1.	**Title of the project:** DESIGN AND DEVELOPMENT OF EV CONVERSION KIT FOR IC ENGINE BIKE
2.	**Name of the College & Department : KVG COLLEGE OF ENGINEERING SULLIA, DEPARTMENT OF MECHANICAL ENGINEERING**
3.	**Name of The students** Name: Mohan Basavaraj S Email id: mohanbasavarajs24@gmail.com Mobile No.: 7975511466 Name: Nithin G M Email id: nithingm84@gmail.com Mobile No.: 8861412689 Name: SUCHETH M J Email id: : sucheth136@gmail.com Mobile No.: 9945595312
4.	**Name(s) of project guide(s):** 1. Name: Mr. Hithesh M S Email id: **mookamale999@gmail.com** Contact No.:9731923101
5.	**Key words:** • Electric vehicle • Internal combustion engine • Replacing it with an electric motor • Environment
6.	**Introduction** The conversion of an internal combustion (IC) engine bike into an electric bike represents an innovative and environmentally friendly approach towards sustainable transportation. With the growing concerns about pollution, rising fuel costs, and the need to reduce greenhouse gas emissions, electric bikes have gained significant attention as a viable alternative to traditional fuel-powered vehicles. This project is to convert a conventional IC engine bike into an electric bike by replacing the combustion engine with an electric motor and integrating a battery system. This conversion not only eliminates the need for fossil fuel consumption but also provides numerous benefits such as reduced emissions, improved energy efficiency, and lower operational costs.

By repurposing an existing IC engine bike, this project aims to showcase the potential of electric bike conversions as an accessible and economical option for individuals who wish to embrace clean and sustainable transportation without investing in a new electric bike. The significance of this project lies in its contribution to addressing environmental concerns by reducing carbon footprints and noise pollution associated with traditional combustion engines. Additionally, the conversion process encourages the efficient use of resources by extending the lifespan of existing vehicles, reducing waste, and promoting a circular economy.

The overview of the conversion process, including the methodology, components used, challenges encountered, performance analysis, safety considerations, environmental impact, cost analysis, and future recommendations. It is intended to serve as a valuable resource for individuals, enthusiasts, and researchers interested in electric vehicle conversions and sustainable transportation.

By documenting and sharing the knowledge gained through this project, we hope to inspire and encourage further exploration and adoption of electric bike conversions as a practical and eco-friendly solution for the transportation needs of the future.

7. Objectives

The objectives of our project are:

- Design and documentation of EV conversion kit for IC engine bike.
- Improve efficiency and reliability.
- Provide a cost-effective solution.
- Reduce carbon footprint.
- Maintain or improve performance.
- Ensure safety and compliance.
- Promote awareness and adoption.

.

8. Methodology

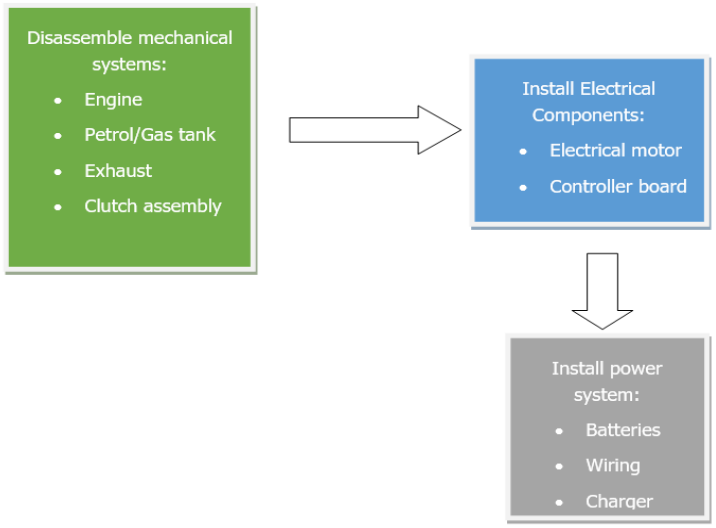

Fig1: Block Diagram

Here are the general steps involved in an EV conversion kit for an IC engine bike:

1. Remove the IC engine and related components: The first step is to remove the internal combustion engine, fuel tank, exhaust system, and any other components related to the fuel system. This will make room for the electric motor and battery pack.
2. Install the electric motor: Next, the electric motor is mounted in place of the IC engine. The motor is connected to the bike's drivetrain via a chain.
3. Install the battery pack: The battery pack is mounted in a secure location on the bike. This is usually in the space vacated by the fuel tank. The battery pack is connected to the motor and controller using heavy-gauge wiring.
4. Install the controller: The controller is the brain of the electric bike. It regulates the power flow from the battery pack to the electric motor. The controller is usually mounted near the battery pack.
5. Install the throttle: The throttle controls the speed of the electric motor. It is usually mounted on the handlebars, and connected to the controller.
6. Install other components: Depending on the specific EV conversion kit, other components may need to be installed, such as a charger, battery management system, DC-DC converter, and instrumentation.
7. Test and fine-tune: Once all components are installed, the electric bike is tested to ensure everything is working properly. Fine-tuning may be necessary to optimize performance and range.
8. Finalize installation: After testing and fine-tuning, the components are secured in place and the bike is ready for use.

Fig.2 Engine Removal Process

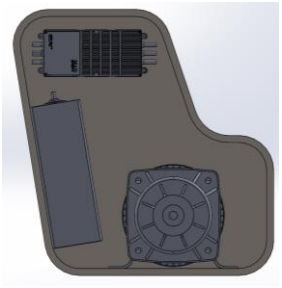

Fig.3 3D Model of Kit

Fig.4 Final Assembly of Electric Motorcycle

9

Major components

1. BLDC Motor
2. Controller
3. GI Steel
4. Battery Pack
5. Charger
6. DC – DC Converter

1. BLDC Electric Motor:

The electric motor is the primary power source in an EV conversion. It converts electrical energy into mechanical energy to drive the vehicle.

Specification: 48V, 30AH, 3000rpm, 1000watt

Fig.5 BLDC Electric Motor

2. Motor Controller:

The motor controller, also known as an inverter or motor drive, is responsible for controlling the speed and torque of the electric motor. It takes input from the accelerator pedal or other control inputs and regulates the power delivered to the motor.

Specification: 48V, 30AH, 1000watt

Fig.6 BLDC Electric Motor Controller

3. GI Steel:

Fig.7 GI Steel

"GI steel," which stands for Galvanized Iron steel. Galvanized steel is a type of steel that has been coated with a layer of zinc to protect it from corrosion. The zinc coating provides a barrier against moisture and other environmental factors, making the steel more durable and long-lasting.

4. Battery Pack:

The battery pack consists of multiple battery modules or cells connected together to provide the energy storage for the electric vehicle. It supplies the electrical power to the motor and other vehicle systems.

Specification: 48V, 7.5AH, 1000watt

Fig.8 Battery Pack

5. Charger

The charger is used to recharge the battery pack when connected to an external power source. It converts AC (alternating current) power from a charging station or wall outlet into DC (direct current) power to charge the batteries.

Fig.9 Charger

6. DC-DC Converter:

The DC-DC converter is responsible for converting the high-voltage DC power from the battery pack to the lower-voltage DC power required by various auxiliary systems in the vehicle, such as lighting, instrumentation, and accessories.

Specification: 48V- 12V 1000watt

Fig.10 DC-DC Converter

Results and Conclusions

By choosing the components with these specifications, the vehicle will travel at a speed of 30 km/hrs for single charge of the battery. It also travels for a longer distance. As 1000W motor is used for our project it gives more initial torque. The speed and distance of the vehicle can be increased by increasing the battery capacity and the motor specifications. On board charging can be also implemented to increase the operating range of the vehicle. As lead acid battery is used it has less weight, long life span and fast charging.

10.1 Advantages

- Environmental benefits
- Reduced operating costs
- Increased reliability

10.2 Disadvantages

- Battery charging time
- Weight

10.3 Applications

Advancements in motor design, magnet materials, and control systems can lead to motors that offer higher torque, improved acceleration, and better overall performance.

Conclusion

In the existing electric vehicles, there are many disadvantages. The hub motored electric vehicles does not provide more initial torque and then the vehicle will not provide more speed as given by the BLDC motor. By implementation of this project it reduces the cost of an electric vehicle and with these components the speed and range for the vehicle can be achieved.

11	**What is the innovation in the project?** **Efficient Electric Motors:** The introduction of compact and high-performance electric motors has enhanced the overall efficiency of EV conversion kits. These motors provide increased torque and power output, enabling engine bikes to deliver comparable or even superior performance to their combustion engine counterparts. **Plug-and-Play Conversion Kits**: Simplified and user-friendly conversion kits have emerged, allowing bike owners to convert their engine bikes into electric vehicles without extensive technical knowledge or expertise. Plug-and-play kits often come with preconfigured components, making installation and integration relatively straightforward.
12	**Future Score** • Integration of Smart Features • It can be used to study battery management of electric vehicles. • Enhanced Charging Infrastructure • Future kits may incorporate more advanced and high-capacity batteries with improved energy density, longer range, and faster charging capabilities.