TRANSMISSION TARIFFS

for 4th Control Period - FY2019-20 to FY2023-24

ORDER

8th March, 2019

Andhra Pradesh
Electricity Regulatory Commission

4th Floor, Singareni Bhavan, Red Hills, Lakdi-ka-pul, Hyderabad-500 004

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ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION

HYDERABAD

FRIDAY, THE EIGHTH DAY OF MARCH, TWO THOUSAND AND NINETEEN

Present

Justice G. Bhavani Prasad, Chairman
Dr. P. Raghu, Member
Sri P. Rama Mohan, Member

In the matter of

Determination of Transmission Tariff for the 4th Control Period

(FY2019-20 to FY2023-24)

in

O.P. No.30 of 2018
Transmission Corporation of Andhra Pradesh Limited (APTRANSCO)

The Aggregate Revenue Requirement (ARR) and Filing for Proposed Tariff (FPT) filed by Transmission Corporation of Andhra Pradesh Limited (APTRANSCO) vide O.P.No.30 of 2018 in respect of its Transmission business for various transmission system users for the 4th Control Period (FY2019-20 to FY2023-24) came up for consideration before the Commission. Upon following the procedure prescribed for determination of such tariff under Section 64 of the Electricity Act, 2003 (Central Act No.36 of 2003) and after careful consideration of the material available on record, the Commission, in exercise of the powers vested in it under the said Central Act No. 36 of 2003, the Andhra Pradesh Electricity Reform Act, 1998 (State Act 30 of 1998) and the APERC Terms and Conditions for determination of Transmission Tariff Regulations, 2005, (Regulation No.5 of 2005) as amended from time to time, hereby passes this:

ORDER
CHAPTER - I
INTRODUCTION

1. Consequent to coming into force of the Andhra Pradesh Reorganization Act, 2014 (Central Act No.6 of 2014) (hereinafter referred to as the Reorganization Act) and in terms of the provisions of Section 92 of the said Act read with Schedule XII (C) (3) and Section 82 of the Electricity Act, 2003, the Government of Andhra Pradesh issued notification in G.O.Ms.No.35, Energy (Power-III) Department, dt.01.08.2014 and constituted the Andhra Pradesh Electricity Regulatory Commission.

2. The Transmission Corporation of Andhra Pradesh Ltd. (APTRANSCO) / the Applicant is the holder of the Transmission License (License No.1/2000) issued by Andhra Pradesh Electricity Regulatory Commission (APERC) which is the State Electricity Regulatory Commission for the State of Andhra Pradesh under relevant provisions of the Electricity Act, 2003 (Act). Further, as per Section 39(1) of the Act, APTRANSCO is also the State Transmission Utility (STU).

APERC (Adaptation) Regulation, 2014

3. In exercise of the power conferred by Section 181 of the Electricity Act, 2003 (Central Act No.36 of 2003) and all other powers thereunto enabling, including those conferred by the Andhra Pradesh Electricity Reform Act, 1998 (State Act No.30 of 1998) and the A.P. Reorganization Act, 2014, the Commission issued APERC (Adaptation) Regulation, 2014 (Regulation No.4 of 2014) and notified that with effect from 01.08.2014, all regulations made by, all decisions, directions or orders of, and all the licenses and practice directions issued by the Commission in existence as on the date of G.O.Ms. No.35, dt.01.08.2014 referred to above, shall apply in relation to the State of Andhra Pradesh and shall continue to have effect until duly altered, repealed or amended. The said Regulation No.4 of 2014 was published in the Extraordinary Gazette of the State of Andhra Pradesh on 29.11.2014.

Statutory provisions, Filing requirements and permission

4. Section 64(3) read with Section 62 (b) of the Electricity Act, 2003 stipulates that the Commission shall determine tariff for transmission of electricity.

5. Regulation No.5 of 2005 notified by the Commission introduced Multi Year Tariff (MYT) framework and accordingly, the transmission licensee has to file ARR along with FPT with the Commission for determination of Tariff for its transmission business for a period of 5 years (called Control Period). The 4th Control Period covers five years from FY2019-20 to FY2023-24.

6. The Central Act No.36 of 2003 as well as the Regulation No.5 of 2005 mandate that a transmission licensee shall file for its licensed business an application in such form and in such manner as specified and in accordance with the guidelines issued by the Commission for the Control Period, not less than 120 days before the commencement of the first year of the Control Period, for approval of the Commission. Transmission Corporation of Andhra Pradesh Limited (hereinafter referred to as APTRANSCO or 'Licensee'), has to file its Aggregate Revenue Requirement (ARR) and Filings of Proposed Tariff (FPT) before 30.11.2018 as per Regulation No.5 of 2005.

7. By a letter dated 29.11.2018, the licensee has requested for extension of time upto 07.12.2018 stating that it is in the process of finalizing the write up for MYT for transmission business and SLDC activity for the 4th Control Period. The Commission, vide its letter No. T-77/D.No.1000/2018, dt.04.12.2018 permitted the licensee to file ARR and Tariff Petition relating to the transmission businesses for the 4th Control Period on or before 07.12.2018.

ARR Filings, Public Notice, Public Hearings and SAC & SCF meetings

8. On 06.12.2018, the licensee has filed an application seeking approval of its Aggregate Revenue Requirement (ARR) and Filing for Tariff Proposals (FPT) for the 4th Control Period. The Licensee, in the filings, has stated that the true-up / true-down for the 3rd Control Period (FY2014-15 to FY2018-19) will be filed separately. The ARR and FPT filed by the Licensee was admitted by the Commission and assigned O.P. No.30 of 2018.

9. The filings made by the licensee were uploaded in the Commission's website and by its letter dated 13.12.2018, the Commission directed the Licensee to issue a public notice in Telugu language in two Telugu daily newspapers and in English language in two English daily newspapers incorporating the ARR and FPT Schedule submitted to the Commission, for information and calling for views / objections / suggestions on the same from individuals, representatives of consumer organizations and other stakeholders to be submitted on or before 07.01.2019 by 5 PM and to upload the filings of ARR and FPT in its official website and to make available the copies of filings at its corporate office and also at circle offices. Further, the Commission also directed the licensee to publish the details of the venues and the dates and timings of public hearings at three (3) different places in the State of Andhra Pradesh at Visakhapatnam, Tirupati and Vijayawada (the headquarters of APTRANSCO and also the Capital of the State of Andhra Pradesh) and at Hyderabad, the place of the head office of the Commission and the details of Joint meetings of State Advisory Committee (SAC) and State Coordination Forum (SCF) on ARR and Tariff Proposals along with the proposed tariff schedule in the public notice. It is also informed to notify in the public notice that the views / objections / suggestions submitted to the Commission up to 5 PM on 25.01.2019 will also be considered while determining the ARR and transmission tariff for the 4th Control Period.

10. In compliance with the directions of the Commission, the licensee has caused publication of public notices on 15.12.2018, in Telugu Language in two (2) Telugu daily newspapers and in English Language in two (2) English daily newspapers **(Annexure-A1, A2 & A3)** incorporating its ARR & FPT Schedules along with other details as directed, inviting views / objections / suggestions in respect of ARR and FPT for various transmission users for the 4th Control Period and also informed that all the interested persons / associations / stakeholders / objectors who want to be heard in person/through authorized representatives may appear before the Commission during public hearings. The filings were also uploaded on the website of the licensee.

Response to the Public Notice

11. In response to the public notice, the Commission received several objections /suggestions/views in writing and/or in person at its Office and during public hearings. As directed by the Commission, the licensee communicated its written replies to the views / objections / suggestions received from various stakeholders.

Public Hearings

12. The Commission conducted public hearings at the following places as published in the public notice and as informed the licensee to have the widest consultations possible and the benefit of maximum inputs in finalizing the transmission tariff for the 4th Control Period.

S. No.	Venue/place of Public Hearing	Date of Public Hearing
1	Conference Hall, ATC Building, Corporate Office, APEPDCL, P&T Colony, Seethammadhara, Visakhapatnam – 530 013.	07-01-2019 (Monday)
2	O/o. SE/Operation/Vijayawada, APSPDCL, Opp. PWD Ground, Beside CM camp office, Vijayawada.	08-01-2019 (Tuesday)
3	Conference Hall, Corporate Office, (Vidyuth Nilayam), APSPDCL, Behind Srinivasa Kalyanamandapam, Sreenivasapuram, Tiruchanoor Road, Tirupati.	09-01-2019 (Wednesday)
4	O/o APERC, 11-4-660, 4th Floor, Singareni Bhavan, Red Hills, Hyderabad - 500 004	18-01-2019 (Friday)
5	O/o APERC, 11-4-660, 4th Floor, Singareni Bhavan, Red Hills, Hyderabad - 500 004	25-01-2019 (Friday)

* Timings for public hearings - 10.00 AM to 1.00 PM and from 2.00 PM to till all the interested persons or their authorized representatives are exhausted.

13. The Commission has conducted last public hearing at Hyderabad thereby providing a final opportunity to the stakeholders to submit their views / objections/suggestions in writing as well as in person on ARR and FPT.

14. During the public hearings, the Joint Managing Director, Fin., Comml., HRD, IPC & IT, APTRANSCO at Vijayawada; the Director, Grid, Transmission Management, APTRANSCO at Visakhapatnam and Tirupathi and the Chief General Manager, HRD & Planning, APTRANSCO at Hyderabad, made a brief presentation on the filings. Then the participating stakeholders were heard in detail apart from receiving all written representations presented by them.

15. After the public hearings, a joint meeting of the State Co-ordination Forum and the State Advisory Committee was held on 10.01.2019 in the Meeting Hall, Corporate Office, APSPDCL, Tirupati, wherein the views of the members were ascertained on the ARR and FPT.

16. The views/objections/suggestions expressed by the stakeholders and/or their representatives (**Annexure-B**), in writing and/or in person and the replies provided by the licensee in writing and/or through oral responses during the public hearings held from 07.01.2019 to 25.01.2019 in respect of ARR and FPT filings and the views of the members of State Coordination Forum (SCF) & State Advisory Committee (SAC) have been duly considered in arriving at the appropriate conclusions in this Order, in so far as they relate to the determination of ARR and transmission tariff for the 4th Control Period.

Summary of filings

17. A brief performance analysis of the key elements of licensee's business is as follows:

    a) Loss Reduction: The licensee has stated that it has improved the performance in terms of transmission loss reduction from 3.37% in FY2013-14 to 3.17% in FY2017-18. The licensee is stated to have undertaken a number of loss reduction measures such as system improvement, reactive compensation etc. and it would like to continue to do so with an aim to further reduce the transmission losses.

    b) Transmission Network Availability: The licensee has stated that the transmission network availability has improved from 99.94% in FY2013-14 to 99.98% in FY2017-18.

Resource Plan for the Fourth Control Period

18. The licensee has stated that the Resource Plan comprising of Transmission load forecast and Capital Investment Plan for the 4th Control Period has already been submitted in compliance with clause no. 9 of the APERC Terms and Conditions for determination of Transmission Tariff Regulations, 2005 (Regulation No. 5 of 2005) dated 30th November, 2005, and in accordance with the APERC guidelines for Load Forecast, Resource Plans, and Power Procurement, 2006.

19. Loss Projection: Based on the proposed network plan, the projected loss trajectory over the five-year control period is stated to be as follows:

Particulars	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Target Transmission Loss Range	3.12% ±0.3	3.10% ±0.3	3.08% ±0.3	3.05% ±0.3	3.00% ±0.3

Capital Investment plan

20. The licensee has filed its Resource Plan in June, 2018 and with the proposed CAPEX in it for the 4th Control Period, the Transmission Charge computed for FY2019-20 is stated to be higher by 35% vis-a-vis charges approved for FY2018-19. It is further stated that there was no revision in the CAPEX for the 3rd Control Period post bifurcation and hence the approved CAPEX for the combined State may not reflect the true CAPEX. The changes in the proposed CAPEX during the 4th Control Period are due to schemes envisaged for meeting the huge loads coming up in CRDA region on account of construction of new capital city post bifurcation and expected industrial growth to be witnessed along the Vizag-Chennai Industrial Corridor (VCIC). However, there are some changes to the schemes envisaged for investment subsequently due to procurement of power from distributed solar generation projects and replacement of existing pump sets with Solar BLDC pump sets. Also, in order to reduce the burden of transmission charges on the distribution licensees and other OA consumers, the investment was deferred for some of the schemes and CAPEX was also phased to the subsequent

years. In line with the proposed CAPEX in this filing, the licensee has stated that it will file the revised Resource Plan to the Commission subsequently. The following capital investments are proposed in the filings for execution of 400 kV Schemes, Schemes consisting of 220kV & 132kV Sub-stations and Lines, Lift Irrigation Schemes and Renovation and modernization schemes during 4th Control Period.

Capital Investments proposed (Rs. Cr.)

Particulars	FY 2018-19 (RE)	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
400 kV Schemes	596.95	599.23	915.41	921.63	916.47	732.00
220 kV Schemes	612.00	732.00	1,684.00	1,890.00	1,971.66	1,891.46
Renovation & Modernization Schemes	56.00	71.00	303.09	274.67	274.31	291.68
Lift Irrigation Schemes	61.34	70.00	-	-	-	-
Total Base Capital Investment	**1,326.29**	**1,472.23**	**2,902.50**	**3,086.30**	**3,162.43**	**2,915.14**

Revenue from ISTS and Intra-State Lines

21. The licensee has estimated the revenue from PGCIL for 42 Nos. inter-state lines for the 4th Control Period based on the tariff regulations approved by CERC for FY2014-19 which is adjusted in the Gross ARR and the details are as below:

(Rs.Cr.)

No.of Lines	FY2019-20	FY2020-21	FY2021-22	FY2022-23	FY2023-24
40 ISTS Lines	69.80	68.60	67.50	66.00	65.00
2 ISTS Lines	74.90	72.80	70.60	68.40	66.30
Total	**144.7**	**141.40**	**138.10**	**134.40**	**131.30**

22. Further, the licensee has stated the following on the revenue from intra-state lines carrying inter-state power:

Estimation of revenue from intra-state lines carrying inter-state power is based on the actual power flows for the previous year. There is a huge variation in the annual transmission charges for the intra-state lines approved by APERC for FY2017-18 (18 Nos. Lines) (APERC order dated 06.01.2018) and FY2018-19 (34 Nos. lines) (APERC order dated 21.07.2018) as it is linked to the actual power flow on intra-state lines of the previous years. SRPC has to certify those lines year by year based on the previous years' actual flows and hence, revenue for FY2019-20 is computed as average of the approved nos. for FY2017-18 & FY2018-19 i.e. Rs. 120 Cr. This revenue is considered for adjustment in the projected Gross ARR only for FY2019-20 of the 4th Control Period.

23. The licensee has computed each item of the ARR as detailed below:

(a) Projection of Return on Capital Employed (RoCE): The Licensee has computed the RoCE based on the methodology suggested by the Commission in the Regulation 5 of 2005. RoCE is computed by multiplying the Regulated Rate Base (RRB) by the Weighted Average Cost of Capital (WACC). A sum of Rs.16,786 Cr. is expected to be added to the Gross Fixed Assets (GFA) during the 4th Control Period.

Summary of RoCE (Rs. Cr.) proposed for the 4th Control Period is shown below.

Particulars	**FY 2018-19 (R.E.)**	**FY 2019-20**	**FY 2020-21**	**FY 2021-22**	**FY 2022-23**	**FY 2023-24**
Additions to OCFA	1,112	1,424	2,547	3,720	4,881	4,214
Depreciation during the Year	541	599	674	829	1,056	1,351
Additions to Contributions	64	21	20	94	171	176
Working Capital	90	100	111	123	135	148
Change in Rate Base	253	402	926	1,399	1,827	1,344
Regulated Rate Base	6,339	7,004	8,343	10,680	13,918	17,101
WACC	11.38%	11.38%	11.38%	11.38%	11.38%	11.38%
Return on Capital Employed	721	797	949	1,215	1,583	1,945

For the computation of WACC, the licensee is stated to have considered the following:

- Debt-Equity Ratio : 75:25
- Cost of Debt : 10.5% p.a.
- Return on Equity : 14.00%

(b) Projection of O&M Expenses: The licensee has stated that Operation and Maintenance (O&M) costs include employee-related costs, repair & maintenance costs and administrative & general costs. The O&M costs are stated to be driven by the following:

- Length of lines in circuit km and
- No. of Sub-station bays

The average of Gross O&M expenses for the years FY2015-16 to FY2017-18 as per the latest audited accounts are stated to have been allocated to lines and sub-stations in the ratio of 30:70 as per Regulation 5 of 2005. The allocated expenditure to lines and sub-stations is further divided with line length (circuit-km) and no. of sub-station bays respectively to compute the O&M norms in terms of Rs./circuit km for lines and Rs./bay for Sub-station Bays.

The norms thus arrived for Lines and Sub-stations are escalated at a rate of 5.16% year-on-year to arrive norms for the base year FY2018-19 and the 4th Control Period. The year wise O&M expenditure for the next 6 years is arrived based on the year wise estimated length of lines and number of bays in sub-stations. The net escalation rate of 5.16% used to project the O&M expenses over the next 6 years is computed based on the weighted average of Wholesale Price Index (WPI) and Consumer Price Index (CPI) for the years FY2011-12 to FY2016-17.

Particulars	FY 2018-19 (R.E)	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Gross O&M Costs (Rs.Cr.)	614.32	706.15	809.87	918.95	1038.59	1161.00
Less: O&M Expenses Capitalised (Rs.Cr.)	91.55	105.24	120.70	136.95	154.78	173.02
Net O&M Expenses (Rs.Cr.)	522.77	600.91	689.18	782.00	883.80	987.98

Wage revision which is due with effect from 1st April 2022 is stated to be not factored in the above O&M projections and stated that the financial commitments of wage revision will be claimed based on actuals during the True-up/True-down for the 4th Control Period.

(c) Depreciation: The licensee has stated that the depreciation has been calculated for every year in compliance with clause 15.3 of Regulation 5 of 2005, on the fixed assets adopting the depreciation rates as notified by the Ministry of Power, Government of India in their Gazette, for the MYT filings. Depreciation pertaining to capital invested through debt and equity only is stated to have been taken into consideration.

Estimated Depreciation (Rs.Cr.)

Depreciation	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
Land & land rights	0.00	0.00	0.00	0.00	0.00	0.00
Buildings	2.85	3.63	5.11	7.28	10.12	28.99
Intangible Assets	2.32	2.23	2.17	2.09	1.97	10.79
Other civil works	0.93	0.96	1.05	1.19	1.37	5.51
Plant & Machinery	264.67	315.73	415.89	562.79	754.07	2313.15
Line Cable Network	323.94	345.88	397.20	473.00	570.44	2110.46
Furniture & Fixtures	0.39	0.47	0.62	0.85	1.15	3.48
Office Equipment	4.35	5.12	6.66	8.90	11.83	36.86
Total	**599.45**	**674.03**	**828.71**	**1056.11**	**1350.94**	**4509.24**

Further, the licensee has stated that the depreciation of assets is as per the guidelines of the Electricity (Supply) Annual Accounts Rules, 1985 till FY2016-17, where in it was specified vide para 2.60(3) that the "Depreciation charge on newly commissioned assets shall commence in the year immediately following the year of commissioning since inception of the company".

Further, it stated that the AG, AP commented that "As per its accounting policy, the company provided depreciation on Property, Plant and Equipment available at the beginning of the year i.e., depreciation is not charged in respect of the assets commissioned during the year. This is contrary to the provision of the Companies Act, 2013 which stipulates that depreciation shall be provided on pro-rata basis from the date of utilization of the assets. Non-provision of depreciation on the assets commissioned during the year resulted in understatement of depreciation and overstatement of profit for the year by Rs.37.90 Cr.".

In view of the comments of the AG, AP, the licensee has requested the Commission to consider the depreciation from the date of Capitalization of asset as per the Companies Act, 2013 while finalizing the Tariff. The additional depreciation cost (Rs.Cr.) estimated by the licensee is given below.

Year	Depreciation calculated on the available assets at the beginning of the year	Depreciation calculated on the additions of assets (half yearly) along with opening balance of assets	Difference
2018-19 (base year)	540.85	577.60	36.75
2019-20	599.45	648.24	48.79
2020-21	674.02	759.88	85.86
2021-22	828.70	953.22	124.52
2022-23	1056.10	1218.81	162.71
2023-24	1350.95	1491.38	140.43
TOTAL	**4509.22**	**5071.53**	**562.31**

(d) Taxes and Special Appropriation: The licensee has stated that taxes have been estimated based on Return on equity expected on the RRB determined. Minimum alternative tax of 20.7468% is considered for tax computation. No special appropriations are stated to have been considered in this filing and True-up/ True-down for the 3rd Control Period will be filed separately.

Aggregate Revenue Requirement for the 4th Control Period

24. To sum up, the licensee has estimated the ARR (Rs. Cr.) for the transmission business for each year of the Control Period as below.

Parameter	FY 2018-19 (R.E)	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Expenditure	1,213	1,370	1,560	1,846	2,222	2,669
Gross O&M Costs	614	706	810	919	1,039	1,161
O&M Carrying Costs	0	0	0	0	0	0
Depreciation	541	599	674	829	1,056	1,351
Provision for Income Tax	58	64	77	98	128	157
Special Appropriation	0	0	0	0	0	0
Others						
Less: Expenses Capitalized	111	127	164	183	202	217
IDC Capitalized	0	0	0	0	0	0
O&M Expenses Capitalized	111	127	164	183	202	217
Net Expenditure	1,102	1,243	1,396	1,662	2,020	2,452
Add: RoCE	721	797	949	1,215	1,583	1,945
Gross ARR	1,823	2,039	2,345	2,877	3,603	4,397
Less: Non-Tariff Income	96	101	106	111	117	124
Less: Tariff from Inter-state Lines		145	141	138	134	131
Less: Tariff from Intra-state Lines		120	-	-	-	-
Net ARR	**1,727**	**1,673**	**2,099**	**2,628**	**3,353**	**4,143**

Further, the licensee has stated that the revenue from Open Access (OA) consumers is not estimated separately and the Net ARR computed doesn't include such revenue given that it is difficult to estimate the open access capacity envisaged during the Control Period.

However, it is stated that the OA consumers would be billed separately based on contracted capacity and such revenue from OA consumers would be adjusted as part of True-down for the next Control Period.

Transmission Charges for the 4th Control Period

25. The licensee has computed the transmission charges by allocating the Net ARR computed above for each year to the total State peak demand in that particular year.

In this regard, the licensee has stated that as per the draft amendment proposed by the Commission, *"The transmission tariff payable by the users of the Transmission system shall be determined in accordance with the following formula:*

*the TR = Net ARR/ (12*TTC)*

Where, TR: Transmission Rate in Rs./kW/month

Net ARR: Net ARR, as determined under clause 8.3.

TTC: Total Transmission Capacity in kW of the Transmission system."

The licensee welcomed the amendment proposed by the Commission to the effect that "Total Transmission Capacity (TTC)" shall be considered instead of "Total Contracted Capacity (TCC)", for determining the transmission tariff.

The licensee proposed the following definition for Total Transmission Capacity (TTC):

Total Transmission Capacity (TTC)

Peak demand incident on the transmission system during the year (determined as part of the projections carried out by the licensee and filed in the resource plan).

Therefore, the licensee has computed the Transmission Charges (Annexure:D) based on the ARR computed above and the projected State peak demand (filed in Resource Plan) for each year of the 4th Control Period, as below:

Transmission Charges					
Parameter	**FY 2019-20**	**FY 2020-21**	**FY 2021-22**	**FY 2022-23**	**FY 2023-24**
Net ARR (Rs. Cr.)	1,673	2,099	2,628	3,353	4,143
State Peak Demand (MW)	11,450	12,219	13,209	14,315	15,539
Transmission Charges (Rs./kW/Month)	**121.79**	**143.12**	**165.81**	**195.18**	**222.17**

Proposed billing of Transmission Charges

26. The licensee has proposed to collect transmission charges as stated below:

DISCOMs shall pay the transmission charges for the total peak demand considered for determination of transmission tariff for the Control Period.

DISCOMs have to execute Long Term Transmission Service Agreement (LTTSA) with the licensee for the peak demand for the respective years in the entire Control Period.

Note:

i. The projected peak demand will be apportioned to DISCOMs in the power sharing ratio.

ii. In case the actual demand incident on the transmission system is greater than the total peak demand considered, then DISCOMs would be required to pay additional transmission charges for the deviated demand.

iii. If the actual demand incident on the transmission system is less than the total peak demand, even then DISCOMs would be required to pay transmission charges for the total peak demand considered for determination of transmission tariff for the Control Period.

iv. The Open Access users (other than APDISCOMs) would be charged based on the actual contracted capacity.

True-up/True-down

27. The licensee has stated that in the absence of separate tariff order for it post bifurcation of State, the component-wise deviations of ARR will be arrived based on approved values for combined State adjusted for 46.11% and

actuals. The licensee is stated to be in the process of reconciliation of actual revenue, cost details and hence there is a delay in filing of the True-up/True-down and stated that the True-up/True-down will be filed separately after completion of the 3rd Control Period.

Non-tariff Income

28. The licensee has requested to issue appropriate amendment to Regulation No. 5 of 2005 with regard to permitting the tax at actuals on the non-tariff income earned by the licensee, as expenses, quoting the correspondence made with the Commission in this regard.

Proposal for introduction of new charges

29. The licensee, as a State Transmission Utility and SLDC as system operator, on account of higher share of RE penetration in the grid, have proposed to set up a battery energy storage system (BESS) with a capacity of 250 -500 MW with 2-4 hours of storage, under OPEX Model, to address morning and evening/night peak deficits (shorter durations), intermittency problems owing to high RE penetration (15 - 30 mins) and also smoothening of curves. The licensee made the following submissions in support of its proposal:

a) Generation from solar plants vary on a daily basis due to weather pattern changes causing cloud cover. This can lead to lower generation, as compared to expected, for a short duration (15-30 minutes). On average, nearly 130 MW deficit within a 15 minute block was observed during the 3 month period (Aug 1 – Oct 31, 2018). There were several (>50%) instances where a drop in solar generation in a given 15-minute block translated into a drop in demand after 30 minutes (i.e. with a lag of 2 blocks). Based on the analysis of the data sample (between 1st August, 2018 to 31st October, 2018), 375 MW of power for a period of 30 minutes would be able to tide over 75% of deficits in solar generation.

b) There are 9,523 instances of over-drawl equivalent to 23 MUs of energy quantum over drawn that has resulted in Utilities paying Rs. 103.5 Cr. as penalty charges for the period between Apr-Oct 2018.

30. The licensee has estimated the cost of battery energy storage system of 500 MWh capacity to be about Rs.975 Cr. The total Annual charges estimated to

be paid by the licensee to the developer over a period of 10 years are Rs.185Cr. The licensee proposed the following to recover the Annual charges estimated:

Charge	Applicability
Renewable integration charges: 70 % of Annual Charges (Rs./MW/Month)	Only to RE developers (Wind/Solar)
Ancillary support charges: 30 % of Annual Charges (Rs./Unit)	All the consumers including Licensees, OA consumers

Computation of ancillary support Charges:

- Capacity of BESS: 500 MWh
- Utilization of BESS in a year: 200 days
- Charge and discharge cycles in a day: 2
- Proposed ancillary service charge: Rs.3.2/kWh (Deviation penalty paid by the State utilities for the period Apr-Oct '18)

Total Ancillary service charges = BESS capacity * Utilization of BESS in No. of days/Year * No. of cycles in a day * Ancillary Service Charge (INR/Unit)

= 500 MWh * 200 days * 3.2 * 2 = Rs. 64 Cr.

The balance Rs.121 Cr. (Rs.185 Cr. – Rs.64 Cr.) is proposed to be collected from the RE developers (Wind and Solar) in the form of 'Renewable Integration Charges'.

Conclusion

31. The Commission has decided to consider the ARR and FPT filings submitted by the licensee, which are mentioned in brief in this Chapter, as the basis for determination of ARR and transmission tariff for each year of the 4th Control Period with due weight being given to views/objections/suggestions of stakeholders, as discussed in subsequent chapters of this order.

CHAPTER-II

OBJECTIONS, RESPONSES AND COMMISSION'S VIEWS

Tariff petition did not include all the works planned

32. Sri M. Thimma Reddy, Convener, People's Monitoring Group on Electricity Regulation, Hyderabad has stated that the tariff petition did not include all the works planned be taken up during the 4th Control Period. Para 3.2 on Capital Investment Plan included lists of proposed 400 kV and 132 kV substations only. It did not include the list of 220 kV substations proposed to be taken up. As such this information differs from the information provided under 'Plans for Capital Expenditure' provided as a response to Guidelines 10(g) and the information provided in the Regulatory Forms, particularly Form 1.1(d).

APTransco's Response: Year wise investments pertaining to 220kV and 132 kV are mentioned substation wise in the format 1.1 of the ARR. Hence, the same was not separately mentioned in the ARR and attached to the list of 220 kV substations.

Commission's View: The objection and the response are noted.

Open Access Capacity not estimated

33. Sri M. Venugopala Rao, Convener, Center for Power studies, Hyderabad has stated that in the latest resource plan AP Transco, while projecting a peak demand of 11,450 MW for the year 2019-20, has maintained that the revenue from Open Access (OA) consumers has not been estimated separately and that the net ARR computed does not constitute such revenue given that it is difficult to estimate the open access capacity envisaged during the Control Period. AP Transco has also maintained that the OA consumers would be billed separately based on contracted capacity and such revenue from OA consumers would be adjusted as part of true-down for the next Control Period. The approach of AP Transco gives rise to several questions. Without estimating requirements of transmission capacity for open access/third party sales, how can it project the need for addition of transmission capacity for the 4th Control Period? When AP Transco bills the OA separately based on contracted capacity and claims that such revenue from them would be adjusted as part of true-down for the next Control

Period, does it mean that it would collect transmission charges for "the total State peak demand in that particular year" from the Discoms? If not, where is the scope or need for adjusting revenue from OA consumers as part of true-down for the next Control Period?

APTransco's Response: Commission issued draft amendment to the Regulation 5 of 2005 wherein transmission system peak demand was considered for determining the transmission tariff to reflect the true costs incurred by AP Transco. Further, with regard to collection of transmission charges from the open access consumers, it is proposed to collect the transmission charges for the contracted capacity as it is difficult to estimate the open access demand separately from the total peak demand.

Commission's view: The difficulty in accurately estimating the Open Access demand is noted

Adopting peak demand for determining the transmission charges - Implications

34. Sri M. Venugopala Rao has stated that AP Transco, having submitted that there is a significant change in the installed capacity due to significant additions from Renewable Energy (RE) during the 3rd Control Period, requested the Commission to consider the total incident peak demand on the transmission system rather than total installed capacity, for determining the transmission rate. AP Transco has also maintained that the DISCOMs shall pay transmission charges for the total peak demand which was considered for determination of transmission tariff for the Control Period. It has further maintained that the DISCOMs have to execute Long-Term Transmission Service Agreement (LTTSA) with it for the peak demand (i.e. the total peak demand which was considered for determination of transmission tariff for the Control Period) for the respective years in the entire Control Period. AP Transco has maintained that, in case the actual demand incident on the transmission system is greater than the total peak demand, then Discoms would be required to pay additional transmission charges for the deviated demand. If the actual demand incident on the transmission system is less than the total peak demand, even then Discoms would be required to pay transmission charges for the total peak demand which was considered for determination of transmission tariff for the Control Period (i.e. the peak demand for which Discoms have entered LTTSA for the

entire Control Period). The submissions have the following implications, among others:

a) If transmission charges are determined by the Commission on total installed capacity and if Transco has to collect the charges from the Discoms based on LTTSA only, it would result in under-recovery of revenue.

b) Since the Discoms have to pay transmission charges as per LTTSA even if the contracted transmission capacity is under-utilized due to lack of demand or projected peak demand turning out to be inflated, even then they have to pay full transmission charges as per LTTSA. Therefore, it is imperative that projections of demand growth and peak demand year-wise should be realistic, without any scope for higher variations.

c) In case the actual demand incident on the transmission system is greater than the total peak demand, as Transco has contended, then Discoms would be required to pay additional transmission charges for the deviated demand. Does it mean that AP Transco is/will be creating additional transmission capacity exceeding the capacities contracted by the Discoms, open access consumers and for third party sales?

APTransco's Response: In order to reflect the true costs incurred, the Commission proposed amendment to the Regulation 5 of 2005 duly adopting State Peak Demand approach instead of Installed Capacity approach for computation of Transmission Tariff. In this regard, AP Transco has also furnished comments against the amendment issued to Regulation No. 5 of 2005 by APERC.

Commission's view: The assessment of demand, actual and peak is realistically done with reference to the latest amendment to Regulation No. 5 of 2005.

Proper examination of the proposed expenditure is needed

35. Sri M. Thimma Reddy has stated that even where some comparable information is available in the filings, it raises doubts about the expenditure being incurred. For example, according to the information on page 188 of the filings, cost of 400 kV substation coming up at Podili in Prakasam district (Serial No. 10) is Rs.600.87 Cr. and the cost of similar substation coming up at Kalikiri in Chittoor district (Serial No.13) is Rs.325.12 Cr. Given such

instances, the prudence of capital expenditure proposed to be incurred by APTRANSCO during the 4th Control Period need to be properly examined.

APTransco's Response: The scheme cost varies based on the scope of the work proposed under the individual scheme. The scheme cost of 400 kV Podili Sub-Station and connected transmission network is Rs.600.87 Cr. whereas the scheme cost of 400 kV Kalkiri Sub-Station and connected network is Rs. 325.12 Cr. The difference in scheme cost is due to the variation in line lengths of 400 KV, 220 KV, PTR capacity and bay extensions.

Commission's View: The cost of all schemes is subjected to prudence check, scheme-wise.

Don't treat tax on Non-tariff income as expense

36. Sri M. Thimma Reddy has stated that AP Transco has requested the Commission to permit income tax on the non-tariff income earned by it as expenses, and make it a part of ARR to be recovered through transmission tariff. Income tax is meant to be paid from the income earned by the entities or individuals. Treating tax on income as expense and reimbursing it by electricity consumers in the State through tariff, will be regressive. If Transco's request is conceded, consumers in the State will be forced to pay twice for the same thing. The Commission is requested not to give consent to AP Transco's request to treat tax on income as expense.

Sri M. Venugopala Rao, on the request of APTransco to make appropriate amendment to the Regulation No.5 of 2005 (Terms and Conditions for determination of tariff for Transmission of Electricity) for permitting the tax as expenses on the non-tariff income earned by the licensee on actuals, stated that, for earning non-tariff income, AP Transco is utilizing its network and manpower at no extra cost. Since it is not incurring any additional capital expenditure for earning non-tariff income and getting permissible RoE on capital invested and transmission charges for utilization of transmission capacities, AP Transco will have the balance of non-tariff income which stands trued up. For generation tariff, income tax is allowed as pass through on return on equity only. In the case of transmission business, 14% income tax is allowed by the Commission on RoE worked out on the basis of regulated rate base, irrespective of actual equity invested by

AP Transco. The Commission is requested not to permit the tax on non-tariff income as expenses.

APTransco's Response: Amendment to the Regulation 5 of 2005 with regard to permitting the tax as expenses on the non-tariff income earned by the licensee is pending before APERC. Hence, the existing methodology has been adopted for the computation of net ARR.

While arriving true-ups, the Commission is considering the Non-tariff Income (NTI) as excess revenue as it is over and above the tariff income. It is a well-known fact that, for any income, income-tax has to be paid. Accordingly, APTRANSCO is also paying income tax on the NTI. But the same is not recouped in the true-up. Commission is treating the whole NTI as revenue while determining the true-up without excluding the tax liability as an expense. In this context, the Commission is requested for amendment to the said regulation. Any excess income earned by APTRANSCO shall be passed on to the consumers only. The Commission is once again requested to consider the tax paid on the non-tariff income, as an expense.

Commission's view: As per Regulation No. 5 of 2005 as it stands, there is no scope for treating the tax on non-tariff revenue as an expense.

Reimburse cost of captive / third party wheeling of Solar and Wind Energy

37. Sri M. Venugopala Rao has stated that the Commission has proposed an amendment to sub clause 20.1. of clause 20 of Regulation No. 5 of 2005 (Terms and conditions for determination of tariff for transmission of electricity). The Total Transmission Capacity (TTC) is defined by the Commission as "Total Transmission Capacity means transmission system peak demand including open access capacities approved by the Commission in the Multi Year Tariff (MYT) order." Following the Solar Power Policy in G.O.Ms.No.8 dated 12.2.2015 and Wind Power Policy in G.O.Ms.No.9 dated 13.2.2015 issued by the Government of Andhra Pradesh, the Commission has issued an amendment to para 17.1 of Open Access Regulation 2 of 2005 for implementing the said two policies of the GoAP wherein the provision that "provided further that the Transmission and Wheeling charges shall be exempted for wheeling of power generated from such Solar and Wind Power Projects and for such operative periods as mentioned in G.O.Ms.No.8 dated 12.2.2015 and G.O.Ms.No.9, dated 13.2.2015 respectively for only captive

use / third party sale within the State" was incorporated. It has several adverse implications for the Discoms/their consumers of power and the said amendment needs to be re-examined and re-amended for the following reasons, among others:

a) For the Solar and Wind power projects set up during the periods as proposed in the two said G.O.s of GoAP and as amended by the Commission, payment of transmission and wheeling charges is exempted for captive use/third party sale for a period of ten years. The issue of who should bear the burden of such an exemption is ignored both in the said G.O.s of GoAP and the amendment effected by the Commission.

b) If transmission capacity means total peak capacity including open access capacity, as proposed by the Commission, transmission and wheeling charges will be decided on that basis only. The capacity that is being and will be used by the solar and wind power units for captive use/third party sale within the State gets exempted from paying transmission and wheeling charges. Will APTransco collect transmission and wheeling charges from the solar and wind power units for captive use/third party sale within the State or their consumers? If not, will APTransco collect the same from Discoms?

c) If, from the total peak transmission capacity, the capacity that is used for captive use/third party sale of solar and wind power is excluded, then the average tariff for transmission and wheeling charges per unit would increase and the entire burden will be imposed on the consumers of the Discoms as a part and parcel of retail tariffs as decided by the Commission in the annual tariff orders.

d) Captive use of solar and wind power or its sale to third parties under open access means the developers use it for their own requirements or sell the same to the consumers of their choice at their own tariffs, without any regulation of tariffs. The Discoms or their consumers have absolutely nothing to do with those transactions and supply and consumption of such solar and wind power.

e) If GoAP wants to give some concessions like exempting the solar and wind power being used for captive purpose or third-party sale through open access from payment of transmission and wheeling charges as a part and parcel of its policy of encouraging generation and consumption of solar and wind energy, in all fairness, it should bear the entire cost of such transmission and wheeling charges. The Commission should have directed the GoAP accordingly, while amending the relevant Regulation in line with the solar and wind power policies of the GoAP. Directing, by implication or otherwise, AP Transco or the Discoms or their consumers of power to bear that burden would be tantamount to an unfair trade practice. This approach of forcing AP Transco and the Discoms or their consumers of power to bear the cost of transmission and wheeling charges for the solar and wind power generated by private developers and sold to consumers of their choice at their tariffs is perverse and contrary even to the canons of free trade.

f) Developers of wind and solar power projects are generating and selling power to the consumers of their choice under open access and earning substantial profits and the consumers purchasing power from them also must be getting that power at tariffs lower than the tariffs determined by the Commission in the annual tariff orders applicable to different categories of consumers. Needless to say, consumers, whether of commercial or industrial categories, opt for purchase of power under open access, if only the tariffs are lower than the tariffs applicable as per the annual tariff orders of the Commission. Otherwise, they opt to get supply of power from the Discoms only. (When there is scarcity for power and Discoms are unable to meet full demand of commercial or industrial consumers, the latter may be constrained to opt for open access, but such a situation no more exists, with the Discoms supplying power continuously, except for very short time due to technical reasons.) Since the tariffs being determined by the Commission to commercial or industrial or other high consumption categories of consumers in the annual tariff orders are much higher than the tariffs of wind or solar power, both the developers of wind and solar power units and consumers who get supply of power from them under open access get benefit, the developers in the form of higher tariffs and the consumers in the form of relatively lower tariffs. Obviously, it is an absurdity to impose the burden of transmission and wheeling charges of such open access transactions on the Discoms or their consumers of power.

g) If solar and wind power is used for captive use, the costs of transmission and wheeling of that power should be borne by those users only. The Discoms and their consumers of power have absolutely nothing to do with such consumption of power. Imposing that burden on the Discoms or their consumers of power is also an absurdity.

h) Even if the solar and wind power projects whose power is being sold under open access by their developers are old units, over the years they must have recovered a lion's share of their Capital Costs already. In other words, by continuing to sell their power under open access at tariffs which are much higher than they would have been due to depreciation of their units and recovery of Capital Cost, they continue to get windfall profits and do not deserve exemption of transmission and wheeling charges anymore.

i) As is well known, the tariffs being discovered through competitive bidding for solar and wind power are as low as less than Rs.2.50 per kWh. Needless to say, such developers reap windfall profits by selling their power under open access. With tariffs for wind and solar power falling drastically through competitive bidding, the tendency to sell solar and wind power under open access gets intensified, and, as and when a viable and economical system of battery storage for power is developed and put to use, sale of solar and wind power under open access will increase by leaps and bounds, as the scope for meeting peak demand would increase. If AP Transco or the Discoms or their consumers of power are forced to bear the burden of transmission and wheeling charges for such third-party sale or captive use of solar and wind power, the totally unjustifiable burden on them would also increase accordingly. Such predatory absurdities are being perpetrated under the guise of reforms at the cost of larger public interest.

APTransco's Response: The Commission has issued 4th amendment Regulation, 2016 in line with Wind & Solar policy, 2015 wherein transmission charges were exempted for wind and solar developers but not mentioned any provision for recovery mechanism. APTRANSCO filed review petition seeking review and / or modification and / or rectification of errors in the order dated 09.05.2014 passed in O.P.No.62 of 2013, wherein the Commission determined Transmission Tariff for FY2014-15 to FY 2018-19 and the same was dismissed by the Commission by its order dt. 17.10.2015.

Neither APERC nor GoAP has given a way out for the said exemption as to how to fill the financial void resulted by such exemption. As such the Commission may provide suitable recovery mechanism for full recovery of transmission charges in the Control Period 2019-2024 for the already exempted transmission charges for the wind and solar developers as per the amended Regulation 2 of 2016. However, APTRANSCO will file true-up petition for recovery of such exempted transmission charges for the 3rd Control Period.

Commission's view: For the purposes of this tariff order, the Commission is bound to follow its own regulation in force as of now.

Increase in transmission cost is high

38. Sri M. Thimma Reddy has stated that both the APDISCOMs together claimed Rs.1,673 Cr. towards transmission costs during FY2019-20. This is 39.77% higher than that reported to be incurred during the previous financial year 2018-19. During this period, according to APTRANSCO filings, while peak power demand is expected to increase by 8.72% the energy input is expected to increase by 7.15%. Increase in transmission cost is more than four times higher than the increased power supply.

APTransco's Response: Transmission costs claimed by APDISCOMs for FY2019-20 are only 15.25% higher than the approved values (shared in the ratio of power sharing between AP & TS) for the year 2018-19. The increase in Transmission charges are due to the proposed capex for schemes envisaged for meeting the huge loads coming up in the CRDA region on account of construction of new capital city post bifurcation and expected industrial growth to be witnessed along the Vizag Chennai Industrial Corridor (VCIC).

Commission's view: The factual situation is noted.

Requirement of substations and lines should be properly assessed

39. Sri M. Venugopala Rao and Sri M. Thimma Reddy have stated that the transmission tariff proposals for the 4th Control Period show that while peak demand increases by 35.70% from 11,450 MW to 15,539 MW, net ARR increases by 147.64% from Rs.1,673 Cr. to Rs.4,143 Cr. During the same period generation capacity addition increases by only 9.48%. Within net

ARR, Return on Capital Employed (RoCE) increases by 144.04%, depreciation increases by 125.55% and gross O&M costs increases by 64.45%. This shows that increase in transmission costs to be incurred during the 4thControl Period is several times higher than the increase in peak demand going to be met during the same period. This proposed abnormal increase in transmission costs need to be closely and thoroughly scrutinized. The need for the proposed substations and transmission lines is to be assessed properly to meet the requirements of electricity consumers in the State.

APTransco's Response: The increase in net ARR is due to the proposed CAPEX for schemes envisaged for meeting the huge loads coming up in CRDA region on account of construction of new capital city post bifurcation and expected industrial growth to be witnessed along the Vizag Chennai Industrial Corridor. However, subsequently due to procurement of power from distributed solar and BLDC pump sets there are some changes to the schemes envisaged for investment. Also, in order to reduce the burden of transmission charges on the Distribution Licensees and other OA consumers, the investment was deferred for some of the schemes and CAPEX was also phased to the subsequent years.

Commission's view: Each investment proposal submitted for the approval of the Commission is scrutinized thoroughly with reference to requirement, Capital Cost, feasibility and every other relevant aspect, before approving or disapproving or returning the proposal.

Proposed rate of interest of debt is high

40. Sri M. Thimma Reddy has stated that the proposed rate of interest of 10.5% on the debt transacted by the licensee in its investment programme, is on higher side. In the recent past, Regulatory Commissions in the country are adopting lower rate of interest on the debt component of the capital. For example, the Telangana Electricity Regulatory Commission (TSERC) in its Order dated 19-06-2017 related to determination of Capital Cost and generation tariff of SCCL's 2 X 600 MW thermal power project, adopted a rate of interest of 9.21%. In this background, the Commission is requested to adopt lower rate of interest on the debt component of capital expenditure to be incurred by APTRANSCO during the 4th Control Period.

APTransco's Response: The Cost of Debt (10.5% per annum) considered for computation of WACC and RoCE is arrived by considering the interest rates on existing loans availed by AP Transco from different agencies.

Commission's View: The Commission has adopted the weighted average rate of interest as per accepted norms.

Are the proposed GIS sub-stations cost-effective?

41. Sri M. Thimma Reddy has sought for the details of the compensation paid per acre to the land owners from whom land is acquired to set up the proposed 5 Nos. 220/33kV Gas Insulated Switchgear (GIS) substations at Nelapadu, Rayapudi, Lingayapalem, Velagapudi and Mandadam. He has further stated that GIS is not that latest or futuristic technology and it is around since a long time. Technologies need to be selected on the basis of their relevance but not in the name of 'futuristic' or 'state of the art' technologies. GIS substations are several times costlier than conventional substations. GIS substations need to be adopted only if their cost-benefit valuation is positive.

APTransco's Response: APTransco has not paid any compensation for the land to any land owners for construction of the GIS substations and laying of the UG cable, as on date. The land allocation for construction of the GIS substations and laying of the UG cable is done by APCRDA. The land is allotted to 220/33 kV GIS Lingayapalem (2 acres 59 cents) as on date by APCRDA. The GIS technology is state of art technology and has been in use in various countries. Further, GIS substations have been in service reliably and are maintenance free compared to Conventional AIS. CRDA has informed that land is major constraint and per acre land would cost around Rs.4 to 5 Cr. The land for GISSS, trench for UG cable and the corridor cost (land) is provided by APCRDA at their cost. The land requirement for conventional substation and connected lines would be more for which the compensation has to be paid by APTRANSCO for acquisition of land. Therefore, in the CRDA capital Region, the GIS is cost effective. Further, Amaravathi Capital City is designed to be a world class city with smart, integrated infrastructure and is one among the selected smart cities by the Government of India. The GISSS are taken up as a part of power transmission / infrastructure development in CRDA, to meet immediate load demand and expected huge demand in the near future.

Commission's View: Nothing further to add to the response.

Allow unutilized transmission capacity for new users

42. Sri M.Venugopala Rao has stated that, due to inadequate supply of fuels like natural gas and coal, lesser rainfall and inadequate inflows into reservoirs and resultant shortfall in generation of hydel power etc., the existing generation capacities could not be utilized as per the estimates made by the Discoms and AP Transco and permitted in the MYT order of the Commission during the third Control Period. Similar position may continue for the 4th Control Period also. The four gas-based projects of GVK extension (220 MW), Vemagiri (370 MW), Gautami (464 MW) and Konaseema (444.08 MW) continue to be stranded due to failure of the GoI to ensure supply of natural gas as per allocations. In other words, the transmission capacities already created for evacuating power to be generated by these projects remain idle. PPAs with Spectrum (208.31 MW) and Lanco Kondapalli (355 MW) also expired and the transmission capacity created for them also remains idle. The installed capacity of LVS project (36.8 MW) will continue to be idle. Projected addition of NCE units during the 4th Control Period is unwarranted and cannot be taken for granted. In order to purchase must-run NCE, transmission capacities created for evacuating power from the plants being backed down remain unutilised to that extent. Therefore, while assessing the need for transmission capacity to evacuate the projected availability of power for the next financial year and the remaining period of the 4th Control Period, under-utilisation of the existing capacities, both in generation and transmission, need to be taken into consideration. Addition of new transmission capacities on the basis of projected additions of generation capacities, will lead to creation of idle transmission capacity, if installed capacities are not added or not utilized as projected. If adequate transmission capacity is not added and if new installed capacity is added as projected, AP Transco will be found wanting in meeting requirements of transmission capacities to evacuate power to be generated by new generating units. Therefore, a careful and realistic examination of the possibilities and requirements for addition of new generation capacities and transmission capacities is required to maintain prudent balance between generation

capacities and requirement of transmission capacities. When the transmission capacity contracted by the Discoms remain unutilized but continue to be paid for, for the reasons explained above among others, the Discoms should be allowed to utilize such unutilized transmission capacity for evacuating power from new projects with whom they had PPAs and got consents of the Commission, without making payment of transmission charges to AP Transco to that extent. The Commission is requested to take necessary steps and give directions accordingly in the MYT order to be issued.

APTransco's Response: APTransco has been building the transmission capacity as per the contracted capacity with both the Discoms, under LTTA. It may not be possible to utilize the underutilized transmission capacity arose due to inadequate supply of coal, natural gas and lesser rain fall for evacuating power from new generating stations.

Commission's View: The suggestion is noted.

Do not impose the burdens of new solar and wind policies on utilities

43. Sri M. Venugopala Rao has stated that GoAP has issued its latest Solar And Wind Power Policies - 2018 afresh in G.O.Ms No.1 and G.O.Ms. No.2, both dated 3.1.2019, respectively. While offering certain incentives for setting up solar and wind power projects for a period of 10 years, it is incorporated in both the policies that transmission and distribution charges shall be exempted only for connectivity to the nearest Central Transmission Utility (CTU) via State Transmission Utility (STU) network for inter-state wheeling of power subject to the consent of APERC (4(a) of solar power and 8(b) of wind power policies). It is obvious that it is for the Commission to decide whether such a consent is to be given or not. The Commission is requested to re-examine the whole issue and bring about necessary amendments to the regulations concerned to the effect that either the GoAP or the developers/consumers of solar and wind power – both captive and under open access - should bear the transmission and wheeling charges applicable and that the same should not be imposed either on APTransco or the Discoms or their consumers of power. The Commission need to incorporate these changes in the regulations applicable and MYT orders to be issued by it for APTransco and AP Discoms for the 4th Control Period.

APTransco's Response: APTransco has been following the Regulations issued by the Commission from time to time.

Commission's View: Suggestion is noted.

Do not allow capital expenditure of GIS and UG XLPE Cables

44. Sri M. Venugopala Rao has stated that APTransco has proposed an increase of net expenditure by 97.26% and of net ARR by 147.64% for the fourth Control Period, while the peak demand growth is projected to increase by 35.70% only which confirm that the per unit Capital Cost of the proposed schemes are inflated and unwarranted. Even after considering normal increase in per unit Capital Cost of the proposed schemes, the proposed increase of net expenditure and net ARR are absolutely abnormal. APTransco has explained that the proposed capital expenditure during the 4th Control Period is higher due to schemes envisaged for meeting the huge loads coming up in CRDA region on account of construction of new capacity post bifurcation of Andhra Pradesh and expected industrial growth to be witnessed along the Vizag Chennai Industrial Corridor. Any expenditure incurred for creating and augmenting transmission and distribution capacities for the new capital region of Amaravati should be adjusted from the funds being provided by the GoI and should not be allowed to be included in the proposed capital expenditure of AP Transco for the 4th Control Period. Similarly, it is a standard practice that Transco and Discoms are collecting expenditure for creating or augmenting transmission and distribution capacities required for industrial corridors, real estate structures etc. from the entities developing the same. Such expenditure should not be permitted to be included in the proposed capital expenditure of AP Transco or the Discoms, as the case may be. The submission of AP Transco that due to procurement of power from distributed solar generation projects and replacement of existing pump sets with Solar BLDC pump sets, there are some changes to the schemes envisaged for investment needs to be taken into consideration, while determining permissible capital expenditure.

The Commission is requested not to allow capital expenditure for the proposed GISSS and underground XLPE cable lines to be included in the capital expenditure for the 4th Control Period, but to direct AP Transco to finance such schemes with the funds being provided by the GoI and GoAP for development of CRDA, if the GoAP persists that Transco should take up the same instead of normal sub-stations and transmission lines, which can reasonably meet requirements.

APTransco's Response: The funds proposed for the expenditure for augmenting transmission system in APCRDA is to meet the immediate load demand and expected huge demand in the near future. The expenditure will be an investment for future revenue generation. The Amaravati capital area is the capital of Andhra Pradesh and will house the AP Legislature, AP High Court, Secretariat and Directorate, Corporations of all the Government Departments which work for the betterment of the people of Andhra Pradesh not for any particular area or region. As there is land constraint, as informed by CRDA, APTransco has taken up augmentation of transmission system with GIS substation and underground XLPE cables. The Land for Substation and corridor for UG cable is provided by APCRDA without any cost to APTransco.

Commission's View: The Commission already suggested to pursue the possibility of the Capital Region Development Authority financing the total cost of the development of Power infrastructure in the Capital Region but it may not have the jurisdiction to compel it to do so. It has to examine the proposals of AP TRANSCO on their own merits.

The proposed capital expenditure needs to be thoroughly checked

45. Sri M. Venugopala Rao has stated that the abnormal increase in the proposed capital expenditure during the 4th Control Period brings to the fore the issue of prudence in expenditure. It needs to be examined thoroughly and ensured that AP Transco follow real competitive bidding for procurement of material and allotment of work. The details and prices of the materials and competitive rates for the works allotted in comparison with market trends are not being made public. The Commission is requested to have a thorough prudence check of all these aspects, regulate the proposed as well as revised capital expenditures and make the same public to ensure transparency and accountability by strictly ensuring that its related directives already issued to AP Transco are complied with (explained at pages 159-160 of the subject filings).

APTransco's Response: The capital expenditure proposed by APTransco during the 4th Control Period is for the expansion of the existing Transmission system, improvement of Voltage profile, reliability & availability of system and investment for the future revenue generation. The estimates for capital expenditure (schemes) are prepared as per the approved norms and standards communicated by the Government. The Capital estimates prepared for the schemes are as per the actual basis and the revision in estimates for schemes if any are due to actual requirements and the same are submitted to the Commission with substantiation for revision of scheme estimates. The award of capital works and procurement of material is being done through open competitive bidding through approved norms and through e –procurement process in transparent manner.

Commission's View: The basic norm followed by the Commission in evaluating any proposal is to subject it to the prudence check.

Proposals should be subjected to test w.r.t. Load Forecasts and Resource Plan

46. Sri M. Venugopala Rao has requested the Commission not to give its consent for addition of transmission capacity and capital expenditure related thereto as proposed by APTransco for the generation capacities or State peak demand proposed by it and the Discoms, without the latter establishing the need for procuring power from the proposed projects, without entering into PPAs with them and submitting the same for consideration of the Commission well in time. All these proposals should be subjected to test on the anvil of realistic long-term load forecast and resource plan to be determined by the Commission after completing public hearings on the same.

APTransco's Response: AP Transco has already submitted the State Electricity Plan and Resource Plan to the Commission highlighting the projections (State peak demand) for the 4th Control Period. In line with those filings, AP Transco has filed the MYT ARR petition for transmission and SLDC business.

Commission's View: The suggestion is followed.

O&M Cost proposed is high

47. Sri M. Venugopala Rao has stated that the growth of Operation & Maintenance costs for the 4th Control Period is proposed to be increased by 64.45%. While projecting net O&M expenses for the 4th Control Period, AP Transco has maintained that these projections did not factor the wage revision which is due with effect from 1st April, 2022. It has maintained that the financial commitments of wage revision will be claimed based on actual during the true-up/true-down for the 4th Control Period. The Commission has been allowing the financial impact of periodical wage revision for the employees of APTransco and other power utilities of the State Government, though the rates of revision tended to be higher, irrespective of permissible norms of O&M expenses. While pay revision for its employees is being decided and the impact of pay revision is being borne by GoAP, the impact of pay revision for employees of the power utilities is being passed on to the consumers of power as a part and parcel of the tariffs to be paid by them as determined by the Commission. As such, under this regulatory regime, the impact of pay revision on tariffs needs to be regulated as a part and parcel of determining total O&M expenditure as per applicable norms. In the case of private power projects with whom the Discoms had PPAs, the O&M costs, including pay and allowances of their employees, of those projects are being determined by the Commission as per applicable norms. The private power projects are not claiming the financial impact of revision of pay and allowances to their staff separately and the Commission also is determining O&M expenditure, which is inclusive of the requirement of pay and allowances, with annual escalation. The claims for administrative costs, including pay and allowances of employees by power utilities should be subjected to applicable norms; they cannot claim the same as they like and the Commission should apply applicable regulations and norms for determining the same in order to ensure prudence in expenditure by power utilities and protect larger consumer interest. Allowing such expenditures as claimed by the power utilities arbitrarily would be tantamount to failure of the Commission to apply applicable regulations and norms, giving its approvals mechanically, and shirking its regulatory responsibility. The basis for wage revision seems to be subjective and imprudent which needs to be examined objectively and the vast difference in wage structure being

implemented between permanent employees and contract/outsourcing personnel doing similar work, principles of wage revision being adopted by different pay revision committees etc., may be examined. With the unquestioning approval for passing on the expenditure on wage revision to the consumers without any prudence check, no organization can compete in the market and will become bankrupt, if such tendencies continue to operate periodically. AP Transco has submitted that as on 31.3.2018, the vacant posts were 3,179 and by 31.3.2024 they would be 2,184. If these posts are filled up on permanent basis, what would be the additional financial impact in terms of tariff hikes is anybody's guess.

APTransco's Response: O&M expenses are filed as per the laid down procedures in the regulations. No projection was made by the APTRANSCO for wage revision while submitting the ARR filing. The projection of employee cost portion of O&M cost was made based on the actuals of FY2017-018 cost only.

The wage structure implemented between permanent employees and contract /outsourcing personnel even though performing the similar work, cannot be compared as there is a difference between the two types of resources in terms of recruitment, responsibility and the governing principles. Any organization whether it is private or government will recover their employees' expenditure from the consumers only. And the Commission is also thoroughly reviewing the O&M expenditure claimed by the APTRANSCO and curtailing wherever necessary and regulating accordingly. The O&M expenditure has been calculated on the projected lines and sub-stations only and not on the projected recruitment of employees to meet employee cost, R&M and administrative expenditure cost of APTRANSCO for the 4th Control Period.

Commission's View: The scope for any intervention by the Commission in any pay revision exercise legally or factually or practically is incomprehensible. Any calculation and determination by the Commission are only strictly in accordance with the parameters prescribed by the regulations on different aspects.

Allow only the lowest depreciation rate

48. Sri M. Venugopala Rao has stated that AP Transco has requested the Commission to consider depreciation as per the Companies Act, 2013, so that an amount of Rs.562.31 Cr. stated to have been claimed less earlier can be recovered during the 4th Control Period. AP Transco cannot calculate depreciation, as it likes, contrary to the methodology or norms decided or permitted by the Commission. Despite the Commission making it repeatedly clear on earlier occasions in its MYT tariff orders that depreciation has to be calculated on the basis of CERC rates only, AP Transco continues to harp on the theme of allowing it to adopt the guidelines of the Ministry of Power or the Companies Act for calculation of depreciation. In fact, in its order for transmission tariff for the second Control Period, the Commission had made it clear: "…As per the Regulation 5 of 2005, APTRANSCO shall adopt the depreciation rates announced by Central Electricity Regulatory Commission (CERC) for transmission assets. APTRANSCO did file neither the reason nor justification for adopting the rates notified by Ministry of Power, Government of India. The Commission decided to adopt the depreciation rates announced by CERC for transmission assets during the Control Period" (para 67). Leaving aside the self-contradictory observations of the Commission in the MYT transmission tariffs order for the third Control Period, its decision on depreciation rates permitted as sought by AP Transco applies to the third Control Period only. Higher rates of depreciation lead to frontloading of the tariff. Permitting recovery of depreciation charges over the useful lifespan of the assets would ensure a fairer recovery of the same by AP Transco, though over a longer period of time. Therefore, the Commission is requested to allow least possible depreciation rates, or at least, the lowest depreciation rates as per the regulations or norms of CERC or MoP, whichever is lower.

APTransco's Response: APTransco is not deliberately asking the Commission to consider depreciation as per the Companies Act, 2013 and not calculating the depreciation as it likes. In fact, APTransco is following the accounting principles in calculating the depreciation. It was also mentioned in the ARR filings of the MYT that, 'The AG, AP commented that "As per its accounting policy, the company provided depreciation on Property, Plant and Equipment available at the beginning of the year i.e. depreciation is not charged in respect of the assets commissioned during the year. This is contrary to the provision of the Companies Act, 2013 which stipulates that depreciation shall be provided on pro-rata basis from the date of utilisation of the assets. Non-provision of depreciation on the assets commissioned during the year resulted in under-statement of depreciation and overstatement of profit for the year by Rs.37.90 Cr.” In light of the above audit remarks of the AG of GoAP, APTransco requested the Commission to consider the depreciation as per Companies Act, 2013 as there is large variation in the depreciation values i.e. about Rs.562 Cr. for the entire Control Period compared to the existing principles. APTransco is adopting the depreciation rates announced by Ministry of Power, Government of India for the purpose of its Annual Accounts since the creation of TRANSCO. Reviewing this practice and adopting a different depreciation system now will require a very high compliance cost. Further, allowing two different systems of depreciation to prevail (one adopted by the Commission and the other by APTRANSCO), will lead to complications in the true-up exercise with possible deleterious impact in the monitoring of efficiency gains. In the regulation also, there is clearly adequate scope exists to adopt a MoP rates w.r.t. depreciation.

Commission’s view: The Commission has adopted the regulations and norms of CERC.

Return on Equity (RoE) should be continued at 14%

49. Sri M. Venugopala Rao has stated that the Return on Capital Employed (ROCE) by AP Transco for the 4th Control Period works out to a growth rate of 144.04%. For the purpose of computation of WACC, APTransco has considered cost of debt as 10.5%. At another place in its filings, APTransco has shown the range of interest on loan between 7.21% to 9.98%. In view of the market trends of interest rates on loans, this rate may be re-examined and AP Transco be directed to explore possibilities for getting loans at lesser rates of interest. Instead of Return on Equity @ 14%, AP Transco has requested the Commission to increase it to 15.5% (pre-tax), as per CERC norms. For the transmission capacity contracted by the Discoms, Transco will be getting transmission charges fully, irrespective of the level of utilisation of the contracted capacity. In case of power generating projects, if they fail for any reason, to generate and supply power as per threshold levels of PLF, for lesser generation, they have to pay penalties to the Discoms. AP

Transco has no such problem. Therefore, the Commission is requested to continue RoE of 14% only for AP Transco.

APTransco's Response: For computation of RoCE in the filings for Transmission MYT, APTransco has considered RoE of 14% as per the existing Tariff order. However, as per clause 13.1 of APERC Regulation 5 of 2005, RoE shall be determined at the beginning of the Control Period after considering the CERC norms. As per the existing CERC norms, RoE is 15.5% (pre-tax). Accordingly, APERC is requested to consider the RoE as per the CERC norms for determining the tariff. For some loans APTRANSCO is availing lower interest rates while for the other it is above 10%. So, APTRANSCO has claimed the average rate of interest which works out to be 10.5%. In this 4th MYT, APTRANSCO has computed the transmission charges based on the peak demands but not on the contracted capacities.

Commission's view: The request of the objector has been accepted.

Review MYT Orders

50. Sri M. Venugopala Rao has stated that Para 8.1 of National Tariff Policy says that implementation of Multi-Year Tariff (MYT) framework "would minimize risks for utilities and consumers, promote efficiency and appropriate reduction of system losses and attract investments and would also bring greater predictability to consumer tariffs on the whole by restricting tariff adjustments to known indicators on power purchase prices and inflation indices. The framework should be applied for both public and private utilities." Experience has confirmed in the case of APTransco, as also in the case of Discoms, that the claimed objectives of MYT framework are belied. AP Transco cannot claim efficiency improvement during earlier Control Periods, in the light of its failure to implement projects incurring the capital expenditure permitted by the Commission, increase in O&M and other expenditure, payment of avoidable taxes etc. On the other hand, MYT has led to collection of excess tariffs by AP Transco from the Discoms. The Commission is requested to review implementation of its MYT orders by AP Transco, SLDC and the Discoms annually by holding public hearings and take further necessary action periodically, including revision of tariffs annually, if necessary.

APTransco's Response:

a. Main intension of the MYT frame work is to provide predictability and less regulated environment for the Licensee because of which the Utility can make better business plan.

b. The tariff determined under MYT provides uniform transmission charges over five years and thus give conducive environment for the stakeholders such as DISCOMs, private and Govt. Generators, to plan and invest in the State.

c. Electricity Act had mandated implementation of MYT framework and so Annual determination of Revenue may not be implementable. The Licensee also believes that going back to Annual determination of revenue from MYT shall be considered non-progressive.

d. MYT framework may impede faster sharing of excess profit and loss made by Utility. So, Licensee suggests review of tariff in third year of Control Period for computation of provisional true-up and passing on the same in between the Control Period while keeping the transmission charges same.

Commission's View: It is for the next Chairman and Members of the Commission to take a decision on the request.

Socialize the Renewable Integration Charges (RIC) across all users

51. Sri Farrukh Aamir, Lead-Policy Advocacy and Sri Naveen Singh, Lead - Business Development, M/s Sterlite Power Transmission Limited, New Delhi, welcoming the proposal of Battery Energy Storage System (BESS) stated that BESS with a capacity of 250-500 MW with 2-4 hours of storage, under an Opex Model to address morning and evening/night peak deficits, RE intermittency challenges and smoothening of curves, is the best solution amongst the options available. BESS is required to meet morning and evening / night peak and as APERC has a Regulation for scheduling the Renewable Energy Generation wherein RE Developer is penalized if it is not within the prescribed limits of the generation forecasted. This brings out that intermittency & smoothening needs to be addressed by the respective RE developer and thus, the envisaged BESS should not be used as a general charge. This would unnecessarily lead to penalization of the disciplined RE

developers who are following the grid code. Further, the BESS being used for Peak Load Management / Shifting, Demand Side Management and Generation management, it should not largely be recovered from RE developers. Since it has been proposed as a Grid Element under the control of SLDC, it would be better to include the tariff discovered for BESS in the overall ARR of the transmission charges and socialize them across all the stake holders as it is primarily being used for reliable grid management in the interest of all stakeholders.

Smt. Bindu Madhavi, Manager, Regulatory & Policy – IESA, Customized Energy Solutions, Pune has stated that the charges are calculated based on the existing RE sources. However, more clarity is required on revenue sharing methodology for upcoming and under-construction RE Generators. There should be a facility to upgrade the capacity in the BESS. At present the Solar and Wind developers connected to the grid are being penalized for under/over injection. Justification required on the proposal of imposing 70% of the BESS charges only on RE developers and value benefit attained by RE developers.

APTransco's Response: Based on the need, BESS is proposed for different applications accordingly the Annual paid to the developer need to be recovered for which new charges are proposed in the ARR petition. APERC shall decide the way forward on the introduction and determination of charges. The computation of RIC is based on the installed RE capacity within the State as on date and the Annual charges determined over the contract period. The computations and methodology proposed by APTransco are still under consideration by the Commission and based on the decision or directive, the RIC would be computed or revised going forward considering the upcoming RE capacity additions. The proposed BESS will be used as a solution to overcome the intermittency and the primary reason for intermittency is variable RE generation (solar and wind) and hence AP Transco proposes to collect 70% of the Annual charges from RE developers.

Commission's view: It is for the AP TRANSCO to study the suggestions.

Explore alternatives for Battery Energy Storage System (BESS)

52. Sri M. Thimma Reddy has stated that the fixed cost of battery energy storage system of 500 MW capacity is estimated to be about Rs.975 Cr. Assuming

the system to operate over a period of 10 Years (2 cycle operation), the total Annual charges to be paid by AP Transco to the developer shall be of Rs.185 Cr. (that may be recovered in the form of Renewable Integration Charges (RIC) to meet the intermittency and smoothening of the solar generation and Ancillary service charges for peak load management (during day and night). It is accepted that increasing renewable energy penetration in the grid presents some problems.

Sri M. Venugopala Rao, Convener, Center for Power studies, Hyderabad has stated that the proposed the fixed cost of the proposed battery energy storage system of 500 MW capacity is estimated to be about Rs.975 Cr. Assuming the system to operate over a period of 10 Years (2 cycle operation), the total Annual charges to be paid by AP Transco to the developer shall be of Rs.185 Cr. It was repeatedly explained on earlier occasions the kind of problems caused by the increasing penetration of renewable energy into the grid, especially wind and solar energy. AP Transco, informing that Andhra Pradesh has an installed capacity of 4000 MW of Wind and 2516 MW of Solar as on July, 2018, and that with the increasing share of RE generation, the intra-day variations are only going to increase, admitted that renewable energy generation, especially from wind and solar projects, is variable in nature and therefore intermittency of RE is a problem during the daytime. Addressing this problem by maintaining a spinning reserve on the reason that some of the State utilities are doing the same, is an inefficient way as the asset would be idle for most of the time, as admitted by AP Transco. These deficits can be overcome by planning a thermal plant but it is an inefficient way and the plant will have lower utilization. Transco has informed that as a result of drop in generation by solar and wind power units, 9523 number of instances of over-drawl by the DISCOMs to the tune of 23 MUs of energy, have taken place, resulting in the latter paying Rs.103.5 Cr. as penalty charges for the period between April and October, 2018. AP Transco is silent about backing down of thermal power projects in order to purchase must-run wind and solar energy and how much were the fixed charges paid for such backing down. The issue needs to be examined from various angles as given below, among others, before the Commission takes a decision on the arrangement of the proposed BESS:

a) AP Transco has proposed to collect 70% of RIC charges from solar and wind power developers and the balance of 30% towards Annual support charges from all the consumers, including licensees and OA consumers. For the existing wind and solar power units with whom the Discoms had PPAs and consents to the same were given by the Commission, the developers had the protection of their units being treated must-run ones. In other words, there is no legally binding obligation on such units to allow their power for storage and pay the proposed RIC charges. In such a situation, how can AP Transco and SLDC compel them to pay RIC charges as proposed?

b) As far as the wind and solar power projects proposed to be selected through competitive bidding and already selected under generic tariffs but consents to PPAs are not yet given by the Commission, if a condition that such projects should bear the proposed RIC charges is imposed, they will simply factor such charges in the tariffs they would quote and it will create new problems. If they quote tariffs by factoring RIC charges for the entire quantum of generation of wind or solar power, the consumers would be saddled with additional and avoidable burdens of RIC charges for wind and solar power generated and supplied without using the battery storage system. Even if they quote tariffs by factoring RIC charges for the quantum of wind and solar power generated and supplied using the battery storage system, if quantified in advance, the consumers will have to shell out higher tariffs. In addition to the RIC charges, if the ancillary service charge of Rs.3.20 per kWh, as proposed by AP Transco, is added, then the total tariff will be prohibitive. If AP Transco, SLDC and the Discoms enter into agreements with developers of BESS to pay Annual charges as proposed, for the entire period of agreement, the consumers will be saddled with higher RIC and ancillary service charges, even if the same charges would come down drastically gradually, as has been the case with wind and solar power charges. Without any meaningful and prudent cost-benefit analysis, GoAP and its power utilities are hasty in proposing to introduce BESS in this manner and at this stage without any patience to wait for development and usage of a viable and economical BESS.

c) When the Discoms are constrained to back down thermal power in order to purchase must-run wind and solar power and paying fixed charges for such backing down, it is obvious that surplus power is available during such periods. Such surplus thermal power also can be stored as and when a viable and economical BESS is developed and put to use. Have AP Transco, SLDC and the Discoms made any comparative analysis of benefits or burdens of BESS for storing solar and wind power, on the one hand, and thermal power, on the other?

d) When the GoAP and its power utilities are aware that with increasing share of RE generation, the intra-day variations are only going to increase, resulting in intensifying the problems with wind and solar power and need for backing down thermal power and paying fixed charges therefor, what is the need and justification for going in for purchasing more and more wind and solar power during the 4th Control Period? Based on the proposed addition of solar and wind power capacities, have they made any cost-benefit analysis? If so, what are the results?

e) Did GoAP and its power utilities consider scope for procurement of power from other sources like power exchanges at relatively lower tariffs to overcome the gap between supply and demand being caused due to fluctuations in generation of solar and wind power?

Sri M. Thimma Reddy and Sri M. Venugopala Rao have further stated that there are also ways of addressing the issue without burdening the electricity consumers in the State through RIC. The advance weather forecasts that are available at present give advanced indication of generation profile of RE plants particularly wind and solar. Along with this AP has access to enough hydel capacity and gas based thermal capacity that can be put to use to address fluctuations in energy availability from wind and solar based RE plants. According to APTRANSCO's present filings A.P. has access at present to 1,780 MW hydel power and 792 MW gas based thermal power. While operation of hydel plants at Srisailam and Nagarjunasagar depends on interstate coordination, hydel plants at lower and upper Sileru with combined capacity of 700 MW are completely under the control of A.P. and the same may be suitably deployed to address intermittency of RE plants without putting additional burden of about Rs.185 Cr. annually through RIC on electricity consumers in the State. These options facilitate operations for ramping up and ramping down.

APTransco's Response: Battery Energy Storage Systems are proposed for the following applications:

a. Peak Load Management (during the day and night)

b. Meeting intermittencies due to variation in RE generation

c. Smoothening of curves (during ramp up and ramp down of solar generation)

Sileru project doesn't have provision of storage hence it can only be used for peak load management and intermittencies but may not be used for other applications. The existing gas-based plants have been identified to be used only for meeting base load power requirements however these are not operational due to unavailability of gas. AP Transco has recommended storage systems to be used not only for peak load management but also for other applications which may not be possible with gas-based plants.

Further, as per the existing IEGC, energy drawl variation upto a maximum of 250 MW is only allowed either side of the schedule. In view of the higher RE integration and need for instantaneous balance resource, storage battery system will only be helpful to maintain load generation balance effectively and to avoid penalties and load shedding. At present, the operating frequency range is 49.9 to 50.05 Hz and Indian Power System slowly moving towards 50 Hz for which Battery Storage system is useful for quick response.

Commission's view: In the absence of any concrete proposals, the Commission is not inclined to express itself on merits on this issue.

Review BESS capacity

53. Smt. Bindu Madhavi, Manager, Regulatory & Policy–IESA, Customized Energy Solutions, Pune has stated that deficit of 130 MW is observed during the 3-month period (1st August to 31st October, 2018). 375 MW of power for a period of 30 minutes would be able to tide over 75% of deficits in solar generation. Clarification required on the same.

APTransco's Response: The historic analysis of the solar generation has shown that owing to the intermittency in the solar generation there are instances of over drawls from UI pool and if the BESS is sized for 375 MW with 30 mins of storage, such intermittencies (75% of the instances) can be bridged or met from BESS.

Commission's view: Nothing further to add to the clarificatory response.

Adopt Tariff Based Competitive Bidding (TBCB) route

54. Ms. Namrata Mukherjee, Head-Policy Advocacy, M/s Sterlite Power Grid Ventures Limited, New Delhi, quoting the stipulations of the Tariff Policy, 2016, stated that the transmission system development at intra-state level by State Transmission utility be accomplished through Tariff Based Competitive Bidding (TBCB) route only in as it is being done at Central level and few States like UP, Jharkhand and MP. This will be not only in conformance to the tariff policy stipulations but has also successively proven itself as a better model for tariff modernization with ultimate benefit to the end consumers. Development of a portion of the planned investments through private investments under TBCB will free up capital for the State which can be deployed for other areas equally important for the Government thus assisting the State's fiscal position. The Commission is requested to look at developing all 400 kV and 220 kV schemes under tariff based competitive bidding route and to come up with a consultation paper for determination of the threshold limit above which transmission project would be necessarily developed only through the competitive route.

Commission's view: The Office of the Commission will undertake a study on the various aspects of the suggestion and to the extent found acceptable, appropriate action will be taken in due course.

CHAPTER-III
INVESTMENTS

55. In this chapter, the Commission has examined the investments proposed by the licensee in its ARR & FPT filings for 4th Control Period. The Commission, while examining the investment proposals for the 4th Control Period, has reckoned/considered all the views/objections/suggestions expressed by the stakeholders in writing and during public hearings, which have been elaborated in Chapter-II, to the extent they are relevant to the subject matter.

56. The licensee has stated that it has filed its investment plan for the 4th Control Period based on the resource plan already submitted to the Commission. Accordingly, the total investment proposed for the 4th Control Period is Rs.13,538.60 Cr. But the investment proposed for the 4th Control Period as per the resource plan is Rs.14,616.58 Cr.

57. The details of investments as per the Resource Plan and MYT filings for the 4th Control Period are as hereunder:

TABLE NO. 3.1
INVESTMENTS (RS. CR.) AS PER RESOURCE PLAN

Financial Year	Evacuation and System Improvement			Total
	132 kV	220 kV	400 kV	
(1)	(2)	(3)	(4)	(5)
2019-20	1587.16	1831.80	1465.19	4884.15
2020-21	1054.19	1663.48	744.97	3462.94
2021-22	588.02	1019.54	983.75	2591.31
2022-23	448.89	946.47	652.01	2047.37
2023-24	830.19	569.00	231.80	1630.81
Total	**4508.57**	**6030.29**	**4077.72**	**14616.58**

TABLE NO. 3.2
FILINGS: INVESTMENTS (Rs. Cr.)

Financial Year	Evacuation and System Improvement				Total
	132 kV & 220 kV	400 kV	R & M and Augmentation	LIS	
(1)	(2)	(3)	(4)	(5)	(6)
2019-20	732	599.23	71	70	1472.23
2020-21	1684	915.41	303.09	0	2902.50
2021-22	1890	921.63	274.67	0	3086.3
2022-23	1971.66	916.47	274.30	0	3162.43
2023-24	1891.46	732.00	291.68	0	2915.14
Total	**8169.12**	**4084.74**	**1214.74**	**70**	**13538.60**

58. The difference in investments between Resource Plan and MYT filings is stated to be due to the subsequent changes in schemes considering procurement of power from distributed solar generation projects and replacement of existing pump-sets with Solar BLDC pump sets, after filing of the resource plan.

59. The licensee, according to the investments filed, has proposed to commission the following number of Substations, voltage wise, during the 4th Control Period:

TABLE NO. 3.3
FILINGS: NO. OF SUBSTATIONS PROPOSED TO BE COMMISSIONED

Voltage Level	2019-20	2020-21	2021-22	2022-23	2023-24	Total Substations
132 kV	32	28	23	22	21	126
220 kV	14	09	07	06	06	42
400 kV	03	02	02	02	01	10
Total	**49**	**39**	**32**	**30**	**28**	**178**

60. Further, the licensee has proposed to add 5211 circuit km of EHT Transmission lines of all voltages.

Commission's decision on Investments

61. The Commission, while approving the investments for the 4th Control Period has examined the following points.

i. The licensee, APTRANSCO being the State Transmission Utility (STU) has to ensure development of an efficient, coordinated and economical system of intra-state transmission lines and sub-stations for smooth flow of electricity from a generating station to the load centers, as per the provisions of the Electricity Act, 2003.

ii. Investment schemes which have already been approved by the Commission presently are under various phases of implementation.

iii. Investments in telecom are required for real-time data transfer to the system operator, SLDC.

iv. The cost of investment of Lift Irrigation schemes, being contributory in nature, is borne by GoAP.

v. Evacuation of Power from Renewable Energy Sources, such as Wind sources in Kadapa, Kurnool & Anantapur Districts and Solar power sources from various locations in the State of AP.

vi. The assets not funded by APTRANSCO i.e. the assets funded by consumers and through grants.

vii. Augmentation and Renovation & Modernization requirements to maintain the present transmission system availability @ 99.98% during the 4th Control Period.

viii. System improvement and strengthening works required to meet the projected Maximum Demand growth and reliability levels as envisaged in the Indian Electricity Grid Code.

ix. System improvement and strengthening works required to meet the projected Maximum Demand growth in view of the new Capital city construction and also Vizag Chennai Industrial Corridor (VCIC), as proposed in the Andhra Pradesh Reorganisation Act, 2014.

x. The investments proposed in the miscellaneous works by the licensee which come under Renovation & Modernisation works.

xi. The investment proposals made in the filings and yet to be submitted by the licensee for the approval of the Commission.

xii. The investment proposals made in the filings and submitted by the licensee for the approval and yet to be approved by the Commission.

62. While approving the investments, the Commission has taken into consideration the following:

i. The investments for all voltage levels which are already approved by the Commission have been considered in toto.

Out of the total investment of Rs.4084.74 Cr. proposed in respect of 400 kV level, investments of Rs.3512.00 Cr. are already approved by the Commission.

Out of the total investment of Rs.8169.12 Cr. proposed in respect of 132 kV and 220 kV level together, investments of Rs.4378.18 Cr. are already approved by the Commission.

ii. The investments for all voltage levels which are submitted by the licensee and yet to be approved by the Commission have been considered in toto.

Out of the total investment of Rs.4084.74 Cr. proposed in respect of 400 kV level, investments of Rs.17.74 Cr. are yet to be approved by the Commission.

Out of the total investment of Rs.8169.12 Cr. proposed in respect of 132 kV and 220 kV level together, investments of Rs.243.20 Cr. are yet to be approved by the Commission.

iii. The investments under miscellaneous head which are general in nature i.e. towards formulation of schemes, carrying out survey works, incorporation of additional features in the existing sub-stations etc. are considered at 50% of the amounts proposed.

iv. The investments towards the Schemes which are under formulation and coming up in the last two years of the Control Period and are yet to be submitted by the licensee for approval are considered at 50% of the amounts proposed.

However, the licensee is not barred from coming up before the Commission with specific proposals in respect of the above stated schemes (for which only 50% is considered is now) which will be considered based on the need and merits and any impact on account of such consideration will be considered under true-up for the 4th Control Period.

v. The investments proposed under the augmentation and R&M head are considered at 75% of the amounts proposed keeping in view the system availability proposed to be maintained at 99.98% during each year of the Control Period.

   However, the licensee is not prevented to take any augmentation and R&M work which is essential to maintain the proposed system availability at 99.98%. The impact of all such works will be considered under true-up for the 4th Control Period.

vi. The Telcom works proposed in the filings of SLDC, which facilitate real-time data transfer to SLDC from various sub-stations, are obligated to be taken by the licensee and as such they are considered as investment by the licensee in the present consideration.

vii. The cost of investment of Lift Irrigation schemes being contributory in nature and borne by GoAP and hence the same is not considered as investments.

viii. As per the information obtained by the Commission subsequently, the Wind Power evacuation projects under Phase-II which are already approved had part of their investments as grants from MNRE, and hence the grants are deducted from the investments.

63. As detailed above, the Commission has approved the investment of Rs.**10,696.34** Cr. against the proposed investment of Rs.**13,538.60** Cr. by the licensee for the 4th Control Period. The details of investments approved by the Commission are given in the table below:

TABLE NO. 3.4
APPROVED: INVESTMENTS (Rs. Cr.)

Financial Year	Evacuation and System Improvement		Augmentation and R&M Works	Total
	440 kV	132 kV and 220 kV		
1	2	3	4	5
2019-20	568.35	831.95	62.25	1462.55
2020-21	809.41	1533.82	259.53	2602.76
2021-22	804.13	1758.78	227.80	2790.71
2022-23	738.47	1176.82	224.39	2139.68
2023-24	463.00	988.17	249.46	1700.63
Total	**3383.36**	**6289.54**	**1023.44**	**10696.34**

64. According to the investment approved, the Commission determined the network elements (substations) to be added during the 4th Control Period as hereunder:

TABLE NO.3.5
APPROVED: NO. OF SUB-STATIONS TO BE COMMISSIONED

Voltage Level	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total Substations
132 kV	32	27	21	12	18	110
220 kV	14	08	06	02	05	35
400 kV	03	02	02	02	01	10
Total	**49**	**37**	**29**	**16**	**24**	**155**

65. With reference to the investments proposed by the licensee for the 4th Control Period which are yet to be submitted to the Commission for approval, **the licensee is directed to strictly comply with clause no. 14(2) and 14 (3) of APERC Regulation No. 5 of 2005.**

66. Further, the Commission reiterates its direction in the Order for Transmission Tariffs for the 3rd Control Period with regard to timely completion of projects / schemes, which is extracted below:

"The Licensee shall take all possible measures to ensure that the projects / schemes taken up are completed as per schedule. In this regard, the

Commission clarifies that it will not allow any interest during construction for delays exceeding one month and three months in respect of completion of projects/schemes with the completion schedules of upto one year and more than one year, respectively, unless the Commission's approval for extension in the completion schedule is obtained in advance."

If the licensee is able to satisfy the Commission otherwise also that it has every justification and reason beyond its control for any such delay, the Commission may consider the request for any interest during construction appropriately.

67. Therefore, the licensee shall henceforth submit quarterly reports on the status of projects/schemes within 15 days after completion of each quarter, starting with July, 2019, without fail.

68. **Capital Investments:** Considering the importance of capitalization works, the Commission, in its previous order on transmission tariffs, laid down the following requirements to be fulfilled before accepting inclusion of the value of the capitalized work in the Original Cost of Fixed Assets (OCFA):

a) On completion of a capital work, a physical completion certificate (PCC) to the effect that the work in question has been fully executed, physically and the assets created are put in use, to be issued by the concerned engineer not below the rank of Superintendent Engineer.

b) The PCC shall be accompanied or followed by a financial completion certificate (FCC) to the effect that the assets created have been duly entered in the fixed assets register by transfer from the CWIP register to OCFA. The FCC shall have to be issued by the concerned finance officer not below the rank of Senior Accounts Officer.

c) The above mentioned certificates have to be submitted to the Commission within 60 days of completion of work, at the latest.

The requirements shall continue to be in force in the 4th Control Period also and the licensee is directed to strictly comply with the said requirements.

69. The Commission may also inspect or arrange to inspect, at random, a few of the capitalized works included in the OCFA to confirm that the assets created are actually being used and are useful for the business.

70. All works of the licensee shall have to be executed in strict compliance with the Andhra Pradesh Works of Licensees Rules, 2007, G.O.Ms.No.6 Energy, Infrastructure and Investment (Power.III) department dated 6.03.2017 notifying the District Collector as the authorized officer, G.O.Rt. No. 83, Energy, Infrastructure and Investment (Pr.II A.2) department dated 20.06.2017 incorporating the guidelines for determining the compensation towards damages as stipulated in Sections 67 and 68 of the Electricity Act, 2003 read with Sections 10 and 16 of the Indian Telegraph Act, 1885 and payment thereof and all other Orders and Instructions issued by the Government of Andhra Pradesh thereunder from time to time and any deviation will be viewed seriously and will invite action under Sections 142 and 146 of the Electricity Act, 2003 against the concerned.

CHAPTER-IV
TRANSMISSION LOSS TRAJECTORY

71. In this chapter, the Commission has examined the Transmission Loss trajectory proposed by the licensee in its ARR & FPT filings for 4th Control Period. The Commission, while examining the loss trajectory for the 4th Control Period, has reckoned / considered all the views / objections / suggestions expressed by the stakeholders in writing and during public hearings, which have been elaborated in **Chapter-II**, to the extent they are relevant to the subject matter.

Loss reduction trajectory and Transmission System availability

72. The licensee has filed the transmission loss reduction trajectory and also the transmission system availability for each year of the Control Period as per Regulation No.5 of 2005.

- The licensee proposes to reduce the average loss from 3.12 percent in FY2019-20 to 3.00 percent by FY2023-24, i.e. the end year of the 4th Control Period.
- The average loss reduction target as proposed above is subject to ± 0.3 variation, as the loss band.
- The licensee has projected the system availability to be at 99.98 percent during all the years of the Control Period.

73. The loss band is stated to be subject to the investment levels proposed by the licensee. There may be variations in loss reduction path consequent to change in investments. The summary of transmission loss trajectory and system availability are given below.

TABLE NO.4.1
FILINGS: TRANSMISSION LOSS TRAJECTORY AND SYSTEM AVAILABILITY

Financial Year	**Average Transmission Loss**	**Transmission Loss Upper Limit**	**Transmission Loss Lower Limit**	**Target System Availability**
(1)	(2)	(3)	(4)	(5)
2019-20	3.12%	3.42%	2.82%	99.98%
2020-21	3.10%	3.40%	2.80%	99.98%
2021-22	3.08%	3.38%	2.78%	99.98%
2022-23	3.05%	3.35%	2.75%	99.98%
2023-24	3.00%	3.30%	2.70%	99.98%

Commission's decision on Licensee's proposal

74. The Commission has examined the actual percentage of loss achieved and loss trajectory approved for 3rd Control Period upto FY2017-18. For the FY2017-18, the transmission loss achieved by the licensee is 3.13% against the approved loss of 3.98% and the losses are in decreasing trend. The Commission also examined the targeted percentage of loss projected by the licensee for every year of 4th Control Period. The Commission notes that the loss trajectory proposed for FY2019-20 to FY2023-24 is lower than the loss trajectory already approved for FY2018-19 in the 3rd Control Period and achieved by the licensee in FY2017-18 (3.13%). The successive reduction of percentage loss may be due to the substantial investments already made towards expansion of network, Augmentation and Renovation & Modernization of network. **The Commission appreciates the licensee's performance during the 3rd Control Period in attaining significant lower losses than the targets set. The Commission also appreciates the licensee's proposal to maintain the system availability at 99.98 percent during all the years of the 4th Control Period.**

Financial Year	**Target Transmission Loss (%)**	**Actual Transmission Loss (%)**
2014-15	4.02	3.37
2015-16	4.02	3.37
2016-17	4.01	2.92
2017-18	3.98	3.13
2018-19	3.95	3.11 (upto January, 2019)

75. Keeping in view the licensee's best track record in reduction of the losses and the investments approved for the 4th Control Period, the Commission approves the percentage of loss trajectory (with ± 0.2 variation, as the loss band) and the system availability for FY2019-20 to FY2023-24 as below.

TABLE NO. 4.2
APPROVED: TRANSMISSION LOSS TRAJECTORY AND SYSTEM AVAILABILITY

Financial Year	**Average Transmission Loss**	**Transmission Loss Upper Limit**	**Transmission Loss Lower Limit**	**Target System Availability**
(1)	(2)	(3)	(4)	(5)
2019-20	3.10%	3.30%	2.90%	99.98%
2020-21	3.08%	3.28%	2.88%	99.98%
2021-22	3.06%	3.26%	2.86%	99.98%
2022-23	3.03%	3.23%	2.83%	99.98%
2023-24	3.00%	3.20%	2.80%	99.98%

76. Hopefully the licensee will achieve a better performance than approved by the Commission during the 4th Control Period also.

77. The licensee shall put the losses to user account provisionally at the average transmission loss approved by the Commission in this order. Upon availability of the actual transmission losses, the licensee may settle the final energy account for users of the transmission system as per the methodology approved by the Commission. **Further, the Commission directs that the details of the energy accounts (weekly/monthly settlements) of all the transmission system users, the month-wise transmission system availability as certified by SLDC shall be placed**

invariably in it's website along with the transmission loss for a month, by the end of the succeeding month, henceforth.

78. Further, clause 18.1 of Regulation No. 5 of 2005 provides an incentive / penalty as may be determined by the Commission to be applicable for Transmission Losses. The Transmission Losses below the approved lower limit shall earn an incentive and such incentive shall be added to the ARR relating to subsequent Control Period. Similarly, increase in the actual Transmission Losses beyond the approved upper limit shall attract a penalty and such penalty shall be deducted from the ARR relating to subsequent Control Period.

79. Clause 18.2 of the said Regulation provides that the Commission may, also, from time to time, specify any other performance parameters, including availability of transmission system, quality targets etc. for which penalty or incentive may be required to be included in the application for ARR:

    Provided that in the event of significant seasonal variations in losses, the licensee may submit to the Commission, the transmission loss levels for corresponding time periods during a year, for approval:

    Provided further that, the total amount of penalty levied, if any, by the Commission under the above provisions shall not exceed 10% of the Return on Equity.

80. Keeping in view the above, the Commission approves the following for consideration of incentive / penalty to the licensee.

    i. For reduction over and above 0.1 on the lower limit of transmission loss percentage, an incentive of one (1) paisa per unit on the total energy handled by the transmission system during that particular year.

    ii. Since the average loss reduction target approved by the Commission is with ±0.2 variation as the loss band, against ± 0.3 variation proposed by the licensee, no penalty is proposed to be imposed.

    iii. In so far as the incentive / penalty prescribed with reference to variations in transmission loss below and above the approved loss levels for the respective years in the Order on Transmission Tariffs for the period

FY2014-15 to FY2018-19 dated 9.05.2014 at page 34 is concerned, the contingency of liability to pay any penalties did not arise as the transmission losses were never higher than the approved levels and the licensee had not chosen to collect any incentive as permitted. Hence, collection of any incentive for that period does not arise hereafter.

CHAPTER - V
AGGREGATE REVENUE REQUIREMENT

81. In this chapter, the Commission has examined the Aggregate Revenue Requirement filed by the licensee in its ARR & FPT filings for 4th Control Period. The Commission, while computing the Aggregate Revenue Requirement for the 4th Control Period, has reckoned /considered all the views /objections / suggestions expressed by the stakeholders in writing and during public hearings, which have been elaborated in **Chapter-II**, to the extent they are relevant to the subject matter.

82. The Aggregate Revenue Requirement (ARR) amount for a year refers to the amount that is required by the licensee to meet the sum of the estimated costs and the allowed Return on Capital Employed (RoCE) as per Regulation No. 5 of 2005, for transmission activity. The RoCE depends on the investment required to meet the forecasted transmission capacity for each year of the Control Period.

83. The licensee estimated the gross ARR at Rs.16,156.05 Cr. After deducting (i) Rs.893.77 Cr. towards the expenses capitalized, (ii) Rs.809 Cr. towards the anticipated other tariff income in the form of Inter-State Transmission System (ISTS) tariff from PGCIL and (iii) Non-Tariff Income (NTI) of Rs.557.70 Cr., the licensee placed the net ARR at Rs.13,895.58 Cr. for the entire 4th Control Period as given below:

TABLE NO. 5.1
FILINGS: NET AGGREGATE REVENUE REQUIREMENT (ARR) (Rs. Cr.)

Financial Year	Gross Revenue Requirement	Less			Net Aggregate Revenue Requirement
		Expenses Capitalized	Non-Tariff Income	Tariff from others (ISTS)	
1	**2**	**3**	**4**	**5**	**6(2-3-4-5)**
2019-20	2166.57	127.32	100.89	265	1673.36
2020-21	2509.45	164.23	105.72	141	2098.50
2021-22	3060.43	183.25	110.93	138	2628.25
2022-23	3805.51	202.22	116.55	134	3352.74
2023-24	4614.10	216.75	123.61	131	4142.74
Total	**16156.05**	**893.77**	**557.70**	**809**	**13895.98**

84. The Revenue Requirement consists of A) Asset Base & Depreciation, B) RoCE which in turn depends on Regulated Rate Base, Debt/Equity ratio, Cost of debt & equity and working capital, C) Operation and Maintenance cost and D) Taxes on Income.

A. Asset Base & Depreciation

85. The licensee projected the year-wise asset base for the 4th Control Period based on the proposed investment plan. The depreciation amount was computed based on item-wise asset base created, using rates notified by the Ministry of Power, Government of India. Applying these rates on forecasted assets, the depreciation amount is computed at Rs.4509.22 Cr. for the entire Control Period giving the details for each year. The year-wise asset base and depreciation amounts as filed by the licensee for the Control Period are given below.

TABLE NO. 5.2
FILINGS: ASSET BASE AND DEPRECIATION FOR THE 4TH CONTROL PERIOD

Financial Year	Asset base (Rs. Cr.)	Depreciation (Rs. Cr.)
2019-20	13088.23	599.45
2020-21	15635.43	674.02
2021-22	19355.13	828.70
2022-23	24235.72	1056.10
2023-24	28450.09	1350.95
Total		**4509.22**

Commission's decision on Asset Base and Depreciation

86. The Commission has examined the asset base and depreciation amounts filed by the Licensee and carefully considered the issue with regard to the depreciation allowance to be applied in determining the licensee's ARR. As per para 15.2 of Regulation No. 5 of 2005, the depreciation allowance for each year of the Control Period shall be determined generally based on the methodology, rates and other terms as decided by CERC from time to time.

87. Accordingly, the Commission adopts the depreciation rates approved by the CERC for determination of transmission tariff for the 4th Control Period.

88. The Commission computed the year-wise asset base and depreciation amounts based on the investments and capitalization schedule as approved in Chapter-III, for each year of the Control Period. The Commission worked out the asset base for the purpose of computing depreciation at the beginning of each year of the Control Period. The assets not funded by APTRANSCO such as assets funded through grants and those funded by consumers have been removed from the asset base prior to computing the depreciation as APERC Regulation No.5 of 2005.

89. The depreciation amount thus arrived by the Commission is Rs.3885.38 Cr. against Rs.4509.22 Cr. filed by the licensee for the 4th Control Period. The details of the asset base and depreciation, filed and approved, are given in below Table.

TABLE NO. 5.3
APPROVED: ASSET BASE AND DEPRECIATION

Financial Year	Asset Base at the beginning of the Year (Rs. Cr.)		Depreciation (Rs. Cr.)	
	Filed	Approved	Filed	Approved
(1)	(2)	(3)	(4)	(5)
2019-20	13088.23	12723.44	599.45	558.31
2020-21	15635.43	14808.75	674.02	623.37
2021-22	19355.13	17780.09	828.70	733.15
2022-23	24235.72	21415.40	1056.10	889.58
2023-24	28450.09	24138.17	1350.95	1080.97
Total			**4509.22**	**3885.38**

90. The licensee has requested the Commission to consider the Depreciation from the date of commercial operation of the asset as per the Companies Act, 2013 instead of the provisions of the APERC Regulation No. 5 of 2005 which stipulates to consider it from 1st April of the following year from the date the asset is put to use, quoting the following observation of the Accountant General, Audit, Andhra Pradesh.

91. "As per its accounting policy, the company provided depreciation on Property, Plant and Equipment available at the beginning of the year i.e. depreciation is not charged in respect of the assets commissioned during the year. This is contrary to the provision of the Companies Act, 2013 which stipulates that depreciation shall be provided on pro-rata basis from the date of utilization of the assets. Non-provision of depreciation on the assets commissioned during the year resulted understatement of depreciation and overstatement of profit for the year by Rs.37.90 Cr.".

92. However, the licensee has not furnished any information about the reply given by it to the AG, AP and any final orders of AG on the same, to necessitate any deviation from Regulation No. 5 of 2005. The Commission has computed depreciation as per its Regulation No. 5 of 2005, in this order, as it is bound to do so in compliance with the statutory regulation so long as it is in force and no administrative proceedings of any administrative authority / officer can override a statutory regulation.

B) Operation and Maintenance Costs

93. The operation and maintenance (O&M) costs consist of a) Employee Cost, b) Repairs and Maintenance (R&M) Cost and c) Administration and General (A&G) Expenses. The licensee estimated the O&M costs for each year of the Control Period as per the procedure stated below.

a) The average of Actual O&M Costs for FY2015-16, FY2016-17 and FY2017-18, (Rs.542.53 Cr.) was considered as the base for the projections.

b) The O&M Costs thus arrived was allocated to the length of lines (in circuit kM) and the No. of substations in the ratio of 30:70 respectively as prescribed in the Regulation No. 5 of 2005.

c) The actual length of lines in Circuit kM and total no. of bays in all the sub-stations for the year preceding the base year was taken as the basis and for computation. Accordingly, O&M cost is estimated as Rs.66,992/- per Circuit-km for lines and Rs.9,10,940/- per bay for sub-stations as a norm for estimating the O&M expenses for base year and also for each year of the Control Period.

d) For estimating the O&M expenses for FY2018-19 (base year) and for the 4th Control Period, an inflation factor (INDX) of 5.16% was adopted based on the 5 years average Wholesale and Retail Price Indices. Accordingly, O&M cost of Rs.70,449/- for Circuit-km of line and O&M cost per bay of sub-stations of Rs.9,57,945/-was estimated for base year (FY2018-19). The O&M expenses for each year of the Control Period are computed based on the proposed length of line in Circuit-km and no. of bays in substations.

As stated above, the licensee has estimated the gross O&M cost at Rs.4634.57 Cr.

94. The estimated O&M expenses are allocated towards Employee Expenses, A&G Expenses and Repairs & Maintenance Expenses based on the actual audited accounts of the preceding year of the base year. Accordingly, 19.41% of Employee Expenses, 20.74% of A&G Expenses, 0.22% of Repairs & Maintenance Expenses and Head Quarters Expenses @ 1.5% of Investment during the year as per T.O.O. for each year of the Control Period are capitalized in the computation of Original Cost of Fixed Assets (OCFA).

95. The net O&M expenses are estimated at Rs.3740.80 Cr. after deducting capitalized expenses of Rs.893.77 Cr. from the Gross O&M expenses for the entire Control Period as given in the Table below:

TABLE NO. 5.4
FILINGS: O&M EXPENSES (Rs. Cr.)

S. No.	Year	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
1	Gross O&M Cost	706.15	809.87	918.95	1038.59	1161.01	4634.57
2	O &M expenses capitalized	127.32	164.23	183.25	202.22	216.75	893.77
3	Net O &M expenses (1) – (2)	578.83	645.64	735.70	836.37	944.26	3740.80

96. Further, the licensee has stated that the O&M cost estimations in the filings have not factored the wage revision which is due w.e.f. 1st April 2022 and its financial commitment of wage revision based on actuals will be filed in the true-up/ true-down for the 4th Control Period.

Commission's Decision

97. The Commission, after examination of the O&M expenses filed by the licensee, has computed the O&M expenses as per the procedure prescribed in the Regulation No. 5 of 2005 which reads as below:

"The licensee in its filings for the Control Period shall submit the consolidated O&M expenses for the base year of the Control Period and for the two years preceding the base year. The O&M expenses for the base year shall be determined based on latest audited accounts, best estimates of licensee of the actual O&M expenses for relevant years and other factors considered relevant. The O&M expenses for the base year, if required, will be used for projecting the expenses for each year of the Control Period. The Commission will determine the admissible quantum of O&M expenses for each year of the Control Period on the basis of the following formula.

$O\&ML_o = 0.3 * O\&M_o / LL_o$

$O\&MS_o = 0.7 * O\&M_o / SS_o$

$O\&M_o$ is Total O&M expenditure

$O\&ML_o$ is O&M cost per circuit-km

$O\&MS_o$ is O&M cost for each sub-station bay

Accordingly,

a) The actual Gross O&M Expenditure as per the audited accounts Rs. 602.09 Cr. for FY2017-18 has been allocated in the ratio of 30:70 between Length of lines (Circuit-Km) and number of sub-stations existing by the end of FY2017-18.
b) 24295 Circuit-kM length of Transmission lines and 4169 bays available in Sub-stations by the end of FY2017-18 as provided by the licensee are considered.
c) O&M Norms are computed as Rs.74,347 per Circuit-km for lines and Rs. 10,10,945 per bay for substations, for FY2017-18.
d) O&M Norms for the base year and for each year of the 4^{th} Control Period are computed by considering INDX inflation factor as 3.32% which was considered by the CERC for escalation of O&M expenditure

w.r.t. transmission system in its Terms & Conditions of Tariff Regulations, 2014. The details are given below.

TABLE NO. 5.5
APPROVED: O&M NORMS (Rs. Cr.)

Projections	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
SS Norm (Rs./bay)	1,079,186	1,115,015	1,152,034	1,190,281	1,229,798
LL Norm (Rs./Circuit km)	26,728	27,668	28,906	30,027	30,893

98. Considering the above norms, the O&M expenditure for each year is computed taking into account the length of lines and number of bays in sub-stations corresponding to the investments approved by the Commission.

99. As stated above, Commission has computed the gross O&M cost at Rs.4,446.96 Cr. against the gross O&M cost of Rs.4,634.56 Cr. filed by the licensee.

100. The net O&M expenses are estimated at Rs.3,784.22 Cr. after deducting capitalized expenses of Rs.662.73 Cr. from the Gross O&M expenses for the entire Control Period as given in the Table below:

TABLE NO. 5.6
APPROVED: O&M EXPENSES (Rs. Cr.)

S. No.	Year	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
1	Gross O&M Cost	695.39	789.29	885.09	987.84	1,089.35	4,446.96
2	O &M expenses capitalized	103.63	117.63	131.90	147.22	162.35	662.73
3	**Net O &M Expenses (1)-(2)**	**591.75**	**671.66**	**753.18**	**840.62**	**927.00**	**3,784.22**

C. Return on Capital Employed (RoCE)

101. The licensee is entitled to claim the Return on Capital Employed (ROCE) as per the Regulation No. 5 of 2005. The amount claimed is expected to meet the Cost of Debt and Equity capital which are used for financing the assets in the transmission business. The three steps required to determine Return on Capital Employed are as follows:

a) Determination of Regulatory Rate Base (RRB).

b) Determination of i) Debt-Equity ratio, ii) Cost of debt and Return on Equity (iii) Working Capital (iv) Weighted Average Cost of Capital (WACC).

c) Weighted Average Cost of Capital (WACC) is applied to RRB to arrive the RoCE for each year of the Control Period.

(i) Debt and Equity Ratio

Filings:

As per the clause 13.1 of the Regulation No. 5 of 2005, the Debt/Equity (D/E) ratio shall be determined at the beginning of the Control Period after considering the Transmission licensee's proposals, previous D/E mix, market condition and other relevant factors.

Commission's Decision:

After examining the licensee's proposal and previous year D/E mix, the Commission approves the debt-equity mix of 75:25 percent throughout the Control Period, as filed by the licensee. This approved debt equity ratio is used in computing the return on capital during the 4th Control Period.

(ii) Cost of Debt and Return on Equity

Filings:

The Licensee has filed the Cost of Debt and Return on Equity (RoE) in percentage for each year of the Control Period which are used to compute the Return on Capital Employed (RoCE). The Licensee has filed the cost of debt at 10.5% p.a. and RoE at 14% p.a.

The Licensee has also requested the Commission to consider the RoE as per clause 13.1 of APERC Regulation No. 5 of 2005 which states that RoE shall be determined at the beginning of the Control Period after considering the CERC norms. RoE is 15.5% p.a. as per the CERC Terms and Conditions of Tariff Regulation, 2014.

Commission's Decision:

As per clause 13.1 of Regulation No. 5 of 2005, the Cost of Debt shall be determined at the beginning of the Control Period after considering the Licensee's proposals, present cost of debt, market conditions, other relevant factors. Return on Equity shall be determined at the beginning of the Control Period after considering CERC norms, the Licensee's proposals, previous years D/E mix, risks associated with distribution & supply business, market conditions and other relevant factors.

After examining the licensee's proposal and other aspects mentioned in the Regulation, Commission has approved the Cost of Debt at 10.3% based on weighted average rate of interest calculated on the basis of the actual loan portfolio furnished in the filings and Return on Equity at 14% for each year of the 4th Control Period.

(iii) Working Capital

Filings:

The licensee has computed the working capital requirement by taking 45 days of O&M cost estimated for each year as per Regulation No. 5 of 2005 and also cost towards O&M stores at Rs. 25 Cr. for each year during the 4th Control Period.

Commission's Decision:

As per the APERC Regulation No. 5 of 2005, working capital requirement for each year of the Control Period shall be considered equivalent of 45 days O & M expenses as allowed for the year and the carrying cost of maintaining an appropriate inventory level of O&M stores.

Accordingly, Commission has approved the working capital equivalent of 45 days O & M expenses as approved in this order and also considered the carrying cost of maintaining an appropriate inventory level of O&M stores as filed by the licensee for each year of the Control Period. The details are given in the table below.

TABLE NO. 5.7
WORKING CAPITAL FILED AND APPROVED

Financial Year	Working Capital (Rs. Cr.)	
	Filed	**Approved**
2019-20	100.11	98.97
2020-21	111.15	108.96
2021-22	122.75	119.15
2022-23	135.48	130.08
2023-24	148.50	140.88
Total	**617.98**	**598.03**

(iv) Weighted Average Cost of Capital (WACC)

Filings:

The licensee has computed the Return on Capital (WACC) of 11.38% p.a. using the proposed Debt-Equity ratio of 75:25, Cost of Debt at 10.5% p.a. and Return on Equity at 14% p.a. as per the following formula provided in Regulation No. 5 of 2005.

$$WACC= (D/E)*r_d/(1+D/E)+(r_e/(1+D/E))$$

Commission's Decision:

Commission has computed the WACC as 11.23% p.a. based on the same formula as mentioned above taking Debt-Equity ratio of 75:25, Cost of Debt 10.3% p.a. and Return on Equity at 14% p.a.

(v) Regulated Rate Base (RRB)

Filings:

The licensee has computed the RRB as per the procedure prescribed in the Regulation 5 of 2005 as per the proposed investments, depreciation, Working Capital and Consumer Contributions for the 4th Control Period.

Commission's Decision:

Commission has computed the RRB as per the procedure prescribed in the Regulation 5 of 2005 with the approved investments, depreciation, Working Capital and Consumer Contributions as proposed by the licensee for the 4th Control Period.

With the above modifications in RRB calculations, the Commission computed the RoCE at Rs. 5892.57 Cr. for the Control Period. The Detailed calculations of RRB and RoCE are provided in the Annexure: C. The RRB and RoCE computed by the licensee and computed by the Commission are given in the following table.

TABLE NO. 5.8
REGULATED RATE BASE AND RETURN ON CAPITAL EMPLOYED (Rs. Cr.)

Financial Year	**Regulated Rate Base (RRB)**		**Return on Capital Employed (RoCE)**	
	Filed	**Approved**	**Filed**	**Approved**
(1)	(2)	(3)	(4)	(5)
2019-20	7004.14	6784.75	796.72	761.59
2020-21	8343.13	7843.48	949.03	880.43
2021-22	10679.70	9646.61	1214.82	1082.83
2022-23	13917.93	12017.26	1583.16	1348.94
2023-24	17101.42	14048.34	1945.29	1576.93
Total			6489.02	5650.71

D. Taxes on Income and other Costs:

102. The licensee, in its filing has estimated the taxes on income based on MAT (Minimum Applicable Tax) @ 20.765% on the estimated equity. Commission has examined the proposals of Licensee for payment income tax and computed the Income Tax to be payable for the Control Period on approved equity. The details of taxes estimated by the licensee and approved by the Commission year wise are given in the table below.

TABLE NO. 5.9
DETAILS OF INCOME TAX FILED AND APPROVED (Rs. Cr.)

Year	**Filed**	**Approved**
2019-20	64.24	62.23
2020-21	76.53	71.94
2021-22	97.96	88.48
2022-23	127.66	110.23
2023-24	156.86	128.86
Total	**523.24**	**461.74**

E. Non-Tariff Income

103. The licensee has stated that major contributor to the non-tariff income is supervision charges that are being collected from the Govt. and this income from Govt. LI schemes is temporary in nature. The other components of non-tariff income are delayed payment charges from consumers, rebate earned from timely payments to suppliers and income from investments etc. The total non-tariff income filed by the licensee is Rs.557.70 Cr.

104. Further, the licensee requested the Commission to consider the Tax on Non-tariff Income as expense by suitably amending the Regulation No.5 of 2005, quoting the correspondence made with the Commission to be made applicable from the 4th Control Period.

Commission's Decision

105. Based on the actual non-tariff income earned by the licensee in the previous financial years, the Commission has finalized non-tariff income at Rs.350Cr. for the 4th Control period considering Rs.70 Cr. for each year of the Control Period uniformly. The year-wise non-tariff income filed by the licensee and approved by the Commission are given in the table below.

TABLE NO. 5.10
NON-TARIFF INCOME FILED AND APPROVED (Rs. Cr.)

FY→	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Filed	100.89	105.72	110.93	116.55	123.61	557.70
Approved	70.00	70.00	70.00	70.00	70.00	350.00

106. With reference to the request of the licensee to consider tax on non-tariff income as expense, there is no scope for treating the tax on non-tariff Income as an expense, in view of the specific provisions of the existing Regulation, with any amendment being only prospective.

Income from Inter-state & Intra-state lines

107. The licensee has estimated the income of Rs.689 Cr. towards transmission charges from 42 Nos. inter-state transmission lines for 4th Control Period based on the orders issued by CERC for the FY2016-17.

108. The licensee also estimated an income of Rs.120 Cr. for FY2019-20 towards transmission charges from intra-state transmission lines carrying inter-state power orders issued by Commission for the FY2017-18 and FY2018-19. These intra-state transmission lines carrying inter-state power will be approved by SRPC based on the actual power flow in the intra-state lines of the previous years and this number varies year on year and depending upon various other factors. Therefore, due to uncertainty, income on this account for the remaining years of the Control Period is not estimated and considered.

109. Commission, having examined the income estimated from the Inter-state and intra-state transmission lines and other facts stated by the licensee in this regard, has accepted the estimated income from Inter-state and intra-state transmission lines filed by the Licensee. The year-wise income from Inter-state and intra-state transmission lines filed by the licensee and approved by the Commission as given in the below table.

TABLE NO. 5.11
INCOME FROM ISTS AND INTRA-STATE TRANSMISSION LINES (Rs. Cr) FILED AND APPROVED

Financial Year	Filed		Approved	
	Inter-State	Intra-State	Inter-State	Intra-State
2019-20	145	120	145	120
2020-21	141	-	141	-
2021-22	138	-	138	-
2022-23	134	-	134	-
2023-24	131	-	131	-
Total	**689**	**120**	**689**	**120**

Net Aggregate Revenue Requirement

110. The gross ARR requirement is the total of Depreciation Cost, Return on Capital Employed, O&M Cost and Taxes on Income & Other Costs less expenses capitalized. The net ARR requirement is the difference between the Gross ARR and the Non-tariff Income & Other Income.

111. Accordingly, the net ARR is computed at Rs.12,623.06 Cr. against Rs.13,895.58 Cr. filed by the licensee for the 4th Control Period. The details are given below.

TABLE NO. 5.12
NET AGGREGATE REVENUE REQUIREMENT FILED AND APPROVED (Rs. Cr.)

Financial Year	Net ARR	
	Filed	Approved
(1)	(2)	(3)
2019-20	1673.36	1638.88
2020-21	2098.50	2036.40
2021-22	2628.25	2449.65
2022-23	3352.74	2985.37
2023-24	4142.74	3512.75
Total	**13895.58**	**12623.06**

True-up/ True-down for 3rd Control Period

112. The licensee has stated that the true-up for the 3rd Control Period will be filed after completion of the Control Period as it is in the process of reconciliation of actual revenue, cost details.

113. In this regard, the clause 10.7 of Regulation No. 5 of 2005 reads as follows:

"For the purpose of sharing gains & losses with the users, only aggregate gains or losses for the Control Period as a whole will be considered. The Commission will review the gains and losses for each item of ARR and make appropriate adjustments where ever required".

114. Therefore, the Commission grants liberty to the licensee to file true-up / true-down for the 3rd Control Period through an appropriate application/petition after completion of the Control Period within a reasonable time. Such petition or application if filed, will be examined independently in accordance with the law and as per the prescribed procedure.

115. Section 41 of the Electricity Act, 2003 enables the Transmission Licensee to take up other business for optimum utilization of its assets. Since the Licensee is having a large developed network of power and telecom, the Commission hereby directs to furnish the details of other businesses conceived to be taken up by it. If no steps are taken so far, the licensee may submit the possibility of taking up other business and constraints if any, within three months from the date of issue of this Order.

CHAPTER - VI
TRANSMISSION TARIFF DETERMINATION

116. The Transmission Tariff Schedule consist of a) Transmission Charge in Rs./kW/Month and b) Transmission Loss percent.

a) To recover the estimated net ARR, the licensee proposed to levy the monthly Transmission Charge/Rate on Peak demand incident on the transmission system for each year of the Control Period as per the resource plan filed. The licensee computed the Transmission Charge by dividing the net ARR with the proposed total peak demand for each year of the Control Period as per the proposed amendment to Regulation No. 5 of 2005.

b) Since the energy drawn by the users from the transmission system is always less than energy injected into system to the extent of transmission losses, the licensee is accountable for energy to the users to the extent of input energy less transmission losses. The licensee estimated the transmission loss percentage and filed the same for each year of the Control Period.

TABLE NO. 6.1
FILINGS: TRANSMISSION TARIFF AND TRANSMISSION LOSS PERCENTAGE

Financial Year	Net ARR (Rs. Cr.)	Peak Demand (MW)	Transmission Tariff	
			Transmission Charge (Rs./kW/Month)	Average Transmission Loss (%)
(1)	(2)	(3)	(4)=(2/3)	(5)
2019-20	1673.36	11450	121.79	3.12
2020-21	2098.50	12219	143.12	3.10
2021-22	2628.25	13209	165.81	3.08
2022-23	3352.74	14315	195.18	3.05
2023-24	4142.74	15539	222.17	3.00

Commission's Decision

117. The Commission has issued 1st amendment to the APERC (Terms & conditions for determination of Transmission Tariff) Regulation, 2005 on 13.02.2019. according to which

"The transmission tariff payable by the users of the Transmission system shall be determined in accordance with the following formula:

TR = Net ARR/(12*TTC)

Where,

TR: Transmission Rate in Rs./kW/month

Net ARR: Net ARR, as determined by the Commission as per the Regulation.

TTC: Total Transmission Capacity in kW of the Transmission system

Total Transmission Capacity (TTC) means Transmission system peak demand including open access demand approved by the commission in the multi-year tariff (MYT) order.

118. In this regard the Commission has examined the peak demands filed by the licensee as per the resource plan already submitted for the 4th Control Period and approved the same for determination of Transmission Tariff in this order. The peak demands filed and Approved is given in the table below.

Parameter	**FY 2019-20**	**FY 2020-21**	**FY 2021-22**	**FY 2022-23**	**FY 2023-24**
Peak Demand (MW)	11450	12219	13209	14315	15539

119. Accordingly, the Commission has computed Transmission Charge in Rs./kW/Month year-wise for the 4thControl period. The Transmission charge computed and Average loss percentage as approved in chapter-III are given in the table below.

TABLE NO.6.2
TRANSMISSION TARIFF SCHEDULE

Financial Year	**Net ARR (Rs. Cr.)**	**Peak Demand (MW)**	**Transmission Charge/Rate (Rs./kW/Month)**	**Average Transmission Loss (%)**
(1)	(2)	(3)	(4)=(3/2)	(5)
2019-20	1638.88	11450	119.28	3.10
2020-21	2036.40	12219	138.88	3.08
2021-22	2449.65	13209	154.54	3.06
2022-23	2985.37	14315	173.79	3.03
2023-24	3512.75	15539	188.38	3.00

The details of the transmission tariff computations by the Commission are shown at Annexure: E

Notes on Transmission Tariff and Losses:

i) The users of the transmission system shall pay transmission charge and bear the transmission loss in kind.

ii) The Discoms shall pay the Transmission charges based on the peak Demands excluding open access demand/ capacity approved by the Commission in this order.

iii) The Open access users shall pay the Transmission charges based on the Contracted Capacities approved by the Commission in this order.

iv) The Transmission losses shall be borne by all the transmission users based on contracted capacity in kW, at the entry point.

v) The other conditions applicable for levy and collection of these charges shall be as per the provisions of the Andhra Pradesh Electricity Regulatory Commission (Terms and conditions of Open Access to Intra-State Transmission and Distribution networks), Regulation, 2005 (Regulation No.2 of 2005) and the Balancing and settlement code, as amended from time to time.

Commission's intervention in case of variations in Cost and Revenues

120. The licensee shall recover the approved revenue requirement without incurring any financial loss at the tariff determined by the Commission on annual and cumulative basis for the Control Period.

TABLE NO. 6.3
APPROVED: ANNUAL AND CUMULATIVE COST (Rs. Cr.)

S. No.	Net ARR Approved	FY				
		2019-20	2020-21	2021-22	2022-23	2023-24
1	Year wise	1,638.88	2,036.40	2,449.65	2,985.37	3,512.75
2	Cumulative	1,638.88	3,675.28	6,124.93	9,110.30	12,623.06

121. If the cumulative actual cost is less than 90 percent of cumulative approved cost at the beginning of the financial year starting from 2020-21, the Commission may require the APTRANSCO to explain the reasons for cost variations. If necessary, the Commission may also require APTRANSCO to file fresh proposals for ARR & FPT for the rest of the Control Period.

122. If the cumulative actual revenue is more than 10 percent of cumulative approved revenue at the beginning of the financial year starting from 2020-21, the Commission may require the APTRANSCO to explain the reasons for revenue variations. If necessary, the Commission may also require APTRANSCO to file fresh proposals for ARR & FPT for the rest of the Control Period.

123. If the actual recovery of revenue through Transmission Charge is less than the actual cost by more than 10 percent, the APTRANSCO may file the details with the Commission seeking a remedy for under recovery of the cost. The Commission, upon examination of these details may pass an appropriate Order or show the ways and means to address issue of the under recovery of the cost.

124. For the purpose of monitoring the actual cost and revenue, the Commission reiterates the earlier direction as reads below:

"APTRANSCO shall file the actual costs and revenues in the last week of quarter for the previous quarter, every year, in the format prescribed for this

purpose by the Commission. APTRANSCO may also state its own observations on cost, revenues and peak demands/capacities along with the quarterly report."

125. **The Transmission Charge and Loss in kind fixed for each year of the Control** Period are applicable from 1st April to 31st March of the respective year.

Introduction of New Charges

126. The licensee as State Transmission Utility and SLDC as system operator, stated to be on account of higher share of RE penetration in the grid, have proposed to set up a Battery Energy Storage System (BESS) with a capacity of 250-500 MW with 2-4 hours of storage, under OPEX Model, to address the morning and evening/night peak deficits (shorter durations), intermittency problems owing to high RE penetration (15 - 30 mins) and also smoothening of curves.

127. The licensee has estimated the cost of Battery Energy Storage System of 500 MWh capacity to be about Rs.975 Cr. The total annual charges estimated to be paid by the licensee to the developer over a period of 10 years are Rs.185 Cr. The licensee proposed the following to recover the annual charges estimated:

Charge	Applicability
Renewable Integration Charges: 70 % of Annual Charges (Rs./MW/Month)	Only to RE developers (Wind/Solar)
Ancillary support charges: 30 % of Annual Charges (Rs./Unit)	All the consumers including Licensees, OA consumers

Computation of ancillary support Charges:

- Capacity of BESS: 500 MWh
- Utilization of BESS in a year: 200 days
- Charge and discharge cycles in a day: 2
- Proposed ancillary service charge: Rs.3.2/kWh (Deviation penalty paid by the State utilities for the period Apr-Oct '18)

Total Ancillary service charges = BESS capacity * Utilization of BESS in No. of days/Year * No. of cycles in a day * Ancillary Service Charge (INR/Unit)

= 500 MWh * 200 days * 3.2 * 2 = Rs. 64 Cr.

The balance Rs. 121 Cr. (Rs.185 Cr. – Rs.64 Cr.) is proposed to be collected from the RE developers (Wind and Solar) in the form of 'Renewable Integration Charges'.

Commission's decision

128. The reasons stated by the licensee for the proposed battery energy storage system (BESS) is to address the morning & evening/night peak deficits of shorter duration, problems due to intermittent generation of wind & solar power plants and smoothening of demand curves. It is also stated that 9,523 instances of over drawl equivalent to 23 MUs of energy and paid penalty of Rs.103.5 Cr. for the period between April -October ,2018.

129. In this regard, the following aspects may have to be noted:

i. APERC Forecasting, Scheduling and Deviation Settlement of Solar and Wind Generation Regulation, 2017(Regulation No. 4 of 2017) is complied with by almost all the Wind and Solar generators as per the reports furnished by the SLDC to the Commission and thus intermittency issues are reasonably addressed.

ii. Since BESS are at infancy stage in India, a policy and regulatory frame work do not exist for deployment of large-scale Battery Energy Storage Systems and for cost recovery.

iii. At the rate of stabilization of Battery Energy Storage System and annual charges estimated to be paid for the proposed storage system, the storage cost alone works out to Rs.18.5 per unit which appears to be very high, apart from the per unit cost of energy for charging the battery.

iv. Central Electricity Regulatory Commission (Ancillary Services Operations) Regulations, 2015 and the Detailed Procedure for Ancillary Services Operations are in place to take care of balancing of generation due to large scale integration of renewable energy and to maintain grid frequency as per the IEGC.

v. The POSOCO is already implementing pilot project of Automatic Generation Control (AGC) at Regional level, as ancillary service for maintaining the Load Generation balance, to optimize the cost.

vi. The opinion of the main stake holders i.e. the distribution and retail supply licensees, is not furnished and

vii. International experience with regard to BESS.

130. While the above aspects need to be pondered over in depth with reference to historical data and experience and scientific and technological advances, it will be premature to express any final opinion in this order. The licensee will be better advised to have these and all other relevant aspects examined and studied by an expert group in-depth and evolve a long-term plan of action to ensure grid stability through dependable energy storage system for the energy generated from Renewable Energy Sources, more particularly Wind and Solar. In any view, consideration of the proposal for Battery Energy Storage System at a cost of Rs.975 Cr. and including it in the ARR for the 4th Control Period at this stage does not arise in the absence of any draft or final detailed project report, cost benefit analysis and any indication of the manner of executing the project and other essential data and details. Hence, the issue is left open for consideration in appropriate proceedings at an appropriate time. The licensee is at liberty to move an appropriate petition / application before the Commission in this regard after duly considering all the relevant aspects on which the Commission will take a decision on merits after due prudence check and in accordance with law.

This Order is signed on the 8th day of March, 2019.

Sd/-	**Sd/-**	**Sd/-**
P. Rama Mohan	**Dr. P. Raghu**	**Justice G. Bhavani Prasad**
Member	**Member**	**Chairman**

ANNEXURE-A1

THE HINDU (AP EDITION) & DECCAN CHRONICLE (AP EDITION) DT:15.12.2018

BEFORE THE HONOURABLE
ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION (APERC)
D.No. 11-4-660, 4th Floor, Singareni Bhavan, Red Hills, Hyderabad - 500 004.

Transmission Corporation of Andhra Pradesh Limited (APTransco)

PUBLIC NOTICE

1. Notice is hereby given to all that the Transmission Corporation of Andhra Pradesh Limited (APTransco) holding License No. 1/2000, as on 06-12-2018, filed before the Andhra Pradesh Electricity Regulatory Commission (APERC) the Multi Year Aggregate Revenue Requirement (ARR) and Filing for Proposed Tariff (FPT) (Transmission Tariffs) for its Transmission Business and SLDC activity for 4th Control Period (FY2019-20 to FY2023-24). These filings have been taken on record by the Hon'ble Commission in O.P.Nos.30 and 31 of 2018.

2. Copies of the filings are available in the Office of the Chief General Manager (HRD & Planning, APTRANSCO, 1st Floor, Vidyut Soudha, Gunadala, Vijayawada-520004) and also in the offices of the Chief Engineers/Zones located at Visakhapatnam, Vijayawada & Kadapa and also in the offices of the Superintending Engineers OMC/O&M located at Vijayawada, Guntur, Ongole, Nellore, Srikakulam, Vizianagaram, Visakhapatnam, Rajhamandry, Eluru, Kadapa, Kurnool, Tirupathi, Ananthapur. Interested persons may inspect/peruse the said Multi Year ARR & FPT and take note thereof during office hours at any of the said offices at free of charge. These proposals are also available on **www.aptransco.co.in** and the same may also be accessed at **www.aperc.gov.in**. A copy of these filings, can be obtained from the above offices from the date of publication on payment of Rs.100/- (DD in favor of Pay Officer/APTransco payable at SBI, Mid Corporate Branch,Vja). Also a summary of Multi Year ARR and FPT in English and Telugu can be separately obtained on payment of Rs.10/- (DD in favor of Pay Officer/APTransco payable at SBI, Mid Corporate Branch, Vijayawada).

3. Views/objections/suggestions if any, on the Multi Year ARR&FPT filings for 4th Control Period proposed by APTransco for its Transmission Business and SLDC activity, together with supporting material may be sent to the Chief General Manager (HRD & Planning, APTRANSCO, 1st Floor, Vidyut Soudha,Gunadala,Vijayawada-520004) in person or through Registered Post so as to reach on or before **07-01-2019 by 5 PM.** A copy of the same must also be filed with the Commission Secretary, APERC at the address mentioned above. The views/objections/suggestions should be duly signed and should carry full name and postal address of the persons(s) sending the views/objections/suggestions. If the views/ objections/ suggestions are filed on behalf of any organization or any category of consumers, it should be so mentioned. If the objector also wants to be heard in person, it may also be specifically mentioned accordingly. The views/objections/suggestion should accompany the following statement as an overleaf.

Name & full address of the Objector with contact Number	Brief details of View(s)/ Objection(s)/ Suggestion(s)	Whether copy of objection & proof of delivery at APTransco's office enclosed (Yes/No)	Whether Objector wants to be heard in person (Yes/No)

4. The Multi Year ARR & FPT (Transmission Tariffs) schedule for Transmission Business and SLDC activity for 4th Control Period (FY2019-20 to FY2023-24) proposed by the APTRANSCO is given below:

SCHEDULE-I

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED PROPOSED TARIFF FOR TRANSMISSION BUSINESS OF APTRANSCO FOR 4th CONTROL PERIOD i.e., FY 2019-20 TO FY 2023-24

A) ARR / Transmission Charges

Sl.	Particulars	2019-20	2020-21	2021-22	2022-23	2023-24
1	Aggregate Revenue Requirement - Transmission (in Rs Crore)	1673.36	2098.50	2628.25	3352.74	4142.74
2	State Peak Demand (MW)	11450	12219	13209	14315	15539
3	Transmission Charges (Rs/kW/Month)	121.79	143.12	165.81	195.18	222.17

B) Transmission Loss Reduction Trajectory

Sl.	Particulars	2019-20	2020-21	2021-22	2022-23	2023-24
1)	Transmission Loss (%)	3.12 +/-0.3	3.10 +/-0.3	3.08 +/-0.3	3.05 +/-0.3	3.00 +/-0.3

C) Capital Investments

Sl.	Particulars	2019-20	2020-21	2021-22	2022-23	2023-24
1)	Capital Investhlents (in Rs. Crore)	1472.23	2902.50	3086.30	3162.43	2915.14

(Any other charges or special conditions and the authority for such levy, which the Licensee intends to, bring to the notice of the public)

SCHEDULE-II

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED PROPOSED TARIFF FOR SLDC ACTIVITY OF APTRANSCO FOR 4th CONTROL PERIOD i.e., FY 2019-20 TO FY 2023-24

A) ARR /SLDC Annual fee

Sl.	Particulars	2019-20	2020-21	2021-22	2022-23	2023-24
1	Aggregate Revenue Requirement - SLDC) (in Rs Crore)	102	110	118	128	138
2	Capacity (MW)	20226	21662	21280	21285	21486
3	Operating Charges (Rs. /MW / Month)	2400	2454	2748	3039	3333
4	Annual Fee (Rs. /MW/Annum)	21445	21240	22499	23548	24064

B) Capital Investment

Sl.	Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
1)	Capital Investments (in Rs. Crore)	43	46	48	50	52

(Any other charges or special conditions and the authority for such levy, which the Licensee intends to, bring to the notice of the public)

Introduction of new charges:

AP Transco as a state transmission utility and SLDC as a system operator are contemplating to set up a battery energy storage system (BESS) with a capacity of 250 -500 MW with 2-4 hours of storage, under Opex Model, to address morning and evening/night peak deficits (shorter durations), intermittency problems owing to high RE penetration (15 - 30 mins) and also smoothening of curves. AP Transco and SLDC as a system operator, may plan to set up storage system under Opex Model by paying annuity charges to the Developer.

The fixed cost of battery energy storage system of 500 MWh capacity is estimated to be about ~ INR 975 Crores. Assuming the system to operate over a period of 10 Years (2 cycle operation), the total annuity charges to be paid by AP Transco to the developer shall be of INR 185 Crs (that may be recovered in the form of Renewable Integration Charges (RIC) to meet the intermittency and smoothening of the solar generation and Ancillary service charges for peak load management (during day and night).

Currently the recovery of Net ARR is entirely through transmission tariff and the proposed charges including Net ARR incurred by AP Transco and SLDC for providing the above mentioned services would be recovered as follows

Charges	Applicability
100% of Net ARR	Distribution Licensees (LTOA/MTOA)
Renewable integration charges: 70 % of Annuity Charges (INR/MW/Month)	Only to RE developers (Wind/Solar)
Ancillary support charges: 30 % of Annuity Charges (INR/Unit)	All the consumers including Licensees, OA consumers.

Renewable Integration Charges (RIC) INR/MW/Month = Total Annuity Charges – {Ancillary Service Charges (INR/Unit) * Quantum of energy supplied by battery energy storage systems for providing ancillary services during the year}.

SLDC shall levy RIC to only RE developers as operating RIC charges (INR/MW/Month).

The Renewable Integration Charges is estimated as INR 121 Crs based on following assumptions

- Capacity of BESS : 500 MWh
- Utilitison of BESS in a year : 200 days
- Charge and discharge cycles in a day : 2
- Proposed ancillary service charge: INR 3.2/kWh (Deviation penalty paid by the state utilities for the period Apr-Oct'18)

Total Ancillary service charges = BESS capacity * Utilization of BESS in No. of days/Year * No. of cycles in a day * Ancillary Service Charge (INR/Unit)

= 500 MWh * 200 days * 3.2 * 2

= INR 64 Crores

5. Hon'ble Commission will conduct Public hearings on said Multi Year ARR&FPT for 4th Control Period (FY2019-20 to FY2023-24) proposals of APTRANSCO along with ARR and FPT proposals on Retail Supply Business of DISCOMs. But, Public Hearing on 25-01-2019 at Hyderabad is exclusively meant for Multi Year ARR & Tariff Proposals submitted by Discoms and APTransco. The schedule is as follows :

Sl. No.	Venue/place of Public Hearing	Date of Public Hearing
1	Conference Hall, ATC Building, Corporate Office, APEPDCL, P&T Colony, Seethammadhara, Visakhapatnam – 530 013.	07-01-2019 (Monday)
2	O/o. SE/Opeation/Vijayawada, APSPDCL, Opp. PWD Ground, Beside CM camp office, Vijayawada.	08-01-2019 (Tuesday)
3	Conference Hall, Corporate Office, (Vidyuth Nilayam), APSPDCL, Behind Srinivasa Kalyanamandapams, Sreenivasapuram, Tiruchanoor Road, Tirupati.	09-01-2019 (Wednesday)
4	O/o APERC, 11-4-660, 4th Floor, Singareni Bhavan, Red Hills, Hyderabad - 500 004	18-01-2019 (Friday)
5	O/o APERC, 11-4-660, 4th Floor, Singareni Bhavan, Red Hills, Hyderabad - 500 004. **(Exclusive for MYT proposals)**	25-01-2019 (Friday)

* Timings for public hearings - **10.00 AM to 1.00 PM and from 2.00 PM** to till all the interested persons who desire to be heard in person or through their authorized representatives are exhausted.

All the interested persons / associations / stakeholders / objectors who want to be heard in person / through authorized representatives may appear before the Hon'ble Commission on the above mentioned dates and submit their views / objections / suggestions in respect of the said Multi Year ARR and Tariff proposals of APTRANSCO.

The views / Objections/suggestions submitted to the Hon'ble Commission beyond the stipulated date **07-01-2019 up to 5 PM on 25-01-2019**, the date of the last public hearing exclusively for Multi Year ARR and Tariff Proposal of Discoms and APTransco, will also be taken into consideration while determining Multi Year ARR and Tariff of APTRANSCO for 4th Control Period.

6. The Hon'ble Commission will also conduct the 13th Joint Meeting of State Advisory Committee (SAC) and 8th State Coordination Forum on 10-01-2019 (Thursday) at Conference Hall, Corporate Office, APSPDCL, Tirupati on Multi Year ARR and Tariff proposals of APTransco along with ARR and FPT proposals on Retail Supply Business of Discoms for 4th Control Period.

Place : Vijayawada
Date : 15-12-2018

Sd/- CHAIRMAN & MANAGING DIRECTOR
APTRANSCO

R.O. No. 60/18

ANNEXURE-A2
ANDHRA JYOTHI & EENADU (AP EDITION) DT:15.12.2018

గౌరవనీయ ఆంధ్రప్రదేశ్ ఎలక్ట్రిసిటీ రెగ్యులేటరీ కమిషన్ (APERC) సమక్షంలో,
డి.నం. 11-4-660, 4 వ అంతస్తు, సింగరేణి భవన్, రెడ్ హిల్స్, హైదరాబాద్- 500 004

ట్రాన్స్‌మిషన్ కార్పొరేషన్ ఆఫ్ ఆంధ్రప్రదేశ్ లిమిటెడ్ (AP Transco)

బహిరంగ ప్రకటన

1.ట్రాన్స్‌మిషన్ కార్పొరేషన్ ఆఫ్ ఆంధ్రప్రదేశ్ లిమిటెడ్ (ఏపి ట్రాన్స్‌కో) లైసెన్స్ నం. 1/2000, 06.12.2018 నాటికి, ఆంధ్రప్రదేశ్ ఎలక్ట్రిసిటీ రెగ్యులేటరీ కమిషన్ (APERC) సమక్షంలో మల్టీ ఇయర్ అగ్రిగేట్ రెవెన్యూ రిక్వైర్‌మెంట్ (ARR)ను దాఖలు చేశారని మరియు 4 వ కంట్రోల్ పీరియడ్ (FY 2019-20 నుండి FY 2023-24) కొరకు టీపి ట్రాన్స్‌మిషన్ బిజినెస్ మరియు SLDC యాక్టివిటీ కొరకు ప్రతిపాదిత టారిఫ్ (FPT) (ట్రాన్స్‌మిషన్ టారిఫ్) దాఖలు చేశారని ఇందుమూలంగా ప్రకటన ఇవ్వడమైనది. ఈ ఫైలింగ్స్ OP నం.లు 30 మరియు 31 ఆఫ్ 2018 లో గౌరవనీయ కమిషన్‌చే నమోదు చేయబడినవి.

2. ఈ ఫైలింగ్స్ కాపీలు చీఫ్ జనరల్ మేనేజర్ (HRD& ప్లానింగ్, APTRANSCO,1వ అంతస్తు, విద్యుత్ సౌధ, గుణదల, విజయవాడ- 520004) లో మరియు విశాఖపట్నం, విజయవాడ & కడప వద్ద చీఫ్ ఇంజనీర్స్/జోన్స్ కార్యాలయాలు మరియు విజయవాడ, గుంటూరు, ఒంగోలు, నెల్లూరు, శ్రీకాకుళం, విజయనగరం, విశాఖపట్నం, రాజమండ్రి, ఏలూరు, కడప, కర్నూలు, తిరుపతి, అనంతపురం వద్ద సూపరింటెండింగ్ ఇంజనీర్స్ OMC/O&M కార్యాలయాలలో కూడా లభ్యమవుతాయి. ఆసక్తి గల వ్యక్తులు సదరు మల్టీ ఇయర్ ARR & FPTలను తనిఖీ చేసుకొనవచ్చును / పరిశీలించవచ్చును. సదరు కార్యాలయాలలో దేని వద్దనైనా ఉచితంగా నోట్ తీసుకొనవచ్చును. ఈ ప్రతిపాదనలు www.aptransco.co.in పై కూడా లభ్యమవుతాయి, మరియు వాటిని www.aperc.gov.in వద్ద యాక్సెస్ చేసుకొనవచ్చును. ఈ ఫైలింగ్స్ కాపీ ఈ ప్రకటన తేదీ నుండి పైన తెలిపిన కార్యాలయాలలో పొందవచ్చును. ఇందుకు గాను రూ 100/-లను చెల్లించవలెను (పే ఆఫీసర్/ ఏపి ట్రాన్స్‌కో పేరున SBI, మిడ్ కార్పొరేట్ బ్రాంచ్, విజయవాడ వద్ద చెల్లింపయ్యేలా డిడి రూపంలో). మల్టీ ఇయర్ ARR మరియు FPT సమ్మరీస్ ఇంగ్లీషులో మరియు తెలుగులో విడి విడిగా పొందుటకు రూ 10/- చెల్లించవలెను(పే ఆఫీసర్/ ఏపి ట్రాన్స్‌కో పేరున SBI, మిడ్ కార్పొరేట్ బ్రాంచ్, విజయవాడ వద్ద చెల్లింపయ్యేలా డిడి రూపంలో).

3. ఏపి ట్రాన్స్‌కోచే టీపి ట్రాన్స్‌మిషన్ బిజినెస్ మరియు SLDC యాక్టివిటీ కొరకు ప్రతిపాదిత 4 వ కంట్రోల్ పీరియడ్ కొరకు మల్టీ ఇయర్ ARR&FPT ఫైలింగ్స్‌పై ఏవేని సూచనలు/ అభ్యంతరాలు/ సలహాలు ఉంటే చీఫ్ జనరల్ మేనేజర్ (HRD & ప్లానింగ్, APTRANSCO, 1 వ అంతస్తు, విద్యుత్ సౌధ, గుణదల, విజయవాడ- 520004) వారికి 07.01.2019 న సా.5 గం.లోగా చేరువిధంగా స్వయంగా లేదా రిజిస్టర్ పోస్ట్ ద్వారా మద్దతునిచ్చే మెటీరియల్‌తో పంపవలెను. దాని కాపీ ఒకదానిని తప్పనిసరిగా పైన తెలిపిన చిరునామా లోని కమిషన్ సెక్రటరీ, APERC వారికి దాఖలు చేయవలెను. సూచనలు/ అభ్యంతరాలు/ సలహాలు పంపుతున్న వ్యక్తులచే క్రింది విధంగా సంతకం చేయబడి వారి పూర్తి పేరు మరియు తపాలా చిరునామా కలిగియుండి సూచనలు/అభ్యంతరాలు/సలహాలు పంపాలి. ఏదేని సంస్థ లేదా ఏదేని వినియోగదారుల కేటగిరీకి తరఫున సూచనలు/అభ్యంతరాలు/ సలహాలు అయితే వాటిని ఆ ప్రకారం తెలియజేయాలి. ఒక వేళ ఆక్షేపణదారు స్వయంగా విచారణ కావాలనుకుంటే ఆ ప్రకారంగా నిర్దిష్టంగా చేసుకొనవచ్చును. దిగువ స్టేట్‌మెంట్ ప్రకారం సూచనలు/ అభ్యంతరాలు/సలహాలు జతచేయబడి ఉండాలి.

ఆక్షేపణదారు సంప్రదించాల్సిన సంపూర్ణపోస్టు పూర్తి పేరు& చిరునామా	సూచనలు/ అభ్యంతరాలు/ సలహాల సంక్షిప్త వివరాలు	అభ్యంతరాల కాపీ & ఏపి ట్రాన్స్‌కో కార్యాలయం డెలివరీ రుజువు జతచేయబడినదా (అవును/కాదు)	ఆక్షేపణదారు స్వయంగా విచారణ కావాలనుకుంటున్నారా (అవును/కాదు)

4. ట్రాన్స్‌మిషన్ బిజినెస్ మరియు SLDC యాక్టివిటీ కొరకు 4 వ కంట్రోల్ పీరియడ్ (FY2019-20 to FY2023-24) కొరకు మల్టీ ఇయర్ ARR & FPT (ట్రాన్స్‌మిషన్ టారిఫ్) షెడ్యూల్ దిగువ ఇచ్చిన విధంగా APTRANSCOచే ప్రతిపాదించబడినది.

షెడ్యూలు -I

4వ కంట్రోల్ పీరియడ్ అనగా FY 2019-20 నుండి FY 2023-24 కొరకు APTRANSCO ట్రాన్స్‌మిషన్ బిజినెస్ కొరకు ట్రాన్స్‌మిషన్ కార్పొరేషన్ ఆఫ్ ఆంధ్రప్రదేశ్ లిమిటెడ్ ప్రతిపాదిత టారిఫ్

A) ARR / ట్రాన్స్‌మిషన్ చార్జీలు

క్ర. సం	వివరాలు	2019-20	2020-21	2021-22	2022-23	2023-24
1	స్థూల రెవెన్యూ అవశ్యకత - ట్రాన్స్‌మిషన్ (రూ. కోట్లలో)	1673.36	2098.50	2628.25	3352.74	4142.74
2	స్టేట్ పీక్ డిమాండ్ (MW)	11450	12219	13209	14315	15539
3	ట్రాన్స్‌మిషన్ చార్జీలు (Rs. / kW / నెల)	121.79	143.12	165.81	195.18	222.17

B) ట్రాన్స్‌మిషన్ లాస్ రిడక్షన్ ట్రాజెక్టరీ

క్ర. సం	వివరాలు	2019-20	2020-21	2021-22	2022-23	2023-24
1)	ట్రాన్స్‌మిషన్ లాస్ (%)	3.12 +/-0.3	3.10 +/-0.3	3.08 +/-0.3	3.05 +/-0.3	3.00 +/-0.3

C) కేపిటల్ ఇన్వెస్ట్‌మెంట్స్

క్ర. సం	వివరాలు	2019-20	2020-21	2021-22	2022-23	2023-24
1)	కేపిటల్ ఇన్వెస్ట్‌మెంట్స్ (రూ. కోట్లలో)	1472.23	2902.50	3086.30	3162.43	2915.14

(సదరు విధింపు కొరకు ఏదేని ఇతర చార్జీలు లేదా ప్రత్యేక నిబంధనలు మరియు అథారిటీ, సదరు లైసెన్సీ భావించినది, ప్రజలకు తెలియజేసినవి)

షెడ్యూలు -II

4వ కంట్రోల్ పీరియడ్ అనగా FY 2019-20 నుండి FY 2023-24 కొరకు APTRANSCO SLDC యాక్టివిటీ కొరకు ట్రాన్స్‌మిషన్ కార్పొరేషన్ ఆఫ్ ఆంధ్రప్రదేశ్ లిమిటెడ్ ప్రతిపాదిత టారిఫ్

A) ARR / SLDC వార్షిక రుసుము

క్ర. సం	వివరాలు	2019-20	2020-21	2021-22	2022-23	2023-24
1	స్థూల రెవెన్యూ అవశ్యకత - SLDC (రూ. కోట్లలో)	102	110	118	128	138
2	సామర్థ్యం (MW)	20226	21662	21280	21285	21486
3	నిర్వహణ చార్జీలు (Rs. / MW / నెల)	2400	2454	2748	3039	3333
4	వార్షిక రుసుము (Rs. / MW / వార్షిక)	21445	21240	22499	23548	24064

B) కేపిటల్ ఇన్వెస్ట్‌మెంట్

క్ర. సం	వివరాలు	2014-15	2015-16	2016-17	2017-18	2018-19
1)	కేపిటల్ ఇన్వెస్ట్‌మెంట్స్ (రూ. కోట్లలో)	43	46	48	50	52

(సదరు విధింపు కొరకు ఏదేని ఇతర చార్జీలు లేదా ప్రత్యేక నిబంధనలు మరియు అథారిటీ, సదరు లైసెన్సీ భావించినది, ప్రజలకు తెలియజేసినవి)

కొత్త చార్జీల ప్రతిపాదన :

అధిక RE ప్రవేశం (15-30 నిమిషములు) కారణాన మధ్య మధ్య అగే సమస్యలు, ఉదయం మరియు సాయంత్రం / రాత్రులలో అధికలోడ్‌లు (సంక్షిప్త కాలాలు) తెలియజేయుటకు ఒపెక్స్ మోడల్ క్రింద 2-4 గంటల స్టోరేజ్‌తో 250-500 MW సామర్థ్యంతో బ్యాటరీ ఎనర్జీ స్టోరేజ్ సిస్టం (BESS) ఏర్పాటు చేసేందుకు మరియు ఇబ్బందులను సులభతరం చేయుటకు కూడా సిస్టం ఆపరేటర్‌గా SLDC మరియురాష్ట్ర ట్రాన్స్‌మిషన్ యుటిలిటీగా APTRANSCO పని చేస్తుంది. సిస్టం ఆపరేటర్‌గా APTRANSCO మరియు SLDC అభివృద్ధిదారుకు వార్షిక చార్జీలు చెల్లించుట ద్వారా ఒపెక్స్ మోడల్ క్రింద నిల్వ విధానం ఏర్పాటు చేయుటకు ప్రణాళిక చేస్తోంది.

500 MW సామర్థ్యంగల బ్యాటరీ ఎనర్జీ స్టోరేజ్ సిస్టం వ్యయం సుమారుగా ~INR 975 కోట్లుగా నిర్ణయించింది. 10 సంవత్సరాలు (2 సైకిల్ ఆపరేషన్) కాలానికి నిర్వహించుటకు అభివృద్ధిదారుకు APTRANSCO చే చెల్లించబడు మొత్తం వార్షిక చార్జీలు INR 185 కోట్లుగా ఉండాయని భావించడమైనది. పీక్‌లోడ్ మేనేజ్‌మెంట్ (పగలు మరియు రాత్రి వేళలలో) కొరకు సోలార్ జెనరేషన్ మరియు అనుబంధ సర్వీసు చార్జీల అవాంతరాలు మరియు సులభతరం చేయుటకు రెనివబుల్ ఇంటిగ్రేషన్ చార్జీలు (RIC) రూపంలో రాబట్టుకోబడతాయి.

పైన తెలిపిన సర్వీసుల ఏర్పాటుకు APTRANSCO మరియు SLDC చే భరించిన నికర ARRకో కలిపి ట్రాన్స్‌మిషన్ టారిఫ్ మరియు ప్రతిపాదిత చార్జీల ద్వారా నికర ARR ప్రస్తుతం మొత్తంగా రాబట్టుకోబడును. అది దిగువ విధంగా రాబట్టుకోబడును.

చార్జీలు	అనువర్తనీయత
100% నికర ARR	పంపిణీ లైసెన్స్‌దారులు (LTOA / MTOA)
రెనెవబుల్ ఇంటిగ్రేషన్ చార్జీలు: వార్షిక చార్జీలలో 70% (INR/MW/నెల)	RE డెవలపర్స్ (విండ్ / సోలార్)కు మాత్రమే.
అనుషంగిక మద్దతు చార్జీలు : వార్షిక చార్జీలలో 30% (INR / యూనిట్)	లైసెన్స్‌దారులు, OA వినియోగదారులతో సహా వినియోగదారులందరూ

రెనెవబుల్ ఇంటిగ్రేషన్ చార్జీలు (RIC) INR/MW/ నెల = మొత్తం వార్షిక చార్జీలు – (అనుబంధ సర్వీసు చార్జీలు (INR / యూనిట్) * సంవత్సరకాలంలో అనుబంధ సర్వీసుల ఏర్పాటు కొరకు బ్యాటరీ ఎనర్జీ స్టోరేజ్ సిస్టంల ద్వారా సరఫరా చేయబడిన క్వాంటం ఎనర్జీ)

RIC చార్జీల నిర్వహణగా RE అభివృద్ధిదారులకు మాత్రమే RICని SLDCచే విధించబడును (INR/MW/నెల)

దిగువ ప్రతిపాదనలపై ఆధారపడి INR 121 కోట్లుగా రెనెవబుల్ ఇంటిగ్రేషన్ చార్జీలు అంచనా వేయబడినవి.

- BESS సామర్థ్యం : 500 MWh
- సంవత్సరంలో BESS వినియోగం : 200 రోజులు
- రోజులో చార్జ్ మరియు డిస్‌చార్జ్ సైకిల్స్ : 2
- ప్రతిపాదిత అనుషంగిక సర్వీసు చార్జ్ : INR 3.2/ KWh (ఏప్రిల్ – అక్టోబర్ '18 కాలానికి రాష్ట్ర వినియోగాల ద్వారా అతిక్రమణ జరిమానా చెల్లించాలి.

మొత్తం అనుషంగిక సర్వీసు చార్జీలు = BESS సామర్థ్యం • రోజులు / సంవత్సరంలో BESS వినియోగం • రోజులో సైకిల్స్ సంఖ్య • అనుషంగిక సర్వీసు చార్జ్ (INR/యూనిట్)

= 500 MWh * 200 రోజులు * 3.2 * 2

= INR 64 కోట్లు.

5. DISCOMs రిటైల్ సరఫరా బిజినెస్‌పై ARR మరియు FPT ప్రతిపాదనలతోపాటు APTRANSCO ప్రతిపాదనల సదరు 4వ కంట్రోల్ పీరియడ్ (FY 2019-20 నుండి FY 2023-24) కొరకు సదరు మల్టీ ఇయర్ ARR & FPT పై గౌరవనీయ కమిషన్ బహిరంగ విచారణలను నిర్వహిస్తుంది. అయితే డిస్కమ్స్ అండ్ ఏపి ట్రాన్స్‌కోచే దాఖలు చేయబడినమల్టీ ఇయర్ ARR & టారిఫ్ ప్రతిపాదనల కొరకు మాత్రమే హైదరాబాద్ వద్ద 25.01.2019 న బహిరంగ విచారణలకు ఉద్దేశించబడినది. షెడ్యూలు వివరాలు దిగువ విధంగా ఉన్నవి:

క్ర. సం	బహిరంగ విచారణ ప్రదేశం/వేదిక	బహిరంగ విచారణ తేది
1	కాన్ఫరెన్స్ హాల్, ATC బిల్డింగ్, కార్పొరేట్ కార్యాలయం, APEPDCL, P& T కాలనీ, సీతమ్మధార, విశాఖపట్నం- 530013	07-01-2019 (సోమవారం)
2	SE /ఆపరేషన్/విజయవాడ, APSPDCL కార్యాలయం, PWD గ్రౌండ్ ఎదురుగా, CM క్యాంప్ కార్యాలయం ప్రక్కన, విజయవాడ	08-01-2019 (మంగళవారం)
3	కాన్ఫరెన్స్ హాల్, కార్పొరేట్ కార్యాలయం (విద్యుత్ నిలయం) APSPDCL, శ్రీనివాస కళ్యాణ మండపాల వెనుక, శ్రీనివాస పురం, తిరుచానూర్, తిరుపతి	09-01-2019 (బుధవారం)
4	APERC కార్యాలయం, 11-4-660, 4వ అంతస్తు, సింగరేణి భవన్, రెడ్ హిల్స్, హైదరాబాద్- 500 004	18-01-2019 (శుక్రవారం)
5	APERC కార్యాలయం, 11-4-660, 4వ అంతస్తు, సింగరేణి భవన్, రెడ్‌హిల్స్, హైదరాబాద్- 500 004 **(MYT ప్రతిపాదనల కొరకు మాత్రమే)**	25-01-2019 (శుక్రవారం)

* బహిరంగ విచారణ సమయాలు - ఉ **10.00** గం. నుండి మ.**1.00** గం.వరకు మరియు మ.**2.00** గం. నుండి స్వయంగా లేదా వారి అధీకృత ప్రతినిధి ద్వారా విచారణకు రావాలనుకునే ఆసక్తిగల వ్యక్తులందరూ పూర్తయ్యే వరకు.

స్వయంగా/ అధీకృత ప్రతినిధుల ద్వారా విచారణకు రావాలనుకునే ఆసక్తిగల వ్యక్తులు/ అసోసియేషన్లు/ స్టేక్‌హోల్డర్లు/ ఆక్షేపణదారులు పైన తెలిపిన తేదీలలో గౌరవనీయ కమిషన్ సమక్షంలో హాజరు కావొచ్చును మరియు సదరు APTRANSCO మల్టీ ఇయర్ ARR మరియు టారిఫ్ ప్రతిపాదనలకు సంబంధించి సూచనలు/ సలహాలు/అభ్యంతరాలు దాఖలు చేయవచ్చును.

నిర్దిష్ట తేది **07.01.2019** న సా. **5** గం.తర్వాత గౌరవనీయ కమిషన్‌కు దాఖలు చేసినట్టి సూచనలు/సలహాలు/ అభ్యంతరాలు,మల్టీ ఇయర్ ARR మరియు టారిఫ్ ప్రతిపాదనలు, డిస్కమ్స్ మరియు ఏపి ట్రాన్స్‌కో కొరకు మాత్రమే విచారణకు ఆఖరి తేది, **25.01.2019** న 4 వ కంట్రోల్ పీరియడ్ కొరకు APTRANSCO మల్టీ ఇయర్ ARR మరియు టారిఫ్ నిర్ధారణ సమయంలో పరిశీలనలోనికి తీసుకొనబడతాయి.

6. గౌరవనీయ కమిషన్ 13 వ స్టేట్ అడ్వైజరీ కమిటీ (SAC) సంయుక్త సమావేశం మరియు 8 వ స్టేట్ కోఆర్డినేషన్ ఫోరం 10.01.2019 (గురువారం)న, కాన్ఫరెన్స్ హాల్, కార్పొరేట్ కార్యాలయం, APSPDCL, తిరుపతి వద్ద 4 వ కంట్రోల్ పీరియడ్ కొరకు రిటైల్ సరఫరా బిజినెస్ ఆఫ్ డిస్కమ్స్‌పై ARR మరియు FPT ప్రతిపాదనలతోపాటు ఏపి ట్రాన్స్‌కో ప్రతిపాదనల మల్టీ ఇయర్ ARR మరియు టారిఫ్ నిబంధనలపై నిర్వహించబడుతుంది.

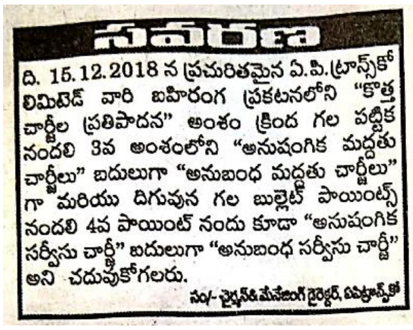
ప్రదేశం : విజయవాడ, సం/- ఛైర్మన్ & మేనేజింగ్ డైరెక్టర్

తేది : 15.12.2018 R.O.No. 60/18 **APTRANSCO**

ANNEXURE- A3

CORRIGENDUM

Andhra Jyothi (AP Edition) dt:16.12.2018



సవరణ

ది. 15.12.2018 న ప్రచురితమైన ఏ.పి.ట్రాన్స్‌కో లిమిటెడ్ వారి బహిరంగ ప్రకటనలోని "కొత్త చార్జీల ప్రతిపాదన" అంశం క్రింద గల పట్టిక నందలి 3వ అంశంలోని "అనుషంగిక మద్దతు చార్జీలు" బదులుగా "అనుబంధ మద్దతు చార్జీలు" గా మరియు దిగువున గల బుల్లెట్ పాయింట్స్ నందలి 4వ పాయింట్ నందు కూడా "అనుషంగిక సర్వీసు చార్జీ" బదులుగా "అనుబంధ సర్వీసు చార్జీ" అని చదువుకోగలరు.

సం/- చైర్మన్ & మేనేజింగ్ డైరెక్టర్, ఏపిట్రాన్స్‌కో

Andhra Jyothi and Enadu (AP Edition) dt:21.12.2018

సవరణ

ది. 15.12.2018న ఏ.పి.ట్రాన్స్‌కో వారిచే ప్రచురితమైన ట్రాన్స్ మిషన్ బిజినెస్ మరియు SLDC ఆక్టివిటీ కొరకు 4వ నియంత్రణ వ్యవధికి సమర్పించిన బహుళ సంవత్సర స్థూల ఆదాయ అవశ్యకత (ARR) మరియు ప్రతిపాదిత చార్జీలు (FPT) కు సంబంధించిన బహిరంగ ప్రకటనలోని 4వ పాయింట్ నందలి షెడ్యూల్-II (పట్టిక-'బి') లో పేర్కొనబడిన ఆర్థిక సంవత్సరములు 2014-15 నుండి 2018-19కి బదులుగా ఆర్థిక సంవత్సరములు 2019-20 నుండి 2023-24 గా చదువుకొనగలరు.

ప్రదేశం: విజయవాడ
తేది: 21.12.2018
R.O.No. 60A/18

సం/-
చైర్మన్ & మేనేజింగ్ డైరెక్టర్,
ఏపిట్రాన్స్‌కో

Deccan Chronicle and Hindu (AP Edition) dt:21.12.2018

CORRIGENDUM

In the Public notice given by APTRANSCO on **15.12.2018** for Multi Year ARR & FPT for Transmission Business and SLDC activity for 4th control period, in Point No. (4) Schedule-II (Table B), the Financial years mentioned from **2014-15 to 2018-19** shall be read as Financial years **2019-20 to 2023-24.**

Place: Vijayawada
Date: 21.12.2018
R.O.No. 60A/18

Sd/-
CHAIRMAN & MANAGING DIRECTOR
APTRANSCO

ANNEXURE-B
LIST OF OBJECTORS

SL.NO.	NAME & ADDRESS OF THE OBJECTOR
1	**Sri. M. Thimma Reddy,** Convenor, People's Monitoring Group on Electricity Regulation, 139, Kakatiya Nagar, Hyderabad – 500 008.
2	**Sri. M. Venugopala Rao,** Senior Journalist &Convener, Centre for Power Studies, H.No.7-1-408 to 413, F 203, Sri SaiDarsan Residency, Balkampet Road, Ameerpet, Hyderabad – 500 016
3	**BinduMadhavi,** Manager, Regulatory & Policy – IESA, Customized Energy Solutions, A501, GO Square, Aundh Hinjewadi Link Road, Wakad, Pune - 411057.
4	**Sri. Naveen Singh, Lead – Business Development,** Sterlite Power Transmission Limited, 1st Floor, Mira Corporate Suits, 1 & 2, Ishwar Nagar, New Delhi - 110065.
5	**Ms. Namrata Mukharjee,** **Head- Policy Advocacy,** **Sterlite Power grid Ventures Limited,** **Iswar Nagar,** **Madhura Road,** **New delhi-**110065.

ANNEXURE - C
REGULATED RATE BASE AND RETURN ON CAPITAL EMPLOYED (Rs. Cr.)

	Details	FILED					APPROVED				
		2019-20	2020-21	2021-22	2022-23	2023-24	2019-20	2020-21	2021-22	2022-23	2023-24
1.0	**Assets (1.1. +1.2)**	**13088.23**	**15635.43**	**19355.13**	**24235.72**	**28450.09**	**12,723**	**14,809**	**17,780**	**21,415**	**24,138**
1.1	Opening balance of OCFA	**11664.11**	**13088.23**	**15635.43**	**19355.13**	**24235.72**	**11,488**	**12,723**	**14,809**	**17,780**	**21,415**
1.2	Additions during the year	**1424.12**	**2547.20**	**3719.70**	**4880.59**	**4214.37**	**1,236**	**2,085**	**2,971**	**3,635**	**2,723**
2.0	**Depreciation (2.1+2.2)**	**4786.02**	**5460.04**	**6288.74**	**7344.84**	**8695.79**	**4,713**	**5,336**	**6,070**	**6,959**	**8,040**
2.1	Opening balance	**4186.57**	**4786.02**	**5460.04**	**6288.74**	**7344.84**	**4,155**	**4,713**	**5,336**	**6,070**	**6,959**
2.2	Depreciation during the Year	**599.45**	**674.02**	**828.70**	**1056.10**	**1350.95**	**558**	**623**	**733**	**890**	**1,081**
3.0	**Consumer Contributions (3.1+3.2)**	**996.59**	**1017.05**	**1110.84**	**1281.52**	**1457.81**	**997**	**1,017**	**1,111**	**1,282**	**1,458**
3.1	Opening balance	**975.11**	**996.59**	**1017.05**	**1110.84**	**1281.52**	**975**	**997**	**1,017**	**1,111**	**1,282**
3.2	Additions during the year	**21.48**	**20.46**	**93.79**	**170.68**	**176.29**	**21**	**20**	**94**	**171**	**176**
4.0	**Working Capital**	**100.11**	**111.15**	**122.75**	**135.48**	**148.5**	**98.97**	**108.96**	**119.15**	**130.08**	**140.88**
4.1	O&M (45 days Net O&M Expenses)	**75.11**	**86.15**	**97.75**	**110.48**	**123.50**	**73.97**	**83.96**	**94.15**	**105.08**	**115.88**
4.2	O&M Stores Inventory	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**	**25.00**
5.0	**Change in Rate Base ((1.2-2.2-3.2)/2)**	**401.60**	**926.36**	**1398.61**	**1826.91**	**1343.57**	**328**	**721**	**1,072**	**1,288**	**733**
6.0	**Regulated Rate Base (1.1-2.1-3.1+4+5)**	**7004.14**	**8343.13**	**10679.70**	**13917.93**	**17101.42**	**6,785**	**7,843**	**9,647**	**12,017**	**14,048**
7.0	**Capital Structure**										
7.1	Debt, (percent)	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**
7.2	Equity, (percent)	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**
8.0	**Cost of Funds (percent)**										
8.1	Cost of Debt, (percent)	**10.5%**	**10.5%**	**10.5%**	**10.5%**	**10.5%**	**10.30%**	**10.30%**	**10.30%**	**10.30%**	**10.30%**
8.2	Return on Equity, (percent)	**14%**	**14%**	**14%**	**14%**	**14%**	**14%**	**14%**	**14%**	**14%**	**14%**
9.0	***WACC ((7.1 X 8.1)+(7.2 X 8.2))**	**11.38**	**11.38**	**11.38**	**11.38**	**11.38**	**11.23%**	**11.23%**	**11.23%**	**11.23%**	**11.23%**
10.0	**Return on Capital Employed, (6X 9)**	**796.72**	**949.03**	**1214.82**	**1583.16**	**1945.29**	**762**	**880**	**1,083**	**1,349**	**1,577**

ANNEXURE - D
TRANSMISSION CHARGE/RATE AS FILED BY APTRANSCO (Rs. Cr.)

S.No.	Details	APTRANSCO				
		2019-20	**2020-21**	**2021-22**	**2022-23**	**2023-24**
1	**Expenditure (2 to 7)**	1369.85	1560.42	1845.61	2222.35	2668.81
2	Operation & Maintenance Cost	706.15	809.87	918.95	1038.59	1161.01
3	O&M Carrying Costs	-	-	-	-	-
4	Depreciation	599.45	674.02	828.70	1056.10	1350.95
5	Advance Against Depreciation	-	-	-	-	-
6	Income Tax	64.24	76.53	97.96	127.66	156.86
7	Special Appropriation	-	-	-	-	-
8	**Expenses Capitalized (9 & 10)**	127.32	164.23	183.25	202.22	216.75
9	IDC Capitalized	-	-	-	-	-
10	O&M Expenses Capitalized	127.32	164.23	183.25	202.22	216.75
11	**Net Expenditure (1 - 8)**	1242.53	1396.19	1662.36	2020.13	2452.06
12	Return on Capital Employed	796.72	949.03	1214.82	1583.16	1945.29
13	**Non-Tariff Income**	100.89	105.72	110.93	116.55	123.61
14	**Tariff from others (ISTS lines)**	265.00	141.00	138.00	134.00	131.00
15	**Net Revenue Requirement (11+12-13-14)**	1673.36	2098.50	2628.25	3352.74	4142.74
16	**Tariff (Rs./KW/Month)**	121.79	143.12	165.81	195.18	222.17
17	**Peak Demand (MW)**	11,450	12,219	13,209	14,315	15,539
	EPDCL	3683.79	4134.78	4475.17	4865.02	5287.37
	SPDCL	6509.75	6615.22	7590.90	8194.39	8909.70
	Others (3rd Party & Open Access)	700.00	152.93	149.59	117.93	109.43

ANNEXURE - E

TRANSMISSION CHARGE/RATE, COMMISSION'S COMPUTATION (Rs. Cr.)

S.No.	Details	APERC				
		2019-20	2020-21	2021-22	2022-23	2023-24
1	**Expenditure (2 to 7)**	**1315.93**	**1484.60**	**1706.72**	**1987.65**	**2299.18**
2	Operation & Maintenance Costs	**695.39**	**789.29**	**885.09**	**987.84**	**1,089.35**
3	O&M Carrying Costs	--	--	--	--	--
4	Depreciation	**558.31**	**623.37**	**733.15**	**889.58**	**1,080.97**
5	Advance Against Depreciation	-	-	-	-	-
6	Income Tax	**62.23**	**71.94**	**88.48**	**110.23**	**128.86**
7	Special Appropriation	-	-	-	-	-
8	**Expenses Capitalized (9 & 10)**	**103.63**	**117.63**	**131.90**	**147.22**	**162.35**
9	IDC Capitalized	-	-	-	-	-
10	O&M Expenses Capitalized	**103.63**	**117.63**	**131.90**	**147.22**	**162.35**
11	**Net Expenditure (1 - 8)**	**1,212.29**	**1,366.97**	**1,574.81**	**1,840.43**	**2,136.83**
12	Return on Capital Employed	**761.59**	**880.43**	**1,082.83**	**1,348.94**	**1,576.93**
13	**Non-Tariff Income**	**70.00**	**70.00**	**70.00**	**70.00**	**70.00**
14	**Tariff from others (ISTS lines)**	**265.00**	**141.00**	**138.00**	**134.00**	**131.00**
15	**Net Revenue Requirement (11+12-13-14)**	**1,638.88**	**2,036.40**	**2,449.65**	**2,985.37**	**3,512.75**
16	**Tariff (Rs./KW/Month)**	**119.28**	**138.88**	**154.54**	**173.79**	**188.38**
17	**Peak demand, MW**	**11450**	**12219**	**13209**	**14315**	**15539**
	EPDCL	**3792**	**4081**	**4401**	**4755**	**5149**
	SPDCL	**7275**	**7828**	**8442**	**9122**	**9877**
	3rd Party / Open Access	**383**	**310**	**366**	**438**	**513**

ACRONYMS AND ABBREVIATIONS

A&G	Administration and General
APERC	Andhra Pradesh Electricity Regulatory Commission
APGENCO	Generation Corporation of Andhra Pradesh
APPCC	AP Power Co-ordination Committee
APTRANSCO	Transmission Corporation of Andhra Pradesh Limited
ARR	Aggregate Revenue Requirement
C&AG	Comptroller and Audit-General
CAPEX	Capital Expenditure
CERC	Central Electricity Regulatory Commission
CGM	Chief General Manager
COD	Date of Commission
CPI	Consumer Price Index
Cr	Crore
CRDA	Capital Region Development Authority
DISCOMs	Distribution Companies
ED	Executive Director
EHT	Extra High Tension
GIS	Gas Insulated Substation
GoAP	Government of Andhra Pradesh
GoI	Government of India
IDC	Interest During Construction
IPP	Independent Power Producer
ISTS	Inter State Transmission System
kW	Kilo-watt
LOA	Letter of Acceptance
MW	Mega-watt
MYT	Multi Year Tariff

NREDCAP	New and Renewable Energy Development Corporation of Andhra Pradesh
NTI	Non-Tariff Income
NTPC	National Thermal Power Corporation
O&M	Operating and Maintenance
O.P. No.	Original Petition Number
OA	Open Access
OFC	Optical Fiber Cable
PFC	Power Finance Corporation
PGCIL	Power Grid Corporation of India Limited
POWER GRID	Power Grid Corporation of India Limited
PPA	Power Purchase Agreement
PSU	Public Sector Undertaking
R&M	Repair and Maintenance
RAC	Regulatory Affairs Cell
RE	Revised Estimate
RKM	Route Kilometers
RoCE	Return on Capital Employed
RoE	Return on Equity
RRB	Regulated Rate Base
SCADA	Supervisory Control and Data Acquisition
SRLDC	The Southern Regional Load Dispatch Centre
SRPC	Standing Committee in Southern Regional Power Committee
STU	State Transmission Utility
T.O.O	TRANSCO Office Order
TL&SS	Transmission Lines and Substation
UMPP	Ultra Mega Power Project
VCIC	Vizag Chennai industrial Corridor
WPI	Wholesale Price Index