PENANG GREEN AGENDA 2030

Title: Sustainable Mobility and Connectivity

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EXECUTIVE SUMMARY

Transport is a critical issue for Penang not only because it forms the backbone of its economy but also because it has a significant impact on Penang's liveability (and the quality of life of Penangites). It is also one of the major contributors to Penang's carbon dioxide (CO_2) emissions and air pollution. In 2015, the State Government launched the Penang Transport Master Plan or PTMP as a long-term solution to Penang's transport problems and needs. It offers a multi-modal transport system that aims to reduce traffic congestion and increase the share of public transportation by 2030. Among the various projects proposed are Light Rail Transit (LRT), Monorail, undersea tunnel, Bus Rapid Transit (BRT), cable car, roads and highways. Local Governments are also looking to expand cycling routes and pedestrian walkways as alternatives to driving and to reduce road congestion.

Current planning focuses on meeting the existing and future transport needs, which is usually extrapolated based on past trends. Population increase and economic growth are usually the two main factors that influence the number of new roads or additional public transport capacity needs. However, this may not be the most optimal approach to planning for Penang's transport system, especially on the Island where there is limited land and in new development areas. Better and more progressive town planning can reduce the need to travel in the first place – providing more mixed-use development can reduce travel between work, home and recreational place. Another option is to overhaul and optimize Penang's logistic sector, which is expected to grow and will impact on the way goods are transported in Penang. Improved siting of warehouses, optimum delivery routes and nodes, and even the use of alternative technologies such as drones can change the travel patterns and needs of Penang in the future.

There are major challenges for the transport sector in Penang. Firstly, traffic in Penang has worsened, due to increases in car ownership, the number of tourists and the intensity of logistic activities. Public transportation usage in Penang is low – only about 5%[1] of journeys compared to 15%-17% in KL[2] – and bus ridership has dropped over the past two years. Despite the fact that there are now more cycling lanes and pedestrian walkways, there is no evidence to show that they have reduced car journeys or road congestion. This is partly because only a small section of the routes are dedicated cycling lanes and not all walkways are adequately shaded.

Being the most important and comprehensive transport master plan for Penang in decades, PTMP has proved to be both complicated and controversial. This stems from the multi-modal system it is proposing and the fluid financing models and arrangements that create uncertainty. These uncertainties affect not only future projects but also the current primary public transport mode in Penang – public buses run by Rapid Penang. In addition to the uncertain timeline of the different public transport projects, the future role of Rapid buses is unclear, once the rail-based public transportation system is completed, it has not yet been decided whether Rapid buses will be running the first and last mile services or whether they

[1] "Penang needs a sustainable public transport network", *Malaysiakini*, <https://www.malaysiakini.com/letters/459406>

[2] Azif Azuddin 2019, Getting Around: Towards a Decent Daily Commute. <https://www.centre.my/post/getting-around-towards-decent-daily-commute>

will be running trunk bus routes. This is not only causing inconvenience but can potentially cause financial losses for Rapid if it makes the wrong investment decisions in changing its rolling stock in 2025.[3] Currently, public transport decisions and investments are made by Federal-government agencies and not the State Government.

The SMC Working Group proposes the following seven recommendations to explore ways to create an efficient, accessible and sustainable mobility network in Penang:

1. Transport-Related Data Acquisition (2020)

It is important to have comprehensive and detailed travel-related data in order to create a transport network that really suits Penang. Data related to travel patterns (direction and frequency), public bus ridership, use of cycling lanes and so on, are crucial in order for the State Government to understand how current infrastructure is used and can be improved. Comprehensive data is also needed for designing the types of public transport (such as LRT) needed as well as determining where the stations should be sited. The State Government should take advantage of the National Census that will be carried out in 2020 to include questions that can shed light on the travel patterns and needs of Penangites. The State Government could also work with transport consultants, including experts from USM to gather data every two to three years to ensure that Penang's transport system is delivering what the people need. It is imperative that the State Government has the correct and relevant data before it embarks on the multi-billion investments under the PTMP.

2. First and Last Mile Connectivity Plan (2020)

One of the main obstacles to public transport usage in Penang is the lack of first and last mile connectivity. Rapid Penang and Penang State Government have tried very hard to increase and improve public bus services (including introducing a free bus service) but the ridership numbers continue to fall. Part of the reason is the lack of first and last mile connectivity. Currently, Rapid Penang buses only service the main trunk roads and there is a lack of covered or shaded walkways connecting residential areas to the bus stations. This makes public buses less attractive. The State Government should take urgent steps to address this issue. Apart from providing pleasant walkways, different options exist to create the first and last mile connectivity through the use of mini vans, bicycles (including Link bikes), ride-hailing services and even trishaws. Mini buses have been suggested but there is concern that they will cause more traffic congestion on the road. Also, in order to promote the use of bicycles for first and last mile connectivity, the State Government, Local Government and Rapid Penang will need to invest in cycling lanes, secure bike parking spaces and even new buses with bicycle racks at the front. Unless the first and last mile connectivity issue is resolved, public transport will remain unattractive and impractical to most Penangites.

The State Government needs to address the first and last mile connectivity not only for public bus usage but also for the use of upcoming public transport modes under PTMP.

[3] 3rd Sustainable Mobility and Connectivity Working Group Meeting on 13th May 2019.

The sooner the Government addresses this issue the better it will be at changing people's mindset and willingness to take public transport.

3. Modernise Logistics Sector (2020-2025)

Apart from the movement of people, the State Government should also improve the **transport system for goods.** The logistics sector is an important sector in Penang. Within the state, the Penang Airport and Penang Port act as the logistics hubs of the Northern Region. Penang's logistics sector is expected to grow due to economic growth in the Northern Region, development of a new port in southern Thailand, and also the growth of online shopping. There are calls for the State Government to modernise and revolutionize Penang's logistics sector to make it more competitive, adaptable and efficient. Considering that the logistics sector has fewer alternative modes of transport compared to other road users (e.g. commuters, tourists), who can utilise public transportation, the reduction of traffic congestion will make the sector more competitive. This issue can be addressed not only by improving Penang's transport network, but also by **revolutionising the sector itself**. For example, private entities within the sector can work with the State Government to better coordinate and share resources on deliveries and pick-ups within and outside the terminal / port to reduce the number of trips made. The port and airport authorities can introduce initiatives to further **improve collaboration** between stakeholders (including the Customs Department) and provide better facilities to speed up processing time. In short, the State Government should create a **sectoral plan** to facilitate the sector's growth and to assess future trends, including any possible disruption from economic downturn or the building of a competing airport in Kulim. A more efficient logistics sector will reduce pressure on Penang's transport network.

4. State Public Transport Authority (2021)

The State Government should push for more **local level decision-making in relation to public transportation**. Most decisions, including public transport routes, are currently made at the Federal Level, which makes the process cumbersome and also reduces local accountability. Local and State Governments have the most direct "feel" and knowledge about local travel needs and patterns, hence they are arguably the most suitable level of authority to make decisions regarding public transport provision. Furthermore, decentralisation of authority was originally one of the objectives of the former land transport unit known as SPAD (now called APAD), but it was never realized. Having a Penang State Public Transport Authority can streamline decision-making, increase transparency and accountability, and provide services catered to local needs. The only caveat is that this would require an independent fund to support public transport projects. Finance can either come from public funds or from other sources through a public-private partnerships model. Without financial independence, autonomy and power of the State Public Transport Authority will be limited.

This solution is not easily achieved as many things need to be in place before decentralisation can happen, including the amendment of relevant regulations/laws and fundraising. The Working Group recommends the State Government starts engaging the

Federal Government as soon as possible for this proposal and aims to set up a State Public Transport Authority by 2021.

5. Investment in and Overhaul of Public Buses (2024)

Public buses operated by Rapid Penang are currently Penang's main mode of public transport. Despite increased investment in providing better services (e.g. Travel App showing live information, smart bus stops etc), public bus ridership in Penang has fallen in the past year. The future of public buses is uncertain as it is dependent on the completion of PTMP. It is generally expected that public buses will play a secondary role, such as being set up as feeder buses once rail-based public transport modes are built (LRT, Monorail etc). However, there is still much uncertainty regarding the time and extent for the construction of the rail-based system. Furthermore, Rapid Penang will need to change its entire bus fleet by 2024. These uncertainties present a considerable challenge to all stakeholders in making the right investment decisions for public buses in Penang in the near future. The Working Group recommends that the State Government provides some certainty around the future of Penang's public transport. This could be done by acknowledging and confirming the **crucial role of public buses in helping the State Government achieve the 40% public transport modal share** target by 2030. This means investing enough **funds** for public buses, increasing ridership by overhauling bus services to increase **dedicated bus lanes and frequency**, and to attract alternative funding. The State Government should also work closely with Prasarana to create an effective business model that suits Penang and to push for large-scale use of alternative energy buses (e.g. electric, hydrogen or biodiesel buses) in Penang. There is also a need to understand current travel needs and patterns through data, provide targeted incentives to change travel patterns, and invest in new fleets (such as mini buses) that suit local travel needs.

As Rapid Penang needs to change its fleet by 2024, this presents a good opportunity for the Government to set out a credible vision and investment plan for public buses in Penang. Planning should start no later than 2021, and to be implemented by 2024.

6. Changing Travel Needs (2025)

On top of building additional infrastructure to cope with increased traffic, the State and Local Governments should also prioritise **reducing or changing travel needs** of Penangites as a more effective way of reducing traffic congestion. This can be achieved in various ways, including changing school or office opening hours to incentivise people to travel during off-peak hours. However, a more long-term and effective way to change travel behaviour is by building **new types of townships or cities** that provide places for work, leisure and living within walking and cycling distance of one another. Sensibly designed townships, with adequate and safely covered or shaded walkways and cycling lanes, will reduce the need to travel by car. Green Building Index (GBI) Malaysia provides toolkits and standards for "green townships", which can be adopted in Penang. The GBI's "green township" criteria include the building of networks of public transport- and pedestrian-friendly local transport systems. Emphasis on GBI's transport criteria can be achieved by either making the specific criteria mandatory or by insisting on higher certification level (e.g. GBI Platinum) for green townships in Penang. Other ways to **break the car-centric**

road user model are to: reduce block size of buildings, complete sidewalks, cycle lane and parking at transit stations, increase density of mixed-use and mixed-income development and limit car parking space for new buildings, among others.

7. Restrict Private Vehicle Use (2026)

In addition to improving public transport, the State and Local Governments also need to introduce measures to **reduce private vehicle use.** There are various ways to do this, including implementing access restrictions at certain times, private vehicle quota (for example restricting the increase in numbers of cars to 5% annually), congestion charges for certain areas, increasing parking prices, providing a good public transport system and so on. Although the State Government recognises that there is a need to introduce certain measures to reduce the reliance on private vehicle use, it is surmised that actions can only be taken after the new public transport systems are completed under PTMP. The Working Group feels that certain restrictions on private vehicle use, such as congestion charges, can be introduced earlier before the full public transport system is completed in order to gradually **shift people's behaviour and mindset**. Furthermore, certain private vehicle restrictions can be rolled out in conjunction with the overhaul of public bus services, which comprises new dedicated bus lanes, increase in bus frequencies and so on. In this way, when the new public transport system is ready, certain levels of ridership can already be achieved. However, this must be carried out together with the upgrade of the current public transport system, especially public buses.

1. Background

1.1 Penang Green Agenda 2030 and Sustainable Mobility and Connectivity

Sustainable Mobility and Connectivity is one of the ten key focus areas that have been identified as critical for Penang to achieve its sustainable development goals. This is because traffic congestion across Penang has been worsening and implementation of the Penang Transport Master Plan (PTMP) is still in its infancy. Current debates centre on the need for quick actions to reduce traffic jams versus less road-focused long-term solutions to address Penang's transport problems. Another considerable challenge for Penang is the lack of funding to carry out large scale transport-related infrastructure construction. As a result, the Penang State Government has resorted to raising funds through selling new land obtained from sea reclamation.

Amidst the controversies and disagreements, there are common objectives that all parties can agree on, such as the need to reduce private vehicle use, explore future-oriented technology and improve mobility without compromising the liveability of Penang. Equally important is the 40% public transport modal share target to be achieved by Penang by 2030.[4] Ultimately, Penang's future depends on the creation of an efficient, accessible, sustainable and low carbon mobility network.

The Working Group aims to explore and identify ways to change the travel needs of Penangites, as well as a suitable governance and sustainable funding model that enables Penang to invest in a low carbon and resilient infrastructure. It also seeks to identify key measures to improve the current public bus services and opportunities for new low-cost smart mobility technology. Lastly, it also looks at ways to enhance Penang's logistics sector and improve efficiency in freight transportation. This Working Group is not designed to come up with a new PTMP or conduct a thorough review of the current PTMP.

1.2 Current Situation

Penang is a main transport hub for the Northern Region with an International Airport, cruise ship terminal, the Penang Port and rail terminals. Just like in other parts of Malaysia, Penang's road transportation is dominated by cars. In fact, the number of cars registered in Penang (above 2 million)[5] is more than Penang's population as a whole (currently just under 1.8 million people[6]). 95% of trips currently made in Penang are by private vehicles[7], and many people commute from the Mainland to the Island for work every day. Even in George Town, the UNESCO Heritage Site, cars dominate the road with little space for pedestrians and cyclists. As a result, Penang's traffic as well as air pollution is getting worse. The transport sector is also estimated to be one of the main CO_2 contributors in Penang. Consequently, the Penang State and Local Government have started to introduce measures to improve the transport sector and address traffic

[4] Penang Transport Master Plan, *Overall PTMP - An Inclusive Transport System for Penang.* <http://pgmasterplan.penang.gov.my/en/2019/07/ptmp-keseluruhan/>

[5] Khai Lee et al., A Survey On Vehicle Registration Code: Association Between On-The-Road Population And Their Vehicle Registration States, *Malaysian Journey of Forensic Science*, 2018, 8(2):46-50

[6] Department of Statistics, Malaysia.

[7] 3rd Sustainable Mobility and Connectivity Working Group Meeting on 13th May 2019.

problems. The original aim in the Penang Transport Master Plan is to increase public transport travel mode to 40% by 2030. In terms of transport infrastructure (e.g. roads, stations) construction, there are currently no specific environmental guidelines; construction only needs to adhere to best engineering practices and codes.

In terms of governance, a large portion of the transport sector falls under the jurisdiction of the Federal Agency of Land Public Transport (APAD), which is part of the Ministry of Transport. The functions of APAD are two-fold: to produce a public transport master plan for sustainable infrastructure development, and to monitor and regulate operator performance standards through licensing. Permission from APAD is needed for the design of routes for local public transportation.

Prasarana, on the other hand, is a government-linked corporation (GLC) established under the Ministry of Finance. It owns and operates urban rail services as well as stage bus services in several states including Penang. In Penang, Prasarana runs Rapid Bus Penang and Rapid Ferry Penang. The Ministry of Public Works (KKR), assisted by Malaysia Public Works Department (JKR), is responsible for public works including highway planning, construction and maintenance.

The Road Transport Department (JPJ) is a government department under the Ministry of Transport and is responsible for issuing Malaysian number plates. The Traffic Enforcement and Investigation Department under the Royal Malaysia Police is in charge of enforcing traffic rules and traffic control.

At the State Government level, a Special Delivery Vehicle was created to implement the Penang Transport Master Plan. The Transport Section under BPEN can provide suggestions to APAD and Prasarana on public transport operation. There is no separate transport unit at Local Government level although there is an enforcement unit that covers parking.

1.2.1 Penang Transport Master Plan (PTMP)

In 2015, the Penang State Government introduced the PTMP as a comprehensive transport strategy to create integrated and modern transport systems on land and sea. The completion of the whole PTMP will take 20-30 years. It consists of a mixture of transport projects such as the Light Rail Transit (LRT) and monorail lines, roads, a cable car line and an undersea tunnel linking George Town with the town of Butterworth on the mainland Malay Peninsula. The State Government is now preparing to implement the first phase of PTMP, namely the Bayan Lepas LRT Line and Pan Island Link 1 (PIL1) Highway. Both the Bayan Lepas and George Town–Butterworth LRT lines are situated in highly populated areas where the demand for it is high.

The State Government is working closely with APAD to study the viability of the different projects and work out the details such as station siting. The target of 40% public transport modal share has been incorporated into PTMP although there is much uncertainty around whether the target can be achieved in time – in terms of public transport, only the Bayan Lepas LRT Line is expected to be completed by 2030. There are as yet no firm timelines for all the other public transport projects, including water taxis.

Given the high price tag (RM46 billion) of the PTMP[8], the State Government has been looking for various financing options. The main financing option relies on the creation and sale of 3 man-made islands off the coast of Southern Penang Island. This option has not been without controversy, and uncertainties affect the implementation of PTMP. The State Government is also trying to obtain financing from the Federal Government and through public-private partnerships.

1.2.2 Local Initiatives

The MBPP has introduced free CAT buses, built 30.9km of walkways[9] and 180km of bike lanes[10], introduced smart traffic lights and a transport initiative to improve smoothness of traffic flow around KOMTAR. In addition, a team of international experts have carried out an in-depth study on promoting green mobility in Penang, starting in George Town.[11] The focus of the study is on increasing pedestrian walkways and cycling lanes while reducing private vehicle use within the George Town Heritage area through effective design and parking policy.

MBSP introduced a series of measures to improve transport in Seberang Perai. The Penang Sentral provides a hub for public transport that links ferry, public bus and rail services. MBSP has also established the Batu Kawan Eco-City, which laid out a set of guidelines on cycling lanes, pedestrian walkways, and even Bus Rapid Transit (BRT). They are currently working with Penang Development Corporation (PDC) to provide detailed guidelines on a cycling and pedestrian network for Batu Kawan. MBSP is also studying the design and length of cycling lanes.

1.2.3 Public Transportation

Public buses are currently the main option of public transportation in Penang, both on the Island and the Mainland. The public buses are operated by Rapid Penang and about 85,000 people use these buses every day.[12] With numbers already low, bus ridership (including free CAT buses) has continued to decline in the past couple of years. As a result, all routes operated by Rapid Penang incur losses, and Rapid Penang itself is heavily subsidised by both Prasarana and Penang State Government (for CAT free buses). At present, Rapid Penang is focusing on increasing ridership as well as reducing costs (e.g. in-house repairs for buses). Bus ridership is currently higher in Penang Island compared to the Mainland. Rapid Penang foresees that the role of Rapid Buses will change once other modes of public transportation (e.g. LRT, Monorail, Tram) under PTMP are built. Therefore, Rapid Penang will shift to provide feeder bus services in the coverage areas.

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[8] "Penang remains optimistic despite no allocation for PTMP". *New Straits Times*, 12th October 2019. <https://www.nst.com.my/news/nation/2019/10/529328/penang-remains-optimistic-despite-no-allocation-ptmp>

[9] 1st Sustainable Mobility and Connectivity Working Group Meeting on 4th April 2019.

[10] "It's a wheel-y good idea". *The Star*, 14th August 2018. <https://www.thestar.com.my/metro/metro-news/2018/08/14/its-a-wheely-good-idea-more-bicycle-and-pedestrian-lanes-to-connect-all-parts-of-island>

[11] Institute for Transportation & Development Policy 2019, George Town Could Become a Malaysian Best Practice in Transport. <https://www.itdp.org/2019/03/04/george-town-cycling-walking-transport/>

[12] "Rapid Penang mulling over inclusion of electric buses", *The Star*, 29th July 2017. <https://www.thestar.com.my/metro/community/2017/07/29/rapid-penang-mulling-over-inclusion-of-electric-buses>

Penang does not have rail-based public transportation apart from the inter-city rail services operated by KTM in the Mainland. The PTMP has proposed a few rail-based transport modes including LRT, monorail and trams. Rail-based public transportation can carry a high number of passengers, runs on segregated lanes and can be highly efficient. Experience from KL shows that middle-income households would prefer rail-based transport, although it did take a few years before LRT became popular with commuters. Rail-based transport can be complemented by buses that are either running major routes or feeder services.

The State Government needs to find out more about road users' preferences and behaviours in order to deliver an effective public transport system that suits the needs of Penangites. The types of data the government would need are information about trip origins and destinations, the degree of substitution between public transport and private vehicles (including motorcycles), price acceptance and so on. Lastly, under the PTMP, there are plans to utilise water transport (in addition to existing ferries) although the implementation plan is not yet ready.

1.2.4 National Priorities

At the national level, there are on average 2 cars per household and the per car occupancy rate is 1.4 people.[13] The focus on per-car occupancy is needed to reduce the number of private vehicles on the road – ride-hailing services do not reduce car use although they redress parking issues. Sustainable mobility focuses on reducing CO_2 in the city. Currently, the transportation sector is the largest energy consumer in Malaysia (40% of energy use[14]; second largest CO_2 emitter after the energy sector). The global average of transportation's share in energy consumption is 25%.[15]

Green Technology Malaysia is currently developing a Low Carbon Mobility Blueprint (LCMB) and Action Plan to address energy consumption in the transport sector, which falls under the Green Technology Master Plan launched in 2017. The LCMB uses the "avoid-shift-improve" model, and "improve" includes better traffic management, quality of cars and so on. The LCMB and Action Plan is looking into several timeframes, which are short-term action plan (3 years), medium-term plan (5 to 7 years), and long-term plan (10 years).[16] The LCMB and Action Plan will incorporate the impact of sustainable mobility on Total Primary Energy Supply (TPES), carbon emission reduction, and economy.

1.2.5 The Logistics Sector

The logistics hub in Penang serves not only the state, but also the overall Northern Region as well as the ASEAN region. Most goods from the Northern Region pass through Penang International Airport and Penang Port – the total value of trade that passed through Penang Port and Penang Airport was RM336 Billion in 2016 and RM430 Billion in 2017.[17] Penang's logistics sector is expected to grow due to changes in consumption patterns

[13] Huzaimi Omar, Discussion on Green Mobility Design, 22nd April 2019.
[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] 4th Sustainable Mobility and Connectivity Working Group Meeting on 28th May 2019.

(online shopping), population growth, better connectivity etc. In terms of connectivity, the Federal Government recently announced the plan to build the Northern Corridor Highway (NCH) to improve transportation and connectivity efficiency, capacity, and induce growth of the NCER. The NCH is a new highway over a 70 km stretch consisting of two phases: the first phase is from Bandar Baharu (Kulim) to Sungai Petani, and the second phase is from Bandar Baharu to the Sultan Abdul Halim Bridge (Penang second bridge).[18]

Penang Port is the main gateway for ships in the Northern States of Malaysia and Southern Provinces of Thailand. It is the 3rd largest Malaysian port by volume. Cargo handled at Penang Port was 1.44 million TEUs in 2016, which increased to 1.52 million TEUs in 2017.[19] There are around 6,000 cargo ships berthing at the port per annum transhipping goods to China, Japan, USA and other Malaysian ports.[20] Penang Port currently captures an estimated 60%~65% (400,000 TEUs) of South Thailand market.[21] This is the Port's main growth opportunity at present. The Port is under a phased expansion plan starting 2019 to increase the capacity and demand in TEUs handling. Forecasts of throughput for Penang Port are: 1.7 million TEUs for 2019, 1.9 million TEUs for 2021, 2 million TEUs for 2020 and 2.5 million TEUs after 2024.[22]

In 2017, 65,774 tonnes of cargo went through Penang Airport.[23] Penang Airport handled 64.4% of Malaysia's overall air trade in 2018.[24] According to Penang Freight Forwarders Association, about 70% of the air cargo handled in 2017 consisted of electronic and semiconductor components and parts.[25] Total passengers handled by Penang Airport was 6.7 million people per year (mppa) in 2016 and 7.2mppa in 2017.[26] Penang Airport is undergoing major upgrading works which includes space optimisation, multi-storey car park, outlet park and airport expansion to increase the passenger capacity from 6.5mppa to 16mppa.[27]

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[18] "7 Fed govt projects worth over RM3 billion for Kedah", *New Straits Times*, 19th March 2019. <https://www.nst.com.my/news/nation/2019/03/470949/7-fed-govt-projects-worth-over-rm3-billion-kedah>

[19] Penang Port Commission, Port Performances. <https://www.penangport.gov.my/en/port-performances/62-statistics>

[20] Penang Port Commission, Annual Report 2018. <https://www.penangport.gov.my/en/sources/publication/annual-report#dflip-dfb5e798c383e15bContainer/11/>

[21] "Penang Port taps southern Thailand's booming economy". *The Malaysian Reserve*, 25th January 2018. <https://www.mmc.com.my/250118%20-%20Penang%20Port%20taps%20southern%20Thailand's%20booming%20economy.pdf>

[22] Mohd Nazmi Harun, Northern Corridor Economic Region (personal communication, 27th May 2019)

[23] "Cargo tonnage at Penang airport seen rising in 2018", *The Star*, 6th March 2018. <https://www.thestar.com.my/business/business-news/2018/03/06/cargo-tonnage-at-penang-airport-seen-rising-in-2018/>

[24] "Association sees 5% cargo growth for Penang airport", *The Star*, 23rd December 2019. <https://www.thestar.com.my/business/business-news/2019/12/23/association-sees-5-cargo-growth-for-penang-airport>

[25] Ibid.

[26] Malaysia Airports Berhad.

[27] "More upgrades for Penang airport after coming expansion". *Free Malaysia Today*, 18th December 2019. <https://www.freemalaysiatoday.com/category/nation/2019/12/18/more-upgrades-for-penang-airport-after-coming-expansion/>

The logistics sector consumes a lot of energy. Nationally, although the sector only accounts for 5% of the total vehicles on the road, its energy consumption accounts for 25% of the transport sector.[28] Currently, the logistics sector does not have many other options and must compete with other road users who can be diverted to use public transportation. As a result, the worsening traffic congestion on Penang's road has increased the cost of logistics companies. Hence, the long-term profitability of the logistics sector depends on a better transport system in Penang.

1.2.6 Green Townships

One of the most fundamental aspects of the transport sector is addressing the needs of people to travel. In fact, the design of the transport system, including the number of roads, types of public transportation and so on, depends mainly on the travel pattern and demand of people, which is reflected in the PTMP. However, a more efficient way of improving Penang's transport system, especially with the need to increase liveability and address climate change, is to change the transport needs of people to suit the transport system that is conducive to a more resilient Penang. For example, green townships (such as those certified by Green Building Index) will promote better design of towns and mixed use, with emphasis on public transport, pedestrian and cycling networks. Green townships can be a platform to introduce a more sustainable transport network and reduce the need to travel in Penang. Putrajaya sets a good example by having extensive pedestrian and cycling networks linking the administrative buildings to all of its precincts.

2. Long-Term Goals

In order to achieve sustainable mobility and connectivity in Penang, the Working Group recommends that the State Government adopt the following targets:

a. Reduce private cars on road by X (either percentage or number per capita) by 2030.
b. 40% public transport modal share by 2030.
c. X (amount in RM) investment in public buses by 2025, focusing on the number of buses, types of buses, walkways and stations upgraded.
d. Penang to have at least 5 green townships by 2030.

In addition, the vision of the Chief Minister, Penang2030: A Family Focused Green and Smart State That Inspires the Nation, has set out a target of electrifying 50% of the motorbikes by 2030.

[28] Huzaimi Omar, Discussion on Green Mobility Design, 22nd April 2019.

3. Main Challenges and Gaps

3.1 Worsening Traffic

3.1.1 For the manufacturing sector, worsening traffic is prolonging the commute time of employees (hence affecting productivity) and increasing the cost of cargo transportation. In relation to the new Bayan Lepas LRT Line, current "bas kilang" passengers who get free transportation will probably not shift to LRT. Some companies provide subsidies to employees who commute using private vehicles, but not public transportation.

3.1.2 In relation to the logistics sector, there are 2 main issues: Strong reliance on the 2 bridges and heavy traffic around Penang Airport. As the traffic worsens, it cuts into the profits of logistics companies.

3.1.3 A rise in domestic tourism sees more cars being driven to Penang. Unchecked tourism and lack of alternative transport are having a negative impact on Penang traffic, which in turn will affect the attractiveness of Penang.

3.2 Public Transport

3.2.1 Public bus ridership has continued to fall – a reduction of 10% compared to the previous quarter, despite punctuality rate of 85% and trips achievement of 98.5%.[29]

3.2.2 Low usage of public transport in Penang is caused by the lack of rail-based public transport. Public buses alone will not be attractive enough for people to give up their cars.

3.2.3 There is indirect suggestion that the introduction of e-hailing services like Grab, Mula etc could be the cause of the decrease in public bus usage.

3.2.4 There is no comprehensive data showing demand behaviour of bus users. For example, the sensitivity of Penangites to perimeters such as waiting time, fare, shelter and walkway etc. There is also no data to explain the downward trend of public bus ridership.

3.2.5 All public bus routes run by Rapid Penang incur losses. Rapid Bus Penang is heavily subsidised by Prasarana and Penang State Government (for the free CAT buses).

3.2.6 Uncertainty around PTMP leads to questions regarding the future of the Rapid Bus such as whether there will be changes in the role of Rapid Bus and the type of services they will provide. As Rapid Bus Penang will need to retire most of its fleet in about 5 years' time, the uncertainties will impede optimal investment in deciding the type and number of buses to acquire.

3.2.7 Current Rapid buses are too big to be navigated in residential areas and to be used as feeder buses.

3.2.8 Although universal design principles have been mandated for building design, there

[29] 3rd Sustainable Mobility and Connectivity Working Group Meeting on 13th May 2019.

is a lack of effective enforcement. Furthermore, “last mile accessibility” (i.e. from house to station) is still lacking.

3.2.9 Penang cannot introduce a vehicle quota without a good public transport system.

3.3 PTMP

3.3.1 Parts of PTMP are very car-oriented (e.g. with the building of highways, undersea tunnels, ring roads etc), continuing the “business-as-usual” approach of car-focused rather than pedestrian-oriented road usage.

3.3.2 The current transit plan (such as the undersea tunnel) is problematic as it does not negate the need to travel from the Mainland to the Island. The focus should be to reduce the flow (locate jobs to the mainland) and number of private vehicles coming to the Island.

3.3.3 The multi-modal public transport design under PTMP is too complicated and may not work due to connectivity and cost issues.

3.3.4 There are questions whether the Bayan Lepas LRT Line covers the right route and places. Furthermore, modelling of demand based on current and past trends may not be helpful as the new train transit system itself will disrupt travel behaviour.

3.3.5 It is notoriously difficult, if not impossible, to achieve profitability for rail-based system

e.g. in Vienna where 40% of journeys are by public transport, but the system is still not profitable.[30]

3.4 Transport Financing

3.4.1 There is yet to be an effective and sustainable financing mode for transport infrastructure building in Penang. Currently, the State Government has to rely either on funds from the Federal Government or partnerships with private developers through land development projects including land reclamation. In this sense, the Penang South Reclamation project is controversial.

3.5 Non-motorised Transport

3.5.1 Although MBPP has created an extensive network of cycling lanes, there is no detailed study on who actually uses them, for what purpose and how often. It seems that current cycling lanes are mainly used for recreational purposes.

3.5.2 To make it more attractive and safer to cyclists, there should be more dedicated cycling lanes. However, this is currently not the case.

[30] Wiener Linien 2014, The role of public transport in achieving Vienna’s future urban development goals. <https://www.intelligenttransport.com/transport-articles/14740/public-transports-role-in-viennas-urban-development/>

4. Solutions

4.1 Transport Demand Management

4.1.1 **Reduce or change travel needs** of Penangites especially commuters through the building of **new types of townships and cities** e.g. City as Campus where facilities including workplaces are within walking and cycling distance of residents. This involves better planning and town design.

- Promote the development of '**green townships**' to build networks of public transport and pedestrian-friendly local transport systems. Emphasis on transport can be achieved by: 1. Insisting on new townships in certain locations to achieve the Platinum level (86 points) or 2. Making the transport criteria mandatory etc.
- Green townships should prioritise designs to **shift away from car-centric road user models**. Some actions that could be taken include reducing block size of buildings, installing sidewalks, cycle lanes and parking at transit stations, increasing density of mixed-use and mixed-income development, limiting car parking space for new buildings etc.

4.1.2 Government should adopt a **policy to reduce private vehicle use**:

- **Private vehicle quota** – most effective in reducing vehicle kilometres travelled (VKT) e.g. not more than 5% increase in cars per year.
- Introduce **congestion charges** into certain areas to encourage motorists to use public transport instead of their cars.
- Increase **parking prices** in certain areas e.g. from RM0.80 sen per hour to RM 5 per hour.
- Provide a **good public transport system**.

4.1.3 Tourism sector needs to look into traffic control. **Tourists need greater mobility choices**. As logistics and manufacturing sectors have very few transport mode choices, the shift to public transport usage should occur in the commuters and tourist population. Use of public transport should be prioritized and encouraged e.g. increase the use of buses.

4.1.4 Focus on **personal mobility devices (PMD)** such as electric scooters, such as along Gurney Drive. Currently, there is no national or state regulation for PMD transport. However, in Penang, there will be no significant changes if we use PMD because the distance is very customized.

4.1.5 In terms of universal design principles, the government should provide a **mobility van** as the main transport or last mile travel. Currently, there is only 1 available in Penang and booking is very difficult. Thorough accessibility audits are also needed in Penang, especially for the transport system.

4.1.6 Adopt **Green Mobility for George Town**:

- Set the priority for pedestrians.
- Improve access to public transport – physical and digital access.

- Introduce a low emission zone.
- Link parking fees with public transport services e.g. RM 5 per hour parking within the Heritage area would generate RM14.4 million per year.[31]

4.1.7 Further **modernise and revolutionize Penang's logistics sector**:

- Improve coordination and resource sharing among different logistics companies within and outside the terminal/port to reduce the number of trips made.
- Penang Port Authority can build a common platform which logistics companies can use to share trip information and on-the-ground resources to reduce cost.
- The State Government should create a sectoral plan to facilitate the sector's growth and to assess future trends, including any possible disruption from economic forecasts or the building of a competing airport in Kulim. A more efficient logistics sector will reduce pressure on Penang's transport network.

4.2 Public Transportation

4.2.1 The Government should **reconsider the design of PTMP** based on up-to-date and accurate data regarding travel needs, population and ridership forecast, specific local travel demands and so on.

4.2.2 Penang should **invest more in public buses** while waiting for other modes of public transport to be built. Ways to increase bus ridership:

- Increase frequency (e.g. every 5 minutes but this will require increasing the number of buses by a large number i.e. around 1000 more buses in Penang).
- Number of transfers should be limited.
- Transfer stations should be comfortable.

4.2.3 Penang should use more **mini buses** especially when it changes its role to running feeder buses.

4.2.4 Working with Prasarana and the private sector (including battery and electric bus companies), Penang should push for the use of **electric buses**.

4.2.5 **Electric motorbikes** can be used as a mode of public transportation.

4.2.6 Local governments should consider **Transport Oriented Development (TOD)** for future LRT stations. TOD Standard Principles include:

- "Walk" – To develop neighbourhoods that promote walking.
- "Cycle" – To develop neighbourhoods that promote cycling.
- "Connect" – To create dense networks of streets and paths.
- "Transit" – To locate development near high-quality public transport.
- "Mix" – To plan for mixed use and mixed income.
- "Densify" – To optimize density and transit capacity.
- "Compact" – To create regions with short commutes.

[31] Asian Development Bank, Penang Green Transportation Plan: Final Report, August 2019.

- "Shift" – To increase mobility by regulating parking and road use.

4.2.7 Public transport should look for new financing models to maintain good services. For example, in the future it can consider **collaborating with the logistics sector** for on-demand deliveries etc.

4.2.8 LRT stations in Penang should be equipped with a **solar power generator**. Some LRT stations are moving towards the use of renewable energy that could also reduce their electricity costs.

4.3 Governance and Finance

4.3.1 For governance, the State Government can propose to the Transport Council under the Transport Ministry a **State-level decision-making body for public transport**.

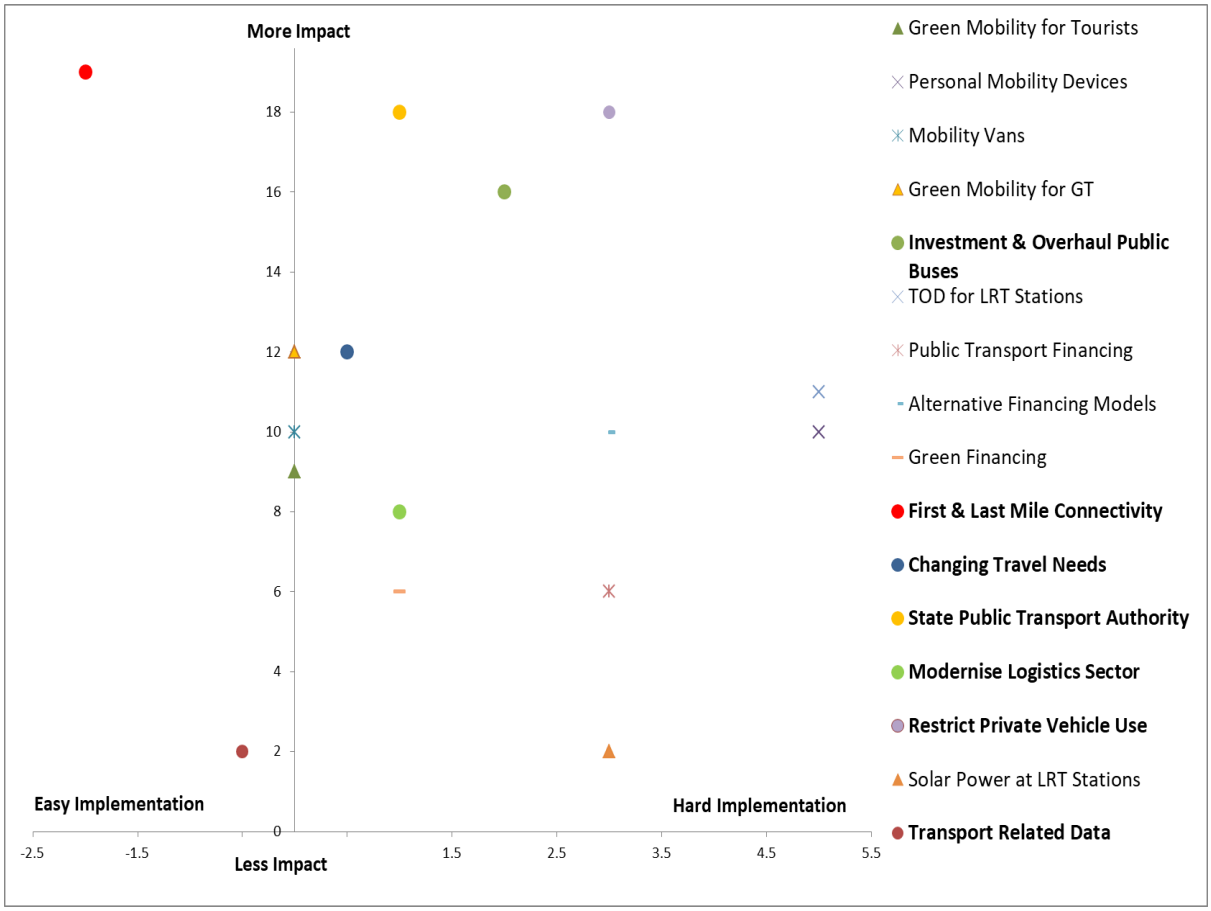
- Can also **decentralise financing** if the State Government can attract investments.
- Currently the State Government can do much **to increase public bus ridership** such as building stations and the related facilities (e.g. covered walkways).
- **Transparent decision-making** process with multi-stakeholder consultation – from the planning stage to on-going monitoring of the transport system.

4.3.2 Explore **alternative financing models** for transport infrastructure building and public transport:

- Land value capture
- Public private partnership – banks, institutional investors, equity firms etc.
- Parking fee
- Congestion charges – which is already allowed under SPAD/APAD Act so Penang could look into using that.
- Infrastructure Investment Fund
- Tourism tax

4.3.3 Penang should actively seek **green financing** for public transport investment in Penang
– green finance e.g. SDGs Fund provided by Bank Pembangunan; green bonds etc.

5. Major Policy Recommendations and Milestones



1. Transport-Related Data Acquisition (2020)

It is important to have comprehensive and detailed travel-related data in order to create a transport network that really suits Penang. Data related to travel patterns (direction and frequency), public bus ridership, use of cycling lanes and so on, are crucial in order for the State Government to understand how current infrastructure is used and can be improved. Comprehensive data is also needed for designing the types of public transport (such as LRT) needed as well as determining where the stations should be sited. The State Government should take advantage of the National Census that will be carried out in 2020 to include questions that can shed light on the travel patterns and needs of Penangites. The State Government could also work with transport consultants, including experts from USM to gather data every two to three years to ensure that Penang's transport system is delivering what the people need. It is imperative that the State Government has the correct and relevant data before it embarks on the multi-billion investments under the PTMP.

Given the urgency for comprehensive travel-related data, the State Government needs to come up with an effective process for data collection soon by working with partners like Rapid Penang, USM, the Department of Statistics and so on.

2. First and Last Mile Connectivity Plan (2020)

One of the main obstacles to public transport usage in Penang is the lack of first and last mile connectivity. Rapid Penang and Penang State Government have tried very hard to increase and improve public bus services (including introducing a free bus service) but the ridership numbers continue to fall. Part of the reason is the lack of first and last mile connectivity. Currently, Rapid Penang buses only service the main trunk roads and there is a lack of covered or shaded walkways connecting residential areas to the bus stations. This makes public buses less attractive. The State Government should take urgent steps to address this issue. Apart from providing pleasant walkways, different options exist to create the first and last mile connectivity through the use of mini vans, bicycles (including Link bikes), ride-hailing services and even trishaws. Mini buses have been suggested but there is concern that they will cause more traffic congestion on the road. Also, in order to promote the use of bicycles for first and last mile connectivity, the State Government, Local Government and Rapid Penang will need to invest in cycling lanes, secure bike parking spaces and even new buses with bicycle racks at the front. Unless the first and last mile connectivity issue is resolved, public transport will remain unattractive and impractical to most Penangites.

The State Government needs to address the first and last mile connectivity not only for public bus usage but also for the use of upcoming public transport modes under PTMP. The sooner the Government addresses this issue the better it will be at changing people's mindset and willingness to take public transport.

3. Modernise Logistics Sector (2020-2025)

Apart from the movement of people, the State Government should also improve the **transport system for goods.** The logistics sector is an important sector in Penang. Within the state, the Penang Airport and Penang Port act as the logistics hubs of the Northern Region. Penang's logistics sector is expected to grow due to economic growth in the Northern Region, development of a new port in southern Thailand, and also the growth of online shopping. There are calls for the State Government to modernise and revolutionize Penang's logistics sector to make it more competitive, adaptable and efficient. Considering that the logistics sector has fewer alternative modes of transport compared to other road users (e.g. commuters, tourists), who can utilise public transportation, the reduction of traffic congestion will make the sector more competitive. This issue can be addressed not only by improving Penang's transport network, but also by **revolutionising the sector itself**. For example, private entities within the sector can work with the State Government to better coordinate and share resources on deliveries and pick-ups within and outside the terminal / port to reduce the number of trips made. The port and airport authorities can introduce initiatives to further **improve collaboration** between stakeholders (including the Customs Department) and provide better facilities to speed up processing time. In short, the State Government should create a **sectoral plan** to facilitate the sector's growth and to assess future trends, including any possible disruption from

economic downturn or the building of a competing airport in Kulim. A more efficient logistics sector will reduce pressure on Penang's transport network.

This solution requires the State Government to look into producing a Logistics Sector Strategy in 2020, with implementation starting in 2025.

4. State Public Transport Authority (2021)

The State Government should push for more **local level decision-making in relation to public transportation**. Most decisions, including public transport routes, are currently made at the Federal Level, which makes the process cumbersome and reduces local accountability. Local and State Governments have the most direct "feel" and knowledge about local travel needs and patterns, hence they are arguably the most suitable level of authority to make decisions regarding public transport provision. Furthermore, decentralisation of authority was originally one of the objectives of the former land transport unit known as SPAD (now called APAD), but it was never realized. Having a Penang State Public Transport Authority can streamline decision-making, increase transparency and accountability, and provide services catered to local needs. The only caveat is that this will require an independent fund to support public transport projects. Finance can either come from public funds or from other sources through a public-private partnerships model. Without financial independence, autonomy and power of the State Public Transport Authority will be limited.

This solution is not easily achieved as many things need to be in place before decentralisation can happen, including the amendment of relevant regulations / laws and fundraising. The Working Group recommends the State Government starts engaging the Federal Government as soon as possible for this proposal and aims to set up a State Public Transport Authority by 2021.

5. Investment in and Overhaul of Public Buses (2024)

Public buses operated by Rapid Penang are currently Penang's main mode of public transport. Despite increased investment in providing better services (e.g. Travel App showing live information, smart bus stops etc), public bus ridership in Penang has fallen in the past year. The future of public buses is uncertain as it is dependent on the completion of PTMP. It is generally expected that public buses will play a secondary role, such as being set up as feeder buses once rail-based public transport modes are built (LRT, Monorail etc). However, there is still much uncertainty regarding the time and extent for the construction of the rail-based system. Furthermore, Rapid Penang will need to change its entire bus fleet by 2024. These uncertainties present a considerable challenge to all stakeholders in making the right investment decisions for public buses in Penang in the near future. The Working Group recommends that the State Government should provide some certainty around the future of Penang's public transport. This could be done by acknowledging and confirming the **crucial role of public buses in helping the State Government achieve the 40% public transport modal share** target by 2030. This means

investing enough **funds** for public buses, increasing ridership by overhauling bus services to increase **dedicated bus lanes and frequency**, and to attract alternative funding. The State Government should also work closely with Prasarana to create an effective business model that suits Penang and to push for large-scale use of alternative energy buses (e.g. electric, hydrogen or biodiesel buses) in Penang. There is also a need to understand current travel needs and patterns through data, provide targeted incentives to change travel patterns, and invest in new fleets (such as mini buses) that suit local travel needs.

As Rapid Penang needs to change its fleet by 2024, this presents a good opportunity for the Government to set out a credible vision and investment plan for public buses in Penang. Planning should start no later than 2021, and to be implemented by 2024.

6. Changing Travel Needs (2025)

On top of building additional infrastructure to cope with increased traffic, the State and Local Governments should also prioritise **reducing or changing travel needs** of Penangites as a more effective way of reducing traffic congestion. This can be achieved in various ways, including changing school or office opening hours to incentivise people to travel during off-peak hours. However, a more long-term and effective way to change travel behaviour is by building **new types of townships or cities** that provide places for work, leisure and living within walking and cycling distance of one another. Sensibly designed townships, with adequate and safely covered or shaded walkways and cycling lanes, will reduce the need to travel by car. Green Building Index (GBI) Malaysia provides toolkits and standards for "green townships", which can be adopted in Penang. The GBI's "green township" criteria include the building of networks of public transport- and pedestrian-friendly local transport systems. Emphasis on GBI's transport criteria can be achieved by either making the specific criteria mandatory or by insisting on higher certification level (e.g. GBI Platinum) for green townships in Penang. Other ways to **break the car-centric road user model** are to: reduce block size of buildings, complete sidewalks, cycle lanes and parking at transit stations, increase density of mixed-use and mixed- income development and limit car parking space for new buildings, among others.

This solution involves adopting and instituting better planning and town design. The requirements, and design, of "green townships" need to be included in the Local Plans that are currently being finalised by MBSP and MBPP. The first "green township" can be achieved by 2025.

7. Restrict Private Vehicle Use (2026)

In addition to improving public transport, the State and Local Governments also need to introduce measures to **reduce private vehicle use.** There are various ways to do this, including implementing access restriction at certain times, private vehicle quota (for example restricting the increase in the number of cars to 5% annually), congestion charges for certain areas, increasing parking prices, providing a good public transport system and so on. Although the State Government recognises that there is a need to

introduce certain measures to reduce the reliance on private vehicle use, it is surmised that actions can only be taken after the new public transport systems are completed under PTMP. The Working Group feels that certain restrictions on private vehicle use, such as congestion charges, can be introduced earlier before the full public transport system is completed in order to gradually **shift people's behaviour and mindset**. Furthermore, certain private vehicle restrictions can be rolled out in conjunction with the overhaul of public bus services, which comprises new dedicated bus lanes, increase in bus frequencies and so on. In this way, when the new public transport system is ready, certain levels of ridership can already be achieved. However, this must be carried out together with the upgrade of the current public transport system, especially public buses.