

## **KSEBL E Mobility- Achievement and future road map.**

KSEBL has been taking all efforts to achieve a variety of sustainability goals. The use of electric vehicles (EVs) helps to achieve improved air quality, lower noise pollution, increased energy security, and lower greenhouse gas emissions. With vehicular pollution becoming a major source of air pollution in Kerala and contributing significantly to particulate pollution in cities, rapid adoption of zero-tailpipe-emission vehicles is critical, particularly in heavily polluted urban areas.

The Government of India announced the National Electric Mobility Mission Plan 2020 in 2013. The Faster Adoption and Manufacturing of Electric Vehicles in India Scheme (FAME India) was launched in March 2015 as part of the Mission for a two-year period. It was later extended until March 31, 2019. In February 2019, the Government of India (GoI) approved Phase-II of FAME India for a period of three years starting 1 April 2019. Several states, including Kerala, have notified state EV policies to supplement the FAME India Scheme and address state-specific needs since 2019. Government of Kerala (Gok) was one of the first states in the country to design and notify an EV policy on 2019.

- **Pole mounted EV charging stations**
- **DC Fast charging stations.**



**DC Fast charging stations.**



**Pole mounted EV charging stations**

The KSEBL-installed pole-mounted eV Charging Stations are the first of their sort in the nation. These public charging stations, which were swiftly installed around Kerala, are making tremendous headlines.

### **Traits of the Pole-mounted eV Charging Stations:**

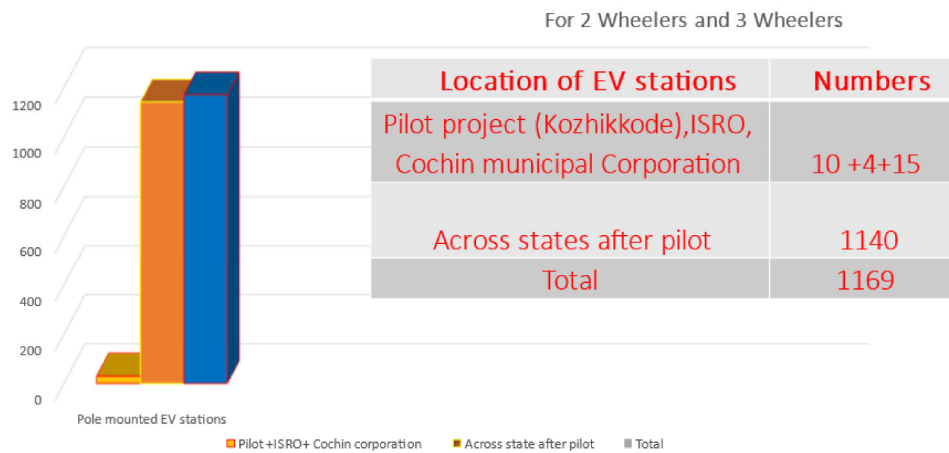
1. KSEBL owned ubiquitous Distribution poles are being used for setting up of the charging station and the charger capacity is 3.3 kW
2. The charging points can be used for charging 2, 3 & 4 wheelers.



3. Charger can be upgraded to higher capacity as per advancements in the future and Installation is easy and can be rapidly deployed within a time period of 2 days.
4. Charging Stations are managed by a Software and CMS. EV users can download the application and do the EV charging effortlessly.
5. Stations are less expensive, low tariff can be offered to the common man.

The Kozhikode city was chosen for the pilot project because it has the highest penetration of three-wheeled vehicles. In Kozhikode City, 10 pole mounted stations were successfully installed, on October, 2021. Subsequently KSEBL succeeded to ratchet up 1140 stations across states. Cochin municipal corporation & ISRO is having 15 and 4 numbers respectively there by adding up to 1169 stations.

## Pole mounted EV charging stations of KSEBL



### DC Fast charging stations.

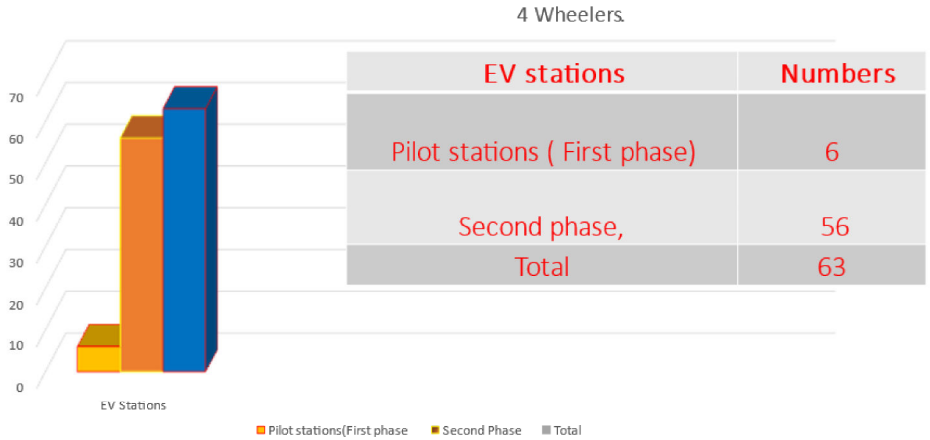
At the outset KSEBL had established 6 Pilot EV Charging Stations in the corporation areas across the State and opened for operation on November ,2020. In the second phase, 56 more stations were established in 2022-23. Few stations are shown below.



**Gok scheme:**

Gok had accorded administrative sanction for the establishment of 32 EV charging stations to KSEBL, through E-mobility Promotion fund. Accordingly, in the first phase, KSEBL established 6 Pilot EV Charging Stations in the corporation areas across the State with a view to build public awareness on E-Mobility.

**DC fast charging stations of KSEBL**



The Department of Heavy Industries, Government of India under FAME India Scheme Phase II initiated for deployment of EV charging Stations (EVCS) in select cities in India in August 2019. In Kerala, seven cities come under the scheme and are Trivandrum, Kollam, Malappuram, Kochi, Thrissur, Kozhikode and Kannur. Here EVCS are classified as fast EVCS and Slow EVCS.

**DC Fast Charging Stations**

- 1.Electrical Section, Nemom
- 2.Electrical Section, Olai
- 3.Vydyuthi Bhavanam, Palarivattom
- 4.110kV substation, Viyyur
- 5.220kV substation, Nallalam
- 6.110kV substation, Chovva
- 7.Mattanchery proposed Division Compound
- 8.Kootanad,Palakkad
- 9.Kothamangalam Substation
- 10.Land near to ED, Karunagapally
- 11.VydyuthiBhavanam Kottarakkara
- 12.VydyuthiBhavanam ,Thodupuzha
- 13.Kottayam East Section
- 14.Land adjacent to TMR Division, Pallom
- 15.Vydyuthi Bhavanam, Pathanamthitta
- 16.110kV substation, Thiruvalla
- 17.Pamba Section Office
- 18.Nenmara Distribution land at Palakkad
- 19.Paruthipara Substation
- 20.Banasura Sagar
- 21.Punnpra Substation
- 22.VydyuthiBhavanam,Thiruvananthapuram
- 23.Electrical Division, Neyyatinkara
- 24.110kV Substaion, Vadakkenchery
- 25.Muvattupuzha Substation
- 26.Gandhinagar Section, Kottayam
- 27.Moolamattom
- 28.Kanjanhad Substation
- 29.Vydyuthi Bhavan, Tirur
- 30.Munnar
- 31.Electrical Sub Division, Shornur
- 32.Electrical section Vaithiri
- 33.Vytilia Appellate Authority Compound
- 34.Kaloor S/s compound
- 35.Kottiyam Section Office
- 36.Angamaly S/s compound
- 37.110kV Substation, North Paravoor
- 38.110kV Substaion, Malappuram
- 39.CGRF
- 40.Electrical Division,Kundara
- 41.Gandhinagar KSEB plot near to Girinagar Section
- 42.Pavangad Substation (West Hill)
- 43.Kuttikattoor Substation Velliparamba
- 44.Thamarassery Substation
- 45.Ramanattukara Substation
- 46.Puthuppady Section, Adivaram
- 47.Avananchery Section
- 48.Koyilandi Substation
- 49.110kV Substation, Ponnani
- 50.Gandhiroad substation
- 51.33kV Substation, Kannur
- 52.Valapattanam Section Office
- 53.Kodungallur Substation
- 54.Kandassankadav
- 55.Madakkatara Substation
- 56.Kunnamkulam substation
- 57.Chalakydy Substation
- 58.110kV Substation, Valappad
- 59.Vydyuthi Bhavan, Thrissur
- 60.Irinjalakuda Substation
- 61.Ollur Section
- 62.Wadakkanchery substation
- 63.Vadakarapathy



**EV Charging stations other than KSEBL:**

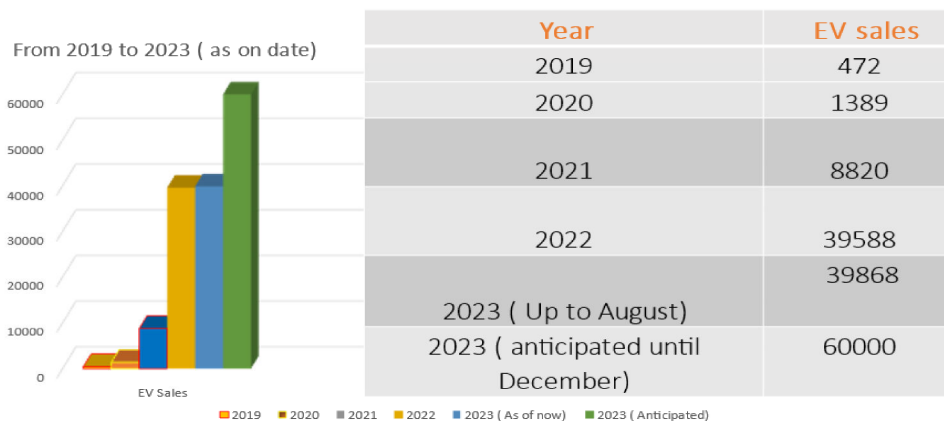
**EV Charging station other than KSEB – 2020 TO 2023**



**Electric vehicles- Surge hit in Kerala roads,**

The demand for electric vehicles has experienced a remarkable surge in Kerala in the last few Years. The number of electric vehicles in Kerala has increased from a mere count of 472 EV, s in 2019 to a substantial 39,868 electric vehicles as of 2023. This spike in EV sales illustrates Kerala’s steady and notable advancement in embracing electric mobility. The data below reveals a substantial increase in the count of registered EV, s in recent years.

**Electric Vehicle sales on rise in Kerala**

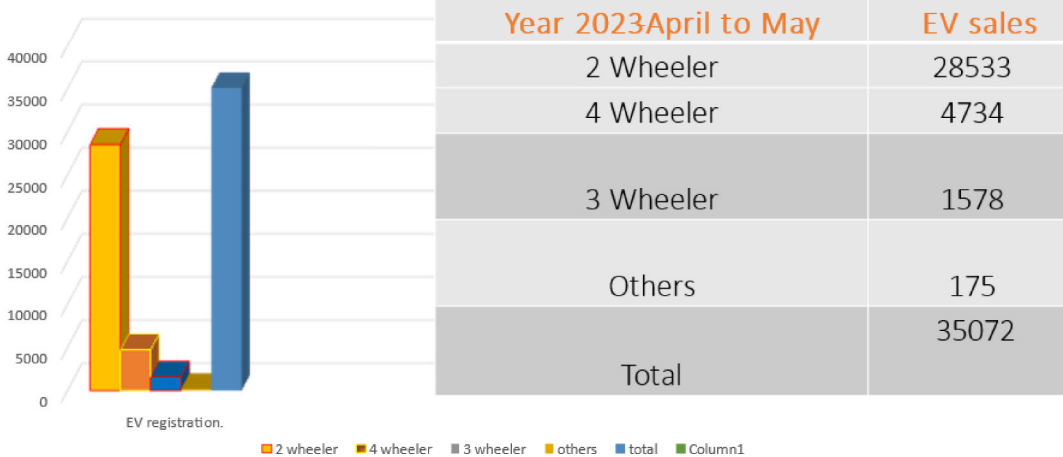


## EV Mix in Kerala Roads- 2,3 and four Wheelers:

The sale of E vehicles in Kerala increased by 13.66 % this year. Last year it was 6.28 %. Kerala is way ahead of other states in the sale of Electric vehicles. Registration of E vehicles has crossed 1 Lakh. 35,072 e vehicles hit the road in the last 6 months. Most of these are 2 Wheelers(28533-81.5%), Cars (4734- 13.5%), 3 Wheelers (1578-4.5%), Others 0.5 % including, KSRTC has introduced 110 e buses.

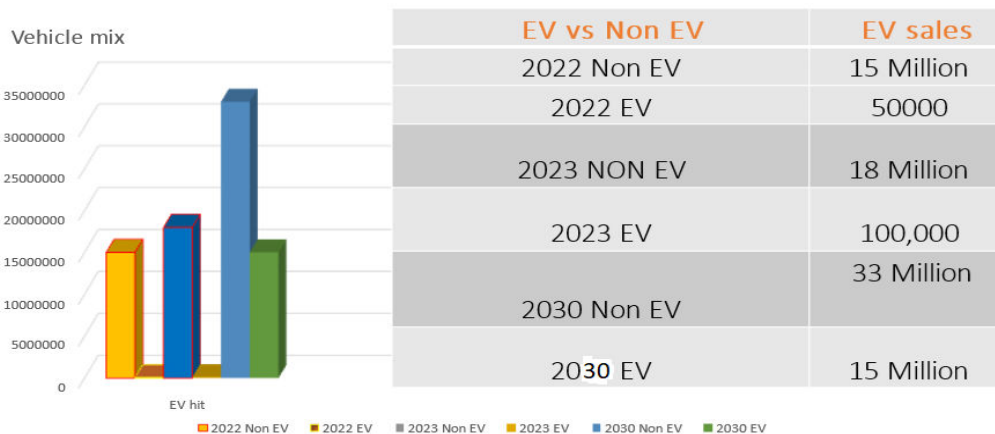
### Electric Vehicle sales on last six months in Kerala- Vehicle mix-

Vehicle mix



## EV Projection- 2030:





### EV Projection – Estimation for charging infrastructure.



## Power requirement and challenges.

It is high time since to analyze the electricity consumption in par with this EV Projection. Strengthening the Existing Charging Stations installed under FAME II Scheme is also on focus. Funding has been requested from the Ministry of Heavy Industries and proposal has been submitted to the Government of Kerala to allocate funds for setting up 20 New High-Capacity Fast Charging Stations. KSEBL is pacing up with RE innovative and customer friendly projects to meet the target.

## Battery capacity and Battery Voltage of E Vehicles (2W, 3W and E cars).

VEHICLE SEGMENT	BATTERY CAPACITY	BATTERY VOLTAGE
<b>E-2W</b> 	1.2-3.3 kWh	48-72V
<b>E-3W</b> (passenger/ goods) 	3.6-8 kWh	48-60V
<b>E-cars</b> (1st generation) 	21 kWh	72V
<b>E-cars</b> (2nd generation) 	30-80 kWh	350-500V

## Power requirement with an EV Projection for 2030:

15 million Electric vehicles will hit the roads in Kerala by 2030 as per the present projection. It is presumed that one EV will run 12,000 kms per year. Also an average of 0.15 kWh ( Unit) is required for one km journey. Accordingly 27000 Million units are required exclusively for EV Charging . It is worth to note that Annual Energy Consumption in FY 2022 -23 was only 25,384 MU. More than 100% of total Power for the FY 22-23 will be required by 2030 for charging EV alone.

## EV Charging – Power requirement by 2030.

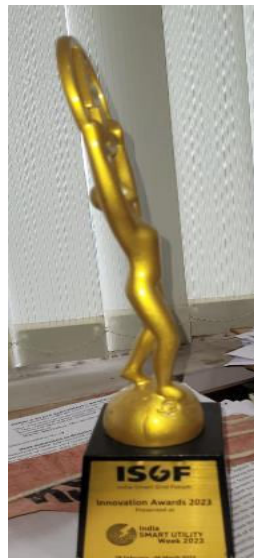


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**Following Projects are in progress to meet above vision.**

- **Solarized EV Charging stations.**
- **Grid integrated Rapid Solar EV Charging Hub:** Green Rapid EV Charging Hub: A rapid charging hub for charging 20 Electric vehicles (120kW dual gun chargers and 120kW Solar Canopy) is planned opposite to Kaloor Metro Station. The Bureau of Energy Efficiency (BEE) the central nodal agency for EV charging infrastructure has approved for 30% grants. sanctioned 1.5 Crore rupees for setting up of this demonstration project. An innovative solarized Rapid-E mobility Hub in Kochi city is proposed at Kaloor Substation premises in order to cater the demand of the growing number of Electric Vehicles in the State. The project has received approval of a 30% grant from the Bureau of Energy Efficiency, the Central Nodal Agency for EV Charging Infrastructure. The proposed station shall have the provision for charging 20 Electric Vehicles
- **EV Accelerator Cell:** Proposal submitted to the Bureau of Energy Efficiency.
- **Vehicle to Grid (V to G) project:** A pilot Vehicle to Grid (V2G) project proposal has been entrusted with KSEBL by Government of Kerala, through ISGF (Indian Smart Grid forum).
- **Carbon Credits:** KSEBL can earn revenue by selling carbon credits generated from the RE sources. 10\$ per credit is expected in the voluntary market. (1Carbon Credit= IMT of Co2 removal from atmosphere.) Initial discussions are over and a road map is set in position so as to earn credits from current Year onwards.

**ISGF -Innovation award 2023:** Pole mounted EV charging stations on Distribution poles is a national level innovative project of **KSEBL which has bagged ISGF -Innovation award 2023** for emerging innovation in e mobility domain.



**E Mobility Conclave- e Watts 22:**

A conclave with many experts in the E Mobility domain was organized by KSEBL on 23/11/2022. Many Tech Sessions like "Building Capability & Capacity of Charging infrastructure network", Standardization of Access to Power to Support EV infrastructure, Network Management for user convenience & charging insights, EV charging equipment, Core of Mobility Future etc. The e watts were evaluated as second to none of its kind in the state by all stake holders.

**Integrated software solution and mobile app 'KEMapp':** The integrated Mobile App KEMapp was launched by the Hon.Minister for Electricity during the EMobility conclave conducted by KSEBL on 23.11. 2022.. Feasibility of a common mobile application for the EV users for the State of Kerala was explored. Hence an end-to-end white label solution capable of addressing the issues faced by the EV users and the Charge Point Operators were developed. As the state nodal agency for the charging infrastructure, KSEBL has implemented such a comprehensive solution for EV charging in Kerala.



**Conclusion:**

The progress that the Electric vehicle industry has seen in recent years is not only welcomed, but highly necessary in light of the increasing global greenhouse gas levels. KSEBL has set all measures in position to initiate next decade technological advancements to ease the transition from traditional fuel powered vehicle. Additionally, the realization and success of this industry relies on the population and is our hope that through team work and environmental education program, people will feel incentivized and empowered to drive an electric powered vehicle. So go electric and help make a difference.