Key insights

- Weaker global growth prospects amid persistent inflationary pressures and monetary policy tightening coupled with a delayed recovery in Chinese demand have become the key factors influencing sentiment and driving the outlook in 2023, dominating oil supply factors and expectations of a large Russian supply disruption as the EU embargo comes into force in December. These are key factors leading to significant downgrades this month and tilting downwards the balance of risks in 2023.

- The resilience of Russian oil production and ability to redirect sanctioned crude have led us to narrow the range of expected disruptions in 2023 between 935,000 b/d and 1.6 mb/d. The prospects of Russian supply disruptions under our Reference case are downgraded again to 1.25 mb/d from 1.5 mb/d projected last month, with Russian crude production expected to fall to 9.8 mb/d in 2023 from 10.6 mb/d in 2022.

As of September 2022, over 1.1 mb/d of Russia’s crude oil exports to Europe and the rest-G7 were disrupted, 88% or 980,000 b/d of which were redirected to other parts of the world, mainly in Asia. In the period March/September 2022, crude exports continued to average higher by 170,000 b/d compared to pre-war January/February levels. On the products export-side, the disruption held higher in September at 1.2 mb/d with only 41% or 510,000 b/d rerouted, albeit the percentage of redirected products is improved from 22% in the first four months of the war. Russian product exports between March/September averaged 630,000 b/d lower than pre-war levels. Taken together, the net disruption in total Russian oil exports in March/September 2022 averaged 460,000 b/d and we now expect the disruption of another 805,000 b/d throughout the forecast horizon, as EU sanctions come into full effect.

- Global oil demand growth is downgraded to 1.8 mb/d from 2.2 mb/d in 2022 and to 1.7 mb/d from 2.1 mb/d in 2023. The largest downward revisions in 2022 are stemming from China associated with H2 and a later than previously expected end to COVID restrictions that pushed Chinese demand growth into a steeper contraction by -460,000 b/d y/y, compared to -100,000 b/d forecast previously. In 2023, downgrades in OECD demand growth (-200,000 b/d) and further downward revisions in Chinese demand growth (-150,000 b/d) are weighing to the demand outlook. Global demand is now expected to contract y/y in the coming two quarters before returning to growth from Q2 2023 onwards.

Risks to oil demand growth are firmly tilted to the downside as the duration and extent of the ongoing macro pressures continue to weigh on the outlook. The range of uncertainty to the demand growth outlook in 2023 now ranges between 500,000 b/d and 1.9 mb/d, with OECD demand under the recession case projected to contract by -600,000 b/d and non-OECD demand downgraded by 300,000 b/d to 1.1 mb/d.

Brent price outlook

Source: OIES
Key insights

- **Global oil supply growth is downgraded to 4.6 mb/d in 2022 from 4.8 mb/d forecast previously and to 1 mb/d in 2023 from 1.7 mb/d.** That is a downward revision by 210,000 b/d in 2022 and by 690,000 b/d in 2023. In response to weakening market balances and consistent with past behavior of acting preemptively, OPEC+ announced an output cut of 2 mb/d. Given that most member countries are producing well below their quotas, the cut in ‘real’ barrels is lower ranging between 880,000 b/d and 1.2 mb/d. The downward revisions to the supply outlook were moderated by a 270,000 b/d upgrade of Russian production in 2023 and modest gains in non-OPEC growth outside NAM and OPEC+, principally in Brazil and Norway.

- **The products markets remain tight.** Supply-side refining pressures driven by unplanned outages (French strikes) and maintenance in Europe, the high utilization rates outside China and the low product stocks which are well below their 5-year average are pushing margins higher and contributing to volatility in cracks. The decline in Russian products exports to Europe and prospect of further disruptions as the EU ban comes into effect; capacity constraints in the US that could potentially fill the Russian gap in the EU as an alternative source of diesel imports; and uncertainty over China’s diesel offering overseas following the latest batch of products export quotas, are all factors contributing to tightness in the diesel markets that has already pushed diesel cracks to new record highs.

- **Our Reference forecast for Brent is downgraded to $100.8/b from $105.1/b in 2022 and to $94/b from $105.8/b in 2023.** We expect Brent to remain in the low-$90s towards year end and to retreat further in the $80s in H1 2023 on negative demand pressures, before rebounding in the second half of the year and potentially breaking again the $100/b mark in Q4. A deeper recession could push Brent lower in the high-$70s by the end of 2022 but we see a $70/b price floor in 2023 supported by the latest OPEC+ output cuts. On the upside, oil prices are not seen departing much higher than $110/b throughout 2023.

The balance of risks this month is further skewed on the downside with negative demand risks associated with a longer period of weakness in global growth dominating the outlook in 2023 and potentially lowering prices to $81.8/b for the year as a whole. Supply-pressures combined with favourable demand conditions particularly in H2 could still lift prices to $104.3/b annually, but on balance downside risks prevail by -$6/b. The Brent Prospect that takes into account the uncertainty underlying the outlook has now converged with our reference outlook, edging only slightly lower to $93/b in 2023.

- **We forecast a 0.4 mb/d surplus in 2022 and a -0.3 mb/d deficit in 2023.** Despite the OPEC+ cuts, the projected market surpluses in H2 2022 and H1 2023 are upgraded by 120,000 b/d and by 170,000 b/d to 700,000 b/d, respectively. While market uncertainty remains elevated, the high/low band to the global balance risks in 2023 has narrowed significantly from previous month by 1.6 mb/d in favour of weaker market conditions (the supply/demand gap now ranges between -1 mb/d and 2.1 mb/d), as the risk of sustained market surpluses beyond H1 2023 rises. Although the stocks build-up is expected to accelerate towards H1 2023, product stocks are starting from a very low base hindering the overall stocks recovery in 2023.
Prospects of Russian supply disruption lowered

The resilience of Russian output and ability to redirect sanctioned crude have led us to narrow the range of expected disruptions in 2023 between 935,000 b/d and 1.6 mb/d.

<table>
<thead>
<tr>
<th></th>
<th>MB/D</th>
<th>Output</th>
<th>Disruptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>Ref</td>
</tr>
<tr>
<td>Q1 22</td>
<td></td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Q2 22</td>
<td></td>
<td>10.3</td>
<td>10.3</td>
</tr>
<tr>
<td>Q3 22</td>
<td></td>
<td>10.7</td>
<td>10.7</td>
</tr>
<tr>
<td>Q4 22</td>
<td></td>
<td>10.4</td>
<td>10.3</td>
</tr>
<tr>
<td>2022</td>
<td></td>
<td>10.6</td>
<td>10.6</td>
</tr>
<tr>
<td>2023</td>
<td></td>
<td>10.1</td>
<td>9.8</td>
</tr>
</tbody>
</table>

1 Difference from pre-invasion February production.

Low = Low case, Ref = Reference, High = High case

Russian crude shut-ins to average 1.25 mb/d in 2023, and output to fall to 9.8 mb/d from 10.6 mb/d in 2022

The prospects of Russian supply disruptions under our Reference case are downgraded again this month to 1.25 mb/d from 1.5 mb/d previously. We expect the net disruption in Russian oil exports to rise by another 805,000 b/d in the forecast horizon, from 460,000 b/d as of September 2022. The disrupted crude/products ratio is estimated between 40/60% and 50/50% of the total.
In Focus: Russia

Disruptions in Russian oil exports remain well below expectations

Russian oil exports averaged 460,000 b/d below pre-war levels in Mar/Sep and we now project a net disruption of another 805,000 b/d in the forecast horizon to the end of 2023.

Russia oil exports disruption

Notes: Compared to Jan/Feb-22 levels. Source: OIES

Russia oil exports curtailment assumptions

Notes: Compared to Jan/Feb-22 levels. Source: OIES
Refinery runs decline on weak products export demand

Russian refinery runs in August reversed a strong recovery by 700,000 b/d since May and they are expected to struggle surpassing 2021 levels in the remainder of the year.

Source: Argus, OIES

Source: Argus, OIES
In Focus: Russia

Crude oil exports fall but remain solid

Russian crude exports fell m/m by 275,000 b/d in September to 4.76 mb/d, their lowest level in 2022, but remain 170,000 b/d above pre-war levels in the period Mar/Sep.

Russia crude oil exports by destination

![Chart showing crude oil exports by destination]

Source: Argus, Kpler, OIES

Russia crude oil export shifts

![Chart showing crude oil export shifts]

Source: OIES
Russian product exports remain weak but redirection rises

Product exports in September stood 730,000 b/d below Jan/Feb levels, but redirection of products continues to rise estimated at 510,000 b/d (40%) vs 230,000 b/d in Q2 (27%).

Russia product exports by destination

Source: Argus, Kpler, OIES

Russia product export shifts

Source: OIES
Russian oil stocks build

Russia’s oil demand continues to fair better, driven by solid demand in transport and industrial fuels, but falling exports demand lifts crude and product stocks.

**Russia implied products demand**

![Graph showing implied products demand](image)

Source: OIES

**Russia crude stocks by selected installation**

![Graph showing crude stocks by installation](image)

Source: Kpler

The contents of this report are the authors’ sole responsibility. They do not necessarily represent the views of the Oxford Institute for Energy Studies or any of its Members.
Russian crude-on-water continues to slow

Russian crude-on-water in September eased m/m by another 3 mbbls to 78 mbbls from 99 mbbls in June, as floating storage mainly Urals picked-up close to mid-year levels.

Russia crude-on-water by grade

Notes: Other grades include Varandey, Novy Port, ARCO, Sak Bl., Yuri Korchagin and Kaliningrad. Source: Kpler

Russia crude in floating storage by grade

Notes: Other grades include Varandey, Novy Port, ARCO, Sak Bl., Yuri Korchagin and Kaliningrad. Source: Kpler
Demand outlook is downgraded on the realization of negative risks

Global growth prospects in 2023 continue to deteriorate particularly for advanced economies, while China’s comeback is now expected to be delayed and more gradual.

Global demand growth is forecast to 1.8 mb/d in 2022 and 1.7 mb/d in 2023

Global oil demand growth is downgraded in both years by -380,000 b/d and -390,000 b/d, respectively. A key driver of the downward revisions this month is the deterioration of global growth in AEs coupled with China’s delayed recovery. Global GDP growth forecast based on Oxford Economics is unchanged to 2.8% in 2022 and downgraded to 1.7% from 2.2% in 2023.
Global demand growth in H2 continues to see downward revisions

Global oil demand growth is expected to fall to 100,000 b/d in H2, from 3.5 mb/d in H1, with y/y contractions in the coming two quarters before returning to growth in Q2 2023.

Global oil demand by region vs 2019

Global oil demand by sector vs 2019

Notes: Other liquids include fuels for other transport, commercial/residential use, industrial and other uses. Source: OIES
Demand

Duration and extent of macro pressures weigh on the demand outlook

Despite factoring to our reference a near-term recession in advanced economies, further downside risks persist in 2023 with demand growth band ranging between 0.5-1.9 mb/d.

Global oil demand growth: Reference vs Recession scenario

Notes: Modelled projections. Source: OIES

G7 economies recession indicators

Notes: Shows simultaneous contractions in output, imports, exports, investments and industrial production within the same quarter in each member country. Source: Oxford Economics, OIES
Demand

OECD

Risk of lengthier contracting OECD demand rises in 2023

OECD demand growth in 2022 is expected to surpass non-OECD for the first time since the 1990s, at 1.1 mb/d vs 700,000 b/d, before growth slows to 350,000 b/d in 2023.

OECD demand is forecast to grow by 1.1 mb/d in 2022 and 0.35 mb/d in 2023

OECD demand growth is slightly lowered by 80,000 b/d in 2022 and is downgraded by 200,000 b/d in 2023. The downward revision in 2023 is driven mainly by OECD Americas that account for -120,000 b/d. Oxford Economics’ AEs GDP growth forecast stands at 2.3% in 2022 and 0.4% in 2023.

OECD demand is forecast to grow by 1.1 mb/d in 2022 and 0.35 mb/d in 2023

OECD demand growth is slightly lowered by 80,000 b/d in 2022 and is downgraded by 200,000 b/d in 2023. The downward revision in 2023 is driven mainly by OECD Americas that account for -120,000 b/d. Oxford Economics’ AEs GDP growth forecast stands at 2.3% in 2022 and 0.4% in 2023.

OECD oil demand

Source: OIES

<table>
<thead>
<tr>
<th>Year</th>
<th>Total (MB/D)</th>
<th>Y/Y (%)</th>
<th>vs 4Q19 (^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>42.0</td>
<td>(5.6)</td>
<td>(4.8)</td>
</tr>
<tr>
<td>± prev</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>44.8</td>
<td>2.8</td>
<td>(0.9)</td>
</tr>
<tr>
<td>± prev</td>
<td>+0.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>46.0</td>
<td>1.1</td>
<td>(1.5)</td>
</tr>
<tr>
<td>± prev</td>
<td>-0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>46.3</td>
<td>0.4</td>
<td>(0.7)</td>
</tr>
<tr>
<td>± prev</td>
<td>-0.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Compared to Q4 in each year.
US macro weaknesses linger on OECD Americas demand outlook

Demand in OECD Americas is forecast to grow by 620,000 b/d in 2022 unchanged from last month but is downgraded by 120,000 b/d to 170,000 b/d in 2023.

OECD Americas oil demand

Source: OIES

OECD Americas oil demand by product vs 2019

Source: IEA, OIES
European demand narrowly avoids a contraction in 2023, for now

OECD Europe demand growth is again downgraded in both years to 410,000 mb/d in 2022 and 40,000 b/d in 2023, a revision by -80,000 b/d and -30,000 b/d, respectively.

OECD Europe oil demand

Source: OIES

OECD Europe oil demand by product vs 2019

Source: IEA, OIES
APAC demand growth downgraded in 2023

Demand in OECD APAC is forecast to grow y/y by 100,000 b/d in 2022, slightly higher than previously, but it is downgraded in 2023 by 50,000 b/d to 140,000 b/d.

OECD APAC oil demand

Source: OIES

OECD APAC oil demand by product vs 2019

Source: IEA, OIES
Chinese demand contraction in 2022 deepens

A complete departure from China’s zero-COVID policy in the near-term and a large stimulus in 2023 remain unlikely, weighing on the Chinese demand outlook in both years.

China oil demand

China’s demand to contract by 0.5 mb/d in 2022 and rebound by 0.6 mb/d in 2023

China’s demand growth forecast is downgraded by -380,000 b/d in 2022 and -150,000 b/d in 2023. Oxford Economics’ China GDP growth forecast stands at 3.2% in 2022 and 4.9% in 2023.
Chinese crude imports recover

China's crude imports in September rose 180,000 b/d above year ago levels, but the higher intake is seen directed towards products exports rather than domestic demand.

Source: Argus, Kpler, OIES

Notes: Seaborne imports only. Source: Kpler, OIES
China’s policy measures continue to weigh on demand outlook

A later-end to COVID restrictions and constraints in policy measures to boost growth suggest that the Chinese demand recovery will fall short of previous recovery cycles.

### China apparent products demand

![Graph showing China apparent products demand](source)

**Source:** Argus, Blavatnik School of Government (University of Oxford), OIES

### China crude import quotas

![Graph showing China crude import quotas](source)

**Notes:** The 1st batch for 2023 was issued in October 2022 with the requirement for refiners to use up the quotas by year-end. **Source:** Argus
India’s demand outlook remains unchanged

India’s demand outlook remains resilient to the global macro pressures, with domestic inflation pressures easing and maintaining the country’s demand growth expectations.

India oil demand

India’s demand growth is forecast to 0.3 mb/d in 2022 and 0.2 mb/d in 2023

India’s demand growth outlook is relatively unchanged in both 2022 and 2023 compared to last month. Oxford Economics’ India GDP growth forecast stands at 7% in 2022 and 4.4% in 2023.

Source: OIES

India oil demand

<table>
<thead>
<tr>
<th></th>
<th>Total (MB/D)</th>
<th>Y/Y (%)</th>
<th>vs 4Q19*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>4.6</td>
<td>(0.4)</td>
<td>0.1</td>
</tr>
<tr>
<td>± prev</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>4.8</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>± prev</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>5.1</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>± prev</td>
<td>+0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>5.3</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>± prev</td>
<td>-0.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Compared to Q4 in each year.
India crude imports ease

India’s crude imports fell m/m in August by 660,000 b/d and are expected to normalize near year-ago levels as refiners are entering their planned maintenance in H2 2022.

**India crude imports**

![Graph showing India crude imports from 2017-2021 range, 2022, 2021, 2020, and 2019. The graph shows the trend of crude imports over the years with a peak in 2021 and a decrease in 2022.](image)

*Source: PPAC, OIES*

**India crude imports by origin**

![Bar chart showing crude imports by origin from Jan-18 to Jan-22. The chart indicates a significant drop in imports from the Middle East (OPEC) and Russia, with a slight increase from other origins.](image)

*Source: Kpler, OIES*
India’s product deliveries continue to outperform 2019

India’s demand performance during its typical monsoon season between Apr/Sep when demand falters held relatively strong, outperforming 2019 levels by some 50,000 b/d.

India consumption of petroleum products vs 2019

![Graph showing consumption of petroleum products](source: PPAC, OIES)

India observed crude oil stocks vs 5-year average

![Graph showing crude oil stocks](source: Kpler, OIES)
Global oil supply outlook downgraded

OPEC+ output cuts in November have pushed the global supply growth in 2023 lower by around 700,000 b/d, but the downgrade is moderated by improvements in non-OPEC.

Global oil supply

Global oil supply to grow by 4.6 mb/d in 2022 and 1 mb/d in 2023

Global oil supply growth outlook is downgraded by -210,000 b/d from 4.8 mb/d in 2022 and by -690,000 b/d from 1.7 mb/d in 2023 mainly due to the agreed OPEC+ output cuts, but downward revisions are moderated by a 270,000 b/d upgrade of Russian oil production in 2023 and small gains in non-OPEC growth outside NAM and OPEC+.
OPEC+ cuts decision consistent with previous cycles

OPEC+ response is consistent with past behaviour reflecting its willingness to remain proactive amid falling markets, to preserve cohesion of Group and to extend the DoC.

**OPEC call**

The OPEC call is lowered to 28.6 mb/d in 2022 and 29.7 mb/d in 2023

The call on OPEC is downgraded by -270,000 b/d in 2022 from 28.9 mb/d previously and by -780,000 b/d in 2023 from 30.5 mb/d. The OPEC call equals the difference between total demand and non-OPEC crude plus NGLs and other liquids.
Production impact will be around half the size of announced cut

Out of the agreed 2 mb/d reduction of OPEC+ quotas in November, the actual cut is estimated to range between 880,000 b/d and 1.2 mb/d, excluding Russia.

**OPEC-10 target vs implied projected cuts in November 2022**

![Chart showing production impact for OPEC-10 countries]

Notes: Gap to target equals target production in November 2022 minus actual production in August. Source: OPEC, OIES

**Non-OPEC+ target vs implied projected cuts in November 2022**

![Chart showing production impact for Non-OPEC+ countries]

Notes: Gap to target equals target production in November 2022 minus actual production in August. Source: OPEC, OIES
Most OPEC+ producers are already producing below required quotas

The laggard producers’ gap to target in November, relative to August production levels, is estimated at 1.7 mb/d.

Gap-to-target vs implied remaining capacity of laggard OPEC+ producers

Notes: Based on IEA estimates of sustainable capacity. Source: IEA, OPEC, OIES

OPEC crude production and drilling activity

Notes: Missing drilling activity data for Iran and Equatorial Guinea. Source: Baker Hughes, OIES
Geopolitical risks outside Russia persist

Geopolitical risks are elevated as the prospect of Iran production returning in 2023 fades away, while Nigerian outages continued to drag output at its lowest level since 1980s.

Nigeria oil supply

Source: IEA, Baker Hughes, OIES

OPEC-10 spare capacity

Notes: Based on IEA estimates of sustainable capacity and OPEC historical composition. Source: IEA, OIES
Non-OPEC supply outlook in 2023 sees small material gains

Non-OPEC growth in 2023 is supported by the 270,000 b/d upgrade of Russian output, but elsewhere the outlook is only little improved with small gains in Brazil and Norway.

Non-OPEC supply

<table>
<thead>
<tr>
<th>MB/D, Y/Y</th>
<th>US</th>
<th>Brazil</th>
<th>Canada</th>
<th>Norway</th>
<th>Other non-OPEC</th>
<th>Non-OPEC</th>
<th>Previous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Crude oil production only. Source: OIES

Non-OPEC supply

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Y/Y</th>
<th>US</th>
<th>Y/Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>51.2</td>
<td>(2.6)</td>
<td>11.3</td>
<td>(1.0)</td>
</tr>
<tr>
<td>± prev</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2021</td>
<td>51.6</td>
<td>0.4</td>
<td>11.2</td>
<td>(0.1)</td>
</tr>
<tr>
<td>± prev</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2022</td>
<td>52.6</td>
<td>1.0</td>
<td>11.8</td>
<td>0.6</td>
</tr>
<tr>
<td>± prev</td>
<td>-0.07</td>
<td>-0.08</td>
<td>-0.07</td>
<td>-0.07</td>
</tr>
<tr>
<td>2023</td>
<td>52.9</td>
<td>0.3</td>
<td>12.6</td>
<td>0.7</td>
</tr>
<tr>
<td>± prev</td>
<td>+0.01</td>
<td>+0.08</td>
<td>-0.15</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

1 Includes crude oil and condensates only.

Non-OPEC crude supply to grow by 1 mb/d in 2022 and by 0.3 mb/d in 2023

Non-OPEC supply growth is little changed in 2022 by -80,000 b/d and by 80,000 in 2023. US crude growth outlook is lowered by -70,000 b/d to 600,000 b/d in 2022 and by -80,000 b/d to 700,000 b/d in 2023.
Supply

US shale activity falters

Cost pressures, supply-chain bottlenecks and capital discipline continue to weigh on US outlook, as growth prospects entered the drilling activity–productivity crossroads.

Wells drilled, completed and DUCs

Source: US EIA

US shale drilling activity by play

Source: OIES
US production growth slows in 2023

US crude in 2022 is forecast to grow by 0.6 mb/d y/y, a rise by nearly 0.7 mb/d exit-to-exit by December, and 0.7 mb/d in 2023 albeit exit-to-exit growth falls to 0.47 mb/d.

Notes: Crude oil only. Source: OIES
Rest non-OPEC supply growth sees modest improvements

Outside US, non-OPEC growth sees some marginal gains in 2023, after a weaker-than-expected performance this year, with production set to expand y/y by 0.5 mb/d.

Canada supply

Source: Baker Hughes, OIES

Non-OPEC supply outside NAM

Source: Baker Hughes, OIES
Refining

Product markets upward pressures return

Supply-side refining pressures driven by unplanned outages/maintenance in EU, high utilization rates outside China and low stocks availability are pushing margins higher.

Refining margins

<table>
<thead>
<tr>
<th>USD/B</th>
<th>Brent NWE</th>
<th>WTI USGC</th>
<th>Murban Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10)</td>
<td>(10)</td>
<td>(10)</td>
<td>(10)</td>
</tr>
<tr>
<td>(5)</td>
<td>(5)</td>
<td>(5)</td>
<td>(5)</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: Argus

Refinery runs

<table>
<thead>
<tr>
<th>MB/D, %</th>
<th>Jul-22</th>
<th>Y/Y</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB/D</td>
<td>±%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>16.2</td>
<td>2.5</td>
<td>93.1</td>
</tr>
<tr>
<td>EU-16</td>
<td>9.4</td>
<td>3.4</td>
<td>80.3</td>
</tr>
<tr>
<td>Japan</td>
<td>2.5</td>
<td>11.2</td>
<td>72.3</td>
</tr>
<tr>
<td>China</td>
<td>12.5</td>
<td>(10.3)</td>
<td>67.6</td>
</tr>
<tr>
<td>India</td>
<td>5.1</td>
<td>11.9</td>
<td>101.3</td>
</tr>
<tr>
<td>Russia</td>
<td>5.6</td>
<td>0.4</td>
<td>85.9</td>
</tr>
</tbody>
</table>

Source: Argus

Diesel winter supply tightness

Product markets remain unsettled shaped by the extent of Russian supply disruptions to Europe and ability to fill the potential gap, the likelihood of recession and impact on products demand, the capacity constraints and high utilization rates outside China, and possible refinery outages resulting from those high rates. Diesel markets in EU are already tight battered by unplanned outages and maintenance aggravating their tight stocks position, while US utilization rates cannot keep up with exports demand to fill the gap and it remains unclear whether China’s latest batch of products export quotas will translate in large diesel availability.
Cracks hitting new highs

Product margins in EU rose anew on French refinery strikes, albeit the latter are starting to ease, while volatility in Asian markets is mostly confined in middle distillate cracks.

Product cracks

Notes: NWE refers to Northwest Europe and SING refers to Singapore. Source: Argus
EU refiners will not be able to fill the gap

The ban on Russian imports is only a few months away while stocks remain heavily depleted and Europe has to attract diesel from other markets.

**EU-16 refinery runs**

![Graph showing EU-16 refinery runs from Jan 2017 to Dec 2022 with 2017-2021 range, 2022, 2021, 2020, and 2019 data points.]

Notes: EU-16 refers to EU-15 plus Norway. Source: Argus

**OECD Europe product stocks vs 5-year average**

![Graph showing OECD Europe product stocks with gasoline and middle distillates from Jan 2015 to Jan 2022 with 5-year average comparison.]

Source: IEA, OIES
US refinery output hits a ceiling on capacity constraints

US refineries continue to run hard exceeding 90% utilization rate since March, but Jan/Sep 2022 output averaged 1 mb/d below the same period in 2019.

**US refinery runs and utilization**

![Graph showing US refinery runs and utilization](image)

*Source: US EIA*

**US product stocks vs 5-year average**

![Graph showing US product stocks vs 5-year average](image)

*Source: IEA, OIES*
Refining

China’s diesel offering overseas expected to rise

Refinery runs are set to rebound in Q4 as China releases a new batch of products export quotas with products exports on the rise.

### China refinery runs

<table>
<thead>
<tr>
<th>Month</th>
<th>2017-2021 range</th>
<th>2022</th>
<th>2021</th>
<th>2020</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Feb</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Mar</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Apr</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>May</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Jun</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Jul</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Aug</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Sep</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Oct</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Nov</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Dec</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Source: Argus

### China products export quotas

2021

- 1st batch: 300 MBBLs
- 2nd batch: 150 MBBLs
- 3rd batch: 50 MBBLs
- 4th batch: 0 MBBLs
- 5th batch: 0 MBBLs

2022

- 1st batch: 300 MBBLs
- 2nd batch: 150 MBBLs
- 3rd batch: 50 MBBLs
- 4th batch: 0 MBBLs
- 5th batch: 0 MBBLs

Source: Argus
India’s refinery runs drop on planned maintenance

India’s refiners are stepping-up maintenance in H2 following a robust first half of the year, while Europe remains the top destination of middle distillate exports.

India refinery runs

![Graph showing refinery runs over time]

Source: PPAC

India exports of middle distillates

![Graph showing middle distillate exports over time]

Source: Kpler
Confluence of negative pressures drag the price outlook lower

The deterioration of global growth prospects, China’s delayed recovery and lower-than-expected Russian disruptions are all key factors behind the latest price outlook revisions.

Brent forecast is downgraded to $100.8/b in 2022 and $94/b in 2023

Our Brent price forecast is downgraded by -$4.3/b in 2022 from $105.1/b forecast previously, and by -$11.8/b in 2023, from $106.6/b last month. Brent bounds range between $98.6/b and $102.1/b in 2022, and between $77.8/b and $104.3/b in 2023. The Brent prospect holds close to our Reference forecast averaging $100.8/b in 2022 and $93/b in 2023.
Price Outlook

Balance of Risks

Price band in 2023 ranges between $77.8 and $104.3/b

Downside risks intensify in H1 2023 (-$7/b on balance), with negative demand pressures associated with the global economic downturn persisting towards year-end.

Balance of risks

![Graph showing price band in 2023]

Notes: Brent price. Source: OIES

<table>
<thead>
<tr>
<th>Balance of risks</th>
<th>USD/B</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td></td>
<td>70.4</td>
<td>100.8</td>
<td>94.0</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>98.6</td>
<td>77.8</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>102.1</td>
<td>104.3</td>
<td></td>
</tr>
<tr>
<td>Supply risks¹</td>
<td></td>
<td>(0.2)</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Demand risks¹</td>
<td></td>
<td>(1.1)</td>
<td>(7.0)</td>
<td></td>
</tr>
<tr>
<td>Geopolitical risks¹</td>
<td></td>
<td>0.3</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Balance or risks</td>
<td></td>
<td>(0.9)</td>
<td>(6.0)</td>
<td></td>
</tr>
</tbody>
</table>

¹ On balance, annually.

Balance of risks is tilted to the downside in both 2022 and 2023

On balance, geopolitical risks to the price outlook add $1.1/b to the reference price in 2023. Supply risks are fairly balanced in both years, while demand-side risks persist to the downside in both 2022 and 2023 standing at -$1.1/b and -$7/b on annual terms, respectively.
Price Outlook

The market is torn between a bearish-macro and bullish-micro oil story

Persistent macro-pressures are gaining ground over supply concerns and are shifting the balance of risks lower.

**Decomposition of upside price risks**

![Upside Price Risk Chart]

Notes: Brent price. Source: OIES

**Decomposition of downside price risks**

![Downside Price Risk Chart]

Notes: Brent price. Source: OIES
Near-term market surpluses withstand OPEC+ cuts

Despite the OPEC+ cuts, the projected market surpluses in H2 2022 and H1 2023 are upgraded by 120,000 b/d to 1.1 mb/d and 170,000 b/d to 0.7 mb/d, respectively.

Global Balance

We forecast a 0.4 mb/d surplus in 2022, followed by a -0.3 mb/d deficit in 2023

The market surplus in 2022 is upgraded by 90,000 b/d from 340,000 b/d forecast previously, and the deficit grew in 2023 by -210,000 b/d from -60,000 b/d previously.
Market uncertainty remains elevated in 2023 but bands narrow

The high/low band has narrowed by 1.6 mb/d in 2023 in favour of downside pressures that raise the risk of sustained market surpluses beyond H2 and the year as a whole.

Global balance risks

The supply/demand gap in 2023 ranges between -1 mb/d and 2.1 mb/d

Global oil demand growth in our forecast scenarios ranges between 1.68 mb/d and 1.8 mb/d y/y in 2022 and 480,000 b/d and 1.9 mb/d y/y in 2023. Global oil supply growth ranges between 4.6 mb/d and 4.7 mb/d y/y in 2022 and 600,000 b/d and 2 mb/d y/y in 2023.
Products tightness hinders stocks replenishment

The stocks build-up accelerates towards H1 2023, but starting from a very low base keeping OECD stocks at 70 mbbls below the 5-year average ending-2023.

**OECD commercial stocks vs 5-year average**

![OECD commercial stocks vs 5-year average chart]

*Source: OIES*

**Global floating storage**

![Global floating storage chart]

*Source: Kpler*
### Tables

#### Price outlook

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>1Q22</th>
<th>2Q22</th>
<th>3Q22</th>
<th>4Q22</th>
<th>2022</th>
<th>1Q23</th>
<th>2Q23</th>
<th>3Q23</th>
<th>4Q23</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brent price (USD/t)</td>
<td>42.3</td>
<td>70.4</td>
<td>99.0</td>
<td>112.7</td>
<td>99.2</td>
<td>92.5</td>
<td>100.8</td>
<td>91.3</td>
<td>86.9</td>
<td>97.3</td>
<td>100.7</td>
<td>94.0</td>
</tr>
<tr>
<td>Brent prospect (USD/t)</td>
<td>42.3</td>
<td>70.4</td>
<td>99.0</td>
<td>112.7</td>
<td>99.2</td>
<td>92.4</td>
<td>100.8</td>
<td>90.4</td>
<td>87.0</td>
<td>95.9</td>
<td>98.8</td>
<td>93.0</td>
</tr>
</tbody>
</table>

#### Price drivers

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>1Q22</th>
<th>2Q22</th>
<th>3Q22</th>
<th>4Q22</th>
<th>2022</th>
<th>1Q23</th>
<th>2Q3</th>
<th>3Q23</th>
<th>4Q23</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geopolitics (USD/t)</td>
<td>-0.6</td>
<td>-1.9</td>
<td>10.1</td>
<td>8.6</td>
<td>-</td>
<td>1.3</td>
<td>0.3</td>
<td>3.3</td>
<td>0.7</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Supply (USD/t)</td>
<td>10.2</td>
<td>4.3</td>
<td>-1.4</td>
<td>-1.2</td>
<td>-</td>
<td>-0.7</td>
<td>-0.2</td>
<td>-0.8</td>
<td>-0.8</td>
<td>0.7</td>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td>Demand (USD/t)</td>
<td>-21.2</td>
<td>22.8</td>
<td>2.3</td>
<td>2.0</td>
<td>-</td>
<td>-4.3</td>
<td>-1.1</td>
<td>-8.4</td>
<td>-8.2</td>
<td>-6.1</td>
<td>-5.1</td>
<td>-7.0</td>
</tr>
<tr>
<td>Speculative (USD/t)</td>
<td>-10.1</td>
<td>2.9</td>
<td>8.3</td>
<td>4.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Balance of risks

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>1Q22</th>
<th>2Q22</th>
<th>3Q22</th>
<th>4Q22</th>
<th>2022</th>
<th>1Q23</th>
<th>2Q23</th>
<th>3Q23</th>
<th>4Q23</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brent low (USD/t)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>83.6</td>
<td>98.6</td>
<td>73.1</td>
<td>69.0</td>
<td>82.6</td>
<td>86.7</td>
</tr>
<tr>
<td>Brent high (USD/t)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>97.6</td>
<td>102.1</td>
<td>103.6</td>
<td>96.5</td>
<td>106.4</td>
<td>110.5</td>
</tr>
<tr>
<td>Total Demand (mb/d)</td>
<td>91.5</td>
<td>97.7</td>
<td>99.5</td>
<td>98.4</td>
<td>99.9</td>
<td>100.0</td>
<td>99.5</td>
<td>98.9</td>
<td>100.1</td>
<td>102.6</td>
<td>103.1</td>
<td>101.2</td>
</tr>
<tr>
<td>(y/y change)</td>
<td>-9.0</td>
<td>6.1</td>
<td>5.0</td>
<td>2.0</td>
<td>1.0</td>
<td>-0.9</td>
<td>1.8</td>
<td>-0.6</td>
<td>1.7</td>
<td>2.7</td>
<td>3.1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

#### Global balance

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>1Q22</th>
<th>2Q22</th>
<th>3Q22</th>
<th>4Q22</th>
<th>2022</th>
<th>1Q23</th>
<th>2Q3</th>
<th>3Q23</th>
<th>4Q23</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEC (mb/d)</td>
<td>25.7</td>
<td>26.4</td>
<td>28.5</td>
<td>28.7</td>
<td>28.6</td>
<td>28.5</td>
<td>28.1</td>
<td>28.4</td>
<td>28.4</td>
<td>28.4</td>
<td>29.5</td>
<td>29.4</td>
</tr>
<tr>
<td>Non-OPEC (mb/d)</td>
<td>51.2</td>
<td>51.6</td>
<td>52.8</td>
<td>51.7</td>
<td>52.8</td>
<td>50.1</td>
<td>52.6</td>
<td>52.5</td>
<td>52.4</td>
<td>53.1</td>
<td>53.5</td>
<td>56.0</td>
</tr>
<tr>
<td>US (mb/d)</td>
<td>11.3</td>
<td>11.2</td>
<td>11.5</td>
<td>11.7</td>
<td>12.0</td>
<td>12.2</td>
<td>11.8</td>
<td>12.3</td>
<td>12.6</td>
<td>12.7</td>
<td>12.6</td>
<td>12.7</td>
</tr>
<tr>
<td>Brazil (mb/d)</td>
<td>2.9</td>
<td>2.9</td>
<td>3.0</td>
<td>2.9</td>
<td>3.0</td>
<td>3.1</td>
<td>3.0</td>
<td>3.2</td>
<td>3.3</td>
<td>3.4</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Canada (mb/d)</td>
<td>4.4</td>
<td>4.6</td>
<td>4.7</td>
<td>4.5</td>
<td>4.8</td>
<td>4.9</td>
<td>4.7</td>
<td>4.9</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Norway (mb/d)</td>
<td>1.7</td>
<td>1.8</td>
<td>1.8</td>
<td>1.6</td>
<td>1.7</td>
<td>1.9</td>
<td>1.7</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
<td>2.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Other non-OPEC (mb/d)</td>
<td>30.8</td>
<td>31.0</td>
<td>31.9</td>
<td>31.0</td>
<td>31.4</td>
<td>30.9</td>
<td>31.3</td>
<td>30.2</td>
<td>30.0</td>
<td>30.1</td>
<td>30.3</td>
<td>30.1</td>
</tr>
<tr>
<td>Total crude (mb/d)</td>
<td>76.9</td>
<td>78.0</td>
<td>81.3</td>
<td>80.4</td>
<td>82.4</td>
<td>82.5</td>
<td>81.7</td>
<td>81.8</td>
<td>81.8</td>
<td>82.2</td>
<td>82.5</td>
<td>83.2</td>
</tr>
<tr>
<td>NGLs (mb/d)</td>
<td>13.5</td>
<td>13.7</td>
<td>14.1</td>
<td>14.4</td>
<td>14.5</td>
<td>14.7</td>
<td>14.4</td>
<td>14.6</td>
<td>14.8</td>
<td>14.8</td>
<td>14.9</td>
<td>14.8</td>
</tr>
<tr>
<td>Biofuels/Misc. (mb/d)</td>
<td>3.4</td>
<td>3.6</td>
<td>3.3</td>
<td>3.9</td>
<td>4.2</td>
<td>3.8</td>
<td>3.8</td>
<td>3.4</td>
<td>4.0</td>
<td>4.3</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Total Supply (mb/d)</td>
<td>93.8</td>
<td>95.3</td>
<td>98.7</td>
<td>98.7</td>
<td>101.1</td>
<td>101.0</td>
<td>99.9</td>
<td>99.9</td>
<td>100.5</td>
<td>101.5</td>
<td>101.8</td>
<td>100.9</td>
</tr>
<tr>
<td>(y/y change)</td>
<td>-6.7</td>
<td>1.4</td>
<td>6.2</td>
<td>4.5</td>
<td>4.7</td>
<td>3.0</td>
<td>4.6</td>
<td>1.2</td>
<td>1.7</td>
<td>0.4</td>
<td>0.7</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Notes:
1/ OPEC estimates are based on current membership throughout.
2/ Non-OPEC crude supplies include crude oil, condensate and processing gains. OPEC includes crude oil only.
3/ NGLs and biofuels/misc. are global estimates and are excluded from OPEC, non-OPEC and country-specific crude supply estimates.
4/ Global balance is equivalent to global stock change.
5/ The OPEC call equals the arithmetic difference between total demand and non-OPEC crude plus NGLs and other liquids.
The contents of this report are the authors’ sole responsibility. They do not necessarily represent the views of the Oxford Institute for Energy Studies or any of its Members.

October 2022