

To realise these outcomes, TMG supports building owners with in depth assistance to prepare their reports and, more importantly, TMG offers information so called 'benchmarks' so that building owners can conduct self-evaluation on their performances. In addition, TMG provides various supports such as; energy audit services for free; seminar for studying energy efficiency measures; and creation and dissemination of textbooks by business types.

It is notable that TMG has sought out implementation of energy saving measures by buildings rather than required them to just submit reports and disclose them. Aforementioned issues (reporting of measures to be implemented as well as energy consumptions, offering 'benchmarks', enhancing capacity through seminars, etc.) are important lessons to be learnt.

Experiences of TMG are important for the effective implementation of the proposed new scheme for energy consumption reduction in buildings in Putrajaya. The AIM team is jointly working with TMG in imparting their knowledge as well as sharing the experiences of TMG with PJC in Putrajaya's effort in reducing CO₂ particularly from the building sectors to realise the vision of turning Putrajaya into a sustainable low carbon green city by 2025.

4.2 Malaysia's Institutional Background on Low Carbon Development

National Policy for low Carbon Development

The Tenth Malaysia Plan (10MP) is the country's comprehensive blueprint for development from 2011 to 2015 and sets forth the country's overarching strategy for low carbon development. The National Policy on Climate Change (NPCC) and National Green Technology Policy (NGTP) both set the policy framework for low carbon development in the country which subsequently set the foundation for the Low Carbon Cities Framework (LCCF).

The National Policy on Climate Change (NPCC)

The NPCC's main objectives include mainstreaming climate change through the wise management of resources and enhanced environmental conservation. The policy also aims to strengthen institutional and implementation capacity to better harmonise opportunities to reduce negative impacts on climate change. The policy is based on the principles of sustainable development, coordinated implementation, effective participation and common but differentiated responsibilities.

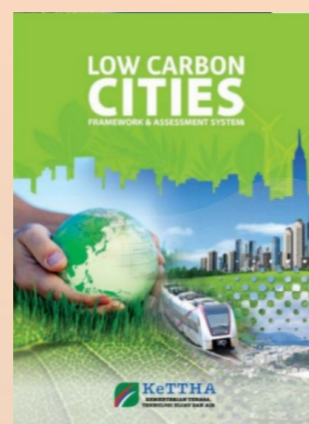
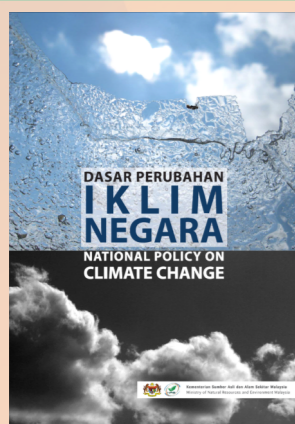
National Green Technology Policy (NGTP)

The NGTP, launched in 2009, seeks to complement the NPCC through the promotion of low carbon technology, sustainable development and conservation of the natural environment and resources. The NGTP focuses on four broad sectors namely building, energy, waste and transportation.



Malaysia's commitment to reduce carbon emissions.

During COP15, Malaysia made a commitment to reduce carbon emissions by up to 40% of the intensity of gross domestic product (GDP) by 2020 compared to 2005.



Low Carbon Cities Framework (LCCF)

- The LCCF is both a conceptual framework to assist cities in developing policy and planning, and also a technical framework upon which analytical tools for calculation of greenhouse gas emissions and evaluation of low emission development options can be based.
- LCCF is intended to be applicable to cities of any sizes, townships and precincts to support them to measure the impact of their development decision in terms of carbon emissions and abatement.
- LCCF is structured around the Low Carbon City Criteria which covers the four focal areas: urban environment, urban transport, urban infrastructure and buildings.

Building Consumption Input System (BCiS)

- BCiS is a voluntary scheme developed and administered by GreenTech Malaysia on behalf of the Government of Malaysia, (The Ministry of Energy, Green Technology & Water (MEGTW/KeTTHA) via an online input database system for the purpose of data collection and monitoring the energy and water consumption of buildings. Initially developed to monitor the performance of buildings in the **10% Savings of Energy & Water** in Government Buildings in Putrajaya, this programme is one of the main programme under the Green Cities Project of Putrajaya & Cyberjaya.

- The scheme acts as the main data collection tool for Energy & Water segment of the LCCF and contributes in the development of Common Carbon Metric (CCM) for buildings in Putrajaya.

- Building performance that can be measured is in term of Building Energy Index (BEI), Water Index (WI) and Carbon Index (CI). In addition, several graphs representing their building's consumption could also be retrieved such as total electric (kWh), Gas District Cooling, GDC (RTH) and water (m³) consumption.

Building Sector Energy Efficiency Project (BSEEP)

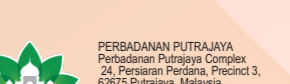
- BSEEP has for its goal the reduction in the annual growth rate of GHG emissions from the Malaysia buildings sector. The project objective is the improvement of the energy utilization efficiency in Malaysian buildings, particularly those in the commercial and government sectors, by promoting the energy conserving design of new buildings and by improving the energy utilization efficiency in the operation of existing buildings.

- The realization of this objective will be facilitated through the removal of barriers to the uptake of building energy efficiency technologies, systems, and practices. The project is in line with the UNDP-GEF's (climate change strategic program on Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1).

- It is comprised of activities aimed at improving energy efficiency and promoting the widespread adoption of energy efficient building technologies and practices in the Malaysian buildings sector.

Introduction of the task force

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PUTRAJAYA GREEN CITY 2025 SCHEME FOR REDUCTION OF ENERGY CONSUMPTION IN BUILDINGS

1. Putrajaya's Transformation into a Sustainable Low Carbon Green City

1.1. Background of Putrajaya

Putrajaya, the federal government administrative centre of Malaysia is a growing city that has undergone development for the last 18 years. As a planned city, its development is based on two underlying concepts, **the city in the garden** concept and **the intelligent city** concept. The adoption of these two concepts to guide the city's physical development was aimed at achieving a balanced and sustainable urban environment. This is clearly evident with the designation of almost 40% of its total city area of 4,931 hectares specifically for green and open spaces in the Structure Plan of Putrajaya, Sustainable Putrajaya 2025. Putrajaya is also intended to be a self-contained city with residential areas planned on neighbourhood planning concept. The road and transportation network are planned on a policy of modal split of 70:30 between public transport: private transport usage complemented with an extensive network of cycleways and walkways. Its planned population is set at 320,000 people with a day time population of half a million people.

Land use	Hectares	%
Government Use	225.38	4.57
Residential	733.64	14.88
Commercial	139.41	2.83
Mixed Use	40.82	0.83
Special Use	132.92	2.70
Service Industry	11.23	0.23
Public Amenities	344.27	6.98
Parks & open Space	1,918.66	38.91
Infrastructure & Utilities	482.57	9.79
Transportation	902.10	18.29
Total	4,931.00	100.00

Table 1: Land Use Components

The construction of the city started in October 1996 and within 18 years of its development, 22 ministries and more than 50 government departments and agencies have been relocated in its purpose built government offices in Putrajaya. At present, this growing city with a population of approximately 86,000 is complete with numerous community facilities, commercial offices and retail outlets, public parks and open spaces as well as sports and recreational amenities.

Component	Planned (2025)	Current Status
Population	347,700	86,000
Housing	65,000	27,589 units
Government office space	2.75 million sqm	2.37 million sqm
Other government use	1.20 million sqm	214,604 sqm
Commercial space	4.35 million sqm	579,000 sqm

Table 2: Current Status of Development for Major Components (2014)

1.2. Summary of This Brochure

One of the key actions introduced to achieve a low carbon society in Putrajaya is the reduction of energy consumption in buildings since the sector contributes 72% of total CO₂ emissions in the city in the year 2013. As such, Putrajaya Corporation (PJC) is proposing to device a scheme to facilitate building owners to reduce energy consumption from their buildings and continuously implement actions towards this aim. One of them is setting up of an institutional framework involving various parties and agencies to participate in the scheme. An implementation mechanism for energy consumption reductions in building is also to be developed. The existing initiatives and programmes as well as the enabling statutory instrument in Malaysia will be examined thoroughly in setting up the scheme.

Asia-Pacific Integrated Model (AIM) team jointly working together with Tokyo Metropolitan Government (TMG), equipped with vast experiences in implementing actions to reduce energy consumption in buildings is assisting PJC in conceiving the scheme aimed at supporting Putrajaya to achieve sustainable low carbon.



Putrajaya Land Use Plan 2025

2. Showcase PGC2025 as Best Practice Model of Asian Low Carbon Cities

2.1. The development of Putrajaya as a green city

At the Copenhagen COP15, Malaysia made a conditional commitment of a reduction of carbon emission intensity of Malaysian GDP, of up to 40% by 2020 from a 2005 baseline and this is followed by the Prime Minister announcement in the 2010 Malaysian Budget speech, that the government will “develop Putrajaya and Cyberjaya as pioneer township in Green Technology, as a showcase for the development of other townships”.

With that aim set PJC, the statutory body incorporated to administer and manage the city and to perform the role of a local government as well as local planning authority, was tasked with a challenging responsibility to realize this national vision by initiating the preparation of **Putrajaya Green City 2025 (PGC2025)**.



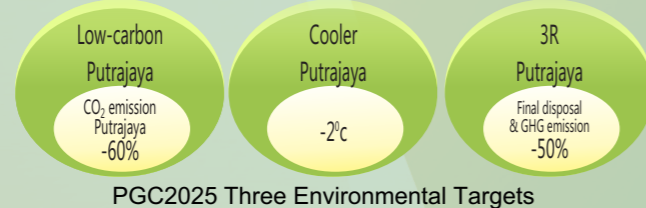
Putrajaya Green City 2025 Seven Focus Areas

2.2. Putrajaya Green City 2025 (PGC2025):

PGC2025 is a collaborative study by a research team namely Universiti Teknologi Malaysia, Malaysia Green Technology Corporation, Putrajaya Corporation, Kyoto University, Okayama University, as well as National Institute for Environmental Studies, Japan and the Asia Pacific Integrated Model team.

PGC2025 is a study to assess the current state of the city in terms of its CO₂ emissions and to offer suggestions in terms of broad targets or counter measures to reduce emissions by 2025.

The study calculated CO₂ emissions baseline of Putrajaya for 2007 and estimated the emissions level for the 'business as usual case' (BaU) for 2025. In order to reduce the emissions level by 2025, the quantitative environmental targets are outlined in three themes; **Low Carbon Putrajaya, Cooler Putrajaya & 3R Putrajaya**.



One of the focus area in turning Putrajaya into a green city is focusing in **Planning, Urban Design & Building**. The urban environment (and its related human activities) consists of many components that will inevitably contribute towards GHG emissions of the city. In Putrajaya, The building (or facilities) sector and the activities and operation in buildings has been identified as a major contributor towards the city's GHG emission and there is a huge potential to introduce and implement counter measures to reduce GHG emissions from this sector particularly related to energy consumption in buildings. PGC2025 has identified **Action 3: Cutting Edge Sustainable Buildings** as one of the 12 actions that can be implemented to reduce Putrajaya's GHG emissions by 2025. This action involves planning and construction of new green buildings, implementing energy efficiency practices including retrofitting of existing buildings/facilities to reduce energy consumption and hence contributes towards reduction of Putrajaya's GHG emissions.

2.3. Green Building Certification Programme

The construction of “green building” and retrofitting of existing building, have been emphasised in an effort to reduce carbon emission arising from the activities and operation in buildings in Putrajaya. As of to date, 7 green buildings have been certified including Prime Minister's Office complex which certified under a retrofitting programme. 13 other buildings under construction and planning are expected to be certified “green building” when it's completed.



Examples of Green Buildings in Putrajaya



Examples of Green Buildings in Putrajaya conts.

3. Proposed Scheme of Energy Consumption Reduction In Buildings

In order to realise the creation of a low carbon society in Putrajaya, one of the key actions to be taken is to reduce energy consumption in buildings. The GHG inventory in 2013 indicates that the building sector contributes the highest in terms of city's GHG emissions at 72% and there is a huge potential to reduce GHG emissions from this sector through the implementation of various programmes and measures targeting at the reduction of energy consumption in buildings. As such, it is essential for PJC to take necessary actions to introduce and implement a scheme to address this.

Such a scheme may involve:

1) Setting up an institutional framework involving various parties and agencies (Ministry of Federal Territories, KeTTHA, GreenTech Malaysia, Public Works Department, property developers, building owners etc) to participate in the scheme

2) Devising an implementation mechanism for energy consumption reductions in buildings involving:

a. Measuring and reporting of energy consumption in buildings/facilities
To implement this, the following issues have to be addressed:

- Responsible actors/parties to measure and report
- Scope of targeted buildings/facilities
- Format of reports and the timing of reporting

PJC will be able to utilise the data reported as basic materials to identify the current status of energy consumption and also to analyze energy consumption and GHG emissions trend by scale/use/etc. of buildings in Putrajaya. Possibility of the use of information and data reported and their integration to existing systems such as the Building Consumption Input System (BCiS) has to be explored further.

b. Developing energy saving plans in buildings/facilities
To implement this, the following issues should be considered and determined:

- Responsible actors/parties to develop energy consumption reduction plans
- Implementation periods
- How to evaluate draft plans and provide feedbacks and advices to improve plans
- How to evaluate efforts such as reduction rate of energy consumption
- Disclosure of reports

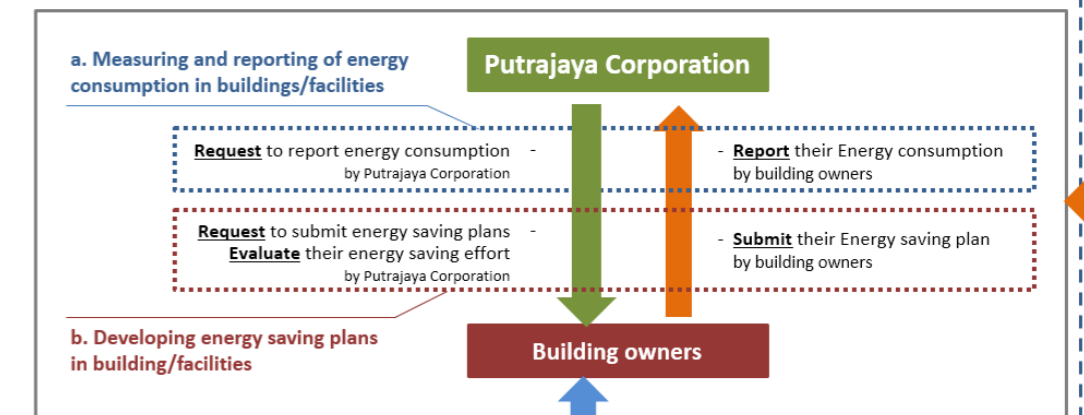
c. Formulating associated regulatory instrument and providing of incentives for the implementation of the scheme

d. Preparing the necessary support instrument to facilitate the implementation of the scheme.
This may include:

- Providing specialists of energy management to buildings/facilities
- Providing facilities with information about technologies and measures for energy consumption reduction
- Providing facilities with feedbacks and advices about energy savings

2) Devising an implementation mechanism for energy consumption reductions in buildings

Institutions for energy consumption reduction in buildings/facilities



Instruments to enhance implementations by buildings/facilities

c. Associated regulatory instruments & Incentives for the implementation of the scheme

d. Support instrument to facilitate the implementation of the scheme

1) Institutional framework involving various parties and agencies to participate in the scheme

Proposed scheme of energy consumption reduction in buildings

4. Institutional Background and Related Information

4.1. Experiences of Tokyo Metropolitan Government in Carbon Reduction Reporting Program in Tokyo

To develop and implement aforementioned scheme in Putrajaya, learning experiences from Tokyo Metropolitan Government (TMG) is important. TMG has developed various emissions reduction measures which set the target of 25% GHG emission reduction from the 2000 level by 2020. One of the emissions reduction measures is “Carbon Reduction Reporting Program for Small and Medium Sized Facilities”. This programme is derived from a reporting program for large scale buildings, which were diverted to Cap and Trade programme in 2010 and the reporting programme was sustained and changed to be targeting middle and small scale buildings. TMG requires buildings which consume less than 1,500kl crude oil equivalent per year to measure their energy consumption and CO₂ emissions then report it to TMG. The reporting is made mandatory for relatively large enterprises which own multiple buildings that added up to a total energy consumption exceeding 3,000kl crude oil equivalent. These buildings also have to report the measures and actions that is planned to be taken to reduce their energy consumptions. The submitted reports and planned measures are disclosed and easily accessible on the TMG website.

This program has been implemented since 2010 and TMG has actively put efforts to increase the number of submissions from buildings including voluntary ones which are not required to submit reports obligatorily. In the end of FY2013, 34,000 reports were submitted and the number has been increasing since the reporting programme was launched.

TMG intended the following effects and outcomes by implementing this programme.

- Building owners become acknowledged about; the amount of energy consumption in their buildings; and the fact that consumption leads directly to CO₂ emissions.
- The amounts of energy consumptions in buildings are compared and thus building owners know how their performances are when they are compared to the other ones.
- Building owners can acquire knowledge about which measures have a potential to reduce energy consumptions in their buildings.