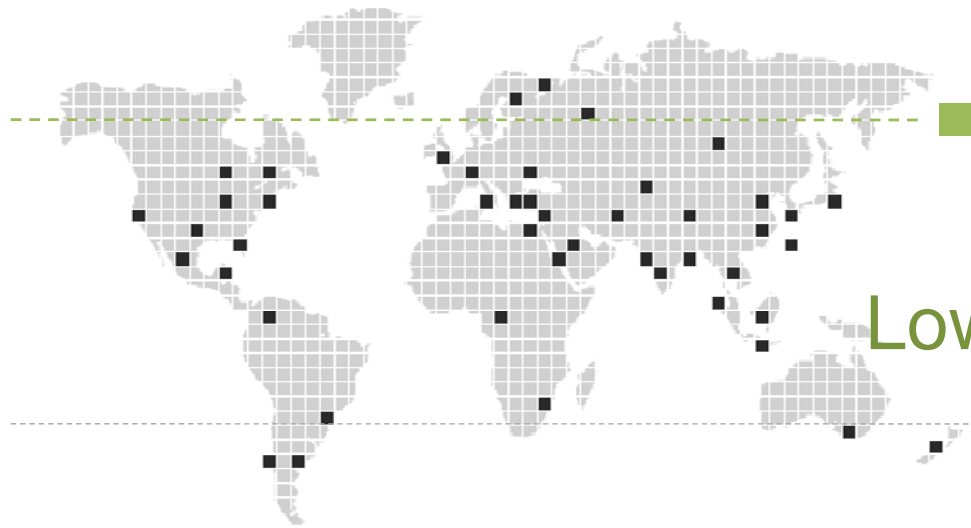


THIRD INTERNATIONAL SYMPOSIUM LOW CARBON
RESEARCH ASIA AND POLICY DIALOGUE
On JULY 9, 2012 at PUTERI PACIFIC HOTEL JOHOR BAHRU.

Malaysian cases



»»» Towards an integrated
climate resilient
Low carbon Growth Framework

Ho Chin Siong
Faculty of Built Environment,
Universiti Teknologi Malaysia.

9 July 2012



ISKANDAR
MALAYSIA



E-mail Address: ho@utm.my (Ho C.S)

Structure of Discussion

1 Introduction

2 Sustainable Development in Malaysia

3 Planning Low Carbon Nation, Region and city

4 Case Study:

a) Malaysia 2020 and 2030

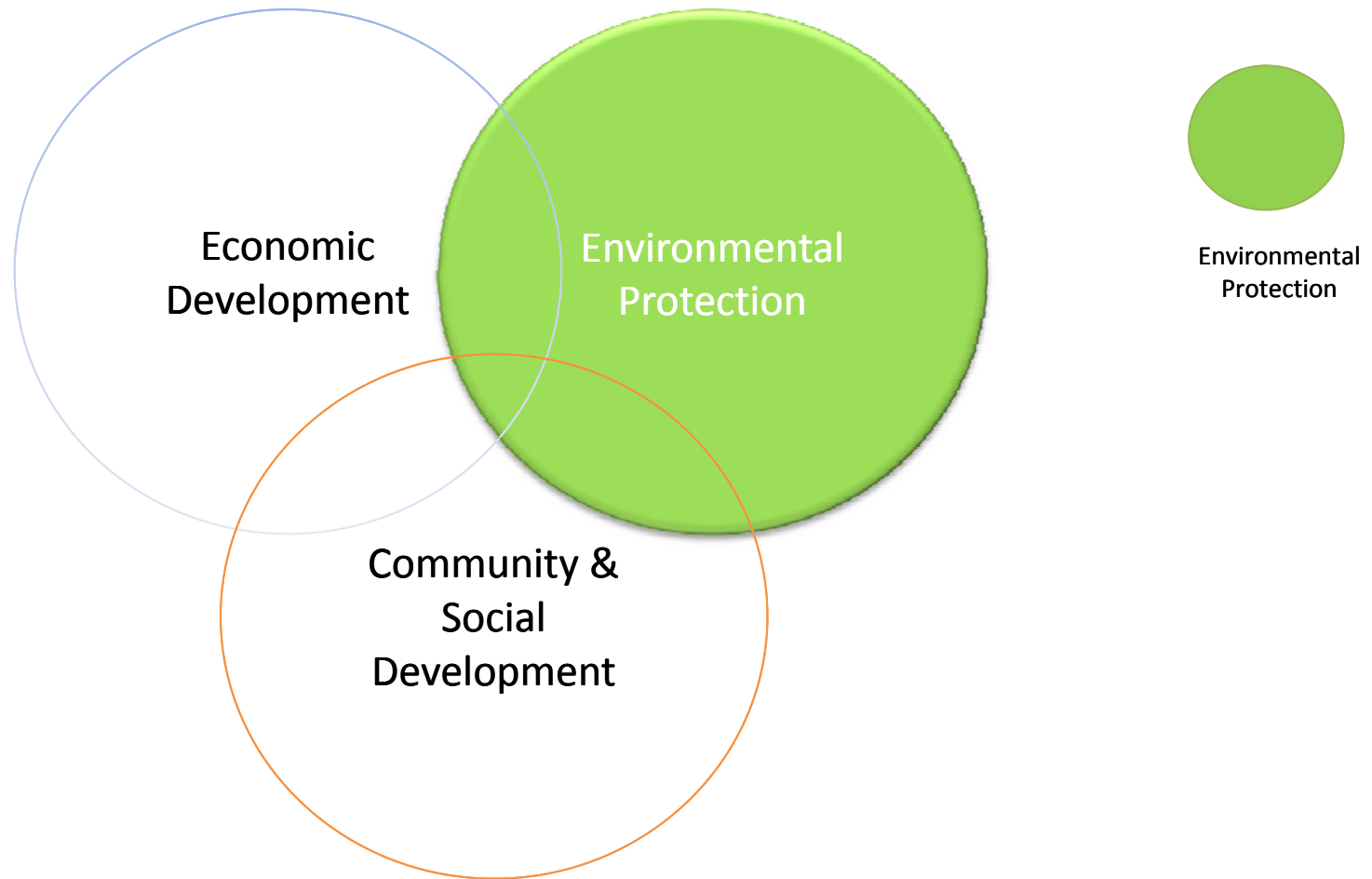
b) Sustainable Iskandar Malaysia 2025

c) Putrajaya Green Cities 2025

d) Cyberjaya Digital Green Cities 2025

5 Conclusion

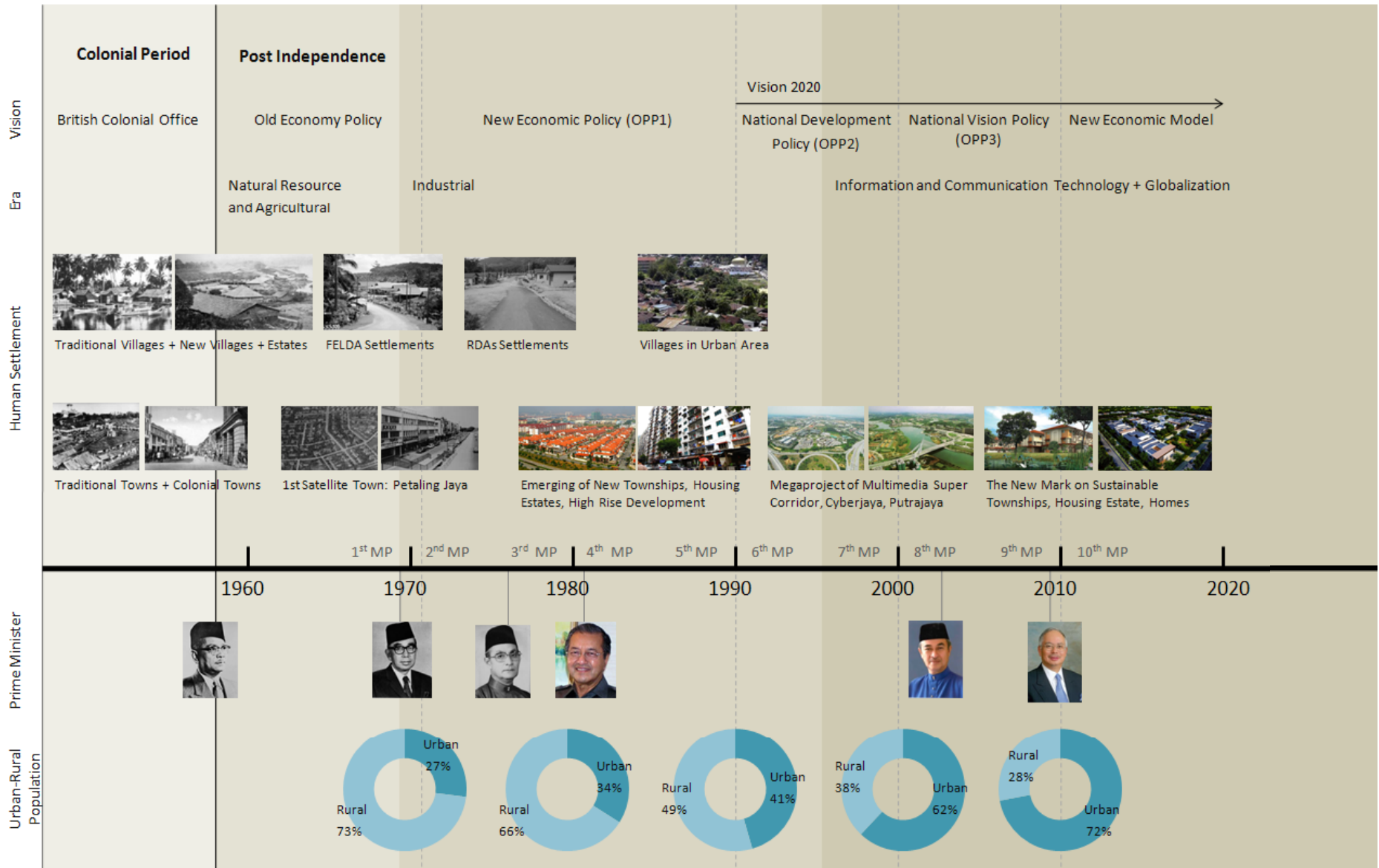
Sustainable Development -Integrating 3 main elements



**SUSTAINABLE DEVELOPMENT WITHIN THE FRAMEWORK OF GREEN GROWTH /
CLIMATE CHANGE AGENDA/ STATE HOLDERS PARTICIPATION**

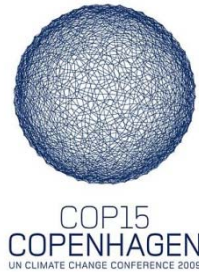
2 Sustainable Development

Moving Towards Sustainable Human Settlement



1 Introduction

Importance of Low Carbon Society scenario



Malaysia Commitment

Speech by YAB Datuk Seri Najib Tun Razak, Prime Minister
“... Malaysia is proposed a voluntary reduction up to 40%
in terms of emission intensity of GDP by the year 2020
compared to 2005 levels.”
17th December 2009



Global Citizens + Responsibilities

For the Earth, for our future generation



Green as New Consumer Culture, New Market, New Growth



Money Saving

Energy conservation and renewable energy

2. Malaysian Outlook

The CO₂ emission per capita and emission intensity of selected countries in 2007

Countries	Emission per capita tones of CO ₂ per capita	Emission Intensity tones of CO ₂ per US\$1000 of GDP
World	4.35	0.73
United States	19.1	0.5
Singapore	9.8	0.3
Japan	9.7	0.2
United Kingdom	8.6	0.3
Malaysia	6.7	1.3
China	4.6	2.5
Thailand	3.5	1.3
Indonesia	1.7	1.6
India	1.2	1.7

The 10th Malaysian Plan (2011-2015) has outlined 2 major National Policies on **Environmental Protection and conservation** :

National Green Technology Policy

- Emphasizes on Sustainable development, development of roadmaps to guide the application of green technologies & establishment of Green Tech Financing Scheme.

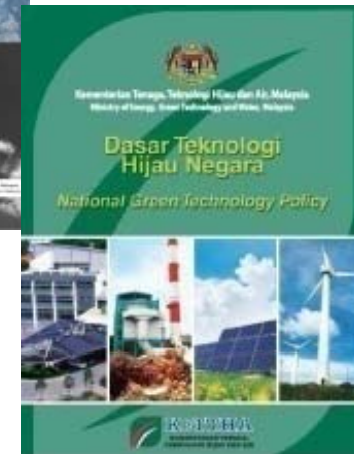
National Climate Change Policy

- Coordinate and streamline policy & legislations, stashed inter-ministrial and cross sectoral committee to facilitate implement and also identify options and strategies to achieve a low carbon economy.

2. Malaysian Outlook

In COP15 (2009), Malaysian Prime Minister ; YAB Dato' Seri Mohd Najib Tun Abdul Razak, has pledged a voluntary 40% reduction of CO₂ emission intensity by 2020.

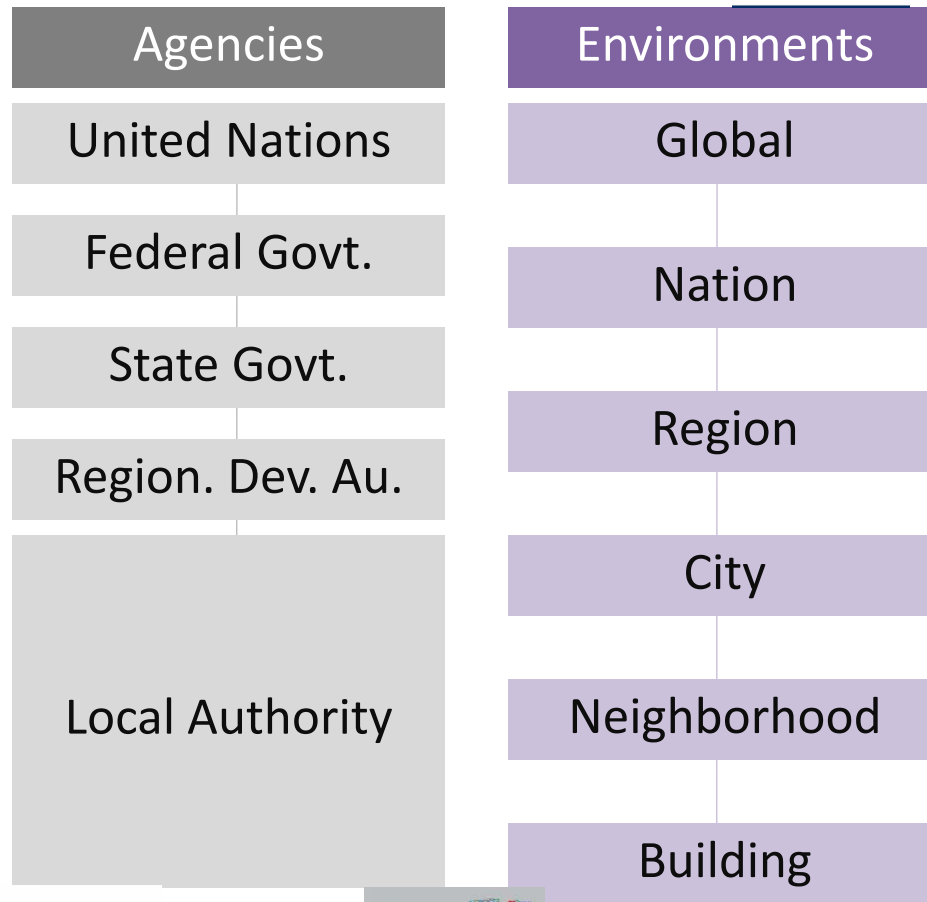
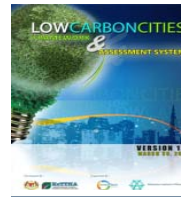
Under the Tenth Malaysia Plan (2011-2015); The Government has intensified effort to reduce emission by climate adaptation and mitigation measures.



- With this in Focus, We look towards lowering the CO₂ emission intensity in Iskandar Malaysia by 50% by 2025.
- **The Tools**; (ExSS & Backcasting Model) play an important role in getting the numbers (Facts and Figures) to **support in the decision making process** when the Local Authorities and Iskandar Regional Development Authority design the Policies & Guidelines towards a Low Carbon Scenario.

2 Sustainable Development

Low Carbon Frameworks



Frameworks

United Nations Climate Change Conference (COP 15), Malaysia committed to reduce 40% carbon emission intensity

Malaysia Plan, Economic Transformation Program, National Policy on Climate Change, National Green Technology Policy, National Policy on the Environment, NPP NUP etc

State Structure Plan, Regional Plan, Economic Region Master Plan

Local Plan, Low Carbon Cities Framework and Assessment System

GBI Township Tool

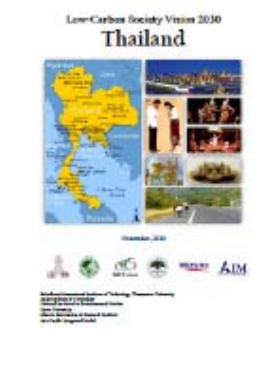
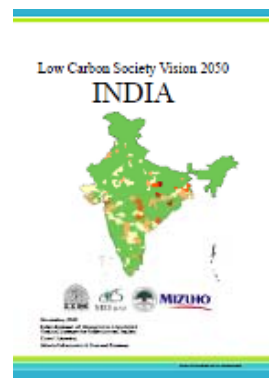
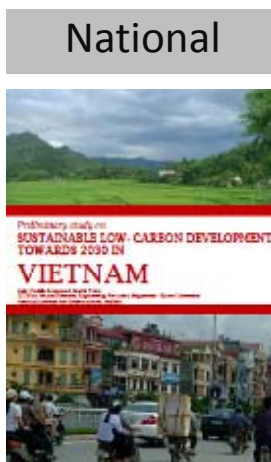
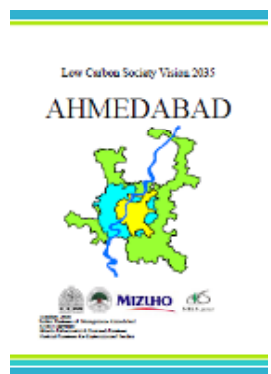
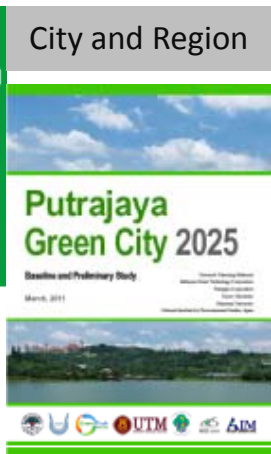
Green Neighbourhood Planning Guideline

Green Building Index, Energy Efficiency in Building Guidelines, Design Strategies for Energy Efficiency in New Buildings (Non-Domestic), Malaysia Industrial Energy Audit Guidelines, Energy Efficiency and Conservation Guidelines for Malaysian Industries

(Source: Carbon Dioxide Information A

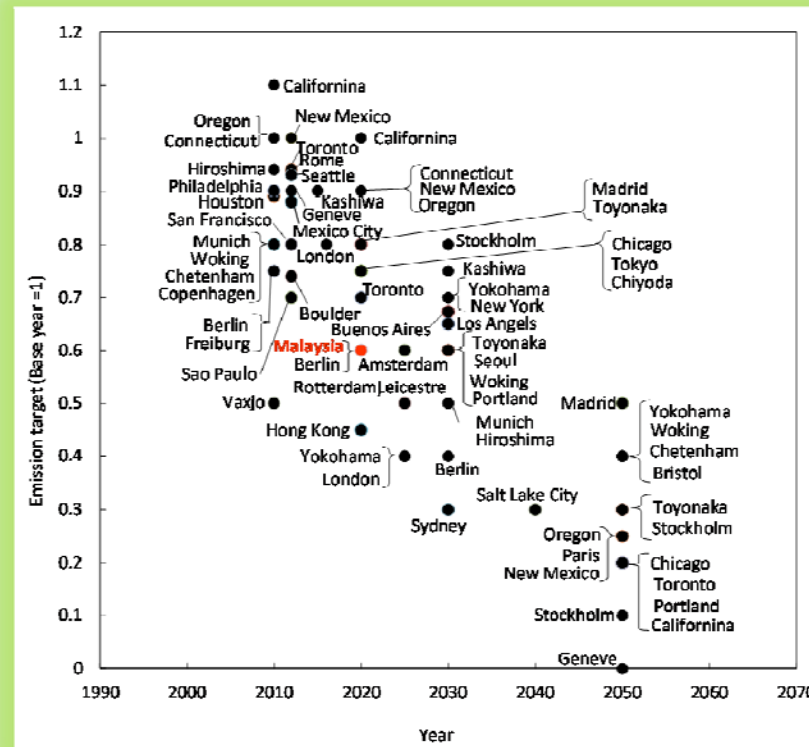
3 Establishing Low Carbon Society Scenario

On Going Low Carbon Society Research Project at Asia



Background

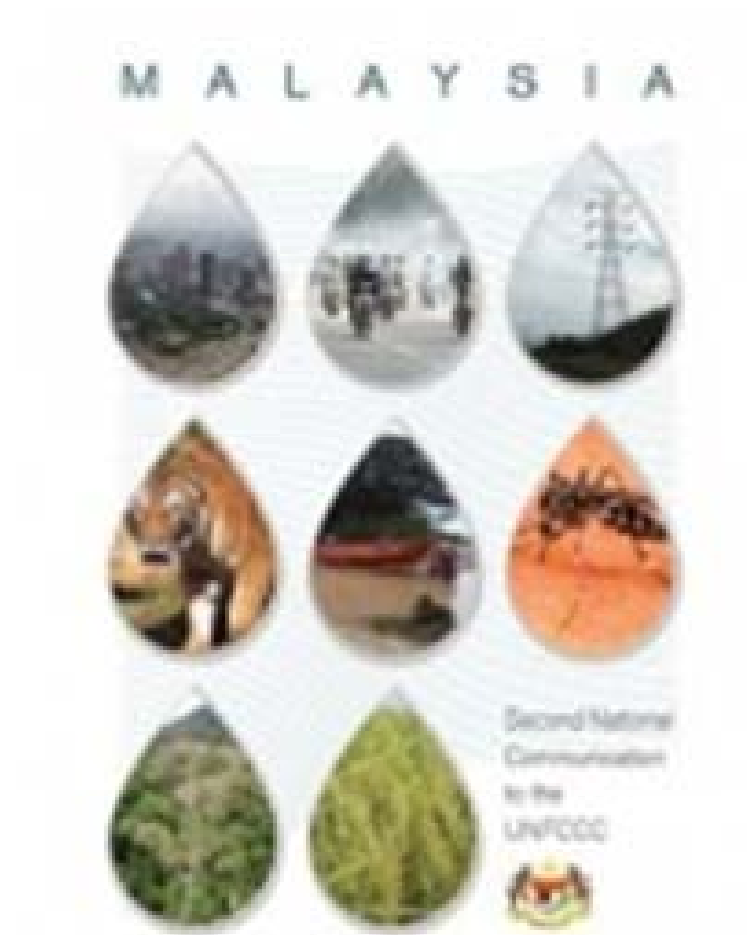
- In these days, not only nations, but increasing number of cities are seeking their way toward a “Low-carbon society”



Emission reduction targets of cities around the world

- Malaysian cities have a great potential to be low-carbon city adopting green economy ,LCS, 3Rs EE and RE.

Developing Malaysia
LCS vision
in 2020 and 2030
for Energy, Waste and
AFOLU sectors



THE CASE OF MALAYSIA

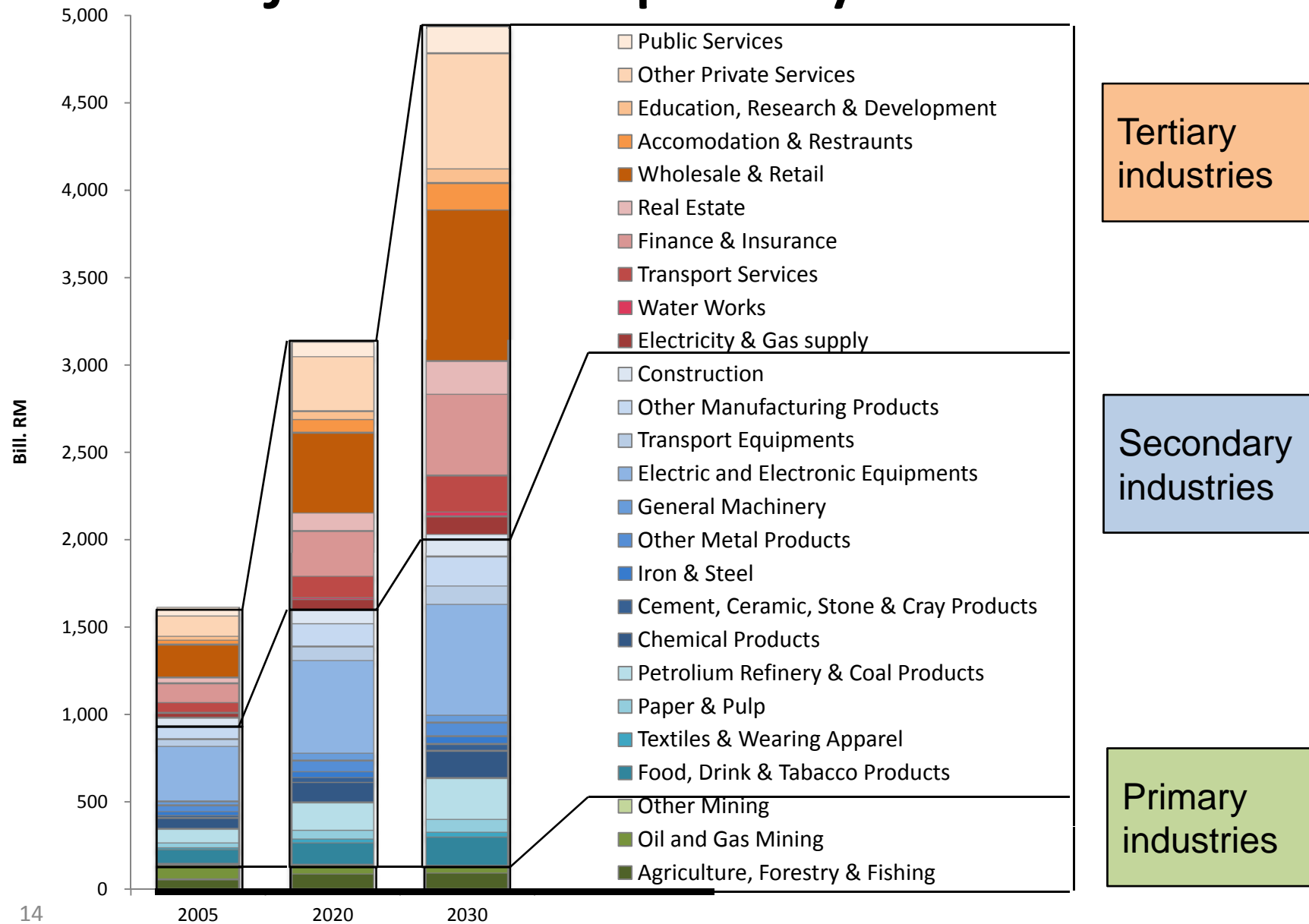
Introduction

- Main Findings are based on **quantitative estimation tools - Extended Snapshot Tool (ExSS) and AFOLU model.**
- Major assumption and data are based on **Malaysia Second National Communication (NC2) 2011** submitted to the UNFCCC
- Base year is 2005, target years are 2020 and 2030
- BaU and two mitigation scenarios
 - CM1:** With mitigation options outlined in NC2 and additional options
 - CM2 :** With more intensive introduction of mitigation options than CM2 so that achieving -40% target in 2020

Main socio-economic variables

	2005	2020	2030	2020 /2005	2030 /2005	
Population	26.1	32.8	37.3	1.3	1.4	Million
Household	5.8	8.2	9.3	1.4	1.6	Million
GDP	509	996	1,601	2.0	3.1	Bill. RM
Per capita GDP	19.5	30.4	43.0	1.6	2.2	1000.RM
Gross output	1,604	3,135	4,929	2.0	3.1	Bill. RM
Primary	55	84	97	1.5	1.8	
Secondary	920	1,507	2,175	1.6	2.4	
Tertiary	629	1,544	2,657	2.5	4.2	
Passenger transport	169	315	359	1.9	2.1	Bill. pass-km
Freight transport	92	150	214	1.6	2.3	Bill. t-km

Projected output by 26 sectors

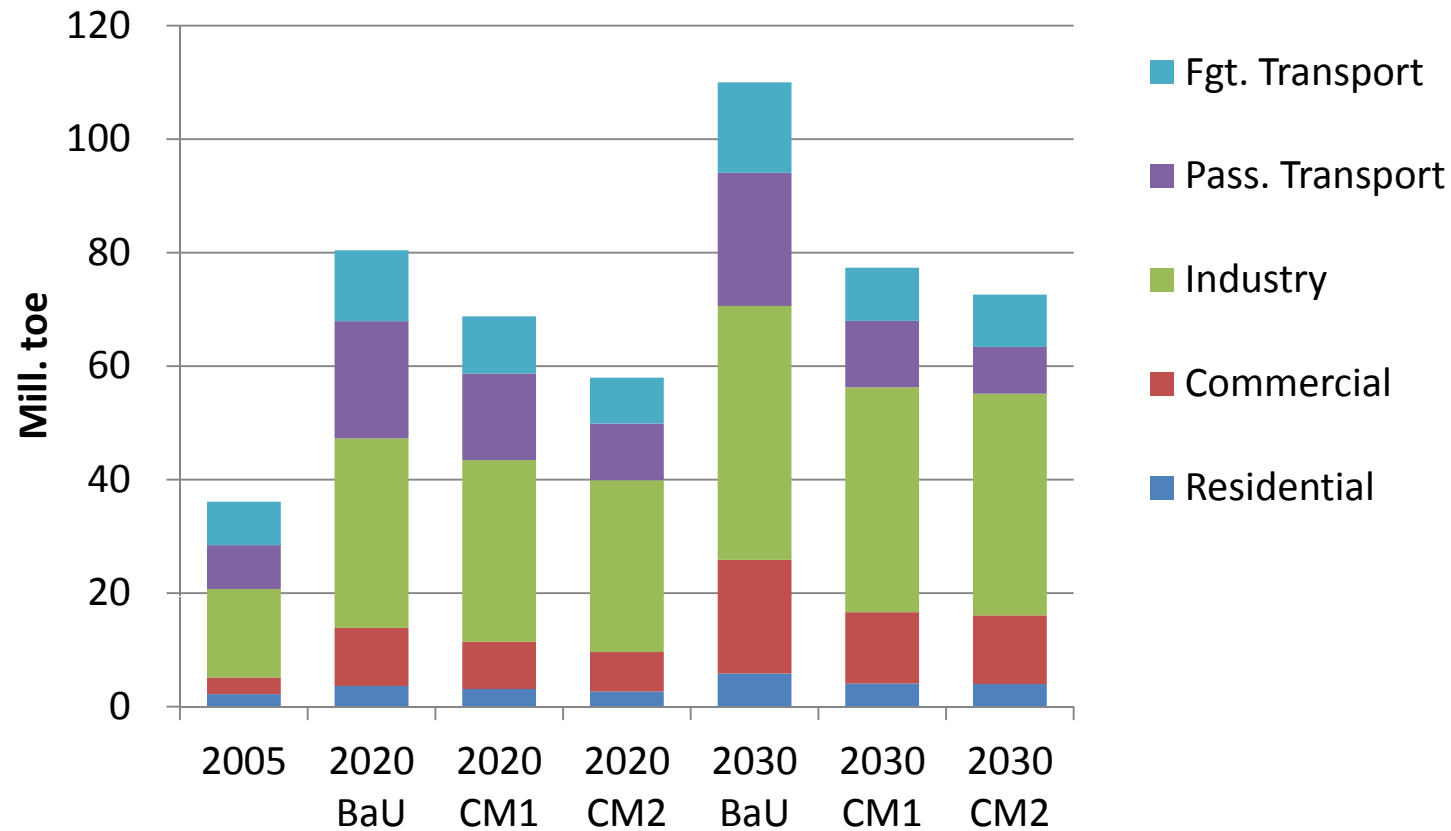


Mitigation options

	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 CH ₄ from waste management	25%	35%	40%	40%
Mitigations in AFOLU sectors*	<10USD/ktCO ₂ eq			

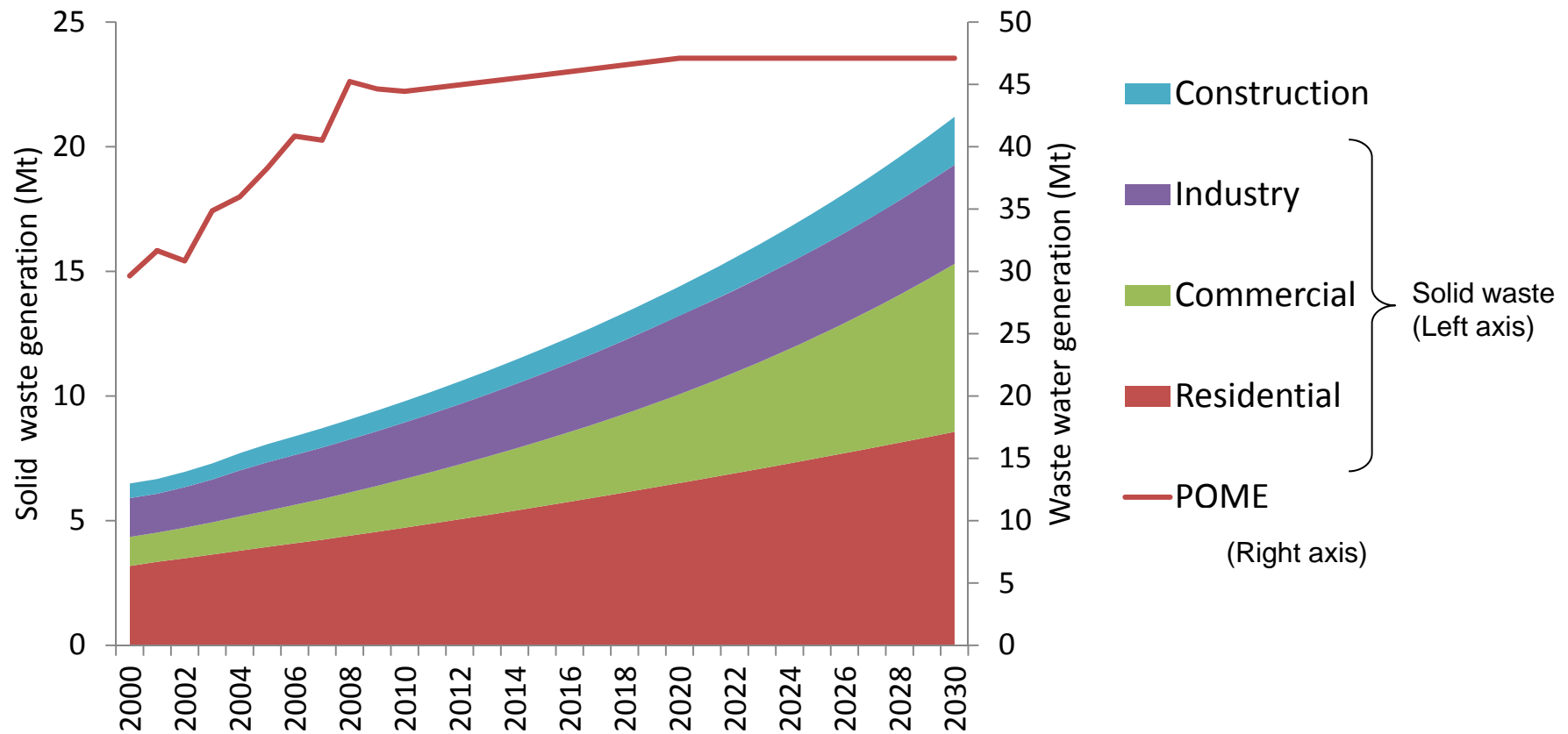
Projected final energy demand by sectors

- Share of each sector is fit to NC2 in 2020BaU scenario
- The largest energy consumer is industry sector



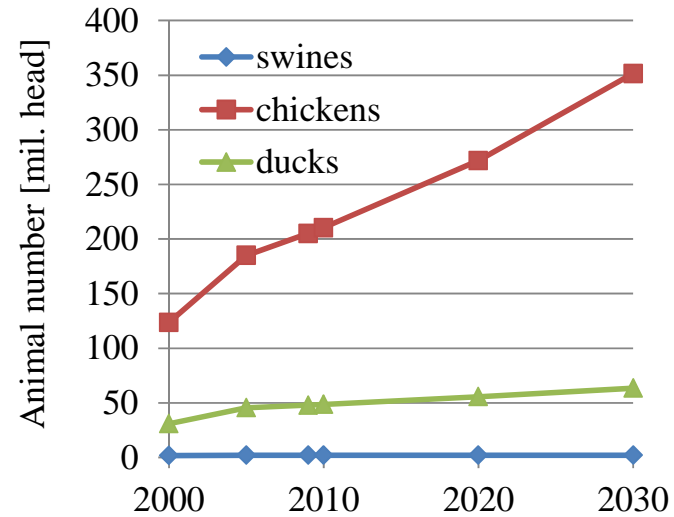
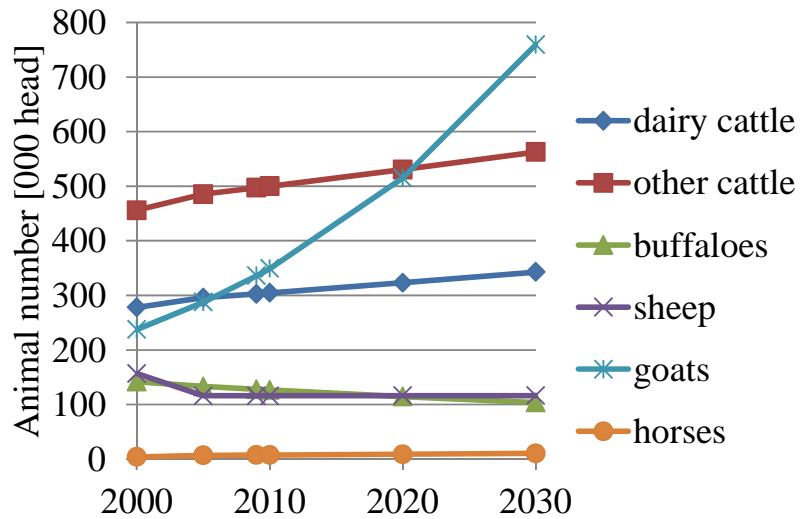
Projected waste generation

- SW generation is increased by 25% in 2020 and 39% in 2030 from 2007.

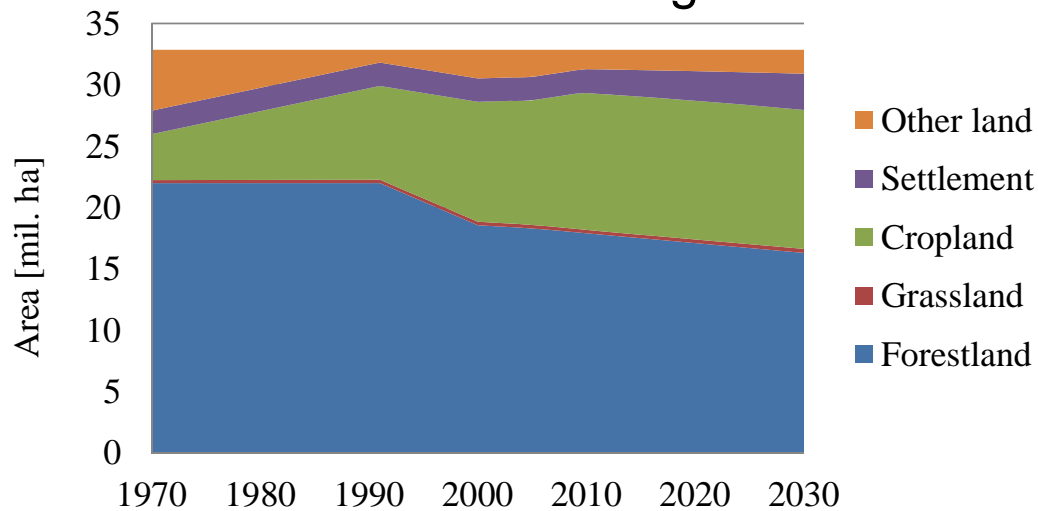


Livestock and Land use change

Population of livestock animals

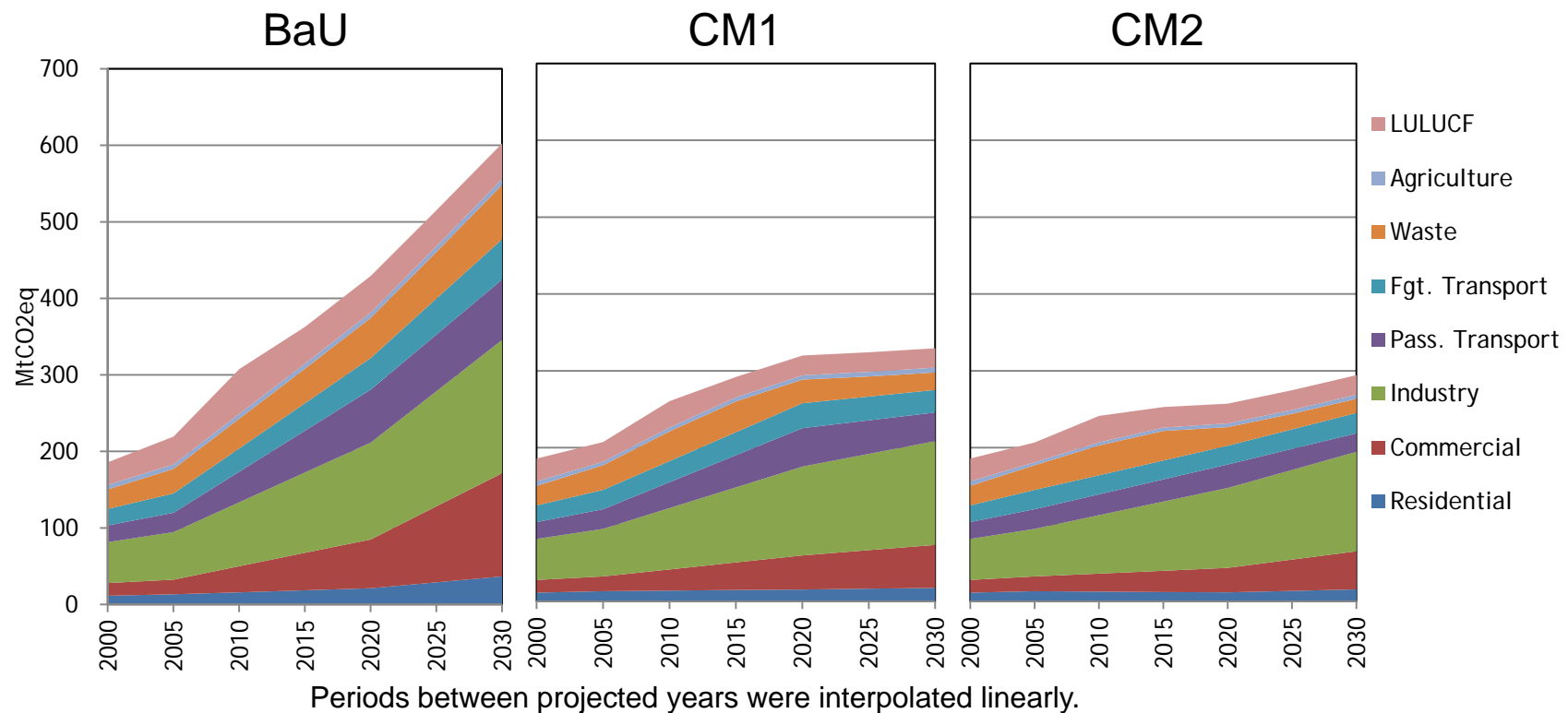


Land use change

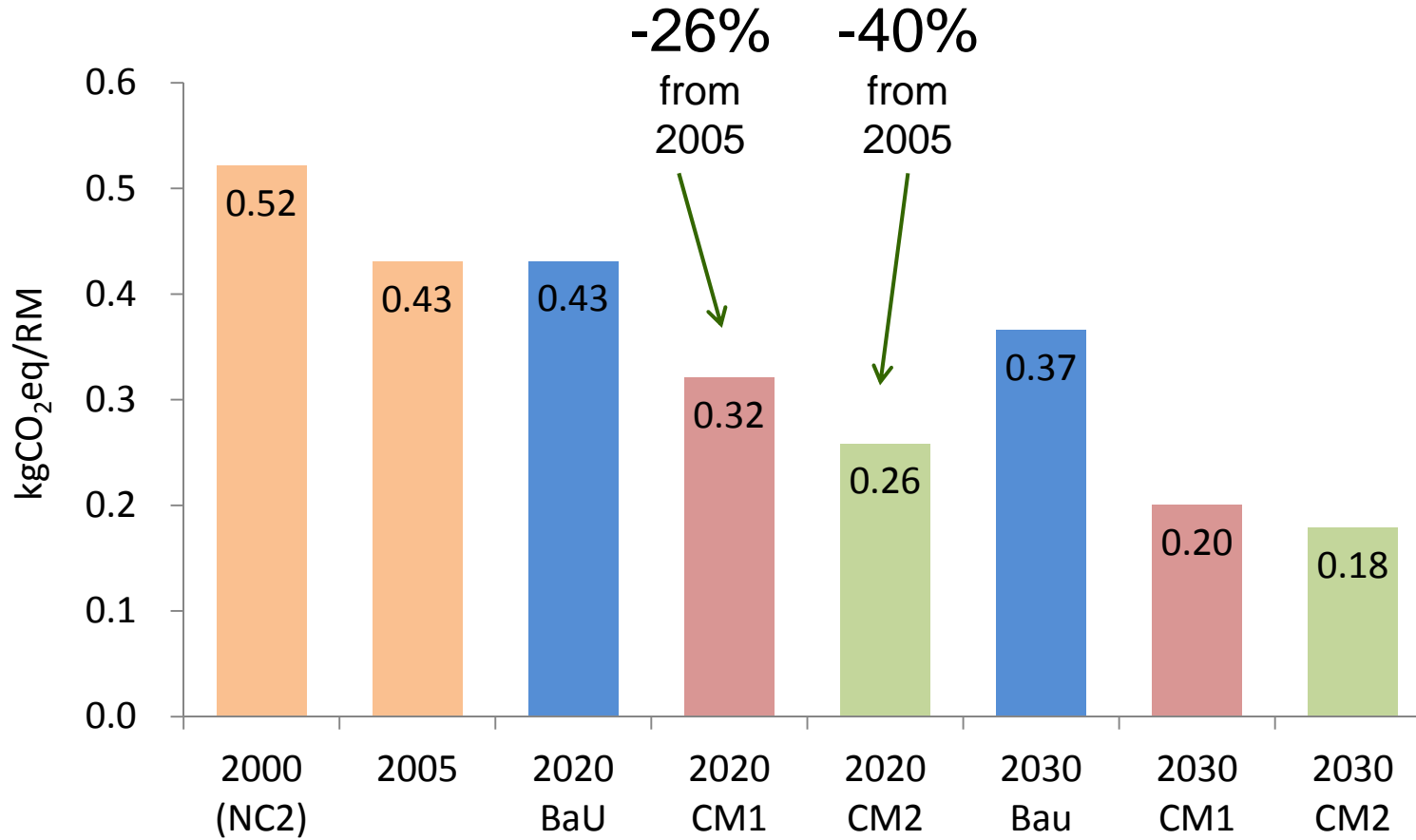


GHG emissions (Energy, Waste and AFOLU)

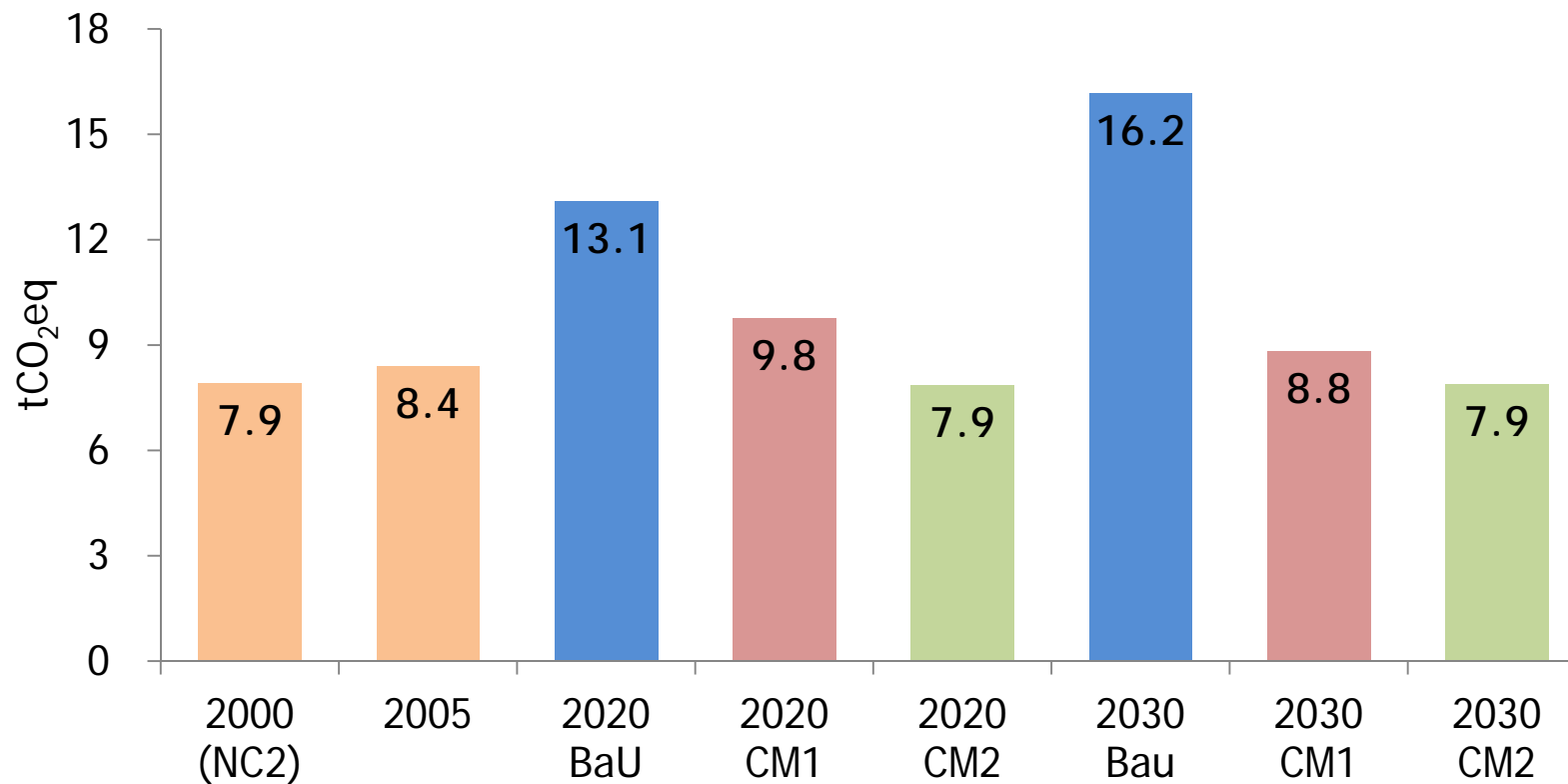
- Energy has the largest contribution in both scenarios in all years.
- In BaU scenario, GHG emission increased by 96% (2020) and 175% (2030) from 2005
- In CM1 scenario, it was reduced by 26% (2020) and 45% (2030) from BaU, in CM2, 40% (2020) and 51% (2030).



Emission intensity (GHG emission per GDP)



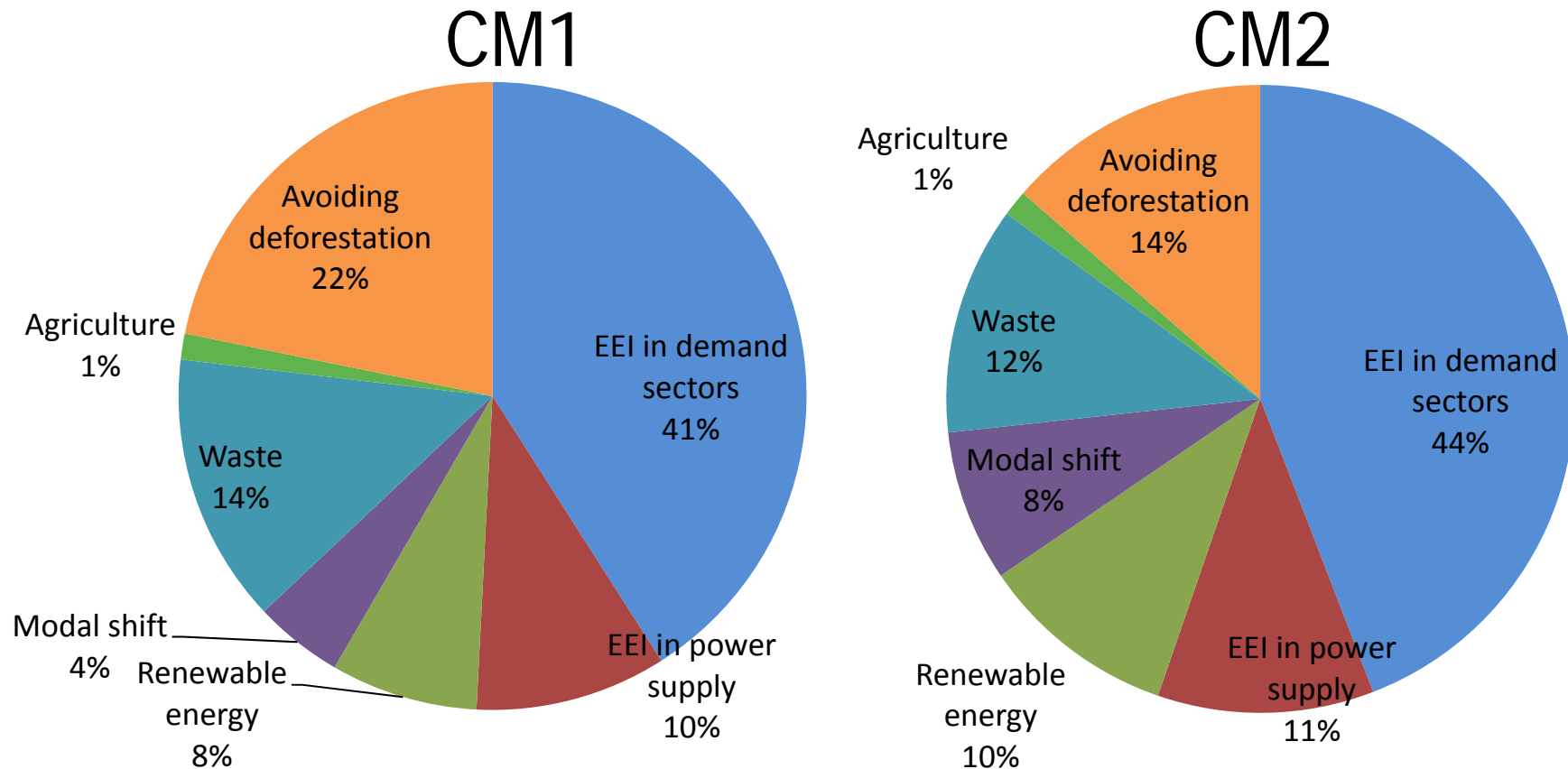
Per capita GHG emission



Note : For Energy, Waste and AFOLU sector (exclude industrial process, CH₄ and N₂O from energy sector)

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.





THE CASE OF ISKANDAR MALAYSIA



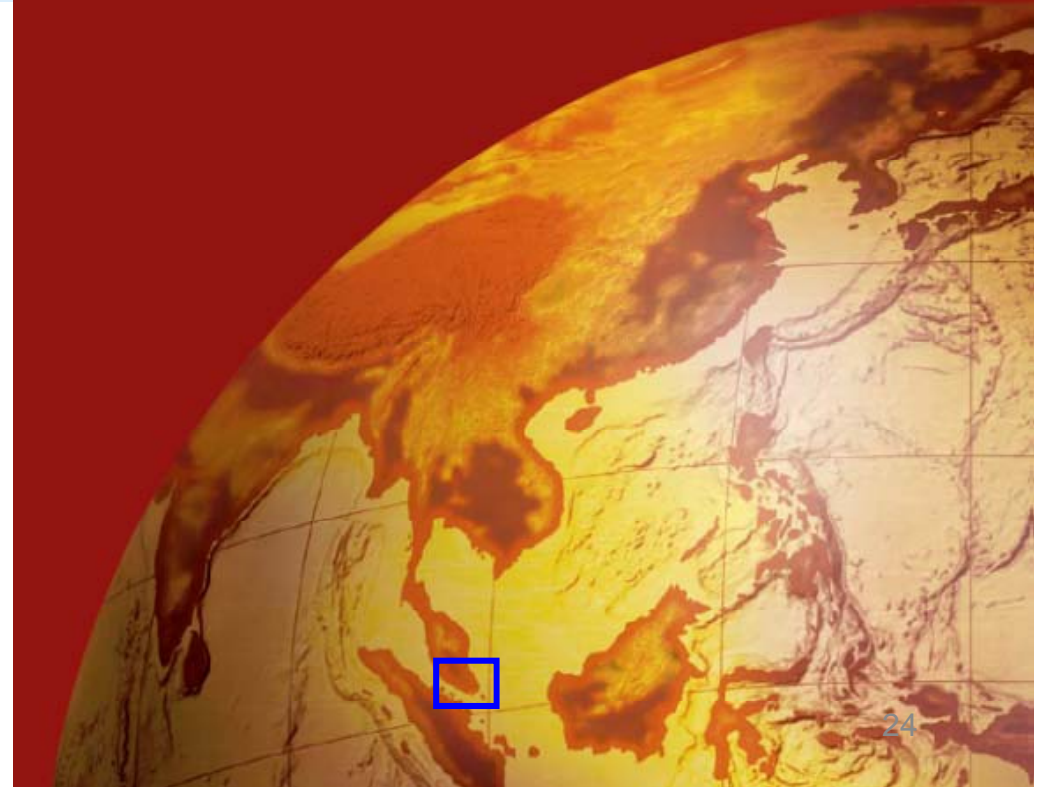
Case study

Iskandar Malaysia

2,217 km²

Pop.1.3m (2010)

Iskandar Malaysia, Johor



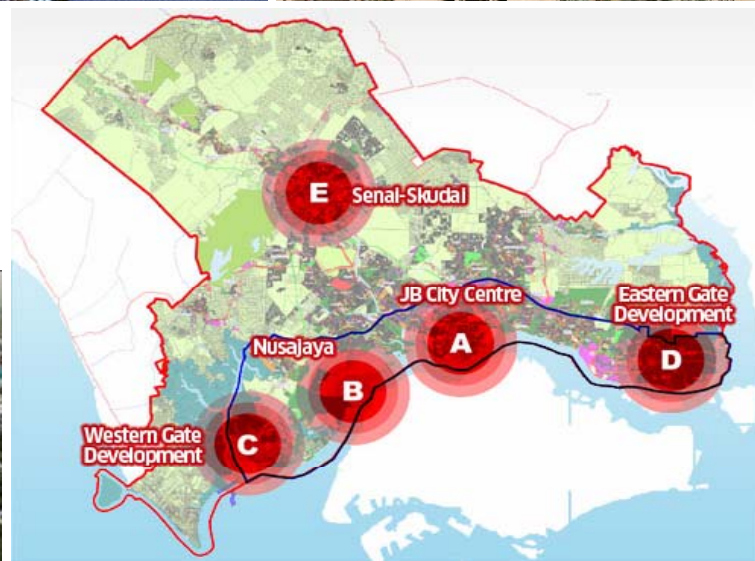
Iskandar Malaysia at a Glance

A



E

B



C



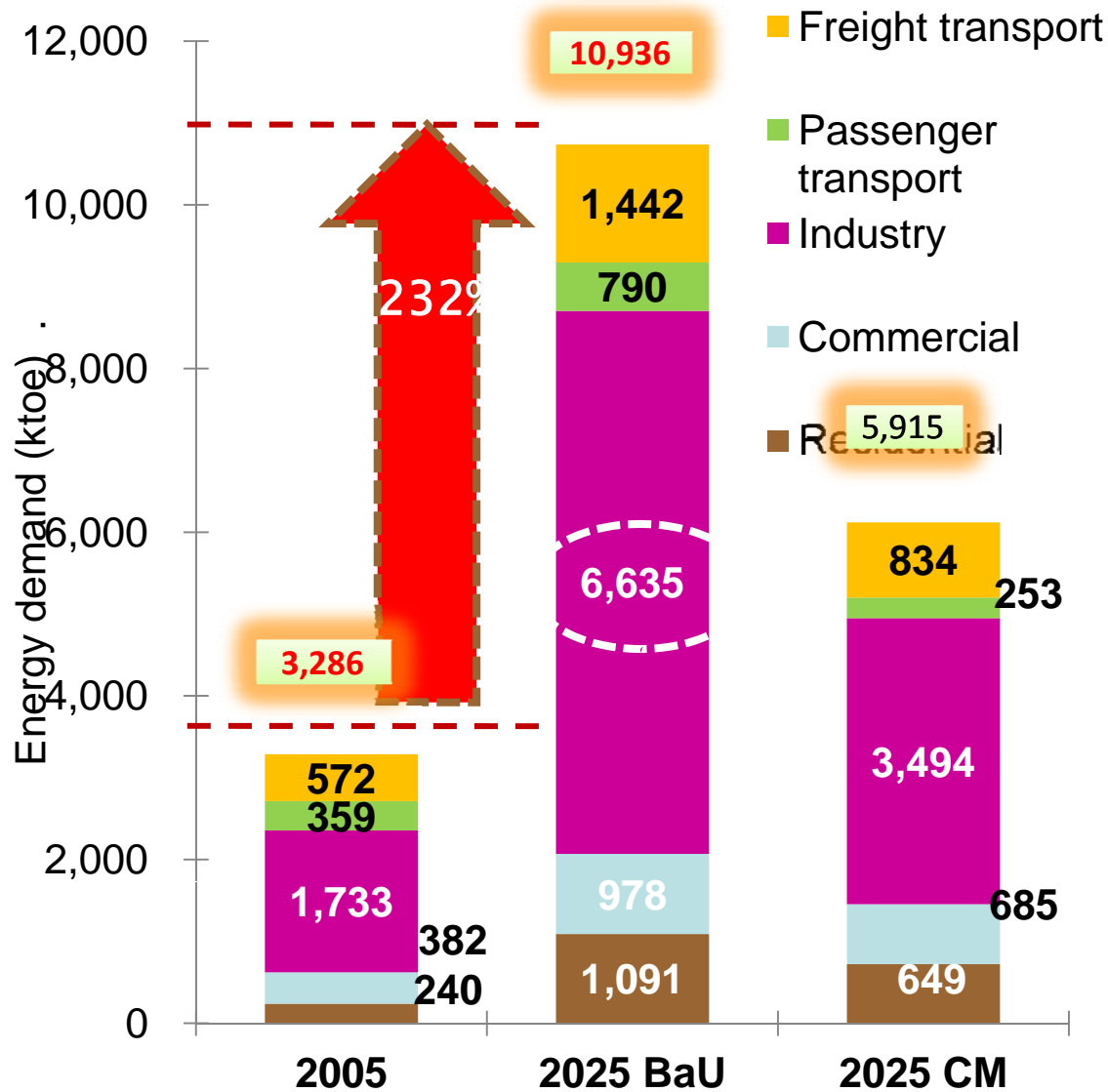
D



Socio Economic Scenario of IM

	2005	2025	2025/ 2005
Population	1,353,200	3,005,815	2.2
No. of households	317,762	751,454	2.4
GDP (mil RM)	37,641	176,224	4.7
GDP per capita (RM/capita)	27,817	58,628	2.1
Gross output (mil RM)	121,431	474,129	3.9
Primary industry (mil RM)	1,860	5,375	2.9
Secondary industry (mil RM)	83,502	263,444	3.2
Tertiary industry (mil RM)	36,069	205,309	5.7
Floor space for commercial (mil m²)	6.8	19.3	2.8
Offices	1.3	1.7	2.9
Shops	5.7	16.3	2.9
Hospitals & Schools	0.6	1.2	2.1
Passenger transport demand (mil p-km)	3,816	8,677	2.3
Freight transport demand (mil t-km)	1,652	5,303	3.1

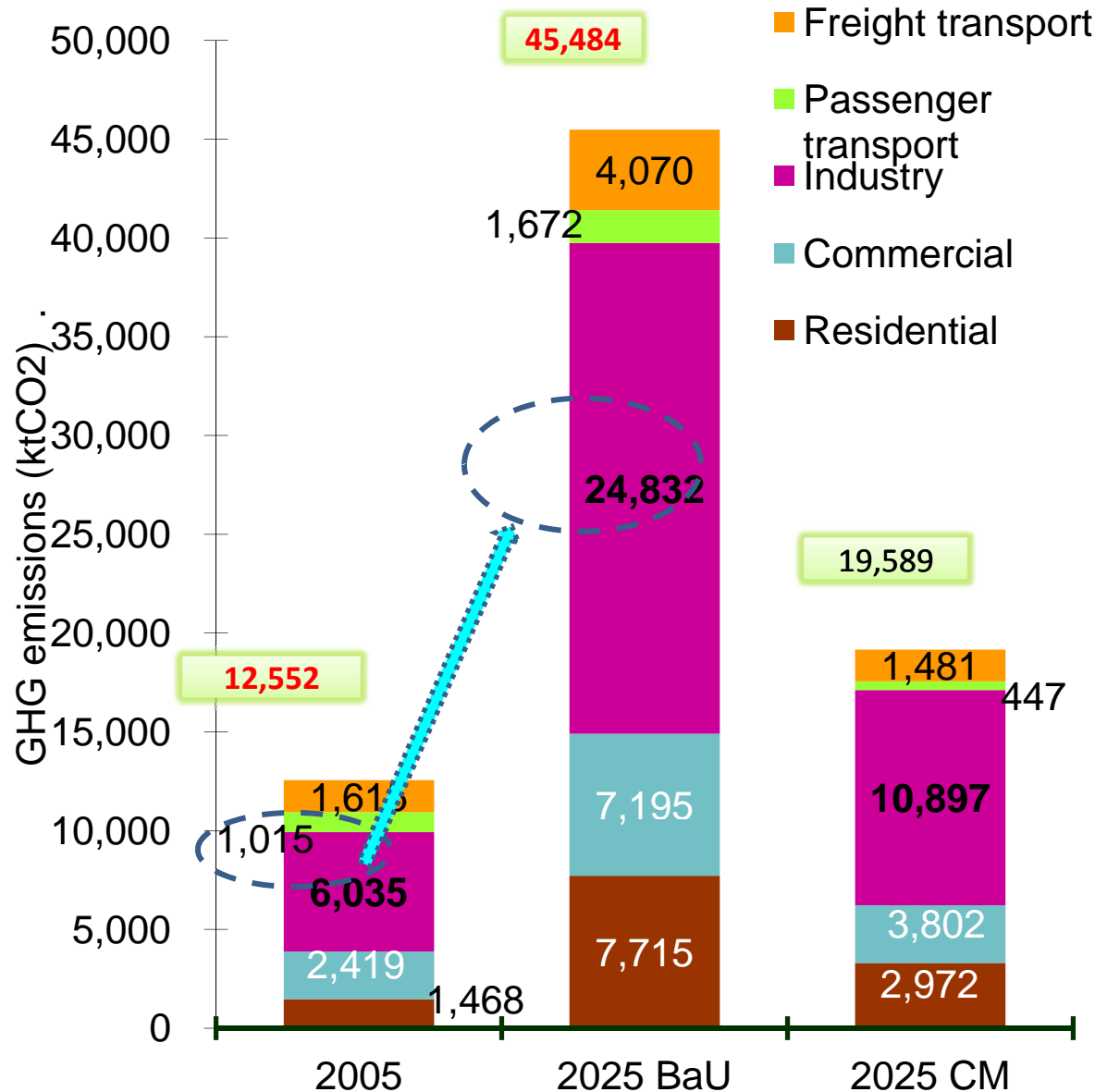
Energy Demand By Sector



Energy demand in IM is projected to increase from **3,286 ktoe** (toe: tonne oil equivalent) in 2005 to **10,936 ktoe** in 2025 for the BaU case (*BaU: business as usual*)

Industry is expected to be 6,635 ktoe and will maintain the largest share of 61%.

GHG Emission By Sector

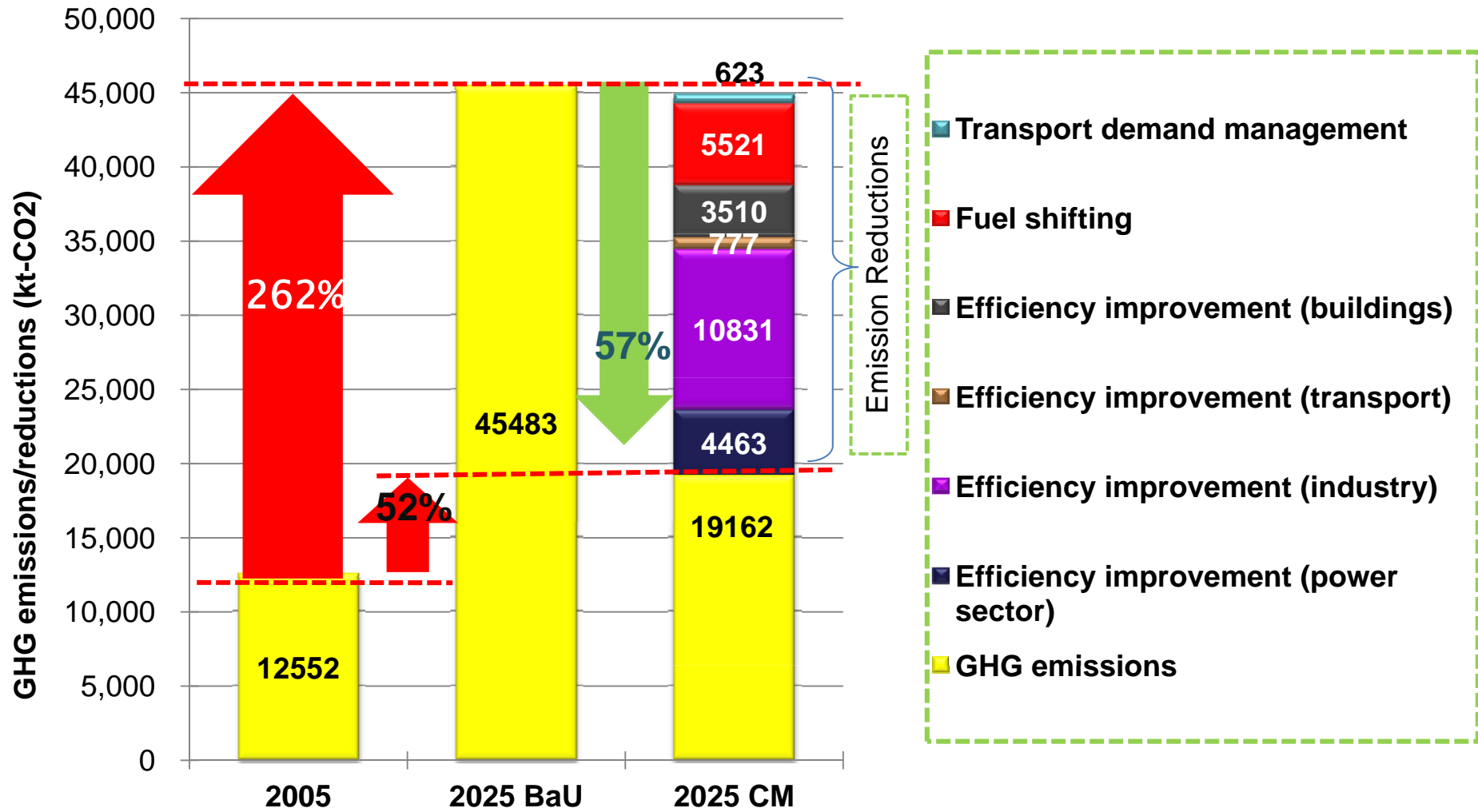


GHG Emissions in IM are projected to increase from 12,552 ktoe CO₂ (2005) to 45,484 ktoe CO₂ (2025 BaU)

Industry Sector will increase 4.1 times in total as compared to 2004 in GHG emission . (54% of total GHG emission in 2025 BaU)

GHG emissions per capital : 9.3 tonnes of CO₂ /capita (2005) to 15.1 tonnes /capita (2025 BaU), with CM will be reduced to 6.5 tonnes of CO₂/capita.

Potential Mitigation in IM



Low Carbon Cities Policy Package

Buildings

- Environmental performance standard and evaluation of buildings
- Adjustment of tax rate of fixed asset tax
- Low interest loans to investment to energy efficient buildings

- Environmental performance standard of equipments
- Environmental labeling
- Education and information service
- Green purchasing policy

- Subsidy to introduce photovoltaic power generation system

Transport & Land use

- Urban planning
- Transport planning
- Tax rate adjustment to fixed asset
- Investment to public transport

- Environmental performance standard of vehicles
- Tax rate adjustment to energy efficient vehicles
- Promotion of bio fuel

Industry

- Subsidy to investment to energy efficient equipments
- Promotion of technology transfer

- Incentive to introduce energy efficient equipments & buildings
- Incentive to introduce renewable energy

- Controlling urban growth & choice of transport mode

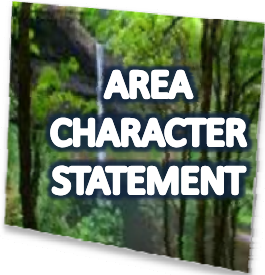
Energy efficiency improvement

Lowering CO₂ intensity

Transport demand control

Mitigation of GHG emissions from Iskandar Malaysia

IRDA Blueprints that promote LCS



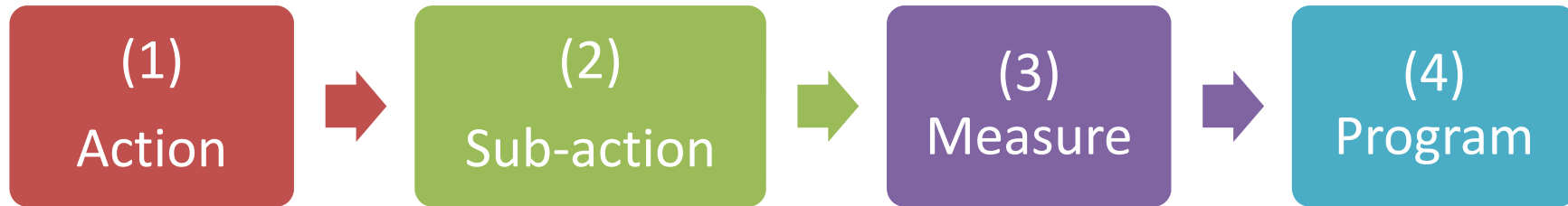
Themes & New List of the Dozen Actions

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

Proposed Numbers of SC by Actions

	Action Names	Sub-action	Measures	Programs	Total
1	Integrated Green Transportation	6	9	28	43
2	Green Industries	2	6	16	25
3	Low Carbon Urban Governance	4	4	14	21
4	Green Buildings and Construction	5	8	21	34
5	Green Energy System and Renewable Energy	5	7	21	32
6	Low Carbon Lifestyle	5	8	21	34
7	Community Engagement and Consensus Building	4	6	24	34
8	Walkable, Safe, Livable City	4	8	30	42
9	Smart Growth	3	5	17	25
10	Green and Blue Infrastructure	7	11	25	43
11	Sustainable Waste Management	4	9	46	59
12	Clean Air Environment	2	4	12	18
Total		51	85	275	410

What are these Specification Cards?



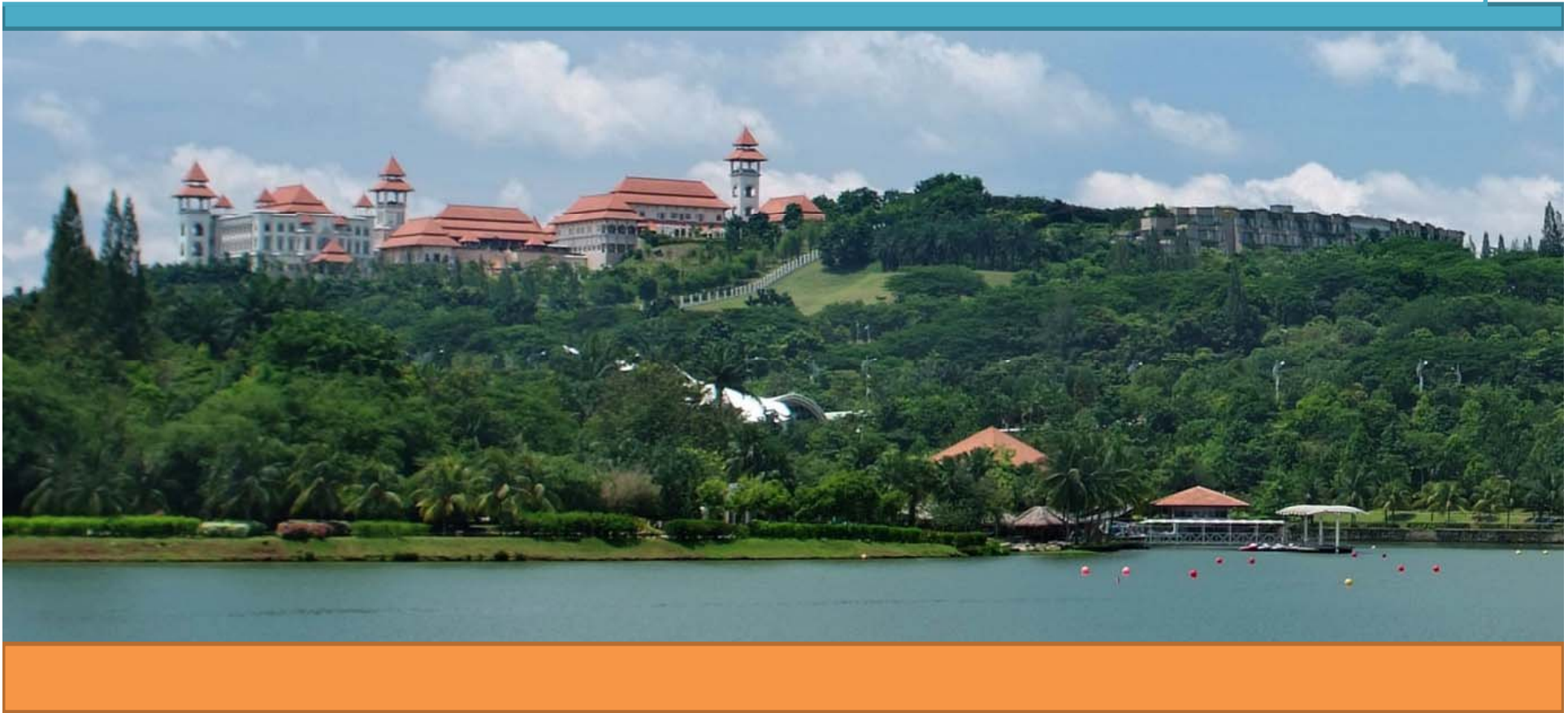
- Above is the Hierarchy of the Specification Card
- **Specification card** is developed for each one of the **Actions**, **Sub-actions**, **Measures** & **Program**
- A Specification Card functions as a **summary card** or a **report card**

Action Specification Card

Action 1:			
Group :			
Name :			
Description			
Background			
Objective			
List of Sub-actions			
Sub-actions		Description	
Effects of this Action			
Emission Reduction			
<p style="text-align: center;">GHG Emission Reduction (Chart & Explanation)</p>			
Other Effects			
<p style="text-align: center;">Example: Employment Identification of Co-benefit</p>			
Existing Documentations			
Document Name	Chapter	Page	Content
1 Comprehensive Development Plan			
2 Transportation Blue Print			
Stakeholders involved in Implementing			
1 Iskandar Regional Development Authority			
2 The Local Authorities within the five (5) Flagship zones in Iskandar Malaysia			
Estimated Cost			

- **Name** of Action (Eg: Action 1: Walkable, Safe, Livable City Design)
- **Group** this action belongs to (Eg: Group 1- Transportation)
- **Description** – A short explanation of the Action
- **Background** of Action (3-4 lines)
 - Background story of this action
- **Objectives** of the Action (3-4 Lines)
 - Why this Action is being implemented
 - What is the focus of this Action
- **List of Sub-action**
 - Name & Description
- **Effects** of this sub-action
 - GHG reduction (Overall total against the 12 Actions)
 - Employment
 - Identification of Co-benefit
- Listing up of the **Stakeholders**
 - Who are the Implementation Agencies? (Existing agencies/departments/government)
 - Other relevant Stakeholders (citizens/ organizations)
- Related **Existing Plans/documents**, Actions, Programs (eg: CDB Which chapter, or policy?)
- **Estimated Cost**
 - Public / private cost by each stakeholder
 - program cost & managing cost

The case of Putrajaya



PUTRAJAYA GREEN CITY 2025

Baseline and Preliminary Study

OBJECTIVE



- Three Main targets are achieved :
- 2025CM (Countermeasure) Compared with 2007
 1. **Low-Carbon Putrajaya:** 60% reduction in CO₂ emission intensity.
 2. **Cooler Putrajaya:** Reduction of 2°C from peak temperature.
- 2025CM Compared with 2025BaU (Business as Usual)
 1. **3R Putrajaya:** 50% Reduction in the Final Disposal of Solid waste & GHG Emission.

Summary of Scenario

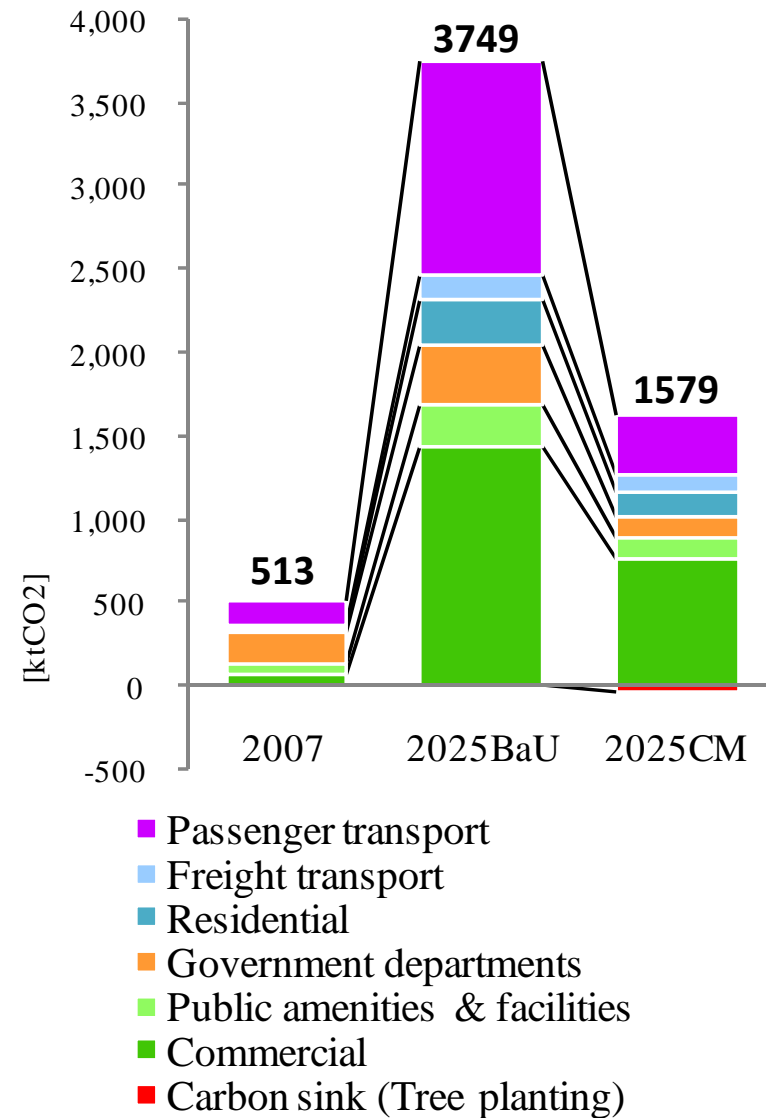
	2007	2025BaU	2025CM	2025BaU /2007	2025CM/ 2007	2025CM/ 2025BaU
Population [no.]	49,452	347,700	347,700	7.0	7.0	1.0
Employment [no.]	45,000	164,500	164,500	3.7	3.7	1.0
Per capita GDP in Malaysia [Mill.RM/capita]	23,605	50,337	50,337	2.1	2.1	1.0
Economic activity (2007=1)	1	7.8	7.8	7.8	7.8	1.0
Passenger transport demand [Mill.pass-km]	571	4149	3646	7.3	6.4	0.9
Freight transport demand [Mill.t-km]	109	851	681	7.8	6.2	0.8
Final energy demand [ktoe]	134	899	407	6.7	3.0	0.5
GHG emission [ktCO ₂ eq]	661	4324	1713	7	3	0

A Dozen Actions

No	Action Names	Category
1	Integrated City Planning & Management	Low Carbon Putrajaya
2	Low Carbon Transportation	
3	Cutting Edge Sustainable Buildings	
4	Low Carbon Lifestyle	
5	More and More Renewable Energy	
6	The Green Lung of Putrajaya	
7	Cooler Urban Structure and Buildings	A Cooler Putrajaya
8	Community & Individual Actions to Reduce Urban Temperature	
9	Use Less Consume Less	3 R Putrajaya
10	Think Before You Throw	
11	Integrated Waste Treatment	
12	Green Incentives & Capacity Building	Inter - Category

CO₂ Emissions

- 2025BaU Increases **7.3 times** from 2007
- Commercial Sector = Largest emitter in 2025BaU: **1435ktCO₂**
- Total reduction from 2025BaU to CM = **57%**
- Per capita CO₂ emission in 2007= **8.68 tCO₂**, and it is reduced to **4.2tCO₂**.



CO₂ Emission by Sector



The Case of Cyberjaya Digital Green City 2025

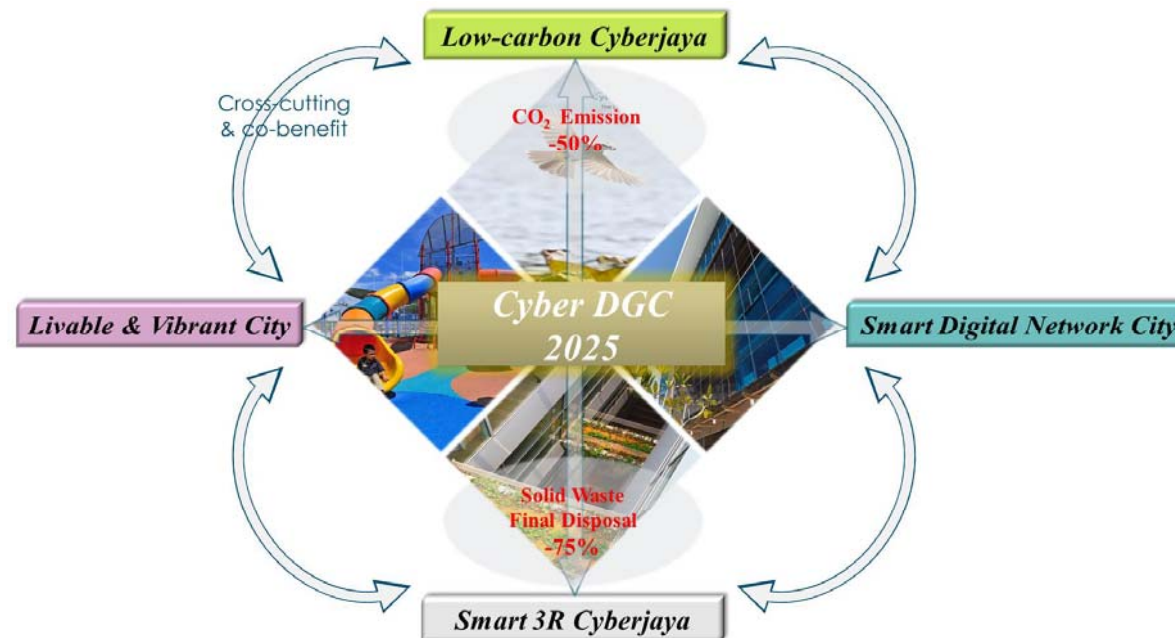
Ho Chin Siong (University Teknologi Malaysia)
Chau Loon Wai (University Teknologi Malaysia)
Janice Jeevamalar Simson (Kyoto university, Japan)
Yuri Hayashi (Kyoto university, Japan)



Four Themes & Environmental Targets

The goal of Cyber DGC2025 is described by **four main themes**;

- I. **Low-carbon Cyberjaya** -for Climate change mitigation-
- II. **Smart 3R Cyberjaya** -for Solid waste management-
- III. **Livable & Vibrant City** –for Good living environment-
- IV. **Digital Network City** –for an ICT based society-



Dozen Actions

=A concrete vision for developing Digital Green City in Cyberjaya through the four themes

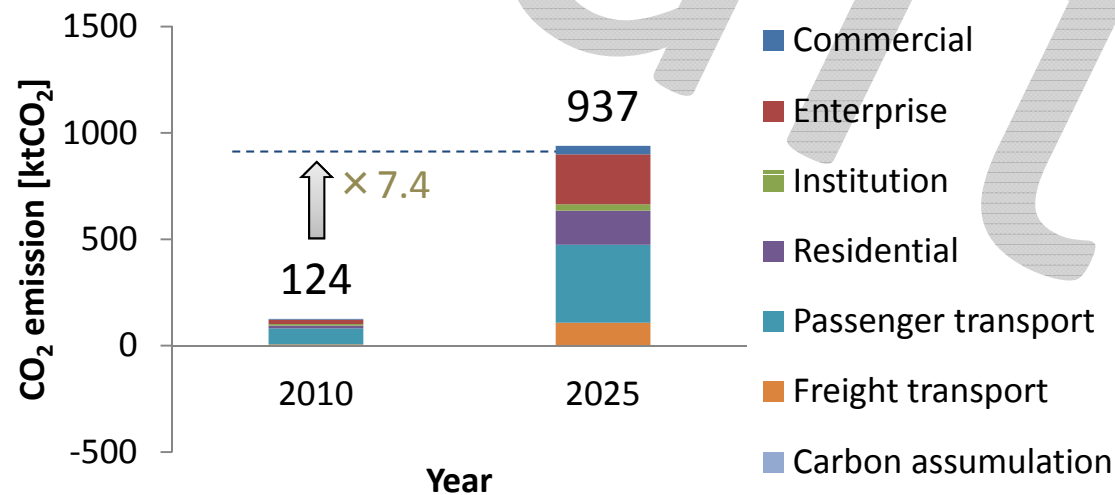
Action		Theme
Action 1	Eco City Planning	Low-carbon Cyberjaya
Action 2	Green Transportation	
Action 3	Environment Friendly Buildings & Houses	
Action 4	Local Production & Consumption of Renewable Energy	
Action 5	Urban Ecology System	
Action 6	Green Incentive & Education	
Action 7	Reduce, Reuse, Recycle & Smart Management	Smart 3R Cyberjaya
Action 8	A Livable Community and City	Livable &
Action 9	A Vibrant Urban Space	Vibrant City
Action 10	Smart Community	Smart Digital Network City
Action 11	Intra-city Digital Network	
Action 12	Innovative Green Business	

Result: CO₂ emission

(Based on TNB's electricity consumption)

	Unit	2010	2025	2025/2010
CO ₂ emission	ktCO ₂	126	939	7.4
CO ₂ accumulation (Carbon sink)	ktCO ₂	-2.4	-2.4	1.0
Total CO₂ emission	ktCO ₂	124	937	7.6
CO ₂ emission per capita (night time population)	tCO ₂ /capita	9.3	8.1	0.9
CO ₂ emission per capita (day time population)	tCO ₂ /capita	3.0	4.1	1.4

CO₂ emission by sector



5 Conclusion

The Way Forward

Quantification from LCS modeling assist **better understanding** on impact of proposed actions, sub actions and programs.

Good **baseline study, consensus building and low carbon blueprint plan** will help to develop an **integrated climate resilient , Low carbon framework** for a city or region.

Green cities or Local carbon cities need to have a **LOW CARBON SOCIETIES mindset/** behavior and **Joint effort** between different professions (Planners, architect, engineer and related environmental profession)

Important to have a Asian (eg IGES & AIM workshop) and **International platform** for **research collaboration** between researchers in LCS as well as **capacity building opportunities.**



Thank You! Terima Kasih! 谢谢! धन्यवाद!
ขอบคุณครับ kaub koon krup
どうもありがとう