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India gets a waiver on U.S. sanctions against Iran port

- India has been **associated with the Chabahar port** at least since **2005**, when it agreed with **Iran** to develop the port. Both sides signed an **MoU in 2015** to jointly develop the **Shahid Beheshti Port at Chabahar**.

Sardar Patel's vision and the meaning of national unity today

- Every year, on **October 31**, India observes **Rashtriya Ekta Diwas — National Unity Day** to honour the birth anniversary of **Sardar Vallabhbhai Patel**.
- **Sardar Vallabhbhai Patel** was **Independent India's first Deputy Prime Minister and Home Minister**.
- Patel **brought together more than 560 princely states** after 1947 to create a **single political entity**. Patel's **realism, patience and firmness** prevented the subcontinent from **fracturing in the wake of Partition**. **Junagarh, Hyderabad, and Jammu & Kashmir** might have slipped into uncertainty but for his **persuasion and resolve**.
- The **2014 decision** to commemorate Patel's birthday as **National Unity Day** recognised that **unity is a continuous act of national renewal**.
- Events such as the **'Run for Unity'** embody Patel's call for **collective action** and **participation**.
- The **150th birth anniversary** will be observed with special programmes at **Ekta Nagar** near the **182-metre-tall Statue of Unity**.
- Institutions under **Ministry of Culture** work to **democratise heritage** and prevent regions from feeling isolated. Programmes like **'Ek Bharat Shreshtha Bharat'** pair States/UTs for **exchanges in language, cuisine and art**.
- Students and artists learning and performing each other's traditions **practise Patel's idea** that **knowing one another is the first step to standing together**.
- **Tourism** is an **instrument of cohesion** promoted through **'Dekho Apna Desh'** and the upgraded **'Incredible India' digital platform**.
- Schemes such as **Swadesh Darshan** and **PRASHAD** create **local livelihoods** and strengthen **people-to-people connections**. Exchanging experiences through travel and handicrafts **knits the Republic closer**.
- **Unity is a task renewed in every generation** and must be defended against **indifference, ignorance and regionalism**. The **'Panch Pran'** of **Azadi ka Amrit Mahotsav** place **national solidarity** at the core of India's journey towards **2047**. Unity remains both the means and the goal of India's destiny — **Ek Bharat, Shreshtha Bharat**.

Fully aware of Great Nicobar project's impact, says Centre

- **₹92,000-crore project** will include a **trans-shipment port**, an **international airport**, a **township**, and a **power plant**. The project will be built on **more than 160 sq. km of land**. About **130 sq. km** of this is **forest land** inhabited by the **Nicobarese** and **Shompen communities**, both **Scheduled Tribes**.
- The **Shompen** community is categorised as a **Particularly Vulnerable Tribal Group (PVTG)**.
- The petition cites **violations of the Island Coastal Regulation Zone (ICRZ) notification**.
- **Plans** were outlined for **translocating over 16,000 of the 20,668 coral colonies** that are under threat.
- There were about **51 active nests of the Nicobar megapode** in the project area. About **30 nests will be permanently destroyed**, but **plans are in place to conserve the remaining nests**.
- **All other nesting beaches of the leatherback turtles** will be **protected and conserved**, according to the Centre. The **Centre added that no tribal persons will be displaced or dispersed** due to the project. The project will **cover only 1.82% of the entire island's archipelago area**, which amounts to **about 18% of the Great Nicobar area**.

Shorter, simpler breast cancer treatment: where evidence meets practice

- **Trastuzumab**, a **monoclonal antibody** that targets the **HER2 receptor**, has been a **mainstay treatment for HER2-positive breast cancer** for over **two decades**.
- It is **traditionally given intravenously every three weeks**, often **with pertuzumab**.
- This schedule is **effective but time-intensive** for **patients and oncology units**.

- A **subcutaneous formulation of trastuzumab** was developed using **recombinant human hyaluronidase (rHuPH20)**. **rHuPH20** temporarily **breaks down hyaluronan** in the tissue, allowing **large molecules to be absorbed through the skin**.
- **Clinical studies** such as the **HannaH** and **FeDeriCa trials** showed that **fixed-dose subcutaneous trastuzumab**, alone or with **pertuzumab**, **matched intravenous infusion** in **safety, efficacy, and drug absorption**.
- A **time-and-motion substudy** from the **ADEPT trial** found that **subcutaneous dosing** reduced **treatment chair time by about an hour** and **pharmacy preparation by over an hour**.
- The **fixed-dose combination of pertuzumab and trastuzumab**, marketed as **PHESGO**, delivers **both antibodies together** in a **single subcutaneous injection**.

How advances in screening, stenting techniques have made it possible to prevent many strokes

- **World Stroke Day** is observed every **October 29**.
- **Advances in imaging, screening, and stenting techniques** have made it possible to **prevent many strokes before they occur**. **Nearly 80% of strokes are preventable**, as the **brain gives early signals** like **transient weakness, speech issues, or vision loss**.
- These warning episodes are known as **Transient Ischemic Attacks (TIAs)** or **"mini strokes"**, which are **temporary but serious**.
- Just as **cholesterol deposits** can **narrow heart arteries**, they can also **affect vessels supplying the brain**.
- **Every patient first needs lifestyle modification**, **blood pressure and sugar control**, and **antiplatelet therapy**.
- If a **significant block remains**, doctors **choose between surgery or stenting** based on **patient's condition and vessel anatomy**.
- A **brain stent** is a **tiny mesh tube** that **keeps narrowed or blocked arteries open**, restoring **blood flow to oxygen-starved regions**. **Modern neuroimaging** has transformed stroke diagnosis and prevention.

Should AI be introduced as part of school curricula?

- The **Ministry of Education** announced that an **Artificial Intelligence (AI) curriculum** will be introduced **from Class 3 onwards** for the **2026-27 academic year**.
- Recently, the government launched the **'Skilling for AI Readiness' initiative**. Under this initiative, **thousands of CBSE schools** will offer **AI as a skill subject starting from Class 6**.
- **AI literacy** means the **ability to understand how AI works** and to **apply critical thinking** while evaluating its responses. **AI skills** refer to **developing AI tools, AI products**, or participating in the **AI value chain**.
- In **Class 6**, the focus is on **AI literacy**, while in **Classes 11 and 12**, it shifts to **AI skills** like **Python programming** and **natural language processing (NLP)**. Students can **develop these skills** and then **enter STEM careers**.
- There is a need for **continuous coaching of teachers** to effectively teach AI.
- About **9% of schools in India** have **just one teacher**, and **35% have fewer than 50 students and two teachers**.
- **Half of the teachers** do not have **proper qualifications**, and there is a **large contingent of para teachers**.
- Many schools in India **lack electricity**, posing a challenge for implementing AI education.

What will power AI data centres?

- **AI data centres** are driving a surge in **electricity demand** and **energy consumption** in India and globally.
- India's **2025 Budget** launched the **Nuclear Energy Mission** with a ₹20,000 crore outlay to achieve **100 GW nuclear capacity by 2047** and deploy **five indigenously manufactured SMRs by 2033**.

Rising Energy Demand and AI Data Centres

- India's **electricity demand growth** remained flat at around **5%** for the past two decades.
- Demand for **data centres** is rising due to **Digital India**, **data localisation policies**, **increased data consumption**, and **5G roll-out** enabling technologies like **IoT** and **Artificial Intelligence (AI)**.
- **AI data centres** consume massive energy — **GPU racks use 80–150 KW** compared to **15–20 KW** for traditional servers. **AI** is now the **most significant driver of increased energy consumption** in the data centre sector.

Global AI Data Centre Infrastructure

- The **U.S.** leads with **51%** of global capacity (Texas, Wisconsin, Northern Virginia, Phoenix, Ohio, Pennsylvania).
- Other nations developing AI infrastructure: **China, Norway, U.K., Germany, Japan, Malaysia**.
- In India, **Visakhapatnam (Google)** and **Jamnagar (Reliance Industries)** have been selected for **GW-scale AI data centres**.

Transition to Low-Carbon Energy Sources

- Driven by **corporate decarbonisation targets**, **rising energy needs**, and **regulatory pressure**.
- Energy mix includes **intermittent renewables**, **green hydrogen**, **natural gas**, **geothermal energy**, and **nuclear fusion**. **Small Modular Reactors (SMRs)** are emerging as a key **low-carbon power source** for AI data centres.

Small Modular Reactors (SMRs)

- Provide **flexible sizing (1–300+ MW)**, **factory-built cost efficiency**, **passive safety**, and **24/7 stable baseload power**. Global **SMR investment: $15.4 billion**.
- **Advantages include:**
  - **Smaller reactor cores** with reduced nuclear material.
  - **Passive safety features** like **natural convection** and **automated shutdown**.
  - **Accident-tolerant fuels** maintaining integrity at higher temperatures.
  - **Longer mitigation times** (hours/days) and smaller **offsite emergency zones**.
  - Do **not require costly transmission infrastructure**.

India's Nuclear Energy Mission (2025 Budget)

- **₹20,000 crore** outlay for **Nuclear Energy Mission**. Target: **100 GW nuclear capacity by 2047**.
- **Aim**: Operationalise **five indigenously** manufactured SMRs by **2033**.

Global SMR Regulatory Reforms

- **Six focus areas:**
  1. **Technology-neutral frameworks** replacing large-reactor-specific rules.
  2. **Streamlined licensing** with fleet approvals and combined licences.
  3. **Factory fabrication certification** for modular manufacturing.
  4. **International harmonisation** via **IAEA standards** and **mutual design recognition**.
  5. **Risk-informed requirements** adjusting **emergency zones and staffing**.
  6. **Accelerated deployment** for follow-on units.

International Collaboration and Safety Frameworks

- **Nuclear Harmonization and Standardization Initiative (NHSI)** promotes **regulatory harmonisation**.
- **IAEA SMR Regulators' Forum** shares **experiences and best practices** globally.
- **Safeguards by Design Programme** integrates **international safeguards** into early design for optimal **safety, economy, and operation**.
- Emphasis on developing **new regulatory frameworks** for **SMR transportation and waste management**.

India expected to add 6 GW of new wind energy capacity: Joshi

- **Union Minister for New and Renewable Energy** announced that **6 GW of new wind capacity** is expected to be added by the **end of FY 2025-26**, the **highest-ever annual addition**, up from **4 GW last year**. So far in the **current financial year**, over **3 GW of new wind capacity** has already been **added**.
- India is **moving towards the goal of achieving 500 GW of renewable energy by 2030**, with **wind power contributing 100 GW or more**. India currently has **54 GW of installed wind energy** and **30 GW under implementation**, keeping the country **on track for the 2030 target**.
- **Tamil Nadu, Karnataka, Andhra Pradesh** together contribute **almost half of India's total wind capacity** of **54 GW**.
- India's **wind industry has 70% local content**, showing **strong domestic capability**, and under the **Atmanirbhar Wind Mission**, the goal is to **increase this to 85% by 2030**.
- The **GST on wind equipment** has been **reduced from 12% to 5%**, cutting **turbine cost by over ₹25 lakh per MW**.
- With the **Approved List of Models and Manufacturers (ALMM) – wind framework**, India can **meet 10% of global wind demand by 2030** and **up to 20% by 2040**, emerging as a **global hub for turbine and component manufacturing**.

- A **study by the National Institute of Wind Energy (NIWE)** shows a **potential of 1,164 GW at 150 metres hub height** across India.
- To **unlock new areas**, the government launched a **Viability Gap Funding (VGF) scheme** for **offshore wind projects**, targeting **1 GW in the first phase — 500 MW each off Gujarat and Tamil Nadu**.
- India's **total installed power capacity** is **nearing 500 GW**, with **non-fossil sources contributing over 257 GW**.

What are rare earths, why are they so vital?

- **China's export restrictions** on **rare earth elements** have disrupted global **supply chains**, affecting industries like **automobiles**, **electronics**, and **defence**.

What are Rare Earths?

- A group of **17 elements — 15 lanthanides** plus **scandium** and **yttrium**. Appear as **silvery-white metals**.

Uses of Rare Earths

- Found in **iPhones**, **washing machines**, **F-35 fighter jets**, **EVs**, **medical equipment**, **oil refining**, **missiles**, and **radar systems**. Crucial for **magnets** used in **high-tech**, **renewable energy**, and **military applications**.
- **Supply chain disruptions** occur quickly without them — **automakers paused production** earlier due to **Chinese export controls**.

Are They Rare?

- Not rare in abundance — some **more common than lead**.
- But **spread thin** in the Earth's crust, often **mixed with other minerals**.
- **Large deposits** are difficult to find and **costly to extract**.

Global Production and China's Dominance

- **U.S.** scientists developed **refining processes** in the 1950s. Since the 1980s, **China** has dominated the industry due to **low costs**, **lax environmental norms**, and **state support**.
- China accounts for **~60% of global mine production** and **90%+ of refined output and rare earth magnet production**.
- **U.S., Europe, and Australia** are developing **alternative supply chains**, but **meaningful output will take years**.
- Meanwhile, **China is tightening export controls** on both **rare earth elements** and **mining/refining equipment**.

List of Rare Earth Elements

- Scandium, Yttrium, Lanthanum, Cerium, Praseodymium, Neodymium, Promethium, Samarium, Europium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium, Lutetium.

Environmental Impact

- Processing involves **solvents** that generate **toxic waste**, contaminating **soil, water, and air**.
- Some ores contain **radioactive thorium or uranium**, removed using **acid-based extraction**.
- Faces **health** and **environmental regulatory hurdles**.
- **Cleaner technologies** are being developed but are **not yet widely adopted**.

As RSF captures El-Fasher, it's death and horror for the fleeing Sudanese

- **Over 36,000 civilians** have **fled the city** after the **Rapid Support Forces (RSF)** captured the army's last stronghold in the **Darfur region**. The **UN and humanitarian groups** have **warned of possible mass killings and ethnic cleansing**. **Displaced people** are **taking shelter in Tawila**, located **70 km away**.