## Action for sustainable mobility in Indian cities

Nascent policy action has begun in some small and big cities of India to move away from car centric city development. The city governments are active to find ways to reform and fund public transport systems, reform bus sector policies, apply more sophisticated information technology in the management of public transport, develop innovative micro finance schemes for non-motorised transport, and design walking infrastructure to make cities more pedestrian friendly. Though just a beginning these are crucial steps forward. These interventions need support and push in all cities. Centre for Science and Environment presents a snapshot of these policy interventions across cities of India.

## Dedicated funds for public transport

### Urban transport fund in Surat

Surat is the first city in India to have set up a dedicated urban transport fund. The city did not have any public transport system. That led to phenomenal increase in the number and usage of personal vehicles. The city's vehicular population increased from 4 lakh in 1994 to 13 lakh in 2007 accounting for a yearly growth rate of 11.89 per cent. To reverse this trend the city government has recently finalized a comprehensive urban mobility plan that is expected to cost Rs. 10,352 crore. Public transport is an important component of this plan.

To meet such humongous budgetary needs and the objective of the National Urban transport Policy, the Surat Municipal Corporation (SMC) has set up a dedicated urban transport fund, the first ever in the country. The SMC proposal on dedicated urban transport fund was notified on February 28, 2008. The fund has been created through budgetary allocation. Its revenue components will include vehicle tax amounting to Rs 8 crore, pay and park charges of Rs. 2 crore and license fee for advertisement rights of all kinds amounting to Rs. 5 crore.

One of the most important steps already initiated by the city government is expansion of public transport buses and implementation of CNG programme. A large number of three-wheelers have been converted to CNG. There are a total of 24 CNG stations on all strategic points.

### Pimpri-Chinchwad urban transport fund

The twin cities of Pimpri-Chinchwad on the Bombay-Pune expressway have also set up a dedicated urban transport fund in September, 2008. The Pimpri Chichwad municipal corporation (PCMC), is a part of Pune urban agglomeration.

Under the Urban renewal mission, PCMC is setting up a bus rapid transit network for 130 kilometers. Currently, work has started for the first 60 km. The project is being funded under the JNNURM. Ashish Sharma, Municipal Commissioner of the PCMC, announced that for future funding of urban transport, the corporation has identified "land" as an important source of revenue in addition to the traditional sources from transport that comprise of the regular fare box collection, monthly passes and advertisements. Land has also been identified as an important source of revenue in the report on eleventh five year plan for funding urban transport.

A zone of 1000 meters on either side of the BRT corridor has been designated as the BRT influence zones. The corporation plans to earn from sale of increased FSI (floor space index), building permission charges and advertisements, transfer of development rights with payment of a premium and incremental property tax from indirect beneficiaries

who are in this case the owners who benefit from enhanced land value due to public transit corridor development. The FSI has been increased from 1 to 1.8 within the BRT influence zone with an objective to promote densification of the bus corridor. The corporation would be able to generate Rs. 14.65 crores through this kind of financial mechanism and the fund would be utilized for development of public transport infrastructure and purchase of rolling stock.

**Indore: Innovative bus transport project**

The city of Indore has become quite iconic for its reform and expansion of the public bus transport system. Indore like many other cities had fallen victim to gregarious growth of traffic, congestion, delays, and accidents. The sum of its pubic transport included private minibuses, tempos, mini-vans, and auto rickshaws. It did not have efficient, safe, and affordable public mass transport system. Proactive city administration therefore made efforts to completely rebuild its public transport system and its reform its management.

Indore City Transport Services Ltd. (ICTSL) was set up as a special purpose vehicle and a specialized regulatory agency to deploy, monitor cost effective and good public transport services with private partnership, get private investment for provision of a fleet of coaches for the city public transport, and to develop necessary support system for improving transport infrastructure within the city. Vivek Aggarwal, the district commissioner of Indore, who had guided this process provides the detail of this initiative.

**How are buses managed and operated?** The city bus route network system has been scientifically planned and designed. Direction oriented hub and spoke pattern of routing has been adopted. The operators actively participate in the bid process and the ICSTL allocate the routes to operators.

Global Positioning System (GPS) has been installed in all buses with central room to manage scheduling and reporting of operational details such as distance travelled and stoppages. ICTSL provides passenger information systems for the convenience of the commuters at all bus stops which shows on a LED monitor the exact time of arrival of the next bus. A fully automated vehicle tracking system has been implemented to ensure that the buses reach the stop at a fixed time. Any deviation from timing is corrected and controlled using GPS and real time tracking solutions from the state of the art control room. GPS-based On Line Bus Tracking System (OLBTS) is identified as a tool to ascertain service levels. The OLBTS provides estimated time of arrival that is flashed on display screens at bus stops as information to passengers. Moreover, it helps in operation of the city bus system by providing the log of exact kilometers travelled by a bus, control over unauthorized and unscheduled stoppages, and better kilometers per litre and earnings per kilometer.

Terminals allow easy and efficient transfer amongst different routes. ICTSL in association with Indore Municipal Corporation has developed more than 300 bus shelters on different city bus routes. On an average, bus stops are located at a spacing of 500–600 m and are sensitively designed.

Bus shelters are provided by the ICTSL and all buses are parked at the common premises. All buses have mobile phones with close user group network. ICTSL has complete charge of the operators. The staff wears a common uniform. Modern low-floor TATA Star bus have been chosen for the scheme.

Colour coding of routes and buses and their numbering has been carried out in such a manner that a commuter may easily identify the bus stop and intersection for convenient commuting.

**Revenue model**: The main sources of revenue for the system are fare collection, advertising, and bidding amount by private participants and sharing of revenue generated through monthly passes. Revenue sharing mechanism allows 80 per cent of the pass revenue and 60 per cent of advertising revenue to the operators besides their daily fare collection.

The monthly pass system was the backbone of the financial model. There is a uniform bus fare system and a single pass for all buses on all routes. The company started with a single pass for all priced at Rs 300. This would allow the passenger unlimited travel for a month on any bus on any route.

There is also self-financing and income generating mechanism for bus stops. The revenue generated through these stops is shared with the Municipal Corporation. The passenger information system display screens are another source of revenue.

To ensure maximization of revenue from the buses, applications are invited from companies interested in taking the rights for advertising on the buses. The highest bidder at Rs 25,000 per bus per month was given the contract. Revenue from advertising on the coaches for this financial year 2006–7 has thus been tendered at the rate of Rs 25,000 per bus per month. 60 per cent of the advertisement revenue is given to the operators and 40 per cent is accounted to ICTSL. Further, revenue from advertising in Passenger Information System LED display screens at ICTSL bus stops and plasma screens within the buses are extra sources of revenue.

Hundred per cent of the daily collection revenue goes to the operator. This covers the cost of operations and EMI. Another advantage of this is ICTSL does not have to keep staff for managing and checking collections.

A competitive fare is charged to provide healthy competition to mini buses and tempos. It is low enough to secure fullest utilization and high enough to ensure viability of the system. ICTSL is now introducing the automatic fare collection system. Fully computerized electronic ticketing machines are used for issuing daily passenger tickets. This helps in effective monitoring and control of conductors and management of ticketing data. There are plans to introduce smart cards for efficient systems of fare collection.

Sharing of pass revenue is dependent on adherence to routes and timings. Salary structure across all operators is uniform.

This initiative has helped to improve the modal share of public transport in the city.

## Innovative financing for non-motorised transport

### *Dipbahan* Rickshaw Bank Project in Guwahati

*Dipbahan* Rickshaw Bank Project began in Guwahati with an aim to design an indigenous tricycle rickshaw, an important means of localized transportation in many Indian cities. This project was initiated by the Indian Institute of technology (IIT) Guwahati, to design an indigenous tricycle rickshaw suitable for Indian conditions, and a manufacturing system with participation from small and medium enterprises (SMEs). Prior to working on tricycle rickshaws for passengers, a single seatertrike (a tricycle for single person) was designed and developed for able bodied person which is modifiable for lower limb disabled people as a pilot experiment. The trial was successful. Cycle rickshaws have been redesigned to be more aerodynamic, lighter than the traditional vehicle, safer seating arrangement making easier on the puller and more comfortable for the passengers. After the launch of

the initial model of *Dipbahan* and observing market acceptance and reactions, design and technology transfer mechanism were studied.

*Dipbahan* and its design were finally transferred to an NGO, Centre for Rural Development, Guwahati. Few key personals from the NGO were also trained for manufacturing. Thereafter, entire manufacturing of *Dipbahan* was handed over to the NGO.

To introduce and popularize *Dipbahan*, concept of Rickshaw Bank was introduced which had the vital factor of creating capital amount to start microfinance. The *Dipbahan* was designed to provide advertising space at the rear end. Corporates such as HLL, OIL and ONGC were approached to fund 100 rickshaws at a rate of Rs. 7,000 from their advertisement budget and they were provided with advertisement space in *Dipbahans*. This served as mobile advertisements for the companies. The amount was invested in fabrication of *Dipbahan* and the rickshaws were provided to rickshaw pullers on microcredit. The pullers were actually paying a hiring charge of Rs. 25 per day and this was converted to repayment and after 300 days the *Dipbahan* was owned by the puller. The amount received was reinvested for fabrication of more *Dipbahan* and thus more employment was generated.

In addition, 5 members of the pullers were grouped and made guarantors of each other. Five such groups were assigned to a rickshaw garage for maintenance of the *Dipbahans* and collection of daily repayment amount. Further the rickshaw bank provides pullers with municipality licenses, photo identity cards and uniform. Insurance facility for the puller, passengers and the vehicles is also being provided. Health checkups of the pullers and their families are regularly carried out. Other benefits include bank accounts, cooking gas connectivity, emergency loan on need based purchase items.

The project started in Guwahati and is expected to spread in other urban centers. Under the rickshaw bank micro credit scheme, the Centre for Rural Development, Guwahati has introduced the *Dipbahans* in Assam, Agartala, Tripura, Uttar Pradesh, Bihar, Tamil Nadu, Madhya Pradesh and Orissa. The garbage disposal van and the school van are in trial stages. Work is going on in other models including mobile PCOs for disabled persons based on tricycle. In addition, vending carts, delivery vans are being developed and tested.

## Reinventing walking environment

### Will Nanded be our little “Copenhagen”?

Nanded, a small town in the Marathwada region of Maharashtra is all geared up to become the ‘Copenhagen’ of India. The streets of this small town are now being redesigned along the principles of the National urban Transport Policy related to public space and equitable space allocation for all road users with a focus on people rather than vehicles. A length of 40 km has been taken for redesigning. A group of architects have selected what is termed as a more “inclusive” and “universal” road design with space for all road users, which would also facilitate even the visually impaired. The right of way has been designed keeping in mind road safety, segregation of traffic, improvement of traffic flows, allocation of space for off road activities and siting of street furniture, modal integration, beautification and landscaping or in other words green streets and maintaining quality of public space.

The pedestrian way has been planned in a way that space is allotted to pedestrians, cyclists, the multiutility zone that include parking space for cars, two wheelers, bicycles and autorickshaws, bus stops, hawker platforms so that they do not encroach upon the

footpaths or the roads. Space has been created for trees, public toilets, post boxes, street lights, planters, garbage bins, garbage collection points, electric transformers and advertising space. The existing land use has been taken into consideration while designing the streets.

The design has also provided for pedestrian crossings, pedestrian refuge islands, signages, traffic signals. The design though provides for kerb cuts for access to the abutting land use, the sidewalk has been continued across the bituminous patch and cobbled ramps have been provided on either side for returning the automobiles back to the road. This also deters the motorized vehicles from picking up speed and acts as a traffic calming measure. Intersections have also been designed and cobbled. Even the entry and exit of the adjacent buildings have been changed to make it a bit more pedestrian friendly, a taste of new urbanism.
The city has found itself a berth in the category 'C' of the JNNURM floated by the Ministry of Urban Development by virtue of its religious and pilgrimage importance -- one of the five Takhts of the Sikh religion. The core area is plagued with dearth of facilities for pedestrians and lack of signages.

The city lacks organized bus transport but has very high share of pedestrian and non motorized transport. Maharashtra State Transport Corporation operates only four public buses on selected routes. The cycle rickshaws, are important transportation mode. Before the jeeps and cars take over its roads its important for this town to plan an alternative path. This network and walkway improvement project was conceived under JNNURM in 2006. Managed by the ILFS group, and designed and conceptualized by Pradeep Sachdeva, Interface for Cycling Expertise, (I-CE) the Netherlands, TRIPP and L.R. Kadiyali and Associates Nanded is all set for a "new look". Sachdeva says, "The streets have traditionally been extension of our homes in India and a well designed street should provide recreational spaces to the rich and the poor, hence a lot of nitty-gritty should be looked into for designing the streets."

**Redesign for multimodal integration**

**Thane Railway station**

Thane, one of the 18 vibrant urban centers of the Mumbai metropolitan region is currently experiencing rapid growth. Thane railway station, one of the first and oldest in the country bears the entire load of inter and intra –city travel demand. The city also has developed in a circular pattern around the central business district adjoining the railway station. The heavy load around the station area makes it very congested as there is haphazard movement of vehicle and people and leads to friction between pedestrians and crisscross movement of motorized traffic.

The Thane municipal corporation has initiated improvement scheme that would not only clear the clutter but would also provide for modal integration and increased usage of public transport. The project targets segregation of motorised and non-motorised modes, safe passage to pedestrians and railway commuters, avoid conflict movement at junctions and creation of additional space at the station area by management of traffic and commuters. The project envisages two skywalks of 410 mt joining railway foot overbridges so that the commuters who wish to avail bus transport can directly come out of the railway platform on to the concourse through the skywalk. The concourse area that would accommodate the additional commuter facilities would cover an area of 1200 square kilometers. A low level deck of 1500 sq m would also be created to accommodate 16 bus stops and the area below would be used by autorickshaws and taxis. A flyover of 800 meter would allow for free passage of bus transport from the concourse. This improvement project would allow for seamless integration of traffic modes – railways, bus

transport, intermediate public transport and pedestrians, would streamline the traffic flow and reduce air and noise pollution levels.

## IT application in public transport

### Electronic ticketing in KSRTC buses in Mysore

The Karnataka State Road Transport Corporation (KSRTC) has become one of the leading public transport undertakings in India to introduce electronic ticketing machine in its buses. This is being done to optimize efficiency, reduce operational cost, increase revenue, reduce scope for revenue pilferage by conductors, help better labour relations, generate scientific accurate traffic information and great help in case of services operated with just driver cum conductor.

-- Compiled by Priyanka Chandola and Jayeeta Sen