

Electrical Vehicle Charging Infrastructure

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Abstract: Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. Electric vehicles are more efficient, and that combined with the electricity cost means that charging an electric vehicle is cheaper than filling petrol or diesel for your travel requirements. Using renewable energy sources can make the use of electric vehicles more eco-friendly. The electricity cost can be reduced further if charging is done with the help of renewable energy sources installed at home, such as solar panels. Also, the cost can be reduced more and charging time can be reduced significantly if proper charging infrastructures are built.

Content: There are several benefits of using electric vehicles over the vehicle which use fossil fuels like petrol or diesel which are as follows:

1. Low maintenance cost
2. Zero Tailpipe Emission
3. Tax and financial benefits
4. No noise pollution
5. Convenience of charging at home

In recent years, there has been an upsurge in electric vehicles (EVs) as the cost of the electricity required to charge an EV is much less than the cost of using petrol for a similar-sized vehicle driving the same distance. In addition, EVs are easy to

power from local and renewable energy sources, which reduces the global crisis of oil dependence. Moreover, choosing to drive an EV helps to reduce harmful air pollution from exhaust emissions. However, despite the many benefits of EVs, full-pledged research is still required into EV charging techniques and infrastructures.

At present, the main area of research in both industry and academic is the upgrading of EV charging and charging station technologies. Therefore, theoretical studies, practical experiences, and deep research into EV charging technologies are required for the establishment of charging stations and the sustainable development of the global market.

Electric vehicle charging infrastructure includes all the equipment and systems that deliver energy and charge electric vehicles. There are different types of charging infrastructure, such as AC charging, DC charging, wireless charging, and bidirectional charging, that vary in power, speed, and efficiency. Charging infrastructure plays a significant role in boosting the demand for electric vehicles, as it reduces range anxiety and supports the targets of green vehicles.

In the next decade, the number of electric vehicles (EVs) on our road will likely rise substantially, and

we believe the bulk of the charging of these vehicles will take place at home. But readily accessible charging away from one's home (or one's workplace) will also be key to support EV growth. Such "on-the-go" charge-ups will also need to be easy and convenient as refueling an internal combustion engine(ICE) vehicle today.

So how will the EV infrastructure support the developing fleet? Today's automobile culture is supported by an estimated 135,000 outlets with some 1.4 million pumps according to the National Petroleum news. This network balances the competing demands of low cost and efficiency, locational convenience and capacity utilization. The result is that most motorist in most situations can easily find a competitively priced gas station and not wait in line for an open pump. We expect similar dynamics will shape the emerging network of EV charging station.

EV chargers are defined by the amount of energy delivered to the vehicle's battery per unit of time. There are four "levels" with Level 4 being the fastest. As the table below shows, different levels of chargers have very different power ratings and charge times for typical EVs.

Charger level	Typical power rating	Charge time
1	1 KW	20 hours
2	5 KW	4 hours
3	80 KW	40 minutes
4	120 KW	25 minutes

Conclusion: An accessible and robust network of electric vehicle (EV) charging infrastructure is an

essential pre-requisite to achieving this ambitious transition to electric mobility which is a promising global strategy for decarbonizing the transport sector.

Reference:

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