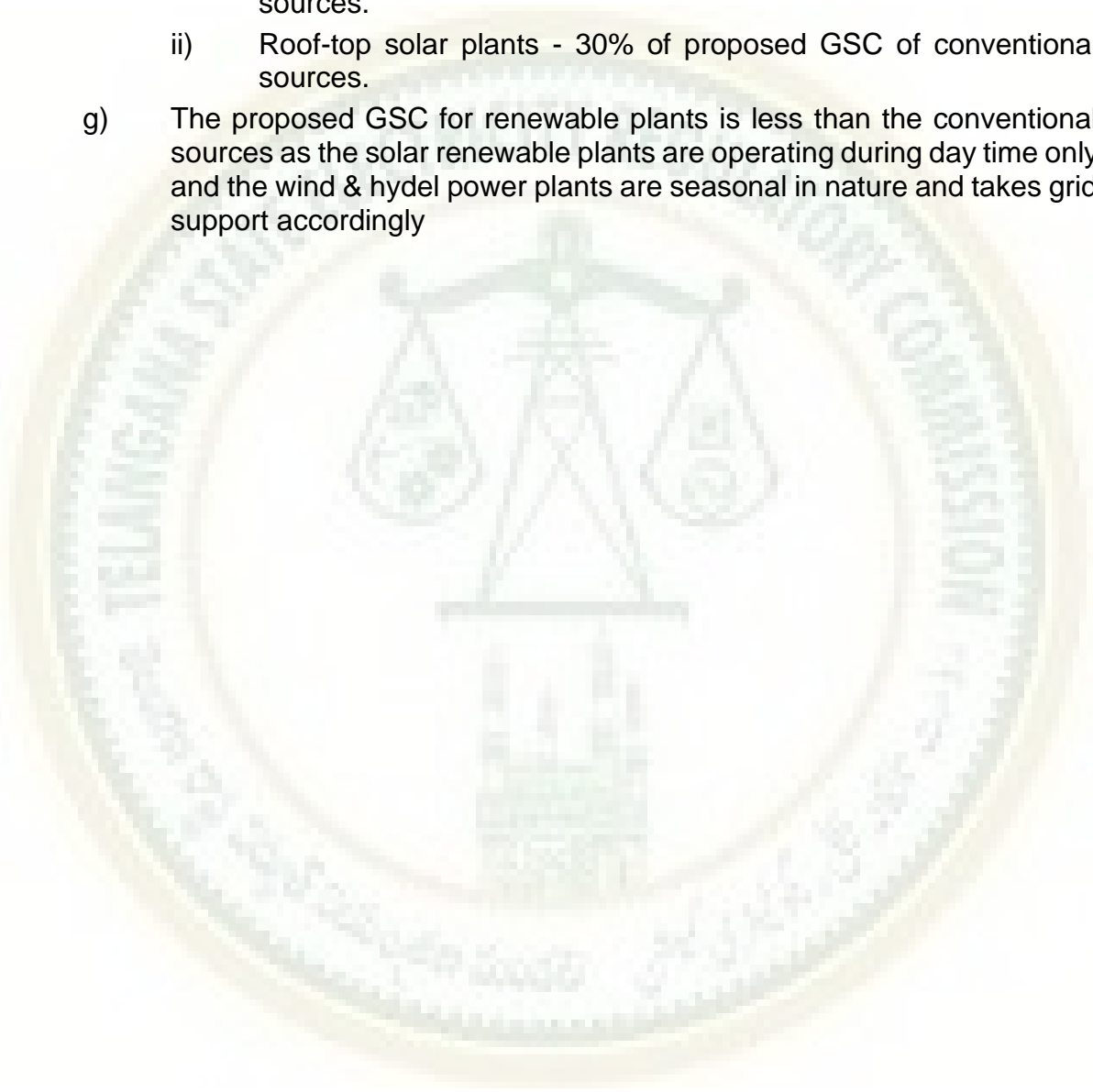


- d) Further, various exemptions were also proposed by the TSDISCOMs, as sought by certain members in the GCC meetings.
- e) Even though the proposal is on installed capacity, it is advantageous to the conventional generators as various exemptions are brought in to the proposal duly considering the requests made by the conventional generators as well as co-generation and seasonal generators.
- f) The GSC proposed for renewable plants is as follows:
  - i) Solar, wind, hydel - 50% of proposed GSC of conventional sources.
  - ii) Roof-top solar plants - 30% of proposed GSC of conventional sources.
- g) The proposed GSC for renewable plants is less than the conventional sources as the solar renewable plants are operating during day time only and the wind & hydel power plants are seasonal in nature and takes grid support accordingly



## CHAPTER-3

### ISSUES RAISED BY STAKEHOLDERS, RESPONSES OF PETITIONER AND COMMISSION'S VIEWS

#### 3.1 OBJECTIONS/SUGGESTIONS

3.1.1 In response to the Public Notice, twenty-one (21) stakeholders/consumer organizations have filed their written objections/suggestions on the proposals of TSDISCOMs and on the GCC report dated 07.10.2023 for levy of GSC for FY 2023-24. The TSDISCOMs have filed the replies on the objections/suggestions received from the stakeholders/consumer organizations. All the objections/suggestions raised by the stakeholders/consumer organizations in writing as well as during the Public Hearing held on 08.01.2024 and responses of TSDISCOMs have been consolidated and summarized issue-wise. The Commission has concluded all the objections/suggestions of the stakeholders and the responses to them by the TSDISCOMs.

3.1.2 Before dwelling into the present objections/suggestions of stakeholders on the GCC report, the stakeholders submissions, TSDISCOMs replies and Commission's view given in the RST Order for FY 2022-23 and RST Order for FY 2023-24 in the matter of grid support charges are reproduced below for ready reference:

**A: RST Order for FY 2022-23 dated 23.03.2022**

"Stakeholder's Submissions

Proposed levy of Grid Support Charges

3.10.11 *The proposal of DISCOMs to levy Grid Support Charges (GSC) for Captive Power Plants (CPPs) operating in parallel with the State grid is based on the judgment of the Hon'ble Supreme Court in C.A. No.4569 of 2003 and batch passed on 29.11.2019 upholding the Order of erstwhile APERC for levy of grid supporting charges from FY 2002-03 to FY 2008-09. The Commission may consider to include co-generation plants within the ambit of definition of plants operating parallel with the grid to avoid misinterpretation of certain cogeneration plants that they are not CPPs. Cogeneration plants, though different from CPP so far as the operation is concerned, are not different on the aspect of operation in parallel with the grid. The levy of GSC needs to be reckoned from FY 2014-15 pursuant to the judgements of APTEL and Supreme Court. When disputes pertaining to past period are settled, making applicability of the order with retrospective effect is common practice.*

3.10.12 *Though the CPPs are not profit centers, substantive investments were made by the industry units to meet the power shortages and were also insisted by the erstwhile APSEB for the same reason to meet the power*

shortages. The current proposal of GSC by the DISCOMs is just the same as the case initially approved vide erstwhile APERC Order dated 08.02.2002 in O.P.No.1 of 1999 wherein GSC was proposed at 50% of the then applicable Demand Charges of Rs.170/kVA/month. In the present context, the proposal for levy of GSC is not supported by any data substantiating that grid is suffering to this extent because of parallel operation of CPPs. It is to be noted that earlier Order was issued before enactment of Act where there was a lot of grid indiscipline and there was no concept of SLDC and open access. The Act promulgated in 2003 does not differentiate between CPP and IPP as far as grid connectivity is concerned. The original levy of GSC in the year 1999 was when the generation shortfall was prevailing and the DISCOMs were going through occasional Restriction and Control (R&C) periods and frequency fluctuations, etc. and the regulators consideration for GSC had merits. However, the grid of Telangana has since improved/made many strides in size, availability and attained stability.

- 3.10.13 There is no provision in the Act or in any Regulation of the Commission to determine the GSC. Further, the National Electricity Policy, 2005 lay emphasis on grid connectivity of captive generators. As per the Act, the transmission and distribution licensees are only mandated to levy transmission/wheeling charges upon the CPPs availing open access for transmission and wheeling of power from generation to consumption point. In case the captive user has its own dedicated transmission line, even the aforesaid charges cannot be levied.
- 3.10.14 The levy of GSC is under the purview of TSSLD only and TSTransco and DISCOMs have nothing to do with GSC. The support for the grid at the times of increases/decreases of consumer demand is being provided by all the generators including state generators, IPPs, CPPs and co-generation plants and DISCOMs are no way providing any support.
- 3.10.15 The transmission system of the TSTransco/DISCOMs has to be designed in such a way that it takes care of fluctuating load and moreover, variation of load of a consumer having CPP is much less than a consumer without CPP. It is to be noted that unbalanced voltage of the grid is a source of negative phase sequence which is absorbed by the CPP. The parallel operation of CPPs with the grid is highly beneficial, otherwise, during a fault the grid voltage would have collapsed.
- 3.10.16 As per the Supply Code, Industries having CPPs can draw emergency power up to the capacity of largest generating unit by paying required tariff. Therefore, it is not a support of the grid as claimed by the DISCOMs. The drawl of power for generation purposes is limited to the Contracted Maximum Demand (CMD) as per the Supply Agreement with the DISCOM, otherwise penalty is attracted. Further, overdrawal from the grid is prevented by proper setting of the relay at the grid substation. Due to injection of power by CPPs the load on the transformers in the grid reduces resulting in lower transformer loss. It is incorrect to state that the active and reactive power demand due to sudden and fluctuating load is not recorded in the meter as the billing is done for all consumers

*by integration over 15 minutes period and this is also applicable for CPPs which does not result in any undue advantage.*

- 3.10.17 The CPPs act as distributed generator at the load center for which T&D loss has been reduced to great extent. Further, since all the cost of the transmission utilities is being covered under the ARR approved by the Commission, there is no scope for levying such additional charges. On the contrary to the claim of the DISCOMs the grid is being benefited and the CPPs are facing lot of problems due to irregularities of grid operation. The DISCOMs/TSTransco are not taking any measures to install suitable equipment to filter harmonics.*
- 3.10.18 GSC to standalone CPPs cannot be levied as the TSTransco is availing various advantages of grid support from CPPs by way of utilizing surplus power from CPPs in a power deficit situation, receiving VAR support and fault MVA support for the grid.*
- 3.10.19 TSTransco being the State Transmission Utility (STU) has the responsibility to maintain the network as per Section 39 and 40 of the Act. As per Grid Code, all the users or prospective users of STU are to be treated equal. Further, Section 9 of the Act does not differentiate between CPP and IPP as far as grid connectivity is concerned and hence both have to be treated equally. Moreover, industries owning arc furnaces and rolling mills but without CPPs creates much bigger problems and create pollution in the state grid as compared to an industry having CPP. The fluctuation in the load, generation of odd harmonics are technical issues which are common for industries with CPPs and without CPPs.*
- 3.10.20 Section 2(32) of the Act defines grid as the high voltage backbone system of interconnected transmission lines, substation and generating plants which implies that CPPs and generators are part and parcel of the grid. Therefore, it is not justifiable as to how one part of the grid is asking support charges from other part. Under such condition of dynamism all the constituents of the integrated grid system are mutually benefited as well as become victims of the vagaries created. Thus, the very concept of levying GSC seems to be absurd.*
- 3.10.21 CPPs involve heavy capital investments and are necessitated to provide fillip to the main consumption industry utilizing captive power at reasonable rate as opposed to fluctuating and ever-increasing grid tariff. The proposed levy of GSC aims to stifle the consuming industries by this arbitrary levy, which in turn erodes the viability of the principal industry to a point that it must perforce cease operations.*
- 3.10.22 CPPs have repeatedly expressed their willingness to provide additional protections in their facilities as desired by the grid to see that no unwanted load throwbacks or fault currents or reactive power surges happen. Further, majority of CPPs also pay for the operation and maintenance expenses of switching substation.*
- 3.10.23 The method of computation of GSC proposed by the DISCOMs is not justified and consequent rate is exorbitantly high. The Commission may consider to appoint an independent third party for conducting a thorough study of the grid for the necessity, evaluation and derivation of a reasonable rate towards GSC. Till such independent study is conducted*

and results discussed with stakeholders through a consultation process, the GSC may not be implemented. In case the proposed GSC is considered, a CPP having installed capacity of 100 MW has to pay GSC of Rs.2.97 crore per month and Rs.35.63 crore per annum. The proposed levy of GSC at such a high rate will have adverse impact on for large process industries which depend upon captive power at reasonable cost and results in closure of operations and in loss of direct and indirect employment aside from loss of revenue to the exchequer.

- 3.10.24 The prevailing parallel operation charges, which are equivalent to proposed GSC, in the other states such as Chhattisgarh, Gujarat, Jammu & Kashmir, Rajasthan, Tamil Nadu and Madhya Pradesh are in the range of Rs.20- 30/kVA/month and the same have been approved only after due prudence check through third party analysis if the grid suffers any forbearance in providing parallel operations of CPPs. In the States of Odisha, West Bengal Kerala and Karnataka there are no such parallel operation charges. The Commission may also refer to the Order of Odisha Electricity Regulatory Commission (OERC) dated 31.03.2014 in Case No.46 of 2012 wherein OERC has not allowed the levy of GSC on CPPs.
- 3.10.25 Even assuming that GSC is applicable, the DISCOMs have not specified the total CPPs capacity in their proposals and the impact such levy may have on such CPPs. Further, while arriving at the CPP capacity, auxiliary consumption has to be excluded along with the capacity that the CPP exports.
- 3.10.26 Since the settlement of deviations from schedule and related issues are being settled in accordance with the Deviation Settlement Mechanism in case of CPPs availing OA a similar methodology may be devised for such CPPs that do not avail OA so that the grid is adequately compensated for forbearance, if any, in providing parallel operation to CPPs. However, the proposed levy of GSC by the DISCOMs is arbitrary, excessive and is not supported by quantifiable data.
- 3.10.27 The DISCOMs are only allowed a charge only if they demonstrate the actual costs incurred, however, in the proposed case there are no extra costs incurred by the DISCOMs for the purported effects of operation of CPPs in parallel with grid.
- 3.10.28 Most of the CPPs installed capacities are much higher when compared to their captive load. When the installed capacity/operating capacity of captive load is much lower than installed capacity of power plant, it is unfair to impose GSC based on the installed capacity of CPP. Accordingly, the Commission may consider the captive demand for levy of GSC.
- 3.10.29 Some of the stakeholders submitted that GSC cannot be a substitute for demand or capacity charges which are determined on a wider basis by the Commission. Accordingly, the proposed levy of GSC based on applicable demand charge is arbitrary, excessive and results in undue enrichment of the DISCOMs at the expenses of CPPs. It is further to be noted that GSC based on CPP capacity in kVA lacks merit while the entire power systems in the premises of CPP are approved by CEIG in kW, in addition to this even the export contracts either bilateral or under

*the exchanges are settled in MW. Accordingly, the quantification of GSC, if any has to be in kW.*

- 3.10.30 The above proposed levy of GSC is unjustified in the following cases:*
- (a) An industry with CPP connected to the grid for the purpose of importing additional power from another source under OA.*
  - (b) An industry with CPP connected to the grid to avail start-up power for which a contracted demand is arranged and paid by the consumer.*
- 3.10.31 The Commission may allow the CPPs to delink from the grid in case the GSC were to be unwieldy and unviable to the extent of power out of the CPP capacity that they can run in island mode.*
- 3.10.32 Levy of GSC on CPPs that operate in parallel with the grid on need basis say twice or thrice during an year is unjustified.*
- 3.10.33 The effect of grid support is different in different classes of consumers like industries with continuous parallel operation and standby permission. In this regard, the Commission may look in to the proposal for levy of uniform GSC.*
- 3.10.34 The Commission may reject the DISCOMs proposal for levy of GSC. If at all the levy of GSC is to be considered then it may be relevant to consider such levy only in such cases where the loads impose instantaneous/intermittent demands on the grid.*
- 3.10.35 Parallel operation with the grid arises in the context of CPP's based on coal, gas, biomass etc. having surplus capacity over and above their own requirement and for process industries having CPPs which run parallel to the grid to avail continuous power supply in the event of CPPs failure to generate. Accordingly, infirm sources of energy like solar and wind are not to be brought under the ambit of the same. Implementation of GSC would be unjust on consumers who have set up solar power to promote renewable sources of energy.*
- 3.10.36 The erstwhile APERC's Order dated 08.02.2002 on determination of GSC was issued before enactment of the Act and was issued in the context of CPPs generating firm power. The formula suggested in the above referred Order also reflects the fact that CPP capacity could be higher than consumers contracted demand, which is possible in case of coal, gas, biomass and bagasse based CPPs. The same formula is not suitable to be applied to solar CPPs wherein the solar plant capacity would be lower than the contract demand in most cases. While the Hon'ble Supreme Court has upheld the APERC Order, the same cannot be applied to renewable sources of power which are infirm in nature. Levy of GSC on existing solar CPPs is against economic principles.*
- 3.10.37 It is important to note that consumers operating CPPs based on solar are governed by contract demand limit. Consumers availing power from solar CPP are not allowed to reduce the contract demand corresponding to installed capacity of the solar CPP. On the contrary, consumers continue to pay demand charges for the contract demand even after availing solar power from CPP. The DISCOMs are already compensated for this through the demand charges levied in the consumer's bill. This is unlike the consumers whose CPPs are not governed by contract*

*demand limits or consumers who would avail contract demand from grid only to cater to demand over and above their load.*

- 3.10.38 The consumers operating CPPs based on solar cannot draw the power over and above the contract demand maintained with the utility at any given point of time and in case the demand exceeds for a moment, temporary charges are applicable as per the provisions of the Regulations. In the case of rooftop solar plants, the capacity of the solar power plant is governed by the capacity restriction which is up to a maximum of 80% of the contract demand availed from the utility by the consumer. Thus, as per the formula proposed by DISCOMs, the difference of capacity of CPP in kVA and contracted demand in kVA with the DISCOMs and all other sources works out to be negative. Accordingly, the GSC in case of renewable sources from solar/wind cannot be applied.*
- 3.10.39 Renewable energy plants installed in the state were installed as per the terms and conditions and charges as applicable at the particular point of time and any new charges to be imposed on these older installations will be violation of law and is against the established principle by the Supreme Court that “a vested right cannot be taken away by a retrospective law”. The Supreme Court stressed on doctrine of fairness and how it would be unfair to fasten an obligation based on an amendment in law in the future. It also provided that a legislation which impose new obligations should be treated as prospective, but the same which confers a benefit, could be construed as retrospective considering the intent of the lawmakers.*
- 3.10.40 The current capacity of rooftop solar capacity in the State is 210 MW as on December 2021 against the target 2000 MW as per Telangana Solar Policy, 2015 and accordingly there is a huge potential for growth of solar rooftop. Levy of GSC at this juncture would be detrimental to the growth of the segment and also will create a hurdle in achievement of the sustainability goals.*
- 3.10.41 The Supreme Court also stated that “if de-licensing of generation is the prime object of the Act, the courts while interpreting the provisions of the statute must guard itself from doing so in such a manner which would defeat the purpose thereof. It must bear in mind that licensing provisions are not brought back through the side door of Regulations”. The Commission may also take note of the approach adopted by other State Electricity Regulatory Commissions in not levying GSC on CPPs based on renewable sources.*
- 3.10.42 The Commission may not allow GSC to be levied on existing consumers or prospective consumers who wish to install solar CPPs. In case the Commission approves the levy of GSC, the formula may be modified to reflect the infirm nature of solar plant and contract demand limitations applicable to solar power plants. Further, such levy of GSC may be limited to prospective consumers only.*
- 3.10.43 The object and purpose to levy such charges shall be limited to the projects who have co-generation or who are having captive power generation together with their processing unit. The judgment of the Hon'ble Supreme Court in C.A.No.4569 of 2003 is only in respect to the*

aforesaid category of projects. Therefore, HMR project cannot be fastened with GSC even if it procures power through open access as it would not fall within aforesaid two categories.

3.10.44 As per the terms and conditions of the Concession Agreement for HMR project, any additional liability of tariff to HMR in view of the directives dated 27.04.2016 given by the GoTS, under Section 108 of Act shall be borne by the Government by way of granting subsidy under Section 65. Further, as per the terms of the Concession Agreement, the DISCOMs have to grant open access as and when sought without levy of GSC. Any deviation from the commitments given by the GoTS through the Concession Agreement in respect of the power supply will hit by the Doctrine of Promissory Estoppel.

DISCOMs Replies

Grid Support Charges

3.10.55 The full Bench of APTEL in Appeal No.120 of 2009 relating to Parallel Operation Charges (Grid Support Charges) in Chhattisgarh by Order dated 18.02.2011 stated that the State Commission is empowered to deal with the question as to whether the levy of parallel operation charges is permissible or not. Further, Hon'ble Supreme Court in its Judgment dated 29.11.2019 in C.A. No.8969 of 2003 held that the State Electricity Regulatory Commission is vested with the power to determine the grid support charges. The licensee has proposed GSC in line with the same methodology approved by the erstwhile APERC in its Order dated 08.02.2002 which was upheld by the Supreme Court. The abovementioned Supreme Court order was issued after the enactment of Act. DISCOMs are not in a position to dispute the findings of the Hon'ble Supreme Court.

3.10.56 The same is also supported by various APTEL judgments (dt. 29.09.2015- Renuka Sugars v/s. GERC, PGVCL, Gujarat TRANSCO; dt. 18.02.2012- Chhattisgarh State Power Distribution v/s. Godawari Power & Ispat Ltd) and SERC orders. Further, a research paper titled "Grid Support charges on Captive power plant", by K. Balaraman, Ananthapadmanabha, R. Nagraja, K. Parthasarthy; presented at IIT Madras – National Power System Conference 2004 also supports technically the application of GSC on CPPs.

3.10.57 The definition of the captive power plant as mentioned at clause 3 in the Electricity Rules, 2005 is reproduced as below: "No power plant shall qualify as a 'captive generating plant' under section 9 read with clause (8) of section 2 of the Act unless-

- (a) in case of a power plant
  - (i) not less than twenty six percent of the ownership is held by the captive user(s), and
  - (ii) not less than fifty one percent of the aggregate electricity generated in such plant, determined on an annual basis, is consumed for the captive use.
- (b) in case of a generating station owned by a company formed as special purpose vehicle for such generating station, a unit or units of such generating station identified for captive use and not the



*entire generating station satisfy (s) the conditions contained in paragraphs (i) and (ii) of sub-clause (a) above.”*

- 3.10.58 In order to consider a power plant as captive there is no discrimination made based on the type of the fuel used and the processes involved. As such all the plants which satisfy the above conditions are treated as CPPs and charges will be levied accordingly as directed by the Commission. Co-generation plants are also considered as CPPs. Further modification of the term “Captive Power Plant (CPP) as “Captive Power Plant (CPP) and Co-generation plant” with respect to levy of GSC is at the discretion of the Commission.*
- 3.10.59 The GSC are being proposed by the DISCOMs for consumers who are having parallel operation of CPPs. The DISCOM’s consumers connected at 132 kV and above are not paying transmission charges and SLDC charges separately but only the retail supply tariffs as determined by the Commission from time to time.*
- 3.10.60 The said GSC are also part of recovery of fixed charges incurred by the Distribution licensee and these charges are proposed to be levied on the CPPs who intend to use and benefit from parallel operation. Hence the proposal of GSC for FY 2022-23 are well within the provisions of Act.*
- 3.10.61 The entire network cost of State excluding OA portion is borne by the DISCOMs and said recovery of cost is under purview of the DISCOMs only.*
- 3.10.62 The CPPs continue to get connected to the licensee network system and operate their plant in synchronism with the grid due to the following reasons and certain benefits which cannot be physically measurable.*
- (a) The fluctuations in the load are absorbed by the utility grid in the parallel operation mode. This will reduce the stresses on the captive generator and equipment.*
  - (b) Fluctuating loads of the industries connected in parallel with the grid inject harmonics into the grid. The current harmonics absorbed by the utility grid is much more than that by the CPP generator. These harmonics flowing in the grid system are harmful to the equipment and are also responsible for polluting the power quality of the system.*
  - (c) Negative phase sequence current is generated by unbalanced loads. The magnitude of negative phase sequence current is much higher at the point of common coupling than at the generator output terminal. This unbalanced current normally creates a problem of overheating of the generators and other equipment of CPP, if not running in parallel with the grid. When they are connected to the grid, the negative phase sequence current flows into the grid and reduces stress on the captive generator.*
  - (d) CPPs have higher fault level support when they are running in parallel with the grid supply. Because of the higher fault level, the*

- voltage drop at the load terminal is less when connected with the grid.*
- (e) In case of faults in a CPP generating unit or other equipment, bulk consumers can draw the required power from the grid and can save their production loss.*
  - (f) The grid provides stability to the plant to start heavy loads like HT motors.*
  - (g) The variation in the voltage and frequency at the time of starting large motors and heavy loads, is minimized in the industry, as the grid supply acts as an infinite bus. The active and reactive power demand due to sudden and fluctuating load is not recorded in the meter.*
- 3.10.63 The impact created by sudden load throw off and consequent tripping of CPPs on over speeding is avoided with the grid taking care of the impact. 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.*
- 3.10.64 The GSC are not for drawl of power from the licensee, but for utilization of parallel operation benefits by captive generators. However, if the captive plant capacity is less than or equal to contracted maximum demand with licensee, such captive power plant capacity will not attract grid support charges.*
- 3.10.65 The DISCOMs have not denied CPPs access to the network, the captive generators who intended to use and benefit from parallel operation need to compensate through GSC.*
- 3.10.66 The faults are to be isolated within a short span to safeguard the grid and highlevel protection systems are in use and to safeguard the grid connected elements. Such fault isolation techniques adopted by grid are not dependent on the parallel operation with CPP.*
- 3.10.67 High power industries with fluctuating loads are to be stabilized to safeguard the grid, from blackout. The demand put on the system is to be considered average value and the integration period of 15 mins is considered to avoid maximum no. of fluctuation to safeguard the grid. However, there is a proposal for amendment from CEA to reduce the indication period further to 5 mins to enhance the grid stability. Whether it is a generator or a consumer has to comply with the grid standards.*
- 3.10.68 A consumer with or without CPP could inject harmonics into the grid and this may affect the power quality of CPP but may never absorb the Harmonics as it is producing power into the system. The harmonics would be mostly absorbed by the loads and can pollute the power quality of the system. DISCOMs have installed suitable meters (ABT meters) at the consumer end to measure the harmonics. If any consumer is going over and above the threshold value, DISCOMs are instructed to mitigate the harmonics to the consumer. If not, the supply is being disconnected.*
- 3.10.69 There is a clear difference between a CPP and the other generators. The CPPs supply power to their own needs and balance/deficit power can be*

*drawn/injected back into the grid. However other generators can supply a constant required amount of power into the grid; thus support the stability of the grid. The mutual benefit of the grid is mostly applicable for CPPs.*

- 3.10.70 An in-house CPP producing power will be drawn by the loads within the premises. In such cases if the load is more than the CPP the balance power would be drawn from the utility's grid. They would have the contract for the balance load from the utility. If it is not in house CPP, and CPP is located at some other location and drawal point at other end, the total power for the load would be drawn from the utility grid only. In such a scenario transformer loss will still be incurred by the utility.*
- 3.10.71 DISCOMs wants to state that the UI charges are levied to the tune upto 12% of the deviation charges in the case where a generator or a distribution company deviates from their said injection or drawal schedule. However, if the same generator or a particular CPP deviates from its said injection schedule say upto a quantum of more than 12% then this level of deviation is absorbed by the grid. In this case grid acts as a stabilizer. Thus, UI charges amount for only a fraction of the quantum of deviation, whereas GSC help to further develop the grid to absorb the rest of deviations. The surplus of CPP would be based on mutual agreement. There has never been a power deficit situation in the system as power utilities have had sufficient power purchase agreements from the past 7 years. Further the faults in the system are very minimal and being isolated as per the standards and contribution for feeding faults MVA of CPPs is not upto considerable level.*
- 3.10.72 As per the proposed grid charges conditions, the GSC will not be levied on the entire capacity of CPP and it will be levied only on differential capacity between CPP capacity and CMD with DISCOM. However, if the CPP capacity is less than or equal to CMD with the DISCOM, such captive power plant capacity will not attract GSC.*
- 3.10.73 The proposed GSC are very negligible in respect of generation of CPPs.*
- 3.10.74 As per the proposed GSC, 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 while calculating GSC.*
- 3.10.75 The benefits of the parallel operation with the grid are enjoyed by the CPP throughout the year. However, if the parallel operation is required twice or thrice per year, the system is kept ready through out the year to serve the parallel operation for their CPP capacity as and when required.*
- 3.10.76 The proposed GSC will not applicable to solar rooftop services as its solar plant capacity is less than or equal to CMD with the DISCOM.*
- 3.10.77 DISCOMs have never intended to obstruct the development and growth of renewable energy in the State by application of GSC. However, application of such charges is equally important to manage the grid stability which is the ultimate aim to get good quality and reliable power. DISCOMs understands the environmental benefits of promoting*

renewable energy and have always actively participated in promoting green energy.

Commission's View

3.10.79 The Commission while determining the ARR and retail supply tariffs for FY 2022-23 is guided by the provisions of the Act, Tariff Policy, 2016 and the Regulations of this Commission. The Commission in Chapter 6 of the Order has dealt in detail the tariff proposals of the DISCOMs.

6.25 PARALLEL OPERATION CHARGES/ GRID SUPPORT CHARGES  
DISCOMs proposals

6.25.1 The parallel operation is defined as activity where one electrical system operates with the connectivity to another system in similar operating conditions. The CPPs opt for parallel operation to seek safety, security and reliability of operation with the support of a much larger and stable system as afforded by the grid. The circumstances under which a CPP seeks to operate in parallel with a large interconnected grid are as follows:

- i) CPPs having surplus capacity over and above their own requirement, connected in parallel with the grid in order to sell power to the grid or bank such surplus energy, which is a general phenomenon in seasonal industries.
- ii) CPPs having load of such nature that results in large momentary peaks, starting currents and runs the plant in parallel to avail the support of grid beyond the contract demand.
- iii) Process industries with CPP's runs in parallel in order to avail continuous power supply, in the event of failure of CPP generating units.
- iv) Black start of CPP, where the startup power is required to restart the units. 165

(Source: CSERC Discussion paper on PoC determination dt. 01.06.2008)

6.25.2 The advantages and disadvantages of parallel operation as discussed in detail in CSERC Order dated 31.12.2008 are as follows:

"10.1 Advantages to CPPs:

- (1) The fluctuations in the load are absorbed by the utility grid in the parallel operation mode. This will reduce the stresses on the captive generator and equipments. The bulk consumer can operate his generating units at constant power generation mode irrespective of his load cycle.
- (2) Fluctuating loads of the industries connected in parallel with the grid inject harmonics into the grid. The current harmonics absorbed by the utility grid is much more than that by CPP generator. These harmonics flowing in the grid system are harmful to the equipments and are also responsible for polluting the power quality of the system.
- (3) Negative phase sequence current is generated by unbalance loads. The magnitude of negative phase sequence current is much higher at the point of common coupling than at generator output terminal. This unbalance

current normally creates problem of overheating of the generators and other equipments of CPP, if not running in parallel with grid. When they are connected to the grid, the negative phase sequence current flows into the grid and reduces stress on the captive generator.

- (4) Captive power plants have higher fault level support when they are running in parallel with the grid supply. Because of the higher fault level, the voltage drop at load terminal is less when connected with the grid.
- (5) On account of increase in plant load factor of captive generator, additional revenues can be generated by the CPPs by sale of surplus power to the utility.
- (6) In addition to the above, CPPs enjoy the following advantages also:
  - (i) In case of fault in a CPP generating unit or other equipment, bulk consumers can draw the required power from the grid and can save their production loss.
  - (ii) The grid provides stability to the plant to start heavy loads like HT motors.
  - (iii) The variation in the voltage and frequency at the time of starting large motors and heavy loads, is minimized in the industry, as the grid supply acts as an infinite bus. The active and reactive power demand due to sudden and fluctuating load is not recorded in the meter.
  - (iv) The impact created by sudden load throw off and consequent tripping of CPP generator on over speeding is avoided with the grid taking care of the impact.
  - (v) The transient surges reduce the life of equipment of the CPP. In some cases, the equipment fails if transient is beyond a limit. If the system is connected to the grid, it absorbs the transient load. Hence, grid enhances the life of CPP equipments.

... ..

#### 10.4 Disadvantage of Parallel Operation to Utility:

- (1) Load fluctuations of captive consumer are passed on to the utility's system thereby the efficiency of utility's system may be affected, which may also impact on utility's other consumers.
- (2) In case of an ungrounded (or grounded through resistance) system supply, fault on interconnecting line (consumer's side) results in interruption of system. For single phase to ground fault which are 80 to 85% of the short circuit fault level, the grounding of the system is achieved through the neutral or step-down transformer of

*the utility, when the generator runs in parallel with the utility's grid. This supply is likely to cause damage to the terminal equipments at utility's sub-stations and line insulators, as voltage on the other two healthy phases rise beyond the limit, under such conditions.*

- (3) The utility has to sustain the impact of highly fluctuating peak loads like that of arc furnace, rolling mill, etc. for which it does not get any return on the capital invested to create system reserve.*
- (4) The variation in reactive power requirement increases the system losses and lowering of the voltage profile. Utility has to bear the cost of such effects.*
- (5) The lower voltage profile and fluctuations affect the service to the neighboring consumers due to deterioration in quality of supply, thus resulting in revenue loss to the utility.*
- (6) Non-recording of high fluctuating / sudden active and reactive demand by the meter results in financial losses."*

*6.25.3 The erstwhile APERC in its Order dated 08.02.2002 approved the levy of GSC for parallel operation of CPPs. The AP High Court had set aside the said Order of APERC and appeals were preferred before the Supreme Court. The Supreme Court in its Judgment 29.11.2019 upheld the APERC's Order.*

*6.25.4 Based on the above, the DISCOMs find that there is a need to levy GSC on the captive consumers, for the benefits availed during parallel operation of CPP with the grid network. The DISCOMs have proposed the GSC in line with the approval of the erstwhile APERC as under:*

*"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."*

*Commission's view*

*6.25.5 The stakeholders have vehemently opposed the DISCOMs proposal of GSC. The stakeholders have also raised certain issues purported to be incorrectness in the rationale provided by the DISCOMs. The stakeholders have also requested the Commission to undertake third party analysis before deciding on the levy of GSC as well as the quantum of such GSC. The Commission finds merit in the stakeholders' suggestion to undertake a detailed study.*

*6.25.6 In accordance with Clause 5.1 of the Regulation No.4 of 2018, a Grid Coordination Committee has been constituted with*

representation from wide spectrum of generating companies, transmission licensees, distribution licensees, electricity traders, OA consumers etc. Clause 5.2(v) of the Regulation No. 4 of 2018 specifies that “the Grid Coordination Committee shall be responsible for such matters as may be directed by the Commission from time to time”. The Commission finds it appropriate to refer the matter to the Grid Coordination Committee for a detailed study on the issue of parallel operation of CPPs and consequent levy of GSC.”

**B: RST Order for FY 2023-24 dated 24.03.2023**

**“Grid Support Charges**

- 3.15.9 *In line with the Commission's ruling in Retail Supply Tariff Order 2022-23, the Grid Coordination Committee has initiated the detailed study on the matter of parallel operation of CPPs and consequent levy of GSC, however, admittedly, the proposal for levy of GSC for FY 2022-23 has not attained finality as on date.*
- 3.15.10 *In the 3rd meeting of the Grid Coordination Committee (GCC) held on 16.07.2022 the Objector had submitted its written submissions that grid support charges with a request to withdraw the proposal.*
- 3.15.11 *The Objector runs a 150 MW Independent/Merchant thermal power plant and export the entire generated power through Grid at all times.*
- 3.15.12 *Earlier TSDISCOMs proposed to levy the grid support charges on captive generating plants considering captive load burden on Grid. It is surprising to note that now TSDISCOMs proposed to levy such charges on all generating plants including Independent power generating plants and Merchant power generating plants without explaining any reason/basis for levy of such charges.*
- 3.15.13 *The IPPs and Merchant power generating plants are meant to generate and export entire power to grid and accordingly always supportive to grid but never opt grid support to run the plant.*
- 3.15.14 *The TSDISCOMs have no role in maintaining Grid security and have to comply with the directions issued by SLDC/RLDC. Hence, in the present scenario, there is no need to propose GSC by TSDISCOMs and TSDISCOMs have no role in seeking GSC.*
- 3.15.15 *It is also pertinent to note that this Commission is constituted under the Act, and thus the earlier AP Electricity Reform Act, 1998 under which GSC were earlier determined is neither applicable nor relevant to IPPs and Merchant Power generating plants. The Act, 2003 specifically lays down the charges and tariffs to be collected, and no charges beyond what is prescribed can be levied. Admittedly, there is no charge such as GSC mentioned in the Act or the regulations, let alone under S.62 under which the present petitions are filed, and as such, any such proposal to levy GSC is without jurisdiction.*
- 3.15.16 *It is thus submitted that the scope of present ARR for Retail Supply Business for FY 2023-24 should be strictly confined in terms of Section 62 of the Act r/w Regulation 4 of 2005 as adopted under Regulation I of 2014, and Section 42 of the Act for the purpose of determination of CSS*

*and any proposal of TSDISCOMs to levy GSC is itself misconceived and patently without jurisdiction.*

- 3.15.17 *The TSDISCOMs proposed to levy Grid Support Charges for FY2023-24 on all the generators (Captive Generating Plants, Cogeneration Plants, third party Generation units, Merchant Power Generation units, Rooftop Power Plants etc.) who are not having PPA/having PPA for partial capacity with the licensees. Whereas there is no mention of basis and methodology by TSDISCOMs for the proposed GSC of Rs.50 KW per Month.*
- 3.15.18 *There is no revenue or costs that are shown to be associated corresponding to the levy of GSC. As such, once the entire costs are recovered by the proposed RST alone, any further levy of GSC amounts to illegal and unjust enrichment of the Applicant TSDISCOMs at the cost of generating companies.*
- 3.15.19 *The proposed levy of GSC appears to be lifted from the APERC's RSTO for FY 2022-23, and such levy itself has been stayed by the APTEL vide order dated 20.05.2022 in DFR No.186/2022, and orders dated 01.07.2022 in DFR Nos.240/2022, 241/2022 and 271/2022. There is no provision in the statute that empowers TSDISCOMs to levy Grid Support Charges on the Merchant power plants.*
- 3.15.20 *Another objector has suggested the following:*
- a) *The GSC Fee has not considered the exemption of CMD from the installed capacity.*
  - b) *The Formula for the GSC i.e., Rs.50 for conventional generators is not mentioned, so is the case with non-conventional GSC. The formula may be disclosed upfront to avoid any arbitrariness.*
  - c) *Exemption is available in case of shut down for any reason that exceeds two months, which pre-supposes that the period of two months is continuous. Instead the same may be taken as overall period of two months of shut down during the year i.e., period of shut down during the year, if the aggregate period of such shut down exceeds 2 months.*

#### TSDISCOMs Replies

#### Grid Support Charges

- 3.15.37 *The grid support charges are being proposed by the Distribution Licensee for consumers who are having parallel operation of Captive Power Plants with grid. The Distribution Licensee's 132 kV & above level HT consumers are not paying Transmission charges & SLDC charges to respective entities even though connected to 132 kV & above level. These consumers are paying retail supply Tariffs as approved by the Commission from time to time which is inclusive of all costs (Incl SLDC & Transmission Charges).*
- 3.15.38 *The advantages of parallel operation with the grid are benefited by the CPPs in addition to other facilities of other consumers. In view of the additional benefits than the normal other consumers, the CPPs who*



*intended to use and benefit from parallel operation need to compensate through Grid Support charges.*

- 3.15.39 The said Grid Support charges are also part of Retail Supply Tariffs and these charges are proposed to levy on the CPPs who intended to use and benefit from parallel operation. Hence the proposal of Grid Support charges for FY 2022-23 are well within the provisions of Act.*
- 3.15.40 However, the full Bench of Tribunal in Appeal No.120 of 2009 relating to Parallel Operation Charges (Grid Support Charges) in Chhathisgarh by Order dated 18.02.2011 stated that the State Commission is empowered to deal with the question as to whether the levy of parallel operation charges is permissible or not. This aspect has been dealt with by this Tribunal in judgment dated 12.09.2006 in Appeal No.99 of 2006. In the said judgment, this Tribunal upheld the levy of parallel operation charges by the State Commission. Further, the Apex Court of India by its judgment dated 29.11.2019 in Civil Appeal No 8969 of 2003 (Grid Support Charges Batch matters) held that the State Electricity Regulatory Commission is vested with the power to determine the grid support charges.*
- 3.15.41 The licensee has not denied CPPs access to grid or availing of parallel operation benefits.*
- 3.15.42 It is clarified that the captive generators who intended to use and benefit from parallel operation need to pay the Grid Support charges, in line with the justifications mentioned in the previous sections.*
- 3.15.43 The Captive Power Plants continue to get connected to the licensee network system and operate their plant in synchronism with the grid due to the following reasons.*
- 3.15.44 The fluctuations in the load are absorbed by the utility grid in the parallel operation mode. This will reduce the stresses on the captive generator and equipment.*
- 3.15.45 Fluctuating loads of the industries connected in parallel with the grid inject harmonics into the grid. The current harmonics absorbed by the Captive Power Plants continue to get connected to the licensee network system and operate their plant in synchronism with the grid due to the following reasons.*
- 3.15.46 The fluctuations in the load are absorbed by the utility grid in the parallel operation mode. This will reduce the stresses on the captive generator and equipment.*
- 3.15.47 Fluctuating loads of the industries connected in parallel with the grid inject harmonics into the grid. The current harmonics absorbed by the utility grid is much more than that by the CPP generator. These harmonics flowing in the grid system are harmful to the equipment and are also responsible for polluting the power quality of the system.*
- 3.15.48 Negative phase sequence current is generated by unbalance loads. The magnitude of negative phase sequence current is much higher at the point of common coupling than at the generator output terminal. This unbalanced current normally creates a problem of overheating of the generators and other equipment of CPP, if not running in parallel with the grid. When they are connected to the grid, the negative phase*

*sequence current flows into the grid and reduces stress on the captive generator.*

- 3.15.49 Captive power plants have higher fault level support when they are running in parallel with the grid supply. Because of the higher fault level, the voltage drop at the load terminal is less when connected with the grid.*
- 3.15.50 In case of faults in a CPP generating unit or other equipment, bulk consumers can draw the required power from the grid and can save their production loss.*
- 3.15.51 The grid provides stability to the plant to start heavy loads like HT motors.*
- 3.15.52 The variation in the voltage and frequency at the time of starting large motors and heavy loads, is minimized in the industry, as the grid supply acts as an infinite bus. The active and reactive power demand due to sudden and fluctuating load is not recorded in the meter.*
- 3.15.53 The impact created by sudden load throw off and consequent tripping of CPP generators on over speeding is avoided with the grid taking care of the impact. 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.*
- 3.15.54 The full Bench of Tribunal in Appeal No.120 of 2009 relating to Parallel Operation Charges (Grid Support Charges) in Chhattisgarh by Order dated 18.02.2011 stated that the State Commission is empowered to deal with the question as to whether the levy of parallel operation charges is permissible or not. This aspect has been dealt with by this Tribunal in judgment dated 12.09.2006 in Appeal No.99 of 2006. In the said judgment, this Tribunal upheld the levy of parallel operation charges by the State Commission. Further, the Apex Court of India by its judgment dated 29.11.2019 in Civil Appeal No 8969 of 2003 (Grid Support Charges Batch matters) held that the State Electricity Regulatory Commission is vested with the power to determine the grid support charges. Hence, the levy of grid support charges is well within the provisions.*
- 3.15.55 The grid support charges are not for drawl of power from the Distribution Licensee, but for utilization of parallel operation benefits by captive generators.*
- 3.15.56 The licensee has not denied CPPs access to the network; the captive generators who intended to use and benefit from parallel operation need to compensate through Grid Support charges.*
- 3.15.57 The advantages of parallel operation with the grid are benefited by the CPPs in addition to other facilities of other consumers. In view of the additional benefits than the normal other consumers, the CPPs who intended to use and benefit from parallel operation need to compensate through Grid Support charges. The said Grid Support charges are also one of the components in Retail Supply Tariffs and these charges are proposed to levy on the CPPs who intended to use and benefit from*

*parallel operation. Hence the proposal of Grid Support charges for FY 2022-23 are well within the provisions of Act.*

3.15.58 *The above benefits are elaborated by TSDISCOMs during the GCC meetings with the stakeholders.*

3.15.59 *The proposed grid support charges of 50% of 475 per KVA per month during the FY 2022-23 RST filings, was supposed to be levied on differential capacity only i.e., difference between CPP capacity and CMD with Distribution Licensee. Whereas in other states, these grid support charges are calculated in entire capacity of Captive Power Plant (CPP).*

3.15.60 *Considering the interest of all stakeholders involved, the licensee has revised its GSC proposal.*

*Commission's View*

3.15.80 *By considering stakeholders suggestions, the Commission has decided to again refer the matter of 'Grid Support Charges/Parallel Operation Charges' to the 'Grid Coordination Committee' for undertaking detailed analysis as the licensees proposed a different methodology and applicability as that proposed earlier in RST for FY 2022-23 for which Grid Coordination Committee has already submitted its final report."*

## **3.2 NO JUSTIFICATION FOR LEVY OF GSC ON IPPs**

### ***Stakeholder's Submissions***

3.2.1 TSDISCOMs proposed to levy the GSC on all the generators instead of co-located CPP plants. Presentation of TSDISCOMs covered about the levy of GSC on CPPs only and has no justification for levy of GSC on IPPs. The way of levy GSC should not be like "*Some are generating the harmonics and we will charge every one*"

### ***TSDISCOMs Reply***

3.2.2 In respect of other generators who are not CPPs, the transients and reactive power transfer are bound to take place between the Grid and generators as long as they operate in tandem with the Grid, more particularly with Wind and Solar generators that use inverters. Moreover, the disturbance, caused by the IPPs due to their outages which are also connected to the grid, is being addressed by the grid support. So, the Grid support is required for all generators and it is a distinguishable service and hence, it is made applicable to all generators.

3.2.3 Further, it is admitted fact that CPP runs in parallel with the Grid and get many advantages because of that, TSDISCOMs opines that confining levy of GSC to CPPs only does not provide for a level playing field as other generators connected to the grid also enjoy the same benefits as that of CPPs. Hence,

TSDISCOMs proposes to bring other generators under the ambit of GSC. So, the grid support cannot be extended free to a nexus of IPPs and other generators.

3.2.4 As there is no differentiation of connectivity to the grid as far as IPP, CPP and Non-CPP and are considered requiring technical grid support for all types of power plants.

3.2.5 The GSC are being proposed by the distribution licensees on generators who are having parallel operation of power generation with grid, typically, any direct or indirect impact on transmission system due to faults, at generator units running in parallel with grid, will be loaded on to the distribution licensees and are required to compensate the transmission system and SLDC.

3.2.6 Hence, TSDISCOMs request the Commission to consider and approve levy of GSC to all the generators who are being benefited from the support of grid.

### **3.3 RATIONALE BEHIND THE PROPOSALS OF TSDISCOMs**

#### ***Stakeholder's Submissions***

3.3.1 The TSDISCOMs GSC proposals have no basis and simply borrowed from other States. There is no justification on the proposed methodology.

3.3.2 The proposed charge for total installed capacity is very high. GSC should be on actual consumption and made applicable to only CPPs having captive consumption. The export capacity by the CPP should be excluded from GSC.

3.3.3 It is seen that the generators having PPAs with TSDISCOMs are excluded from levy of GSC.

3.3.4 Previously the grid size was small, the impact of CPPs was significant, now the grid size is larger, impact of CPPs is negligible. Lot of protective systems are installed in CPP, and there will be no injection of reverse currents into the grid. Remedial measures will be taken if technical experts suggest so.

3.3.5 The stakeholder has also suggested that since imbalances of harmonics are happening only due to captive power plants GSC can be levied on captive power plants.

#### ***TSDISCOMs Reply***

3.3.6 The detailed analysis and reasons, for levy of GSC by TSDISCOMs, was

already submitted to the Grid Co-Ordination Committee (GCC) and TSDISCOMs presented their views and analysis to all the stakeholders during the past GCC meetings with the stakeholders and also during the public hearings organized by the Commission regarding the ARR filings of TSDISCOMs.

- 3.3.7 The GCC has already conducted a detailed technical study on grid support required for the CPPs and Solar & Wind projects. GCC has studied the technical fault analysis at generator end and the grid support availed by such generator for restoration in the fault instances. From this study it was concluded that the power plant requires technical support from the grid, which was included in the report submitted by GCC to the Commission.
- 3.3.8 Grid support is required irrespective of size of the grid. It is pertinent to mention that the parallel operation is a service which extends support to the system and at the same time it causes voltage dip in the system, harmonics, additional reactive power requirement irrespective of the size of the grid. By parallel operation the CPP has many advantages and hence they are liable to pay the charges for service being provided.
- 3.3.9 It is to note that GCC has conducted the detailed analysis on grid support for renewable and rooftop solar generators and submitted a report in October 2023, where they have observed that the on-grid solar/wind inverter takes energy, reference voltage & frequency from the grid for the process of conversion of the DC power generated from solar panels/wind turbines to AC power. Further, the energy generated from the Solar panels/Wind turbines is uncertain and depends on the environmental conditions hence there is always uncertainty in energy output Solar plants/Wind plant. In case of sudden drop in from the solar plant/wind plant, the load will have to be supported by the grid instantaneously and in case of excess generation, the Grid acts as a supporting system for consuming the same instantaneously.
- 3.3.10 Moreover, the AC power from the output of the inverter, is prone to be having a larger number of harmonics resulting in the distorted sinusoidal waveform. The Grid absorbs such harmonics thus aiding the solar PV plants/wind plants.
- 3.3.11 The consumer having installed solar panels may cause imbalance in the system

as per their nature of consumption and likely possibility of exporting/importing energy in one or two phases but not in all phases. Thus, in all the above instances, the solar power plants/roof-top PV systems, wind plants takes support of the grid and hence the levy of GSC is essential and justified.

### **3.4 APPLICABILITY OF GSC TO GENERATORS RUNNING IN ISLAND MODE**

#### ***Stakeholder's Submissions***

- 3.4.1 The stakeholder has stated that their unit is kept in islanded mode when the power supply is unstable. The unit is getting connected to grid only when power is exported. Hence CPP capacity should used for levy of GSC and not installed capacity.

#### ***TSDISCOMs Reply***

- 3.4.2 GCC has conducted the detailed analysis on parallel operation of CPPs and submitted a report in December 2023 where they have studied grid connection and isolated mode of conventional CPP plants. It was observed that in case of grid connection mode, with outage of one unit at CPP, grid & other units of CPP are stable, no prominent swings detected in the other units, whereas in Isolated mode with outage of one unit at CPP, other units become unstable. Hence, the stability of machines of CPP improves by parallel operation with grid. When the CPPs operate in isolation from grid which means no connectivity with the grid, the GSC will not be applicable.
- 3.4.3 As per the analysis and technical study conducted by the GCC, the power plants operating in parallel to the grid are taking the support from the larger grid in the event of faults and other parameters which are affecting the grid and concluded that the GSC are to be levied.
- 3.4.4 Hence, TSDISCOMs request the Commission to consider the same and approve the levy of GSC to all the generators who are being benefitted from the support of grid.

### **3.5 LEVY OF GSC ON SOLAR PLANTS**

#### ***Stakeholder's Submissions***

- 3.5.1 Solar plants are constructed near to load centres, and support to TSDISCOMs during summer peak demand thus contributing to saving cost to TSDISCOMs from buying power from exchanges. SPPs generate power during day time

meeting the day demand and reduce the burden on power purchase cost of TSDISCOMs.

- 3.5.2 Plants with PPAs are exempted though they have same technicalities. All the solar power plants are having certified devices meeting the IEEE standards, so solar power plants can be exempted from the levy of GSC. This would help the employees getting affected due to shut down of solar power plants.

***TSDISCOMs Reply***

- 3.5.3 For the TSDISCOMs the peak load hours are from 6.00AM to 10.00 AM and from 6.00PM to 10.00 PM, and the solar generation during DISCOMs peak load hours is nominal.
- 3.5.4 It is to reiterate that GCC has conducted the detailed analysis on grid support for renewable and rooftop solar generators and submitted a report in October 2023, where they have observed that the on-grid solar/wind inverter takes energy, reference voltage & frequency from the grid for the process of conversion of the DC power generated from solar panels/wind turbines to AC power. Further, the energy generated from the solar panels/wind turbines is uncertain and depends on the environmental conditions hence there is always uncertainty in energy output from the solar plants/wind plant. In case of sudden drop in from the solar plant/wind plant, the load will have to be supported by the grid instantaneously and in case of excess generation the grid act as a supporting system for consuming the same instantaneously.
- 3.5.5 Moreover, the AC power from the output of the inverter is prone to be having a larger number of harmonics resulting in the distorted sinusoidal waveform. The grid absorbs such harmonics thus aiding the solar PV plants/wind plants.
- 3.5.6 The consumer having installed solar panels may cause imbalance in the system as per their nature of consumption and likely possibility of exporting/importing energy in one or two phases but not in all phases. Thus, in all the above instances, the solar power plants/roof-top PV systems, wind plant takes support of the grid and hence the levy of GSC is essential and is justified.
- 3.5.7 Hence, TSDISCOMs request the Commission to consider and approve the levy of GSC to all the generators who are benefitting from the support of grid.

### **3.6 PUBLIC NOTICE AND JUSTIFICATION OF TSDISCOMS ON THE PROPOSALS FOR LEVY OF GSC**

#### ***Stakeholder's Submissions***

- 3.6.1 The public notice is not clear regarding O.P. numbers of the petitions admitted. No justification has been given pertaining to levy of GSC in TSDICOMs filings. They have simply copied from the proposals of other states. The proposals in FY2022-23 referred to committee and there was no edge on the filings of FY 2022-23.

#### ***TSDISCOMs Reply***

- 3.6.2 The details are available in the public notice published in the daily newspapers and the same are also uploaded in the TSERC website. The detailed analysis and reasons for levy of GSC by TSDISCOMs is already submitted to the GCC and TSDISCOMs have presented their views and analysis to all the stakeholders during the past GCC meetings with the stakeholders and also during the public hearings organized by TSERC regarding the ARR filings of TSDISCOMs.
- 3.6.3 The committee report on the FY 2022-23 filings was submitted to the Commission, and as per the instructions of the Commission, GCC has organized multiple meetings with committee members representing various generators where the views/objections were received, and the TSDISCOMs have timely addressed such views/objections orally during the meetings and also through written submissions to GCC for further response to the participants.
- 3.6.4 GCC has analysed the views of members and data collected from various sources including CERC order Dt: 31.12.2008 issued based on the study conducted by Electrical Research & Development Association (ERDA). The analysis also included levy of parallel operation charges/grid support charges by various states across the nation and their methodology and technical study on impact of CPP connectivity and renewable and rooftop solar generators to the grid.

### **3.7 TECHNICAL STUDY IN THE GCC REPORT**

#### ***Stakeholder's Submissions***

- 3.7.1 GSC is a charge on connectivity and GSC is not proposed to be levied on



Generators with PPA. The claim that grid voltage supports the plants connected to grid is not correct as solar power plants are connected to grid at grid voltage. Solar power cannot be injected when the grid is down. The solar power generators draw reactive power while injecting active power into the grid. The solar power generators are injecting reactive power during night hours. Solar power generators take the reference from grid voltage. Solar inverter steps up and connects to the same voltage.

- 3.7.2 It is not clear from the report as to how support is taken from grid when a radial line from the grid trips and why the study is focused only on solar generators.
- 3.7.3 The stakeholder has also expressed that their objections were never forwarded to the GCC for clarification by the TSDISCOMs else GCC would have given an opportunity to the objectors before finalising the report. The conclusions have come out without the presence of all members.

***TSDISCOMs Reply***

- 3.7.4 The GSC is meant for providing service to the CPPs, IPPS and other generators hence they are liable to pay the charges for service being provided. As per the GCC study on solar plants, it was observed that solar plants in Telangana are grid tie inverters and always need a grid support (voltage reference) for injection of active power. The proposal for levy of GSC is for the technical support received by the generator due to the connectivity with larger grid.
- 3.7.5 GCC studied the technical fault analysis at generator end and the grid support availed by such generator for restoration in the fault instances. From the study it was confirmed that the power plant requires technical support from the grid, which was included in the report submitted by GCC to the Commission.
- 3.7.6 Grid voltage reference is mandatory to inject power from the inverter to the grid and there cannot be injection of power during the times of different voltage levels of the inverter with the grid. This kind of technical support from grid, at large, is required for the solar power plants throughout the year. Levy of GSC for power plants are not only meant for reactive power drawal from the grid but also for the other technical support.
- 3.7.7 As per the GCC study on solar plants, it was observed that during tripping of radial line from grid causing severe voltage instability and isolation from the

grid. Further, it can be observed that solar plants in Telangana are grid tie inverters and always need a grid support (voltage reference) for injection of active power. The GCC has also conducted the detailed analysis on parallel operation of conventional CPPs and submitted a report in December 2023.

- 3.7.8 GCC has organized multiple meetings with the stakeholders including representation from various generators. In these meetings the necessity of grid support, for renewable generators, was contested by some of the members. Hence to clarify those objections, GCC has carried out the technical study on renewable generators for the technical grid support required which was detailed in the GCC report. GCC has organized multiple meetings with committee members representing various generators where the views/objections were received, and the TSDISCOMs have timely addressed such views/objections orally during the meetings and also through written submissions to GCC for further response to the participants.
- 3.7.9 TSDISCOMs have also addressed the views/objections of consumers regarding the levy of GSC in the ARR filings of TSDISCOMs.

### **3.8 IMPACT OF FLUCTUATIONS AND HARMONICS**

#### ***Stakeholder's Submissions***

- 3.8.1 All the fluctuations and harmonics are due to the type of load but not due to Generators. Demand charges are paid as per the CMD. Only power electronic, nonlinear loads generate harmonics. The third harmonic is harmful, all other odd harmonics are displaced near the load. Every inverter generates harmonics depending on the load. Mainly three kinds of industries viz., steel, automobile and petrochemical industries generate harmonics. It is not clear as to how the TSDISCOMs can place all the industries under the same category. On the other hand, TSDISCOMs should insist to install filters before connecting to grid.
- 3.8.2 The third harmonic can be controlled by the grid operators and can be minimized by connecting various filters to the grid. It is also TSDISCOM's essential duty to identify the major types harmonic injectors, record the time and place of happening.
- 3.8.3 The stakeholder has also stated that there are no ungrounded systems and negative phase sequence currents flow through the plant loads first but not to

the grid. The motors draw high starting currents and it is TSDISCOM's obligation to supply power required by the loads as per the GTCS.

***TSDISCOMs Reply***

- 3.8.4 The GSC are being proposed by the distribution licensees on generators who are having parallel operation of power generation with grid. Typically, any direct or indirect impact on transmission system due to faults at generator units running in parallel with grid will be loaded on to the distribution licensees and are required to compensate the transmission system and SLDC.
- 3.8.5 The generators are benefited from the technical support of the grid for parallel operation with the grid (stability, reactive power management, fault level support). Thus, the GSC is not to be compared with the demand and capacity charges. It is true that the harmonics are being injected by the induction furnaces, rectifier units and other power electronic devices, certain captive users having such loads are injecting into the grid. In addition, solar power plants are also injecting harmonics into the grid.
- 3.8.6 As the grid support is not limited to the above advantages to the power plants and having many other advantages while running the power plants in parallel to the grid, the TSDISCOMs proposes GSC on all types of generators.
- 3.8.7 TSDISCOMs have been identified the type of loads in each area of their jurisdiction and planning against the loading conditions, as a result the TSDISCOMs can supply reliable quality power to all the stakeholders. TSDISCOMs are planning and supplying power in consumers prospective.
- 3.8.8 As specified in CEA (Technical Connectivity to the Grid) Regulation, 2019, the users prone to generate harmonics, have to filter them before injecting/drawing power to/from the grid. The grid operator can only monitor the harmonics being injected into the grid, but it is the responsibility of all the grid user to minimize the harmonics as per the CEA regulation, In practical, the grid network resistance is very less as compared to the individual power plants, so the fluctuations flow through the grid first and part of them flows through the plant equipment.
- 3.8.9 As per the GCC study and technical analysis, it was observed that due to higher fault level of the grid at the point of common coupling, the flow of pollutants like

harmonics, negative phase sequence currents are absorbed by the grid due to low impedance path of the grid as compared to that of CPP generators.

- 3.8.10 TSDISCOMs proposed to levy GSC on CPP, IPPs and other generators who take support from the grid in terms of voltage stability, reactive power management, fault level support and grid reference voltage & load fluctuations but not limited to harmonics.
- 3.8.11 The GSC are being proposed by the distribution licensees on generators who are having parallel operation of Power generation with grid. Typically, any direct or indirect impact on transmission system due to faults at generator units running in parallel with grid will be loaded on to the distribution licensees and are required to compensate the transmission system and SLDC. The high starting currents drawn from the grid by the loads of users are supported by the TSDISCOMs even when there is a loss of consumption and demand in the energy meters due to instantaneous high starting currents are not being sensed by the meters as the meters consider only the average samplings in the respective integration periods.

### **3.9 OTHER ISSUES**

#### ***Stakeholder's Submissions***

- 3.9.1 The TSDISCOMs are getting Rs.10~12/unit as revenue from their tariffs and paying only Rs.2/unit to the solar generators against power purchases.
- 3.9.2 The proposal for levy of GSC on generators is double charging, which are already covered under demand charges.
- 3.9.3 The stakeholder also stated as to why TSDISCOMs, TSTRANSCO and TSGENCO are not going for solar generating plants to support green energy.
- 3.9.4 Proper detailed technical study by the experts would have relevance and the cost of technical study can be borne by the stakeholder.

#### ***TSDISCOMs Reply***

- 3.9.5 As per the RST Order for FY 2023-24 approved by the Commission, the Average CoS for FY 2023-24 is Rs.7.02/kWh and the average recovery of cost through revenue realisation is Rs.5.81/kWh, resulting a deficit of Rs.1.21/kWh.
- 3.9.6 The GSC are being proposed by the distribution licensees on generators who

are having parallel operation of power generation with grid, typically, any direct or indirect impact on transmission system due to faults at generator units running in parallel with grid will be loaded on to the distribution licensees and are required to compensate the transmission system and SLDC.

- 3.9.7 As per the GCC study on solar plants, it can be observed that solar plants in Telangana are grid tied inverters and always need a grid support (voltage reference) for injection of active power. The IPPs, CPPs are benefited from the technical support of the grid for parallel operation with the grid (stability, reactive power management, fault level support). Thus, the GSC is not to be compared with the demand charges.
- 3.9.8 TSGENCO has installed solar power plants at various locations in the state of Telangana, TSDISCOMs are purchasing the green energy from the generators on top priority beyond the targets fixed by the Commission. Hence the TS power utilities are supporting green energy.
- 3.9.9 GCC after considering the views/suggestions of all the participants in the GCC meetings, submitted a report in October 2023, where they have stated that after the technical analysis and study, it was agreed that the generators (conventional, renewable and roof-top solar generators) receive technical support of grid for parallel operation keeping in view of stability, reactive power management, fault level support and the majority of the GCC members agreed for levy of GSC.

***Commission's View***

The Commission takes note of the submissions of the stakeholder and the TSDISCOMs and the matter is dealt in next Chapter-4.

## **CHAPTER-4**

### **ANALYSIS AND CONCLUSION ON DETERMINATION OF GRID SUPPORT CHARGES FOR FY 2023-24**

#### **4.1 GRID SUPPORT CHARGES FOR FY 2023-24**

- 4.1.1 Grid networks are the most economical and effective method in serving the high density loads. These networks provide maximum reliability and operating flexibility. Because the grid is getting power from several transmission lines, the consumers will not face outage due to switching off a transmission line for scheduled maintenance. Voltage regulation is improved since power flow to the consumer is through integrated grid operation. The grid can handle abrupt load changes and disturbances associated with large motor starting without severe voltage dips. The fault in one unit does not disrupt voltage outside the sensitive load tolerance limits because of very high inertia of the strong grid network.
- 4.1.2 Consumers having higher contracted loads and who have installed Captive Power Plants to meet their whole or part of their requirement of demand, generally will reduce their contracted demand with the distribution licensees. Their major demand requirement will be met from their CPP. The CPPs continue to run their plants in parallel with the grid due to the following reasons.
- a. The grid provides stability to the power plants when their industries start motors of large capacity.
  - b. The dip in the voltage and frequency at the time of starting the large motors is minimised as grid acts as an infinite Bus.
  - c. The slow responses of governors and excitation system will make the CPP sluggish without the support of grid.
  - d. The shocks created and consequent tripping of the generator on over speeding is avoided in the event of sudden load throw off's of the CPP.
  - e. The connection with grid helps CPP's connected to system with fluctuating loads (like steel mills and arc furnaces) in stabilising their units.
- 4.1.3 Thus, the grid acts as the supporting system for the CPPs for its successful operation in terms of electrical performances. Initially, the consumers were having contracted demand to meet their peak demand and the distribution licensees were getting their fixed charges. These fixed charges were able to cover the cost of infrastructure provided by the utilities. The consumers have started installing CPPs and reducing their contracted demands with the distribution licensees. This resulted in loss of revenue to the utilities and at the

same time CPPs are taking support from the grid at no cost or least cost.

- i) The fluctuations in the load are absorbed by the utility grid in the parallel operation mode which will reduce the stresses on the captive generator and equipment. The bulk consumer can operate his generating units at constant power generation mode irrespective of his load cycle.
- ii) Fluctuating loads of the industries connected in parallel with the grid inject harmonics into the grid. The current harmonics absorbed by the utility grid is much more than that by CGP generator. These harmonics flowing in the grid system are harmful to the equipment and are also responsible for polluting the power quality of the system.
- iii) Negative phase sequence current is generated by unbalance loads. The magnitude of negative phase sequence current is much higher at the point of common coupling than at generator output terminal. When they are connected to the grid, the negative phase sequence current flows into the grid and reduces stress on the captive generator.
- iv) CPPs have higher fault level support when they are running in parallel with the grid supply. Because of the higher fault level, the voltage drop at load terminal is less when connected with the grid.
- v) The grid provides stability to the plant to start heavy loads like HT motors.
- vi) The variation in the voltage and frequency at the time of starting large motors and heavy loads, is minimized in the industry, as the grid supply acts as an infinite bus. The active and reactive power demand due to sudden and fluctuating load is not recorded in the meter.
- vii) The impact created by sudden load throw off and consequent tripping of CGP generator on over speeding is avoided with the grid taking care of the impact.
- viii) If the system is connected to the grid, it absorbs the transient load. Hence, grid enhances the life of CGP equipment.

4.1.4 Grid support being an ancillary service extended by the utility to the consumers, it has to be charged to the CPPs who utilise the grid support.

**Methodology and Rate of Grid Support charges:**

4.1.5 It is observed from the GCC report that the GSC is calculated by including the Artisans cost in the R&M cost.

4.1.6 However, as per the judgement of Hon'ble APTEL the parallel operation of the generators will affect the grid equipment which in turn will affect the R&M cost of the transmission licensee and distribution licensees and the Commission is of the view that the Artisans' cost should not be considered for arriving GSC.

4.1.7 In view of the above, the Commission has computed the GSC of Rs.15.50/kW/month by considering the total generation capacity connected to Telangana grid as on end of 31.03.2023 and actual R&M charges of TSTRANSCO and TSDISCOMs as shown below:

<b>FY 2022-23</b>	<b>Actual R&amp;M Cost (Rs. in crore)</b>
TSSPDCL	154.00
TSNPDCL	116.44
TSTRANSCO	47.17
Total [A]	317.61
Contracted Capacity in MW [B]	17076.46
<b>Grid Support charges Rs/kW/month [C=(A*10<sup>^</sup>/12)/(B*1000)]</b>	<b>15.50</b>

4.1.8 In view of the above the Commission decides the GSC as detailed below:

Grid Support Charges (GSC) = power consumed by the co-located load x Rate of GSC (Rs./kW/month)	
Rate of GSC	Rs.15.50 per kW per month

### **Applicability**

4.1.9 **Co-located captive plants**: The Hon'ble APTEL in its order dated 08.10.2015 in Appeal No.167 of 2014 held that GSC can only be levied on the CPPs which are inter-connected with their load and the utility grid by a point of common coupling. The relevant extract is given below:

*"We further hold that the impugned petition, being Petition No.52/2013, is in reality, and letter and spirit, a clarificatory petition which cannot be said to be time barred. We further hold that the POCs can only be levied on the CPPs which are inter-connected with their load and the utility grid by a point of common coupling. Since, the Tawa Plant of the Appellant/petitioner is not inter-connected with its load/consumer and the utility grid by a point of common coupling, and hence, the POCs cannot be levied on the Tawa Plant of the Appellant".*

Provided that GSC cannot be levied on:

- A. Captive Power Plants ( both Renewable and Conventional) which are not co-located.
- B. IPPs ( both Renewable and Conventional).
- C. Solar Roof Top plants.
- D. Generators which have PPAs with TSDISCOMs.

4.1.10 The reasoning for non-applicability of GSC on the above are given below:

A. **Non-Captive Plants**: As per Hon'ble APTEL order dated 14.12.2023 in Appeal No.228 of 2022 & I.A.No.1962 of 2023, I.A.No.722 of 2022, I.A.No.1014 of 2023 an IPP can be categorized as CPP only if the generating station is self-consuming more than 51% of what it generates, in case the IPP is consuming less than 51% of energy, it cannot be termed as a CPP and thus will not be liable to pay GSC.