

ELECTRIC VEHICLES – PAVING THE PATH OF INDIAN FUTURE

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Today, it is a concept whose time has come!

Electric Vehicle (EV) technology is gaining ground and popularity rapidly. With depletion of oil reserves and a world characterized by smog, noise and all kinds of pollutants, governments and communities are awakening to the several benefits of EV technology. Zero emission vehicles that are noiseless with just the faint hum of the motor. Vehicles that can be charged at home or at work, saving drivers the need to queue in at gasoline stations. Vehicles that can draw electricity even at night when consumption is low, making more efficient use of our Power Plants. EVs are easier to service and maintain and are ideal for “stop – start” city driving conditions. The absence of gears and clutch make them extremely reliable and safe and easy to drive and maneuver in our congested cities.

With the innumerable advantages of EVs, companies in the developed countries have spent huge amounts to develop electric cars that can travel longer distances, providing a high level of comfort. In spite of this technology being available now, the cost of electric vehicles to suit driving requirements in these developed countries is prohibitively high.

High fuel costs, congested city roads, low vehicular speeds and limited driving distances make India a leading contender for the introduction of EVs. India is also uniquely and favorably positioned for EV startup because of availability of mechanical hardware and low manufacturing cost. Other advantages for India are its low labour cost, low production start up cost, availability of R&D facilities in electrical, electronics and auto component industries, low level of current investment in IC engine manufacturing capacity and potentially very large domestic city car market. With the largest potential EV market in the world, the chance of reducing the production cost of EVs in the near future is highest in India.

India has an excellent opportunity of exploiting existing EV technology, which is most appropriate to its current needs of city mobility. With current Lead

acid battery technology, EV technology can be currently used for small city vehicles, 3-wheelers, city taxis and mini buses. In India, the EV manufacturers include BHEL, Scooters India, Mahindra & Mahindra, Bajaj Auto and Reva Electric Car Company. All these are indigenous efforts and look at niche markets that exist in India. These vehicles have a range of 80-100 km with top speeds of up to 65 kph, which meets the requirements of Indian conditions.

The success of EV technology will depend on the capabilities of organizations to integrate international standards at a low cost and capability to produce low volumes at low overheads. Reva Electric Car Company (RECC) has done just that. The vehicle's design allows it to be manufactured and tooled at low cost and done indigenously. Reva has been designed using the state of the art Technology in the EV Industry. It incorporates advanced battery management and Diagnostic Systems along with the unique safety features.

EV's need to be light and efficient. The REVA uses a lightweight tubular steel space frame that supports all the suspension and body components. The space frame completely encloses the passenger compartment and is designed with energy absorption sections. The body is made out of lightweight dentproof ABS body panels. The extruded sheets are thermoformed to the desired shape and have a high impact resistance. The bumpers are 1-piece hollow, rotationally molded. The integrated bumpers include energy absorption cones and all light attachments. The doors incorporate a steel frame with side impact protection beams, sandwiched between two plastic panels. Use of this technology makes decreases the weight of EV's improving range and performance

The management of the energy flow in battery powered electric vehicles is essential. The REVA has a microprocessor based Energy Management System (EMS), that communicates to all other systems in the vehicle, such as motor controller, battery pack, charger, instrument cluster and

controls. It uses state-of-the-art algorithms for battery charging, state of charge calculation, vehicle safety and diagnostics.

As electric vehicle service is fairly new, for prompt service it is essential that any problem in the vehicle should be easily identified. To analyze the data at the service center, a sophisticated data retrieval system, based on a palm device called Portable Electronic Tool (PET) was developed for REVA. Individual voltages, currents, temperatures, etc. are measured, processed and data stored. All other electrical / electronic systems are continuously monitored and error logs are generated. The palm device has capabilities to post process the data and provide help menus for service personnel. The information collected by the palm device can be easily transferred to a desktop for further analysis.

What Indian EV manufacturers have been able to do, is to incorporate the latest EV technology in vehicles, and at the same time make them commercially viable. For example, the equivalent product to the Reva sells for over 3 times in Europe. These strengths are unique to India and enable India-based companies

to respond more rapidly to the technology shift. Thus, they have the opportunity to capture leadership as the industry evolves. Companies that avail themselves of the situation by establishing positions as innovators in EV development will gain parity and possibly surpass entrenched competitors.

Such possibilities are not without precedent. India's ascendancy in the information technology sector offers an excellent example of the ability to enter emerging markets by mobilizing available capabilities and resources to create a vibrant new business sector.

The worldwide EV industry is projected to grow to over Rs. 45,000 crores (USD 10 billion) within the next 10 years. Also, as future battery technology gets more inexpensive (such as lithium Ion and Nickel Metal Hydride) EV's acceptability and usability will further increase in next 3-4 years. In the next 10 years, Electric vehicles will certainly be the mainstay in technology – EVs powered with fuel cells for inter-city driving and EVs powered with batteries for intra-city use.

