TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Draft amendments to the Tamil Nadu Electricity Supply Code

Notification No. TNERC/SC/- ……. Dated xx.xx.2024

(Comments invited by 15.07.2024)

The following draft of amendments to the Supply Code Regulations, 2004, which is proposed to be made in exercise of the powers conferred by section 181 read with section 50 of the Electricity Act, 2003 (Central Act 36 of 2003) and all other powers enabling it in this behalf, is hereby published for information of all persons likely to be affected thereby, as required by subsection (3) of section 181 of the said Act.

Notice is hereby given that the draft amendment will be taken into consideration after expiry of thirty days from the date of publication of this Notification in the TNERC website and that any objection or suggestion, which may be received from any person before the expiry of the aforesaid period, will be considered by the Commission.

Objection or suggestion, if any, should be addressed in duplicate along with a soft copy to the Secretary, Tamil Nadu Electricity Regulatory Commission, 4th Floor, SIDCO Corporate Office Building, Thiru Vi Ka Industrial Estate, Guindy, Chennai-600032 (email id- tnerc@nic.in).

AMENDMENTS

In the said Regulations,-

1. The heading "Current harmonic control" occurring in clause (iv) of sub-regulation (1) of Regulation 4 shall be substituted as follows:-

"(A). Current Harmonic control in loads of consumers / prosumers of HT/EHT services and charging stations of all voltage levels:"

2. Sub-clause (b) in clause (iv) of sub-regulation (1) of Regulation 4 shall be substituted as follows:-

"b) The CEA (Amendment) Regulations 2019 stipulate the same provision in respect of current harmonics that the limits of injection of current harmonics at the point of common coupling by the user, method of harmonic measurement and other such matters, shall be in accordance with the IEEE Std. 519-2022, as amended from time to time."

3. Sub-clause (l) In clause (iv) of sub-regulation (1) of Regulation 4 shall be substituted as follows:-

"l) In case of new supply connectivity, a self-declaration by the applicant that adequate harmonic filters will be installed, shall be enclosed with the application requesting supply. Current distortion shall be measured within three months from the date of effecting supply and if it is found to be exceeding the limit, the further course of action shall as per sub-classes from (h) to (k) summarized above.

Note: refer explanation below."

4. In the principal Regulation, in Regulation 4 after sub-clause (n) of clause (iv) of sub-regulation (1), the following shall be inserted:-

***"(B) HARMONIC CURRENT CONTROL FOR GENERATION RESOURCES**:*

a) *Central Electricity Authority (Technical standard for connectivity to the Grid) Regulations, 2007 and its Amendment Regulations 2013 and 2019, Central Electricity Authority (Technical Standards for Connectivity below 33 kilovolts)*

Regulations, 2013 and its Amendment Regulations 2019 apply to wind generating stations, generating stations using inverters, wind-solar photovoltaic hybrid systems, energy storage systems and distribution generation resources , prosumers acting as generators stipulate that the limits of harmonic current injections , point of harmonic measurement, harmonic measurement and other related matters, shall be in accordance with the IEEE 519-2014 Standards, as amended from time to time.

b) *IEEE 519-2014 is revised as IEEE 519-2022. According to the revised IEEE Standard,*
   i) *current distortion limits shall applicable to inverter-based resources (IBR) as per tables and point of measurement as specified in IEEE 2800-2022.*
   ii) *current distortion limits shall applicable to distributed energy resources (DER) as per tables and point of measurement as specified in IEEE 1547-2018.*
   iii) *combined site rated generation of IBR/DER is less than 10%, applicable IEEE 519-2022, greater than 10% applicable IEEE 2800/1547 respectively.*
c) *Instrument used for harmonic measurement shall comply with specifications of IEC61000-4-7 and IEC 61000-4-30 CLASS-A.*
d) *The licensee shall use his portable instrument for the measurement of harmonic current injection at the referred point of measurement of the IBR / DER.*
e) *Measurement methodology as detailed in IEEE 519-2022 shall be followed.*
f) *If current distortion is exceeded the limits specified in the respective IEEE Std, a notice shall be issued to the owner of the generation resource by the licensee to install adequate means/ filters within 6 months. The notice shall also convey that in case of non-compliance, the connectivity of the generation resource shall be disconnected after expiry of 6 months period without any further notice, under report to the Commission.*
g) *In case if the owner of generation resource provided the required means /filters within 6 months and intimated the fact in writing to the licensee and after*

confirmation by the licensee by measurement, the disconnection of connectivity shall not be resorted to.

The owner of generation resource shall pay the fee in advance for the harmonic measurement for the second and subsequent time if necessitated. The fee will be collected as fixed by the Commission.

h) In case of seeking new or expanded electrical plant connectivity, a self-declaration by the applicant that adequate harmonic filters will be installed, shall be enclosed with the application requesting connectivity. While giving connectivity, harmonic measurement shall be done. If the measurement reveals that the harmonic exceeds the prescribed limit, connectivity shall not be given till the harmonic distortion brought to limits.

i) The licensee is at liberty to conduct current harmonic distortion limit at periodic interval at generation resource installation to check as to whether the consumer is maintaining current harmonic distortion within limits.

j) This regulation shall apply to all generation resources, including wind generating stations, generating stations using inverters, wind-solar photovoltaic hybrid systems, energy storage systems (for exporting power) and prosumers (when acting as generators) all having or seeking new /extended electrical plant connectivity at 11 kV, and above.

Explanation (applicable both 4(1)(iv)(A) and 4(1)(iv)(B)) as defined in IEEE 519- 2022:

(a) Maximum demand load current:

This current value is established at the point of common coupling and shall be taken as the sum of the rms currents corresponding to the 15 min or 30 min maximum demand during each of the twelve previous months divided by 12. If 12 months of data is not available due to the length of time in service, then the maximum 15 min or 30 min apparent power demand for each month should be summed over the total number of months available, and then divided by the number of months. For situations where the installation is a proposed new installation, the maximum demand load current shall be based on the projected 15 min or 30 min maximum monthly apparent power demand

over the course of the year following operation of the proposed harmonic producing loads listed on the service application.

(b) Short-circuit ratio:

At a particular location, the ratio of the available short-circuit current in amperes to the maximum demand load current in amperes (I_{sc} / I_L).

Where,

I_{sc} = Short circuit at PCC, and

I_L = Maximum demand load current at PCC under normal operating conditions."

5. The explanation to sub-regulation (2) of Regulation 3 shall be omitted.

6. The notation (c) of clause (ii) of sub-regulation (6) in Regulation 22 shall be deleted.

(By order of the Tamil Nadu Electricity Regulatory Commission)

Sd/- 13.06.2024
(Dr.C.VEERAMANI)
Secretary,
Tamil Nadu Electricity Regulatory Commission.

Explanatory statement

The Tariff Policy issued by the Ministry of Power dated 28.01.2016 and Section 86 (1)(i) of the Electricity Act 2003 mandate the State Commission to specify and enforce standards of performance of Licensees with respect to quality, continuity and reliability of service by Licensee.

CEA has issued Technical Standards for Connectivity below 33 kilovolts (Amendment) Regulation 2019 and Technical Standards for connectivity to the Grid (Amendment) Regulations 2019 mandating implementation of harmonic control in compliance of IEEE Standards 519 of 2014 as amended from time to time.

In endeavour of implementation of harmonic control to ensure quality of power to consumers of the State, Commission had amended the Supply Code Regulations vide Notification No. TNERC/SC/7 – 47 dated 29.03.2022 mandating compliance of IEEE 519-2014 Standards *for consumers of 11kV and above and charging stations.*

As further development, the IEEE Standard 519-2014 has been revised as IEEE Std 2022 accommodating additional IEEE Standards ie IEEE 2800-2022 and IEEE 1547 -2018 with harmonic limits for IBR(Inverter based Resources) and DER (Distributed Energy Resources).

As the next step in this direction, in order to formulate regulation for harmonic current control for *generation resources* in line with updated Standards a consultative paper has been published in the Commission's website with the detailed study report of the expert consultants appointed by the Commission.

Accordingly, this amendment seeks to incorporate necessary provision for enforcement of harmonic control in generation resources in the Regulations of the Commission.

(By order of the Tamil Nadu Electricity Regulatory Commission)

Sd/- 13.06.2024
(Dr.C.VEERAMANI)
Secretary,
Tamil Nadu Electricity Regulatory Commission.

ANNEXURE

TAMIL NADU ELECTRICITY SUPPLY CODE

Sl. No.	Existing regulation	*Proposed Regulation*
1.	**4(1)(iv).Current Harmonic control:**	***4(1)(iv) (A). Current Harmonic control in loads of consumers / prosumers of HT/EHT services and charging stations of all voltage levels:***
	a) Nonlinear loads change the sinusoidal nature of the ac power current (and consequently the ac voltage drops), thereby resulting in the flow of harmonic currents in the ac power system that can cause many ill-effects to the power system and to the consumers' installations. Hence the harmonic currents generated by the loads of consumers/ prosumers connected to electricity system at 11kV, 22kV, 33kV and above and charging stations have to be brought within limits.	*a) xxx*
2.	b) The CEA (Amendment) Regulations 2019 stipulate the same provision in respect of current harmonics that "the limits of injection of current harmonics at the point of common coupling by the user, method of harmonic measurement and other such matters, shall be in accordance with the IEEE Std. 519-2014, as amended, from time to time".	*b) The CEA (Amendment) Regulations 2019 stipulate the same provision in respect of current harmonics that the limits of injection of current harmonics at the point of common coupling by the user, method of harmonic measurement and other such matters, shall be in accordance with the **IEEE Std. 519-2022**, as amended, from time to time.*
	c) Measurement of current distortion / harmonic currents shall be made at the point of common coupling (PCC) of the Installation.	*c) xxx*
	d) Power quality meter complying with the IEC Standard 61000-4-30 edition 3.0 class A – shall be used.	*d) xxx*

e) The Licensee shall use his portable power quality meter for one week for each installation of consumer/prosumer/ charging station to measure the harmonic currents.

e) *xxx*

f) All three total demand distortion (TDD) values at 99th percentile very short time (3s) value, 99th percentile short time (10 min) value,95th percentile short time (10 min) value shall be measured and compared with the values specified in IEEE Std. The highest value among the above three shall be considered for levying penalty.

f) *xxx*

g) If the measured values exceed the limits, a notice shall be issued to the consumer/prosumer/ charging station by the Licensee to install adequate harmonic filters within 6 months. The notice shall also convey that in case of non – compliance, penalty at the rate mentioned in the following sub-regulation h) will be levied by the Licensee for the subsequent 12 months and there after supply to the service shall be disconnected in case of noncompliance even after the said 12 months.

g) *xxx*

h) A penalty of a maximum of 10% in steps of 1% increase will be levied on the monthly current consumption charges as shown below:

h) *xxx*

TDD excess over and above the limit	**Penalty on the monthly current consumption charges**
Up to 3%	1%
Above 3% up to 6%	2%
Above 6% up to 9%	3%
Above 9% up to 12%	4%

Above 12% up to 15%	5%
Above 15% up to 18%	6%
Above 18% up to 21%	7%
Above 21% up to 24%	8%
Above 24% up to 27%	9%
Above 27% up to 30%	10%
Above 30 %	10%

If the excess TDD over and above the limit involves decimals and if the decimal is from 0.1 to 0.4, the whole number may only be reckoned. If it is from 0.5 and 0.9, the next whole number will be reckoned.

i) The levying of penalty shall be stopped by the Licensee upon installation of filters by the consumer/prosumer/charging station and testing by the Licensee. If it is confirmed by testing that the harmonic currents are brought within the limits specified in the IEEE Standards, the levy of penalty will have to be stopped from the date of intimation of the consumer/prosumer/charging station to the effect that the installation of filters are fully completed and ready for testing by the Licensee. If the measured values exceed the limits, the penalty would continue. The Licensee shall issue a notice to the consumer/prosumer/ charging station forthwith to this effect. It is open to the consumer/prosumer/ charging station to rectify/re-install the filters again and intimate the Licensee forthwith for re-testing before expiry of said 12 months.

i) *xxx*

j) Even after 12 months penalty period, if the consumer/ prosumer/charging station does not come forward to install the required harmonic filters or unable to bring the values within prescribed limits, the Licensee shall

j) *xxx*

	issue a 30 days disconnection of supply notice to the consumer/ prosumer/ charging station for non–compliance. If the consumer/ prosumer/ charging station installs the filters and makes them ready for testing by the Licensee during the notice period, the Licensee shall test them before disconnection. If the measured values are within limits, the supply shall not be disconnected. If the measured values exceed limits, supply to the service shall be disconnected by the Licensee after expiry of the 30 days' disconnection notice period under report to the Commission.	
	k) During subsequent measurement by the Licensee, if the current distortion limit as specified in IEEE standard is not maintained, the Licensee is at liberty to disconnect the supply to the consumer/ prosumer/charging station service by issuing 30 days' disconnection of supply notice under report to the Commission.	*k) xxx*
3.	l) In case of new supply connectivity, a self-declaration by the applicant that adequate harmonic filters will be installed, shall be enclosed with the application requesting supply. The supply may be initially given and after 12 Months the current distortion shall be measured and if it is found to be exceeding the limit, the further course of action shall be as per sub-clauses from (g) to (k), summarized above.	*l) In case of new supply connectivity, a self-declaration by the applicant that adequate harmonic filters will be installed, shall be enclosed with the application requesting supply. Current distortion shall be measured within three months from the date of effecting supply and if it is found to be exceeding the limit, the further course of action shall as per sub-classes from (h) to (k) summarized above.* *Note: refer explanation below*
	m) The Licensee is at liberty to conduct current harmonic distortion measurement at any time at the installation of consumer/ prosumer/charging station to check as to whether the current harmonic distortion is	*m) xxx*

	maintained within the limit by the consumer/ prosumer/charging station. n) This Regulation shall apply to all bulk consumers at 33kV and above, consumers and prosumers at 11kV and 22kV and charging stations .This regulation is not applicable to HT tariff IV (Lift Irrigation).	*n) xxx*
4.		***4(1)(iv)(B) HARMONIC CURRENT CONTROL FOR GENERATION RESOURCES****:* *k) Central Electricity Authority (Technical standard for connectivity to the Grid) Regulations, 2007 and its Amendment Regulations 2013 and 2019, Central Electricity Authority (Technical Standards for Connectivity below 33 kilovolts) Regulations, 2013 and its Amendment Regulations 2019 apply to wind generating stations, generating stations using inverters, wind-solar photovoltaic hybrid systems, energy storage systems and distribution generation resources , prosumers acting as generators stipulate that the limits of harmonic current injections , point of harmonic measurement, harmonic measurement and other related matters, shall be in accordance with the IEEE 519-2014 Standards, as amended from time to time.* *l) IEEE 519-2014 is revised as IEEE 519-2022. According to the revised IEEE Standard,*

		iv) current distortion limits shall applicable to inverter-based resources (IBR) as per tables and point of measurement as specified in IEEE 2800-2022. *v) current distortion limits shall applicable to distributed energy resources (DER) as per tables and point of measurement as specified in IEEE 1547-2018.* *vi) combined site rated generation of IBR/DER is less than 10%, applicable IEEE 519-2022, greater than 10% applicable IEEE 2800/1547 respectively.* *m) Instrument used for harmonic measurement shall comply with specifications of IEC61000-4-7 and IEC 61000-4-30 CLASS-A.* *n) The licensee shall use his portable instrument for the measurement of harmonic current injection at the referred point of measurement of the IBR / DER.* *o) Measurement methodology as detailed in IEEE 519-2022 shall be followed.* *p) If current distortion is exceeded the limits specified in the respective IEEE Std, a notice shall be issued to the owner of the generation resource by the licensee to install adequate means/*

		filters within 6 months. The notice shall also convey that in case of non-compliance, the connectivity of the generation resource shall be disconnected after expiry of 6 months period without any further notice, under report to the Commission. *q) In case if the owner of generation resource provided the required means /filters within 6 months and intimated the fact in writing to the licensee and after confirmation by the licensee by measurement, the disconnection of connectivity shall not be resorted to.* *The owner of generation resource shall pay the fee in advance for the harmonic measurement for the second and subsequent time if necessitated. The fee will be collected as fixed by the Commission.* *r) In case of seeking new or expanded electrical plant connectivity, a self-declaration by the applicant that adequate harmonic filters will be installed, shall be enclosed with the application requesting connectivity. While giving connectivity, harmonic measurement shall be done. If the measurement reveals that the harmonic exceeds the prescribed limit, connectivity shall not be given till the*

		harmonic distortion brought to limits. *s) The licensee is at liberty to conduct current harmonic distortion limit at periodic interval at generation resource installation to check as to whether the consumer is maintaining current harmonic distortion within limits.* *t) This regulation shall apply to all generation resources, including wind generating stations, generating stations using inverters, wind-solar photovoltaic hybrid systems, energy storage systems (for exporting power) and prosumers (when acting as generators) all having or seeking new /extended electrical plant connectivity at 11 kV, and above.* *Explanation (applicable both 4(1)(iv)(A) and 4(1)(iv)(B)) as defined in IEEE 519- 2022:* *(a) Maximum demand load current:* *This current value is established at the point of common coupling and shall be taken as the sum of the rms currents corresponding to the 15 min or 30 min maximum demand during each of the twelve previous months divided by 12. If 12 months of data is not available due to the length of time in service, then the maximum 15 min or 30 min apparent power demand for each month should be summed over the total number of months available, and then divided by the number of months. For*

		situations where the installation is a proposed new installation, the maximum demand load current shall be based on the projected 15 min or 30 min maximum monthly apparent power demand over the course of the year following operation of the proposed harmonic producing loads listed on the service application. *(b) Short-circuit ratio:* *At a particular location, the ratio of the available short-circuit current in amperes to the maximum demand load current in amperes (I_{sc} / I_L).* *Where,* *I_{sc} = Short circuit at PCC, and* *I_L = Maximum demand load current at PCC under normal operating conditions.*
5.	**3. Categories of supply** (2) In case of existing service connection / installation not conforming to the provisions mentioned in Sub-Regulation (1), conversion of such service connection / installation to higher / lower voltage may be carried out based on the mutual consent between the Distribution Licensee and the Consumer duly considering the capacities of the existing line / cable, transformer, etc. and the cost-benefit analysis of such conversion. *Explanation: For this purpose of this sub regulation, existing service connection*	***3. Categories of supply*** *(2) In case of existing service connection / installation not conforming to the provisions mentioned in Sub-Regulation (1), conversion of such service connection / installation to higher / lower voltage may be carried out based on the mutual consent between the Distribution Licensee and the Consumer duly considering the capacities of the existing line / cable, transformer, etc. and the cost-benefit analysis of such conversion*.

<table>
<tr><td></td><td>means the service connection or additional demand to the existing service connection, effected on or before 21-03-2012, the date on which the sub regulation (2) came into force</td><td></td></tr>
<tr><td>6.</td><td>22. Restoration of supply of electricity
(1 to 5) xxx

(6). (i) When a service connection remains disconnected for more than six months for non-payment of electricity charges beyond the notice period of three months, if the consumer comes forward within the period mentioned below to pay the actual dues and agrees to remit the charges in clause (ii) below, the official authorized by the Licensee may grant extension of time beyond the notice period and revoke the termination of agreement provided that the lines feeding the service connection have not been dismantled, so as to facilitate reconnection of the disconnected service

<table><tr><th>Category</th><th>Period for reconnection of disconnected service</th></tr><tr><td>HT consumers</td><td>Within five years from the date of Disconnection</td></tr><tr><td>LT Agricultural consumers</td><td>-do -</td></tr><tr><td>Other LT consumers</td><td>Within two years from the date of Disconnection</td></tr></table></td><td>22. Restoration of supply of electricity
(1 to 5) xxx
(6) (i) xxx</td></tr>
</table>

	(ii) The authorized Officer of the Licensee may permit such consumer to pay the outstanding in installments and to avail reconnection on receipt of 40% of the total arrears outstanding after closing of account due to the Licensee, which include – *(a) Arrears on the date of closure of accounts.* *(b) The applicable BPSC / interest up to the date of payment.* *(c) The balance 60% of the amount shall be collected in ten monthly installments. In addition to the above, the full amount of Security Deposit adjusted while closing of account shall be collected in one lumpsum along with the aforesaid portion of 40% before effecting restoration of supply.* *Explanation: For the purpose of removal of doubts, it is hereby declared that any tariff minimum collected by the Tamil Nadu Electricity Board prior to the date of publication of the Tamil Nadu Electricity Supply (Amendment) Code, 2006 in the Tamil Nadu Government Gazette, that is to*	*(ii) xxx* *(a) xxx* *(b) The applicable BPSC / interest up to the date of payment.* *The balance 60% of the amount shall be collected in ten monthly installments. In addition to the above, the full amount of Security Deposit adjusted while closing of account shall be collected in one lumpsum along with the aforesaid portion of 40% before effecting restoration of supply.* *Explanation: For the purpose of removal of doubts, it is hereby declared that any tariff minimum collected by the Tamil Nadu Electricity Board prior to the date of publication of the Tamil Nadu Electricity Supply (Amendment) Code, 2006 in the Tamil Nadu Government Gazette, that is to say prior to 21st June 2006 on the basis of sub-regulation*

	say prior to 21st June 2006 on the basis of sub-regulation (6) as it stood before the said amendment need not be refunded by the Tamil Nadu Electricity Board.	*(6) as it stood before the said amendment need not be refunded by the Tamil Nadu Electricity Board.*

(By order of the Tamil Nadu Electricity Regulatory Commission)

Sd/- 13.06.2024
(Dr.C.VEERAMANI)
Secretary,
Tamil Nadu Electricity Regulatory Commission.