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The future of EV Infrastructure in India

We have witnessed a sustained impetus by the government for the development and production of electric vehicles. This has appropriated rapid and pervasive planning and implementation of a holistic, ubiquitous, and accessible digital-electronic infrastructure. This is to facilitate, maintain, and support widespread usage of electric automobiles. A lot of companies have stepped in and progress is on track. However, there persists generous room for further betterment.

The government is working with various research and regulatory bodies as well as companies to develop norms, technical specifications, and standards to equip the country with a network of charging stations. A number of specifications have been released by the government and some original specifications like the AC-001 and the DC-001 have already been devised and finalized and are awaiting rollout. Tangible, modular infrastructure, that is charging stations themselves, have been erected at select sites. All of this is aimed at unfailingly catering to the various needs of a vast base of future users, smoothly and multifariously. The ultimate goal is to ensure their convenience of access. The more recent regulations demand that all the charging stations be fitted with multi standard chargers, as AC Type 2, CCS, and CHADEMO, besides the existing norm of the lower power AC and DC-001. However, these measures rely on the grid. Hence their performance and utility are contingent upon the availability of property, connectivity to the grid, and the very capacity of the grid. It is here that Solar Energy infrastructure comes into the picture.

Owing to its position on the globe, India has immense solar potential. Investments get compensated soon after installation and steady returns flow in for several years.

A solar EV charging station consists of 3 kinds of power management blocks. These are the solar panels, the grid, and the battery, a central control unit, and a user side providing Power Output and an Information Display and User Interface, respectively.

The Solar Panel Installation yielding approximately 150 kW/m should viably lie in the Kilowatt range. It is connected to a very high-efficiency DC-DC converter module and the operating voltage at either end is of the order of a few hundred Volts. The grid connection is optional and supplementary in role. The batteries which are of the high-longevity, deep-discharge, and volume-efficient Li-ion type serve as a source and the sink or storage. Numerous recent advancements in Semiconductors and Magnetics have rendered power conversion blocks very efficient and power-dense. There is a data port on each battery, typically CAN or RS485, which are daisy-chained and fed to this termination unit. It further has a top-level indicator displaying the health and status of each constituent battery, a part, or the entire system.

The system is modular in nature for easy scalability and ready expansion. The modules are 3-5kW each with a communication bus, typically CAN or MODBUS/RS485. The central controller can be used to smartly

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configure, manage, diagnose, track, measure, and monitor all the operational parameters of the system for optimization as well as billing purposes. It also enables

user interaction managing wireless connectivity, ID verification, and account handling as well as remote control and fault reporting. In the long run, all of these save maintenance costs and maximize delivery and convenience.

In the coming years, with the sustained push from government subsidies and incentives, and advances in material sciences in leaps and bounds, the rise of solar energy to paramountcy is imminent. In a diverse, subtropical-tropical nation as India that enjoys a high number of clear, sunny days, solar technology, being an adaptive and modular setup is widely-implementable and highly-scalable. Today, ecological concerns are not isolated but are about alleviating our footprint all over the supply chain. A combination of solar energy and electric vehicles is an ideal solution to pervasive, contemporary pollution problems. A hybrid, smart supply is not only convenient and reliable for the buyers and profitable to the supplier but also likely to enjoy widespread adoption, endorsement, approval, and even active sponsorship by various governments and bodies. Thus, the Solar prospects in the Indian EV Sector are indeed very bright and present a ripe opportunity to be reaped for power-sector investors.