UN climate report reignites global fight for compensation

With this week’s UN climate science report laying bare the staggering economic costs and losses already faced from climate change, an inevitable question arises: who should pay?

Within UN climate negotiations, “loss and damage” refers to the costs countries are incurring from climate-related impacts and disasters – costs that disproportionately hit the world’s poor and vulnerable who did least to cause global warming.

Drawing on more than 34,000 references from the latest scientific papers, the report released on Monday by the UN Intergovernmental Panel on Climate Change (IPCC) confirmed that economic sectors from agriculture and fishing to tourism were already being damaged.

Extreme heat has fuelled crop losses. Rising seas have turbo-charged cyclones that have razed homes and infrastructure, slashing economic growth.

And as the bills mount up, poorer countries are left with even less to spend on heath, education and infrastructure – compounding suffering.

“It’s an unending situation,” said Anjal Prakash, a lead IPCC

author and research director at the Indian School of Business.
The report is likely to intensify a years-long political fight over funding to pay for climate-linked losses, ahead of the next UN climate summit, COP27, in Egypt in November.
Vulnerable countries for years have sought funding to help them shoulder these costs. So far, it hasn't arrived, and rich nations have resisted steps that could legally assign liability or lead to compensation.
The mention of "loss and damage" in the 2015 Paris Agreement came with the caveat that it "does not involve or provide a basis for any liability or compensation".
Last November at the COP26 climate summit in Glasgow, poor countries called for a special "loss and damage" fund to be established, but the United States and other rich nations resisted. The delegates agreed to set up a UN body to help countries address loss and damage, and to continue discussions towards making "arrangements" for funding.
But there is no clarity on where the money would come from.
"We can't just create more talk shops when people are dying," said Harjeet Singh, senior adviser at Climate Action Network. He said COP27 needed to establish the funding facility that developing countries, including China, had called for at COP26.
Singh and other campaigners said the IPCC report – which has been approved by nearly 200 governments – could intensify pressure on the world's most powerful nations.
"It will help us to say that science is clear, the impacts are clearer now. So you are accountable for this, and you have to pay for this," said Nushrat Chowdhury, a policy advisor at NGO Christian Aid.
The report's discussion of climate losses is bolstered by recent improvements in "attribution science", which allows scientists to confirm when climate change caused or worsened a specific extreme weather event.
Still, putting a number on the resulting losses remains contentious. For example, can climate-linked losses from a weather event be separated from losses caused by poor disaster

planning? Can costs be counted for losses outside our economic systems, such as when nature is degraded or a community burial site is destroyed?

“We are still debating that in the scientific community,” said another IPCC lead author Emily Boyd, a professor at Sweden’s Lund University.

As climate disaster costs mount and UN negotiations remain stuck, some are considering other options.

“Liability and compensation have other avenues to be taken forward, which are courts,” said Saleemul Huq, an adviser to the Climate Vulnerable Forum group of 55 countries.

Sophie Marjanac, lawyer at environmental law firm ClientEarth, said the IPCC report “will generally support litigation” to address climate change.

The legal avenue faces other obstacles, however.

Last year a federal appeals court rejected New York City’s attempt to use state law to hold five oil companies liable to help compensate harm caused by global warming. The court said the regulation of greenhouse gas emissions should instead be addressed under federal law and international treaties.

“Challenges in climate change litigation are related to the law, not to do with the science,” Marjanac said. “The science has been clear, very clear for years.”

Global airlines on the flight path to carbon neutral aviation

Air transport's commitment to tackling its environmental challenges has not diminished despite the Covid-19 crisis that has decimated the global aviation industry. On the contrary, many airlines have pledged further action by targeting net-zero emissions; by purchasing sustainable aviation fuel (SAF); retiring aged aircraft, such as the iconic Boeing 747; and investing in the latest generation of fuel-efficient planes, including the Boeing 737 MAX and Airbus A350.

The development and deployment of sustainable aviation fuel (SAF) is the biggest area of opportunity for long-term reductions in aviation emissions, according to IATA, the global body of airlines.

SAF has the capability to reduce emissions 80% on a "like-for-like" basis with Jet A-1 fuel.

Elevating the production capacity for SAF is therefore a priority for airlines. Current levels are too low, at around 0.02% of global demand, to significantly lessen emissions or to generate the economies of scale necessary to reduce costs to competitive levels. But production is beginning to increase dramatically.

In 2021, IATA estimates the production and use of between 100mn and 120mn litres of SAF – an increase of more than 50% on 2020.

SAF facilities commissioned some three to four years ago are now coming online, IATA noted. An example is the Fulcrum Sierra Biofuel plant in Reno, Nevada, in the United States, which converts solid municipal waste into SAF.

Numerous additional SAF production facilities will come online over the next four years, such that by 2025 approximately 5bn litres of SAF could be available. That, IATA says, will meet around 2% of global demand.

By 2030, projections are for SAF availability to increase to cover at least 5% of demand globally. Meeting and exceeding projections for SAF cannot be the responsibility of SAF producers and the aviation industry alone.

Governments need to set in place supportive policy frameworks, industry experts say.

The global air transport industry recently took a momentous decision to achieve net-zero carbon emissions by 2050 and ensure that flying is sustainable.

To achieve that, cost-competitive sustainable aviation fuels (SAF) should fuel the majority of aviation's global emissions mitigation in 2050.

The industry has set out the pathway to meet its 2050 goal using a mixture of new technology, efficient operations, and improved infrastructure.

The target of reducing net CO2 by half is feasible through the aggressive deployment of SAF.

Other proposed options include the accelerated development of small, zero-emissions aircraft for short-haul operations from 2035 and the use of offsets in the interim.

These and other measures could also make it possible for the industry to meet an even more ambitious goal of net-zero carbon emissions by 2050.

It is estimated that (under the industry's trend setting initiative CORSIA or Carbon Offsetting and Reduction Scheme for International Aviation – a global carbon offsetting scheme) aviation will have to offset 2.6bn tonnes of CO2 between 2021 and 2035.

Obviously, the aviation industry has pinned its hopes on

sustainable aviation fuels, which it believes will help reduce airlines' global emissions and industrial carbon footprint.
It is proven that SAF can cut CO2 lifecycle emissions up to 80% compared with conventional jet fuel. It uses sustainable fuel sources, which do not compete with food or water, or damage biodiversity.
Rather than being refined from petroleum, SAF is produced from sustainable resources such as waste oils from a biological origin, agri-residues, or non-fossil carbon dioxide (CO2).
Sustainable aviation fuels are currently certified by regulators for up to 50% use in commercial flights.
SAF has been around since 2008. And more than 300,000 flights have taken to the skies using SAF since 2016, according to the International Air Transport Association. More than 45 airlines now have experience with SAF.
These flights have used it blended with regular aviation – without the need for any modification of engines or aircraft – and production continues to grow.
The amount of SAF used by commercial aircraft rose 65% between 2019 and 2020, despite the devastating financial impact of Covid-19 on airlines.
IATA Director General Willie Walsh says governments must be active partners in achieving net zero by 2050. As with all other successful energy transitions, government policies have set the course and blazed a trail towards success.
"The costs and investment risks are too high otherwise. The focus must be on reducing carbon," Walsh insists.

'Liveable future' on Earth at

risk, UN climate report warns

A landmark UN report warned on Monday that time had nearly run out to ensure a “liveable future” for all, detailing a horrifying “atlas of human suffering” and warning that far worse was to come.

Species extinction, ecosystem collapse, insect-borne disease, deadly heatwaves and megastorms, water shortages, reduced crop yields – all are measurably worse due to rising temperatures, the Intergovernmental Panel on Climate Change (IPCC) said.

In the last year alone, the world has seen a cascade of unprecedented floods, heatwaves and wildfires across four continents.

Such events will accelerate in coming decades even if the fossil fuel pollution driving climate change is rapidly brought to heel, the 195-nation IPCC warned.

As nations struggle to bend the curve of carbon dioxide emissions downward, they must also prepare for a climate onslaught that in some cases can no longer be avoided, the

report made clear.

For UN chief Antonio Guterres, it stands as a “damning indictment” of failed leadership that he described as nothing short of “criminal”.

“The world’s biggest polluters are guilty of arson of our only home,” he said.

Even Russia’s invasion of Ukraine cannot distract from the truths laid bare in the 3,600-page report and its summary for policymakers, said US Secretary of State Antony Blinken.

“The international community must urgently continue to pursue ambitious climate action, even as we face other pressing global challenges,” he said in a written statement.

Svitlana Krakovska, who headed Ukraine’s delegation, spoke passionately at the conference’s final virtual plenary about the link between conflict and global warming.

‘Root’ of war and warming

“Human-induced climate change and the war on Ukraine have the same roots – fossil fuels – and our dependence on them,” she said.

Among the report’s key takeaways was the intertwined fates of human and natural systems.

It stressed that climate change cannot be tamed unless degraded forests and oceans that stock carbon are restored and protected; and the ecosystems on which life forms depend for clean water, air and soil will not survive intact in a world of runaway warming.

The report made clear that a viable future rests on a knife’s edge.

Some dire impacts are already irreversible, such as the likely

demise of nearly all shallow water corals.

Other points-of-no-return lie just beyond the Paris Agreement’s aspirational target of capping global warming at 1.5 degrees Celsius above preindustrial levels, the report warned.

The 2015 treaty enjoins nations to hold the increase in temperatures to “well below” 2°C, but recent science has left no doubt that a 1.5°C threshold is far safer.

Even in optimistic scenarios of rapid reductions in carbon pollution, projections of climate impacts are sobering.

Up to 14 per cent of land species face a “very high” risk of extinction with only 1.5°C of warming, the IPCC said, bolstering calls for conservation of 30 to 50pc of the world’s land and ocean territory.

The threat grows with every fraction of a degree.

Adaptation

By 2050 there will be more than a billion people in coastal areas highly vulnerable to storm surges amplified by rising seas by 2050. Per usual, the poorest will often be the hardest hit.

An additional 410 million people will be exposed to water scarcity from severe drought at 2°C of warming, and up to 80m will be at risk of hunger by mid-century.

By 2100, around $10 trillion of assets will be in flood-prone coastal areas in a moderate greenhouse gas emissions scenario, according to the report.

The IPCC assessment – the sixth since 1990 – highlights the need to cope with unavoidable climate impacts on almost every page.

Overall, the IPCC warns, global warming is outpacing our preparations for a climate-addled world.

“For people in Africa living on the front line of climate change, it is adapt or die,” said Peter Verkooijen, CEO of the Rotterdam-based Global Centre on Adaptation.

The report also spotlights irreversible and potentially catastrophic changes in the climate system known as tipping points, triggered at different thresholds of global heating.

These include the melting of ice sheets atop Greenland and the West Antarctic that could lift oceans 13 metres; the morphing of the Amazon basin from tropical forest to savannah; and the disruption of ocean currents that distribute heat across the globe.

“The cumulative scientific evidence is unequivocal: Climate change is a threat to human wellbeing and planetary health,” the report concluded.

Further delays in cutting carbon pollution and preparing for impacts already in the pipeline “will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all”.

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.

The Economic Consequences of the Ukraine War

Feb 25, 2022JASON 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.

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.

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.

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

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 at 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 Agency 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.

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 CO2 emissions, it will enable renewable energy to potentially power large aircraft over long distances but without the undesirable by-product of CO2 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 CO2. 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.*

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