**CENTRAL ELECTRICITY REGULATORY COMMISSION**
**NEW DELHI**

**Petition No. 131/MP/2017**
**With IA. No. 38/2017**

**Coram:**
**Shri Gireesh B. Pradhan, Chairperson**
**Shri A.K Singhal, Member**
**Shri A.S Bakshi, Member**
**Dr. M.K. Iyer, Member**

**Date of Order : 7th of September, 2017**

**In the matter of**

Petition under Section 38(2) of the of the Electricity Act, 2003 read with Section 79 (1)(c) and Section 79(1)(k) of the Act, along with (i) Central Electricity Regulatory Commission (Grant of Regulatory Approval for execution of Inter-State Transmission Scheme to Central Transmission Utility) Regulations, 2010; (ii) Regulations 111 and 114 of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 and (iii) Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2010 for Grant of Regulatory Approval for execution of the Transmission System for Ultra Mega Solar Power Park (additional scope) at Tumkur (Pavagada) Karnataka.

**And**
**In the matter of**

Power Grid Corporation of India Limited
"Saudamini", Plot No.2,
Sector-29, Gurgaon (Haryana)- 122001. **….Petitioner**

Vs

1. Karnataka Solar Power Development Corporation Ltd.
39, Shanthi Gruha,
Bharath Scouts and Guides Building,
Opp. The Chief Post Master General Office,
Palace Road, Bangaluru-560 001

2. Tamil Nadu Generation and Distribution Corporation Ltd.
NPKRR Maaligai, 800, Anna Salai
Chennai-600 002

3. Karnataka Power Transmission Corporation Ltd.
Kaveri Bhawan, Bangalore-560 009.

4. Transmission Corporation of Andhra Pradesh Ltd.
Vidyut Soudha,
Hyderabad-500 082

5. Kerala State Electricity Board
Vidyuthi Bhavanam,
Pottom, Thiruvananthapuram-695 004

6. Electricity Department
Government of Goa,
Vidyut Bhawan, Panji,
Near Mandvi Hotel, Goa- 403001

7. Electricity Department
Govt. of Pondicherry,
Pondicherry-605001

8. Eastern Power Distribution Company of Andhra Pradesh Limited
APEPDCL, P&T Colony,
Seethmmadhara, Vishakhapatnam,
Andhra Pradesh

9. Southern Power Distribution Company of Andhra Pradesh Limited
Srinivasasa Kalyana Mandapam Backside,
Tiruchanoor Road, Kesavayana Gunta,
Tirpuati-517 501, Chittor District, Andhra Pradesh

10. Central Power Distribution Company of Andhra Pradesh Limited
Mint Compound, Hyderabad-560 063

11. Northern Power Distribution Company of Andhra Pradesh Limited
Opp NIT Petrol Pump,
Chaitanyapuri, Kazipet, Warangal-506 004, Andhra Pradesh

12. Transmission Corporation of Telangana Limited
Vidhyut Sudha, Khairatabad,
Hyderabad-500 082

13. Bangalore Electricity Supply Company Limited
K.R.Circle, Bangalore-560 001, Karnataka

14. Gulbarga Electricity Supply Company Ltd.
Station Main Road, Gulbarga, Karnataka

15. Hubli Electricity Supply Company Ltd
Navanagar, PB Road,
Hubli, Karnataka

16. Mangalore Electricity Supply Company Ltd.
MESCOM Corporate Office,
Paradigm Plaza, AB Shetty Circle, Mangalore-575 001

17. Chamundeshwari Electricity Supply Corporation Ltd.
927, L.J.Avenue, Ground Floor,
New Kantharaj Urs Road,
Saraswatipuram, Mysore-570 009 **...Respondents**

**Following were present:**

Shri Amit Bhargava, PGCIL
Shri Sandeep Kumawat, PGCIL
Shri Aditya Singh, Advocate, TANGEDCO

**ORDER**

This petition has been filed by the Petitioner, Power Grid Corporation of India Limited (PGCIL) for seeking regulatory approval for additional scope for execution of transmission system associated with Solar Power Parks at Tumkur, in the State of Karnataka.

2. Karnataka Solar Power Development Corporation Pvt. Ltd. (KSPDCL), a Joint Venture company of Karnataka Renewable Energy Development Limited (KREDL) and Solar Energy Corporation of India Limited is developing 2000 MW Ultra Mega Solar Power Park (hereinafter referred to as 'Solar Park') at Pavagada Taluk, Tumkur district in the State of Karnataka. The Commission vide order dated 19.8.2016 in Petition No. 36/MP/2016 granted regulatory approval for execution of the transmission system for Solar Park. The Petitioner has submitted that in the 40$^{th}$ meeting of the Standing Committee on Power System Planning of Southern Region held on 19.11.2016, the

transmission system for Solar Park was reviewed and the following addition and modification in the scope in the Phase-II transmission scheme was agreed:

Fixed series capacitor (40%) on 400 kV Tumkur (Pavagada)-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end **

** formed after LILO of 400 kV Bellary pool-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end

Hiriyur-Mysore 400 kV D/C line (after completion of this line, one circuit of this line would be connected with one ckt of Tumkur-Hiriyur line so as to make Tumkur-Mysore direct line)

220 kV bays (8 nos.) at Tumkur (Pavagada) PS for interconnection with solar project (earlier 16 nos. of 220 kV bays)

4. The Petitioner has submitted that in the 40th meeting of Standing Committee on Power System Planning of Southern Region held on 19.11.2016, the following system was finalized for Tumkur (Pavagada) Solar Park:

**(A) Transmission system for connectivity**

(i) LILO of 400 kV Gooty-Tumkur (Vasantnarsapura) D/C at Tumkur (Pavagada) Pooling station

(ii) 1x500 MVA, 400/220 kV Pooling station at Tumkur (Pavagada)

(iii) 220 kV bays (8 nos.) at Tumkur (Pavagada) PS for interconnection with solar project

(iv) 1x125 MVAR bus reactor at 400/220 kV Tumkur (Pavagada) Pooling station

**(B) Transmission system for LTA-Phase-1 (1000 MW)**

(iii) LILO of 400 kV Bellary Pool-Tumkur (Vasantnarsapura) D/C (Quad)(both circuits) [KPTCL line] at Tumkur (Pavagada) Pooling station*

Tumkur (Pavagada) Pooling station-Hiriyur 400 kV D/C (as part of Tumkur (Pavagada)- pooling station-Mysore line)

Augmentation of 2x500 MVA, 400/220 kV Pooling station at Tumkur (Pavagada) pooling station

*KPTCL would complete Bellary pooling station-Tumkur (Vasantnarsapura) line D/C (Quad) by December, 2016.

(C) **Transmission system for LTA-Phase-II (1000MW**)

Hiriyur-Mysore 400 kV D/C line (after completion of this line, one circuit of this line would be connected with one ckt of Tumkur (Pavagada)-Hiriyur line so as to make Tumkur (Pavagada)-Mysore direct line)

Fixed series capacitor (40%) on 400 kV Tumkur (Pavagada)- Tumkur (Vasantnarsapura) D/C (QUAD) line at Tumkur (Pavagada) PS end

Augmentation of 2x500 MVA, 400/220 KV transformer at Tumkur (Pavagada) Pooling station

(iv) 1x125 MVAR bus reactor (2nd) at Tumkur (Pavagada) Pooling Station

(v) Third 400/220kV, 1x500 MVA transformer at Tumkur (Vasantnarsapura) S/s

(vi) 1x80 MVAR switchable Line reactor at Mysore end of Hiriyur- Mysore D/C (each ckt)

**Additional ATS for Tumkur (Pavagada)**

400 kV Tumkur (Pavagada) pooling station-Devanahalli (KPTCL) D/C (Quad) line with some portion on multi circuit towers.

5. The Petitioner has placed on record the Project Inception Report for additional scope and modified scope in terms of Regulation 4 (2) of the Central Electricity Regulatory Commission (Grant of Regulatory Approval for execution of Inter-State Transmission Scheme to Central Transmission Utility) Regulations, 2010 (Regulatory Approval Regulations).

6. Against the above background, the Petitioner has made the following prayers:

"(a) Grant Regulatory approval for taking up implementation of additional and modified transmission systems as follows:

Scope addition

Fixed series capacitor (FSC) (40%) on 400 kV Tumkur (Pavagada)- Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end* *

* * formed after LILO of 400 kV Bellary pooling station-Tumkur (Vasantnarsapura) D/C line (Quad) (KPTCL line) at Tumkur (Pavagada) end

Scope modification:

- Hiriyur-Mysore 400 kV D/C line (after completion of this line, one circuit of this line would be connected with one ckt of Tumkur-Hiriyur line so as to make Tumkur-Mysore direct line)
- 220 kV bays (8 nos.) at Tumkur (Pavagada) PS for interconnection with solar project.

(b) Grant of approval for recovery of transmission charges of the assets mentioned at (a) above through CERC (Sharing of Transmission charges and losses for ISTS) Regulations, 2010 or any other sharing mechanism notified by CERC from time to time;

(c) Grant of approval for inclusion of the above system under the TSA to be notified by CERC; and

Pass such other relief as the Hon'ble Commission deems fit and appropriate under the circumstances of the case."

7. The Petitioner has filed IA No. 38/2017 to list the petition at the earliest and to pass appropriate order.

8. The petition was heard on 20.7.2017 after notice to the respondents. No reply has been filed by the respondents. The Petitioner was directed to submit the reasons for addition for FSC (40%) along with system studies. The Petitioner, vide its affidavit dated 10.8.2017, has submitted that as per the system studies, in the absence of Tumkur-Devanahalli line, loading on Tumkur (Pavagada) PS-Tumkur (Vasantnarsapura) D/C quad line is lesser than twin line. Therefore, twin line may pose a constraint in the loadability of above corridor(s). The system studies also showed that under outage of

one line of Tumkur (Pavagada) PS-Tumkur (Vasantnarsapura) D/C twin line, loading on healthy circuit increase to about 750 MW, which is critical. The Petitioner has submitted that to address the above aspects alongwith requirement for Phase-II generation, system studies were carried out with 40% FSC on 400 kV Tumkur (Pavagada) PS-Tumkur (Vasantnarsapura) D/C line (Quad) which is in parallel to above twin line of Tumkur (Pavagada) PS-Tumkur (Vasantnarsapura) D/C line. It was observed that with the above proposed 40% FSC, during N-1 contingency of Tumkur (Pavagada) PS-Tumkur (Vasantnarsapura) D/C (twin) line, loading on other circuit is reduced to above 590 MW, which is in order. Therefore, FSC not only reduce loading on twin line but also addresses loadability of the above corridor facilitating of power from Tumkur Phase-II generation reliably. The Petitioner has submitted that to facilitate reliable evacuation requirement of Tumkur (Pavagada) Phase-II generation, it was decided to install FSC (40%) on 400 kV Tumkur (Pavagada) PS-Tumkur (Vasantnarsapura) D/C line (Quad) at Tumkur (Pavagada) PS end (formed after LILO of 400 kV Bellary Pool-Tumkur (Vasantnarsapura) line (quad) (KPTCL) at Tumkur (Pavagada end) as part of transmission system for Tumkur (Pavagada) Phase-II generation.

**Analysis and Decision:**

9. We have considered the submissions of the Petitioner. The Commission vide order dated 19.8.2016 in Petition No. 36/MP/2016 granted regulatory approval for execution of the following transmission system for Ultra Mega Solar Power Park at Tumkur (Pavagada), Karnataka:

**Phase-I**

(i) LILO of 400 kV Gooty-Tumkur (Vasantnarsapura) D/C at Tumkur (Pavagada) Pooling station

(ii) Tumkur (Pavagada) Pooling station - Hiriyur 400 kV D/C

(iii) LILO of 400 kV Bellary Pool-Tumkur (Vasantnarsapura) D/C (Quad) (both circuits) [KPTCL line] at Tumkur (Pavagada) Pooling station

(iv) Establishment of 3x500 MVA, 400/220 kV Pooling station at Tumkur (Pavagada) along with 1x125 MVAR bus reactor

(v) 8 Nos. 220 kV Line bays at Tumkur (Pavagada) Pooling Station for Solar Interconnection

**Phase-II**

(i) Hiriyur - Mysore 400 kV D/C line[$]

(ii) Tumkur (Pavagada) Pooling station - Devanhalli (KPTCL) 400kV D/C (Quad)^^

(iii) Augmentation of 2x500 MVA, 400/220KV transformer at Tumkur (Pavagada) Pooling station

(iv) 1x125MVAR bus reactor (2nd) at Tumkur (Pavagada) Pooling Station

(v) Third 400/220kV, 1x500 MVA transformer at Tumkur (Vasantnarsapura) S/s

(vi) 1x80 MVAR switchable Line reactor at Mysore end of Hiriyur- Mysore D/C (each ckt)

(vii) 8 nos. 220kV line Bays at 400/220 kV Tumkur (Pavagada) Pooling station for Solar interconnection

$*With the completion of this line, it would be connected with Tumkur (Pavagada) Pooling station- Hiriyur 400 kV D/C line to form Tumkur (Pavagada)-Mysore D/C line.*

^^KPTCL would complete establishment of 400/220 kV sub-station at Devanahalli including inter-linking 400 kV and 220 kV lines before Phase-II at Ultra Mega Solar Power Park.

10. Subsequent to the order dated 19.8.2016, in the 40th meeting of Standing Committee on Power System Planning of Southern Region held on 19.11.2016, transmission system for Tumkur (Pavagada) UMSPP was reviewed and the following

issues were discussed:

"I. KSPDCL subsequently requested for provision of only 8 nos. of 220 kV line bays at 400/220 kV Tumkur (Pavagada) PS for terminating 8 nos of 220 kV transmission lines from their 220/66 kV sub-stations instead of earlier agreed 16 nos bays.

It was discussed that since transmission planning criteria stipulates that N-1 criteria may not be applied to the immediate connectivity of wind/solar farms, above revisions for reduction of number of 220 kV bays to 8 nos at 400/220 kV Tumkur (Pavagada) PS was agreed.

II. Further in the said meeting dated 19.11.2016, it was deliberated that considering high loading level of 400 kV Hiriyur-Neelmangala line and likely load generation scenario in Karnataka, it was suggested that one circuit of Tumkur-Mysore 400 kV D/C line may be routed via Hiriyur sub-station (Earlier Scope: Tumkur-Mysore 400 kV D/C line bypassing Hiriyur s/stn) whereas second circuit may be passed at Hiriyur.

Accordingly, it was agreed that one ckt of Hiriyur-Mysore line shall be routed via Hiriyur (making 400 kV Tumkur-Hiriyur-Mysore one ckt) whereas second circuit shall be bypassed at Hiriyur and connected with Tumkur-Hiriyur another ckt (making 400 kV Tumkur-Mysore direct line)

III. Further, in the meeting, the Petitioner informed that during 39$^{th}$ meeting of SCPSPSR, Tumkur (Pavagada) PS-Devanahalli (KPTCL) 400 kV D/C (quad) line was agreed as a part of transmission system for Tumkur (Pavagada) UMPP (2000 MW) Phase-II.

In the 40th meeting of the Standing Committee on Power System Planning of Southern Region, the line was proposed and agreed under scope of additional ATS for Solar Park matching with commissioning schedule of Devanhalli S/s (KPTCL)

IV. Considering above and based on the requirement of reliable evacuation of power from Tumkur (Pavagada) Phase-II (1000 MW) solar generation, following was agreed:

Fixed series capacitor (40%) on 400 kV Tumkur (Pavagada)-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end has been included in Phase-II transmission scope of Tumkur UMSPP. The above line shall be formed after LILO of 400 k V Bellary pool-Tumkur (Vasantnarsapura) D/C (Quad) Tumkur (Pavagada) PS end as part of Phase-I transmission scheme."

11. Based on the above addition/modification in the scope during 40$^{th}$ meeting of

Standing Committee on Power System Planning of Southern Region held on 19.11.2016, the Phase-II transmission scheme comprises the following addition and modification in the scope:

**Addition in the scope**

Fixed fixed series capacitor (40%) on 400 kV Tumkur (Pavagada)-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end **

** formed after LILO of 400 kV Bellary pool-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end.

**Modification in the scope**

Hiriyur-Mysore 400 kV D/C line (after completion of this line, one circuit of this line would be connected with one ckt of Tumkur-Hiriyur line so as to make Tumkur-Mysore direct line)

220 kV bays (8 nos.) at Tumkur (Pavagada) PS for interconnection with solar project (earlier 16 nos. of 220 kV bays)

Based on the above, 40th meeting of Standing Committee on Power System Planning of Southern Region held on 19.11.2016, the following transmission scheme was finalized for Tumkur (Pavagada) Solar Park:

**A. Transmission system for connectivity**

- LILO of 400 kV Gooty-Tumkur (Vasantnarsapura) D/C at Tumkur (Pavagada) Pooling station
- 1x500 MVA, 400/220 kV Pooling station at Tumkur (Pavagada)
- **220 kV bays (8 nos.) at Tumkur (Pavagada) PS for interconnection with solar project**
- 1x125 MVAR bus reactor at 400/220 KV Tumkur (Pavagada) Pooling station

**B. Transmission system for LTA-Phase-1 (1000 MW)**

- LILO of 400 kV Bellary Pool-Tumkur (Vasantnarsapura) D/C (Quad)(both circuits) [KPTCL line] at Tumkur (Pavagada) Pooling station*

- Tumkur (Pavagada) Pooling station-Hiriyur 400 kV D/C (as part of Tumkur (Pavagada)- pooling station-Mysore line)

- Augmentation of 2x500 MVA, 400/220 KV Pooling station at Tumkur (Pavagada) pooling station

* KPTCL would complete Bellary pooling station-Tumkur (Vasantnarsapura) line D/C (Quad) by December, 2016.

(D) **Transmission system for LTA-Phase-II (1000MW**)

- **Hiriyur-Mysore 400 kV D/C line [after completion of this line, one circuit of this line would be connected with one ckt of Tumkur (Pavagada)-Hiriyur line so as to make Tumkur (Pavagada)-Mysore direct line]**

- **Fixed series capacitor (40%) on 400 kV Tumkur (Pavagada)-Tumkur (**Vasantnarsapura**) D/C (QUAD) line at Tumkur (Pavagada) PS end**

- Augmentation of 2x500 MVA, 400/220 KV transformer at Tumkur (Pavagada) Pooling station

- 1x125 MVAR bus reactor (2nd) at Tumkur (Pavagada) Pooling Station

- Third 400/220kV, 1x500 MVA transformer at Tumkur (Vasantnarsapura) S/s

- 1x80 MVAR switchable Line reactor at Mysore end of Hiriyur-Mysore D/C (each ckt)

**Additional ATS for Tumkur (Pavagada)**

- 400 kV Tumkur (Pavagada) pooling station-Devanahalli (KPTCL) D/C (Quad) line with some portion on multi circuit towers."

12. We are of the view that the transmission system needs to be implemented matching with the time schedule of the generation projects so that the generation from Ultra Mega Solar Power Projects in Tumkur (Pavagada) District in the State of Karnataka do not get stranded. Accordingly, we accord regulatory approval under Regulation 3 of the Regulatory Approval Regulations for the following addition and modification in the scope of work for execution of the transmission scheme:

**Addition in the scope**

- Fixed Series Capacitor (40%) on 400 kV Tumkur (Pavagada)-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end * *

  ** formed after LILO of 400 kV Bellary pool-Tumkur (Vasantnarsapura) D/C (Quad) line at Tumkur (Pavagada) PS end

**Modification in the scope**

- Hiriyur-Mysore 400 kV D/C line (after completion of this line, one circuit of this line would be connected with one ckt of Tumkur-Hiriyur line so as to make Tumkur-Mysore direct line)

- 220 kV bays (8nos.) at Tumkur (Pavgada) PS for interconnection with solar project (earlier 16 nos of 220 kV bays)

13. All other terms and conditions of the order dated 19.8.2016 in Petition No. 36/MP/2016 remains unchanged.

14. The Petition and IA are disposed of with the above.

| | | | |
|---|---|---|---|
| Sd/- | sd/- | sd/- | sd/- |
| **(Dr. M.K.Iyer)** | **(A.S. Bakshi)** | **(A. K. Singhal)** | **(Gireesh B. Pradhan)** |
| **Member** | **Member** | **Member** | **Chairperson** |