A Review Based On Electric Vehicle

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ABSTRACT: Electric Vehicles (EV) are highly advantageous due to their dependence on energy and response to climate change, but sales of EVs are lower than anticipated due to concern about range. If a prospective customer cannot be confident that charging stations are continuously available and compliant they will not purchase an EV. This paper discusses parking arrangements, charger design, easy "EV only" parking, free charging, marking in unplugging another's car, and legislation to increase sales of EVs through enhanced charger availability. Academic journals, trade market press, conversations, personal experiences, and laws derived records. The findings show that chargers are often in the corner of a lot and are thus only available to one vehicle, EV owners leave their charged car in the area, drivers use EV spaces for parking, etiquette cards are not understood and legislation makes it illegal to unplug the EV of another. Improvements include fewer convenient charger spots, an octopus charger in the middle of the parking lot, minimal charging fees to promote turnover, chargers showing an EV is charged, education and etiquette card legislation, and legislation that allows an person to unplug the charged EV of another. Charging measures should be introduced simultaneously to minimize anxiety spread and understand the environmental benefits of reductions in fuel consumption and air emissions from mobile sources.

KEYWORDS: Electric vehicle, charging etiquette, charging legislation.

INTRODUCTION

HEV (Hybrid EV's) or PEV (plug-in EV's) are hybrid vehicles (EV's). HEV's are powered by an ICE (internal combustion engine) charging the battery as part of its normal vehicle propeller operation. PEV's, the vehicles primarily discussed in this paper, are either PHEV (plug-in hybrid electrical) with electrical and ICE propulsion, or electrical battery (BEV) propulsion only. PHEV and BEV both are charged by plugging into a correct EV charger. The findings show that chargers are often in the corner of a lot and are thus only available to one vehicle, EV owners leave their charged car in the area, drivers use EV spaces for parking, etiquette cards are not understood and legislation makes it illegal to unplug the EV of another. Improvements include fewer convenient charger spots, an octopus charger in the middle of the parking lot, minimal charging fees to promote turnover, chargers showing an EV is charged, education and etiquette card legislation, and legislation that allows an person to unplug the charged EV of another.

Persistent environmental issues and frequent energy shortages are major car industry concerns. Investigating alternative powertrain systems and compact, energy-saving vehicles provides solutions that are potentially fuel efficient. Hybrid Electric Vehicles (HEVs) deliver promising fuel efficiency in comparison with traditional internal combustion engine (ICE) vehicles, due to their capacity to recover braking energy and the fact that an additional degree of freedom is required to meet the driver's power requirements more effectively. Their energy management is framed as power / torque split selection, whereby the amount of power / torque-motive source provides is calculated to satisfy the demand of the driver while improving the overall energy efficiency of the vehicle. Improvements in fuel economy of HEVs with reduced emissions are widely recognized as being crucially dependent on their energy management strategies (EMSs). Many solutions have been suggested to address the issue of energy management, recognizing that EMS efficiency is closely linked to many variables, such as future speed, road slope, driver behavior, traffic information. The difficulty and uncertainty of driving conditions, however, sometimes hinder the efficiency of existing EMSs. How to the the fuel consumption of HEVs and Plug-in HEVs (PHEVs) is a major research subject for fostering a paradigm shift towards more sustainable mobility.

Linked and Automated Vehicle (CAV) technologies have emerged in recent years to catalyze fuel savings both for conventional vehicles and for HEVs / PHEVs. CAV technologies have innovative ideas for developing EMSs to maximize fuel efficiency and improve vehicle overall performance by fusing mechatronics with modern computer technologies. Vehicles will include vehicle-to-vehicle (V2V) communication and vehicle-to-infrastructure (V2I) communication with enough communication interfaces. In this way, vehicles can be linked to the smart transportation system (ITS), namely the vehicle network, and vast data exchange and sharing of current traffic status and vehicle operating data. For the production of sophisticated EMSs that dramatically boost overall vehicle performance in terms of mobility, protection and fuel economy, these data can be leveraged.

HEVs and PHEVs have similarities and variations in appearance. HEVs typically enforce load-sustaining control techniques, while PHEVs' State of Charge (SOC) can work across a comparatively broader range. Normally the EMSs of traditional HEVs / PHEVs are built on the basis of a certain driving cycle with no future information to investigate the advantages of a truly optimal algorithm, whereas connected HEVs / PHEVs may take advantage of the traffic information obtained from ITS to adjust to stochastic driving cycles. EMSs for wired HEVs / PHEVs typically use a predictive mechanism with additional levels of connectivity to that end. In this respect, the so-called electronic horizon (eHorizon) is among the latest innovations in environmental perception and trip planning, which can be compensated by Intelligent Horizon (iHorizon), which promotes its immediate implementation in current ordinary vehicles and enhances their predictive capacity. This can be achieved by combining limited information that is readily available through intelligent transport system (ITS), geographic information system (GIS) or global positioning system (GPS). In addition, driving style information gives space for expansion and further growth of iHorizon in the CAV sense. The energy management controller output has been shown to depend on the amount of future knowledge it is provided with. The integration of future driving data into the EMS is therefore an successful way of improving the future fuel economy.

A number of reports about EMSs of traditional HEVs and PHEVs have been published in the current literature. Nevertheless, a thorough analysis of EMSs for linked HEVs / PHEVs is still missing to date, representing the state of the art and elucidating possible future directions for study. For the first time the present study contributes to the literature through a detailed analysis of the state-of-the-art studies of paired HEVs / PHEVs with additional classifications including single-vehicle, double-vehicle and multi-vehicle scenarios in the EMSs. They also focus on their concepts, advantages and drawbacks for each strategy. This emphasizes the importance of ITS multi-source data in optimizing EMSs. Eco-driving is also provided for connected vehicles using the V2I interface. Finally, the future developments and research directions in the EMSs of linked HEV / PHEVs are explored and suggested from different perspectives.

LITERATURE REVIEW

This paper offers a detailed survey of hybrid electric vehicles produced by various researchers on their combination of sources, models, energy management system (EMS) etc. It is observed from the thorough analysis that current technologies are more or less capable of performing HEV well; however, the reliability and the intelligent systems are still not up to the mark. Accordingly, this analysis has illuminated many hybrid vehicle next generation sustainability influences, threats and problems [1]. The internal combustion engine may compete in new ways in the form of hydrogen fuel cells, but the successors to those early power plants still remain today. The original external combustion engine, Steam engines, are still around in the form of Stirling engines. There are still electric battery power trains today, but in decline, for almost the same reasons as a century ago [2].

The main aim of this analysis was to analyze the environmental effects of each type of vehicle, taking into account the usage of energy in the lifecycle and the CO_2 equivalents as well as the air pollution. The BEV was estimated to have the least cumulative impact in terms of environmental effects, followed by the hybrid and, lastly, the CV. Also a cost-effectiveness was measured for each type of vehicle; the hybrid vehicle was found to be the most cost-effective for CO_2 reduction. Even the net present cost of all vehicles was estimated resulting in the hybrid being the least expensive over its lifespan, followed by the CV, and finally the BEV [3]. This chapter will concentrate on the physical laws working in these road vehicles, the different vehicle configurations, focusing on the configurations of pure electric vehicles and series hybrid vehicles and the subsystems integrating them. Finally it present and explain battery management systems, some computer-based models, design examples and future trends. The following chapter introduces the reader to the key features of the electric and hybrid vehicles. Such vehicles, often in conjunction with combustion engines, are powered by electric motors and derive their power from onboard energy sources [4]. It approaches the precision of the Rosetta FlexPepDock system recently developed (63 percent performance for these 19 peptides) while being more than 100 times faster.

Cross-docking was conducted for a subset of cases where there was an unbound receptor structure, and in that case, 40 percent of peptides were successfully docked and examine the results and find that for extended peptides of restricted size and number of formal charges, the optimized polypeptide protocol is most effective, identifying a scope of applicability for that approach[5]. The roadmap has been revised to reflect the latest developments of hybrid electric and plug-in vehicles through June 2011. In order to keep the roadmap current and appropriate, various details, graphs, figures, and policy outlines have been updated in the publication[6]. A literature review is conducted to understand how well current hybrid and electric vehicle (EV) environmental impact studies tackle the entire life cycle of those technologies. Study findings are synthesized to compare various EV and internal combustion engine vehicle (ICEV) choices with the global warming potential (GWP). Other impacts are compared; however, the degree to which this may be done is constrained by the quality of the data. This paper describes what should be included in a detailed, state-of-the-art hybrid and electric vehicle environmental assessment that considers components and life cycle phases, emission categories, impact categories, and resource usage, and compares the content of 51 hybrid and electric vehicle environmental assessments to our description.

Effects of an impact assessment associated with complete life cycle inventories (LCI) are measured for GWP as well as other pollutant emissions. GWP findings are extracted by stage of life cycle and key parameters and used to conduct a meta-analysis quantifying the impacts of vehicle choices [7]. The Battery Management System (BMS) is a vital feature of electric cars and electric hybrids. BMS strives to guarantee safe and secure operation of the battery. The functionalities introduced in BMS are to preserve the battery protection and durability, state monitoring and assessment, charge control, and cell balancing. A battery behaves differently as an electrochemical component, under different operating and environmental conditions. The ambiguity of the efficiency of a battery poses a challenge to enforcing certain functions. This paper deals with questions about existing BMSs. State evaluation of a battery including charging level, safety level, and quality of life is a crucial activity for a BMS [8]. This work has consequences for fleet customers and private owners looking to move to a low-emission vehicle. Policymakers who are keen to implement effective measures to promote fleet decarbonization and boost air quality are also involved in the results. New powertrain innovations such as hybrid electric vehicles have a price premium that can often be balanced by lower operating costs.

Total Ownership Cost blends such purchasing and maintenance costs to determine the most cost-effective vehicle option. This paper deals with questions about existing BMSs. State evaluation of a battery including charging level, safety level, and quality of life is a crucial activity for a BMS. The research offers a cradle-to-grave review of the transport sector's emerging developments, including an evaluation of green chemistry as innovative renewable energy sources for the electric vehicle and portable energy environment for microelectronics. Furthermore, in the view of biobatteries, this study envisages and surveys the potential development of biological systems for energy production. This research is of vital interest to legislative bodies in the European Union in evaluating the effect on the environment of the life cycle of electric and hybrid vehicle batteries and in developing relevant regulations in connection with the handling of electric and hybrid vehicles and in support of emerging developments in the field of renewable portable energy[9].

METHOD

In architecture, the design and location of EV charging stations primarily involves the same concepts, i.e. physical design, space, and utilization. Analysis methods which are widely used in architectural study are also used. While the approaches may have included action analysis, i.e. diagnosis, action planning, action-taking, assessment and design, the expensive steps of constructing and testing EV charging stations would have included that. Hence, several case studies replication model of Yin was implemented using knowledge available from several cases. The multiple cases came from Vermont, a small countryside state with long driving distances between community centers and a high percentage of EV owners. Registered in Vermont 891 EV, which is around 0.2 per cent of the total number of registered vehicles. Around 0.08 per cent of registered vehicles in the U.S. were EV. The case studies in Vermont included details on charging stations at St. Michael's College in Burlington, at a grocery store in Burlington, at a parking lot in Stowe, and at the Vermont Law School in South Royalton. Case studies may be exploratory, descriptive, or informative and a combination of all three offers insight into the new world of EV charging stations.

Car	EPA range (Miles)	List price	DC fast charge
Tesla Model S P85	265	120,170	Tesla
Tesla Roadster	245	$101,500	Tesla
Mercedes B-Class Electric	85	$33,950	J1772 CCS
Chevrolet Spark EV	82	$19,185	J1772 CCS
BMW i3	81	$41,350	J1772 CCS
Ford Focus Electric	76	$35,170	No
Nissan Leaf	84	$21,510	CHAdeMO
Smart Electric Drive	68	12,490	No
Toyota RAV4 EV	103	$49,800	No
Honda Fit EV	82	$36,625	No
Mitsubishi MiEV	62	$22,995	CHAdeMO

TABLE 1: EV model, range and price.

Information was gathered for each case through literature, including trade-market press, and observations. Knowledge which was useful and which guided this study was also extracted from discussions focused on spontaneous non-work. T.H., School of the Human Research Administration Public Health Office stated that this non-research information receiving program has been authorized. Such conversations were not part of formal interviews, since the conversations were not scheduled. Instead, individuals offered to give their EV-specific experiences or perspectives. A literature review was performed to frame these case studies on Vermont. Literature should provide specific case-specific details and help to ground the project at epistemological points (Groat and Wang 2002). Web searches were performed mainly with Google Scholar and Google, using keywords like electric cars, hybrid vehicles, charging stations, electric vehicle parking, electric vehicle etiquette and electric vehicle legislation. The selected information was an expert decision based on whether the source was considered reliable, and whether the information would help direct the design of charging stations for EV.

Design of parking spaces and chargers for EVs

A simple way of increasing the availability of charging stations is by placing the charging stations in parking areas. Charging stations are frequently installed at the parking lots' corner edge, raising the number of vehicles that the charger can touch. Chargers have typically one or two charging ports with some of them having more. A charger put in a parking lot's corner can reach only one car. A loader can reach two vehicles around the edge of a parking lot, and one in the center of the rows can reach four vehicles. If, as some suggest, each charger cord was of sufficient length to meet its neighbor across the nearest car, then twice as many vehicles as could be charged could be reached.

Handling another's EV and the liability

Also if the EV early adopts unplugging other's EVs when driven by an etiquette pass, some businesses hesitate to unplug a charged EV because of concerns about the legality of handling the property of the owner. A Burlington, Vermont retail co-op, City Market, provides free charging as a consumer service but store policy doesn't require anyone to unplug a charged vehicle (Fig. 4). The store also has a policy that limits EV charging only to customers when shopping. Due to the underuse of the chargers, even though it is a political issue, the store does make exceptions. A PHEV user uses the City Market charger from 8:00 a.m. to 12:00 a.m. every day while the vehicle only takes about an hour to charge. An arriving BEV owner and store customer wanted to unplug the PHEV that had finished charging but the store policy prohibited the vehicle unplugging.

Battery swapping and smart grid

Increasing availability of chargers is not the only way to charge an EV and thus minimize anxiety about the actual or imagined range. Battery swapping is a strategy adopted by many European and U.S. manufacturers along with Tesla to minimize charging time. Battery swapping looks like a niche market and is not supposed to be a big part of the general charging market for EVs. However, battery life and replacement costs are primary concerns of potential PHEV owners, and swapping will resolve those concerns in addition to offering a "instant charge".

EVs are used as both an energy source and drain by a smart grid network, meaning the remain plugged in by the EVs. The use of EVs as a power source is also claimed as a key advantage of the smart grid. It is a complex problem, however, which will develop slowly and be limited to specific locations. While the use of EV's with the smart grid has advantages, they are not expected to be important for the EV owner at this time. The smart grid link is therefore not an economic factor in sales or in charging EVs

CONCLUSION

EV sales are lower than environmental consciousness would expect with range anxiety being one known factor. Reservations for battery swapping and charging stations are partial solutions but these would only impact niche markets. In the near future, EV charging infrastructure which supports the smart grid doesn't seem to play a significant role. Enforcing time limits for charging is only a partial solution, because this method is biased towards BEV's and too reliant on compliance. Therefore, to minimize the anxiety of range, the location of EV parking spots should be relocated to less chosen locations, the layout and design of the chargers should allow multiple vehicles to be charged, chargers should indicate when a charge is full, and modest charging fees should be implemented to promote turnover. Legislation on how to deal with unplugging or ticketing a charged vehicle should be created to regulate the grey areas. The law would require a charged EV to be unplugged if the plug is used by another EV, require etiquette cards to be operated on, and should not enable an EV to be unplugged under any other circumstance.

Legislation on how to deal with unplugging or ticketing a charged vehicle should be created to regulate the grey areas. The law will require a charged EV to be unplugged if the plug is used by another EV, require etiquette cards to be acted on, and do not enable an EV to be unplugged under any other circumstance. Because EV's could then be unplugged, legislation would require unplugged EV's without being in violation in charging locations. This paper may have been written based on assumptions about emerging EV technology, the ideas in this report are now being implemented, and in the future the parking structure and legislative measures will continue to function as workable solutions.

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