FINDER
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FORTUNE IAS NEWS DAILY EXPLAINER
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Preparing India for a true innovation-led economy

Prelims: General Studies Paper - 1
Economic and Social Development-Sustainable Development, Poverty, Inclusion, Demographics, Social Sector Initiatives, etc.

Mains: General Studies - 3
Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.

1. Government Initiatives and Policy Push

- The Government of India has increased focus on **Research, Development and Innovation (RDI)** through major funding and reforms.
- A **₹1,00,000 crore RDI Fund** and **₹20,000 crore fund for deep-tech startups** aim to strengthen innovation.
- Funding for **Atal Tinkering Labs** increased from **₹500 crore to ₹3,200 crore** to encourage young innovators.
- Policy measures follow the **removal of the three-year existence requirement**.
  - Which earlier **restricted deep-tech startups from accessing schemes under the Department of Scientific and Industrial Research's Industrial R&D Promotion Programme**.
- The government **removed the ban on patenting atomic energy inventions**.
  - The **SHANTI Act, 2025** now allows **patents for peaceful uses of nuclear energy**, encouraging **greater private-sector participation**.
- India's **Global Innovation Index (GII) ranking improved to 38th** and **patent filings increased to over 1,10,000 in 2024-25**.

2. Low R&D Investment and Weak Private Sector Role

- India spends only **0.65% of GDP on R&D**, far lower than innovation leaders such as **South Korea, Japan, and Singapore**.
- Unlike advanced economies, **the government contributes the majority of R&D spending**, while **private-sector investment remains limited**.
- Patent filings are rising but remain **far behind countries like China and the United States**.
- **International patent filings (PCT applications)** from India are only **4,547 in 2024**, compared to **70,000+ from China**.

3. Human Capital and Talent Gaps

- India ranks **95th in employment in knowledge-intensive sectors** and **80 in the number of full-time equivalent researchers** (GII).
- **Gender disparity in research and innovation** is significant; India ranks **101st in employment of women with advanced degrees**.
- Government initiatives like **Women's Instinct for Developing and Ushering in Scientific Heights and Innovations (WIDUSHI)** and **Women in Science and Engineering (WISE)-KIRAN** aim to increase **women's participation in science and engineering**, but their impact is still uncertain.

4. Weak Research-to-Market Linkages

- India faces a major gap in **commercialising research and translating ideas into marketable technologies**.
- Universities produce **scientific research**, but **technology transfer, venture creation, and industry collaboration remain weak**.
- Many Indian startups rely on **labour-intensive service models** rather than **deep-tech innovation**.
- To achieve meaningful innovation, India needs stronger **industry-academia collaboration, risk capital, and long-term private investment**, especially in areas like **deep tech, space technology, and future standards such as 6G**.

Economic Survey promises, impact of new labour codes

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Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.

1. Background

- India released **draft central rules for new labour codes** in December 2025.
- The **Economic Survey 2025-26** projects formalisation rising from **60.4% to 75.5%** and creation of **77 lakh jobs.**
- It also expects **higher female labour force participation** and a **1.25% increase in GDP** by 2029-30.

2. Labour Market Reality

- Over **80% of India's workforce remains informal**, outside most labour protections.
- Firms increasingly shift towards **contract and casual employment:**
  - **Factory employment fell** from **61%** (2011) to **47%** (2023).
  - **Contract workers** now form **42%** of the factory workforce.
  - Central public sector enterprises **lost 30,000 regular jobs** in 2024, replaced by contract workers.

3. Key Provisions and Concerns

- The **Occupational Safety, Health and Working Conditions Code** raises regulatory thresholds:
  - **"Factory" definition** increased from **10 to 20 workers** (with power) and **20 to 40 workers** (without power).
  - **Contract labour** threshold increased from **20 to 50 workers.**
  - **Lay-off approval** threshold increased from **100 to 300 workers**.
- Greater reliance on **fixed-term employment** may **weaken job security**.
- **Gig companies** must contribute **1-2% of turnover** for **worker welfare**, but implementation rules remain unclear.
- The Code on Wages introduces **National Floor Wage and Minimum Wage**, but without a clear methodology.

4. Institutional and Enforcement Issues

- Labour inspectors are re-designated as **"Inspector-cum-Facilitators"**, which may weaken enforcement.
- Employers can **settle violations such as wage theft by paying fines**, reducing deterrence.

5. Conclusion

- **Informality persists** because it remains **structurally profitable for firms**, not merely due to regulatory complexity.
- **Labour flexibility** may **increase contract employment** rather than create stable jobs.
- **Formalisation figures may rise statistically**, but may reflect accounting changes rather than real improvements in workers' conditions.

Women's political participation in India

Prelims: General Studies Paper - 1
Indian Polity and Governance - Constitution, Political System, Panchayati Raj, Public Policy, Rights Issues

Mains: General Studies - 1
Role of women and women's organization, population and associated issues

1. Background

- **Women's electoral participation** in India has **increased significantly** over the last six decades.
- But higher participation has **not translated into equal political representation.**
- The situation reflects a **paradox of electoral inclusion without structural equality.**

2. Women's Political Participation and Representation

- In the **1967 Lok Sabha election**, male turnout was **66.7%** and female turnout **55.5%**, a gap of 11.2 percentage points; it widened to **11.8 points** in 1971.
- The **gap narrowed steadily** to **4.4 points** in 2009, **1.5 points** in 2014, and reached **near parity in 2019 and 2024**.
- In **State Assembly elections (1990-2025)**, the trend reversed after 2011, with **women voting slightly more than men** in many elections.
- Women's involvement in **campaign activities** remains lower than men's.
- Participation i**n election meetings and rallies** rose from **9%** in 2009 to about **16%** recently, but **men's participation remains roughly double**.
- Participation in **processions and door-to-door canvassing** increased from about 5-6% to 11%, still below men's levels.
- The **Lokniti-CSDS 2019 surve**y shows many women require **family permission** to attend rallies or campaign activities, indicating **persistent social constraints.**
- Women's representation in the Lok Sabha increased from **22 MPs in 1952** to **78 in 2019,** before declining slightly to **74 in 2024.**
- Even at its peak, **women constituted only about 14% of the Lok Sabha**, despite forming nearly **50% of voters**.

3. Candidate Representation and Success Rates

- **Female candidates increased** from **45 (1957)** to 599 (1996), 668 (2014), 726 (2019), and **800 (2024)**, but they remain a **minority among contestants**.
- Women's **success rates are equal to or higher than men'**s (e.g., 49% vs 33% in 1957; 11% vs 6% in 2019; **9% vs 6% in 2024**).
- This suggests that **limited party nominations, not electability**, restrict women's representation.

4. Structural and Social Barriers

- In **2014, 51%** of women reported **voting independently,** which slightly declined to **50%** in 2024.
- **52%** of women prefer **sharing political views** with family members, reflecting **limited autonomy.**
- According to the **Lokniti–CSDS survey:**
  - **58%** believe **women from political families** have easier entry into politics.
  - **57%** believe **wealthy women have an advantage.**
  - **44%** believe **parties prefer male candidates**, and a similar share think voters favour men.
- Key barriers include **patriarchal structures**, **household responsibilities**, **lack of confidence** or awareness , **cultural norms** , and **financial constraints**.

5. Way Forward

- The **Women's Reservation Bill** offers a **structural pathway** to improve representation.
- The challenge is to ensure that increased participation leads to **real political authority** and **decision-making power** for women.

Electrifying industrial heat as a path to India's thermal independence

Prelims: General Studies Paper - 1
Current events of national and international importance

Mains: General Studies - 3
Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

1.Context

- Rising **tensions between the United States and Iran have made the Strait of Hormuz unstable.**
- India **depends heavily on gas imports through this route.**
- The **Ministry of Petroleum and Natural Gas has cut gas supply to non-priority industries to 65–80%,** forcing **industrial clusters like Morbi (ceramic tiles) and Ludhiana (textiles) to slow or halt production.**

2. Need for Thermal Independence in India

- **Gas disruptions highlight India's need** for thermal independence.

- **Key industries such as textiles** in Ludhiana and ceramics in Morbi **rely heavily on gas or coal** to generate high-temperature heat.
- Concentrated Solar Thermal **technology uses mirrors to concentrate sunlight and produce heat (up to ~400 °C) for industrial processes** like steam generation.
- The **Ministry of New and Renewable Energy (MNRE) estimates 15 GW CST potential** in India.
- Electrification technologies like **induction heating improve efficiency**.

Induction heating is a **process in which electric current passing through a coil creates a magnetic field that generates heat directly inside a conductive material** (usually metal) without direct contact or combustion. It is highly efficient (often above 90%) because heat is produced inside the material itself rather than through burning fuel.

3. Infrastructural Challenges in Electrifying Industrial Heat

- **India's grid may struggle** if industries shift fully to electric heating.
- **Electrification needs round-the-clock renewables with battery** and pumped hydro storage.
- **Ageing power infrastructure and overloaded DISCOMs** (Distribution Companies) limit supply.
- **CST (Concentrated Solar Thermal)** can generate and store heat on-site, reducing grid dependence.
- **India needs a National Thermal Policy** and support for the Carbon Credit Trading Scheme (CCTS).

4. Global Policy Lessons

- **Hybrid energy systems:** Combine CST (Concentrated Solar Thermal), gas backup, and induction heating for flexibility.
- **Miraah Solar Thermal Project, Oman:** Solar steam reduces gas use by about 80% in industrial operations.
- **Solar Heat for Industrial Processes (SHIP):** In **Spain**, plug-and-play solar thermal units help factories adopt CST easily.
- **Denmark model:** Heat Purchase Agreements allow industries to buy heat at fixed rates from providers.
- **Supportive policies and innovative financing models can accelerate the transition to clean industrial heat** while reducing costs for industries

KEYWORDS

India-Middle East-Europe Economic Corridor (IMEC)

- IMEC is a **multinational infrastructure and trade corridor** linking **India, the Middle East, and Europe.**
- It was announced on **9 September 2023 at the G20** Summit in **New Delhi**.
- The corridor uses **ports, railways, and sea routes** to make trade faster, greener, and more reliable.
- It has two segments:
  - **East Corridor:** India to the Arabian Gulf
  - **North Corridor:** Arabian Gulf to Europe
- **Key nodes** and countries:
  - **Mumbai**, India
  - **Jebel Ali and Al Ghuwaifat,** United Arab Emirates
  - **Riyadh, Haradh, Al-Hadith**a, Saudi Arabia
  - **Haifa**, Israel
  - **Piraeus**, Greece
- Partners include **India, UAE, Saudi Arabia, the United States, France, Germany, Italy, and the European Union.**
- IMEC is a strategic alternative trade route **connecting Asia, the Gulf, and Europ**e.
- It improves **logistics efficiency, digital connectivity, and energy links.**
- By cutting transit time and carbon emissions, IMEC **supports sustainable growth** and strengthens India's role in global supply chains.

Concentrated Solar Power (CSP) Technology

- Concentrated Solar Power (CSP) technology **uses mirrors to concentrate sunlight to produce steam that drives turbines to generate electricity.**
- CSP systems **allow thermal energy storage, enabling electricity generation even when sunlight is not available.**
- It **operates at higher temperatures than Photovoltaic (PV) systems,** allowing greater operational flexibility.
- **CSP requires direct solar radiation** and is currently less cost-competitive than PV solar power.
- CSP **plants are best suited for regions with high direct normal irradiation (DNI)** and **clear skies for efficient operation.**
- (Direct Normal Irradiation is the amount of solar radiation received on a surface directly facing the Sun's rays.)

Peptide therapy

- Peptide therapy is a **medical treatment that uses short chains of amino acids (peptides) to regulate or stimulate specific biological functions** in the body.
- Peptides **act as signalling molecules that help cells communicate and control physiological processes**.
- It is **being explored for tissue repair, hormone regulation,** and immune system support.
- Peptide therapy is studied in areas such as anti-ageing treatment, metabolic disorders, and regenerative medicine.
- Some peptides can be misused for performance enhancement in sports or anti-ageing treatments, raising ethical and regulatory concerns.

Women's Instinct for Developing and Ushering in Scientific Heights & Innovations (WIDUSHI)

- The **Department of Science and Technology (DST)** has launched the **Women's Instinct for Developing and Ushering in Scientific Heights & Innovations (WIDUSHI)** programme.
- It is implemented under the umbrella scheme **Women in Science and Engineering–KIRAN (WISE-KIRAN)**.
- The programme aims to **encourage and support senior women scientists** to undertake **interdisciplinary research in Science and Technology**.
- It provides support to **women scientists nearing retirement, retired from government service, or active researchers without permanent positions**.
- The initiative seeks to **utilise the experience and expertise of senior women scientists for scientific advancement and societal benefit**.
- The **maximum age limit to apply is 62 years**.