

LOW CARBON SOCIETY

ACTION PLAN 2025



PASIR GUDANG

Green & Clean Industrial City



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Universiti Teknologi Malaysia
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Kyoto University
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Low Carbon Society Action Plan for Pasir Gudang 2025: Green and Clean Industrial City

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FOREWORD



Y.A. B Dato' Seri Mohamed Khaled Nordin
Menteri Besar of Johor
Co-Chairman of Iskandar Regional Development Authority

The Low Carbon Society Action 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 environment and natural resources is the key to pursue sustainable green growth and resilient development. This sets the context within which all other factors from land use proposals and development to social engineering, service provision and economic growth 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 Md. Za'nal Bin Haji Misran
Yang Dipertua Majlis Perbandaran Pasir Gudang

Pasir Gudang Municipal Council (MPPG) aims at addressing economic growth, societal well-being and development, as well as environmental preservation and management in Pasir Gudang in a holistic manner, and the Low Carbon Society initiative is one of the various mechanisms that have been deployed to achieve these objectives.

We learned the idea of low carbon society through the *Low Carbon Society Blueprint for Iskandar Malaysia 2025* prepared by Universiti Teknologi Malaysia (UTM) and Iskandar Regional Development Authority (IRDA), with support from the Japanese government and research institutions. The Blueprint gives us a clear view to an innovative approach and concrete framework for achieving sustainable development in Pasir Gudang. We are pleased to be one of the local authorities in Iskandar Malaysia that are on the path to realising low carbon society, enhancing inclusiveness by emphasising community centric development and promoting green growth for greater prosperity while at the same time reducing our GHG emissions. This *Low Carbon Society Action Plan for Pasir Gudang 2025*, with its 12 Actions and 266 programmes, will be implemented in a timely and proactive manner, with MPPG taking on the leading role.

We wish to thank UTM and Japanese researchers from Kyoto University, the National Institute for Environmental Studies (NIES) and Okayama University; and funders of the project, the Japan International Cooperation Agency (JICA) and Japan Science and Technology Agency (JST), for their invaluable research efforts, diligence, support and commitment to the sustainable, low carbon growth of Pasir Gudang. This is a major contribution towards the realisation of MPPG's vision in making Pasir Gudang a *Green and Clean Industrial City*.

PREFACE



Ho Chin Siong
Project Manager
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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 thrust 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 Pasir Gudang region specifically. Apart of emphasizing on low carbon development, this action plan is align with the vision of Pasir Gudang – Green and Clean Industrial City. This report is the outcome of the strong partnership with Pasir Gudang Municipal Council (MPPG) 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 Pasir Gudang 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

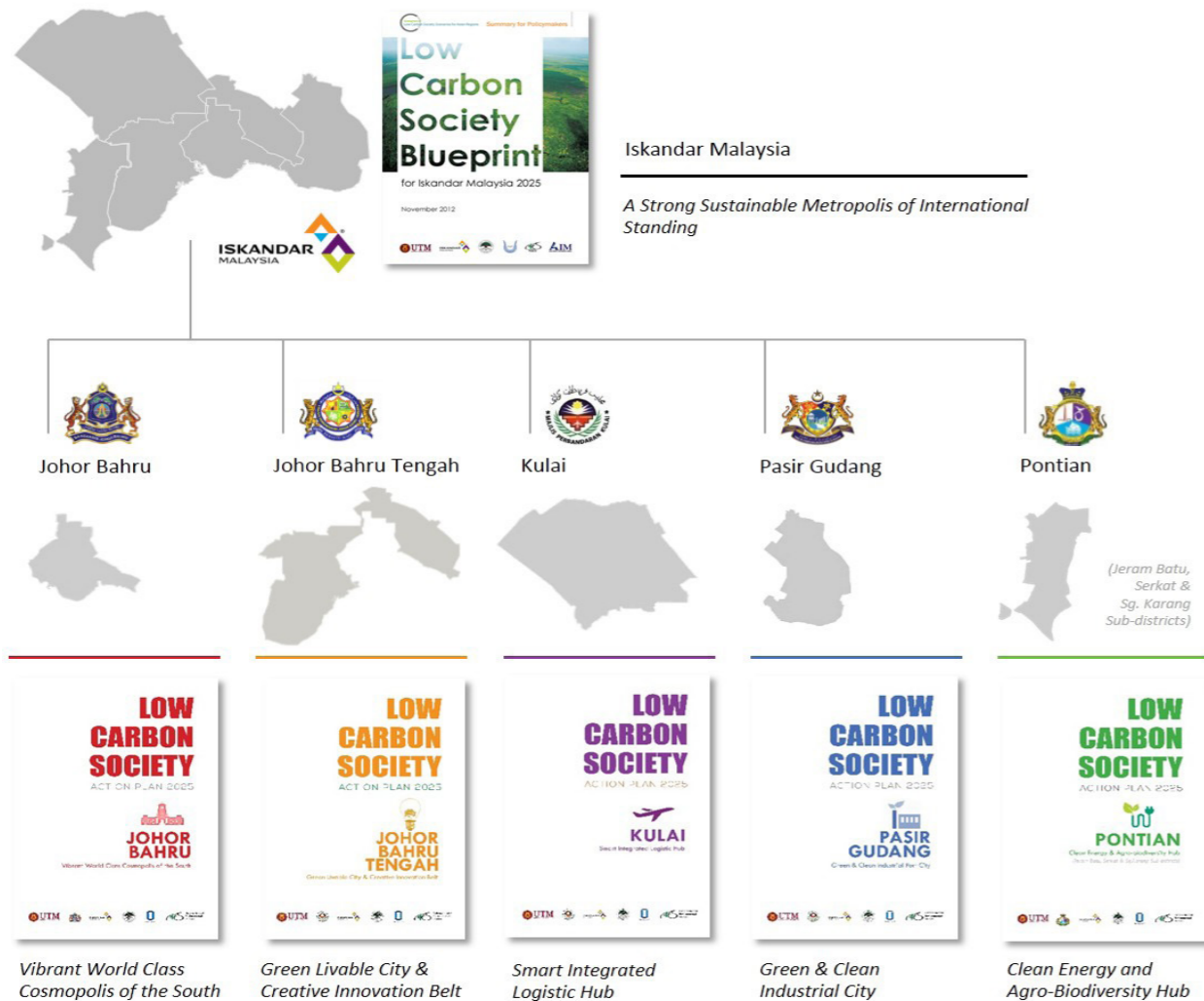
INTRODUCTION

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 Pasir Gudang Municipal Council (Majlis Perbandaran Pasir Gudang, MPPG).

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



LOW CARBON ISKANDAR MALAYSIA 2025

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

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

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



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



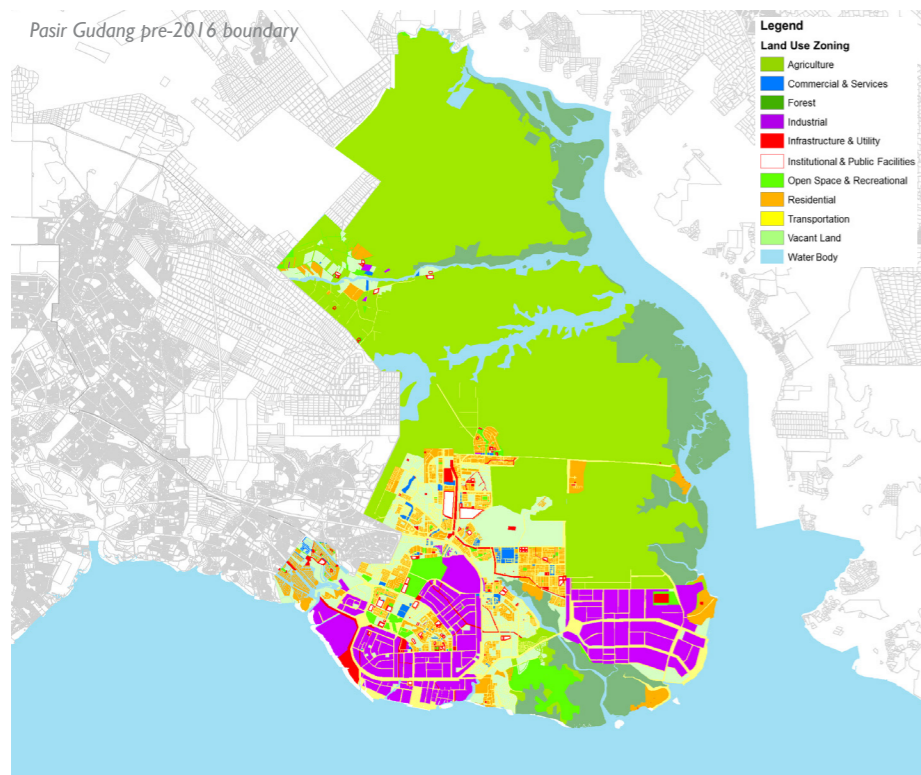
- FLAGSHIP A**
JOHOR BAHRU CITY CENTRE
• New Financial District
• Danga Bay Integrated Waterfront City
• Upgrading of Central Business District
• Tebrau-Pleiong Mixed Development
• Customs, Immigration and Quarantine Complex (CIQ)
• JB-Singapore Causeway
• Lido Boulevard
- FLAGSHIP B**
NUSAJAYA
• Kota Iskandar
• Puteri Harbour
• Medini
• EduCity
• Southern Industrial Logistic Clusters (SILC)
• Medical Park
• International Destination Resort
• Housing and Residential Projects
- FLAGSHIP C**
WESTERN GATE DEVELOPMENT
• Port of Tanjung Pelepas
• Tanjung Bin Power Plant
• Malaysia - Singapore Second Link
• RAMSAR World Heritage
• Tanjung Piai - Southernmost Tip of Mainland Asia
• Free Trade Zone
- FLAGSHIP D**
EASTERN GATE DEVELOPMENT
• Tanjung Langsat Industrial Complex
• Tanjung Langsat Port
• Johor Port
• Pasir Gudang Industrial Park
• APTEC (Lakehill Resort City)
- FLAGSHIP E**
SENAI-SKUDAI
• Senai International Airport
• Senai Cargo Hub
• Senai High-Tech Park
• Sedenak Industrial Park
• MSC Cyberport City
• Johor Technology Park
• Johor Premium Outlets®

Iskandar Malaysia's five Flagship Zones

Low Carbon Society Pasir Gudang 2025

Pasir Gudang is one of five (5) municipality region in the Iskandar Malaysia and the most important manufacturing hub in the southern part of Peninsular Malaysia. Back in early 20th century key economy of Pasir Gudang was rely on agriculture activity. Industrial activity in Pasir Gudang today mainly consist of petrochemical, oleo-chemical, electrical and electronic, food, metal and logistic industry. Pasir Gudang is also well-known for international kite festival that attracting many foreign and local tourist in every year.

Population in Pasir Gudang is expected to increase from 205,575 (2010) to 375,700 (2025) (1.83 times compared to 2010). While the number of household in the Pasir Gudang region will increase from 46,959 (2010) to 92,906 (2025). The GDP per capita of the region is expected to increase from RM 60,790 (2010) to RM 78,246 (2025).



Green and Clean Industrial City

It is envisioned that by 2025, Pasir Gudang will be a green and clean industry city where it will promote environmentally industries through cleaner production by manufacture eco-products and efficient energy management. This concept also aims to control the pollution from wastewater and industrial waste by recycling programs.

KEY FEATURES OF PASIR GUDANG



Sungai Johor is the eastern shore of Iskandar Malaysia region. Mangrove forest in Sungai Johor is a home for various exotic flora and fauna species. Aquaculture activities can be found along the river too. The iconic bridge of Senai-Desaru Expressway could be spotted at Sungai Johor.



Pasir Gudang Ports consist of Johor Port and Tanjung Langsat Port that are strategically located next to key industry zone of Pasir Gudang. These ports provide international cargo shipment, marine service, bunker facility and oil and gas.



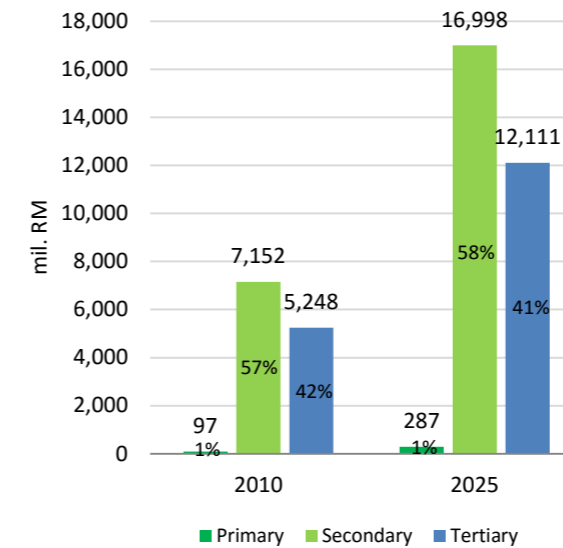
Pasir Gudang Kite Museum Kite Museum is a living monument in Malaysia that showcases history of kites and host to international kite festival. One of the unique features of the museum is that it has working windmill to generate electricity for the daily use of the museum.



Pasir Gudang Industrial Areas consist of Pasir Gudang Industrial Park and the new extension of Tanjung Langsat Industrial Complex. They have more than 700 manufacturing companies actively operating to serve the hinterland of Asia.

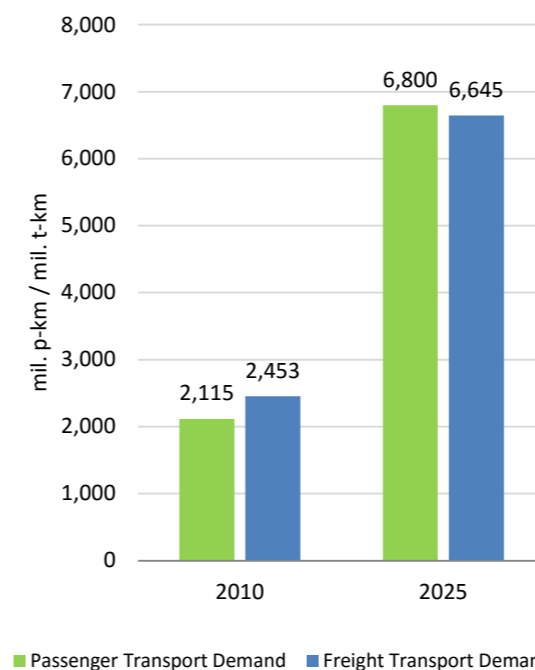
Economic Structure

Gross Domestic Product (GDP) of the Pasir Gudang region in 2025 is expected to be RM 29,397 mil. (2.35 times of the performance in 2010). The share of future primary industry sector in Pasir Gudang area will remain as constant 1% (2025). Secondary industry sector's share is expected to have slight increase from 57% (2010) to 58% (2025) and remain as a key economic sector in Pasir Gudang. The share of tertiary industry sector is likely to be decline from 42% (2010) to 41% (2025).

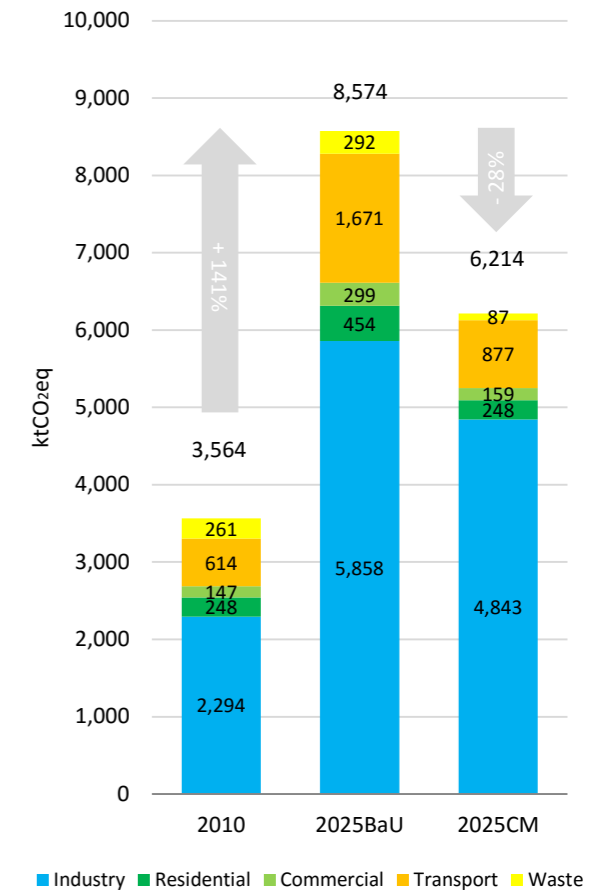


Transportation Structure

Passenger transport demand in Pasir Gudang will increase from 2,115 million passenger-kilometres (2010) to 6,800 million passenger-kilometres (2025). Freight transport demand will increase from 2,453 million tonne-kilometres (2010) to 6,645 million tonne kilometres (2025).



Greenhouse Gas (GHG) Emissions



The figure above shows the total of carbon emission of Pasir Gudang according to the sectors in 2010 (base year), 2025BaU (Business as Usual) and 2025CM (Counter Measures). The total GHG emission of Pasir Gudang region in year 2010 is about 3,564 ktCO₂eq, the value expectedly will increase 141% to 8,574 ktCO₂eq in year 2025 if no mitigation measures are taken. However, the current GHG scenario could be improve if counter measures are introduced. An expected reduction of 28% (-2,360 ktCO₂eq) could be achieved as compared to 2025BaU.

Specifically the carbon emission from the waste sector can be reduced up to 70% (-205 ktCO₂eq), while the reduction for the transport is 48% (-794 ktCO₂eq) and commercial sector is also 47% (-140 ktCO₂eq) follow by residential sector 45% (-206 ktCO₂eq) and industry sector 17% (-1,015 ktCO₂eq).

Unit	2010	2025BaU	2025CM	2025BaU/2010	2025CM/2010	2025CM/2025BaU
Final energy Demand (ktoe)	895	2,323	1,875	2.60	2.09	0.81
GHG emissions (ktCO ₂ eq)	3,564	8,574	6,214	2.41	1.74	0.72
Per capita CO ₂ emissions (tCO ₂ eq)	17.3	22.8	16.5	1.32	0.95	0.72
GHG intensity (kgCO ₂ eq / mil.RM)	0.29	0.29	0.21	1.02	0.74	0.72

Low Carbon Society Pasir Gudang 2025
GREEN & CLEAN INDUSTRIAL CITY

Integrated Green Transportation	Green Industry	Low Carbon Urban Governance	Green Building and Construction	Green Energy System & Renewable Energy	Low Carbon Lifestyle	Community Engagement and Consensus Building	Walkable, Safe and Livable City Design	Smart Urban Growth	Green and Blue Infrastructure	Sustainable Waste Management	Clean Air Environment
<p>Integrated Public Transportation</p> <ol style="list-style-type: none"> Route network expansion planning (improve network coverage and connectivity) Increase bus frequency, improve punctuality and reliability Real time arrival information Public transport reimagining Web-based journey planner Route network planning Connectivity & integration with existing public transport modes Integrated ticketing system (across all platforms) Public transport interchanges as destinations & urban activity nodes <p>Diffusion of Low Carbon Vehicles</p> <ol style="list-style-type: none"> Government agencies to use hybrid vehicles/ electric vehicles Tax reduction for hybrid vehicle purchase Gradual phasing out for diesel engine buses Subsidy for purchase of hybrid buses <p>Enhancing Traffic Flow Conditions and Performance</p> <ol style="list-style-type: none"> Intelligent Transportation System (ITS) Enhancing traffic signal performance Enhance the use of Variable Message Sign (VMS) Tidal flow and contra-flow along primary radial routes <p>Green Freight Transportation</p> <ol style="list-style-type: none"> Modal shift from road-based to rail-based freight transport Modal shift to ship-freight transport Tax incentives for freight operators in acquisition of hybrid freight vehicles 	<p>Pasir Gudang as Regional Hub for Green Industry</p> <ol style="list-style-type: none"> Tax exemption for FDI in green industries Working with banks for soft loan with low interest packages for new green industries Expedite approval process for green technology-based FDI Industry-university/research institution research linkages Attract FDI in production of RE (e.g. BIPV, bio-fuel) & EE (e.g. fuel cell) technologies Innovation in green vehicles (hybrid, electric) <p>Decarbonising Industries</p> <ol style="list-style-type: none"> Purchase of energy efficient equipment Investment in energy saving managing system Introduce intelligent logistic system (ILS) & low-energy warehousing Tax incentives to industry for EEI in production process Soft loan with low interest rate to promote adoption of green technology in industry Research and planning for establishment of eco-industrial park Establish environmental assessment system including carbon emission for new investment ISO 14000 Series Environmental Management System Establish energy audit system of the industries Monitoring and enforcement of energy saving actions <p>Green Employment in Existing Industries</p> <ol style="list-style-type: none"> Progressive requirement for cleaner production & eco-efficiency policies in industries that aim at improving their environmental performance Incentives for industries to set up an environmental & energy performance unit that generates green employment Progressive requirement for Corporate Social Responsibility (CSR) reporting (including energy & environmental performance reporting) by existing industries Create "contact point" personnel in existing industries for environmental analytical & advisory services (e.g. ESCO) <p>Human Capital Development in Green Industry</p> <ol style="list-style-type: none"> Joint government-industry intensive training programs Fiscal incentives for industries that offer continuous professional education for employees 	<p>Development Planning for Low Carbon Pasir Gudang</p> <ol style="list-style-type: none"> Set clear carbon intensity reduction targets for PG 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) Formulation of achievable & implementable low carbon transition strategies for 2015-2025 and beyond Provide policies to "reward" land development projects that contribute to PG's low carbon visions Coordination of LCS guidelines & standards for MPPG Revise and update existing use classes order to facilitate mixed use development Implementation & enforcement of compact & transit supportive development zoning & design codes (supporting Subactions 9.2, 9.3) <p>Planning Control Process, Procedures and Mechanism for Materialising LCS in Pasir Gudang</p> <ol style="list-style-type: none"> Re-actualisation of Planning Permission application, processing & granting procedures Eliminate duplications in currently overly compartmentalised planning approval processes through enhancing the One-stop Centre (OSC) mechanism in PG Integrated decision making processes in planning control at State & local levels Expedite approval process for proposed developments that support achievement of PG's LCS visions (e.g. developments proposed around planned public transport nodes; developments that retain existing vegetation; green buildings that contribute to energy efficiency) Requirement for submission of a "low carbon statement" in all Planning Permission applications Imposition of planning conditions on granting of planning permissions that support LCS actions (e.g. mandatory provision of walkways in residential neighbourhoods) <p>Development of necessary human capital for operationalising and implementing Pasir Gudang's Low Carbon Society vision</p> <ol style="list-style-type: none"> Develop low carbon urban & regional planning retraining curriculum for in-service municipal officials Incorporate low carbon society concepts, philosophy, approaches, measures etc. in municipal human capital development programs Systematically prioritise & organise continuous (re)training of officials <p>Pasir Gudang LCS Monitoring, Reporting and Publication System</p> <ol style="list-style-type: none"> Ongoing monitoring of energy and carbon emission performance of development and economic activities in PG Transparent and accountable publishing of energy and carbon emission data in multiple formats that are accessible anytime, anywhere 	<p>Promote Green Building in New Construction</p> <ol style="list-style-type: none"> To impose building rating system Plot ratio incentive for platinum rated buildings <p>EEL of Existing Building (retrofitting)</p> <ol style="list-style-type: none"> Subsidy and/or tax incentives for building owners Apply building rating system <p>Green Construction</p> <ol style="list-style-type: none"> All consultants to adopt green design process Encourage production and cost-effective supply chain of green construction materials by industries <p>Green Building Design and Technology</p> <ol style="list-style-type: none"> Temperature control at 24°C (air conditioning for government offices) Movement sensors for low occupancy areas Consultants to adopt IB5 in their design process Maximise north-south orientation Optimal building depths (9-13m) for natural lighting Maximise natural cross ventilation Integrate green landscaping with building façade Maximise use of day lighting Enhance building durability Maximise space adaptability <p>Rural Green Buildings</p> <ol style="list-style-type: none"> Subsidy for conservation of vernacular structures such as tradition timber houses, mosques, schools, community centres, clinics, shops & holiday cottages Promote reinterpretation & adaptation of vernacular construction principles & methods in new buildings 	<p>Promotion of Renewable/Alternative Energy</p> <ol style="list-style-type: none"> Encouraging of Solar PV as PV roofing, PV farm and PV on public infrastructure Promotion of Solar Thermal for Power generation Applying waste treatment technologies for energy generation from municipal solid waste (MSW), agricultural waste and sewage sludge Research and development of hydrogen technologies Establishing infrastructure for hydrogen supply Producing and promoting utilisation of hydrogen <p>Establishment of Advanced Energy System</p> <ol style="list-style-type: none"> Starting pilot project for installation of distributed energy generation system for power generation, district heating and cooling Establishing evaluation methods for selecting candidate place to incorporate distributed energy system Evaluating the suitability of energy storage technologies to PG Establishing evaluation method for appropriate capacity for Energy Storage which will be installed Evaluating the impacts of Demand Response technologies on curtailment of peak loads in PG Evaluating the economic impacts of Demand Response technologies on the power supplier and participants in PG Conducting Research and Development of power management system with IT technologies for enabling self-healing system features, allowing system transparency within the grid ensuring cyber-security and physical security and allowing system transparency within the grid Promoting the installation of power management system <p>Provision of Incentives and Subsidies and Derivation of Tariff Rates</p> <ol style="list-style-type: none"> 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. Establishing incentives schemes for acceleration of demand response (load management) Allocating research fund for R&D on green initiatives 	<p>Awareness through Education</p> <ol style="list-style-type: none"> Freely available green education catalogue in shopping centres Awareness program s for community LCS education across curriculum School clubs for LCS & 3R programs Children eco-life challenge project Interschool 3R project competitions 3R measures at schools LCS measures at schools Collaboration with relevant government agencies & NGOs Students to collect reusable & recyclable wastes from home & neighbourhood <p>Smart Working Style</p> <ol style="list-style-type: none"> 'Work-from-home' pilot project for government agencies Encourage teleworking / telecommuting among private sectors employees Promote adoption of flexi working hours in suitable sectors <p>Promote Energy Efficiency</p> <ol style="list-style-type: none"> Set up Eco Point system in local stores Promote 'Cool Biz' concept Promote the engagement of Energy Saving Advisors (Environmental Concierge) Real time energy monitoring system for low carbon lifestyle Subsidies for energy efficiency appliance in residential <p>Promote "Smart Travel Choices"</p> <ol style="list-style-type: none"> "Burn more calories, burn less carbon" campaign Guideline for eco-driving practices <p>Stock-taking for Low Carbon Lifestyle</p> <ol style="list-style-type: none"> Development of environmental report system at community level Establish Eco-life check tool for household 	<p>Share LCS Information and Gather Opinion through Stakeholder Engagement</p> <ol style="list-style-type: none"> Maintain updated list of stakeholders Invite all key stakeholders to PG development plan processes Brain storming on LCS actions in PG with experts' knowledge & local knowledge Disseminate/ ongoing feedbacks & comments on LCS actions Feedback and comments during LCS workshops and FGDs Feedback and comments through website <p>Public Information on LCS progress</p> <ol style="list-style-type: none"> LCS project updates LCS events announcements Web-based newsletters Distribution of printed newsletter (printed on recycled paper) Dissemination of progress updates/ events announcement via billboards, banners and mass media (newspaper, radio, television) LCS mobile showroom / exhibition (hybrid vehicle) periodic visit to neighbourhood PG LCS info-kiosks in shopping centres PG LCS info-kiosks in community centres (multi-purpose hall, places of worship) <p>Developing Model Low Carbon Communities</p> <ol style="list-style-type: none"> Build consensus with related authorities Produce action plans & road maps (through FGD) Formation of implementation committee Continuous monitoring of implementation <p>Green Ambassadors/ Champions</p> <ol style="list-style-type: none"> On going monitoring of neighbourhood, company, organisation green initiatives Annual green neighborhood, company, organisation competitions Appoint community level leadership Human resource development for community leaders Green ambassadors in school (students) Champions in school (school management team) 	<p>Designing Walkable City Centres and Neighborhoods</p> <ol style="list-style-type: none"> Street tree planting for shades Appropriate Street furniture Continuous covered pedestrian walkways Apply universal and inclusive design concepts Create permeable street layouts (maximum street block dimensions of 70m-90m) Identify gaps/ disconnections in existing street network Identify potential new pedestrian connections Create continuous active street frontages Provide safe walking routes to schools <p>Designing the Cyclist-friendly City</p> <ol style="list-style-type: none"> Provide dedicated, shaded cycle tracks along major roads Priority signals for bicycles at major junctions Provide sufficient & secure bicycle parking facilities Provide safe cycling routes to schools Promote bicycle rental services <p>Designing the Safe City (from crime)</p> <ol style="list-style-type: none"> Installing CCTVs at strategic locations Increase residents' natural surveillance Identify & eliminate blind spots & gap spaces Community patrolling cum recreation GIS database on crime occurrences Set up community police beats at strategic locations Increase police patrolling in neighborhoods Community cycling patrol with police <p>Designing Civilised & Livable Streets through Traffic Calming</p> <ol style="list-style-type: none"> Enforcing 30km/h zones Installing speed humps Carriageway deflection (chicanes & chokers) Reduce junction turning radii Home zones Gateway design into traffic calmed areas Community landscaping program Carriageway narrowing Pavement widening Kerb extension at junctions Humped pedestrian crossings 	<p>Promote Polycentric Growth Pattern in Pasir Gudang</p> <ol style="list-style-type: none"> Identify & reinforce functions of existing urban centres as polycentric nodes Expand public transport service coverage (new development area within UGB) Coordination of spatial growth strategies across administrative boundaries of local authorities <p>Promote Compact Urban Development</p> <ol style="list-style-type: none"> Setting spatial growth limit of PG & enforcing UGB Encourage infill development within existing built up areas (on brownfield & greyfield sites) Preserve urban fringe primary agricultural areas Mixed residential development (including affordable homes) Promote locally self-sufficient land use mix in distinct urban neighbourhoods Design high quality public realms that encourage higher density urban living <p>Promote Transit Supportive Land Use Planning</p> <ol style="list-style-type: none"> Identify existing & potential public transport / transit nodes Integrate pedestrian network with transit nodes Orientate and provide direct walking routes from homes to transit stops Permit higher densities & plot ratios within 800m of public transport nodes Incentive to developers in reduced parking requirement <p>Develop the 'Smart Digital City'</p> <ol style="list-style-type: none"> All built up areas in Pasir Gudang to be gradually covered as WIFI hotspots Develop an Pasir Gudang "People's Information System" (PIS) that integrates various electronic applications towards smart living, smart working, smart learning, smart travelling etc. 	<p>Regional Green Corridor Network</p> <ol style="list-style-type: none"> Identify potential linking corridors between existing forested areas for future land acquisition Gradually gazette presently ungazetted primary & secondary forests as protected forests <p>Conservation of Mangrove Forests</p> <ol style="list-style-type: none"> Gazette all mangrove areas as protected forests Strict enforcement against illegal mangrove clearing Ongoing mangrove species audit Corporate sectors adoption of mangrove regeneration projects Involving students and schools in mangrove trees planting <p>Promote Urban Forests (urban recreation and green lungs)</p> <ol style="list-style-type: none"> Identify the species and location of trees to be planted. Involving students and schools in forest tree planting Identify potential plots for urban parks (unused government land) Introduce endemic forest species in new urban parks Create linear urban parks along river & waterway reserves Strengthening existing planning policy to increase green areas Immediate replanting for cut down areas Public awareness for importance of reforestation One resident one tree program Tree planting at government/ corporate events Government subsidy for tree saplings <p>New Development to Retain Existing Vegetation</p> <ol style="list-style-type: none"> Encourage reporting of illegal tree felling Carry out municipal tree surveys for existing green areas in PG <p>Low Carbon Farming in Rural Areas</p> <ol style="list-style-type: none"> To reduce agricultural CH₄ and N₂O emissions Plant high quality and fast growing crops and supply to urban area (plant and eat locally to reduce import food) Ongoing technical support & training from government <p>Ecotourism and Rural-cultural Tourism</p> <ol style="list-style-type: none"> Introduce low carbon rural tourism packages Promote rural low carbon lifestyle as a tourism product Conserve, enhance & link key rural natural resources in PG 	<p>Sustainable Municipal Solid Waste Management</p> <ol style="list-style-type: none"> Smart consumption (buy in bulk, refill & concentrate local product) Choose durable item and reusable item. Restrict of using non-recyclable packaging. Encourage culture of sharing, borrowing, or renting instead of buying. Choose online digital services paperless service. Buy product from recycled materials. 'Pay as you throw' system by 2015 Scheduled waste collection for bulky waste Composting at home. Decentralised composting plant. Establishment of material recycling facilities (MRF). Waste Incineration Recycling of E-waste. Sanitary landfill with methane gas capture to energy. Separate waste collection at source. Effective use of transfer station. Optimization of waste collection routes Selection of appropriate size of collection vehicles Use of collection vehicle driven by bio-diesel fuel (BDF) or Natural Gas Vehicle (NGV) <p>Sustainable Agricultural Waste Management</p> <ol style="list-style-type: none"> POME to biogas Onsite Co-composting . Onsite combustion. Formulation of biomass into animal feed. <p>Sustainable Industrial Waste Management</p> <ol style="list-style-type: none"> Encourage cleaner production initiative Select of treatment method with less energy and less material. Decentralized scheduled waste treatment plant Smelting of inorganic wastes Introduce industrial symbiosis for waste reusing system Waste to fuel and production of BDF Non-scheduled waste incineration <p>Sustainable Sewage Sludge Management</p> <ol style="list-style-type: none"> Improved wastewater treatment by Anaerobic digestion Sewage sludge recycling as construction material Sewage sludge recycling through composting Sewage sludge energy recovery through incineration <p>Sustainable Construction and Demolition Waste Management</p> <ol style="list-style-type: none"> Reuse and Recycling of construction and demolition waste 	<p>Clean Air Quality</p> <ol style="list-style-type: none"> Quantitatively evaluate the reduction of pollutant emission for each LCS CM Evaluate /predict the improvement of local air quality by model simulation Visualisation of co-benefit of LCS CM in the industrial sector Formulation of guidelines on good technology in the industrial sector Implement a tax incentives to new technologies for improving air quality Improve air quality monitoring network Encourage consumers to purchase low emission vehicles Implement tax incentives on purchase of low emission vehicles Increase investments in public transportation Improve roadside air quality monitoring Install the appropriate removal device when using biomass as fuel <p>Improve Regional Air Quality</p> <ol style="list-style-type: none"> Increase number of API reading stations across Pasir Gudang Conduct continuous regional API monitoring & publishing of real-time API readings Lobby for ministerial level imposition of tougher penalties on slash & burn activities in the region

01 INTEGRATED GREEN TRANSPORTATION



Strong economic development and population growth of Pasir Gudang lead to higher passenger and freight transportation demand. In order to mitigate the carbon emission level of the projected increase transportation demand, development of an integrated transportation system in Pasir Gudang is highly essential. This calls for five (4) strategies of: (1) integrated public transportation; (2) diffusion of low carbon vehicles; (3) enhancing traffic flow conditions and performance and (4) green freight transportation. Under these strategies, 20 potential programs are listed for the implementation of integrated green transportation.

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

Key Projects	2015	2020	2025	Potential Actors
Integrated Public Transportation				
1. Route network expansion planning (improve network coverage and connectivity)	High	Medium	Low	SPAD, PPAJ, MPPG, Enterprises
2. Increase bus frequency, improve punctuality and reliability	High	Medium	Low	PPAJ, MPPG, Enterprises
3. Real time arrival information	High	Medium	Low	PPAJ, MPPG, Enterprises
4. Public transport reimagining	High	Medium	Low	PPAJ, MPPG
5. Web-based journey planner	High	Medium	Low	PPAJ, MPPG
6. Route network planning	High	Medium	Low	SPAD, PPAJ, MPPG
7. Connectivity & integration with existing public transport modes	High	Medium	Low	SPAD, PPAJ, MPPG
8. Integrated ticketing system (across all platforms)	High	Medium	Low	SPAD, PPAJ, MPPG
9. Public transport interchanges as destinations & urban activity nodes	High	Medium	Low	SPAD, PPAJ, MPPG
Diffusion of Low Carbon Vehicles				
1. Government agencies to use hybrid vehicles/ electric vehicles	High	Medium	Low	SPAD, MPPG
2. Tax reduction for hybrid vehicle purchase	High	Medium	Low	SPAD, MPPG
3. Gradual phasing out for diesel engine buses	High	Medium	Low	SPAD, PPAJ, MPPG
4. Subsidy for purchase of hybrid buses	High	Medium	Low	SPAD, PPAJ, MPPG
Enhancing Traffic Flow Conditions and Performance				
1. Intelligent Transportation System (ITS)	High	Medium	Low	SPAD, PPAJ, MPPG
2. Enhancing traffic signal performance	High	Medium	Low	SPAD, PPAJ, MPPG
3. Enhance the use of Variable Message Sign (VMS)	High	Medium	Low	SPAD, PPAJ, MPPG
4. Tidal flow and contra-flow along primary radial routes	High	Medium	Low	SPAD, PPAJ
Green Freight Transportation				
1. Modal shift from road-based to rail-based freight transport	High	Medium	Low	SPAD, PPAJ, MPPG
2. Modal shift to ship-freight transport	High	Medium	Low	SPAD, PPAJ
3. Tax incentives for freight operators in acquisition of hybrid freight vehicles	High	Medium	Low	SPAD, PPAJ, MPPG

Importance level
 High
 Medium
 Low

02 GREEN INDUSTRY



Industry is one of the key activities that contribute the highest CO₂ in Pasir Gudang. It is important for ensuring the industry sector to be environment friendly for a sustainable future of Pasir Gudang. In order to promote green industry in Pasir Gudang there are four (4) major strategies: (1) Pasir Gudang as regional hub for green industry; (2) decarbonising industries; (3) green employment in existing industries and (4) human capital development in green industry. A total of 22 potential projects have been identified for Pasir Gudang green industry development. Implementation of the programmes under these strategies are expected to begin from year 2015.

Diagram on the next page shows the list of key projects for Pasir Gudang Green Industry and the target year for implementation.

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

Importance level



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 CO₂ 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 Pasir Gudang

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 Pasir Gudang 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 Pasir Gudang's continuous growth while meeting the carbon reduction targets.

Planning Control Process, Procedures and Mechanism for Materialising LCS in Pasir Gudang

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

Development of necessary human capital for operationalising and implementing Pasir Gudang'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.

Pasir Gudang LCS Monitoring, Reporting and Publication System

Ongoing monitoring of the progression towards LCS targets.

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

Importance level

High Medium Low

04 GREEN BUILDING AND CONSTRUCTION



Rapid progression of building and construction sector significantly contribute to the robust urban development of Pasir Gudang. This action aims to bring stakeholders in the building industry towards creating LCS Pasir Gudang. 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 Pasir Gudang there are five (5) major strategies: (1) promoting green building in new construction; (2) energy efficiency improvement of existing buildings (retrofitting); (3) green construction in existing industries (4) green building design and technology and (5) rural green buildings. A total of 18 potential projects have been identified for green building and construction of Pasir Gudang.

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

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

Importance level

High
 Medium
 Low

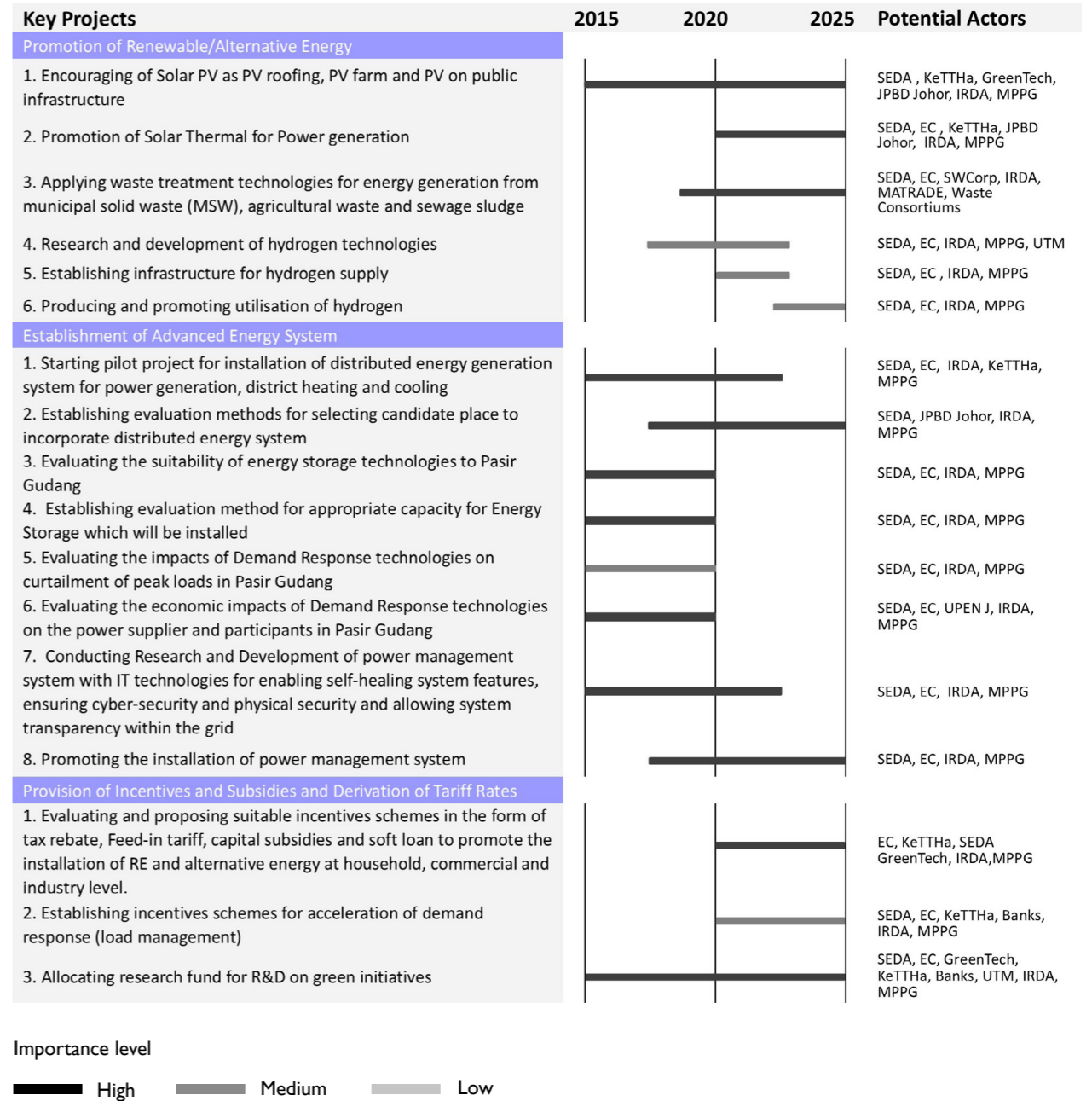
05 GREEN ENERGY SYSTEM AND RENEWABLE ENERGY



Energy system is an important driver for every development in Pasir Gudang. Therefore, by encouraging a more efficient and renewable energy system, it helps to reduce the impact of environment. Key strategies and programs in this action which have been identified for implementation are: (1) promotion of renewable and alternative energy; (2) establishment of advanced energy system; and lastly, (3) provision of

incentives and subsidies and derivation of tariff rates. A total of 17 potential projects have been identified for green energy system and renewable energy in Low Carbon Society of Pasir Gudang.

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



06 LOW CARBON LIFESTYLE



Low carbon lifestyle refers to living and working in a sustainable way of life. This means that having a living pattern that reduces carbon foot print per person. Low carbon lifestyle promotes low energy consumption through using appliances with higher energy efficiency and adopting energy saving practices, opting for lower energy transportation mode, and switching to a healthier lifestyle. Low carbon lifestyle calls for involvement from individuals of all levels, communities, government offices, and private businesses to support low carbon development in Pasir Gudang, 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 CO₂ 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 CO₂ emission from residents and communities.

Key Projects	2015	2020	2025	Potential Actors
Awareness through Education				
1. Freely available green education catalogue in shopping centres	High	High	High	IRDA, MPPG, JPNJ ¹ , Schools
2. Awareness programs for community	High	High	High	MPPG, NGO, Local community
3. LCS education across curriculum	High	High	High	IRDA, MPPG, JPNJ ¹ , Schools
4. School clubs for LCS & 3R programs	High	High	High	JPNJ ¹ , Schools, MPPG
5. Children eco-life challenge project	High	High	High	JPNJ ¹ , Schools, MPPG
6. Interschool 3R project competitions	High	High	High	JPNJ ¹ , Schools, MPPG
7. 3R measures at schools	High	High	High	JPNJ ¹ , Schools, MPPG
8. LCS measures at schools	High	High	High	JPNJ ¹ , Schools, MPPG
9. Collaboration with relevant government agencies & NGOs	High	High	High	JPNJ ¹ , Schools, MPPG
10. Students to collect reusable & recyclable wastes from home & neighbourhood	High	High	High	JPNJ ¹ , Schools, MPPG
Smart Working Style				
1. ‘Work-from-home’ pilot project for government agencies	High	High	High	MPPG, Government agencies, Businesses
2. Encourage teleworking / telecommuting among private sectors employees	High	High	High	MPPG, Government agencies, Businesses
3. Promote adoption of flexi working hours in suitable sectors	High	High	High	MPPG, Government agencies, Businesses
Promote Energy Efficiency				
1. Set up Eco Point system in local stores	High	High	High	MPPG, GreenTech, Businesses
2. Promote ‘Cool Biz’ concept	High	High	High	MPPG, GreenTech, Businesses
3. Promote the engagement of Energy Saving Advisors (Environmental Concierge)	High	High	High	MPPG, GreenTech, Businesses
4. Real time energy monitoring system for low carbon lifestyle	High	High	High	MPPG, GreenTech, Businesses
5. Subsidies for energy efficiency appliance in residential	High	High	High	MPPG, GreenTech, Businesses, Local community
Promote “Smart Travel Choices”				
1. “Burn more calories, burn less carbon” campaign	High	High	High	MPPG, SPAD, Communities, Schools
2. Guideline for eco-driving practices	High	High	High	MPPG, SPAD, Communities, Schools
Stock-taking for Low Carbon Lifestyle				
1. Development of environmental report system at community level	High	High	High	MPPG, SPAD, Communities, Households
2. Establish Eco-life check tool for household	High	High	High	MPPG, SPAD, 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 Pasir Gudang. The process of moving towards LCS involves various stakeholders in PG. 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 Pasir Gudang 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 Pasir Gudang.

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

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

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

Importance level

High Medium Low

09 SMART URBAN GROWTH



Due to the rapid economic growth and urban development of Pasir Gudang its population is expected to increase from 205,575 in 2010 to 375,700 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, 16 potential programs are listed for the implementation of smart urban growth.

Key Projects	2015	2020	2025	Potential Actors
Promote Polycentric Growth Pattern in Pasir Gudang				
1. Identify & reinforce functions of existing urban centres as polycentric nodes	High			JPBD Johor, IRDA, MPPG
2. Expand public transport service coverage (new development area within UGB)	High			MPPG, JPBD Johor, PPAJ
3. Coordination of spatial growth strategies across administrative boundaries of local authorities	High			MPPG, JPBD Johor, Developers
Promote Compact Urban Development				
1. Setting spatial growth limit of PG & enforcing UGB		High		MPPG, JPBD Johor, Developers
2. Encourage infill development within existing built up areas (on brownfield & greyfield sites)		High		MPPG, JPBD Johor, Developers
3. Preserve urban fringe primary agricultural areas		High		MPPG, JPBD Johor, Developers
4. Mixed residential development (including affordable homes)		High		MPPG, JPBD Johor, Developers SUKJ
5. Promote locally self-sufficient land use mix in distinct urban neighbourhoods		High		MPPG, JPBD Johor, Developers
6. Design high quality public realms that encourage higher density urban living		High		MPPG, JPBD Johor, Developers
Promote Transit Supportive Land Use Planning				
1. Identify existing & potential public transport / transit nodes	High			MPPG, JPBD Johor, PPAJ, Developers
2. Integrate pedestrian network with transit nodes	High			MPPG, JPBD Johor, PPAJ, Developers
3. Orientate and provide direct walking routes from homes to transit stops	High			MPPG, JPBD Johor, PPAJ, Developers
4. Permit higher densities & plot ratios within 800m of public transport nodes		High		MPPG, JPBD Johor, Developers
5. Incentive to developers in reduced parking requirement		High		MPPG, JPBD Johor, Developers
Develop the 'Smart Digital City'				
1. All built up areas in Pasir Gudang to be gradually covered as WiFi hotspots		High		MPPG, MSC Cyberport, Businesses, MCMC
2. Develop an Pasir Gudang "People's Information System" (PIS) that integrates various electronic applications towards smart living, smart working, smart learning, smart travelling etc.		High		MPPG, MSC Cyberport, Businesses, 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 sequester and store excessive CO₂ 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. Pasir Gudang 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 Pasir Gudang: (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 of 26 potential projects have been identified for green and blue Infrastructure of Pasir Gudang.

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

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. Managing waste effectively will bring benefit to environment, society and economic. Five (5) sub-actions and 35 programs were considered in Pasir Gudang 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.

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

Importance level



12 CLEAN AIR ENVIRONMENT



Air pollution issue in Pasir Gudang is mainly caused by the emissions of particular matter (PM), SO₂, 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.

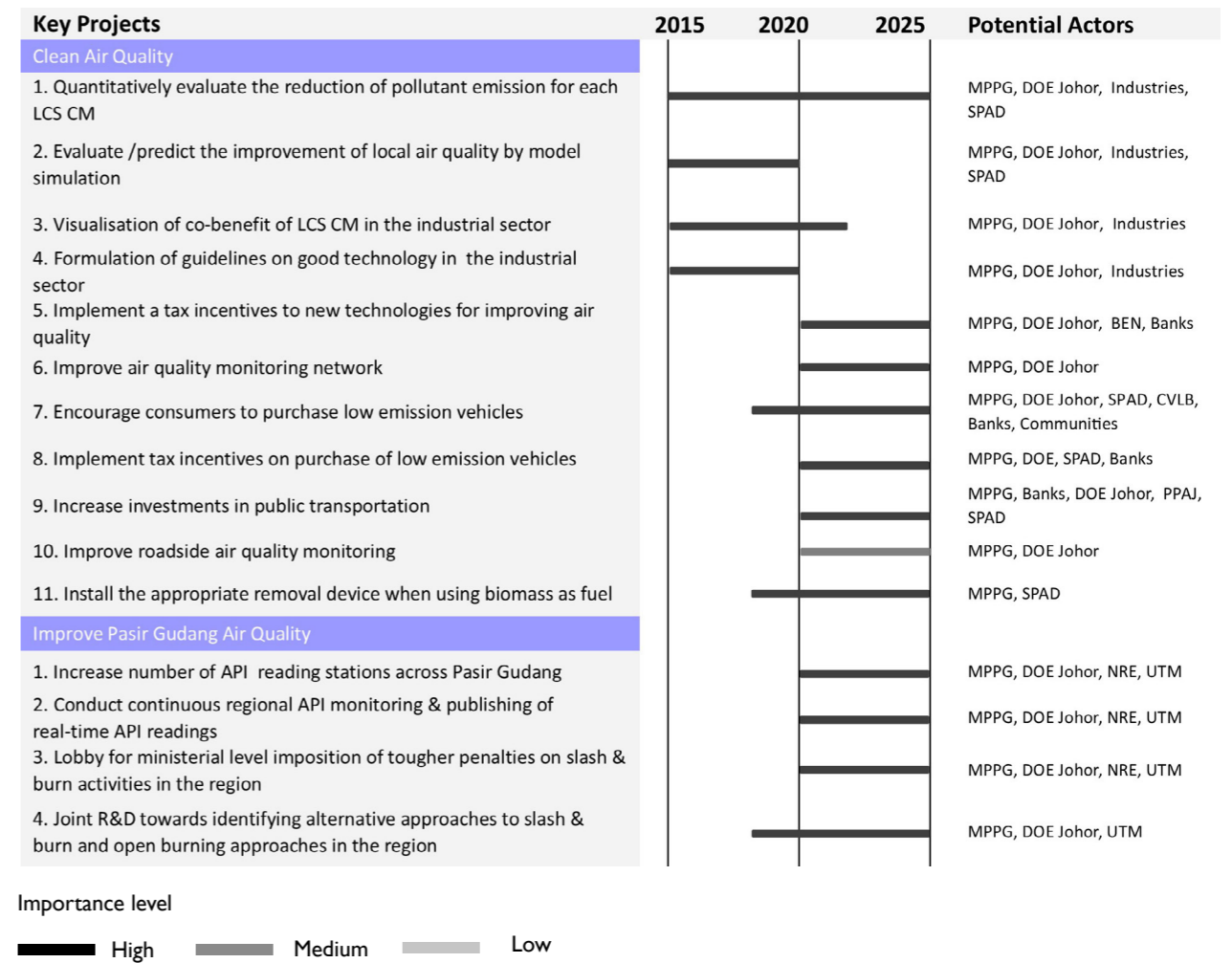
Clean Air Quality

In order to introduce a suitable countermeasure that is effective for the emission reduction of both greenhouse gases (GHGs) and air pollutants, such as SO₂, 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 Pasir Gudang Air Quality

Continuous monitoring and realtime publishing of Air Pollutant Index (API) information is important for achieving good air quality of Pasir Gudang. Air quality monitoring stations are necessary for Pasir Gudang 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.

A more detailed list of sub-actions and programs which can be implemented in Pasir Gudang for clean air environment is as show in the next diagram



ACRONYMS AND ABBREVIATIONS

3R	Reduce, Reuse and Recycle	MITI	Malaysia International Trade and Industry
API	Air Pollutant Index	MOA	Ministry of Agriculture
BaU	Business as Usual	MoHR	Ministry of Human Resources Development Malaysia
BEM	Board of Engineers Malaysia		
BIPV	Building Integrated Photovoltaic	MPPG	Pasir Gudang Municipal Council
CCTV	Closed Circuit Television	MSC	Multimedia Super Corridor
CH ₄	Methane	NGOs	Non-governmental organizations
CIDB	Construction Industry Development Board	NO _x	Nitrogen Dioxide
CM	Counter Measures	NRE	Ministry of Natural Resources and Environment
CO ₂	Carbon Dioxide	PG	Pasir Gudang
COP	Conference of the Parties	POME	Palm Oil Mill Effluent
DOE Johor	Department of Environment Johor	PPAJ	Johor Public Transport Corporation
EC	Energy Commission	PTD	District Office
EE	Energy Efficient	PTG	Land and Mines Office
EEl	Energy Efficiency Improvement	PTNJ	Johor National Park Corporation
ESCO	Energy Service Company	PV	Photovoltaic
E-waste	Electronic waste	R&D	Research and Development
FDI	Foreign Direct Investment	RE	Renewable Energy
FELDA	The Federal Land Development Authority	SEDA	Sustainable Energy Development Authority
FGD	Focus Group Discussion	SIRIM	Standards and Industrial Research Institute of Malaysia
FRIM	Forest Research Institute		
GIS	Geographical Information System	SME Bank	Small and Medium Enterprises Bank
GreenTech	Malaysian Green Technology Corporation	SO ₂	Sulfur Dioxide
IBS	Industrialised Building System	SPAD	Land Public Transport Commission
IRDA	Iskandar Regional Development Authority	SPAN	National Water Services Commission
ISO	International Organisation for Standardisation	SUKJ	State Secretary of Johor
IWK	Indah Water Consortium	SWCorp	Solid Waste Management and Public Cleansing Corporation Johor
JKR	Public Work Department		
JLN	National Landscape Department	SWM	Southern Waste Management Environment
JPBD Johor	Town and Country Planning Department of Johor State	UGB	Urban growth boundary
		UPENJ	Johor Economic Planning Unit
JPBDSM	Town and Country Planning Department of Peninsular Malaysia	UTM	Universiti Teknologi Malaysia
		VOC	Volatile organic compound
JPJ	Road Transport Department	WiFi	Wire free internet
JPNJ ¹	Johor Education Department	WWF	World Wide Fund for Nature
JPNJ ²	Johor State Forestry Department		
JPNJ ³	Tourism Department of Johor		
JPSPN	National Solid Waste Management Department	UNIT	
KeTTHa	Ministry of Energy, Green Technology and Water	km ²	kilometres squared
KPKT	Ministry of Urban Wellbeing, Housing and Local Government	ktCO ₂ eq	kilotonne carbon dioxide equivalent
		ktoe	kilotonne oil equivalent
LAM	Board of Architecture Malaysia	mil. p-km	million passenger-kilometres
LCS	Low Carbon Society	mil. RM	million Ringit Malaysia
MATRADE	Malaysia External Trade Development Corporation	mil. t-km	million tonne-kilometres
		tCO ₂ eq	tonne carbon dioxide equivalent
MCMC	Malaysia Communications and Multimedia Commission		
MIDA	Malaysia Investment Development Authority		

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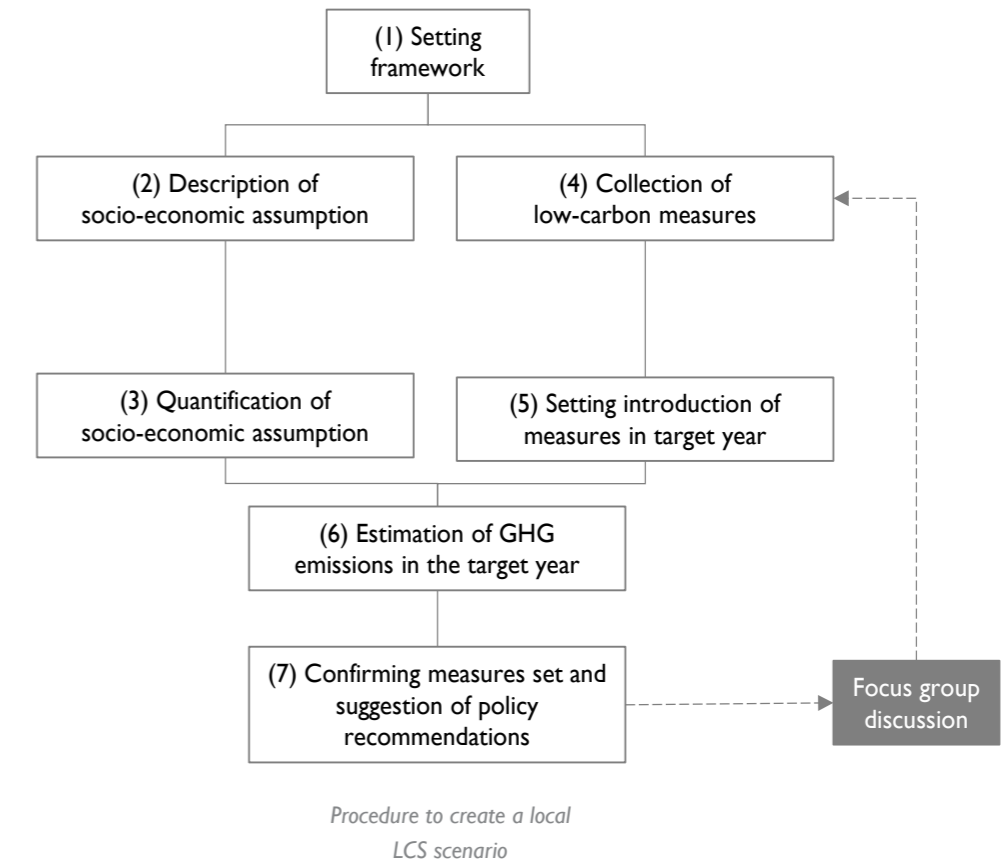
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Method of Low Carbon Society Scenarios Development

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



(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.

APPENDIX

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 Context			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 reimagining			✓			✓			✓
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%)		
	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 reimagining	3	3	2	87
Flat rate tickets and central area free shuttle services	3	3	1	73
Web-based journey planner	3	3	3	100

4) Interpret the results

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

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

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