LOW CARBON SOCIETY

ACTION PLAN 2025

JOHOR BAHRU

Vibrant World Class Cosmopolis of the South

UTM UNIVERSITI TEKNOLOGI MALAYSIA

ISKANDAR MALAYSIA

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Universiti Teknologi Malaysia
Majlis Bandaraya Johor Bahru
Iskandar Regional Development Authority
Kyoto University
Okayama University
National Institute for Environmental Studies

Low Carbon Society Action Plan for Johor Bahru 2025: Vibrant World Class Cosmopolis of the South

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FOREWORD

Y.A. B Dato' Seri Mohamed Khaled Nordin

Menteri Besar of Johor

Co-Chairman of Iskandar Regional Development Authority

The Low Carbon Society Action Plan for Johor Bahru 2025 is a great initiative taken by all five local authorities within the Iskandar Malaysia economic region. The local authorities are Majlis Bandaraya Johor Bahru (MBJB), Majlis Perbandaran Johor Bahru Tengah (MPJBT), Majlis Perbandaran Pasir Gudang (MPPG), Majlis Perbandaran Kulai (MPKu) and Majlis Daerah Pontian (MDP).

These local authorities are among the first few in Malaysia to take address climate change issues to meet world community demands for concrete action in global environment conservation. I am confident that these plans will ensure the wellbeing and sustainable growth of Iskandar Malaysia.

In the State of Johor and Iskandar Malaysia, we understand that astute and careful management of the environment and natural resources is key to pursuing sustainable green growth and ensuring a resilient development. This sets the context within which all other factors from land use proposals and development to social engineering, service provision and economic growth substantial, supported by solid scientific research and strong buy-in from the various stakeholders.

Therefore, the implementation must be done through collaboration with the local communities,m whose knowledge and intimate experiences of their environment are crucial for a well-planned economic region. This will enhance the value proposition of such developments, without sacrifing the future.

I would like to commend all parties involved, especially the local authorities for taking up this challenge and making Johor a better living environment for all.

FOREWORD

Y.Bhg Tuan Haji A. Rahim Bin Haji Nin

Datuk Bandar Majlis Bandaraya Johor Bahru

Being the local authority that oversees development of the southern international gateway into Malaysia, Johor Bahru City Council (MBJB) aims at promoting rapid economic growth, societal well-being and development, as well as environmental protection and management in Johor Bahru in a holistic manner, and the Low Carbon Society initiative is one of the various mechanisms that have been deployed to achieve these objectives.

We learned the idea of low carbon society through the *Low Carbon Society Blueprint for Iskandar Malaysia 2025* prepared by Universiti Teknologi Malaysia (UTM) and Iskandar Regional Development Authority (IRDA), with support from the Japanese government and research institutions. The Blueprint gives us a clear view to an innovative approach and concrete framework for achieving sustainable development in Johor Bahru. We are pleased to be one of the local authorities in Iskandar Malaysia that are on the path to realising low carbon society, enhancing inclusiveness by emphasising community centric development and promoting green growth for greater prosperity while at the same time reducing our GHG emissions. This *Low Carbon Society Action Plan for Johor Bahru 2025*, with its 12 Actions and 248 programmes, will be implemented in a timely and proactive manner, with MBJB taking on the leading role.

We wish to thank UTM and Japanese researchers from Kyoto University, the National Institute for Environmental Studies (NIES) and Okayama University; and funders of the project, the Japan International Cooperation Agency (JICA) and Japan Science and Technology Agency (JST), for their invaluable research efforts, diligence, support and commitment to the sustainable, low carbon growth of Johor Bahru. This is a major contribution towards the realisation of MBJB's vision of making Johor Bahru a *Vibrant World Class Cosmopolis of the South*.

PREFACE

Ho Chin Siong
Project Manager
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Kyoto University

Malaysia is experiencing rapid urbanization and transformation. The government is aiming to become a high income nation that is both inclusive and sustainable by 2020. One of the major strategic thrusts of Eleventh Malaysia Plan 2016 – 2020 is stressing on the green growth for better wellbeing and quality of life. It is important to develop low carbon, vibrant and liveable communities in our major economic growth corridors that adopt climate resilient growth strategies. The formulation of a Low Carbon Action Plan for the cities of metropolis is one of the approaches to empower local authorities to implement climate resilient growth strategies to reduce emissions of greenhouse gases (GHGs) at local level.

This action plan is a complementary document that builds upon the Low Carbon Society Blueprint for Iskandar Malaysia 2025 with the focus on Johor Bahru region specifically. Apart of emphasizing on low carbon development, this action plan is align with the vision of Johor Bahru – Vibrant World-class Cosmopolis of the South. This report is the outcome of the strong partnership with Johor Bahru City Council (MBJB) and Iskandar Regional Development Authority (IRDA) to outline realistic implementation program by involving diverse stakeholders through focus group discussion.

This action plan is a continuous effort of research outputs of our SATREPS (Science and Technology Research Partnership for Sustainable Development) project on the Development of Low Carbon Society for Asian Region sponsored by Japan International Cooperation Agency (JICA) and Japan Science and Technology Agency (JST). The main research institutes involved in this collaboration work are Universiti Teknologi Malaysia (UTM), Kyoto University, National Institute for Environmental Studies (NIES), and Okayama University.

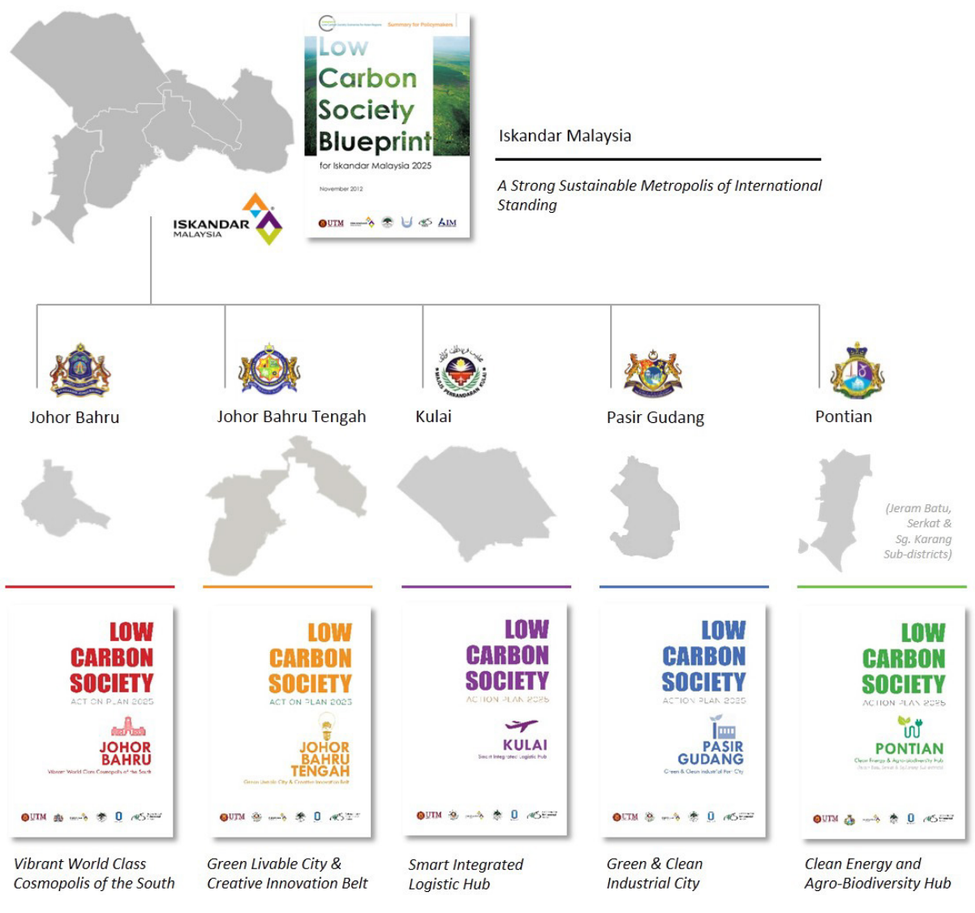
CONTENTS

INTRODUCTION

The *Low Carbon Society Blueprint for Iskandar Malaysia 2025* (LCSBP-IM2025), officially launched by the Prime Minister of Malaysia and adopted by the Iskandar Regional Development Authority (IRDA) in 2012, outlines a total of 281 implementation programs which are projected to reduce Iskandar Malaysia's carbon emission intensity by 58% in 2025 compared to 2005 levels. Several strategic programs outlined in the LCSBP-IM2025 have since been implemented. To accelerate the realisation of low carbon society (LCS) in Iskandar Malaysia (IM), which covers four local authority (LA) jurisdictions and part of a fifth LA jurisdiction, a set of five LCS Action Plans are formulated, one for each of the five LA jurisdictions (see figure below). This document presents the LCS Action Plan for the Johor Bahru City Council (Majlis Bandaraya Johor Bahru, MBJB).

These LA-level LCS Action Plans are crucial to ensure effective implementation of the LCSBP-IM2025 as each LCS Action Plan recognises and responds to the distinctive economic, social and environmental characteristics, as well as strengths, potentials and issues unique to each LA. By adopting their respective LCS Action Plan, the LAs are in effect adopting LCS policies and programs within the framework of the LCSBP-IM2025 that are appropriate to their socioeconomic and environmental contexts. To that end, three rounds of focus group discussions (FGDs) have been conducted for each LA prior to, during and after the preparation of the LA's Draft LCS Action Plan between March and October 2015. Through the FGD sessions, LA officials provided direct feedback and comments on the proposed LCS programs in terms of their priority, suitability and feasibility for implementation (see Appendix: Method of Project Evaluation).

This LCS Action Plan 2025 for Johor Bahru aims at facilitating LCS development for the Johor Bahru Municipal area to become a "Vibrant World Class Cosmopolis of the South". It recommends specific local level LCS programs and provides implementation guidance to policymakers of MBJB by identifying the level of importance, timeline and implementation agencies for each program. For consistency and ease of reference, LCS programs in this LCS Action Plan are structured following the 12 LCS Actions in the LCSBP-IM2025. For technical details of each LCS program, readers are referred to the Low Carbon Society Blueprint for Iskandar Malaysia 2025 – Full Report (UTM-LCAR, 2013).



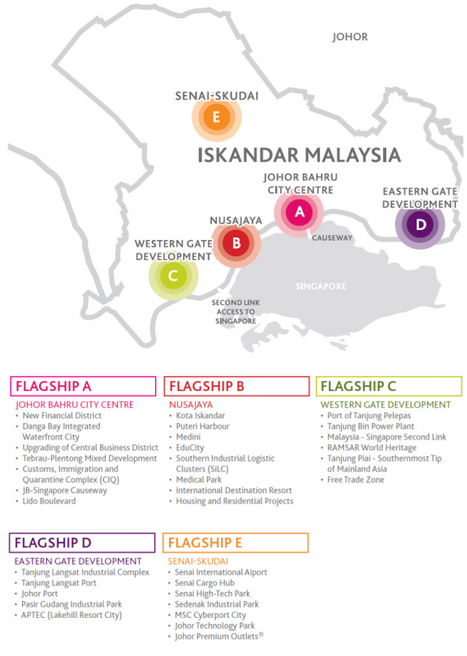
LOW CARBON ISKANDAR MALAYSIA 2025

Iskandar Malaysia (IM) is a visionary economic region in Johor that was established in 2005 as one of the catalyst development corridors to spur growth of the Malaysian economy. Covering an area of 221,634 hectares (2,216.3 km²), IM is the largest single development project ever to be undertaken in the Southeast Asia region. Strategically located at the southernmost tip of Mainland Asia to tap on a vast market of about 0.8 billion people within a 6-hour flight radius, IM is set to become an integrated global node that synergises with growth of the global City-state of Singapore and Indonesia. To that end, it has been projected that population in IM will more than double from 1.35 million in 2005 to over 2.83 million by 2025, supported by a stable 7-8% annual GDP growth that is primarily driven by services and manufacturing. Towards strengthening the existing economic clusters and diversifying growth, five Flagship Zones have been earmarked as key growth poles for development in Iskandar Malaysia.

In line with IM's vision to be "A strong sustainable metropolis of international standing" and Malaysia's voluntary commitment to reducing the country's carbon emission intensity by 40% by year 2020 (based on 2005 levels), it is vital that the targeted strong growth is achieved while keeping IM's carbon emission at bay. This calls for the LCSBP-IM2025 to nurture a healthy, knowledgeable and globally competitive society that subscribes to low carbon living while at the same time develop a total urban-regional environment that enables rapid economic growth but reduces growth's energy demand and carbon emission intensity. It is a holistic and integrated approach that pulls together measures under green economy, green community and green environment to decouple rapid growth and development from carbon emission in IM. The LCSBP-IM2025 covers wide ranging aspects which include urban planning, transportation, industry, building, energy efficiency, renewable energy, lifestyle change, education and awareness, governance, forest conservation, waste management and air and environmental quality.

The Iskandar Malaysia LCS development is a pilot research project of the project of Development of Low Carbon Society Scenarios for Asian Regions initiated under the auspices of Science and Technology Research Partnership for Sustainable Development (SATREPS). The project aims at showcasing best practices in LCS for Asian Regions and will therefore benefit not only IM and Malaysia, but also the Asian Regions. It is a hands-on project where researchers and government officials of Asian Countries work together in implementing research outputs within the cities or regions involved, leading to the eventual establishment of an Asian Low Carbon Society network.

Iskandar Malaysia's strategic location in Asia.
(Source: Iskandar Regional Development Authority)

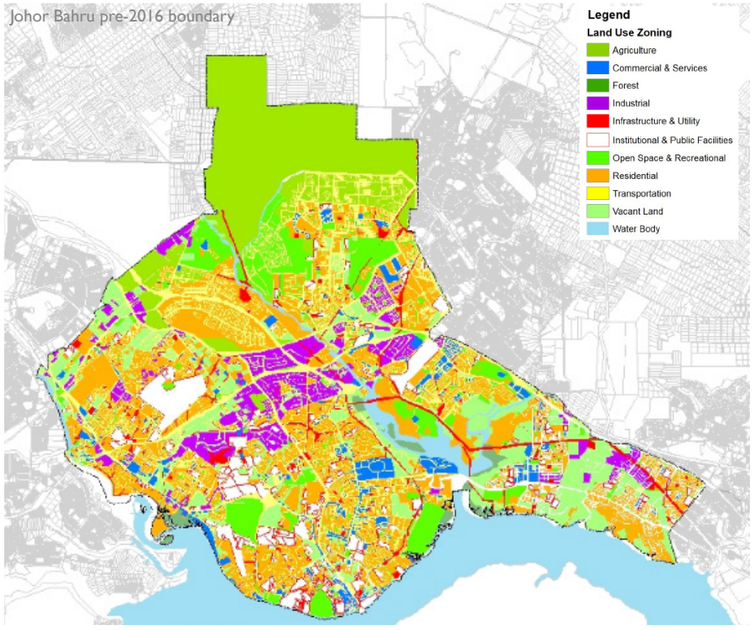


Iskandar Malaysia's five Flagship Zones

LOW CARBON SOCIETY JOHOR BAHRU 2025

Johor Bahru or formerly known as Tanjung Puteri and Iskandar Puteri is situated at the southern part of Iskandar Malaysia. It has been conferred as the City Status in 1994. It is capital of the state of Johor as well as Malaysia's second largest conurbation, after Kuala Lumpur. As Johor Bahru develop rapidly, it has high residential, commercial, industry and leisure value to local and non-locals.

Population in Johor Bahru is expected to increase from 541,508 (2010) to 1,197,000 (2025) (2.21 times compared to 2010). Number of household in Johor Bahru region will increase from 135,716 (2010) to 324,935 (2025).The household size in Johor Bahru is expected to shrink from 3.99 (2010) to 3.68 (2025). Population in Johor Bahru is expected to increase from 541,508 (2010) to 1,197,000 (2025) (2.21 times compared to 2010). Number of household in Johor Bahru region will increase from 135,716 (2010) to 324,935 (2025).



Vibrant World Class Cosmopolis of the South

It is envisioned that by 2025, Johor Bahru will be a vibrant, world-class cosmopolis of the southern region. Strategic economic activities in Johor Bahru include financial services, commerce and retail, arts and culture, hospitality, urban tourism, plastic manufacturing, electrical and electronics (E&E) and metal products.

KEY FEATURES OF JOHOR BAHRU

The Sultan Ibrahim Building is among the evidence of Johor Bahru rich history. The buildings are significant as they stood witness to many historical events including Japanese invasion.

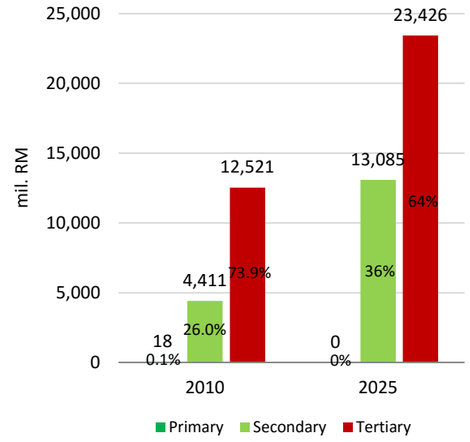
Johor Bahru City Centre became the main shopping attraction for tourists. It is also the centre of financial services, commerce and retail, arts and culture, hospitality and urban tourism.

The Johor-Singapore Causeway is a crucial link between the City of Johor Bahru and Woodlands in Singapore. The causeway records an average daily traffic of over 222,000. Apart from serving as a primary road and rail link, it also carries the water supply pipeline to Singapore.

Danga Bay is set to be a premier waterfront city in Malaysia. It offers a lot of retails outlets and leisure activities that are suitable for all ages and considered as the biggest recreation park in Johor Bahru.

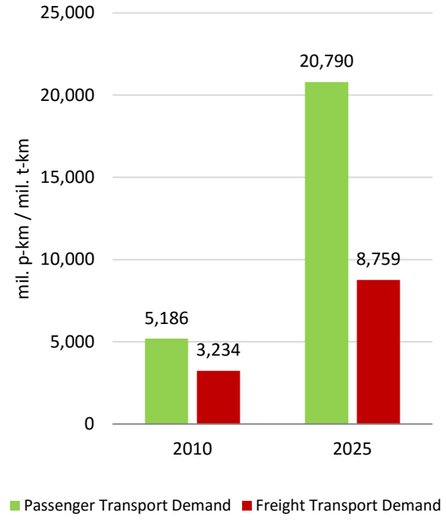
Economic Structure

Gross Domestic Product (GDP) of the Johor Bahru area in 2025 is expected to be RM 36,511 mil. (2.15 times of the performance in 2010). The share of future primary industry sector in Johor Bahru will be null (2025). Secondary industry sector's share is expected to increase from 26% (2010) to 36% (2025). The tertiary industry sector will remain as the key economic sector of the Johor Bahru (from 74% in 2010 to 64% in 2025).

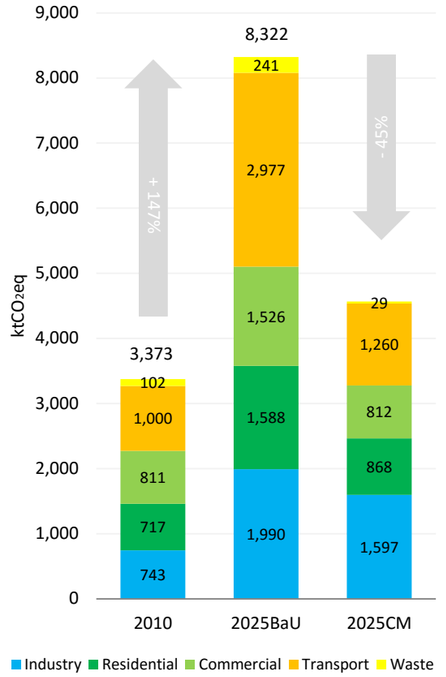


Transportation Structure

Passenger transport demand in Johor Bahru area will increase from 5,186 million passenger-kilometres (2010) to 20,790 million passenger-kilometres (2025). Freight transport demand will increase from 3,234 million tonne-kilometres (2010) to 8,759 million tonne-kilometres (2025).



Greenhouse Gas (GHG) Emissions



The figure above shows the total of carbon emission of Johor Bahru according to the sectors in 2010 (base year), 2025BaU (Business as Usual) and 2025CM (Counter Measures). The total GHG emission of Johor Bahru region in year 2010 is about 3,373 $ktCO_2eq$, the value expectedly will increase 147 % to 8,322 $ktCO_2eq$ in year 2025 if no mitigation measures are taken. However, the current GHG scenario could be improve if counter measures are introduced. An expected reduction of 45% (-3,756 $ktCO_2eq$) could be achieved as compared to 2025BaU.

Specifically the carbon emission from the waste sector can be reduced up to 88% (-212 $ktCO_2eq$), while the reduction for the transport sector is 58% (-1,717 $ktCO_2eq$), commercial sector 47% (-714 $ktCO_2eq$) follow by residential sector 45% (-720 $ktCO_2eq$) and industry sector by 20% (-393 $ktCO_2eq$).

Unit	2010	2025 BaU	2025CM	2025BaU/ 2010	2025CM/ 2010	2025CM/ 2025BaU
Final energy demand (ktoe)	751	2,025	1,234	2.70	1.64	0.61
GHG emissions ($ktCO_2eq$)	3,373	8,322	4,566	2.47	1.35	0.55
Per capita CO_2 emissions (tCO_2eq)	6.2	7.0	3.8	1.13	0.61	0.54
GHG intensity ($ktCO_2eq$ / mil.RM)	0.20	0.23	0.13	1.15	0.63	0.55

Low Carbon Society Johor Bahru 2025
VIBRANT WORLD-CLASS COSMOPOLIS OF THE SOUTH

Integrated Green Transportation

Integrated Public Transportation

1. Route network expansion planning (improve network coverage and connectivity)
2. Increase bus frequency, improve punctuality and reliability
3. Real time arrival information
4. Public transport reimaging
5. Flat rate tickets and central area free shuttle services
6. Web-based journey planner
7. Route network planning
8. Connectivity & integration with existing public transport modes
9. Integrated ticketing system (across all platforms)
10. Public transport interchanges as destinations & urban activity nodes
11. 'Park and ride' facilities in suburban transit nodes

Diffusion of Low Carbon Vehicles

1. Government agencies to use hybrid vehicles/ electric vehicles
2. Tax reduction for hybrid vehicle purchase
3. Gradual phasing out for diesel engine buses
4. Subsidy for purchase of hybrid buses

Enhancing Traffic Flow Conditions and Performance

1. Intelligent Transportation System (ITS)
2. Enhancing traffic signal performance
3. Enhance the use of Variable Message Sign (VMS)
4. Tidal flow and contra-flow along primary radial routes
5. Increase parking charges

Improve JB—Singapore, JB-KL Connectivity

1. Integrate Singapore MRT (SMRT) system with Iskandar Malaysia Light Rail

Green Freight Transportation

1. Modal shift from road-based to rail-based freight transport
2. Tax incentives for freight operators in acquisition of hybrid freight vehicles

Green Industry

Johor Bahru as Regional Hub for Green Industry

1. Tax exemption for FDI in green industries
2. Working with banks for soft loan with low interest packages for new green industries
3. Expedite approval process for green technology-based FDI
4. Industry-university/research institution research linkages
5. Attract FDI in production of RE (e.g. BIPV, bio-fuel) & EE (e.g. fuel cell) technologies
6. Innovation in green vehicles (hybrid, electric)

Decarbonising Industries

1. Purchase of energy efficient equipment
2. Investment in energy saving managing system
3. Introduce intelligent logistic system (ILS) & low-energy warehousing
4. Tax incentives to industry for EEI in production process
5. Soft loan with low interest rate to promote adoption of green technology in industry
6. Research and planning for establishment of eco-industrial park
7. Establish environmental assessment system including carbon emission for new investment
8. ISO 14000 Series Environmental Management System
9. Establish energy audit system of the industries
10. Monitoring and enforcement of energy saving actions

Green Employment in Existing Industries

1. Progressive requirement for cleaner production & eco-efficiency policies in industries that aim at improving their environmental performance
2. Incentives for industries to set up an environmental & energy performance unit that generates green employment
3. Progressive requirement for Corporate Social Responsibility (CSR) reporting (including energy & environmental performance reporting) by existing industries
4. Create "contact point" personnel in existing industries for environmental analytical & advisory services (e.g. ESCO)

Human Capital Development in Green Industry

1. Joint government-industry intensive training programs
2. Fiscal incentives for industries that offer continuous professional education for employees
3. Set up joint-regional faculties to meet future green technology human capital demand.

Low Carbon Urban Governance

Development Planning for Low Carbon Johor Bahru

1. Set clear carbon intensity reduction targets for JB up to 2025 (minimum 50% based on 2005 emission intensity levels to contribute to the national 40% reduction target announced by the Prime Minister at COP 15)
2. Formulation of achievable & implementable low carbon transition strategies for 2015-2025 and beyond
3. Provide policies to "reward" land development projects that contribute to JB's low carbon visions
4. Coordination of LCS guidelines & standards for MBJB
5. Revise and update existing use classes order to facilitate mixed use development
6. Implementation & enforcement of compact & transit supportive development zoning & design codes (supporting Subactions 9.2, 9.3)

Planning Control Process, Procedures and Mechanism for Materialising LCS in Johor Bahru

1. Re-rationalisation of Planning Permission application, processing & granting procedures
2. Eliminate duplications in currently overly compartmentalised planning approval processes through enhancing the One-stop Centre (OSC) mechanism in MBJB
3. Integrated decision making processes in planning control at State & local levels
4. Expedite approval process for proposed developments that support achievement of JB's LCS visions (e.g. developments proposed around planned public transport nodes; developments that retain existing vegetation; green buildings that contribute to energy efficiency)
5. Requirement for submission of a "low carbon statement" in all Planning Permission applications
6. Imposition of planning conditions on granting of planning permissions that support LCS actions (e.g. mandatory provision of walkways in residential neighbourhoods)

Development of necessary human capital for operationalising and implementing Johor Bahru's Low Carbon Society vision

1. Develop low carbon urban & regional planning retraining curriculum for in-service municipal officials
2. Incorporate low carbon society concepts, philosophy, approaches, measures etc. in municipal human capital development programs
3. Systematically prioritise & organise continuous (re)training of officials

Johor Bahru LCS Monitoring , Reporting and Publication System

1. Ongoing monitoring of energy and carbon emission performance of development and economic activities in JB
2. Transparent and accountable publishing of energy and carbon emission data in multiple formats that are accessible anytime, anywhere

Green Building and Construction

Promote Green Building in New Construction

1. To impose building rating system
2. Plot ratio incentive for platinum rated buildings
3. Pilot/ demonstration & joint venture project for constructing green offices, commercial and residential buildings in Johor Bahru

EEI of Existing Building (retrofitting)

1. Subsidy and/or tax incentives for building owners
2. Apply building rating system

Green Construction

1. All consultants to adopt green design process
2. Encourage production and cost - effective supply chain of green construction materials by industries

Green Building Design and Technology

1. Temperature control at 24°C (air conditioning for government offices)
2. Movement sensors for low occupancy areas
3. Consultants to adopt IBS in their design process
4. Maximise north-south orientation
5. Optimal building depths (9-13m) for natural lighting
6. Maximise natural cross ventilation
7. Integrate green landscaping with building façade
8. Maximise use of day lighting
9. Enhance building durability
10. Maximise space adaptability

Rural Green Buildings

1. Subsidy for conservation of vernacular structures such as tradition timber houses, mosques, schools, community centres, clinics, shops & holiday cottages
2. Promote reinterpretation & adaptation of vernacular construction principles & methods in new buildings

Green Energy System and Renewable Energy

Promotion of Renewable/ Alternative Energy

1. Encouraging of Solar PV as PV roofing, PV farm and PV on public infrastructure
2. Establishing infrastructure for hydrogen supply
3. Producing and promoting utilisation of hydrogen

Establishment of Advanced Energy System

1. Starting pilot project for installation of distributed energy generation system for power generation, district heating and cooling
2. Establishing evaluation methods for selecting candidate place to incorporate distributed energy system
3. Evaluating the impacts of Demand Response technologies on curtailment of peak loads in JB
4. Evaluating the economic impacts of Demand Response technologies on the power supplier and participants in Johor Bahru
5. Conducting Research and Development of power management system with IT technologies for enabling self-healing system features, allowing system transparency within the grid ensuring cyber-security and physical security and allowing system transparency within the grid
6. Promoting the installation of power management system

Provision of Incentives and Subsidies and Derivation of Tariff Rates

1. Evaluating and proposing suitable incentives schemes in the form of tax rebate, Feed-in tariff, capital subsidies and soft loan to promote the installation of RE and alternative energy at household, commercial and industry level.
2. Establishing incentives schemes for acceleration of demand response (load management)
3. Allocating research fund for R&D on green initiatives
4. Evaluating current tariff scheme to propose new tariff scheme, i.e., on and off-peak tariff scheme for household

Low Carbon Lifestyle

Awareness through Education

1. Freely available green education catalogue in shopping centres
2. Awareness program s for community
3. School clubs for LCS & 3R programs
4. Children eco-life challenge project
5. Interschool 3R project competitions
6. 3R measures at schools
7. LCS measures at schools
8. Collaboration with relevant government agencies & NGOs
9. Students to collect reusable & recyclable wastes from home & neighbourhood

Smart Working Style

1. 'Work-from-home' pilot project for government agencies
2. Promote private SOHO development in JB
3. Encourage teleworking / telecommuting among private sectors employees
4. Promote adoption of flexi working hours in suitable sectors

Promote Energy Efficiency

1. Set up Eco Point system in local stores
2. Promote 'Cool Biz' concept
3. Promote the engagement of Energy Saving Advisors (Environmental Concierge)
4. Real time energy monitoring system for low carbon lifestyle
5. Subsidies for energy efficiency appliance in residential

Promote "Smart Travel Choices"

1."Burn more calories, burn less carbon" campaign
2. Guideline for eco-driving practices

Stock–taking for Low Carbon Lifestyle

1. Development of environmental report system at community level
2. Establish Eco-life check tool for household

Community Engagement and Consensus Building

Share LCS Information and Gather Opinion through Stakeholder Engagement

1. Maintain updated list of stakeholders
2. Invite all key stakeholders to JB development plan processes
3. Brain storming on LCS actions in JB with experts' knowledge & local knowledge
4. Disclose/ ongoing feedbacks & comments on LCS actions
5. Feedback and comments during LCS workshops and FGDs
6. Feedback and comments through website

Public Information on LCS progress

1. LCS project updates
2. LCS events announcements
3. Web-based newsletters
4. Distribution of printed newsletter (printed on recycled paper)
5. Dissemination of progress updates/ events announcement via billboards, banners and mass media (newspaper, radio, television)
6. LCS mobile showroom / exhibition (hybrid vehicle) periodic visit to neighborhood
7. JB LCS info-kiosks in shopping centres
8. JB LCS info-kiosks in community centres (multi-purpose hall, places of worship)

Developing Model Low Carbon Communities

1. Build consensus with related authorities
2. Produce action plans & road maps (through FGD)
3. Formation of implementation committee
4. Continuous monitoring of implementation

Green Ambassadors/ Champions

1. On going monitoring of neighbourhood, company, organisation green initiatives
2. Annual green neighborhood, company, organisation competitions
3. Appoint community level leadership
4. Human resource development for community leaders
5. Green ambassadors in school (students)
6. Champions in school (school management team)

Walkable, Safe and Livable City Design

Designing Walkable City Centres and Neighborhoods

1. Street tree planting for shades
2. Appropriate Street furniture
3. Continuous covered pedestrian walkways
4. Apply universal and inclusive design concepts
5. Create permeable street layouts (maximum street block dimensions of 70m-90m)
6. Identify gaps/ disconnections in existing street network
7. Identify potential new pedestrian connections
8. Create continuous active street frontages
9. Provide safe walking routes to schools

Designing the Cyclist-friendly City

1. Provide dedicated, shaded cycle tracks along major roads
2. Priority signals for bicycles at major junctions
3. Provide sufficient & secure bicycle parking facilities
4. Provide safe cycling routes to schools
5. Promote bicycle rental services

Designing the Safe City (from crime)

1. Installing CCTVs at strategic locations
2. Increase residents' natural surveillance
3. Identify & eliminate blind spots & gap spaces
4. Community patrolling cum recreation
5. GIS database on crime occurrences
6. Set up community police beats at strategic locations
7. Increase police patrolling in neighborhoods
8. Community cycling patrol with police

Designing Civilised & Livable Streets through Traffic Calming

1. Enforcing 30km/h zones
2. Installing speed humps
3. Carriageway deflection (chicanes & chokers)
4. Reduce junction turning radii
5. Home zones
6. Gateway design into traffic calmed areas
7. Community landscaping program
8. Carriageway narrowing
9. Pavement widening
10. Kerb extension at junctions
11. Humped pedestrian crossings

Smart Urban Growth

Promote Polycentric Growth Pattern in Johor Bahru

1. Identify & reinforce functions of existing urban centres as polycentric nodes
2. Expand public transport service coverage (new development area within UGB)
3. Coordination of spatial growth strategies across administrative boundaries of local authorities

Promote Compact Urban Development

1. Setting spatial growth limit of JB & enforcing UGB
2. Encourage infill development within existing built up areas (on brownfield & greyfield sites)
3. Preserve urban fringe primary agricultural areas
4.City centre & inner city area repopulation
5. Mixed residential development (including affordable homes)
6. Promote locally self-sufficient land use mix in distinct urban neighbourhoods
7. Design high quality public realms that encourage higher density urban living

Promote Transit Supportive Land Use Planning

1. Identify existing & potential public transport / transit nodes
2. Integrate pedestrian network with transit nodes
3. Orientate and provide direct walking routes from homes to transit stops
4. Permit higher densities & plot ratios within 800m of public transport nodes
5. Incentive to developers in reduced parking requirement

Develop the 'Smart Digital City'

1. All built up areas in Johor Bahru to be gradually covered as WiFi hotspots
2. Develop an Johor Bahru "People's Information System" (PIS) that integrates various electronic applications towards smart living, smart working, smart learning, smart travelling etc.

Green and Blue Infrastructure

Conservation of Mangrove Forests

1. Gazette all mangrove areas as protected forests
2. Strict enforcement against illegal mangrove clearing
3. Ongoing mangrove species audit
4. Corporate sectors adoption of mangrove regeneration projects
5. Involving students and schools in mangrove trees planting

Promote Urban Forests (urban recreation and green lungs)

1. Identify the species and location of trees to be planted.
2. Involving students and schools in forest tree planting
3. Identify potential plots for urban parks (unused government land)
4. Introduce endemic forest species in new urban parks
5. Create linear urban parks along river & waterway reserves
6. Strengthening existing planning policy to increase green areas
7. Immediate replanting for cut down areas
8. Public awareness for importance of reforestation
9. One resident one tree program
10. Tree planting at government/ corporate events
11. Government subsidy for tree saplings

New Development to Retain Existing Vegetation

1. Encourage reporting of illegal tree felling
2. Carry out municipal tree surveys for existing green areas in JB

Sustainable Waste Management

Sustainable Municipal Solid Waste Management

1. Smart consumption (buy in bulk, refill &concentrate local product)
2. Choose durable item and reusable item.
3. Restrict of using non-recyclable packaging.
4. Encourage culture of sharing, borrowing, or renting instead of buying.
5. Choose online digital services paperless service.
6. Buy product from recycled materials.
7. 'Pay as you throw' system by 2015
8. Scheduled waste collection for bulky waste
9. Composting at home.
10. Decentralised composting plant.
11. Establishment of material recycling facilities (MRF).
12. Recycling of E-waste.
13. Separate waste collection at source.
14. Effective use of transfer station.
15. Optimization of waste collection routes
16. Selection of appropriate size of collection vehicles
17. Use of collection vehicle driven by bio-diesel fuel (BDF) or Natural Gas Vehicle (NGV)

Sustainable Industrial Waste Management

1. Encourage cleaner production initiative
2. Introduce Industrial symbiosis for waste reusing system
3. Waste to fuel and production of BDF

Sustainable Sewage Sludge Management

1. Improved wastewater treatment by Anaerobic digestion
2. Sewage sludge recycling as construction material
3. Sewage sludge recycling through composting

Sustainable Construction and Demolition Waste Management

1. Reuse and Recycling of construction and demolition waste

Clean Air Environment

Clean Air Quality

1. Quantitatively evaluate the reduction of pollutant emission for each LCS CM
2. Evaluate /predict the improvement of local air quality by model simulation
3. Visualisation of co-benefit of LCS CM in the industrial sector
4. Formulation of guidelines on good technology in the industrial sector
5. Implement a tax incentives to new technologies for improving air quality
6. Improve air quality monitoring network
7. Encourage consumers to purchase low emission vehicles
8. Implement tax incentives on purchase of low emission vehicles
9. Increase investments in public transportation
10. Improve roadside air quality monitoring
11. Install the appropriate removal device when using biomass as fuel

Improve Johor Bahru Air Quality

1. Increase number of API reading stations across Johor Bahru
2. Conduct continuous regional API monitoring & publishing of real-time API readings
3. Lobby for ministerial level imposition of tougher penalties on slash & burn activities in the region

01 INTEGRATED GREEN TRANSPORTATION

Strong economic development and population growth of Johor Bahru lead to higher passenger and freight transportation demand. In order to mitigate the carbon emission level of the projected increase transportation demand, development of an integrated transportation system in Johor Bahru is highly essential. This calls for five (5) strategies of: (1) integrated public transportation; (2) diffusion of low carbon vehicles; (3) enhancing traffic flow conditions and performance (4) improve JB—Singapore, JB-KL connectivity; and (5) green freight transportation. Under these strategies, 23 potential programs are listed for the implementation of integrated green transportation.

The diagram in the next page shows the list of key projects in and targeted

Source of image:Tri Nuraini

Key projects	2015	2020	2025	Potential Actors
Integrated Public Transportation				
1. Route network expansion planning (improve network coverage and connectivity)				MBJB,SPAD, Enterprises,PPAJ
2. Increase bus frequency, improve punctuality and reliability				MBJB,SPAD, Enterprises,PPAJ
3. Public transport reimaging				MBJB,SPAD, Enterprises,PPAJ
4. Flat rate tickets and central area free shuttle services				MBJB,SPAD, Enterprises,PPAJ
5. Connectivity & integration with existing public transport modes				MBJB,SPAD, Enterprises,PPAJ
6. Public transport interchanges as destinations & urban activity nodes				MBJB,SPAD, Enterprises,PPAJ
7. Web-based journey planner				MBJB,SPAD, Enterprises,PPAJ
8. Route network planning				MBJB,SPAD, Enterprises,PPAJ
9. Real time arrival information				MBJB,SPAD, Enterprises,PPAJ
10. Integrated ticketing system (across all platforms)				MBJB,SPAD, Enterprises,PPAJ
11. 'Park and ride' facilities in suburban transit nodes				MBJB,SPAD, Enterprises,PPAJ
Diffusion of Low Carbon Vehicles				
1. Tax reduction for hybrid vehicle purchase				MBJB,SPAD
2. Government agencies to use hybrid vehicles/ electric vehicles				MBJB,SPAD
3. Subsidy for purchase of hybrid buses				MBJB,SPAD
4. Gradual phasing out for diesel engine buses				MBJB,SPAD
Enhancing Traffic Flow Conditions and Performance				
1. Intelligent Transportation System (ITS)				MBJB,SPAD
2. Enhancing traffic signal performance				MBJB,SPAD
3. Enhance the use of Variable Message Sign (VMS)				MBJB,SPAD
4. Tidal flow and contra-flow along primary radial routes				MBJB,SPAD
5. Increase parking charges				MBJB,SPAD
Improve JB—Singapore, JB-KL Connectivity				
1. Integrate Singapore MRT (SMRT) system with Iskandar Malaysia Light Rail				SEDA,KeTTHa, GreenTech,MBJB
Green Freight Transportation				
1. Modal shift from road-based to rail-based freight transport				MBJB,SPAD
2. Tax incentives for freight operators in acquisition of hybrid freight vehicles				MBJB,SPAD

Importance level

High Medium Low

02 GREEN INDUSTRY

Industry is one the activities that contribute to the highest GHG emission in Johor Bahru. It is important for ensuring the industry sector to be environment friendly for a sustainable future of Johor Bahru. In order to promote green industry in Johor Bahru, there are four (4) major strategies. There are (1) Johor Bahru as regional hub for green industry; (2) decarbonising industries; (3) green employment in existing industries and (4) human capital development in green industry. A total of 23 potential projects have been identified for Johor Bahru green industry development. Implementation of the programmes under these strategies is expected to begin from year 2015.

Diagram on the next page shows the list of key projects for Johor Bahru green industry and the target year for implementation.

Source of image: Sunicetint

Key projects	2015	2020	2025	Potential Actors
Johor Bahru as Regional Hub for Green Industry				
1. Industry-university/research institution research linkages				MBJB,KeTTHa,MIDA
2. Attract FDI in production of RE (e.g. BIPV, bio-fuel) & EE (e.g. fuel cell) technologies				MBJB,Ke TTHa,MIDA
3. Expedite approval process for green technology-based FDI				MBJB,KeTTHa,MIDA, PTD,PTG
4. Tax exemption for FDI in green industries				MBJB,KeTTHa,MIDA
5. Working with banks for soft loan with low interest packages for new green industries				MBJB,KeTTHa,MIDA
6. Innovation in green vehicles (hybrid, electric)				MBJB,KeTTHa,MIDA
Decarbonising Industries				
1. Purchase of energy efficient equipment				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
2. ISO 14000 Series Environmental Management System				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
3. Establish energy audit system of the industries				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
4. Investment in energy saving managing system				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
5. Soft loan with low interest rate to promote adoption of green technology in industry				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
6. Research and planning for establishment of eco-industrial park				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
7. Introduce intelligent logistic system (ILS) & low-energy warehousing				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
8. Tax incentives to industry for EEI in production process				MBJB,KeTTHa,Green Tech,DOE-GIVC, PTD SIRIM, MATRADE
9. Establish environmental assessment system including carbon emission for new investment				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
10. Monitoring and enforcement of energy saving actions				MBJB,KeTTHa,Green Tech,DOE-GIVC, SIRIM, MATRADE
Green Employment in Existing Industries				
1. Progressive requirement for Corporate Social Responsibility (CSR) reporting (including energy & environmental performance reporting) by existing industries				SEDA,KeTTHa, GreenTech,MBJB, Citizen
2. Create "contact point" personnel in existing industries for environmental analytical & advisory services (e.g. ESCO)				SEDA,KeTTHa, GreenTech,MBJB, Citizen
3. Incentives for industries to set up an environmental & energy performance unit that generates green employment				SEDA,KeTTHa, GreenTech,MBJB, Citizen
4. Progressive requirement for cleaner production & eco-efficiency policies in industries that aim at improving their environmental performance				SEDA,KeTTHa, GreenTech,MBJB, Citizen
Human Capital Development in Green Industry				
1. Joint government-industry intensive training programs				SEDA,KeTTHa, GreenTech,MBJB
2. Fiscal incentives for industries that offer continuous professional education for employees				SEDA,KeTTHa, GreenTech,MBJB
3. Set up joint-regional faculties to meet future green technology human capital demand				SEDA,KeTTHa, GreenTech,MBJB

Importance level

High Medium Low

03 LOW CARBON URBAN GOVERNANCE

At the local level where decisions about urban form and structure are made, low carbon urban governance is indispensable. Low carbon urban governance measures and programs are essential to the effective implementation of vital CO_2 emission reduction measures and programs related to integrated green transportation; green building and construction; walkable, safe and livable city design; smart urban growth; and green and blue infrastructure.

Development Planning for Low Carbon Johor Bahru

Development planning plays an indispensable another word please role in guiding development on the ground and shaping the urban future. Once low carbon targets and policies are in place in the development plant, all developments in Johor Bahru will statutorily need to comply with the plans in order to obtain planning permission as well as other development approvals. This will contribute to ensuring Johor Bahru's continuous growth while meeting the carbon reduction targets.

Planning Control Process, Procedures and Mechanism for Materialising LCS in Johor Bahru

Department must looks into carbon reduction as an overarching element for development approval.

Development of necessary human capital for operationalising and implementing Johor Bahru's Low Carbon Society vision

Officers in local authority must implement the Federal and State policies and regulations. Hence, it is important for officers in the planning departments in local level to have sufficient knowledge, appreciation and technical knowhow about low carbon society.

Johor Bahru LCS Monitoring, Reporting and Publication System

Ongoing monitoring of the progression towards LCS targets.

Source of image : MBJB

Key projects	2015	2020	2025	Potential Actors
Development Planning for Low Carbon Johor Bahru				
1. Set clear carbon intensity reduction targets for JB up to 2025 (minimum 50% based on 2005 emission intensity levels to contribute to the national 40% reduction target announced by the Prime Minister at COP 15)				MBJB,JPBD Johor
2. Formulation of achievable & implementable low carbon transition strategies for 2015-2025 and beyond				MBJB,JPBD Johor
3. Revise and update existing use classes order to facilitate mixed use development				MBJB,JPBD Johor
4. Implementation & enforcement of compact & transit supportive development zoning & design codes (supporting Subactions 9.2, 9.3)				MBJB,JPBD Johor
5. Provide policies to "reward" land development projects that contribute to JB's low carbon visions				MBJB,JPBD Johor
6. Coordination of LCS guidelines & standards for MBJB				MBJB,JPBD Johor
Planning Control Process, Procedures and Mechanism for Materialising LCS in Johor Bahru				
1. Re-rationalisation of Planning Permission application, processing & granting procedures				MBJB,JPBD Johor
2. Integrated decision making processes in planning control at State & local levels				MBJB,JPBD Johor
3. Eliminate duplications in currently overly compartmentalised planning approval processes through enhancing the One-Stop Centre (OSC) mechanism in MBJB				MBJB,JPBD Johor
4. Expedite approval process for proposed developments that support achievement of JB's LCS visions (e.g. developments proposed around planned public transport nodes; developments that retain existing vegetation; green buildings that contribute to energy efficiency)				MBJB,JPBD Johor
5. Requirement for submission of a "low carbon statement" in all Planning Permission applications				MBJB,JPBD Johor
6. Imposition of planning conditions on granting of planning permissions that support LCS actions (e.g. mandatory provision of walkways in residential neighbourhoods)				MBJB,JPBD Johor
Development of necessary human capital for operationalising and implementing Johor Bahru's Low Carbon Society vision				
1. Develop low carbon urban & regional planning retraining curriculum for in-service municipal officials				MBJB,JPBD Johor,UTM
2. Incorporate low carbon society concepts, philosophy, approaches, measures etc. in municipal human capital development programs				MBJB,JPBD Johor,UTM
3. Systematically prioritise & organise continuous (re)training of officials				MBJB,JPBD Johor,UTM
Johor Bahru LCS Monitoring , Reporting and Publication System				
1. Ongoing monitoring of energy and carbon emission performance of development and economic activities in JB.				MBJB,JPBD Johor
2. Transparent and accountable publishing of energy and carbon emission data in multiple formats that are accessible anytime, anywhere				MBJB,JPBD Johor

Importance level

High Medium Low

04 GREEN BUILDING AND CONSTRUCTION

Johor Bahru, the capital of Johor State witness robust growth in building and construction sector. This action is aims to bring the stakeholders in the building industry towards creating a Low Carbon Society Johor Bahru. Communication amongst the stakeholders, planners, architects, engineers, contractors, developers, manufactures and the local authorities is vital to create common goals. In order to achieve green building and construction in Johor Bahru there are five (5) major strategies: (1) promoting green building in new construction; (2) energy efficiency improvement of existing buildings (retrofitting); (3) green construction in existing industries (4) green building design and technology and (5) rural green buildings. A total of 19 potential projects have been identified for green building and construction of Johor Bahru.

The diagram on the next page shows the list of key projects in and targeted year of implementation.

Source of image :Tessa Houghton

Key projects	2015	2020	2025	Potential Actors
Promote Green Building in New Construction				
1. To impose building rating system				MBJB,GreenTech, Enterprises,LAM,BEM
2. Plot ratio incentive for platinum rated buildings				MBJB,GreenTech, Enterprises,LAM,BEM
3. Pilot/ demonstration & joint venture project for constructing green offices, commercial and residential buildings in Johor Bahru				MBJB,GreenTech, Enterprises,LAM,BEM
EEI of Existing Building (retrofitting)				
1. Subsidy and/or tax incentives for building owners				MBJB,GreenTech, SEDA Enterprises,LAM,CIDB
2. Apply building rating system				MBJB,GreenTech, SEDA,CIDB,LAM, Enterprises
Green Construction				
1. All consultants to adopt green design process				MBJB,GreenTech, Enterprises,CIDB
2. Encourage production and cost-effective supply chain of green construction materials by industries				MBJB,GreenTech, Enterprises,CIDB
Green Building Design and Technology				
1.Temperature control at 24°C (air conditioning for government offices)				MBJB,GreenTech,LAM, BEM,UTM
2. Movement sensors for low occupancy areas				MBJB,GreenTech,LAM, BEM,UTM
3. Maximise north-south orientation				MBJB,GreenTech,LAM, BEM,UTM
4. Optimal building depths (9-13m) for natural lighting				MBJB,GreenTech,LAM, BEM,UTM
5. Maximise natural cross ventilation				MBJB,GreenTech,LAM, BEM,UTM
6. Integrate green landscaping with building façade				MBJB,GreenTech,LAM, BEM,UTM
7. Maximise use of day lighting				MBJB,GreenTech,LAM, BEM,UTM
8. Enhance building durability				MBJB,GreenTech,LAM, BEM,UTM
9. Maximise space adaptability				MBJB,GreenTech,LAM, BEM,UTM
10. Consultants to adopt IBS in their design process				MBJB,GreenTech,LAM, BEM,UTM
Rural Green Buildings				
1.Promote reinterpretation & adaptation of vernacular construction principles & methods in new buildings				MBJB,GreenTech,UTM
2. Subsidy for conservation of vernacular structures such as tradition timber houses, mosques, schools, community centres, clinics, shops & holiday cottages				MBJB,GreenTech,UTM

Importance level

High Medium Low

05 GREEN ENERGY SYSTEM AND RENEWABLE ENERGY

Energy system is an important driver for every development Johor Bahru. Therefore, by encouraging a more efficient and renewable energy system, it helps to reduce the impact of environment. Key strategies and programs in this action which have been identified for implementation are: (1) promotion of renewable and alternative energy; (2) establishment of advanced energy system and (3) provision of incentives and subsidies and derivation of tariff rates. A total of 13 potential projects have been identified for green energy system and renewable energy in Low Carbon Society of Johor Bahru.

Diagram on the next page shows the list of key projects in and targeted year of implementation.

Source of image : Zaki Yamani Zakaria

Key projects	2015	2020	2025	Potential Actors
Promotion of Renewable/Alternative Energy				
1. Encouraging of Solar PV as PV roofing, PV farm and PV on public infrastructure	High	High		KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
2. Establishing infrastructure for hydrogen supply		Low	Low	KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
3. Producing and promoting utilisation of hydrogen			Low	KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
Establishment of Advanced Energy System				
1. Starting pilot project for installation of distributed energy generation system for power generation, district heating and cooling	High	High		KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
2. Establishing evaluation methods for selecting candidate place to Incorporate distributed energy system		Medium	Medium	KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
3. Evaluating the impacts of Demand Response technologies on curtailment of peak loads in JB	High	High		KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
4. Evaluating the economic impacts of Demand Response technologies on the power supplier and participants in Johor Bahru	High	High		KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
5. Conducting Research and Development of power management system with IT technologies for enabling self-healing system features, allowing system transparency within the grid ensuring cyber-security and physical security and allowing system transparency within the grid	High	High		KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
6. Promoting the installation of power management system		Medium	Medium	KeTTHa,GreenTech, SEDA,EC, JPBD Johor, IRDA,MBJB
Provision of Incentives and Subsidies and Derivation of Tariff Rates				
1. Evaluating and proposing suitable incentives schemes in the form of tax rebate, Feed-in tariff, capital subsidies and soft loan to promote the installation of RE and alternative energy at household, commercial and industry level.		Medium	Medium	KeTTHa,GreenTech,SEDA ,MBJB,EC,IRDA
2. Establishing incentives schemes for acceleration of demand response (load management)		Low	Low	KeTTHa,GreenTech,SEDA ,MBJB,EC,IRDA
3. Allocating research fund for R&D on green initiatives	High	High		KeTTHa,GreenTech,SEDA ,MBJB,EC,IRDA
4. Evaluating current tariff scheme to propose new tariff scheme, i.e., on and off-peak tariff scheme for household	High	High		KeTTHa,GreenTech,SEDA ,MBJB,EC,IRDA

Importance level

High Medium Low

06 LOW CARBON LIFESTYLE

Low carbon lifestyle refers to living and working in a sustainable way of life. This means that having a living pattern that reduces carbon foot print per person. Low carbon lifestyle promotes low energy consumption through using appliances with higher energy efficiency and adopting energy saving practices, opting for lower energy transportation mode, and switching to a healthier lifestyle. Low carbon lifestyle calls for involvement from individuals of all levels, communities, government offices, and private businesses to support low carbon development in Johor Bahru giving a minimum impact to the environment without compromising the quality of life.

Awareness Through Education
Raising awareness through education (public education and formal education at schools) needs the involvement of government agencies, non-governmental organisations (NGOs), schools and local communities.

Smart Working Style
It is about finding good practices on more flexible arrangement and alternative working style. By sharing the knowledge on how we can reduce working hours, it can save our energy and lead a good life.

Promote Energy Efficiency
To promote spending less, consuming less and emitting less CO_2 will eventually lead to the society towards a low carbon lifestyle.

Promote "Smart Travel Choices"
Making individuals feel good, smart and socially rewarding travelling on foot, riding bicycle, using public transport, practicing car-pooling as well as eco-driving.

Stock-taking for Low Carbon Lifestyle
Calculating CO_2 emission from residents and communities.

Source of image: pigeonposto

Key projects	2015	2020	2025	Potential Actors
Awareness through Education				
1. Freely available green education catalogue in shopping centres				MBJB,Schools,JPNJ
2. Awareness program s for community				MBJB,Schools,JPNJ
3. School clubs for LCS & 3R programs				MBJB,Schools,JPNJ
4. Children eco-life challenge project				MBJB,Schools,JPNJ
5. Interschool 3R project competitions				MBJB,Schools,JPNJ
6. 3R measures at schools				MBJB,Schools,JPNJ
7. LCS measures at schools				MBJB,Schools,JPNJ
8. Collaboration with relevant government agencies & NGOs				MBJB,Schools,JPNJ
9. Students to collect reusable & recyclable wastes from home & neighbourhood				MBJB,Schools,JPNJ
Smart Working Style				
1. 'Work-from-home' pilot project for government agencies				MBJB,Government agencies,businesses
2. Promote private SOHO development in JB				MBJB,Government agencies,businesses
3. Encourage teleworking / telecommuting among private sectors employees				MBJB,Government agencies,businesses
4. Promote adoption of flexi working hours in suitable sectors				MBJB,Government agencies,businesses
Promote Energy Efficiency				
1. Set up Eco Point system in local stores				MBJB,GreenTech Malaysia,businesses
2. Promote 'Cool Biz' concept				MBJB,GreenTech Malaysia,businesses
3. Promote the engagement of Energy Saving Advisors (Environmental Concierge)				MBJB,GreenTech Malaysia,businesses
4. Real time energy monitoring system for low carbon lifestyle				MBJB,GreenTech Malaysia,businesses
5. Subsidies for energy efficiency appliance in residential				MBJB,GreenTech Malaysia,businesses
Promote "Smart Travel Choices"				
1."Burn more calories, burn less carbon" campaign				MBJB,SPAD, communities,schools
2. Guideline for eco-driving practices				MBJB,SPAD, communities,schools
Stock–taking for Low Carbon Lifestyle				
1. Development of environmental report system at community level				MBJB,communities, households
2. Establish Eco-life check tool for household				MBJB,communities, households

Importance level

High Medium Low

07 COMMUNITY ENGAGEMENT AND CONSENSUS BUILDING

This action engages with the community through consensus building to develop LCS for Johor Bahru. The process of moving towards LCS involves various stakeholders in JB. Strong collaboration among these stakeholders are needed to work as a whole. Community engagement aims at building an on-going and strong partnership among stakeholders or communities in Johor Bahru moving towards LCS. The formation of relationship is for the benefits of the communities involved.

Consensus building is to create mutual agreement to meet the interests of all stakeholders and to raise awareness among all parties who are relevant in creating LCS. It is a process to help mediate conflict between stakeholders, remove misunderstanding, clarify interests and establish common grounds between concerned parties based on negotiations.

Both community engagement and consensus building are long-term process and on-ongoing efforts for related parties, supporting low carbon development in Johor Bahru.

This can be achieved through (1) sharing LCS information and gathering opinion through stakeholder engagement, (2) public information on LCS progress, (3) developing model for low carbon communities and (4) appointing green ambassadors or champions. A total of 24 potential projects have been identified for community engagement and consensus building in Low Carbon Society of Johor Bahru.

Source of image : MBJB

Key projects	2015	2020	2025	Potential Actors
Share LCS Information and Gather Opinion through Stakeholder Engagement				
1. Maintain updated list of stakeholders				MBJB,Government agencies,NGOs, Communities
2. Invite all key stakeholders to JB development plan processes				MBJB,Government agencies,NGOs, Communities
3. Brain storming on LCS actions in JB with experts' knowledge & local knowledge				MBJB,Government agencies,NGOs, Communities
4. Disclose/ ongoing feedbacks & comments on LCS actions				MBJB,Government agencies,NGOs, Communities
5. Feedback and comments during LCS workshops and FGDs				MBJB,Government agencies,NGOs, Communities
6. Feedback and comments through website				MBJB,Government agencies,NGOs, Communities
Public Information on LCS progress				
1. LCS project updates				MBJB,Media,NGOS
2. LCS events announcements				MBJB,Media,NGOS
3. Web-based newsletters				MBJB,Media,NGOS
4. Distribution of printed newsletter (printed on recycled paper)				MBJB,Media,NGOS
5. Dissemination of progress updates/ events announcement via billboards, banners and mass media (newspaper, radio, television)				MBJB,Media,NGOS
6. LCS mobile showroom / exhibition (hybrid vehicle) periodic visit to neighborhood				MBJB,Media,NGOS
7. JB LCS info-kiosks in shopping centres				MBJB,Media,NGOS
8. JB LCS info-kiosks in community centres (multi-purpose hall, places of worship)				MBJB,Media,NGOS
Developing Model Low Carbon Communities				
1. Build consensus with related authorities				MBJB,UTM, Communities
2. Produce action plans & road maps (through FGD)				MBJB,UTM, Communities
3. Formation of implementation committee				MBJB,UTM, Communities
4. Continuous monitoring of implementation				MBJB,UTM, Communities
Green Ambassadors/ Champions				
1. On going monitoring of neighbourhood, company, organisation green initiatives				MBJB,Communities, Govermnet agencies
2. Annual green neighborhood, company, organisation competitions				MBJB,Communities, Govermnet agencies
3. Appoint community level leadership				MBJB,Communities, Govermnet agencies
4. Human resource development for community leaders				MBJB,Communities, Govermnet agencies
5. Green ambassadors in school (students)				MBJB,Communities, Govermnet agencies
6. Champions in school (school management team)				MBJB,Communities, Govermnet agencies

Importance level

High Medium Low

08 WALKABLE, SAFE AND LIVABLE CITY DESIGN

A low carbon city should offer its inhabitants a high quality, healthy and safe living environment while contributing to mitigate CO_2 emission. Designing walkable and livable cities is therefore an important facet of a low carbon society. It is to induce a voluntary modal shift from motorised vehicles to walking and cycling for short to medium distance trips while creating world-class environments to live, work, learn and play in. Walkable and livable city design is crucial to ensure that Johor Bahru to be the choice location to invest, live and work in. The actions and programs to be implemented in Johor Bahru are: (1) designing walkable city centres and neighborhoods; (2) designing the cyclist-friendly city; (3) designing the safe city (from crime) and lastly (4) designing civilised and livable streets through traffic calming.

Source of image : dfran

Key projects	2015	2020	2025	Potential Actors
Designing Walkable City Centres and Neighborhoods				
1. Street tree planting for shades				MBJB,Developers
2. Appropriate Street furniture				MBJB,Developers
3. Continuous covered pedestrian walkways				MBJB,Developers
4. Apply universal and inclusive design concepts				MBJB,Developers
5. Create permeable street layouts (maximum street block dimensions of 70m-90m)				MBJB,Developers
6. Identify gaps/ disconnections in existing street network				MBJB,Developers
7. Identify potential new pedestrian connections				MBJB,Developers
8. Create continuous active street frontages				MBJB,Developers
9. Provide safe walking routes to schools				MBJB,Developers
Designing the Cyclist-friendly City				
1. Provide dedicated, shaded cycle tracks along major roads				MBJB,Developers
2. Priority signals for bicycles at major junctions				MBJB,Developers
3. Provide sufficient & secure bicycle parking facilities				MBJB,Developers
4. Provide safe cycling routes to schools				MBJB,Developers
5. Promote bicycle rental services				MBJB,Developers
Designing the Safe City (from crime)				
1. Installing CCTVs at strategic locations				MBJB,Police,IRDA
2. Increase residents' natural surveillance				MBJB,Police,IRDA
3. Identify & eliminate blind spots & gap spaces				MBJB,Police,IRDA,
4. Community patrolling cum recreation				MBJB,Police,IRDA
5. GIS database on crime occurrences				MBJB,Police,IRDA,
6. Set up community police beats at strategic locations				MBJB,Police,IRDA
7. Increase police patrolling in neighborhoods				MBJB,Police,IRDA
8. Community cycling patrol with police				MBJB,Police,IRDA
Designing Civilised & Livable Streets through Traffic Calming				
1. Enforcing 30km/h zones				MBJB,JKR
2. Installing speed humps				MBJB,JKR
3. Carriageway deflection (chicanes & chokers)				MBJB,JKR
4. Reduce junction turning radii				MBJB,JKR
5. Home zones				MBJB,JKR
6. Gateway design into traffic calmed areas				MBJB,JKR
7. Community landscaping program				MBJB,JKR
8. Carriageway narrowing				MBJB,JKR
9. Pavement widening				MBJB,JKR
10. Kerb extension at junctions				MBJB,JKR
11. Humped pedestrian crossings				MBJB,JKR

Importance level

High Medium Low

09 SMART URBAN GROWTH

Due to the rapid economic growth and urban development of Johor Bahru its population is expected to double from 541,508 in 2010 to 1,197,000 in 2025. Supporting and managing rapid growth while keeping energy demand and GHG emissions at bay becomes a critical issue. Smart urban growth strategies could reduce average number of trips, trip distance and vehicle mile travel (VMT) and at the same time increase the use of public transport by providing a spatial framework for sustainable growth.

Smart urban growth strategies consist of: (1) promoting a polycentric growth pattern; (2) promoting compact urban development; (3) promoting transit supportive land use planning; and (4) developing the 'Smart Digital City'. Under these strategies, 17 potential programs have been indentified for the implementation of smart urban growth.

Diagram on the next page shows the list of key projects in and targeted year of implementation.

Source of image : Campus Malaysia

Key projects	2015	2020	2025	Potential Actors
Promote Polycentric Growth Pattern in Johor Bahru				
1. Identify & reinforce functions of existing urban centres as polycentric nodes				JPBD Johor,MBJB
2. Expand public transport service coverage (new development area within UGB)				JPBD Johor,MBJB,PPAJ
3. Coordination of spatial growth strategies across administrative boundaries of local authorities				JPBD Johor,MBJB
Promote Compact Urban Development				
1. Setting spatial growth limit of JB & enforcing UGB				MBJB,JPBD Johor, Developers
2. Encourage infill development within existing built up areas (on brownfield & greyfield sites)				MBJB,JPBD Johor, Developers
3. Preserve urban fringe primary agricultural areas				MBJB,JPBD Johor, Developers
4. City centre & inner city area repopulation				MBJB,JPBD Johor, Developers
5. Mixed residential development (including affordable homes)				MBJB,JPBD Johor, Developers,SUKJ
6. Promote locally self-sufficient land use mix in distinct urban neighbourhoods				MBJB,JPBD Johor, Developers
7. Design high quality public realms that encourage higher density urban living				MBJB,JPBD Johor, Developers
Promote Transit Supportive Land Use Planning				
1. Identify existing & potential public transport / transit nodes				JPBD Johor,MBJB,PPAJ
2. Integrate pedestrian network with transit nodes				MBJB,JPBD Johor,Developers
3. Orientate and provide direct walking routes from homes to transit stops				MBJB,JPBD Johor,Developers
4. Permit higher densities & plot ratios within 800m of public transport nodes				JPBD Johor,MBJB
5. Incentive to developers in reduced parking requirement				JPBD Johor,MBJB
Develop the 'Smart Digital City'				
1. All built up areas in Johor Bahru to be gradually covered as WiFi hotspots				MBJB,MSC,Cyberport Johor,MCMC, Businessess
2. Develop an Johor Bahru "People's Information System" (PIS) that integrates various electronic applications towards smart living, smart working, smart learning, smart travelling etc.				MBJB,MSC,Cyberport Johor,MCMC, Businessess

Importance level

High Medium Low

10 GREEN AND BLUE INFRASTRUCTURE

Green and blue infrastructure includes the natural environmental components and green and blue spaces that lie within and between our cities and towns. It helps to sequestrate and store excessive CO_2 from the atmosphere, moderating high temperature in the cities (large trees, lakes and water courses) and reducing GHG emissions by conserving energy used for space cooling. Johor Bahru has less of green infrastructure exist compared to other municipality that should be managed wisely in term of safeguarding, creating, enhancing, maintaining and promoting. There are three (3) major strategies in promotion for green and blue infrastructure of Johor Bahru: (1) conservation of mangrove forests; (2) promote urban forests (urban recreational and green lungs) and (3) new development to retains existing vegetation. A total of 18 potential projects have been identified for green and blue infrastructure of Johor Bahru.

Source of image: Asahjaya

Key projects	2015	2020	2025	Potential Actors
Conservation of Mangrove Forests				
1. Gazette all mangrove areas as protected forests				PTNJ,MBJB,WWF,NRE, JPNJ
2. Strict enforcement against illegal mangrove clearing				PTNJ,MBJB,WWF,NRE, JPNJ
3. Ongoing mangrove species audit				PTNJ,MBJB,WWF,NRE, JPNJ
4. Corporate sectors adoption of mangrove regeneration projects				PTNJ,MBJB,WWF,NRE, JPNJ
5. Involving students and schools in mangrove trees planting				PTNJ,MBJB,WWF,NRE, JPNJ
Promote Urban Forests (urban recreation and green lungs)				
1. Identify the species and location of trees to be planted.				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
2. Involving students and schools in forest tree planting				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
3. Identify potential plots for urban parks (unused government land)				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
4. Introduce endemic forest species in new urban parks				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
5. Create linear urban parks along river & waterway reserves				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
6. Strengthening existing planning policy to increase green areas				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
7. Immediate replanting for cut down areas				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
8. Public awareness for importance of reforestation				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
9.One resident one tree program				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
10.Tree planting at government/ corporate events				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
11.Government subsidy for tree saplings				PTNJ,MBJB,WWF,NRE, JPNJ,Citizen,JLN,FRIM
New Development to Retain Existing Vegetation				
1. Encourage reporting of illegal tree felling				MBJB,NRE,JPBD Johor,Developer,PTD
2. Carry out municipal tree surveys for existing green areas in JB				MBJB,NRE,JPBD Johor,Developer

Importance level

High Medium Low

11 SUSTAINABLE WASTE MANAGEMENT

Sustainable waste management can reduce waste generation and enhance material and energy recovery of solid waste in order to fulfil the challenge of building both low carbon and material recycling society. Four (4) sub-actions and 24 programs were considered in Johor Bahru context which are: (1) sustainable municipal solid waste management; (2) sustainable industrial waste management; (3) sustainable sewage sludge management and (4) sustainable construction and demolition. Diagram on the next page shows the sub-actions, programs, implementation year and potential actors for the programs.

Source of image: MBJB

Key projects	2015	2020	2025	Potential Actors
Sustainable Municipal Solid Waste Management				
1. Smart consumption (buy in bulk, refill &concentrate local product)				MBJB,JPSPN,SWCorp, SWM
2. Choose durable item and reusable item.				MBJB,JPSPN,SWCorp, SWM
3. Restrict of using non-recyclable packaging.				MBJB,JPSPN,SWCorp, SWM
4. Encourage culture of sharing, borrowing, or renting instead of buying.				MBJB,JPSPN,SWCorp, SWM
5. Choose online digital services paperless service.				MBJB,JPSPN,SWCorp, SWM
6. Buy product from recycled materials.				MBJB,JPSPN,SWCorp, SWM
7. 'Pay as you throw' system by 2015				MBJB,JPSPN,SWCorp, SWM
8. Scheduled waste collection for bulky waste				MBJB,JPSPN,SWCorp, SWM
9. Composting at home.				MBJB,JPSPN,SWCorp, SWM
10. Decentralised composting plant.				MBJB,JPSPN,SWCorp, SWM
11. Establishment of material recycling facilities (MRF).				MBJB,JPSPN,SWCorp, SWM
12. Recycling of E-waste.				MBJB,JPSPN,SWCorp, SWM
13. Separate waste collection at source.				MBJB,JPSPN,SWCorp, SWM
14. Effective use of transfer station.				MBJB,JPSPN,SWCorp, SWM
15. Optimization of waste collection routes				MBJB,JPSPN,SWCorp, SWM
16. Selection of appropriate size of collection vehicles				MBJB,JPSPN,SWCorp, SWM
17. Use of collection vehicle driven by bio-diesel fuel (BDF) or Natural Gas Vehicle (NGV)				MBJB,JPSPN,SWCorp, SWM
Sustainable Industrial Waste Management				
1. Encourage cleaner production initiative				MBJB,DOE Johor,MIDA
2. Introduce Industrial symbiosis for waste reusing system				MBJB,DOE Johor,MIDA
3. Waste to fuel and production of BDF				MBJB,DOE Johor,MIDA
Sustainable Sewage Sludge Management				
1. Improved wastewater treatment by anaerobic digestion				MBJB,IWK, JPSPN, DOE Johor,SPAN
2. Sewage sludge recycling as construction material				MBJB,IWK, JPSPN, DOE Johor,SPAN
3. Sewage sludge recycling through composting				MBJB,IWK, JPSPN, DOE Johor,SPAN
Sustainable Construction and Demolition Waste Management				
1. Reuse and recycling of construction and demolition waste				MBJB,CIDB

Importance level

High Medium Low

12 CLEAN AIR ENVIRONMENT

Air pollution is one of the issue in Johor Bahru, mainly caused by the emissions of particular matter (PM), SO_2, NO_x, CO and VOC from vehicles in transportation, industrial activity, and trans-boundary pollution by biomass burning, which is known as "Haze". There are many good strategies to improve local air quality under the Low Carbon Society policies.

Clean Air Quality

In order to introduce a suitable countermeasure that is effective for the emission reduction of both greenhouse gases (GHGs) and air pollutants, it is necessary to reflect the quantitative evaluation of co-benefit of each countermeasure during the policymaking process. To quantify the co-benefit of each LCS CMs, it is required the detail spatial and temporal emission estimation by using Geographical Information System (GIS). Then, air pollution model and exposure model are used to evaluate the impact to human health and eco-system. Then, the effect of air pollution abatement potential of each LCS CMs have to be visualised simply and intelligibly.

Improve Johor Bahru Air Quality

Continuous monitoring and realtime publishing of Air Pollutant Index (API) information is important for achieving good air quality of Johor Bahru. Air quality monitoring stations are necessary for Johor Bahru air quality management to attain the national ambient air quality standards (NAAQS). Air pollution monitoring network brings the possibility of controlling of emissions from large point sources, such as major roads and industrial areas. The main contents are establishment of comprehensive air quality management system, installation of air quality monitoring station and pollutant emission control device in the industry sector. Green passenger, freight transportation, cross-border cooperation is also considered.

Source of image : Stockhut

Key projects	2015	2020	2025	Potential Actors
Clean Air Quality				
1. Quantitatively evaluate the reduction of pollutant emission for each LCS CM				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
2. Evaluate /predict the improvement of local air quality by model simulation				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
3. Visualisation of co-benefit of LCS CM in the industrial sector				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
4. Formulation of guidelines on good technology in the industrial sector				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
5. Implement a tax incentives to new technologies for improving air quality				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
6. Improve air quality monitoring network				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
7. Encourage consumers to purchase low emission vehicles				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
8. Implement tax incentives on purchase of low emission vehicles				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
9. Increase investments in public transportation				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
10. Improve roadside air quality monitoring				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
11. Install the appropriate removal device when using biomass as fuel				MBJB,UTM,SPAD, JPJ,DOE Johor,Industries
Improve Johor Bahru Air Quality				
1. Increase number of API reading stations across Johor Bahru				MBJB,NRE,MOFA,UTM
2. Conduct continuous regional API monitoring & publishing of real-time API readings				MBJB,NRE,MOFA,UTM
3. Lobby for ministerial level imposition of tougher penalties on slash & burn activities in the region				MBJB,NRE,MOFA,UTM

Importance level

High Medium Low

ACRONYMS AND ABBREVIATIONS

3R	Reduce, Reuse and Recycle
API	Air Pollutant Index
BaU	Business as Usual
BEM	Board of Engineers Malaysia
BIPV	Building-Integrated Photovoltaic
CCTV	Closed-circuit television
CIDB	Construction Industry Development Board
CM	Counter Measures
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COP	Conference of the Parties
DOE Johor	Department of Environment Johor
DOE-GIVC	Department of Environment – Green Industry Virtual Centre
EC	Energy Commission
EE	Energy Efficiency
EEI	Energy Efficiency Improvement
ESCO	Energy Service Company
E-waste	Electronic waste
FDI	Foreign direct investment
FGD	Focus group discussion
FRIM	Forest Research Institute of Malaysia
GIS	Geographic Information System
GreenTech	Malaysian Green Technology Corporation
IBS	Industrialised Building System
IRDA	Iskandar Regional Development Authority
ISO	International Organisation for Standardisation
IWK	Indah Water Konsortium
JB	Johor Bahru
JKR	Public Works Department
JLN	National Landscape Department
JPBD Johor	Town and Country Planning Department of Johor
JPBDSM	Federal Department of Town and Country Planning Peninsular Malaysia
JPJ	Road Transport Department
JPNJ	Johor Education Department
JPSPN	National Solid Waste Management Department
KeTTHa	Ministry of Energy, Green Technology and Water
KPKT	Ministry of Urban Wellbeing, Housing and Local Government
LAM	Board of Architects Malaysia
LCS	Low Carbon Society
MATRADE	Malaysia External Trade Development Corporation
MBJB	Johor Bahru City Council
MCMC	Malaysian Communications and Multimedia Commission
MIDA	Malaysia Investment Development Authority
MOFA	Ministry of Foreign Affairs
MSC	Multimedia Super Corridor
NGOs	Non-governmental organisations
NOx	Nitrogen Oxide
NRE	Ministry of Natural Resources and Environment
PPAJ	Johor Public Transport Corporation
PTD	District Office
PTG	Land and Mines Office
PTNJ	Johor National Parks Corporation
PV	Photovoltaic
R&D	Research and Development
RE	Renewable Energy
SEDA	Sustainable Energy Development Authority
SIRIM	Standards and Industrial Research Institute of Malaysia
SO_2	Sulfur Dioxide
SPAD	Land Public Transport Commission
SPAN	National Water Services Commision
SUKJ	State Secretary of Johor
SWCorp	Solid Waste Management and Public Cleansing Corporation Johor
SWM	Southern Waste Management
UGB	Urban growth boundary
UTM	Universiti Teknologi Malaysia
VOC	Volatile organic compound
WiFi	Wire free internet
WWF	World Wide Fund for Nature

UNIT	
km^2	kilometre squared
$ktCO_2eq$	kilotonne carbon dioxide equivalent
ktoe	kilotonne oil equivalent
mil. p-km	million passenger-kilometres
mil. RM	million Ringgit Malaysia
mil. t-km	million tonne-kilometres
tCO_2eq	tonne carbon dioxide equivalent

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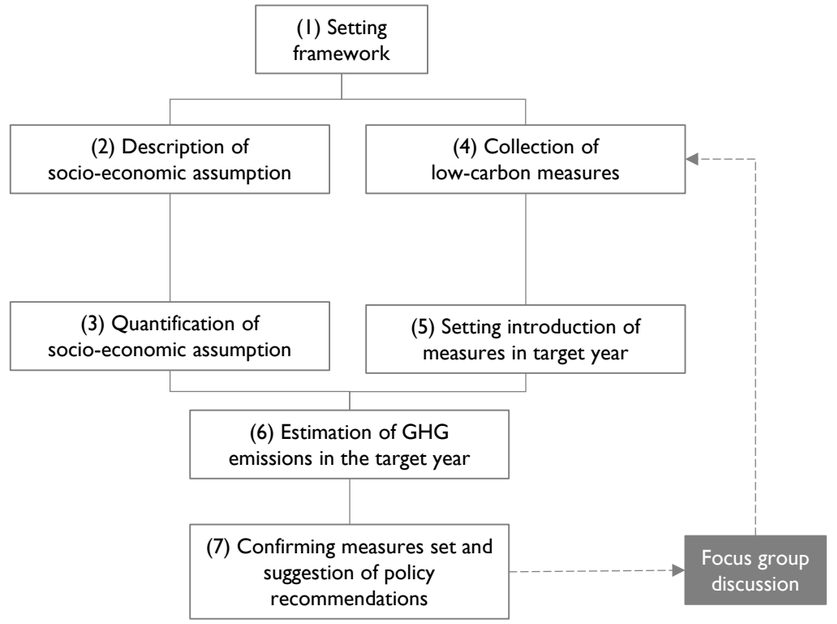
APPENDIX

Method of Low Carbon Society Scenarios Development

The method is based on the idea of "back casting" to create a local low carbon society scenario.



Procedure to create a local LCS scenario

(1) Setting framework
Aspects included in a LCS scenario framework are: the target area, base year, environmental targets and a number of scenarios. The target year is compared with base year. In Iskandar Malaysia, the target year for GHG emission reduction is 2025.

(2) Description of socioeconomic assumptions
Qualitative future image of lifestyle, economy, industry, land use and other related aspects should be written (based on assumptions from IM's CDP and other key officiwal documents).

(3) Quantification of socioeconomic assumptions
Values of exogenous variables and parameters are set in order to estimate the future image of (2). Then, using these values, ExSS calculates key socio-economic indices of the target year.

(4) Collection of low carbon measures
Counter measures which are thought to be available in the target year are collected. Meanwhile, technical data that are required to estimate their effects on GHG emission reduction are gathered.

(5) Setting introduction of measures in target year
Suitable framework and level of introduction of low carbon measures are recommended considering technological parameters related to energy efficiency that have been defined.

(6) Estimation of GHG emissions in target year
GHG emissions are calculated based on target year socioeconomic indices (for BaU scenario) and level of introduction of low carbon measures (for low carbon scenario). GHG emission results and proposed LCS policy package are shared with stakeholders in FGD for evaluation and feedback.

(7) Confirming measures set and suggestion of policy recommendations
Suitable LCS measures and policy package are confirmed and proposed. Suitability of the policy should be in accordance with specific socioeconomic and environmental contexts of the local authority area in order to yield an optimal reduction potential of measures.

Method of Project Evaluation through FGD

Three rounds of Focus Group Discussions (FGD) have been conducted between March and October 2015 corresponding to stages prior to, during and after the preparation of the Draft Low Carbon Society Action Plan 2025 each local authority (LA). The purpose of the first round of FGD has been to present and explain to LA officials in detail LCS programs in the LCSBP-IM2025 and get buy-in, support and preliminary ideas from the officials for the preparation of the LCS Action Plan 2025 for their LA area. Based on the outcome of the first FGD, the Draft Low Carbon Society Action Plan 2025 was prepared outlining specific LCS programs proposed for implementation in the LA area and their projected GHG reduction potentials. The second round of FGD has been aimed at gathering direct feedback, views and comments from LA officials on the priority, suitability and feasibility of every LCS project to be proposed in the Draft LCS Action Plan (see below). Based on the second FGD, the Final Draft LCS Action Plan was prepared with a refined list of LCS programs and their respective implementation timeline and agencies, and updated GHG reduction results. The Final Draft LCS Action Plan was sent to the LAs for final review and evaluation in the third FGD, which led to this current Low Carbon Society Action Plan 2025 document.

During the second FGD, every potential project for the development of LCS for the LA is evaluated based on three (3) main criteria: i) priority, ii) suitability and iii) feasibility.

Priority
measures the extent to which proposed LCS Projects are in line with institutional policy directions and prioritisation as may have been outlined in the LA's official policy documents (e.g. the Johor Bahru and Kulai District Local Plan, the LA's strategic plan and other sectorial policies). It is usually closely associated with the project's contribution towards the LA's current policy direction. Participants are encouraged consider purely the dimension of priority for implementation (not suitability and feasibility, see below) with respect to their LA's vision and policy direction.

Suitability
measures the appropriateness of the proposed projects to fit into the LA's local geographic setting and political-cultural context. This may be characterised by the acceptability and readiness of the local community, businesses/enterprises and industries in the LA area (e.g. Car Free Day Program; New Development to Retain Existing Vegetation). Here, participants are to only consider the suitability dimension for implementation (not priority and feasibility) of the proposed projects with respect to the LA's geographic and socio-cultural contexts.

Feasibility
measures the "implementability" of the proposed projects with respect to the LA's financial capacity and human capital, as well as local technology and material resource availability to develop, manage and operate the projects (e.g. Citywide Photovoltaic and LED Street/Public Lighting; Centralised Utility Provider in Industrial Parks). Participants are to evaluate each proposed project based only on its feasibility for implementation (not priority and suitability).

LA officials have been requested to assign a rating to each proposed LCS project for the above three criteria according to three (3) levels, which are Low (L), Medium (M) and High (H) (see example in table below).

Programs	PRIORITY Institutional Vision / Policy Direction			SUITABILITY Local Geography Setting / Socio-cultural			FEASIBILITY Finance / Human Capital / Local Technology / Material		
	L	M	H	L	M	H	L	M	H
Route network expansion planning			✓			✓		✓	
Increase bus frequency, improve punctuality and reliability			✓			✓		✓	
Real time arrival information			✓			✓		✓	
Public transport reimaging			✓			✓		✓	
Flat rate tickets and central area free shuttle services			✓			✓	✓		
Web-based journey planner			✓			✓			✓

The resultant rating levels for each proposed LCS program according to the criteria of priority, suitability and feasibility are then analysed using the 'weighted scoring method', involving: i) the allocation of weights to each of the evaluation criteria to reflect their relative importance and ii) the allocation of scores to each rating level to reflect each LCS project's performance in relation to each criterion. The result is a single weighted score for each criterion, which may be summed across each proposed LCS projects being evaluated. The sum weighted score indicates the overall performance of the potential project that combines all three criteria of priority, suitability and feasibility.

1) **Weight the criteria to reflect their relative importance**

The weights of the criteria are decided to reflect group consensus about the relative importance of each of the criteria. Justification for the weights ascribed are recorded to ensure the basis of the weights assigned is fully understood and accepted. In this LCS Action Plan 2025, weights for three (3) criteria are expressed in percentages, which is most common approach and readily comprehended, as follows:

Priority – 40%
Suitability -20%
Feasibility - 40%

Both criteria of priority and feasibility are given highest and same weights because they are considered the most important criteria compared to suitability. All the weights sum to 100.

2) Score the levels to reflect how each option performs against each criterion

The next step is to score each level against each criterion on a suitable scale. The ordinal scale is used in this analysis for simplicity of operation, where a score value of 1, 2 or 3 is assigned correspondingly to a rating level of L, M or H. This can be simply explained via table below:

Criteria	Priority (40%)			Suitability (20%)			Feasibility (40%)		
Level	Low	Medium	High	Low	Medium	High	Low	Medium	High
Score	1	2	3	1	2	3	1	2	3

3) Calculate the weighted scores

This simply involves multiplying each score by the weight of each criterion for every LCS project. The resulted weighted scores are summed to obtain an aggregate weighted score for each potential project (see table below):

Programs	PRIORITY (40%) Institutional Vision / Policy Direction	SUITABILITY (20%) Local Geography Setting / Socio-cultural Context	FEASIBILITY (40%) Finance / Human Capital / Local Technology / Material	Weighted Score
Route network expansion planning	3	3	2	87
Increase bus frequency, improve punctuality and reliability	3	3	2	87
Real time arrival information	3	3	2	87
Public transport reimaging	3	3	2	87
Flat rate tickets and central area free shuttle services	3	3	1	73
Web-based journey planner	3	3	3	100

4) Interpret the results

The results are then interpreted carefully to guide decisions on each LCS project's overall level of importance for implementation, which integrates the project's priority, suitability and feasibility for implementation in the LA area. The results also translate into the implementation timeline of each proposed LCS project.

Weighted scores	0-39	40-79	80-100
Colour			

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