PENANG GREEN AGENDA 2030

Title: Green Buildings and Townships

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EXECUTIVE SUMMARY

Penang's urban areas continue to expand with the development of new towns and even new landmass through land reclamation. To promote greener construction and buildings, Penang's Local Governments are providing various incentives to encourage developers to aim for green building certification, especially the Green Building Index (GBI) promoted by Malaysia Green Building Council. Currently Penang has the third highest number of GBI certified buildings in Malaysia, after Kuala Lumpur and Selangor. Despite this, the uptake of GBI certification has been slow and the trend is likely to remain so, unless positive and effective measures are introduced by the State Government.

Penang launched the Batu Kawan Eco-City initiative in 2011 with an aim to create sustainable growth for the new city with mixed development with the highest quality of life socially, economically and environmentally. The Batu Kawan Eco-City guidelines specify that all commercial and residential buildings within the 2,600 ha development are to be GBI certified.[1] It also encourages the building of cycling paths and pedestrian walkways, adoption of green technologies such as LED lighting, as well as the creation of 40% of the total development as public space.[2] In reality, enforcement and implementation of the guidelines have been lacking and there is a real danger that the vision of Eco-City will not be achieved by 2030. Apart from Batu Kawan, there is no concrete plan at the State and Local Government levels to build new - or convert existing townships into - green townships.

The Government of Penang needs to address the following challenges if it wants to promote the uptake of green buildings and townships. First and foremost, the current paradigm in city development in Penang is characterised by urban sprawl and car-oriented design. The lack of a concrete vision and the often "developer-led city design" have discouraged the adoption of bold and holistic approaches when it comes to changing the trajectory of constructing buildings and townships. There is also a lack of knowledge and capacity within the government to plan, implement and enforce green building and township guidelines, as in the case of Batu Kawan. In addition, incomplete data or data shortage is also hampering the adoption of green buildings and township.

Cost is also a concern for the adoption of green technology and design in buildings and townships. Developers have been pushing back on green standards because of the extra cost it incurs, which they will eventually pass on to the buyers. And even though Local Governments in Penang do provide incentives to developers for the adoption of green buildings certification, the concern about cost and market demand has hampered progress. The cost issue is particularly true with regards to retrofitting existing towns to become green townships and there is a lack of dedicated funding for this purpose.

[1] Phee Boon Poh, 'Planning of Eco-City and Green Technologies in Province Wellesley, Penang, Malaysia', 14th Asia Pacific Eco-Business Forum [Presentation Slide]. <http://eri-kawasaki.jp/wp-content/uploads/2018/02/43535ff2c35363df56776bd4aa40167d.pdf>

[2] MBSP, 'Developing Eco Town In Penang', 22nd July 2011. <http://gec.jp/gec/en/Activities/ietc/fy2011/EcoTown/Penang111207-03.pdf>

The GBT Working Group proposes the following four recommendations to promote the construction of green buildings and townships in Penang:

1. Mandatory GBI criteria and Green Building Incentives (2020)

Currently, a developer who wants to get GBI certification is free to select any of a variety of GBI criteria that allow their project to earn points. To reflect the priorities of Penang, GBI can work with the Penang State Government to identify a few GBI criteria that should be made mandatory for all GBI certified projects (buildings as well as townships) in Penang. These criteria must be aligned to the achievement of Penang's 2030 vision and include issues such as public transport, water efficiency or flood mitigation. Mandatory criteria can be further customised to suit the different needs of Penang Island and the Mainland. By targeting specific criteria, the State Government can make sure that its development agenda is supported by the private sector. To further encourage the voluntary application of GBI certification, the State and Local Governments should provide targeted incentives not only for new development and buildings, but also for retrofitting of existing buildings or townships.

2. Penang Green Design Council (2023)

To support Penang's initiative to build green townships, the Penang State Government can set up a Penang Green Design Council (PGDC). The council would provide independent and impartial advice to the State Planning Committee (SPC) and One Stop Centre (OSC) regarding sustainable land use planning. The PGDC can provide visions, consistency and blueprints for green towns or cities, and lead on district-level planning for green cities. The council should also consist of experts of various backgrounds including planners, engineers, social scientists, conservationists, technology experts and so on. There are a couple of options for setting up the PGDC. Option 1: Incorporate the PGDC mandate into the existing technical consultative body at SPC level called SPEAD (so there is no need for a separate PGDC entity). Option 2: Set up the PGDC at the local Government level (either as a technical committee or as an additional consultation entity) to advise on local planning and planning authorisation processes. In relation to Option 2, the challenge is to make sure that the extra consultation step does not frustrate the current KPI that requires development planning application to be processed within 90 days. Hence, the form and role of the PGDC may be different before and after the gazettement of the Local Plan.

3. Green and Liveability Standards (incl. neighbourhood waste management, universal planning, 20% green space and urban agriculture) (2020-2030)

The State Government should set higher standards for certain types of development that impose high social or environmental costs on the community, such as land reclamation, conversion of agricultural land and greenfield development. For these developments, the State Government should impose specific green and liveability standards, which can include neighbourhood waste management, universal design and accessibility, at least 20% green space, and planning for urban agriculture. The Working Group recommends that the State Government prioritise the mandatory application of these standards in

agriculture land conversion, factory or industrial zone, large-scale development and the development of state land. These standards should gradually be extended to all types of major development.

4. “City as Campus” and Batu Kawan Pilot (2030)

The State and Local Government should strengthen the implementation of the one and only Eco-City currently in Penang, which is Batu Kawan. Although enforcement of ‘green elements’ in Batu Kawan has so far been piecemeal and many development projects have been approved without fulfilling ‘green’ conditions, there is still hope that Batu Kawan can be turned into a successful pilot for a green city in Penang. There is already a relatively comprehensive document outlining the vision for Batu Kawan Eco-City, so efforts can begin there. The development of Batu Kawan can also take into account the concept of “City as Campus”, which is developed by the built environment specialist firm ARUP. The concept incorporates aspects of inclusivity and dynamic design of a space (where people can ‘work, live and play’ in the same area), phasing and placemaking, digital planning, multi-uses of spaces, people-oriented environment, on-site waste and energy solutions, and a resilient design to cater for future changes. Successful establishment of the Batu Kawan Eco-City will have a positive impact on the future plan for more green townships in Penang. Through the Batu Kawan pilot, Penang can also identify and create local industrial supply chains for materials and technologies needed for green and innovative urban solutions.

1. Background

1.1 Penang Green Agenda 2030 and Green Buildings and Townships

Green Buildings and Townships constitute one of the ten key focus areas that have been identified as an important area that will enable Penang to achieve its sustainable development goals. This is because buildings are one of the main contributors of global warming. Apart from the fact that more buildings are being constructed as a result of rapid urbanisation, the whole life cycle of buildings, from construction to building maintenance, has a huge impact on resource use and pollution. This ranges from the materials used, types of ventilation or insulation, as well as energy- and water-saving design of buildings.

Hence, by improving the way we construct and use buildings, we can create a better living space for everyone while reducing the impact on the environment. The effect of green buildings can be multiplied when they are built in a cluster to become a "green" township. Green townships are defined not only by the quality of the buildings alone but also by how well the building design and location serve the local community – public space, mobility, jobs, recreation, health, safety and sustainability. Lifestyle, modes of transportation, waste management systems and so on are key factors in designing a green township.

The Working Group outlines the definition of green buildings and townships for Penang as well as targets to be achieved by 2030. Existing policies relevant to green buildings and townships will be reviewed to further understand challenges of implementing the policies as well as to suggest recommendations for improving the policies. The Working Group also looks into key elements or factors as well as policy tools that can unlock the potential for green buildings and townships in Penang. The Working Group also explores the role of smart solutions and technologies in promoting green living and increasing liveability in relation to green buildings and townships. Furthermore, the possibilities of introducing mandatory green building construction standards, such as construction of waste treatment / recycling and use of renewable energy, are explored by the Working Group. The Group goes on to identify key principles of green township design for Penang to include, but not limited to, universal access, social inclusivity, use of renewable energy, public-oriented and non-motorised transport, work-life balance, and usable public space.

1.2 Current Situation

1.2.1 Green Buildings

In Malaysia and in Penang particularly, there are various standards and tools used to rate green buildings, among them are the Green Building Index (GBI), Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCrest) and GreenTech's Low Carbon City Framework. In Penang, the Government has promoted the use of GBI as a tool to assess the environmental design of, and to set standards, for "green" buildings. Currently, there are 42 buildings covering 14.9m sq ft in Penang that are recognised as green buildings, which ranks Penang as third in Malaysia in terms of the number of GBI-

certified buildings.[3] The Penang Structure Plan 2030 or *Rancangan Struktur Negeri Pulau Pinang* (RSNPP) 2030 guides the development of Penang until 2030. For development planning submission, the component must include at least 10% of green space.[4] Furthermore, the National Landscape Policy outlines that at least 30% of the urban development area should be transformed into green areas.[5]

To promote the green concept, reduced development charges are offered as incentives to developments that adhere to the 128 unit per acre guideline. The incentives for green building development can be divided into two categories, namely Gold and Platinum. The normal rate for development charges are RM15 per square feet for residential development and RM21 per square feet for commercial development.[6] The reduction in development charges from RM15 to RM5 and from RM21 to RM7 per square feet will be given to those development proposals that are successfully accredited in the category of Gold and above.[7]

The Seberang Perai Municipal Council (MBSP) is giving incentives for GBI achievers, which are 20% increase in the density / plot ratio for Silver Award Achiever, 30% increase in the density/plot ratio for Gold Award Achiever and 40% increase in the density / plot ratio for Platinum Award Achiever.[8] On the other hand, the Penang Island City Council (MBPP) is giving rebates for development charges if the building is GBI certified in Gold or Platinum category. The cash rebate of 2/3 of the development charges is given by the Penang State Government until the building receives certification from GBI.[9] The end user of a GBI-rated building in the category of Gold, and Platinum will enjoy 100% waived assessment fees for every three years.[10] Currently, the Penang State Government has agreed to absorb the renewal fees for the GBI rated buildings in Penang Island. Almost 60% of the GBI certified buildings are from the residential development sector.[11]

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[3] "Pushing for more green buildings". *The Star Online*, 3rd December 2018. <https://www.thestar.com.my/metro/metro-news/2018/12/03/pushing-for-more-green-buildings-council-announces-incentives-for-developers-of-gbicertified-project>.

[4] Rancangan Struktur Negeri Pulau Pinang 2030. <http://epublisiti.townplan.gov.my/turun/rsn_pulaupinang2030/rsnpp2030.pdf>

[5] Jabatan Landskap Negara, Kementerian Perumahan dan Kerajaan Tempatan. '*Dasar Landskap Negara: Malaysia Negara Taman Terindah'*. <https://www.kpkt.gov.my/resources/index/user_1/MENGENAI%20KPKT/DASAR/DLN.pdf>

[6] "Assemblyman: Hike in development charges led to steep property prices in Penang". *The Star Online*, 26th December 2017. <https://www.thestar.com.my/news/nation/2017/12/26/assemblyman-hike-in-development-charges-led-to- steep-property-prices-in-penang>.

[7] 1st Green Buildings and Townships Working Group Meeting on 8th April 2019.

[8] Phee Boon Poh, 'Planning of Eco-City and Green Technologies in Province Wellesley, Penang, Malaysia', 14th Asia Pacific Eco-Business Forum [Presentation Slide]. <http://eri-kawasaki.jp/wp-content/uploads/2018/02/43535ff2c35363df56776bd4aa40167d.pdf>

[9] "It pays to make buildings green". *The Star Online*, 6th December 2018. <https://www.thestar.com.my/metro/metro-news/2018/12/06/it-pays-to-make-buildings-green-those-with-gbi-certificate-enjoy-assessment-waiver-for-three-years>.

[10] "MBPP promotes GBI initiative through its assessment fee rebate". *Buletin Mutiara*, 29th November 2018. <https://www.buletinmutiara.com/mbpp-promotes-gbi-initiative-through-its-assessment-fee-rebate/>

[11] 1st Green Buildings and Townships Working Group Meeting on 8th April 2019.

1.2.2 Green Townships

In relation to green townships, Township Tool 2.0 was developed by GBI. It consists of six core categories, which are: Climate, Energy & Water; Transportation & Connectivity; Business & Innovation; Community Planning & Design; Building & Resources; and Ecology & Environment.[12] Generally, a green township should: have plans to reduce heat island effect; install efficient street and park lighting; create methods for on-site energy generation; reduce water usage; and recycle wastewater. A green township requires a more holistic planning approach, creating better linkages between communities, environment and buildings. GBI's green township tool changes every 5 years and the assessment becomes stricter year by year.[13] Around 27 applications for green townships have been received in Malaysia.[14] Two of the applications have been certified and another two projects are in planning assessment.

There is no established green or eco-township in Penang although there is aspiration to turn Batu Kawan in Seberang Perai into an eco-city. Within Batu Kawan, GBI submission is compulsory for both residential and non-residential entities (commercial). Currently, the CAT bus is operating in Batu Kawan, from Bandar Cassia Mutiara to Design Village. A suggestion has already been proposed by MBSP to the State Government to extend the route to IKEA. If a transport hub is established in Batu Kawan in the future, there is a possibility to have bus services from Penang Island to Bandar Cassia via the Second Bridge. There is currently a new 'green township' being planned by MBSP in Tasik Gelugor. MBSP is also working on green townships guidelines. There is no plan for green townships by MBPP, nor an incentive package for green townships.

Specifically on transportation, GBI's Green Township tool gives 14 points to the transport criteria covering inter- and intra- transport masterplan, public transport, pedestrian network and cycling network.[15] The walkability distance is set at 500m.[16] The tool emphasizes inter- and intra-community travel, which means moving people around a township and connecting them from the township to other places, with a particular focus on reducing private car use. Points are also given to the provision of facilities for public transportation e.g. a Park & Ride system, covered or shaded bus stops and pedestrian walkways. The pedestrian network has to be connected with key amenities and neighbourhoods, and must comply with universal design. In terms of the "liveability" of buildings and townships, there is not yet any clear guidelines for Penang or even Malaysia. However, other places such as Hong Kong and Singapore can provide examples of current practices. Where "liveability" is used to emphasise inclusivity, facilities and amenities within and outside a building should be accessible and reachable by all people of different age groups and abilities. It also denotes sufficient green spaces, safe environment, buildings and facilities that are built to last and with low maintenance cost,

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[12] Serina Hijjas, 'Changing Climate Changing Cities the Next Decade' [Powerpoint presentation], 8th April 2019.

[13] Green Building Index. 'Green Building Index Township Tool and Residential New Construction Tool Version II', 29th March 2011. <https://new.greenbuildingindex.org/Files/Resources/20110329%20-%20Launch%20of%20the%20GBI%20Township%20Tool/GBI%20Township%20Tool%20Booklet%20(Web)%20201107.pdf>

[14] Serina Hijjas, 'Changing Climate Changing Cities the Next Decade' [Powerpoint presentation], 8th April 2019.

[15] Serina Hijjas, 'Changing Climate Changing Cities the Next Decade' [Powerpoint presentation], 8th April 2019.

[16] Ibid.

availability of amenities such as health centres and so on. Liveability also requires focus on facilities and amenities that strengthen community ties to enhance social well-being. There must be a conscious effort to build liveable buildings and townships starting from the design phase, and continue to monitor performance through the construction stage and actual usage.

At the national level, the Low Carbon City Framework (LCCF) was introduced to encourage carbon emissions reduction at city level. Malaysia has agreed to reduce the country's carbon dioxide emissions intensity to 45% of GDP in the next 12 years.[17] Under the Green Technology Master Plan 2017-2030, the government is targeting CO2 emissions and aims to reduce the present 8 metric tonnes (MT) per capita to 6 MT per capita by 2030.[18] According to the World Green Building Council, globally, almost 40% of energy-related greenhouse gas emissions come from buildings, with 28% coming from operation of the buildings.[19] In response to this, construction of green buildings will help to reduce consumption of energy by 26%.[20] Under LCCF, there are currently nine projects at Planning Assessment stage and two projects at Final Planning Assessment stage.

Technology can do a lot to contribute to reducing the cost of smart green buildings and improving connectivity between residents and buildings, as well as the local community. For example, sensors coupled with the use of data can cut down energy usage and increase home security. In essence, smart green buildings should be green, secure and convenient for users. In addition to green technology, green infrastructure can be used to reduce the surface temperature. This is a network of ecological systems, both natural and engineered, that act as living infrastructure to solve urban and climate challenges. It is predicted that 200 days of heatwave will occur in Penang by 2050.[21] Examples of green infrastructure include rain gardens, green roofs, porous pavements, wetlands, forest and stream buffers.

It has been suggested that Putrajaya is one example that Penang can look to. Besides its road system, Putrajaya has a pedestrian and cycling network that links the administrative buildings to all of its precincts. Examples of low-cost projects for green building are available at SP Selayang and Johor Bahru.

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[17] Ministry of Energy, Green Technology and Water, 'Green Technology Master Plan Malaysia 2017-2030'. <https://www.pmo.gov.my/wp-content/uploads/2019/07/Green-Technology-Master-Plan-Malaysia-2017-2030.pdf>

[18] "Malaysia to slash another 25% of CO2 emission by 2030". *The Malaysian Reserve*, 4th February 2020. <https://themalaysianreserve.com/2017/06/21/malaysia-slash-another-25-co2-emission-2030/>

[19] "World Green Building Council Calls on Companies Across the World to Make their Buildings Net Zero Carbon". *World Green Building Council*, 6th June 2018. <https://www.worldgbc.org/news-media/world-green-building-council-calls-companies-across-world-make-their-buildings-net-zero>

[20] Serina Hijjas, 'Changing Climate Changing Cities the Next Decade' [Powerpoint presentation], 8th April 2019.

[21] Penang Nature-Based Climate Adaptation Programme, Think City (2019)

2. Long-Term Goals

In order to accelerate the transformation of the sustainability and quality of buildings and townships in Penang, the GBT Working Group recommends that the State Government adopt the following targets:

a. **All new buildings** to be GBI certified by 2030.

b. Penang to have at least **5 green townships by 2030**.

c. Make green buildings or townships (GBI certified or otherwise) **mandatory** for the following types of development:

- Reclaimed land
- Central business district
- Greenfield development
- Large value and size development
- TOD e.g. LRT station areas
- PDC-owned land (new or old)
- Factories/industrial zone
- Agricultural land conversion
- High risk/flood-prone areas

3. Main Challenges and Gaps

3.1 Current Development Paradigm

3.1.1 It has been pointed out that the **current paradigm in city development** covers the following three aspects:

a. **Urban Sprawl Design** where it is not mixed land use.
b. More development in outer-city areas, which also means longer travel times and distances to the city centre.
c. **Private car-oriented development,** which means larger car parking areas have to be provided, easy access to highways must be allocated, and larger roads have to be built to accommodate more vehicles.

3.2 Data

3.2.1 There is a lack of data showing the frequency and manner in which the existing cycling network in Penang island is used. However, there is anecdotal evidence showing that the cycling lanes are not used extensively for work commute, which is most likely due to the fact that the cycling network is not well designed to cater for cyclist-commuters and is still lacking reasonable linkages to different parts of the city. Without correct data, the effectiveness of the lanes in changing people's travel behaviour is not known. This provides a few valuable lessons to MBSP, which is currently designing its own cycling lane network.

3.3 Governance

3.3.1 Enforcement of Batu Kawan Eco-City has not been satisfactory. There are nine fundamental concepts for Batu Kawan Eco-City, namely:
(a) "Ecology Preservation", (b) "Accessibility", (c) "Safe City", (d) "Zero Renovation", (e) "Neighbourhood Unit", (f) "Affordable Housing", (g) "Solid Waste Management", (h) "Green Building", and (i) "Green Neighbourhood".
Currently, there is no specific percentage of land coverage for "Ecology Preservation", no details for both "Accessibility" and "Safe City", and no new ideas or new guidelines for "Solid Waste Management" to ensure proper management of solid waste in the Eco-City.

3.3.2 MBSP faces the difficulty of enforcing the GBI as they do not have access to the status of GBI.

3.4 Transportation

3.4.1 Penang has a population around 1.8 million.[22] However, the registered cars in Penang are said to be around 2.5 million.[23] Developers provide condominiums with two parking lots per unit. This might be one of the challenges if Penang is to achieve the vision of the "car-lite" society. It has been pointed out that it is difficult for Penang to reduce car parks now due to the lack of an efficient and sufficient public transportation system.

3.5 Universal Accessibility

3.5.1 In terms of universal accessibility, there is great improvement in the regulatory requirement for universal design. However, enforcement of these regulations and guidelines has to date been lacking and inadequate. It has been pointed out that there are occasions where pedestrian walkways are blocked by vehicles. This situation brings inconvenience to walkway users.

3.5.2 Buses in Penang do have ramps that help disabled passengers to board. However, there are cases where bus drivers do not stop their buses for disabled persons, especially those in wheelchairs.

3.5.3 Some universal design is less than satisfactory – for example the ramps are too steep from KOMTAR to Prangin Mall, and most public toilets are also not user-friendly to disabled persons.

3.6 Factories

3.6.1 It has also been pointed out that it is not mandatory for factories to achieve green certification. Factories are built on large pieces of land with relatively small patches of greenery.

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[22] Department of Statistics, Malaysia.
[23] "Vehicle registrations in Malaysia hit 28.2 million units", *paultan.org*, 3rd October 2017. <https://paultan.org/2017/10/03/vehicle-registrations-in-malaysia-hit-28-2-million-units/>

3.7 Cost

3.7.1 Green Building development costs money. The cost of implementing green building aspects into residential projects is 1% of the total price of a house.[24]

3.8 Rating System

3.8.1 There is no index to rate the liveability of buildings and townships in Malaysia.

3.9 Incentive and Policy

3.9.1 Lack of incentive and policy framework for waste management and green construction.

4. Solutions

4.1 Planning

4.1.1. Local Governments should include **green and liveable townships in Local Plans**. Liveability includes social inclusivity, amenities, health and density. Local plans should include the following:

- Carry out "**District Planning**" to optimise local planning and to facilitate the establishment of green townships.
- **Community-based programmes** should be promoted and encouraged by the local authority. For instance, allocating certain portions of land for a community centre, recycling centre and urban farming. It is believed this is the fundamental concept of "Green Neighbourhoods".
- **Covered walkways** have to be provided to promote walkability of pedestrians.

4.1.2 The State Government should plan for **TOD at new LRT stations**. Several big towns - the locations for LRT stations in Penang - are potential candidates for TOD. However, it is understood that not every LRT station can become TOD as this requires considerable investment.

4.1.3 **All reclaimed land** should be used for green building development or Green Townships-certified development.

4.1.4 The design of car parks, pedestrian crossings, and lighting should follow **universal design** to ensure accessibility to all. It is especially important to provide universal access to public transport stations. Suggestions include:

- Provide mobility vans to enable point-to-point access for people with disabilities.
- A section in the local authority's town planning department looking at universal design compliance.
- Local authorities promote 'competition' among developers to achieve excellence in compliance of universal accessibility design, using the "cleanest toilet" as example.

[24] 1st Green Buildings and Townships Working Group Meeting on 8th April 2019.

4.1.5 Requirement for **green space should be increased to 20%** - “Open space” (or “kawasan lapang”) should be changed to “green space”. A target on “urban forest cover” should be adopted.

4.1.6 Local Plans should accommodate future uptake of **urban agriculture** – community open space, building codes (for roof top planting) etc.

4.1.7 Distributed or **“district” energy** should be included in Local Plans e.g. biomass plants and other localised services such as waste recycling, water etc.

4.1.8 Establish **successful pilots**:

- Better enforcement of **Batu Kawan Eco-City** as the role model for the entire Northern Corridor in terms of an eco-city. It has been pointed out that Batu Kawan Eco-City will eventually become an ordinary city if the authority does not instill sufficient monitoring during the planning stage.
- The **industrial zone** in Batu Kawan should be encouraged to aim for green building development. Eco-city status should be enforced through better information, transparent land use proposals and compliance of standards.
- Local governments should work with companies within the i**ndustrial zone in Bayan Lepas** to move, in phases, towards green buildings/townships.

4.1.9 **George Town World Heritage Site** should incorporate the idea of GBI.

- The back lanes should be converted into a landscape that can be beneficial, such as to be used to settle drainage issues.
- Renovation and restoration, in phases, within the George Town World Heritage Site should also conform to GBI certification for green townships.

4.1.10 Adopt “**City as Campus**” idea for future town planning and retrofitting:

- Where people ‘**work, live and play**’ in the same area – more inclusive and dynamic design of the space, and changing travel needs of people.
- **Phasing and placemaking** – identify attractive features and carry out in stages.
- **Digital planning** needs to be added to the planning process, which includes urban, transport and resource planning.
- **Multi-uses of spaces** – designs and amenities need to be dynamic.
- **People oriented** – make streets not roads; increase walkability of cities.
- **On-site waste and energy solutions** – this requires development of a certain scale and of mixed use.
- “**Resilient**” design to cater for future changes e.g. car parks that will be redundant in the future can be turned into something else but design must start now.
- Different types of tenure to allow multiple types of uses.

4.1.11 **Retrofitting** of buildings and towns:

- Government should identify places for retrofitting (e.g. potential TOD towns)

that must incorporate **circular design**.

- Biggest challenge is to change **social behaviour and expectations**.
- Work with GBI to have customised GBI criteria for building and township retrofitting.

4.2 Standards

4.2.1 New **"green and liveability" standards** to be adopted by all state development projects

e.g. Hong Kong Green Building Council (HKGBC) standards.

- Use ISOs for minimum standards.
- Design buildings with longer lifespan that can be easily maintained.
- Use of sustainable and easily recycled materials.
- Promote community life.

4.2.2 Depending on the needs of Penang, **certain GBI criteria should be made mandatory** e.g. transportation, green space etc.

4.2.3 Specific standards for **neighbourhood waste management** – segregation and recycling facilities need to be ready in accordance with local guidelines.

4.2.4 Require **higher standards for building construction**, including complementary infrastructure building:

- Less costly, less waste and low maintenance.
- Work with research institutes and industries to create recycled materials – need a platform where information about waste volume and availability can be easily accessed.
- Waste segregation during construction.
- Adopt a whole life-cycle approach.
- The use of modular system (IBS) in public buildings

4.2.5 Increase **enforcement capacity and the will of the local Government** – PPP, self-regulation, Green Building, Township Watchdog.

- Better enforcement of local regulations on green buildings e.g. rainwater harvesting, green space, wastewater management system.

4.2.6 The relevant departments or authorities should take the initiative to plan for more **incentives** to be given out to developers that are incorporating the idea of green building. These include more financial incentives (local charges waiver), mandatory standards, leading by example through PDC.

- Increase the minimum standards in building codes to achieve carbon reduction targets.

4.3 Governance, Financing and Technology

4.3.1 Establish a "**Penang Design Council**" to harness the expertise of Governmental and Non-Governmental stakeholders. It is possible to provide a holistic view to particular development projects, increase capacity of Government planners, and improve transparency in land-use decision making.

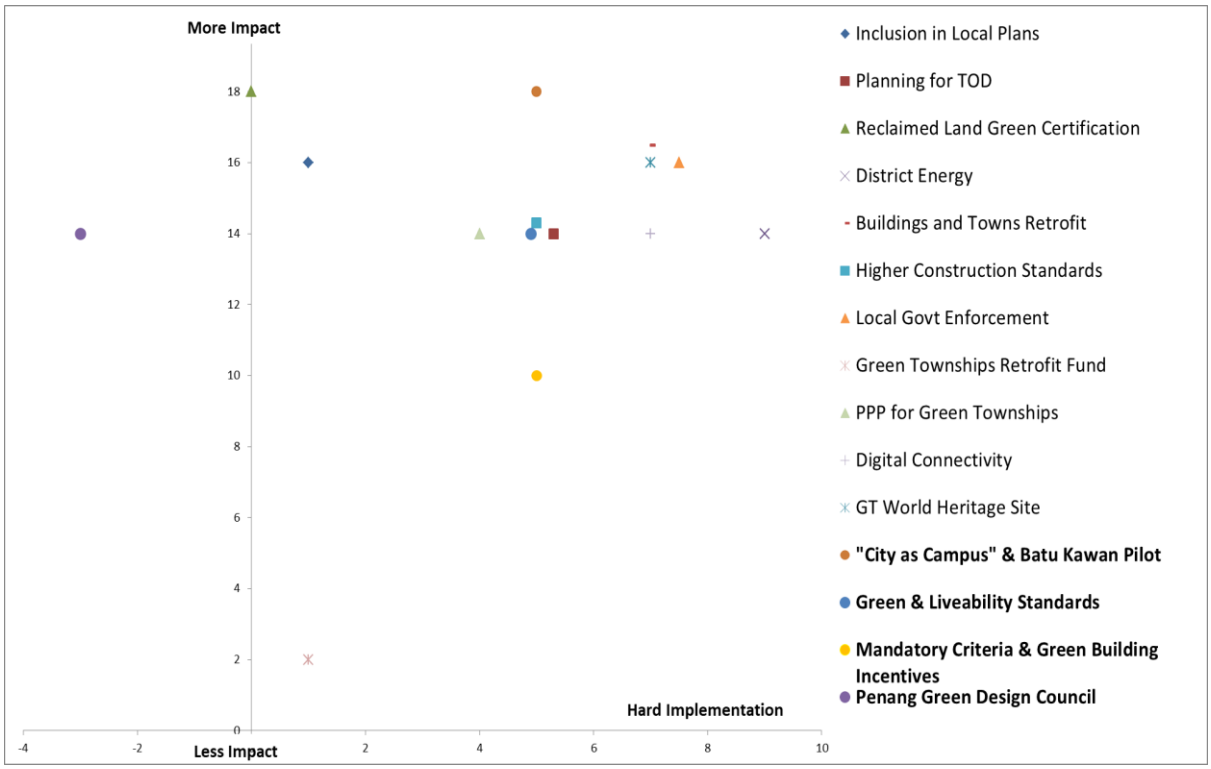
4.3.2 Establish a **Green Township Retrofitting Fund**. Revenue can be generated from development charges, parking fees, CSR etc.

4.3.3 Explore and establish a suitable **public-private partnership (PPP) model** suitable for Penang to promote construction and retrofitting of green townships.

4.3.4 Build a **digitally powered green / liveable district, town, or neighbourhood**:

- Physical connectivity (telecommunication, transport)
- Citizen engagement
- Command and control platform (e.g. control centre, energy sensors)
- User phase (customised uses)

5. Major Policy Recommendations and Milestones



1. Mandatory GBI criteria and Green Building Incentives (2020)

Currently, a developer who wants to get GBI certification is free to select any of a variety of GBI criteria that allows their project to earn points. To reflect the priorities of Penang, GBI can work with the Penang State Government to identify a few GBI criteria that should be made mandatory for all GBI certified projects (buildings as well as townships) in Penang. These criteria must be aligned to the achievement of Penang's 2030 vision and include issues such as public transport, water efficiency or flood mitigation. Mandatory criteria can be further customised to suit the different needs of Penang Island and the Mainland. By targeting specific criteria, the State Government can make sure that its development agenda is supported by the private sector. To further encourage the voluntary application of GBI certification, the State and Local Governments should provide targeted incentives not only for new development and buildings, but also for retrofitting of existing buildings or townships.

2. Penang Green Design Council (2023)

To support Penang's initiative to build green townships, the Penang State Government can set up a Penang Green Design Council (PGDC). The council would provide independent and impartial advice to the State Planning Committee (SPC) and One Stop Centre (OSC) regarding sustainable land use planning. The PGDC can provide visions, consistency and blueprints for green towns or cities, and lead on district-level planning for green cities. The council should also consist of experts of various backgrounds including planners, engineers, social scientists, conservationists, technology experts and so on. There are a couple of options for setting up the PGDC. Option 1: Incorporate the PGDC mandate into the existing technical consultative body at SPC level called SPEAD (so there is no need for a separate PGDC entity). Option 2: Set up the PGDC at the local Government level (either as a technical committee or as an additional consultation entity) to advise on local planning and planning authorisation processes. In relation to Option 2, the challenge is to make sure that the extra consultation step does not frustrate the current KPI that requires development planning application to be processed within 90 days. Hence, the form and role of the PGDC may be different before and after the gazettement of the Local Plan. The PGDC or equivalent may be set up within the next few years.

3. Green and Liveability Standards (incl. neighbourhood waste management, universal planning, 20% green space and urban agriculture) (2020-2030)

The State Government should set higher standards for certain types of development that impose high social or environmental costs on the community, such as land reclamation, conversion of agricultural land and greenfield development. For these developments, the State Government should impose specific green and liveability standards, which can include neighbourhood waste management, universal design and accessibility, at least 20% green space, and planning for urban agriculture. The Working Group recommends

that the State Government prioritise the mandatory application of these standards in agriculture land conversion, factory or industrial zone, large-scale development and the development of state land. These standards should gradually be extended to all types of major development.

4. “City as Campus” and Batu Kawan Pilot (2030)

The State and Local Government should strengthen the implementation of the one and only Eco-City currently in Penang, which is Batu Kawan. Although enforcement of ‘green elements’ in Batu Kawan has so far been piecemeal and many development projects have been approved without fulfilling ‘green’ conditions, there is still hope that Batu Kawan can be turned into a successful pilot for green city in Penang. There is already a relatively comprehensive document outlining the vision for Batu Kawan Eco-City, so efforts can begin there. The development of Batu Kawan can also take into account the concept of “City as Campus”, which is developed by the built environment specialist firm ARUP. The concept incorporates aspects of inclusivity and dynamic design of a space (where people can ‘work, live and play’ in the same area), phasing and placemaking, digital planning, multi-uses of spaces, people-oriented environment, on-site waste and energy solutions, and a resilient design to cater for future changes. Successful establishment of the Batu Kawan Eco-City will have a positive impact on the future plan for more green townships in Penang. Through the Batu Kawan pilot, Penang can also identify and create local industrial supply chains for materials and technologies needed for green and innovative urban solutions.