70 BY 30

A GREENER BETTER KUALA LUMPUR

KUALA LUMPUR LOW CARBON SOCIETY BLUEPRINT 2030

SUMMARY FOR POLICYMAKERS 4th EDITION

JULY 2018

UTM — UNIVERSITI TEKNOLOGI MALAYSIA

UTM-LOW CARBON ASIA RESEARCH CENTRE

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WHAT'S INSIDE
SUMMARY FOR POLICYMAKERS

KUALA LUMPUR LOW CARBON SOCIETY BLUEPRINT 2030

Photo credit: UTM LCARC

FOREWORD FROM THE MINISTER

Tuan Hj. Khalid bin Abd. Samad
Minister of Territories

At the 2009 United Nations Climate Change Conference in Copenhagen, the former Prime Minister announced Malaysia's commitment to reducing its carbon emission intensity in comparison to Gross Domestic Products (GDP) by up to 40% by the year 2020 compared to the 2005 level, with the assistance from developed countries.

The country has achieved great progress since then, recording a 33% reduction in emission intensity by 2015. Building on this success and as a further commitment to tackling global climate change, Malaysia has ratified The Paris Agreement 2015 and re-pledged to reduce the country's carbon emission intensity of GDP by 45% by 2030.

In order to stand by our pledges, our actions have to be planned, informed and coordinated across different cities, townships and communities. We have to ensure that our future generations inherit a place that is not only fit for human habitation, but also conducive for future growth and prosperity.

As the nation's capital, Kuala Lumpur must lead the change. It is essential for Kuala Lumpur to put in place and implement concrete Low Carbon Society (LCS) blueprint towards reducing greenhouse gases (GHG) emissions of the city. I commend the Kuala Lumpur City Hall (KLCH) in leading the cause, and hope that the LCS blueprint would increase and strengthen investments in environmental assets, green technology and production for Kuala Lumpur.

May this initiative serve as a working model for other cities within Malaysia and beyond.

FOREWORD FROM
THE MAYOR

Tan Sri Hj. Mhd. Amin Nordin bin Abd Aziz
Mayor of Kuala Lumpur

We have an ambitious vision yet achieveable for Kuala Lumpur.

We envision Kuala Lumpur to be a World Class City by 2020. We are enhancing our economic growth, societal wellbeing and development of its people. We hope to see Kuala Lumpur on par with other global cities like Melbourne, Copenhagen, Tokyo and New York, by adopting a holistic approach in managing resources, environment and space within the city.

With this in mind, the Kuala Lumpur Low Carbon Society Blueprint 2030 (KL LCSBP 2030) is formulated. This blueprint will provide Kuala Lumpur City Hall (KLCH) with a strategic direction and clear framework for coordinating related policies and programs towards the reduction of GHG emissions for Kuala Lumpur. It also optimises the City's limited resources towards more effective and impactful implementation of various measures related to GHG emissions reduction.

Based on the projected development scenarios and baseline assessment of GHG emissions reduction potentials in 2020 and 2030, we have identified 10 Actions and 245 Programs to be implemented in a timely and proactive manner. I expect Kuala Lumpur City Hall to play the leading role in the process, engaging our stakeholders to work together in achieving our targets.

I wish to thank the UTM-Low Carbon Asia Research Centre team for their invaluable research efforts and consultation throughout the formulation of the Kuala Lumpur Low Carbon Society Blueprint 2030.

PREAMBLE

This Summary for Policymakers (SPM) offers a concise synopsis of the Kuala Lumpur Low Carbon Society Blueprint 2030 (the Blueprint). It is aimed at facilitating quick and convenient reference to the Blueprint's 10 Low Carbon Society (LCS) actions and the potential carbon emission reductions achievable from the implementation of the actions in Kuala Lumpur. It is targeted especially at readers who need to get a *straightforward yet sufficient* overview of the LCS actions and how the actions, severally and jointly, potentially contribute to reducing carbon emission levels in Kuala Lumpur, without the burden of unneeded technical complexities. Target reader groups include policy/ decision makers or relevant officials of various public, private and/or not-for-profit entities, as well as stakeholder groups and citizens concerned with Kuala Lumpur's development and its impacts on the environment, society and climate change, and anyone who would like to have a role in reducing carbon emission in Kuala Lumpur.

This summary focuses readers on key explanations and justifications of each LCS 'action' and their supportive 'sub-actions' that are deemed vital and sufficient for guiding *strategic- and policy-level discussions and decision making,* saving all scientific and technical details to the master Blueprint document. Therefore, 'measures' and 'programs' that follow each LCS sub-action are listed under the relevant LCS action but specific descriptions and explanations of the measures and programs, which are more pertinent to the operational and implementation levels, have been excluded from this summary. When these and further technical details are required, and for better insight into the complete strategies to transform Kuala Lumpur into a low carbon society, readers should consult the master Blueprint document.

PREFACE to KL LCSBP 2030

Cities are increasingly recognised as the most effective and important non-state actors in mitigating global climate change in terms of yielding real cuts in urban Greenhouse Gas (GHG) emissions. Kuala Lumpur, as the Capital City and economic powerhouse of rapidly developing Malaysia, needs to lead the way to reducing GHG emissions of rapid economic growth, especially in contributing to the achievement of the national target of 45% reduction in GHG emission intensity of GDP by 2030 (compared to the 2005 level). To that end, the formulation and implementation of a holistic, scientifically grounded and people-centric city-level climate change mitigation plan – the Kuala Lumpur Low Carbon Society Blueprint 2030 (KL LCSBP 2030) – using the 'Science to Action' (S2A) approach are highly essential.

As a holistic plan, the KL LCSBP 2030 proposes 10 Actions, 37 Sub-actions, 82 Measures and 245 Programs for implementation that straddle three key thrusts: 1) Prosperous, Robust and Globally Competitive Economy; 2) Healthy, Creative, Knowledgeable and Inclusive Community; and 3) Ecologically Friendly, Liveable and Resilient Built Environment.

Being scientifically grounded, the internationally-recognised Asia-Pacific Integrated Model (AIM) has been used to project Kuala Lumpur's GHG emission intensity reduction potential under various scenarios (with different sets of parameters and justified assumptions for the proposed Measures and Programs). The model shows Kuala Lumpur can potentially reduce its GHG emission intensity by up to 70% by 2030 (compared to the 2010 level), which is equivalent to an absolute reduction of 48,206 ktCO$_2$eq from the business as usual scenario.

As a people-centric plan, the proposed Actions, Sub-actions, Measures and Programs have been put under scrutiny and review by multiple stakeholders in three Focus Group Discussion (FGD) workshops. The KL LCSBP 2030 is therefore the outcome of review by, and feedback from, the multiple stakeholders engaged in the workshops.

Ultimately, the KL LCSBP 2030 seeks to be a people's policy that is grounded in scientific research with practical implementation in mind. It will provide a strategic direction and clear framework for coordinating and consolidating various related but largely unconnected sustainability and climate change mitigation policies and programs to optimise the City's limited resources towards more effective and impactful implementation of GHG reduction measures towards meeting the city's emission intensity reduction target of 70% by 2030.

November 2017

UTM-Low Carbon Asia Research Centre (UTM-LCARC)
Faculty of Built Environment and Surveying
Universiti Teknologi Malaysia
Johor Bahru
Malaysia

KEY MESSAGES TO POLICYMAKERS

KEY MESSAGES.....

1

Kuala Lumpur as Malaysia's economic capital and an emerging global city is well positioned to lead developing cities nationally and globally towards reducing significant GHG emissions of rapid economic growth

2

Kuala Lumpur presents a huge potential for reducing over 48,000 $ktCO_2eq$ by 2030 and up to 70% of the reduction can be effected through measures and programs that are under KLCH's direct and indirect purviews
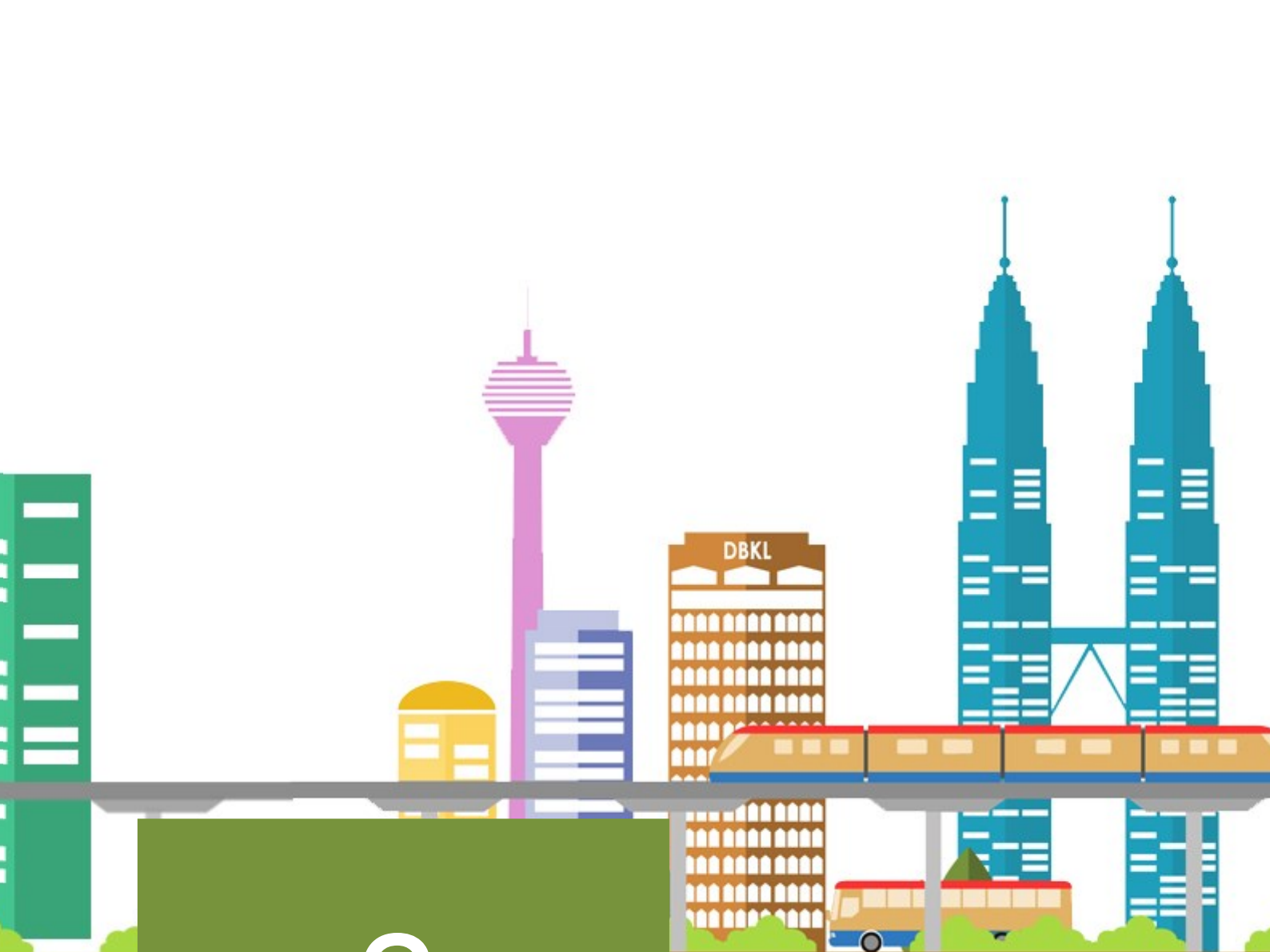
3

Immediate adoption and progressive implementation of LCS Blueprint by KLCH are crucial to putting Kuala Lumpur on the path towards achieving carbon neutrality beyond 2030

4

KLCH needs to work with, and secure effective buy-in of the KL LCSBP 2030 from, various stakeholders, including residents and the civil society; businesses and industries; as well as relevant ministries and federal agencies

KUALA LUMPUR

Function

National Capital of Malaysia. One of the major commercial, financial, education, entertainment, healthcare, cultural, and tourism centres of Asia.

Location

On the central west coast of Peninsular Malaysia, enclave within the State of Selangor and Klang Valley.

3.1390° N, 101.6869° E

Area

242km^2 (24,221 hectares)
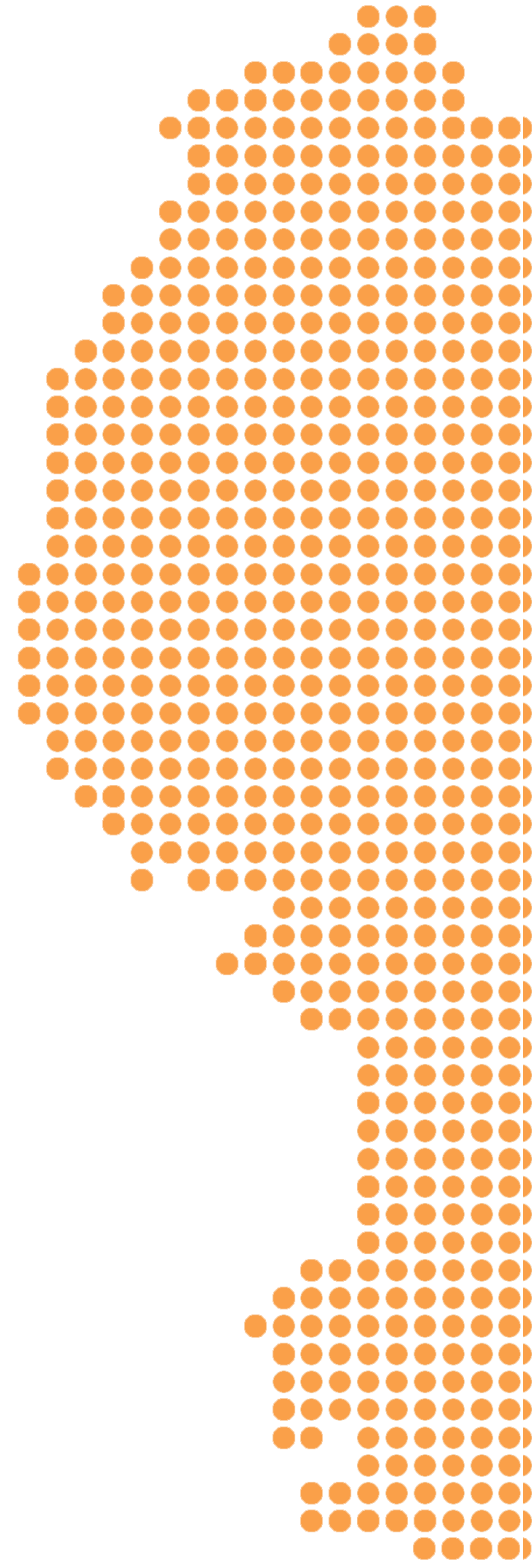
BASIC
PROFILE

1,674,621 (2010);

2,198,400 (2020 projected);

2,488,399 (2030 projected)

Population

RM 84,852 million (2010);

RM 227,621 million (2020 projected);

RM 399,013 million (2030 projected)

Gross Domestic Product

A World Class City

Vision

Kuala Lumpur City Hall (KLCH)

Administration
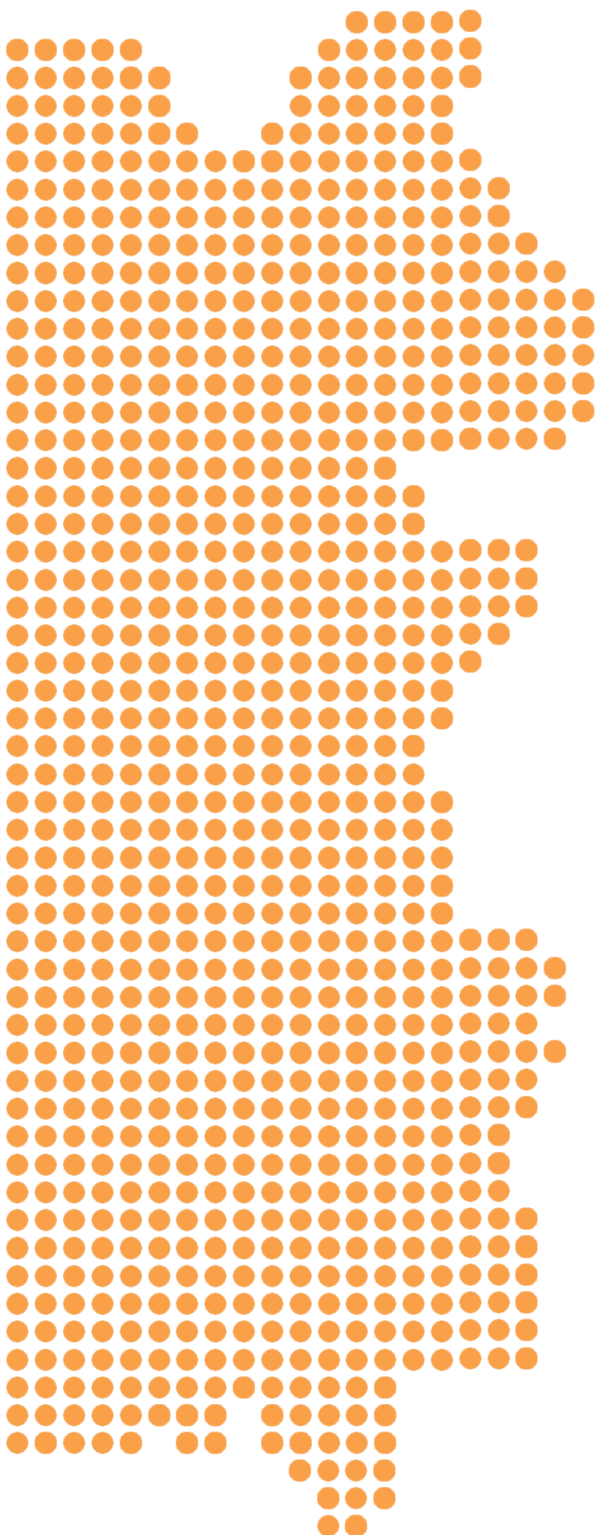
KL LCSBP 2030
BASELINE SCENARIOS
AT A GLANCE

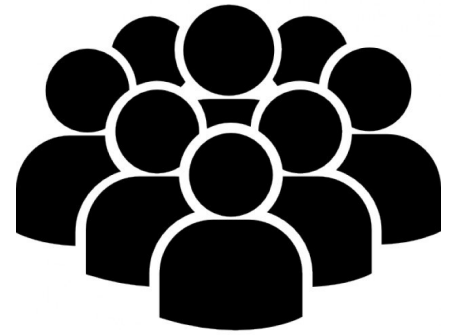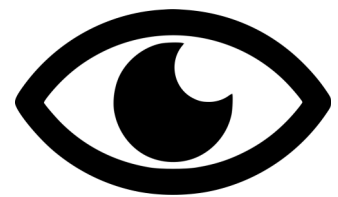| Sector/Aspects	Components	2020 (Mid-term) Targets	2030 Targets	Cumulative Reduction Induced in 2030
Transport				
Trip Generation (trips/person/day)	Transport	4.5	3.7	12,690 ktCO$_2$ (26.3%)
Mode Share (%)	Public Transport	30	60	
	Private Transport	70	40	
Average Trip Distance (km)	Public Transport	64	70	
	Private Transport	15	23	
Passenger Vehicle by Fuel Type (%)	Conventional Vehicle Oil	90	40	
	Conventional Vehicle (Biodiesel)	1	15	
	Hybrid (Oil)	7	20	
	Hybrid (Biodiesel)	0	5	
	Electric Vehicle	2	20	
Bus by Fuel Type (%)	Conventional (Oil)	95	50	
	Hybrid Bus (Oil)	5	40	
	Hybrid Bus (Biodiesel)	0	10	
Rail (%)	Conventional Passenger Train (Electric)	90	40	
	High Efficiency Train	10	60	
Behaviour Change (%)	Eco-Driving (Percent of drivers)	20	25	
Freight Vehicle by Fuel Type (%)	Conventional Vehicle (Oil)	80	50	
	Conventional Vehicle (Biodiesel)	20	30	
	Hybrid Vehicle (Oil)	0	20	
Rail (%)	Conventional Freight Train (Electric)	90	70	
	High Efficiency Freight Train (Electric)	10	30	
Waste Management				
	Recycling Rate (%)	22	30	878 ktCO$_2$ (1.8%)
	Composting Rate (%)	8	15	
	Diversion of Solid Waste from Landfill (%)	30	45	
Energy				
Power Generation (%)	Solar	3	10	17,525 ktCO$_2$ (36.4%)
	Hydropower	5	10	
	Coal	59	42	
	Oil	5	3	
	Natural Gas	28	30	
	Biomass	0	5	

Sector/Aspects	Components	2020 (Mid-term) Targets	2030 Targets	Cumulative Reduction Induced in 2030
Low Carbon Green Building				
Commercial Buildings				
Air Conditioner (%)	High Efficiency Air Conditioner	15	40	14,433 ktCO$_2$ (29.9%)
	Conventional Air Conditioner	85	60	
Water Heating (%)	High Efficiency Oil Water Heater	5	5	
	Conventional Oil Water Heater	5	5	
	High Efficiency Electric Water Heater	5	20	
	Conventional Electric Water Heater	85	50	
	Solar Water Heater	0	20	
Kitchen (%)	High Efficiency Gas Cooking Stove	5	20	
	Conventional Gas Cooking Stove	0	0	
	High Efficiency Oil Cooking Stove	7	20	
	Conventional Electric Cooking Stove	83	30	
	IH Cooking Device	5	30	
Other Electrical Appliances (%)	High Efficiency Electric Appliances	20	40	
	Conventional Electric Appliances	80	60	
Building (%)	Solar Power Generation	10	40	
	Insulation of Commercial Building	15	30	
Behaviour Change (%)	Energy Saving Action (percent of commercial buildings)	10	20	
Residential Buildings				
Air Conditioner (%)	High Efficiency Air Conditioner	20	60	2,153 ktCO$_2$ (4.5%)
	Conventional Air Conditioner	80	40	
Water Heating (%)	High Efficiency Oil Water Heater	10	5	
	Conventional Oil Water Heater	40	5	
	High Efficiency Electric Water Heater	15	70	
	Conventional Electric Water Heater	35	20	
Kitchen (%)	High Efficiency Gas Cooking Stove	5	10	
	Conventional Gas Cooking Stove	20	0	
	High Efficiency Oil Cooking Stove	4	20	
	Conventional Electric Cooking Stove	70	40	
	IH Cooking Device	1	30	
Home Electrical Appliances (%)	High Efficiency Home Electric Appliances	40	60	
	Conventional Home Electric Appliances	60	40	
Building (%)	Solar Power Generation (percent of residential buildings)	15	60	
Behaviour Change (%)	Energy Saving Action	10	20	
Industry				
Equipment (%)	Energy Efficiency Improvement	5	10	75 ktCO$_2$ (0.2%)
Carbon Sink				
Green Spaces (hectares)		2,808.6	5,164.7	452 ktCO$_2$ (0.9%)
Number of Street Trees (mill.)		1.52	2.49	
TOTAL POTENTIAL REDUCTION				48,206 ktCO$_2$

KUALA LUMPUR
70 BY 30

In transforming Kuala Lumpur towards achieving 70 by 30: A Greener and Better City by 2030, a clear sustainable and climate-responsive growth vision is crucial to frame and direct KLCH's commitment to becoming a leading city in combating climate change while simultaneously improving the city's economic, social and environmental performances. As Kuala Lumpur is envisioned to become a World Class Sustainable City by 2030, it needs to play a major global and sub-global role in tackling climate change and protecting the environment while benefiting all its residents, workers, visitors and investors socially and economically.

70 by 30 expresses Kuala Lumpur's aspiration to reduce the city's carbon emission intensity of GDP by up to 70% by 2030, which crucially supports Malaysia's renewed national carbon emission intensity reduction target of 45% by 2030. This calls for the adoption and implementation of ambitious yet achievable LCS measures and programs that have been formulated based on a holistic, Science-to-Action (S2A) and people-centric approach. The implementation of 245 LCS Programs, framed under 82 Measures, 37 Sub-actions and 10 LCS Actions, sets Kuala Lumpur on the path towards more ambitious carbon neutrality goals beyond 2030.

Photo credit: UTM LCARC

INTRODUCTION
TO KL LCS

As Malaysia's vibrant capital city and commercial heart, and as a leading economic and cultural growth centre in Asia, Kuala Lumpur plays a pivotal role in the country's transformation towards becoming a socially progressive high income nation by 2020 and beyond.

In a climate changed world, it is essential that Kuala Lumpur realises its growth vision and at the same time contributes to meeting Malaysia's global commitment to reducing carbon emissions. The concept of LCS is therefore fundamental to guiding Kuala Lumpur's development up to 2030. The KL LCSBP 2030 will provide an effective policy platform for consolidating and coordinating in an integrated manner various related but largely unconnected sustainability and climate change mitigation policies that have been separately put in place over the years in Kuala Lumpur.

In doing so, the KL LCSBP 2030 lays down a strategic direction and clear policy framework that optimises Kuala Lumpur's limited resources towards more effective and impactful implementation of GHG reduction measures while enabling the city to continue its economic growth and social development visions.

POLICY CONTEXT
OF KL LCSBP 2030

Towards decarbonising Kuala Lumpur's rapid economic growth and development, the city faces immense challenges in simultaneously meeting competing pro-growth and pro-environment goals, especially in the context of needing to advance institutionally less emphasised pro-environment goals within a traditionally deeply institutionalised pro-growth development policy framework. As such, it is critical that the formulation of the KL LCSBP 2030 carefully considers as much as possible all relevant global and national climate change mitigation and sustainable development policies as well as all existing national, regional and local development and environmental policies with a view to concretely linking the former with the latter policy sets.

The KL LCSBP 2030 therefore serves as a key policy instrument that translates and bridges between higher level sustainable, low carbon development policies (including the recent Sustainable Development Goals 2030, the Paris Agreement and the New Urban Agenda) and the city-level development policies (refer Figure 1).

Crucially, towards operationalising the KL LCSBP 2030, it needs to be streamlined into Kuala Lumpur's existing spatial development planning framework, in particular into the city's statutory development plans (the Kuala Lumpur Structure Plan and the Kuala Lumpur City Plan) so as to take effect through the statutory planning control process to which all developments within the city are subject.
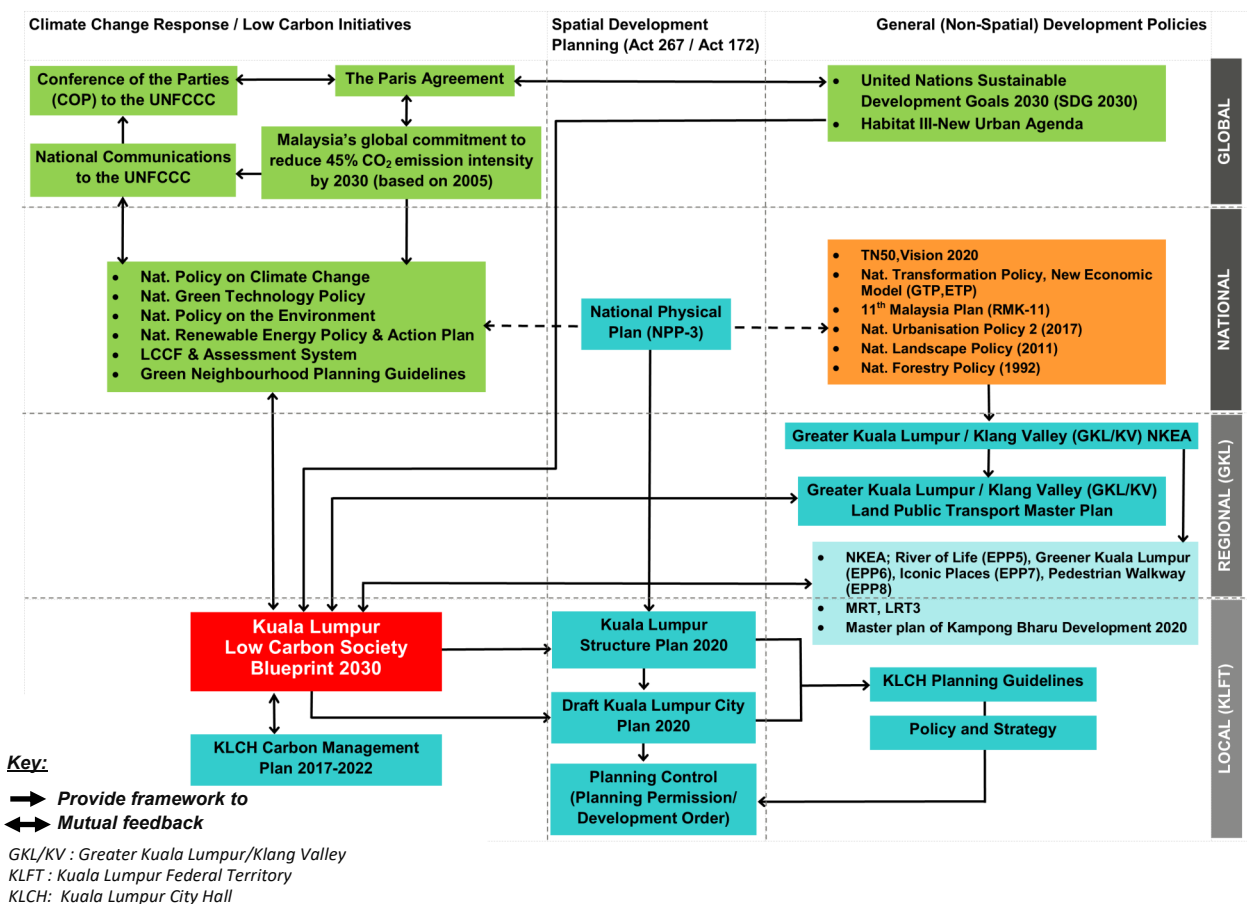

Figure 1: The policy context for the development of the KL LCSBP 2030
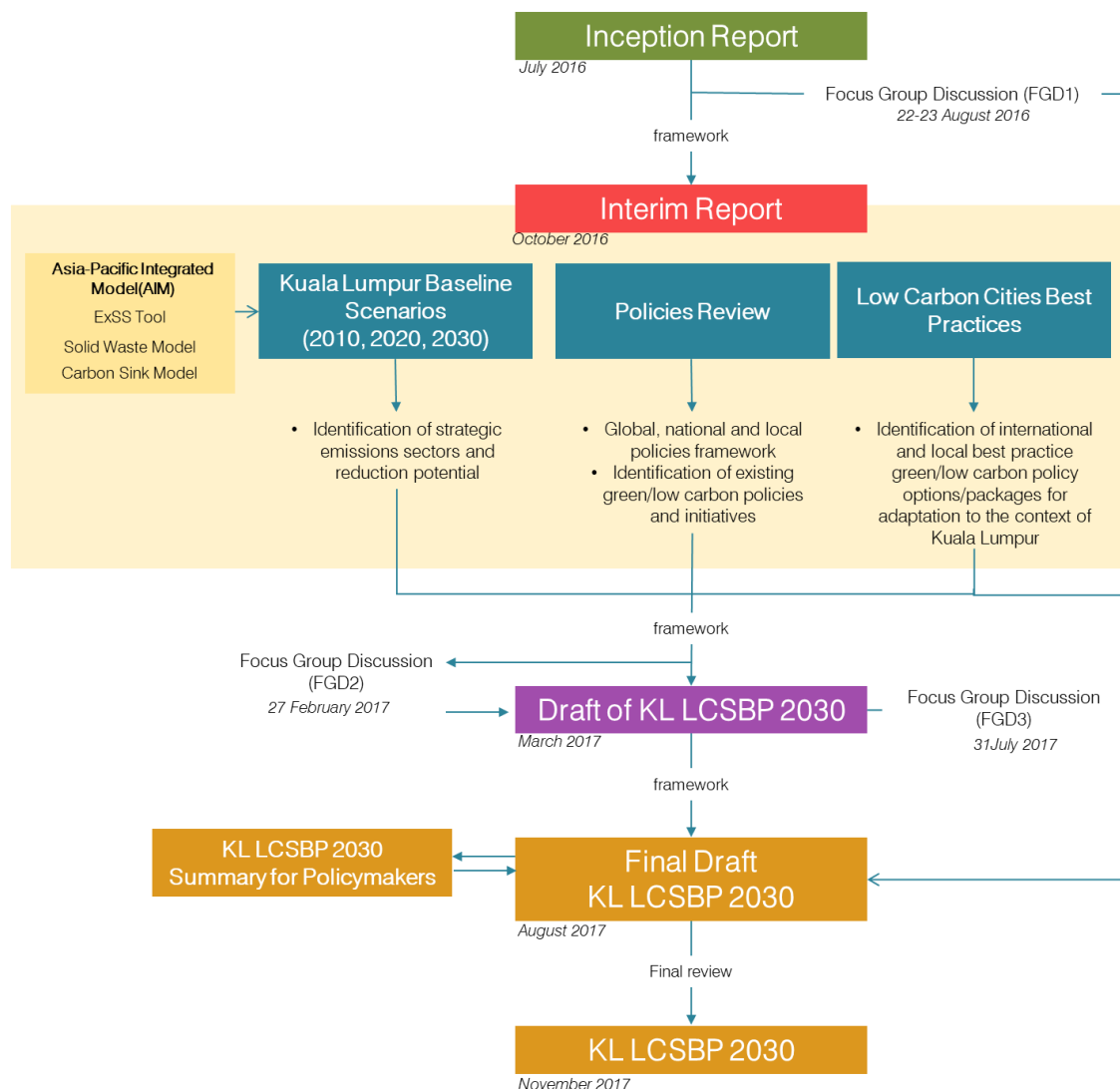
KL LCSBP 2030 PROCESS AND METHODOLOGY

Figure 2: Project framework for KL LCSBP 2030

Formulation of the KL LCSBP 2030 began in July 2016 with a scoping exercise (Inception Report) that provided a framework for preparing the baseline study for Kuala Lumpur's GHG emissions (Interim Report) (refer Figure 2). The baseline study comprises four key components, namely 1) the setting of various baseline development scenarios for Kuala Lumpur (2010, 2020, 2030); 2) a careful review of all relevant global, national and local policies with respect to sustainable and low carbon development; 3) precedent and benchmarking studies on international and local best practices on sustainable and low carbon development; and 4) GHG modeling using the internationally recognised Asia-Pacific Integrated Model (AIM) (refer Figure 3 for details).

In tandem with the preparation of the baseline study, a multiple stakeholder engagement workshop (the first Focus Group Discussion, FGD1) was conducted in order to gain feedback and comments on modeling results and framework assumptions used in the baseline study. Findings from the FGD1 were then synthesised with that of the baseline study and results from FGD2, which provided a subsequent framework for preparing the Draft KL LCSBP 2030.

The Draft KL LCSBP 2030 was put to a final scrutiny by multiple stakeholders in FGD3, from which refinements were made to the program structures and emissions results, to produce the KL LCSBP 2030 and its Summary for Policymakers (SPM).
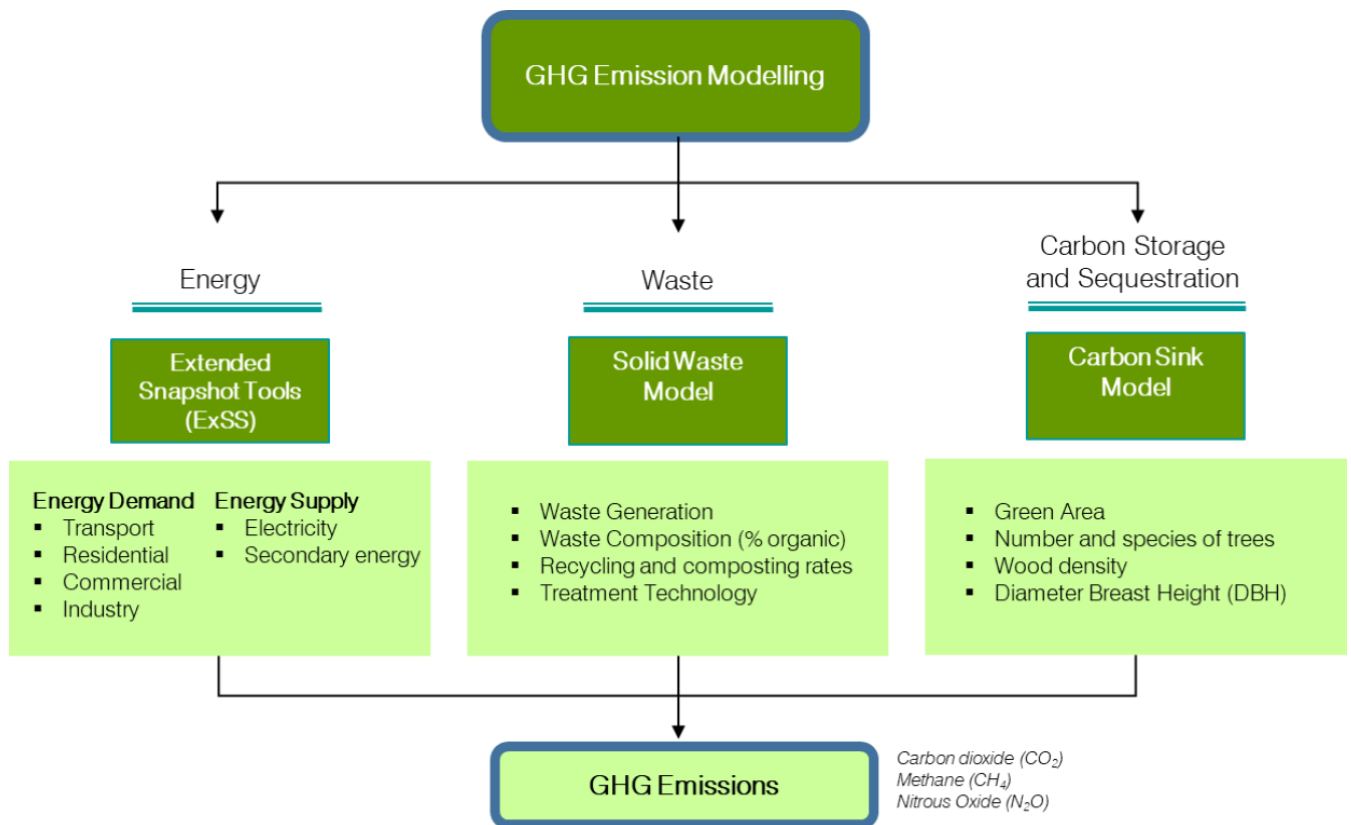
Figure 3: GHG Emission Modelling

The Asia-Pacific Integrated Model (AIM) quantifies GHG emissions for Kuala Lumpur for Business as Usual (BaU) and Counter Measure (CM) scenarios for 2020 and 2030. Three main models have been used including AIM's Extended Snapshot Tool (ExSS), Solid Waste Model (SWM) and Carbon Sink Model (refer Figure 3).

These models present the carbon emissions and reduction potentials of various low carbon countermeasures for Kuala Lumpur, which lead to the setting of priority sectors for effective emission reduction.

OBJECTIVES

The Kuala Lumpur Low Carbon Society Blueprint 2030 (KL LCSBP 2030) is a written document that presents comprehensive climate change mitigation policies and detailed strategies to guide the development of Kuala Lumpur towards becoming A World Class Sustainable City: A Greener Better Kuala Lumpur by 2030.

The blueprint incorporates various existing low carbon related plans and projects in Kuala Lumpur along with the Kuala Lumpur Structure Plan 2020 and Draft Kuala Lumpur City Plan 2020 in transforming Kuala Lumpur into a low carbon city. The blueprint discusses and provides more technical details of carbon mitigation options (with specific measures and programs) for implementation in Kuala Lumpur's development.

The blueprint aligns with the city's vision and aims to reduce the city's carbon emission intensity by 70% by 2030 while contributing to the economic growth targets. After an assessment of the current situation and future goals, the report lays down the following objectives:

1 To review existing policies and development plans of Kuala Lumpur;

2 To benchmark Kuala Lumpur with selected global cities in terms of low carbon best practices;

3 To develop baseline and future scenarios and quantify carbon emissions and enhance co-benefits of improved livability and green growth for Kuala Lumpur;

4 To develop a roadmap and identify the relevant implementation agencies.

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ROAD TO ACHIEVING
70 BY 30 GOAL
LOW CARBON KUALA LUMPUR GOALS AND INITIATIVES

KL LCSBP 2030 provides a strong foundation for promotion of economic growth, decoupling GHG emissions from growth and achieving various co-benefits, including the enhancement of quality of life in an equitable manner and protection of the environment. The LCS vision of Kuala Lumpur World Class Sustainable City 2030 is buttressed by three major thrusts: 1) prosperous, robust and globally competitive economy; 2) healthy, creative knowledgeable and inclusive community; and 3) ecologically friendly, liveable and resilient built environment. These thrusts are well aligned with the triple bottom line of sustainable development, the 17 Sustainable Development Goals (SDGs) 2030, the tree transformative commitments of the New Urban Agenda

as well as the Draft Kuala Lumpur City Plan 2020 (refer Figure 4). Kuala Lumpur World Class Sustainable City 2030 entails the creation of A Greener Better Kuala Lumpur that embraces a GHG emission intensity reduction target of up to 70% by 2030. To that end, 10 actions have been formulated which are organised under the three Thrusts that encompass Economy, Social and Environment. Actions under "Economy" include green growth (GG); energy efficient spatial structure (SS); green mobility (GM) and sustainable energy system (SE). Under "Social" is the action on community engagement and green lifestyle (CE) while under "Environment" are the actions of low carbon green building (GB); green and blue (BG); sustainable waste management (WM) and sustainable water management (WW). The last action—green urban governance (UG)—acts as the Kuala Lumpur low carbon society enabler.

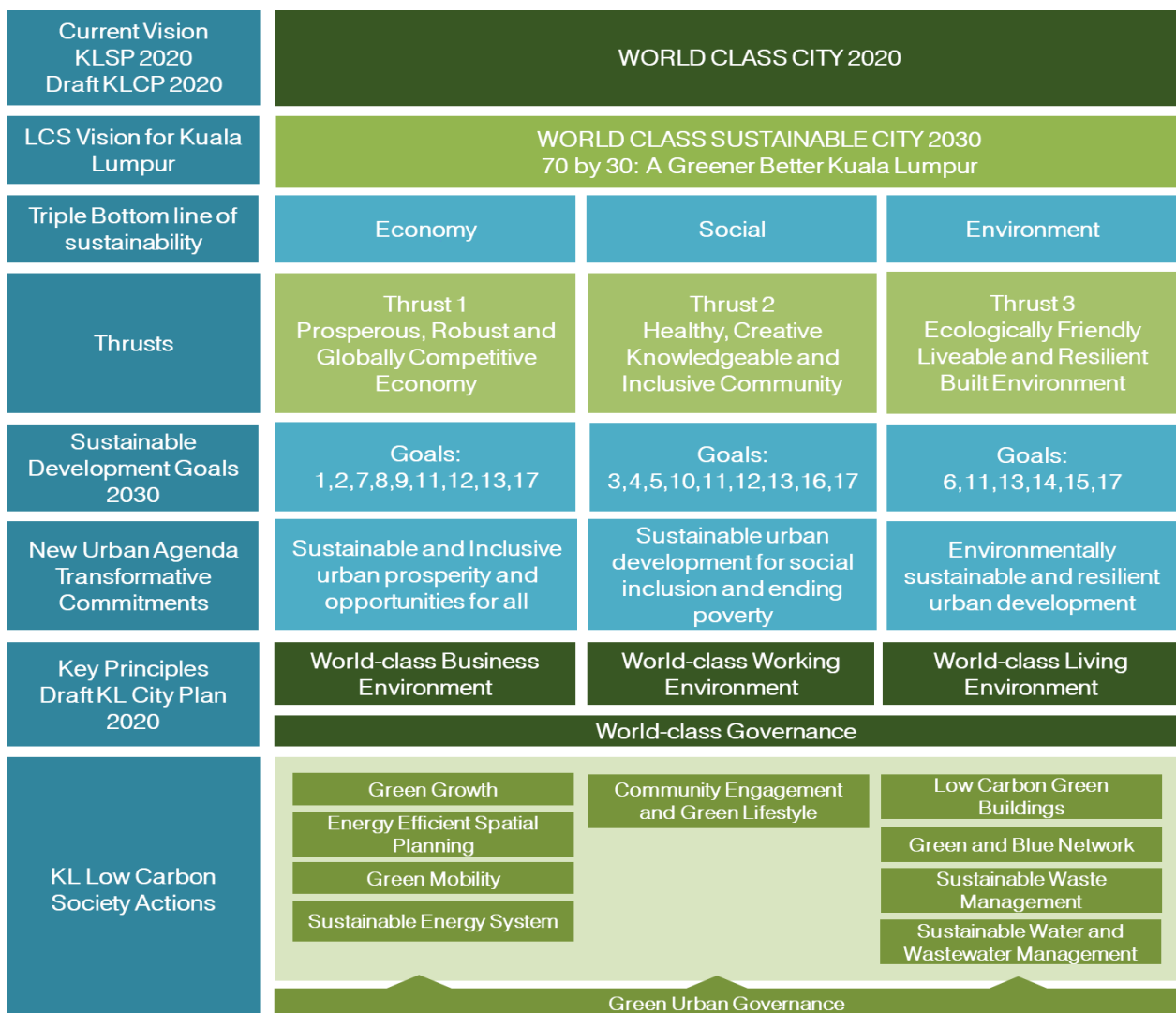|			
Current Vision KLSP 2020 Draft KLCP 2020	**WORLD CLASS CITY 2020**		
LCS Vision for Kuala Lumpur	**WORLD CLASS SUSTAINABLE CITY 2030 70 by 30: A Greener Better Kuala Lumpur**		
Triple Bottom line of sustainability	Economy	Social	Environment
Thrusts	Thrust 1 Prosperous, Robust and Globally Competitive Economy	Thrust 2 Healthy, Creative Knowledgeable and Inclusive Community	Thrust 3 Ecologically Friendly Liveable and Resilient Built Environment
Sustainable Development Goals 2030	Goals: 1,2,7,8,9,11,12,13,17	Goals: 3,4,5,10,11,12,13,16,17	Goals: 6,11,13,14,15,17
New Urban Agenda Transformative Commitments	Sustainable and Inclusive urban prosperity and opportunities for all	Sustainable urban development for social inclusion and ending poverty	Environmentally sustainable and resilient urban development
Key Principles Draft KL City Plan 2020	World-class Business Environment	World-class Working Environment	World-class Living Environment
	World-class Governance		
KL Low Carbon Society Actions	Green Growth / Energy Efficient Spatial Planning / Green Mobility / Sustainable Energy System	Community Engagement and Green Lifestyle	Low Carbon Green Buildings / Green and Blue Network / Sustainable Waste Management / Sustainable Water and Wastewater Management
	Green Urban Governance		

Figure 4: The framework of Kuala Lumpur Low Carbon Society Blueprint 2030

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To provide a clear and effective framework for future implementation, monitoring and reporting of the KL LCSBP 2030, the 'work breakdown structure' (WBS) approach has been adopted. Through the WBS approach, key low carbon society actions are divided into sub-actions, which are further divided into measures and detailed implementation programs as described in Figure 5.
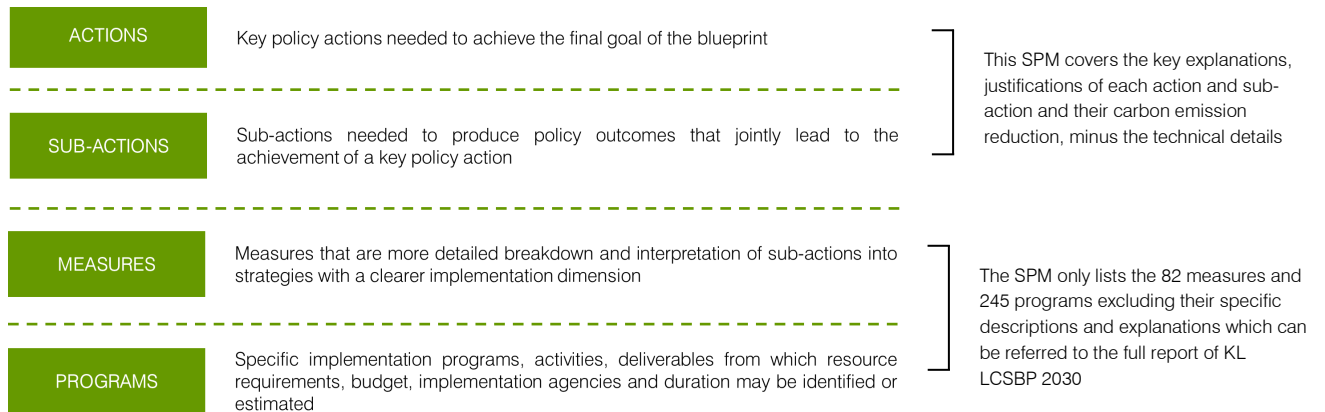
ACTIONS	Key policy actions needed to achieve the final goal of the blueprint	This SPM covers the key explanations, justifications of each action and sub-action and their carbon emission reduction, minus the technical details
SUB-ACTIONS	Sub-actions needed to produce policy outcomes that jointly lead to the achievement of a key policy action	
MEASURES	Measures that are more detailed breakdown and interpretation of sub-actions into strategies with a clearer implementation dimension	The SPM only lists the 82 measures and 245 programs excluding their specific descriptions and explanations which can be referred to the full report of KL LCSBP 2030
PROGRAMS	Specific implementation programs, activities, deliverables from which resource requirements, budget, implementation agencies and duration may be identified or estimated	

Figure 5: Work breakdown structure for Kuala Lumpur's Low Carbon Society Blueprint 2030

Photo credit: UTM-LCARC

KUALA LUMPUR EMISSION PROFILE

GHG emission intensity of GDP

Figure 6 shows the GHG emission intensity of GDP of Kuala Lumpur. Based on Table 1, Kuala Lumpur's GHG emission intensity in 2010 is estimated at 0.30 ktCO$_2$eq/Mill.RM. In the 2030 CM scenario, the value decreases to 0.09 ktCO$_2$eq/Mill.RM, which is equivalent to a 70% reduction. This is higher than the national GHG emission intensity reduction target of 45% by 2030. As such, proper implementation of the KL LCSBP 2030 is essential to enable Kuala Lumpur to significantly contribute to Malaysia's global commitment to mitigating climate change while maintaining strong economic growth.

Table 1: GHG emission intensity by GDP

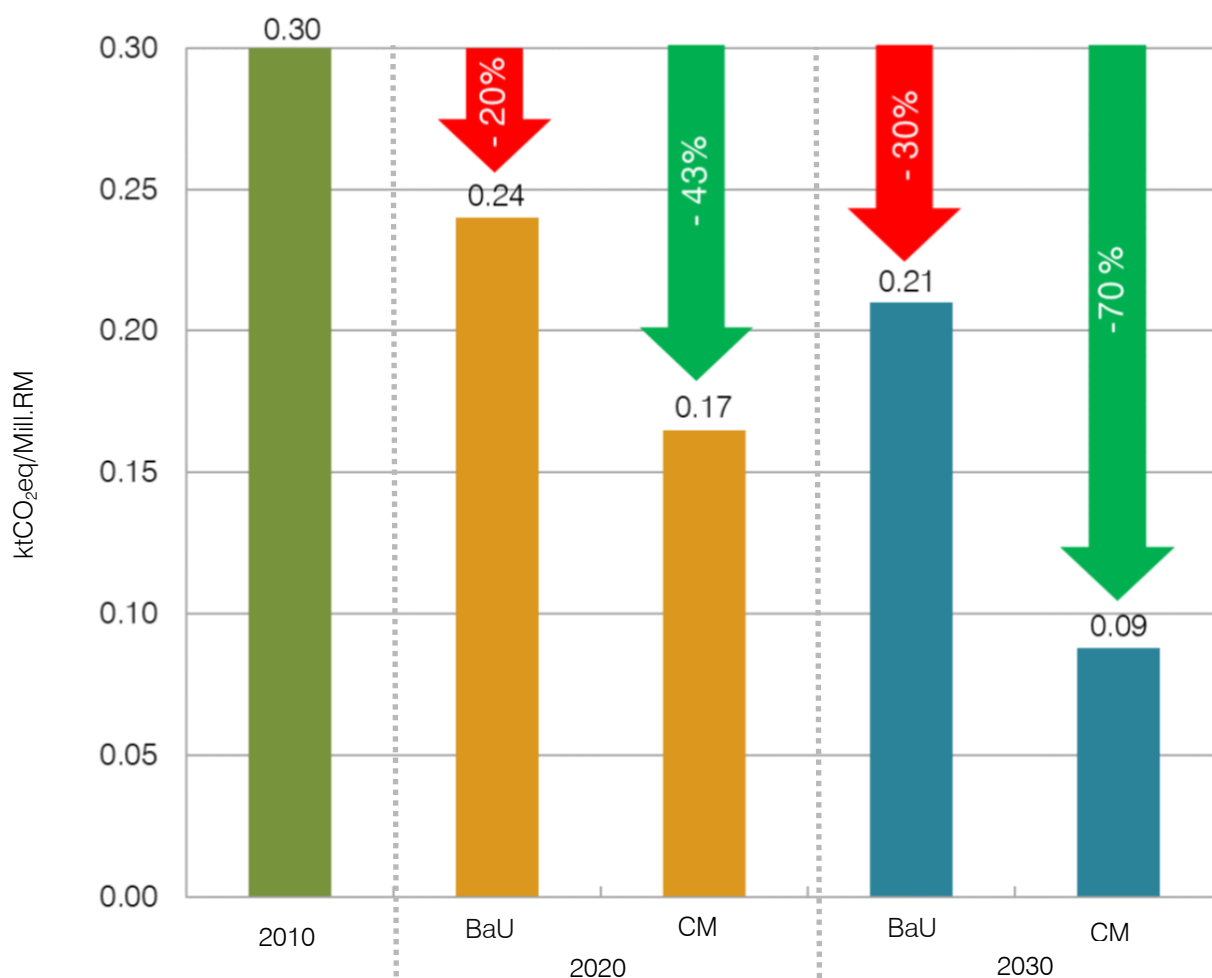|	2010	2020		2030	
		BaU	CM	BaU	CM
GDP (Mill.RM)	84,852	227,621	227,621	399,013	399,013
Total CO$_2$ Emission (ktCO$_2$eq)	25,427	54,609	38,497	84,314	36,106
GHG Emission Intensity of GDP (ktCO$_2$eq/Mill.RM)	0.30	0.24	0.17	0.21	0.09
Reduction in Intensity	-	20%	43%	30%	70%

Figure 6: GHG emission intensity by GDP

EMISSION REDUCTION CONTRIBUTION BY ACTION

Towards providing further guidance to policymakers in prioritising and strategising implementation of the KL LCSBP 2030, the potential contribution of each of the 10 LCS Actions that have been identified has been estimated (refer Figure 7 and Table 2). With respect to LCS programs that come under direct and indirect purviews of KLCH, investments in Low Carbon Green Building, Community Engagement and Green Lifestyle, Green Mobility, Energy Efficient Spatial Structure and Green Growth are highly recommended as these jointly potentially contribute to over 64% of the targeted emission reduction in 2030.
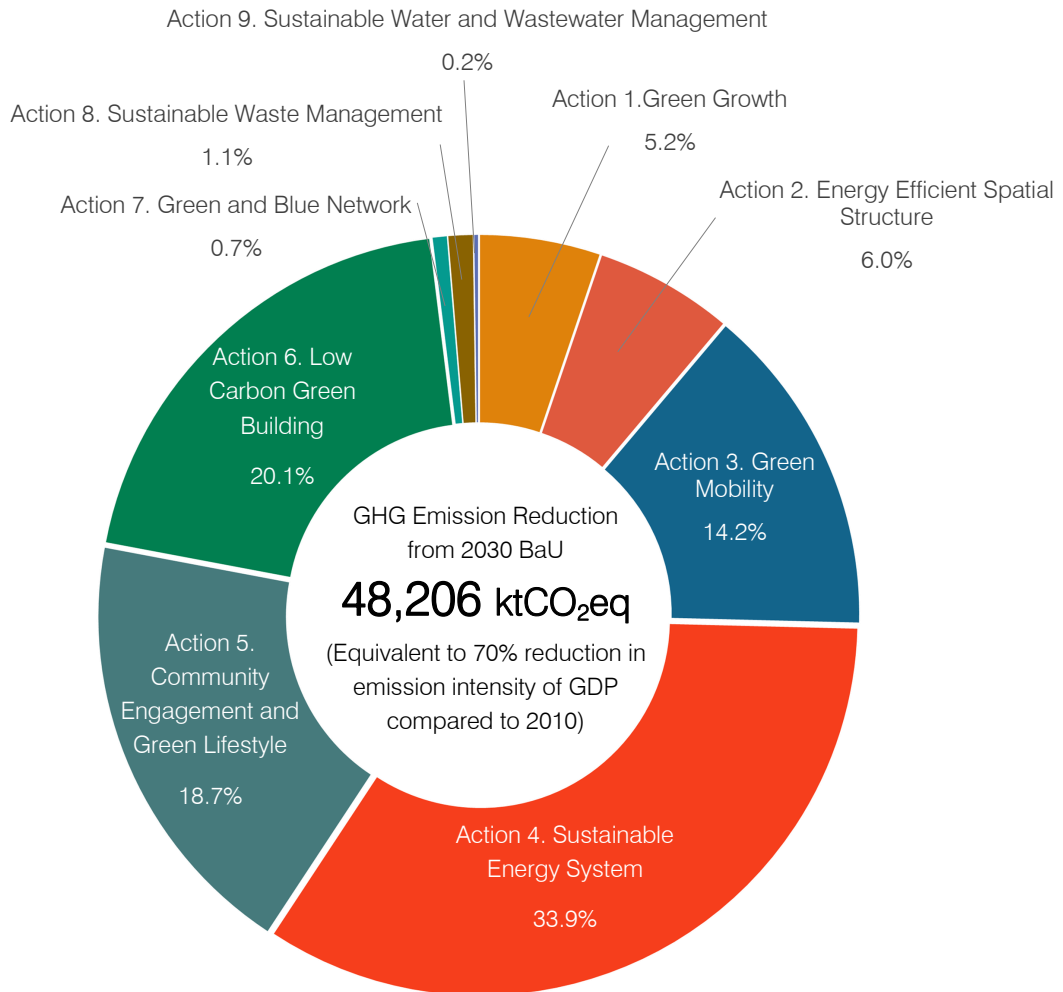

Action 9. Sustainable Water and Wastewater Management
0.2%

Action 8. Sustainable Waste Management
1.1%

Action 7. Green and Blue Network
0.7%

Action 1.Green Growth
5.2%

Action 2. Energy Efficient Spatial Structure
6.0%

Action 6. Low Carbon Green Building
20.1%

Action 3. Green Mobility
14.2%

Action 5. Community Engagement and Green Lifestyle
18.7%

GHG Emission Reduction from 2030 BaU

48,206 ktCO$_2$eq

(Equivalent to 70% reduction in emission intensity of GDP compared to 2010)

Action 4. Sustainable Energy System
33.9%

Figure 7: The carbon emission reduction contribution for the 10 actions

Table 2: Carbon emission reduction contribution and share of 10 LCS Actions

| Thrusts	Actions	Reduction (ktCO$_2$eq)	Share by Actions (%)*	Share by Thrusts (%)
Economy	Action 1 Green Growth (GG)	2,502	5.2	59
	Action 2 Energy Efficient Spatial Structure (SS)	2,872	6.0	
	Action 3 Green Mobility (GM)	6,868	14.2	
	Action 4 Sustainable Energy System (SE)	16,327	33.9	
Social	Action 5 Community Engagement and Green Lifestyle (CE)	9,015	18.7	19
Environment	Action 6 Low Carbon Green Building (GB)	9,673	20.1	22
	Action 7 Green and Blue Network (BG)	316	0.7	
	Action 8 Sustainable Waste Management (WM)	527	1.1	
	Action 9 Sustainable Water and Wastewater Management (WW)	105	0.2	
Enabler	Action 10 Green Urban Governance (UG)	-	-	0
Total		48,206	100	100

*Numbers may not add up precisely to 100% due to rounding

GREEN GROWTH

In the face of pressing economic and environmental challenges, national and international efforts to promote green growth as a new source of economic growth have been intensified in recent years. The current economic system is not only unsustainable and inefficient in its resource use, but is inequitable in its distribution of costs and benefits. A business that does not invest in low carbon measures will be at risk of being locked out of low-carbon growth markets demand and may experience a reduced market share in the traditional economy in the future. Align with Kuala Lumpur vision of becoming "a sustainable city" and achieving 70% GHG reduction by 2030, the progression towards low carbon society must ensure that carbon reduction targets are met without compromising the economic growth of the city.

Sectoral contribution to CO_2 emission reduction

2,502 $ktCO_2eq$

5.2%
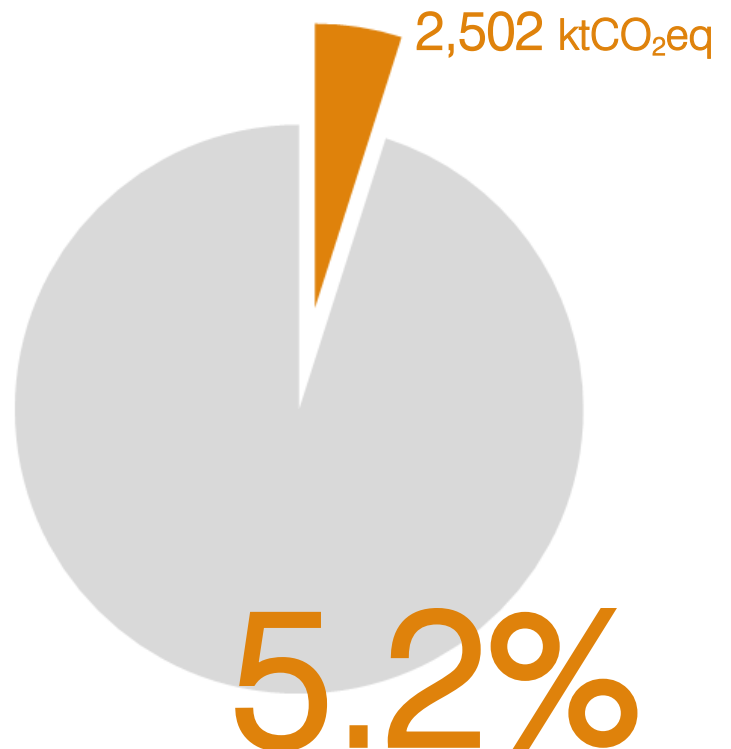
1.1 Kuala Lumpur as a Green Business Hub

It is important for KLCH to develop Kuala Lumpur into a business hub that provides business owners and investors clear guide to its strategic directions, priority sectors, policy framework, incentives and procedures on investing in Kuala Lumpur.

Measure 1.1.1 Promote New Green Sectors and Services

Programs:

GG 1 Establish Kuala Lumpur as a major global venue for annual exhibitions, conferences and/or workshops on green businesses and investments

GG 2 Promote and attract R&D activities in strategic green sectors that are suited to Kuala Lumpur's economic and business ecosystems

GG 3 Establish a Green Enterprise Zone in each of Kuala Lumpur's six strategic zones to accommodate new green businesses and investments

Photo credit: www.klia.com.my

Photo credit: www.digitalnewsasia

Measure 1.1.2 Incentives and Fiscal Measures to Attract Green Businesses

Programs:

GG 4 KLCH to work with relevant ministries/agencies to create viable taxation systems and incentive mechanisms to attract strategic green sectors and Foreign Direct Investment (FDI) in green business

GG 5 KLCH to collaborate with relevant agencies and liaise with major financial institutions to expand on environmental investment opportunities and create attractive loan options for green investments

GG 6 Put in place procedures that expedite approval processes for green business and investments in Kuala Lumpur

1.2 Greening Existing Business

Measures such as reducing energy and resource intensity of existing businesses and green incentives and taxation for greening business are identified in order for greening every business in Kuala Lumpur to take place.

Measure 1.2.1 Reduce Energy and Resource Intensity of Existing Businesses

Programs:

GG 7 Progressive requirement for greener operation & eco-efficient policies in business administration, supply chain, and operations

GG 8 Promotion of environmental analytical & advisory services towards improving resource & energy efficiency in existing businesses

GG 9 KLCH to lead the way in preparing institutional/ establishment level 5-year carbon management plan to reduce institutional/ establishment operational carbon emissions

GG 10 Create "KL Green Business Champions" by engaging KL's dominant building uses and/or biggest energy users (e.g. major offices, hotels, shopping malls, hospitals, educational institutions and restaurants) in greening their administration, supply chain and operation


Photo credit: UTM LCARC

Dewan Bandaraya Kuala Lumpur
Carbon Management Plan
2017 - 2022

Version: 1.0
Owner: Low Carbon Green City Task Force
Approval Route: Council Board
Approval Status: Draft

CARBON TRUST
Photo credit: KLCH

Measure 1.2.2 Green Incentives and Taxation for Greening Business

Programs:

GG 11 Introduce green incentives that cover and support existing businesses' green initiatives in investment and/or innovation in reducing energy and resource intensity of their administration, supply chain and operations

GG 12 Provide green incentives for business to set up an environmental & energy performance unit that generates green employment

GG 13 Introduce prestigious annual green awards that recognise and/or reward existing businesses that achieve significant results in resource and energy efficiency improvement in their overall operations

Photo credit: www.digitalnewsasia
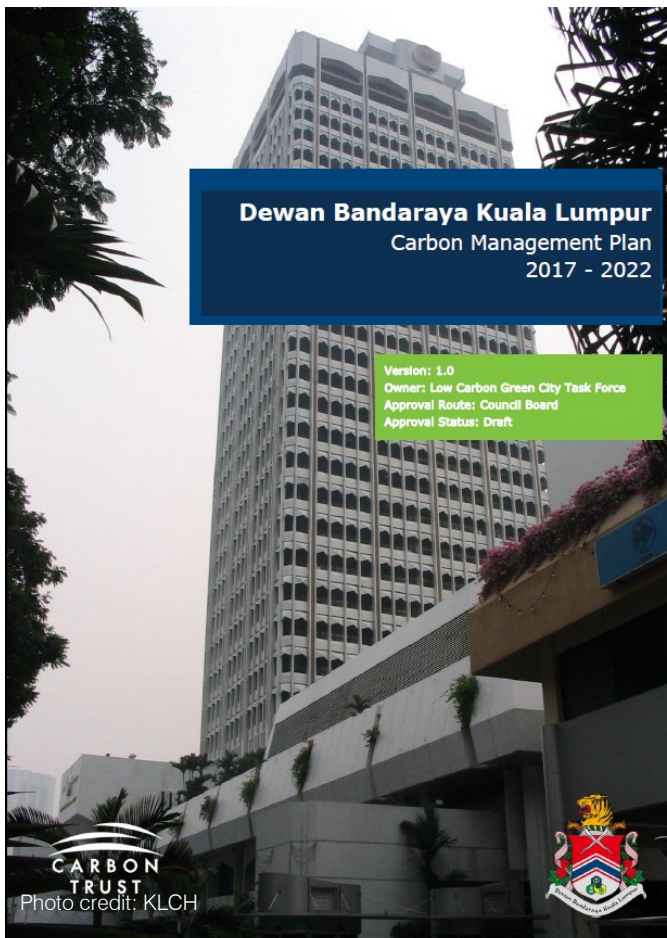
1.3 Establish Green Economy Ecosystem

Green economy focusing on the consumers as one of the players in the ecosystem. It is important to strengthen institutional support for green growth, create and expand green markets and capacity building in Kuala Lumpur.

Measure 1.3.1. Strengthen Institutional Support for Green Growth

Programs:

GG 14 Establish a Green Economy Unit in KLCH to promote, coordinate, advise, enable and facilitate the setting up of green businesses and markets in Kuala Lumpur

GG 15 KLCH through the Green Economy Unit to facilitate businesses and public sector organisations in solicitation of advice from relevant agencies (e.g. GreenTech Malaysia, MESTECC) on energy efficiency and renewable energy

GG 16 Develop a Green Growth Action Plan for Kuala Lumpur that clearly outlines KLCH's green growth policy direction and strategies, and provides clear policy guidance to green businesses and investors

Photo credit: UTM LCARC

Measure 1.3.2 Create and Expand Green Markets

Programs:

GG 17 All government entities within KLCH area to implement the Government Green Procurement (GGP) practice

GG 18 Set up and maintain a "Kuala Lumpur Green Portal" that provides real-time information on Kuala Lumpur's LCS progress, green technologies, green jobs, green education and links to key government green portals

GG 19 Widespread adoption of green certification (e.g. MyHIJAU Mark) for all range of green products and services within Kuala Lumpur to provide consumers with an authoritative and reliable guide to the emerging green market

GG 20 Encourage business establishments in Kuala Lumpur to tap into the MyHIJAU platform to expand connections to other green businesses and wider consumers

1.4 Capacity Building

Kuala Lumpur needs diverse range of workers with broad skill sets as well as workers that can cope with shifting demands in skills set. The adoption of green growth in Kuala Lumpur will create new jobs and redefine existing occupations. These changes involve the process such as reskilling, cross-skilling, and upskilling of new work practices.

Measure 1.4.1 Human Capital Enhancement

Programs:

GG 21 Work with the academia, industry and relevant government agencies to establish Kuala Lumpur as the regional hub for accredited professional short courses on green growth and green businesses

GG 22 Develop systematic up-skills programs for progressive upgrading/retraining of existing pool of professional and semi-professional workers in various green sectors

GG 23 Fiscal incentives for business establishment that offer continuous professional education for current employees in the green sector

GREEN GROWTH

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 1.1.1 Promote New Green Sectors and Services						
GG 1 Establish Kuala Lumpur as a major global venue for annual exhibitions, conferences and/or workshops on green businesses and investments		▬		Corporate Planning Dept.	KW (Corporate Communication), MIDA, MESTECC, MOTAC, MOHR	GreenTech Malaysia
GG 2 Promote and attract R&D activities in strategic green sectors that are suited to Kuala Lumpur's economic and business ecosystems	▬	▬	▬	Corporate Planning Dept.	KLCH (Administration Dept.), KW (Corporate Communication, and Policy Planning Dept.), MIDA	MIDA, GreenTech Malaysia
GG 3 Establish a Green Enterprise Zone in each of Kuala Lumpur's six strategic zones to accommodate new green businesses and investments	▬	▬	▬	City Planning Dept.	KLCH (Economic Planning & Development Dept.), KW (Corporate Communication), MIDA, MOHR	Business assoc.
Measure 1.1.2 Incentives and Fiscal Measures to Attract Green Businesses						
GG 4 KLCH to work with relevant ministries/ agencies to create viable taxation systems and incentive mechanisms to attract strategic green sectors and Foreign Direct Investment (FDI) in green business	▬			Corporate Planning Dept.	KW (Policy Planning Division), GreenTech Malaysia, InvestKL, KLN, SSM	MIDA, SSM
GG 5 KLCH to collaborate with relevant agencies and liaise with major financial institutions to expand on environmental investment opportunities and create attractive loan options for green investments		▬		Corporate Planning Dept.	KW (Finance, and Policy Planning Dept.), MIDA, MESTECC, SSM, SME Corporation	Business assoc., SME assoc.
GG 6 Put in place procedures that expedite approval processes for green business and investments in Kuala Lumpur		▬		Economic Planning & Development Dept.	GreenTech Malaysia, SSM, InvestKL, PEMANDU, MIDA, SME Corporation, MITI, MIGHT	KLCH (Economic Planning & Development Dept.)
Measure 1.2.1 Reduce Energy and Resource Intensity of Existing Businesses						
GG 7 Progressive requirement for greener operation & eco-efficient policies in business administration, supply chain, and operations	▬	▬	▬	City Planning Dept.	KW (Policy Planning Dept.), SSM, GreenTech Malaysia, MIDA	SSM, Business assoc.
GG 8 Promotion of environmental analytical & advisory services towards improving resource & energy efficiency in existing businesses		▬		Licensing & Petty Traders Development Dept.	KW (Corporate Communication), SSM, GreenTech Malaysia, MAESCOs, MIDA	Business assoc.
GG 9 KLCH to lead the way in preparing institutional/establishment level 5-year carbon management plan to reduce institutional/ establishment operational carbon emissions	▬	▬		Administration Dept.	KLCH (Administration Dept. *(Jawatankuasa Tenaga)*)	KLCH (Administration Dept.)
GG 10 Create "KL Green Business Champions" by engaging KL's dominant building uses and/or biggest energy users (e.g. major offices, hotels, shopping malls, hospitals, educational institutions and restaurants) in greening their administration, supply chain and operations		▬		Licensing & Petty Traders Development Dept.	SSM, MIDA, GreenTech Malaysia	Business assoc., Building owners
Measure 1.2.2 Green Incentives and Taxation for Greening Business						
GG 11 Introduce green incentives that cover and support existing businesses' green initiatives in investment and/or innovation in reducing energy and resource intensity of their administration, supply chain and operations		▬		Property Management & Valuation Dept.	KW (Corporate Communication), SSM, MIDA, GreenTech Malaysia, MOF	Business assoc.

| Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 1.2.2 Green Incentives and Taxation for Greening Business						
GG 12 Provide green incentives for business to set up an environmental & energy performance unit that generates green employment		■ (High)		Administration Dept.	KW (Finance, Corporate Communication, and Socio Economic), SSM, MIDA, GreenTech Malaysia, MOF	Business assoc.
GG 13 Introduce prestigious annual green awards that recognise and/or reward existing businesses that achieve significant results in resource and energy efficiency improvement in their overall operations		▬ (Medium)		Licensing & Petty Traders Development Dept.	KW (Corporate Communication), SSM, MIDA, GreenTech Malaysia	Business assoc.
Measure 1.3.1. Strengthen Institutional Support for Green Growth						
GG 14 Establish a Green Economy Unit in KLCH to promote, coordinate, advise, enable and facilitate the setting up of green businesses and markets in Kuala Lumpur		▬ (Medium)		Administration Dept.	KLCH (Human Resource Dept.), MIDA, GreenTech Malaysia, SSM	KLCH (Administration Dept.)
GG 15 KLCH through the Green Economy Unit to facilitate businesses in solicitation of advice from relevant agencies (e.g. GreenTech Malaysia Malaysia, MESTECC) on energy efficiency and renewable energy	▬ (Medium)			Administration Dept.	KLCH (Human Resource Dept.), GreenTech Malaysia, MESTECC, SEDA, MAESCOs	Business assoc.
GG 16 Develop a Green Growth Action Plan for Kuala Lumpur that clearly outlines KLCH's green growth policy direction and strategies, and provides clear policy guidance to green businesses and investors	■ (High)			Administration Dept.	KW (Policy Planning, and Corporate Communication), GreenTech Malaysia, MIDA, SSM	KLCH (City Planning Dept.), Business assoc.
Measure 1.3.2 Create and Expand Green Markets						
GG 17 All government entities within the KLCH area to implement the Government Green Procurement (GGP) practice	■ (High)			Administration Dept.	GreenTech Malaysia	Business assoc.
GG 18 Set up and maintain a "Kuala Lumpur Green Portal" that provides real-time information on Kuala Lumpur's LCS progress, green technologies, green jobs, green education and links to key government green portals (e.g. MyHIJAU)		▬ (Medium)		Information Management Dept.	GreenTech Malaysia, MIDA	KLCH (Information Management Dept.)
GG 19 Widespread adoption of green certification (e.g. MyHIJAU Mark) for all range of green products and services within Kuala Lumpur to provide consumers with an authoritative and reliable guide to the emerging green market	▬ (Medium)			Administration Dept.	GreenTech Malaysia	KLCH (Administration Dept.), GreenTech Malaysia
GG 20 Encourage business establishments in Kuala Lumpur to tap into the MyHIJAU platform to expand connections to other green businesses and wider consumers	▬ (Medium)			Administration Dept.	GreenTech Malaysia, KW (Corporate Communication)	Business assoc.
Measure 1.4.1 Human Capital Enhancement						
GG 21 Work with the academia, industry and relevant government agencies to establish Kuala Lumpur as the regional hub for accredited professional short courses on green growth and green businesses	▬ (Medium)			Human Resource Management Dept. (IDB)	KPM, KW, SSM, MIDA, GreenTech Malaysia	KLCH (Human Resource Management Dept. (IDB)), Business assoc.
GG 22 Develop systematic up-skills programs for progressive upgrading/retraining of existing pool of professional and semi-professional workers in various green sectors	▬ (Medium)			Human Resource Management Dept. (IDB)	KPM, SSM, GreenTech Malaysia	KLCH (Human Resource Management Dept. (IDB)), Business assoc.
GG 23 Fiscal incentives for business establishments that offer continuous professional education for current employees in the green sector	▬ (Medium)			Human Resource Management Dept. (IDB)	KLCH (Licensing and Petty Traders Development Dept.), KW (Finance), SSM, GreenTech Malaysia	KLCH (Licensing and Petty Traders Development Dept.), Business assoc.

Importance Level

High ■   Medium ▬   Low ░

ENERGY EFFICIENT SPATIAL STRUCTURE
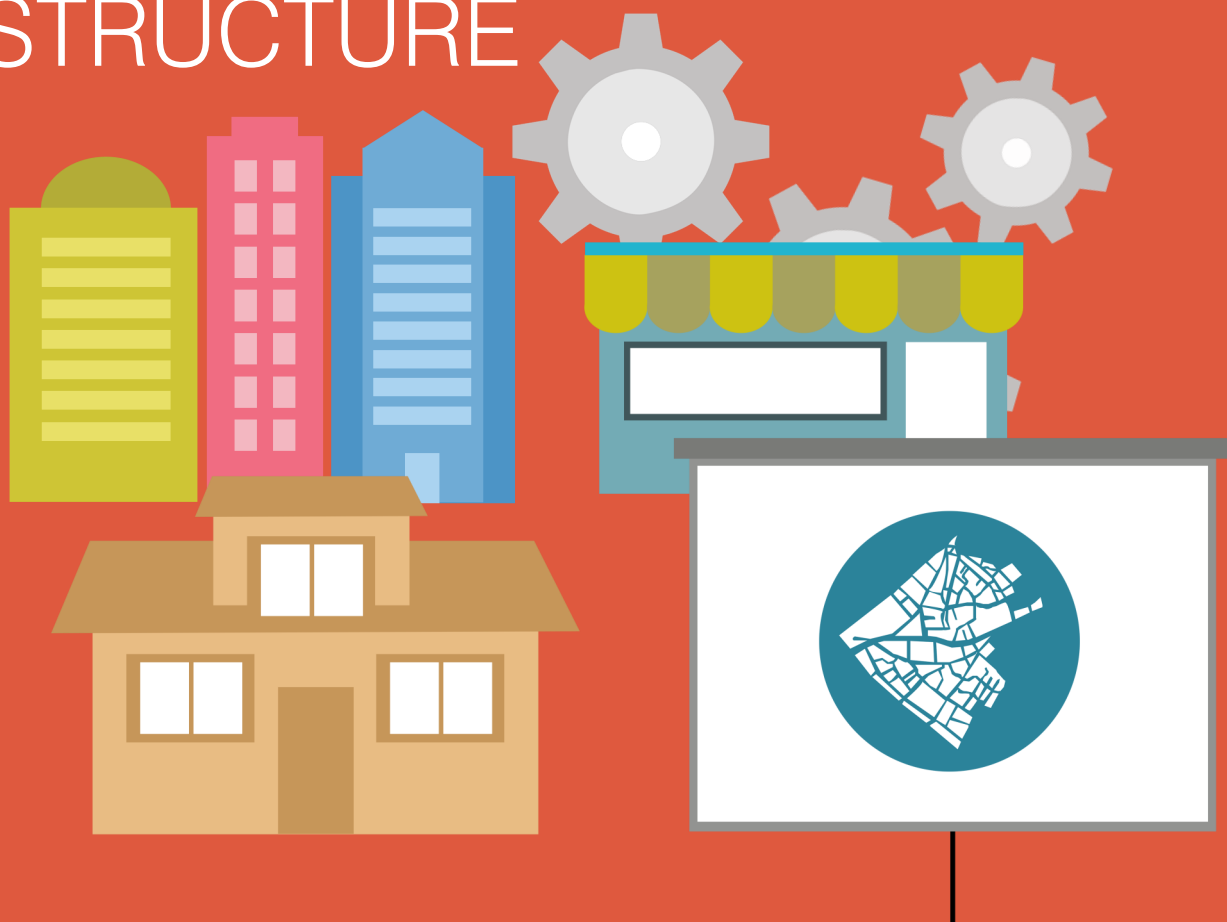
Kuala Lumpur's population is expected to increase to 2.49 million by 2030. With the growing population, along with the scarcity and increasing demand for urban spaces in Kuala Lumpur, the spatial structure of this metropolis needs to be efficiently developed to reduce its energy consumption and CO_2 emission. This can be achieved by promoting polycentric spatial structure, materialising Transit Oriented Development (TOD) as well as encouraging walking and cycling as a mode of travel within suitable distance. Kuala Lumpur needs a more human-oriented urban design, which offers its residents a healthy and safe living environment, higher quality of life whilst reducing travel and energy demand as well as cost of living. This requires continuous collaboration between city planners, key economic actors and residents of Kuala Lumpur.

Sectoral contribution to CO_2 emission reduction

2,872 $ktCO_2eq$

6.0%
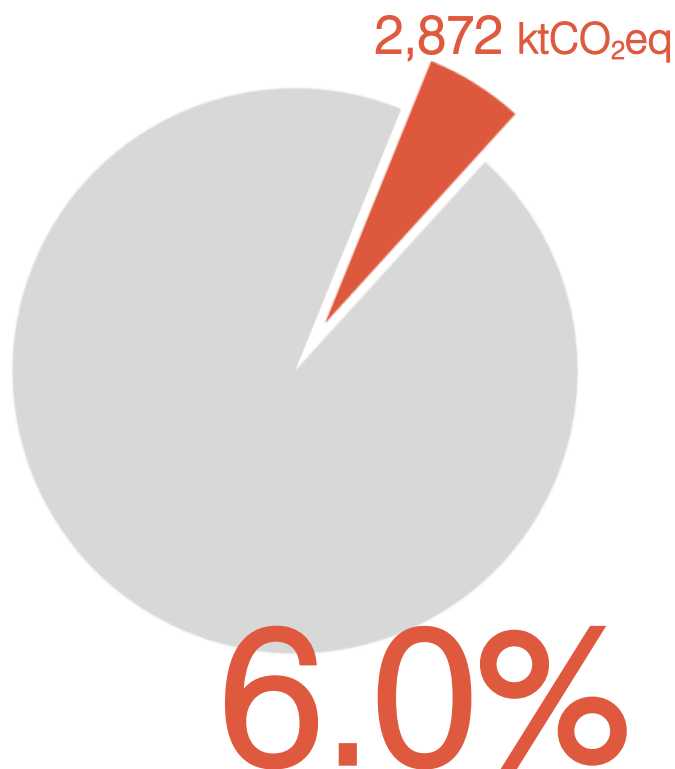
2.1 Compact Urban Form

Rapid development and economic growth coupled to limited land and strong demand for housing and urban space points to the importance of having a more compact urban form, which promotes higher density development with mixing of various activities as well as pedestrian and cyclist-friendly environments with better accessibility to services and facilities within closer proximity.

Measure 2.1.1 Promote Polycentric, Compact Growth Pattern in Kuala Lumpur

Programs:

SS 1 Gradual densification in polycentric nodes connected by public transportation

SS 2 Focus on high density mixed use development to minimise the need to travel

SS 3 Plan to achieve a compact, contiguous pattern of growth – looking "inward and upward"

Measure 2.1.2 Promote Transit Supportive Land Use Planning

Programs:

SS 4 Promote higher intensity urban development around transit stations

SS 5 Rationalise key locations for TOD in relation to existing and proposed MRT and LRT networks

SS 6 Station Area Planning (SAP)

SS 7 Concentrate provision of new affordable homes around transit stations

Sunway Velocity
Sunway medical centre, Sunway hotel, Sunway shopping mall & V residence suites

Cochrane MRT Station

Maluri MRT Station

Distance to station: 220m

Distance to station: 100m

Photo credit: Malaysia Property Review, May 201

2.2 Walkable and Cyclist-Friendly Urban Districts

Creating a human-oriented environmentally friendly urban design, which is a key aspect of a low carbon society, will eventually contributing to the CO_2 emission reduction. Like other cities such as Copenhagen, Amsterdam and especially Singapore, Kuala Lumpur can potentially solve its traffic problem by providing extensive and comprehensive pedestrian walkways and cycling lanes.

Measure 2.2.1 Enhance Interconnected Pedestrian Network

Programs:

SS 8 Design permeable street layouts

SS 9 Identify and connect discontinuities within existing pedestrian network and sub-urban areas

SS 10 Create continuous active street frontages

SS 11 Safe walking routes to schools and public institutions

Photo credit: PADU,2015

Measure 2.2.2 Providing Comfortable and Safe Walkways

Programs:

SS 12 Street planting for shades

SS 13 Improve street furniture

SS 14 Extend existing covered walkways to include all main pedestrian routes

SS 15 Enforce universal design concept

Measure 2.2.3 Build Quality Public Spaces and Pedestrian Environments that Support Walking

Programs:

SS 16 Identify potential urban spaces as public realms

SS 17 Improve and redesign existing pocket parks

SS 18 Conduct pedestrian Level of Service (LOS) analysis on high pedestrian traffic areas

Measure 2.2.4 Providing Safe and Comfortable Cycling Network

Programs:

SS 19 Engaging local cycling clubs in planning Kuala Lumpur cycling routes

SS 20 Dedicated cycle lanes on major routes in Kuala Lumpur

SS 21 Bike Expressway (Bike E-Way) from suburbs area to city centre and along major rivers and railway lines

Photo credit: Oxford Street by James Reid, 2014

Photo credit: UTM LCARC

Measure 2.2.5 Crime Prevention Through Environmental Design (CPTED)

Programs:

SS 22 Install CCTVs

SS 23 Set up security beats at appropriate locations

SS 24 Increase natural surveillance through proper building orientation and landscape design

SS 25 Eliminate blind spots in urban environments

SS 26 Enhance street lighting along pathway and other pedestrian used areas

2.3 Designing Civilised and Livable Streets

The liveability of streets decline as the traffic volumes and speeds increase. Streets with moderate to low traffic volume and speed are more satisfying to residents. In line with Kuala Lumpur policy documents in ensuring the safety of all road users, 'traffic calming" should be introduced. Traffic calming can potentially control the volume and speed of traffic for example via road humps and 30km/h traffic sign which have been used in roads in Amsterdam and Barcelona.

Measure 2.3.1 Street Environment Enhancement

Programs:

SS 27 Create 'home zones' in residential areas

SS 28 Community landscaping program

Measure 2.3.2 Reducing Vehicular Traffic Speed for Enhanced Pedestrian Safety

Programs:

SS 29 Carriageway narrowing, chicanes, pavement widening and kerb extension at junctions

SS 30 Install humped pedestrian crossings and raised junction plateau

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
2.1.1 Promote Polycentric, Compact Growth Pattern in Kuala Lumpur						
SS 1 Gradual densification in polycentric nodes connected by public transportation				City Planning Dept.	KLCH(Civil Engineering & Urban Transportation Dept.), Neighbouring local authorities, MOT	Developers
SS 2 Focus on high density mixed use development to minimise the need to travel				City Planning Dept.	MOT, KPKT	Developers
SS 3 Plan to achieve a compact, contiguous pattern of growth – looking "inward and upward"				City Planning Dept.	KPKT, PLANMalaysia	Developers
Measure 2.1.2 Promote Transit Supportive Land Use Planning						
SS 4 Promote higher intensity urban development along transit stations				City Planning Dept.	PRASARANA, MOT, KPKT	Developers
SS 5 Rationalise key locations for TOD in relation to existing and proposed MRT and LRT networks				City Planning Dept.	MOT, KPKT, KW	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
SS 6 Station Area Planning (SAP)				Infrastructure Planning Dept.	KLCH (City Planning Dept.), MOT, KPKT, KW	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
SS 7 Concentrate provision of new affordable homes around transit stations				City Planning Dept.	KLCH (Housing Management & Community Development Dept.)	KLCH (Economic Planning & Development Dept.), KW, Developers
Measure 2.2.1 Enhance Interconnected Pedestrian Network						
SS 8 Design permeable street layouts				Infrastructure Planning Dept.	KLCH (City Planning, Building Control Dept., Project Implementation & Building Maintenance Dept., Civil Engineering & Urban Transportation Dept., Landscape & Recreational Development Dept.), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
SS 9 Identify and connect discontinuities within existing pedestrian network and sub-urban areas				Infrastructure Planning Dept.	KLCH (City Planning Dept., Civil Engineering & Urban Transportation Dept.), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
SS 10 Create continuous active street frontages				Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept., Licensing & Petty Traders Development Dept.), KW, KPKT	Property/business owners
SS 11 Safe walking routes to schools and public institutions				Infrastructure Planning Dept.	KW, KPKT, JPWPKL, JKR	KLCH (Civil Engineering & Urban Transportation Dept.), Developers, Communities, Schools

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Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
2.2.2 Providing Comfortable and Safe Walkways						
SS 12 Street planting for shades	████	████	████	Landscape & Recreational Development Dept.	KLCH (Infrastructure Planning Dept., Civil Engineering & Urban Transportation Dept., City Planning Dept.) KW, KPKT	KLCH (Landscape & Recreational Development Dept.) and Developers
SS 13 Improve street furniture	████	████	████	Civil Engineering & Urban Transportation Dept.	KLCH (City Planning Dept., Landscape & Recreational Development Dept., Infrastructure Planning Dept.), KW, KPKT	KLCH(Project Implementation & Building Maintenance Dept. Civil Engineering & Urban Transportation Dept.), Developers
SS 14 Extend existing covered walkways to include all main pedestrian routes	████	████	████	Infrastructure Planning Dept.	KLCH (Landscape & Recreational Development Dept.), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.,), Developers
SS 15 Enforce universal design concept	████	████	████	Infrastructure Planning Dept.	KLCH (Project Implementation & Building Maintenance Dept., Landscape & Recreational Development Dept.), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
2.2.3 Build Quality Public Spaces and Pedestrian Environments that Support Walking						
SS 16 Identity potential urban spaces as public realms	████	████	████	City Planning Dept.	KLCH (Project Implementation & Building Maintenance Dept., Landscape & Recreational Development Dept.), KW, KPKT	Developers
SS 17 Improve and redesign existing pocket parks	████	████	████	Landscape & Recreational Development Dept.	KLCH (Project Implementation & Building Maintenance Dept.), KW, KPKT	KLCH (Landscape & Recreational Development Dept.), Developers
SS 18 Conduct pedestrian Level of Service (LOS) analysis on high pedestrian traffic areas	████			Civil Engineering & Urban Transportation Dept.	KLCH (Project Implementation & Building Maintenance Dept.), JKR, KW, KPKT, Prasarana	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
Measure 2.2.4 Providing Safe and Comfortable Cycling Network						
SS 19 Engaging local cycling clubs in planning Kuala Lumpur cycling routes	████			Infrastructure Planning Dept.	KLCH (City Planning Dept., Landscape & Recreational Development Dept., Culture, Arts, Tourism & Sports Dept.), Prasarana, MOT, KW, KPKT, Cycling organisations	KLCH (Civil Engineering & Urban Transportation Dept.)
SS 20 Dedicated cycle lanes on major routes in Kuala Lumpur	████	████	████	Infrastructure Planning Dept.	KLCH (City Planning Dept., Landscape & Recreational Development Dept., Culture, Arts, Tourism & Sports Dept.), Prasarana, MOT, KW, KPKT, Cycling organisations	KLCH (Civil Engineering & Urban Transportation Dept.,), Developers

| Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 2.2.4 Providing Safe and Comfortable Cycling Network						
SS 21 Bike Expressway (Bike E-Way) from suburbs area to city centre and along major rivers and railway lines	████	████	████	Infrastructure Planning Dept.	MOT, KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
2.2.5 Crime Prevention Through Environmental Design (CPTED)						
SS 22 Install CCTVs	████	████	████	Civil Engineering & Urban Transportation Dept.	PDRM, KW, KPKT, PLANMalaysia	KLCH (Civil Engineering & Urban Transportation Dept.), Community, Property owners
SS 23 Set up security beats at appropriate locations	████	████	████	Enforcement Dept.	PDRM, KW, KPKT, PLANMalaysia	KLCH (Civil Engineering & Urban Transportation Dept.)
SS 24 Increase natural surveillance through proper building orientation and landscape design	████	████	████	Project Implementation & Building Maintenance Dept.	KW, KPKT, PLANMalaysia	KLCH (Landscape & Recreational Development Dept.), Resident assoc., Property owners, Community
SS 25 Eliminate blind spots in urban environments	████	████		Project Implementation & Building Maintenance Dept.	KLCH (Landscape & Recreational Development Dept.) PDRM, KW, KPKT, PLANMalaysia	KLCH (Civil Engineering & Urban Transportation Dept.), Property owners
SS 26 Enhance street lighting along pathway and other pedestrian used areas	████	████		Mechanical & Electrical Engineering Dept.	KW, KPKT	KLCH (City Planning Dept., Landscape & Recreational Development Dept., Civil Engineering & Urban Transportation Dept.), Property owners
2.3.1 Street Environment Enhancement						
SS 27 Create 'home zones' in residential areas	████	████		Civil Engineering & Urban Transportation Dept.	KLCH (Housing Management & Community Development Dept., Infrastructure Planning Dept..), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
SS 28 Community landscaping program	████	████		Housing Management & Community Development Dept.	KLCH (City Planning Dept. (LA21KL)), KW, KPKT	KLCH (Landscape & Recreational Development Dept.), Resident's assoc.
2.3.2 Reducing Vehicular Traffic Speed for Enhanced Pedestrian Safety						
SS 29 Carriageway narrowing, chicanes, pavement widening and kerb extension at junctions	▓▓▓▓	▓▓▓▓		Civil Engineering & Urban Transportation Dept.	KLCH (Project Implementation & Building Maintenance Dept.), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers
SS 30 Install humped pedestrian crossings and raised junction plateau	▓▓▓▓	▓▓▓▓		Civil Engineering & Urban Transportation Dept.	KLCH (Project Implementation & Building Maintenance Dept.), KW, KPKT	KLCH (Civil Engineering & Urban Transportation Dept.), Developers

Importance Level

High ████   Medium ▓▓▓▓   Low ░░░░

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GREEN MOBILITY

With the targeted strong growth in the economy and population in Kuala Lumpur, rapid growth in intra- and intercity passenger and freight transportation demand is inevitable. If left unchecked, growth in the transportation sector is expected to add to Kuala Lumpur carbon emission by 26,919 $ktCO_2$ and increased the transportation demand by 2030. In order to mitigate the carbon emission level of the projected increasing transportation demand, the development towards green mobility in Kuala Lumpur is essential. Its main purpose is to reduce Kuala Lumpur's carbon emission by inducing a voluntary modal shift from motorised vehicles to walking and cycling for short to medium distance trips, at the same time promoting public transport use. Undoubtedly, green mobility will create and promote a new culture of sustainable mobility in the Kuala Lumpur city.

Sectoral contribution to CO_2 emission reduction

6,868 $ktCO_2eq$

14.2%
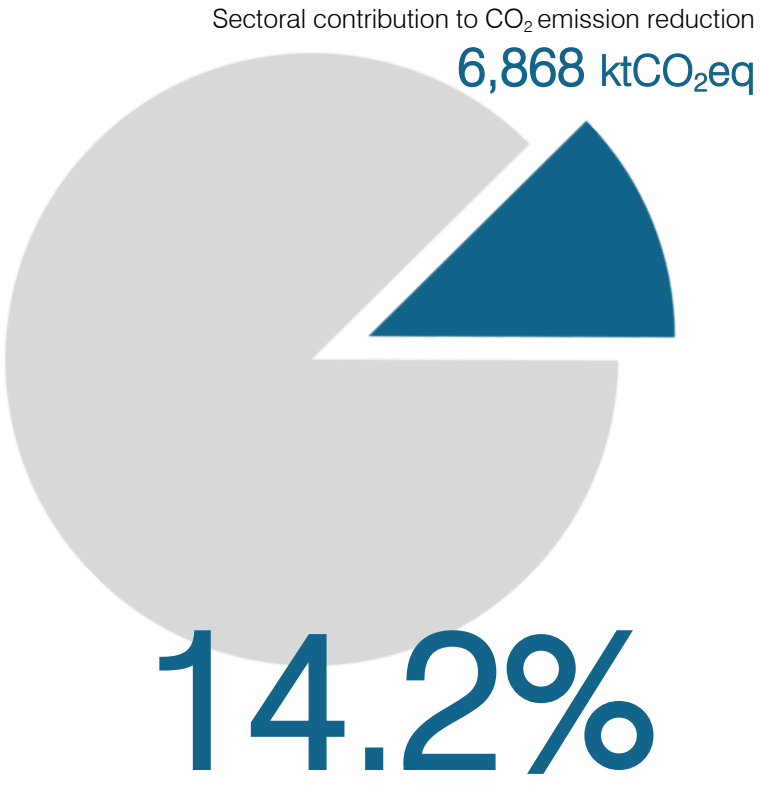
3.1 Active Mobility

Active mobility is a form of transport of people and goods which use physical activity of the human being such as walking and cycling.

Measure 3.1.1 Promote Walking and Cycling on Short to Medium Trips

Programs:

GM 1 Provision of bicycle facilities

GM 2 Pedestrian and cycling priority at crossings

GM 3 Cycle Safe and Right

GM 4 Promote cycling as an attractive transport mode beyond recreational purposes

GM 5 Establish bike rental program – KL Cycle Hire Scheme

Measure 3.1.2 Designate Pedestrian Zones in Key Activity Centres

Program:

GM 6 Identify potential activity centres for implementation of pedestrian zones

3.2 Integrated Public Transportation

Integrated public transport system tends to meet the need of customers, which ultimately results in the increment of ridership.

Measure 3.2.1 Public Transport System Improvement (Bus and Rail)

Programs:

GM 7 Route network expansion planning

GM 8 Re-rationalisation of existing bus lane network

GM 9 Strengthen enforcement against misuse of dedicated bus lanes

GM 10 Work with relevant agencies to advocate for high capacity, fast, frequent and reliable rapid transit

GM 11 Provide real time arrival information at all bus stops and rail stations

GM 12 Reimaging public transport

GM 13 Implement flat rate tickets and central area free shuttle services

GM 14 Develop and promote web-based journey

Photo credit: www.data-display.com

Measure 3.2.2 Seamless Intermodal Transfer (Interchange Facilities)

Programs:

GM 15 Integrated e-ticketing system (across all platforms)

GM 16 Public transport interchange as destination and urban activity nodes

GM 17 Upgrading bus and rail integrated terminal

GM 18 Enhance 'Park and Ride' facilities in sub-urban transit nodes

Photo credit: UTM LCARC

3.3 Diffusion of Low Carbon Vehicles

It is imperative that the diffusion of low carbon vehicles in Kuala Lumpur to play its role as a potential to minimise the carbon impact of private vehicles for a low carbon future in Kuala Lumpur.

Measure 3.3.1 Promote the Use of Green Vehicles

Programs:

GM 19 KLCH to use viable low carbon vehicles

GM 20 Partnering with EV car sharing companies

GM 21 Tax reduction for green vehicle purchase

GM 22 Gradual phasing out for conventional diesel engine buses

Photo credit: www.paultan.org

3.5 Green Freight Transportation

Government policies should focus on freight transport as much as it focuses on private vehicles and public transport.

Measure 3.5.1 Modal Shift to Greener Freight Transport Modes

Programs:

GM 30 Promote hybrid freight transport through tax incentives in hybrid freight transport acquisition

Measure 3.5.2 Freight Demand Management (FDM)

Program:

GM 31 Optimal scheduling of pick-up and delivery

Photo credit: www.autorentalnews.com

3.4 Enhancing Traffic Flow Conditions and Performance

Enhancing traffic flow in Kuala Lumpur means delivering more reliable journey times and more free-flowing travel conditions than at present.

Measure 3.4.1 Transport Demand Management

Programs:

GM 23 Enhance Intelligent Transportation System (ITS)

GM 24 Chart out practical timeline for progressive implementation of congestion pricing scheme

GM 25 Parking demand management

GM 26 Intelligent traffic control and support eco driving

GM 27 Enhance the use of effective Variable Message Signs (VMS)

GM 28 Improve traffic signal performance

GM 29 Tidal flow and contra-flow along primary radial routes

Photo credit: UTM LCARC

GREEN MOBILITY

| Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 3.1.1 Promote Walking and Cycling on Short to Medium Trips						
GM 1 Provision of bicycle facilities	███	██		Infrastructure Planning Dept.	KLCH (City Planning Dept.), MOT, JKJR, Cycling organisations	KLCH (Civil Engineering & Urban Transportation Dept.), KL residents association, Neigbouring local authorities
GM 2 Pedestrian and cycling priority at crossings	███	██		Infrastructure Planning Dept.	KLCH (City Planning Dept.), JKR	KLCH (Civil Engineering & Urban Transportation Dept. Enforcement Dept.), PDRM
GM 3 Cycle Safe and Right		███		Infrastructure Planning Dept.	KLCH (Housing Management & Community Dev. Dept.), JPJ, MOT, MOE, Cycling organisations, JPWPKL, MIROS	KLCH (Infrastructure Planning Dept.)
GM 4 Promote cycling as an attractive transport mode beyond recreational purposes	███	██		Infrastructure Planning Dept.	KLCH (Housing Management & Community Dev. Dept.), JPJ, MOT, KPM, Cycling organisations, JPWKL, MIROS	KLCH (Infrastructure Planning Dept.)
GM 5 Establish bike rental program – KL Cycle Hire Scheme		███		Culture, Arts, Tourism & Sports Dept.	Prasarana, MOT, EC, MESTECC	KLCH (Civil Engineering & Urban Transportation Dept. Culture, Arts, Tourism & Sports Dept.), Cycling organisations, Residents assoc.
Measure 3.1.2 Designate Pedestrian Zones in Key Activity Centres						
GM 6 Identify potential activity centres for implementation of pedestrian zones	███	██		Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept. Maintenance Dept., Building Control Dept.,), JKR, JKJR, MOT, DID, NAHRIM, REHDA	KLCH (Enforcement Dept. Civil Engineering & Urban Transportation Dept.)
Measure 3.2.1 Public Transport System Improvement (Bus and Rail)						
GM 7 Route network expansion planning		███		Infrastructure Planning Dept.	KLCH (City Planning Dept., Civil Engineering & Urban Transportation Dept.), MOT, MOF	KLCH (Civil Engineering & Urban Transportation Dept.), MOT, Prasarana, MRT Corp., MYHSR
GM 8 Re-rationalisation of existing bus lane network		███		Infrastructure Planning Dept.	MOT, MRT Corp., Prasarana	KLCH (Civil Engineering & Urban Transportation Dept.), Prasarana, MOT
GM 9 Strengthen enforcement against misuse of dedicated bus lanes	███	██		Enforcement Dept.	KLCH (Legal & Prosecution Dept.), MOT, PDRM, JPJ	KLCH (Enforcement Dept., Civil Engineering & Urban Transportation Dept., (ITIS))
GM 10 Work with related agencies to advocate for high capacity, fast, frequent and reliable rapid transit	███	██		Civil Engineering & Urban Transportation Dept.	MOT	Prasarana, MRT Corp., MYHSR
GM 11 Provide real time arrival information at all bus stops and rail stations	███	██		Civil Engineering & Urban Transportation Dept.	MOT, Prasarana, MRT Corp.	MOT, Prasarana

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 3.2.1 Public Transport System Improvement (Bus and Rail)						
GM 12 Reimaging public transport	▬	▬		Civil Engineering & Urban Transportation Dept.	MOT, MOE, Malaysian Nature	Schools, HEIs
GM 13 Implement flat rate tickets and central area free shuttle services	▬	▬		Civil Engineering & Urban Transportation Dept.	EPU, MOT	Prasarana, MRT Corp.
GM 14 Develop and promote web-based journey planner			▬	Civil Engineering & Urban Transportation Dept.	KLCH (Information Management Dept.), MOT	KLCH (Civil Engineering & Urban Transportation Dept., Information Management Dept.), MOT, Prasarana
Measure 3.2.2 Seamless Intermodal Transfer (Interchange Facilities)						
GM 15 Integrated e-ticketing system (across all platforms)	▬	▬		Civil Engineering & Urban Transportation Dept.	MOT	MOT, Prasarana, MRT Corp., MYHSR
GM 16 Public transport interchange as destination and urban activity nodes		▬	▬	Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept., City Planning Dept.), MOT	MOT, Prasarana, MRT Corp., MYHSR, Developers
GM 17 Upgrading bus and rail integrated terminal	▬	▬	▬	Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept.) MOT,MOF	Prasarana, MRT Corp., MYHSR
GM 18 Enhance 'Park and Ride' facilities in sub-urban transit nodes	▬	▬	▬	Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept.), MOT	MOT, Prasarana, MRT Corp., MYHSR
Measure 3.3.1 Promote the Use of Green Vehicles						
GM 19 KLCH to use viable low carbon vehicles	▬			Mechanical & Electrical Engineering Dept.	MESTECC, GreenTech Malaysia	COMOS, MAI
GM 20 Partnering with EV car sharing companies	▬	▬	▬	Mechanical & Electrical Engineering Dept.	KLCH (Civil Engineering & Urban Transportation Dept., Corporate Planning Dept.), MESTECC, GreenTech Malaysia , MOT	COMOS, MAI, Various EV car manufacturers
GM 21 Tax reduction for green vehicle purchase		▬	▬	Mechanical & Electrical Engineering Dept.	MOF, KASTAM, MOT,MITI, JPJ	MESTECC, GreenTech Malaysia, COMOS
GM 22 Gradual phasing out for conventional diesel engine buses	▬	▬	▬	Mechanical & Electrical Engineering Dept.	KLCH (Civil Engineering & Urban Transportation Dept.), MESTECC, GreenTech Malaysia, MOT	MOT, Prasarana
Measure 3.4.1 Transport Demand Management						
GM 23 Enhance Intelligent Transportation System (ITS)		▬		Civil Engineering & Urban Transportation Dept.	KLCH (Information Technology Management Dept.), MOT, MESTECC	MOT, PRASARANA
GM 24 Chart out practical timeline for progressive implementation of congestion pricing scheme			▬	Civil Engineering & Urban Transportation Dept.	KLCH (Legal & Prosecution Dept., Enforcement Dept.), MOT	MOT, JPJ
GM 25 Parking demand management	▬	▬	▬	Civil Engineering & Urban Transportation Dept.	KLCH (Legal & Prosecution Dept., City Planning Dept.)	KLCH (Economic Planning & Development Dept.)

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 3.4.1 Transport Demand Management						
GM 26 Intelligent traffic control and support eco driving	████	████		Civil Engineering & Urban Transportation Dept.	KLCH (Information Management Dept.), MOT, MESTECC	GreenTech Malaysia , Various car manufacturers
GM 27 Enhance the use of effective Variable Message Signs (VMS)	▓▓▓▓	▓▓▓▓		Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept.)	KLCH (Civil Engineering & Urban Transportation Dept.), LLM and JKR
GM 28 Improve traffic signal performance	████	████	████	Civil Engineering & Urban Transportation Dept.	MOT	KLCH (Civil Engineering & Urban Transportation Dept.), LLM and JKR
GM 29 Tidal flow and contra-flow along primary radial routes	▓▓▓▓	▓▓▓▓		Civil Engineering & Urban Transportation Dept.	KLCH (Enforcement Dept., Infrastructure Planning Dept.), JKR, MOT	KLCH (Enforcement Dept.), JPJ and PDRM
Measure 3.5.1 Modal Shift to Greener Freight Transport Modes						
GM 30 Promote hybrid freight transport through tax incentives in hybrid freight transport acquisition		▓▓▓▓	▓▓▓▓	Mechanical & Electrical Engineering Dept.	KASTAM, MITI, MESTECC, MOT	GreenTech Malaysia, Logistics operators
Measure 3.5.2 Freight Demand Management (FDM)						
GM 31 Optimal scheduling of pick-up and delivery	████	████	████	Civil Engineering & Urban Transportation Dept.	MOT	KLCH (Enforcement Dept.), JPJ, PDRM, Logistics operators

Importance Level

High ████ Medium ▓▓▓▓ Low ░░░░

SUSTAINABLE ENERGY SYSTEM
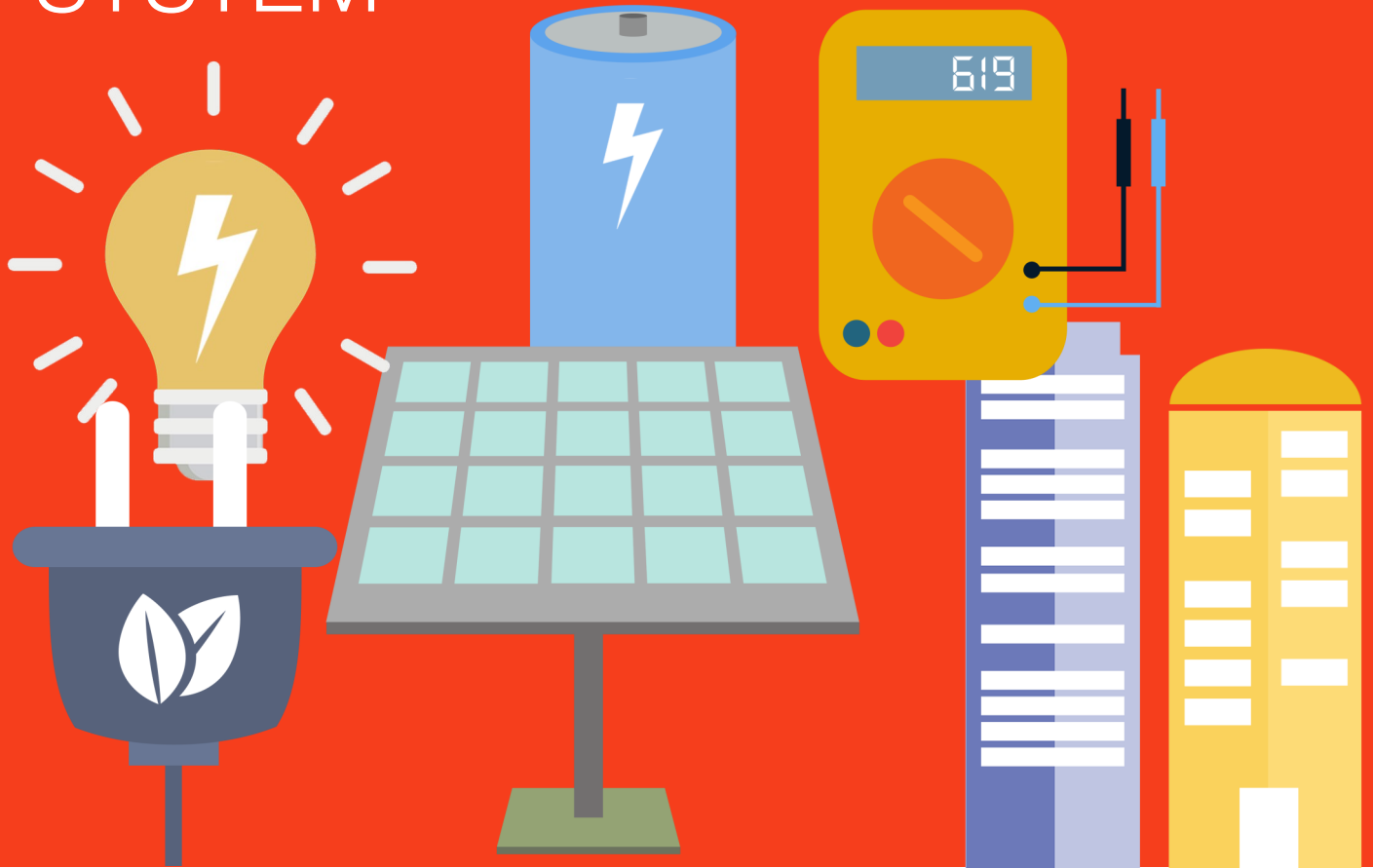
Energy consumption of a modern society like Kuala Lumpur city is far less sustainable with high carbon emissions from the centralised power generation. As a countermeasure, the development of sustainable energy systems comprising efficient energy (in terms of operation and management) and renewable power generation are necessary. To accommodate a complex network of energy-demanding premises which are not initially designed with sustainable energy consumption criteria, there is still a long way to go for KLCH and relevant stakeholders to harmonise the existing situation with the sustainable energy consumption practices, besides stimulating renewable resources in the current power system.

33.9%
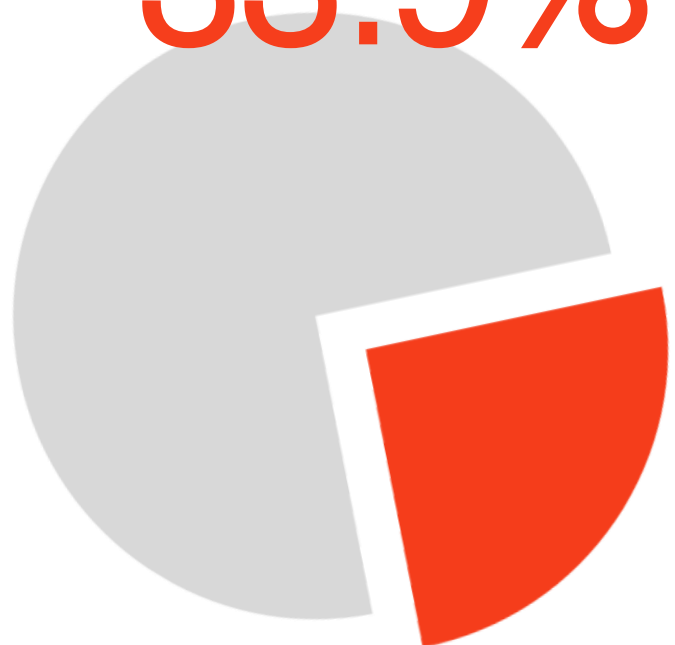
16,327 ktCO$_2$eq

Sectoral contribution to CO$_2$ emission reduction

4.1 Utilise Renewable Energy

Maximising the penetration of renewable and sustainable energy sources is an effective means of reducing the GHG emissions, via reduction of fossil fuel combustion for power generation.

Measure 4.1.1 Solar Energy System

Programs:

SE 1 To provide solar farms

SE 2 To promote PV and solar thermal system on buildings

SE 3 To promote PV system on public infrastructure

Measure 4.1.2 Waste-to-Energy

SE 4 Conversion of waste oil to biodiesel for KLCH transportation

SE 5 To recover energy from municipal solid waste using gasification

SE 6 Energy harvest from sewage treatment plant

SE 7 To convert food waste to energy

4.2 Enhance Efficient Energy System

The prediction from the Intergovernmental Panel on Climate Change (IPCC) reveals that a 75% reduction in energy consumption can be achieved by incorporating holistic and systematic energy efficiency strategies in buildings' design and operation, rather than improving individual component efficiency (M. Zaid et al., 2013).

Measure 4.2.1 Advanced Energy System

Programs:

SE 8 Implementation of district cooling system

Measure 4.2.2 Energy Storage System

Programs:

SE 9 To promote energy storage for efficient energy consumption

SE 10 Promote thermal energy storage for cooling

4.3 Implement Effective Energy Management System

As a countermeasure, an effective implementation of energy management system and some effective energy efficiency (EE) programs shall be scrutinised. Strengthening the funding and financial assistance are also vital for promoting a sustainable energy management system.

Measure 4.3.1 Energy Management System

Programs:

SE 11 To obtain certification in energy management system

SE 12 Implementation of online energy monitoring

4.4 Funding and Incentives to Encourage Energy Efficient and Renewable Energy Strategies

Sufficient funding and subsidies have to be provided for incentivising the energy efficiency strategies.

Measure 4.4.1 Funding and Incentives Support

Programs:

SE 13 To provide tax incentives for Waste-to-Energy (WtE) Initiatives

SE 14 Energy Performance Contracting to overcome financial barriers

Photo credit: Namita Shah

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SUSTAINABLE ENERGY SYSTEM

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partner	Implementer
Measure 4.1.1 Solar Energy System						
SE 1 To provide solar farms				Mechanical & Electrical Engineering Dept.	KLCH (Health & Environment Dept.), TNB, SEDA, MESTECC, GreenTech Malaysia, MIGHT, Alam Flora Sdn. Bhd.	Solar PV technology provider land owners, Alam Flora Sdn. Bhd.
SE 2 To promote PV and solar thermal system on buildings\n\n*Please cross reference with GB 18				Mechanical & Electrical Engineering Dept.	KLCH (City Planning Dept., Building Control Dept.), TNB, SEDA, MESTECC, GreenTech Malaysia, MIGHT	KLCH (Project Implementation & Building Maintenance Dept.), Building owners, Solar PV technology suppliers
SE 3 To promote PV system on public infrastructure				Mechanical & Electrical Engineering Dept.	KLCH (Civil Engineering & Urban Transportation Dept.), SEDA, MIGHT, SIRIM, MESTECC, GreenTech Malaysia	KLCH (Project Implementation & Building Maintenance Dept.), Infrastructure owners, Solar PV technology supplier
Measure 4.1.2 Waste-to-Energy						
SE 4 Conversion of waste oil to biodiesel for KLCH transportation				Health & Environment Dept.	KLCH (City Planning (LA21KL)), MESTECC	KLCH (Mechanical & Electrical Engineering Dept.), Alam Flora Sdn. Bhd., Waste oil treatment company, Hotel and Restaurant operators, Resident's assoc.
SE 5 To recover energy from municipal solid waste using gasification				Mechanical & Electrical Engineering Dept.	KLCH (Health & Environment Dept.), SEDA, Alam Flora Sdn. Bhd	WtE technology provider
SE 6 Energy harvest from sewage treatment plant				Mechanical & Electrical Engineering Dept.	SEDA, IWK, SPAN	IWK
SE 7 To convert food waste to energy\n\n*As a pilot project				Health & Environment Dept.	KLCH (Mechanical & Electrical Engineering Dept.),Perbadanan Kampung Bharu, SEDA, MESTECC, SWCorp	Pasar Chow Kit, WtE technology providers
Measure 4.2.1 Advanced Energy System						
SE 8 Implementation of district cooling system				Mechanical & Electrical Engineering Dept.	KLCH (City Planning Dept., Building Control Dept.), GreenTech Malaysia	KLCH (Mechanical & Electrical Engineering Dept.), Building owners, utility (chilled water and electricity) companies
Measure 4.2.2 Energy Storage System						
SE 9 To promote energy storage for efficient energy consumption				Mechanical & Electrical Engineering Dept.	TNB, SEDA, GreenTech Malaysia	Energy storage suppliers, Solar PV distributors, Building owners
SE 10 Promote thermal energy storage for cooling				Mechanical & Electrical Engineering Dept.	TNB, SEDA, GreenTech Malaysia	Energy storage suppliers, Solar PV distributors, Building owners

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partner	Implementer
Measure 4.3.1 Energy Management System						
SE 11 To obtain certification in energy management system	▬	▬		Project Implementation & Building Maintenance Dept.	KLCH (Human Resource Management Dept., Adminstration Dept.), EC,SEDA, GreenTech Malaysia	Commercial building owners, ESCO (Advisor of energy management system)
SE 12 Implementation of online energy monitoring system			▬	Project Implementation & Building Maintenance Dept.	KLCH (Information Management Dept.), SEDA, EC, TNB	Building owners, Developers, Smart meter providers
Measure 4.4.1 Funding and Incentives Support						
SE 13 To provide tax incentives for Waste-to-Energy (WtE) initiatives		▬	▬	Property Management & Valuation Dept.	KLCH (City Planning Dept.), GreenTech Malaysia, MIDA	KLCH (Finance Dept.), LHDN, Building owners, Developers
SE 14 Energy Performance Contracting to overcome financial barriers	▬	▬	▬	Economy Planning & Development Dept.	KLCH (Building Control Dept.), EC, GreenTech Malaysia, MIGHT, TNB	Building owners, Energy service companies, Technology suppliers

Importance Level

High ▬ Medium ▬ Low ▬

COMMUNITY ENGAGEMENT AND GREEN LIFESTYLE

People are the core element in achieving sustainability. Establishing a low carbon society whereby residents are practising low carbon behaviour is an essential element in transforming Kuala Lumpur into a world recognised low carbon city. However, changing how people behave is a challenging task and is time consuming. In response to this challenge, empowering community to undertake low carbon initiatives and adopt a low carbon lifestyle via effective action plans is highly crucial to motivate and support the establishment of low carbon society in Kuala Lumpur.

18.7%

9,015 ktCO$_2$eq

Sectoral contribution to CO$_2$ emission reduction
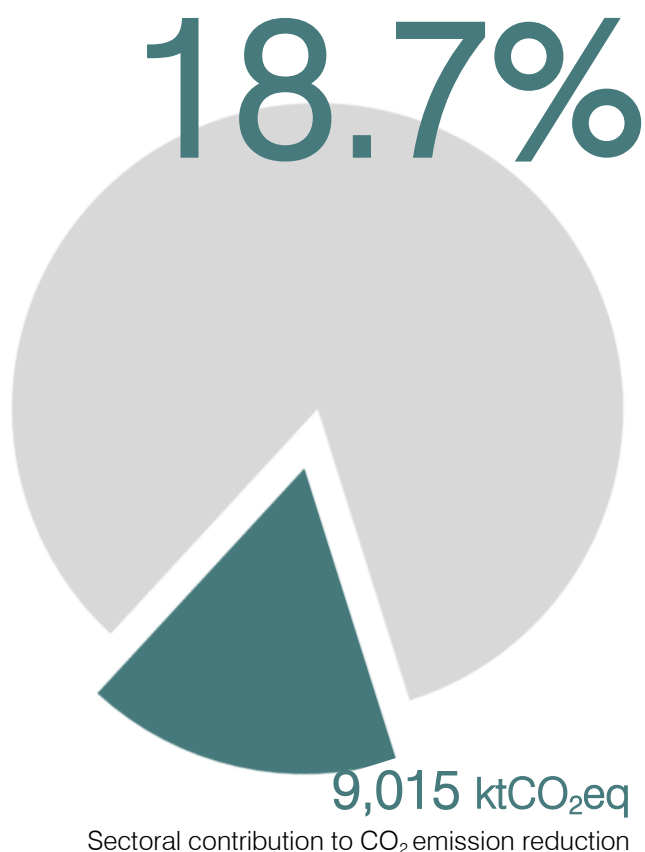
5.1 Sustainable Consumption

Operation of electrical appliances to support modern lifestyle consume massive amount of electricity and considering that electricity is generated by power plant, mainly from natural gas and coal, it can lead to carbon emission.

Measure 5.1.1 Foster Sustainable Consumption Behaviour

Programs:

CE 1 Survey sustainable consumption practice

CE 2 Stimulate sustainable consumption practice

CE 3 Strengthen sustainable consumption practice

CE 4 Sustain sustainable consumption practice
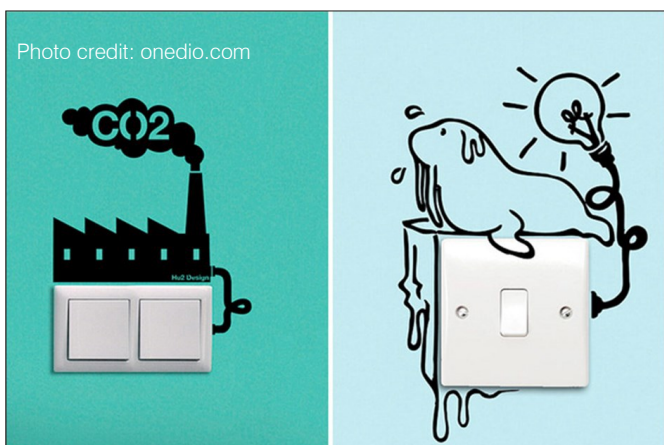
Photo credit: onedio.com

Measure 5.1.2 Promote Use of Technology that Contributes to Low Carbon Society

Programs:

CE 5 Promote the adoption of Energy Star Rating/eco-labelling appliances

CE 6 Promote the adoption of rainwater harvesting system

CE 7 Promote the adoption of photovoltaic panel
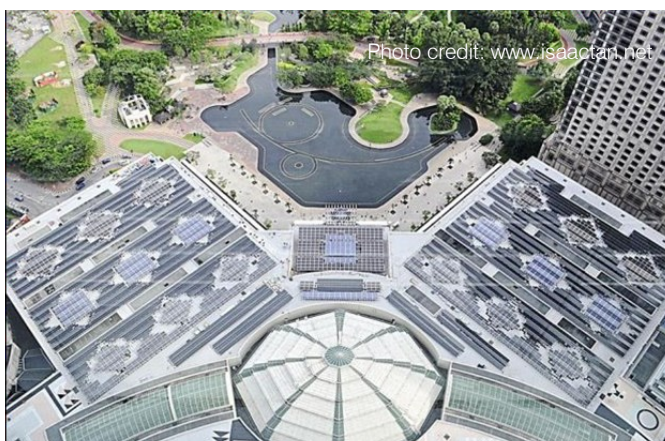
Photo credit: www.isaactan.net

5.2 Low Carbon Society

Awareness about low carbon is a must in converting a society into a low carbon society. Local citizen's awareness can be fostered via a series of public relation and marketing campaign and educational campaign.

Measure 5.2.1 Public Community Awareness

Programs:

CE 8 Communicate LCS progress through mass media

CE 9 Raise environmental awareness through community-based social marketing program
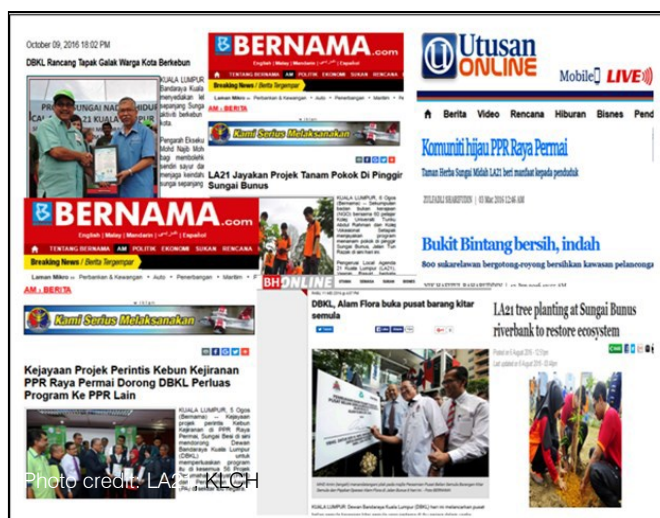
Photo credit: LA21, KLCH

Measure 5.2.2 Community Awareness through Education

Programs:

CE 10 KLCH to collaborate with agencies and schools/pre schools on educating public

CE 11 Virtual science centre for children and youth education

CE 12 Develop new climate projects for children and youth

CE 13 Climate Ambassador program

CE 14 Green School Awards program

CE 15 Introduce Eco-Life Challenge (ELC) in schools

5.3 Public Involvement

Alternatively, viewing the local community as partner by the local authority via fostering public involvement and engagement into low carbon initiative is an important strategy in promoting co-operation and collaboration between the authority and the local community as well as among the member of the community in moving towards a low-carbon society.

Measure 5.3.1 Community Engagement and Involvement

Programs:

CE 16 Introduce Community Energy Saving program

CE17 Promote community garden association and urban farming

CE 18 Setting up database to record low carbon activities

CE 19 Setting up Low Carbon Residential Association

CE 20 Setting up community-based waste recycling centre

CE 21 Introduce Waste to Wealth program

CE 22 KLCH to collaborate with local communities in green space design

Measure 5.3.2 Increase Community Involvement in Community Safety and Security

Programs:

CE 23 Set up community/police patrolling

CE24 Set up Business Improvement District (BID)

Photo credit: KLCH

5.4 Green Lifestyle

Lifestyle is closed related to the formulation of a sustainable low carbon city.

Measure 5.4.1 Green Lifestyle and Smart Working Style

Programs:

CE 25 Promote 'Work-from-Home" and the adoption of flexi working hours initiative

CE 26 Reinforce 24 degree Celsius campaign

CE 27 Promote *Cool Biz* campaign

CE 28 Introduce turn-off Idling engine campaign

CE 29 Promote "Stop Open Burning" campaign

CE 30 Promote Eco-driving campaign

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 5.1.1 Foster Sustainable Consumption Behaviour						
CE 1 Survey sustainable consumption practice	▬	▬		Health & Environment Dept.	KLCH (Information Management Dept.),JPWPKL, HEIs	KLCH (Housing Management & Community Development Dept.), Local research and higher learning institutions, NGOs, Resident's assoc.
CE 2 Stimulate sustainable consumption practice	▬	▬		Health & Environment Dept.	KLCH (Housing Management & Community Development Dept.)	NGOs, Resident's assoc.
CE 3 Strengthen sustainable consumption practice	▬	▬		Health & Environment Dept.	KLCH (Housing Management & Community Development Dept., Corporate Planning Dept., City Planning Dept. (LA21KL), Civil Engineering & Urban Transport Dept. (ITIS)).	NGOs, Resident's assoc.
CE 4 Sustain Sustainable consumption practice	▬	▬		Health & Environment Dept.	KLCH (Housing Management & Community Development Dept., City Planning Dept. (LA21KL), Information Management Dept.)	NGOs, Resident's assoc.
Measure 5.1.2 Promote Use of Technology that Contributes to Low Carbon Society						
CE 5 Promote the adoption of Energy Star Rating/ eco-labelling appliances	▬	▬		Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL), Housing Management & Community Development Dept.), EC, MESTECC	NGOs, Resident's assoc.
CE 6 Promote the adoption of rainwater harvesting system	▬	▬		Infrastructure Planning Dept.	KLCH (Health & Environment Dept., Project Implementation & Building Maintenance Dept. Building Control Dept.), DID, NAHRIM, REHDA	Developers, Building owners, Resident's assoc.
CE 7 Promote the adoption of solar photovoltaic panel (cross reference with energy SE2)	▬	▬		Mechanical & Electrical Engineering Dept.	KLCH (Building Control Dept., Project Implementation & Building Maintenance Dept.), GreenTech Malaysia, SEDA	Building/Property owners, Resident's assoc.

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 5.2.1 Public Community Awareness						
CE 8 Communicate LCS progress through mass media	███			Corporate Planning Dept.	KLCH (Health & Environment Dept., Culture, Arts & Sport Dept., Information Management Dept.)	Mass Media
CE 9 Raise environmental awareness through community-based social marketing program	███			City Planning Dept. (LA21KL)	KLCH (Housing Management & Community Development Dept., Health & Environment Dept., Culture, Arts & Sport Dept.)	Resident's Assoc., NGOs
Measure 5.2.2 Community Awareness through Education						
CE 10 KLCH to collaborate with agencies and schools/pre schools on educating public	███			City Planning Dept. (LA21KL)	KLCH (Health & Environment Dept.), PPD, JPWPKL, JKM	NGOs, Schools
CE 11 Virtual science centre for children and youth education		░░	░	Administrative Dept.	KLCH (Health & Environment Dept., Culture, Arts & Sport Dept.), Young Scientists Network-Academy Of Sciences Malaysia, PPD, JPWPKL, JKM, MOE, Malaysian Nature Society	Schools, HEIs
Measure 5.2.2 Education Community Awareness						
CE 12 Develop new climate projects for children and youth	███			Housing Management & Community Development Dept.	KLCH (City Planning Dept., Housing Management & Community Development Dept., Health & Environment Dept.),PPD,JPWPKL,PIBG, JKM, MOE	Schools, HEIs
CE 13 Climate Ambassador Program		██	█	Housing Management & Community Development Dept.	KLCH (City Planning Dept. (LA21KL), Health & Environment Dept.), PPD,JPWPKL,PIBG	Schools, Resident's Assoc.
CE 14 Green School Awards program		██		Housing Management & Community Development Dept.	KLCH ((City Planning Dept. (LA21KL), Culture, Arts & Sport Dept.), PPD, JPWPKL, Social Welfare Dept., DOE, MOE, WWF, MESTECC	JPWPKL, Schools
CE 15 Introduce Eco-Life Challenge (ELC) in schools	███			Housing Management & Community Development Dept.	KLCH ((City Planning Dept. (LA21KL), Health & Environment Dept.), PPD,JPWPKL, DOE, MOE, MESTECC, WWF	JPWPKL, Schools
Measure 5.3.1 Community Engagement and Involvement						
CE 16 Introduce Community Energy Saving program	███			Housing Management & Community Development Dept.	KLCH (City Planning Dept. (LA21KL)), TNB, GreenTech Malaysia	KLCH (Housing Management & Community Development Dept.), Resident's Assoc.
CE 17 Promote community garden association and urban farming	███			City Planning Dept. (LA21KL)	KLCH (Landscape & Recreation Development Dept., Housing Management & Community Development Dept.), MARDI, UPM	Resident's Assoc., NGOs, Schools

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
CE 18 Setting up database to record low carbon activities		▬ Medium	▬ Medium	City Planning Dept.	KLCH (Health & Environment Dept., Information Management Dept., Landscape & Recreation Development Dept.)	Resident's Assoc., NGOs
CE 19 Setting up Low Carbon Residential Association		▬ Medium		Housing Management & Community Development Dept.	KLCH (City Planning Dept. (LA21KL)), KW	Resident's assoc.
CE 20 Setting up community-based waste recycling centre		▬ Medium	▬ Medium	Health & Environment Dept.	KLCH (Housing Management & Community Development Dept., Mechanical & Electrical Engineering Dept.), Alam Flora Sdn. Bhd., SWCorp	Resident's assoc.
CE 21 Introduce Waste to Wealth program	■ High	■ High	■ High	Health & Environment Dept.	KLCH (City Planning Dept., Project Implementation & Building Maintenance Dept., Housing Management & Community Development Dept.)	Resident's assoc., NGOs
CE 22 KLCH to collaborate with local communities in green space design	▬ Medium			Landscape & Recreation Development Dept.	KLCH (City Planning Dept., Housing Management & Community Development Dept.), JLN	Resident's assoc., Business community, Property owners, NGOs
Measure 5.3.2 Increase Community Involvement in Community Safety and Security						
CE 23 Set up community/police patrolling			▬ Medium	City Planning Dept.	KLCH (Enforcement Dept.), PDRM	Resident's Assoc., Business community
CE 24 Set up Business Improvement District (BID)			▬ Medium	City Planning Dept.	KLCH (Enforcement Dept., Licensing & Petty Traders Dept.), PDRM	Business community
Measure 5.4.1 Green Lifestyle and Smart Working Style						
CE 25 Promote 'Work-from-Home" and the adoption of flexi working hours initiative	■ High	■ High	■ High	Administration Dept.	KLCH (Human Resource Management Dept.)	Private & public sectors
CE 26 Reinforce 24 degree Celsius campaign	■ High	■ High	■ High	Administration Dept.	KLCH (Project Implementation & Building Maintenance Dept.), JPKKB	Private & public sectors
CE 27 Promote *Cool Biz* campaign	■ High	■ High	■ High	Administration Dept.	KLCH (Human Resource Management Dept.), MESTECC	Private & public sectors
CE 28 Introduce turn-off Idling engine campaign	■ High	■ High	■ High	Health & Environment Dept.	KLCH (Civil Engineering & Urban Transportation Dept., Enforcement Dept.), PDRM, MOT	KLCH (Health & Environment Dept.), Car park operators
CE 29 Promote "Stop Open Burning" campaign	■ High	■ High	■ High	Health & Environment Dept.	KLCH (Enforcement Dept.), DOE	Resident's assoc., NGOs
CE 30 Promote Eco-driving campaign	■ High	■ High	■ High	Civil Engineering & Urban Transportation Dept.	KLCH (Mechanical & Electrical Engineering Dept., Civil Engineering & Urban Transportation Dept.), MOT, JPJ	MIROS & MKJR, Driving schools, MAI, NGOs, Car manufacturers

Importance Level

High ■   Medium ▬   Low ▭

ACTION 6

LOW CARBON GREEN BUILDING

Kuala Lumpur as the capital city of Malaysia has become one of the major commercial centres in Asia region, which comprises many headquarters of multinational corporations as well as mega shopping building complexes. With the total area of 242 km^2, about 28% of the city's land use are used for commercial and residential buildings. Buildings contributed to 49% from the total of Kuala Lumpur's GHG emission where 10,329 ktCO$_2$ generates from commercial buildings and 2,152 ktCO$_2$ from residential buildings, respectively. In fact, about 80% of the commercial and residential space supply in Kuala Lumpur city centre is from the existing buildings (Kuala Lumpur Structure Plan 2020). With the rapid growth of GDP in the city, the total GHG emission from the building sector will rise about three times by 2030. Therefore, countermeasures are urgently needed for both the new and existing buildings.

20.1%
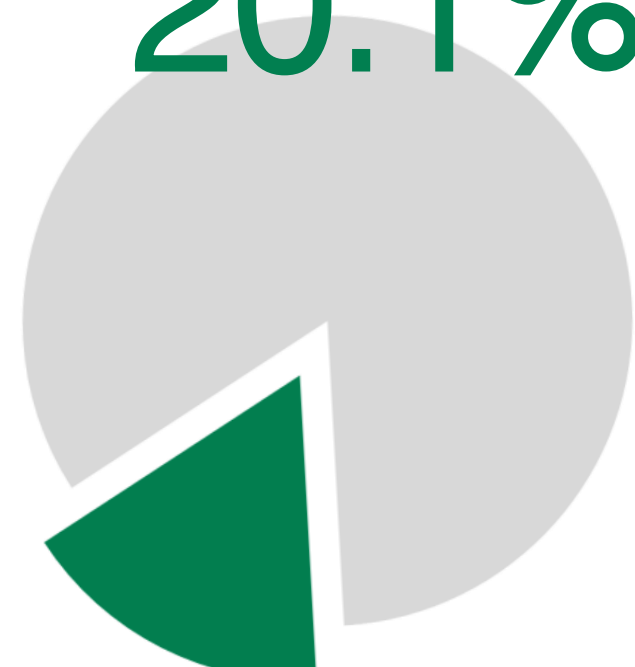
9,673 ktCO$_2$eq
Sectoral contribution to CO$_2$ emission reduction

6.1 Implementation of Sustainable Design Strategies

By responding to the local climatic conditions, which include the sun, wind and rain, buildings can reduce their dependency on mechanical and electrical equipment that require energy to achieve indoor comfort.

Photo credit: UTM LCARC

Measure 6.1.1 Efficient Building Envelope Performance

Programs:

GB 1 Minimum building envelope requirements

GB 2 Reduction of heat gain from direct solar radiation

GB 3 Maximising daylighting zone

GB 4 Promoting the use of natural ventilation

GB 5 Retrofitting the existing building envelope

Measure 6.1.4 Sustainable Low Carbon Building Construction

Programs:

GB 12 Incentives for certified low carbon green building materials and products

GB 13 Reuse of building materials for redevelopment projects

6.2 Usage of Energy Efficient (EE) & Renewable Energy (RE) Building Technologies

Efforts are needed to reduce the usage of non-renewable energy sources towards achieving zero energy or carbon neutral building.

Photo credit: UTM LCARC

Measure 6.1.2 Mitigation of Urban Heat Island (UHI) Phenomenon

Programs:

GB 6 Using appropriate materials on building surfaces

GB 7 Increasing the requirement of building green covering

GB 8 Improving coverings of the existing buildings

Measure 6.2.1 Energy Efficient Air Conditioning System

Programs:

GB 14 High efficiency air conditioner for new non-residential buildings

GB 15 Conversion to high efficiency air conditioner for existing buildings

Measure 6.1.3 Increasing Building Water Efficiency

Programs:

GB 9 Implementation of rainwater harvesting

GB 10 Reduction of potable water consumption

GB 11 Improving water efficiency of existing buildings

Photo credit: UTM LCARC
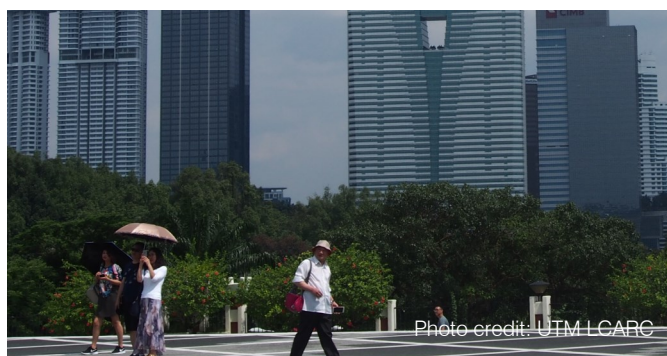
Measure 6.2.2 Energy Efficient Lighting System

Programs:

GB 16 Energy efficient lighting system for new buildings

GB 17 Conversion to energy efficient lighting for existing buildings

Measure 6.2.3 Renewable Energy System

Programs:

GB 18 Installation of renewable energy system in commercial buildings

GB 19 Implementation of net metering for PV System

Photo credit: http://www.kenan-flagler.unc.edu

Measure 6.2.4 Other Energy Efficient Equipment and Systems

Program:

GB 20 Incentives for energy efficient products and electrical appliances usage

6.3 Monitoring and Management of Green Buildings

Maintenance and monitoring of the performances of green buildings require additional measures and are essential to assure the sustainability of these buildings with low carbon emission.

Measure 6.3.1 Low Carbon Green Building Monitor

Programs:

GB 21 Low Carbon Green Building Calculator

GB 22 Low Carbon Building Award (LCBA)

Measure 6.3.2 Low Carbon Green Building Plan

Programs:

GB 23 Submission of low carbon building plan

GB 24 Submission of sustainable building waste management plan

GB 25 Submission of Green Building User Manual

Measure 6.3.3 Sustainable Management and Building Audit

Programs:

GB 26 Energy Management System (EMS) requirement

GB 27 Smart and centralised building data collection

GB 28 Modernising facility management for existing buildings

GB 29 Building energy audit and certificate

Photo credit: Metro Services

Measure 6.3.4 Global Warming Control

Program:

GB 30 Banning of Global Warming Potential (GWP) substance

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 6.1.1 Efficient Building Envelope Performance						
GB 1 Minimum building envelope requirements	▬	▬	▬	Building Control Dept.	KLCH (City Planning Dept., Project Implementation & Building Maintenance Dept.), MESTECC, SEDA, JKR, CIDB	Professional Architects, Developers, Building owners
GB 2 Reduction of heat gain from direct solar radiation	▬	▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Building Control Dept.), SEDA, JKR	Building owners, Professional Architects, Developers
GB 3 Maximising daylighting zone	▬	▬	▬	Building Control Dept.	KLCH (Project Implementation & Building Maintenance Dept., City Planning Dept.), SEDA, PAM	Building owners, Professional Architects, Developers
GB 4 Promoting the use of natural ventilation	▬	▬	▬	Building Control Dept.	KLCH (Project Implementation & Building Maintenance Dept.), SEDA, PAM	Building owners, Professional Architects, Developers
GB 5 Retrofitting the existing building envelope	▬	▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept., Building Control Dept., Property Management & Valuation Dept., Legal & Prosecution Dept.), SEDA, PAM	Building owners, Developers, Chamber of Commerce
Measure 6.1.2 Mitigation of Urban Heat Island (UHI) Phenomenon						
GB 6 Using appropriate materials on building surfaces		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Civil Engineering & Urban Transportation Dept., Building Control Dept., Quantity Surveying Dept., Landscape & Recreation Development Dept.), SEDA	Building owners, Professionals Architects, Developers
GB 7 Increasing the requirement of building green covering	▬	▬	▬	City Planning Dept.	KLCH (Project Implementation & Building Maintenance Dept., Building Control Dept., Landscape & Recreation Development Dept.)	Building owners, Professionals Architects, Developers
GB 8 Improving coverings of the existing buildings		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Landscape & Recreational Development Dept., Building Control Dept., Property Management & Valuation Dept.), SEDA	Building owners, Professionals Architects, Developers
Measure 6.1.3 Increasing Building Water Efficiency						
GB 9 Implementation of rainwater harvesting		▬	▬	Infrastructure Planning Dept.	KLCH (Project Implementation & Building Maintenance Dept., City Planning Dept., Building Control Dept.), NAHRIM	Building owners, Professionals Architects, Developers
GB 10 Reduction of potable water consumption		▬	▬	Infrastructure Planning Dept.	KLCH (Building Control Dept.) SPAN, SYABAS	Building owners

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 6.1.3 Increasing Building Water Efficiency						
GB 11 Improving water efficiency of existing buildings		▬	▬	Infrastructure Planning Dept.	KLCH (Building Control Dept., Project Implementation & Building Maintenance Dept.), SPAN, SYABAS	Building owners, Professionals Architects, Developers
Measure 6.1.4 Sustainable Low Carbon Building Construction						
GB 12 Incentives for certified low carbon green building materials and products		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Building Control Dept.) MIDA, CIDB, SIRIM Berhad, SEDA, MESTECC, GreenTech Malaysia	Building owners, Professionals Architects, Developers
GB 13 Reuse of building materials for redevelopment projects			▬	Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept., Building Control Dept., Property Management & Valuation Dept.) CIDB	Building owners, Professionals Architects, Developers
Measure 6.2.1 Energy Efficient Air Conditioning System						
GB 14 High efficiency air conditioner for new non-residential buildings		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept., Building Control Dept.,) MESTECC, MIDA	Professionals bodies, Building owners
GB 15 Conversion to high efficiency air conditioner for existing buildings	▬	▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept., Building Control Dept., Housing Management & Community Development Dept.) MESTECC, MIDA, SEDA, EC	Professionals bodies, Building owners
Measure 6.2.2 Energy Efficient Lighting System						
GB 16 Energy efficient lighting system for new buildings		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Mechanical & Electrical Engineering Dept., City Planning Dept.) MIDA, MESTECC, CIDB, SIRIM Berhad	Professionals bodies, Building owners
GB 17 Conversion to energy efficient lighting for existing buildings	▬	▬		Project Implementation & Building Maintenance Dept.	KLCH (Housing Management & Community Development Dept, Building Control Dept,), EC	Professionals bodies, Building owners
Measure 6.2.3 Renewable Energy System						
GB 18 Installation of renewable energy system in commercial buildings		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept.) SEDA, MESTECC, TNB	Professionals bodies, Building owners
GB 19 Implementation of net metering for PV System		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept, Licensing & Petty Traders Development Dept.), SEDA, MESTECC, TNB	Professionals bodies, Building owners
Measure 6.2.4 Other Energy Efficient Equipment and Systems						
GB 20 Incentives for energy efficient products and electrical appliances usage		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Mechanical & Electrical Engineering Dept.), Administration Department *(Bahagian Perolehan)*), MESTECC *(Bdn penarafan hijau)*, EC	Professionals bodies, Building owners
Measure 6.3.1 Low Carbon Green Building Monitor						
GB 21 Low Carbon Green Building Calculator		▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Property Management & Valuation Dept.)SEDA, JKR, INSPEN	Professionals bodies, Building owners
GB 22 Low Carbon Building Award (LCBA)	▬	▬		Project Implementation & Building Maintenance Dept.	KLCH (Property Management & Valuation Dept.), MESTECC, Rating tool operators	Professionals bodies, Building owners

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 6.3.2 Low Carbon Green Building Plan						
GB 23 Submission of low carbon building plan		▬▬▬	▬	Project Implementation & Building Maintenance Dept.	KLCH (Building Control Dept., Health & Environment Dept, Infrastructure Planning Dept.), Relevant sector regulator / Sector facilitator	Professionals bodies, Building owners
GB 24 Submission of sustainable building waste management plan	▬▬▬▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (Building Control Dept., Health & Environment Dept.), KPKT (Jabatan Pengurusan Sisa Pepejal Negara) Relevant sector regulator / Sector facilitator	Professionals bodies, Building owners
GB 25 Submission of Green Building User Manual	▬▬▬▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (Building Control Dept., City Planning Dept, Mechanical & Electrical Engineering Dept, Infrastructure Planning Dept, Civil Engineering & Urban Transportation Dept.), MESTECC, Professional bodies, REHDA, MIP	Professionals bodies, Building owners
Measure 6.3.3 Sustainable Management and Building Audit						
GB 26 Energy Management System (EMS) requirement	▬▬▬▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (Information Management Dept. & City Planning Dept.), SEDA, MESTECC, JKR	Professionals bodies, Building owners
GB 27 Smart and centralised building data collection	▬▬▬▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (Information Management Dept.), SEDA, TNB	Professionals bodies, Building owners
GB 28 Modernising facility management for existing buildings	▬▬▬▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (Information Management Dept.), SEDA	Professionals bodies, Building owners
GB 29 Building energy audit and certificate	▬▬▬▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (Information Management Dept.), SEDA	Professionals bodies, Building owners
Measure 6.3.4 Global Warming Control						
GB 30 Banning of Global Warming Potential (GWP) substance	▬▬▬▬			Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept., Health & Environment Dept., Administration Dept.), MESTECC	Professionals, building owners

Importance Level

High ▬▬▬▬   Medium ▬▬▬▬   Low ▬▬▬▬

GREEN AND BLUE NETWORK

Enhancing green and blue elements in Kuala Lumpur city provides higher carbon sink and better liveable environment to the city inhabitants. Rapid development resulted in the decrease of green and blue elements in Kuala Lumpur. Based on the projection, carbon sink capacity of green infrastructure in Kuala Lumpur may rise from 1,067.65 (year 2010) to 1,746.36 $ktCO_2$ in 2030. KL LCSBP 2030 aims to increase the green cover of Kuala Lumpur from 10% (2010) to 30% (2030). In achieving this aim, the city's green space indicator (GSI) is expected to be increased from 0.36 to 2.0 hectare per 1000 population; which is corresponding to the current GSI of Melbourne, New York, and Toronto.

0.7%

316 $ktCO_2eq$

Sectoral contribution to CO_2 emission reduction

7.1 Green Cover Protection

Preserving and conserving these green elements is very important to maintain their high carbon storage capability and to mitigate the urban heat island effect.

Measure 7.1.1 Enhance Forest Conservation

Programs:

BG 1 Protect existing reserved forests

BG 2 Law enforcement and governance

Measure 7.1.2 Improve Urban Parks Health

Programs:

BG 3 Develop an integrated pest management plan

BG 4 Inspect and retain topsoil quality of urban parks

7.2 Promote Tree Planting

In order to utilise the tree planting program in an effective manner, measures as below are formulated to meet the 2.5 million trees target by 2030.

Measure 7.2.1 Achieve Appropriate Canopy Cover

Programs:

BG 5 Establish canopy cover target by locations

BG 6 Identify new planting spaces

BG 7 Introduce 'no net tree canopy cover loss' policy

Photo credit: UTM-LCARC

Measure 7.2.2 Develop Tree Establishment Program

Programs:

BG 8 Establish tree inventory

BG 9 Prepare a 15-year tree planting plan

BG 10 Organise 'One Resident, One Tree' program

Measure 7.2.3 Establish Diversity in Tree Population

Programs:

BG 11 Develop standards for species at specific location

BG 12 Develop a native tree seedlings project
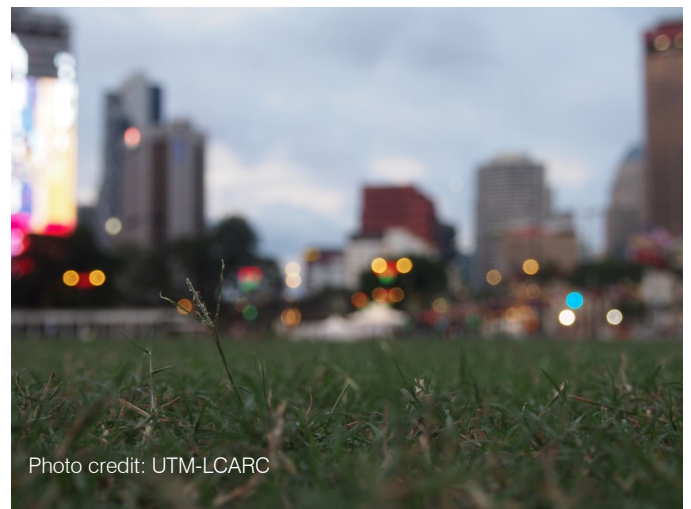
Photo credit: UTM-LCARC

Measure 7.2.4 Preserve and Enhance Local Natural Biodiversity

Programs:

BG 13 Manage green cover to enhance biodiversity

BG 14 Reintroduce, where appropriate, 'lost' or rare native species in natural areas

BG 15 Develop Kuala Lumpur green cover preservation master plan

BG 16 Improving existing policies by laws

BG 17 Revise the existing 'open space' policy

7.3 Improve Green Cover Maintenance

Tree maintenance improve the survival period of trees and other plants by pruning, watering, fertilization planning and keeping the surrounding environment clean.

Measure 7.3.1 Ensure Departments of KLCH Operate with Common Goals

Programs:

BG 18 Organise inter-departmental workshops on tree maintenance program

BG 19 Using tree for place making

Measure 7.3.2 Monitor Existing Canopy Cover

Programs:

BG 20 Carry out tree surveys for existing green areas

BG 21 Encourage reporting of illegal tree felling

Photo credit: UTM-LCARC

Measure 7.3.3 Undertake Research to Improve Green Cover Performance and Encourage Adaptive Management

Programs:

BG 22 Form research partnerships with local institutions to study different aspects of green cover

7.4 Facilitate Local Community Engagement

The engagement of local community by facilitating events and workshops and by consultation and cooperation with stakeholders such as private landholders, developers, nurseries, and citizens at the neighbourhood can increase the awareness and acknowledge the importance of canopy cover.

Measure 7.4.1 Increase Public Awareness

Programs:

BG 23 Facilitate events and educational workshops

7.5 Promote More Water Bodies

Open water bodies are a great source of moisture for a relatively dry urban environment.

Measure 7.5.1 Preserve and Create Attractive Waterfronts

Programs:

BG 24 Monitor and improve water quality

BG 25 Increase new water elements

BG 26 Create linear urban parks along river and waterway reserves

Photo credit: UTM-LCARC

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 7.1.1 Enhance Forest Conservation						
BG 1 Protect existing reserved forest	▬	▬	▬	Landscape & Recreation Development Dept.	KLCH (Property Management & Valuation Dept.), Federal Territory of Kuala Lumpur (Forestry Dept.), PTG WPKL	Federal Territory of Kuala Lumpur (Forestry Dept.)
BG 2 Law enforcement and governance	▬	▬	▬	Landscape & Recreation Development Dept.	KLCH (Property Management & Valuation Dept.), Federal Territory of Kuala Lumpur (Forestry Dept.)	Federal Territory of Kuala Lumpur (Forestry Dept.)
Measure 7.1.2 Improve Urban Parks Health						
BG 3 Develop an integrated pest management plan	▬ (grey)			Landscape & Recreation Development Dept.	KLCH (Health & Environmental Dept.), Federal Territory of Kuala Lumpur (Forestry Dept.), FRIM	KLCH (Landscape & Recreation Development Dept.), Federal Territory of Kuala Lumpur (Forestry Dept.)
BG 4 Inspect and retain topsoil quality of urban parks	▬ (grey)	▬ (grey)	▬ (grey)	Landscape & Recreation Development Dept.	KLCH (Health & Environmental Dept.), Federal Territory of Kuala Lumpur (Forestry Dept.), FRIM	KLCH (Landscape & Recreation Development Dept.), Federal Territory of Kuala Lumpur (Forestry Dept.)
Measure 7.2.1 Achieve Appropriate Canopy Cover						
BG 5 Establish canopy cover target by locations	▬	▬	▬	Landscape & Recreation Development Dept.	KLCH (City Planning Dept.), HEIs	KLCH (Landscape & Recreation Development Dept.)
BG 6 Identify new planting spaces	▬	▬	▬	Landscape & Recreation Development Dept.	KLCH (Landscape & Recreation Development Dept.), HEIs	KLCH (City Planning Dept.), Building owners, Local communities
BG 7 Introduce 'no net tree canopy cover loss' policy	▬	▬	▬	Landscape & Recreation Development Dept.	KLCH (City Planning Dept., Enforcement Dept., Legal & Prosecution Dept.), HEIs, FRIM	KLCH (Landscape & Recreation Development Dept.),
Measure 7.2.2 Develop Tree Establishment Program						
BG 8 Establish tree inventory	▬	▬	▬	Landscape & Recreation Development Dept.	FRIM, JLN, HEIs	KLCH (Landscape & Recreation Development Dept.), NGOs, Local communities
BG 9 Prepare a 15-year tree planting plan	▬	▬	▬	Landscape & Recreation Development Dept.	FRIM, JLN, HEIs	KLCH (Landscape & Recreation Development Dept.), NGOs, Local communities
BG 10 Organise 'One Resident, One Tree' program	▬	▬	▬	Landscape & Recreation Development Dept.	KLCH (City Planning Dept. (LA21KL), Corporate Planning Dept.), FRIM, JLN, HEIs	KLCH (Landscape & Recreation Development Dept.), NGOs, Local communities
Measure 7.2.3 Establish Diversity in Tree Population						
BG 11 Develop standards for species at specific location	▬			Landscape & Recreation Development Dept.	FRIM, JLN., HEIs	KLCH (Landscape & Recreation Development Dept.)
BG 12 Develop a native tree seedlings project	▬	▬	▬	Landscape & Recreation Development Dept.	JPWPKL, FRIM, HEIs, JLN.	KLCH (Landscape & Recreation Development Dept.), NGOs, Local

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 7.2.4 Preserve and Enhance Local Natural Biodiversity						
BG 13 Manage green cover to enhance biodiversity	━━━	━━━	━━━	Landscape & Recreation Development Dept.	FRIM, Federal Territory of Kuala Lumpur (Forestry Dept.), JPWPKL, HEIs, JLN	KLCH (Landscape & Recreation Development Dept.)
BG 14 Reintroduce, where appropriate, 'lost' or rare native species in natural areas	━━━	━━━	━━━	Landscape & Recreation Development Dept.	KLCH (City Planning Dept. (Landscape Valuation unit)), FRIM, Federal Territory of Kuala Lumpur (Forestry Dept.), JPWPKL, HEIs, JLN	KLCH (Landscape & Recreation Development Dept.), NGOs
BG 15 Develop Kuala Lumpur green cover preservation master plan	━━━			Landscape & Recreation Development Dept.	FRIM, Federal Territory of Kuala Lumpur (Forestry Dept.), JPWPKL, HEIs, JLN	KLCH (Landscape & Recreation Development Dept.)
BG 16 Improving existing policies by laws	━━━	━━━	━━━	Landscape & Recreation Development Dept.	KLCH (City Planning Dept. (Landscape Valuation unit))	KLCH (Enforcement Dept.)
BG 17 Revise the existing 'open space' policy	━━━			City Planning Dept.	KLCH (Landscape & Recreation Development Dept.), JLN	KLCH (City Planning Dept.)
Measure 7.3.1 Ensure Departments of KLCH Operate with Common Goals						
BG 18 Organise inter-departmental workshops on tree maintenance program	━━━			Landscape & Recreation Development Dept.	KLCH (City Planning Dept.), JLN, Arborists, HEIs, FRIM	KLCH (Landscape & Recreation Development Dept.)
BG 19 Using tree for place making	━━━	━━━	━━━	Landscape & Recreation Development Dept.	KLCH (City Planning Dept., Development Dept.), Arborist, HEIs, FRIM	KLCH (City Planning Dept., Landscape & Recreation Development Dept.)
Measure 7.3.2 Monitor Existing Canopy Cover						
BG 20 Carry out tree surveys for existing green areas	━━━			Landscape & Recreation Development Dept.	NGOs, Local Communities, HEIs	KLCH (Landscape & Recreation Development Dept.)
BG 21 Encourage reporting of illegal tree felling	━━━	━━━	━━━	Landscape & Recreation Development Dept.	KLCH (Enforcement Dept., Legal & Prosecution Dept., Information Management Dept., Corporate Planning Dept.), NGOs, Local Communities, HEIs	KLCH (Landscape & Recreation Development Dept.)
Measure 7.3.3 Undertake Research to Improve Green Cover Performance and Encourage Adaptive Management						
BG 22 Form research partnerships with local institutions to study different aspects of green cover	━━━	━━━	━━━	Landscape & Recreation Development Dept.	KLCH (Human Resources Management Dept.), FRIM, HEIs, Arborists	KLCH (Landscape & Recreation Development Dept.)
Measure 7.4.1 Increase Public Awareness						
BG 23 Facilitate events and educational workshops	━━━	━━━	━━━	Landscape & Recreation Development Dept.	KLCH (Human Resources Management Dept. (IDB), City Planning Dept. (LA21KL)), JLN, JPWPKL, FRIM, HEIs	KLCH (Landscape & Recreation Development Dept., City Planning Dept. (LA21KL)), Schools, Kindergarten, Local communities

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 7.5.1 Preserve and Create Attractive Waterfronts						
BG 24 Monitor and improve water quality	████	████	████	Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept., , Health & Environment Dept.), DID	KLCH (Civil Engineering & Urban Transportation Dept.), DOE
BG 25 Increase new water elements		░░░░		Landscape & Recreation Development Dept.	KLCH (Infrastructure Planning Dept., Civil Engineering and Urban Transportation Dept.)	KLCH (Landscape & Recreation Development Dept.)
BG 26 Create linear urban parks along river and waterway reserves		████		Project Implementation & Building Maintenance Dept.	KLCH (City Planning Dept.)	KLCH (Landscape & Recreation Development Dept.)

Importance Level

High ████   Medium ▓▓▓▓   Low ░░░░

SUSTAINABLE WASTE MANAGEMENT

Rapid urbanisation is expected to change urban consumption patterns of Kuala Lumpur's residents. It is estimated that a total of 1,582 $ktCO_2$ GHG emission generated by waste coming from both landfill and waste transportation within Kuala Lumpur year 2030. Inadequate and inefficient waste collection, recycling or treatment, and uncontrolled disposal of waste in dump areas could cause severe effects such as health risks to human beings and pollution to the environment. With these severe environmental issues arising from managing solid waste, protective and preventive measures should be in place to minimise the adverse effects of these issues to Kuala Lumpur.

1.1%

527 $ktCO_2eq$

Sectoral contribution to CO_2 emission reduction

8.1 Sustainable Municipal Solid Waste (MSW) Management

Sustainable municipal solid waste (SMSW) management facilitates holistic approach in handling waste to reduce the environmental impact from the increased generation of waste and its disposal.

Measure 8.1.1 Nurturing Zero-Waste Culture

Programs:

WM 1 Encourage culture of sharing, borrowing, repairing and renting

WM 2 Promote the use of greener packaging, reusable bag

WM 3 KLCH to promote global "Love Food Hate Waste" initiative

WM 4 Encourage waste separation at source premises

WM 5 "Pay as You Throw" (PAYT) program

WM 6 Recycling of used cooking oil from residential premises

Measure 8.1.2 Promoting Education and Awareness on Waste Reduction

Programs:

WM 7 Involvement and promotion of green school initiative

WM 8 Organising reduction and awareness campaigns on enforcement of Act 672

Measure 8.1.3 Electronic Waste (E-waste) Reduction

Programs:

WM 9 Implementation of E-waste recycling program

Measure 8.1.4 Commercial Waste Reduction

Programs:

WM 10 Development and implementation of recycling commercial waste policies

WM 11 Food waste collection and treatment from commercial premises

Photo credit: feldavoice.com

8.2 Fostering Circular Economy (CE)

CE is known as an alternative to a traditional linear economy (make, use, dispose) in which resources are kept in use for as long as possible, extract the maximum value while in use, then recover and regenerate products and materials at the end of each service life.

Measure 8.2.1 Promoting Sustainable Consumption and Production (SCP)

Programs:

WM 12 Encouraging purchases of products made of recycled materials

WM 13 Development and implementation of Eco-Town

WM 14 Adoption of paperless meeting

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 8.1.1 Nurturing Zero-Waste Culture						
WM 1 Encourage culture of sharing, borrowing, repairing and renting		━━━━		Housing Management & Community Development Dept.	KLCH (Housing Management & Community Development Dept., City Planning Dept. (LA21KL), Corporate Planning Dept.), SWCorp, JPSPN	Resident's assoc., NGOs
WM 2 Promote the use of greener packaging, reusable bag	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (Licensing & Petty Traders Dept.), JPSPN, SWCorp, KW, SIRIM Berhad	Biodegradable companies/ manufacturers, Commercial premises, Resident's assoc.
WM 3 KLCH to promote global "Love Food Hate Waste" initiative	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL)), JPSPN, SWCorp., KW, KPDNHEP	Resident's assoc., Residential premises, Commercial premises, Food truck assoc., Schools, NGOs
WM 4 Encourage waste separation at source at premises	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (Licensing & Petty Traders Dept., Housing Management & Community Development Dept.), JPSPN, SWCorp, KW	Resident's assoc., Commercial premises, Property owners, Schools, NGOs, MAH, Alam Flora Sdn. Bhd.
WM 5 "Pay as You Throw" (PAYT) program	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (Licensing & Petty Traders Dept.), JPSPN, SWCorp., Alam Flora Sdn. Bhd., JPWPKL	Resident's assoc., Commercial premises owners
WM 6 Recycling of used cooking oil from residential premises	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL)), JPSPN, SWCorp., DOE	Resident's assoc., Residential premises, Commercial premises, Licensed oil waste carrier companies
Measure 8.1.2 Promoting Education and Awareness on Waste Reduction						
WM 7 Involvement and promotion of green school initiative	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL)), MOE, JPSPN, SWCorp, DOE, JPWPKL, Alam Flora Sdn. Bhd.	Schools, HEIs, NGOs
WM 8 Organising reduction and awareness campaigns on enforcement of Act 672	━━━━	━━━━	━━━━	Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL), Housing Management & Community Development Dept.), JPSPN, KPKT, MOE, Alam Flora Sdn. Bhd., SWCorp	Schools, HEIs, NGOs, JPWPKL
Measure 8.1.3 Electronic Waste (E-waste) Reduction						
WM 9 Implementation of E-waste recycling program	━━━━	━━━━		Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL)), SWCorp, DOE	Resident's assoc., E-Waste collector companies, Commercial premises owners, Malaysian Shopping Malls assoc., MAH

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 8.1.4 Commercial Waste Reduction						
WM 10 Development and implementation of recycling commercial waste policies	■	■	■	Health & Environment Dept.	SWCorp, DOE, Resident's assoc., NGOs	Commercial premises owners, Malaysian Shopping Malls Assoc., MAH
WM 11 Food waste collection and treatment from commercial premises	■	■	■	Health & Environment Dept.	KLCH (City Planning Dept. (LA21KL), Licensing & Petty Traders Development Dept.), SWCorp, Alam Flora Sdn. Bhd.	Licensed contractors, Commercial premises owners, Malaysian Shopping Malls Assoc., MAH
Measure 8.2.1 Promoting Sustainable Consumption and Production (SCP)						
WM 12 Encouraging purchases of products made of recycled materials		▬	▬	Health & Environment Dept.	JPSPN, MESTECC, GreenTech Malaysia, SWCorp	Resident's assoc., Commercial premises, Property owners, MOE, NGOs, MAH
WM 13 Development and implementation of Eco-Town	▬	▬	▬	Health & Environment Dept.	KLCH (City Planning Dept., Economic Planning Development Dept.), SWCorp, KPKT, KW	Developers, NGOs
WM 14 Adoption of paperless meeting	■	■	■	Administration Dept.	KLCH (Human Resource Management Dept., Information Management Dept.), SWCorp DOE, Alam Flora Sdn. Bhd., GreenTech Malaysia, HEIs, MOE	Private and government institutions, JPWPKL

Importance Level

High ■   Medium ▬   Low ▭

SUSTAINABLE WATER AND WASTEWATER MANAGEMENT
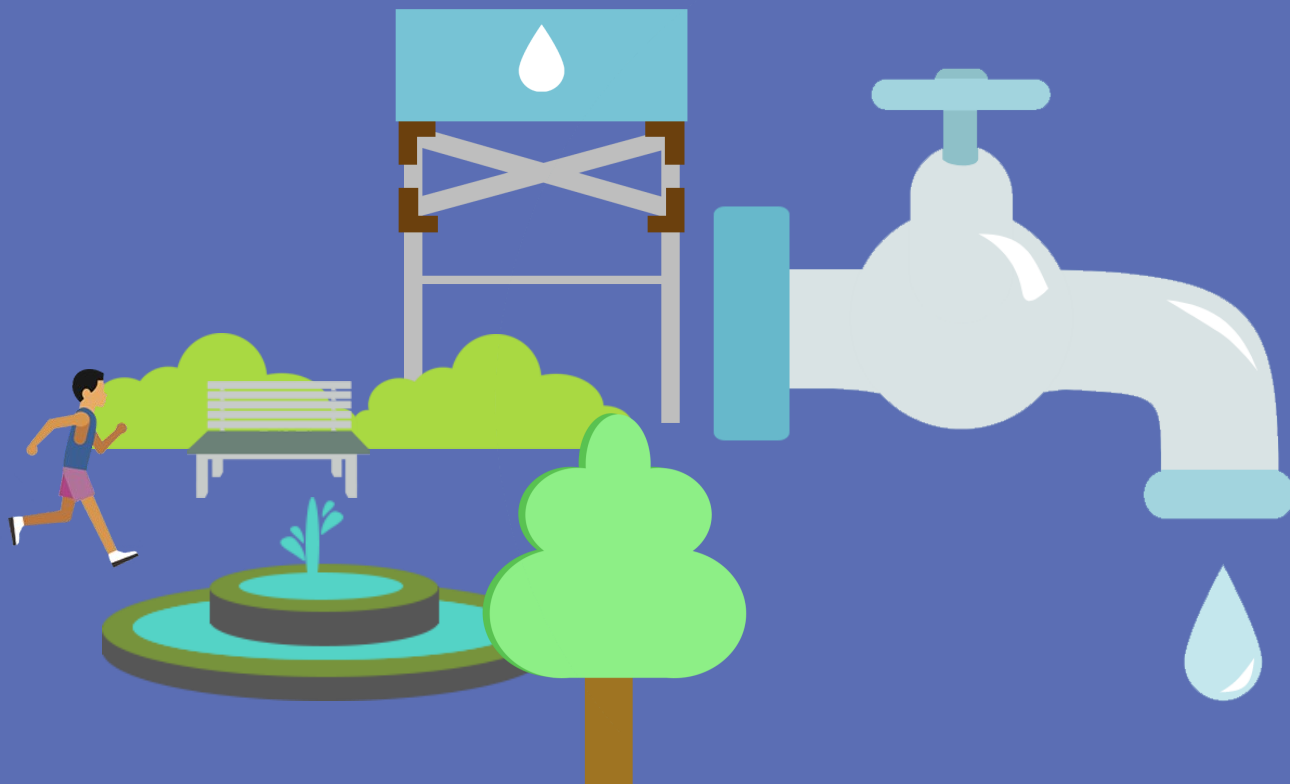
Kuala Lumpur is facing similar challenges when it comes to water resources and wastewater management. The city is vulnerable to prolonged periods of dryness, when reservoir levels drop to dangerously low levels. This precarious situation happens even though Kuala Lumpur usually receives at least 2,600 mm of rain annually. On the flip side, the urban drainage system in the City centre is overstrained during heavy downpours, leading to flash floods. As Kuala Lumpur is heavily reliant on surface water, it is also vulnerable to river pollution, where the bulk of raw water comes from. It is expected that the pollution nearby Sungai Langat, Sungai Semenyih and Sungai Selangor are recurring examples grey water recycling will be important option for sustainable water and wastewater management.

Sectoral contribution to CO_2 emission reduction

105 ktCO$_2$eq

0.2%
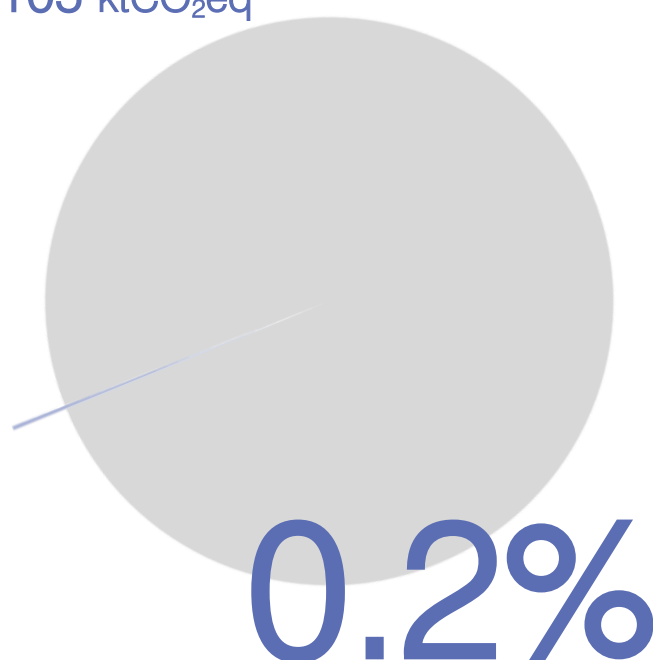
9.1 Water Supply Management

There are three measures introduced that are suitable for KLCH which includes: minimising the use of drinking quality water for nonpotable functions, reduction of non revenue water (NRW) loss and smart water management.

Measure 9.1.1 Minimising the Use of Drinking Quality Water for Non-Potable Functions

Program:

WW 1 KLCH to work with relevant agencies to develop viable non potable water system distribution in Kuala Lumpur for new residential and commercial development

Measure 9.1.2 Reduction of Non Revenue Water (NRW) Loss

Programs:

WW 2 Collaborate with respective agencies for incorporating smart water technologies that allow water providers to minimise Non- Revenue Water (NRW)

WW 3 Encourage and promote community awareness practice towards reduction of NRW

Measure 9.1.3 Smart Water Management System

Program:

WW 4 Kuala Lumpur smart water management

9.2 Sustainable Wastewater Management

Management of wastewater in the urban context must be adapted according, not only to the size, but also to the economic development and governance capacity of the urban area.

Measure 9.2.1 Limit Wastewater Production

Programs:

WW 5 Work with relevant agencies to promote reduction at source

Measure 9.2.2 Maximizing the Value of Wastewater

Programs:

WW 6 Collaborate with relevant agencies to promote usage of recycled wastewater in Kuala Lumpur

WW 7 Collaborate with relevant agencies and academics institution to utilise bioenergy harvesting method for energy recovery

WW 8 Collaborate with respective agencies on composting sewage sludge from wastewater

WW 9 Promote use of phosphorous recovery from wastewater as new sustainable fertiliser alternative

WW 10 Collaborate with respective agencies to use and promote sludge as soil amendment

WW 11 Promote application of sewage sludge in urban landscaping and forest rehabilitation and regeneration

9.3 Stormwater Management

In moving towards sustainability, KLCH should take up the approach of control-at-source in managing stormwater in Kuala Lumpur. With this approach , quality and quantity of the runoff from developing an area can be maintained to be the same as predevelopment condition.

Measure 9.3.1 Incorporation of Low Impact Development (LID) in Stormwater Management

Programs:

WW 12 Adoption of Low Impact Development (LID) in Kuala Lumpur

WW 13 Promote installation of run off storage

Measure 9.3.2 Elimination or Minimisation of Non-Point Source Pollutants

Programs:

WW 14 Establish partnership with agencies in educating and training public and industries

WW 15 Support implementation of Best Management Practices at construction site

WW 16 Promote incorporation of NPS pollution prevention strategies and policies into regional and official community plans

WW 17 Promote effluent management

SUSTAINABLE WATER AND WASTEWATER MANAGEMENT

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 9.1.1 Minimizing the Use of Drinking Quality Water for Non-Potable Functions						
WW 1 KLCH to work with relevant agencies to develop viable non potable water system distribution in Kuala Lumpur for new residential and commercial development	▬	▬	▬	Economic Planning & Development Dept.	KLCH (Infrastructure Planning Dept., Health and Environment Dept., Community Development & Urban Wellbeing Dept.), KATS, SPAN, SYABAS, JPS	SPAN, Developers, SYABAS
Measure 9.1.2 Reduction of Non-Revenue Water (NRW) Loss						
WW 2 Collaborate with respective agencies for incorporating smart water technologies that allow water providers to minimise Non- Revenue Water (NRW)	▬	▬		Infrastructure Planning Dept.	KLCH (Community Development & Urban Wellbeing Dept., City Planning Dept., Infrastructure Planning Dept.), KATS, SPAN, SYABAS, JPS	Resident's assoc., SPAN, SYABAS
WW 3 Encourage and promote community awareness practice towards reduction of NRW		▬		Corporate Planning Dept.	KLCH (Civil Engineering & Urban Transportation Dept.), SPAN, SYABAS, HEIs, JPWPKL, KKMM (Information Dept.)	KLCH (Community Development & Urban Wellbeing Dept.), Resident's assoc., SPAN
Measure 9.1.3 Smart Water Management System						
WW 4 Kuala Lumpur smart water management		▬		Economic Planning & Development Dept.	KLCH (Infrastructure Planning Dept., Community Development & Urban Wellbeing Dept.), MESTECC, KATS, SPAN	KLCH (Community Development & Urban Wellbeing Dept.), Developers, Resident's assoc.
Measure 9.2.1 Limit Wastewater Production						
WW 5 Work with relevant agencies to promote reduction at source	▬	▬		Project Implementation & Building Maintenance Dept.	KLCH (Infrastructure Planning Dept., Community Development & Urban Wellbeing Dept.), KATS, SPAN, DOE	DOE, IWK, Developers Resident's assoc.,
Measure 9.2.2 Maximizing the Value of Wastewater						
WW 6 Collaborate with relevant agencies to promote usage of recycled wastewater in Kuala Lumpur	▬	▬		Health & Environment Dept.	KLCH (Infrastructure Planning Dept., Health & Environment Dept.), SPAN, KATS, NGOs, IWK, KW, JPKKB	DOE, IWK, Resident's assoc.
WW 7 Collaborate with relevant agencies and academics institution to utilise bioenergy harvesting method for energy recovery		▬		Health & Environment Dept.	KLCH (Infrastructure Planning Dept., Health & Environment Dept.), JPSPN, SPAN, Energy Commission (EC), HEIs, SEDA	DOE, IWK, Registered industrial and commercial companies

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 9.2.2 Maximizing the Value of Wastewater						
WW 8 Collaborate with respective agencies on composting sewage sludge from wastewater		▬ (Medium)		Health & Environment Dept.	KLCH (Health & Environment Dept.), IWK, KATS, JPSPN, SPAN	KLCH (Civil Engineering & Urban Transportation Dept., Infrastructure Planning Dept.)
WW 9 Promote use of phosphorus recovery from wastewater as new sustainable fertiliser system alternative			▬ (Low)	Landscape & Recreational Development Dept.	KLCH (Health & Environment Dept., Infrastructure Planning Dept.), DOE, IWK, KATS	IWK, Registered industrial and commercial companies in KL
WW 10 Collaborate with respective agencies to use and promote sludge as soil amendment		▬▬▬ (Medium)		Landscape & Recreational Development Dept.	KLCH (Civil Engineering & Urban Transportation Dept., Health & Environment Dept.), SPAN, CREAM	KLCH (Health & Environment Dept.), IWK
WW 11 Promote application of sewage sludge in urban landscaping and forest rehabilitation and regeneration		▬▬▬ (Medium)		Landscape & Recreational Development Dept.	KLCH (Health & Environment Dept., Infrastructure Planning Dept.), SPAN	KLCH (Health & Environment Dept.), IWK
Measure 9.3.1 Incorporation of Low Impact Development (LID) in Stormwater Management						
WW 12 Adoption of Low Impact Development (LID) in Kuala Lumpur		▬▬▬ (Medium)		Civil Engineering & Urban Transportation Dept.	KLCH (Infrastructure Planning Dept., City Planning Dept.), PLANMalaysia	KLCH (Project Implementation & Building Maintenance Dept., City Planning Dept.), Developers
WW 13 Promote installation of run off storage		▬ (Low)		Infrastructure Planning Dept.	KLCH (City Planning Dept., Building Control Dept., Project Implementation & Building Maintenance Dept.), DID, PLANMalaysia	KLCH (City Planning Dept., Infrastructure Planning Dept.), DID, Developers, Run off storage suppliers
Measure 9.3.2 Elimination or Minimisation of Non-Point Source Pollutants						
WW 14 Establish partnership with agencies in educating and training public and industries	▬▬▬▬▬▬ (High)			Health & Environment Dept.	KLCH (Human Resource Management Dept.), Alam Flora Sdn. Bhd., DOE, DID, HEIs, JPWPKL, NGOs, SYABAS	DOE, Developers, Industry players, Schools, NGOs
WW 15 Support implementation of Best Management Practices at construction site	▬▬▬▬▬▬ (Medium)			Building Control Dept.	KLCH (City Planning Dept., Infrastructure Planning Dept.), CIDB	PSP (Engineer & Architect), IEM, PAM
WW 16 Promote incorporation of NPS pollution prevention strategies and policies into regional and official community plans	▬▬▬▬▬▬ (Medium)			Health and Environment Dept.	DOE, DID, MESTECC	KLCH (Infrastructure Planning Dept.)
WW 17 Promote effluent management	▬▬▬▬▬▬ (Medium)			Health and Environment Dept.	KLCH (City Planning Dept.), DOE, NGOs	KLCH (Health & Environment Dept.)

Importance Level

High ▬▬▬   Medium ▬▬▬   Low ▬▬▬

GREEN URBAN GOVERNANCE

DBKL

With the emergence of the concept of sustainable cities, there has been a growing interest in the role which cities could have in addressing global environmental issues and, in particular, climate change. The past decade has witnessed a new wave of municipal actions on climate change mitigation in which transnational municipal networks have grown and multiplied, while a more geographically diverse range of cities have become involved in addressing this issue. In an increasingly urbanising world with emissions producing activities concentrated in cities, the question of how municipal authorities and other actors might intervene in order to reduce their impact remains a significant one.

Green Urban Governance programs do not lead to direct carbon emissions reduction in Kuala Lumpur but they are fundamental to the effective implementation of vital CO_2 emissions reduction measures and programs of most other LCS actions

10.1 Enabling Development of Low Carbon Society (LCS)

Providing funding and training are key means through which municipal governments can enable action by private sector organisations or even by individuals. However, it is important for KLCH to provide enough financial resources through the ability to secure funding from external sources such as from ministry as MESTECC or agencies such as GreenTech Malaysia or MIDA.

Measure 10.1.1 Fund, Grant and Sourcing

Programs:

UG 1 Identifying existing pool of funds

UG 2 Setting up special unit for fund and grant sourcing for projects/programs that related to realisation of LCS

Measure 10.1.2 Incentives, Subsidies, Taxation Framework

Programs:

UG 3 Collaboration with relevant agencies to work out possible framework for incentives/subsidies/taxation

UG 4 Rebates for developments that comply with low carbon policies

UG 5 Energy Efficiency and Renewable Energy Management Centre which provides partial monetary aid to domestic users for the installation of solar water heating systems

Photo credit: UTM-LCARC

Measure 10.1.3 Staff Development

Programs:

UG 6 Awareness programs and continuous training conducted by KLCH on low carbon development

UG 7 Ensuring complementarity with other research based activities in Malaysia that are focused on the low carbon/green skills agenda

UG 8 Identifying funding package for pilot training, capacity building and skills development, which will support the stimulation and growth of low carbon built environment workforce in Kuala Lumpur

Photo credit: UTM-LCARC

10.2 KLCH as Low Carbon Leader

Municipal initiatives in the self-governing mode have also involved the development of 'exemplar' or best practice buildings, to showcase the possibilities of new technologies and of energy efficiency standards.

Measure 10.2.1 Introduction of Best Practice for Institutional Behaviour Change towards Low Carbon

Programs:

UG 9 KLCH Carbon Management Plan towards going low carbon

UG 10 Procurement of vehicles which runs on new and emerging sustainable technologies in council's fleet and assessing their performance

UG 11 Encouraging environmentally friendly behavior in the workplace

Measure 10.2.2 Demonstration Project on Low Emission Technologies

Programs:

UG 12 Replacement of bulbs and banning of incandescent lighting in the government building

UG 13 Trial of low emissions technologies on city hall's buildings

UG 14 Effective usage of air-conditioner

UG 15 Setting up a target of increasing energy efficiency within the municipality by 20% by 2030

UG 16 Building Energy and Monitoring Reporting System (BEMRS)

Photo credit: UTM-LCARC

Photo credit: UTM-LCARC

Photo credit: UTM LCARC

Measure 10.2.3 Sustainable Operation and Energy Consumption

Programs:

UG 17 Work with partners in the city to build new neighbourhood-scale renewable energy system

UG 18 Energy consumption mapping for energy management
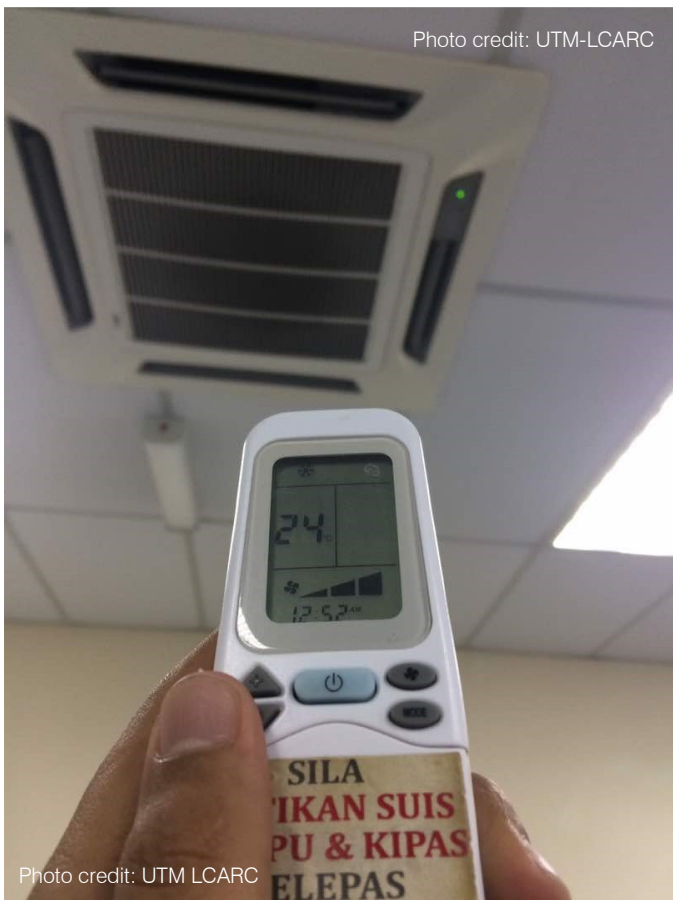
10.3 Setting up Command and Control through Regulations

KLCH should ensure that it is vital to mandate local action for CO_2 mitigation and enabling planning authorities to take climate change into account in their decision-making.

Measure 10.3.1 Development Planning for Low Carbon Kuala Lumpur

Programs:

UG 19 Institutionalisation of low carbon vision and carbon reduction targets in all statutory plans (KLSP 2020 and KLCP 2020)

UG 20 Design clear low carbon zoning and urban design codes that are geared towards Kuala Lumpur's energy efficient spatial structure

UG 21 Launching of a new social housing model that integrates green areas, public spaces and environmental design

Photo credit: starproperty.my

Measure 10.3.2 Planning Control Process, Procedures and Mechanism for Materialising LCS in Kuala Lumpur

Programs:

UG 22 Mandatory requirement for new government buildings to adopt green performance framework and achieve the qualified level of recognition

UG 23 Enhance substantive (content) aspects of development order approval

UG 24 Online submission for applications with respect to development projects (e-Submission)

UG 25 Progressive retraining of planners, architects, engineers and other built environment professionals and semiprofessionals

UG 26 Setting up of a low carbon monitoring unit/task force in KLCH

Photo credit: UTM LCARC

Photo credit: UTM LCARC

10.4 Partnership through Multi Stakeholders Engagement

In addition to engaging a range of stakeholders and partners in addressing climate change locally, municipalities have, sometimes, also sought to involve communities in responding to the challenges of reducing GHG emissions.

10.4.1 Encouragement on Low Carbon Practices

Programs:

UG 27 To promote energy and water efficiency in public facilities

UG 28 To promote extensive use of online services to citizens

Photo credit: UTM LCARC

Measure 10.4.2 Low Carbon Projects with NGOs

Programs:

UG 29 Awards and recognition for any corporates or NGOs efforts towards low carbon

UG 30 Existing LA21KL unit to collaborate with community and NGOs on low carbon and environmental friendly campaigns

Photo credit: BERNAMA

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Action 10 GREEN URBAN GOVERNANCE

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 10.1.1 Fund, Grant and Sourcing						
UG 1 Identifying existing pool of funds	▬			Finance Dept., Administration Dept.	MESTECC, KLCH (Economic Planning & Development Dept., Quantity Surveying Dept.), KW	KLCH (Finance Dept., Economic Planning & Development Dept.)
UG 2 Setting up special unit for fund and grant sourcing for projects/programs that related to realisation of LCS	▬			Finance Dept., Administration Dept.)	KLCH (Administration Dept. Quantity Surveying Dept., Finance Dept., Economic Planning & Development Dept., Human Resource Management Dept.), MESTECC, KW	KLCH (Human Resource Management Dept.
Measure 10.1.2 Incentives, Subsidies and Taxation Framework						
UG 3 Collaboration with relevant agencies to work out possible framework for incentives/subsidies/taxation	▬			Finance Dept., Administration Dept.)	KLCH (Building Control Dept. City Planning Dept., Legal and Prosecution Dept., Finance Dept.), MESTECC, SEDA, GreenTech Malaysia	KLCH (Economic Planning & Development Dept.)
UG 4 Rebates for developments that comply with low carbon policies	▬			Building Control Dept.	KLCH (City Planning Dept., Economic Planning & Development Dept., Finance Dept.), MESTECC, SEDA, GreenTech Malaysia	Developers, Building owners
UG 5 Energy Efficiency and Renewable Energy Management Centre which provides partial monetary aid to domestic users for the installation of solar water heating systems		▬		Economic Planning & Development Dept.	KLCH (Building Control Dept., Property Management & Valuation Dept. (*Commissioner of Building*)), KW, Residents, NGOs, MESTECC	KLCH (Housing Management & Community Development Dept.)
Measure 10.1.3 Staff Development						
UG 6 Awareness programs and continuous training conducted by KLCH on low carbon development	▬			Human Resource Management Dept.	KLCH (City Planning Dept., Corporate Planning Dept., Administration Dept.), MESTECC, HEIs	KLCH (Administration Dept., Human Resource Management Dept.)
UG 7 Ensuring complementarity with other research based activities in Malaysia that are focused on the low carbon/green skills agenda.	▬			Human Resource Management Dept.	HEIs, MESTECC, Professional Bodies, KW	KLCH (Human Resource Management Dept.)
UG 8 Identifying funding package for pilot training, capacity building and skills development, which will support the stimulation and growth of low carbon built environment workforce in Kuala Lumpur	▬			Human Resource Management Dept.	HEIs, MESTECC, Professional Bodies, KW	KLCH (Finance Dept., Human Resource Management Dept.)
Measure 10.2.1 Introduction of Best Practice for Institutional Behavioural Change towards Low Carbon						
UG 9 KLCH Carbon Management Plan towards going low carbon	▬			Administration Dept.	KLCH*, SEDA	KLCH (Project Implementation & Building Maintenance Dept.)
UG 10 Procurement of vehicles which runs on new and emerging sustainable technologies in council's fleet and assessing their performance		▬		Administration Dept.	KLCH (Quantity Surveying Dept. Administration Dept. (*Bahagian Perolehan*))	KLCH (Mechanical & Electrical Engineering Dept.), EV Providers
UG 11 Encouraging environmentally friendly behavior in the workplace	▬			Administration Dept.	KLCH (All Dept.)	KLCH Staff

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 10.2.2 Demonstration Project on Low Emission Technologies						
UG 12 Replacement of bulbs and banning of incandescent lighting in the government building	▬			Mechanical & Electrical Dept.	KLCH (Project Implementation & Building Maintenance Dept., Administration Dept. (*Bahagian Perolehan*))	KLCH (Mechanical & Electrical Dept.)
UG 13 Trial of low emissions technologies on city hall's buildings		▬		Project Implementation & Building Maintenance Dept.	KLCH (Mechanical & Electrical Dept.), SEDA, GreenTech Malaysia	KLCH (Project Implementation & Building Maintenance Dept.)
UG 14 Effective usage of air-conditioner	▬	▬		Administration Dept.	KLCH (All Dept.)	KLCH (All Dept.)
UG 15 Setting up a target of increasing energy efficiency within the municipality by 20% by 2030		▬		Administration Dept.	KLCH (Administration Dept.), Carbon Trust	KLCH (Project Implementation & Building Maintenance Dept.)*
UG 16 Building Energy and Monitoring Reporting System (BEMRS)			▬	Project Implementation & Building Maintenance Dept..	KLCH (Mechanical & Electrical Engineering Dept.), SEDA	KLCH (Project Implementation & Building Maintenance Dept.)
Measure 10.2.3 Sustainable Operation and Energy Consumption						
UG 17 Work with partners in the city to build new neighbourhood-scale renewable energy system		▬		Mechanical & Electrical Engineering Dept.	KW, TNB, GreenTech Malaysia, SEDA, Resident's assoc.	KLCH (Economic Planning & Development Dept.), Developers, Land owners
UG 18 Energy consumption mapping for energy management		▬		City Planning Dept.	KLCH (Information Management Dept.), TNB, Building owners, DOS	KLCH (City Planning Dept.)
Measure 10.3.1 Development Planning for Low Carbon Kuala Lumpur						
UG 19 Institutionalisation of low carbon vision and carbon reduction targets in all statutory plans (KLSP 2020 and KLCP 2020)		▬		City Planning Dept.	KW, MESTECC, PLANMalaysia	KLCH (City Planning Dept.)
UG 20 Design clear low carbon zoning and urban design codes that are geared towards Kuala Lumpur's energy efficient spatial structure		▬		City Planning Dept.	KLCH (Civil Engineering & Urban Transportation Dept.), KW, SEDA, MOT, PLANMalaysia	KLCH (City Planning Dept.)
UG 21 Launching of a new social housing model that integrates green areas, public spaces and environmental design	▬	▬		Economic Planning & Development Dept.	KLCH (City Planning Dept., Landscape & Recreation Development Dept., Building Control Dept.), KW, Prime Minister Dept.	Land owners, Developers
Measure 10.3.2 Planning Control Process, Procedures and Mechanism for Materialising LCS in Kuala Lumpur						
UG 22 Mandatory requirement for new government buildings to adopt green performance framework and achieve the qualified level of recognition		▬		Building Control Dept.	KLCH (Project Implementation & Building Maintenance Dept., City Planning Dept., Mechanical & Electrical Engineering Dept., Health & Environment Dept.), JKR, MESTECC, SPAN, TNB, Alam Flora Sdn.Bhd.	Government agencies (Building owners)

Programs	2015-2020	2021-2025	2026-2030	Responsible KLCH Department	Key Partners	Implementers
Measure 10.3.2 Planning Control Process, Procedures and Mechanism for Materialising LCS in Kuala Lumpur						
UG 23 Enhance substantive (content) aspects of development order approval	■	■		City Planning Dept.	KLCH Technical Departments & external technical agency**	KLCH (City Planning Dept., Building Control Dept.)
UG 24 Online submission for applications with respect to development projects (e-Submission)	■	■		City Planning Dept.	KLCH (All Dept.), Professional bodies, MESTECC, MAMPU, KW	KLCH (All Dept.)
UG 25 Progressive retraining of planners, architects, engineer and other built environment professionals and semiprofessionals		■ (gray)		Human Resource Management Dept.	KW, MESTECC, HEIs, PLANMalaysia	MIP, PAM, Board of Engineers Malaysia (BEM) and other built environment professionals and semiprofessionals
UG 26 Setting up of a Low Carbon Monitoring unit/task force in KLCH		■	■	City Planning Dept.	KLCH (Human Resource Management Dept., Administration Dept.)	KLCH (City Planning Dept.)
Measure 10.4.1 Encouragement on Low Carbon Practices						
UG 27 To promote energy and water efficiency in public facilities		■		Corporate Planning Dept.	KLCH (Housing Management & Community Dept., Information Management Dept., Project Implementation & Building Maintenance Dept.), MESTECC, TNB, SYABAS, JKR	Public facilities owners, KL residents, NGOs
UG 28 To promote extensive use of online services to citizens		■		Corporate Planning Dept.	KLCH (Finance Dept., Information Management Dept., Enforcement Dept., Licensing & Petty Traders Development Dept., Housing Management & Community Development Dept., Legal & Prosecution Dept.)	KLCH (Finance Dept., Information Management Dept., Enforcement Dept., Housing Management & Community Development Dept., Legal & Prosecution Dept.), KL residents
Measure 10.4.2 Low Carbon Projects with NGOs						
UG 29 Awards and recognition for any corporates' or NGOs' efforts towards low carbon		■		Corporate Plannning Dept.	KLCH (Housing Management & Community Development Dept., Corporate Planning Dept., Landscape & Recreation Development Dept.Infrastructure Planning Dept., Civil Engineering & Urban Transportation Dept., Mechanical & Electrical Engineering Dept., City Planning Dept.(LA21KL)), Professional Bodies, MESTECC, KPKT	NGOs, Resident's assoc., Business owners.
UG 30 Existing LA21KL unit to collaborate with community and NGOs on low carbon and environmentally friendly campaigns		■		City Plannning Dept. (LA21KL)	KLCH (Housing Management & Community Development Dept. Landscape & Recreation Development Dept., Health & Environment Dept.), NGOs, Resident's assoc., HEIs, JPWPKL, Jabatan Pertanian, IWK, KW	NGOs, Resident's assoc.

Notes:

*<u>Administration Department (Jawatankuasa Tenaga)</u>

City Planning Department (Jabatan Perancangan Bandaraya)
Civil Engineering and Urban Transportation Department (Jabatan Kejuruteraan Awam dan Pengangkutan Bandar)
Administration Department (Jabatan Pentadbiran)
Human Resource Management Department (Jabatan Pengurusan Sumber Manusia)
Licensing and Petty Traders Development Department (Jabatan Pelesenan dan Pengurusan Penjaja)
Culture, Arts, Tourism and Sports Department (Jabatan Kebudayaan, Kesenian dan Sukan)
Housing Management and Community Development Department (Jabatan Pengurusan Perumahan dan Pembangunan Komuniti)
Landscape and Recreation Development Department (Jabatan Pembangunan Landskap dan Rekreasi)
Mechanical and Electrical Engineering Department (Jabatan Kejuruteraan Mekanikal dan Elektrikal)
Health and Environment Department (Jabatan Kesihatan dan Alam Sekitar)
Enforcement Department (Jabatan Penguatkuasaan)
DBKL Training Institute (Institut Latihan DBKL)
Kuala Lumpur Library (Perpustakaan Kuala Lumpur)

** <u>Internal and External Technical Agencies OSC</u>

Internal Technical Agency
Technical Department

City Planning Department

Infrastructure Planning Department
Building Control Department
Health and Environment Department

Landscape and Recreation Development Department

External Technical Agency
Pejabat Tanah dan Galian Wilayah Persekutuan (PTGWP)
Suruhanjaya Komunikasi dan Multimedia Malaysia (SKMM)
Tenaga Nasional Berhad (TNB)
Syarikat Bekalan Air Selangor (SYABAS)
Perbadanan Pengurusan Sisa Pepejal dan Pembersihan Awam (PPSP&PA)
Indah Water Konsortium (IWK)
Jabatan Mineral dan Geosains Malaysia (JMG)
Jabatan Bomba dan Penyelamat Malaysia (JBPM)
Jabatan Alam Sekitar (JAS)

Importance Level

High ▪▪▪▪▪   Medium ▪▪▪▪▪   Low ▫▫▫▫▫

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HOW TO READ KL LCSBP 2030 ROADMAP

Methods of Program Evaluation through FGD

Kuala Lumpur Low Carbon Society Blueprint 2030 is formulated to help guide Kuala Lumpur towards becoming a world class sustainable city by 2020. This blueprint will provide Kuala Lumpur City Hall with a strategic direction and clear framework for coordinating related policies towards the reduction of 70% GHG emissions intensity for Kuala Lumpur by 2030 based on 2010 level with the implementation of 245 policy programs in a timely and proactive manner. Towards the implementation phase, several questions must be answered such as which programs should be implement first? How long is the implementation timeline? When is the target implementation year? Which potential implementation agencies should play important role in carrying out the programs? Thus, the roadmap section provides pathway to the stated questions by outlining programs proposed in the blueprint according to the given priority, timeline and related implementation agencies for 2015-2020, 2021-2025 and 2025-2030 periods. The roadmap is subject to review to accommodate possible institutional and organisational roles changes both external and internal to KLCH that may arise from time to time.

This section explains briefly the KL LCSBP 2030 method of program evaluation through focus group discussions (FGD). Three sessions of FGD had been conducted in August 2016, and February and July 2017 during the Interim Report, Draft Blueprint and Final Draft KL LCSBP 2030 stages. The purpose of FGD1 was to introduce the KL LCS 2030 and share the preliminary baseline results of Kuala Lumpur in 2010, building continuous engagement with stakeholders and understanding their feedback and views on overall direction, scope, and methodology of KL LCS 2030. Based on the outcome of FGD1, the Draft Kuala Lumpur Low Carbon Society Blueprint 2030 (Draft KL LCSBP 2030) was produced to outline the proposed LCS programs for implementation. The FGD2 was then held to present the proposed programs outlined and gain feedback from stakeholders with respect to the FGD1. The FGD2 also involved the presentation of draft proposal of sub-actions, measures, and LCS programs outlined in the Draft KL LCSBP 2030, based on three weighted three main criteria: i) Significance, ii) Suitability and iii) Feasibility. The definition for the three main criteria are as follows:

Significance - Measures the extent to which proposed LCS programs are in line with a stakeholder's institutional/corporate goal or policy direction.

Suitability - Appraises the appropriateness, acceptability and readiness of Kuala Lumpur's stakeholders on the proposed LCS programs with respect to Kuala Lumpur's local geographic setting and socio-cultural context.

Feasibility - Gauges the "implementability" of proposed LCS programs in terms of institutional and corporate financial capacity and human capital, as well as technological readiness and material resource availability in Kuala Lumpur.

Stakeholders were requested to assign a rating to each proposed LCS project based on three (3) levels which are Low (L), Medium (M) and High (H).

Programs	Significance Institutional Vision/Policy Direction			Suitability Long Geography setting/ socio-cultural context			Feasibility Finance/Human Capital/ Local Technology/Material		
	L	M	H	L	M	H	L	M	H
CE6 Promote the adoption of rainwater harvesting system			● ●			●			●
CE7 Promote the adoption of photovoltaic panel					● ●				

The results were then analysed using the 'weighted scoring method' involving i) allocation of weights for each evaluation criterion, and ii) allocation of scores to each rating level to reflect each LCS program's performance in relation to each criterion. The result presented in a single weighted score for each criterion was then summed across for each proposed LCS program. The sum of the weighted score indicates the overall performance of a potential program, which combines all the three criteria of significance, suitability, and feasibility.

1) Criteria weightage

The three criteria were weighted to reflect the stakeholders' consensus on the relative importance of each criterion. Justification for the weights ascribed (Significance (40%), Suitability (20%), and Feasibility (40%)) was recorded to ensure the basis of the weights assigned is fully understood and accepted. Both the significance and feasibility criteria were equally given higher percentages as they were considered the most important compared to suitability. Ultimately, all the weights amounted to 100.

2) Score the levels to reflect how each program performs against each criterion and calculate the weighted scores

The next step was to score each level against each criterion on a suitable scale. A score value of 1,2, or 3 was assigned correspondingly to the rating level of Low (L), Medium (M) and High (H), and each LCS program was given a total score, by multiplying the score with the weightage that has been assigned to the criterion. The resulted weighted scores were then summed up to obtain an aggregate weighted score for each potential program (refer table below):

Criteria	Significance (40%)			Suitability (20%)			Feasibility (40%)		
Level	Low	Medium	High	Low	Medium	High	Low	Medium	High
Score	1	2	3	1	2	3	1	2	3

Programs	Significance Institutional Vision/Policy Direction	Suitability Long Geography setting/socio-cultural context	Feasibility Finance/Human Capital/ Local Technology/Material	Weighted Score
CE6 Promote the adoption of rainwater harvesting system	2	3	3	83

3) Interpret the results

The weighted score results were then carefully translated into the importance level of Low, Medium and High with the target year in the implementation timeline (determined from the participants in FGD) to guide decision-makers. The three ranges of weighted scores were averaged for each different Action of the KL LCSBP 2030 accordingly and coloured based on the level of importance: light-gray (Low), medium-gray (Medium), and black (High) (refer below).

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

The Draft KL LCSBP 2030 and Summary for Policymakers (SPM) were then presented in the FGD3 for further refinement of the LCS programs and roadmap (timeline and responsible actors). Based on the outcome of FGD3, the Final Draft KL LCSBP 2030 and SPM were then produced with better justified responsible actors, which have been divided to three key implementation actors namely: responsible KLCH department, key partners, and implementers. The LCS program implementation timeline was also divided into three period of target years (2015-2020, 2021-2025, and 2026-2030 (refer table below), while the operational definitions of actors are shown as follows:

PROGRAMS	2015-2020	2021-2025	2026-2030	Responsible KLCH Dept.	Key Partners	Implementers
2.1.1 Promote Polycentric, Compact Growth Pattern in Kuala Lumpur						
SS 1 Gradual densification in polycentric nodes connected by public transportation				City Planning Dept.	MPK, MPAJ, MOT	Developers

Responsible KLCH department

KLCH department with primary responsibility for initiating, coordinating, liaising with relevant external agencies, monitoring, and/or approving implementation of programs.

Key Partners

Technology providers, funding agencies or entities, and relevant government agencies with approving authority for and/or statutory duty of regulating, facilitating, and overseeing the implementation of programs.

Implementers

Agencies, entities and/or parties who implement, or are needed to implement, programs due to their statutory duty, ownership rights, institutional responsibility, and/or effective serving of collective interests.

ACRONYMS AND ABBREVIATIONS

AIM	Asia-Pacific Integrated Model
BaU	Business as Usual
BEI	Building Energy Intensity/Index
CO_2	Carbon dioxide
CM	Countermeasure
EE	Energy Efficiency
EEI	Electrical, Electronic and Information Technologies
EEI	Energy Efficiency Improvement
EC	Energy Commission
EMS	Energy Management System
EPU	Economic Planning Unit
ERP	Electronic Road Pricing
ExSS	Extended Snapshot Tools
EV	Electric Vehicle
FDI	Foreign Direct Investment
FDM	Freight Demand Management
FGD	Focus Group Discussion
FITs	Feed-in tariffs
GHG	Greenhouse gases
GDP	Gross Domestic Products
GEZ	Green Enterprise Zone
GGP	Government Green Procurement
GIS	Geographic Information System
GTFS	Green Technology Financing Scheme
GTP	Government Transformation Programme
ICT	Information Communication Technology
IGEM	International GreenTech and Eco Products Exhibition and Conference Malaysia
IGES	Institute for Global Environment Strategies
IEA	International Energy Agency
IT	Information Technology
ITS	Intelligent Transport System
ITT	Integrated Transportation Terminal
JASE	Japanese Business Alliance for Smart Energy WorldWide
KLCH	Kuala Lumpur City Hall
KLCP	Kuala Lumpur City Plan
KLSP	Kuala Lumpur Structure Plan
LCCF	Low Carbon City Framework
LCS	Low Carbon Society
LED	Light-emitting diode
LID	Low Impact Development
LRT	Light Rail Transit
MAESCO	Malaysia Association of Energy Service Companies
MRT	Mass Rapid Transit
MSW	Municipal Solid Waste
NC2	Second National Communication to the UNFCCC
NGTP	National Green Technology Policy
NIES	National Institute for Environmental Studies, Japan
NPCC	National Policy on Climate Change

NPE	National Policy on the Environment
NPP2	Second National Physical Plan
NPS	Non-point Source
NRW	Non-revenue Water
NREPAP	National Renewable Energy Policy and Action Plan
NUP	National Urbanisation Policy
OECD	Organisation for Economic Cooperation and Development
PV	Photovoltaic
R&D	Research and Development
RE	Renewable energy
RMK 11	Eleventh Malaysia Plan
RTTV	Roof Thermal Transfer Value
SDG	Sustainable Development Goals
SME	Small and Medium Enterprise
STP	Sewage Treatment Plant
TDM	Transportation Demand Management
TOD	Transit Oriented Development
UHI	Urban Heat Island
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
UTM-LCARC	UTM-Low Carbon Asia Research Centre
VMS	Variable Message Signs

Unit

kg	Kilogram
g/km	Gram per kilometre
Mil.t/km	Million tonne per kilometre
mm	milimeter
Mt	Million tonne
MWp	MegaWatt peak
km	Kilometre
km^2	Kilometre squared
Km/h	Kilometre per hour
ktoe	Kilotonne oil equivalent
kWh	Kilowatt-hour
MJ	Mega joule
Mil.RM	Million ringit
t/day	Tonne per day
t/year	Tonne per year
tCO_2eq	Tonne carbon dioxide equivalent
$ktCO_2eq$	Kilotonne carbon dioxide equivalent

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