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WHAT IS THE INTERNATIONAL ENERGY AGENCY (IEA)?



It is an autonomous intergovernmental organisation within the Organisation for Economic Co-operation and Development (OECD) framework.

- **Mission:** It works with governments and industry to shape a **secure and sustainable energy future for all.**

Background:

- It was **created in response to the 1973-1974 oil crisis** when an oil embargo by major producers pushed prices to historic levels and exposed the vulnerability of industrialised countries to dependency on oil imports.
- It was founded in **1974 to ensure the security of oil supplies.**
- IEA's **mandate has expanded over time to include tracking and analyzing global key energy trends, promoting sound energy policy, and fostering multinational energy technology cooperation.**
- It is the global energy authority, providing data, analysis, and solutions on all fuels and all technologies.
- In recent years, the IEA has also focused on renewable energy and initiatives focused on environmental protection and stopping climate change.

Membership: It is made up of **31 member countries**, 13 association countries, and 5 accession countries.

- **Criteria for membership:** A candidate country to the IEA **must be a member country of the OECD. In addition,** it must demonstrate several requirements.
 - **Crude oil and/or product reserves equivalent to 90 days of the previous year's net imports,** to which the government has immediate access (even if it does not own them directly) and could be used to address disruptions to global oil supply;

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- A **demand restraint programme** to **reduce national oil consumption** by up to **10%**;
 - Legislation and organisation to operate the **Co-ordinated Emergency Response Measures (CERM)** on a national basis;
 - Legislation and measures to ensure that all oil companies under its jurisdiction report information upon request;
 - Measures are in place to ensure the capability of contributing its share of an IEA collective action.
- **India joined** this organization in **2017** as an **Associate member**.
 - **Reports published** by IEA: **World Energy Outlook, World Energy Balances, Energy Technology Perspectives, World Energy Statistics and Net Zero by 2050**.
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KEY FACTS ABOUT VITAMIN D



Scientists have made some notable discoveries about how **Vitamin D deficiency early in life can trigger problems with the body's immune system.**

- Vitamin D (also referred to as **calciferol**) is a **fat-soluble vitamin** that is **naturally present in a few foods**, added to others, and available as a dietary supplement.
- It is also **produced endogenously** when **ultraviolet (UV) rays** from sunlight **strike the skin** and trigger vitamin D synthesis.
- **During periods of sunlight**, vitamin D is **stored in fat and then released** when sunlight is not available.
- Foods that naturally have vitamin D include **egg yolks, saltwater fish, and liver**.

Why is vitamin D so important?

- Vitamin D promotes **calcium absorption** and helps maintain adequate levels of calcium and phosphorus in the blood, which is necessary for healthy bones and teeth.

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- Without sufficient vitamin D, bones can become thin, brittle, or misshapen.
 - Vitamin D also plays a role in your nervous system, musculoskeletal system, and immune system.
 - **Vitamin D Deficiency:**
 - A lack of vitamin D can lead to bone diseases such as osteoporosis or rickets. Osteoporosis is a disease in which your bones become weak and are likely to fracture (break).
 - With chronic and/or severe vitamin D deficiency, a decline in calcium and phosphorus absorption by your intestines leads to hypocalcemia (low calcium levels in your blood).
 - This leads to secondary hyperparathyroidism (overactive parathyroid glands attempting to keep blood calcium levels normal).
 - Both hypocalcemia and hyperparathyroidism, if severe, can cause symptoms, including muscle weakness and cramps, fatigue, and depression.
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PM VISHWAKARMA YOJANA



- It is a central sector scheme launched by the **Ministry of Micro, Small, and Medium Enterprises**.
- It offers services like market linkage support, skill training, and incentives for digital transactions to artisans and craftspeople engaged in specified trades.
- **Time period:** Five years (FY 2023-24 to FY 2027-28).
- **Aim:**
 - To strengthen and nurture the **Guru-Shishya parampara**, or family-based practice of traditional skills by artisans and craftspeople working with their hands and tools.



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- The scheme also aims at improving the quality as well as the reach of the products and services of artisans and craftspeople and to ensure that the Vishwakarmas are integrated with the domestic and global value chains.

Eligibility & coverage:

- It is available **for rural and urban artisans** and craftsmen across India.
- It covers 18 traditional crafts such as Boat Maker; Armourer; Blacksmith; Hammer and Tool Kit Maker; etc.
- Five lakh families will be covered in the first year and 30 lakh families over five years.

Key Benefits

- **Enhanced Access to Tooling Facilities:** Improves MSMEs' access to tooling resources, boosting their efficiency and productivity.
 - **Industry-Ready Manpower:** Provides training programs to equip participants with skills that meet industry standards.
 - **Support for Process and Product Development:** Facilitates development initiatives within relevant sectors to enhance competitiveness.
 - **Consultancy and Job Work Services:** Offers tailored consultancy and job work to address the specific needs of various industries.
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PROBA-3 MISSION



- It is the **European Space Agency's (ESA)** first mission dedicated to **precision formation flying**.
- It is an innovative mission which will **demonstrate precision formation flying** between two satellites to create an artificial eclipse, revealing new views of the Sun's faint corona.
- The core objective of the mission is to **create an artificial eclipse** by precisely coordinating two independent satellites. This capability will enable scientists to observe the Sun's corona, a region typically obscured by the intense brightness of the Sun.



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- It consists of two small satellites — a **Coronagraph spacecraft** and a **solar-disc-shaped Occulter spacecraft**.

Working

- By flying in tight **formation about 150 metres apart**, the Occulter will precisely cast its shadow onto the Coronagraph's telescope, blocking the Sun's direct light.
 - This will allow the **Coronagraph to image the faint solar corona in visible, ultraviolet and polarised light** for many hours at a time.
 - It will provide new insights into **the origins of coronal mass ejections (CMEs)** — eruptions of solar material that can disrupt satellites and power grids on Earth.
 - The mission will also **measure total solar irradiance**, tracking changes in the Sun's energy output that may influence Earth's climate.
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EXERCISE VINBAX 2024



The Exercise “VINBAX 2024” is scheduled to be conducted from 04 to 23 November 2024 at Ambala and Chandimandir.

- It is a **bilateral army exercise conducted between India and Vietnam**.
- This edition marks a significant increase in the scope with **Bi Service level participation** for the first time by personnel of **Army and Air Force from both the countries**.
- The Indian Army contingent comprising 47 personnel is being represented by a **Regiment of the Corps of Engineers** along with personnel from other arms and services.
- VINBAX-2024 aims to enhance the **joint military capability** of both sides in the employment and deployment of **Engineer Companies and Medical Teams** to undertake engineering tasks as part of the **United Nations Contingent in Peace peacekeeping operations** under Chapter VII of the United Nations Charter.



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- The conduct of VINBAX-2024 as a field training exercise with enhanced scope from previous editions of bilateral exercise will strengthen mutual confidence, interoperability and enable sharing of best practices between the Indian Army and Vietnam People's Army.
 - A 48 hours Validation Exercise with **Humanitarian Assistance & Disaster Relief demonstration** and equipment display is also part of the schedule to assess the standards achieved by both contingents
 - The joint exercise will also provide an opportunity to the troops of both the Contingents to learn about the social and cultural heritages of each other.
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GRAVITY ENERGY STORAGE



- It is a new technology that **stores energy using gravity**.

How it works?

- It involves lifting a heavy mass during **excess energy generation** and releasing it to produce electricity when demand rises or solar energy is unavailable.
- The types of weights used are often water, concrete blocks or compressed earth blocks.
- Unlike pumped-hydro energy storage, gravity energy storage offers more flexibility in site selection.
- A typical setup involves a heavy piston within a **fluid-filled cylindrical container**.
- When solar energy production exceeds demand, surplus electricity lifts the piston, converting the surplus electrical energy into stored energy.
- When demand surpasses supply, the piston descends, driving water through a turbine to generate electricity supply to meet demand.

Advantages

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- It can **last for decades with minimal maintenance**, unlike batteries that degrade over time.
 - It avoids **harmful chemical reactions**, reducing environmental impact and disposal issues, an important consideration in the move towards a greener planet.
 - It can also be **more cost-effective for large-scale applications**, with lower level costs of energy and storage.
 - It is particularly advantageous in areas with space constraints or environmental concerns that restrict the deployment of other storage systems.
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HOW DEDICATED FREIGHT CORRIDORS ARE ADDING TO GDP, BOOSTING RAIL REVENUES

A recent study by the University of New South Wales highlights the economic impact of India's Dedicated Freight Corridors (DFCs) on the country's GDP and Indian Railways' revenue.

The study found that **reduced freight costs and shorter travel times on DFCs have lowered commodity prices by up to 0.5%. Additionally, DFCs contributed to a 2.94% revenue increase for Indian Railways from FY 2018–19 to FY 2022–23.**

- DFCs are specialized freight routes that boost transport capacity through faster transit, double-stack container trains, and heavy-haul trains, enhancing supply chains for industries along economic centers and increasing export-import traffic.
- The Ministry of Railways launched the DFC project in 2006, constructing two main corridors:
 - **Eastern DFC (EDFC):** Spanning 1,337 km from Sonnagar, Bihar, to Sahnewal, Punjab. This corridor is complete and operational, with feeder routes to coal mines and thermal plants.
 - **Western DFC (WDFC):** Extending 1,506 km from Mumbai's Jawaharlal Nehru Port to Dadri, UP. Currently 93% operational, it serves major ports in Gujarat and is set for full completion by December 2025.

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- As of March 31, 2024, Rs 94,091 crore has been invested in the DFC project (excluding land costs).

Need

- The need for Dedicated Freight Corridors (DFCs) arose due to two main reasons:
 - **Overuse of the Golden Quadrilateral:** This critical rail network, linking Delhi, Mumbai, Chennai, and Howrah, along with its diagonals, makes up only 16% of routes but handles over 52% of passenger and 58% of freight traffic.
 - **Declining Rail Freight Share:** To address the Railways' decreasing share in total freight traffic, the National Rail Plan set a goal to increase rail freight's share to 45% by 2030.

DFC project

- The DFC project was first announced in the Railway Budget for FY 2005-06. In 2006, then PM Manmohan Singh laid the foundation stones for the Eastern DFC in Ludhiana and the Western DFC in Mumbai.
- In October 2006, Dedicated Freight Corridor Corporation of India Limited (DFCCIL) was established as a Special Purpose Vehicle for the corridors' construction, operation, and maintenance.
- In March 2024, PM Modi inaugurated three new DFC sections: the 135-km Makarpura-Sachin segment on the WDFC, and the 179-km Sahnewal-Pilkhani and 222-km Pilkhani-Khurja sections on the EDFC.
- In addition to the existing DFCs, four more corridors are proposed:
 - **East Coast Corridor:** Kharagpur to Vijayawada (1,115 km)
 - **East-West Sub-Corridor-I:** Palghar to Dankuni (2,073 km)
 - **East-West Sub-Corridor-II:** Rajkharsawan to Andal (195 km)
 - **North-South Sub-Corridor:** Vijayawada to Itarsi (975 km)

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IL-35 PROTEIN



Scientists at the Institute of Advanced Study in Science and Technology (IASST) in Guwahati, an autonomous institute under the Department of Science and Technology, have discovered a specific protein IL-35 that can aid in new treatments for type I and autoimmune diabetes mellitus.

- It is a specific protein of **IL-12 α** and **IL-27 β** chains.
- It helps **protect against type 1** and **autoimmune diabetes**.
- It regulates macrophage activation, T-cell proteins and regulatory B cells.
- It inhibited pancreatic beta cell-attacking immune cells. Additionally, IL-35 lowered particular immune cells that produce inflammatory chemicals, **reducing pancreatic cell infiltration**, a key contributor in type 1 diabetes and autoimmune diabetes mellitus.

What is autoimmune diabetes mellitus?

- Autoimmune diabetes mellitus or T1DM is an **organ-specific autoimmune disease**.
 - It affects the **insulin-producing pancreatic beta cells** after an inflammatory process, leading to a chronic deficiency of insulin in genetically susceptible individuals.
 - It ultimately results in lifelong dependence on exogenous insulin.
 - It is a **complex multifactorial disease** in which both genetic susceptibility and **environmental factors promote** the autoimmune responses against beta cells.
 - Several environmental risk factors have been suggested as candidate triggers of islet autoimmunity, including certain viruses higher birthweight, infant weight gain, dysbiosis of the gut microbiota and various dietary factors (e.g., vitamin D deficiency, omega-3 fatty acid deficiency, high milk consumption)
 - There are **no preventive or immunosuppressive therapies** that can prevent damage or disease manifestations.
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