

# PATENTED TECHNOLOGY LICENSING PROPOSAL

UNIQUE, EFFICIENT SEAT ASSEMBLY INCORPORATED WITH A SOLAR PANELS IN ELECTRIC TWO-WHEELER

TITLE: ELECTRIC TWO-WHEELER INCORPORATED WITH SOLAR PV PANELS TO MAKE IT SELF-RELIANT

Patent No: 376820 (India)

Prepared and Presented by

Yash Sheth

Bachelor of Mechanical Engineering, India

Master of Renewable and Sustainable Energy, Australia

## TECHNICAL FIELD OF INNOVATION

We have always heard about innovation in solar cars, solar airplanes, solar trains etc but did we underestimated a solar PV two-wheeler? which in a way could be easiest to achieve based on its small battery size! However, installation of solar panels in a two-wheeler sounds like an issue! Maybe not much anymore.

This innovation is about redesigning the seat assembly of an electric two-wheeler by incorporating solar panels into it through a chain of kinematics motions. Idea is to make the vehicle charge itself through its own power production and smartly utilising the available parking time.

Note: Invention is to increase the vehicle's efficiency and self-utilization.

## PATENT STATUS

**Patent granted in India: No 376820**

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## BACKGROUND

Electric two-wheeler related innovation has been most underrated, therefore it has become necessary to provide two-wheeler electric vehicles with high efficiency and flexible charging to overcome the range anxiety. To achieve this, it is essential to make the vehicle self-reliant along with proper charging infrastructure. It will assist in increasing the market adaptability and enhance end user satisfaction.

At the same time, it is also important that economy of the industry/service is maintained.

This design strikes the right balance by providing flexible charging to the vehicle to make it self-reliant and increase the vehicle's efficiency without compromising common aesthetics of an electric two-wheeler.

# INTRODUCTION

The current invention aims to introduce and incorporate solar pv panels in an electric two-wheeler, through a special seat assembly which consist of series of solar panels linked with a kinematic motion. As per this system, three solar panels are installed below the seat of the vehicle.

When the vehicle is at parked position, the vehicle's seat can be rotated on a side with the help of hinges to change its

position upside down so that three panels could be pulled out to exposed itself to the sun, hence charging the vehicle's battery through proper electrical connections among them.

Flexibility of charging is largely improved and vehicle's parking time can be utilised to charge itself. It avoids pressure on grid, reduces purchasing of electricity (as it produced by it's own), thus, enhancing the efficiency at a tremendous level.

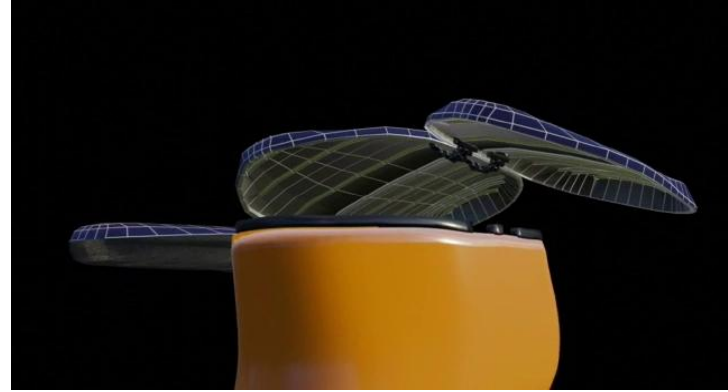
## WORKING MECHANISM

This invention is based on improving the efficiency of electric two-wheelers by replacing the rigid seat of the vehicle with a flexible and convertible seat having solar panels to charge the vehicle when it is kept parked. The seat can be rotated to bring the solar panels out through different mechanisms and with the help of suitable hinges, sliding mechanisms and shock absorbers as below:

Mechanism 1: When the vehicle is kept parked, the seat can be rotated upside down towards the right position with the help of hinges and it will further open additional two folds of the solar panel to provide more surface area.

Mechanism 2: When the vehicle is kept parked, the seat can be rotated upside down towards the right position with the help of hinge and it will further slide two folds with the sliding mechanism (rollers and guideway), enhancing the solar panel area.

## VIDEO DEMONSTRATION



# MARKET SCOPE

- The highest fuel [prices](#) in India's history are spurring efforts to shift the nation's ubiquitous motor scooters -- which account for nearly 70% of local gasoline consumption -- to electric models.
- 80% of the vehicles sold in India today are two wheelers and despite that only 12% of India owns a two wheeler (Bloomberg, 2020).
- The design makes the vehicle more sustainable
- Unique design that has never seen anywhere across the world. Could be a major breakthrough in the market.
- India's new [pledge](#) to hit net-zero by 2070.
- Large scale customised local solar PV manufacturing within the country



# KEY BENEFITS OF THE DESIGN/ TECHNOLOGY

- Cost effective and more efficiency: When the vehicle is getting charged from the free direct sunlight available, it reduces the input charging cost which would have occurred if charged from the grid or any public charging station. Thus, all the electricity generated by the vehicle itself leads to increase in its efficiency while also lowering the input or operation cost.
- Utilizing parking time effectively: This invention will give the best benefit when the vehicle is kept parked. For example, a university student travelling to his/her college can put the vehicle on charging while in the class (This charging is not from grid, but vehicle will charge itself). Another example, a shopkeeper going to his shop can put the vehicle on charging for whole time when it is kept for parking.
- Prevents the seat from heating
- Reduces energy consumption from grid and self-reliant: The amount of power generated, or battery charged will be a result of vehicle's own power generation. Thus, it will reduce the energy consumption from the grid making the vehicle more efficient and self-reliant.
- Will promote electric two-wheelers compared to four-wheelers for short distances travelling thus reducing traffic congestion.
- Avoiding long queues for charging: If proper and large charging infrastructure is lacking at some places due to which people must wait in long queues to get their vehicle charge, this technology will assist in charging the vehicle at their own likeable spot which has good amount of sunshine. Thus, it might save us from waiting in long ques.

# CONCERNS WITH TVS ELECTRIC MODEL

**Air Drag:** A huge windscreen on the front of vehicle will significantly increase the air drag of the vehicle leading to more work done by the motor and thus reduced efficiency.

**Typical design of two-wheeler scooter:** The design of a scooter plays a vital role for its adoption. In this case, vehicle's design is unusual then what people would generally visualize for a two-wheeler.

**Height of the vehicle:** A solar roof will significantly increase the height of the vehicle compared to one available these days. This may create issue while driving through a thin road or lower head parking.

**Weight of the Vehicle:** The addition of solar panel, rooftop, backrest seat will significantly increase the weight of the vehicle which will result in reducing its efficiency.

Reduced back view

Increased capital and maintenance cost

*Proposed design aims to eliminate all the above mentioned concerns*





# LITTLE BIT MATHS!

Three solar panels connected in a series increases the surface area of solar panel to generate more power comparatively.

For example, If we use 3 solar panels, each of 80 Watts and assuming, average sunshine hours to be 5 hours and derating factor be 0.85, then, it would be able to generate a power as below:

$$\begin{aligned}\text{Solar panel}_{P_{\text{output}}} &= \text{Solar panels watt} * \text{average hours of sunlight} * \text{Derating factors} \\ &= (3*80) * 5 * 0.85 = 1,020 \text{ Watts/ hour} = \mathbf{1.02 \text{ kWh}}\end{aligned}$$

This power output is more than enough to fully charge the Hero Optima battery (link below) which has a total capacity of 0.96 kWh (48V/20AH). Importantly, the complete charging of the battery can be done by the vehicle's panels itself instead of external source of charging supply. Idea is to optimize the vehicle's efficiency and effectively utilizing parking time.

**Note:** A flexible composite solar panel that is 70% lighter than a glass module and 14 to 17 kg lighter than conventional panels” (Australian Government, 2020)

Hero Optima battery size: [https://heroelectric.in/optima\\_e2\\_la/](https://heroelectric.in/optima_e2_la/)

Flexible solar panels: <https://www.energy.gov.au/news-media/news/backing-next-generation-solar-technologies>



# CONCLUSION

Overall, the innovative design could bring a major revolution in the electric two-wheeler industry. An ability to charge anywhere with the presence of sun and utilizing the free parking time effectively is main ambition of this project. Moreover, it will also assist the electric infrastructure by reducing the load on itself and promote two-wheelers compared to four-wheelers.

## Any Questions?



## ABOUT INVENTOR / PATENT HOLDER (S)



Mr Yash Sheth is an Indian based innovator and presently a renewable energy engineer in Australia. Yash Sheth inherit extensive experience in the area of renewable energy and energy efficiency. Moreover, holds a master degree in Renewable energy from an prestigious Australian University and Bachelor in Mechanical Engineering from India.

Miss Dimple Sheth is in a teaching profession since past 5 years after finishing her Diploma in Computer engineering and Bachelor of Computer Applications. She inherits deep knowledge in computer programming and designing.

## EXPECTATIONS

Inventor/ Patentee seeks alliance with potential entities to license this technology, including patents.

Inventor/ Patentee is looking to sell/ assign this technology, including patents to any entity.

Further collaboration on this technology, including for further research, product development etc.