

Country Profile

BHUTAN



0.8 million population (2024)



4.6% GDP growth rate (2023)



3.5 GW total installed capacity (June 2025)



~3 MW installed solar capacity (2024)

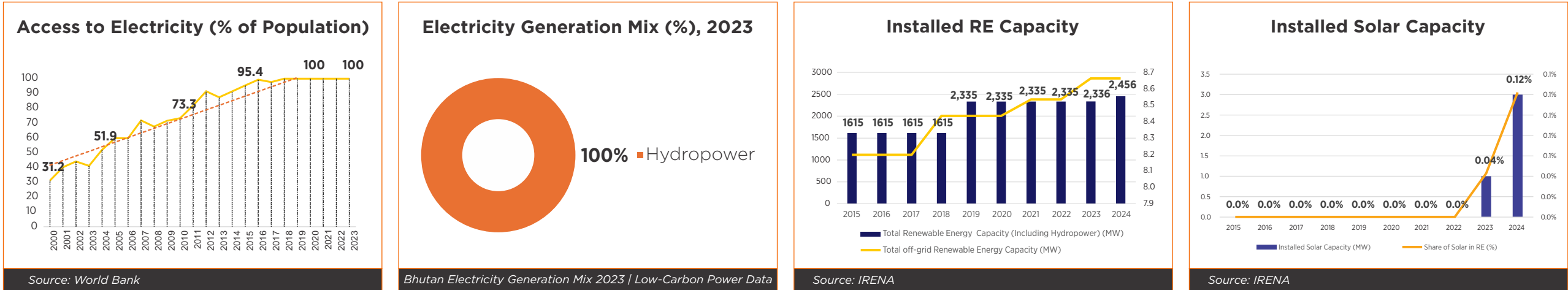


World's only Carbon Negative nation



Targets 25 GW RE in energy mix by 2040





KEY CHALLENGES ▶

- All major hydropower **plants are run-of-the-river schemes with no storage**, reducing generation from 2,460 MW installed capacity to ~415 MW in dry season
- Bhutan needs \$26 billion by 2040 for expansion (15,000 MW hydro + 5,000 MW solar)
- Annual requirement: \$1.5–1.6 billion, but limited fiscal space and dependence on external financing

POTENTIAL OPPORTUNITIES ▶

- Bhutan has high solar potential, especially in southern regions. Government **targets 300 MW solar by 2030** under the National Energy Master Plan
- Seasonal variability in river flows creates **strong case for pumped storage projects**. Feasibility studies underway for 1,200 MW pumped storage capacity
- Regional integration under **BBIN (Bangladesh-Bhutan-India-Nepal)** framework offers new revenue streams
- Bhutan's carbon-negative status positions it well for carbon credit trading

ENERGY STORAGE AND GRID INTEGRATION ▶

- Existing hydro fleet already acts as **“natural storage”**; future mix is likely “hydro + solar” with flexible hydro balancing.
- Cross-border interconnections with India give balancing and export options but also require coordinated grid codes.
- Battery Energy Storage Systems (BESS) can stabilize grid during winter and peak demand. Opportunity for private sector investment in storage linked to solar and mini-grids.

Key Policies and Framework

- Sets the strategic direction for Bhutan's energy sector, focusing on energy security, diversification beyond hydropower, and private sector participation.
- **Electricity Act of Bhutan (2001, amended 2019):** Provides the legal framework for generation, transmission, distribution, and trade of electricity.
- **National Energy Efficiency Policy:** Aims to reduce energy intensity and improve efficiency in industries, transport, and buildings
- **Renewable Energy Development Policy (REDP):** Focuses on solar, wind, and biomass development to complement hydropower.
- **National Adaptation Plan (NAP):** Integrates climate resilience into energy planning, addressing risks like glacial lake outburst floods (GLOFs) and erratic rainfall
- **Hydropower Development Strategy:** Long-term plan to achieve 15 GW hydropower capacity by 2040.

Climate & Sustainability Commitments

- Bhutan is one of the few countries in the world that is **carbon negative**, absorbing more CO₂ than it emits
- Forests cover over 70% of the country, sequestering ~6 million tons of CO₂ annually while emissions are under 2.5 million tons
- The country **targets 1 GW solar capacity by 2030**, highlighting solar investment potential
- The country unveiled a **Green Hydrogen Roadmap** at COP28 to support carbon neutrality and develop green hydrogen

Investment & Financing Landscape

- **ADB approved USD 18 million for the country's first utility- scale solar plant** in Sephu, due by end of 2024
- **Republic of India provided USD 1.1 million to support development and carbon - neutral cities**
- **OPEC plans a USD 30 million loan for hydropower projects** totaling 75 MW
- **The World Bank approved USD 50 million in 2023 to support green economy development**
- **Key investors:** European Investment Bank (EIB), Asian Development Bank (ADB), Government of India, Druk Holding & Investments (DHI), Reliance Power, Adani Power

Sources:

- Population: Population, total | Data
 - GDP: GDP growth (annual %) | Data
 - Installed Capacity: National-Energy-Policy-2025.pdf
- Solar Capacity: Renewable Energy Statistics 2025
 - Carbon Target: Bhutan: The World's Only Carbon-Negative Nation - EBNW Story
 - RE Target: www.moenr.gov.bt