

Electric Vehicles Vital to India and Nepal

By David Matthews

While electric cars were developed in the U.S. more than 100 years ago, on this continent and in Europe the greatest number of EVs are still found off-road, mainly for industrial, recreational, personal mobility and transport purposes. EVs fulfill an important role in these practical applications because of the evident need to eliminate indoor pollution. Only recently have EVs started to gain wider acceptance for on-road transportation.

In comparison, there is an urgent need to introduce EV alternatives to pollution-generating transportation in large metropolitan centers throughout the developing world. Vehicle emissions have created such serious health problems that public health concerns in several countries now dictate that EV technology is actually a necessity. Indeed, many cities around the world are forced to mandate the EVs to mitigate the explosive growth of poisonous two-cycle engine vehicles.

In the Indian subcontinent, there are a number of companies, predominantly Indian, working on EV solutions to reduce the vehicle pollution problem. Curtis Instruments, Inc. is one of a few U.S. companies involved in these efforts. For the past 40 years, Curtis has worked with hundreds of companies and on thousands of EV applications in use globally. Five years ago, Curtis began to supply manufacturers in India and Nepal with components, including motor speed controllers, battery indicators, throttles and Curtis/Albright contactors. Today, Curtis is involved in most of the on-road EV development efforts in these regions.

India's pollution problem is one of the most serious in the world, and vehicular emissions accounts for two-thirds of it. The worst polluters on the road are the two-cycle engine vehicles, such as scooters, auto-rickshaws and tempos (a large auto-rickshaw that transports up to ten passengers). Many of these vehicles burn a gasoline and kerosene mixture and spit out up to 40 percent of its fuel as hydrocarbon emission. Already the largest market for two-cycle engine vehicles, India has the population growth and

improving economic conditions that point to an explosive demand for more of these vehicles - and the EV alternative.

The health issues and economic impact associated with the toxic air problem in India are posing a serious threat to the country.

- Air pollution in India caused an estimated 2.5 million premature deaths in 1997 - equivalent to wiping out the entire population of Jamaica or Singapore. (*World-Watch*, July/August 1998)

- In 1995, 25 million people in India's major cities were treated for respiratory diseases like asthma and bronchitis. (*World-Watch*,



Photo by Karen Kaszanski/Matrix

With one of the worst pollution problems in the world, India is turning to electric vehicles for relief.

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• World Health Organization ranks Delhi number four on its list of cities with the worst air quality.

Because of the intensifying air pollution problem, many local auto-manufacturers embarked on electrification programs to convert their internal combustion vehicles to quiet, clean electrical power. Evidence of this is apparent in India and also in Nepal, where 400 electric "green" tempos traverse the streets of Katmandu.

The EV market in those regions is segmented into three distinct vehicle types. One is the electric "tempo." These vehicles operate throughout cities on set point-to-point routes. The fixed routes and schedules make tempos ideally suited for conversion to electricity. Scooters India Limited is a key player in this market and has demonstration fleets running in Lucknow, Delhi and Agra. Mahindra and Mahindra, India's largest manufacturer of multi-utility vehicles, also has made inroads in both India and Nepal with its electric tempo called Bijlee.

In Nepal, several small companies have sprung up to produce electric tempos, which now are the region's most common public transportation vehicles. This has helped combat severe pollution experienced in that region due to the valley effect, which traps pollution. Because of limited manufacturing in Nepal, all but one of the current makers of electric tempos utilize a chassis supplied by Scooters India Limited. Local companies build the bodies of these vehicles at their shops and import select components from companies like Curtis.

With the infusion of electric tempos in



Three-wheelers developed by Scooters India Limited, such as the VIKRAM EV, were the first electric vehicles to be introduced on Indian roads.

Nepal, the need for an infrastructure to support EVs has also appeared. Charging-stations capable of charging fleets of vehicles as well as banks of batteries, which can be swapped from station to vehicle at any time, have become a common site in Katmandu.

Another distinct EV product in India is the auto-rickshaw, which transports up to three passengers. Unlike its big "tempo" brother, the auto-rickshaw operates more like a taxi and does not travel on a set daily route. Bajaj Auto, based in Pune, produces the bulk of these vehicles, which include two- and four-cycle engine types and a diesel version. As the primary mode of transport in cities, these vehicles signifi-

cantly contribute to pollution problems. Working on an aggressive schedule, Bajaj has EV prototypes operating in Pune and other major Indian cities. Production units are scheduled for this year.

The third EV product hitting the streets of India is a passenger car for personal use. Like other Indian auto-manufacturers, the REVA Car Company has the goal of producing a product with components from India. In 1996, this Bangalore-based subsidiary of the Maini Group displayed a prototype of their first electric car, the REVA. Available for purchase this year, the REVA is a two-door hatchback that seats four people. With a range of 80 km and a top speed of 65 kmph, this electric car is targeted for consumers who want the convenience of a four-wheel vehicle at the operating cost of a two-wheeler.

India and Nepal can be proud of their most recent EV developments. The great strides taken by their manufacturers mark the most aggressive on-road EV activity worldwide. Curtis values its role in these efforts since the opportunity is far more than a business pursuit - it addresses a major environmental issue affecting the quality of life of millions of people.

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The REVA is India's first mass produced four-wheel electric vehicle.