

WHAT IS AFRICAN UNION (AU)?

The African Union recently condemned the Israeli military's moves into southern Gaza's Rafah, calling for the international community to stop "this deadly escalation" of the war



African Union (AU) is a **continental body** consisting of the **55 member states** that make up the countries of the **African Continent**.

- It was officially launched in 2002 and **replaced its predecessor**, the **Organization of African Unity (OAU)**, which was founded in 1963.
- **Primary Objective:** To promote unity, cooperation, and development among African nations while advancing the continent's interests on the global stage.
- It is **guided by its vision** of “**An Integrated, Prosperous, and Peaceful Africa**, driven by its own citizens and **representing a dynamic force in the global arena.**”
- To ensure the realisation of its objectives and the attainment of the Pan African Vision of an integrated, prosperous and peaceful Africa, **Agenda 2063** was developed as a **strategic framework** for Africa's long term socio-economic and integrative transformation.
 - **Agenda 2063 calls for greater collaboration and support for African led initiatives** to ensure the achievement of the aspirations of African people.
- **Headquarters: Addis Ababa, Ethiopia**

Structure:

- **Assembly:** It is the **highest decision-making body**, consisting of the **heads of state** and government of member countries.
- **Executive Council:** Made up of **foreign affairs ministers**, handles **policy matters** and makes recommendations to the Assembly.
- **AU Commission:** Headquartered in Addis Ababa, is the administrative arm responsible for **implementing the decisions** of the Assembly and the Executive Council.

- **The Peace and Security Council:** Responsible for maintaining peace and security on the continent.
 - The AU structure **promotes the participation of African citizens** and civil society **through the Pan-African Parliament and the Economic, Social & Cultural Council (ECOSOCC).**
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WHAT IS CLOUD SEEDING?

The Supreme Court recently told the Uttarakhand government that cloud-seeding would not douse the forest fires that had claimed five lives in the State.



Why Cloud Seeding is done?

- Water vapour condenses around small particles to form the droplets that make up a cloud.
- These droplets collide and grow; as they get heavy and the cloud gets saturated, it rains.
- Not all clouds create rain. Even if they do make rainwater, **only a few clouds** are able to **produce enough moisture** that allows for large raindrops.
 - This may happen because there **aren't enough ice particles within a cloud.**
 - **Because of this,** there aren't enough cloud droplets to combine and make raindrops.

What is Cloud Seeding?

- It is a scientific process that **improves a cloud's ability to make rain** or snow, as well as control other weather events.
- It is the **deliberate introduction** into clouds of **various substances (seed)** that **act as condensation nuclei or ice nuclei** in an attempt to induce precipitation.
- Cloud seeding gives these clouds a lot more ice crystals (or cloud nuclei). It has been **performed from aircraft, rockets, cannons, and ground generators.**

- Many substances have been used, but **solid carbon dioxide (dry ice) and silver iodide** have been the **most effective**. When used in supercooled clouds (composed of water droplets at temperatures below freezing), they **form nuclei around which the water droplets evaporate**.
- The **resulting water vapour deposits into ice crystals**, which build quickly as water droplets attach themselves.
- Right after, the **ice crystal becomes a heavy, large raindrop**, it will **then fall** through the cloud and onto **the ground as rainfall**.

Conditions Required:

- Cloud seeding **requires existing clouds**, and not all types of clouds are suitable for seeding.
- **Clouds must be deep enough and of a suitable temperature** (between -10 and -12 degrees Celsius) to be seeded effectively.
- The **wind must also be below a certain speed**. These conditions are most **common in mountainous areas**.
- **Benefits:** It is used all over the world as a method for **enhancing winter snowfall and increasing mountain snowpack, supplementing the natural water supply** available to communities in the surrounding area.

INDIA AS THIRD LARGEST PRODUCER OF SOLAR POWER IN 2023

Why in news?

As per the **Global Electricity Review 2024**, India surpassed Japan to claim the title of the world's third-largest solar power generator in 2023 as it has climbed from 9th ranking in 2015.

- India **generated** 113 Billion Units (BU) of solar power in 2023 compared to Japan's 110 BU.

Global Electricity Review 2024

- It was published by global energy think tank

- The report offers a comprehensive examination of the global power landscape in 2023, drawing on data from individual countries.
 - It has analysed the data from 80 nations that represent 92% of global electricity demand, along with historical data from 215 countries.
- It provides a realistic summary of how on track the electricity transition is for limiting global heating to 1.5 degrees.

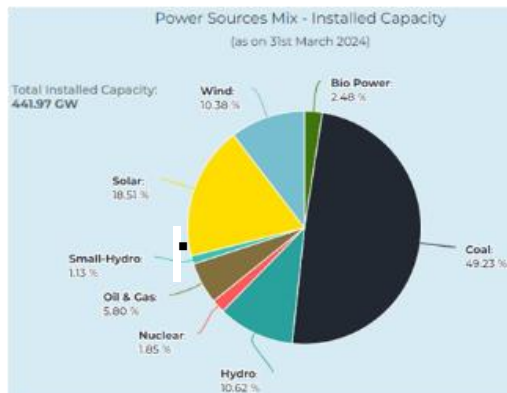
Key highlights of the report

- **Share of solar energy in global electricity in 2023**
 - Solar produced a record 5.5 per cent of global electricity in 2023.
- **Trajectory of solar energy has been accelerating rapidly**
 - For the nineteenth consecutive year, solar maintained its status as the fastest-growing electricity source worldwide.
 - It outpaced coal in new electricity additions by more than two fold in 2023.
- **Share of renewable energy in global electricity produced**
 - Renewable sources of energy made up **30% of global electricity** Renewables have expanded from 19% (in 2000), driven by an increase in solar and wind power, to 30% (in 2023).
 - Combined with nuclear, the world generated almost 40% of its electricity from low-carbon sources in 2023.
- **Fossil fuel generation to drop in 2024**
 - The report forecasts fossil fuel generation to drop in 2024 and the trend to continue in other years.
 - It suggests that 2023 might be the year when the fossil fuel production may have peaked globally.
- **China is the main contributor in renewable energy in 2023**
 - China accounted for 51% of the additional global solar generation and 60% of new global wind generation in 2023.

Opportunities for Solar energy in India

- **Increasing demand**

- The government's ambitious target of 500 GW of installed capacity from non-fossil fuels by 2030 is the main driver to scale solar power in India.
- India also accounts for the fastest rate of growth for demand of electricity through 2026 among major economies.
 - This is because of strong economic activity and expanding consumption of products to mitigate extreme weather.



- According to NITI Aayog, as of May 2024, solar power while making up ~18% of India's total installed electricity of 442 GW, made up only **66%** of the power **actually produced**.

- This data reflects the **gap between potential and actuals** as the power produced per year can vary due to fluctuations in a country's power demand and local circumstances.

- **Estimated solar power potential**

- The country has an estimated solar power potential of 748.99 GW.
- Hence, the potential of solar energy is not fully tapped, so far. The government is making efforts to harness the available potential through various schemes & programs.

ALPHAFOLD3

Google Deepmind has unveiled the third major version of its "AlphaFold" artificial intelligence model, designed to help scientists design drugs and target disease more effectively.



AlphaFold3 is a new AI model developed by Google DeepMind and Isomorphic Labs.

- It is a revolutionary model that can **predict the structure and interactions** of all **life's molecules** with unprecedented accuracy and even it mapped the behaviour for all of life's molecules, including human DNA.
 - It can generate molecules joint 3D structure, revealing how they all fit together.
 - It models large biomolecules such as **proteins, DNA and RNA**, as well as small molecules, also known as ligands — a category encompassing many drugs.
 - Furthermore, AlphaFold 3 can **model chemical modifications** to these molecules which control the healthy functioning of cells, that when disrupted can lead to disease.
 - It assembles its predictions using a **diffusion network**, akin to those found in AI image generators.
 - **Significance:**
 - It allows scientists to **see cellular systems** in all their complexity, across structures, interactions and modifications.
 - This new window on the molecules of life reveals how they're all connected and **helps understand** how those connections affect biological functions — such as the **actions of drugs**, the production of hormones and the health-preserving **process of DNA repair**.
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DICE SNAKE



The recent study found that the dice snakes can fake their own death when being attacked by predators by putting on a theatrical display which includes oozing “mouthfuls” of blood.

Dice Snake is a **nonvenomous snake** belonging to the family Colubridae, subfamily Natricinae. It is also called **water snake**.

- Females of this species are bigger than males.
- **Distribution:** They are mainly found in much of **Eurasia** and are also **present in Egypt**.
- **Habitat:** They live near rivers, lakes, streams, ponds, and the surrounding grasslands. They can also be found in coastal areas and frequent plantations and urban areas.

- **Unique character:**
 - They **fake their own death** to avoid being eaten by predators, as it is a good tactic for the prey to create a distraction and escape.
 - This behaviour depended on various factors like the sex of the individual, injuries, body temperature, size, age, presence of food in the stomach, presence of eggs in females, and previous experience with a predator.
 - When feeling threatened, they spread a very bad-smelling secretion from their **cloaca or play dead**.
 - **Threats:** They suffer from loss of the wetland habitat in some areas of their range, pollution, roadkill, persecution by people, and collection for the pet trade.
 - **Conservation status**
 - **IUCN Red list:** Least Concern
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INDIAN OCEAN DIPOLE



Recently, two Australian weather agencies have said that **Positive Indian Ocean Dipole (IOD) or Indian Nino in the Indian Ocean, may re-emerge for the second consecutive year in the latter half of 2024.**

- It is sometime referred to as the **Indian Nino**, is a similar phenomenon, playing out in the relatively smaller area of the Indian Ocean between the **Indonesian and Malaysian** coastline in the east and the **African coastline near Somalia** in the west.
- A '**positive IOD**' — or simply 'IOD' — is associated with cooler than normal **sea-surface temperatures (SST)** in the eastern equatorial Indian Ocean and warmer than normal sea-surface temperatures in the western tropical Indian Ocean.
- The opposite phenomenon is called a '**negative IOD**', and is characterised by warmer than normal SSTs in the eastern equatorial Indian Ocean and cooler than normal SSTs in the western tropical Indian Ocean.
- A positive IOD event is often seen developing at **times of an El Nino**, while a negative IOD is sometimes associated with La Nina.

- **Impacts**

- A positive IOD helps **rainfall along the African coastline** and also over the Indian sub-continent while suppressing rainfall over Indonesia, southeast Asia and Australia. The impacts are opposite during a negative IOD event.
 - The IOD was identified as an independent system only in 1999.
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GLIDE PHASE INTERCEPTOR (GPI) PROJECT



Amid growing concerns over rivals deploying advanced weapons like hypersonic missiles, Japan is investing in the **Glide Phase Interceptor (GPI) Project** under joint development with the US.

Glide Phase Interceptor (GPI) Project is a **missile-intercepting system** under joint development by the **US and Japan**.

- By the end of 2032, Washington and Tokyo aim to achieve full operational capability for the system.

What is the Glide Phase?

- With a traditional Intercontinental Ballistic Missile (ICBM), the warhead separates from its booster and continues on a parabolic, gravity driven trajectory to its target.
- A **hypersonic weapon**, by contrast, **separates** from its booster **after the peak of its trajectory** and **accelerates toward the Earth using gravity**. It then performs a **pitch manoeuvre** to begin a **flatter trajectory** called the **glide phase**.
- Unlike typical ballistic missiles, the hypersonic and glide vehicles **travel at five times** (or more) the **speed of sound** on an unpredictable trajectory.

What is the Project all about?

CROSS & CLIMB ROHTAK

- **Hypersonic weapons** or missiles pose a **unique challenge** due to their **blinding speeds** and relatively **low altitudes** (20 to 80 km) **during the glide phase**.
 - They can **navigate around** areas containing known **missile defence sensors**.
 - These characteristics make it particularly **challenging for ground-based radar systems to track them** efficiently.
 - The **GPI Project** aims to **provide regional hypersonic missile defence**.
 - It will achieve this by **launching specially modified missiles** from surface warships.
 - These **missiles will engage and destroy incoming hypersonic missiles as they glide through the boundary between space and Earth's atmosphere**.
 - The “**glide**” phase of the missile's trajectory provides the **best opportunity to intercept it** before it enters its last high-speed drop.
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