



भारत सरकार
Government of India
विद्युत मंत्रालय

Ministry of Power
केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन - I प्रभाग

Power System Planning & Appraisal - I Division

सेवा में / To,

1.	Chairperson, Central Electricity Authority, Sewa Bhawan, R.K Puram, New Delhi-110066	2.	Member (Power System), Central Electricity Authority, Sewa Bhawan, R.K Puram, New Delhi-110066
3.	Member (Economic & Commercial), Central Electricity Authority, Sewa Bhawan, R.K Puram, New Delhi-110066	4.	Director (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001
5.	Chief Operating Officer, Central Transmission Utility, POWERGRID, Saudamini, Plot No.2, Sector-29, Gurgaon-122011	6.	Joint Advisor (Energy), NITI Aayog, Parliament Street, New Delhi-110001
7.	Sh. P.K Pahwa, Ex-Member (GO&D), CEA, 428 C, Pocket-2, Mayur Vihar, Phase-1, Delhi-110091	8.	Sh. Prabhakar Singh, Ex- Director (Projects), POWERGRID, D-904, Tulip Ivory, Sector-70, Gurgaon- 122001

Subject/विषय: 6th meeting of “National Committee on Transmission (NCT)” to be held on 30th September, 2019 - Agenda

Sir/ Madam,

The agenda for the 6th Meeting of NCT scheduled to be held on 30th September, 2019 (Monday) at 15:30 hrs under the chairmanship of Shri. P.S Mhaske, Chairperson, CEA in conference room of CEA (Chintan), 2nd floor, Sewa Bhawan, R.K Puram, New Delhi is available on the CEA website : www.cea.nic.in (path to access – Home page – Wing – Power System – PSPA-1 – National Committee on Transmission)

Yours faithfully,

(Goutam Roy)

Chief Engineer (PSPA-1) & Member Secretary (NCT)

Copy to:

1. Joint secretary, Ministry of Power, Shram Shakti Bhawan, New Delhi-110001

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2. Chief Engineer (PSPA-II), CEA
3. CEO, RECTPCL, ECE House, 3rd Floor, Annexe - II, 28A, KG Marg, New Delhi - 110001
4. PFC Consulting Ltd, First Floor, "Urjanidhi", 1, Barakhmba Lane, Connaught Place, New Delhi -110001

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Agenda note for the 6th meeting of National Committee on Transmission (NCT)**Date and Time: 30.09.2019, 15:30 hrs****Venue: Conference Room of CEA (Chintan), 2nd Floor, SewaBhawan, R.K. Puram, New Delhi****1. Confirmation of the minutes of 5th meeting of National Committee on Transmission (NCT)**

- a. The minutes of 5th meeting of National Committee on Transmission held on 21.08.2019 were issued vide CEA letter No. CEA-PS-11-15(11)/1/2018-PSPA1 dated 28.08.2019.
- b. The minutes of the meeting except item no 5.1 (Transmission scheme for solar energy zones in Rajasthan (8.1GW) under Phase-II) may be confirmed.
- c. Transmission scheme for solar energy zones in Rajasthan (8.1GW) under Phase-II was reviewed in the 5th NRSCT meeting held on 13.09.2019 and the revised scheme has been put up for deliberation in the 6th meeting of NCT.

2. Status of transmission schemes under bidding process - briefing byBPCs

PFCCL and RECTPCL may give brief about the status of transmission projects awarded through TBCB route by them.

Members may like to note.

3. Cost estimates for the transmission projects to be implemented through tariff based competitive bidding (TBCB)

Sl. No.	Independent Transmission Projects	Estimated Cost of the Project as per Empowered Committee (in Rs. Crore)	Estimated Cost of the Project as per Cost Committee (including RoW compensation) (in Rs.Crore)
1.	Transmission system associated with RE generation at Bhuj-II , Dwarka and Lakadia	1075	1052.54
2.	Jam Khambaliya Pooling Station and interconnection of Jam Khambaliya Pooling station for providing connectivity to RE projects (150MW) in Dwarka (Gujarat) and installation of 400/220 kV ICT along with associated bays at M/s CGIL Switchyard	435	394.49

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4. New Inter-State Transmission Schemes in Northern Region :

4.1. The transmission system for solar potential of 8.1 GW in Rajasthan under Phase-II was agreed in the 4th meeting of NRSCT held on 25.7.2019 .The scope of work for the agreed scheme was as follows:

Transmission system for evacuation of power from solar potential of 8.1 GW -Ramgarh/ Kuchheri (1.9 GW), Bikaner (2.95 GW), Bhadla (1.05GW) & Fatehgarh (2.2GW).

A. EHVAC Portion

- i) Establishment of 400/220kV, 4x500 MVA pooling station at suitable location near Ramgarh/Kuchheri in Distt Jaisalmer (Ramgarh-II PS)
- ii) Establishment of 400/220kV, 6x500MVA pooling station at suitable location near Bikaner (Bikaner-II PS) with suitable bus sectionalisation at 400 and 220 kV level.
- iii) Establishment of 765/400kV, 3x1500MVA substation at suitable location in Narela (near delhi)
- iv) Augmentation with 765/400kV, 2x1500MVA transformer (5th & 6th) at Fatehgarh-II PS.
- v) Augmentation with 400/220kV, 4x500MVA transformer at Fatehgarh-II PS with suitable bus sectionalisation at 400 and 220 kV level
- vi) Augmentation with 400/220kV, 3x500MVA transformer at Bhadla-II PS with suitable bus sectionalisation at 400 and 220 kV level.
- vii) Augmentation with 765/400kV, 1x1500MVA (3rd) transformer at Bikaner(PG)
- viii) Ramgarh-II PS –Fatehgarh-II PS 400 kV D/c Line (Twin HTLS^s)
- ix) Ramgarh-II PS – Jaisalmer-II (RVPN) 400 kV D/c Line (Twin HTLS^s)
- x) Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2nd)
- xi) Bikaner-II PS – Khetri 400kV 2xD/c line (*Twin HTLS^s line on M/c tower*)
- xii) Khetri - Bhiwadi 400kV D/c line (Twin HTLS^s)**
- xiii) Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/c(Quad) line at Bikaner(PG). Extension of above LILO section from Bikaner(PG) upto Bikaner-II PS to form Bikaner-II PS – Bikaner (PG) 400kV D/c(Quad) line
- xiv) Khetri - Narela 765kV D/c line
- xv) LILO of 765kV Meerut – Bhiwani S/c line at Narela S/s
- xvi) Removal of LILO of Bawana – Mandola 400kV D/c(Quad) line at Maharani Bagh/ Gopalpur S/s. Extension of above LILO section from Maharani Bagh/GopalpuruptoNarela S/s so as to form Maharani Bagh – Narela 400kV D/c(Quad) and Maharani Bagh -Gopalpur-Narela 400kV D/c(Quad) lines.
- xvii) LILO of both circuits of Bawana – Mandola 400kV D/c(Quad) line at Narela S/s
- xviii) Power reversal on ± 500 kV, 2500MW Balia – Bhiwadi HVDC line upto 2000MW from Bhiwadi to Balia
- xix) 220kV line bays for interconnection of solar projects at Bikaner-II PS (10 nos.), Ramgarh-II PS (7 nos), Fatehgarh-II PS (8 nos) & Bhadla-II PS (4 nos)
- xx) 1x125 MVA_r (420kV), 2x240 MVA_r (765kV) Bus Reactor at Narela Substation
- xxi) 2x125 MVA_r (420kV) Bus Reactor each at Bikaner-II & Ramgarh-II PS

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- xxii) 1x240 MVAR Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla-II 765kV D/c line (2nd)
 - xxiii) 1x80 MVAR Switchable line reactor for each circuit at each end of Bikaner-II – Khetri 400kV 2xD/c line
 - xxiv) 1x240 MVAR Switchable line reactor for each circuit at each end of Khetri – Narela 765kV D/c line
- ** Due to space constraints 400kV bays at Bhiwadi S/s to be implemented as GIS \$ with minimum capacity of 2200 MVA on each circuit at nominal voltage*

B. HVDC Portion

- 1) VSC based HVDC system between Bhadla-II PS and suitable location near Modipuram
 - i) ± 400 kV, 5000 MW HVDC terminal at Pooling point near Bhadla-II PS
 - ii) ± 400 kV, 5000 MW HVDC terminal at Pooling point in suitable location near Modipuram
 - iii) ± 400 kV HVDC line (Quad) between Bhadla-II PS and suitable location near Modipuram (on M/c tower)

AC interconnection at Pooling point in suitable location near Modipuram

- 2) 5x1500MVA transformer at suitable location (near modipuram)

The above scheme was deliberated in the 5th meeting of NCT held on 21.08.2019, wherein various packages of the scheme along with implementation mode (through RTM/TBCB) were recommended.

However, it was decided to review the transmission system for evacuation of power from solar potential of 8.1 GW (Ramgarh/ Kuchheri (1.9 GW), Bikaner (2.95 GW), Bhadla (1.05GW) & Fatehgarh (2.2GW) in the 5th NRSCT meeting held on 13.09.2019, in view of the high cost of the HVDC system and difficulty in implementation of the VSC based HVDC transmission system by 21-22.

- 4.2.** The transmission system strengthening for solar potential of 8.1 GW (Ramgarh/Kuchheri (1.9 GW), Bikaner (2.95 GW), Bhadla (1.05GW) & Fatehgarh (2.2GW) was agreed in the 5th NRSCT meeting held on 13.09.2019. The scope of work for the agreed scheme was as follows:

The transmission system strengthening for solar potential of 8.1 GW Ramgarh / Kuchheri (1.9 GW), Bikaner (2.95 GW), Bhadla (1.05GW) & Fatehgarh (2.2GW)

- i) Establishment of 400/220kV, 4x500 MVA pooling station at suitable location near Ramgarh/Kuchheri in Distt Jaisalmer (Ramgarh-II PS) with 2x125 MVAR bus reactor.
- ii) Ramgarh-II PS –Fatehgarh-II PS 400 kV D/c Line (Twin HTLS).
- iii) Ramgarh-II PS – Jaisalmer-II (RVPN) 400 kV D/c Line (Twin HTLS)

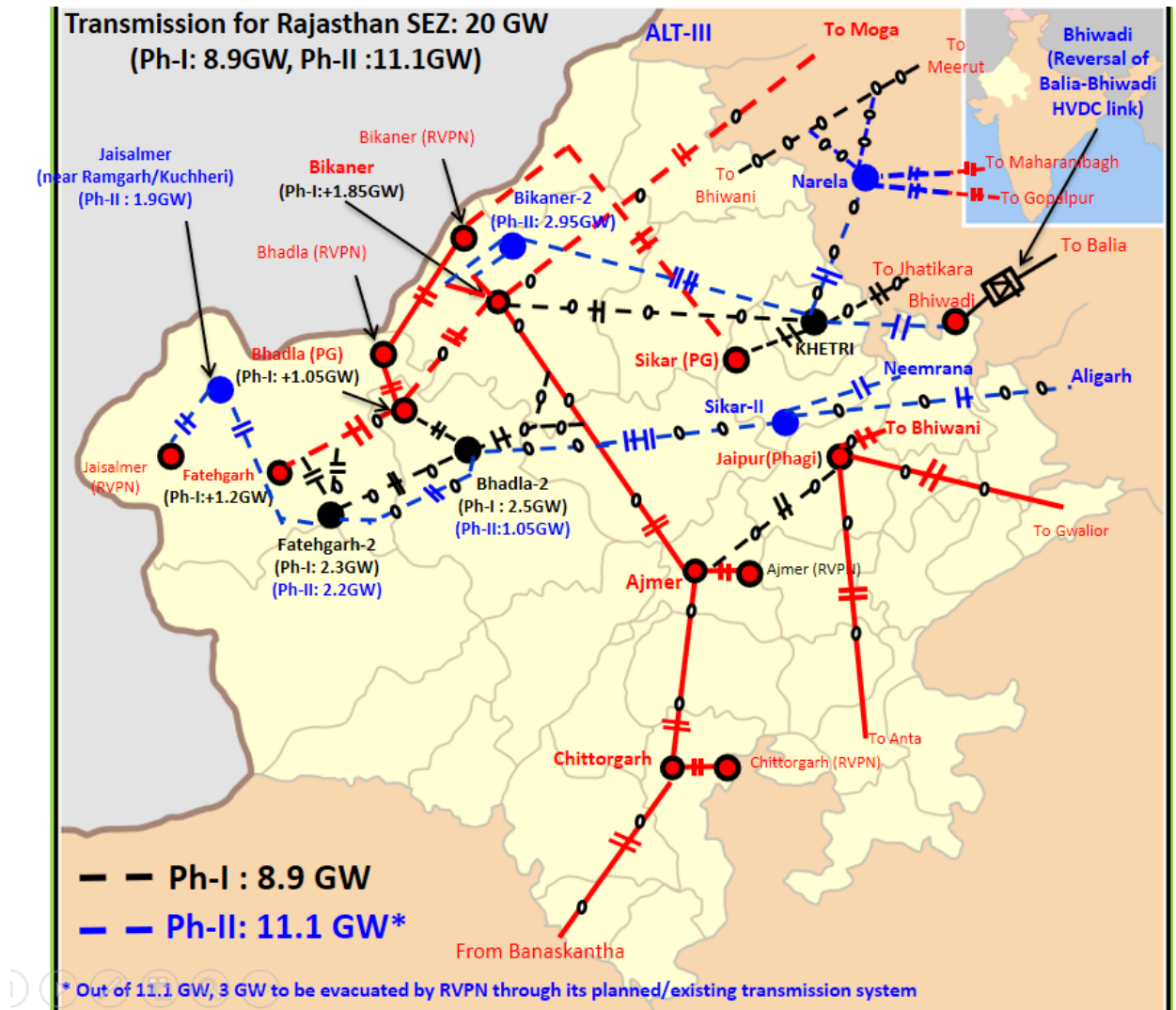
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- iv) Establishment of 400/220kV, 6x500MVA pooling station at suitable location near Bikaner (Bikaner-II PS) with 2x125 MVAR bus reactor and with suitable bus sectionalisation at 400 and 200 kV level.
- v) Bikaner-II PS – Khetri 400kV 2xD/c line (Twin HTLS line on M/c tower)
- vi) Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/c(Quad) line at Bikaner(PG). Extension of above LILO section from Bikaner(PG) upto Bikaner-II PS to form Bikaner-II PS – Bikaner (PG) 400kV D/c(Quad) line)
- vii) 1x80 MVAR Switchable line reactor for each circuit at each end of Bikaner-II – Khetri 400kV 2xD/c line
- viii) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation) with 1x125 MVAR& 2x330 MVAR bus reactor at Sikar (II)
- ix) Sikar-II – Aligarh 765kV D/c line
- x) Bhadla-II PS – Sikar-II 765kV 2xD/c line
- xi) Sikar-II – Neemrana 400kV D/c line (Twin HTLS)*
- xii) 1x330 MVAR Switchable line reactor for each circuit at Sikar end of Bhadla-II – Sikar-II 765kV 2xD/c line
- xiii) 1x240 MVAR Switchable line reactor for each circuit at Bhadla-II end of Bhadla-II – Sikar-II 765kV 2xD/c line
- xiv) 1x330MVAR Switchable line reactor for each circuit at each end of Sikar-II – Aligarh 765kV D/c line
- xv) Augmentation with 765/400kV, 2x1500MVA transformer (5th & 6th) at Fatehgarh-II PS
- xvi) Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2nd)
- xvii) 1x240 MVAR Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla-II 765kV D/c line
- xviii) Augmentation with 400/220kV, 4x500MVA transformer(6th to 9th) at Fatehgarh-II PS with suitable bus sectionalisation at 400 kV & 220 kV
- xix) Augmentation with 765/400kV, 1x1500MVA transformer (4th) at Bhadla-II PS.
- xx) Augmentation with 400/220kV, 3x500MVA transformer (6th to 8th) at Bhadla-II PS with suitable bus sectionalisation at 400 kV & 220 kV.
- xxi) Khetri - Bhiwadi 400kV D/c line (Twin HTLS*)#
- xxii) Power reversal on +500kV, 2500MW Balia – Bhiwadi HVDC line upto 2000MW from Bhiwadi to Balia in high solar generation scenario.
- xxiii) 220kV line bays for interconnection of solar projects at Bikaner-II PS (10 nos.), Ramgarh-II PS (7 nos), Fatehgarh-II PS (7 nos) & Bhadla-II PS (4 nos)
- xxiv) Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela with 765 kV (2x330 MVAR) bus reactor and 400kV (1x125 MVAR) bus reactor.
- xxv) Khetri – Narela 765 kV D/c line
- xxvi) 1x330 MVAR Switchable line reactor for each circuit at Narela end of Khetri – Narela 765kV D/c line
- xxvii) LILO of 765 kV Meerut- Bhiwani S/c line at Narela
- xxviii) Removal of LILO of Bawana – Mandola 400kV D/c(Quad) line at Maharani Bagh/ Gopalpur S/s. Extension of above LILO section from Maharani Bagh/Gopalpur upto Narela S/s so as to form Maharani Bagh – Narela 400kV D/c(Quad) and Maharani Bagh -Gopalpur-Narela 400kV D/c(Quad) lines.
- xxix) STATCOM:
 - Fatehgarh – II S/s : STATCOM : ± 600 MVAR, 4x125 MVAR MSC , 2x125 MVAR MSR
 - Bhadla – II S/s : STATCOM : ± 600 MVAR, 4x125 MVAR MSC , 2x125 MVAR MSR

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Bikaner – II S/s : STATCOM : ± 300 MVAR, 2x125 MVAR MSC , 1x125 MVAR MSR

* with minimum capacity of 2200 MVA on each circuit at nominal voltage
 # Due to space constraints 400kV bays at Bhiwadi S/s to be implemented as GIS



4.3. For implementation purpose, the scheme has been split into following transmission packages:

4.3.1. Name of the Scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase II – PartA

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS with 420kV (2x125 MVAR) bus reactor	400/220 kV, 500 MVA ICT – 4 400 kV ICT bays – 4 220 kV ICT bays – 4 400kV line bays – 4 220 kV line bays – 7	225

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	<i>Future provisions: Space for 400/220 kV ICTs along with bays: 2 400 kV line bays: 2 220 kV line bays:4 420 kV reactors along with bays: 1</i>	125 MVA, 420 kV bus reactor-2 420 kV reactor bay – 2	
2.	Ramgarh-II PS – Fatehgarh- II PS 400kV D/c line (Twin HTLS)	Length – 150	255
3.	2 no. of 400 kV line bays at Fatehgarh- II for Ramgarh – II PS–Fatehgarh-II PS 400kV D/c line	400 kV line bays – 2	18
4.	Ramgarh –II PS– Jaisalmer-II (RVPN) 400 kV D/c line (Twin HTLS)	Length- 60	102
5.	2 no. of 400 kV line bays at Jaisalmer- II for Ramgarh – II - Jaisalmer-II 400kV D/c line	400 kV line bays – 2	18
		TOTAL	618

Note:

- i) Powergrid to provide space for 2 no of 400 kV bays at FatehgarhII
- ii) M/s RVPNL to provide space for 2 no of 400 kV bays at JaisalmerII
- iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

4.3.2. Name of scheme: Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase II –Part A1 (765/400kV ICT augmentation at Fatehgarh-II)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Augmentation with 765/400kV, 1x1500MVA transformer (5 th) at Fatehgarh-II PS.	765/400 kV, 1500 MVA ICT – 1 765 kV ICT bays –1 400 kV ICT bays –1	72

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		Total	72
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4.3.3. Name of the Scheme: Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase II –PartB

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2 nd)	Length-200	937
2.	2 no. of 765 kV line bays each at Fatehgarh-II and Bhadla-II for Fatehgarh-II PS – Bhadla- II PS 765kV D/c line (2 nd)	765 kV line bays – 4	80
3.	1x240 MVA _r Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla- II 765kV D/c line (2 nd)	240 MVA _r , 765 kV reactor- 4 (2 reactors each at Fatehgarh-II and Bhadla-II) Switching equipments for 765 kV reactor - 4 (2 Switching equipments each at Fatehgarh-II and Bhadla-II) <i>(1x80 MVA_r spare reactor each at Fatehgarh-II and Bhadla-II to be used as spare for Fatehgarh-II – Bhadla-II 765kV D/c line (2nd))</i>	99
		Total	1116

Note:

- i. *Powergrid to provide space for 2 no of 765 kV bays each at Fatehgarh II and Bhadla II substation and space for 2 no of line reactors each at Fatehgarh II and Bhadla II substation*
- ii. *The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey*

4.3.4. Name of scheme: Transmission system strengthening Scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase II –Part B1 (765/400/220 ICT augmentation at Fatehgarh-II and Bhadla-II)

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Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Augmentation with 765/400kV, 1x1500MVA transformer (6 th) at Fatehgarh-II PS.	765/400 kV, 1500 MVA ICT – 1 765 kV ICT bays –1 400 kV ICT bays –1	72
2.	Augmentation with 400/220kV, 4x500MVA Transformer (6 th to 9 th) at Fatehgarh-II PS with suitable Bus sectionalisation at 400 and 220 kV level	400/220 kV, 500 MVA ICT – 4 400 kV ICT bays –4 220 kV ICT bays –4 220 kV line bays-7	167
3.	Augmentation with 400/220kV, 3x500MVA Transformer (6 th to 8 th) at Bhadla-II PS with suitable Bus sectionalisation at 400 and 220 kV level.	400/220 kV, 500 MVA ICT – 3 400 kV ICT bays –3 220 kV ICT bays –3 220 line bays-5	121
4.	Augmentation with 765/400 kV ,1x1500 MVA transformer (4 th) at Bhadla-II PS.	765/400, 1500 MVA ICT- 1 765 ICT bays-1 400 kV ICT bays-1	72
5.	STATCOM at Fatehgarh –II S/s	± 600 MVA _r , 4x125 MVA _r MSC, 2x125 MVA _r MSR	200
6.	STATCOM at Bhadla–II S/s	± 600 MVA _r , 4x125 MVA _r MSC, 2x125 MVA _r MSR	200
		Total	832

4.3.5. Name of the Scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part C

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Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Establishment of 765/400 kV, 2x1500 MVA at Sikar – II with 420kV (1x125 MVAR) and 765 kV (2x330 MVar) bus reactor <i>Future provisions: Space for- 765 kV line bays – 4 400 kV line bays – 2 765 kV Switchable line reactors-2</i>	765/400 kV, 1500 MVA ICT – 2 765/400 kV, 500 MVA spare ICT-1 phase -1 765 kV ICT bays – 2 400 kV ICT bays – 2 765 kV line bays – 6 400 kV line bays – 2 125 MVar, 420 kV bus reactor-1 420 kV reactor bay – 1 330 MVar, 765 kV bus reactor-2 765 kV reactor bay- 2 80 MVAR, 765 kV, 1 ph Reactor (spare unit) -1	406
2.	Bhadla-II PS – Sikar-II 765kV 1xD/c line	Length- 310 km	1452
3.	2 no. of 765 kV line bays at Bhadla- II for Bhadla-II PS – Sikar-II 765kV D/c line	765 kV line bays – 2	40
4.	1x330 MVar switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765kV D/c line	330MVar, 765 kV reactor- 2 Switching equipments for 765 kV reactor - 2 80 MVAR, 765 kV, 1 ph Reactor (spare unit) -1	58
5.	1x240MVar switchable line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765kV D/c line	240MVar, 765 kV reactor- 2 Switching equipments for 765 kV reactor - 2	50
6.	Sikar-II – Neemrana 400kV D/c line (Twin HTLS*)	Length-140	238
7.	2 no. of 400 kV line bays at Neemrana for Sikar-II – Neemrana 400kV D/c line (Twin HTLS*)	400 kV line bays- 2	18
		Total	2262

Note:

- i. Powergrid to provide space for 2 no of 765 kV bays each at Bhadla II and space for 2 no of line reactors at Bhadla II substation
- ii. Powergrid to provide space for 2 no of 400 kV bays each at Neemrana
- iii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

4.3.6. Name of the Scheme: Transmission system strengthening scheme for

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evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part D

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Sikar-II – Aligarh 765kV D/c line	Length – 330	1545
2.	2 no. of 765 kV line bays at Aligarh for Sikar-II – Aligarh 765kV D/c line	765 kV line bays – 2	40
3.	1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II – Aligarh 765kV D/c line	330MVAr, 765 kV reactor- 4 (2 reactors each at Sikar-II and Aligarh) Switching equipments for 765 kV reactor - 4 (2 Switching equipments each at Sikar-II and Aligarh) 80 MVAR, 765 kV, 1 ph Reactor (spare unit) -1	115
		Total	1700

Note:

- i. Powergrid to provide space for 2 no of 765 kV bays each at Aligarh and space for 2 no of line reactors at Aligarh substation
- ii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

4.3.7. Name of the scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part E

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Bhadla-II PS – Sikar-II 765kV D/c line	Length- 310 km	1452
2.	2 no. of 765 kV line bays at Bhadla- II for Bhadla-II PS – Sikar-II 765kV D/c line	765 kV line bays – 2	40
3.	1x330 MVAr switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765kV D/c line	330MVAr, 765 kV reactor- 2 Switching equipments for 765 kV reactor - 2 80 MVAR, 765 kV, 1 ph Reactor (spare unit) -1	58
4.	1x240MVAr switchable	240MVAr, 765 kV reactor- 2	50

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	line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765kV D/c line	Switching equipments for 765 kV reactor - 2	
		Total	1600

Note:

- i. Powergrid to provide space for 2 no of 765 kV bays each at Bhadla II and space for 2 no of line reactors at Bhadla II substation
- ii. Powergrid to provide space for 2 no of 400 kV bays each at Neemrana
- iii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

4.3.8. Name of the scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part F

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Establishment of 400/220 kV, 6x500 MVA Pooling Station at Bikaner –II PS with suitable bus sectionalisation at 400 kV and 220 kV level and with 420kV (2x125 MVAR)bus reactor <i>Future provisions: Space for 400/220 kV ICTs along with bays:2 400 kV line bays:2 220 kV line bays:4 420 kV reactors along with bays: 1</i>	400/220 kV, 500 MVA ICT – 6 400 kV ICT bays – 6 220 kV ICT bays – 6 400kV line bays - 4 220 kV line bays – 10 125 MVAR, 420 kV bus reactor-2 420 kV reactor bay – 2	300
2.	Bikaner-II PS – Khetri 400 kV 2xD/c line (Twin HTLS on M/c Tower)	Length –2x270	917
3.	1x80MVAR switchable Line reactor on each circuit at both ends of Bikaner-II – Khetri 400 kV 2xD/cLine	400 kV 80MVAR reactor – 8 nos. (4 each at Bikaner-II and Khetri) Switching equipments for 400 kV switchable line reactor – 8 (4 each at Bikaner-II and Khetri)	78

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4.	4 no. of 400 kV line bays at Khetri for Bikaner –II PS – Khetri 400kV 2xD/c line	400 kV line bays – 4	36
5.	Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)	Length- 120	205
6.	2 no. of 400 kV line bays at Khetri for Khetri - Bhiwadi 400kV D/c line	400 kV line bays – 2	18
7.	2 no of 400 kV(GIS) line bays at Bhiwadi for Khetri-Bhiwadi 400 kV D/c line	400 kV line bays – 2	26
8.	STATCOM at Bikaner–II S/s	± 300 MVA _r , 2x125 MVA _r MSC, 1x125 MVA _r MSR	200
		TOTAL	1,780

Note:

- i) Powergrid to provide space for 2 no of 400 kV bays at Bhiwadi substation.
- ii) Developer of Khetri substation to provide space for 6 no of 400 kV bays at Khetri for Bikaner-II –Khetri 400 kV 2x D/c line & Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)
- iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- iv) Developer of Bikaner-II to provide space for 2 no of 400 kV bays for termination of Bikaner-II PS- Bikaner (PG) 400 kV D/c (Quad)

4.3.9. Name of the scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part F1

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/c(Quad) line at Bikaner(PG). Extension of above LILO section from Bikaner(PG) up to Bikaner-II PS to form Bikaner-II PS – Bikaner (PG) 400kV D/c(Quad) line	Length - 25	65

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2.	2 nos. of 400 kV line bays at Bikaner-II PS for Bikaner-II PS – Bikaner (PG) 400kV D/c(Quad) line formed after removal of LILO of one circuit of Bhadla-Bikaner(RVFN) 400kVD/c(Quad)	400 kV line bays – 2	18
		TOTAL	83

Note:

- i) Developer of Bikaner II to provide space for 2 no of 400 kV bays
- ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

4.3.10. Name of the scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part G

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela with 765 kV (2x330 MVA) bus reactor and 400 kV (1x125 MVAR) bus reactor <i>Future provisions: Space for 765/400kV ICTs along with bays: 1 765 kV line bays: 2 400 kV line bays: 6+4 765kV reactor along with bays:2 400/220 kV ICTs along with bays:4 220 kV line bays: 8 400 kV reactor along with bays:2</i>	765/400 kV, 1500 MVA ICT – 3 765/400 kV, 500 MVA spare ICT (1-phase) – 1 765 kV ICT bays –3 400 kV ICT bays –3 765 kV line bays –4 400 kV line bays –4 330MVA, 765 kV reactor- 2 765 kV reactor bay – 2 125 MVA, 420 kV reactor - 1 420 kV reactor bay – 1 80 MVAR, 765 kV, 1 ph Reactor (spare unit) -1 (for both 1x 80 MVA bus reactor and 1x80 MVA line reactor on Khetri – Narela 765 kV D/c/line)	615
2.	Khetri – Narela 765 kV D/c line	Length -180	843
3.	2 nos. of 765 kV line bays at Khetri for Khetri – Narela 765 kV D/c line	765 kV line bays - 2	69

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4.	1x330MVAr Switchable line reactor for each circuit at Narela end of Khetri – Narela 765kV D/c line	330 MVAr, 765 kV reactor- 2 Switching equipments for 765 kV reactor - 2 <i>(1x80 MVAr spare reactor at Khetri to be used as spare for Khetri – Narela 765 kV D/c line)</i>	69
5.	LILO of 765 kV Meerut-Bhiwani S/c line at Narela	Length – 25	117
		Total	1714

Note:

i) Developer of Khetri substation to provide space for 2 no of 765 kV bays at Khetri substation along with the space for 2 no of linereactors

ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

4.3.11. Name of the scheme: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part G1 (Maharani Bagh/Gopalpur- Narela 765/400 kV substation 400 kV interconnection)

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Estimated Cost (in Rs Cr)
1.	Removal of LILO of Bawana – Mandola 400kV D/c(Quad) line at Maharani Bagh /Gopalpur S/s. Extension of above LILO section from Maharani Bagh/ Gopalpur upto Narela S/s so as to form Maharani Bagh – Narela 400kV D/c(Quad) and Maharani Bagh -Gopalpur-Narela 400kV D/c(Quad)lines.	Length – 14 (2x7)	36

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2.	2 no of line bays at Narela each for Maharani Bagh – Narela 400kV D/c(Quad) and Maharani Bagh -Gopalpur-Narela 400kV D/c(Quad) lines formed after removal of LILO of Bawana – Mandola 400kV D/c(Quad) line at Maharani Bagh/Gopalpur S/s and Extension of above LILO section from Maharani Bagh/Gopalpur upto Narela S/s.	400 kV line bays – 4	36
		Total	72

4.4. Members may deliberate regarding the transmission packages proposed and implementation mode of the transmission schemes.

5. New Inter-State Transmission Schemes in Eastern Region :

5.1. Transmission system for power evacuation from Arun-3 (900MW) HEP, Nepal of M/s SAPDC

5.1.1. M/s SJVN Arun-3 Power Development Company Pvt. Ltd. (SAPDC) is establishing a 900MW HEP in Nepal. The power from the hydro project is proposed to be evacuated through Arun-3 – Dhalkebar (Nepal) – Muzaffarpur (POWERGRID) 400kV D/c (Quad) line. In the 4th meeting of JSC/JWG held on 13th-14th Feb 2017, it was decided that Nepalese portion of the transmission system would be implemented by M/s SAPDC as per PDA. The Indian portion of the cross-border line may be built by an Indian entity.

5.1.2. In the 2nd meeting of ECT held on 06.08.2018, the scheme was deferred for further deliberation with the stakeholders. In the 2nd meeting of NCT held on 04.12.2018, it was informed that this link is being further discussed in JTT meeting of India- Nepal and therefore would be put up to the NCT in its next meeting. In the third meeting of ECT held on 21.12.2018, ECT agreed with the decision of NCT to deliberate the matter in next NCT meeting.

5.1.3. In the 3rd meeting of NCT held on 01.03.2019, it was decided that Indian portion of Arun-III-Muzaffarpur 400 kV D/c line would be implemented through RTM. Before implementation of this transmission line, Arun III HEP in Nepal would sign requisite agreements including TSA/BPTA etc..

5.1.4. Subsequently, In 2nd Eastern Region Standing Committee on Transmission(ERSCT) held on 05.07.2019, members agreed for construction of Indian portion of Dhalkebar (Nepal) – Muzaffarpur (POWERGRID) 400kV D/c (Quad) line along with 2 no. 400kV line bays at Muzaffarpur (POWERGRID). Members noted that the charges for the said scope would be completely borne by M/s SAPDC.

5.2. Augmentation of transformation capacity at Muzaffarpur (POWERGRID) S/s

5.2.1. In the 2nd ERSCT meeting, BSPTCL has informed that the load in Muzaffarpur area

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is growing very fast. The load demand in Muzaffarpur & adjoining areas is largely fed by Muzaffarpur (PG) with transformation capacity of 1x500+2x315 MVA. In present scenario itself, Muzaffarpur (PG) is not able to fulfill N-1 criteria and in case of outage of any power transformer.

- 5.2.2.** After deliberations members agreed for Installation of 400/220kV, 1x500MVA ICT along with associated bays at Muzaffarpur (POWERGRID) S/s (400kV ICT bay in AIS and 220kV ICT bay in GIS along with 220kV cable from ICT to GIS bay) under ISTS.

Members may deliberate

- 5.3. Additional 400kV connectivity at 400/220/132kV Saharsa (new) 400/220/132kV S/s** (being implemented by POWERGRID under TBCB as part of ERSS-XXI)

- 5.3.1.** In the 2nd ERSCT meeting, BSPTCL has informed that the present connectivity of upcoming 400/220/132 kV Saharsa (New) GSS at 400 kV level is LILO of Patna (PG) - Kishanganj (PG) 400 kV D/C line and this work is being done by POWERGRID under TBCB route. Saharsa (New) GSS has to be fed from two reliable sources, whereas one of the feed i.e. Patna (PG) - Saharsa (New) 400 kV D/c line is having river crossing and tower failure may occur during floods. Therefore, to improve the reliability at 400 kV level, it is proposed to provide an additional source by making D/c LILO of Darbhanga (DMTCL) - Kishanganj (PG) 400 kV D/C line at 400 kV Saharsa (New) S/S.

- 5.3.2.** Members agreed for the following under ISTS:

- (i) LILO of Kishanganj (POWERGRID) – Darbhanga (DMTCL) 400kV D/c (Quad) line at Saharsa S/s
- (ii) 4 no. of 400kV line bays at Saharsa (New) S/s of POWERGRID for termination of above LILO line

Members may deliberate

- 5.4. Bypassing of 400kV lines to limit fault current level at Farakka (NTPC)**

- 5.4.1.** In the 2nd ERSCT meeting, to limit the fault current at Farakka (NTPC) S/s Members agreed for bypassing of Farakka – Kahalgaon (ckt-3 & ckt-4) and Farakka – Durgapur 400kV D/c lines of POWERGRID outside of Farakka generation switchyard so as to form Kahalgaon – Durgapur 400kV D/c line under ISTS.

Members may deliberate.