A Novel Idea for Electric Vehicle Using Low-Cost Solution by Using Solar Power for Range Extension

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Abstract

In todays world we know there is a drastic shift towards electric vehicles is undeniable The main hurdle of affordability remains a key concern for consumers our mission is to revolutionize this narrative by pioneering the development of affordable evs through the repurposing of existing internal combustion engine ic vehicles this not only tackles the cost barrier but also champions sustainability by reducing vehicle wasteat the core of our innovation lies the transformation of retired ic engines into brushless direct current bldc motors boasting a power rating of 750 w or higher this not only breathes new life into these components but also repurposes them for efficient electric vehicle transportation the essence of our zero-emission vehicles lies in the adaptation of heavy vehicle alternators into high-performing electric motorsin addressing the battery dilemma we embrace an eco-conscious approach by repurposing lithium-ion cells from discarded electronic devices this results in the creation of adaptable battery packs available in configurations of 48v 30ah and 48v 60ah tailored to suit diverse consumer needs by harnessing existing resources and recycled materials our initiative aims to confront the pivotal challenges within the ev industry head-onbeyond technological ingenuity our vision is rooted in accessibility we aspire to democratize these advancing making sustainable electric transportation attainable for all through our endeavor we seek to not only mitigate environmental impact but also dismantle economic barriers having the way for a future where sustainability is synonymous with everyday mobility using solar panel we can extent the range of the vehicle and utilising moment of inertia the alternator can generate power and recharge the the battery while running.

Keywords: Electric vehicles (EVs), Brushless direct current (BLDC)motors, Lithium-ion cells ,Battery packs, Vehicle waste reduction, Solar panel.

DOI: https://doi.org/10.5281/zenodo.15010491

1. Introduction

In an era prioritizing environmental consciousness and sustainability the conversion of traditional petrol-driven vehicles into electric alternatives stands as a significant step towards greener transportation this report chronicles a meticulous paper dedicated to transforming a conventional petrol bike into an electric vehicle ev encapsulating the essence of this eco-friendly endeavor amidst a swiftly evolving automotive landscape this initiative aims not just to adapt to change but to lead a revolution in our perception and engagement with personal mobility as societies increasingly adopt eco-conscious practices repurposing existing petrol bikes into evs emerges as a tangible and impactful solution perfectly aligned with the ethos of sustainable transportation the methodology section unveils the rigorous process undertaken in this conversion endeavor from selecting the ideal petrol bike base considering factors

like weight and chassis compatibility to seamlessly integrating state-of-the-art electric components this report reveals the technical intricacies involved in transitioning from combustion engines to electric power however such transformative endeavors come with their share of challenges the subsequent section delves into the hurdles encountered during the conversion journey spanning technical complexities such as aligning electric components with the existing framework to navigating regulatory requirements to ensure safety and emissions compliance by documenting these challenges the report not only serves as a roadmap for future electric vehicle conversions but also highlights the significance of perseverance and innovation in realizing a sustainable and greener future for transportation using solar panel and alternator for charging while running the vehicle because of its moment of inertia

2. Literature Review

[1] Dhameja, S. (2001). ―Electric Vehicle Battery Systems‖ New Delhi. This article provides a comprehensive overview of electric vehicle (EV) battery systems, focusing on key aspects crucial to their design, performance, and integration into modern transportation. The review covers battery chemistries, including lithium-ion and emerging technologies, examining their advantages, limitations, and implications for EV applications. Furthermore, the article explores thermal management strategies, addressing the critical issue of temperature control to enhance battery life and safety. It delves into the impact of charging infrastructure on battery performance, discussing fast-charging technologies and their influence on energy density and efficiency. Additionally, the article touches upon the environmental considerations associated with battery production, usage, and recycling, emphasizing the need for sustainable practices in the rapidly evolving field of electric mobility. Overall, this review consolidates key findings and advancements in EV battery systems, offering valuable insights for researchers, engineers, and policymakers shaping the future of sustainable transportation [2]Larminie, J. , Lowry, J., ―Electric Vehicle Technology Explained Electric vehicles (EVs) operate on the principle of converting electrical energy stored in high-capacity batteries into mechanical energy to propel the vehicle. The heart of an electric vehicle is its electric motor, which relies on the electromagnetic interaction between the stator and rotor to generate motion. The energy required for this process is stored in advanced rechargeable batteries, commonly lithium-ion, which power the vehicle's electric motor. EVs also employ power electronics for tasks like controlling the speed and direction of the motor, managing energy flow, and facilitating regenerative braking. Unlike traditional internal combustion engine vehicles, EVs produce zero tailpipe emissions and contribute to a more sustainable and environmentally friendly mode of transportation. Charging infrastructure, battery technology, and motor efficiency are key areas of innovation and development within the electric vehicle theory, shaping the future of clean and efficient transportation[3] ―Designing an Electric Vehicle Conversion‖, Southcon/95. IEEE Conference Record This article explores the multifaceted process of designing electric vehicles (EVs), delving into the intricate balance between performance, efficiency, and sustainability. It provides insights into the key considerations in EV design, including the selection of appropriate battery technologies, motor configurations, and power electronics. The integration of advanced materials for lightweight construction and aerodynamics is examined for optimizing energy efficiency and extending range. Moreover, the article addresses the challenges associated with charging infrastructure and the evolving landscape of energy storage solutions. The role of smart technologies and connectivity in enhancing user experience and energy management within the EV ecosystem is also discussed. By synthesizing the electric vehicles in the pursuit of a cleaner and more sustainable future in

transportation[4] Ibanez, J., Dixon ,J., (2004), "Monitoring Battery System for Electric Vehicle, Based On 'One Wire' Technology", IEEE Vehicular Power Propulsion This article presents an innovative approach to monitoring battery systems in electric vehicles (EVs) using one-wire technology. The one-wire system simplifies the monitoring process by integrating various sensor functionalities into a single communication line, minimizing wiring complexity and reducing the overall weight of the EV. The proposed monitoring system encompasses real-time data collection on battery health, temperature, and voltage, crucial for ensuring optimal performance and safety. The article discusses the advantages of this streamlined one-wire technology, including its cost-effectiveness and potential for scalability in large-scale EV production. By enhancing the efficiency of battery monitoring systems, this approach contributes to the overall advancement and reliability of electric vehicles, addressing critical concerns related to battery performance and extending the operational life of EVs.

3. Block Diagrams

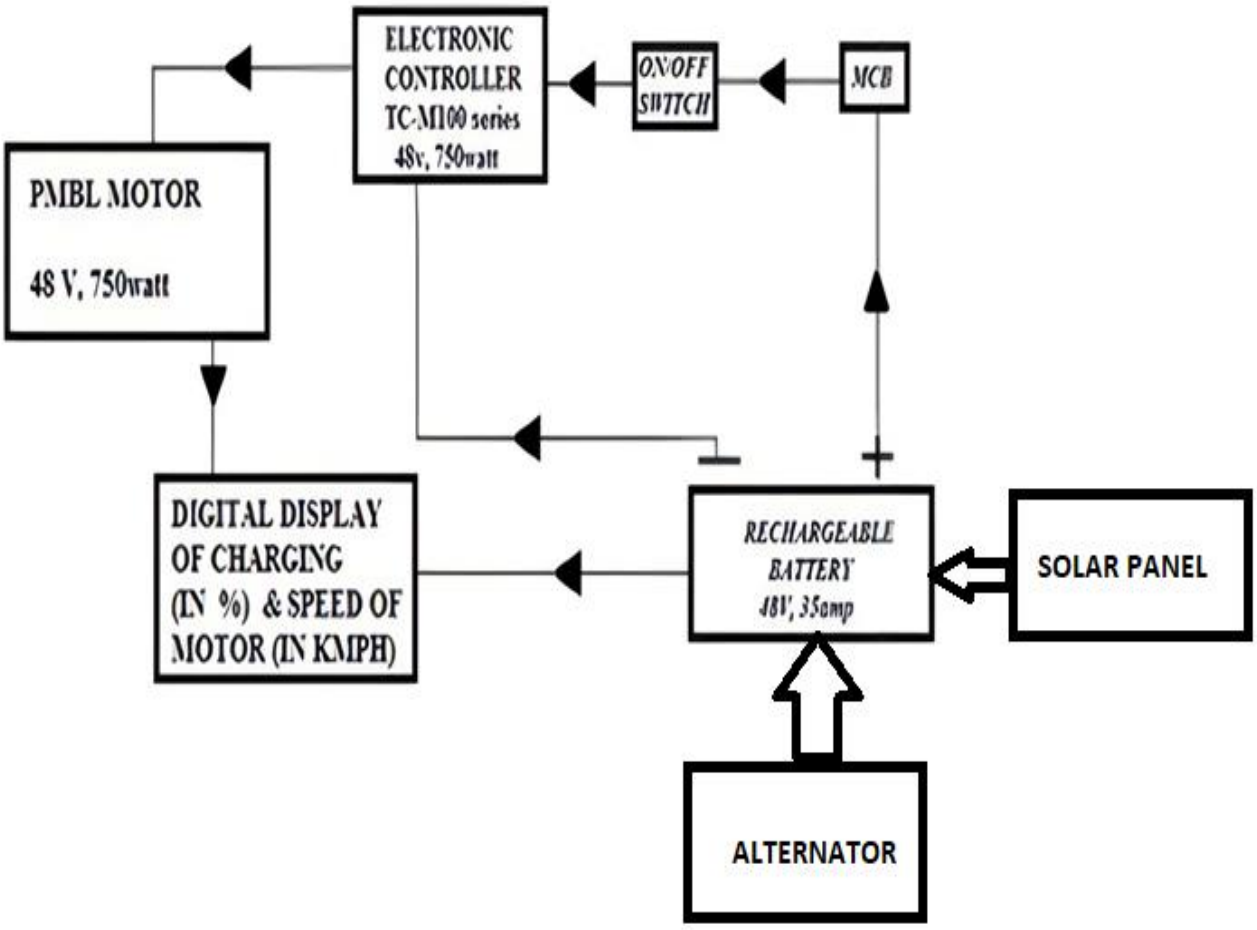

Figure 1: Block diagram of the system with solar panel and alternator

4. Circuit Diagram

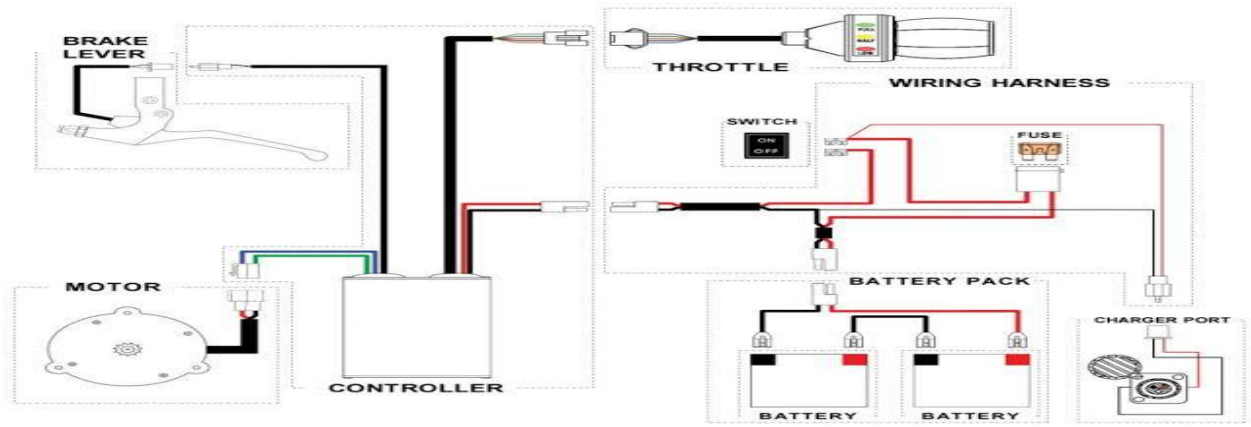

Figure 2: Circuit Diagram of the system

5. Scope

This paper paves the way for environmental stewardship and the concepts of the circular economy, the study has enormous potential for the future. In addition to prolonging the life of important materials, the creative reuse of retired electric vehicle components drastically lowers waste and the carbon footprint related to vehicle manufacturing. The need for creative end-of-life management solutions will increase as society places a greater emphasis on sustainability, placing your paper in the vanguard of this revolutionary change.A wide range of prospects are included in the Paper's future scope, all of which are intended to address urgent environmental issues, reduce waste, and promote environmentally friendly transportation methods. The demand for affordable refurbishing solutions for parts like batteries, motors, and electronics will only increase as electric vehicles become more and more commonplace worldwide.

We are uniquely positioned to meet this demand, offering not only economic benefits but also environmental advantages that resonate deeply with consumers and policymakers alike. Moreover, the potential for converting petrol bikes into electric vehicles is boundless, with a landscape ripe for innovation and growth. Technological advancements will undoubtedly drive progress, with continuous research and development efforts focused on enhancing battery energy density, motor efficiency, and charging infrastructure. These improvements will not only enhance the performance and range of converted electric bikes but also make them more accessible and affordable for a broader audience. As governments worldwide prioritize sustainability and emissions reduction goals, regulatory support and incentives for electric vehicles, including conversions, are expected to expand. This favorable policy landscape, coupled with shifting consumer preferences towards eco-friendly transportation options, will catalyze the electric bike conversion market's rapid expansion, creating abundant opportunities for businesses, entrepreneurs, and investors to thrive in the burgeoning field of sustainable mobility.

6. The Benefits of Powering Your Ev With Solar Energy

The current, wide-ranging benefits to using solar energy increase significantly when paired with an electric vehicle (EV). Harnessing the sun to power your vehicle saves you money, benefits the electric grid, and provides backup power to your home in the future.

There are five ways your EV could be solar powered:

Rooftop Solar: Rooftop solar systems provide power to your home or building, which can be used to power your EV. Rooftop solar systems whether or not they are paired with battery storage systems can be optimized to power your car when you're generating more electricity than you're using—maximizing your solar savings.

Solar-Powered Public Charging Stations: Need a charge on the road? Some public EV charging stations have installed onsite solar panels. Find your nearest charging station using one of the many apps available or the navigation built into your EV. You can also reference the National Renewable Energy Laboratory's Fuel Data Center's Station Locator. Although many of these apps do not differentiate which stations are solar-powered and which aren't, it's a great way to try different stations to find out.

Community Solar: Community solar subscribers can use their share of a larger, shared solar array to power their EV by plugging into their home's electricity supply.

Vehicle-Attached/Added Photovoltaics: Solar modules can be attached to the existing vehicle structure to provide an extra boost for electrical systems on your car.

Vehicle-Integrated Photovoltaics: Solar modules can be mechanically and electrically integrated into the design of a vehicle.

Combining solar energy with EVs creates many benefits, and as more solar energy and EVs join the electric grid, the U.S. Department of Energy Solar Energy Technology Office (SETO) works to understand how solar energy, in tandem with EVs, helps meet clean energy goals.

Generating Cost-Savings

By using the electricity from your own PV panels, you don't need to pay your local electricity company to fill your tank, potentially saving you hundreds of dollars per year. If you've paid off your PV, that's a free fill up. It's also worth noting that by taking advantage of federal tax credits, you can lower your up-front costs by 30% for a solar system and up to $7,500 for an EV. Additional state and local incentives may also be available; check with your state, county and city government and your electric utility provider.

Improving Environmental Health

EVs have a lower carbon impact than gas-powered cars over their lifetimes—and as your local electricity mix becomes cleaner, your carbon impact will be even lower. To maximize the environmental benefits, use clean energy directly from the sun with a dedicated solar energy charging station to power your EV.

Providing Backup Power

While the technology is still developing, it is possible to use the power stored in an EV battery for your home during a power outage, emergency, or natural disaster. Most EVs have batteries large enough to power parts of a home for

several days with the energy they store. Additionally, in using solar energy you can also charge your EV during an outage.

Benefiting the Electric Grid

Many EV owners choose to charge their EVs when electricity demand is lower-to reduce the strain on the local electricity grid. Charging your EV when you have plentiful solar generation can have the same effect—you can avoid putting strain on the grid by using your own solar generation. In areas with a lot of PV systems, it can even benefit the electric grid to charge your EV during the daytime, when the sun is shining and energy from those PV systems is most plentiful. Thankfully, the newest PV equipment automates the charge-scheduling question for you.

In certain areas, the number of chargers connected to the electric grid can be limited by the local utility's infrastructure. Companies that want to provide EV charging for their employees typically run into this, where they can't add more onsite chargers without expensive upgrades to their electrical service. By powering the chargers with local solar, this expense can be avoided.

7. Conclusion

In order to highlight the revolutionary potential of transforming gasoline-powered motorcycles into electric vehicles, our paper draws on a foundation of research and analysis. A research conducted by the International Council on Clean Transportation (ICCT) found that switching from internal combustion engine vehicles to electric powertrains offers a potential way to lower greenhouse gas emissions and enhance air quality (ICCT, 2020). This is consistent with our research, which emphasizes how these changes help the environment by reducing the effects of climate change and fostering environmentally friendly transportation.A fundamental component of our research, technical

feasibility, has been confirmed by studies like the one carried out by researchers at the University of California, Davis, which showed how to successfully retrofit traditional motorcycles with electric drivetrains (Wu et al.., 2018).

These results are supported by our analysis, which shows that performance measures can be maintained or improved throughout the switch to electric propulsion, allaying worries about acceleration and speed.Our research also focuses on economic benefits, which are supported by publications from agencies such as the International Energy Agency (IEA), which highlight the financial benefits of electric vehicles, such as lower fuel and maintenance costs (IEA, 2021). By supporting these findings, our paper highlights the financial incentives that encourage the conversion of electric bikes and their potential to boost employment and economic growth in associated sectors.Our study's findings on issues like range restrictions and charging infrastructure shortcomings are consistent with the World Economic Forum's (WEF) remarks, which highlight the necessity of concerted efforts to address these barriers to widespread electric vehicle adoption (WEF, 2020).

These results are supported by our analysis, which emphasizes the ability to preserve or improve performance measures throughout the switch to electric propulsion. Our paper emphasizes how crucial it is to launch cooperative projects with stakeholders from other industries in order to overcome these obstacles and speed up the switch to electric vehicles. Our goals for a more resilient and clean future are in line with those stated in reports published by groups such as the Rocky Mountain Institute (RMI), which promotes sustainable manufacturing methods and ongoing advancements in battery technology to hasten the shift to electric vehicles (RMI, 2022). By utilizing technology, advocating for legislation that support it, and cultivating an innovative culture, we can all work together to propel the shift towards sustainable and equitable mobility, so creating a more promising future. Solar energy is the primary means of extending our range. The vehicles manufacturing with panels will be there as per new norms that means entire body of vehicle will be covered with solar panels for producing power.

8. References

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