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Vehicles powered by an Electric Motor which draws current from rechargeable batteries are termed as Electric Vehicles. IC Engines replaced by Electric Motor & rechargeable Batteries To address the quantum of emissions from the “Transport” sector powered by fossil fuels, “electric vehicle” is considered a viable option for short distance / intercity trips with adequate “charging stations” available. India is a power surplus country and is currently witnessing lower plant load factors due to lower capacity utilization. As per the conservative estimates, demand from electric vehicles (EV) could greatly improve the utilization factor of underutilized power plants, as charging pattern of EV users is considered to coincide with power demand during the non-peak hours in the country.

Today, India is one of the fastest growing economies in the world, but its increasing dependency on oil imports, rising environmental concerns and growing need for Sustainable mobility solutions are posing serious economic and social challenges for the country.

- Rising crude oil imports –an energy security challenge
- Rising pollution levels – an environmental challenge
- Evolving global automotive market –a manufacturing transition challenge

The premier think tank of Govt, NITI Aayog (National Institution for Transforming India), reports that India can save 64% of anticipated passenger road-based and mobility-related energy demand and 37% of carbon emissions by 2030 if it pursues electric mobility in future. This would probably result in an annual reduction of 156 MToE (Mega Tons of Oil Equivalent) in diesel and petrol consumption for 2030, saving INR 3.9 lakh crores. The cumulative savings for the tenure 2017- 2030 is expected to reach 876 MToE of savings for petrol and diesel, which totals to INR 22 lakh crores and 1gigaton for carbon dioxide emissions. (Source: International Energy Agency (IEA) - World Energy Outlook 2018)

Business opportunities in the E- mobility sector includes EV manufacturing, Battery manufacturing, Powertrain component manufacturing & Charging Infrastructure. Charging infrastructure is about; Charging station management, Home charging station set up, Portable charging station set up and Solar charging station installation centres.

The FAME II scheme of Govt offers Rs 1000 crore as incentives to set up charging stations across India. Under the scheme, the government is proposing to set up 2700 charging stations across the country, ensuring at least one station in a grid of 3 square km. With government push and the influx of startups, EV market is indeed a hot segment to invest in.

Proposed Plan for URJA- Charging infrastructure development

Centre for System Design (CSD), NITK Surathkal has put a lot of time & effort into the design & development of the VidhYug Series. These EVs are aimed to aid students & staff to navigate with ease around the campus sprawling over 295 acres. A charging station equipped with a solar farm for the same is proposed on the campus. Students & staff will be able to seamlessly charge their e scooters with a mobile app. About 10 e cycles, 4 e-scooters/bikes will be charged in the docking station at a time in a row. The solar charging station will consist of 16 panels, that is 8 panels in each row which will be 4m in width & 9m in length. These 16 panels will be 390W each and also includes a 5kW UPS. All this will be implemented following the guidelines issued by the Ministry of Power.

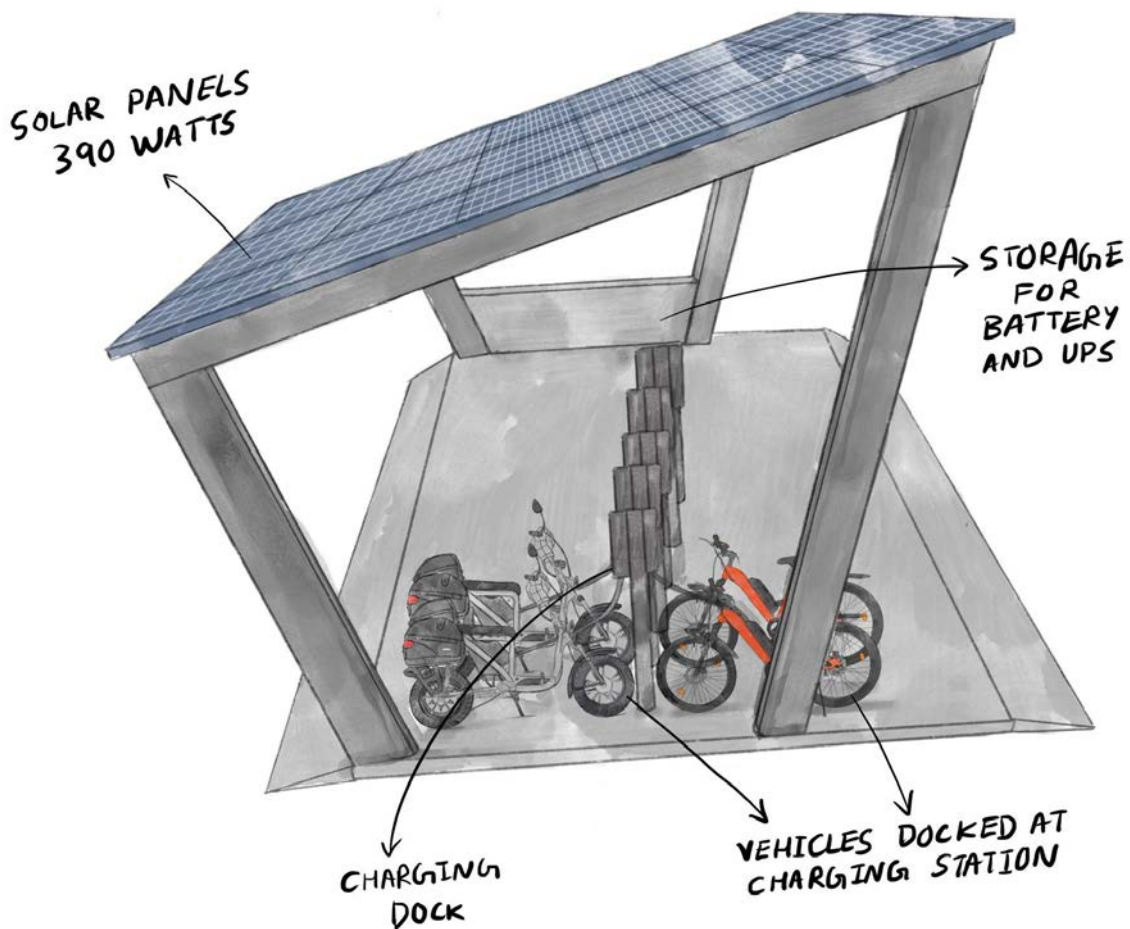


Figure : Concept diagram of URJA - Charging Infrastructure for Electric Vehicles at NITK Campus

EV Chargers and Charging Type:

Electric Vehicle Supply Equipment (EV Charger) : Equipment that supplies Electrical Energy to recharge the battery of vehicles

- DC charger for VidYug 3.0 72W- 10 nos
- DC charger for VidYug 2.0 330W- 2nos
- DC charger for VidYug 4.0 840W- 2nos

The system is also capable of charging upcoming "e van" for NITK

Charging Infrastructure Financials

1. Cost of URJA (1 no : pilot study) ₹ 16 Lakh
(includes civil works , solar charging unit(5KW with 10 hrs battery backup, CCTV, Digital signage, LED display panel, IRIS integrated for inhouse NITK designed smart monitoring system of URJA)-
2. Comprehensive AMC Charges and operational maintenance- ₹ 0.4 lakh/ year after warranty period .

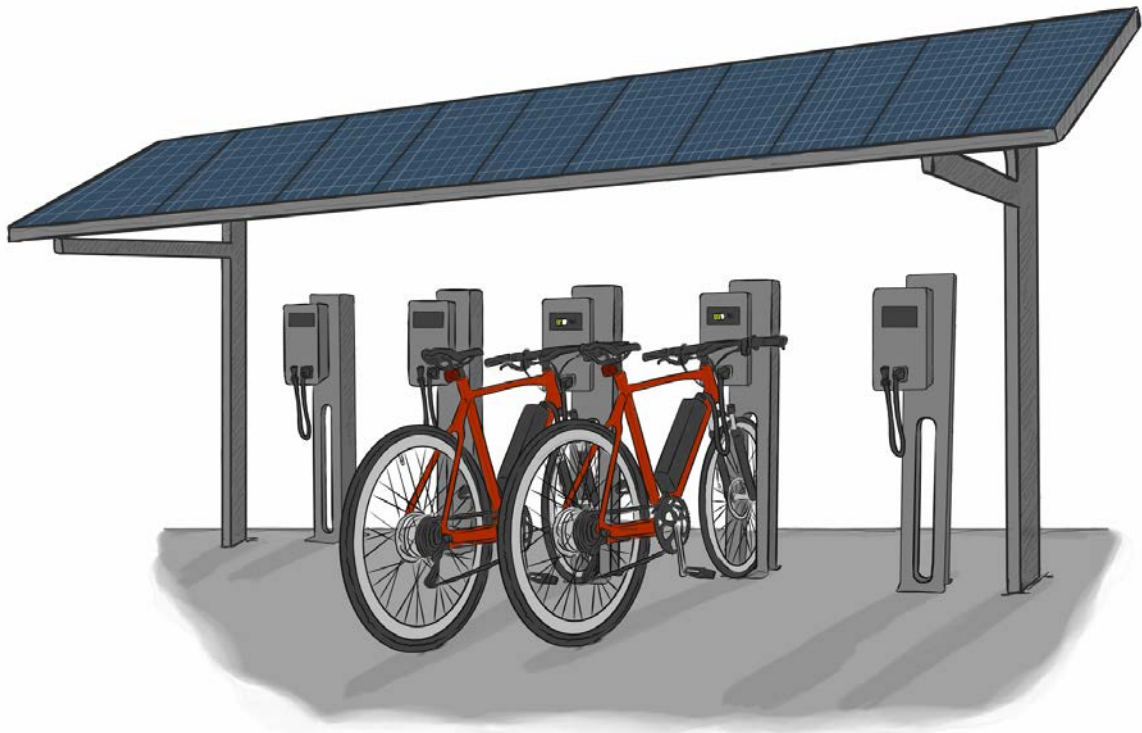
Warranty period : battery : 3 years, Solar panel : 5 years, UPS : 1 year

Total cost for 10 year (approximate) : ₹ 18 lakh

**NOTE: All expenses as per actual expenses, will be made to the firm that wins & executes the work order of this project*

An Earnest Plea to 1970 batch Alumni

N R Narayan Murty says, *"Nobody is bothered about an institution, more than its alumni"*. An organization's alumni are the reflection of its past, representation of its present and a link to its future. Good alumni relationships bring many benefits to both the institution and the alumni. The alumni's opinion in developing the university and enabling it to achieve its vision is highly valued by NITK. Setting up of Charging infrastructure for the NITK campus (**Urja**) will help immensely to meet the energy demands of EVs in the campus as well as boost the brand value of NITK Hence it is a humble request to our 1970 alumni batch to come forward and donate to this project -" **URJA - Charging Infrastructure for Electric Vehicles at NITK Campus**" which is of very high potential. This is a great opportunity to credit NITK for the success it has given to your life. Your donations will go a long way in ensuring that we achieve our goal of improving the brand value of NITK. The donors will be made a part of the project review committee consisting of professors from industries & the NITK fraternity and representatives from the 1970 alumni batch. Donors will have a say in the progress of the project. 1970's batch nameplate will be put up in front of the charging infrastructure. It is our assurance to maintain transparency in all our transactions and the progress of this project will be updated on social media and YouTube from time to time.



About Centre for System Design, NITK Surathkal

Centre for System Design (CSD)- A Centre of Excellence at NITK envisages an interdisciplinary approach and means for the realization of successful engineering systems. The Centre focuses on how to address and solve problems that transcend traditional boundaries. CSD also provides a platform for industry-academia collaboration

in multidisciplinary research areas. CSD has active collaborations with Industries such as M/s Aditya Auto India Pvt Ltd for a project on electrical mobility funded by the Department of Heavy Industry, M/s IFB, Goa (consultancy work for Noise and Vibration optimization of their front-loaded washing machine), M/s MRPL, etc. CSD is also catering to drone-related activities to the Govt of India, the Indian Army and the Govt. of Karnataka. CSD has ventured into the electric vehicle domain through the VidhYug series. VidhYug is EVs ranging from mini-e-scooter to e-bikes for campus mobility purposes. VidhYug 1.0 is a mini-e-scooter to help students commute around the campus, while VidhYug 2.0 and VidhYug 2.1 are e-scooters for the commuting of staff of the RE office and Dispatch section. For all the EV related activities mentioned above, the availability of an in-house state of the art charging infrastructure facility is necessary to fulfil the core energy demand of the EVs on the campus.



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Representative 1
1970 Batch



Representative 2
1970 Batch