

Subansiri Lower Hydroelectric Project (SLHEP): Test Run and Commissioning

1. Recent Development

- **Event:** The **first test run (wet commissioning)** of **Unit-1 (250 MW)** of the **Subansiri Lower Hydroelectric Project** began.
- **Purpose:** To check turbine performance and operational parameters **without generating electricity**.
- **Duration:** The test run is expected to last **4-5 days**.

2. Project Overview

- **Name:** Subansiri Lower Hydroelectric Project (SLHEP)
- **Location:** **Gerukamukh**, on the **Arunachal Pradesh-Assam border**, across the **Subansiri River** (a major tributary of the Brahmaputra).
- **Implementing Agency:** **NHPC Limited (National Hydroelectric Power Corporation)**
- **Installed Capacity:** **2,000 MW**
 - Consists of **8 units of 250 MW each**.
- **Type:** **Run-of-the-river hydroelectric project** with limited storage.
- **Objective:** To generate **clean, renewable energy** for India's northeastern and eastern states.

3. Current Status (as of October 2025)

- **Four out of eight units** are ready for test runs.
 - Once **two units are synchronised** with the power grid, **power generation will commence**.
 - Full commissioning will occur **in phases**.
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4. Project Timeline

Year	Development
January 2005	Project launched.
2011	Work suspended due to large-scale protests and environmental concerns in Assam.
2019 (October)	Work resumed after intervention from the Prime Minister's Office (PMO) .
2025 (October)	Wet commissioning of the first unit begins — a major milestone.

5. Reason for Past Delays

A. Protests and Public Concerns

- **Anti-dam movements** in Assam halted construction for years.
- Concerns raised about:
 - **Downstream flooding risks** in Assam.
 - **Erosion of riverbanks** due to sediment changes.
 - **Impact on fish and aquatic biodiversity** of the Subansiri and Brahmaputra rivers.
 - **Seismic vulnerability** (project area lies in a high earthquake-prone zone).

B. Environmental and Social Concerns

- Possible submergence of forests and displacement of local communities.
- Fear of altering natural river flow and ecology downstream.

6. Resumption and Revised Measures (Post-2019)

After 8 years of suspension, the project was revived in **October 2019** with **enhanced safety and mitigation measures**:

1. **Revised dam design** to handle high floods and seismic activity.
2. **Improved spillway capacity** to manage excess water safely.
3. **Downstream protection plans** for flood and sediment control.

4. **Biodiversity and fish migration management** systems.
5. **Community consultations** and local employment generation.

7. Technical and Environmental Features

- **Dam type:** Concrete gravity dam.
- **Height:** Around **116 metres** (approximate).
- **Reservoir length:** Extends up to ~47 km.
- **Catchment area:** Around 25,000 sq km (estimated).
- **Powerhouse location:** Underground / surface complex on the right bank.
- **Turbine type:** Francis-type turbines.

8. Strategic and Economic Importance

A. Regional Benefits

- Will supply power to **Assam, Arunachal Pradesh, and other northeastern states**.
- Expected to **stabilise power supply** in the region.
- Will promote **industrial and infrastructural development** in Northeast India.

B. National Benefits

- Contributes to **India's renewable energy targets**.
- Reduces dependence on **coal-based thermal plants**.
- Helps India move toward **net-zero carbon goals** by 2070.

9. NHPC's Perspective

- NHPC Chairman **Bhupender Gupta** described the commissioning as:
 - A “**shining testament to engineering excellence.**”
 - A step toward a **cleaner, greener, and self-reliant energy future.**

- Emphasised that the project reflects India's **push for sustainable hydropower development**.

10. Environmental Significance

- Hydropower is a **renewable source** of energy with low carbon emissions.
- However, large dams can:
 - Alter **river hydrology**.
 - Affect **aquatic and terrestrial ecosystems**.
 - Cause **sedimentation and displacement** issues.
- Thus, **balance between energy development and ecological safety** is crucial.

11. Broader Context

- The Subansiri Project is part of India's **hydropower expansion in the Northeast**, where:
 - Over **50,000 MW** hydropower potential exists.
 - The government aims to develop the region as a **“powerhouse of India.”**
- It aligns with:
 - **National Hydro Policy**
 - **National Electricity Plan**
 - **Paris Climate Commitments**

12. Key Takeaways for UPSC

Aspect	Details
Project Name	Subansiri Lower Hydroelectric Project
Capacity	2,000 MW (8×250 MW)
Location	Gerukamukh, Arunachal Pradesh-Assam border
River	Subansiri River (Tributary of Brahmaputra)
Executing Agency	NHPC Limited
Started	2005

Aspect	Details
Suspended	2011 (due to protests)
Resumed	2019
Status (2025)	First unit under wet commissioning
Significance	India's largest hydropower project; renewable energy milestone
Concerns	Downstream flooding, seismic safety, ecological impact

13. Conclusion

The **Subansiri Lower Hydroelectric Project** represents both the **promise and challenge** of India's renewable energy ambitions.

While it will substantially boost **clean power generation**, it also underscores the need for **sustainable environmental management, community participation**, and **climate-resilient infrastructure planning** in ecologically fragile regions like the Himalayas.

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