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An electrifying solution to urban pollution

Introduction of electric rickshaws will reduce the pollution in large cities, says **Anil K Rajvanshi**

An electric cycle rickshaw can provide a non-polluting and very silent transport system for urban areas of India. Besides it is very energy efficient and cost effective. Work done at Nimbkar Agricultural Research Institute (NARI) in Maharashtra has shown that improved cycle rickshaws powered by electric motor and batteries have a potential to provide an attractive alternative to petrol and diesel powered three wheelers.

The cycle rickshaw has hardly changed since it was introduced in 1930s and '40s in India. The gearing and the mechanical advantage of the pedal is very poor. Similarly the seating arrangement is very uncomfortable and the aerodynamic drag of the system is very high. The rickshaw manufacturing is a footpath industry with no quality control and there are as many rickshaw designs as cities in which they ply.

NARI has designed a very efficient rickshaw with ample luggage space, five speed gears, back wheel braking and better aerodynamics. This improved rickshaw enables a rickshaw puller to take two persons on a 6 per cent slope quite easily and effortlessly. NARI improved rickshaw is expected to cost Rs 5000 which compares very favourably with the existing rickshaw costs of Rs 4000-4500. Now this improved rickshaw is being converted into an electric one.

A pedal assisted electric cycle rickshaw with a very efficient 1 KW DC motor, suitable lead acid batteries and a smart interface card can provide a suitable transport system in urban areas and can be an attractive replacement for the existing petrol and diesel powered three wheelers. The electric rickshaw is designed to go about 60-70 km in one charge.

Data collected has shown that electric rickshaw is very energy efficient and will consume specific energy of about 103 whr/person-km. A petrol powered three wheeler however consumes 198 whr/person-km. These petrol powered rickshaws are designed to run at 40-50 km/hr. Normally in cities they operate at 20 km/hr. At these low speeds they not only become even more inefficient but also pollute much more than their designed exhaust levels. Also the running cost of a petrol powered three wheeler is 85 paise/person-km whereas the electric rickshaw running cost will be 6 paise/person-km or about 14 times less than that of a petrol powered one.

The electric rickshaw can be easily designed with the existing motor and battery development technology. Our estimates show that electric rickshaws can be mass produced for about Rs 25,000. This is much cheaper than Rs 53,000 that one pays for diesel or petrol powered three wheelers.

Besides creating a non-polluting transport system in India, electric rickshaws will also provide dignity to rickshaw pullers. Besides giving dignity, electric rickshaws can also provide extra income to the rickshaw puller since he can ply his rickshaw to greater distances in one day.

Similarly pedal assisted electric bicycles can be a replacement of petrol powered two wheelers. There are quite a number of good designs developed by companies all over the world. Last year Japanese companies Yamaha and Honda sold about 200,000 such bicycles. These bicycles go about 30-40 km at a speed of 20-25 km/hr in one charge. However they are presently being sold at $1500. Nevertheless with more R&D their prices can be brought down.

It should however be pointed out that for electric bicycles and the electric rickshaws to succeed they require very efficient and lightweight permanent magnet DC (PMDC) motors. These small motors (capacity one one KW or less) are not manufactured in India.

(1) Policy decisions need to be made by the government that in the centre of cities only improved or electric rickshaws and bicycles will ply. Or at least a preference should be given for parking these vehicles. This type of decision will also help spur the R&D and manufacturing of such rickshaws.

(2) More R&D needs to be done in developing better and efficient PMDC electric motors for these rickshaws. Even importing of battery and motor technology will be very useful to reduce the time taken for introducing electric rickshaws in India. Electric rickshaws should be put in renewable energy system category and hence should get all the incentives presently available to these system.

(3) Loan facilities at easy interest rate should be made available to the buyers of electric rickshaws and bicycles.

Introduction of electric rickshaws will not only reduce the pollution existing in large cities but will help arrest the trend of increasing pollution in small Taluka towns as well.

The author is director, NARI