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(Approved by AICTE, New Delhi and Affiliated to Anna University)**

ELECTRIC CYCLE PROJECT

Under

E-Mobility Center



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CONTENTS

S. No	Description	Page No
1	Introduction to Electric Cycle	1
2	Objectives	2
3	Legal Definition of E-Cycles in India	2
4	Indian Government Measures to Boost Electric Vehicles	2
5	Tamil Nadu Government Plans for Electric Vehicle	2
6	Benefits of Electric Vehicles	3
7	Components of Electric Cycle	3
8	Battery Management System	6
9	Challenges of Electric Vehicles	6
10	Electric Cycle Assemble	7
11	Outcomes	8
12	Conclusion	12



1. Introduction to Electric Cycle

Electric bicycle (e-bike) is the only transportation device that managed in the last 20 years to take significant part of the bicycle market share. With its simple design that closely mimics traditional bicycle, small and efficient electric motor and easy control methods, it successfully experienced rapid sales growth since 1998. Today, it is estimated that there is approximately over 120 million electric bicycles in use in China alone. Use of electric bicycles in Europe and North America is growing fast, with the reported yearly sales of one and a half million units.

One of the most appealing features of electric bicycles is that it has no harmful emissions from combustion engine with zero chances of Earth pollution. Even if we include the cost of frequent battery changes, e-bike is many times more environment friendly than any other public road transportation device (it is 18-13 times more efficient than automobile, 6 times from rail transit and has same environment impact as traditional bicycle). Another advantage of electric bicycle is its rehabilitation use with recovering health patients. For example, patients with cardiac problems can greatly improve their mobility if they use e-bike models that help them to reduce muscle strain and cardiac exertion. One of the down points of the electric bicycle has been noted in China. Speed of the e-bikes proved to be troubling when they were used on the traditional roads that were intended for traditional bicycle use (bike lanes).

First models of electric bicycles appeared in late 19th century. US Patent office registered several e-bike patents since 1895 to 1899 (Ogden Bolton patented battery-powered bicycle in 1895, Hosea W. Libbey patented bicycle with double electric motor in 1897 and John Schnepf patented electric motor with roller wheel). Models with torque sensors and power controls became available during late 1990s. One of the first commercially successful e-bike models appeared in 1997 with the name “Select”. Year after that there was over 49 different e-bike models available on the market. In the early 2000s, two big Japanese companies Yamaha and Panasonic became their worldwide mass production.

Main design of e-bike consists of the traditional bicycle frame (with or without pedals) and a small electric motor (up to 750 watts) powered with light rechargeable batteries (lead-acid, NiCd, NiMH and Li-ion). Power of those motors is limited to produce maximal speeds of 24 to 32 km/h (15 to 20 mph). There are several types of motors currently in use most notably direct-drive and geared. Transmission to the wheel is done with chain drive, belt drive, hub motors or friction drive. One of the early models of electric bicycle from 1980 had a solar charging station, which was used to replenish on board batteries.



Today, worldwide production of the electric bicycles is in the steady rise. Countries around the world have different rules that regulate their use on the public roads. They are often classified in the same class as bicycles, but somewhere they are regarded as one subtype of motorcycles and motorized bicycles.

In India the first E-Cycles appeared in 1993.

2. Objectives

E-bikes are great for commuting a few kilometres to work and doing it quickly. Because it is designated as a bicycle, in many cities you can cycle on sidewalks and around and through parks.

Alternative routes to your destination will make your journey faster than a car stuck in traffic.

3. Legal Definition of E-Cycles in India

- ☐ One or more electric motor with power of less than 250W
- ☐ Maximum speed of 25 KMs per hour

Electric Vehicles, which comply with the above requirements are not categorized as motor vehicles. Hence the transport rules are not applicable for them (Insurance, taxes, helmet, driving license, pollution certificate, etc)

4. Indian Government Measures to Boost Electric Vehicles

- ☐ Reduced the GST rate from 12% to 5%.
- ☐ Additional income tax deduction of Rs 1.5 lakh
- ☐ Cabinet approved with an outlay of Rs 10,000 crore.
- ☐ Bring down the custom duty on lithium-ion cells to nil.

5. Tamil Nadu Government Plans for Electric Vehicle

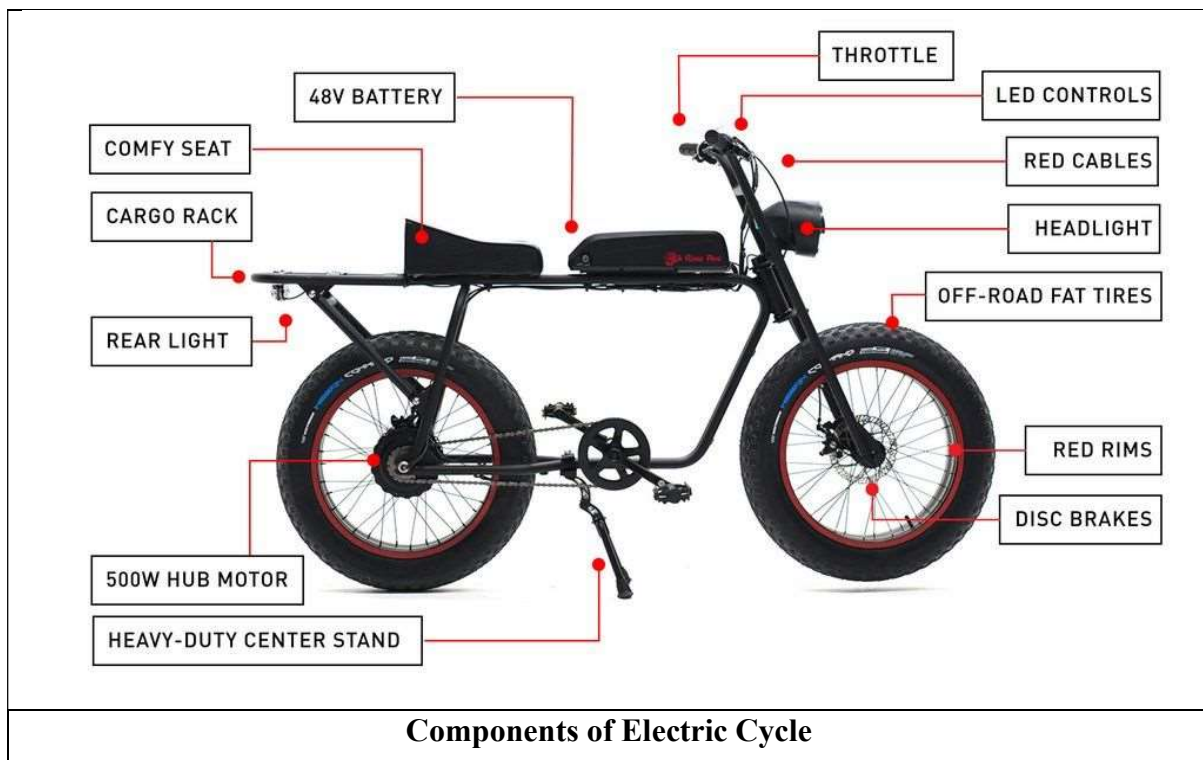
- ☐ The vision to attract ₹50,000 crore (₹500 billion) of investments in EV manufacturing.
- ☐ Such investments are expected to create 1.5 lakh new jobs.

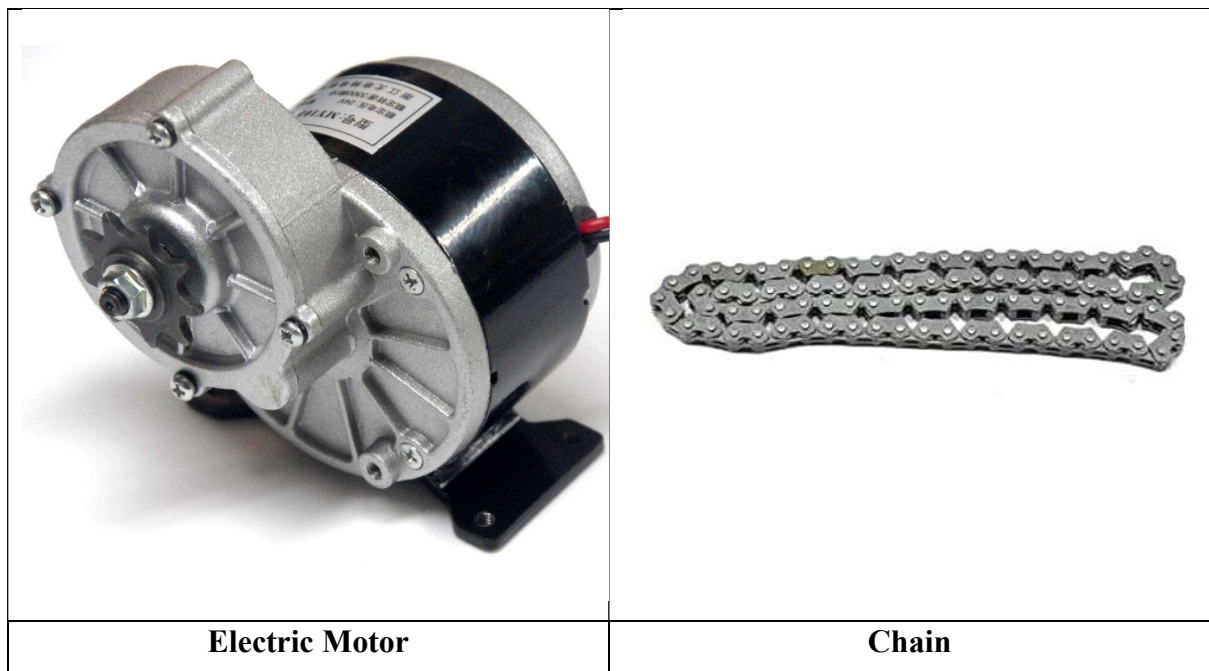
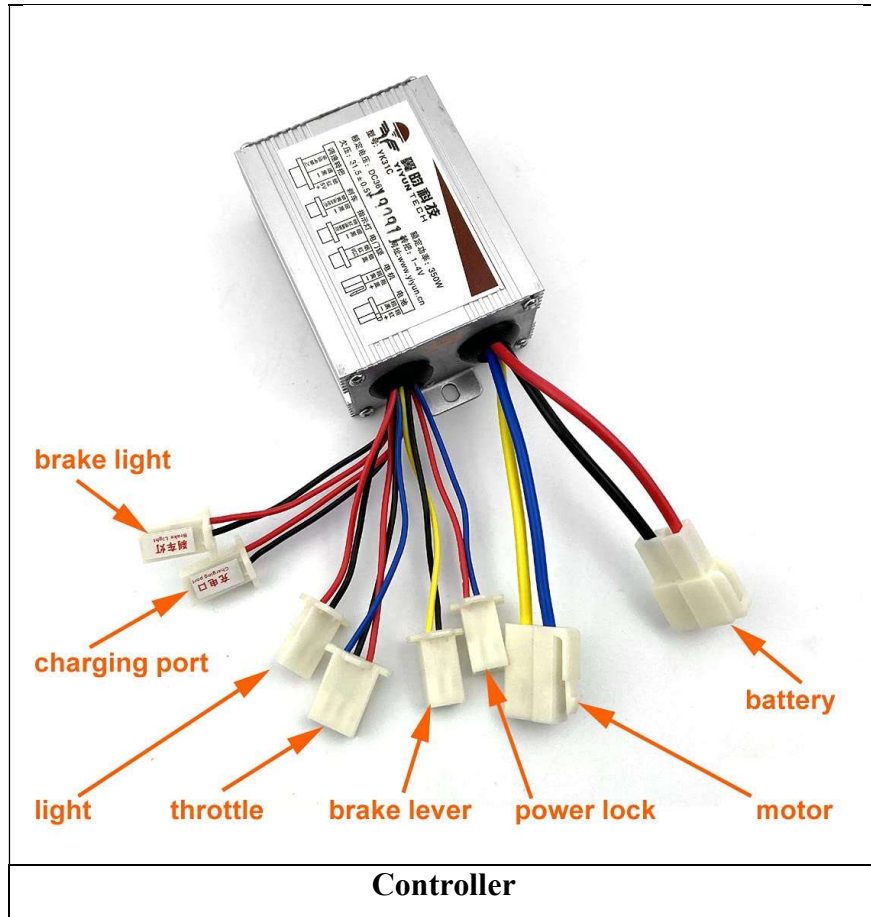


6. Benefits of Electric Vehicles

- ☐ Low Maintenance Costs.
- ☐ EVs have NO noise.
- ☐ Low Running Costs.
- ☐ No more frequent fuel price hikes.
- ☐ Convenient Charging at Home.
- ☐ Easy to drive.
- ☐ Environment Friendly.
- ☐ Comfortable Cabin and More Storage Options.



7. Components of Electric Cycle









	
Throttle	Head Light and Charge Indicator

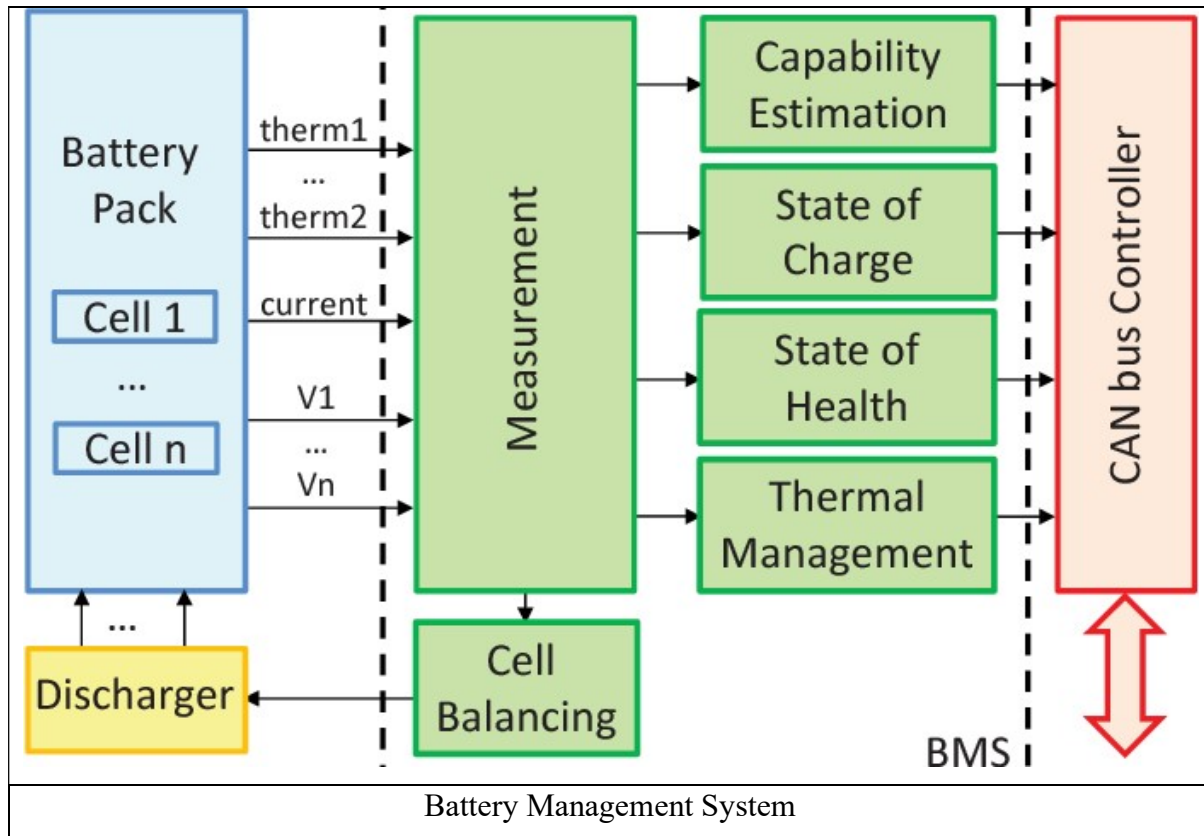
	
Free Wheel	Brake levers

	
Lithium-ion Battery	Battery Charger



8. Battery Management System

- ❑ Battery Management is typically used in rechargeable batteries.
- ❑ It is an electronic circuit that helps in safeguarding and monitoring the status and health of the battery.
- ❑ The BMS protects the battery from over charging, deep discharging, over loading, under temperature, over temperature and short circuit.



9. Challenges of Electric Vehicles

- ❑ Infrastructure for electric vehicles. The infrastructure support provided by the country for them to be convenient.
- ❑ Charging time.
- ❑ Service of electric vehicles.
- ❑ Breakdowns and awareness.
- ❑ No assured government policy.



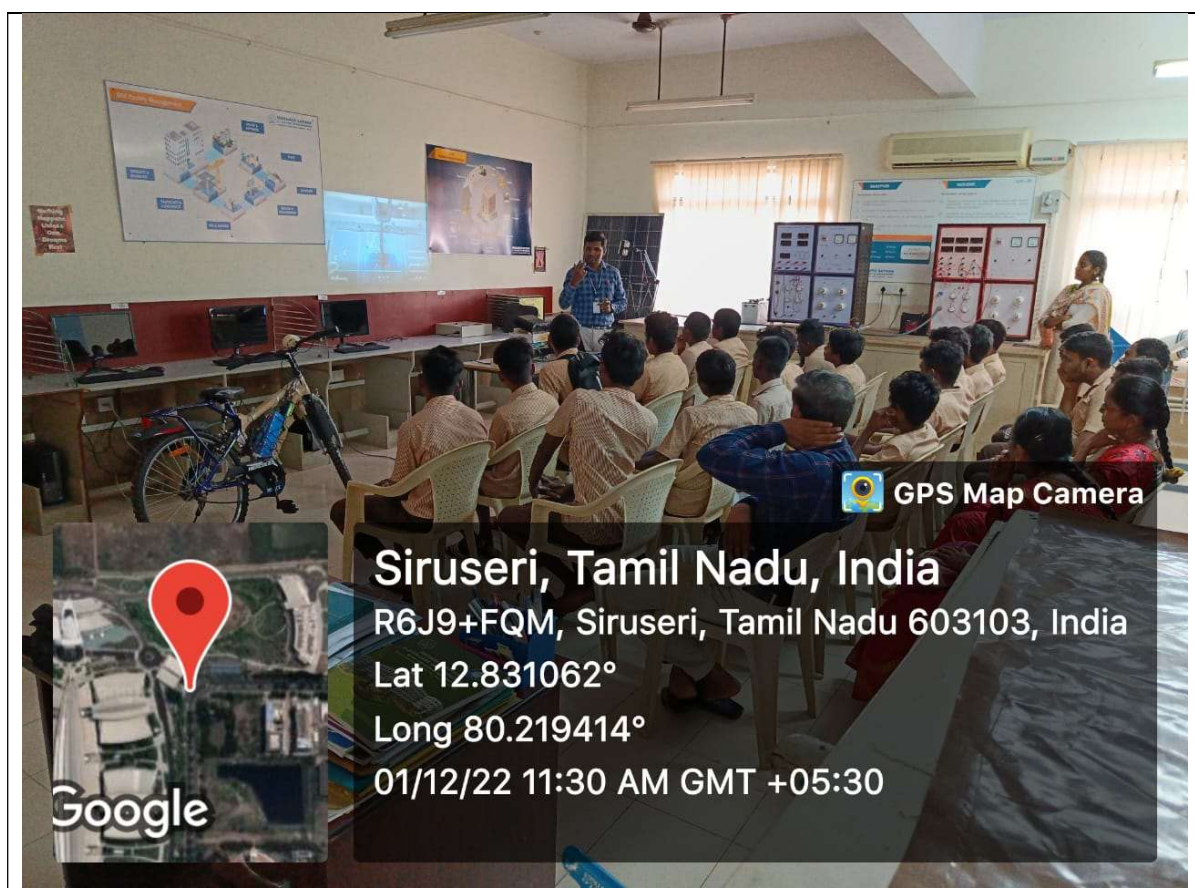
10. Electric Cycle Assemble



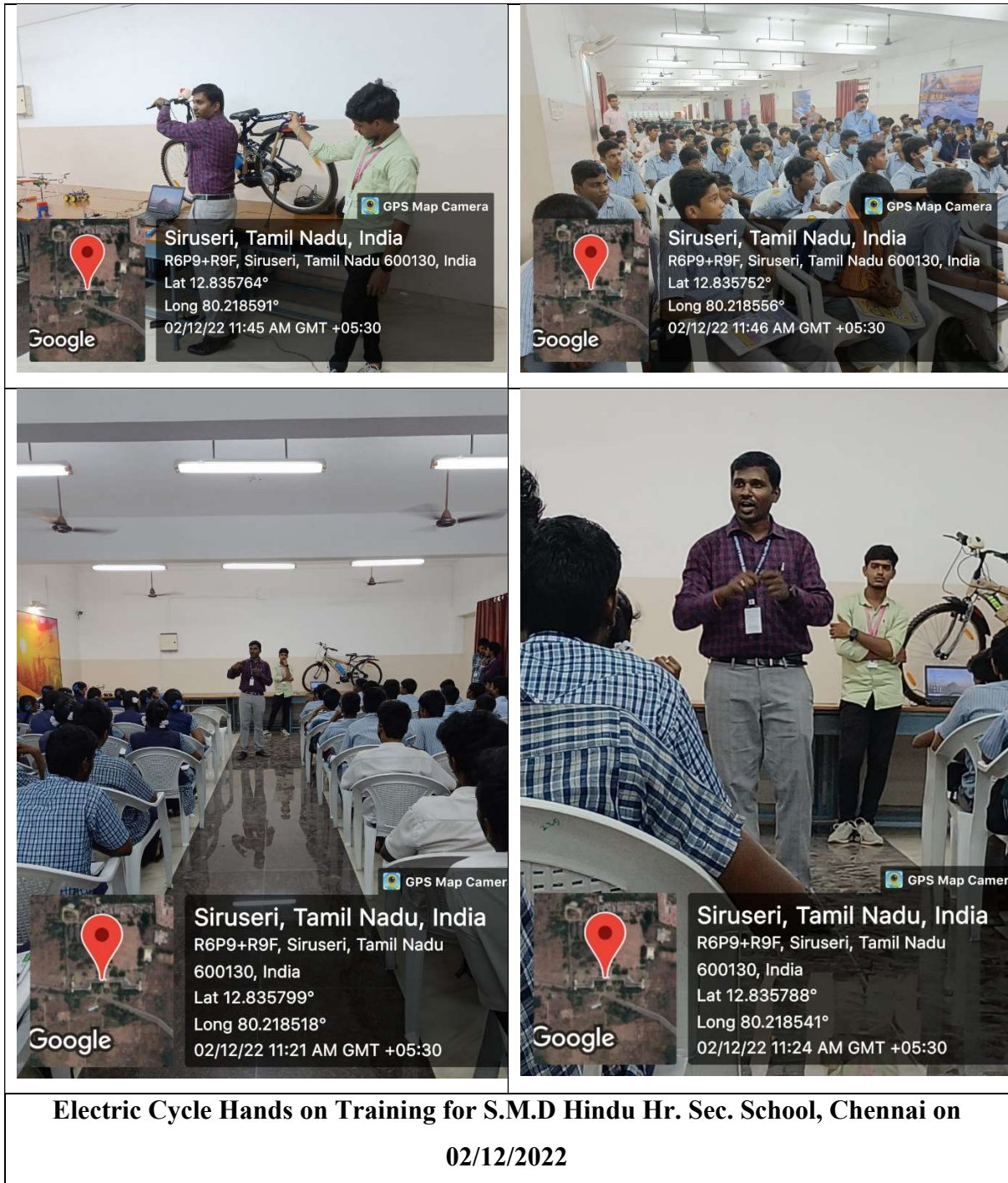
Pictures During Assemble of Electric Cycle



11. Outcomes



**Electric Cycle Hands on Training for Govt Hr. Sec. School, Kelambakkam, Chennai
on 01/12/2022**





Electric Cycle Hands on Training for Arupadai Veedu Matric Hr Sec School, Tiruporur and Bharath Vidyalaya Matric Hr Sec School Tiruporur on 03/12/2022



Electric Cycle Hands on Training for Measi Matric Hr Sec School, Broadway and Govt Hr Sec School, Thuraipakkam on 06/12/2022



12. Conclusion

Bicycle use is known to be healthy, efficient, environ-mentally friendly and in some localities is even faster than driving (either due to traffic conditions, or the distance of available parking spaces from origin and destination respectively). Unfortunately, bicycle adoption rates are not high in many places, due to various reasons.

Hence to overcome these barriers by defining and testing a range of electric bicycle alternatives to converge on a suitable solution. The rider must pedal, causing the motor to contribute to the motion. The main aim in this environment being to ensure that whether the rider is going uphill, down, or riding on the flat, their rate of energy expenditure can be maintained low enough to prevent excessive perspiration.

Riders consider the majority of the electric bicycles to be both comfortable and fun to use, and extremely convenient for campus travel.