

partnership (PPP) with the government.

- Uttar Pradesh specifies that it will facilitate land acquisition for EV charging by PSUs, implying that the incentive will not be applicable to private CSOs.
- Punjab and Madhya Pradesh allow CSOs to operate or sublet a percentage of allocated space for charging stations in lounges, cafeterias, retail kiosks, and other revenue-generating operations to support the project's financial viability.
- Karnataka, Andhra Pradesh and Bihar will allot land parcels for the installation of public charging stations, but do not specify if this will be at concessional rates.

Public charging stations located on distinct land parcels are only one type of solution needed for our cities, suitable as charging hubs for commercial fleets and in locations of high EV charging demand.

States can integrate charging facilities with parking lots and organized on-street parking, to optimize the use of existing parking spaces.

Table 6: State EV tariffs

STATE	EV TARIFF (in INR)		
	ENERGY CHARGE	DEMAND CHARGE	
		Low Tension	High Tension
Andhra Pradesh	6.7/kWh	-	-
Assam	5.25 to 6.75/ kWh	130/kW per month	160 /kVA per month
Bihar	6.3 to 7.4/ kWh	-	-
Chhattisgarh	5/kWh	-	-
Delhi	4.5/kWh	-	-
Gujarat	4 to 4.1/ kWh	-	25 to 50 per kVA per month
Haryana	6.2/kWh	100/kW per month	-
Himachal Pradesh	4.70 to 5/ kWh	-	130/ connection per month and 140/ kVA per month
Jharkhand	6.00 to 6.25/ kWh	40 to 150/ connection per month	
Karnataka	5/kWh	60/kW per month	190/kVA per month
Kerala	5/kWh	75/kW	250/kVA per month
Madhya Pradesh	5.9 to 6 /kWh	-	100 to 120/kVA of Billing Demand
Maharashtra	4.05 to 4.24/kWh	-	70/kVA per month
Meghalaya	10.09/kWh	100 to 230/ connection per month	
Odisha	4.20 to 5.70/ kWh	200 to 250/kW per month	200 to 250/kVA per month
Punjab	5.4/kWh	-	-
Rajasthan	6/kWh	40/HP per month	135/kVA per month
Tamil Nadu	5 to 8.05/ kWh	70/kW per month	-
Telangana	6/kWh	-	-
Uttar Pradesh	5.9 to 7.7/ kWh	-	-
Uttarakhand	5.5/ kWh	-	-

Concessional tariffs for EV charging

Concessional EV tariffs are meant to reduce the cost of electricity procurement for EV charging, resulting in lower charging costs for consumers. In its Charging Infrastructure Guidelines and Standards (June 2020 amendment), the Union Ministry of Power mandated that state electricity regulatory commissions fix an EV tariff that is not more than the average cost of supply plus 15%. Several state EV policies reiterate this mandate of a separate, concessional power tariff for connections to EV charging stations. Some states offer the concessional tariff only for public charging stations, while others extend it to private customers in residential and non-residential buildings as well.

Which states are using it?

- EV policies of Telangana, Delhi, Kerala, Andhra Pradesh, Karnataka, Uttar Pradesh, and Punjab include the provision for a concessional power tariff for EV charging connections. Delhi's policy explicitly mentions that the tariff will be applicable for both public and compliant private EV charging points.
- Tamil Nadu defines separate tariffs for EV charging, based on whether it is for public or private use. A domestic consumption tariff is applicable for private charging at home, while a different tariff is applicable for private charging in offices, malls, and gated communities. A concessional tariff is provided for public charging stations only.
- Madhya Pradesh applies the domestic consumption tariff for charging at home while mandating a lower tariff for public charging stations.
- Bihar will charge industrial electricity tariffs for EV charging, while Maharashtra will charge according to existing rates as per the charging facility's location.
- Punjab is the only state that offers a 100% exemption on electricity duty for EV charging facilities for five years.

In addition to the above, the EV policies of Uttar Pradesh, Punjab, Andhra Pradesh, and Kerala also provide for time-of-day metering for lower charges during off-peak hours. Madhya Pradesh specifies a ceiling for the charges to be levied on customers at public charging stations.

TIME-OF-USE TARIFFS FOR EV CHARGING

Hawaiian Electric, the electricity provider in the U.S. state of Hawaii, offers time-of-use (TOU) tariffs for EV owners¹⁷, for charging at home or on the DC public charging network. Charging is cheapest between 9am and 5pm, and most expensive during peak hours, i.e. between 5pm and 10pm. For home charging, EV owners may opt for a TOU tariff for the whole residence, or a separate metered connection for EV charging on which the TOU tariff will be applicable.

¹⁷ <https://www.hawaiianelectric.com/products-and-services/electric-vehicles/electric-vehicle-rates-and-enrollment>

Some states offer additional support in providing and expediting the power connections for EV charging.

- Bihar's EV policy supports CSOs in getting electricity connections and assures a 100-kW load connection to every charging station location. This incentive is expected to be highly beneficial for operators, as power connectivity forms a significant cost in EVSE installation.
- Delhi is the only state to frame standard operating protocols (SOP) for private customers, including individuals and building associations. Customers can request the installation of private charging points through the state DISCOM's web portal. Installation expenses will be recovered through the customer's electricity bill.
- Andhra Pradesh and Madhya Pradesh have mandated that DISCOMs supply power to charging and battery-swapping stations within 48 hours of application. Municipalities are also expected to issue provisional permissions immediately to expedite the setting up of charging facilities.

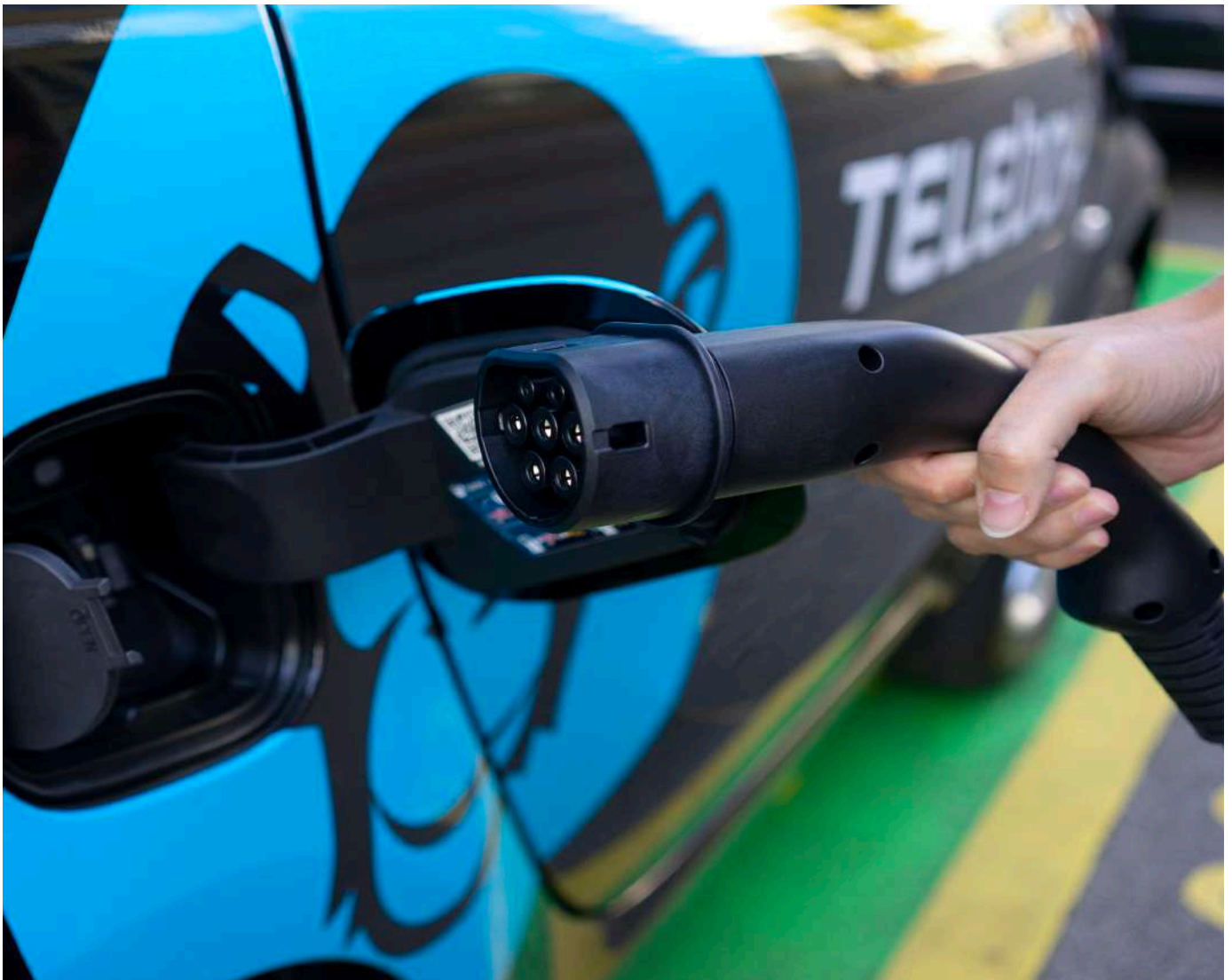


Figure 7: Renewable energy powered charging stations in California



Source: <https://www.envisionsolar.com/gallery/>

Use of renewable energy sources

To truly decarbonize mobility, the use of renewable energy sources for electric vehicles is essential. EV charging loads can also accommodate a greater share of renewables in the electricity grid through use of mechanisms like time-of-day metering. This promotes higher charging activity during the day when renewable energy generation tends to be the highest. To further this mutually beneficial linkage, some state EV policies have encouraged captive renewable energy generation and open access for EV charging facilities.

Which states are using it?

- Several states, including Tamil Nadu, Telangana, Delhi, Kerala, Andhra Pradesh, Punjab, and Bihar, promote the preferential supply of renewable energy for public charging stations. These states also give permission for captive renewable energy generation by charging operators.
- Andhra Pradesh and Delhi further allow power procurement from renewable energy sources through the open access route, irrespective of the size of demand. Madhya Pradesh will also provide open access to CSOs, as long as cumulative demand for the operator is more than 1 megawatt (MW). Open access is a provision through which large customers, typically with power demands above 1MW, have access to the transmission and distribution network from suppliers other than the state DISCOM.
- Punjab, Tamil Nadu, and Karnataka offer concessions on connection charges and waivers of wheeling charges to access renewable energy.
- Telangana and Madhya Pradesh offer net metering facilities for captive renewable energy generation by CSOs. Delhi offers power banking facilities with the local DISCOMs for charging operators who use renewable energy

Figure 8: EV charging spots in building parking areas



Source: https://commons.wikimedia.org/wiki/File:EV_charging_stations_Arlington_08_2017_5214.jpg

Amendments to development control regulations

Development control regulations (DCR), an umbrella term for laws and regulations governing land use and building specifications, need to be amended to accommodate EV charging infrastructure. Zonal regulations and building bylaws are the most common DCR frameworks, which govern the provision of public and private EV charging, respectively. In 2019, the Union Ministry of Housing and Urban Affairs (MoHUA) amended the Model Building Byelaws (MBBL) 2016 and the Urban Regional Development Plans Formulation and Implementation (URDPFI) Guidelines 2014, providing guidelines for the planning of public and private EV charging points. While most state EV policies mention the need for regulatory amendments, only a few provide specific measures.

Which states are using it?

- Delhi's building bylaws mandate that at least 20% of a residential complex or workplace's parking capacity should be 'EV ready,' i.e. equipped with the conduits and power supply infrastructure required for EV chargers. Buildings are also required to have an additional power load to accommodate charging points, with a safety factor of 1.25.
- Bihar, Punjab, Andhra Pradesh, Maharashtra, Madhya Pradesh and Karnataka have policies that mandate the amending of building bylaws in urban areas to incorporate infrastructure for EV charging. They, however, do not provide further specifics.
- Commercial complexes, housing societies, and residential townships with a built-up area of 5,000 square meters in Andhra Pradesh and Uttar Pradesh are required to provide charging infrastructure as part of permit requirements.
- Maharashtra, Bihar, and Kerala permit petrol bunks to set up charging or swapping stations as long as they fulfill safety norms

The GoI guidelines are non-binding in nature, and it is up to municipalities and urban development authorities to make the necessary amendments to the DCR. For public charging stations, rules including EV charging in urban planning requirements must be formulated. For private charging, building codes need to be amended to mandate that new building constructions be equipped with EV charging connections in parking areas.