

International Forum on Sustainable Future in Asia /NIES International Forum

- Pathway to Decarbonized Asia based on AIM-

Pathway to Decarbonized Malaysian cities using Asia Pacific Integrated (AIM) modelling

16 Feb 2023 | NIES Tsukuba Japan

HO CHIN SIONG and CHAU LOON WAI

*UTM-Low Carbon Asia Research Centre
Faculty of Built Environment and Surveying
Universiti Teknologi Malaysia
Johor Bahru, Malaysia*



UTM
UNIVERSITI TEKNOLOGI MALAYSIA



CO2 Modelling /LCS blueprint on the Case study of Iskandar Malaysia in 2011 SATREPS Project funded by JICA and JST

Project Background



FLAGSHIP A

- JOHOR BAHRU CITY CENTRE**
- Central Business District (CBD) as heritage and cultural city
 - Customs, Immigration and Quarantine Complex (CIQ)
 - Johor – Singapore Causeway

FLAGSHIP B

- NUSAJAYA**
- Kota Iskandar
 - EduCity
 - Medical Park
 - International Destination Resort
 - Southern Industrial & Logistics Clusters (SILC)
 - Puteri Harbour

FLAGSHIP C

- WESTERN GATE DEVELOPMENT**
- Port of Tanjung Pelepas (PTP)
 - Tanjung Bin Power Plant
 - 2nd Link Access to Singapore
 - RAMSAR World Heritage Park
 - Tanjung Piai – Southernmost Tip of Mainland Asia
 - Maritime Centre

FLAGSHIP D

- EASTERN GATE DEVELOPMENT**
- Tanjung Langsat Industrial Complex
 - Johor Port
 - Tanjung Langsat Port
 - Pasir Gudang Industrial Park

FLAGSHIP E

- SENAI-SKUDAI**
- Senai Airport City
 - Senai High-Tech Park
 - Sedenak Industrial Park
 - MSC Cyberport City
 - Johor Technology Park
 - University Technology Malaysia (UTM)

Site: Iskandar Malaysia

Objective:

(Iskandar Regional Development Authority)

i. To draw up **key policies and strategies** in guiding the development of Iskandar Malaysia in **mitigating carbon emission**. *Transforming Iskandar Malaysia into a sustainable low carbon metropolis by adopting green growth strategies/roadmap.*

ii. To respond to the nation's aspiration for **ensuring climate-resilient development for sustainability**.

Target Year: 2025 (2005 – 2025)



Project for Development of Low Carbon Society for Asia Regions

Outline of Project

Research Team:

Malaysia side : **University Technology Malaysia**

Japan side : **Kyoto University(KU)**, National Institute for Environmental Studies(**NIES**), **Okayama University (OU)**

Coordinating Institutions: Iskandar Regional Development Authority (**IRDA**), PLANMalaysia, Malaysia Green Technology Corporation (**MGTC**)

Sponsorship: Japan International Cooperation Agency (**JICA**) , Japan Science and Technology (**JST**)

Expected Outputs:

OUTPUT 1: Methodology to create LCS scenarios which is appropriate for Malaysia is developed.

OUTPUT 2: LCS scenarios are created and utilized **for policy development** in Iskandar Malaysia (IM)

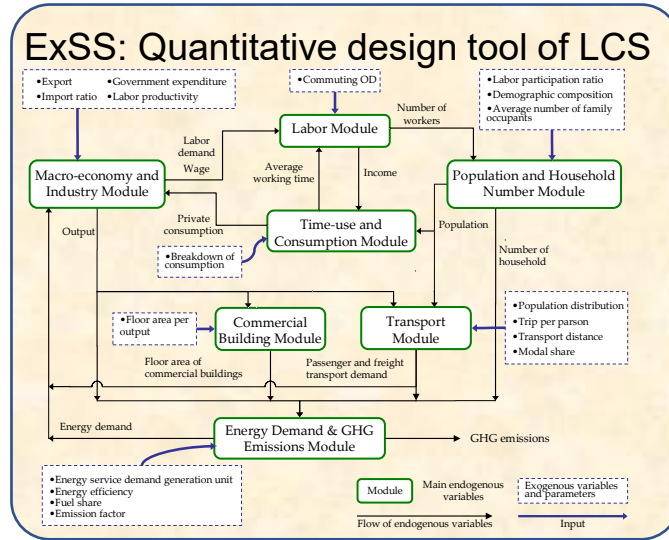
OUTPUT 3: Co-benefit of LCS policies on air pollution and on recycling-based society is quantified in IM

OUTPUT 4: Dissemination and Propagation of the approach. Conduct trainings on LCS scenarios for Malaysia and Asian countries, Collaborating network for LCS in Asia is enforced



OUTPUT – Scientific Methodology (Database and Model)

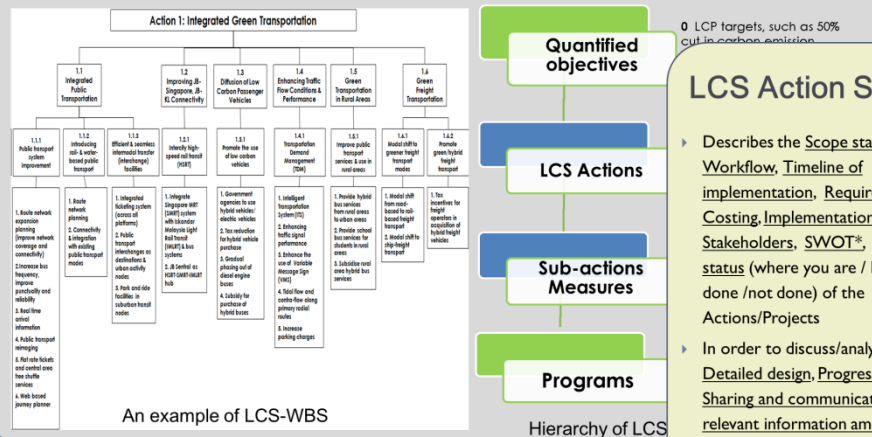
Development of supporting tools for designing and managing LCS scenarios



- Extended SnapShot model (ExSS)
- LCS Action Reference Database
- LCS Action Work Breakdown Structures(LCS-WBS)
- LCS Action Specification Cards(LCS-ASC)
- LCS Action Design Structure Matrix (LCS-DSM)
- Tool for attributing the Efforts towards Quantified targets to each Action/program (ARIPPLE)
- LCS Action Backcasting tool (LCS-BCT)

LCS-WBS: Overall structure diagram of LCS actions

Graphical diagram of hierarchically displaying deliverable measures and projects, which are further broken down into more detailed deliverables.



An example of LCS-WBS

Hierarchy of LCS

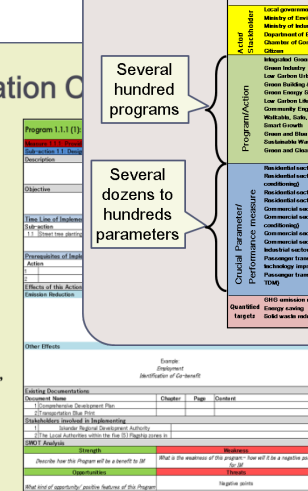
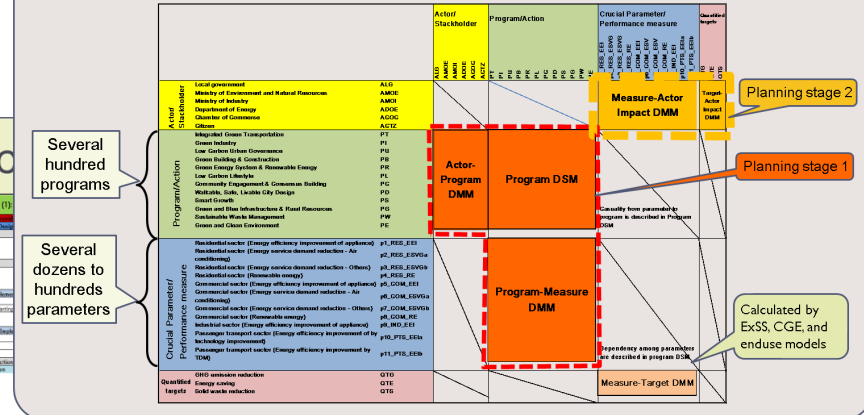
LCS Action Specification Card

- Describes the **Scope statement, Workflow, Timeline of implementation, Required resource, Costing, Implementation organization, Stakeholders, SWOT[®], Current status** (where you are / how much is done /not done) of the Actions/Projects

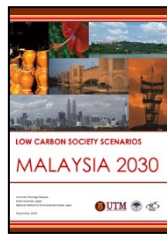
- In order to discuss/analyze the **Detailed design, Progress management, Sharing and communicating of the relevant information among research groups, implementation agencies and stockholders**

LCS Action Design Structure Matrix (LCS-DSM)

- Direction of information is from column to row
- Elements of matrix denote functional types of relation between column elements and row elements



An example from IMLCSBP case



OUTPUT : Low Carbon Society (LCS) scenarios for policy development

National backgrounds of National Target of 45% emission intensity reduction by 2030, Low Carbon Policies and GHG Reduction Potential in cities in Malaysia

National mitigation target :
 Maintain 45% reduction emission intensity by year 2030, under the condition of technology transfer from developed countries

Policy and GHG reduction trend:

- Now proposing “Low Carbon Roadmap of Malaysia Economy 2030”, pending for Cabinet approval Jan / Feb 2015
- Currently achieved 33% (2014) reduction as compared with 40% target in 2020, considering mitigation option (big financial implication), such as FIT – solar and rain harvesting, hybrid car policy, MRT ,etc.

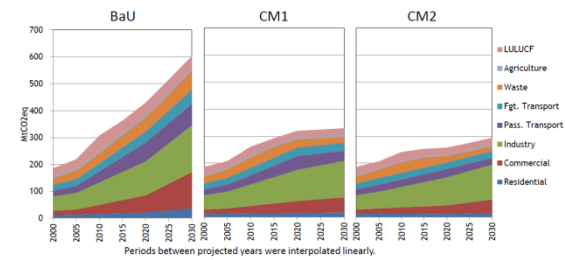
Low Carbon Society Scenarios in Malaysia

Summary of mitigation options

	2020		2030	
	CM1	CM2	CM1	CM2
Diffusion of energy efficient devices	40%	60%	75%	85%
EEl rate from BaU of thermal power plants	10%	20%	20%	30%
Modal shift from passenger cars	10%	22%	20%	40%
Share of bio diesel in transport	2%	6%	3%	8%
Capacity of RE power plant (MW)	2080	4160	4160	10400
Recycling rate of solid waste	40%	55%	50%	60%
Incineration rate of solid waste	10%	15%	20%	20%
Recovery rate of CH4 from waste management	25%	35%	40%	40%
Mitigations in AFOLU sectors*	<10USD/ktCO2eq			

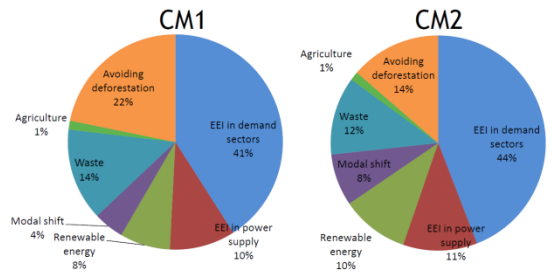
GHG emissions (Energy, Waste and AFOLU)

- Energy has the largest contribution in both scenarios in all years.
- In BaU scenario, GHG emission increased by 96% (2020) and 175% (2030) from 2005
- In CM1 scenario, it was reduced by 26% (2020) and 45% (2030) from BaU, in CM2, 40% (2020) and 51% (2030).

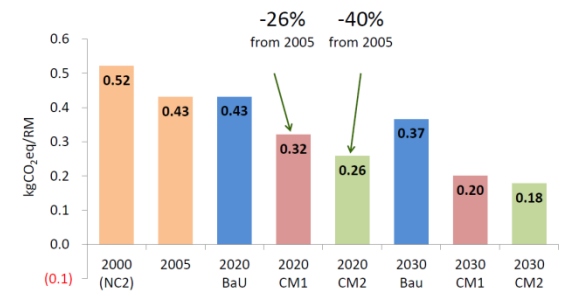


Contribution to emission reduction in 2020

- In order to achieve -40% target in 2020, more contribution of EEI, renewable energy and modal shift is required.



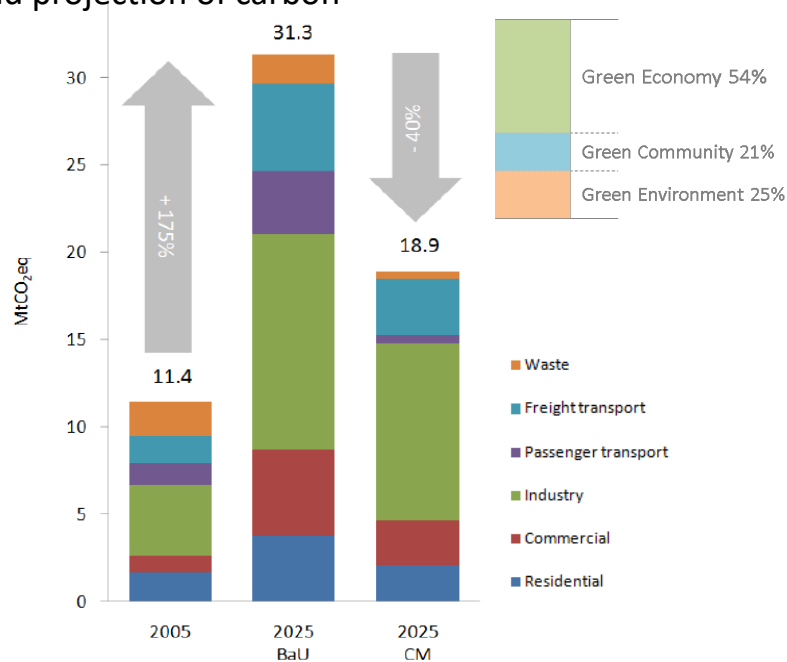
Emission intensity (GHG emission per GDP)



OUTPUT : LCS scenarios/ modelling for policy development in Iskandar Malaysia

The *Low Carbon Society Blueprint for Iskandar Malaysia 2025*

- ✓ Document that presents **comprehensive climate change mitigation policies** and detailed strategies to guide development of Iskandar Malaysia
- ✓ Stress on the **holistic and integrated approach to decouple economy and environment development**
Comprise of two principal components:
 - Narrative on **growth scenarios, policies, measures and programs** to achieve a minimum targeted **40% reduction in carbon emission by 2025** based on the 2005 level and;
 - scenario-based modelling** and projection of carbon emission reductions achievable.

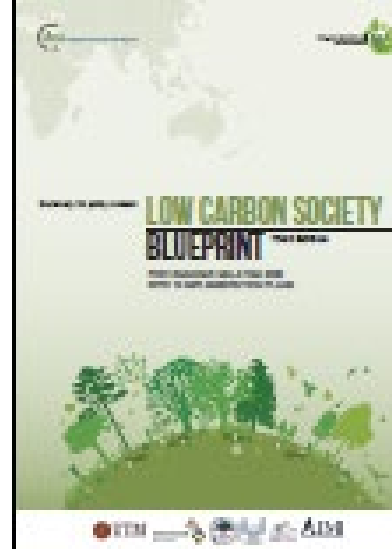
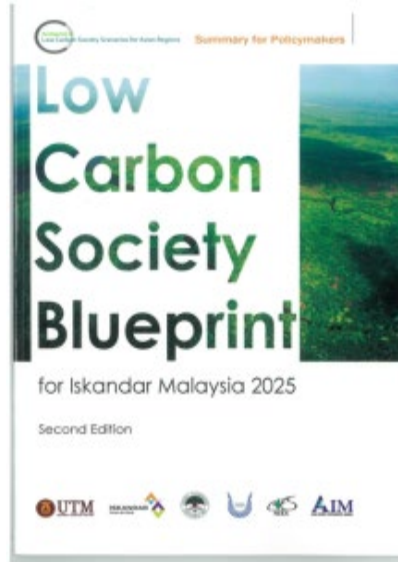


GHG reductions by Actions

Mitigation Options	ktCO ₂ Reduction	%
Green Economy	6,937	54%
Action 1 Integrated Green Transportation	1,916	15%
Action 2 Green Industry	1,094	9%
Action 3 Low Carbon Urban Governance**	-	-
Action 4 Green Building and Construction	1,203	9%
Action 5 Green Energy System and Renewable Energy	2,725	21%
Green Community	2,727	21%
Action 6 Low Carbon Lifestyle	2,727	21%
Action 7 Community Engagement and Consensus Building**	-	-
Green Environment	3,094	25%
Action 8 Walkable, Safe and Livable City Design	263	2%
Action 9 Smart Urban Growth	1,214	10%
Action 10 Green and Blue Infrastructure and Rural Resources	392	3%
Action 11 Sustainable Waste Management	1,224	10%
Action 12 Clean Air Environment**	-	-
Total	12,467**	100%



Official Document of Low Carbon Society Blueprint for Iskandar Malaysia 2025

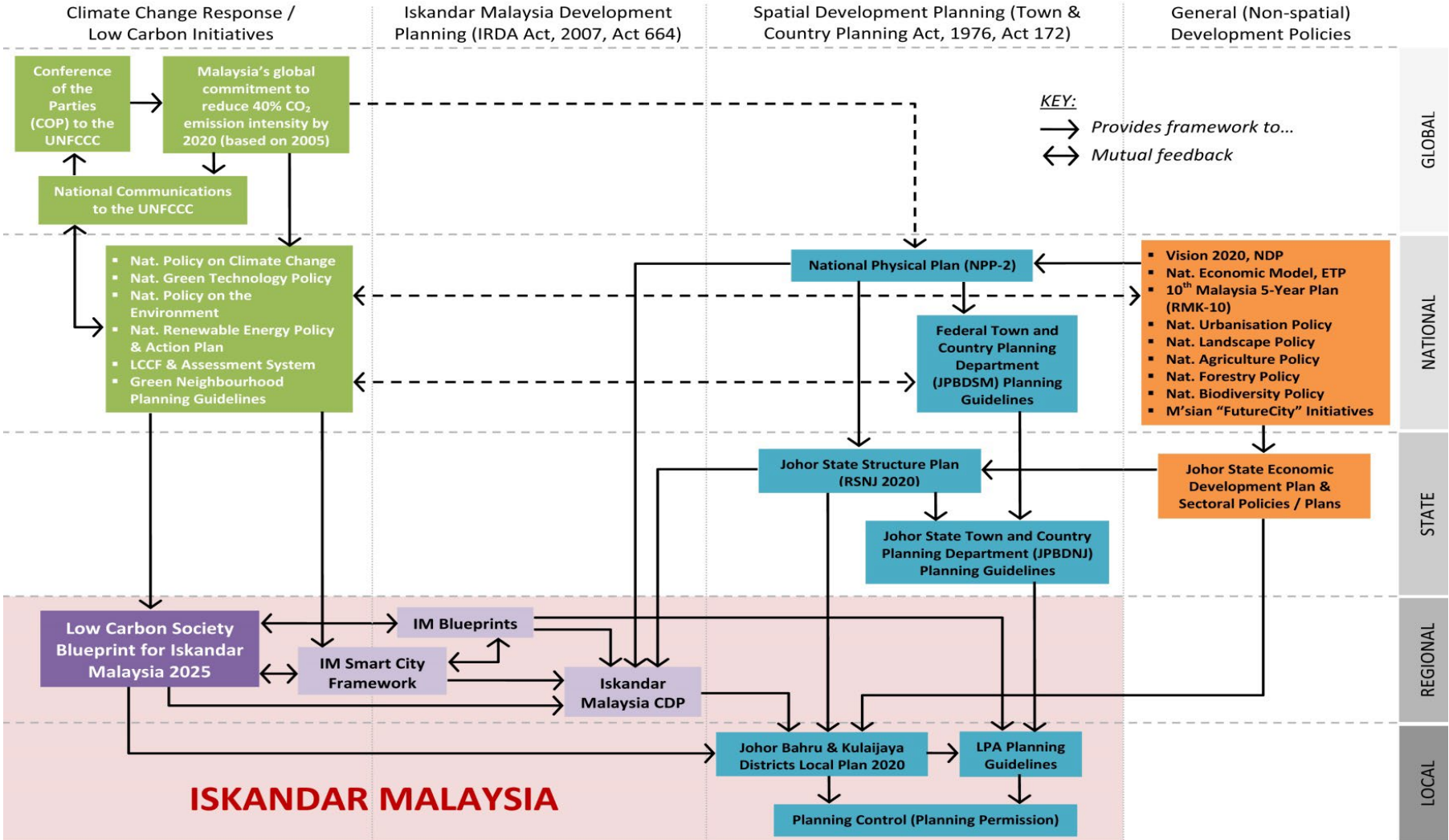


- The LCSBPIM– a quick reference for all policy-makers in both public and private sectors as well as IRDA;
- 12 Actions grouped in 3 parts namely: (Green Economy), (Green Community), and Green Environment); 281 programmes;
- Each Chapter contains an analysis, list of programmes and the potential GHG emissions reduction;
- IRDA launched its Low Carbon Society Blueprint for Iskandar Malaysia 2025 on 30 November 2012 at the United Nations Climate Change Conference in Doha, Qatar. The ultimate goal is to reduce Iskandar Malaysia's carbon intensity emissions by 50 per cent by 2025.
- The Blueprint was subsequently endorsed by the Prime Minister of Malaysia in December 2012

	Action Names	Themes
1	Integrated Green Transportation	GREEN ECONOMY
2	Green Industry	
3	Low Carbon Urban Governance	
4	Green Buildings & Construction	
5	Green Energy System & Renewable Energy	
6	Low Carbon Lifestyle	GREEN COMMUNITY
7	Community Engagement & Consensus Building	
8	Walkable, Safe, Livable City Design	GREEN ENVIRONMENT
9	Smart Growth	
10	Green and Blue Infrastructure & Rural Resources	
11	Sustainable Waste Management	
12	Clean Air Environment	

OUTPUT : LCS scenarios for policy development in Iskandar Malaysia

Positioning the *Low Carbon Society Blueprint for Iskandar Malaysia 2025* within the context of existing national, state and local development policies and plans



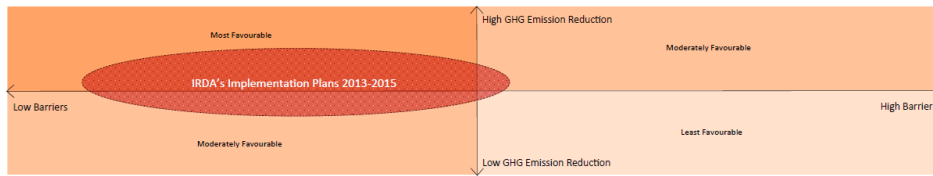
LCS scenarios for policy development in Iskandar Malaysia (IM)

How to make the LCS happen in IM -A Roadmap towards Low Carbon Iskandar Malaysia 2025



Rationales for Implementation Phasing

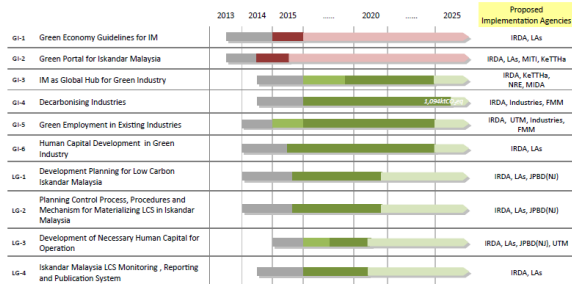
A good roadmap is characterised by well justified phasing of projects. Priority projects would be those that have relatively low barriers but high GHG reduction impacts (see diagram below). Implementation barriers include cost, human capital, institution and legislation framework, societies readiness (stakeholder acceptance) and technology availability.



The roadmap comprises of EIGHT (8) implementation sectors demonstrating the implementation plan for TWELVE (12) key policy actions of Low Carbon Society Blueprint for Iskandar Malaysia 2025 as well as IRDA's Implementation Plans 2013-2015. Each section breaks its policy action(s) into detail strategic plans, their implementation phases and duration and identified potential implementation agencies. These are presented in a series of timeline diagrams.

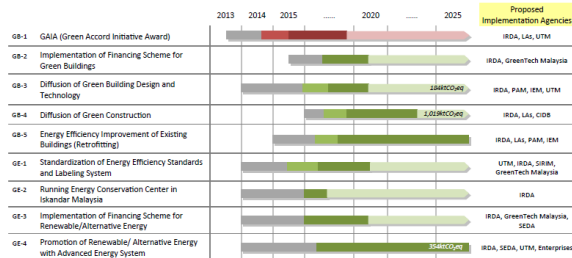
Green Industry and Low Carbon Governance (GI, LG)

Action 2 "Green Industry" (GI) and Action 3 "Low Carbon Urban Governance" (LG), IRDA's Implementation Plans; Green Economy Guidelines for IM (GI-1) and Green Portal for Iskandar Malaysia (GI-2) are covered. The main contents are establishment of planning and governance system in IRDA, dissemination activities through a website, and low-carbonizing existing industries through mainly energy efficiency improvement and to encourage production of green goods and services required in a low carbon society.

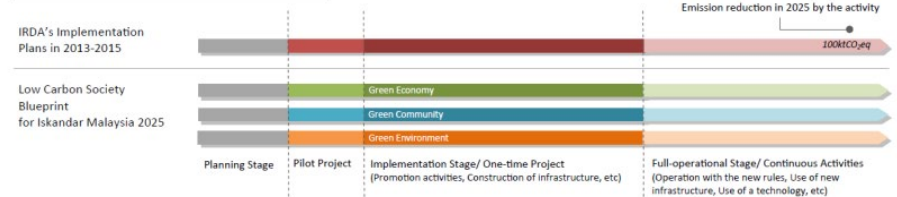


Green Building and Energy System (GB, GE)

This roadmap describes implementation of Action 4 "Green Building and Construction" (GB) and Action 5 "Green Energy System and Renewable Energy" (GE) with IRDA's implementation plan of GAIA (Green Accord Initiative Award) (GB-1). The roadmap includes implementation of GAIA in IM, establishment of green building design, technology and construction, and its standardization in IM with financial scheme. At the same time, the roadmap covers diffusion of renewable and alternative energies in IM through strengthening financial support scheme for the energies and encouraging public awareness by Energy Conservation Center in Iskandar Malaysia.

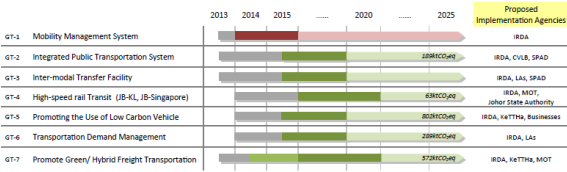


Guide to Reading Timeline Diagram



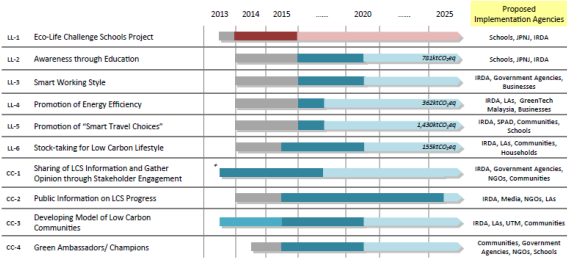
Green Transportation (GT)

Action 1 "Green Transportation" (GT) and Mobility Management System (GT-1), IRDA's Implementation Plan are covered. The main contents are development of the integrated public transportation system, high-speed rail connection between Johor Bahru (JB)-Kuala Lumpur (KL) and JB-Singapore, development of inter-modal transfer facility and promotion of the use of low carbon passenger vehicle and freight transport.



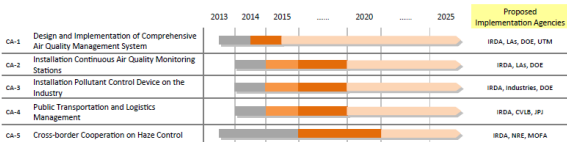
Green Community (LL, CC)

This roadmap describes implementation of Action 6 "Low Carbon Lifestyle" (LL) and Action 7 "Community Engagement and Consensus Building" (CC) with IRDA's Implementation Plan, Eco-Life Challenge Schools Project (LL-1). Strong connections among people or communities forms an indirect support for direct impact inducing change to low carbon lifestyle.



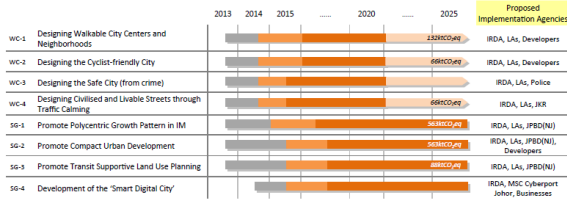
Clean Air Environment (CA)

Action 12 "Clean Air Environment" (CA) is covered. 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 and freight transportation are also considered. Cross-border cooperation to avoid regional haze pollution from open biomass burning is tightened.



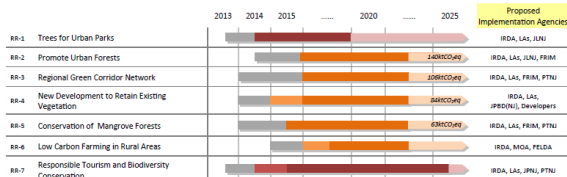
Green Urban Design (WC, SG)

Action 8 "Walkable, Safe and Livable City Design" (WC) and Action 9 "Smart Urban Growth" (SG) are covered. The main contents for walkable city are establishment of walkable city centers and neighborhoods, cyclist-friendly city, safe city from crime, and civilized and livable streets through traffic calming. The main contents for smart urban growth are promotion of the polycentric growth pattern in IM, compact urban development, transit supportive land use planning and smart digital city.



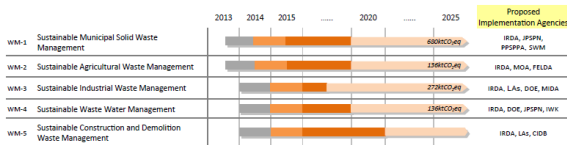
Green and Blue Infrastructure, and Responsible Tourism (RR)

This roadmap describes implementation of Action 10 "Green and Blue Infrastructure and Rural Resources" (RR) with IRDA's implementation Plans; Trees for Urban Parks (RR-1) and Responsible Tourism and Biodiversity Conservation (RR-7). The main contribution of this roadmap to emission reduction is enhancement of carbon sink by forests, including conservation of natural forests, such as mangrove forests, and tree planting in urban area.



Sustainable Waste Management (WM)

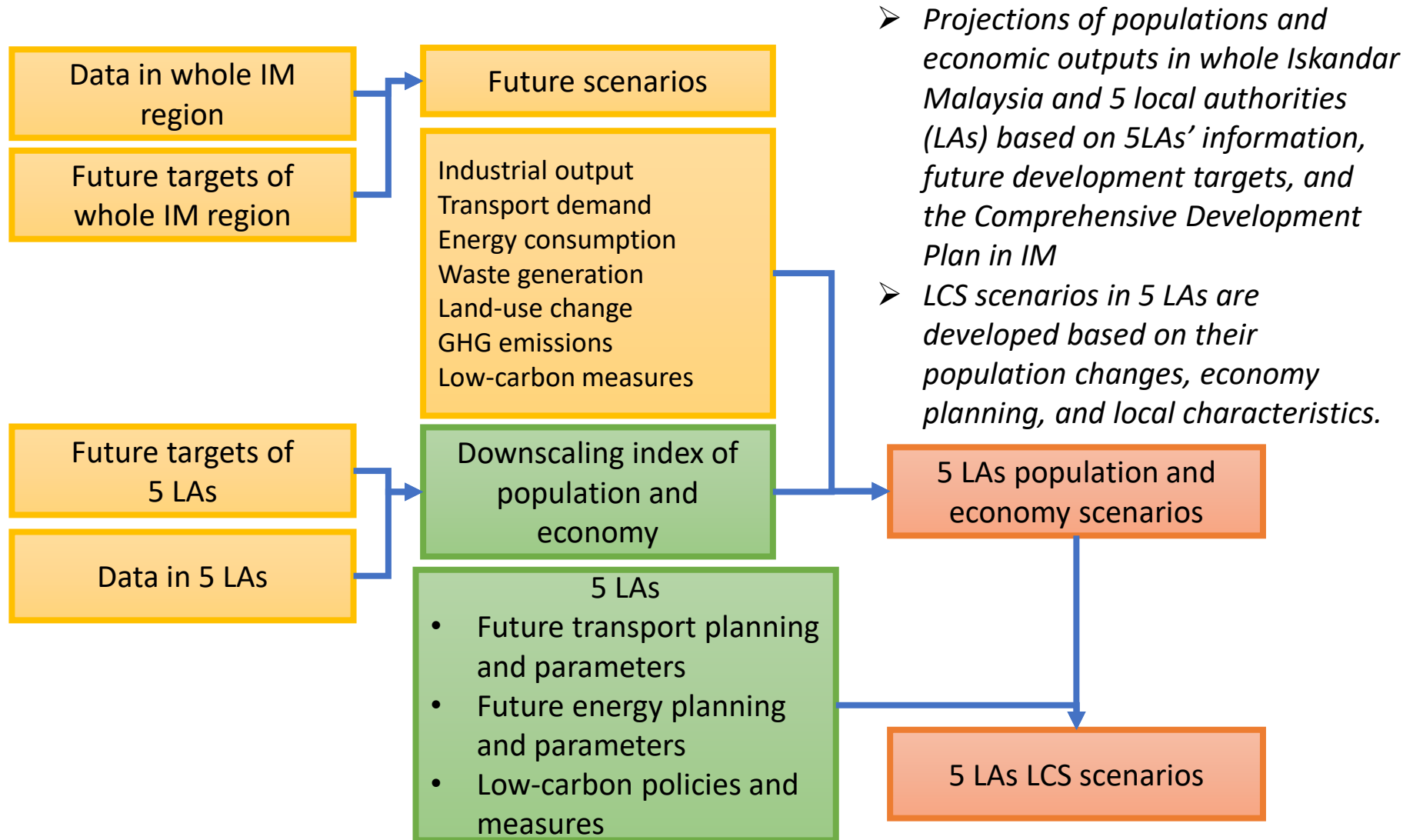
This roadmap covers Action 11 "Sustainable Waste Management" (WM) that includes five sub-actions which cover waste from five different sectors - municipal (household and commercial), agriculture, industry, waste water, and construction and demolition. IRDA implementation plan of *Nafas Baru* Pasir Gudang will become the platform for promoting Sustainable Municipal Solid Waste Management through pilot project of waste separation at source and also focusing on upgrading of landfill management.



LCS scenarios for policy development in Iskandar Malaysia

Make the Actions more close to the People / Implementers

Development of LCS scenarios for five Local Authorities



Make the Actions more close to the People (2)

Set LCS Action Plans in place to five Local Authorities

Kulaijaya Scenario 2025

It is envisioned that by 2025 the MPKu area will host clusters for distribution and logistics services, airport and air cargo activities, high-tech industries, aviation and aerospace industries, R&D facilities, retail and shopping, oil palm plantation and agro-business.

Economic Structure

- Gross Domestic Product (GDP) of the MPKu area in 2025 is expected to be RM5,539 million (3.97 times of the 2005 GDP).
- The share of future primary industry sector in MPKu will decrease from 10% (2005) to 5% (2025).
- The secondary industry sector's share is expected to decrease from 41% (2005) to 36% (2025).
- Tertiary industry sector will become the main economic sector in MPKu, its share rising from 49% in 2005 to 59% in 2025.

Demographics

- Population in MPKu in 2025 is expected to increase to 251,679 (1.44 times compared to 2005).
- Number of households in the MPKu area will increase from 39,777 (2005) to 57,320 (2025).
- GDP per capita in the MPKu area is expected to increase from RM13,727 (2005) to RM80,868 (2025).

Transportation

- Passenger transport demand in the MPKu area will increase from 1,124 million passenger-kilometres (2005) to 6,393 million passenger-kilometres (2025).
- Freight transport demand will increase from 1,284 million tonne-kilometres (2005) to 3,749 million tonne-kilometres (2025).

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	174,584	251,679	1.44	No. of households	39,777	57,320	1.44
GDP (mil RM)	5,539	20,345	3.67	GDP per capita (RM)	31,727	80,869	2.55
Primary Industry (mil RM)	539	934	1.73	Passenger Transport Demand (mil p-km)	1,124	6,393	5.68
Secondary Industry (mil RM)	2,271	7,320	3.23	Freight Transport Demand (mil t-km)	1,284	3,749	2.92
Tertiary Industry (mil RM)	2,729	12,093	4.43				

Figure 1 shows the total carbon emission of the MPKu area by key emission sectors in 2005 (base year), 2025(BaU) (Business as Usual) and 2025CM (Counter Measures) scenarios.

GHG emission of the MPKu area in year 2005 is about 2,297 MtCO₂e which doubles to 4,423 MtCO₂e in year 2025 if no mitigation measures are taken.

However, the scenario will be better if mitigation measures are introduced. An estimated 41% GHG reduction (1,808 MtCO₂e) may be achieved under the 2025CM (as compared to 2025BaU) scenario.

Specifically, emission of the waste sector can be reduced up to 67% (-408MtCO₂e) while the reduction for the transport sector is 54% (-180MtCO₂e), commercial sector 47% (-309MtCO₂e), residential sector 41% (-131MtCO₂e), and industry sector 19% (-327MtCO₂e).

Figure 1: GHG emission by sector

Final Energy Demand (Mtoe)	Year	2005	2025 BaU	2025CM	2025CM/2005	2025CM/2025BaU
GHG emissions (MtCO ₂ e)	2005	2,297	4,423	2,614	1.13	0.59
Per capita CO ₂ emissions (tCO ₂ e)	2005	13.1	17.6	10.4	1.34	0.59
GHG intensity (MtCO ₂ e/mil RM)	2005	0.41	0.22	0.13	0.34	0.30

Pontian Scenario 2025

It is envisioned that by 2025, the three sub-districts of MDP will become the hub for eco-tourism, petrochemical and oil and gas industry as well as power plant.

Economic Structure

- Gross Domestic Product (GDP) of the MDP area in IM in 2025 is expected to be RM5,550 million (1.84 times of the 2005 GDP).
- The share of future primary industry sector of the area will decrease from 10% (2005) to 5% (2025).
- The secondary industry sector's share is expected to decrease from 41% (2005) to 36% (2025).
- Tertiary industry sector will become the main economic sector of the area (from 49% in 2005 to 59% in 2025).

Demographics

- Population in the three sub-districts of MDP in 2025 is expected to increase to 54,142 (1.84 times compared to 2005).
- Number of households in the sub-districts will increase from 6,550 (2005) to 12,101 (2025).
- GDP per capita of the sub-districts is expected to increase from RM 21,667 (2005) to RM35,461 (2025).

Transportation

- Passenger transport demand in MDP area within IM will increase from 205 million passenger-kilometres (2005) to 1,169 million passenger-kilometres (2025).
- Freight transport demand will increase from 147 million tonne-kilometres (2005) to 354 million tonne-kilometres (2025).

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	29,307	54,142	1.84	No. of households	6,550	12,101	1.84
GDP (mil RM)	635	1,921	3.03	GDP per capita (RM)	21,667	35,461	1.64
Primary Industry (mil RM)	124	105	1.33	Passenger Transport Demand (mil p-km)	205	1,169	5.71
Secondary Industry (mil RM)	336	940	2.82	Freight Transport Demand (mil t-km)	147	354	2.40
Tertiary Industry (mil RM)	175	800	4.62				

Figure 1 shows the total carbon emission of the MDP area within IM by key emission sectors in 2005 (base year), 2025(BaU) (Business as Usual) and 2025CM (Counter Measures) scenarios.

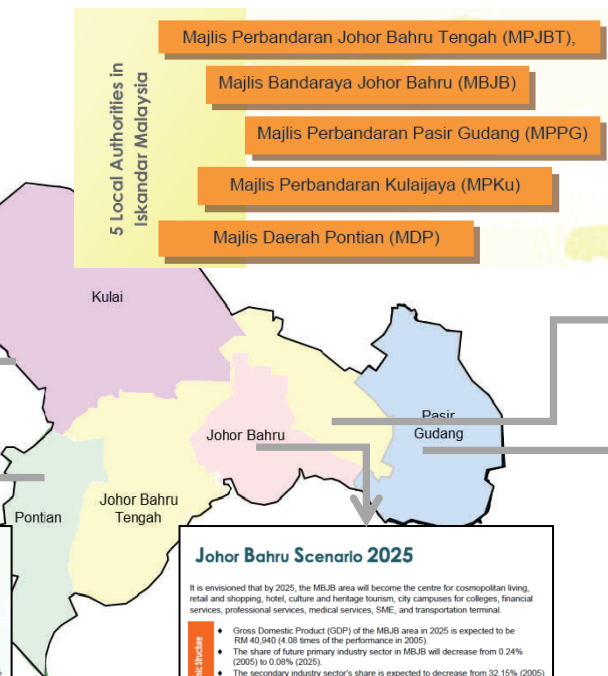
GHG emission of the MDP area within IM in year 2005 is 387 MtCO₂e and is projected to increase to 852 MtCO₂e in year 2025 if no mitigation measures are taken.

However, the scenario will be better if mitigation measures are introduced. An estimated 67% reduction (565 MtCO₂e) may be achieved under the 2025CM (as compared to the 2025BaU) scenario.

Specifically, emission of the waste sector can be reduced up to 66% (-178MtCO₂e) while the reduction for the transport sector is 60% (-178MtCO₂e), commercial sector 49% (-178MtCO₂e), residential sector 49% (-128MtCO₂e) and industry sector 19% (-43MtCO₂e).

Figure 1: GHG emission by sector

Final Energy Demand (Mtoe)	Year	2005	2025 BaU	2025CM	2025CM/2005	2025CM/2025BaU
GHG emissions (MtCO ₂ e)	2005	387	852	2,69	1.73	0.37
Per capita CO ₂ emissions (tCO ₂ e)	2005	10.35	10.75	6.15	0.79	0.63
GHG intensity (MtCO ₂ e/mil RM)	2005	0.63	0.30	0.17	0.48	0.57



Johor Bahru Tengah Scenario 2025

It is envisioned that by 2025, the MPJBT area will become the centre for green livable city & creative innovation belt of tertiary education, creative industries, tourism, entertainment area, theme parks, SME, seaport activities, warehousing, distribution, medical and wellness services.

Economic Structure

- Gross Domestic Product (GDP) of the MPJBT area in 2025 is expected to be RM49,078 (4.31 times of the performance in 2005).
- The share of future primary industry sector in MPJBT will increase from 43% (2005) to 57% (2025).
- Secondary industry sector's share is expected to increase from 25% (2005) to 75% (2025).
- Tertiary industry sector is expected to become a key economic sector in MPJBT (from 16% in 2005 to 84% in 2025).

Demographics

- Population in MPJBT in 2025 is expected to increase to 1,443,921 (2.66 times compared to 2005).
- Number of households in the MPJBT area will increase from 136,640 (2005) to 363,748 (2025).
- GDP per capita of the MPJBT area is expected to increase from RM 20,974 (2005) to RM 33,988 (2025).

Transportation

- Passenger transport demand in the MPJBT area will increase from 3,649 million passenger-kilometres (2005) to 25,399 million passenger-kilometres (2025).
- Freight transport demand will increase from 2,638 million tonne-kilometres (2005) to 6,043 million tonne-kilometres (2025).

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	542,436	1,443,921	2.66	No. of households	136,640	363,748	2.66
GDP (mil RM)	11,377	49,078	4.31	GDP per capita (RM)	20,974	33,988	1.62
Primary Industry (mil RM)	217	289	1.33	Passenger Transport Demand (mil p-km)	3,649	25,399	6.94
Secondary Industry (mil RM)	36,57	11,061	3.00	Freight Transport Demand (mil t-km)	2,638	6,043	2.29
Tertiary Industry (mil RM)	7,383	37,207	5.05				

Figure 1 shows the total carbon emission of the MPJBT area by key emission sectors in 2005 (base year), 2025(BaU) (Business as Usual) and 2025CM (Counter Measures) scenarios.

GHG emission of MPJBT in year 2005 is 3,428 MtCO₂e, the value is expected to increase 50% to 10,159 MtCO₂e in year 2025 if no mitigation measures are taken.

However, the scenario will be better if mitigation measures are introduced. An expected reduction of 67% (5,628 MtCO₂e) may be achieved as compared to 2025BaU.

Specifically, emission of the waste sector can be reduced up to 79% (-330 MtCO₂e) while the reduction for the passenger transport and freight transport sectors are respectively 80% (-1,208 MtCO₂e) & 36% (-629 MtCO₂e), commercial sector 47% (-1,029 MtCO₂e), residential sector 45% (-633 MtCO₂e) and industry sector 10% (-145 MtCO₂e).

Figure 1: GHG emission by sector

Final Energy Demand (Mtoe)	Year	2005	2025 BaU	2025CM	2025CM/2005	2025CM/2025BaU
GHG emissions (MtCO ₂ e)	2005	3,428	10,159	3,500	1.02	0.65
Per capita CO ₂ emissions (tCO ₂ e)	2005	6.3	7.0	3.9	1.11	0.52
GHG intensity (MtCO ₂ e/mil RM)	2005	0.30	0.20	0.11	0.37	0.52

Pasir Gudang Scenario 2025

It is envisioned that by 2025, the MPPG area will support the concentration of Liquid and Bulk Cargo Port Activities, Warehouse and Distribution Activities, Manufacturing, Petrochemical and Chemical Industries, Oil and Gas, Palm Oil Plantation & Agro-Business.

Economic Structure

- Gross Domestic Product (GDP) of the MPPG area in 2025 is expected to be RM29,118 (3.08 times of the performance in 2005).
- The share of future primary industry sector in MPPG will decrease from 2% (2005) to 1% (2025).
- Secondary industry sector's share is expected to remain constant to 75% for 2005 and remain as a key economic sector in MPPG.
- Tertiary industry sector will increase from 23% (2005) to 24% (2025).

Demographics

- Population in the MPPG area in 2025 is expected to increase 329,509 (2.16 times compared to 2005).
- Number of households in the MPPG area will increase from 152,564 (2005) to 329,509 (2025).
- GDP per capita of the MPPG area is expected to increase from RM 52,961 (2005) to RM 88,369 (2025).

Transportation

- Passenger transport demand in MPPG area will increase from 895 million passenger-kilometres (2005) to 5,391 million passenger-kilometres (2025).
- Freight transport demand will increase from 1,873 million tonne-kilometres (2005) to 5,365 million tonne-kilometres (2025).

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	152,564	329,509	2.16	No. of households	34,859	75,289	2.16
GDP (mil RM)	8,000	25,118	3.14	GDP per capita (RM)	52,961	88,369	1.67
Primary Industry (mil RM)	134	231	1.72	Passenger Transport Demand (mil p-km)	895	5,391	6.02
Secondary Industry (mil RM)	6,048	21,832	3.61	Freight Transport Demand (mil t-km)	1,873	5,365	2.86
Tertiary Industry (mil RM)	1,899	7,055	3.72				

Figure 1 shows the total carbon emission of the MPPG area by key emission sectors in 2005 (base year), 2025(BaU) (Business as Usual) and 2025CM (Counter Measures) scenarios.

GHG emission of MPPG area in year 2005 is about 2,673 MtCO₂e, the value will increase 20% to 3,272 MtCO₂e in year 2025 if no mitigation measures are taken.

However, the scenario will be better if mitigation measures are introduced. An estimated 27% GHG reduction (1,193 MtCO₂e) may be achieved under the 2025CM (as compared to the 2025BaU) scenario.

Specifically, emission of the waste sector can be reduced up to 10% (-178MtCO₂e) while the reduction for the transport and commercial sector is 47% (-1,029MtCO₂e), residential sector 46% (-1,138MtCO₂e), industry sector 16% (-1,138MtCO₂e), by the year of 2025 (CM compared to 2005 BaU) or 41% as total carbon emission reduction for all sectors.

Figure 1: GHG emission by sector

Final Energy Demand (Mtoe)	Year	2005	2025 BaU	2025CM	2025CM/2005	2025CM/2025BaU
GHG emissions (MtCO ₂ e)	2005	2,673	3,272	2,479	1.23	0.74
Per capita CO ₂ emissions (tCO ₂ e)	2005	17.5	20.1	14.4	1.48	0.73
GHG intensity (MtCO ₂ e/mil RM)	2005	0.33	0.28	0.21	0.85	0.74

Now name Johor Bahru Tengah is change to Iskandar Puteri City

Low Carbon Society Documents for 5 Municipalities within Iskandar Malaysia

Local Action Plan: Cover and Respective Development Theme



Johor Bahru

Vibrant world class cosmopolis of the south



Johor Bahru Tengah

Green livable city & creative innovation belt



Pasir Gudang

Green & clean industrial port city



Kulaijaya

Smart integrated logistic hub



Pontian

Clean energy and agro-biodiversity hub

S2A FUNDAMENTAL BELIEFS & PRINCIPLES

our beliefs

- Policies are only as good as their implementation
- Good policies are:
 - made with implementation in mind
 - scientifically rooted
 - people centric

our principles

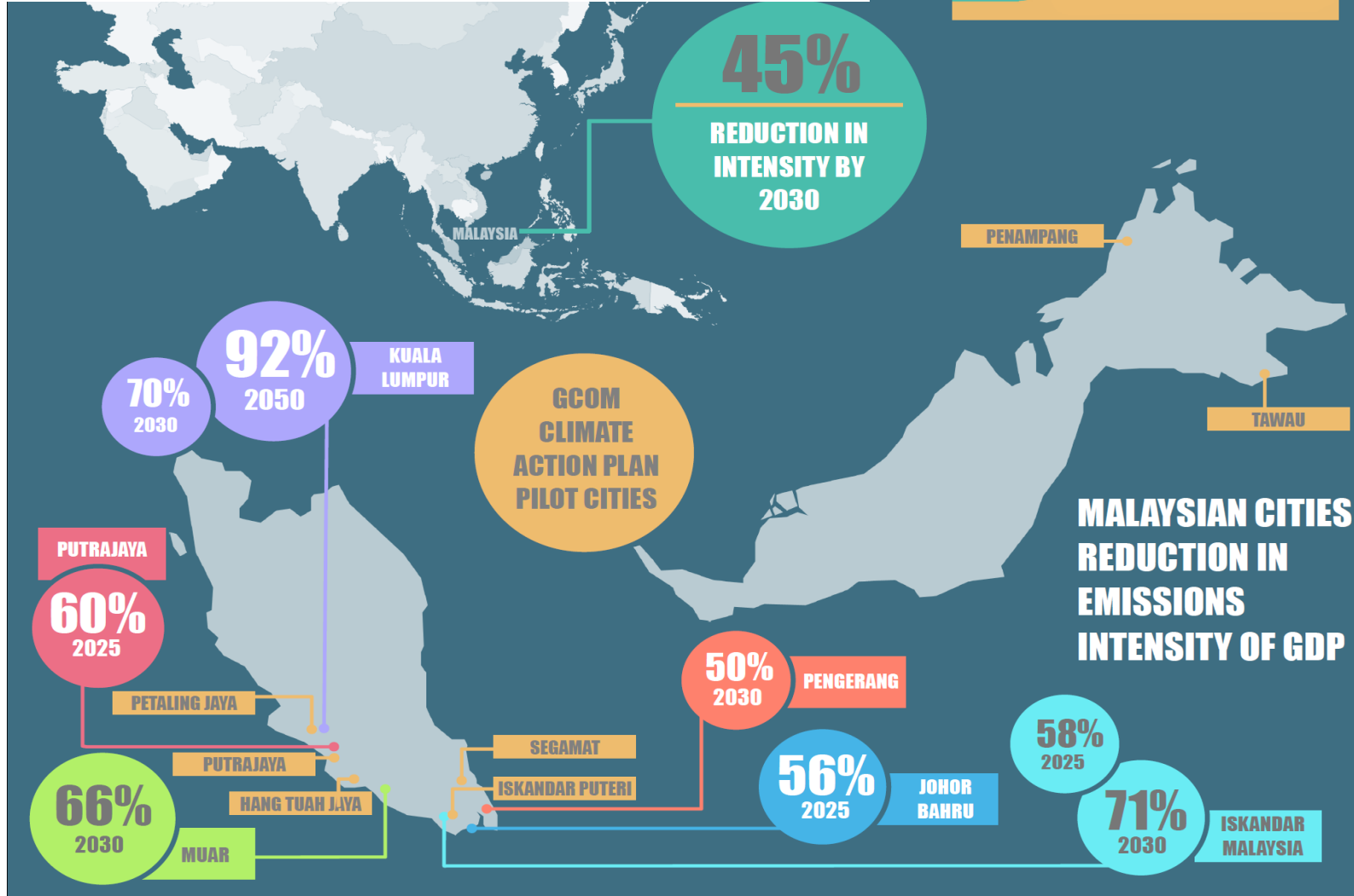
- **SOCIETY** at the core
- **Decoupling**, decarbonising + **CO-BENEFITS**
- Holistic: **TECHNO**-fixes + **PEOPLE**-centric, socially-rooted programs + **ENVIRONMENTAL** countermeasures



In Malaysia we promote
AIM under S2A –



CONTRIBUTIONS TO MALAYSIAN CITY-LEVEL LCS



2022

- GCoM 4 Pilot Cities Climate Action Plan Phase 2
- Low Carbon Society Blueprint for Iskandar Malaysia 2030- Climate Action Plan Asia-Pacific Integrated Model (AIM)

2021

- Wangsa Maju Carbon Neutral Growth Centre Action Plan 2050
- Project for Developing a Policy Framework for Building Energy Efficiency through City-to-City Collaboration between Kuala Lumpur City Hall and Tokyo Metropolitan Government – Phase 3 (FY2021)'
- Iskandar Malaysia GHG Inventory 2018-2019
- Japan-Malaysia Science-Policy Dialogue: Malaysian Climate Change Policies and Capacity Building Needs

2020

- Segamat Low Carbon Society Blueprint 2030
- Project for Developing a Policy Framework for Building Energy Efficiency through City-to-City Collaboration between Kuala Lumpur City Hall and Tokyo Metropolitan Government – Phase 2 (FY2020)'
- Development of Guidebook on How to Develop A Climate Action Plan in Malaysia
- Industrial Symbiosis Survey Workshop of Iskandar Malaysia
- Kuala Lumpur Local Plan 2040 - LCS Sector

2019

- Project for Developing a Policy Framework for Building Energy Efficiency through City-to-City Collaboration between Kuala Lumpur City Hall and Tokyo Metropolitan Government – Phase 1 (FY2020)'
- GCoM 4 Pilot Cities Climate Action Plan Phase 1
- Muar District Local Plan 2030

2018

- Low Carbon Stocktaking Exercise for Iskandar Malaysia
- Casbee Iskandar for Buildings: Assessment of Nong Chick Mosque and Johor Port Authority in Iskandar Malaysia
- Johor Bahru Low Carbon Society Action Plan 2025 (Revision)
- Low Carbon Island Model
- Pengerang Low Carbon Society 2030 Final Report

2016 & 2017

- Kuala Lumpur Low Carbon Society 2030 Blueprint
- Kulai_Sedenak Special Area Plan
- Casbee Iskandar for Building, City and Urban Development

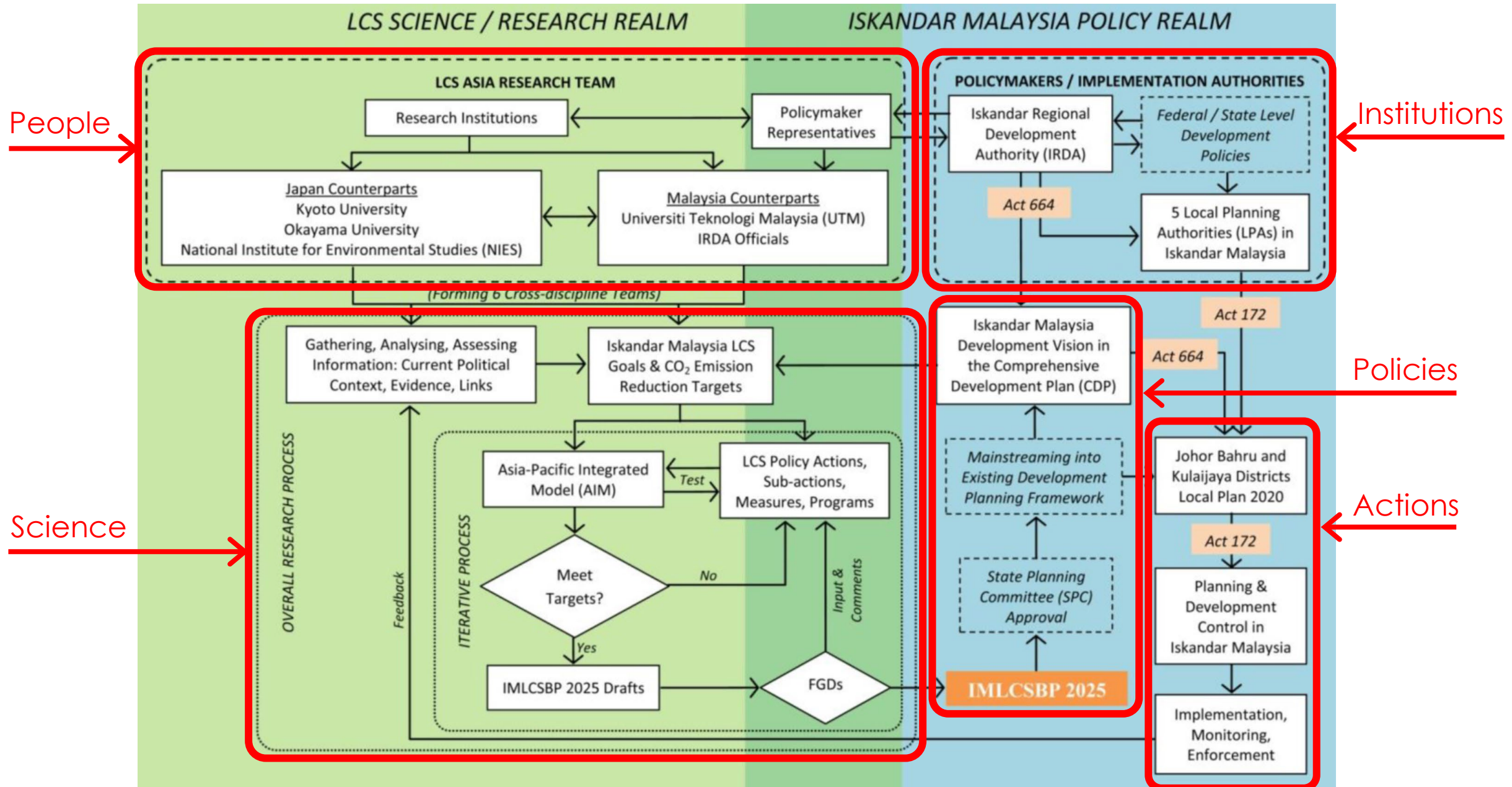
2015

- Low Carbon Society Action Plan 2025 for Johor Bahru: Vibrant world Class Cosmopolis of the South
- Low Carbon Society Action Plan for Johor Bahru Tengah: Green Livable City and Creative Innovation Belt
- Low Carbon Society Action Plan for Johor Kulai: Smart Integrated Logistic Hub
- Low Carbon Society Action Plan for Pasir Gudang: Green and Clean Industrial City
- Low Carbon Society Action Plan for Pontian: Clean energy and Biodiversity Hub
- Casbee Iskandar Pilot Project

2009-2014

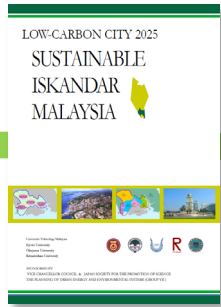
- Iskandar Malaysia Low Carbon Society Blueprint —Summary for Policymaker
- Pasir Gudang Green and Smart Cities
- Iskandar Malaysia Eco-Life Challenge 2014
- Low Carbon Society Scenarios Malaysia 2030
- Low Carbon Society Blueprint for Iskandar Malaysia 2025 - Full Report
- Iskandar Malaysia: Action for a Low Carbon Future
- Putrajaya Green City 2025

ISKANDAR MALAYSIA CLIMATE SCIENCE-POLICY-ACTION



UTM & ISKANDAR MALAYSIA'S EPIC LCS JOURNEY

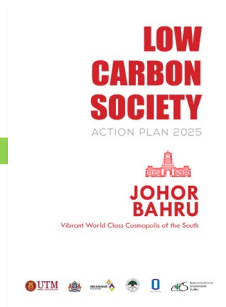
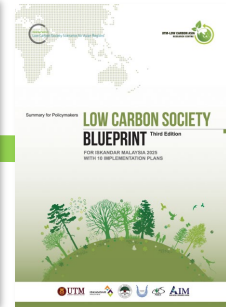
Science-based Climate Policies and Action Plans



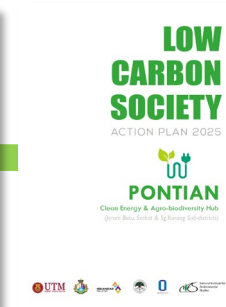
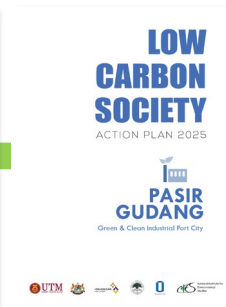
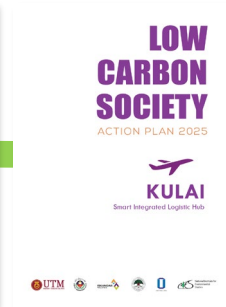
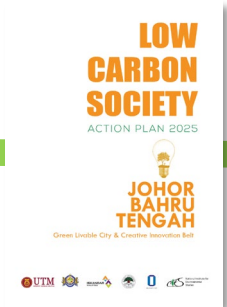
2009



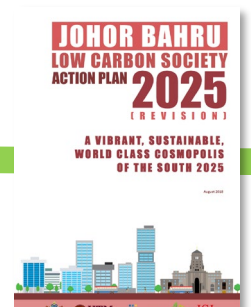
2011-2012



Now name change to Iskandar Puteri



2014-2015

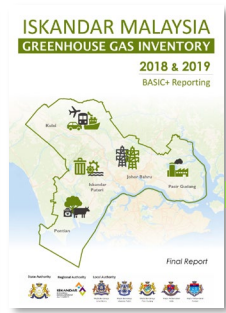
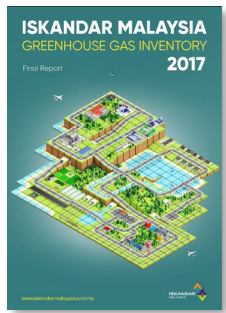


2018



Tools for Action

2015-2016



Stocktaking and Monitoring

2015-2019

LCSBPIM 2030-CAP (Launching 12 Nov 2022 @ COP27)

2021-2022

Iskandar Malaysia Net Zero Emission Future (2050)

EXTENDING AIM BEYOND ISKANDAR MALAYSIA

– KUALA LUMPUR LOW CARBON SOCIETY 2030

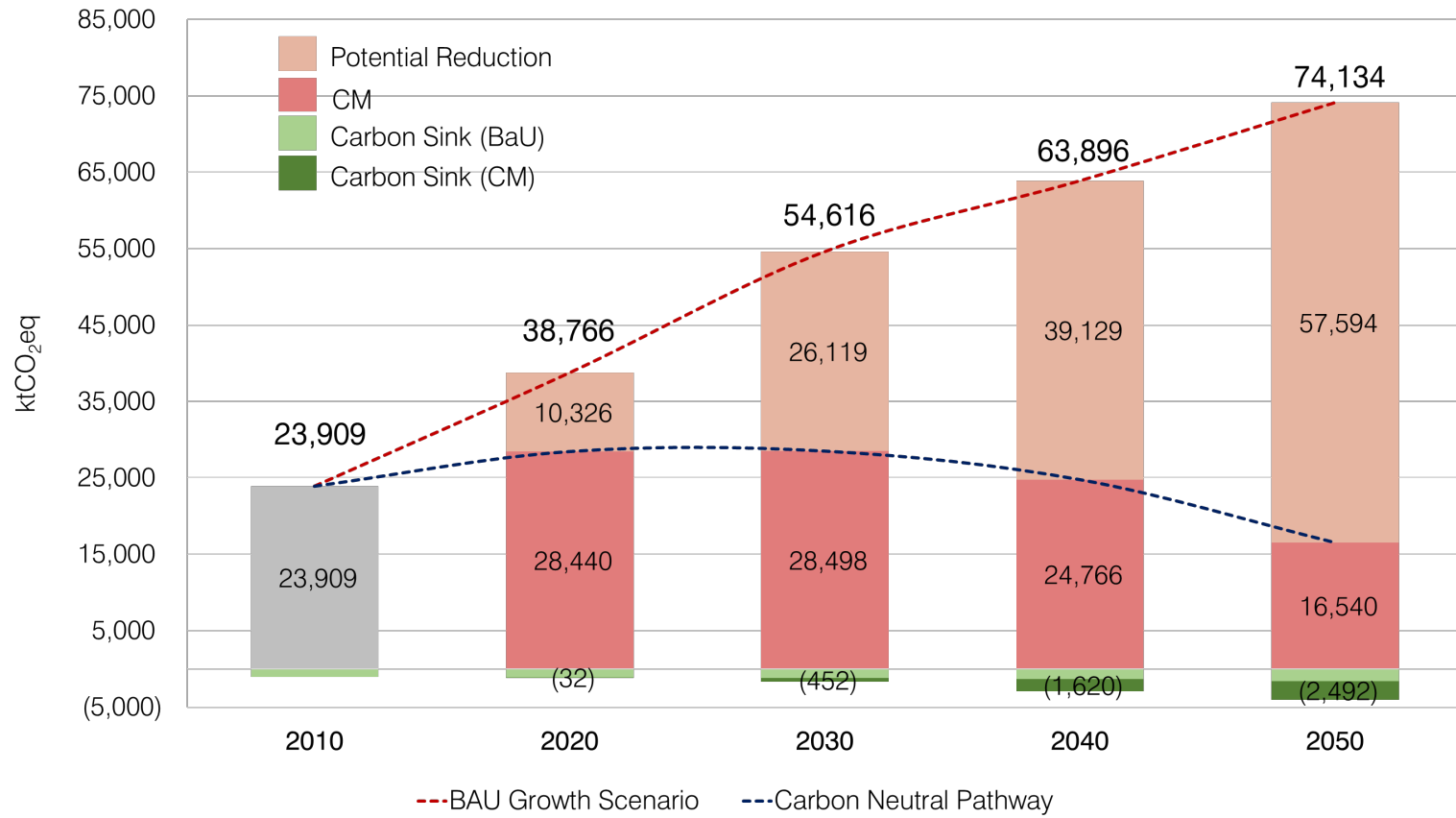
– KUALA LUMPUR NET ZERO EMISSION 2050



2017-2018

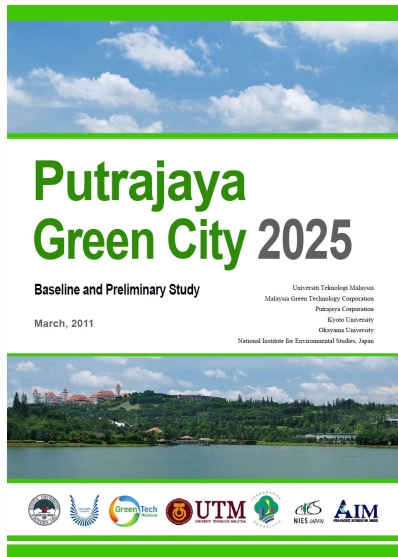


2021-2022



EXTENDING AIM BEYOND ISKANDAR MALAYSIA LCSBP 2025

- PUTRAJAYA GREEN CITY 2025
- PENGERANG LOW CARBON SOCIETY 2030
- MUAR DISTRICT LOCAL PLAN 2030
- SEGAMAT LOW CARBON SOCIETY 2030
- ISKANDAR MALAYSIA – LOW CARBON SOCIETY BLUEPRINT 2030



2011-2012



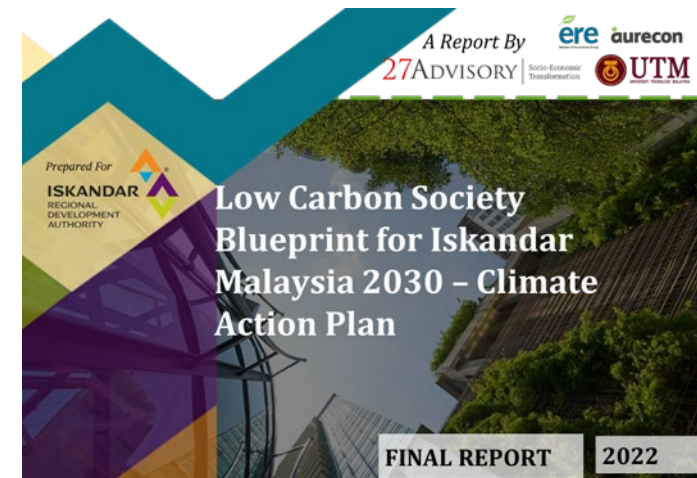
2017-2018



2019-2021



2020-2021



2021-2022

Lesson learned / take away Messages on AIM Application In Malaysia Accelerating Decarbonisation City-level LCS

- ❑ ***GHG Modelling application/ scientific research*** is cornerstone to policy makers and ensure effective implementation of LCS policies in realising GHG emission reduction.
- ❑ ***Top Down with Highest-level policy makers support*** greatly expedites LCS science to LCS actions
- ❑ ***Bottom up with Progressive inclusive stakeholders buy in*** are pivotal to accelerating LCS transitions.
- ❑ ***Joint research*** (local and international) on LCS is essential to developing countries.
- ❑ ***Development of Low carbon society*** (life style change) is the way forward to strong, sustainable cities and regions.
- ❑ ***ACT NOW and Project Visibility to public are important.***



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

UTM **LOW**
CARBON
ASIA
RESEARCH CENTRE



COP27
SHARM EL-SHEIKH
EGYPT 2022



THANK YOU!

UTM-Low Carbon Asia Research Centre
Block B12, 02-04-01
Faculty of Built Environment & Surveying
Universiti Teknologi Malaysia
81310 UTM Johor Bahru
Johor, MALAYSIA

T: +60-7-5557359
E: lwchau@utm.my
E: ho@utm.my

