PUTRAJAYA

LOW CARBON GREEN CITY

INITIATIVES REPORT

Putrajaya Low Carbon Green City Initiatives Report

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Fifth Edition
November 2020

FOREWORD from the President

Assalamualaikum Warahmatullahi Wabarakatuh and greetings.

Alhamdulillah, my sincere congratulations on the release of the fifth edition of the Low Carbon Green City Initiatives Report.

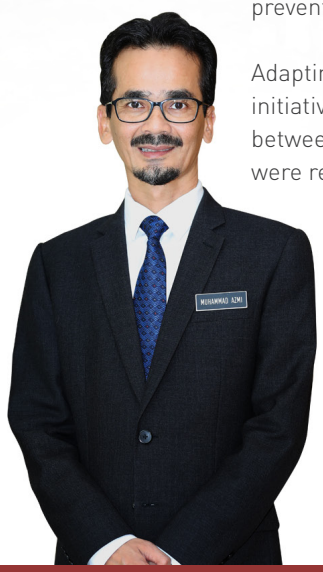
This report showcases the continuous efforts of Putrajaya Corporation, our strategic partners and our communities in Putrajaya to make Putrajaya a Green City based on seven areas of interest.

2020 is a very challenging year for all of us, the COVID-19 pandemic has disrupted lives and changed the world. However, the pandemic has not prevented Putrajaya from actively implementing the Green city's programmes. We have successfully modified and adapted our approaches, strategies an action to the Standard Operating Procedures established by Government during the Movement Control Order (MCO) period.

Our observations indicate that the COVID-19 pandemic has had a positive impact on environmental quality and we can see a reduction in carbon emissions, particularly during the MCO period. This is largely explained by the decline in the number of economic activities and the use of motor vehicles during this period.

However, these effects will only be temporary, if follow-up action is not taken to address the issue of climate change at the city level. Based on this scenario, our next challenge is to formulate our green initiative programmes to suit the new normal lifestyle adapted within the community, private and government work cultures in the post-COVID-19 era. Behaviour change resulting from the COVID-19 pandemic could support or undermine efforts to prevent climate change at the micro-level.

Adapting to the new standard, Putrajaya Corporation will pursue its efforts to implement low carbon green city initiatives with exciting new programmes in the years ahead. These programmes will enhance cooperation between the members of the task force and the strategic partners. Our strong collaboration and ongoing efforts were recognized when Putrajaya won the 2020 National Green City Award for the bicycle lane category.



I wish to express my deepest gratitude to all those involved in planning and implementation various programmes and initiatives that support Putrajaya Green City 2025 (PGC2025). We hope that this collaboration and effort will continue until we reach our final goal of making Putrajaya a Green City in 2025.

Thank you.

DATUK MUHAMMAD AZMI BIN MOHD ZAIN
PRESIDENT, PUTRAJAYA CORPORATION
NOVEMBER 2020

MESSAGE from the Vice President

Assalamualaikum Warahmatullahi Wabarakatuh and greetings.

All praises be to Allah SWT for His bounty and permission, that Putrajaya Green City Task Force had successfully carried out various green city initiatives and programmes throughout 2019 and 2020.

In line with the post-COVID-19 situation, Putrajaya Corporation which is the city administrator and local planning authority, has taken proactive measures based on the new normal to reduce the risk of COVID-19 outbreak in Putrajaya.

In implementing the programmes for green city initiative, the committee has turned to online methods such as conducting energy management training and the Putrajaya Green Initiative Award (AIH Putrajaya). AIH Putrajaya is a new annual programme introduced in May 2020 during the Movement Control Order (MCO) period. The aim is to ensure that during MCO time, the communities in Putrajaya continue to practice green initiatives especially at their residential areas.

In addition, we are also focusing on initiatives based on physical project such as the improvement of pedestrian walkways, bicycle lanes, the installation of bike access ramps at two Putrajaya bridges, retrofitting and installation of energy-saving lamps and the development of new recycling innovation facility (FIKS).

Other than that, special education materials on green practices for primary school children - the Putrajaya Green Folio book have been produced under the GreenROSE@Putrajaya Programme.

For the adult and senior citizen groups, the CAREton@Putrajaya programme which is based on the concept of circular economy. The CAREton@Putrajaya programme aims to reduce solid waste such as used beverage cartons (UBC) and further develop green technology products based on UBC. It is the intention of this Corporation that, this programme not only increase the community's creativity in upcycle activities but also to generate green economy in the city.

All new and existing initiatives have received strong support from the private companies and government agencies that specialise in their respective fields. Last but not least, my utmost appreciation to all parties that have contributed to Putrajaya Green City initiatives.

Thank you.

DATO' FADLUN BIN MAK UJUD
VICE PRESIDENT CITY PLANNING
PUTRAJAYA CORPORATION
NOVEMBER 2020

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CITY PLANNING & BUILDING

1.0 CITY PLANNING AND BUILDING

1.1 Inventory of Putrajaya Greenhouse Gas Emissions

Putrajaya Corporation has continued to conduct its annual inventory of greenhouse gas (GHG) emissions, as a way to measure the achievement of its green city initiatives. The GHG emissions in Putrajaya are measured by the emissions level in seven sectors - residential buildings, government buildings, commercial buildings, public amenities and utilities, passenger transportation, freight transportation and solid waste.

1.1.1 Inventory of Putrajaya Greenhouse Gas Emissions 2018

In 2018, the total amount of GHG emissions in Putrajaya was 1,592ktCO_2eq. The rate of carbon emissions in 2018 was 4.1% higher than 2017 (1,530ktCO_2eq). Chart 1.1 summarises the GHG emissions trend in Putrajaya from 2012 base year up until 2018. The detail breakdown of the GHG emissions for the seven sectors are in Chart 1.2.

Chart 1.1: GHG Emissions in Putrajaya Year 2007, 2012 – 2018

Chart 1.2: GHG Emissions from the Seven Sectors

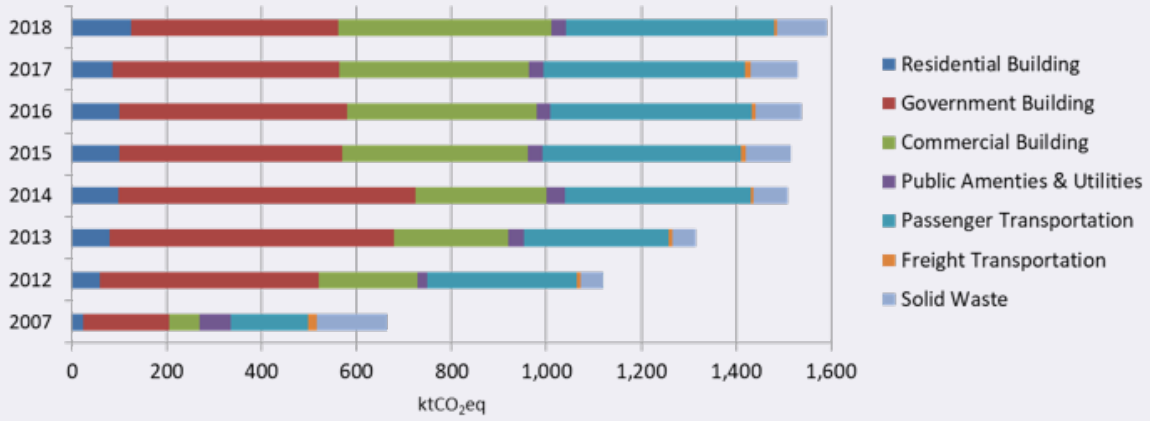


Table 1.1 shows that in 2018, the increase in GHG emissions was closely related to the total increase of GHG emissions from residential building, commercial building and solid waste.

Table 1.1: Comparison of 2018 GHG Emissions in Seven Sectors ($ktCO_2eq$)

Sector	2007	2012	2013	2014	2015	2016	2017	2018
Residential buildings	23	59	79	98	99	99	85	124
Government buildings	180	461	600	626	469	481	478	437
Commercial buildings	65	207	240	277	393	398	401	450
Public amenities and utilities	67	21	34	38	30	30	31	31
Passenger transportation	161	316	305	392	419	425	425	438
Freight transportation	20	7	7	7	10	7	11	6
Solid waste	148	49	51	72	95	97	100	106
Total GHG emissions	**664**	**1,120**	**1,316**	**1,508**	**1,515**	**1,538**	**1,530**	**1,592**
Carbon sink	**-**	**23.96**	**24.10**	**24.10**	**24.11**	**24.27**	**24.42**	**24.42**
Total GHG emissions (net)	**664**	**1,096**	**1,292**	**1,484**	**1,491**	**1,513**	**1,506**	**1,568**

In 2018, the main contributors of GHG emissions (Chart 1.3) were the building sector at 65% (1,042$ktCO_2eq$), followed by the transportation sector, 28% (444$ktCO_2eq$) and solid waste sector, 7% (106$ktCO_2eq$).

Chart 1.3: GHG Emissions from the Three Main Sectors 2018

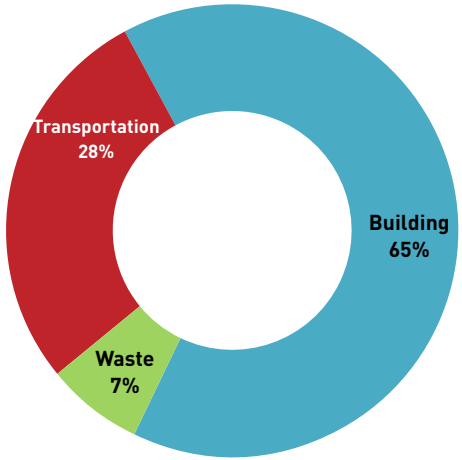
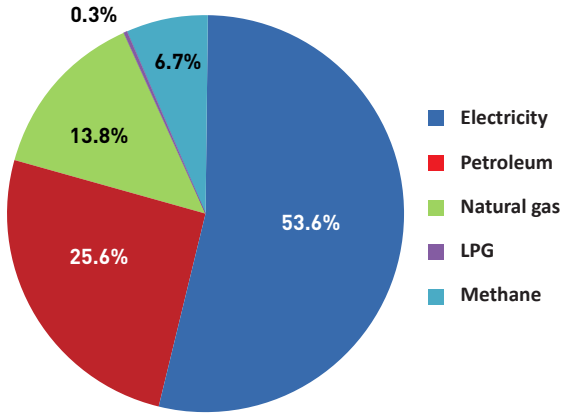


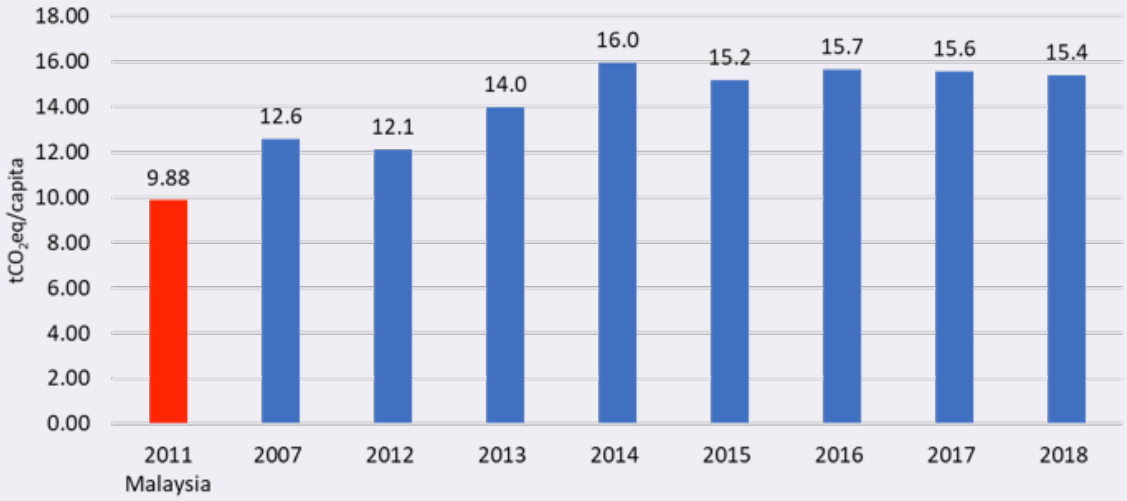
Chart 1.4: GHG Emissions based on Emission Source 2018



Three main sources of carbon emissions (Chart 1.4) are electricity power, 53.6% (853ktCO_2eq), petroleum, 25.6% (408ktCO_2eq) and natural gas, 13.8% (220ktCO_2eq). This shows that Putrajaya is still relying on non-renewable energy sources.

As for per capita emissions rate in 2018, chart 1.5 shows the inventory indicated a 1.3% decrease (15.4tCO_2eq/capita) from the rate in 2017(15.6tCO_2eq/capita).

Chart 1.5: GHG Emissions Per Capita 2018



Carbon Emissions from Building Sector

The building sector remains as the sector with the highest rate of energy consumption. Chart 1.6 shows the total floor areas developed up until 2018. Residential floor area was 47% in total, whereas non-residential 53%. Carbon emissions data from the building sector showed that non-residential building carbon emissions are significantly higher (88%) than residential building emissions (12%). Of the three non-residential building types, commercial building emissions were the highest at 43%, followed by government building at 42% and public amenities and utilities at 3% (Chart 1.7).

When comparing emissions rate with the total floor area that had been developed, it is shown that commercial building which only made up of 11% of the total floor area, contributed 43% to the total carbon emissions of the building sector.

Chart 1.6:
Developed Floor Area by Building Types 2018

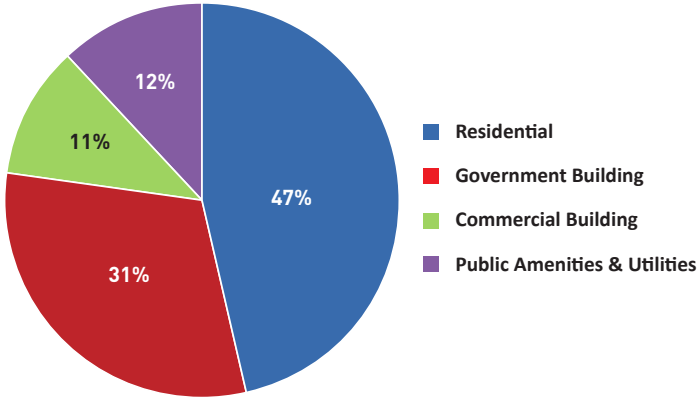
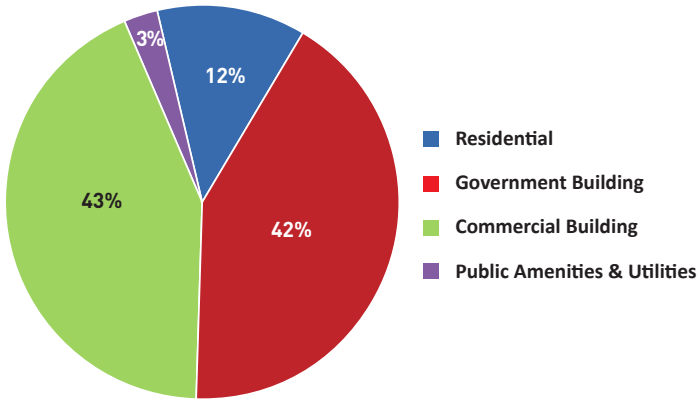


Chart 1.7:
Building Sector Carbon Emissions 2018



In terms of emissions intensity by floor area, analysis results showed that emission intensity remained the same as in 2017 which was 0.115tCO_2/m^2. The increase in completed floor area was related to an increased in the total amount of GHG emissions in 2018. Although the completed floor area in 2018 had increased by 5%, the emissions intensity per square metre remained the same. This shows that majority of the existing buildings are able to maintain their energy efficiency level during operation.

Chart 1.8: Emissions Intensity by Floor Area (tCO_2/m^2)

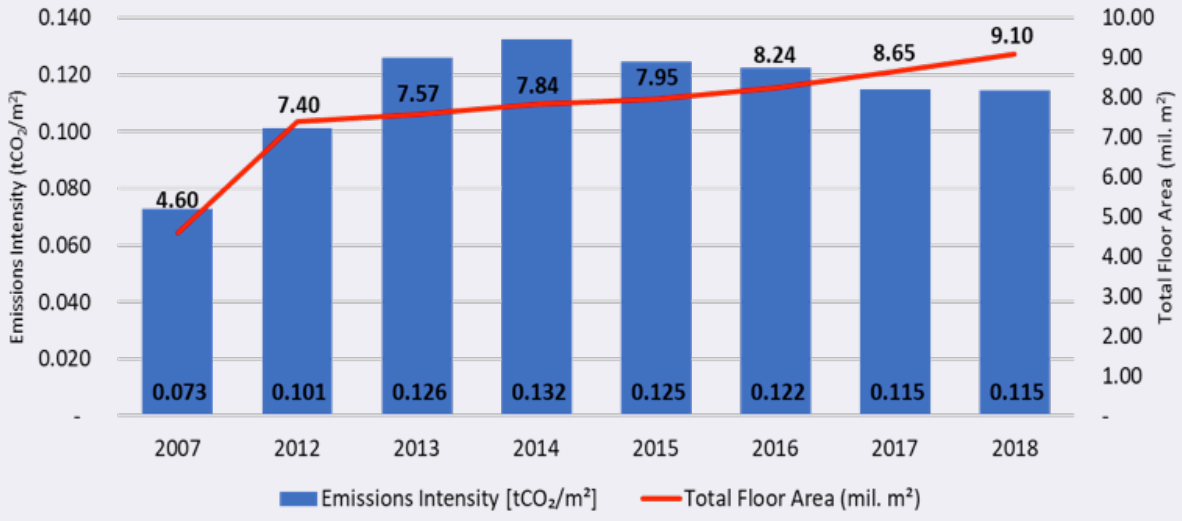


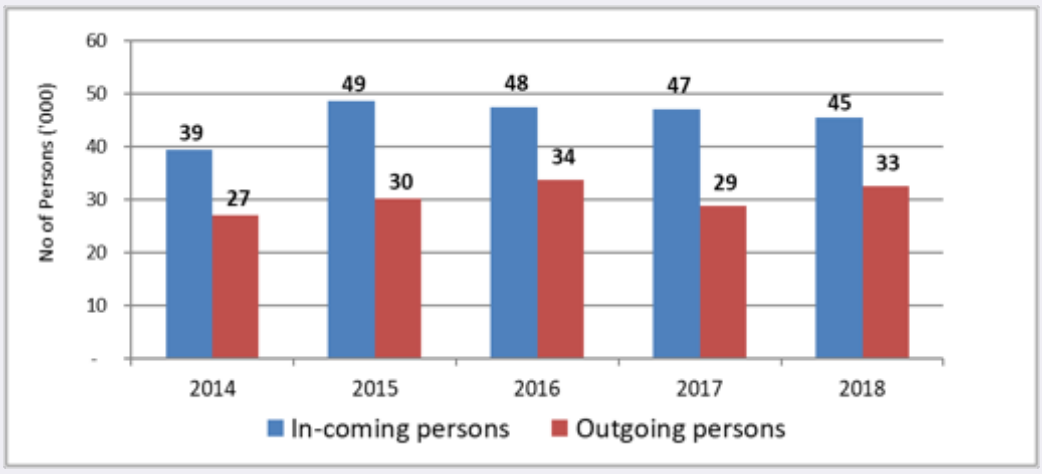
Table 1.2: Carbon Emissions by Energy Source in the Building Sectors ($ktCO_2eq$) 2018

	Electricity	Natural Gas	LPG
Residential building	119	0.3	4
Government building	327	110	-
Commercial building	373	77	0.1
Public amenities and utilities	31	-	0.03
Total	**849**	**188**	**5**

Carbon Emissions from the Transportation Sector

Transportation sector is the second highest sector on energy consumption in Putrajaya. Chart 1.9 compares total trips generated. The increase in population and workers had resulted in more trips generated. This is shown by the recorded number of people coming into and going out of Putrajaya.

Chart 1.9 Comparison of In-coming and Out-going Persons 2018



Carbon emissions from the transportation sector is dominated by passenger transportation at 99% compared to freight transportation at only 1%. The main contributor of carbon emissions in the transportation sector is petroleum at 92%.

Chart 1.10: Transportation Sector Carbon Emissions 2018

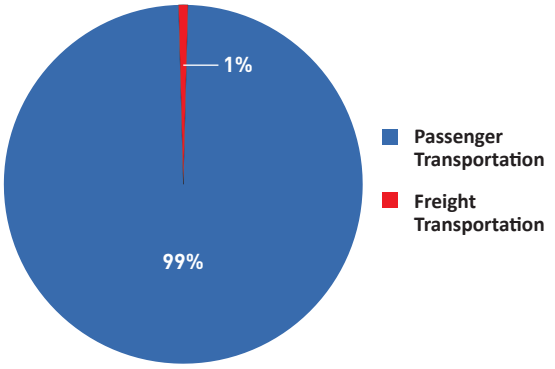
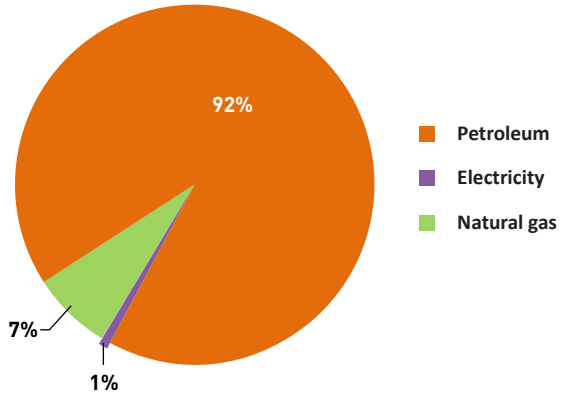


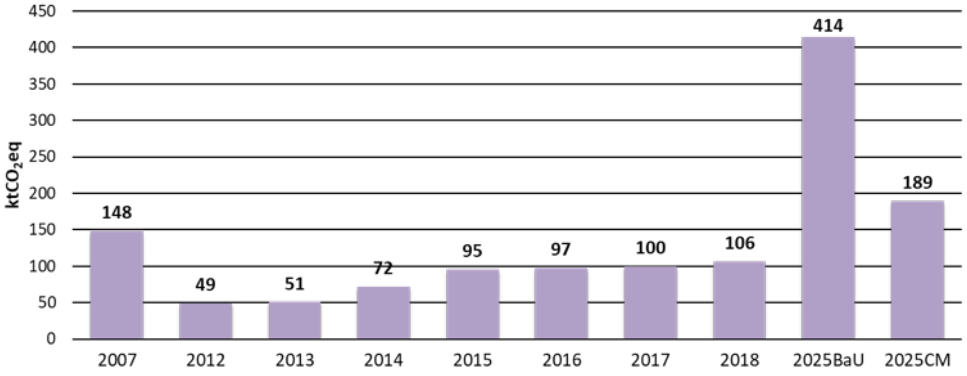
Chart 1.11: Transportation Sector Carbon Emissions by Energy Source 2018



Carbon Emissions from the Solid Waste Sector

For the solid waste sector, the 2018 inventory showed an increase of 6% in the GHG emissions (106ktCO_2eq) compared to 2017 (100ktCO_2eq).

Chart 1.12: Comparison of GHG Emissions in Solid Waste Sector 2018



1.1.2 Inventory of Putrajaya Greenhouse Gas Emissions 2019

The total amount of GHG emissions in Putrajaya in 2019 was recorded at 1,563ktCO_2eq. The rate of carbon emissions in 2019 indicated a 1.8% decrease from the level in 2018 (1,592ktCO_2eq). Chart 1.13 summarises the GHG emissions trend in Putrajaya from 2012 base year up to 2019. The detail breakdown of the GHG emissions for the seven sectors is shown in Chart 1.14.

Chart 1.13: GHG Emissions in Putrajaya Year 2007, 2012 – 2019

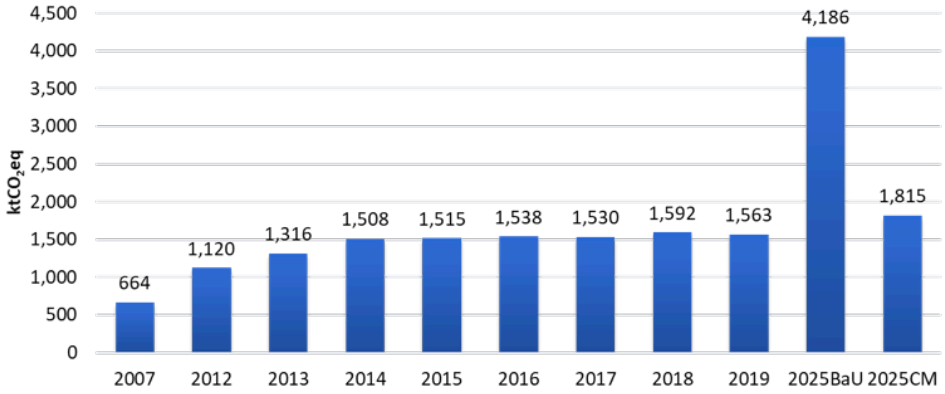


Chart 1.14: GHG Emissions from the Seven Sectors

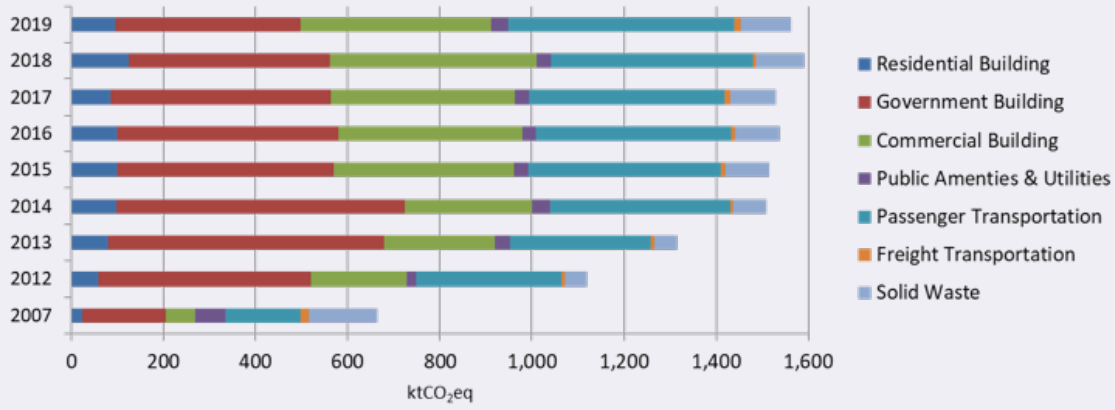


Table 1.3 shows the decrease in GHG emissions in 2019 was closely related to the reduction of GHG emissions from residential building, government building and commercial building.

Table 1.3: Comparison of 2019 GHG Emissions in Seven Sectors ($ktCO_2eq$)

Sector	2007	2012	2013	2014	2015	2016	2017	2018	2019
Residential buildings	23	59	79	98	99	99	85	124	95
Government buildings	180	461	600	626	469	481	478	437	401
Commercial buildings	65	207	240	277	393	398	401	450	414
Public amenities and utilities	67	21	34	38	30	30	31	31	38
Passenger transportation	161	316	305	392	419	425	425	438	490
Freight transportation	20	7	7	7	10	7	11	6	15
Solid waste	148	49	51	72	95	97	100	106	111
Total GHG emissions	**664**	**1,120**	**1,316**	**1,508**	**1,515**	**1,538**	**1,530**	**1,592**	**1,563**
Carbon sink	**-**	**23.96**	**24.10**	**24.10**	**24.11**	**24.27**	**24.42**	**24.42**	**24.57**
Total GHG emissions (net)	**664**	**1,096**	**1,292**	**1,484**	**1,491**	**1,513**	**1,506**	**1,568**	**1,539**

As conclusion, the main contributors of GHG emissions (Chart 1.15) were the building sector at 61% (948$ktCO_2eq$), followed by the transportation sector, 32% (504$ktCO_2eq$) and solid waste sector, 7% (111$ktCO_2eq$). The three main sources of carbon emissions (Chart 1.16) are electricity power, 51.3% (802$ktCO_2eq$), petroleum, 29.7% (464$ktCO_2eq$) and natural gas, 11.4% (178$ktCO_2eq$). This shows that Putrajaya is still relying on non-renewable energy sources.

Chart 1.15: GHG Emissions from the Three Main Sectors 2019

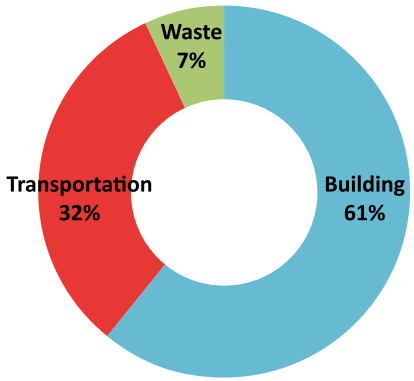
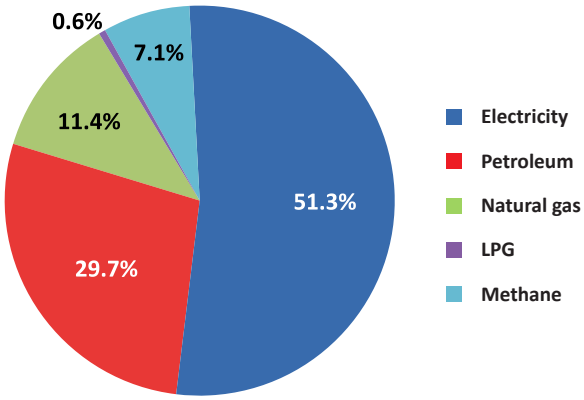
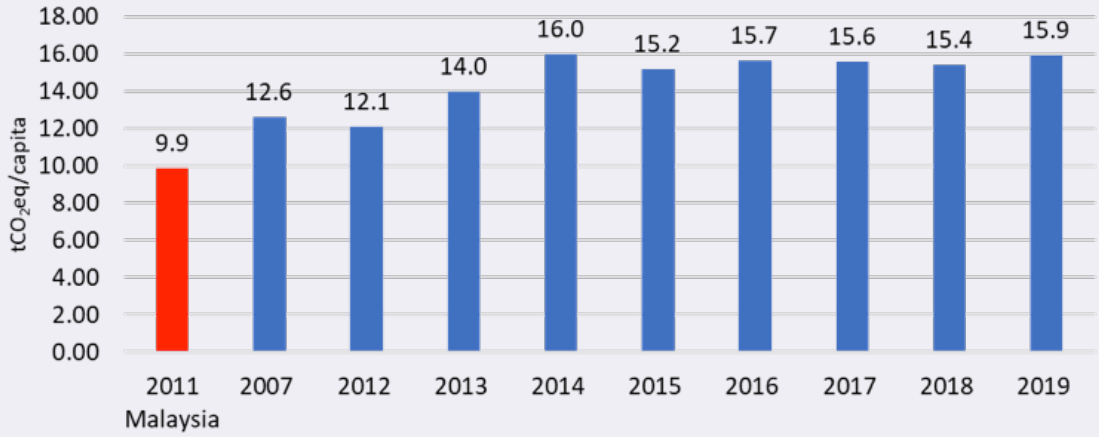


Chart 1.16: GHG Emissions based on Emission Source 2019



In terms of per capita emissions rate, Chart 1.17 shows that in 2019, there was an increase of 3.2% (15.9tCO_2eq/capita) from the rate in 2018 (15.4tCO_2eq/capita)

Chart 1.17: GHG Emissions Per Capita 2019



Carbon Emissions from Building Sector

Chart 1.18 shows the total floor areas developed up by building type until 2019. The floor area for residential buildings was 46% in total, whereas non-residential 54%. The carbon emissions scenario for these two categories of buildings is shows in Chart 1.19. The conclusion that can be drawn from this is carbon emission from non-residential building carbon emissions are significantly higher (90%) than residential building emissions (10%). Among the three non-residential building types, commercial building emissions were the highest at 44%, followed by government building at 42% and public amenities and utilities at 4%.

When comparing emissions rate with the percentage of total floor area that had been developed, it is shown that commercial building which only made up of 11% of the total floor area had contributed significantly at 44% to the total carbon emissions of the building sector.

Chart 1.18: Developed Floor Area by Building Types 2019

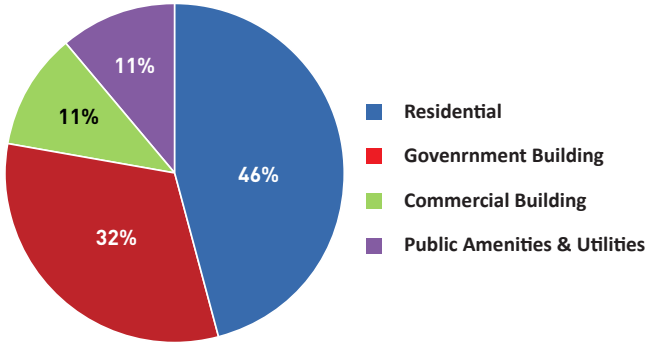


Chart 1.19: Building Sector Carbon Emissions 2019

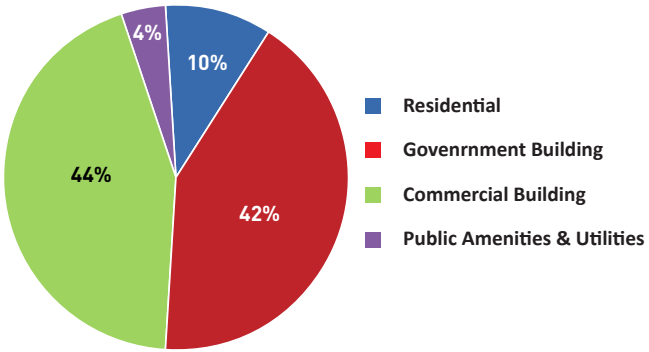


Chart 1.20 shows emissions intensity by floor area in 2019 was decrease (0.096tCO_2/m^2) from the level of 2018 (0.115tCO_2/m^2). Although the completed floor area in 2019 had increased by 8%, the emissions intensity per square metre shown the decrease. This shows that majority of the existing buildings are committed to maintain their energy efficiency level during operation.

Chart 1.20: Emission Intensity by Floor Area (tCO_2/m^2)

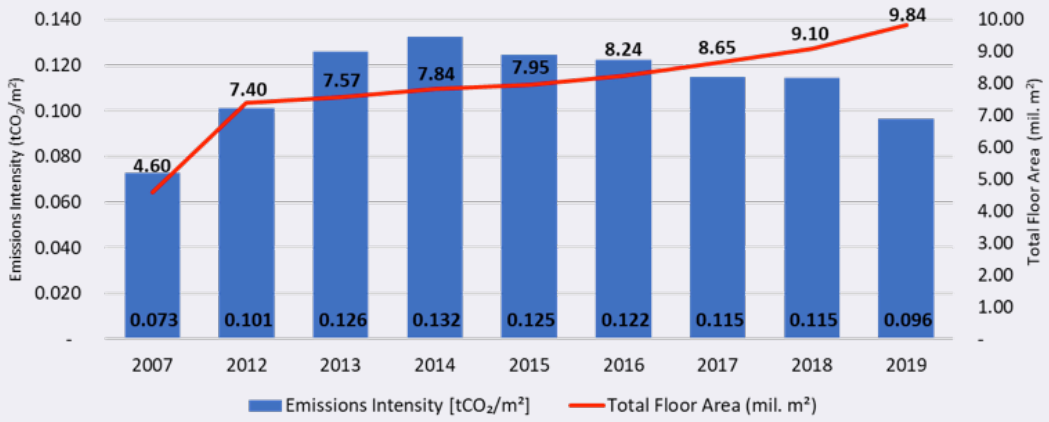


Table 1.4: Carbon Emissions by Energy Source in the Building Sectors (ktCO_2eq) 2019

	Electricity	Natural Gas	LPG
Residential Buildings	86	0.3	9
Government Buildings	286	115	-
Commercial Building	388	27	0.1
Public Amenities and utilities	38	-	0.02
Total	**798**	**142**	**9**

Carbon Emissions from the Transportation Sector

In Putrajaya, transportation sector is the second highest sector on energy consumption. Chart 1.21 compares total trips generated. The increase in population and workers had resulted in more trips generated. This is shown by the recorded number of people coming into and going out of Putrajaya.

Carbon emissions from the transportation sector is dominated by passenger transportation at 97% compared to freight transportation at only 3%. The main contributor of carbon emissions in the transportation sector is petroleum at 92%.

Chart 1.21: Comparison of In-coming and Out-going Persons 2019

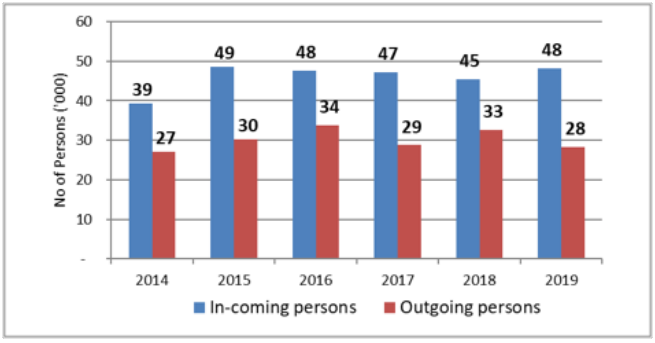


Chart 1.22: Transportation Sector Carbon Emissions 2019

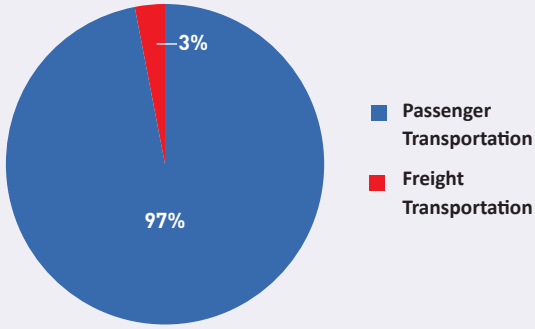
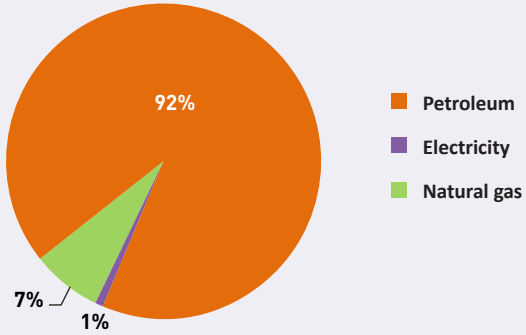


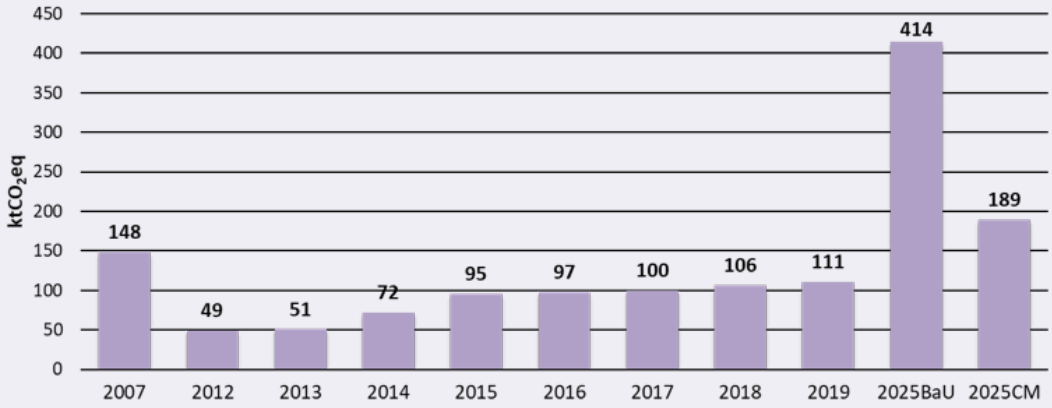
Chart 1.23: Transportation Sector Carbon Emissions by Energy Source 2019



Carbon Emissions from the Solid Waste Sector

For the solid waste sector, the 2019 inventory showed an increase of 5% in the GHG emissions (111ktCO_2eq) compared with the 2018 level.

Chart 1.24: Comparison of GHG Emissions in Solid Waste Sector 2019



1.2 Sustainable Building Rating Status

In general, there are four types of rating system used in Putrajaya to assess the sustainability of a building in the aspects of design and operation. These rating systems are:

i. Green Building Index (GBI).
ii. MyCrest.
iii. GreenPASS.
iv. National Building Energy Intensity (BEI) Labelling.

The status of each rating system in 2019 are shown in Table 1.5 to Table 1.8.

Table 1.5: List of Buildings with Green Building Index (GBI) Certification

No.	Building	Certification Status
a) Completed Building		
1	Ministry of Science, Technology and Innovation (MOSTI), Precinct 1	GBI final rating SILVER (NREB), 2011
2	Suasana PJH, Precinct 2	GBI provisional rating SILVER (NRNC), 2014
3	Malaysian Anti-Corruption Commission (MACC), Precinct 7	GBI provisional rating CERTIFIED (NRNC), 2014
4	Danau Suria, Precinct 16	GBI provisional rating CERTIFIED (RNC), 2014
5	MRCB Tower, Precinct 2	GBI provisional rating GOLD (NRNC), 2015
6	Office Tower on Plot Z10, Presint 1	GBI final rating CERTIFIED (NRNC), 2015
7	3-Star Hotel on Plot Z10 (The Everly Putrajaya)	GBI final rating CERTIFIED (NRNC), 2015
8	Energy Commission Building	GBI #1 rating PLATINUM (NRNC), 2016 (Renewal Verification)
9	Perdana Putra Building	GBI #1 rating PLATINUM (NREB), 2017 (Renewal Verification)
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
13	Heriot-Watt University Malaysia Putrajaya	GBI final rating CERTIFIED (NRNC), 2017
14	PJH Tower	GBI #1 rating GOLD (NRNC), 2018 (Renewal Verification)
15	Government Building Block F1	GBI provisional rating GOLD (NRNC), 2013
16	Government Building Block F2	GBI provisional rating GOLD (NRNC), 2013
17	Government Building Block F3	GBI provisional rating GOLD (NRNC), 2013
18	Government Building Block F4	GBI provisional rating GOLD (NRNC), 2013
19	Government Building Block F5	GBI provisional rating GOLD (NRNC), 2013
20	Government Building Block F6	GBI provisional rating GOLD (NRNC), 2013
21	Government Building Block F7	GBI provisional rating GOLD (NRNC), 2013
22	Government Building Block F8	GBI provisional rating GOLD (NRNC), 2013
23	Government Building Block F9	GBI provisional rating GOLD (NRNC), 2013
24	Government Building Block F10	GBI provisional rating GOLD (NRNC), 2013
25	Government Building Block F11	GBI provisional rating GOLD (NRNC), 2013
26	Shaftsbury Putrajaya	GBI provisional rating CERTIFIED (RNC), 2017
27	Zenith Hotel Putrajaya	GBI provisional rating SILVER (NRNC), 2013
28	Hening (39 Unit Terrace House)	GBI provisional rating CERTIFIED (RNC), 2014

Source: Green Building Index Sdn. Bhd.

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

Table 1.6: List of Buildings with MyCrest Certification

No.	Building	Certification Status (Scores/Stars)
a)	Ministry of Communication and Multimedia (KKMM)	2 Stars
b)	Ministry of Foreign Affairs (WP1)	2 Stars
c)	Ministry of Foreign Affairs (WP2)	1 Star
d)	Ministry of Women, Family and Community Development (KPWKM)	1 Star
e)	Ministry of Rural Development	1 Star

Source: Construction Industry Development Board (CIDB) Malaysia

Table 1.7: List of Buildings with GreenPASS Certification

No.	Building	Certification Status
a)	Ministry of Finance Malaysia	3 Diamonds
b)	Galeria PjH	2 Diamonds
c)	The Everly Hotel	2 Diamonds

Source: Sustainable Energy Development Authority (SEDA) Malaysia

Table 1.8: National Building Energy Intensity (BEI) Labelling 2019

No.	Building	Certification Status
a)	5-Star	11
b)	4-Star	25
c)	3-Star	19
d)	2-Star	12

Source: Energy Commission

Parcel F5 Government Office (GBI-Gold)

Ministry of Finance Malaysia (GreenPASS – 3 Diamond)

Zenith Hotel Putrajaya (GBI-Silver)

Ministry of Women, Family and Community Development (MyCrest – 2-Star)

1.3 Building Sector Energy Use and Carbon Reporting Programme (BECO$_2$R) 2019

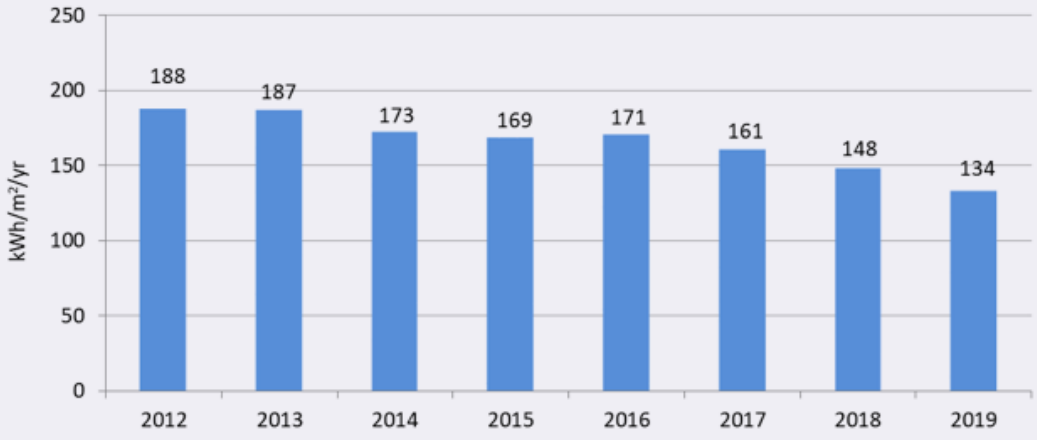
The Building Sector Energy Use and Carbon Reporting Programme (BECO$_2$R) continued in 2019 with the addition of several new commercial buildings in Putrajaya. 4 new buildings had joined BECO$_2$R, and they are Danau Point, Zenith Hotel Putrajaya, Dorsett Hotel Putrajaya and Heriot-Watt University Malaysia. Until the end of 2019, 77 buildings were recorded as actively participating in the BECO$_2$R programme. These buildings are listed in Table 1.9.

Table 1.9: Total Buildings Participated in BECO$_2$R Programme (Until 2019)

Building Type	Total Building
Government Office Buildings	66
Commercial Buildings	3
Hotel Buildings	2
Public Facilities Buildings	3
Residential Buildings (Apartment)	1
School / University Buildings	1
Other Buildings	1
TOTAL	**77**

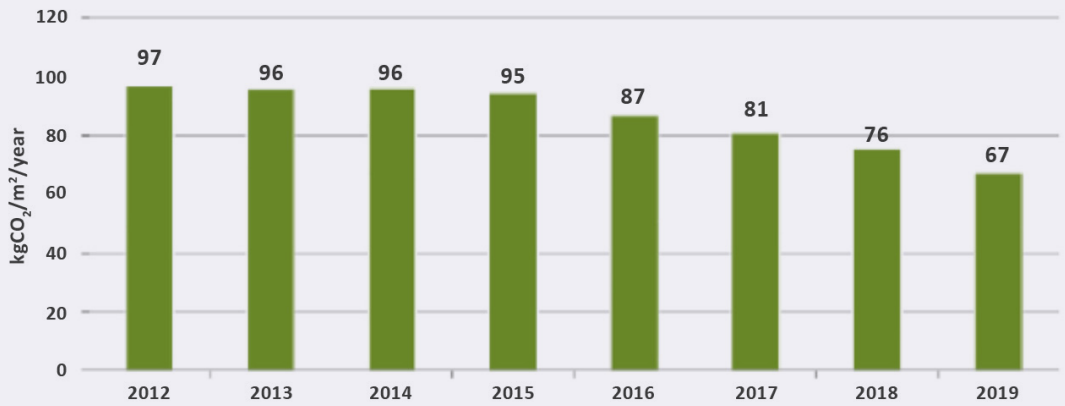
Based on the reported in the 2019 BECO$_2$R Programme, the Building Energy Index (BEI) had decreased 29% (134kWh/m^2/year) compared to the BEI in 2012 (188kWh/m^2/year).

Chart 1.25: Building Energy Index (kWh/m²/year) for Government Office Buildings in Putrajaya 2019



The Building Carbon Index (BCI) of 2019 has also shown a 31% decrease (67kgCO_2/m²/year) from the 2012 level (97kgCO_2/m²/year).

Chart 1.26: Building Carbon Index (kgCO_2/m²/year) for Government Office Buildings in Putrajaya 2019



BECO$_2$R Incentive (Capacity Building)

In 2019, Putrajaya Corporation had provided numerous incentives in the form of capacity building programmes to the BECO$_2$R participants. The programmes include hands-on training for using the reporting system and series of building energy management clinics. Examples of the programmes that had been conducted are as follows:

1.3.1 Building Energy Management Clinics

This programme was carried out at the participating building using the walk through audit method. During the visit, based on the individual building profile and use, free guidance and advice on building energy management were given. In 2019, 4 energy management clinics had successfully been conducted at these buildings:

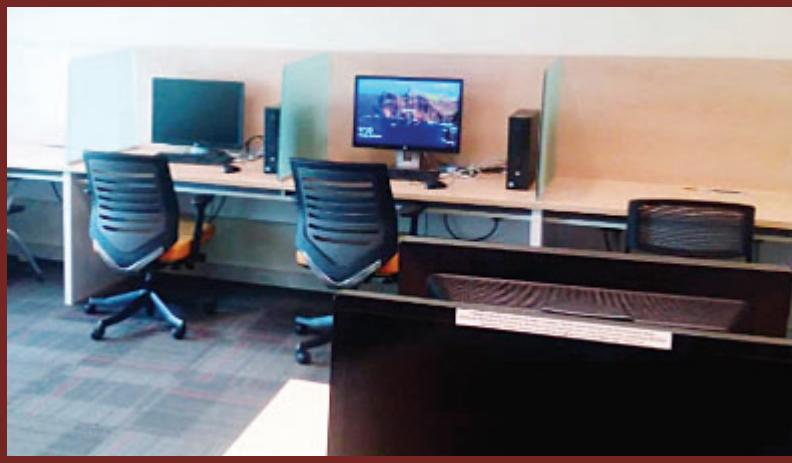
i. Heriot-Watt University Precinct 5, 20 August 2019.
ii. Danau Point, Precinct 16, 5 September 2019.
iii. Zenith Hotel Putrajaya, Precinct 2, 18 October 2019.
iv. Dorsett Hotel Putrajaya, Precinct 3, 20 December 2019.

Subsequent to the clinics, suggestion for improvement in various aspects have been submitted to the buildings owner or manager for further action. Some of the suggestion include:

Rearrange the server racks or partition the room in order to reduce the size of the area needed to be cooled by the air conditioning. This will also ensure heat from the servers be released more effectively.

Hot air from the unit is not released properly due to the obstructions at the surrounding. Owner may look into ways to relocate or improve air circulation at this area.

Retrofit existing single pane glass façade into double pane glass, which could reduce the glare and heat from the sunlight.



Conduct awareness programme and educate users to switch off unused computers, and enable energy saving mode on photocopy machines.

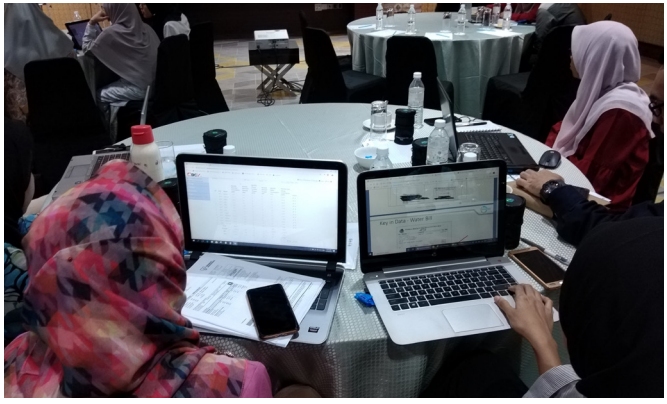
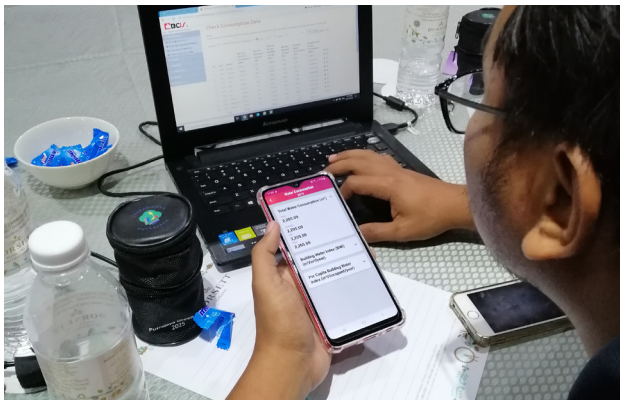
Use table lamp at cubicle work space or delamping the office space, without compromising the minimum requirement for lighting.

Link CO_2 sensors to the fresh air damper, so that it could properly modulate fresh air intake based on the set requirement.

1.3.2 Online Data Reporting System Training

This training was carried out with Putrajaya Corporation strategic partner, the Malaysian Green Technology and Climate Change Centre (MGTC). It is in line with the $BECO_2R$ requirement to prepare monthly reporting on building performance.

Date : **26 November 2019**
Location : **Dorsett Hotel Putrajaya, Precinct 3**
Number of Participants : **20 participants**

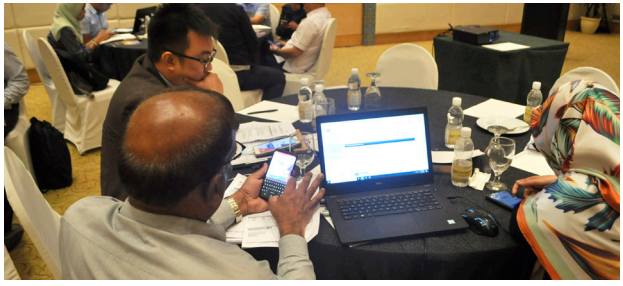
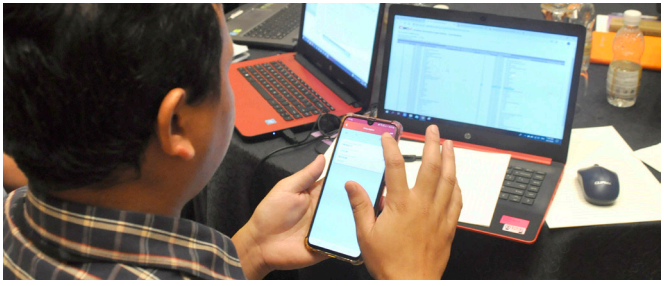

The participants consisted of representatives from Putrajaya Public Works Department (JKR) and manager of new buildings such as Danau Point Building, Heriot-Watt University Malaysia and Zenith Hotel Putrajaya.

Date : 10 March 2020
Location : Pulse Grande, Precinct 1
Number of Participants : 30 participants





Also present at the training session were representatives of the owner or manager of private buildings and Putrajaya Public Works Department (JKR).

The use of BCIS application helps new building owner monitor more quickly the energy consumption level of their building.

1.3.3 Energy Management Training 2020 (Introduction and Intermediate Level)

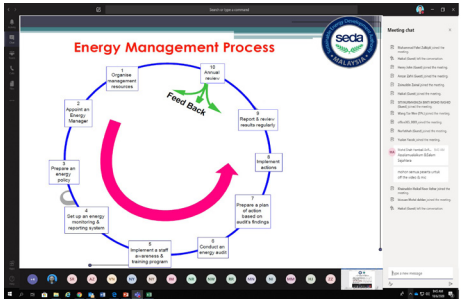
As part of the BECO$_2$R programme capacity building incentive, BECO$_2$R participants had been given free energy management training. This training aims to help the participants achieve the targeted energy consumption and carbon emissions reduction, as well as to increase their awareness on building management. BECO$_2$R participants have different levels of knowledge and understanding on building energy management, therefore the training had been conducted in two series, the introduction and intermediate levels.

Series 1: Introduction Level

Date	:	**18 June 2020**
Time	:	**9:45 am – 1:00 pm**
Strategic Partner	:	**Sustainable Energy Development Authority, SEDA Malaysia**
Participants	:	**31 participants (Putrajaya Public Works Department representative, government building facilities manager, private building manager, Engineering and Maintenance Department, Putrajaya Corporation representative).**

This training covered topics on Introduction and Guide on Energy Management, Introduction to MS: 1525, Low Carbon Green Building and Energy Efficiency.

The Director of Sustainable Development Division, Putrajaya Corporation introducing the BECO$_2$R programme.

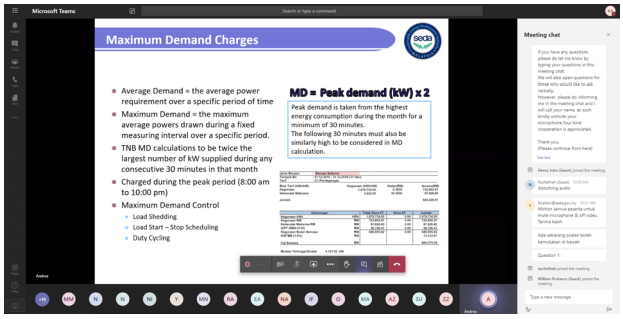


Explaining the energy management process which include energy consumption monitoring, auditing and reporting.

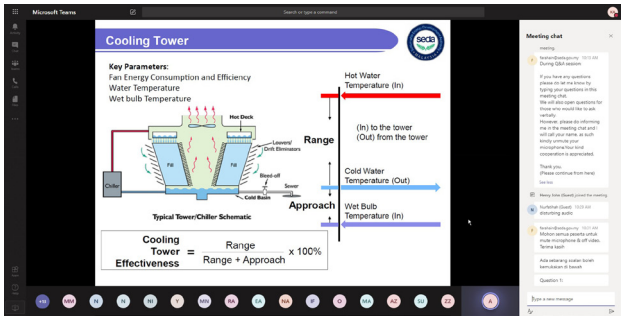
Series 2: Intermediate Level

Date	:	**24 and 25 June 2020**
Time	:	**9:00 am – 1:00 pm**
Strategic Partner	:	**Sustainable Energy Development Authority, SEDA Malaysia**
Participants	:	**34 participants (Putrajaya Public Works Department representative, government building facilities manager, private building manager, Engineering and Maintenance Department, Putrajaya Corporation representative).**

The intermediate training session covered topics on Introduction to Energy in Malaysia, Analysing Energy Consumption Bill and the saving potential of mechanical and electrical systems.



The maximum demand control method includes scheduling the operation of high-powered machines and ensuring systems are not running simultaneously.



Increasing the efficiency of cooling tower is one of the ways to saving in buildings mechanical system.

1.4 Green Building Practices at The Operational: Shell, Precinct 18

In 2019, Shell Malaysia made history when it became the first oil industry retailer in Southeast Asia to be awarded the Green Building Index (GBI) certification for its Shell Damansara Jaya and Taman Connaught branches. In Putrajaya, Shell at Precinct 18 has also implemented various green practices at the operational level.

Photovoltaics (PV) Solar with a capacity of 70kWp had been installed to reduce the dependence on electricity from grid system.

Rainwater harvesting and utilisation system (SPAH) had been installed to reduce the usage of treated water.

Awareness campaign to encourage customers to use own bags when shopping at this premise.

The management of Shell Precinct 18 has prepared a Rak Prihatin to encourage the public to contribute to help the less fortunate, by providing basic necessities such as rice, sugar and flour to those in need.

1.5 Putrajaya Low Carbon Green City Forum 2020

Putrajaya Corporation had organised the Putrajaya Low Carbon Green City Forum 2020 on 25 February 2020 (Tuesday) at Seri Siantan Hall, Putrajaya Corporation Complex. The theme of this forum is the concept of circular economy in supporting Putrajaya towards a low carbon green city.

4 papers had been presented during this forum, namely:

a) **Circular Economic Concept towards Low Carbon Green City** by Mr. Asfaazam Bin Kasbani, Assistant Resident Representative (Programme), United Nations Development Program (UNDP) Malaysia, Singapore and Brunei Darussalam.
b) **Urban Mining for Low Carbon Green City** by Mr. Mohd Shamsul Izuan Bin Che Musa, Assistant Director Technology Development Department, Malaysian Communications and Multimedia Commission.
c) **Beverage Cartons Reuse Initiative-CAREton Programme** by Mdm. Terrynz Tan Miang Lee, Director of Environment, Tetra Pak Malaysia.
d) **NEM Briefing: Solar Leasing** by Mr. Ir. Mohd Zamri Bin Laton, Deputy Director of Renewable Energy Technology Division, SEDA Malaysia.

A total of 330 participants comprising school representatives, residents, government agencies, developers and Putrajaya Corporation officers attended the forum.

1.5.1 Exhibition

An exhibition was held in conjunction with the Forum, in which 15 agencies and private companies from the green technology sector had joined in.

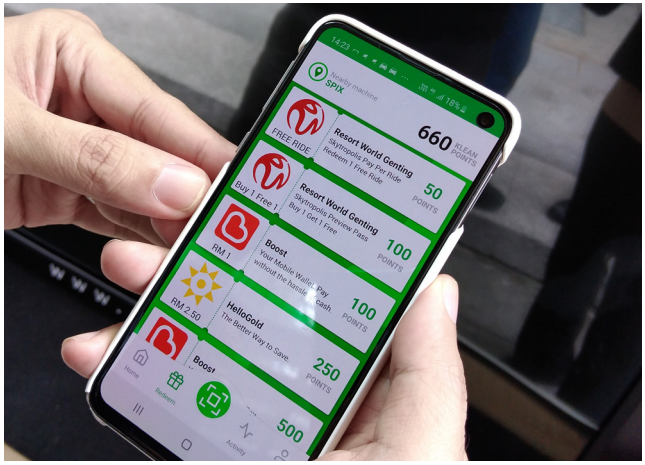
Exhibition by PJC to promote Putrajaya various initiatives.

Innovations from the Greenovators Programme by the students in Putrajaya.

Sustainable Energy Development Authority Malaysia (SEDA Malaysia) sharing information on energy management and renewable energy programmes.

Alam Flora Sdn. Bhd. conducting registration session for the #JomRawatBumi programme and 3R quiz.

Tetra Pak (Malaysia) Sdn. Bhd. and Nestle (Malaysia) Sdn. Bhd. introducing the initiative to reuse beverage cartons – CAREton.



NSF Dynamic Company has introduced a technology to collect plastic bottle (PET) and aluminium beverage containers. Reward points are credited into the Boost E-wallet.

Rainwater harvesting system products by I Controls Solution (M) Sdn. Bhd.

'Asher' solid waste management product by AMP Group.

Solar energy company introducing solar system installation packages for residential and commercial buildings, to further increase the use of solar energy.

Shah Poornam Metals Sdn. Bhd. exhibited different types of e-waste that had been segregated for recycling.

1.5.2 The Launch of Putrajaya Green City Mascot

In conjunction with the Forum, Putrajaya Corporation had also launched four Putrajaya Green City Maskot. This is an effort to further promote and enhance awareness among Putrajaya community to carry out more green initiatives. The selected mascot are the fauna found in Putrajaya and their presence indicate the good ecosystem here. The four mascots are:

Smooth-coated Otter (Otto)

Smooth-coated otter lives in a group of 10 to 20 otters. It is very sensitive to the change happen in the wetland ecosystem. Water pollution can deplete food resources and cause otters to migrate to other habitat. The presence of this species indicates ecological good health.

Purple Heron (Sera)

The Purple Heron is a migratory bird. However, it has now inhabited in this country and is categorised as a resident bird in Peninsular Malaysia. There are studies which suggested that these birds serve as an indicator of the pollution level of water. The level of heavy metal contamination can be detected through the eggshell and the chicks' feathers.

Dragonfly (Nini)

The dragonfly is a type of insect in the Odonata order. It is being categorised based on features such as large square eyes, 2 pairs of strong and transparent wings, as well as a long body. The presence of a dragonfly is an indicator of clean water.

Tree Frog (Leo)

The tree frog is an amphibian that has thin, smooth skin at the top, a small, slender and oval body and a sharp tail. Tree frog is a good biology indicator as it lives in two environments, water and soil. Its thin skin can absorb chemicals and radiation.

1.5.3 Appreciation Ceremony

New Participants of the Building Sectors Energy Use and Carbon Reporting Programme ($BECO_2R$) 2019

As a token of gratitude for the participation of non-government office building owners and managers in the $BECO_2R$ programme, a ceremony of appreciation was organised for the following buildings:

a) Zenith Hotel Putrajaya, Precinct 2.
b) Dorsett Putrajaya, Precinct 3.
c) Heriot-Watt University Malaysia, Precinct 5.
d) ORANGEBEAM Development Sdn. Bhd., Precinct 16.

Key Strategic Partners of Green City's Key Programmes

Throughout 2019, Putrajaya Corporation had collaborated and worked with various agencies to make the green city programmes and initiatives a success. Among these agencies are:

a) Putrajaya Public Works Department (JKR): BECO$_2$R programme for government office complex and Low Carbon Cities 2030 Challenge Award: Category for Zone.
b) Sustainable Energy Development Authority Malaysia (SEDA Malaysia): Energy Management Clinic under the BECO$_2$R programme.
c) Universiti Kebangsaan Malaysia: GreenROSE@Putrajaya Programme.

Presenting certificate of appreciation to the key strategic partners - JKR Putrajaya, SEDA Malaysia and Universiti Kebangsaan Malaysia.

Green Neighbourhood Initiative - Urban Farming

PJC presented appreciation and incentives to Koperasi Komuniti Penduduk Putrajaya Berhad which had carried out urban farming initiatives.

Certificate Presentation for SEDA Malaysia Voluntary Sustainable Energy Low Carbon Building - GreenPASS Certification Programme

The Ministry of Finance Malaysia Building has received the GreenPASS 3 Diamond certification for achieving 34% reduction in carbon emissions in 2019 compared to the 2009 level.

2.0

INTEGRATING NATURE INTO THE URBAN FABRIC

2.0 INTEGRATING NATURE INTO THE URBAN FABRIC

2.1 Urban Farming Programme

Since the establishment of the Urban Farming in 2014, various cultivation activities have been carried out by the farm members, which are under the Koperasi Komuniti Penduduk Putrajaya Berhad (KKPPB). A series of cultivation activities by crop type had been carried out at each Putrajaya urban farming.

Rock melon is the main crop at Putrajaya Urban Farming.

Vegetables such as spinach, mustard greens and kulai chilli are planted by series at all Putrajaya Urban Farming.




These are among the harvests of the Urban Farming, which are to be marketed to the residents of Putrajaya. About 250kg of rock melons and 100kg of vegetables can be harvested per season.

2.2 P15H Community Stingless Bee Farm, Precinct 15, Putrajaya

The P15H Community Stingless Bee Farm, Precinct 15, Putrajaya was established in March 2016 at Rimba Alam Park, Precinct 15. This project is a joint venture between the residents of P15H4 and Putrajaya Corporation, under the Putrajaya Local Agenda 21 Programme. The selection of the site is based on environmental consideration, as the main food source for the stingless bees are from the acacia and oil palm tree species, which are readily available on site. In addition, the site also has water source and shaded surroundings which made it ideal breeding ground for the stingless bees. This existing environmental advantage has increased the production of honey at the stingless bee farm.

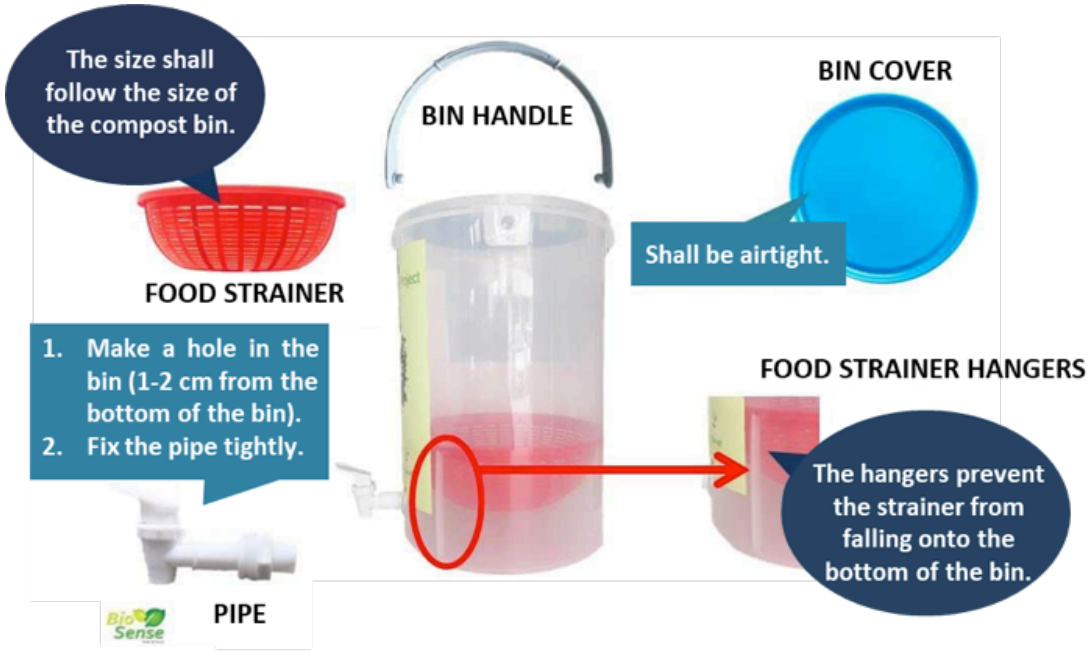
The stingless bees species that are breeding at the farm include *Heterotrigona Itama, Tetrigona Apicalis, Tetrigona Binghami* and *Geniotrigona Thoracica*.

The estimated yield of honey per year is 240kg, which is equivalent to 720 bottles of 250ml.

2.3 Production of Compost Fertiliser from Food Waste

On 20 September 2020, P15H Community Stingless Bee Farm, Precinct 15, Putrajaya, had collaborated with Smart Heritage to organise a knowledge sharing session with the farm members, to produce fertilisers from food waste. The purpose of this knowledge sharing session was to teach how to produce chemical-free fertiliser and at the same time to reduce direct dumping of food waste into the landfill.

Dr. Rokiah Hassan from Smart Heritage explained the methods to produce fertilisers from food waste.



The first step in producing compost fertilisers is to prepare a modified bin with cover.

Put food waste in the food strainer alternately with the catalyst (which helps speed up the decomposition process) until full.

Cover and store carefully for 7 days and the resulting liquid can be used as fertiliser.

2.4 Putrajaya Public Parks Promotion Program

2.4.1 Putrajaya Park Day

In line with the aim to promote the use of public parks in Putrajaya for recreation purpose, Putrajaya Corporation had organised the Putrajaya Park Day Programme on 23 February 2020 at Taman Wawasan, Precinct 2, Putrajaya.

Putrajaya Park Day had shown that the parks in Putrajaya are unique and attractive. This include the various activities held and numerous birds and insects species that had attracted some 3,000 visitors. Through this programme, the parks in Putrajaya are also being promoted as tourist destination, in line with the Visit Malaysia Year 2020 initiative.

The Putrajaya Park Day Programme had been officiated by the Honourable Minister of Federal Territories and various activities had taken place throughout the programme.

2.4.2 EcoTrail Putrajaya 2019

Putrajaya Corporation had collaborated with the Ministry of Tourism, Arts and Culture Malaysia and Eco Trail to organise the EcoTrail Putrajaya run, which was held on 26 October 2019 at the Botanical Garden, Precinct 1, Putrajaya. The EcoTrail is an international trail running event that started 12 years ago.

In 2019, Putrajaya had been chosen to host this event, as the city embodies the environmental traits that meet the EcoTrail organising objective, that is 'a trail running event in an urban environment'. By holding such sporting event, the participants can learn to appreciate nature in the city and increase their awareness on the importance and need to protect environment.

875 participants from 210 countries had joined the EcoTrail Putrajaya 2019, which was held in 4 categories, namely the 15km, 30km, 50km and 80km.

2.5 Putrajaya Lake and Wetlands Management

In 2019, Putrajaya Corporation had identified areas at risk of habitat decline in Putrajaya Lake and Wetlands. The management works had been concentrated at the Upper Bisa Wetland Islands due to the declining number of bird species in the area. With the help of experts, necessary measures have been identified and need to be taken to overcome the decline in habitat.

The maintenance works carried out under the supervision of avian experts include cleaning and pruning of tree branches, soil repair and replanting of ground cover plants. According to the avian experts, the observation made at the area shows that the soil have been covered by tree roots and causing the soil to lack nutrients. This has caused plants such as grass, not being able to grow fertile and hence contributed to the decrease in the number of bird species.

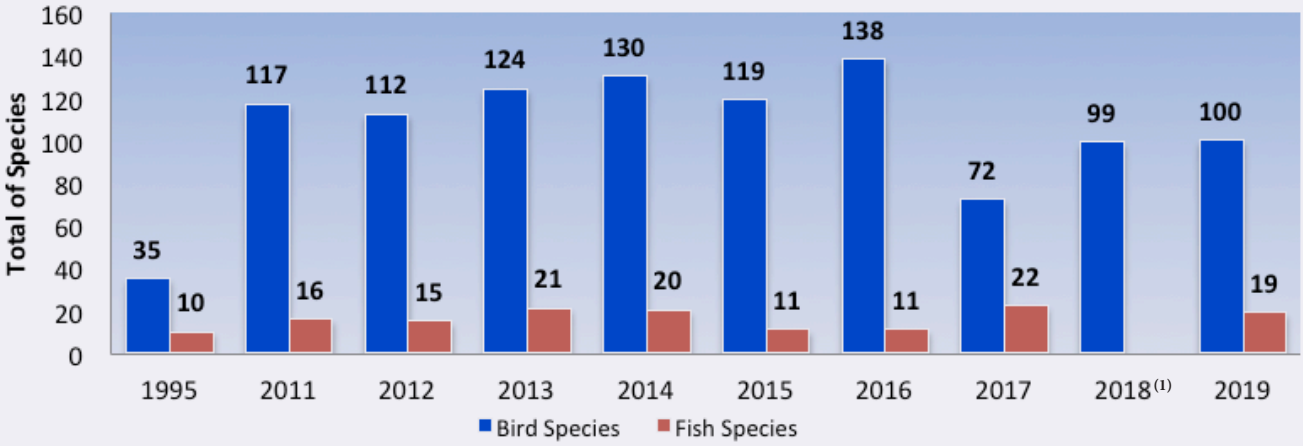
2.6 Quick Facts

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

	The size of open space (hectare): 1,000 population							
	2013	2014	2015	2016	2017	2018	2019	2025
National Urbanisation Policy(1)	2 hectares							
Putrajaya	22.37(2)	23.42 (3)	20.81(4)	20.07(5)	19.49 (6)	21.47 (7)	18.70 (8)	5.5(9)

Source:
(1): National Urbanisation Policy 9 (NUP9), Step (ii).
(2) - (8): MURNInets.
(9): Estimated based on targeted population 347,700 people in 2025.

Chart 2.1: Number of Bird and Fish Species in Putrajaya



Source: Environment, Lake and Wetlands Division, Putrajaya Corporation.
Note:
(1): Fish sampling has not been conducted.

Stripe-throated Bulbul
(Pycnonotus finlaysoni)

Juvenile Painted Stork *(Mycteria leucocephala)*

Table 2.2: Number of Species Found in Putrajaya Lake and Wetlands (Until 2019)

Fauna Species	1995 (EIA)	2007 (Baseline)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Insects	-	21	21	343	445	767	1084	924	928	523	800	676
Amphibian	-	2	5	5	8	13	9	8	11	9	10	9
Reptile	-	5	4	15	15	14	10	8	11	7	9	10
Mammal	24	7	5	8	11	9	13	9	10	11	13	12

Source: Environment, Lake and Wetlands Division, Putrajaya Corporation.

3.0

TRANSPORTATION & MOBILITY

3.0 TRANSPORTATION AND MOBILITY

3.1 Improvement on Pedestrian Walkway and Bicycle Lane Facilities

Throughout 2019 and 2020, much effort had been made to continue improving bicycle lanes and pedestrian walkways to increase the comfort level and safety for the users. The improvements had been carried out at Precinct 8 (25km), Precinct 14 (2.4km) and Precinct 18 (20.43km) which involved the following key components:

i) Installation of pedestrian and bicycle lane signage.
ii) Marking of pedestrian and cycling lane symbols.
iii) Marking of pedestrian crossing.
iv) Installation of safety signage.
v) Installation of audible traffic signal at main intersections.
vi) Installation of warning tactile and guiding blocks.
vii) Installation of bicycle racks.
viii) Kerbs-cut treatment.
ix) Installation of benches at the pedestrian walkways and bicycle lanes at Sisiran Tasik.

Installation of Pedestrian and Bicycle Lane Signage

Jalan P8E/2, Precinct 8

Marking of Pedestrian and Cycling Lanes Symbols




Jalan P14, Precinct 14 and Jalan P18K, Precinct 18

Marking of Pedestrian Crossing

Jalan P8E 2/6, Precinct 8

Installation of Safety Signage

Jalan P8E intersection, Precinct 8

Installation of Audible Traffic Signal

Jalan P14 intersection, Precinct 14.

Lebuh Wawasan main intersection.

Installation of Warning Tactile and Guiding Blocks

Jalan P8E main intersection, Precinct 8 and Jalan P14, Percinct 14

Installation of Bicycle Racks

D'Belian@14 Kiosks Area, Precinct 14 and New England Commercial Area, Precinct 18

Kerbs-cut Treatment

Jalan P18, Precinct 18

Installation of Benches

Sisiran Tasik at Precinct 8

3.2 The Use of Electric Bicycles in Putrajaya

Putrajaya Corporation has received five electric bicycles for the use of its officials, donated by the Green Technology Application for the Development of Low Carbon Cities (GTALCC) Programme. The main objective of this initiative is to promote local green technology and also to encourage cycling as a mode of transportation for short distances, especially moving between places along Persiaran Perdana.

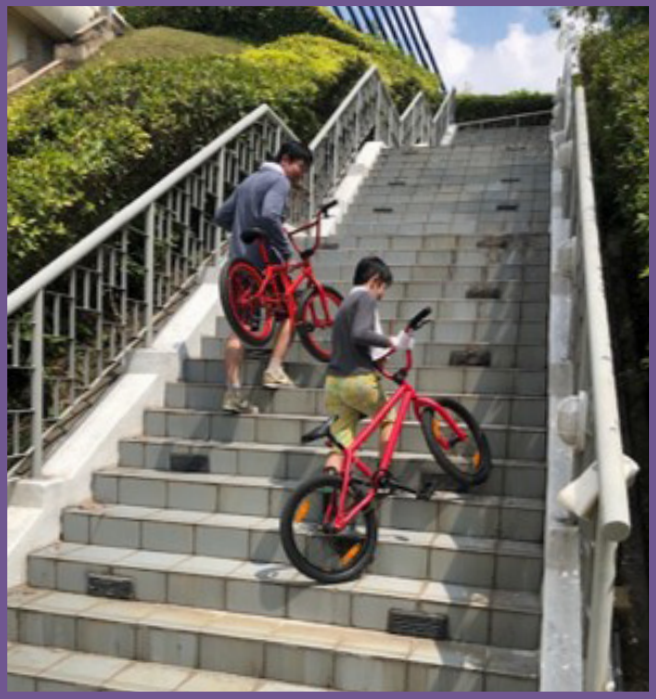
The use of electric bicycles to conduct monitoring at the dam area and carry out general maintenance works in Putrajaya.


PPj enforcement team conducting daily task such as monitoring illegal parking at restricted areas along Persiaran Perdana.

Apart from PPj, government agency such as SEDA Malaysia also use electric bicycles to travel to meeting venues located nearby

3.3 Bike Access Ramp Facility

The continuity between bicycle paths and shorter distances are among the aspects that will influence the cycling experience in Putrajaya. For example, it is shorter and more comfortable to cycle from Sisiran Tasik Putrajaya to the main road through the bridge. However, cyclists are restricted by the stairs at the bridge, as they need to climb up the stairs carrying their bicycles. Based on this situation, the improvement measures that have been taken by Putrajaya Corporation together with the Green Technology Application for the Development of Low Carbon Cities (GTALCC) project team, with the installation of bike access ramp facility.



Cyclists having difficult time carrying bicycles up and down the stairs at Seri Saujana Bridge.

Source: KBS Malaysia Instagram

Two locations have been identified based on popularity for the installation of bike access ramp facility at Seri Saujana Bridge and Seri Wawasan Bridge. With this new facility, cyclists are able to climb up and descend the stairs more easily and safely.

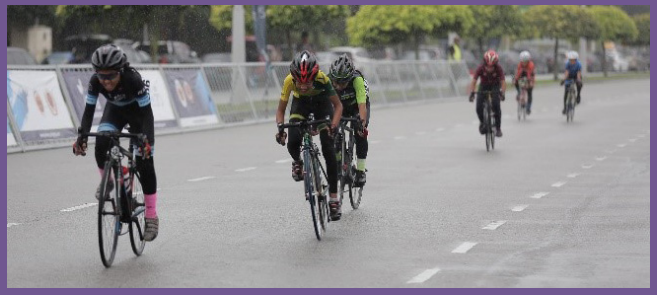
Bike access ramps installed at the staircase of Seri Wawasan Bridge and Seri Saujana Bridge.

3.4 Cycling Campaigns and Programmes

Putrajaya is one of the country's top-picked venues for community, national and international level cycling events. The city is a popular choice as it has good infrastructure and well-equipped facilities. The cycling programmes which had taken place throughout 2019 and 2020 are:

3.4.1 CIMB Youth Cycling Development Programme

On 15 December 2019, Junior Cycling Malaysia, CIMB Foundation and the Ministry of Youth and Sports had jointly organised the CIMB Foundation Grand Finale Criterion at Precinct 3. This programme aims to be a platform to unearth new cycling talents for the country.



15 teams from all over the country had joined this programme, which involved 93 participants aged between 16 to 18 year-old.

3.4.2 Malaysia Day Fun Ride

In conjunction with the Malaysia Day celebration, the Neighbourhood Watch (KRT) of Phase 4B(2), Precinct 8, had organised the Malaysia Day Fun Ride, which was flagged off at Dataran Phase 4B, Precinct 8, Putrajaya. Numerous side events were carried out in collaboration with the strategic partners, which include National Population and Family Development Board (NPFDB), Department of Information Malaysia, Putrajaya District Police Headquarters (IPD) and KOSPEN, Ministry of Health Malaysia. The purpose of these programmes is to disseminate information related to the independence month, Covid 19 : the practice of new norms and the population and housing census 2020 (Census 2020).

The fun ride consists of 2 categories, namely the 12km ride and the 30km ride.

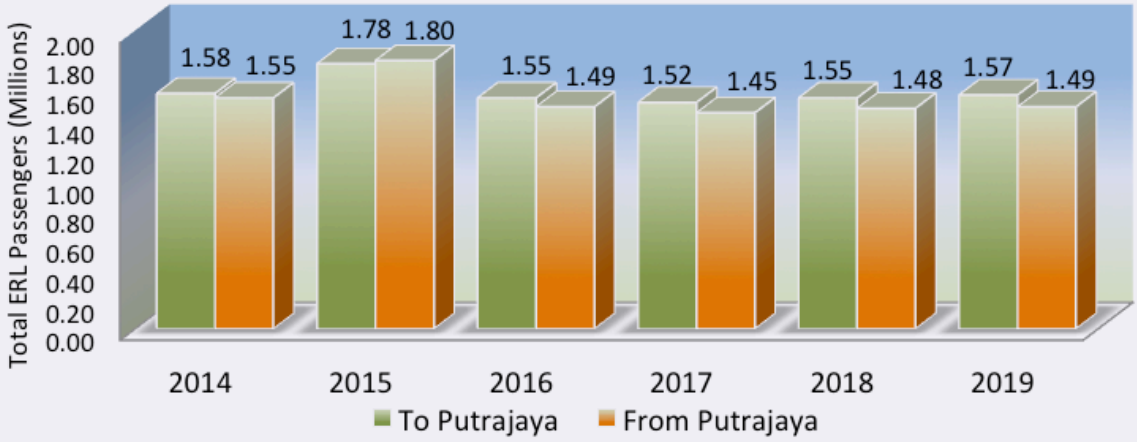
Side events conducted by the strategic partners include health screening, dissemination of information related to independence month and the practice of new norms.

3.5 Quick Facts

Chart 3.1: Bus Ridership in Putrajaya

Source: Putrajaya Public Transportation Travel & Tours Sdn. Bhd.

Chart 3.2: Annual Express Rail Link (ERL) Ridership at Putrajaya Sentral Station



Source: Express Rail Link Sdn. Bhd.

4.0
ENERGY USAGE

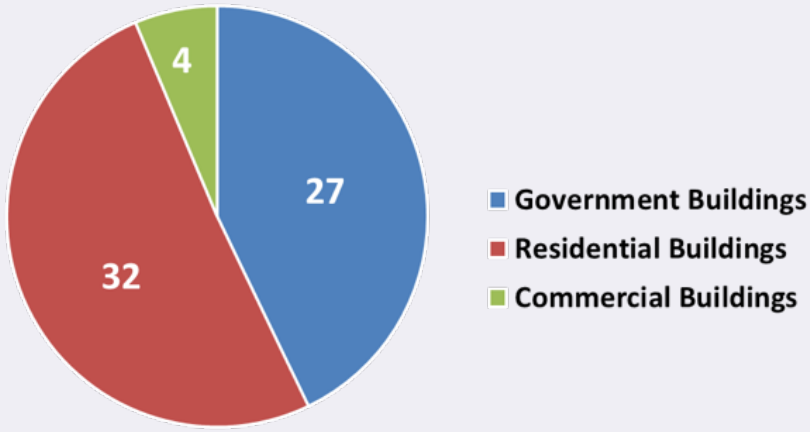
4.0 ENERGY USAGE

4.1 Increasing the Use of Renewable Energy

4.1.1 Status of Solar Energy Consumption in Putrajaya

Putrajaya Corporation has always encouraged the use of renewable energy in residential, commercial and government buildings. As of 2019, a total of 63 buildings in Putrajaya have been equipped with PV solar system serving as an alternative source of energy. The buildings include residential, commercial and government building as detailed in Chart 4.1.

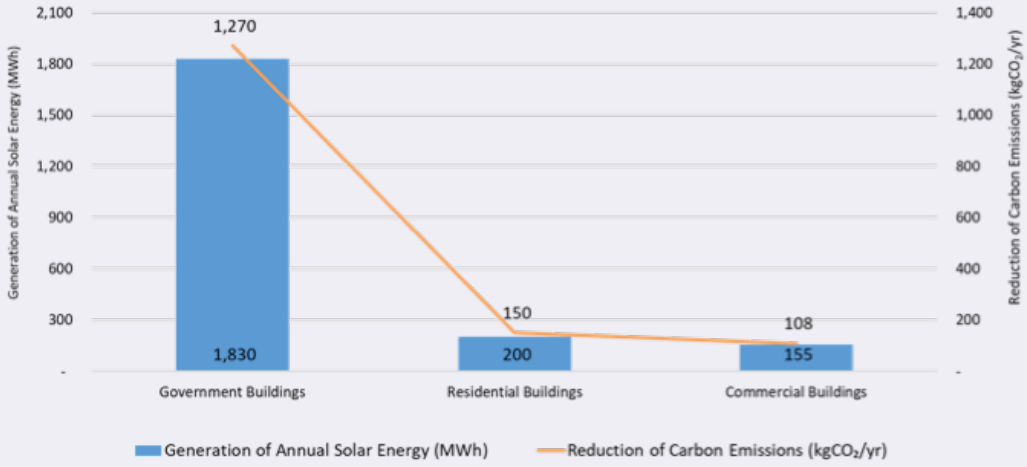
Chart 4.1: Number of Buildings with PV Solar System in Putrajaya



Source: Sustainable Energy Development Authority (SEDA) Malaysia

The total annual solar energy generated from all 63 buildings was 2,186MWh. In terms of the generation of solar energy by building type, government buildings contributed most significantly to the generation of solar energy at 84% (1,830MWh), followed by residential buildings at 9% (200MWh) and commercial buildings at 7% (155MWh).

Chart 4.2: Total Generation of Solar Energy and Reduction of Carbon Emissions in Putrajaya



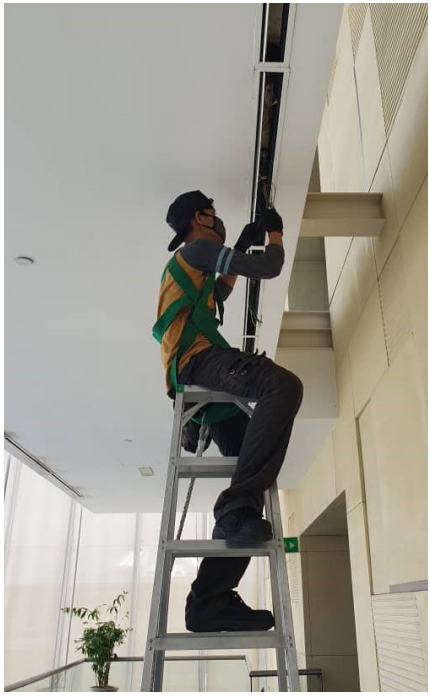
Source: Sustainable Energy Development Authority (SEDA) Malaysia

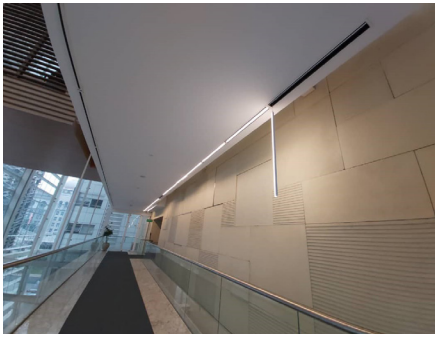
4.2 Improvement of Energy Efficiency

Putrajaya Corporation has initiated the use of energy saving lamps to improve building energy efficiency. This initiative includes the use of energy saving lamps at PPj Complex as well as street lightings in Putrajaya.

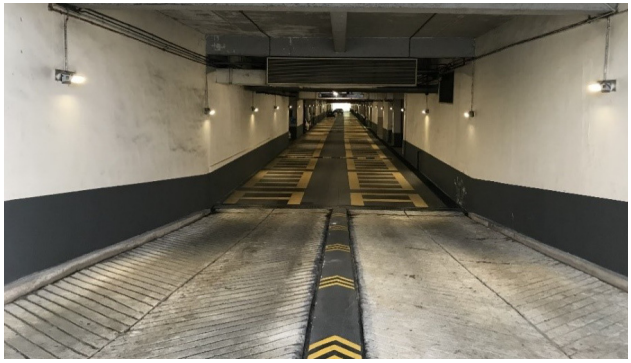
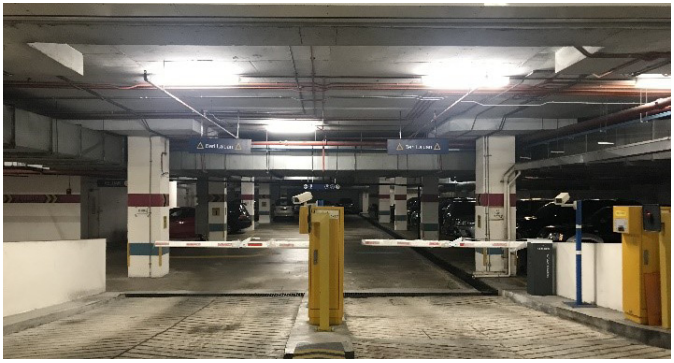
4.2.1 Putrajaya Corporation Complex

Putrajaya Corporation has continued its efforts to improve energy efficiency by converting conventional lamps to LED T5 lamps at the complex's corridor areas, install motion sensors and LED down lights at the lobby of Seri Melati Hall, Seri Siantan Hall, Auditorium and the access to the parking area.





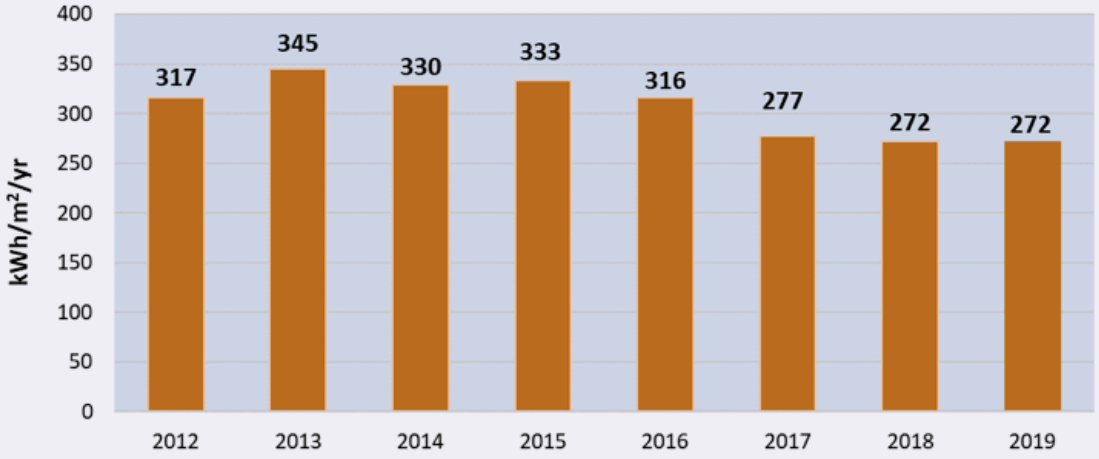

LED lights and motion sensors are fitted at office block corridors and hall's lobby area.

The parking areas have also been fitted with energy saving lamps (LED/T8) and motion sensors.

As the result of this effort, PPj had successfully reduced its annual electricity consumption in 2019 by 22% (10,008,582kWh) compared to the 2012 level (12,894,876kWh). The saving of electricity also has positive impact on Putrajaya Corporation Complex's building energy index (BEI) which has reduced by 14% from 317kWh/m^2/year in 2012 to 272kWh/m^2/year in 2019 (Chart 4.3).

Chart 4.3 : Putrajaya Corporation Complex's Building Energy Index (BEI)



Source: Building Consumption Input System (BCIS)

4.2.2 Street Lights

The effort to improve energy efficiency is not only concentrated on office building, it is also carried out on street lights. As of 2019, a total of 936 (5.6%) street lights in Putrajaya are LED type. The locations of the LED street lights are shown in Table 4.1.

Table 4.1 : Numbers of LED Street Lights Installed in Putrajaya (Until 2019)

No.	Location	No. of LED Lights
1.	Putra Square (Dataran Putra) and Bridge, Precinct 1	264
2.	Parcel E, Precinct 1	5
3.	Jalan Alamanda, Precinct 1	33
4.	Jalan Perdana Timur A/1, Precinct 1	6
5.	Jalan P3K, Precinct 3	4
6.	Jalan KVDT, Precinct 11	25
7.	Jalan Alamanda/Alam Shah School towards Augusta Residency, Precinct 12	133
8.	Jalan P16H and Jalan Kesum P16/2, P16/3, P16/4, Precinct 16	53
9.	Lebuh Gemilang towards Taman Selatan, Precinct 20	107
10.	Lingkaran Putrajaya	52
11.	Lebuh Wawasan	68
12.	Lebuh Wadi Ehsan	74
13.	Seri Ehsan Bridge, Precinct 4	112
	Total	**936**

Source: Engineering and Maintenance Department, Putrajaya Corporation

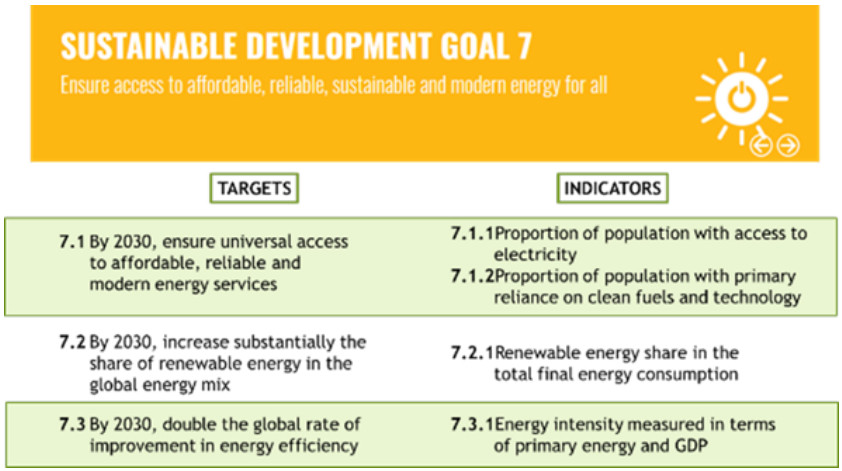
Installing LED street lights at Lebuh Wadi Ehsan

4.3 Localisation of SDG7 - Clean Energy for Sustainable and Low Carbon Cities

CityNet is an organisation committed to sustainable development in the Asia Pacific Region. It was established in 1987 with the support of UNESCAP, UNDP and UN-Habitat. The members of CityNet consist of 135 cities, non-governmental organisations (NGOs), private companies and research centres.

Putrajaya Corporation had received invitation from CityNet to join the Localisation of SDG7 – Clean Energy for Sustainable and Low Carbon Cities Project. This project focuses on the implementation of Sustainable Development Goal 7 (SDG7) to produce clean and affordable energy for cities.

At the initial stage of the project, city is required to answer questionnaire prepared by the United Nations Economic and Social Commission For Asia and the Pacific (ESCAP) and the United Nations Environment Program (UNEP). The purpose is to review the current situation of a city in relation to the implementation of SDG7.



SUSTAINABLE DEVELOPMENT GOAL 7

Ensure access to affordable, reliable, sustainable and modern energy for all

TARGETS	INDICATORS
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Proportion of population with access to electricity 7.1.2 Proportion of population with primary reliance on clean fuels and technology
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP

In order to answer the SDG7 questionnaire for Putrajaya, 2 Focus Group Discussions (FGDs) have been conducted, involving 8 government agencies and 6 private agencies working in the field of SDG7.

Among the agencies participated in the FGDs include the Ministry of Federal Territories (KWP), Town and Country Planning Department (PLANMalaysia), Energy Commission (ST), Sustainable Development Authority Malaysia (SEDA), Tenaga National Berhad (TNB), Malaysian Green Technology and Climate Change Centre (MGTC), Putrajaya Public Works Department (JKR), National Solid Waste Management Department (JPSPN), Indah Water Konsortium (IWK), Solid Waste and Public Cleansing Management Corporation (SWCorp), National Water Services Commission (SPAN), Air Selangor, Sewerage Services Department (JPP), Alam Flora Sdn. Bhd. and the Ministry of Transport Malaysia (MOT).

FGD sessions with government and private agencies in Putrajaya to gather feedback on oriented policies, strategies and initiatives the implementation of SDG7.

4.4 Quick Facts

Table 4.2: Total Electricity Consumption (kWh) Per Capita in Putrajaya

No.	2015	2016	2017	2018	2019
Total Domestic Electricity Consumption (kWh)	135,842,542.00	137,200,967.42	111,214,485.00	171,393,692.00	124,216,389
Total Population	81,400	84,400	86,900	90,400	103,800
Total Electricity Consumption Per Capita (kWh)	1,669	1,627	1,280	1,896	1,196
kWh/day/capita	4.57	4.46	3.51	5.19	3.28

Source: Putrajaya Sustainable City Reports, 2015-2019.

5.0 WATER USAGE

5.0 WATER USAGE

5.1 Lake Water Quality Control

Putrajaya Corporation has undertaken various actions to maintain Putajaya Lake water quality. Among the actions are integrated monitoring carried out by the Environment, Lake and Wetlands Division and lake maintenance, involving cleaning work, as well as replanting wetlands vegetation.

Maintenance workers clearing *Hydrilla Verticillata* species weeds from the lake.

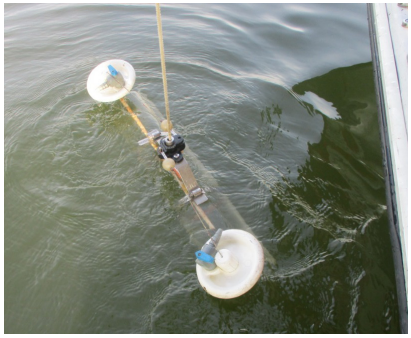
Apart from maintaining the lake and wetlands, the Environment, Lake and Wetlands Division also conducts monitoring of the biological and water quality of Putrajaya Lake and Wetlands. As the result of the Movement Control Order (MCO) started on 18 March 2020 and the continuous monitoring works by the Environment, Lake and Wetlands Division, the quality of Putrajaya Lake water had shown tremendous improvement, reaching Class I Water Quality Index (WQI) (94.3) from the previous Class II WQI (90.6) recorded in January 2020.

The improved WQI is the direct result of lesser water polluting activities at the lake, reduced car wash and dish washing wastewater that flow into the drains in Putrajaya.

Table 5.1: Putrajaya Lake Water Quality Index (Average) from January 2020 to May 2020

Month	Lake Water Quality Index	
January	90.6	(Class II)
February	92.2	(Class II)
March	94.3	(Class I)
April	93.4	(Class I)
May	93.3	(Class I)

Source: Environment, Lake and Wetlands Division, Putrajaya Corporation.



Samplings are carried out once a month at 17 locations, to collect data and measure Putrajaya Lake Water Quality Index (WQI).

5.2 Putrajaya Lake Awareness Programme

5.2.1 Public Participation in Putrajaya Lake and Wetlands Management

As part of the Ecosystem and Environmental Educational Programme (3EP), under Putrajaya Corporation, Putrajaya lake and wetlands have become the living lab for extracurricular learning and research focusing on the care and management of lake and wetlands. In 2019, a total of 3,311 participants had joined the 3EP and they were representatives of the higher learning institutions, government agencies, private sector and related organisations. During the programme, the participants learned various management skills including observation, lake water quality control through the removal of weeds, water sampling and collect lake water quality data. In addition to that, briefings and exhibitions on integrated lake and wetlands management were also carried out during the 3EP.

Students from the University College of Agroscience Malaysia removing *Hydrilla Verticillata*, a foreign and invasive weed species from the Putrajaya Wetlands. Removing this weed species will keep the lake wet and avoid dry up.

Putrajaya Corporation has also introduced The Young Water Scientist and Young Ecologist Programmes. These extracurricular learning modules designed to nurture the interest of school children and students to become future scientists and ecologists. The programmes also aimed to instil the sense of belonging towards Putrajaya Lake and Wetlands ecosystem.

School children were introduced to the invertebrate animals through biological monitoring activities, as these animals are indicators of clean water.




Participants learned how to determine water quality index through the presence of biological indicators in water.

5.2.2 UNESCO-Ecohydrology Programme

In 2019, Putrajaya Corporation had organised the UNESCO-Ecohydrology Programme, namely UNESCO Global Ecohydrology Demonstration Sites Meeting, UNESCO International Ecohydrology Forum and Putrajaya Lake and Wetland Ecosystem Management Seminar on 1 to 4 July 2019 in Putrajaya. A total of 161 participants from 34 government agencies, statutory bodies and universities had attended.

The Honourable Tengku Zulpuri Shah Bin Raja Puji, Deputy Minister of Water, Land and Natural Resources had officiated the Putrajaya Lake and Wetland Ecosystem Management Seminar on 3 July 2019.

5.2.3 UNESCO-IHP Malaysia National Care for Water Young Leaders Camp

The UNESCO-IHP Malaysia National Care for Water Young Leaders Camp was held from 2 to 4 April 2019 at Putrajaya Wetlands Park. This camp aimed to introduce high school and university students to water resource management.

A total of 103 participants had joined the UNESCO-IHP Malaysia National Care for Water Young Leaders Camp. This camp was officiated by Madam Rozaini Ahmad, the Deputy Director of Sports and Arts Education Division, Ministry of Education Malaysia.

5.2.4 National Level Journey of Water Programme

Putrajaya Corporation has been selected with the World Wide Fund for Nature-Malaysia (WWF) to jointly organise the Journey of Water (JoW) 2019 Programme, which was held in conjunction with the World Water Day celebration from 4 to 6 October 2019. The purpose of this programme is to raise awareness on the importance of rivers and the need for sustainable management of river basins, to preserve water resources. JoW is an international event that was first held in South Africa in 2013 and subsequently organised in Zambia and Brazil.

The first JoW in Asia was held in Malaysia in 2018 and for the second edition of JoW in 2019, Tasik Putrajaya was this programme's final checkpoint.

5.3 Quick Facts

Table 5.2: Water Loss Rate in Putrajaya 2014 to 2019

Year	2014	2015	2016	2017	2018	2019
Total treated water generated (m^3)	24,627,282	24,312,285	25,147,412	26,290,642	27,051,975	26,680,374
Total water used (m^3)	22,132,761	21,648,150	21,331,861	21,900,836	22,586,900	22,132,634
NRW (m^3)	2,494,521	2,664,135	3,815,551	4,389,806	4,465,075	4,547,740
NRW (%)	10.13	10.96	15.17	16.70	16.51	17.05

Source : MURNInets Sustainable City Indicators Report 2014-2019.

Table 5.3: Comparison of Lake and River Water Quality Index

Location	Lake and River Water Quality Index							
	2012	2013	2014	2015	2016	2017	2018	2019
Chuau 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)	73.6 (Class III)	73.1 (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)	90.4 (Class II)	91.3 (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)	90.6 (Class II)	89.8 (Class II)

Source: Environment, Lake and Wetlands Division, Putrajaya Corporation.

Table 5.4: Benefits of Using Lake Water as an Alternative Water Resource

Item	2002-2014	2015	2016	2017	2018	2019
Approved Annual Lake Water Intake (million liters)	529.85	59.21	181.99	389.98	363.96	153.20
Savings from Not Consuming Treated Water (RM)[(1)]	RM861,109	RM95,328	RM293,004	RM627,868	RM585,976	RM246,652
Annual Water Consumption[(2)]	Equals: 7,012 people	Equals: 776 people	Equals: 2,386 people	Equals: 5,112 people	Equals: 4,912 people	Equals: 2,068 people

Notes:
(1) Based on government departments' rate at RM1.61/m^3.
(2) Estimated based on Malaysian average daily domestic water consumption (203 liters/person) x 365 days.


I ♥ FIKS

6.0
SOLID WASTE MANAGEMENT

6.0 SOLID WASTE MANAGEMENT

6.1 Recycling Innovation Facility (FIKS)

Recycling Innovation Facility (FIKS) is a facility that integrates solid waste management and education centre. The development of FIKS aims to promote 5R activities (refuse, reduce, re-use, recycle and recovery) to the community and help reduce solid waste going to the landfills.

In line with the development objectives of FIKS, various interactive facilities and activities have been provided to further enhance the public's understanding on solid waste management. Among the facilities available at FIKS are Knowledge Hub, 3R Boutique, Buy Back Centre, Library (KOC Ilmu), Kids Play Area (KOC Kreatif), Integrated Recycling Facility (IRF) and Anaerobic Digester (AD).

The Recycling Innovation Facility (FIKS) is a 5.6 acre facility situated in Precinct 5. It is developed by Alam Flora Sdn. Bhd. in support of the Sustainable Development Goals (SDGs) initiative.

The inauguration ceremony of the Recycling Innovation Facility (FIKS) by the Minister of Federal Territories, YB. Tan Sri TPr. Annuar Bin Hj. Musa on 25 July 2020.

Knowledge Hub provides explanation and information regarding recycling activities and the operations at FIKS.

Basic information and brief facts about solid waste, waste types and recyclable items.

Information about waste management and products made from recycled materials.

3R Boutique is a centre that collects used clothes for resale with proceeds donated to charitable organisations.

The Community Recycling Centre is a centre that buys back recyclable items from the residents. In return, the residents can earn cash and reward points as an incentive.

The Knowledge Coach and Creative Coach are among the children attractions at FIKS. These coaches were old monorail coaches that had been modified into library and children's play space.

The library is equipped with various children's books and computer facilities.

The children's play space is furnished with games and learning equipment.

Integrated Recycling Facility (IRF)

The collected recycled items are send to the Integrated Recycling Facility (IRF) for sorting and compressed before transferred to the factories for further recycling process.

The collected recycled items will be segregated by category at the IRF.

Paper boxes are compressed before being sold to manufacturers to be made new products.

Used cooking oil and e-waste are among the recycled items that can be accepted by FIKS.

Anaerobic Digester Facilities

Anaerobic Digester (AD) is a new facility developed by Alam Flora Sdn. Bhd. under the Food Waste Solution Programme. It is used for managing food waste from the industrial, commercial and institutional sectors.

This AD machine with 500kg capacity can produce biogas and biofertilizers as a result of the food waste decompose process.

The smaller 50kg AD machine is also available for use at individual premises.

Biogas that had been produced is kept in this 20m^3 capacity storage bag.

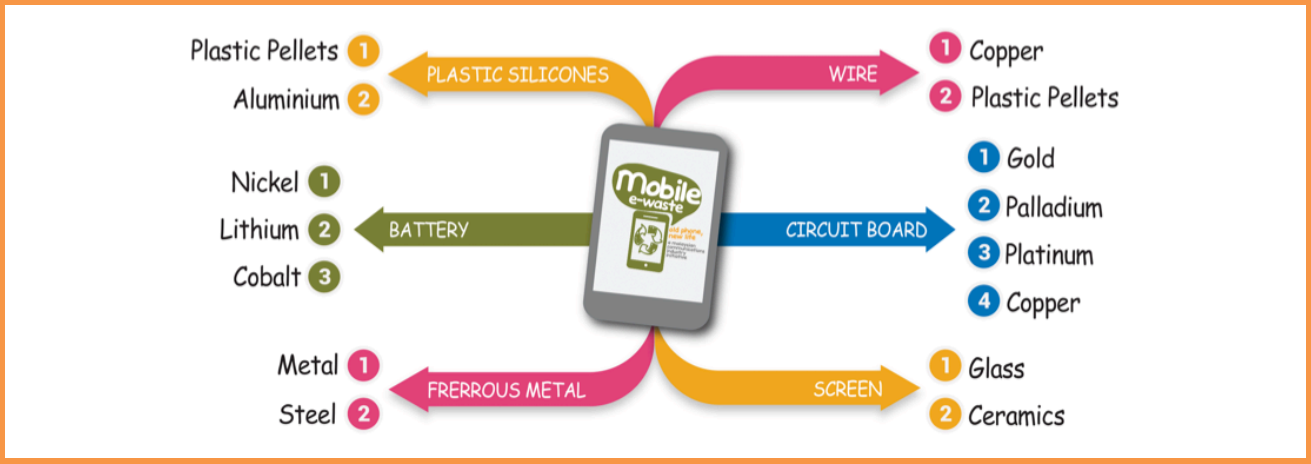
The resulting biogas can be used as fuel for cooking and lighting up lamps.

6.2 Mobile e-Waste Bin Facility

The rapid advancement of technology has affected the demand for mobile phones for daily use. Based on the Malaysian Communications and Multimedia Commission (MCMC) information, the production of smartphone in Asia has increased by 60% in 5 years. There were 44,078,000 million mobile phone customers in Malaysia in the 3rd quarter of 2019 (Communications & Multimedia Statistics, MCMC). The average lifespan of a mobile phone is about 18 to 24 months.

If used mobile phones are not managed properly, contaminants such as lead, cadmium and mercury can pose serious environmental and health risk. Based on this scenario, MCMC has introduced a programme called Mobile e-Waste: Old Phone, New Life. Mobile e-waste specifically refers to all types of waste generated from SIM-based devices such as mobile phones, smartphones, tablets, phablets, chargers and accessories.

How is device recycled?



Mobile devices will be broken down into several components. Unusable materials will be disposed safely, while reusable materials will be extracted and turned into new products. The extraction process is known as urban mining.

In total, there are 104 mobile e-waste bin located nationwide. In Putrajaya, there are 4 mobile e-waste bin facilities. They are situated at PPj Complex, Digi Alamanda Putrajaya, Bank Rakyat Precinct 8 and Putrajaya Sentral.

Starting 30 September 2019, PPj Complex has become one of the locations in Putrajaya with mobile e-waste bin facilities. The locations of the bin facilities are at the lobby of Block AB and Block CD.

6.3 CAREton@Putrajaya

The CAREton project was introduced in 2012 by Tetra Pak® Malaysia and Nestle MILO® UHT. The purpose of this programme is to collect used beverage cartons (UBC) and process them into environmentally friendly building materials called poly Aluminium (polyAl) panel boards. Apart from that, UBC can also be recycled and turned into items such as baskets, bags, boxes, lamps, hand fans and so on.

In 2020, Putrajaya Corporation has participated in this programme, which is named as CAREton@Putrajaya. Various initiatives had been carried out under the CAREton@Putrajaya Programme, such as providing bin facilities to collect UBC, MyLaman pilot project and used beverage cartons upcycle training.

3 UBC collection locations have been provided, there are Putrajaya Corporation Complex cafeteria, Anjung Bestari Apartments Phase 4B, Precinct 8 and Block A, Apartments 14/7, Precinct 14. The information bunting and collection bins which are made from polyAl boards, are placed at the collection location.

Used Beverage Cartons (UBC) Upcycle Training

In order to enhance the production of recycled items by the community in Putrajaya, PPj has organised two series of Used Beverage Cartons (UBC) Upcycle Training, which were held on 3 and 10 September 2020. Through these programmes, the participants received basic training on the techniques to produce handicrafts using UBC.

These trainings were conducted in collaboration with Tetra Pak and Nestle MILO UHT.

Participants who joined the training were representatives from the Putrajaya Senior Citizens Association (PerWEP), Putrajaya People with Disabilities Association (PROcJAYA) and Phase 4B Community.

Among the UBC products from the training sessions are baskets, wallets, photo frames and coasters.

Creativity 3R@MyLaman Programme

The Creativity 3R@MyLaman Programme is another activity under the CAREton@Putrajaya initiative. Creativity 3R@MyLaman aims to integrate recycling elements in the urban farming activities. The pilot project for this programme is carried out by the Community Farm 4 (KK4) at Precinct 14. KK4 members have produced numerous new products from polyAl boards.





Among the items produced by KK4 members are farm sales kiosks, trolleys, tables and nursery containers.



Wall clock, radio and compost container cover made from polyAl boards are also among the creation by the creative KK4 members.


Farm waste collection plots and stairs.

6.4 Jom Rawat Bumi Programme Implementation Status

Jom Rawat Bumi (JRB) is a programme that had started in March 2019. This programme works on the concept of collecting reward points through the Petronas's Mesra Card and has gained encouraging response from the residents. The status of JRB bin distribution is detailed in Table 6.1 as of the end of 2019. This programme had successfully attracted 1,135 residents as its members.

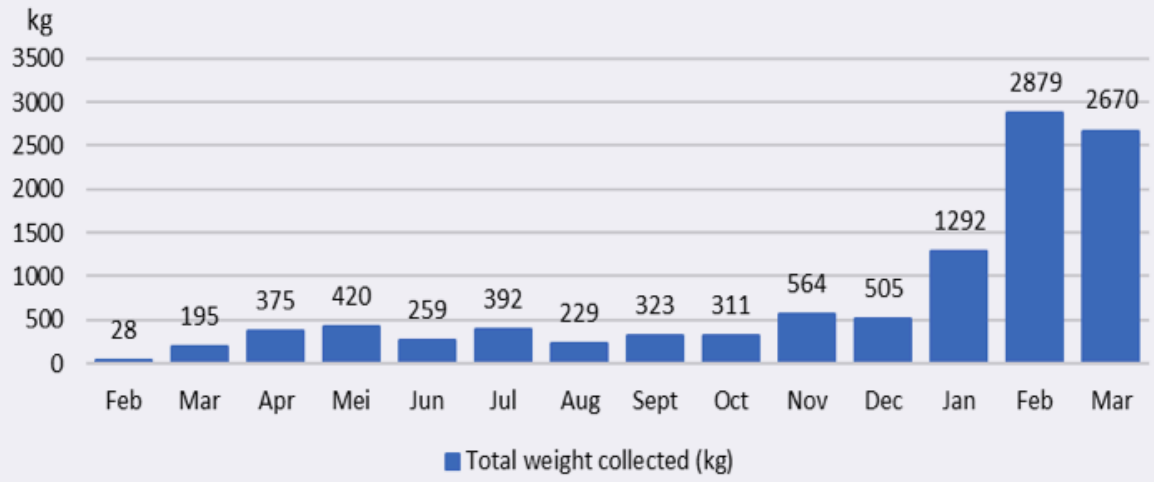
Table 6.1: JRB Bin Distribution Status by Precinct

No.	Precinct	No. of Bins
1	Precinct 5	6
2	Precinct 6	4
3	Precinct 8	9
4	Precinct 9	17
5	Precinct 11	11
6	Precinct 14	4
7	Precinct 15	7
8	Precinct 16	3
9	Precinct 17	13
10	Precinct 18	7
11	Precinct 3	2
Total		**83**

Source: Alam Flora Sdn. Bhd.

The total weight of recyclable materials that had been collected from February 2019 to March 2020 is 10,441kg.

Chart 6.1: Total Weight of Recyclable Materials Collected Through the Jom Rawat Bumi Programme (February 2019 to March 2020)



Source: Alam Flora Sdn. Bhd.

Program #JomRawatBumi kurangkan 16 tan sampah sehari

PUTRAJAYA – Pelaksanaan program barkod *#JomRawatBumi* yang menempatkan 20 tong kitar semula di dua buah blok perumahan di sini berjaya mengurangkan 16 tan kutipan sampah sehari.

Ketua Pegawai Eksekutif Alam Flora, Datuk Mohd. Zain Hassan berkata, sebelum program tersebut dilaksanakan, barangan kitar semula yang diterima pihaknya adalah lima hingga enam tan sehari.

"Selepas memulakan program ini di Presint 8 dan Presint 11, kita mendapat lebih kurang 16 tan sehari dan itu merupakan pencapaian baik untuk Putrajaya. Pada masa ini, fokus utama adalah di bangunan tinggi.

AMINUDDIN menunjukkan barkod pada plastik kitar semula sebelum memasukkannya ke dalam tong sampah pintar pada program #JomRawatBumi di Putrajaya baru-baru ini. Turut hadir Mohd. Zain (kiri).

"Kita letak tong ini, pertamanya kerana ia selamat dan tidak boleh dimasuki. Keduanya, bersih kerana sisa tidak bersepah-sepah dan kekal. Ini sampah kering untuk kitar semula bagi mengelakkannya di hantar ke tapak pelupusan," katanya selepas Mesyuarat Jawatankuasa Bandar Hijau Putrajaya baru-baru ini.

Menurut Mohd. Zain, pihaknya akan meneruskan program seumpama itu di 86 lokasi di seluruh Putrajaya yang mana tong kitar semula akan dihantar ke blok-blok perumahan tertentu sekali gus meningkatkan lagi kutipan sampah kitar semula.

Ujarnya, Putrajaya merupakan bandar pemacu dan model untuk program berkenaan sebelum ia dilaksanakan di bandar-bandar lain.

Dalam pada itu, Presiden Perbadanan Putrajaya, Datuk Dr. Aminuddin Hassim memaklumkan, program tesebut merupakan satu insentif untuk penduduk di Putrajaya yang membolehkan mereka berbelanja sambil kitar semula.

"Biar fasa pertama kita laksanakan dulu dan lihat penglibatan penduduk serta kesungguhan mereka untuk bersama-sama kerana akhirnya ini adalah untuk generasi akan datang, selamatkan bumi di samping untuk memastikan tabiat positif dilakukan masyarakat.

"Kalau penglibatan dan penyertaan mereka lebih meluas, maka kita akan memperluaskannya lagi dengan meletakkan tong ini di tempat-tempat yang strategik bagi memudahkan mereka membuang atau mengutip sampah," katanya.

The JRB bins handover ceremony at Putrajaya Corporation Complex was held on 30 September 2019. The bins were handed over by Datuk Mohd Zain Hassan (Chief Executive Officer of Alam Flora Sdn. Bhd.) to Datuk Dr. Aminuddin Hassim (President of Putrajaya Corporation).

6.5 Recycling Campaign, Promotion and Exhibition

Educational and promotional programmes for solid waste management are continually carried out through organised activities such as exhibitions, quizzes and talks as follows:

6.5.1 Recycling Carnival at Dwiputra Residences, Precinct 15

The community of Dwiputra Residences had organised the Dwiputra Residences Recycling Carnival on 27 July 2019. This carnival aimed to further increase the recycling efforts among Dwiputra Residences residents. Various activities had been carried out such as exhibitions, talks on green initiatives, colouring competition, Upcycle competition and lucky draws.

The carnival was held at the foyer of Block A1 and its surrounding area. It was officiated by Datuk Ir. Hj Ahmad Fuad Bin Embi, Chairman of the Joint Management Body.

Putrajaya Green City 2025 Exhibition and Briefing

Putrajaya Corporation had been invited to give a briefing on the concept of Putrajaya Green City and the initiatives that had been implemented.

The exhibition by Putrajaya Corporation had disseminated information on the concept of Putrajaya Green City which is based on 7 focus area and also the green initiatives that had been implemented in Putrajaya.

Green city concept quizzes had received encouraging responses from the visitors.

Briefings and hands-on sessions had been conducted to show how to produce ecobrick.

Private Agencies and Universities Exhibitions

During the carnival, there were also other private agencies and institutions of higher learning which had conducted recycling products exhibitions.

Exhibition and 3R quiz sessions conducted by Alam Flora Sdn. Bhd.

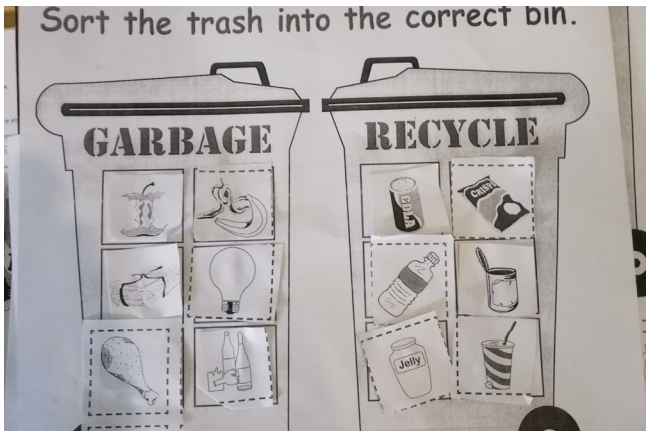
DHES had also opened counter for residents to sell collected recyclable items including used cooking oil.

Private companies also promote recycled products such as compost and food waste composting machines.

Universiti Putra Malaysia (UPM) showcased the results of their research in producing 'Garbage Enzyme' from vegetable and fruit skin wastes.

Children's Colouring, Quiz and Upcycle Competitions

In order to instil the awareness of good recycling practices among children, several competitions had been conducted including colouring and upcycle competitions.



Colouring competition and recycling quizzes were well received by the children.





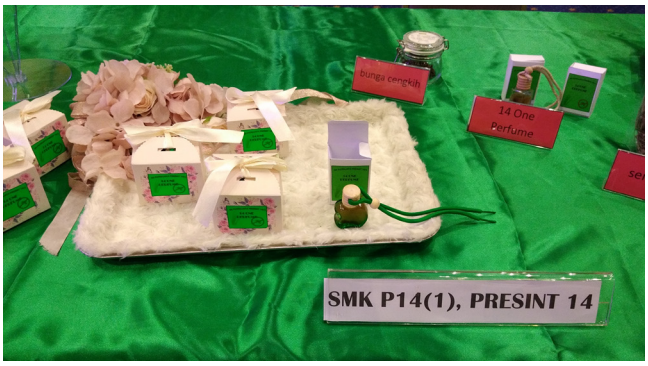
The children of the residents of Dwiputra Residences using their creativity to produce items made from recycled materials.

6.5.2 Exhibition in Conjunction with the Putrajaya Recycling Carnival 2019

Putrajaya Recycling Carnival 2019 was held for two days at Seri Siantan Hall, Putrajaya Corporation Complex from 20 to 21 November 2019. It was organised by the City Services Department. Besides exhibitions, other key events that took place include Putrajaya school level COMBI acting competitions, talks focusing on avoiding single-use plastics and the use of biodegradable products.

Carnival visitors were attracted to the educational exhibition materials presented graphically and Putrajaya wetland plants (lake water quality filters) exhibition.

Educational quizzes on topics like green practices and climate change were adapted for all age groups and work background such as school children and government agency employees.



Exhibitions by schools in Putrajaya, government agencies, private companies and demonstrations by SWCorp on producing upcycle items from used clothing.

6.6 Quick Facts

Table 6.2: Solid Waste Rates in Putrajaya

Year	Total Solid Waste (kg)	Solid Waste (tonne/day)	Total Domestic Solid Waste (kg)	Domestic Waste (tonne/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
2017	41,516,810	113.7	28,903,840	79.2
2018	42,797,900	117.2	30,191,620	82.7
2019	40,729,370	111.5	30,539,680	83.7

Source: Environmental Health Division, Putrajaya Corporation.

Table 6.3: Domestic Solid Waste Rate per Capita in Putrajaya from Year 2014 to Year 2019

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
2017	28,903,840	86,900	0.91
2018	30,191,620	90,400	0.92
2019	30,539,680	103,800	0.81

Source:
(1), (3): Environmental Health Division, Putrajaya Corporation.
(2): MURNInets 2014-2019.

Table 6.4: Recycling Rate in Putrajaya from Year 2014 to Year 2019

Year	Total Domestic Solid Waste (kg)	Total Recycling Collection (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
2017	28,903,840	2,503,000	9
2018	30,191,620	2,837,733	9
2019	30,539,680	3,101,901	10

Source: Environmental Health Division, Putrajaya Corporation.

7.0
CITY ADMINISTRATION AND MANAGEMENT

7.0 CITY ADMINISTRATION AND MANAGEMENT

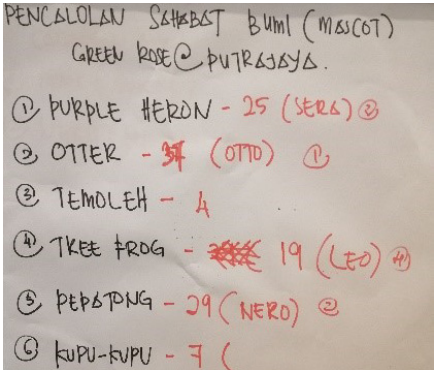
7.1 GreenROSE@Putrajaya Green Folio

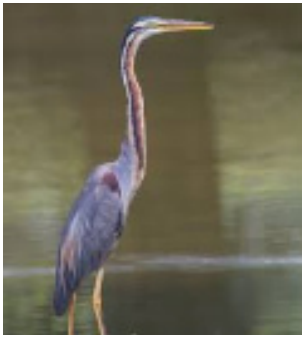
The GreenROSE@Putrajaya Programme is a green city initiative that focuses on instilling climate change phenomenon awareness among primary school children and encouraging them to take micro actions to reduce carbon emissions and conserve the environment. For this purpose, the GreenROSE@Putrajaya Green Folio book is used as one of the key learning materials. This folio book is tailored to the context of Putrajaya, especially in featuring the facts and low carbon green practices in Putrajaya.

The publication of Putrajaya Green Folio book is also to support the Sustainable Development Goals (SDGs) in particular SDG 4: Quality Education; SDG 11: Sustainable Cities and Communities and SDG 13: Climate Action.

The editorial sessions of the book were conducted in collaboration with relevant expert agencies such as Universiti Kebangsaan Malaysia, Ministry of Federal Territories (KWP), Putrajaya Federal Territory Education Department, Department of Irrigation and Drainage (DID), National Water Research Institute of Malaysia (NAHRIM), National Water Services Commission (SPAN), Solid Waste and Public Cleansing Management Corporation (SWCorp), Sustainable Energy Development Authority Malaysia (SEDA Malaysia), Green Technology and Climate Change Centre (MGTC) and Putrajaya Federal Territory Department of Environment.

A series of meetings and workshops had been organised to identify appropriate information and education modules in the Putrajaya context.





In order to make the educational content of the Green Folio book more interesting for primary school children, several types of fauna found in Putrajaya had been identified as Green City Mascot. After the voting process, 4 faunas had been selected and they are Purple Heron bird, Smooth-coated otter, dragonfly and tree frog.

There are all together 5 key modules in the GreenROSE@Putrajaya Green Folio, namely Water Management Campaign, Recycling Campaign, Energy Saving Campaign, Save the Air Campaign and Save the Land Campaign.

GreenROSE@Putrajaya Green Folio aims to educate and train the younger generation of Putrajaya to be the agents of change to undertake green practices and actions to preserve the environment.

7.2 Putrajaya Green Initiative Award 2020 (AIH 2020)

During the Movement Control Order (MCO) period, the society in general begins to feel changes in their life. This include longer stay-at-home time and the positive impact observed on the environment, in particular the improved air and river water quality. This situation is closely related to the decline in human activities that have impacted the environment negatively, such as motor vehicles on the road and economic activities that caused pollution.

The Putrajaya Green Initiative Award 2020 (AIH Putrajaya 2020) was introduced by Putrajaya Corporation in 2020. AIH Putrajaya aims to highlight Putrajaya residents creative ideas and green city practices in particular on ways to save electricity, water and reduce solid waste at home. It was held from 5 May to 9 June 2020.

There are 3 award categories namely electricity saving, water saving and solid waste reduction. AIH Putrajaya 2020 participation is free and open to all Putrajaya residents. The participants are required to upload video recording of no more than 2 minutes on the official Facebook page of Putrajaya Corporation as a condition of participation.

These uploaded videos shared creative initiatives on how to save electricity, water and reduce solid waste at home.

Summary of AIH Putrajaya Participation

The award which was introduced for the first time by Putrajaya Corporation had received encouraging responses from the residents of Putrajaya. A total of 34 entries had been received, whereby 9 were in the electricity saving category; 13 water saving category and 12 solid waste management category.

The initiatives that demonstrated how to save electricity at home and save water for gardening.

Among the initiatives that showed how to reduce solid waste.

Putrajaya AIH 2020 Award Ceremony

The AIH Putrajaya 2020 award ceremony was held on 7 July 2020 at the Putrajaya Corporation Complex. The awards were presented by YBhg. Datuk Dr. Aminuddin Bin Hassim, President of Putrajaya Corporation. The winners of AIH Putrajaya received certificate of participation and cash prizes as follows: first place RM500; second place RM400; third place RM300; consolation RM200 and Special Jury Award RM350.

Recipient of the Electricity Saving Category Award

Recipient of the Water Saving Category Award

Recipients of the Solid Waste Reduction Category Award

Recipients of the Special Jury Award

The judging panel of AIH Putrajaya consists of Putrajaya Corporation strategic partner agencies, namely SEDA Malaysia, Malaysian Green Technology and Climate Change Centre (MGTC) and Alam Flora Sdn. Bhd.

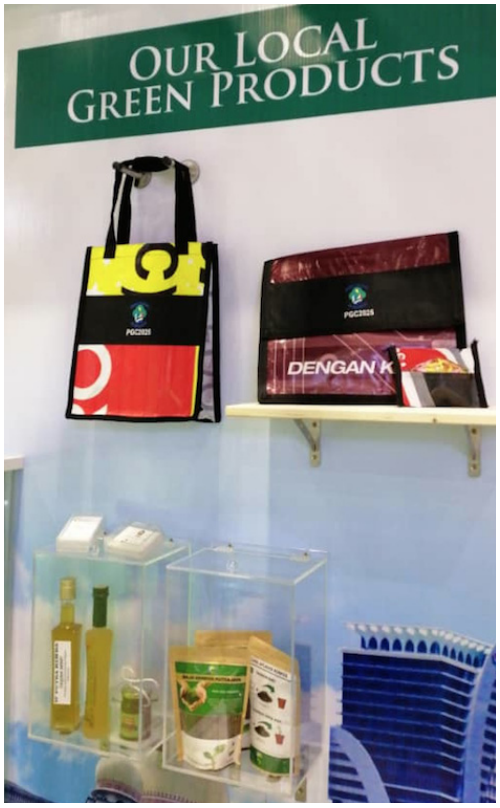
The winner of the Special Jury Award explaining the urban farming innovation which saves water and space.

7.3 Participation in the International Green Technology and Eco Products Exhibition (IGEM)

7.3.1 IGEM2019

The 10th International Conference on Green Technology and Eco Products 2019 (IGEM2019) organised by the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) was held from 9 to 11 October 2019 at Kuala Lumpur Convention Centre (KLCC). The objective of IGEM2019 is to promote the potential and development of green technology businesses. In addition, it also intends to raise public awareness on the importance of green technology and low carbon lifestyle.

376 companies and agencies from within and outside the country had showcased their green technology and eco products at IGEM2019.



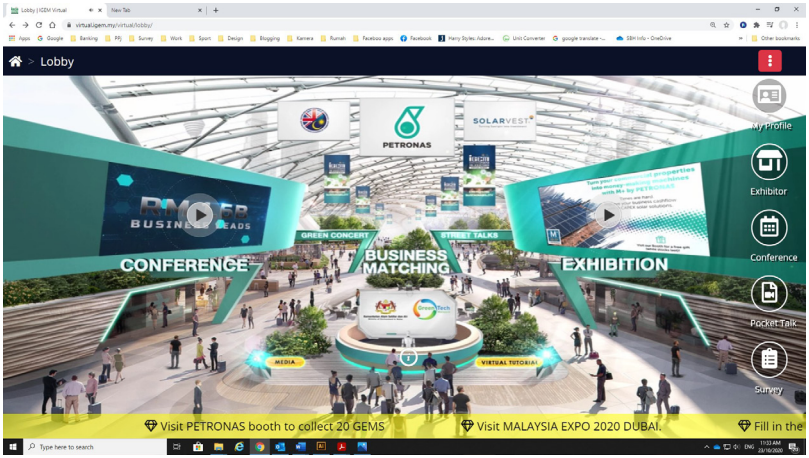
Putrajaya Corporation together with its strategic partner Putrajaya Holdings Sdn. Bhd. also participated in the IGEM2019 exhibition to promote Putrajaya green initiatives.

PJC exhibition attracts many local and international visitors who were also IGEM2019 participants.

The honourable President and officials of PJC had paid a visit to the exhibition after attending the Low Carbon Cities 2030 Challenge (LCC2030c) presentation ceremony organised by the Malaysian Green Technology and Climate Change Centre (MGTC).

7.3.2 Virtual IGEM2020

IGEM2020 was held virtually from 19 to 23 October 2020 due to the COVID-19 pandemic that is currently plaguing Malaysia.



IGEM2020 web site featuring conference space, business matching space and exhibition space that are open to visitors 24-hour a day.

International Hall

Main Hall

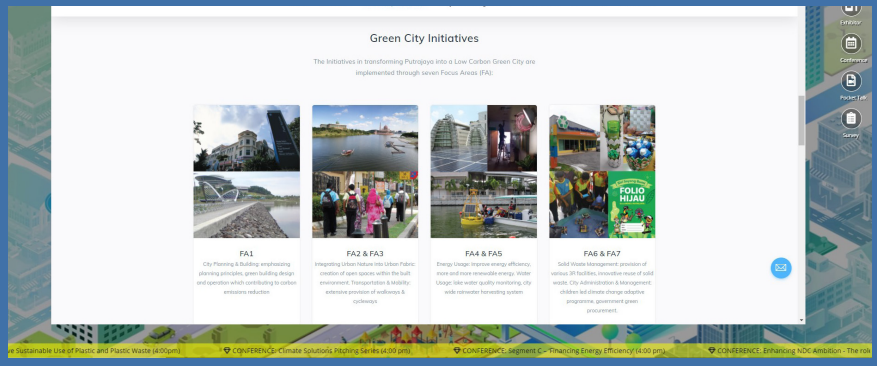
Malaysia Hall

There are 3 main virtual exhibition spaces that house local and international exhibitors.

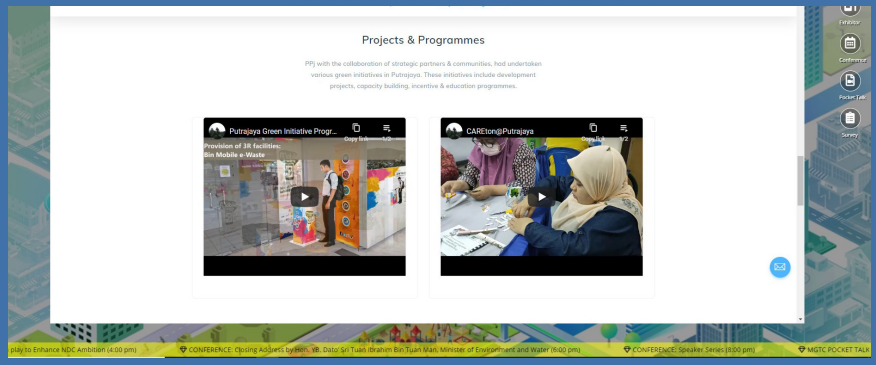
Putrajaya Corporation is one of the exhibitors under the Cities 2030 which intends to highlight low carbon initiatives implemented at the city level. A total of 8 local authorities had participated in this virtual exhibition, namely Putrajaya Corporation, Hang Tuah Jaya Municipal Council, Sepang Municipal Council, Shah Alam City Council, Ipoh City Council, Batu Pahat Municipal Council, Langkawi Tourism City Municipal Council and Pasir Gudang Municipal Council.

Virtual visit and briefing session by Dr. Nagulendran, Deputy Secretary General of Environment, Ministry of Environment and Water (KASA) with the local government representatives who participated in the Cities 2030 exhibition.

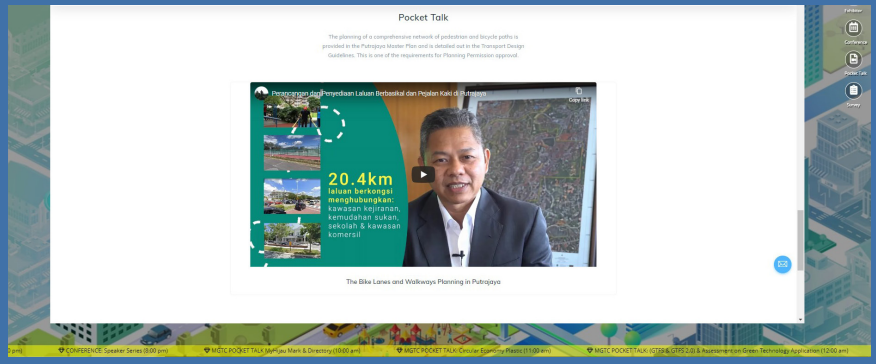
The main topics highlighted on the exhibition site are the 3 key targets set to make Putrajaya Low Carbon Green City.



Description of the initiatives implemented in Putrajaya based on 7 focus area namely City Planning and Building, Integrating Nature into the Urban Fabric, Transportation and Mobility, Energy Usage, Water Usage, Solid Waste Management and City Administration and Management.



Exhibition videos explaining PJC green initiatives jointly carried out with the community and strategic partners.



Pocket Talk by YBhg. Dato' Fadlun Mak Ujud, Vice President, City Planning Department, Putrajaya Corporation on the comprehensive pedestrian and cycling infrastructure planning in Putrajaya.

During the 5 day virtual exhibition, PJC microsite received 568 visitors, of whom 97% were locals and 3% international visitors.

7.4 Green Tour

A series of visits had been organised to explore new and innovative ideas, as well as new green technologies that can be implemented in Putrajaya. In addition, the Green Tour can also provide opportunity for members of the Putrajaya Green City Committee, the strategic partner agencies and the government or private sectors stakeholders to experience first-hand of green city initiatives that have been implemented in other places.

Date : 28 November 2019
Initiative : Organic Waste Processing Programme Using Black Soldier Fly Technology (BSF)
Location : Kuala Lumpur Wholesale Market Vegetable Seperation Center

This initiative had been implemented since 1 April 2019 where organic waste collected from the Kuala Lumpur Wholesale Market (PBKL) will be sent to BETSOL Sdn. Bhd. to be processed into compost fertiliser using black soldier fly technology. The 3 main parties involved in the implementation of this programme are:

i) Kuala Lumpur City Hall as the approving authority;
ii) BETSOL Sdn. Bhd. as the initiative operator;
iii) Fruits and vegetables wholesalers association as the party that conduct the separation process.

Organic wastes are separated by vegetables and fruits wholesalers at the wholesale market and put into special bins before being sent to BETSOL Sdn. Bhd.

Every day about 16,000 kg of organic wastes can be collected for compost processing. This initiative also helps DBKL save RM15,000 per month solid waste management costs.

BETSOL plant also receives organic waste such as fruit peels from surrounding food processing factories.

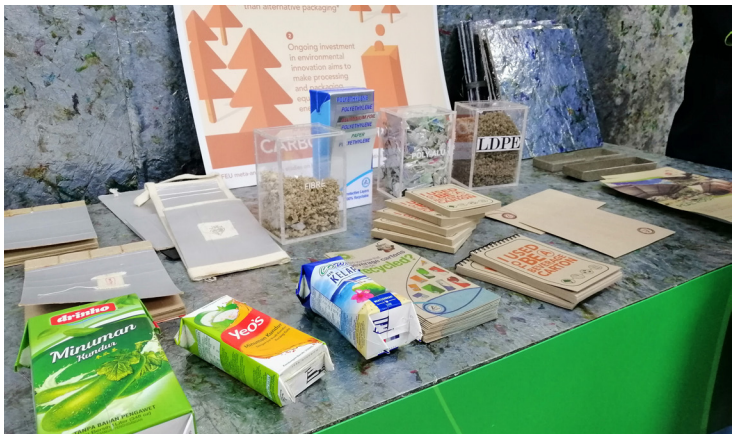
Organic wastes are finely ground and placed in multi-storey containers. Each shelf (6 storey containers) contains one day organic waste.

BSF larvae will be placed in each container which is filled with organic waste for the decomposition process up to 7 days.


The end result is the compost fertilisers and BSF larvae are processed into fish food or dried and mix into bran and food for chicken.

Date : 21 February 2020
Initiative: Used Beverage Carton (UBC)
Location : S.H.A Paper Mills Sdn. Bhd. and KPT Recycle Sdn. Bhd.

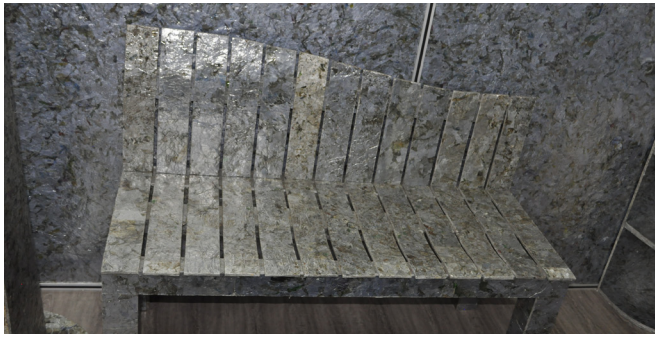
This initiative was introduced by Tetra Pak Malaysia and is known as the CAREton Programme. UBC can be recycled into papers as well as building materials - polyAl board and roof.



The composition of beverage carton materials are 75% paper, 20% plastic and 5% aluminium. The Tetra Pak used beverage carton materials can be recycled 100%. For that purpose, the separation process between paper (fibre) and plastic-aluminium (polyAl) needs to be carried out

To produce a piece of polyAl board measuring 4' x 8' requires 7,247 used beverage cartons.

There are 2 types of end products; polyAl board and polyAl roof. The price for a piece of polyAl board is RM42 while polyAl roof is RM45. Due to the durable features, these products can be used as building materials for roof and office wall.



Examples of the furniture made from polyAl boards are bench, bookshelf and decorative lamp.

7.5 Low Carbon Cities 2030 Challenge

Low Carbon Cities 2030 (LCC 2030 Challenge) is an initiative by the Malaysian Green Technology and Climate Change Centre (MGTC). It is an effort to accelerate the transformation of Malaysian cities towards low carbon cities. The target of LCC 2030 Challenge is for all participating cities to reduce the intensity of green house gas emissions by 45% by year 2030 compare to the base year level.

The five recommended elements to achieve this goal are:

i. Building sector energy consumption;
ii. Vehicular petrol and diesel consumption;
iii. Solid waste disposed at landfills;
iv. Building sector water consumption;
v. Increase in the number of trees, green areas and water bodies to absorb carbon.

City that achieves carbon emissions reduction will be awarded the Diamond Certificate. The rating system for LCC 2030 Challenge is based on the scales in Table 7.1:

Table 7.1: LCC 2030 Challenge Diamond Certificate Rating System

1 *Diamond*	1% reduction
2 *Diamonds*	5% reduction
3 *Diamonds*	10% reduction
4 *Diamonds*	25% reduction
5 *Diamonds*	45% reduction

Source: Malaysian Green Technology and Climate Change Centre

In 2019, PJC had participated in two categories, there are the building category (PPj Complex) and the zone category (Precinct 1). The base year was set on 2012 for all elements except solid waste which had its base year set on 2015. The achievements of carbon emissions reduction in these two categories up to 2018 are shown in Table 7.2.

Table 7.2: Carbon Emissions Reduction Achievements in 2018

	PPj Complex	Precinct 1
Elements	**Reduction Achievements**	
1. Energy	(19.50%)	(21.58%)
2. Solid Waste	(8.09%)	(14.62%)
3. Water	-	(41.04%)
Elements	**CO_2 Absorption**	
4. Greenery & Water Bodies	9.61tCO_2e/year	1,053 tCO_2e/year

The Provisional and Diamond Certificates presented by YB. Yeo Bee Yin (Minister of Energy, Science, Technology, Environment and Climate Change) to Datuk Dr. Aminuddin Bin Hassim (President of PJC).

7.6 Green Neighbourhood Award (AKH)

7.6.1 AKH 2019

Putrajaya Corporation had won the third place of the Green Neighbourhood Award 2019 (AKH 2019) organised by PLANMalaysia. Putrajaya had participated in the multi-storey housing category, with the entry of Apartments 14-7 and its neighbourhood, Precinct 14, Putrajaya. The award this time, was judged based on 4 main initiatives:

i. Installation of bicycle lanes.
ii. Installation of pedestrian walkways.
iii. Development of urban farming.
iv. Programme for waste composting.

The AKH 2019 award ceremony was held on 10 November 2019 at Dataran Kemerdekaan, Shah Alam. The award was presented by the Honourable Minister of Federal Territories together with the Chief Minister of Selangor.

The award was judged by the implementation of 4 main initiatives, namely bicycle lane installation, pedestrian walkway installation, urban farming development and waste composting programme at Apartment 14-7 and its neighbourhood area in Precinct 14.

7.6.2 AKH 2020

For the participation in Green Neighbourhood Award 2020 (AKH 2020), Putrajaya Corporation had won the first place in the local authority (PBT) city council/corporation category. The award is for the pedestrian walkways and bicycle lanes initiatives in Precinct 8, Putrajaya.

The AKH 2020 results were announced in a virtually ceremony held in conjunction with the World Town Planning Day (HPSB) celebration at national level. The ceremony was live streamed on 10 November 2020 via PLANMalaysia Facebook page.

Examples of pedestrian walkway and bicycle lane facilities at Precinct 8, Putrajaya, that take into account users comfort and safety.

PUTRAJAYA GREEN CITY COMMITTEES, PUTRAJAYA CORPORATION

APPENDIX A

PATRON:
YBhg. Datuk Muhammad Azmi Bin Mohd Zain,
President, Putrajaya Corporation

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

MEMBERS:

Pn. Norzita Binti Abdul Razak (TPr.)
Director Sustainable Development Division,
City Planning Department

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

Tn. Hj. Zainal Arifin Bin Baseri
Director Building Inspectorate & Architecture Division,
City Planning Department

Pn. Ruhselah Binti Hj. Ismail
Director Environment, Lakes & Wetland Division,
City Planning Department

En. Muhamad Zubir Bin Saran (Ir.)
Director Road Division,
Engineering & Maintenance Department

Tn. Hj Ahmad Zubir Bin Sapian
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

En. Abd Aziz Bin Buang (LAr.)
Director Management & Landscape Division,
Landscape & Park Department

Dr. Mohd Helmi Bin Abdul Hamid
Director Environmental Health Division,
City Services Department

Pn. Rodziah Binti Ismail (Sr.)
Director Procurement & Surveying Division,
Finance Department

Pn. Norliana Akida Binti Abd Rahim
Senior Principal Assistant Director Administration Division,
Corporate Services Department

SECRETARIAT
(PUTRAJAYA GREEN CITY SECTION):
Wang Tze Wee (TPr.)
Nor Hasimah Binti Haji Samod
Khairuddin Haikal Bin Noor Azhar
Muhammad Fahri Bin Zulkipli

LIST OF APPRECIATIONS

- MINISTRY OF FEDERAL TERRITORIES
- MINISTRY OF ENERGY AND NATURAL RESOURCES
- MINISTRY OF ENVIRONMENT AND WATER
- MINISTRY OF TRANSPORT MALAYSIA
- MINISTRY OF HOUSING AND LOCAL GOVERNMENT
- PUTRAJAYA PUBLIC WORKS DEPARTMENT
- SUSTAINABLE ENERGY DEVELOPMENT AUTHORITY MALAYSIA (SEDA)
- MALAYSIAN GREEN TECHNOLOGY AND CLIMATE CHANGE CENTRE (MGTC)
- ENERGY COMMISSION
- PUTRAJAYA FEDERAL TERRITORY EDUCATION DEPARTMENT
- PUTRAJAYA FEDERAL TERRITORY DEPARTMENT OF ENVIRONMENT
- TOWN AND COUNTRY PLANNING DEPARTMENT (PLANMalaysia)
- MALAYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION (MCMC)
- SOLID WASTE AND PUBLIC CLEANSING MANAGEMENT CORPORATION (SWCorp)
- NATIONAL SOLID WASTE MANAGEMENT DEPARTMENT (JPSPN)
- NATIONAL WATER SERVICES COMMISSION (SPAN)
- DEPARTMENT OF IRRIGATION AND DRAINAGE (DID)
- SEWERAGE SERVICES DEPARTMENT (JPP)
- NATIONAL WATER RESEARCH INSTITUTE OF MALAYSIA (NAHRIM)
- UNIVERSITI KEBANGSAAN MALAYSIA (UKM)
- CONSTRUCTION INDUSTRY DEVELOPMENT BOARD (CIDB)
- GREEN BUILDING INDEX (GBI)
- UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP) MALAYSIA
- GREEN TECHNOLOGY APPLICATION FOR THE DEVELOPMENT OF LOW CARBON CITIES (GTALCC)
- PUTRAJAYA HOLDINGS SDN. BHD.
- ALAM FLORA SDN. BHD.
- INDAH WATER KONSORTIUM SDN. BHD.
- TETRA PAK (MALAYSIA) SDN. BHD.
- NESTLÉ MILO UHT
- EXPRESS RAIL LINK SDN. BHD.
- PENGANGKUTAN AWAM PUTRAJAYA TRAVEL & TOURS SDN. BHD. (PAPTT)
- TENAGA NATIONAL BERHAD (TNB)
- GAS DISTRICT COOLING (PUTRAJAYA) SDN. BHD.
- GAS MALAYSIA BERHAD (PUTRAJAYA)
- AIR SELANGOR
- PUTRAJAYA SENIOR CITIZENS ASSOCIATION (PerWEP)
- PUTRAJAYA PEOPLE WITH DISABILITIES ASSOCIATION (PROcJAYA)
- APARTMENTS PHASE 4B, PRECINCT 8
- BLOCK A, APARTMENTS 14/7, PRECINCT 14
- COMMUNITY FARM 4 (KK4), PRECINCT 14
- DWIPUTRA RESIDENCES, PRECINCT 15

PHOTO SEPERATOR COURTESY OF:

Putrajaya Tourism and Photo Contest

Putrajaya Lake & Wetland Photo Competition 2016

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