CYBERJAYA
SMART & LOW CARBON CITY 2025

Briefing on Draft Final Report
16 June 2017

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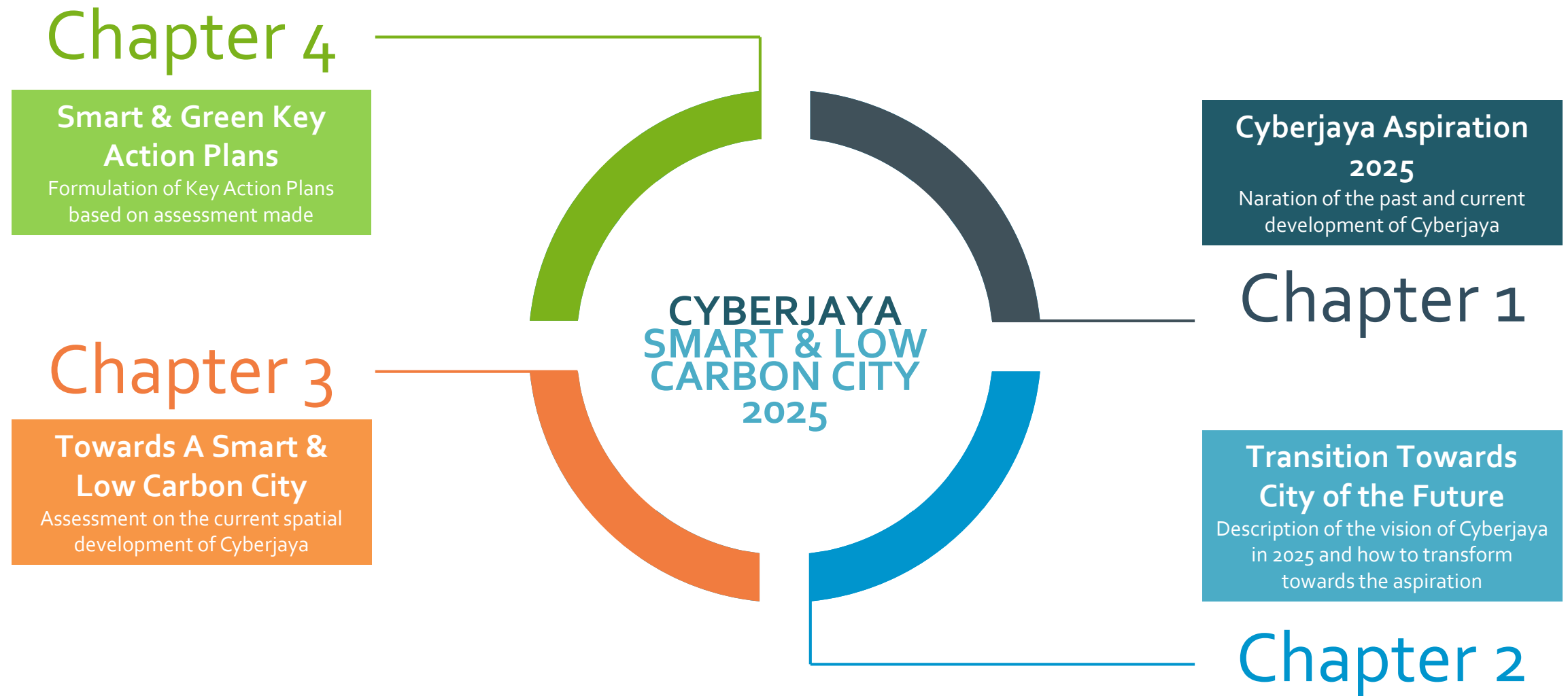
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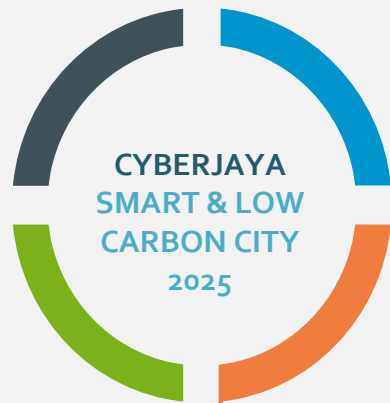**3.0 – KEY HIGHLIGHTS OF CHAPTER 4**

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Chapter 4

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Formulation of Key Action Plans based on assessment made

Chapter 3

Towards A Smart & Low Carbon City
Assessment on the current spatial development of Cyberjaya

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Cyberjaya Aspiration 2025
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Chapter 1

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Description of the vision of Cyberjaya in 2025 and how to transform towards the aspiration

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2.0   Key Highlights of Chapter 3

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Chapter 3

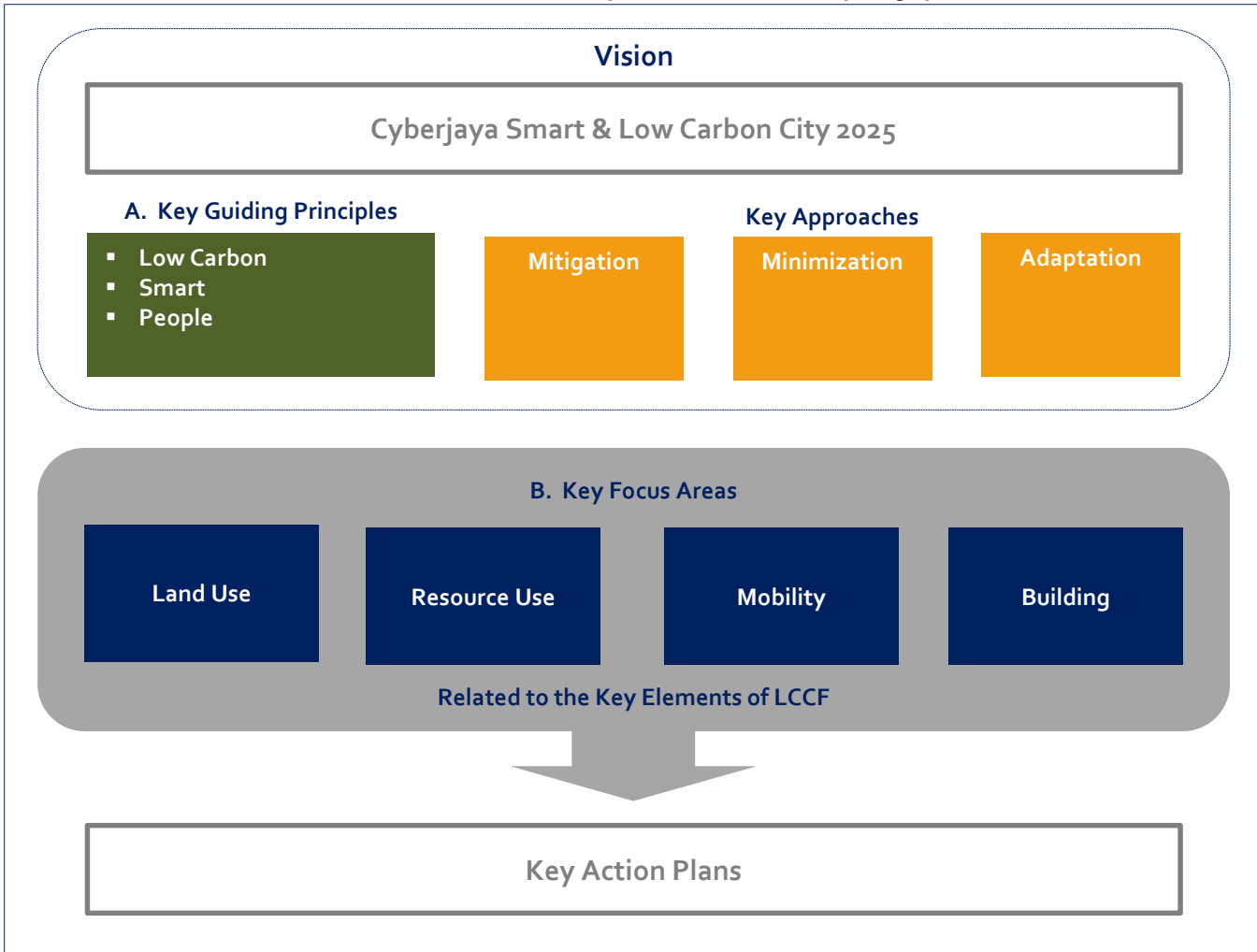**Towards A Smart & Low Carbon City**
Assessment on the current spatial development of Cyberjaya

The formulation of Key Action Plans for **Cyberjaya Smart & Low Carbon City 2025** are guided by **three Guiding Principles** :

- **Low Carbon**
- **Smart**
- **People**

The Guiding Principles are also used to determine **the Key Focus Areas** - which are very much related to the spatial planning and key elements of LCCF - for the purpose of accessing and analysing the current conditions of Cyberjaya to derive to the Key Action Plans that would catapult Cyberjaya's aspiration to be Smart & Low Carbon City by 2025.
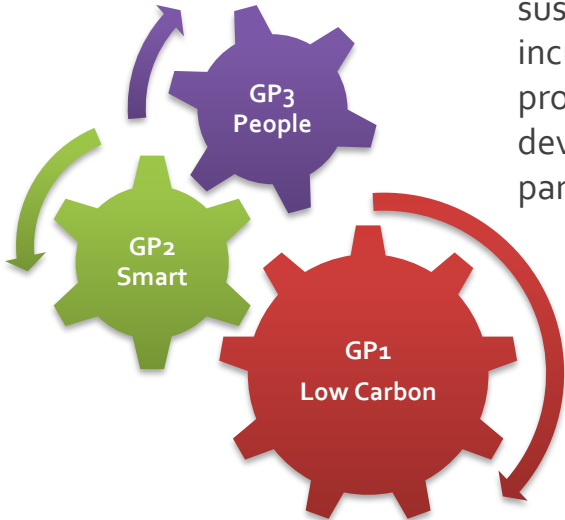
Smart & Low Carbon City Framework for Cyberjaya

Vision

Cyberjaya Smart & Low Carbon City 2025

A. Key Guiding Principles

- Low Carbon
- Smart
- People

Key Approaches

| Mitigation | Minimization | Adaptation |

B. Key Focus Areas

| Land Use | Resource Use | Mobility | Building |

Related to the Key Elements of LCCF

Key Action Plans

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2.1   Key Guiding Principles

Key Guiding Principles in the Formulation of Cyberjaya Action Plans

GP3 - PEOPLE

- Every human activity to a certain extent has some impact on the environment.

- Within the overall framework of sustainable development, there is an increasing emphasis on the need to promote and enact sustainable development through people/community participation or involvement.

GP2 - SMART

- Smart cities are forward-looking, progressive and resource-efficient while providing at the same time a high quality of life (e.g promote social and technological innovations and link existing infrastructures including new energy, traffic and transport concepts that go easy on the environment).

- In local context, fully support the Smart Selangor Blueprint 1.0 (SSB 1.0) that was launched by the State of Selangor in December 2016.

- The twelve (12) dimensions of Smart City : Smart Governance, Smart Digital Infrastructure, Smart Disaster Management, Smart Building/Development/Infrastructure, Smart Safety & Security, Smart Food & Agro, Smart Energy, Smart Water Management, Smart Transport & Mobility, Smart Waste Management, Smart Healthcare and Smart Education.

GP3 People

GP2 Smart

GP1 Low Carbon

GP1 - LOW CARBON

- The Low Carbon Principle fully supports all the four (4) main elements established in the Low Carbon City Framework & Assessment System (LCCF).

- LCCF is a documented system to guide the implementation of CO_2 reduction measures in cities and townships.

- The four (4) main elements are URBAN ENVIRONMENT, URBAN INFRASTRUCTURE, URBAN TRANSPORTATION and BUILDING.
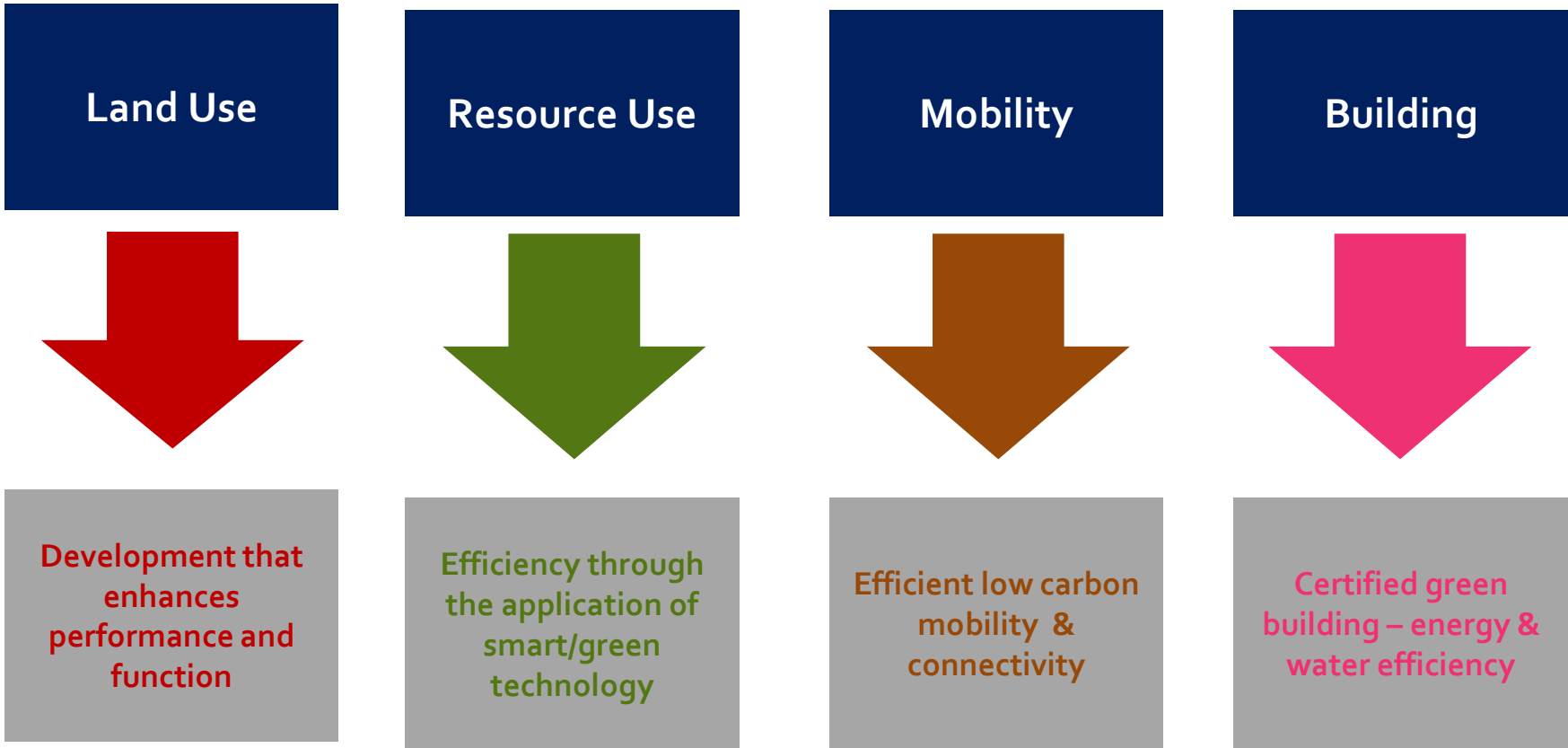
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Key Dimensions of Smart Selangor Blueprint 1.0

Key Dimensions	What It Is About
Smart Governance	The Smart Selangor initiative will be executed by the 4 governing bodies : • Smart Selangor Steering Committee – will focus on strategic governance, will set and determine directions • Project Execution Committee – will look at methods and controls adopted by implementation team • Project Management Committee – will concentrate on working methods and best practices to implement project • Project Team Committee – will concentrate on working methods and best practices to implement project
Smart Digital Infrastructure	Looking into Next Generation Networks, IoT Platforms, mobile & wireless access, data centres and disaster recovery centres, ubiquitous connectivity for citizens, government and citizens.
Smart Disaster Management	Integrated crisis management system and early warning system to enable better inter-agency coordination and prepare citizens for calamities.
Smart Building/Development /Infrastructure	Looking into the full cycle of buildings, from the construction methods to the operations of the building. Using a combination of building sciences and technology, the intention is to optimise energy efficiency and improve building quality.
Smart Safety & Security	Looking into implementing a range of integrated safety and security system through collaboration with public in areas related to accidents, crimes, terror incidents, etc..
Smart Food & Agro	Looking into using technological solutions to maximize yield and minimizing agricultural input in order to boost efficiency and enhance food & agricultural ecosystem to meet growing food consumption in Malaysia.
Smart Energy	Looking at a suite of systems that enable Sustainable Energy infrastructure to reduce cost and reinforce energy networks, which also includes solutions for Demand Side Response, smart transmissions, and distribution networks.
Smart Water Management	Looking into minimising NRW, ensuring safe and clean water supply and river cleaning as its core focus.
Smart Transport & Mobility	Looking into fostering seamless multi modal transportation access and efficient connectivity by interacting smart infrastructure, integrating big data and providing smart services that improve user experience.
Smart Waste Management	Looking into minimiszing waste by engaging the community. The end goal is to achieve a zero waste society.
Smart Healthcare	The Selangor government intends to invest 6%-8% of its GDP for healthcare digital transformation, which includes investments into Population Health Management, integrating case/disease management, care co-ordination and advanced tools to perform the tasks.
Smart Education	Looking into preparing human capital to capture new economy opportunities, which includes initiatives to set-up a coding academy to equip citizens with the skill to code and develop apps, coupled with the initiatives to create Smart App Development platform with Open API.

Key Elements of LCCF

Urban Environment	Urban Infrastructure	Urban Transportation	Building
Matters related to the challenges of the growing urban population with the demands for reducing CO2 emissions at the same time.	Socio-technical systems of facilities and services that are vital to the basic functioning of cities and regions.	The ability to cope with density (i.e. people, activities and structures) while moving people and goods.	A relatively permanent enclosed construction over a plot of land, having a roof and used for any of a wide variety of activities (e.g living, manufacturing).
Performance Criteria • Site Selection • Urban Form • Urban Greenery & Environmental Quality	**Performance Criteria** • Infrastructure Provision • Waste • Energy • Water	**Performance Criteria** • Shift of Transport Mode • Green Transport Infrastructure • Clean Vehicles • Traffic Management	**Performance Criteria** • Low Carbon Building • Community Services

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2.2 Key Focus Areas

Key Focus Areas are characterised by the Guiding Principles. The establishment of the Key Focus Areas are vital towards getting the right implementable actions to get desired/maximum impacts.

Key Focus Areas Related to Sustainability

Land Use	Resource Use	Mobility	Building
Development that enhances performance and function	Efficiency through the application of smart/green technology	Efficient low carbon mobility & connectivity	Certified green building – energy & water efficiency

A through analysis and understanding of all the four elements will outline a more credible mitigation measures or low carbon strategies to minimize CO_2 emissions both in resources and consumption.

The recommended specific set of actions not only will enhance urban development but at the same time curtail negative environmental impacts.

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2.3 Key Highlights Of Assessment On Spatial Planning & Development

The aim of this section is to understand the performance of Cyberjaya's spatial planning and development, which are the key elements of sustainable city.

It is imperative to understand the performance of Cyberjaya's spatial planning and development with the overall objectives of MP Sepang in transforming Cyberjaya into Smart & Low Carbon City by 2025.

The analysis will provide baseline sustainability information on existing and planned development. This information and related additional understanding will assist in the formulating of new mitigation measures and improving the existing countermeasures that will lead to a more effective emission reduction.

Development within Define Urban Footprint	Mixed-Use Development / Compact Development
Land use planning of Cyberjaya is based on conventional planning model.	**The land use pattern clearly does not promote Mixed Land Uses.**
▪ Sustainable land use planning should look into maintaining ecological functions as the prerequisite for land-use layout.	▪ Mixed land use is one of the contributing factors in achieving sustainable urban form as it allows compatible land uses to locate in close proximity to one another and thereby decrease the travel distances between activities.
▪ This type of planning is able to integrate various functions of nature's services, such as water conservation, flood management, biodiversity preservation, local culture protection, leisure, aesthetic experiences, etc..	**It also does not encourage compact development strategy.**
Cyberjaya was a greenfield development.	▪ Compactness of urban space can minimize transport of energy, water, materials, products and people.
▪ As such, a lot of CO_2 had been emitted through earthworks activities and additional infrastructure works.	

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Preserve Natural Ecology, Water Body and Biodiversity / Green Open Space

Total percentage of green open space and water bodies is small.

- Increasing the percentage of green spaces in the city would increase carbon sequestration as well as reduce the urban heat island effects. Promoting more water bodies creates vibrant public spaces.

Number of Trees

Tree planting efforts in Cyberjaya are implemented on ad hoc basis and not holistically strategized.

- Increasing the number of trees in cities or development would ensue quantifiable benefits such as reduction in atmospheric carbon dioxide, storm water control, improvement in air quality and helps in energy conservation.

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Land Take for Infrastructure and Utility Services

Current infrastructure does not support Common Utility Trench (CUT).

- Benefits of having CUT include reduction of disruption to services and facilitate maintenance and upgrading works.

Urban Storm Water Management and Flood Mitigation

Cyberjaya uses conventional method for managing urban storm water.

- Other green technology applications to manage urban storm water includes rain gardens, green roofs, regional storm water pond, constructed wetlands and bio swales.

Potential smart and low carbon application :

- Convert storm water to demineralized water for industrial usage.

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Household Solid Waste Management

Recycling rate - unknown .
- To establish community-level recycling centres.
- Private sector investment in recycling system – reactivate composting.

100% dependency on landfill.
- Landfill has shown to be not the best technology in dealing with organic waste

Cyberjaya composting rate is 0%.
- Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost.
- Composting is the basis of sustainable urban farming, which promotes a closed loop system where all components of a farm add to and support each other.

Potential smart and low carbon application :
- Conversion of plastic to diesel for public transport usage.
- Bio-chilled water generation using landscape waste.

Energy Optimization

Energy Audit Report for MP Sepang HQ Building.
- Implementation of Sustainable Energy Management System (SEMS) that would provide a systematic manner to monitor and control the power and energy consumption in MP Sepang.

Only 3% LED lightings usage in streetlights.
- Widespread use of LED lighting has great potential in reducing energy consumption since LEDs are energy efficient – 95% of the energy is converted into light.

About 101.72% increase in energy consumption from 2011 to 2016.
- Studies show that a significant part of energy use can be optimized through occupants' awareness about energy consumption.

Potential smart and low carbon application :
- Supply side - CoGen to meet chilled water and electricity.
- Bulk sale of chilled water from waste heat recovered from TNB power plant.

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Renewable Energy

Potential smart and low carbon application :

- Floating solar panel from retained water bodies.
- Energy from bio-digesters.

Side-Wide District Cooling System

DCSs are currently running on electricity.

- To look into the optimization of DCS integrated with sustainable energy technologies including systems integrated with RE, combined cooling, heating and power systems, and thermal storage systems.

Potential smart and low carbon application :

- Industrial water for cooling towers and landscape use – to be recovered from storm water and waste water.
- Supply of grey water to DCS.
- Bio-chilled water generation using landscape waste.
- Supply side - CoGen to meet chilled water and electricity.
- Bulk sale of chilled water from waste heat recovered from TNB power plant.

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Efficient Water Management

100% potable water supply from surface water stored in reservoirs.

- In general, only 30% of water usage is used for actual consumption while the remaining 70% of it is just for non-potable uses .

Recycle water usage in Cyberjaya is 0%.

- With predictions of water shortages in the future, reclaimed water along with groundwater and storm water are options for diversification.

Potential smart and low carbon application :

- Industrial water for cooling towers and landscape use – to be recovered from storm water and waste water.

- Supply of grey water to DCS.

Sewerage Treatment

Centralized STP in Cyberjaya – conventional and not sustainable (100% usage of conventional STP).

- A paradigm shift from centralized conventional wastewater systems to decentralized wastewater systems.

- Sewage as a valuable resource as opposed to a problem to be treated.

Currently in Cyberjaya, energy generated from biogas is 0%.

- Sewage should be viewed as a valuable resource, and not just a problem to be treated.

Potential smart and low carbon application :

- Energy generation via co-digestion between STP waste water and food/garden waste.

- Supply of grey water to DCS.

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Development within Transit Nodes and Corridors

Potential smart and low carbon application :

- Develop activity centres as vibrant places by focusing on mixed-use activity, main streets and public realm improvements.

Integration with the development of Cyberjaya City Centre (CCC).

- CCC is the catalyst of anchoring Cyberjaya into a global technology hub.

Comprehensive Pedestrian/Cycling Network

Cycling activity is more towards recreational/leisure/health purposes.

- Currently, road marking for bicycle spanned only 5.8km.

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Public / Private Transportation

Public transportation modal split was estimated at 7% as at 2016.

- Travelling by public transport uses less energy and produces less pollution than comparable travel in private vehicles.

- Buses and cabs remain the only form of public transportation in Cyberjaya.

Cyberjaya is a low density development - population density of 6 persons per acre or 24 persons per hectare.

- Most of low density areas are extremely automobile dependent.

- The need to formulate innovative approaches to low-density transit system.

- The need to increase density to increase number of public transport ridership.

Cyberjaya is predominantly a job centre - its employment ratio is higher than its population ratio.

- This means higher mobility into and within Cyberjaya - contributes to the high percentage usage of private vehicle.

Traffic Flow Management

Cyberjaya has installed smart traffic management system in 2016.

- The cameras analyse the traffic situation and intelligently direct traffic at the intersection to reduce waiting time at traffic lights.

- Travel time has been reduced to between 10 to 15 minutes from 30 minutes previously.

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Buildings

There are 19 completed green buildings in Cyberjaya whilst another 6 buildings are still under construction.

- Sustainable buildings or green buildings are designed in such a way to reduce overall impact on environment and human health by efficiently using energy, water and other resources.

- Conducting energy audit for buildings is recommended for discovering ways to make buildings much more energy efficient.

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3.0 Key Highlights of Chapter 4

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Chapter 4

Smart & Green Key Action Plans
Formulation of Key Action Plans based on assessment made

For the purpose of measuring the performance of the proposed key actions in terms of CO_2 emission, the key actions have been grouped together into four (4) themes according to the key elements of LCCF as visualized in the diagram below :
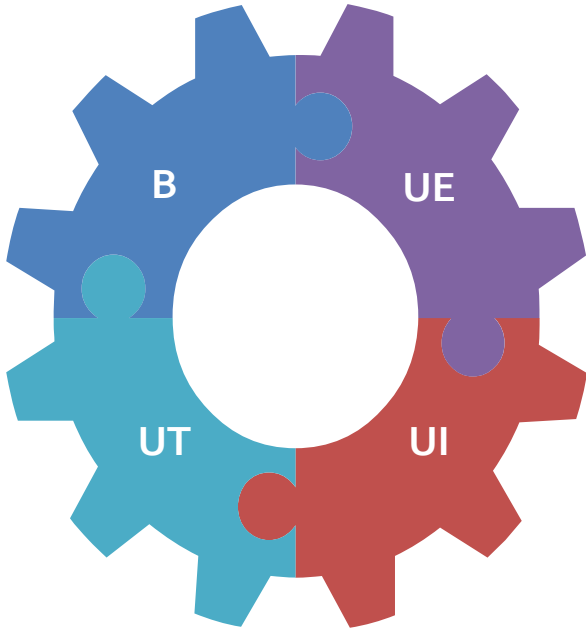
Building
A relatively permanent enclosed construction over a plot of land, having a roof and used for any of a wide variety of activities (e.g living, manufacturing).

Urban Environment
Matters related to the challenges of the growing urban population with the demands for reducing CO_2 emissions at the same time.

Urban Transportation
The ability to cope with density (i.e. people, activities and structures) while moving people and goods.

Urban Infrastructure
Socio-technical systems of facilities and services that are vital to the basic functioning of cities and regions.

For each Key Action Plan that has been identified, a **Project Identification Brief (PIB)** is prepared to :

- describe about the key actions and sub-actions
- provide rationale for proposing the key actions based on the current assessment/situation
- implementation timeline
- identify key driver(s) to champion the task
- identify collaborating partner(s) to support the task
- set target so that measure on the performance can be monitored
- illustrate case study / benchmarking / best practices

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3.1   Implementation Timeline

Implementation Timeline

The implementation and delivery timeline is given for each key action to indicate the priority of project delivery and the timing. There are four (4) categories of projects based on the implementation and delivery timeline namely (1) **QUICK WIN** project or **QW**, (2) **SHORT-TERM** project or **S**, (3) **MEDIUM-TERM** project or **M** and (4) **LONG-TERM** project or **L**. The description of the categories are as follows :
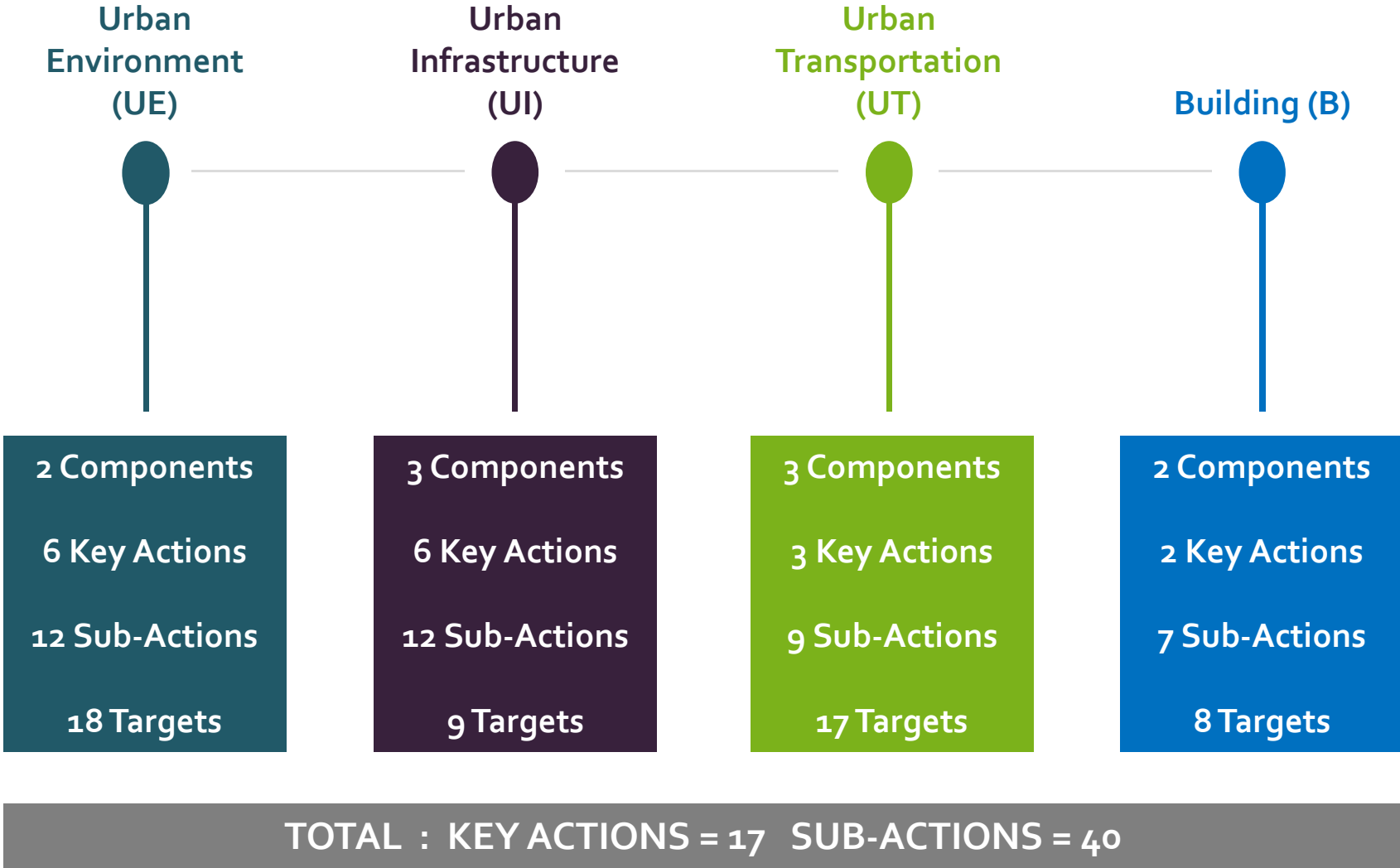
Short Term

Projects that can be implemented and completed within three (3) years time.

Feasibility studies may or may not be required.

Long Term

Projects that require more than 5 years to be implemented and completed.

Feasibility/impact studies shall be required.

QW

M

Quick Win

Projects that can be implemented and completed within about one (1) year time.

Bring quick impact/result to intended beneficiaries, environment, etc..

Small or minimum budget is required to implement the projects.

Medium Term

Projects that can be implemented and completed within three (3) to five (5) years time.

Feasibility/impact studies may or may not be required.

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3.2 Summary of Project Identification Briefs

A total of 17 key actions and 40 sub-actions have been identified under these four (4) themes and the number of key actions and targets according to each theme are listed as per diagram below :

Urban Environment (UE)	Urban Infrastructure (UI)	Urban Transportation (UT)	Building (B)
2 Components	3 Components	3 Components	2 Components
6 Key Actions	6 Key Actions	3 Key Actions	2 Key Actions
12 Sub-Actions	12 Sub-Actions	9 Sub-Actions	7 Sub-Actions
18 Targets	9 Targets	17 Targets	8 Targets

TOTAL : KEY ACTIONS = 17   SUB-ACTIONS = 40

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3.3 Summary of Projects Under Urban Environment

	2		6	12	18
	Components		**Key Actions**	**Sub-Actions**	**Targets**
	Smart Urban Growth		3	7	9
	Protect & Enhance the Nature		3	5	9

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3.4 Summary of Projects Under Urban Infrastructure

	3			6	12	9
	Components			**Key Actions**	**Sub-Actions**	**Targets**
	Solid Waste Management System			3	7	5
	Energy Optimization			2	4	2
	Water & Sewerage Treatment			1	1	2

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3.5   Summary of Projects Under Urban Transportation

	3			3	9	17
	Components			**Key Actions**	**Sub-Actions**	**Targets**
	Non Motorized Transport			1	3	6
	Public Transportation & Private Vehicle			1	4	7
	Integrated Transit Oriented			1	2	4

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3.6 Summary of Projects Under Building

	2		
Components			

Key Actions	Sub-Actions	Targets
2	7	8

Component	Key Actions	Sub-Actions	Targets
Existing & New Buildings	1	4	4
People & Behaviours	1	3	4

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Thank you

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