

**DETAILED PROJECT REPORT FOR TRANSMISSION SYSTEM FOR
DEVELOPMENT OF POOLING STATION IN NORTHERN PART OF
WEST BENGAL AND TRANSFER OF POWER FROM BHUTAN TO
NR/WR**

1.0 CONTEXT / BACKGROUND

At present about 1400MW power from the existing hydro projects in Bhutan e.g. Chukha HEP (336 MW), Kurichu HEP (60 MW) and Tala HEP (1020 MW) is being imported to India. Bhutan has an estimated hydro potential of 21,000MW. Out of this, about 8000MW potential has been identified to be implemented in near future. This includes various HEPs like Punatsangchu-I (1200 MW), Punatsangchu-II (1000 MW), Mangdechu (600 MW), Bunakha (180 MW), Wangchu (900 MW), Sankosh (4080 MW) etc.

Major portion of power from the future generation projects in Bhutan is envisaged to be imported in India for consumption in deficit regions like NR/WR. The first of the future generation projects to be commissioned in Bhutan is Punatsangchu-I (1200 MW) in Sept. 2014. In order to pool power from Punatsangchu-I as well as various other future projects in Bhutan, a new pooling station is planned to be established in the northern part of West Bengal at Alipurduar. The power pooled here is to be transferred to NR/WR by utilizing Bishwanath Chariali - Agra HVDC bipole line (6000MW, ± 800 kV) being constructed as a part of 'NER - NR/WR Interconnector-I' project for evacuation of 3000MW power from hydro projects in NER like Lower Subansiri(2000 MW), Kameng(600 MW) etc.

The above scheme was discussed and agreed in the Standing Committee Meeting of NR held on 30-05-2009 at Nainital (copy of the minutes enclosed at ANNEXURE-7.0).

2.0 JUSTIFICATION

As indicated above, the power from the various generation projects of Bhutan would have to be imported in the main grid of Indian Power System for onward transfer to power deficit regions like NR & WR. For this, a new pooling station has been planned in the northern part of West Bengal near Alipurduar. The first of the future projects in Bhutan i.e. Punatsangchu-I (1200 MW) is planned to be evacuated through 400kV D/c line with quad moose conductor upto the Alipurduar pooling substation.

From the new pooling station at Alipurduar, power would be further transferred utilizing the ± 800 kV, 6000MW Bishwanath Chariali - Agra HVDC bipole line planned under "NER-NR interconnector-I" for transfer of 3000MW power from NER generation projects like Lower Subansiri(2000 MW), Kameng(600 MW) and surplus power from other generation projects to power deficit regions like NR/WR. This line would be looped in and looped out at the new pooling station at Alipurduar, where a 3000 MW HVDC terminal (rectifier) would be connected for

injecting additional power from Bhutan into the HVDC bipole line. The 3000MW inverter end of the HVDC terminal would be connected at Agra from where power can be transferred to NR/WR.

The Alipurduar pooling substation would also be integrated with the Indian grid with the help of strong EHVAC network in order to take care of the outage of one pole of the above HVDC bipole line. For this, the Bongaigaon-Siliguri 400kV D/c line with quad moose conductor (proposed to be developed under private sector) as well as Tala-Siliguri 400kV D/c line are to be looped in and looped out at Alipurduar. With this, Alipurduar would have strong interconnection with both Bongaigaon and Siliguri and thus would also provide a reliable evacuation path for transfer of power from NER and Sikkim hydro projects to NR/WR.

The schematic of the proposed Tr. system is shown at **Exhibit-1.0**.

3.0 PROJECT OBJECTIVES

The objective of the project is to provide transmission arrangement so as to pool the power from future power generating stations in Bhutan at a pooling substation near Alipurduar in northern part of West Bengal and further transfer of the same to power deficit regions like NR & WR.

3.1 Project Highlights

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|----------------------------|---|
| a) Project | : Transmission system for development of pooling station in Northern part of West Bengal and transfer of power from Bhutan to NR/WR |
| b) Location of the Project | : Northern part of West Bengal |
| c) Beneficiary States/UT | : Constituents of NR & WR |
| d) Project Cost | : Rs. 4422.74 Crores at 2 nd Quarter 2009 Price Level(Incl IDC of Rs. 423.96 Cr) |
| e) Monthly Fixed Charges | : Rs. 6030.92 Lakhs |
| f) Commissioning schedule | : The Transmission System is proposed to be implemented within 57 months from the date of investment approval. |

3.2 SCOPE OF WORK

Transmission Line

- LILO of Bishwanath Chariali – Agra HVDC line at new pooling station in Alipurduar for parallel operation of the HVDC station : 12 Km

- LILO of Bongaigaon – Siliguri 400kV D/c line(quad) (under pvt. Sector) at new pooling station in Alipurduar: 8 Km
- LILO of Tala-Siliguri 400kV D/c line at new pooling station in Alipurduar. : 87 Km
- ✓ *link up* ➤ Punatsangchu-1(Generation Project in Bhutan) – Alipurduar 400kV D/c with quad conductor (Indian Portion) : 71 Km *41 km from*
- LILO of Birpara-Salakati 220kV D/c line at new pooling station in Alipurduar: 4.0 Km
- Earth Electrode line at new pooling station in Alipurduar : 50 Km
- Earth Electrode line at Agra end : 40 Km

Sub-station

- New 2x315MVA, 400/220kV AC & HVDC sub-station at new pooling station in Alipurduar.
 - 2 nos. of 315MVA, 400/220/33 kV ICT along with associated bays.
 - 10 nos. 400 kV bays
 - 4 bays for LILO of Tala - Siliguri 400kV D/c line
 - 4 bays for LILO of Bongaigaon - Siliguri 400kV D/c (quad) line (under the scope of pvt. sector)
 - 2 bays for Punatsangchu-1 – Alipurduar 400kV D/c line
 - ± 800kV, 3000 MW HVDC converter module
 - 2 nos. 125 MVAR Bus Reactor at 400kV bus
 - 4 nos. 220 kV bays (for LILO of Birpara-Salakati 220kV D/c line)
 - Space for 6 nos. of 400 kV and 2 nos. of 220kV bays for future transmission system and associated bays for one ICT.
 - Space for ± 800kV, 3000 MW HVDC module for future
- Extension of ± 800 kV HVDC station at Agra
 - ± 800kV, 3000 MW HVDC inverter module at Agra

4.0 TARGET BENEFICIARIES

The target beneficiaries of this project are the constituent States of Northern & Western Regions. The above scheme was discussed and agreed in the Standing Committee Meeting of NR held on 30-05-2009 at Nainital. In line with POWERGRID's commercial policies, it is proposed to recover the transmission charges from the beneficiaries in proportion to the benefits derived by them / the generation developers.

5.0 PROJECT STRATEGY

Being a Central Sector Regional transmission project, POWERGRID had undertaken and evolved the various elements of this transmission scheme in

consultation with CEA keeping in view the present and future load requirement of Northern/Western Region. Transmission system for development of pooling station in Northern part of West Bengal and transfer of power from Bhutan to NR/WR has been evolved to reliably transfer the power to the beneficiaries.

6.0 LEGAL FRAMEWORK

It is proposed to execute the above entire transmission scheme as per provisions contained in the Indian Electricity Act, 2003 and the rules made there-under and the Electricity (Supply) Act, 1910 and 1948, in so far as these are applicable.

7.0 ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Forest involvement / Clearance

Preliminary route selection is to be done based on such documents as the Forest Atlas and the Survey of India maps using "bee" line method, followed by field verification through walk over survey. All possible steps are to be taken to avoid the route alignment through forests. In cases where it becomes unavoidable due to the geography of terrain, the alignment is to be made in such a way that the route through the forests is the barest minimum.

For selection of optimum route, following points are to be taken into consideration:

- (i) The route of the proposed transmission line does not involve any human rehabilitation.
- (ii) Any monument of cultural or historical importance is not getting affected.
- (iii) The route does not create any threat to the survival of any community.
- (iv) It does not affect any Public-Utility Services like Playground, School, Other establishments, etc.
- (v) It does not pass through any sanctuaries, National Park, etc.
- (vi) It does not infringe with areas of natural resources.

As per the preliminary assessment based on Forest Atlas, toposheet and walk over survey of the area, certain forest stretches are likely to be encountered for this Transmission system comprising of the following lines :