Energy Tidbits

Liberal's Proposes Cap on GHG Emissions at 35-38% Below 2019 Levels on Oil & Gas Would be a Huge Impact on the Sector

Produced by: Dan Tsubouchi

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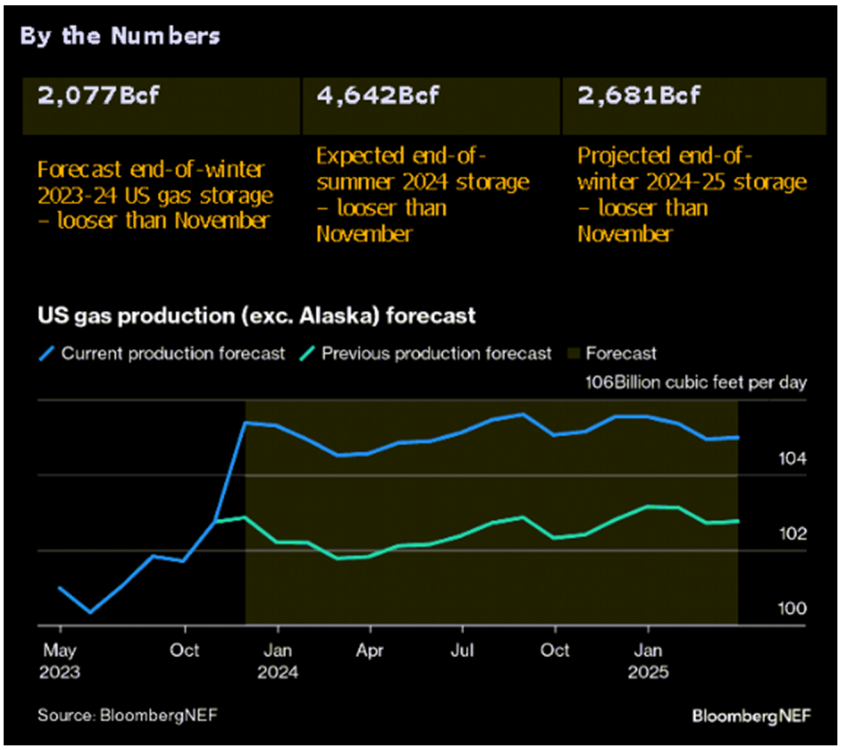
US Gas Monthly: A Kind Winter and Strong Production
2023-12-07 19:50:31.240 GMT

By Enrique Gonzalez
(BloombergNEF) -- Surprisingly strong production growth and warmer-than-normal weather have teamed up to crush any chances of tight inventories for end of winter 2025. Meanwhile, US gas exports to Mexico in 2024 will remain nearly flat despite growing pipeline capacity and the startup of a liquefied natural gas export facility. Combined, these factors outweigh higher power burns resulting from improved gas power plant economics and considerable industrial gas demand growth.



* This report assumes a 2H 2024 Golden Pass startup. That forecast will be adjusted based on Exxon's December 2023 corporate plan.
* December is forecast to deliver 57 heating degree days below normal. This results in expected heating demand for the month that is 3.5 billion cubic feet per day (Bcf/d) below the last report's.
* US gas production (excluding Alaska) saw a massive 2.6Bcf/d month-on-month increase in November following a 1.0Bcf/d jump in October. BNEF has updated its production forecast to reflect the rapid increase and now expects 2024 to average 105.1Bcf/d, 2.7Bcf/d above our previous report.
* US dry gas exports to Mexico in 2023 (including December forecast) will average 6.00Bcf/d in 2023, setting a new yearly

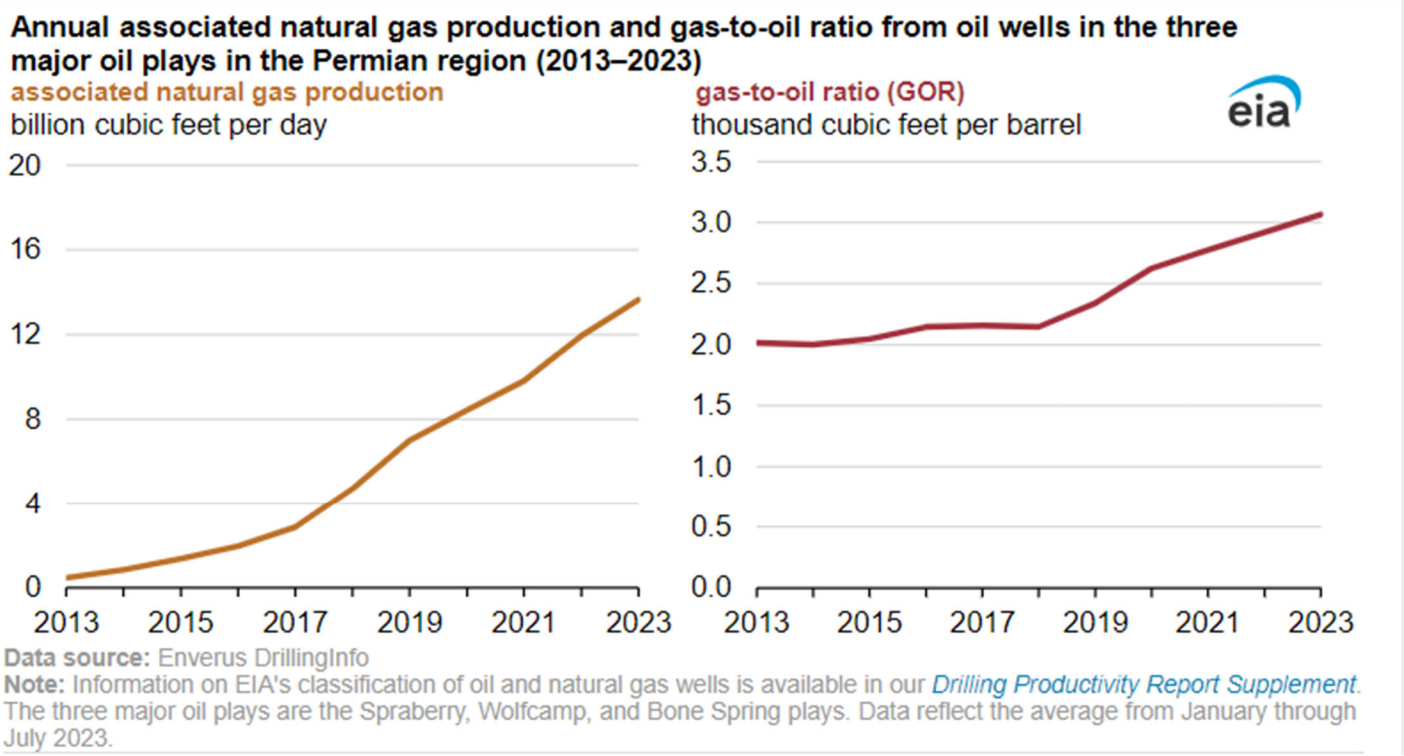
high due to record heat. However, BNEF expects a slight fall in exports to Mexico in 2024 under the assumption of normal weather.
* Starting in January 2024, BNEF expects higher power sector gas consumption on account of improved gas plant economics due to a drop in the Henry Hub futures curve while future coal prices remained nearly flat.
* BNEF calculates 1,464Bcf of gas storage variability attributable to weather between now and the end of winter 2023-24. Out of the 12 scenarios modeled, 11 see inventories sitting above the five-year-average.
View the full report

To view this story in Bloomberg click here:
https://blinks.bloomberg.com/news/stories/S5BB47DWRGG0

https://www.eia.gov/todayinenergy/detail.php?id=61043

DECEMBER 6, 2023

Associated natural gas production has tripled since 2018 in top three Permian oil plays



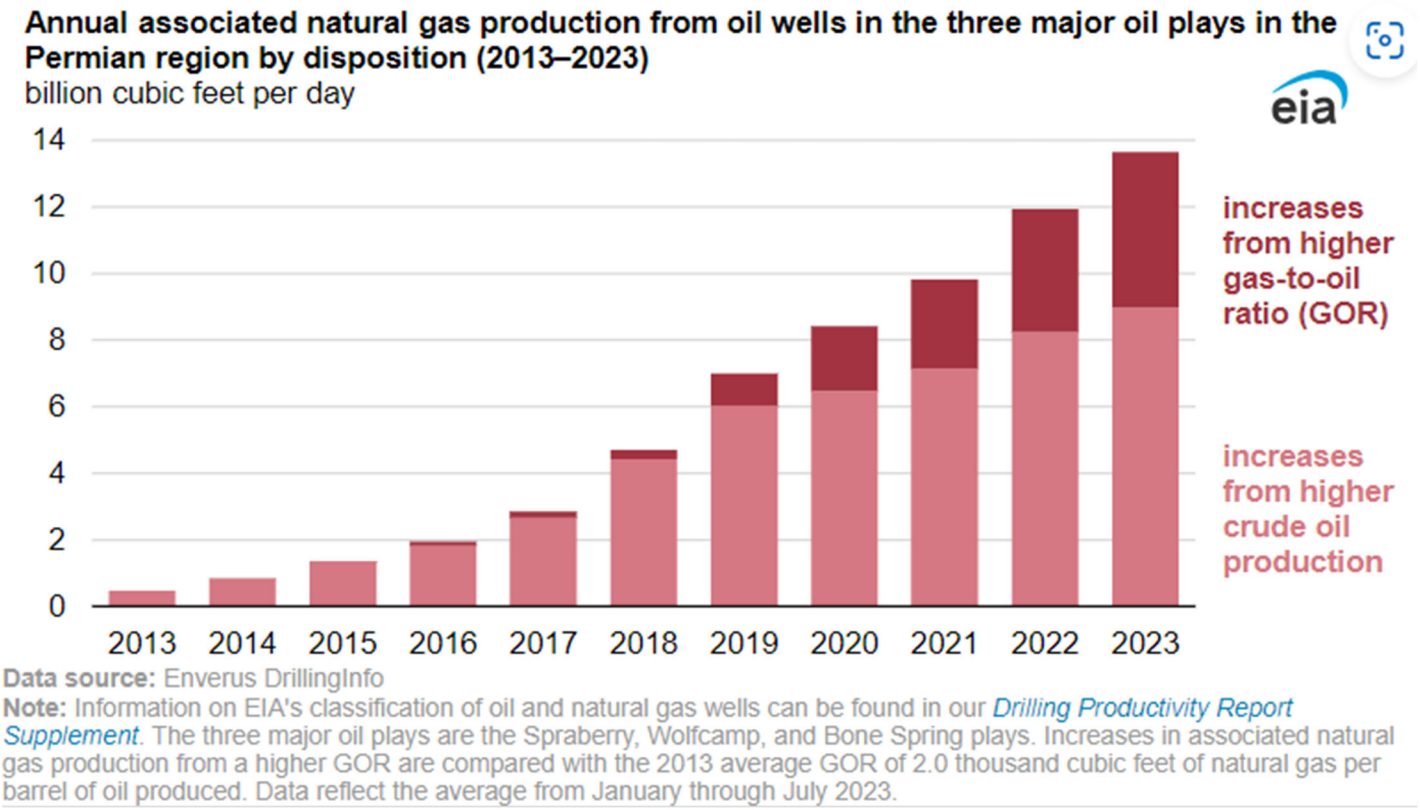
Production of associated-dissolved natural gas, or associated natural gas, which is natural gas produced from predominantly oil wells, has nearly tripled since 2018 in the three top-producing tight oil plays in the Permian region. Associated natural gas from the Wolfcamp, Spraberry, and Bone Spring plays averaged a combined 13.7 billion cubic feet per day (Bcf/d) in the first seven months of 2023, up from an average of 4.7 Bcf/d in 2018, according to data from Enverus DrillingInfo. Associated natural gas production has grown due to increases in both crude oil production and the volume of natural gas per barrel of oil that a well produces, the gas-to-oil ratio (GOR), among the oil wells in these three plays.

Any increase in the GOR in an oil well means more natural gas per barrel of oil is being produced. We define oil wells as those with a GOR of less than or equal to 6.0 thousand cubic feet of natural gas per barrel of oil produced (Mcf/b). We classify wells with a GOR of more than 6.0 Mcf/b as natural gas wells.

The Permian region, which spans parts of western Texas and southeastern New Mexico, produces more crude oil than any other region in the United States, accounting for more than 40% of total U.S. crude oil production. The Permian is the second-largest natural gas-producing region in the country, accounting for about a quarter of total U.S. marketed natural gas production. Most of the natural gas produced in the Permian region is associated natural gas. Consequently, in the Permian region, increased crude oil production has also increased associated natural gas production. Average crude oil production in the first nine months of 2023 increased by 68% in the Permian compared with 2018, while natural gas production in the Permian increased by 104% over the same period, according to our *Drilling Productivity Report*.

The Spraberry, Wolfcamp, and Bone Spring plays produce most of the associated natural gas within the Permian region. In 2023, these three plays produced 13.2 Bcf/d more associated natural gas than in 2013. Higher crude oil production accounted for 65% of the

increase in natural gas production, and 35% of the increase came from a higher GOR, which rose from 2.0 Mcf/b in 2013 to 3.1 Mcf/b in the first seven months of 2023.



As more oil and natural gas are released within a well, the GOR tends to progressively increase, increasing the volume of associated natural gas produced per every barrel of oil. Pressure within the reservoir declines progressively as more oil is brought to the surface, which allows more natural gas to be released from the geologic formation.

We provide a national breakdown of crude oil and natural gas production volumes based on well type classification annually.

Principal contributors: Troy Cook, Max Ober

Tags: natural gas, wells, Permian, production/supply

https://mexicopacific.com/mexico-pacific-and-woodside-sign-long-term-lng-sales-and-purchase-agreement/

Mexico Pacific and Woodside Sign Long-Term LNG Sales and Purchase Agreement

December 5, 2023 – Mexico Pacific Limited (Mexico Pacific) and Woodside have signed a sales and purchase agreement (SPA) for 1.3 million tonnes per annum (Mtpa), equivalent to approximately 18 cargoes per year, of liquefied natural gas (LNG) for 20 years.

Under the SPA, Woodside will purchase the LNG on a free-on-board basis over a term of 20 years from the proposed third train of Mexico Pacific's Saguaro Energia LNG Project with pricing linked to US gas indices. The SPA is subject to Mexico Pacific taking a final investment decision (FID) on the proposed third train at the Saguaro Energia LNG Project which is expected in the first half of 2024.

The Saguaro Energia LNG Project leverages low cost Permian Basin natural gas in the U.S. and a Pacific Basin facing liquefaction site to deliver more cost efficient LNG for supply into the world's largest LNG market, Asia without risk of the Panama Canal.

Woodside CEO Meg O'Neill said: "As we deliver on our strategy, we aim to complement Woodside's produced LNG supply with third parties' volumes, giving us greater scale and portfolio flexibility to serve our customers, while optimising our LNG trading activities.

"This agreement with Mexico Pacific delivers a new source of LNG into our trading portfolio, expands our geographic diversification in the Pacific Basin and builds on our presence in Mexico.

"The Saguaro Energia LNG Project is located on Mexico's Pacific coast, providing proximity to key markets in Asia," she said.

"We are delighted to welcome Woodside, one of the most established global LNG market participants, as a foundation customer of Train 3, further validating the value of west coast Mexican LNG." said Sarah Bairstow, President of Mexico Pacific. "We look forward to continuing our collaborative relationship with Woodside to bring additional supply online to address critical energy security and energy transition needs."

About Mexico Pacific

Mexico Pacific's anchor project, the 15 Mtpa Saguaro Energia LNG Facility, is the most advanced LNG development project on the West Coast of North America. The Saguaro Energia LNG Facility achieves significant cost and logistical advantages resulting in the lowest landed price of North American LNG into Asia by, leveraging low-cost natural gas sourced from the nearby Permian Basin, and a significantly shorter shipping route avoiding Panama Canal transit risk for Asian markets.

More information can be found at www.mexicopacific.com.

About Woodside

Woodside Energy Group Ltd is the largest energy company listed on the Australian Securities Exchange (ASX) and has oil and gas assets and interest in Australia, the Gulf of Mexico, the Caribbean, Senegal and Timor-Leste.

Find out more at www.woodside.com.

https://tass.com/world/1718643

9 DEC, 19:22

Presidents of Venezuela, Guyana to hold talks on territorial dispute on December 14

"The presidents will meet in [the island nation of] Saint Vincent and the Grenadines on Thursday, December 14, 2023, under the auspices of CELAC and CARICOM," the country’s government said in a communique

Venezuelan President Nicolas Maduro
© AP Photo/Ariana Cubillos

CARACAS, December 10. /TASS/. Saint Vincent and the Grenadines will serve as a venue for talks between Presidents Nicolas Maduro of Venezuela and Mohamed Irfaan Ali of Guyana on settling the territorial dispute between the two countries on December 14, the country’s government announced.

"The presidents will meet in [the island nation of] Saint Vincent and the Grenadines on Thursday, December 14, 2023, under the auspices of CELAC (the Community of Latin American and Caribbean States - TASS) and CARICOM (the Caribbean Community - TASS), on matters related to the border dispute between Guyana and Venezuela," the country’s government said in a communique.

Venezuela's Foreign Ministry said earlier that Maduro had telephone conversations with his Brazilian counterpart Luiz Inacio Lula da Silva and Prime Minister of Saint Vincent and the Grenadines Ralph Gonsalves, during which "he received an offer to hold a summit with the Co-operative Republic of Guyana."

About 95% of participants in the December 3 consultative referendum voted in favor of creating the Guayana Esequiba state and making it part of Venezuela. The country’s National Assembly (parliament) on December 6 unanimously passed a bill on the protection of Guyana-Essequibo within Venezuela on first reading, based on the results of a consultative referendum. The bill provides for the creation of the 24th state of Guyana-Essequibo in the disputed territory. Maduro signed six decrees that create a legal framework to govern the annexed territory.

Territorial dispute

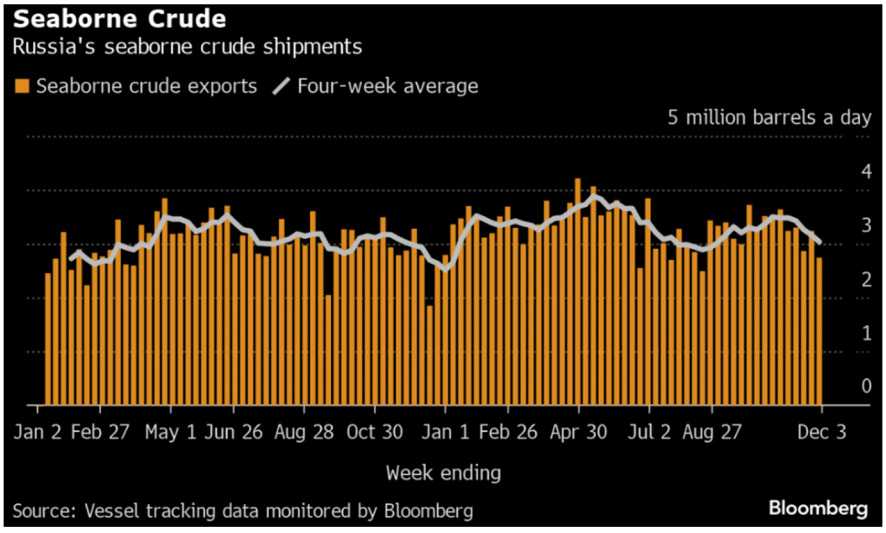
Venezuela and Guyana have been at odds over a 159,500-square-kilometer area west of the Essequibo River for more than a century. Tensions flared up after oil fields containing at least ten bln barrels of oil had been discovered in 2015 and Guyana provided the ExxonMobil company with a concession to explore oil in the offshore areas that had not been delimited. In April, the UN International Court of Justice found Guyana's lawsuit against Venezuela on border demarcation based on the 1899 decision of a Paris arbitral tribunal to be admissible. The court ruling, which cited fake maps and huge pressure from the UK, handed 90% of the disputed area to London's colony, British Guiana. Venezuela views Guyana-Essequibo as its legitimate territory and believes that the dispute does not fall under the jurisdiction of the International Court of Justice and insists on direct border demarcation talks with Guyana, as provided for in the 1966 Geneva Agreement.

TAGS

Black Sea Storms Batter Russian Crude Exports to Three-Month Low
2023-12-05 11:15:45.576 GMT

By Julian Lee
(Bloomberg) -- Russia's four-week average seaborne crude exports fell to the lowest in three months, with storms in the Black Sea disrupting shipments for a third week. Loading activities remained sluggish at the port of Novorossiysk even after they restarted on Nov. 30.
About 3.04 million barrels a day of crude were shipped from Russian ports in the four weeks to Dec. 3, tanker-tracking data monitored by Bloomberg show. That was down by 125,000 barrels a day from the revised figure for the period to Nov. 26. The more volatile weekly average also fell.
The OPEC+ group of oil producers, jointly led by Russia and Saudi Arabia, met virtually on Nov. 30 to set output targets for the first part of next year. Several members of the group agreed to make further production cuts during the first quarter after Saudi Arabia said it would prolong its unilateral one-million-barrel-a-day supply reduction.

Russia will deepen its oil export cuts to 500,000 barrels a day below their average May-June levels during the first quarter of next year. The cuts will be shared between crude shipments, which will be reduced by 300,000 barrels a day, and refined products, according to Deputy Prime Minister Alexander Novak. For the rest of 2023, the reduction is set at 300,000 barrels a day, spread across both crude and refined products in undefined proportions. That complicates assessments of whether Russia is meeting its commitment to its OPEC+ partners.



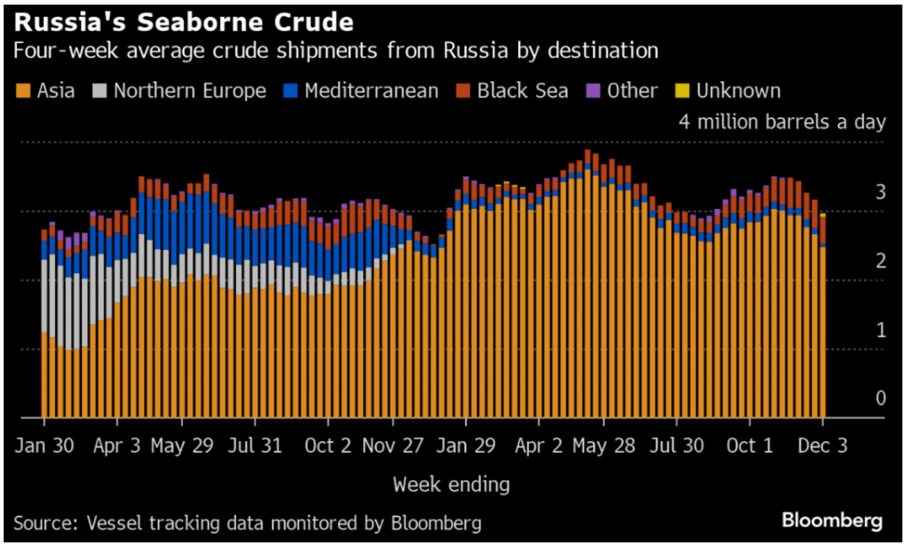
The figure for weekly flows fell sharply. Using this measure, shipments dropped to 2.74 million barrels a day, down by about 500,000 barrels a day from the revised figure for the period to Nov. 26. Weekly shipments were the lowest in 15 weeks.
Russia's oil processing in the last week of November showed the deepest weekly decline since late August amid lower

processing at several refineries. One of the hardest hit was Rosneft PJSC's Tuapse refinery on the Black Sea coast. The plant, which sends the bulk of its oil-products abroad, lowered processing rates amid a halt in operations at region's ports last week due to thestorms.

The Kremlin's weekly revenues from oil export duties fell, hit by a combination of lower flows and a reduced duty rate for December shipments. From January, Russia's oil producers are set to pay a higher output tax to fund increased downstream subsidies, which were reinstated in October after being halved the previous month. Export duty is set to be abolished at the end of this year as part of Russia's long-running tax reform plans.

Flows by Destination

Russia's seaborne crude flows in the four weeks to Dec. 3 fell to 3.04 million barrels a day. That was down from a revised 3.16 million barrels a day in the period to Nov. 26. Shipments were about 550,000 barrels a day below the average seen during the surge in volumes between April and June.



All figures exclude cargoes identified as Kazakhstan's KEBCO grade. Those are shipments made by KazTransoil JSC that transit Russia for export through Novorossiysk and the Baltic port of Ust-Luga and are not subject to European Union sanctions or a price cap.

The Kazakh barrels are blended with crude of Russian origin to create a uniform export grade. Since Russia's invasion of Ukraine, Kazakhstan has rebranded its cargoes to distinguish them from those shipped by Russian companies.

*** Asia**

Observed shipments to Russia's Asian customers, including those showing no final destination, fell to 2.58 million barrels a day in the four weeks to Dec. 3, down from a revised 2.66

million barrels a day in the period to Nov. 26. That's the lowest since August.

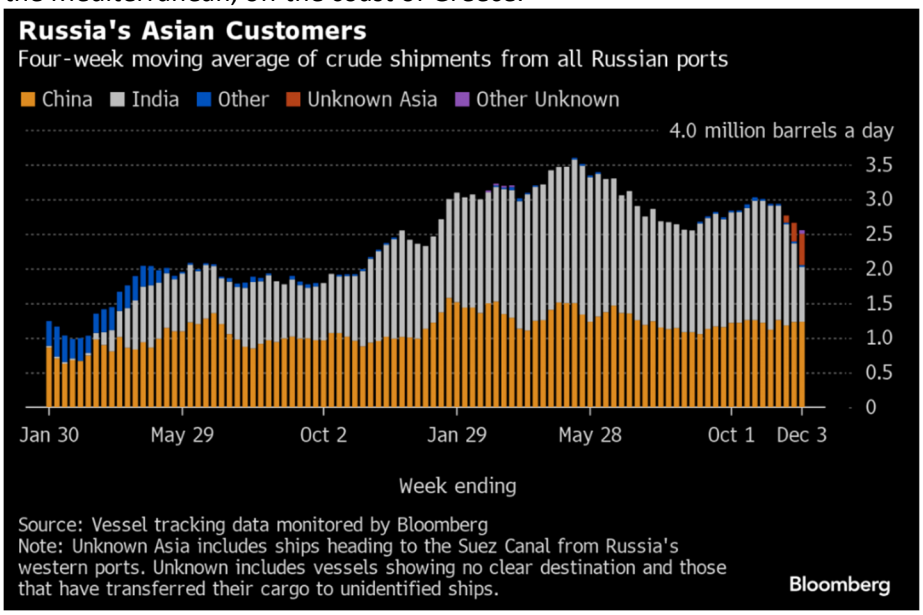
About 1.23 million barrels a day of crude was loaded onto tankers heading to China in the four weeks to Dec. 3. China's seaborne imports are supplemented by about 800,000 barrels a day of crude delivered directly from Russia by pipeline, either directly, or via Kazakhstan.

Flows on ships signaling destinations in India averaged about 790,000 barrels a day in the four weeks to Dec. 3.

Both the Chinese and Indian figures will rise as the discharge ports become clear for vessels that are not currently showing final destinations.

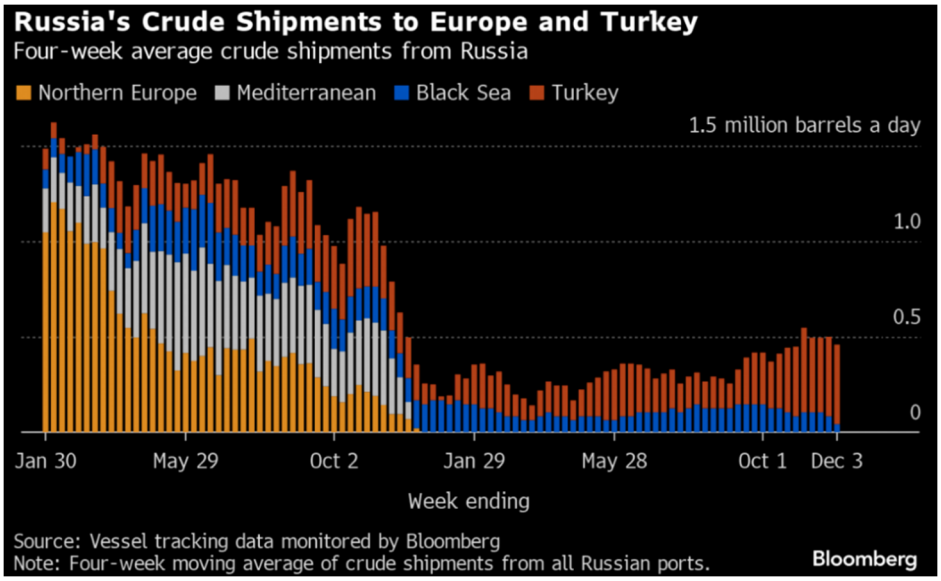
The equivalent of about 475,000 barrels a day was on vessels signaling Port Said or Suez in Egypt, or are expected to be transferred from one ship to another off the South Korean port of Yeosu. Those voyages typically end at ports in India or China and show up in the chart below as "Unknown Asia" until a final destination becomes apparent.

The "Other Unknown" volumes, running at about 52,000 barrels a day in the four weeks to Dec. 3, are those on tankers showing no clear destination. Most of those cargoes originate from Russia's western ports and go on to transit the Suez Canal, but some could end up in Turkey. Others could be moved from one vessel to another, with most such transfers now taking place in the Mediterranean, off the coast of Greece.



*** Europe and Turkey**

Russia's seaborne crude exports to European countries have collapsed since Moscow's troops invaded Ukraine in February 2022. A market that consumed about 1.5 million barrels a day of short-haul seaborne crude, coming from export terminals in the Baltic, Black Sea and Arctic has been lost almost completely, to be replaced by long-haul destinations in Asia that are much more costly and time-consuming to serve.



No Russian crude was shipped to northern European countries, or those in the Mediterranean in the four weeks to Dec. 3.

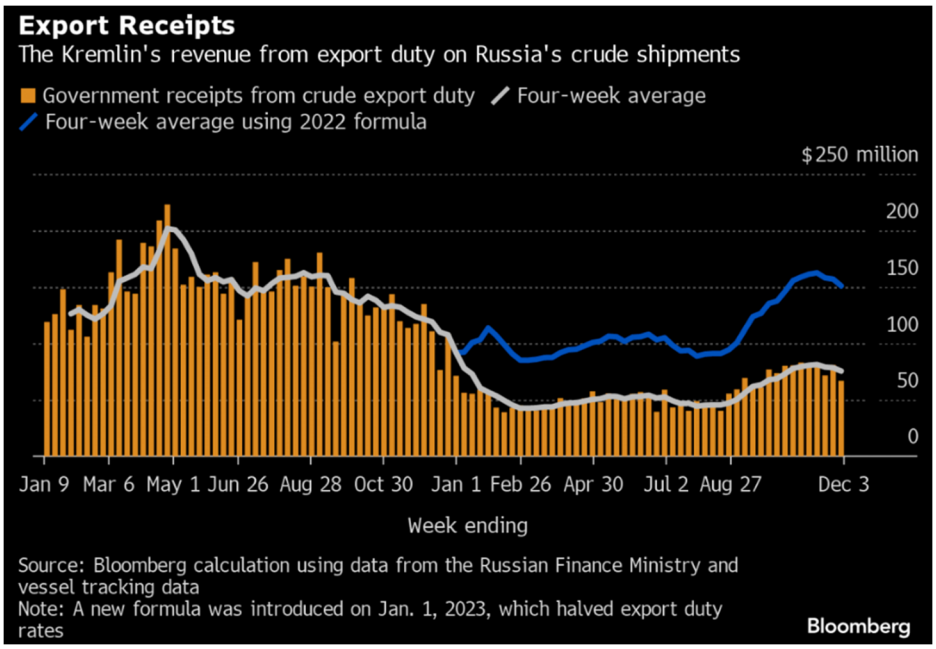
Flows to Bulgaria, now Russia's only European market for crude, fell to about 42,000 barrels a day in the most recent four-week period, it's lowest since April 2022. The disruption to flows from Novorossiysk hit shipments across the Black Sea.

Exports to Turkey were unchanged at about 420,000 barrels a day in the four weeks to Dec. 3. They remain more than twice as high as they were in July and August.

Vessel-tracking data are cross-checked against port agent reports as well as flows and ship movements reported by other information providers including Kpler and Vortexa Ltd.

Export Revenue

Inflows to the Kremlin's war chest from its crude-export duty slumped to $67 million in the seven days to Dec. 3. That's the lowest since September. Meanwhile four-week average income fell by $3 million to $75.5 million.



The duty rate for November was set at $3.57 a barrel, based on an average Urals price of $83.35 during the calculation period between Sept. 15 and Oct. 14. That was about $7.70 a barrel below Brent over the same period. November's duty rate set another new high for the year.

The rate for December is $3.37 a barrel, based on an average Urals price of $79.23 during the calculation period between Oct. 15 and Nov. 14. That was about $9.39 a barrel below Brent over the same period.

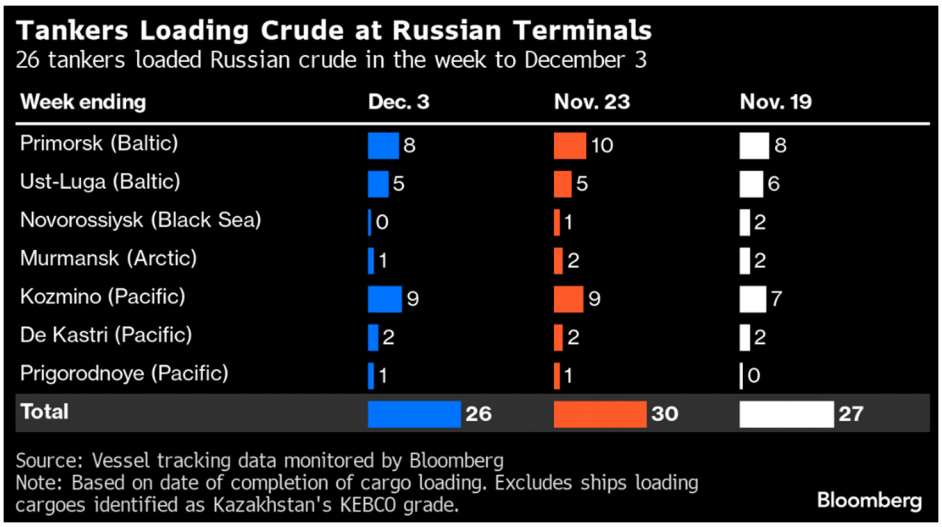
Origin-to-Location Flows

The following table shows the number of ships leaving each export terminal.

A total of 26 tankers loaded 19.2 million barrels of Russian crude in the week to Dec. 3, vessel-tracking data and port agent reports show. That's down by about 3.5 million barrels from the revised figure for the previous week.

There were no shipments from Novorossiysk, with storms continuing to hamper activity at the port for a third week. Loading activities resumed on Nov. 30, but still appear to be running slowly.

Destinations are based on where vessels signal they are heading at the time of writing, and some will almost certainly change as voyages progress. All figures exclude cargoes identified as Kazakhstan's KEBCO grade.



Two cargoes of KEBCO were loaded at Ust-Luga and one at Novorossiysk during the week.NOTES

Note: This story forms part of a weekly series tracking shipments of crude from Russian export terminals and the export duty revenues earned from them by the Russian government. Weeks run from Monday to Sunday. The next update will be on Tuesday, Dec. 12.

Note: All figures exclude cargoes owned by Kazakhstan's KazTransOil JSC, which transit Russia and are shipped from Novorossiysk and Ust-Luga as KEBCO grade crude.

If you are reading this story on the Bloomberg terminal, click here for a link to a PDF file of four-week average flows from Russia to key destinations.

--With assistance from Sherry Su.

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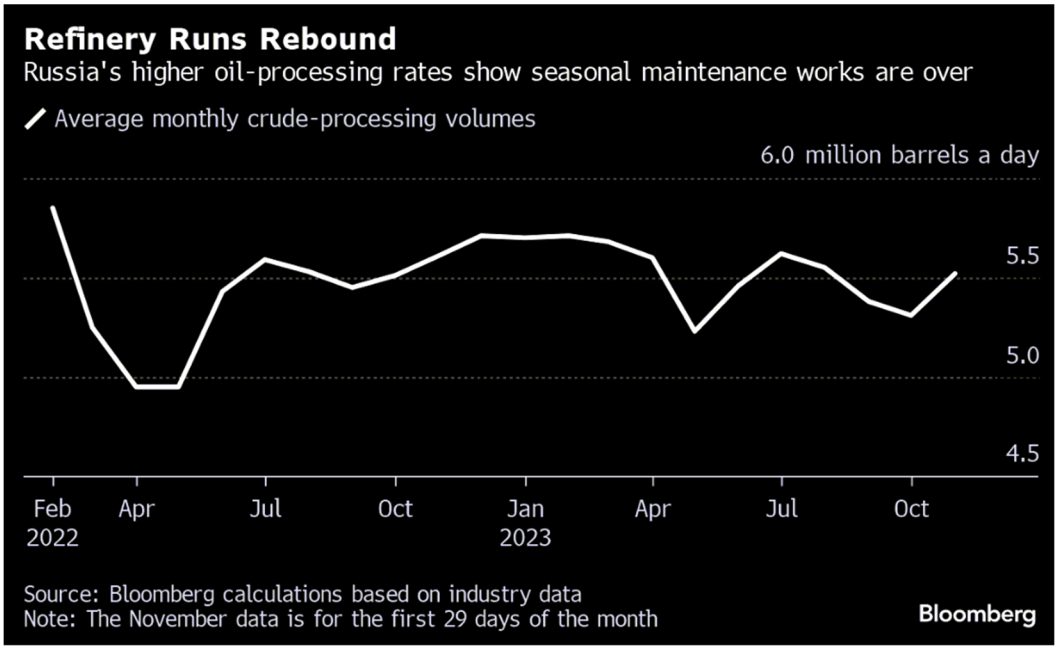
Russia Oil Processing in Late November Falls On Unplanned Halts
2023-12-04 09:39:37.328 GMT

By Bloomberg News
(Bloomberg) -- Russia's oil refining in the last week of November showed the deepest weekly decline since late August amid lower processing at a range of refineries.
The nation's refineries processed 5.41 million barrels a day of crude between Nov. 23-29, down some 233,000 barrels a day from the average for the previous week, according to a person with knowledge of the industry.
The decline was driven mainly by lower runs at Rosneft PJSC's Tuapse refinery in Russia's south, Gazprom PJSC's Astrakhan condensate-processing plant, and a range of small independent facilities, the person said.
The Tuapse refinery, that sends the bulk of its oil-products abroad, lowered processing rates amid a halt in operations at Russia's Black Sea ports last week due to storms, the person pointed out. Astrakhan's runs were cut because of an incident at the facility, the person said, without giving details.
Rosneft and Gazprom didn't immediately respond to emails seeking comments.
Still, Russian daily crude refining in the first 29 days of November averaged 5.52 million barrels, up about 204,000 barrels compared with most of October, according to Bloomberg calculations based on historic data.
Traders and analysts scrutinize Russian crude-processing rates as one of the key remaining gages, together with seaborne crude exports, to assess the nation's oil production after Russia classified official output data amid Western sanctions.



The monthly increase comes as Russia's refineries completed

scheduled seasonal maintenance and the government further eased restrictions on car-fuel exports. Last month, the government allowed overseas sales of gasoline and lifted outstanding restrictions on summer-grade diesel exports.

While domestic processing has declined from a week ago, its seaborne crude shipments to foreign markets rose by 370,000 barrels a day, in the week to Nov. 26 from the revised figure for the period to Nov. 19, tanker-tracking data monitored by Bloomberg show.

Earlier this week, Russia agreed to deepen its voluntary oil exports cuts to 500,000 barrels a day in the first quarter, in a joint move with some of its allies within OPEC+, following a drop in crude prices. Russia's pledge includes a cut by 300,000 barrels a day in crude exports and by 200,000 barrels a day in oil products overseas supplies through March 2024, according to Deputy Prime Minister Alexander Novak.

The promised export curbs come on top of voluntary cuts in production of 500,000 barrels a day from March 2023 through 2024 in response to Western sanctions, in particular the Group of Seven's price cap on Russian crude and products.

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Joint Statement at the Conclusion of the Visit of the Russian Federation President to the Kingdom

Thursday 23/05/1445

Riyadh

Riyadh, December 7, 2023, SPA -- Within the framework of the distinguished bilateral relations between the Kingdom of Saudi Arabia and the Russian Federation, the President of the Russian Federation, Vladimir Putin, visited the Kingdom on December 6, 2023.
His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, Crown Prince and Prime Minister, received the President of the Russian Federation, Vladimir Putin, at Al-Yamamah palace in Riyadh. His Royal Highness and His Excellency held an official session of talks, during which they reviewed the historical and strategic relations between the two friendly countries, and ways to develop them in all fields. Views were exchanged on the overall current regional and international situations.
The President of the Russian Federation, Vladimir Putin, extended his congratulations to His Royal Highness, Prince Mohammed bin Salman bin Abdulaziz Al Saud, Crown Prince and Prime Minister, on winning the bid to host World Expo 2030.
In the economic, trade and investment fields, the two sides commended the increase in the volume of trade, as the volume of bilateral trade in the year 2022 increased at a rate of 46% compared to the year 2021. They noted the extent of the common economic interests between the two countries, they affirmed their intention to continue the joint work to enhance and diversify trade between them, and working to intensify communication between the private sectors in the two countries to discuss promising trade and investment opportunities and transform them into active partnerships.
The two sides stressed their keenness to continue working to enhance mutual and joint investments in the two countries, enable the private sector, exchange visits, hold joint investment forums and events, develop the investment-attractive environment, provide the necessary enablers, and solve any challenges in this field.
In the field of energy, the two sides commended the close cooperation between them and the successful efforts of the OPEC+ countries in enhancing the stability of global oil markets. They stressed the importance of continuing this cooperation, and the need for all participating countries to adhere to the OPEC+ agreement, in a way that serves the interests of producers and consumers and supports the growth of the global economy.
The two sides commended the success of the 8th session of the Saudi-Russian Joint Committee, which was held in October 2023 in Moscow, to enhance the close cooperation between the two countries, as the meeting witnessed the two sides agreeing on new areas of cooperation between them.
The two sides agreed on the importance of enhancing cooperation in the following areas: (1) oil and gas, such as procurement, supplying and standardizing equipment in the field of oil and gas, research and development services in oil , gas, and petrochemicals, evaluating the use of modern technologies in this field between companies in the two countries, the peaceful uses of nuclear energy, electricity and renewable energy including solar, wind, and geothermal energy, developing its projects and technologies, developing supply chains for the energy sectors and their sustainability, and enabling cooperation between companies to maximize the use of local resources in a way that both countries contribute to achieving flexibility and effectiveness of energy supplies, energy efficiency, rationalization of its consumption, and raising awareness of its importance. (2) The geoscientific field

and knowledge exchange, which contributes to increasing geotechnical capabilities through geological, mining and environmental studies, and benefiting from investment opportunities in the sectors targeted in the Kingdom's National Industrial Strategy, including pharmaceutical industries and medical devices. (3) Environment, water, agriculture and food security. (4) Communications, technology and digital economy, innovation, space, transportation and logistics. (5) Judiciary and justice, and starting discussions on a cooperation agreement between the two countries in the judicial field regarding civil and commercial matters. (6) Sustainable tourism and developing tourism movement between the two countries. (7) Sports. (8) Education, higher education, research and innovation, medical training, technical and vocational training, teaching the Arabic and Russian languages (4) Media. (10) Health.

The Russian side welcomed the Kingdom's launch of the "Saudi Green Initiative" and the "Middle East Green initiative" and affirmed its support for the Kingdom's efforts in the field of climate change by implementing the circular carbon economy approach launched by the Kingdom and approved by the leaders of the G20 countries. The two sides stressed the importance of adhering to the principles of the Framework Convention on Climate Change and the Paris Agreement, and the necessity of developing and implementing climate agreements by focusing on emissions rather than sources.

The two sides expressed their desire to maximize the use of local content in energy sector projects, cooperate to stimulate innovation, apply emerging technologies, including artificial intelligence in the energy sector, and develop its ecosystem.

The two sides commended the level of joint investments between the two countries in industrial projects in the Kingdom, including (4) factories in the cities of the Royal Commission for Jubail and Yanbu, with investments amounting to (300) million riyals.

Regarding defense and security, the two sides agreed to enhance defense cooperation, in a way that supports and achieves common interests between the two countries. They affirmed their desire to strengthen existing security cooperation and coordination on issues of common interest, including combating crimes in all its forms, combating terrorism and extremism and their financing, and exchanging information to confront terrorist organizations, in a way that achieves security and stability in the two countries.

The two sides affirmed their determination to strengthen and coordinate bilateral international cooperation among their relevant agencies to combat cross-border corruption crimes in all its forms, prosecute their perpetrators, and recover proceeds obtained from corruption crimes, by benefiting from the Global Operational Network of Anti-Corruption Law Enforcement Authorities (GlobE Network).

The Russian side welcomed the Kingdom's hosting of the (fourth) Ministerial Conference on Antimicrobial Resistance, scheduled to be held in November 2024.

The two sides agreed on the importance of strengthening coordination and cooperation between the two countries in international organizations, including the International Monetary Fund, the World Bank, and the G20, to confront the economic challenges that the world is facing.

Regarding international affairs, the two sides renewed their determination to continue coordination and intensify efforts aimed at maintaining international peace and security. The two sides exchanged views on issues of concern to both countries on the regional and international arenas, and affirmed their determination to enhance cooperation and joint coordination towards these issues, and to continue their support for all that would establish peace and stability in the region and the world.

The two sides discussed developments in the situation in Palestine, expressed their deep concern about the humanitarian catastrophe in Gaza, and stressed the need to stop military operations in the Palestinian territories, and the need to protect civilians in accordance with international law and international humanitarian law. The two sides stressed the need to enable international humanitarian organizations to play their role in providing humanitarian and relief aid to the Palestinian people, including United Nations organizations, especially the United Nations Relief and Works Agency for Palestine Refugees (UNRWA), and to support their efforts in this regard. The two sides stressed that there is no way to achieve security and stability in Palestine except through implementing international resolutions related to the two-state solution in order to ensure the creation of appropriate

conditions for peaceful coexistence and economic development, and to enable the Palestinian people to achieve their legitimate rights to establish an independent, sovereign Palestinian state on the 1967 borders, with East Jerusalem as its capital. In this regard, the Russian side valued the Kingdom's hosting of the Joint Arab Islamic Extraordinary Summit in Riyadh and the resulting resolutions regarding the events taking place in Palestine, and commended the Kingdom's leadership in the implementation of the Summit resolutions to start an international move to stop the aggression against Gaza.

Regarding the crisis in Ukraine, the Russian side expressed its appreciation for the humanitarian and political efforts undertaken by His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, Crown Prince and Prime Minister, including the release of a number of prisoners of different nationalities, and the ongoing efforts in this regard.

Regarding Yemen, the two sides stressed their full support for the international and regional efforts to reach a comprehensive political solution to the Yemeni crisis. The Russian side commended the Kingdom's efforts to encourage dialogue and reconciliation between the Yemeni parties, facilitating the arrival of humanitarian aid to all regions of Yemen, the financial support provided by the Kingdom to address the difficult financial conditions facing the Yemeni Government, and the development projects provided by the Saudi Program for the Development and Reconstruction for Yemen.

The Russian side welcomed the resumption of diplomatic relations between the Kingdom and Iran, expressing its hope that this step would contribute to enhancing security and stability in the region, in a way that preserves the sovereignty of countries and non-interference in their internal affairs. The two sides stressed the importance of Iran's commitment to the peacefulness of its nuclear program and transparent cooperation with the International Atomic Energy Agency, and the importance of concerted efforts in conducting comprehensive negotiations that involve the countries of the region, and addressing the sources of the threat to regional and international security and peace.

Regarding Syria, the two sides commended the decision of the Arab League to resume the participation of Syrian Government delegations in the meetings of the Council of the Arab League and its affiliated organizations and bodies, and expressed their aspiration that this would contribute to supporting the stability and territorial integrity of the Syrian Arab Republic, resolving the Syrian crisis and facilitating the safe voluntary return of Syrian refugees to their country.

Regarding Sudan, the two sides stressed the importance of building on the Jeddah Declaration (Commitment to Protect Civilians in Sudan), signed on May 11, 2023, and the humanitarian arrangements within the framework of international humanitarian law, signed on May 20, 2023, to end the ongoing conflict in Sudan and return to political dialogue between all parties. The two sides welcomed the progress achieved in the second round of the Jeddah talks on November 7, 2023, and the resumption of dialogue between the two parties to the conflict in Sudan, with the aim of reaching a permanent cessation of hostilities, in a way that contributes to alleviating the suffering of the Sudanese people. The Russian side commended the Kingdom's efforts in evacuating a number of nationals of brotherly and friendly countries from Sudan, and the relief and humanitarian assistance provided to the Sudanese people.

At the conclusion of the visit, His Excellency the President of the Russian Federation, Vladimir Putin, expressed his gratitude and appreciation to His Royal Highness, Prince Mohammed bin Salman bin Abdulaziz Al Saud, Crown Prince and Prime Minister, for the warm reception and generous hospitality accorded to him and his accompanying delegation. His Royal Highness also expressed his best wishes for good health to His Excellency, and further progress and prosperity for the friendly Russian people.

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https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/120423-cop28-saudi-aramco-ceo-says-fossil-fuel-investment-more-viable-than-renewables-to-meet-demand

- 04 Dec 2023 | 17:18 UTC

COP28: Saudi Aramco CEO says fossil fuel investment more viable than renewables to meet demand

HIGHLIGHTS

Fossil fuel investment down 40% from 2014 levels: Nasser

Q4 2023 oil demand set to be higher than Q4 2019

Renewables, hydrogen not viable in the short term, he says

- Author Jennifer Gnana
-

Saudi Aramco's CEO Amin Nasser on Dec. 4 called for more investment in oil compared to renewables to meet energy demand growth.

"If you look at this quarter, there is 103 million b/d of demand, compared to 2019 where we were running around 100 million b/d," Nasser told the Saudi Green Initiative, a side event at COP28 UN climate summit in Dubai, where fossil fuel companies have called for a seat at the table to discuss their contributions to the future energy mix.

"We anticipate there is going to be further growth in demand going forward and as such you need that investment to meet the call on our production and at the same time manage the decline in existing fields," he added.

Nasser's call for greater investment in fossil fuels is at odds with climate activists and observers at the United Nations Framework Convention on Climate Change event, who have questioned the sensibility of fossil fuel producers such as the UAE hosting climate talks.

Saudi Aramco has exclusive rights to produce crude oil within Saudi Arabia, pumping some 9-11% of global supply, depending on the kingdom's production quota under the OPEC+ accord. At the moment, Saudi Arabia has agreed to hold output at 9 million b/d, as the OPEC+ alliance seeks to bolster flagging prices, leaving some 3 million b/d of capacity offline.

According to S&P Global Commodity Insights, global oil demand is set to reach pre-pandemic levels for the first time in 2023 and hit an all-time high of 105 million b/d in 2025.

S&P Global forecasts global oil demand to be "solid" in the fourth quarter of this year with a 2.4 million b/d increase on the year. Mild-to-average global recession is set to slow growth to 1.2 million b/d for 2024, according to estimates.

Expensive hydrogen

Saudi Aramco's chief called for more investment in fossil fuels while dismissing the short-term viability of renewables due to what he suggested were higher costs and low demand for clean energy.

"I think we need more investment," Nasser said citing a 40% decline in investment in fossil fuels from 2014 levels.

"If you look at existing fields today and the level of maturity that we're seeing in conventional and unconventional resources, you're looking at a 7% decline," he added.

Saudi Aramco is currently boosting domestic oil production capacity to 13 million b/d by 2027 from around 12 million b/d presently. The company is also committed to reaching net-zero emissions by 2050, with projects underway to capture and store carbon dioxide from upstream processes, as well as investments in renewables and hydrogen.

It has said its capital expenditures for 2023 will be between $48 billion to $52 billion, with Q3 spending at $11 billion, an increase over the $9 billion spent in the same quarter of 2022.

"We're investing in renewables, hydrogen, e-fuels and all of that, but still you need a lot more investment and it needs to pass a certain threshold to make it commercial," Nasser said.

"Hydrogen now is waiting for demand. Demand is still not there for obvious reasons: it is expensive. At the same time, we need to continue to invest in oil and gas because there is more demand," he added.

https://news.yahoo.com/exclusive-edge-over-red-sea-123623277.html

REUTERS

Exclusive-On edge over Red Sea attacks, Riyadh seeks to contain fall-out

Aziz El Yaakoubi and Parisa Hafezi

Wed, December 6, 2023 at 5:36 AM MST·4 min read

Exclusive-On edge over Red Sea attacks, Riyadh seeks to contain fall-out

By Aziz El Yaakoubi and Parisa Hafezi

RIYADH/DUBAI (Reuters) - Saudi Arabia has asked the United States to show restraint in responding to attacks by Yemen's Houthis against ships in the Red Sea, two sources familiar with Saudi thinking said, as Riyadh seeks to contain spillover from the Hamas-Israel war.

The Iran-aligned Houthis have waded into the conflict that has spread around the Middle East since war erupted on Oct. 7, attacking vessels in vital shipping lanes and firing drones and missiles at Israel itself.

The group which rules much of Yemen says its attacks are a show of support for the Palestinians and has vowed they will continue until Israel stops its offensive on the Gaza Strip - more than 1,000 miles from their seat of power in Sanaa.

The Houthis are one of several groups in the Iran-aligned "Axis of Resistance" which have been attacking Israeli and U.S. targets since the start of the conflict on Oct. 7, when their Palestinian ally Hamas sparked the war by attacking Israel.

Their role has added to the conflict's regional risks, threatening sea lanes through which much of the world's oil shipped, and worrying states on the Red Sea as Houthi rockets and drones fly towards Israel.

Riyadh, the world's top oil exporter, has watched with alarm as Houthi missiles have been fired over its territory.

With the Houthis stepping up attacks on shipping over the past weeks, two sources familiar with Saudi thinking said Riyadh's message of restraint to Washington aimed to avoid further escalation. Riyadh was so far pleased with the way the United States was handling the situation, the sources added.

"They pressed the Americans about this and why the Gaza conflict should stop," one of the sources said.

The White House declined to comment.

The Saudi government did not respond to an emailed request for a comment on the discussions.

As Saudi Arabia presses for a ceasefire to halt what it has called a "barbaric war" in Gaza, its diplomacy reflects a wider policy aimed at promoting regional stability after years of confrontation with Iran and its allies.

Focused on expanding and diversifying the Saudi economy, Riyadh this year normalised ties with Tehran and is seeking to exit the war it has been waging with the Houthis in Yemen for nearly nine years.

The sources said Saudi Arabia was seeking to advance the Yemen peace process even as war rages in Gaza, worrying it could be derailed. Yemen has enjoyed more than a year of relative calm amid direct peace talks between Saudi and Houthi officials.

The Houthi attacks during the Hamas-Israel war have elevated their profile in the Iran-aligned camp which also includes Hamas, Lebanon's Hezbollah and Iran-backed militias in Iraq.

The Houthis have emerged as a major military force in the Arabian Peninsula, with tens of thousands of fighters and a huge arsenal of ballistic missiles and armed drones.

Senior sources in the Iran-aligned camp told Reuters the Houthi attacks were part of an effort to put pressure on Washington to get Israel to halt the Gaza offensive, a goal that Iran shares with Saudi Arabia and other countries in the region.

One of the sources, who is based in Tehran, said Houthi representatives had discussed their attacks with Iranian officials during a meeting in Tehran in November, agreeing to carry out actions in a "controlled" way that would help force an end to the Gaza war. The source was briefed on the matter.

Another of the sources said Tehran did not seek "all-out war in the region" that would risk drawing it in directly.

A Houthi spokesperson did not respond to a request for comment. Iran has denied being involved in the attacks. Iranian officials did not respond to a request for comment on the Houthi attacks.

DESTROYER DOWNS DRONES

The United States and Britain have condemned the attacks on shipping, blaming Iran for its role in supporting the Houthis. Tehran says its allies make their decisions independently.

In one of the latest incidents, three commercial vessels came under attack in international waters on Sunday. The Houthis said they had fired at what they said were two Israeli vessels. Israel denied any link to the ships.

A U.S. Navy destroyer, the Carney, shot down three drones as it answered distress calls from the vessels, which the U.S. military said were connected to 14 separate nations.

The Pentagon said on Monday the Carney had taken action as a drone was headed in its direction, but that it could not assess if the warship was the intended target.

Pentagon spokesperson Sabrina Singh stopped short of using language that could suggest any imminent U.S. retaliation against the Houthis. Asked if the United States might retaliate, Singh said: "If we decide to take action against the Houthis, it will of course be at a time and place of our choosing."

An Iranian diplomat said Tehran and Washington had exchanged messages through intermediaries about Houthi attacks since the start of the Hamas-Israel war. The diplomat, who was involved in exchanging the messages, said both called for restraint.

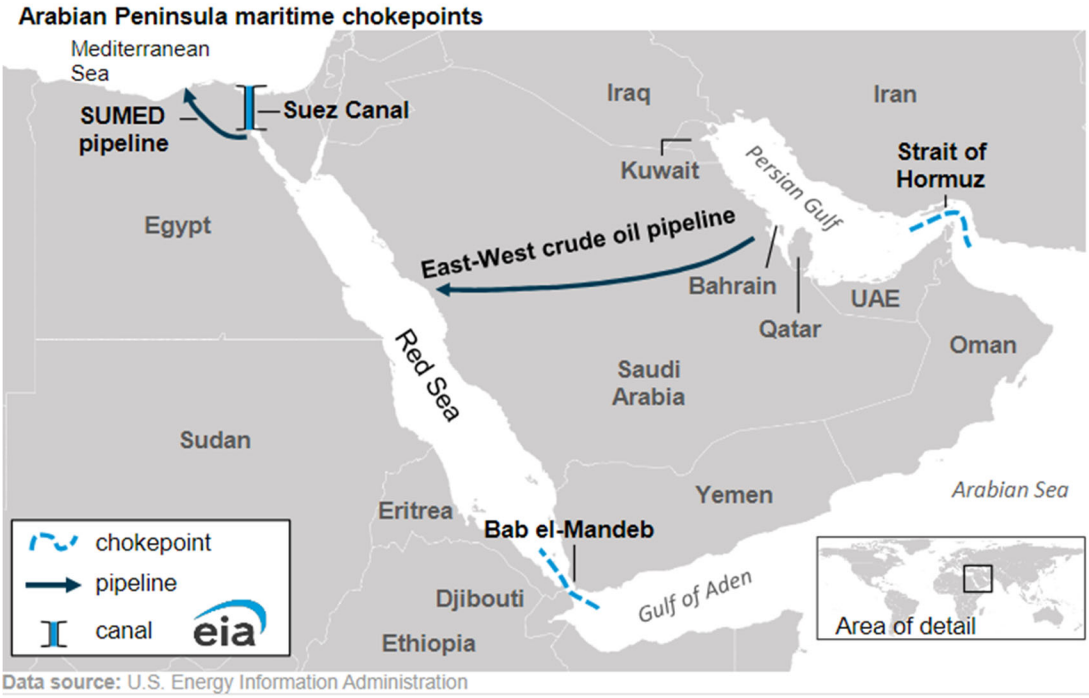
Iran on Tuesday denied any role in attacks or actions against U.S. forces.

(Additional reporting by Steve Holland in Washington; Writing by Tom Perry; Editing by Alison Williams)

https://www.eia.gov/todayinenergy/detail.php?id=61025

DECEMBER 4, 2023

Red Sea chokepoints are critical for international oil and natural gas flows



Data source: U.S. Energy Information Administration

The Suez Canal, the SUMED pipeline, and the Bab el-Mandeb Strait are strategic routes for Persian Gulf oil and natural gas shipments to Europe and North America. Total oil shipments via these routes accounted for about 12% of total seaborne-traded oil in the first half of 2023, and liquefied natural gas (LNG) shipments accounted for about 8% of worldwide LNG trade.

The Suez Canal and SUMED pipeline are located in Egypt and connect the Red Sea with the Mediterranean Sea. The SUMED pipeline transports crude oil north through Egypt and has a capacity of 2.5 million barrels per day. The Bab el-Mandeb Strait is between the Horn of Africa and the Middle East, connecting the Red Sea to the Gulf of Aden and Arabian Sea. Most exports of petroleum and natural gas from the Persian Gulf to Europe and North America pass through multiple chokepoints, including the Suez Canal or the SUMED pipeline and both the Bab el-Mandeb and the Strait of Hormuz.

Volume of crude oil, condensate, and petroleum products transported through the Suez Canal, SUMED pipeline, and Bab el-Mandeb Strait (2018–1H23)
million barrels per day

	2018	2019	2020	2021	2022	1H23
Total oil flows through Suez Canal and SUMED pipeline	**6.4**	**6.2**	**5.3**	**5.1**	**7.2**	**9.2**
crude oil and condensate	3.4	3.1	2.6	2.2	3.6	4.9
petroleum products	3.0	3.1	2.6	2.9	3.6	4.3
LNG flows through Suez Canal (billion cubic feet per day)	**3.3**	**4.1**	**3.7**	**4.5**	**4.5**	**4.1**
Total oil flows through Bab el-Mandeb Strait	**6.1**	**5.9**	**5.0**	**4.9**	**7.1**	**8.8**
crude oil and condensate	**3.0**	**2.7**	**2.2**	**1.9**	**3.3**	**4.5**
petroleum products	**3.1**	**3.2**	**2.8**	**3.1**	**3.8**	**4.4**
LNG flows through Bab el-Mandeb Strait (billion cubic feet per day)	**3.1**	**3.9**	**3.7**	**4.5**	**4.5**	**4.1**

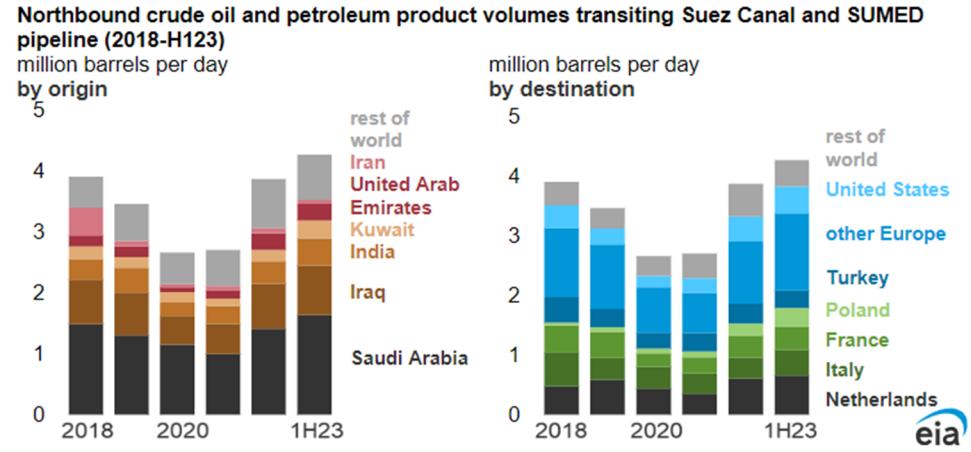
Data source: U.S. Energy Information Administration analysis based on Vortexa tanker tracking
Note: LNG=liquefied natural gas, 1H23=first half of 2023

Oil shipments

Northbound oil flows toward Europe via the Suez Canal and SUMED pipeline fell between 2018 and 2020. Renewed U.S. sanctions on

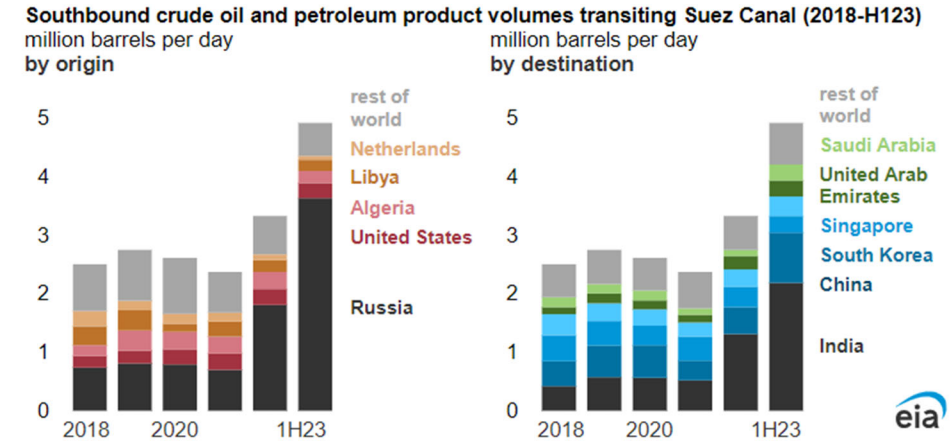
Iran reduced all exports from Iran, including those through the Suez Canal. In addition, less crude oil and oil products from Middle East producers moved through the Suez Canal because Europe imported less oil from the Middle East and more from the United States. The COVID-19 pandemic further reduced flows through the Suez Canal because of slowing global oil demand.

In the first half of 2023, northbound crude oil flowing through the Suez Canal and SUMED pipeline had increased by more than 60% from 2020, as demand in Europe and the United States rose from pandemic-induced lows. Also, Western sanctions on Russia's oil beginning in early 2022 shifted global trade patterns, leading Europe to import more oil from the Middle East via the Suez Canal and SUMED pipeline and less from Russia.



Data source: U.S. Energy Information Administration analysis based on Vortexa tanker tracking
Note: 1H23=first half of 2023.

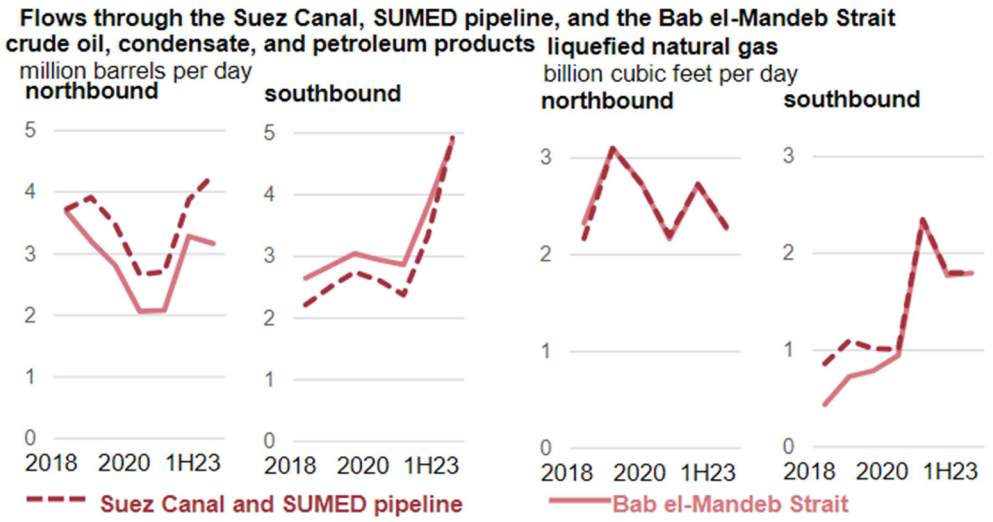
Southbound shipments through the Suez Canal rose significantly between 2021 and 2023, largely because of Western sanctions on Russia's oil exports. Oil exports from Russia accounted for 74% of Suez southbound oil traffic in the first half of 2023, up from 30% in 2021. Most of those export volumes were destined for India and China, which imported mostly crude oil from Russia. The Middle East, primarily Saudi Arabia and the United Arab Emirates, increased imports of refined oil products from Russia in 2022 and the first half of 2023 in order to generate electric power or to store or re-export.



Data source: U.S. Energy Information Administration analysis based on Vortexa tanker tracking

LNG shipments

LNG flows through the Suez Canal in both directions rose to a combined peak in 2021 and 2022 of 4.5 billion cubic feet per day (Bcf/d) before total flows declined in the first half of 2023 to 4.1 Bcf/d. Southbound LNG flows more than doubled from 2020 to 2021, mainly driven by growing exports from the United States and Egypt heading to Asia. In 2022 and the first half of 2023, southbound LNG volumes via the Suez Canal declined as U.S. and Egyptian LNG exports both favored European destinations over Asian markets, supplanting some of the natural gas exports that Russia historically sent to Europe. Most of the variation in northbound volumes reflects changes in Qatar's exports to Europe (via the Suez Canal) compared with Asia. Qatar also sent more LNG to Europe in 2022 to replace some volumes from Russia, increasing northbound flows.



Data source: U.S. Energy Information

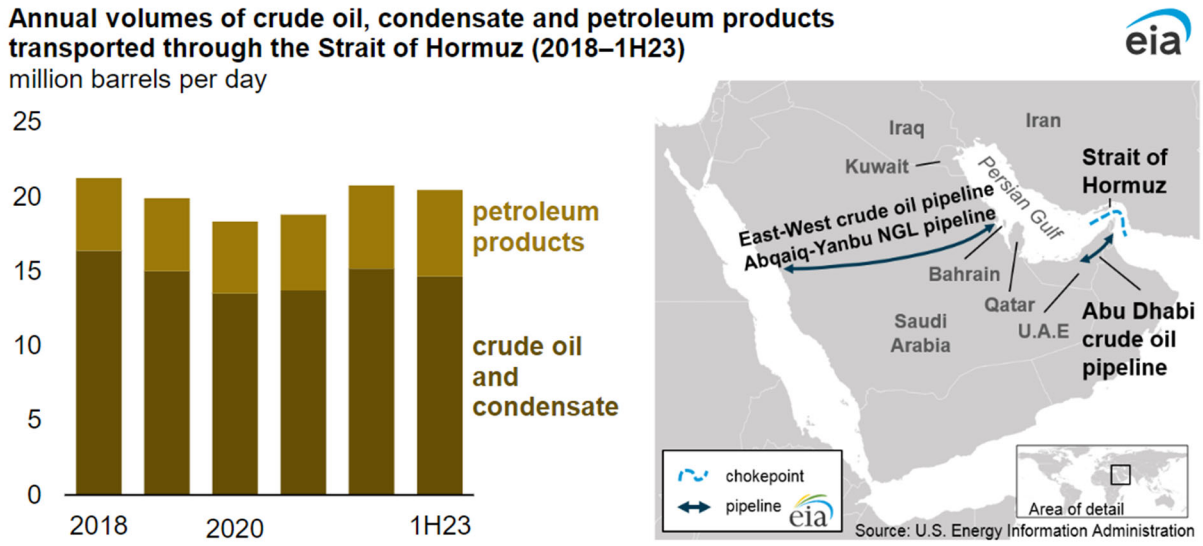
Although oil flow trends through the Bab al-Mandeb Strait are similar to those of the Suez Canal, more oil exits the Red Sea (northbound via the Suez Canal and southbound via the Bab el-Mandeb Strait) than enters the Red Sea through these chokepoints. Saudi Arabia transports some crude oil from the Persian Gulf via pipeline to the Red Sea for export mostly to Europe. LNG flows through the Bab el-Mandeb Strait have matched those in the Suez Canal over the last few years because the few LNG import terminals in the Red Sea have been used less.

Principal contributors: Candace Dunn, Justine Barden

https://www.eia.gov/todayinenergy/detail.php?id=61002

NOVEMBER 21, 2023

The Strait of Hormuz is the world's most important oil transit chokepoint



Data source: U.S. Energy Information Administration analysis based on Vortexa tanker tracking and FACTS Global Energy
Note: 1H23=first half of 2023

The Strait of Hormuz, located between Oman and Iran, connects the Persian Gulf with the Gulf of Oman and the Arabian Sea. The Strait of Hormuz is the world's most important oil chokepoint because large volumes of oil flow through the strait. In 2022, its oil flow averaged 21 million barrels per day (b/d), or the equivalent of about 21% of global petroleum liquids consumption. In the first half of 2023, total oil flows through the Strait of Hormuz remained relatively flat compared with 2022 because increased flows of oil products partially offset declines in crude oil and condensate.

Chokepoints are narrow channels along widely used global sea routes that are critical to global energy security. The inability of oil to transit a major chokepoint, even temporarily, can create substantial supply delays and raise shipping costs, increasing world energy prices. Although most chokepoints can be circumvented by using other routes, which often add significantly to transit time, some chokepoints have no practical alternatives.

Between 2020 and 2022, volumes of crude oil, condensate, and petroleum products transiting the Strait of Hormuz rose by 2.4 million b/d as oil demand recovered after the economic downturn from the COVID-19 pandemic. In the first half of 2023, shipments of crude oil and condensates dropped because OPEC+ members implemented crude oil production cuts starting in November 2022. Flows through the Strait of Hormuz in 2022 and the first half of 2023 made up more than one-quarter of total global seaborne traded oil. In addition, around one-fifth of global liquefied natural gas trade also transited the Strait of Hormuz in 2022.

Volume of crude oil, condensate, and petroleum products transported through the Strait of Hormuz (2018–1H23)
million barrels per day

	2018	2019	2020	2021	2022	1H23
Total oil flows through Strait of Hormuz	**21.3**	**19.9**	**18.3**	**18.8**	**20.8**	**20.5**
Crude oil and condensate	16.4	15.0	13.5	13.7	15.2	14.7
Petroleum products	4.9	4.9	4.8	5.1	5.6	5.8
World maritime oil trade	**77.4**	**77.1**	**71.9**	**73.2**	**75.2**	**76.3**
World total petroleum and other liquids consumption	**100.1**	**100.9**	**91.6**	**97.1**	**99.6**	**100.3**
LNG flows through Strait of Hormuz (billion cubic feet per day)	**10.3**	**10.6**	**10.4**	**10.6**	**10.9**	**10.8**

Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, and U.S. Energy Information Administration analysis based on Vortexa tanker tracking and FACTS Global Energy
Note: World maritime oil trade excludes intra-country volumes except those volumes that transit the Strait of Hormuz. LNG=liquefied natural gas. 1H23=first half of 2023.

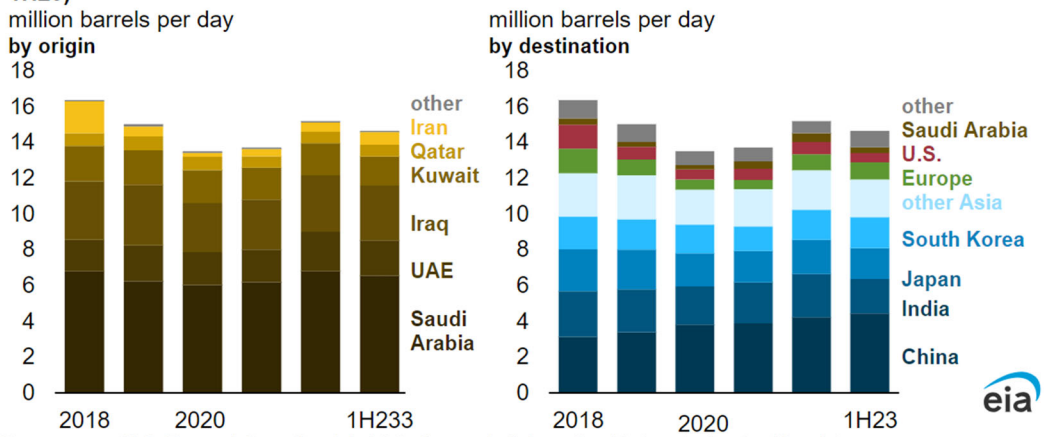
Only Saudi Arabia and the United Arab Emirates (UAE) have operating pipelines that can circumvent the Strait of Hormuz. Saudi Aramco operates the 5-million-b/d East-West crude oil pipeline and temporarily expanded the pipeline's capacity to 7 million b/d in 2019 when it converted some natural gas liquids pipelines to accept crude oil. The UAE links its onshore oil fields to the Fujairah export terminal on the Gulf of Oman with a 1.5 million b/d pipeline.

Iran inaugurated the Goreh-Jask pipeline and the Jask export terminal on the Gulf of Oman with a single export cargo in July 2021. The pipeline's capacity was 0.3 million b/d at that time, although Iran has not used the pipeline since then. We estimate that around 3.5 million b/d of effective unused capacity from these pipelines could be available to bypass the strait in the event of a supply disruption.

Based on tanker tracking data published by Vortexa, Saudi Arabia moves more crude oil and condensate through the Strait of Hormuz than any other country, most of which is exported to other countries. Around 0.5 million b/d transited the strait in 2022 from Saudi ports in the Persian Gulf to Saudi ports in the Red Sea.

We estimate that 82% of the crude oil and condensate that moved through the Strait of Hormuz went to Asian markets in 2022. China, India, Japan, and South Korea were the top destinations for crude oil moving through the Strait of Hormuz to Asia, accounting for 67% of all Hormuz crude oil and condensate flows in 2022 and the first half of 2023.

Annual volumes (crude oil and condensate) transported through the Strait of Hormuz (2018–1H23)



Data source: U.S. Energy Information Administration analysis based on Vortexa tanker tracking data
Note: 1H23=first half of 2023.

In 2022, the United States imported about 0.7 million b/d of crude oil and condensate from Persian Gulf countries through the Strait of Hormuz, accounting for about 11% of U.S. crude oil and condensate imports and 3% of U.S. petroleum liquids consumption. U.S. crude oil imports from countries in the Persian Gulf have fallen by half since 2018 as domestic production has increased.

Principal contributors: Candace Dunn, Justine Barden

https://www.globaltimes.cn/page/202311/1302731.shtml

Hospitals across China grapple with respiratory illnesses surge

By GT staff reporters Published: Nov 29, 2023 10:37 PM Updated: Nov 29, 2023 10:47 PM

Sick children receive a drip at a children's hospital in Beijing on November 23, 2023. Photo: VCG

From providing more beds for pneumonia treatment and allocating more manpower to extending working hours, hospitals across China are grappling with a surge in cases of respiratory illnesses in children, especially a spike in mycoplasma pneumonia.

But the Global Times learned from several hospitals and clinics in Beijing, Shanghi and Central China's Henan Province that though facing an obvious increase in outpatient and inpatient visits for respiratory illnesses this winter, the health system has not been overwhelmed as it did during the early stage of the fight against COVID-19.

The Capital Institute of Pediatrics, a Beijing-headquartered renowned hospital for children, which has been one of the top choices for Beijing parents when their children get sick, has made several improvements to enhance its medical treatment capability - raising the number of infusion seats by 48.7 percent on the daily basis compared to their usual capacity, and also expanding the number of beds available for patients with pneumonia by 40.58 percent, according to Beijing Youth Daily.

In order to manage the high demand at the hospital, there has been an 86.36 percent increase in the number of doctors available for visits. Moreover, a dedicated fast-track system has been implemented for critically ill children, allowing them to receive diagnostic reports promptly, the Beijing Youth Daily report said.

The Global Times spoke with the pediatrics department at the First Affiliated Hospital of Henan University of Chinese Medicine on Wednesday. Zhou Rongyi, deputy director of the hospital's pediatrics department, stated that his department receives more than 2,000 visits a day, about 70 percent of whom are patients of respiratory tract infections. It has been hard to find a ward since October. Many children are infected with mycoplasma this time. One of the main reasons for this is the combination infections of influenza and mycoplasma."

As one of the coping measures, Zhou's hospital has opened pediatric wards previously used for treating COVID-19 patients to accommodate the surge in cases. Like many other pediatric hospitals, they have extended their working hours from 5:30 pm until 8 pm to provide convenience for working parents.

Zhou emphasized that "while some pediatric hospitals may have long queues and limited ward availability, overall, medical resources have not reached an overwhelmed state. Hospitals have learned from their experiences with COVID-19 and have developed strategies to prioritize severe cases and classify treatment based on symptoms."

Major hospitals and local health authorities have also disseminated information on influenza and pneumonia prevention measures to communities and grass-roots hospitals in a bid to alleviate pressure, Zhou said.

The overall medical situation in our hospital is currently stable, with a decrease in the number of children seeking treatment for mycoplasma pneumonia infection and an increase in cases of influenza, an expert from Shanghai Children's Medical Center, who asked for anonymity, told the Global Times on Wednesday.

The Global Times learned in Shanghai that major hospitals in this metropolis have been adding pre-examination tests, medical scheduling, and enhancing internet-based outpatient services as parts of their efforts to alleviate their pressure of receiving patients. The move has also reduced waiting time of patients.

Though facing overcrowding in hospitals, most people still tend to seek doctors in major hospitals. However, experts said, community hospitals can play a crucial role in managing this wave of respiratory disease.

A Beijing mother, preferred to be referred to as Song, who recently brought her child to the Liulitun Community Health Service Center in Beijing, shared her experience with the Global Times. Due to difficulties in registering at pediatric hospitals and long waiting times, she opted to visit the community hospital near her home. The doctor conducted various tests and prescribed medication for routine treatment. Song emphasized that parents do not need to overcrowd large hospitals when community hospitals are fully capable of providing effective treatment at an early stage.

Lu Hongzhou, head of the Third People's Hospital of Shenzhen, echoed this sentiment. He told the Global Times on Wednesday that most community hospitals can prescribe effective medications and treat respiratory diseases at an early stage.

This year's respiratory diseases are caused by commonly known pathogens, but there has been a noticeable increase in cases of mycoplasma pneumonia, which is more resistant to antibiotics due to long-term overuse. Zhou stated that in his clinical practice, about 80-90 percent of children infected with mycoplasma pneumonia are resistant to commonly used drugs. Early oral treatment in outpatient clinics is no longer effective, leading to more hospitalized cases.

Lu believes the recent outbreak of mycoplasma pneumonia is an "immunization gap," which resulted in children not having the opportunity to develop resistance to common viruses like influenza. As a result, when the COVID-19 restrictions were lifted, they became vulnerable to these pathogens, Lu told the Global Times on Wednesday.

Lu advised parents to consider the prevalence of the disease in their child's environment and seek timely diagnosis and medication. Lu reassured parents that there is no need to worry, as timely treatment can effectively manage infections like mycoplasma pneumonia.

Hypes are biased

Amid a surge in respiratory illnesses in China, which the country's health authorities have already attributed to known pathogens, certain overseas media reports have been sensationalizing the severity of the diseases and even raising doubts about China's transparency in dealing with respiratory illnesses. These reports have hyped concerns about whether travel restrictions should be imposed on China.

Respiratory and pediatric experts have rebuffed these claims, stating that such hype is not based on facts and reminding individual countries and media to avoid their biased perspectives when reporting on China-related affairs.

However, health experts reached by the Global Times have criticized these reports for sensationalizing an inhumane image of the country. The truth is that this practice is not common in hospitals across the country.

The Global Times found out that very few hospitals had set up study areas for children, including Jiangsu Nantong First People's Hospital. Later on, the hospital in Jiangsu clarified that the study zone was set up two months ago as a makeshift measure for students who haven't finished their homework, not as an encouragement for children to study while receiving medical treatment.

Both educational and health authorities in provinces including East China's Shandong Province as well as Beijing have also advised students not to take classes or do their homework when they are sick. Personal health always comes first.

When the World Health Organization made a standard request to China last week for information regarding the reported cases of "undiagnosed pneumonia," some Western media outlets publicized this request as unusual. Experts have noted that this was an attempt to sensationalize China's transparency over increase in respiratory diseases.

On Tuesday, when a reporter from Antara asked the spokesperson of China's Foreign Ministry about rising concerns among the international public about the safety of traveling to China as well as people who travel from China, Wang Wenbin, the spokesperson, said, "Let me assure you that it is safe to travel and do business here in China and there's no need to worry."

On Wednesday, answering a reporter from NHK about international attention over increasing outpatient and emergency visits, Wang said China's National Health Commission (NHC) held a press conference on November 26 to share information on the prevention and treatment of respiratory infectious diseases in winter. The NHC has had communication in a timely manner with the WHO, Wang emphasized.

Commenting on media's exaggerated worries and concerns about China's respiratory disease, Zhou, from the First Affiliated Hospital of Henan University of Chinese Medicine,told the Global Times that it is not surprising to see some Western media outlets spreading false information about China. "But facts speak for themselves."

Perception and reality

Macro fears overwhelm micro fundamentals in commodity markets.

Saad Rahim
Chief Economist

"Demand for commodities might have been expected to wane. In fact, we have seen consumption climb to record highs across several markets."

Rarely have markets seen a gap this wide between sentiment and reality. Consumer confidence globally remains at multi-year lows, with some surveys at levels even below the peak COVID-19 months. Investor sentiment has been more mixed, depending more on the asset class and geography, but sentiment with regard to commodity markets has remained subdued over the course of the year. Economic growth, however, has been more robust than expected, leading to stronger demand for commodities than prices suggested for most of our financial year.

At the beginning of October 2022, expectations were for recessions in the US[1] and Europe to occur within 12 months. Inflation metrics were still at or near peaks in Europe and the US respectively, and central banks had only just started the interest rate hike cycle. China was still in the throes of COVID-19 lockdowns, with an uncertain recovery path ahead, particularly with regards to its property sector.

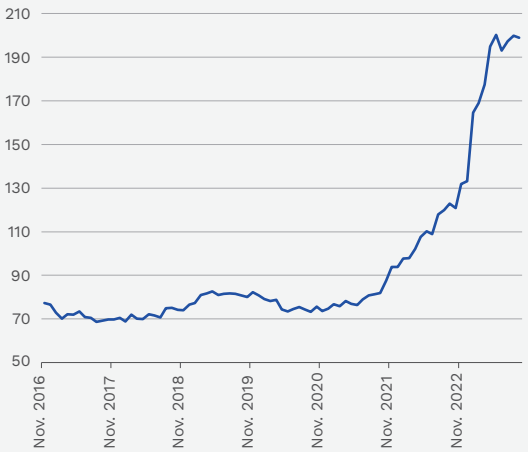
And at times over the past year, it seemed these fears were justified. European industrial production contracted sharply, with activity in Germany falling back to COVID-19-level lows, as still-elevated energy costs took their toll on heavy industry. China's property market was markedly worse than in 2022, despite hopes for a post-lockdown rebound. And the US experienced three of the four largest bank failures in its history, while its housing sector went into stasis due to high interest rates.

Given those headwinds, demand for commodities might have been expected to wane. In fact, we have seen consumption climb to record highs across several markets. Oil demand is expected to record growth of over 2.3 million barrels a day according to the International Energy Agency, reaching a new all-time high of approximately 102 million barrels a day in 2023. Copper demand, globally, is forecast to rise by just under four percent year-on-year, in 2023 driven by 6.5 percent growth in China.

1 Source: Bloomberg Economics, *Bloomberg Economics Probability of a Recession in the next 12 months*

US construction and manufacturing sector

Stated in billion USD



Source: US Census Bureau

US capital goods new orders, excluding aircraft

Stated in billion USD

Source: US Census Bureau

These increases reflect the fact that economic growth held up quite well over the year. This was especially true in the US, which not only avoided the widely predicted recession but recorded GDP growth of more than five percent in Q3 2023 one of the strongest quarters of growth since the 2008 Financial Crisis.

A big part of the reason for the strength in the US is down to post-Financial Crisis and pre-COVID-19 periods. They significantly reduced debt and locked in low rates for the remainder of their loans. So, even where consumers have materially higher credit balances, their household financial obligations[2] remain at the lowest levels in over 30 years.

And while there has been significant debate on whether 'excess savings' from the pandemic have been exhausted, other key metrics show that the US consumer is retaining significant spending firepower. For example, cash holdings remain above USD4 trillion (compared to USD1 trillion average pre-pandemic)[3]; while overall household net worth is up USD37.5 trillion since 2019. All this explains why US retail sales alone are topping USD700 billion a month, close to a 40 percent increase versus 2019 levels (22 percent in real terms).

US corporate spending and investment have also risen, driven by decades of under-investment and the impacts of measures such as the Inflation Reduction Act and CHIPS Act.

The combination of higher spending across consumer and corporate sectors means that despite a rapid rise in interest rates, US growth has continued to hold up at an above-trend level.

Europe in contrast has struggled over the past year. Inflationary pressures remained higher for longer, and the European Central Bank's rate hikes have had a greater impact on consumers and businesses, which have less of a cash buffer than their US counterparts. As a result of higher energy costs, industrial production fell back to the lowest levels (ex-COVID-19) since late 2017. Services have held up much better, but there too there were signs of weakness during the summer months, with France the laggard in this instance.

China's economic health this year has been a conundrum for markets. The year began with high expectations that the reopening from the COVID-19 lockdowns of 2022 would result in strong demand growth across sectors, including the beleaguered property sector. That proved to be false hope, as residential sales fell a further 20 percent year-on-year, following the 2022 drop of 25 percent. More developer bankruptcies resulted, ensnaring even some of China's biggest developers.

Property remains a key component of China's economy as the primary driver of both wealth generation and consumer and investor sentiment. Therefore, for the investor community at large, such a weak property picture could only mean that China as a whole was experiencing very weak growth.

But while the property sector has undeniably been a major drag on growth, viewing China solely through this lens overlooks a profound shift underway in the composition of its economy.

2 Sum of all debt service payments and financial obligations (mortgage, credit cards, auto loans) relative to disposable personal income (https://www.federalreserve.gov/releases/housedebt/default.htm ↗)

3 Federal Reserve Financial Accounts Data, *US FOF Balance Sheet of Households Checkable Deposits & Currency,* June 2023

Since accession to the World Trade Organisation (WTO), China's growth has been driven primarily by building manufacturing facilities, infrastructure and property. That came at the expense of household consumption, which fell from about 48 percent of GDP pre-WTO to only about 37 percent pre-pandemic (compared to 68 percent in the US).

The government's goal now is to boost household consumption, creating a more durable base for long-term growth. To do so, household incomes will have to rise; this in turn requires moving into higher-value sectors. While technology had been one promising sector, the emphasis has now turned to renewable power, batteries and electric vehicles.

The impact on those sectors globally has been seismic. China's domestic solar panel installations jumped to 250GW this year and close to 90 percent of panels used to install the remaining 300GW of 550GW of global installations came from China.

Chinese electric vehicle production rose 43 percent, with exports of electric vehicles rising 80 percent year-on-year and taking light vehicle production of all types up by six percent and exports up by 73 percent. China is now well on its way to becoming the largest exporter of vehicles, overtaking Japan. In addition, China also controls close to 90 percent of the midstream battery supply chain, with the result that batteries have been the export category that has seen the largest annual dollar increase this year.

The implications for commodity markets have been clear but underappreciated nonetheless by investors.

Take copper for example: the weakness in Chinese construction activity means copper demand from that sector is down almost 600,000 tonnes since 2021. But the growth in renewables, electric vehicles (both of which are much more copper intensive) and electrical grid spending mean that copper demand from those segments has increased by 1.4 million tonnes. In fact, copper demand in China in calendar year 2023 is set to grow by 6.5 percent. Aluminium and zinc demand were also bolstered due to demand from new growth sectors

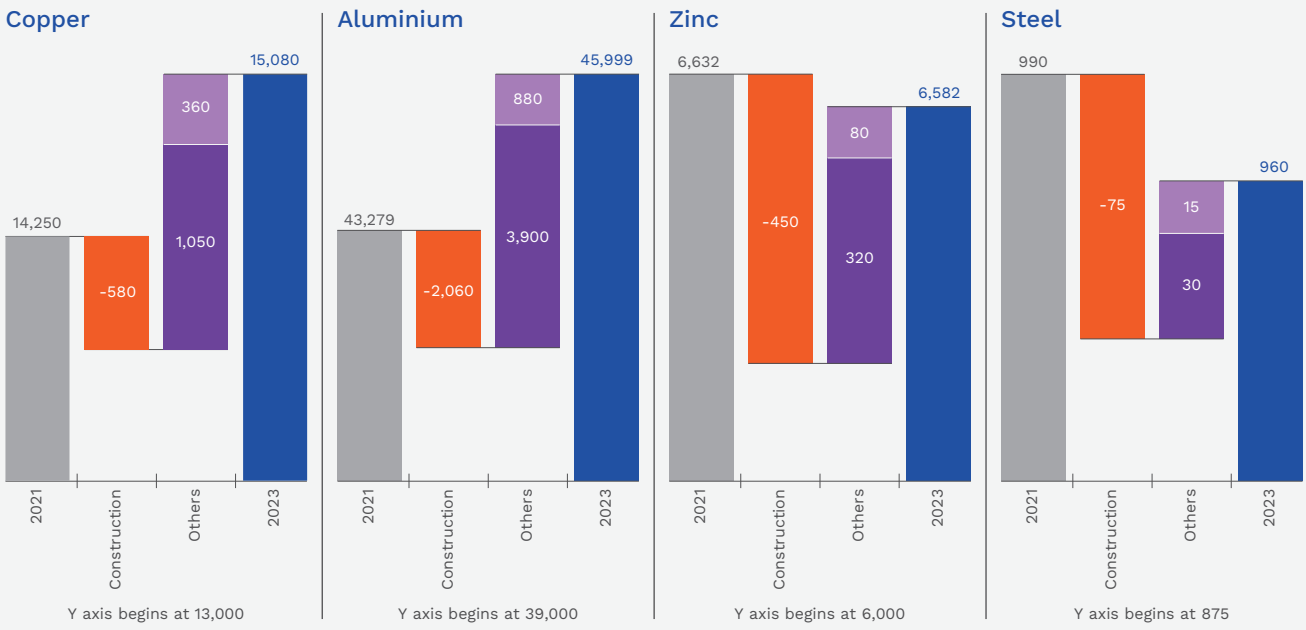
And yet the persistent market narrative has been that Chinese demand is weak.

It was a similar story for the Chinese oil market. While Chinese manufacturing has been generally weak for most of the year, affecting diesel and petrochemical demand, services have been relatively strong. Domestic air travel reached 120 percent of pre-pandemic peaks for most of the year, and road traffic surpassed 2019 levels by some distance. Consequently, gasoline and jet demand increased, pushing total oil demand up by well over 1.2 million barrels a day.

Commodity prices did not reflect this underlying strength. Brent crude started our fiscal year at about USD90 per barrel and was heading toward USD100 before plummeting 25 percent in a month by the end of December 2022. Prices then traded in a range of USD75-USD85 per barrel before a breakout higher in September 2023. This was despite OPEC+ production cuts, strong Chinese crude runs, inefficiencies due to the price cap, and inventories ex-China at levels well below recent years.

Changes in metal consumption in China, 2021-2023

Stated in kmt, except steel in mmt



Source: Trafigura Research

In copper, inventories did build much more than normal heading into Chinese New Year but then started to draw much earlier and more sharply, bringing stocks below even last year's record-low levels. And yet prices declined, falling from USD9,500 per tonne at the start of the year, to USD8,500-USD9,000 per tonne, and then to USD8,000-USD8,500 per tonne as the year wore on.

In our view, persistent macro-headwinds, either real or perceived, have been the critical driver for commodity prices in many markets regardless of fundamentals.

Expectations of weakening demand due to an impending recession caused by high interest rates meant that commodity prices found no support from falling inventories, supply disruptions and changing demand drivers.

Foreign exchange rates and interest rates also played a material part in commodity price dynamics over the fiscal year.

As interest rates continued to rise from near-zero levels, fears of over-tightening and a so-called hard landing led to a deeper inversion of the yield curve, widely seen as a harbinger of a recession.

The US Dollar did not benefit as much from higher rates as it did in our previous fiscal year when the US Dollar Index reached a 20-year high of 114, but it did remain at levels that were much higher than any seen since 2002.

As our fiscal year concluded, the macro narrative seems to have changed. Markets are now more concerned about when the first-rate cuts from major central banks will start. And with inflation metrics materially lower, it looks like the macro headwinds of the past few years might be reversing.

Of course, it is still possible that we will see the delayed impacts of existing rate increases, which normally take some time to filter through into tightening financial conditions and reduced economic growth. But if inflation is indeed sustainably lower, central banks can start considering reversing the rate hikes and loosening financial conditions, which should boost growth.

The flip side is that unless we see unexpectedly strong demand growth next year, prices might struggle to absorb increased supplies in some commodity markets. For example, oil markets should see further non-OPEC supply growth in 2024, as Guyana, Brazil, Canada and the US all continue to add barrels as well as incremental supplies elsewhere. In copper, we expect increased smelter capacity additions, primarily from China, leaving the refined copper market in surplus. Higher production, new terminals, ample inventories, structurally warmer weather and lower industrial demand mean gas markets might also struggle.

But other markets will see the opposite: in copper concentrates output continues to lag demand, led by the recent closure of First Quantum's Cobre Panama mine, resulting in large deficits that are likely to necessitate smelter curtailments.

Looking forward, we expect to see further progress on the journey to a low-carbon economy.

Our research indicates that renewables are being built at a much more rapid pace than almost any estimates; global renewable power capacity will shortly be larger than thermal capacity for the first time ever, albeit with lower utilisation rates and thus output. Solar capacity alone will surpass thermal generation within the next two years.

Nonetheless, our view is that demand for natural gas will also continue to grow. We expect gas to remain a key part of the energy mix for many years, as a source of reliable baseload power, given the lack of battery storage and the intermittency of renewable energy.

Electric vehicle adoption is moving much more quickly than forecast in China and Europe. On the other hand, US auto manufacturers have recently cut back investment plans in response to slower consumer uptake.

But taken together, this suggests that metals demand from renewables, electrification and electric vehicle sales will rise sharply in coming years.

We also expect oil demand to continue to grow until around 2030, when we should see demand peak and plateau, reflecting reduced demand for mobility and energy, but continued pull from the petrochemicals sector.

As such, we remain well-positioned to supply the commodities the world needs as it moves forward with this momentous transformation of the global energy system.

Oil and Petroleum Products

Another strong performance as the market returns to more normal conditions.

263.7mmt
Total volume traded
(2022: 277.6mmt*)

5.5m
Average barrels traded per day
(2022: 5.7m*)

Oil and Petroleum Products volumes traded (mmt)

	2023	2022
Biofuels	1.0	0.7
Bitumen	1.8	2.0
Condensates	2.4	2.0
Crude oil	136.4	149.0
Fuel oil	31.9	36.7
Gasoline	23.9	24.4
Liquid petroleum gas (LPG)	9.4	7.8
Middle distillates	39.9	41.4
Naphtha	17.0	13.6
Total	**263.7**	**277.6**

* For FY2023, natural gas and liquefied natural gas (LNG) traded volumes are reported separately in the Gas, Power and Renewables section on page 20. Total volumes traded per annum and average barrels traded per day for FY2022 have been adjusted to give a like-for-like comparison. Total average barrels traded per day including natural gas and LNG is 6.3 million.

Performance overview

It was another strong year for the Oil and Petroleum Products division as we continued to focus on supplying our customers with cargoes as efficiently as possible in unpredictable markets.

What was particularly pleasing was that all of our teams, from crude oil to gasoline, naphtha to distillates and fuel oil to LPG, contributed positively to our results. In particular, we grew our share of markets such as petrochemicals, where demand for products such as naphtha continues to increase.

Integral to our strong performance was close collaboration with our Shipping and Chartering division. By working closely with the Wet Freight team, we were able to successfully navigate the challenges presented by the emergence of the 'shadow fleet', which transports Russian oil and has disrupted the global shipping market.

Our volumes were broadly flat year-on-year as we replaced the Russian crude oil we no longer lift under long-term contracts with new sources of supply.

A highlight of the year was completing an exclusive supply and marketing deal with ISAB, one of the largest refineries in Europe.

Looking forward, we expect crude and product markets to remain highly uncertain because of the conflict in the Middle East, the ongoing war in Ukraine and the impact of the energy transition on fuel demand.

Oil continues to be an essential part of the global energy mix and will play an important role in the future, supporting demand during the global shift to a low-carbon economy.

As one of the world's largest independent commodity companies, we will continue to play our part in moving crude oil and petroleum products to consumers around the world – safely, reliably and efficiently.

Ben Luckock
Head of Oil

← In FY2023, we secured a deal to provide crude oil to the ISAB refinery in Sicily, Italy and to market its refined products via our global customer base.

Crude oil

Following the extreme volatility of prior financial year, the global crude oil market returned to more normal conditions in 2023 as supply chains were reconfigured and new trade flows established.

Active market management by OPEC and its allies helped keep the market broadly in balance. As a result, prices traded in a relatively narrow range, climbing briefly above USD95 a barrel after Saudi Arabia and Russia extended voluntary output cuts at the end of the financial year.

Against this backdrop, our Crude Oil team recorded solid results, despite relatively flat volumes compared to the same period in FY2022.

During the year, we consolidated our position in the US export market, supporting the introduction of US Midland West Texas Intermediate to the benchmark assessment for Brent, the global crude oil standard.

We also announced an exclusive long-term agreement to supply the ISAB refinery in Italy with crude oil, helping its new owners to run a wider slate of feedstocks and to improve margins. This transaction, which leverages our global marketing reach and shipping expertise, is a good example of the supply chain solutions we can provide for our customers.

Looking into 2024, the market is likely to become unsettled because of rising geopolitical tensions and tighter financial conditions. However, our Crude Oil team is well positioned to tackle further disruptions and manage any subsequent volatility that may arise.

Gasoline

Our Gasoline team had another strong year, expanding its European business and adapting to changing market dynamics as prices returned to more normal levels following the volatility seen in 2022.

A shortage of high-quality blending components underpinned prices over the summer months as demand weakened following the decision by Nigeria to scrap its fuel subsidy.

Alongside North America and west Africa, Nigeria is one of the top destinations for European gasoline exports. The commissioning of the large Dangote Refinery on the outskirts of Lagos will reshape trade flows in the Atlantic basin in the year ahead. We are well positioned to help our customers manage these changes.

Volatility is expected to remain elevated with both the Russia and Middle Eastern conflicts distorting relevant trade flows.

With macro headlines and government policies in flux and continuing to provide uncertainty, our strategy will be to remain nimble and to react as quickly as possible to any supply chain disruptions that may arise.

In the financial year ahead, we expect a more challenging gasoline market because of the return of many of the smaller companies who were forced to step back from the industry because of vastly increased margin funding requirements after Russia's invasion of Ukraine.

Going forward, a key focus for our Gasoline team will be continuing to grow our customer base and logistics footprint.

↑ A TFG Marine fuel bunkering operation in Singapore.

Naphtha and condensates

Geopolitics were a primary driver of market movements in 2023 as the EU embargoes on Russian products and other applicable sanctions caused significant adjustments to global trade flows.

At the same time, the petrochemical industry was weighed down by weak margins and overcapacity after the commissioning of new world-scale ethylene cracking facilities in Asia and the US. This led to naphtha oversupply while facility operating rates declined globally, most notably in Europe, which struggled with relatively high energy costs on a comparative basis.

The result was a weak market and naphtha was repriced to a level where a lot more of it could be used in gasoline blending.

Our Naphtha and Condensates team reacted quickly to these shifting flows to post strong results using our footprint, storage and shipping capacity to help balance supply and demand. Our global scale and network continue to give us the ability to work with customers to adapt to market dynamics and source product at competitive levels.

We expect the year ahead to remain volatile but maintain a level of cautious optimism based on improving conditions in petrochemicals as industry overcapacity is slowly reduced.

Fuel oil and bitumen

Following the disruptions and market volatility caused by COVID-19 and the outbreak of the war in Ukraine, the fuel oil market showed signs of returning to more stable conditions in the second half of FY2023.

Notably, the pressures caused by hedging difficulties and rising costs of finance, which forced some companies to reduce their operations and trading volumes, eased during this period. This created a much more competitive marketplace. This is particularly the case with fuel oil, where the number of tradeable barrels declined significantly, with most Russian volumes either sanctioned or shifted into the control of new entrants into the market.

Margins for refiners remained high for most of the year because of OPEC supply cuts led by Saudi Arabia. Feedstock demand was healthy for much of the year which we believe was a result of the reduction in OPEC-produced heavy sour crude oil. This in turn led to a reduction of fuel oil production coinciding with an increased appetite for heavy fuels as an alternative to crude oil. We saw a strong high-sulphur fuel oil market throughout the summer months of 2023, with elevated spreads between crude oil and wholesale petroleum products, and good utility-led demand into the Middle East. Very low sulphur fuel oil (VLSFO) was volatile as the world started to get used to intermittent supply from the Al Zour Refinery in Kuwait.

Against this backdrop, our Fuel Oil team performed well, expanding its bunkering footprint through TFG Marine, our bunkering joint venture with shipping companies Frontline and Golden Ocean. In FY2023, we continued to expand our feedstock business globally. We also further expanded our base oil business, now trading this commodity in more than 25 countries around the world.

Looking ahead, a major focus for the Fuel Oil team will be the growth of exports from new large-scale processing facilities in the Middle East and west Africa, which have the potential to reshape trade flows. Thanks to our global reach and relationship with TFG Marine, the Fuel Oil team is well placed to adapt to changing market dynamics and to deliver excellent results for our customers.

In bitumen, our performance was good despite significant headwinds. Demand was strong in the first half of the year but much weaker in the second as rising inflation forced governments to reduce spending on infrastructure projects. However the Bitumen team was able to react quickly to these changing market dynamics using our infrastructure and fleet of bitumen carriers. In 2024, we expect prices to remain volatile. Nevertheless, we are very well positioned to offer our customers reliable supply and expand our bitumen asset base in the years ahead.

Distillates and biofuels

As Russia searched for new outlets for its petroleum products, principally in India and China, and the West looked for new sources of supply, there was a reconfiguration of long-established trade routes. The market also witnessed the emergence of new participants operating outside of sanction-compliant countries.

It was another volatile year and few markets were more affected than European diesel, but despite the challenges we enjoyed strong growth across the region. France and Germany were key drivers in northwest Europe, while our exclusive supply and offtake agreement with the ISAB refinery in Italy not only highlighted our ability to offer tailored solutions but also provided a platform for growth in the Mediterranean.

Our global jet business enjoyed a strong year as we continued to expand our cargo trading activity and integrated our aviation business into the wider Group business model. Biofuels also posted strong growth as we expanded our footprint in feedstock markets.

While volume growth was a key strategy in FY2023, it was also critical that we maintained our vigilance, particularly in emerging markets that were grappling with high interest rates and currency volatility.

Looking ahead, we expect to see continued levels of heightened volatility in 2024 as new refinery start-ups and macroeconomic headwinds clash with geopolitical risk and low global inventory levels.

Liquefied petroleum gas and ammonia

Our LPG and Ammonia team delivered another strong performance in FY2023, helping to balance the global market by ensuring the efficient flow of volumes between regions.

In FY2023, we registered record LPG exports from the US. We have built a significant presence in this market by connecting a large number of small-scale producers to export markets through the domestic rail network and our Sawtooth Caverns storage joint venture.

The year was also characterised by a tight freight market. This was triggered to a large extent by a severe drought in Panama, which led to unusually long delays and restrictions along one of the world's most important trading routes. Drawing on the strength of our shipping business, we were able to avoid the worst of the disruption to trade passing through the Panama Canal.

In China, new propane dehydrogenation plants, which produce propylene for the petrochemicals industry, played a key role in increasing flows from the US to Asia. We see a broadly balanced LPG market in 2024, albeit one that is sensitive to changes in demand from China, where margins in the petrochemicals industry remain under pressure.

Elsewhere, we continued to expand our ammonia business. This came against the backdrop of a volatile market as high gas prices forced the closure of several production facilities in Europe, disrupting inter-regional trade. We also increased our ethane trading volumes.

A key focus for the LPG and Ammonia team going forward will be the introduction of ammonia-fuelled engines for maritime vessels. We see ammonia playing a key role in the decarbonisation of the shipping industry, as a low-emission alternative to bunker fuel. However, we believe its full potential will not be realised without a carbon tax to address the price gap that exists between the two fuels.

↓ LPG collection and export terminal in New Jersey on the US East Coast.

Gas, Power and Renewables

A strong year for our newly established division amid shifting market dynamics.

23.9mmt
Total volume natural gas traded
(2022: 23.7mmt)

11.2mmt
Total volume LNG traded
(2022: 13.0mmt)

Gas volumes traded (mmt)	2023	2022
Natural gas	**23.9**	23.7
LNG	**11.2**	13.0
Total	**35.1**	36.7

Performance overview

Over the year, we worked hard to achieve closer cooperation between our Gas and Power teams as the new division expanded its footprint in Europe and North America.

Among the highlights of 2023 was a ground-breaking deal to supply significant amounts of natural gas to Germany's national importer. When the agreement was signed in October 2022, it was worth more than USD12 billion at market prices.

The deal, which is backed by a government guaranteed loan, shows how the public and private sectors can work together to ensure security of supply and strengthen supply chains. It is also a powerful endorsement of Trafigura and our role as a reliable supplier of vital natural resources.

Meanwhile, we made further progress on our new power trading hub in Copenhagen and continued to build our presence in the US natural gas market. We also struck our first biomethane deal, working in close collaboration with our Biofuels team.

The performance of our Power Trading division was also of note. From a standing start three years ago, we are now an established participant in the physical power market, offering a range of services from renewable power purchase agreements to battery storage.

In carbon credits trading, we were active in both compliance and voluntary markets, with a particular emphasis on Europe, Australia, New Zealand and the US. At the same time, Agora, the supply chain emissions tracking platform we co-developed, extended its offering to include energy supply chains, in addition to metals and minerals. Understanding the carbon intensity of upstream oil production enables consumers to make more informed decisions about the barrels they are buying.

In green hydrogen, we continued to work toward final investment decisions at our planned flagship projects in Denmark and Wales.

Looking ahead, although 2023 brought a gradual softening of gas and power prices in Europe on the back of a mild winter, lower demand and increased LNG imports, we expect markets to remain turbulent and prone to spikes in 2024.

Our focus will remain on further integrating our activity in trading new fuels in new markets around the world and on helping our clients navigate volatility.

Richard Holtum
Head of Gas, Power and Renewables

← A long-term offtake agreement with US LNG producer Cheniere Energy adds an important source of gas to our growing supply portfolio.

Natural gas and LNG

FY2023 was characterised by fundamental changes in the way gas flowed across Europe due to the lack of Russian supply and the region's newfound dependence on liquefied natural gas (LNG).

Higher LNG imports from the US, Asia and Middle East combined with increased pipeline supplies from Africa, Azerbaijan and Norway resulted in a complete change of trade flows in Europe, which for the past 70 years have predominately flowed from east to west. This led to wide differentials in prices at key delivery points.

Against this backdrop, our strategy of building a pan-European flexible portfolio with a strong focus on storage and pipeline capacity paid dividends with our European business reporting strong results.

We expanded into markets that have previously been dependent on Russian gas, including Slovakia, Hungary, Czechia and Austria. Trafigura was one of the few companies to inject gas into Ukraine storage as EU storage approached capacity.

In the US, we continued to focus on exports by using our pipeline transportation network to carry gas from the Permian and Eagle Ford Basins to the Gulf Coast and Mexico markets. In the coming years, this is a business we expect to grow as global gas markets become more interconnected.

US natural gas prices fell substantially at the start of the year and subsequently traded in a narrow range near USD3 per million British Thermal Units (Btu) reflecting a mild winter, relatively robust supply and high storage levels.

This was in marked contrast to Europe, where prices remained volatile. After spiking to more than EUR300 per megawatt hour in the summer of 2022, prices eased as a mild autumn delayed the start of the heating season and storage sites filled up.

As it became clear that Europe would avoid a winter gas crisis, prices continued to retreat and by the spring were at the lowest level since the build up to the war in Ukraine.

However, the market remained volatile as highlighted during the summer when concerns about supply disruptions in Australia triggered a surge in prices.

In LNG, our services remained in high demand throughout the year. We brought cargoes to Europe when they were needed and diverted them away when storage was nearing capacity. In Asia, we continued to be a reliable supplier for traditional demand centres and new locations.

Our ability to adjust to changing market conditions during the year owes much to our strong presence in shipping and the close collaboration between our LNG and Natural gas teams.

Looking forward, we expect gas prices in Europe to remain unstable until a wave of new LNG projects come on stream later in the decade. Until then, Europe will have to compete with Asia for LNG cargoes. Our strategy will be to remain agile and respond to changing customers' needs by drawing on the size and scale of our operations and our integrated approach.

↑ A photovoltaic facility at Nyrstar's Budel site in the Netherlands.

Power trading

European power prices started FY2023 at near-record levels, at more than EUR250 per megawatt hour, as a result of high gas prices, which in turn reflected a risk premium for possible supply disruptions.

A particularly mild winter, meant that supply disruptions did not materialise and prices started to slowly deflate. Lower demand from industrial consumers added further downward pressure and prices were rangebound for most of the summer.

On the other side of the Atlantic, there were several weather events: a deep freeze in the Pacific Northwest, Storm Elliott on the East Coast over Christmas and record high summer temperatures in Texas. These events led to spikes in power prices in the respective regions.

We expect volatility of short-term prices to remain a feature of power markets in Europe and the US as both the supply and demand of electricity are becoming increasingly weather dependent. We are positioning the Power business so that our teams can quickly respond to these dynamics.

Overall, the Power team had a successful year, recording strong results as we successfully managed to navigate price movements in Europe and the US.

We completed a number of transactions during the year, including a tolling agreement with the developer of a European battery storage project and several offtake deals with power plants.

Trading volumes were up year-on-year as we added new products, and extended our geographic reach. We expanded our origination team through a number of new hires. We also continued to develop intraday capabilities at our 24/7 trading desk in Denmark.

Moving forward, we expect power markets in Europe and the US to remain volatile as more renewable energy projects come onstream and thermal power generation is retired. As such, our strategy will be focused on securing flexible generation and infrastructure, so that we can help our clients manage volatility and the challenges associated with intermittency, and on helping connect renewable generation plants to customers looking for low carbon energy supply.

Renewable investments

In 2019, the Group established an internal venture capital fund to invest in start-up companies and projects developing alternative and renewable energy technologies.

The focus of our investment strategy is threefold: to gain access to experienced teams and intellectual property in early stage companies working in sustainable energy and technologies; to support the conversion of their intellectual property into viable development projects; and, ultimately, to help develop new markets and business opportunities.

Since launching the fund, we have built an extensive understanding of low-carbon fuels, including ammonia, methanol, ethanol and sustainable aviation fuel.

To date, our Energy Transition Group has made 11 investments in start-ups that are developing technologies and business models targeting the decarbonisation of large, hard-to-abate sectors.

In 2023, we invested in two companies: Zero Emission Industries, a hydrogen technology company focused on the maritime industry, and OXCCU, a climate technology spin-out from the University of Oxford that is working to commercialise a technology that can produce sustainable aviation fuel from carbon dioxide and hydrogen.

Both of these investments highlight our commitment to investing in and helping incubate businesses and technologies that complement our commercial activities and energy transition strategy.

During the year, we worked hard to support our existing portfolio companies and help them deal with the challenges presented by rising inflation and higher interest rates. This was highlighted by the two top-up investments we made in 2023: in Daphne Technology, an emissions capture start-up developing technology to measure and reduce greenhouse gas emissions from industrial and maritime sources, and in OneH2, a hydrogen production company supplying customers across the US.

In May, we published a new whitepaper on low-emissions fuel supply for shipping. The publication focused on the vital role that hydrogen-based fuels will play in decarbonising shipping and the enormous potential for countries in the Global South to produce green ammonia and green methanol to satisfy growing global demand.

Areas of focus

Hydrogen and H_2-based fuels

Exploring opportunities in early stage adoption of hydrogen and project development

- H2energy Europe
- HY2GEN AG
- ONEH2
- CIZERO
- ZERO EMISSION INDUSTRIES

Long-duration storage

Exploring market gap opportunity in deployable, non-geologically constrained, competitive energy storage solutions

- Quidnet Energy
- MALTA
- Bboxx

Carbon capture and utilisation schemes

Exploring emission capture in key sectors and utilisation pathways and monetisation for CO_2

- LanzaTech
- DAPHNE TECHNOLOGY
- OXCCU

↑ An artist's impression of the proposed H2 Energy Europe 1GW renewable hydrogen plant in Esbjerg, Denmark.

H2 Energy Europe

Green hydrogen is a clean-burning alternative to traditional fossil fuels which we believe has the potential to support the decarbonisation of several hard-to-abate industries, including shipping, long-distance trucking cement and steelmaking.

Through H2 Energy Europe, our joint venture with Zurich-based company H2 Energy, we have been developing two renewable hydrogen projects: a 20-megawatt hydrogen production facility within the port of Milford Haven, Wales; and a one gigawatt product plant in Esbjerg, Denmark.

During the year we took the decision to increase our shareholding in H2 Energy Europe and become the majority owner of the company, as we move toward final investment decisions on both projects in 2024.

We selected COWI, an engineering and architecture consultancy, to produce the front-end engineering design for the production plant at Esbjerg and submitted a formal planning application for the Milford Haven project, which will produce hydrogen for use as a chemical feedstock and in shipping.

The Milford Haven project has already been shortlisted for funding from the UK government, as part of the UK's aim to develop up to 10 gigawatts of low-carbon hydrogen by 2030.

At Esbjerg, the proposed production plant will use renewable energy generated by offshore wind to produce green hydrogen for industrial use and for heavy-duty transportation.

At full capacity, the plant will be capable of producing up to 100,000 tonnes of green hydrogen a year, which we envisage will be delivered to northwestern Europe (primarily Germany) via pipeline.

H2energy Europe

Carbon trading

The Carbon Trading team was active across both compliance and voluntary carbon offset markets in 2023 helping our customers meet their compliance obligations and low-carbon objectives.

We continued to work hard on expanding our portfolio of carbon removal projects including our investment in Brújula Verde, a landscape restoration project on degraded lands in Colombia.

The planting of 12 million eucalyptus trees began at Brújula Verde, where we have engaged best-in-class partners to provide digital monitoring and verification and e-DNA biodiversity tracking, and to carry out a trial of native species.

Meanwhile, the use of Agora, the supply chain carbon emissions tracking and analysis platform we developed with US technology company Palantir, continued to grow. Its services are now available to the energy sector and are already being used by oil producers BP and Ecopetrol.

During the year, compliance markets continued to grow in number and scope. Indonesia and the US state of Washington launched domestic schemes, while several jurisdictions announced plans to either expand the scope of existing schemes or to adopt new ones.

In Mexico, the government is preparing to start the operational phase of its emissions trading scheme in 2024. In Europe, the EU has formally adopted a broad set of laws related to its Fit for 55 package of measures to cut carbon emissions. This includes the reform of the current EU emissions trading scheme and the expansion to the scheme to the maritime industry.

We are already working with shipowners to help them understand and meet their obligations in Europe. The EU has also agreed to launch an expanded emissions trading scheme (ETS2) in 2027 to cover emissions from buildings and road transport.

Overall, the share of global greenhouse gas emissions covered by a carbon price is set to grow further. The implementation of national carbon schemes has been proposed in Brazil, Chile, India, Japan, Malaysia, Thailand, Turkey and Vietnam.

The year also witnessed further development of Article 6 of the Paris Agreement, which allows countries to trade mitigation outcomes to achieve their climate action goals.

With the first transactions already occurring, the mechanism is on track to be fully operational in the next few years, a development that will help underpin and support global carbon markets.

Progress on Article 6 of the Paris Agreement comes in time for the launch of the first phase of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), the aviation industry's flagship carbon offsetting system. From 1 January 2024, eligible carbon credits under this scheme are required to be aligned with Paris Agreement criteria.

It was a challenging year for voluntary carbon markets where there was an increased focus on the climate credentials of so-called REDD+ projects, which focus on reducing emissions from deforestation and forest degradation in developing countries.

However, progress was made in ensuring the integrity of carbon credits through the launch of the Core Carbon Principles benchmark and assessment framework.

In FY2023, the EU launched a transitional phase of the Carbon Border Adjustment Mechanism, which requires importers to report the embedded emissions of certain carbon-intensive goods.

Also during the year, two climate laws were passed in California that define a corporate climate disclosure rule and require companies to report their carbon emissions and climate-related financial risks.

For the year ahead, the focus for the Carbon Trading team will be on strengthening its presence in established markets and expanding its offerings to the Americas.

↓ The Brújula Verde project, located in Orinoco region, Vichada, Colombia, will see the planting of 12 million trees across 10,000 hectares in its first phase, with the possibility of expanding the footprint to 30,000 hectares. The project has the potential to absorb up to 45 million tonnes of CO_2e over its lifetime.

Metals, Minerals and Bulk Commodities

A strong underlying performance as demand for energy transition metals grows.

21.0mmt
Total volume non-ferrous concentrates and refined metals traded
(2022: 23.3mmt)

89.9mmt
Total volume bulk minerals traded
(2022: 91.3mmt)

Volumes traded (mmt)	2023	2022
Non-ferrous concentrates and refined metals	**21.0**	23.3
Bulk minerals	**89.9**	91.3
Total	**110.9**	114.6

Performance overview

The most interesting trend of the year in metals markets was the strength of China's metal consumption in spite of the well-publicised problems in the country's property sector.

Renewable energy demand has taken up the growth mantle in China, which is now a major exporter of solar panels, electric vehicles and the batteries that power them.

As other countries seek to increase their renewable energy and battery manufacturing capacity, this sets the scene for supply-demand balances in metals to tighten – in some cases dramatically from 2026 onwards – as years of underinvestment in new mining projects start to take effect. We expect to play a key role in supplying the metals the world needs to meet this demand.

The Metals, Minerals and Bulk Commodities divisions recorded a strong underlying trading performance in FY2023, notwithstanding one-off exceptional charges in relation to the major loss from a fraudulent nickel scheme against Trafigura as well as impairments to certain Nyrstar operations, currently included within this divisional result.

In metals, a highlight of 2023 was a long-term deal to supply up to 500,000 tonnes of non-ferrous metals to Germany. To support this agreement, we raised USD800 million from a consortium of banks backed by a credit guarantee from Germany's Export Credit Agency.

In bulk minerals, it was another strong year in both coal and iron ore with our teams quick to respond to changing customer requirements and trade flows. Going forward, a key focus for our Iron ore and Coking coal teams will be India, where steel demand is tipped to grow strongly because of rising infrastructure investment.

Shortly after the end of our financial year, we announced an investment in Korea Zinc with a view to developing a new state-of-the-art nickel refinery in South Korea to produce a range of feedstocks for the rechargeable battery market.

Looking forward, we expect metals and minerals prices to be highly sensitive to macroeconomic factors in 2024, in particular the outlook for US interest rates. At the same time, we believe energy demand from the energy transition will continue to rise, helped by strong support from policymakers around the globe.

Gonzalo de Olazaval
Head of Metals, Minerals and Bulk Commodities

← Trafigura's concession agreement with the Angolan government will see the refurbishment and operation of the 1,300km Lobito rail corridor, offering a western route to market for crucial energy transition metals produced in the DRC.

Non-ferrous concentrates and refined metals

Copper

For copper, FY2023 comprised two contrasting periods. In the first half, the price of copper rose from USD7,500 per tonne in October to USD9,300 per tonne in January after China, the world's largest consumer of non-ferrous metals, scrapped its sweeping COVID-19 policies.

As re-opening elation died down and investors started to fret about China's property sector, prices declined. By the end of May, copper was back to below USD8,000 per tonne even though demand in China remained extremely healthy, driven by booming production of solar panels and grid investment.

However, a well-supplied concentrate market and excess smelting capacity meant China was able to meet this increased demand domestically without the need to expand imports of refined metal.

Prices strengthened between June and August as copper stocks held at major exchanges sunk to a 15-year low and the closure of a major EU refinery raised concerns about a supply gap.

However, the gains were fleeting and, buffeted by macro headwinds, including a strong US dollar and weak manufacturing activity in Europe, copper settled into a narrow trading range near USD8,000 per tonne.

In these conditions, our Copper team delivered a strong performance in both copper concentrates and refined metal, with our supply chain services in high demand from our global customer base.

In the African Copperbelt, we worked hard to overcome logistical hurdles and ensure the efficient movement of goods to international markets. The region's supply chains will be tested again in 2024 when production in the Democratic Republic of the Congo (DRC) is forecast to increase.

We are committed to improving transport and logistics in Africa through our involvement in the joint venture consortium that operates the 1,300km Lobito Atlantic Railway, which runs across Angola to the border with the DRC. The first copper concentrate to be exported under the new concession is intended to be dispatched by the end of the 2023 calendar year or soon thereafter.

For concentrates, we see a relatively balanced market in 2024 before new smelting projects in China and the rest of the world drive the market into deficit.

Alumina and aluminium

Aluminium was a bifurcated market in 2023, with strong demand growth in China compensating for weakness in the rest of the world.

In China, demand rose to an all-time high, driven by rising production of electric vehicles and solar panels. Combined with growth in infrastructure and transport, this more than offset lower demand from the property sector.

In the rest of the world, higher interest rates and lower consumer spending on goods resulted in lower demand. This was also reflected in the performance of aluminium prices on the London Metal Exchange, which have fallen 15 percent since the start of the 2023 calendar year. The strength of the US dollar proved to be another headwind for prices.

On the supply side, high energy prices continued to limit growth. Aluminium production is highly energy intensive and many smelters in Europe have been forced to curtail production to reduce losses. In China, continued problems with hydroelectric generation led to further smelter supply disruptions.

Meanwhile, the supply of alumina, a key ingredient needed to make the aluminium, continued to grow strongly.

Following the decision by the government of Indonesia to ban bauxite ore exports, new refining projects are expected to be developed in the coming years. China is also building more refining capacity in coastal provinces, although it is increasingly relying on Guinean bauxite to produce alumina. Indeed, one of every three tonnes of aluminium produced worldwide is made using Guinean bauxite.

Our focus in the year ahead will be on helping our customers navigate difficult and constantly changing market conditions.

More widely, the drive to a low-carbon economy is having a clear impact on the aluminium market, with more than seven percent of global demand now coming from products linked to the energy transition.

As China continues to produce the vast majority of solar and wind generation equipment, the outlook for consumption in the world's second largest economy is strong.

Nickel, cobalt and lithium

Increased mining capacity, predominantly in Indonesia and the DRC, led to oversupplied nickel and cobalt markets in 2023.

The lithium market also fell into surplus because of increased recycling and higher production of low-quality lepidolite ore in China, which can be processed into higher-grade battery material.

The market surpluses of nickel, cobalt and lithium raw materials combined with slowing battery electric vehicle (BEV) sales momentum led to a build-up in stocks throughout the supply chain that will take some time to work through.

While current prices for nickel, cobalt and lithium are depressed, demand for these materials is expected to grow rapidly over the long term. For example, we expect battery electric vehicles to account for close to 50 percent of new car sales by 2030.

As such, we see opportunity to work with the automotive industry to solve its procurement challenges. One way to do this is by helping to develop new sources of supply.

In 2022, we first announced an investment in Korea Zinc with a view to developing an all-in-one nickel refinery in South Korea.

A deal was recently signed to build the plant, which will see us supply 20,000 to 40,000 tonnes of nickel feedstock per year. We have also secured offtake rights in relation to the feedstock agreement.

Looking ahead, policies such as the US Inflation Reduction Act and the European Critical Raw Materials Act will create further opportunities for our teams in nickel, cobalt and lithium.

Our focus is on building our business in the fast-moving battery metals market, while continuing to serve our traditional clients in the stainless steel industry.

↑ Refined zinc at Nyrstar's zinc smelter in Hobart, Tasmania.

Zinc and lead

The refined zinc market was tightly correlated with European power prices during the first quarter of FY2023. As smelters across the region either closed or were forced to curb production because of rising energy costs, the refined zinc price rose and went on to hit USD3,500 per tonne in January.

The price then drifted lower as China increased domestic production and reduced imports. This resulted in an oversupplied global market (outside of China), with zinc eventually bottoming out at USD2,300 a tonne in August.

It was a different story in zinc concentrates, where the market was in deficit because of mine disruptions and a recovery in smelter output in the second half of the year.

Meanwhile, lead was the top-performing major metal on the London Metal Exchange, rising by more than 15 percent over FY2023, supported by its inclusion in a commodity index widely followed by financial institutions.

In spite of the challenges presented by the power crisis in Europe, our Lead and Zinc teams delivered solid results and continued to add customers.

Volumes of refined zinc were down year-on-year, reflecting reduced output at Nyrstar sites in Belgium, France and the Netherlands, but lead volumes rose following the acquisition of the Stolberg smelter in Germany.

The Stolberg deal has helped change the focus of our lead business, which is now supported by an advanced smelter capable of producing technical alloys for customers.

The outlook for the year ahead is uncertain and we will be monitoring closely how global consumption develops, particularly for zinc. However, there is a clear global push for renewable energy which will be positive for both zinc (wind turbines) and lead (battery storage) in the medium-term.

Bulk commodities

Coal

In metallurgical coal, used in steel-making, supply increased although it was lower than forecast because of adverse weather conditions and labour constraints in Australia. Demand also increased, particularly during the second half of the year in India and Indonesia.

The upshot was a broadly balanced market, albeit one with low inventories, which contributed to price volatility throughout the year.

After trading at nearly USD400 per tonne in the first quarter of 2023, high-quality Australian metallurgical coal dropped to USD180 per tonne as China's economy slowed. As demand from Indonesia and India kicked in during the second half, prices recovered to around USD370 per tonne at the end of the financial year. Looking forward, we see India as a key growth market for metallurgical coal as their steel industry expands production and also Indonesia, where the commodity is needed to feed new coke plants.

It was a different story for thermal coal, which is burnt in power stations to generate electricity. The market was oversupplied for much of the year because of weak demand in Europe caused by a mild winter and then energy-intensive industries curtailing production.

On the supply side, Indonesia increased production and exports. This material and other excess supply were absorbed in China, leading to expanding inventory levels.

As a result, prices slumped from more than USD400 per tonne in October for high-grade material to USD120 per tonne in June. Towards the end of FY2023, prices started to stabilise, helped by a recovery in industry activity, particularly in Asia Pacific and India.

Against this volatile backdrop, our Coal team had another active and profitable year, helping customers adapt to new trade flows as a result of the sanctions imposed on Russian supply.

One highlight is our South African business, which has played an important role in supplying coal to Europe and Japan.

Looking forward, we see India as a key growth market for metallurgical coal as their steel industry expands production and also Indonesia to feed new coke plants.

Iron ore

In FY2023, the iron ore market saw an increase in supply from Australia and Brazil, as well as India after export tariffs were scrapped. This was balanced by strong steel production in China in spite of weak downstream margins.

Prices briefly touched USD80 per tonne in October before rebounding as China, the world's largest steel producer and consumer of iron ore, retreated from its sweeping zero-Covid policy.

In the re-opening euphoria iron ore went on to reach USD130 per tonne before retreating as China's economy lost momentum.

From there, prices consolidated and traded in range between USD100 and USD130 per tonne.

For our Iron ore team, it was another 12 months of progress. We saw continued growth at Porto Sudeste, a joint venture Brazilian iron ore terminal. Throughput should increase further in 2024 as our Tico-Tico mine increases production following construction and commissioning.

Outside of Brazil, we are looking to increase third-party tonnage to provide greater alternatives for our global customers.

↓ Vessels loading iron ore at the Porto Sudeste export facility, Brazil.

Air Passenger Market Analysis

October 2023

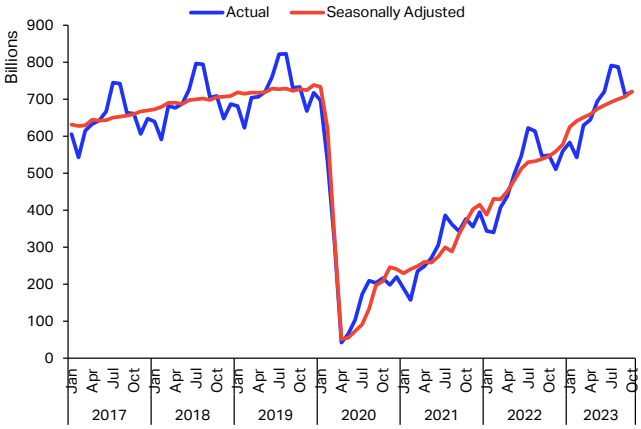
Passenger traffic growth remains on track in October

- Industry-wide revenue passenger-kilometers (RPKs) increased 31.2% year-on-year (YoY) in October and closed the gap to pre-Covid levels to within 2%.
- Available seat-kilometers (ASKs) climbed by 29.4% YoY, recovering to 97.0% of pre-pandemic capacity. As seat capacity stood in line with passenger demand, the global passenger load factor (PLF) remained at 83%.
- Domestic traffic growth over 2019 levels stabilized at 4.8% with an annual growth rate at 33.7%. International passenger traffic reached 94.4% of pre-pandemic levels with a 29.7% growth YoY.
- Air ticket sales trended close to 2019 levels, indicating resilient demand for air travel despite the economic challenges faced by consumers.
- Despite reduced airline operations to and from Israel due to the Israel-Gaza conflict in October 2023, global and regional traffic seemingly remained largely unaffected.

October saw resilient passenger traffic growth…

In October, the air passenger traffic continued its upward trend with a 31.2% year-on-year, measured in revenue passenger-kilometers (RPKs), edging closer to pre-pandemic figures. Global RPKs are now just 1.8% shy of 2019 levels, and on a seasonally-adjusted basis, they saw a steady 1.2% month-on-month rise. (**Chart 1**).

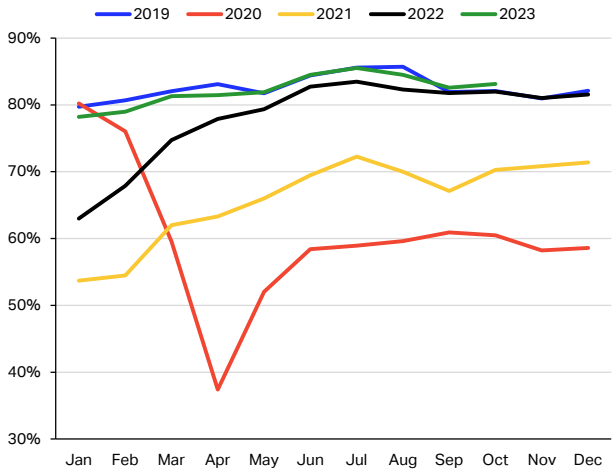
Chart 1 – Global air passengers, RPKs, billions per month



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

Available seat-kilometers (ASKs), a metric for seat capacity, increased by 29.4% year-on-year, reaching 97.0% of the levels seen before the pandemic. Since May, the industry's passenger load factor (PLF) has aligned closely with pre-pandemic figures, and ending October with 1.2 and 1.0 percentage points higher than the same months in 2022 and 2019, respectively. (**Chart 2**). Notable improvements in seat occupancy are observed in both international and domestic flights, indicating a sustained high interest in air travel.

Chart 2 – Industry-wide passenger load factors, % share of ASKs



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

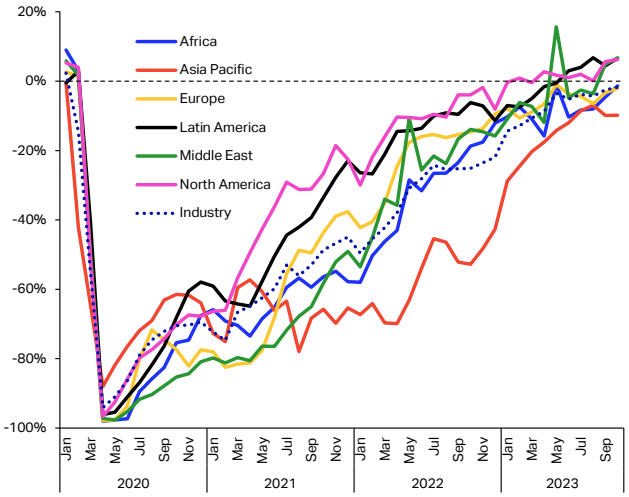
All regions witnessed strong growth in passenger traffic, with the Middle East, North America, and Latin America surpassing their 2019 RPKs by more than 6%. Meanwhile, African and European airlines are close to their recovery milestones, trailing by just 1.3 and 2.1 percentage points, respectively, from their pre-pandemic levels (see Chart 3). With a more than 90% annual growth rate, Asia Pacific airlines stood at less than 10% below its pre-pandemic levels.

Air passenger market in detail - October 2023

	World share[1]	October 2023 (% year-on-year)			October 2023 (% ch vs the same month in 2019)			
		RPK	ASK	PLF (%-pt)	RPK	ASK	PLF (%-pt)	PLF (level)
TOTAL MARKET	***100.0%***	**31.2%**	**29.4%**	**1.2%**	**-1.8%**	**-3.0%**	**1.0%**	**83.1%**
International	*58.1%*	29.7%	28.0%	1.1%	-5.6%	-7.8%	2.0%	83.2%
Domestic	*41.9%*	33.7%	31.8%	1.2%	4.8%	5.5%	-0.6%	83.0%

[1]% of industry RPKs in 2022

Chart 3 – Total RPKs by airline region of registration, YoY% change vs. 2019

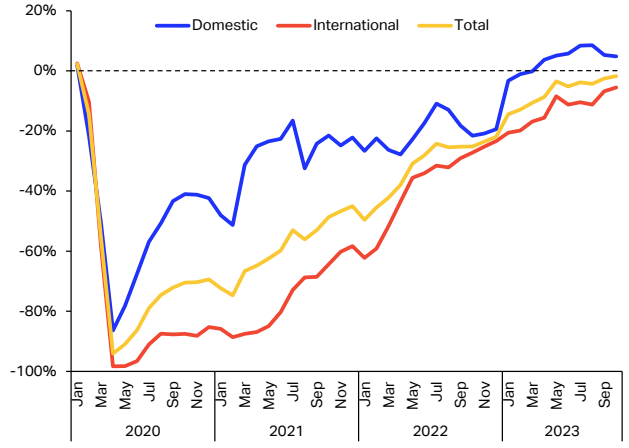


Sources: IATA Sustainability and Economics, IATA Monthly Statistics

...while total domestic traffic stabilized and international remained on track

In October, international passenger traffic continued its upward trend, with RPKs increasing by 29.7% year-on-year, approaching pre-Covid levels with a mere 5.6 percentage point gap, as shown in **Chart 4**. This growth trend was consistent across all regions over the past year. In contrast, domestic traffic experienced a slight downturn, yet it remains strong overall at 4.8% above 2019's RPKs.

Chart 4 – Global domestic and international RPKs, YoY% change vs. 2019



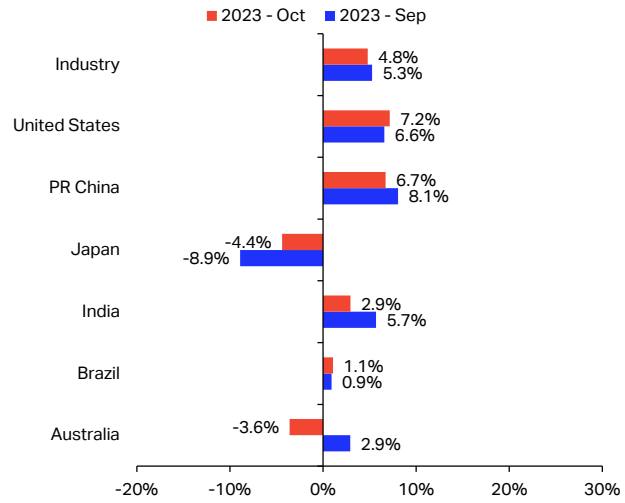
Sources: IATA Sustainability and Economics, IATA Monthly Statistics

Robust results among monitored markets

China's domestic passenger traffic saw exceptional growth over the year, surging 252.6% YoY, a result mainly driven by a base effect as this market was affected by the reintroduction of travel restrictions in October 2022. As the pent-up tourism demand cools down, passenger traffic growth over 2019 levels has gradually slowed over the past months and reached 6.7% in October 2023 (**Chart 5**). The market's seat capacity however remained elevated compared to the increase in passenger traffic, standing 13.1%. above the October 2019 level partly driven by the now more frequent use of widebody aircrafts in domestic operations.

The steady recovery in global domestic traffic was also mirrored in majority of monitored markets. Traffic in India continued on its growth momentum, RPKs and ASKs increased 10.0% and 9.2% YoY. In October, Japan was the only market, amongst those monitored, to outperform its 2019 passenger load factor. The 2.2 ppt increase was driven by demand for air travel slightly outpacing the growth in available seats. Over the year, growth in RPKs remained stable, climbing 7.8% YoY while ASKs contracted 2.3% YoY (**Chart 5**).

Chart 5 – Domestic RPK growth by market, YoY% change vs. 2019



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

Traffic development in Australia carried on in seasonally adjusted terms RPKs grew 1.5% MoM and 14.9% annually in actual terms. In the US, domestic RPKs grew by 7.2% over pre-Covid levels. Brazil saw 5.0% annual growth in passenger traffic, surpassing 2019 levels by 0.8% (**Chart 5**).

All regions achieved further recovery in international traffic

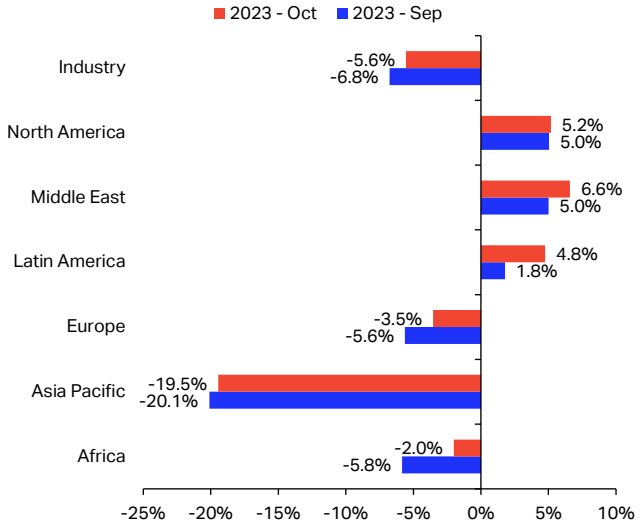
In October, international RPKs recovery remained on track, increasing 1.7% MoM in seasonally adjusted terms and 29.7% YoY in actual terms. The industry was only 5.6% short on 2019 RPKs levels while seat occupation reached 83.2%, 2.0 ppt above pre-pandemic. October was marked by the conflict in Israel and the Gaza Strip. Many international airlines have suspended service to Israel. These recent events have not significantly impacted October traffic levels at the global scale. Most of flights were previously operated by European and Middle Eastern airlines, which have not seen significant consequences.

Middle Eastern carriers posted strong results in October, international RPKs increased 24.1% YoY and 6.6% over 2019 levels. The number of available seats were nevertheless under those of 2019 by 2.7% while

high demand pushed the monthly load factor up 7 ppt, reaching 80.6%. European airlines saw 16.1% YoY growth in international traffic and were 3.5 ppt away from recovering their pre-Covid levels.

Asia Pacific carriers' international rebound remained on track, despite the recovery momentum unwinding over the past months. the region still leads in yearly growth with 80.3% and 72.5% YoY increases in RPKs and ASKs respectively. Nevertheless, compared to 2019, international RPKs made a modest progress of 0.6 ppt from September to October 2023 and stood 19.5% away from total recovery (**Chart 6**).

Chart 6 – International RPK growth by airline region of registration, YoY% change versus 2019

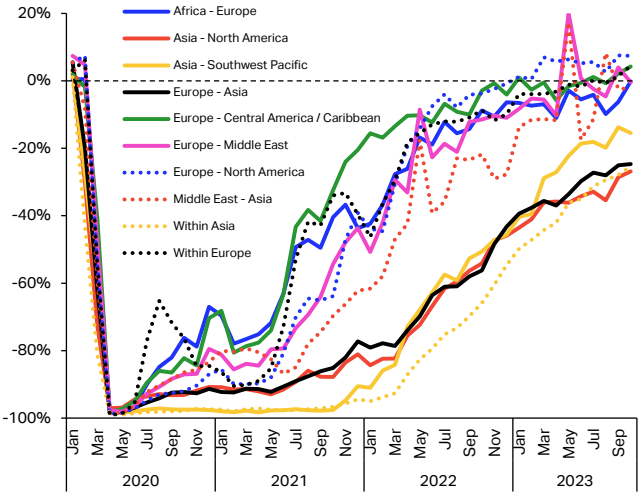


Sources: IATA Sustainability and Economics, IATA Monthly Statistics

International traffic levels remained robust for North American and Latin American airlines, outperforming 2019 levels by 5.2% and 4.8%, mainly driven by resilience in passenger demand and traffic between the Americas, the Middle East and Europe, as well as within the region (**Chart 7**).

Airlines in Africa achieved 98.0% of October 2019 international RPKs, further approaching complete recovery. The region saw buoyant recovery in international connectivity on intra-regional routes and to its neighboring regions, Europe and the Middle East (**Chart 7**). The Africa – Europe route area was amongst the 10 most traffic intense worldwide in 2019 and reached complete monthly recovery for the first time in October.

Chart 7 – International RPKs, YoY% change vs. 2019 – Top 10 route areas in 2019

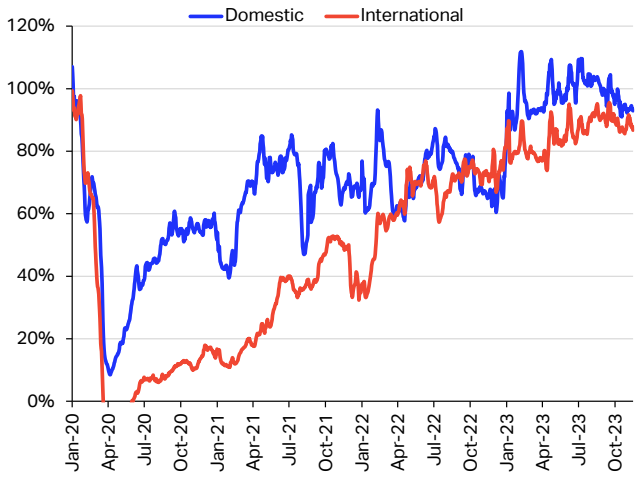


Sources: IATA Sustainability and Economics, IATA Monthly Statistics

Solid demand for air travel despite economic challenges posed to consumers

Over the past weeks, total air ticket sales trended horizontally, remaining close to the sales volumes observed in 2019 (**Chart 8**). Domestic ticket sales continued to reflect the slowdown in PR China and stagnated in early November. International ticket sales growth also steadied, however, remaining aligned with the stable demand recovery trend observed since early 2022. Despite the optimism that resilience in demand for air travel brings for the near future, elevated costs of living, high energy prices and pressures on household incomes continue to pose challenges for consumers.

Chart 8 – Ticket sales by purchase date, 7-day moving average - % share of 2019 levels



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TOTAL MARKET	***100.0%***	**31.2%**	**29.4%**	**1.2%**	**-1.8%**	**-3.0%**	**1.0%**	**83.1%**
Africa	*2.1%*	21.4%	29.0%	-4.4%	-1.3%	-2.4%	0.7%	70.7%
Asia Pacific	*22.1%*	90.9%	77.9%	5.6%	-9.8%	-10.6%	0.7%	82.1%
Europe	*30.8%*	14.7%	12.4%	1.7%	-2.1%	-1.8%	-0.3%	85.6%
Latin America	*6.4%*	13.6%	12.0%	1.3%	6.7%	2.6%	3.2%	84.8%
Middle East	*9.8%*	23.9%	21.4%	1.6%	6.6%	-2.8%	7.1%	80.6%
North America	*28.8%*	10.5%	13.7%	-2.4%	6.2%	6.4%	-0.2%	83.6%
International	***58.1%***	**29.7%**	**28.0%**	**1.1%**	**-5.6%**	**-7.8%**	**2.0%**	**83.2%**
Africa	*1.8%*	25.3%	32.4%	-4.0%	-2.0%	-3.4%	1.0%	70.3%
Asia Pacific	*8.9%*	80.3%	72.5%	3.6%	-19.5%	-22.6%	3.2%	82.9%
Europe	*26.5%*	16.1%	14.5%	1.2%	-3.5%	-2.2%	-1.1%	85.1%
Latin America	*2.8%*	21.2%	22.3%	-0.8%	4.8%	-0.3%	4.2%	85.3%
Middle East	*9.4%*	24.1%	22.2%	1.2%	6.6%	-2.7%	7.0%	80.6%
North America	*8.7%*	17.5%	17.5%	0.0%	5.2%	3.3%	1.5%	83.9%
Domestic	***41.9%***	**33.7%**	**31.8%**	**1.2%**	**4.8%**	**5.5%**	**-0.6%**	**83.0%**
Dom. Australia	*1.0%*	7.5%	11.4%	-3.1%	-3.6%	-2.8%	-0.7%	83.0%
Domestic Brazil	*1.5%*	8.9%	3.3%	4.3%	1.1%	1.9%	-0.7%	83.3%
Dom. China P.R.	*6.4%*	252.6%	188.2%	14.7%	6.7%	13.1%	-4.8%	80.6%
Domestic India	*2.0%*	10.0%	9.2%	0.6%	2.9%	2.9%	0.0%	83.7%
Domestic Japan	*1.2%*	7.8%	-2.3%	7.5%	-4.4%	-7.0%	2.2%	79.8%
Domestic US	*19.2%*	7.9%	12.9%	-3.8%	7.2%	9.1%	-1.5%	83.2%

[1] % of industry RPKs in 2022

Note: the six domestic passenger markets for which broken-down data are available account for approximately 31.3% of global total RPKs and 74.6% of total domestic RPKs

Note: The total industry and regional growth rates are based on a constant sample of airlines combining reported data and estimates for missing observations. Airline traffic is allocated according to the region in which the carrier is registered; it should not be considered as regional traffic.

IATA Sustainability & Economics
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5 December 2023

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Air Cargo Market Analysis

October 2023

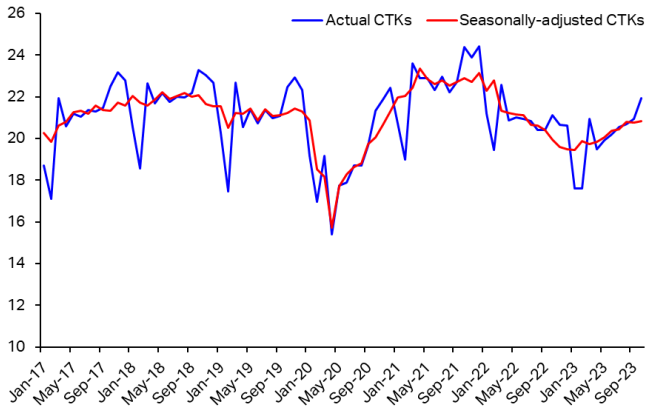
Cargo volumes expand amid stabilized trade

- Global air cargo tonne-kilometers (CTKs) registered the third consecutive year-on-year (YoY) growth in October by 3.8%. Compared to the pre-pandemic level, industry CTKs were 2.4% lower.
- Air cargo capacity, measured by available cargo tonne-kilometers (ACTKs), increased by 13.1% YoY in October, owing to the continued strong return of international passenger belly capacity. Industry ACTKs surpassed 2019 levels by 2.8%.
- Global trade stabilized in September, and inflation eased in most major economies. In the meantime, global jet fuel prices decreased by 7.8% from September and closed October with USD 120.8 per barrel on average.
- Airlines from all regions recorded annual increases in their international CTKs in October, with carriers from the Middle East exhibiting the most significant growth by 10.8% YoY.

Cargo demand continued its expansion in October

Global air cargo demand quantified through Cargo Tonne-Kilometers (CTKs) recorded 21.9 billion in October. This represents a 3.8% increase on a year-on-year (YoY) basis. Despite this growth, the industry's performance remains slightly lower than the pre-Covid level by 2.4%. Seasonally adjusted (SA) CTKs grew by 4.5% this month, a 2.7 percentage points increase compared to September. The sustained annual growth in CTKs since August highlights the ongoing recovery of the global air cargo market and a positive signal to close the year with a better performance. **(Chart 1)**.

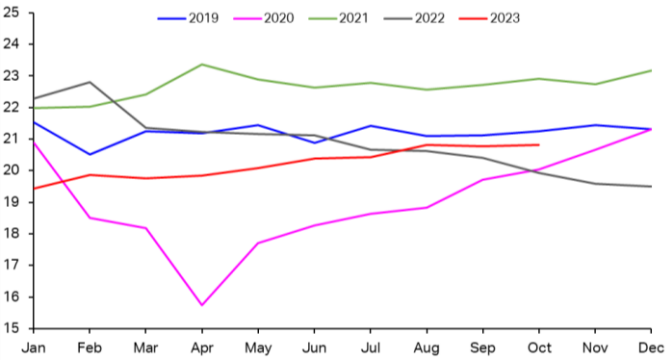
Chart 1 – Global CTKs (billions per month)



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

SA CTKs continued its upward trend. Air cargo traffic displayed resilience maintaining steady levels, which contrasts with the overall declining trend observed in 2022. **(Chart 2)**.

Chart 2 – Seasonally adjusted monthly CTKs (billions)



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

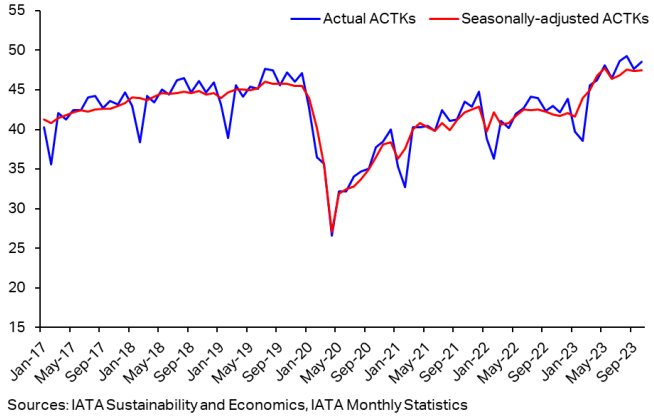
Cargo capacity maintained double-digit growth

Air cargo capacity, measured by Available Cargo Tonne-Kilometers (ACTKs), reached 48.6 billion in October, surpassing the 2022 and 2019 levels by 13.1% and 2.8% respectively. Seasonally adjusted air cargo capacity registered 47.5 billion in October, with an annual growth rate of 13.4%, exceeding the pre-pandemic levels by 3.7% **(Chart 3)**. The double-digit growth in industry ACTKs is largely attributable to the strong return in air passenger belly capacity. The international belly capacity saw a 30.5% annual growth in October, reaching 19.77 billion. In comparison, global international cargo capacity for dedicated freighters stayed at about the same level compared to the previous year, registering 17.9 billion this month.

Air cargo market in detail - October 2023

	World share [1]	October 2023 (% year-on-year)			October 2023 (% ch vs the same month in 2019)			
		CTK	ACTK	CLF (%-pt)	CTK	ACTK	CLF (%-pt)	CLF (level)
TOTAL MARKET	*100.0%*	**3.8%**	**13.1%**	**-4.0%**	**-2.4%**	**2.8%**	**-2.4%**	**45.2%**
International	*86.9%*	3.5%	11.1%	-3.7%	-2.2%	3.0%	-2.7%	50.8%

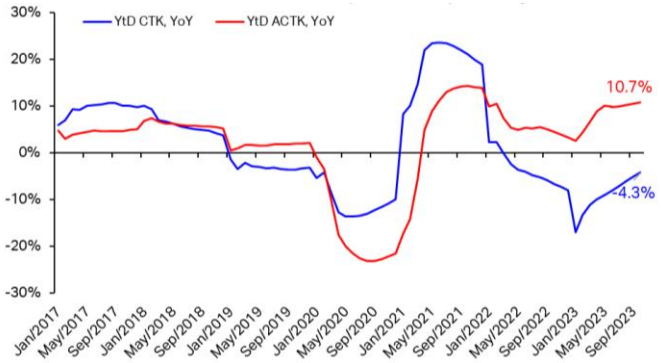
Chart 3 – Global ACTKs (billions per month)



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

A broader perspective can be offered by examining the year-to-date (YTD) performance. Up to October, the cumulative industry CTKs continued to progressively close the disparity with the levels achieved in 2022, narrowing the gap to 4.3%. **(Chart 4)**. This data underscores a significant recovery trajectory in the air cargo sector over the course of the year. Moreover, this month was particularly significant in terms of annual growth in YTD industry ACTKs. A remarkable upsurge was recorded, with the highest annual growth rate for the year being 10.7%. This brought the ACTKs to a substantial figure of 458.8 billion **(Chart 4)**.

Chart 4 – Year-to-date CTKs and ACTKs, year-on-year % change

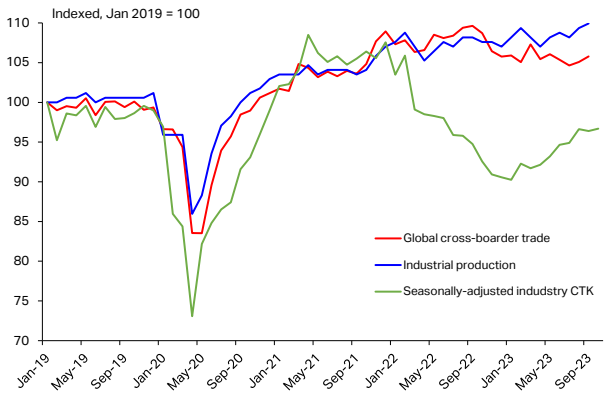


Sources: IATA Sustainability and Economics, IATA Monthly Statistics

Air cargo recovery in line with stabilized global trade

Global trade, while not yet reaching the heights achieved in 2022, has shown growth for the second consecutive month, reversing its previous downward trajectory. This recovery in global trade, though slightly lagging behind the rebound in Industrial Production, is notable. Both global cross-border trade and industrial output have surpassed pre-pandemic levels, exceeding them by over 5%. In the meantime, the recovery in air cargo is also gaining momentum, showing upward trend while approaching pre-pandemic levels (**Chart 5)**.

Chart 5 – Global goods trade and CTKs

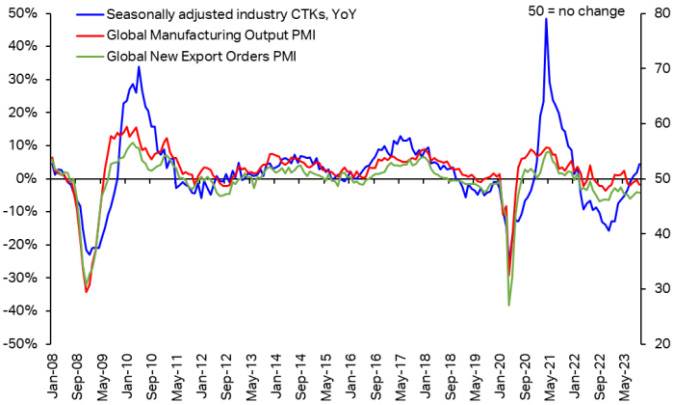


Sources: IATA Sustainability and Economics, IATA Monthly Statistics, Netherlands CPB

Economic activities slowed down in October

The manufacturing output and new export order Purchasing Managers Indexes (PMIs) have historically served as leading indicators of global air cargo demand. Therefore, we closely monitor developments in these PMIs at a global level **(Chart 6)** and for major economies **(Chart 7).**

Chart 6 – CTK (SA) growth, global manufacturing output and global new export orders PMIs (50 = no change)



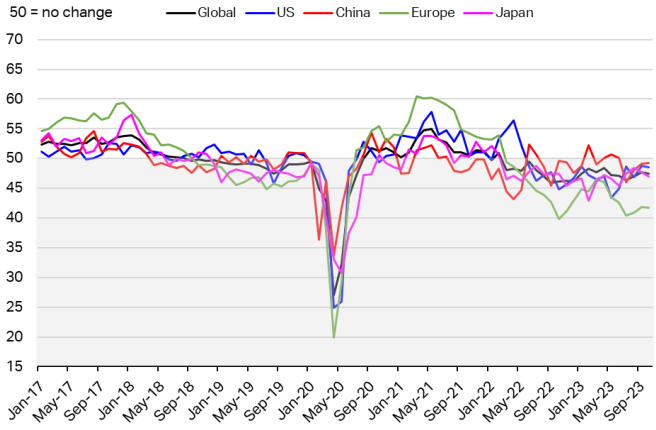
Sources: IATA Sustainability and Economics, IATA Monthly Statistics, S&P Global Markit

During October, the global economic deceleration was reflected in significant contractions within the manufacturing sector and export activities. Specifically, the manufacturing output, as indicated by the Purchasing Managers' Index (PMI), witnessed a decline from 49.8 in September to 48.9 in October. This downturn suggests a further reduction in industrial production and is a clear marker of the economic challenges faced by the manufacturing sector. Additionally, the new export orders PMI, which measures the health of international trade, also saw a decrease, moving from 47.7 to 45.5. This shift signifies a notable drop in global demand for exports, further highlighting the impact of the broader economic slowdown **(Chart 6)**.

In October, the PMIs for new export orders across major economies remained below the crucial 50-point threshold, as shown in **Chart 7**, indicating persistent decline. The ongoing conflicts in Ukraine and new

conflicts in the Middle East have impacted Europe's economic activities, leading to significant increases in energy and food prices. This rise in essential living costs has contributed to slowing down the economy. While the United States, Japan, and China have managed to maintain their PMIs above 45, Europe has continued to experience contraction, with its PMI falling below 45 for the sixth month in a row.

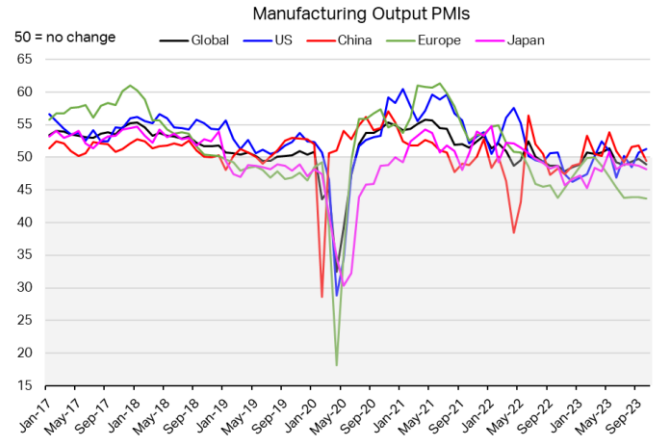
Chart 7 – New export orders PMI in major economies (50 = no change)



Sources: IATA Sustainability and Economics, S&P Global Markit

Similar pattern is reflected in Manufacturing output PMI, where Europe saw continuous contractions for the seventh month in a row. US is the only country that recorded an expansion with its PMI standing at 51.2. **(Chart 8)**.

Chart 8 – Manufacturing output PMI in major economies (50 = no change)

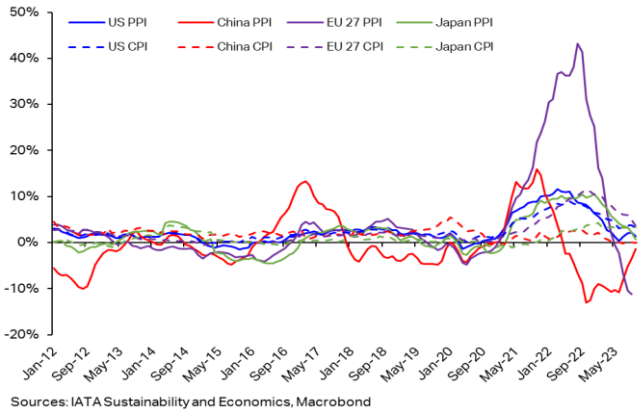


Sources: IATA Sustainability and Economics, S&P Global Markit

Inflation eased in most major economies

Inflation in major advanced economies continued to ease from its peak in terms of Consumer Price Index (CPI), reaching between 3% and 4% for the US and for EU, respectively in October. Inflation in Japan remained stable at around 3%. In the meantime, China exhibited a negative annual growth in its CPI, marking the second instance of deflation this year. This pattern potentially indicates a decrease in consumer demand, raising concerns about an impending economic slowdown. **(Chart 9)**.

Chart 9 – Headline CPI and PPI inflation (YoY) in major economies

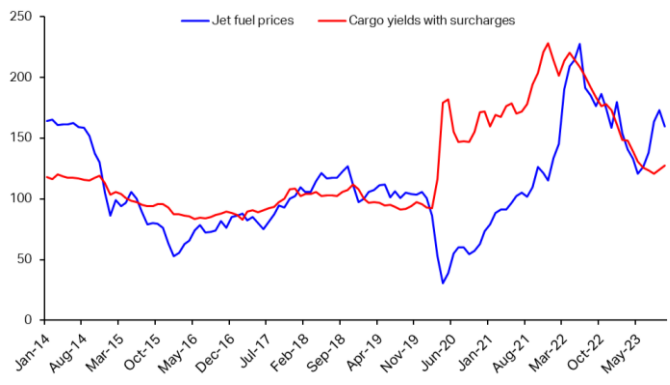


Sources: IATA Sustainability and Economics, Macrobond

In October, the Producer Price Index (PPI), which tracks changes in the prices producers receive for their products, exhibited distinct trends. The United States, following three months of escalating PPI, observed a deceleration, settling at 1.3% year-on-year (YoY). In contrast, China's PPI continued its downward trajectory, decreasing by 1.3% during the same month. As for the EU 27 countries, the October PPI data is yet to be released. However, preceding months showed a significant decline, with a 10.5% drop in August and an 11.2% fall in September YoY. **(Chart 9)**.

One of the primary factors influencing consumer prices is the global oil price. The IATA jet fuel monitor tracks the latest developments in global jet fuel prices, which directly impact airline operating costs. In October, jet fuel prices declined by 7.8% from September, closing October at USD 120.8 per barrel on average. In the meantime, air cargo yields (including surcharges) continued to close its gap and rose by 2.5% from September **(Chart 10)**.

Chart 10: Jet fuel price versus air cargo yields including surcharges (indexed, Jan 2019 = 100)



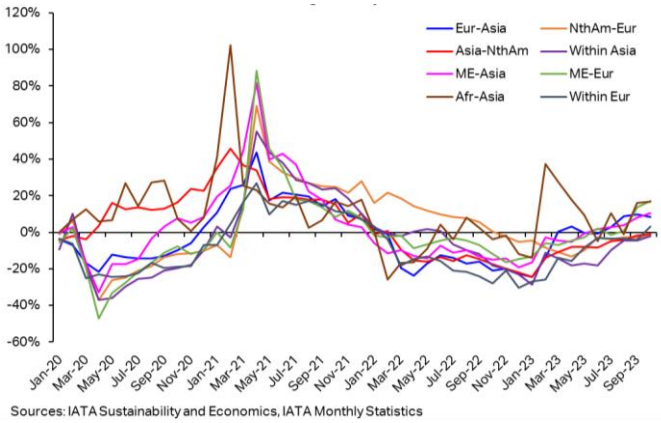
Source: IATA monthly statistics, IATA Jet fuel price monitor, CargoIS

Asia-related trade lanes continued to lead CTK growth while Within-Europe saw annual growth for the first time since Jan 2022

The majority of Asia-related trade lanes maintained their momentum from September and registered annual growth in their international CTKs. Among these trade lanes, the Africa–Asia market saw the greatest annual growth of 16.7%. This is followed by the Middle East–Asia trade lane, which exhibited a 10.3% YoY increase this month. International CTKs on the Europe–Asia market expanded by 8.5% while Asia – North America had a minor increase by 0.9%. In comparison, although the within Asia market still registered annual contraction by 2.0%, a 2.4 ppts improvement compared to September **(Chart 11)**.

Middle East – Europe trade lane experienced its third consecutive growth in international CTKs, with a 17.1% growth YoY. North America – Europe also saw a slight improvement in their international CTKs which stood at -2.1%, 0.6 ppts smaller than September. Within Europe, international air cargo traffic registered its first annual growth since January 2022, by 3.4% YoY.

Chart 11 – International CTK growth (YoY) by route area



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

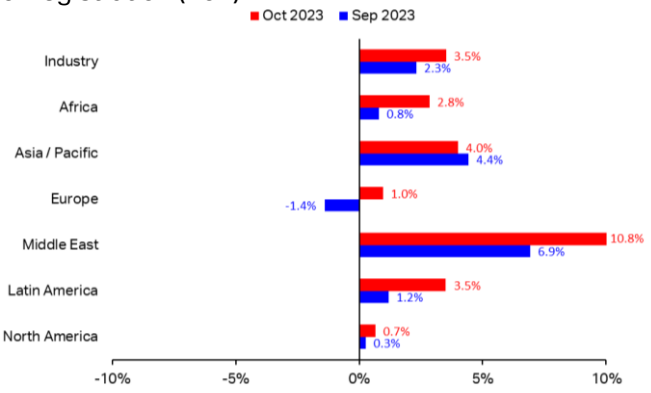
Growth in international CTKs seen by airlines from all regions led by Middle East carriers

Following the positive performance of international CTKs in major trade lanes, in October, industry-wide international CTKs expanded by 3.5% and all regions experienced an annual improvement. Carriers registered in the Middle East recorded the highest annual growth this month, with a YoY increase of 10.8%, benefitted from the 10.3% annual growth in the Asia – Middle East trade lane and the 17.1% growth in the Europe – Middle East market **(Chart 11)**.

Asia Pacific airlines ranked the second with an expansion in international CTKs by 4.0% YoY, owing to the traffic growth in all the Asia-related trade lanes. This is followed by airlines from Latin America (3.5%), Africa (2.8%), and Europe (1.0%). North America airlines registered the weakest YoY growth this month, standing at 0.7% **(**

Chart 12).

Chart 12 – Growth in international CTKs by airline region of registration (YoY)



Sources: IATA Sustainability and Economics, IATA Monthly Statistics

Air cargo market in detail - October 2023

	World share [1]	October 2023 (% year-on-year)			October 2023 (% ch vs the same month in 2019)			
		CTK	ACTK	CLF (%-pt)	CTK	ACTK	CLF (%-pt)	CLF (level)
TOTAL MARKET	***100.0%***	**3.8%**	**13.1%**	**-4.0%**	**-2.4%**	**2.8%**	**-2.4%**	**45.2%**
Africa	*2.0%*	2.9%	9.8%	-2.8%	6.2%	-2.8%	3.5%	41.6%
Asia Pacific	*32.4%*	7.6%	30.0%	-9.8%	-5.0%	8.5%	-6.7%	47.2%
Europe	*21.8%*	1.0%	7.0%	-3.2%	-11.3%	-10.7%	-0.3%	53.0%
Latin America	*2.7%*	4.0%	8.3%	-1.5%	0.7%	-1.8%	0.9%	35.4%
Middle East	*13.0%*	10.9%	15.0%	-1.7%	2.8%	6.6%	-1.7%	46.0%
North America	*28.1%*	-1.8%	2.4%	-1.7%	6.3%	5.9%	0.2%	39.2%
International	***86.9%***	**3.5%**	**11.1%**	**-3.7%**	**-2.2%**	**3.0%**	**-2.7%**	**50.8%**
Africa	*2.0%*	2.8%	9.6%	-2.8%	6.9%	-1.5%	3.3%	42.6%
Asia Pacific	*29.7%*	4.0%	15.9%	-6.3%	-4.3%	7.4%	-6.7%	54.6%
Europe	*21.5%*	1.0%	7.7%	-3.7%	-11.7%	-11.5%	-0.2%	55.0%
Latin America	*2.3%*	3.5%	11.8%	-3.3%	3.0%	12.7%	-3.9%	41.0%
Middle East	*13.0%*	10.8%	15.0%	-1.8%	2.8%	6.8%	-1.8%	46.3%
North America	*18.4%*	0.7%	5.5%	-2.3%	9.5%	10.4%	-0.4%	47.0%

[1]% of industry CTKs in 2022

Note: the total industry and regional growth rates are based on a constant sample of airlines combining reported data and estimates for missing observations. Airline traffic is allocated according to the region in which the carrier is registered; it should not be considered as regional traffic. Historical statistics are subject to revision.

IATA Sustainability & Economics
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Country Analysis Brief: Brazil

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U.S. Energy Information Administration

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Overview

Table 1. Brazil's energy overview, 2021

	Crude oil and other petroleum liquids	Natural gas	Coal	Nuclear	Hydro	Other renewables	Total
Primary energy consumption (quads)	5.34	1.40	0.66	0.15	2.68	1.85	12.09
Primary energy consumption (percentage)	44.2%	11.6%	5.5%	1.3%	22.2%	15.3%	100.0%
Primary energy production (quads)	6.41	0.79	0.11	0.15	1.09	3.32	11.88
Primary energy production (percentage)	54.0%	6.7%	0.9%	1.3%	9.2%	27.9%	100.0%
Electricity generation (terawatthours)	22.39	96.18	26.81	14.70	362.82	139.69	662.60
Electricity generation (percentage)	3.4%	14.5%	4.0%	2.2%	54.8%	21.1%	100.0%

Data source: U.S. Energy Information Administration, International Energy Statistics; the International Energy Agency, *World Energy Statistics 2022*; and Energy Institute, *Statistical Review of World Energy 2023*
Note: Quads=quadrillion British thermal units.

- Brazil's energy mix is diverse; hydropower, fossil fuels, biofuels, wind energy, and solar power all make significant contributions (Table 1). Brazil's total energy production increased by an average annual growth rate of 1.5% from 2011 to 2021. Petroleum and other liquids accounted for most of the energy production increase, followed by natural gas. Brazil's energy production in 2021 accounted for 2.0% of global production and 48.8% of South America's total.
- Energy consumption in Brazil increased by an average annual growth rate of 0.5% between 2011 and 2021, compared with 3.3% between 2000 and 2010, driven by Brazil's real GDP per capita growth (Figure 4). Brazil remained one of the world's largest energy consumers, accounting for 2.0% of global consumption and 53.3% of South America's consumption. In Brazil, the industrial and transportation sectors use most of the energy.
- Crude oil and other petroleum liquids production contributes significantly to Brazil's total energy production, accounting for 54.0% of total energy production and 44.2% of total energy consumption in 2021 (Table 1). Brazil is the largest producer of petroleum and other liquids in South America and the ninth biggest in the world, accounting for 3.5% of global output in 2021.
- Brazil's natural gas and liquefied natural gas (LNG) market is expanding because of rising domestic consumption, infrastructure development, and market reforms. Natural gas

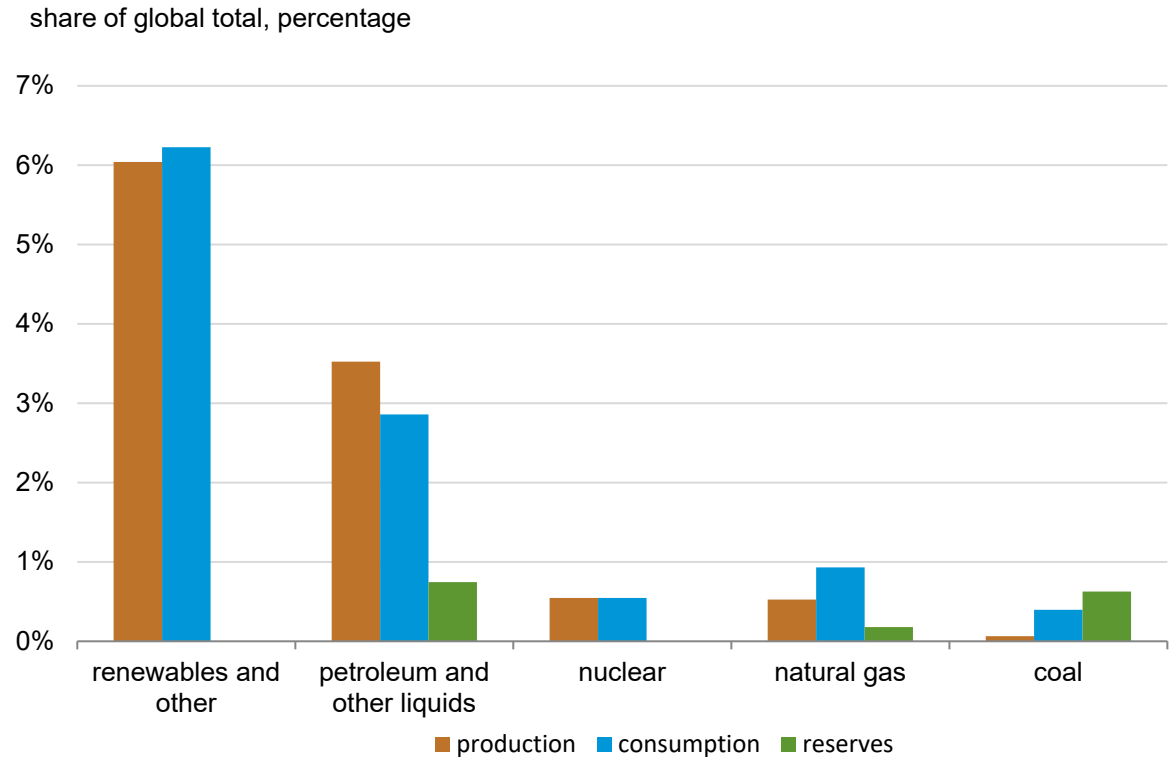
accounted for 7% of Brazil's total energy production in 2021, up from 5% in 2011, and natural gas accounted for 12% of total energy consumption in 2021, up from 8% in 2011. In 2021, Brazil implemented reforms in the natural gas sector to increase competition, among other goals. The New Gas Law, approved in 2020, aims to make the market more competitive, promote third-party access to infrastructure, and attract private investment in the sector.

- Brazil is the world's third-largest hydropower producer, behind China and Canada. Brazil generated 363 terawatthours of electricity in 2021, accounting for 9% of global hydropower output.[1]
- In 2021, 20% of all global biofuels were produced and 21% of total global biofuels were consumed in Brazil. For 2023, the Brazilian government increased the national biodiesel blending mandate from 10% to 12%.[2] This change means increased domestic demand for biodiesel and upstream products, particularly soy oil, which accounts for about 70% of the feedstock used to produce biodiesel in Brazil.[3]
- Growth in Brazil's CO_2 emissions from fossil fuels has slowed (Figure 5). Between 2011 and 2021, CO_2 emissions in Brazil increased on average at an annual rate of 0.9%, compared with 1.8% between 2000 and 2010. Brazil's CO_2 emissions from fossil fuels have shifted from petroleum to cleaner-burning natural gas. Brazil has no laws or policies requiring the early retirement of carbon-based generation.[4] In 2022, Brazil's government published a decree that established the National System for Reducing Greenhouse Gas Emissions (SINARE) and the procedure for developing Sectoral Plans for Climate Change Mitigation.[5]

Figure 1. Map of Brazil

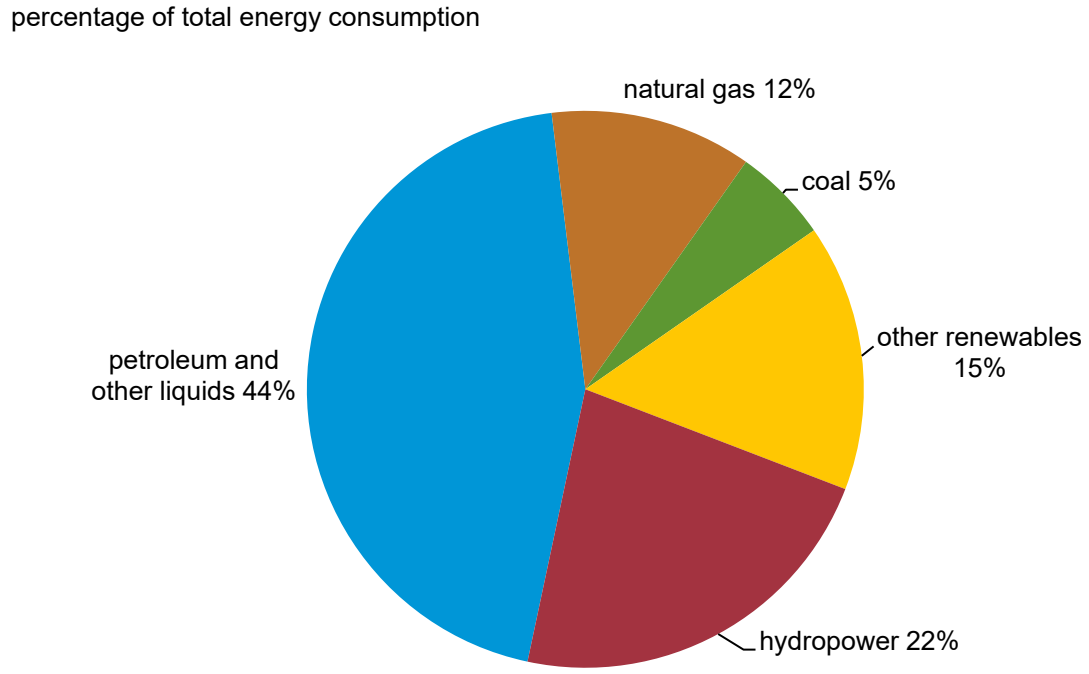
Data source: U.S. Central Intelligence Agency, CIA World Factbook—Brazil

Figure 2. Brazil energy production, consumption, and reserves, by source, 2021



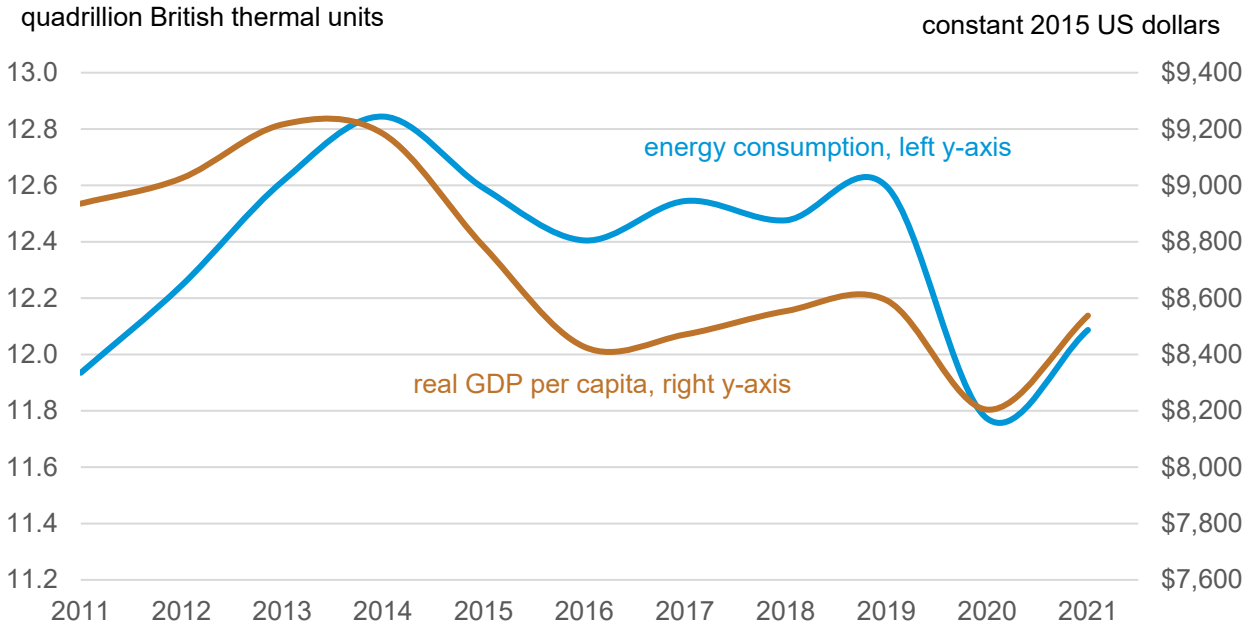
Data source: U.S. Energy Information Administration, International Energy Statistics
Note: *Renewables and other* include hydropower, geothermal, tide, wave, fuel cell, solar, wind, and biomass and waste.

Figure 3. Total primary energy consumption in Brazil by fuel type, 2021



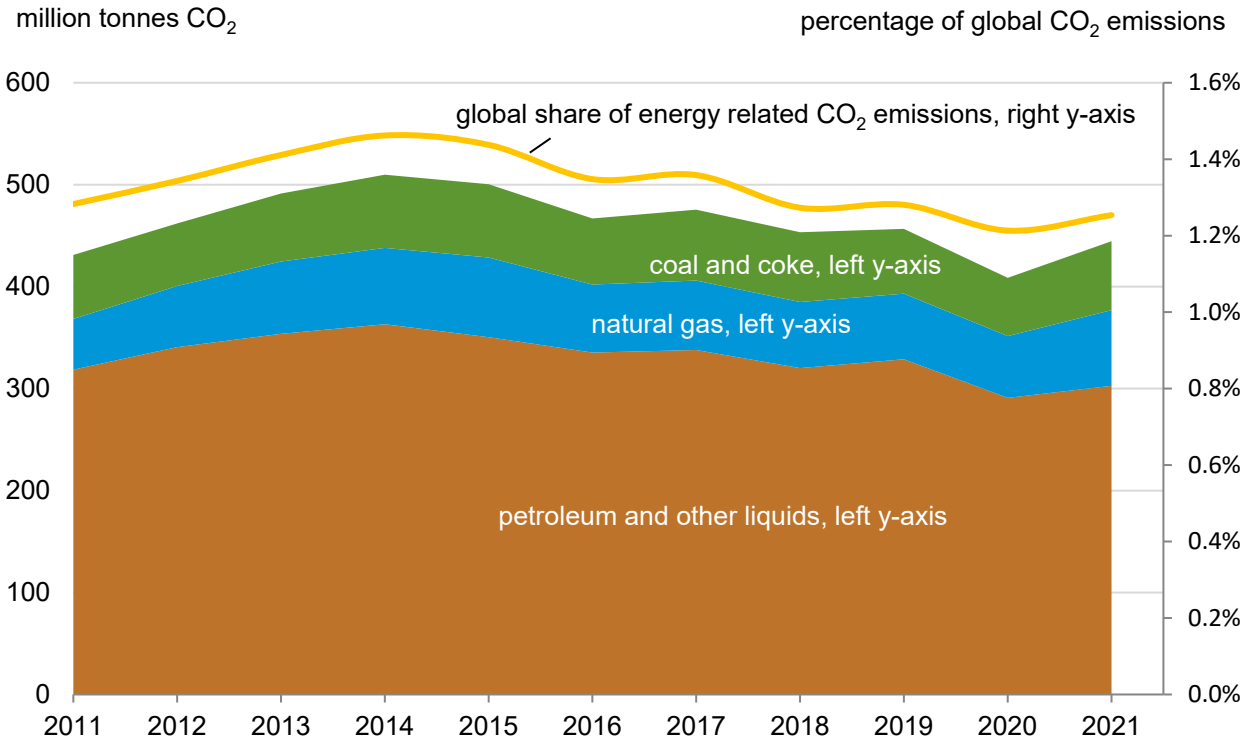
Data source: U.S. Energy Information Administration, International Energy Statistics
Note: Non-hydro renewables include geothermal, tide, wave, fuel cell, solar, wind, and biomass and waste.

Figure 4. Brazil's total primary energy consumption and real GDP per capita, 2011–2021



Data source: U.S. Energy Information Administration, International Energy Statistics and World Bank, *World Development Indicators*

Figure 5. Brazil's energy related CO_2 emissions, 2011–2021



Data source: U.S. Energy Information Administration, International Energy Statistics

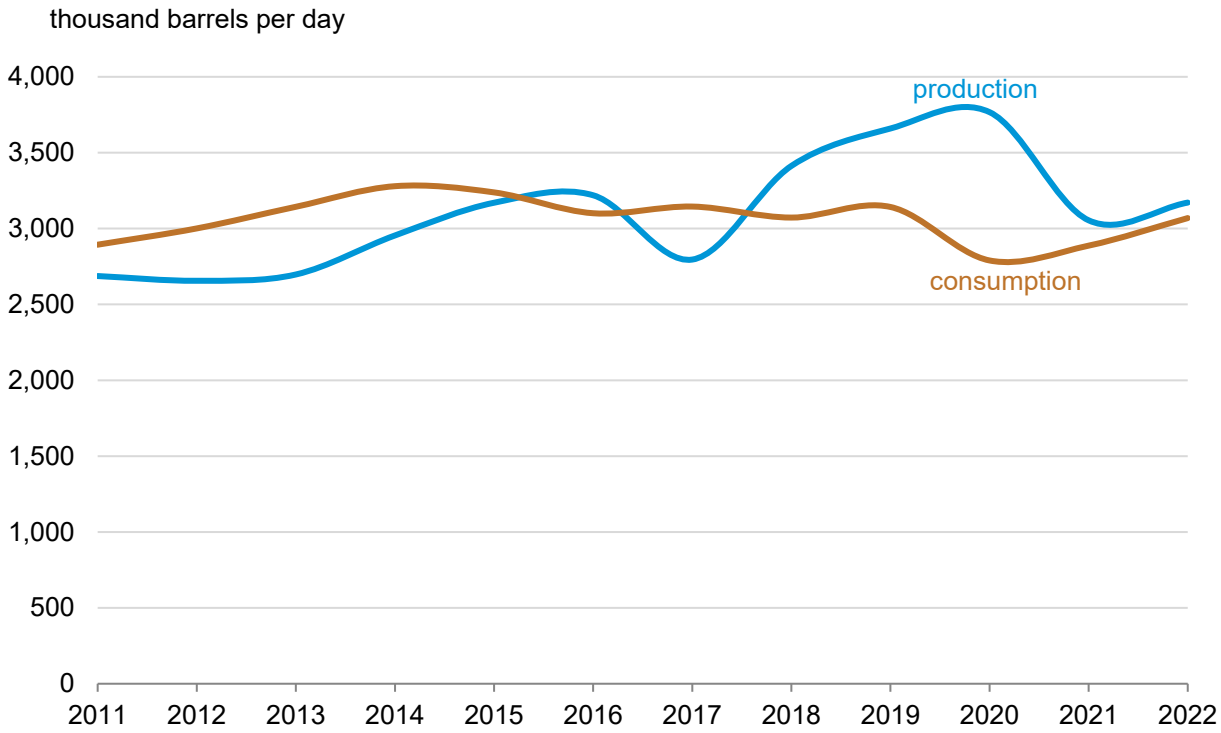
Petroleum and Other Liquids

- Brazil held the second most crude oil reserves in Central America and South America in 2022, behind Venezuela, with approximately 13.24 billion barrels.[6] Since 2006, vast offshore oil reserves have been discovered deep beneath a layer of salt known as the pre-salt layer off the coast of Brazil, significantly boosting the country's crude oil production. These oil deposits include the pre-salt fields of Tupi, Buzios, and Sapinhoá in the Santos Basin, as well as other deposits in the Campos Basin in the South Atlantic, south of Rio de Janeiro.[7] Brazil's reserves will likely continue to grow as exploration and development drilling continue. Baker Hughes's International Rig Count showed 18 active rigs at the end of July 2023, up from 11 the previous year.[8]
- Petrobras (Petroleo Brasileiro S.A.), Brazil's state-owned oil and natural gas company, has been the primary operator in charge of exploring and developing the pre-salt reserves. In 2010, Brazil introduced the Pre-Salt Law. The legislation established primary guidelines for exploration and production, including the use of production-sharing agreements (PSAs) rather than concession agreements. Petrobras was designated as the operator in the pre-salt oil region, with a minimum 30% stake. It also appointed the public company Pré-Sal Petróleo SA (PPSA) as the manager of all PSAs in 2013 and required all foreign companies wishing to drill in the area to join a consortium with Petrobras and PPSA. Following criticism, the Pre-Salt Law was amended in 2016 to

relieve Petrobras of its obligation to hold a 30% operating interest in future projects, but it also granted the company an optional right of preference.[9]

- In 2018, Brazil reduced requirements for using locally produced goods and services, or local content, which had previously contributed to delays. Brazil also has restored a regular schedule of annual licensing sales. Shell, BP, TotalEnergies, Repsol, Chevron, Galp Energia, Equinor, Sinopec, and Sinochem are among the international oil companies participating in the PSA with deepwater operations experience. Petrobras, PetroRio, and other domestic companies are also involved in the PSAs.[10] The goal of this market liberalization is to increase efficiency, stimulate innovation, and increase crude oil production. As of July 2023, Petrobras produced nearly 63% of Brazil's crude oil.
- Brazil's crude oil production has been steadily increasing because of the development of pre-salt reserves. In 2022, Brazil produced approximately 3.2 million barrels per day (b/d) of petroleum and other liquids, up from 2.7 million b/d in 2012 (Figure 6). Oil production from Brazil's pre-salt fields exceeded that of the country's other fields for the first time in 2018. In 2020, output from pre-salt fields reached a new high of 2.8 million b/d, accounting for 70% of Brazil's output. As of 2023, Brazil ranks among the top 10 global oil producers.[11]
- Petrobras, which controls more than 90% of the domestic market, has increased pre-salt well productivity by 30% since 2010, while reducing both the number of wells required to reach capacity and the time required to build them. Pre-salt breakevens have fallen from $70 per barrel in 2014 to less than $35 in 2022, attracting greater private sector participation. Favorable regulatory and tax reforms, the pooled expertise of Petrobras and joint venture partners, and technological advancements in subsea and topsides infrastructure have resulted in a sharp decrease in costs.[12]
- Brazil's refinery portfolio consists of 19 refineries (Table 2) with a combined processing capacity of approximately 2.4 million b/d.[13] The refineries produce a variety of oil products, including diesel, gasoline, naphtha, jet fuel, liquefied petroleum gas, and lubricants, as well as other substances used as feedstock for a variety of other products.[14] Since 2016, Petrobras has used a competitive pricing scheme to set wholesale prices at its refineries.
- To reduce debt and focus on its core upstream business, Petrobras announced plans to sell a series of refineries in 2019, initiated by the company's previous management under former President Jair Bolsonaro. As of August 2023, Petrobras has completed the sale of Potiguar Clara Camarão Refinery (RPCC) to 3R Portiguar SA, Paraná Xisto SA (Unidade de Industrializacao do Xisto) to Forbes & Manhattan Resources Inc, Refinaria de Mataripe (RLAM) to Acelen (Mubadala Capital), Refinaria Lubrificantes e Derivados do Nordeste (LUBNOR) to Grepar Participações, and Refinaria Isaac Sabba (REMAN) to Ream Participações SA.[15, 16, 17] Petrobras's new management decided to halt the divestment process under Brazil's current President Luiz Inacio Lula da Silva. As of 2023, Petrobras operated 78% of Brazil's refining capacity, with refineries located primarily in the country's southeastern industrial heartland.

Figure 6. Brazil's total petroleum and other liquids production and consumption, 2011–2022



Data source: U.S. Energy Information Administration, International Energy Statistics and the Short-Term Energy Outlook

Table 2. Brazil's oil refineries

Refinery	Operator	Crude oil distillation capacity (thousand barrels per day)	Location
Refinaria Paulínia (REPLAN)	Petroleo Brasileiro SA	434	Paulinia, Sao Paulo
Refinaria de Mataripe (RLAM)	Acelen	377	Mataripe, Bahia
Refinaria Duque de Caxias (REDUC)	Petroleo Brasileiro SA	252	Rio de Janeiro
Refinaria Henrique Lage (REVAP)	Petroleo Brasileiro SA	252	Sao Jose dos Campos, Sao Paulo
Refinaria Alberto Pasqualini (REFAP)	Petroleo Brasileiro SA	220	Canoas, Rio Grande do Sul
Refinaria Getúlio Vargas (REPAR)	Petroleo Brasileiro SA	214	Araucaria, Parana
Refinaria Presidente Bernardes (RPBC)	Petroleo Brasileiro SA	179	Cubatao, Sao Paulo
Refinaria Gabriel Passos (REGAP)	Petroleo Brasileiro SA	166	Minas Gerais
Refinaria Abreu e Lima (RNEST)	Petroleo Brasileiro SA	115	Ipojuca, Pernambuco
Refinaria Capuava (RECAP)	Petroleo Brasileiro SA	63	Maua, Sao Paulo

Refinaria Isaac Sabba (REMAN)	Ream Participações SA	46	Manaus, Amazonas
3R Potiguar	3R Potiguar SA	45	Guamaré, Rio Grande do Norte
Refinaria de Petróleo Riograndense	Refinaria de Petróleo Riograndense SA	17	Rio Grande, Rio Grande do Sul
Manguinhos	Refinaria de Petróleos de Manguinhos SA	14	Rio de Janeiro
SSOIL Energy	SSOIL Energy SA	12	Coroados, São Paulo
Refinaria Lubrificantes e Derivados do Nordeste (LUBNOR)	Grepar Participações	10	Fortaleza, Ceara
Univen	Univen Refinaria de Petroleo Ltda	5	Itupeva, São Paulo
Dax Oil	Dax Oil Refino SA	4	Polo Petroquímico de Camaçari
Paraná Xisto (Unidade de Industrializacao do Xisto)	Paraná Xisto SA	...	São Mateus do Sul, Paraná
Total		**2,426**	

Data source: *Oil & Gas Journal,* 2022 Worldwide Refining Survey; and the National Agency for Petroleum, Natural Gas and Biofuels (ANP)

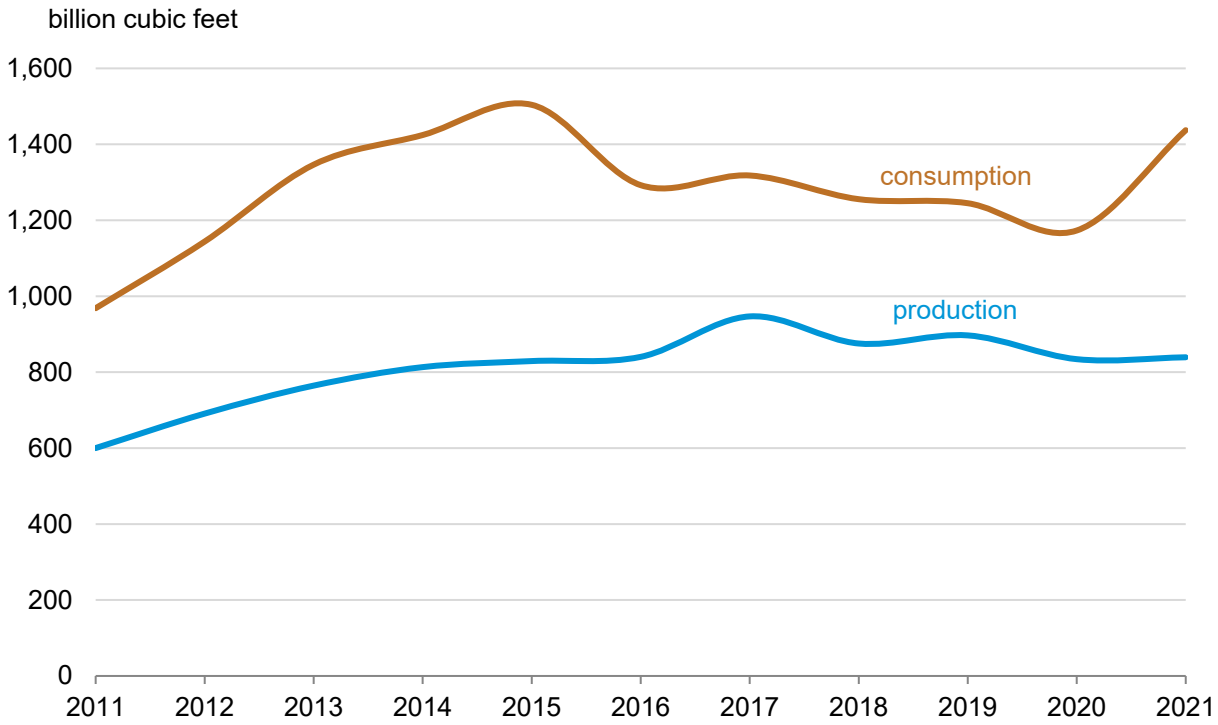
Natural Gas and LNG

- Brazil had 13.4 trillion cubic feet (Tcf) of natural gas reserves as of January 2023, the fourth highest in Central America and South America. Associated gas from oil fields makes up most of the proven natural gas reserves in the country, particularly pre-salt reserves, with 76% located offshore, mostly in the Santos Basin. The remaining 24% of proven natural gas is located onshore, primarily in the Solimões Basin and Paranaíba Basin.[18]
- Brazil's natural gas supply is made up of domestic production, Bolivian imports, and LNG cargoes. Brazil's natural gas production reached 839 billion cubic feet (Bcf) in 2021, up by 1% from 2020. Three basins drive the country's natural gas production: Santos, Campos, and Espirito Santo.
- Most of Brazil's natural gas output is reinjected rather than sold in the domestic market. Reinjection is used to improve oil recovery. Petrobras is Brazil’s largest natural gas producer. As of July 2023, Petrobras produced 64.8% of Brazil’s natural gas, according to Brazil’s energy regulator called the National Agency for Petroleum, Natural Gas and Biofuels (ANP). Other producers of natural gas include the domestic company, Eneva, and three major international companies: Shell, Galp, and Repsol.
- Routes 1 and 2 are the two main offshore routes for natural gas pipelines in Brazil. Route 1 primarily transports natural gas from the Tupi, Sapinhoá, and Mexilho fields to Petrobras's Caraguatatuba processing unit in São Paulo state.[19] Route 2 transports natural gas from Búzios, Tupi, Atapu, Sururu, and other fields to Cabiúnas Gas Treatment Terminal in Macaé, Rio de Janeiro state.[20] The Route 3 pipeline is currently under construction and is scheduled to be operational in 2024.[21] This pipeline will supply natural gas to the GasLub complex in Rio de Janeiro state.[22]
- Brazil’s natural gas market faces some challenges including the far distances between offshore natural gas fields and the coast as well as limited natural gas pipeline

infrastructure.[23] The New Gas Law of 2021 seeks to gradually unbundle the market, creating the foundation for a more competitive natural gas market in Brazil. The law aims to improve the physical flexibility of the natural gas system, allow for faster delivery of natural gas, foster competition, and make it easier to integrate a greater share of intermittent renewables into Brazil's energy system. The ANP now has more authority to promote competition and reduce market concentration. However, the liberalization process is still in its early stages. Petrobras still owns most upstream natural gas projects, natural gas processing units, and other natural gas infrastructure.[24, 25, 26]

- Brazilian industries, thermal power plants, refineries, and fertilizer plants account for most natural gas demand. As of 2020, the industrial sector consumed most of Brazil's natural gas (67% of total natural gas consumption).[27] Natural gas is used in industries such as petrochemicals, fertilizers, steel, ceramics, and food processing for process heating, power generation, and as a feedstock.[28] The southeastern region has the highest demand, followed by the northeastern region. A large portion of Brazil's territory does not yet have access to the pipeline grid, which is mainly concentrated in coastal states, where most of the demand is located.
- Brazil has increased the number of natural gas-fired power plants over recent years. They are high efficiency, low emissions facilities. Brazil's heavy reliance on hydropower means it needs to have a natural gas-fired power backup for when water levels are low.[29]
- Natural gas is increasingly used as a transportation fuel in Brazil, increasing from a 17% share of consumption in 2010 to 26% in 2020. The natural gas-powered automotive fleet consists primarily of light commercial and passenger vehicles. Residential and commercial demand account for a minor portion of total demand, representing a 5% share of natural gas consumption in 2020. Most of the demand is concentrated in the country's southeastern region, where the pipeline distribution system is more developed.[30]

Figure 7. Brazil's dry natural gas production and consumption, 2011–2021



Data source: U.S. Energy Information Administration, International Energy Statistics

Table 3: Brazil's operating natural gas pipelines

Name	Operator	Start year	Capacity (billion cubic feet of natural gas per year)	Start location	End location
NTS Gas Pipeline Network	Brookfield Infrastructure Partners (unknown %)	…	2,039	São Bernardo do Campo, São Paulo, Brazil	Cabiúnas, Rio de Janeiro, Brazil
Gasene Gas Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	2007	391	Cabiúnas, Rio de Janeiro, Brazil	Catu, Bahia, Brazil
Gasbol Gas Pipeline	Petrobras (51%); Fluxys (37%); YPFB (12%)	1999	388	Río Grande, Santa Cruz, Bolivia	Canoas, Rio Grande do Sul, Brazil
Route 2 Gas Pipeline	Petrobras (55%); Shell (25%); Galp Energia (100%); Repsol (10%)	2016	258	Tupi field, Rio de Janeiro, Brazil	Cabiúnas, Rio de Janeiro, Brazil
Carmópolis-Pilar Gas Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	2006	194	Carmópolis, Sergipe, Brazil	Pilar, Alagoas, Brazil
Paraná-Uruguayana Gas Pipeline	CGC (Compañía General de Combustibles) (15.77%); CMS Energy (unknown %); Petronas	2000	194	Paraná, Entre Ríos, Argentina	Uruguaiana, Rio Grande do Sul, Brazil

	(unknown %); Techint (unknown %); TotalEnergies SE (unknown %)				
Itaporanga-Carmópolis Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	2006	162	Itaporanga, São Paulo, Brazil	Carmópolis, Sergipe, Brazil
Route 1 Gas Pipeline	Petrobras (65%); Shell (25%); Galp Energia (10%)	2011	129	Tupi field, Rio de Janeiro, Brazil	Monteiro Lobato Gas Treatment Unit
Catu-Itaporanga Gas Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	2007	117	Pojuca, Bahia, Brazil	Itaporanga, São Paulo, Brazil
Urucu-Manaus Gas Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	2009	87	Urucu, Amazonas, Brazil	Manaus, Amazonas, Brazil
Cuiabá Pipeline	Grupo J&F (100%)	2002	36	San José de Chiquitos, Santa Cruz, Bolivia	Cuiaba, Mato Grosso, Brazil
Uruguaiana-Porto Alegre Gas Pipeline	Ipiranga Produtos de Petróleo SA (25%); Petrobras (25%); Repsol (25.00%); TotalEnergies SE (25%)	…	36	Argentina-Brazil border	Uruguaiana, Rio Grande do Sul, Brazil
GASALP Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	2001	32	Alagoas, Brazil	Cabo de Santo Agostinho, Pernambuco, Brazil
Nordestão Gas Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	1986	29	Guamaré, Rio Grande do Norte, Brazil	Cabo de Santo Agostinho, Pernambuco, Brazil
GASFOR Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	1998	26	Guamaré, Rio Grande do Norte, Brazil	São Gonçalo, Rio de Janeiro, Brazil
GASEB Pipeline	Engie (65%); Caisse de dépôt et placement du Québec (35%)	1974	18	Catu, Bahia, Brazil	Atalaia, Alagoas, Brazil
Uruguaiana-Porto Alegre Gas Pipeline	Ipiranga Produtos de Petróleo SA (25%); Petrobras (25%); Repsol (25%); TotalEnergies SE (25%)	…	16	Triunfo, Rio Grande do Sul, Brazil	Canoas, Rio Grande do Sul, Brazil
Total			**4,152**		

Data source: Global Energy Monitor, Latin America Energy Portal, January 2023

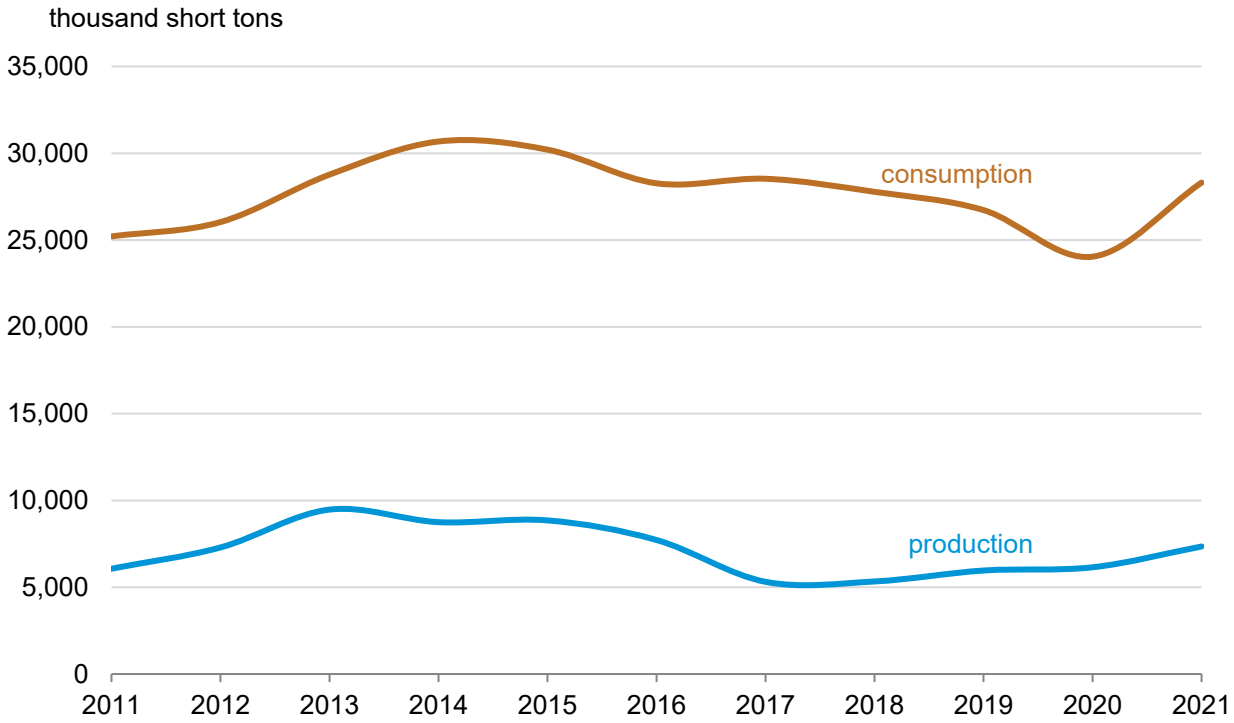
Coal

- Brazil has the most coal reserves in Central America and South America, with 7.3 billion short tons as of 2021, amounting to 0.6% of the world's coal reserves. This amount equals 257 times the annual consumption in Brazil. The Paraná Basin has eight large coal deposits associated with Permian sedimentary successions. Seven of these deposits are in Rio Grande do Sul, and the remaining one is in Santa Catarina. Rio Grande do Sul has

most of the total coal resources.[31] Brazil's reserves are primarily made up of bituminous and subbituminous coal.

- Brazil was the second-largest coal producer in Central America and South America in 2021, after Colombia.
- Brazil's coal mining industry is controlled by small-scale mining operations. The country produced approximately 7.3 million short tons of coal in 2021, representing a 19% increase over the previous year. Coal accounted for 0.9% of Brazil's total energy production in 2021 (Table 1). About 70% of coal produced in Brazil in 2021 was subbituminous, 28% was lignite, and 2% was bituminous.[32]
- Brazil was the highest coal consumer in Central America and South America in 2021. Brazil consumed approximately 28.3 million short tons of coal in 2021, an 18% increase from 2020. In 2021, coal consumption in Brazil was the third-highest nonrenewable source, accounting for approximately 5.5% of the country's total nonrenewable consumption. Most of the coal produced (98% of total) is used in industrial processes.[33] Brazil's coal is unsuitable for use in the steel industry because of its high ash content and low calorific content. [34] As a result, only 26% of domestic coal production is consumed, and the remainder is exported.

Figure 8. Brazil's coal production and consumption, 2011–2021

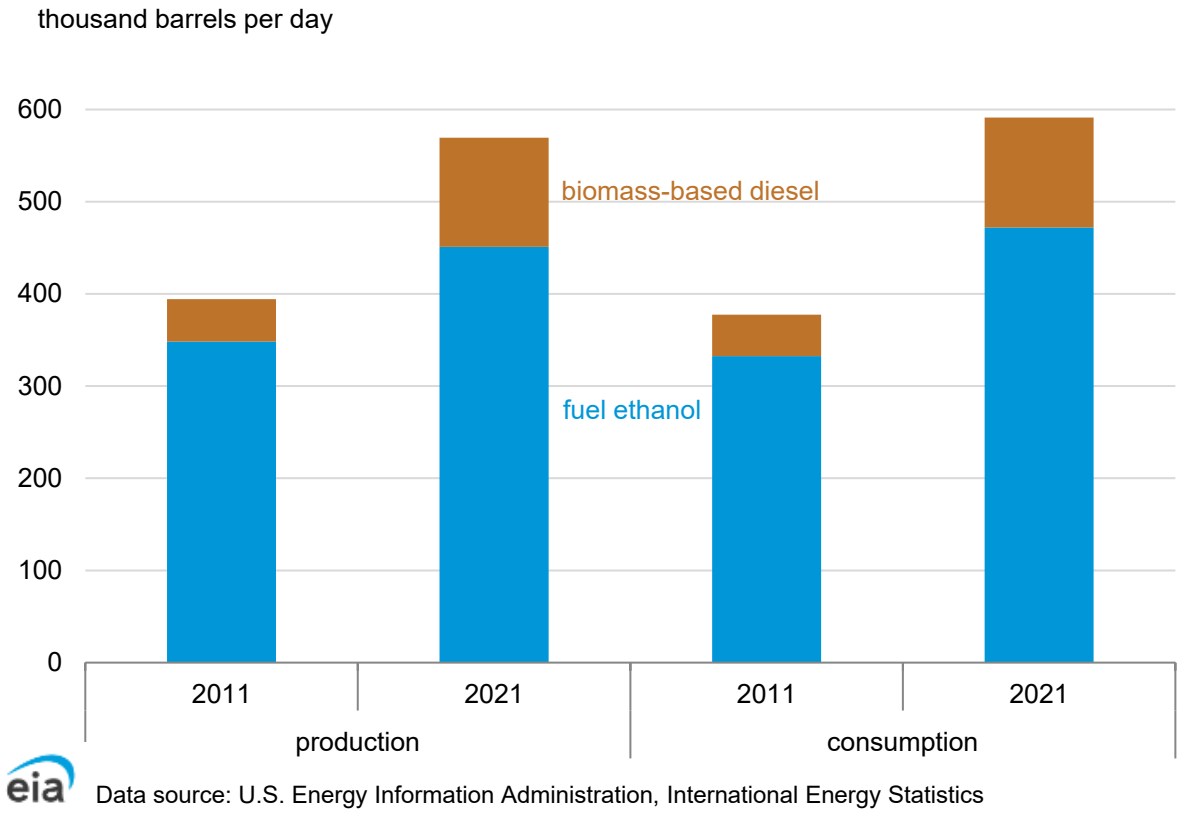


Data source: U.S. Energy Information Administration, International Energy Statistics

Biofuels

- Brazil is the second-largest producer of biofuels in the world behind the United States, accounting for a global share of 20% in 2021.[35] From 2011 to 2021, Brazil's biofuel production increased at an average annual growth rate of 3%, while biofuel consumption increased at an average annual growth rate of 4%. However, Brazil's seasonal production of biofuels results in seasonal consumption of biofuels, necessitating imports from abroad during the offseason for biofuels output. In 2021, Brazil consumed 569,000 b/d of biofuels: 79% was bioethanol, and 21% was biodiesel.[36]
- Brazil's primary biofuel is fuel ethanol, primarily derived from sugarcane (about 96% of total ethanol production). Brazil is the world's largest producer of sugarcane. Brazil produced 451,000 b/d of fuel ethanol in 2021, accounting for 26% of global output.[37] During the crop production cycle in 2021, Brazil experienced a drought and low temperatures. These conditions limited the productivity of key sugarcane-producing regions.[38] As a result, fuel ethanol production fell by 15% in 2021 compared to 2020. The country has approximately 350 sugarcane ethanol plants, the majority of which are concentrated along the coast.
- The plentiful and cheap supplies in Brazil's Center-West region attracted investment in the corn ethanol sector in recent years. Corn has been used to produce a small but growing portion of Brazilian ethanol since 2014. Brazil currently has 16 corn ethanol plants in the Center-West states of Mato Grosso, Goias, and Mato Grosso do Sul. At least four units are corn-only plants, and the remaining flex plants can produce ethanol from both sugarcane and corn.[39]
- Brazil's biodiesel production has increased significantly over the last decade. Brazil produced 118,000 b/d of biodiesel in 2021, a 6% increase over the previous year. [40] As of 2022, approximately 79% of biodiesel produced is made from soybean oil and 15% is made from animal fat. As of 2021, the country has 57 biodiesel production plants, and 60% of them are in the central-western region, which has a surplus of soybeans.[41] More than 4.9 million cubic meters of soybean oil were used for biodiesel production in 2021.[42]
- Biofuels account for 25% of Brazil's transportation fuels, a higher percentage than in most other countries.[43] Brazil has the largest fleet of flex-fuel vehicles in the world, which can run on any combination of gasoline and ethanol, or up to 100% ethanol. Flex-fuel vehicles account for 85% of all cars on the road in Brazil and 83% of all new light vehicle sales in 2022.[44] Since 1977, Brazil has had a mandatory ethanol-use mandate that requires a certain percentage of ethanol to be blended with gasoline. The current national blending mandate is 27% ethanol (E27) in regular gasoline and 12% ethanol (E12) in premium gasoline. Brazil has a biodiesel blending mandate at 12%.[45]

Figure 9. Brazil's biofuels production and consumption, 2011–2021



Data source: U.S. Energy Information Administration, International Energy Statistics

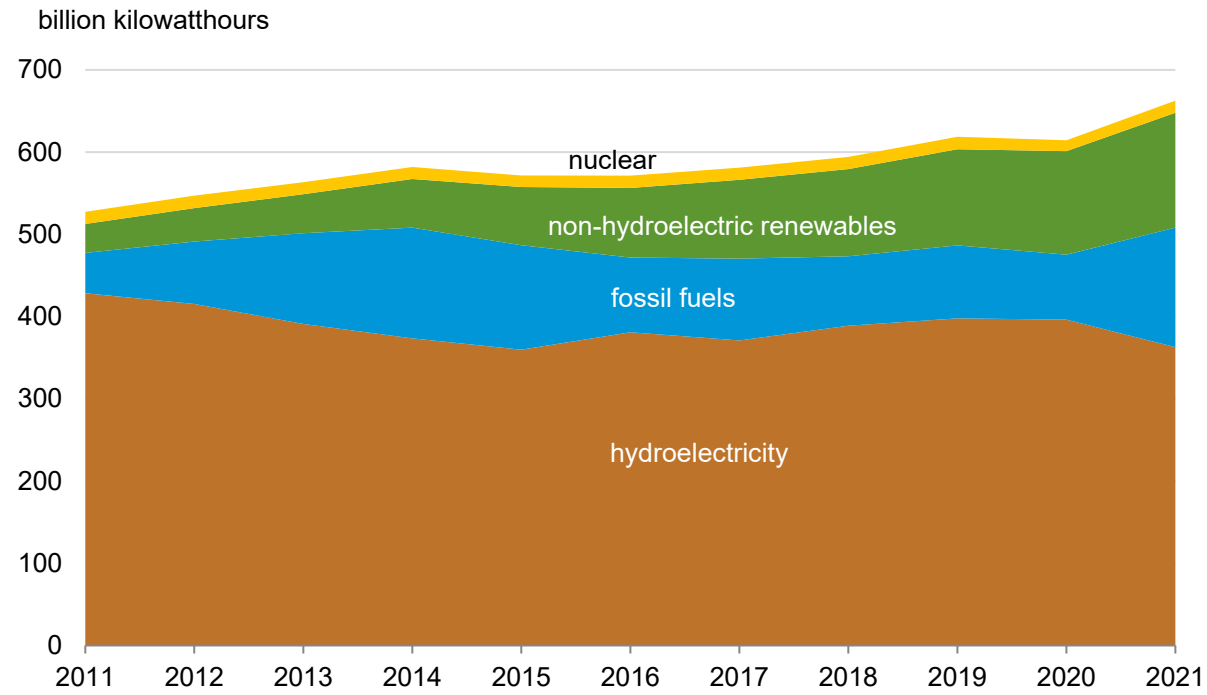
Electricity

- Brazil was the world's sixth-largest electricity generator in 2021, with 663 terawatthours generated, an 8% increase from 2020. Brazil's generation in 2021 represented 2% of total global electricity generation.[46] From 2011 to 2021, Brazil's electricity generation increased by an average growth rate of 2.4% per year. This average annual growth was largely driven by solar power (up by 199%), wind power (up by 40%), and fossil fuels (up by 13%) over the same period. The most important sources of electricity generation in Brazil in 2021 were hydropower (55% of total electricity), natural gas (15% of total electricity), and wind (11% of total electricity).[47] Industrial (39% of total electricity consumption), residential (29%), and commercial and public services (25%) consumers use most of Brazil's electricity.
- To deliver electricity throughout the country, Brazil has a vast transmission and distribution network. Brazil's National Interconnected System (SIN) is a large network that serves 98% of the electricity market in Brazil. The SIN is made up of several individual power systems that communicate via a network of tie lines, ensuring that electricity from various sources is available[48] and can be coordinated by Brazil's 102 power distribution companies. [49] The distribution of electricity in Brazil is nearly universal; 99% of the population has access to some form of electricity (Figure 12). Brazil's top 10 electricity distribution companies accounted for about 57% of the total distributed electricity.[50]

- The National Electric Energy Agency (ANEEL) regulates Brazil's electricity market, establishing rules and regulations, promoting competition, and regulating the electricity sector.
- To finance investments and provide better services, Brazil's largest electric power holding company, Electrobras, was privatized in 2022. Brazil's government previously owned 72% of the company. The privatization was the largest in the country in over two decades. Eletrobras subsidiaries control approximately 40% of Brazil's generation capacity and 69% of the National Interconnected System.[51]
- Brazil increases new generation capacity through auction-based renewable procurement, and contracts typically last 15 to 30 years. Auctions are used to award power purchase agreements (PPAs) to various generators, including renewable energy projects, in the market.[52] These auctions serve as a venue for project developers to compete for contracts to sell electricity to distribution companies. The framework includes contracts to reduce risk for investors.[53]
- In 2021, hydropower accounted for an estimated 9.2% of Brazil's total energy production and 54.8% of total electricity generation (Table 1). Hydropower is the second most common type of energy consumed in Brazil, accounting for an estimated 22.2% of total energy consumption. Brazil has an abundance of rivers and has built many large-scale hydroelectric plants, with a total installed capacity of 99,828 megawatts (MW) (Table 4). The Itaipu Dam, located on the Paraná River between Brazil and Paraguay, has the world's third-highest installed hydroelectric capacity with 14,000 MW. Brazil and Paraguay have each an installed capacity of 7,000 MW.[54] Another notable hydroelectric project in Brazil is the Belo Monte Dam, located on the Xingu River in the state of Pará. It has the fifth-highest installed hydroelectric capacity of around 11,233 MW.[55] Because of its impact on the Amazon rainforest and local indigenous communities, the Belo Monte Dam has raised some environmental and social concerns.[56] Droughts and reduced water availability can lower reservoir levels and, as a result, limit hydroelectric power generation. Brazil has experienced periods of low water levels in its reservoirs, which have hampered the country's ability to ensure a sufficient supply of electricity solely from hydroelectricity.[57] Despite the challenges, Brazil continues to increase hydroelectric capacity and invest in new projects.[58]
- In 2021, the country's installed capacity from fossil fuels was 43.2 gigawatts (GW), accounting for 21% of total electric capacity. Brazil generated 145,386 gigawatthours (GWh) of electricity from fossil fuels in the same year, accounting for 22% of total electricity generation. During periods of low water availability or high electricity demand, electricity from fossil fuels is frequently used to supplement hydroelectric power. The share of electricity from natural gas among fossil fuels increased from 48% in 2011 to 66% in 2021. Coal-fired power plants play a smaller role in Brazil's electricity generation, accounting for 4% of total electricity generation in 2021. Coal is primarily used in regions with coal deposits, such as the southern Brazilian states of Rio Grande do Sul and Santa Catarina. The share of coal among fossil fuels has decreased from 25% in 2011 to 18% in 2021, reflecting efforts to transition to cleaner energy sources.[59] Brazil has a small number of oil-fired power plants that help to keep the electricity grid flexible and stable, accounting for 3.4% of total electricity generation. However, because of higher costs and environmental concerns, the use of oil for electricity generation is limited.

- Brazil is the world's fifth-largest generator of wind energy.[60] With 21 GW of installed capacity, Brazil generated 71,500 GWh of wind power in 2021, accounting for 11% of the country's total electricity generation. Wind power is Brazil's third-largest source of electricity generation after hydropower and natural gas.[61] Wind power generation in Brazil has grown in recent years. This expansion was the result of government initiatives and private-sector investments.[62] Brazil only has onshore wind farms as of 2022 because onshore wind farms are less expensive and more flexible than offshore projects.[63] As of 2022, Brazil has 801 onshore wind farms, most of which are in the northeastern region of the country, with 219 of them in Bahia, 217 in Rio Grande do Norte, and 101 in Ceará.[64] In 2022, the Brazilian Senate passed a bill that proposes a regulatory framework for the implementation of offshore wind projects.[65]
- With 13 GW of installed solar power capacity, Brazil was the 10th-largest solar electricity generator in 2021.[66] Solar power's share of total electricity generation in Brazil increased from 0% to 3% between 2011 and 2021.[67] As of 2022, Brazil had 168 solar projects in operation, all with photovoltaic (PV) systems, primarily in the central and northeastern regions.[68] To encourage the development of solar power, the Brazilian government has implemented tax breaks, financing programs, and net metering regulations.[69]
- Brazil's biomass and waste market generated 8% (approximately 51,435 GWh) of total electricity generation in the country in 2021.[70] As of 2020, approximately 92% of biomass and waste electricity generation was generated by primary solid biofuels, 4% by industrial waste, 3% by biogases, and 1% by liquid biofuels.[71] The biomass power sector in Brazil is inextricably linked to the production of sugarcane ethanol. The same sugarcane feedstock used to produce ethanol also produces significant amounts of biomass residues, such as bagasse, which are then used to generate electricity. This integration of the biofuels and biomass power sectors helps to make resources more sustainable and efficient.[72] Brazil's installed capacity from biomass and waste was 16 GW in 2021.[73] Brazil was the world's third-largest biomass and waste electricity generator in 2021, accounting for 8% of the world's total. Biomass is less competitive than wind and solar generation.[74] As such, the share of biomass and waste electricity generation among non-hydroelectric renewables has declined from 92% in 2011 to 37% in 2021, trailing wind. [75] As of 2022, Brazil had 230 biomass and waste power plants in operation with 12 additional plants announced to open.[76]
- Brazil was the top generator of electricity from nuclear power plants in Central America and South America with 15 billion kilowatthours generated in 2021.[77] Eletrobras Eletronuclear SA operates two nuclear power plants in Angra dos Reis, Rio de Janeiro state, known as Angra 1 and Angra 2. Angra 1 has been in operation since 1985, and Angra 2 began in 2001. These plants have a total installed capacity of around 2 GW and contribute significantly to Brazil's electricity generation. Angra 3 is a third nuclear power plant that has been under construction since 1984 because several delays and challenges have hampered its completion. Angra 3 is scheduled to begin operating in 2028 with an installed capacity of around 1.4 GW.[78]
- Brazil's nuclear power plants provide a consistent source of baseload electricity, which contributes to overall energy security and grid stability. Brazil has significant uranium reserves and is capable of mining, processing, and enriching uranium for use in nuclear reactors.[79] The only uranium producer is the state-run Industrias Nucleares do Brasil (INB). In 2022, the Brazilian Lower House approved a constitutional amendment that allowed the private sector to enter the uranium industry.[80]

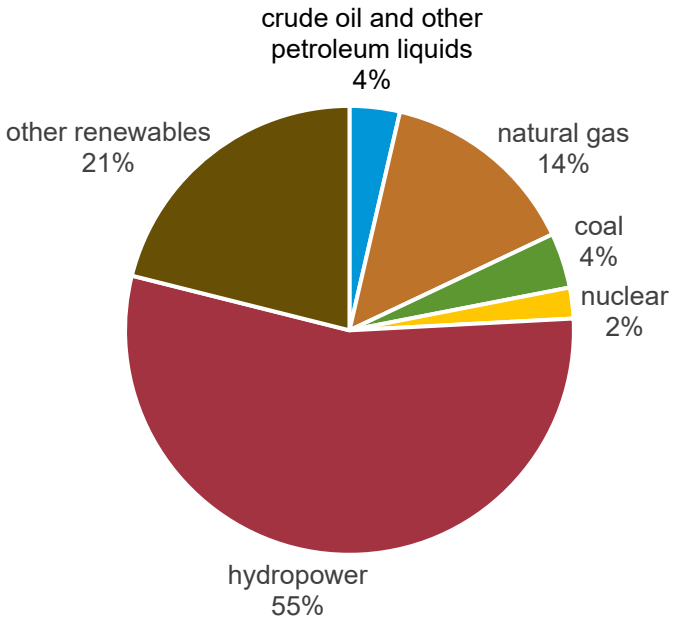
Figure 10. Brazil's electricity generation by source, 2011–2021



Data source: U.S. Energy Information Administration, International Energy Statistics

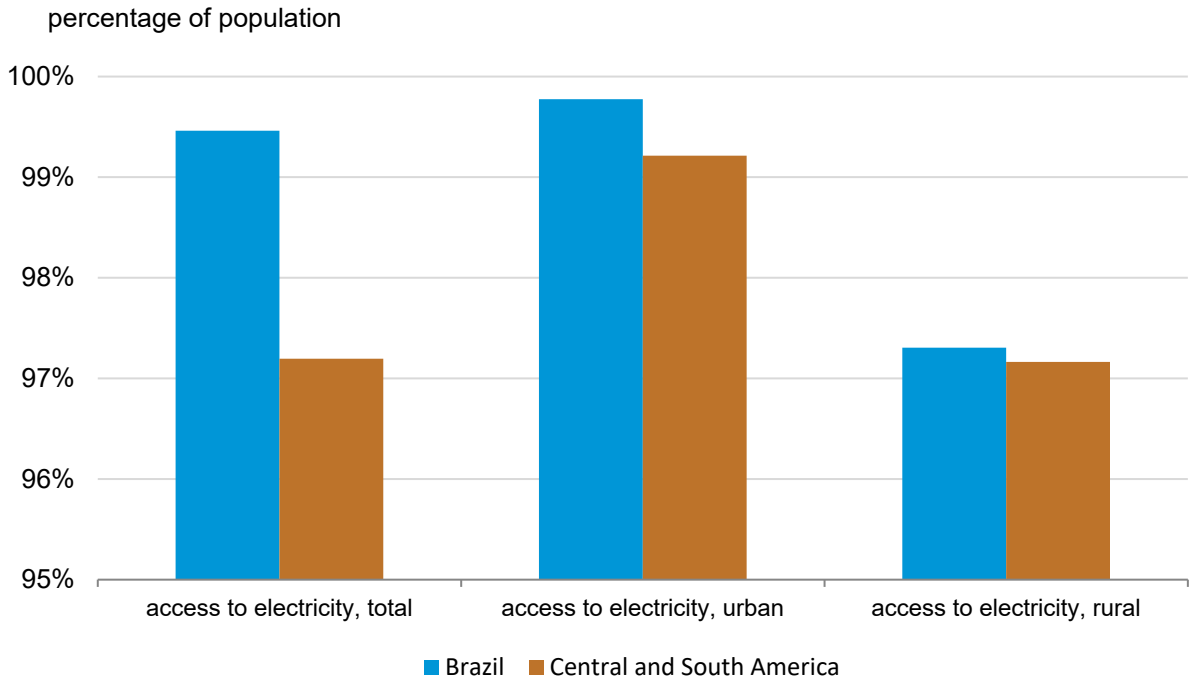
Figure 11. Brazil's electricity generation supply, 2021

percentage of total electricity generation



Data source: U.S. Energy Information Administration, International Energy Statistics, and International Energy Agency, *Electricity Information 2022*

Figure 12. Brazil's access to electricity, 2021



Data source: World Bank, *World Economic Indicators*
Note: *Central and South America* is an average that includes Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Belize, Bolivia, Brazil, British Virgin Islands, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Curacao, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Martin (French part), St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos, Uruguay, and Venezuela.

Table 4. Brazil's operating hydroelectric plants

Name	Operator	Start year	Capacity (megawatts)	Type	Location
Usina Hidrelétrica Belo Monte	Norte Energia SA	2016	11,233	Conventional storage	Pará
Usina Hidrelétrica Tucuruí	Eletrobras Eletronorte	1984	8,535	Conventional storage	Pará
Central Hidroeléctrica Itaipú, Usina Hidrelétrica de Itaipu	Itaipu Binacional	1984	7,000	Conventional storage	Paraná
Usina Hidrelétrica Jirau	Energia Sustentável Do Brasil SA	2013	3,750	Run-of-river	Rondônia
Usina Hidrelétrica Santo Antônio	Santo Antônio Energia SA	2012	3,568	Run-of-river	Rondônia
Usina Hidrelétrica Ilha Solteira	Rio Paraná Energia SA	1973	3,444	Conventional storage	Mato Grosso do Sul
Usina Hidrelétrica Xingó	Companhia Hidro Elétrica do São Francisco SA (CHESF)	1994	3,162	Run-of-river	Alagoas

Usina Hidrelétrica Paulo Afonso IV	Companhia Hidro Elétrica do São Francisco SA (CHESF)	1979	2,462	Run-of-river	Bahia
Usina Hidrelétrica Itumbiara	Furnas-Centrais Elétricas SA	1980	2,082	Conventional storage	Minas Gerais
Usina Hidrelétrica Teles Pires	Companhia Hidrelétrica Teles Pires	2015	1,820	Run-of-river	Pará
Other conventional storage	Other conventional storage	1991 (average)	31,318	**63** conventional storage	**14** Minas Gerais; **9** Paraná; **40** Other
Other run-of-river	Other run-of-river	1987 (average)	20,806	**51** run-of-river	**11** São Paulo**; 10** Minas Gerais; **30** Other
Other conventional and run-of-river	Other conventional and run-of-river	1988 (average)	648	**2** conventional and run-of-river	**1** Goiás; **1** Espírito Santo
Total			**99,828**		

Data source: Global Energy Monitor, Global-Hydropower-Tracker, May 2023

Energy Trade

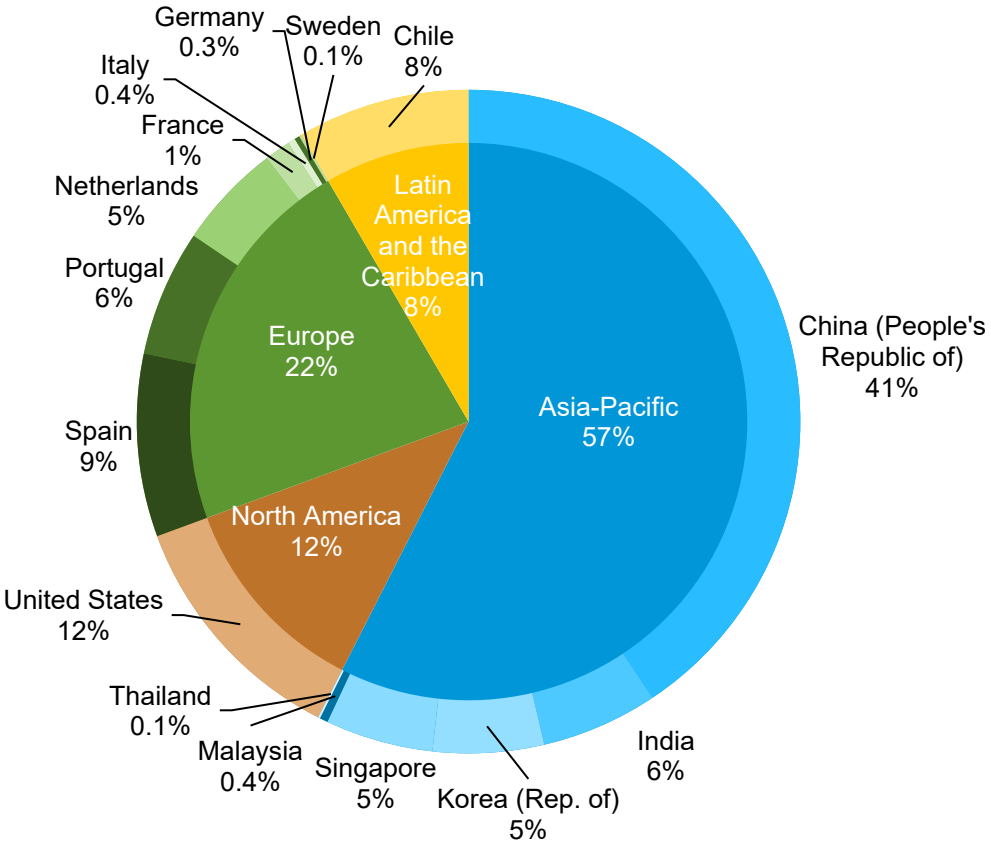
- Brazil has been a crude oil net exporter since 2006. The share of crude oil exports increased from 5% of total export volume in 2012 to 9% in 2022, ranking third in Brazil's commodity basket.[81] Brazil's crude oil is primarily exported to Asian countries (57%), particularly China (41%), as well as Europe (22%) and the United States (12%) (Figure 13). To meet domestic demand, the country imports a significant amount of refined petroleum products (Figure 15), accounting for 14% of total imports in 2022, the highest in Brazil's product basket.[82] Close to 53% of these imports come from the United States, 10% come from India, and 9% come from the United Arab Emirates.[83] Brazil's government intends to modernize and expand its refining capacity to reduce reliance on imports and increase the country's self-sufficiency in meeting refined product needs.[84]
- Brazil is a net importer of natural gas and liquefied natural gas (LNG). Nearly all of Brazil's natural gas in a gaseous state comes from Bolivia. Brazil has increased its imports of LNG to meet rising natural gas demand, increasing LNG imports by an average annual rate of 75% between 2012 and 2022. LNG is imported via coastal regasification terminals in Guanabara Bay and the Pecém Port.[85] In 2022, most of the country's LNG imports came from the United States (76%) and Qatar (14%).[86]
- Brazil relies on imports to meet its coal needs because of limited domestic coal production. In 2022, coal ranked as the second-highest import commodity in Brazil, accounting for 11% of total imports. The imported coal is primarily used in industrial processes that require specific coal qualities. Most of the domestic coal production in Brazil is used for power generation, but coal imports in Brazil are primarily used for steel making.[87] In 2022, Brazil primarily imported coal from Australia (33%), the United States (30%), and Colombia (17%).[88]
- Brazil is a net exporter of biofuels. In 2022, Brazil exported 24% of the world's ethanol, making it the world's highest ethanol exporter, which only accounted for 0.3% of Brazil's

total exports. As gasoline prices rose in 2022, so did demand internationally for cheaper E10 fuel (gasoline containing 10% ethanol).[89] As such, the volume of Brazil's ethanol exports increased by 25% in 2022 from the year prior. Of total ethanol exports in 2022, 31% went to South Korea, 29% to the Netherlands, and 19% to the United States. [90] Brazil's ethanol exports benefit from advantageous trade agreements, such as the Brazil-United States Ethanol Cooperation Agreement, which facilitates ethanol trade between the two countries.[91] Because of the favorable carbon intensity rating that Brazil's sugarcane ethanol receives under California's Low Carbon Fuel Standard (LCFS), California receives the majority of ethanol shipped to the United States. Brazil's ethanol is frequently shipped to the U.S. Gulf Coast and converted to ethyl tertiary butyl ether (ETBE) before being shipped to Japan.[92] Brazil's biodiesel exports remain low because of the high cost of production. Brazil's National Agency for Petroleum, Natural Gas and Biofuels continues to prohibit biodiesel imports except in "exceptional circumstances," limiting import volumes.

- Brazil has interconnected transmission grids that allow for the trade of electricity with neighboring countries. Electricity interconnections have been established with Argentina, Uruguay, Paraguay, and Venezuela, allowing for the import and export of electricity based on supply and demand conditions.[93] Brazil gets a large portion of its electricity from the Itaipu dam and exports excess electricity to neighboring countries. Argentina is Brazil's main electricity export market.[94] Brazil imports electricity from Uruguay to help meet peak electricity demand.[95]
- Brazil is a member of the Southern Common Market (Mercosur), which promotes energy integration among its member countries. This regional cooperation includes initiatives such as energy policy harmonization, energy infrastructure interconnection, and energy trade facilitation within the Mercosur bloc.[96]

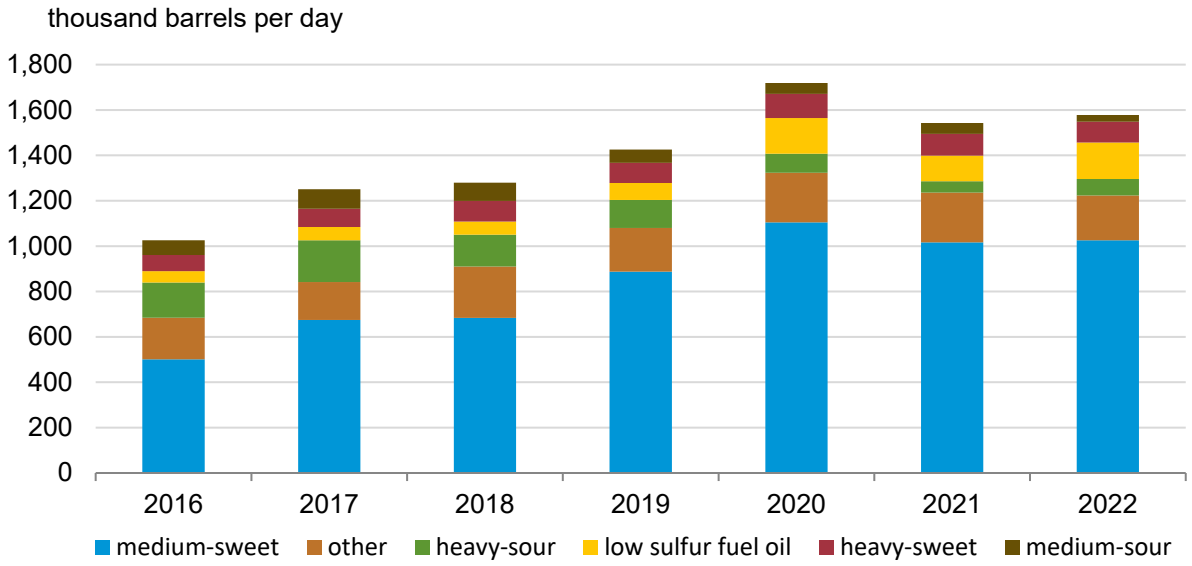
Figure 13. Brazil's crude oil exports by region and country, 2022

percentage of total crude oil exports



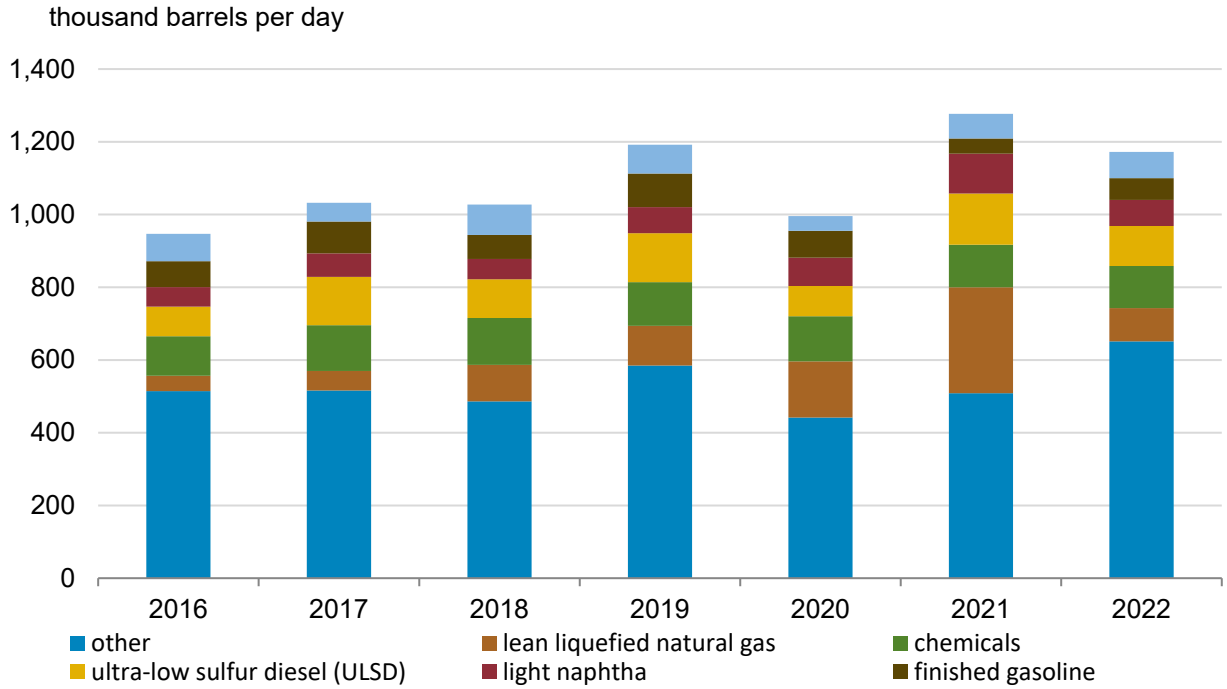
Data source: Global Trade Tracker, provided by Zen Innovations AG © 2023
Note: Some individual figures do not match the regional total because of rounding. Belgium, Bolivia, and Paraguay are excluded from the graph because they account for less than 0.0 barrels per day in 2022.

Figure 14. Brazil's oil and gas exports, 2016–2022



Data source: Vortexa Ltd.
Note: *Other* includes chemicals, biodiesel feedstock, blending components, finished gasoline, gasoil, olefins or other chemicals, light naphtha, high sulfur fuel oil, propane, diesel, light-sweet crude oil, ultra-low sulfur diesel (ULSD), other biodiesel or edible oils, jet fuel, vacuum gas oil (VGO), finished biodiesel, dirty feedstocks, butane, heavy naphtha, lube oils, and other naphthas.

Figure 15. Brazil's oil and gas imports, 2016–2022



Data source: Vortexa Ltd.
Note: *Other* includes full range naphtha, propane, medium-sour, gasoil, diesel, rich liquefied natural gas, dirty condensates, medium-sweet, clean condensates, jet fuel, heavy-sweet, biodiesel feedstock, olefins or other chemicals, low sulfur fuel oil, blending components, butane, other naphthas, heavy naphtha, lube oils, ethane, kerosene, heavy-sour, other biodiesel or edible oils, finished biodiesel, and bitumen.

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OPEC Statement to the UN Climate Change Conference

Delivered by Dr Ayed Al-Qahtani, Director of OPEC's Research Division, on behalf of HE Haitham Al Ghais, OPEC Secretary General, at the UN Climate Change Conference, 9 December 2023, Dubai, the UAE.

Mister President, distinguished delegates,

It is a great honour to deliver these remarks in an OPEC Member Country, the UAE.

Holding COP28 here underscores the UAE's role as a climate leader, and its capabilities in the realm of providing energy.

The interwoven nature of reducing emissions and energy security is now 'rightfully' at the forefront of global discussions about energy transition pathways. For this:

We need an all-energies approach.

Otherwise, the world cannot meet rising energy demand, maintain energy security and ensure affordable universal energy access.

The Paris Agreement also focuses on reducing emissions, rather than choosing certain energy sources.

We need an all-peoples approach.

The capacities, national circumstances, and development priorities of all countries must be taken into account to ensure that no one is left behind.

And, we need an all-technologies approach.

The world needs to develop and finance all forms of technologies to help reduce emissions while meeting demand.

Technological innovation is a key focus for OPEC. It is why our Member Countries are investing heavily in hydrogen projects, CCUS, CCS and DAC facilities, the circular carbon economy, and renewables.

I hope that you have visited the OPEC Pavilion here at COP28 to see this firsthand.

The oil industry is also taking a proactive approach here at COP28, with 50 oil companies representing nearly half of global production, including many from OPEC Member Countries, pledging to reach near-zero methane emissions and end routine flaring in their operations by 2030.

Ultimately, this 'all-energies, all-peoples and all-technologies' approach needs to adhere to the principles of equity and common but differentiated responsibilities.

This means ensuring:

That the first global stocktake under the Paris Agreement concludes with equitable and inclusive outcomes;

That developed countries fulfil their long overdue climate finance commitments;

And that funding arrangements for loss and damage enable adequate and accessible financing that does not increase liabilities.

There is no single solution or path to achieve a sustainable energy future.

We need nuanced and realistic approaches to tackle emissions; ones that also enable economic growth, help eradicate energy poverty, and increase resilience at the same time.

In this respect, I wish COP28 every success in going down in history as a 'COP of Unity, Action and Delivery'.

Thank you.

https://www.canada.ca/en/environment-climate-change/news/2023/12/canada-introduces-framework-to-cap-greenhouse-gas-pollution-from-oil-and-gas-sector.html

Canada introduces framework to cap greenhouse gas pollution from oil and gas sector

From: Environment and Climate Change Canada

News release

December 7, 2023 – Ottawa, Ontario

Canadians are making decisions and choices today that will profoundly impact the world we leave to our children and grandchildren. Climate action pays immediate dividends in good jobs and cleaner air and water, but it also opens up more opportunities for the generations that will follow. Every sector of the economy has a part to play in cutting pollution, particularly the oil and gas sector—one of a few where greenhouse gas pollution levels continue to increase.

Today, the Honourable Steven Guilbeault, Minister of Environment and Climate Change, and the Honourable Jonathan Wilkinson, Minister of Energy and Natural Resources, introduced Canada's draft framework to cap pollution from the oil and gas sector to reduce emissions and remain competitive in a shifting global market. No sector of the economy should be allowed to emit unlimited pollution—not when we are all driving toward the same goal of net zero by 2050 to ward off the worst impacts of the climate crisis. The proposed emissions cap sets a limit on pollution, not production.

The proposed Regulatory Framework for an Oil and Gas Sector Greenhouse Gas Emissions Cap was developed following extensive engagement with industry, Indigenous groups, provinces and territories, and stakeholders. It proposes to cap 2030 emissions at 35 to 38 percent below 2019 levels, while providing compliance flexibilities to emit up to a level about 20 to 23 percent below 2019 levels. The greenhouse gas pollution cap puts a limit on the amount that the sector can pollute and will be key to making sure we reduce our emissions as a country, on the road to reaching net zero by 2050.

The greenhouse gas pollution cap will spur reductions over time at a pace and scale needed to ensure the sector achieves net-zero emissions by 2050, which aligns with provincial and industry commitments. This framework comes at a

critical time for Canada, with many Canadians having seen firsthand the impacts of the climate crisis—from floods, heatwaves, and wildfires to economic loss and health impacts.

The greenhouse gas pollution cap has been designed to ensure greenhouse gas emissions from the sector decline, while providing compliance flexibilities to respond to global demand for oil and gas. Facilities will be able to buy a limited amount of carbon offset credits or contribute to a decarbonization fund, which would hold them accountable for a limited volume of emissions above the greenhouse gas pollution cap. These compliance flexibility options will both help reduce emissions—offsets will result in reductions in other sectors, and proceeds from the decarbonization fund will be reinvested to support emissions reductions within the oil and gas sector.

The proposed emissions cap is part of a suite of measures designed to help Canada's important oil and gas sector remain competitive in a global economy that is rapidly moving to net zero, supporting the talented and skilled energy workers of the sector. Alongside the introduction of the draft Regulatory Framework, Minister Wilkinson has released a Roadmap for the Decarbonization of Canada's Oil and Gas Sector that sets out the many measures being taken by the Government of Canada, provinces and territories, and the investment community to build a strong, sustainable energy resource sector that can thrive in the 21st century.

The Government of Canada will continue engaging with industry, Indigenous groups, provinces, territories, and all other stakeholders to get this system right. Written comments in response to the Framework should be submitted by February 5, 2024.

At a time when oil and gas companies are reaching record profits, this emissions cap and the suite of complementary measures will stimulate the kinds of investment needed to create and maintain good-paying jobs. The oil and gas sector has time and again proven its ability to innovate, and today marks another step forward in our shared work to keep our air clean and build a strong, thriving economy that works for everyone.

Quotes

"Every sector of Canada's economy must do its part to combat climate change and build a safe, prosperous, and healthy future for Canadians. All sectors of our economy need to reduce their emissions, and that includes oil and gas companies. The Government of Canada's plan to cap and reduce emissions from

Canada's largest emitting sector is ambitious, but practical. It considers the global demand for oil and gas—and the importance of the sector in Canada's economy—and sets a limit that is strict, but achievable. Canadians have always risen to the challenge of building a brighter future, and this greenhouse gas pollution cap will help Canada compete and succeed in a world that is moving to a clean-energy future."

– The Honourable Steven Guilbeault, Minister of Environment and Climate Change

"Today, we are moving forward on our commitment to introduce an ambitious and achievable pollution cap on oil and gas sector emissions. The pollution cap will ensure Canada's oil and gas sector does its part to reduce emissions and it will enhance the sector's competitiveness in the rapidly decarbonizing global economy. Today's announcement is a key component of our plan to decarbonize Canada's oil and gas sector. A plan which recognizes the direction the global economy is heading. A plan that collaborates with provinces and territories, industry, Indigenous peoples, workers, and international partners. And a plan that protects the planet and enhances the competitiveness of Canada's economy for decades to come."

– The Honourable Jonathan Wilkinson, Minister of Energy and Natural Resources

Quick facts

- According to the most recent *National Inventory Report*, Canada's oil and gas sector accounted for 28 percent of national emissions in 2021, making it the largest contributor to Canada's emissions, followed by the transportation sector at 22 percent.
- Capping the greenhouse gas pollution from the oil and gas sector is one of the key measures outlined in Canada's 2030 Emissions Reduction Plan (ERP), released in March 2022, that is a sector-by-sector roadmap to cut emissions to achieve 40 to 45 percent below our 2005 pollution levels in the most cost-effective way possible, while building a stronger economy for the 21st century.
- Today, the Government of Canada also published the first *Progress Report on the 2030 ERP* to provide an update on progress toward the 2030 target, based on Canada's most recent inventory of historical emissions and recently updated emissions projections. The publication is timely, as Canada participates in the 28th Conference of the Parties to the United

Nations Framework Convention on Climate Change (COP28), where ambitious mitigation action is front and centre.

- The Government of Canada proposes to implement the national cap-and-trade system through regulations to be made under the *Canadian Environmental Protection Act, 1999*. The Government is planning to publish draft regulations by mid-2024.
- Cap-and-trade is a market-based system where the regulator issues a quantity of emissions allowances, and may allow for some compliance flexibilities, that together act as a limit on emissions from covered sources.
- The cap-and-trade system would cover all direct greenhouse gas emissions, while also accounting for indirect emissions related to the production of oil and gas and carbon storage. The greenhouse gases covered would include carbon dioxide, methane, nitrous oxide, and others. Each emission allowance will be equivalent to one tonne of carbon dioxide equivalent emissions (CO2e).
- The greenhouse gas pollution cap would regulate upstream oil and gas facilities, including offshore facilities, and would also apply to liquefied natural gas facilities. These subsectors represent the majority of emissions from the oil and gas sector—the upstream subsector represented 85 percent of sector emissions in 2021. The emissions cap will cover activities such as oil sands, conventional oil production, natural gas production and processing, and production of liquified natural gas.

https://www.capp.ca/news-releases/statement-from-the-canadian-association-of-petroleum-producers-capp-on-the-federal-government-emissions-cap-framework/

Statement from The Canadian Association of Petroleum Producers (CAPP) on the federal government emissions cap framework

Calgary, Alberta (Dec 7, 2023)

Despite the federal government's stated objective that the emission cap should not put a limit on Canadian oil and natural gas production, the unintended consequences of the draft framework announced today of a cap-and-trade system with an interim target of a 35% to 38% emissions reductions below 2019 by 2030 could result in significant curtailments – making this draft framework effectively a cap on production. At a time when the country's citizens are experiencing a substantial affordability crisis, coincident with record budget deficits, the federal government risks curtailing the energy Canadians rely on, along with jobs and government revenues the energy sector contributes to Canada.

An emissions cap on the upstream oil and natural gas industry is unnecessary, given the longstanding carbon policies which already have Canada well on its way to meet or exceed emission targets. The added complexity of yet another layer of carbon policy is potentially detrimental to established carbon markets that fund clean energy projects. Canada is a major exporter of hydrocarbons to its western allies who value our commitment to energy security while operating under one of the most stringent environmental regulatory regimes in the world.

The government's own data shows that Canadian conventional producers have achieved meaningful absolute reductions in both methane and Scope 1 carbon dioxide equivalent emissions – absent a legislated cap – through investments in clean technologies and other innovations. In addition, Canada's largest oil sands companies have committed to reaching net zero emissions by 2050 and have put into place a credible plan to achieve that goal with interim targets. While the draft framework released today does allow for Internationally Transferred Mitigation Outcomes (ITMOs) and compliance flexibility, the trajectory and target remain problematic for industry as technology pathways will be challenging by 2030.

In 2022, Canada's oil and gas industry contributed over $9 billion in cash taxes to the federal treasury. CAPP believes the proposed policy risks triggering unforeseen socioeconomic consequences not the least of which is likely to be higher energy prices for Canadians. CAPP will raise our concerns through the consultation process and continue our efforts to work with the federal and provincial governments to ensure the draft framework released today does not become a cap on Canadian oil and natural gas production, allowing industry to continue its path of emissions reduction while growing Canada's role as a secure provider of responsibly produced energy.

The Canadian Association of Petroleum Producers (CAPP) is a non-partisan, research-based industry association that advocates on behalf of our member companies, large and small, that explore for, develop, and produce oil and natural gas throughout Canada. Our associate members provide a wide range of services that support the upstream industry. CAPP's members produce nearly three quarters of Canada's annual oil and natural gas production and provide more than 400,000 direct and indirect jobs in nearly all regions of Canada. In 2022 across Canada, our industry contributed $111 billion to the Gross Domestic Product (GDP) in addition to paying $45 billion in taxes and royalty payments. CAPP is a solution-oriented partner and works with all levels of government to ensure a thriving Canadian oil and natural gas industry. We strive to meet the need for safe, reliable, affordable, and responsibly produced energy, for Canada and the world. We are proud to amplify industry efforts to reduce GHG emissions from oil and gas production and support Indigenous participation and prosperity.

Lisa Baiton, CAPP President and CEO

About CAPP

The Canadian Association of Petroleum Producers (CAPP) is a non-partisan, research-based industry association that advocates on behalf of our member companies, large and small, that explore for, develop, and produce oil and natural gas throughout Canada. Our associate members provide a wide range of services that support the upstream industry. CAPP's members produce nearly three quarters of Canada's annual oil and natural gas production and provide more than 400,000 direct and indirect jobs in nearly all regions of Canada. In 2022 across Canada, our industry contributed $111 billion to the Gross Domestic Product (GDP) in addition to paying $45 billion in taxes and royalty payments. CAPP is a solution-oriented partner and works with all levels of government to ensure a thriving Canadian oil and natural gas industry. We strive to meet the need for safe, reliable, affordable, and responsibly produced energy, for Canada and the world. We are proud to amplify industry efforts to reduce GHG emissions from oil and gas production and support Indigenous participation and prosperity.

Labor

Global unemployment rates are generally at or around historically low levels. This is contributing to labor and skill shortages in many countries and across a broad spectrum of industries, including aviation. The time taken to recruit, train, undertake the necessary security checks and other requirements before staff are "job-ready" continues to present challenges for the industry in 2023.

Staff shortages resulted in significant disruption during the peak Northern Hemisphere summer period last year. While the situation started to stabilize this year, with notably fewer disruptions, tight labor markets and persistent inflation translate into upward pressure on wages. For air transport, we expect that the labor and skill shortages observed in 2023 will gradually dissipate next year. Nonetheless, wages will rise with the higher cost of living, and the industry will have to keep up with the employment needs dictated by the strength of the demand for air transportation (Table 5).

Fuel

The outbreak of war in Europe in February 2022 caused a sharp increase in global oil prices. The price of jet fuel rose further still, exceeding USD 175 per barrel in the summer of 2022, causing the spread between jet fuel and crude oil prices (jet crack spread) to climb above USD 60 per barrel.

In 2023, crude oil prices again increased in the second half of the year but have so far remained below the levels of 2022. The main driver of this trend is the war in the Middle East, which poses a risk to the stability of oil production and exports, as well as OPEC's production curbs. We estimate the average crude oil price in 2023 at USD 85 per barrel and see the crack spread remaining high at USD 30.6 per barrel, reflecting the limited refining capacity allocated to jet fuel. According to our estimates, the aviation industry will consume between 450k and 500k tonnes of sustainable aviation fuel (SAF) at USD 2500 per tonne (or 2.8x jet fuel), which will add USD 756 million to the industry fuel bill in 2023.

In 2024, we forecast that crude oil prices will remain high between USD 85-90 per barrel, depending on the evolution of the geopolitical situation in the Middle East, and the production decisions of OPEC. If it decides to increase its output targets to meet the growing demand, the price could drop. Clearly, a sharper decline in global GDP growth could also push the price lower. In our central scenario, the crack spread should narrow to 30%, down from 36% in 2023, equivalent to USD 26 per barrel (Table 6).

The aviation industry will increase its use of SAF and carbon credits to reduce its carbon footprint. We estimate that SAF production could rise to 0.53% of airlines' total fuel consumption in 2024, adding USD 2.4 billion to next year's fuel bill. In addition, the carbon offsetting and reduction scheme for international aviation (CORSIA) is a global market-based carbon offsetting mechanism designed to stabilize international aviation emissions. The CORSIA-related costs are estimated at USD 1 billion in 2024. These costs will add more pressure to the already fragile profitability of the industry.

Table 5: Key industry labor metrics

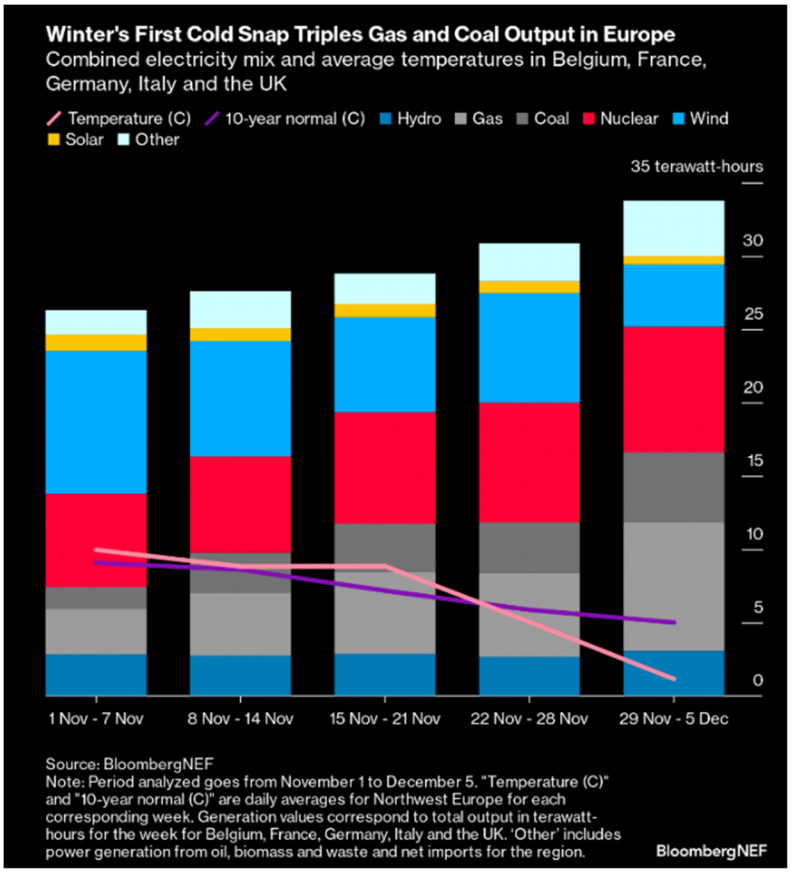
Worldwide airline industry	2019	2020	2021	2022	2023e	2024f
Labour costs, USD billion	189	160	162	175	194	206
% change over year	3.5%	-15.2%	0.8%	8.2%	11.3%	6.1%
Employment, million	2.93	2.56	2.61	2.75	2.94	3.05
% change over year	0.3%	-12.6%	2.0%	5.0%	7.0%	4.0%
Productivity, ATK/employee	526,003	335,264	382,109	445,100	516,068	529,144
% change over year	2.5%	-36.3%	14.0%	16.5%	15.9%	2.5%
Unit labour costs, USD/ATK	0.123	0.187	0.162	0.143	0.128	0.128
% change over year	0.6%	52.2%	-13.3%	-11.6%	-10.3%	-0.5%

Table 6: Fuel

Worldwide airline industry	2019	2020	2021	2022	2023e	2024f
Fuel spend, USD billion	190	80	105	215	271	281
% change over year	6.8%	-58.0%	31.8%	104.2%	26.1%	3.8%
% opex	23.9%	16.1%	18.9%	29.7%	31.7%	30.8%
Fuel use, billion liters	359	196	236	292	357	377
% change over year	1.0%	-45.3%	19.9%	23.8%	22.5%	5.4%
Fuel efficiency, fuel/100 ATK	22.1	21.7	22.4	22.6	22.3	22.1
% change over year	-1.8%	-1.8%	3.2%	1.2%	-1.2%	-1.2%
Fuel price, USD/barrel	79.7	46.6	77.8	135.6	115.5	113.8
% change over year	-7.4%	-41.5%	67.0%	74.3%	-14.8%	-1.5%
% spread over oil price	22.6%	11.6%	10.1%	35.0%	36.0%	30.0%

Source: IATA Sustainability and Economics

Winter Cold Snap Triples European Coal and Gas Generation: BNEF
2023-12-06 08:20:51.896 GMT
By Adriana Martins and Andreas Gandolfo
(BloombergNEF) -- The first cold week of the 2023/24 winter saw gas and coal output in Belgium, France, Germany, Italy and the UK rise sharply. Temperatures dropped to under 2C — almost 4C below the 10-year average — for the week commencing Nov. 29. This led to a week-on-week rise in electricity demand of 5%, and an accumulated 27% increase since temperatures started dropping at the beginning of November.
Nuclear output over the same period rose by 36%, meeting some of the increase in demand. However, the cold spell also brought with it a halving of output from renewables. As temperatures dropped, wind speeds around Europe dipped. The correlation between wind output and temperature during the winter months — contrary to the summer seasons — is positive. This means as temperatures reduce, wind output is also expected to drop.
Weather forecasts show temperatures rising back above the 10-year average in the coming days. Yet, coal and gas output is likely to remain elevated even if demand falls, mainly because output from renewables is also less likely to recover in the coming weeks. For short-term forecasts on power production, see EFOR, and weather forecasts can be seen at WFOR.



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https://www.who.int/news/item/05-12-2023-who-calls-on-countries-to-increase-taxes-on-alcohol-and-sugary-sweetened-beverages

WHO calls on countries to increase taxes on alcohol and sugary sweetened beverages

5 December 2023

The World Health Organization (WHO) is releasing today new data that show a low global rate of taxes being applied to unhealthy products such as alcohol and sugary sweetened beverages (SSBs). The findings highlight that the majority of countries are not using taxes to incentivize healthier behaviours. To help support countries WHO is also releasing a technical manual on alcohol tax policy and administration.

Globally 2.6 million people die from drinking alcohol every year and over 8 million from an unhealthy diet, implementing tax on alcohol and SSBs will reduce these deaths.

Half of all countries taxing SSBs are also taxing water, which is not recommended by WHO. Although 108 countries are taxing some sort of sugar-sweetened beverage, globally, on average excise tax, a tax designated for a specified consumer product, represents just 6.6% of the price of soda.

At least 148 countries have applied excise taxes to alcoholic beverages at the national level. However, wine is exempted from excise taxes in at least 22 countries, most of which are in the European Region. Globally, on average, the excise tax share in the price of the most sold brand of beer is 17.2%. For the most sold brand of the most sold spirits type, it is 26.5%.

A 2017 study shows that taxes that increase alcohol prices by 50% would help avert over 21 million deaths over 50 years and generate nearly US$17 trillion in additional revenues. This is equivalent to the total government revenue of eight of the world's largest economies in one year.

“Taxing unhealthy products creates healthier populations. It has a positive ripple effect across society - less disease and debilitation and revenue for governments to provide public services. In the case of alcohol, taxes also help prevent violence and road traffic injuries,” said Dr Rűdiger Krech, Director, Health Promotion, World Health Organization.

Countries like Lithuania, that increased alcohol tax in 2017 to drive down consumption have decreased deaths from alcohol related diseases. Lithuania increased alcohol tax revenue from 234 million euros in 2016 to 323 million euros in 2018 and saw alcohol-related deaths drop from 23.4 per 100 000 people in 2016 to 18.1 per 100 000 people in 2018.

Research shows that taxing alcohol and SSBs helps cut down use of these products and gives companies a reason to make healthier products. While at the same time tax on these products help prevent injuries and noncommunicable diseases such as cancers, diabetes and heart diseases.

A recent Gallup Poll, conducted in collaboration with WHO and Bloomberg Philanthropies, found that the majority of people surveyed across all countries supported increasing taxes on unhealthy products such as alcohol and SBBs.

WHO recommends that excise tax should apply to all SSBs and alcoholic beverages.

The release of the alcohol tax manual today follows a suite of already existing tax manuals including on tobacco and sugar sweetened beverages.

Experiences of Canadians with long-term symptoms following COVID-19

by Sianne Kuang, Steven Earl, Janine Clarke, Dianne Zakaria, Alain Demers, and Samina Aziz

Acknowlegdements

The Canadian COVID-19 Antibody and Health Survey - Follow-up Questionnaire is the result of a collaboration between the Public Health Agency of Canada and Statistics Canada to understand the long-term impacts of COVID-19 on the lives of Canadians. This study was co-authored by lead analysts from both agencies.

Overview of the study

Using data from the 2023 Canadian COVID-19 Antibody and Health Survey – Follow-up questionnaire (CCAHS-FQ),[1] this article provides updated estimates on COVID-19 infections and reinfections among Canadian adults, and describes the nature of symptoms experienced as a result of infection. Results are compared to those from the Canadian COVID-19 Antibody and Health Survey – Cycle 2 (CCAHS-2), which was conducted in 2022, one year before CCAHS-FQ.[2] This article also describes the experiences of Canadians who reported long-term symptoms consistent with post COVID-19 condition or long COVID, including the severity of symptoms, their experiences with the health care system, and the impact on their daily lives. Finally, this article also provides updates of the vaccination status of Canadian adults.

- As of June 2023, about two-thirds of Canadian adults reported at least one confirmed or suspected COVID-19 infection, with many reporting more than one infection since the beginning of the pandemic.
- Multiple infections were more commonly reported among certain racialized groups; Black Canadians were most likely to report multiple infections compared to other racialized groups.
- About 3.5 million Canadian adults reported experiencing long-term symptoms following a COVID-19 infection; 2.1 million reported they were still experiencing those symptoms as of June 2023. Almost half of those still experiencing symptoms reported they have not seen any improvement in symptoms over time.
- Among Canadians who were in school or employed and dealing with long-term symptoms, more than 1 in 5 missed days of school or work, missing 24 days on average.
- About 40% of those with long-term symptoms who sought healthcare about their symptoms reported difficulties with access.
- Adults with chronic conditions and senior adults were more likely to have been vaccinated in the 6 months prior to June 2023.

Introduction

Since it was declared an emergency of international concern in January 2020 by the World Health Organization (WHO), COVID-19 has required unprecedented public health action to protect the health of individuals and populations alike.[3] In Canada, the pandemic was characterized by waves of infection and subsequent public health measures (including restrictions of in-person activities) with cases becoming more frequent in 2021 and early 2022.[4] Initially, the impact of the pandemic was measured by deaths, hospitalizations, and intensive care unit admissions. However, growing population immunity through vaccination and infection, emergence of less virulent variants, and availability of new treatments for acute SARS-CoV-2 infections contributed to the WHO declaring that COVID-19 was no longer an emergency of international concern in May 2023.[5]

Despite this declaration, COVID-19 continues to cause significant concern for the health of the Canadian population and the wider international community. Accumulating research indicates that COVID-19 is associated with long-term effects on health including the presence of symptoms months or years after the initial infection.[6] For some, these long-term symptoms cause significant hardship that affects their health and ability to contribute to society.

To provide initial insights into the burden of long-term symptoms in Canadian adults, the Canadian COVID-19 Antibody and Health Survey Cycle 2 (CCAHS-2) was completed in the summer of 2022. The survey indicated that, as of August 2022, among the approximately 11.8 million Canadian adults that ever had a COVID-19 infection, about 16% experienced long-term symptoms following their infection, and a significant proportion of those affected reported limitations in daily activities and missed time from work or school due to their symptoms.[7] These and other results from the CCAHS-2 have helped to improve understanding of COVID-19 infections among Canadians, which is crucial to inform public health policy, economic policy, and respond to the health challenges from COVID-19 as they arise.

To examine the ongoing experiences with and impacts of COVID-19 in Canadian adults more than three years after the start of the pandemic, Statistics Canada, in partnership with the Public Health Agency of Canada (PHAC), conducted a follow-up study (CCAHS-FQ) on the respondents of CCAHS-2 in June 2023.

This study uses data from the CCAHS-FQ to describe the current COVID-19 landscape, including infection, reinfection, and acute and long-term symptoms. This study also uses data from both the CCAHS-2 and the CCAHS-FQ to understand how peoples' experiences with the virus have evolved in the context of growing immunity, emerging variants, new treatments, and relaxation of public health measures. All results presented from these two surveys relate to the adult population, aged 18 years and older, residing in private households in the 10 Canadian provinces.

In this study, long-term symptoms of a COVID-19 infection refer to the presence of symptoms three or more months after a confirmed or suspected COVID-19 infection that could not be explained by anything else. This definition aligns with the World Health Organization's post COVID-19 condition case definition, with the exception that the latter requires a symptom duration of at least 2 months. To avoid confusion, this study uses the terminology "long-term symptoms" after COVID-19 infection rather than post COVID-19 condition.

World Health Organization definition of Post COVID-19 Condition:

Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others which generally have an impact on everyday functioning. Symptoms may be new onset, following initial recovery from an acute COVID-19 episode, or persist from the initial illness. Symptoms may also fluctuate or relapse over time.[7]

As of June 2023, about 2 in 3 Canadians reported at least one infection with 1 in 5 having been infected multiple times

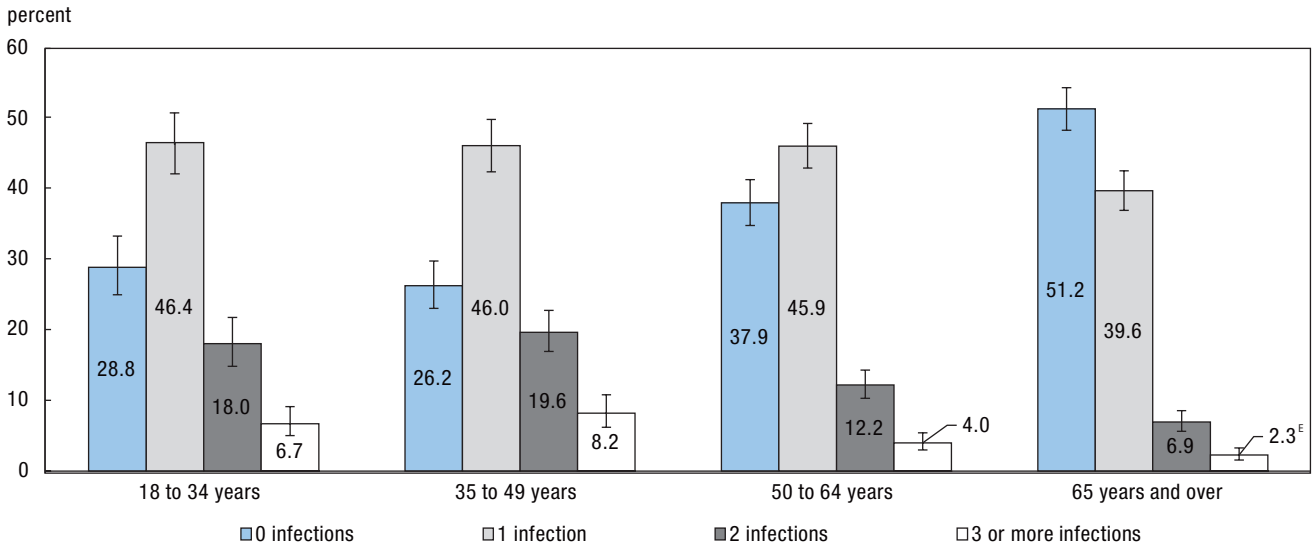
It is expected that the number of COVID-19 reinfections will grow as the percentage of the population ever having COVID-19 grows, antibody levels decline over time, and novel variants with increased ability to evade immunity emerge. The percentage of Canadian adults who tested positive for COVID-19 or suspected a COVID-19 infection since the start of the pandemic increased from 38.7% in the summer of 2022 as reported in CCAHS-2 to 64.4% by June 2023 as reported in the CCAHS-FQ. At this point, 44.6% of Canadians had experienced one, 14.4% two, and 5.4% three or more infections.

While cases surged in the early months of 2022, infections have continued through to June 2023. In fact, in the three months prior, 8.9% of Canadian adults reported being infected. In the six months prior, the proportion was 13.7%.

These numbers likely underestimate the true number of infections by June 2023, as individuals are not always aware that they have been infected. Results from CCAHS-2 showed that during the summer of 2022, 41.2% of Canadians with antibodies from a past infection never previously tested positive nor suspected an infection.[8]

Infection and reinfection varied by age. As displayed in Chart 1, older adults were less likely to report multiple infections. This could be attributed to the increased risk of severe disease from COVID-19 for older adults leading this group to take more precautions against a COVID-19 infection.[9] Males more frequently reported not having had a previous COVID-19 infection than females, but both males and females were similarly likely to report multiple COVID-19 infections. Reinfection reporting also differed across racialized groups. Black (30.3%) Canadians more frequently reported having multiple infections than Canadians with Latin American (21.7%), Chinese (18.3%), Filipino (17.9%), Arab (12.1%) and West Asian (9.1%) backgrounds. Previous studies have shown that some populations in Canada were more adversely impacted by the pandemic. For example, in 2020, Black and South Asian populations were found to have a much higher mortality rate due to COVID-19 than non-racialized and non-Indigenous groups.[10]

Chart 1
Number of self-reported COVID-19 infections, by age group, June 2023



[E] use data with caution
Note: Some estimates do not add correctly due to rounding.
Source: Statistics Canada, Canadian COVID-19 Antibody and Health Survey - Follow-up Questionnaire, 2023.

People have experienced symptoms differently since the emergence of Omicron compared to before

Throughout the pandemic, fatigue, fever, coughing, and sore throat have remained the most commonly reported acute symptoms, however some symptoms have become more common since the emergence of Omicron in December 2021. Most notably, the percentage reporting cough rose from 41.7% to 55.2%, nasal congestion from 30.2% to 42.4%, and sore throat from 41.6% to 52.8%. Other studies have found minor variation in symptoms across variants.[11]

In January 2022, prescription medications were approved for the treatment of COVID-19 infections.[12] Among Canadian adults reporting a COVID-19 infection since then, 3.1% reported taking such medication. Of these, 77.1% reported the medication was effective or very effective. Use of prescription medication increased with age and was more common among those with a pre-existing long-term health condition. Both are populations at higher risk of more severe disease or outcomes from a COVID-19 infection.[13] This result aligns with Health Canada's authorization of the use of prescription anti-viral medication for patients at high risk of developing serious disease.[12]

1 in 9 Canadian adults have experienced long-term COVID-19 symptoms; most continue to experience symptoms

The increased rate at which long-term symptoms occur in those with COVID-19 infections is an observed phenomenon that sets the illness apart from other respiratory viruses, such as the flu.[14] This may be related to the fact that COVID-19 affects a wide range of body systems, not limited to the respiratory system, and has been documented to be able to cause organ damage in infected individuals.[15]

As of June 2023, 19% of Canadian adults infected reported ever experiencing long-term symptoms (symptoms present 3 or more months after a COVID-19 infection). This represents 11.7% of the total adult population or 3.5 million Canadians living in the ten provinces. The current burden, measured in June 2023, is also substantial: 6.8% of all Canadian adults or 2.1 million people continue to experience long-term symptoms. On average, this group had their most recent COVID-19 infection 11 months prior.

Some Canadians were at greater risk of experiencing long-term symptoms following a COVID-19 infection. Adults with a self-reported disability were more likely to report long-term symptoms than those without a reported disability (26.8% vs. 18.3%), and adults reporting one or more chronic conditions prior to the start of the pandemic were more likely to report long-term symptoms than adults not reporting chronic conditions (24.7% vs. 14.0%). Other studies have demonstrated an association between pre-existing medical conditions and the development of long-term symptoms.[16]

Despite many different long-term symptoms having been reported, some occurred more often than others, with fatigue (65.5%), brain fog (39.0%) and shortness of breath (28.0%) being the most frequently reported. These long-term symptoms have also been reported in other international contexts.[17] Differences are observed in the frequency of some long-term symptoms before and after the emergence of Omicron. For example, since the emergence of Omicron, individuals with long-term symptoms were more likely to report feeling worse after physical or mental activity, coughing and fatigue, and less likely to report loss of smell or taste and headache.

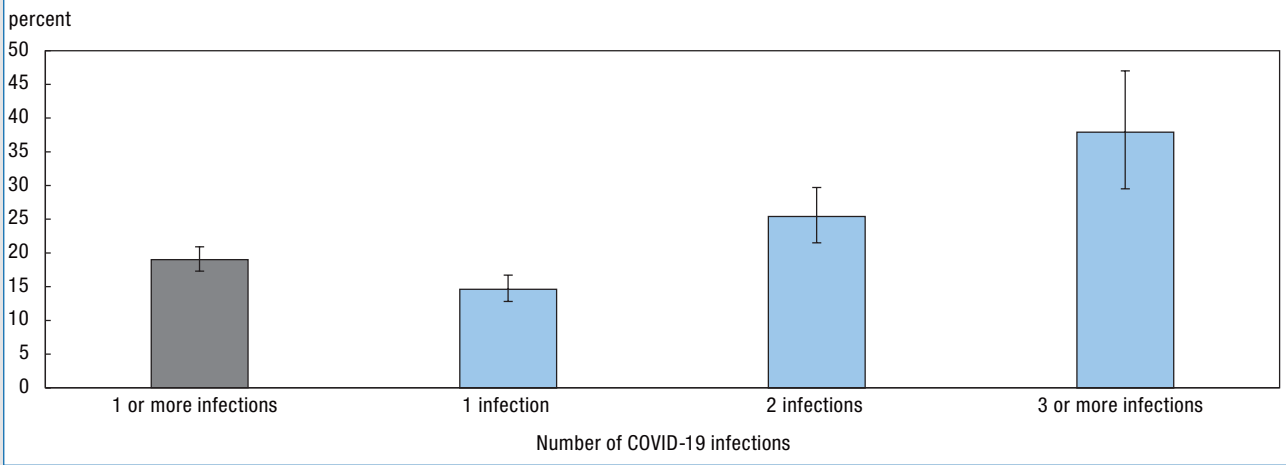
Long-term symptoms may take longer than three months to develop or return after an initial recovery. Among individuals who reported not experiencing symptoms three months or longer after a COVID-19 infection in the summer of 2022, 11.1% have since reported developing long-term symptoms after that same infection that could not be explained by anything else.

The percentage of adults experiencing long-term symptoms increased with the number of COVID-19 infections reported

The potential impact of re-infections on the risk of developing or exacerbating pre-existing long-term symptoms is important considering the endemic nature of COVID-19. However, studies providing evidence of increased risk are limited in number and generalizability.[18] As seen in Chart 2, Canadians reporting two known or suspected COVID-19 infections (25.4%) were 1.7 times more likely to report prolonged symptoms than those reporting only one known or suspected infection (14.6%), and those with 3 or more infections (37.9%) 2.6 times more likely.

People that had their first infection early in the pandemic, though, were also more likely to report multiple COVID-19 infections. For example, in this study the average date of first infection for those with three or more infections was May 2021, compared to September 2021 for those with two infections, and May 2022 for those with one infection. Those infected earlier in the pandemic, before vaccination and the emergence of the Omicron variant were more likely to develop long-term symptoms, but also had more time since their first infection to become infected with COVID-19 again.[19] This may help to explain the relationship between number of COVID-19 infections and the development of long-term symptoms. However, as displayed in Table 1 below, a positive association is observed throughout time when examining the above relationship by period of first COVID-19 infection, suggesting that time period of first infection may not fully account for this correlation. In addition, since the follow-up questionnaire did not capture the exact sequencing of infections and long-term symptoms, it is also possible that certain immune responses in people that develop long-term symptoms may increase susceptibility to re-infection.[15]

Chart 2
Percentage of Canadian adults with long-term symptoms, by number of self-reported COVID-19 infections, June 2023



Source: Statistics Canada, Canadian COVID-19 Antibody and Health Survey - Follow-up Questionnaire, 2023.

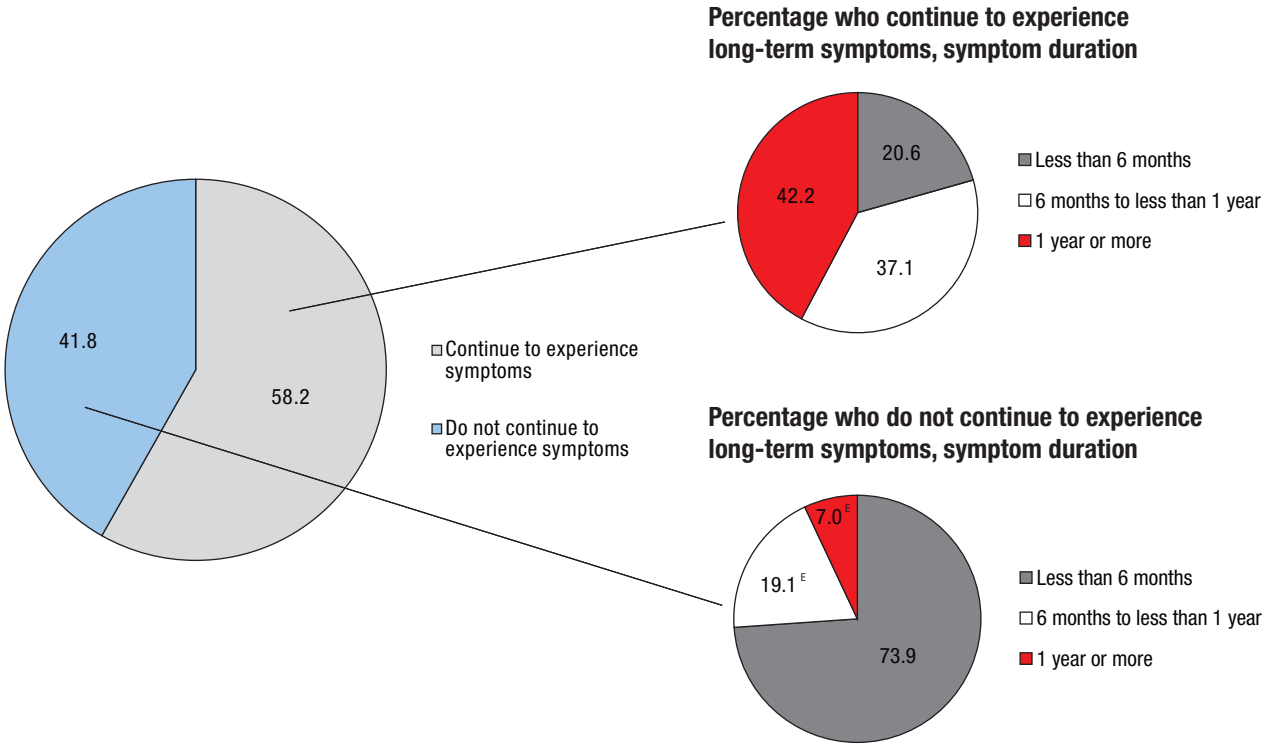
Table 1
Long-term symptoms among infected Canadians, by number of COVID-19 infections and period of first COVID-19 infection, June 2023

Period of first infection	Number of COVID-19 infections	People ever reporting long-term symptoms	95% confidence intervals	
		percentage	lower bound	upper bound
January 2020 to December 2020	1	14.2 [E]	9.0	21.7
	2	34.1	25.9	43.3
	3 or more	45.3 [E]	31.0	60.4
January 2021 to December 2021	1	17.8 [E]	12.0	25.5
	2	18.8	13.5	25.7
	3 or more	31.1 [E]	16.8	50.1
January 2022 to December 2022	1	13.3	11.4	15.5
	2	25.8	19.8	32.8
	3 or more	33.9 [E]	23.3	46.4

[E] use data with caution

Source: Statistics Canada, Canadian COVID-19 Antibody and Health Survey - Follow-up Questionnaire, 2023.

Figure 1
Symptom resolution status among Canadian adults that ever experienced long-term symptoms, June 2023



[E] use data with caution
Note: Some estimates do not add correctly due to rounding.
Source: Statistics Canada, Canadian COVID-19 Antibody and Health Survey - Follow-up Questionnaire, 2023.

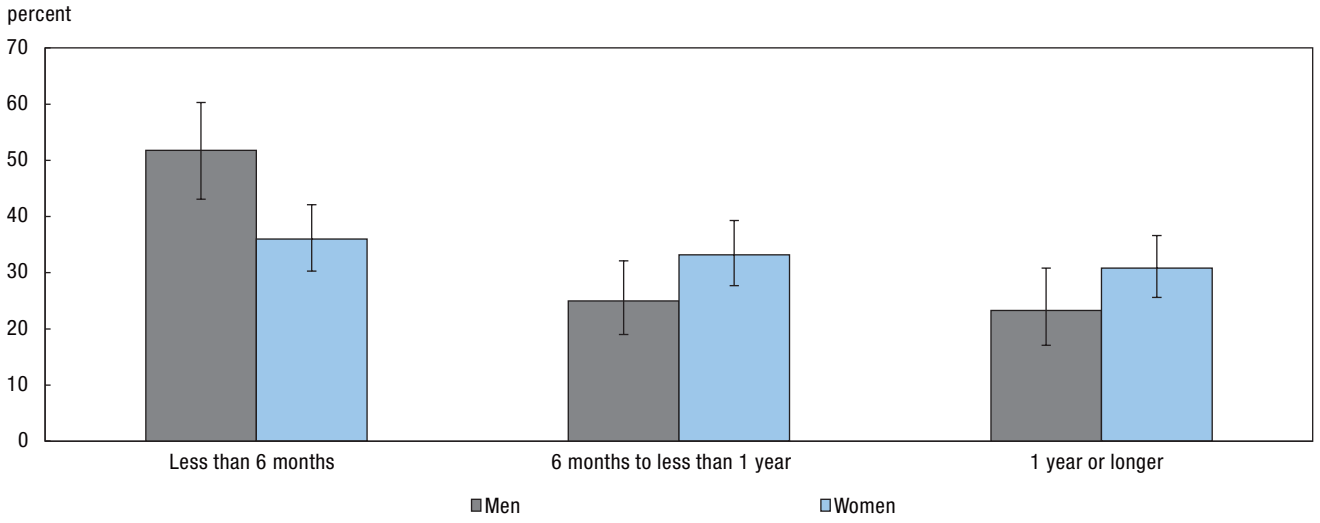
Almost half of Canadians who reported that they continue to experience long-term symptoms also reported no improvement over time

Many Canadians with long-term symptoms experience a protracted symptom duration. As of June 2023, 58.2% of infected Canadians who ever reported long-term symptoms continue to experience them. Among Canadian adults who continued to experience long-term symptoms, 79.3% had been experiencing symptoms for 6 months or more, including 42.2% with symptoms for one year or more (Figure 1).

Of those who reported experiencing long-term symptoms in the CCAHS-2 in the summer of 2022, 72.5% continued to experience symptoms one year later.

Depending on the nature, severity and frequency of long-term COVID-19 symptoms, the effects of such symptoms on an individual can range from mild to debilitating. Among Canadians who continue to experience symptoms, about 70% reported experiencing them every day or almost every day when symptoms were at their worst, and 21.7% reported being often or always limited by them in their daily activities. Overall, 49.7% with ongoing symptoms reported no improvement in their symptoms over time. Among Canadians who reported ever experiencing long-term symptoms, females (33.0%) were less likely than males (53.1%) to report a resolution of their symptoms and experienced their symptoms longer on average (see Chart 3).

Chart 3
Symptom duration for Canadians reporting long-term COVID-19 symptoms, by sex at birth, June 2023



Note: Some estimates do not add correctly due to rounding.
Source: Statistics Canada, Canadian COVID-19 Antibody and Health Survey - Follow-up Questionnaire, 2023.

As of June 2023, more than 1 in 5 Canadians with long-term symptoms missed days of work or school

Results of the CCAHS-FQ show that long-term symptoms interfere with many Canadians' livelihoods and education. Among Canadian adults ever experiencing long-term symptoms who were employed or attending school, 22.3% missed days. On average, they missed 24 days of school or work. This translates to 600,000 Canadians missing time from work or school and a cumulative total of about 14.5 million missed days of work or school due to long-term symptoms.

Among employed Canadian adults reporting ever experiencing long-term symptoms, 5.3% applied for disability benefits or workers' compensation due to their symptoms, and 93.8% of those who applied received benefits or compensation. Among those working Canadians reporting long-term symptoms, the most common industries they worked in were healthcare and social assistance (17.5%), professional, scientific and technical services (17.1%), and educational services (10.3%). As of June 2023, about 100,000 Canadian adults have been unable to return to work or school because of their symptoms.

Some estimates of the impact of long-term symptoms on work and school may differ from those previously reported because this study focuses on impacts experienced three or more months after a COVID-19 infection.

Only 1 in 8 Canadians who sought help for their long-term symptoms felt they received adequate care

While many Canadians have needed healthcare because of COVID-19 in the past few years, the pandemic complicated many Canadians' access to these services. Factors, including restricted entry into healthcare facilities due to public health protocols and the absence of medical personnel due to illness, slowed the delivery of healthcare services. While virtual care was expanded to service Canadians during the pandemic, these services are not always appropriate depending on clinical needs.[20]

As of June 2023, 46.9% of Canadian adults with long-term symptoms consulted with a healthcare provider or service about their symptoms. Family doctors and nurse practitioners continue to be the main point of contact for most Canadians for their healthcare needs, as 82.8% of the above group reported consulting with either of these professionals about their long-term symptoms. Studies from other countries have found a similar percentage of people with post COVID-19 condition consulted a general practitioner about their condition.[21] The other most frequently reported healthcare services consulted for long-term

symptoms were specialist medical doctors (20.0%), pharmacists (18.7%), and emergency departments (17.0%). Of those who accessed a healthcare service for their long-term symptoms, the average number of different services consulted was two.

According to the CCAHS-FQ, 39.7% of those who consulted a healthcare provider or service about their long-term symptoms also reported at least one difficulty accessing those providers or services. Of the 800,000 Canadians with long-term symptoms who reported difficulty accessing a healthcare provider or service, 1 in 5 did not receive that service because of their reported difficulties. Among those who reported difficulties, the most frequently reported problems accessing healthcare were: waiting too long between booking an appointment and a healthcare service (49.4%), having an appointment cancelled, rescheduled, or delayed due to the pandemic (39.6%), and difficulty getting a referral (35.2%).

Being able to consult with a healthcare professional does not necessarily ensure that an individual's need for treatment was fully met. In fact, 66.4% of those with long-term symptoms who needed healthcare services felt they did not receive adequate treatment, service, or support for any of their symptoms. Only 12.5% of Canadian adults who needed healthcare for their long-term symptoms reported receiving treatment, services, or support for all their symptoms, and among those who continue to experience long-term symptoms as of June 2023, only 5.7% received a post COVID-19 condition diagnosis.

Older adults are more likely to keep up to date with their vaccinations against COVID-19

COVID-19 vaccines reduce the risk of severe disease, hospitalization, and death.[22] Some research also suggests that vaccination may also lower the risk of developing long-term symptoms.[23] Results from the CCAHS-FQ indicate that as of June 2023, 93.0% of Canadian adults had received one or more COVID-19 vaccine doses: less than 1 percent had received one, 13.8% two, 29.4% three, and 49.2% four or more. With respect to recency of last vaccine dose, 18.3% of the Canadian adult population were last vaccinated in the 6 months prior to the CCAHS-FQ, but this varied by age group and number of chronic conditions present prior to the start of the COVID-19 pandemic.

Staying up to date with COVID-19 vaccinations is particularly important for people at high risk of adverse outcomes, including people aged 65 years and older, and people with pre-existing long-term health conditions.[24] Adults 65 years and older (34.5%) were more likely to have received a vaccination in the six months prior to June 2023, compared to 50 to 64 year olds (18.1%), and 18 to 49 year olds (10.5%). Adults with three or more pre-existing chronic conditions (28.4%) were more likely to have received a vaccination in the six months prior to survey collection compared to adults with two chronic conditions (23.9%), 1 chronic condition (20.4%), and no chronic conditions (14.1%). Flu vaccine uptake trends also show a higher coverage rate for adults aged 65 years and older.[25]

Conclusion

Using data from the CCAHS-FQ and the CCAHS-2, this study depicts how COVID-19 has evolved in the Canadian landscape more than three years into the pandemic. The results show that 1 in 5 Canadian adults have experienced COVID-19 more than once, and that many Canadians currently experience long-term symptoms from a COVID-19 infection. For the latter group, these symptoms often have strong implications on many facets of their lives, including their ability to perform daily activities, work and go to school. The study adds to a growing body of evidence around the association between COVID-19 reinfection and the reporting of long-term symptoms.

Among Canadians who reported ever experiencing long-term symptoms, those who continue to experience these symptoms (58.2%) outnumber those who have reported them resolved (41.8%). As of June 2023, an estimated 2.1 million Canadian adults continued to experience long-term symptoms after a confirmed or suspected COVID-19 infection that could not be explained by anything else. Almost 80% of these adults had been experiencing long-term symptoms for 6 or more months and about half reported no improvement in their symptoms over time. When at their worst, these symptoms often or always limited daily activities for more than 1 in 5 Canadian adults who continued to experience long-term symptoms at the time of the survey. In addition, among adults who experienced long-term symptoms and were employed or attending school, more than 1 in 5 missed days because of their symptoms.

With about 2 in 5 affected Canadian adults accessing healthcare for their long-term symptoms, awareness of

the condition and evidence-based methods for diagnosing, treating, and managing it are important. However, this study found that a substantial number of adults with long-term symptoms experienced difficulties accessing healthcare for their symptoms, and 2 in 3 who needed healthcare services reported not receiving treatment, services or support for any of their symptoms. Considering these findings, protection against COVID-19 infections including reinfections and the development of long-term symptoms is paramount. While 93% of Canadian adults have received at least one COVID-19 vaccine dose, only 18.3% received their most recent dose in the 6 months prior to June 2023.

Sianne Kuang, Steven Earl, *and* ***Janine Clarke*** *are analysts with the Centre for Direct Health Measures at Statistics Canada.* ***Dianne Zakaria, Alain Demers,*** *and* ***Samina Aziz*** *are analysts with the Public Health Agency of Canada.*

Data sources, methods and definitions

Data sources

Data are primarily from the Canadian COVID-19 Antibody and Health Survey – Follow-up Questionnaire (CCAHS-FQ) administered by Statistics Canada in collaboration with the Public Health Agency of Canada. Respondents included adults aged 18 and older living in the 10 provinces who had previously participated in the Canadian COVID-19 Antibody and Health Survey – Cycle 2 (CCAHS-2). Excluded from the survey were: persons living in the three territories; persons living on reserves and other Indigenous settlements in the provinces; members of the Canadian Forces living on a base; the institutionalized population; and residents of certain remote regions. All estimates in the study should be assumed to be from the follow-up survey unless an external source is explicitly stated, or the reference year of the estimate is 2022. In the latter case, the source of the estimate is the CCAHS-2. Data on long-term health conditions are sourced from CCAHS-2, only long-term health conditions diagnosed by a healthcare professional were included. A list of the conditions can be found in the questionnaire.

CCAHS-FQ

The CCAHS-FQ was conducted between May and June 2023. The survey collected information on vaccination status, reinfection with the virus that causes COVID-19, and symptoms of COVID-19, including long-term symptoms and their impact on daily life, health conditions and the use of health care services.

Survey weights were used to create a representative sample and to minimize any potential bias that could arise from the follow-up survey non-response. Non-response adjustments and calibration using available auxiliary information were also applied and are reflected in the survey weights.

CCAHS-2

The CCAHS-2 was conducted between April and August 2022. The CCAHS-2 survey consisted of two parts. The first part was an electronic questionnaire about general health and experiences with COVID-19, including long-term symptoms. The second part included two self-administered sample collections: an at-home finger-prick sample collection called a dried blood spot (DBS) sample and a saliva sample. The DBS was used to measure the presence of antibodies against SARS-CoV-2, the virus that causes COVID-19, from vaccination or prior infection. The saliva sample was used to determine if there was a recent or current SARS-CoV-2 infection at the time of sampling, by testing for viral material in the sample using a polymerase chain reaction (PCR) test.

Definitions

Confirmed or suspected COVID-19 infection: A confirmed infection refers to an infection that is determined by a positive COVID-19 test result, whether it is a PCR test or an at-home rapid antigen test. A suspected infection is based on the presence of symptoms or recent contact with a COVID-19 infected person.

Long-term symptoms: Long-term symptoms of a COVID-19 infection refer to the presence of symptoms three or more months after confirmed or suspected COVID-19 infection that could not be explained by anything else.

Long-term health conditions or chronic conditions: In the initial survey (CCAHS-2), respondents were asked a series of questions about long-term health conditions. These are conditions which are expected to last or have already lasted 6 months or more and have been diagnosed by a health professional.

Strengths and limitations

The main strength of the present analysis is that it is based on a nationally representative survey of Canadian adults. The large sample allowed a wide variety of analyses to be conducted in order to best describe the current COVID-19 situation in Canada.

A limitation of the present study is that it relies on self-reported information about infections and experiences since the beginning of the pandemic, which some people may not be able to remember accurately, especially as time goes on. It is also subject to recall bias, where a person's current state may influence their recollection of the past. Further, with regards to past infections, respondents were asked to include both confirmed and *suspected* COVID-19 infections; it is possible that a person reported one or more suspected COVID-19 infections that were due to a different virus. Data from CCAHS-2, which tested for the presence of COVID-19 antibodies, showed that some people who reported a suspected infection in 2022 did

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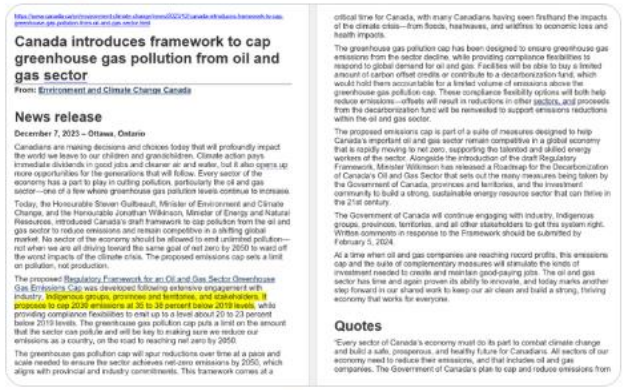

Canada introduces framework to cap greenhouse gas pollution from oil and gas sector

From: Environment and Climate Change Canada

News release

December 7, 2023 – Ottawa, Ontario

Canadians are making decisions and choices today that will profoundly impact the world we leave to our children and grandchildren. Climate action pays immediate dividends in good jobs and cleaner air and water, but it also opens up more opportunities for the generations that will follow. Every sector of the economy has a part to play in cutting pollution, particularly the oil and gas sector—one of a few where greenhouse gas pollution levels continue to increase.

Today, the Honourable Steven Guilbeault, Minister of Environment and Climate Change, and the Honourable Jonathan Wilkinson, Minister of Energy and Natural Resources, introduced Canada's draft framework to cap pollution from the oil and gas sector to reduce emissions and remain competitive in a shifting global market. No sector of the economy should be allowed to emit unlimited pollution—not when we are all driving toward the same goal of net zero by 2050 to ward off the worst impacts of the climate crisis. The proposed emissions cap sets a limit on pollution, not production.

The proposed Regulatory Framework for an Oil and Gas Sector Greenhouse Gas Emissions Cap was developed following extensive engagement with industry, Indigenous groups, provinces and territories, and stakeholders. It proposes to cap 2030 emissions at 35 to 38 percent below 2019 levels, while providing compliance flexibilities to emit up to a level about 20 to 23 percent below 2019 levels. The greenhouse gas pollution cap puts a limit on the amount that the sector can pollute and will be key to making sure we reduce our emissions as a country, on the road to reaching net zero by 2050.

The greenhouse gas pollution cap will spur reductions over time at a pace and scale needed to ensure the sector achieves net-zero emissions by 2050, which aligns with provincial and industry commitments. This framework comes at a critical time for Canada, with many Canadians having seen firsthand the impacts of the climate crisis—from floods, heatwaves, and wildfires to economic loss and health impacts.

The greenhouse gas pollution cap has been designed to ensure greenhouse gas emissions from the sector decline, while providing compliance flexibilities to respond to global demand for oil and gas. Facilities will be able to buy a limited amount of carbon offset credits or contribute to a decarbonization fund, which would hold them accountable for a limited volume of emissions above the greenhouse gas pollution cap. These compliance flexibility options will both help reduce emissions—offsets will result in reductions in other sectors, and proceeds from the decarbonization fund will be reinvested to support emissions reductions within the oil and gas sector.

The proposed emissions cap is part of a suite of measures designed to help Canada's important oil and gas sector remain competitive in a global economy that is rapidly moving to net zero, supporting the talented and skilled energy workers of the sector. Alongside the introduction of the draft Regulatory Framework, Minister Wilkinson has released a Roadmap for the Decarbonization of Canada's Oil and Gas Sector that sets out the many measures being taken by the Government of Canada, provinces and territories, and the investment community to build a strong, sustainable energy resource sector that can thrive in the 21st century.

The Government of Canada will continue engaging with industry, Indigenous groups, provinces, territories, and all other stakeholders to get this system right. Written comments in response to the Framework should be submitted by February 5, 2024.

At a time when oil and gas companies are reaching record profits, this emissions cap and the suite of complementary measures will stimulate the kinds of investment needed to create and maintain good-paying jobs. The oil and gas sector has time and again proven its ability to innovate, and today marks another step forward in our shared work to keep our air clean and build a strong, thriving economy that works for everyone.

Quotes

"Every sector of Canada's economy must do its part to combat climate change and build a safe, prosperous, and healthy future for Canadians. All sectors of our economy need to reduce their emissions, and that includes oil and gas companies. The Government of Canada's plan to cap and reduce emissions from

1 4 481

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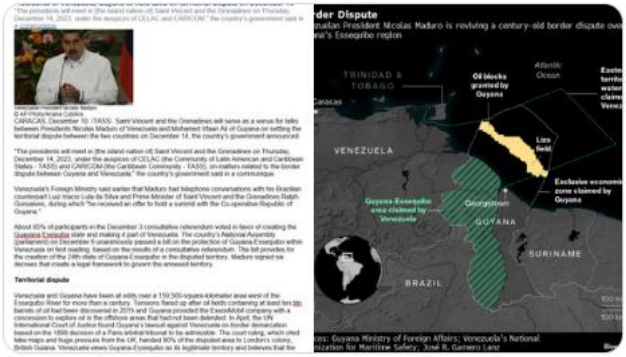
Does this give Maduro more enthusiasm to keep pressing on his claim for Guyana offshore oil?

Guyana has previously said nothing to negotiate.

Thx @busines for map.

#OOTT



CARACAS, December 10. /TASS/. Saint Vincent and the Grenadines will serve as a venue for talks between Presidents Nicolas Maduro of Venezuela and Mohamed Irfaan Ali of Guyana on settling the territorial dispute between the two countries on December 14, the country's government announced.

"The presidents will meet in [the island nation of] Saint Vincent and the Grenadines on Thursday, December 14, 2023, under the auspices of CELAC (the Community of Latin American and Caribbean States - TASS) and CARICOM (the Caribbean Community - TASS), on matters related to the border dispute between Guyana and Venezuela," the country's government said in a communique.

Venezuela's Foreign Ministry said earlier that Maduro had telephone conversations with his Brazilian counterpart Luiz Inacio Lula da Silva and Prime Minister of Saint Vincent and the Grenadines Ralph Gonsalves, during which "he received an offer to hold a summit with the Co-operative Republic of Guyana."

About 95% of participants in the December 3 consultative referendum voted in favor of creating the Guayana Esequiba state and making it part of Venezuela. The country's National Assembly (parliament) on December 6 unanimously passed a bill on the protection of Guyana-Esequibo within Venezuela on first reading, based on the results of a consultative referendum. The bill provides for the creation of the 24th state of Guyana-Esequibo in the disputed territory. Maduro signed six decrees that create a legal framework to govern the annexed territory.

Territorial dispute

Venezuela and Guyana have been at odds over a 159,500-square-kilometer area west of the Essequibo River for more than a century. Tensions flared up after oil fields containing at least ten bln barrels of oil had been discovered in 2015 and Guyana provided the ExxonMobil company with a concession to explore oil in the offshore areas that had not been delimited. In April, the UN International Court of Justice found Guyana's lawsuit against Venezuela on border demarcation based on the 1899 decision of a Paris arbitral tribunal to be admissible. The court ruling, which cited fake maps and huge pressure from the UK, handed 90% of the disputed area to London's colony, British Guiana. Venezuela views Guyana-Esequibo as its legitimate territory and believes that the

der Dispute
ıuslan President Nicolas Maduro is reviving a century-old border dispute ove
na's Essequibo region

TRINIDAD & TOBAGO
Oil blocks granted by Guyana
Atlantic Ocean
Caracas
VENEZUELA
Liza field
Exclusive economic zone claimed by Guyana
Guyana-Esequibo area claimed by Venezuela
Georgetown
GUYANA
SURINAME
BRAZIL
es: Guyana Ministry of Foreign Affairs; Venezuela's National ization for Maritime Safety; José R. Guerrero Lanz

1 1 4 1K

Dan Tsubouchi @Energy_Tidbits · 2h

#OPEC to #COP28

We need an all-energies approach. Otherwise, the world cannot meet rising energy demand, maintain energy security & ensure affordable universal energy access. The Paris Agreement also focuses on reducing emissions, rather than choosing certain energy sources #OOTT

https://www.opec.org/opec_web/en/press_room/7269.htm

OPEC Statement to the UN Climate Change Conference

Delivered by Dr Ayed Al-Qahtani, Director of OPEC's Research Division, on behalf of HE Haitham Al Ghais, OPEC Secretary General, at the UN Climate Change Conference, 9 December 2023, Dubai, the UAE.

Mister President, distinguished delegates,

It is a great honour to deliver these remarks in an OPEC Member Country, the UAE.

Holding COP28 here underscores the UAE's role as a climate leader, and its capabilities in the realm of providing energy.

The interwoven nature of reducing emissions and energy security is now 'rightfully' at the forefront of global discussions about energy transition pathways. For this:

We need an all-energies approach.

Otherwise, the world cannot meet rising energy demand, maintain energy security and ensure affordable universal energy access.

The Paris Agreement also focuses on reducing emissions, rather than choosing certain energy sources.

We need an all-peoples approach.

The capacities, national circumstances, and development priorities of all countries must be taken into account to ensure that no one is left behind.

And, we need an all-technologies approach.

The world needs to develop and finance all forms of technologies to help reduce emissions while meeting demand.

Technological innovation is a key focus for OPEC. It is why our Member Countries are investing heavily in hydrogen projects, CCUS, CCS and DAC facilities, the circular carbon economy, and renewables.

I hope that you have visited the OPEC Pavilion here at COP28 to see this firsthand.

The oil industry is also taking a proactive approach here at COP28, with 50 oil companies representing nearly half of global production, including many from OPEC Member Countries, pledging to reach near-zero methane emissions and end routine flaring in their operations by 2030.

Ultimately, this 'all-energies, all-peoples and all-technologies' approach needs to adhere to the principles of equity and common but differentiated responsibilities.

This means ensuring:

That the first global stocktake under the Paris Agreement concludes with equitable and inclusive outcomes;

That developed countries fulfil their long overdue climate finance commitments;

And that funding arrangements for loss and damage enable adequate and accessible financing that does not increase liabilities.

There is no single solution or path to achieve a sustainable energy future.

We need nuanced and realistic approaches to tackle emissions; ones that also enable economic growth, help eradicate energy poverty, and increase resilience at the same time.

In this respect, I wish COP28 every success in going down in history as a 'COP of Unity, Action and Delivery'.

Thank you.

1 4 8 1.8K

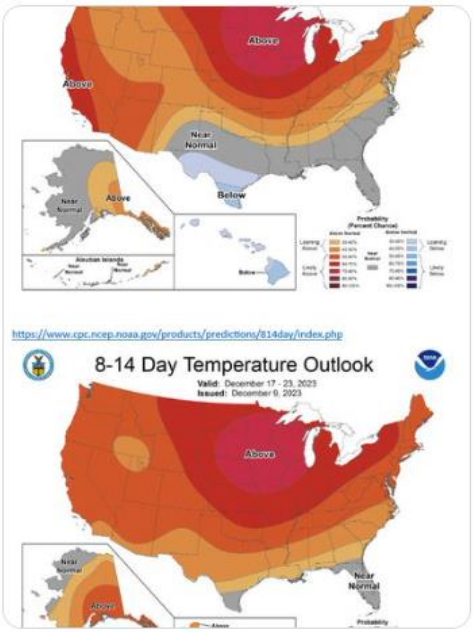
Dan Tsubouchi @Energy_Tidbits · 17h

Negative for HH #NatGas prices.

Today's @NOAA 6-10 & 8-14 day temp outlook still call for much warmer than normal temps for Dec 9-23.

A warm start to winter is difficult, but not impossible to catch up, BUT will need a cold Jan!

#OOTT



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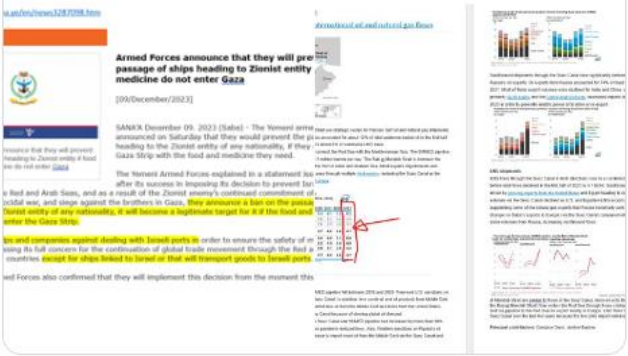
Dan Tsubouchi @Energy_Tidbits · 19h

#OOTT

> **Dan Tsubouchi** @Energy_Tidbits · 20h
>
> #Houthis expand target list. warn it will target **any ship of any nationality** in Red Sea/Bab el Mandeb **IF it is heading to Israel.**
>
> Suez Canal 101: Every ship thru the Suez has to go thru Red Sea & Bab El Mandeb...
>
> Show more



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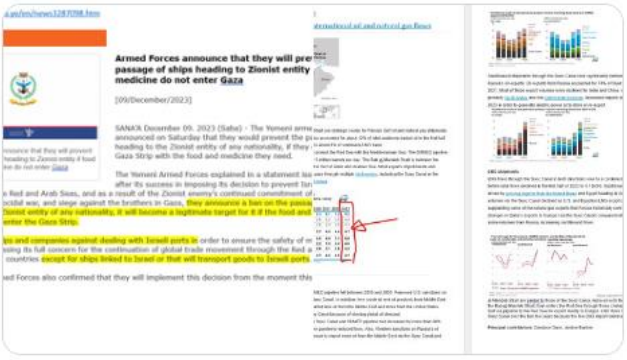
Dan Tsubouchi @Energy_Tidbits · 20h

#Houthis expand target list. warn it will target **any ship of any nationality** in Red Sea/Bab el Mandeb **IF it is heading to Israel.**

Suez Canal 101: Every ship thru the Suez has to go thru Red Sea & Bab El Mandeb

@EIAgov: 8.8 mmbd #Oil #Products & 4.1 bcfd #LNG thru Bab el Mandeb



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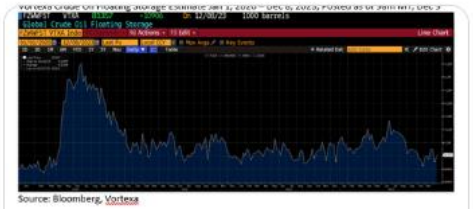
Dan Tsubouchi @Energy_Tidbits · 23h

Floating #Oil storage at okay levels but creeping higher with more wks in 80s than in 70s.

12/08 is 81.36 mmb, +10.91 WoW vs revised up 12/01 of 70.45.

Latest 7-wk ave 80.85 mmb, vs last wk's 7-wk ave 77.73.

Thx @Vortexa @business
#OOTT



Source: Bloomberg, Vortexa

Source: Bloomberg, Vortexa

Vortexa Crude Oil Floating Storage by Region (mmb)				Original Posted	Recent Peak	
Region	Dec 8/23	Dec 1/23	WoW	Dec 1/23	Jun 23/23	Dec 8 vs Jun 23
Asia	41.44	32.34	9.10	27.77	73.58	-32.14
Europe	10.64	4.69	5.95	4.97	6.47	4.17
Middle East	9.04	7.17	1.87	8.17	7.17	1.87
West Africa	6.54	4.46	2.08	4.54	7.62	-1.08
US Gulf Coast	2.84	0.70	2.14	0.52	0.97	1.87
Other	10.86	21.09	-10.23	28.55	17.57	-6.71
Global Total	81.36	70.45	10.91	64.52	113.38	-32.02

Vortexa crude oil floating storage posted on Bloomberg 9am MT on Dec 9
Source: Vortexa, Bloomberg

Prepared by SAF Group: https://safegroup.ca/news-insights/

4 16 2.8K

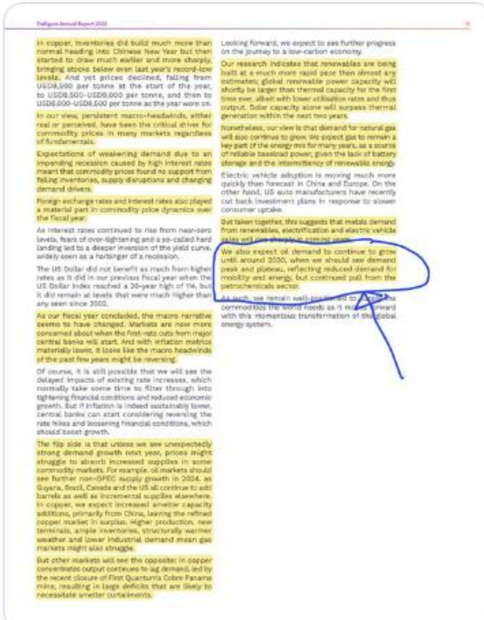
SAF

Dan Tsubouchi @Energy_Tidbits · 2h

Peak oil demand & then plateau.

"*we also expect #oil demand to continue to grow until around 2030, when we should see demand peak and plateau, reflecting reduced demand for mobilty and energy, but continued pull from the petrochemicals sector*" @Trafigura @saadrahim.

#OOTT



Trafigura Annual Report 2023

In copper, inventories did build much more than normal heading into Chinese New Year but then started to draw much earlier and more sharply, bringing stocks below even last year's record-low levels. And yet prices declined, falling from USD9,500 per tonne at the start of the year, to USD8,500-USD9,000 per tonne, and then to USD8,000-USD8,500 per tonne as the year wore on.

In our view, persistent macro-headwinds, either real or perceived, have been the critical driver for commodity prices in many markets regardless of fundamentals.

Expectations of weakening demand due to an impending recession caused by high interest rates meant that commodity prices found no support from falling inventories, supply disruptions and changing demand drivers.

Foreign exchange rates and interest rates also played a material part in commodity price dynamics over the fiscal year.

As interest rates continued to rise from near-zero levels, fears of over-tightening and a so-called hard landing led to a deeper inversion of the yield curve, widely seen as a harbinger of a recession.

The US Dollar did not benefit as much from higher rates as it did in our previous fiscal year when the US Dollar Index reached a 20-year high of 114, but it did remain at levels that were much higher than any seen since 2002.

As our fiscal year concluded, the macro narrative seems to have changed. Markets are now more concerned about when the first-rate cuts from major central banks will start. And with inflation metrics materially lower, it looks like the macro headwinds of the past few years might be reversing.

Of course, it is still possible that we will see the delayed impacts of existing rate increases, which normally take some time to filter through into tightening financial conditions and reduced economic growth. But if inflation is indeed sustainably lower, central banks can start considering reversing the rate hikes and loosening financial conditions, which should boost growth.

The flip side is that unless we see unexpectedly strong demand growth next year, prices might struggle to absorb increased supplies in some commodity markets. For example, oil markets should see further non-OPEC supply growth in 2024, as Guyana, Brazil, Canada and the US all continue to add barrels as well as incremental supplies elsewhere. In copper, we expect increased smelter capacity additions, primarily from China, leaving the refined copper market in surplus. Higher production, new terminals, ample inventories, structurally warmer weather and lower industrial demand mean gas markets might also struggle.

But other markets will see the opposite: in copper concentrates output continues to lag demand, led by the recent closure of First Quantum's Cobre Panama mine, resulting in large deficits that are likely to necessitate smelter curtailments.

Looking forward, we expect to see further progress on the journey to a low-carbon economy.

Our research indicates that renewables are being built at a much more rapid pace than almost any estimates; global renewable power capacity will shortly be larger than thermal capacity for the first time ever, albeit with lower utilisation rates and thus output. Solar capacity alone will surpass thermal generation within the next two years.

Nonetheless, our view is that demand for natural gas will also continue to grow. We expect gas to remain a key part of the energy mix for many years, as a source of reliable baseload power, given the lack of battery storage and the intermittency of renewable energy.

Electric vehicle adoption is moving much more quickly than forecast in China and Europe. On the other hand, US auto manufacturers have recently cut back investment plans in response to slower consumer uptake.

But taken together, this suggests that metals demand from renewables, electrification and electric vehicle sales will rise sharply in coming years.

We also expect oil demand to continue to grow until around 2030, when we should see demand peak and plateau, reflecting reduced demand for mobility and energy, but continued pull from the petrochemicals sector.

As such, we remain well-positioned to supply the commodities the world needs as it moves forward with this momentous transformation of the global energy system.

Dan Tsubouchi @Energy_Tidbits · 3h

Record #Oil consumption in 2024 but @Trafigura @saadrahim warns "*oil markets should see further non-OPEC supply growth in 2024, as Guyana, Brazil, Canada and the US all continue to add barrels as well as incremental supplies elsewhere*" ".. *gas markets* ...
Show more

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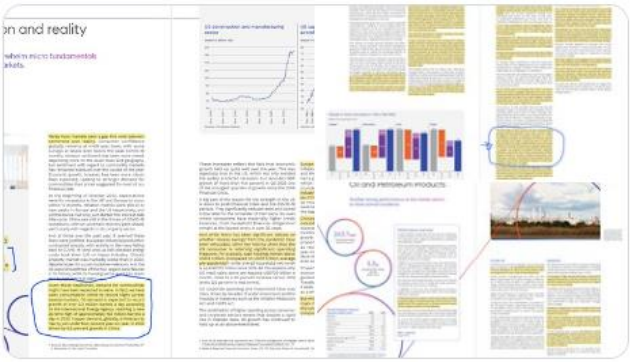
Dan Tsubouchi @Energy_Tidbits · 3h

Record #Oil consumption in 2024 but @Trafigura @saadrahim warns "*oil markets should see further non-OPEC supply growth in 2024, as Guyana, Brazil, Canada and the US all continue to add barrels as well as incremental supplies elsewhere*" "*.. gas markets might also struggle*"

#OOTT



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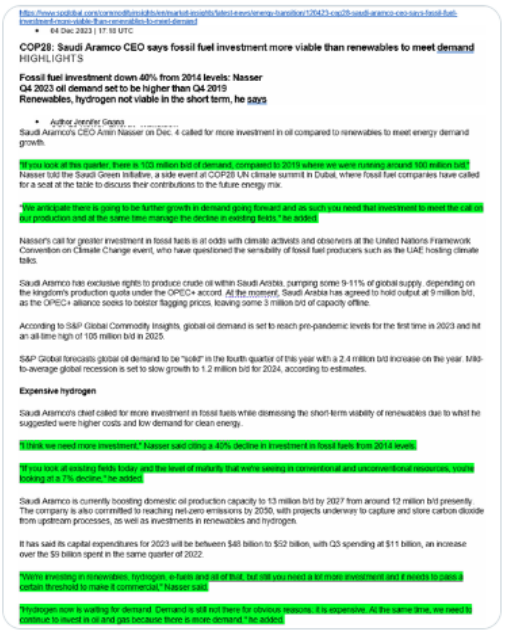
Dan Tsubouchi @Energy_Tidbits · 19h

For anyone looking at #Oil in 2025+

#Aramco CEO "If you look at existing fields today & the level of maturity that we're seeing in conventional and unconventional resources, you're looking at a 7% decline" ie. 7 mmbd has to be replaced each yr to stay flat

Thx @jcgnana #OOTT



https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/120423-cop28-saudi-aramco-ceo-says-fossil-fuel-investment-more-viable-than-renewables-to-meet-demand

- 04 Dec 2023 | 17:10 UTC

COP28: Saudi Aramco CEO says fossil fuel investment more viable than renewables to meet demand

HIGHLIGHTS

Fossil fuel investment down 40% from 2014 levels: Nasser
Q4 2023 oil demand set to be higher than Q4 2019
Renewables, hydrogen not viable in the short term, he says

- Author Jennifer Gnana

Saudi Aramco's CEO Amin Nasser on Dec. 4 called for more investment in oil compared to renewables to meet energy demand growth.

"If you look at this quarter, there is 103 million b/d of demand, compared to 2019 where we were running around 100 million b/d," Nasser told the Saudi Green Initiative, a side event at COP28 UN climate summit in Dubai, where fossil fuel companies have called for a seat at the table to discuss their contributions to the future energy mix.

"We anticipate there is going to be further growth in demand going forward and as such you need that investment to meet the call on our production and at the same time manage the decline in existing fields," he added.

Nasser's call for greater investment in fossil fuels is at odds with climate activists and observers at the United Nations Framework Convention on Climate Change event, who have questioned the sensibility of fossil fuel producers such as the UAE hosting climate talks.

Saudi Aramco has exclusive rights to produce crude oil within Saudi Arabia, pumping some 9-11% of global supply, depending on the kingdom's production quota under the OPEC+ accord. At the moment, Saudi Arabia has agreed to hold output at 9 million b/d, as the OPEC+ alliance seeks to bolster flagging prices, leaving some 3 million b/d of capacity offline.

According to S&P Global Commodity Insights, global oil demand is set to reach pre-pandemic levels for the first time in 2023 and hit an all-time high of 105 million b/d in 2025.

S&P Global forecasts global oil demand to be "solid" in the fourth quarter of this year with a 2.4 million b/d increase on the year. Mild-to-average global recession is set to slow growth to 1.2 million b/d for 2024, according to estimates.

Expensive hydrogen

Saudi Aramco's chief called for more investment in fossil fuels while dismissing the short-term viability of renewables due to what he suggested were higher costs and low demand for clean energy.

"I think we need more investment," Nasser said citing a 40% decline in investment in fossil fuels from 2014 levels.

"If you look at existing fields today, and the level of maturity that we're seeing in conventional and unconventional resources, you're looking at a 7% decline," he added.

Saudi Aramco is currently boosting domestic oil production capacity to 13 million b/d by 2027 from around 12 million b/d presently. The company is also committed to reaching net-zero emissions by 2050, with projects underway to capture and store carbon dioxide from upstream processes, as well as investments in renewables and hydrogen.

It has said its capital expenditures for 2023 will be between $48 billion to $52 billion, with Q3 spending at $11 billion, an increase over the $9 billion spent in the same quarter of 2022.

"We're investing in renewables, hydrogen, e-fuels and all of that, but still you need a lot more investment and it needs to pass a certain threshold to make it commercial," Nasser said.

"Hydrogen now is waiting for demand. Demand is still not there for obvious reasons. It is expensive. At the same time, we need to continue to invest in oil and gas because there is more demand," he added.

11 32 115 15K

Dan Tsubouchi @Energy_Tidbits · 6h

Fan or not, got to appreciate how @ewarren messages

a 2 cent wealth tax, doesn't sound like big deal,

but 2% on assets >$50mm is a huge pot of $$, listen 👇 to all the items it can fund.

is wealth tax likely in Biden 2024 election? Trudeau 2025 election?

@andrewrsorkin #OOTT

3 2 1 2.5K

Dan Tsubouchi @Energy_Tidbits · 7h

Sustainable Aviation Fuel is not cheap.

#IATA aviation "will consume between 450k and 500k tonnes of sustainable aviation fuel (SAF) at **USD 2500 per tonne (or 2.8x jet fuel)**, which will add USD 756 million to the industry fuel bill in 2023"

Thx @IATA Nicolas Jammes
#OOTT

Labor

Global unemployment rates are generally at or around historically low levels. This is contributing to labor and skill shortages in many countries and across a broad spectrum of industries, including aviation. The time taken to recruit, train, undertake the necessary security checks and other requirements before staff are "job-ready" continues to present challenges for the industry in 2023.

Staff shortages resulted in significant disruption during the peak Northern Hemisphere summer period last year. While the situation started to stabilize this year, with notably fewer disruptions, tight labor markets and persistent inflation translate into upward pressure on wages. For air transport, we expect that the labor and skill shortages observed in 2023 will gradually dissipate next year. Nonetheless, wages will rise with the higher cost of living, and the industry will have to keep up with the employment needs dictated by the strength of the demand for air transportation (Table 5).

Fuel

The outbreak of war in Europe in February 2022 caused a sharp increase in global oil prices. The price of jet fuel rose further still, exceeding USD 175 per barrel in the summer of 2022, causing the spread between jet fuel and crude oil prices (jet crack spread) to climb above USD 60 per barrel.

In 2023, crude oil prices again increased in the second half of the year but have so far remained below the levels of 2022. The main driver of this trend is the war in the Middle East, which poses a risk to the stability of oil production and exports, as well as OPEC's production curbs. We estimate the average crude oil price in 2023 at USD 85 per barrel and see the crack spread remaining high at USD 30.6 per barrel, reflecting the limited refining capacity allocated to jet fuel. According to our estimates, the aviation industry will consume between 450k and 500k tonnes of sustainable aviation fuel (SAF) at USD 2500 per tonne (or 2.8x jet fuel), which will add USD 756 million to the industry fuel bill in 2023.

In 2024, we forecast that crude oil prices will remain high between USD 85-90 per barrel, depending on the evolution of the geopolitical situation in the Middle East, and the production decisions of OPEC. If it decides to increase its output targets to meet the growing demand, the price could drop. Clearly, a sharper decline in global GDP growth could also push the price lower. In our central scenario, the crack spread should narrow to 30%, down from 36% in 2023, equivalent to USD 26 per barrel (Table 6).

The aviation industry will increase its use of SAF and carbon credits to reduce its carbon footprint. We estimate that SAF production could rise to 0.53% of airlines' total fuel consumption in 2024, adding USD 2.4 billion to next year's fuel bill. In addition, the carbon offsetting and reduction scheme for international aviation (CORSIA) is a global market-based carbon offsetting mechanism designed to stabilize international aviation emissions. The CORSIA-related costs are estimated at USD 1 billion in 2024. These costs will add more pressure to the already fragile profitability of the industry.

Dan Tsubouchi @Energy_Tidbits · Dec 6

"Airfares have to go up. There is just no way of avoiding that" "there is no way the industry can absorb the additional costs that are coming our way as we transition to #NetZero*"* says @IATA head to @GuyJohnsonTV....
Show more

4 4 1.8K

Dan Tsubouchi @Energy_Tidbits · 10h

Are increasing respiratory infections in China why traffic is dropping?

3rd consecutive WoW drop in Baidu city-level road congestion -1.8% WoW for 12/6 wk,-3.5% WoW for 11/29 wk, -5.9% WoW for 11/22 wk.

13 of top 15 cities down MoM.

Thx @BloombergNEF. #OOTT

2 4 1.5K

Dan Tsubouchi @Energy_Tidbits · Dec 6

For those not near their laptops. @EIAgov
just released at 8:30am MT its #Oil #Gasoline #Distillates inventory as of dec 1. Table below compares EIA data vs @business expectations and vs @APIenergy yesterday. Prior to release, WTI was $70.50. #OOTT

Oil/Products Inventory Dec 1: EIA, Bloomberg Survey Expectations, API			
(million barrels)	EIA	Expectations	API
Oil	-4.63	-1.60	0.59
Gasoline	5.42	1.34	2.80
Distillates	1.27	1.10	1.90
	2.06	0.84	5.29
Note: Oil is commercial so builds in a build of +0.3 mmb in SPR for the Dec 1 week			
Note: Included in the oil data, Cushing had a 1.29 mmb build for Dec 1 week			
Source EIA, Bloomberg			
Prepared by SAF Group https://safgroup.ca/news-insights/			

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Dan Tsubouchi @Energy_Tidbits · Dec 6

"Airfares have to go up. There is just no way of avoiding that" "there is no way the industry can absorb the additional costs that are coming our way as we transition to #NetZero" says @IATA head to @GuyJohnsonTV.

Higher prices = energy conservation

#OOTT

4 1 4.4K

Dan Tsubouchi @Energy_Tidbits · Dec 6

Stalled China recovery

China scheduled domestic flights +0.1% WoW to 89,810.

4th consecutive wk <90,000, back to Mar 21-27 level.

Will increasing respiratory questions hold back scheduled increase in flights?

Thx @BloombergNEF Claudio Lubis #OOTT

2 4 2.8K

Dan Tsubouchi @Energy_Tidbits · Dec 6

Europe wind generation 101.

Winter: positive correlation. as temps drop, so does wind generation.

#NatGaS has been saving the day this week.

Good thing for people cold spell is ending & a warm winter is expected.

Thx @BloombergNEF Adriana Martins, Andreas Gandolfo

...

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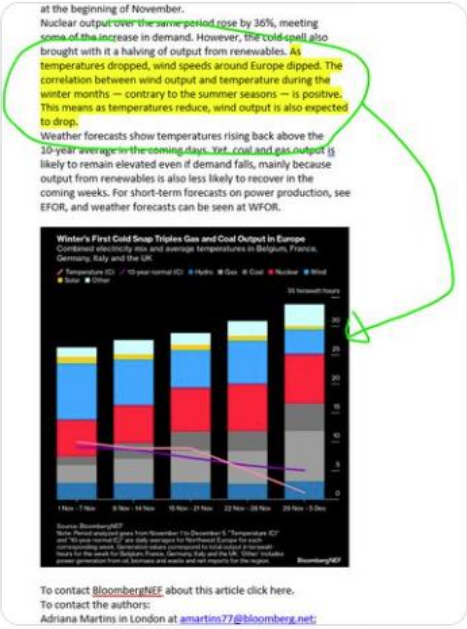


at the beginning of November.
Nuclear output over the same period rose by 36%, meeting some of the increase in demand. However, the cold spell also brought with it a halving of output from renewables. As temperatures dropped, wind speeds around Europe dipped. The correlation between wind output and temperature during the winter months — contrary to the summer seasons — is positive. This means as temperatures reduce, wind output is also expected to drop.
Weather forecasts show temperatures rising back above the 10-year average in the coming days. Yet, coal and gas output is likely to remain elevated even if demand falls, mainly because output from renewables is also less likely to recover in the coming weeks. For short-term forecasts on power production, see EFOR, and weather forecasts can be seen at WFOR.

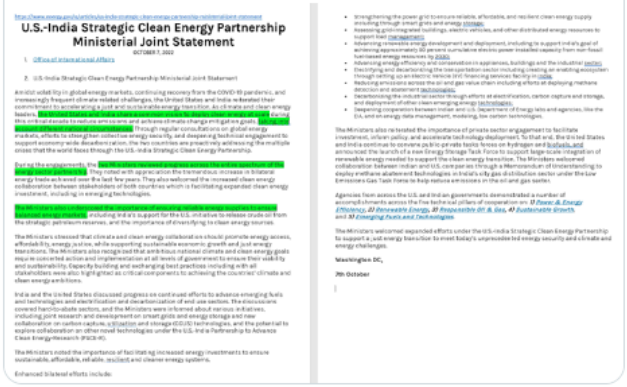
To contact BloombergNEF about this article click here.
To contact the authors:
Adriana Martins in London at amartins77@bloomberg.net;

1 3 5 3.2K

Dan Tsubouchi @Energy_Tidbits · Dec 5

"*taking into account different national circumstances*" will be the key words that will get countries to sign on to final COP28 declaration. ie. gives an out to countries that want an out.

#Oil #NatGas will be needed for longer.
#OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Oct 8, 2022
>
> Key caveat in joint @SecGranholm @HardeepSPuri #CleanEnergy statement "taking into account different national circumstances." No one can deny India wants to reduce emissions, etc, but will do so in the way, pace and cost impact to India consumers that is best for them. #OOTT
>
> 
> U.S.-India Strategic Clean Energy Partnership
> Ministerial Joint Statement

2 · 1 · 4.2K

Dan Tsubouchi @Energy_Tidbits · Dec 5

US consumer still spending!

$BAC CEO "*what you're seeing in the tension between how I feel versus what I do. And how I feel is I feel inflation, I'm reading about everything is more expensive. What I'm doing, I'm going to concerts, I'm spending money on entertainment*"...
Show more

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Dan Tsubouchi @Energy_Tidbits · Dec 5

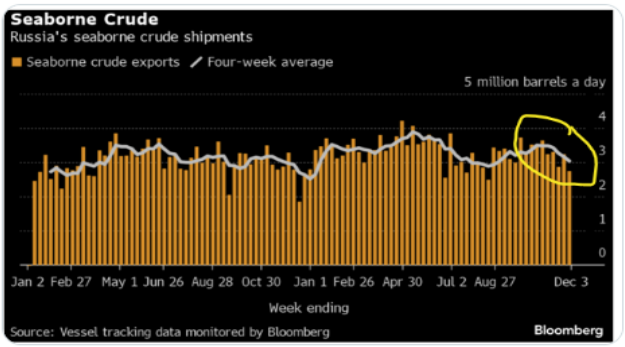
Storms in Black Sea = big drop in Russia #Oil shipments.

So should see some post storm increase.

Dec 3 wk was -0.5 mmb/d WoW to 2.74 mmb/d.

4-wk ave to Dec 3 was ~3.04 mmb/d, well below 3.28 mmb/d commitment.

Thx @JLeeEnergy....
Show more



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Dan Tsubouchi @Energy_Tidbits · Dec 5

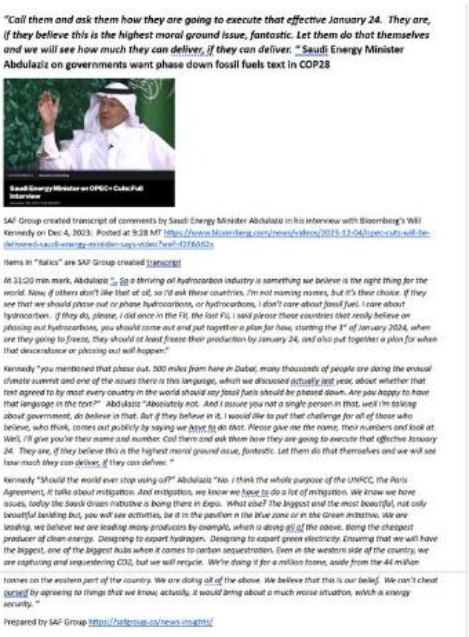
ICYMI

Saudi Energy Minister's challenge to governments who want to phase down hydrocarbons.

See 👇 SAF Group transcript.

#OOTT #COP28

> **Dan Tsubouchi** @Energy_Tidbits · Dec 4
>
> Legitimate question.
>
> "*Call them & ask them how they are going to execute that effective January 24. They are, if they believe this is the highest moral ground issue, fantastic. Let them do that themselves & we will see how much...*
> Show more



***"Call them and ask them how they are going to execute that effective January 24. They are, if they believe this is the highest moral ground issue, fantastic. Let them do that themselves and we will see how much they can deliver, if they can deliver. "* Saudi Energy Minister Abdulaziz on governments want phase down fossil fuels text in COP28**

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At 31:00 min mark, Abdulaziz "... for a thriving oil hydrocarbon industry is something we believe is the right thing for the world. Now, if others don't like that at all, so I'd ask these countries. I'm not naming names, but it's their choice. If they see that we should phase out or phase hydrocarbons, or hydrocarbons, I don't care about fossil fuel. I care about hydrocarbon. If they do, please, I did once in the FII, the last FII, I said please those countries that really believe on phasing out hydrocarbons, you should come out and put together a plan for how, starting the 1st of January 2024, when are they going to freeze, they should at least freeze their production by January 24, and also put together a plan for when that deacreadsce or phasing out will happen."

Kennedy "you mentioned that phase out. 500 miles from here in Dubai, many thousands of people are doing the annual climate summit and one of the issues there is this language, which we discussed actually last year, about whether that text agreed to by most every country in the world should say fossil fuels should be phased down. Are you happy to have that language in the text?" Abdulaziz "Absolutely not. And I assure you not a single person in that, well I'm talking about government, do believe in that. But if they believe in it, I would like to put that challenge for all of those who believe, who think, comes out publicly by saying we have to do that. Please give me the name, their numbers and look at. Well, I'll give you're their name and number. Call them and ask them how they are going to execute that effective January 24. They are, if they believe this is the highest moral ground issue, fantastic. Let them do that themselves and we will see how much they can deliver, if they can deliver. "

Kennedy "Should the world ever stop using oil?" Abdulaziz "No. I think the whole purpose of the UNFCC, the Paris Agreement, it talks about mitigation. And mitigation, we know we have to do a lot of mitigation. We know we have issues, today the Saudi Green Initiative is being there in Expo. What else? The biggest and the most beautiful, not only beautiful banking but, you will see activities, be it in the pavilion in the blue zone or in the Green Initiative. We are leading, we believe we are leading many producers by example, which is doing all of the above. Being the cheapest producer of clean energy. Designing to export hydrogen. Designing to export green electricity. Ensuring that we will have the biggest, one of the biggest hubs when it comes to carbon sequestration. Even in the western side of the country, we are capturing and sequestering CO2, but we will recycle. We're doing it for a million tonne, aside from the 44 million tonnes on the western part of the country. We are doing all of the above. We believe that this is our belief. We can't cheat ourself by agreeing to things that we know, actually, it would bring about a much worse situation, which is energy security. "

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2 1 2 2K

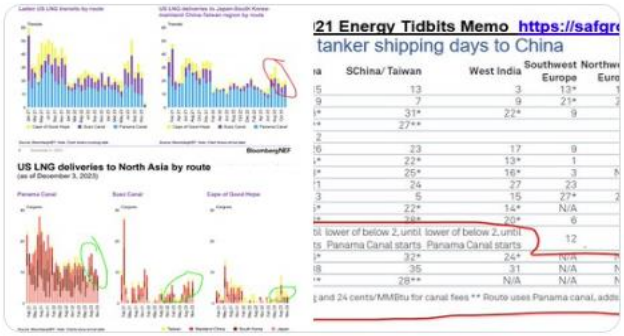
Dan Tsubouchi @Energy_Tidbits · Dec 5

Panama Canal Traffic Jam.

@BloombergNEF: More US #LNG to Asia having to take longer voyage time via Suez Canal or Cape of Good Hope.

See 👇 @SPGlobal comparative tanker shipping voyage times.

#OOTT



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Dan Tsubouchi @Energy_Tidbits · Dec 5

Suez Canal 101

Yesterday @JakeSullivan46 said US talking with other counties to set maritime task force to "ensuring safe passage" of ships in Red Sea."

All cargo ships/tankers (incl 👇 10/28 >6 mmbd) thru Suez have to go thru Red Sea & Bab El Mandeb chokepoint..

#OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Oct 28
>
> Suez Canal 101
>
> Tanker/cargo ships thru the Suez have to go thru Red Sea & Bab el Mandeb.
>
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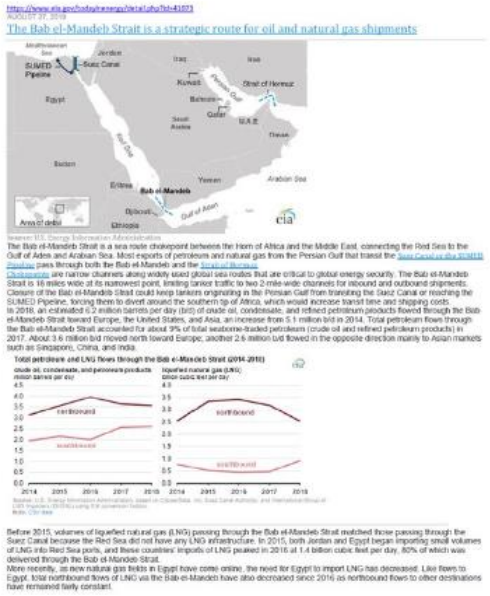

Dan Tsubouchi @Energy_Tidbits · Dec 4

#Oil markets will want/need more clarity on respiratory in China

@SullyCNBC with @onlyyoontv on Xpeng boss deleted post on return of Covid testing all on his flight back to Shanghai. Also reports Covid testing at Beijing, Tianjin, etc.

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Dan Tsubouchi @Energy_Tidbits · Dec 4

Legitimate question.

"*Call them & ask them how they are going to execute that effective January 24. They are, if they believe this is the highest moral ground issue, fantastic. Let them do that themselves & we will see how much they can deliver, if they can deliver*" Saudi...

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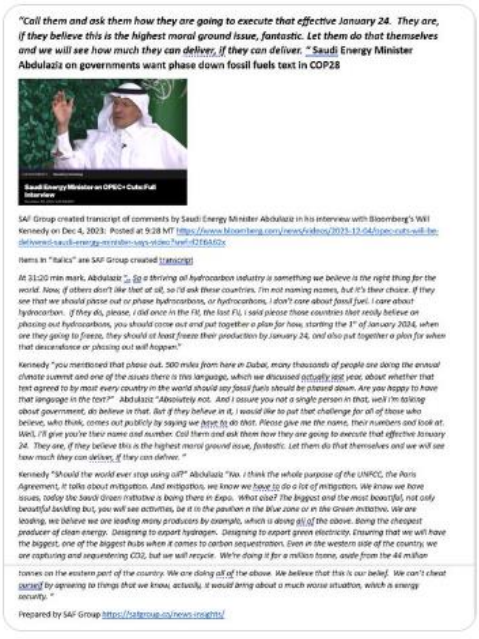

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Dan Tsubouchi @Energy_Tidbits · Dec 4

WOW!

Russia, OPEC Secretariat meeting with 5 Secondary Sources & 5 tanker trackers agree to a template & mthly meetings for transparency in RUS #Oil & products exports.

It's why Saudi Energy Minister is The Man!

See 👇 SAF Group transcript.

...

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"They have agreed to put a meeting in a monthly basis on the 5th of each month to engage with more transparent information on a month-to-month basis. In fact there was a template that was agreed and the exercise will be continuous." **Saudi Energy Minister Abdulaziz on Russia, OPEC Secretariat, Five Secondary Sources & Five Tanker Trackers for Russian export transparency.**

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Items in "italics" are SAF Group created transcript

At 2:15 min mark, Abdulaziz *"...in that extended period that we have taken, Russian ministry went with the Secretariat to the Secondary Sources, those who can attended wanted to attend because two of them could not do it because of the embargo issue and five of the more known, we aren't naming names, of the tanker trackers, in one collective meeting preceded by a compilation of what is their requirements for Russia to become much more transparent in their data. Especially that it is done on exports. We wanted to convince our friends in Russia that they have separate out what is crude and what is product. And the meeting was made on Monday. And this is one of the reasons we had to ask for the timing, the additional time. And that had that meeting collectively with five of the Secondary Sources and, if I am not mistaken, five of the tanker trackers. They have agreed with them on answering, answers on so many of the questions. They have agreed to put a meeting in a monthly basis on the 5th of each month to engage with more transparent information on a month-to-month basis. In fact there was a template that was agreed and the exercise will be continuous. "*

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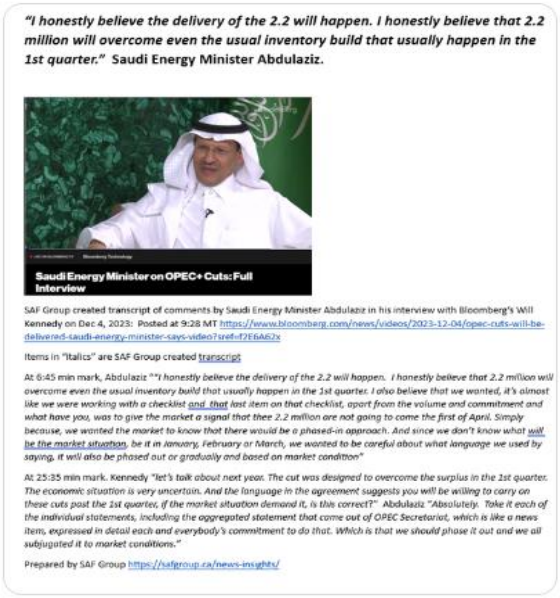
2 32 118 57K

Dan Tsubouchi @Energy_Tidbits · Dec 4

"i honestly believe that 2.2 million will overcome the usual inventory build that usually happen in the 1st QT". "Absolutely" cuts could be extended. Saudi Energy Minister Abdulaziz.

Much more in this great @wenkennedy interview.
bloomberg.com/news/videos/20...
#OOTT



"I honestly believe the delivery of the 2.2 will happen. I honestly believe that 2.2 million will overcome even the usual inventory build that usually happen in the 1st quarter." **Saudi Energy Minister Abdulaziz.**

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At 6:45 min mark, Abdulaziz *"I honestly believe the delivery of the 2.2 will happen. I honestly believe that 2.2 million will overcome even the usual inventory build that usually happen in the 1st quarter. I also believe that we wanted, it's almost like we were working with a checklist and that last item on that checklist, apart from the volume and commitment and what have you, was to give the market a signal that thee 2.2 million are not going to come the first of April. Simply because, we wanted the market to know that there would be a phased-in approach. And since we don't know what will be the market situation, be it in January, February or March, we wanted to be careful about what language we used by saying, it will also be phased out or gradually and based on market condition"*

At 25:35 min mark. Kennedy *"let's talk about next year. The cut was designed to overcome the surplus in the 1st quarter. The economic situation is very uncertain. And the language in the agreement suggests you will be willing to carry on these cuts past the 1st quarter, if the market situation demand it, is this correct?"* Abdulaziz *"Absolutely. Take it each of the individual statements, including the aggregated statement that came out of OPEC Secretariat, which is like a news item, expressed in detail each and everybody's commitment to do that. Which is that we should phase it out and we all subjugated it to market conditions."*

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8 24 4.1K

Dan Tsubouchi @Energy_Tidbits · Dec 4

What is "opposing by all legal means"?

Venezuelans vote YES "*Do you agree in **opposing**, by all **legal** means, Guyana's pretension to u**se unilaterally a sea** whose borders haven't been defined, illegally and in violation of international law?*"

Thx @inaitriago @zerpius #OOTT

2 3 5 2.2K