Visakhapatnam Municipal Corporation, India

EcoMobility SHIFT+ Assessment Report

Overview

The EcoMobility SHIFT+ is a methodology designed for cities to measure the performance in urban mobility and make informed decisions based on the areas that need improvement. Visakhapatnam, commonly known as Vizag, is Andhra Pradesh's largest city in terms of economy and population.

The hilly coastal city is connected by different transport modes: east coast railway, national highway, airport, and a seaport. The Visakhapatnam Port is one of the largest ports in India and has the only natural harbor on the east coast. Visakhapatnam's main economic activities are agriculture, aquaculture and heavy industries at the Special Economic Zones and industrial parks.

Visakhapatnam Municipal Corporation gathered key stakeholders, including representatives from the Municipal and Greater Visakhapatnam Municipal Corporation, traffic police and private sector to form the EcoMobility SHIFT+ Working Group to analyze the transport system and discussed the short- and long-term interventions.

The EcoMobility SHIFT+ indicator score for Visakhapatnam is 49%, performing slightly below average. While there are still some challenges in preventing automobiles from increasing and providing adequate public transportation, the administration led by the urban planning department is proactive in planning and enhancing multi-modal transportation.

Facts & Figures

Population
1,728,128 (2011)

Land area
543 square kilometers (km^2)

Modal split (2014)

- Cycling 3%
- Personal car 2%
- IPT 9%
- Motorcycle 18%
- Walking 50%
- Public transport 18%
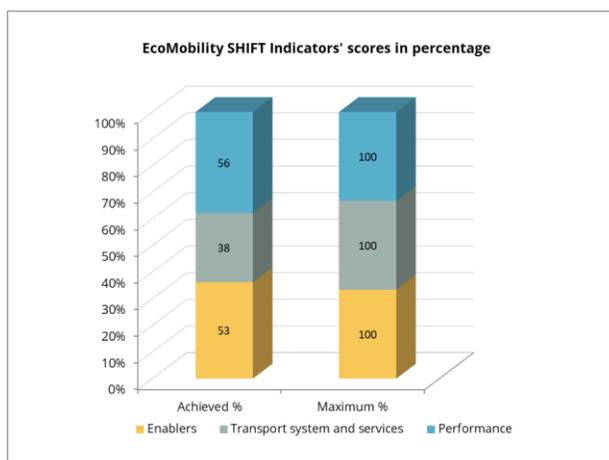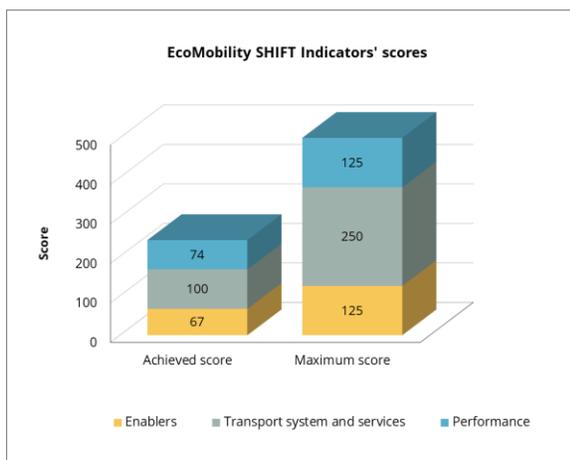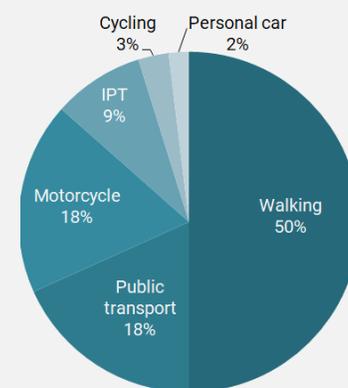
Figure 1: EcoMobility SHIFT+ Indicator scores and in percentage for each category

Overview of the 23 EcoMobility SHIFT+ indicators' ranking is presented below.

EcoMobility SHIFT+ indicators' ranking

■ Good   ■ Average   ■ Poor
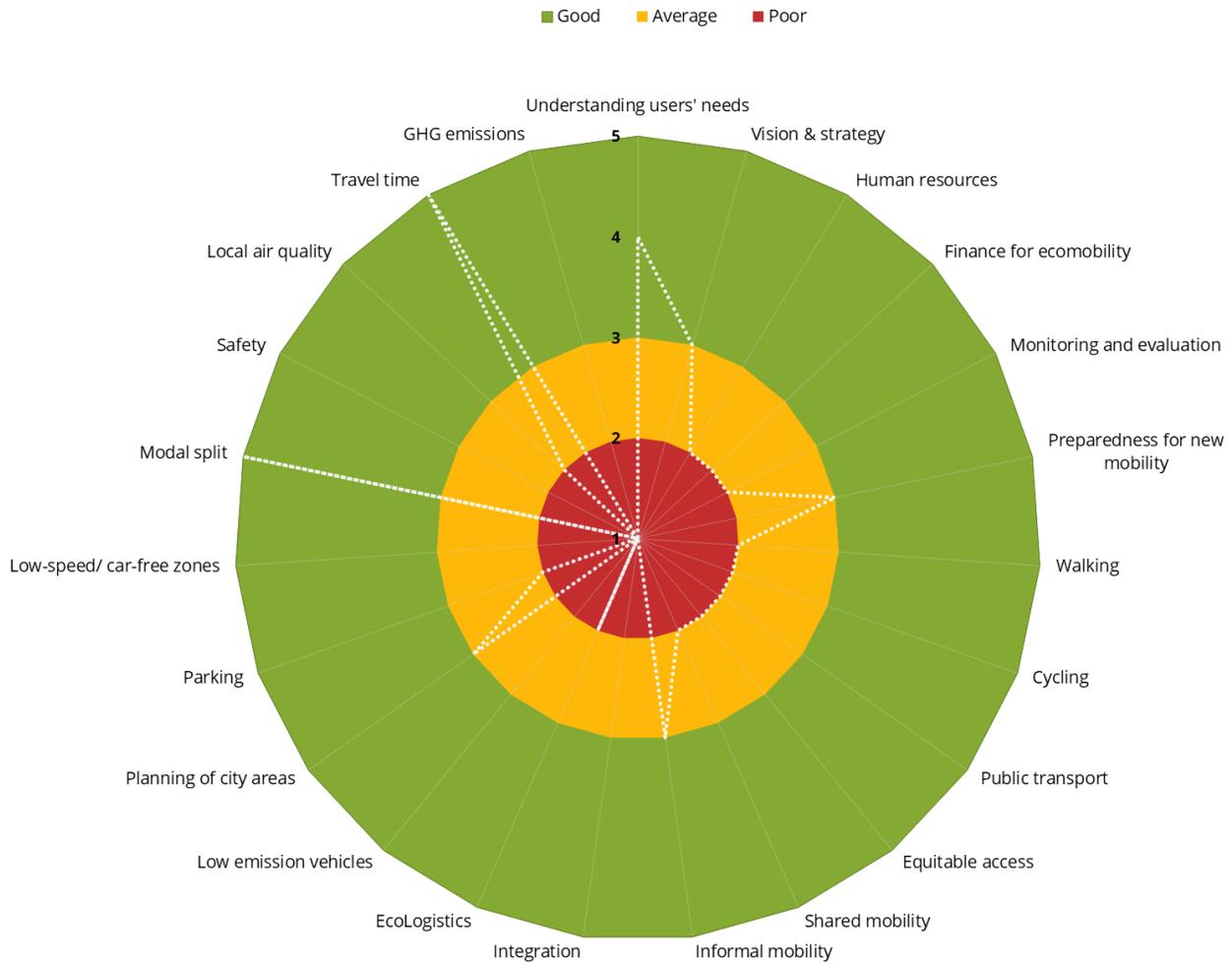
Figure 2: Overview of the EcoMobility SHIFT+ Indicators ranking

EcoMobility SHIFT+ Results based on Category

Enablers

Visakhapatnam is one of the Smart City Mission cities in India. According to the household survey (2015), the critical concerns of the residents are: (1) weak public transportation system (78%); (2) inadequate parking facilities (68%); (3) annual vehicular growth rate of 9% is too high, directly correlated to poorer air quality; and (4) absence of a safe and comfortable pedestrian environment.

Visakhapatnam's transportation issues are included under the Greater Visakhapatnam Masterplan and managed under the Visakhapatnam Urban Development Authority (VUDA) while working with other stakeholders from the Visakhapatnam Municipal Regional Development Authority (VMRDA), Andhra Pradesh State Road Transportation Corporation (APSRTC), Smart City team, traffic police, and road engineers. The United Nations Environmental Program (UNEP) also supported the city to establish the Low Carbon Comprehensive Mobility Plan 2011 – 2030, although it is not actively implemented. Matters on active mobility and public transportation are separately considered and included in the Masterplan. There is no transport department as responsibilities are shared across different bodies.

The city actively collects data and feedback from the residents through mobile applications under the Smart City program or helpline number. This includes suggestions on the revival of the Bus Rapid Transit (BRT) system and the pedestrian improvement program. Other forms of studies are done on a project basis. Even in the development of the Masterplan as well as the Smart City implementation plans, stakeholder consultation meetings are mandated involving the GVMC, Port Authority, technical experts, NGOs, institutions, private companies and the general public.

Under the Smart City Vizag Mission, five principal thrusts have been identified for mobility including electrification of transport, upgrading of the existing BRT system, new rapid development, "smart street" corridors and expanding the current airport. In doing so, various feasibility studies and a Transit-Oriented Development proposal have been conducted and some are in the process of implementation. This reflects the commitment of the city in improving the city's mobility system by leveraging on the Smart City Mission. The city conducts monitoring and evaluation only if a project requires it.

The city is also open to welcome new mobility services although there is not much engagement for privately-owned new mobility companies such as Ola, Uber, Rapido, Food Panda, Swiggy and Uber Eats, etc. However, the city's first public bike-sharing system along Beach Road is a result of a public-private partnership.

In general, Visakhapatnam is quite proactive in enhancing sustainable mobility through the Smart Cities Missions project. As many plans are still at the initial implementation stage, the impacts are not obviously reflected yet. Since responsibilities on mobility are spread across different departments and stakeholders, there is no accountability. The lack of a coherent approach to attractive, sustainable mobility options result in increasing motorization.
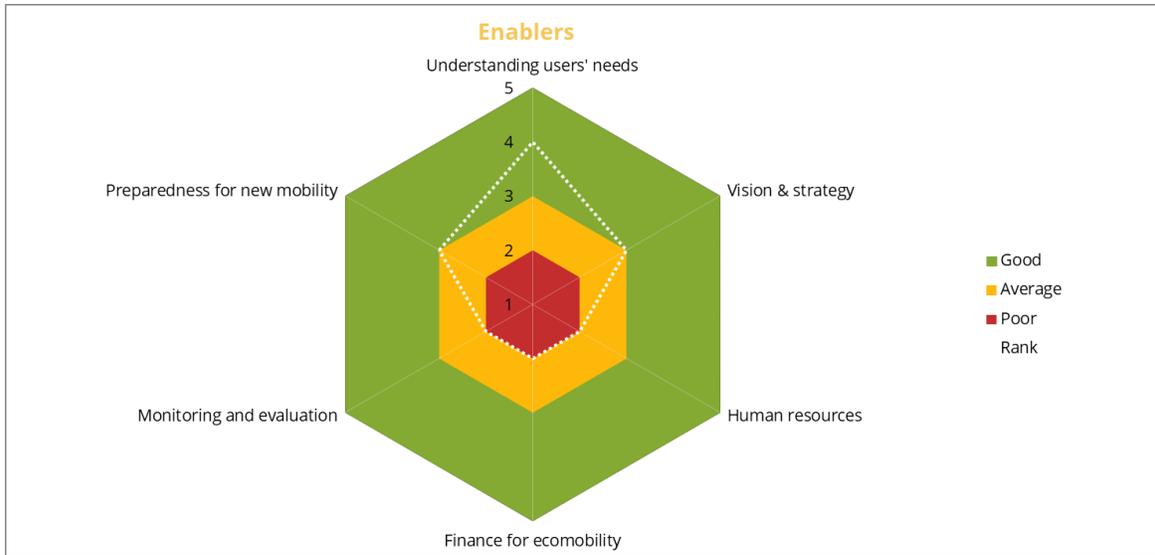
Figure 3: Enabler category's indicators' ranking

Transport system and services

The transport system and services category's indicators' ranking is presented in Figure 4 below.

Transport systems

According to the Low Carbon Mobility Plan (2011), most trips are made on foot (52%), followed by public bus (18%), two-wheelers (15%), and auto-rickshaws (9%). As Visakhapatnam is a hilly city, bicycle represents only 3%. Car trips are low, at 2%. However, it was pointed at out at the stakeholders' meeting that the modal split for cars would have increased significantly, replacing walking. This is due to insufficient investment as only 0.01% of transport expenditure is spent on walking and cycling facilities, resulting in dangerous and not universally accessible active mobility facilities. This is serious as about 25 to 30% of students walk to school. However, investment has slightly increased over the years by paving sidewalks and through placemaking. The city maintains only 78 km of footpaths out of the 480 km of the road network, with most of them being discontinuous. Of this 77 km, 40 km is part of the two BRT corridors[1]. Some murals across the city are painted with vivid colors to attract more pedestrians.

While improving walking is part of the new Masterplan, cycling is still overlooked due to the hilly nature of the city. There is only 10.5 km of bikeway in the city along the Beach Road, which is a popular tourist spot. In cooperation with a private company, the public bike-sharing system is also piloted with 100 bicycles along this Beach Road with a positive response. However, most trips are recreational purposes.

---

[1] ICLEI South Asia. Supporting sustainable mobility under the Smart City Mission (2019)

Poor walking conditions with barriers and no connectivity (left) and more than half of the residents walk in Visakhapatnam although investment on walkways is insufficient

Encroachment by informal fruit sellers or illegal parking by auto-rickshaws on pedestrian walkways or junctions are commonly seen throughout the city (left) and the newly constructed pedestrian walkway along the Beach Road for tourism (right)

The pilot bike-sharing system started along the Beach Road (left) and pedestrian crossing (right)

The public bus forms the primary public transportation system operated by the APSRTC. Of the 18% of public transport modal split, 85% of the trips are made by public buses ("City Bus Services"), while 15% is with auto rickshaws. This still falls short of the targeted 50%[2] share of public transport in the modal split. Dwarake Bus Complex is the major bus station functioning as a regional and intercity transport hub. The current public bus system is uncomfortable and insufficient to accommodate demand. Last-mile connectivity is also a challenge. As there is no dedicated lane for public buses, they compete for road space with auto-rickshaws and private cars, reducing the reliability of the travel times. There are approximately 25,000 auto-rickshaws in the city with an average trip length of 5.9 km. Paratransit vehicles (three- and seven-seater auto-rickshaws) servicing peak hour demand increased over the years, competing with the City Bus Services although the price is slightly higher than the public buses.

In 2014, the city completed the construction of 45 km of Bus Rapid Transit (BRT) corridors but could not be operated effectively due to various issues, including subsidy and legal issues. It is observed that the BRT corridors lack real-time information for passengers and passenger amenities. The BRT lanes are currently intruded by unauthorized vehicles and inaccessible for the differently-abled. Under the Smart City Mission, the city plans to upgrade the existing BRT system and develop new BRT lines to improve passenger safety and information and minimize intrusion by other vehicles. There are also proposals for new Mass Rapid Transit (MRT) lines for the city although the LCMP 2011 concluded that Visakhapatnam does not need a metro system based on projected population and economic growth.

Passengers waiting at the BRT station (left); the designated BRT lane is illegally used by other road vehicles. The high BRT stations are built to prevent auto-rickshaws from using it but do not allow wheelchair users to access the stations easily (right)

City design and parking
As Visakhapatnam develops, the city grows from a core city center to a polycentric metropolitan area. The distance to reach destinations and services increases, inducing more need to travel with cars. The hilly topography of some parts of the city poses a challenge to implement active mobility. There is neither low- emission zone nor reduced- or car-free center in Visakhapatnam. Due to the tourism nature of Beach Road, the city is investing in the beautification of this area to create public space for residents and tourists to enjoy.

---

[2] AECOM. Smart City Infrastructure Plans for Visakhapatnam. Task 6: Interim Report (2016)

Under the Smart City Mission, a feasibility study was conducted to redevelop the city's only bus station, the Dwaraka Bus Station, into an intermodal transit hub and a mixed-used complex. This USD120 million project covers 1,035,000 square feet development and is the city's first attempt to implement a Transit-Oriented Development project. This is still being considered.

A draft parking policy is currently being reviewed, as parking is a significant challenge in the city. Unorganized on-street parking and encroachment by informal kiosks reduce road capacity and inhibits vehicle flow especially at main junctions (e.g., Jagadamba junction). Due to lack of enforcement and monitoring, the city faces illegal parking or underutilized parking at parking facilities. Auto-rickshaws are also parked at intersections slowing down moving vehicles. Under the Smart City Mission, studies have been made to improve junctions and manage parking demand and supply within the city.

Integration, equity, and connectivity
Most of the city is inaccessible for people with reduced mobility as few footpaths and bus stops are available in the city. None of the BRT stations are friendly to people with reduced mobility. Based on the average household income for Visakhapatnam (29,920 INR[3]), monthly expenditure on public transport (bus and IPT) is roughly 2 to 5%, but this changes significantly for the poorest population quartile (about 2,000 INR[2]) i.e., about 20%. There is no difference in fares for different population profiles. About 70% of the trips made on public transport (including IPT) are within 15 minutes of walking distance[4], which is relatively high for a developing city.

Presently, there is no consideration of integration and connectivity. For example, buses are not connected with a pedestrian walkway or any cycling facilities including the BRT stations. No real-time information system is provided at the bus stations but it is being planned under the "Connect Vizag" project under the Smart City Mission. This will upgrade the current bus systems with Intelligent Transport System to improve the reliability and travel time of the buses.

Electrification
Electrification is an emerging focus for Visakhapatnam as a strategy to tackle air pollution. There is no e-vehicle in the city yet, but e-zones will be demarcated to install charging stations in the city center and bus depots for electric auto-rickshaws and the proposed electric bus services. However, this is a huge leap as the current electrical substations and transmission lines need to be upgraded to ensure the reliability of electric supply.

In general, public buses and auto-rickshaws are the backbone of the city's public transportation system while many residents still walk although at a decreasing rate. The rising middle class favors cars as it is also a status symbol but there are no disincentives to discourage them from owning a car. More than 70% of the current transport investment is on road networks while only less than 25% is on ecomobile-friendly infrastructure (2011)[3]. Nonetheless, the Smart City Mission provides Visakhapatnam an opportunity to plan for a multimodal transportation system with many feasibility studies and proposals developed. The key right now is implementation and enforcement.

---

[3] AECOM. Smart City Infrastructure Plans for Visakhapatnam. Task 6: Interim Report (2016)
[4] UNEP. Low Carbon Mobility Plan (2011)
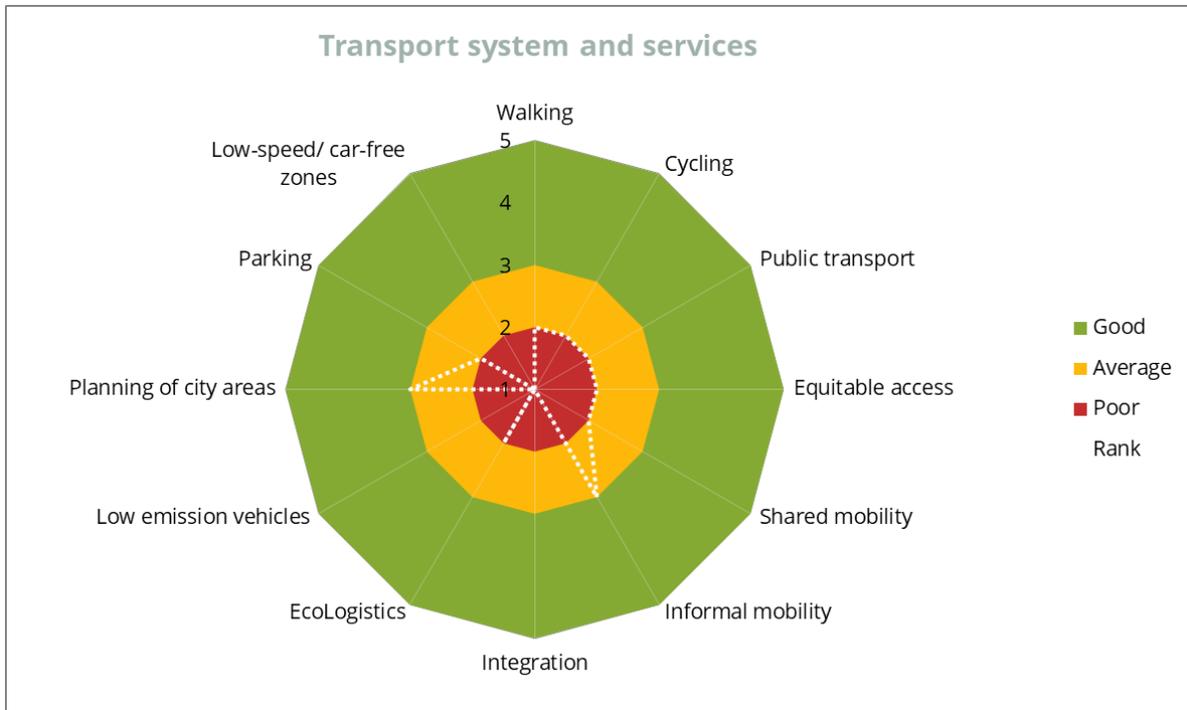
Figure 4: Transport system and services category's indicators' ranking

Performance

About 80% of the trips are on foot or with public transport, while private vehicles represent only less than 20%, although at an increasing rate. Safety is a significant concern with more than 400 road fatalities each year, which is amongst the highest in India. This is especially dangerous amongst pedestrians (43%), motorcyclists (33%) and cyclists (5%) as they represent 80% of the road fatalities[3]. Most pedestrians are women (about 70%[3]) and many residents voiced out that safety is a massive concern with the high crime rate and inadequate street lighting.

Local air quality is fair as it is a coastal city, but old fossil-based vehicles contribute to air pollution. There is no data on GHG emissions yet.

Travel time across the city is not long, and most trips can be made within 60 minutes. However, trips on public transport are notably longer than private cars or auto rickshaws. Performance indicators' ranking is illustrated in Figure 5.

No adherence to traffic lanes so mixed traffic slows traffic(left) and motorcyclists driving against the traffic endangering the pedestrians

Figure 5: Performance category indicator ranking

Barriers and enablers

Factor	Enablers	Barriers
Policy	The new Masterplan to include consideration on walkability and mixed land-used development	Efficient and practical implementation on time due to the lack of a unified authority managing transport as it is currently dependent on stakeholder engagement which is loose and is often led by a private consultant
Institutions	The leadership at VUDA, VMRDA, and APSRT share a consensus on where the city should move towards i.e., strengthening public transportation and walkability	Lack of proper urban and traffic department or authority to plan and implement sustainable mobility with a firm reliance on a private consulting company to design and propose projects for the city Insufficient traffic police for enforcement Behavioral change across the population is critically needed to improve civic-mindedness on driving behavior and use of public space
Finance	The Smart City Mission provides support to plan and invest in public transportation	Investment on sustainable mobility services, especially on pedestrian and cycling infrastructure (at least 5% of the transport budget) Understanding the needs of the city is essential to sound and sustainable investments
Infrastructure	Visakhapatnam's port and logistics economic activities require the city to have good road network and support, which could be further strengthened for sustainable mobility	Lack of use of technology to improve transportation The city's slightly hilly condition at certain parts pose as a challenge for a cycling network

Actions planned

The SHIFT+ Working Group committee members invited the different stakeholders for discussion, and about 11 key measures were proposed during the meeting. All stakeholders are given a chance to propose short- and long-term actions and vote for its priority (1- least; 5 – highest priority).

Goals	Actions	Priority
Improving the efficiency and comfort of the public transportation system	1. Operationalize the existing BRT by clearing the bottleneck (before extending more BRT routes)	5
	2. Upgrade bus shelters by increasing the number of shades and include user-friendly information systems and services such as toilets, ATM, shelter, seating etc.	4
	3. Gender-sensitive bus coaches to improve the safety of women and children	3
	4. Separate road lanes to give priority to the existing City Bus Services to improve efficiency	5
	5. Increase the number of the public bus for the City Bus Services	5
	6. Introduce electric buses	2
Managing parking	7. Develop a proper mechanism to collect parking fees which differentiate fares based on time, demand, and space	5
	8. Identify parking zones (building multi-level car parks) to avoid haphazard on-street parking especially at commercial zones	5
	9. Better enforcement to penalize wrongful parking	5
	10. Reallocate holding zones for auto-rickshaws to reduce encroachment of public space especially at road junctions	4
Enhancing walking and cycling environment to improve last-mile connectivity	11. Establish or separate road lanes for walkways and cycling paths	5
	12. Encourage walking and cycling at the university campus, e.g., Andhra University, Citam College etc.	2
	13. Make Beach Road only for pedestrians and cyclists at a particular hour of the day	2
	14. Government institutions like VMRDA, GVMC lead by example by parking their vehicles at a designated area and walk or cycle to the office	2

Goals	Actions	Priority
	15. Reduce the speed of vehicles or separate roads for fast-moving vehicles from slow-moving transport mode	3
	16. Improve aesthetic or plant green belt and pathways for pedestrians	3
	17. Improve pedestrian amenities, e.g., seating, green spaces, playgrounds at public space	4
	18. Walking and cycling campaign	3
Urban planning	19. Mixed land use in the Masterplan	4
	20. Strengthen connectivity of the established sub-centers or inner-city with the transit-oriented development approach	3
	21. Stop encroachment of informal kiosks or hawkers on the roads by establishing specific hawker or small businesses zones	4
	22. Designate low-speed zones (30 km/hr) or car-reduced areas at the city center to allow pedestrians, cyclists, and e-rickshaws	2
Adopting the use of technology	23. Priority traffic signals for public buses	2
	24. Strengthen enforcement and safety surveillance through cameras	3
	25. Implement automated parking fee collection	2
Control	26. Limit car growth by imposing higher registration fee	2

Some of the hotspots proposed for improvement

- Central train station: Long-distance business travelers rely on this station but traffic outside this area is congested due to reduced traffic flow, partly due to the busy old market area
- The bus terminal in the city center: Better signage and organization since 2,000 buses enter the city daily but there is no proper station

Best Practices: Inspiration from Leipzig, Germany

Torben Heinemann, the Director of the Transport Planning and Road Construction Office from Leipzig, Germany, shared the experience of Leipzig which transformed the city from a car-centric city to an ecomobile city. In Visakhapatnam's new Masterplan, it envisages improving walkability and public transportation to the town. Leipzig's experience in enhancing walking and cycling can help Visakhapatnam in this vision.

A walking and cycling city

Leipzig is a city of 29,760 hectares with 601,737 populations, which is one of the fastest-growing cities in East Germany.

The inner core of the city (about 900 meters x 700 meters) is designed as a car-reduced zone with the inner core as a pedestrian zone where no other motorized vehicles are allowed, while limited access for cars is permitted at the surrounding area (Figure 6). Meanwhile, more than 30 covered walkways were constructed throughout the inner city to connect between buildings and provide a comfortable walking environment. This attracts more pedestrians to enjoy the streets and walk into the shops, creating better social and economic opportunities for the locals and shop owners.

Parking in the inner city is limited to 10,400 parking spots within the inner city. The parking fee is raised by 200% to 2 Euro per hour, and in the last ten years, on-street parking in the city center reduced from 870 spots to 220 to control the number of cars entering the city.

While parking for cars reduced, bike parking in the inner city almost tripled with the opening of bicycle garages. Good cycling infrastructure is continuously developed, and it presently maintains 499 km of the bicycle network. A Bicycle Specialist is employed by the administration to oversee the task of improving the cycling network of the city. The efforts have been successful, leading to almost five times more cycling trips in the city.
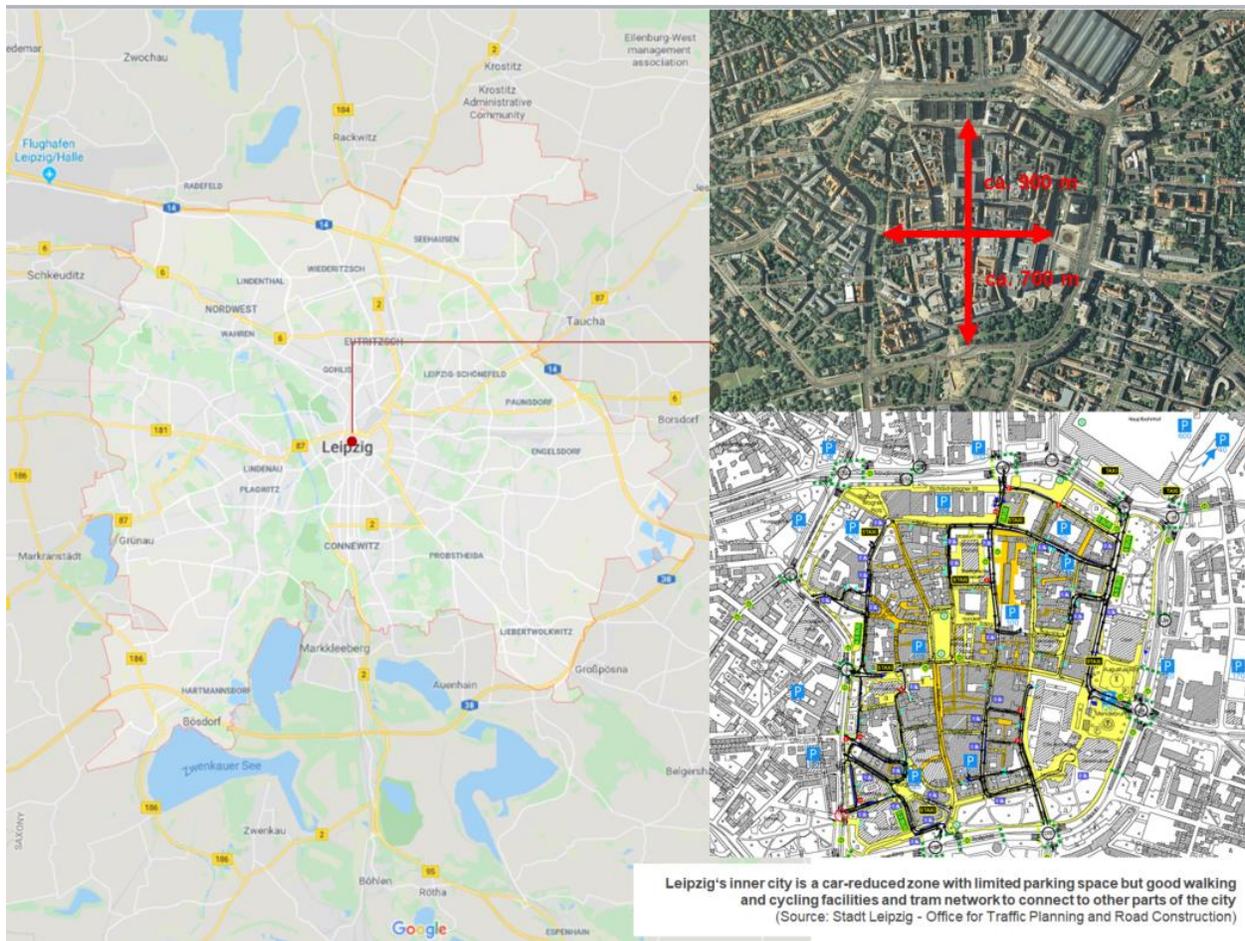
Figure 6: Map of Leipzig city (Top and bottom inserts: Leipzig's inner-city that is a car-reduced zone)

Public transportation as the backbone of the city's mobility

Although Leipzig does not maintain a BRT system, it has a comprehensive public transportation network consisting of trams and buses (inner city) and regional metros connecting to other neighboring cities.

An extensive tram system is established to connect the entire city, making Leipzig's tram network the ten most protracted in the world with 148 km. The tram system is more favored as the central public transportation system compared to mass rapid transit (MRT) because of the size and the urban form of the city. This forms the backbone of the city's public transportation system, reducing road space for cars and encourage more people to opt for this efficient and reliable system. All public transport vehicles and stations are accessible to people with reduced mobility.

Leipzig built a new mobility ecosystem managed by a public transport company to provide all transport modes as a way for multimodality and intermodality. The mobility ecosystem includes tram, bus, rail service, car- and bike-sharing, electric car-sharing. Mobile applications such as the easyGo, Leipzig Mobil, DB smart applications are used to provide information to all modes and also charge one bill for the different transport modes used in a trip to improve user experience and convenience. This proves to be a useful strategy to attract more people to use public transport and new mobility services instead of private vehicle ownership.

14

The precondition for this is the institutional set-up of the municipal transit operator, the Leipziger Verkehrsbetriebe (LVB), which is responsible for the bus and tram networks and the overall planning and management of public transportation in Leipzig. LVB also forms an Alliance with the Mitteldeutscher Verkehrsverbund (MDV) or the Central German Transit Alliance who coordinates the regional transit, namely the S-Bahn (metro).
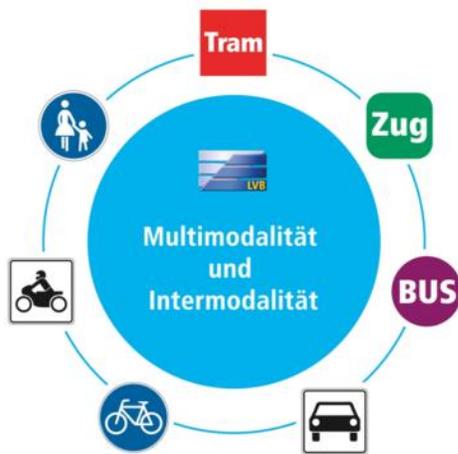
Figure 8: The mobility ecosystem managed by LVB (left); and the tram system in Leipzig (right) (Photo source: Leipzig City)

Key Takeaways or Recommendations

Investment on transport modes should correspond to the needs and projected city and population growth of the city

The Integrated Smart City Framework Plan[5] proposes to develop a metro system for the city. Metro system is favored in many Indian cities, but the cost feasibility and sustainability should be considered and compared to other types of the public transportation system. The Low Carbon Mobility Plan 2011 performed different scenarios until 2030 based on projected growth and demand for the city and concludes that a metro system is not sustainable or needed for Visakhapatnam. Instead, strengthening the current public transportation system and the BRT system is more urgent. Thus, a rational projection and decision to evaluate the feasibility of the different options and costs incurred are necessary. An example of the initial cost of investment against the various public transport system according to the different capacity and speed is illustrated in Figure 8.

---

[5] AECOM. Integrated Smart City Framework Plan (2017)
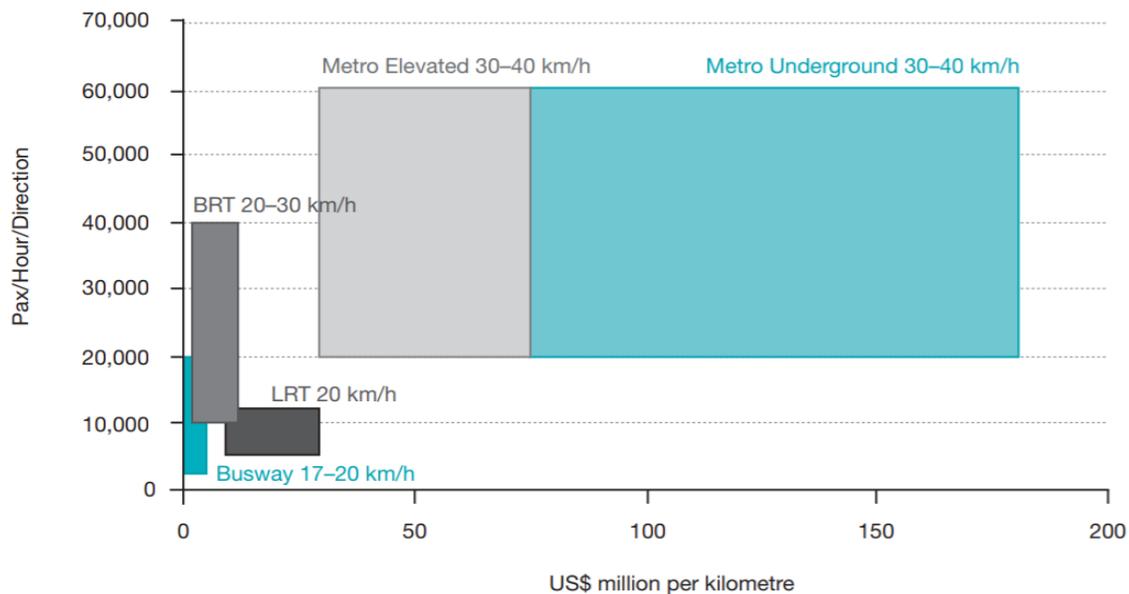
*Figure 8: Initial investment cost versus capacity and speed of the different transportation system*6

Improving the quality of the public bus system

Upgrade the quality of the public bus system to attract more users through increased coverage and the use of an intelligent management system. Installing a Global Positioning System (GPS) on buses allow the integrated platform to analyze data, identify hotspots and need for better transport planning and timely deployment of buses. Live information can be provided at all public bus stops or through a smartphone application. Public transport fare needs to be price sensitive according to different user groups such as the elderly or the students. For the added convenience of the commuters, adopt an electronic payment and ticketing systems.

Design public transport stops and stations that ar inclusive for all, with sheds and live information, as well as wheelchair accessible. IPT can be used for last-mile connectivity.

---

[6] Hidalgo, 2007 (From UN-Habitat Planning and Design for Sustainable Urban Mobility 2013)

Summary

The high population growth is not met with the supply of efficient public transport system, while the better economic situation of the population resulted in higher automobile ownership. Thus, the city faces a familiar problem: the increasing motorization rate resulted in traffic congestion and degraded quality of life.

- Enhance quality, comfort, and safety of public transportation through increased coverage and use of intelligent management system;
- Ensure physical connectivity between important transport hubs (e.g., BRT stations) and pedestrian/ cycling lanes that is universally accessible;
- Establish a Transport Authority as the leading policymaker for transport issues for the city, including planning and managing the different transport modes;
- Improve cycling networks at low-lying areas and consider electric bicycles for hilly areas;
- Create an Urban Transport Fund to finance sustainable mobility projects. This fund could collect funds from parking fee, charges on car-users in general, while investing or co-financing public transportation or active mobility network; and
- The Smart City projects learnings can be replicated to other parts of the city, concentrating on the inner city area where more low- to middle-class residents reside and work.

About EcoMobility SHIFT+

The EcoMobility SHIFT+ scheme is developed by ICLEI-Local Governments for Sustainability to provide local authorities with a useful tool to *assess, analyze,* and *act* to improve sustainable mobility. By working with the public and private stakeholders, this tool analyzes the ecomobility performance and status quo to identify short-term and long-term interventions and making informed decisions. The backbone of this system is 23 indicators categorized into three main dimensions: Enablers, Transportation System and Services, and Performance. This is a powerful tool for policymaking by capturing and synthesizing complex data into meaningful information.

About CitiesSHIFT: Capacity building and networking for climate- and people-friendly mobility project

Funded by Hewlett Foundation, the overarching goal of this project is to support cities to identify challenges and opportunities of urban mobility system in the hope that the city could shift towards more ecomobile modes of travel, i.e., walking, cycling, public, and shared transport. Six project cities from China, India, and Uganda participates in this project。

Scan the QR code and download the reports about the project and project cities.

Contact us
If you are interested in conducting EcoMobility SHIFT+ for your city, please contact us
Sustainable Mobility Team
ICLEI-Local Governments for Sustainability World Secretariat
www.ecomobility.org | ecomobility@iclei.org