

Indian Standards for EV Charging

https://standardsbis.bsbedge.com/

Normal Power level (AC & DC) Light EV (<7 kw) & Parking bay (7→22 kw)

High Power (Only DC) DC Fast Station (50→200 kw) & eBus/ Trucks (200→500 kw)

Battery Swap (Charging outside EV in a dock)

Scooters, 3 wheeled Autorickshaw

A small EV focussed eMobility Program Distributed Charging Infrastructure

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eMobility in Tropical Region

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- Higher ambient temperature & monsoon weather
- Driving trips are shorter, roads rougher
- Smaller Vehicles, 2 wheeler, 3 wheeler, small cars, small goods transport,
- Large population of buses ...





India's Transformative Mobility Program

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- <u>Consumer Subsidy Program (till 2023)</u>
 - Subsidy allocation Rs.8500 crores (\$)
- 1 million two wheelers. Slow pick up. Recently a big investment by Ola was announced; followed by other such announcements from leading manufacturers.
- 300,000 three wheelers. Tender for 100,000 has been placed already.
- Approx 5000 eBuses
- (Battery) Cell manufacturing program incentives
 - 50 GW in 10 years; subsidy Rs. 18,500 crores (\$)
- <u>Production linked incentives for components</u>
 - Rs. 25,000 crores (\$)





Batteries to be charged

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Charging systems

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Front-end Data

between EV & DC Charger control the flow of power to match the Charge acceptance state of Battery

Back-end Data

for Authorization, Credentials, Tariffs, Schedules etc. Roaming, Assist Grid Management



- EV Charge Controller
- EV Inlet/ Cable Connector
- Cable carry data & power
- Plug & Socket at Charger
- Supply Point Charge Controller

- EV Smart Meter
- Modem/ BLE Internet
- Mobile App
- Application Programming Interface
- Central Database





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1 AC & DC supply

- Power Level 1 (upto 7 kw): Light EV
- Power Level 2 (7 \rightarrow 22 kw): Cars in Parking bay

2 DC only supply

- Power Level 3 (50→ 250 kw): *DC Fast Wayside Station*
- Power Level 4 (250→ 500 kw): *eBus/ Trucks Station*

3 Interoperable battery

- Light EV Battery Swap (~1 kWh pack)
- eBus Battery Swap

4 Roaming & Grid Integration

Networked EV Infrastructure





Handbook for EV charging deployment

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- Provide clear guidelines on effective planning, implementation and governance for right-sized EV charging
- To support state and local government authorities in planning and governance of EV charging







Distributed Charging System is possible

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General Requirements

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1	EV Charging Systems	IS-17017-1: 2018	₹0
2	Connection Systems	IS-17017-2-1: 2020	₹o
3	Electromagnetic Compatibility	IS-17017-21-1: 2019	₹680
4		IS-17017-21-2: 2019	₹680

Basic Communication: AC Charging

- Charging control process at start of charging & normal/emergency shutdown is managed through basic communication via the control pilot lines
- <u>DC Charging</u>
 - For DC Charging, the data signals are also exchanged via the control pilot lines
- <u>Connection Systems</u>
- It specifies dedicated plugs/ socket outlets & vehicle connectors / vehicle inlets including mechanical, electrical, performance requirements & control means.





Light EV Infrastructure

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5	AC Charge Point	IS-17017-22-1: 2021	₹0
6	DC Charge Point	IS-17017-25 : 2021	₹o
7	LEV DC Connector	IS-17017-2-6: 2021	₹o
8	LEV Combined Connector	Draft expected	₹o

• Light EV can be charged anywhere

- Charge points in stores, roadside, apartments
 - Low Cost AC Charge Point from DST project at ARAI
 - Target Rs.4000/- Standard Published. Unique BLE.
 - Delhi Government tender for 30,000 units
 - DC Charge Points for Scooters & 3-wheelers
 - First time in the world, a specific DC system for LEV
 - Indian Standard for Protocol and DC Connector published.







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Power Level 2 Parking bay/ Destination

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9	AC Charge Point	IS-17017-2-2: 2020	₹0
10	Combined Charge Point	IS-17017-22-2 (under discussion)	₹o

- EV Car is best charged in the Parking
 - Destination/ Parking Bay Chargers
 - Offices, Apartments, Malls or any parking area. Dozen or more parking bay with AC or DC chargers.
 - Single LT supply (upto 150 kW) to parking campus
 - Smart-Plugs; networked with a scheduling program to charge all the EV efficients.
- <u>Advantages</u>
 - Parking exists, LT connection has no additional cost
 - Network benefits
 - Easy to integrate Rooftop Solar Power. Features like Time of Day Tariff to help Grid management





High Power Chargers

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11	DC Charging Station	IS-17017-23	₹0
12	DC Connector	IS-17017-2-3: 2020	₹o
13	DC Communications (CAN)	IS-17017-24	₹o
14- 19	DC Communications (PLC)	IS 15118 (6 standards)	₹26, 830
20	Dual Gun Charging Station	IS-17017-23-2 (Draft)	₹o
21	Automated Pantograph	IS-17017-3-1 (Draft)	₹0
22	Charging Station	IS-17017-3-2 (Draft)	₹o



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Interoperable Battery: Replacable/ Swap

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Light EV Battery Swap

25	General Guidelines & Pack Dimensions	Part-1
26	Connection System	Part-2
27	Communication Protocol	Part-3
28	Backend for Interoperability	Part-4

Electric Bus Battery Swap

29	General guidelines	Part-1
30	Safety requirements	Part-2
31	eBus Battery Swap Communication	Part-3
32	Battery Connection System	Part-4
33	Dimensions of the pack	Part-5
34	Standard Operating Procedures (SOP)	Part-6





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