

Scenarios Towards Viksit Bharat and Net Zero



For Prelims: NITI Aayog , Mission LiFE , Carbon Capture, Utilisation, and Storage , Small Modular Nuclear Reactors , Extended Producer Responsibility

For Mains: India's Net Zero pathway and developmental implications, Role of NITI Aayog in climate and economic planning

Source: PIB

Why in News?

NITI Aayog has released a comprehensive set of 11 reports focusing on "**Scenarios Towards Viksit Bharat and Net Zero**," developed by ten Inter-Ministerial Working Groups.

- These reports provide an integrated assessment of how India can achieve the ambitious vision of becoming a **Viksit Bharat (Developed Nation) by 2047** with a GDP of **USD 30 trillion** , while simultaneously honoring its commitment to achieve **Net Zero Greenhouse Gas (GHG) emissions by 2070** .

Summary

- NITI Aayog's reports outline how India can become a USD 30 trillion economy by 2047 while achieving Net Zero by 2070 through electrification, massive renewable and nuclear expansion, green jobs, and sustainable urbanization.
- The transition faces hurdles like financing gaps, critical mineral dependence, technology limits, and just transition needs; solutions include climate finance reforms, green industrial policies, resilient supply chains, sustainable infrastructure, and Mission LiFE-driven behavioral change.

What are the Key Highlights of NITI Aayog Reports on "Scenarios Towards Viksit Bharat and Net Zero"?

Macroeconomic and Social Impacts

- **GDP Structure:** The economy will shift from "Consumption-Led" to "**Investment-Driven.**" Private consumption share will drop, while investment share will rise.
 - GDP is projected to rise from **USD 4.18 trillion (2025)** to **USD 30 trillion (2047)** .
- **Trade Balance:** While **critical mineral** imports will rise, **fossil fuel import savings** are estimated at **INR 9 trillion by 2070** , strengthening economic resilience.
- **Employment:**
 - **Green Jobs:** The energy sector will add **7 million jobs** by 2050.
 - **Just Transition:** Fossil-fuel dependent districts (over 150) will face restructuring, requiring massive skilling and social protection for workers.
- **Land Conflict:** **Renewable energy** expansion requires vast land, potentially competing with agriculture and ecology.
- **Role of Behavior:** Initiatives like **Mission LiFE** are critical to moderate demand through lifestyle changes (e.g., public transport, efficient cooling).
- **Urbanization:** The urban population will swell from 37% in 2023 to **51% by 2047** and **65% by 2070** .
- **Infrastructure Boom:**
 - **Housing:** 86% of the building floor space required by 2070 is yet to be built.
 - **Cooling:** Air Conditioner (AC) penetration is projected to rise from **10% today to 80% by 2070** , significantly increasing energy demand.
 - **Vehicle Ownership:** Car ownership per 1,000 people will jump from **32** to **200-250** by 2070.

Energy Transition under the Net Zero Scenario

- **Electrification is Key:** Electricity's share in final energy demand will triple, rising from **21% (2025)** to **60% (2070)** under the Net Zero Scenario.
 - *Drivers:* **Electric Vehicles (EVs)** , induction cooking, and industrial heat pumps.
- **Shift in Power Generation:**
 - **Renewables:** **Solar and Wind capacity** will scale massively from ~164 GW (2025) to over **6,000 GW (2070)** .
 - **Nuclear Energy:** Envisioned as a strategic pillar, scaling from 8 GW to over **300 GW by 2070** to provide firm, baseload power.
 - **Fossil Fuels:** The share of fossil fuels in the primary energy mix will drop from **87% (2025)** to **14% (2070)** .
 - Remaining fossil fuel usage will rely on **Carbon Capture, Utilisation, and Storage (CCUS)** .
- **Grid Emissions:** The grid emission factor is projected to drop to **zero** by 2070.

Financial Implications and Investment Gaps

- **Investment Requirement:** The Net Zero Scenario requires a cumulative investment of **USD 22.7 trillion by 2070** .
 - This translates to **USD 500 billion per year** , compared to the current annual investment of USD 135 billion.
- **Financing Gap:** Even with domestic reforms, a financing gap of **USD 6.5 trillion** remains.
- **Reliance on Foreign Capital:** To bridge this gap, the share of international capital sources (FDI,

concessional finance) may need to rise from **17% to 42%** by 2070.

Critical Minerals

- **Demand Surge:** The transition from fossil fuels to clean technologies moves energy security risks from "fuel supply" to "mineral supply."
 - Demand for **Critical Energy Transition Minerals (CETMs)** will increase by **51%** in the Net Zero Scenario compared to current policies.
- **Key Minerals:**
 - **Copper & Graphite:** Account for two-thirds of demand.
 - **Lithium, Cobalt, Nickel:** India faces near-total import dependence for these.
- **Sectors Driving Demand:** **EV Batteries** (55% of demand) and **Solar Technologies** (30%).
- **Strategy:** India needs to enhance exploration, secure international assets, and promote **circularity (recycling)**.

What are India's Challenges in Achieving Viksit Bharat and Net Zero?

- **The "Unprecedented Experiment" of Scale:** The NITI Aayog notes that no major economy has ever attempted to scale its GDP **eightfold** (from ~USD 4.18 trillion to USD 30 trillion) within a single generation while simultaneously transforming its energy system to Net Zero.
- **Nascent Technology:** Key technologies required for this transition specifically **CCUS** , **Long-duration Energy Storage** , and **Small Modular Nuclear Reactors** remain "nascent and unproven at scale in India."
- **The Financing Gap & Macroeconomic Shift:** The transition demands a structural shift where the share of **Private Consumption** in GDP drops (from 58% in 2025 to 52% in 2070), while **Investment** share rises.
 - This implies a **"tightening of domestic liquidity"** that could crowd out consumption if not balanced by foreign inflows.
- **Critical Mineral Security:** For **Lithium, Nickel, Cobalt** , and **Rare Earth Elements** , India faces near-total dependence on imports due to a lack of domestic reserves.
 - Even where raw materials might be available, there are gaps in refining capacity (e.g., **Polysilicon** for solar panels).
- **Water Stress:** A critical spatial challenge is that **nearly 75% of India's renewable energy capacity** is clustered in water-stressed states, creating a conflict between energy generation and water conservation.
- **Infrastructure "Lock-in" Risk:** The NITI Aayog highlights that **86% of the building floor space** that will exist in 2070 is **yet to be built** .
 - With Air Conditioner ownership projected to jump from **10% to over 80%** , there is a massive risk of "locking in" **high energy demand if passive design and super-efficient appliances** are not mandated immediately.
- **Social & Regional Disparities:** The report identifies that **over 150 districts** are dependent on coal and thermal power ecosystems.
 - Fossil-fuel-linked manufacturing currently employs nearly **17 million workers** .
 - These sectors face "profound restructuring pressures," requiring large-scale social protection and

reskilling to prevent regional economic collapse.

- **Agriculture's Dual Vulnerability:** Agriculture is unique as it is both a **source of emissions** and a **victim of climate change**.
 - The challenge is to mitigate emissions (which are often "invisible") while ensuring food security for the largest employer in the country, without disrupting farmer livelihoods.

What Measures can Strengthen India's Path Towards Viksit Bharat and Net Zero?

- **Behavioral Change:** Systematically integrate **Mission LiFE** to encourage sustainable consumption.
 - Enforce **"Extended Producer Responsibility" (EPR)** and recycled-content standards to minimize virgin resource use.
- **Reorient Urban Mobility** : Focus on integrating rail, metro, and non-motorized transport rather than just switching private vehicles to EVs.
 - Develop **Transit-Oriented Development (TOD)** by integrating land use and transport planning to reduce the need for travel. Shift freight to efficient modes like **Rail and Waterways** .
- **Future-Proofing Buildings:** Since **80%** of the 2070 building stock is yet to be built, strict codes are essential.
 - Use benchmarking, disclosure, and **Green Procurement** to make "Net Zero Ready" buildings the norm.
- **Industrial Competitiveness in a Green World:** Use **Blended Finance** and public procurement to de-risk **Green Hydrogen** , **CCUS** , and low-carbon cement.
 - Strengthen **carbon measurement and certification systems** to prepare for global carbon border taxes.
- **Resilient Supply Chains:** Avoid replacing fossil fuel dependence with mineral dependence. Accelerate domestic exploration and refining. Empower institutions like **KABIL** for overseas asset acquisition.
- **Integrated Land & Water Planning:** Promote **Agrivoltaics** , **Floating Solar** , and repurposing of degraded/mined lands.
 - Adopt basin-aware strategies for water-intensive technologies like Green Hydrogen.
- **Just Transition (People, Jobs, Affordability):** Utilize **District Mineral Foundations (DMF)** and **Skill India Mission** to finance worker shifts. Upgrade the **e-Shram** platform to link informal workers in fossil sectors to new green opportunities.
- **Adaptation & Resilience:** Treat adaptation as equal to mitigation. Conduct vulnerability mapping and **"Climate-Proof" critical infrastructure** to protect development gains from worsening climate risks.
- **Climate Finance:** India needs **USD 500 billion/year** (vs. current ~USD 135 billion) to achieve net zero emissions by 2070.
 - Establish a **National Green Finance Institution** to anchor blended finance.
 - Develop a unified **Climate Finance Taxonomy** to boost market confidence.
 - Expand **GIFT City** platforms to crowd in sovereign wealth funds and foreign capital.
- **Data as Core Infrastructure:** Establish credible **Monitoring, Reporting, and Verification (MRV)** systems.
 - Create an interoperable digital layer for EV charging (Unified Energy Interface (UEI)) and energy services (similar to UPI for payments).

- **Strong Institutional Architecture:** Establish a **Low Carbon Development Cell** under the Prime Minister's Council on Climate Change to align Centre-State action.
- Align five-year sectoral and state budgets with India's **NDC (Nationally Determined Contributions)** cycle.

Conclusion

NITI Aayog concludes that India's Net Zero transition is not just a climate imperative but a **developmental opportunity**.

- Just as the steam engine defined the Industrial Revolution, India's transition can create a new **"Indian Development Model"** —one that combines economic vitality with sustainability—serving as a **lighthouse for the Global South**.
- While global climate finance remains uncertain, India's pathway must align with **fairness** and **climate justice**, ensuring that the transition remains compatible with economic inclusion and resilience.

Drishti Mains Question:

"India's Net Zero transition is a developmental opportunity rather than a constraint." Discuss

Frequently Asked Questions (FAQs)

1. What is the goal of NITI Aayog's Net Zero report?

To outline pathways for India to achieve a USD 30 trillion economy by 2047 while reaching Net Zero emissions by 2070 through energy transition, electrification, and green growth.

2. How will India's energy mix change under the Net Zero scenario?

Electricity's share will rise to 60% by 2070, renewables may exceed 6,000 GW, nuclear will expand to 300+ GW, and fossil fuels will drop to 14% with CCUS support.

3. What is the scale of investment required for India's Net Zero transition?

India needs about USD 22.7 trillion by 2070 (~USD 500 billion annually), with a financing gap of USD 6.5 trillion requiring increased foreign capital.

4. Why are critical minerals important for India's Net Zero pathway?

Clean technologies depend on minerals like lithium, cobalt, nickel, copper, and graphite, with EV batteries and solar driving most demand, creating import dependence risks.

5. What is meant by a 'Just Transition' in India's context?

It refers to reskilling workers, providing social protection, and supporting over 150 fossil-fuel-dependent districts to prevent economic disruption during decarbonization.

[Watch Video on YouTube: [▶ https://www.youtube.com/embed/6HFGrzHovSU](https://www.youtube.com/embed/6HFGrzHovSU)]

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. The term 'Intended Nationally Determined Contributions' is sometimes seen in the news in the context of (2016)

- (a) pledges made by the European countries to rehabilitate refugees from the war-affected Middle East
- (b) plan of action outlined by the countries of the world to combat climate change
- (c) capital contributed by the member countries in the establishment of the Asian Infrastructure Investment Bank
- (d) plan of action outlined by the countries of the world regarding Sustainable Development Goals

Ans: (b)

Exp:

- Intended Nationally Determined Contributions is the term used under the UNFCCC for reductions in greenhouse gas emissions in all countries that signed the Paris Agreement.
- At COP 21 countries across the globe publicly outlined the actions they intended to take under the international agreement. The contributions are in the direction to achieve the long-term goal of the Paris Agreement; "to hold the increase in global average temperature to well below 2°C to pursue efforts to limit the increase to 1.5°C, and to achieve net zero emissions in the second half of this century." Therefore, option (b) is the correct answer.

Mains

Q. Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? (2021)

Reforming India's Power Distribution Sector



For Prelims: Power Distribution Companies , Ujwal DISCOM Assurance Yojana , Revamped Distribution Sector Scheme

For Mains: Power sector reforms and fiscal prudence, Role of regulatory institutions in utilities reform, Governance challenges in service delivery

Why in News?

Recent Union government data for **Financial Year 2024-25** show a financial turnaround in **Distribution Companies (DISCOMs)**, with improved **Profit After Tax** and reduced **Aggregate Technical and Commercial (AT&C) losses** following sectoral reforms.

Summary

- Power distribution companies have shown a financial and operational turnaround with reduced AT&C losses, a narrowed ACS-ARR gap, and improved payment discipline due to recent reforms.
- Despite these gains, continued dependence on State subsidies, non-cost-reflective tariffs, and unmetered agricultural supply remain major structural challenges.
- Sustained reform through tariff rationalisation, regulatory strengthening, renewable integration, and improved governance is essential for long-term viability of DISCOMs.

What are the Key Developments in DISCOM Performance?

- **Recent Financial Turnaround:** Distribution Companies (DISCOMs) recorded a positive **Profit After Tax (PAT) of ₹2,701 crore** in Financial Year (FY) **2024-25**, marking a significant improvement from losses of **₹67,962 crore** in FY **2013-14**, indicating a notable financial recovery.
- **Reduction in Aggregate Technical and Commercial (AT&C) Losses:** **AT&C** Losses declined from **22.62% to around 15.04%**, reflecting improved operational efficiency, although losses remain elevated in several States.
- **Dependence on State Government Support:** A considerable portion of the financial improvement is attributable to **tariff subsidies** and direct takeover of losses by State governments, raising concerns regarding long-term sustainability.
- **Improved Payment Discipline:** Implementation of the **Late Payment Surcharge (LPS)** Rules has significantly reduced legacy dues and improved payment cycles, strengthening liquidity across the electricity value chain.
- **Demand and Cost Pressures:** Rising electricity **demand and fluctuations** in fuel costs continue to exert pressure on power procurement expenses.
- **Reform Implementation through Revamped Distribution Sector Scheme (RDSS):** Performance-linked financial assistance under **RDSS** has contributed to operational improvements and enhanced accountability.

Government Initiatives to Support State DISCOMs

- **Ujwal DISCOM Assurance Yojana (UDAY):** Launched in **2015** to address mounting DISCOM debt, **UDAY** enabled states to take over **75% of DISCOM liabilities** through low-interest bonds. It aimed to reduce AT&C losses, improve billing efficiency, promote smart metering, and enhance operational accountability.
- **Revamped Distribution Sector Scheme (RDSS):** Introduced with an outlay of **₹3,03,758 crore for FY 2021-22 to FY 2025-26**, **RDSS** seeks to reduce AT&C losses to 12-15% and eliminate the ACS-ARR gap. Funding under RDSS is linked to **performance-based reforms** and measurable operational improvements, promoting financial sustainability and reliability in the distribution sector.
- **Integrated Power Development Scheme (IPDS):** Focused on strengthening urban **power distribution infrastructure**, **IPDS** aims to improve supply reliability, reduce technical losses, and enhance customer service in urban areas.
- **Late Payment Surcharge (LPS) Rules:** Implemented to enforce financial discipline, these rules allowed DISCOMs to **clear legacy dues** in up to 48 equated monthly instalments (EMIs). Outstanding dues reduced significantly from **₹1,39,947 crore in June 2022** to **₹4,927 crore by January 2026**, improving liquidity and payment cycles across the power value chain.
- **Integrated Rating of DISCOMs:** Annual ratings assess financial and operational performance, promoting **transparency and accountability**. Recent editions highlighted **reductions in AT&C losses** and improvements in payment discipline.

What are the Challenges Faced by DISCOMs?

- **Dependence on State Subsidies:** Many DISCOMs have shown financial improvement largely due to **tariff subsidies and direct loss absorption** by State governments. Without such fiscal support, several utilities would continue to report substantial losses, raising concerns about long-term sustainability.
- **Chronic Financial Stress and Legacy Debt:** Historically **high AT&C losses** and a widening **ACS-ARR gap** have resulted in accumulated losses and mounting debt. Although recent improvements are visible, the risk of reverting to revenue deficits remains.
- **Tariff Rationalisation and Political Economy Constraints:** Non-cost-reflective tariffs and delayed State subsidy payments have historically weakened DISCOM finances. **Political reluctance** to revise tariffs or withdraw **free power schemes** continues to pose a structural challenge.
- **Employee Resistance to Privatisation:** Employees of public-sector DISCOMs often **oppose privatisation** due to fears of **job losses, retrenchment, and deterioration in service conditions**. Past experiences, such as **Delhi's voluntary retirement scheme**, reflect concerns about job security and financial stability.
- **Unmetered Agricultural Supply and Data Gaps:** In several States, **unmetered power supply** to the farm sector distorts actual consumption data and complicates subsidy estimation, limiting effective financial planning.

What Steps Are Needed to Further Strengthen DISCOMs?

- **Strengthening Financial Discipline:** Strict enforcement of the **Late Payment Surcharge Rules** and **timely clearance of dues** must continue to prevent the recurrence of legacy debt and ensure smooth cash flow across the power value chain.
- **Cost-Reflective Tariffs:** Institutionalising **automatic and timely tariff revisions** aligned with fuel costs and inflation is essential to prevent widening of the **ACS-ARR gap** and ensure **long-term financial sustainability**.
- **Targeted Subsidy Delivery:** Moving towards **Direct Benefit Transfer (DBT)** for electricity subsidies can **enhance transparency, reduce fiscal stress** on DISCOMs, and ensure support reaches genuinely vulnerable consumers.
- **Expanding Feeder Segregation:** States with significant **agricultural consumption** should adopt **feeder segregation** to accurately measure farm usage and reduce inefficiencies arising from unmetered supply.
- **Promoting Solarisation in Agriculture:** Scaling up **solar pump deployment** and **decentralised renewable generation** can lower procurement costs and reduce subsidy burdens in the long run.
- **Regulatory Strengthening:** State electricity regulatory commissions must be empowered to enforce **transparent tariff determination, incentivise efficiency**, and protect consumer interests.

Conclusion

Recent improvements in DISCOM performance reflect the impact of targeted reforms and fiscal discipline. However, sustained progress depends on reducing subsidy dependence, strengthening regulation, and improving governance to ensure long-term financial viability of the power distribution sector.

Drishti Mains Question

Improving the financial health of DISCOMs is essential for fiscal prudence and energy security. Examine the recent reforms, persistent challenges, and the way forward.

Frequently Asked Questions (FAQs)

1. What are DISCOMs?

They are power distribution companies responsible for supplying electricity to consumers.

2. Why have DISCOM finances improved recently?

Reforms, subsidy support, and Late Payment Surcharge rules improved payment discipline and reduced losses.

3. Why do DISCOMs still face problems?

Dependence on state subsidies, free power schemes, and unmetered agricultural supply continue to affect long-term financial sustainability.

4. What is UDAY?

Launched in 2015, Ujwal DISCOM Assurance Yojana allowed states to take over 75% of DISCOM debt through low-interest bonds and aimed to reduce losses and improve billing efficiency.

5. What is IPDS?

The Integrated Power Development Scheme strengthens urban power distribution infrastructure to improve reliability and reduce technical losses.

[Watch Video on YouTube:

► <https://www.youtube.com/embed/arpccFYTdV4>

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UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. Which one of the following is the purpose of 'UDAY', a scheme of the Government? (2016)

- (a) Providing technical and financial assistance to start-up entrepreneurs in the field of renewable sources of energy
- (b) Providing electricity to every household in the country by 2018
- (c) Replacing the coal-based power plants with natural gas, nuclear, solar, wind and tidal power plants over a period of time
- (d) Providing for financial turnaround and revival of power distribution

Ans: (d)

New Telescopes in Ladakh to Boost Space Research



Why in News?

The **Union Budget 2026-27** has sanctioned two new world-class telescopes in Ladakh - the **National Large Solar Telescope (NLST)** and the **National Large Optical-Near Infrared Telescope (NLOT)** , along with the upgradation of the existing **Himalayan Chandra Telescope**.

- The move is being seen as a transformative step for observational astronomy in India and the Global South.
- Ladakh, already home to the **Hanle Dark Sky Reserve** , offers ideal high-altitude, dry, and clear atmospheric conditions, making it one of the best astronomical sites in the world.

What is the National Large Solar Telescope (NLST)?

- **About** : The **National Large Solar Telescope (NLST)** will be a state-of-the-art facility dedicated to solar physics. It is estimated to be operational within the next **5-6 years** .
 - It will be set up in the **Merak region** near **Pangong Tso lake** . It features a **2-metre aperture** and will serve as India's **third ground-based solar observatory** (after Kodaikanal Solar Observatory (1899) and Udaipur Solar Observatory (1975)).
- **Operational Spectrum**: The telescope will operate in the **visible and near-infrared wavelengths** of the electromagnetic spectrum.
- **Scientific Objectives**:
 - To study fundamental **solar dynamics and magnetism** .
 - To observe energetic solar events and map **space-weather processes** .
 - This data is crucial for protecting national space assets like satellites and launch vehicles.
- **Synergy with Space Missions**: Data from NLST will complement **ISRO's Aditya-L1 mission** (India's space-based solar observatory), reinforcing India's leadership in heliophysics.

What is the National Large Optical-Near Infrared Telescope (NLOT)?

- **About**: The National Large Optical-Near Infrared Telescope (NLOT), to be built in Hanle, will be a 13.7-metre aperture segmented-mirror telescope and is set to become one of the **world's largest telescopes operating in the optical-near infrared spectrum**.
 - NLOT is projected to be ready over the next **decade** .
- **Technology**: Unlike a single piece of glass, the primary mirror will consist of **90 smaller hexagonal segmented mirrors** that act as one large unit.
 - This design leverages India's experience in the international **Thirty Meter Telescope (TMT)** project.
- **Scientific Objectives**: To conduct frontier research on **exoplanets** , stellar evolution, and **supernovae** .
 - To search for clues regarding the **origins of the universe** .
- **Geographical Advantage**: Due to Hanle's high altitude, cold/dry atmosphere, and clear skies, data

collected here will not suffer from **diffraction** issues common in other locations.

What is the Himalayan Chandra Telescope (HCT)?

- **About:** The HCT is a 2.01-metre optical-infrared telescope located at the Indian Astronomical Observatory in Hanle, Ladakh.
 - It achieved first light in 2000, and began regular scientific observations in 2003.
 - The telescope operates remotely from **CREST (Centre for Research and Education in Science and Technology), Hosakote, Karnataka** , via a dedicated satellite link.
 - It is equipped with advanced instruments including the **Himalaya Faint Object Spectrograph (HFOSC)** , the **Near-Infrared Imaging Spectrograph (TIRSPEC)**, and the **Hanle Echelle Spectrograph (HESP)**.
 - With high pointing and tracking accuracy, strong image quality, and an autoguider system capable of guiding on faint stars, HCT plays a crucial role in optical and infrared astronomy, particularly in the study of transient cosmic events such as supernovae.
- **Upgrade Details:** The telescope will be upgraded to a **3.7-metre segmented primary mirror** system.
- **Future Role:** It will continue to operate in the **optical-infrared wavelength** .
 - Its operations will complement major international facilities like **LIGO-India** (Gravitational-Wave Observatory in Maharashtra) and the **Square Kilometre Array** (radio telescope project in Australia and South Africa).

What is the Significance of These Developments in Astronomy?

- **Unique Longitudinal Advantage:** Both NLST and NLOT will be **one-of-a-kind facilities operating at this specific longitude**.
 - This fills a crucial gap in global surveillance of the sky, allowing for continuous monitoring of celestial events that might be missed by telescopes in other time zones.
- **Data Sovereignty:** These facilities will generate **high-quality data** that was previously inaccessible to Indian scientists without international dependence.
- **Global South Leadership:** The project boosts the scientific capabilities of the Global South, offering preferential telescope observation time to Indian researchers and facilitating international collaborations.
- **Space Weather Monitoring:** The NLST will be crucial for monitoring **solar flares and coronal mass ejections (CMEs)** . Understanding these "Space Weather" events is vital for protecting India's **satellites** , communication grids, and power infrastructure from solar storms.

Frequently Asked Questions (FAQs)

1. What is the primary objective of the National Large Solar Telescope (NLST)?

NLST aims to study solar magnetism, dynamics, and space weather events like solar flares and coronal mass ejections to protect satellites and communication systems.

2. What makes the National Large Optical-Near Infrared Telescope (NLOT) unique?

NLOT will be a 13.7-metre segmented-mirror telescope, among the largest globally in its wavelength range, enabling research on exoplanets and cosmic evolution.

3. Why is Ladakh chosen as the site for these telescopes?

Hanle offers high altitude, dry atmosphere, and clear skies, minimizing diffraction and making it ideal for precision astronomical observations.

4. How does the HCT upgrade contribute to India's astronomy ecosystem?

Upgrading HCT to a 3.7-metre segmented mirror enhances transient astronomy and complements facilities like LIGO-India and the Square Kilometre Array.

5. What is meant by "Data Sovereignty" in astronomy?

It refers to India generating and controlling high-quality astronomical data domestically, reducing dependence on foreign observatories.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q1. In the context of modern scientific research, consider the following statements about 'IceCube', a particle detector located at South Pole, which was recently in the news: (2015)

1. It is the world's largest neutrino detector, encompassing a cubic kilometre of ice.
2. It is a powerful telescope to search for dark matter.
3. It is buried deep in the ice.

Which of the statements given above is/are correct ?

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

Q2. In the context of space technology, what is "Bhuvan", recently in the news? (2010)

- (a) A mini-satellite launched by ISRO to promote distance education in India
- (b) The name given to the next Moon Impact Probe, for Chandrayan-II
- (c) A geoportal of ISRO with 3D imaging capabilities of India
- (d) A space telescope developed by India

Ans: C

Removal of the Lok Sabha Speaker



Source: IE

Why in News?

The Members of Parliament (MPs) submitted a notice seeking the removal of **Lok Sabha Speaker Om Birla** . The notice, reportedly signed by over 100 MPs, cites "partisan conduct" and the denial of permission to the **Leader of Opposition (LoP)** to speak as primary reasons.

- This move has brought the constitutional procedure for the **removal of the Lok Sabha Speaker** into the spotlight.

What is the Procedure for the Removal of the Lok Sabha Speaker?

- **Constitutional Provision: Article 94 of the Constitution** specifies the circumstances in which the Speaker or Deputy Speaker of the Lok Sabha vacates office.
 - Under Article 94(a), they automatically **cease to hold office if they stop being a member of the Lok Sabha**.
 - Article 94(b) allows **them to resign at any time by submitting a written resignation**.
 - Under Article 94(c), they may be **removed by a resolution passed by a Majority of all the then members of the House**.
 - This provision applies exclusively to the Lok Sabha and not the Rajya Sabha.
- **Procedural Requirements:** The specific steps are governed by Rules 200–203 of the *Rules of Procedure and Conduct of Business in Lok Sabha* .
 - **14-Day Notice:** A resolution for removal can only be moved after giving at least **14 days' notice** .
 - The notice must be given in writing to the **Secretary-General** of the Lok Sabha, signed by at least one member.
 - **Admission of Motion:** The motion is entered in the List of Business if it is in order.
 - The Presiding Officer reads the notice to the House, for the motion to be admitted for discussion, at least **50 members** must rise in support of it in the House.
 - If fewer than 50 members rise, the motion fails to get the "leave of the House" and is dropped.
 - **Strict Guidelines for the Motion:** The charges in the resolution must be **specific, clearly expressed, and precise** .
 - It must **not** contain arguments, inferences, ironic expressions, imputations, or defamatory statements.

- The discussion is strictly confined to the charges mentioned in the resolution.
- **Passing the Resolution:** For the removal to be successful, the resolution must be passed by a majority of all the then members of the House. This is technically known as an **Effective Majority**.
- **Outcome:** If the resolution is passed by the Effective Majority, the Speaker is removed from office immediately.
 - Notably, the **Speaker does not vacate his office upon the dissolution of the Lok Sabha. The Speaker** continues until immediately before the first meeting of the newly elected Lok Sabha.
 - However, in the case of removal by resolution, the vacation is immediate.
- **Speaker's Role During Proceedings:** The Speaker **cannot preside** over the House while a resolution for their removal is under consideration (**Article 96**).
 - The Speaker has the right to speak and take part in the proceedings. They can vote in the **first instance** (as an ordinary member) but **cannot exercise a casting vote** in the case of an equality of votes (tie).
- **Historical Precedents:** No-confidence motions against the Speaker have been moved only **three times** in history:
 - **1954:** Against **G.V. Mavalankar** (First Speaker).
 - **1966:** Against **Hukam Singh** .
 - **1987:** Against **Balram Jakhar** .
 - **Outcome:** All three motions failed, and no Speaker has ever been removed from office via this process.

Frequently Asked Questions (FAQs)

1. Under which Article can the Lok Sabha Speaker be removed?

Under Article 94(c), the Speaker can be removed by a resolution passed by a majority of all the then members of the House.

2. What is meant by an “Effective Majority”?

It means a majority of all the then members of the Lok Sabha, excluding vacant seats, not just those present and voting.

3. What is the notice requirement for moving a removal motion?

A minimum of 14 days' written notice must be given to the Secretary-General under Rules 200–203.

4. Can the Speaker preside during the removal proceedings?

No. Under Article 96, the Speaker cannot preside but may participate and vote in the first instance.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q1. Consider the following statements: (2017)

1. In the election for Lok Sabha or State Assembly, the winning candidate must get at least 50 percent of the votes polled, to be declared elected.
2. According to the provisions laid down in the Constitution of India, in Lok Sabha, the Speaker's post goes to the majority party and the Deputy Speaker's to the Opposition.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (d)

Q2. Regarding the office of the Lok Sabha speaker, consider the following statements: (2012)

1. He/She holds the office during the pleasure of the President.
2. He/She need not be a member of the House at the time of his/her election but has to become a member of the House within six months from the date of his/her election.
3. If he/she intends to resign, the letter of his/her resignation has to be addressed to the Deputy Speaker.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 1, 2 and 3
- (d) None

Ans: (b)

Advanced Chemistry Cell Production Linked Incentive Scheme



Source: TH

Why in News?

A recent report highlights serious implementation challenges in **India's Advanced Chemistry Cell Production Linked Incentive (ACC-PLI) scheme**.

What is the ACC-PLI Scheme?

- **About:** Launched in October 2021 by the **Ministry of Heavy Industries** , the scheme aims to promote domestic manufacturing of next-generation battery cells, especially lithium-ion batteries used in electric vehicles (EVs) and energy storage systems.
 - Advanced Chemistry Cells use technologies like **lithium-ion** that offer higher **energy density**, **longer life and faster charging** , unlike conventional **lead-acid batteries** traditionally used in vehicles and inverters.
- **Objective:** The scheme seeks to develop a domestic battery supply chain, i ncluding **cathode, anode, and electrolyte manufacturing**, to reduce import dependence (**especially on China**) , attract **private investment** and global technology partnerships, lower battery costs, and accelerate EV and energy storage adoption.
- **Target:** The scheme targets the **creation of 50 GWh of battery manufacturing capacity** by 2026, supported by a financial outlay of ₹18,100 crore.
- **Incentives:** Manufacturers are offered incentives up to ₹2,000 per kWh of battery sold, subject to a **minimum investment of ₹1,100 crore** and phased domestic value-addition requirements (25% within two years and 60% within five years).
 - Despite initial enthusiasm, only 30 GWh of the proposed 50 GWh capacity was allotted, and as of October 2025, just 1.4 GWh has been commissioned, with 8.6 GWh under development but delayed.
- **Status:** As battery production has not begun, **no incentives have been disbursed against the ₹2,900 crore target**, and project implementation has slowed, with some companies scaling back expansion plans.
 - This has resulted in a **sharp gap between expectations and outcome** s, with only 1,118 jobs created against a projected 1.03 million and **EV demand growth falling short of projections**.

Production Linked Incentive (PLI) Scheme

- **About:** The **Production Linked Incentive (PLI) Scheme** , launched in **March 2020** , aims to boost domestic manufacturing, reduce imports, and generate jobs, starting with **three sectors** and later expanding to **14 key sectors** .
- **Mechanism:** Under the PLI framework, both **domestic and foreign companies** receive **financial incentives** for manufacturing in India, calculated as a **percentage of incremental revenue** over a period of up to **five years** .
- **Targeted Sectors:** It covers mobile manufacturing, automobiles and auto components, pharmaceuticals, electronics, textiles, solar PV modules, **ACC batteries** , and drones.
- **Incentives:** Incentives are linked to **incremental sales** , with select sectors also assessed on **performance and local value addition** , while promoting **R&D investment** for global competitiveness.

Frequently Asked Questions (FAQs)

1. What is the ACC-PLI scheme?

It is a government scheme launched in 2021 to promote domestic manufacturing of advanced battery cells, especially lithium-ion batteries used in electric vehicles and energy storage.

2. What are Advanced Chemistry Cells?

They are modern high-performance batteries with higher energy density, longer life and faster charging compared to traditional lead-acid batteries.

3. Why is the scheme important for India?

It helps reduce battery imports, build a local supply chain, and support the growth of electric vehicles and clean energy storage.

[Watch Video on YouTube: [▶ https://www.youtube.com/embed/wocQBda9ML8](https://www.youtube.com/embed/wocQBda9ML8)]

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Consider, the following statements : (2023)

Statement-I : India accounts for 3.2% of global export of goods.

Statement-II : Many local companies and some foreign companies operating in India have taken advantage of India's 'Production-linked Incentive' scheme.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

Ans: (d)

India Leads CTF-154 Maritime Training Force



Source: IE

For the first time, the Indian Navy has assumed command of **Combined Task Force (CTF) 154** , a major **multinational maritime training force** operating under the **Combined Maritime Forces(CMF)** highlighting India's growing role in cooperative maritime security and capacity building.

CTF-154

- **About:** CTF 154, established in **May 2023** under the **Combined Maritime Forces (CMF)** , is a **multinational task force** dedicated to maritime security training and capacity building across the **Middle East** and **the wider region**.
 - **CMF**, headquartered in Bahrain, is the world's largest **multinational naval partnership** comprising 47 nations committed to **maintaining security** and a **rules-based order** across vital international waters.
- **Training Focus:** The task force works on **Maritime Domain Awareness, Law of the Sea, Maritime Interdiction Operations, Maritime Rescue & Assistance** and **leadership development**.
- **Composition:** The **core staff** of CTF-154 includes personnel from **Canada , Egypt , Jordan, Seychelles , Turkey** and **the United States** , reflecting its multinational character.
- **Role:** It operates alongside **CTF-150** (maritime security), **CTF-151** (counter-piracy), **CTF-152** (Arabian Gulf security) and **CTF-153** (Red Sea security).
- **Exercises:** It conducts **Maritime Security Enhancement Training (MSET), Compass Rose** and **Northern/Southern Readiness** exercises to strengthen partner nations' capabilities against piracy, illegal trafficking and irregular migration.

Read more: [Combined Maritime Forces \(CMF\)](#)

Desert Dust Bacteria's Impact on Himalayan Health



Source: PIB

Recently, a study revealed that pathogens transported through desert dust plumes from western India reach the Eastern **Himalayas** and are linked to respiratory, skin, and gastrointestinal diseases.

- **About:** The study was conducted by researchers from the **Bose Institute** , an autonomous institute under the **Department of Science and Technology (DST)** , based on **over two years of continuous monitoring** of dust storms from **arid regions of western India**.
 - It was undertaken to address the lack of understanding about how airborne microbes carried by transboundary dust affect human health in the **cold, low-oxygen Himalayan environment** .
- **Key Findings:** Powerful dust storms travel **hundreds of kilometres** , crossing the **Indo-Gangetic Plain** before settling over Himalayan hilltops. These dust plumes carry **airborne bacteria, including disease-causing pathogens** .
- **Mechanism of Spread:** Health impacts arise due to a **dual process** , horizontal long-range transport of desert dust, associated pathogens and **vertical uplift of polluted air** from Himalayan foothills. Together, these processes **alter the atmospheric bacterial community** over high-altitude regions.
- **Significance:** This first-of-its-kind quantitative study **links transboundary dust transport to changes in Himalayan atmospheric microbiology** and associated public health risks, offering crucial inputs for national health action plans and early warning systems aligned with the vision of **Viksit Bharat @ 2047** .

Read more: [Indian Himalayan Region](#)

RBI Tightens Norms on Recovery Agents' Conduct



Source: TH

RBI issued draft guidelines titled **Reserve Bank of India** (Commercial Banks – Responsible Business Conduct) Second Amendment Directions, 2026, **regulating engagement and conduct of recovery agents by banks** and other regulated entities, effective from 1 st July 2026.

- **Prohibited Practices:** Agents cannot use **abusive language, threaten borrowers, make excessive** or **anonymous calls**, contact outside prescribed hours, or publicly **humiliate** borrowers or guarantors.
- **Definition of Harsh Methods:** Intimidation or harassment, whether verbal, physical, or reputational, towards borrowers, guarantors, or their relatives, friends, or co-workers will be treated as harsh recovery practices. False or misleading representations regarding the extent of debt or consequences of **non-repayment are also prohibited**.
- **Institutional Responsibility:** All banks must establish a **formal policy on recovery of loans, engagement of recovery agents** , and taking possession of security. The policy must include eligibility criteria, due diligence norms, a **code of conduct**, specified activities, and performance evaluation standards for recovery agents.
- **Grievance Redressal:** Every bank must establish a dedicated **mechanism for complaints** related to recovery practices.

Read more: [Reserve Bank of India](#)