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FRIDAY, 31st OCTOBER 2025

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1. Electronics Component Manufacturing Scheme (ECMS)

- **Prelims -** Electronics Component Manufacturing Scheme (ECMS)
- **Mains -** GS 3 - Economy

Why in the news?

- Union Electronics and IT Minister Shri Ashwini Vaishnaw announced the approval of the first tranche comprising seven projects under the Electronics Components Manufacturing Scheme (ECMS).

Electronics Component Manufacturing Scheme (ECMS)

- **What is it?:**
  - ➔ These projects aim to strengthen India's electronics components materials manufacturing capacity (e.g., PCBs, camera modules, copper-clad laminates, polypropylene films).
  - ➔ The move aligns with India's objective of transitioning from assembling end-products to manufacturing modules, components, materials and machinery in the electronics value chain.
- **Objectives:**
  - ➔ To develop a robust electronics component manufacturing ecosystem in India.
  - ➔ Attract large global and domestic investments across the electronics value chain.
  - ➔ Enhance domestic value addition in electronic components manufacturing.
  - ➔ Integrate India's electronics industry with global value chains.
- **Key Features:**
  - ➔ **Implementation:** Launched in April 2025 by the Ministry of Electronics and Information Technology (MeiTY).
  - ➔ **Financial Outlay:** ₹22,919 crore
  - ➔ **Scheme Duration:** 6 years with one year optional gestation period (FY 2025-26 to FY 2031-32).
  - ➔ Implemented through a nodal Project Management Agency (PMA) under MeiTY.
- **Target Segments:**
  - ➔ Subassemblies (e.g., display modules, camera modules)

- ➔ Bare components (e.g., multilayer printed circuit boards - PCBs)
- ➔ Selected bare components (e.g., flexible printed circuit boards)
- ➔ Supply chain ecosystem and capital equipment for electronics manufacturing

- **Incentive Structure:**
  - ➔ Turnover-linked incentives (on incremental turnover/sales) for sub-assemblies and bare components
  - ➔ Capex-linked incentives (on eligible capital expenditure) for supply chain ecosystem and capital equipment
  - ➔ Hybrid incentives (both turnover and capex linked) for selected bare components
  - ➔ Incentives contingent on employment generation
  - ➔ Distributed on a first-come, first-served basis
- **Significance:**
  - ➔ **Import-dependency reduction:** By enabling production of high-value components that are currently largely imported, India strengthens its domestic supply chain.
  - ➔ **Higher value-chain capture:** The shift from assembling finished goods to manufacturing components and materials helps move India up the value chain in electronics manufacturing.
  - ➔ **Skill development & job creation:** The initiative would create higher-skilled manufacturing and R&D jobs rather than only low-end assembly jobs.
  - ➔ **Strategic & defence relevance:** Trusted supply chains for electronics components are critical for defence, telecom, EVs, renewable energy, the domains with strategic importance.
  - ➔ **Regional development:** Spread of projects beyond the traditional hubs indicates a drive for balanced industrial growth.- e.g., Madhya Pradesh.
  - ➔ **Global export push:** With ~60% production envisaged for export, India's electronics manufacturing ecosystem is being positioned for both domestic and global supply.
  - ➔ **Policy ecosystem complementarity:** Complements other initiatives like the Production Linked Incentive (PLI) scheme for electronics, and the India Semiconductor Mission (ISM), thereby creating an end-to-end electronics

manufacturing ecosystem.

- **Challenges:**
  - ➔ **Execution challenge:** Translating approved investment into commissioned production with timelines, technology transfer, required skills, and infrastructure quality remains key.
  - ➔ **Supply chain resilience:** While import dependency is targeted to reduce, managing raw-material sourcing, logistics, energy access, and ecosystem linkages will determine success.
  - ➔ **Skill ecosystem readiness:** The high-skill jobs anticipated will require upskilling/reskilling programmes, industry–academia linkages, and regional skill hubs.
  - ➔ **Regional infrastructure:** For States like Madhya Pradesh (with fewer established electronics clusters), availability of utilities, connectivity and ecosystem partners needs attention.
  - ➔ **Demand articulation:** Ensuring offtake (both domestic and export) is necessary; aligning component production with downstream manufacturers (smartphones, EVs, renewables) will be important.
  - ➔ **Monitoring & evaluation:** Robust mechanisms to track the pace of implementation, job creation, export realisation, and import substitution will ensure policy effectiveness.

2. Underground Coal Gasification (UCG)

- **Prelims** - Underground Coal Gasification (UCG)
- **Mains** - GS 3 - Environment

Why in the news?

- The Ministry of Coal launched the 14th Round of Commercial Coal Mine Auction, introducing Underground Coal Gasification.

Underground Coal Gasification (UCG)

- **What is it?:** Underground Coal Gasification (UCG) is an in-situ (on-site) process that **converts coal in the ground into combustible gas** by injecting controlled amounts of oxidants (air, oxygen, or steam) through boreholes and extracting the product gas through production wells.
- **Process:**
  - ➔ **Drilling Wells:** Two wells are drilled: one for injection and one for production.
  - ➔ **Injection of Oxidants:** Air, oxygen, and steam are injected to partially oxidize the coal underground.
  - ➔ **Gasification Reaction:** The reaction produces **syngas** (a mixture of CO, H_2, CH_4, CO_2, and small hydrocarbons).
  - ➔ **Gas Extraction:** The syngas is brought to the surface through the production well for power generation or as a chemical feedstock.
- **Uses of Syngas:**
  - ➔ Power generation (gas turbines)
  - ➔ Production of methanol, ammonia, and synthetic fuels
  - ➔ Hydrogen generation
- **Advantages:**
  - ➔ **No need for surface mining:** Avoids land disturbance and large-scale waste handling.
  - ➔ **Economic utilization of deep/unmineable coal seams:** Exploits coal that cannot be mined economically or safely.
  - ➔ **Cleaner than direct coal combustion:** Allows pre-combustion carbon capture and easier emission control.
  - ➔ **Energy security:** Expands domestic resource utilization, supporting

Atmanirbhar Bharat in energy.

➔ **Potential for hydrogen economy:** Syngas can be a source of clean hydrogen for industrial and mobility sectors.

- **Environmental Considerations:**
  - ➔ **Benefits:**
    - ★ Reduced surface disturbance compared to open-cast mining.
    - ★ CO_2 management possible through capture and underground sequestration.
  - ➔ **Concerns:**
    - ★ Groundwater contamination due to leakage of gases or chemicals.
    - ★ Subsidence (collapse of underground cavities).
    - ★ Monitoring challenges for deep subsurface reactions.
- **Indian Initiatives:**
  - ➔ **Policy Support:** The Ministry of Coal has included UCG under its energy diversification and clean coal initiatives.
  - ➔ **Technology Partnerships:** Collaboration with global technology providers (e.g., Linc Energy, Ergo Exergy) and R&D with CSIR-CIMFR and IITs.
  - ➔ **Pilot Projects:**
    - ★ ONGC Energy Centre (OEC) – pilot in **Gujarat (Vastan Lignite Block)**.
    - ★ CMPDI and Singareni Collieries Company Ltd (SCCL) – project proposals in Telangana and Odisha.
- **Challenges:**
  - ➔ **Subsurface complexity:** Geological heterogeneity makes process control difficult.
  - ➔ **Environmental regulation:** Need for robust groundwater protection standards.
  - ➔ **Technology costs:** Initial setup and monitoring systems are capital-intensive.
  - ➔ **Public acceptance:** Environmental and safety concerns hinder rapid deployment.

3. Koyla Shakti Dashboard

- **Prelims -** Koyla Shakti Dashboard
- **Mains** - GS 3 - Economy

Why in the news?

- The Commerce Ministry has launched a coal analytics dashboard named 'Koyla Shakti' to enhance transparency, data-driven decision-making, and real-time monitoring in the coal sector.

Koyla Shakti Dashboard

- **What is it?:** A unified digital dashboard (Smart Coal Analytics Dashboard – SCAD) that **integrates the entire coal value-chain** from production (mines) through transportation (rail/road/ports) to end-use (power, steel, cement) in real-time.
- **Key Features:**
  - ➔ Real-time monitoring and tracking of coal production, dispatch, and transportation activities.
  - ➔ Data integration from multiple stakeholders, including coal PSUs, private miners, Indian Railways, ports, power utilities, and state mining departments through e-Khanij platforms.
  - ➔ Advanced analytical tools using AI for demand forecasting, logistics optimization, and supply chain efficiency.
  - ➔ Automated alerts and notifications for disruptions or deviations in coal operations.
  - ➔ Standardized data formats and performance indicators for uniformity across agencies.
  - ➔ Scalable architecture to incorporate future digital systems and additional data sources.
  - ➔ The dashboard was launched alongside the CLAMP Portal (Coal Land Acquisition, Management, and Payment) which digitizes land acquisition processes for coal projects.
  - ➔ The system consolidates data from over 15 ports and integrates more than 48 APIs to create a seamless digital coal ecosystem.

- **Significance:**
  - ➔ Enhances transparency and accountability, reducing manual errors and reporting delays.
  - ➔ Facilitates better coordination and decision-making by providing policymakers with a comprehensive and real-time view of the coal sector.
  - ➔ Helps optimize coal supply chain operations, thereby improving supply reliability for industries dependent on coal.
  - ➔ Supports evidence-based policy formulation and strategic planning through data analytics.
  - ➔ Contributes to India's energy security and sustainable resource management.
  - ➔ Marks a milestone in digital governance and operational modernization of India's coal industry.
- **Challenges:**
  - ➔ **Data Quality & Integration:** Ensuring all stakeholders (public, private, state, central) feed accurate, timely data, and that systems talk to each other.
  - ➔ **Digital Divide & Access:** Smaller mines/units or remote regions may face difficulty in digital interface uptake.
  - ➔ **Change in Management of Operations:** Operational practices will need to adapt. e.g., real-time tracking may alter logistics contracts, inventory practices.
  - ➔ **Privacy & Security:** Large data flows (multi-stakeholder, real-time) raise issues of cybersecurity, commercial confidentiality, state vs private data access.
  - ➔ **Scaling & Future Expansion:** While the dashboard covers many nodes already, further expansion (to deeper value-chain, more players, cross-domain data like emissions, mine reclamation) will require continued investment.

4. Chabahar Port

- **Prelims** - Chabahar Port
- **Mains** - GS 2 - International Relations

Why in the news?

- India has received a waiver on the United States' sanctions against Iran's Chabahar port for six months.

Chabahar Port

- **Location**: Located on the southeastern coast of Iran, along the Gulf of Oman.
- **Infrastructure & Development**
  - ➔ India's participation through India Ports Global Limited (IPGL).
  - ➔ Includes development of Shahid Beheshti terminal.
  - ➔ Agreement signed in 2016; India took over operations in 2018.
  - ➔ India has supplied equipment like cranes and invested in capacity building.
- **Strategic Importance for India**
  - ➔ **Access to Afghanistan & Central Asia**: Provides an alternative trade route, avoiding Pakistan's land route restrictions.
  - ➔ **Counter to Gwadar Port (Pakistan)**: Balances China's presence in Gwadar (part of CPEC).
  - ➔ **Connectivity Projects**: Integrated with International North-South Transport Corridor (INSTC), linking India–Iran–Russia–Europe.
  - ➔ **Energy Security**: Facilitates crude oil and natural gas imports from Iran and Central Asia.
  - ➔ **Regional Diplomacy**: Enhances India–Iran ties while strengthening relations with Afghanistan.
- **Challenges**
  - ➔ **US Sanctions on Iran**: Slow progress due to restrictions on banking, insurance, and investments.
  - ➔ **Geopolitical Tensions**: Iran–US rivalry, instability in Afghanistan, and regional power competition.
  - ➔ **China Factor**: Beijing's deepening engagement with Iran (25-year strategic partnership) competes with India's role.

5. Model Youth Gram Sabha Initiative

- **Prelims** - Model Youth Gram Sabha Initiative
- **Mains** - GS 2 - Governance

Why in the news?

- The Union government launched the Model Youth Gram Sabha (MYGS) initiative along with a Training Module and the MYGS Portal in New Delhi.

Model Youth Gram Sabha Initiative

- **Aim**: To strengthen Janbhagidari (people's participation) and foster grassroots democracy through youth engagement. It simulates Gram Sabha sessions to give students practical experience in deliberative decision-making and local governance.
- **Jointly Implemented by**
  - ➔ Ministry of Panchayati Raj (MoPR)
  - ➔ Ministry of Education (MoE)
  - ➔ Ministry of Tribal Affairs (MoTA)
- **Objectives**
  - ➔ Promote participatory local governance among the youth.
  - ➔ Inculcate democratic values, civic responsibility, and leadership qualities.
  - ➔ Align with National Education Policy (NEP) 2020 goals of experiential learning and citizenship education.
  - ➔ Encourage youth commitment to transparency, accountability, and inclusive development, resonating with the vision of Viksit Bharat @2047.
- **Scope and Coverage**
  - ➔ To be implemented in over 1,000 schools across India.
  - ➔ Includes:
    - ★ Jawahar Navodaya Vidyalayas (JNVs)
    - ★ Eklavya Model Residential Schools (EMRSs)
    - ★ State Government Schools
- **Significance**
  - ➔ Acts as a training ground for democratic participation at the grassroots level.
  - ➔ Builds awareness about Gram Sabha functions, Panchayati Raj Institutions (PRIs), and local development planning.
  - ➔ Encourages youth-led community problem-solving and fosters inclusive governance.
  - ➔ Strengthens the link between education and citizenship, promoting Atmanirbhar and participatory villages.

6. East Asia Summit

- **Prelims -** East Asia Summit
- **Mains -** GS 2 - International Relations

Why in the news?

- 20th East Asia Summit adopts Kuala Lumpur Declaration on Peace and Stability with aim to implement joint projects and activities under the EAS Plan of Action (2024–2028) aligned with ASEAN 2045: Our Shared Future vision.

East Asia Summit

- **Formation**: The East Asia Summit (EAS) was established in 2005 with the first summit held in Kuala Lumpur, Malaysia.
- **What is it?**: It serves as a forum for strategic dialogue and cooperation on political, security, and economic issues of regional and global significance.
- **Objectives**
  - ➔ Promote peace, stability, and economic prosperity in the East Asian region.
  - ➔ Encourage strategic and political dialogue between leaders on broad regional and global issues.
  - ➔ Support ASEAN centrality in the evolving regional architecture.
- **Priority Areas of Cooperation (Six Pillars)**
  - ➔ Environment and Energy
  - ➔ Education
  - ➔ Finance
  - ➔ Global Health Issues and Pandemic Diseases
  - ➔ Natural Disaster Management
  - ➔ ASEAN Connectivity
- **Members: Total 18 members**
  - ➔ **10 ASEAN Member States**: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam
  - ➔ 8 Dialogue Partners: Australia, China, India, Japan, New Zealand, Republic of Korea, United States, and Russia