National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
Ph: +92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/DG(CAD)/TCD-10/135-56

January 5, 2022

MOST IMPORTANT

1. Chief Executive officer, Islamabad Electric Supply Company (IESCO) Street # 40, Sector G-7/4, Islamabad.
2. Chief Executive officer, Peshawar Electric Supply Company Limited (PESCO), WAPDA House, Shami Road, Sakhi Chashma, Peshawar.
3. Chief Executive officer, Gujranwala Electric Power Company Limited (GEPCO), 565/A, Model Town, G.T. Road, Gujranwala.
4. Chief Executive officer, Hyderabad Electric Supply Company Limited (HESCO), WAPDA Offices Complex, Hussainabad, Hyderabad.
5. Chief Executive officer, Sukkur Electric Power Company Limited (SEPCO), Administration Block, Thermal Power Station, Old Sukkur.
6. Chief Executive officer, Faisalabad Electric Supply Company Limited (FESCO), AbdullahPur, Canal Bank Road Faisalabad.
7. Chief Executive officer, Lahore Electric Supply Company Limited (LESCO), 22-A, Queens Road, Lahore.
8. Chief Executive officer, Multan Electric Power Company Limited (MEPCO), MEPCO Headquarter, Khanewal Road, Multan.
9. Chief Executive officer, Quetta Electric Supply Company Limited (QESCO), Zarghoon Road, Quetta
10. Chief Executive officer, Tribal Areas Electric Supply Company Limited (TESCO), Room No. 213, 1st Floor, WAPDA House, Shami Road, Sakhi Chashma, Peshawar.
11. Chief Executive officer, K-Electric Limited (KEL), KE House, Punjab Chowrangi, 39-B, Sunset Boulevard, Phase-II, DHA, Karachi

SUBJECT: REGULATORY FRAMEWORK FOR ELECTRIC VEHICLES CHARGING STATIONS

Reference is made to the hearing held on September 08, 2021 via Zoom Application regarding the subject matter.

2. The Authority has approved a regulatory framework for electric vechicle charging stations. Accordingly, a new Chapter i.e. Chapter No.16 has been framed and the same is enclosed for incorporation in Consumer Service Manual (CSM) and compliance with immediate effect.

Encl: As above.

5/1/22

(Shakil Ahmed)
Additional Director
Registrar Office

Copy to:

i. C.E./CSD, Islamabad Electric Supply Company (IESCO), Street # 40, Sector G-7/4, Islamabad
ii. C.E./CSD, Sukkur Electric Power Company Limited (SEPCO), Administration Block, Thermal Power Station, Old Sukkur

iii. C.E./CSD, Faisalabad Electric Supply Company Limited (FESCO), Abdullah Pur, Canal Bank Road Faisalabad
iv. C.E./CSD, Lahore Electric Supply Company Limited (LESCO), 22-A, Queens Road, Lahore
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viii. C.E./CSD, Peshawar Electric Supply Company Limited (PESCO), WAPDA House, Shami Road, Sakhi Chashma, Peshawar
ix. C.E./CSD, Hyderabad Electric Supply Company Limited (HESCO), WAPDA Offices Complex, Hussainabad, Hyderabad
x. C.E./CSD, Gujranwala Electric Power Company Limited (GEPCO), 565/A, Model Town, G.T. Road, Gujranwala
xi. Mr. Ayaz Ahmed Jaffar, Director (Finance & Regulations) K-Electric, KE House, Punjab Chowrangi, 39-B, Sunset Boulevard, Phase-II, DHA, Karachi

CHAPTER 16
Public Electric Vehicle Charging Stations

16.1 This chapter has been inserted in this Manual on Public Electric Vehicle Charging Station (PEVCS) to consolidate some of the relevant provisions exclusively applicable to PEVCS. Notwithstanding this chapter, all the applicable laws and provisions in this Manual shall apply to PEVCS.

16.2 Definitions

The Definitions given in Chapter 1 are applicable herewith. However, the definitions of the terms used specifically in this chapter are given below:

16.2.1 **"electric vehicle or EV"** means a vehicle that uses electric motors and motor controllers for propulsion, and contains an energy storage device, such as a rechargeable battery to store electricity and use it as a transportation fuel to power its electric motors and motor controllers, which is manufactured primarily for use on public streets, roads or highways and charges its battery by plugging into the national distribution facilities.;

16.2.2. **"electric vehicle supply equipment or EVSE"** means a complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for power transfer and information exchange between a branch electric circuit and an electric vehicle.

16.2.3 **"EV Services"** means the charging of a battery of an EV User by an EVSE at a PEVCS.

16.2.4 **"EV User"** means any person who owns, charges, or operates an EV.

16.2.5 **"Margin"** means an amount (in PKR) announced by NEPRA as a rate per unit of electric power (kWh) to be billed by a PEVCS from time to time from an EV User and duly notified and displayed on the NEPRA website.

16.2.6 **"public EV charging station or PEVCS"** means any premises where an EVSE is located for recharging of an EV by the public and which allows any EV User or operator to access and use the charging station free of cost or on payment;

16. 3 PEVCS's Connection and Category

16.3.1 PEVCS shall be deemed to fall within the category of "commercial" consumer and be subject to the relevant tariff as announced by NEPRA and to all the applicable laws and relevant terms and conditions and more specifically chapter 7 of this Manual.

16.3.2 PEVCS shall be subject to all the provisions of chapter 2 and chapter 11 of this Manual, Performance Standards (Distribution) Rules (PSDR), 2015 and Distribution Code for obtaining a connection and submitting the requisite application forms stated therein.

16.3.3 For each EVSE installed at a PEVCS a separate connection will be required and shall be approved under chapter 2 unless DISCO makes an exception subject to any conditions the DISCO deems necessary.

16. 4 Maximum Margin

16.4.1 PEVCS shall not bill an EV User above the Maximum Margin for each unit of electric power (kWh) used in the delivery of EV Services.

16.4.2 DISCO shall ensure that a PEVCS shall not bill more than the Maximum Margin from EV Users and shall comply with the terms and conditions as notified by the Authority.

16.4.3 PEVCS shall display on the premises, website, and any online tool (as applicable) at a prominent and visible place the Margin applicable from time to time for the benefit of the EV Users. The Margin should be displayed in such a manner to ensure that the EV User is made aware before using the EV Services of the Margin applicable per kWh.

16.4.4 If a PEVCS is found to have billed an EV User a rate higher than the Margin for EV Services, then DISCO shall be under an obligation to report this infraction to the Authority. The Authority may itself or may require DISCO to take any measures against the owner(s) of the PEVCS amongst others imposing any financial penalties including taking measures to prevent the PEVCS owner(s) in the future owning, managing, or indirectly being involved in the running of a PEVCS.

16. 5 Metering

16.5.1 PEVCS shall be subject to all the requirements stated in chapter 4 and chapter 6 of this Manual as well as PSDR and Distribution Code.

16.5.2 PEVCS will install any and all meters as required to ensure that the number of kWh consumed by the PEVCS in total and by each EV User for charging the EV at the PEVCS can be accurately measured. PEVCS shall be required to follow any directions given by DISCO in this regard.

16.5.3 DISCO shall inspect the functioning of any meter forming part of EVSE to ensure it accurately measures the number of kWh consumed by an EV User and DISCO may recommend any alterations in the metering equipment to protect its integrity and accuracy.

16.5.4 If DISCO detects any defect or interference with the EVSE, which has or can cause wrong billing to EV Users, then DISCO shall require PEVCS to take all steps to rectify the defect/interference and further shall take any penal measures applicable under this Manual

16.6 Billing

PEVCS shall be at liberty to design any bill/invoice which is to be given to the EV User for the EV Services.

16.7 Safety and Technical Standards for PEVCS and EVSE

16.7.1 **Safety Standards for PEVCS**

DISCO shall ensure PEVCS are installed according to manufacturer's instructions and applicable legal requirements during construction and installation and shall be in compliance with the highest safety, industrial and technical standards/codes issued by any regulatory body of Pakistan, including Pakistan Standards & Quality Control Authority, recommendations provided by the manufacturer, or DISCO or requirements incorporated into this Consumer Services Manual, from time to time for EVSE and for the overall premises on which the PEVCS is located/installed.

16.7.2 PEVCS shall adhere to all the technical and safety requirements stated in this Manual and more specifically chapter 12 as well as PSDR, Distribution Code and Power Safety Code.

16.7.3 PEVCS and the EVSE must conform to all approved and prevailing technical and safety standards approved by National Energy Efficiency and Conservation Authority (NEECA)/Pakistan Standards, Quality Control Authority (PSQCA) and manufacturer's recommendations.

16.7.4 The owner of PEVCS shall ensure that:

a) Display safe charging tips/instructions for Operator and EV User.

b) Display fixed "Danger Sign" at places where an immediate hazard/ danger exists such as panel, substation, transformer, etc. Display fixed "Caution Sign" at places where it is required to warn against potential hazards or to caution against unsafe practices.

c) Danger and Caution Signs shall be clear, easy to understand, and the words shall be in Urdu, English, and/or in a language understood by locals and workers. The signs shall be readable at a minimum distance of 5 feet.

d) Fire Prevention system for charging station shall be provided with manufacturer's instruction and applicable legal requirements.

e) The enclosure of the charging station shall be made of fire retardant material with self-extinguishing media.

f) Fire detection, alarm, and control system shall be provided as per manufacturer's instructions, Pakistan Building Codes and other applicable national and provincial legal requirements.

16.7.5. **Design**

The owner of PEVCS shall ensure that:

a) It coordinates with the DISCO to obtain EVSE installation requirements, specifications, and other relevant information and documents. This includes any interconnection documents required by the DISCO for new service requests and sites requiring a service upgrade;

Provided that the DISCO shall be bound to provide such information and documents in response to the request free of cost within seven working days.

b) the installation, design, and site layout shall consider the potential risk of ignitable fumes such as gasoline dispensers and therefore must comply with relevant safety requirements.

c) the installation, design, and site layout shall consider the potential risks during the installation, operation, and maintenance of the EVSE and all support equipment including wiring, conduit, and protection devices;

d) the design shall consider protection against vehicle impact and EVSE shall be installed in a position to minimize the likelihood of damage from vehicle impact;

Provided that in case the likelihood of damage from vehicle impact cannot be minimized, use of additional protection barriers shall be installed following IEC 62262 i.e. a typical protection against mechanical stress impact for EVSE installed outdoors is IK10.

e) The electric vehicle parking place shall be such that the connection on the vehicle when parked for charging shall be within five meters from the electric vehicle charging point.

f) Electric vehicle charging stations shall be designed, installed, tested, certified, inspected, and connected as per manufacturer's instructions/specifications by following the applicable law and international standards such as IEEE, IEC, ASTM, BS, NFPA, UL, or ISO, etc.

g) Hazardous live parts shall not be accessible to protect persons against electric shock.

h) Every part of the electric apparatus shall be securely guarded and fenced unless they are safe by position or construction.

i) Electric vehicle charging station shall be provided with protection against the overload of input supply and output supply fittings.

j) Electric vehicle charging points shall be installed so that any socket-outlet of supply is at least 800 millimeters above the finished ground level.

k) A cord extension set or second supply lead shall not be used in addition to the supply lead for the connection of the electric vehicle to the electric vehicle charging point and it shall be so constructed so that it cannot be used as a cord extension set.

l) Where the connection point is installed outdoors, or in a damp location, the equipment shall have an ingress protection code at least IPX4 as defined in IEC standard 60529".

m) A lightning protection system shall be provided for the electric vehicle charging station.

n) The electric vehicle charging station shall be equipped with a protective device against the uncontrolled reverse power flow from the vehicle.

o) The electric vehicle charging station shall have protection to prevent overvoltage/overloading of the battery.

p) The electric vehicle charging point shall not be energized until it is connected to the vehicle.

q) Identify, install and maintain the protective system for abnormal conditions (short-circuits, overcurrent, fault or overloading, etc.) including the grounding of circuits, apparatus, and infrastructures to interrupt all live connections, including the neutral. ELCBs (earth leakage circuit breakers), RCDs (residual current devices), and RCCBs (residual current circuit breakers) shall be used as per design in circuits to prevent fires and shocks in electrical installations. Protections/ controls/ interlocks shall be intact and shall not be bypassed or modified without approval from the designer.

r) Install and maintain earthing/grounding system for the charging station and bonding system for the vehicle. The resistance shall be as per design or manufacturer's instruction or Distribution design code of Distribution Code. In the absence of grounding and bonding instruction, the earthing resistance shall be not more than 5 Ohms and the transformer shall be not more than 2.5 Ohms to determine the integrity of the grounding path to ensure protection from shock hazards. Verify integrity of earthing/ grounding and bonding by

continuity test and resistance measurement after 12 months and critical care shall be after 6 months. Provide nameplate/ tag to all equipment with numbers for tracking of earthing/ grounding and bonding testing record, etc. The original record of testing shall be retained and preserved for three (03) years.

s) Electric vehicle charging station shall be provided with an earth continuity monitoring system that disconnects the supply if the earthing connection to the vehicle becomes ineffective.

t) All apparatus of charging stations shall have the insulation resistance value as per manufacturer's instructions/specifications or as stipulated in the relevant IEC 61851-1 standard.

u) Power supply cables used in charging stations or charging points shall conform to manufacturer's instructions/specifications or IEC 62893-1 standard.

16.7.6 **Installation**

EVSE shall:

a) be installed in a position to avoid obstruction to public or private footpaths and it shall not be installed in such a position that causes an unnecessary trip hazard.
b) have electrical wiring routed and suitably clipped or enclosed in a containment system to avoid creating a potential trip hazard and contact risk to the public. Wire routing requiring a conduit shall either be installed underground at the appropriate depth following local requirements or along walls or ceilings when necessary.
c) be installed to minimize the distance between the EV inlet and the charging equipment. The cord installed for charging vehicles shall have appropriate length to ensure minimum distance;
d) be installed with precautions to ensure that live parts i.e. hot wires/loaded circuits are either not accessible or cannot be touched during installation, operation, and maintenance;
e) be designed and installed to enable maintenance and service work to be carried out safely;
f) be designed and installed to comply with the requirements for health, safety, and environment as set out in this Manual, PSDR and Distribution Code;
g) be designed to prevent unauthorized usage of the charging facilities such as housing the socket outlet in a padlocked box or using an access card for energizing charging facility etc. may be provided as necessary especially for outdoor installations;
h) be installed with sufficient space around it to allow for adequate ventilation and cooling of the equipment (e.g. DC charging equipment incorporating

rectifiers). The designer and installer of the EV must refer to the manufacturer's installation and operating instructions supplied and comply with requirements stated in relevant standards;

i) have all associated equipment an IP rating suitable for the installation location; for indoor locations, minimum ingress protection of IP44 shall be used; for outdoor locations, minimum ingress protection of IP55 shall be used;
j) comply with the relevant quality and safety standards.
k) the connector type installed shall comply with IEC 62196 (Type 2 for level 2 charging and CCS2 (Combined Charging System) for DC (Direct Current)charging.
l) Entry of unauthorized visitors and access of stray or street animals shall be controlled in hazardous areas.
m) The EVSE installed at existing petrol/gas stations shall be located outside the hazardous zone;

16.7.7 **Operations**

a) EVSE shall be set up in compliance with relevant standards and codes to ensure proper calibration, accurate metering, and transparency;
b) EVSE shall be capable to provide a technical basis for billing options, metering accuracy, and network connectivity;
c) EVSE shall be capable of upgrades to enable Smart-grid-capability through Open Charge Point Protocol (OCPP) transmission and an integrated 4G/5G modem;
d) EVSE shall not create faults (typically through a circuit breaker/overcurrent protection), harmonics, and frequency misbalance in the distribution network;
e) EVSE shall have the capability to detect and monitor faults and generate signals/alarms in case of any fault is detected as required under international standards like J1772. It shall be capable to react to critical as well as small residual faults, reporting it and deliberately terminating the charging process before the residual current device (RCD) is tripped;
f) EVSE shall be connected to energy management systems (EMS) through the standardized EEBUS protocol for energy management, data exchange, and control;
g) EVSE shall be capable to have bi-directional communication with the vehicle as well as intelligent connection to EMS, monitoring the internal hardware of the charging system, the user interfaces as well as the charging socket and the charging cable. However, it shall be ensured that the EVSE shall not back-feed the grid in the case of an outage;
h) the charging infrastructure results in maximum availability and safety for both the charging infrastructure and the electric vehicle to be charged.

i) A portable socket-outlets or adaptor shall not be used for electric vehicle charging.

16.7.8 Maintenance, Inspection, and Testing

a) The owner of the charging station shall ensure the electrical and mechanical isolation before performing any servicing or maintenance at the charging station, where the unexpected energizing, start-up, or release of any type of energy (electrical, kinetic, potential, thermal, chemical) could occur, cause damage to equipment, and injury to personnel.
b) The owner of the charging station shall plan and conduct periodic preventive maintenance based on the manufacturer's instructions/manual.
c) The owner of the charging station shall ensure that the inspection and testing shall be done as specified in the manufacturer's instructions/manual at specified intervals.
d) The owner of the charging station shall arrange inspection and testing by the Electrical Inspector or Third Party Inspector. The report of inspection / testing may be submitted to DISCO.
e) The owner of the charging station shall ensure that inspection and testing of the charging station shall carry out every year or at the time of any major breakdown.
f) The original record of inspection, maintenance, and testing shall be retained and preserved by the owner for three (03) years.

16.8 Complaints

EV Users may raise any complaints against the PEVCS and DISCO under chapter 10 and chapter 15 of this manual. An EV User shall be deemed to be a consumer for purposes of raising any complaint.