New development – 7 new projects

NATIONAL LEVEL

1. **ASEAN States Climate Change Report** (Country Report – Malaysia) Appointed as Think Thank by ASEAN Secretariat and ASCCR, IGES Japan) funded by Ministry of Environment (MoEJ) JAPAN Jun 2020 – April 2021

2. **Policy-Research Dialogue on Malaysia's Mid-/Long-Term Emissions Reduction Scenario Analyses** commissioned by IGES /Mizuho Japan) funded by Ministry of Environment (MoEJ) JAPAN Feb -March 2021

LOCAL LEVEL

1. **Climate Action Plan Guide for Malaysian cities** commissioned by Joint Research Council European Commission (JRC-EU) Rome Jun -Dec 2020

2. **Climate Action Plans for Four (4) Malaysia Pilot cities** commissioned by Global Covenant of Mayors International Urban Cooperation (GCoM-I*UC) Brussels Jan – Dec 2020*

3. **Muar Local Plan2030** commissioned by PLANMalaysia and Muar Municipality May 2019- March 2021

4. **Kuala Lumpur City Local Plan 2040** commissioned by Kuala Lumpur City Hall (KLCH) Nov 2020- July 2021

5. Project developing **framework for building energy efficiency through City to City collaboration between Kuala Lumpur and Tokyo Metropolitan Government** (2nd Year) commissioned by IGES and funded Ministry of Environment (MoEJ)JAPAN 2020-May – March 2021

1

Policy-Research Dialogue on Malaysia's Mid-/Long-Term Emissions Reduction Scenario Analyses - AIM Modelling capabilities/ training, Climate Change Policy, Carbon Neutral Vision

KEMENTERIAN ALAM SEKITAR DAN AIR
Ministry of Environment and Water

環境省
Ministry of the Environment

KEMENTERIAN TENAGA DAN SUMBER ASLI
MINISTRY OF ENERGY AND NATURAL RESOURCES
KeTSA/MENR

KEMENTERIAN PERTANIAN DAN INDUSTRI MAKANAN
MAFI

EPU
ECONOMIC PLANNING UNIT
PRIME MINISTER'S DEPARTMENT, MALAYSIA

Suruhanjaya Tenaga
Energy Commission
EC

KEMENTERIAN PENGANGKUTAN MALAYSIA
MoT

KEMENTERIAN PERUSAHAAN PERLADANGAN DAN KOMODITI
MPIC

IGES
Institute for Global Environmental Strategies

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

MIZUHO
みずほ情報総研

Science-Policy Dialogue
on Malaysia's Mid-/Long-Term Emissions Reduction Scenario Analyses

Moderator: TPr Chau Loon Wai UTM   12 March 2021

Time	Agenda
15:00-15:10 (M) / 16:00-16:10 (J)	**Opening Remarks (10 min)** • Mr Ahmad Farid , Deputy Under Secretary (Environment), KASA • Mr. SUGIMOTO Ryuzo, Director, International Cooperation and Sustainable Infrastructure Office, Global Environmental Bureau, Ministry of the Environment, Japan
15:10-15:15 / 16:10-16:15	**Self-Introduction (5 min)** • All participants – 40 participants (KASA, KeTsa, MITI, EPU,MAFI, MoT, EC)
15:15-15:25 / 16:15-16:25	**Introduction of Malaysia's Climate Change Policies (10 min)** • KASA – Mr Ridwan
15:25-15:40 / 16:25-16:40	**Asia-Pacific Integrated Assessment Model (AIM) and its contribution to climate neutral society development in Asia(15 min)** • Dr. MASUI Toshihiko, Head, Center for Social and Environmental Systems Research (Integrated Environment and Economy Section), National Institute for Environmental Studies (NIES)
15:40-15:50 / 16:40-16:50	**Q and A (for the above two presentations) (10 min)**
15:50-16:20 / 16:50-17:20	**Mid/Long-Term Emissions Reduction Scenario Analysis and Reduction Potential in Malaysia – Analysis by AIM ExSS (30 min)** • Prof. TPr. Dr. Ho Chin Siong, Professor, Director, UTM-Low Carbon Asia Research Centre, Universiti Teknologi Malaysia (UTM) • Mr. OCHI Yuki, E-Konzal
16:20-16:55 / 17:20-17:55	**Discussion (35 min)**
16:55 / 17:55	**Closing (5 min)**

A Preliminary Research on Carbon Neutral Malaysia 2050 Scenario

Malaysia-Japan Knowledge Sharing on Climate Change: Policy and Capacity Building Needs
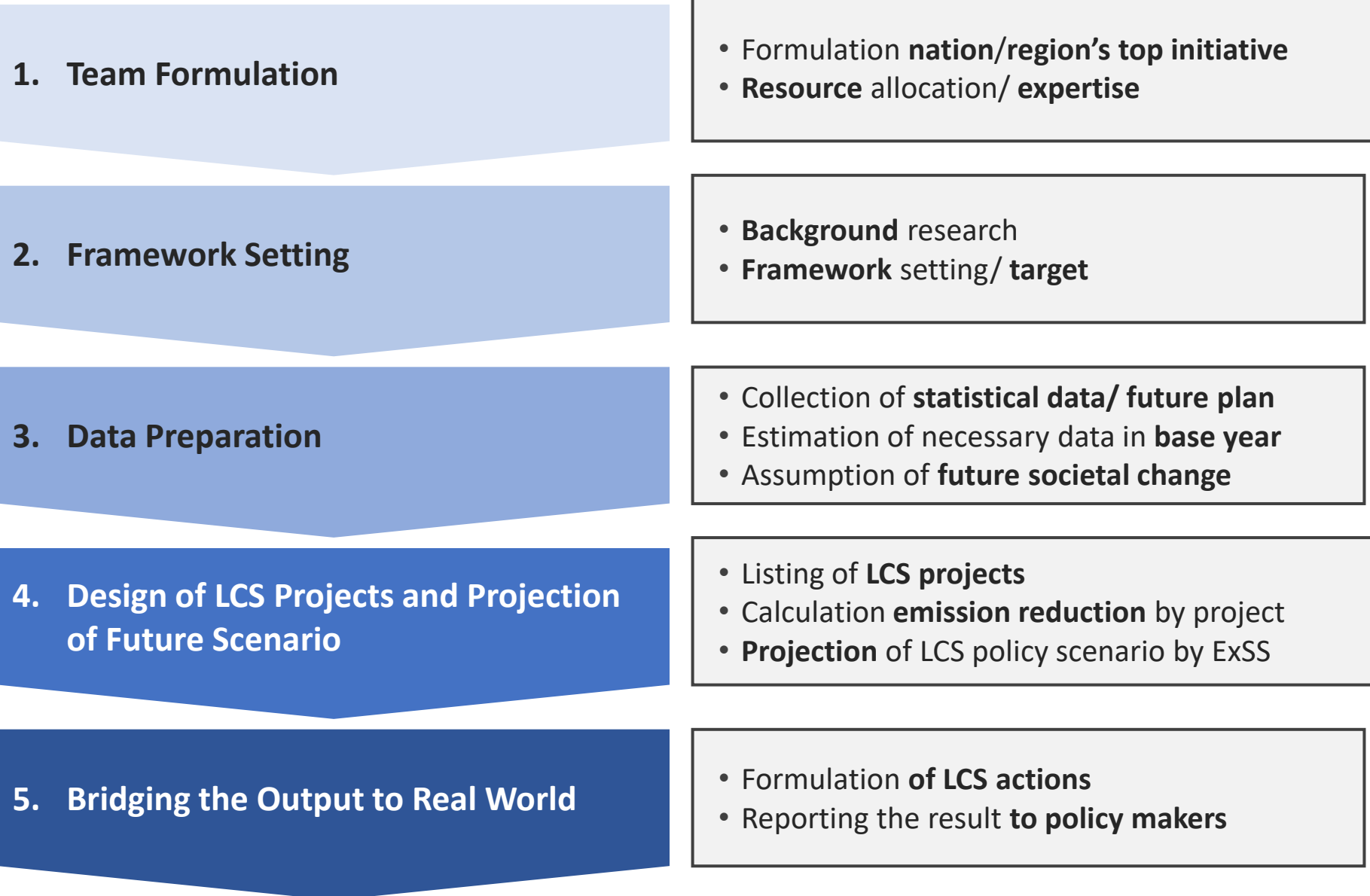12th March 2020

Ho Chin Siong, Chau Loon Wai and Teh Bor Tsong
Universiti Teknologi Malaysia

Yuki Ochi
E-Konzal Co. Ltd.

Outline of Designing LCS Scenario

1. Team Formulation

- Formulation **nation/region's top initiative**
- **Resource** allocation/ **expertise**

2. Framework Setting

- **Background** research
- **Framework** setting/ **target**

3. Data Preparation

- Collection of **statistical data/ future plan**
- Estimation of necessary data in **base year**
- Assumption of **future societal change**

4. Design of LCS Projects and Projection of Future Scenario

- Listing of **LCS projects**
- Calculation **emission reduction** by project
- **Projection** of LCS policy scenario by ExSS

5. Bridging the Output to Real World

- Formulation **of LCS actions**
- Reporting the result **to policy makers**

Framework of the Scenarios

Base year	2014 (NC3 as baseline data)
Target year	2050 (PARIS AGREEMENT)
Target GHG	CO_2
Target activities	**Energy related activity** Industry, Transport, Commercial, Residential
No. of scenarios	**BaU (Business as Usual) Scenario** - Socioeconomic development based on future plan of the region - Without implementation of LCS policy in future **CN (Carbon Neutral) Scenario** - Same socioeconomic development as BaU scenario - With implementation of LCS policy in future

Data Collection

- We collect data and information for **both base year calibration and future estimation** from national statistics, international report and other researches.

| Drivers/sector	Data/Information	Source
Demography	Population	■ Malaysia 2010 Population ■ Malaysia 2014 Population/ NC3 ■ Statistics Yearbook Malaysia 2019
	No. of Households	■ Characteristics of Household 2010 ■ Euromonitor International "Malaysia Country Factfile"
Economy	GDP	■ National Accounts (DOSM website)
	No. of employees	■ Statistics Yearbook Malaysia
	GDP growth	■ Malaysia 3rd National Communication
Transport	Transport demand	■ Transport Statistics Malaysia 2018 ■ UTM et al. "Low Carbon Society Scenarios Malaysia 2030" ■ World Bank "World Development Indicators"
	Vehicle registration	■ Malaysia 3rd National Communication
	Future modal share	■ National Land Public Transport Master Plan
Energy	Energy consumption	■ National Energy Balance ■ IEA World Energy Balances
	Renewable energy	■ National Renewable Energy Policy and Action Plan
	Future energy trend	■ IEA "Southeast Asia Energy Outlook 2019"
	Future energy mix	■ The Institute of Energy Economics "IEEJ Outlook 2019"

Socioeconomic Status

- Population will increase to **42.0 million in 2050**. (1.4 times as large as 2014)

- No. of households will reach **12.0 million in 2050**. (1.7 times as large as 2014)

  - It is assumed that household size will decrease to 3.5 in 2050.
  - 2014: 4.3 persons/household   2050: 3.5 persons/household

- GDP per capita will **triple from 2014 to 2050**.

Key Socioeconomic Indicators

	2014	2050	2050 /2014	CAGR
Population (thous. persons)	30,708	**42,000**	1.37	0.87%
No. of households (thous. housholds)	7,160	**12,000**	1.68	1.44%
GDP per capita (thous. RM/person)	36	**92**	2.57	2.66%
GDP (bil. RM)	1,094	3,845	3.51	3.55%
No. of employees in tertiary industry (thous. persons)	8,422	**31,718**	3.77	3.75%
Passenger transport demand (mil. pass-km)	279,566	4**43,935**	1.59	1.29%
Freight transport demand (mil. ton-km)	143,751	**322,753**	2.25	2.27%

Population

Source: Malaysia Population Year 2040 (DOSM)
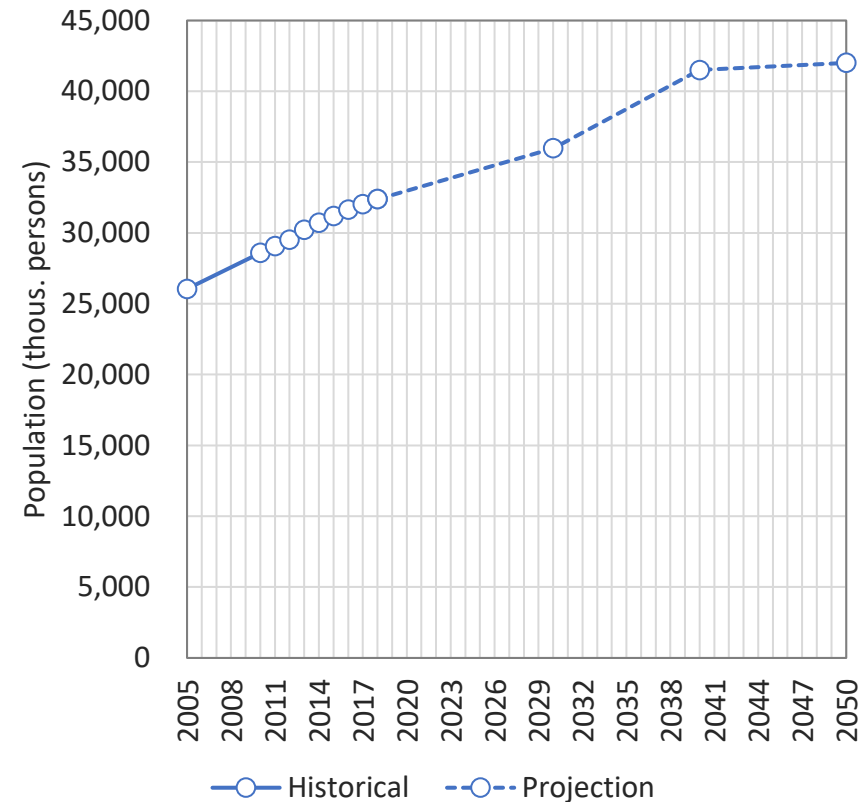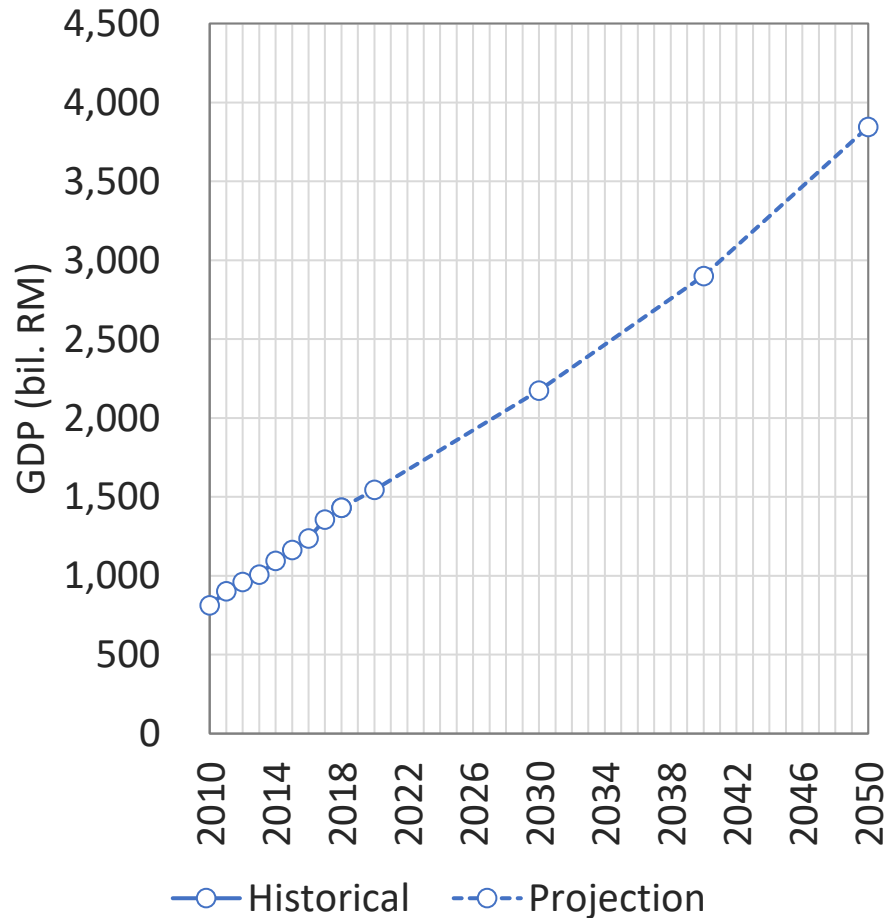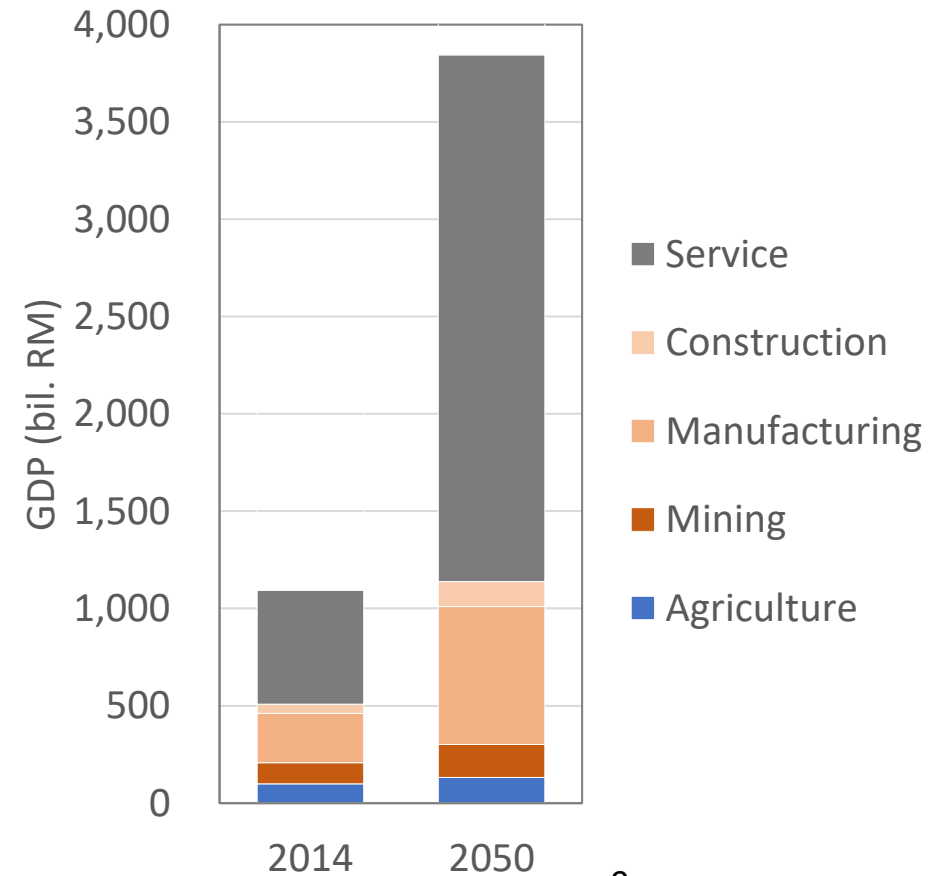
Economic Growth

- GDP will amount to **3,845 bil RM in 2050**.

- GDP growth rate (2014-2050): **3.6%/year**

- GDP per capita will increase **by 2.7% per year**

- **Service sector is** assumed to lead economic growth.

GDP Trend

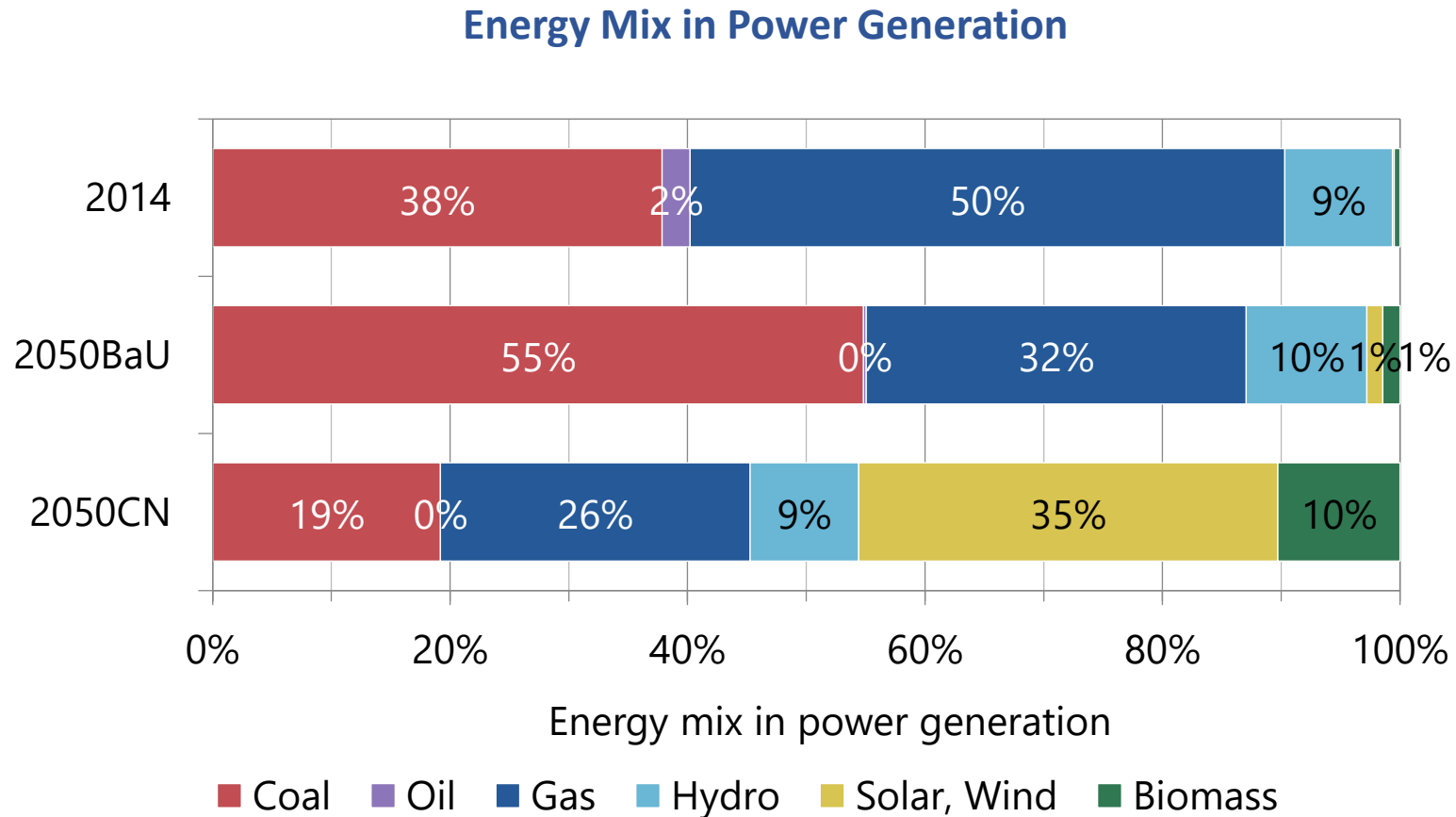**GDP by Type of Economic Activities**

Energy Demand

- **Energy demand will grow by 2.1 times** from 2014 to 2050 in BaU scenario due to population and economic growth.

- Especially, **energy demand in industry** sector will increase remarkably.

- Regarding **type of fuels, increase of electricity demand** is the largest among fuels.

- In CN scenario, energy demand can be reduced by **51% compared with BaU scenario**.

Energy Demand
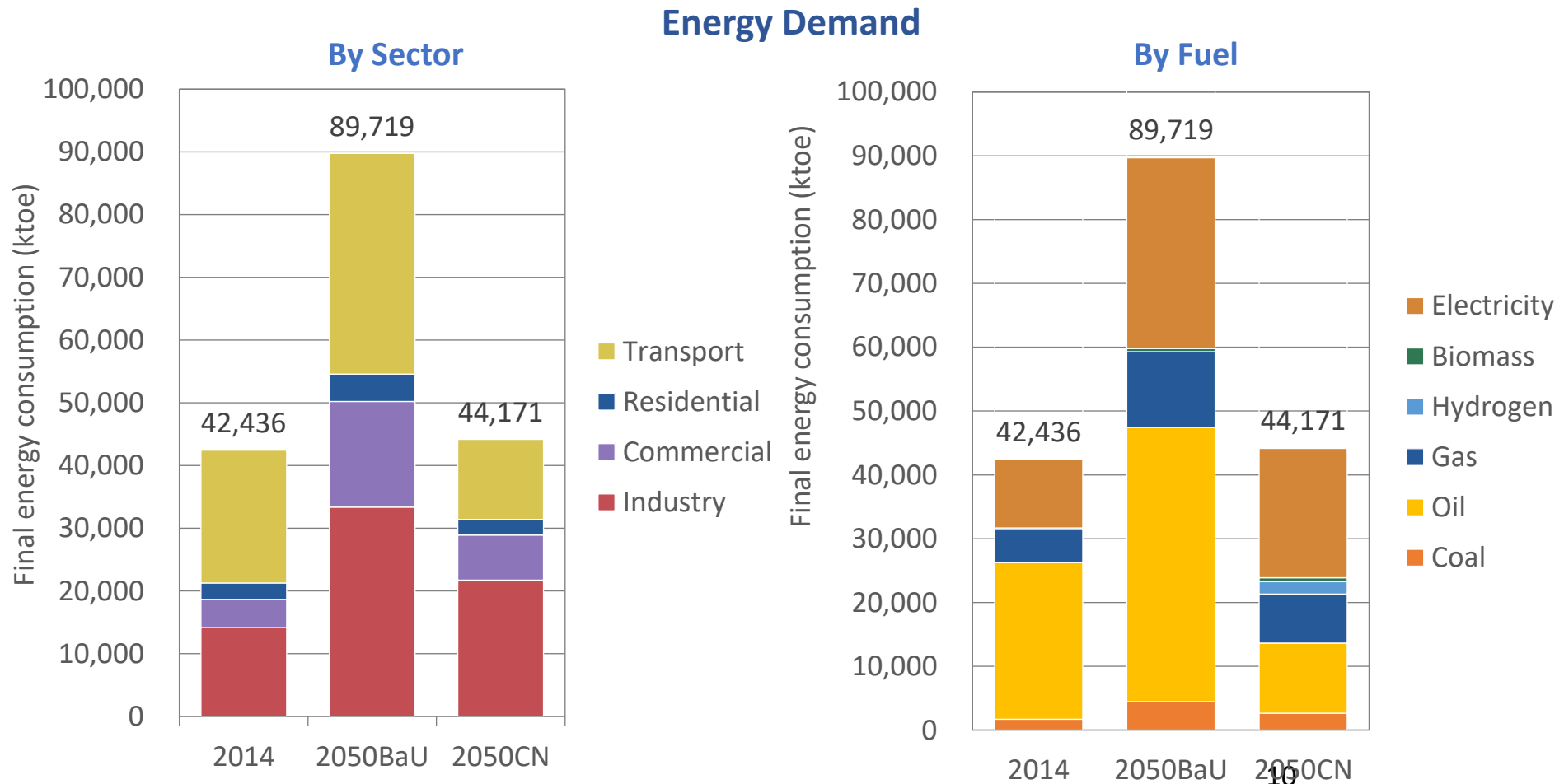
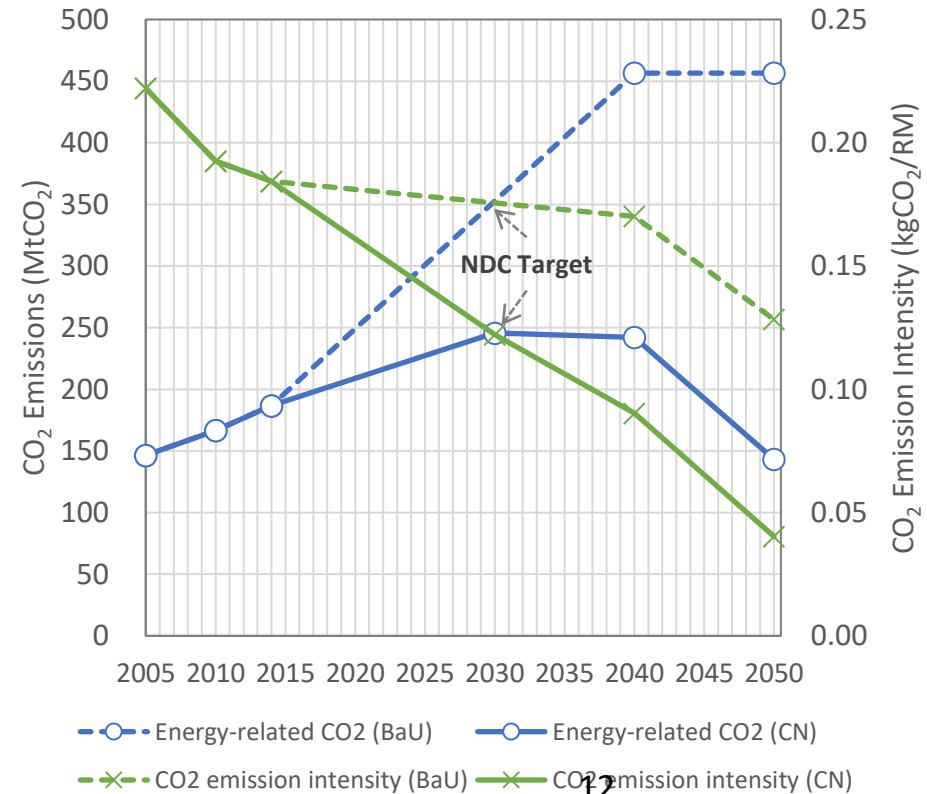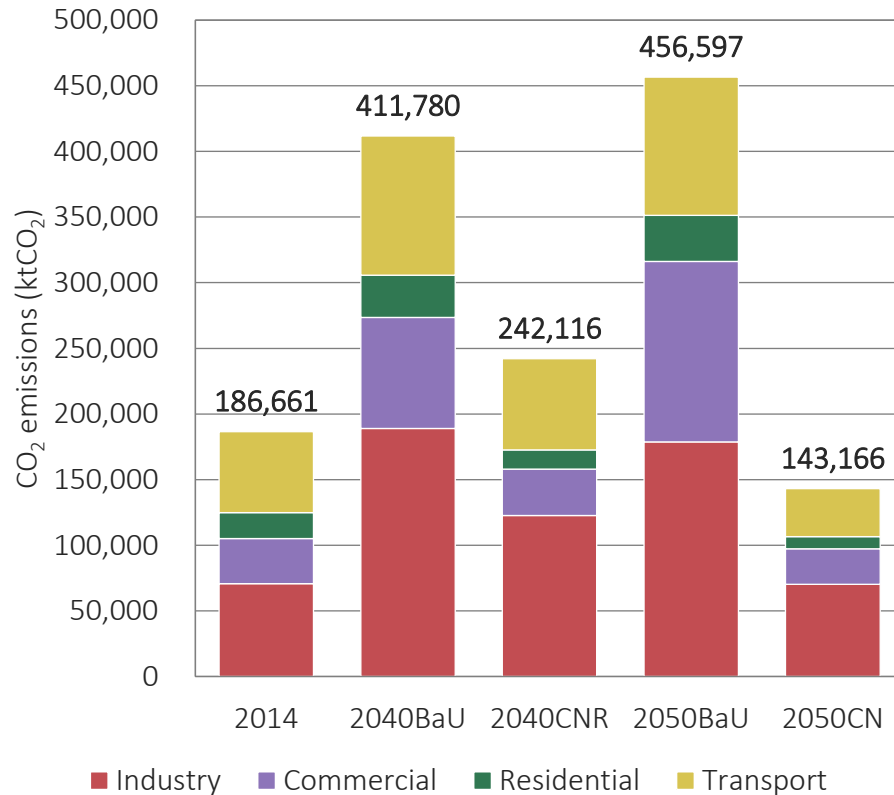# Energy Mix in Power Generation in Malaysia

- Natural gas accounts **for 50% of energy mix** in 2014.

- We assumed **increase of coal in energy mix in BaU** scenario.

- **Share of renewable energy** (excluding hydropower) in energy mix will **increase to 45%** and CO_2 emission factor will improve in CN scenario.
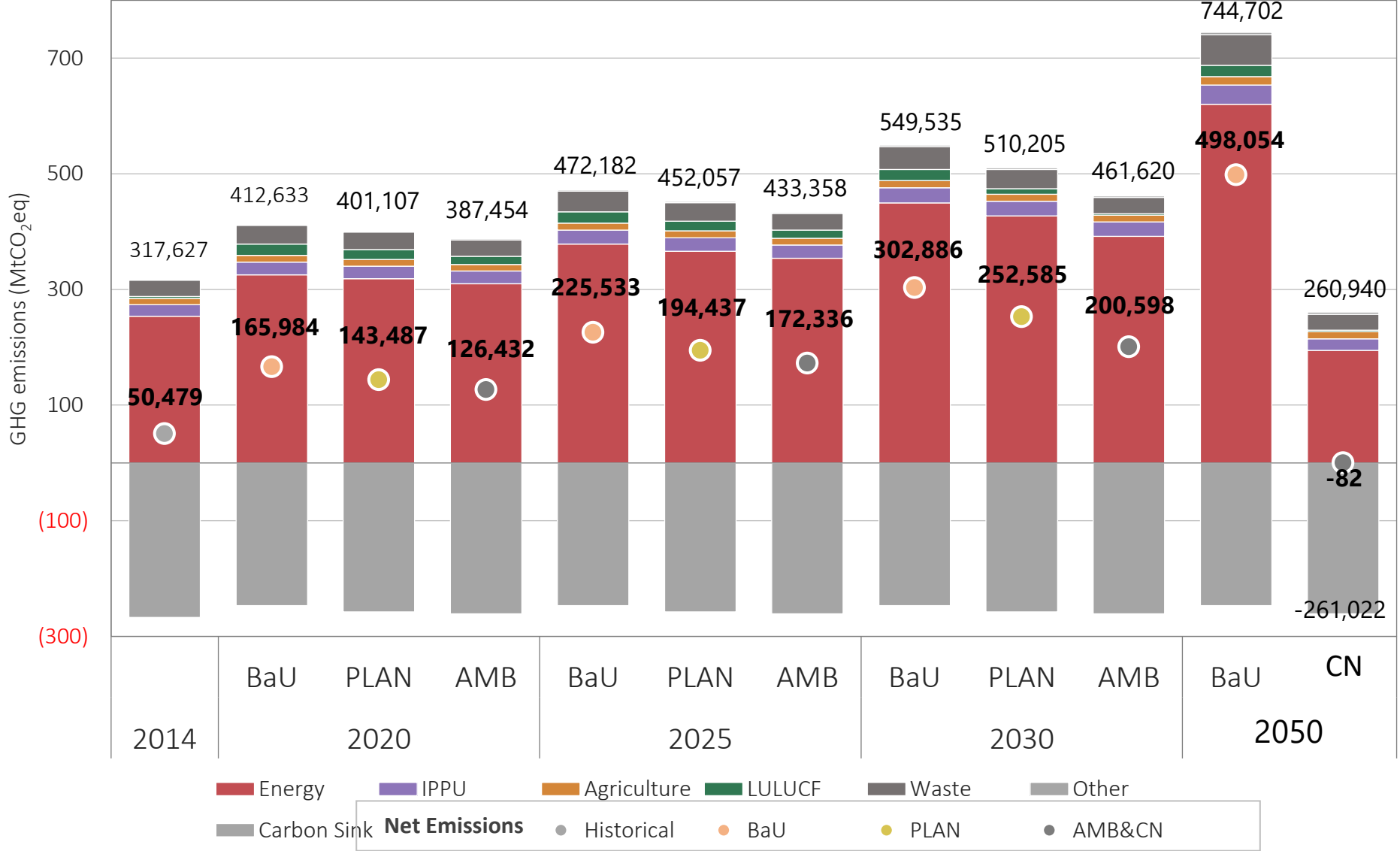
Energy Mix in Power Generation

Year	Coal	Oil	Gas	Hydro	Solar, Wind	Biomass
2014	38%	2%	50%	9%		
2050BaU	55%	0%	32%	10%	1%	1%
2050CN	19%	0%	26%	9%	35%	10%

Energy mix in power generation

■ Coal ■ Oil ■ Gas ■ Hydro ■ Solar, Wind ■ Biomass

Energy-related CO_2 Emission

- Energy-related CO_2 emissions will **increase to 457MtCO$_2$** in 2050 BaU and **become 2.5 times** as large as that in 2014.

- The largest emission source is **industry sector** both in 2014 and 2050.

- In CN scenario, CO_2 emission can be reduced by **70% compared with BaU scenario.**

- Energy-related CO_2 emissions will **peak out by 2030 in 2050 CN scenario**.
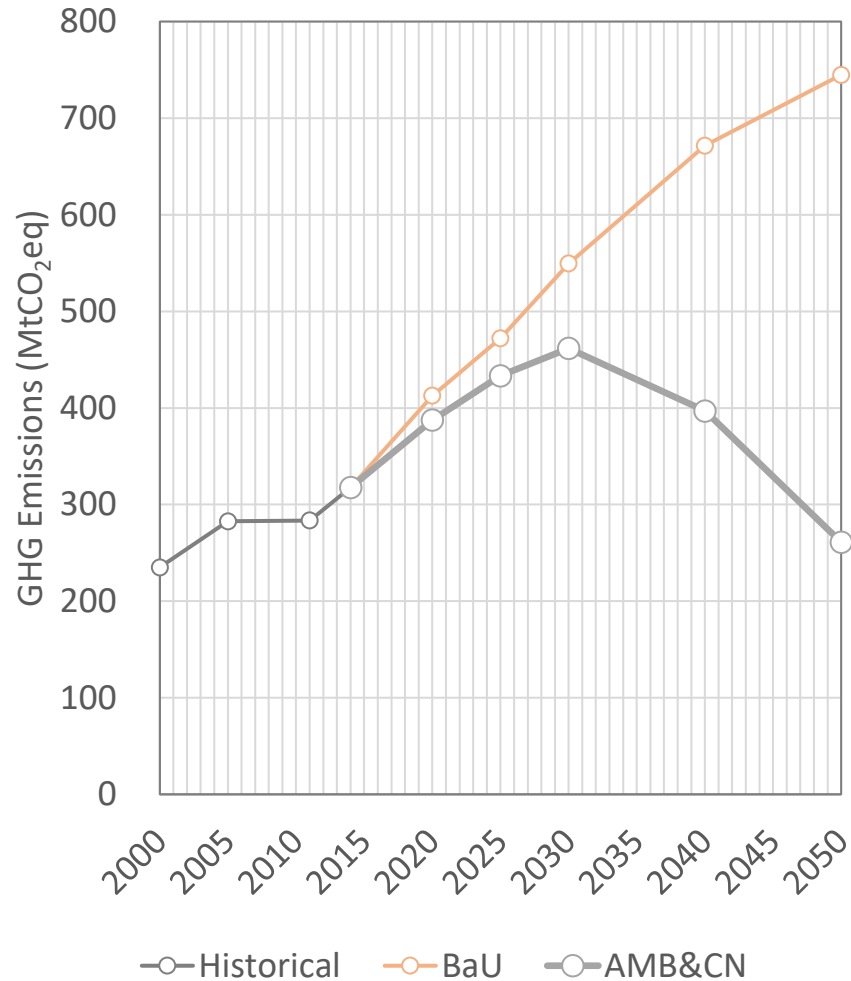
Energy-related CO_2 Emissions
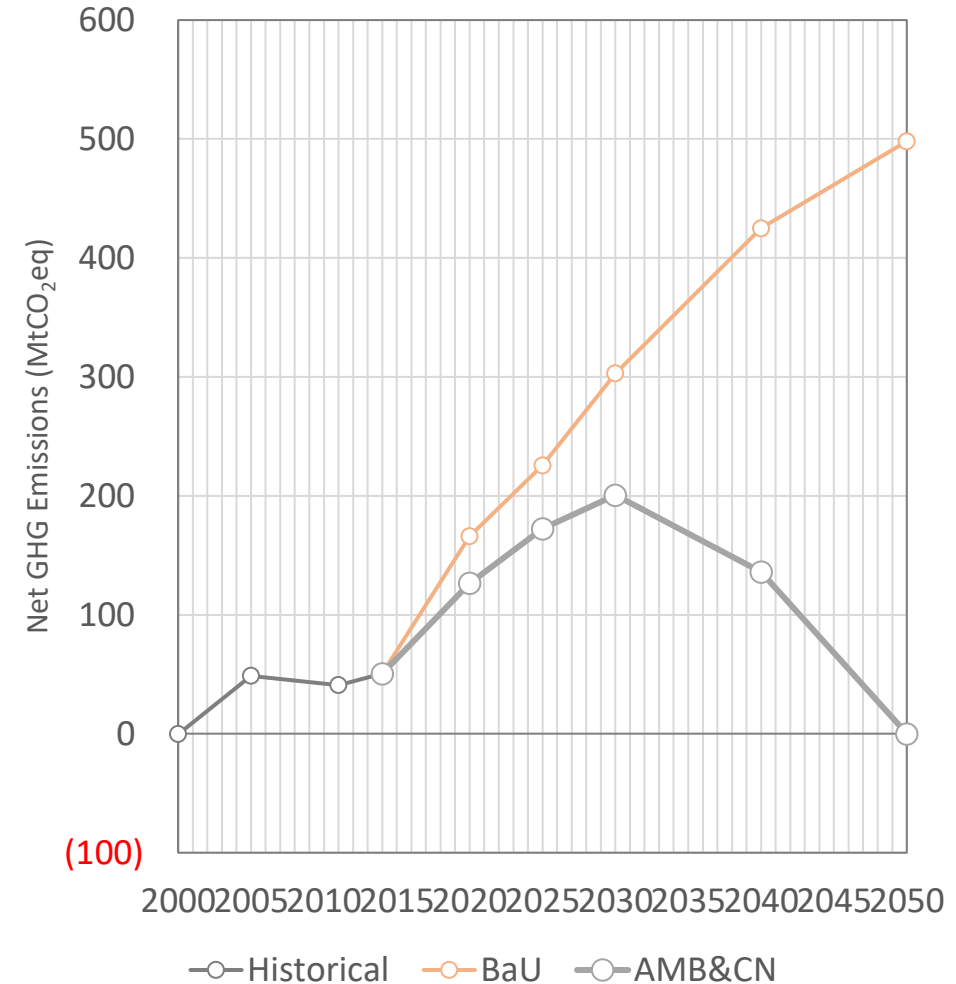
Total CO$_2$ Emission & Net Emissions

Chart: GHG emissions (MtCO$_2$eq)

Total values by scenario:
- 2014: 317,627 (Net: 50,479)
- 2020 BaU: 412,633 (Net: 165,984)
- 2020 PLAN: 401,107 (Net: 143,487)
- 2020 AMB: 387,454 (Net: 126,432)
- 2025 BaU: 472,182 (Net: 225,533)
- 2025 PLAN: 452,057 (Net: 194,437)
- 2025 AMB: 433,358 (Net: 172,336)
- 2030 BaU: 549,535 (Net: 302,886)
- 2030 PLAN: 510,205 (Net: 252,585)
- 2030 AMB: 461,620 (Net: 200,598)
- 2050 BaU: 744,702 (Net: 498,054)
- 2050 CN: 260,940 (Net: -82), Carbon Sink: -261,022

Legend: Energy, IPPU, Agriculture, LULUCF, Waste, Other, Carbon Sink

Net Emissions: Historical, BaU, PLAN, AMB&CN

13

Total CO$_2$ Emission & Net Emissions


Total CO$_2$ Emissions

Net Emissions

Emission Reduction by Countermeasure

- **Behavior change**: Meeting **quality service demand**
  - Home/Building **energy management** system, **Nudge**, **Modal shift** to public transportation etc.

- **Energy efficiency and fuel shift**: **Choice of technology** in end user
  - Hight efficient **air conditioner**, **Heat pump** water heater, **Electric vehicle**, Biomass boiler etc.

- **Low carbon electricity**: Lower emission in generating and supplying electricity
  - Increase of **renewable energy** in energy mix, Improvement of **power generation efficiency**, **Reduction of transmission loss** etc.

Emission Reduction by Type of Countermeasure
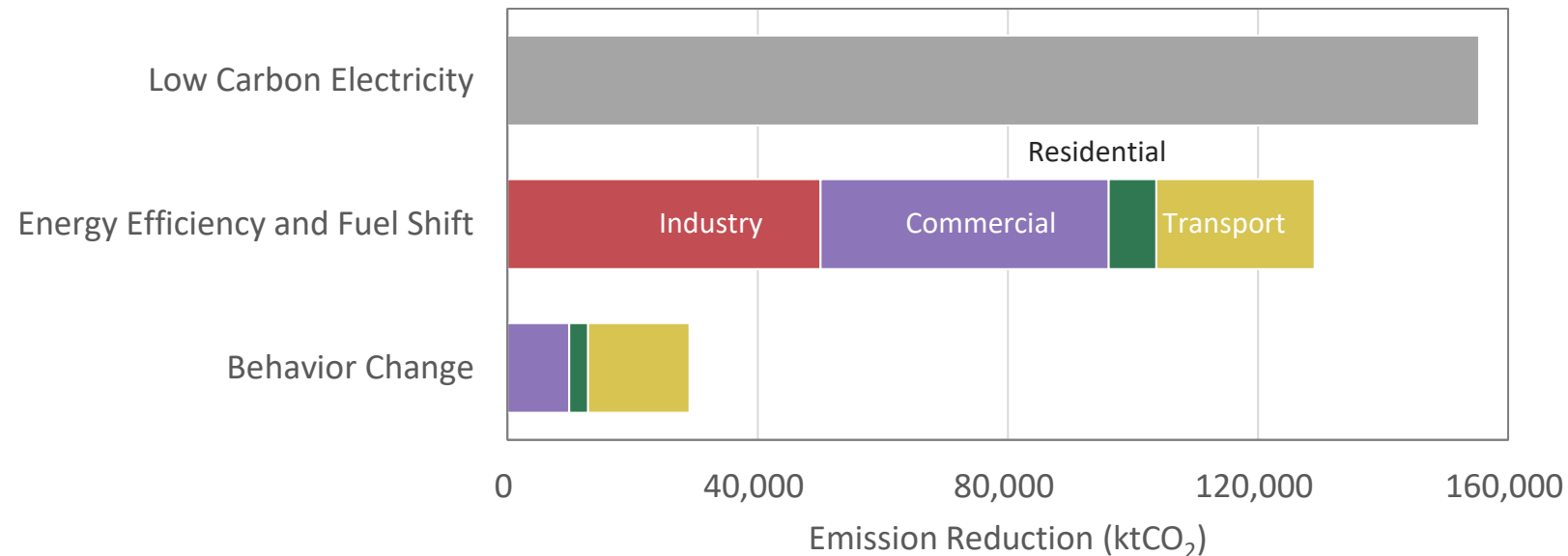
Conclusion

Preliminary modelling on a **2050 Carbon neutral Scenario for Malaysia** appear possible to achieve with several challenges as follows:

- Energy-related **CO_2 emission has to reduced by about 70% compared** with BaU.

- Emission intensity need to **decrease by about 80% from 2005** in Carbon Neutral Scenario.

- **Energy sector is key component (at least 55**% of energy source should be renewables and **conserving 50% of forest reserve as sink in 2050).**
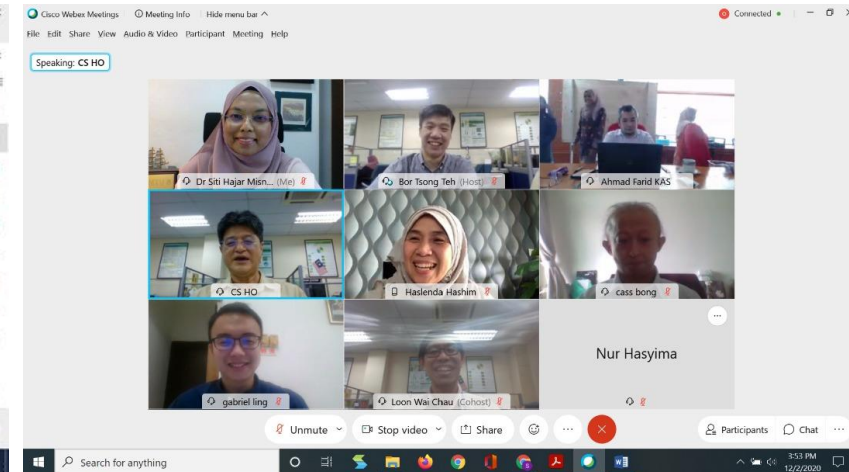
Need further refinement the scenario with better

- **Data reliability**

- Consideration of **suitable set of countermeasures**

Thank you for your kind attention.
Terima kasih!

2

ASEAN States Climate Change Report 2050
(Country Report – Malaysia)

KEMENTERIAN ALAM SEKITAR DAN AIR
Ministry of Environment and Water

Development of the Report on the State of Climate Change in ASEAN Region:

MALAYSIA

Work Completion Report

March 2021

Prepared by

Universiti Teknologi Malaysia (UTM)

Chin Siong Ho, Haslenda Hashim, Loon Wai Chau, Bor Tsong Teh, Cassendra Phun Chien Bong, Siti Hajar Misnan and Gabriel Hoh Teck Ling

UTM   IGES

National Climate Change Report

August 12, 2020

September 8, 2020

December 2, 2020

Consultation Meeting Session

Malaysia National Think-Tank conduction a series of feedback discussion with the Malaysia National Focal Point - Climate Change Division of Ministry of Environment and Water, Malaysia (KASA) for the preparation of National Climate Change Report.

Climate Action Plan Guide for Malaysian cities
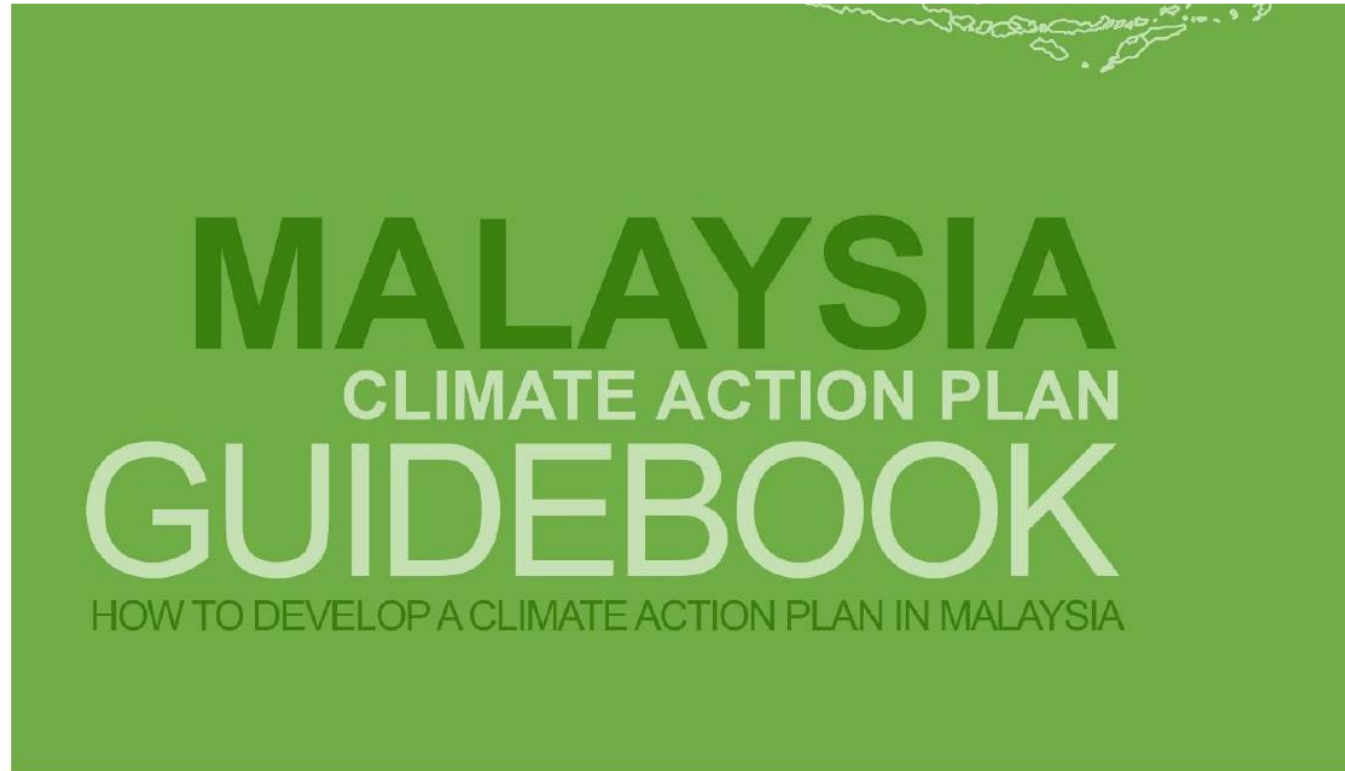
CLIMATE ACTION PLANS 2020 – 4 MALAYSIAN PILOT CITIES (MUAR, MALACCA, TAWAU, PENAMPANG CITIES With INTERNATIONAL URBAN COOPERATION / GLOBAL COVENANT OF MAYORS (GCoM BRUSSEL)

INDUSTRIAL SYMBIOISI KNOWLEDGE SHARING WORKSHOP

CLIMATE ACTION PLAN 2030– HANG TUAH JAYA FGD

CLIMATE ACTION PLAN 2030 – PENAMPANG FGD

MUAR DISTRICT LOCAL PLAN 2030

GOAL

'Leading District for economic development of the Northern Johor Region – based on Heritage, Smart Technology and Low Carbon Sustainable Society'

RANCANGAN TEMPATAN DAERAH

MUAR

2030

JILID 1   JANUARI 2020

MUAR DISTRICT LOCAL PLAN 2030

The first local plan integrated with LCS

SPECIAL, SUSTAINABLE

LIVEABLE, LEADING

MUAR to **LCS**

COMPETITIVE, CONNECTED

- Total 191 development projects (91 low carbon initiatives

Kuala Lumpur City Local Plan 2040

- Goal 4 : Kuala Lumpur towards Smart and Low carbon City

  - Ke Arah Kuala Lumpur Bandar Raya Pintar Iklim dan Rendah Karbon

- Focus on Renewable energy, Energy Efficiency , District Cooling, Low Emission Zones initiatives
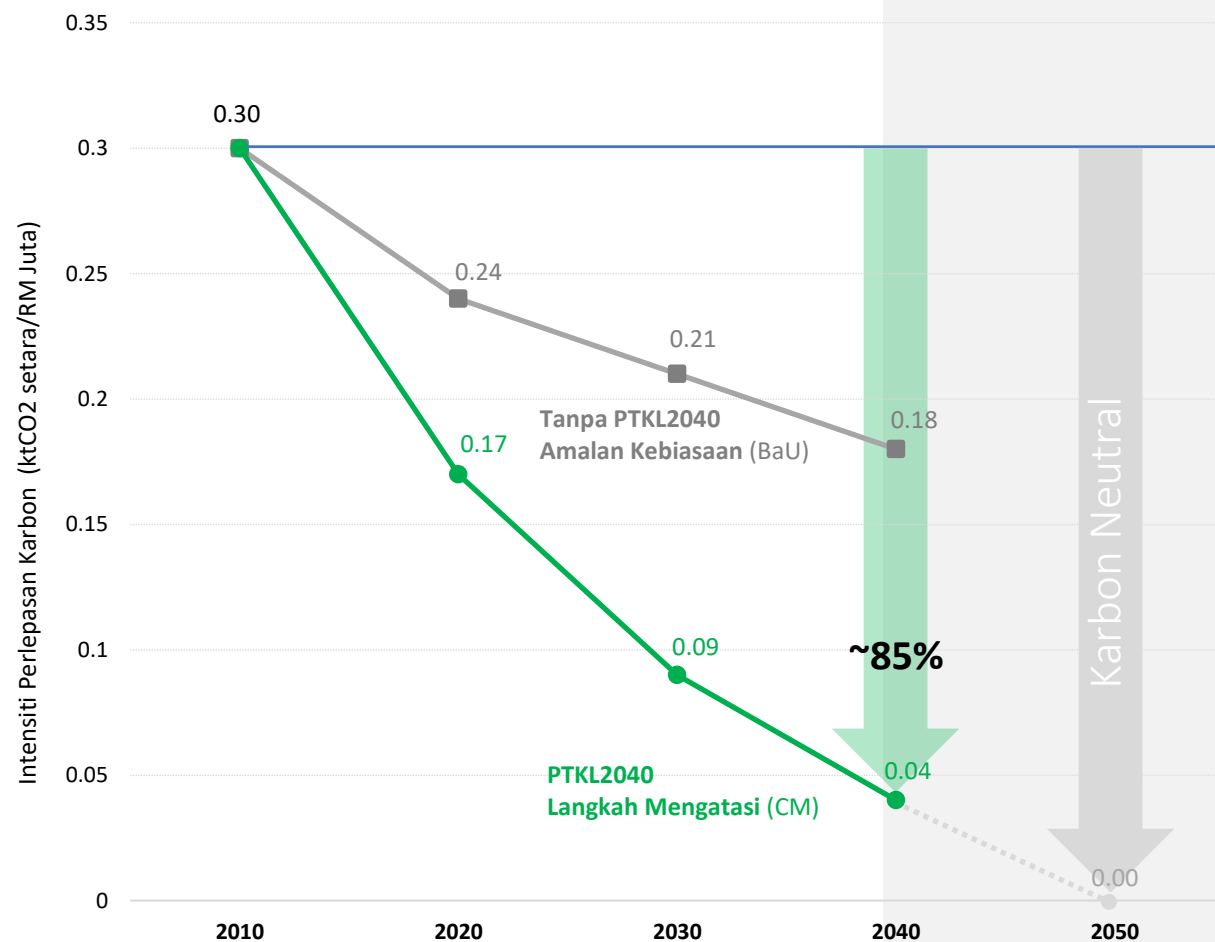
OVERVIEW EMISSION OF KL 2040

ST 4.8 PENGWUJUDAN BANDAR PINTAR IKLIM KE ARAH RENDAH KARBON

Perlepasan Karbon di Kuala Lumpur 2010, 2040BaU dan 2040CM
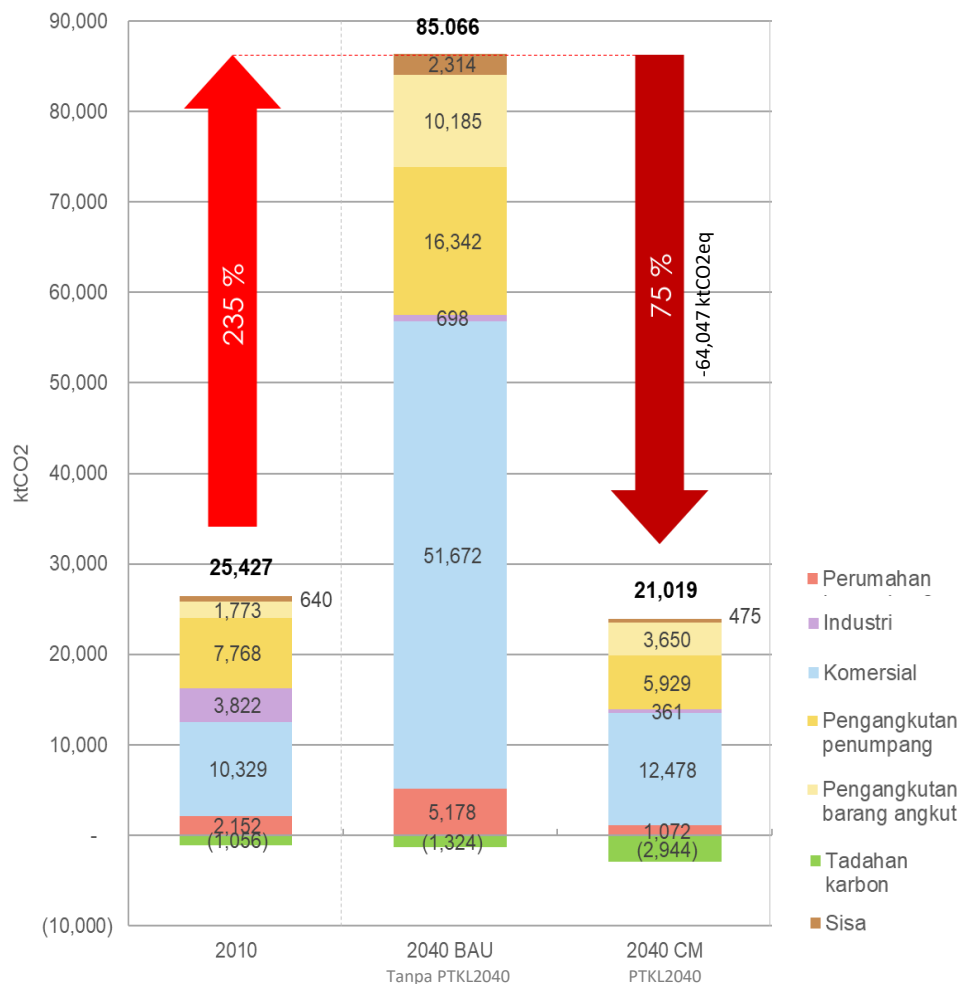
Perlepasan Karbon Intensiti di Kuala Lumpur 2010, 2020, 2030 dan 2040

Sumber: Kajian Pelan Tempatan Kuala Lumpur 2040

Current Climate Change Effort by Kuala Lumpur

The very first climate change related urban policy of Kuala Lumpur
Kuala Lumpur Low Carbon Society Blueprint 2030 (2016)

Mainstreaming low carbon policy and strategy in the statutory development plan **Kuala Lumpur Structure Plan 2040** & **Kuala Lumpur Local Plan 2040** to guide and regulate the growth of Kuala Lumpur.

Kuala Lumpur Low Carbon Society Blueprint 2030
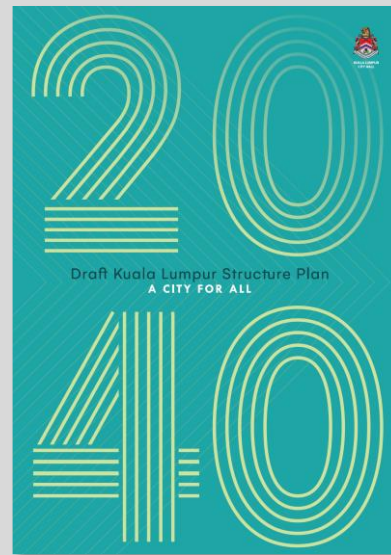
World Class City 2030
70 by 30: A Greener Better Kuala Lumpur

3 Thrust & 12 Key Actions

Statutory Development Plan: Federal Territory (Planning) Act 1982 (267)
Presently under way and expected to complete by 2021.

Kuala Lumpur Structure Plan 2040

Goal 4
Kuala Lumpur as a Climate Smart and Low Carbon City

Kuala Lumpur Local Plan 2040

New Sector
Green Technology, Low Carbon and Renewable Energy (Building, Mobility, Renewable Energy, District Cooling System)

Kuala Lumpur City Hall adopts KL LCSBP2030 and aimed for further reduction in 2040

Project of developing a policy framework for building energy efficiency through city-to-city collaboration between Kuala Lumpur City Hall and Tokyo Metropolitan Government

T2KLLCS

Funded by

Kuala Lumpur
City Hall

Ministry of the Environment