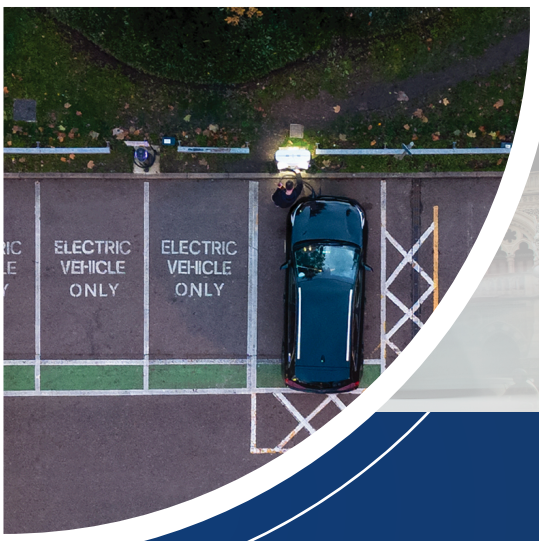
IESA
India Energy Storage Alliance

Cu International Copper Association India

RIGHT TO CHARGE

MAHARASHTRA



IEMC
India Electric Mobility Council

Customized Energy Solutions
Analyze · Simplify · Implement

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ABOUT THIS REPORT

The report “Right to Charge – Maharashtra” outlines a comprehensive framework for accelerating EV adoption by developing safe, accessible, and scalable charging infrastructure across residential, commercial, and public spaces. It details state and national policies as well as financial models and streamlined approval processes to overcome existing challenges. The report is built on extensive stakeholder consultations and case studies, emphasizing the need for stakeholder partnerships and standardized safety measures. Overall, it provides clear recommendations to integrate EV charging into urban planning, ensuring a robust and future-ready network that supports Maharashtra’s transition to sustainable mobility.

ABOUT INTERNATIONAL COPPER ASSOCIATION INDIA (ICA INDIA)

The International Copper Association India (ICA India) is a nonprofit organisation engaged in raising awareness about the beneficial usage of copper for safety, health, environment and energy efficiency, and clean energy technology, throughout India, in collaboration with policymakers, regulators, like-minded organisations, institutions, trade bodies and other key stakeholders. We are dedicated to strengthening India’s copper sector by working with industry partners to achieve sustainable development goals.

The Right to Charge campaign was set up by ICA India to develop a Public-Private Partnership (PPP) between the state government/ local municipal authorities and private entities to set up EVCS in public and private parking spaces in buildings so as to encourage and influence accelerated adoption of e-mobility. The campaign aims to ensure faster deployment of EVCS in public parking lots, municipal buildings, and urban housing societies. The campaign has already committed to the Government of India’s Go Electric campaign and state-based intended targets towards developing a low-carbon transportation network. This campaign will primarily provide facilitation between the identified stakeholders to participate in the necessary development of a framework for the installation of the EVCS in the above-identified parking spaces

ABOUT INDIA ENERGY STORAGE ALLIANCE (IESA)

India Energy Storage Alliance (IESA) is a leading industry alliance focused on the development of advanced energy storage, green hydrogen, and e-mobility technologies in India. Founded in 2012, by Customized Energy Solutions (CES), IESA’s vision is to make India a global hub for R&D, manufacturing, and adoption of advanced energy storage, e-mobility, and green hydrogen technologies. The alliance has been at the forefront of seminal efforts to shape an enabling policy framework for the adoption of energy storage, electric mobility, green hydrogen, and emerging clean technologies in India.

With close to a decade of experience, IESA provides its member network a holistic eco-system to network and grow its business in India and the world by providing in-depth market analysis, facilitating dialogue between industry and government stakeholders, and providing the latest skill-development training. Over the years, IESA has launched several initiatives and councils that support its member companies in staying ahead of the curve.

Today IESA is a proud network of 180+ member companies, encompassing industry verticals from energy storage, EV manufacturing, EV charging infrastructure, green hydrogen, microgrids, power electronics, renewable energy, research institutes and universities, and cleantech startups.

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ASEA	Architects, Engineers, Surveyors Association
BIS	Bureau of Indian Standards
CBD	Central Business Districts
CCS	Community Charging Stations
CEA	Central Electricity Authority
CEIG	Chief Electrical Inspector to the Government of State
CPO	Charge Point Operators
CPWD	Central Public Works Department
CREDAI	Confederation of Real Estate Developers Associations of India
DCPR	Development Control and Promotion Regulation)
DISCOM	Electricity distribution companies of India
EV	Electric Vehicle
EVCS	Electric Vehicle Charging Stations
EVSE	Electric Vehicle Supply Equipment
FAME	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FC	Fast Chargers
GHS	Group Housing Societies
GOI	Government of India
GOM	Government of Maharashtra
HCS	Home Charging Stations
HT	High Tenison
ICE	Internal Combustion Engine
LEC	Licensed Electrical Contractor
LPG	Liquified Petroleum Gas
LT	Low Tension
MBBL	Model Building Bye Laws

MOHUA	Ministry of Housing and Urban Affairs
MOP	Ministry of Power
MSEDCL	Maharashtra State Electricity Distribution Company Limited
NABL	National Accreditation Board for Testing and Calibration Laboratories
NBC	National Building Code
NEC	National Electrical Code
NEMMP	National Electric Mobility Mission Plan
NOC	No Objection Certificate
OCPI	Open Charge Point Interface
OEMS	Original Equipment Manufacturers
ORCS	On-Street Residential Chargepoint Scheme
PCMC	Pimpri-Chinchwad Municipal Corporation
PCS	Public Charging Stations
PESO	Petroleum & Explosives Safety Organization
PMC	Pune Municipal Corporation
PMPL	Pune Mahanagar Parivahan Mahamandal Limited
PPL	Public Parking Lot
PPP	Public-Private Partnerships
RERA	Real Estate Regulatory Authority
RWAS	Residential Welfare Associations
SC	Slow Chargers
SNA	state nodal agency
SOC	State of Charge
SOP	Standard Operating Procedure
SWC	Single Window Clearance
TOD	Time of Day
UEI	Unified Energy Interface
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01. INTRODUCTION & BACKGROUND

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The state of Maharashtra introduced the Electric Vehicle (EV) Policy 2021 with the objective of accelerating the adoption of electric mobility across the state. The policy emphasizes the creation of a robust ecosystem for electric vehicles, including the development of widespread EV charging infrastructure. Additionally, it highlights the importance of leveraging parking spaces in both residential and commercial buildings to establish Electric Vehicle Charging Stations (EVCS).

The Maharashtra EV Policy outlines the plan to set up 2,375 charging stations in key cities, including Greater Mumbai, Pune, Nagpur, Aurangabad, Nashik, Amravati, and Solapur. The goal is to ensure the availability of at least one charging station within a 3 km x 3 km grid or a minimum of 50 charging stations per million people, whichever is higher.

Furthermore, the policy aims to make all major highways in the state EV-ready by 2025, including the Mumbai-Pune Highway, Mumbai-Nagpur Highway, Mumbai-Nashik Highway, and Nashik-Pune Highway.

At the national level, the central government has also established clear targets, incentives, and policies to drive EV adoption by 2030. These include initiatives such as the National Electric Mobility Mission Plan (NEMMP), Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) schemes, and the PM e-Drive program. These policies focus on both demand and supply-side enablers, reinforcing the need for a well-developed EV charging infrastructure to support electrification goals. The rapid deployment of charging stations in residential, commercial, and public spaces is essential to meet the anticipated rise in EV demand.

Key Drivers for Increasing EV Charging Infrastructure

- **Growing Demand for Overnight Home Charging:** Residential buildings must accommodate EV charging infrastructure to enable convenient home charging for users. Studies indicate that most EV owners prefer to charge their vehicles primarily at home or work, relying on public charging infrastructure only for opportunity charging. However, home charging availability varies across regions and is influenced by factors such as urban density, suburban and rural distribution, and income levels. It is crucial to align building regulations to mandate charging provisions, particularly for residents in rental accommodations or those without dedicated parking spaces.
- **Utilizing Vacant Parking Spaces for Public and Captive Charging:** Societies, malls, office complexes, and other strategic locations can be equipped with EV charging infrastructure to support both public and shared charging needs. A shift in mindset is required to recognize the growing importance of EVs and to mandate EV-ready or EV-enabled parking spaces in new developments.

To meet the rising interest and adoption of EVs, it is imperative to establish and operationalize a network of public, captive, and home charging infrastructure. Additionally, safety concerns—particularly regarding the installation of EV charging stations in locations such as building basements—must be addressed to mitigate risks related to fire and other hazards.

This whitepaper provides a comprehensive framework for deploying EV charging infrastructure in Maharashtra while ensuring an optimal balance between accessibility, scalability, and safety.

1.1 RIGHT TO CHARGE CAMPAIGN

As electric vehicle (EV) adoption accelerates, the burden of charging is increasingly falling on individual owners. Lacking dedicated charging facilities, many are forced to improvise, using common parking lot outlets, extending home electrical circuits, or even tapping directly into residential lines—practices that create unsafe wiring and potential fire hazards. Two-wheeler owners with removable batteries often charge them indoors, adding to the load on household circuits.

These unsustainable and risky practices underscore the critical need for a structured and safe charging infrastructure. Recognizing this, **the "Right to Charge" campaign in Maharashtra, a joint effort by the International Copper Association (ICA India) and the India Energy Storage Alliance (IESA), seeks to establish a supportive ecosystem for residential, public, and captive EV charging.**

The campaign focuses on residential parking, particularly in group housing societies, and exploring semi-public charging opportunities in locations such as commercial complexes and office spaces where business opportunities exist. To better understand and reflect on ground situation, series of stakeholder consultation meetings were conducted in **Pune, Chhatrapati Sambhaji Nagar, and Nagpur to understand customer mindset, varied traffic densities, charging behaviours, and EV adoption patterns across the state.**

The Stakeholder consultations involved multiple stakeholders, including Maharashtra State Electricity Distribution Company Limited (MSEDCL), Municipal Corporations, Ministry of Housing and Urban Affairs (MoHUA), Ministry of Power, Charge point operators (CPOs), Fleet operators, Original Equipment Manufacturers (OEMs) and Think tanks.

Key objectives of the Right to Charge campaign include:

- Development of recommendations and guidelines for setting up EVCS in buildings.
- Establishing institutional frameworks, including integration of standards, codes, and building bye-laws.
- Capacity building and awareness generation among diverse stakeholders.

The campaign has employed a multi-pronged approach, including roundtable discussions, one-on-one consultations, and focused group discussions. The primary focus areas deliberated during the campaign include:

- Challenges and safety risks in setting up EVCS in diverse building types and identifying solutions to enhance adoption.
- Formulation of clear guidelines for EVCS installation in buildings, covering building byelaws, standards, codes, and pathways for permits and approvals, with a strong focus on safety compliance.
- Recognizing the capacity-building needs of stakeholders and raising public awareness to ensure broader participation and smooth implementation.

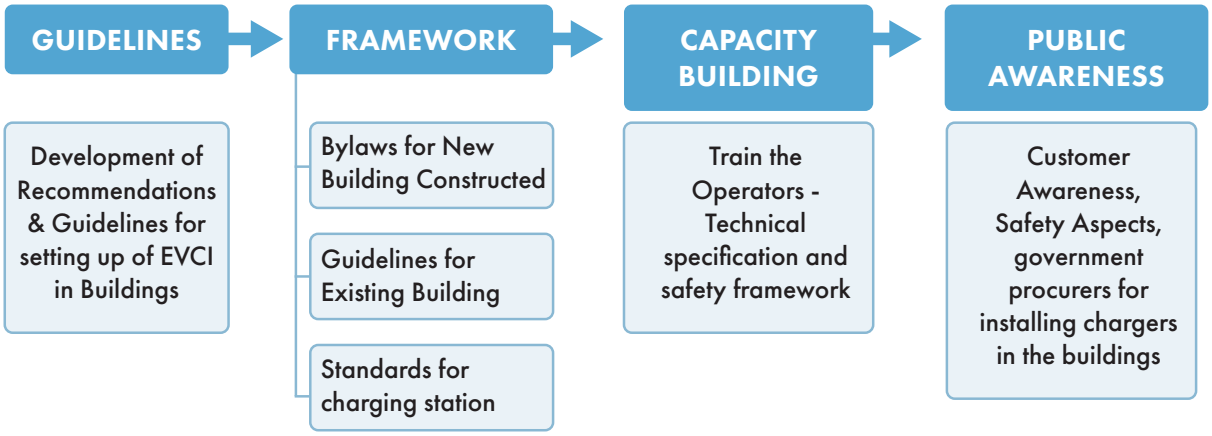

Figure 1 Right to Charge Framework

02.
POLICIES & GUIDELINES TO SUPPORT EVSE IN BUILDINGS

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To facilitate the widespread deployment of EVCS in buildings, various policies and guidelines have been introduced at both the national and state levels. These regulations aim to standardize infrastructure requirements, streamline approvals, and promote EV-ready developments in residential and commercial spaces.

The Key Policies & Guidelines Include:

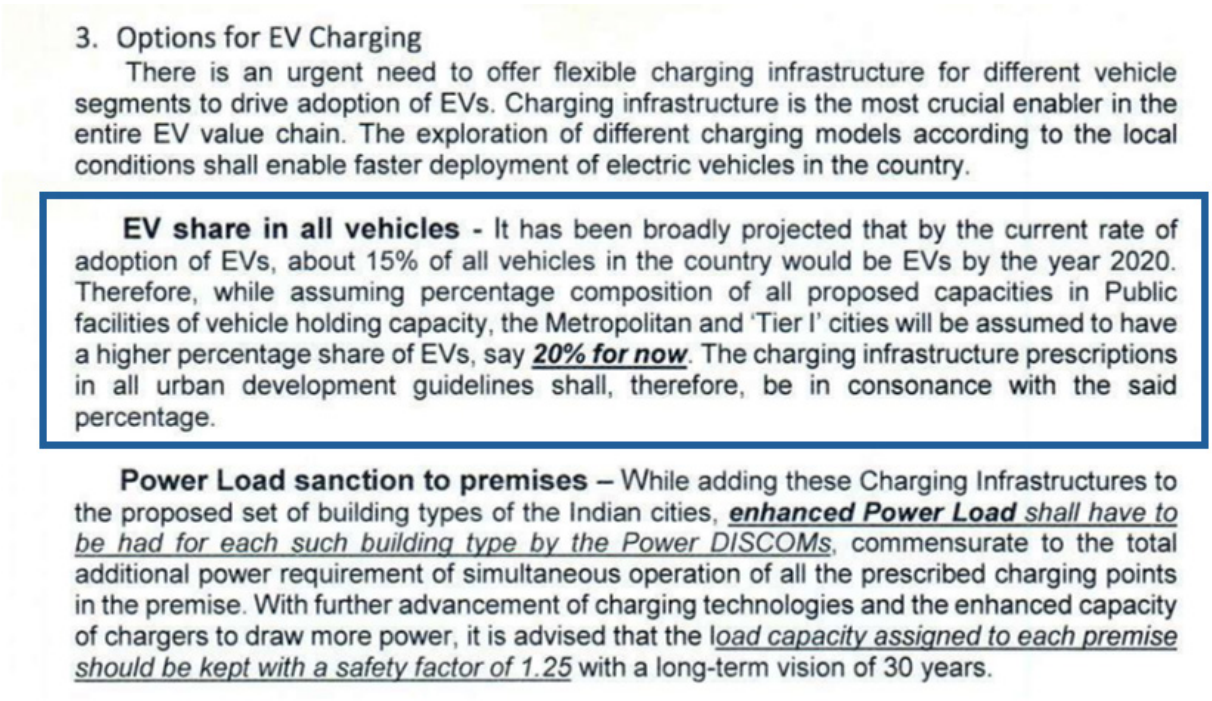
- MoHUA Model Building Bye-Laws for EV Charging Stations (EVCS), 2019
- Ministry of Power Guidelines, September 2024
- Central Electricity Authority (CEA) Regulations, 2023
- PM E-DRIVE Scheme
- Maharashtra EV Policy and Special Initiatives
- Mumbai DCPR (Development Control and Promotion Regulation) 2034

These frameworks collectively establish the foundation for integrating EV charging infrastructure into new and existing buildings, ensuring accessibility, safety, and efficiency.

2.1 MOHUA MODEL BUILDING BYE-LAWS FOR EVCS, 2019

MoHUA has recognised that it is necessary to make provisions for establishing Public Charging Stations (PCS) in the local areas including urban central business districts (CBD) for vehicle refuelling/recharging. Based on the occupancy pattern and total parking provisions in the premises of the various building types, **charging infrastructures shall be provided only for EVs, which is currently assumed to be 20% of all 'vehicle holding capacity'/'parking capacity' at the premise.** Additionally, the building premise will have to have an additional power load, equivalent to the power required for all charging points (in a PCS) to be operated simultaneously, with a **safety factor of 1.25**

The 2019 amendments to the MoHUA Model Building Bye-Laws (MBBL) 2016 introduced model guidelines for incorporating EV Charging Infrastructure (EVCS) in buildings. These include provisions for various charger types based on vehicle requirements and charging power, ranging from 3.3 kW to 7.2 kW in household outlets to advanced 150 kW rapid charging stations for commercial use.



3. Options for EV Charging

There is an urgent need to offer flexible charging infrastructure for different vehicle segments to drive adoption of EVs. Charging infrastructure is the most crucial enabler in the entire EV value chain. The exploration of different charging models according to the local conditions shall enable faster deployment of electric vehicles in the country.

EV share in all vehicles - It has been broadly projected that by the current rate of adoption of EVs, about 15% of all vehicles in the country would be EVs by the year 2020. Therefore, while assuming percentage composition of all proposed capacities in Public facilities of vehicle holding capacity, the Metropolitan and 'Tier I' cities will be assumed to have a higher percentage share of EVs, say ***20% for now***. The charging infrastructure prescriptions in all urban development guidelines shall, therefore, be in consonance with the said percentage.

Power Load sanction to premises – While adding these Charging Infrastructures to the proposed set of building types of the Indian cities, ***enhanced Power Load*** *shall have to be had for each such building type by the Power DISCOMs*, commensurate to the total additional power requirement of simultaneous operation of all the prescribed charging points in the premise. With further advancement of charging technologies and the enhanced capacity of chargers to draw more power, it is advised that the l*oad capacity assigned to each premise should be kept with a safety factor of 1.25* with a long-term vision of 30 years.

Figure 2 Snapshot of MoHUA Model Building Bye-Laws 2016 (Amendment 2019)

Detailed guidelines for types of Electric Vehicle Supply Equipment (EVSE) & Types of Charging are as below:

1. Residential Parking & Charging:

Private Charging Points: Residential EV owners can install private charging stations for personal **use with a separate meter connection**, adhering to safety and technical standards. Typically, these use slow AC chargers with 3.3 to 7.2 kW integrated with the home electrical system.

Charging Provisions: Residential buildings must allocate 20% of parking spaces for EV charging. Power systems must accommodate simultaneous operation of all charging points with a 1.25x safety factor.

Building Type	Plotted House
Ownership of Station	Private (Owner)
Connection & Metering	Domestic Meter
Type of Charger	Slow charger
Mode of Charger	AC (Single Charging Gun)
Provision	Minimum 1 Slow Charger

Table 1 Charging Infrastructure Requirements for Self-use (non-commercial basis)

While initial policy entails use of Domestic meter for EV charging, based on request from a consumer, the Distribution Licensee shall provide a separate connection for supply of electricity for Electric Vehicle charging system.

2. **Commercial and Public Charging (including Group Housing):**

Charging Stations: Chargers in public or private areas serving **commercial EV charging including Group housing shall be deemed as a Public Charging Station (PCS)** and shall have to install the minimum requirements of chargers as specified in the Guidelines dated Oct 2024 of Ministry of Power. However, to provide sufficient charging points for the EV share in all vehicles, ratio of types of chargers is recommended in the table below.

Commercial properties such as malls and offices are mandated to dedicate 20% of parking spaces to EV charging infrastructure. Strategically, **Public Charging Stations (PCS) must be located within a 3x3 km grid in urban areas and every 25 km along highways**. Additionally, fast-charging stations are required every 100 km on highways to support long-distance and heavy-duty EVs.

Charger Types and Capacities: PCS must offer a combination of slow (SC) and fast chargers (FC) to support diverse EV types, including two-wheelers, cars. **Standards include Type-2 AC (22 kW) and CCS (60 kW).**

Building Type	Any Building Type		
Ownership of Station	Service Provider		
Connection and Metering	Commercial Metering and Payment		
Type of Charger	As per requirements specified in Ministry of Power guidelines		
Mode of Charger	AC (Single Charging Gun), DC		
Number of provisions for charging points	2W 1 Slow Charger–2EV	3W 1 Slow Charger–2 EV	4W 1 Slow Charger-3 EV 1 Fast Charger-10 EV

Table 2: Charging Infrastructure requirements for public use (Commercial basis)

2.2 MINISTRY OF POWER GUIDELINES, SEPT 2024

- The Ministry of Power (MoP) initially issued the Guidelines and Standards for Setting up Charging Infrastructure for Electric Vehicles on December 14, 2018, and has since updated them periodically, with the most recent revision released on September 17, 2024.
- In the latest update, MoP has reduced the timelines for EV charger installation upon application submission and directed **DISCOMs to establish a single-window portal for charger applications up to 150 kW.** The tariff structure has been optimized to differentiate between solar and non-solar hours, while land lease options now include subsidized rates. Additionally, the MoP is advancing technologies such as Vehicle-to-Grid (V2G), enabling bidirectional charging which is beneficial for residential and community users connected to solar grids.
- The guidelines also emphasize siting and density requirements for public charging infrastructure, including specifications for long-range EVs and heavy-duty EVs with charging capacities of up to 500 kW. Additionally, the government stresses the adoption of open standards and communication protocols such as **UEI (Unified**

Energy Interface), OCPI (Open Charge Point Interface), or Open ADR (Automated Demand Response) to facilitate efficient demand response communication with DISCOMs. The guidelines mandates EV chargers for the provision of flexible payment methods and centralized real-time information to help create a **National database.**

Unified Energy Interface	UEI network, is Open source and built on Beckn protocol, facilitates the interoperability of charging networks for easier charger discovery and streamlined payments between users and charge point operators.
OPEN CHARGE POINT INTERFACE	Open Charge Point Interface is a point-to-point protocol that bridges charging networks and service providers to ensure interoperability across the EV charging ecosystem, between charging networks, mobility service providers, and EV drivers.
openADR ALLIANCE	Open Automated Demand Response (OpenADR) provides a non-proprietary, open standardized Demand Response interface that allows electricity providers to communicate DR signals directly to existing customers using a common language and existing communications such as the Internet.

Table 3 Open Standards and Communication Protocols

Specific guidelines for EV Charging at Residence are as below:

- New Connection: Owners can request for a separate metered connection from Distribution Licensee with a dedicated EV charging tariff. This shall be granted within the timelines specified in Electricity (Rights of Consumers) Rules, 2020 as amended from time to time.
- Existing Connection: Owners can use their existing electricity connection to charge their EVs at home.
- Increased Load: If EV charging station requires more power than the current sanctioned load, the owner will apply to the distribution licensee for seeking increase in the sanction load.
- Charging Rates: Domestic electricity rates will apply to charging EVs at home.

Community Charging for Residents

- New Connection: Resident Welfare Association, Group Housing Society, an owner of a flat, house in an Association, any other consumer within a GHS, can request for a separate metered connection from Distribution Licensee with a dedicated EV charging tariff. This will be installed within the timelines specified in Electricity (Rights of Consumers) Rules, 2020 as amended from time to time.

Group Housing Societies (GHS):

In consultation with the distribution licensee, Residential Welfare Associations (Society) can establish EV charging stations within their premises.

- Choice of EV Chargers: Residents can decide on the types and number of community EV chargers to be installed.
- Visitor Charging: Community stations can be equipped to allow charging for authorized visitor vehicles.

- Private Charging Points: Residents can install private EV charging stations in their designated parking spaces. The Distribution Licensee will ensure electricity supply through the resident's existing meter or a separate sub-meter depending on consumer's choice.
- Increased Load: If community EV charging stations requires more power than the current sanctioned load, then GHS will apply to the distribution licensee for seeking increase in the sanctioned load.
- Community Charging Rates: GHS will determine the charging fees for community charging based on the applicable electricity tariff and service ceiling limits laid down under these guidelines.

The Ministry of Power also released a checklist to ensure the safe installation and usage of EV charging stations (EVCS), focusing on component requirements and wiring standards. The following checklist outlines regulatory frameworks, technical standards, and implementation strategies to promote accessible, efficient, and safe EV charging.

Checklist — (Safety Requirements)

- Reliable Wiring: Appropriate cabling and electrical work to ensure safety.
- Surge Protection: Type-1 and Type-2 protection (as per Indian Standard Code IS / IEC 62305-4/IEC 61643-12 © IEC: 2008 (Edition 2.0 2008-11) to safeguard against electrical surges implemented.
- Fire Safety: Adequate fire protection equipment and facilities installed as per relevant Indian Standards.
- Weather Protection: As per Clause 12.4 Ingress Protection of BIS 17017 (Part 1) 2018
- Compliances - National Regulations: All electrical equipment installed in EV Charging station complies with Central Electricity Authority regulations, specifically the Technical Standards for Connectivity of Distributed Generation Resources (2013) and Safety and Electric Supply Measures (2023), as amended from time to time.
- Compliances - Equipment Testing: Each EVSE model with different power ratings and communication protocols type tested by the Original Equipment Manufacturer in accordance with BIS standards for charger mentioned in Table 4 in a testing agency accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL), with a valid Type Test certificate.

BIS Standards for different categories of Chargers

BIS is the national standards body of India, responsible for publishing standards in EV charging systems to ensures product safety, quality, and interoperability through standardized specifications. BIS Standards such as IS 17017 (Part 2/ Sec1): 2020, IS 17017 (Part 2 / Sec 2): 2020, IS 17017 (Part 2 / Sec 3):2020, IS 17017 (Part 2 / Sec 6): 2020 suggest that accessories such as plugs, socket-outlets, vehicle connectors, vehicle inlets and cable assemblies for electric vehicles; are intended to be connected **only to cables with copper conductor.**

These standards ensure compatibility, safety, and performance of accessories used in electric vehicle conductive charging systems. As EV charging technology continues to evolve, with advancements in fast charging and wireless charging solutions, BIS standards will likely adapt to accommodate these changes. This continuous evolution of standards is crucial to maintain safety, interoperability, and efficiency in the rapidly growing EV ecosystem.

Power Level	Type of EV Charger	EV Charger Capacity	Charging Device / Protocol	EV – EVSE Communi-cation	Charge Point Plug / Socket	Vehicle Inlet / Connector
Power Level 1	Light EV AC Charge Point (for 2W, 3W & 4W – M1 Category)	Up to 7 kW	IS-17017-22-1	Bluetooth Low Energy	IS-60309	IS-17017-2-7, IS-17017-2-2
	Light EV DC Charge Point (for 2W, 3W Category)	Up to 12 kW	IS-17017-25 [CAN]		IS-17017-2-6	IS-17017-2-6
	Light EV AC/ DC Combo (for 2W, 3W)	Up to 7 kW (AC) or up to 12 kW (DC)	IS-17017-31		IS-17017-2-7	IS-17017-2-7
Power Level 2	Parkbay AC Charge Point (for 3W & 4W – M1 Category)	Normal Power ~11kW/ 22 kW	IS-17017-1	IS-15118 [PLC]	IS-17017-2-2	IS-17017-2-2
Power Level 3	DC Charging Protocol (for 4W (M1 Category), Buses and Trucks (M3 Category))	DC 50 kW to 250 kW	IS-17017-23	IS-17017-24 [CAN], IS-15118 [PLC]	IS-17017-2-3	IS-17017-2-3
Power Level 4	DC High Power for e-Bus & Trucks Charging Station (M3 Category)	DC High Power (250 kW -> 500 kW)	IS-17017-23	IS-17017-24 [CAN], IS-15118 [PLC]	IS-17017-2-3	IS-17017-2-3

Table 4 Indian Standards EV Charging Notified by BIS on 17.09.2024

2.3 CENTRAL ELECTRICITY AUTHORITY (CEA) GUIDELINES,2023

The CEA is responsible for regulating the electricity sector in India and has issued regulations for EV charging infrastructure, which cover the technical specifications, safety requirements, and testing procedures for EV charging stations. It oversees compliance with the Electricity Act, 2003, ensuring safe and efficient use of electricity, compatibility of EV chargers with the grid and renewable energy sources.

The CEA guidelines cover various aspects such as safety standards required for grid, technical standards for electric vehicles, technical standards for EV Charger (AC & DC), technical standards for connectors, communication standards between EV and Electric Vehicle Supply Equipment (EVSE), communication standard between EVSE and CMS, testing and verification of equipment with respect to standards, assessment, and strengthening of sub-transmission/distribution network to supply a load of electric vehicles as well as energy performance standards of chargers.

CEA Measures (Relating to Safety and Electric Supply), Amendment Regulations, 2019: This regulation prioritizes safety protocols for Electric Vehicle Charging Stations (EVCS), encompassing various aspects such as:

- General safety requirements for EVCS,
- Earth protection system for EVCS,
- Requirement to prevent fire for EVCS,
- Testing of EVCS,
- Maintenance, Inspection and periodic assessment of EVCS,
- Maintenance of records and
- Adherence to International standards for EVCS
- Socket-outlets of supply installed at least 800 mm above the finished ground level.

CEA Technical Standards for Connectivity of the Distributed Generation Resources Amendment Regulations, 2019. This regulation focuses on integrating EV charging infrastructure into the electricity grid without compromising stability. Key aspects include a) Standards for charging station, prosumer (consumers who also generate electricity), and entities seeking grid connectivity), b) Registration requirements for EVCS in a central registry maintained by the CEA, c) Compliance with grid connectivity regulations and provisions for relaxations in specific cases.

2.4 PM E-DRIVE SCHEME:

The Ministry of Heavy Industries (MHI) has announced the PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme to promote EV adoption, **supported by a ₹10,900 crore budget for the period from April 1, 2024, to March 31, 2026.**

The new scheme builds on the foundation laid by the previous Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME) scheme, which expired in March 2024, and the Electric Mobility Promotion Scheme, which expired on September 30, 2024. The PM e Drive scheme has significant focus on expanding EV charging infrastructure across India and key highlights of the scheme include:

1. **Budget Allocation:** The PM E-DRIVE **Scheme allocates ₹2,000 crore for establishing a comprehensive public EV charging infrastructure** to support a wide range of vehicle categories, including long-range and heavy-duty EVs, supporting up to 500 kW charging. This network will also cater to intercity and interstate routes, developed in collaboration with the Ministry of Road Transport and Highways. The emphasis on setting up charging infrastructure is largely focussed on setting up public charging infrastructure in mega cities, urban areas and city centres and there is still need for focus on creation of residential charging network.

2. **Financial Support:** The scheme provides financial assistance covering up to **100% of project costs, including upstream electrical infrastructure**. Benchmarked costs and technical specifications will be outlined by the Project Implementation and Steering Committee (PISC) in consultation with stakeholders. The scheme envisages to install ample public charging infrastructure for various vehicle categories, including over **22,000 EV chargers for e-4Ws and 1,800 chargers for e-buses**, to boost confidence among EV users.

3. **Implementation Standards:** All charging infrastructure must comply with the Ministry of Power's updated guidelines, issued on September 17, 2024. These standards mandate the use of open protocols like OCPI, OCPP, and Open ADR for efficient integration with DISCOMs and include advanced features such as Vehicle-to-Grid (V2G) capabilities, enabling bidirectional energy flow.

4. **Residential EV Charging Initiatives in the PM E-DRIVE Scheme:** Residential Focus: Encourages the installation of residential and **community charging stations with V2G capabilities, benefiting users connected to solar grids.** It includes provisions for bidirectional charging, allowing homes to function as mini power grids during peak demand periods.

    - Simplified Applications: DISCOMs are instructed to create single-window portals for charger applications up to 150 kW, making the process easier for residential and small-scale setups.
    - Consumer Incentives: Subsidies and grants are offered for installing private chargers in both multi-dwelling units and standalone homes. DISCOMs are also guided to implement time-of-day tariffs to promote charging during off-peak hours.
    - Infrastructure Support: Recommendations suggest including pre-installed EV-ready wiring in new residential developments and promoting community-owned charging stations in apartment complexes to lower individual installation costs.

2.5 MAHARASHTRA EV POLICY AND SPECIAL INITIATIVES:

The Maharashtra Electric Vehicle Policy 2021 outlines a robust framework to accelerate EV adoption, focusing heavily on developing comprehensive charging infrastructure. The policy aims to make EVs more accessible by providing financial incentives, streamlining installation processes, and integrating EV-ready facilities into urban planning and highways. Key highlights of Maharashtra EV policy are as under:

1. **Charging Station Incentives:** Subsidy of 60% for slow chargers (up to ₹10,000) and 50% for moderate/fast chargers (up to ₹5,00,000), with a cap of 15,000 slow chargers and 500 fast chargers.

2. **Role of Urban Local Bodies:** Promote property tax discounts for private charging setups and draft city-level charging infrastructure plans.

3. **Inclusion in Development Plans:** Designate charging stations as essential amenities, with urban plans allocating specific spaces. Require new private and commercial buildings to include charging provisions as per updated building codes.

4. **Highway Charging Infrastructure:** Install EV charging stations at 25 km intervals on four major highways: Mumbai-Nagpur Expressway, Mumbai-Pune, Mumbai-Nashik, and Nashik-Pune, by 2025.

5. **EV-Ready Public Parking:** Convert 25% of parking spaces in public, institutional, and commercial facilities to EV-ready by 2023; ensure all government office parking is 100% EV-ready by 2025.

6. **Smart Charging Systems:** Enable centralized charging management systems with real-time usage data and cashless payment options. Simplify EV-specific connection and tariff processes through a single-window approach.

7. **Funding and Partnerships:** Leverage funds from the 15th Finance Commission and National Clean Air Programme (NCAP) to enhance EV charging infrastructure and support power distribution companies.

MSEDCL periodically based on emerging trends, targets and achievements revises and issues amendments to the policy which will be notified in the MSEDCL website.

2.6 MUMBAI DCPR (DEVELOPMENT CONTROL AND PROMOTION REGULATION) 2034

Mumbai is the financial capital of India and the most populated city in India. Keeping in mind urbanisation challenges that are likely to emerge with increasing population and urban high density mega development, the Municipal Corporation of Mumbai has finalised a master planning and policy document called Mumbai DCPR (Development Control and Promotion Regulation) 2034. The forward-looking policy document **has provision for Battery charging in Residential, Commercial and Industrial Zones**, however the policy does not allude any reference to Electric Vehicle Charging Stations in Public Parking Lots.

The state government laid down its vision for the city's growth over the next two decades. Land in Mumbai remains a scarce commodity and thus redevelopment is crucial for the city's future. Hence, **a policy framework is needed to promote redevelopment in a sustainable way and bring about meaningful change on ground.** To promote widespread use of Electric motor vehicles permission for Electric vehicle charging station will be sanctioned as below:

Conditions under which land uses and occupancies will be permitted in zones (Electric Vehicle Charging Station)		
RESIDENTIAL	COMMERCIAL	INDUSTRIAL
✓	✓	✓
Additional Comments	This shall be allowed in Public Parking Lot (PPL) subject to condition that specific remarks/ requirements of EV charging provider companies/electric supply companies/regulatory requirements if any as decided by the Government from time to time will have to be observed/compiled with and also specific NOC from CFO and Chief Engineer (M & E) of M.C.G.M shall be obtained from a safety point of view	

Table 5 EVCS sanctions for zones under Mumbai DCPR, 2034

2.7 MAHARASHTRA STANDARD OPERATING PROCEDURE (SOP) FOR EVCS- FIRE AND ELECTRICAL SAFETY

The Chief electrical Inspectorate, Industry, Energy and Labour department, Maharashtra outlines comprehensive guidelines to ensure fire safety for Electric Vehicle Charging Stations (EVCS) and parking facilities. These procedures emphasize **mitigating risks associated with EV charging and storage, particularly in multi-story buildings, public spaces, and mechanized parking systems.**

OBJECTIVE: The Objective of Standard Operating Procedure (SoP) is to ensure the Fire and Electrical safety of electrical vehicle charging stations during its operation cycle to safeguard the human life and property.

Major Fire and Electrical Safety Guidelines are:

1. **EV Charging Points:**
   - Charging stations must comply with Central Electricity Authority standards and Maharashtra Fire Prevention & Life Safety Measures Act, 2006.
   - Installations should be carried out by licensed contractors and be placed in well-ventilated areas, preferably on open rooftops.
   - No EV charging is allowed in automated parking towers, puzzle systems, or basements.
2. **Electrical Safety:**
   - Use fire-retardant and insulated cables conforming to IS standards.
   - Equip EVCS with surge protection, residual current devices, and systems to monitor earthing continuity.
   - Ensure all charging points are 800 mm above the highest flood level and at least 10-15 meters from combustible materials and hazardous installations.

3. **Parking and Storage:**
   - Dedicated charging bays must be marked and physically protected from vehicular damage.
   - EV parking must not obstruct escape routes or emergency access for fire fighting vehicles.
   - Avoid charging near flammable materials; ensure proper signage and barriers.
4. **Mechanized Parking:**
   - Fire-resistant construction (2-hour rating) for mechanized systems.
   - Automated sprinklers, smoke exhaust systems, and emergency stop switches must be installed.
   - Segregate EV parking areas with fire-resistant walls.
5. **Maintenance and Monitoring:**
   - Regular inspections, proper housekeeping, and maintenance of fire detection systems are mandatory.
   - Charging should be monitored initially, especially in residential setups, to avoid unattended operations.

2.8 TARIFFS

MSEDCL being the state nodal agency (SNA) has the responsibility to fix the service charges for charging stations both private and commercial uses and have been tasked to introduce the ceiling rates for charging. The mentioned **tariff rate will be updated from time to time and can be accessed in the MSEDCL website under the commercial circular.**

For LT Connection current tariff rate is INR 7.75 per kWh for EVCS with a separate EV meter and price change in ToD tariff rates are mentioned below in the table below:

Tariff w.e.f. 1 April, 2024 to 31 March, 2025

Consumption Slab (kWh)	Fixed/ Demand Charge (Rs./ kW/Month)	Energy Charges (Rs./kWh)	Wheeling Charges (Rs./ kWh)
All Units	80.0	6.58	1.17
ToD Tariffs (in addition to above base Tariffs) (Rs/kWh)			
2200 Hrs-0600 Hrs			-1.50
0600 Hrs-0900 Hrs & 1200 Hrs-1800 Hrs			0.00
0900 Hrs-1200 Hrs			0.80
1800 Hrs-2200 Hrs			1.10

For HT Connection current tariff rate is INR 8.00 per kWh for EVCS and price change in ToD tariff rates are mentioned below in the table below:

Tariff w.e.f. 1 April, 2024 to 31 March, 2025

Supply Voltage Level	Wheeling Charges (Rs./kWh)
EHV	-
HT	0.60

Demand/Fixed Charge and Energy Charge (for all Supply Voltage Levels)

Consumer Category	Demand Charges (Rs. /kVA/month)	Energy Charges (Rs. /kVAh)
HT	80.0	7.4
ToD tariff (in addition to above base tariffs) (Rs/kVAh)		
2200 Hrs - 0600 Hrs		-1.50
0600 Hrs - 0900 Hrs & 1200 Hrs - 1800 Hrs		0.00
0900 Hrs - 1200 Hrs		0.80
1800 Hrs - 2200 Hrs		1.10

The Tariff category for both LT and HT connection is applicable for Electric Vehicle Charging Station for private and commercial purposes **including battery swapping station** for electric vehicle. The updated tariff rate will be available in the MSEDCL website

The Government of India (GoI) on 17th Sept 2024 under the *'Guidelines for Installation of Operation of Electric Vehicle Charging Infrastructure'* has notified the maximum ceiling limit for service charges (excluding GST & land cost) shall be applicable till 31st March 2028 for conductive AC/DC charging at PCS & Community EV Charging Stations setup on either public or private land.

TOTAL TARIFF TO CONSUMER = (Tariff rate +/-ToD rate) + (Service charge +/- solar and non - solar rate) + (GST)

03.
APPROACH & METHODOLOGY

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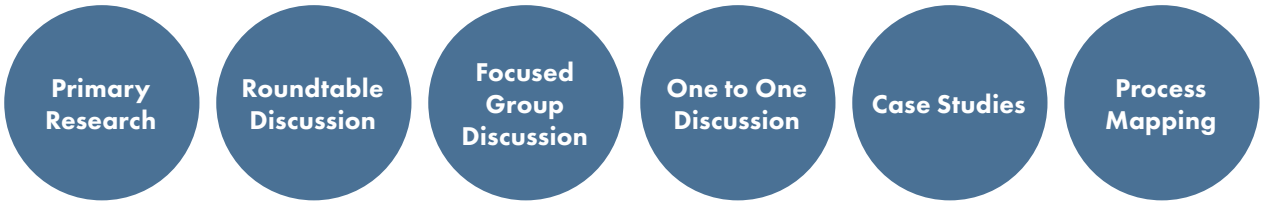
With an objective to identify challenges in setting up of EVCS in buildings (Residential and Commercial) and pathways to increase adoption, the team interacted with various government stakeholders such as MSEDCL, Municipal Corporations, Smart cities Mission, and private stakeholders such as RERA, Think Tanks, Fleet Operators, OEMs, select RWAs, Charge Point Operators, etc.

OBJECTIVE

To identify challenges in setting up EVCS in residential & commercial buildings, identify countermeasures for the same to support increase in EV adoption



OUTCOME

Stakeholder consensus and recommende guidelines to setup EVCS in residential building in Maharashtra

Figure 3 Right to Charge activity flowchart

Government and Private Stakeholders involved in the Roundtable & Focussed Group

Government stakeholders	Private stakeholders
MSEDCRL	OEMs
	Developers
Municipal Corporation	MEP Consultants
	Fleet Operators
Fire safety	CPOs
	CREDAI
Metropolitan Development Authority	Architects

3.1 PRIMARY RESEARCH AND DISCUSSIONS WITH STAKEHOLDERS INVOLVED

Government stakeholders from MSEDCRL, PCMC, PMRDA, FIRE SAFETY, AMC, and private stakeholders from CREDAI, Architects, Designers, Developers, MEP Consultants, OEMs, Fleet operators, CPOs were involved in the roundtable and consultative discussions.

Figure 4 Right to Charge Stakeholder meeting at Pune

Major Objective of the Roundtable Discussions:

- To support Government of Maharashtra and various nodal departments and agencies in accelerating the adoption of EVs through deployment of EVCS in the state.
- To identify the challenges faced by stakeholders in set up of EVCS in private and government premises (existing and new buildings) including parking spaces and to jointly develop appropriate recommendations, solutions/ pathways to address the above challenges.
- Including provisions for EVCS set up in parking spaces in building bye-laws, aligning with infrastructure codes and the risks, challenges and opportunities including standards, regulations and safety requirements.

Discussion Points:

1. **Set up of EVCS and Permits / Approvals**
   - Maharashtra is actively addressing key aspects such as land allocation, regulatory approvals, and the establishment of charging infrastructure. A significant focus has been on optimizing land use for EV charging stations. The state encourages the **utilization of government-owned land parcels, including existing fuel stations, to set up charging infrastructure**. Urban local bodies in cities like Mumbai and Pune are tasked with identifying suitable locations to meet projected EV penetration. This strategic approach aims to reduce the financial burden associated with land acquisition and ensures the availability of charging facilities in high-demand areas.
   - As per the new order, **20 percent of the total parking spaces** should be reserved for electric vehicles in all commercial as well as residential buildings that have parking space for 20 or more four-wheeler vehicles. To streamline the deployment

of charging stations, Maharashtra has implemented a **time-bound, single-window process** for obtaining necessary approvals and connections. This initiative simplifies the regulatory framework, making it more attractive for Charging Point Operators (CPOs) to invest in the region. Additionally, adherence to safety standards set by agencies such as the Central Electricity Authority (CEA) and the Bureau of Indian Standards (BIS) is mandated to ensure the safe operation of charging equipment.

- The state also promotes the development of semi-public charging stations within residential complexes, commercial establishments, and malls. Guidelines have been established to facilitate the installation of these chargers, emphasizing the importance of safety and compliance with technical standards. Housing societies and Resident Welfare Associations (RWAs) are **encouraged to support the installation of EV chargers by granting No Objection Certificates (NOCs) to residents**, thereby fostering a community-driven approach to expanding the charging network.
- Public-Private Partnerships (PPPs) are being leveraged to accelerate the expansion of charging infrastructure. By offering **concessional rentals and revenue-sharing models, the state aims to attract private investment and expertise in establishing and operating charging stations.** This collaborative approach is designed to overcome challenges such as high capital investment and limited availability of affordable land in densely populated urban areas.

2. Setting up of future Investments in EV ecosystem

- Maharashtra is actively advancing e-mobility through strategic partnerships and infrastructure development. In **collaboration with Amazon India, SUN Mobility has expanded its battery-swapping operations within the state**, enhancing the efficiency of electric two- and three-wheelers used in delivery services. This initiative supports the growing demand for sustainable last-mile logistics and contributes to the broader adoption of electric vehicles (EVs) in urban areas.
- The state is also witnessing significant investments in EV manufacturing. The JSW Group, through its subsidiary JSW Green Mobility, has **secured 636 acres in Aurangabad Industrial City to establish an electric vehicle manufacturing facility.** This plant will focus on producing electric cars and commercial vehicles, aiming to manufacture up to one million EVs in India by 2030. Such investments are poised to position Maharashtra as a leading hub for EV production, fostering economic growth and technological innovation in the region.
- Furthermore, cities like Pune are spearheading the development of EV infrastructure. Pune's progress in establishing charging stations and integrating renewable energy solutions underscores its role as a trailblazer in India's sustainable energy transition. These localized efforts complement state-level policies, creating a conducive environment for EV adoption and contributing to Maharashtra's vision of becoming a leader in electric mobility.

3. Safety Measures for Building Installations:

- Electrical safety Standard Operating Procedures (SOPs): The Chief Electrical Inspector of Maharashtra has released SOPs detailing safety measures for EV charging stations. These include compliance with the Central Electricity Authority (Measures related to Safety and Electric Supply) Amendment Regulations 2023 and the Maharashtra Fire Prevention and Life Safety Measures Act, 2006. The SOPs mandate that all electrical installation work for charging stations be carried out by licensed electrical contractors approved by the state government.

- Fire Safety Guidelines: The Mumbai Fire Brigade has issued specific advisories for EV charging stations to mitigate fire risks. These guidelines emphasize the use of certified equipment, proper installation practices, and regular maintenance to ensure safety.

4. **Electrical Infrastructure Upgrades and Associated Costs:**

- The integration of EV charging stations in housing societies necessitates significant enhancements to existing electrical systems, including transformers, metering boards, and cabling, to accommodate increased power demands. Recognizing the substantial upfront costs involved, the Maharashtra government has introduced incentives to alleviate the financial burden on residential units. These incentives aim to make the installation of EV charging infrastructure more affordable across various housing segments, from affordable to premium housing. Additionally, the state encourages cooperative housing societies to establish EV charging stations by offering subsidies that cover up to 50% of the cost of Electric Vehicle Supply Equipment (EVSE).
- In large housing societies, particularly those with **High Tension (HT) category VI connections, the responsibility for electrical infrastructure setup, including metering and distribution transformers, typically falls on the builder or RWA.** To facilitate the installation of EV charging points, the Maharashtra government mandates that housing societies or RWAs issue a No Objection Certificate (NOC) to EV owners within seven days of application. This directive ensures that residents seeking to install EV chargers face minimal administrative hurdles, promoting a more streamlined adoption process.
- Equitable Cost Distribution and DISCOM Involvement: A significant concern arises when only a few residents opt for EVs, potentially necessitating infrastructure upgrades that could financially impact all residents, including those without EVs. To address this, there is a recommendation for distribution companies (DISCOMs) to assume responsibility for the electrical infrastructure setup in such scenarios. By categorizing these costs under Gross Fixed Assets, the expenses can be distributed among all consumers within the DISCOM's jurisdiction, ensuring a fair and equitable approach that does not unduly burden non-EV owners.

3.2 CONSULTATIVE MEETINGS AND FOCUSED GROUP DISCUSSIONS

1. **Permits and Approvals:** The "Right to Charge" campaign and group discussions aimed to assist MSEDCL, Fire Safety departments, CREDAI, and others in understanding the current process for getting permits to set up Electric Vehicle Charging Stations (EVCS) in buildings, RWA and Group Housings. This includes identifying challenges, safety concerns, and any additional approvals needed. In many cases, even though **residents have assigned parking spots, the builder/ RWA controls the power requirements of these areas, making it difficult for individuals to install personal charging cables.** As a result, installing shared or common chargers becomes the practical solution.

   Adequate electrical provisioning should be made for electric vehicle charging in designated spaces for electric car parks in enclosed/covered car parking. These electrical outlets should be fed from a separate distribution board located near such outlets for electric car parks. Distribution board and outlets should be protected and metered.

NOTE : National Electrical Code India 2023, Section 15 Supplies for Electric Vehicle may be ensured. Reference may be made to IEC 60364-7-722:2015 'Low-voltage electrical installations.

2. **Costs**: Major CPOs are open to setting up public EV charging stations in RWAs/ housing societies if there's enough utilisation rate. They are willing to cover the installation costs and operate these stations on a revenue-sharing basis.

   For private and community-based EV charging that utilizes an existing power connection or spare load, no approval is required from DISCOMs. However, if a Resident Welfare Association (RWA) opts for a dedicated power connection to facilitate EV charging and avail special tariffs or government subsidies, prior **approval from DISCOM is mandatory.**

   When implementing EV charging stations in residential or community spaces, two primary financial models can be adopted: the Capital Expenditure (CAPEX) model and the Operational Expenditure (OPEX) model. These **models determine how the charging infrastructure is funded, managed, and how electricity costs are passed on to end-users.**

	CAPEX	OPEX
Initial Investment	RWA/Housing Society	CPO
Per unit charge	As per existing tariff/ subsidised tariff if dedicated connection is taken	CPO adds transaction premium as a percentage of tariff
Installation, Internal cabling & electrical provision	RWA	RWA

Table 6 Suggested CAPEX and OPEX Models

Under the CAPEX model, the initial investment for setting up EV charging infrastructure is covered by the RWA or housing society. If a dedicated electricity connection is obtained, the society may be eligible for subsidized tariff rates where applicable. This model provides greater control over pricing and operations but requires an upfront financial commitment.

In contrast, the OPEX model shifts the initial investment responsibility to a CPO, which finances the setup and recoups costs by adding a transaction premium to the electricity tariff for users. This model eliminates the upfront capital burden on the RWA but results in higher per-unit charging costs for end-users due to the operator's service fee.

Both models have distinct advantages, and RWAs should **assess EV adoption trends, future demand across different user categories, and expected utilization rates** before deciding. The choice between CAPEX and OPEX should be based on factors such as **budget constraints, long-term financial benefits, and the willingness of RWAs to manage charging infrastructure.** While the CAPEX model ensures lower costs over time, the OPEX model is more suitable for societies that prefer outsourcing the infrastructure to a third-party operator without incurring upfront investment costs.

3. **Safety and Guidelines:** It's important to develop guidelines for installing EVCS in buildings across Maharashtra. Discussions with various departments have highlighted the need to **focus on safety requirements for EVCS** installations in basements. This includes understanding the different types of charging stations suitable for basements, open spaces and planning their deployment strategy within buildings. The primary concern of Building owners is **related to Fire safety consideration for Electric vehicles parking** especially in residential areas. These concerns are based on several unfortunate incidents of EV fires that occurred across the country during 2022.

   Taking stern cognisance of the EV Fire incidents Ministry of Road Transport and Highways of India (MoRTH) reviewed the Electric vehicle and battery testing criteria, standards and progressively made revisions and amendments to existing regulations to enhance safety at cell, pack and vehicle level as per timelines below:

Notification	Release Date	Standard
AIS 156	2020	Establish safety requirements for Electric vehicles Battery + Vehicle Safety (L Category)
AIS 156 AMENDMENT 2	AUG'2022	The amendment strengthens safety in three key areas of the battery pack: Cell, BMS, and Pack design and includes additional safety requirements for: Battery cells, Battery pack design, BMS, Onboard chargers, and Thermal propagation due to internal cell short circuits causing fire.
AIS 156 AMENDMENT 3	SEP'2022	Specific Requirements for L Category Electric Power Train Vehicles including REESS Ingress protection, BMS system and Thermal Propagation
COP FOR TRACTION BATTERY	OCT'2022	Additional Safety Requirements for Battery Cells, Battery Management System, On board charger, Battery Pack and Thermal Propagation
AIS 038 REV1	2015	Vehicle Safety
AMENDMENT	2017	An addition to the standard for the construction and functional safety of electric power train vehicles
AIS 038 REV2	2020	Battery & Vehicle Safety (M & N Category)

Table 7 Vehicle testing criteria for Fire safety

4. Electrical safety

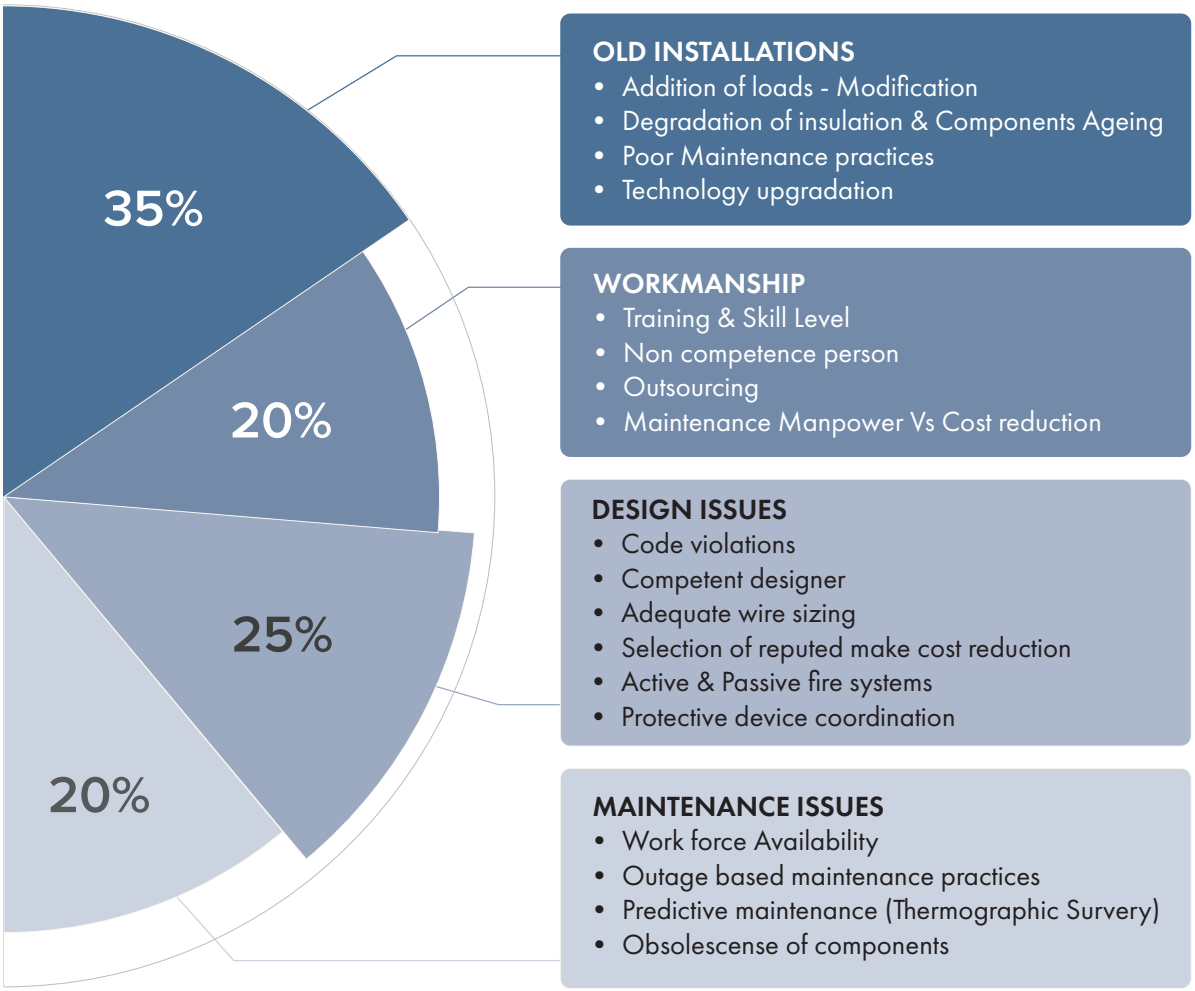
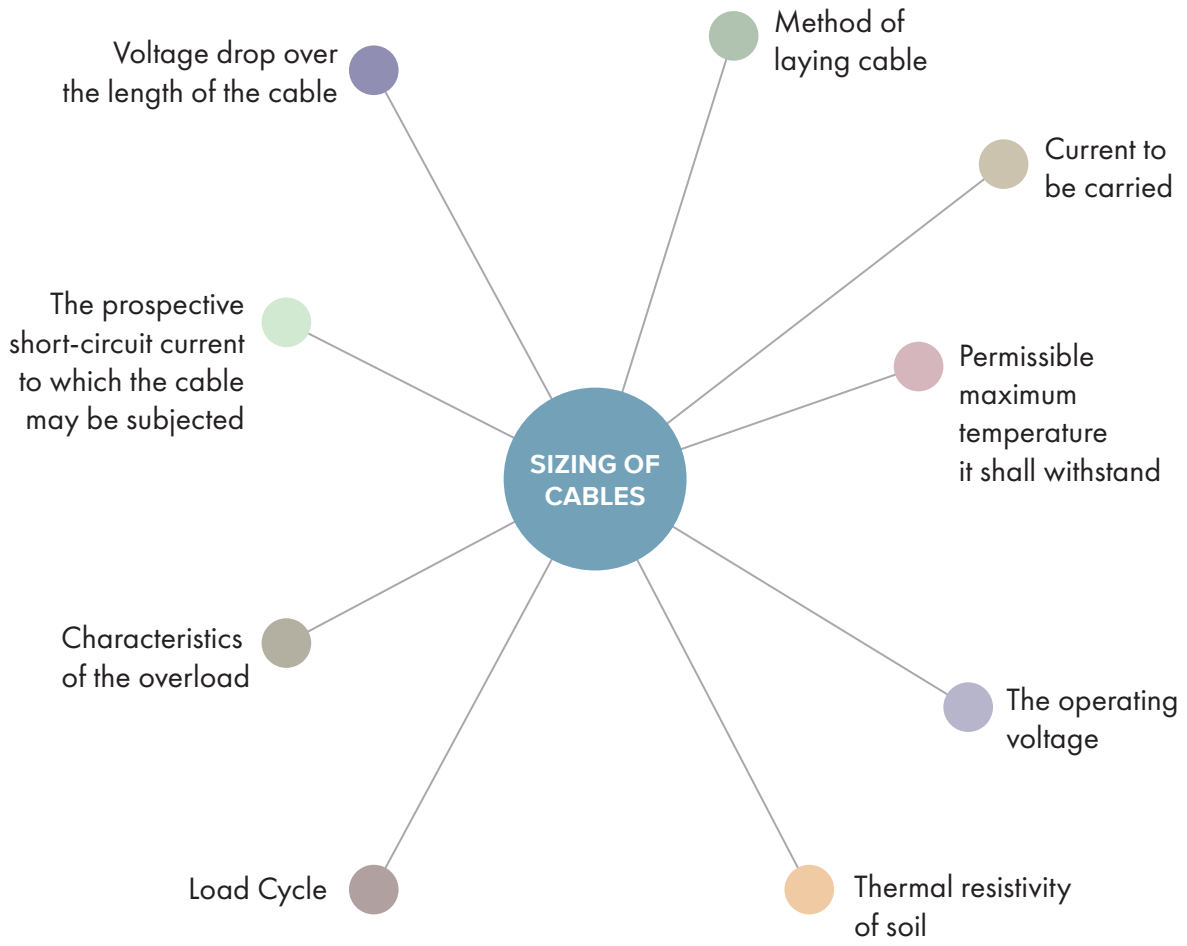


Figure 5 Challenges in Electrical Installations

- Heat / spark gets generated due to over-current or fault current which may occur due to incorrectly designed **size of conductor** and its protection. NEC 2023 gives guidelines in this regard and refer size of the conductor as per clause no. 5.8 of NEC 2023 along with clause no. 3.12 of Electrical Installation Guidelines of CPWD document
- Electrical hazards can mainly be classified as Electrical Shock and Fire initiated due to electrical installation. **If selection of cables is not proper**, gases generated due to burning of insulation are toxic endangering human life
- **Current carrying capacity**_as claimed by manufacturer under normal conditions may **reduce to 50%** depending on situation and method of installation, which further requires increase in **size of conductor proportionately**
- Adequate and correctly designed **protective equipment** is a gate way to prevent any mishap. Any possible cause of mishap, **over current, short-circuit, earth leakage, earth fault, voltage variation** can be prevented by following guidelines mentioned under IS 732.
- Electrical installation needs **verification.** This verification shall be done before connecting the installation to electric supply, after connecting to supply and then further periodically, **once in a year or at least once in five years**



- Connections need to be reliable and protected.
- The wire's insulation must be appropriate for the voltage and tough enough for the environment.
- The wire must be able to handle the current safely.
- Choose the right size wire for the amount of current expected in a circuit.

Figure 6 Right selection and sizing of cables & wires

5. National Electrical Code (NEC), 2023

- While selecting conductor for size less than or equal to 16 mm2, **copper conductor of Class 1 or Class 2 is recommended.** Over the period of time, loosening of contacts and oxide formation is prominent in Aluminium conductors which may lead to increased generation of heat and sparking.
- The cross-sectional area of conductors shall be selected based on factors such as maximum current load, fault level withstand capacity, allowable voltage drop, harmonic disturbances, and current carrying capacity under installation conditions.
- The nominal cross-sectional area of phase conductors in AC circuits and live conductors in DC circuits shall not be less than the values for mechanical safety as specified in **Chapter 5.8.3; Table 6 (page 75), NEC 2023** document.
- The specified values in the National Electrical Code of India and the National Building Code of India are periodically updated through amendments to reflect changes in infrastructure and ensure safety and compliance with current standards.

6. **CPWD General Specifications, 2023**

- **Clause No. 3.3 - Wiring:** All flexible copper wires used shall have a Class 2 copper conductor that meets the resistance requirements specified in NEC 2023, Part 1, Section 17, Annex B.

- **Clause No 3.12** - Only copper conductor cables shall be used for sub-main, circuit, and point wiring. Insulation of Copper conductor cable shall be PVC insulated conforming to BIS Specification. Multi stranded Cables are permitted to be used. However, proper termination on the ends with lugs/ thimbles should be used.

- **Clause No 3.13** – Flexible cables shall have copper conductors with a cross-sectional area as per design. Only 3-core cables shall be used for single-phase appliances. Cables without mechanical protection, such as armour, tough rubber, or PVC sheath, shall not be used in areas prone to damage. Connections to a bell push from a ceiling rose shall be routed through a steel conduit or metallic casing.

- The **IS Code of Practice on Earthing (IS 3043: 2018)** and **NEC 2023** shall be referred to for all earthing requirements (Chapter 8, 74 CPWD, 2023)

7. **CEA Technical and Safety Guidelines for EVCS installation:** Ministry of Power and Central Electricity Authority, developers/ RWAs/ DISCOMs must comply with the provisions of the CEA (Measures Relating to Safety and Electric Supply) Regulations, 2010, and CEA (Technical Standards for Connectivity of Distributed Generation Resources) Regulations, and their amendments released from time to time. These regulations should be adhered to for the safe installation, operation, and maintenance of the charging points as well as the safe connectivity of these distributed generation resources.

   A. **Fault Detection & Grid Safety:** EV charging equipment must be capable of detecting faults and abnormal conditions and should automatically isolate faulty equipment to prevent disruptions to the grid.

   B. **Power Quality Standards:** Harmonic current injections, DC current injections, voltage sag, voltage swell, flicker, and other power quality parameters must comply with CEA Technical Standards, BIS standards, or IEC/IEEE standards where BIS is unavailable.

   C. **Overload Protection & Installation Height:** All EV charging stations must have protection against overload and proper height clearance, with socket outlets placed **at least 800 mm above ground level** to prevent safety hazards.

   D. **Charging Cable Length & Placement:** The maximum supply lead length should be 5 meters, ensuring that **parking spaces are within 5 meters of the charging point** to prevent cable damage and extension issues.

   E. **Lightning & Reverse Power Protection:** EVCS must include lightning protection (as per IS/IEC 62305) and a protective device to prevent uncontrolled reverse power flow from the EV. The use of **cord extensions, secondary supply leads, or adaptors is strictly prohibited**.

   F. **Voltage Safety & Emergency Disconnection:** After disconnection from mains, the **voltage between conductive parts and earth must not exceed 42.4V peak (30V RMS) or 60V DC, and stored energy must be below 20J (as per IEC**

60950). Warning labels must be placed if these limits are exceeded. Public charging stations must have an **emergency push button** to cut power supply instantly.

G. **DC Charging & Safe Disconnection:**

Vehicle connectors used for DC charging must lock onto the vehicle inlet if voltage exceeds 60V DC. In case of a malfunction, the system must provide safe disconnection and prevent unlocking if hazardous voltage is detected. EVCS must disconnect supply of electricity to prevent overvoltage at the battery, if output voltage exceeds maximum voltage limit permissible for the vehicle.

H. **Charging Cable Safety & Earthing:**

- Charging cables must not be energized if the vehicle connector is in an unlocked position. The connector shall not unlock if the voltage between the vehicle connector and the earth is more than 60 V
- A four-core cable must be used for three-phase charging, while three-core cables can be used for single-phase.
- Underground cables must be at least 1 meter deep and should not pass through oil tanks or pipelines.
- Safety clearance between EVCS and oil/gas dispensers must follow the Authority's safety orders.

I. **Electrical Protection & Monitoring:**

- Each EV charging point must have a dedicated sub-circuit protected by an overcurrent protective device (OCPD), which must be part of a switchboard.
- EVCS must have an earth continuity monitoring system that disconnects supply if the earthing connection fails.
- The charging lead must have metal shielding and wear-resistant cable insulation to maintain flexibility across different temperatures.
- Protective earthing must establish equipotential bonding between the supply terminal and the vehicle's conductive parts.

J. **Fire Safety & Material Standards:**

- EVCS enclosures must be made from fire-retardant, self-extinguishing materials, free from halogens.
- Fire detection, alarm, and control systems must be installed as per relevant standards.

K. **Record-Keeping & Compliance:**

- The charging station owner must perform regular testing and maintenance per manufacturer guidelines and retain test certificates for compliance.
- Records of inspections, test results, and corrective actions must be kept for at least seven years, either in physical or digital form, and be available for inspection by authorities.

Figure 7 Photos from Consultative meetings and Focused group discussion

3.3 CASE STUDIES – PRACTICES AND APPROACHES TAKEN TOWARDS EVCS SET UP IN BUILDINGS IN MAHARASHTRA

Based on the recommendations from the roundtable discussions, **a case study was done to identify the practices of builders/ developers in set up of EVCS in buildings in few cities of Maharashtra.** The aim was to understand whether the buildings have followed the safety standards or guidelines in the installed locations, the deployment strategy followed for EVCS within the building premises in terms of allotment of charging spaces, the metering arrangement, the costs, costs per unit (if any) and so on.

IESA conducted the case studies in three residential group housing societies in Pune, Aurangabad and Nagpur. While two societies have opted to provide a set of charging stations (1AC and 1DC) for common use by all residents, one of the societies has opted to provide each unit with a dedicated EV charging station for self/ individual use in their individual parking spaces.

Below are few of the observations from the case study:

Figure 8 Installed EV charging station at GHS A

Societies / Parameters	GHS A	GHS B	GHS C
Status of the Township/ Building	Occupied by Residents	Planned/ Design stage	Occupied by Residents
Number of Units (Households)	40	800	1200
No of Charging Stations (Planned/ Installed)	4 Installed	800 Planned (each unit to be provided with ONE charging facility)	2 Installed
Type of Charging Stations	AC Slow Chargers (3.5 kW each)		DC Chargers (60 kW each)
Location of Charging Stations	Visitors Parking (basement)	Each individual parking	Common area parking (open space)
Ownership of the Charging Stations	RWA	Individual Residents	CPO (Tata Power)
Cost of EVCS Set up	~INR 80,000	~INR 20,000 per residential unit ~INR 1.60 Crores	~INR 30 Lakhs (excluding land lease and annual operational costs)
Who bears the cost of EVCS Set up?	RWA with costs distributed to individual residential units	Developer with costs distributed to individual residential units	CPO
Is an Additional Transformer Set up/ Planned?	EV load is within the planned load for the RWA	EV load will be included in the total transformer capacity calculation	EV load is within the planned load for the Township
Is Separate Cabling Installed/ Planned?	Yes, as per NEC 2023 copper cables are preferred	Yes, as per NEC 2023	Yes, as per NEC 2023
Tariff for EV Charging	Commercial Tariff	Residential Tariff	Commercial Tariff
Tariff rate (current)	7.75 INR/kWh	7.75 INR/kWh	18.25 INR/kWh

Figure 8 Installed EV charging station at GHS A

3.4 MAPPING EXISTING PERMIT/ APPROVAL PROCESS FOR EVCS SET UP IN BUILDINGS:

Setting up an EVCS in residential and commercial buildings requires navigating multiple approvals and permits, ensuring compliance with electricity distribution norms and safety regulations. In Maharashtra, particularly in Mumbai, the process varies based on the electricity provider. While MSEDCL is the primary distribution company for most regions, Mumbai users connected to Adani, Reliance, Tata, or BESS grids follow a different process, as MSEDCL's procedures do not apply to them.

This section outlines the **step-by-step process for obtaining approvals, submitting necessary documents, and ensuring the proper installation of EV charging infrastructure**. It details the key requirements for different categories of charging stations, including private and public setups, ensuring clarity for residents, businesses, and developers looking to deploy EVCS efficiently

<table>
<tr><th>Steps</th><th>Details</th><th>CCS and HCS</th><th>PCS/ SPCS</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Online Application</td><td colspan="2">• Visit the MSEDCL Web Self Service Portal.
• Navigate to the 'New Connection Request' section and select 'Electric Vehicle Charging Station'.
• Complete the application form with accurate details, including the nearest consumer number to facilitate proper assignment to the relevant MSEDCL field office.</td></tr>
<tr><td>Details required
• Consumer Category - 1-LT-SUPPLY (<150kW)
• Supply Type – SINGLE / THREE PHASE (3.3 kW to 7.2 kW)
• Requested Load – required Load in KW
• Nearest Consumer No
• Charger Type and vehicle type
• Ownership details - Private/ Public</td><td>Details Required
• Load: Desired Load, Supply Type (LT/HT)
• Ownership: Captive/ Mall/ Private/ Society
• Premises: Self-owned/ Lease
• Station type: Manned/ Unmanned
• Charging rate, Charger cost, Incentive amount, No. of connector guns, date of commissioning
• Charger Invoice bill, Charger specification, EVCS equipment type test certificate and premises details</td></tr>
</table>

2	**Document Submission**	• Upload necessary documents, such as proof of identity, address, and No Objection Certificate (NOC) from the RWA or housing society in case of group parking space. • Undertaking on Rs 200 Stamp Paper for using power supply only for Electric vehicle charging • D1 form or Test Report for connection	Submit required documents*, including business registration certificates, proof of premises ownership or lease agreement, and technical specifications of the proposed charging infrastructure.
3	**Application Tracking**	• Upon submission, note the request ID for future tracking. • Visit the MSEB office to verify all documents and get the approval • MSEB electrician will visit the site and give the test report (A1 form)	
4	**Fee Payment**	Pay the requisite processing fees online as per MSEDCL guidelines.	
5	**Meter Installation/ Infrastructure Setup**	• After receiving confirmation text message contact the MSEB electrician • MSEDCL will install the EV meter in the designated meter room. • Residents are responsible for arranging the cabling from the meter to the parking area, typically requiring a licensed electrician's services.	• Coordinate with MSEDCL for the installation of necessary electrical infrastructure, including transformers and metering equipment, suitable for the charging station's load requirements. • Engage qualified professionals to install the charging equipment in compliance with MSEDCL and safety standards. • MSEDCL will conduct inspections to ensure adherence to technical and safety norms before commissioning the connection.
6	**Post Installation**	The new meter will become active, and billing details will be accessible through the MSEDCL app after the first billing cycle.	Once approved, the charging station becomes operational, and billing will commence as per the applicable commercial tariff rates.

Table 9 Documents Required and Process for Different Types of Charging Stations

Documents required from the CPO (Tentative list) as specified by Ministry of Power on Sept 2024, Guidelines for EVCS installation

1. Registered land deed between Land Owning Agency and the CPO or between lessee and charge point operator in case of sub leased property.
2. Power of Attorney confirming powers on the person(s) who are competent to execute the MoU / agreement.
3. Certified copy of Company Registration Certificate.
4. Copy of PAN Card.
5. Copy of GST Registration.
6. Self-Attested copy of Govt. ID Proof of the Authorised Representative.
7. Petroleum & Explosives Safety Organization (PESO)Approval in case electricity connection required for installation of EV chargers at Petrol Pumps / Gas Stations, shall be sought by CPO.
8. NOC from fire department (if EV charger is to be installed in the basement of a building).
9. EV Charger type test certificate from NABL Accredited Lab.
10. Undertaking on Stamp Paper for using power supply only for public EV charging.

To apply for incentives for Electric Vehicle Charging Stations (EVCS) meant for commercial use, such as public or semi-public stations within societies or residential welfare associations in Maharashtra, individuals or corporates must **register and apply through the portal associated with their respective DISCOM, based on the location.** The DISCOM will review the submitted documents, conduct a site inspection jointly with the applicant, and then forward the application to the State Nodal Agency (SNA), which is MSEDCL. The SNA will verify and approve the application documents before forwarding them to the Government of Maharashtra (GoM) for incentive disbursement. Upon approval, the GoM will process and release the incentive directly to the applicant.

04.
RECOMMENDATIONS FOLLOWED

04
RECOMMENDATIONS FOLLOWED

Multiple aspects have been discussed with the stakeholders and considered for development of guidelines specific to considering safety, ease of implementation and ease of compliance as captured below.

4.1 RECOMMENDATIONS

4.1.1 CHARGER CAPACITY AND DEPLOYMENT STRATEGY

Housing societies, encompassing both existing and new buildings, should develop long-term EV charging roadmaps starting from the initial adoption phase. Begin with a thorough demand estimation by conducting a resident survey to assess current EV charging needs and forecast future requirements. This proactive approach is essential given the expected rapid growth in EV adoption as more models become available and broader acceptance takes hold. Based on **both current and anticipated EV numbers, accurately estimate the electricity requirement.**

RWAs can adopt a phased strategy for installing EV charging infra. When the adoption levels of EVs are less than 5%, RWAs can make common charging points stations available for residents. However, this isn't sustainable as EV adoption increases. A long-term and more convenient solution would be to provide charge points in the private parking lots of residents preferably from the available spare load or through a dedicated EV connection from the power distribution companies (DISCOMs).

Electric vehicle charging is available at three levels based on the rate at which a vehicle can recharge. **Higher levels indicate faster charging rates but are also typically costlier and may require upgrades** to a site's electrical infrastructure. The following table provide a brief overview of the various levels of EV charging.

	AC Level 1	AC Level 1	AC Level 2	DC Fast Charging
Charger Capacity	3.3 kW	7.2 kW	11 kW	60 kW
Power Connection	Existing AC single phase supply	Existing AC single phase supply	3-phase AC connection	Dedicated connection
Set Up Location	Individual parking lots/ basements	Common/ Visitor parking bays	Common/ Visitor parking bays	Accessible public spaces
Vehicle Type	2W/4W	2W/4W	2W/4W	4W
Time taken to charge e-2W (4 kWh battery)	2 – 3 hours	1 – 1.5 hours	NA	NA

Time taken to charge e-4W (30 kWh battery)	8 – 10 hours	4 - 5 hours	2 – 3 hours	40-50 minutes
Number of vehicles that can be charged in per day by per charger	4 to 5 e2Ws 2 to 3 e4Ws	>10 e2Ws 4 to 5 e4Ws	6 to 8 e4Ws	>15 e4Ws
Use case	Private/ community charging	Private/ community charging	Community Charging	Community charging/ Public charging
Recommended for	All societies	All societies	All societies	High density societies/High EV adoption

Table 10 Comparison between different charging methods

Phased approach to charging infrastructure:

PHASE I →	PHASE II →	PHASE III
Low adoption	Medium adoption	High adoption
Install Level 1 charging stations in community/ common parking areas	Provide residents option to charge EV's in their private parking lots	Retrofitting of power source in each parking lot with dedicated EV connection
		DC charging facilities in common/community areas

Charger Capacity and Deployment Strategy In High Rise/ Low Rise Buildings, stakeholder consultations and recommendations **were to permit only AC slow chargers of upto 7.2KW defined as per BIS standards,** to be set up in any basement levels subject to these levels have ventilation, water sprinkler grid, fire water capacity and other fire safety requirements as per NBC and as amended from time to time or additional safety related infrastructure requirements as detailed in relevant section 4.1.4.

DC Chargers maybe set up only in open ground level/ open stilt parking/ upper podium parking levels. DC fast chargers require protection against ground faults on both the input and output sides. The isolation transformer insider the charger separates the input AC power from the output DC power and therefore output side is not grounded. Ground fault monitor installed on the output side detects any earth leakage and shuts off power immediately.

NOTE:
Home chargers (AC) will typically be used for overnight charging when vehicles are in premises for long durations and slow chargers are normally recommended by OEM from a battery health and safety perspective as well.

4.1.2 Electrical Load, Infrastructure Planning and Upgradation:

As per SOP provided by Chief Electrical Inspector adequate sanctioned load must be available to accommodate the additional EV charging load alongside residential or commercial unit loads. If the existing sanctioned load is insufficient, consumers or charging station owners must apply for a new or additional load from the area's DISCOM. Alternatively, consumers may adopt load mitigation measures, including upgrading wiring, cabling, and protection systems, under the guidance of a licensed contractor or DISCOM. All electrical installations for residential EV charging must be carried out by a **Licensed Electrical Contractor (LEC)** approved by the Chief Electrical Inspector to the Government of State (CEIG).

Developers, Resident Welfare Associations (RWAs), Group Housing Societies (GHS), or individuals can **consult DISCOMs for Estimating the load capacity** of the existing transformer, Determining the need for transformer upgrades, and Assessing feasibility for connections and related electrical infrastructure (cabling, metering, and costs).

The distribution transformer must be **installed on the ground floor or an open ground level** and not in basements or cellars. Additionally, **The Ministry of Housing and Urban Affairs (MoHUA)** has amended the Model Building Bye Laws (MBBL) 2016 to make EV charging infrastructure mandatory for new and existing buildings (excluding independent residences). It mandates that 20% of parking spaces must have EV charging points, and additional power capacity, with **a safety margin of 1.25**, must be provisioned to operate all points simultaneously.

Key Challenges and Solutions

1. **Electrical Safety**: As per National Electrical Code 2023, use only copper conductor cables for installation of EV Chargers in Buildings, use any other conductor material may result in loosening of contacts and oxide formation which may lead to increased generation of heat and sparking. The distance between the console and the PCC should be minimal, ensuring the use of copper conductors with a cross-sectional area of less than 25 sq. mm.

2. **Parking Allocation Issues**: In existing buildings, assigning dedicated EV charging spaces is challenging due to pre-allocation of parking for residents. Shared or visitor parking is also impractical due to mixed usage by internal combustion engine (ICE) and electric vehicles.

3. **Logistical Concerns**: Additionally, managing/scheduling of EV charging for residents can be challenging considering the charging time for each vehicle and it may not be possible to cater to all residents with increase in EV penetration creating potential bottlenecks in meeting residents' needs.

4. **Community Charging Solutions for Early EV Adopters:** In existing buildings and townships with only a few early EV adopters, there may be resistance from other residents to bearing the cost of upgrading electrical infrastructure, such as transformers and metering systems. To address this, RWAs, GHS, or consumers can **opt for Community**

Charging Stations (CCS) in visitor parking or common areas. These stations are non-commercial and typically charge tariffs lower than Public Charging Stations (PCS) but higher than private Home Charging Stations (HCS).

5. **Managing Harmonic Currents and Safety:** Electric vehicle chargers introduce harmonic currents that can negatively impact appliances and electronics. To address this, stakeholders recommend installing K-rated transformers*, where feasible, for EV connections. These transformers are designed to handle harmonic currents effectively, ensuring better safety and performance by using enhanced construction materials and zig-zag configurations to neutralize harmonic currents.

   Additionally, metering at the distribution transformer (DT) level should be implemented to ensure accurate energy accounting. With regard to power quality, the following measures may be adopted to minimize electromagnetic distortion and upstream pollution:

   - Use of double-sized neutrals to avoid overheating and failure
   - Use of isolation transformers to prevent disturbances from transmitting towards the supply side (for public charging stations)
   - Use of appropriate filters, including reactive compensation at the secondary of the DT (for public charging stations)

6. A survey conducted by **MyGate** indicates significant interest in adopting EV charging infrastructure, with over 35% of Resident Welfare Associations (RWAs) in Mumbai and 30% in Pune planning installations within six months. To ensure safety, RWAs must establish clear cabling standards for private installations and use certified contractors or supervisors to monitor the installation process. They should also prioritize the use of safe charging points with features such as load surge protection, voltage regulation, and auto power cutoff.
7. As EV adoption grows, RWAs must plan for the gradual implementation of community chargers in public parking spaces, creating a safe and accessible charging ecosystem. In Maharashtra, RWAs and cooperative housing societies are required to provide no-objection certificates (NOCs) for installing EV charging points within seven days, facilitating faster infrastructure deployment. RWAs need to carefully evaluate the safety concerns arising from ad-hoc electrical connections and **consider the following safety guidelines:**
   - Define cabling standards for residents to follow during private installations
   - Route the cabling through your electrical contractor or have the implementation monitored by your electrical supervisor to avoid any potential threats
   - Install a low-cost charge point with adequate safety layers to protect against load surges and voltage fluctuations.
   - Charge points with auto-power cutoff options on full charge and additional safety features are safer than a regular 16A socket.
   - Every RWA needs to plan its charging road map from initial adoption stage. As EV adoption in societies increases, common charging points need to be installed in community/public parking spaces.
   - Additionally, community chargers can be installed to encourage faster adoption to EV's clearly highlighting need for creation of a safe, accessible and sustainable charging ecosystem.
   - In Maharashtra, Resident Welfare Associations (RWAs) and cooperative housing societies are required to grant no-objection certificates (NOCs) for installing electric vehicle (EV) charging points within seven days.

4.1.3 EV Parking Safety and Infrastructure

The safety of electric vehicles (EVs), especially during charging while parked, has been a critical concern following numerous fire incidents across the country in 2022. In response, extensive awareness-building efforts and the introduction of enhanced safety standards, such as **AIS 156** and **AIS 038**, were undertaken. These new standards, which became mandatory on **1st April 2023**, ensure that all batteries and vehicles manufactured after this date comply with stringent safety measures. Encouragingly, no major EV fire incidents have been reported since the implementation of these enhanced norms.

KEY CHALLENGES AND SOLUTION

EV fires pose unique challenges due to the **hazardous nature of lithium-ion** batteries. They emit toxic gases like **hydrogen fluoride**, which can endanger firefighters even when using breathing apparatus, as the gases can penetrate the skin. Additionally, lithium-ion **battery fires are difficult to extinguish, have a high risk of reignition, and tend to burn for extended periods.** Fires in underground parking areas are particularly dangerous due to limited ventilation, restricted dispersion of smoke and heat, and safety concerns for firefighters during evacuation.

1. To address these risks, it is recommended that EV parking spaces be **designed based on safety standards, vehicle manufacturing dates, and battery testing norms**. For e-2Ws and e-3Ws with batteries tested before **1st April 2023**, parking should **be limited to open ground-level spaces, ground-level open stilt parking, or upper podium parking.** These parking areas must be dedicated and clearly demarcated with visible signage to ensure safety and awareness.
2. For **e-2Ws and e-3Ws** manufactured and tested post **1st April 2023**, parking may be allowed in **open ground-level parking, ground-level open stilt parking, upper podium parking, and up to the 1st basement level.** However, basement-level parking must include appropriate safety-related infrastructure, such as ventilation systems and fire suppression measures, alongside clear demarcation of dedicated EV parking zones with signage.
3. For **e-4Ws (electric cars)**, parking may be permitted across different basement levels, provided the parking spaces a`re equipped with comprehensive safety-related infrastructure. This includes adequate ventilation to disperse smoke and toxic gases, advanced fire suppression systems to handle lithium-ion battery fires, clear emergency exits, and well-defined evacuation pathways for both occupants and firefighters.
4. Finally, these recommendations should be periodically reviewed and updated by the concerned state government agencies and departments. The review process should consider advancements in EV technologies, improved safety standards, and the evolving infrastructure requirements specified in the **National Building Code (NBC)**. By adopting and adhering to these measures, safer EV parking environments can be established, minimizing risks to property, life, and the environment.

4.1.4 Safety Related Infrastructure Requirements in Basements:

1. Mechanical Ventilation

Mechanical ventilation was recommended by stakeholders to be required for multi-basement levels (as per National Building Code, NBC). 1st basements may continue with natural ventilation cut outs. Low rise buildings may consider having natural

ventilation (as per NBC) in 1st basements when considering set up of EV Parking/ EVCS at this level with Air changes **recommended of 15 Air changes per hour**. Else, EV parking / EVCS may be considered in such buildings only in ground level/ open ground stilt parking levels.

Water Capacity: Each **e-4W requires about 10kL of water for firefighting**. It is recommended to consider having fire water capacity of a minimum of 150kL to 200kL water capacity with assured minimum operation zone of 260 sqm for medium hazard.

NOTE:

A proper assessment maybe made here through CPOs/ Consultants in the market on the benefits or lack of therein between special EV tariff meter and existing tariff meter. In buildings where such sufficient fire water capacity is not available, it was therefore considered to recommend having domestic water being tapped as well. For the same, the domestic water tank be tapped via booster pump and down corner and an outlet be provided near the EV Parking / EVCS in basements to effectively fight EV fires in case of emergencies. Where, there are underground water sumps, appropriate pumps may be set up to access this water for fire-fighting. For buildings with no basements, underground fire water tank capacity is not mandatory. Further, it was recommended to consider having intermediate fire pumps arranged for every 150 m in buildings with basements.

2. Water Sprinkler Grid

The recommendation was to ensure that for buildings with basements where there is a plan to set up EV Parking/ EVCS, water sprinkler grid must be present as per NBC. New buildings it is recommended may consider setting up a more **compact grid of 9 sqm with 1 or 2 sprinklers with K factor:80, above each car parking** or charging spaces given. Automatic Sprinkler **Systems confirming to IS 15105** should be installed. IS 15105 shall be followed for the installation of the automatic sprinkler system for protection to each car parking in the bay, at roof level as well as intermediate sprinklers within the car parking.

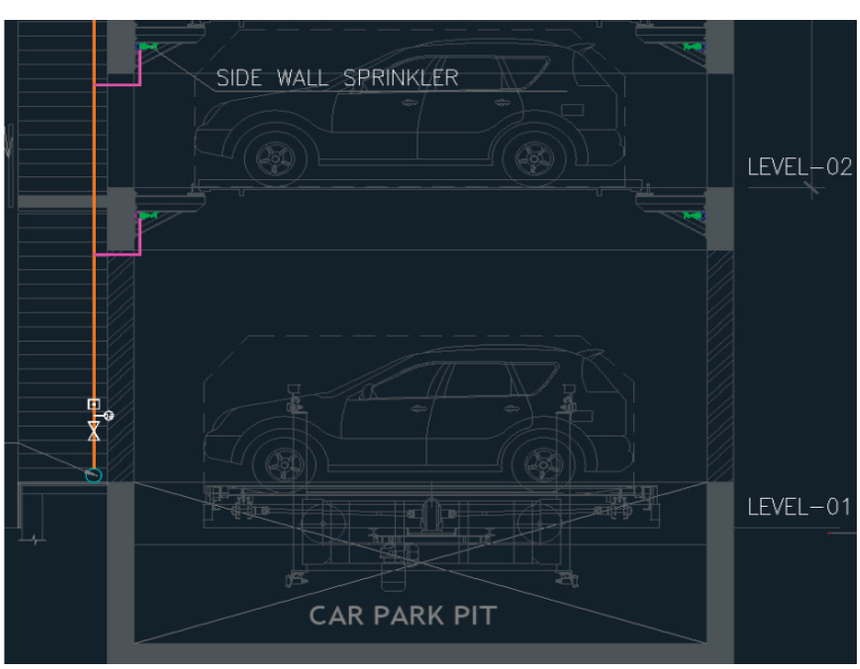


Figure 9 Section layout of side wall sprinkler facing the car bonnet / engine

3. Compartmentation Zone

Compartmentation zones in all kinds of buildings in basements it was recommended to continue to be considered as per NBC in both existing and new buildings (high-rise and low-rise). Recommended size for new and existing buildings is **1500 sqm to 2000 sqm (water curtains).** Additionally, in assembly occupancies, it was recommended to have separate demarcated EV zones with compartmentation, fire water outlet, water sprinkler grid, mechanical ventilation, smoke detectors etc. In assembly occupancies, to set up EVCS and EV parking spaces in 1st basements, it was recommended that it maybe considered to set up **separate 2-hour fire compartmentation subject to additional consultations**.

4. Smoke Detectors:

These are extremely essential to monitor EV fires and therefore, the consensus was that smoke detectors must be provided in each EV parking space in all basements wherever EVCS is to be set up or EVs are to be parked. For the same, the smoke detectors recommended were to be of the appropriate type that can differentiate between dust and smoke to avoid false alarms. Further, the consensus was that even individuals setting up HCS on their own must set up smoke detectors in the appropriate places. Further, as dedicated parking spaces are to be set up for e-2Ws/e-3Ws, these spaces must also set up the above appropriate smoke detectors as well.

5. Fire Extinguishers:

Electric vehicles can catch fire, and when that happens, those fires are difficult to extinguish. It could take firefighters 10kL of water to put an electric car fire out. Community emergency services can also use EV fire suppression gear to contain any fires and cool down the car faster, lessening the time it would take to put out the fire and controlling water usage. The consensus was that it must be recommended to have fire extinguishers for **every 200 sqm as per IS 2190 in all basements**.

6. Equipment's Fire Safety & Personal Safety Recommendations:

A. **Right selection and sizing of copper wires:** The mechanical characteristics of the cable should be equivalent or superior to those of IS 694 Standard cable, as well as for fire resistance, chemical withstand, UV resistance. NEC 2023 guidelines emphasize the importance of proper wiring selection for electrical safety. Further, National Building Code (NBC) is being revised and the electrical installation recommendation from NBC may be adopted.

Applicable Standards & Regulations for sizing of electric wires are as below:

For AC Chargers:

For EV Chargers installations the right size of copper cables to be used. The wire gauge must support the current without excessive voltage drop or overheating. Below are general guidelines and our recommendation:

Charger Output	Current (A)	Recommended min Wire Size (mm^2)
3.7 kW (Single-phase, 230V)	~16 A	2.5 mm^2
7.4 kW (Single-phase, 230V)	~32 A	6 mm^2
11 kW (Three-phase, 400V)	~16 A per phase	2.5 mm^2
22 kW (Three-phase, 400V)	~32 A per phase	6 mm^2

Table 11 Recommended wire-size thickness for AC Chargers

For DC Chargers:

For EV Chargers installations the right size of copper cables to be used. The wire gauge in DC chargers depends on the charging voltage and current levels. Below is an indicative guide for wire sizing for the same:

DC Charger Power	Voltage (V)	Current (A)	Recommended Wire Size (mm^2)
25 kW DC	400V	~62 A	16 mm^2
50 kW DC	400V	~125 A	35 mm^2
100 kW DC	400V	~250 A	70 mm^2
150 kW DC	400V	~375 A	95 mm^2

Table 12 Recommended wire-size thickness for DC Chargers

B. **Factors affecting Wire selection in DC Chargers as per NEC Guidelines, 2023**

- **Current Rating**: Directly determines wire size (higher current = thicker cable).
- **Cable Cooling:** High-power DC chargers use liquid-cooled cables to prevent overheating.
- **Voltage Drop:** Should be minimal to maintain efficiency; typically, <1% of the supply voltage.
- **Flexibility & Weight:** Thicker cables are heavier, making liquid cooling necessary for ergonomic handling.
- **Insulation Material:** Must be high-temperature resistant (e.g., XLPE, TPU, TPE).

While the above table 11 and 12 serves as guidelines, it is best to finalise EV charging cable specification after considering specific layout and electric load. **The use of copper conductor cables is recommended for installation of EV Chargers to prevent overheating and fire risk.**

- Additionally, using **low-powered adapters and extension cords for EV charging poses fire hazards, inefficiency, and unreliable connections.** They can overheat, cause voltage drops and violate safety standards. Always use properly rated EV charging cables and dedicated outlets for safe and efficient charging.
- **Parking and Fire Safety:** Electric vehicles (EVs) should not be parked in fire escape routes to avoid obstructing evacuation in emergencies. Maintenance and servicing of EV chargers must only be performed by qualified and licensed electricians.
- **Charging Station Signage:** When multiple chargers are installed, clear signage must be displayed at each charging point, specifying whether it is suitable for AC or DC charging. Fast DC charging stations should be distinctly marked with labels to differentiate them from regular charging points due to the specific hazards associated with direct current.

- **Storage and Power Distribution:** No flammable or combustible materials, aside from vehicle components and their chargers, should be stored in designated charging areas. The power distribution system should ensure balanced load distribution across all three phases. Additionally, branch-wise or phase-wise load monitoring must be in place, with protections against overload. In case of an overload, the system should either reduce the charging current or deactivate some chargers based on a first-come, first-served basis. EV charging power cables should not be routed along with other utility connections such as gas lines, fire exits, or emergency pathways.

- **Child Safety and Parking Regulations:** When selecting common areas for public or shared EV charging stations, locations such as children's play areas must be avoided, and necessary safety measures must be taken to make them child-proof. A security guard or station attendant should be assigned to enhance safety. Charging bays should have clearly marked signs on the ground to guide vehicles into parking spots close to the charging point, minimizing cable stretching. Physical barriers must be installed in front of EV chargers to prevent accidental vehicle collisions.

- **Designated EV Charging Zones:** Dedicated EV charging zones must be clearly marked to prevent non-EV vehicles from occupying these spaces. This can be reinforced with ground markings, signboards, and removable barriers.

- **Protection Against External Elements:** Charging points should be safeguarded against water ingress and foreign object interference. The cables and wiring for EV chargers must have adequate mechanical protection to ensure durability.

- **Safe Distance from Hazardous Installations:** EV charging stations and parking areas must be located at least 10 meters away from combustible materials such as waste, storage items, or flammable structural elements. Furthermore, EVCS and parking must be at least 15 meters away from hazardous installations such as transformers, flammable liquid storage areas, and LPG tanks, unless separated by fire-resistant walls with at least a two-hour fire rating.

- **User Guidance and Emergency Planning:** EV service provider apps should include clear instructions on charging procedures, as many users may be unfamiliar with the correct methods. There must be a well-defined emergency evacuation plan in case of incidents, especially in basements, with sufficient illumination at all parking levels. Any civil modifications necessary for safety compliance should be undertaken as per the directives of regulatory authorities.

- **Charging Standards for E-2Ws and E-3Ws:** Direct 15A charging should not be used for any vehicle type, particularly for e-2Ws and e-3Ws, including their portable/removable batteries. Instead, a dedicated EV charger conforming to relevant standards must be used. Portable batteries should not be charged inside individual flats or basement floors, and periodic checks should be conducted during charging to monitor for excessive heating or abnormalities. Dedicated parking spaces must be allocated for e-2Ws and e-3Ws.

- **Emergency Response Preparedness:** It is recommended that, similar to the National Fire Protection Agency (NFPA) in the USA, India should develop emergency response guidelines for first and second responders. EV manufacturers (OEMs) should also be encouraged to provide model-specific emergency response instructions.

C. **Maintenance and monitoring of EVCS**

- Periodic test/ inspection of EVSE should be carried out by electrical inspector/ CESE in every four years.
- The owner should establish and implement a safety assessment programme for regularly assessing the electrical safety of EVSE, conductors and fittings.
- The owner should keep records of the results of every periodic assessment and details of any issues found during the assessment; and any actions required to be taken in relation to those issues.
- The owner should retain a copy of all records, whether in hard copy or electronically, for at least seven years and shall provide a copy of the records to the inspecting officers.

4.2 WAY FORWARD

The above recommendations should be compiled into comprehensive guidelines that address safety infrastructure and compliance requirements for safe deployment of EVCS in old and new buildings. These guidelines must prioritize key electrical safety measures, including adherence to Central Electricity Authority standards and state fire safety regulations, proper installation by licensed contractors, and the strategic placement of charging stations in well-ventilated areas. Additionally, they should incorporate specific provisions for mechanized parking, fire-resistant construction, automated safety systems, elevating charging points above flood levels, maintaining safe distances from combustible materials, and conducting routine inspections to establish a secure and efficient EV charging environment.

Earlier, it was considered necessary to include Fire Services Department approval as a statutory requirement in the EVCS permit process. However, given the enhanced safety regulations and the need for a more efficient approval process, it is recommended that applicants adhere to safety guidelines issued by the Fire Services Department and submit a Self-Declaration form through a proposed Single Window Clearance (SWC) portal. In the rare event of an EV or battery-related fire incident, the **central government should consider formulating model first-responder and second-responder emergency response guidelines for both fire and non-fire hazards associated with EVs and their batteries.**

The guidelines should also mandate EV manufacturers (OEMs) to develop vehicle platform/ model specific emergency response procedures, similar to requirements imposed on EV manufacturers in the USA. Once the guidelines and the Single Window Clearance (SWC) portal are launched and/ or announced, there will be need for targeted activities as part of Right to Charge Campaign on capacity building and awareness generation for various related target stakeholder groups such as:

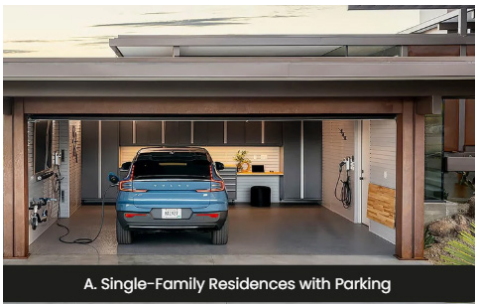
- Architects/ Designers/ MEP Consultants,
- Real Estate Developers,
- RWAs,
- Government Stakeholders – DISCOM, Fire Department etc., and
- Potential chartered safety engineers for empanelment by CEIG/ Fire Department.

4.2.1 Collaborative Strategies for EV Charging Across Housing Types

The integration of electric vehicle (EV) charging infrastructure within residential settings presents a spectrum of challenges, intricately linked to housing types and the distinction between existing and new structures. Selecting the right size of cabling is crucial to ensure efficient power delivery, minimize voltage drops, and enhance overall safety. However, different housing types present unique obstacles, as outlined below, and addressing these challenges is pivotal, especially in urban areas where diverse housing configurations prevail.

1. **Challenges Based on Housing Types**

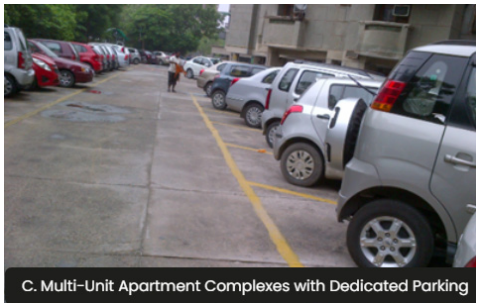
A. **Single-Family Residences with Parking**: Homeowners with private parking spaces are generally well-positioned to install personal EV charging stations. This setup offers convenience and cost savings, as charging can be done using standard home electricity rates. However, the initial installation may require minor electrical upgrades depending upon AC charging capacity and the home's existing infrastructure.


A. Single-Family Residences with Parking

B. **Single-Family Residences with Street Parking**: Residents relying on street parking face significant hurdles. The absence of dedicated parking complicates the installation of personal chargers, often necessitating reliance on public charging infrastructure. This dependence can lead to higher costs and inconvenience due to the variability in public charger availability and pricing.


B. Single-Family Residences with Street Parking

C. **Multi-Unit Apartment Complexes with Dedicated Parking**: While having designated parking spots is advantageous, retrofitting these areas with EV charging stations involves navigating shared property considerations. Challenges include obtaining consensus from homeowners' associations or property management, addressing potential electrical capacity constraints, and managing the equitable use of shared charging facilities.


C. Multi-Unit Apartment Complexes with Dedicated Parking

D. **Multi-Unit Apartment Complexes with Shared Parking**: In scenarios where parking spaces are communal, the complexity intensifies. Allocating specific spots for EV charging can be contentious, and the installation may require substantial infrastructural modifications. Additionally, coordinating among multiple residents and stakeholders to fund and manage the charging stations adds layers of administrative challenges.


D. Multi-Unit Apartment Complexes with Shared Parking

Figure 10 Housing with different parking settings in India

2. Challenges Arising from Building Status

- **Existing Structures**: Retrofitting older buildings for EV charging is often fraught with obstacles. The sanctioned electricity load may be insufficient to support multiple charging stations, necessitating costly electrical upgrades. Physical modifications, such as trenching and drilling, can be invasive and expensive. Moreover, achieving consensus among residents or property owners can be a protracted process, delaying implementation.
- **New Structures**: Incorporating EV charging infrastructure during the construction phase offers distinct advantages. Electrical systems can be designed to accommodate anticipated EV adoption rates, and allocating 20% or more of parking spaces for EV charging can be mandated, as seen in progressive building codes. While this approach entails upfront costs, it is generally more cost-effective than retrofitting and positions the property as forward-thinking and sustainable.

Figure 11 Individual stilt parking in Pune, Maharashtra with 16 A provision for EV charging

3. Ministry of Housing & Urban Affairs (MoHUA) Guidelines:

MoHUA guidelines have been based on the projection of EV adoption rate for the year 2020 (estimated at 15%) and 5% incremental consideration for Metropolitan and Tier 1 cities thereby specifying guideline of **allocation of 20% of parking spaces to be equipped/EV ready.**

However, considering our ambitious target of achieving 30% EV penetration by 2030 there is **need to reevaluate and define guidelines** for provision of parking spaces to be EV ready to help support ecosystem creation for EV adoption.

4. Case Studies and Regulatory Responses

The United Kingdom's On-Street Residential Chargepoint Scheme (ORCS) exemplifies governmental efforts to bridge the charging infrastructure gap for residents without off-street parking. By providing grants to local authorities for the installation of public charging stations, the program aimed to enhance accessibility for urban dwellers. Although the scheme has concluded, it underscores the **critical role of public investment in facilitating EV adoption**.

In Mumbai, regulatory measures are being considered to prohibit EV charging in automated, puzzle, and basement parking structures due to safety concerns. The guidelines advocate that **multilevel parking structures are permitted up to a height of 45 meters. Additionally, a 1.5-meter clearance** must be maintained along the sides and rear of the parking facility to facilitate rescue operations during emergencies. It is also recommended that charging stations be situated in well-ventilated areas to mitigate fire risks. These measures highlight the importance of safety considerations in the deployment of EV infrastructure.

5. Innovative Solutions and Collaborative Efforts

To overcome these challenges, innovative solutions are emerging. **Real estate developers are increasingly partnering with charge point operators to integrate EV charging infrastructure into new developments**. For instance, collaborations between developers and energy companies facilitate the seamless incorporation of charging stations, enhancing property value and appeal to eco-conscious consumers. Societies with solar rooftop setups, groundwater recycling, and lush parks are appreciated. Leading real estate developers including Hirandani Group, DLF and K Raheja Corp and Emaar have started including EV charging in their new complexes.

In existing properties, third-party management of EV charging facilities is gaining traction. Dedicated parking bays are leased to external operators who handle the installation, maintenance, and operation of charging stations. This model alleviates the administrative burden on property owners and ensures professional management of the infrastructure.

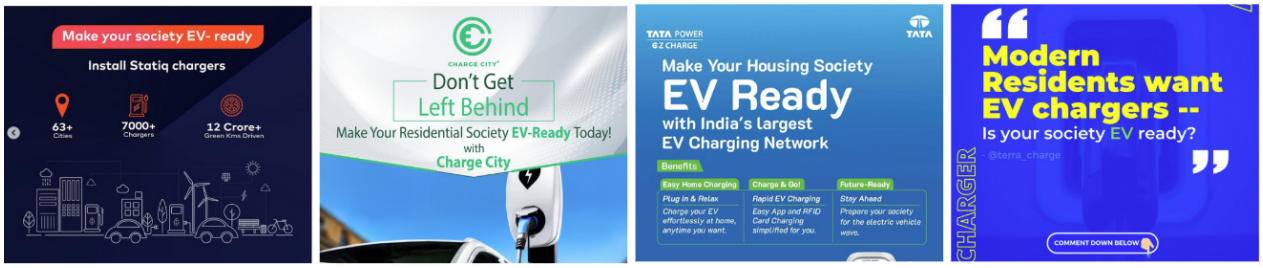


Figure 12 Promotional Campaigns by CPOs for EV Charging Infrastructure in Residential Societies

The integration of EV charging infrastructure within residential settings is a multifaceted challenge influenced by housing types and building statuses. While new constructions have the advantage of proactive planning, existing structures require tailored solutions that consider technical, financial, and social factors. Collaborative approaches involving developers, residents, and policymakers are essential to create an inclusive and efficient charging ecosystem, thereby accelerating the transition to sustainable transportation.

4.2.2 Charging methods to conserve EV Battery Life

1. It is advisable to charge the vehicle up to 100%. This ensures accurate SoC calculation and consistent energy content intake during charging. **Charging to 100% also maintains battery health** for a longer time and ensures better range throughout the life cycle of the EV.

2. **Cell balancing or equalization and SoC calibration happens during charging**, especially at higher SoC, > 90%. This causes charging to take longer time above 90%. Allow the EV to reach 100% SoC before terminating the charging session, as both cell balancing and SoC calibration are essential steps for any battery to perform optimally for a prolonged time.

3. It is also advisable to slow (AC) charge or home charge the EV to 100% as much as possible. Slow Charging and full charging are the best way to charge EV to maintain the health of the high-voltage battery. If fast charging is used, it is advisable to slow or home charge the vehicle from **less than 20% charge to 100% for every 4 fast charging cycles**.

4. Avoid leaving the vehicle parked with a state of charge **(SoC) below 20% for more than 14 days.** For extended parking periods beyond 14 days, it is ideal to maintain the SoC between 40% and 60%. If the vehicle will remain unused for over three months, ensure the SoC stays between 50% and 60% to preserve battery health.

5. Extreme temperatures impact upon how well a battery can maintain its level of charge. **Avoid charging the high voltage battery when it is hot**, and vehicle is driven for long distances especially in summers. Allow vehicle temperature to cool down before charging. It is always better to charge EV when ambient temperature is low especially at night.

6. Avoid parking vehicle in direct sunlight for long duration. Try to park it under shade, tree etc. This helps in keeping battery temperature low resulting enhance battery life over the life cycle.

Types Of Charging	Charging Component Specification	Charge Port	Charge Gun	Power Source
Normal/AC Charging	• Nominal Voltage: 230V AC RMS single Phase 50Hz • Power Rating: 3.3Kw AC RMS • Rated Current 16A AC RMS			
AC Charging (WMU)	• Nominal Voltage: 230 V AC RMS single Phase 50Hz • Power Rating: 7.5Kw AC RMS • Rated Current 32A AC RMS			
Fast/DC Charging	Charging station voltage capability should be greater than or equal high voltage battery pack nominal voltage.			

Figure 13 Details of the different types of charging mechanisms

4.2.3 EV Battery Fire suppression methods

Managing electric vehicle (EV) battery fires presents unique challenges due to the nature of **lithium-ion batteries and their propensity for thermal runaway**. The position of the EV battery pack, typically located along the floor pan between the chassis rails, complicates firefighting efforts. If the battery pack enters thermal runaway, **its location makes it difficult to visually identify the affected area,** even with thermal imaging cameras. Additionally, applying water to the exterior of the pack often requires firefighters to be in close proximity, increasing their exposure to potential hazards. **According to EV Fire Safe, three primary methods have emerged globally as best practices for suppressing and containing such fires: cooling, controlled burning, and submersion.**

1. **Cool Method:** This approach involves using **water to lower the temperature of the battery and suppress flames.** Firefighters employ fog nozzles to knock down flames and apply cooling jets onto the exterior of the battery pack to mitigate the exothermic reaction of thermal runaway. While this method is recommended by all EV manufacturers and provides visible action to onlookers, it has limitations. It **can require between approximately 3,000-8,000 gallons (11,356-30,283 Liters) of water, applied directly to the battery**, to fully extinguish and cool down a battery

fire, necessitating the establishment or request of additional water supply early in the response. If water is not immediately available, using CO_2, dry chemicals, or other typical fire-extinguishing agents can be temporary measures until water becomes available.

NOTE:

Some manufacturers do not recommend the use of foam on electric vehicles.

Water should be applied directly to the battery, and if safety permits, the vehicle can be lifted or tilted for more direct access to the battery. Water may be applied onto the pack from a safe distance only if a natural opening (such as a vent or opening from a collision) already exists; the battery should not be opened for the purpose of cooling.

Figure 14 EV battery fire suppression - Cool Method; (Image courtesy: evfiresafe.com)

2. **Burn Method**: In certain situations, **allowing the EV battery to burn out completely** while protecting surrounding exposures is considered best practice. This method acknowledges the difficulty in extinguishing the fire and focuses on containment. However, this approach may **not be feasible in all circumstances, particularly in urban areas** were closing roads and allocating firefighting resources for extended periods may not be practical.

The time required for the battery to burn will depend on factors such as battery size, state of charge, ambient temperature, and other conditions. There are also air quality risks, necessitating monitoring and warnings for surrounding exposures. For example, on April 22, 2022, in Berlin, Germany, an EV went into thermal runaway while fast charging. The fire department opted to let the battery burn out and flipped the vehicle onto its side for easier monitoring with a thermal imaging camera.

Figure 15 EV battery fire suppression - Burn Method

3. **Submerge Method**: This technique **involves immersing the EV in water to cool the battery** and suppress the fire. While effective, **it requires specialized equipment and may not be practical in all situations,** as containment units may not be available or in close enough proximity, and water usage may be in excess of 10,000 Liters. For instance, on March 25, 2019, in Tilburg, Netherlands, an EV went into thermal runaway with off-gassing but no visible flame while at a dealership. Fire crews organized a containment unit, and the EV was submerged for several weeks.

Submerged EV in a containment unit that can be filled to pack level with water.

Figure 16 EV battery fire suppression - Submerge Method

The use of a **Thermal Imagery Camera or Infrared (TIC or IR) is recommended to monitor battery temperatures during the cooling process**, and it is advisable to continue to use water till battery has reached ambient temperatures or below, indicated by the thermal imagery camera. When utilizing a thermal imaging camera, allow enough time, once the application of water has stopped, to allow for heat within the battery to transfer to the battery enclosure. Extinguish small fires that do not involve the high voltage battery using typical vehicle firefighting procedures.

During fire extinguishing, **do not make contact with any high voltage components**. Always use insulated tools for fire extinguishing. Heat and flames can compromise airbag inflators, stored gas inflation cylinders, gas struts, and other components which can result in unexpected excessive heat, which can cause inflation cylinder explosion. Perform an adequate knock down before entering a hot zone.

Additionally, Firefighters can **use an underbody spray system for EV battery fire suppression** functions like a sprinkler that can be placed beneath an electric vehicle to cool the battery pack. Its key advantages include enhancing firefighter safety by allowing them to combat fires from a distance and potentially limiting fire spread depending on the water spray's coverage. However, it may extend the duration of thermal runaway compared to letting the fire burn out naturally. Additionally, the unit could be costly and challenging to transport due to its size.

It's important to note that there is currently no product available that can fully extinguish an EV or lithium-ion battery fire. Therefore, the choice of suppression method depends on the specific circumstances of the incident, available resources, and the primary goal of ensuring safety. Firefighting teams should receive **specialized training to handle EV battery fires** effectively, considering the unique risks and challenges involved.

Figure 17 Training for firefighters to use underbody spray system;(Image courtesy: evfiresafe.com)

05.
CONCLUSION

05
CONCLUSION

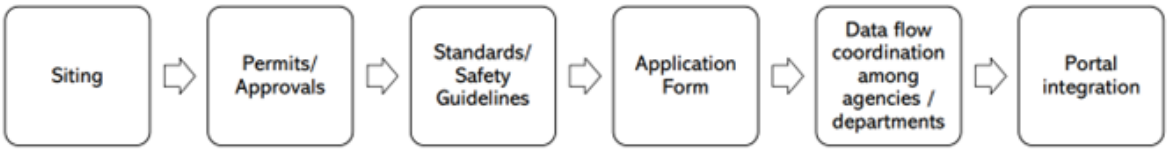
The Paper on “Right to Charge” in Maharashtra highlights the critical need to expand electric vehicle (EV) charging infrastructure to accommodate the increasing adoption of EVs. Maharashtra’s EV policy, along with national initiatives and policies, aims to build a strong ecosystem through financial incentives, regulatory frameworks, and infrastructure development. The paper emphasizes the importance of integrating EV charging stations within residential societies, commercial complexes, and public spaces to ensure accessibility and efficiency.

A key challenge lies in the absence of comprehensive guidelines and the complexities of obtaining load connections for EV chargers in housing societies, often resulting in unregulated and unsafe charging practices to update the existing guidelines from various departments and the complexities of installing EV chargers in housing societies. The report underscores the need for clear policies, simplified approval processes, and financial support to encourage Resident Welfare Associations (RWAs) and commercial developers to install charging points. It also addresses fire safety concerns, particularly in basements, recommending proper ventilation, fire suppression systems, and dedicated EV parking zones.

The “Right to Charge” campaign advocates for public-private partnerships (PPP) to accelerate infrastructure deployment while ensuring fair cost distribution and minimizing the financial burden on users. Furthermore, the report highlights the role of government agencies, distribution companies (DISCOMs), and regulatory bodies in standardizing tariffs, maintaining grid stability, and enforcing safety regulations. By fostering collaboration among stakeholders and implementing structured policies, Maharashtra aims to establish a scalable, sustainable, and accessible EV charging network, facilitating a smooth transition to electric mobility.

The “Right to Charge” campaign has successfully focused on enabling guidelines and framework for EV infrastructure in Buildings. Moving forward, there is now needed to focus on aspects of creation of future pipeline of opportunities, supporting startups for pilots and important aspects of capacity building and awareness creation. **Additionally, there is need to further build on the Right to Charge campaign to cover capacity building and public awareness and creating a favourable ecosystem for Public Charging Infrastructure in the state of Maharashtra**. Evaluation criteria for Selection of states for subsequent phases of the Right to Charge campaign can be based on existing sales of Electric vehicles in India.

There is need to engage with diverse stakeholders to drive consensus on setting up **Single Window Clearance Approval system that helps integrate diverse stakeholders onto a single unified platform.**



Guidelines and recommendations from this study help provide valuable inputs and guidelines on simplification of the process of obtaining connections, approvals and other mandatory clearances along with selection criteria and evaluation basis for Charging infrastructure. Moving forward, as follow through activity, specific focus will be needed on Training and awareness building.

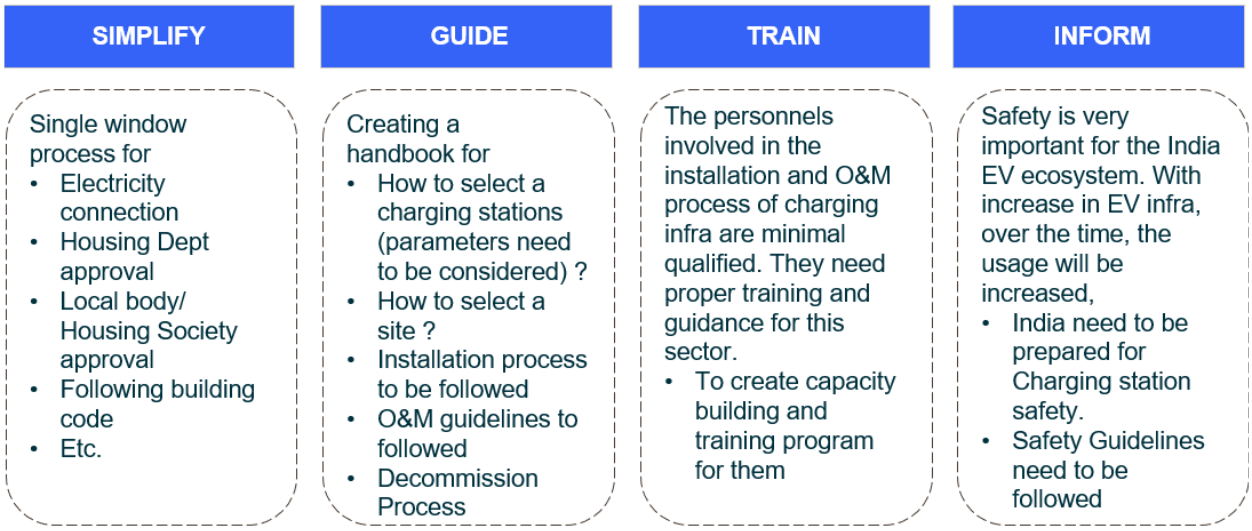
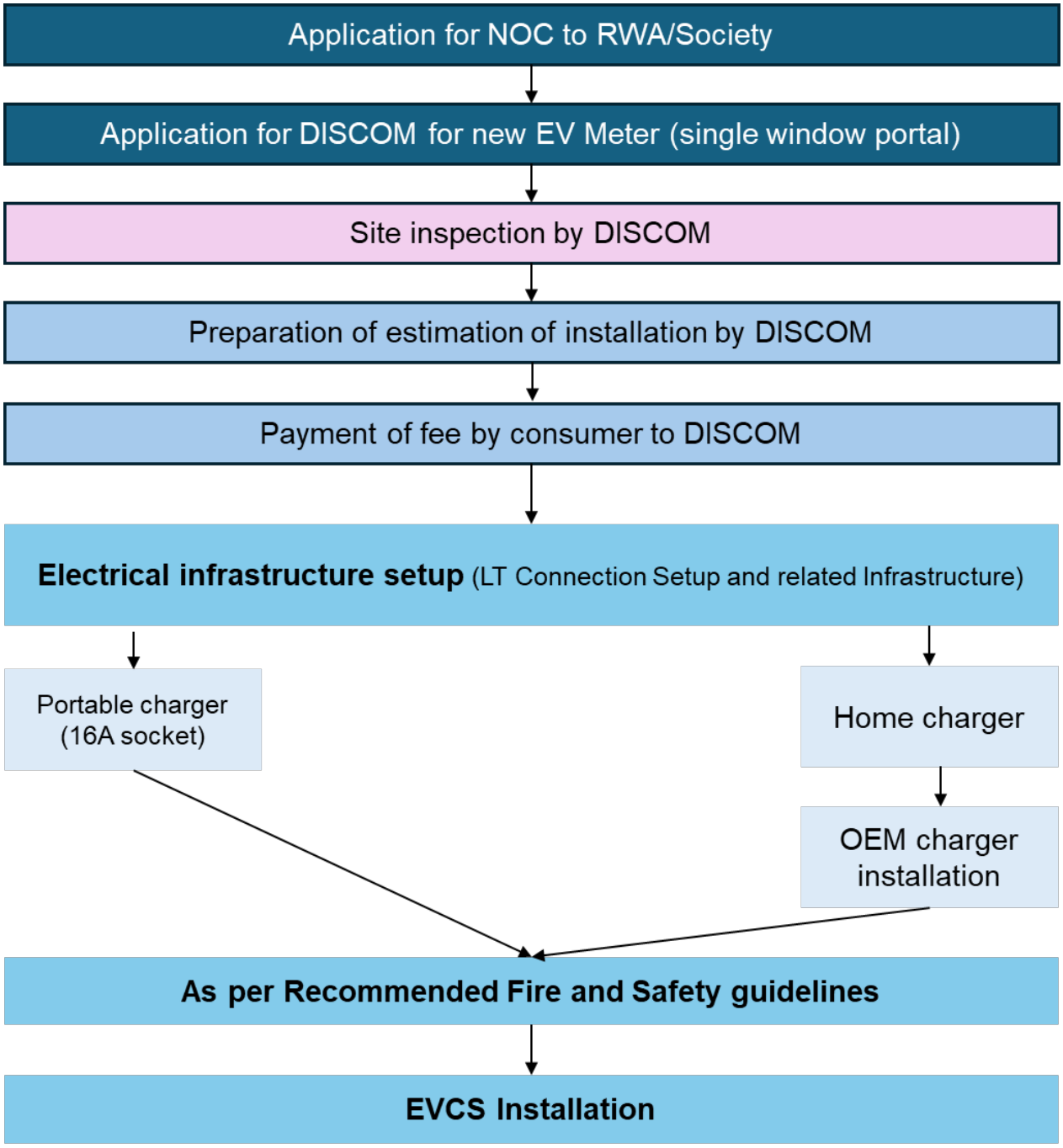
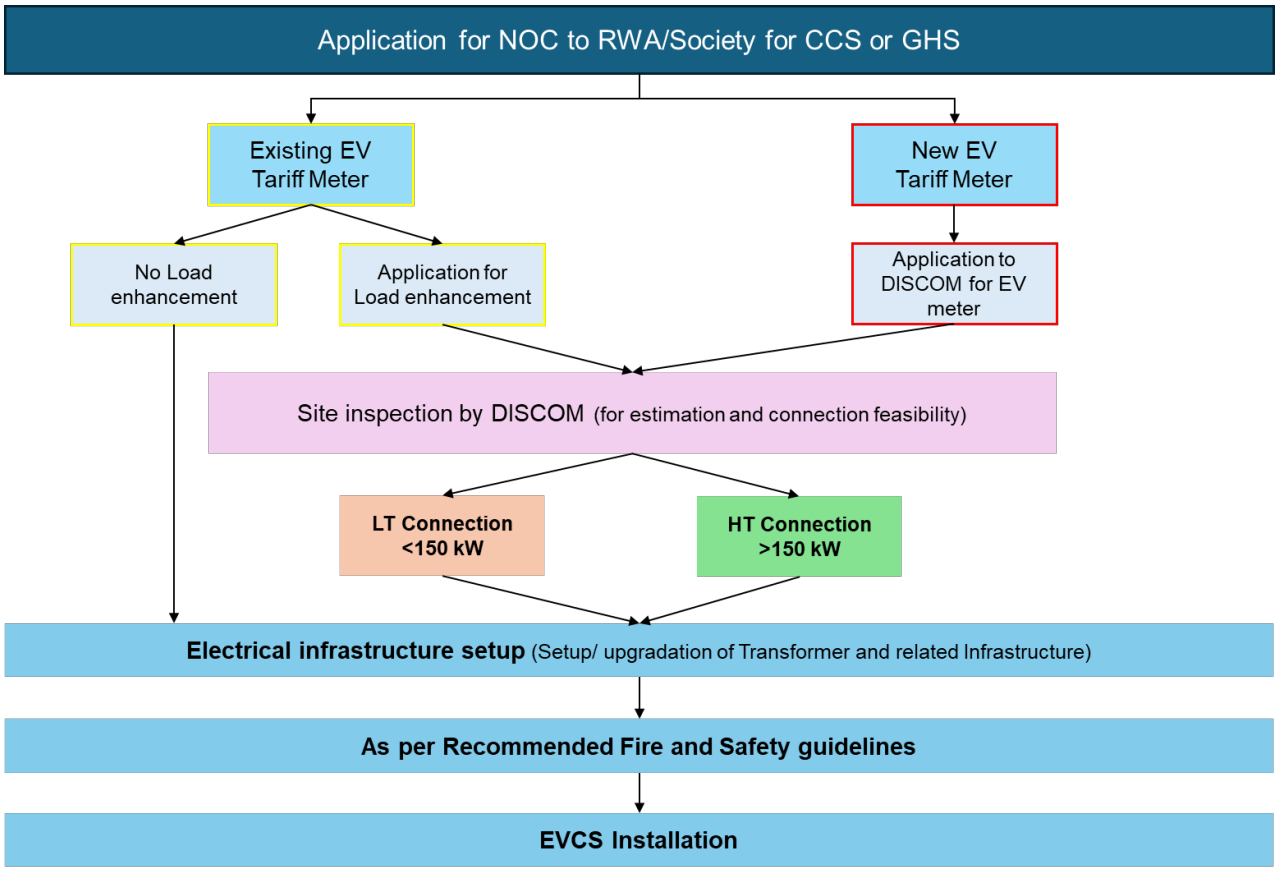


Figure 18 Framework for Right to Charge Campaign

ANNEXURE 1: Permit/ Approval process for set of Private Charging in all buildings



ANNEXURE 2: Permit/ Approval process for set of Charging Stations in CCS or GHS



ANNEXURE 3: Sample Template for No Objection Certificate for private EV Charger

From,

XYZ (name)
Address

Date: DD/MM/YYYY

To,

The Secretary /
Chairman, Name
of housing society
Address

Subject: Request for No Objection Certificate (NOC) for installing a private electric vehicle charger

Dear Sir / Madam,

I, XYZ of apartment no. x, have recently decided to purchase an electric vehicle (EV) due to personal preference. To charge my EV, I will need to install an EV charger at my allotted parking space (parking spot no.).

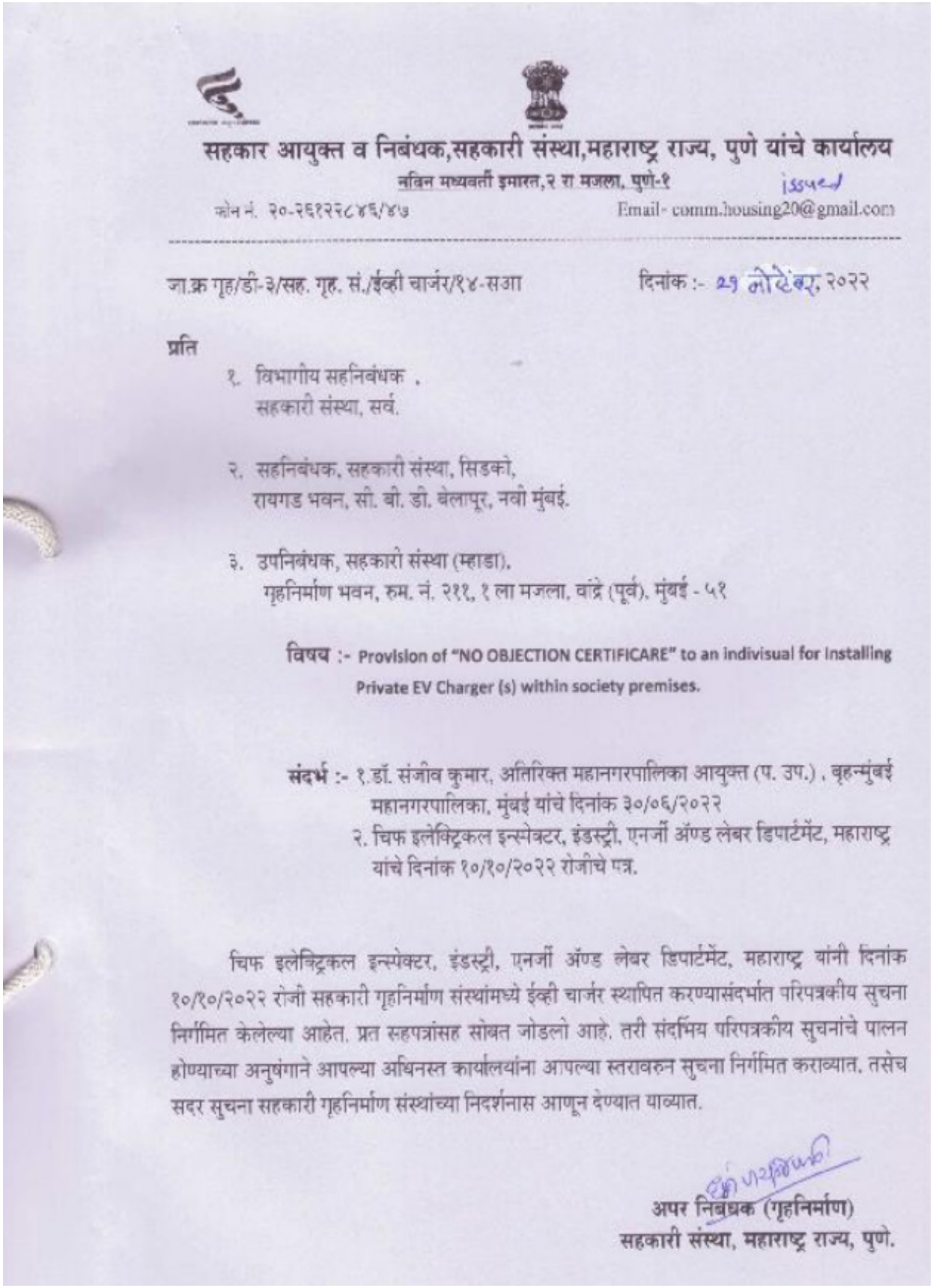
I, therefore, request the housing society/ RWA to grant me a No Objection Certificate (NOC) to proceed with the installation of a private EV charger in my allotted parking space.

To further clarify, I will ensure that all conditions for obtaining a NOC for the installation of a private EV charger are adhered to, as per the circular titled "Provision of No Objection Certificate to an individual for setting up private EV charger within housing premises" issued by the Registrar of Societies.

Kindly grant me the NOC for hassle-free installation of a charger for my EV. Your support will be highly appreciated.

Yours sincerely,
(signature)

XYZ



सहकार आयुक्त व निबंधक,सहकारी संस्था,महाराष्ट्र राज्य, पुणे यांचे कार्यालय

नविन मध्यवर्ती इमारत,२ रा मजला, पुणे-१

फोन नं. २०-२६१२२८४६/४७ Email- comm.housing20@gmail.com

जा.क्र गृह/डी-३/सह. गृह. सं./ईव्ही चार्जर/१४-सआ दिनांक :- २९ नोव्हेंबर, २०२२

प्रति

१. विभागीय सहनिबंधक ,
सहकारी संस्था, सर्व.

२. सहनिबंधक, सहकारी संस्था, सिडको,
रायगड भवन, सी. बी. डी. बेलापूर, नवी मुंबई.

३. उपनिबंधक, सहकारी संस्था (म्हाडा),
गृहनिर्माण भवन, रुम. नं. २११, १ ला मजला, वांद्रे (पूर्व), मुंबई - ५१

विषय :- Provision of "NO OBJECTION CERTIFICARE" to an indivisual for Installing Private EV Charger (s) within society premises.

संदर्भ :- १.डॉ. संजीव कुमार, अतिरिक्त महानगरपालिका आयुक्त (प. उप.) , बृहन्मुंबई महानगरपालिका, मुंबई यांचे दिनांक ३०/०६/२०२२
२. चिफ इलेक्ट्रिकल इन्स्पेक्टर, इंडस्ट्री, एनर्जी अँण्ड लेबर डिपार्टमेंट, महाराष्ट्र यांचे दिनांक १०/१०/२०२२ रोजीचे पत्र.

चिफ इलेक्ट्रिकल इन्स्पेक्टर, इंडस्ट्री, एनर्जी अँण्ड लेबर डिपार्टमेंट, महाराष्ट्र यांनी दिनांक १०/१०/२०२२ रोजी सहकारी गृहनिर्माण संस्थांमध्ये ईव्ही चार्जर स्थापित करण्यासंदर्भात परिपत्रकीय सुचना निर्गमित केलेल्या आहेत. प्रत सहपत्रांसह सोबत जोडली आहे. तरी संदर्भिय परिपत्रकीय सुचनांचे पालन होण्याच्या अनुषंगाने आपल्या अधिनस्त कार्यालयांना आपल्या स्तरावरुन सुचना निर्गमित कराव्यात. तसेच सदर सुचना सहकारी गृहनिर्माण संस्थांच्या निदर्शनास आणून देण्यात याव्यात.

अपर निबंधक (गृहनिर्माण)
सहकारी संस्था, महाराष्ट्र राज्य, पुणे.

Screenshot of the NOC

Source: SoP, Chief Electrical Inspector

ANNEXURE 4: Format for NOC by residential society on society letter head

NO OBJECTION CERTIFICATE

A No-Objection Certificate (NOC) is hereby granted to the applicant (name) as per request (ref. no) vide dated XXXX, for the purpose of installing a private EV charger in his/her allocated parking space considering all conditions of the circular titled “Provision of No Objection Certificate to an individual for setting up private EV charger within housing premises” issued by the Registrar of Societies have been adhered to.

The private EV charger is liable to be inspected by the housing society/ RWA at any time following its installation. In the case that any conditions of the above-mentioned circular are found to be violated by the applicant, the NOC may be temporarily revoked with immediate effect.

The applicant can be given 7 days to take the remedial measure(s) to meet all the compliance requirements which if not fulfilled in the given time may result in permanent revocation of the NOC.

Sign: _____

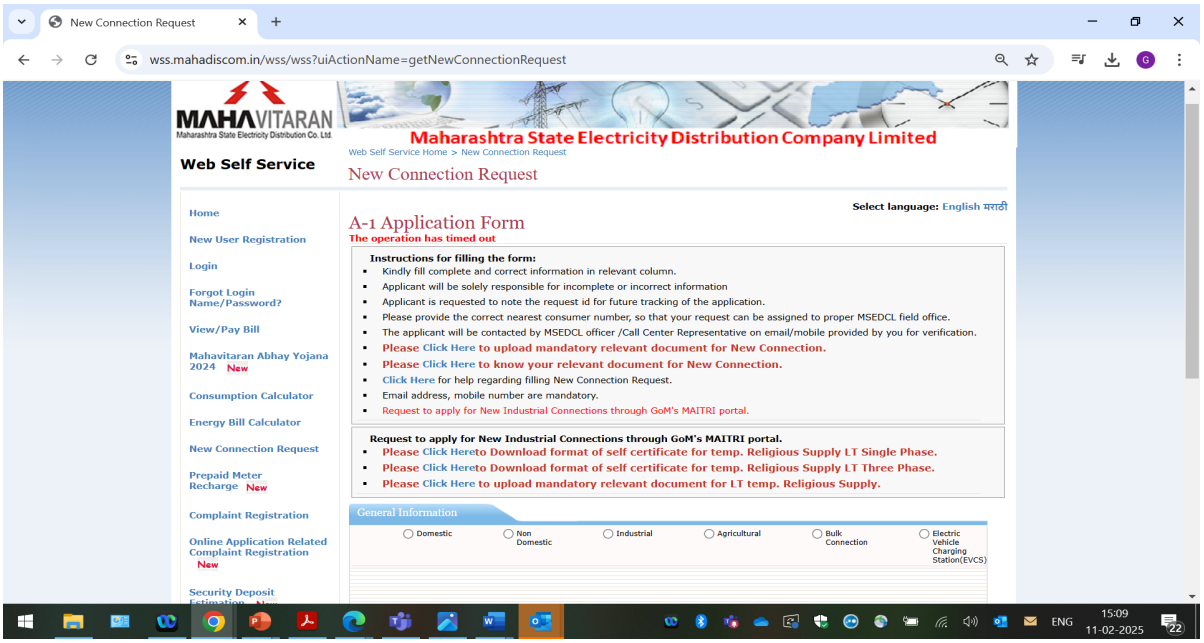
Name: _____

Society stamp

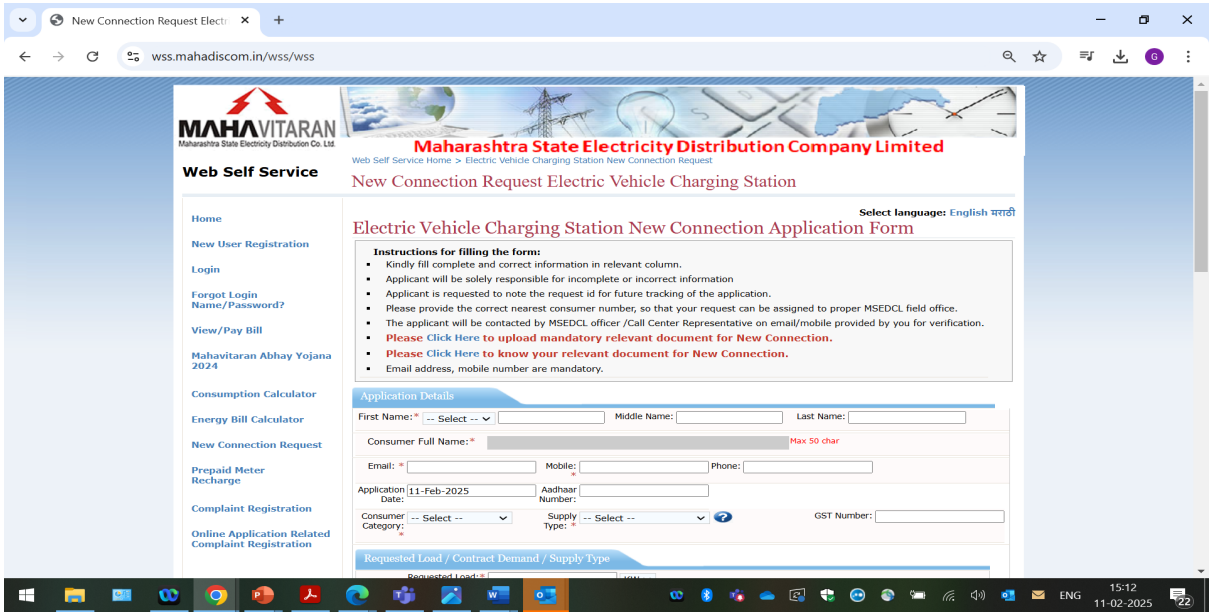
Authorized signatory Name of the housing society

ANNEXURE 5: Residential EV Connection Request From DISCOM

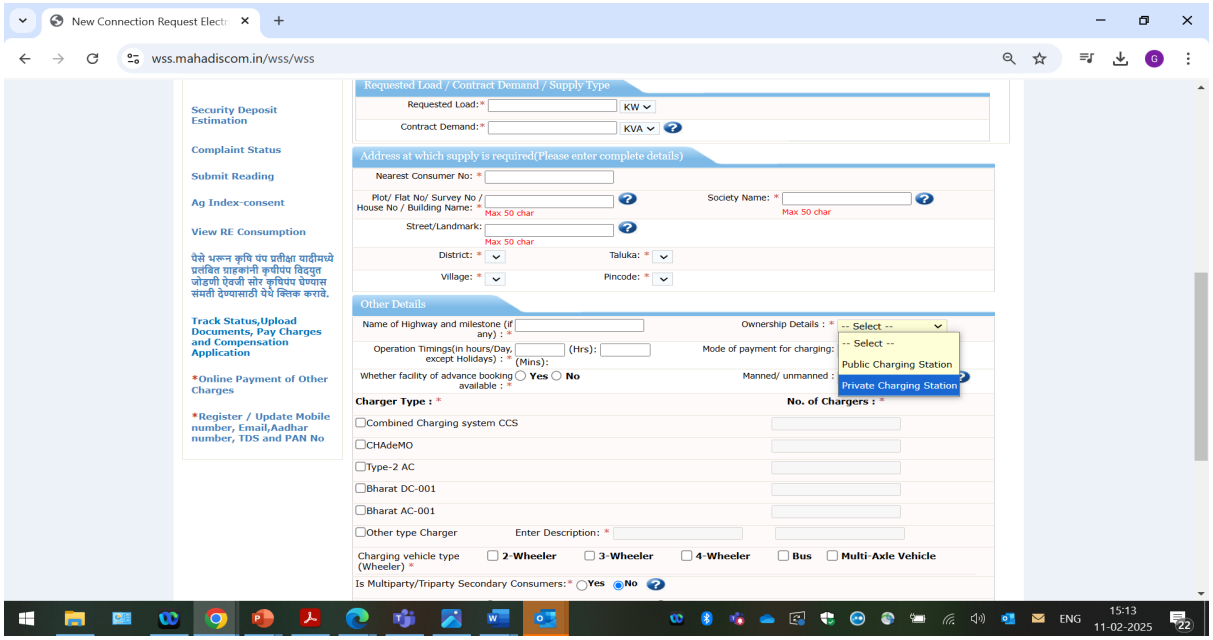
Step 1 New connection request from the MAHAVITARAN (DISCOM) site



Step 2 Select EVCS and upload mandatory documents



Step 3 Enter applicant details and required Load



Step 4 Complete the charger details to be installed and authenticate with OTP through registered phone

Source link: [New Connection Request Electric Vehicle Charging Station]

ANNEXURE 6: Application For Load enhancement

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO.LTD

Registration No._____ Date: _____(For Office Use)

A-1 Application Form (To be used for Residential and other connections except Ag. and Industrial]

Under Section 43 of Electricity Act – 2003 hereinafter called 'Act' and MERC (Electricity supply code and other conditions of supply) Regulation 2005, herein after called 'Regulations'.

Note: Intending consumers are requested to see that this form is fully, clearly and legibly filled and signed with date before sending to the company. Please strike out words or clauses which are not applicable.

I/We hereby submit application for:- **Single Phase/Three Phase-L.T/H.T Supply**

☐ **New Connection (Permanent)** ☐ **Additional Load** ☐ **Reduction of Load**
☐ **Change in Contract Demand** ☐ **Change of Name (Alongwith XYZ or W form)** ☐ **Shifting**
☐ **New connection (Temporary) from date**_____ **to date** _____

and request to supply energy to the premises owned/ occupied by me/us and situated within the area of MSEDCL. I/We further request you to supply me/us with the necessary meter. I/We agree to give you such security that may be required as per rules, whenever called upon to do so. I/We shall abide by the rules & regulations prescribed by MERC & the Electricity Act 2003 and amendments therein from time to time.

1. Applicant's Name Mr. /Mrs./Ms. (IN BLOCK LETTERS)

First Name Middle Name

Surname

Occupation/ Designation

Address at which Supply is required (Please provide complete details)

Plot/Flat No/survey No House No/Building Name

Lane /Street Landmark/.

Village/City Pin code

E-mail

Phone No. Mobile No.:

Bank Account No.(optional)

Bank Name / Branch (optional)

Existing/Nearest Consumer No.

Type of premises (Tick as applicable)
☐ Owned ☐ Rented ☐ Lease ☐ Others (Specify)

In case of premises on Rent or Lease or not owned by applicant

Name of the Owner

(Please provide complete details)

Plot/Flat.No./Survey Building Name

Lane /Street

Land mark Phone No.

Village /City Pin code

ANNEXURE 7: Timeline for release of power supply

5.2 The MSEDCL shall follow the following schedule of activities for release of power supply in response to an application for power supply / additional power supply:

ACTIVITY	IN TOWNS & CITIES	IN RURAL AREAS
Inspection of premises	Within seven days from the date of receipt of application	Within ten days from the date of receipt of application
Intimation of Charges to be borne by applicant	Within fifteen days from the date of receipt of application in case connection is to be given from existing network and within 30 days if augmentation of distribution system is required	Within twenty days from the date of receipt of application in case connection is to be given from existing network and within 30 days if augmentation of distribution system is required
Release of power supply when the power supply is to be given from the existing network	Within thirty days from the date of receipt of completed application	Within thirty days from the date of receipt of completed application
Release of power supply where extension or augmentation of distributing mains is required	Within three months from the date of receipt of complete application	Within three months from the date of receipt of complete application
Release of power supply where commissioning of sub-station is	Within one year from the date of receipt of complete application	Within one year from the date of receipt of complete application

ANNEXURE 8: Key Stakeholders

1. Ministry of Power

Ministry of Power (MoP) has issued Charging Infrastructure Guidelines and Standards for public charging infrastructure, which laid out an enabling framework for implementation. In its capacity as a legislative authority, the MoP clarified that the operation of EV charging services did not require licensing under the Electricity Act 2003.
Weblink:https://powermin.gov.in/sites/default/files/uploads/Amendments_in_Charging_Infrastructure_for_Electric_Vehicles_the_revised_consolidated_Guidelines_Standards_issued_by_mop.pdf

2. Bureau of Energy Efficiency (BEE)

Ministry of Power has designated Bureau of Energy Efficiency (BEE) as the Central Nodal Agency (CNA) for the National-level rollout of charging infrastructure in the country.
Weblink: Electric Mobility | BUREAU OF ENERGY EFFICIENCY, Government of India, Ministry of Power

3. Central Electricity Authority:

The Central Electricity Authority (CEA) is responsible for defining technical standards and regulations for EV charging.

Weblink: https://cea.nic.in/ev-charging-standards/?lang=en

4. State Electrical Regulatory Commissions (SERCs)

The State Electrical Regulatory Commissions (SERCs) sets EV tariff and other regulations concerning electricity supply for EV charging.
Weblink: Statutory Bodies | Government of India | Ministry of Power

5. Ministry of Housing and Urban Affairs (MoHUA)

The Ministry of Housing and Urban Affairs (MoHUA) amended the Model Building Byelaws 2016 and the Urban and Regional Development Plans Formulation and Implementation Guidelines 2014 (URDPFI) to include provisions for EV charging. These are recommended amendments for states to implement.
Weblink:https://mohua.gov.in/upload/whatsnew/5c6e472b20d0aGuidelines%20(EVCI).pdf

6. State Level Urban Development Departments:

The Urban Development Departments at the state level are responsible for amendments to the building byelaws and other urban planning frameworks as suggested by MoHUA.

7. Urban development authorities (UDAs)/Municipal Corporations:

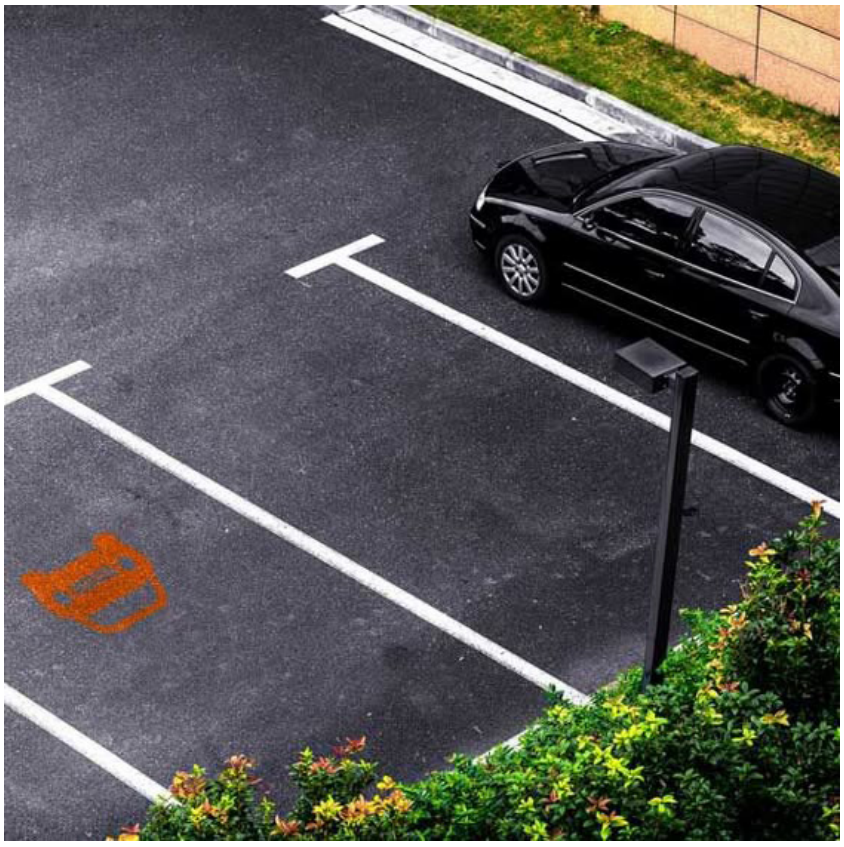
Where authority is further devolved, it is the urban development authorities (UDAs) or the municipal corporations that are responsible for amendments to building byelaws and urban planning frameworks to include provisions for EV charging.
Weblink: UrbanPlanningCapacity-in-India-16092021.pdf

8. Bureau of Indian Standards (BIS):

EV charging standards are defined by the Bureau of Indian Standards (BIS), the standards-making body of the country
Weblink: BIS Standard

ANNEXURE 9: Categorisation of Parking Spaces

Parking in residential areas is a significant concern for homeowners, residents, and housing societies. With the country's rapid urbanization and the increasing number of vehicles, the demand for parking spaces has skyrocketed, leading to numerous challenges. Proper management of parking spaces is essential to avoid conflicts, ensure fair usage, and maintain harmony within residential communities.



Parking spaces are a valuable commodity in housing societies, and allocation of parking spaces is typically based on:

Apartment Type and Size

- **Larger Apartments**: In many housing societies, the allocation of parking spaces is directly proportional to the size of the apartment. Larger apartments, such as penthouses or multi-bedroom units, often receive more parking spaces due to their higher value and larger number of occupants who may own multiple vehicles.
- **Smaller Apartments**: Conversely, smaller units like studio apartments or one-bedroom flats might be allocated fewer parking spaces, reflecting their lower occupancy and potential vehicle ownership.

Allocation Systems

- **Lottery System**: To ensure fairness, some housing societies adopt a lottery system for parking space allocation. This method involves drawing lots to assign parking spaces randomly. The lottery system helps eliminate biases and ensures every resident has an equal chance of securing a desirable parking spot, regardless of their influence or seniority within the society.

- **First-Come, First-Served Basis**: Another common method is the first-come, first-served approach. In this system, parking spaces are allocated based on the order of application or booking. Residents who apply early get to choose their parking spots first, which can lead to a fair distribution but may also favor those who are more proactive.
- **Preference to Senior Residents**: In some cases, seniority or the length of residence in the society can play a role in parking allocation. Long-term residents might be given preference for better parking spots as a token of appreciation for their continued association with society.

Reserved and Common Parking

- **Reserved Parking**: Certain parking spaces might be reserved for specific uses or individuals. These include parking spots for society office bearers, maintenance staff, or handicapped residents. Reserved parking helps ensure that critical personnel have convenient access to their vehicles.
- **Common Parking Areas**: Societies may also have common parking areas where spaces are not individually allotted but used collectively. These areas operate on a first-come, first-served basis daily, and residents must find available spots each time they return.

Paid Parking

- **Additional Spaces for Purchase**: Some housing societies offer additional parking spaces for sale or rent beyond the allocated ones. Residents who require more than the standard allocation can purchase or lease extra spots. This practice helps manage the demand for parking spaces while generating revenue for the society's upkeep.
- **Visitor Parking Fees**: To regulate visitor parking and prevent misuse, societies might charge a nominal fee for visitors who park within the premises. This fee can also contribute to the society's maintenance fund
-

Types of Parking:

Housing societies generally have different types of parking spaces to accommodate the diverse needs and preferences of residents.

- **Open Parking:**

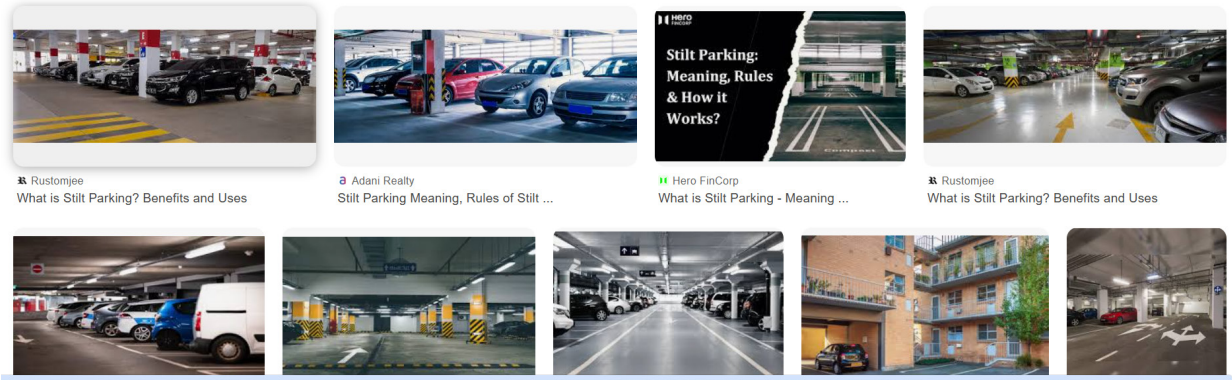
Open parking spaces are allotted on a first-come, first-served basis or according to society rules.

Open parking is typically found in designated areas within the society's premises, such as open grounds or along internal roads and Residents can park their vehicles in any available space within these areas.

- **Covered Parking:**

Covered parking spaces are normally part of sale agreement when purchasing an apartment or can be leased separately by the residents and is usually located in dedicated structures like a garage or under building overhangs.

- **Stilt Parking:**

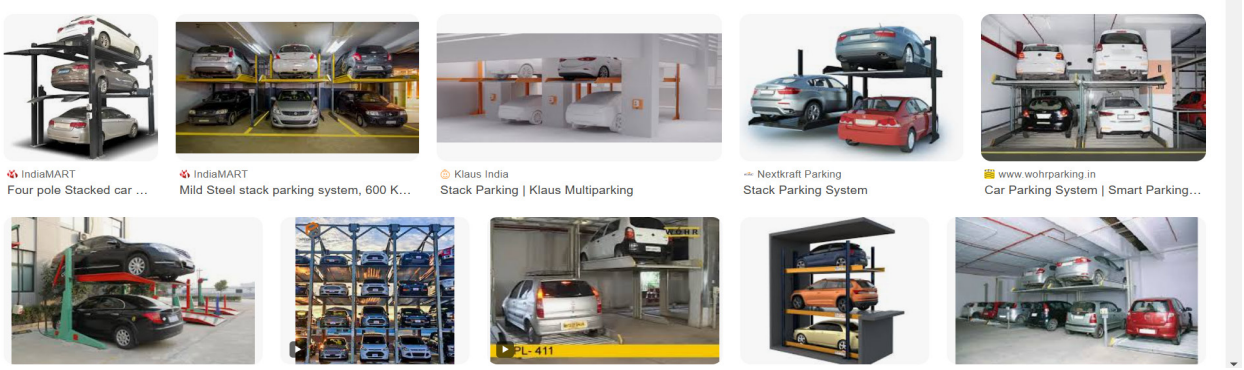


Stilt parking spaces are located on the ground floor of the building, often beneath the residential units and residents can access their vehicles without leaving the building premises

- **Basement Parking:**

Basement parking spaces are located beneath ground level of the building and are normally found in high density areas since they allow opportunity to maximise use of all available spaces for occupancy and commercial consideration.

- **Stack Parking:**



Stack level parking is emerging trend in parking that is being favoured to help ensure dedicated parking allocation for all individual residents and also to help provide multiple car parking spaces for residents within same available space. This stack level parking's may be located in the stilt, ground level or basement level parking

IESA
India Energy Storage Alliance

International Copper Association India

IEMC
India Electric Mobility Council

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