Sustainable Urban Transport Management for Nashik City

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Abstract- Nasik is a rapidly developing city of Maharashtra with unique problem set of Kumbhmela when it attracts pilgrims many times its population creating tremendous strain on City resources especially on roads & traffic. Heavy traffic congestion accompanied by Vehicular pollution has become bane of this once City of Gardens. The city is witnessing rapid motorization along with increased traffic congestion and pollution. Present status of transportation infrastructure of Nashik city is studied. A comprehensive study is carried out to find solution for Perennial Choking of Transport System of Nashik. BRTS appears to be a Sustainable Transport Management for Nasik. "A Smart City delivers public and civic services to citizen and businesses in an integrated and resource efficient way while enabling innovative collaborations to improve quality of life and grow the local and national economy"

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I.   INTRODUCTION

Nashik has grown from a population of 21940 in 1901 to 1077236 in 2001 and 14.86 lakhs in 2011 and current population of Nashik is approx. 18 lakhs. Population growth rate of Nashik has been constantly more than any of the cities in the Maharashtra state, and is the fourth largest city in terms of existing population. The projected population for the year 2031 is 37.5 lakhs. Nashik is situated on Delhi – Mumbai Industrial Corridor (DMIC) which is being developed by Government of India as dedicated freight corridor between Delhi and Mumbai. Nashik is also one of the important cities of the golden triangle project of Govt. of Maharashtra. The National Highway No.3 i.e. Mumbai Agra road connects Nashik to important cities of Nashik and National Highway No.50 connects Nashik to Pune. Nashik also has good railway connectivity as it is situated on the main line of Central Railway on Mumbai-Bhusawal Section.

In addition to this four state highways i.e. Nashik-Dindori-Wani (SH-11),Nashik-Peth (SH-12),

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Nashik Aurangabad (SH-60), Nashik-Trimbak (SH-4) also provides additional connectivity former two state highways also connect Nashik to Gujarat State. Nashik city traffic consists of mixed traffic of slow and fast moving vehicles.

Due to inadequate width of carriageway and low vehicle speed, the carrying capacity of the roads is hampered by frequent congestion. There is substantial increase in the volume of motor vehicles, cycles and pedestrians, traffic due to high rate of industrial development. There is also a marked increase in the motor cars in the city roads.

Again, the problems are aggravated due to lack of footpaths for pedestrians and cycle tracks.In a nutshell Nasik needs a Sustainable Transport system for various stake holders including four wheelers, two wheelers, pedestrians, non-motorized transport, bicycles & heavy vehicles.

The term 'sustainable transport' is used to describe modes of transport and systems of transport planning that are consistent with wider concerns of sustainability. There are various interpretations of sustainable transport, and images associated with its meaning, but the more popular meaning tends to refer to: "modes of transport (or ways of getting around) that reduce or minimize social costs and environmental impact, particularly the minimization of carbon and other polluting emissions from transport". The current structure of governance for transport sector is not well equipped to deal with the problem of urban transport (UTP 2006).

In order to promote sustainable transport the government of India has taken various steps such as formulation of NUTP, encouragement of project with global environmental facility, capacity building programme, clean development mechanism, strengthening of institutional setup. There is dire need of improvement both in road and rail based mass rapid transit (MRT) facility.

Aim of the present study is to study present Transport System & different modes of transport in Nasik city as well as to explore different alternatives for Public Transport, Non-motorized Transport, Traffic management, Pedestrian safety, Mode of shifting from personal vehicle to public transport system.Government has decided on developing 100 "Smart Cities" in the country. Accordingly, in his budget speech of July 2014, the Finance Minister has stated as follows:

"As the fruits of development reach an increasingly large number of people, the pace of migration from the rural areas to the cities is increasing. A neo middle class is emerging which has the aspiration of better living standards. Unless, new cities are developed to accommodate the burgeoning number of people, the existing cities would soon become unlivable. Smartness in a city means different things to different people. It could be smart design, smart utilities, smart housing, smart mobility, smart technology etc.

Physical Infrastructure for Smart City:
Urban Mobility
Our urban communities are confronted with fast mechanization. This has prompted serious blockage, falling apart air quality, expanding occurrence of street mischances and a quickly expanding vitality bill. Strolling and cycling have been rendered hazardous because of poor base and open transport has been lacking. As such, urban transport

arranging has stressed accommodating the individual engine vehicle. Open transport frameworks have been arranged in disconnection with the outcome that a very much coordinated multi-modular framework has not come up. This has brought about high cost offices not giving the results that were looked for.

Hence, improved mobility will involve a three pronged approach whereby there are:

1. Improvements in public transport – Metro Rail, BRT, LRT, Monorail, Trams etc.
2. Improvements in infrastructure of other motor vehicles – ring roads, bypasses, underpasses, elevated roads, improvements in the existing road ways
3. Improvements in infrastructure for walking, cycling and waterways

II. METHOD AND DATA COLLECTION

To assess the traffic characteristics in the study area, classified traffic volume counts, Origin-Destination surveys were carried out at a number of locations identified along outer cordon, inner cordon and screen lines. Road Network Inventory Survey, Speed and Delay Survey, Turning Movement Count Survey, Occupancy Survey of Passenger Vehicles were also conducted.

As per traffic count survey, Origin and destination survey carried out for Nashik city is shown in the Figure 1. It is observed that 37% are private vehicles which include 4 and 2 wheelers which can be very well observed through the Figure 1 which shows that non-motorized and public transport mode are the dominant means of transport in the city. The resulting mode split is shown in figure 1.
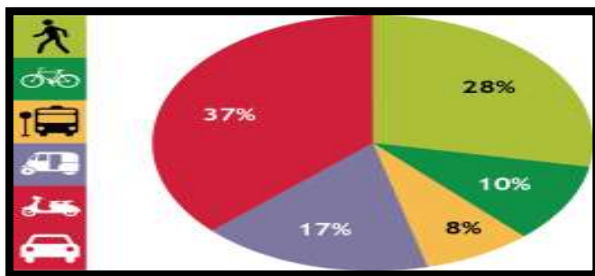

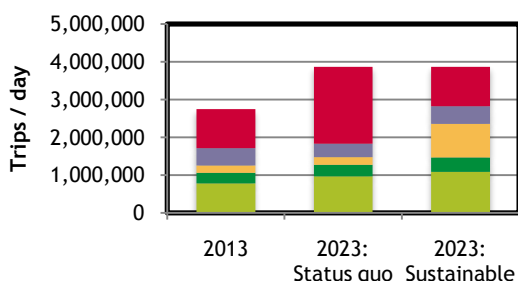*Figure 1: 2013 Nashik mode shares*

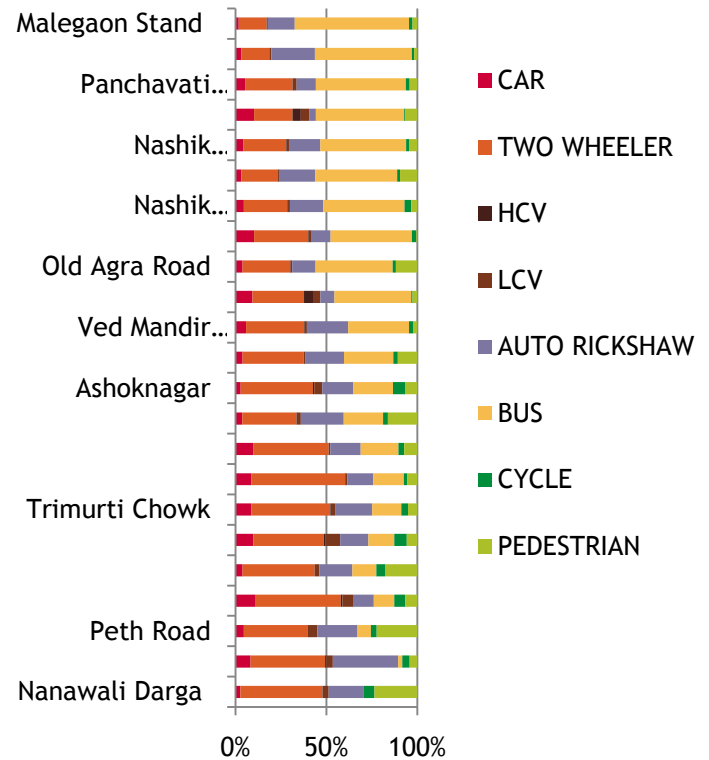*Figure 2: 2023 scenario comparisons (Status Quo v. Sustainable).*

Figure 3:Traffic count survey

It was identified by Origin Destination (O-D) Survey & socio-economic surveys following issues concerning Nashik's transport system were noticed:

a) There is Poor pedestrian infrastructure in Nashik.
b) Limited public transport services and low public transport mode share.
c) An effective parking management mechanism is not available in Nashik city.
d) Environment deterioration due to motorized traffic.

Nasik city is witnessing rapid motorization along with increase congestion and pollution. In the present study data collected are as follows:

1. Sanctioned development plan of Nashik city: - Land uses for various purposes, road width, reservation from parking, future requirement for parking, D.C. rules and amendments for upcoming D.P. which is under progress.
2. Vehicle data from RTO:- Vehicle population for last 3 years and their growth in each year, so we can able to forecast for vehicular population for coming 10 years and also te different types of vehicle.
3. Data from traffic police: - It gives data regarding accidents since last 3 years, it also gives count of fatality and injured persons and it also gives the information regarding different one way sanctioned in government gadget and their enforcement in the city regarding the traffic.
4. Data from MSRTC: - the collected from MSRTC gives details about the number of city buses and with bus route in the city (320 routes) with their fares.

5. Data from NMC regarding Kumbhmela: -Length of total constructed road in the city, availability of footpath, developed parking reservation, policy regarding existing, future traffic management and information regarding other existing infrastructure is collected.
6. NHAI: - Information regarding NH 3 & NH 50 and other roads which passes through city limits is collected.
7. Statistical Department: - Information collected regarding the population of the city.

2.1Present status of Nashik City:

In the year 2001, India's urban population was 27.8% but it is likely to increase to 38% and 47.5% in the year 2031 and 2051 respectively and provision of transportation infrastructure is a tough task for such huge population. As per survey of City Mayor foundation Nashik is the 16th fastest growing city in the world.

Issues related to public transport in Nasik City-

*   Poor pedestrian infrastructure such as RUBs / ROBs / Footpaths, Pedestrian crossing etc. are necessary for proper transport system. Inadequate parking Traffic, Traffic Safety, Traffic problems are due to increased number of Auto Rickshaws and private vehicles.
*   Numbers of buses are less, as a result of which more private vehicles are on the roads
*   The bus depots are inadequate and are not properly located, this results in lot of dead mileage,The over aged fleet is resulting in unreliable operations and consequent passenger's dissatisfaction
*   Absence of link roads and bypass road is responsible for traffic congestion. There is environmental deterioration due to motorized traffic such as Greenhouse gases (GHG) emissions. There is need of increase in share of public transport. In Kumbhmela there is heavy inflow of private vehicles & public vehicles is expected
*   Lot of congestion is caused in the city centre
*   There is lack of infrastructure accountability and co-ordination between different agencies
*   Lack of traffic awareness in people
*   Ignorance about Vehicular pollution & its causative effects on health of citizens.
*   Intersection/ junction development & pedestrian / cycle corridors are neglected
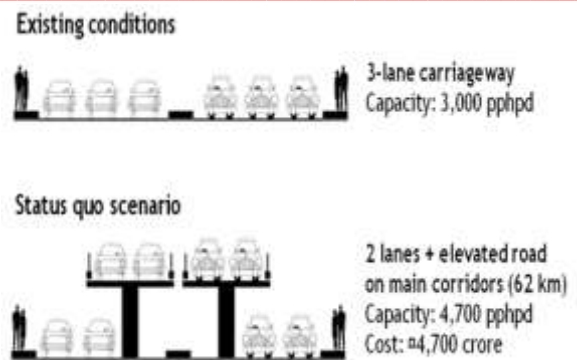*   Paucity of Parking places

Figure 4: Traditional infrastructure system

Even if all roads have elevated from top, there won't be enough capacity for 2023 demand.

Figure 5. Traffic congestion at Shalimar Chowk

A case of Shalimar Chowk is explored for development of proposed BRTS which is shown in figure no. 5.Large crowds of people waiting for the infrequent and unreliable bus service and heavy 2-and-3 wheeler traffic at the Shalimar bus stop characterize the transportation scenario in Nashik.

The following goals for the Nashik city upto the year 2023are summarised as given below:

*   *Improve safety*: Zero fatalities per year from traffic crashes or public transport accidents(existing 160 persons/year).
*   *Support Non-Motorized Transport (NMT):* Maintain existing 38% (10% existing) share of all trips by cycling and walking.
*   *Improve public transport:* 35% (8% existing) of all trips by public transport.
*   *Public transport accessibility:* 75% (8% existing) of residents within a 5 min walk of formal public transport.
*   *Keep Nashik air healthy:* Zero nonattainment days for PM and NO_X, So2 80 (existing 25), SPM-100 micron gm/cum (existing 152 micron gm/cum) emission& to manage SPM within permissible limits.

Achieving these goals will require a detailed planning process along with regular monitoring and

evaluation to determine whether Nashik is on target to meet these benchmarks.

Besides, the existing MSRTC Bus service, to meet the future demand Bus Mass Transit System (BMTS) is proposed BRT network comprises approximately 26 km in 1st phase of dedicated BRT corridors and service large portion of Nashik metropolitan region corridors are selected based on the following basics which includes current demand for travel base on existing MSRTC and share auto rickshaw networks, potential for future growth as per Nashik sanctioned DP. These corridors are CBS to gangapur road (7.5 km), CBS to trimbak road (9 km), CBS to Nashik road (9.5 km).

Figure 6 shows Shalimar area of Nashik, which is in commercial zone as per sanctioned DP of Nashik. It is situated in gaothan area, near big and old commercial zone main road and also the super specialty hospital. People travel through MSRTC & Auto rickshaw from Nashik road and other parts of city. In present situation there is no bus base, no proper parking arrangement. Buses are overcrowded during peak hour and their speed is dropping by the day during the traffic congestion which leads increase in noise and air pollution. Due to insufficient public vehicle which result use of personal vehicle. Figure 3 shows the sustainable traffic management which design all road users like footpath for pedestrian, cycle track for bicycle for NMT (Non-motorized transport), BRT as public transport which has dedicated right of way, affordable and high performance, also the hawkers place and also separate lane for private vehicle which reduces traffic congestion and environmental pollution too which leads to a sustainable development.

Figure 6: Sustainable traffic management at Shalimar Chowk, Nashik

Sustainable traffic management-

- In order to facilitate integration of transport services holistically and pragmatically, an "institution" need be created to coordinate the existing multiplicity of organizations dealing various complex issues of urban transport. High Capacity bus system can be used in city; it can reduce 40-50% accidents and injuries.
- Creating of Parks and other pedestrians places to make happy urban life.

- Creating more number of pedestrian plazas and vehicle free zone.
- Private vehicle free zone would be making in certain portion of congested area of city during 4 to 9 pm every day.
- Celebration of days like Happy Streetwhere people get together to live a breath full day on roads & vehicle free day.

Nashik remains at an intersection in its history and advancement. With appropriate urban mediations at this stage, it can maintain a strategic distance from the pitfalls of urban areas of comparable attributes and can set elevated requirements for different urban areas to take after. The city can possibly turn into a worldwide business and social focus that manages its subject's massive advantages as employments, open doors, and enhanced personal satisfaction. For this chance to wind up a reality, the city will need to create satisfactory framework and administrations to encourage advancement and enhance the personal satisfaction of every one of its subjects, both rich and poor.

III. CONCLUSION

1. After a detailed study of Nashik city it is found that for sustainable development of city, Nashik needs integrated transportation management plan.

2. With the aim of promoting sustainable transport in Nashik, it is necessary for the transportation point of view to regulate the heavy traffic smoothly by the way to facilitate compact, pedestrian friendly development along the city's planned with BRT corridors, improve non-motorized transport connectivity and manage the parking supply to reduce dependence on personal motor vehicles, Which will reduce traffic congestion so that it will minimize environment deterioration like air pollution and noise pollution. It also promotes NMT on motorize transportation.

3. Nashik has a good potential to develop as a smart city.

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