



**TRANSMISSION CORPORATION OF TELANGANA LIMITED
VIDYUT SOUDHA::HYDERABAD - 82**

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Lr.No.Dir(GO)/CESLDC/SESLDC/DEPP2/ADE-1/F.GCC/D.No. 76 /22,Dt:27.12.2022

Sir,

Sub: TSTRANSCO – SLDC - GCC – Direction by Hon'ble TSERC - Detailed study on the issue of Parallel Operation of CPPs and Consequent levy of Grid support charges - Final Report - Submitted - reg.

- Ref: 1) Lr. No. Secy/TSERC/JD (TE)/F.No.E-406508/D.No.509/22,Dt:16.09.2022.
2) Lr. No. Secy/TSERC/JD (TE)/F.No.E-406508/D.No.572/22,Dt:25.10.2022.
3) Lr. No. Secy/TSERC/JD (TE)/F.No.E-406508/D.No.638/22,Dt:14.11.2022.

In the references cited, Hon'ble TSERC directed Grid Coordination Committee (GCC) for submitting final report with specific recommendation on levy of Grid Support Charges (GSC) duly proposing the methodology for calculation of GSC.

In compliance to the above, GCC is here with submitting the final report with the following specific recommendation.

Methodology for Calculation of GSC:

Grid Support Charges (GSC)	Differential Capacity x Rate of GSC (Rs./ kVA/ month)
Differential Capacity	Total Capacity of CPP in KVA –Contracted Maximum Demand in kVA with the Licensee - All other sources of supply - CPPs exporting firm power to TSTRANSCO
Rate of Grid Support Charges	25% of the prevailing demand charge for respective HT consumers

The final report is herewith submitted.

Encl: Final Report.

Yours faithfully,

msm
27/12
**Chair Person/GCC &
Director/Grid Operations
TSTransco**



TRANSMISSION CORPORATION OF TELANGANA LIMITED
STATE LOAD DESPATCH CENTRE

FINAL REPORT
ON
PARALLEL OPERATION
OF
CPPs & CONSEQUENT LEVY
OF
GRID SUPPORT CHARGES

Submitted By

TELANGANA STATE GRID
COORDINATION COMMITTEE

DECEMBER-2022

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1. INTRODUCTION

Hon'ble TSERC vide letter dated 13.04.2022 directed Grid Coordination Committee(GCC) for a detailed study on the issue of Parallel Operation of CPPs and consequent levy of Grid Support Charges(GSC) and to submit a detailed report on or before 30.05.2022.

Further as per the request of Chair Person GCC for extension of time, Hon'ble TSERC vide letter dated 14.06.2022 granted extension of time to GCC and directed to submit detailed report on or before 30.07.2022. Copies enclosed as **Annexure -A**.

The background of the subject is as follows.

TSDISCOMs requested commission to allow levy of Grid Support Charges(GSC) for FY2022-23 based on the previous APERC order dated 08.02.2002 and Hon'ble Supreme Court judgement dated 29.11.2019 by mentioning the following content:

“Persons operating Captive Power Plants (CPPs) in parallel with T.S. Grid have to pay ‘Grid Support Charges’ for FY 2022-23 on the difference between the capacity of CPP in kVA and the Contracted Maximum Demand in kVA with Licensee and all other sources of supply, at a rate equal to 50% of the prevailing demand charge for HT Consumers. In case of CPPs exporting firm power to TSTRANSCO, the capacity, which is dedicated to such export, will also be additionally subtracted from the CPP capacity.”

The commission has taken note of above submissions made by TSDISCOMs along with other Retail Supply Tariff (RST) proposals and invited comments/suggestions/objections from stake holders, wherein they have requested the commission to undertake third party analysis before deciding on the levy of GSC as well as the quantum of such GSC.

Considering the above, Commission has decided to refer the matter to Grid Coordination Committee with a direction for a detailed study on the issue of parallel operation of CPPs and consequent levy of Grid Support Charges(GSC) and to submit a detailed report.

The directions of Hon'ble TSERC were complied by the GCC. Accordingly a study carried out and conclusions are explained under various chapters of this report.

2. STAKE HOLDERS VIEWS

To understand the issue GCC convened the 2nd GCC meeting through virtual mode on 11.05.2022 for taking the views of all the members.

Brief summary of 2nd GCC Meeting:

Initially TSDISCOMs presented their proposal to the forum and explained the circumstances under which the proposals were submitted to Hon'ble TSERC. GCC sought the views of the members of the committee on the proposals of TSDISCOMs. Accordingly the views of the members were recorded in the minutes. Certain members not represented in the second GCC meeting.

Further GCC also requested members to submit their written views on the deliberations. Accordingly, TSDISCOMs and Representative of Generating Companies – Thermal (other than state generating companies) submitted their written views.

It was understood from the deliberations that there are two issues to be studied by GCC. **One is Necessity of Grid Support (Technical Analysis) and the other is Quantum of charges/Reasonability of charges.**

It was decided to conduct next meeting, to further deliberate the subject on the above two dimensions. It is also conveyed that, in next meeting Member Convener, GCC will putforth the analysis to Committee Members.

With the above observations the second GCC meeting was concluded and the minutes was communicated to GCC members on 28.05.2022. Copy of 2nd GCC minutes of meeting is enclosed as **Annexure – B.**

3. GCC ANALYSIS AND STUDY

The committee analysed the views of members and data collected from various sources including Hon'ble CSERC order Dt: 31.12.2008 issued based on the study conducted by Electrical Research & Development Association(ERDA). The detailed report of ERDA study was obtained from Hon'ble CSERC and procedures being followed by various states collected from the authorized websites of respective state ERCs. The following are the topics analysed by GCC.

- a.** Proposals of TSDISCOMs regarding Grid Support Charges
- b.** Views of the Members
- c.** Levy of Parallel Operation Charges/ Grid Support Charges by various states across the Nation and their Methodology.
- d.** Analysed the M/s Electrical Research & Development Association (ERDA) study report on evaluation of Parallel Operation Charges in respect of Chattisgarh State during the year 2008.
- e.** Technical Study of Impact of CPP connectivity to the Grid.

The above topics are studied keeping in view of two aspects which were flagged during the 2nd GCC meeting, that are

A. Necessity of Grid Support.

B. Reasonability of Charges for Grid Support.

A. Necessity of Grid Support :

GCC analysed the impact of CPP connectivity to the Grid and whether Grid Support is required for Parallel Operation of CPP, through Power System Simulator for Engineering (PSS/E) software which is used at national level for Power System Planning.

The details are as follows.

PSS/E is a reputed software used as common platform across nation for planning studies, load flow analysis, dynamic studies and short circuit studies etc.. It is also being used in the day- to- day Power System operations for analyzing the impact of planned shut downs and contingency analysis etc.

GCC analysed the CPP behaviour using PSS/E software in two cases that is :-

i) Connected in Parallel with Grid

ii) Operated in isolation

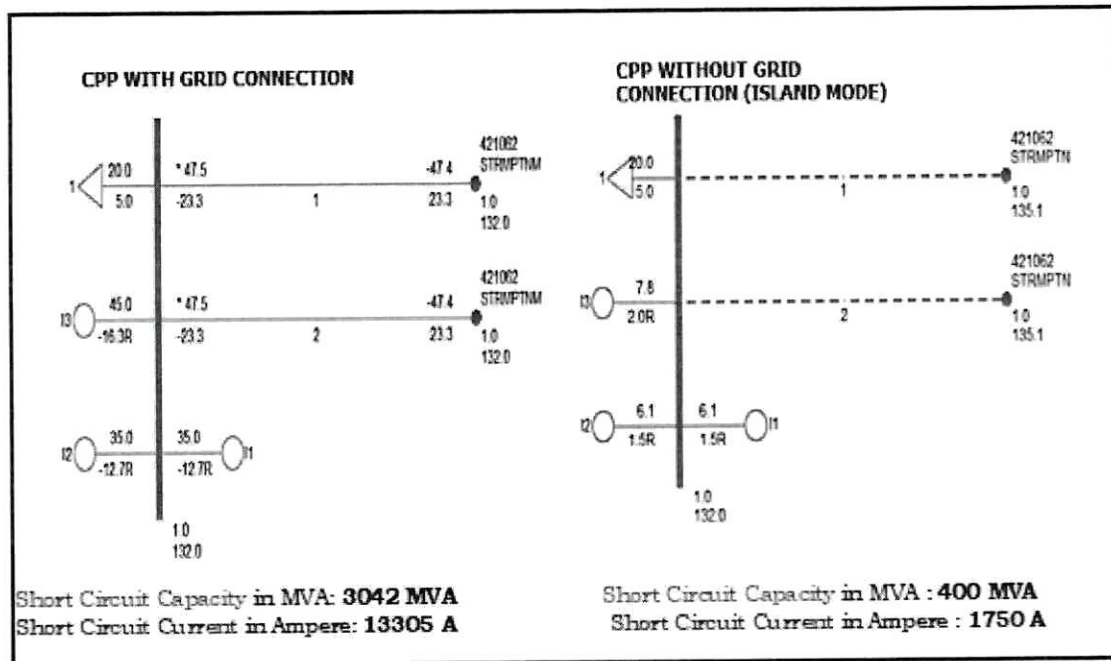
The following cases with Grid connection and Isolated mode of CPP plant are studied utilizing Generator and Exciter Models from Transmission Planning Criteria-2013 issued by Central Electricity Authority. The following assumptions considered while evaluating the issue using the Power System Simulator for Engineering (PSS/E) Software.

- a.** Isolated Telangana network is considered.
- b.** Three No. Units, 1 No. 50 MW & 2 No.'s 32 MW each capacity for CPP is considered.
- c.** All CPP units are operated in parallel.
- d.** CPP Generation is evacuated via double circuit with Grid.
- e.** For isolated case , above **(d)** is considered as opened.

Evaluation of Short Circuit Capacity:

The simulation was carried out to know how the short circuit capacity of CPP is with Grid Connection and without Grid Connection.

The short circuit level of CPP with and without Grid connectivity is computed using Power System Simulator for Engineering (PSS/E) as follows.



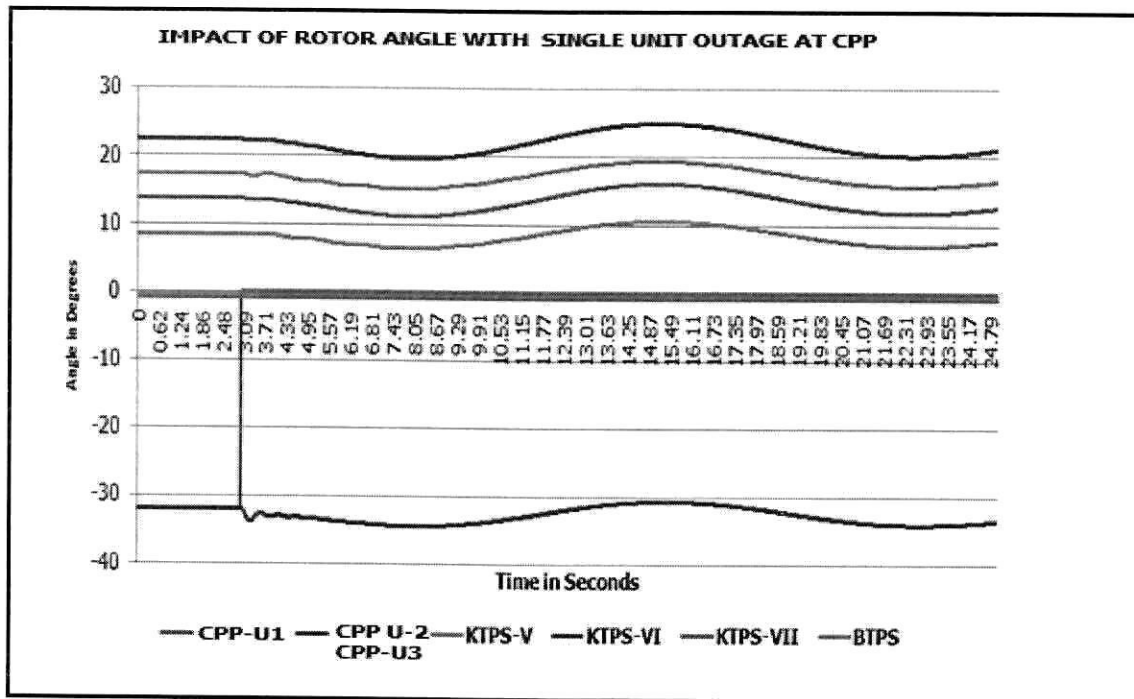
It is understood from the simulation studies that

- Basically the fault level has the significance of service provided by utility to captive power plants in terms of voltage regulation, stability, reliability and absorbing the load variation / fluctuation, etc. Most of the ancillary services are thus provided by the utility to the CPP through better fault level.
- Due to higher fault level of the grid at the point of common coupling, the flow of pollutants like harmonics, negative phase sequence current, etc. are absorbed by the grid due to low impedance path of the grid as compared to that of CPP generator.
- As the fault level of grid is higher, it results in better voltage regulation to CPP load.

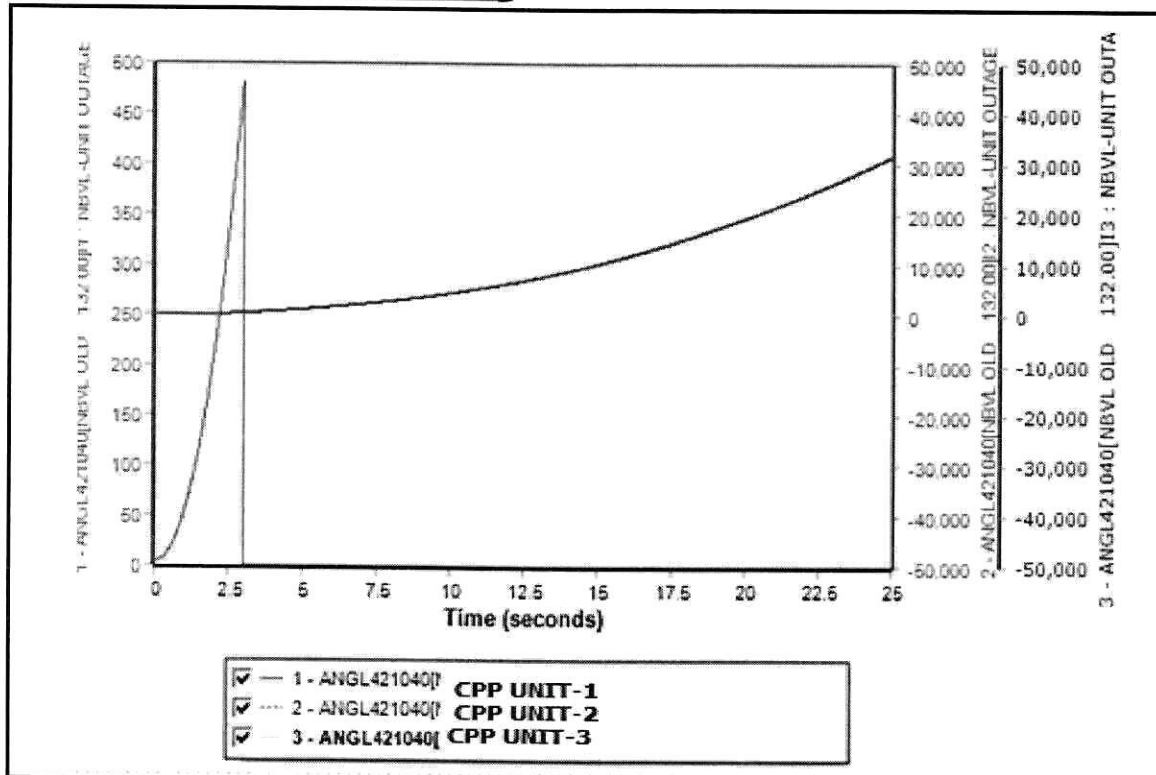
Evaluation of Stability of CPP with one Unit Outage:

The stability of the machines of CPP were analysed with unit outage.

Grid Connection Mode: Stable Operation



Isolated Mode: Unstable Swing



one Unit of CPP is disconnected(at 3 sec) for analysing the impact of Outage.

It is understood from the above simulation studies that

Grid Connection Mode: With Outage of one unit at CPP, it is found that Grid & other units of CPP are stable, no prominent swings detected in the other units, with loss of generation at CPP.

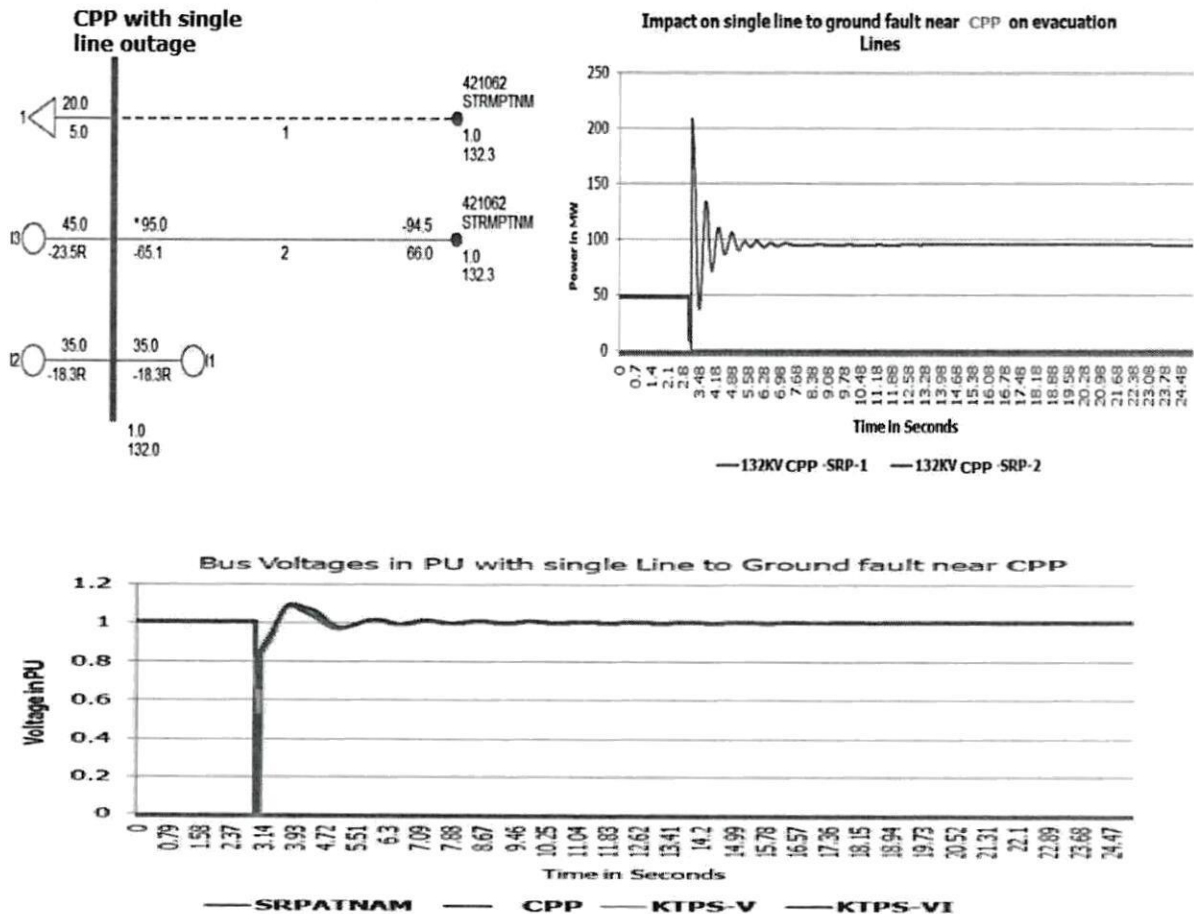
Isolated Mode: With Outage of one unit at CPP, other units are found unstable.

Hence it may be observed that stability of machines of CPP improves with Grid connection.

Evaluation of Stability with Single Line / Internal Faults:

The stability was further evaluated with line outage.

Grid Connection Mode:

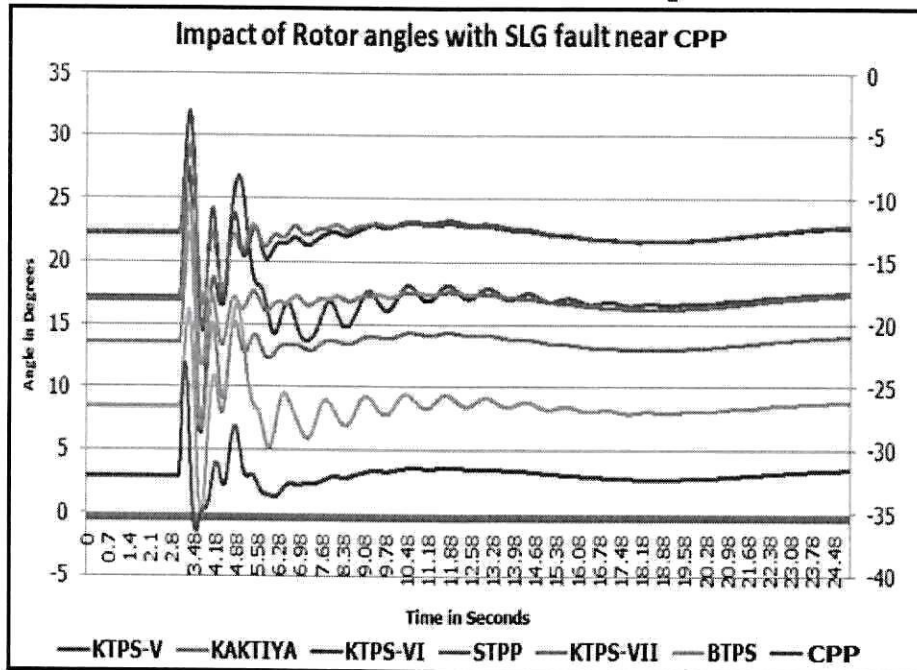


CPP Evacuation single Line Outage:

- Voltage is recovered after fault is cleared.
- Generators are found stable after fault.
- Other Evacuation line can cater load.

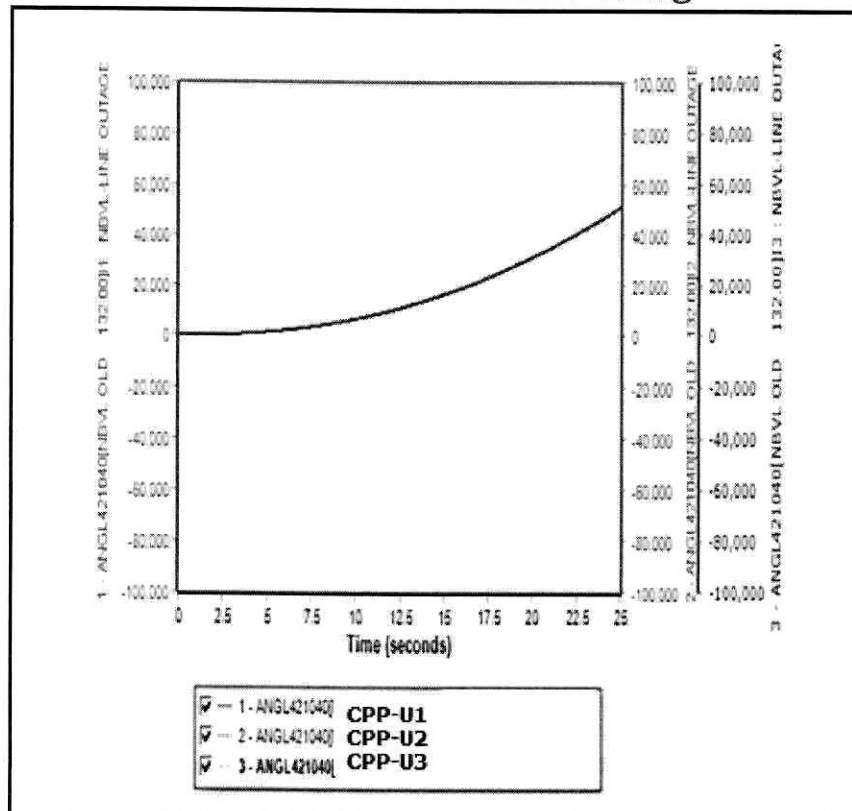
Line Outage near CPP end

Grid Connection Mode: Stable Operation



Internal cable/Line fault at CPP isolated

Isolated Mode: Unstable Swing



Thus it is observed from the above simulation studies that the units of CPP are having better stability, higher short circuit levels in the Grid Connection Mode, which implies that certain benefits were received by CPP which improves their operation of load, life of the equipment, stability of CPP units.

Finally it is noted from the three cases of PSS/E simulations that there is impact of connectivity of CPP to Grid or in other words, Grid Support is necessary for Parallel Operation of CPPs.

B.GCC STUDY ON REASONABILITY OF CHARGES FOR GRID SUPPORT:

Grid Support Charges based on various methods adopted in different States:

Scenario 1:

Andhra Pradesh Methodology:

Explanation: The parallel operation of the generators will affect the grid equipment which in turn will affect the R&M cost of the Transco and the DISCOMs.

Therefore, based on the total generation capacity connected to AP state grid as of 31.12.2021 and R&M charges of APTransco and the DISCOMs, the Commission has determined the Grid support charges/parallel operation charges.

Extract of Order Enclosed as Annexure-C(1).

Andhra Pradesh Method	Similar Methodology applied to Telangana
<p><u>R&M Cost Method:</u></p> <p>Methodology:</p> <p>POC = (Discoms R&M + Transco R&M) / (12 x Total Installed Capacity)</p> <p>POC charges = Total installed capacity of CPP x Rate of POC (Rs./ kW/ month)</p> <p>Approved Transco R&M Cost: Rs.224.39 Cr</p> <p>Approved Discoms R&M Cost: Rs.830 Cr</p> <p>Total Installed Capacity:16854MW</p> <p>POC Determined: Rs.52.13/kW/Month</p> <p>Tariff being implemented is as follows.</p> <p>a) RS. 50/kW/month for conventional generators</p> <p>b)RS. 25/kW/month for RE Generators</p> <p>c)RS. 15/kW/month for Rooftop Solar Generators</p>	<p><u>R&M Cost Method:</u></p> <p>for FY 2022-23</p> <p>Approved Transco R&M Cost including Artisans Employee cost :Rs.204 Cr</p> <p>Approved Discoms R&M Cost including Artisans Employee cost :Rs.788 Cr</p> <p>Total Installed Capacity:16355 MW</p> <p>Equivalent Value: Rs.50/kW/Month</p>

Scenario2:

Chhattisgarh Method -1:

Explanation:The parallel operation charges are calculated considering the base MVA support provided by the utility to the CPP, base MVA support provided by the CPP to the utility grid and 'no load losses' of power transformers in financial terms.

Commission agrees with the recommendation of ERDA and comes to the conclusion that the rates of parallel operation charges should be as derived on the basis of Base MVA Support method.

Copy of Order enclosed as Annexure-C(2) & C(3).

Chhattisgarh Method -1	Similar Methodology applied to Telangana
<p><u>Base MVA Method:</u></p> <p>Fault level in electrical system is analogous with the shock absorbing capacity of mechanical system. The fault level in MVA corresponds to the fault current flowing through the power system in the event of a short circuit in the system. The higher fault level is the significance of better voltage profile. In this method, base MVA support on the basis of fault level has been calculated.</p> <p>Steps for calculating PoC charges -</p> <p>1.Base MVA (A) = Fault level at Point of Common Coupling (PCC) x Transient Reactance</p>	<p>On the Same principles of Base MVA Method with some assumptions, the POC arrived as Rs.102/kVA/Month</p>

Where, fault level at PCC is equal to the difference between the fault level in MVA with grid interconnection and fault level contributed by CPP.

2.MVA support required by CPP from grid is equal to the installed capacity (B) of the CPP.

3.Minimum of support available and support required by CPP(C). $C = (A)$ or (B), whichever is minimum

4.Total support provided by utility to CPP in financial terms, $D = \text{Transmission related fixed charges per kVA per month} \times \text{minimum support required "C"} \times 1000$

5.Base MVA support provided by CPP to utility, $E = (\text{Installed capacity of CPP} \times \text{Fault level contributed by CPP}) / (\text{Fault level in MVA at PCC})$

6.Total support provided by CPP to utility to CPP in financial terms,

$F = \text{Transmission related fixed charges per kVA per month} \times \text{Base MVA support provided by CPP "E"} \times 1000$

7.Net grid support charges per month to be paid to utility by CPP, $G = \text{Base MVA support provided by utility in financial terms} - \text{Base MVA support provided by CPP in financial terms}$ i.e., $G = D - F$.

8.The average cost of no load loss is to be paid additionally as the no load loss of

power transformer is always present irrespective of quantum of load, installed capacity, Contracted Demand, export etc.

9. Rate of Parallel Operation Charge (POC)
in Rs. per kVA per Month = (Charges for net support received by CPP in Rs. / Installed capacity in kVA) + No load charges per kVA

POC Charges = Rate of POC in Rs. per KVA per month X (Installed capacity of CPP in KVA – Contracted demand taken by CPP from utility in KVA – Contracted export power by CPP to utility in KVA)

Tariff being implemented is
Rs.21/kVA/Month

Scenario3:

Chhattisgarh Method – 2:

Explanation: The power generated by CPP can be utilized for auxiliary consumption, captive load, non-captive load, supply to utility and for interstate sale. In case of elimination of supply for auxiliary consumption, supply to utility and power for interstate sale, the balance remains power supply to captive and non-captive loads of CPP, and this can be specifically identified as an element for payment of POC.

Actual number of Units consumed by captive and non-captive loads =
Gross units generation - Auxiliary Consumption (subject to maximum of 10%) units - actual number of units sold to licensee under PPA – actual number of units sold through Inter-state open access

Keeping in view of difficulties in implementing the Parallel Operation charges calculation with the previous(Base MVA) method, certain petitions were filled. Accordingly, Hon'ble CSERC issued the order to follow the below method for calculation of Parallel Operation charges.

Extract of Order Enclosed as Annexure-C(4)

Chhattisgarh Method - 2 (Captive and Non Captive Consumption)	Similar Methodology applied to Telangana
<p><u>Methodology:</u> POC Rate (Ps./kWh) = CSPTCL ARR / Total Connected Load / Load Factor</p> <p>POC Charge = Actual no. of units consumed by captive and non-captive loads x Rate of POC (Ps./ kWh)</p> <p>Approved Transmission Cost:Rs.979.67 Cr Total Installed Capacity:8586MW POC Determined: Ps.13.02/kWh</p> <p>Tariff being implemented is Ps.13/kWh</p>	<p>for FY 2022-23 Approved Transmission Cost=3398.66 Cr</p> <p>Transmission Capacity Approved:16355MW</p> <p>Equivalent Value: Ps.23.72/kWh</p>

Scenario4:

Gujarat Method:

Explanation: Parallel operation is beneficial to the CPP and at the same time, it is true that some benefit is also accrued to the grid. Considering the Pari passu it is proposed to levy 50% of the transmission and distribution related fixed costs on the CPP.

Extract of Order Enclosed as Annexure-C(5).

Gujarat Method	Similar Methodology applied to Telangana
<p>Methodology: Based on Fixed Cost of Transco & Discom System and Connected Load</p> <p><u>Steps for calculating PoC charges –</u></p> <p>1.Fixed costs in Rs./kVA/Month (A) = Total fixed cost of Transmission and Distribution System ÷ Total connected load in the system (MVA)/12/1000</p> <p>2.Rate of Parallel Operation Charge (POC) in Rs. per kVA per Month = 50% x A</p> <p>3.Revenue from POC collected from CPPs, has to be allocated between the transmission and distribution systems in proportionate of their fixed costs</p> <p>4. POC charges = Installed capacity of CPP x Rate of POC (Rs./ kVA/ month)</p> <p>Transmission & Distribution Cost: Fixed Cost: Rs.1797.95Cr Connected load: 28275.29MVA</p> <p>Tariff being implemented is Rs.26.5/kVA/Month</p>	<p>for FY 2022-23 Transmission & Distribution Cost: Fixed Cost:Rs.13286 Cr</p> <p>Connected load:42882MVA Determined Value= Rs.258/kVA/Month</p> <p>POC Rate = 50% of Determined Value</p> <p>Equivalent Value:Rs.129/kVA/Month</p>

TSDISCOMs Latest Proposal to GCC.

The Captive Power Plants continue to get connected to the licensee network system and operate their plant in synchronism with the grid due to certain benefits which cannot be physically measurable. Thus, the grid acts as the supporting system for the CPPs for its successful operation in terms of electrical performances. However, the grid support being an ancillary service extended by the licensee to the consumers, it has to be charged to the consumers who utilize the grid support.

Further, TSDISCOMs explained the reasons in the 3rd GCC meeting for revision of proposal is that, earlier proposal to Hon'ble TSERC is on differential capacity i.e., Installed Capacity minus Contracted Demand with Discom was as per the Hon'ble APERC Order of year 2002. Even it is on differential capacity, most of the generators thought that DISCOMs proposed very high charges. By keeping those considerations, DISCOMs proposed in line with other states, is as follows.

TSDISCOMs proposal	
Grid Support Charges (GSC)	Total installed capacity of generator x Rate of GSC (Rs./ kW/ month)
Rate of Grid Support Charges	15% of Demand Charge (Conventional generators) 10% of Demand Charge for HT (Rooftop Solar under net metering/gross metering, RE plants including WHRP, Municipal solid waste, Co-gen, etc.) 50% of Fixed Charge for LT(Rooftop Solar under net metering/gross metering)

4. PRESENTATION OF GCC ANALYSIS AND STUDY REPORT TO MEMBERS

GCC organized a 3rd meeting on 16.07.2022 at 14:00Hrs at Vidyut Soudha, to present analysis and study report to members and further deliberate the issue of Parallel Operation of CPPs and consequent levy of Grid Support Charges(GSC).

During the meeting Member Convener, GCC explained the brief background of the subject, the views expressed by members in the 2nd GCC meeting, data collected from various sources, Hon'ble Chhattisgarh State Electricity Regulatory Commission Report, data submitted by TSDISCOMs, Analysis and Study report carried out by SLDC along with advantages to CPPs and advantages to Utility in Parallel Operation of CPP with Grid. The subject is putforth in the meeting for deliberation by members.

The following are the views/opinions expressed by GCC Members.

A) Representative of Generating Companies – Thermal (other than state generating companies):

General Manager/Commercial/ Nava Bharat Energy India Limited, Representative of Thermal Generating Companies, presented the following views:

Grid support is required for a shorter period. For export of surplus power & for import of start-up power grid support is required. The fluctuations/harmonics are not only absorbed by the grid but also by CPPs.

Representative requested for a Detailed System Study by Third Party for analysing the issue of Grid Support.

Regarding charges member expressed the following views.

Grid Support Charges are being collected in different states by different methods and at the same time there is no charges being collected in so many states like Karnataka, Odisha, West Bengal etc.

i) Recently Andhra Pradesh issued order for Parallel Operation Charges as Rs.50/kW/month considering R&M Cost. Based on this method TSDISCOMs arrived Rs.50/kW/month including Artisan Employee Cost. It is Requested for excluding the Artisan Employee Cost.

ii) Requested for delink this percentage from the Demand Charges and arrive a fixed number. Few of the states have in the range of Rs.20 to Rs.30 and Andhra Pradesh has Rs.50/kW/month.

iii) Requested to limit the charges to Captive Load of the CPP, as the entire installed capacity is not used for captive consumption purposes.

In summary, representative submitted the following to GCC:

1. Not to impose Grid Support Charges on CPPs.
2. For Detailed System Study by Third Party.
3. Delinking the charges from percentage of Demand Charges and arrive a fixed Number.
4. For more than 2 months in a year if the plant is under shut down, exempt the levy of the charges for the Shut Down Period.
5. In case Hon'ble TSERC considers the proposals of DISCOMs, to Limit Grid Support Chages to Rs.20 to Rs.25 (max) per kW per month.

6.Limit the levy of Grid Support Chages to Captive Load of the CPP.

7.Exempt the export capacity from purview of levy of Grid Support Charges.

Further, Representative of Thermal Generating Companies vide letter dated 21.07.2022 submitted their written submissions.

B) TSDISCOMs

TSSPDCL

Member Convener, GCC requested TSDISCOMs to explain the reason for submitting the revised proposal dated 07.07.2022.

TSDISCOMs explained that, earlier proposal to Hon'ble TSERC is on differential capacity i.e., Installed Capacity minus Contracted Demand with Discom, was as per the Hon'ble APERC Order of year 2002. Even it is on differential capacity, most of the generators thought that DISCOMs proposed very high charges. By keeping those considerations, DISCOMs proposed in line with other states. Final proposal submitted to GCC on 07.07.2022, for submitting the same to Hon'ble TSERC.

The request of Member representing Generating Companies – Thermal, to refer the matter for analysis to third party, is highly objectionable. Hon'ble Supreme Court issued judgement after thorough analysis. The views of member is such that not honouring the judgement of Hon'ble Supreme Court. Further informed the forum that many other states are also levying Grid Support Charges.

TSNPDCL

It was informed the forum that Grid Support charges are facilitation charges and not penalty, as pointed out by Member representing Generating Companies – Thermal. There are various judgements including Hon'ble Supreme Court Judgement. Grid Support Charges are certainly leviable on CPPs.

Further, TSDISCOMs vide letter dated 26.07.2022 communicated their written submissions with regard to the proposal of levy of Grid Support Charges.

C) CESS, Siricilla – CESS agreed that Grid Support is required. Regarding Charges proposals of DISCOMs are agreed.

D) Representative of Generating Companies – Solar:

Renew Power Ltd. representatives informed that, technically Grid Support is required. But even running in island mode when the plant trips, for startup definitely Grid Support is required. Further requested Solar Captive Power Plants has to be exempted from levy of Grid Support Charges.

E) Representative of State Generating Companies - TSGenco:

TSGenco informed forum that, Grid Support is required. With respect to charges TSGenco agreed with the proposal of DISCOMs.

F) Representative of STU & Person Nominated by Hon'ble TSERC under clause 5.3(n) – Chief Engineer/Transmission:

Chief Engineer/Transmission/TSTransco informed forum that, Grid Support is required & agree with DISCOMs Proposal.

G) Southern Regional Load Despatch Centre – Representative of SRLDC informed the forum that, they will be limiting to technical part only.

Beyond doubt Grid Support is required, interms of studies regional level, national level PSS/E software is only used. Further the PSS/E software is used across nation for technical studies.

With respect to short circuit level, definetly there is contribution from CPP also but the level of contribution as compared to grid would be in different scale.

Interms of Voltage support and interms of stability also Grid support is required. Even for the black start also it is required.

With respect to charges it was informed that, we will not be able to comment.

H) Southern Regional Power Committee - Representative of SRPC informed the forum that, Grid Support is required. Further vide mail dated 19.07.2022 SRPC communicated their Observations/Comments on the agenda. In the written observations it is mentioned that, by parallel operation of CPPs with Grid there are many advantages to CPPs in meeting technical requirements during operation similar to other generating stations connected to the integrated grid and CPPs also contribute to the grid during parallel operation (may not be much appreciable as the capacity connected is meager considering the large grid).

Parallel Operation Charges may be included in the connectivity charges as reliability charges.

I) Singareni Thermal Power Plant – Representative of STPP informed that Grid Support is required.

J) NSL Krishnaveni Sugars Ltd., Representative of Bagasse Generating Companies

Grid support is needed, with respect to charges Rs./kVA/Month (Gujarat Method) will be preferable.

K) MRF Ltd., Representative of Open Access Consumers

As far as stability is concerned, Grid support is required.

L) There is no representation from the following members of GCC:

a) M/s PTC India Ltd. – Trader Member

b) Gowthami Bio Energies Pvt. Ltd., Representative of Biomass Generating Companies

c) Mytrah Vayu (Godavari) Ltd., Representative of Wind Generating Companies

d) SLS Power Corporation Ltd., Representative of Mini Hydel Generating Companies

Copy of 3rd GCC minutes of meeting enclosed as Annexure – D.

5. CONCLUSION

GCC being a forum consisting members representing various entities connected to the Grid and analysed the subject in a thorough manner in accordance with directions of Hon'ble TSERC.

GCC organized two coordination meetings and the members were actively involved in the deliberations of the subject and expressed their opinions/submitted their written views.

GCC organized the first meeting on Dt:11.05.2022 on the subject to understand the issue and for taking the views of members. GCC analysed the views expressed/submitted by members, TSDISCOMs Proposals on the issue and Data from various Sources. A detailed presentation was presented by Member Convener, GCC during the second meeting held on Dt:16.07.2022. The issue was discussed elaborately.

The summary of deliberations and recommendations are as follows:

- a) After going through the Analysis and Study Report, all the members present are accepted for Technical Support of Grid for Parallel Operation keeping in view of Stability, Reactive Power Management, Fault level support to CPPs.**
- b) In respect of Grid Support Charges, majority members are accepted for levy of charges for Parallel Operation and expressed that the charges shall be reasonable.**
- c) TSDISCOMs proposed levy of charges for full capacity of CPP instead of differential capacity by reducing the initial proposed 50% of Demand Charge to 15% of Demand charge.**

Further TSDISCOMs have introduced Grid Support Charges to the following Generators.

- i) 10% of Demand Charge for HT (Rooftop Solar under net metering/gross metering, RE plants including WHRP, Municipal solid waste, Co-gen, etc.)**
 - ii) 50% of Fixed Charge for LT (Rooftop Solar under net metering/gross metering)**
- d) Some of the members requested to limit the levy of charges to Captive Load (for avoidance of doubt Captive Capacity) of the CPP.**

6. SPECIFIC RECOMMENDATION

Further to the detailed Report submitted by Grid Coordination Committee(GCC) vide letter Dt:05.08.2022 on the issue of Parallel Operation of CPPs and consequent levy of Grid Support Charges(GSC), Hon'ble TSERC vide letter dated 05.09.2022 directed GCC to give detailed presentation on the Report on 07.09.2022.

Accordingly, GCC presented the Report to Hon'ble TSERC in a detailed manner. Subsequently, Hon'ble TSERC vide letter dated 16.09.2022 opined that the report of GCC is incomplete and directed the GCC to submit its final report with specific recommendation on levy of Grid Support Charges duly proposing the methodology for calculation of GSC to the commission on or before 30.09.2022.

Further as per the request of Chair Person GCC for extension of time, Hon'ble TSERC vide letter dated 25.10.2022 granted extension of time to GCC and directed to submit final report on or before 30.10.2022. Subsequently, GCC requested to grant an additional 20days time for submission of final report.

In this Connection GCC submits the following:

Keeping in view of conclusions during GCC meeting held on Dt:16.07.2022, indicated at items (a), (b) & (d) of above chapter to limit the Grid Support Charges to a reasonable amount, in line with other states and also Hon'ble TSERC direction to limit the GCC recommendation to the extent of terms of reference to the committee about finalisation of Methodology and Charges with reference to proposal of Discoms during

Retail Supply Tariff Proposals, the specific methodology proposed by GCC is as follows.

Methodology for Calculation of GSC:

Grid Support Charges (GSC)	Differential Capacity x Rate of GSC (Rs./ kVA/ month)
Differential Capacity	Total Capacity of CPP in KVA –Contracted Maximum Demand in kVA with the Licensee - All other sources of supply - CPPs exporting firm power to TSTRANSCO
Rate of Grid Support Charges	25% of the prevailing demand charge for respective HT consumers

Justification for levying on Differential capacity:

- The Captive generating plant is defined in the Electricity Act 2003 as

“Captive generating plant” means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any co-operative society or association of persons for generating electricity primarily for use of members of such cooperative society or association”
- As per the above definition the generation from other sources of supply (if any taken) and the firm power exported to the TSTRASNCO (if any) cannot be considered as captive.
- Further as per the Electricity Rules 2005 clause (3) Requirements of Captive generation plant the captive user is explained as below:

“b. “Captive User” shall mean the end user of the electricity generated in a Captive Generating Plant and the term “Captive Use” shall be construed accordingly”

- As per the above definition and explanation, the wheeling quantum of the captive consumer from the respective captive plant will be treated as captive only.
- Considering the above, the proposed method for arriving captive capacity for levy of Grid support charges by TSDISCOMS is justifiable.
- Further, the list of captive power plants and working sheet for arriving differential capacity are herewith enclosed for perusal of Hon’ble TSERC.

Justification for Rate of Grid Support Charges:

- Keeping in view of the power crisis at that time, the central government and the then AP state government have notified Captive power policy. The CPPs were promoted by the government and permissions were accorded by State government /State ERC.
- Accordingly, various consumers have installed CPPs to meet their power requirement by operating the CPPs in parallel with the grid by duly de-rating their respective CMD with the DISCOMs considerably.
- In view of the above, the then APTRANSCO has proposed grid support charges for the first time to recover the fixed charges of the respective HT consumers at a rate of prevailing HT demand charges. The then State ERC after deliberations with all the stake holders finalized the rate to levy of grid support charges with the following methodology in Tariff order 2002-03

“The Commission approves the proposals of APTRANSCO to levy Grid Support Charges where parallel operation of CPPs is permitted, on the difference between the total capacity of CPP in kVA and the Contracted Maximum Demand in kVA with the Licensee and all other sources of supply, but at a rate equal to 50% of the prevailing Demand Charge for HT Consumers, (which at present is Rs.170 per kVA/month). In case of CPPs exporting firm power to APTRANSCO, the capacity, which is dedicated to such export, will also be additionally subtracted from the CPP capacity”, to strike balance between the CPPs and DISCOMs.

- It may be noted that, even though there is certain quantum of power wheeled through APTRANSCO grid as per the power purchase and wheeling agreements entered between APTRANSCO and certain generators at that point of time, the respective export quantum cannot be considered as “firm export power to APTRANSCO” in the above methodology as the wheeled quantum is uncertain and will vary in accordance with the load requirement.
- Aggrieved by the above order, certain generators approached various legal forums. The matter is pending before various legal forums from 2002 to 2019. Finally, Hon'ble Supreme Court upheld the power of State ERC to decide upon the wheeling charges and grid support charges matters in the year 2019.
- Since the Hon'ble Supreme Court upheld the tariff order 2002-03, the same methodology for grid support charges was proposed in RST 2022-2023 by TSDISCOMs.

➤ **These previous events are well deliberated and all the members accepted for technical support of grid and requested that charges shall be reasonable, in line with other states.**

Keeping in view of conclusions in the meetings, GCC recommend 25% of the prevailing demand charge for respective HT consumers instead of 50% of the prevailing demand charge proposed by Discoms, to strike balance between CPPs & Discoms.

*** * * * ***

Details of CPPs of TSSPDCL

Sl.No.	Name of the Captive Power Plant	SC.No	Type of fuel	Name of the Connecting Substation	Voltage level	Installed Capacity (MW)	Power factor	Installed Capacity (MVA)	Contracted Maximum Demand with Discom (MVA)	Export Capacity/Sale to Discoms (MVA)	Differential Capacity (MVA)
1	M/s Penna Cement Industries Ltd	NLG718	Coal (77) + WHRP (7)	132KV Ganeshpahad Switching station	132KV	84	0.8	105.00	10	0	95.00
2	M/s Home Industries Limited	SPT351	Coal (88.5) + WHRP (13.5)	132KV Vepalasingaram SS	132KV	102	0.8	127.50	10	0	117.50
3	M/s Sitapuram Power Limited (now Zuari Cements Limited)	SPT543	Coal	132/33 kV Sitapuram Switching SS	132KV	43	0.8	53.75	2.5	0	51.25
4	M/s The India Cements Ltd	NLG162	Coal (50.4 MW) + WHRP (9.625 kVA)	132/33 kV Wadapally SS	132KV	58.1	0.8	63.01	16	0	47.01
5	M/s Deccan Cements	SPT415	WHRP	132 kV Ganeshpahad Switching Sub Station	132KV	6.31	0.8	7.89	10.25	0	
6	M/s Bharath Electronics limited	SGR2363	Solar	220/132 KV Yeddumailaram SS	132KV	16.25	0.9	18.06	0.07	0	17.99
7	M/s Heritage Food Limited	SDP1950	Solar	33/11 KV Adavi Masjid SS	33KV	2.34	0.9	2.60	0.07	0	2.53
8	M/s Unshodaya Enterprises Limited	MBN1159	Solar	132/33 KV Midjil SS	33KV	10	0.9	11.11	0.07	0	11.04
9	M/s Vishaka Industries	NLG1053	Solar	132/33 KV Madgulapally SS	33KV	2.5	0.9	2.78	0.07	0	2.71
10	M/s Pennar industries	VKB1746	Solar	33/11KV Mominpet SS	33KV	2.5	0.9	2.78	0.07	0	2.71
11	M/s Tropical Flavour	RJN1982	Solar	132/33KV Amangal SS	33KV	1.2	0.9	1.33	0.07	0	1.26
12	M/s BVM energy & Residency Pvt Ltd	SGR2007	Solar	33/11KV Hatnoor SS	33KV	5	0.9	5.56	0.07	0	5.49
13	M/s Sarwottam Care Pvt Ltd	MCL2803	Solar	33/11 KV Ravikole SS	33KV	3	0.9	3.33	0.07	0	3.26
14	M/s Infosys Ltd	HBG2975	Solar	33/11 KV Singapore city SS	33KV	6.636	0.9	7.37	0.07	0	7.30
15	M/s JNTU	SGR2103	Solar	132/33 KV Annasagar SS	33KV	4	0.9	4.44	0.5	0	3.94

Details of CPPs of TSSPDCL

Sl.No.	Name of the Captive Power Plant	SC.No	Type of fuel	Name of the Connecting Substation	Voltage level	Installed Capacity (MW)	Power factor	Installed Capacity (MVA)	Contracted Maximum Demand with Discom (MVA)	Export Capacity/Sale to Discoms (MVA)	Differential Capacity (MVA)
16	M/s Bharath Dynamics Ltd	SGR2448	Solar	33 /11KV Nandigama SS.	33KV	5.1	0.9	5.67	0.07	0	5.60
17	M/s DRES Energy Pvt Ltd	MCL3069	Solar	220/132/33 KV Shapur SS, 33 /11KV D.P.Pally SS.	33KV	7.1	0.9	7.89	0.07	0	7.82
18	M/s DRES Energy Pvt Ltd	SGR2311	Solar	132/33 KV Sadasivpet SS, 33/11 KV Kamkole SS	33KV	8	0.9	8.89	0.07	0	8.82
19	M/s Mishra Dhatu Nigam Ltd	SRN3118	Solar	33/11 KV Lenin Nagar SS	33KV	4	0.9	4.44	0.07	0	4.37
20	M/s Bharath Dynamics Ltd	SRN3180	Solar	33/11 kV Mangalapally SS	33KV	5	0.9	5.56	0.07	0	5.49
21	M/s Sneha Renewable Energies	SPT1041	Mini Hydrel	33/11 kV Keethavarigudem	33 kV	0.9	0.9	1.00	0.07	0	0.93
22	M/s SNS starch	GDL917	Bio Mass	33/11KV Kodandapur SS	33KV	4	0.9	4.44	1	0	3.44
23	M/s Bravo Energies Pvt Ltd	SPT1038	Mini Hydrel	33/11 KV Huzurnagar SS	33KV	1.2	0.9	1.33	0.07	0	1.26
24	M/s Bambino Pasta Food industries Ltd	YDD846	Solar	132/33KV Bibingar SS	33KV	2	0.9	2.22	1.503	0	0.72
25	M/s BHEL	CBC2856	Solar	132/33KV RC Param SS	33KV	1.5	0.9	1.67	0.07	0	1.60
26	M/s Rain Cements Limited	SPT105	WHRP		132 kV	4.5	0.9	5.00	12.5	0	
27	M/s Sai Deepa Rock Drills Pvt Ltd	YDD1170	Solar	33/11 KV Pedda thanda SS	33KV	1.1	0.9	1.22	0.07	0	1.15
28	M/s NVNR-I	YDD1315	Solar	132 /33 KV Ramannapet SS.	33KV	15	0.9	16.67	0.07	0	16.60
29	M/s NVNR-II	YDD1316	Solar	132 /33 KV Ramannapet SS.	33KV	15	0.9	16.67	0.07	0	16.60
30	NCL Industries	SPT209	WHRP		132 kV	11	0.9	12.22	25.35	0	
						421		499	66	0	443

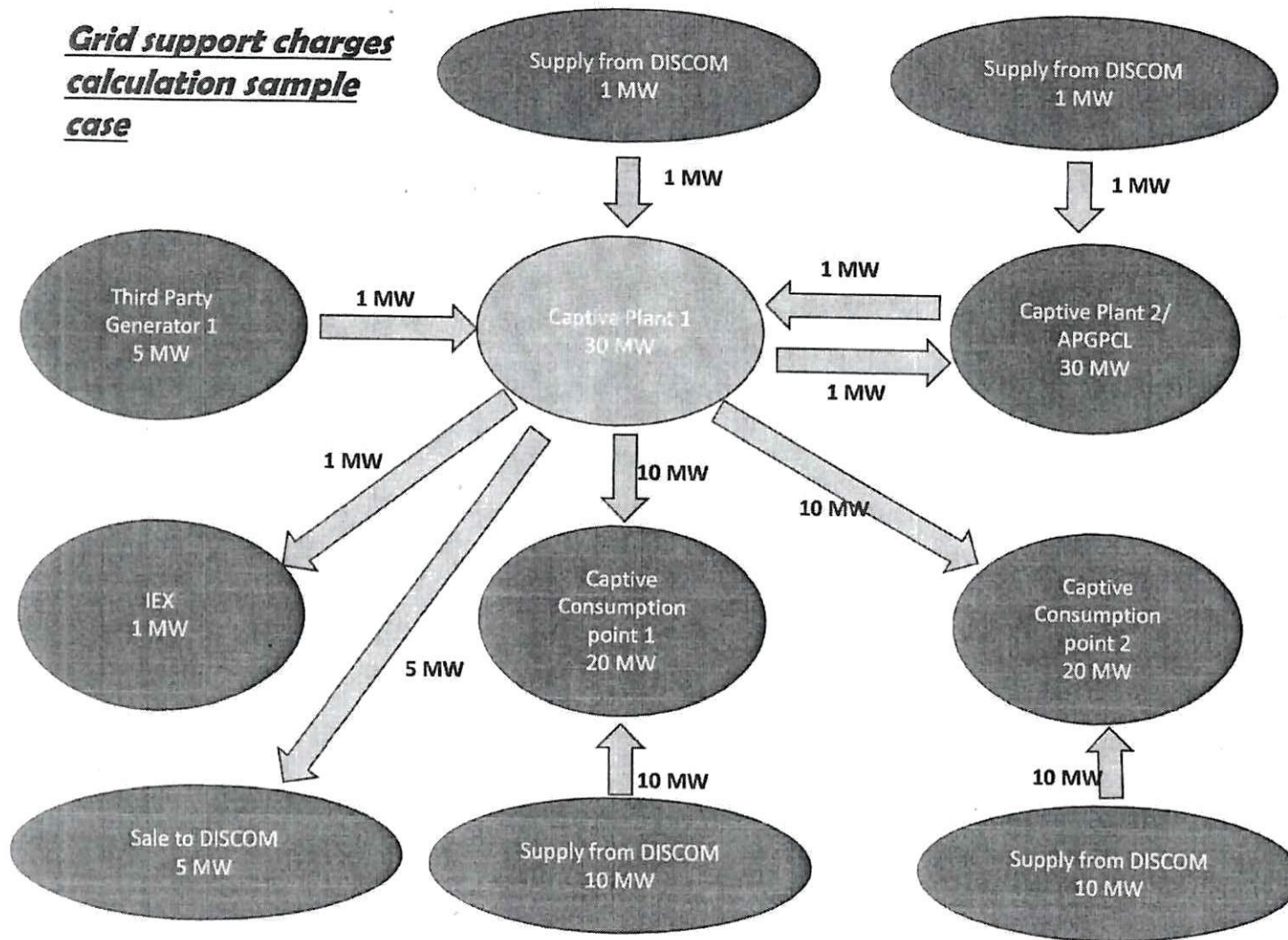
Details of CPPs of TSNPDCL

Sl.No	Name of the Captive Power Plant	S.C.No.	Type of fuel	Voltage level	Name of the Connecting Substation & Voltage Level	Installed capacity in MW	Power factor	Installed Capacity (MVA)	Contracted Maximum Demand with Discom (MVA)	Export Capacity/Sale to Discoms (MVA)	Differential Capacity (MVA)
1	M/s. Sirpur Paper Mills Ltd.	<u>KMB-001 (New)</u> ADB-009 (Old)	80% Coal 20% Bio-Mass	132KV	132/33KV SS Sirpur	24.50	0.8	30.63	6.000	0	24.625
2	M/s. Orient Cement	<u>MCL-007 (New)</u> ADB-018 (Old)	Coal	132KV	132/33KV SS Bellampally	50.00	0.8	62.50	6.000	0	56.500
3	M/s Luxmi Tulasi Agro Paper Limited	<u>BKM-049 (New)</u> KMM-305 (Old)	80% Coal 20% Bio-Mass	33KV	132/33KV SS Aswaraopet	16.00	0.8	20.00	0.800	0	19.200
4	M/s Kesoram Cements	<u>PDL-002 (New)</u> KRN-002 (Old)	Coal	132KV	132/33KV SS Malyalpally	15.70	0.8	19.63	6.200	0	13.425
5	M/s Navabharat Ventures Ltd.	<u>BKM-001 (New)</u> KMM-026 (Old)	Coal	132KV	220/132/33KV SS Seetharampatnam	114	0.8	142.50	2.000	0	140.500
6	M/s Heavy Water Plant	<u>BKM-013 (New)</u> KMM-039 (Old)	93.4 MW Coal 12 MW Solar	220KV	220/132KV SS Managuru	93.4	0.8	116.75	8.000	0	108.750
7	M/s ITC Ltd.	<u>BKM-011 (New)</u> KMM-036 (Old)	80% Coal 20% Bio-Mass	132KV	220/132 KV SS Seetharampatnam	145.2	0.8	181.50	15.000	0	166.500
8	M/s Gayathri Sugars Limited	KMR134	Bagasse	33 KV	132/33KV SS Kamareddy	9	0.8	11.25	1.000	7.50	2.750
9	M/s. Ramagundam Fertilizers & Chemicals Ltd.	PDL-250	Gas Turbine Generator	220KV	220/132 KV RSS Malyalalpally	27.5	0.8	34.38	30.000	0	4.375
10	M/s. Valens Molecules Pvt. Ltd., (Formerly M/s POSH Chemicals P Ltd.)	KMR-053/75 KVA	Solar	33KV	33/11 KV SS Rajampet	1	0.9	1.11	0.075	0	1.036

Details of CPPs of TSNPDCL

Sl.No	Name of the Captive Power Plant	S.C.No.	Type of fuel	Voltage level	Name of the Connecting Substation & Voltage Level	Installed capacity in MW	Power factor	Installed Capacity (MVA)	Contracted Maximum Demand with Discom (MVA)	Export Capacity/Sale to Discoms (MVA)	Differential Capacity (MVA)
11	M/s. Hyderabad Institute of Oncology Pvt. Ltd.	KMM-1173/70 KVA	Solar	33KV	33/11 KV SS Beerolu	1	0.9	1.11	0.070	0	1.041
12	STPP	ADB-132/28MVA	Solar	33KV	132/33 KV SCCL SS	10	0.9	11.11	28.000	0	
13	Manuguru, Bhadradi Kothagudem Dist.	BKM-163	Solar	132KV	220/132/33 KV Manuguru SS	30	0.9	33.33	0.150	0	33.183
14	Ramagundam, Peddapally Dist	<u>PDL-001 /46 MVA</u>	Solar	132KV	132/33 KV OCM SS	50	0.9	55.56	46.000	0	9.556
15	Yellandu, Bhadradi Kothagudem Dist.	BKM-169	Solar	132KV	132/33 KV Yellandu SS	39	0.9	43.33	0.300	0	43.033
16	Bhupalapally, Jayashankar Bhupalapally Dist.	BPL-098	Solar	33KV	132/33 KV Chelpur SS	10	0.9	11.11	0.150	0	10.961
17	Kasipet Mine, Mandamarri area, Mancheri Dist.	MCL-127	Solar	33KV	132/33 KV Bellampally SS	15	0.9	16.67	0.100	0	16.567
18	Mandamarri, Mancheri Dist.	ADB-132/28MVA	Solar	132KV	132/33 KV SCCL SS	28	0.9	31.11	28.000	0	3.111
19	Kothagudem, Bhadradi Kothagudem Dist.	BKM-180	Solar	132KV	220/132/33KV SS Seetharampatnam	37	0.9	41.11	0.250	0	40.861
						716.30		864.68	178.10	7.50	695.97

Grid support charges calculation sample case



For Captive plant 1 :

Installed capacity: 30 MW
Power from all sources : 3 MW

Taken from 3 sources

1. DISCOM: 1MW
2. Captive plant 2: 1 MW
3. Third party Generator: 1MW

Auxiliary consumption : 3 MW

Open Access to

Captive consumption point 1: 10 MW

Captive consumption point 2: 10 MW

Captive plant 2/APGPCL: 1 MW

IEX sale: 1 MW

Sale to DISCOM: 5 MW

The capacity for which the Grid support charges is to be levied =

installed capacity - Power from all sources (not captive generation for that particular plant) - power sold through IEX (not captive consumption)- Firm export to Grid (not captive consumption).

$$= 30 \text{ MW} - 3 \text{ MW} - 1 \text{ MW} - 5 \text{ MW}$$

$$= 21 \text{ MW}$$