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No.BMRCL/MD/PS/2019-20/
29th April 2019

Dear Dr. Basavaraaju

In pursuance of the Government Order No.ಸಾ�ರಿ 269 ಸಾಇಪ 2018, dated 20.09.2018, the report of the Committee on **"Efficient and Sustainable Transport in Bengaluru and Bike Taxis"** is submitted with this letter for appropriate consideration of the Government.

On behalf of the committee members and on personal behalf, I would like to convey our gratitude to the Government for being given the opportunity to deliberate on this critical challenge for the city and to give a report with recommendations for addressing the binding constraint for the economic growth of the city in environmental sustainable manner.

With regards,

Yours sincerely,

(AJAY SETH)

Encl: Report

Dr. B.Basavaraaju
Principal Secretary to Govt.
Transport Department
M.S.Building
Bangalore-560 001.

PRS on leave.

12/02/2021
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ಸಾರಿಗೆ ಇಲಾಖೆ (ಸಾರಿಗೆ-2)

T-2

Report on Efficient and Sustainable Transport in Bengaluru and Bike Taxis

Government of Karnataka

April 2019

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Note from Committee Chairman

Bengaluru is one of the major engines of economic growth for the entire country. For the state of Karnataka, the city accounts for almost 36% of the Gross State Domestic Product. With its robust and extensive eco-system for professional education, scientific and technical research, information technology, electronics design, and start-up opportunities, the city has been generating huge economic opportunities and jobs for highly skilled to semi-skilled populations, attracted from within the state as well as outside. The massive pace of growth of the city's population necessitates expansion and upgradation of the city's infrastructure, housing stock for different income segments and public services. In particular, the urban mobility infrastructure has fallen behind the curve, with the increasing road congestion, longer commute times and environmental stresses emerging as the binding constraints for the city's march towards achieving its ecologically sustainable economic potential.

For enabling comprehensive planning for addressing the constraint of mobility infrastructure, Government of Karnataka constituted a Committee for making recommendations on "Efficient and Sustainable Transport in Bengaluru". The Committee was also asked to study the pros and cons of introducing bike taxis in the city and to make its recommendations.

The Committee held 4 formal meetings, besides having several interactions among the members for specific problem areas. The Committee also met bike taxi operators including the IT-based mobility solution providers. The Committee interacted with experts working in the mobility sector. Assistance was obtained from the World Resources Institute (WRI) India and UITP. The Vidhi Centre for Legal Policy provided support for analysing the problems from legal perspective and suggesting possible anchoring of the recommendations in the relevant laws.

The Committee is indebted to the support provided by WRI India, in particular to Ms. Chaitanya Kanuri from the organisation who helped in data analysis, delineation of concepts recommended by the Committee members and in putting together this report.

The report recommends strategic focus areas by the Government and macro-level interventions by various mobility infrastructure agencies, regulatory authorities and mobility service providers. It is expected that the work of the Committee can provide meaningful inputs for the development of a comprehensive mobility plan for Bengaluru by the Directorate of Urban Land Transport or the Bengaluru Metropolitan Land Transport Agency, which is likely to be constituted soon.

Ajay Seth
Chairman
Committee on
Efficient and Sustainable Transport in Bengaluru

Introduction to the report

1. Transportation is a driver of economic growth, connecting goods and services to markets and citizens to education, healthcare, livelihood opportunities and other social activities.

2. In rapidly urbanizing India, poorly planned and inadequate transport infrastructure has created inefficient urban transport networks that are slowly bringing the country's most dynamic cities to a gridlocked halt. Declining levels of public transport service provision and a concurrent rise in average household incomes have led to higher levels of vehicular ownership, resulting in an exponential growth in the number of registered vehicles in cities across the country. In addition to widespread congestion on urban roads, this has led to air pollution levels beyond permissible limits and a growing inequality in access to mobility. Moreover, the transport sector is one of the fastest growing in terms of GHG emissions. As the third highest contributor to GHG emissions in the country, the majority of transport sector emissions are due to fossil fuel usage in road transport.

3. Efficient and sustainable transportation is therefore the need of the hour in Indian cities. Taking cognizance of this fact, the Government of Karnataka, as per the Government Order dated 20th September 2018[1], established this committee for the purpose of making recommendations for establishing efficient and sustainable transport in Bengaluru, and to study the pros and cons of implementing 'bike model systems' as a means to achieve this. In the course of its deliberations, the committee debated widely on several aspects of the vast landscape of sustainable and efficient transportation and focused its attention on some fundamental questions. Through this, it is hoped that the report becomes a resource for contextual short-term action to improve transportation in Bengaluru, as well as a framework for consultation in shaping the long-term objectives and policies of urban transportation in the state of Karnataka.

Report outline

4. The report is organised as follows:

- Section one defines what is meant by efficient and sustainable transportation, setting the context for a common understanding of the objectives and stated outcomes of a transport system that aims to be efficient and sustainable.
- Section two lays out the status of urban transport in Bengaluru and goes on to highlight the gaps in the transport system that make it inefficient and unsustainable, leading to poor outcomes and negative externalities.

[1] Annexure 1

- Section three provides a vision, mission statement and goals of a comprehensive mobility plan for Bengaluru.

- Section four outlines a set of strategies for achieving a transition to sustainable and efficient transportation in Bengaluru, through nine strategies for shaping the decision-making processes of transport planning in the city. The rationale behind each strategy and the expected impacts from its application are described in detail to present a clear picture of what each strategy is expected to achieve.

- Section five details a set of actions recommended for implementing the strategies, categorised into the different components of the urban transport infrastructure and the regulatory, fiscal and governance measures needed to shape the sector.

- Section six deals with recommendations for financing the mobility action plans from budgetary as well non-budgetary sources.

- Section seven assesses the need and potential implications of 'bike model systems' on the transport system of the city, by analysing the bike-based models vis-à-vis existing service models of urban transport and their potential impact in Bengaluru, and making appropriate recommendations based on the analysis.

- The report ends with a section highlighting the next steps required to operationalize the recommendations.

Scope and limitations of the report

5. The report had to rely on the available set of data on mobility infrastructure and traffic, as collection of up-to-date primary data was not found practical given the short timeframe for the committee. The focus of the report is to assess the status of urban transport in Bengaluru through the twin lenses of sustainability and efficiency, and frame guiding strategies and macro-level action plans for medium to long term periods of 6 to 12 years to achieve improved transportation and mobility in the city. The way forward will require collection of primary data to validate the scope of recommended macro-level plans, detailed study of the mobility infrastructure to identify specific location-based projects, and deep study of all public transport systems for improving their efficiency and to plan their expansions, dialogue with regulatory authorities, and specific outreach measures to get strong buy-in from the commuters.

1 Efficient and sustainable urban transport

6. Efficiency and sustainability as concepts in transportation hold multiple meanings with overlapping connotations and variations that depend on the geopolitical context in which they are used. This section offers a concise definition of the two concepts, tailored to be relevant to the key issues faced by transport in Indian cities such as congestion, air pollution and uneven quality of public transport services.

1.1 Efficiency in transportation

7. Efficiency is a measure of the relationship between inputs and outputs, or between costs and benefits in a given system. High efficiency indicates an optimal use of inputs associated with achieving desired outputs or benefits. Efficiency in passenger transportation is defined as 'the extent to which a certain transportation input can meet the travel demand of people in a transportation system.'[2] A second definition describes efficient transportation systems as those that achieve transportation goals through the optimal utilisation of limited resources.

8. Input resources in urban transportation comprise the transport infrastructure, vehicles, fuel, time and money required to achieve the output of fulfilling a given travel demand. Of these, the most limited resources are the transport infrastructure and time. Transport infrastructure, which includes the road network, parking spaces, transit hubs and other fixed components of the urban transport system, takes up urban land which is a limited resource with many potential productive uses. Similarly, time is a limited resource which can be put to other productive uses. There are thus huge opportunity costs of the transport infrastructure and travel time required for fulfilling a given travel demand, and an efficient transport system is one that optimizes their utilisation. While money and fuel, which in the transport sector refers primarily to non-renewable fossil fuels, are also limited resources when seen at a national or global scale, they are not considered limited at the individual or urban level. They are therefore not considered when defining efficiency in urban transportation.

9. Inefficiencies in urban transport are caused for one of three reasons, as enlisted below.

i. **There is insufficient transport supply to serve the travel demand:** Transport supply refers to the transport infrastructure network as well as the available fleet of public and private vehicles plying on this network. Transportation may become inefficient when a growing travel

[2] Yuan, H., Lu, H., 2005. Evaluation and analysis of urban transportation efficiency in China. Proceedings of the Eastern Asia Society for Transportation Studies 3(3), pp. 323-333.

demand is no longer adequately served by the existing supply of transport, be it the volume of the road network or the amount of parking space available or the capacity of public transport services.

ii. **There is mismatch of allocation of transport supply and travel demand:** It may be that the total supply of transportation is adequate to meet the existing travel demand but there is a mismatch in where the transport supply is provided and where travel demand exists. Transportation is inefficient if there are wide roads and frequent public transport services in the city centre, but travel demand is growing and underserved in the city's peripheries. It is also inefficient if high frequency public transport is provided during off-peak hours, but peak hour demand remains underserved. Mismatches in allocation can also be by mode of transport- transportation is inefficient if the road carriageway is allocated primarily to motorized vehicles despite substantial pedestrian and bicyclist traffic volumes.

iii. **There is sub-optimal utilisation of transport supply to serve the travel demand:** Even if transportation systems are well designed to serve a given travel demand, incentive structures or user behaviour patterns may result in sub-optimal utilisation of the existing transport supply, leading to inefficiencies such as single-occupancy cars congesting a roadway designed for higher-occupancy vehicles and pedestrians.

10. Results of inefficiencies in transportation are experienced as road congestion wherein the volume of vehicles exceeds the road capacity, as unavailability or overcrowding of public transport services, as higher pedestrian and bicyclist accidents due to mismatched road allocations, as illegally parked vehicles due to insufficient parking availability, among other negative impacts. Inefficient transportation systems lead to over-expenditure of time spent on fulfilling travel demand and the excess or sub-optimal utilisation of urban land for transportation. Inefficiency due to inadequate transport supply also leads to latent travel demand that remains unrealised, with consequences for social equity and economic productivity.

11. Efficient transportation is concerned primarily with fulfilling given travel demand with the most optimal utilisation of limited resources. It is not directly concerned with the social equitability of access to transportation, or the negative economic and environmental externalities of unchecked growth in travel demand which are issues that come under the purview of sustainable transportation. It is however important to note that improving accessibility and reducing travel demand directly contribute to the efficiency of a transport system. In turn, efficiency in transportation can improve sustainability outcomes of transport systems. Efficiency and sustainability in transportation are thus closely related

and interdependent, with the achievement of one contingent on the achievement of the other.

1.2 Sustainable transportation

12. The modern definition of sustainable development was framed in the landmark report of the Brundtland Commission in 1987, as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Transportation being one of these needs, the definition of sustainability highlights the necessity of meeting the mobility needs of everyone in the present without depleting the resources needed for mobility by future generations. Sustainable transportation is also defined as transportation where beneficiaries pay their full social costs, including those that would be paid by future generations. This definition links the non-sustainability of transport to its negative externalities, which are in turn a result of commuters not paying the full social costs of their mobility choices. The social, economic and environmental dimensions of sustainable transportation are further explored below.

13. **Social sustainability of transportation:** Sustainable transportation allows the mobility needs of individuals and societies to be met safely and equitably. The social dimension of sustainable transportation is concerned with the creation of inclusive transport systems that are accessible for everyone, including marginalised groups such as differently-abled persons, senior citizens, and women. Transportation is not equitable when it is predominantly designed for the mobility of private vehicles while neglecting pedestrians and users of public transportation, nor is it equitable when it limits the mobility of wheelchair bound and other differently-abled persons. Social equity in access to transport is marked by the comprehensive availability of transport infrastructure in all parts of the city, universal accessibility to transport services and the assurance of safe and secure mobility for women, pedestrians and any other commuter groups at risk of harassment or accidents.

14. **Economic sustainability of transportation:** Sustainable transportation is affordable, operates efficiently, and supports a vibrant economy that links people to economic opportunities and industries to markets. The quality of transportation networks and linkages is critical to economic development and growth. Affordable transportation is closely linked to social equity and enables all urban residents with mobility to access educational and livelihood opportunities. This results in a more productive workforce that in turn helps realise vibrant economic growth for the city. Further, the efficient operation of transport systems enhances this productivity by minimizing the costs and resources required for serving travel demand, thereby enabling a virtuous cycle of the economic sustainability of transportation.

15. **Environmental sustainability of transportation:** Sustainable transportation limits emissions and waste, and minimizes the consumption of non-renewable resources such as fossil fuels and land. Considering the contribution of the transport sector to CO2 emissions and urban air pollution, environmental sustainability is concerned with reducing the total number of vehicle kilometres travelled for serving travel demand while also reducing the emissions and fuel consumption per vehicle kilometre. The Avoid-Shift-Improve (ASI) framework focuses on ensuring the environmental sustainability of transport systems. The ASI framework provides a holistic approach to sustainable mobility, with cross-sectoral measures that result in avoiding unnecessary motorized trips, shifting a significant proportion of trips to more sustainable modes of transport, and improving vehicular technologies to minimize the health and environmental impacts while providing more convenient mobility options.

16. Sustainable transportation is primarily concerned with achieving the equitable fulfilment of travel demand in the present while minimizing negative externalities to ensure the intergenerational equity of resource availability. As such, it aims to realise and fulfil suppressed demand in the present transport system with the supply of accessible and affordable transportation. At the same time, it aims to curb induced or excess travel demand to minimize waste and consumption of resources. Sustainability in transportation is thus directly concerned with the regulation of travel demand, while also focusing on the efficiency of the transport supply for resource optimization.

2 Transport Ecosystem in Bengaluru

17. This section provides a comprehensive overview of the different components of the urban transportation system in Bengaluru and the mobility patterns and trends of those living in the city. This is followed by an analysis of the key challenges and gaps of the city's transport ecosystem.

2.1 Components of urban transport

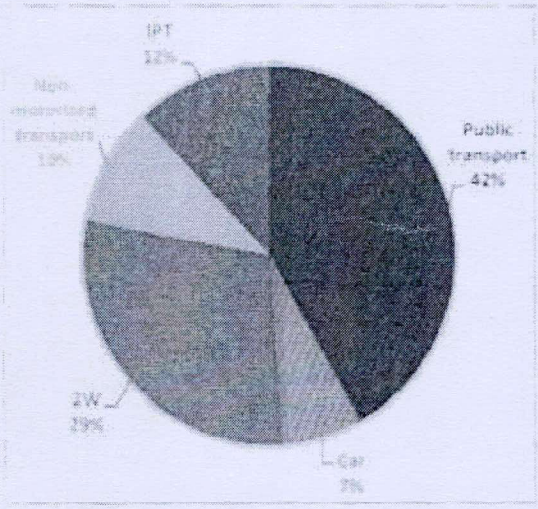

Figure 1: Bengaluru transport mode share

18. The economic transformation of Bengaluru into the IT capital of the country in the past three decades has resulted in the unprecedented growth of the city, both in terms of population and spatial distribution. As more and more migrants moved to the city in search of employment opportunities and major job centres were developed at the urban peripheries, the demand for transportation in the city boomed. A 2011 study shows that Bengaluru's per capita trip rates (PCTR) vary between 1.04 and 1.52 in different zones of the city[3], which is comparable to average PCTR values for Indian cities with populations of over 8 million inhabitants[4]. Average trip lengths in Bengaluru ranged between 4.75 and 7.59 km[5] (varies in different zones), a figure that is expected to have grown since 2011 as the city expands further, and trip lengths become longer.

19. The city's rapid urbanisation has been accompanied by even higher levels of motorisation. There is a total of 7.7 million registered motor vehicles in the city, for a population of approximately 12.3 million inhabitants. Ninety per cent of these are personal vehicles, with motorbikes accounting for a lion's share of 5.3 million vehicles. Vehicle ownership stands at 650 vehicles per 1000 people, equivalent to average vehicle ownership rates in countries like Japan and German where the per capita income is many times that of India. The number of personal vehicles continues to grow at over 10 per cent per year, more than double the rate of population growth.

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[3] DULT 2011. Bangalore Mobility Indicators 2010-11.

[4] C-STEP, Institute of Urban Transport (India). 2014. *Review of Urban Transport in India.* Accessed 14 Feb, 2017. http://www.indiaenvironmentportal.org.in/files/file/Reviewper cent20ofper cent20Urbanper cent20Transportper cent20inper cent20India.pdf

[5] DULT 2011. Bangalore Mobility Indicators 2010-11.

20. Public transport, served by a sizeable city bus network and a growing metro rail system, continues to carry a sizeable number of vehicular trips in the city. The Bengaluru Metropolitan Transport Corporation (BMTC) has a fleet of 6,521 buses which cumulatively cover 1.38 million kilometres and carry about 3.5 million passengers every day. Moreover, the Bengaluru Metro Rail Corporation BMRCL) operates a recently-completed 42 km metro rail network with average daily ridership of 375,000 commuters, and another 72 km of the network under construction. Limited suburban rail services also exist along select corridors in the city, with a daily ridership of 150,000-200,000 passengers. A network analysis of the existing public transit services shows that 85 per cent of the city's population live within a 500 m walking distance to a public transit station.

21. Other components of Bengaluru's transport ecosystem include formal and informal paratransit services, corporate employee transport services and numerous app-based new mobility services (see Section 7 for a definition of new mobility services). In addition to a fleet of 150,000 autorickshaws, a significant number of informal bus and shuttle services ply along major bus corridors across the city. Fleets of private service vehicles, both cars and buses, provide corporate employee transport services to the many IT and tech parks in Bengaluru. And in recent years, the city has been home to a growing number of new mobility services, which are characterised by on-demand transportation that can be accessed via mobile application. These are primarily ride hailing services provided by cab aggregators, with 150,000 taxis attached to these app-based services. They also include carpooling platforms, short-term motorized two-wheeler rentals and bicycle sharing services.

22. In total, personal vehicles serve 35 per cent of the total number of trips in the city compared to 42 per cent by public transport, 12 per cent by paratransit and other shared mobility services, with the remaining 10 per cent of trips made by walk or bicycle (see Figure 1).

2.2 Challenges and gaps in the transport system

23. Public transport continues to be vital to urban mobility in Bengaluru, but its mode share has been in decline over the years. BMTC's fleet size increased by 42% over a period of 13 years, however ridership increased by only 18% in the corresponding period. Growing traffic congestion is partly responsible for this, as is evident from the reduction in the number of kms traversed per bus per day from 231 km in 2006 to 202 km today.

24. Moreover, the growth in the public transport bus fleet has not kept pace with the growing transport demand. As per one estimate by UITP, the ideal fleet size of BMTC as per the current population of Bengaluru should be 9500 buses, as compared to 6500 buses. Moreover, the high proportion of routes to fleet size

mean that bus services suffer from overcrowding and infrequent service schedules along many routes, problems that are exacerbated by an ageing bus fleet and frequent delays due to traffic congestion.

25. While the 42-km long metro rail network contributed significantly to the public transport network during this time, low levels of service integration between the bus services and the metro rail network have led to a lack of adequate last-mile connectivity to access the metro. This has resulted in the failure to incentivise a large proportion of personal vehicle users to switch to the metro.

26. A declining or sub-optimal mode share of public transport has negative impacts on transport and external outcomes in a city like Bengaluru. The growing use of low-occupancy personal vehicles combined with fast-growing transport demand have greatly increased the number of vehicles and vehicle kilometres being carried on Bengaluru roads. This steep growth has overburdened the road network, which has been unable to expand to match the city's growth. Bengaluru is served by a 4000 km road network (according to CTTP Bangalore), the density of which is a low 8.2 km/sq.km., equivalent to 1/3rd of Delhi's road density[6]. Moreover, transport infrastructure in Bengaluru is inequitably distributed, with road densities and public transport networks that favour the core urban area over the expanding suburban regions. This further adds to vehicle kilometres on the road due to the higher dependency of the fastest-growing parts of the city on personal vehicles. This is demonstrated with statistics showing that the highest number of non-transport vehicle registrations are in the peripheral Regional Transport Offices (RTO) of Bengaluru East and Bengaluru South, while the lowest number are at the Bengaluru Central RTO[7].

27. The result is severe congestion, leading to productivity losses for the city's economy. Much of the city's road network, including that of non-CBD areas like Koramangala, has a recorded volume to capacity ratio far greater than 1, with V/C values going up to 3.6 on some stretches. Average motorized speeds in the city are among the slowest in the country at an average 17.2 kmph, according to data released by a private on-demand cab aggregator. Yet another study has shown that average speeds during peak hours in the CBD areas have dropped below 10 kmph. The Revised Master Plan for Bengaluru 2031 by the BDA has estimated that the cost of congestion to the city is around INR 3,700 crores, including the cost of time spent in traffic and the cost of fuel.

28. In addition to incurring economic losses for the city, the transport sector is also responsible for negative social and environmental externalities. Bengaluru's transport sector emissions contribute about 40 per cent of the city's PM 2.5

[6] Global Mobility Monitor Network. India Mobility Final Report.
[7] https://www.thehindu.com/news/cities/Bengaluru/over-60-lakh-vehicles-on-bengaluru-roads-and-counting/article8573251.ece

emissions[8], and 43.5 per cent of the city's GHG footprint[9], equivalent to 8.6 million tonnes of CO_2 released into the atmosphere. PM 2.5 emissions, in addition to other emissions caused by the burning of fossil fuels in vehicles, have negative health impacts that disproportionately affect the lower-income groups that form a higher proportion of pedestrians and bicyclists with higher exposure to air pollution. Congestion during peak hours further contributes to unsafe levels of localized PM2.5 emissions, while continued increased in vehicle kilometres travelled on city roads adds to the sector's CO_2 emissions. The resulting urban transport network is inefficient, with high social, economic and environmental costs of provision.

[8] Urbanemissions.info. Retrieved on 11 November 2018 from: http://www.urbanemissions.info/ india-apna/bengaluru-india/

[9] Ramachandra, T.V. et al, April 2015. GHG footprint of major cities in India. *Renewable and Sustainable Energy Reviews, Vol 44, pp 473-495.*

3 Vision, Mission and Goals

3.1 Vision: Efficient and Sustainable Transportation for All

29. The vision for urban transportation in Bengaluru is to achieve "Efficient and Sustainable Transportation for All," with a system that serves to help fulfil the economic and social needs of residents and visitors. The achievement of this vision is expected to help mitigate a major constraint to the city's role as one of the major economic engines for development of the state and the country.

3.2 Mission: Build a multi-modal transport system for equitable mobility access and minimized negative externalities

30. Achieving efficient and sustainable transport for all requires comprehensive data-driven reforms of our existing urban mobility paradigm which favours inefficient and unsustainable modes of transport that provide personal mobility but negatively impact system-wide mobility. There is a need to build a robust multi-modal transport system that provides options of high-quality, safe and integrated mobility for all users, regardless of income and gender. Further, it is necessary to reduce the negative externalities of the transport sector, by incentivizing sustainable modes of transport and investing in future-proof infrastructure. This mission statement may be further expressed in the form of the following three short-term and medium-term goals or objectives.

3.3 Goal 1: Regain road infrastructure as public good

31. The road infrastructure in the city is skewed in favour of those using their private vehicles, with commuters who are dependent on more efficient and sustainable modes such as NMT and public transport getting excluded from the equitable use of roads and being subjected to the negative externalities imposed by excess private vehicle usage.

32. Roads are supposed to be a "public good" from the economics perspective, meaning that their use should be non-excludable and non-rivalrous. No commuter group should be excluded from accessing or using the roads. At the same time, use of the road network by any one set of commuters should not prevent their simultaneous use by other sets of commuters. Regaining road infrastructure as a public good should be a central goal of a comprehensive mobility plan for Bengaluru.

3.4 Goal 2: Increase mode share of public transport in meeting transport demand

33. The share of motorized transport in meeting the mobility needs in Bengaluru is 90 per cent, of which public transport meets about 42 per cent[10]. This share of public transport has been declining over the past decade, with rapid urbanisation and rising income levels leading to higher levels of vehicle ownership and a growing trend of low-occupancy vehicle usage on roads. With the total vehicle kilometres in Bengaluru expected to grow by 205 per cent in the next 15 years[11], it is critical that the decline in public transport mode shares be arrested and the majority of growth in transport demand be accommodated by the transit network.

34. By 2025, the mode share of public transport should be increased to 60 per cent. In the long term, say by 2031, the goal should be to enhance it further to 70 per cent.

3.5 Goal 3: Reduce transport sector contribution to air pollution and GHG emissions

35. Sustainable urban development needs the contribution of all the different sectors therein, and urban transport currently is a major contributor to air pollution and GHG emissions in the city. As transport demand and motorisation are poised to grow further, the negative impacts of urban transport on health and the environment are set to further escalate. It is necessary to reduce the negative externalities imposed by transportation, by regulating transport demand, investing in cleaner technologies and prioritizing more sustainable modes of transport.

36. By 2025, the contribution of the transport sector to air pollution and GHG emissions should have reduced by 30 per cent. By 2031, this should have come down by 50 per cent from 2019 levels.

37. These mission goals require a comprehensive set of strategies ranging from better use of existing mobility infrastructure, investment in augmenting network capacity, facilitating mobility options with efficient use of mobility infrastructure, discouraging mobility options with negative externalities, and improving governance of the mobility sector.

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[10] EMPRI 2017. State of the Environment Report Karnataka 2015-16.
[11] Ibid.

4 Strategies for efficient and sustainable transport in Bengaluru

38. With the rapid growth in urban transport demand in Bengaluru, there is an urgent need to enable environmentally sustainable and economically efficient transport systems that increase accessibility for all urban residents. The traditional approach to dealing with transport demand, with the provision of additional road space to improve vehicular mobility, is no longer sufficient to ensure ease of movement in a sustainable manner. The focus now must be on moving people rather than vehicles, with an integrated and seamless transport system providing modal choice and viable alternatives to personal vehicle use.

39. The way forward should be to transition away from the current laissez-faire system that subsidises low-occupancy, personal mobility at the cost of public transport efficiency and the quality of the urban environment. The objective is to move towards an efficient and sustainable system that meets mobility needs of all residents of Bengaluru in an equitable manner and complements the growth of the city as the economic engine for the state as well as the country.

40. Transitioning to pathways of efficient and sustainable urban transportation requires significant, coordinated, and multi-sectoral action. A holistic approach is needed to achieve efficient and sustainable mobility, with multi-sectoral measures that result in avoiding unnecessary motorized trips, shifting a significant proportion of trips to more sustainable modes of transport, and incentivising cleaner and more efficient vehicular technologies to minimize negative externalities while improving accessibility. This requires a wide range of actions at different levels of governance, from promoting more integrated land-use planning and transit-oriented development for reduced travel demand to incentivizing cleaner vehicular technologies through policy and regulation. Shifting travel demand to more sustainable modes also requires a range of push and pull mechanisms that incentivize public transportation and shared mobility, while dis-incentivizing personal transport.

4.1 Strategy 1: Improve efficiency of road infrastructure

41. A large part of the capacity of the road network is blocked in unproductive and inefficient usage, due to improper planning as well as unregulated behaviours. Parking is a key culprit, taking up to 25 per cent of urban road widths- lack of a comprehensive parking policy and insufficient investments in building public parking capacities have resulted in even the most overburdened roads being used for organised and unorganised parking. Lack of parking provision by commercial establishments and individual vehicle owners has led to unregulated residential and commercial parking taking place on roads not designed for the same.

42. Other factors impacting the throughput efficiency of urban roads include the design of cross roads and junctions. Cross roads at shorter distances and the signalisation of their junctions with arterial roads are contributing to reduced speeds- for example, Dr. B.R. Ambedkar Road and M.G. Road have 5 signals each over distances of 1.5 km and 2.1 km respectively. Poor junction design with inadequate distribution capacity further aggravates throughput inefficiencies. Yet more factors include the non-uniform capacity of roads, flyover ramps occupying normal traffic lanes, lack of bus bays and the location of bus stops close to road junctions, all of which create bottlenecks in traffic flow leading to congestion.

43. For efficient road networks that work at full capacity and improve the management of traffic flows, it is necessary to free up road space from unproductive uses and enhance throughput of the road infrastructure.

4.2 Strategy 2: Augment capacity of road infrastructure

44. In addition to inefficient use of road infrastructure, the overall capacity of the road network is also a major constraint. Fast-growing parts of the city along the urban periphery contribute hugely to the population growth, but depend on inadequate and poorly-planned road networks that were not built for current transport demand levels. Urban growth beyond the Outer Ring Road, developed as a major arterial road with a 4 to 6 lane capacity to avoid traffic through the CBD, has resulted in large stretches of the ORR handling vehicle flows up to 2.5 times the road capacity during peak hours. Some of the busiest traffic junctions in the city are on ORR, namely, Hebbal, K.R.Puram and Central Silk Board junction with daily PCU counts of 3 lakh vehicles. This congestion, in turn, puts additional pressure on arterial roads in the CBD areas.

45. There is a need for augmenting the capacity of arterial roads in the CBD areas, as well as beyond the ORR. Planned road infrastructure in the rapidly developing peripheral areas such as Whitefield are also necessary for more equitable road densities across the city. While at-grade augmentation is the default option and should be pursued for peripheral areas, limitations of land acquisition in the CBD require consideration of road capacity augmentation through elevated roads. While major arterial roads leading out of the city have had their capacities augmented with the construction of elevated corridors in the past decade (Hosur Road, Bellary Road, Tumkur Road), there has not been much addition to road capacity within the CBD area. All further augmentation of urban road capacity, be it at-grade or along elevated corridors, should pay particular attention to the equitable allocation of road space, and should prioritise movements of public transport vehicles, pedestrians and bicyclists.

4.3 Strategy 3: Make commuters bear full cost of externalities of mobility modes

46. There are several negative externalities attributed to low-occupancy transport modes such as personal vehicles and certain IPT modes that contribute to increased vehicle kilometres travelled and fuel consumed, With the current laissez faire approach to regulating the usage of inefficient transport modes, the costs of the resulting negative externalities are not borne by the users themselves. Instead, the costs fall disproportionately on commuters who are dependent on walk-based and public transport modes with the encroachment of spaces meant for NMT by parked vehicles and the hampering of movement of public transport vehicles by excess traffic.

47. The current regulatory and fiscal regime do not account for the costs imposed by inefficient transport modes- for instance, taxi services under the guise of 'shared mobility' enjoy taxes lower than those on public transport and personal vehicles. Based on the principles of fairness and polluter-pays, a new approach is needed which imposes the full costs of negative externalities of given modes on their users in a proportionate manner, to mitigate their impacts on the city and influence more efficient mode choices.

4.4 Strategy 4: Influence mobility choice through regulatory, fiscal and pricing measures

48. Mobility is one of the core enablers of economic growth, and the fulfilment of the mobility needs of all urban residents in an efficient, sustainable and equitable manner is vital. Individuals choose to fulfil their mobility needs using a wide variety of transport modes ranging from single-occupancy personal vehicles to high-occupancy public transport services. These mode choices are often shaped by the regulatory and fiscal framework governing the urban transport system, which has traditionally favoured car-based personal transport. However, the goal of mobility systems should be the efficient movement of people and not that of vehicles, and the governance of the urban transport sector needs to evolve to reflect this objective. Regulatory, fiscal and pricing instruments should be designed to restructure the incentives and dis-incentives that influence commuter mode choices, with efficient and sustainable modes being favoured and prioritised over inefficient ones.

4.5 Strategy 5: Promote multi-modal mobility options

49. As urban mobility in the city is experiencing a shift towards greater personal vehicle ownership and usage, it is necessary to arrest this trend and

achieve more efficient, sustainable and equitable mobility by building a system that provides multiple options for quality transport. An effective multi-modal transport system that provides integrated, seamless and safe mobility has been found to reduce personal vehicle usage. This requires infrastructure investments that go beyond road networks for vehicles and include investments in public transport, NMT networks, and rail-based infrastructure. Integration between these different modes is essential to increase ease of access and movement, with multi-modal transit hubs and technology-based applications that provide integrated information and payment systems. By promoting urban transport policies centred around multi-modal mobility, it is possible for us to build mobility systems that are more diverse, equitable and resilient.

4.6 Strategy 6: Expand reach and augment capacity of public transport systems

50. For areas beyond walkable and cyclable limits in the city, public transport is the most efficient and sustainable mode for supporting equitable urban mobility. While shares of public transport usage have typically been high in Indian cities, they have experienced a decline in recent decades due to lowering service levels and aging, overburdened fleets.

51. The areas of operations of existing public transport systems, both road-based and rail-based, should be expanded throughout the city to provide convenient mobility options for commuters. At the same time, capacity of existing systems should also be expanded to provide frequent and reliable transit services for commuters during peak and off-peak hours.

4.7 Strategy 7: Improve operational efficiency of public transport systems

52. While the creation of infrastructure and capacity of public transport is critical, these systems also need to achieve operational efficiency to enhance commuter convenience and to optimize throughput- for instance, the Bengaluru Metro currently has a ridership of 9000 commuters per km per day, whereas it has a potential capacity that is two times this value. Similarly, the BMTC, which has a wide coverage of bus stops and bus routes across the city, can further optimise the frequency of services and on-time performance to provide more reliable services to commuters. Upgradation of the aging bus fleet and driver training for improved safety can further improve performance of the system. Use of the agency's comprehensive ITS system for data-driven decision-making and route rationalisation exercises on a periodic basis will ensure viability and operational efficiency.

53. There should be a continuing and incentive-based focus by transit agencies on improving operational performance, using technology, innovation and partnerships.

4.8 Strategy 8: Promote Transit Oriented Development

54. Transit-oriented development (TOD) brings together the closely-related urban planning and transport planning sectors, which are currently governed in siloes. TOD refers to the development of urban areas in which a mix of residential, commercial and recreational land-uses are planned in dense and walkable layouts that are centred around high-quality mass transit networks. TOD promotes the use of NMT and public transport trips, while at the same time augmenting ridership of mass transit systems and reducing trips made by private vehicles. Greater integration in the governance of urban planning and urban transport is needed to promote transit-oriented development and redevelopment in the city.

4.9 Strategy 9: Establish mechanism for planning, capacity building and accountability

55. Fragmentation in the governance of urban transport leads to conflicting objectives, and inequitable distribution of transport investments. The establishment of a single organization at the city level is necessary for integrated planning of mobility infrastructure, coordination among different public agencies responsible for mobility services, capacity building in transit agencies for optimization of mobility services, development of a framework for accountability of those agencies, advisory role to State Government for regulatory functions, and the setting up of infrastructure common to different service providers for greater multi-modal integration. Such an organisation should have a legislative mandate and its scope should be wider than being merely advisory.

5 Action Plan for meeting Mission Goals

56. The current mobility eco-system and its trends are unsustainable from economic as well as environmental perspectives. The strategies recommended in the previous section to address the root causes of the unsustainability will require a comprehensive set of actions taken together in tandem in a time bound manner. This section delineates the necessary actions at the conceptual level which may be used to identify ground level improvement and capacity addition works and to formulate the regulatory, fiscal and economic interventions.

5.1 Road Infrastructure

57. The road infrastructure in Bengaluru needs quality improvement, design re-engineering and capacity addition in core as well as peripheral areas (areas outside ORR). Maintaining and upgrading the existing road infrastructure across the city to a uniform, consistent level of service is critical to ensuring the smooth flow of traffic and improving throughput of the road network.

58. **Throughput and quality improvement measures:** Re-engineering and upgrading existing road infrastructure is essential to increasing the overall throughput across all parts of the city. To the extent possible, all roads must be redesigned as complete streets that provide adequate space for pedestrians, cyclists, public transport and motorists, with the prioritisation of environmentally sustainable modes that minimise the negative externalities of the urban transport sector. A massive effort to redevelop the existing roads on "tender-sure" norms is already under implementation. Those efforts need to be complemented by following measures to improvement the throughput.

i. Resize the roads to maintain consistent carriageway widths and remove flow bottlenecks on arterial roads.

ii. Develop long distance signal-free corridors on arterial roads that do not have high levels of pedestrian movements, by channelizing traffic from cross roads and constructing underpasses / flyovers without reducing existing capacity due to ramps by acquiring lands as required through direct compensation or TDR measure.

iii. Re-engineer junction design and augment junction capacity, with responsive signal management and consideration of pedestrian flows.

iv. Relocate bus stations away from the junctions to reduce movement across the lanes.

v. Construct bus and IPT bays at all arterial roads and near main economic centres, by acquiring land, if necessary.

vi. Construct long-distance elevated walkways from public transport stations to nearby economic centres.

vii. Provide and maintain road markings and signage consistently across the entire road network to enable safer and more efficient traffic flows by reducing haphazard traffic weaving.

viii. Develop framework for allocation of road infrastructure (sub-surface and above the ground both) for utilities, formulate standard operating procedure for laying and maintenance of utilities.

ix. Improve road construction and maintenance practices by bundling longer duration maintenance responsibility.

59. **Capacity addition:** Road infrastructure should be judiciously expanded to meet rapidly growing transport demand, while at the same time earmarking a part of the additional capacity for public transport, dis-incentivising usage by private transport modes. The focus should be on equitable allocation of additional road infrastructure, to ensure that all residents and parts of the city have adequate access to road infrastructure that is well-connected, and to ensure that all modes of motorised and non-motorised transport are accounted for in the design and planning of roads.

i. Augment road capacity with at-grade widening, wherever feasible, with prioritisation of road space allocation for pedestrian movement and public transport for more complete streets

ii. Construct elevated roads on north-south and east-west corridors and a central ring corridor with adequate capacity, with no section having capacity less than aggregate capacity of sections contributing traffic to that section, and properly designed ramps at regular intervals to enhance connectivity and allow smooth traffic weaving.

iii. Prioritize construction of Peripheral Ring Road (PRR) to facilitate future planned growth of the city.

iv. Develop grid roads, at every 1 km by 1 km, in areas being opened up for fresh development, including those abutting the PRR, through town planning schemes.

v. Earmark a significant part of the new road capacity, ranging from one-third to one-half, on elevated corridors, PRR, and other new road construction, to be dedicated for public transport with necessary

components such as accessible bus stops, turn-outs for buses at stops, and separated bus lanes.

vi. Impose congestion or user fee on all private vehicles using elevated corridors at any time of the day with telemetry or camera based detection and automatic fee collection system.

vii. Take-up rail cum road infrastructure on arterial and ring roads to reduce adverse impact of exclusive earmarking of road space for rail-based public transport

60. **Levy on usage:** Even as the road network is improved and expanded, the costs of road usage should be applied to users, to ensure efficient usage and to dis-incentivise any travel demand induced due to the availability of good mobility networks. At the same time, strict enforcement of traffic rules is necessary for safer roads for all users.

i. Regulatory and pricing measures such as dynamic congestion fees and parking fees to be applied in areas experiencing high traffic congestion and peak volumes.

ii. Robust traffic management to be instituted and penalties levied, to encourage adherence to traffic rules and lane discipline; violations to be linked with driving license and vehicle registration, with suspension of license of repeat offenders.

5.2 Parking Infrastructure

61. With up to 25 per cent of road width of several roads taken up by parked vehicles, there is a need for comprehensive parking policy and management to improve the efficiency of road usage for traffic flow. Where rules and parking fees exist, they are often limited to certain locations, nominally priced and weakly enforced. This not only contributes to the inefficiencies of urban transport systems but also exacerbates social inequality of road space allocation with the prioritized use of public roads for parking personal vehicles at the expense of free vehicular movement and pedestrian rights-of-way. Provision of parking infrastructure and parking management must consider on-street and off-street parking, and the use of parking policy to dis-incentivise excess use of private vehicles, especially along transit corridors.

62. On-street parking should get the lowest priority for road space usage, while higher priorities are assigned to NMT infrastructure including footpath, cycle track, cycle stations, bus and IPT bays. The management of on-street parking is an important part of improving the efficiency of road infrastructure use. The rules for on-street parking should be guided by the following considerations:

i. On-street parking to be prohibited entirely on high-density roads that are operating at full capacity or at V/C ratios of 1 and higher, and within 100 metres of all junctions of such roads.

ii. On-street parking on roads with V/C ratio less than 1 should be considered only after ensuring the provision of NMT infrastructure such as pedestrian footpaths and bicycle lanes, transit infrastructure such as bus stops and other curb-side requirements such as emergency vehicle and delivery vehicle zones and designated paratransit zones.

iii. Only short-term parking should be permitted in on-street parking spaces.

iv. Parking spaces on tender-sure roads should be used for bus and IPT bays or at the most for short-term parking with high fee instead of the current practice of long-duration parking.

v. **Private vehicle parking:** For non-transport vehicles, proof of parking space allocated for new vehicle to be pre-requisite for registration of new vehicles, either in their own residence or at a parking facility. If parking space is being leased at an external facility, details of lease of at least one-year time to be furnished and subsequently updated annually.

vi. **Transport vehicle parking:** Transport vehicle owners, be they transport aggregators, private fleet operators, IPT operators or individuals, should be required to show proof of parking prior to registration.

vii. **Trip generating economic centres:** Large economic centres such as wedding halls, restaurants, movie theatres, shopping centres, etc. that have widely varying traffic flows should be obligated to have arrangements for peak load parking, and permits for these land-uses should be contingent on the proof of peak load parking spaces, which may be shared between different trip generators.

viii. Time window of 2 years should be provided for existing vehicle owners to organise and submit proof of parking space availability, failing which penal fee should be charged for on-street parking in residential areas with the proceeds to be used for building pooled parking infrastructure in those areas.

ix. The required changes are to be made in the motor vehicle regulations and municipal corporation byelaws, supplemented by near-real time linking of motor vehicle registration system and building plan approval system to enforce the parking regulations.

63. Removing most of the on-street parking stock and reallocating road space to more productive uses should go hand-in-hand with the creation of off-street parking, which should provide the greater supply of parking in the city and be guided by the following considerations:

i. Parking supply to be restricted along transit corridors to discourage personal vehicles and incentivise transit use, and rental of parking spaces to be separate from rental of housing or commercial units.

ii. Parking fee to be the principal instrument to discourage use of private vehicles by fixing the fee as close to the economic cost of the parking infrastructure as is practical and enforcing the parking regulations.

iii. Parking fees for off-street parking to be lower than that of on-street parking (where on-street parking is allowed), to ensure that off-street parking is the preferred option for commuters.

iv. Extensive park and ride facilities to be limited to terminal transit hubs, with access to stations in the city centre to be encouraged through walking and feeder services.

v. Mechanical parking and multi-level parking facilities should be considered at main economic centres in view of limited land availability and high cost of land.

64. Effective enforcement mechanisms are necessary to uphold any regulatory framework for parking. Enforcement officers may be designated to monitor violations in parking and no-parking areas. Technologies such as handheld devices, video analytics and centralised enforcement databases can support more effective enforcement while mobile applications make it easier for vehicle users to reserve and pay for parking.

5.3 Road-based Public Transport

65. Buses continue to form the spine of public transport systems in Bengaluru, and their low infrastructure requirements makes them a flexible and inexpensive option for expanding transit networks in the fast-growing city. They are also an efficient form of road transport, taking up the least amount of road space per passenger kilometre covered. However, reduced service quality and reliability of bus services due to road congestion, limited fleet expansion and operational inefficiencies lead to shift away from public transport and contribute to greater traffic congestion. Greater investments in the city bus network and improved operational efficiencies can incentivise higher mode shares of public transport and ease congestion.

66. Measures are needed to ensure that the capacity and the reach of the operational fleet is adequate to meet the growing travel demand, and this may be done through fleet augmentation and network expansion.

i. Provide fiscal support or gap funding to BMTC for fleet size augmentation that is commensurate to the growth in population.

ii. Promote zero emission clean-tech vehicular fleet for lower operational costs and social and environmental benefits, and explore cost-effective procurement methods such as leasing contracts and retrofit mechanisms.

iii. Expand bus services to all satellite bus stands for better rural-urban connectivity, and increase capacity of network along the peripheries of the BBMP area.

67. Improved operational efficiency of the public transport network may be achieved through a mix of data-driven and technological improvements to provide higher quality of services to commuters.

i. Analyse Origin- Destination (O-D_ data, occupancy data and other data points provided by ITS infrastructure for periodic route rationalization of the bus network, to improve deployment of network capacity to match demand.

ii. Promote private sector contracting through competitive tendering on routes with heavy losses for lowering operational costs while continuing to provide services for all parts of the city.

iii. Introduce smaller-sized vehicles with capacity of 10 to 20 seats without conductor but with IT system based fare collection to provide feeder services in interior areas, to improve access to main bus routes and to metro rail services as well as to lower operational costs along low-demand routes.

iv. Support the phase-out of all BS-II and BS-III vehicles in the BMTC fleet, and subject all new fleet procurements to the highest vehicle emission standards.

v. Introduce automated fare collection (AFC) mechanisms along feeder routes and loss-making routes to reduce leakage and to lower operating costs by not requiring the conductor for fare collection; actively supplement the introduction of AFC systems with retraining programs for conductors so that they may be absorbed in the transit agency for other operational requirements over the longer term.

vi. Enable operational integration of bus services with metro services, with bus stops at metro stations and feeder services routed to supplement the last-mile connectivity for the metro network.

vii. Promote expansion of chartered services whereby BMTC can provide dedicated transport services to IT companies, garment companies and other trip generation centres, thereby reducing dependence on private transport.

viii. Operationalise the common mobility card for widespread adoption, for integration of fares across all public transit services.

ix. Use ITS data to support an improved and integrated Commuter Information System which can be accessed at all places including bus stops, bus terminals and via mobile application, with information on routes, stops and schedules, and real-time updates on bus arrival times and service frequency.

x. Provide access to operations data to become part of City Mobility Stack, which aims to integrate all mobility services into a seamless urban transport network.

5.4 Rail-based Public Transport

68. The rail-based public transport system is the most efficient mode in terms of usage of road space and sustainable from environmental perspective, but requires high cost and is dependent on last mile connectivity by NMT or motorized transport.

5.4.1 Metro rail services

69. The metro rail network is a mega-infrastructure project which has the potential to reshape the city and its mobility patterns, and to contribute to cleaner urban transport. Planning for the metro rail network needs to consider the requirements of future growth, while its construction needs to be optimized for more efficient implementation.

i. Enable improved coordination between government agencies to remove roadblocks in land acquisition and construction and to speed up the pace of metro rail implementation and expansion.

ii. Plan new metro lines aligned with the master plan of the city and its areas of growth, keeping in mind the development of economic centres and residential layouts; focus must also be ensured on core areas, where construction may be difficult.

iii. Integrate planning for metro rail with existing transport networks, through physical integration of metro stations with adjacent railway stations and bus terminals.

iv. Support robust transit-oriented development (TOD) policy and value capture mechanisms for part-financing metro rail projects and lowering fiscal burden on the transit agency.

v. Fast-track the completion of the Outer Ring Road (ORR) line and the metro lines along main arterial roads.

vi. Complete the conversion of all train sets to 6-car sets, for increased capacity of the existing network; decrease operational headways for increased capacity per track kilometre.

vii. Explore the potential for metro cum road infrastructure, for more efficient and cost-effective infrastructure development.

70. Metro operations should aim to minimize end-to-end trip times and maximise ridership, with improved connectivity to station catchment areas.

i. Improve operational and fare integration with public bus services for last mile connectivity and an end-to-end public transport network.

ii. Explore the introduction of monthly subscriptions, 10-ticket sets and other products for discounted fares for regular metro commuters.

iii. Improve access to metro stations through elevated walkways to key economic centres up to one kilometre away, nearby, facilitate the development of NMT infrastructure such as continuous pedestrian footpaths and bicycle lanes within a one-kilometre catchment zone.

iv. Create transit hubs at metro stations by physical integration of bus stops, IPT bays and bicycle parking, as well as the provision of electric charging infrastructure and parking for shared mobility services.

v. Minimise transfer times and improve throughput of station areas with real-time passenger information systems, crowd management mechanisms and easy access to last-mile modes, with a prioritisation of sustainable modes- bus stops to be closer to station exits than access to parking, for example.

vi. Promote shared mobility services for offering additional improvements in connectivity to commuters, through service level agreements with operators.

5.4.2 Suburban rail services

71. Bengaluru currently has nominal suburban rail services, which can be further augmented by leveraging and supplementing the existing railway tracks, making it a cost-effective option for mass transit. If well-planned and integrated, the suburban rail network has the potential to provide affordable and reliable mass transit services that greatly improve ease of connectivity in the city.

i. Fast-track works of enhancing network capacity along the suburban rail route and at stations with track doubling, electrification and automatic signalling works.

ii. Connect to nearby urban areas such as Bidadi, Ramanagar, Tumkur, Hosur, Bangarpet, Doddaballapur, Devanahalli, etc. for easing long-distance daily commutes.

iii. Improve access road connectivity to suburban rail stations, to ensure smooth traffic flows to and from the stations.

iv. Ensure integration with metro rail stations and inter-city rail lines and promote high-quality first and last-mile connectivity to suburban rail stations.

5.5 Intermediate Para Transit and New Mobility

72. Intermediate paratransit (IPT) and new mobility services increase the supply of mobility in the city, but may also have negative externalities on congestion, air pollution and GHG emissions, depending on their numbers, average occupancy and the quality of vehicles. Regulation of these services should strive to maximise their contribution to mobility in the city while at the same time minimising their negative externalities.

73. The IPT sector in Bengaluru comprises of auto-rickshaws, which provide an alternative to personal vehicles for door-to-door connectivity and act as last-mile feeders to and from transit stations. Street hailed and largely driven by individual operators, ease of access and efficiency of the auto-rickshaw sector can be improved by technological interventions and regulations concerning their governance and usage.

i. Promote higher conversion rate to CNG engines for auto-rickshaws, and initiate engine reforms to address the higher emission of oxides of nitrogen by four-stroke engines.

ii. Consider vehicle design improvements to enhance road safety of auto-rickshaw occupants, specifically those involved in multi-vehicle

collisions which have been found to result in greater injuries for auto-rickshaw passengers.

iii. Incentivise high-quality electric auto-rickshaws through special dispensation of permits, with focus on vehicular quality for eligibility.

iv. Allow shared auto-rickshaw services to ply to and from mass transit stations, to reduce the vehicle kilometres travelled and pool trips moving in the same directions.

v. Regulatory reforms to enable fleet-based operations for dispatch services and app-based services, for improved operational efficiencies through reduced dead kilometres travelled and better demand-supply matching.

vi. Enable location tracking and fleet operations of auto-rickshaws and taxis, enforce sharing of service availability and location data for commuters and parking regulation enforcement, and sharing of necessary operations data for planning authorities as part of the City Mobility Stack.

74. New mobility enterprises comprise the range of app-based services that commuters can access using mobile phones. In Bengaluru, these primarily include on-demand taxi and auto-rickshaw services, short-term bike and car rentals, corporate employee transport services, trip planners and digital fare payment technologies. While a number of new mobility models are currently prohibited by law, including motorcycle taxis, carpooling services and on-demand bus services, it is suggested that regulation of new mobility needs to be more nuanced and progressive.

i. Adopt a data-driven and analytical approach to engaging with new mobility business models and regulating their operations.

ii. Promote high-capacity shared mobility services that have the potential to shift people away from low-occupancy personal vehicles-including on-demand bus services.

iii. Amend the On-Demand Transportation Technologies Aggregator (ODTTA) Rules to strengthen road and passenger safety requirements and include provisions of greater accessibility and service levels for commuters as well as data-sharing requirements with responsible city agencies for improved mobility planning and for inclusion in the City Mobility Stack.

iv. Conduct analysis to understand the necessity for limiting the number of auto and taxi permits in the city and to formulate objective benchmarks.

v. Urban parking policy may have provisions for reserved spaces for shared mobility services, to incentivise their use over that of personal vehicles.

vi. Enable greater public-private partnerships for transport between public transit agencies and the operators of new mobility services.

5.6 Private Transport

75. The explosive growth in registration of personal vehicles and the corresponding growth in the number of trips fulfilled using personal two-wheelers and cars, has led to negative consequences for congestion and environmental stress. Growing ownership rates of two-wheelers and cars is an indicator of the mode shift to personal transportation, as vehicle ownership is a highly significant factor that impacts mode choice. The imperative for more sustainable and efficient transport is to reduce the number of trips made by personal vehicles by shifting trips to public transport, shared mobility and NMT.

i. Make reserved parking a pre-requisite for new vehicle registrations across the state to raise the bar for ownership and to ensure that vehicles do not take up on-street parking space at residential areas.

ii. Apply parking requirements for existing vehicles, allowing owners two years' time to find reserved parking spaces for their vehicles.

iii. Strengthen PUC checks and penalties for polluting vehicles and those emitting smoke; improve enforcement by installation of remote sensor-based PUC system.

iv. Introduce reforms for medium term renewal of personal vehicle registrations, and link documentary requirements such as current address proof, vehicle insurance, PUC and vehicle fitness certificates, to the vehicle registration renewal.

v. For safer driving behaviours and greater traffic discipline, enforce stricter norms for driving license achievement with more rigorous testing, and link traffic violations to drivers' licenses with appropriate penalties.

vi. Promote regulatory, fiscal and pricing measures to influence usage of vehicles- these could include fuel surcharges, congestion fees, renewal fees, insurance premiums based on usage, etc.

vii. Enable the availability of quality public transport services and NMT infrastructure, to provide credible alternatives to personal vehicle usage.

viii. Promote greater integration of urban planning and transport planning, with preference for mixed-use land use planning and more walkable urban design.

5.7 Non-Motorized Transport

76. While allocation of existing road infrastructure for public transport exclusively is not practical in many areas, a part of all existing road networks should be earmarked and improved for non-motorized transport. Non-motorized transport primarily comprises walking and bicycling, which are the lowest-impact transport modes with no negative externalities. Encouraging more NMT trips will primarily require the provision of adequate road infrastructure to enable ease of walking and bicycling and ensuring the safety of pedestrians and bicyclists.

i. Invest in the expansion of pedestrian infrastructure such as that mandated by the tender-sure road design, which ensures universally accessible footpaths, minimum footpath widths, and elements of pedestrian safety such as bollards.

ii. Ensure the presence of continuous and well-maintained footpaths and elevated walkways, and curb footpath encroachments across the entire road network with a focus on high-density areas.

iii. Design road networks to provide safe crossings at regular intervals, preferably at-grade and alternately, via elevated walkways.

iv. Prioritise walking and bicycling infrastructure in the catchment areas of transit stations, to promote NMT as the default mode for first and last mile connectivity.

v. As much as possible, provide exclusive bicycle lanes in existing roads and include bicycle lanes in the design and construction of new roads.

vi. Provision bicycle docking and parking infrastructure at regular intervals and integrate docking/ parking infrastructure at transit stations and bus stops.

5.8 Inter-city mobility

77. Contributing almost 36 per cent to Karnataka's GSDP, Bengaluru is an important economic centre in the state. Ease of connectivity of nearby cities to Bengaluru increases access to livelihood opportunities for residents of nearby cities and enhances the potential for spreading economic growth. Ease of

transportation of passengers and freight are key objectives for inter-city connectivity, which can be achieved by a mix of road- and rail-based networks.

i. Provide transit hubs towards the urban peripheries, to enable transfers from personal vehicles and inter-urban bus and train services to local transit services.

ii. Deploy public-private partnerships for the development of quality highway infrastructure linking nearby cities to Bengaluru.

iii. Improve rail linkages and schedules to nearby cities for daily commuting.

5.9 Freight Transportation and Logistics

78. Freight in urban areas today can be classified into two types- large-scale inter-city freight movements with linkages in the city and the growing number of intra-urban logistics and home deliveries using commercial vans and two-wheelers, which contribute to traffic congestion and have higher negative impacts on pollution and emissions than private vehicles.

i. Create a decentralised network and hierarchy of logistics and freight transit hubs, not only at the urban peripheries but also in core city areas.

ii. High-volume freight deliveries and truck movements to market areas to be restricted to night-time or off-peak hours.

iii. Impose tax on e-commerce delivery trips to mitigate the negative externalities caused by movements of delivery vans and two-wheelers, with higher taxes on same-day deliveries and other premium delivery methods that may lead to increased vehicle kilometres travelled.

iv. Freight movements not meant for the city to be routed via the PRR or other bypass road networks to prevent entry of high-capacity vehicles into the city.

5.10 Regulatory Measures

79. Regulations for urban transport need to be aligned with one another and designed to achieve system objectives of greater efficiency and sustainability. The regulatory framework must include the right mix of incentives and dis-incentives to influence commuter behaviour and the operations of public and private

mobility providers. Permit specifications and number of permits for different mobility services, fare regulations, vehicle specifications for fuel consumption and emission levels, vehicle testing and maintenance standards, speed and other safety regulations, data sharing standards and integrated planning requirements- all comprise different tools available to the state regulator for providing access to safe and sustainable mobility for the maximum number of people.

i. Parking rules and regulations set up entry barriers for vehicle ownership and usage, which in turn can support more sustainable mode choices provided that credible alternatives exist.

ii. Regulatory reform is needed around personal vehicle registration, renewal, inspection and maintenance to ensure that emitting vehicles are removed from the roads, road safety is improved, and the costs of vehicle use are proportionately levied on owners.

iii. Regulatory reform for public transport should focus on permitting public-private partnerships and contracting of private bus services for capacity augmentation.

iv. Explore the potential for fare regulations to promote integrated fares between public transport services and enable payment integration across all mobility services using the common mobility card.

v. Mandate data integration of operations of different mobility services through a City Mobility Stack, which helps commuters by providing integrated information on service availability and options and helps service providers and planning agencies to use data analytics for operational decision making.

vi. Necessitate integrated planning for infrastructure projects, between different transport networks as well as inter-sectoral integration between urban and transport planning.

vii. Mandate the inclusion of pedestrian footpaths, bicycle lanes and bus lanes in all new road construction.

viii. Augment strength and deployment of traffic police personnel as necessary, for traffic management and enforcement of rules and regulations.

ix. Promote the greater use of technology for regulatory enforcement, using integrated databases for tracking and linking violations with driving licenses, and data capture tools such as video analytics, sensors and other solutions for automated enforcement.

80. **Fare regulations for urban transport:** Fare-setting for public transport systems and the application of fare structures for IPT and other shared mobility

services are sensitive and complex tasks. Fares must strike a balance between commuters' interests of affordability and service quality, the financial viability of public transport operators, the inclusion of costs of negative externalities to be borne by users of different transport services, and ensuring adequate market competitiveness for mobility companies. Currently, there is no integrated mechanism for a scientific and independent process, though fare regulations exist for public transport, IPT and transport aggregators in the state. It is hence suggested that an independent authority, potentially under the aegis of the BMLTA, may be constituted to determine and regulate fares of transport services in the city.

81. **Data-sharing standards for urban transport:** Urban transport systems are seeing a profusion of data being generated that could significantly improve evidence-based urban and transport planning, and enable unobtrusive enforcement of regulations. Data sets include trip data of modern transport aggregator services and public transport services held with the respective companies or transit agencies; license, vehicle registration and permits data held with the Transport Department; road network, parking, land-use and plot level data held with the BBMP and BDA; traffic violations and accidents data with the BTP. Bringing together these data sets currently held in silos by various public and private agencies, as well as opening up anonymized transport data to the public, can promote integrated mobility planning as well as innovation for the development of better commuter services.

82. The following principles would guide the data-sharing framework:

i. All public transport vehicles and rail-sets, IPT vehicles and four-wheel private vehicles should be obligated to telemetry-based tracking as they use the public road space.

ii. The locational and occupancy data about public transport and IPT vehicles should be placed in the public domain on an open platform for use by different transport agencies and IT-based transport support service companies.

iii. The data of the commuters must be non-personal and anonymized to protect all individuals.

iv. The data regarding drivers of vehicles on the roads should be available to regulatory agencies.

83. It is therefore recommended that BMLTA may set up an exclusive agency to oversee the set-up of the City Mobility Stack, and to establish a trusted legal and governance framework for data collection, sharing, and use of mobility data, which protects the interests of residents, commuters and transport operators. This framework should lay down and enable enforcement of standards for collection and sharing of necessary data generated by IPT and public transport services, be

it for use by specific planning authorities or for sharing as 'open data'. The framework should also oversee the usage of the data for efficient and integrated mobility planning. Owing to concerns of privacy and data protection and security, the data collected should be protected by a robust privacy framework which would ensure that the collected data is anonymized and safely stored to prevent any mis-use.

5.11 Fiscal and Pricing Measures

84. Fiscal policies work in complement with regulations and standards to minimize the negative externalities of transportation. Equally important, they generate revenues for investment in transportation. The objective of fiscal measures and user fees should be to incentivise sustainable choices and align user costs to reflect the costs of their mode choice. In Bengaluru, where the mode share of public transit is eroding and the shift to personal vehicles accelerating, a comprehensive policy of fiscal and pricing measures can serve to incentivise investment in cleaner vehicles, penalise emitters and polluters, induce more sustainable mode choices for more numbers of trips, and reduce the number of vehicle kilometres driven. As such, comprehensive fiscal reform combined with a diverse, multi-modal transport system can balance individual commuter well-being with that of the city.

i. Explicitly link motor vehicle tax for new vehicle purchases to fuel efficiency and emissions standards, with additional fees for bigger cars and SUVs and exemptions for cleaner energy vehicles including hybrids and EVs.

ii. Introduce dynamic pricing instruments to capture and charge vehicle usage-

   a. Fuel taxes for each litre of fuel consumed

   b. Insurance premiums based on vehicle usage with higher premiums for higher usage

   c. Congestion fees and road pricing for each instance of road usage

   d. Parking fees that are time-based and demand-based

iii. Institute annual renewal fees for vehicle registration and link them with the pollution emission and fuel efficiency of the vehicle, and ensure that strict action is taken against polluting vehicles.

iv. Institute friendlier tax environment on inputs and revenues for public transport operators, to keep bus fares constant and support the upgradation of bus services.

v. Reform the taxation of motor vehicles to become a function of road usage efficiency; public transport vehicles to have the lowest tax rate, and IPT to be taxed at higher rates based on the vehicle capacity and road usage efficiency.

vi. Deploy transit-oriented development along all mass transit corridors to generate revenues for funding infrastructure growth.

85. Revenues generated from fiscal policies and pricing instruments should be used for investment in cleaner and more efficient transportation systems. In Bengaluru, investments can be made in upgrading and expanding public transport systems and constructing continuous and accessible NMT infrastructure.

5.12 Governance Measures

86. Fragmented governance of urban transport sector has led to inequities of investment and competing interests- for example, the provision of metro services, suburban rail services and public bus services should be complementary to one another and collaborative rather than competing, which may not be the case if they are governed by wholly independent agencies. Moreover, transport demand is generated by the locations of homes and jobs in the urban planning of the city, whereas transport supply is provided through transport planning- it is essential to integrate urban and transport planning to better regulate the growth of transport demand and design more pedestrian friendly and transit-oriented cities.

i. Operationalise the BMLTA with representation from all transit agencies, urban planning bodies and equip the authority with adequate fiscal and regulatory power to achieve objectives of integrated urban transport planning and development.

ii. Enable the integration of the city bus services with the rail-based metro and suburban train networks, for seamless transit connectivity.

iii. Build capacity for data-driven decision making and integrated planning among transit agencies and the BMLTA.

5.13 Strategy-Action Plan Matrix

87. The matrix below illustrates how each of the action plan areas feeds into achieving the different strategies.

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5	Strategy 6	Strategy 7	Strategy 8	Strategy 9
	Efficiency of road infrastructure	Capacity of road infrastructure	Pay cost of externalities	Influence mode choice	Multi-modal mobility options	Reach and capacity of PT	Operational efficiency of PT	Transit-oriented development	Capacity building, accountability
Road infrastructure	✓	✓	✓	✓					
Parking infrastructure	✓		✓	✓					
Road-based public transport		✓		✓	✓	✓	✓		
Metro rail services		✓		✓	✓	✓	✓	✓	
Suburban rail services				✓	✓	✓	✓	✓	
IPT and new mobility	✓		✓		✓				✓
Private transport	✓		✓	✓					✓
Non-motorized transport				✓	✓			✓	
Inter-city mobility	✓				✓				
Freight transportation and logistics	✓							✓	
Regulatory measures	✓		✓	✓	✓			✓	✓
Fiscal and pricing measures	✓	✓	✓	✓		✓			
Governance measures								✓	✓

5.14 Action Plan-Lead Agency Matrix

88. The matrix below illustrates the responsible agencies for achieving the different items under the action plan areas.

	DULT / BMLTA	Transp. Dept.	BMRCL	BMTC	KSRTC	Indian Railways	BBMP	BDA	Urban Devpt. Dept.	KRDCL	Bangalore Traffic Police
Road infrastructure	✓						✓	✓	✓	✓	✓
Parking infrastructure	✓		✓	✓		✓	✓	✓	✓		✓
Road-based public transport	✓	✓		✓							
Metro rail services	✓		✓						✓		
Suburban rail services						✓			✓		
IPT and new mobility	✓	✓									✓
Private transport	✓	✓					✓				✓
Non-motorized transport	✓						✓	✓	✓		
Inter-city mobility		✓		✓	✓	✓				✓	✓
Freight transportation and logistics	✓	✓									✓
Regulatory measures	✓	✓					✓		✓		✓
Fiscal and pricing measures	✓	✓	✓	✓		✓	✓	✓	✓		
Governance measures	✓	✓					✓		✓		

6 Financing of Mobility Infrastructure

89. The mobility infrastructure being public good, the bulk of the investment funding has to come from fiscal resources. However, the same can be complemented by appropriate levies on commuters and residents in general based on their mobility choices and on economic transactions in Bengaluru having implications on the mobility.

90. The current level of investment for building or improving the mobility infrastructure including public transport from fiscal sources is Rs.6250 crore per annum, which is about 2.8 per cent of the state budget and about 15 per cent of the capital outlay in the state budget. With fiscal support of the order of Rs.2000 Crore per annum from GOI and Rs.6250 crore from GOK, the total investment in mobility infrastructure and public transport system is of the order of 1.65 per cent of the city's GDP. As the need is much larger and the fiscal resources are already stretched over competing demands for public investment throughout the state and across sectors, innovative ways of augmenting fiscal resources specifically for mobility infrastructure will have to be found. Following basic principles are recommended for financing of the mobility infrastructure

91. **Funding of road infrastructure:** For the road infrastructure, the government may provide 75 per cent of the funding from fiscal resources as interest free funds and facilitate mobilization of the balance 25 per cent by the concerned infrastructure agency (BBMP, BDA) as debt. The augmentation of road infrastructure benefits all residents, contributes to economic growth of the city and results in appreciation of the land and building assets. The concerned infrastructure agency should augment its own resources to be able to service the debt to extent of interest cost, though continue to be dependent on the state government for the debt repayment. At the same time, the concerned agencies should be solely responsible for funding periodic maintenance cost of road infrastructure.

92. **Funding of public transport system:** For the public transport infrastructure and systems including rolling stock for bus, metro and suburban rail services, the government may provide 50 per cent of the funding from fiscal resources as interest-free funds, and facilitate mobilization of the balance 50 per cent as debt by the concerned agency (BMRCL, BMTC, B-RIDE). Those agencies should organize and operate their services in cost effective and efficient manner and peg their service charges to a level adequate for meeting full cost of operations, maintenance and interest cost of debt, while being partly dependent on the government to repay the debt.

93. **Funding of parking infrastructure:** For the parking infrastructure, the funding from the fiscal resources should be limited to cost of the land only. The entire cost of building or mechanical parking infrastructure should be funded from own or borrowed funds of the concerned agency. The parking charges should be

adequate to meet the entire operation, maintenance and debt servicing cost including repayment. A stiffer cost recovery norm is recommended for parking infrastructure as this infrastructure caters only to private modes of transport having the largest negative externality and the parking fee pegged to recovery of economic and environment costs can act as an effective means to guide the mobility demand to sustainable operations.

6.1 Fiscal Resources

94. **Government of Karnataka:** The current fiscal levies by the Government of Karnataka for mobilization of resources for urban infrastructure including mobility infrastructure throughout the state lead to annual mobilization of Rs.750 crores. These levies are 10 per cent cess plus 1 per cent additional cess on motor vehicle tax for transport infrastructure and state transport fund, and surcharge on stamp duty at the rate of 2 and 3 per cent for urban local bodies and rural local bodies respectively.

95. It is recommended that the tax base for these cess and surcharge should be expanded to cover state excise duty and the rates of these cess and surcharge should also be enhanced to mobilize additional Rs.2000 crore per annum over and above the current level of around Rs.750 crore in the following manner:

i. Increasing the cess on motor vehicle tax from current 10 per cent to 20 per cent of the tax throughout the state.

ii. Increasing surcharge on stamp duty and registration fee on land transactions in Bengaluru from current 2 per cent to 10per cent of the stamp duty and registration fee.

iii. Levy of 10 per cent cess on state excise duty and additional excise duty on sale of liquor in Bengaluru city.

96. **Government of India:** The current level of fiscal support from GoI for mobility infrastructure in Bengaluru by way of interest free funds and sovereign loans at concessional terms from multilateral and bilateral development agencies is of order of Rs.2000 crore per annum. It is recommended that the infrastructure agencies should step-up their planning and project management capacities so as to be able to seek and utilize at least double the current level of fiscal support from GoI.

97. The Committee recommends that the total support for mobility infrastructure and public transport systems from fiscal resources of GoI and GoK should be enhanced from current level of Rs.8250 crore to Rs.12500 crore per annum by following the above-mentioned measures.

6.2 Additional Resource Mobilization

98. **Land Value Capture:** The Transit Oriented Development (TOD) can contribute to sustainable mobility systems and can also be source of funding the required investment by way of Land Value Capture, i.e., collecting a part of the land value appreciation due to TOD led densification and increase in Floor Area Ratio (FAR) whenever there is a land transaction or development in the TOD impact zone. In addition, an appropriate infrastructure cess on approvals for newer layouts and building plans in the city in general is recommended as another means of land value capture. However, the rate of this cess should be much lower than the rate of cess or premium fee in the TOD impact zone as the land owners outside the impact zone will have indirect gains from the mobility infrastructure and public transport systems.

99. **Parking Fee:** High and graded parking fee, based on the location, reflecting the economic cost of parking infrastructure is recommended to fund the infrastructure as well as to increase the cost of using private vehicles and thereby create a positive bias in favour of public transport.

100. **Congestion Fee:** Congestion fees on the use of private vehicles and IPT during specified peak hours on specified arterial and major roads with vehicle to capacity ratio of more than one is suggested as a means of financing the mobility infrastructure by capturing the cost of negative externality from such modes. The collection of the congestion fee should be entirely unobtrusive by using appropriate telemetry and camera-based detection technology (such as automatic number plate recognition technology) and prior mandate-based automatic collection from bank accounts linked to the vehicle registration.

101. BBMP should be responsible for levying the congestion fee, as it has the primary mandate of maintaining urban roads. Enforcement however, must be given to the Transport Department, as it has the database of registered vehicles and it is the government interface for vehicle owners for all matters vehicle-related. Amendments would need to be made to the Karnataka Municipal Corporation Act, 1976 and the Karnataka Motor Vehicle Taxation Act, 1957 to enable the levy and collection of congestion fees. The collected amount should come to the proposed Bangalore Infrastructure Fund and then allocated for improving road infrastructure. To enable effective collection of congestion fees, a governing mechanism must be developed to ensure coordination between the BBMP and the Transport Department. The proposed Bengaluru Metropolitan Land Transport Authority may facilitate the coordination between BBMP and Transport Department and establish the required IT system.

102. **Revenues from advertisement on public transport infrastructure:** The draft regulations by BBMP, namely Outdoor Signage and Public Messaging Byelaws 2018 for banning advertising at public places, should be reviewed as

advertising provides a good revenue source and should be encouraged judiciously. Such advertising in eco-friendly manner without hampering the traffic safety is taken-up in all major cities and highways, and there does not appear any cogent reason to take a contrarian view for Bengaluru city. The revenues from such advertisements can be a significant source of funds for operations and maintenance of public transport.

103. **Public-Private Partnership with Corporates for metro station naming rights and direct access:** The financing of public transport by private companies under PPP mode is found to be largely impractical due to allocation of risks related to traffic volume and fare determination. However, limited scope PPP for long-term naming rights for metro or other public transport stations and direct elevated access from corporates premises is recommended as a means for mobilizing resources.

104. **TOD at metro stations and depots:** Full utilization of permissible FAR at metro stations and depots or assignment of unutilized FAR as Transferrable Development Rights (TDR) are recommended to leverage the TOD potential for financing the PT infrastructure.

105. **Roof-top solar power plants at metro stations and depots:** Such solar power plants are recommended for economizing the operating cost of metro services.

6.3 Bengaluru Infrastructure Fund:

106. It is recommended that a separate Bengaluru Infrastructure Fund (BIF) should be created in the public account of the state government. The fiscal resources mobilized by way of cess or surcharge after collection in the consolidate fund should get transferred to the BIF and thereafter distributed to the concerned mobility infrastructure and public transport agencies (BBMP, BDA, BMTC, BMRCL, B-RIDE) and other city infrastructure agencies (BWSSB and BESCOM) in the prescribed proportions for utilizing for projects approved by BMLTA in accordance with the city's Comprehensive Mobility Plan.

107. The extra budgetary resources, except proceeds from advertising, PPP, TOD at stations and roof-top solar plants which are specific to an agency, should also come to the common pool in the BIF and then distributed for the approved projects in the agreed proportions.

108. With the above proposed measures, it should be possible to step-up the investment in mobility infrastructure and public transport from current level of about Rs. 8250 crore, i.e.1.65 per cent of city's GDP to Rs. 20000 crore per annum, i.e., 4 per cent of city's GDP.

7 Assessing need and potential impact of bike taxis in Bengaluru

109. Advances in telemetry and mobile technologies have enabled new forms of mobility through demand-responsive, personalized transport services that are characterized by their efficiency in matching transport supply and demand, and in the ease of service access and delivery. They are encompassed under the umbrella term of shared mobility, which is defined as transportation services or resources that are shared between different users, either concurrently or one after another. These services span a wide range of vehicular modes and models of operation including bike sharing, carsharing, carpooling, shuttles, on-demand bus services and various micro-mobility modes.

110. In the past few years, India has seen a boom of shared mobility services cropping up in its cities, at the same time that smartphone ownership in cities has also skyrocketed. Of the different models of shared mobility, motorized bike[12]-based systems have attracted several start-up companies and logistics service providers for providing shared access to bikes for intra-city transport.

111. The dominance of bikes as a preferred mode of transport and introduction of bike-based shared mobility services in several Indian cities is not surprising, considering the weak public transport systems, poor infrastructure for non-motorized transport, lack of enforcement of on-street parking, inadequate road infrastructure, all leading to severe congestion on roads. However, there is a lack of clarity regarding need and impact of bike-based shared mobility services and the regulatory frameworks for such services, with current regulation not addressing them explicitly. This has led to cases of unauthorized introduction of these bike systems in certain cities, while in others laissez faire approach prevails due to this lack of clarity.

112. Addressing the need for making an informed decision regarding utility and impact of bike-based shared mobility services in the overall context of efficient and sustainable transport system for Bengaluru city and formulating appropriate regulations in the event of the services being found useful, the Government of Karnataka has mandated this committee, as per the Government Order dated 20th September 2018, to study the pros and cons of implementing 'bike model systems' and to provide recommendations for the same. In fulfilling this mandate, the committee has studied the current state of bike-based service models in India and abroad, consulted with existing operators of bike-based services and conducted analyses of the potential impact of such models on the efficiency and sustainability of urban transportation.

[12] Hereinafter referred as bike

7.1 Types of bike-based service models

113. There are two predominant types of motorized two-wheeler bike-based service models for intra-city transport currently in existence in the Indian transport ecosystem. One is short-term bike rentals, wherein a shared fleet of bikes can be rented by the hour, day or week. The other model is bike taxis, in which a bike ridden by a driver can be hailed to provide taxi services between any two points in the city. A third model of bike pooling exists in which users can pool their motorbike rides with others, but this model currently does not have many commercial operators globally.

114. Both bike rental and bike taxi models have undergone a transformation in service delivery and access with the emergence of app-based transport services. There are different business models for both types of bike-based services as detailed in Table 1. Bike rental services operate with aggregated or self-owned fleets, with station-based or free-floating vehicles. Bike taxi models, while predominantly an aggregator service, have also in certain cases deployed self-owned fleets with salaried drivers.

Table 1: Classification of bike-based service models for urban mobility

<table>
<tr><td rowspan="5">Ride hailing</td><td colspan="3">Online platform providing on-demand ride-booking services and ride-pool services using motorized two-wheelers (bike)</td></tr>
<tr><td rowspan="3">Taxi</td><td colspan="2">Online platforms that let user hire a bike taxi</td></tr>
<tr><td>Aggregator</td><td>Bikes are owned by individuals who make the bike and their service as driver available on the online platform</td></tr>
<tr><td>Own fleet</td><td>Bikes are owned by a company including a logistics services company</td></tr>
<tr><td>Pool</td><td colspan="2">Online platforms that let users pool their self-owned bike rides with others</td></tr>
<tr><td rowspan="4">Self-drive rentals</td><td colspan="3">Companies providing motorized two-wheeler rentals to customers or assisting users to look for motorized two-wheeler (bike) rental options</td></tr>
<tr><td colspan="2">Aggregator</td><td>Own Fleet</td></tr>
<tr><td colspan="2">Online platform which aggregates availability of bikes, owned by multiple companies or individuals, for their customers to hire and use.</td><td>Bikes are owned by the rental service provider</td></tr>
<tr><td>Station-based</td><td colspan="2">Companies aggregating motorized two-wheelers which require the vehicles to be picked up and dropped off at designated stations</td></tr>
<tr><td></td><td>Free-float</td><td colspan="2">Companies aggregating motorized two-wheelers which do not require the vehicles to be picked up and dropped off at designated stations</td></tr>
</table>

115. Bike rentals are legally permitted in Karnataka under the aegis of the Rent a Motor Cycle Scheme 1997, which was notified by the central government in exercise of powers conferred by Section 75 of the Motor Vehicles Act 1988. Under

this scheme, operators may rent out motorcycles for personal use to individuals, subject to the terms and conditions enlisted under the scheme. Operators need to obtain a license for running the business of bike rentals, from the Regional Transport Authority having jurisdiction in the area in which the central place of business is located. To be eligible for the license, which is valid for a period of five years, operator needs to maintain a minimum of five motorcycles having contract carriage permits and have necessary facilities for the housing, maintenance and repair of his vehicles.

116. As of November 2018, records show that 28 bike rental companies have received licenses in RTOs in Bengaluru. Companies in Bengaluru include Drivezy, ONN Bikes, Bounce (previously Metro Bikes), Vogo, Fae Bikes, Ontrack, Royal Brothers, Self Ride, Wheelstreet, Bykemania, RentOnGo, Roadpanda, Rentomojo and Rentrip, with the biggest two or three operators maintaining fleet sizes of 3000-5000 bikes each.

117. Motorcycle taxis or bike taxis are a type of paratransit mode typically found in Southeast Asia and increasingly in African countries. Traditionally street-hailed or found at taxi stands, motorcycle taxis have undergone a transformation in service delivery and access with the emergence of app-based bike taxi services. Grab, provider of the largest on-demand bike taxi service globally, has operations in 191 cities across 8 countries, including Indonesia, the Philippines, Vietnam, Malaysia and Thailand.

118. In India, bike taxis have not been a traditional paratransit mode despite the dominance of motorcycles in the vehicular fleet composition in the country, comprising 70-75 per cent of all registered vehicles. The central government permits the use of motorcycles as transport vehicles, by means of the Rent a Motor Cycle Scheme and by S.O. 1248(E), which categorises vehicles for registration in exercise of the powers conferred by sub-section (4) of Section 41 of the MV Act. Despite this, the Motor Vehicles Rules of most states have not considered motorcycles as a separate category for the award of contract carriage permits for passenger carriage.

119. It is only Goa's Motor Vehicles Rules 1991 that explicitly mention motorcycles in Rule 75, which comprises the schedule of fees for applying for a fresh contract carriage permit or for permit renewal. Goa has thus been the only state in India in which bike taxi services have typically been available. However, a growing number of bike taxi start-ups in the country have attempted to fill-up the unmet need for mobility due to poor public transport systems. The MoRTH's Taxi Policy Guidelines 2016 recommend that states may allow two-wheeler taxi permits on the lines similar to those for city taxi for last-mile connectivity solution and to allow private bikes to convert to taxis to facilitate utilization of idle assets. The guidelines also recommend unhindered grant of permits for Taxis of all types without restriction on numbers. This committee is of the view that the suitability

of those guidelines will have to be assessed based on mobility eco-system of each city, instead of being applied blindly.

120. The states of Haryana, Mizoram, West Bengal, Uttar Pradesh, Rajasthan and Punjab have issued notifications allowing the bike taxi services by obtaining contract carriage permits from State and Regional Transport Authorities, upon the receipt of an application and the payment of fees as defined.

121. Motorcycles plying as bike taxis in these states must be registered as transport vehicles, equipped with a yellow number plate with black alphanumeric lettering. This is distinct from the contract carriage permit that allows the use of motorcycles for rental purposes, which are equipped with a black number plate with yellow alphanumeric lettering. Further, states have imposed different requirements on the operations of bike taxi services, with parameters including vehicle specifications, vehicle markings and driver uniforms, parking requirements, minimum fleet size for operators and fare structure. Regulation of bike taxi services across states is currently uneven, characterised by an absence of standards and wide variations in the conditions of operation as detailed in Table 2.

Table 2: Regulation of bike taxi services

	Parking specs	Safety specs	Vehicle specs	Fare structure	Data sharing	Area of operation
Haryana	✓	✓	✓			
Punjab	✓	✓	✓			
Rajasthan						
West Bengal	✓	✓		✓	✓	✓
Mizoram		✓	✓	✓		✓
Uttar Pradesh	✓	✓	✓			

122. Where state governments have not explicitly permitted bike taxis, operators have in some cases introduced peer-to-peer ride-sharing services, which are operated illegally on non-transport vehicles without the requisite permits. This peer-to-peer ride-sharing model using motorcycles is not permitted under Section 66 of the central MV Act. Section 66 disallows the use of any vehicle as a transport vehicle in a public place except in accordance with the conditions of a permit granted or countersigned by the State or Regional Transport Authority.

123. This is currently the case in Bengaluru, where certain app-based mobility enterprises are aggregating bike drivers to provide bike taxi services to customers. The Government of Karnataka, by commissioning this study on bike-model systems for Bengaluru, is taking an analysis-based approach to assess need and impact of this new service model that is currently plying without legal permissions in the city.

7.2 Analysis of bike-based service models for urban transport systems

124. To better understand the benefits and costs of implementing bike-based mobility services in Bengaluru and their potential in helping to achieve more sustainable and efficient transportation in the city, the committee undertook an analysis of the two bike-based service models discussed above.

125. The SWOT (Strengths-Weaknesses-Opportunities-Threats) framework as detailed in Table 3 was employed to conduct the analysis, with a focus on the identified parameters of efficient and sustainable mobility. Strengths and weaknesses analyse the inherent business model and operations of the services, while opportunities and threats analyse the potential impacts within a given ecosystem.

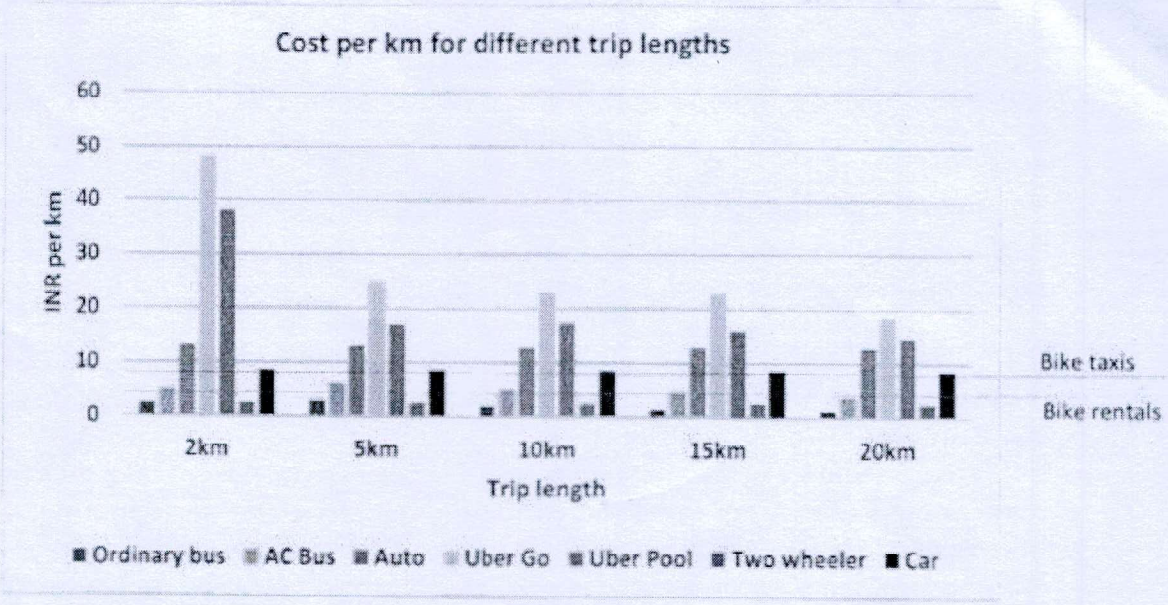
Table 3: SWOT Analysis

Strengths	**Weaknesses**
• Lower fares • Travel time savings • Accessibility on narrow roads	• Poor road usage efficiency • Low capacity • Low safety and security • Dead kilometres • Low additional utility
Opportunities	**Threats**
• Suppress vehicular ownership • Enable last-mile connectivity	• Promoting shift away from PT • More vehicle kilometres on road • Increased vehicle ownership • Unregulated parking and road obstruction • Higher carbon emissions • Discourage NMT

7.2.1 Strengths

126. **Lower fares:** Bike rentals and bike taxis both cater to an existing gap in the price ranges of mobility services. Bike rentals vary in cost from INR 3-6.5 per kilometre while unregulated bike taxi fares are approximate INR 8 per kilometre. This works out to INR 15-33 for a typical five-kilometre trip by a rented bike, while a bike taxi costs INR 40. In Aizawl and Rajarghat (New Town Kolkata), where bike taxi fares are regulated, the same five-kilometre trip would cost INR 30 and INR 35 respectively. This positions bike rentals and bike taxis at price points that are higher than that of bus-based transport while being cheaper than auto rickshaws and existing ridesharing services as detailed in Figure 2.

Figure 2: Pricing of different mobility modes



127. **Travel time savings:** With extreme congestion in many parts of Bengaluru during peak hours, the city has one of the lowest average speeds of motorized vehicles. While no reliable figures exist on the average speed of motorcycles in Indian cities vis-à-vis the average speed of cars and buses, it is acknowledged that motorcycles offer a faster mode of transportation in congested road conditions, leading to travel time savings and more efficient trips for commuters. However, that faster speed comes by violation of traffic flow regulations by way of haphazard traffic weaving, breaking of lane discipline, use of NMT space, and passage through side residential lanes, all causing major impact on other modes of transport, especially public transport.

128. **Accessibility on narrow roads:** Taxi and vehicle rental services using motorcycles improve accessibility to areas with narrow roads, where cars and buses may not be able to otherwise ply. In cities like Bangkok, which has a high proportion of narrow lanes or 'sois', bike taxis provide intermediate services to the main road.

7.2.2 Weaknesses

129. **Poor road usage efficiency:** Bike-based service models have a poor road use efficiency, which can be measured by PCU (passenger car unit) per passenger. Motorbikes have a PCU of 0.5, which means that they tend to occupy about half the space of a typical car as they move in traffic. In mixed traffic with a high proportion of motorbikes, their PCU increases to 0.75. While bike rentals have a potential occupancy of two and thereby a PCU per passenger of 0.38, bike taxis are very inefficient in terms of road usage, as they can only carry one passenger at any given time. This gives them a PCU per passenger value of 0.75, which is higher than most

other mobility modes including a typical car with two passengers. The bike taxis therefore make the least efficient use of the scarce road infrastructure.

130. **Low capacity vehicles:** Bike-based service models are inherently disadvantaged in their capacity, which is a maximum of two. This is further lowered for bike taxis, which have a maximum capacity of one (as the driver is always taking up one seat). Thus, they are limited in the number of passenger kilometres that can be served per vehicle kilometre and further, they take up a large amount of parking space for providing low levels of additional mobility along dense traffic corridors with high levels of congestion.

131. **Safety and security:** Two-wheelers have a much higher safety risk than other modes, with the highest number of accidents and traffic violations, and 29 casualties reported in Bengaluru in 2017 according the Bengaluru Traffic Police. Moreover, security of women and children is a cited concern of bike taxi services, with some states prohibiting the carriage of children and necessitating security measures for the protection of women. Two-wheelers also contribute to endangering pedestrians and bicyclists through reckless driving behaviours and add to accident risk on the road. This is further aggravated by reckless driving by drivers of bike taxis and delivery services, who aim to earn more by completing more rides.

132. **Dead kilometres:** On-demand taxi models, be they car-based or bike-based, deal with the problem of dead kilometres, as they have to ply empty to pick up passengers or on their return from dropping a passenger. These dead kilometres add to vehicle kilometres on the road, with impacts on congestion, air quality and carbon emissions.

133. **Low additional utility:** Due to their perceptions of poor safety and low comfort levels, bike-based services have lower utility for many segments of the population- women, children, elderly persons, differently-abled persons. The additional access from one more mode on the road is thus drastically reduced as bike taxis cater to limited commuter groups.

7.2.3 Opportunities

134. **Suppress vehicular ownership:** The availability of shared mobility has been shown to dissuade or delay the purchase of vehicles by individuals and households. Reliable availability of bike rental and bike taxi services may slow down the growth rate of two-wheeler and car registration, by providing a viable alternative mode of end-to-end transport as well as an affordable last-mile mode for connecting to public transport networks. From perspective of efficient and sustainable mobility system, this is not a real opportunity. The impact of usage of a motorized vehicle instead of its ownership or the vehicle kept idle is the relevant factor from the mobility perspective.

135. **Enable last-mile connectivity:** Last mile connectivity is an important use case of bike taxis in cities where the market is mature. For instance, in Bangkok, bike taxis are the main mode for accessing transit stations for a first/ last mile trip distance of 500-1000m, and the second most popular mode for trip distances of 0-500m to or from a transit station. Bike taxi operators in the Indian city of Gurgaon also emphasise the last-mile use case of bike taxis, with the statistics of one operator showing one in two bike taxi trips beginning or terminating at a metro station. From perspective of sustainable mobility, this opportunity is also not real. For short distances of less than a km, walking or non-motorized transport (NMT) is the recommended mode, and not the motorized transport. With that goal, Bengaluru city has been investing in developing NMT infrastructure through tender-sure roads.

7.2.4 Threats

136. **Promoting shift from public transport:** Initial studies from bike rental services found that a significant proportion of users shift to the service from bus services. Bike taxi services, if introduced, can prompt a greater shift away from public transport, among commuters that currently use bus or metro rail services for their travel. This has potential impacts on congestion, air quality and carbon emissions, by replacing more sustainable modes with less sustainable modes.

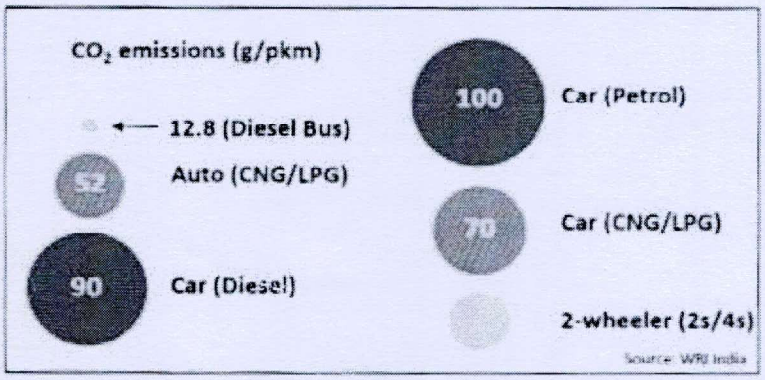
137. **More vehicle kilometres on road:** Global studies have shown that access to on-demand services induces urban residents to make trips that they would otherwise not have made or would have made by NMT mode, with some studies showing that approximately 50 per cent of the trips being made by cab aggregators were trips that would not have been made or would have been made on foot, by bicycle or by public transport. With more on-demand services prompting greater transport demand, and the additional dead kilometres accrued by these vehicles, bike taxi services are likely to add to the number of vehicle kilometres on the road, directly contributing to the heavy congestion.

138. **Increased vehicle ownership and usage:** With bike taxis being a potentially attractive livelihood opportunity for low-skilled populations, permitting bike taxis could lead to a spike in two-wheeler registrations, thereby contributing to worsening congestion. This is evident from the experience with on-demand cab aggregator services, which resulted in the influx of a large number of vehicles on the road. As bikes are significantly cheaper, the oversupply problem may be aggravated due to more people having access to purchasing a motorbike. Business models of certain bike taxi service providers further escalate this issue, as they provide financing mechanisms for low-income drivers to purchase their own bikes for plying as bike taxis.

139. **Unregulated parking and roadway obstruction:** Experience of shared mobility services in Indian cities, where parking regulations and their enforcement are weak or absent, which is the case in Bengaluru, has led to the

usage of road space for parking these service vehicles. In turn, this contributes to congestion due to reduced and obstructed carriageways. In the absence of robust parking rules regulating on-road parking, bike taxis are one more mobility service that is likely to use road space for parking in-between trips and overnight, during off-service hours.

Figure 2: CO_2 emissions per passenger km by mode



140. **Higher emissions:** By promoting a shift away from high-capacity public transport, through excess dead vehicular kilometres, or by the emergence of older bikes with lower pollution standards, bike taxis have the potential to contribute to higher emissions of pollutants and carbon dioxide, resulting in poorer air quality and a higher transport sector contribution to climate change.

141. **Discourage NMT:** A study on bike taxis in Bangkok has shown that the use of bike taxis for last-mile connectivity to mass transit stations has negatively impacted walking and bicycling shares, due to reduced safety for pedestrians and cyclists and the availability of a motorised mode of transport. As Bengaluru is focusing on introducing bicycle sharing systems and improving its pedestrian networks around transit stations, the introduction of bike taxis may conflict with the NMT goals of the city and reduce NMT usage for last-mile connectivity.

7.3 Bike taxis: Assessing the complete picture

142. Bengaluru is served by multiple shared mobility modes. Taken together, the BMTC and BMRCL networks provide connectivity to about 85 per cent of the city's population within a 500-metre radius. Much of the road network has footpaths and the city is now developing bicycle sharing projects to provide improved first and last mile connectivity to public transport. Additionally, the city has a range of privately-provided mobility options, ranging from traditional paratransit modes like auto-rickshaws to on-demand ride hailing and bike rental services. In such a scenario, it is found that bike taxis have a minimal positive benefit for commuters, which is outweighed by the greater potential for negative externalities, both for commuters and for the city.

143. The most prominent negative externality arising from the bike-taxi is due to highly inefficient usage of the road infrastructure by this mode and its low capacity as detailed in Table-4 below.

Table 4: Usage of road infrastructure per passenger by various modes

Mode	Average occupancy*	PCU[13]	PCU per Passenger
Bus	60	3.5	0.06
Car	2	1	0.5
Two-wheeler	1.2	0.5	0.4
4-wheeler Taxi	1	1	1
Auto-Rickshaw	1.2	0.8	0.67
Bike on Rent	1.2	0.5	0.4
Bike Taxi	1	0.5	0.5

*Average occupancies are estimated based on different studies.

144. When looking at the advantages of bike-based service models, it is found that the existing bike rental services have many of the same benefits as the proposed bike taxi services. Bike rentals provide a more affordable mode choice for commuters than taxis and play the same role in improving accessibility and last-mile connectivity. Rental services also provide access to bikes, thereby lowering the need for vehicle ownership and providing a faster mode of travel for commuters across the city.

145. Moreover, bike rentals do not suffer from many of the disadvantages of the bike taxi model. Bike rentals, unlike bike taxis, do not add dead kilometres to the road, as commuters pick them up from their parked location and drop them off for the next user to pick up. Bike rental usage is likely to be safer than the bike taxis, as bike taxi drivers would be incentivized to ride faster to complete more trips and earn more. Further, the supply of bikes by bike rental service providers is more regulated based on demand as the fleet is controlled by the service provider, while bike taxi platforms may face an oversupply from multiple independent drivers.

146. The regulatory authorities in Bengaluru have been attempting to limit number of permits for other IPT modes such as auto-rickshaw and four-wheeler taxi in view of adverse impact caused by them on the congestion. In that situation, the introduction of another mode with lower fares is likely to be resisted by those operators along with demands for unhindered issuance of permits for those modes also.

147. Wherever bike taxis have been operating in India so far, the circumstances are different from that of Bengaluru in different ways. The service has been picking

[13] NPTEL measures for PCU on a highway- may vary in urban areas or with different traffic compositions.

up in smaller cities, where traffic congestion is not as prevalent and public transport is uneven. In Gurugram, the lack of widespread public bus services[14], poor walkability and exploitative para-transit services have made bike taxis a potential last-mile mode. Aizawl, Mizoram, is a hilly city with narrow roads where bike-based services are more appropriate; moreover, the introduction of bike taxis was accompanied by the banning of auto-rickshaws from the city centre, which led to the replacement of one service mode for another.

148. Among Tier 1 cities, bike taxi operations have been limited. In Kolkata, the regulated service has been run as a small-scale pilot limited to the New Town zone of the city, which has a much lower population density and fewer public transit services than the main city area. Hyderabad remains the only major city in which bike taxi services are operating, with no other city having permitted their operations thus far.

149. **Meeting with bike taxi operators:** On 22nd December 2018, the committee met with potential bike taxi operators including Uber, Ola, Vogo, Bounce, Rapido and Dunzo. The meeting was an opportunity to understand the use cases envisioned by operators for bike taxis in the city, and how amenable bike taxi operators might be to regulations on the service model. The following observations were made:

i. Current bike taxi operators made a case for bike taxis being used primarily for last-mile connectivity; however, their evidence was drawn from Gurugram, which is a peculiar case with thoroughly inadequate public transport services as noted in Paragraph 147 above.

ii. Most operators, especially the bigger ones, expressed a reluctance to share data on their operations.

iii. Expressions of interest in operating bike taxi services by consignment delivery companies and bike rental services had the primary intent of maximising the utilisation of their fleets during their off-peak hours and thereby, their profits.

150. Bike taxis are assessed to be an unproven and inappropriate model for Bengaluru and other large Indian cities. The state committee was further not convinced by the meeting with the bike taxi operators that the service would be valuable in Bengaluru. They are not a necessary service in the city given the abundant transport options available and they are more likely to aggravate the negative impacts of the transport sector further such as congestion and contribution to pollution and carbon emissions. The bike taxis are among the least efficient modes in terms of usage of the most constrained mobility resource of

[14] Gurugram has thoroughly inadequate public transport service with less than 200 buses and has set a goal of increasing the fleet size to 500.

roads. For these reasons, it is recommended that bike taxis should not be permitted in Bengaluru and any existing operations should be ceased.

151. For providing last mile connectivity to areas not served by public transport, investment in NMT infrastructure including well developed footpaths for pedestrian movement, and station based 'rent a bicycle' and 'rent a bike' would be the appropriate modes instead of bike taxis. For areas with narrow lanes and high degree of congestion, elevated walkways would be the sustainable mode instead of bike taxis.

152. The committee recommends continuation of bike-rental mode with improved regulations in terms of operational and economic parameters on following lines.

i. Only station-based bike-rental services should be allowed in view of extreme congestion on the roads and limited space for off-street parking.

ii. Appropriate public spaces at or near main economic centre throughout the city, specially near the public transport stations, should be earmarked for bike-rental stations. In the event of public space being limited, the allocation prioritization can follow the sequence of space for pedestrian movement, public transport bay, bicycle rental station, auto-rickshaw bay, bike rental station, and private vehicle parking.

iii. A penalty should be imposed on the service provider if the rented bike is parked by their customers in the no-parking zone. They should develop their business model including recovery of penalty from the customer, and adopt bike tracking technology accordingly. In case of repeated parking violations by any customer, the service provider should have option to escalate complaint online to parking regulatory authorities for suspension of the license.

iv. Appropriate norms for costing and equitable allocation of limited public spaces for the bikes on rent to various service providers should be formulated by the city UMTA.

v. The space allocation can follow minimum and maximum slots that can be allocated to service provider. In addition, a rental cap be imposed as the public spaces for the stations are recommended to be given at nominal rates much lower than the economic cost of land.

8 Next steps

153. This report aims to provide a snapshot of the current scenario of the transport sector in Bengaluru. It is found that while there are a wide diversity of mobility options available in the city. However, growing transport demand, overburdened infrastructure, increasing use of unsustainable transport modes and a fragmented governance structure have led to an inefficient urban transport network with significant negative externalities for the city and its residents.

154. Based on the mandate given to the committee, a framework of strategies and action plans has been developed that should help achieve the goals and vision of efficient and sustainable mobility for all. Lead agencies for implementing the policies are identified and a range of financing mechanisms have been explored that could support more sustainable investments and mitigate negative externalities.

155. While the report provides a global overview of the initiatives and actions needed, more research and data are required to prioritise the most impactful actions and create an implementation plan for achieving each of the strategies. It is impossible to measure change and progress without regular and high-quality data that can support data-driven decision making. The next steps towards operationalising the recommendations provided by this committee include:

i. Conduct an exercise to frame a comprehensive mobility plan that is based on the recommendations of the report and provides a clear and updated picture, with detailed and granular data, of the transport ecosystem in Bengaluru today.

ii. Create an independent authority for the integrated governance of urban transport in the city, and provide it with legislative, regulatory and fiscal powers for achieving the objectives of the mobility plan.

iii. Restructure the regulatory and fiscal policy frameworks for urban transport to reflect the evolving principles that are necessary for more efficient and sustainable transport systems.

iv. Identify various PPP financing mechanisms and a suite of transport fees, taxes, cesses and other instruments for funding transport infrastructure in the city.

v. Follow through on the implementation of the Comprehensive Mobility Plan, which should have a vision for urban transportation in Bengaluru for the next 20 years and should be protected from political imperatives.

156. Achieving efficient and sustainable mobility in Bengaluru is a long-term, multi-stakeholder process that will require tremendous amount of concerted efforts and strong buy-in from all stakeholders including the residents of the city, which are essential to ensure the continued liveability and economic growth of the city.

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Principal Secretary, Transport
Department, GOK
(Member)

V. Ponkiert
Transport Commissioner
(Member- Secretary)

N. Manjunatha Prasad
Commissioner, BBMP
(Member)

Dr. N.V. Prasad
Managing Director, BMTC
(Member)

P. Harishekaran
Additional Commissioner of Police
(Traffic), Bengaluru
(Member)

V. Ponnuraj
Commissioner, DULT
(Member)

Manoj Kumar
Member-Secretary, KSPCB
(Member)

Alok Prasanna Kumar
Vidhi Centre for Legal Policy
(Member)

Ajay Seth
Managing Director, BMRCL
(Chairman of Committee)

Date: 29.04.2019

ANNEXURE - 1

ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ನಡವಳಿಗಳು

ವಿಷಯ:- "Efficient and Sustainable Transport in Bengaluru" ಕುರಿತಂತೆ ತಯಾರಿಸಿರುವ ವರದಿಯ ಸಲಹೆ/ಶಿಫಾರಸುಗಳನ್ನು ಪರಿಶೀಲಿಸುವ ಬಗ್ಗೆ.

ಓದಲಾಗಿದೆ:-

ಮಾನ್ಯ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ದಿನಾಂಕ: 14-09-2018 ರಂದು ನಡೆದ ಸಭೆಯ ನಡವಳಿಗಳು

ಪ್ರಸ್ತಾವನೆ:-

ಮಾನ್ಯ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ದಿನಾಂಕ: 14-09-2018 ರಂದು ನಡೆದ ಸಭೆಯಲ್ಲಿ ಮೆ: [illegible] ಸಂಸ್ಥೆಯವರು "Efficient and Sustainable Transport in Bengaluru" ಕುರಿತು ತಯಾರಿಸಿರುವ ವರದಿಯ ಬಗ್ಗೆ ಚರ್ಚಿಸಲಾಗಿದ್ದು, ಬೆಂಗಳೂರು ನಗರದಲ್ಲಿ [illegible] ಯೋಜನೆ [illegible] ಕುರಿತಂತೆ [illegible] ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಬಿ.ಎಂ.ಆರ್.ಸಿ.ಎಲ್ ರವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಸಮಿತಿಯನ್ನು ರಚಿಸಲು ತೀರ್ಮಾನಿಸಲಾಗಿರುತ್ತದೆ.

ಸರ್ಕಾರಿ ಆದೇಶ ಸಂಖ್ಯೆ: [illegible] 269 [illegible] 2018, ಬೆಂಗಳೂರು, ದಿನಾಂಕ: 20.09.2018

ಪ್ರಸ್ತಾವನೆಯಲ್ಲಿ ವಿವರಿಸಿರುವ ಅಂಶಗಳ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಈ ಕೆಳಕಂಡ ಅಧಿಕಾರಿಗಳನ್ನು ಒಳಗೊಂಡ ಸಮಿತಿಯನ್ನು ರಚಿಸಲಾಗಿದೆ.

1.	ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಬಿ.ಎಂ.ಆರ್.ಸಿ.ಎಲ್	ಅಧ್ಯಕ್ಷರು
2.	ಸರ್ಕಾರದ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿ, ನಗರ [illegible]	ಸದಸ್ಯರು
3.	ಆಯುಕ್ತರು, ಸಾರಿಗೆ ಮತ್ತು ರಸ್ತೆ ಸುರಕ್ಷತೆ	ಸದಸ್ಯ ಕಾರ್ಯದರ್ಶಿ
4.	ಆಯುಕ್ತರು, ಬಿ.ಬಿ.ಎಂ.ಪಿ	ಸದಸ್ಯರು
5.	ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಬಿ.ಎಂ.ಟಿ.ಸಿ	ಸದಸ್ಯರು
6.	ಹೆಚ್ಚುವರಿ ಪೊಲೀಸ್ ಆಯುಕ್ತರು (ಸಂಚಾರ)	ಸದಸ್ಯರು
7.	ನಿರ್ದೇಶಕರು, ನಗರ ಭೂ ಸಾರಿಗೆ ನಿರ್ದೇಶನಾಲಯ	ಸದಸ್ಯರು
8.	ಸದಸ್ಯ ಕಾರ್ಯದರ್ಶಿ, ಕರ್ನಾಟಕ ಮಾಲಿನ್ಯ ನಿಯಂತ್ರಣ ಮಂಡಳಿ	ಸದಸ್ಯರು
9.	[illegible], [illegible] ಸಂಸ್ಥೆ	ಸದಸ್ಯರು

ಸಮಿತಿಯು ಪ್ರಸ್ತಾವನೆಯ ವರದಿ ಶಿಫಾರಸುಗಳನ್ನು ಪರಿಶೀಲಿಸಿ ಬೆಂಗಳೂರಿನಲ್ಲಿ [illegible] ವ್ಯವಸ್ಥೆಯನ್ನು ಜಾರಿಗೆ ತರುವುದರ ಬಗ್ಗೆ ಹಾಗೂ ಬೆಂಗಳೂರಿನಲ್ಲಿ "Efficient and Sustainable Transport System" ತರುವುದರ ಬಗ್ಗೆ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ನೀಡಿ ವರದಿಯನ್ನು ಮಾನ್ಯ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳಿಗೆ 15 ದಿನಗಳೊಳಗಾಗಿ ಸಲ್ಲಿಸತಕ್ಕದ್ದು.

ಕರ್ನಾಟಕ ರಾಜ್ಯಪಾಲರ ಆದೇಶಾನುಸಾರ
ಮತ್ತು ಅವರ ಹೆಸರಿನಲ್ಲಿ

(ಎಂ.[illegible])
ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿ,
ನಗರ [illegible]

ಗೆ:-

1) ಸರ್ಕಾರದ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳು, ವಿಧಾನ ಸೌಧ, ಬೆಂಗಳೂರು.

ಶಾಖಾಧಿಕಾರಿ ಹಾಗೂ ಸಾರ್ವಜನಿಕ ಮಾಹಿತಿ ಅಧಿಕಾರಿ, ಸಾರಿಗೆ ಇಲಾಖೆ (ಸಾರಿಗೆ-2 ಶಾಖೆ) ಇವರ ಕಚೇರಿ

ಸಂ: ಟಿಡಿ 151 ಟಿಡಿಒ 2019

ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಸಚಿವಾಲಯ,
ಬಹುಮಹಡಿಗಳ ಕಟ್ಟಡ,
ಬೆಂಗಳೂರು, ದಿನಾಂಕ:12-02-2021.

ಇವರಿಗೆ:
ಶ್ರೀ ದತ್ತಾತ್ರೇಯ ಟಿ. ದೇವರೆ,
ಎ-102, ನತಾಶ ಗಾಲ್ಫ್ ವೀವ್ ಅಪಾರ್ಟ್ ಮೆಂಟ್,
ಒಳರಿಂಗ್ ರಸ್ತೆ, ದೊಮ್ಮಲೂರು,
ಬೆಂಗಳೂರು-560071.

ಮಾನ್ಯರೆ,

ವಿಷಯ: ಶ್ರೀ ದತ್ತಾತ್ರೇಯ. ಟಿ ಇವರು ಮಾಹಿತಿ ಹಕ್ಕು ಅಧಿನಿಯಮದ ಕಲಂ19(3) ರಡಿಯಲ್ಲಿ ಕರ್ನಾಟಕ ಮಾಹಿತಿ ಆಯೋಗಕ್ಕೆ ಸಲ್ಲಿಸಿರುವ 2ನೇ ಮೇಲ್ಮನವಿ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1. ತಮ್ಮ ಮಾಹಿತಿ ಹಕ್ಕು ಅಧಿನಿಯಮದ ಅರ್ಜಿ ದಿನಾಂಕ:17-06-2019
2. ಪ್ರಥಮ ಮೇಲ್ಮನವಿ ಅರ್ಜಿ ದಿನಾಂಕ: 03-08-2019.
3. ಕರ್ನಾಟಕ ಮಾಹಿತಿ ಆಯೋಗದ ಪ್ರಕರಣ ಸಂಖ್ಯೆ: KIC/14153/APL/2019.

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ಮೇಲಿನ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಮಾಹಿತಿ ಹಕ್ಕು ಅಧಿನಿಯಮದ ಕಲಂ19(3) ರಡಿಯಲ್ಲಿ ಕರ್ನಾಟಕ ಮಾಹಿತಿ ಆಯೋಗಕ್ಕೆ ಸಲ್ಲಿಸಿರುವ 2ನೇ ಮೇಲ್ಮನವಿ ಪ್ರಕರಣ ಸಂಖ್ಯೆ: KIC 14153APL2019 ಕುರಿತಂತೆ ದಿನಾಂಕ: 12-02-2021 ರಂದು ಮಾನ್ಯ ಕರ್ನಾಟಕ ಮಾಹಿತಿ ಆಯೋಗದ ಪೀಠ ಸಂಖ್ಯೆ: 1 ರಲ್ಲಿ ಖುದ್ದಾಗಿ ವಿಚಾರಣೆಗೆ ಹಾಜರಾಗಲಾಗಿತ್ತು.

ಪ್ರಕರಣವನ್ನು ಪರಿಶೀಲಿಸಿದ ಆಯೋಗವು ಸರ್ಕಾರದ ಅದೇಶ ಸಂಖ್ಯೆ: ಸಾರಿಇ 269 ಸಾಇಪ 2018 ರಲ್ಲಿ "Efficient and Sustainable Transport in Bengaluru" ಕುರಿತಂತೆ ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಬಿ.ಎಂ.ಆರ್.ಸಿ.ಎಲ್. ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿನ ಸಮಿತಿಯು ದಿನಾಂಕ: 29-04-2019 ರಂದು ಸಲ್ಲಿಸಿರುವ ವರದಿ ಮತ್ತು ವರದಿಯ ಬಗ್ಗೆ ಕೈಗೊಂಡಿರುವ ಕ್ರಮದ ಕುರಿತು ಮಾಹಿತಿಯನ್ನು ಅರ್ಜಿದಾರರಿಗೆ ಇಂದೇ ಖುದ್ದಾಗಿ/ಅಂಚೆ ಮುಖಾಂತರ ಒದಗಿಸಲು ಆದೇಶಿಸಲಾಗಿರುತ್ತದೆ.

--2

ಈ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಬಿ.ಎಂ.ಆರ್.ಸಿ.ಎಲ್. ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ರಚಿಸಲಾದ ಸಮಿತಿಯು ಸಲ್ಲಿಸಿರುವ ದಿನಾಂಕ: 29-04-2019ರ ವರದಿಯ ಪ್ರತಿಯನ್ನು ಇದರೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ತಮಗೆ ಕಳುಹಿಸಿಕೊಡಲಾಗಿದೆ. ಹಾಗೂ ಸದರಿ ವರದಿಯ ಕುರಿತಂತೆ ಕೈಗೊಂಡ ಕ್ರಮಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸದರಿ ವರದಿಯ ಮೇಲೆ ಸಾರಿಗೆ ಆಯುಕ್ತರ ಅಭಿಪ್ರಾಯವನ್ನು ಪಡೆದು ಸಂಬಂಧಿಸಿದ ಕಡತವನ್ನು ಸೂಕ್ತ ಆದೇಶಕ್ಕಾಗಿ ಸಕ್ಷಮ ಪ್ರಾಧಿಕಾರದ ಅನುಮೋದನೆಗೆ ಸಲ್ಲಿಸಲಾಗಿದ್ದು, ಪ್ರಸ್ತುತ ಪ್ರಸ್ತಾವನೆ ಪರಿಶೀಲನೆಯಲ್ಲಿರುತ್ತದೆ ತಮಗೆ ತಿಳಿಸಿದೆ.

ತಮ್ಮ ನಂಬುಗೆಯ,

(ರಂಗಪ್ಪ ಕರಿಗಾರ) 4/02/2021
ಸಾರ್ವಜನಿಕ ಮಾಹಿತಿ ಹಕ್ಕು ಅಧಿಕಾರಿ
ಹಾಗೂ ಶಾಖಾಧಿಕಾರಿ
ಸಾರಿಗೆ ಇಲಾಖೆ.