

# Total upstream, midstream investments in natural gas to reach \$8.7tn by 2050: GECF



The Gas Exporting Countries Forum (GECF) has projected that the total upstream and midstream investments in natural gas will reach a hefty \$8.7tn by 2050.

A lack of investment will lead to higher gas prices, which, coupled with higher carbon prices, may result in inflationary pressures so high that they may trigger people's resistance to energy transition policies in developed countries, GECF noted in the 'GECF Global Gas Outlook 2050'.

The ripple effect of these undercurrents will be even more dramatic in developing countries, it said and noted investment in natural gas is critical for the stability of global energy systems.

GECF yesterday unveiled its annual 'GECF Global Gas Outlook 2050', which is a comprehensive report on the status of natural gas up to 2050.

In the sixth edition, the outlook finds that natural gas can become the fuel of choice in satisfying the growing world energy needs, addressing climate change and improving air quality. It predicts the share of natural gas in the energy

mix will increase from 23% today to 27% by 2050.

In his overview of new-edition outlook, Mohamed Hamel, secretary-general, GECF, highlighted the continued prominence of natural gas in various energy outlooks and pathways.

Hamel said, "The GECF Global Gas Outlook 2050 underscores that investment in natural gas is critical for the stability of global energy systems. It projects that by 2050, total upstream and midstream investments will reach a hefty \$8.7tn."

In his foreword, Hamel said, "Recent energy markets developments have underlined the critical role of natural gas in ensuring a continuous and affordable supply to end-consumers, in particular when the wind is not blowing and the sun not shining. They have also epitomised the globalisation and increased financialisation of natural gas markets.

"Additionally, they have emphasised the positive role that natural gas plays in many important sectors and for the daily life of people. This even includes food security, as natural gas is a key input in the production of fertilisers.

"Environmental policies are a key driver of the projections contained in the outlook. In this context, whilst upholding that natural gas is the cleanest of hydrocarbon fuels, the outlook explores the state of technologies that will make it even cleaner.

"Carbon capture, utilisation, and storage (CCUS) is a promising pathway, as it involves proven technologies and attracts increased interest. The number of new CCUS projects launched in 2021 has sharply increased. Methane emissions are expected to be reduced, especially considering that in most cases, this is a commercially-sound undertaking.

"Blue hydrogen derived from natural gas is the least costly option to decarbonise high-temperature process industries, such as steel and cement industries. Direct air capture, though still very expensive, is also attracting more attention and research funds."

The GECF Global Gas Outlook 2050 is the flagship publication of the association of 19 countries, who together represent 71% of the world's proven gas reserves, 43% of its marketed production, 52% of pipeline, and 58% of LNG exports in the world.

The outlook is based on a proprietary GECF Global Gas Model.

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# The Economic Consequences of the Ukraine War



Feb 25, 2022 JASON FURMAN

Russia's invasion of Ukraine has been rapid and dramatic, but the global economic consequences will be much slower to materialize and less spectacular. Yet, other than Ukraine, Russia will likely be the biggest long-term economic loser from the conflict.

CAMBRIDGE – Russia's invasion of Ukraine has been rapid and dramatic, but the economic consequences will be much slower to materialize and less spectacular. The war itself is enormously tragic, first and foremost for the Ukrainian people, but also for the Russian people and the global order more generally. When something like this happens, we expect it to be like a morality play in which all the bad consequences play out equally dramatically in every dimension, including the economy. But the economy does not work that way.

True, financial markets reacted swiftly to news of Russia's invasion. The MSCI All Country World Index, a leading global equity gauge, fell to its lowest level in almost a year. The price of oil rose above \$100 a barrel, while European natural gas prices initially surged by almost 70%.

These energy-price increases will negatively affect the global economy. Europe is especially vulnerable, because it did little in recent years to reduce its dependence on Russian gas, and in some cases – notably, Germany, which abandoned nuclear power – even exacerbated it.

Oil-importing countries will experience a headwind from higher prices. The United States is more hedged: Because its oil production is equal to its oil consumption, more expensive oil is roughly neutral for GDP. But higher oil prices will hurt US consumers while helping a more limited segment of businesses and workers tied to the oil and gas industry. The price surge will also add to inflation, which is already at its highest levels in a generation in the US, Europe, and other advanced economies.

But some perspective on these immediate consequences is in order. At \$100 a barrel, oil is about one-quarter below its inflation-adjusted price during 2011 to 2014. Moreover, prices for oil futures are lower than spot prices, suggesting that the market expects this increase to be temporary. Central banks may therefore largely look through events in Ukraine, neither holding off on tightening nor speeding it up in response to higher headline inflation. And global stock markets are still up over the last year.

Similarly, although the Russian stock market has fallen significantly since the start of the invasion, Western sanctions are unlikely to have immediate dramatic effects. Sanctions rarely do; they are simply not the economic equivalent of the bombs that Russia is currently dropping on Ukraine.

Moreover, Russia is better prepared than most countries to weather sanctions. The country has been running an enormous current-account surplus and has accumulated record foreign-exchange reserves of \$630 billion – sufficient to cover nearly two years of imports. And while Russia is dependent on revenue from Europe, Europeans are dependent on Russia's oil and gas – which may be even harder to replace in the short run.

But, in the longer term, Russia will likely be the biggest economic loser from the conflict (after Ukraine, whose losses will go well beyond what can be measured in the national accounts). Russia's economy, and the well-being of its population, have been stagnant since the Kremlin's 2014 annexation of Crimea. The fallout from its current, large-scale invasion will almost certainly be more severe over time. Sanctions will increasingly take a toll, and Russia's growing isolation, as well as heightened investor uncertainty, will weaken trade and other economic links. In addition, Europe can be expected to reduce its fossil-fuel dependence on Russia.

The longer-term economic consequences for the rest of the world will be far less severe than they are for Russia, but they will still be a persistent challenge for policymakers. There is a risk, albeit a relatively unlikely one, that higher short-run inflation will become embedded in increasingly unanchored inflation expectations, and thus persist. If that happens, central banks' already difficult job will become even more complicated.

In addition, defense budgets are likely to rise in Europe, the US, and some other countries to reflect the increasingly dangerous global situation. This will not reduce GDP growth, but it will reduce people's well-being, because resources dedicated to defense are resources that cannot go toward consumption or investment in education, health care, or infrastructure.

The medium- and long-term consequences for the global economy of Russia's invasion of Ukraine will depend on choices. By invading, Russia has already made one terrible choice. The US, the European Union, and other governments have made initial choices on sanctions, but it remains to be seen how Russia will react to them or whether further penalties will be imposed. To the extent that sanctions and counter-responses escalate, the costs will be larger – first and foremost for Russia, but also to some degree for the rest of the global economy.

Global economic relations are positive-sum, and Russia's growing isolation will remove a small positive. More broadly, uncertainty is never good for the economy.

But, as the world continues to respond to the Russian invasion, concerns about GDP seem minor by comparison. Far more important is a world where people and countries feel secure. And that is something worth paying for – even more than the world's leaders have paid so far.

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## **U.S. oil drilling rises in response to higher prices**



By John Kemp

LONDON, Feb 25 (Reuters) – Prominent business leaders in the U.S. shale industry have been proselytising about their newfound commitment to restricting output growth to protect prices and profit margins.

But the rate of new drilling and production is climbing in response to rising prices – albeit more slowly than during the frenzied growth of the first (2009–2014) and second (2016–2019) shale booms.

Nearly 80 weeks after hitting a cyclical low, the number of rigs drilling for oil has risen by 348 (an average of 4.4 per week), according to data from oilfield services company Baker Hughes.

The rise compares with increases of 433 (5.5 per week) and 584 (7.4 per week) at the same point after the last two cyclical lows in 2016 and 2009 respectively.

The number of rigs is rising at roughly similar rates in the



Permian Basin (2.4 per week) and the other oil-rich shale plays (2.0 per week).

As a result, onshore production from the Lower 48 states rose in six of the seven months between May 2021 and November 2021, the most recent month for which production statistics are available.

Onshore production was rising at an annual rate of roughly 630,000 barrels per day (bpd) at the end of 2021, according to the U.S. Energy Information Administration.

The agency predicts a similar increase of 630,000 bpd by the end of 2022 and a slightly slower one of 470,000 bpd by the end of 2023 ("Short-term energy outlook", EIA, Feb. 8).

Output is increasing much more slowly, only a quarter to a third as fast, as at height of the last boom in 2018, when onshore production was increasing by as much as 1.8 million bpd over twelve months.

In that sense, shale industry leaders are being true to their word, increasing the number of new wells and production more slowly than before to protect prices and profit margins and return capital to shareholders.

But the industry's commitment to limiting investment is being tested as prices continue rising to levels that are well above the long-term average after adjusting for inflation.

Faster production increases look likely as a result of the continued escalation in oil prices since the start of the year.

## DELAYED RESPONSE

Shale drilling has become much more efficient since horizontal drilling and hydraulic fracturing techniques began to be widely applied to oil-rich plays at the start of the last decade.



In the short run, however, drilling exhibits diminishing marginal returns during an upswing; additional rigs add smaller increments to output as they are deployed to less promising sites with less experienced crews using older equipment.

Current rig counts cannot usefully be compared with those five let alone ten years ago, but short-term changes in the rig count can provide a useful directional indicator for output changes over the next 12 months.

Changes in oil futures prices generally filter through into changes in drilling activity with a lag of just under 20 weeks.

The explanation is that it takes four-to-five months for producers to see if price changes will be sustained before deciding to alter the drilling programme, contract with drilling firms, wait for rigs to arrive on site, set up and begin boring.

Current drilling rates therefore reflect prices in September–October 2021, when front-month futures were trading around \$70–80 per barrel.

On average, it will take another six months for wells being drilled at present to be fractured, completed, hooked up to gathering systems and enter commercial production, which should keep output rising through at least August.

Since September–October, however, prices have risen by another \$10–15 per barrel which will ensure the number of rigs keeps rising throughout the second quarter, and production climbs faster through the end of the year.

The rapid escalation in spot prices and severe backwardation in futures is signalling the urgent need for more crude to meet strong consumption growth as the economy rebounds after the pandemic-driven recession.

U.S. oil producers are starting to respond by increasing their drilling programmes in the core shale plays of Texas and more marginal ones elsewhere, which should improve oil availability later this year and especially in 2023.

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## European industry faces shrink or shut decisions on soaring energy pain



Bloomberg / Brussels

Europe's biggest industrial firms have been banking on spring to bring down soaring energy costs. Those hopes faded this week as Russian tanks rolled into Ukraine.

Smelters and chemical factories across Europe were already struggling before the invasion sparked another jump in gas and electricity prices. Now, a growing list of companies including Europe's biggest chemicals maker BASF SE are warning the

energy crisis will keep hacking away at their bottom lines for the foreseeable future.

“Energy prices will stay at a high level and they won’t go back to normal soon,” said Martin Brudermueller, BASF’s chief executive officer.

BASF already took an €800mn (\$900mn) hit from rising gas prices in the fourth quarter, and the situation could worsen if the US and Europe broaden sanctions against Russia, which supplies more than 40% of the European Union’s natural gas.

“It would be very difficult to replace Russian gas with liquefied natural gas from elsewhere,” Brudermueller said.

BASF isn’t alone. The energy-intensive metals industry is also struggling. Aluminium Dunkerque Industries France, Europe’s largest aluminium smelter, had planned to ramp up curtailed production after the French government helped shoulder as much as 80% of the cost burden. But the renewed surge in prices following Russia’s invasion of Ukraine has put the plan on ice, a labour union official said.

Meanwhile, Germany’s Trimet Aluminium SE said manufacturing the metal isn’t economical at present energy prices. And building-materials giant HeidelbergCement AG on Thursday warned that profits are likely to suffer from rising energy costs over the coming months.

European energy prices surged in the autumn, tipping smaller firms across the continent towards bankruptcy and prompting others to temporarily cut production at unprofitable factories. The continent’s larger industrial firms typically purchase their energy in monthly tranches, a strategy that initially enabled them to absorb the price shocks and more gradually pass them to consumers.

While mild weather eased gas prices off record highs hit December 21, benchmark month-ahead prices have traded at nearly four times the five-year average of €90 per megawatt hour over the past five months.

Gas prices have been highly volatile since Russia’s invasion. Benchmark month-ahead contracts surged 60% to an intraday high of €143 per megawatt hour on Thursday, before falling back to

trade around €90 per megawatt hour late Friday.

Wolfgang Hahn, owner of Energy Consulting GmbH that gives energy advisory services to 2,500 companies in Germany, said there's growing concern about energy supplies later in the year.

"Many companies are already looking forward to next autumn and winter and are wondering whether the gas storage facilities will be filled again," Hahn said. They're also worried "whether an appropriate alternative to Russian gas will be found, or whether gas imports from Russia will be completely interrupted."

In the days since hostilities began in Ukraine, prices have spiked for forward contracts for warmer months when consumers typically use less energy to power and heat their homes. The impact of sanctions, Germany's decision to halt the Nord Stream 2 pipeline, and uncertainty around Russian gas supplies that flow through Ukraine are expected to keep prices elevated over the coming months.

"Firm supplies through Ukraine and NS2 are needed to balance the European gas market and rebuild depleted storage levels," Rystad Energy analysts said in a note.

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## **India solar park sparks desire for school**



By Roli Srivastava/Bhadla

The teenage girls of Bhadla, near one of the world's largest solar parks, store their books in tattered briefcases and their dreams in the essays they write between household chores.

Their remote pastoral community lost the land their animals grazed on until about a decade ago to the solar power plant in the northwestern state of Rajasthan – as well as the opportunity to work at the park due to a lack of education and skills.

Once resentful, these days Bhadla's young women say they want to get jobs at the solar facility, reflecting emerging aspirations as India expands its renewable power capacity amid a global shift to clean energy.

"I could work in the solar park if I was educated – I could manage files in the office or do their accounts," said Hira Bano, 18, who finished tenth grade two years ago.

"I have to study or I will be stuck in household work all my life," said Bano, taking her books out of a briefcase gathering dust since the only village school shut more than two years ago.

Bhadla is home to one of the 52 solar parks India had approved

across 14 states as of last year, in a drive to wean itself off planet-heating coal and meet a renewable energy goal of 500 gigawatts by 2030.

Sunny Rajasthan is a preferred state for building large new solar installations as it has available barren desert land that is sparsely populated, said state officials.

At 2,300 megawatts, Bhadla has the world's largest solar farm capacity – and more parks are in the offing in Rajasthan, according to officials at the state-run Rajasthan Renewable Energy Corporation Limited (RRECL).

That is creating opportunities in a region with previously few jobs due to its extreme natural conditions and lack of water, said RRECL chairman and managing director Subodh Agarwal.

Nonetheless, Bhadla locals – pastoralists who for generations kept animals on state land they treated as their own – feel left out of the development frenzy in their backyard.

"We have lost land and livestock, so it is only education that can give us a livelihood," said village elder Mohamed Sujawal Mehr.

"Now big companies surround us, but only a few of our men got jobs there," he said, noting that even a security guard position requires tenth-grade schooling. "How can they hire us if we can't read or write?"

Bhadla's school was once an unused village accessory, as education was not seen as a priority, until the arrival of the solar park infused new life into it.

The park's biggest operator, Saurya Urja, a joint venture of the state and infrastructure firm IL&FS, started sending two teachers to the school to hold regular classes.

One of them, Andaram Meghwal, said that when he first came to the village in 2017, the children climbed to the tops of the trees they were so afraid.

"We got students (to come in) from nearby towns to give them exposure to the world outside," he said. "We shared stories of women achievers, the challenges they overcame."

Bano – who had previously spent her time grazing cattle, working on the farm and fetching firewood – fell in love with

science, school games and the idea of pursuing a career.

Girls were more inspired to study than boys as they had lost their main activity of grazing animals, while men could find work at the solar park, Meghwal said.

This was between 2015 and 2020, when 900,000 blue solar panels were erected on 12,000 acres, 5,500 jobs were created, and eateries and tea shops opened along a new highway.

But as the park neared completion, jobs for unqualified workers began to shrink. The plant has created about 1,100 long-term jobs to operate and maintain it over 25 years – but locals lack the technical skills needed, said Saurya Urja officials.

Sarthak Shukla, a sustainability policy consultant, said clean energy provides fewer direct jobs than thermal coal power, which employs 800 to 900 people for a 1GW plant compared with 25 to 30 at a similar-sized solar park.

In Bhadla, Ayub Khan Chooda, 35, is among those who have benefited, crediting his contract to wash 400 solar panels daily to his three tractors – which pull small water tankers along the rows – despite having studied only up to first grade.

Dadda Khatoon, 32, was also happy when her husband returned from Dubai, after six years of milking and grazing camels, and got a security guard job at the solar park for Rs8,000 (\$106.30) a month.

“He is happy, healthy and we are also able to save some money,” said Khatoon, sitting with village women in the winter sun. “But I don’t seem to have a role anymore apart from cooking and feeding my family. I think I had more respect then.”

With no land left to graze their animals, Bhadla residents sold their livestock whose fodder, a bitter yellow fruit called “tumba”, now lies uneaten on the vine between the solar panels.

Women from this conservative community no longer venture out, fearing the busy highway and “the new people from cities”.

Local health workers said hypertension and diabetes have



become quite common owing to the new sedentary lifestyles. Shukla said that with a better understanding of the social and cultural impacts and the right policies, the solar sector could offer opportunities for Indian women, including training and other incentives such as health and education programmes. Globally, women make up 32% of the renewable energy workforce compared with 22% in the oil and gas industry, according to the International Renewable Energy Agency.

Local elder Mehr loves to recall the celebrations two years ago when three girls, including Bano, passed their tenth grade, the first to do so in this village of 250 households. "We banged plates, clapped," he said.

But their school, which had about 100 students, shut down soon after when a disgruntled teacher submitted a report showing zero attendance – a claim disputed by villagers.

The solar firm also stopped supporting classes and shifted to a broader community focus running mobile health and veterinary clinics, according to Saurya Urja CEO Keshav Prasad.

He told the Thomson Reuters Foundation that the company backed the villagers' demand to reopen the school, pointing to rising demand for education across villages near the solar park.

Manphool Singh, the education official overseeing Bhadla school, said he had received the requests and a government decision was pending.

"We are trying our best to open it so children can study again," he said.

Meanwhile, the girls cook, clean and stitch together colourful pieces of cloth to make rugs for their dowries.

Drawing water from a well, Asma Khatoon, 15, said her only desire was for the school to reopen so she could sit her tenth-grade exam.

In a short Hindi essay, she wrote: "This village has too many restrictions... I want to study, become a working woman." – Thomson Reuters Foundation

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# COMMODITIES Feb 22, 2022

## OPEC+ sees no need to pump faster as oil heads toward US\$100



Several key OPEC+ members see no need to accelerate output increases even as oil heads toward US\$100 a barrel amid worsening tension over Ukraine.

Iraq and Nigeria said the group's strategy of gradually raising production is enough to balance the market and the group has no need to be more aggressive.

Many delegates echoed that view privately on Tuesday, saying it wouldn't make a difference if crude did hit triple digits.

The 23-nation alliance, led by Saudi Arabia and Russia, next meets on March 2. It is factoring in growth in output from non-OPEC+ members such as Brazil and Canada and doesn't want to see any increase in commercially-stored oil around the world, according to Iraq's Energy Minister Ihsan Abdul Jabbar.

"The market will have more and more oil so we think there's no need" to diverge from today's strategy, he said in an interview in Qatar, where he's attending a natural gas conference. "We will not create any growth to the commercial storage. We will secure all the demand by making the required supply."

Brent crude rose 3.6 per cent to US\$98.94 a barrel as of 10:04 a.m. in London, extending this year's jump to 27 per cent. Tuesday's gain came after Russian President Vladimir Putin announced he's recognizing two self-proclaimed separatist republics in eastern Ukraine and plans to send "peacekeeping forces" to the region in a dramatic escalation of the conflict. Moscow has consistently denied having plans to invade Ukraine.

## **KEEP STEADY**

Nigeria's energy minister, Timipre Sylva, backed Jabbar's comments.

"We won't do anything extraordinary at this time because we are expecting a lot of production" from outside of OPEC+, Sylva told reporters at the same event. There's "no need at all to bring on more barrels than the current plan."

Several of OPEC+'s biggest producers want to continue to add 400,000 barrels a day of crude to the market each month, Bloomberg reported on Monday.

Iraq's Jabbar said the Organization of Petroleum Exporting Countries and its partners will make their decision for April at the March meeting, after reviewing fresh data on supply and

demand.

Some major oil importers have called on OPEC+ to pump faster and put pressure on the likes of Saudi Arabia to use up some of their spare capacity.

Read more: OPEC+ Must Fix Its Million-Barrel Supply Gap, IEA Says

Jabbar said it would be “unfair” for any OPEC+ state to raise output beyond its quota, despite many members struggling to reach theirs. Last week, the International Energy Agency, which advises rich countries, said OPEC+ was pumping almost 1 million barrels a day below its target.

“We have come from the recovery from COVID,” the Iraqi minister said. “It is not fair that you will give the increase just for some countries.”

Iraq undershot its output target last month because of bad weather at ports, Jabbar said. The country should meet its quota for February of around 4.3 million barrels a day, he said.

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## **Airbus to test hydrogen engine on A380 jumbo jet**



By Alex Macheras

Airbus this week announced it will modify a superjumbo A380 to test a hydrogen-powered jet engine as the European aerospace group prepares to bring a zero emissions aircraft into service by 2035.

The partnership is an agreement with CFM International, a 50/50 joint company between GE and Safran Aircraft Engines, to develop an engine that can run on hydrogen. The converted test aircraft, the A380, will fly by the end of 2026.

The programme's objective is to ground and flight test a direct combustion engine fuelled by hydrogen, which Airbus is betting on to enable the company to decarbonise in line with aviation's climate change goals. The A380 flying test jet will be equipped with liquid hydrogen tanks prepared at Airbus facilities in France and Germany. Airbus will also define the hydrogen propulsion system requirements, oversee flight testing, and provide the A380 platform to test the hydrogen combustion engine in cruise phase.

CFM International will modify the combustor, fuel system, and control system of a GE Passport turbofan to run completely on hydrogen. The engine itself will be mounted along the rear fuselage of the A380 test jet to allow engine emissions,

including contrails, to be monitored separately from those of the engines powering the aircraft.

"This is the most significant step undertaken at Airbus to usher in a new era of hydrogen-powered flight since the unveiling of our ZEROe concepts back in September 2020," said Sabine Klauke, Airbus chief technical officer. "By leveraging the expertise of American and European engine manufacturers to make progress on hydrogen combustion technology, this international partnership sends a clear message that our industry is committed to making zero-emission flight a reality."

The venture comes amid increasing pressure on the aviation industry to cut pollution and meet zero-emission targets by 2050. Before the pandemic led to the grounding of much of the world's aircraft, aviation accounted for roughly 2.4% of global emissions. "To achieve these goals by 2050 the industry has to take action now and we are," said Gael Meheust, chief executive of CFM.

"Is hydrogen harder? Yes. Is it do-able? Absolutely," said Mohamed Ali, vice-president and general manager of engineering at GE Aviation.

Executives said the decision to use an A380, the world's largest passenger airline jet that has been phased-out at many airlines around the world due to its inefficiencies, would allow engineers more room for things like the tanks and the testing equipment. A commercial product available to airlines over the coming years will be much smaller. Airbus is expected to initially produce a regional or shorter-range aircraft.

In today's aircraft, wings are where the fuel is stored, and they are in no way large enough to store the hydrogen that would be needed for a long flight. Hydrogen planes of the future could have extra-large fuselages, but more likely they will be what's called blended wing, in which the planes are shaped like large triangles. This would allow them to store more fuel, but also reduce fuel consumption to make the aircraft aerodynamics even better.

Planes using hydrogen would emit only water, and initial tests suggest they can be just as fast as traditional planes, carrying more than a hundred passengers per flight over thousands of kilometres.

Most of the world's hydrogen today is produced by reforming

methane from natural gas – a fossil fuel – which produces carbon dioxide. Efforts are underway to develop green hydrogen by using an electric current from a renewable source to convert water into oxygen and hydrogen and reduce emissions in its production. If that is possible, along with no emissions from the planes themselves, aviation could become a green form of travel.

There are significant challenges that remain. If Europe were to fully achieve the environmental benefits of hydrogen-power – for example, for air travel, the production of clean – or green – hydrogen needs to be dramatically scaled up. Clean hydrogen is produced from water using an electric current from a renewable source, rather than from fossil fuels. Today only a tiny fraction of hydrogen used in Europe is categorically “clean.”

Hydrogen is a high-potential technology with a specific energy-per-unit mass that is three times higher than traditional jet fuel. Airbus notes that, if generated from renewable energy through electrolysis, given the fact it emits no CO<sub>2</sub> emissions, it will enable renewable energy to potentially power large aircraft over long distances but without the undesirable by-product of CO<sub>2</sub> emissions.

For now, we are still years away from commercial hydrogen aircraft becoming a reality, though. The refuelling infrastructure doesn't exist yet and hydrogen is more expensive and difficult to store onboard than kerosene-based fuel.

“Hydrogen combustion capability is one of the foundational technologies we are developing and maturing as part of the CFM RISE Programme,” said Gaël Méheust, president & CEO of CFM. “Bringing together the collective capabilities and experience of CFM, our parent companies, and Airbus, we really do have the dream team in place to successfully demonstrate a hydrogen propulsion system.”

Boeing has focused on more sustainable aviation fuels, which currently make up less than 1% of the jet fuel supply and are more expensive than conventional jet fuel. CEO Dave Calhoun said at an investor conference that he didn't expect a hydrogen-powered plane on “the scale of airplanes that we're referring to” before 2050.

Sustainable Aviation Fuel is a clean substitute for fossil jet



fuels. Rather than being refined from petroleum, SAF is produced from sustainable resources such as waste oils from a biological origin, or non-fossil CO<sub>2</sub>. It is a so-called drop-in fuel, which means that it can be blended with fossil jet fuel and that the blended fuel requires no special infrastructure or equipment changes. It has the same characteristics and meets the same specifications as fossil jet fuel.

Since the first commercial flight operated by KLM in 2011, more than 150,000 flights were powered by SAF. More than 45 airlines now have experience with SAF, and around 14bn litres of SAF are in forward purchase agreements.

Several airlines are driving forward the use of SAFs by signing multi-million dollar forward purchasing agreements. Others have invested in start-up support for SAF deployment, and some have promoted SAFs through test flights, research, and investigation of local opportunities. Five airports also have a regular SAF supply: San Francisco, Los Angeles, Oslo, Bergen and Stockholm.

However, scaling up the use of SAFs to a global market is challenging and requires substantial investment. The industry has called on governments to assist potential SAF suppliers to develop the necessary feedstock and refining systems – at least until the fledgling industry has achieved the necessary critical mass and prices drop thanks to economies of scale.\*

*The author is an aviation analyst. Twitter handle: @AlexInAir*

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## **UAE Minister praises brave decision by Qatar to pump new investments to boost natural gas production**



Doha: United Arab Emirates' Minister of Energy and Infrastructure HE Suhail bin Mohamed Al Mazrouei praised Qatar's decision to pump new investments to enhance its production capacity of liquefied natural gas.

In a speech at the opening session of the 6th Gas Exporting Countries Forum (GECF) Summit in Doha today, he congratulated Qatar on its brave decision to make new investments to enhance its production capacity of liquefied natural gas, which will enhance its role and the role of the region and the forum countries in supplying the world with resources needed by the global economy.

He pointed out that this decision comes in a circumstance characterized by the lack of investments in previous years in developing new sources of natural gas, especially liquefied gas, due to the low prices witnessed in the world.

The new global trend towards limiting climate change and carbon neutrality should be an encouraging factor for natural gas to occupy a key place in the transition towards energies

that are less polluting to the environment, the minister explained, stressing that natural gas is one of the best sources of fossil energy the world will heavily rely on in the coming years during the transition period.

He added that the regional countries represent the majority of natural gas reserves and they bear the responsibility of producing and supplying the world with this wealth, which will be in great demand.

The Minister said that the UAE is working to integrate the role of natural gas with renewable energy and peaceful nuclear energy to achieve its Energy Strategy 2050, in which green energies will represent 50 percent of the energy mix.

He clarified that the UAE's hosting of the COP 28 on Climate Change in 2023 will be an incentive and an opportunity to cooperate with the GECF to enhance the role of natural gas in the transition period and to work in the interest of member states.

In 2019, Qatar announced its intention to raise its production capacity of liquefied natural gas from 77 million tons per year currently to 126 million tons per year by 2027 through production expansion projects from the North Field, which include huge investments in environmentally friendly technologies.

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## **Qatar committed to low-carbon energy: Amir**



\*"Qatar has an annual carbon capture and sequestration capacity of up to 2.5mn tonnes, which will reach 9mn tonnes by 2030" "Qatar will continue to support the efforts to protect the interests of gas exporters, and to preserve the interests of the consumers, and to affirm the full and permanent sovereign rights of the member states to develop and exploit their natural resources"

The State of Qatar has confirmed on many occasions "its commitment to support the transition" to low-carbon energy, said His Highness the Amir Sheikh Tamim bin Hamad al-Thani.

At the opening of the 6th GECF Summit of Heads of State and Government of the Gas Exporting Countries Forum (GECF) member countries on Tuesday, His Highness the Amir referred to Qatar's carbon capture and sequestration facility and said it has an annual capacity of up to 2.5mn tonnes (of carbon dioxide). This capacity will reach about 9mn tonnes by 2030, he said.

His Highness the Amir patronised the summit's opening, which attended by Abdelmadjid Tebboune, President of Algeria; Ebrahim Raisi, President of Iran; Filipe Nyusi, President of Mozambique; Teodoro Obiang Nguema Mbasogo, President of Equatorial Guinea; Abdul Hamid Mohamed al-Dbeiba, Head of the Government of National Unity of the State of Libya; Dr Keith Rowley, Prime Minister of Trinidad and Tobago; and a number of ministers and heads of delegations of brotherly and friendly countries, QNA reported.

It was also attended by a number of sheikhs, ministers, heads of diplomatic missions accredited to Qatar, senior officials, businessmen, decision makers in the field of economy and energy, representatives of international institutions and companies and guests of the summit.

His Highness the Amir noted the transition to low-carbon energy is not only relevant to producers, but also closely related to end-users whose consumption behaviours determine the extent of the effectiveness and success of this transition.

"The transformation efforts must follow a balanced approach that takes into account human and economic development requirements in developing countries and poor societies, where nearly one billion people are deprived of electricity and fuel, the two basic sources required for a decent life for human beings.

"Investing in the ways and means of scientific and technological advances to capture and sequester carbon and reduce methane emissions is an essential component of a successful clean energy transition, and in enhancing the qualitative value that natural gas provides to users around the world, and keeping the global energy economy on a sustainable path."

His Highness the Amir noted, "To enhance our role in the natural gas industry, we are working to develop and increase our current production capacity of liquefied natural gas from 77mn tonnes per year to 126mn tonnes per year by 2027, through the North Field production expansion projects. "These include huge investments in eco-friendly technologies, namely an integrated system for capturing and injecting carbon dioxide, which, when fully operational, will become the largest of its kind in the LNG industry. Solar energy will be relied upon to generate part of the electricity required for this project."

Over the past two decades, His Highness the Amir said the world has witnessed a major change in the energy chart, where natural gas has occupied a large space, for several reasons, including that it is the least harmful energy source to the environment among other fossil energy sources.

Natural gas has been able to occupy increasing spaces in the energy basket in many countries.

The State of Qatar, His Highness the Amir said, "will continue

to support the efforts to protect the interests of the gas exporters, and to preserve the interests of the consumers, and to affirm the full and permanent sovereign rights of the member states to develop and exploit their natural resources.

"We will remain committed to enhancing the role of natural gas in the transition to low-carbon economies, and working alongside all our partners to achieve sustainable growth in the gas industry and meet the growing demand for this important source of energy. We will also seek to encourage investments and develop infrastructure and member states' capabilities to respond to natural disasters and accidents."

The GECF has played a major role in enhancing the contribution of natural gas to supporting economies and facing environmental challenges, which also contributes to achieving sustainable development goals.

"In this regard, we appreciate the joint efforts of all member states which have worked to provide reliable natural gas supplies to global markets, and maintained the stability of the markets."

Later, His Highness the Amir yesterday concluded the 6th Gas Exporting Countries Forum, which was held at the Sheraton Doha under the slogan 'Natural Gas: Shaping the Energy Future'.

The closing was attended by the presidents of Algeria, Iran, Mozambique and Equatorial Guinea, head of the Government of National Unity of Libya, prime minister of Trinidad and Tobago, and a number of ministers and heads of delegations of brotherly and friendly countries.

It was also attended by a number of sheikhs, ministers, heads of diplomatic missions accredited to Qatar, senior officials, businessmen, decision makers in the field of economy and energy, representatives of international institutions and companies and guests of the summit.

In a speech on the occasion, His Highness the Amir expressed "deep appreciation for all the sincere efforts that have marked its activities, leading to the adoption of the Doha Declaration, which came in response to the challenges and variables we are witnessing around us, and coinciding with a new phase in which natural gas contributes to charting a course towards a more sustainable future."

"Our summit confirmed our conviction that dialogue is the optimum way to achieve consensus, enhance co-operation, and



protect the interests of producers and consumers for the good of their peoples,” he said, according to an unofficial translation by QNA. “The State of Qatar welcomes working with everyone to make common good, security and stability prevalent among all peoples of the world.

“I reiterate my thanks to you all for your participation in this summit, and I also thank all those who contributed to organising and preparing for it.”

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## Wall St Week Ahead Surging oil prices add another worry for frazzled investors



NEW YORK, Feb 20 (Reuters) – A U.S. stock market, already on edge from a hawkish Federal Reserve and a conflict between Russia and Ukraine, now has another worry: higher oil prices.

U.S. crude prices stand at around \$91 a barrel after surging some 40% since Dec. 1 and earlier this week touched their



highest level since 2014. Prices for Brent crude , the global benchmark, have also soared and are near 7-year highs.

Rapidly rising oil prices can be a troubling development for markets, as they cloud the economic outlook by increasing costs for businesses and consumers. Higher crude also threatens to accelerate already-surging inflation, compounding worries that the Fed will need to aggressively tighten monetary policy to tamp down consumer prices.

“The stock market would really run into trouble if we went north of \$125 per barrel and stayed there for a while because that would overheat high levels of inflation,” said Peter Cardillo, chief market economist at Spartan Capital Securities. “That means that the Fed would have to be a lot more aggressive and that certainly would not be a pleasant scenario for the stock market.”

Rising tensions between Russia – one of the world’s largest oil producers – and Ukraine recently helped drive the rally in oil, which had been supported by a recovery in demand from the coronavirus pandemic.

Capital Economics analysts said earlier this week that crude oil and natural gas prices would surge if the conflict in Ukraine escalated “even if they fall back relatively quickly as the dust settles.”

Elevated oil prices contributed to the rise in U.S. inflation, which grew at its fastest pace in nearly four decades last month: While overall consumer prices rose 7.5% year-over-year in January, the index’s energy component rose by 27%.

Each “sustained” \$10 increase in the price of oil per barrel adds about 0.3 percentage points to the overall consumer price index, on a year-over-year basis, according to analysts at Oxford Economics.

“The largest impact of higher oil prices is on consumer price

inflation and it adds further to the pressure for the Fed to be more aggressive,” Kathy Bostjancic, chief U.S. financial economist at Oxford Economics, said in emailed comments to Reuters.

The benchmark S&P 500 (.SPX) is down over 8% this year while the yield on the benchmark 10-year Treasury note has risen by 40 basis points to over 1.9%. Investors are pricing the Fed funds rate to rise to above 1.50% by the end of 2022, from near zero now, according to Refinitiv’s Fedwatch tool.

## CONSUMER SPENDING IMPACT

Rising crude is already raising costs for businesses and drivers. The national U.S. average for gasoline recently stood at \$3.48 a gallon, automobile group AAA said earlier this week, up 18 cents from a month earlier and 98 cents from a year ago.

As gasoline prices rise, investors are monitoring trends for consumers, whose spending accounts for over two-thirds of U.S. economic activity. Data on Wednesday showed U.S. retail sales increased by the most in 10 months in January, but last week’s consumer sentiment reading came in at its lowest level in more than a decade in early February. [read more](#)

“The risk is that if gas prices at the pump start going up that means less discretionary spending for consumers at a time when a lot of their fiscal benefits from the last couple years are fading,” said Michael Arone, chief investment strategist at State Street Global Advisors.

Investors are gauging the effect of higher oil on companies’ earnings. Typically, rising oil prices are estimated to lift overall S&P 500 earnings by about \$1 per share for every \$5 increase in the price of crude, according to David Bianco, Americas chief investment officer at DWS Group, with benefits to energy firms outweighing the drag on earnings of airlines and other companies potentially hurt by higher crude costs.

That amounts to about 0.4% of total S&P 500 earnings expected for 2022.

The S&P 500 energy sector (.SPNY) is up 22% so far in 2022 while fund managers in the latest BofA Global Research survey reported their highest allocation to energy stocks since March 2012.

But with oil prices already near seven-year highs, and energy stocks comprising a far lower share of the market than a decade ago, those slim bottom-line benefits may be overshadowed by inflation worries if crude keeps charging higher, some investors said.

“Higher oil prices, without a recession, raise S&P profits,” Bianco said. “But not as much as it used to and you definitely don’t want this happening when the Fed is fighting inflation.”