

UPSC Daily Current Affairs | Prelim Bits 27-08-2024

Qutb Shahi tombs complex

After a decade-long restoration effort by the Telangana government and Aga Khan Trust for Culture the Qutb Shahi Heritage Park was opened to the public recently.

- The Qutb Shahi tomb complex built by the kings of the Qutb Shahi dynasty, who ruled the Golconda sultanate from 1518-1687.
- **Located in** - Ibrahim bagh in Hyderabad.
- The Qutb Shahi tombs complex consists of 30 tombs, mosques and a mortuary bath.
- The tombs belong to the rulers of the Qutb Shahi Dynasty, their queens and children and ***the nobles*** who faithfully served them.
- **Architecture** - The Qutb Shahi tombs collectively constitute an outstanding example of an ***Indo-Muslim architecture***, a style that combines Indian and Persian architectural influences.



- It features onion domes on top of cubes, surrounded by arcades with ornamental details and small minarets with floral motifs.
- The tombs are ***quadrangular*** in shape, with galleries in the smaller tombs that are single-story and larger galleries in the two-story tombs.
- In the center of each tomb is a sarcophagus that sits above a burial vault in a crypt below.
- The domes were originally covered in blue and green tiles. The most impressive tomb in the complex is that of ***Mohammed Quli Qutb Shah***, which is 42 meters tall and covered by a large dome.
- It is a ***UNESCO World Heritage Site***.

Qutb Shahi Dynasty (1518-1687)

- The Qutb Shahi tomb also known as the Golconda Sultanate, a Muslim dynasty, ruled the kingdom of Golconda.
- **Founded by** - Quli Qutb Shah
 - Quli Qutb shah is a Turkish governor of the Bahmani eastern region, who declared independence in 1518 and moved his capital to Golconda.
- The kingdom stretched from the **Godavari river** in the north, sharing a border with **Tamil Nadu** to the south, **Bijapur** to the west, and the **Bay of Bengal** to the east.
- **Ethnicity** - The Qutb Shahis were Shia Muslims who belonged to the **Turkmen tribe** from the Turkmenistan-Armenia region.
- **Trade** - The Qutb Shahis are known for their contributions to trade, developing links with the Middle East, Europe, and East Asia. The port city of Masulipatnam flourished under their rule.
- **Architecture** - The dynasty is also known for its distinct style of Indo-Islamic architecture, seen in the city of Hyderabad and its surroundings.
- The dynasty ended in 1687 when the Mughal emperor Aurangzeb's army conquered Golkonda.

Reference

[The Indian Express | The restoration of Qutb Shahi tombs](#)

Unified Lending Interface (ULI)

At the Global Conference on Digital Public Infrastructure and Emerging Technologies, the RBI Governor announced that the central bank is set to launch the Unified Lending Interface (ULI) across India soon.

- **ULI**- It aims to **transform India's lending sector**, like how the Unified Payments Interface (UPI) revolutionized the payments ecosystem.
- It is a standardized, plug-and-play system that aims to reduce the need for extensive documentation from borrowers.
- It is designed to address unmet credit demand, particularly for agriculture and MSMEs by digitizing access to data like land records.
- **Objective**- It is designed to provide lenders with consent-based digital access to both financial and non-financial customer data, stored across various silos, to **facilitate frictionless credit**.
- This is particularly aimed at aiding **farmers** and Micro, Small, and Medium Enterprises (**MSMEs**).
- **Benefits of ULI** - It will greatly **reduce the credit appraisal time** taken by consolidating data scattered across different government, local authority, and banking databases.
- ULI's architecture, featuring common and standardized APIs, will simplify the integration process for lenders, resulting in **faster and more efficient credit delivery** without the need for extensive documentation.

- **Integration with Existing Digital Infrastructure-** ULI will join the 'new trinity' of JAM (Jan Dhan, Aadhaar, Mobile) and UPI, marking a revolutionary step forward in India's digital infrastructure.

Quick facts

- **Unified Payments Interface (UPI)** - It is a real-time payment system launched in India in 2016 by the National Payments Corporation of India (NPCI).
- It integrates multiple bank accounts into a single mobile application, simplifying various banking features, fund routing, and merchant payments.
- **Central Bank Digital Currency (CBDC)** - It is a digital currency issued by a central bank.
- It is also called digital fiat currency or digital base money.
- It is also a liability of the central bank and denominated in the sovereign currency, as is the case with physical banknotes and coins.
- **Public Tech Platform for Frictionless Credit (PTPFC)** - It aims to develop an open-source, public digital infrastructure to enable seamless flow of credit to various sectors of the economy, especially small businesses and farmers.
- It has been created by the Reserve Bank Innovation Hub (RBIH), a wholly owned subsidiary of the central bank.
- It will enable the disbursement of non-collateral based loans for Micro, Small and Medium Enterprises (MSMEs), Kisan Credit Card loans up to Rs 1.6 lakh, dairy loans, personal loans, and home loans.

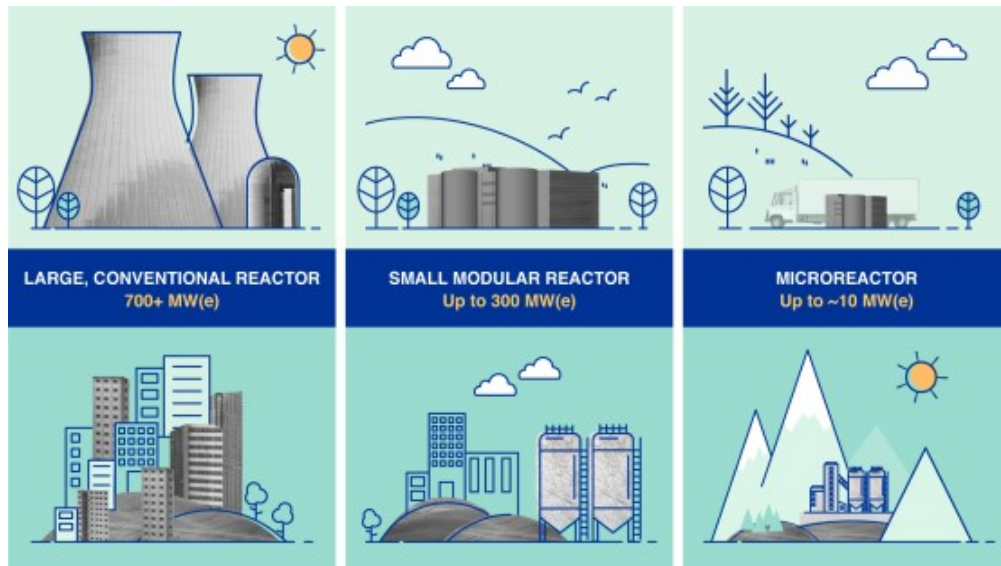
References

1. [Business Standard | Unified Lending Interface \(ULI\)](#)
2. [The Indian Express | ULI](#)
3. [PTPFC | Public Tech Platform for Frictionless Credit](#)

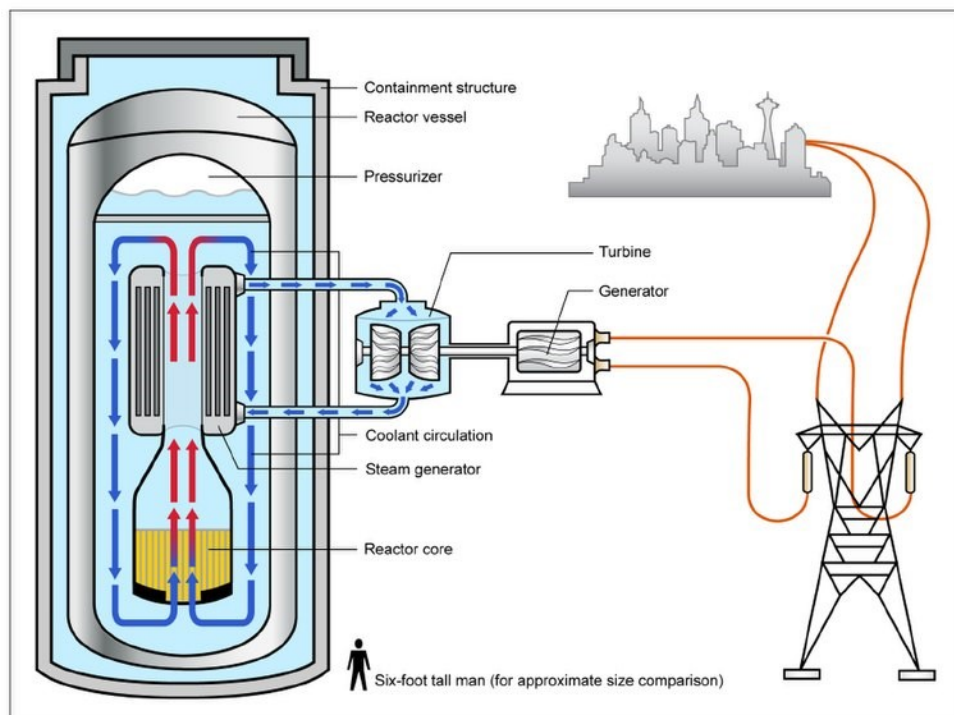
Small Modular Reactors

In the Budget 2024-25, 'Bharat Small Reactors' (BSR) has been emphasized to achieve clean energy and energy security.

- **Small Modular Reactors** - They are a class of small nuclear fission reactors, designed to be built in a factory, shipped to operational sites for installation and then used to power buildings or other commercial operations.
 - **Small** - Physically a fraction of the size of a conventional nuclear power reactor.
 - **Modular** - Making it possible for systems and components to be factory-assembled and transported as a unit to a location for installation.
 - **Reactors** - Harnessing nuclear fission to generate heat to produce energy.



- **Types** - Reactor type and the nuclear processes may vary based on SMR designs. Of them pressurized water reactor (PWR) is the most common.



Source: GAO, based on Department of Energy documentation. | GAO-15-652

- **Capacity** - They have a power capacity of up to **300 MW(e)** per unit.
- It is about one-third of the generating capacity of traditional nuclear power reactors and can produce large amount of low-carbon electricity.
- **Refuelling** - Power plants based on SMRs may require less frequent refuelling, **every 3 to 7 years**, in comparison to between 1 and 2 years for conventional plants.
- Some SMRs are designed to operate for up to 30 years without refuelling.
- **Benefits** - Many of the benefits of SMRs are inherently linked to the nature of their design, small and modular.
- **Locational Accommodation** - SMRs can be sited on locations not suitable for larger nuclear power plants.
- **Affordability** - Prefabricated units of SMRs can be manufactured and then shipped

and installed on site, making them more affordable to build.

- **Easy Construction** - SMRs offer savings in cost and construction time, and they can be deployed incrementally to match increasing energy demand.
- **SMR in India** - There are 15 pressurised heavy water reactors (PHWR) of 220 MW each being operated in India, accounts for half of India's 6780 MW nuclear power capacity.
- **PHWR to BSR** - Government is considering modifying the PHWRs pressurised heavy water reactors into BSRs.

References

1. [BusinessLine | Small-scale commercial nuclear reactors](#)
2. [IAEA | Small Modular Reactors](#)

Tanager-1

Tanager-1 satellite launched recently aboard a SpaceX Falcon 9 rocket from Vandenberg Space Force Base in California.

- **Tanagers 1** - It is a **hyperspectral satellite** launched by a coalition of companies and organisations, including NASA's Jet Propulsion Laboratory.
- **Features** - It can measure point-source emission, down to the level of individual facilities and equipment, around the world.
- It will scan 130,000 square kilometres of Earth's surface per day.
- **Technology** - The satellite will use **imaging spectrometer technology** developed at **Jet Propulsion Laboratory** to track methane and carbon dioxide emissions.
- It will measure hundreds of wavelengths of light that are reflected by Earth's surface.
- Different compounds in the planet's atmosphere including methane and carbon dioxide absorb different wavelengths of light.
- This leaves spectral "fingerprints" that the imaging spectrometer can identify.
- These infrared fingerprints can enable to pinpoint and quantify strong greenhouse gas emissions.
- **Use** - The satellite can detect major emitters of carbon dioxide and methane.
- Data from Tanager-1 can be used to identify gas plumes with the unique spectral signatures of methane and carbon dioxide and pinpoint their sources.

Methane

- Methane is an invisible strong greenhouse gas.
- It is the 2nd largest contributor to global warming after carbon dioxide, responsible for 30 per cent of global heating since the Industrial Revolution.
- Methane is 80 times more potent at warming than carbon dioxide.
- The gas also contributes to the formation of ground-level ozone — a colourless and highly irritating gas that forms just above the Earth's surface.
- Fossil fuel accounts for about 40% of all human-caused methane emissions.

References

Human Exploration Rover Challenge (HERC)

Recently, a team of Indian students built a lunar rover for a competition in NASA.

- **HERC**- It is an **annual competition** for high school and college students to design, build, and race human-powered, collapsible vehicles over simulated lunar/Martian terrain.
- The challenge **encourages students worldwide** to engage in human space exploration through design, construction, and testing of technologies.
- **Establishment**- The NASA Human Exploration Rover Challenge (HERC) began in **1994**, originally known as the **Great Moonbuggy Race**.
- **Historical ties**- The challenge was conceived in the spirit of NASA's **Apollo missions** and the Apollo Lunar Roving Vehicle (LRV) used during Apollo 15.
- **Artemis mission connection**- HERC now serves as an **Artemis Student Challenge**, drawing inspiration from both Apollo and Artemis missions, which focus on returning humans to the Moon and advancing space exploration technologies.

The [Artemis mission](#) aims to send the first woman and person of color to the Moon's South Pole, develop a sustained human presence on the Moon, and use in-situ resources to reduce dependency on Earth.

- **Global participation**- While most participants are from the United States, teams from countries like Canada, Mexico, India, Germany, and Romania also compete.
- **Structure and divisions**-
 - **Human-Powered (HP) division**- Teams design and build a human-powered rover that must traverse challenging terrains, mimicking conditions astronauts faced on the Moon.
 - **Remote-Controlled (RC) division**- Introduced recently, this division focuses on solving complex scientific tasks using a remotely operated vehicle, expanding the challenge's reach and inclusivity.
- **Diverse participation**- Teams must include both male and female riders, a rule introduced in 2020 to promote diversity and inclusion.
- **31 years of challenge**- In 2024, HERC marks 31 years of challenging students in designing and racing rovers.

References

1. [The Hindu | Human Exploration Rover Challenge \(HERC\)](#)
2. [NASA | Human Exploration Rover Challenge \(HERC\)](#)



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