



GEF-6 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title: Sustainable-city development in Malaysia			
Country(ies):	Malaysia	GEF Project ID: ¹	9147
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	150046
Other Executing Partner(s):	Malaysian Industry-Government Group for High Technology (MiGHT)	Submission Date:	06-20-2016
		Resubmission Date:	07-28-2016
GEF Focal Area (s):	Climate Change	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities <input checked="" type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/> Corporate Program: SGP <input type="checkbox"/>		
Name of Parent Program	Cities-IAP: Sustainable Cities Integrated Approach Pilot (IAP-PROGRAM)	Agency Fee (\$)	247,707

A. FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Focal Area Objectives/Programs	Focal Area Outcomes	Trust Fund	(in \$)	
			GEF Project Financing	Co-financing
CCM-1 Program 1	Outcome A - Accelerated adoption of innovative technologies and management practices for GHG emission reduction and carbon sequestration; Outcome B - Policy, planning and regulatory frameworks foster accelerated low GHG development and emissions mitigation.	GEFTF	1,834,862	13,486,667
IAP-Sustainable Cities	To promote integrated planning and investments related to urban sustainability that result in environmental, social and economic benefits at the local and global scale.	GEFTF	917,431	6,743,333
Total project costs			2,752,293	20,230,000

B. PROJECT DESCRIPTION SUMMARY

Project Objective:						
1. To promote an integrated approach to urban planning and management that is guided by evidence-based, multi-dimensional, and broadly inclusive planning process that balance economic, social and environmental resource consideration;						
2. To build awareness and institutional capacity, and promote investment in climate risks mitigation technologies through demonstration projects						
Project Components/Programs	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Confirmed Co-financing
1. Integration of climate risks in urban planning and management	TA	1.1 National urban policy framework strengthened to promote sustainable and resilient cities model/ Improved	Output 1.1.1 National & state policies and strategic direction for development of sustainable and resilient cities	GEFTF	937,293	8,784,141

¹ Project ID number remains the same as the assigned PIF number.

² When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

³ Financing type can be either investment or technical assistance.

		planning and increased knowledge and partnerships on sustainable cities and climate resilience at multiple levels	improved/developed; supported by enabling programs (funding models, green procurement, PPPs, etc.) & projects Output 1.1.2. Institutional capacity of policy-makers at the national, state and local levels built Output 1.1.3. Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project			
	Inv	1.2 Investments in pilot cities generate local and global environmental benefits	Output 1.2.1. The adoption of renewable energy (RE) integrated smart grid facilitated through demonstration activities of distributed RE systems, solar-powered EV charging facilities, battery energy storage, EE and RE applications in buildings and ICT system	GEFTF	1,605,000	10,290,329
2. Monitoring and Evaluation	TA	2.1 Adequate monitoring and evaluation facilitates smooth and successful project implementation	Output 2.1.1 - Regular monitoring exercises conducted Output 2.1.2 - Midterm review and final independent project evaluation conducted	GEFTF	80,000	200,000
Subtotal					2,622,293	19,274,470
Project Management Cost (PMC) ⁴				GEFTF	130,000	955,530
Total project costs					2,752,293	20,230,000

C. CONFIRMED SOURCES OF [CO-FINANCING](#) FOR THE PROJECT BY NAME AND BY TYPE

Please include evidence for [co-financing](#) for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Cofinancing	Amount (\$)
Recipient Government	Malaysian Industry-Government Group for High Technology (MiGHT)	In-kind	3,000,000
Recipient Government	Ministry of Energy, Green Technology and Water (KeTTHA)	In-kind	1,000,000

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

Recipient Government	Ministry of Urban Wellbeing, Housing and Local Government	In-kind	1,000,000
Recipient Government	Melaka State Government	Grants	5,000,000
Recipient Government	Melaka State Government	In-kind	10,000,000
GEF Agency	UNIDO	Grants	84,000
GEF Agency	UNIDO	In-kind	146,000
Total Co-financing			20,230,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country Name/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee ^{a)} (b) ²	Total (c)=a+b
UNIDO	GEF TF	Global Sustainable Cities Initiative	IAP Set Aside	IAP-Cities	917,431	82,569	1,000,000
UNIDO	GEF TF	Malaysia	Climate Change	(select as applicable)	1,834,862	165,138	2,000,000
Total Grant Resources					2,752,293	247,707	3,000,000

a) Refer to the Fee Policy for GEF Partner Agencies

E. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁵

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>hectares</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>hectares</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>Number of freshwater basins</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>Percent of fisheries, by volume</i>
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	Direct 849,300 metric tons; Indirect (Bottom-Up) 3,499,000 metric tons
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>metric tons</i>
	Reduction of 1000 tons of Mercury	<i>metric tons</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>ODP tons</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries:</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries:</i>

F. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? NO

(If non-grant instruments are used, provide an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF Trust Fund)

⁵ Update the applicable indicators provided at PIF stage. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period.

ABBREVIATIONS

Abbreviations	Description
ADB	Asian Development Bank
ASGM NAPs	Artisanal and Small-Scale Gold Mining National Action Plan
AWP	Annual Work Plan
BAU	Business-as-usual
BEMS	Building Energy Management System
BESS	Battery Energy Storage System
BSEEP	Building Sector Energy Efficiency Project
BURs	Biennial Update Reports
CO _{2e}	Carbon Dioxide equivalent
COP21	Conference of Parties, United Framework Convention on Climate Change
DDI	Domestic Direct Investment
EE	Energy Efficiency
EPU	Economic Planning Unit
ESA	Environmental sensitive Areas
ESIA	Environmental and Social Impact Assessment
EV	Electric Vehicle
FDI	Foreign Direct Investment
FiT	Feed-in tariff
G2V	Grid-to-Vehicle
GCAP	Melaka Green City Action Plan
GDP	Gross Domestic Product
GEFTF	Global Environment Facility Trust Fund
GHG	Greenhouse Gases
GNG	Green Neighbourhood Guidelines
GNI	Gross National Income
GTALCC	Green Technology Application for the Development of Low Carbon Cities
GTP	Government Transformation Programme
HCFC	Hydro chlorofluorocarbon
HEMS	Home Energy Management System
HVAC	Heating, Ventilating and Air Conditioning
IAP	Integrated Approach Pilot
ICLEI	International Council for Local Environmental Initiatives
ICT	Information and Communications Technology
IEEMMS	Industrial Energy Efficiency for Malaysian Manufacturing Sector
IMT-GT	Indonesia-Malaysia-Thailand Golden Triangle
IPCC	Intergovernmental Panel on Climate Change
IRDA	Iskandar Regional Development Authority
JPBD	The Federal Department of Town & Country Planning
KeTTHA	Ministry of Energy, Green Technology and Water
KKMM	Ministry of Communications & Multimedia Malaysia (KKMM)
KPKT	Ministry of Urban Well Being, Housing and Local Government
LCCF	The Low Carbon Cities Framework
LCS	Low Carbon Society Framework
LCT	Low Carbon Transport
LDCE	Least Developed Countries Fund
LED	Light-emitting diode
M&E	Monitoring and Evaluation
MCTICEA	Malaysia Clean Technology Innovation Competition and Entrepreneurship Acceleration Programme
MEAs	Multilateral environmental agreements
MGDO	Melaka Green Development Organisation
MGTC	Malaysia Green Technology Corporation
MIAs	Minamata Convention Initial Assessments
MiGHT	Malaysian Industry-Government Group for High Technology
MIP	Malaysian Institute of Planners

MITI	Ministry of International Trade and Industry
MNRE	Ministry of Natural Resources and Environment
MOSTI	Ministry of Science, Technology and Innovation
MOT	Ministry of Transport
MOW	Ministry of Work
MSC	Multimedia Super Corridor
MURNInets	Malaysian Urban Indicators Networks
NAPAs	National Adaptation Programmes of Action
NAPs	National Adaptation Plans
NBSAPs	National Biodiversity strategy and Action Plan
NCs	National Communications
NCSAs	National Capacity Self Assessment
NGTP	National Green Technology Policy
NIPs	National Implementation Plans
NKRAs	National Key Result Areas
NPD	National Project Director
NPFE	National Portfolio Formulation Exercise
NPM	National Project Manager
NPP	National Physical Plan
NREPAP	National Renewable Energy Policy Action Plan
NSC	National Steering Committee
NUP	National Urbanization Policy
ODP	Ozone Depletion Potential
ODS	Ozone Depletion Substances
OECD	Organisation for Economic Cooperation and Development
PCB	Polychlorinated Biphenyl
PIF	Project Identification Form
PIRs	Project Implementation Reviews
PLC	Power Line Carrier
PMU	Project Management Unit
POPs	Polychlorinated Biphenyl, obsolete pesticides
PPG	Project Preparation Grant
PPP	Public, Private Partnership
PRSPs	Poverty Reduction Strategy Paper's
PTHM	Melaka Green Development Organisation
PV	Photovoltaic
PWD	Public Work Department
RE	Renewable Energy
S2A	Science to Action Initiative
SCCF	Special Climate Change Fund
SCD	Sustainable City Development
SEDA	Sustainable Energy Development Authorities
SPAD	Land Public Transport Commission
T&D	Transmission and Distribution
TAG	Technical Advisory Group
TNAs	Technology Needs Assessments
TNB	Tenaga Nasional Berhad
TOD	Transit Oriented Development
TOR	Terms of Reference
TOU	Time of Use
UAC	Unit Abatement Cost
UBBL	Uniform Building by Law
UNDP	United Nations Development Programme
UNITEN	Universiti Tenaga Nasional
UPEN	State Economic Planning Unit
V2G	Vehicle-to-Grid

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF⁶

This project is a child project of Programme #9077: Sustainable Cities Integrated Approach Pilot. While there is no original separate PIF, the basic parameters of the project were described as part of Annex A: Child Project Concept Note within the Programme.

Based on baseline studies and a number of consultative meetings conducted with key stakeholders to identify barriers and issues for the design during the PPG (see Annex L), the project endorsement document has been formulated. A national workshop for scoping of the project was held on 26 November 2015 which was attended by more than 80 participants. A national steering committee meeting was also held on 22 March 2016 for the validation and endorsement of the proposed project outputs and activities.

The objectives of the project remain the same as described in the Child Project Concept Note, namely: i) To promote an integrated approach to urban policy making and management that is guided by evidence-based, multi-dimensional, and broadly inclusive planning process that balance economic, social and environmental resource consideration; and ii) To build awareness and institutional capacity, and promote investment in climate risks mitigation technologies through demonstration projects. The general framework of the project also remains unchanged compared with that of the child project concept note, and comprises of two main components, namely: i) Integration of climate risks in urban planning and management; and ii) Monitoring and Evaluation.

During the PPG phase, it was found that the ongoing GEF-UNIDO project entitled *Energy Efficient Low-Carbon Transport (LCT) in Malaysia* will be installing two or three solar-powered Electric Vehicle (EV) charging stations in Melaka as a demonstration activity aimed at promoting EVs adoption through enhancement of EV charging infrastructure. Also, Melaka has an ongoing smart grid pilot project which is currently planning the phase of installation of smart meters in residential buildings. It was therefore decided to combine *Output 1.1.4 Increased adoption of electric vehicles promoted through demonstration activities of solar-powered charging facilities, smart-grids, IT applications, etc.* and *Output 1.1.5 Energy efficiency and renewable energy applications in commercial and government buildings demonstrated* of this proposed project into a single output with two demonstration elements, namely, smart grid integrated with i) Solar-powered EV charging infrastructure and ii) energy efficiency (EE) and renewable energy (RE) applications on buildings. The adjusted Output 1.2.1. is now titled *The adoption of renewable energy integrated smart grid facilitated through demonstration activities of distributed RE systems, solar-powered EV charging facilities, battery energy storage, EE and RE applications in buildings and ICT systems.*

This adjustment will avoid some apparent duplications with the output of the LCT project. It will give more focus and emphasis on the demonstration of an integrated smart grid technology as a way for renewable energy integration, energy efficiency improvement in buildings and the promotion of EV uptake. It would also ensure a more comprehensive demonstration of the smart grid benefits.

The changes to the Outputs of Component 1 have been made as outlined below:

At Child Project Concept Note stage	At CEO Endorsement Stage
Output 1.1.1 - National policies for strategic direction and demand creation for sustainable-cities improved/ developed; incentive schemes (funding models, green procurement, PPPs, etc.) developed	Output 1.1.1 - National and State policies improved/developed for strategic direction on the development of sustainable cities; supported by enabling programs (funding models, green procurement, PPPs, etc.) and projects
Output 1.2.1. - Institutional capacity of policy-makers at the national level built, specifically focusing on the policy coordination partners of Malaysia's Smart City Programme	Output 1.1.2.- Institutional capacity of policy-makers at the national, state and local levels built

⁶ For questions A.1 –A.7 in Part II, if there are no changes since PIF , no need to respond, please enter “NA” after the respective question.

At Child Project Concept Note stage	At CEO Endorsement Stage
Output 1.4.1. - Awareness raising events for policy-makers, industry and end-users organized at the local and city levels for dissemination of tangible results achieved under Outputs 1.1.4 and 1.1.5	Output 1.1.3. - Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project
Output 1.3.1. - Increased adoption of electric vehicles promoted through demonstration activities of solar-powered charging facilities, smart-grids, IT applications, etc.	Output 1.2.1. – The adoption of renewable energy (RE) integrated smart grid facilitated through demonstration activities of distributed RE systems, solar-powered EV charging facilities, battery energy storage, EE and RE applications in buildings and ICT systems
Output 1.3.2. - Energy efficiency and renewable energy applications in commercial and government buildings demonstrated	Combined into Output 1.2.1.

A.1. Project Description. Elaborate on:

1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed;

Cities and Climate Risks

Cities and urban areas provide a very good opportunity for reduction of greenhouse gas (GHG) as many emerging climate change risks are concentrated in these areas. More than half of the world's population currently lives in cities, and this will grow further to 60 % by 2030 and 70 % by 2050. Besides population, cities concentrate disproportional parts of the economy, resource consumption and the decision making power in most countries, while occupying just 2 per cent of their land. Cities are also engines of economic growth and social change, with annual economic activity of about US\$62 trillion, or about 85% of global GDP in 2015. By 2030, this is expected to rise to US\$115 trillion, or 87% of global GDP⁷.

Cities and urban areas are responsible for 70 % of the total global energy consumption and more than 70% of GHG emissions and these trends significantly intensify the severity of climate change and energy security. Cities are also uniquely vulnerable to increasing impacts of climate change such as rising temperature, heat stress, pollution, extreme weathers event, inland flooding, food security and ocean acidification.

Cities have unique and strong influence over several policy levers – such as urban planning and public transportation – that may be less available to national actors. They not only can reduce emissions, but also lower the cost of future reductions and avoid “lock-in” to high-carbon pathways. City-based climate change policies have been proven to be effective and efficient, feasible and relatively easy to deliver as compared to national climate change policies. With the rapidly urbanizing pace around the world, cities or urban areas are excellent places to strive towards achieving the COP21 goals, and the greatest potential for mitigation of GHG emissions may be in developing cities in industrializing countries.

During COP21 in November 2015 at a side summit, the Compact of Mayors declared that the collective commitments of more than 360 cities will deliver over half of the world's potential urban emission reductions by 2020⁸.

New research for a report to the UN Secretary-General shows that if all cities took on aggressive new efforts to reduce building, transportation and waste energy use, they could potentially reduce annual GHG emissions by an additional 3.7 and 8.0 Gigatons (Gt) CO₂e by 2030 and 2050 respectively over what national policies and actions are currently on track to achieve. This corresponds to roughly 6% of global business-as-usual GHG emissions in 2030, and 11% in 2050⁹.

⁷ http://2015.newclimateeconomy.report/wp-content/uploads/2015/09/NCE2015_workingpaper_cities_final_web.pdf

⁸ <http://www.c2es.org/international/negotiations/cop21-paris/summary>

⁹ <http://www.bloomberg.org/press/releases/new-research-shows-cities-potential-reduce-annual-greenhouse-gas-emissions-8-gigatons-2050-current-national-targets/>

In order to realize this potential, the world's cities must take new, even more aggressive actions. The following sectors and actions have been identified where mayors have the greatest control and which offer the most significant opportunities for urban GHG reductions:

- Transportation mode shifts and transit efficiency for city residents
- Building energy efficiency standards for new urban buildings;
- Building energy retrofits for existing urban buildings;
- Aggressive energy performance standards for urban building lighting and appliances.

Malaysian Context:

Malaysia has enjoyed one of the best economic growth records in Asia over the last five decades despite a multitude of challenges and economic shocks. The economy has achieved a stable real GDP growth of 6.2% per annum since 1970, successfully transforming from a predominantly agriculture-based economy in the 1970s, to manufacturing in the mid 1980s, and to modern services in the 1990s. The country rose from the ranks of a low-income economy in the 1970s to a high middle-income economy in 1992 and remains so today. Its national per capita income expanded more than 25-fold from US\$402 (1970) to US\$10,796 (2014) and is aspiring to surpass the US\$15,000 threshold of a high-income economy by 2020¹⁰ - where real GDP is targeted to expand between 5%-6% per annum during 2016-2020 and the Gross National Income (GNI) per capita is expected to reach US\$15,690 (RM54,100) (therefore exceeding the estimated US\$15,000 minimum threshold of a high-income economy).

The 11th Malaysia Plan is expected to create 1.5 million jobs by 2020, with targeted improvements in labour productivity through the continuous shift from labour-intensive to knowledge- and innovation-based economic activities. Growth is to be driven by the private sector with private investment expanding at 9.4% per annum. All economic sectors are expected to witness strong growth with the manufacturing and services sectors contributing more than 75% of GDP.

Coupled with economic growth, Malaysia's energy demand tripled between 1993 and 2013, from 17.3 million tonnes of oil equivalent (Mtoe) to 51.8 Mtoe¹¹. The composition of energy demand remained largely constant during this period, although the residential and commercial sectors increased their share by about 6.7% at the expense of the industrial sector. The transport sector continued to have the largest share at 43.3% of national energy demand (excluding agriculture) in 2013. The rapid growth in energy consumption has been enabled by Malaysia's large oil and natural gas production capacity: the country has the fifth largest oil reserves in the Asia-Pacific and is investing heavily in refining and storage capacities.

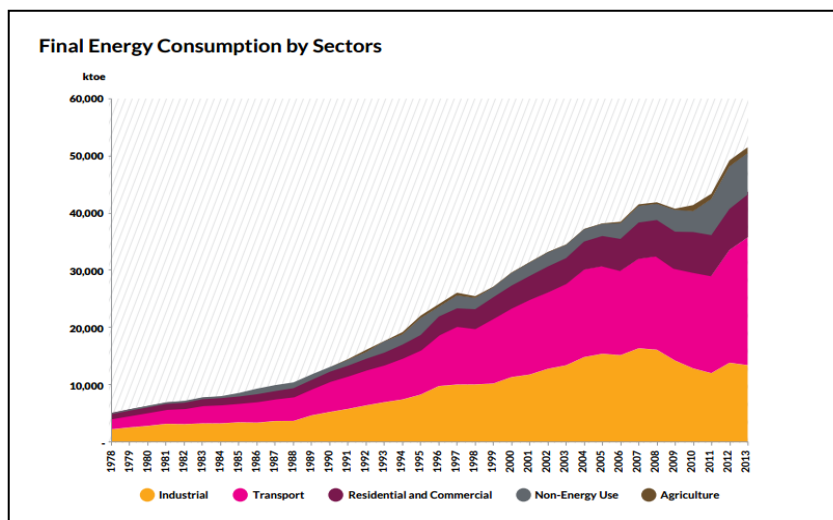


Figure 1: Final energy consumption by sector in Malaysia

¹⁰ The Eleventh Malaysia Plan, Economic Planning Unit, Malaysia.

¹¹ <http://www.climatesmartcities.org/sites/default/files/4336%20Malaysia%20Report%20v5.pdf>

Malaysia's GHG emission levels are relatively high compared to other countries in the region at similar stages of development. Total emission of GHG in Malaysia was about 180 million metric tons in the year 2012. It is the second largest per capita GHG emitter among the group of ASEAN countries¹². The per capita GHG emission in Malaysia is 5.9 tons which is three times more than the levels recorded for the whole Southeast Asia. Although the total emission for Malaysia is only about 40% of Indonesia and 64% of Thailand, the per capita emission of Malaysia is about 3.5 and 1.6 times of the values of Indonesia and Thailand, respectively.

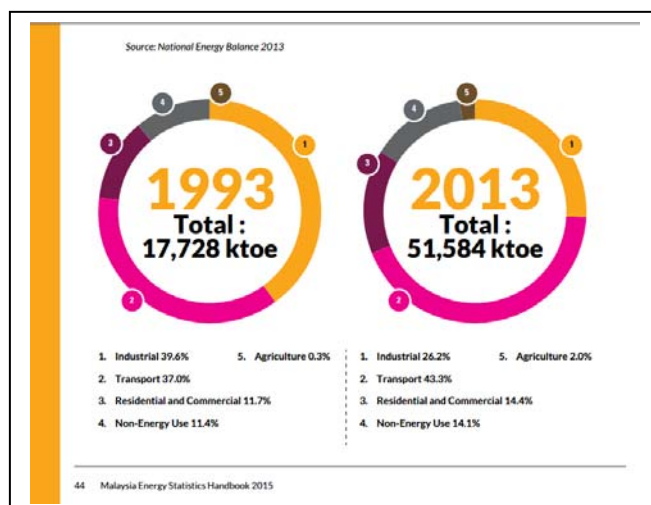
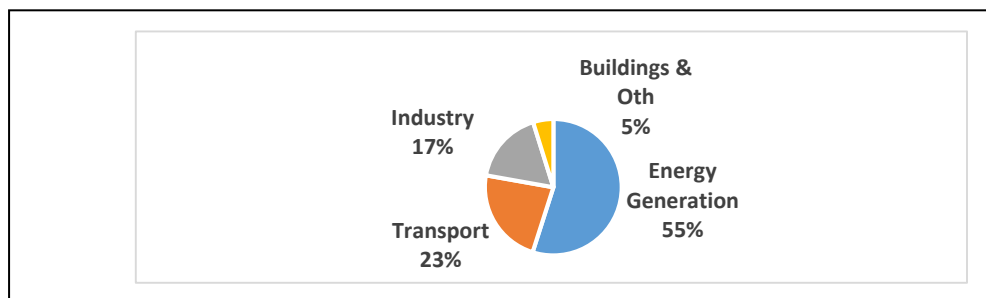


Figure 2: Breakdown of energy consumption by sector in 1993 and 2013

Although, Malaysia shares only 0.3% of global GHG emission, the major concern lies in the ever increasing trend of GHG emission. When many developed countries have successfully reduced the GHG emission, Malaysia continues to increase its emission level.



Source: <http://www.jurnalteknologi.utm.my/index.php/jurnalteknologi/article/viewFile/3481/2614>

Figure 3: Share of GHG emissions from various sectors

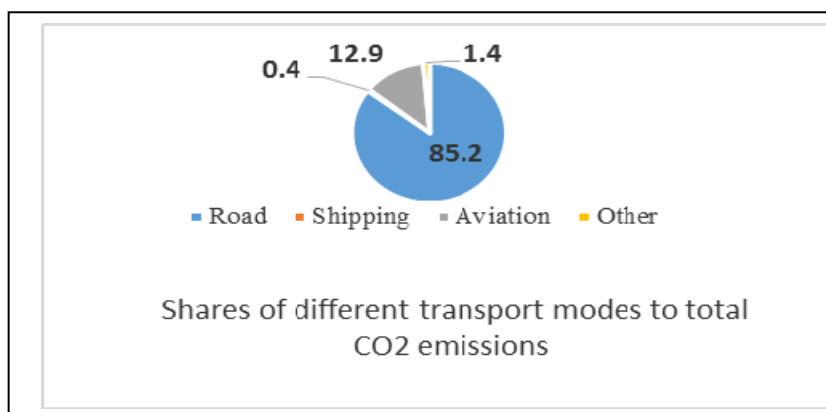
Energy generation, transport, Industry, and residential building are the major sectors contributing to GHG in the country. Energy generation contributes about 54.9% of the total emissions followed by transport, which accounted for 22.9%. Industry contributes to about 17.4% of total GHG emission and ranks third amongst sources, followed by residential buildings and other sectors.

Since 2009, the transport sector has exceeded the industrial sector in terms of CO₂ emissions. The sector produced 42.43 million metric tons CO₂ in 2012 compared with about 15 million metric tons in the early 1990s. As per calculations in one study, the transport sector would need to reduce CO₂ by 9.17 million metric tons in order to achieve the target of reducing 40% emission by the year 2020 pledged by the Government¹³.

¹² http://www.academia.edu/8324454/Assessment_of_Greenhouse_Gas_Emission_Reduction_Measures_in_Transportation_Sector_of_Malaysia

¹³ http://www.academia.edu/8324454/Assessment_of_Greenhouse_Gas_Emission_Reduction_Measures_in_Transportation_Sector_of_Malaysia
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Within the transportation sector, road transportation represents the major share (85.2%) of total GHG emission from transportation. This is followed by the aviation, shipping and other small sectors. Therefore, the major reductions of GHG emissions should be achieved in road transportation.



Source: <http://www.jurnalteknologi.utm.my/index.php/jurnalteknologi/article/viewFile/3481/2614>

Figure 4: Share of CO₂ emissions from different transport modes

The above broader context on energy consumption and GHG emissions in Malaysia is directly relevant to cities. Currently, 74.7% (22.8 million) of the 30.5 million population of Malaysia lives in cities, and there is a strong policy geared towards urban development¹⁴. Malaysia also faces a high level of income inequality within cities and urban areas compared to either the OECD average or neighbouring countries such as Thailand and Indonesia. These considerations mean that energy consumption and GHG emissions are likely to be concentrated in cities for the foreseeable future. Indeed, in terms of emission sources, more than half are directly related to urban settings – specifically electricity, transportation and solid waste.

Although Kuala Lumpur dominates the Malaysian economic landscape – the wider Klang Valley that includes Kuala Lumpur is home to 7.2 million people and produces 38% of national GDP – 48% of the Malaysian population live in other urban regions, which generate 52% of national GDP¹⁵. These smaller cities therefore have a critical role to play if the country is to avoid locking into an energy- and carbon-intensive development path.

While data on GHG emissions by cities in Malaysia are practically non-existent, Melaka, with the support of the International Council for Local Environmental Initiatives (ICLEI), has recently prepared its first GHG Emission Inventory Report 2013. The report shows transport sector (59.4%) was the largest emitter of GHG in Melaka in 2013 followed by Industry (23.1%) and Building sector (12.9%). Per capita GHG emissions have been estimated at 2.33 tCO₂eq¹⁶. Melaka has also set a target of 20% renewable energy contribution to its total energy consumption by the Year 2020¹⁷.

Table 1: GHG Emission by Sector in Melaka State for 2013

Sector	GHG emission (tCO ₂ eq)	Share (%)
Stationary Units	711,449	36.3
- Residential	76,640	3.9
- Commercial/Institutional Buildings and Facilities	176,431	9.0
- Manufacturing Industry and Construction	453,339	23.1
- Agriculture, Forestry and Fishing Activities	5,039	0.3
Mobile Units	1,165,109	59.4
- On-Road Transportation	1,160,333	59.2

¹⁴ July 2015 estimate, World Factbook, CIA

¹⁵ Policy Options for Low Carbon Cities Johor Bahru and Pasir Gudang, Malaysia by Andy Gouldson, Sarah Colenbrander and Effie Papargyropoulou

¹⁶ Source: CM speech Sep 15 in Philippines

¹⁷ Melaka State Greenhouse Gas Emission Inventory Report 2013 prepared by Melaka Green Technology Corporation and ICLEI. GEF6 CEO Endorsement /Approval Template-Dec2015

- Railway	4,412	0.2
- Aviation (Landing and Take Off)	363	0.02
Waste	15,643	0.8
- Solid Waste Disposal	15,643	0.8
- Biological Treatment of Waste	0.6	0.0
Agriculture, Forestry and Land Use (AFOLU)	69,396	3.5
- Livestock	69,396	3.5
Total	1,961,598	100.0

Source: Melaka State Greenhouse Gas Emission Inventory Report 2013

Another city – Putrajaya – has also undertaken a GHG inventory. The overall GHG emissions for 2013 were 1,316 ktCO₂eq and its per capita emissions were 13.2tCO₂. The building sector was the largest emitter at 72 percent followed by transport at 24 percent¹⁸.

Malaysian Cities and Urban Areas

In Malaysia, more than 74% of population lives in cities and over 90% of national economic activity is conducted in cities. During 2010-2015, the total population grew at an annual rate of more than 1.8 % per annum where urban growth was around 2.66 %. It is predicted that urbanization will further outpace population growth so that by 2030 about 82% of the population will live in urban areas. This will lead to a population density shift of 71 persons/km² in 2000 to more than 107 persons/km² by 2030¹⁹. This burgeoning urban shift has been strongly linked to nearly continuous economic growth since independence.

According to the World Bank, Malaysia is among the more urbanized countries of East Asia, and its urban population continues to increase rapidly. However, urban areas in the country are among the least dense in East Asia²⁰. The Kuala Lumpur urban area is one of the largest in the region as measured by area, but not as measured by population. Some of the key findings of the Bank's recent report are:

- Malaysia has the fourth-largest amount of built-up land in East Asia as of 2010. Its urban land grew from about 3,900 square kilometers to 4,600 between 2000 and 2010, an average annual growth rate of 1.5%, which was lower than the 2.4% average for the region.
- Its urban population increased during this period from 10.2 million (43% of the total population) to 15 million (53%), making it among the more urbanized countries and economies in the region in demographic terms, after Japan, the Republic of Korea, and Singapore (and Taiwan, China).
- The rate of urban population growth, 4.0% a year, on average, was among the fastest in the region, surpassed only by Lao PDR, Cambodia (both of which have much smaller urban populations), and Vietnam.
- Urban areas were, on average, among the least dense in East Asia, with an overall urban population density of 3,300 people per km² in 2010, up from 2,600 in 2000, and lower than the regional average of almost 5,800 people per km².
- Malaysia has 19 urban areas with more than 100,000 people: one urban area of more than 5 million people (Kuala Lumpur), two between 1 million and 5 million people (George Town and Johor Bahru), five of 500,000 to 1 million people, and 11 urban areas of between 100,000 and 500,000 people.
- As of 2010, the Kuala Lumpur urban area was geographically the eighth largest in the region, larger than some megacity urban areas like Jakarta, Manila, and Seoul despite its smaller population.
- Despite being the eighth-largest urban area in size, because of its low density, the Kuala Lumpur urban area was only the 22nd largest in population. The overall urban area grew from about 4 million inhabitants in 2000 to 5.8 million in 2010, a relatively high average annual growth rate of 3.8%.
- Johor Bahru saw rapid growth during this period, taking advantage of its location immediately across a narrow strait from Singapore. Growing from 270 km² to 420 between 2000 and 2010 (4.4% a year), it surpassed George Town and Ipoh to become geographically the second-largest urban area in the country.

¹⁸ http://www.ppi.gov.my/cpnavigation/general/brochure-1_GHG_Inventory_2013.pdf

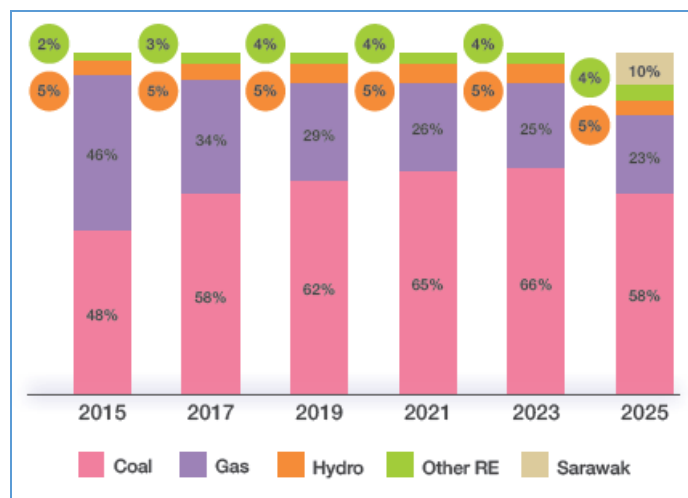
¹⁹ https://www.researchgate.net/publication/285334165_Policy_Options_for_Low_Carbon_Cities_Johor_Bahru_and_Pasir_Gudang_Malaysia

²⁰ <http://www.worldbank.org/en/news/feature/2015/01/26/malaysia-among-most-urbanized-countries-in-east-asia>

Threats and Root Causes

Unlike OECD or other Asian economies, Malaysia has made little progress towards its climate targets. Energy intensity per unit of GDP has remained roughly constant between 1990 and 2010, while the increasing carbon intensity of the electricity grid serving Peninsular Malaysia looks set to continue in a business as usual (BAU) scenario²¹. Improvements in emission intensity are also being far outstripped by rapid economic growth, meaning that the absolute level of emissions produced in Malaysia is rising rapidly.

There are some renewable energy and energy efficiency programmes in place, but these are insignificant compared to ongoing support for fossil fuel production and consumption (see Figure 5). The Tenth Malaysia Plan (2011-2015) had established a renewable energy target of 985 MW by 2015 (5.5% of Malaysia's total electricity generation), which was further adjusted to 2080 MW by 2020 under the 11th Plan. The Tenth plan also established an energy efficiency target of 4,000 ktoe savings per year by 2015, substantially from more efficient lighting, appliances and buildings; and the construction of energy-from-waste infrastructure²². In practice, only 243MW of renewable energy capacity was installed by 2014 and the Energy Save programme reduced consumption by just 306.9 GWh or 26.4 ktoe, far short of the targets set. Mitigation measures are largely sector focused and insignificant relative to, for example, the expansion of installed coal-fired capacity by 3.4 GW between 2008 and 2013²³



Source: Energy Commission, Malaysia

Figure 5: Approved Generation Mix (2015-2025)

The high levels of energy consumption were significantly enabled by low energy costs. Though they have been reduced in recent years, substantial fossil fuel subsidies in Malaysia in the past have led to artificially low prices for consumers and encouraged preferential investment in these energy sources. The subsidies impose a significant burden on government budgets, favor the emerging middle classes at the expense of pro-poor expenditure and risk national 'lock in' to high carbon, high cost development paths.

Cities in Malaysia are faced with numerous climate change challenges that threaten the ability of these urban areas to become viable pillars of sustainable development. The rapid increase in GHG emissions in cities has been further aggravated by:

- Rapid urbanization and industrialization (7% per annum),
- Relatively high carbon intensity dependence on fossil fuels and coal.
- Poor public transportation system and high demand of mobility caused rapid increase of cars compared to population growth. Motor cars and motorcycles together made up about 92% of the total vehicles in the country in 2009. On the other hand, public transportation modes in Malaysia have only 1% share in the total registered

²¹ <http://www.climatesmartcities.org/sites/default/files/4336%20Malaysia%20Report%20v5.pdf>

²² Tenth Malaysia Plan, Economic Planning Unit, Malaysia.

²³ Cities and climate change mitigation: Economic opportunities and governance challenges in Asia by Andy Gouldson, et al.

vehicles. The share of public transport in cities has continuously declined from 34% in 1985 to 20% in 1997 and is now closer to 10–12%. In 1995, there was approximately one vehicle to every three people whereas in 2010 there was one vehicle to every 1.4 people.

- Low density development in urban areas resulting in urban sprawl with negative effects as follows:
 - Increased urban pollution and environmental degradation through depletion of resources (air, water and soil). Traffic congestion, excessive use of motor vehicles and long distances traveled by private transport release enormous amount of pollution in the atmosphere and; clearing of the forest cover and farmlands creates a threat to water quantity and quality;
 - Increased urban poor, inequality, social fragmentation;
 - Inadequate affordable housing and over-burdened public amenities;
 - Declining health condition and well being;
 - Loss of open space, green areas, forests, valuable farmlands;
 - Public safety and increased crime.
- Low energy efficient and renewable energy applications in buildings.

The above challenges call for an integrated and coordinated response at the local, state and national levels in order to ensure sustainable city development. Further delay in adopting an integrated approach poses a number of threats to sustainable urban development and cities continue to face development problems that are directly linked to socio-economical problems and environmental degradation with increased GHG emission. These include²⁴:

- *A “lock-in” of unsustainable economic activities* which threatens growth. This is especially the case with regards urban mobility, which is the priority development challenge for cities in Malaysia. Congestion undermines growth, and fuel and energy subsidies continue to be a burden on public budgets.
- *Rising urban sprawl* resulting in increase in public expenditure, traffic congestion, noise and air pollution, socio-inequality, health and other sustainability issues.
- *Inconsistent development across the country leading to inefficient use of resources and inequity.* Vague jurisdiction on policy and regulatory control over low carbon development leads to poor technical and implementation performance.
- *Missed development opportunities through ineffective decision-making.* Data and tools for decision-making on low emission development are not available and cities are unable to do effective planning.
- *Reduced opportunities to access finance or create enabling partnerships for investment.* Lack of preparedness due to limited capacity to access new carbon financing or to liberate private sector investment through enabling finance and partnerships.

Barriers:

The main barriers to the implementation of an integrated approach in sustainable city development are:

- Lack of a coherent strategy and direction for sustainable city development. Visions of sustainability have not been integrated with a holistic view in different policy areas.
- Fragmentation of policy actions aggravated by sectoral and silo thinking which impede holistic solutions and realization of the vision of the integrated and multi-functional city.
- Unsustainable lifestyles and behaviors leads to high GHG emissions and high resource consumption.
- Insufficient dialogue with citizens about the city’s long term development. Insufficient feedback and monitoring of conducted dialogue processes prevents knowledge-building.
- Limited coordination within and between different levels that results in difficulties for municipalities to realize good holistic solutions.
- Limited institutional capacity and know-how for complex, cross-sectoral processes comprises an obstacle to the development of cities.
- Limited incentives for long term sustainable decisions.
- Structural lock-ins due to fragmented and short term focus planning that curbs a fast adjustment.
- Insufficient support for research and learning in relation to the importance of cities is an obstacle to favorable

²⁴ UNDP GEF5 project on Green Technology Applications for Low Carbon City Development.
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development.

- Limited know-how and technological capabilities
- Lack of suitable financial and business models.

2) The baseline scenario or any associated baseline projects

Baseline Scenario

Malaysia has made several official commitments to sustainable development. In 2009, it pledged a 40 percent reduction in carbon emissions per unit of GDP by 2020, while reiterating its commitment at the Rio Summit in 1992 to keep at least 50 percent of the nation's landmass under forest cover. The emission cut has been adjusted to 45 % per unit of GDP by 2030 during the COP21 meeting in Paris last year.

This project will provide an important step in achieving these macro-goals by demonstrating the potential for savings from smart-grid implementation and facilitating the diffusion of this technology throughout the country. This will lead to savings via (a) altering consumer behavior and building properties which leads to energy savings and (b) allowing for the inclusion of renewable energy and electric vehicles in the smart grid which will further stabilize the grid and reduce peak loads.

Though there are a number of baseline projects within Malaysia and specifically within Melaka, they are not currently being undertaken in an integrated and inclusive manner. Additionally, there is limited scope for national cooperation in these activities. Therefore, under the baseline scenario, the impacts are likely to be limited or at the very least slowed.

Associated Baseline Programmes/Projects

Development of sustainable cities is being supported by a number of on-going and upcoming programmes and policy tools at the national and local levels

Related Baseline National Policies on Sustainable City Development

Urban development planning in Malaysia is guided by the five-year Malaysia plan (currently, the Eleventh Malaysia Plan, 2016-2020) as well as National Physical Plan-2 (NPP2).

The Eleventh Malaysia Plan

In the Eleventh Malaysia Plan, 2016-2020, the Government has defined six strategic thrusts to help Malaysia stay ahead of the challenges and opportunities of the fast-changing global and political landscape. These thrusts, which aim to comprehensively address the end-to-end needs of the people and the nation, are:

1. Enhancing inclusiveness towards an equitable society;
2. Improving wellbeing of all;
3. Accelerating human capital development for an advanced nation;
4. Pursuing green growth for sustainability and resilience;
5. Strengthening infrastructure to support economic expansion; and
6. Reengineering economic growth for greater prosperity.

The Government has also identified six “game changers”, which are innovative approaches to accelerate Malaysia's development that once successfully applied, will fundamentally change the trajectory of the country's growth. One of the Game Changers is the promotion of competitive cities that will provide nodes for strong economic agglomeration. Under the Plan, city competitiveness master plans will be developed for four major cities (namely Kuala Lumpur, Johor Bahru, Kuching, and Kota Kinabalu) taking into account six principles to ensure that they will be economically advanced and be a great place to live in for urban residents of all socioeconomic levels (see Box).

Box 1: Building Competitive Cities in Malaysia

Six principles will be used as building blocks for local authorities to develop their city competitiveness plans.

Principle 1: Enhancing Economic Density High economic density in cities is the key to innovation. It brings people and businesses closer and enables information and knowledge sharing, new technological inventions, and new businesses. In addition, economic density increases efficiency and optimises resource use.

Principle 2: Expanding Transit-oriented Development (TOD) Transit-oriented Development (TOD) refers to urban development concepts involving the mixed use of residential and commercial development to be pedestrian-friendly, designed with maximum access to public transport.

Principle 3: Strengthening knowledge-based clusters Knowledge-based clusters will be developed to attract investment and talent.

Principle 4: Enhancing liveability Cities need to be liveable and should create a conducive environment that attracts talent to live, study, work, and play in.

Principle 5: Adopting green-based development and practices All these cities will place high importance on continuous sustainable growth by enhancing green-based development and optimising low carbon resources.

Principle 6: Ensuring inclusivity Inclusivity is the backbone to successful and competitive cities. Inclusiveness will be one of the main thrusts for the four cities, to ensure that communities have ample opportunities to participate in social, political, and economic activities.

National Physical Plan (NPP)

First approved by the National Physical Planning Council in 2005, the goal of the National Physical Plan (NPP) is to establish an efficient, equitable and sustainable national spatial framework to guide the overall development of the country towards achieving developed nation status by 2020. The NPP is prepared in accordance with the provisions of the Town and Country Planning Act 1976 (Act 172).

Recognizing the needs to strengthen the green agenda and to overcome the issues of climate change, the second NPP (NPP-2) sets out a strategic direction to cope with these issues with additional policies and measures formulated to include climate change, protection of biodiversity, green and new technology sustainable tourism and public transport. Selected policies in the NPP2 supporting the green growth concept and initiatives are summarized as follows²⁵:

- a) The spatial planning framework will incorporate mitigation and adaptation measures against the impacts of climate change.
- b) Environmentally Sensitive Areas (ESA) will be integrated in the planning and management of land use and natural resources to ensure sustainable development.
- c) Forests and peat lands are important carbon sinks. Existing forest reserves shall be conserved in order to limit the amount of carbon released into the atmosphere.
- d) Promoting the transit oriented development (TOD3) concept as the basis of urban land use planning to ensure viability of public transport, supported by walkways and linkages to promote connectivity and to reduce emissions.
- e) All urban settlements will be serviced by an integrated network of solid-waste disposal and/or recovery facilities. Waste generation management will be promoted including recycling of waste, solid waste collection and disposal in accordance with the National Solid Waste Master Plan.
- f) As strategic assets, electricity generation plants and distribution mains shall be suitably located to provide a reliable and efficient supply of power to consumers. Renewable energy such as energy from solar, wind, wave and biomass are to be promoted to complement traditional power generation sources. In accordance with the National Green Technology Policy (see below), green technology shall be actively promoted as a means to mitigate climate change. Therefore new developments and buildings shall incorporate greater energy efficiency and utilize renewable energy sources.

National Urbanization Policy (NUP)

The NUP guides and coordinates planning and urban development in Malaysia by incorporating key concepts such as urban growth limits, compact cities, urban regeneration, utilization of open spaces, solid waste generation/containment, sustainable transport, energy efficiency, and renewable energy. Green urbanism has also been reflected in the NUP approved by the Cabinet on 8 August 2006. The NUP, which is being revised, emphasizes the following:

1. Optimal and balanced land use planning for urban development to ensure all development shall be compatible with the surrounding land use and concentrated within the urban growth limit so as to create a compact city.

²⁵ Green Township Policy Initiatives in Malaysia, IMPAK, Issue 3 / 2011, Department of Environment, Malaysia
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2. Re-development programmes for brownfield areas and promotion of urban regeneration.
3. Provision of adequate open spaces and recreational areas to meet the requirements of the population, consequently promoting the contiguous and integrated development of green areas in urban centers to reduce carbon emission.
4. Development of an integrated, efficient and user-friendly public transportation system including environmental friendly vehicles, bicycle lanes, and a pedestrian network for efficient connectivity and a reduction in air pollution.
5. Effective and sustainable solid waste and toxic management systems to effect solid waste reduction, full utilization of bio-degradable materials and encourage recycling programmes for the community.
6. Strategies related to sufficient, affordable housing, taking into account the needs of various groups of society including the disabled and senior citizens.
7. Environmental conservation and improvements to the urban quality of life.
8. Development that reduces the impact of urban heat islands and ensure that urban development will take into account reduction of air, noise and water pollution.
9. Use of innovative technology in urban planning, development and urban services management with the aim of reducing the production of waste, promoting the construction of green buildings and encouraging the use of efficient energy and renewable energy.

State and Local Urban Planning Policies

Local land-use planning and development has a key role in reducing GHG emission from cities and in Malaysia this is a top down process through three tiers of government – the Federal Government, State Government and Local Authorities. The National Physical Plan (NPP) and the National Urbanization Policy (NUP) set the framework for land-use planning within which, on a nominal 5-year cycle, the states prepare their *State Structure Plans* and the municipalities prepare the *District Local Plans*, the *Municipal Council Plans* and *Special Area Plans*. The Federal Department of Town & Country Planning (JPBD) of the Ministry of Urban Well Being, Housing and Local Government (KPKT) guides planning, including for low carbon development, through the provision of planning policies, standards and guidelines.

State and local physical planning procedures are based on the provisions of the Town and Country Planning Act 1976. There are several specific planning guidelines and circulars with specific green city provisions including the following (See Annex G):

- Planning Guideline on Environmentally Sensitive Areas;
- Green Neighbourhood Planning Guideline;
- Planning Guideline for Roof Top Gardens; and
- The Circular from the Secretary General, KPKT on Rain Water Harvesting System, 1999.

Energy and Transport Policy Framework and Support Initiatives

Low Carbon Cities Framework (LCCF)

The Low Carbon Cities Framework (LCCF), which was launched in 2011 by KeTTHA, is a conceptual framework aimed at providing a framework to achieve sustainable developments that will subsequently reduce carbon emissions. The document can be used by all stakeholders, in human settlements of any size, be they cities, townships or neighbourhoods either new or existing, to measure the impact of their development decisions in terms of carbon emissions and abatement. LCCF is a national framework and assessment system to guide and assess the development of cities and to support holistic sustainable development in Malaysia. It will provide for equivalent GHG as a result of human activities in cities so that there may be awareness towards how these GHG can be reduced.

It focuses on four key areas: urban environment, urban transport, urban infrastructure and buildings. The LCCF is structured around the Low Carbon City Criteria, which is categorized into 13 performance criteria and 35 sub-criteria, each of which provides specific action plans toward carbon reduction targets for cities to adopt. Its assessment system allows the user to calculate the baseline as well as the reduced carbon count. This count will then translate into a carbon reduction rating for any particular development.

The Electric Mobility Blueprint

The draft Electric Mobility Blueprint was released in February 2015, providing a comprehensive framework for the development of an EV sector and supporting ecosystem in Malaysia. Key strategies outlined are:

- i) Encourage Public Engagement with EVs;
- ii) Encourage Private Ownership of EVs through Financial Incentives;
- iii) Implement Regulatory Support to Encourage Use of EVs;
- iv) Incentivize and Create an EV System; and
- v) Build an EV Economy.

Specific targets outlined in the Electric Mobility Blueprint are: Progressive increase in number of EVs and charging stations by 2020:

- 100,000 electric cars;
- 100,000 electric scooters;
- 2,000 electric buses;
- 125,000 charging stations.

The Blueprint has yet to be officially adopted and additional input from the project is expected to assist in its final adoption and implementation.

National Key Result Areas

The National Key Result Areas (NKRAs) identified under the Government Transition Programme (GTP), launched in 2010, includes Urban Public Transport as one of the six focus areas, specifically highlighting the importance of the development and improvement of bus networks, and connecting outlying areas with metropolitan cities, such as Kuala Lumpur and Melaka City. The Land Public Transport Commission (SPAD) was established in 2010 under the Land Public Transport Act and is responsible for developing transport related policies, and planning and regulating trains, buses and taxi services within Malaysia, with a specific focus on integrated and sustainable public transport. Focusing on the more general development of green technologies, the National Green Technology Policy (NGTP) specifically identifies the transportation sector as one of its four focal areas, highlighting the importance of incorporating green technology into supporting infrastructure and public road transport.

Malaysian Urban Rural National Indicators Network (MURNInet)

JPBD has also introduced MURNInet (Malaysian Urban Rural National Indicators Network) in 1998. It is a system to determine the sustainability level of an urban area by using a set of urban indicators. The programme, in which more than 70 % of the local authorities had participated by 2015, enables the tracking of the sustainability status of an urban area whether it has increased, reduced or static. The main objectives of MURNInet are:

1. To determine sustainability level of cities in the country based on a set of selected indicators;
2. To identify the strength and weaknesses of every city based on the performance of the indicators;
3. To propose improvement measures and identify opportunities to achieve sustainability level; and
4. To establish MURNInets as a tool to measure various local authority roles including administrative, technical, formulation of political objectives, encourage public participation and monitoring plan implementation.

The MURNInet is currently being reviewed for enhancement by JPBD.

Additional national policies and programmes which are relevant but not directly connected to the project are described in Annex K.

Baseline Scenario: Pilot Green Cities/Region

Putrajaya

Putrajaya is a planned city that serves as the federal administrative centre of Malaysia. It also is a Federal Territory for Malaysia and houses almost all of Malaysian government ministries. A residential population of around 50,000 is matched daily by a similar number of commuters. Planned as a city that is environmentally, socially and economically sustainable, the Putrajaya Structure Plan 2025 was recently prepared. Taking into account the National Green

Technology Policy (NGTP), this plan provides the legal basis for land use reforms required for transforming Putrajaya into a sustainable city by 2025 and led to the development of the Putrajaya master plan: “Towards Putrajaya Green City 2025” (PGC 2025) which identified a priority set of action plans including: integrated city planning and management, low carbon transportation, cutting-edge sustainable buildings, renewable energy, and gas district cooling networks.

Cyberjaya

Cyberjaya is a new township under the jurisdiction of the Sepang council and created in 1996. It forms a key part of the Multimedia Super Corridor (MSC) in Malaysia and has a daytime population of around 55,000 of which 42% are students. The Sepang council is responsible for overall development planning and ensuring compliance to the local plan. Together with Putrajaya, Cyberjaya is spearheading the way as a pioneer green township. It aims to cut carbon emissions in the city by 21% by the year 2020. To achieve this, a Low Carbon City Framework was formulated to align and mobilize green efforts, covering Urban Environment, Urban Transportation, Urban Infrastructure and Building. Through this framework, it is hoped that Cyberjaya will become a catalyst for positive change, not only in business and technology, but also as a model for sustainable future cities.

Iskandar Malaysia

Iskandar Malaysia was established in 2006 as a part of the Southern Economic Corridor under the 9th Malaysia plan. Iskandar Regional Development Authority (IRDA), being a Malaysian Federal Government statutory body, administers this project. The development region has a population of around 1.6 million (in 2010) people across 5 local planning authorities covering Johor Bahru, Johor Bahru Tengah, Kulai, Pasir Gudang and some parts of the district of Pontian. IRDA has adopted and applied the Low Carbon Society Framework (LCS) on a regional scale for the low carbon development of the Iskandar Malaysia region. ‘The LCS Blueprint for Iskandar Malaysia 2025’ which was launched in 2013 promotes the low carbon development of a city and provides the policy framework and technical tools to support this. It outlines 12 actions to reduce carbon emission grouped in three themes, Green Environment, Green Economy and Green Community. IRDA does not have the authority of a local government, and therefore, face the challenge of promoting the adoption of the Blueprint among the the local authorities within the Iskandar Malaysia region.

Melaka State: Project Demonstration City

In consultation with the national stakeholders, Melaka has been selected to be the demonstration city for this project as it is a front-runner in Malaysia that is actively involved in embracing the concept of ‘Green City’. The state government has announced an ambitious plan to become the first state in Malaysia to adopt green technology and be a green ‘city-state’ by 2020. This initiative is the first by a city or state outside the Klang Valley Area, after the Prime Minister of Malaysia announced that the cities of Putrajaya and Cyberjaya would become pioneer green cities.

Melaka (also known as the The Historic State) is the third smallest Malaysian state. It is located in the southern region of the Malay Peninsula, at proximity to the Straits of Melaka. The capital is Melaka City, which is 148 km south-east of Malaysia's capital city Kuala Lumpur, 235 km from Johor's largest city Johor Bahru. This historical city centre has been listed as a UNESCO World Heritage Site since 7 July 2008. It has more than 14 million tourists per year and a population of around 900,000,

Melaka State consists of four municipal districts – Alor Gajah, Jasin, Melaka Tengah, and Hang Tuah Jaya. Melaka Tengah is the most built out, with the highest urban density, and includes the historic Melaka center. Alor Gajah and Jasin are still predominantly agricultural districts, while Hang Tuah Jaya is a newly created planned district that has become the new state government center.

Box 2: Melaka in Numbers

Population : 0.86mil (2014)
GDP per capita: USD 9,506
Labour Force: 375,000
Unemployment: 0.9%
Number of tourist arrival: 13.5mil (2013) &
15mil expected in 2014
(Source: news)

Total Emissions: 1.96 MT CO₂ eq
Emissions per-capita: 2.33 T CO₂ eq
(Source: CM speech Sep 15 in Philippines)

Total Number of Vehicles, Melaka (2014)
Motorcycle 416,813
Motorcar 310,169
Bus 1,645
Taxi 1,548
Goods vehicles 26,683
Others 13,199
Total 770,057

Source: Ministry of Transport, Malaysia

As of 2014, service sector contributed to the largest share of economy in Melaka accounting for 46.4% of its GDP, followed by manufacturing (39.1%), agriculture (11.1%), construction (3.3%) and mining (0.1%)²⁶. In terms of number of workforce, as of 2013, there were 275,000 people working in the industrial sectors, 225,000 people working in the service sectors, 35,000 people working in the entrepreneurship sectors and 12,300 people working in the agricultural sectors.

Currently there are 23 industrial areas which are centered along the edges of the city proper in suburbs which include Ayer Keroh, Batu Berendam, Cheng, Taman Tasik Utama and Tanjung Kling. While outside Melaka City, industrial areas include Alor Gajah and Sungai Udang. There are around 500 factories in the state which are owned by investors from Germany, Japan, Singapore, Taiwan, United States, etc. For small and medium-sized enterprises, a number of estates have been established by the state government.

Baseline projects/investments in the demonstration city:

There are significant programmes and planned investments in the primary demonstration city/state of Melaka. However, without the project's interventions, the urban planning and management involved would not be based on an integrated and inclusive approach – and levels of investment in green technologies through public and private means would be limited. Essentially, while there are a number of potential programmes, they would not be integrated in a cohesive manner and their impacts would be limited without the proposed project.

In October 2010 Melaka had declared that it met the benchmark of 'Developed State' as set out by the OECD (Organisation for Economic Co-operation and Development). The State Government has developed the Melaka Green Technology City State 2020 Blueprint and Melaka Green City Action Plan (GCAP). The GCAP, which has been developed in 2014 under the Asian Development Bank (ADB) funded project on Indonesia-Malaysia-Thailand (IMT) Growth Triangle (GT) Green City Initiative, provides a broad framework for integrated development that supports the actions being taken under the Blueprint. Together, these two documents will help achieve Melaka's vision of becoming a green city by 2020, a designation that is contingent on achieving a set number of indicators listed in the Blueprint.

Melaka has also set up the Melaka Green Technology Council to oversee the implementation of the blueprint and various green initiatives under GCAP. The function of the council as the highest coordinating body in green initiatives is to ensure that green technology is implemented in a holistic manner in the state by 2020. The state has also set up the Melaka Green Development Organisation (PTHM), under the council, which focuses on managing nine committees tasked with pursuing the state's green initiatives in areas such as open spaces, industrial zones, rivers, beaches, buildings, the transportation system, utilities, education, information as well as marketing. While more detailed information about the initiatives of GCAP can be found in Annex H, some related ones are elaborated below.

Renewable energy power generation in Melaka

Melaka has an ambitious vision to “to become a world-class solar city ... by 2025.”²⁷ For this purpose, it has set up a Melaka World Solar Valley, an area of 7,248 hectares, where a cluster of green technology industries specializing in solar energy will be created. The initiative will positively impact the process for development of renewable energy power generation – specifically for the integration of Solar PV into the grid. The state inaugurated a 5 megawatts solar farm in Rembia, Alor Gajah in 2013, and completed a second solar farm with a capacity to generate 8 megawatts of electricity in its newly developed state administrative centre of Hang Tuah Jaya in Ayer Keroh a year later. The State is also confident that its solar PV capacity will increase in the next few years as its industry players take advantage of the incentives offered by both the national and state governments for the installation of Large Scale Solar Photovoltaic Plant (LSSPV) in the State.²⁸

²⁶ <https://en.wikipedia.org/wiki/Melaka#Economy>

²⁷ Brochure for Melaka World Solar Valley produced by the Planning Department, Alor Gajah Municipal Council

²⁸ The government has outlined plans to develop 200 MW of large-scale solar farms via an auction mechanism, spread out between now and 2020. The inaugural national tender will be offered in 2016. Source: http://www.pv-magazine.com/news/details/beitrag/malaysian-state-utility-eyeing-100-mw-of-solar-in-forthcoming-auctions_100021877/#axzz46XZpmffn

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Building and smart-grid related programmes in Melaka

In most regions of the world, heating, ventilation and air conditioning (HVAC) and cooling loads represent the largest building-sector energy end-use (50% of building consumption). The building envelope – the boundary between the conditioned interior of the building and the outdoors – can be significantly improved to reduce the energy needed to heat and cool buildings. With innovative technologies such as advanced facades, highly insulating windows, high levels of insulation, well-sealed structures, and cool roofs in hot climates, the need for interior conditioning can be avoided in many parts of the world, including some of the fastest growing regions in hot climates.

In Malaysia, the average building energy consumption is between 269 to 275 kWh/m²/year. Malaysia's commercial and residential sector consumes approximately 13% of national energy demand, and 48% of electricity consumption. Its GHG emission accounted for approximately 4% of national CO₂ emission related to energy, at 3947 GgCO₂²⁹.

There is potential for reduction of energy consumption of 40-50% in new buildings and 15-25% in existing buildings through energy efficiency applications including retrofits, building/home energy management systems (BEMS/HEMS). Renewable energy applications could also help to save energy consumption and reduce the use of fossil fuels. The Malaysian Standard Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-residential Buildings (MS 1525:2007) provides guidelines on the effective use of energy (including renewable energy) in new and existing non-residential buildings.

Melaka is implementing an **Energy Efficient (EE) State Owned Government Buildings** initiative whereby energy audit will be conducted on nine Government buildings. The Auditing was carried out by Danish Energy Management. Out of these nine buildings, three are now undergoing the retrofitting stage with a cost of RM 20 million (~USD 5.15 million). This project is funded by EPU in collaboration with Danish Energy Management. Another 17 buildings owned by federal government will also be retrofitted to improve energy efficiency.

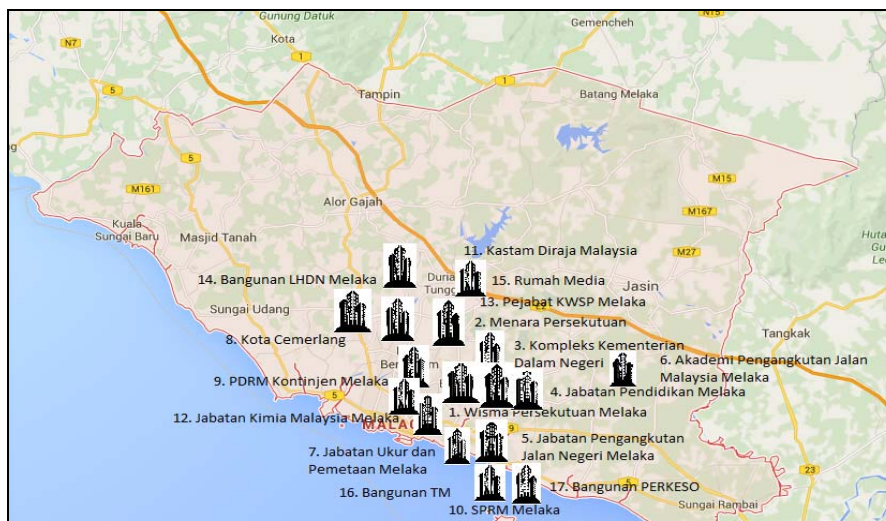


Figure 6: Implementation of Energy Efficiency for 17 Federal Buildings at Melaka

A **Green Seal project** was also developed by Melaka Green Development Organisation (MGDO), a Melaka Green NGO and PTHM. Green Seal is a certification for green buildings. It acts as an interim green building rating tools for Melaka and directly embedded to local council regulatory. It is focusing on Uniform Building by Law (UBBL) and Malaysia Energy Efficiency standards, MS1525. It is a compulsory certification for new development projects in Melaka such as the World Solar Valley, Hang Tuah Jaya Green City Melaka and government buildings. To date, two buildings have been awarded the Green Seal.

²⁹ GHG emission of low-cost housing in Malaysia using UNEP-SBCI Common Carbon Metric. Case study of Kuala Lumpur, Suzaini Zaid. et al.

Melaka is also implementing a **Smart Communities Program** which is a part of the Science to Action (S2A) initiative, and is a strategic Program to support the implementation of the 11th Malaysia Plan. The Malaysia Industry-Government Group for High Technology (MIGHT) and Melaka Green Development Organisation (PTHM) will collaborate on developing an industry centric implementation model in Melaka as the first demonstration city to serve as the benchmark for replication in other sites in the nation beginning 2016. The collaboration involving 6 industry-driven green projects in Melaka for phase 1 in 2014-2015 will see MIGHT as the key delivery partner for projects identified under the GCAP. The initial projects are targeting an industry investment totaling RM 550 million (USD 133 million) in six key green areas, namely Energy Efficient Buildings, City Info-structure, Green tourism, Smart Grid, Waste Water Eco-Park and Solar Industry Eco-Park.

Together with Putrajaya, Melaka has been selected to implement the first smart grid project in Malaysia. Under the first phase of the **Advanced Meter Infrastructure (AMI) Pilot Project**, the energy service company Tenaga Nasional Berhad (TNB) will install smart meters in 800 buildings and residences and as well as a data center and ICT systems at Melaka International Trade Center Town in Hang Tuah Jaya. More than 300,000 meters are planned to be rolled out in the second phase that is targeted to be completed in the coming years. It is expected that the proposed project will facilitate this implementation by providing technical assistance in how to integrate smart meters and smart grids into the system (including tracking GHG reductions).

Additionally, Melaka has outlined technical guidelines and blue prints which would compel developers to register for **Malaysia Green Building Index** certification before completing their projects. Under this guideline, the property developers would be requested to allocate and design a special lane for electric vehicles, bicycle lanes, pedestrian walkways, besides creating a charging station for electric vehicles and building LED or solar-powered street lamps. In addition, the physical development at the new city would also include “green” restaurants, a green technology academy, a nursing college, and a state health department administration complex, all with environmentally friendly and green features.

EV Sector in Melaka

Public transportation is one of the important priorities in the Melaka Green City Action Plan. The State is planning to develop a mobility plan. Consequently, the State is implementing electric buses, cars and scooters programme as part of the initiatives under this plan. Currently, two e-buses imported from Shanghai Automotive Industry Corporation are already in operation around the Unesco World Heritage Site and it is expected that by the end of 2016, a total of 40 electric buses will be fully operational throughout the State. Started in 2012, this initiative has been operated under the state government subsidiary support through the Panorama Melaka Sdn. Bhd., being the state owned bus company.

To promote the adoption of EVs, the State government is also building up EV infrastructure by installing charging stations for buses in the city. Currently two have already been installed, one at the main bus terminal at Melaka Sentral and the other at Hatten Square at the Heritage Site. Another 10 charging stations will be installed throughout the State by the end of 2016³⁰. These conventional charging stations will all be connected directly to the power grid for their electricity supply.

The state government also has a programme to promote electric cars and scooters in the City. About 60 e-scooters are already deployed by the traffic police department for making rounds to check parking offences in the City. In terms of electric cars, two are already in operation and the Malaysia Green Technology Corporation (MGTC) will secure another 10 cars with 4 charging stations for the City this year³¹.

The State is planning to scale up electric vehicles, charging stations and enhancing interconnectivity and the use of non-motorized transport, especially in the tourist areas. With the increasing deployment of the EVs and as their charging stations are mainly connected directly to the electricity grid, the increased electricity demand and the unpredictability of the timing of the higher demand may give rise to grid instability. This results in the need of a renewable energy

³⁰ Source: PTHM

³¹ Source: MGTC

integrated smart grid that will promote grid load stability and reduces outages. The proposed project will assist the city in developing this smart grid programme linked with EVs.

3) The proposed alternative scenario, GEF focal area³² strategies, with a brief description of expected outcomes and components of the project;

The alternative to the business as usual (BAU) scenario will be enabled through the activities designed in the Project – which will assist Melaka and the national Government in achieving their ambitious goals. In this alternative scenario, urban planning and management will be based on an integrated and inclusive approach, with inclusion of investment promotion in green technologies through public and private means. It will be evidence-based, multi-dimensional and broadly inclusive taking into consideration the economic, social and environmental factors. The following will be realized in the alternative scenario:

- Enhancement of policy and regulatory framework for national, states and cities that affect climate risks aimed at promoting an integrated planning approach.
- Enhancement of institutional capacities of those dealing with urban planning and management in promoting integrated sustainable city planning and management, appraising investment and development applications, and enforcing standards and guidelines.
- Promotion of the engagement and participation of private sector, civil society and communities in local sustainable city planning and green technology investments.
- Establishment of systems and tools for more transparent data analysis, planning and decision making with regard to sustainable city development.
- Demonstration of integrated and evidence-based approach for development of sustainable city master plans and guidelines.
- Development of financial and business models using public-private partnership approach for green technology investment promotion.
- Demonstration of the benefits of RE-integrated smart grid in urban systems for climate change mitigation.
- Development of policy and regulatory framework and incentive schemes to kick start the adoption of RE integrated smart grid system.
- Knowledge sharing through production and dissemination of information on lessons learn, best practices, and technologies, human and technical resources through web portal, workshops, forums, conferences and other professional meetings.

The project will operate at two levels: (1) At the level of the pilot city in Melaka and (2) At the national level to allow for scaling up of interventions for more sustainable cities.

Consistency with GEF 6 Strategies

The proposed project is in line with Objective 1 of the GEF-6 Climate Mitigation Strategy which aims to promote innovation, technology transfer, and supportive policies and strategies. The project will support Programme 1 of this objective, i.e., Promote the timely development, demonstration, and financing of low carbon technologies and mitigation options. It will provide policy support and build capacity of cities and urban areas in Malaysia at all levels in sustainability planning and financing in an integrated manner. Through demonstration, the project will support innovation and technology transfer of RE integrated smart grid system at a key early stage in Malaysia. It will help address the elevated risks associated with innovation and mitigate the barriers of technology transfer. It will develop policies and mechanisms to enable the uptake of the said smart grid system.

The project is also in line with the Sustainable Cities Integrated Approach Pilot (IAP) Outcome “To promote integrated planning and investments related to urban sustainability that result in environmental, social and economic benefits at the local and global scale” as it focuses on integrated planning and investments in the urban environment initially in Melaka and then in other cities. The project results framework is very much aligned with the IAP’s results framework – as noted

³² For biodiversity projects, in addition to explaining the project’s consistency with the biodiversity focal area strategy, objectives and programs, please also describe which Aichi Target(s) the project will directly contribute to achieving..
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in Annex A where the overlapping indicators are clearly marked. In line with the Sustainable Cities IAP, the project promotes integrated planning and investments related to urban sustainability and resilience, strengthening of awareness and development of institutional and technical capacities, as well as mainstreaming sustainability and resilience into relevant policies, plans and associated processes at city and national level. In addition, the GEF project integrates relevant gender mainstreaming strategies, as well as coordination and knowledge exchange with the Global Knowledge Platform.

Project objectives:

This project has its ultimate goal to reduce GHG emissions in cities in Malaysia. It will achieve this by providing support to the development and enhancement of national urban policy framework in an integrated and inclusive manner. Towards this, it has a two-pronged objective:

1. To promote an integrated approach to urban planning and management that is guided by evidence-based, multi-dimensional, and broadly inclusive planning process that balance economic, social and environmental resource consideration;
2. To build awareness and institutional capacity, and promote investment in climate risks mitigation technologies through demonstration projects.

Component 1: Integration of Climate Risks in Urban Planning and Management

This component will address the barriers to sustainable city development mentioned above by mainstreaming climate risk mitigation policies in urban planning and management through a holistic and coordinated approach. It will also demonstrate an integrated smart grid technology that will kick-start its uptake with an end result of promoting renewable energy deployment, improving energy efficiency and reducing air pollutions and GHG emissions, thus building resilience in cities.

Output 1.1.1: National & state policies and strategic direction for development of sustainable and resilient cities improved/developed; supported by enabling programs (funding models, green procurement, PPPs, etc.) & projects

The development of sustainable and resilient cities requires an integrated approach in urban planning and management which is based on a holistic view of its social development, economic development, environmental management (at the local, national and global levels) and governance components, as well as increasing cities' ability to better respond and adapt to the potential stresses and challenges of increasing energy scarcity, climate change, and population change. It goes beyond the drafting of physical plans and entails the coordination of objectives and programmes among different city stakeholders (e.g., citizens, government and the business sector), as well as the development of linkages between and within socioeconomic sectors and activities. In economic terms, the integrated approach tries to improve synergies and efficiencies among activities such as public transportation, energy consumption, biodiversity and human health.

Building sustainable and resilient cities requires investment in (a) renewable energy sources, (b) efficiency in the use of water and electricity, (c) design and implementation of compact cities, (d) retrofitting of buildings and increase of green areas, (e) fast, reliable and affordable public transportation and (f) improved waste and recycling systems. Cities face the challenges in securing the necessary resources for the above investment and providing incentives to the private sector to create decent employment for large urban populations that are underemployed and have limited access to good housing conditions, clean water, sanitation, drainage and schools.

Under an integrated approach, city administrations would integrate investment in various types of infrastructures with the development of institutional and management capacities and the active participation of all stakeholders in the process of building sustainable cities.

This output will reduce the current sector focused fragmentation in policy actions by promoting an integrated and evidence based urban planning and management approach. It will support the development or enhancement of existing policy and regulatory framework related to city development by mainstreaming climate risks into urban planning and management. The existing regulatory framework will be reviewed and enhanced with best practices as needed.

More specifically, this Output will support the Economic Planning Unit (EPU) and KPKT in the development of a national framework as guidance for the formulation of city competitiveness master plans for the four cities earmarked under the 11th Malaysia Plan (Kuala Lumpur, Johor Bahru, Kuching and Kota Kinabalu). The national framework will promote a holistic approach with inclusion of other sustainability factors namely environment, social, governance and gender appropriate dimensions into the master plans. The national framework is expected to include an incentive scheme and required national guidelines for urban planning which would focus less simply on “city competitiveness” and more on sustainable city development – including:

- Increasing urban density, where Malaysia’s typical urban density is well below the UN-Habitat recommended urban density of 15,000/km²,
- Reducing urban sprawl utilizing various incentive/disincentive mechanisms such as increased road pricing, differentiated property development taxes/fees, urban growth boundaries, etc.
- Tracking the energy savings and other global environmental benefits of such planning.

These policies will have an impact both in terms of the re-orientation of thinking about urban development as well as expected levers of budgetary outlays to encourage/enforce this orientation towards sustainable urban development. At the specific city level, policies will need to be crafted to address different levels of economic development within each city.

The Output will also support the effective implementation of the current Melaka Green Technology Blueprint, 2011-2020 and the Green City Action Plan. Using these and other existing national and state urban development policies and strategies as inputs, the Output will support the preparation of a **Sustainable City Master Plan** for Hang Tuah Jaya which has been newly designated as a green city in Melaka. The Master Plan will showcase an integrated and inclusive approach in urban planning that is evidence-based, multidimensional, multi sectoral and broadly inclusive, and will transform current highly energy-intensive urban economic system into much less energy-intensive and much less carbon-intensive one, thus bulking the resilience of Hang Tuah Jaya. The master plan, while taking into account the principles of sustainability, will emphasize coordination between spatial levels and between sectoral plans and sectoral policies. It will promote stakeholders engagement and coordination with state and federal authorities as well as peer municipalities in the state and region. Data and metric systems will also be established or strengthened for sustainability planning.

The output will also support the development of a policy and regulatory framework to promote the adoption and investment of smart grids in Malaysia which is non-existent at the moment. In this regard, the project will develop technical standards, safety and cyber security guidelines as well as business model to kick-start the development of smart grid.

The following main technical assistance activities will be conducted by the project as part of this Output:

- Verify existing national, state and local urban policies and guidelines with the view of developing new or enhancing the existing policy and regulatory frameworks for sustainable city development;
- Support the development of a national framework as guidance for formulation of city competitiveness master plans for Kuala Lumpur, Johor Bahru, Kuching and Kota Kinabalu by promoting the concept of integrated and inclusive sustainable city development;
- As a part of the development of the national framework, develop/Enhance incentive schemes, financial and business models for sustainable city development to promote more efficient and inclusive spatial distribution of urban activities to reduce urban sprawl;
- Support the implementation of the Melaka Green Technology Blueprint, 2011-2020 and the Green City Action Plan through an integrated and inclusive approach;
- Develop a sustainable city master plan for Hang Tuah Jaya and propose them for endorsement by the relevant national stakeholders;
- Develop/Enhance data and metrics for sustainable city planning – including related to evaluating global environmental benefits (GHG emissions); update MURNInets.
- Develop policy and regulatory framework, roadmap and implementation guidelines for Smart Grid (with integration of distributed solar-energy systems, EV charging infrastructure and energy efficient building system) and propose them for endorsement by the relevant national stakeholders;

- Develop technical standards for smart grid, including those for safety and cyber security and propose them for endorsement by the relevant national stakeholders;
- Develop incentive schemes, business models for smart grid-related industrial development;
- Develop scale-up and replication plans for smart grid, allowing other cities to rapidly adopt them.

For this output, the project will collaborate closely with the Asian Development Bank (ADB) to support the effective implementation of the ADB funded project on Melaka Green City Action Plan. It will also work closely with the team of the GEF-UNDP project on *Green Technology Applications for Low Carbon City Development*, in particular, on policy and Melaka demonstration components of that project, so as to promote synergy and avoid duplication of resources.

Output 1.1.2.: Institutional capacity of policy-makers at the national, state and local levels built

Institutional capacity of policy-makers is key to the development of sustainable cities. The proposed project will conduct training activities with the objectives of building institutional capacities in integrated and inclusive approach to sustainable city development, such as training courses on sustainable city development, formulation on city master plans, how to streamline permit approvals and land acquisition without compromising the quality of outcome, natural hazards zoning, etc. For promotion of investment in smart grid, energy efficiency and renewable applications, training course on smart grid systems, cost and benefits analysis, energy efficiency and renewable energy applications in buildings will be organized.

The training courses will target capacity building of policy-makers at all levels. At the national level, it includes those from the Ministry of Urban Wellbeing, Housing and Local Government (KPKT), Ministry of Energy, Green Technology and Water (KeTTHA), the Economic Planning Unit (EPU), the Ministry of Natural Resources and Environment (MNRE), MiGHT and Malaysia Green Technology Corporation (MGTC), among others. At the state and local levels, UPEN, PTHM and municipalities in Melaka will be the beneficiaries. Targeted training programmes will also be organized for end-users, private sector, academia and civil society.

The project will work closely with KPKT, KeTTHA and PTHM of Melaka to support their planned training programmes as well as develop new ones. Its training modules will focus on on-the-job training for officers and staff of the participating institutions and will be based on training of the trainers approach. They will be conducted in collaboration with partner universities such as University of Technology, Malaysia (UTM) on sustainable city development modules and UNITEN on smart grid related modules. The former has a sustainable city development programme jointly run with faculty of the Massachusetts Institute of Technology (MIT) while the latter hosts a Centre of Smart Grid Technology. The strengthened institutional capacity development will not only ensure the sustainability of the project's impact, but will also help to attract and retain investment in this relatively new market. Furthermore, the built capacity will help to ensure the institutionalization of the policies and strategies developed under Output 1.1.1.

The main activities of this Output are as follows:

- Organize capacity building events at federal, state & local levels on integrated sustainable city planning, financing sustainability, technology and investment planning;
- Organize training courses on preparation of national framework on sustainable city master plan and city master plans;
- Organize targeted training courses for end-users, private sector, academia and civil society to promote integrated approach to sustainable city development;
- Organize training courses on costs and benefits analysis on smart grid-related investment;
- Organize capacity building events on RE-integrated smart grid, solar powered EV charging stations, energy efficiency and RE applications in buildings;
- Organize training courses on data analysis and management on sustainable city development and on data collected from smart grid.

Output 1.1.3.: Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project

Building on the improved policy framework developed under Output 1.1.1. and the demonstrations under Output 1.2.1., the project will develop and implement an awareness raising programme on the opportunities and benefits (environmental, health, economic, etc.) associated with sustainable cities and integrated smart grid systems. Sharing of best practices with national, regional as well as international counterparts will be an important element of this output.

Specifically, this output will focus on raising awareness for policy-makers, industry and end-users on the benefits associated with sustainable city development, smart grid, the increased adoption of electric vehicles and energy efficiency and renewable energy measures in both commercial and government buildings. Given the larger movement toward sustainable cities in Malaysia, the proposed project will leverage other interventions and demonstrations to improve overall awareness in Malaysia.

Active involvement of citizens is an important prerequisite for making the transition towards sustainable cities, although there are many obstacles to mobilizing citizens. This project will look into the primary obstacles of consumer engagement and design awareness programmes accordingly to encourage end-users and public participation in the activities of the project.

The key activities of this Output will be:

- Organize awareness events to promote benefits of sustainable city development and integration of climate risk into urban planning and management;
- Organize regular national, regional and international events on sustainable city development for sharing of knowledge and best practices;
- Organize regular meetings with ongoing Team Members of GEF-funded SCD-related projects to discuss implementation issues for synergistic cooperation and avoidance of duplications;
- Conduct education and outreach programmes with smart grid stakeholders and consumers;
- Organize industry, end-users and community awareness, outreach and education events on benefits of smart grid with RE-powered EV charging stations, EE and RE applications buildings and ICT system;
- Establish a web portal for knowledge sharing and dissemination of information on sustainable city development – to be linked with Knowledge Management activities within the IAP-Sustainable Cities Programme, including sharing lessons learned, results, etc. To ensure the sustainability of the web portal after the project completion, a long term national owner will be identified during the project implementation.

Output 1.2.1.: The adoption of renewable energy (RE) integrated smart grid facilitated through demonstration activities of distributed RE systems, solar-powered EV charging facilities, battery energy storage, EE and RE applications in buildings and ICT system

The resilience of cities is inextricably bound to the effectiveness, efficiency and safety of its technical and industrial systems and processes as well as sustainable modes of transportation. The importance of reducing negative environmental impacts of economic activities and processes, as well as reducing their dependence on fossil fuels requires development of more integrated and more highly efficient industrial processes and technical systems that ensure a maximum of efficiency in the use of both materials and energy resources, as well as the elimination of all wasteful and potentially harmful bi-products, thus building the resilience of cities.

Under output 1.2.1, the project will demonstrate an integrated package of technologies and involve interventions to assist Melaka in carrying out and facilitating investments which will reduce GHG emissions and enhance the effectiveness, efficiency and safety of their technical and industrial systems and processes as well as transportation modes – with potential scale up to other cities. Industrial and technical systems, as well as transportation modes will be strategically integrated into mixed use city neighbourhoods, so as to produce not only better economic performance, but also create easily accessible and safe working environments, healthy surrounding neighbourhoods, and no negative impacts in the natural environment. The outcomes of the demonstration projects will be closely monitored and will inform improvement/development of the national and state policies and strategies for development of sustainable and resilient cities under output 1.1.1, as demonstrated in the figure 7 below.

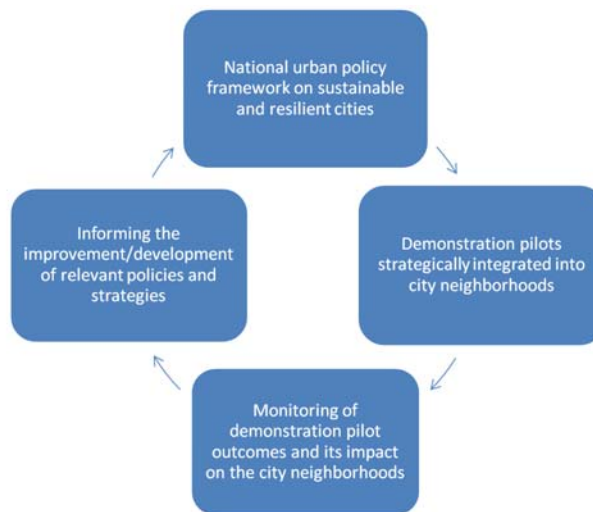


Figure 7: Impact of the demonstration pilots on the national urban policy framework

Smart grid technologies could enable higher levels of renewables in electricity systems by making the system more flexible, responsive, and intelligent. They could also be used to promote the deployment of EVs and higher energy efficiency in buildings through a two way communication using smart meters. In addition, smart grids also have profound implications for transmission and distribution (T&D) systems, as they can mitigate power supply interruption and ease T&D system integration of distributed renewable generation and reduce T&D losses and investment needs by optimizing use of existing infrastructure. This will become increasingly relevant given that T&D is projected to account for almost half of the power sector investment until 2035³³.

Key barriers to a comprehensive approach of smart grid technology, electrical vehicle usage, renewable energy deployment, and building energy management systems in Malaysia include:

- Non-existence of smart grid policy and regulatory framework;
- Lack of or weak institutional framework for smart grid;
- Limited awareness and technical expertise in integrated smart grid technologies;
- Limited experience with regards to the technical, economic, social and environmental aspects of smart grid;
- Limited experience in incorporating measures and technologies to increase the energy efficiency in new and existing buildings;
- Limited know how in renewable energy integration as an energy source and its applications in buildings.

The approach to remove such barriers within this project will be through demonstrations of the application and impacts of RE integrated smart grid technologies for distributed RE systems, electric vehicle and building sectors. The expected outcome of the demonstration is an enhanced local capacity and improved confidence in the feasibility, performance, energy, environmental and economic benefits of integrated smart grid system comprising technologies for distributed RE systems, RE-powered EV charging infrastructure, battery as energy storage system as well as EE and RE applications in buildings.

As part of the project, a demonstration project will showcase the technologies of an integrated smart grid system comprising a few key elements which include: smart meter installation, renewable energy application e.g. solar PV for distributed energy generation and solar thermal energy for heating and cooling, EV charging station integrated with battery energy storage system and renewable energy, energy efficiency through BEMS/HEMS applications for smart buildings, time of use (TOU) apps for customer energy management portal and smart grid system linked with power line communication for the information exchange between consumers and utility company.

More specifically, this output will involve interventions to assist Melaka in carrying out and facilitating investments which will reduce GHG emissions – with potential scale up to other cities. It will result in four major areas of

³³ IRENA, *Smart Grids and Renewables: A Cost-Benefit Analysis Guide for Developing Countries*, 2015
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interventions resulting in GHG emissions reduction:

1. Smart meters and smart grid technology implemented in pilot buildings and scaled up include at least 110 commercial meters and 300,000 residential meters;
2. Implementation of EE measures as a part of Building Energy Management Systems in at least 10 large public buildings;
3. Installation and integration of distributed solar power generation of at least 30.26 MW into smart grid; and
4. Implementation of electric vehicles including 40 buses, 10 cars, and 60 scooters.

Integrated Smart Meter and Smart Grid Demonstrations and Scale Up

Advanced metering equipment is an essential component of smart grid systems, enabling a two-way flow of information and providing customers and utilities with real-time data. The data allows consumers to better understand their own energy use, helping them identify energy saving opportunities. Utilities and third-party energy service providers may provide critical assistance in realizing these opportunities. For utilities, a better understanding of the status of the electrical grid at a second-by-second level allows the grid to be operated at much tighter tolerances, resulting in greater efficiencies and reliability. Consumer demand response activities enabled by a smart grid can improve grid efficiency as well, reducing grid congestion during peak periods.

Two demo projects (described below) combined with technical assistance will facilitate the scaling up of smart meters to at least 110 end-use commercial customers in Melaka (mostly public sector) and provide additional support for the major residential smart meter/smart grid investments being planned for the state – a total of 300,000 smart meters. It is estimated that the proposed project would have 10% causality on this 300,000 smart meters for direct GHG reductions (i.e. 30,000 smart meters in the residential sector).

Studies³⁴ have shown that the implementation of smart meters lead to reductions in electricity consumption of:

- 3% due to the conservation effect of consumer information and feedback systems – included in the GHG reduction estimates for this project for commercial and residential customers);
- 3% due to deployment of diagnostics – included in the GHG reduction estimates for this project for commercial customers; and
- 2% due to conservation voltage reduction and advanced voltage control – included in the GHG reduction estimates for this project for commercial customers.

Implementation of building integrated smart grid system and Building Energy Management Systems

A Building Energy Management System (BEMS) and Home Energy Management System (HEMS) is a computer-based system that automatically monitors and controls a range of building services, including heating, ventilation, air conditioning (HVAC), lighting, boilers, chillers and other consumers of energy within the building or sometimes groups of buildings or home. Some systems also provide management of gas and water use.

There are a number of important benefits associated with use of a Building Energy Management system.

- It provides energy analysis, management and control information.
- It enables equipment, air conditioning, lighting etc. to be switched on and off automatically.
- It optimizes space heating within the building.
- It allows monitoring of equipment status and environmental conditions.

An example is chiller plant optimization, which boosts the efficiency of chiller operation by incorporating outside weather data and information about occupancy. Another example is using data from the building security system to turn off lights and reduce cooling when occupants are not present.

³⁴ See Pacific NW National Lab (2010) The Smart Grid: An Estimation of the Energy and CO2 Benefits.
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With the advent of the Smart Grid, which could enable demand response (DR) and time of use (TOU), BEMSs/HEMSs can help end-users better manage their electricity demand. With a varying price of electricity at different periods of the day, the BEMS/HEMS can program the system to turn on and turn off loads without sacrificing occupant safety, comfort and productivity.

The project will assist the Melaka Government in implementing BEMS in at least 10 buildings – which will result in savings of approximately 20% of electricity consumption at those buildings. The buildings will be selected from the 26 government buildings in Melaka that have been earmarked by the federal (17 buildings) and state (9 buildings) governments to undertake retrofitting and energy efficiency enhancement under the Energy Performance Contracting (EPC) Initiative of the government³⁵. The selection criteria will be based on the potential of energy and water savings which depends on the number of occupants in the buildings and their utility usage.

Installation and integration of distributed RE systems – particularly PV

In addition to the existing 13 MW of solar farms, there is a sizeable pipeline of potential investments in solar PV in Melaka. This project will assist the Government via policy dialogue and technical assistance in ensuring that this pipeline can come to realization and be integrated into the grid. It is expected that the project will assist in bringing along a pipeline of at least 30 MW of grid-connected utility-scale solar PV.

Currently, all conventional power plants in Peninsular Malaysia are connected to the TNB National Load Dispatch Centre (NLDC) located at Bangsar in Kuala Lumpur for monitoring of power generation and stabilization of national grid loads. This is not the case for distributed renewable energy systems. With the increasing integration of utility scale distributed renewable energy systems to the national grid, there is a need to expand the load management to cover the RE generation data through an online link to the NLDC. For this purpose, this project will integrate the new and existing solar farms in Melaka to a smart grid system to enable online communication with the NLDC so that energy generated can be monitored and managed on a real-time basis. The monitoring could help utility companies to stabilize the grid loads and also enable more comprehensive analyses of time of use.

In addition to the utility-scale solar installations, the project will also support solar PV installations at the two demo sites (for a total of 260 kW) which will be directly linked to EV charging stations and the buildings which are implementing BEMS.

Furthermore, the project will investigate and potentially support solar thermal applications for hot water and cooling in public buildings.

In determining where to site the demonstration projects, the existing grid condition will be considered to avoid concentrating PV capacities in areas with low power demand and relatively weak distribution grids, where variability may cause voltage problems, create reverse power flows, and lead to large grid congestions.

Implementation of electric vehicles as part of the smart grid

Electric vehicles (EVs) could play a central role in decarbonising road transport and mitigating air and noise pollution and GHG emissions in urban areas. Although electricity needs for EVs are likely to remain small relative to overall load in Malaysia for many years to come, they could have a much bigger impact on peak load as motorists seek to recharge their batteries during the evening. Recent technological advances in electricity distribution and load management that make use of smart grids promise to facilitate the integration of EVs into electricity load and to lower costs. Smart grid technology can enable EV-charging (grid-to-vehicle, or G2V) load to be shifted to off-peak periods, thereby flattening the daily load curve and significantly reducing both generation and network investment needs.

³⁵ EPC is an initiative started in January 2013 by the Government to promote energy efficiency (EE) in government buildings.

Under this concept, government buildings are allowed to engage energy services companies (ESCO) to improve EE. The cost of investment to implement EE improvement will be provided by the ESCO, while the government buildings are allowed to pay the cost of investment by the ESCO from the savings made from the improvement efforts.

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In the longer term, there may be potential for smart-grid technology to enable EVs to be used as distributed storage devices, feeding electricity stored in their batteries back into the system when needed (vehicle-to-grid, or V2G, supply). This can help to reduce electricity system costs by providing a cost-effective means of providing regulation services, spinning reserves and peak-shaving capacity. In this way, EVs could both benefit from and drive forward investment in smart grids. However, there are a number of technical, practical and economic barriers to such a development, including low battery discharge rates and storage capacity. Developments in battery technology will be critical to the future of V2G supply.

The project will support the implementation of solar-powered charging stations to allow for a relatively large scale introduction of electric vehicles including 40 buses, 10 cars, and 60 scooters.

Demonstration projects

Smart grid technology combined with distributed PV power generation installations, BEMS, and EV charging stations will be initially conducted at three different locations in Melaka, namely Melaka Sentral, Hang Tuah Jaya and Jasin, which are strategically selected based on the considerations of feasibility, reliability and significance of impacts to the demonstration objectives.

Melaka Sentral is chosen as one of the demonstration sites because it is the most densely populated district in Melaka where most of the historical/heritage sites are also located. The EV charging stations will be located at the main bus terminal of the city which has a commercial center where EE and solar PV panels could be demonstrated (solar thermal will not be included here as the roof structure does not permit the installation of solar thermal equipment). Being at the main bus terminal, the site could provide high visibility to the demonstration project.

On the other hand, Hang Tuah Jaya is the designated Green City and also the administrative center of the State. Here, a few electric cars and charging stations will be located by the State. The demonstration activities for this location will focus on electric car and scooter charging infrastructure (including battery energy storage system) and EE and RE (both solar PV and solar thermal) applications for government buildings. The smart grid sub-systems at the two locations will be linked to a common data control center at Melaka Sentral.

In order to demonstrate the integration of distributed RE systems to smart grid and analyse time of use, a new pipeline LSSPV plant of 30 MW capacity, which will be located in Jasin, will be connected with smart meters and linked to the National Load Dispatch Center (NLDC) in Kuala Lumpur. The existing 13 MW of solar farms in Alor Gajah and Hang Tuah Jaya will also be connected to the NLDC to allow real time monitoring of energy produced and provide a more comprehensive analysis on TOU.

Figure 8 below depicts the model of smart grid demonstration of the project at various locations.

Location 1: Melaka Sentral

The smart grid system at this location will comprise the following elements:

- 1-2 conventional grid-connected electric bus charging stations that will be installed (one station is already operational) at the main bus terminal by the government linked bus company;
- 2 Solar PV powered fast charging stations and battery energy storage systems for electric buses at the main bus terminal, one of which will be installed by the *GEF-UNIDO LCT* project, the other will be converted by this Project from a conventional charging station of the bus company to solar-powered;
- 1 additional Solar PV powered electric scooter charging station with capacity of 30kW with 4 charging ports will be installed by the project
- Solar PV system at capacity of 100kW to be installed by the project at the sidewalk or parking area for electricity needs of a commercial building, the surplus of which could be injected back to the grid; and
- BEMS/HEMS architecture for office rooms, smart meter and Time of Use (TOU) apps for the commercial building. The BEMS/HEMS which uses high technology plug with encrypted chips can communicate with smart meters to detect and monitor the energy usage of each appliances and devices. It will serve as an enabler for the smart grid

system in which each of the selected appliances in the Melaka Sentral's office room will be upgraded into smart plug and the energy usage can be monitored from time to time.

The smart grid system basically integrates the EV charging stations which are powered by a PV source and a battery energy storage system with EE and RE application in a commercial building. It will be supported by the national grid for emergency use, if needed. The charging of the EVs through battery energy storage system which are, in turn, charged by solar PV source will reduce the negative impact on the power supply but promote RE based technology harmonically. The battery energy storage system could also be used to supply electricity to EVs at night as well as to serve as energy backup for any potential of electricity interruption supply.

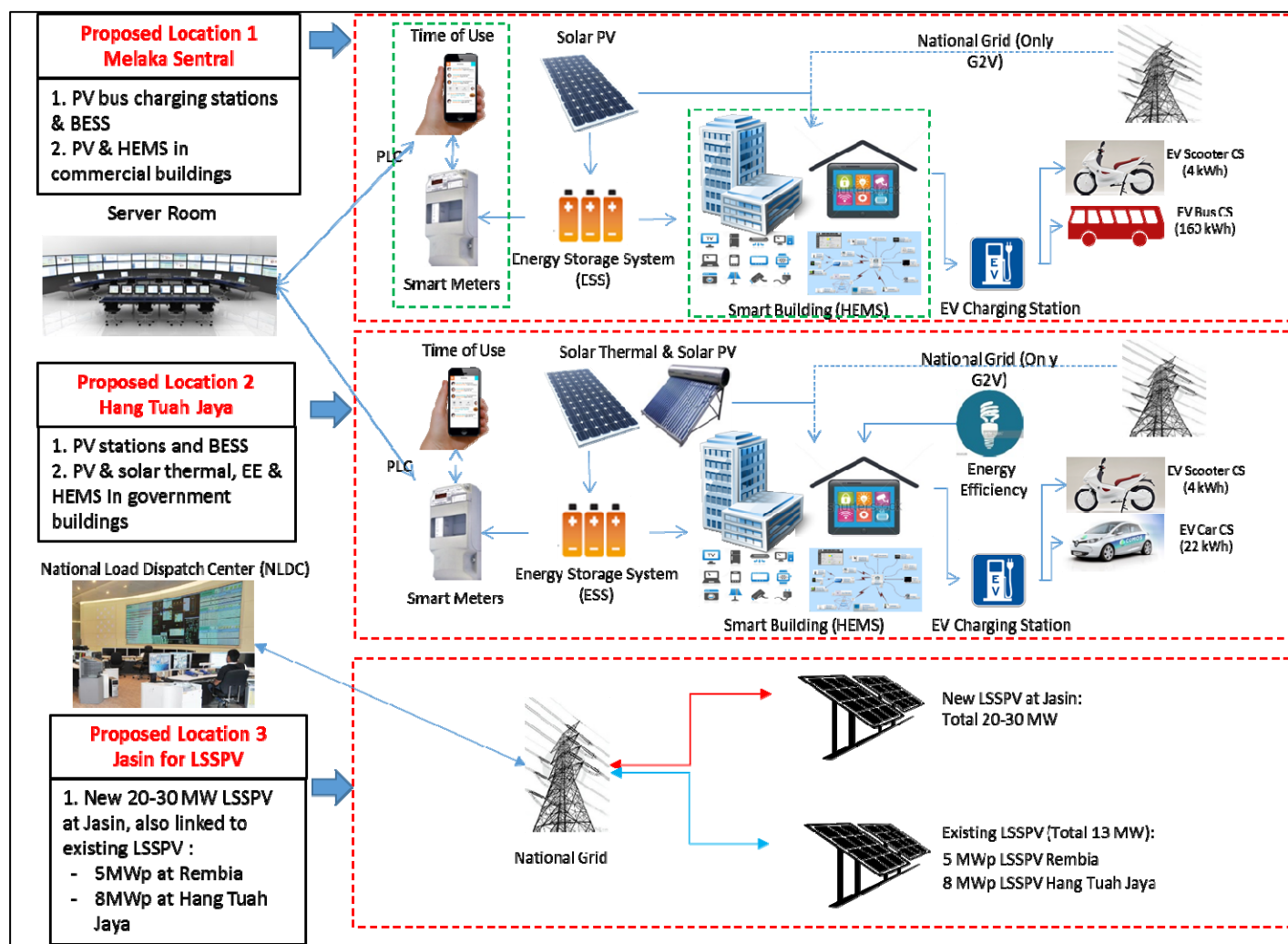


Figure 8: Demonstration Project Framework

Location 2: Hang Tuah Jaya Township

At Hang Tuah Jaya, the demonstration will have the following elements:

- 1-2 conventional grid-connected electric car charging stations that will be installed (one station is already operational) by the state government;
- 1 solar PV powered electric scooter charging station with capacity of 30kW, 4 charging ports and a small battery pack for energy back up that will be installed by the project
- An additional solar PV system at capacity of 100 kW to be installed by the project at the rooftop (about 1300 m2 required) of a government building. The energy generated from the PV source will be supplied into the ESS and

then serve to other loads of the government buildings and EV charging stations. The surplus electricity could be injected back to the grid;

- Solar thermal heating system to supply about 1000 Liters of hot water to the cafeteria which consists of a few stalls located at the ground floor of the building. The solar thermal installation will require a floorspace of about 30 m² on the same rooftop area for the solar PV; and
- BEMS/HEMS architecture for office rooms, smart meter and TOU apps for the government building which has recently been retrofit with LED lighting system.

Location 3: Jasin

In Jasin, the demonstration will focus on the installation and integration of a new utility-scale solar PV energy system (LSSPV) plant of 30 MW capacity into a smart grid with online communication to the National Load Dispatch Centre (NLDC) in Bangsar, Kuala Lumpur. The existing solar farms at Rembia and Hang Tuah Jaya will also be connected to the NLDC for load management and analyses of time of use (TOU).

Main Activities

The main activities that will be carried out under this output include:

- Verify institutional framework and governance structure on smart grid at national and state levels;
- Define scope and design project details for the three demonstration sites;
- Conduct a detailed/ comprehensive cost and benefits analysis on the demonstration smart grid systems;
- Conduct outreach and education on end-users, industry, civil society and other stakeholders;
- Integrate into Smart Grid: Distributed solar power generation, AMI, RE powered EV charging stations, Battery as Energy Storage System, EE/HEMS and RE (PV and solar thermal) applications in buildings, etc.;
- Evaluate the system: Data Collection, Analyze performance;
- Develop feasible TOU business models.
- Assist the Melaka Government in scaling up smart grid/smart meter applications, PV installations, BEMS, and EV usage.

The project will work very closely with MGTC and GEF-UNIDO project on *Energy Efficient Low Carbon Transportation* project in identifying the scope and project sites in particular on the forecast of electric vehicles (cars) and number of and location of the fast charging solar powered E-bus charging stations of the respective projects. The project will also cooperate with the ongoing GEF-UNIDO *Industrial Energy Efficiency in the Malaysian Manufacturing Sector (IEMMS)* project, in particular on capacity building activities on Energy Management Systems and energy system optimization: fan, compressed air, pumping, steam systems, etc., and GEF-UNIDO project on *GHG Emissions Reduction in Targeted Industrial Sub-sectors through EE and Application of Solar Thermal Systems in Malaysia* on solar thermal heating and cooling technologies. Collaboration will also be sought with other related initiatives in Melaka, such as the building retrofitting initiative of the State which is being executed by Danish Energy Management Company, smart grid initiative of TNB, demonstration activity of GEF-UNDP GTALCC project in Melaka, private sector EV suppliers, etc.

Component 2: Monitoring and Evaluation

The monitoring and evaluation component will ensure that adequate monitoring and evaluation mechanisms are in place, facilitating smooth and successful project implementation and sound impact. Specifically, this component's outputs include; (i) Regular monitoring exercises conducted: tracking tools prepared according to GEF requirements; and (ii) Mid-term and final project evaluation conducted. The monitoring and evaluation approach taken by the project is explained in more detail in Annex E.

4) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTE, LDCF, SCCF, and co-financing;

Cost Effectiveness

The Project will strengthen national, state and local planning systems which are expected to bring economic benefits in terms of boosting consumers' and investors' confidence. In particular, Melaka, where the main economic drivers are closely linked to green development agenda, such as tourism and foreign direct investment, will be able to reap broader economic benefits through green industrial development as engine of growth. This will catalyze further green technology investments and generate replication and indirect GHG emission reductions. The development of National Sustainable Development Framework and Replication Plans for Smart Grid adoption in other cities will promote upscaling and contribute to cost effectiveness of the project.

Co-financing

During project formulation phase, commitments were received for grant and in-kind contributions from the key national stakeholders, Melaka and UNIDO. These co-financing letters are included in Annex O – Co-Financing Letters and

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Agreements. All stakeholders have included sufficient co-finance to support the proposed activities in which they are involved. In particular, the project will build on and complement the ongoing initiatives of Melaka Green City Action Plan and the pilot smart grid initiative in Melaka. These initiatives will provide co-financing support to the project.

The project will also work closely with the GEF-UNDP project on *Green Technology Application for the Development of Low-Carbon Cities* to create synergies and avoid overlap in particular with respect to the policy components of the proposed project. In terms of the smart grid demonstration project, the proposed project will coordinated closely with GEF-UNIDO project on *Energy Efficient Low Carbon Transport* in order to complement the objective of promoting EV adoption in Melaka city. In fact, most of the EV charging infrastructure for the demonstration activities at Melaka Sentral will be contributed as part of this project – though double-counting of co-financing has been avoided.

5) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and

This proposed GEF project will facilitate and scale up the development of sustainable cities in Malaysia. Through an integrated approach with mainstreaming of climate risks into urban planning and management and promotion of smart grid integrated with RE applications in EV infrastructure, energy storage system and buildings, the project will reduce the GHG and pollutants emission in cities and achieve global environmental benefits.

The cumulative direct GHG emission reduction from the Project is estimated to be 43,736 tonnes CO₂ by End of Project and 849,300 tonnes CO₂ over the lifetime of project investment. The GEF contribution for the Project is USD 3,100,000 including Agency Fees and the PPG. This gives a direct CO₂ unit abatement cost (UAC) of USD 3.65 per tonne of CO₂. The detailed analysis and methodologies for calculation are included in Annex J – Detailed CO₂ Emission Calculations.

This project is not primarily geared towards addressing climate risks to achieve adaptation benefits. However, climate resilience benefits are likely to result due to improved energy efficiency and smart grids which will take pressure off of the electricity system in the event of – for example – extreme heat events. Furthermore, risks associated with climate impacts will be addressed as a part of the integrated planning process.

6) Innovativeness, sustainability and potential for scaling up.

Innovativeness

Current urban planning practices in Malaysia tend to be sector focused with limited public engagement. One of the main innovative aspects of the project is the promotion of a holistic approach in urban development planning that is evidence-based, multi-dimensional and broadly inclusive and sustainable. This will be done through institutional capacity building, awareness raising and engagement with the public.

Also, the demonstration project is a first of its kind in Malaysia as it demonstrates and tests individual technologies, as well as their integration and validation in a smart grid system. The specific new technologies to be tested include:

- RE-integrated smart charging infrastructure - This will optimize the charging time for EVs to maximize the RE use and off-peak electricity use;
- Energy storage using secondary battery from EV - The battery will be used in off-grid RE storage and implement secondary recycling. It will also supply electricity for common areas lighting as well as street lighting;
- Power grid / Communication technologies facilitating the control of stored power being stored in EV batteries.
- Renewable energy application for heating and cooling in government and commercial buildings – demonstration of RE-integrated distributed energy system;
- Home energy management system – an example of energy efficiency application for buildings.

Sustainability

Through the following actions the project will improve the sustainability of the project by:

- Strengthening the governance systems and sustainability planning and management capability at national, state and local levels. This will be achieved by building institutional capacity in adopting an integrated and inclusive approach in sustainable city development. Policy linkages and coordination mechanisms at all levels will be put in place by the project.

- The project will work closely with national stakeholders, such as KPKT, KeTTHA and PTHM of Melaka to support their planned training programmes as well as develop new ones. To ensure the sustainability the training modules will focus on on-the-job training for officers and staff of the participating institutions and will be based on training of the trainers approach.
- Enhancing awareness and engagement with stakeholders in particular with the public throughout the planning and management process. Capacity building activities of the project will also include key stakeholders and beneficiaries.
- Development of suitable incentive schemes and business and financial models. This will improve business investment financing for sustainable city development that could result in the creation of green jobs.
- Development of national framework, master plans and replication plan for sustainable city development.

Scale up potential

To encourage replicability, upscaling plans will be developed both for policy making and smart grid technologies. A National Sustainable City Development Framework will be developed to provide guidelines for upscaling. Capacity will be built in the use of this framework and in formulation of city master plans. The project will also organize regular national, regional and international fora among cities in Malaysia that have ongoing sustainable city development initiatives to share lessons learnt and best practices in integrated urban planning approach.

The lessons learnt from the RE integrated smart grid demonstration project, piloting technology and policy framework will be shared with other cities which choose to establish smart grid as a way to promote distributed RE integration, energy efficiency, BEMS/HEMS and EV programmes. For those cities with solar RE resources, all piloting technologies (distributed RE integration to grid, smart grid, smart charging, energy storage on secondary use of EV battery, solar thermal cooling) can be leveraged to increase using RE and EE management in buildings and RE for EV charging and buildings. A main project output is the development of integrated policy and technical regulations, which removes policy and institutional barriers for EV-RE integration through smart grid in Malaysia.

Furthermore, demonstrating the technical feasibility and commercial viability of piloting projects will provide city level examples that can be replicated across the country. Not only will the demonstration projects show what is possible and the examples be disseminated widely in the country, but the implementation and operation of these projects will build up the technical capacity within the project developer institutions to help in the replication of these projects. The projects will give confidence to all parties involved in smart grid technologies, i.e., from developer, owner to financier.

A.2. Child Project? If this is a child project under a program, describe how the components contribute to the overall program impact.

The proposed project is part of the global GEF project on Sustainable Cities Integrated Approach Pilot (IAP) programme. The Sustainable Cities Integrated Approach Pilot (SC IAP) is an integrated program consisting of two tracks: (a) City-level projects in 27 cities across 11 countries, with around US\$140 million in GEF grant funding. Each country is supported by one or several implementing agencies to manage the various projects in the participating cities. (b) The Global Platform for Sustainable Cities (GPSC), led by the World Bank with US\$10 million in GEF grant funding. The GPSC is a knowledge platform that ties all participating cities together and creates a collaborative space for cities aspiring towards sustainability to engage with entities already working in the urban realm.

The objectives of the Global Platform for Sustainable Cities (GPSC) are to

- Support the participating cities' work on evidenced-based urban planning with the aim of forging a common vision and approach to urban sustainability;
- Provide a platform for knowledge sharing and learning on integrated approach to urban planning and management; and
- Create a space for networking and learning among cities and relevant organizations on issues related to urban sustainable development.

In order to successfully support the participating cities in their sustainability initiatives, the GPSC and city-level projects will carry out joint activities, which may include:

- Supporting cities in the use of geospatial data/tools;

- Supporting cities to establish or enhance a set of indicators for urban sustainability, including the core indicators for achieving SDG goal 11;
- Using of tools for integrated urban planning;
- An assessment on urban sustainability and action plan; or
- Activities to enhance municipal financing.

In addition, the participating cities are expected to participate in knowledge sharing activities such as the GPSC annual meetings, trainings, and working group meetings.

As each city's needs are different, and as there are many existing efforts at the city-level, the GPSC, together with the Implementing Agency(ies) and other relevant partner organizations, will fully flesh out the specific work plan, laying out key activities, timetable, deliverables and budget for each interested IAP city by the end of 2016.

In order to maximize the use of the limited resources in a fair and efficient manner, in principle, the GPSC will provide the general framework and guidance in the form of trainings, guidance documents, etc., while the Implementing Agency(ies) will cover the activities in this framework that are city- or country-specific with the allocated budget. Should some cities already have some components of the framework (such as certain geospatial data), they will be encouraged to identify other services/products that would complement or further their work in other components.

Furthermore, the GPSC will lead the global efforts to promote an integrated approach to urban sustainability and bring international expertise to individual projects. In principle, the GPSC will cover most of the cost of the global events (annual meetings, workshops, working group meetings, etc.), and to some extent, some regional events.

The Implementing Agencies and participating cities should allocate sufficient resources to ensure the implementation of the joint deliverables and to cover the cost of participation (e.g. travel, accommodations, etc.) of city/country representatives in GPSC activities/events for the full duration of the program (60 months). As such, it is suggested that implementing agency(ies) budget \$1 million to \$1.5 million for each city. It is likely that the budget per city will be less should the country have several cities in the SC IAP program, as the work program will probably be more cost efficient due to the economy of scale of having more participating cities. Similarly, the GPSC will dedicate resources for all participating countries to ensure that all interested IAP cities have sufficient resources to participate in the joint deliverables.

The proposed project will directly contribute to the IAP goals of integrated sustainability planning, namely: integrating climate risks in urban planning and management. This will be achieved through support to the development/enhancement of national sustainable city policy frameworks in a holistic and inclusive approach, improved planning and management in Melaka City, development of a Sustainable Melaka Master Plan and upscaling to other cities, increased investment in Melaka City into urban management modalities; and increased knowledge and partnerships on sustainable cities in Melaka City, and in Malaysia in general.

The IAP Programme indicators and the targets of this project have been included in the logical framework (Annex A).

A.3. Stakeholders. Identify key stakeholders and elaborate on how the key stakeholders engagement is incorporated in the preparation and implementation of the project. Do they include civil society organizations (yes ☒ /no ☐)? and indigenous peoples (yes ☐ /no ☒)? ³⁶

Stakeholders involved in the promotion of low carbon urban planning and development are described below.

During the PPG phase, a number of consultative meetings were held with key stakeholders to identify barriers and issues for the design of the meeting (see Annex L). A national workshop for scoping of the project was also held on 26 November 2015 which was attended by more than 80 participants. A national steering committee meeting was also held on 22 March 2016 for validation and endorsement of the proposed project outputs and activities.

³⁶ As per the GEF-6 Corporate Results Framework in the GEF Programming Directions and GEF-6 Gender Core Indicators in the Gender Equality Action Plan, provide information on these specific indicators on stakeholders (including civil society organization and indigenous peoples) and gender.

As part of the project, a Technical Advisory Group (TAG) and National Steering Committee (NSC) will be formed comprising key stakeholders to provide guidance for project implementation (further described in Section A.6 below).

Stakeholder	Mandates/Role in the project
Main executing partner	
Malaysian Industry-Government Group for High Technology (MiGHT)	<p>Under the purview of the Prime Minister's Office, MiGHT is a membership-driven organization with members from industry, government and academia to promote high technology development and industrial advancement. MiGHT, is an implementing partner of the Smart Cities Programme under the S2A initiative.</p> <p>Role in the Project: MiGHT will be the national executing agency of the project, responsible for hosting the Project Management Unit (PMU) and will appoint the National Project Director (NPD).</p>
Main counterparts and stakeholders	
Ministry of Urban Wellbeing, Housing and Local Government (KPKT)	<p>KPKT is committed to building a dynamic society through planning, coordinating and implementing comprehensive housing programs, uniformed development with integral infrastructure facilities, social and recreational services. KPKT provides guidance to local government and planning units. In the Project, they will ensure buy in and effective engagement from cities as well as the mainstreaming of low carbon development within national planning and development systems.</p> <p>Role in the Project: KPKT will be the Chair of the NSC and a member of the TAG</p>
Department of Town and Country Planning (JPBD)	<p>JPBD is responsible for the formulation of city and spatial planning and guidelines to be used by the sub-national and local authorities. JPBD is the guardian to the Green Neighbourhood Guidelines, National Physical Plan2 and the National Urban Policy. Together with the Local Government Department (LGD) of KPKT, they will facilitate coordination from cities and integration with existing sub-national planning processes. They will be an important source for national housing, cities and waste data, and access to MURInets.</p> <p>Role in the Project: JPBD will support KPKT and the project in urban policies, planning and management related matters</p>
Ministry of Energy, Green Technology and Water (KeTTHA)	<p>The role of KeTTHA is to facilitate and regulate the electricity sectors in the country, to ensure affordable energy is available to consumers throughout the country (by reviewing tariffs imposed by the utilities and monitoring standards of the utilities), to monitor energy programmes and to promote energy efficiency and renewable energy. The Ministry, in coordination with the Economic Planning Unit (of the Prime Minister's Office), provides the general direction, and strategies in the energy sector. KeTTHA is also responsible for the promotion, innovation in and application of green technologies and for the water sector. The Ministry is tasked to promote EV in Malaysia.</p> <p>Role in the Project: KeTTHA will be a member of the NSC and the Chair of the TAG</p>
Ministry of International Trade and Industry (MITI)	<p>MITI has the function of planning, formulating and implementing policies on industrial development, international trade and investment; encouraging foreign and domestic investment; promoting Malaysia's exports of manufacturing products and services by strengthening bilateral, multilateral and regional trade relations and cooperation as well as enhancing national productivity and competitiveness in the manufacturing sector.</p> <p>Role in the Project: MITI will be a member of the NSC and will support the project on industrial policy and investment related issues.</p>
Ministry of Transport (MOT)	<p>The key objectives of MOT are to provide:</p> <ul style="list-style-type: none"> • A supply driven integrated transport network infrastructure • Technology driven, modern and efficient transport systems. • An excellent and safe seamless public and cargo transportation. • A competitive environment for the transport industry. • Effective enforcement and monitoring with integrity. <p>Role in the Project: MoT will be a guest member of the NSC and will support/advise the project on policy activities, as well as standards development and demonstration activity planning.</p>

Stakeholder	Mandates/Role in the project
Ministry of Natural Resources and Environment (MNRE)	<p>MNRE is the GEF Focal point in Malaysia and its major areas of focus include: (i) Natural resource management; (ii) Conservation and management of environment and shelters; and (iii) Management of land survey and mapping administration.</p> <p>Role in the Project: As the GEF Focal Point in Malaysia, MNRE will act as a member of the NSC and support the policy component of the project.</p>
Ministry of Science, Technology and Innovation (MoSTI)	<p>MoSTI seeks to increase productivity and competitiveness in agriculture, manufacturing and service sectors, generate new sources of wealth in technology and knowledge-intensive sectors (such as biotechnology, ICT, sea and space technology as well as industrial technology) and to raise the country's capacity for knowledge, creativity and innovation.</p> <p>Role in the Project: MoSTI will be a member of the NSC and will advise the project on technology related issues, such as those related to the smart grid demonstration under Output 1.2.1.</p>
MGTC/Greentech Malaysia	<p>MGTC, or more commonly known as GreenTech Malaysia, was established on 12 May 1998 as the Malaysian Energy Centre or Pusat Tenaga Malaysia (PTM). As a national energy research center, PTM focuses on the development of the energy sector, especially technological research and demonstration of renewable and efficient energy. In August 2009, the Government launched the National Green Technology Policy with the aim to provide direction toward the management of sustainable environment. To pursue it further, PTM was restructured as GreenTech Malaysia on 7 April 2010, to act as the implementing arm of KeTTHA. GreenTech Malaysia is the focal point to drive and facilitate the implementation of the development and promotion of green technology in Malaysia. GreenTech Malaysia chairs the National Technical Committee on the adoption and harmonization of EV standards.</p> <p>Role in the Project: GreenTech Malaysia will be a member of TAG and support KeTTHA on technical issues related to the smart grid demonstration project.</p>
Melaka City	<p>Melaka state and local authorities are the main beneficiaries, change agents, and co-implementation partners with guidance from KETTHA and MUWHLG. They will be responsible for coordination of all local planning activities and will ensure that technical assistance provided by the Project is linked to local planning needs and aligned with local priorities. They will be important stakeholders in scaling up of low carbon urban interventions in collaboration with the private sectors.</p> <p>Role in the Project: Melaka City will partner with the project on Output 1.1.1 and Output 1.2.1., hosting the demonstration project, as well as on awareness raising activities.</p>
SIRIM Berhad	<p>The Department of Standards Malaysia (DSM) has appointed the Standards and Industrial Research Institute of Malaysia (SIRIM Berhad) as the sole 'national standards development agency.' SIRIM Berhad is a wholly owned company of the Government (incorporated in 1996) under the Ministry of Finance Incorporated. While Standards Malaysia is responsible at the policy level, SIRIM is responsible at the technical level for the development of standards, as well as R&D development, engineering and design services, technology commercialization, training and consulting services and (through SIRIM QAS Int. Sdn. Bhd.) providing certification, inspection and testing services.</p> <p>Role in the Project: SIRIM Berhad will be a member of the TAG.</p>
Standards Malaysia	<p>The Department of Standards Malaysia (Standards Malaysia), under the Ministry of Science, Technology and Innovation (MOSTI), is the National Standards Body and the National Accreditation Body, providing confidence to various stakeholders, through credible standardization and accreditation services for global competitiveness</p> <p>Role in the Project: Member of TAG</p>
Energy Commission	<p>Energy Commission has been the regulatory agency for the electricity and piped gas supply industries in Malaysia since 2001. The Commission's main tasks are to provide technical and performance regulation for the electricity and piped gas supply industries, safety regulations for electricity and piped gas, to advise the Minister on all matters relating to electricity and piped gas supply and to ensure consumer protection. Another function of the Commission is to promote the use of renewable energy and the conservation of non-renewable energy. Several initiatives have been started, mostly related to efficient electricity production and use.</p> <p>Role in the Project: Member of TAG</p>

Stakeholder	Mandates/Role in the project
Sustainable Energy Development Authorities (SEDA)	SEDA has recently been established and assigned to administering the FiT (feed-in tariff mechanism) and promoting renewable energy technology in Malaysia. Role in the Project: Member of TAG
Economic Planning Unit (EPU)	EPU in Prime Minister's Department is responsible for the formulation of the 5-year Malaysia plan and provides overall policy direction on national development including issues related to sustainable development and climate change. It is the co-signatory to the Project Document and as such will oversee project governance as part of the NSC. It will assist in overall policy guidance and facilitate the uptake of policies related to low carbon urban development. EPU is a key cross-sectors policy convener and will ensure engagement of sectoral agencies towards an integrated approach (at the national policy level). It is expected that key sections in EPU mainly Environment, Natural Resources and Economics section, Energy section, Regional Development section and International Division section will be participating as members of the TAG and in the NSC meeting. Role in the Project: Member of NSC
Land Public Transport Commission (SPAD)	SPAD is responsible for policies, planning and regulating all aspects of train, bus and taxi services as well as road- and railbased freight transport. In the Project it will assist the Ministry of Transport in drafting and enforcement of policies related to integrated low emission transportation. SPAD is responsible for the issuance of the Bus Rapid Transit licensing and permits and will be a member of the NSC and TAG. Role in the Project: Guest member of NSC
Public Works Department	Public Works Department is responsible in the implementation of the national infrastructure projects, asset management, roads and maintenance as well as providing expertise and advisory on national physical development. PWD is currently executing the UNDP-GEF Buildings Sector Energy Efficiency Project in promoting wide-spread energy efficiency practices in the public and private building sectors. Role in the Project: Guest Member of NSC
Industry	
Tenaga Nasional Berhad	Tenaga Nasional Berhad is the largest <u>Electric utility</u> company in <u>Malaysia</u> and also the largest power company in <u>Southeast Asia</u> with MYR 99.03 billion worth of assets. It serves over 8.4 million customers throughout <u>Peninsular Malaysia</u> and also the eastern state of <u>Sabah</u> through Sabah Electricity Sdn. Bhd. TNB's core activities are in the generation, transmission and <u>distribution</u> of electricity. Other activities include repairing, testing and maintaining <u>power plants</u> , providing engineering, procurement and construction services for power plants related products, assembling and manufacturing high voltage switchgears, coal mining and trading. Operations are carried out in Malaysia, <u>Mauritius</u> , <u>Pakistan</u> , <u>India</u> and <u>Indonesia</u> . Role in the Project: Guest Member of TAG
International Organizations	International Organizations such as European Space Agency (ESA) will be engaged in the project through provision of services such as delivering technology solutions specifically in regards to monitoring of relevant indicators under output 1.1.1. Role in the Project: Guest Member of TAG
Academic Institutions	Academic Institutions such as UNITEN, Universiti Teknologi Malaysia have been engaged in the formulation of the Low Carbon Society Projects 2025 for cities such as Putrajaya, Cyberjaya, and Iskandar Malaysia. UNITEN, in particular, has a research project on smart grid as well as a laboratory. In the Project it will provide technical and training support in the demonstration project on smart grid. Role in the Project: Guest Member(s) of TAG
Civil social service organizations	Civil social service organizations such as the Center for Environment, Technology and Development Malaysia (CETDEM) and Melaka Green Development Organisation (PTHM) that can raise the profile of sustainable city development, and its local and national economical environmental and social benefits through advocacy, awareness raising and training programmes. Role in the Project: Guest Member(s) of TAG

Stakeholder	Mandates/Role in the project
Professional organisations	Professional organisations such as the Malaysian Institute of Planners have participated in the baseline activities, especially the application of LCCF in Petaling Jaya, Cyberjaya and Putrajaya. In the project they will provide policy support and training and in the development of capacity of local level planners. Professional organisations will be a key partner in operationalizing and maintaining low carbon planning capabilities at the local level. Role in the Project: Guest Member(s) of TAG
Organizations/ associations promoting gender equality and advocating women's empowerment	Relevant CSOs and NGOs, including those focusing on gender equality issues and advocating women's empowerment, such as women's associations, will be invited to participate in stakeholder consultations, as well as during the implementation phase of the project. Regular consultations with both female and male stakeholders and local beneficiaries will ensure that the project's impact on and appropriation by the local communities can be assessed throughout project implementation. Equal participation of women will be encouraged as experts, conveners and consultants for training and capacity building activities, as well as in expert panels. Project stakeholders will be encouraged to nominate female employees to participate in the project. Efforts will also be made to include gender focal points from relevant ministries and other stakeholders where possible.

A.4. *Gender Equality and Women's Empowerment*. Elaborate on how gender equality and women's empowerment issues are mainstreamed into the project implementation and monitoring, taking into account the differences, needs, roles and priorities of women and men. In addition, 1) did the project conduct a gender analysis during project preparation (yes ☒/no ☐?; 2) did the project incorporate a gender responsive project results framework, including sex-disaggregated indicators (yes ☒/no ☐?; and 3) what is the share of women and men direct beneficiaries (women 50%, men 50%)?³⁷

Gender mainstreaming at UNIDO

UNIDO recognizes that gender equality and the empowerment of women have a significant positive impact on sustaining economic growth and inclusive industrial development, which are key drivers of poverty alleviation and social progress. In addition to the UNIDO Policy on Gender Equality and the Empowerment of Women (2015), which provides overall guidelines for establishing a gender mainstreaming strategy, UNIDO has also developed an operational energy-gender guide³⁸ to support gender mainstreaming of its sustainable energy initiatives and integrated a robust gender review as part of the project appraisal process both at technical and organizational level, as well as, established a Gender Team to support gender related efforts.

All **energy** interventions are expected to have an impact on people and are, therefore, not gender-neutral. In fact, due to diverging needs and rights regarding energy and water consumption and generation, women and men are expected to be affected differently by the project (in terms of their rights, needs, roles, opportunities, etc.).

To ensure that men and women equally benefit from development projects and that gender inequalities in activities and outcomes are reduced or eliminated, gender dimensions need to be considered during the entire project cycle – from design and implementation to monitoring and evaluation. By systematically mainstreaming gender into its interventions, UNIDO's Energy Department (ENE) aims to ensure equal opportunities for both women and men, thus furthering UNIDO's inclusive and sustainable industrial development agenda and contributing to the achievement of the Millennium Development Goals (MDGs), and the Post-2015 development framework, as well as the Sustainable Energy for All (SE4ALL) objectives.

Gender dimensions of the project in Malaysia

³⁷ Same as footnote 8 above.

³⁸ UNIDO 2014: Guide on Gender Mainstreaming Energy and Climate Change Projects:

https://www.unido.org/fileadmin/user_media_upgrade/What_we_do/Topics/Women_and_Youth/Guide_on_Gender_Mainstreaming_ECC.pdf

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Malaysia has a relatively high women participation rate in the workforce. According to the 2013 statistics, the number of women employed almost tripled to about 5 million with a labor force participation rate of 52.4 percent and unemployment rate of 3.4 percent compared to 1982. The employment of women in senior management roles in Malaysia has also increased from 29 percent in 2014 to 34 percent in 2015³⁹.

Nevertheless, the UNIDO Policy on Gender Equality and the Empowerment of Women outlines UNIDO's commitment to and recognition of the positive impact of women's empowerment on inclusive and sustainable industrial development. Guiding principle of the project will be to ensure that both women and men are provided equal opportunities to access, participate in, and benefit from the project, without compromising the technical quality of the project results. In practical terms,

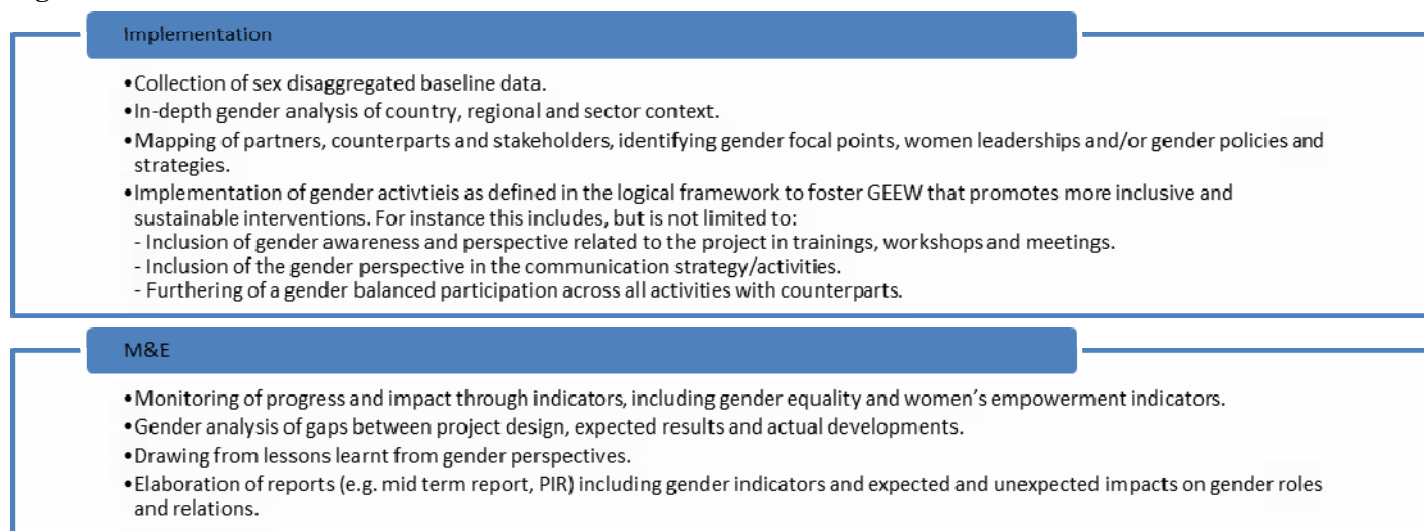
- Gender-sensitive recruitment will be practiced at all levels where possible, especially in selection of project staff. Gender responsive TORs will be used to mainstream gender in the activities of consultants and experts. In cases where the project does not have direct influence, gender-sensitive recruitment will be encouraged. Furthermore, whenever possible existing staff will be trained and their awareness raised regarding gender issues.
- All decision-making processes will consider gender dimensions. At project management level, National Steering Committee meetings will invite observers to ensure that gender dimensions are represented. Also at the level of project activity implementation, effort will be made to consult with stakeholders focusing on gender equality and women's empowerment issues. This is especially relevant in policy review and formulation.
- To the extent possible, efforts will be made to promote participation of women in training activities, both at managerial and technical levels, as participants and trainers. This can include advertising of the events to women's technical associations, encouraging companies to send women employees, adjusting ToRs for the selection of trainers, etc.
- When data-collection or assessments are conducted as part of project implementation, gender dimensions will be considered. This can include sex-disaggregated data collection, performing gender analysis as part of ESMP, etc.
- All communication and outreach material, as well as training material will be gender mainstreamed also communicating on gender equality and women's roles in the energy sector.
- Cooperation with women's associations, women's advocacy and professional groups will be thought for example to assure actively promotion of trainings and gender mainstreaming of outreach and training material highlighting positive female roles and the agent of change role that women can play. In any awareness and communication the GEF project will adapt its functions to actively include gender equality considerations to ensure that the maximum level of female participation in the project's different training courses is achieved and that the project contributes to national efforts to promote gender equality in relevant sectors.
- The project will support women in the capacity building activities and public awareness activities.

Key issues of gender mainstreaming the project cycle

Gender dimensions are considered as key for the development of industry, energy and environmental resources and climate change mitigation. Therefore, a gender analysis will be carried out as part of the capacity assessment of Output 1.1.2. at the outset of the project. Gender mainstreaming action will be integrated into all stages of the project cycle, in particular in the training and skills strengthening activities of output 1.1.2. References to gender will be consistent throughout the project approach, the activities, indicators, and budget. Female experts will also be encouraged to participate in the training and other project activities. Figure 9: Gender mainstreaming the project cycle below provides an overview of key issues that will be further considered during the gender mainstreaming of the next steps in the project cycle. Depending on the type of intervention and scope of activities, the degree of relevance of gender dimensions may vary.

³⁹ Hays Asia Salary Guide 2015
GEF6 CEO Endorsement /Approval Template-Dec2015

Figure 9:



During the project preparatory phase, a preliminary gender analysis of the country context and the project has been conducted, based on which potential gender dimensions of project outcomes and outputs, as well as potential entry points for gender equality and women's empowerment (GEEW) were identified. Some gender-disaggregated indicators and targets have already been included while additional key gender dimensions of the project outcomes and outputs as well as potential gender-relevant indicators are provided in the logical framework. These identified gender dimensions will be verified during a detailed gender analysis during project inception as part of the capacity assessments of the project and used as a guide during the inception and implementation of the project as well as during M&E.

A.5 Risk: Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation (table format acceptable):

Risk	Rating	Mitigation
Drop in oil prices significantly affect government revenues and spending resulting in changed priorities and resource allocation	Medium	<p>The economy being highly dependent on global economic factors is beyond the control of the project. However, by virtue of the focus on planning at the sub-national level and the emphasis on an integrated approach, especially with regards cross-sectoral coordination, the impact of economic downturn in any particular sector is diffused.</p> <p>The risk will also be reduced by closely engaging Government at all levels across a range of institutions and in various capacities. In particular, KPKT, KeTTHA, MNRE, and state and city authorities have been involved in the project design and have clearly defined roles and responsibilities. Also, by ensuring that the project outputs are aligned to the national and state priorities, the said risk would be reduced. Continued political support will be maintained by involving high level decision makers in the activities of the project, especially in public events, and maintaining a regular high level briefing and feedback on project progress.</p>
Delays/lack of adoption at the national level of the proposed improvements to the institutional and regulatory framework by public institutions	Medium	<p>Output 1.1.1. is dedicated to supporting improvements to the regulatory and policy framework, and awareness and capacity building within national, state and local institutions. In order to mitigate any potential risk of delays, close cooperation of the project partners in the NSC, comprising of senior government policy makers, will be sought and a clear delineation of project stakeholders' roles and responsibilities has been outlined in this project document.</p>

Risk	Rating	Mitigation
		In addition, Output 1.1.2. aimed at capacity building of the various relevant institutions to create awareness and a better understanding of the project's interventions, thereby creating ownership among the local counterparts.
Delays/lack of adoption at the municipal level of the proposed improvements to the institutional and regulatory framework by public institutions	Medium	At a municipal level, a number of green city initiatives are being developed in Malaysia, in such cities as Putrajaya, Cyberjaya and Iskandar. The project envisages substantial policy and information support for selected city, including provision of training, awareness raising activities and demonstration. The project will tailor capacity building activities for local counterparts to ensure essential understanding on importance and benefits of sustainable city master plan.
Negative construction, operation, and decommissioning phase impacts and technology failure	Medium	<p>Proper due diligence and construction management will be carried out during the pre-construction and construction phases of the pilot project to mitigate negative construction impacts. This will include public consultation and information disclosure.</p> <p>For the operational phase, though this is a pilot project, electric vehicles and the associated required equipment, as well as the energy efficiency and renewable energy applications in buildings are now commercially and widely available in Malaysia. In addition, the groundwork already laid by the ongoing Energy Efficient Low-Carbon Transport project will have built capacity and tested the products at length. The smart grid demonstration will also build on ongoing smart grid initiative of the Melaka State. Moreover, UNIDO will share its experience of similar projects in other countries such as South Africa, Senegal, Ivory Coast, India and China.</p> <p>To address risks of inappropriate disposal of equipment during the decommissioning phase, during the project there will be the provision of training on hazardous materials as well as adoption of official policies for dealing with disposal of materials.</p>
Project interventions are not sustained beyond the project life span	Medium	Relevant public bodies' agreement will be secured in order to guarantee the project continuation after the end of the GEF funding period and the built capacity and policies will support this continued implementation. Given the ongoing Green City initiatives, it is expected that the project activities will be incorporated into its structure to ensure sustainability.
Climate change risk/Infrastructure developed is vulnerable to climate change risks	Low	While the infrastructure to be developed under the proposed project could potentially be vulnerable to climatic disruptions (e.g. smart grid system in coastal areas), sufficient due diligence has been undertaken in the PPG phase as to the location of such infrastructure and location to mitigate this risk.
<p>Gender Risk: Risk of resistance against, or lack of interest in, the project activities from stakeholders, especially with regard to the active promotion of gender equality.</p> <p>Low participation rates of suitable female candidates due to lack of interest, inadequate project activity or missing qualified female population within engineering sector.</p>	Low	Malaysia, while having a number of significant gender issues, is a pro-gender equality society. This project will pursue thorough and gender responsive communication and ensure stakeholder involvement at all levels, with special regard to involving women and men, as well as civil society and non-governmental organizations promoting gender equality. This shall mitigate social and gender related risks, promote gender equality, create a culture of mutual acceptance, and maximize the potential contribution of the project to improving gender equality in the energy field. As gender has been clearly mainstreamed throughout the project design, this will help mitigate any potential risk.
Key stakeholders (government institutions, the private sector and end-users) are not interested/not supportive the project's interventions	Medium	As the project will demonstrate a very new and unique technology to Malaysia, 'buy-in' from the private sector and public is very important to mitigate the said risk of disinterest. Any such potential risk will be mitigated through targeted public awareness, engagement, outreach and education activities, dissemination of information and consultations, as well as capacity building, to be implemented under Outputs 1.1.2. and 1.1.3. In addition, the demonstrations to be undertaken under Output 1.2.1. will showcase the technology in a visible manner to present

Risk	Rating	Mitigation
		the opportunities and benefits of the proposed technologies. Furthermore, the private sector's involvement in the development of the policies and strategies under Output 1.1.1. will help ensure that the policy framework and financial mechanisms are in line with the needs of investors and manufacturers.
Environmental and social risks	Medium	During the project preparation period (PPG) relevant environmental and social risks have been identified and included in the ESMP (please refer to Annex P). Since ESMP will serve as an active tool, additional risks that are identified during the project implementation will be included as they are identified.

A.6. Institutional Arrangement and Coordination. Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

PROJECT MANAGEMENT ARRANGEMENTS

The project management arrangements for the project are depicted in Figure 10 below.

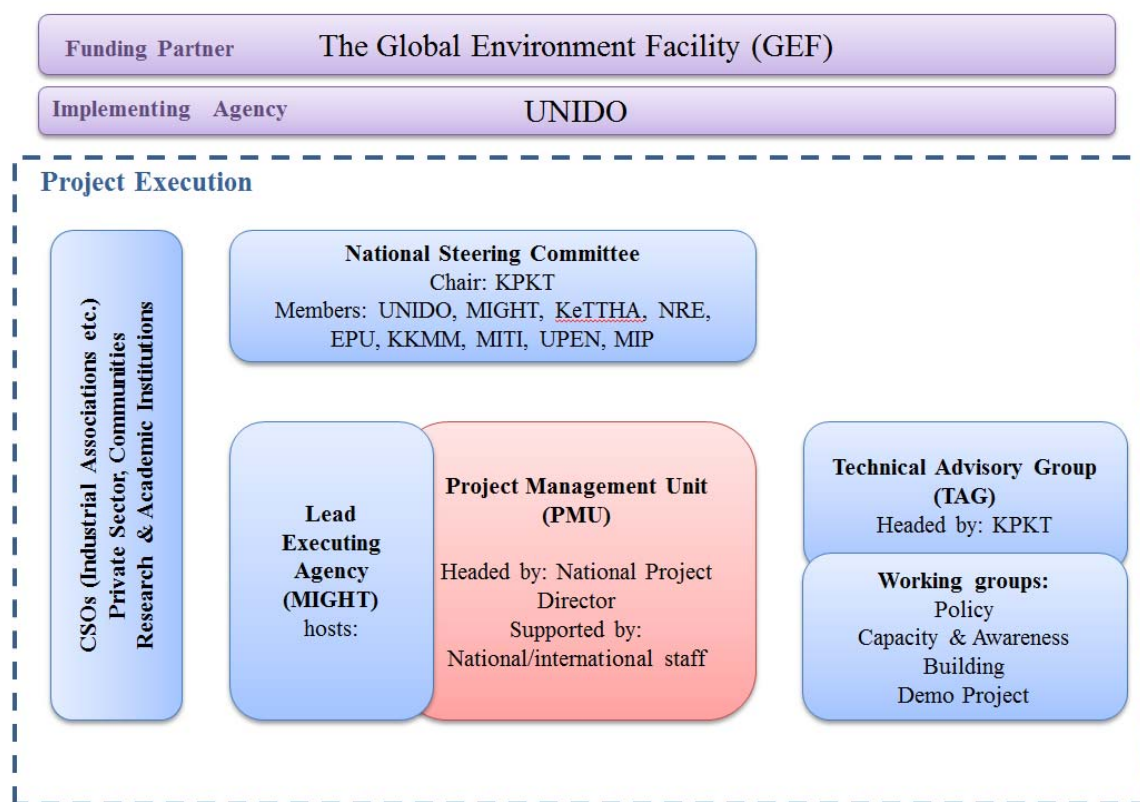


Figure 10: Project Management Arrangements

National Steering Committee

A National Steering Committee (NSC) has been established for the project during the PPG phase to provide strategic guidance, and coordination between various ministries, state and local authorities, and other stakeholders. Table 2 shows the membership composition of the NSC that had been agreed at the first NSC meeting held on 22 March 2016 which was chaired by the Permanent Secretary of KPKT.

Table 2: Members of National Steering Committee

Project Implementing Agency	UNIDO
Chairman	Ministry of Urban Wellbeing, Housing and Local Government (KPKT)
Secretariat	Malaysian Industry Government Group for High Technology (MIGHT)
Members of the Committee:-	
Federal	Ministry of Energy, Green Technology and Water (KeTTHA)
	Ministry of Natural Resources and Environment (NRE)
	Economic Planning Unit (EPU)
	Ministry of Communications & Multimedia Malaysia (KKMM)
	Ministry of International Trade and Industry (MITI)
Melaka State	State Economic Planning Unit (UPEN)
Professional Organisation	Malaysian Institute of Planners (MIP)
Guest of Steering Committee:-	
	Ministry of Transport (MOT)
	Ministry of Science, Technology and Innovation (MOSTI)
	Ministry of Work (MOW)

The main roles and functions of NSC are:

- Provide strategic guidance to the project while ensuring no overlap with other development projects;
- Facilitating the coordination and execution of project activities across institutions, including collaboration with Industry;
- In line with the approved work plan and budget, reviewing and verifying on each year's proposed workplan and budget;
- In line with the approved project document, reviewing project deliverables;
- Making decisions on the issues brought to its notice by UNIDO and other cooperating institutions;
- Reviewing issues raised and agreeing to action plans for their resolutions;
- Initiating remedial action to remove impediments in the progress of the project activities that were not envisaged earlier;
- Monitoring the continued applicability of project benefits;
- Resolving amicably any dispute as to the interpretation of the project document and the implementation of the project.

The NSC will meet 1-2 times per year with ad-hoc meetings organized when necessary. While there are a number of NSC members, experience gathered from similar projects has shown that effective coordination and active participation by the key project stakeholders can be maintained as long as all members are relevant to the project.

At the beginning of project implementation a detailed work plan for the first year of implementation will be developed by the NSC in collaboration with UNIDO, Technical Advisory Group (TAG) and Project Management Unit (PMU), based on the overall work plan for the entire duration of the project. The yearly work plan will clearly define roles and responsibilities for the execution of project activities, including monitoring and evaluation; it will set milestones for deliverables and outputs. The overall and yearly work plans will be used as management and monitoring tool by PMU and UNIDO and the overall work plan will be reviewed and updated as appropriate on a biannual basis.

The mentioned stakeholders are indicative. The respective tasks to be carried out by organizations and experts will be made part of contractual arrangements with UNIDO and in line with UNIDO's rules and regulations. Any changes to the work program/project with the approved GEF CEO Endorsement request will comply with GEF document C 39. Info 03.

The NSC will be supported by a TAG which will include multi-domain technical and policy specialists from participating ministries, cities and key stakeholder groups. This will include senior technical specialists from KeTTHA, Energy Commission, KPKT, MOSTI, SIRIM, Standards Malaysia, TNB, private sector, universities, UNIDO and others as required by the NSC. The TAG is not a decision making body but will be called upon to provide objective and independent technical expertise to the NSC to support project oversight and monitoring. The TAG will do this by providing the NSC with an informed review of project management reports, technical reports, and other outputs of the

project. This will include a periodic review of the project risks and issues, including those reported by the Project Manager in the project risk and issues logs. The Chair of NSC has assigned his deputy Permanent Secretary to be will chair the TAG. The TAG will be supported by a few working groups based on the project outputs, meet biannually prior to the NSC meetings, and as otherwise required by the NSC.

The local project executing agency will be *the Malaysian Industry-Government Group for High-Technology (MiGHT)* that will host the PMU. MiGHT will appoint one of its senior managers to be the National Project Director (NPD) who will act as the Government representative to work closely with the PMU to ensure that the daily management of project execution is fully in line with Government priorities, rules and regulations, and that all local inputs and participation in the project implementation are on time and adequate.

The NPD shall have adequate authority and knowledge within the Government to get the necessary support from all local project partners to perform his/her duties under this Project, in particular to ensure that the Project is supporting Malaysian efforts. He/She will be the custodian of the Project Document and as such will be responsible for ensuring compliance of operations with the agreed work plan and budget. The NPD will ensure that subsequent revisions to the Project Document are verified and approved by the NSC and in accordance with the requirements of the Government and GEF, noting that any revision to the document would require GEF approval. The NPD will be responsible for delivery of project objectives, for all project reporting including submission of Annual Work Plans (AWP), monitoring and financial reports. The NPD will oversee the effective communications and coordination with all parties involved in the project and will verify that resources committed to the project are available. This includes in-kind commitments, which will be monitored and reported during project reviews. The NPD will report to the NSC any issues, internal or external to the project, which are likely to affect the delivery of results.

The Project Management Unit (PMU) is responsible for the daily management of project activities/execution, and will also act as the Project Steering Committee Secretariat. It will provide guidance/advice in the execution of each project component, in accordance with the project document. The PMU will comprise of:

- National Project Manager (NPM; fulltime, paid from the GEF budget);
- Administrative Assistant (fulltime, paid from the GEF budget);
- Technical Advisors (part-time, paid from GEF budget and co-financing).

The National Project Manager (NPM) will be responsible for the day-to-day delivery of the project activities in accordance with the agreed Project Document. The NPM will be recruited by the project and will report programmatically to the NPD and administratively to the UNIDO. The NPM establishes the project team, maintains the project management plan and facilitates procurement and scheduling of activities. The NPM prepares all project management and financial reports, and; ensures effective communication and coordination of the project team and partners; establishes the result monitoring systems and facilitates all project evaluations and reviews; and keeps track of project risks and issues in the project's risk and issues log.

In order to support the NPM in the administration and delivery of the project, a full time Project Assistant will be appointed and will be co-located at the project office in MiGHT. The TOR for the NPM is included in Annex I - Terms of Reference.

To ensure effective coordination of the project, each Ministry and Melaka will identify a high level focal point within their structure that will provide coordination and ensure logistic support for all activities supported by the project in their domain.

The planned coordination with other relevant GEF-financed projects and other initiatives:

Complementary GEF-funded Projects

The proposed project will coordinate with and seek to build synergies and complementarities with other on-going GEF funded projects in the country, in particular the following:

- ***Green Technology Application for the Development of Low Carbon Cities (GTALCC)*** is a GEF-UNDP initiative with the objective of facilitating the implementation of low carbon initiatives in at least five Malaysian cities and showcases a clear and integrated approach to low carbon development. The objective will be achieved by removing barriers to integrated low carbon urban planning and development through three components: 1) policy support for the promotion of integrated low carbon urban development, which will enable cities to implement and adopt integrated low carbon urban development plans and programmes; 2) awareness and institutional capacity development, which will expedite appraisal, approval and the implementation of strategic urban development, and ensure cities are aware of and planning and implementing low carbon technology applications, and; 3) low carbon technology investments in cities, where there is an increase in investment in low carbon technologies with more low carbon projects implemented. The project will be implemented over 5 years in Cyberjaya, Iskandar Malaysia, Melaka, Petaling Jaya, and Putrajaya – though the involvement in Melaka is planned to be limited and there is not a focus on smart-grids – both of which are to be covered in a complementary fashion within the project proposed here.
- ***Energy Efficient Low-carbon Transport in Malaysia*** is a GEF-UNIDO ongoing project with the objective of catalyzing and accelerating widespread use of EVs as part of energy efficient low carbon transport and low-carbon cities initiatives of Malaysia. It has i) Improvement of policy and regulatory framework for EV use and local manufacturing; strengthened capacity of concerned institutions and awareness raising; ii) Development and demonstration of infrastructure for EVs, and local EV manufacturing capacity. The project aims to install 3 PV-based fast EV charging stations in Melaka. This project does not address wider issues of urban development as is proposed here nor does it address issues of smart grids as a way to ensure effective inclusion of EVs into the electricity system.
- ***Building Sector Energy Efficiency Project (BSEEP)*** is a GEF-UNDP initiative with the goal to reduce GHG emission growth rate in the Malaysian building sector and it will do this by improving building energy utilization efficiency. The objective of BSEEP is to develop and implement legislative and institutional framework changes and specific measures to enable the reduction in the annual growth rate of GHG emissions from the building sector in Malaysia. The end result of this project objective is the improvement in the efficiency of energy utilization in Malaysian buildings, particularly those in the commercial, institutional and government sectors by:
 - Developing Energy Efficient design for new buildings as a building industry standard, and
 - Improving the efficiency of energy utilization in the operation of existing buildings through appropriate measures such as energy management, improvement of the building fabric and retro-fitting of cost-effective EE equipment and appliances as necessary.
- ***GHG Emissions Reduction in Targeted Industrial Sub-sectors through EE and Application of Solar Thermal Systems in Malaysia*** is a GEF-UNIDO project that is aimed at reducing GHG emissions by promoting and demonstrating sector-specific EE improvements and solar thermal technology utilization in industry. It seeks to develop a regulatory framework and financial incentive schemes to facilitate solar thermal energy utilization and thermal energy efficiency; undertake awareness raising and capacity building programmes relating to process heating and cooling optimization and solar thermal energy utilization; and conduct demonstration and scaling up of sector-specific EE and solar thermal energy utilization in targeted industrial subsectors.
- The GEF-UNIDO project on ***Industrial Energy Efficiency for Malaysian Manufacturing Sector (IEEMMS)*** is aimed to improve the policy and regulatory framework, and incentives schemes for energy efficiency in industry. Currently, it is working under the leadership of the Energy Section of the Economic Planning Unit of the Prime-Minister's Office to assist the development of the NEEMP, covering all energy sources. This project focuses on energy systems optimization and energy management systems; ISO 50001 requires an organization to establish, implement, maintain, and improve an energy management system, enabling systematic achievement of continual improvements in energy performance, energy efficiency, and energy conservation. It imposes requirements on energy supply and consumption in terms of measurement, documentation and reporting, design and procurement practices for energy-using equipment and systems, as well as processes and personnel. It is not only applicable to industry, but also to all organizations that use energy.

- The **GEF UNIDO Cleantech Programme for SMEs in Malaysia** (known as the Global Cleantech Innovation Programme (GCIP) for SMEs in Malaysia) is a medium sized GEF-UNIDO project that commenced in 2013. The project aims to assist Malaysia in creating an enabling policy and regulatory environment and building up adequate institutional capacity to organize national competitions on clean technology innovations and implement acceleration programmes for clean technology SME start-ups.

The project will be closely coordinated with the on-going GEF-UNIDO projects in Malaysia. Specifically, the ongoing GEF-UNIDO project, **Energy Efficient Low-Carbon Transport in Malaysia** will provide significant input to the proposed project in terms of policy, project partnerships and expertise in the solar PV fast charging stations for EVs. The said GEF5 project which will also install solar PV fast EV charging infrastructure in Melaka will provide valuable lessons learnt, knowledge and expertise to the demonstration project of the proposed project. Moreover, the project will install two solar powered charging stations in Melaka Sentral and one EV charging station in Hang Tuah Jaya. These charging stations could be linked to the smart grid demonstration activities of the proposed project.

Many key partners of this new project are also those of the on-going GEF funded projects that are related to sustainable development with a particular focus on cities. In particular, the GEF-UNIDO project on Low Carbon Transportation and GEF-UNDP project on *Green Technology Application for the Development of Low Carbon Cities* will both conduct demonstration activities related to EVs promotion in Melaka. The project will ensure the effective coordination of related ongoing projects, in particular the said two projects, at the various project management levels, i.e., the NSC, project management and technical working groups. The National Project Directors and National Project Managers of the related GEF-funded projects in Malaysia will be invited to attend the National Steering Committee meetings whenever necessary. In this regard, a regular meeting with all concerned GEF national project managers will be institutionalized and organized on a regular basis.

The proposed project will closely coordinate with the relevant UNIDO departments, particularly the Department of Environment, and Department of Partnerships and Results Monitoring. The proposed project will also closely liaise with other initiatives implemented in the country with regard to the fostering of a green industrial sector and the transition toward a green economy.

Additional Information not elaborated at PIF Stage.

A.7 Benefits. Describe the socioeconomic benefits to be delivered by the project at the national and local levels. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The long term socio-economic benefits of the proposed project are associated to widespread adoption of integrated approach to urban planning and management that will result in higher competitiveness and livability of the cities characterized by good quality of life, healthy and viable communities, natural open spaces, reduced waste, equality, access, lower crime, sense of community, clean air and water quality, and environmental diversity.

The widespread uptake of the RE integrated smart grid system will provide the following benefits:

- *More stable and efficient supply of electricity:* Consumers will not be disrupted with electricity outages; in particular, production processes of industry will not be interrupted.
- *Energy savings for household and business sector:* With adoption of smart grid integrated with HEMS, energy efficient and renewable energy application in buildings, household and industry can save money on energy costs.
- *Reduced impact of energy price shocks to public and private sectors:* Deployment of renewable energy and transportation and building HVAC efficiencies inherently promoted by this project will reduce exposure to global energy price shocks, and financial sustainability for households and commerce.
- *Increased tourism:* Tourism is attracted to vibrant and livable cities. They will be attracted to a clean, green and efficient public transportation system with lesser traffic congestion and air pollution.

- *Better access to green job within sustainable cities:* The project will promote green industrial development which will lead to greener job opportunities.
- *Improved personal health from less air pollution:* With greater uptake of EVs in the cities, emissions from transportation sector will be reduced leading to lesser health problems such as asthma and emphysema.

Calculating the cost per tonne of direct reduction of emissions for the GEF – including the PPG, the project grant, and Agency fees, the cost per tonne of abatement would be approximately 3.65 USD/tonne CO₂. Adding the top-down indirect reduction of emissions to the direct reduction of emissions, the cost per tonne of abatement for the GEF would be reduced to as low as 0.71 USD/tonne CO₂.

A.8 Knowledge Management. Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.

Sharing of best practices through national and international events will be organized by the project as well as Global knowledge platform of the IAP.

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation through lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects. A web portal will also be established to create awareness and disseminate outputs of the project. Finally, there will be a two-way flow of information between this project and other projects of a similar focus, such as Cities Development Initiative Asia (CDIA, with parallel funding from BMZ and ADB), as well as Global Platform for Sustainable Cities (GPSC).

GPSC, in addition to serving as a platform for knowledge sharing, endeavors to compile lessons learned from the child projects, including this project and will promote innovation through collaboration and knowledge exchange. Case studies on each child project will be created at the end of the program to evaluate whether the knowledge positively affected the urban processes and systems.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 Consistency with National Priorities. Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions such as NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.:

The proposed project aims to reduce GHG emissions in Malaysia through sustainable city development. It will specifically support and contribute to the realization of the following national and state priorities:

1. Malaysia's 2nd National Communication (2011) which highlights the importance of developing green and low-carbon cities and townships to ensure great resilience towards negative climate change impacts. Introducing green buildings and green technologies in urban areas through public policy and development guidelines are noted as measures to support urban development in Malaysia. In addition, the National Communication highlights the importance of improving Malaysia's transportation system and infrastructure, specifically noting that only 10% of Kuala Lumpur is directly served or within the transit catchments of the existing stations. In this field, the National Communication highlights two key strategies with which the proposed project is closely aligned; capacity building and awareness rising of the public institutions and the larger populous, and improving the regulatory environment.

The interventions of this project, under Component 1, are closely in line with these objectives and will serve to support the objectives of the Government of Malaysia.

2. INDC Malaysia which intends to reduce its greenhouse gas (GHG) emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005. This consists of 35% on an unconditional basis and a further 10% is condition upon receipt of climate finance, technology transfer and capacity building from developed countries.
3. Achievement of UN Sustainable Development Goals, in particular, Goal 11 Sustainable cities and Communities - Make cities and human settlements inclusive, safe, resilient and sustainable, Goal 7 Affordable Clean Energy – Ensure access to affordable, reliable, sustainable and modern energy for all, Goal 9 Industry, innovation, infrastructure and Goal 13 Climate Action - Take urgent action to combat climate change and its impacts.
4. Achievement of GHG emissions reduction target. Malaysia is a signatory of many international accords for GHG emission reduction including Montreal protocol of 1987, Kyoto protocol of 1992, Copenhagen accord of 2009 and Cancun agreements of 2010. Malaysia has also declared to reduce its GHG emissions by up to 40% by the year 2020 as comparable with 2005 levels to implement the Cancun agreements and the Bali declaration of joint efforts of emission reduction by both developed and developing countries⁴⁰. The reduction pledge was adjusted to 45% by 2030 during the recent COP21 meeting in Paris last November.
5. Implementation of related strategic thrusts and Game Changers of the Eleventh Malaysia Plan, specifically on:
 - Thrust 4 – Pursuing Green Growth for Sustainability and Resilience.
 - Thrust 5 – Strengthening Infrastructure to support economic expansion (involving city infrastructure).
 - Game Changer No. 4 – Embarking on Green Growth.
 - Game Changer No. 6 – Investing in Competitive Cities. Together with EPU and KPKT, the Project will prepare a Sustainable City Development Framework to provide guidelines for sustainable city policy formulation at national level in an integrated manner. The Framework could also be used by the four designated cities namely Kuala Lumpur, Johor Bahru, Kuching and Kota Kinabaru to prepare their own city master plans.
6. Enhancement of the Melaka Green Technology City State Blueprint, 2011-2020 and GCAP by integrating them into a Sustainable Melaka Master Plan.

C. DESCRIBE THE BUDGETED M & E PLAN:

Monitoring Framework and Evaluation Plan

Project monitoring and evaluation (M&E) will be conducted in accordance with established UNIDO and GEF procedures. According to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies like Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

The overall objective of the monitoring and evaluation process is to ensure successful and quality implementation of the project by: i) tracking and reviewing project activities execution and actual accomplishments; ii) providing visibility into project progress so that the implementation team can take early corrective action if performance deviates significantly from original plans; iii) adjust and update the project strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken; iv) keep the GEF Secretariat updated on all project activities.

The Logical Framework Matrix in Annex A provides performance and impact indicators for project implementation along with their corresponding means of verification. These will form the basis upon which the project's M&E Plan will be built. In particular, the impact and performance indicators in Annex A will track, report and review project activities and accomplishments in relation to: establishment and adoption of policy papers and financial incentive schemes, capacity building and utilization, awareness raising and demonstration projects. In addition, a standardized approach will be used for monitoring energy reduction in the 40 plants, following the ISO 50001, Energy Management

⁴⁰ Assessment of Greenhouse Gas Emission Reduction Measures in Transportation Sector of Malaysia by Shamsuddin Shahid, et al.

Standards and the process heat assessment guidelines to be developed and trained on during the project implementation. GHG emissions reductions will be calculated based on the energy saving amounts; the detailed process for doing so is elaborated on in Annex H. Progress made in achieving the project targets will be reported in the form of Project Implementation Reports (PIR) to be submitted to the GEF on an annual basis

UNIDO will be responsible for overall management and tracking of project milestones as well as reporting to the GEF. The M&E procedure will consist of a) project inception, b) semi-annual reviews, c) tracking project progress and d) mid-term review and final independent evaluation. The estimated total budget for M&E is US\$280,000 (US\$80,000 from the GEF and US\$200,000 from co-financing).

Table 3: M&E Budget

M&E Activity Categories	Feeds Into	Time Frame	GEF Budget (USD)	Responsible Parties
Monitoring of project impact indicators (as per LogFrame)	Project management	<i>Continuous</i>	30,000	PMU
Periodic Progress Reports	Project management; NSC Meeting	Semi-annually		
Mid-term review/ evaluation	Project management; NSC	At project mid-term	20,000	UNIDO PM, PMU, UNIDO Quality Monitoring Division and evaluator
Independent terminal evaluation	Terminal Evaluation Review (TER) conducted and TOR for evaluation drafted by UNIDO EVA.	Project completion	30,000	Independent evaluator, PMU, UNIDO PM, and UNIDO Evaluation Group
TOTAL			80,000	

More details on M&E are provided in Annex E and progress indicators are given in Annex A.



D. LEGAL CONTEXT:

The Government of the Republic of the Union of Malaysia agrees to apply to the present project, *mutatis mutandis*, the provisions of the UNDP Standard Basic Assistance Agreement signed and put into effect on 17 September 1987.

PART III: CERTIFICATION BY GEF PARTNER AGENCY(IES)

A. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies⁴¹ and procedures and meets the GEF criteria for CEO endorsement under GEF-6.

Agency Coordinator, Agency Name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Philippe R. Scholtès Managing Director Programme Development and Technical Cooperation (PTC) UNIDO GEF Focal Point		07-28-2016	Tonilyn P. Lim Industrial Development Officer PTC/ENE/RRE 	+43-1- 260263847	t.lim@unido.org

⁴¹ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF
GEF6 CEO Endorsement /Approval Template-Dec2015

LIST OF ANNEXES:

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ANNEX A: PROJECT RESULTS FRAMEWORK

(Either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Please note that since this project is a child project under a larger GEF Programmatic Approach entitled “Sustainable Cities Integrated Approach Pilot”, the below project results framework has been created in line with the project, as well as program requirements that were provided by the World Bank as a lead program agency.

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
1. To promote an integrated approach to urban planning and management that is guided by evidence-based, multi-dimensional, and broadly inclusive planning process that balance economic, social and environmental resource consideration;	Direct energy savings and substitution with renewable energy	0 GJ annually	121,617 GJ annually saved 2,286,393 GJ over the lifetime of investments 34,043 MWh RE produced 680,850 MWh RE produced over the lifetime of investments	Project progress report	Assumes scale up of smart meters and electric vehicles within Melaka and elsewhere
2. To build awareness and institutional capacity, and promote investment in climate risks mitigation technologies through demonstration projects	Lifetime GHG emission reductions	0 tonnes CO ₂ reduced	43,736 tonnes CO ₂ reduced annually 849,300 tonnes CO ₂ reduced over the 20-year lifetime of investments	Demonstration projects validation reports	
	Indirect GHG emission reductions	0 tonnes CO ₂ reduced	3.5 million tonnes CO ₂ reduced – bottom up estimate 4.3 million tonnes CO ₂ reduced – top-down estimate	End-of-project impact report	
Component 1: Integration of climate risks in urban planning and management					

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
Outcome 1.1 National urban policy framework strengthened to promote sustainable and resilient cities model/ Improved planning and increased knowledge and partnerships on sustainable cities and climate resilience at multiple levels	<u>SC IAP Indicator 1</u> Number of cities exhibiting projects with integrated, multi-sector sustainability planning	A number of fragmented sector-focused policies on green urban development exist but no specific integrated sustainable city master plans have been developed by city municipalities in Malaysia;	At least 1 sustainable city master plan proposed for endorsement by stakeholders	Official documents	National authorities are willing to adopt specific regulations;
	<u>SC IAP Indicator 2</u> Number of cities have integrated resilience consideration into their planning process	There are no cities with integrated resilience practices within planning process at the moment	At least 1 city integrated resilience practices into their planning process	Technical reports/Project progress reports	Local authorities understand importance and are willing to integrate such practices;
	<u>SC IAP Indicator 3</u> Number of cities with meaningful engagement of multiple stakeholders in planning and implementation of the projects supported by the IAP	Limited scope of Stakeholders involved in planning and implementation of sustainability plans	Multiple groups attend the stakeholder engagement events at the design and/or implementation stages, and the events complement or enhance the local authority's established process for stakeholder engagement	Stakeholder map identifying the relevant stakeholders with corresponding engagement strategies is prepared	Stakeholders agree to the adoption and implementation of sustainable city master plan
	<u>SC IAP Indicator 4</u> Number of cities with improved tracking systems and enhanced capacity for measuring local and global sustainability indicators	The existing practices do not address sustainability indicators.	Developed manual for collecting and analysing sustainability indicators at city level	Manual	Local authorities are willing to apply manual within their work;

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
	<u>SC IAP Indicator 6</u> Number of cities that have learned about best practices for municipal financial management and financing for sustainability	The cities have low understanding of the best practices for municipal financial management and sustainability	At least 3 cities' representatives received knowledge	Evaluation reports, Survey, Event reports	Interest by stakeholders to participate in trainings/workshops
	<u>SC IAP Indicator 9</u> Number of institutions and city-based networks engaged with IAP at the local, regional and global level as partners	No institutions institutions or city-based networks engaged with IAP	At least 3 institutions and city-based networks engaged	Evaluation reports, Survey, Event reports	Interest by stakeholders to participate in trainings/workshops
Outcome 1.2 Investments in pilot cities generate local and global environmental benefits	<u>SC IAP Indicator 7</u> Number of cities where investment projects have incorporated sustainability indicators or factors	No city project on low-emission and environmentally sound technologies implemented under SC-IAP	Two (2) to three (3) city demonstration projects on low-emission and environmentally sound technologies, incorporating sustainability indicators or factors, implemented under SC-IAP	Project reports; Physical verification of installations; Operations records	Techno-economic feasibility of projects established; Appropriate contractors / technology suppliers found; Project execution modality agreed between UNIDO and executing agency
	<u>SC IAP Indicator 8</u> Funds leveraged to support the investment flow to urban sustainability in the IAP projects	No business models / contractual agreements established under SC-IAP	2-3 business models / contractual agreements established in the 2-3 investment projects	Project reports, Contracts	Co-financing for the projects can be sourced from government, banks and private investors
Output 1.1.1.: National & state policies and strategic direction for development of sustainable and resilient cities improved/developed; supported by enabling programs (funding models, green procurement, PPPs, etc.) & projects					
Local counterparts supported to develop integrated sustainable city master plan	Developed national framework for sustainable city development	A number of fragmented sector-focused policies on green urban development exist but no specific	1 national framework for sustainable city development	Official documents	National

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
		integrated sustainable city master plans have been developed by city municipalities in Malaysia			authorities are willing to adopt specific regulations
National and state counterparts supported to develop policy papers and incentive schemes on RE-integrated smart grid.	Developed enabling policy frameworks	There are smart grid initiatives of TNB and GEF-UNDP GTALCC projects in Melaka. The project will leverage ongoing initiatives and allow for scaling up smart-grid developments through development of enabling policies.	10% increase of expected smart grid applications	Technical reports/ Project progress reports	National authorities are willing to adopt national framework for smart-grid
Output 1.1.2.: Institutional capacity of policy-makers at the national, state and local levels built					
Training programmes for federal level authorities	Number of workshops and seminars organized.	No comprehensive trainings on integrated sustainable urban planning and management.	At least 1 training on integrated, evidence-based and inclusive sustainable city planning and management including formulation of master plans conducted.	Training reports/Project progress reports	Availability and willingness of counterparts to receive training.
	Number of policy makers participated in training courses/ workshops and awareness events on integrated sustainable city development	No national or local policy makers trained	100 policy makers at national state and local levels trained (at least 40 % female participants)	Training and workshop logs	Interest by stakeholders to participate in trainings/workshops
	Number of experts and end-users participated in training courses/ workshops and awareness events on integrated sustainable city development and RE-integrated smart grid.	No experts or end users makers trained	At least 50 experts and 50 end users trained (at least 40% female participants)	Training and workshop logs	Interest by stakeholders to participate in trainings/workshops

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
	Increased Awareness of local policy-makers	Low awareness on RE-integrated smart grid system among equipment vendors, service providers, industry management, and financial institutions	At least 60% of the participating end-users and utilities companies are convinced on the benefits of smart grid	Training and workshop logs	Interest by stakeholders to participate in trainings/workshops
	Increased Awareness of concerned national policy makers at various levels and targeted stakeholders created on integrated, evidence-based and inclusive approach to sustainable city planning and management.	Low awareness on integrated, evidence-based and inclusive approach to sustainable city planning and management.	At least 60% of participants feel capable of successfully applying the knowledge/skills	Training and workshop logs	Interest by stakeholders to participate in trainings/workshops
Capacity building events at federal, state & local levels	Number of events	Capacity building activities on sustainable city development are limited and fragmented, For instance, GEF-UNIDO IEEMMS project implements capacity building activities in the field of Energy Management Systems and energy system optimization.	1 Targeted training courses for end-users, private sector, academia and civil society to promote integrated approach to sustainable city development; 1 Training course on costs and benefits analysis on smart grid-related investment; RE-integrated smart grid, solar powered EV charging stations, energy efficiency and RE applications in buildings	Event reports/ Project progress reports	Availability and willingness of counterparts to participate.
Training courses for local authorities	Number of workshops and seminars organized.	There are only a few demonstration projects on smart-grid in few locations in Malaysia, e.g. Melaka, Johor, Putrajaya. The institutional capacity of local authorities remains limited and not sufficiently	At least 1 RE-integrated smart grid training conducted; on data analysis and management on sustainable city development and on data collected from	Training reports/ Project progress reports	Availability and willingness of counterparts to receive training.

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
		addressed within the other demonstration projects.	smart grid.		
Output 1.1.3.: Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project					
Increased Awareness of smart-grid stakeholders and consumers	Developed and implemented education and outreach programme	The state government has a programme to promote electric cars and scooter, but generally there is Low awareness on benefits of smart-grid among consumers and stakeholders.	At least 5 awareness raising events on RE-integrated smart grid organized (at least 40% female participants)	Evaluation reports, Survey, Event reports/	Availability and willingness of stakeholders to attend awareness events;
Increased Awareness of local policy-makers	% of participants reporting that they feel capable of successfully applying the knowledge/skills acquired in their workplace;	Low awareness on RE-integrated smart grid system among equipment vendors, service providers, industry management, and financial institutions	At least 60% of the participating end-users and utilities companies are convinced on the benefits of smart grid	Evaluation reports, Survey, Event reports/	
Facilitated knowledge exchange on sustainable city development	Number of institutions and city-based networks engaged with IAP at the local, regional and global level as partners (IAP Indicator 8)	Limited number of institutions and networks have been engaged with IAP so far	At least 50 companies engaged	Project progress reports	
	Established web portal	There is no specific web-portal on sustainable city development	Published materials on integrated approach for sustainable city development; and RE-integrated smart grid (materials should be gender aware)	Web-portal	

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
	Number of national and regional awareness raising seminars/conferences organized on integrated approach on integrated smart grid organized	Low knowledge on sustainable city practices, lack of information sources and poor information exchange	At least 5 awareness raising events on integrated smart grid organized (at least 40% female participants)	Evaluation reports, Survey, Event reports/	
Output 1.2.1.: The adoption of renewable energy (RE) integrated smart grid facilitated through demonstration activities of distributed RE systems, solar-powered EV charging facilities, battery energy storage, EE and RE applications in buildings and ICT systems					
Integrated smart grid system installed at 3 locations	Location choice and demonstration project design are justified through Review local policies, urban planning and permitting procedures; scope and design project details, assessed social and environmental impact; a detailed cost and benefits analysis, feasible TOU business model etc.	Currently, no due diligence studies conducted for smart grid applications on selected sites in Melaka.	Prepared Due Diligence report	Due Diligence report	Development of smart-grid is supported by local communities and feasible in chosen locations
	Demonstration projects constructed in line with ESMP and technical requirements	The project has not started yet	Successfully performing three installations	Technical reports/ Project progress reports	
Scale up of comprehensive EE/RE measures	Number of consumers (residential and commercial) connected to the smart grid with smart meters	270,000 residential	300,000 residential 110 commercial	Technical reports/ Project progress reports	Development of smart-grid is supported by local communities and electricity company
	Number of commercial buildings implementing BEMS	0 commercial	10 large commercial buildings	Technical reports/ Project progress reports	Continued interest by the public authorities to implement EE in buildings

Project Result	Indicator	Baseline	Targets	Source of verification	Risks and Assumptions
	Capacity of Renewable Energy installed in Melaka	0 MW	30.26 MW of solar PV	Technical reports/ Project progress reports	Commercial interest in investment
	Number of electric vehicles added to the municipal fleet	0	40 buses, 10 cars, and 60 scooters	Technical reports/ Project progress reports	Continued interest by the public authorities to implement EVs
Component 2 Monitoring and Evaluation					
Outcome 2.1 Adequate monitoring and evaluation facilitates smooth and successful project implementation	Project progress reports, mid-term and final evaluation reports submitted on time	The project has not started yet	Implement M&E activities according to standard UNIDO and GEF rules	UNIDO regular project reports Mid-term review Final evaluation	Project monitored and evaluated in line with UNIDO and GEF rules and regulations
Output 2.1.1 - Regular monitoring exercises conducted	GEF PIRs prepared	The project has not started yet	Prepare GEF PIRs on yearly basis	GEF PIRs	Project monitored in line with UNIDO and GEF rules and regulations
Output 2.1.2 - Midterm review and final independent project evaluation conducted	Project mid-term review carried out including submission of GEF Tracking Tools Project final evaluation carried out including submission of GEF Tracking Tools	The project has not started yet	Carry out independent mid-term review in project year 3 Carry out independent final evaluation	Mid-term review report Final evaluation report	Midterm review and final independent evaluation done in line with UNIDO and GEF rules and regulations

ANNEX B: RESPONSES TO PROJECT REVIEWS

(From GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Since most of the comments that were received at the concept level from STAP and Council are referring to the SC IAP program level, the relevant answer from the World Bank as a lead program agency has been provided below. In addition, where applicable, answers relevant to this child project have been included.

GEF STAP

The following Table shows comments on the SC IAP program received from GEF STAP and responses at concept stage.

Comments	Team responses
1. Collective Impact and Stakeholder Engagement	
<p>Acknowledging that in approaching complex environmental problems, stakeholder engagement and collective action is critical. The overarching objective of the PFD document speaks to broad inclusiveness in the pursuit of urban development planning and implementation, stressing a "network" approach to help pull the complex web of urban stakeholders onto a path of united vision and effort (see page 9 of PFD).</p> <p>The strength of many GEF initiatives is typically in the technical and institutional components. Often social science components which can enhance performance of GEF interventions are lacking. It was also recognized that the link between local action and global impacts/benefits in this context must be supported with a clear conceptual framework, such that local intent and action is in step with national, regional and international actions. In addition, many governments marginalize informal settlements in their formal decision-making processes. As such, the IAP should attempt to address this challenge as it may undermine success in other areas.</p> <p>One can compare and contrast the traditional isolated impact approach with the collective impact approach (Kania, J.; Kramer, M. 2011. "Collective Impact". Stanford Social Innovation Review. See also http://www.fsg.org/OurApproach/WhatIsCollectiveImpact.aspx)</p> <p>Isolated Impacts:- Funders select individual grantees that offer the most promising solutions Collective Impacts:- Funders and implementers understand that social problems, and their solutions, arise from the interaction of many organizations within a larger system</p> <p>Isolated Impacts:- Non-profits work separately and compete to produce the greatest independent impact Collective Impact:- Progress depends on working toward the same goal and measuring the same things</p> <p>Isolated Impacts:- Evaluation attempts to isolate a particular organization's impact Collective Impacts:- Large scale impact depends on increasing cross-sector</p>	<p>Within the project context, Sustainable-City Development in Malaysia project will ensure wide stakeholder engagement and entail the coordination of objectives and programmes among different city stakeholders (e.g., citizens, government, CSOs and the business sector), as well as the development of linkages between and within socioeconomic sectors and activities.</p> <p>Social, economic, environmental and governance components will be integrated part of sustainable city planning, and active participation of all stakeholders will be sought at the local and national level, as well as, at the global level, mainly through the coordination and contribution to the activities of the Global Platform for Sustainable Cities (GPSC).</p> <p>The GPSC acknowledges the important role that stakeholder engagement plays in urban change and has been designed in such a way to ensure that all relevant stakeholders will be involved in the GPSC's design and implementation process. The Program-Level Results Framework measures stakeholder engagement in the design and implementation of IAP child projects (Indicator 3: Number of cities with meaningful engagement of multiple stakeholders in planning and implementation of the projects</p>

Comments	Team responses
<p>alignment and learning among many organizations</p> <p>Isolated Impacts:- Large scale change is assumed to depend on scaling a single organization</p> <p>Collective Impacts:- Corporate and government sectors are essential partners</p> <p>Isolated Impacts:- Corporate and government sectors are often disconnected from the efforts of foundations and nonprofits</p> <p>Collective Impacts: - Organizations actively coordinate their action and shared lessons learned.</p> <p>Over time the GEF has moved towards the collective approach, though it could be made more comprehensive and better embedded in GEF operations. Collective impacts provide a significant shift away from the traditional paradigm of "isolated impact," because the underlying premise of collective impact is that no single organization can create large-scale, lasting social change alone. This has been transposed to tackling environmental problems as well, since the social issues actually heavily influence success in tackling environmental problems at scale even where there are technological solutions available. Typically there is no "silver bullet" solution to systemic problems, and these problems cannot be solved by simply scaling or replicating one organization or program.</p> <p>Collective impact is best employed for problems that are complex and systemic rather than technical in nature. Collective impact initiatives are currently being employed to address a wide variety of issues around the world, including education, healthcare, homelessness, the environment, and community development. Many of these initiatives are already showing concrete results, reinforcing the promise of collective impact in solving complex social problems.</p> <p>This gradual change in thinking has been well researched, culminating in 2011 with the publishing of a critical article by Kania et. al (2011), which, based on evidence of success and failure in tackling complex and systemic problems, was able to devolve five conditions of collective impact success.</p> <p>Conditions of Collective Impact Success</p> <p>Collective impact is more rigorous and specific than collaboration among organizations. There are five conditions that, together, lead to meaningful results from collective impact:</p> <ol style="list-style-type: none"> 1. Common Agenda: All participants share a vision for change that includes a common understanding of the problem and a joint approach to solving the problem through agreed-upon actions. 2. Shared Measurement: All participating organizations agree on the ways success will be measured and reported, with a short list of common indicators identified and used for learning and improvement. 3. Mutually Reinforcing Activities: A diverse set of stakeholders, typically across sectors, coordinate a set of differentiated activities through a mutually reinforcing plan of action. 4. Continuous Communication: All players engage in frequent and 	<p>supported by the IAP).</p> <p>To ensure that the GPSC achieves a lasting, collective impact, the GPSC will coordinate and collaborate with the relevant entities working in the larger web of urban sustainability. Working within this larger web, the GPSC will actively coordinate its actions to complement and build off of current work, actively seeking to communicate and align initiatives—as demonstrated by the Joint Deliverables section of the PCN. The GPSC, the implementing agencies, and the participating cities will deliver a set of joint activities at the city-level, focusing on geospatial data/tools, indicators, urban planning, and urban finance. To achieve this, the GPSC will have to actively partner with the implementing agencies, international organizations and networks, local governments, civil societies, and the private sector.</p> <p>The design of the GPSC endeavors to encompass the right conditions for a successful collective impact:</p> <ol style="list-style-type: none"> 1. Common Agenda/Framework: The objectives of the GPSC are to (i) provide a platform for knowledge sharing and learning on an integrated approach to urban planning and management, (ii) create a space for networking and learning among cities and relevant organizations on issues related to urban sustainable development, and (iii) support the participating cities' work on evidence-based urban planning with the aim of forging an agreed-upon common vision and approach to urban sustainability. The Joint Deliverables at the city-level attempt to co-align actions and approaches. The Joint Deliverables framework will focus on urban indicators

Comments	Team responses
<p>structured open communication to build trust, assure mutual objectives, and create common motivation.</p> <p>5. Backbone Support: An independent, funded staff dedicated to the initiative provides ongoing support by guiding the initiative's vision and strategy, supporting aligned activities, establishing shared measurement practices, building public will, advancing policy, and mobilizing resources</p> <p>The STAP has consulted with the US Department of Housing and Urban Development on their experience in applying this approach to their urban projects, and they reported significant improvements in accomplishment of project objectives that this model is endorsed by the White House council for Community Solutions. A follow-up study and updated guidance was also published in the Stanford Social Review in 2012 to highlight successes of the performance of initiatives by various municipalities as well as large private sector and CSO entities and foundations (eg. UN GAIN, Communities That Care, Calgary Homeless Foundation, Bill and Melinda Gates Foundation, AVINA).</p> <p>STAP has passed on information to the lead agency regarding experts in this area who could be consulted as the program document is further developed, along with the Global Knowledge Platform and other child projects. Indeed the Capacity Building subsection of the Global Platform document (see page 9 of the concept note) discusses how to overcome the cacophony of local city decisions that can threaten a united development path. Also in terms of the Global Knowledge platform, there can be support provided to all involved to show how they can be involved in the collective impact community (http://www.collectiveimpactforum.org/). This approach does seem to be emerging as the definitive way in which private and public entities (including funding bodies) are tackling complex social and environment problems, including leveraging and sourcing funding. Also in its favor is the fact that there has been high level, peer-reviewed research involved in devolving these principles for stakeholder engagement.</p>	<p>and geospatial data/tools, urban planning, and urban finance at the city-level.</p> <p>2. Shared Measurement: All participating cities will share a common urban sustainability framework for selecting indicators and geospatial datasets that are relevant to the city's contexts. In addition to this shared framework, participating cities will be encouraged to adopt core common indicators that reflect progress made towards UN SDG 11. The GEF Tracking Tool and Program-Level Results Framework will be tracked across all 11 child projects at the program-level to measure and report the progress of each child project.</p> <p>3. Mutually Reinforcing Activities: The PCN of the GPSC indicates the type of coordinated activities that will be offered through collaboration with urban think tanks, networks, and implementing agencies. Cities interested in participating in Joint Deliverables will develop a city-specific work program outlining a set of differentiated activities around the GPSC framework.</p> <p>4. Continuous Communication: The GPSC holds a monthly conference call with all implementing agencies to ensure frequent and structured open communication to build trust, assure mutual objectives, and create common motivation. In addition, GPSC will conduct active and inclusive city-level consultations with the implementing agencies to define a relevant city-level work program.</p> <p>5. Backbone Support: The GPSC will provide ongoing support by</p>

Comments	Team responses
	guiding the initiative's vision and strategy, supporting aligned activities, establishing shared measurement practices, building public will, advancing policy, and mobilizing resources.
2. Results Framework	
<p>Looking at the PFD document, to measure a city's "increased scope and depth of integrated urban sustainability planning management policies" will be challenging against a baseline, as will the other proposed metrics. So the rating system alluded to in Component 1 will be a critical part of the M&E framework and methodology. Similarly for Component 2 the proposed core performance framework is difficult to understand without putting the concept into practice. A few details are provided in the M&E section on page 24 but there remain many uncertainties as to how this will be achieved in practice given the wide variations between cities as is evident from the section outlining the Child projects.</p> <p>On the issue of process indicators, one might be included to measure the extent of stakeholder engagement as it is so critical to the IAP success. The aim of the IAP pilot to "ensure broad engagement with stakeholders across a city" is commendable, as is having a process-focused indicator to measure change over the life of the IAP program. Indeed the 5 conditions of success of the Collective impact model could be used as a ratings system based on increasingly comprehensive permutations of these criteria, with a 1 rating meaning perhaps only 1 condition is being met, and 5 meaning all have been met. This is also an important aspect of learning from, and ultimately capitalizing on, the IAP experience to determine best practices in stakeholder engagement, and other processes that may be identified as critical, foundational actions for Cities integrated projects.</p> <p>STAP does not question the need for selected Cities to have some latitude in selecting indicators for their locally specific work. However, there should be an assessment process or preferably a common conceptual framework to ensure that the indicators selected are appropriate to measure the areas of performance critical to the specific interventions, relevant to the overall IAP knowledge needs, benchmarking, and comparability. Indeed the PFD and Global Knowledge Platform documents both cite a medium level risk of lack of alignment between child projects and overall program goals. <u>A comprehensive, suite of locally specific indicators might be achieved through use of a common conceptual framework such that all projects would use similar criteria in determining if the suite of indicators selected covers all the critical areas to be monitored.</u> STAP has developing a similar process for socio-ecological systems, and application of it under the Food Security IAP is already underway. This approach could also be used in the Cities IAP as the program develops.</p> <p>STAP welcomes the opportunity for research on other urban sustainability indicators, and hopes that work for instance on urban metabolism indicators can be included going forward. In addition, in order to contribute to the GEF</p>	<p>The GPSC aims to support cities in developing or adopting an evidence-based, integrated approach toward resilient and sustainable cities. As such, the GPSC will lead the development of a comprehensive framework that supports cities in choosing among a suite of locally-specific indicators based on common criteria. As part of the Joint Deliverables, cities wishing to enhance their capacity for measuring urban sustainability will receive guidance on selecting and implementing a set of locally relevant indicators. This work will be part of the GPSC's work towards enhancing a city's capacity for an evidence-based planning approach that is not tied to the duration of the program.</p> <p>Separate from the city-level work on indicators, the GPSC, as a child project of the SC IAP, has developed a results framework to evaluate its progress as a knowledge platform during the duration of the program.</p> <p>At the SC IAP program-level are two results frameworks that attempt to assess the results of all 11 child projects + GPSC: the GEF Tracking Tool and the Program-Level Results Framework.</p>

Comments	Team responses
<p>2020 IAP strategic priority as relates to resilience and adaptation, open source indices for resilience such as the Notre Dame Global Adaptation Index (ND-GAIN) might be consulted as there exists a clear methodology that can assist with indicator selection, data sources, and rationale for indicator selection.</p>	
<p>3. Knowledge Management</p>	
<p>Knowledge Management is a key part of the IAP if the ambition is to widely disseminate information from lessons learned to other cities. STAP welcomes the Global Knowledge Platform as a key component of this effort. STAP looks forward to engaging with this component of the IAP going forward.</p> <p>The PFD makes reference to the importance of comprehensive, evidence-based planning, and states that the IAP is "designed to function as proof of concept". The Global Knowledge Platform, however, emphasizes a construct that speaks to swapping of information between Cities, but reporting nothing back to the GEF and its donors to indicate whether investment was impactful or not. The difference between information gathering and knowledge generation is not clearly delimited, and there is no indication of any plans to develop overarching knowledge questions into a centralized Knowledge Management Strategy for the IAP and then the GEF. (For example: What are the overarching knowledge goals of the IAP? In what ways did the IAP contribute to the GEF 2020 strategic vision? Is the sum of the outputs of the child projects likely to contribute to overall outcomes and ultimately the overall objective of the IAP? What are the best conditions for successful investment?). Developing a Knowledge Management strategy will help inform the Results Framework such that indicators utilized will need to be as objective as possible, and quantifiable where feasible. Without such an approach resulting in clear information flows back to the GEF partnership, including its donors, there will be no way for any objectively derived conclusions to be made about why an intervention succeeded or failed, nor to capture best practices for replication and scale-up. This is critical to any pilot activity, and the STAP wishes to re-emphasize this point because it was made during the consultations.</p> <p>There should also be consultation between the authors of the upcoming STAP and GEF Sec papers on Knowledge Management in the GEF to help organize this area of the IAP. In addition, consultation with the Knowledge Management mechanisms as proposed in the other IAPs should be encouraged.</p>	<p>The project will seek sharing of best practices through national and international events that will be organized by the project, as well as Global knowledge platform of the IAP.</p> <p>Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects. A web portal will also be established to create awareness and disseminate outputs of the project. Finally, there will be a two-way flow of information between this project and other projects of a similar focus, as well as with the GPSC.</p> <p>The GPSC fully acknowledges the wide range of ongoing initiatives and currently existing knowledge on urban sustainability and does not attempt to duplicate them. In addition to serving as a platform for knowledge sharing, it endeavors to compile lessons learned from the child projects and promote innovation through collaboration and knowledge exchange. Case studies on each city will be created at the end of the program to evaluate whether the knowledge positively affected the urban processes and systems. Given the limited budget and timeline, it is unlikely that the GPSC will be heavily engaged in knowledge creation activities but rather it will prioritize knowledge</p>

Comments	Team responses
	curation and sharing through its platform.
4. Program Structure	
<ul style="list-style-type: none"> Number of Pilot Cities <ul style="list-style-type: none"> While STAP typically does not comment upon funding aspects of projects, it can raise questions related to incremental cost reasoning and expected contributions from the baseline. Based on the PFD child project descriptors, as well as Table C of the PFD, it is clear that agencies have wisely targeted cities with ongoing urban sustainability initiatives and investment, and the co-financing arrangements appear robust. However, with each country averaging around \$2M per city from the IAP set-aside, even with the STAR country allocations it is uncertain if the GEF funding spread across 23 cities can trigger the incremental globally beneficial action of improving "the depth, breadth, and quality of local sustainability planning efforts and investment decisions,". For example, are resources sufficient to significantly develop resilience to future extreme events including climate change impacts? The increase in number of pilots expected also further reconfirms the need for streamlined stakeholder engagement processes, indicator assessment and knowledge management. Link to other IAPs <ul style="list-style-type: none"> A review of child projects indicates potential opportunities for linkages with other IAPs (e.g. South Africa's Johannesburg project has a clear component for food (in) security). It would be useful to explore these possibilities for engagement in this case, as this could present interesting learning opportunities on urban-periurban-rural interactions. Other examples may exist in the portfolio. 	<p><u>Number of Pilot Cities:</u></p> <ul style="list-style-type: none"> We agree that the funding is not enough to achieve the desired change and suggest tempering expectations. The funding is simply insufficient to achieve the long-lasting, in-depth change to which the Pilot Program professes to aspire. Taking a more realistic approach given the limited budget can help direct the limited budget to key priorities instead of trying to overcommit. The Joint Deliverables approach attempts to address this by dedicating resources to jointly-agreed upon actions at the city-level. The GPSC will also rely upon existing initiatives to leverage the knowledge and resources of entities currently working on the urban sustainability agenda. <p><u>Link to other IAPs:</u></p> <ul style="list-style-type: none"> We will recommend to the South Africa child project that synergies with the IAP on Food Security be sought.
5. Miscellaneous Comments	
<ul style="list-style-type: none"> Table C of PFD <ul style="list-style-type: none"> The Table C of the PFD makes it very difficult to assess the precise municipalities to be covered in each country, and therefore to align with the city names laid out in the text of the report. There are also several instances of acronyms used without explanations. Section E of PFD: "Program's target contributions to GEBs" <ul style="list-style-type: none"> The only relevant target shown is the mitigation of 106,669,069 metric tons of GHG emission reductions. There should be some clarification as to how this figure was reached, especially given the various emission factors that differ widely between each city's energy and electricity sources. Direct and indirect emissions are included. Was this estimate made using the old GEF definition for "indirect" which is under review? For cities to be able to track their own GHG emissions will 	<p><u>Table C of PFD:</u></p> <ul style="list-style-type: none"> We agree that there has been confusion about the precise municipalities to be covered in each country. Currently, we have identified 27 participating cities: Xalapa, La Paz (Mexico), Campeche, Recife, Brasilia, Johannesburg, Abidjan, Vijayawada, Guntur, Bhopal, Jaipur, Mysore, Melaka, Saint-Louis (Senegal), Greater Dakar (Diamniadio Industrial Park), Guiyang, Shenzhen, Ningbo, Nanchang, Beijing, Tianjin, Shijiazhuang, Lima, Asuncion, Hue, Ha Giang, and Vinh Yen. <p><u>Section E of PFD:</u></p>

Comments	Team responses
<p>require a standard method offered as detailed guidelines if there is to be any real benefit from benchmarking and having a common baseline. For example, accounting for road/rail/air traffic passing through a city requires a common boundary to be used. STAP realizes that there has been much good work already done on identifying indicators, but questions whether it will be possible to produce a set of practical guidelines in time for practical use by the pilot cities as they begin their programs.</p> <ul style="list-style-type: none"> Program Challenges <ul style="list-style-type: none"> Under the "Global Coordination and Knowledge-Sharing Platform" section, there are many activities listed. Acknowledging the short time line that the agency has had to outline potential activities, there should be attention paid to the planning, timelines and quantification of the human and other resource issues needed for enabling a city/municipality to participate actively and make a useful contribution. It is a very ambitious program, covering 23 pilot cities, and as noted by the authors, continual turnover of local government officials (and of elected representatives) will make capacity building particularly challenging. Further, the 23 pilot cities outlined in the PFD have very different issues to cope with. This will add challenges to the services to be provided using the various joint activities as planned. 	<p>- Given that many cities use various GHG emissions methodologies, it was agreed at the first GPSC meeting in March 2016 that though there will not be a standard methodology, participating cities will be required to report their target contributions to GHG emissions according to internationally accepted methods and to disclose their methodology.</p> <p><u>Program Challenges:</u></p> <p>- We acknowledge that the SC IAP program poses many challenges and have tried to address the details of planning and timelines in our PCN. We are sensitive to resource constraints of cities and are in continued conversation with the implementing agencies to ensure that enough resources are allocated to ensure the successful participation of cities in GPSC activities throughout the duration of the program. The GPSC will focus on shared themes and common challenges of the participating cities in GPSC learning activities and products.</p>

GEF Council

The following Table shows comments on the SC IAP program received from Council members (Canada, France, Germany, and USA) and responses at PIF stage.

Comments	Team responses
1. GPSC v. Existing Initiatives	
<p>The proposal has parallels to the very successful Cities Development Initiative Asia (CDIA, with parallel funding from BMZ and ADB), which supports medium sized Asian municipalities in infrastructure projects development and access to finance (from development banks and private sector). It needs to be ensured that this project can learn from CDIA's experiences and success factors. [Germany]</p> <p>The PFD provides too few details of the activities the program will support and how they will differ from those of other organizations that are developing similar sustainable cities-focused programs. We expect that the</p>	<p>We acknowledge the importance of learning from existing initiatives and will work closely with Cities Development Initiative Asia as well as other entities working on the urban sustainability agenda to avoid duplication of efforts and to leverage their knowledge and expertise in certain fields. The GPSC is unique among existing initiatives in that it works to operationalize the knowledge shared and learned in the fully-funded projects of the 27 pilot cities. The immediacy in impact is a rare opportunity for urban practitioners to translate the learned knowledge into a better designed and implemented project. In addition, as a knowledge platform, the GPSC is able to help cities navigate the overwhelming amount of initiatives and</p>

Comments	Team responses
<p>PFD will be modified to respond to STAP comments, and look forward to reviewing the child projects for this program prior to GEF CEO Endorsement. [USA]</p>	<p>knowledge on urban sustainability. The GPSC can also serve as a global network for collaborative engagement on the urban agenda. In addition, the GPSC can contribute to the implementation of the SGD goals. The GPSC concept note outlines the types of activities the program will support.</p>
<h2>2. Common Framework & Scope</h2>	
<p>The project will contribute to promote among participating cities an approach to urban sustainability that is guided by evidence-based, multi-dimensional, and broadly inclusive planning processes that balance economic, social and environmental resource considerations.</p> <p>We globally support this proposal but we would like to underline the following points.</p> <p>Indeed, regarding the aim of the project and its thematic and geographical (11 countries) scope, it seems that :</p> <ul style="list-style-type: none"> - the common methodological framework could be strengthened by systematically conducting vulnerability studies on hydrological, environmental and socio-economic aspects. These studies will notably allow to take into account resilience and adaptation to climate change; - the common framework of knowledge capitalization must be more precise ; - the issues of urban mobility, in particular in Abidjan, might benefit from the application of innovative planning tools based on analysis of Big Data that have already been tested in these contexts. <p>Opinion: Favorable provided the above comments are taken into account in the design phase. [France]</p> <p>While we recognize that multidimensionality is an aspect of the program, it may be useful to limit the variables for each city. This would make the information more comparable, make it easier to assess overall objectives of the program, and facilitate the exchange and dissemination of knowledge. [Canada]</p>	<p>We agree that a common framework is key, given the wide range of thematic and geographic scope of the program. As such, the GPSC proposes an integrated approach based on 4 components: (i) indicators for urban sustainability and geospatial data/tools, (ii) urban planning, (iii) urban finance, (iv) partnerships and engagement. Within this framework, each interested city will develop a roadmap to sustainability.</p> <p>We agree that a systematic assessment of the cities will help given the vast thematic and geographical scope of the program—the GPSC will develop a common assessment framework that may include vulnerability studies. Through these assessments, a more tailored, city-specific action plan will be developed as one of the possible Joint Deliverables. The GPSC will serve as a knowledge repository as well as a collaborative forum where knowledge can be accessed and shared. Case studies of the participating cities will also be developed at the end of the program.</p> <p>We agree with the suggestion of using Big Data in understanding urban mobility issues and look forward to investigating that modality with the Abidjan child project as part of the Joint Deliverables.</p> <p>We agree to limiting the variables for each city for ease of implementation and evaluation and will endeavor to keep this in mind.</p>
<h2>3. Risks</h2>	
<p>The scope of this IAP will make it difficult to sufficiently finance and manage, and it is uncertain that funding and resources spread across 23 cities will result in the desired beneficial outcome for improving local sustainability planning efforts. Please strengthen the proposal to show how these risks will be mitigated. [Canada]</p>	<p>We agree that the funding is not enough to achieve the desired change and scope of the program. Taking a more realistic approach given the limited budget can help direct the limited budget to key priorities instead of trying to overcommit. The Joint Deliverables approach attempts to address this by dedicating resources to jointly-agreed upon actions at the city-level: the GPSC, the implementing agencies, and the participating cities will deliver a set of</p>

Comments	Team responses
	<p>joint activities at the city-level, focusing on geospatial data/tools, indicators, urban planning, and urban finance. More details on this approach can be found in our Concept Note.</p> <p>The GPSC will also rely upon existing initiatives to leverage the knowledge and resources of entities currently working on the urban sustainability agenda.</p> <p>We acknowledge that the SC IAP program poses many challenges and have tried to address the details of planning and timelines in our Concept Note. The GPSC will also focus on shared themes and common challenges of the participating cities in GPSC learning activities and products.</p>
4. Miscellaneous	
<p>Please clearly outline the methodology for this IAP, including: the criteria used to choose cities; and, the criteria that will be used to measure the effectiveness, efficiency, budgetary cost, and level of stakeholder engagement involved within each child project. [Canada]</p> <p>We note that sound management of harmful chemicals and wastes in urban environment is an expected outcome of the IAP. This link should be strengthened in the project proposal, as only two cities identified chemicals and wastes management as a dimension of their project. We propose that more emphasis be placed on the objective of developing “the enabling conditions, tools and environment for the sound management of harmful chemicals and wastes” within all pilot cities proposals, and more detail be included as to how this objective would be met. [Canada]</p>	<p>The Sustainable Cities Integrated Approach Pilot (SC IAP) is an integrated program consisting of two tracks: (a) City-level projects in 27 cities across 11 countries, with around US\$140 million in GEF grant funding. Each country is supported by one or several implementing agencies to manage the various projects in the participating cities. (b) The Global Platform for Sustainable Cities (GPSC), led by the World Bank with US\$10 million in GEF grant funding. The GPSC is a knowledge platform that ties all participating cities together and creates a collaborative space for cities aspiring towards sustainability to engage with entities already working in the urban realm.</p> <p>Within this framework, it is important to clarify that the World Bank is the lead organization for the GPSC track. However, the World Bank did not play a major role in defining the “methodology for this IAP” (i.e. the criteria used to choose the cities, etc.) nor in defining the scope of each project in all pilot cities.</p> <p>Taking into account the limited financial recourses, within the context of Malaysia child project, the project priorities and interventions have been defined through extensive consultations with the national stakeholders, and have been built on the baseline situation in the country, to ensure sustainability and scale up of the project interventions and results.</p>

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁴²

During the PPG, relevant baseline studies, as well as a number of consultative meetings with key stakeholders to identify barriers and issues were conducted. A national workshop for scoping of the project was held on 26 November 2015 which was attended by more than 80 participants. A national steering committee meeting was also held on 22 March 2016 for the validation and endorsement of the proposed project outputs and activities. In addition, during the PPG, Environmental and Social Management Plan (please see annex P), preliminary Gender Analysis (please see Annex P) and detailed calculation of GEBs (please see annex J) were prepared.

A. Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: 91,743			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent Todate</i>	<i>Amount Committed</i>
Benchmarking/GPSC Activities	25,000	3,798	30,367
Studies / Preparation of Project Documents	38,553	30,356	
Project Coordination / Communications	28,190	27,222	
Total	91,743	61,376	30,367

⁴² If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities. Agencies should also report closing of PPG to Trustee in its Quarterly Report.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (IF NON-GRANT INSTRUMENT IS USED)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF Trust Funds or to your Agency (and/or revolving fund that will be set up)

N/A

ANNEX E: MONITORING AND EVALUATION

Project Start

A Project Inception Workshop will be held within the first three months of project start with those with assigned roles in the project organization structure. The Inception Workshop is crucial for building ownership for the project results and for planning the first year annual work plan. The Inception Workshop should address a number of key issues including:

- Understand objectives & other outputs and activities;
- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNIDO and of the project stakeholders vis-à-vis the Project Management Unit. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting, communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed;
- Based on the project results framework and the relevant GEF Tracking Tools, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks;
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements; the M&E work plan and budget should be agreed upon and scheduled;
- Discuss financial reporting procedures and obligations, and arrangements for annual audit;
- Plan and schedule Project Steering Committee meetings; roles and responsibilities of all project organization structures should be clarified and meetings planned. The first NSC meeting should be held within the first 12 months following the inception workshop.

The Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided upon during the meeting.

Half-Year reviews

Will consist of:

- Summary of progress made during the most recent six-month period;
- Based on the initial risk analysis submitted, the risk log shall be regularly updated. Risks become critical when the impact and probability are high;

Annual review

Annual Project Review/Project Implementation Reports (APR/PIR): These key reports are prepared to monitor progress made since project start and in particular for the previous reporting period. The APR/PIR includes UNIDO/GEF requirements and includes, but is not limited to, reporting on the following:

- Progress made toward project objective and outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Project outputs delivered per project outcome (annual);
- Lessons learned/good practices;
- AWP and other expenditure reports;
- Risk and adaptive management;

UNIDO will conduct visits to project sites based on the agreed upon schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the NSC may also join these visits.

Mid-term of project cycle

The project will undergo an Mid-Term Review at the mid-point of project implementation. The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after

consultation between the parties to the project document. UNIDO Quality Monitoring Division will support the execution of the midterm evaluation. The Terms of Reference for this Mid-term review will be prepared by the Project Management Team and the management response and the evaluation will be uploaded to the UNIDO Evaluation Group website.

End of project

An independent Final Evaluation will take place three months prior to the final NSC meeting and will be undertaken in accordance with UNIDO and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNIDO Evaluation Group. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response. The GEF Focal Point will be involved in this Final Evaluation.

ANNEX F: TIMELINE OF ACTIVITIES:

Output	Year 1				Year 2				Year 3				Year 4				Year 5			
1.1.1 National & state policies and strategic direction for development of sustainable and resilient cities improved/developed; supported by enabling programs (funding models, green procurement, PPPs, etc.) & projects:																				
• Policies, legislations and regulations and enforcement systems for SCD strengthened at national, state and local levels;																				
• National Guidelines and Framework for SC Master Plan and Sustainable Melaka City Master Plan developed;																				
• Smart grid regulatory framework developed																				
1.1.2. Institutional capacity of policy-makers at the national, state and local levels built:																				
• Training programmes on sustainable city development, master plan formulation conducted																				
• Training programmes for smart grid initiatives conducted																				
1.1.3. Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project																				
• Awareness activities on sustainable city development conducted																				
• Smart grid awareness and consumer engagement programmes conducted																				
1.2.1. The adoption of renewable energy (RE) integrated smart grid facilitated through demonstration activities of solar-powered EV charging facilities, battery energy storage, EE and RE applications in buildings and ICT system.																				
• Smart grid demonstration at Melaka Sentral prepared and completed																				
• Smart grid demonstration at Hang Tuah Jjaya prepared and completed																				

ANNEX F.1: TIMELINE OF OUTPUT 1.2.1. SMART GRID DEMONSTRATION

No	Stage of Implementation	Details	YEAR 1				YEAR 2				YEAR 3			
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
1.	Pre- project + Scoping & Implementation Study + Technical Spec Evaluation +RE Quota + Pre Design & Costing + Procurement SOP	Scoping, Formation Technical Committee												
		Project Cost Plan & Co- fund mechanism												
		Best Available Technologies & Practices												
		Site Selection												
2.	During Project + Energy Efficiency + TOU & Metering + Energy Storage + Solar PV + EV Charging + Solar Thermal + Retrofitting + Server Connection	Auditing, Installation, GIC, Testing & Commissioning												
		Technical Performance												
		Site Supervision												
		*Progress Payment												
3.	Post Project	Measurement & Verification												
		Defect Liability Period (DLP)												
		Launching & Handing over												

ANNEX G: URBAN PLANNING GUIDELINES PREPARED BY JPBD





No.	Planning Guidelines	Overview
1	Gated Community & Guarded Neighbourhood Planning Guidelines (2010)	The formulation of the Gated Community (GC) and Guarded Neighbourhood Planning Guidelines are to control the existence of these two schemes. The general guidelines include aspects of planning control such as the placement location, minimum wide area, common property facilities, the construction of the wall / fence and the needs of Social Impact Assessment (SIA).
2	Universal Design Planning Guidelines (2011)	The Universal Design Planning Guidelines (The Guideline) published on 15th June 2011 is a revised version of the Facilities Of The Disabled Planning Guidelines published by Ministry of Housing and Local Government in the year 2000. The Guidelines outlined the needs for planning of facilities and designing the urban environment that focused on providing barrier free facilities. The approach of universal design is to integrate urban environment and products, to be accessible to all individuals of all ages and physical abilities, particularly individuals with various impairments, also known as the people with disabilities (PWDs). Thus, the facilities and urban environment shall be provided and designed through an integration concept, accessible, at an ideal location, safe and user-friendly.
3	Outdoor Advertisement Planning Guidelines (2009)	The guideline is prepared to guide the instalment and control of outdoor advertisement uniformly in all local authorities' area.
4	Roof-Top Garden Planning Guidelines (2012)	The Roof-Top Garden Planning Guidelines is a revision to replace the Roof-Top Garden and Development Standards JPBD 2/1997. It was prepared in the early 90s, when the Appeal Board of Penang allowed the provision of roof-top garden as a replacement for landed open space. The Guidelines is prepared to meet the needs in terms of amenity and aesthetics, environment, and economy. In the general guidelines, it is mentioned that the roof-top garden must incorporate elements from Green Building Index (GBI) in support of the National Green Technology Policy and National Policy on Climate Change.
5	Community Facilities Planning Guidelines (2012)	This guideline replaces Community Facilities Planning Guidelines, JPBD, 1997 where one of its purposes is to benefit and service local population toward sustainable living. One of the principles in the guidelines is providing local population with Integrated facilities which are near to the public transport terminals. This is to minimize the movement mode which is in line with our country's target in decreasing carbon emission intensity to 40% by 2020.
6	Theme Park Planning Guidelines (2012)	General guidelines covering aspects of planning control consists of the following 13 aspects such as location selection, site planning, the type of theme parks, area theme parks, planning zones, density control, gaming equipment, support facilities, pedestrian walkways, landscaping, signage, infrastructure and emergency routes. In principle 4.1, it is mentioned that preserving natural resources which includes geotechnical factor such as topography and gradient. The natural resources asset should be the main attraction.
7	Island and Marine Park Physical Development Planning Guidelines (2015)	This planning guideline provides the conditions of minimum planning standards for all type of development in the island and marine park. These conditions aim to preserve and improve the quality of the environment through conserving the flora and fauna and the whole biodiversity of the island and its surrounding area.
8	Heavy Vehicle Terminals Planning Guidelines (2012)	These new planning guidelines for heavy vehicles terminal is formulated to assist the State Local Authority, Local Municipality and heavy vehicle operators in the development of planning and design of heavy vehicles terminal. In terms of planning principles, heavy vehicles terminal should be planned in strategic location with good accessibility. It's also should emphasizes on health and safety, avoiding settlement area and environment friendly.






No.	Planning Guidelines	Overview
9	Golf course Planning Guidelines (2012)	One of the principles in the planning guideline is the Green area to preserve natural beauty by maintaining rows of trees as buffer zone. Presence of water reservoir is needed to water and maintain the grass and landscape.
10	Identification of Brownfield Area Redevelopment Planning Guidelines (2012)	The guidelines are applying the sustainable development concept where 3R (Reduce, Reuse, Recycle) practice to save natural resources which is the soil. This is to decrease the needs to develop new area especially the greenfield areas such as the agriculture land and the forest.
11	Green Neighbourhood Planning Guidelines (2012)	The Green Neighbourhood is an important land use planning concept in green development which is the fundamental of the green growth. Elements that have been taken into consideration in developing a green neighbourhood are passive design building, energy efficient usage, green technology application and etc.
12	Early Child Care and Education Center Development Planning Guidelines (2012)	It is mentioned in principle 6.2.2 that each room needs to be equipped with natural lighting and ventilation systems in accordance to Health Division of Malaysia.
13	Hills and Highlands Development Planning Guidelines (2009)	The Hills and Highlands Development Planning Guidelines were formulated to plan and monitor the development at hilly areas, highlands, hillside and hilltop and the surrounding areas. In the guideline, preserving the sensitive nature such as the flora and fauna and the rivers is important. Other than that, water catchment area should also be preserve to produce high quality of minerals.
14	Back Alley Planning Guidelines (2014)	The guidelines were formulated to help local councils, related agencies and developers to plan and control the back alley preparation in the housing area development scheme so that it will be more systematic and organized to elevate the neighbourhood surrounding quality in fulfilling the needs of the house owners.
15	Special Route Utilities Planning Guideline (2012)	The Planning Guidelines was formulated to help State, Local councils and developer in planning of putting down the special route utilities in development proposal. The guidelines did not encompass utilities network on the ground or on the pole.

ANNEX H: MELAKA GREEN CITY ACTION PLAN (GCAP)

	<p>IMT-GT Green City Initiatives - Melaka was selected under IMT-GT Green Cities Initiative along with Medan (Indonesia) and Songkhla (Thailand). It is collaboration between Economic Planning Unit (EPU) and Asian Development Bank (ADB). With the establishment of Green City Action Plan (GCAP), Melaka has been selected as the Green model city and currently embarking several initial key projects:-</p>
 	<p>Green City Benchmarking and Baseline Indexing The project was done by ADB -CSIRO</p>
	<p>Green House Gas (GHG) Release Inventory It is a collaboration with International Council for Local Environmental Initiatives (ICLEI) to assist Melaka in coming up with inventories and where through this project, Melaka has submitted reports to the United Nations Framework Convention of Climate Change (UNFCCC) at Conference of Parties (COP21) at Paris. The GHG Inventory is using HeatPlus Software. The state of Melaka has been accepted officially as a member of ICLEI on 17 November 2014. The submission of these inventory reports will be carried out in two phases:-</p> <ul style="list-style-type: none"> Phase 1 involves the Melaka State Inventory Phase 2 involves the four Local Councils. <p>A special committee for Melaka Carbon Inventory was set up on 18 January 2014. As of today, Melaka has come out with Melaka State Greenhouse Gas Emission Inventory Report 2013.</p>
	<p>Energy Efficient (EE) State Owned Government Buildings 9 Government buildings have been undergo Energy Audit for the IMT-GT Green City Initiatives Project. Auditing was carried out by Danish Energy Management. The following are the Government buildings under the implementation of the energy efficient audit project:- Seri Negeri Building; Graha Makmur Building; Wisma Negeri Building; Putra Specialist Hospital Building; Graha Maju Building; MITC Complex Building; Majlis Perbandaran Alor Gajah Building Melaka Central uilding; Wisma Air Building Out of these 9 buildings, 3 buildings are now undergo the retrofitting stage through – Putra Specialist Hospital, Wisma Negeri and Melaka Central with the cost of RM20 million. This project is funded by EPU in collaboration with Danish Energy Management.</p>
	<p>The International Green Training Center (IGTC) It is a subsidiary of PTHM which was formed on 21 October 2014. Through this center, PTHM will organize a skilled training using JPK's National Competency Standard & National Occupational Skilled Standard through International Green Training Center (IGTC).the module based on Occupation Structure of the Green Technology Industry. To start with several skills program 1. Green Technology Compliance; 2. Solar Panel Installation; 3. AEMAS Energy Audit and etc. The current temporary campus is at Politeknik Merlimau whereby under the 11th Malaysia Plan, the new campus will be at Klebang.</p>
	<p>Installation of Energy Management Unit on Street Lamp in Melaka A project on installation of Energy Management Unit on Street Lamp had been taken place where 20 EMU equipment had been installed on 23 July 2014. An electrical energy saving reports for 2014 have been produced by the contractor.</p>
	<p>Melaka River Rehabilitation Project Melaka river is becoming a benchmark for river rehabilitation and beautification projects in Malaysia. The effort taken by Melaka Government to beautify the Melaka river has not only managed to turn the river as commodity for tourism but also help mitigate flood issue. This project has received Green Apple Award for the achievement from KeTTHA. There is about 1.2 million tourist ride the Melaka River Cruise boat annually. The second phase of the project was completed in December 2014 which involved 6km stretch.</p>

  	<p>Melaka World Solar Valley (MWSV) Melaka World Solar Valley situated in Rembia sets to be a sustainable city and the catalyst for solar industry. The gazette area of 7,248.43 hectares comprised of various solar development sectors. It is being gazette under the National Physical Planning Council in 2012 by the Federal Dept of Town and Country Planning. The main projects include:- AUO Sunpower Solar Factory – Completed Kumpulan Melaka Berhad (KMB) 5MW Solar Farm – Completed Research, Development, Innovation and Commercialisation Centre (RDIC) - Planning Solar Mosques – Planning Solar lamps, roads, building and many more – Planning Solar Community Project in Taman Rembia Perkasa is the first Malaysia Building Integrated Photo-Voltaic (BIPV) Solar Community Project) The objective of this project is to install solar panel to 400 houses. The home owners only need to provide the roof while the vendor providing all the system. As of to date, 10 houses already completed the installations and feed the electricity to the grid (TNB). The vendor of this PV system is Green Energy Design Solutions Sdn Bhd.</p>
	<p>Hang Tuah Jaya Green City The city is set to be Sustainable Development Green City. All developments and buildings shall comply with building rating certifications i.e. Melaka Green Seal, GBI, LEED, Green Star and Green Mark. The gazette area is up to 2085 hectares of land. Key projects:- PERKESO Rehabilitation Centre – completed in June 2014 8 MW Solar Farm Project. This is the 2nd solar farm in Melaka. It is the biggest solar farm in Melaka for the time being. It is owned by private company Gading Kencana Sdn Bhd. It covers 14 acre land area in Bandar Hang Tuah Jaya – completed in December 2014. Rumah Citra Kasih - Completed in September 2015. Dewan Citra Kasih – Still in the pipeline; F form has been out on 24 December 2014</p>
	<p>Melaka Electric Bus It is the first fully operated electric bus in Malaysia. It has successfully completed 3 month trial in March 2014. The bus is travelling in Melaka World Heritage City. It is owned by Panorama Melaka Sdn. Bhd. It can travel up to 280 km when fully charged. The charging station is placed in Melaka Central. 40 electric bus are targeted to operate in Melaka by 2016. Up to date, there are two buses in operation. It is targeted by Feb. 2016, 8 more e-buses will be in operation and the remaining 30, by June 2016. The package includes 10 charging poles which will be placed at Melaka Central, Jasin, Masjid Tanah and Sungai Rambai.</p>
	<p>Melaka Electric Car Charging Station Network It is the first charging station outside KL. A network of 2 electric charging stations around Melaka city at Seri Negeri, Ayer Keroh and Hatten Square, Bandar Hilir is to establish Melaka as the center of the electric car connectivity between KL and Singapore. The two charging stations were donated by Honda. It was launched on 11 October 2013. Up to date, State Government is buying 8 electric car for official use There is MOU between COMOS and KMB for electric mobility in UNESCO World Heritage Zone Melaka.</p>
<p>Melaka Green Seal</p> 	<p>Melaka Green Seal It was developed by Melaka Green Development Organisation (MGDO), a Melaka Green NGO and PTHM. It was approved by the State Government Meeting Council (MMKN) on 16 December 2014. The Green Seal is a certification for green buildings. It acts as an interim green building rating tools for Melaka and directly embedded to local council regulatory. It is focusing on Uniform Building by Law (UBBL) and Malaysia Energy Efficiency standards ; MS1525. It is a compulsory certification for new development in Melaka World Solar Valley, Hang Tuah Jaya Green City Melaka and Government Buildings. Up to date, the guidelines have been produced and two buildings have been awarded with Green Seal. The first building to be awarded with the certification is the Kings Green Hotel Three more buildings are still under the process of application.</p>
	<p>The National Smart Community Programs for Melaka is focusing on industry driven projects where it is a coordination between MIGHT, Prime Minister's Office together with Melaka Green Technology Corporation. MIGHT is given a role as the key delivery partner for Green City Action Plan (GCAP).</p> <ol style="list-style-type: none"> 1. Energy Efficient Buildings - 10 private buildings to commence with energy Audit at the end March 2015. 2. Solar Industry Eco-Park - There was a signing of Memorandum of Agreement involving B to B industry partnership in April 2015 3. Waste Industry Eco-Park - The project is part of National Waste Grid Initiative recently approved by Green Technology & Climate Change Council. 4. Smart Grid - Discussion with TNB started on full scale Smart Grid involving on Smart Meter localisation. 5. Green Mobility – The project will be commenced in Q1-2016. There is a six month Feasibility Study which started in June 2015. 6. City Info-Structure - Industry interest and stakeholders engagement had been gathered and commenced in

	<p>December 2015. The project will be started in Q1- 2016.</p> <p>Melaka has been selected to initiate the Smart Grid Pilot Project along with Putrajaya by Tenaga Nasional Berhad (TNB). This is the first project to be implemented in Malaysia. 800 buildings and residential in MITC City, Ayer Keroh will involve in the project. There will be installation of smart meters, data center and networking facility.</p> <p>The program has taken off in August 2014. As of now, 770 meters have been deployed around Taman Tasik and Vista Perdana area. The change of meters are free of charge.</p>																																																
	<p>All the four local councils have been instructed to setup Green Technology Action Committee since 2011 by Melaka State Green Technology Council.</p> <p>List of infrastructure being develop and monitor:-</p> <table><tr><th>ITEMS</th><th>MBMB</th><th>MPHTJ</th><th>MPAG</th><th>MPJ</th><th>Total</th></tr><tr><td>1. LED Lamp Installation</td><td>391</td><td>804</td><td>279</td><td>13</td><td>1487</td></tr><tr><td>2. Electric and Hybrid Car Parking Lots</td><td>10</td><td>4</td><td>N/A</td><td>34</td><td>48</td></tr><tr><td>3. Pedestrian Walk (by kilometer)</td><td>TBD</td><td>14071</td><td>11.1</td><td>11.8</td><td>14093.9</td></tr><tr><td>4. Bicycle Lane (by kilometer)</td><td>TBD</td><td>N/A</td><td>N/A</td><td>TBD</td><td>TBD</td></tr><tr><td>5. Number of certified Green Building</td><td>3</td><td>4</td><td>0</td><td>N/A</td><td>7</td></tr><tr><td>6. Rain Water Harvesting System in new development</td><td>522</td><td>636</td><td>46</td><td>111</td><td>1315</td></tr><tr><td>7. Solar Bus Stop</td><td>TBD</td><td>5</td><td>4</td><td>N/A</td><td>9</td></tr></table>	ITEMS	MBMB	MPHTJ	MPAG	MPJ	Total	1. LED Lamp Installation	391	804	279	13	1487	2. Electric and Hybrid Car Parking Lots	10	4	N/A	34	48	3. Pedestrian Walk (by kilometer)	TBD	14071	11.1	11.8	14093.9	4. Bicycle Lane (by kilometer)	TBD	N/A	N/A	TBD	TBD	5. Number of certified Green Building	3	4	0	N/A	7	6. Rain Water Harvesting System in new development	522	636	46	111	1315	7. Solar Bus Stop	TBD	5	4	N/A	9
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	<p>Majlis Perbandaran Hang Tuah Jaya is one of the Pilot Partner for Low Carbon City Framework (LCCF). It is known as 'Low Carbon Cities@Hang Tuah Jaya. The selected area is 1956.57 acres encompassed MITC Town and Hang Tuah Jaya. It has been accredited by KeTTHA on 1st January 2014.</p>																																																
	<p>Knowledge Transfer Program (KTP)</p> <p>Melaka has been chosen by PEMANDU, Prime Minister's Department to participate in the KTP under the 'Public Service Delivery Transformation' (PSDT) Green Technology which involves the PTHM as Melaka State Government representative, the Ministry of Education (MOE), Universiti Sains Malaysia and Universiti Putra Malaysia.</p> <p>The objective of the program is to transfer the technology from the university to the public.</p> <p>Currently there are three projects which have been identified:-</p> <ol style="list-style-type: none">1. Energy Audit for 30 secondary school2. Vermicomposting in Central Market, Melaka Central Air quality and detoxification in Melaka General Hospital. Easy solar drying for the fish-based food processing industry.3. Energy efficiency evaluation for the Energy Performance Certificate Award. <p>3 more KTP Projects will take off in 2016 which are:</p> <ol style="list-style-type: none">1. Waste reduction of fat, oil and grease at the food court, of Melaka Central Market.2. Energy Performance Certificates Award for Energy Efficiency Building in Melaka.3. Solar drying house for food processing industry for small medium industry (SMI) in Melaka.																																																
	<p>Melaka Historical Town Council (MBMB) was selected for Clean Air for Smaller Cities Programs among ASEAN Cities. It is a collaboration with DOE and German Technical Institute (GIZ).</p> <p>Up to date, the Data monitoring and final Clean Air Plan proposal has been out.</p>																																																
	<p>MYCarbon GHG Reporting Pilot Program</p> <p>Melaka has been selected in MYCarbon alongside 20 large corporation in Malaysia. It is in corporation with Ministry of Natural Resources and Environment (MNRE).</p> <p>The program is to calculate and measure GHG Emission and carbon footprint based on ISO 14064: International Standard for GHG Emissions Inventories and Verification.</p>																																																
	<p>Melaka-Kyushu Environment Protection, Recycling & Green Technology Joint Programs</p> <p>It is proposed for a specialized facilities in recycling technology in Melaka similar to Kitakyushu Eco Town. The objective of the program is to encourage business collaborations. It is focusing on four projects; Waste, Recycling, Energy and Water.</p> <p>It is in collaboration with METI-Kyushu and Kyushu Recycle Industry Plaza (K-RIP).</p> <p>The project was reported to GSIAC meeting which was chaired by Prime Minister in New York.</p>																																																

	<p>Melaka Biodiesel Program</p> <p>It is a community program to collect Waste Cooking Oil which will be recycled into biodiesel. This is to reduce the distribution of recycled cooking oil to the market. This is a collaboration between PTHM and licence Biodiesel manufacturer. Up to date, all fuel pump in Melaka already using Biodiesel B10.</p>
	<p>The introduction of 2+1 Municipal Waste collection system came from the previous waste collection system of three times a week.</p> <p>The 2+1 system means the organic and unrecycleable waste collected twice a week. The recyclable waste such as plastic, paper, etc. are collected once a week. The program was introduced in September 2013 by Perbadanan Pengurusan Sisa Pepejal & Pembersihan Sisa Awam(PPSPPA) (now known as SWCorp) and Southern Waste Management(SWM).</p>
	<p>Melaka has implemented No Plastic and Polystyrene Program on Saturday since 1st January 2011.</p> <p>The objectives of the program are:-</p> <ol style="list-style-type: none"> 1. To promote bringing own bag from home 2. To ensure the shopping complex not supplying plastic bag during No Plastic Bag Day alternatively to sell only non-plastic bag wrapper. <p>Melaka will add additional day consequently for No Plastic Day Program as follows:-</p> <ol style="list-style-type: none"> 1. Friday & Saturday (1st April 2014) 2. Friday, Saturday & Sunday (1st January 2015) 3. Every day (1st January 2016) <p>No Plastic Day for everyday has been implemented on 1st January 2016. There are a total of 13 biodegradable product's supplier in Malaysia which includes biodegradable bag & food container.</p> <p>Other than that, Melaka has implemented no polystyrene usage for foods and drinks in Melaka starting 15 May to all government own cafeteria and premises. In 1st September 2015, no polystyrene for foods and drinks has been implemented for the whole state of Melaka. On 21 January 2016, it has been decided that all hypermarket in Melaka need to provide at least craft bag or brown paper bag to the consumer.</p>
	<p>"Do not Litter The Melaka State" is the message meant to be conveyed through the "Don't Mess with Melaka" campaign, one of the programs carried out to ensure the cleanliness of the state is at the highest level. Melaka is imposing immediate compounds of RM5 to RM10 on litter bugs to preserve the cleanliness of the state. The offenders has to pay immediately when they get caught by the authority.</p> <p>Local authorities in the state are taking the necessary steps to implement the enforcement of the compound.</p>
	<p>Melaka Green Practices Certification</p> <p>The training conducted by PTHM for awareness program of green technology for state government offices. This is in compliance with Green Office Practices Certification conducted by UPEN Melaka. The training will be expanded to private companies.</p>
	<p>Melaka Green Award</p> <p>PTHM organised this Event to recognise the initiative taken by various organisations and institutions in Melaka for implementing green efforts.</p> <p>The Inaugural ceremony has initiated in August 2015.</p> <p>This event is annually organise Melaka.</p> <p>PTHM will be organizing this award yearly and this year it will be held on July or August. The category will be decided.</p> <p>In 2015, Ramada Plaza Hotel was the champion for Melaka Hotel Green Award.</p>

ANNEX I: TERMS OF REFERENCE OF NATIONAL PROJECT MANAGER

TITLE : National Project Manager

ORGANIZATION: Project Management Unit (PMU)

CONTRACTING PARTY: UNIDO

REPORTS TO: NSC and UNIDO

DURATION: 5 years (one-year renewable)

REMUNERATION: Commensurate with qualifications, skills and experience

REQUIREMENTS:

Applicants must have post-graduate training in any one of the following fields of study:

- Development economics with a strong energy systems planning and management component and/or industrial engineering with energy systems planning focus and/or economics background;
- Work experience with energy efficient and renewable energy technologies, in particular in industry;
- Have an extensive knowledge of renewable energy applications, industrial energy efficiency and present status and needs of Malaysian industry;
- At least ten years of experience in the area of energy efficiency; knowledge of thermal systems an advantage;
- At least seven years work experience at senior management level with demonstrable program or project level management skills and ability to coordinate activities involving a large contingent of professional consultants drawn around the country and/or internationally.

RESPONSIBILITIES:

Directing activities of the PMU:

- Day-to-day management and co-ordination;
- Budgeting;
- Forward planning;
- Liaising with project participants and stakeholders;
- Preparation and presentation of project status reports to the Project Steering Committee;
- Preparing subcontractors terms of reference and contracts;
- Supervision of contracts;
- Technical assistance; and
- Project execution of all tasks identified under the project specified in the Project Document.

DUTIES:

- Lead, manage and coordinate the day-to-day management of the PMU, including administration, accounting, technical expertise, and actual project implementation and reporting;
- Lead the development of detailed project design including preparation of subcontractors' terms of reference, identification and selection of national, regional and international subcontractors, cost estimation, time scheduling, contracting, and reporting on forward planning of project activities and budget;
- Coordinate activities of consultants and subcontractors including contract management, direction and supervision of field operations, logistical support, review of technical outputs/reports, measurement/assessment of project achievements and cost control;
- Supervise the selection of the sites, profiling and actual installation and follow-up evaluation of demonstration project on renewable energy integrated smart grid systems;
- Assist in the design, supervision and where possible, delivery of the training and outreach activities of the project and take a lead role in the organization of project workshops and dissemination of results of the projects;
- Plan and coordinate various workshops identified in this Project Document;

- Work closely together with the National Steering Committee (NSC), UNIDO and the Malaysian counterpart organizations;
 - Allocation of the contribution of GEF and other co-financiers according to the annual work plans and financial reports;
 - Preparation of annual work plans, quarterly financial and progress reports and the annual APR (annual project implementation review report);
 - Inform NSC and UNIDO on project progress and budget variations, and advise on the policy direction at NSC meetings;
 - Maintain records/minutes of proceedings of the NSC.
- Take responsibility for the quality and timing of project outputs;
- Assist in overall project monitoring and evaluation; and
- Undertake other management duties that contribute to the effective functioning of the project.

DELIVERABLES:

Finalized Terms of Reference for PMU staff and subcontracting consultants:

- Work plan and financial reports;
- Annual progress reports;
- Minutes of NSC meetings;
- Agenda for project workshops and meetings.

ANNEX J: DETAILED CO2 EMISSION CALCULATIONS

The project interventions will lead to energy savings, resulting in consequent GHG emission reductions resulting from the investment in the demonstration and diffusion of smart grid technology, electric vehicles, and solar PV in Melaka, Malaysia – to be replicated in other cities. This is to be undertaken within Component 1 of the project “Component 1: Integration of climate risks in urban planning and management”.

The global benefits in terms of avoided GHG emissions were calculated separately for renewable energy and energy efficiency. The avoided GHG emissions for energy efficiency interventions were estimated using the methodology described in the document “Calculating Greenhouse Gas Benefits of the Global Environment Facility Energy Efficiency Projects”.⁴³ The associated worksheet templates were used to conduct the calculation using the Demonstration and Diffusion module.⁴⁴

The total reductions are estimated as follows:

Direct GHG reductions

In total, the project is expected to result in a total of 43,736 tonnes CO₂ per year in the last year of the project (2021) and 849,300 tonnes CO₂ over the lifetime of investments – broken down according to Renewable Energy and Energy Efficiency as follows:

Renewable Energy

- Renewable energy production of 34,043 MWh in the last year of the project (2021)
- Annual reductions due to renewable energy of 22,557 tonnes CO₂ per year as direct GHG reductions in the last year of the project (2021)
- A total 20-year reduction of 451,139 tonnes CO₂ as direct GHG reductions.

Energy Efficiency

- Energy efficiency resulting in direct annual energy savings of 121,617 GJ in the last year of the project (2021).
- A total 20-year reduction of 2,286,393 GJ (assuming a 20-year lifetime of investments).
- Annual reductions due to energy efficiency of 21,129 tonnes CO₂ per year as direct GHG reductions in the last year of the project (2021) A total 20-year reduction of 398,161 tonnes CO₂ as direct GHG reductions.

Indirect GHG reductions

In total, the project is expected to result in indirect GHG reductions as follows:

Label	Unit	Value
Indirect - bottom up – Renewable Energy	tonnes CO2	1,804,558
Indirect - top-down – Renewable Energy	tonnes CO2	2,635,605
Indirect - bottom up – Energy Efficiency	tonnes CO2	1,694,302
Indirect - top-down – Energy Efficiency	tonnes CO2	2,790,076
Total indirect - bottom up	tonnes CO2	3,498,859
Total indirect - top-down	tonnes CO2	5,425,681

⁴³ Available here: <http://www.thegef.org/gef/sites/thegef.org/files/publication/GEF%20EE%20Methodology%20v1.0.pdf>

⁴⁴ Available here: <https://www.thegef.org/gef/pubs/STAP/Methodology-for-Calculating-GHG-Benefits-of-GEF-Energy-Efficiency-Projects-v.1>

The methodology for estimating emissions reductions from renewable energy and energy efficiency are described in detail below.

1. Emissions reductions from Renewable Energy

Direct and indirect reductions related to increased renewable energy (solar power) were estimated using the methodology described in the document “Manual for calculating GHG benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects”.⁴⁵ The associated worksheet templates were used to conduct the calculation.⁴⁶

1.1. Direct GHG emissions reductions from Renewable Energy

These calculations to estimate the direct emissions reductions from increased renewable energy are carried out as follows:

Table 4: GHG reductions and energy savings from solar PV installations

Variable	Name of the variable	Unit	Source of information	Value
A	Estimated annual production per kWp	kWh/kWp	<i>MIGHT Solar PV study from 2020</i>	1,250
B	Capacity installed	kWp	<i>Project document</i>	30,260
C	Estimated annual production	MWh	<i>Calculated</i>	37,825
D	Percent of Activities Implemented in the Baseline	%	<i>Assumption</i>	10%
$E = C \times (1 - D)$	Renewable Energy produced per year minus the baseline (MWh)	MWh	<i>Calculated</i>	34,043
F	GHG emissions per MWh replaced	Tonnes CO ₂ per MWh	<i>GEF GHG Reduction worksheet⁴⁷ - based on CDM combined margin approach, from IGES database</i>	0.663
G	GHG emissions reduction - annual	Tonnes CO ₂ per year	<i>Calculated</i>	22,557
H	Lifetime of investments	Years	<i>Assumption</i>	20
$I = E \times H$	Estimated lifetime production	MWh	<i>Calculated</i>	680,850
$J = G \times I$	GHG emissions reduction - lifetime	Tonnes CO ₂	<i>Calculated</i>	451,139

1.2. Indirect GHG emissions reductions from Renewable Energy

Indirect Bottom-up emissions reductions estimate from Renewable Energy

This project is designed to ensure sustainability and replication of energy efficiency improvements beyond the project cycle. It will do so by:

1. National & state policies and strategic direction for development of sustainable cities improved/developed; supported by enabling programs (funding models, green procurement, PPPs, etc.) & projects
2. Institutional capacity of policy-makers at the national, state and local levels built
3. Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project
4. Allowing for scaling up of investments from Output 1.4.

⁴⁵ Available here: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.33.Inf_18%20Climate%20Manual.pdf

⁴⁶ Available here: <https://www.thegef.org/gef/node/313>

⁴⁷ See here: <https://www.thegef.org/gef/pubs/STAP/Methodology-for-Calculating-GHG-Benefits-of-GEF-Energy-Efficiency-Projects-v.1>

Due to these activities within the project, the “Number of Replications Post-project as Spillover” was given as 4 for Component 1 related to Renewable Energy, resulting in the following bottom-up emissions reductions:

Table 5: Indirect bottom-up GHG savings calculation from Renewable Energy

Component	Year of indirect savings	Direct savings	Replication factor	Total	Unit
Variable	A	B	C	D = B x C	
INDIRECT BOTTOM-UP SAVINGS	2022-2036	451,139	4	1,804,558	tCO2

Indirect Top-down emissions reduction estimate from Renewable Energy

In order to calculate the Indirect-Top-down emissions reduction estimate, the 10-year market potential for GHG emissions reductions from solar PV installations was evaluated based on Malaysia's National Renewable Energy Policy & Action Plan.⁴⁸ The 10-year market potential from 2022 to 2031 were estimated based on the linear interpolation of the targets. The causality factor was estimated to be only 20% since there are additional policies and projects geared towards increased PV at a nation-wide level. The calculation carried out is described in the table below.

Top-down - 10-year market targets for power from solar PV							
Variable		A	B = A2 – A1, A3 – A2, etc.	C	D = B x C	E	F = D x E
Year		MWh produced per year	Additional MWh	Investment lifetime	Lifetime energy produced	Grid emissions factor (tonnes GHG/MWh)	GHG emissions reductions
2022	1	298,800	52,400	20	1,048,000	0.663	694,417
2023	2	351,200	52,400	20	1,048,000	0.663	694,417
2024	3	403,600	52,400	20	1,048,000	0.663	694,417
2025	4	456,000	52,400	20	1,048,000	0.663	694,417
2026	5	568,600	112,600	20	2,252,000	0.663	1,492,202
2027	6	681,200	112,600	20	2,252,000	0.663	1,492,202
2028	7	793,800	112,600	20	2,252,000	0.663	1,492,202
2029	8	906,400	112,600	20	2,252,000	0.663	1,492,202
2030	9	1,019,000	112,600	20	2,252,000	0.663	1,492,202
2031	10	1,240,800	221,800	20	4,436,000	0.663	2,939,347
Top-down - 10-year market potential for GHG reductions from solar PV	F11 = sum of F1 through F10						13,178,027

⁴⁸ Available here: <http://www.seda.gov.my/?omaneg=0001010000000101010100010000100000000000000000000000000000000000&s=31>

Causality factor	12	20%
Indirect Top-Down Emission Reductions (tCO ₂) from the project	13 = F11 x F12	2,635,605

2. Emissions reductions from Energy Efficiency

Direct and indirect reductions related to improved energy efficiency were estimated using the methodology described in the document “Revised Methodology for Calculating GHG Benefits of GEF Energy Efficiency Projects (Version 1.0)” using the Demonstration and Diffusion module. The associated worksheet templates were used to conduct the calculation.⁴⁹

2.1. Direct GHG emissions reductions from Energy Efficiency

The following steps were carried out in estimating GHG emissions reductions due to energy efficiency improvements.

Step 1: Disaggregating the potential energy savings measures according to type of customer

In order to find the potential for energy efficiency savings, analysis has been undertaken for the various types of energy/GHG savings which will occur as a part of the project. This includes:

- **Savings from smart meters/smart grids** according to two main types of customers according to their typical sizes, typical electricity consumption, and potential savings. These are described in Table 6 and Table 7.
- **Savings from implementing BEMS in a commercial building** are described in Table 8.
- **Savings from fuel switching from diesel and motor gasoline vehicles to electricity powered vehicles** as described in Table 9, Table 10, and Table 11.

⁴⁹ The methodology and associated worksheet templates are available here: <https://www.thegef.org/gef/pubs/STAP/Methodology-for-Calculating-GHG-Benefits-of-GEF-Energy-Efficiency-Projects-v.1>
GEF6 CEO Endorsement /Approval Template-Dec2015

Table 6: Per-unit calculation of energy savings– commercial buildings

Name of the variable	Unit	Variable	Source of information	Value
Total floor area - Wisma Negeri	m2	A	<i>Feasibility study</i>	18,638
Total floor area - Melaka Central	m2	B	<i>Feasibility study</i>	20,000
Total number of smart meters	#	C	<i>Feasibility study</i>	20
Total floor area per smart meter	m2	D = (A + B) / C	<i>Assumption</i>	932
Total electricity consumption - Wisma Negeri	kWh	E	<i>Feasibility study</i>	2,598,533
Total electricity consumption - Melaka Central	kWh	F	<i>Feasibility study</i>	3,828,316
Specific electricity demand	kWh/m2	G = (E + F) / (A + B)	<i>Request for CEO endorsement</i>	166.33
Base case electricity consumption per smart meter	MWh	H = (D x G) / 1000	<i>Calculated</i>	155.01
Price of electricity	USD/MWh	I	<i>Assumption</i>	\$140
Base case electricity cost	USD/MWh	J = I x H	<i>Assumption</i>	\$21,640
Cost per customer - smart grid	USD/customer	K	<i>Feasibility study</i>	\$733
Reduction in electricity demand caused by conservation effect of consumer information and feedback systems	%	L	<i>Pacific NW National Lab (2010) The Smart Grid: An Estimation of the Energy and CO2 Benefits</i>	3.0%
Reduction in electricity demand caused by deployment of diagnostics in residential and small/medium commercial buildings	%	M	<i>Pacific NW National Lab (2010) The Smart Grid: An Estimation of the Energy and CO2 Benefits</i>	3.0%
Reduction in electricity demand caused by conservation voltage reduction and advanced voltage control	%	N	<i>Pacific NW National Lab (2010) The Smart Grid: An Estimation of the Energy and CO2 Benefits</i>	2.0%
Total potential savings	%	O = L + M + N	<i>Calculated</i>	8%
EE case electricity consumption	MWh	P = H x (1 - O)	<i>Calculated</i>	143
Electricity saved	MWh	Q = H - P	<i>Calculated</i>	12.4
GHG emissions per MWh for electricity	tonnes CO ₂ /MWh	R	<i>GEF GHG Reduction worksheet which is the default value based on CDM combined margin approach, from IGES database</i>	0.663
GHG reductions per meter - annual	tonnes CO ₂ /year	S = Q x R	<i>Calculated</i>	8.2
Lifetime of investment	Years	T	<i>Assumption</i>	20.0
GHG reductions per meter - lifetime	tonnes CO ₂	U = T x S	<i>Calculated</i>	164.34

Table 7: Per-unit calculation of energy savings - residential

Name of the variable	Unit	Variable	Source of information	Value
Total floor area per customer	m2	A	<i>Assumption</i>	100
Specific electricity demand	kWh/m2	B	<i>Request for CEO endorsement</i>	270
Base case electricity consumption	MWh	C = (A x B) / 1000	<i>Calculated</i>	27.00
Price of electricity	USD/MWh	D	<i>Assumption</i>	\$ 100.00
Base case electricity cost	USD/MWh	E = C x D	<i>Assumption</i>	\$ 2,700
Cost per customer - smart grid	USD/ customer	F	<i>Smart Grid Consumer Collaborative (2013) Smart Grid Economic and Environmental Benefits</i>	\$ 400
Reduction in electricity demand caused by conservation effect of consumer information and feedback systems	%	G	<i>Pacific NW National Lab (2010) The Smart Grid: An Estimation of the Energy and CO2 Benefits</i>	3.0%
Total potential savings	%			3%
EE case electricity consumption	MWh	H = C x (1 - G)	<i>Calculated</i>	26.19
Electricity saved	MWh	I = C - H	<i>Calculated</i>	0.81
GHG emissions per MWh for electricity	tonnes CO ₂ / MWh	J	<i>GEF GHG Reduction worksheet which is the default value based on CDM combined margin approach, from IGES database</i>	0.663
GHG reductions per meter - annual	tonnes CO ₂ / year	K = I x J	<i>Calculated</i>	0.54
Lifetime of investment	Years	L	<i>Assumption</i>	20.0
GHG reductions per meter - lifetime	tonnes CO ₂	M = K x L	<i>Calculated</i>	10.73

Table 8: Per-unit calculation – BEMS in commercial buildings

Name of the variable	Unit	Variable	Source of information	Value
Total floor area of typical building	m ²	A	<i>Feasibility study</i>	18,000
Specific electricity demand	kWh/m ²	B	<i>Feasibility study</i>	150
Base case electricity consumption per building	MWh	C = (A x B) / 1000	<i>Calculated</i>	2,700
Price of electricity	USD/MWh	D	<i>Assumption</i>	\$140
Base case electricity cost	USD/MWh	E = C x D	<i>Calculated</i>	\$376,944
Total potential savings	%	F	<i>Calculated</i>	20%
EE case electricity consumption	MWh	G = C x (1 - F)	<i>Calculated</i>	2,160
Electricity saved per building	MWh	H = C - G	<i>Calculated</i>	540
GHG emissions per MWh for electricity	tonnes CO ₂ / MWh	I	<i>GEF GHG Reduction worksheet which is the default value based on CDM combined margin approach, from IGES database</i>	0.663
GHG reductions per building - annual	tonnes CO ₂ / year	J = I x H	<i>Calculated</i>	358

Table 9: GHG reductions and energy savings from diesel bus replacement with electric buses

Name of the variable	Unit	Variable	Source of information	Value
BAU - Diesel bus				
km driven per year	km	A	<i>Assumption</i>	100,000
Fuel use per 100 km	Liters/100 km	B	<i>Assumption</i>	32.00
Fuel used	Liters	C = A x B	<i>Calculated</i>	32,000
Energy per liter of diesel fuel	GJ/liter	D	<i>International Gas Union</i>	0.0386
Final energy used - GJ	GJ	E = C x D	<i>Calculated</i>	1,235.2
Conversion factor - final energy/ primary energy	#	F	<i>Assumption</i>	1.0
Primary energy used - GJ	GJ	G = F / E	<i>Calculated</i>	1,235.2
GHG emissions per GJ	Tonnes CO ₂ per GJ	H	<i>GEF calculations template</i>	0.0741
GHG emissions per vehicle	Tonnes CO ₂ per vehicle	I = H x G	<i>Calculated</i>	91.5
EE case - electric bus				
Cost per bus	USD	J	http://ebus.com/bus-type/ , http://www.alibaba.com/showroom/electric-bus-price.html	\$350,000
km driven per year	km	K	<i>Assumption</i>	100,000
Fuel use per 100 km	MWh/100 km	L	http://www.civitas.eu/sites/default/files/documents/cerny_j_electric_buses_ljubljana_final.pdf	0.100
Fuel used	MWh	M = (K x L) / 100	<i>Calculated</i>	100.0
Final energy used - GJ	GJ	N = M x 3.6	<i>Calculated</i>	360.0
Conversion factor - final energy/ primary energy	#	O	<i>Estimate</i>	0.500
Primary energy used - GJ	GJ per vehicle	P = N / O	<i>Calculated</i>	720.0
Diesel fuel savings	GJ per vehicle	Q = G	<i>Calculated above</i>	1,235.2
GHG emissions per MWh	Tonnes CO ₂ per MWh	R	<i>GEF GHG Reduction worksheet which is the default value based on CDM combined margin approach, from IGES database</i>	0.663
GHG emissions per vehicle	Tonnes CO ₂ per vehicle	S = M x R	<i>Calculated</i>	66.3
Energy saved per vehicle	GJ per vehicle	T = G - P	<i>Calculated</i>	515.2
GHG reduced per vehicle	Tonnes CO ₂ per vehicle	U = I - S	<i>Calculated</i>	25.3
# of vehicles switching	# of vehicles	V	<i>Assumption</i>	40
Total energy saved	GJ	W = T x V	<i>Calculated</i>	20,608
Total GHG reduced - annual	Tonnes CO ₂ /year	X = U x V	<i>Calculated</i>	1,011

Table 10: GHG savings from motor gasoline cars replacement with electric cars

Name of the variable	Unit	Variable	Source of information	Value
BAU - Gasoline car				
km driven per year	km	A	<i>Assumption</i>	50,000
Fuel use per 100 km	Liters/100 km	B	<i>Assumption</i>	10.00
Fuel used	Liters	C = (A x B) / 100	<i>Calculated</i>	5,000
Energy per liter of gasoline fuel	GJ/liter	D	<i>International Gas Union</i>	0.0342
Final energy used - GJ	GJ	E = C x D	<i>Calculated</i>	171.0
Conversion factor - final energy/ primary energy	#	F	<i>Assumption</i>	1.0
Primary energy used - GJ	GJ	G = E / F	<i>Calculated</i>	171.0
GHG emissions per GJ	Tonnes CO ₂ per GJ	H	<i>GEF template</i>	0.0693
GHG emissions per vehicle	Tonnes CO ₂ per vehicle	I = G x H	<i>Calculated</i>	11.9
EE case - electric car				
km driven per year	km	J	<i>Assumption</i>	50,000
Fuel use per 100 km	MWh/ 100 km	K	<i>Assumption</i>	0.020
Fuel used	MWh	L = (J x K) / 100	<i>Calculated</i>	10.0
Final energy used - GJ	GJ	M = L x 3.6	<i>Calculated</i>	36.0
Conversion factor - final energy/ primary energy	#	N	<i>Estimate</i>	0.500
Primary energy used - GJ	GJ per vehicle	O = M / N	<i>Calculated</i>	72.0
Gasoline fuel savings	GJ per vehicle	P = G	<i>Calculated</i>	171.0
GHG emissions per MWh	Tonnes CO ₂ per MWh	Q	<i>GEF GHG Reduction worksheet which is the default value based on CDM combined margin approach, from IGES database</i>	0.663
GHG emissions per vehicle	Tonnes CO ₂ per vehicle	R = L x Q	<i>Calculated</i>	6.6
Energy saved per vehicle	GJ per vehicle	S = G - O	<i>Calculated</i>	99.0
GHG reduced per vehicle	Tonnes CO ₂ per vehicle	T = I - R	<i>Calculated</i>	5.2
# of vehicles switching	# of vehicles	U	<i>Assumption</i>	10
Total energy saved	GJ	V = S x U	<i>Calculated</i>	990
Total GHG reduced - annual	Tonnes CO ₂	W = T x U		52

Table 11: GHG savings from motor gasoline scooters replacement with electric scooters

Name of the variable	Unit	Variable	Source of information	Value
BAU - Gasoline scooter				
km driven per year	km	A	<i>Assumption</i>	50,000
Fuel use per 100 km	Liters/100 km	B	<i>Assumption</i>	2.50
Fuel used	Liters	C = (A x B) / 100	<i>Calculated</i>	1,250
Energy per liter of gasoline fuel	GJ/liter	D	<i>International Gas Union</i>	0.0342
Final energy used - GJ	GJ	E = C x D	<i>Calculated</i>	42.8
Conversion factor - final energy/ primary energy	#	F	<i>Assumption</i>	1.0
Primary energy used - GJ	GJ	G = E / F	<i>Calculated</i>	42.8
GHG emissions per GJ	Tonnes CO ₂ per GJ	H	<i>GEF template</i>	0.0693
GHG emissions per vehicle	Tonnes CO ₂ per vehicle	I = G x H	<i>Calculated</i>	3.0
EE case - electric scooter				
km driven per year	km	J	<i>Assumption</i>	50,000
Fuel use per 100 km	MWh/100 km	K	<i>PPG study</i>	0.004
Fuel used	MWh	L = (J x K) / 100	<i>Calculated</i>	2.0
Final energy used - GJ	GJ	M = L x 3.6	<i>Calculated</i>	7.2
Conversion factor - final energy/ primary energy	#	N	<i>Estimate</i>	0.500
Primary energy used - GJ	GJ per vehicle	O = M / N	<i>Calculated</i>	14.4
Gasoline fuel savings	GJ per vehicle	P = G	<i>Calculated</i>	42.8
GHG emissions per MWh	Tonnes CO ₂ per MWh	Q	<i>GEF factor</i>	0.663
GHG emissions per vehicle	Tonnes CO ₂ per vehicle	R = L x Q	<i>Calculated</i>	1.3
Energy saved per vehicle	GJ per vehicle	S = G - O	<i>Calculated</i>	28.4
GHG reduced per vehicle	Tonnes CO ₂ per vehicle	T = I - R	<i>Calculated</i>	1.6
# of vehicles switching	# of vehicles	U	<i>Assumption</i>	60
Total energy saved	GJ	V = S x U	<i>Calculated</i>	1,701
Total GHG reduced - annual	Tonnes CO ₂	W = T x U	<i>Calculated</i>	98

Step 2: Scaling up the per-unit savings to reflect the entire project intervention

In order to utilize the GEF GHG reduction tool, it is necessary to define the impact of the entire project and spread it across the period of implementation.

This was done as follows:

Table 12: Plan for investment in the various energy saving/GHG reductions as a result of the project

Type of intervention	Units	# of units
Electricity savings		
Smart meters	# of commercial customers with smart meters	110
	Energy saved per year (MWh)	1,364
	Annual GHG emissions reduced (tonnes CO ₂)	904
	# of residential customers with smart meters	30,000
	Energy saved per year (MWh)	24,300
	Annual GHG emissions reduced (tonnes CO ₂)	16,101
Building Energy Management Systems	# of buildings with EE improvements	10
	Energy saved per year (MWh)	5,400
	Annual GHG emissions reduced (tonnes CO ₂)	3,578
Sub-total - electricity	Energy saved/ RE produced per year (MWh)	31,064
	Annual GHG emissions reduced (tonnes CO₂)	20,583
	Lifetime GHG emissions reduced (tonnes CO₂) - assuming 20 year lifetime of investment	411,668
EV charging stations - diesel savings	# of buses changed to electricity	40
	Energy saved per year (GJ)	20,608
	Annual GHG emissions reduced (tonnes CO ₂)	1,011
Sub-total - diesel	Energy saved per year (GJ)	20,608
	Annual GHG emissions reduced (tonnes CO₂)	1,011
	Lifetime GHG emissions reduced (tonnes CO₂) - assuming 10 year lifetime of investment	10,107
EV charging stations - motor gasoline savings	# of gasoline cars changed to electricity	10
	Energy saved per year (GJ)	990
	Annual GHG emissions reduced (tonnes CO ₂)	52
	# of gasoline scooters changed to electricity	60
	Energy saved per year (GJ)	1,701
	Annual GHG emissions reduced (tonnes CO ₂)	98
Sub-total - motor gasoline	Energy saved per year (GJ)	2,691
	Annual GHG emissions reduced (tonnes CO₂)	150
	Lifetime GHG emissions reduced (tonnes CO₂) - assuming 10 year lifetime of investment	1,505

The investments are expected to be spread out as follows:

- Year 1 (2017): 20%
- Year 2 (2018): 40%
- Year 3 (2019): 40%

Step 3: Utilizing the GEF's calculation tool for calculating GHG benefits of GEF energy efficiency projects to calculate Energy and GHG Reductions

The key parameters as described above along with a schedule for percentage of project implementation were input into the GHG calculations tool as follows:

Table 13: Percentage of project implementation, energy savings, and emissions reductions for Component 1: Integration of climate risks in urban planning and management

		2016	2017	2018	2019	2020	2021
PROGRAMME	Project(s) in Year	0%	20%	40%	40%	0%	0%
BASELINE	Project(s) in Year	0%	2%	4%	4%	0%	0%
NET	Cumulative Project(s) in Place	0.00	0.18	0.54	0.90	0.90	0.90
DIRECT SAVINGS	Annual Electricity Savings (MWh)	0	5,592	16,775	27,958	27,958	27,958
	Annual Diesel Savings (GJ)	0	3,709	11,128	18,547	18,547	18,547
	Annual Motor Gasoline Savings (GJ)	0	484	1,453	2,422	2,422	2,422
TOTALS	Direct Energy Avoided 2016-2021 (GJ)	462,143		Direct GHG Avoided 2016-2021 (tCO2)		80,479	
	Direct Energy Avoided 2022-2036 (GJ)	1,824,250		Direct GHG Avoided 2022-2036 (tCO2)		317,682	
	Direct Post-project Energy Avoided 2022-2036 (GJ)	0		Direct Post-project GHG Avoided 2022-2036 (tCO2)		0	

The total expected direct emissions reductions are then calculated by the GHG tool as follows:

Table 14: Total direct emissions reductions expected for Energy Efficiency

All Components	Cumulative			Annual			
	Total	2016-2021	2022-2036	2016	2021	2025	2035
Direct Electricity Savings (MWh)	525,604	106,239	419,365	0	27,958	27,958	27,958
Direct Diesel Savings (GJ)	348,687	70,479	278,208	0	18,547	18,547	18,547
Direct Motor Gasoline Savings (GJ)	45,532	9,203	36,329	0	2,422	2,422	2,422
N/A	0	0	0	0	0	0	0
Direct Total Energy Savings (GJ)	2,286,393	462,143	1,824,250	0	121,617	121,617	121,617
Direct GHG Emission Savings (tCO2)	398,161	80,479	317,682	0	21,179	21,179	21,179

2.2. Indirect GHG emissions reductions from Energy Efficiency

Indirect Bottom-up emissions reductions estimate from Energy Efficiency

This project is designed to ensure sustainability and replication of energy efficiency improvements beyond the project cycle. It will do so by:

1. National & state policies and strategic direction for development of sustainable cities improved/developed; supported by enabling programs (funding models, green procurement, PPPs, etc.) & projects
2. Institutional capacity of policy-makers at the national, state and local levels built
3. Awareness raising events for policy-makers, industry and end-users organized at all levels for dissemination of tangible benefits/results of project
4. Allowing for scaling up of investments from Output 1.4.

Due to these activities within the project, the “Number of Replications Post-project as Spillover” was given as 4 for Component 1 related to Renewable Energy, resulting in the following bottom-up emissions reductions:

Table 15: Indirect bottom-up GHG savings calculation for energy efficiency

Component	Year of indirect savings	Direct savings	Replication factor	Total	Unit
Variable	A	B	C	D = B x C	
INDIRECT BOTTOM-UP SAVINGS	2022-2036	398,161	4	1,694,302	tCO ₂

Indirect Top-down emissions reduction estimate from Energy Efficiency

In order to estimate the Top-down emissions reduction from the project for energy efficiency, the 10-year market potential for GHG reductions was calculated based on the assumption that the remainder of Melaka as well as the cities of Putrajaya, Cyberjaya, and Iskandar Malaysia (or equivalent elsewhere in Malaysia) would implement smart grid technology at least in the equivalent of the residential sector over the course of the 10-year period after the project.

Additionally, the project would assist indirectly scaling up the number of electric vehicles throughout Malaysia.

Using this as the estimate for the market over a 10-year period, the following table shows how the indirect top-down reductions estimate is carried out – yielding a result which is similar to that of the indirect bottom-up estimate – though higher. A low causality factor of 20% was used to be conservative.

Table 16: Indirect Top-down emissions reduction estimate calculations for Energy Efficiency

Smart meters	Population	# of residential customers*	MWh saved per unit	Annual MWh saved potential	Emissions factor (tonnes CO ₂ /MWh)	Annual GHG savings potential	Lifetime of investments (years)	10-year market potential
Variable	A	B = A / 4.3	C	D = B x C	E	F = D x E	G	H = G x F
Melaka	860,000	170,000	0.54	91,242	0.663	60,457.83	20	1,209,157
Putrajaya	50,000	11,628	0.54	6,241	0.663	4,135	20	82,706
Cyberjaya	55,000	12,791	0.54	6,865	0.663	4,549	20	90,976
Iskandar Malaysia	1,600,000	372,093	0.54	199,708	0.663	132,329	20	2,646,581
Sub-total - smart grids/smart meters		566,512		304,056		201,471	20	4,029,419
Electric vehicles		# of vehicles to be replaced	GJ saved per unit	Annual GJ saved potential	Emissions factor (tonnes CO ₂ /GJ)	Annual GHG savings potential	Lifetime of investments (years)	10-year market potential

Variable		A	B	C = A x B	D	E = C x D	F	G = E x F
Diesel buses		2,000	1,235	2,470,400	0.0741	183,057	10	1,830,566
Diesel cars		50,000	73	3,637,500	0.0741	269,539	10	2,695,387
Motor gasoline cars		50,000	99	4,950,000	0.0693	343,035	10	3,430,350
Motor gasoline scooters		100,000	28	2,835,000	0.0693	196,466	10	1,964,655
Sub-total - vehicle replacement				13,892,900		992,096		9,920,959
Total 10-year potential						1,193,567		13,950,378
Causality factor						20%		20%
Top-down estimate						238,713		2,790,076

* Based on 4.3 people per household

ANNEX K: ADDITIONAL POLICIES RELEVANT TO ENERGY EFFICIENCY/ RENEWABLE ENERGY IN MALAYSIA

Additional programmes at the national level which are relevant but not directly connected to the project are described here.

In addition to policy directions and prescriptions in the NPP and NUP, the Federal Department of Town and Country Planning (JPBD), under the Ministry of Urban Wellbeing, Housing and Local Governments has also initiated a number of programmes focusing on green cities, such as:

- Green Neighbourhood Index
- Sustainable Development Indicators - Malaysia Urban and Rural Indicator Network for Sustainable Development (MURNInets)
- LUPAr (Land use Appraisal for Risk Areas) Programme
- Action Plan for Environmental Sensitive Areas
- Planning Methods in application - Sustainability Assessment (SA) application in plan making process
- Planning guidelines for Open Space and Recreation Facilities and Roof Top Gardens a
- Circulars on Rain Water Harvesting System

Additional specific programmes under implementation include the following:

Green Neighbourhood Guidelines (GNG)

This guideline was prepared by JPBD under KPKT to serve as a tool to drive planning and the formation of green urban neighbourhoods in Malaysia, including carbon reduction assessed by 'low carbon cities framework' by the KeTTHA. The Green Neighbourhood is an important land use planning concept in green development which is the fundamental of the green growth. Elements that have been taken into consideration in developing a green neighbourhood are passive design building, energy efficient usage, green technology application and etc.

Green Technology Financing Scheme

The *Green Technology Financing Scheme*, operating with a total budget of US\$1.6 billion, is managed by Green Tech Malaysia, and covers energy (production, as well as efficient utilization), building, transport, and water and wastewater management sectors. Under the scheme, a company can apply for a loan at a participating Malaysian commercial or development finance institution of which the government guarantees 30% of the loan amount or subsidizes 2% of the interest rate.

Other Related Policies

Malaysia's *National Climate Change Policy* was formulated in 2009, under the *Tenth Malaysia Plan 2011-2015 (10MP)*. It adopts a dual strategy in addressing climate change impacts: firstly, adaptation strategies to protect economic growth and development factors from the impact of climate change; and secondly, mitigation strategies to reduce emissions of greenhouse gases (GHGs). The Policy aims to mainstream climate change into national policies, plans and programmes and to strengthen the institutional and implementation capacity to better harness climate change adaptation and mitigation opportunities.

The *National Green Technology Policy (NGTP)* is one of the most current platforms supporting green growth. It introduces and proposes the implementation of innovative economic instruments, as well as the establishment of effective fiscal and financial mechanisms to support the growth of green industries. The NGTP comprises of four pillars, namely energy, environment, economy and social with four key areas focusing on energy, building, water and waste management and transportation. These areas are expected to promote Foreign Direct Investments (FDI) on green technology to foster Domestic Direct Investments (DDIs) and local industry participation.

Implications on green cities have been identified through two strategic thrusts in the NGTP. The first thrust focuses on providing a conducive environment for green technology development with measures to strengthen the understanding of local players in Green Technology industries and their value chain. This would include technology and infrastructure support required for energy efficient neighbourhoods and cities. The NGTP facilitates and infuses funds into

sustainability-oriented projects that simultaneously green the economy. The second thrust in the NGTP is to promote education and information dissemination through comprehensive roll-out programmes to increase public awareness on Green Technology.

The **National Energy Efficiency Action Plan** was developed by the Ministry of Energy, Green Technology and Water (KeTTHA) to foster the efforts by industry and other sectors to reduce energy consumption, not only of electricity but also thermal energy use. The aim of the Plan is to promote energy efficiency so as to ensure productive use of energy and minimise waste in order to contribute to sustainable development and increased welfare and competitiveness. The effective and efficient implementation of the Plan is expected to save 50,594 GWh of electricity over the 5-year plan period against a business-as-usual (BAU) scenario. The corresponding electricity demand growth reduction at the end of the plan is 6.0%. It will also result in a total capacity saving of 2,268 MW. The fuel savings derived also are expected to lead to a total reduction of GHG emissions of 40 million tons CO₂eq. A total reduction of 96 million tons of CO₂eq will be achieved over the lifetime of the energy-efficient technologies adopted and adapted from the plan implementation.

Malaysia began incorporating Renewable Energy (RE) into its energy supply mix in the 1980s with the introduction of stand-alone solar photovoltaic systems for rural electrification. In April 2001, the importance of renewable energy was formally recognized with adaptation of the Five-Fuel Policy under the Eighth Malaysia Plan which defined RE as the fifth fuel in the national energy supply mix alongside natural gas, oil, hydro and coal. The **National Renewable Energy Policy and Action Plan (NREPAP)** was established in 2011 to provide a more comprehensive and effective renewable energy policy to accelerate renewable energy contribution into the national power generation mix. The NREPAP enabled the formulation of two acts, the Renewable Energy Act 2011 and the Sustainable Energy Development Authority Act 2011, which forms the basis for the feed-in tariff (FIT) mechanism implementation in Malaysia. The Policy Planned outcome of the Action Plan is shown in Table below.

Table 16: RE Policy Planned Outcome

Year Ending	Cum. Total RE (MW)	Share of RE Capacity	Annual RE Generation (GWh)	RE Mix	Annual CO2 Avoidance (tons)
2011	217	1%	1,228	1%	773,325
2015	975	6%	5,374	5%	3,385,406
2020	2,065	10%	11,227	9%	7,073,199
2030	3,484	13%	16,512	10%	10,402,484
2050	11,544	34%	25,579	13%	16,114,871

Source: National Renewable Energy Policy & Action Plan, KeTTHA

ANNEX L: STAKEHOLDER ENGAGEMENTS DURING THE PPG PHASE



Preliminary Meeting with various ministries & agencies – 27 Oct. 2015



Meeting with JPBD – 6 Nov. 2015



Meeting with other GEF/UNIDO & GEF/UNDP project owners – 17 Nov. 2015



Special Briefing to KPKT – 18 Nov. 2015



Meeting with MBMB & PTHM – 20 Nov. 2015



Site Visit to Melaka Central – 20 Nov. 2015



Meeting with Energy Commission – 23 Nov. 2015



The 1st National Workshop – 26 Nov. 2015



Meeting with MGTC– 21 Jan 2016



Meeting with KeTTHA– 22 Jan 2016



Meeting with TNB– 26 Jan 2016



Special Briefing to the Secretary General of
KPKT – 15 Feb. 2016



Meeting with GEF Operational Focal Point; Dr. Gary Theseira – 18 March 2016



Attendants of the 1st National Steering Committee Meeting – 22 March 2016



Meeting on Solar Thermal Application with SOLID Asia Energy Services Pte Ltd & UKM – 25 March 2016



Meeting with the newly appointed Director of The Federal Town and Country Planning (JPBD) – 31 March 2015

ANNEX M: GEF GRANT BUDGET

GEF Grant Budget							
Component 1. Integration of climate risks in urban planning and management	Type of expense	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Output Total
1.1 National urban policy framework strengthened to promote sustainable and resilient cities model/ Improved planning and increased knowlage and partnerships on sustainable citites and climate resilience at multiple levels	BuLi 11xx (International Experts)	82,000.00	82,000.00	25,000.00	20,000.00	20,000.00	229,000.00
	BuLi 15xx (Local Travel)	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	50,000.00
	BuLi 17xx (National Experts)	10,000.00	10,000.00	20,000.00	20,000.00	20,000.00	80,000.00
	BuLi 21xx (Subcontract - services)	114,311.75	114,311.75	114,311.75	9,357.75		352,293.00
	BuLi 30xx (Training/ST/Fellowship)						-
	BuLi 35xx (Int'l Meetings/EGM)	45,200.00	45,200.00	45,200.00	45,200.00	45,200.00	226,000.00
	BuLi 45xx (Subcontract - Equipment)						
	BuLi 51xx (Miscellaneous Expenses)						-
	Output subtotal						937,293.00
1.2 Investments in pilot cities generate local and global environmental benefits	BuLi 11xx (International Experts)						-
	BuLi 15xx (Local Travel)						-
	BuLi 17xx (National Experts)						
	BuLi 21xx (Subcontract - services)	41,000.00	41,000.00	41,000.00	41,000.00	41,000.00	205,000.00
	BuLi 30xx (Training/ST/Fellowship)						-
	BuLi 35xx (Int'l Meetings/EGM)						-
	BuLi 45xx (Subcontract - Equipment)	200,000.00	500,000.00	500,000.00	200,000.00		1,400,000.00
	BuLi 51xx (Miscellaneous Expenses)						-
	Output subtotal						1,605,000.00
	Component subtotal						2,542,293.00
Component 2. Monitoring and Evaluation	Type of expense	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Output Total
2.1 Adequate monitoring and evaluation facilitates smooth and successful project implementation	BuLi 11xx (International Experts)	3,000.00	3,000.00	23,000.00	3,000.00	3,000.00	35,000.00
	BuLi 15xx (Local Travel)	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	15,000.00
	BuLi 17xx (National Experts)						-
	BuLi 21xx (Subcontract - services)					30,000.00	30,000.00
	BuLi 30xx (Training/ST/Fellowship)						-
	BuLi 35xx (Int'l Meetings/EGM)						-
	BuLi 45xx (Subcontract - Equipment)						-
	BuLi 51xx (Miscellaneous Expenses)						-
	Output subtotal						80,000.00
	Component subtotal						80,000.00
3. Project management cost (PMC)	Type of expense	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	PMC Total
3.1. PMC	BuLi 11xx (International Experts)						
	BuLi 15xx (Local Travel)						
	BuLi 17xx (National Experts)	6000	6000	6000	6000	6000	30,000.00
	BuLi 21xx (Subcontract - services)	20,000	20,000	20,000	20,000	20,000	100,000.00
	BuLi 30xx (Training/ST/Fellowship)						-
	BuLi 35xx (Int'l Meetings/EGM)						-
	BuLi 45xx (Subcontract - Equipment)						-
	BuLi 51xx (Miscellaneous Expenses)						-
	PMC subtotal						130,000.00
Total project costs							2,752,293.00

ANNEX N: TEN GUIDING PRINCIPLES FOR THE GLOBAL PLATFORM SUSTAINABLE CITIES (GPSC) AND FOR CHILD PROJECTS UNDER THE INTEGRATED APPROACH PILOT ON SUSTAINABLE CITIES (IAP-SC)

The following principles are understood as guidance for the development and selection of the components and activities of child projects by countries and respective cities under the IAP-SC child projects. These aim at promoting transformative change towards achieving more sustainable and integrated urban planning.

The countries, cities and respective implementing agencies *acknowledge* the different baselines and contexts of participating cities, driven by diverse political economy characteristics, planning culture and procedures, existing policies, strategic priorities, legal frameworks, knowledge base, and capacities in different parts of the world that in turn require adjustment of procedures, tools and solutions adequate to the local circumstances.

The IAP partner entities *endorse* these guiding principles as the overall framework for pursuing transformative change and as pre-conditions for delivering on the objectives of the IAP-SC.

Implementation of the IAP-SC at national and municipal levels

1. The interventions will build on and reinforce locally self-determined strategic priorities and practices as well as on existing decision-making processes, and will not be in competition to the existing ones.

Output 1.1.1. will:

- Support the development of Competitive City Master Plans for four cities namely Kuala Lumpur, Johor Bahru, Kuching and Kota Kinabalu earmarked under the Malaysia Eleventh Plan, 2016-2020 by formulating a national framework as guidance to the development of the competitive city master plans but emphasizing the consideration of all pillars of sustainable city development, namely economic, social and environment factors.
- Support Melaka's effort to effectively implement its the Green Technology Blueprint, 2011-2020 and GCAP (finalized in 2014) as well as the development of a sustainable city master plan for Hang Tuah Jaya which is the newly designated green city of Melaka.
- Support KPKT's plan to update MURNInets (Malaysia Urban Rural National Indicator Network on Sustainable Development).

Output 1.2.1. will support the ongoing green initiatives of Melaka on smart grid, Advanced Metering Infrastructure, energy efficient buildings and promotion of solar energy installations.

2. With a view to achieve or accelerate transformation, all projects will need to identify and/or demonstrate a pathway for integration in a comprehensive way that supersedes a purely sectoral perspective. A comprehensive assessment of all relevant sectors will constitute a starting point of the proposed action plan and activities.

- Output 1.1.1. will promote an integrated approach in urban planning through formulation of a national framework for sustainable city master plan by mitigating policy fragmentation and sector focused planning practices. It will also showcase the benefits of a holistic and inclusive approach in Melaka by formulating a sustainable city master plan for the newly designated green city of Melaka, Hang Tuah Jaya.
- Under output 1.2.1., the project will demonstrate an integrated package of technologies including demonstration of smart grid systems and integration of ICT that encompass energy, transport, household and buildings sector in cities. The interventions will assist cities in carrying out and facilitating investments which will reduce GHG emissions and enhance the effectiveness, efficiency and safety of their technical and industrial systems and processes as well as transportation modes thus building the resilience of the cities. Industrial and technical systems, as well as transportation modes will be strategically integrated into mixed use city neighbourhoods, so as to produce not only better economic performance, but also create easily accessible and safe working environments, healthy surrounding neighbourhoods, and no negative impacts in the natural environment.

3. The integrated approach planning framework will necessarily include all required elements that can support long-term institutional sustainability. The participating city(ies) will identify the proper interlinkages between municipal agencies/department/sectors deemed appropriate for successful project implementation.

- As in #2
- Also capacity building activities of the project will focus on training of integrated urban planning and training needs worked out closely with the counterparts.

4. All IAP pilot projects will include the following building blocks: indicators and associated data; integrated planning; implementation and overall financial considerations.

- Situation analysis, baseline analysis will be done for formulation of sustainable city master plan.
- Cost benefits analysis, business and financial models will be worked out in Output 1.1.
- MUNRNInets, Time of use (TOU), standard and data from smart grids demo activities

5. Appropriate Global Environmental Benefits will be estimated for each of child project, and be tracked throughout project implementation.

- GHG reduction impact is calculated and will be monitored.

6. Child projects will identify success indicators and be assessed against them.

- Logframe has been prepared that show the key success indicators and their measurement
- Monitoring and evaluation activities will also be carried out during the course of project implementation

7. Child projects will identify relevant stakeholders and participatory approaches that will be necessary preconditions for success.

- National workshop with all relevant stakeholders was organized on 26th November 2015 for project design
- National steering committee (NSC) and its composition had been established during the PPG phase. Its first meeting was held on 22 March 2016. One of the items endorsed by the NSC is the establishment of a Technical Advisory Committee that will be supported by a few working groups based of project outputs. The general framework and outputs of the project has also been endorsed.

8. City peer to peer connectivity will become a distinctive feature of the IAP, including by building upon the experience of model cities. This will be accomplished through knowledge exchanges, peer to peer work, documentation and outreach activities promoted by GPSC.

- Involvement of other green city municipalities will be an emphasis in awareness and capacity building activities of the project. The four municipalities that will be formulating their competitive city master plans are also included as members of the NSC.
- Regular meetings will be organize under output 1.1.3.. with peer municipalities, nationally, regionally and internationally, to exchange best practices in integrated sustainable city development.
- Also, one of the features of the sustainable city master plan for Hang Tuah Jaya is the emphasis on its development relationship and impact with peer municipalities of Melaka.

Links to the other levels of government

9. State, regional and national governments are important enablers in creating optimal frameworks for integrated planning approaches, and must be considered as part of the project activities.

- Coordination meeting encompassing all levels will be organized under output 1.1.3.. Also both national and state policy makers are represented in the NSC.

Links to global frameworks and agreements

10. The IAP-SC builds on the Sustainable Development Goals, the Paris agreement, the Sendai and Addis Ababa Decisions, as well as the expected outcomes of Habitat III backbones for future change in cities.