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Punatsangchhu-I Hydropower Project: Bhutan's Stalled Giant Resumes

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WHY IN NEWS

Construction on Bhutan's **1,200 MW Punatsangchhu-I Hydroelectric Project** resumed on **April 10, 2026**, after a **seven-year halt** caused by a slope failure in 2019. India's Union Minister for Power, Manohar Lal, attended the concrete-pouring ceremony marking the resumption of work, underscoring the project's centrality to India-Bhutan energy cooperation.

PROJECT SPECIFICATIONS

PARAMETER	DETAILS
Installed capacity	**1,200 MW** (6 × 200 MW underground turbines)
Dam height	**130 metres**
Dam length	**239 metres**
Dam type	Concrete gravity dam
River	Punatsangchhu River
Location	~80 km east of Thimphu, Wangdue Phodrang District, Bhutan
Turbine arrangement	Underground powerhouse (6 Francis-type turbines)
Status (April 2026)	Physical completion: ~88%
Work halted	**2019** (slope failure)
Work resumed	**April 10, 2026**

WHY WAS THE PROJECT HALTED?

In **2019**, a major **slope failure** (landslide/geological instability on the dam abutment) forced a halt to all construction at Punatsangchhu-I. The right bank abutment — a critical structural support for the dam — showed signs of deep-seated geological movement.

Geological Challenge

- The Punatsangchhu River valley has complex geology — Himalayan geology with active tectonics and weak rock formations
- The slope failure forced engineers to redesign the dam's abutment and drainage systems
- A **modified design** incorporating:
  - Additional drainage tunnels and anchoring systems
  - Revised dam profile to reduce load on the unstable slope
  - International geological consultancy from European and Japanese experts

This is a common challenge in Himalayan hydropower: geological surveys conducted before construction often underestimate deep slope instability that manifests only during construction.

INDIA'S FINANCING AND STRATEGIC INTEREST

Funding Structure

India finances the project under a **grant + loan** model standard for Bhutan hydro cooperation:

COMPONENT	DETAILS
Grant component	**40%** of project cost (free of any repayment)
Loan component	**60%** of project cost
Loan interest rate	**10% per annum**
Repayment source	Power exports to India (electricity revenues service the loan)

Strategic Logic

- **All surplus power** from Punatsangchhu-I will be exported to India — this is the cornerstone of the India-Bhutan energy relationship
- Bhutan's hydro exports to India generate approximately **40–50% of Bhutan's total government revenues**

- For India: Bhutan provides clean, renewable, cross-border electricity that counts toward India's renewable portfolio

India-Bhutan Hydropower Framework

Under successive agreements, India has been developing **10,000 MW** of hydroelectric capacity in Bhutan by 2020 (a target that has slipped but continues). The framework covers:

- **Operational:** Tala (1,020 MW), Chukha (336 MW), Kurichu (60 MW)
- **Under development/resumed:** Punatsangchhu-I (1,200 MW), Punatsangchhu-II (1,020 MW), Mangdechhu (720 MW — operational 2019)
- **Planned:** Bunakha (180 MW), Chamkharchhu-I (670 MW)

INDIA-BHUTAN RELATIONS — ENERGY AS CORNERSTONE

India and Bhutan's bilateral relationship is uniquely characterised by deep energy interdependence:

DIMENSION	DETAILS
Treaty basis	India-Bhutan Friendship Treaty (2007, revised from 1949)
Hydro cooperation	Established 1960s (Chukha project)
Revenue share	~40–50% of Bhutan's GDP contribution from hydro exports
India's position	Only country with which Bhutan has a defence alignment
Open border	Free movement of people and goods (no passport/visa)
Indian rupee	Accepted alongside ngultrum in Bhutan (pegged 1:1)

Why This Is Different from Other Regional Hydro Deals

India's Bhutan model is distinct from deals with Nepal or Bangladesh:

- Bhutan cedes strategic autonomy (no military alliances without India's knowledge) in exchange for economic security
- Indian PSUs (NHPC, SJVN) build, operate, and eventually hand over projects
- Power Purchase Agreements (PPAs) are long-term and guaranteed by India

PUNATSANGCHHU-II — NEARBY SISTER PROJECT

Punatsangchhu-I has a companion project: **Punatsangchhu-II (1,020 MW)**, also on the Punatsangchhu River. It faces similar geological challenges and has also experienced delays. Both projects are often discussed together in UPSC context.

UPSC RELEVANCE

PAPER	ANGLE
GS2 — International Relations	India-Bhutan bilateral; energy diplomacy; grant-loan model
GS2 — Governance	India's cross-border energy cooperation framework
GS3 — Economy	Hydropower; renewable energy; transboundary river management
GS1 — Geography	Punatsangchhu River; Bhutan's river systems; Himalayan geology
Interview	Should India use hydro financing as diplomatic leverage? Sustainable infrastructure in geologically fragile zones

Capacity: **1,200 MW** *(6 × 200 MW underground turbines)* | *Dam:* **130 m high, 239 m long** *(concrete gravity)* | *River: Punatsangchhu* | *Location: ~80 km east of Thimphu, Wangdue Phodrang* | **Halted: 2019** *(slope failure/geological instability)* | **Resumed: April 10, 2026** | *Physical completion: ~88%* | *Financial completion: ~93%* | *India funding:* **40% grant + 60% loan @ 10% p.a.** | *All surplus power exported to India* | *India's power minister at ceremony: Manohar Lal* | *Bhutan hydro revenues: ~40–50% of government revenues* | *GS2: India-Bhutan Relations; GS3: Economy, Hydropower*

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