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PUTRAJAYA LOW CARBON GREEN CITY INITIATIVES REPORT PUTRAJAYA CORPORATION JULY 2018

PUTRAJAYA
LOW CARBON GREEN CITY
INITIATIVES REPORT

Putrajaya Low Carbon Green City Initiatives Report

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Third Edition
July 2018

FOREWORD BY THE PRESIDENT

Assalamualaikum warahmatullahi wabarakatuh and salam sejahtera,

Alhamdulillah, Putrajaya Corporation has published the third edition Low Carbon Green City Initiatives Report. Since 2009, various efforts have been made in Putrajaya to support the government's aspiration to develop Putrajaya into a Green Technology Township and to help reduce carbon emissions. These efforts were carried out in seven focus areas. The 'Science to Action' (S2A) approach has helped Putrajaya Corporation greatly in determining clearer quantitative targets and to facilitate initiatives that have already been implemented.

This publication reports the status of greenhouse gas emissions in Putrajaya and records the involvement of residents, schools, government agencies and the private sector in implementing green city initiatives either locally or abroad. Among these initiatives are: Building Sector Energy Use and Carbon Reporting ($BECO_2R$); Bike-able City Programme; electric powered public bus; the use of solar energy in government buildings; Putrajaya lake water quality control system; waste separation at source; Creativity 3R Award; enforcement on the use of biodegradation products; composting and disposal of organic waste; and government green procurement.

I would also like to extend my sincere appreciation and gratitude to all the parties involved in the planning and implementation of various programmes and initiatives. Thank you for supporting the vision and achievement of Putrajaya Green City 2025 (PGC2025). We look forward to future collaboration and hope these ongoing efforts would continue.

DATUK SERI HAJI HASIM BIN HAJI ISMAIL
PRESIDENT
PUTRAJAYA CORPORATION
MARCH 2018

MESSAGE FROM THE VICE PRESIDENT

Assalamualaikum warahmatullahi wabarakatuh and salam sejahtera,

Thanking Allah SWT for his blessings, Putrajaya Green City Task Force has successfully implemented various green city initiatives and programmes throughout year 2015 to 2017.

As of today, Putrajaya's planning and development are on the right track to transform Putrajaya into one of the green cities in Malaysia.

From time to time, members of the Green City Task Force reviewed and implemented innovative initiatives based on the latest green technology. The Putrajaya green initiatives are being implemented not only during the planning stage but also the operation and maintenance stages. This approach was adopted based on the experiences of developed nations' cities, as the method could help achieve optimum results of keeping city sustainable and control carbon emissions level.

Land use planning together with the design of new green buildings that contribute to the reduction of urban carbon emissions, are priority during the planning stage. The use of green technology, monitoring and adopting low carbon life / working style, are the main focuses during the operation and maintenance stages.

Finally, I would like to express my utmost appreciation to all the parties involved in the Putrajaya Green City initiative. Not forgetting also our strategic partners who have given their commitment and assistance to Putrajaya Corporation.

DATO' FADLUN BIN MAK UJUD
VICE PRESIDENT
PUTRAJAYA CORPORATION
MARCH 2018

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1.0 CITY PLANNING AND BUILDING

1.1 Inventory of Putrajaya Greenhouse Gas Emissions 2015

Putrajaya Corporation has continued its annual inventory of greenhouse gas (GHG) emissions level in Putrajaya, as a way to measure the achievement of green city initiatives that have been carried out. For year 2015, the level of GHG emissions in Putrajaya is measured by the performance in these seven sectors:

i. Residential building.
ii. Government building.
iii. Commercial building.
iv. Public amenities and utility.
v. Passenger transport.
vi. Freight transport.
vii. Solid waste.

Based on the inventory, the total GHG emissions in Putrajaya in 2015 was recorded at 1,515 $ktCO_2eq$. Chart 1.1 summarises the GHG emissions trend in Putrajaya from year 2012 to 2015. The details of GHG emissions for the seven sectors are shown in Chart 1.2. The overall carbon emission rate in 2015 had grown 0.5% from the level of 2014. This is lower than the growth experienced in the previous years (2012-2014) which ranged from 15% to 17.5%.

Chart 1.1: GHG Emissions in Putrajaya Year 2007, 2012 – 2015

Chart 1.2: GHG Emissions from the Seven Sectors

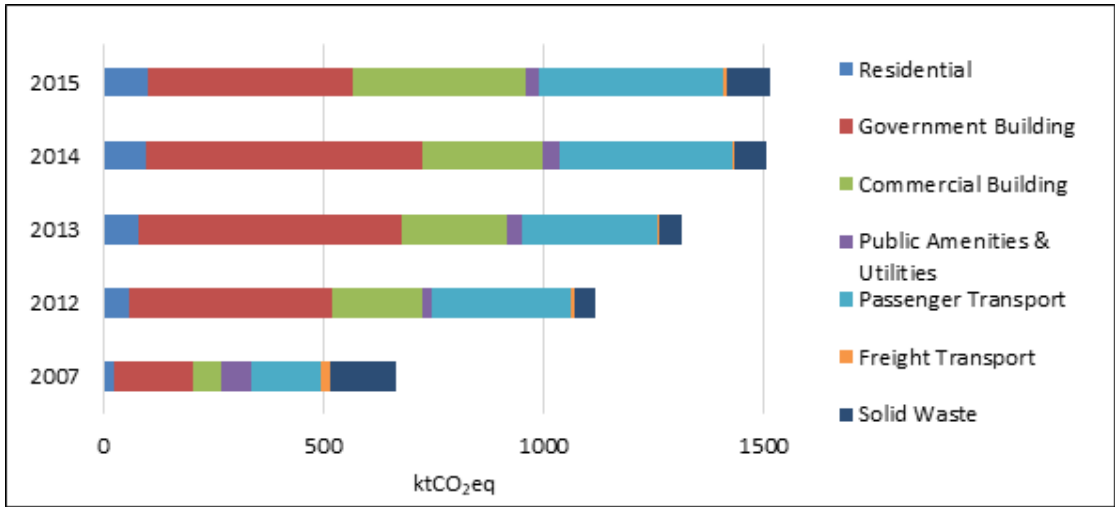


Table 1.1 shows that the drop in 0.5% of GHG emissions rate in 2015 was closely related to the reduction of emissions from government buildings, public amenities and utilities.

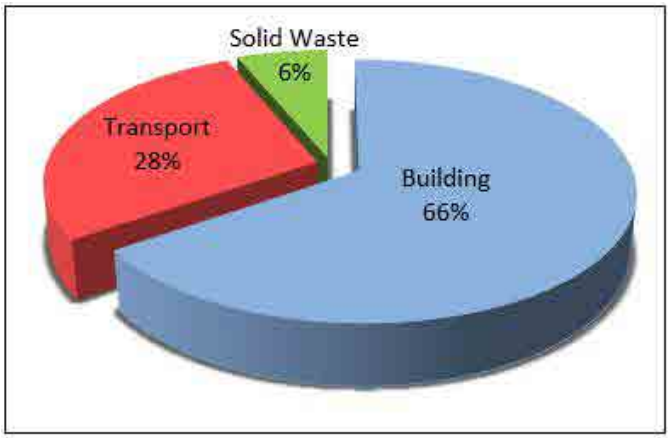
Table 1.1: Comparison of GHG Emissions by Seven Sectors ($ktCO_2eq$)

Sectors	2007	2012	2013	2014	2015
Residential building.	23	59	79	98	99
Government building.	180	461	600	626	469
Commercial building	65	207	240	277	393
Public amenities and utility.	67	21	34	38	30
Passenger transport.	161	316	305	392	419
Freight transport.	20	7	7	7	10
Solid waste.	148	49	51	72	95
Total GHG emissions	664	1,120	1,316	1,508	1,515
Carbon sink		23.96	24.10	24.10	24.11
Total GHG emissions (net)	664	1,096	1,292	1,484	1,491

As conclusion, the building sector is the number one contributor to GHG emissions (66%, 991 $ktCO_2eq$), followed by the transport sector (28%, 429 $ktCO_2eq$) and the solid waste sector (6%, 95$ktCO_2eq$).

This trend continues since 2012, when the first inventory was carried out. It is due to the reason that Putrajaya is built as the government administrative centre with many buildings used for government offices, commercial outlets, housing and public utilities. And Putrajaya has no industrial area.

Chart 1.3: GHG Emissions from the Three Main Sectors



The three major sources of carbon emissions in Putrajaya were electricity at 53.4% (809$ktCO_2eq$), followed by petroleum 26.0% (394$ktCO_2eq$) and natural gas at 14.0% (212$ktCO_2eq$). This shows that the city's main source of energy is still very much dependent on non-renewable energy.

Chart 1.4: GHG Emissions based on Emission Source

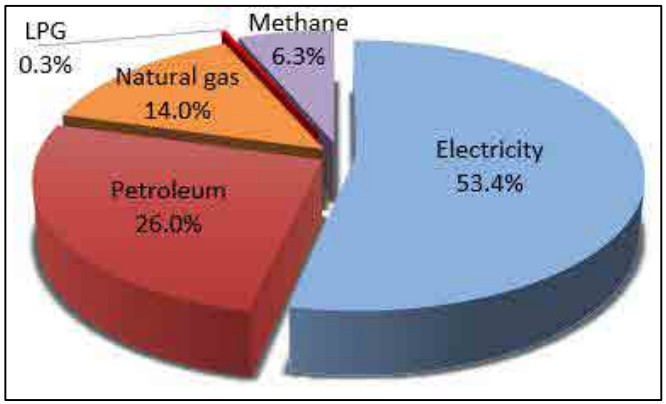
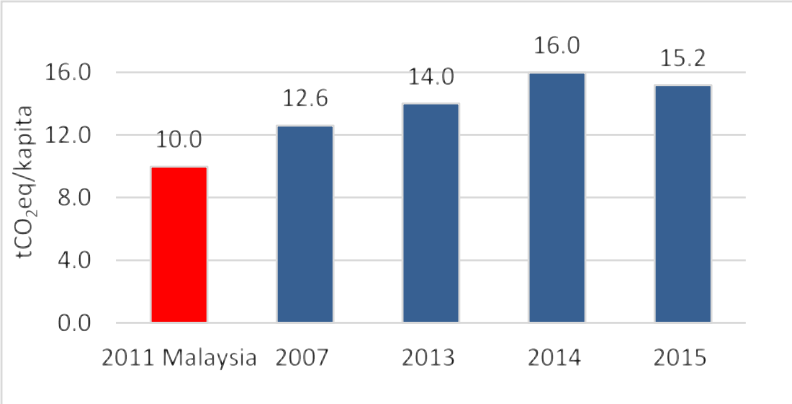


Chart 1.5: GHG Emissions Per Capita

As for per capita emissions, the inventory indicated a 5% decline (15.2tCO_2eq/capita) in 2015, compare with 2014 (16.0tCO_2eq/capita) (Figure 1.4).



Carbon Emission from Building Sector

Building sector remains the sector with the highest energy use. Chart 1.6 shows the total number of floor areas by building type in Putrajaya. Almost half (45%) of the total floor areas was for residential building use while another half (55%) was for non-residential building. The carbon emissions scenario for these two categories of buildings is shown in Chart 1.7. Based on the inventory, it can be concluded that non-residential building emitted more carbon than residential building, which made up of 90% of the total carbon emissions from the building sector.

Out of the three non-residential building types, government building recorded the highest carbon emissions at 47%; followed by commercial building, 40%; and public amenities and utility building at 3%. When comparing the emissions rate with the size of floor area by building types shown in Chart 1.6, it is found that commercial building which consist of only 9% of the total floor areas of the building sector, had contributed to almost half (40%) of the carbon emissions.

Among the three non-residential building types, government building recorded the highest amount of emissions (47%). This can be explained by the fact that government building had the largest number of floor space for non-residential building (34%) compared to the other two building types. Nevertheless, carbon emitted from government building had dropped significantly by 25% (469ktCO_2eq) in 2015, as compared to the emissions in 2014 (626ktCO_2eq).

Chart 1.6: Developed Floor Area by Building Types

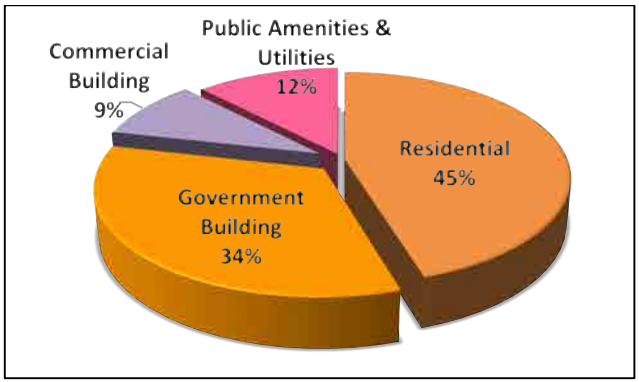


Chart 1.7: Building Sector Carbon Emissions

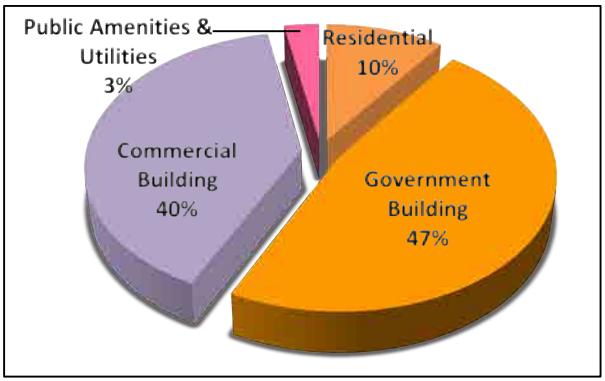
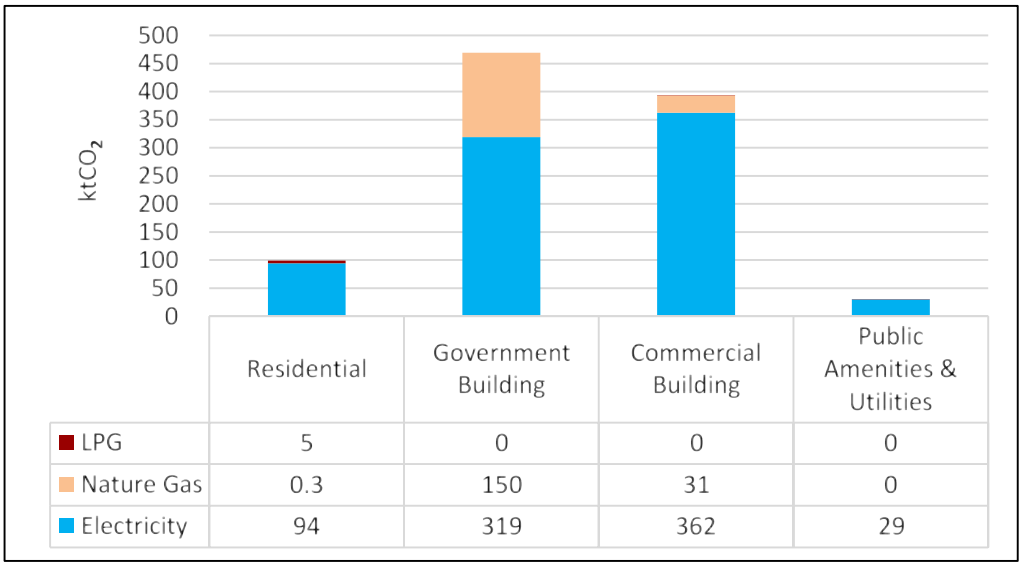


Chart 1.8: Carbon Emissions by Energy Source in Building Sector ($ktCO_2eq$)

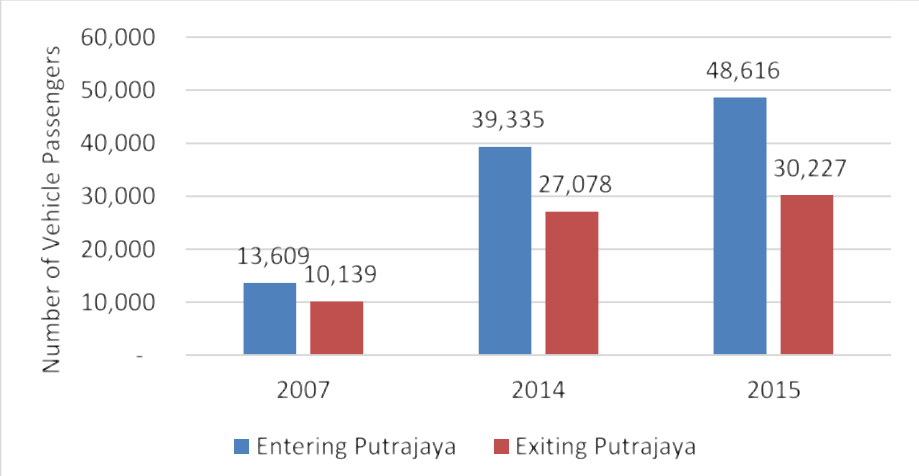


	Residential	Government Building	Commercial Building	Public Amenities & Utilities
LPG	5	0	0	0
Nature Gas	0.3	150	31	0
Electricity	94	319	362	29

Carbon Emissions from the Transport Sector

The transport sector is the sector with the second highest energy use in Putrajaya. The increase in population and employement had led to the increase in travel trips. This can be seen in the numbers of passenger car entering and exiting Putrajaya.

Chart 1.9: Comparison of Passenger Numbers Entering and Exiting Putrajaya



Transport sector's carbon emissions were mainly from passenger transport, which consist of 98% of the total emissions. Whereas freight transport emitted the other 2%. The main contributor of carbon emissions in the transport sector was petrol, at 92%.

Chart 1.10: Transport Sector Carbon Emissions

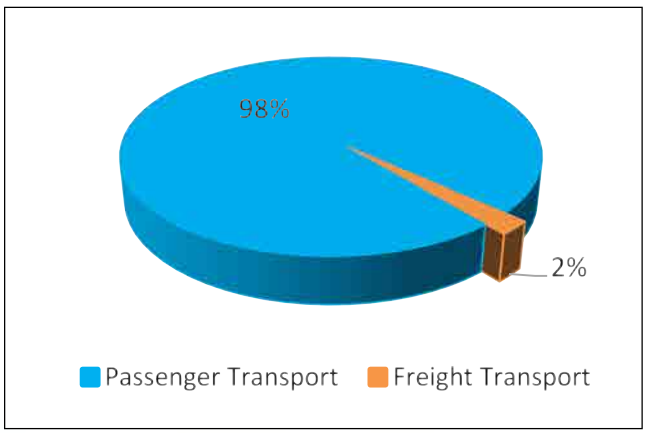
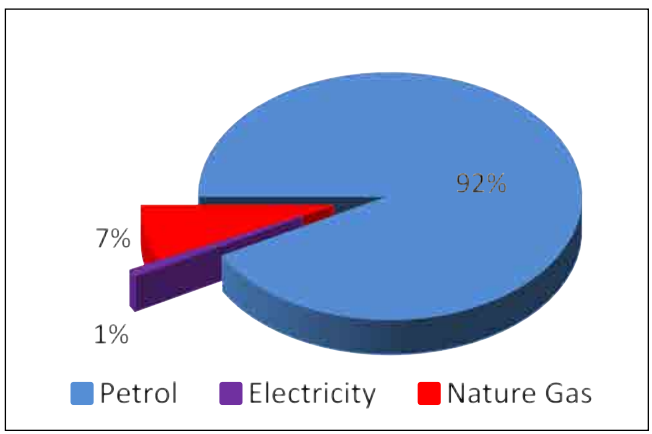


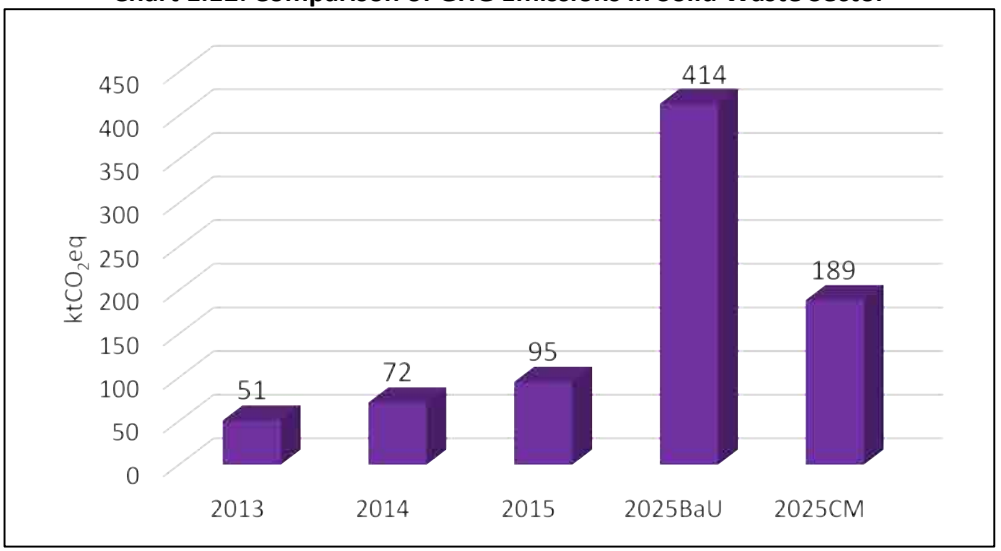
Chart 1.11: Transport Sector Carbon Emissions by Energy Source



Carbon Emissions from the Solid Waster Sector

The result of the 2015 inventory shows that there is an increase of 32% in the GHG emissions in the solid waste sector compared to the level in 2014.

Chart 1.12: Comparison of GHG Emissions in Solid Waste Sector



1.2 Green Building Design and Certification

Building new green building and retrofitting existing building into green building are the two major emphasis to reduce carbon emissions level in the building sector. Until November 2017, 27 buildings had successfully obtained Green Building Index (GBI) green building certification. Another 14 completed buildings and 12 buildings which are in the planning or construction stage, will obtain the final green building certification once they are ready.

Table 1.2: List of Buildings with Green Building Certification

No.	Building	Green Building Certification
A. Completed Building:		
1.	Energy Commission Building	GBI PLATINUM (NRNC), 2016 (Renewal Verification)
2.	Perdana Putra Building	GBI rating PLATINUM, 2017 (Renewal Verification)
3.	The Ministry o f Energy, Green Technology and Water (KeTTHA)	GBI rating SILVER (NREB), 2011
4.	Putrajaya Holdings Tower (Menara PJH)	GBI rating GOLD (NRNC), 2014
5.	Heriot-Watt University Malaysia Putrajaya	GBI final rating CERTIFIED (NRNC), 2017
6.	Office Tower on Plot Z10	GBI final rating CERTIFIED (NRNC), 2015
7.	The Everly Putrajaya (3 Star Hotel on Plot Z10)	GBI final rating CERTIFIED (NRNC), 2015
8.	Lot 2C5 Putrajaya – Suasana PJH	GBI provisional rating SILVER (NRNC), 2014
9.	The Malaysian Anti -Corruption Commission Headquarters	GBI provisional rating CERTIFIED (NRNC), 2014
10.	Putrajaya Islamic Complex Block A and B	GBI provisional rating CERTIFIED (NRNC), 2017
11.	Putrajaya Islamic Complex Block C	GBI provisional rating CERTIFIED (NRNC), 2017
12.	Putrajaya Islamic Complex Block D	GBI provisional rating CERTIFIED (NRNC), 2017
B. Building at the planning or construction stage:		
1.	Government Building Block F1	GBI provisional rating GOLD (NRNC), 2013
2.	Government Building Block F2	GBI provisional rating GOLD (NRNC), 2013
3.	Government Building Block F3	GBI provisional rating GOLD (NRNC), 2013
4.	Government Building Block F4	GBI provisional rating GOLD (NRNC), 2013
5.	Government Building Block F5	GBI provisional rating GOLD (NRNC), 2013
6.	Government Building Block F6	GBI provisional rating GOLD (NRNC), 2013
7.	Government Building Block F7	GBI provisional rating GOLD (NRNC), 2013
8.	Government Building Block F8	GBI provisional rating GOLD (NRNC), 2013
9.	Government Building Block F9	GBI provisional rating GOLD (NRNC), 2013
10.	Government Building Block F10	GBI provisional rating GOLD (NRNC), 2013
11.	Government Building Block F11	GBI provisional rating GOLD (NRNC), 2013
12.	Shaftsbury Putrajaya	GBI provisional rating CERTIFIED (RNC), 2017
13.	MRCB Tower (Menara MRCB)	GBI provisional rating GOLD (NRNC), 2015

Source: Green Building Index Sdn Bhd

Note: NRNC-(Non-Residential New Construction), NREB-(Non-Residential Existing Building), RNC-(Residential New Construction)

PJH Tower (Gold)

2C5 Putrajaya (Silver)

Heriot-Watt University Malaysia Putrajaya (Certified)

Shaftsbury Putrajaya (certified)

Government Building Block Parcel F9 (Gold)

1.3 Building Sector Energy Use and Carbon Reporting ($BECO_2R$)

The building sector energy use and carbon reporting programme ($BECO_2R$) is a new initiative undertaken by Putrajaya Corporation in 2017. $BECO_2R$ seeks to further reduce building sector's carbon emissions, in particular existing buildings that have been operating in Putrajaya. It is a bottom-up monitoring mechanism for building performance that involves all building sector's stakeholders at the operational level, such as the owners, managers, tenants and building users.

Programme's objectives:

1. To support achieve Putrajaya Green City 2025 quantitative target of 60% carbon reduction.

2. To increase urban energy efficiency through existing building stocks.

3. To maintain the continuous involvement of building sector's stakeholders in carbon reduction action.

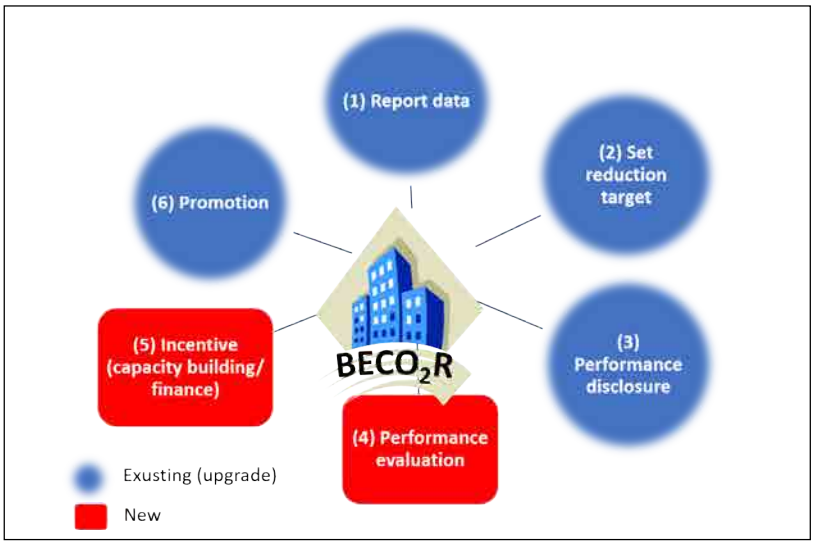
4. To develop common carbon metric (CCM)* at city level, as a guide to new developments for potential CO^2 reduction.

**CCM: Energy intensity ($kWh/m^2/yr$; $kWh/o/yr$); carbon intensity ($kgCO_2/m^2/yr$; $kgCO_2/o/yr$).*

Figure 1.1: BECO$_2$R Programme Components

BECO$_2$R programme consist of six main components. Two are new components, whereas four are currently being refined or reviewed (Figure 1.1).

This programme was designed with reference made to similar system implemented in three other cities - Tokyo, Seattle and Houston.



BECO$_2$R Programme Incentive (Capacity Development)

i. Hands-on Training for Online Data Reporting System (BCIS)

Date : 15, 16, 23 and 29 August, 2017
Location : Meeting Room D5, Putrajaya Corporation Complex
Strategic partner : Malaysian Green Technology Corporation (MGTC)
Participants : 115 people (representatives from Putrajaya Public Works Department; facility manager of government office buildings; building managers of government department buildings; Putrajaya International Convention Centre, developers and Putrajaya Corporation officers).

In the BECO$_2$R Programme, the major component is the reporting of data on building performance. Building performance data were reported via an online system called Building Consumption Input System (BCIS). BCIS had been improved with new functions and training is required to enable BECO$_2$R participants, in particular those who are new to the system to familiarise with its application.

ii. Briefing on Malaysian Standard (MS) 1525: Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings

Date : 16 and 17 October 2017
Location : SEDA Malaysia Training Room, Level 9, Galeria, Precinct 4, Putrajaya.
Strategic partner : Sustainable Energy Development Authority Malaysia (SEDA).
Participants : 80 people (representatives from Putrajaya Public Works Department; Putrajaya International Convention Centre; developers and Putrajaya Corporation officers).

The purpose of this briefing and training sessions is to educate building sector's stakeholders, which include architects, developers and building managers, the need to apply energy efficiency principles recommended by the MS 1525 document.

During the briefing sessions, three topics were presented:

a) Putrajaya Green City 2025 and Putrajaya Building Sector's Carbon Emissions Scenario by Ms. Wang Tze Wee, Putrajaya Corporation.

b) Building Sector's Energy Efficiency Scenario in Malaysia and Putrajaya by Mr. Deep Kumar, Sustainable Energy Development Authority Malaysia (SEDA).

c) Introduction to the Use of MS 1525 by Mr. Steve Anthony Lojuntin, Sustainable Energy Development Authority Malaysia (SEDA).




The views during briefing and question - answers sessions.


Various printed materials on Putrajaya green city initiatives were given free to participants.

iii. Training on Energy Management (Introductory Level)

Date	: 21 and 22 October, 6 December 2017,
Location	: SEDA Malaysia Training Room, Level 9, Galeria, Precinct 4, Putrajaya.
Strategic partner	: Sustainable Energy Development Authority Malaysia (SEDA)
Participants	: 60 people (representatives from the facility management company of government office buildings; building managers of government department buildings; management company of PPA1M apartment buildings; Putrajaya International Convention Centre; IKN and Putrajaya Corporation officers).

This training intended to raise the awareness of building sector's stakeholders in managing building energy. These introductory sessions also served as the preparatory step for selected participants to join the subsequent $BECO_2R$ programme and attend technical level training.

Among the topics covered in these training sessions are:
a) Introduction to the Management of Building Energy.
b) Building Energy Audit.
c) Introduction to Energy Performance Contracting (EPC).
d) Energy Efficiency, Low Carbon Green Building, Nearly Zero Energy Building.

1.4 Forum

Putrajaya Low Carbon Green City Forum 2015

Putrajaya Corporation has organised the third annual Putrajaya Low Carbon Green City Forum on 12 March 2015, at Seri Melati Hall, Putrajaya Corporation Complex. The theme for this forum was solid waste management and 3R activities. It was in line with the government's announcement to regulate solid waste management, which came into effect on September 2015 in states that have adopted the Solid Waste Management and Public Cleansing Act 2007.

Three working papers were presented during the forum in Putrajaya:

a) **Solid Waste Management and 3R Practices** by Dr. Mohd Pauze Bin Mohamad Taha, Director of Research Technology Division, Solid Waste and Public Cleansing Management Corporation (SWCorp).

b) **Recycling Programmes in Putrajaya** by Mdm. Ismi Azura Binti Istear Khan, Unit Head for 3R, Alam Flora Sdn. Bhd.

c) **Why waste? Let's Compost!** by Mdm. Rohaya Binti Ismail, Putrajaya Precinct 9 (1) National Secondary School.

The forum was officiated by YBhg. Dato' Omairi bin Hashim, Vice President of Town Planning, Putrajaya Corporation. 251 people had participated in this forum, including representatives from government agencies, private sector, Putrajaya residents' associations, representatives from secondary schools, primary schools and Putrajaya Corporation.

Schools' representatives, residents, government agencies, developers and officers from Putrajaya Corporation participated in the forum.

Side Events in Conjunction with the Forum

i. Exhibition and Interactive Activities (Games Stall) by 3R and Solid Waste Management Agencies.

Educational exhibition on 3R and solid waste management by SWCorp and Alam Flora.

Interactive activities (games stall) by Alam Flora

ii. Used Clothes Collection Campaign by Alam Flora

Campaign to collect used clothes was also carried out as part of the 3R activities and to support the 3R Boutique at Precinct 9, Putrajaya. Public who donated clothes on that day were presented souvenir from Alam Flora. Collected used garments were sold at lower price at the 3R Boutique, Putrajaya. Sales proceeds were donated to orphanages.

iii. Putrajaya Green City Award Prize Giving Ceremony (PGC) 2025: 3R Creativity 2015 and Competition Exhibition

During this forum, the prize giving ceremony for PGC2025 award winner: 3R Creativity was also held. 16 schools in Putrajaya had took part in this competition – 8 primary schools participation and 8 secondary schools. Competition entries submitted by students from all the schools were exhibited during the forum. Various recycled items were used and the result of creative design also became solution to problems identified at school.

The students' entries for the 3R Creativity Design Competition

1.5 Green Tours

A series of tours were also organised to present new and innovative ideas towards achieving low carbon green city. These tours had provided exposures to Putrajaya Green City Taskforce members, strategic partner agencies, government and private stakeholders, on the initiatives that have been implemented by other cities.

Series 1:

Date **: 24 May 2017**

Location **: Malaysian Institute of Architects (PAM) Office Building**

Series 2:

Date : **7 August, 2017**

Location : **Petaling Jaya City Council (MBPJ)**

Corridor walls that are decorated with recycled items and fish pond that uses SPAH system

Vegetable cultivation using compost and liquid fertilizer

Rainwater collection and reuse system (SPAH) at Surau Nur Ehsan, Petaling Jaya City Council headquarters

Smart PJ Waste Solution Lab (Green Kiosk)

2.0 INTEGRATING NATURE INTO THE URBAN FABRIC

2.0 INTEGRATING NATURE INTO THE URBAN FABRIC

2.1 Putrajaya Greening Pogramme

The greening of Putrajaya via trees planting has been carried out from 2015 to 2017. The number of trees planted in 2015 were 2,784, 1,725 trees in 2016 and 3,977 trees in 2017. In total, 689,813 trees have been planted in Putrajaya.

Pledge and Plant a Tree Programme (2017)

The 'Pledge and Plant a Tree Program' was initiated by the Malaysian Institute of Planners (MIP) in 2008. The aim is to increase the involvement of organisations and individuals in making city green and tackle global warming.

Putrajaya Corporation has participated in the 'Pledge and Plant a Tree' programme organised by MIP, in line with its effort to become a green and low carbon city. The programme in Putrajaya was held at Sisiran Tasik, Precinct 8 (AYER @ 8), Putrajaya on 18 November 2017 (Saturday).

During the programme, a total of 123trees were planted at two locations - Sisiran Tasik Precinct 8 and the monorail bridge area.

Various government, private agencies and institutes of higher learning joining the activities in this programme.

Trees planting at the monorail bridge

Colouring Competition

The colouring competition was a side event in conjunction with the Pledge and Plant a Tree 2017 Programme. This competiton was opened to children aged 7 to 12, and a total of 68 children had took part.

The winners for the 7-9 year-old age group

The winners for the 10-12 year-old age group

2.2 Putrajaya Urban Farming Programme

Throughout 2016, a series of cultivation and farming activities had been conducted at Community Farm 1, Precinct 9 and Community Farm 2, Precinct 8 as follows:

a. Community Farm 1 (KK1): Precinct 9

i. First series was carried out from September to November 2015 involving rock rock melon cultivation (500 Polybags).
ii. Second series from December 2015 to February 2016, rock melon cultivation (400 Polybags).
iii. Third series from March to May 2016, melon rock cultivation (250 Polybags).

b. Community Garden 2 (KK2): Precinct 8

i. First series took place from September 2015 to January 2016 involving Kulai chili cultivation (300 polybags).
ii. Second series from March to May 2016, rock melon cultivation (500 Polybags).
iii. Third series from June to August 2016 , rock melon cultivation (500 Poliybags).

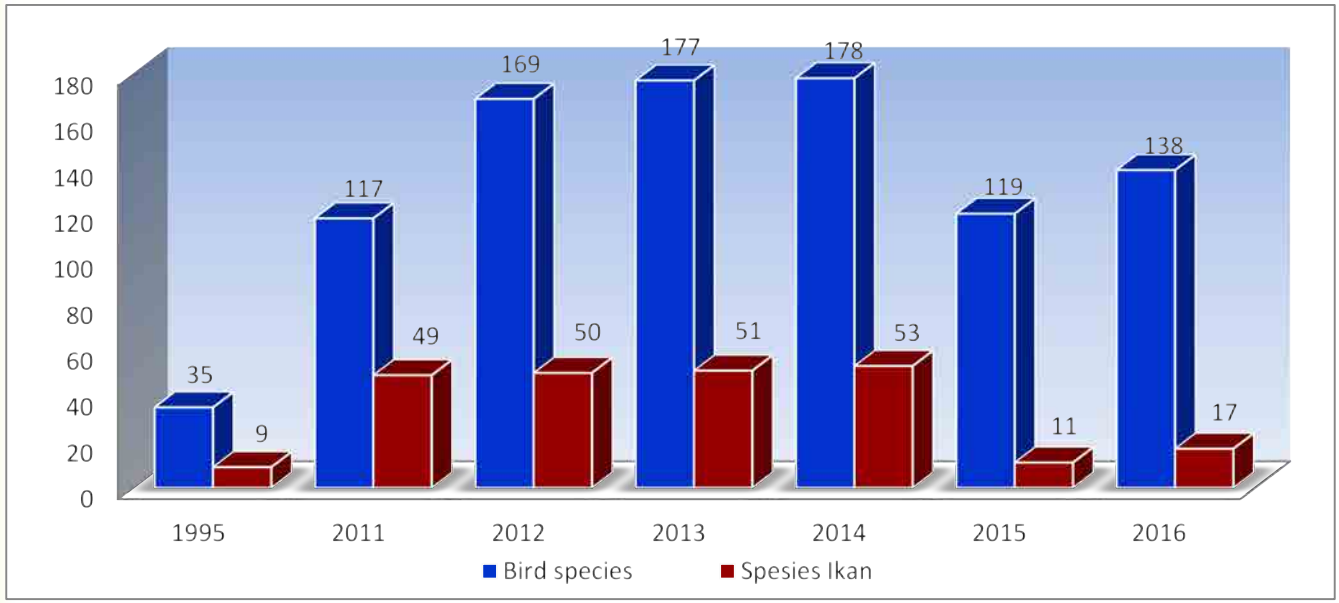
2.3 Quick Facts

Table 2.1: Public Open Space Ratio to 1,000 Population in Putrajaya

	Open Space Area : 1,000 population (hectare)				
	2013	2014	2015	2016	2025
National Urbanisation Policy[1]	2 hectares				
Putrajaya	22.37[2]	23.42 [3]	20.81[4]	20.07[5]	5.5[6]

Source:
(1): Target from National Urbanisation Policy, DPN9, step (ii).
(2)- (5): MURNInet 2013-2016
(6): Estimated based on the target of 347,700 in year 2025.

Chart 2.1: Number of Bird and Fish Species in Putrajaya



Source: Putrajaya Corporation's Environment, Lake and Wetland Division.

Dark-sided Flycatcher (Muscicapa sibiirica)

Little Cormorant (Micricarbo niger)

Rufous-bellied Eagle (Lophotriorchis kienerii)

Stork-billed Kingfisher (Pelargopsis capensis)

Table 2.2: Number of Species Found in Putrajaya Lake and Wetland (Until 2016)

Fauna Species	1995 (EIA)	2007 (Baseline)	2011	2012	2013	2014	2015	2016
Insect	-	21	343	445	767	1271	1025	928
Amphibian	-	2	5	8	13	13	9	12
Reptile	-	5	15	15	14	20	12	11
Mammal	24	7	8	11	9	16	9	10

Source: Putrajaya Corporation's Environment, Lake and Wetland Division.

Striped-backed Frog *(Hylarana macrodactylus)*

American Bullfrog *(Lithobates castesbeianu)*

Blue Glassy Tiger *(Ideopsis vulgaris)*

Towny Coster *(Acraea violae)*

3.0 TRANSPORTATION & MOBILITY

3.0 TRANSPORTATION AND MOBILITY

3.1 Upgrading of Bicycle Lanes in Putrajaya

To further promote the use of bicycle as one of the low-carbon mode of transportation in Putrajaya, existing bicycle lanes were upgraded and improved. 20.6 km dedicated cycling lane that pass through Persiaran Perdana (Precinct 1-5) and the main routes of Precinct 8, 9 and 18, have all been upgraded to enhance users' safety and comfort (Figures 3.1 and 3.2).

Figure 3.1: Bird's Eye View of the Bicycle Lanes in Putrajaya

Precinct 2 and 3 (7 KM)

Precinct 4 (2.8 KM)

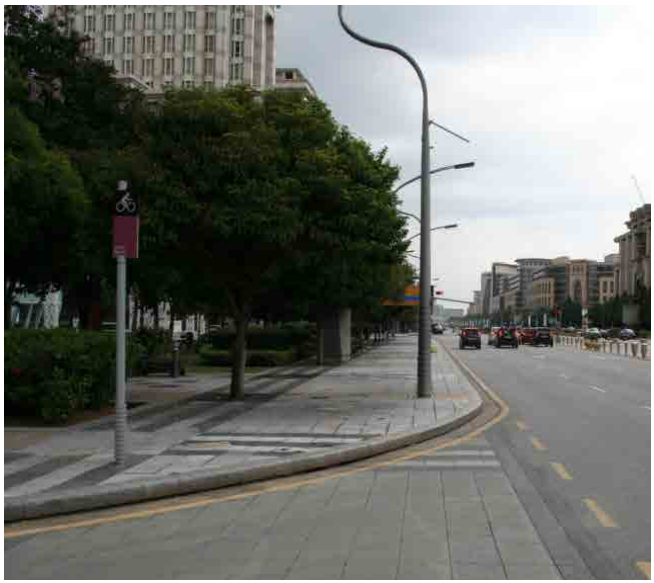
Figure 3.2: Bicycle Lanes Plan Pre 8,9 & 18

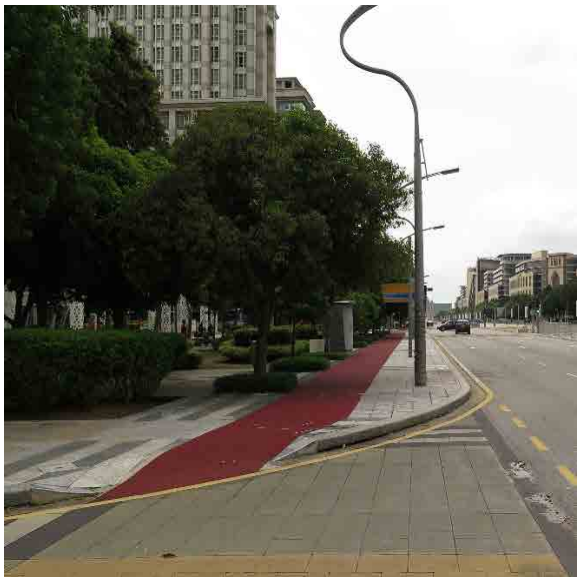
Precinct 8 and 9 (4 KM)

Precinct 18 (6.8 KM)

The upgrading of these bicycle lanes involved the following job scope:

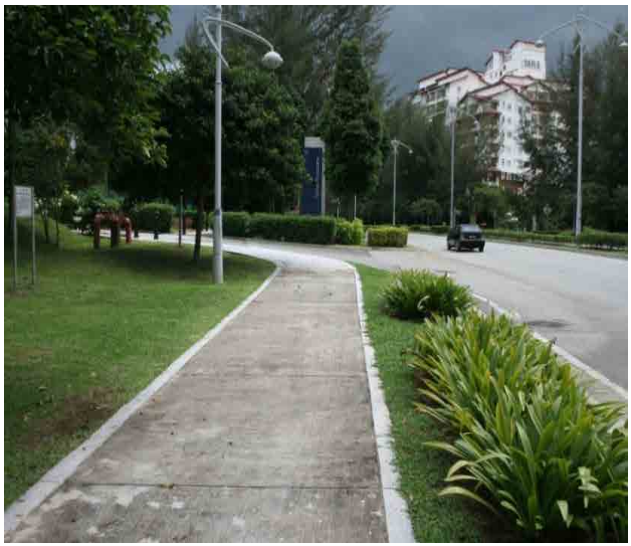
Re-marking the Bicycle Lanes



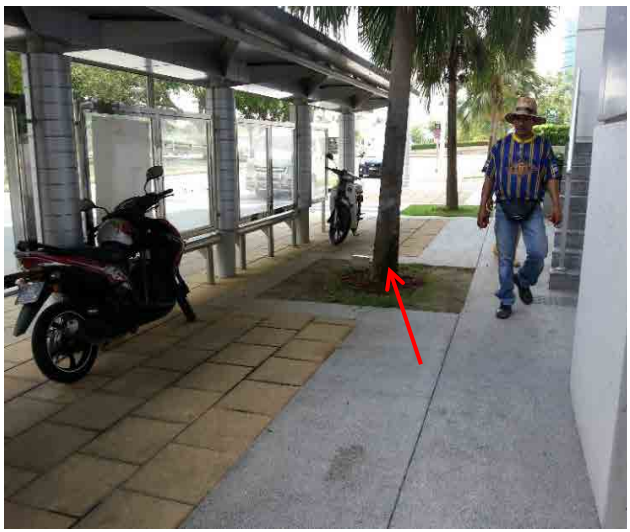


Re-suface bicycle lanes with anti-skid materials made of recycled glass (only at Persiaran Perdana)

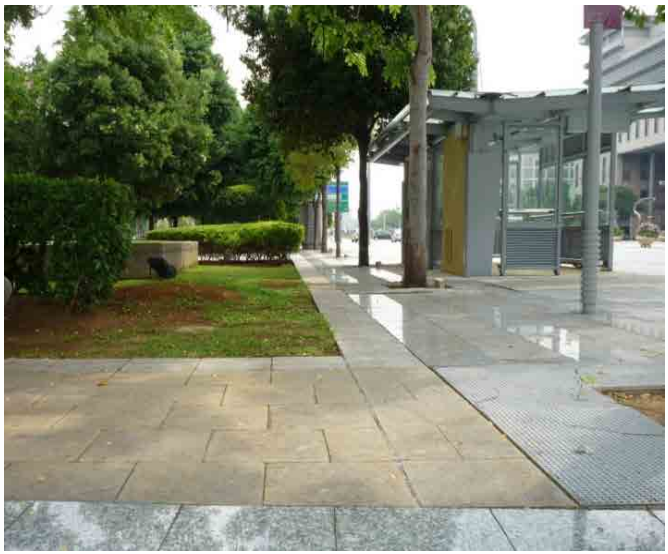
Marking the lanes with cycling symbol (Precinct 8 dan 18)



Relocating barriers that block the bicycle lanes



Resize landscape and plant area to make way for bicycle lane



Relocate benches, dustbins, lamp posts and bollards

Kerb-cut treatment to reduce barrier

Install bicycle-friendly traffic lights and signages

3.2 Community Park Ride Programme

Various cycling events were held in Putrajaya to support the Putrajaya Bikeable City programme. Among the programmes throughout 2016 and 2017 were:

i. Merdeka Cycle (Kayuhan Merdeka) Programme on 11 September.

ii. 1 Region Cycling Convoy Programme.

iii. Federal Territories Fun Cycle (Kayuhan Ceria) 2017 on 19 February 2017.

iv. Women Cycling Convoy Programme in conjunction with World Women Day 2017 at Precinct 3, Putrajaya on 11 March 2017.

v. Putrajaya Bridge Night Ride (PBNR) on 22 April 2017.

vi. Putrajaya Community Ride.

Cycling International Anti-Corruption Day

1 Region Cycling Convoy Programme

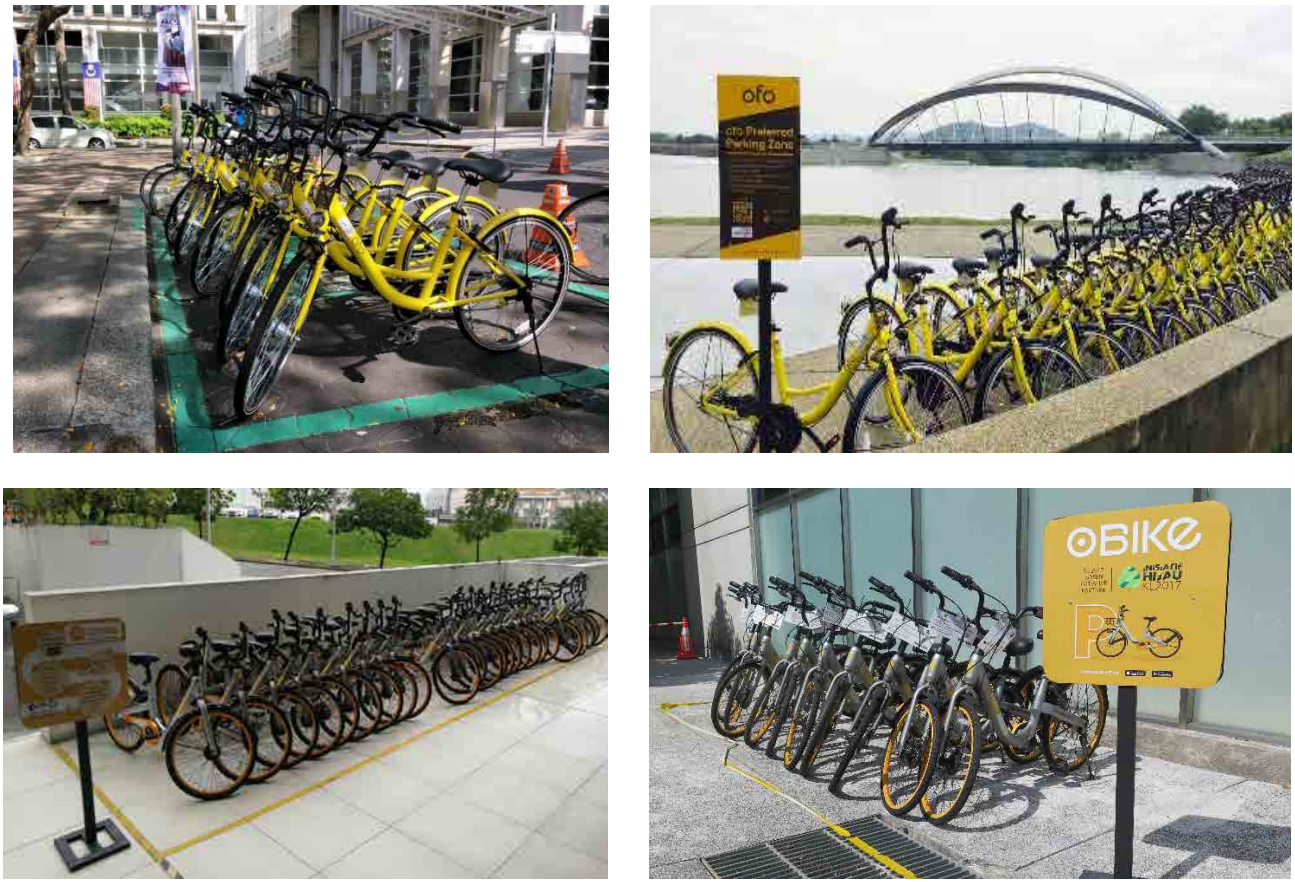
Putrajaya Bridge Night Ride

Women Cycling Convoy Programme in conjunction with World Women Day 2017

Putrajaya Community Fun Ride

3.3 Station Free Bike Sharing Facility

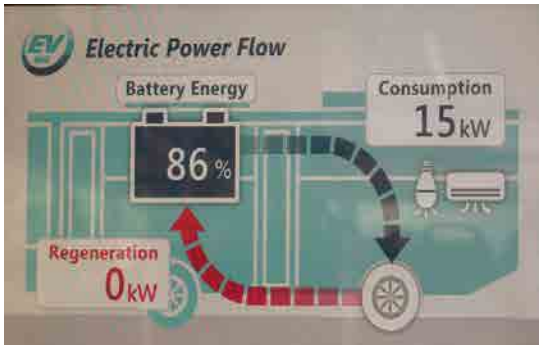
Until November 2017, two private operators had provided bike sharing facilities around Putrajaya. Approximately 527 units of rental bicycle were available for use in Precincts 1 to 5, 8 and 15. Between September and November 2017, there were 5,000 recorded users who traveled 61,061 km. This distance equals the carbon emissions of a petrol fueled car (15,876kgCO_2) . To absorb this amount of carbon will require the planting of 2,887 trees.



The Station and facility of Bike Sharing

3.4 Showcasing of Super Quick Charging Electric Bus

As an initiative to introduce low carbon transport, a project to showcase the use of electric-powered public bus was jointly conducted by Putrajaya Corporation and the New Energy and Industrial Technology Development Organisation (NEDO), Japan. This project runs from 2016 to 2021. Under the agreement, NEDO will supply in stages, 11 electric-powered buses and 4 charging stations. 3 stations are available at Putrajaya Sentral and 1 at Precinct 9 bus depot. As of November 2017, 6 electric buses have commenced operations, with the aim to reduce carbon emissions by 40%. This is an effort to make Putrajaya the city that pioneer green technology by 2025.



The implementation of Putra-NEDO Electric Bus Project was carried out by Putrajaya Corporation's subsidiary - Public Transport Putrajaya Travel & Tours Sdn. Bhd. (PAPTT). The Super Quick Charging (SQC) electric bus project was the first of its kind in ASEAN Region, and 6 electric buses have been operating commercially in Putrajaya since 8 June 2017.

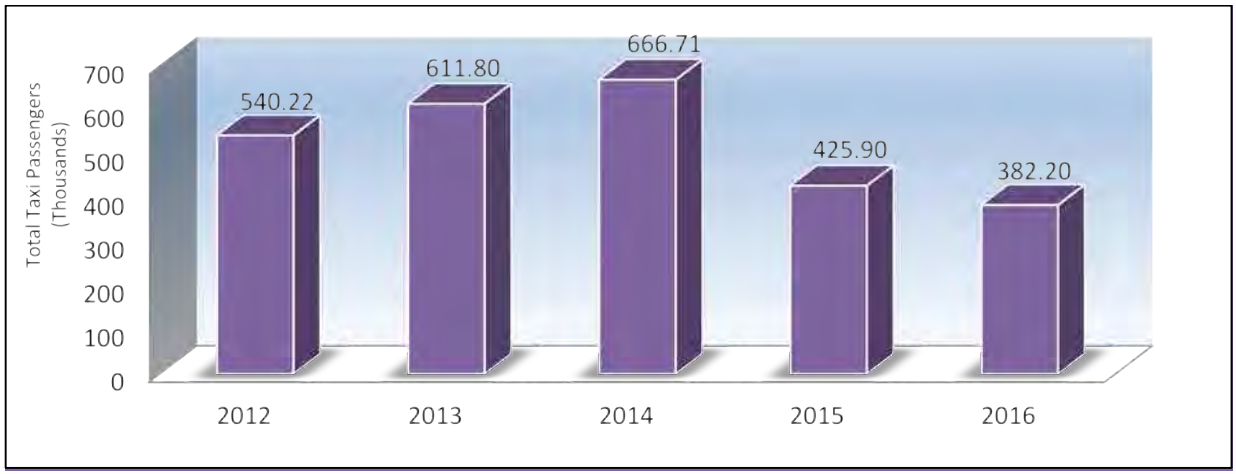
The launching of Putra-NEDO Electric Bus Project on 28 August 2017 at Precinct 7, Putrajaya Sentral

3.5 Quick Facts

Chart 3.1: Annual Bus Passengers, Putrajaya

Source: Public Transport Putrajaya Travel and Tours Sdn. Bhd.

Chart 3.2: Annual Taxi Passengers, Putrajaya



Source: Public Transport Putrajaya Travel and Tours Sdn. Bhd.

Chart 3.3: Annual Express Rail Link (ERL) Passengers, Putrajaya Sentral Station

Source: Express Rail Link Sdn. Bhd.

4.0 ENERGY USAGE

4.0 ENERGY USAGE

4.1 Improve Energy Efficiency (EE)

4.1.1 Putrajaya Corporation Complex

From 2015 to 2017, Putrajaya Corporation has continued its effort to increase energy efficiency in Putrajaya. At Putrajaya Corporation Complex, among the improvements made were the replacement of energy-saving lamps and installation of sensors to detect brightness and movement in the office.

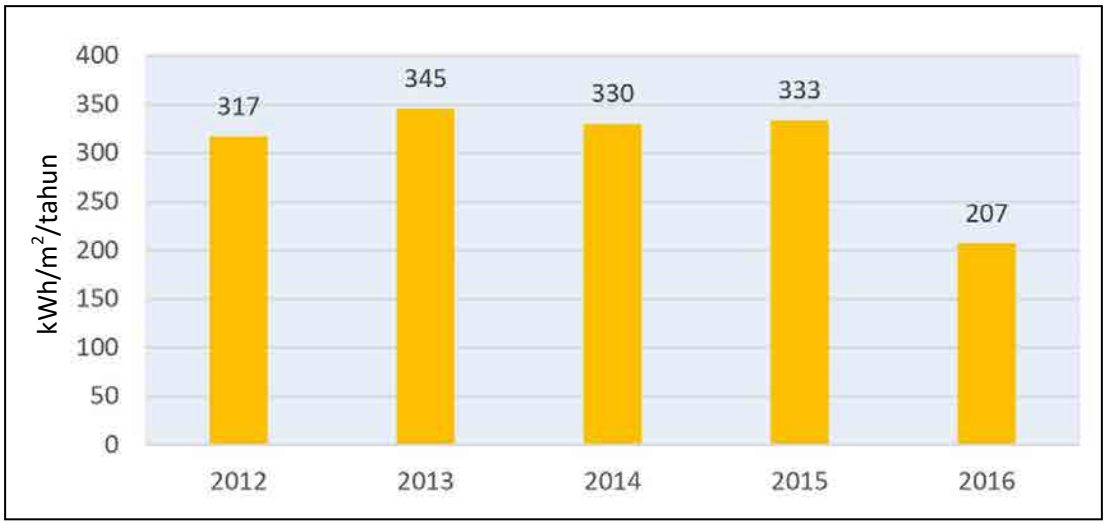
Installing energy saving lamps, brightness and movement detectors in the office.

LED down light installed at the corridors.

LED T8 Tube and T5 Fluorescent lamps at the stairways.

Up to 2016, Putrajaya Corporation's initiatives to enhance energy efficiency had succeeded in lowering its building energy index (BEI) by 35%, from 317kWh/m_2/year in 2012 , to 207kWh/m_2/year in 2016. As for the annual utility cost, electricity bill for the office blocks, in particular Block A - D, also recorded 13% decline compare to 2013.

Chart 4.1: Putrajaya Corporation Complex's Building Energy Index (BEI)



Source: Building Consumption Input System (BCIS), 2017

4.1.2 Public Lighting

Besides Putrajaya Corporation complex, effort was also made to ensure public lightings in Putrajaya are more energy efficient. Under this initiative, two approaches were taken. Approach one involved the replacement by stages, the existing high pressure sodium valve (HPSV) to the more energy saving light-emitting diode (LED). Approach two is for new development to use energy saving lamps for public lightings.

As of October 2017, 673 public lightings in Putrajaya have been replaced by LED lamps. The replacement works were carried out at two locations - Lebuh Wawasan and Jalan Alamanda. Table 4.1 shows the reduction in daily energy consumption, before and after the replacement of LED lamps. The reduction could reach up to maximum 26%. While electricity bill also recorded substantial savings (48%) compared to that of HPSV lamps.

Table 4.1: Comparison of Daily Energy Consumption (kWh) at Lebuh Wawasan and Jalan Alamanda

Location	Average Daily Energy Consumption (kWh)		Reduction (%)
	Before	After	
Lebuh Wawasan	265 (56 nos HPSV)	196 (26 nos HPSV + 30 LED)	26
Jalan Alamanda	337 (92 nos HPSV)	279 (60 nos HPSV + 32 LED)	17

Source: Department of Engineering and Maintenance, Putrajaya Coporation

LED streetlights at Jalan Alamanda

LED streetlights at Lebuh Wawasan

4.2 Increase the use of Renewable Energy Consumption

4.2.1 Installation of Photovoltaic (PV) Solar System at Government Buildings

To further promote the use of renewable energy in Malaysia, the government has in 2014, launched the initiative to install photovoltaic (PV) solar system at government owned buildings. This was one of the government's lead-by-example (GLBE) initiatives, and was implemented by the Sustainable Energy Development Authority (SEDA).

The PV project was divided into two phases. Phase one, 24 government office complexes in Putrajaya were chosen to be installed PV solar system, with capacity ranging between 12kWh to 48kWh (Table 4.2). Besides PV solar, this project is also equipped with online monitoring system to record the amount of solar energy generated daily.

Table 4.2 Government Office Buildings and Complexes Installed with PV Solar System

No.	Listing	Capacity (kWp)
1.	Ministry of Energy, Green Technology and Water (KeTTHA)	48kWp
2.	Ministry of Agriculture and Agro-based Industry	24kWp
3.	Ministry of Natural Resources and Environment (NRE)	30kWp
4.	Ministry of Youth and Sports	30kWp
5.	Ministry of Rural and Regional Development	24kWp
6.	Ministry of Urban Wellbeing, Housing and Local Government	12kWp
7.	Ministry of Women, Family and Community Development	20kWp
8.	Ministry of Tourism and Culture	30kWp
9.	Ministry of Federal Territories	24kWp
10.	Ministry of Domestic Trade, Co-operatives and Consumerism	20kWp
11.	Ministry of Plantation Industries and Commodities	20kWp
12.	Ministry of Science, Technology and Innovation	20kWp
13.	Ministry of Health	20kWp
14.	Ministry of Education	20kWp
15.	Ministry of Finance	42 kWp
16.	National Registration Department	20kWp
17.	Royal Malaysian Customs Department	40kWp
18.	Public Service Department	24kWp
19.	Department of Islamic Development Malaysia (Complex D)	24kWp
20.	Legal Affairs Division (BHEUU), Prime Minister Department	48kWp
21.	Public Sector Home Financing Board	30kWp
22.	Putrajaya Corporation	24kWp
23.	Accountant General's Department	20kWp
24.	Public Works Department	20kWp

Source: Sustainable Energy Development Authority

Putrajaya Corporation

Department of Islamic Development Malaysia (Complex D)

Ministry of Energy, Green Technology and Water (KeTTHA)

4.2.2 Installation of Photovoltaic (PV) Solar System at National Cancer Institute's (IKN) Pedestrian Route

The National Cancer Institute (IKN) is the government building involved in phase 2 of this project. In July 2017, 70kWh PV solar system was installed at the 125 meters pedestrian walkway between IKN and Putrajaya Hospital. The total electricity generated from this solar system is estimated at 89, 971 kWh/year.

Photovoltaic (PV) solar system installed at the pedestrian walkway connecting National Cancer Institute (IKN) and Putrajaya Hospital

Table 4.3: Solar Power Generation and Carbon Emissions Reduction Estimates

Description	Phase 1 (24 Government Buildings)	Phase 2 (Padestrian Walkway at National Cancer Institute)	Total
PV Solar Generated (MWh/year)	809.9	89.4	899.3
Carbon Emission Reduced (tanCO_2/year)	605.0	62.1	667.1

Source: Sustainable Energy Development Authority

4.3 Low Carbon House

Besides the initiatives carried out by the government, Putrajaya's residents have also embarked on their own energy-saving initiatives at home. One example is the 'low carbon house' in Precinct 14. The home owner has introduced green elements in his terrace house, with the aim to reduce monthly energy consumption and save electricity bill. This project has managed to lower the average monthly electricity usage to 200kW, equivalent to RM50 electricity bill. As for the measurement on building energy index, it is only 8.27kWh/m_2/year.

To give a better understanding, below are examples of the key actions taken by house owners to save energy and electricity bill:

Top-hung Window System

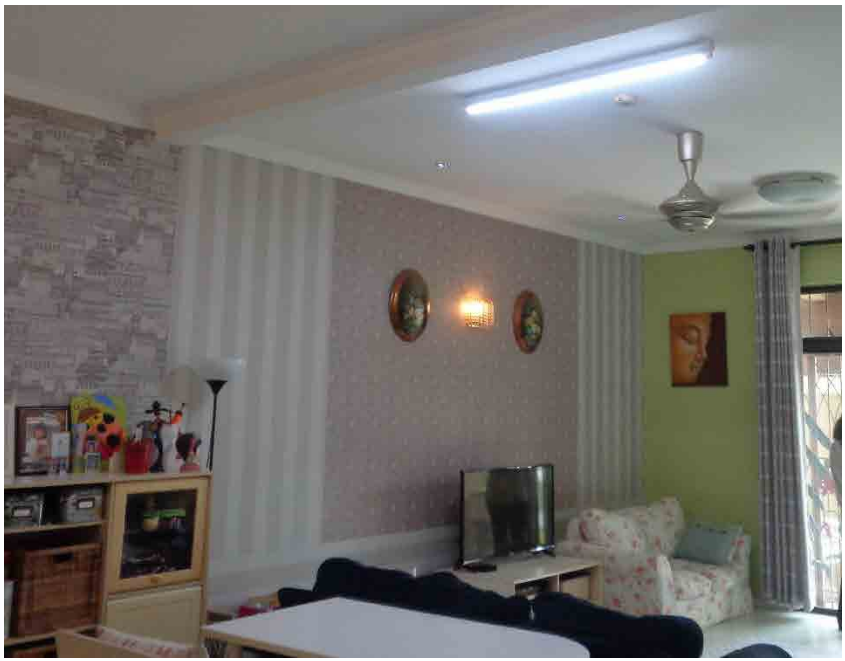
Top-hung windows are used to promote air flow and dispel heat, especially at night. This design together with the use of electric fan, could lessen the dependency on air conditioners.

To ensure the windows and doors (sliding doors) can be left open at all times to allow air flow into the house, the house owner had installed mosquito netting. Good air flow can help lower the internal temperature of the house especially during day time.

Flowers and Plants

The owner had grown flowers and plants to function as the awning, that shade and cool the house during day time. These plants also serve to make the surrounding more green and attractive.

Energy Efficient Appliances



The house owner had chosen energy saving lamps and refrigerator for their home. The choice of appliance shall meet the household needs and not incur wastage.

Renewable Energy

PV solar system with the capacity of 6kWp was installed by the house owner to help lessen electricity use and reduce carbon emissions.

Food waste were seperated, collected and turn into fertiliser

4.4 Quick Facts

Table 4.4 Electricity Consumption Per Capita (kWh) in Putrajaya

Description	2012	2013	2014	2015	2016
Total Domestic Electricity Consumption (kWh)	72,519,970	103,640,035.43	125,381,875.00	135,842,542.00	58,634,330.85
Population	79,400	80,500	82,200	81,400	84,400
Toatl Electricity Consumption Per Capita (kWh)	913	1,287	1,525	1,669	1627
kWh/day/capita	2.50	3.53	4.18	4.57	4.46

Source: MURNInet 2012-2016

5.0 WATER USAGE

5.0 WATER USAGE

5.1 The Control of Lake Water Quality

In 2010, Putrajaya has recieved the recognition from UNESCO - International Hydrological Programme (IHP), as one of the seven sites in the world that spearheads best practices in ecohydrology managent for its water bodies. Putrajaya Corporation is committed and had initiated various programmes to ensure the city provides the best, from infrastructure to management of water quality that meet the National Water Quality Standards.

Supervisory Control and Data Acquisition (SCADA)

In order to maintain good water quality for lakes and wetlands in Putrajaya, Putrajaya Corporation had installed early warning system or Supervisory Control and Data Acquisition (SCADA) system to detect pollution. Five telemetry stations have been set up at Putrajaya Lake. This tool collects water quality information 24 hours and is monitored by Putrajayas Lake and Wetland Division via computer monitoring system and Telegram. There are two types of alerts which each SCADA station transmits to the control division. These alerts are Operational Alert and Pollution Alert, which will then be forwarded to the relevant controlling agencies for follow-up action.

These telemetry stations could keep track of the following 21 water quality parameters:
Water qualiti index (WQI), class, Amoniacal Nitrogen (NH3-N), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Water Accidity (pH), Total Suspended Solids (TSS), Nitrate (NO3), Turbidity (TUR), Chlorine (Cl), Conductivity (COND), Ammonia (NH3), Ammonium (NH4), Chloride (Cl-), Concentration Value (CPYL), Blue-green Algae (BGA), Hydrocarbon (HC), Temperature (TEMP), Total Dissolved Solids (TDS) and Total Organic Carbon (TOC).

The station at Marina Putrajaya

The station at Cyberjaya Inlet

The station outlet at Precinct 9, 10, 11

The station at Lake Valley

The station at Seri Bakti

Information from the SCADA stations can be monitored online

5.2 Awareness Programme for the Importance of Putrajaya Lake

5.2.1 International Seminar on Putrajaya Lake and Wetland Ecohydrology Management

This international seminar was held from 19 to 20 January 2016 at Seri Melati Hall, Putrajaya Corporation Complex. The purpose of this seminar was to share and diseminate findings from the *Putrajaya Lake and Wetland, Ecosystem Services Economic Assessment (ESEA),* and also to make known the results of studies on Putrajaya lakes and wetlands' water, biology, engineering and management quality.

This seminar was attended by 218 participants from various sectors, including officials from the public and private sectors, students from institutes of higher learning and foriegn representatives. 14 working papers were presented during the discourse. This seminar had highlighted the recomendation for future innovation, improvement and way forward for Putrajaya's lake and wetland integrated management.

The seminar was officiated by Senator Dato' Dr. Loga Bala Mohan, Deputy Minister of Federal Territories.

5.2.2 National Care for Water Young Leaders Camp (Central Zone) UNESCO-IHP 2016

The National Care for Water Young Leaders Camp (Central Zone), UNESCO-IHP 2016 was held at Putrajaya Wetlands Park camp site from 22 to 24 March 2016, in conjuction with the World Water Day. Putrajaya Corporation has been appointed for the second time as the main organiser and host of this camp.

The organiser and participants of the National Care for Water Young Leaders Camp (Central Zone), UNESCO-IHP

5.3 Quick Facts

Table 5.1: Water Loss Rate in Putrajaya 2011 to 2016

Year	2011	2012	2013	2014	2015	2016
Total treated water generated (m^3)	19,375,275	21,636,808	23,310,593	24,627,282	24,312,285	25,147,412
Total water used (m^3)	16,784,325	19,194,568	20,910,175	22,132,761	21,648,150	21,331,861
NRW (m^3)	2,590,950	2,442,240	2,400,418	2,494,521	2,664,135	3,815,551
NRW (%)	13.4	11.3	10.3	10.13	10.96	15.17

Source: MURNInet 2011-2016

Table 5.2: Daily Domestic Water Consumption in Putrajaya 2011 to 2016

Year	Domestic Water Consumption (liters/day/person)	
	Putrajaya	Malaysia
2011	351	210
2012	258	212
2013	253	210
2014	295	211
2015	271	209
2016	261	210

Source: MURNInet 2011-2016

Table 5.3: Comparison of Lake and River Water Quality Index

Location	Lake and River Water Quality Index					
	2012	2013	2014	2015	2016	2017
Sungai Chua (Chua River), Inlet	83.3 (Class II)	81.9 (Class II)	78.4 (Class II)	78.7 (Class II)	80.2 (Class II)	70.1 (Class III)
Lake Water	91.5 (Class II)	88.7 (Class II)	90.4 (Class II)	90.5 (Class II)	90.0 (Class II)	90.4 (Class II)
Outlet after Putrajaya Dam	89.7 (Class II)	87.1 (Class II)	90.9 (Class II)	89.8 (Class II)	89.4 (Class II)	87.6 (Class II)

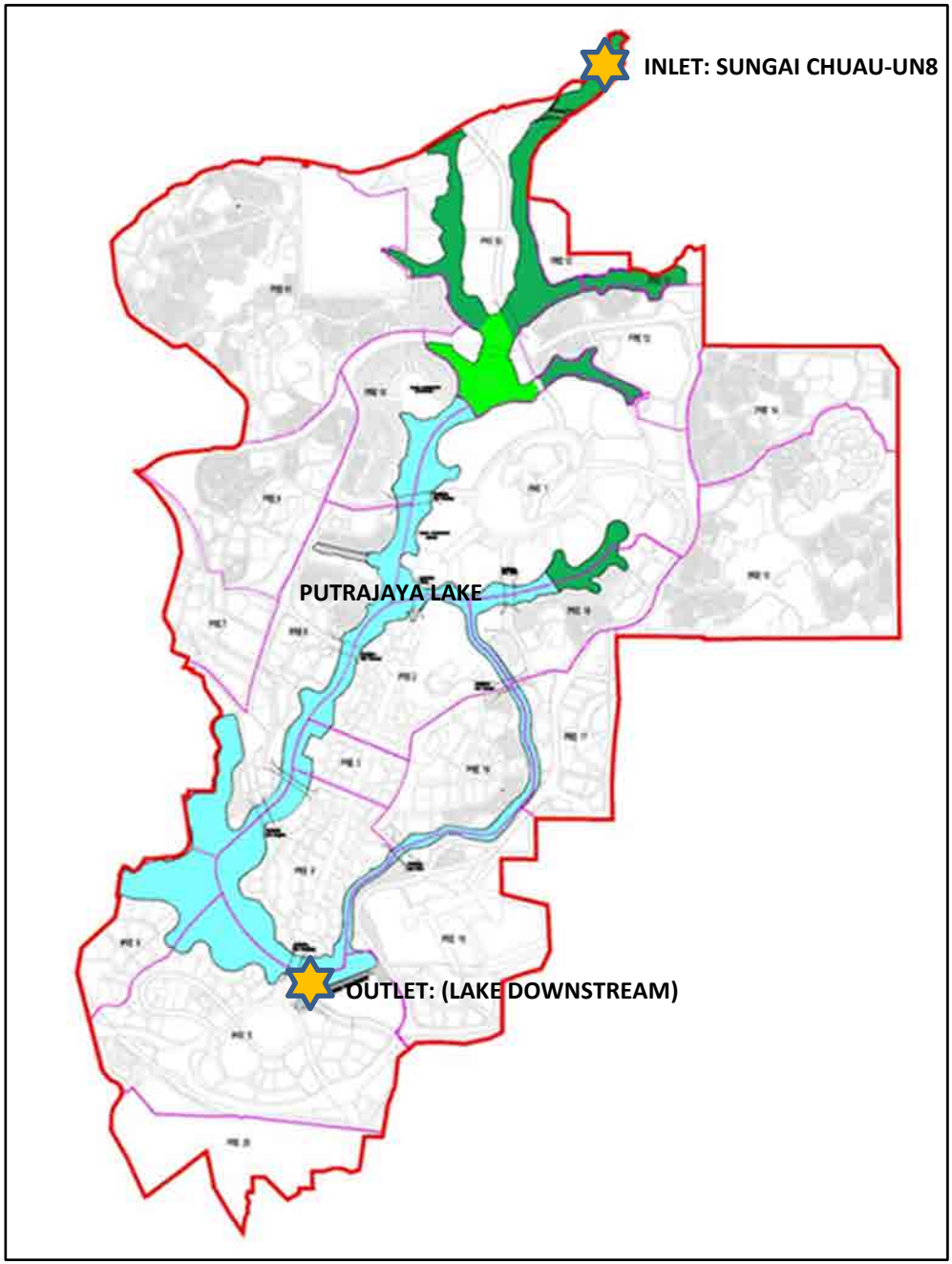
Source: Putrajaya Environment, Lake and Wetland Division

Table 5.4: The Benefits of Using Lake Water As An Alternative Water Resource

Item	2002-2013	2014	2015	2016	2017
Approved Annual Lake Water Intake (million liters)	473.66	56.19	59.21	181.99	389.98
Savings from Not Consuming Treated Water (RM)[(1)]	RM770,643	RM90,466	RM95,328	RM293,004	RM627,868
Annual Water Consumption[(2)]	Equals: 6,275 people	Equals: 737 people	Equals: 776 people	Equals: 2,386 people	Equals: 5,112 people

Notes: *(1) Based on government department rate of RM1.61/ m^3.*
(2) Estimates based on Malaysian's average daily domestic water consumption (203 liter/person) x 365 days.

Figure 5.1: Water Quality Sampling Location (Inlet and Outlet)



Source: Putrajaya Environment, Lake and Wetland Division

6.0 SOLID WASTE MANAGEMENT

6.0 SOLID WASTE MANAGEMENT

6.1 Separation of Waste at Source

The regulation that requires waste to be separated at source was enforced in Putrajaya on 1 September 2015, when the city adopted the Solid Waste and Public Cleansing Management Act 2007 (Act 672). Besides having to fulfill the legal obligations stipulated in Act 672, this exercise is also important to:

- Reduce the disposal of recyclable materials.

- Reduce the amount of final disposal at dumping site.

There are two types of waste: (1) recyclable waste and (2) residual waste (kitchen waste, food waste, dirty substance, disposable diaper, etc.). Recyclable waste (including bulk or garden waste) is collected once a week, whereas residual waste two times a week.

Examples of recyclable waste inlcuding bulk and garden wastes

Example of residual waste

Example of bulk and gurden waste

To encourage recycling among the residents, all landed housing areas are provided with two mobile bins. One is for recyclable waste (in orange colour) and the other for residual waste (green colour).

6.2 Enforcement on the Use of Biodegradable Product

Beginning 1 September 2017, the rulling that requires city-wide use of biodegradable products was enforced in Putrajaya. This rulling is expected to lessen the negative impact from the use of plastic and polystyrene in Putrajaya, and at the same time, reduce the cost to dispose plastic waste.

The intiative to promote the use of biodegradable products was carried out by phases at the following places and premises:


The use of biodegradable plastic bags at grocery stores, agricultural markets and *hypermarkets*.


Biodegradable food containers and wrappers used at the government office complexes' cafeterias and restraurants.

6.3 Food Waste Composting and Disposal Programme

Medium Scale Food Waste Composting Machine

From 2015 to 2017, two additional medium scale food waste composting machine were being operated in Putrajaya. The operation of these two machines were handled by Alam Flora Sdn. Bhd. and Putrajaya Floria Sdn. Bhd.

Alam Flora Sdn. Bhd. operates the second composting machine, which is located next to the recyling centre at Precinct 18. He machine started to operate in 2015 and can handle 100 kg waste.

Everyday, food waste from the market at Precinct 8 and the restaurants in the futsal complex at Precinct 18, were collected for composting.

Compost could be produced within 48 hours.

Worker taking out and sieving the compost, which will then be left to 'stabalised' for 2 to 6 weeks, before it is pack for sale.

The compost is packed and 1 kg compost is selling at RM4.00.

The third food waste composting machine in Putrajaya, contributed by the Ministry of Federal Territories.

This machine is placed at the Agriculture Heritage Park and is being supervised by Putrajaya Floria Sdn. Bhd., a subsidiary of Putrajaya Corporation. It started to operate since November 2016.

Food wastes were collected twice a day from the commercial premises at the Agriculture Heritage Park.

Food wastes were then mixed with EM to expedite the decomposition.

The compost was used for the cultivation of young trees.

Small Scale Food Waste Disposal Machine

Merry Corporation of Japan had donated a small scale food waste disposal machine to Putrajaya Corporation. The machine was placed at MAIWP Sulaimaniyyah Islamic Kindergarten, Precinct 18, Putrajaya. The machine has been used to educate and promote low carbon lifestyle among the younger generation, in particular children at kindergaten level.

In a ceremony on 27 July 2017, Mr. Matsuo Takaki, Vice President of Merry Corporation, Japan, handed over the food waste disposal machine to Dato' Fadlun bin Mak Ujud, Vice President of Putrajaya Corporation.

The food waste disposal machine, also known as 'the little giant', could dispose various types of food waste up to maximum 10 kg per day. The machine uses 'bio chip' to break down organic food waste within 24 hours. The machine could also produce compost if the bio chip is replaced with other matarial such as paddy husk.

Mr. Matsuo Takaki from Merry Corporation, Japan, explained and demonstrated the method to operate the food waste disposal machine.


Teachers and children from the kindergarten learnt to operate the food waste disposal machine.

6.4 Solid Waste Management and Recycling Facilities

6.4.1 Integrated Waste Management Centre, Precinct 5

A new integrated waste management centre was planned at Precinct 5, Putrajaya and would be implemented in two phases. Phase 1 of this project would be completed in 2018. It is being built on a 5.65 acres site with proposed components such as material recovery facilities (MRF), recycle centre, 3R boutique, 3R education centre and neighbourhood farming plot.

The phase 1 development site at Precinct 5, near sewage treatment plant 2 (STP2).

Material recovery facilities (MRF)

Neighbourhood farming plot

6.4.2 3R Boutique and Food Waste Compost Centre, Precinct 18

In June 2015, a permanent recycling centre, 3R boutique and the second Alam Flora Composting Centre were launched. The recycling centre and 3R boutique operate on Sunday. This 3R boutique is the second in Putrajaya, and it comes with more quality and attractive interior. Apart from clothes, this boutique also recieves donation items such as bags, toys and shoes, which are for charity sale.

This facility is located next to the 1Malaysia Futsal Complex at Precinct 18.

The counter and racks in the boutique are made of recycled wood.

The items are sold cheaply priced between RM0.50 to RM5.00.

6.5 Putrajaya Green City 2025 Award (PGC2025): 3R Creativity

PGC2025 Award: 3R Creativity was introduced in 2015 to promote recycling culture among people and communities in Putrajaya. This award and its related programmes' main objectives are:

- To achieve the quantitative target of PGC2025, that is to reduce waste disposal at dump site by 50%, through solid waste management (3R Putrajaya).
- To increase reuse and the collection of recylable items to be sent to recyle centre. This will subsequently reduce wastage (Action 9).

Activity At Primary and Secondary School in Putrajaya

The inaugural 3R Creativity Competition was held in 2015, in conjunction with the Low Carbon Green City Forum themed Solid Waste Management and 3R Activity. This event was organised in partnership with the National Solid Waste Management Department (JPSPN), Solid Waste and Public Cleansing Management Corporation (PPSPPA) and Alam Flora Sdn. Bhd.

The competition was opened to all primary and secondary schools' pupils in Putrajaya. It was held for two months, from January to February 2015. This competition was divided into two parts as follow:

- Stage one: collect recylable items and calculate recycling rate per capita by individual school.
- Stage two: produce 3R creative design using the collected recyclable items. The creation could be decorative item or item design to solve the issue identified by school.

Schools that participated in the competition were required to collect recyclable items from the month of January to February 2015.

The total collected recyclable items during the competition period was 52,946.50 kg. The highest collection per capita was 362.50 kg/capita.




The size of the creation must not exceed 1 m (H) x 1 m (W) x 1 m (L) and is portable.

The main winners are as follow:

Secondary School Category:
First : SMK Putrajaya Precinct 9 (1)
Second : SMK Putrajaya Presint 11 (1)
Third : SMK Putrajaya Presint 11 (2)

Primary School Category:
First : SK Putrajaya Precinct 9 (1)
Second : SK Putrajaya Precinct 8 (1)
Third : SK Putrajaya Precinct 11 (2)

Secondary school first place winner was SMK Putrajaya Precinct 9 (1), with the 3R creation titled 'My Snail Bin'.

The first place winner of the primary school category was SK Putrajaya Precinct 9(1). The winning creation was a organic self-watering system called SPES-O.

The first place winners recieved a trophy, RM1,000 cash, certificate of participation and appreciation gift.

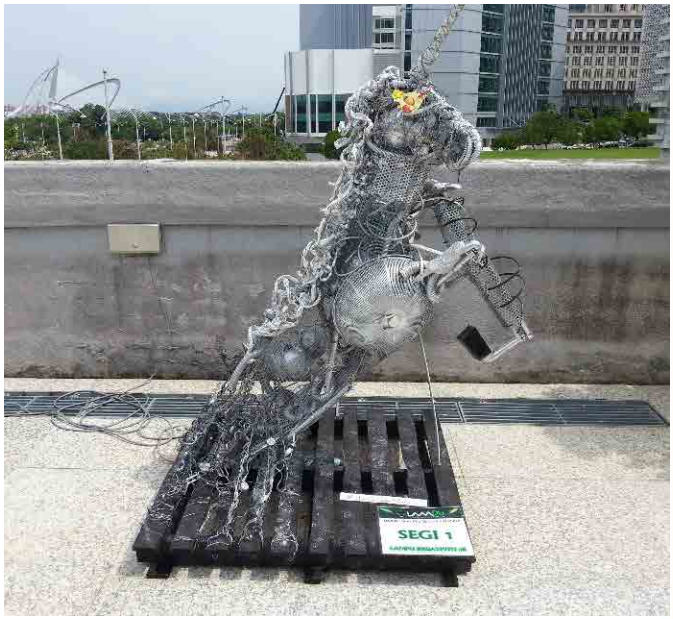
The first place winner of each category was invited to present their creation at the prize giving ceremony during the Local Carbon Green City Forum 2015 on 12 March 2015.

Light and Motion Festival (LAMPU) Putrajaya

Besides the events held at the schools, the 3R Creativity Competition was also one of the side events during the Light and Motion Festival (LAMPU) Putrajaya, held from 2015 to 2017. Subsequently, the participation of 3R Creativity LAMPU was extended to institutes of higher learning and professional bodies such as architecture and urban planning entities.

The main evalution criteria of this competition include:

- Creativity and aesthetic values.
- Variety of 3R materials being used.
- Application of green technology.
- Creations' finishing and firmness.

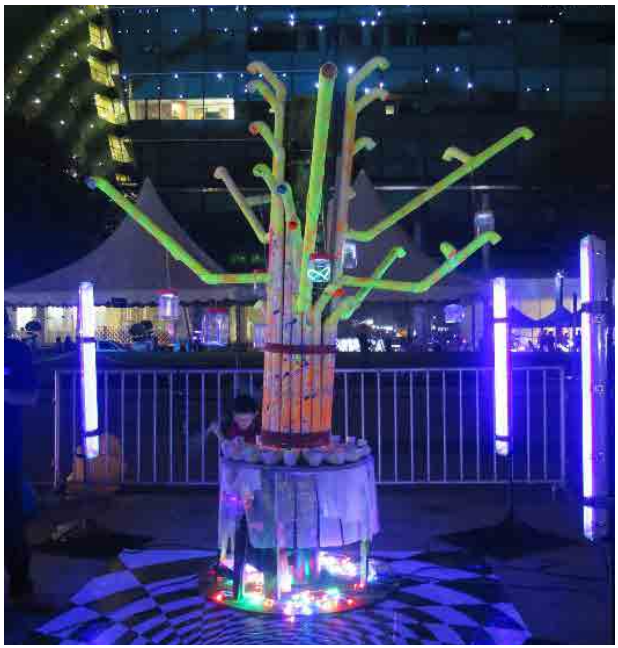


3R creation submitted by institutes of higher learning participated in the 3R Creativity LAMPU, 2015.




3R creation submitted in 3R Creativity LAMPU, 2016.






3R creation submitted by professional architect and urban planner firms in 3R Creativity LAMPU, 2017.

6.6 Quick Facts

Table 6.1: Solid Waste Rate in Putrajaya

Year	Total Solid Waste (kg)	Solid Waste (tonnes/day)	Total Domestic Solid Waste (kg)	Domestic Waste (tonnes/day)
2014	34,473,700	94.4	27,757,460	76.0
2015	37,613,320	103.1	28,987,590	79.4
2016	40,084,760	109.8	29,360,290	80.4

Source: Environmental Health Division, Putrajaya Corporation

Table 6.2: Recycling Rate in Putrajaya from 2014 to 2016

Year	Total Domestic Solid Waste (kg)[1]	Population[2]	Domestic Waste (kg/capita/day)[3]
2014	27,757,460	82,200	0.93
2015	28,987,590	81,400	0.98
2016	29,360,290	84,400	0.95

Sourcer: (1), (3) Environmental Health Division, Putrajaya Corporation
(2) MURNInet 2014-2016

Table 6.3: Recycling Rate in Putrajaya from 2014 to 2016

Year	Total Domestic Solid Waste (kg)	Total Recyclable Items Collected (kg)	Recycling Rate (%)
2014	27,757,460	2,220,000	7
2015	28,987,590	2,232,837	7
2016	29,360,290	2,382,172	8

Source: Environmental Health Division, Putrajaya Corporation

7.0 CITY ADMINISTRATION & MANAGEMENT

7.0 CITY ADMINISTRATION AND MANAGEMENT

7.1 Healthy Lifestyle

Friendly-walk With President of Putrajaya Corporation Programme

The Friendly-walk with President of Putrajaya Corporation Programme continued for year 2016 and 2017. The purpose of this programme was to encourage the people of Putrajaya to develop a healthy and low carbon lifestyle. In addition to that, this programme also intended to make Putrajaya a walkable city, with the President leads by example.

This walk programme was held every Wednesday for two hours, covering five to nine kilomtres around Putrajaya. This programme not only promoted low carbon lifestyle among residents, it was also a way for Putrajaya Corporation to monitor public facilities built around Putrajaya.

The '10,000 steps' signage at Putrajaya Recreational Park.

Friendly-walk Programme with President of Putrajaya Corporation.


Putrajaya Corporation's President and officers having a walking in the park and inspected the infrastructure and facilities that required upgrading.

Cycling Programme

Besides building user-friendly and safe bicycle lanes for the people as part of the initiatives to encourage low carbon lifestyle in Putrajaya, various cycling programmes have also been organised. These include:

Cycling Programme with President of Putrajaya Corporation, to Precinct 18's Community Centre


Putrajaya Bridge Night Ride 2017

7.2 Green Procurement

The Government of Malaysia has introduced Government Green Procurement (GGP) in year 2010. The Government Green Procurement Guidelines defines GGP as the acquisition of products, services and works in the public sector that takes into account environmental criteria and standards to conserve the natural environment and resources, with the aim to minimise and reduce the negative impacts of human activities.

The GGP is not just one of the instruments to achieve Government's aspiration drawn out in the National Green Technology Policy, but it can directly helps to achieve the target of carbon emission reduction. The use of environmentally friendly products and services as outlined in the GGP, is expected to enhance energy efficiency and consequently achieve cost saving.

GGP has put foward six groups of pioneer product and service to be implemented and they are as follow:

- Cleaning service.
- ICT equipment.
- *Energy efficient indoor lighting.*
- Paper.
- Paint or coating.
- Fibre cement.

Putrajaya Corporation has begun to implement Government Green Procurement in 2017. For a start, the focus was on installing energy efficient lighting.

ICT EQUIPMENT

PAPER

CLEANING SERVICES

SIMEN GENTIAN

PAINT

ENERGY SAVING LAMP

7.3 Award and Appreciation

Putrajaya Corporation has received numerous awards and appreciation throughout 2016 and 2017. Among the main awards were:

1. ASEAN Environmentally Sustainable Cities Award 2017.
2. Appreciation for Green Neighborhood Development Initiative by the Ministry of Housing and Local Government (KPKT) in conjunction with the World Town Planning Day 2017:
   - Bicycle lane facility.
   - Neighbourhood farming.
3. National Environment Day Special Award (Eco City Initiative) in conjunction with the National Environment Day 2017 on 21 October 2017, at the d'Tempat Country Club, Negeri Sembilan.
4. Malaysian Institutue of Planners (MIP) Planning Excellence Awards 2016:
   - Recognition for Sustainable Practices.
   - Merit Winner for Innovative Management (Ecohydrology Management of Lake and Wetland in Putrajaya Urban Ecosystem).

ASEAN Environmentally Sustainable Cities Award 2017

National Environment Day Special Award
(Eco City Initiative)

Appreciation for the Implementation of Green Neighbourhood Development Initiative, for two categories - bicycle lane facility and neighbourhood farming.

PUTRAJAYA CORPORATION

APPENDIX A

GREEN CITY TASK FORCE MEMBERS

PATRON:
YBhg. Datuk Seri Haji Hasim Bin Haji Ismail
President, Putrajaya Corporation

CHAIRMAN:
YBhg. Dato' Fadlun Bin Mak Ujud
Vice President City Planning

MEMBERS:
Pn. Norzita Binti Abdul Razak
Director Sustainable Development Division,
City Planning Department

Pn. Hjh Salmah Binti Hj Salman (TPr.)
Director Plan Approval & Land Development Division,
City Planning Department

En. Shamsul Bahrin Bin Rahmat
Director Building Inspectorate & Architecture Division,
City Planning Department

Tn Hj. Ahmad Zubir Bin Sapian
Director Environment, Lakes & Wetland Division,
City Planning Department

Tn Hj. Marzuki Bin Abdullah (Ir.)
Director Road Division,
Engineering & Maintenance Department

Tn. Hj Ab Rahim Bin Md. Junoh (Ir.)
Director Facility Management Division,
Engineering & Maintenance Department

Tuan Hj. Jalani Bin Abdullah
Director Project Management Division,
Engineering & Maintenance Department

En. Mohammad Bin Salleh
Director Recreation & Park Division,
Landscape & Park Department

Dr. Azali Bin Sulaiman
Director Environmental Health Division,
City Services Department

Pn. Roziah binti Bujang
Director Procurement & Surveying,
Finance Department

En. Abd Aziz Bin Buang
Senior Deputy Director Management & Landscape Division,
Landscape & Park Department

En. Ahmad Azuddin Bin Arshad
Senior Deputy Director Strategic Planning Division,
Corporate Services Department

En. Norazle Bin Abd Malik
Principal Assistant Director Sustainable Development Division,
City Planning Department

LIST OF APPRECIATIONS

APPENDIX B

MINISTRY OF FEDERAL TERRITORY

MINISTRY OF ENERGY, GREEN TECHNOLOGY AND WATER (KeTTHA)

MINISTRY OF URBAN WELLBEING, HOUSING AND LOCAL GOVERNMENT

PUBLIC WORKS DEPARTMENT PUTRAJAYA

SUSTAINABLE ENERGY DEVELOPMENT AUTHORITY MALAYSIA (SEDA)

MALAYSIAN GREEN TECHNOLOGY CORPORATION (MGTC)

ENERGY COMMISSION

GREEN BUILDING INDEX (GBI)

SOLID WASTE MANAGEMENT AND PUBLIC CLEANLINESS CORPORATION (SWCorp)

ALAM FLORA SDN. BHD.

NEW ENERGY AND INDUSTRIAL TECHNOLOGY DEVELOPEMNT ORGANIZATION (NEDO), JAPUN

MERRY CORPORATION, JAPUN

MALAYSIAN INSTITUTE OF PLANNERS (MIP)

EXPRESS RAIL LINK SDN. BHD.

KOPERASI PENGANGKUTAN PUTRAJAYA & CYBERJAYA BERHAD.

PENGANGKUTAN AWAM PUTRAJAYA TRAVEL & TOURS SDN. BHD. (PAPTT)

OFO MALAYSIA

OBIKE MALAYSIA

TADIKA ISLAM MAIWP SULAIMANIYYAH, P18

SECRETARIAT (PUTRAJAYA GREEN CITY SECTION):

Wang Tze Wee

Nor Hasimah Binti Haji Samod

Khairuddin Haikal Bin Noor Azhar

Muhammad Fahri Bin Zulkipli

Hamzah Husni Bin Mustafa