

# Dynamic Charging For Electric Vehicles

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**Abstract** - From years non-conventional sources of energy are used as fuels in vehicles. This harms our environment as well as this sources are also exhaustible hence they will get extinct in near future. Hence, for a long run we cannot be dependent on this sources, so to revolutionize automobile industry invention of electric vehicles came as savior.

But in electric vehicles too there is a difficulty related to its fuel i.e. electricity which gets stored in a battery and hence there comes some limitations of travelling to long distances.

**Key Words:** Electric Vehicles, Charging, Hot Rails, Electrified Roads, Induction Charging

## 1. INTRODUCTION:

As discussed above, there are some limitations of Electric Vehicles (EV) too. The major limitation is too carry enough electricity in its battery for long distance travels. A normal battery of an EV can carry enough energy to power it up for daily operations or intracity travelling but when we take a glance at long distance travels or intercity travelling the question of battery drainage in mid-way journey arises. The only solution to this problem is to charge the EV using method of Dynamic Charging.

Dynamic charging means to charge an EV while it's still in motion, while in conventional methods of charging the vehicle remains steady at its place. Hence dynamic charging saves a great amount of time as well as increases the travelling range of an EV.

## 2. METHODS OF DYNAMIC CHARGING:

There are various methods for dynamic charging of an EV, below are discussed mainly two of them :

- A. Induction Charging Method
- B. Electrified Roads

### 2(A). INDUCTION CHARGING METHOD:

In this method Faraday's law of Electromagnetic Induction is used. In this method of dynamic charging electricity conducting coils are placed beneath the road. When high frequency alternating electric current passes through them it produces electromagnetic field.

Same way the EV will also be equipped with a receiving coil at the bottom of it. So when this electromagnetic fields interacts with the receiving coil placed at the bottom of an EV it induces electric current in it. This coil is further connected to the battery charge controller of EV which charges the battery accordingly.

### 2(B). ELECTRIFIED ROADS:

This method is also known as Hot-Rail method, because this is very much similar to the method used for powering Metro & Trams.

In this method an electrified conductor similar to a rail track is placed at the bottom of a road or a highway. This conductor track is supplied with sufficient amount energy for charging multiple vehicles at once.

The EV is equipped with a retraceable arm which is deployed when vehicle has low battery charge and travelling over one of this power rails. This arm makes contact with the electrified rail and fetches power from it. Then this power is further transferred to battery charge controller through retraceable arm.

### 3. BILLING SYSTEM:

The user is billed according to the amount of power he/she has used. This system uses a unique vehicle identification technique for these purposes. As soon as vehicle leaves charging area it processes the previously logged data for that particular user about its usage time as well as power consumption and then sends the payment summary to the user.

### 4. CONCLUSIONS

Hence, now there is no need to worry about long distance travels as EV can now be charged on the go. Secondly, this method of charging is convenient, efficient, fast, reliable, and effective.

This method also helps states/nation to generate revenues and to provide direct electricity to users and hence lowering their transmission charges as well as losses.

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### BIOGRAPHIES



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