

LCA Tejas Mk1A takes first flight; symbol of self-reliance: Rajnath

AMRITA NAYAK DUTTA

NASHIK, OCTOBER 17

THE INDIGENOUS Light Combat Aircraft (LCA) Tejas Mk1A undertook its first public sortie at the Hindustan Aeronautics Limited (HAL) facility in Nashik on Friday, a move that Defence Minister Rajnath Singh called a "shining symbol" of India's growing self-reliance in defence. The event also marked the formal inauguration of the third production line of the LCA Mk1A and the second production line of the indigenously made Hindustan Turbo Trainer (HTT)-40 basic trainer aircraft.

In his address, Singh said India once imported 65-70 per cent of critical military hardware, but is now manufacturing 65 per cent of the equipment on its own soil, highlighting the government's resolve to increase domestic manufacturing to 100 per cent in the years to come.

"We not only reduced import dependency, but also strengthened our commitment to indigenisation. Whatever we used to buy from abroad, we are now

EXPLAINED

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Big boost to IAF

THE INAUGURAL flight of LCA Mk1A is a step towards formal induction into the IAF, which has been facing a decline in its fighter squadron strength. The newly inaugurated production line in Nashik has the capacity to manufacture 8 aircraft per year, and can be increased to 10. HAL is expected to produce 24 aircraft annually.

manufacturing it domestically, be it fighter aircraft, missiles, engines and electronic warfare systems," he said. "We have now set a target of increasing defence manufacturing to Rs 3 lakh crore and exports to Rs 50,000 crore by 2029."

An aerial display by the LCA Tejas Mk1A, an HTT-40 and Sukhoi-30 MKI was carried out at the ceremony. HAL Chief Test



Union Defence Minister Rajnath Singh during the Nashik event on Friday. PTI

Pilot (fixed wing) Group Capt KK Venugopal (retd) piloted the LCA Tejas Mk1A sortie after the fighter got a water cannon salute.

In his address, Singh highlighted the need to stay ahead of the curve as Artificial Intelligence, cyber warfare, drone systems and next-generation aircraft are shaping the future, and wars are being fought across multiple frontiers. "India must always stay ahead in this new race, and not lag," he said, exhorting HAL to make its mark in the fields of next-generation aircraft, unmanned systems and civil aviation, and not limit itself to LCA Tejas or HTT-40.

During Operation Sindoor, Indian forces not only demonstrated valour and commitment but also displayed confidence in indigenous platforms, he said.

"HAL provided support at various operational sites 24 hours a day during the operation. It ensured the IAF's operational readiness by carrying out prompt maintenance on fighter jets and helicopters," he said.

Sanjeev Kumar, Secretary, Defence Production, described the inauguration of two production lines as a symbol of India's growing technological confidence, industrial strength, and strategic foresight. He said the LCA Tejas Mk1A is not merely a fighter aircraft but a statement of India's design and manufacturing excellence—conceived, developed and produced indigenously through the collaboration of HAL, Aeronautical Development Agency, DRDO and the IAF.

D K Sunil, HAL Chairman and Managing Director, said the successful operationalisation of the LCA Mk1A and HTT-40 production from Nashik is a testament to HAL's capacity for expansion.



The first Tejas LCA Mk1A aircraft from Hindustan Aeronautics Limited facility in Nashik receiving a water salute on Friday. Defence Minister Rajnath Singh flagged off the fighter jet. REUTERS (REPORT ON PAGE 12)

Nashik unit open; HAL can roll out 24 Tejas jets a year

Rajnath Singh flags off the first light combat aircraft Mk1A produced at the facility; Minister opens the third production line for the fighter and the second of Hindustan Turbo Trainer-40 aircraft

Saurabh Trivedi

Hemanth C.S.

NASHIK

The production lines of the light combat aircraft Tejas Mk1A and the training aircraft HTT-40 are proof of the synergy among government, industry and academia, Defence Minister Rajnath Singh said here on Friday, asserting that no challenge was too big if faced together.

He was speaking after inaugurating the third production line of Tejas Mk1A and the second of the Hindustan Turbo Trainer-40 at the Hindustan Aeronautics Ltd. facility.

The Defence Minister flagged off the first LCA Mk1A aircraft produced at the facility, describing it as a symbol of India's growing self-reliance in defence.

Highlighting the transformation of India's defence sector in the past decade under Prime Minister Narendra Modi's leadership, Mr. Singh said the country, which once imported 65-70% of its military hardware, now manufactured nearly 65% of it domestically. "Our goal is to increase this to 100% in the near future," he said.



Coming on stream: Rajnath Singh during the flagging off of new production lines at HAL in Nashik on Friday. @SPOKESPERSONMOD X

He recalled that when the government under Mr. Modi came to power in 2014, it faced numerous challenges such as limited defence preparedness, import dependence, and a lack of private sector participation.

"Earlier, defence production was largely confined to government enterprises. There was insufficient focus on planning, advanced technology, and innovation, which made us dependent on other nations and created strategic vulnerabilities," he said. "These challenges pushed us to adopt new thinking and reforms. Today, we are manufacturing domestically what we used to import – fighter jets, missiles, engines, and elec-

tronic warfare systems."

Mr. Singh reaffirmed the government's commitment to inducting indigenous technologies into the armed forces and hailed HAL as the backbone of India's defence manufacturing ecosystem. He commended HAL for supporting the recently decommissioned MiG-21 fleet and its pivotal role during Operation Sindoor.

"In our security history, few instances have tested our system as much as Operation Sindoor. HAL provided round-the-clock support to the Indian Air Force, ensuring operational readiness. The Nashik team carried out crucial integration of the BrahMos missile on Su-30 aircraft, which destroyed terrorist

hideouts during the operation," he said.

"This proved that India can design, produce, and deploy its own systems effectively," he added.

HAL plans

The first two production lines of the LCA and the first production line of the HTT-40 are in Bengaluru. The company initiated establishment of the third production line to fast-track delivery of Tejas to

the IAF. The production line in Nashik has a capacity of eight aircraft a year.

The company said that with the third production line, HAL would achieve a total production capacity of 24 aircraft per year for LCA Mk1A.

The third Line had resulted in creation of approximately 1,000 jobs, and development of more than 40 industry partners in and around Nashik, including in cities of Maharashtra, Gujarat, and Madhya Pradesh. In two years, the company plans to expand capacity in Nashik up to 10 aircraft a year by way of establishing an additional Assembly Jig Line, Tooling and Pre-installation Check facilities for Line Replaceable Units.

LAB agrees to talks after Centre orders judicial probe into Sept. 24 Leh violence

Peerzada Ashiq

SRINAGAR

The Leh Apex Body (LAB) has agreed to resume stalled talks with the Centre after the Union Home Ministry announced a judicial inquiry into the September 24 violence in Leh on Friday.

The LAB leads a movement that calls for Statehood and inclusion in the Sixth Schedule.

Meanwhile, the LAB and the Kargil Democratic Alliance (KDA), which are conglomerations of social, political, and religious bodies, will hold “peaceful protests” in the region on Saturday over the September 24 violence and the subsequent crackdown by security forces.

Justice B.S. Chauhan, a former Supreme Court judge, will conduct the inquiry

The Ministry said Justice B.S. Chauhan, a former judge of the Supreme Court, will conduct the judicial inquiry.

It will look “into the circumstances leading to the serious law and order situation, the police action, and the resultant unfortunate death of the four individuals”, the order stated.

The MHA, in the order, also underlined that the Centre was “always open for dialogue”.

“We continue to welcome the discussions with LAB and KDA through the

High-Powered Committee (HPC) on Ladakh or any such platform,” read the order. It added that the Centre was “confident that continuous dialogue would yield the desired results in the near future.” “The Government stands committed to the aspirations of the people of Ladakh”.

A judicial probe has been among the LAB and KDA's key demands to resume talks with the Centre. Both the bodies had withdrawn from talks scheduled for October 6 with the HPC led by Union Minister Nityanand Rai following the violence.

“We welcome the judicial probe. We are ready to resume talks with the Centre,” said Chering Dorjay Lakruk, Ladakh Budd-

hist Association president and co-chairman of the LAB.

Mr. Lakruk clarified that other demands, like the release of activist Sonam Wangchuk and compensation to victims, “are not a hurdle to resume talks.”

Silent protest march

The Centre and citizens from Ladakh have held several rounds of talks over the past year to address demands by the LAB and the KDA, including Statehood, inclusion in the Sixth Schedule, an additional Lok Sabha seat, and a Public Service Commission.

The Central government has already notified domicile and reservation rules for Ladakh after consulting with these bodies.

Gorkhaland statehood: Govt names ex-Dy NSA as interlocutor

RAVIK BHATTACHARYA
KOLKATA, OCTOBER 17

THE CENTRE'S appointment of former Deputy National Security Adviser Pankaj Kumar Singh on Thursday as an interlocutor for talks with leaders of the Darjeeling hills in West Bengal over various demands from the region, including finding a "permanent political solution", is once again poised to raise the issue of Gorkhaland statehood and the Scheduled Tribe status for 11 Gorkha sub-tribes.

While the Gorkha leaders from the region have welcomed the Centre's decision to appoint

the former director general of the BSF as the interlocutor, the ruling Trinamool Congress (TMC) dubbed it as another attempt by the BJP to woo Gorkha votes before next year's Assembly polls.

"It is clear that this is another attempt to woo the voters of Darjeeling and the surrounding areas before the Assembly elections in the state," Minister for North Bengal Development Udayan Guha told *The Indian Express* over the phone.

The Gorkha Janmukti Morcha (GJM), in a statement, said, "We thank Prime Minister Narendra Modi and Union Home Amit Shah for taking this posi-



Interlocutor and former Dy NSA Pankaj Kumar Singh

tive step of appointing an interlocutor to take forward and finalise the political demands of

the Gorkha community."

Stating that the GJM was formed with the "sole aim" of securing the political identity and rights of the Gorkha community, the outfit leaders Bimal Gurung and Roshan Giri said: "We have dedicated nearly two decades of political activism for Gorkhaland state and granting of Scheduled Tribe status for the 11 Gorkha sub-tribes... A permanent solution under the Constitution of India for our region is not only vital for protecting the rights of the Gorkha community, but also essential for the overall progress and prosperity of the entire region and the people who live here. The Gorkha, Rajbongshi,

Adivasi, Bengali, and other communities have coexisted here in harmony for generations."

Urging other political parties and social organisations from the region to welcome the "positive development", the GJM said: "At this critical juncture, our foremost duty is to rise above individual interests and work together with a common agenda for the betterment of our people and our region. We call on everyone, regardless of their political or social affiliations, to join hands in unity, so that we can present a strong and collective voice."

In a statement, Gorkha National Liberation Front (GNLF) chief Mann Ghising thanked PM

Modi and Shah, and said: "With this initiative, not just a few individuals or groups, but all concerned stakeholders will now have the opportunity to present their views, suggestions, and perspectives in a constructive manner... We firmly believe that this inclusive and consultative process will pave the way for a concrete, just, and permanent solution to the long-standing political aspirations of the Gorkha community."

The BJP MP from Darjeeling, Raju Bista, expressed hope that all stakeholders, including the West Bengal government, would engage with the interlocutor "positively".

U.S. trade body moves court over Trump's H-1B fee hike

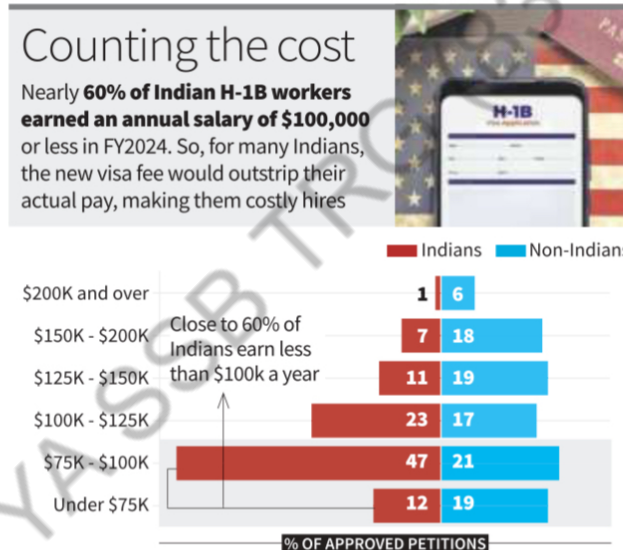
Lawsuit says \$100,000 fee on new applications overrides existing provisions in current laws that apply to programme; hike will make H-1B cost prohibitive for employers, says body's executive V-P

The Hindu Bureau
NEW DELHI

The U.S. Chamber of Commerce has filed a lawsuit challenging the Donald Trump administration's \$100,000 fee on new H-1B visa applications, saying it overrides existing provisions in current laws that apply to the H-1B programme.

The fee hike on fresh H-1B visa applications was aimed at undoing the apparent trend of U.S. employers replacing American workers with cheaper labour from foreign countries.

"The Chamber's litigation argues that the new fee is unlawful because it overrides provisions of the Immigration and Nationality Act that govern the H-1B program, including the re-



The salary figures are drawn from details submitted by employers before the beneficiary begins work under a specific H-1B approval

quirement that fees be based on the costs incurred by the government in processing visas," the business advocacy group said in a statement on

Thursday. The case was filed before the U.S. District Court for the District of Columbia.

The H-1B programme was designed for high-

skilled jobs for which companies find it difficult to find local talent.

"The new \$100,000 visa fee will make it cost-prohibitive for U.S. employers, especially start-ups and small and midsize businesses, to utilise the H-1B program, which was created by Congress expressly to ensure that American businesses of all sizes can access the global talent they need to grow their operations here in the U.S.,"

Neil Bradley, executive vice-president and chief policy officer at the U.S. Chamber of Commerce, said.

The new fee will expire after a year of application, but the U.S. government can extend it.

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U.S. trade body moves court over H-1B fee hike

The U.S. government does not provide data on the number of H-1B visa-holders in the U.S. at any point of time, revealing only the number of people who registered for the visa and the number of those who were selected.

However, other sources, such as FWD.us, an immigration and criminal justice reform advocacy body co-founded by Meta chief executive officer Mark Zuckerberg, say that there were 7.3 lakh H-1B visa-holders in the U.S. as of January 2025. Of these, about 70% – an overwhelming majority – were Indian.

According to the U.S. Citizenship and Immigration Services (USCIS), Tata Consultancy Services had 5,505 H-1B visas approved in 2025 as of June, the second-highest globally that year. Amazon topped the list with 10,044 workers using H-1B visas as of June 2025.

Other Indian companies that have significantly benefited from the H-1B programme include Infosys (2,004 visa approvals as of June 2025), Wipro (1,523) and Tech Mahindra Americas (951).

Embraer, Mahindra to build C-390 planes for Indian Air Force

Jagriti Chandra

NEW DELHI

Brazilian aerospace company Embraer opened its India office on Friday and marked the occasion by signing a strategic cooperation agreement with the Mahindra Group to advance C-390 Millennium military transport aircraft for the Indian Air Force.

The milestone event was graced by Brazil's Vice President Geraldo Alckmin, Brazil's Minister of Defense Jose Mucio, Indian Minister of Civil Aviation K. Rammohan Naidu and the Ambassador of Brazil to India Kenneth Felix Haczynski da Nobrega.

The pact builds upon the Memorandum of Understanding signed in Fe-



The pact deepens the scope of cooperation on developing India as a hub for C-390.

bruary 2024 in New Delhi and deepens the scope of cooperation to include joint marketing, industrialisation and developing India as a manufacturing and support hub for C-390 to serve local and regional needs, a release said.

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Resolution of Palestinian question necessary for IMEC: Egyptian FM

In Delhi for the first India-Egypt Strategic Dialogue, Abdelatty urges India to join the Egyptian Suez Canal Economic Zone; meets Jaishankar, calls on PM Modi; IMEC project, unveiled at the G-20 Summit in 2023, stalled soon after due to Gaza war

Sahasini Haidar
NEW DELHI

Plans for the India-Middle East-Europe-Economic Corridor (IMEC) cannot proceed without some progress on the Palestinian question, Egypt's Foreign Minister Badr Abdelatty said on Friday, adding that Egypt would be interested to join all such connectivity projects once the situation is "conductive".

Mr. Abdelatty told a group of presspersons that he had discussed the IMEC project with External Affairs Minister S. Jaishankar during the first India-Egypt Strategic Dialogue on Friday, and also proposed that India join the Egyptian Suez Canal Economic Zone (SCZONE), where Russia, China, and a few other countries already have separate industrial complexes.

On Friday, he called on Prime Minister Narendra Modi, who praised Egyptian President Abdel Fattah Al-Sisi for the Gaza Peace Plan signed with U.S. President Donald Trump this week.

Derailed by attacks

The IMEC was launched during the G-20 in New Delhi in September 2023 by a number of countries including India, the United Arab Emirates, Saudi Arabia, the U.S., and the European Union, and is meant to be routed via Israel's Haifa port. The project floundered within a month, however, after the October 7 terror attacks in Israel and the Israeli bombardment of Gaza.

While welcoming all connectivity projects "between the east and west", Mr. Abdelatty said that the aspirations of the Palestinian people for their own



Building relations: Prime Minister Narendra Modi meeting Foreign Minister of Egypt Badr Abdelatty in New Delhi on Friday. PTI

State was necessary for peace and security in the region, and it would not be possible to run a cross-regional connectivity project like the IMEC without it.

"If we are serious about having final peace and security, a comprehensive deal and the security for Israel and the whole region, the only solution is to res-

pond positively to the legitimate aspirations of the Palestinian people to have their own statehood, to have their own independent state," Mr. Abdelatty said in response to a question from *The Hindu*.

Indian industrial zone

Turning to bilateral matters, Mr. Abdelatty said

that India and Egypt have committed to doubling bilateral trade from the present level of \$5 billion, with particular potential in the areas of chemicals, minerals, pharmaceuticals, phosphates, digital technology, artificial intelligence, and renewable energy.

"We have a special industrial zone for China and for Russia in the SCZONE and we are encouraging an Indian industrial zone where we would provide all facilitation and incentives to Indian companies," he said, adding that India would be able to export goods beyond Egypt, with its population of 120 million, to a market of more than "two billion inhabitants" across Africa, South America, Europe, and Arab countries that are connected to Egyptian ports through free trade agreements.

AI IN PLAY

Google's \$15 billion investment for hub in Andhra Pradesh is a big boost to India's plans in this sector

THE LAST FEW years have seen a dramatic surge in AI investments, driven by global tech majors such as Microsoft, Alphabet, Meta, Nvidia and OpenAI. As developing AI models and then making them available for use at a global level requires huge capital, the scale of the investments being made has reached impressive proportions. In 2024, global corporate investment in AI touched \$252.3 billion as per the AI index report from Stanford University. As per McKinsey, the data centres needed to handle AI processing are expected to require \$5.2 trillion in capex by 2030, the bulk of which is likely to be directed towards technology developers to produce chips and computing hardware. While some have expressed concerns over this AI boom — the IMF has, for instance, warned that “the risk is also that lofty profit expectations will ultimately be unmet” — others are more optimistic with tech majors stepping up their investments.

Earlier this week, Google announced that it will invest \$15 billion over the next five years (2026-2030) to set up an AI data centre in Andhra Pradesh. Situated in Visakhapatnam, it will be Google's largest outside the US, and will include a “purpose-built data centre campus capable of gigawatt-scale compute capacity”. Earlier this year, during its second quarter earnings season, the company had raised its capex forecast for the year to \$85 billion to meet the growing demand as adoption rates for both firms and companies surge. This is a big boost to India's plans to be a major player in this space. India's data centre industry had crossed the 1 GW mark in 2024 as per a report by JLL. Estimated to account for 52 per cent of the country's capacity, Mumbai leads the market, followed by Chennai and Delhi.

The world over, governments are announcing ambitious plans and pledging huge resources in the AI space. The Indian government has also taken several steps to help build the larger ecosystem in the country. Ten semiconductor manufacturing projects, including high-volume fabs and OSATs (outsourced semiconductor assembly and test), have been approved. Alongside, 23 chip-design projects have been sanctioned by the government and 12 startups have been chosen to build indigenous large language models and small language models. Thus, across the spectrum, from the physical infrastructure (data centres) and the semiconductor projects (chips) to developing large language models, India is making progress. These efforts need to be supplemented by a similar focus on boosting research and development and skilling the labour force.

‘Govt mulls easing curbs on certain Chinese imports’

REUTERS

NEW DELHI, OCTOBER 17

THE MINISTRY of Commerce and Industry and government think-tank NITI Aayog are pushing to ease certain tariff and non-tariff curbs on Chinese imports, three officials said, acknowledging the country's growing reliance on Chinese raw materials.

They are seeking measures including allowing anti-dumping duties to lapse on certain products, while considering tariff cuts on raw materials used in sectors such as leather and engineering goods where domestic capacity remains limited, the sources said.

“A consensus is emerging within the government and the industry that, while negotiating a deal with Washington, India needs to fine-tune its trade policy, including trade relations with China,” one of the government officials said.

Both the commerce ministry and the NITI Aayog have backed industry calls to cut import tariffs on raw materials at inter-ministerial meetings, a second official said, noting countries such as Vietnam import Chinese raw ma-



File

India is also considering easing Chinese investment curbs on a case-by-case basis.

terials at zero duty, putting Indian manufacturers at a disadvantage.

However, the final decision on duty cuts rests with the finance ministry, the official said. The sources spoke on condition of anonymity as details are not public. India's commerce ministry didn't immediately respond to an email seeking comment.

The government would also not renew anti-dumping duties on items such as axle beams, steering components and high-tenacity polyester yarn, another government source said. However, India's trade remedies authority has launched new anti-dumping probes on certain imports from China on local complaints.

WE CAN'T DEplete OUR COUNTRY: U.S. PRESIDENT, DAY AFTER PUTIN CALL

Trump meets Zelenskyy, signals not sure of selling long-range missiles

Ukraine leader:
Trump has big
chance to end war

**ASSOCIATED PRESS
& REUTERS**

WASHINGTON, OCT 17

PRESIDENT DONALD Trump is hosting Ukrainian President Volodymyr Zelenskyy for talks at the White House on Friday, with the US leader signalling he's not ready to agree to sell Kyiv a long-range missile system that Ukraine says they desperately need.

Zelenskyy arrived with top aides to discuss the latest developments with Trump over lunch, a day after the US president and Russian President Vladimir Putin held a lengthy phone call to discuss the conflict.

At the start of the talks, Zelenskyy congratulated Trump over landing last week's ceasefire and hostage deal in Gaza and said Trump now has "momentum" to stop the Russia-Ukraine conflict. "President Trump now has a big chance to finish this war," Zelenskyy added.

In recent days, Trump had shown an openness to selling Ukraine long-range Tomahawk cruise missiles, even as Putin



President Donald Trump with Ukraine's Volodymyr Zelenskyy at the White House, Friday. AP

warned that such a move would further strain the US-Russian relationship. But following Thursday's call with Putin, Trump appeared to downplay the prospects of Ukraine getting the missiles.

"We need Tomahawks for the United States of America too," Trump said. "We have a lot of them, but we need them. I mean we can't deplete our country." Zelenskyy had been seeking the

weapons, which would allow Ukrainian forces to strike deep into Russian territory and target key military sites, energy facilities and critical infrastructure.

But Putin warned Trump during the call that supplying Kyiv with the Tomahawks "won't change the situation on the battlefield, but would cause substantial damage to the relationship between our countries," according to Yuri Ushakov,

Putin's foreign policy adviser.

Zelenskyy is expected to offer to store American liquefied natural gas in Ukraine's gas storage facilities, which would allow for an American presence in the European energy market.

Trump announced following Thursday's call with Putin that he would soon meet with the Russian leader in Budapest, Hungary, to discuss ways to end the war.

EXPLAINED
E Putin counters Kyiv tactics

UKRAINE'S PREFERRED strategy in the war is to obtain more weapons deliveries to strike deeper inside Russia, and forcing it to negotiate in earnest. But analysts say that Vladimir Putin, in his call with Trump on Thursday, effectively countered that strategy with the prospect of more talks and a peace deal. He achieved a path that is appealing to Trump — who is looking forward to his "ninth deal" — and buys him time to strengthen the offensive.

Kremlin envoy suggests 'Putin-Trump tunnel'

Russia and the United States should build a "Putin-Trump" rail tunnel under the Bering Strait to link their countries, unlock joint exploration of natural resources and "symbolise unity", a Kremlin envoy has suggested. The proposal by Kirill Dmitriev, Putin's investment envoy, envisages a project costing \$8 billion.

Rising CO₂ levels

Carbon dioxide concentrations increased by a record amount between 2023 and 2024. Man-made activities like burning of fossil fuels, and natural variabilities in CO₂ loop led to this unprecedented rise

ANJALI MARAR & AMITABH SINHA
BENGALURU, NEW DELHI, OCTOBER 17

THE ATMOSPHERIC concentration of carbon dioxide (CO₂), the primary driver of climate change, increased by a record amount between 2023 and 2024, according to latest data released by the World Meteorological Organization (WMO). Globally averaged CO₂ concentration near the Earth's surface reached 423.9 parts per million in 2024, 3.5 ppm higher than in 2023. The year-on-year increase in this period was significantly higher than the annual average during the 2011-2020 decade.

The year 2024 was also the warmest year ever recorded, with the global average temperature being 1.55 degrees Celsius higher than pre-industrial times. This was the first time that global annual temperatures had crossed the 1.5 degree Celsius threshold, a key limit which, when breached over a long-term period, can result in devastating irreversible impacts.

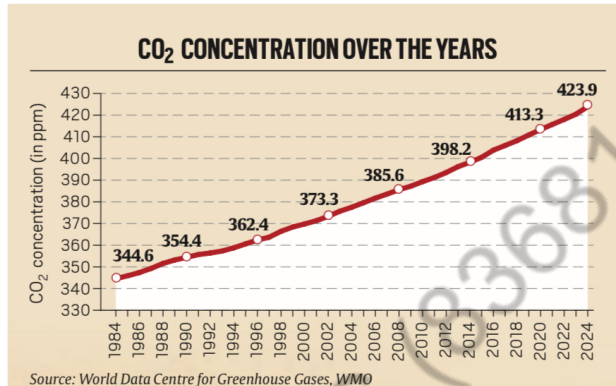
The rapidly rising CO₂ concentrations underscore the failure of the international climate framework, as represented by the Paris Agreement, to achieve a meaningful slowdown in global emissions.

Rise in CO₂ concentrations

CO₂ concentrations have been rising consistently over the years. There has been no instance of a decline in the last 40 years, at least. However, the new data from the WMO show that the year-on-year increase between 2023 and 2024 was the highest since these kinds of measurements began in 1957. This has come at a time when a massive effort is being made globally to restrain CO₂ emissions.

The rate of increase in CO₂ concentrations had already tripled from an average of 0.8 ppm per year during the 1960s to 2.4 ppm per year between 2011 and 2020. But a 3.5 ppm jump in a year is unprecedented. The current CO₂ concentration in the atmosphere, 423.9 ppm, is now 152% more than the pre-industrial levels of 278.3 ppm.

CO₂ is the most widespread of the greenhouse gases (GHGs), and is produced in a variety of natural and man-made processes. The emissions from natural processes such as respiration, ocean releases, volcano eruptions, wildfires, or decomposition of organic matter are nearly all absorbed back in other natural processes like photosynthesis, ocean and land sinks, thus maintaining a balance. Nearly half of the CO₂ emissions from man-made processes, such as the burning of fossil fuels,



Wikimedia Commons

is also absorbed by these natural sinks. It is the other half that accumulates in the atmosphere, resulting in a warming effect.

Although CO₂ accounts for more than 90% of all accumulated GHGs in the atmosphere, its ability to trap heat is significantly less than other GHGs such as methane (CH₄) and nitrous oxide (N₂O). CH₄ is at least 25% more potent than CO₂ in its heat-trapping capability, while N₂O is about 270 times more potent.

However, CO₂ remains in the atmosphere for a far longer time, about hundreds to thousands of years. As a result, it has a cumulative

impact on global warming. CO₂ is known to have contributed about 66% of the warming that has happened since pre-industrial times, and about 79% in the last decade.

In comparison, CH₄ is relatively short-lived and remains in the atmosphere for only about 12 to 14 years. N₂O disintegrates after about 100 to 120 years.

Reasons behind the increase

The unusually high increase of 3.5 ppm between 2023 and 2024 could not be solely attributed to continued emissions of CO₂ from man-made activities, the WMO report

said. Variabilities in the natural CO₂ loop also had a role to play.

In particular, oceans and land sinks seem to have absorbed a lesser amount of CO₂ in 2024. An exceptionally high number of forest fire incidents in the year resulted in additional emissions.

One of the causes of the reduced capability of natural sinks in oceans and land to absorb CO₂ is global warming itself. At higher temperatures, oceans absorb less CO₂ due to decreased solubility. Similarly, extreme droughts, which result in forests and vegetation drying up, reduce the absorption capacity of trees and grasslands. These processes feed into each other and worsen the CO₂ imbalance, leading to more CO₂ being released into the atmosphere.

Other GHGs

The concentration of CH₄ and N₂O also increased in 2024, but the jump was lower than the annual average witnessed in the last decade. CH₄ — the second most widely emitted GHG — concentrations increased by 8 parts per billion to reach a level of 1,942 ppb in the atmosphere, while N₂O concentrations increased by 1 ppb to reach 338 ppb.

In the last decade, CH₄ concentrations increased by an average of about 10.6 ppb every year, while N₂O concentrations increased at the rate of 1.07 ppb a year.

CH₄ concentrations account for 16% of the warming caused since pre-industrial times, while N₂O concentrations contributed about 6%. The rest come from other gases and processes.

Challenges

The new data from the WMO Greenhouse Gas Bulletin underline the enormity of the challenge being faced in restraining the rapid accumulation of GHGs in the atmosphere. It is not just the man-made activities, over which humans have some control, that are accentuating the problem. Natural processes are also getting destabilised under the influence of global warming, resulting in greater accumulation of these gases.

However, even in areas where they have some control, humans have been finding it extremely difficult to rein in emissions of GHGs. Global emissions are still on the rise. Ten years of the Paris Agreement have been unable to make any appreciable dent in this rising trend. The emission reduction targets for 2030 are almost certain to be missed, while global temperatures already breached the 1.5 degree Celsius mark in 2024.