

Managing Maximum Demand using V2G Technology

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Abstract - In today's world energy crisis is a major issue. Researchers all over the world are concerned about this issue. Another problem lying in our power infrastructure is that of maximum demand. To solve this issue initially load side management/ demand side management approach was taken but as the time went by it proved to be very inefficient. Hence, to cope up with this issue V2G Technology was used which was implemented in Electric Vehicles.

Key Words: Vehicle-to-Grid Technology, Maximum Demand, Energy Efficiency, Renewable Source of Energy

1. INTRODUCTION

As discussed above in today's times energy crisis is a major issue. But as world continuously moves towards the process of advance developments energy consumption is increasing day by day. This also causes problem of maximum demand.

To overcome this issue we can make use of V2G Technology integrated with Electric Vehicles (EV). V2G stands for Vehicle-to-Grid Technology. Basically, in this technology the EV is charged by the user at his/her home. Then it's used to commute to workplace where it gets parked at the parking area of that building. Here, it is integrated with the national energy grid. During maximum energy demand period the grid fetches the energy from EV. According to a research 90% of the vehicles are parked at a particular time of the day. Hence, this technology can be used efficiently.

2. TYPES OF V2G TECHNOLOGIES:

- A. Unidirectional V2G/V1G
- B. Bidirectional Local V2G
- C. Bidirectional V2G

2(A). Unidirectional V2G/V1G

In this type, when the vehicle is connected to grid, it can only supply energy to it but can't charge itself from it. Hence, the energy flow is unidirectional or only in single direction. When the grid reaches to its peak demand it communicates with the EV to permit it to fetch energy from it and supply it to load attached to grid. In return the grid compensates the vehicle user by crediting the amount of money proportional to the energy fetched by the grid. Here, user charges the vehicle using renewable energy for free but sells it to the grid in return of money so the user is benefitted financially.

2(B). Bidirectional Local V2G

This method is basically used to interact the EV with its own surroundings such as houses & buildings. This doesn't usually have any effects on the grid. It is basically applied to use the EV as back-up power source in case of blackout or to power up commercial buildings or houses during peak demand time to save energy cost.

2(C). Bidirectional V2G

In this type, the EV is connected to grid similarly as it is done in V1G but the only difference here is the method of compensation used to compensate the user of EV. As it is bi-directional technology the flow of energy is in both directions, hence when grid gets maximum demand and when it is unable to supply such a huge power, the grid comes under high stress; to reduce this it fetches energy from the EV for that particular period.

As soon as the maximum demand period gets over the energy flow in grid increases, hence now it passes this energy to the EV back and charges it up as a form of compensation. Hence, there is no difference in energy levels of battery before and after of peak demand period.

3. APPLICATIONS

- **Peak Load Leveling System:** Here, the EV is used for peak suppression by acting as a battery back-up during maximum demand period and for valley filling by charging itself during low demand period usually at night. This method can also be used as energy buffer for renewable sources of energy such as wind mills. The EV can be charged in windy period and when there is demand but wind flow is reduced then EV can reduce the stress of grid by discharging.
- **Back-Up Power:** As we know that the battery capacity of an EV is usually high then energy demand of an average household. Hence, EV can be used to power up the house during severe blackouts for couple of days or peak demand periods. This also reduces the cost and need of an inverter as well as the capacity is very high compared to an inverter.

4. CONCLUSION

After thorough research we reached to a conclusion that V2G Technology can help the mankind to achieve a bright and energy efficient future as well as to solve the energy crisis and to handle the peak demand period.

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BIOGRAPHIES



Nidhi

- ❖ Fascinated by Machines
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- ❖ Elegant Charisma