LOW CARBON SOCIETY

ACTION PLAN 2025

JOHOR BAHRU TENGAH

Green Livable City & Creative Innovation Belt

UTM UNIVERSITI TEKNOLOGI MALAYSIA

ISKANDAR MALAYSIA

KYOTO UNIVERSITY FOUNDED 1897 JAPAN

OKAYAMA UNIV.

National Institute for Environmental Studies

LOW CARBON SOCIETY

ACTION PLAN 2025

JOHOR BAHRU TENGAH

Green Livable City & Creative Innovation Belt

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

Low Carbon Society Action Plan for Johor Bahru Tengah 2025: Green Livable City and Creative Innovation Belt

Lead Editors
Ho Chin Siong
Chau Loon Wai
Teh Bor Tsong
Yuzuru Matsuoka
Kei Gomi

Associate Editors
Muhammad Akmal Hakim Hishammuddin
Nadzirah Jausus
Lv Yang
Nur Syazwani Saari
Rohayu Abdullah

This document should be cited as:
Ho, C.S., Chau L.W., Teh B.T., Matsuoka Y., Gomi K., Muhammad Akmal Hakim H., Nadzirah J., Nur Syazwani S., Lv Y. and Rohayu A. (eds.) (2015) Low Carbon Society Action Plan for Johor Bahru Tengah 2025: Green Livable City and Creative Innovation Belt. Johor Bahru: UTM-Low Carbon Asia Research Centre.

Published by UTM-Low Carbon Asia Research Centre
Level 2, Block B12, Faculty of Built Environment, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia.

First published November 2015

Graphic design by Nadzirah Jausus

Printed and bound in Malaysia

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 Plans 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 all other factors from land use proposals and development to social engineering, service provision and economic growth potential must be considered. Every development must be sound and 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, 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 sacrificing 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 Dr. Badrul Hisham bin Kassim

Yang Dipertua Majlis Perbandaran Johor Bahru Tengah

Johor Bahru Tengah Municipal Council (MPJBT) aims at addressing economic growth, societal well-being and development, as well as environmental preservation and management in Johor Bahru Tengah 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 by Iskandar Regional Development Authority (IRDA) in 2012. It opens our eyes on innovative approaches to achieve sustainable development. We are pleased to be one of the local authorities in Iskandar Malaysia to realise low carbon society, enhancing inclusiveness by emphasising community centric development and promote green growth for greater prosperity. This Low Carbon Society Action Plan for Johor Bahru Tengah 2025, with its 12 Actions and over 241 programmes, will be implemented in a timely and proactive manner, with MPJBT performing the leading role.

We wish to thank Universiti Teknologi Malaysia (UTM) and researchers from Kyoto University, the National Institute for Environmental Studies (NIES) and Okayama University; and the funders for the project, namely Japan International Co-operation Agency (JICA) and Japan Science and Technology Agency (JST), for their invaluable research efforts, diligence, support and commitment to the growth of Johor Bahru Tengah. This is a major contribution towards the realisation of MPJBT's vision in making Johor Bahru Tengah a Green Livable City and Creative Innovation Belt.

PREFACE

Ho Chin Siong
Project Manager
Professor
Universiti Teknologi Malaysia

Yuzura Matsuoka
Project Leader
Professor
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 Tengah region specifically. Apart of emphasizing on low carbon development, this action plan is align with the vision of Johor Bahru Tengah - Green Livable City and Creative Innovation Belt. This report is the outcome of the strong partnership with Johor Bahru Tengah Municipal Council (MPJBT) 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

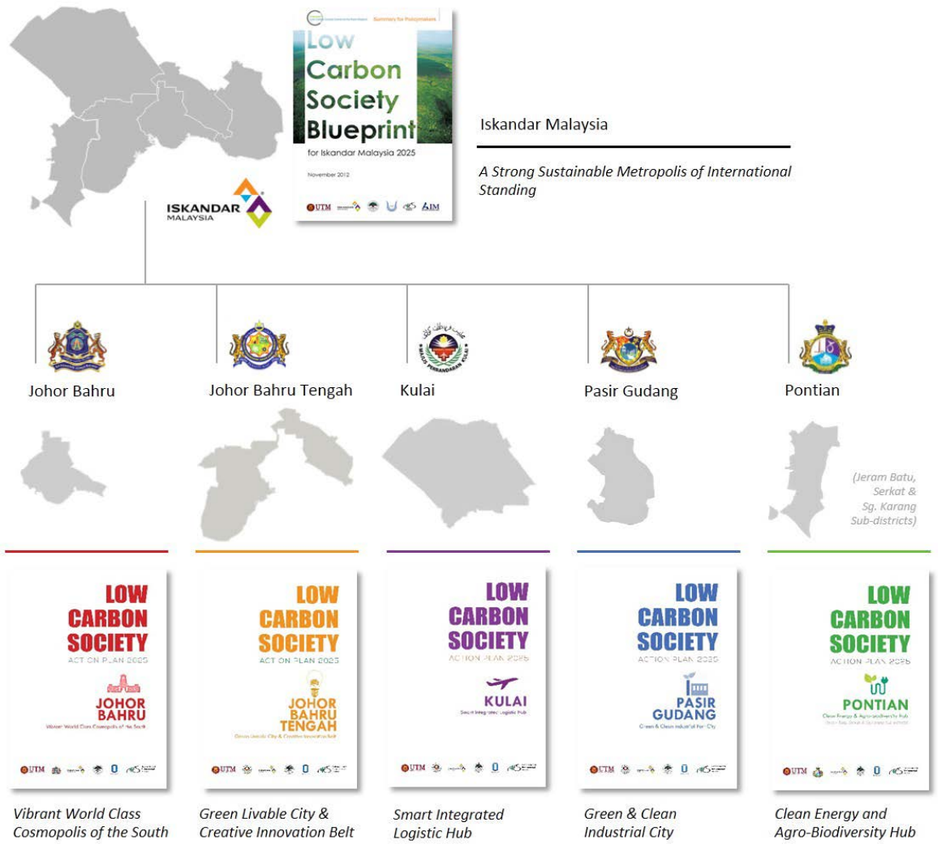
Foreword	i
Preface	iii
Contents	iv
Introduction	1
Low Carbon Society Johor Bahru Tengah 2025	3
Action 1: Integrated Green Transportation	7
Action 2: Green Industry	9
Action 3: Low Carbon Urban Governance	11
Action 4: Green Building and Construction	13
Action 5: Green Energy System and Renewable Energy	15
Action 6: Low Carbon Lifestyle	17
Action 7: Community Engagement and Consensus Building	19
Action 8: Walkable, Safe and Livable City Design	21
Action 9: Smart Urban Growth	23
Action 10: Green and Blue Infrastructure	25
Action 11: Sustainable Waste Management	27
Action 12: Clean Air Environment	29
Acronyms and Abbreviations	31
Research Team Information	32
Appendix	33

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 Tengah Municipal Council (Majlis Perbandaran Johor Bahru Tengah, MPJBT).

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 Tengah aims at facilitating LCS development for Johor Bahru Tengah area to become a "Green Livable City & Creative Innovation Belt". It recommends specific local level LCS programs and provides implementation guidance to policymakers of MPJBT 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 km^2), 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.

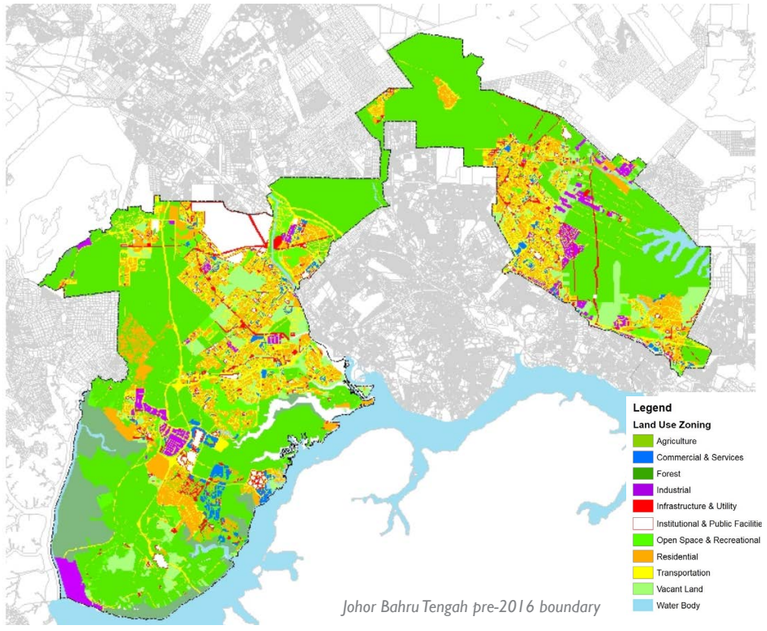
Iskandar Malaysia's strategic location in Asia
(Source: Iskandar Regional Development Authority)

Iskandar Malaysia's five Flagship Zones

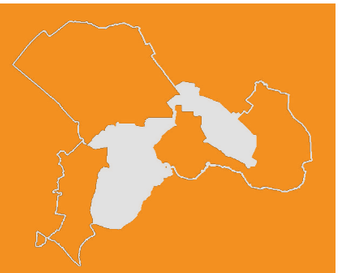
LOW CARBON SOCIETY JOHOR BAHRU TENGAH 2025

Johor Bahru Tengah is one of the five (5) local authorities in Iskandar Malaysia. Geographically, Johor Bahru Tengah is located at the central region and presently houses the largest population in Iskandar Malaysia. It consists of four (4) sub-districts: Pulai, Jelutong, Tanjung Kupang and Tebrau. The key activities of Johor Bahru Tengah are mainly governmental administration hub, research institutions, commerce, retail and entertainment.

Population in Johor Bahru Tengah is expected to increase from 650,381 (2010) to 863,800 (2025) (1.33 times compared to 2010). While the number of household in Johor Bahru Tengah region will increase from 163,797 (2010) to 253,667 (2025). The GDP per capita of Johor Bahru Tengah region is expected to increase from RM 23,083 (2010) to RM 51,583 (2025).



Johor Bahru Tengah pre-2016 boundary



Green Livable City & Creative Innovation Belt

It is envisioned that by 2025, Johor Bahru Tengah will be a clean and prosperous city with vibrant and diverse activities as well as a livable centre for communities to enjoy a better quality of life. The city is expected to host clusters for local and international tertiary education institutions, creative industries, tourisms, entertainment and theme park, SME, seaport activities, warehousing, distribution, medical services and wellness industries.

KEY FEATURES OF JOHOR BAHRU TENGAH

Kota Iskandar is the Johor State and Federal government administration centre. It includes the Johor State Assembly Building, Chief Minister and State Secretary Complex, State and Federal Government Office Complexes and a ceremonial plaza.

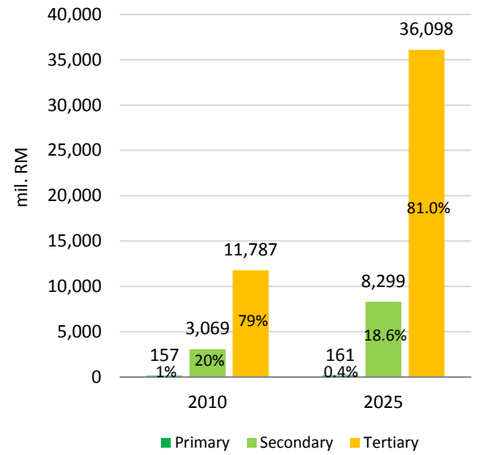
EduCity @ Iskandar is an education hub comprising universities, institutes of higher education, academia-industry action, R&D centre as well as students accommodation, recreational and sports facilities.

Puteri Harbour is an integrated waterfront development. Featuring 10.8km of waterfront properties, this area boasts developments that include canal homes, condominiums, service apartments, resorts, hotels, convention centre, harbor view offices, ferry terminal and 276 Marina berths.

Port of Tanjung Pelepas is Malaysia's most advanced container terminal. It is situated on the eastern side of Pulai River in South-West Johor. Naturally sheltered deep water port, this terminal is located near the Malaysia-Singapore Second Crossing and also equipped with 57 Super Post Panamax cranes.

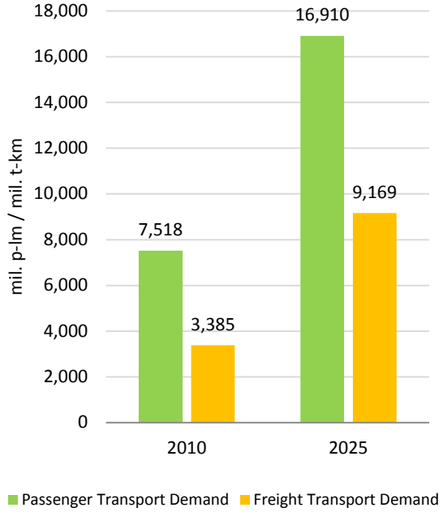
Economic Structure

Gross Domestic Product (GDP) of Johor Bahru Tengah region in 2025 is expected to be RM44,557 mil. In 2025, the share of future primary industry sector in JBT is expected to decrease from 1% (2010) to 0.4% (2025). The share of secondary industry is expected to decrease from 20% (2010) to 19% (2025). The tertiary sector continues to be the main economic driver of Johor Bahru Tengah. The share is increase from 79% (2010) to 81% in 2025.

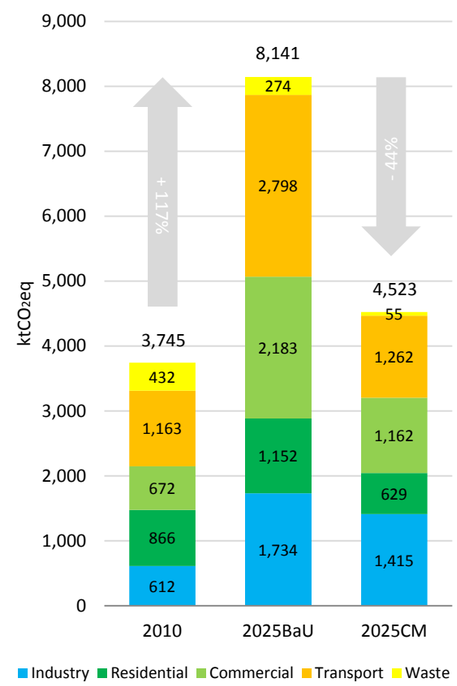


Transportation Structure

Passenger transport demand of Johor Bahru Tengah will increase from 7,518 million passenger-kilometres (2010) to 16,910 million passenger-kilometres (2025). While Freight transport demand will increase from 3,385 million tonne-kilometres (2010) to 9,169 million tonne-kilometres (2025).



Greenhouse Gas (GHG) Emissions



The figure above shows the total of carbon emission of Johor Bahru Tengah region according to the sectors in 2010 (base year), 2025BaU (Business as Usual) and 2025CM (Counter Measures). The total GHG emission of Johor Bahru Tengah region in year 2010 is about 3,745 $ktCO_2eq$, the value expectedly will increase 117% to 8,141 $ktCO_2eq$ in year 2025 if no mitigation measures are taken. However, the scenario could be improved if mitigation measures are introduced. An expected reduction of 44% (-3,618 $ktCO_2eq$) could be achieved as compared to 2025BaU.

Specifically the carbon emission from the waste sector can be reduced up to 80% (-219 $ktCO_2eq$), while the reduction for the transport sector is 55% (-1,536 $ktCO_2eq$), commercial sector 47% (1,021 $ktCO_2eq$) follow by residential sector 45% (-523 $ktCO_2eq$) and industry sector 18% (-319 $ktCO_2eq$).

Unit	2010	2025 BaU	2025 CM	2025BaU/ 2010	2025CM/ 2010	2025CM/ 2025BaU
Final energy Demand (ktoe)	771	1,953	1,220	2.53	1.58	0.62
GHG emissions ($ktCO_2eq$)	3,745	8,141	4,523	2.17	1.21	0.56
Per capita CO_2 emissions (tCO_2eq)	5.8	9.4	5.2	1.62	0.90	0.55
GHG intensity ($ktCO_2eq$ / mil.RM)	0.25	0.18	0.10	0.73	0.41	0.56

Low Carbon Society Johor Bahru Tengah 2025

GREEN LIVABLE CITY & CREATIVE INNOVATION BELT

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. Public transport interchanges as destinations & urban activity nodes
10. 'Park and ride' facilities in suburban transit nodes

Improve JB– Singapore, JB–KL Connectivity

1. Nusajaya as HSRT-SMRT-IMLRT hub

Diffusion of Low Carbon Vehicles

1. Government agencies to use hybrid vehicles/ electric vehicles

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

Green Transportation in Rural Areas

1. Provide hybrid bus services from rural areas to urban areas
2. Subsidise rural area hybrid bus services

Green Freight Transportation

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

Green Industry

JBT as Regional Hub for Green Industry

1.Expedite approval process for green technology-based FDI
2.Attract FDI in production of RE (e.g. BIPV, bio-fuel) & EE (e.g. fuel cell) technologies

Decarbonising Industries

1.Tax incentives to industry for EEI in production process
2.Research and planning for establishment of eco-industrial park
3.Establish environmental assessment system including carbon emission for new investment
4.ISO 14000 Series Environmental Management System
5.Establish energy audit system of the industries
6.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)

Low Carbon Urban Governance

Development Planning for Low Carbon Johor Bahru Tengah

1. Set clear carbon intensity reduction targets for JBT 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 JBT's low carbon visions
4. Coordination of LCS guidelines & standards for MPJBT
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 JBT

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 JBT
3. Integrated decision making processes in planning control at State & local levels
4. Expedite approval process for proposed developments that support achievement of JBT'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 Tengah'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

JBT LCS Monitoring, Reporting and Publication System

1. Ongoing monitoring of energy and carbon emission performance of development and economic activities in JBT
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 JBT

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 facade
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.Research and development of hydrogen technologies
3.Establishing infrastructure for hydrogen supply
4.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 JBT
4.Evaluating the economic impacts of Demand Response technologies on the power supplier and participants in JBT
5.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

Low Carbon Lifestyle

Awareness through Education

1. Freely available green education catalogue in shopping centres
2. Awareness program s for community
3. LCS education across curriculum
4. School clubs for LCS & 3R programs
5. Children eco-life challenge project
6. 3R measures at schools
7. LCS measures at schools
8. Collaboration with relevant government agencies & NGOs

Smart Working Style

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

Promote Energy Efficiency

1. Set up Eco Point system in local stores

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 JBT development plan processes
3. Brain storming on LCS actions in JBT 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. JBTLCS info-kiosks in shopping centres
4.JBT 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 neighbourhood, company, organisation competitions
3. Appoint community level leadership
4. Human resource development for community leaders

Walkable, Safe and Livable City Design

Designing Walkable City Centers 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 Tengah

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 JBT & 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 JBT to be gradually covered as WiFi hotspots
2. Develop an Johor Bahru Tengah "People's Information System" (PIS) that integrates various electronic applications towards smart living, smart working, smart learning, smart travelling etc

Green and Blue Infrastructure

Regional Green Corridor Network

1. Identify potential linking corridors between existing forested areas for future land acquisition
2. Gradually gazette presently ungazetted primary & secondary forests as protected forests

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 Johor Bahru Tengah

Low Carbon Farming in Rural Areas

1.To reduce agricultural CH_4 and N_2O emissions
2.Plant high quality and fast growing crops and supply to urban area (plant and eat locally to reduce import food)
3.Ongoing technical support & training from government

Ecotourism and Rural-cultural Tourism

1.Introduce low carbon rural tourism packages
2.Promote rural low carbon lifestyle as a tourism product
3.Conserve, enhance & link key rural natural resources in JBT

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 Agricultural Waste Management

1. POME to biogas
2. Onsite co-composting
3. Onsite combustion
4. Formulation of biomass into animal feed

Sustainable Industrial Waste Management

1. Encourage cleaner production initiative
2. Select of treatment method with less energy and less material
3. Decentralized scheduled waste treatment plant
4. Smelting of inorganic wastes
5. Introduce industrial symbiosis for waste reusing system
6. 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. Establish a mechanism to authenticate the quality of biofuels
12. Install the appropriate removal device when using biomass as fuel

Improve Regional Air Quality

1. Increase number of API reading stations across JBT
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
4. Joint R&D towards identifying alternative approaches to slash & burn and open burning approaches in the region

01 INTEGRATED GREEN TRANSPORTATION

Strong economic development and population growth sector of Johor Bahru Tengah 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 green transportation system in Johor Bahru Tengah is highly essential. In bussiness as usual scenario of year 2025, carbon emissions from transportation sector is projected to be 2,798 ktCO_2eq. With the introduction of counter measures, the emissions can be lower to 1,262 ktCO_2eq.

In order to achieve the 2025 target of integrated green transportation in Johor Bahru Tengah, it calls for five (5) strategies of: (1) integrated public transportation; (2) diffusion of low carbon vehicles; (3) enhancing traffic flow conditions and performance; (4) green transportation in rural areas and (5) green freight transportation. Under these strategies there are 22 potential programs listed for the implementation of integrated green transportation. The diagram in the next page shows the list of key projects in and targeted year of implementation.

Source of image: PublicTransportSG

Key Projects	2015	2020	2025	Potential Actors
Integrated Public Transportation				
1. Route network expansion planning (improve network coverage and activity)				MPJBT, SPAD, Enterprises, PPAJ
2. Increase bus frequency, improve punctuality and reliability				MPJBT, SPAD, Enterprises, PPAJ
3. Real time arrival information				MPJBT, SPAD, Enterprises, PPAJ
4. Public transport reimaging				MPJBT, SPAD, Enterprises, PPAJ
5. Flat rate tickets and central area free shuttle services				MPJBT, SPAD, Enterprises, PPAJ
6. Web-based journey planner				MPJBT, SPAD, Enterprises, PPAJ
7. Route network planning				MPJBT, SPAD, Enterprises, PPAJ
8. Connectivity & integration with existing public transport modes				MPJBT, SPAD, Enterprises, PPAJ
9. Public transport interchanges as destinations & urban activity nodes				MPJBT, SPAD, Enterprises, PPAJ
10. 'Park and ride' facilities in suburban transit nodes				MPJBT, SPAD, Enterprises, PPAJ
Improve JB-Singapore, JB-KL Connectivity				
1. Nusajaya as HSRT-SMRT-IMLRT hub				MPJBT, SPAD, PPAJ
Diffusion of Low Carbon Vehicles				
1. Government agencies to use hybrid vehicles/ electric vehicles				MPJBT, SPAD, PPAJ
Enhancing Traffic Flow Conditions and Performance				
1. Intelligent Transportation System (ITS)				MPJBT, SPAD, PPAJ
2. Enhancing traffic signal performance				MPJBT, SPAD, PPAJ
3. Enhance the use of Variable Message Sign (VMS)				MPJBT, SPAD, PPAJ
4. Tidal flow and contra-flow along primary radial routes				MPJBT, SPAD, PPAJ
5. Increase parking charges				MPJBT, SPAD, PPAJ
Green Transportation in Rural Areas				MPJBT, SPAD, PPAJ
1. Provide hybrid bus services from rural areas to urban areas				MPJBT, SPAD, PPAJ
2. Subsidies rural area hybrid bus services				MPJBT, SPAD, PPAJ
Green Freight Transportation				MPJBT, SPAD, PPAJ
1. Modal shift from road-based to rail-based freight transport				MPJBT, SPAD, PPAJ
2. Modal shift to ship-freight transport				MPJBT, SPAD, PPAJ
3. Tax incentives for freight operators in acquisition of hybrid freight vehicles				MPJBT, SPAD, PPAJ

Importance level

High Medium Low

02 GREEN INDUSTRY

Industry in JBT contribute as much as 612 ktCO_2eq (16%) of total CO_2 emission in 2010. It is important for ensuring the industry sector to be environment friendly for a sustainable future in Johor Bahru Tengah. In bussiness as usual scenario of year 2025, carbon emissions from industry sector is projected to be 1,734 ktCO_2eq. With the introduction of counter measures, the emissions can be lower to 1,415 ktCO_2eq.

In order to achieve the 2025CM, three (3) major strategies identified are (1) JBT as regional hub for green industry; (2) decarbonising industries and (3) green employment in existing industries. A total of 23 potential projects have been identified for green industry in Low Carbon Society of Johor Bahru Tengah green industry development. Implementation of the programs under these strategies are expected to begin from year 2015. Diagram on the next page shows the list of key projects for Johor Bahru Tengah Green Industry and the target year for implementation.

Source of image: Chong Tkc

Key Projects	2015	2020	2025	Potential Actors
JBT as Regional Hub for Green Industry				
1.Expedite approval process for green technology-based FDI				MPJBT, KeTTHa, UTM, MIDA, PTD, PTG
2. Attract FDI in production of RE (e.g. BIPV, bio-fuel) & EE (e.g. fuel cell) technologies				MPJBT, KeTTHa, UTM, MIDA
Decarbonising Industries				
1.Tax incentives to industry for EEI in production process				MPJBT, KeTTHA, Green Tech, DOE Johor, SIRIM, MATRADE, PTD
2. Research and planning for establishment of eco-industrial park				MPJBT, KeTTHA, GreenTech, DOE Johor, MATRADE
3. Establish environmental assessment system including carbon emission for new investment				MPJBT, KeTTHA, GreenTech, DOE Johor, SIRIM
4. ISO 14000 Series Environmental Management System				MPJBT, KeTTHA, GreenTech, DOE Johor, MATRADE
5. Establish energy audit system of the industries				MPJBT, KeTTHA, GreenTech, DOE Johor, MATRADE
6. Monitoring and enforcement of energy saving actions				MPJBT, KeTTHA, GreenTech, DOE Johor, MATRADE
Green Employment in Existing Industries				
1. Progressive requirement for cleaner production & eco-efficiency policies in industries that aim at improving their environmental performance				SEDA, KeTTHa, GreenTech, MPJBT, Citizen
2. Incentives for industries to set up an environmental & energy performance unit that generates green employment				SEDA, KeTTHa, GreenTech, MPJBT, Citizen
3. Progressive requirement for Corporate Social Responsibility (CSR) reporting (including energy & environmental performance reporting) by existing industries				SEDA, KeTTHa, GreenTech, MPJBT, Citizen
4. Create "contact point" personnel in existing industries for environmental analytical & advisory services (e.g. ESCO)				SEDA, KeTTHa, GreenTech, MPJBT, Citizen

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 JBT

Development planning plays an indispensable 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 Tengah 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 Tengah's continuous growth while meeting the carbon reduction targets.

Planning Control Process, Procedures and Mechanism for Materialising LCS in JBT

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

Development of necessary human capital for operationalising and implementing JBT'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.

JBT LCS Monitoring, Reporting and Publication System

Ongoing monitoring of the progression towards LCS targets.

Source of image : MPJBT

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

Importance level

High Medium Low

04 GREEN BUILDING AND CONSTRUCTION

This action aims to bring the stakeholders in the building industry towards creating a LCS Johor Bahru Tengah. 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 Tengah there are five (5) major strategies. These strategies are (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 in Low Carbon Society of JBT.

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

Source of image : Hartanah Johor Property

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

Importance level

High Medium Low

05 GREEN ENERGY SYSTEM AND RENEWABLE ENERGY

Energy system is a key to drive the development of Johor Bahru Tengah. It is important to establish the energy system in a sustainable manner so that it will create a minimal impact to the environment. In order to achieve the 2025 CM target of green energy system and renewable energy in Johor Bahru Tengah, key strategies and programs in this sector which have been identified for implementation starting 2015 onwards.

The strategies 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 12 potential projects have been identified for green energy system and renewable energy in Low Carbon Society of Johor Bahru Tengah.

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

Source of image : IskandarFactory.my

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				KeTTHa, SEDA, EC
2. Research and development of hydrogen technologies				KeTTHa, SEDA, EC
3. Establishing infrastructure for hydrogen supply				KeTTHa, SEDA, EC
4. Producing and promoting utilisation of hydrogen				KeTTHa, SEDA, EC
Establishment of Advanced Energy System				
1.Starting pilot project for installation of distributed energy generation system for power generation				KeTTHa, GreenTech, EC
2. Establishing evaluation methods for selecting candidate place to incorporate distributed energy system				KeTTHa, GreenTech, SEDA
3. Evaluating the impacts of Demand Response technologies on curtailment of peak loads in Johor Bahru Tengah				KeTTHa, GreenTech, SEDA
4. Evaluating the economic impacts of Demand Response technologies on the power supplier and participants in Johor Bahru Tengah				KeTTHa, GreenTech, SEDA
5. Promoting the installation of power management system				KeTTHa, GreenTech, SEDA
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				KeTTHa, GreenTech, SEDA, MPJBT
2. Establishing incentives schemes for acceleration of demand response (load management)				KeTTHa, GreenTech, SEDA, MPJBT
3. Allocating research fund for R&D on green initiatives				KeTTHa, GreenTech, SEDA, MPJBT

Importance level

High Medium Low

06 LOW CARBON LIFESTYLE

Low carbon life 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 Tengah, 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. The diagram in the next page shows the list of key projects in and targeted year of implementation.

Source of image: MPJBT

Key projects	2015	2020	2025	Potential Actors
Awareness through Education				
1. Freely available green education catalogue in shopping centres				MPJBT, Schools, JPNJ[1], Communities
2. Awareness program s for community				MPJBT, Schools, JPNJ[1], Communities
3. LCS education across curriculum				MPJBT, Schools, JPNJ[1]
4. School clubs for LCS & 3R programs				MPJBT, Schools, JPNJ[1]
5. Children eco-life challenge project				MPJBT, Schools, JPNJ[1]
6. 3R measures at schools				MPJBT, Schools, JPNJ[1]
7. LCS measures at schools				MPJBT, Schools, JPNJ[1]
8. Collaboration with relevant government agencies & NGOs				MPJBT, Schools, JPNJ[1]
Smart Working Style				
1. 'Work-from-home' pilot project for government agencies				MPJBT, Government agencies, businesses
2. Encourage tele-working / telecommuting among private sectors employees				MPJBT, Government agencies, businesses
3. Promote adoption of flexi working hours in suitable sectors				MPJBT, Government agencies, businesses
Promote Energy Efficiency				
1. Set up Eco Point system in local stores				MPJBT, GreenTech, businesses
Promote "Smart Travel Choices"				
1."Burn more calories, burn less carbon" campaign				MPJBT, SPAD, communities, schools
2. Guideline for eco-driving practices				MPJBT, SPAD, communities, schools
Stock–taking for Low Carbon Lifestyle				
1. Development of environmental report system at community level				MPJBT, Communities, households
2. Establish Eco-life check tool for household				MPJBT, 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 Tengah. The process of moving towards LCS involves various stakeholders in JBT, 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 Tengah 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 Tengah.

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.

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

Source of image : MPJBT

Key projects	2015	2020	2025	Potential Actors
Share LCS Information and Gather Opinion through Stakeholder Engagement				
1. Maintain updated list of stakeholders				MPJBT, Government agencies, NGOs, communities
2. Invite all key stakeholders to JBT development plan processes				MPJBT, Government agencies, NGOs, communities
3. Brain storming on LCS actions in JBT with experts' knowledge & local knowledge				MPJBT, Government agencies, NGOs, communities
4. Disclose/ ongoing feedbacks & comments on LCS actions				MPJBT, Government agencies, NGOs, communities
5. Feedback and comments during LCS workshops and FGDs				MPJBT, Government agencies, NGOs, communities
6. Feedback and comments through website				MPJBT, Government agencies, NGOs, communities
Public Information on LCS progress				
1. LCS project updates				MPJBT, Media, NGOS
2. LCS events announcements				MPJBT, Media, NGOS
3. JBT LCS info-kiosks in shopping centres				MPJBT, Media, NGOS
4. JBT LCS info-kiosks in community centres (multi-purpose hall, places of worship)				MPJBT, Media, NGOS
Developing Model Low Carbon Communities				
1. Build consensus with related authorities				MPJBT, UTM, communities
2. Produce action plans & road maps (through FGD)				MPJBT, UTM, communities
3. Formation of implementation committee				MPJBT, UTM, communities
4. Continuous monitoring of implementation				MPJBT, UTM, communities
Green Ambassadors/ Champions				
1. On going monitoring of neighbourhood, company, organisation green initiatives				MPJBT, Communities, government agencies, NGOs, schools
2. Annual green neighbourhood, company, organisation competitions				MPJBT, Communities, government agencies, NGOs, schools
3. Appoint community level leadership				MPJBT, Communities, government agencies, NGOs, schools
4. Human resource development for community leaders				MPJBT, Communities, government agencies, NGOs. schools

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 GHG emissions. 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 Tengah to be the choice location to invest, live and work in. The actions and programs to be implemented in Johor Bahru Tengah are: (1) designing walkable city centres and neighborhoods; (2) designing the cyclist-friendly city; (3) designing the safe city (from crime) and (4) designing civilised and livable streets through traffic calming.

Source of image : Chau Loon Wai

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

Importance level

High Medium Low

09 SMART URBAN GROWTH

Due to the rapid economic growth and development of Johor Bahru Tengah, its population is expected to increase from 650,381 in 2010 to 863,800 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 listed 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 : MPJBT

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

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 Tengah has abundant of green infrastructure exist that should be managed wisely in term of safeguarding, creating, enhancing, maintaining and promoting.

There are six (6) major strategies in promotion for green and blue infrastructure of Johor Bahru Tengah: (1) regional green corridor network; (2) conservation of mangrove forests; (3) promote urban forests (urban recreational and green lungs); (4) new development to retains existing vegetation; (5) low carbon farming in rural areas; and (6) ecotourism and rural cultural tourism. A total 26 potential projects have been identified for green and blue infrastructure in Johor Bahru Tengah.

Source of image: MPJBT

Key projects	2015	2020	2025	Potential Actors
Regional Green Corridor Network				
1. Identify potential linking corridors between existing forested areas for future land acquisition				PTNJ, MPJBT, WWF, JPNJ[2]
2. Gradually gazette presently ungazetted primary & secondary forests as protected forests				PTNJ, MPJBT, WWF, JPNJ[2]
Conservation of Mangrove Forests				
1. Gazette all mangrove areas as protected forests				PTNJ, MPJBT, NRE, JPNJ[2], PTG
2. Strict enforcement against illegal mangrove clearing				PTNJ, MPJBT, WWF
3. Ongoing mangrove species audit				MPJBT, WWF, NRE
4. Corporate sectors adoption of mangrove regeneration projects				PTNJ, MPJBT, JPNJ
5. Involving students and schools in mangrove trees planting				PTNJ, MPJBT, NRE
Promote Urban Forests (urban recreation and green lungs)				
1. Identify the species and location of trees to be planted.				JLN, MPJBT, WWF, NRE, FRIM, Citizen
2. Involving students and schools in forest tree planting				JLN, MPJBT, WWF, NRE, FRIM
3. Identify potential plots for urban parks (unused government land)				JLN, MPJBT, WWF, NRE, FRIM
4. Introduce endemic forest species in new urban parks				JLN, MPJBT, WWF, NRE, Citizen, FRIM
5. Create linear urban parks along river & waterway reserves				JLN, MPJBT, WWF, NRE, Citizen, FRIM
6. Strengthening existing planning policy to increase green areas				JLN, MPJBT, WWF, NRE, FRIM
7. Immediate replanting for cut down areas				JLN, MPJBT, WWF, NRE, FRIM
8. Public awareness for importance of reforestation				JLN, MPJBT, WWF, NRE, Citizen, FRIM
9.One resident one tree program				JLN, MPJBT, NRE, Citizen, FRIM
10.Tree planting at government/ corporate events				JLN, WWF, NRE, Citizen, FRIM
11.Government subsidy for tree saplings				JLN, MPJBT, WWF, NRE, Citizen, FRIM
New Development to Retain Existing Vegetation				
1. Encourage reporting of illegal tree felling				MPJBT, NRE, JPBD Johor, Developers, PTD
2. Carry out municipal tree surveys for existing green areas in JBT				MPJBT, NRE, JPBD Johor, Developers, PTD
Low Carbon Farming in Rural Areas				
1.To reduce agricultural CH_4 and N_2O emissions				MPJBT, FAMA, MOA
2.Plant high quality and fast growing crops and supply to urban area (plant and eat locally to reduce import food)				MPJBT, FAMA, MOA, DOA, FRIM, FELDA
3.Ongoing technical support & training from government				MPJBT, FAMA, MOA, DOA, FRIM, FELDA
Ecotourism and Rural-cultural Tourism				
1.Introduce low carbon rural tourism packages				JPNJ[3], PTNJ, MPJBT
2.Promote rural low carbon lifestyle as a tourism product				JPNJ[3], PTNJ, MPJBT
3.Conserve, enhance & link key rural natural resources in JBT				JPNJ[3], PTNJ, MPJBT

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. Five (5) sub-actions and 31 programs were considered in Johor Bahru Tengah context which are: (1) sustainable municipal solid waste management; (2) sustainable agricultural waste management; (3) sustainable industrial waste management; (4) sustainable sewage sludge management and (5) 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: Stream Environment

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

Importance level

High Medium Low

12 CLEAN AIR ENVIRONMENT

Air pollution issue in Johor Bahru Tengah is 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, such as SO_2, NO_x, PM, CO and VOC, 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 JBT Air Quality

Continuous monitoring and realtime publishing of Air Pollutant Index (API) information is important for achiecing good air quality of Johor Bahru Tengah. Air quality monitoring stations are necessary for JBT 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 power plant and big industrial sites.

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 : MPJBT

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

Importance level

High Medium Low

ACRONYMS AND ABBREVIATIONS

3R	Reduce, Reuse and Recycle
API	Air Pollutant Index
BaU	Bussiness as Usual
BEM	Board of Engineers Malaysia
BIPV	Building-Integrated Photovoltaic
CCTV	Closed-circuit Television
CH_4	Methane
CIDB	Construction Industry Development Board
CM	Counter Measures
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COP	Conference of the Parties
DOA	Malaysia Department of Agriculture
DOE Johor	Department of Environment Johor
E-waste	Electronic waste
EE	Energy Efficiency
EEI	Energy Efficiency Improvement
EC	Energy Commission
ESCO	Energy Service Company
FAMA	Federal Agricultural and Marketing Authority Malaysia
FDI	Foreign Direct Investment
FELDA	The Federal Land Development Authority
FGD	Focus Group Discussion
FRIM	Forest Research Institute Malaysia
GHG	Greenhouse Gas
GIS	Geographic Information System
GreenTech	Malaysian Green Technology Corporation
HSRT	High Speed Rail Transit
IBS	Industrialised Building System
IMLRT	Iskandar Malaysia Light Rail Transit
IRDA	Iskandar Regional Development Authority
ISO	International Organisation for Standardisation
IWK	Indah Water Consortium
JBT	Johor Bahru Tengah
JKR	Public Works Department
JLN	National Landscape Department
JPBD Johor	Town and Country Planning Department of Johor
JPBD SM	Federal Department of Town and Country Planning Peninsular Malaysia
JPJ	Malaysian Road Transport Department
JPNJ[1]	Johor State Education Department
JPNJ[2]	Johor State Forestry Department
JPNJ[3]	Tourism Department of Johor
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
MCMC	Malaysian Communications and Multimedia Commission
MIDA	Malaysian Investment Development Authority
MOA	Ministry of Agriculture
MOFA	Ministry of Foreign Affairs Malaysia
MPJBT	Johor Bahru Tengah Municipal Council
MSC	Multimedia Super Corridor
N_2O	Nitrous Oxide
NGOs	Non-governmental organisations
NO_x	Ministry of Natural Resources and Environment
NRE	Ministry of Natural Resources and Environment
POME	Palm Oil Mill Effluent
PPAJ	Johor Public Transportation Corporation
PTD	District Land Office
PTG	Johor Lands and Mines Office
PTNJ	Johor National Parks Cooperation
PV	Photovoltaic
R&D	Research and Development
RE	Renewable Energy
SEDA	Sustainable Energy Development Authority Malaysia
SMRT	Singapore Mass Rapid Transit
SO_2	Sulfur Dioxide
SPAD	Land Public Transport Commission
SPAN	National Water Services Commission
SUKJ	Johor State Secretary
SWCorp	Solid Waste Management and Public Cleansing Corporation Johor
UGB	Urban Growth Boundary
UPENJ	Johor Economic Planning Unit
UTM	Universiti Teknologi Malaysia
VOC	Volatile organic compound
WiFi	Wire Free Internet
WWF	World Wide Fund for Nature

UNIT	
km^2	kilometer squared
$KtCO_2eq$	kilotonne carbon dioxide equivalent
ktoe	kilotonne equivalent
mil. p-km	million passenger-kilometres
mil. RM	million Ringgit Malaysia
mil. t-km	million tonne-kilometres
tCO_2eq	tonne carbon dioxide equivalent

UTM-Low Carbon Asia Research Centre

Senior Management

Prof. Datuk Ir. Dr. Wahid Omar
Prof. Dr. Ahmad Fauzi bin Ismail
Prof. Dr. Mohd Ismail Abd Aziz
Prof. Dr. Azlan Ab. Rahman
Prof. Dr. Ho Chin Siong
Prof. Dr. Yuzuru Matsuoka
Prof. Dr. Takeshi Fujiwara
Dr. Junichi Fujino
Mr. Koichi Okabe

Scenario Integration and Land Use Planning

Prof. Dr. Mohd. Hamdan Ahmad
Prof. Dr. Ahmad Nazri Muhammad Ludin
Prof. Dr. Ibrahim Ngah
Assoc. Prof. Dr. Roslan Amirudin
Assoc. Prof. Dr. Kasturi Devi Kanniah
Assist. Prof. Reina Kawase
Dr. Kei Gomi
Dr. Irina Safitri Zen
Dr. Tan Kian Pang
Mr. Chau Loon Wai
Mr. Teh Bor Tsong
Mr. Abdul Rahim Ramli
Mr. Kang Chuen Siang
Ms. Nadzirah Jausus
Ms. Nur Syazwani Saari
Mr. Muhammad Akmal Hakim
Ms. Rohayu Abdullah
Ms. Fateen Nabilla Rosli
Mr. Boyd Dionysius Joeman
Ms. Choo Hui Hong
Ms. Sharifah Shahidah Syed Ahmad

Consensus Building and Education

Assoc. Prof. Dr. Fatin Aliah Phang
Ms. Wong Wai Yoke
Mr. Benjamin Tee Xin Rui
Ms. Maiko Suda
Mr. Isma Ezwan Safri

Energy System

Assoc. Prof. Dr. Haslenda Hashim
Dr. Shuichi Ashina
Dr. Ho Wai Shin
Dr. Lim Jeng Shiun

Solid Waste Management

Assoc. Prof. Dr. Zainura Zainon Noor
Assoc. Prof. Dr. Lee Chew Tin
Prof. Dr. Mohd Razman Salim
Dr. Tan Sie Ting
Ms. Nawal Shaharuddin
Ms. Nur Fatihah Zainal Abidin
Ms. Cindy Lee Ik Siang
Mr. Muhammad Fadly Muhammad Nor

Air Quality and Transportation

Assoc. Prof. Dr. Mohammad Rafee Majid
Assoc. Prof. Dr. Muhammad Zaly Shah Muhammad Hussein
Assoc. Prof. Dr. Gakuji Kurata
Dr. Gobi Krishna Sinniah
Ms. Kamisah Mohd Gazali
Mr. Muhamad Azahar Zikri Zahari
Ms. Nadhirah Nordin

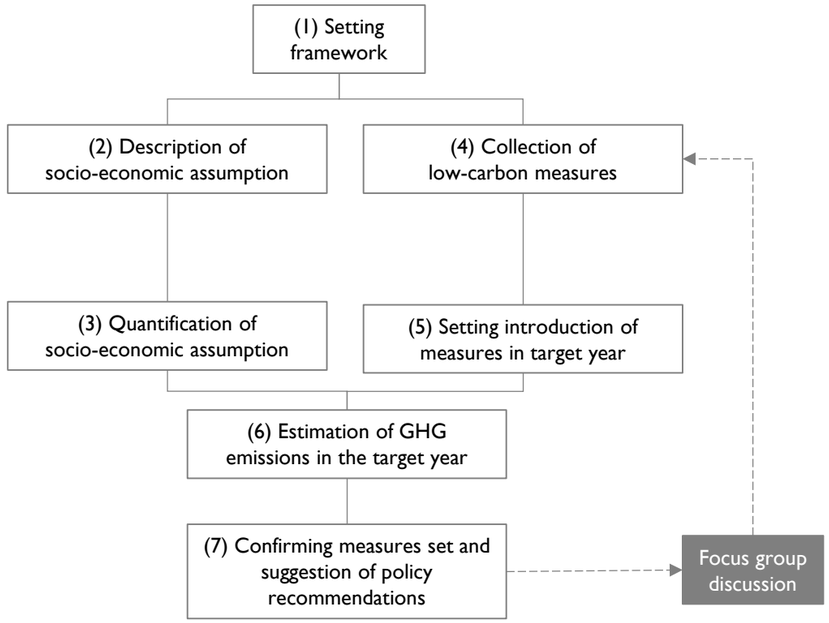
Administration

Ms. Nur Ashikin A. Hamid
Ms. Azilah Mohamed Akil

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 official 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 20%	**FEASIBILITY (40%)** Finance / Human Capital / Local Technology / Material 40%	**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			

Participants of Focus Group Discussion

Majlis Perbandaran Johor Bahru Tengah (MPJBT)

Y.Bhg Dr. Badrul Hisham bin Kassim	Yang Dipertua
Mr. Abdul Malik bin Haji Ismail	Secretary
Ms. Salwa binti Abdul Rashid	Head of Corporate and Public Relation Department
Ms. Fadzilah bte A. Rahman	Head of Internal Audit Unit
Ms. Zarina bte Abdul Hamid	Head of Planning Department
Ms. Nor Azrah bte Ayub	Planning Officer of Planning Department
Ms. Chew Lee Ting	Planning Officer of Planning Department
Mr. Yahya bin Hassan	Engineer of Engineering Department
Ms. Nurulain binti Rahmat	Officer of Environmental Health Department
Ms. Haryanti binti Abdol Rahman	Architect of Building Department
Mr. Mohamad Zul Feka bin Kamri	Assistant Planning Officer of Planning Department
Mr. Mohd Sharir bin Mohd Nor	Assistant Architect of Building Department
Ms. Zuriatie binti Mat Hussain	Assistant Auditor of Internal Audit Unit
Mr. Mohd Qayyum bin Sunawan	Assistant Officer of Environmental Health Department
Mr. Mohd Hazdi bin Md Dan	Administrative Assistant of Community Services Division

UTM-Low Carbon Asia Research Centre
Level 2, Block B12,
Faculty of Built Environment,
Universiti Teknologi Malaysia,
81310 Johor Bahru, Johor, Malaysia.

T +607-555 7539
F +607-553 8003
E utmlowcarbon@gmail.com
W www.utm.my/satreps-lcs

Sponsored by

JICA JST SATREPS