

POWER EVACUATION & UTILISATION OF VARIOUS HYDRO PROJECTS TO BE DEVELOPED IN TEESTA AND RANGIT BASIN IN SIKKIM.

Based on the discussion in the Standing Committee meeting on Power System Planning in Eastern Region held at Ranchi on 5.11.2007 and subsequent discussion held between CEA, PGCIL and Generation Developers/open access applicants on 1st Feb., 2008 at POWERGRID office, a composite transmission system for power evacuation and utilisation from IPP projects in Sikkim was evolved identifying major pooling/de-pooling points with HVDC and AC grid interconnections. It has been envisaged to develop the transmission system in phases by PGCIL matching with the commission of IPP projects. While the tentative schedule of IPP Projects, as available in CEA, is depicted in Annex-I, the generation developers would require to ascertain their commissioning programme of various hydro projects in Sikkim and sign BPTA with PGCIL.

The Project specific transmission system for immediate evacuation of power from IPP projects and system strengthening works including setting up of pooling points in Sikkim have been determined as following:.

Stage-I: Mid, 2009

Generation Projects: Chuzachen (118 MW) -likely by June 09

- i) LILO of Gangtok-Melli and Gangtok-Rangit 132kV S/C line at Rangpo
- ii) Establishment of 220/132 kV, 3x100 MVA GIS Substation at Rangpo
- ii) Chuzachecn-Rangpo 132 kV D/C line with Zebra conductor (to be developed by the generation developer)

{Note: 132 kV level at Rangpo would be required at this stage. 220 kV level and 220/132 kV transformer at Rangpo would be required in Stage-II}

Stage-II: Mid, 2010

Generation Projects: Jorethang (96 MW) -likely by Sept. 10

- i) Establishment of 13x167MW, 1 phase, 400/220 kV GIS Substation at New Melli.
- ii) Jorethang - New Melli 220 kV D/C with single moose conductor (to be developed by the generation developer)
- iii) Rangpo- New Melli 220 kV D/C with twin moose conductor
- iv) LILO of Teesta-Siliguri D/C lines at New Melli with quad moose line which would be used in Stage-III when LILO of Teesta-V-Siliguri line would be withdrawn and the LILO portion would be utilised for termination of Mangan-New Melli and Kishanganj-New Melli 400 kV D/C lines.

Stage-III: Sept, 2011

Generation Projects:

Teesta-III(1200 MW) – by Sept. 2011.

Rolep (80 MW)- by Oct. 2011.

Tingting (90 MW) and Tashiding(80 MW) - by Mid 2010.

Teesta-I and Teesta-II likely to get delayed.

Rangit-IV - by July, 2012.

- i) Establishment of 2x315 MVA, 400/220 kV Kishanganj S/s through LILO of one of two nos of Siliguri-Purnea 400 kV D/C lines
- ii) Establishment of 7x105MVA, Single Phase, 400/132 kV GIS S/s at Mangan (The 400 kV portion is required at this stage, 220 kV portion and 400/220 kV transformer is required at Stage-IV)
- iii) Teesta-III-Mangan 400 kV D/C line with quad Moose. (to be developed by the generation developer)
- iv) Tingting-New Melli 220 kV D/C with twin moose conductor, one ckt via Tashiding. (to be developed by the generation developer) (The line would be routed through the proposed pooling point substation near Tingting)
- v) Rolep-Rangpo 132 kV D/C line with Zebra conductor. (to be developed by the generation developer)
- vi) Mangan-New Melli 400 kV D/C line with quad conductor
- vii) New Melli-Kishanganj 400 kV D/C line with quad conductor
- viii) LILO of Biswanath Chariali – Agra +/- 800 kV, HVDC line at new pooling station for parallel operation of HVDC station.
- ix) Establishment of New 2x315 MVA, 400/200 kV and +/- 800 kV, 3000MW HVDC sub-station at new pooling station

- ix) 1x1500MW HVDC terminal each at Kishanganj and Agra.

The LILO of Teesta V-Siliguri 400 kV D/c line at New Melli substation would be withdrawn and the 4 nos. of 400 kV bays at New Melli used for LILO would be utilized for New Melli-Kishanganj and New Melli-Mangan 400 kV D/c lines.

It may be mentioned that there may be some constraint in case of outage of 1500MW HVDC module. Further it is to mentioned that the 6000 MW, ± 800 kV HVDC bi-pole line (proposed as a part of transmission system associated with Lower Subansiri & Kameng HEPs in NER) is to be used for transfer of power from Kishanganj to Agra. However, if Sikkim HEPs come up earlier than Lower Subansiri & Kameng HEPs, then the 6000 MW, ± 800 kV HVDC bipole line would also be a part of this scheme.

During this time period, a pooling point substation may be established at Mangan and transmission line from Mangan to Kishanganj pooling point via New Melli would be developed as common transmission corridor to be utilized by other generation developers both in the upper and lower parts of Sikkim. The projects like Teesta-III in this stage and Pannan, Rongyong, Dikchu is the next Stage would be evacuated through dedicated transmission lines up to Mangan.

Stage-IV: Mid, 2012 onwards

Generation Projects:

Pannan HEP(300 MW)- by first unit as Jan, 2013.

Teesta –VI(500 MW) - by mid of 2012.

Teesta-I(300MW),Teesta-II(480MW),Rongyong(60 MW), Dikchu (96MW), Chungtang (99 MW), Bhimkyong (99 MW), Lachung(99 MW), Chakungchu (90 MW), Rangit-IV (120 MW) Rongnichu (96MW), Sada Mangdsher (71 MW), Bhasme (51 MW), Ralong (100 MW)are also expected to materialize in 2012-13.

To be developed by the generation developer

- i) Teesta-I-Pooling Station(near Teesta-II) 400 kV D/C(Twin Moose)
- ii) Teesta-II-Pooling Station(nearTeesta-II)400 kV D/C(Twin Moose)
- iii) BOP Chungtang - P.S. BOP Chungtang 220 kV D/C line

- iv) Bhimkyong – BOP Chungtang Pooling Station 220 kV D/c line
- v) Lachung – BOP Chungtang Pooling Station 220 kV D/c line
- vi) P.S.BOP Chungtang -Teesta-II Pooling Point 220 kV D/c line(twin Moose)
- vii) Rangyong-Mangan 132 kV D/c line
- viii) Pannan-Mangan 400kV D/c line (twin Moose)
- ix) Dikchu-Mangan 132 kV D/c line (Single Moose)
- x) Rongnichu-Rangpo 220 kV D/c line
- xi) Establishment of 220 kV pooling substation near Tingting.
- xii) Sada Mangdher-Tingting Pooling Substation 220 kV D/C line
- xiii) Ralong-Tingting Pooling station 220 kV D/C line
- xiv) LILO of Tingting/Tashiding-New Melli 220 kV line at Tingting Pooling susbtation
- xv) LILO of one ckt of Rongnichu Rangpo 220 kV D/C line at Bhasme
- xvi) Chakungchu-Mangan 132 kV D/c line (Single Moose)
- xvii)Teesta-VI- New Melli 220 kV D/C line (Twin Moose).
- xviii) LILO of one ckt of Jorethang-New Melli 220 kV D/c line with single moose conductor at Rangit-IV

To be developed as a part of strengthening scheme

- xix) Extension of 7x105 MVA, Single Phase, 400/132 kV GIS S/s at Mangan (Balance portion of stage-III)
- xx) Establishment of 7x105 MVA, Single Phase, 400/220 kV GIS S/s at Teesta-II HEP
- xxi) Teesta-II pooling point-Mangan 400 kV D/c with Twin Lapwing conductor
- xxii) Mangan-Kishanganj 400 kV D/c (quad) line
- xxiii) Dikchu-Gangtok 132 kV D/c
- xxiii) 2nd 1x1500 MW HVDC terminal at Kishanganj and Agra
- xxiv) LILO of 2nd Siliguri-Purnea 400 kV D/c at Kishanganj
- xxv) LILO of Siliguri-Dalkhola 220 kV D/c at Kishanganj

The same 6000 MW \pm 800 kV HVDC bipole line as mentioned above (under Stage-III) would be utilized for evacuation of power beyond Kishanganj.

A map showing the Transmission system in Sikkim is given at **Exhibit-I**

Annex-I

Status of Various Hydro Generation Projects in Sikkim

Sl. No	Name of the Developer/Open Access Applicant	Name of the Generation Plant	Capacity/ Power to be transferred	Financial Closure	Expected Comm. Schedule*
A	Upper Part of Sikkim				
1.	Teesta Urja Ltd./ PTC	Teesta-III	1200 MW	June, 07	Sept., 2011
2.	Himurja Infra Pvt. Ltd.	Teesta -II	480 MW	Expected by April, 09	Dec., 2012 (uncertain)
3.	Himagiri Hydro Energy Pvt. Ltd.	Panan	300 MW	Expected by Dec, 08	Jan.,2013
4.	Himalayan Green Energy Pvt. Ltd.	Teesta-I	300 MW	Expected by March, 09	Dec., 2013 (uncertain)
5.	BSC(P)L -SCL JV Engineers & Contractors	Rongyong	60 MW	Expected by March, 09	Dec., 2012
6.	Sneha Kinetic Power Projects Ltd.	Dickchu	96 MW	Expected by Sept, 08	July, 2012
7.#	Chungtang Hydro Pvt. Ltd.	BOP(Chungtang)	99 MW	Expected by Dec, 08	April 2012
8.#	Teesta Hydro Power Pvt. Ltd.	Bhimkyongl	99 MW	Expected by Dec, 08	April 2012
9.#	Lachung Hydro Power Pvt. Ltd.	Lachung-Tangchi.	99 MW	Expected by Dec, 08	April 2012
10		Chakungchu	90 MW	Expected by Oct, 09	April 2013
		Subtotal	2823 MW		
B	Lower Part of Sikkim				
1.	Lanco Energy Pvt. Ltd.	Teesta-VI	500 MW	Expected by July, 07	June 2012
2.	DANS Energy Pvt. Ltd.	Jorethang	96 MW	Expected by Feb, 08	Sept., 2010
3.	JAL Power Corporation	Rangit-IV	120 MW	Expected by Nov, 07	July 2012
4.	Shiga Energy Pvt. Ltd.	Tashiding	80 MW	Under discussion with Govt. of Sikkim	Dec., 2010 (to be delayed)
5.	TT Energy Pvt. Ltd.	Tingting	90 MW	Under discussion with Govt. of Sikkim	July,2010 (to be delayed)
6.	Madhya Bharat Power Corporation	Rongnichu	96 MW	Expected by May, 08	March, 2012
7.	Gati Infrastructure Limited	Chuzachen	118 MW	April, 07	June, 2009
8.		Rolep	80 MW	Expected by Oct, 08	Oct., 2011
9.		Ralong	100 MW	Expected by Oct, 09	April 2013
10.		Sada Mangdher	71 MW	NA	
11.		Bhasme	51 MW	NA	
		Subtotal	1402 MW		
		Total	4225 MW		

Yet to apply for long-term open access.

EXHIBIT-I

**TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM HYDRO PROJECTS
IN SIKKIM- AS AGREED IN THE MEETING FOR LTOA MEETING HELD ON 1.02.08**

