

Current Cross-Border Electricity Trade Experiences, Opportunities and Challenges – A Bhutan Perspective

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Outline

- Current status of CBET
- Initiatives promoting CBET in South Asia
- Key learning from the past and current CBET
- Opportunities in development of Hydropower Resources and ATS for CBET
- Challenges to investments in development of resources and transmission infrastructure

Current Status of CBET

Power Exports started since 1986:

- ✓ Long term PPAs between with India (DHPS/DGPC and PTC):
 - **Duration of PPAs:** CHP – 14.5 yrs from 1st Oct. '02; THP – 35 years from 27th Sept. '06 & Kurichhu – 35 yrs from 1st Oct. '02.
- ✓ Terms & conditions of the PPA generally in accordance with agreed principles of the IG Agreements.
- ✓ Principle of surplus power export > 5.5 BU.
- ✓ Export tariffs mutually determined at the time of commissioning of the Projects (cost of project, financing costs, O&M charges, depreciation, prevalent market conditions, etc.)

Current Status Contd.

- ✓ Export tariffs reviewed jointly every three/four years to ensure predictability.
- ✓ Inter-Country Power transfer capacity – 2,560MW
- ✓ Delivery at the international border.
- ✓ Joint meter readings.
- ✓ Communication between each power plant and ERLDC

Initiatives Promoting CBET

- ✓ CBET dialogue pursued through SAARC Energy Centre (SEC) / SASEC – fulfilling mandates
- ✓ Tri-lateral process among India-Bangladesh-Bhutan (IBB).
- ✓ Active participation in USAID's SARI/Energy & SARI/EI.
- ✓ Accelerated Hydropower Development Initiative (SHDP'o8)
- ✓ Agreement with India (2006) ~ Target of 5,000MW by 2020 and further development of HPP and trade in electricity to be through public and private sector participation – Enhanced to 10,000MW in 2008 – 41 TWh.
- ✓ Process underway for setting up of a PTC in India.
- ✓ BPSO (NLDC) established under BPC.

Key Learning from the Past and Current CBET

- Small power system – less complex
- Tariffs not market based
- Market diversification (multiple cross-borders, short-term market opportunities)
- Need to have common International Communication Protocol - establish operational protocols between various Grids.
- Metering and billings becoming a complex and challenging.
- Power despatch becoming a complex issue
- ABT a formidable concept for small players (LT PPA, costs, administrative burdens, etc.)
- Current RoR projects not complementary to the demand (Highly seasonal nature of power generation from RoR schemes i.e. ~ 70% of generation in four months)

Opportunities – Hydropower development & Associated CB Transmission Infrastructure

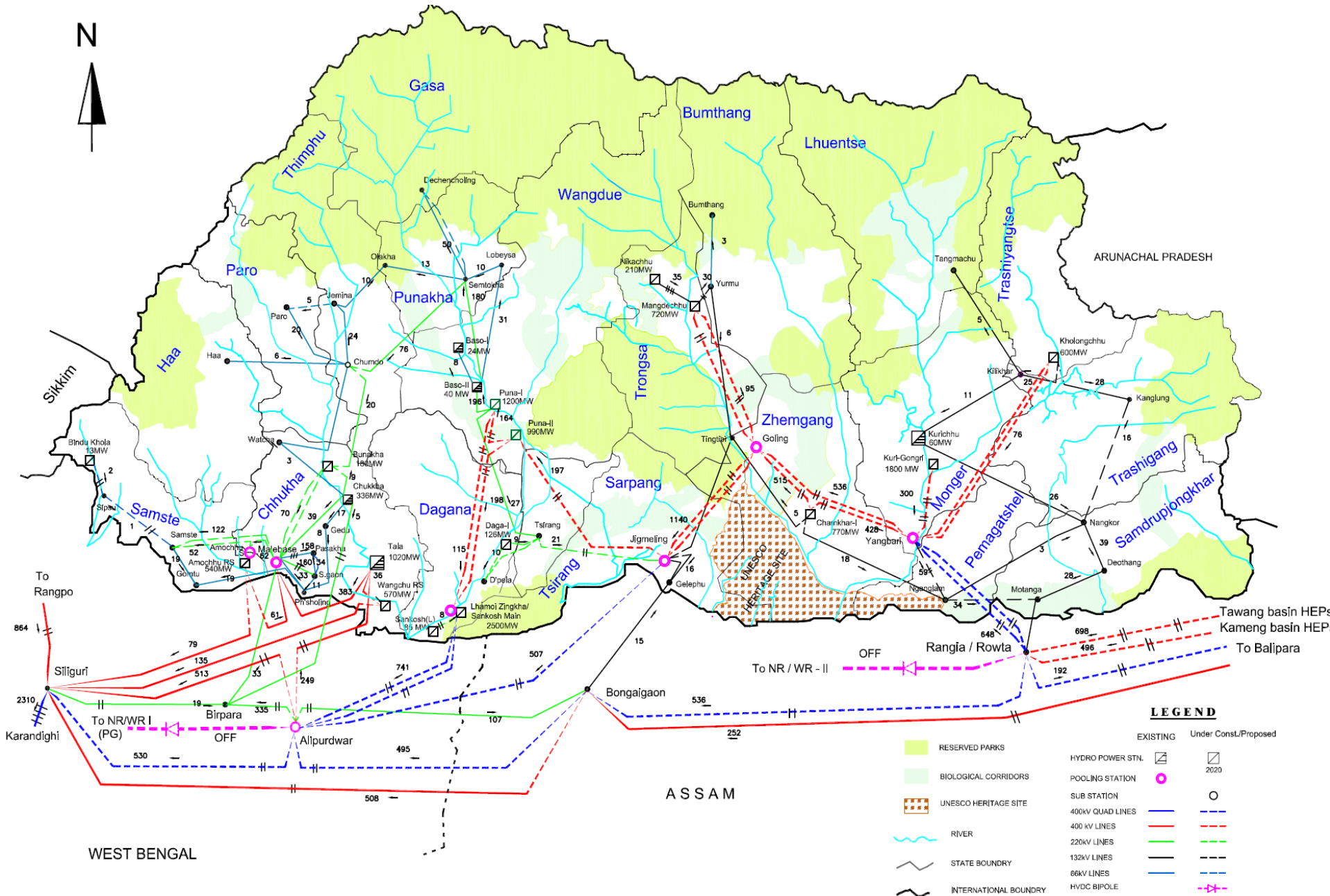
- Huge per capita hydropower & techno-economic potentials – 30GW/24GW (SAARC~294GW).
- Storage projects for energy security.
- Favorable policies (SHDP, EDP, FDI) and investment environment (peace & stability, no rights groups) – competitive generation cost, peaking supply, etc.
- South Asia presents a huge market with ever increasing demands and steady economic growths - fossil fuel based.
- Trans-boundary CDM potential.
- Regional Hydropower Power Plant (NIPA, BIB, NIB, ...)

Opportunities – Contd.

- Availability of Umbrella Agreement for cooperation in hydropower development and power export/trading valid for 60 years and extendable with mutual consent.
- Need of the Hour – a plausible Road Map for CBET amongst SA Region as a whole (IG Framework Agmt. for Energy Cooperation, SAME).
- Power systems, being mostly under regulatory mechanism, the internal and external regulatory requirements need to be harmonized with Common Grid code.
- National Transmission Grid Master Plan-2012
- Bhutan's transmission system well integrated with India's (SAPP model):

NTGMP (2018-2030); Transfer capacity - 10GW

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LEGEND

	EXISTING	Under Const./Proposed
RESERVED PARKS		
BIOLOGICAL CORRIDORS		
UNESCO HERITAGE SITE		
RIVER		
STATE BOUNDARY		
INTERNATIONAL BOUNDARY		
HYDRO POWER STN.		
POOLING STATION		
SUB STATION		
400kV QUAD LINES		
400 kV LINES		
220kV LINES		
132kV LINES		
66kV LINES		
HVDC BIPOLE		

WEST BENGAL

ASSAM

Tawang basin HEPs
Kameng basin HEPs
To Balipara

To NR / WR - II

To Rangpo
Karandighi

To NR/WR I (PG)

Challenges to Investments in development of Resources and Transmission Infrastructure

- ✓ Capital intensive & huge Investment requirements – *limited domestic financing*
- ✓ Limited external financing – Small economy & issue of debt sustainability, overheating of economy, foreign currency (Rupee) shortage
- ✓ High investment size for Storage projects
- ✓ Existing system of uniform/flat tariff structure irrespective of energy type (normal/peaking).
- ✓ ATS Reliability investment in the hilly terrain a costly affair
- ✓ Limited institutional and manpower capacities.
- ✓ Slow pace of regional dialogue for CBET.

**THANK YOU
&
TASHI DELEK**