Development of
Low Carbon Scenarios for Asia Regions

CBA ASIA TOKYO CONFERENCE 2016

MARCH 7-9, 2016 TOKYO JAPAN

Parallel session 2 on March 7 2016 at 1545-1700

Consensus building project showcase

Project for Development of Low Carbon Society Scenarios for Asia Regions using the focus group discussion

HO CHIN SIONG, Universiti Teknologi Malaysia

Background

Iskandar Malaysia: Key Challenges

Target

- COP 19 Copenhagen 2015 – Malaysia pledge Voluntary **40% reduction** by 2020

- COP21 Paris 2015 - **45% by 2030** relative to the emissions intensity of GDP in 2005.

Issues

_ How do we use consensus building and other participatory proceses for policy issues

Size: 2,216.3 km²

Population: 1.3 mil. (2005) I 3.0 mil. (2025)

GDP: 35.7 bil. RM (2005) I 141.4 bil. RM (2025)

Related Government Policy Directions

a. Five-Fuel Policy (2001)
b. National Policy on the Environment (2002)
c.National Strategic Plan for Solid Waste Mgmt (2005)
d. National Biofuel Policy (2006)
e. National Energy Policy (2008)
f National Green Technology Policy (2009)
g. National Policy on Climate Change (2009)
h. New Econ Model, Govt & Econ Transformation (2010)
i. Renewable Energy Policy and Action Plan (2010)
j. Second National Physical Plan (2010)
k. Low Carbon Cities Framework (2011)
l National Agro-food Policy (2011)
m. National Water Resources Policy (2012)
N National Automotive Policy (2014)

Urban Policy issues – Introducing Low carbon Physical planning

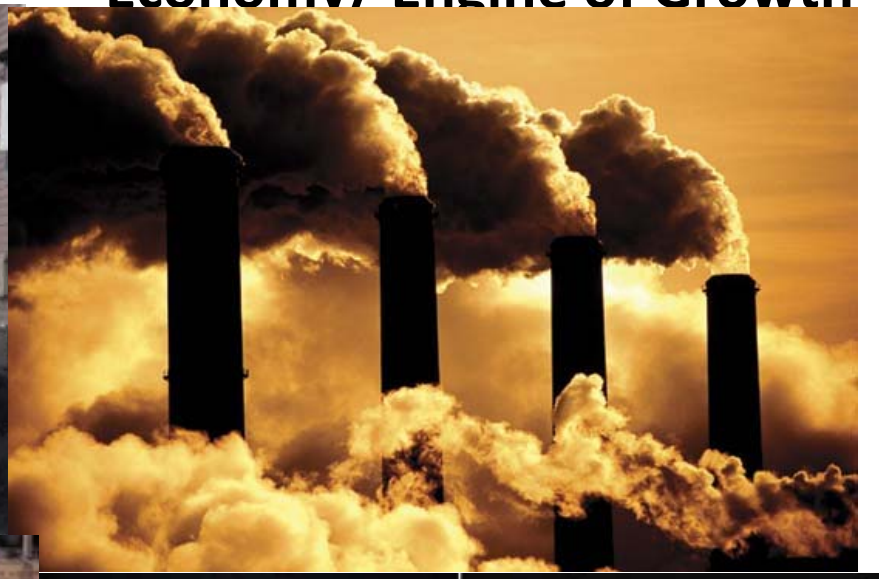
Material and Energy

Mobility and Green

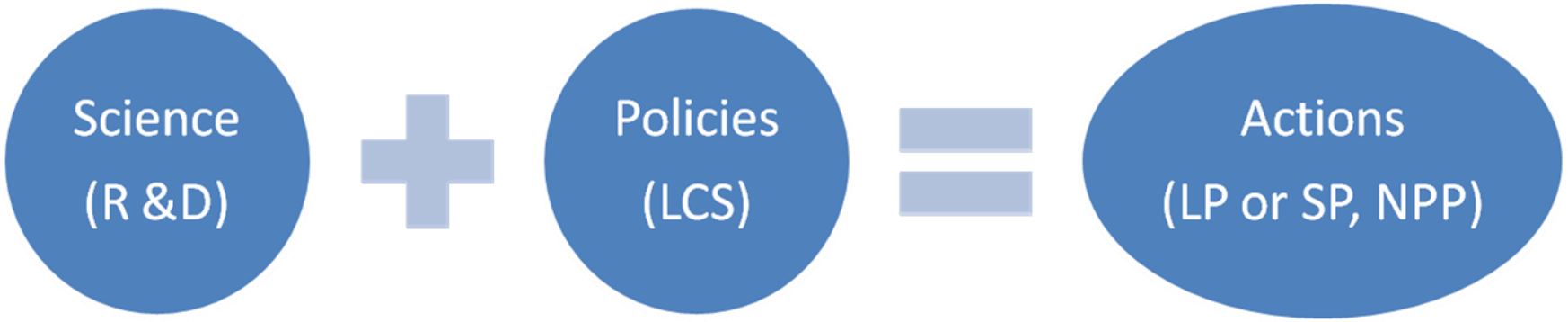
Urban Policy issues – Introducing Low carbon– Socio-economic system

Social/ People

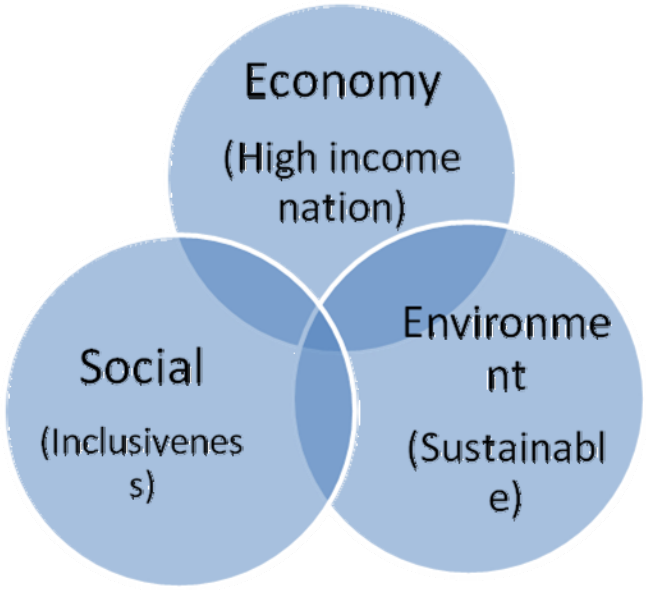
Economy/ Engine of Growth

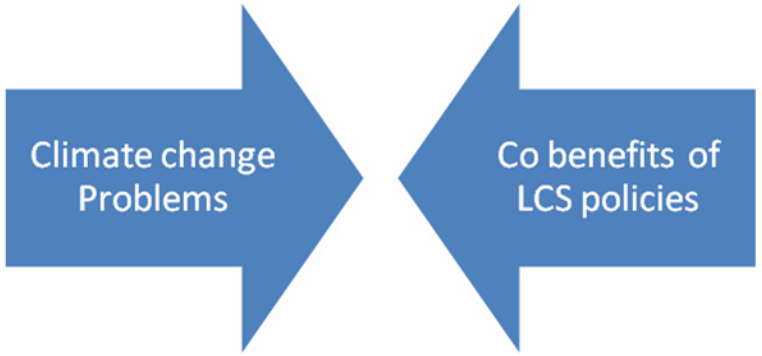


Low carbon solution- incorporating sustainable development approach (decarbonising policy)



Key element Sustainable development = PRO GROWTH, PRO JOB , PRO POOR and PRO ENVIRONMENT





Low carbon society and sustainability in developing countries like Malaysia ?

Rationale

- **National Agenda** 40% CO_2 intensity reduction
- Climate change and **sustainability policy issues are embedded** in all spatial planning policies (NPP/ RS/LP)
- Green as **New Consumer Culture, New Market, New Growth** with Green Credentials **Economics + Environment = Green Economy.**
- **Fulfill roles to reduce vulnerability** on disasters (flood) and promote comfort and safety.
- **Money-saving -**Energy conservation and renewable energy

Why LCS cities?

CO2 Modelling /LCS blueprint on the Case study of Iskandar Malaysia

Project Background

Site: Iskandar Malaysia

(Iskandar Regional Development Authority)

Objective:

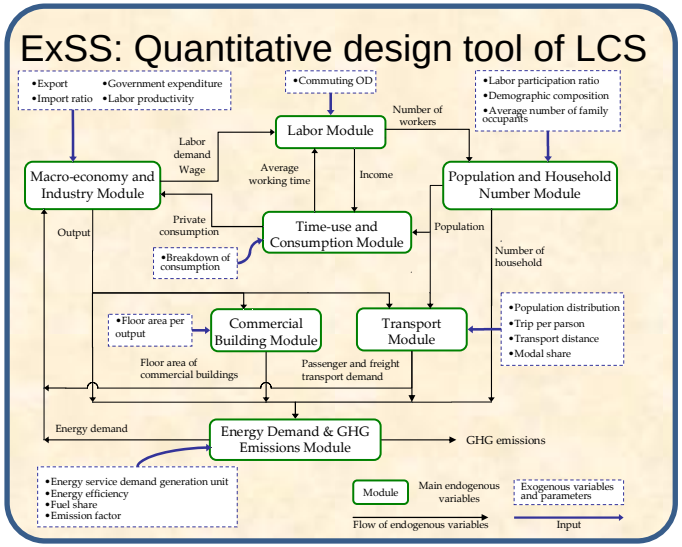
i. To draw up **key policies and strategies** in guiding the development of Iskandar Malaysia in **mitigating carbon emission**. *Transforming Iskandar Malaysia into* ***a sustainable low carbon metropolis by adopting green growth strategies/roadmap.***

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

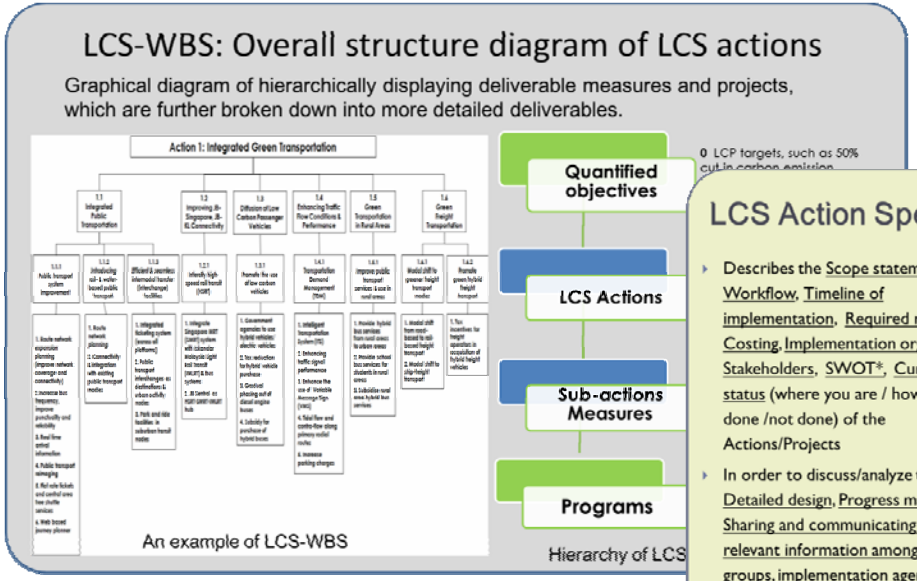
Target Year: 2025 (2005 – 2025)

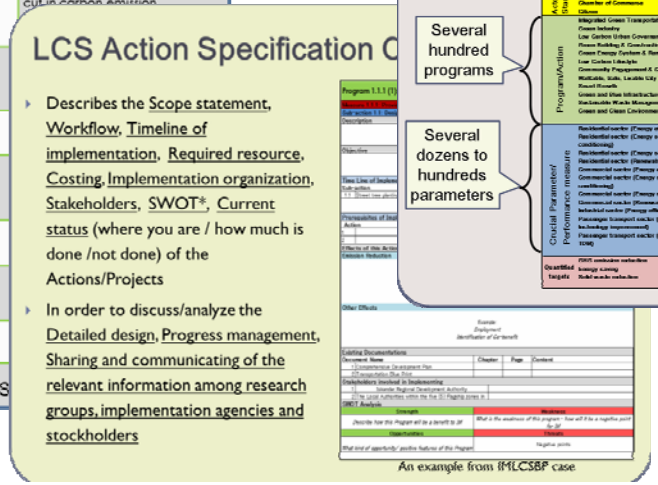
Scientific Methodology – evidence

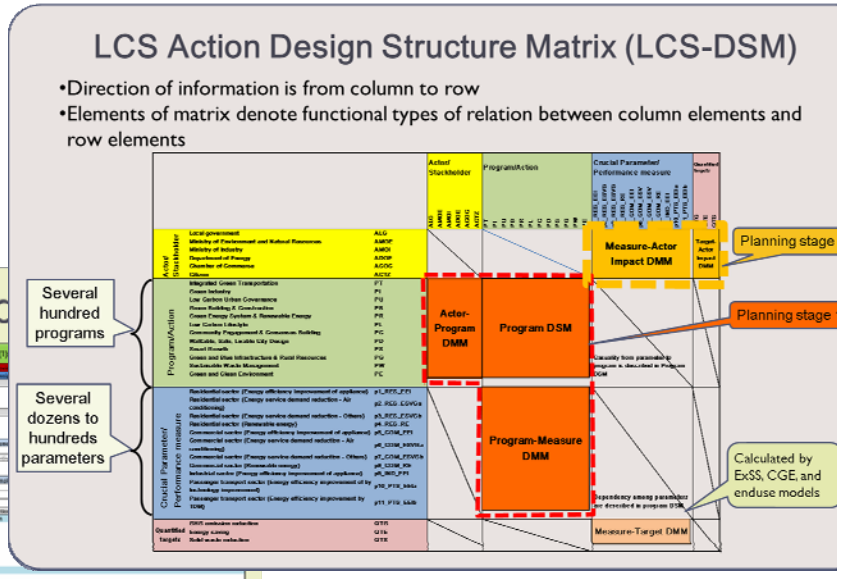
Development of supporting tools for designing and managing LCS scenarios

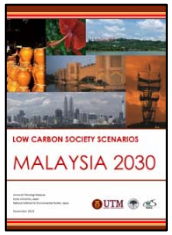


- Extended SnapShot model (ExSS)
- LCS Action Reference Database
- LCS Action Work Breakdown Structures(LCS-WBS)
- LCS Action Specification Cards(LCS-ASC)
- LCS Action Design Structure Matrix (LCS-DSM)
- Tool for attributing the Efforts towards Quantified targets to each Action/program (ARIPPLE)
- LCS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









LCS scenarios for policy development

National context - of Low Carbon Policies and GHG Reduction Potential in Malaysia

National mitigation target :
Maintain 40% reduction emission intensity by year 2020, 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.

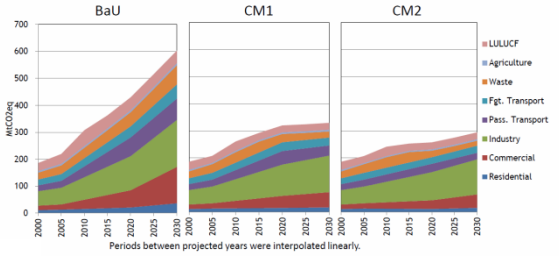
Low Carbon Society Scenarios in Malaysia

Summary of mitigation options

	2020		2030	
	CM1	CM2	CM1	CM2
Diffusion of energy efficient devices	40%	60%	75%	85%
EEI 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			

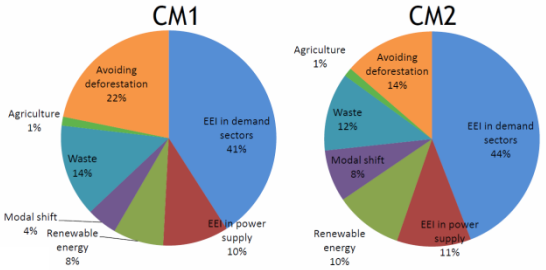
GHG emissions (Energy, Waste and AFOLU)

- 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).

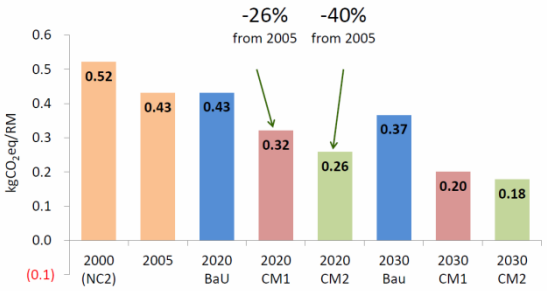


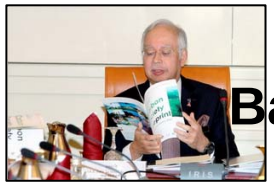
Contribution to emission reduction in 2020

- 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)





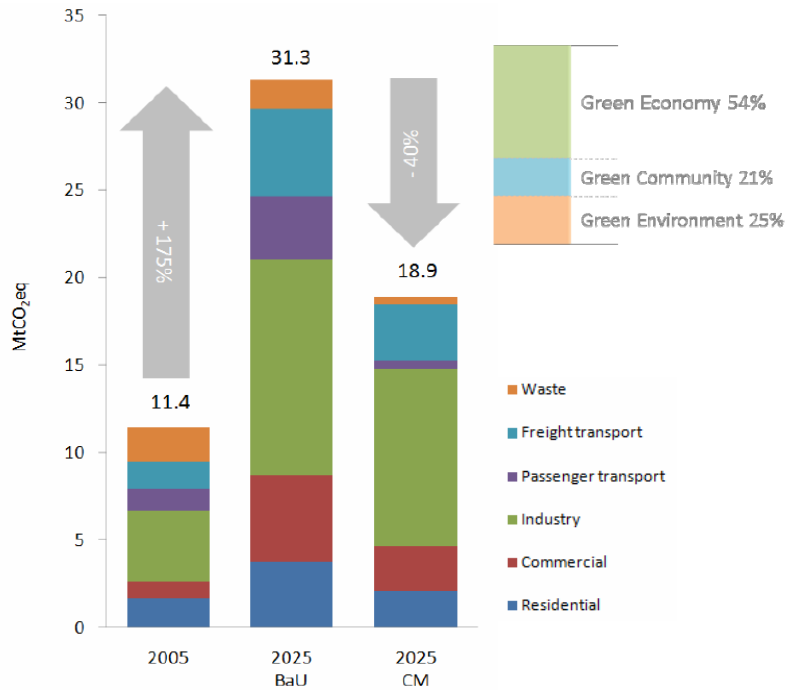
Baseline study - LCS scenarios for policy development in IM

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:

  I) 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;

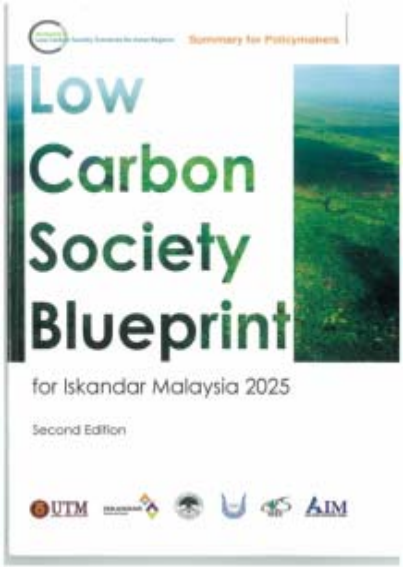
  II) **scenario-based modelling** and projection of carbon emission reductions achievable.

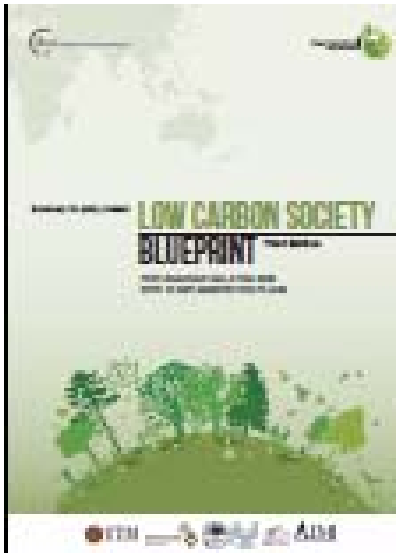


GHG reductions by Actions

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%

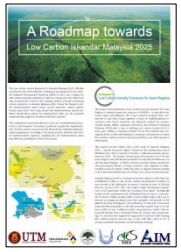
Community engagement (local authorities, business community, Professional bodies, NGOs) to produce Low Carbon Society Blueprint Iskandar Malaysia 2025





- 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	



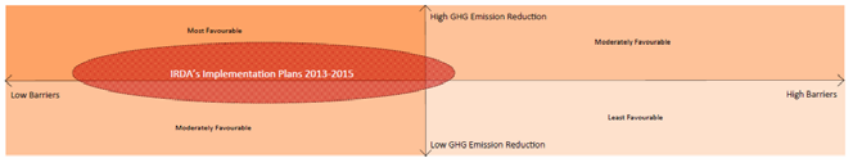
Operational Oriented - LCS scenarios for policy development in IM

How to make the LCS happen in IM through FGD

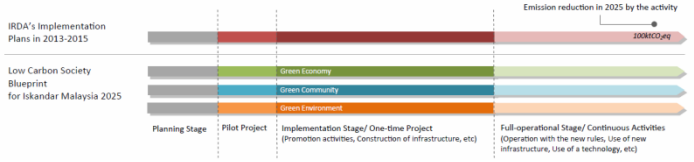
A Roadmap towards Low Carbon Iskandar Malaysia 2025

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.



Guide to Reading Timeline Diagram

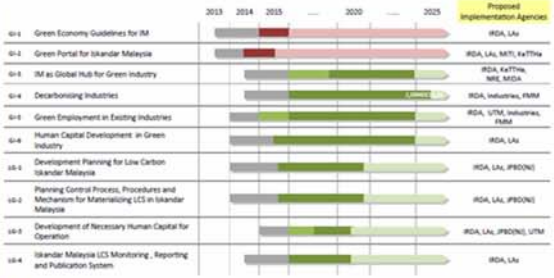


The roadmap comprises of EIGHT (8) implementation sectors demonstrating the implementation plan for TWELVE (12) key policy actions of *Low Carbon Society Blueprint for Iskandar Malaysia 2025* as well as IRDA's Implementation Plans 2013-2015. Each section breaks its policy action(s) into detail strategic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

Please see "Guide to Reading Timeline Diagram" printed overleaf for clarity >>>

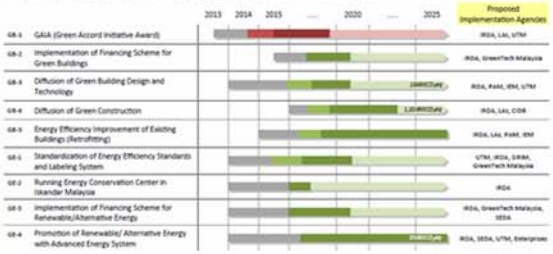
Green Industry and Low Carbon Governance (GI, LG)

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.



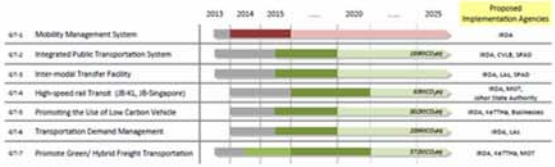
Green Building and Energy System (GB, GE)

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.



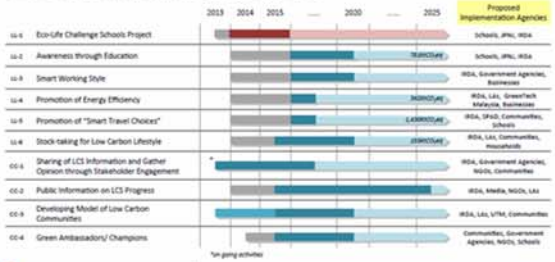
Green Transportation (GT)

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.

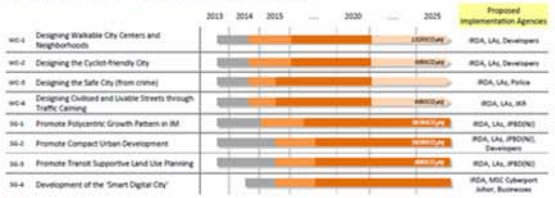


Clean Air Environment (CA)

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.

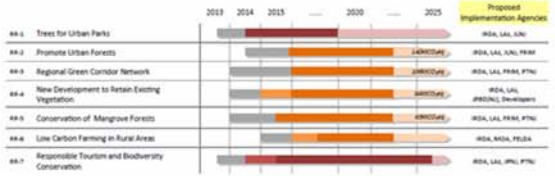
Green Urban Design (WC, SG)

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.



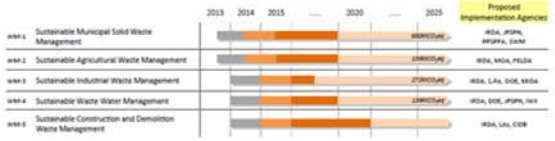
Green and Blue Infrastructure, and Responsible Tourism (RR)

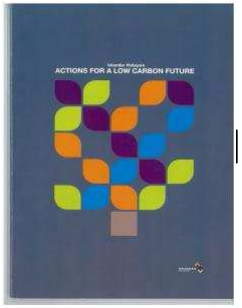
This roadmap describes implementation of Action 10 "Green and Blue Infrastructure and Rural Resources" (RR) with IRDA's Implementation Plans; Trees for Urban Parks (RR-1) and Responsible Tourism and Biodiversity Conservation (RR-7). The main contribution of this roadmap to emission reduction is enhancement 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.





Prioritization LCS scenarios for policy development in IM

low to make the LCS happen in IM through FGD with local authorities

"*Actions for a Low Carbon Future*"

- **Near term action plans "Actions for a Low Carbon Future" from year 2013 to 2015 have been proposed based on the *Low Carbon Society Blueprint for Iskandar Malaysia 2025*.**
- **It listed up 10 programmes which IRDA has started implementing. It was launched by Malaysia Prime Minister Dato' Sri Mohd Najib Tun Abdul Razak on 6th November 2013.**

	Programmes
1	Integrated Green Transportation – Mobility Management System
2	Green Economy Guidelines
3	Eco-Life Challenge Project for Schools
4	Portal on Green Technology
5	Trees for Urban Parks/Forests
6	Responsible Tourism and Biodiversity Conservation
7	Bukit Batu Eco-Community
8	GAIA – Green Accord Initiative Award
9	Low Carbon Village FELDA Taib Andak
10	Special Feature: Smart City –Nafas Baru Pasir Gudang: CLEAN AND HEALTHY

How to link near term actions to LCSBP Iskandar Malaysia

Relationship Matrix

The matrix below shows the relationship between IRDA's Implementation Plans 2013-2015 and key policy actions of the *Low Carbon Society Blueprint for Iskandar Malaysia 2025*. Out of IRDA's TEN (10) implementation plans, SEVEN (7) of them are included in this roadmap. These implementation plans are IRDA's first attempt at good initiatives towards a climate resilient economy in Iskandar Malaysia. The plans have been proposed according to the recommendation of the *Low Carbon Society Blueprint for Iskandar Malaysia 2025*. The implementation plans cover THREE (3) major themes that underpin the low carbon society concept - Green Economy, Green Community and Green Environment. However, THREE (3) special projects covering specific area namely; (i) Bukit Batu Eco-Community, (ii) Low Carbon Village Felda Taib Andak and (iii) *Nafas Baru* Pasir Gudang that require comprehensive study are not discussed in this roadmap.

12 Actions in the *Low Carbon Society Blueprint for Iskandar Malaysia 2025* / IRDA's Implementation Plan 2013-2015		Specific Action-based Projects							Special Projects		
		GI-1 Green Economy Guidelines for IM	GI-2 Portal on Green Technology for Iskandar Malaysia	GB-1 GAIA (Green Accord Initiative Award)	GT-1 Mobility Management System	LL-1 Eco-Life Challenge Schools Project	RR-1 Trees for Urban Parks/ Forests	RR-7 Responsible Tourism and Biodiversity Conservation	Bukit Batu Eco-Community	Low Carbon Village Felda Taib Andak	*Nafas Baru* Pasir Gudang - Clean and Healthy City
Green Economy	Action 1 Integrated Green Transportation (GT)				●				○		○
	Action 2 Green Industry (GI)	●	●								
	Action 3 Low Carbon Urban Governance (LG)										
	Action 4 Green Building and Construction (GB)			●							
	Action 5 Green Energy System and Renewable Energy (GE)			●					○		
Green Community	Action 6 Low Carbon Lifestyle (LL)					●			○	○	○
	Action 7 Community Engagement and Consensus Building (CC)										
Green Environment	Action 8 Walkable, Safe and Livable City Design (WC)										
	Action 9 Smart Urban Growth (SG)										
	Action 10 Green and Blue Infrastructure and Rural Resources (RR)						●	●		○	
	Action 11 Sustainable Waste Management (WM)								○		○
	Action 12 Clean Air Environment (CA)								○	○	○

Make the Actions more close to the People (2)

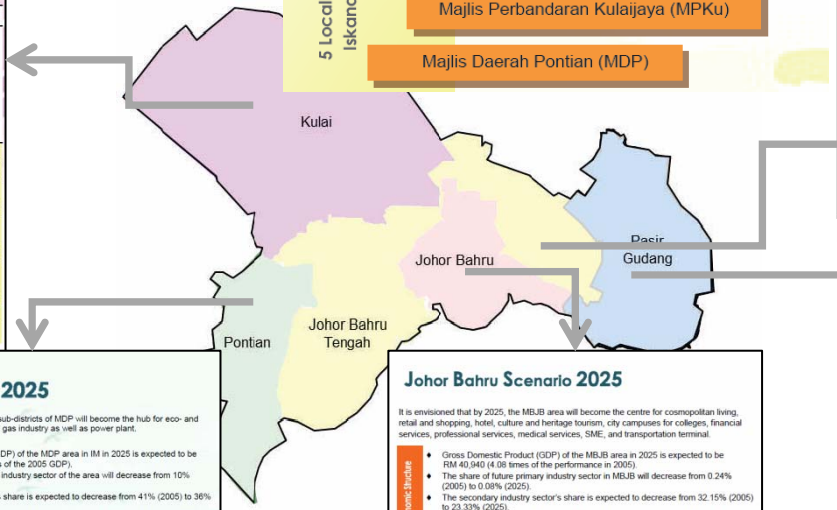
Set LCS Action Plans in place to five Local Authorities

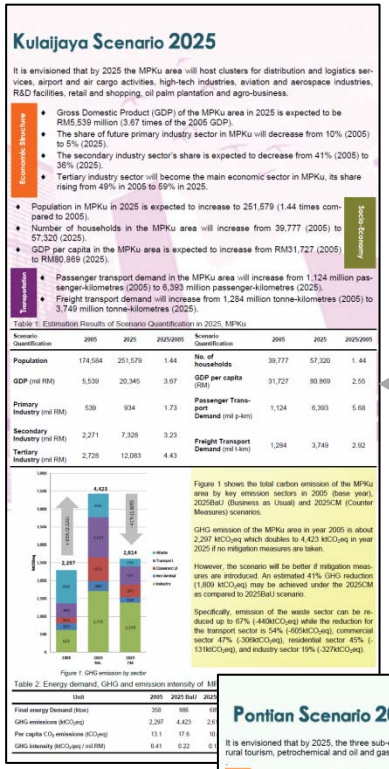
Future Activities

5 Local Authorities in Iskandar Malaysia

- Majlis Perbandaran Johor Bahru Tengah (MPJBT),
- Majlis Bandaraya Johor Bahru (MBJB)
- Majlis Perbandaran Pasir Gudang (MPPG)
- Majlis Perbandaran Kulaijaya (MPKu)
- Majlis Daerah Pontian (MDP)

(Source: CDP 2006)





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 (3.67 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.

Socio-Economy

- Population in MPKu in 2025 is expected to increase to 251,579 (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 RM31,727 (2005) to RM80,869 (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).

Table 1: Estimation Results of Scenario Quantification in 2025, MPKu

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	174,584	251,579	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	7,328	3.23	Freight Transport Demand (mil t-km)	1,284	3,749	2.92
Tertiary Industry (mil RM)	2,728	12,083	4.43				

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

GHG emission of the MPKu area in year 2005 is about 2,297 ktCO$_2$eq which doubles to 4,423 ktCO$_2$eq in year 2025 if no mitigation measures are taken.

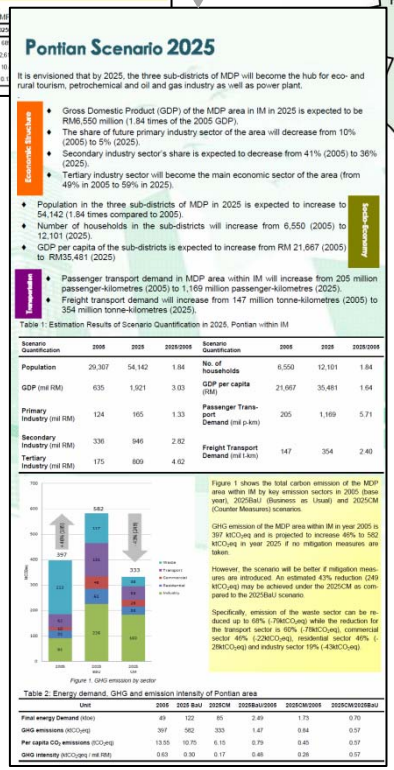
However, the scenario will be better if mitigation measures are introduced. An estimated 41% GHG reduction (1,809 ktCO$_2$eq) may be achieved under the 2025CM as compared to 2025BaU scenario.

Specifically, emission of the waste sector can be reduced up to 67% (-443ktCO$_2$eq) while the reduction for the transport sector is 54% (-605ktCO$_2$eq), commercial sector 47% (-309ktCO$_2$eq), residential sector 45% (-131ktCO$_2$eq), and industry sector 19% (-327ktCO$_2$eq).

Figure 1: GHG emission by sector

Table 2: Energy demand, GHG and emission intensity of MPKu

Unit	2005	2025 BaU	2025
Final energy Demand (ktoe)	358	986	68
GHG emissions (ktCO$_2$eq)	2,297	4,423	2,6
Per capita CO$_2$ emissions (tCO$_2$eq)	13.1	17.6	10
GHG intensity (kgCO$_2$eq / mil RM)	0.41	0.22	0.1



Pontian Scenario 2025

It is envisioned that by 2025, the three sub-districts of MDP will become the hub for eco- and rural 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 RM6,650 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).
- 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).

Socio-Economy

- 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 RM35,481 (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).

Table 1: Estimation Results of Scenario Quantification in 2025, Pontian within IM

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	35,481	1.64
Primary Industry (mil RM)	124	165	1.33	Passenger Transport Demand (mil p-km)	205	1,169	5.71
Secondary Industry (mil RM)	336	946	2.82				
Tertiary Industry (mil RM)	175	809	4.62	Freight Transport Demand (mil t-km)	147	354	2.40

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

GHG emission of the MDP area within IM in year 2005 is 397 ktCO$_2$eq and is projected to increase 46% to 582 ktCO$_2$eq in year 2025 if no mitigation measures are taken.

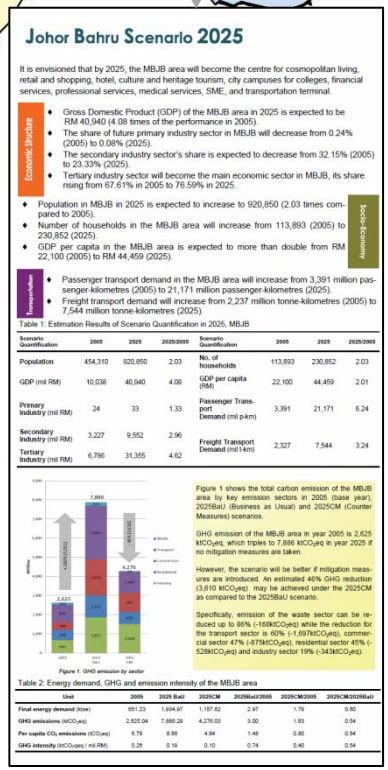
However, the scenario will be better if mitigation measures are introduced. An estimated 43% reduction (249 ktCO$_2$eq) may be achieved under the 2025CM as compared to the 2025BaU scenario.

Specifically, emission of the waste sector can be reduced up to 68% (-79ktCO$_2$eq) while the reduction for the transport sector is 60% (-79ktCO$_2$eq), commercial sector 46% (-22kCO$_2$eq), residential sector 46% (-26ktCO$_2$eq) and industry sector 19% (-43ktCO$_2$eq).

Figure 1: GHG emission by sector

Table 2: Energy demand, GHG and emission intensity of Pontian area

Unit	2005	2025 BaU	2025CM	2025BaU/2005	2025CM/2005	2025CM/2025BaU
Final energy Demand (ktoe)	49	122	85	2.49	1.73	0.70
GHG emissions (ktCO$_2$eq)	397	582	333	1.47	0.84	0.57
Per capita CO$_2$ emissions (tCO$_2$eq)	13.55	10.75	6.15	0.79	0.45	0.57
GHG intensity (kgCO$_2$eq / mil RM)	0.63	0.30	0.17	0.48	0.26	0.57



Johor Bahru Scenario 2025

It is envisioned that by 2025, the MBJB area will become the centre for cosmopolitan living, retail and shopping, hotel, culture and heritage tourism, city campuses for colleges, financial services, professional services, medical services, SME, and transportation terminal.

Economic Structure

- Gross Domestic Product (GDP) of the MBJB area in 2025 is expected to be RM 40,940 (4.08 times of the performance in 2005).
- The share of future primary industry sector in MBJB will decrease from 0.24% (2005) to 0.08% (2025).
- The secondary industry sector's share is expected to decrease from 32.15% (2005) to 23.33% (2025).
- Tertiary industry sector will become the main economic sector in MBJB, its share rising from 67.61% in 2005 to 76.59% in 2025.

Socio-Economy

- Population in MBJB in 2025 is expected to increase to 920,850 (2.03 times compared to 2005).
- Number of households in the MBJB area will increase from 113,893 (2005) to 230,852 (2025).
- GDP per capita in the MBJB area is expected to more than double from RM 22,100 (2005) to RM 44,459 (2025).

Transportation

- Passenger transport demand in the MBJB area will increase from 3,391 million passenger-kilometres (2005) to 21,171 million passenger-kilometres (2025).
- Freight transport demand will increase from 2,237 million tonne-kilometres (2005) to 7,544 million tonne-kilometres (2025).

Table 1: Estimation Results of Scenario Quantification in 2025, MBJB

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	454,310	920,850	2.03	No. of households	113,893	230,852	2.03
GDP (mil RM)	10,038	40,940	4.08	GDP per capita (RM)	22,100	44,459	2.01
Primary Industry (mil RM)	24	33	1.33	Passenger Transport Demand (mil p-km)	3,391	21,171	6.24
Secondary Industry (mil RM)	3,227	9,552	2.96				
Tertiary Industry (mil RM)	6,786	31,355	4.62	Freight Transport Demand (mil t-km)	2,327	7,544	3.24

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

GHG emission of the MBJB area in year 2005 is 2,625 ktCO$_2$eq, which triples to 7,886 ktCO$_2$eq in year 2025 if no mitigation measures are taken.

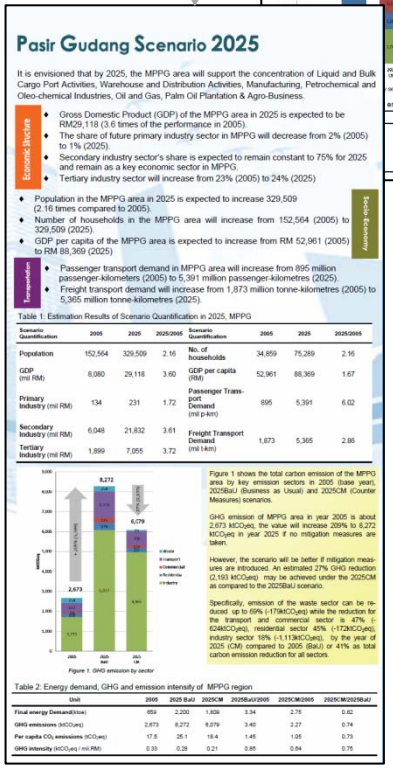
However, the scenario will be better if mitigation measures are introduced. An estimated 46% GHG reduction (3,610 ktCO$_2$eq) may be achieved under the 2025CM as compared to the 2025BaU scenario.

Specifically, emission of the waste sector can be reduced up to 86% (-168ktCO$_2$eq) while the reduction for the transport sector is 60% (-1,697ktCO$_2$eq), commercial sector 47% (-675ktCO$_2$eq), residential sector 45% (-528ktCO$_2$eq) and industry sector 19% (-343ktCO$_2$eq).

Figure 1: GHG emission by sector

Table 2: Energy demand, GHG and emission intensity of the MBJB area

Unit	2005	2025 BaU	2025CM	2025BaU/2005	2025CM/2005	2025CM/2025BaU
Final energy demand (ktoe)	681.23	1,834.97	1,187.62	2.97	1.79	0.80
GHG emissions (ktCO$_2$eq)	2,625.04	7,886.29	4,276.03	3.00	1.63	0.54
Per capita CO$_2$ emissions (tCO$_2$eq)	5.78	8.56	4.94	1.48	0.86	0.54
GHG intensity (kgCO$_2$eq / mil RM)	0.26	0.19	0.10	0.74	0.40	0.54



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 Oleo-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 (3.6 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 2025 and remain as a key economic sector in MPPG.
- Tertiary industry sector will increase from 23% (2005) to 24% (2025)

Socio-Economy

- 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-kilometers (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).

Table 1: Estimation Results of Scenario Quantification in 2025, MPPG

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)	8,080	29,118	3.60	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				
Tertiary Industry (mil RM)	1,899	7,055	3.72	Freight Transport Demand (mil t-km)	1,873	5,365	2.86

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

GHG emission of MPPG area in year 2005 is about 2,673 ktCO$_2$eq, the value will increase 206% to 8,272 ktCO$_2$eq in year 2025 if no mitigation measures are taken.

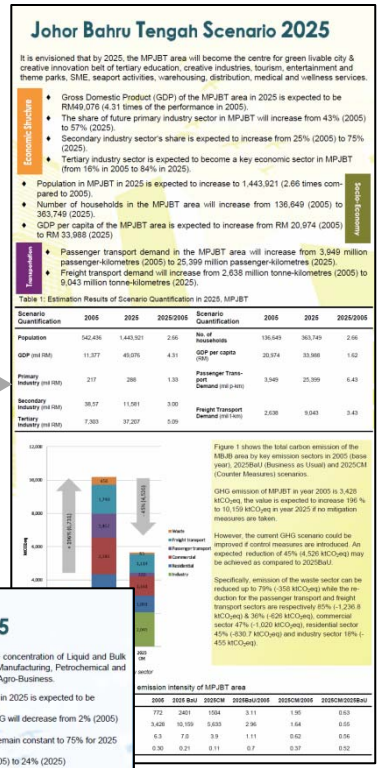
However, the scenario will be better if mitigation measures are introduced. An estimated 27% GHG reduction (2,193 ktCO$_2$eq) may be achieved under the 2025CM as compared to the 2025BaU scenario.

Specifically, emission of the waste sector can be reduced up to 69% (-178ktCO$_2$eq) while the reduction for the transport and commercial sector is 47% (-624ktCO$_2$eq), residential sector 45% (-172ktCO$_2$eq), industry sector 18% (-1,113ktCO$_2$eq), 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

Table 2: Energy demand, GHG and emission intensity of MPPG region

Unit	2005	2025 BaU	2025CM	2025BaU/2005	2025CM/2005	2025CM/2025BaU
Final energy Demand(ktoe)	659	2,200	1,509	3.34	2.76	0.82
GHG emissions (ktCO$_2$eq)	2,673	8,272	8,079	3.40	2.27	0.74
Per capita CO$_2$ emissions (tCO$_2$eq)	17.5	25.1	18.4	1.45	1.05	0.73
GHG intensity (kgCO$_2$eq / mil.RM)	0.33	0.28	0.21	0.85	0.64	0.75



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 and 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 RM49,076 (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).

Socio-Economy

- 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 136,649 (2005) to 363,749 (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 3,949 million passenger-kilometres (2005) to 25,399 million passenger-kilometres (2025).
- Freight transport demand will increase from 2,638 million tonne-kilometres (2005) to 9,043 million tonne-kilometres (2025).

Table 1: Estimation Results of Scenario Quantification in 2025, MPJBT

Scenario Quantification	2005	2025	2025/2005	Scenario Quantification	2005	2025	2025/2005
Population	542,436	1,443,921	2.66	No. of households	136,649	363,749	2.66
GDP (mil RM)	11,377	49,076	4.31	GDP per capita (RM)	20,974	33,988	1.62
Primary Industry (mil RM)	217	288	1.33	Passenger Transport Demand (mil p-km)	3,949	25,399	6.43
Secondary Industry (mil RM)	38,57	11,581	3.00				
Tertiary Industry (mil RM)	7,303	37,207	5.09	Freight Transport Demand (mil t-km)	2,638	9,043	3.43

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

GHG emission of MPJBT in year 2005 is 3,428 ktCO$_2$eq, the value is expected to increase 196 % to 10,159 ktCO$_2$eq in year 2025 if no mitigation measures are taken.

However, the current GHG scenario could be improved if control measures are introduced. An expected reduction of 45% (4,526 ktCO$_2$eq) may be achieved as compared to 2025BaU.

Specifically, emission of the waste sector can be reduced up to 79% (-358 ktCO$_2$eq) while the reduction for the passenger transport and freight transport sectors are respectively 65% (-1,236.8 ktCO$_2$eq) & 36% (-626 ktCO$_2$eq), commercial sector 47% (-1,020 ktCO$_2$eq), residential sector 45% (-630.7 ktCO$_2$eq) and industry sector 18% (-455 ktCO$_2$eq).

emission intensity of MPJBT area

2005	2025 BaU	2025CM	2025BaU/2005	2025CM/2005	2025CM/2025BaU
772	2401	1504	3.11	1.95	0.63
3,428	10,159	5,633	2.96	1.64	0.55
6.3	7.0	3.9	1.11	0.62	0.56
0.30	0.21	0.11	0.7	0.37	0.52

Low Carbon Society Brochures for 5 Municipalities within IM

Local Action Plan: Cover and Theme (Example)

Johor Bahru	Johor Bahru Tengah	Pasir Gudang	Kulaijaya	Pontian
Vibrant world class cosmopolis of the south	***Green livable city & creative innovation belt***	***Green & clean industrial port city***	***Smart integrated logistic hub***	***Clean energy and agro-biodiversity hub***

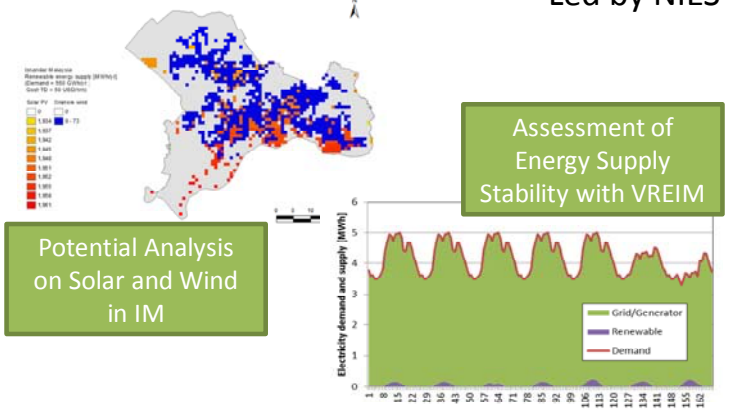
LCS scenarios for policy development in IM through Professional FGD

Towards Green Energy System with Renewables

- Energy supply is the main driver of development as well as the largest emitter of greenhouse gases (GHG).
- Low carbonization of the energy supply is one of the key factors toward the realization of Low Carbon Society in Iskandar Malaysia.
- Two groups of renewable energy sources are expected to become major driver for greening energy system with renewables – (1) Variable Renewables (Solar and Wind), and biomasses (biogas and waste).

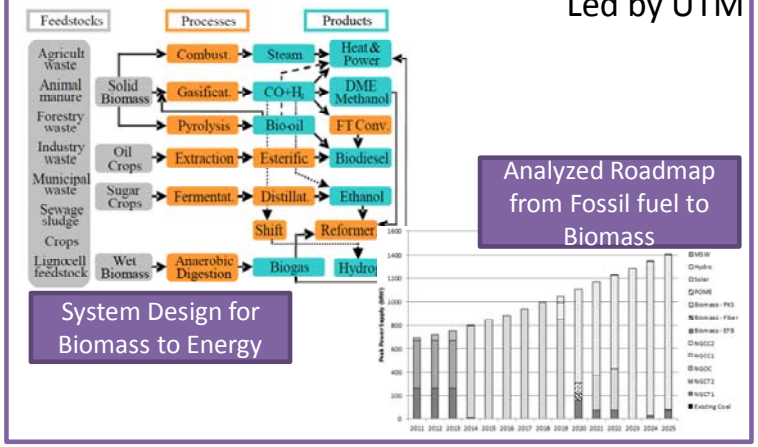
Feasibility Analysis on Variable Renewable-based Energy System in IM

Led by NIES



Designing Strategy for Utilization on Biomass and Waste Energy in IM

Led by UTM

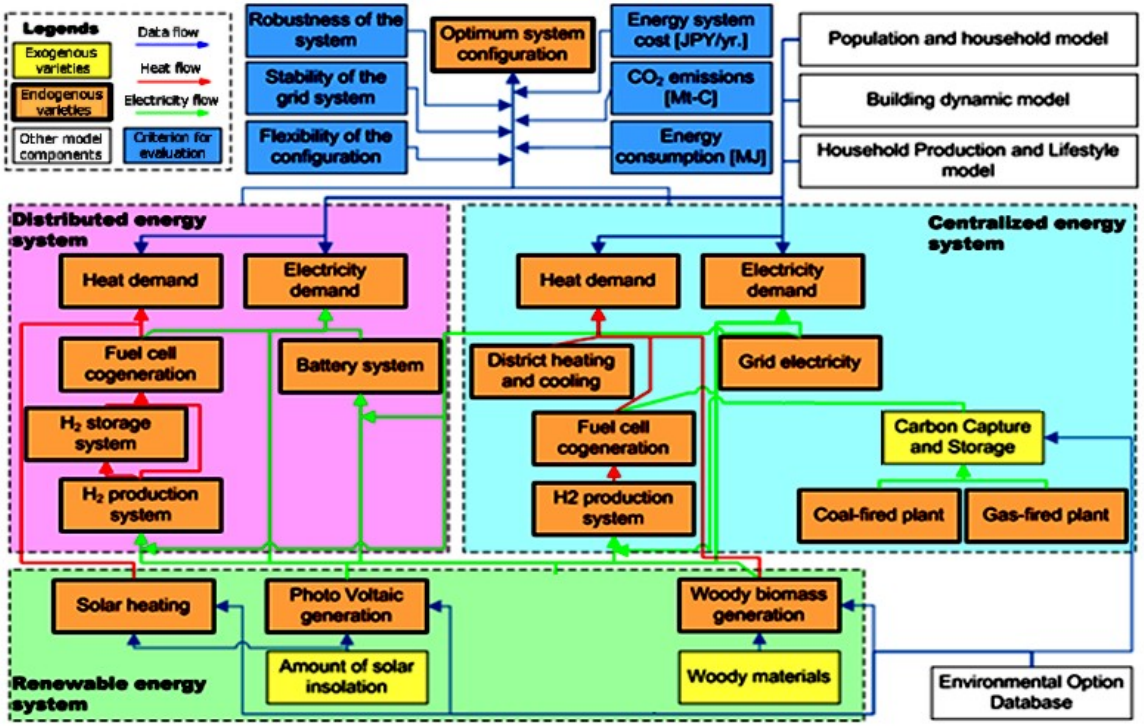


LCS BP Action 5: Green Energy System and Renewable Energy

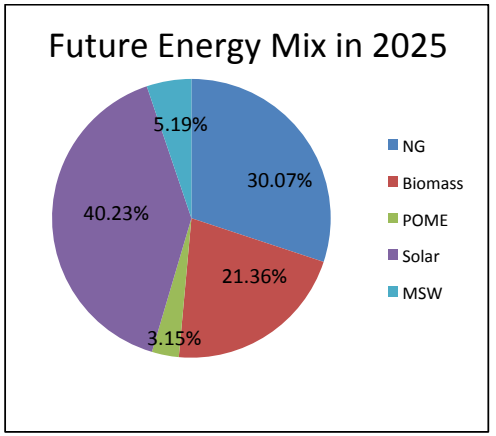
LCS scenarios for policy development in IM – Best Practices

Establishment of the Advanced Energy System Planning in IM

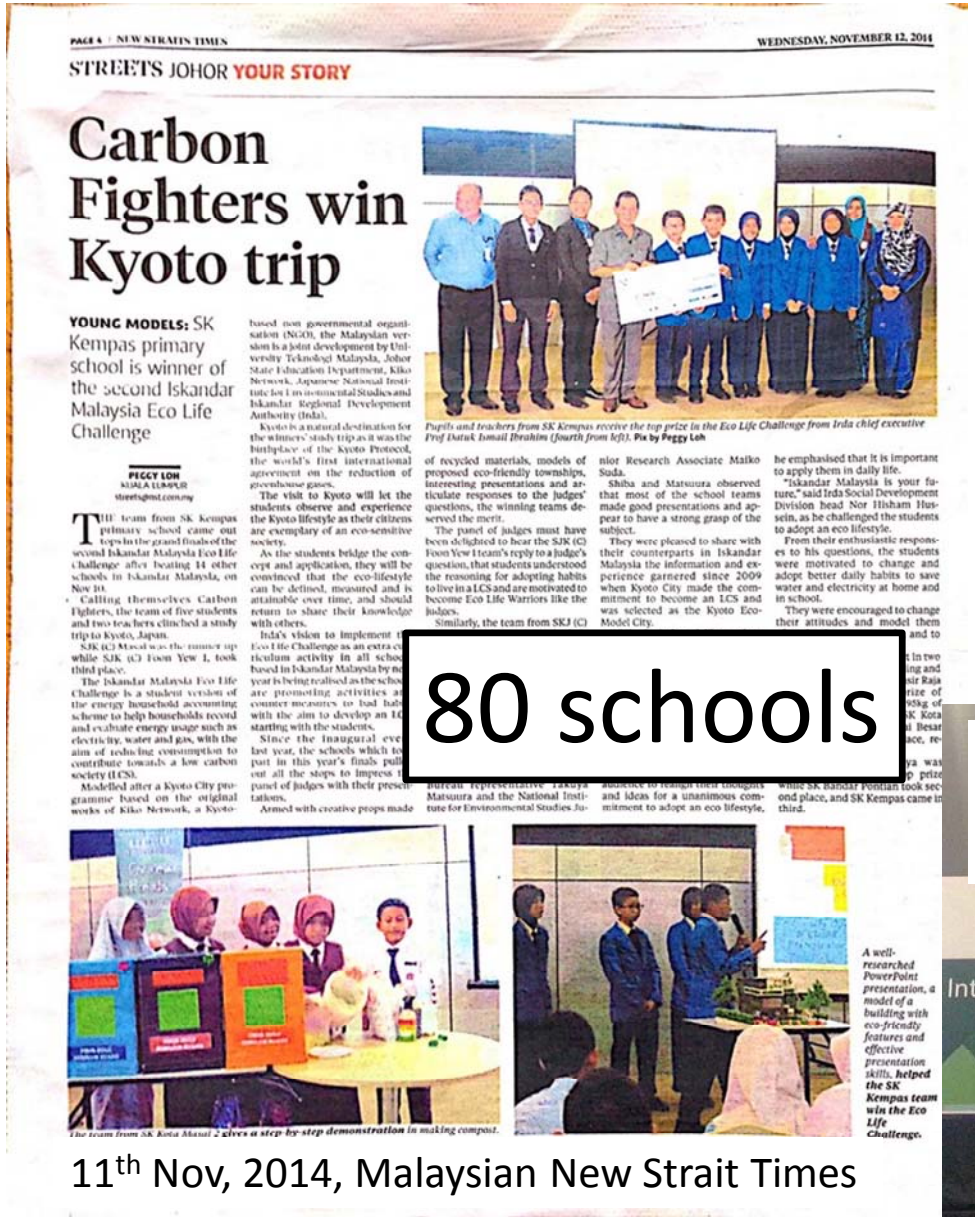
- The advanced energy system is comprehensive system for energy supply which is decentralized and has several key technologies such as distributed energy generation, energy storage, demand response technology and load management system with IT technologies.
- By integrating methodologies for variable renewables and biomass to energy, possible energy system for 5 authorities will be designed.
- The methodology will be shared with our Asian friends including in Indonesia.



Conceptual Design of Advanced Energy System



Buy in from School, GAIA, FutureCity Forum etc.



PAGE 4 · NEW STRAITS TIMES WEDNESDAY, NOVEMBER 12, 2014

STREETS JOHOR **YOUR STORY**

Carbon Fighters win Kyoto trip

YOUNG MODELS: SK Kempas primary school is winner of the second Iskandar Malaysia Eco Life Challenge

PEGGY LOH
KUALA LUMPUR
streets@nst.com.my

THE team from SK Kempas primary school came out tops in the grand finals of the second Iskandar Malaysia Eco Life Challenge after beating 14 other schools in Iskandar Malaysia, on Nov 10.

Calling themselves Carbon Fighters, the team of five students and two teachers clinched a study trip to Kyoto, Japan.

SJK (C) Maoxi was the runner up while SJK (C) Foon Yew 1, took third place.

The Iskandar Malaysia Eco Life Challenge is a student version of the energy household accounting scheme to help households record and evaluate energy usage such as electricity, water and gas, with the aim of reducing consumption to contribute towards a low carbon society (LCS).

Modelled after a Kyoto City programme based on the original works of Kiko Network, a Kyoto-based non governmental organisation (NGO), the Malaysian version is a joint development by University Teknologi Malaysia, Johor State Education Department, Kiko Network, Japanese National Institute for Environmental Studies and Iskandar Regional Development Authority (IRDA).

Kyoto is a natural destination for the winners' study trip as it was the birthplace of the Kyoto Protocol, the world's first international agreement on the reduction of greenhouse gases.

The visit to Kyoto will let the students observe and experience the Kyoto lifestyle as their citizens are exemplary of an eco-sensitive society.

As the students bridge the concept and application, they will be convinced that the eco-lifestyle can be defined, measured and is attainable over time, and should return to share their knowledge with others.

IRDA's vision to implement the Eco Life Challenge as an extra curriculum activity in all schools based in Iskandar Malaysia by next year is being realised as the schools are promoting activities and counter measures to bad habits with the aim to develop an LCS starting with the students.

Since the inaugural event last year, the schools which took part in this year's finals pulled out all the stops to impress the panel of judges with their presentations.

Armed with creative props made of recycled materials, models of proposed eco-friendly townships, interesting presentations and articulate responses to the judges' questions, the winning teams deserved the merit.

The panel of judges must have been delighted to hear the SJK (C) Foon Yew 1 team's reply to a judge's question, that students understood the reasoning for adopting habits to live in a LCS and are motivated to become Eco Life Warriors like the judges.

Similarly, the team from SKJ (C) Maoxi was delighted to share with Bureau Representative Takuya Matsuura and the National Institute for Environmental Studies Junior Research Associate Maiko Suda.

Shiba and Matsuura observed that most of the school teams made good presentations and appear to have a strong grasp of the subject.

They were pleased to share with their counterparts in Iskandar Malaysia the information and experience garnered since 2009 when Kyoto City made the commitment to become an LCS and was selected as the Kyoto Eco-Model City.

They were encouraged to change their attitudes and model them and to be emphasised that it is important to apply them in daily life.

"Iskandar Malaysia is your future," said Irda Social Development Division head Nor Hisham Hussein, as he challenged the students to adopt an eco lifestyle.

From their enthusiastic responses to his questions, the students were motivated to change and adopt better daily habits to save water and electricity at home and in school.

They were encouraged to change their attitudes and model them and to

Pupils and teachers from SK Kempas receive the top prize in the Eco Life Challenge from Irda chief executive Prof Datuk Ismail Ibrahim (fourth from left). **Pix by Peggy Loh**

The team from SK Kota Masuri 2 gives a step-by-step demonstration in making compost.

A well-researched PowerPoint presentation, a model of a building with eco-friendly features and effective presentation skills, helped the SK Kempas team win the Eco Life Challenge.

80 schools

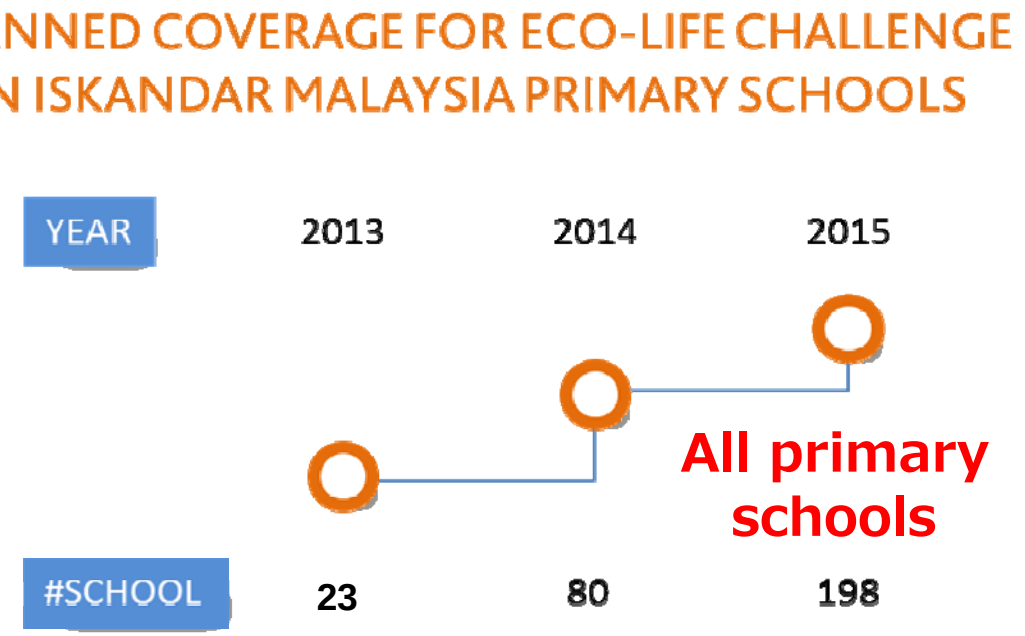
11th Nov, 2014, Malaysian New Strait Times

<u>Progress in FY2014</u>

- 80 schools joined IM Eco-Life Challenge program, Acknowledgement of RCE
- Study on Energy-Efficient building scheme for GAIA
- FutureCity Forum, ASEAN City Seminar were held in JB.

International Forum on "FutureCity" Initiative in Malaysia on Feb 8th, 2015 (First one outside Japan)

Engagement with school through Eco-life Challenge campaign/contest in 2015



Plan in FY 2015

- All primary schools will join IM Eco-Life Challenge program
- Study on low carbon education in Secondary schools/Community
- Kyoto city, Miyako Ecology Center, Kiko network applied “Iskandar Malaysia Human capacity building and community development for low carbon society” to JICA grassroot fund
- Study on energy-efficient building diffusion scheme

International Network and Organizational Arrangement

UTM-Low Carbon Research Centre

RCE Iskandar

UNITED NATIONS UNIVERSITY

UTM-LOW CARBON ASIA RESEARCH CENTRE

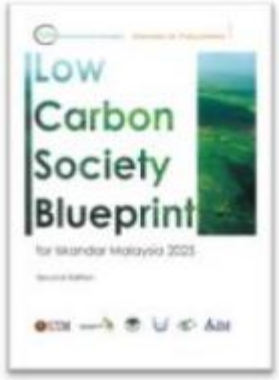
LCS Research & Training Hub in Asian Region

Training in JB, August 2015

Training in Phnom Penh,
September 2015

Low Carbon Society for Iskandar Malaysia Publications

2012



Low Carbon Society Blueprint for Iskandar Malaysia 2025- Summary for Policymakers

2013

Low Carbon Society Blueprint for Iskandar Malaysia 2025- Full Report

2013

A Roadmap towards Low Carbon Iskandar Malaysia 2025

2013

Iskandar Malaysia: Action for a Low Carbon Future

2014

Low Carbon Society Brochures for 5 Municipalities within IM

COP 18, Doha

MOA, 2012

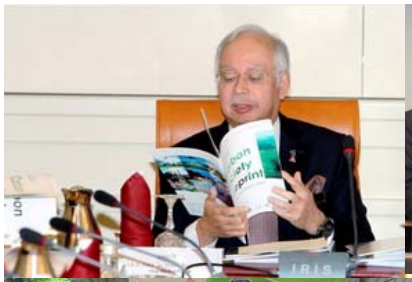
11th December 2012
The PM endorses the launching of LCSBPIM at COP 18 during MoA

MOA, 2013

COP 19, Warsaw

COP 20, Lima

6th November 2013
The PM launched Actions for a Low Carbon Future during MoA



PARLIMEN
MALAYSIA

UNITED NATIONS
CLIMATE CHANGE


KEMPEN 3R & PENGKOMPOSAN SISA MAKANAN
DI FELDA TAIB ANDAK


ECO-LIFE

"FutureCity"Initiative
Cabinet Office
UTM


SUSTAINABLE & LOW CARBON
SCHOOLS EXHIBITION 2015


United Nations
Climate Change Conference 2012
COP18/CMP8
DOHA
UN CLIMATE CHANGE CONFERENCE
COP18·CMP8




UNIVERSITI TEKNOLOGI MALAYSIA



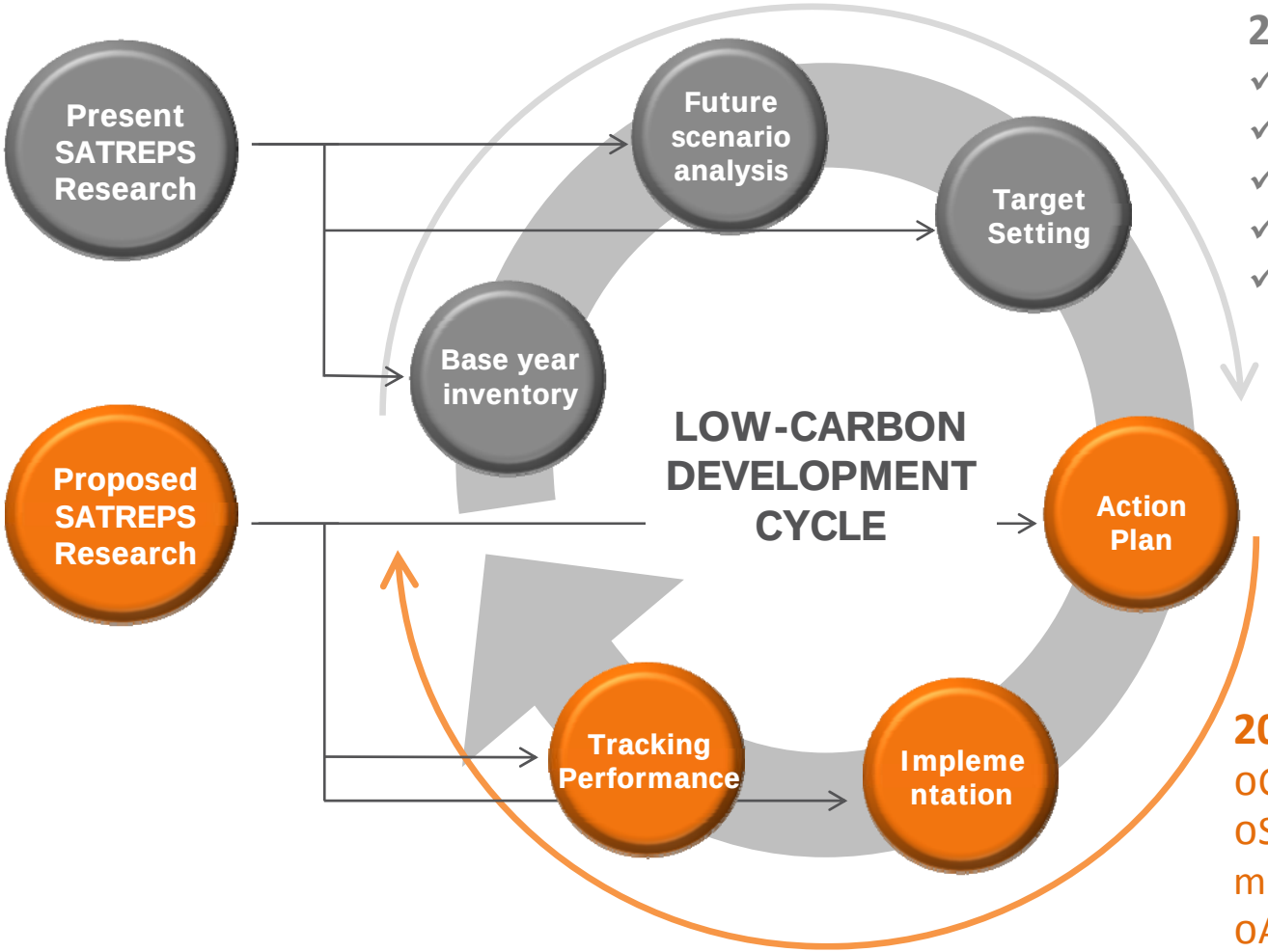


SYMPOSIUM ON LOW CARBON ASIA
RESEARCH PROJECT
&

Media Highlights 2012-2013 (LCS AND IM)

Media Highlights 2013-2014 (LCS AND IM)

(The importance of Implementation and Monitoring)



2011 - 2016

- ✓LCS baseline study
- ✓LCS scenario development
- ✓GHG modelling
- ✓LCS policy design
- ✓IM (regional) level action plan

2016 - 2021

- oCity level detailed action plan
- oSectorial specific strategic mitigation
- oAdaptation
- oCarbon monitoring

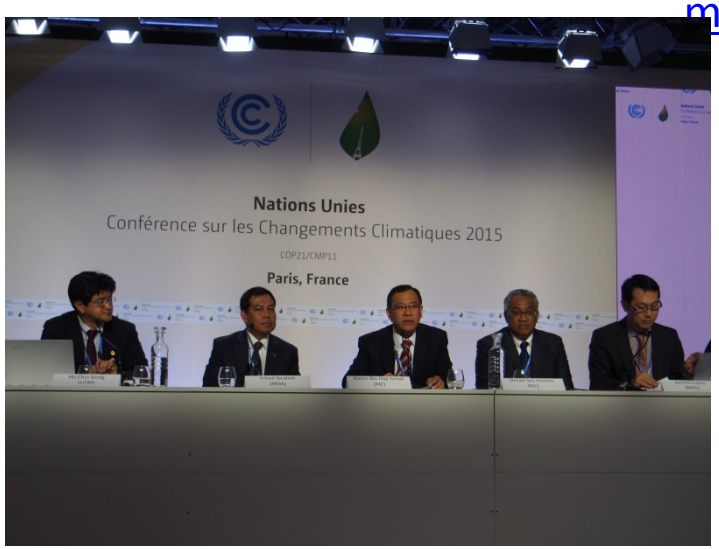
East Asia Low carbon Growth Dialogue side event jointly organised by UTM, NIES, IGES Japan

East Asia Low carbon Growth Dialogue side event jointly organised by UTM, NIES, IGES Japan

UTM exhibition booth (33A) at COP21 showcasing UTM work on LCS

Press Conference and Mayors participation at COP21 Paris on Dec7 2015

http://unfccc6.meta-fusion.com/cop21/events/2015-12-07-14-00-university-of-technology-malays



Press conferences to launch action plan for Iskandar Malaysia and Putrajaya

PM and Chief Minister Johor launched the Low Carbon Action Plans on Dec 15 2015 during Meeting of Authority in Putrajaya

Concluding remarks

1. **Community engagement using focus discussion are used in decarbonisaton of urban development using the approach of low carbon society.**

2. **It needs to pragmatic in fast developing countries in Asia byrecognising Cities as main CO2** emitters will continue be competitive and engine of growth. We should aims at co benefits and **decoupling CO2 reduction and economic growth..**
3. Low carbon measures has to **relate to local co benefits (safety, income generation or increase in property value, health improvement, better air quality, saving from commuting, stronger community engagement and interaction)**

4. Effective implementation of low carbon measures **at city level** needs **multi disciplinary professional/ scientific input, multi stakeholders and buy in.**

5. S2A (Science to Action) paradigm can facilitates the formulation and implementation of **science-based policies** for low-carbon development in the Asian region order to realise a **sustainable future based on a stabilised climate**. .

6. **Needs close collaboration between Researchers and Policy makers** will **continue to seek knowledge for more effective climate action plan** due to knowledge gaps exists.

Thank You Terima Kasih 谢谢 धन्यवाद ありがとう

Thank you for your attention!

ho@utm.my

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