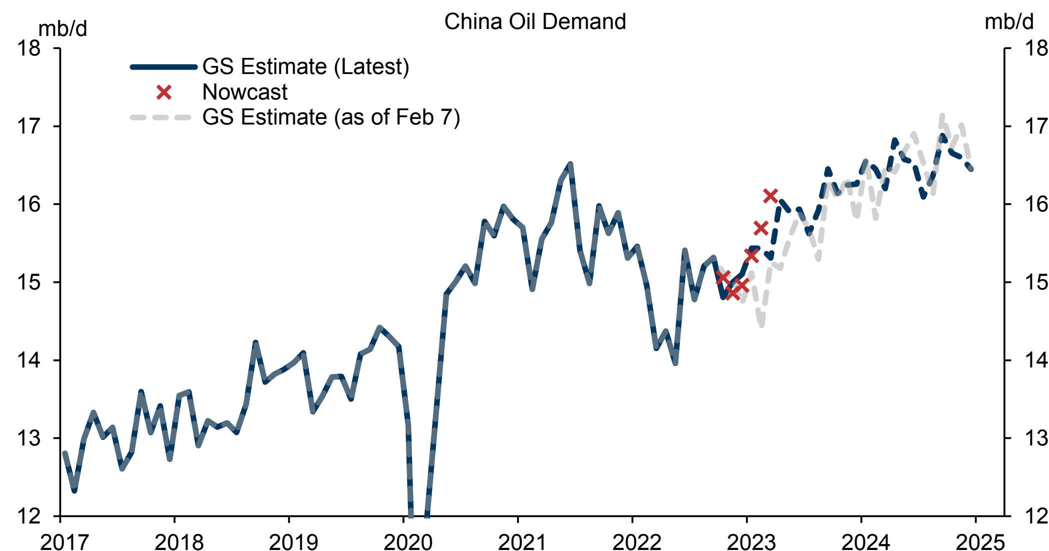
Exhibit 8: A More Front-Loaded Recovery in China Oil Demand



Source: ICIS, Oilchem, Kpler, IEA, Goldman Sachs Global Investment Research

Factor 3: Higher Non-OPEC Supply

We have nudged up our non-OPEC supply estimates in 2023 (+0.3mb/d) and 2024 (+0.2mb/d), incorporating several upside surprises, most notably in Russia but also in Brazil, and Mexico.

Russia total liquids production edged up further in February to around 11.3mb/d (Exhibit 9), and early March exports data remain resilient. This is surprising given last month's announcement of a 0.5mb/d March cut relative to January levels, and given frictions in clean tanker markets. We, however, continue to assume that Russia will gradually cut production by 0.5mb/d in the context of OPEC+ coordination. The recent reiteration of this plan by Russia's energy minister, and Thursday's meeting between Russian and Saudi policymakers support our expectation that OPEC+ coordination will contribute to a reduction in Russia production to 10.6mb/d from May onwards. The risks, however, are skewed to higher Russia output for longer.

Outside of Russia, notable upside surprises to February production came from Brazil (ramp-up of the Itapu pre-salt offshore field) and Mexico (rapid growth of the Quesqui condensate field).

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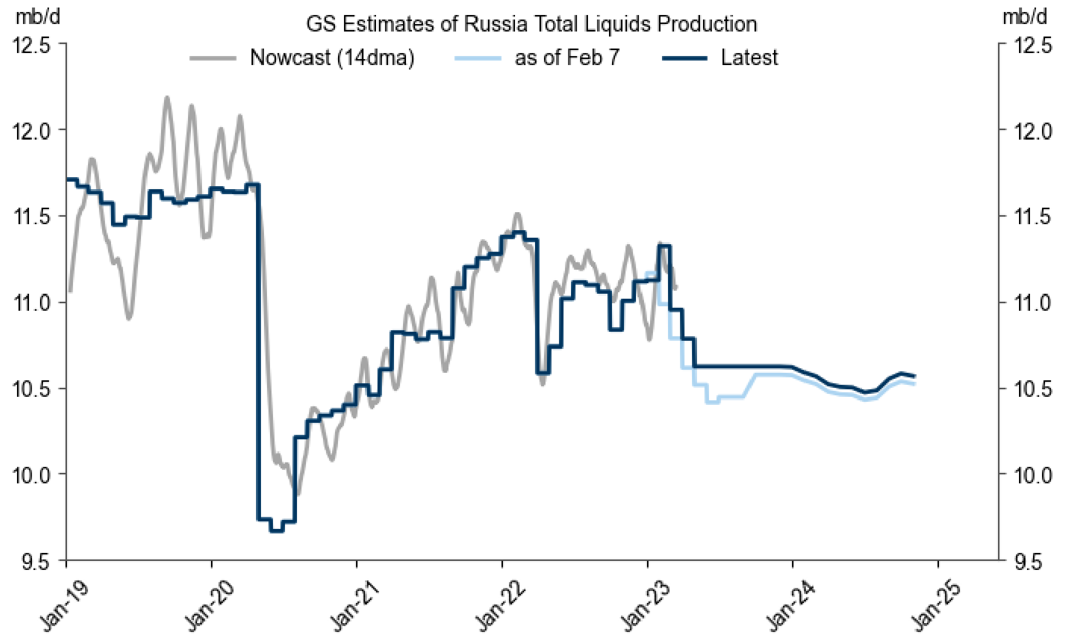
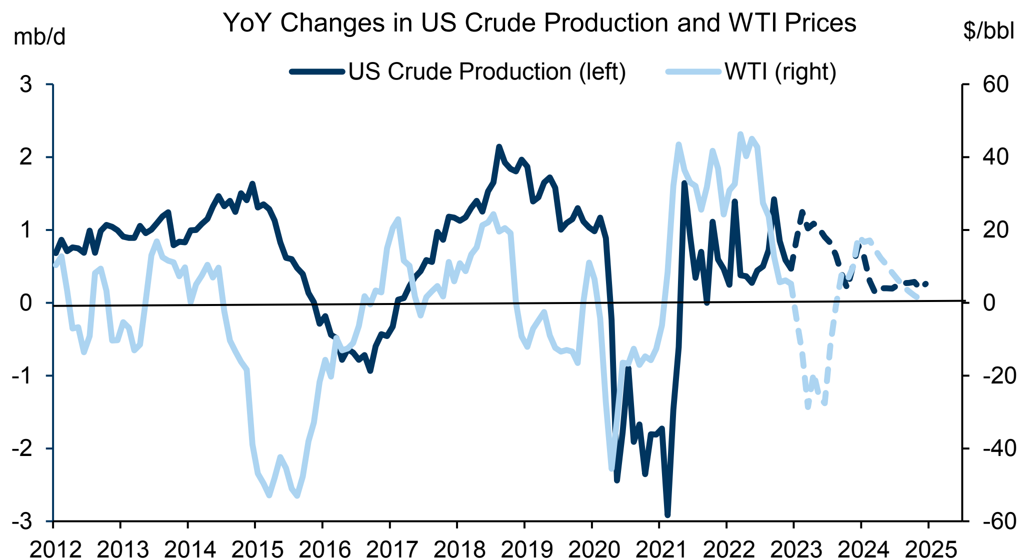
Exhibit 9: While Russia Oil Production Has Exceeded Expectations, We Expect Russia to Implement the Announced 500kb/d Cut



Source: Petro-Logistics, Kpler, IEA, Goldman Sachs Global Investment Research

In contrast, we have lowered our forecasts for US supply, which remains the key global marginal producer. Specifically, we have nudged down our 2023 and 2024 annual average estimates for US supply by 0.1mb/d on lower oil prices and tighter lending standards. Although we expect prices to gradually recover and although US production has become less price-sensitive, lower near-term prices are likely to further slow down US crude oil sequential growth to a soft annualized pace of just 0.2mb/d (Exhibit 10).

Exhibit 10: We Now Expect a Sharper Slowdown in US Production Growth Following the Decline in Oil Prices



Source: EIA, CME, Goldman Sachs Global Investment Research

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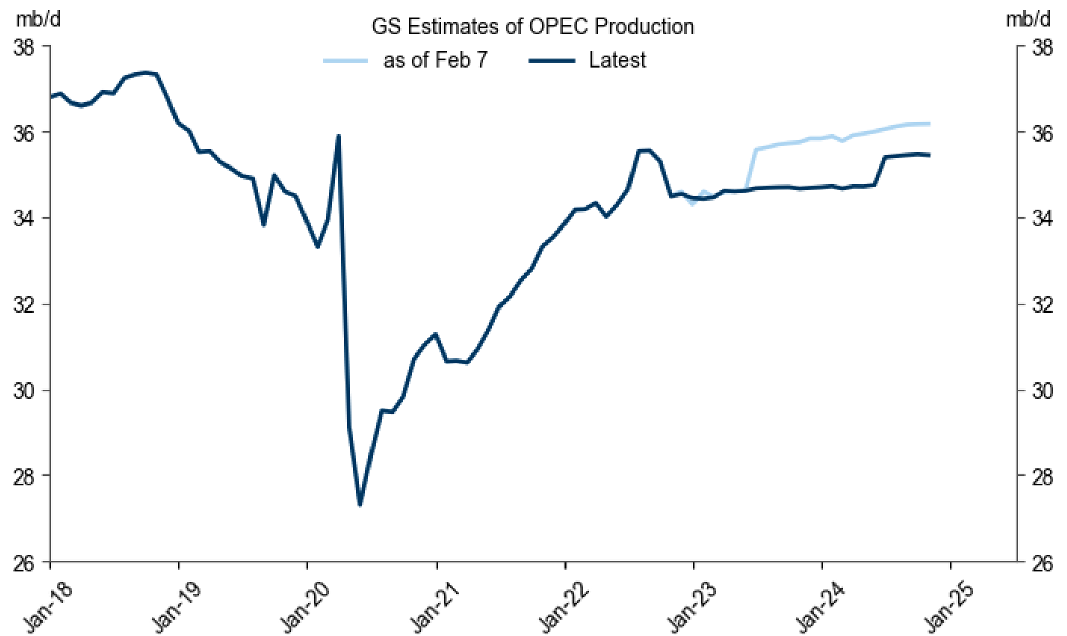
OPEC Patience Supports a Return to Deficits

Following the sharp drop in oil prices, these softer non-OPEC fundamentals, and downside GDP risks, we no longer expect OPEC to announce a reversal of its production cut this year.

OPEC leaders have recently emphasized that the October cut is here to stay for the rest of 2023, and the need to see "sustained positive signals" in the market. Moreover, OPEC pricing power is now elevated, and the producer group has historically responded cautiously to domestic demand pulls out of China. Taken together, we now only expect OPEC to increase its production by 0.5mb/d in 2024Q3, compared to a 1.0mb/d increase in 2023Q3 previously (Exhibit 11).

Exhibit 11: OPEC Supply: Lower for Longer

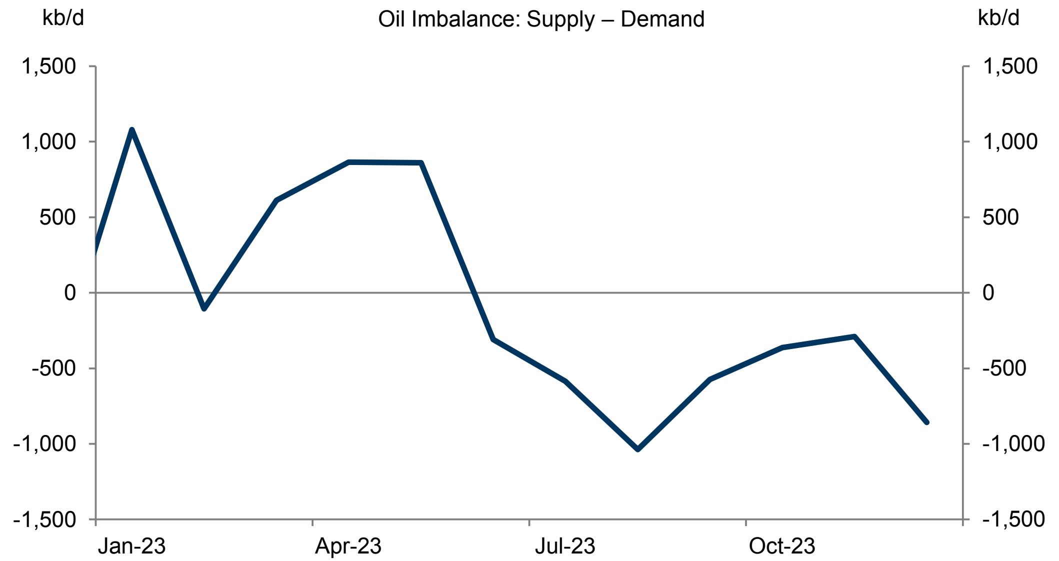


Source: IEA, Goldman Sachs Global Investment Research

In fact, if any sustained further rise in inventories were to lead to persistently low prices, elevated OPEC pricing power would allow the producer group to cut production even further, if required.

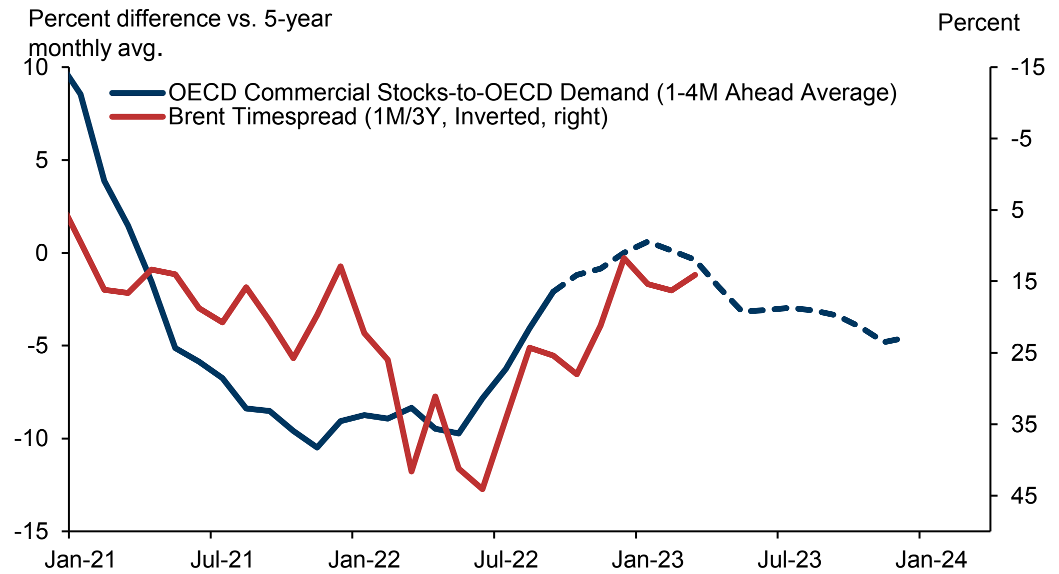
Taken together, we predict that OPEC patience and strong Eastern demand growth will push the oil market back into deficits from June 2023 onward. Renewed inventory draws (Exhibit 12) should support the gradual recovery in timespreads and oil prices (Exhibit 13).

Exhibit 12: We Expect a Return to Deficits from June...



Source: IEA, JODI, National Sources, EIA, China NBS, GTT, Goldman Sachs Global Investment Research

Exhibit 13: … Which Should Drive a Recovery in Timespreads and Oil Prices



Source: IEA, Bloomberg, Goldman Sachs Global Investment Research

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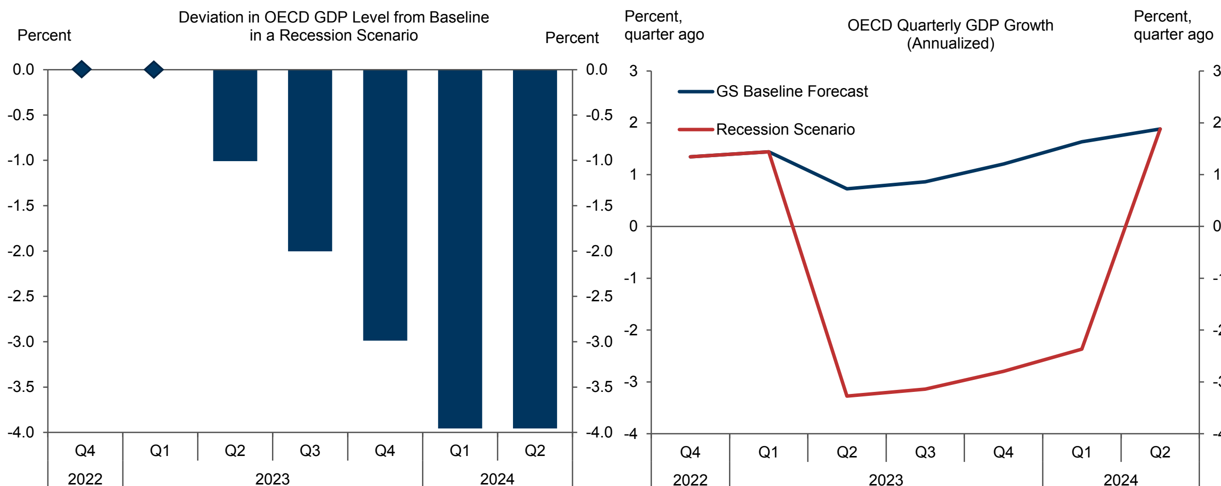
The Oil Market Seems Too Pessimistic About the Growth Outlook

We continue to expect the US and European economies to expand although predicting developments in the financial system is difficult (given, for instance, uncertainty about depositor and investor psychology and the policy response). We conclude by estimating the effects of a hypothetical recession on oil demand, balances, and prices.

This hypothetical scenario assumes a moderate OECD recession starting in 2023Q2. We assume a typical recession length of 4 quarters, and a peak 4% hit to the level of GDP (relative to the GS baseline), which is slightly more moderate than the median historical recession in G10 economies. As Exhibit 14 shows, this scenario assumes that OECD GDP contracts by 2.9% in 2023Q2-2024Q1, or 4pp below our 1.1% baseline.[4] This scenario also assumes modest spillovers to non-OECD economies, where growth is 1pp softer than in the baseline, but keeps oil supply in line with our baseline.[5]

Exhibit 14: Our Hypothetical Scenario Assumes a Moderate Recession With a 4% Peak Hit to the Level of OECD GDP



Source: Haver, Goldman Sachs Global Investment Research

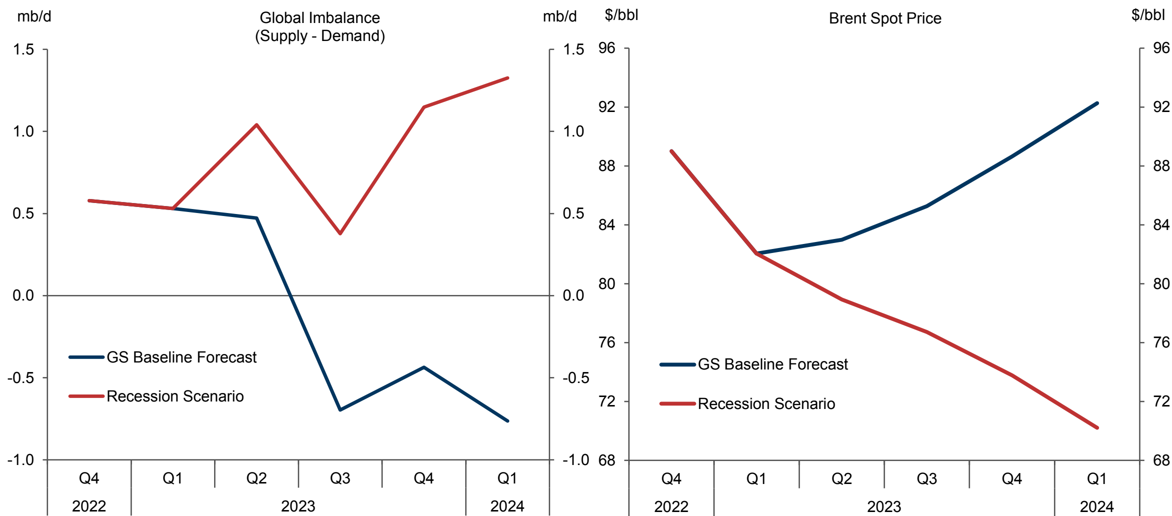
Using our oil demand model, we estimate that the oil market would remain in an average 1.0mb/d surplus over the next four quarters. Our pricing model—which relates timespreads to the level of OECD inventories 1-4 months ahead—suggests that 2024Q1 Brent would be $22/bbl below our baseline (at $70/bbl).

However, the model-implied near-term hit to oil prices in 2023Q2 is much smaller at just $4/bbl (Exhibit 15). That is because spot oil markets (and specifically timespreads) usually largely price the outlook for the level of inventories over the next few months. Relatedly, inventory levels tend to only reach very high levels after multiple quarters of significant demand damage or if demand collapses suddenly, as happened in early 2020.

[4] The unemployment rate has risen by 2.7pp in the median advanced economy recession since the 60s, which corresponds to a 5% hit to GDP relative to trend using a standard Okun's law coefficient.

[5] Any hypothetical recession could weigh on oil supply, through tighter lending standards, and lower price production incentives.

Exhibit 15: A Moderate OECD-Centric Recession Would Lower Brent Prices by $22/bbl



Source: IEA, OAG, Haver, Bloomberg, Goldman Sachs Global Investment Research

While this model is highly stylized (and abstracts from long-dated prices), we draw two conclusions from comparing the $4/bbl estimate of the near-term hit to oil and the actual $10 sell-off over the past 10 days.

First, oil markets have likely turned excessively pessimistic about the near-term growth outlook. This is particularly clear relative to the GS view that the probability that the US economy enters a recession over the next year has edged up by 10pp to 35% (from 25% before the banking stress). The contrast with equity prices is also striking, as the S&P500 stands at about the same level as 10 days ago. While some investors may short oil as a recession hedge based on the collapse in oil prices during the last recession, we think that its mobility-driven nature does not offer the right benchmark for how the next hypothetical recession is likely to affect oil demand. Second, this stylized comparison also increases our conviction that oil prices should recover this year under most of the likely scenarios for the global economy.

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Appendix: Supply, Demand, and Stocks Forecasts

Exhibit 16: GS Global Oil Supply

	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	2022	2023	2024	yoy 23	yoy 24	
Non-OPEC Supply															
Lower 48 crude	10,053	10,195	10,365	10,429	10,532	10,552	10,671	10,757	10,808	9,699	10,380	10,697	681	317	Lower 48 crude
Gulf of Mexico crude	1,800	1,860	1,950	1,847	1,840	1,893	1,873	1,813	1,830	1,742	1,874	1,853	133	-22	Gulf of Mexico crude
Alaska crude	440	453	387	410	420	420	353	377	400	437	418	388	-19	-30	Alaska crude
US crude	12,293	12,508	12,701	12,686	12,792	12,865	12,898	12,947	13,038	11,878	12,672	12,937	794	265	*US crude*
US NGL	5900	5947	6207	6220	6240	6240	6400	6387	6427	5881	6153	6363	273	210	US NGL
Lower 48 other	220	207	220	223	227	213	220	220	220	218	219	218	1	-1	Lower 48 other
US ethanol	1,010	1,000	1,007	980	1,017	1,013	1,023	1,000	1,033	1,002	1,001	1,018	-1	17	US ethanol
Total US	19,423	19,661	20,135	20,109	20,275	20,332	20,541	20,554	20,718	18,978	20,045	20,536	1,067	491	Total US
Canada	5,910	5,926	5,580	5,831	5,992	5,964	5,641	5,872	6,023	5,752	5,832	5,875	80	43	Canada
Mexico	2,029	2,096	2,104	2,100	2,092	2,087	2,078	2,066	2,054	2,008	2,098	2,071	89	-27	Mexico
Total North America	**27,362**	**27,683**	**27,818**	**28,039**	**28,359**	**28,383**	**28,261**	**28,491**	**28,796**	**26,739**	**27,975**	**28,483**	**1,236**	**508**	**Total North America**
Argentina	740	751	759	767	774	783	792	800	810	712	763	796	51	33	Argentina
Brazil	3,233	3,317	3,299	3,382	3,373	3,330	3,378	3,446	3,488	3,118	3,343	3,411	225	68	Brazil
Colombia	778	778	765	758	750	743	736	729	723	761	763	733	2	-30	Colombia
Guyana	370	372	375	375	392	445	498	550	584	272	378	519	106	141	Guyana
Ecuador	465	363	452	447	437	432	429	424	415	466	425	425	-41	0	
Other Latam	324	316	299	294	294	294	292	289	291	323	301	292	-22	-9	Other Latam
Non-OPEC LatAm	**5,909**	**5,896**	**5,950**	**6,023**	**6,021**	**6,026**	**6,125**	**6,238**	**6,310**	**5,652**	**5,973**	**6,175**	**320**	**202**	**Non-OPEC LatAm**
Norway	1,966	1,999	1,979	1,954	2,091	2,018	1,895	1,867	2,047	1,898	2,006	1,957	108	-49	Norway
UK	808	804	776	638	748	768	731	586	688	831	742	693	-89	-48	UK
Other Europe	510	512	493	496	512	502	483	488	506	518	503	495	-15	-8	Other Europe
Total Europe	**3,283**	**3,315**	**3,248**	**3,088**	**3,351**	**3,289**	**3,109**	**2,941**	**3,242**	**3,247**	**3,251**	**3,145**	**4**	**-106**	**Total Europe**
Azerbaijan	668	650	644	638	632	626	620	613	607	672	641	616	-31	-25	Azerbaijan
Kazakhstan	1,909	1,975	1,957	1,935	2,028	2,049	1,990	1,973	2,072	1,820	1,974	2,021	153	47	Kazakhstan
Russia	10,984	11,131	10,674	10,621	10,621	10,589	10,506	10,500	10,567	11,056	10,762	10,541	-294	-221	Russia
Other FSU	313	317	316	313	313	314	313	312	315	316	315	313	-1	-1	Other FSU
Total FSU	**13,874**	**14,072**	**13,591**	**13,507**	**13,595**	**13,578**	**13,428**	**13,399**	**13,561**	**13,864**	**13,691**	**13,491**	**-173**	**-200**	**Total FSU**
China	4,126	4,165	4,207	4,194	4,127	4,125	4,181	4,182	4,129	4,178	4,173	4,154	-5	-19	China
India	687	681	668	661	657	654	641	634	628	704	667	639	-37	-27	India
Indonesia	631	628	626	619	611	607	602	588	572	632	621	592	-11	-28	Indonesia
Malaysia	571	563	518	485	506	509	464	431	453	562	518	464	-45	-54	Malaysia
Australia	421	406	409	428	411	365	383	402	384	413	414	384	1	-30	Australia
Vietnam	183	168	159	151	155	152	143	142	152	186	159	147	-28	-12	Vietnam
Rest of Asia-Pacific	681	697	672	666	661	670	649	647	646	693	674	653	-19	-21	Rest of Asia-Pacific
Non-OPEC Asia	**7,300**	**7,309**	**7,259**	**7,205**	**7,126**	**7,081**	**7,063**	**7,026**	**6,965**	**7,368**	**7,225**	**7,034**	**-143**	**-191**	**Non-OPEC Asia**
Oman	1,082	1,075	1,069	1,075	1,069	1,067	1,056	1,074	1,071	1,072	1,072	1,067	0	-5	Oman
Qatar	1,842	1,853	1,849	1,853	1,842	1,849	1,829	1,819	1,796	1,836	1,849	1,823	13	-26	Qatar
Other Middle East	290	266	287	285	276	273	275	274	264	294	279	271	-16	-7	Other Middle East
Non-OPEC Middle East	**3,214**	**3,194**	**3,205**	**3,213**	**3,186**	**3,189**	**3,160**	**3,167**	**3,130**	**3,203**	**3,200**	**3,162**	**-4**	**-38**	**Non-OPEC Middle East**
Egypt	600	598	599	597	589	581	579	577	570	600	596	577	-4	-19	Egypt
Ghana	170	168	162	163	167	156	150	152	156	168	165	154	-4	-11	Ghana
Other Africa	536	513	521	507	505	506	513	508	516	541	511	511	-30	-1	Other Africa
Non-OPEC Africa	**1,306**	**1,279**	**1,282**	**1,267**	**1,261**	**1,243**	**1,242**	**1,238**	**1,242**	**1,309**	**1,272**	**1,241**	**-37**	**-31**	**Non-OPEC Africa**
Processing gains	2,319	2,323	2,318	2,319	2,332	2,339	2,348	2,375	2,368	2,294	2,323	2,357	30	34	Processing gains
Biofuels exc. US ethanol	1,829	1,641	2,128	2,362	1,957	1,618	2,204	2,441	2,038	1,950	2,022	2,075	73	53	Biofuels exc. US ethanol
Total non-OPEC supply	**66,396**	**66,713**	**66,800**	**67,024**	**67,190**	**66,747**	**66,941**	**67,314**	**67,650**	**65,626**	**66,932**	**67,163**	**1,306**	**231**	**Total non-OPEC supply**
Non-OPEC ex. US Lower 48 & NGL	**50,443**	**50,572**	**50,229**	**50,375**	**50,418**	**49,955**	**49,870**	**50,170**	**50,415**	**50,046**	**50,398**	**50,102**	**352**	**-296**	**Non-OPEC ex. US Lower 48 & NGL**
Non-OPEC ex. US, Canada, OPEC+	**25,849**	**25,732**	**26,223**	**26,330**	**26,067**	**25,610**	**26,124**	**26,297**	**26,139**	**25,712**	**26,088**	**26,042**	**376**	**-46**	

	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	2022	2023	2024	yoy 23	yoy 24	
OPEC Supply															
Venezuela	671	677	687	705	724	738	746	755	763	684	698	750	15	52	Venezuela
Algeria	1,030	1,011	1,007	1,030	1,035	1,029	1,018	1,007	996	1,017	1,021	1,013	4	-8	Algeria
Congo	255	263	261	259	254	253	260	258	253	263	259	256	-4	-3	Congo
Gabon	199	188	190	190	190	189	188	187	186	196	189	187	-7	-2	Gabon
Angola	1,085	1,072	1,098	1,086	1,075	1,064	1,053	1,041	1,030	1,142	1,083	1,047	-59	-36	Angola
Nigeria	1,171	1,314	1,334	1,368	1,349	1,311	1,268	1,302	1,282	1,205	1,341	1,291	137	-51	Nigeria
Equatorial Guinea	63	59	65	62	61	57	56	53	52	84	61	55	-22	-7	Equatorial Guinea
Libya	1,156	1,156	1,164	1,170	1,175	1,183	1,191	1,199	1,207	991	1,166	1,195	176	28	Libya
Iran	2,767	2,750	2,750	2,750	2,750	2,748	2,746	2,744	2,741	2,821	2,750	2,745	-71	-5	Iran
Iraq	4,508	4,381	4,390	4,390	4,390	4,390	4,390	4,538	4,538	4,442	4,388	4,464	-54	76	Iraq
Kuwait	2,713	2,683	2,676	2,676	2,676	2,686	2,700	2,778	2,793	2,705	2,678	2,739	-27	61	Kuwait
Saudi Arabia	10,603	10,399	10,478	10,478	10,478	10,483	10,491	10,744	10,752	10,527	10,458	10,618	-69	159	Saudi Arabia
UAE	3,194	3,147	3,150	3,150	3,150	3,182	3,231	3,366	3,415	3,165	3,149	3,299	-16	149	UAE
Total OPEC Crude	**29,414**	**29,100**	**29,251**	**29,315**	**29,307**	**29,313**	**29,338**	**29,973**	**30,009**	**29,240**	**29,243**	**29,658**	**3**	**415**	**Total OPEC Crude**
Total OPEC NGL	**5,360**	**5,345**	**5,361**	**5,372**	**5,378**	**5,384**	**5,392**	**5,443**	**5,452**	**5,333**	**5,364**	**5,418**	**31**	**54**	**Total OPEC NGL**
Total OPEC supply	**34,774**	**34,445**	**34,612**	**34,687**	**34,684**	**34,698**	**34,730**	**35,416**	**35,461**	**34,573**	**34,607**	**35,076**	**35**	**469**	**Total OPEC supply**
OPEC crude ex exempt	**24,820**	**24,517**	**24,649**	**24,690**	**24,658**	**24,644**	**24,655**	**25,276**	**25,298**	**24,745**	**24,629**	**24,968**	**-116**	**340**	**OPEC crude ex exempt**
Total OPEC+ inc NGLs	**49,987**	**49,839**	**49,474**	**49,441**	**49,540**	**49,538**	**49,365**	**50,008**	**50,231**	**49,756**	**49,574**	**49,785**	**-182**	**212**	**Total OPEC+ inc NGLs**
Total OPEC+ ex exempt	**40,034**	**39,911**	**39,511**	**39,444**	**39,514**	**39,485**	**39,290**	**39,868**	**40,068**	**39,928**	**39,595**	**39,677**	**-333**	**82**	**Total OPEC+ ex exempt**

Source: IEA, EIA, JODI, GTT, China NBS, National Sources, OPEC, Woodmac, Kayrros, ICIS, Goldman Sachs Global Investment Research

Exhibit 17: GS Global Oil Demand

	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	2022	2023	2024	yoy 23	yoy 24	
Global Demand															
USA	20,321	19,991	19,887	20,139	19,911	19,746	19,707	20,023	19,849	20,433	19,982	19,831	-451	-151	USA
Canada	2,329	2,290	2,236	2,396	2,341	2,283	2,244	2,407	2,352	2,290	2,316	2,322	26	6	Canada
Mexico	1,952	1,901	1,934	1,911	1,911	1,903	1,945	1,930	1,938	1,915	1,914	1,929	-1	15	Mexico
North America	**24,602**	**24,181**	**24,058**	**24,446**	**24,163**	**23,932**	**23,896**	**24,361**	**24,139**	**24,638**	**24,212**	**24,082**	**-426**	**-130**	**North America**
Brazil	3,229	3,060	3,157	3,272	3,277	3,141	3,202	3,308	3,304	3,145	3,191	3,239	47	47	Brazil
Chile	375	390	374	376	374	390	376	378	377	381	379	381	-2	2	Chile
Argentina	660	676	694	693	693	692	707	703	700	657	689	700	32	12	Argentina
Other Latam	2,387	2,411	2,480	2,491	2,463	2,506	2,571	2,578	2,544	2,387	2,461	2,550	74	89	LatAm ex. Mexico, Brazil, Chile
LatAm ex. Mexico	**6,651**	**6,538**	**6,705**	**6,832**	**6,807**	**6,729**	**6,856**	**6,967**	**6,926**	**6,570**	**6,720**	**6,869**	**151**	**149**	**LatAm ex. Mexico**
OECD Europe	13,341	13,002	13,093	13,632	13,175	12,885	13,043	13,595	13,240	13,515	13,226	13,191	-289	-35	OECD Europe
Non-OECD Europe	803	759	762	780	796	753	790	801	796	785	774	785	-11	11	Non-OECD Europe
Total Europe	**14,144**	**13,761**	**13,855**	**14,412**	**13,971**	**13,638**	**13,833**	**14,396**	**14,036**	**14,300**	**14,000**	**13,976**	**-300**	**-24**	**Total Europe**
Japan	3,560	3,787	3,120	3,227	3,544	3,744	3,100	3,212	3,534	3,371	3,419	3,397	49	-22	Japan
Korea	2,570	2,652	2,499	2,589	2,638	2,708	2,551	2,618	2,648	2,582	2,595	2,631	13	37	South Korea
Australia & New Zealand	1,302	1,278	1,280	1,276	1,317	1,300	1,298	1,297	1,340	1,238	1,288	1,309	49	21	Australia & New Zealand
Israel	246	246	242	260	243	246	240	258	243	244	248	247	4	-1	Israel
OECD Asia Pacific	**7,679**	**7,962**	**7,142**	**7,352**	**7,742**	**7,997**	**7,188**	**7,384**	**7,766**	**7,435**	**7,549**	**7,584**	**114**	**34**	**OECD Asia Pacific**
China	14,917	15,272	15,963	16,000	16,214	16,405	16,643	16,445	16,566	14,864	15,862	16,515	998	653	China
India	5,281	5,475	5,384	5,056	5,474	5,636	5,575	5,232	5,635	5,128	5,347	5,519	219	172	India
Other non-OECD Asia	8,781	9,055	9,058	9,158	9,198	9,421	9,361	9,451	9,376	8,847	9,117	9,402	270	285	Other non-OECD Asia
Total Asia	**28,978**	**29,802**	**30,405**	**30,213**	**30,886**	**31,462**	**31,579**	**31,128**	**31,577**	**28,839**	**30,326**	**31,436**	**1,488**	**1,110**	**Total Asia**
FSU	**5,127**	**4,832**	**4,941**	**5,215**	**5,172**	**4,821**	**4,952**	**5,211**	**5,153**	**4,984**	**5,040**	**5,034**	**55**	**-6**	**FSU**
Total Middle East	**9,071**	**9,179**	**9,484**	**9,739**	**9,208**	**9,190**	**9,490**	**9,700**	**9,217**	**9,169**	**9,403**	**9,399**	**234**	**-3**	**Total Middle East**
Total Africa	**4,339**	**4,374**	**4,351**	**4,235**	**4,429**	**4,519**	**4,491**	**4,325**	**4,474**	**4,238**	**4,347**	**4,452**	**109**	**105**	**Total Africa**
OECD demand	**45,997**	**45,536**	**44,667**	**45,807**	**45,454**	**45,204**	**44,504**	**45,719**	**45,522**	**45,969**	**45,366**	**45,237**	**-603**	**-129**	**OECD demand**
Non-OECD demand	**54,595**	**55,093**	**56,273**	**56,637**	**56,923**	**57,083**	**57,781**	**57,753**	**57,765**	**54,204**	**56,232**	**57,596**	**2,028**	**1,364**	**Non-OECD demand**
World Demand	**100,592**	**100,629**	**100,940**	**102,444**	**102,377**	**102,288**	**102,285**	**103,472**	**103,287**	**100,172**	**101,598**	**102,833**	**1,425**	**1,235**	**World Demand**
World ex China	**85,675**	**85,357**	**84,978**	**86,444**	**86,164**	**85,883**	**85,642**	**87,027**	**86,721**	**85,309**	**85,736**	**86,318**	**427**	**583**	**World ex China**
Non-OECD demand ex China	**39,678**	**39,821**	**40,310**	**40,637**	**40,710**	**40,679**	**41,138**	**41,308**	**41,199**	**39,340**	**40,370**	**41,081**	**1,030**	**711**	**Non-OECD demand ex China**

Source: IEA, EIA, JODI, China NBS, GTT, SCI, OAG, National Sources, Goldman Sachs Global Investment Research

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Exhibit 18: GS Imbalance and Stocks Breakdown

	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	2022	2023	2024	yoy 23	yoy 24
Imbalance	**578**	**529**	**472**	**-732**	**-503**	**-843**	**-614**	**-741**	**-176**	**26**	**-59**	**-594**	**-85**	**-535**
Global stock change vs. Dec-19 (mb)	**-33**	**2**	**54**	**11**	**-37**	**-102**	**-161**	**-236**	**-267**	**-54**	**8**	**-191**	**62**	**-199**
EM Crude exc. China (producers)	53	233	20	20	20	20	20	20	20	85	73	20	-12	-53
EM Crude exc. China (consumers)	-76	199	183	-36	-374	19	-2	99	-147	94	-7	-8	-102	0
EM Crude exc. China	-22	432	203	-16	-354	39	18	119	-127	179	66	12	-113	-54
EM Products exc. China	-115	45	52	-62	-237	-33	-44	9	-119	-12	-50	-47	-38	4
EM exc. China/Iran	-137	477	255	-78	-592	6	-25	128	-246	167	15	-34	-151	-50
China crude	589	-339	184	-103	-184	-275	-116	-303	-184	421	-111	-220	-532	-109
China products	159	67	0	-43	164	171	-100	-143	64	-1	47	-2	48	-49
China Total	748	-271	184	-146	-20	-105	-216	-446	-120	420	-64	-222	-483	-158
Crude Floating Storage (ex-Iran)	-81	-32	36	-43	-164	-23	-30	6	-82	-102	-51	-32	51	18
Crude in Transit	228	310	199	-185	754	-581	-151	-435	404	214	270	-191	55	-460
Products Floating Storage (ex-Iran)	-9	-27	12	-14	-55	-8	-10	2	-27	83	-21	-11	-104	10
Products in Transit	238	-377	-60	53	242	76	-260	53	108	160	-35	-6	-195	30
Iran (onshore & floating)	-161	-9	0	0	0	0	0	0	0	-47	-2	0	44	2
Other EM/Floating	215	-134	188	-189	776	-535	-451	-374	402	308	160	-239	-148	-400
EM total	**826**	**71**	**626**	**-413**	**164**	**-634**	**-692**	**-693**	**36**	**895**	**112**	**-496**	**-783**	**-608**
OECD government	**-306**	**22**	**-273**	**0**	**328**	**0**	**328**	**0**	**328**	**-730**	**19**	**164**	**750**	**145**
OECD commercial stocks	**551**	**82**	**119**	**-319**	**-995**	**-209**	**-250**	**-49**	**-540**	**392**	**-278**	**-262**	**-670**	**17**
Total observed builds	**1,072**	**175**	**472**	**-732**	**-503**	**-843**	**-614**	**-741**	**-176**	**556**	**-147**	**-594**	**-703**	**-447**
Miscellaneous to Balance (Imbalance less observat	-493	354	0	0	0	0	0	0	0	-530	88	0	618	-88

Source: IEA, Kpler, Kayrros, PJK ARA, PAJ, Insights Global, Refinitiv Eikon, Goldman Sachs Global Investment Research

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