



REQUEST FOR CEO APPROVAL

PROJECT TYPE: Medium-sized Project

TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title: Energy Efficient Low-carbon Transport in Malaysia			
Country(ies):	Malaysia	GEF Project ID: ¹	5741
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	120309
Other Executing Partner(s):	Ministry of Energy, Green Technology and Water (KeTTHA), Malaysia Green Technology Corporation (MGTC/GreenTech Malaysia)	Submission Date:	05/13/2015
		Resubmission Date:	07/13/2015
GEF Focal Area (s):	Climate Change	Project Duration(Months)	36 months
Name of Parent Program (if applicable):		Project Agency Fee (\$):	\$190,000
	<ul style="list-style-type: none"> ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/> ➤ For PPP <input type="checkbox"/> 		

A. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Cofinancing (\$)
Climate Change Mitigation/ Transport/ Urban (CCM-4): Promote energy efficient, low-carbon transport and urban systems	Outcome 4.1: Sustainable transport and urban policy and regulatory frameworks adopted and implemented	Cities adopting in low-carbon programs	GEF TF	727,500	1,615,000
	Outcome 4.2: Increased investment in less-GHG intensive transport and urban systems	Investment mobilized	GEF TF	1,272,500	27,105,000
Total project costs				2,000,000	28,720,000

B. PROJECT FRAMEWORK

Project Objective: To catalyze and accelerate widespread use of electric vehicles (EVs) as part of energy efficient low-carbon transport and low-carbon cities initiatives of Malaysia						
Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Cofinancing (\$)
1. Improvement of policy and regulatory framework for EV use and local manufacturing; strengthened capacity of concerned institutions and awareness raising.	TA	1.1 Enabling policies and regulatory framework, strengthened institutional capacity, and enhanced awareness catalyze and accelerate widespread use of	1.1.1 National policy and regulatory framework to catalyze and accelerate widespread use of EVs, both public and private: EV strategy and roadmap, business models, favorable tax/incentive schemes for local manufacturing, safety standards, etc. improved or developed;	GEFTF	600,000	1,200,000

¹ Project ID number will be assigned by GEFSEC.

² Refer to the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

		EVs in Malaysia, resulting in GHG reductions, local manufacturing, job and income creation and environmental improvements.	1.1.2 Institutional capacity built, and awareness on EV use raised.			
2. Development and demonstration of infrastructure for EVs, and local EV manufacturing capacity.	INV	2.1 Adequate infrastructure and skilled personnel to locally manufacture EV parts and components facilitate widespread utilization of EVs.	2.1.1 At least 6 PV-based charging stations (fast and off-grid) for EVs, designed, installed, and tested; used for demonstration and further studies; 3 stations will be installed in Melaka and the other 3 tentatively in Kuala Lumpur, Putrajaya and Cyberjaya.	GEFTF	300,000	26,000,000
	TA		2.1.2 Enhanced standards and regulations for EV infrastructure, including charging stations, safety, and support applications, developed;		845,000	700,000
			2.1.3 Local manufacturing of e-bus and e-motorcycle components supported through development of enabling support programmes; enhanced incentives and industry support to encourage Foreign Direct Investment in the sector developed;			
			2.1.4 Effective capacity building and technology transfer to enable EV manufacturing facilitated.			
3. Monitoring and Evaluation.	TA	3.1 Adequate monitoring and evaluation mechanisms are in place, facilitating smooth and successful project implementation and sound impact.	3.1.1 Regular monitoring exercises conducted; tracking tools prepared according to GEF requirements;	GEFTF	105,000	230,000
			3.1.2 Final project evaluation conducted.			
Subtotal					1,850,000	28,130,000
Project management Cost (PMC) ³				GEFTF	150,000	590,000
Total project costs					2,000,000	28,720,000

³ PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$) ⁴

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount (\$)
National Government	Ministry of Energy, Green Technology and Water (KeTTHA)	In-kind	3,000,000
National Government	Malaysia Green Technology Corporation (MGTC/GreenTech Malaysia)	In-kind	1,000,000
Private Sector	Eclimo Sdn. Bhd.	In-kind	1,700,000
Private Sector	First Energy Networks Sdn. Bhd. (FEN)	In-kind	1,000,000
Private Sector	AMDAC Sdn. Bhd.	In-kind	5,800,000
Private Sector	Panorama Melaka Sdn. Bhd.	In-kind	9,000,000
Private Sector	Panorama Melaka Sdn. Bhd.	Cash	6,000,000
Private Sector	Hanwha Q Cells Malaysia Sdn. Bhd.	In-kind	1,000,000
GEF Agency	UNIDO	Cash	50,000
GEF Agency	UNIDO	In-kind	170,000
Total Co-financing			28,720,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY ¹

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in \$)		
				Grant Amount (a)	Agency Fee (b) ²	Total c=a+b
Total Grant Resources						

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

² Indicate fees related to this project.

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount (\$)	Cofinancing (\$)	Project Total (\$)
International Consultants	464,000	120,000	584,000
National/Local Consultants	615,000	400,000	1,015,000

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

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

⁴ Contributions made by local partners consist of public and private investment in ongoing or planned e-mobility projects that are in line with and complement the objectives of this project. Thus, these could be considered as in-cash contributions. More information on this cofinancing can be found in the co-financing section on page 16 of this document.

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF⁵

The objective of the project remains the same: to catalyze and accelerate widespread use of electric vehicles (EVs) as part of energy efficient and low-carbon transport and low-carbon cities initiatives of Malaysia. The general framework of the project also remains the same as in the PIF and organized into three components: (i) to promote the use of electric vehicles (EVs) by improving relevant policy and regulatory frameworks, developing incentive schemes and support programmes, and strengthening the capacity of concerned institutions, as well as raising public awareness; (ii) to promote local manufacturing of EVs and development of adequate EV infrastructure and demonstration of photo-voltaic (PV)-based, off-grid and fast charging stations; and (iii) Monitoring and Evaluation. The project will assist Malaysia in the implementation of the National Automotive Policy that was adopted in 2014 with the vision to become a regional automotive hub in energy efficiency vehicles with a particular focus on e-mobility.

As a result of the PPG phase consultations (see Annex L), to support the project's participatory approach and national ownership and sustainability, Melaka City has been confirmed for the demonstration of 3 out of the total 6 PV-based charging stations (fast and off-grid), with the remaining three to be tentatively located in Kuala Lumpur, Putrajaya and Cyberjaya. The Melaka city has been selected by the Government of Malaysia as a pilot city for the implementation of its Smart Communities Programme, and for the new UNIDO GEF-6 project proposal on sustainable cities, to be included as a Child Project under the World Bank-led GEF Sustainable Cities Integrated Approach Pilot (IAP). Thus, the implementation of demonstration activities under this project in Melaka will provide ample opportunity to leverage on existing and planned initiatives, as well as ensure sustainable impact and ongoing interventions.

Additional information resulting from intensive consultations undertaken and work conducted during the PPG phase, as well as developments since PIF approval, have also been included. The CEO Approval Request (AR) has been aligned closely with the principles of Inclusive and Sustainable Industrial Development (ISID) as approved by member states at the UNIDO General Conference in December 2013 in Lima, Peru that includes creating shared prosperity and safeguarding the environment, as well as with the newly developed UNIDO guidelines on gender mainstreaming in energy and climate change projects. Special focus has also been given to comply with the GEF Guidelines for implementation of the GEF Public Involvement Policy as this project is among the first interventions promoting the nation-wide use of EVs in an integrated manner: policy improvement, institutional and manufacturing capacity building, demonstration and awareness raising.

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

Malaysia's **2nd National Communication (2011)** has highlighted the importance of developing the public transport system of Malaysia, specifically noting that only 10% of Kuala Lumpur is directly served or within the transit catchments of the existing stations. In recognition of transportation's environmental impact on Malaysia, the National Communication lays out two key strategies; capacity building and awareness raising of public institutions and the larger populous, and improving the regulatory environment. The key objectives of the proposed project are closely in line with these outlined strategies and will support their achievement.

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 a 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, 2009)** 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.

⁵ For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter "NA" after the respective question.

A.2 GEF focal area and/or fund(s) strategies, eligibility criteria and priorities:

The GEF-5 Climate Change Focal Area Objective 4 aims at promoting energy efficient, low-carbon transport and urban systems. This project complies with this objective; clearly focusing on the promotion of low-carbon transportation in Malaysia for the widespread adoption of energy-efficient vehicles by the market.

A.3 The GEF Agency's comparative advantage:

Following the endorsement of the Lima Declaration in December 2013, UNIDO has a new mandate to promote inclusive and sustainable industrial development (ISID); recognizing that future strategies for poverty reduction need to be economically empowered, UNIDO promotes ISID to harness the full potential of industry's contribution to the achievement of sustainable development, and lasting prosperity for all. UNIDO's mandate is inter-alia, to promote technology transfer, technology development and deployment in developing countries. One of the current three thematic priorities of UNIDO programme is sustainable energy and environment. UNIDO's Energy Strategy aims at helping developing countries and countries in transition to achieve the following objectives:

- Increase the competitiveness of their industries by reducing the dependence on fossil fuels;
- Reduce their impact on climate change by decreasing the carbon emissions of their industries and by promoting renewable energy technologies;
- Increase the viability of their enterprises, particularly in rural areas, by augmenting the use of locally available renewable energy sources.

UNIDO already has a number of ongoing climate change projects under implementation as well as under development in Malaysia, many of which are GEF-funded. UNIDO has, therefore, developed a strong level of expertise, trust and a large network of national counterparts involved in this space which will benefit the proposed projects through a number of synergies,

UNIDO has years of experience developing and managing projects in South-East Asia, namely Thailand, Indonesia and Vietnam, as well as other countries around the world, such as South Africa, Russia, India, Turkey, etc. This experience has been in a variety of project focal areas, including providing assistance to automotive sectors to increase their competitiveness, and reduce their negative impact on the environment. UNIDO has, therefore, developed a strong level of expertise, trust and a large network of international partners involved in this field. Under the ICHET project in Turkey, UNIDO assisted the design, manufacture, operation and maintenance of a Hydrogen fuel-cell (FC) van powered by solar energy for emergency situations, and a fleet of tri-wheelers in New Delhi based on Hydrogen combustion. Further, the Business, Investment and Technology Services Branch of UNIDO has worked with the automotive sector in a number of countries on supply-chain management, thus developing capacity in this field. As a result, UNIDO has proven experience and expertise in the transportation sector, specifically in the manufacturing processes of energy efficient vehicles, charging stations, including PV-based ones, and the development of charging infrastructure for EVs.

In 2013, UNIDO began the process of establishing a strategic approach to a sustainable transport sector centered around three areas of intervention: i) Fostering Enabling Policy Frameworks for Market Transformation; ii) Strengthening Local Capacities for Establishing Low-Emission Transport Systems; and iii) Enhancing Knowledge and Innovation. Within these key pillars, three specific cross-cutting themes have been identified as areas of UNIDO's comparative advantage; i) vehicle technologies; ii) transport and energy infrastructure; and iii) alternate and clean fuels. The proposed project is in line with this strategic approach and will closely liaise with other initiatives implemented in the country with regard to the fostering of a green industrial sector and the transition towards a green economy.

A.4 The baseline project and the problem that it seeks to address:

BASELINE SCENARIO

Economic development & Energy Consumption

Malaysia has shown strong and stable economic growth in the last 3 years at around 5%, underpinned by stronger manufacturing and services sectors. The services sector, which accounts for more than half of Malaysian Gross Domestic Product (GDP), expanded by 6.4% in 2012 (Q4), as a result of improvements in trade and manufacturing activities. The manufacturing sector, accounting for nearly 25% of GDP, expanded at a slower pace of 5.1% in Q4 2013, supported by higher growth in both export- and domestic-oriented industries. Industrial GDP for Malaysia in 2012 registered a slightly higher growth of 5.6% as compared to the year prior at 5.1% and industrial energy

intensity was 68 tons of oil equivalent (toe)/RM Million, an increase of 11% from the previous year due to higher growth of final energy consumption compared to the growth of GDP.

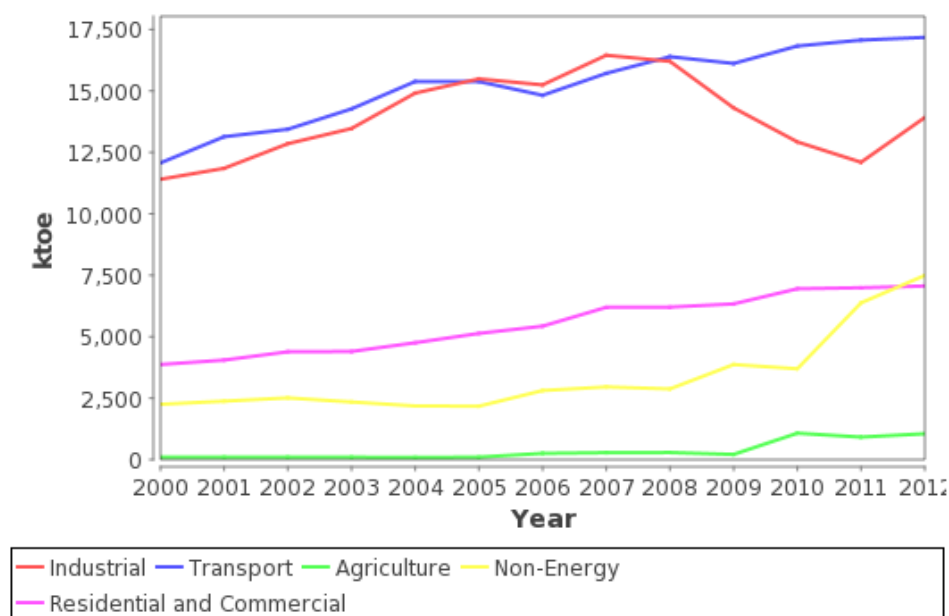


Figure 1 - Final Energy Demand by Sectors

Final energy consumption in 2012 grew by 7.5% to settle at 46,711 ktoe compared to 4.8% in 2011. The share in energy demand was highest for the transport sector at 36.8%, followed by the industrial sector at 29.8%, the non-energy sector⁶ at 16%, the residential and commercial sectors at 15.1% and the agriculture sector at 2.3% (see Figure 1)⁷. All sectors showed an upward trend, with double digit growth from the non-energy use, industrial and agriculture sectors. In addition, the commencement and progress of several infrastructure projects, including those under the Economic Transformation Programme (ETP), such as the

Malaysia Rapid Transit, had also provided significant positive spillover effects in the domestic manufacturing and services sectors. Reflecting these developments, the construction sector registered a robust growth in 2012. While this growth has had positive economic impacts for Malaysia as a whole, it also highlights the significant effect this can have on the environment and GHG emissions, and the need for sustainable development and growth.

Analysis of total final energy consumption by type of fuels showed that petroleum products constituted about 53% of total energy demand, followed by natural gas at 21.8%, 21.4% for electricity and 3.7% for coal and coke. In 2012, total final energy consumption for petroleum products increased by 3.4% with the major increase coming from kerosene and fuel oil; final consumption of kerosene increased by 100.1% and 85.5% for fuel oil. Petrol (36.2%) and diesel (35.5%) continue to be the largest contributors to total consumption of petroleum products, followed by LPG (11.7%), ATF and AV GAS (10.2%), fuel oil (3.1%), non-energy (3%) and kerosene (0.2%).

The high demand of energy in the transport sector is due to an increasing level of motorization resulting from a growing population, an automobile dependent urban sprawl, subsidized transport fuel prices, and promotion of the automobile industry in the country. This is closely linked to the fact that manufacturing is an important sector in Malaysia, being labor intensive and considered a high yield investment opportunity. The country's economic development is driven by an export-orientated manufacturing sector, making Malaysia a top choice for foreigners to invest in the industry.

GHG Emissions

In the baseline scenario of Malaysia's 2nd National Communication, GHG emissions are expected to grow at 3.72% per annum from 2000 to 2020, implying an increase in total emissions of 260 million tons of CO₂ equivalent (tCO₂) in 2020, up from 123 million tCO₂ in 2000. Malaysia voluntarily aspires to the scenario of reducing GHG emissions intensity of GDP by up to 40% of 2005 levels by 2020⁸, i.e., from 0.62 kg CO₂ per unit of GDP to 0.37 kg CO₂ (see Annex K).

In 2000, energy production in Malaysia was responsible for around 35% of total CO₂ emissions (167 million tCO₂), with the transportation sector following with 21%;⁹ fossil fuels (mainly natural gas and petroleum products) are the most used fuels for energy production and consumption. In this baseline scenario, CO₂ emissions would increase to 260 million tCO₂ by 2020, pushed upward by Malaysia's high economic growth rate of about 4.8% annually¹⁰.

⁶ Non-energy use refers to the use of products resulting from the transformation process for non-energy purpose (i.e. bitumen /lubricants, asphalt/ greases), and the use of energy products (such as natural gas) as industrial feed stocks.

⁷ Malaysia Energy Hub, ST Energy Commission; Final Energy Demand

⁸ Confirmed by the Prime Minister in Copenhagen during COP 15 in 2009

⁹ CO₂ constituted 75% of the total GHG emissions in 2000, according to the 2nd National Communication

¹⁰ Final energy demand would increase from 30 million tons of oil equivalent (MToe) in 2000 to almost 80 MToe by 2020

Since 2009, the transport sector has become Malaysia's largest GHG emitter sector, and the second-biggest driver of energy demand of the economy; in the Business as Usual Scenario, CO₂ emissions from the road transportation sector will increase by 213% from 61.6 MtCO₂ in 2013 to 127 MtCO₂ in 2030.

Industry

Malaysia is ideally located in South East Asia, offering a dynamic and productive business environment suitable for investment due to a well-developed infrastructure (five state-of-the-art international airports complete with air-cargo facilities and seven international seaports) and a highly skilled workforce. In 2014, the industrial sector accounted for 35% of the economy, with export-oriented manufacturing forecasted to account for some 80% of total manufacturing output in the period 2014-18. Electrical and electronic goods are the main industry in Malaysia for export, responsible for 37% of total industrial exports in 2013.¹¹

Malaysian Automobile Sector

The Malaysian automotive sector is one of the most developed in the ASEAN region, and is the second largest market for passenger cars, accounting for nearly 28% of all new registrations in ASEAN (2014), as well as for automotive parts.¹² In 2013, Malaysia was the 21st largest vehicle producer in the world, with total car production increasing by 5.6%, 90% of which were passenger cars.¹³ The majority of passenger cars assembled in Malaysia are intended for the domestic market, with Malaysia's Proton (Perusahaan Otomobil Nasional Bhd.) and Perodua dominating the market, with market share of 18.2% and 29%, respectively.¹⁴ The vehicle manufacturing sector in Malaysia consists of nearly 30 manufacturing and assembly plants, and more than 800 automotive component manufacturers.

Like many Asian countries and in light of heavy traffic in the key cities, motorcycles continue to play a large role in Malaysia's transport sector. Numbering 11,118,326 in 2014, motorcycles form 46.6% of land transport vehicles in Malaysia, with numbers expected to increase by 5% annually.¹⁶

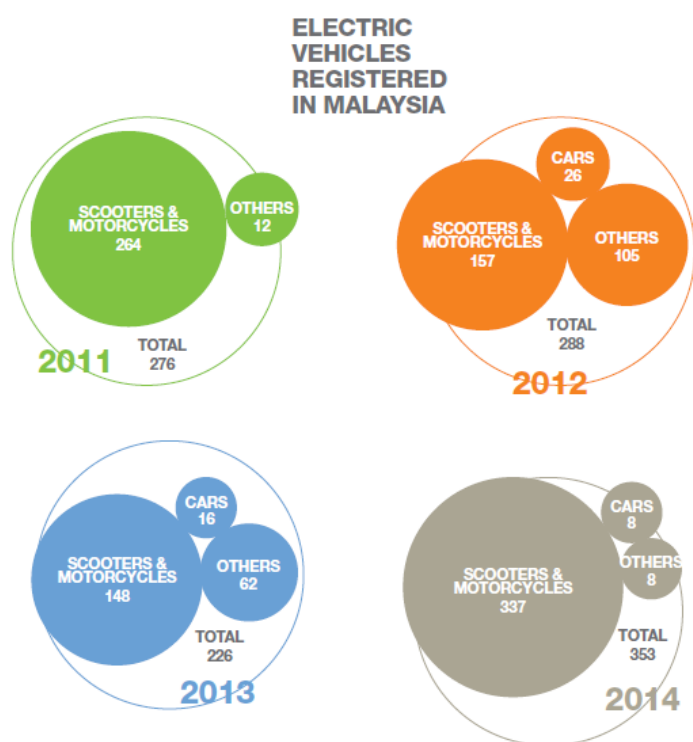


Figure 2 - Annual electric vehicle registrations in Malaysia

Under the current regulations, the automotive industry is not subject to specific CO₂ reduction targets, with energy efficiency gains relying on the promotion of the use of cleaner fuels. In line with government targets to become a regional hub for EVs, Proton plans to bring their electric hybrid to the market by end-2015; this is supported by a government grant to fund the development of clean-energy vehicles.

E-mobility

In August 2014, the Road Transport Department of Malaysia had registered sales of 1,143 units of EVs in Malaysia, consisting of EVs, electric scooters, electric bicycles and others. In 2015, only four EV models are available on the Malaysian market; the Nissan LEAF, the Renault Twizy and Zoe, and the Mitsubishi i-MiEV. For electric motorcycles, only one Malaysian manufacturer exists, **Eclimo**, while DRB-HICOM/Kawasaki Heavy Industries' Modenas manufactures and supplies electric motorcycles in Malaysia. Eclimo has been involved in the electric bicycle sector since 2011, producing electric motorcycles (ES11 and EB25), as well as Lithium battery packs and modules. Recently, Eclimo has begun collaboration with KFC for the development of a fleet of

¹¹ Country Forecast: September 2014. The Economic Intelligence Unit

¹² Industry Report: Automotive December 2014, The Economic Intelligence Unit, www.eiu.com/automotive

¹³ International Organisation for Motor Vehicle Manufacturers (OICA)

¹⁴ Market share figures for the first 10 months of 2014; Industry Report: Automotive December 2014, The Economic Intelligence Unit, www.eiu.com/automotive

¹⁵ Proton was recently purchased by DRB-HICOM in 2012 but was previously wholly owned by the Government of Malaysia; Perodua is a privately owned and operated company.

¹⁶ Electric Mobility Blueprint, February 2015

400 ES11 scooters for food delivery purposes.¹⁷ **AMDAC**, a Malaysian incorporated company, is another key player involved in the local manufacturing of specialized vehicles, e-buses, energy storage systems and battery manufacturing. In 2013, AMDAC began the production of the BYD K9 e-bus for local trials; the 29-seater bus costs around RM 1.4 million per unit (US\$ 380,000), with 15 and 40 units already reserved by Sunway BRT and Panorama Melaka, respectively.¹⁸ As highlighted in Figure 2, the annual number of registrations of EVs has been decreasing since 2011, while the registrations of e-scooters and e-motorcycles have been increasing. This can be explained by the introduction of the National Automotive Policy 2014 which included requirements that have discouraged OEMs from further investment in a relatively new market, paired with an increase in the number of national initiatives promoting e-motorcycles, i.e. KFC delivery fleet, Royal Malaysian Police, etc.

As of March 2015, 38 cost-free public access EV charging stations are available in Malaysia, only two of which are fast-charging stations (see Annex J). These are primarily installed at shopping complexes, car dealerships and government buildings in order to create public awareness and allow for convenient charging opportunities for EV users. Malaysia's major e-mobility operator, **First Energy Networks (FEN)**, has to date, installed 20 charging stations across six states of Malaysia at shopping malls, petrol stations, municipal buildings and public car parks capable of fully charging a 24 kWh battery in 4 to 8 hours; the first two public charging stations were launched in October 2012 in two locations of Kuala Lumpur. In order to expand on the network and contribute to the development of the nation-wide **Electric Mobility Program**, FEN has signed a Memorandum of Understanding with Greentech Malaysia for future collaboration.¹⁹ This provides significant opportunity for the proposed project to leverage on the existing momentum in the field to introduce PV-based and fast charging stations which are, to date, not prevalent in Malaysia, as well as worldwide.

BASELINE POLICIES AND PROJECTS

Malaysia is host to a number of ongoing and planned initiatives focused on either developing the local automotive sector, or the promotion of more sustainable form of transportation. These initiatives, however, suffer from a lack of coordination and isolated approaches that focus more on their objectives in a specific field and miss potential linkages and benefits of cooperation with one another. In light of this, and the rich field of initiatives, this project proposes to play a coordinating role amongst project partners, bringing together public and private entities to ensure that progress towards sustainable transportation in Malaysia is achieved in an effective and sustainable manner.

The energy policy of Malaysia addresses issues of energy development, planning, production, distribution, and consumption. Governmental agencies that contribute to the country's energy policy are the Ministry of Energy, Green Technology and Water (KeTTHA), the Energy Commission (Suruhanjaya Tenaga, ST), and the Economic Planning Unit of the Prime Minister's Department. Government-linked companies such as Petronas and Tenaga Nasional Berhad are major players in Malaysia's energy sector. In light of the recent shift away from the use of palm oil as a biofuel, and the subsidization thereof, increased focus has turned towards the potential of electric vehicles to deliver sustainable transport solutions.

In recognition of the large impact of the transportation sector on the country's GHG emissions, and in order to meet the emissions reduction target, as well as creating jobs and income, the Government of Malaysia issued the **National Automotive Policy (NAP 2014)** in January 2014. The NAP envisages to make Malaysia a regional hub for EVs with a vibrant, world-class industry, and to have EVs driven by electricity generated from renewable energy (RE) sources to achieve truly sustainable transport with zero emissions. The NAP focuses on the development of a local manufacturing market, strengthening the entire value chain for energy efficient vehicles (EEV), with the long-term goal of being an EEV Hub by 2020. While the Policy focuses primarily on market development and competitiveness, it has been developed in close collaboration with the private sector and will be closely linked with Component 1 of the proposed project. Furthermore, the development of such a Hub could help ensure the sustainability of the project's impact beyond its life scope.

Under the Economic Transformation Program (ETP), the National Key Economic Area (NKEA) Electrical and Electronics identified Entry Point Project (E&E EEP) 18, **Enabling Electric Vehicle Component Manufacturing**, is the key enabler towards Malaysia becoming a regional hub for EV manufacturing, financing, and backend ecosystem.

To realize this vision, the Government and many institutions have developed policies, set up programmes and projects, and taken measures to reduce the emissions originating from the transport sector. For example, the Government has continuously reduced the fuel price subsidy over the past years and one of the ETPs focuses on

¹⁷ Electric Mobility Blueprint, February 2015

¹⁸ <http://paultan.org/2014/10/20/byd-k9-e-bus-amdac-set-first-deliveries/>

¹⁹ Electric Mobility Blueprint, February 2015

collecting and consolidating funds to provide incentives for energy efficient appliances and vehicles. The Malaysian Investment Development Authority (MIDA) has many incentives schemes to promote Green Transport, for example, customized incentives for up to 10 years based on the merit of each project for the assembly or manufacture of hybrid and EVs. Customized incentives for up to 5 years based on the merit of each project for the manufacture of selected critical components supporting hybrid and EVs are also available. The Sustainable Energy Development Agency (SEDA) has several programmes to promote RE, in particular PV, with feed-in-tariffs (FITs) and FC storage programmes.

GreenTech Malaysia, commissioned by KeTTHA, developed the **EV Infrastructure Roadmap** in July 2011 that envisioned the development of an EV roadmap, a national automotive policy, with initial EV sales in the second half of 2014, local production of e-motorcycles and e-buses, etc. The development of the **EV Roadmap** focuses on policies, assessments, implementation and reporting on the use of EVs in Malaysia. This Hub would mean; widespread adoption of EVs; effective reduction of urban emissions through deployment of EVs; adequate EV charging infrastructure networks; financial services supporting the growth of EVs; and local manufacturing of EVs and EV components.

The proposed project will work with these government partners to ensure that these various policies, incentives and programmes can be brought underneath a coordinated policy and regulatory framework focused on catalyzing and accelerating the widespread use of EVs in Malaysia.

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.

Proposed fiscal incentives:

- Tax exemption for fully imported EVs;
- To promote cleaner air quality in the cities, reduce public spending in fuel cost, and mitigate the Government's fuel subsidy;
- Proposed tax exemption for CBU electric vehicles on a reducing scale basis from 2015 to 2020;
- Over 10 years of use of the projected number of EVs - directly reduce government's fuel subsidy by RM 1 billion (US\$ 269.7 million), generate RM 0.7 billion (US\$ 188.6 million) of savings to the owners, and displace RM 1.8 billion (US\$ 485 million) of fuel costs;
- In return, the tax exemption may cost foregone tax revenue of RM 1.4 billion to the Government by year 2020.

As the Electric Mobility Blueprint is yet to be finalized and adopted, it provides ample opportunity for the proposed project to work with government and private sector partners to improve/strengthen the document based on the project's efforts. In addition, the demonstration activities under the proposed project, namely the six charging stations to be introduced under Output 2.1.1, will aim to serve as a catalyst for the achievement of the targets of the Blueprint, thus supporting its roll-out strategy and implementation.

As the world inevitably transitions from an oil-dependent economy to more environmentally sustainable sources of energy, the potential multiplier effects of Electric Mobility across different sectors of the Malaysian economy will be transformative. Key to achieving this, however, is market acceptance of EVs, beginning with the private vehicle market. Based on the Product Life Cycle Model, the Malaysian market for private passenger EVs can currently be described as being at an introductory stage, where the EV technologies are considered to be relatively new, with a limited range of products being offered. A two-pronged approach has been envisioned for Malaysia to accelerate EV adoption:

- 1) Encouraging the replacement of diesel-fuelled public buses with electric buses; and
- 2) Exposing Malaysians to EVs via the offer of an EV car sharing programme.

The **Green Technology Financing Scheme**, operating with a total budget of US\$ 1.6 billion, is managed by GreenTech 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. This scheme could serve as a potential funding source for local manufacturers looking to invest in manufacturing capacity of either EVs themselves or the supporting infrastructure envisaged under this proposed project. Further, according to KeTTHA, with the aim to foster the development of the electric bus manufacturing industry in Malaysia, a **Sustainable Mobility Fund** of RM 70 million (US\$ 19.5 million) was established under the SME Bank as part of the 2015 budget. To ensure their effectiveness, it is vital that these Funds are closely in line with the needs of the automotive manufacturing sector. The proposed project, in its coordinating function, will work with the relevant partners to build awareness, facilitate access to this funding and provide advice and expertise, where relevant.

The **Green Township Malaysia and Low Carbon Cities Framework (LCCF)** will provide assistance to cities, inter-alia, in identifying climate change mitigation strategies, collecting baseline data, and implementing pilot projects. It has endorsed the need for cities to focus on their urban transport as one of the significant areas where strategies and appropriate actions to reduce their GHG emissions should be identified and developed. While the LCCF project is very comprehensive, capacity building of the manufacturing sector is lacking, thus neglecting the supply side of the sector. The proposed project will seek to rectify this through the activities planned for implementation under Component 2, such as capacity building and technology transfer.

The key programmes focusing on the promotion of e-mobility use currently operating in Malaysia are listed below:

Electric Vehicles

Driving Efficient Electricity Demand Growth through Electric Mobility, a project funded by the Malaysian Electricity Supply Industry Trust Account (MESITA) and implemented by GreenTech Malaysia, aims to improve energy efficiency by increasing electricity demand from EV charging. This will be achieved through the installation of 125,000 public-access charging stations across Peninsular Malaysia in shopping malls, near transit networks and commercial and office buildings by 2020. For the year 2015, the installation of 300 EV charging units is foreseen, as well as an EV backend system that successfully connects all available EV chargers and has a utilization rate of 30%. Complementing the demonstration activities, the MESITA-GreenTech Malaysia project aims to improve public perception and awareness of power generation potential and EV backend support systems. As this initiative remains at an initial stage, the proposed project will coordinate closely with, aiming to provide the groundwork and build awareness and recognition to support its sustainable impact.

Focusing on EV sharing initiatives, the planned **Cohesive Mobility Solution (COMOS)** is a public-private partnership between CMS Consortium, GreenTech Malaysia and Malaysia Automotive Institute (MAI). COMOS adopts the car-sharing modality of systems such as Car2Go and aims to roll-out 30 EVs in the Klang Valley in Phase 1, followed by 20-30 EVs in the northern region of Malaysia, as well as Melaka and Johor;²⁰ initially, EV models such as Renault's Zoe and Twizy will be used. COMOS will build on the work of the Driving Efficient Electricity Demand Growth through Electric Mobility project, utilizing the established information network system.

Electric Buses

Malaysia also has a number of programmes focusing on Electric Buses (e-buses), such as PEMANDU's **NKEA E&E EPP** that entails the development and introduction of e-buses in public transportation. GreenTech Malaysia and KeTTHA are jointly leading the EPP and aim to develop 2,000 e-buses by 2020; pilot projects are planned for a Sunway Bus Rapid Transit (BRT) with an initial fleet of 15 e-buses ready to be launched in June 2015 through an initiative of Prasarana, Sunway Group, BYD, AMDAC, and Gemilang, a local bus manufacturer.

In 2013, GreenTech Malaysia initiated a 6-month pilot phase trial to assess the viability of e-buses for public transportation, leading to a 3-month trial of an AMDAC-produced K9 Electric Bus in Melaka, where passengers were offered free trips to boost awareness and familiarity with e-buses. The trial resulted in the following key benefits for every 100km travelled: 69% fuel cost reduction for bus operators, 65% government subsidy reduction, 31% maintenance cost reduction, and 100% CO₂ emissions reduction.²¹ More recently, NEDO Japan, working with

²⁰ Electric Mobility Blueprint, February 2015

²¹ Electric Mobility Blueprint, February 2015

Toshiba, Deftech and Putrajaya Corporation, plans to launch 11 e-buses based on overhead conductive charging technology in Putrajaya in the third quarter of 2015, and MAI also plans to introduce e-buses from September 2015 onwards, in cooperation with Bustech, an Australian bus manufacturer and Swinburne University. Furthermore, as mentioned earlier, a **Sustainable Mobility Fund** of RM 70 million (US\$ 19.5 million) has been established this year to intensify the development of the e-bus industry in the country.

While there has been increasing interest from both public and private partners in the stimulation of the e-bus industry in Malaysia, their introduction remains limited to pilot and demonstration projects, with widespread adoption yet to take place. The proposed project aims to leverage on the momentum in the market and initiate and encourage actual on-the-ground adoption and deployment of e-bus fleets in Malaysia.

Electric scooters

The Electric Mobility Blueprint, in recognition of the fact that motorcycles account for 46.6% of all land transport vehicles in Malaysia, also targets the widespread adoption of electric scooters in Malaysia. Two key projects are currently in the planning phase: **The Electric Scooter Rakyat 1 Malaysia (SER1M)** has proposed to provide 10,000 electric scooters to Malaysians above the age of 50 living in rural areas to exchange their existing motorcycles with the electric scooters, or enable them to lease the electric scooters for their mobility; and **the electric scooter sharing scheme** that would enable students to embrace green technology, while assisting them to move around campus without the cost burden of owning their own motorcycle. These projects, however, remain in the planning phase with implementation yet to begin.

As outlined on page 7, Eclimo, a project partner, is a local manufacturer of electric motorcycles that already has a number of initiatives ongoing in Malaysia, including a partnership with KFC.

Demonstration Cities

As highlighted earlier, Melaka City has been very actively involved in the ongoing initiatives focused on the promotion of energy efficient transportation in Malaysia; a number of e-buses have already been piloted in the City, or will be deployed this year, and the COMOS initiative will roll-out the EV car sharing system in Melaka in their 2nd Phase. Notably, Melaka City, with the support of the Asian Development Bank (ADB), has prepared its first comprehensive Green City Action Plan (GCAP) which was launched on 22 April 2014.

The City has also been selected as the first demonstration city of the Smart City Programme of the Science to Action (S2A) initiative of the Malaysian Prime Minister. This will provide the proposed project with considerable areas for intervention, ensuring that project outputs directly feed into this large national initiative, as well as sub-regional cooperation. In light of this, and the number of upcoming projects that could utilize the stations, the proposed project has selected Melaka City as the site for three of the six charging stations to be installed under Output 2.1.1. As GreenTech Malaysia is a City Development Partner of Melaka City under the Smart City Programme, it will benefit from the project's support on policy and capacity building. It is also worth noting that Melaka City has been selected as the project partner of the proposed UNIDO project on Sustainable City Development in Malaysia, a child project under the GEF Sustainable Cities Integrated Approach Pilot to be financed by the GEF (further information on this project can be found in Section A7). This would allow the outputs of this project, namely promotion of EVs, development of the relevant policies and standards, built capacity and installation of charging stations, to become direct inputs into this new project proposal. This ongoing partnership is a key element of the project's sustainability strategy. Having highlighted the numerous existing projects and policies in the field of e-mobility in Malaysia, strong partnerships will be a key area of focus of the proposed project, forming a strong baseline for the planned GEF Sustainable Cities Integrated Approach Pilot.

The remaining three charging stations will be installed in Kuala Lumpur, Putrajaya and Cyberjaya. These cities were selected in line with stakeholder discussions and due to the large number of relevant ongoing baseline projects, and high potential for upscaling and replication. Kuala Lumpur, as the largest city in Malaysia and federal capital, offers significant potential to reach out to the general public, raising awareness and knowledge of e-mobility. FEN, for instance, has already installed two stations in Kuala Lumpur, albeit slow-charging.

Putrajaya, about 40 km south of Kuala Lumpur, serves as the new federal administrative center of Malaysia and is dominated by modern government buildings. Similarly, Cyberjaya is a science park 50km south of Kuala Lumpur that is considered the "Silicon Valley" of Malaysia. Given that both cities are very modern and characterized by government partners and private sector companies, rather than residential housing, there is significant potential for utilization of the installed charging stations in both cities.

To date, 9 charging stations have been installed in Putrajaya, all of which are slow charging, and NEDO is already working with local partners on the introduction of a small fleet of e-buses. Given this existing interest in e-mobility,

there is ample opportunity for the proposed project's demonstration activities. Cyberjaya, while not yet as advanced in the field of e-mobility, has shown ongoing interest in sustainable technologies and green urban transport; for instance, a comprehensive network of cycling paths are under development to connect the existing public transport networks and solar panels are widely distributed throughout the city.

Barriers

While there has been an increased interest in promoting the adoption of EVs in Malaysia, the majority of initiatives in this field remain at the nascent stage, with real implementation yet to take place.

While the ongoing policies and programmes highlighted above have been effective in increasing the sale of hybrid vehicles (fully hybrid, not plug-in hybrid) in the short-term, e.g. by 84% from 2010 to 2012, there has been a very small number of EVs sold, as indicated above. This is due to a number of persistent coordination and awareness barriers that are hindering the implementation of several initiatives and the widespread adoption of EVs. For instance, the sheer scale of stakeholders in the field of e-mobility has led to a lack of coordination between initiatives where despite shared objectives, little coordination exists, thus risking overlaps and lost synergies. The proposed project will seek to rectify this through focusing firstly on strengthening coordination, under the leadership of KeTTHA and execution by GreenTech Malaysia. This coordination will also be significantly strengthened by the Project Steering Committee (PSC), bringing together all relevant stakeholders, as well as policy support and awareness raising that will be cross-cutting across a number of initiatives to ensure knowledge sharing.

Furthermore, EV market growth has been hindered by a lack of incentive schemes; the import duty exemption that has spurred the increase of hybrid vehicles sale already expired in December 2013, and currently there are no incentives available. Limited demand also persists for locally produced e-motorcycles due to the same barriers mentioned above. As a result, and limited support programmes for manufacturers, there is little incentive for local manufacturers to invest in these innovative technologies and become first-movers in the market. The proposed project will seek to mitigate this problem by focusing on both the demand and supply aspects of the market, as well as the policy frameworks, thus taking a long-term approach. The proposed project, through its policy development and institutional capacity building activities, will aim to maintain the political momentum in this field.

The key barriers identified during the PPG phase of the proposed project through workshops and consultations, are outlined below:

Barrier	Mitigation Actions
<p>Policy barriers: Despite a large number of policies and initiatives, there persists a lack of concrete incentive programmes to encourage early market take-off and first-movers; high subsidization of fossil fuels;</p>	<p>Baseline: While some initiatives and policy papers for the promotion and adoption of EVs and an EV ecosystem have been issued by the relevant counterparts, concrete incentive programmes for the development of local manufacturing capacity and the widespread adoption of EVs are still lacking.</p> <p>Alternative: The proposed project will seek to mitigate this risk through i) the improvement and development of national-level enabling policies, in close coordination with national partners, as well as supporting local and municipal parties in the adoption and operationalization of these policies; and ii) building of institutional awareness and capacity to aid the adoption and implementation of the new policies.</p> <p><i>Related project outcome:</i> 1.1, 2.1 <i>Related project outputs:</i> 1.1.1, 1.1.2, 2.1.2</p>
<p>Coordination Barriers Given the large number of ongoing initiatives focused on either developing the local automotive sector, or the promotion of more sustainable form of transportation, there persists a lack of coordination and risks efficiency losses and overlap.</p>	<p>Baseline: The automobile sector landscape of Malaysia is complex, with a range of ministries, government departments and agencies controlling and regulating the transportation sector, thus resulting in a large number of differing and often conflicting regulations. Currently, a number of institutions and private sector companies have launched initiatives on EV adoption in Malaysia; however, to date, no one coordinating mechanism has been created to ensure that these initiatives support one another and lead towards the shared goal of an EV Ecosystem.</p> <p>Alternative: Institutional and policy coordination will be sought through the PSC which will bring together the relevant players in the field of low-carbon transport to ensure that overlap is minimized. Further, the close partnership with GreenTech</p>

	<p>Malaysia, a focal point for EVs in the Malaysian government, as well as Chair of the National Technical Committee on EV standards, will support coordination among project partners. In addition, the EV Strategy and Roadmap to be developed under Component 1 will clearly lay out the ongoing initiatives, and the role of the relevant institutions to mitigate efficiency losses and introduce clarity.</p> <p><i>Related project outcome:</i> 1.1, 2.1</p> <p><i>Related project outputs:</i> 1.1.1, 1.1.2, 2.1.2</p>
<p>Knowledge/Awareness Barriers</p> <p>Lack of information about EVs and outreach programmes, hence low awareness within the public of the opportunities associated with EVs; low human capacity on EVs, battery disposal management, etc.</p>	<p>Baseline:</p> <p>Despite the number of EV options now available on the Malaysian market and to date established infrastructure, lack of awareness and cynicism from the public persists, i.e. range anxiety, high purchase prices, limited model availability, etc.</p> <p>Alternative:</p> <p>Awareness raising activities under Component 1 will target institutional partners, as well as the general public, to ensure that the facts and benefits of using EVs are disseminated, as well as information on the available programmes. The EV Strategy and Roadmap will also support this by creating an institutional structure upon which these awareness raising activities can be based.</p> <p>In addition, capacity building activities under Components 1 and 2 will build the skill sets of national experts on the promotion and manufacturing of EVs and the relevant components.</p> <p><i>Related project outcome:</i> 1.1, 2.1</p> <p><i>Related project outputs:</i> 1.1.1, 1.1.2, 2.1.1, 2.1.2</p>
<p>Infrastructure Barriers</p> <p>Lack of the necessary supporting infrastructure: testing facilities, charging station networks and support applications, maintenance, etc.</p>	<p>Baseline:</p> <p>38 public charging stations have been built throughout Malaysia; only two of them are fast charging stations, and 3 are PV-based and slow-charging, but rarely used (see Annex J). In addition, the information networks required to create a sustainable ecosystem are still at the nascent stage.</p> <p>The development of infrastructure for EV use is primarily hindered by lack of enabling policy, regulation, guidelines and standards, and by lack of knowledge of the potential use of renewable energy in combination with EVs, as well as limited institutional capacity at the municipality level.</p> <p>Alternative:</p> <p>The project will support the development of EV infrastructure through policy and standards development and the design, installation and testing of at least 6 PV-based charging stations. These facilities will act as demonstration stations to raise awareness of EVs in the Malaysian market and support the increased adoption of EVs.</p> <p><i>Related project outcome:</i> 1.1 2.1</p> <p><i>Related project outputs:</i> 1.1.1, 2.1.1, 2.1.2, 2.1.3</p>

A.5 Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCE/SCCF) activities requested for GEF/LDCE/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCE/SCCF) to be delivered by the project:

Project Alternative:

In order to assist Malaysia in achieving its target of 10% of all vehicles being EVs by 2020 and becoming a regional EV hub, the proposed project is designed to address the above-mentioned barriers and specifically the need for coordination amongst the baseline projects and policies outlined earlier. The project will not only result in GHG emissions reduction, but also have a significant long-term impact on income and job creation in Malaysia, as well as environmental benefits such as a reduction in air and noise pollution, particularly in large cities. Furthermore, to effectively contribute to the country's low-carbon cities initiatives, the project will work closely with the concerned authorities and institutions to ensure that the project implementation is integrated into overall urban planning and sustainable cities policies, in particular within the project outputs relating to policy development and selection of sites for the installation of the PV-based charging stations. This focus will establish a solid baseline for the

development of new projects on sustainable cities, including GEF-6 project proposals, and the inclusion of Melaka in the GEF Sustainable Cities Integrated Approach Pilot.

The project approach is developed around two substantive components: the first one focuses on policy development, institutional capacity building, and awareness raising to promote EV use, and the second one on technology transfer for infrastructure development and demonstration, as well as capacity building to enhance EV manufacturing capability and adequate supply to the market. The project will also promote solar energy utilization for powering of EVs that can contribute to zero-emissions in the transport sector and to the reduction of fossil fuel consumption. In order to ensure effective management of the project and that a solid monitoring and evaluation (M&E) strategy is in place, the project also has a M&E component.

The project will work closely with the GEF-5 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 third component of the GEF-UNDP project that promotes low-carbon technology investment in cities. KeTTHA and GreenTech Malaysia are key partners of both projects and, thus will encourage coordination. As strengthening the coordination mechanism for e-mobility promotion and development efforts by all stakeholders is a key focus of the policy and institutional capacity building outputs of the proposed GEF-UNIDO project, it will be given ample attention.

As Malaysia and South Africa are the first two countries to work with UNIDO on projects for the promotion of early take-off and use of EVs, they have shared information and experience during the PPG phases and will continue to do so during project implementation, sharing experiences and knowledge with other countries, in particular developing countries. For example, both countries have already actively participated in the EV Initiative under the Clean Energy Ministerial.

GreenTech Malaysia has been confirmed by the Government during the PPG phase to host the project as the local project executing agency and will continue to do so in the implementation phase.

Component 1: Improvement of policy and regulatory frameworks for EV use and local manufacturing; strengthened capacity of concerned institutions built and awareness raising.

This component aims at accelerating the development of an enabling national policy and regulatory framework, strengthening institutional capacity and raising awareness to promote early demand for and supply of EVs. It has two integrated outputs:

Output 1.1.1 National policy and regulatory framework to catalyze and accelerate widespread use of EVs, both public and private: EV strategy and roadmap, business models, favorable tax/incentive schemes for local manufacturing, safety standards, etc. improved or developed.

Experience around the world has shown that countries with well-developed policy and regulatory frameworks with clear targets and supported by favorable incentives and support programmes, are leading in the deployment of e-mobility. Under this Output, the project will work closely with all stakeholders under the coordination of KeTTHA and GreenTech Malaysia to accelerate the development, and if possible also the approval of, relevant policy papers; for example, the Electric Mobility Blueprint, the EV Roadmap, etc. The project will also assist the development of suitable incentives and support programmes, as well as business models, for EV demand promotion and local manufacturing. The project will follow the principle of wide participation by all stakeholders: public, private and civil society organizations (CSOs) in policy development and ensure that policies address the principles of ISID, i.e. job creation and sustainability, in particular relating to the manufacturing of e-buses and e-scooters, and the development of EV infrastructure.

Below are select concepts, measures and sustainable business models that have, in partnership with public and private sector partners, been identified during the PPG phase (see Annex L) that will be more carefully reviewed and potentially further developed under this Output. Efforts will also be made to incorporate lessons learned and best practices in terms of EV goals, policies, incentives, etc. of both developed and developing countries. In particular, the International Energy Agency's publication, EV City Casebook, will be a key reference source in the policy design stage. Furthermore, consultations and partnerships with leaders in the field of EVs will be sought through existing initiatives and mechanisms; for instance, the Urban Electric Mobility Initiative (UEMI) led by UN-Habitat and SOLUTIONs provides an interesting platform for knowledge sharing between Malaysian cities and market leaders such as Amsterdam, Copenhagen, Berlin and Oslo.

- *Incentives to make EVs more affordable:* tax rebates, tax reductions, further liberalization of the local automotive manufacturing industry and incentives for local manufacturing of EVs and/or components, as stipulated in the NAP 2014 in order to reduce the local EV price.

- *Measures to accelerate the development of EV infrastructure:* lease of state land for electric charging stations; electric charging stations at common public areas, including rest-area facilities, building complexes, etc.; public/private partnerships with EV charging station providers to fund infrastructure; roll-out strategies for long-term sustainability; competitive grants for communities that invest in EV infrastructure.
- Other incentives could include the provision of exclusive parking or lanes, including using bus lanes, highway tolls exemptions, or the linking of EV purchases to the provision of a slow charging station in the home or free charging at public stations, introduction of road structures based on CO₂ emissions, acceleration of fuel subsidy reductions, etc. Such innovative approaches to encouraging the use of EVs have had significant success; in the case of Norway, an improved incentive package in various areas resulted in a doubling of EVs in the country within only 12 months. Best practices from pioneers in the field of EV policy development and implementation, such as Norway, will be considered for their suitability to the Malaysian context and incorporated into the design of the policy recommendations under this Output.
- Incentives for investment in R&D for electric drive, energy storage technologies, smart car air-conditioning, smart charging system, etc.

The policy and regulatory framework to be developed will encourage and facilitate investment, both foreign and domestic, and technology transfer in local manufacturing of EVs and infrastructure, in development and maintenance, and human resources. The incentives will also aim to facilitate the development of PV-based infrastructure to reduce the consumption of fossil fuels and other GHG-intensive energy sources, for example in cooperation with the FIT scheme introduced by SEDA in 2013, and with TNB, the national power utility, under the MESITA.

During the inception phase, the project will focus on defining a timetable for the completion of the E-Mobility Blueprint and the development of the EV Roadmap, as well as recommendations for regulations, incentives and support programmes to be developed during the project.

Output 1.1.2 Institutional capacity built and awareness on EV use raised.

In order to ensure that the required institutional capacity is present in Malaysia, while also stimulating market pull factors by increasing public and private sector awareness and demand, the project strategy will focus on a three-tiered approach; i) capacity building of Malaysian institutions through on-the-job training for officers and staff; ii) creating awareness amongst private sector players, such as manufacturers, taxi fleet operators, etc.; and iii) public outreach to end-users and drivers for stimulate demand and awareness. This approach will ensure a strategic focus of project activities on a broad range of relevant stakeholders.

To ensure the sustainability and impact of the project's activities, as well as sufficient awareness to underpin the policy activities under Output 1.1.1, this Output will focus on capacity building of the Malaysian institutions directly involved in this field. Currently, the Green Technology section of KeTTHA is the national authority responsible for EV development and deployment; other supporting institutions and authorities are GreenTech Malaysia, the Malaysian Industry-Government Group for High Technology (MIGHT), ST, SEDA, MAI, MIDA, Ministry of International Trade and Industry (MITI), Ministry of Science, Technology and Innovation (MOSTI), Ministry of Transport (MOT), various universities, Malaysia EV Association (MEVA), etc. In order to streamline coordination and ensure efficiency, GreenTech Malaysia has been selected as a focal point and will form an EV Steering Committee to facilitate cooperation and discussion among the various stakeholders. The project will specifically focus on strengthening the coordinating function of GreenTech Malaysia. The establishment of specific thematic committees or working groups, such as for infrastructure development, local manufacturing of e-buses and scooters, development of financing and incentive schemes, ICT application, etc. will be reviewed and initiated in order to accelerate the development and implementation of the policy, regulations, incentives schemes and support programs.

The project's training will be mainly in the form of on-the-job training for officers and staff of the participating institutions, both at the national and pilot city levels, and particularly GreenTech Malaysia, while working closely with the international and local consultants during the project implementation and in particular under Output 1.1.1, and participation in workshops, seminars and study tours to get experience from other countries. One key area to be addressed is the development of city based policies to encourage adoption of EVs without relying on national level policies and incentives. The strengthened institutional capacity 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, specifically within GreenTech Malaysia, will help to ensure the institutionalization of the policies and strategies developed under Output 1.1.1 with project resources available to provide additional capacity building/awareness raising where needed.

Building on the strengthened and newly developed strategies, roadmaps, incentives and support programmes under Output 1.1.1, and the results of testing and demonstration under Component 2, the project will develop and implement an awareness raising programme on the opportunities and benefits (environmental, health, economic, etc.) associated with using EVs combined with solar power. This awareness raising programme will include potential competitions, roadshows, etc. and will involve all project partners in a sustainable manner so that they can be continued beyond the project period. The focus of the awareness programme will be firstly on populations of the four cities which have been selected for the installation of the 6 PV-based charging stations.

The project will also work with EV taxi services, in particular self-driving services, for example through COMOS, to raise awareness of users/drivers on EVs. Relevant mega events, such as the annual IGEM held in Kuala Lumpur, will be used to conduct awareness raising programmes. Opportunities to leverage on relevant high-level events of ongoing UNIDO projects, such as the Global Cleantech Innovation Programme for SMEs or the Industry Energy Efficiency project will also be considered.

Component 2: Development and demonstration of infrastructure for EVs and local EV manufacturing capacity.

This component aims at technology transfer, deployment and the demonstration of PV-based charging stations, building local EV manufacturing capacity, and development of standards and regulations for EV infrastructure. It has four key outputs:

Output 2.1.1 At least 6 PV-based charging stations (fast and off-grid) for EVs designed, installed and tested; used for demonstration and further studies; 3 stations will be installed in Melaka and the other 3, tentatively in Kuala Lumpur, Putrajaya and Cyberjaya.

Under this Output, the project will assist in the design, purchase of necessary equipment, installation, operation and maintenance of at least 6 PV-based fast charging stations, one of which will be capable of charging e-buses. Firstly, 3 charging stations will be installed in Melaka: one for e-buses and two for EVs and e-bikes, while the 3 other stations will be installed in Putrajaya for government use and in Cyberjaya and Kuala Lumpur for public use. These cities were selected in line with stakeholder discussions and due to the large number of relevant ongoing baseline projects, and high potential for upscaling and replication. Kuala Lumpur, as the largest city in Malaysia and federal capital, offers significant potential to reach out to the general public and both Putrajaya and Cyberjaya, being very modern and characterized by government partners and private sector companies, rather than residential housing, have significant potential for utilization of the installed charging stations.

PV-based and fast charging stations are still very rare globally; in Malaysia, there are currently only three PV-based stations, but slow charging stations have been built by UNITEN at its compound, and two fast charging stations have been installed in Penang. The project will work closely with MOSTI, the concerned universities, MIA, FEN, AMDAC and other charging station providers within the Driving Efficient Electricity Demand Growth through Electric Mobility. It is expected that at the end of the project, the concerned institutions and industries will be able to design, install and operate more PV-based and quick charging stations. These stations will also serve as input for testing and the collection of data and information for Output 2.1.2 and demonstration activities. The use of solar energy to power the EVs during the project will also raise awareness amongst the public of emission-free EV options and the solar energy utilization that can result in increasing demand for EVs. For instance, efforts will be made to work with residential buildings' Joint Management Committee to provide charging stations for apartment and condominium dwellers in the future; land property owners could choose to install charger units of 3.7kW, 7kW, or 11kW. Most upmarket homes in Malaysia already have 240V 3 phase supply, or alternatively, homeowners could use a charging cable that plugs directly into the conventional 3-pin socket with 240V supply.

The selection of the charging station sites will be carried out in close consultation with local stakeholders, as well as the GEF-UNDP project in order to create synergies, and their use will be coordinated with COMOS, e-bus operators, and other EV pool users. Local ownership, sustainability, operation and maintenance support, and scale-up and hand-over mechanisms will be key parameters for the site selection process and will involve all relevant stakeholders.

The cost of each of the 6 PV-based and fast charging stations, to be installed under this Output, will vary depending on whether the station will be used for EVs or e-buses, its location, its capacity, etc. It is foreseen that each PV-based charging station shall comprise of three main components, the solar PV panels, battery storage, and a fast charger. The capacity of solar PV panels shall be determined by the amount of space available and ideally should be at least 5kWp. The battery storage shall utilize second life lithium ion batteries from EV applications of at least 20kWh, and the fast charger to be deployed ranges from the 22kW 32A chargers, 50kW chademo chargers to the Tesla Superchargers. It has been estimated that the cost for a charging station with lithium batteries for EVs in a city is around USD 85,000, and for e-buses, USD 250,000. A portion of these costs, as well as the operation and

maintenance costs, will be covered by counterparts' co-financing. During the design phase, consideration will be given to the possibility to use the electricity stored in the charging stations and also the EV batteries for other purposes that can initiate the work on smart grids of future projects, in particular for the project on sustainable cities in Melaka. In order to facilitate future cooperation and investment for scaling up, cooperation with foreign companies from Australia, USA, Germany, South Korea, China, Japan and Austria, etc. will be sought. This approach to technology transfer would aim to leverage on the presence of global solar PV manufacturers in Malaysia, where Malaysia is currently the second largest producer of solar PV; discussions have been held with Hanwha Q-Cells and other global manufacturers. The energy storage shall make use of second life batteries from Renault, while the fast chargers shall be sourced from several charger manufacturers, such as The New Motion, Netherlands and the Tesla Superchargers. The key element in this technology space is the system integration that will be done in collaboration with leading local universities, such as Universiti Tenaga Nasional, and leading international companies and institutions in this field.

Output 2.1.2 Enhanced standards and regulations for EV infrastructure, including charging stations, safety, and support applications, developed.

The project will assist in the development of appropriate national standards and regulations covering the technical parameters of various types of charging stations, and design, safe operation, and maintenance of charging station networks, etc. This will be carried out through a technical committee led by GreenTech Malaysia, in close cooperation with the Standards and Industrial Research Institute of Malaysia (SIRIM) and other relevant stakeholders, including the EV original equipment manufacturers (OEMs). Where relevant, the project will also work closely with the GEF-UNDP project on GTALCC. The development of EV Charging Station Installation Guidelines for residential and commercial locations will be undertaken by the National Technical Committee on LVDC Supply, Storage and EV Charging.

The standards and regulations to be developed under this Output, will serve as input to and complement the policies and strategies developed under Component 1. Experience from other more advanced countries will also be shared to ensure maximum adoption of internationally accepted standards, thus simplifying compliance by manufacturers. Close attention will be paid, however, to adapting these to the specific conditions of Malaysia, e.g. weather, drivers' habits, climate change risks, etc. Close consultations with the private sector will be held to ensure that their requirements are also met, thus encouraging close cooperation between the public and private sectors, and reducing the perceived risk of investment in infrastructure.

The project will also assist in the development and utilization of IT applications that aim to facilitate the use of EVs, for example: identification of suitable charging stations, facilitating EV car sharing, communication between charging stations and utility companies, etc.

Output 2.1.3 Local manufacturing of e-bus and e-motorcycle components supported through development of enabling support programmes; enhanced incentives and industry support to encourage Foreign Direct Investment in the sector developed.

The project aims to position Malaysia as part of the global EV supply chain. Historically, Malaysia has been a prime location for global companies to setup their manufacturing base and technology development center, particularly in the area of semiconductors and solar photovoltaic. Examples such as Intel, AMD, First Solar, and Sunpower established their presence in Malaysia as an integral part of their global operations with Malaysia then benefitting from the local skills and expertise that were developed and becoming a major global producer of key components within the industry. Malaysian made microchips can be found in electronic devices the world over.

Similarly, the project aspires to position Malaysia as a global EV marketplace hence attracting key battery manufacturers such as LG, Panasonic, and Samsung to set up presence and position Malaysia as part of their global supply chain. For example, LG, which supplies batteries from Korea to Renault France can alternatively deliver or produce batteries in Malaysia to cater for the Asian market, thereby significantly reducing the carbon footprint of EV production. Samsung already has a battery manufacturing facility in Malaysia and the project aims to attract other global battery players to leverage on the geographical position of Malaysia, as well as the industrial expertise that have developed over the past fifty years. Other key components that are targeted include the traction motor and controller.

The project will work with all concerned stakeholders to verify a strategic approach to support programmes, including support facilities, such as testing labs and facilities, training workshops, etc. are required for accelerating the local manufacturing of e-buses and e-motorcycles as mentioned in the NAP 2014, the draft Electric Mobility Blueprint and the to-be-developed EV Roadmap. As such programmes are closely linked with the global context, especially considering foreign investment, all efforts will be made to ensure that the selected support programmes

can leverage on global initiatives and opportunities, while also closely supporting and expanding on national strategies. The project will also facilitate private sector investment in local manufacturing capacity and potentially access the Sustainability Mobility Fund to produce e-buses that meet the demand of bus operators.

The project will also identify necessary incentives and industry support programmes to attract Foreign Direct Investment (FDI) in the local manufacturing of EVs, thus supporting supply chain management and upgrading in Malaysia through the facilitation of international networks. The project will help Malaysia in showcasing Malaysia's various EV programs on relevant global platforms and events, or organizing FDI events in Malaysia, for example during the IGEM, to attract key global and regional industry leaders to invest in the local manufacturing industry. This will help to develop a pool of global EV manufacturers operating in Malaysia and work towards Malaysia's aim to become a regional EV hub. Furthermore, increased investment in the manufacturing capabilities will expand capacity, utilizing the activities undertaken in Output 2.1.4 and leading to job creation and skills development in the manufacturing sector.

As part of the project's engagement strategy and participatory approach, a number of stakeholders from the private sector have been engaged during the PPG phase; the project will continue to work closely with them under this output. These are: AMDAC, Eclimo, Panorama Melaka, BYD, Tesla, Tan Chong, TC Euro Cars, Mitsubishi Motors, Proton, etc.

Output 2.1.4 Effective capacity building and technology transfer to enable EV manufacturing facilitated.

This output will assist relevant universities and vocational schools to develop curricula on EV training in order to provide the required manpower, engineers and skilled workers to the EV industry development and manufacturing. Adequate resources and incentive mechanisms will be proposed and monitoring programs developed, in order to facilitate training and technology transfer in EV development and manufacturing, and also to attract the investment sought under Output 2.1.3 and required for the sufficient supply of locally manufactured EVs in Malaysia. The project will work closely with the Ministry of Education and MoSTI, as well as the Federation of Malaysian Manufacturers (FMM), MAI, and other concerned institutions on this Output to encourage adoption of the proposed curricula and incorporation into national education modules.

In addition, the project will also consider conducting training courses on EV operations and maintenance in order to create market confidence.

Component 3: Monitoring and Evaluation

Outcome 3.1 Adequate monitoring and evaluation facilitate smooth and successful project implementation

Output 3.1.1 Regular monitoring exercises conducted; tracking tools prepared according to GEF requirements

As outlined in Section C, as well as Annex F, the project will have an ongoing M&E mechanism in place, including ongoing measurement of energy savings and GHG emission reductions based on GEF Tracking Tool indicators, and those outlined in Annex A (Project Results Framework). This ongoing approach to M&E will ensure that knowledge management is incorporated into the project approach throughout the implementation period.

Output 3.1.2 Final project evaluation conducted

In line with GEF and UNIDO requirements, the project will have an independent terminal evaluation. The PMU, Project Steering Committee (PSC), Local Executing Agency and staff at UNIDO Headquarters will support these evaluations where required, providing the necessary data, expertise and assistance.

Incremental reasoning and co-financing:

In the case of no support from the GEF to assist Malaysia in removing the discussed barriers, it is very likely that the transportation sector will continue to grow without being able to significantly reduce its GHG emissions and its negative environmental impact, in particular in large cities. Opportunities for investment in the e-mobility sector and job provision would go unrealized in Malaysia as well as other ASEAN countries. Indeed, under this project it has been planned that the experience of Malaysia could be shared with other developing countries and that the replication potential in ASEAN Region could be investigated.

Co-financing

The total co-financing of the project is equivalent to US\$ 28.72 million and ample consultations have been carried out with strong support and commitment secured from the project's partners: the Government of Malaysia and the transport sector's key players consider this project an opportunity to accelerate the implementation of the other interconnected national initiatives that would otherwise be delayed or neglected; as well as being a suitable platform

for coordination, dialogue and policy engagement with regard to e-mobility and more generally in support of the promotion of low-carbon transportation.

Co-financing by the private sector has been discussed with relevant local companies, such as those in the automotive and battery manufacturing sub-sectors, high-tech and innovative companies, transport supporting industry sub-sectors, etc. Specific private sector companies, including FEN, AMDAC, Hanwha Q Cells Malaysia, and Eclimo have committed to support the project with their efforts and expertise in the production of e-motorcycles, EV charging stations, and e-buses, and Panorama Melaka Sdn. Bhd., a local bus service provider, has committed to support the project towards the development of an e-buses program in Melaka. These contributions, which will be provided by local partners consist of their investment in ongoing or planned e-mobility projects and mentioned as in-kind contribution in their commitment letters. Considering that these investments are in line with and complement to the objectives of this project, they could also be considered in-cash contributions. Discussions have also been conducted with concerned government authorities and institutions to develop support programmes and financing schemes to support the private sector in this EV development programme.

Global Environment Benefits

As mentioned above, the transportation sector in Malaysia is currently the largest sectoral contributor to country GHG emissions. Its exhaust gases and the dust and noise created not only have a negative impact on climate change, but also pollute the environment, and therefore have negative health and socioeconomic impacts, particularly in large cities. This project will provide significant opportunities for reductions in GHG emissions, other exhaust gas emissions and noise from the transport sector of Malaysia. A preliminary estimate of GHG emissions reduction has been carried out of which details are provided in Annex G. The overall methodology in estimating GHG emissions reduction as an impact of the project’s intervention is given in the *GEF Manual for Calculating GHG benefits of GEF projects* (GEF/C.33/Inf.18), distinguishing between direct and indirect emission impacts.

The direct emission reduction is related to the amount of e-buses, EVs, and electric 2-wheelers (motorbikes and scooters) that can be attributed to the project’s activities and calculating the emissions reduction over the technologies’ lifetimes. The indirect emission reduction is given in a bottom-up approach by applying a ‘replication factor’ (RF, assuming that activities will be replicated and expanded after project’s end), while the top-down approach provides the upper range of indirect emission reduction impacts, by looking at the targets in the relevant national policies and providing an ‘expert’s’ estimate of the contribution (by means of a ‘coincidence factor’, CF) of the project’s capacity strengthening and other activities. Details of the calculations are given in Annex G, while a summary table of the results is given below:

Cumulative emission reduction, electric vehicles and buses		
- direct		168,525 tCO ₂
- indirect, bottom-up, RF=	3	505,575 tCO ₂
- indirect, top-down, CF=	60%	1,293,135 tCO ₂

Innovativeness, sustainability and potential for scaling up:

As the EV market is relatively new and the technologies involved are continuously being improved and developed, the project presents a multitude of innovative opportunities for Malaysia and the project’s stakeholders. While the project itself will not develop innovative technologies, its interventions in the policy framework and supporting infrastructure will help to create an enabling environment for the introduction and adoption of EV-related technologies. For instance, the six PV-based and fast-charging stations to be installed under Output 2.1.1 are relatively new to the Malaysian market and will act as a catalyst for related initiatives in the market. The successful adoption of these innovative technologies in the market will require sustainable interventions. The project will seek to achieve this under Component 1 with a focus on capacity building within the relevant institutions and policy development; a comprehensive policy framework will ensure that the enabling environment persists beyond the project’s 3 year scope and the built capacity will ensure that institutions are able to effectively use the developed tools to develop and support the EV market in Malaysia. Further, the project’s coordinating approach will focus on bringing partners together and catalyzing movement in the market, a new approach in Malaysia.

As the EV market is still at the nascent stage, there is significant opportunity for scaling up. The six pilot projects shall explore various different configurations at different cost levels, with the emphasis on achieving technical integration, maximizing local content, and creating a sustainable business model. Ultimately, the key to the scalability of the project is in the proposition of enabling zero emission EV charging at zero energy cost. This may be able to reduce significantly the payback period of the system and ensure its business viability and sustainability. The enhanced policy and regulatory framework, the institutional and manufacturing capacity built, and the created infrastructure development plan and standards will lead to large implementation programmes by the private sector,

both local and foreign, and by the national Government and local authorities. These opportunities will be taken advantage of through demonstration projects to encourage investment and implementation by the private sector and the development of new projects based on the experiences of the proposed one. These could include, for instance, the design, development and implementation of different business models and EV infrastructure in large cities, or municipalities such as Petaling Jaya, Melaka, and Iskandar region. This will allow project stakeholders to assess where additional opportunities lie and take full advantage of them with the newly developed policies and capacity for scaling up purposes.

Finally, the close cooperation with the private sector presents significant opportunities to expand into a number of geographical regions and sectors beyond this project's scope. To support these investments by the private sector (in line with Output 2.1.3), the project will seek cooperation with leading foreign companies in this field, for example with Tritium based in Brisbane, Australia, Tesla from Silicon Valley, or companies in Germany, Japan and Austria. The Sustainability Mobility Fund of KeTTHA, endowed with US\$ 20 million to intensify development of e-buses, also presents ample opportunities for additional investment in this field. As KeTTHA is a key project partner and has already highlighted the relevance of the Fund to the project's objectives (see attached co-financing letter), the proposed project will actively aim to facilitate access to the Fund for scaling-up initiatives (i.e. development of further charging stations), with specific linkages to be identified in the project implementation period.

One potential area for significant upscaling and sustainability is a follow-up project focused on sustainable cities development in support of the National Smart Communities Program. This project will be a child project under the GEF Sustainable Cities Integrated Approach Pilot, to be implemented in 11 different countries by a host of GEF agencies. This child project in Malaysia would also aim to build on the current project's efforts in Melaka City, a green city model under the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), supporting the City to integrate their EV policies into the larger sustainable city framework. MiGHT, as the national implementation agency for the National Smart Community Programme and also the lead executing agency of the proposed Malaysia child project of the GEF Sustainable Cities Integrated Approach Pilot, has been working very closely with GreenTech Malaysia during the PPG phase, and both institutions will continue to work closely during the implementation phase to ensure sustainability and up-scaling.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

Risk	Rating	Mitigation Actions
Management priorities in the participating public and private sector organizations change over time, before and during project implementation, resulting in reduced participation or even termination of collaboration.	Low	Both the private sector and the relevant government institutions have shown interest in and commitment to the promotion of EVs in Malaysia in a number of national initiatives. In addition, UNIDO has significant experience working in Malaysia and has developed long-lasting cooperation relationships with the majority of project stakeholders. In order to avoid the negative impact of such a risk, the local executing partner will establish detailed Terms of Reference contracts before the commencement of the project to ensure commitment to project activities and investments (where possible, participating organizations will be legally bound to participate until project completion).
Key stakeholders, namely government institutions, the private sector and end-users show a lack of interest in the project's interventions.	Low	To date, the public has reacted positively to demonstration activities, for instance, the e-bus demonstration in Melaka and due to the number of ongoing initiatives from the public and private sectors, no negative reaction is expected. Any potential risk will be mitigated through targeted public awareness and advocacy activities, dissemination of information and consultations, as well as capacity building, to be implemented under Components 1 and 2. In addition, the demonstrations to be undertaken under Component 2 will showcase the technology in a visible manner to present the opportunities and benefits of the proposed technologies. In particular, relevant university courses and/or summer school initiatives will serve to inform the general public and educate a new generation of sustainable energy engineers from a technical and safety point of view.

Delays in the proposed improvements to the institutional and regulatory framework by public institutions.	Medium	Component 1 is solely dedicated to supporting improvements to the regulatory and policy framework, and awareness and capacity building within national institutions. In order to mitigate any potential risk of delays, close cooperation of the project partners in the PSC will be sought and a clear delineation of project stakeholders' roles and responsibilities has been outlined in this project document.
Incentives and the financial support system are insufficient.	Low	The private sector's involvement in the development of the policies and strategies under Component 1 will help ensure that the policy framework and financial mechanisms are in line with the needs of investors and manufacturers.
Uptake by cities and institutions is limited due to lack of interest and incentives.	Low	Relevant public bodies' agreement will be secured in order to guarantee the project continuation and expansion during and after the end of the GEF funding period, and the built capacity and policies will support this continued implementation. Furthermore, the project's focus on developing both the demand and supply sides of the market will ensure that enough momentum is present to expand the interventions. In addition, as Malaysian counterparts have already expressed interest to scale-up the interventions of this proposed project into a larger project on sustainable cities, uptake issues are not foreseen.
Infrastructure developed is vulnerable to climate change risks.	Low	While the infrastructure to be developed under the proposed project could potentially be vulnerable to climactic disruptions (e.g. charging stations in coastal areas), sufficient due diligence will be undertaken in as to the location of such infrastructure to mitigate this risk. Any required environmental impact assessments, in line with national building regulations, will also be conducted in the implementation phase before installation takes place.
Low participation rates of suitable female candidates due to lack of interest, inadequate project activity or missing qualified female population within engineering sector.	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.

A.7 Coordination with other relevant GEF financed initiatives

The project will be closely coordinated with the on-going GEF-UNIDO **Global Cleantech Innovation Programme (GCIP) for SMEs in Malaysia** and the GEF-UNIDO **Industrial Energy Efficiency for the Malaysian Manufacturing Sector (IEEMMS)** projects. For example, the GCIP project will consider adding a new technology category on electric drive, energy storage, smart charging, etc. The GEF-UNIDO project, **GHG Emissions in Targeted Industrial Sub-Sectors through EE and Application of Solar Thermal Systems in Malaysia**, also provides cooperation opportunities, particularly in the policy and capacity building components for the utilization of solar energy.

In particular, very close consultations will be maintained with KeTTHA, GreenTech Malaysia and UNDP to avoid overlap and create synergies with the GEF-UNDP project on **Green Technology Application for the Development of Low Carbon Cities (GTALCC)**. The focus of each project will continue to be based on the comparative advantages of each agency; for example, the UNDP project will focus more on the promotion of business models and financing of public transport, which will gradually lead to the use of more e-buses, while the UNIDO project will focus on promotion of PV-based charging station manufacturing, installation and operation, and the

manufacturing of e-buses, e-motorcycles, and EVs. Particularly, the selection of the sites of the 6 PV-based charging stations will be carried out in close consultation with the GEF-UNDP project as mentioned earlier in the document.

In order to explore synergies in those areas of common efforts, for instance, support to both national and local authorities in the improvement and development of relevant policies, the proposed project will make efforts to maintain an ongoing dialogue with the GTALCC project. This will be of particular importance when ensuring that the policies developed by this proposed project feed into the larger low-carbon urban development regulations and policy frameworks proposed by the GTALCC project. In addition, as Melaka is also a focus city of the GTALCC project, efforts will be made to coordinate at the local level, exploring opportunities for the proposed project to leverage on the investments and incentive schemes proposed by the GEF-UNDP project, as well as the promotion of EVs in the BRT.

The proposed project will also closely coordinate with the other GEF-UNDP project under the Climate Change Focal Areas in Malaysia, the **Building Energy Efficiency Improvement Project** as well as with other relevant projects of UNIDO in Malaysia, in particular with those relating to the Environment Branch. 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.

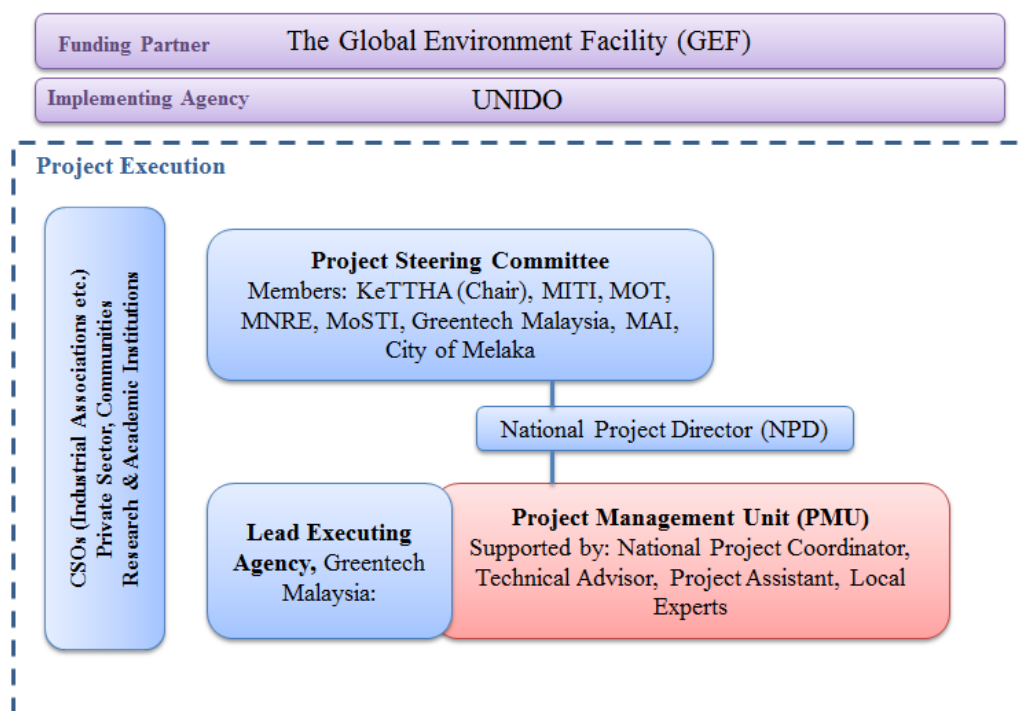
Active coordination with the project, **Sustainable City Development in Malaysia** under the World Bank-led Sustainable Cities IAP, to be implemented in 11 different countries by a host of GEF agencies, will also be sought. This child project in Malaysia would aim to build on the current project’s efforts in Melaka City, a green city model under the IMT-GT, supporting the City to integrate their EV policies into the larger sustainable city framework. Given the shared objectives and high potential for scaling-up, coordination activities will be a key strategy of this proposed project.

Efforts will also be made to leverage on the expertise and learning opportunities from other UNIDO projects focused on the development of energy efficient vehicles. The GEF-funded projects, **Energy Efficient Low-Carbon Transport in South Africa** and **Vehicle Technologies in China** are both due to begin implementation in 2015, and another project in China is also in the pipeline: **Integrating Renewable Energy and Electric Vehicles in China and Piloting at City Scale in Yancheng City**.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

The institutional arrangement foreseen for the implementation of the proposed project is outlined in the below diagram:



GreenTech Malaysia has been confirmed by the Government during the PPG phase to host the project as the local project executing agency and will continue to do so in the implementation phase. Greentech Malaysia will coordinate project inputs from all project stakeholders, as well as nominate the National Project Director (NPD) to act as the government representative and daily focal point for the Project Management Unit (PMU) to ensure ongoing ownership of the project and that project execution is operationally in line with Government priorities, rules and regulation. 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 the project. Currently, the Chief Executive Officer (CEO) of GreenTech Malaysia is assuming this NPD function, assisted by the Electric Mobility Flagship team.

UNIDO is the implementing agency of the project and is responsible for overall project oversight; contractual arrangements and procurement will be conducted in accordance with UNIDO rules and regulations.

Project Steering Committee (PSC)

To ensure ongoing coordination of the project and cohesive leadership, the PSC will consist of high level representatives from MITI, MOT, Ministry of Natural Resources and Environment (MNRE), MoSTI, GreenTech Malaysia, MAI, City of Melaka; the PSC will be chaired by KeTTHA. The purpose of the PSC is to provide strategic guidance to the project while ensuring no overlap with other development projects occurs, and to maximize the input and participation of project counterparts, as well as coordinating these inputs. The PSC will also review and approve or reject amendments to the project based on the approved project document in accordance with UNIDO and GEF procedures, and in line with the GEF Council document C.39/Inf.4, and will meet on a six-month basis, but can also be organized on an ad hoc basis as required. The PMU will act as the Secretariat of the PSC, preparing and distributing the minutes of meetings to be signed by UNIDO and KeTTHA.

Project Management Unit (PMU)

The PMU will be established by UNIDO and hosted by the Lead Executing Agency, GreenTech Malaysia; the PMU will report to the UNIDO Project Manager. The NPD will provide ongoing strategic guidance for the PMU, facilitating coordination with national partners, while the PMU is responsible for the day-to-day management and execution of project activities. The PMU will consist of two core staff members; the National Project Coordinator (NPC) and the Project Assistant, and is expected to report to the NPD on project progress, as required. In addition to the two core staff of the PMU, technical experts, subcontractors and international experts will support project activities where and when required.

The PMU will play a strong role in project reporting; responsible for semi-annual progress reports, financial reports, and the development of work plans and budgets in coordination with the PSC and UNIDO and based on the approved project document; all such reports shall be sent to UNIDO for endorsement/approval. At the end of project implementation, the PMU shall develop the Terminal Report to be submitted to the PSC at least 2 weeks before the final PSC meeting. The Terminal Report should summarize the activities/achievements of the project implementation, lessons learned and future upscaling potential, as well as relevant gender dimensions.

During project implementation, if necessary for the improvement of the project management, additional committees and working groups, etc. will be considered, such as a Project Management Committee (PMC), and specific technical working groups, etc. The PMC to potentially be established would meet every 2 months (at least) and be chaired by KeTTHA, consisting of representatives from KeTTHA, MITI, MOT, MAI, etc.

Stakeholder	Role in the project
Government Stakeholders	
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 the Chair of the Project Steering Committee.</p>
Ministry of International Trade and Industry	<p>MITI has the function of planning, formulating and implementing policies on industrial development, international trade and investment; encouraging foreign and domestic investment;</p>

(MITI)	<p>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:</p> <p>MITI will be a member of the PSC and will support the project on 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:</p> <p>MoT will be a member of the PSC and will support/advise the project on policy activities, as well as standards development and demonstration activity planning.</p>
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:</p> <p>As the GEF Focal Point in Malaysia, MNRE will act as a member of the PSC 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:</p> <p>MoSTI will be a member of the PSC and will advise the project on technology related issues, such as those related to the installation of the charging stations under Component 2.</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 <i>Pusat Tenaga Malaysia</i> (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.</p> <p>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:</p> <p>GreenTech Malaysia will be the Lead Executing Agency of the project and responsible for the coordination of the work to be carried out by other local project partners. GreenTech Malaysia will work on regulation, incentives, support programmes, etc. to promote EV use and PV-based charging stations. GreenTech Malaysia will also be a member of the PSC.</p>
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.</p> <p>Role in the Project:</p> <p>MiGHT, as an implementing partner of the Smart Cities Programme under the S2A initiative, and close partner of GreenTech Malaysia, will support the project's activities under Component 2.</p>
Melaka City	<p>Melaka City is the capital city of Melaka State, with a metro population of almost 800,000. The City has actively engaged in the ongoing initiatives focused on the promotion of energy efficient transportation in Malaysia, for instance, acting as a pilot city of the Smart Cities Programme.</p> <p>Role in the Project:</p> <p>Melaka City will partner with the project on Output 2.1.1, hosting the 3 demonstration charging</p>

	stations to be installed under the project, as well as on awareness raising activities.
Industrial Associations and Chambers	
Malaysian Automotive Institute (MAI)	MAI serves as focal point and coordination center for the development of the local automotive industry in all matters related to automotive industry, including formulating of the national automotive policy, managing manpower development programme, formulating and coordinating automotive related research and development. Role in the Project: MAI will provide technical support to the project and GreenTech Malaysia, in particular relating to the promotion of local EV manufacturing.
Private Sector Entities	
Banks/Financial Institutions	Bank officials will receive training from the project and will provide loans for the demonstration projects, when applicable, participating in the application of non-grant instruments. For instance, efforts will be made to coordinate closely with the SME Bank on potential utilization of the funding available under the Sustainability Mobility Fund for demonstration projects.
Other Stakeholders	
Industries	The industry comprises of EV manufacturers: multi-national corporations and 2 local companies for car production and those for e-motorcycles and e-buses; charging station manufacturers and network developers and operators. Role in the Project: Industries will focus on technology transfer and local manufacturing of EVs, parts and components, and EV infrastructure. Specifically, Eclimo, AMDAC, FEN, and Panorama Melaka have already committed to actively support the project in terms of expertise and ongoing initiatives.
Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs)	Relevant CSOs and NGOs, including those focusing on gender equality issues and advocating women's empowerment, such as women's associations (also see Annex E), will be invited to participate in the implementation phase of the project, and consultations will be held to confirm their roles in project execution. 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.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

Economic Benefits:

The proposed project will offer economic benefits at the national level in terms of increased energy security, as well as increased economic opportunities in the form of a new growth industry in the region and competitiveness competencies at an early stage. The proposed project will directly support this through the building of capacity within Malaysian component manufacturers, thus leading to skill and job creation for both women and men in higher value-added activities of the production value chain. Considering the predicted competitive advantage of Malaysian industry in this field, and the expected economic growth, significant economic benefits could be reaped. Through the development of such capacities, the automotive sector of Malaysia would attract increasing foreign direct investment, becoming a market leader in the ASEAN Region. Given the upcoming initiation of the ASEAN Economic Community in 2015, this development could offer significant benefits for Malaysia.

In light of the fact that gender, mobility and the economy are closely connected and the close linkages with development issues, such as education and employment, and even health, sustainable policies relating to mobility and transport must incorporate gender issues. The improvement of access of both women and men to safer, cleaner and more efficient transport can increase economic development by reducing the time of trips, making available more frequent and safer transport, and making available markets and products to more buyers, as well as sellers.²²

²² Chantal Duchene, OECD/ ITF (International Transport Forum), "Gender and Transport", Discussion Paper 2011-11, April 2011

Social benefits:

The increased adoption of EVs in Malaysia will lead to an improved air quality through a reduction in CO₂ emissions, reduced noise pollution, and a higher quality of infrastructure services. In addition, it is expected, based on UNIDO's extensive experience in the implementation of energy projects in Malaysia that the proposed project will create additional jobs for both women and men in Malaysia and an upgrading of technical skills, and thus income growth and improved living standards for both women and men.

Gender dimensions:

Key gender dimensions of the project outcomes and outputs, as well as gender-relevant indicators are provided in Annex A: Project Results Framework and Table 1 of Annex E.

This intervention in Malaysia is expected to have limited direct influence over gender equality and/or women's empowerment in the country and therefore could be classified as a project with "**limited gender dimensions**"²³ according to the UNIDO Project Gender Categorization Tool.

Nevertheless, UNIDO recognizes that all energy interventions are expected to have an impact on people and are, therefore, not gender-neutral.²⁴ In fact, due to diverging needs and rights regarding energy consumption and production, women and men are expected to be affected differently by the project (in terms of their rights, needs, roles, opportunities, etc.). This is also true for low-carbon transport since both women and men use vehicles for different purposes, thus different expectations and needs.

Until recently, little attention has been paid to the special aspects linking gender and transport, while greater account is increasingly being taken of gender in a variety of other areas. Our societies are gendered in both developed and developing countries, in that women and men play different roles. This is true for many household chores and childcare that are associated with reproductive tasks and mainly the preserve of women but also productive and community activities that impose different obligations on men and women. These differentiated responsibilities influence the time women and men have available and the trips (e.g. distances, frequency) they need to make in order to perform these activities.²⁵ Furthermore, it is important to take into consideration the critical issues that shape users' behavior with respect to their choices and possibilities of transport, such as specific needs and priorities of women and men, their available resources, etc.²⁶ However, also cultural issues can influence the mode of transport; for instance, a woman's traditional clothing might be unsuitable for using bicycles.²⁷

For instance, studies showed that in many cases fewer women than men own a private car. Moreover, in both urban and rural areas, developed and developing countries, the daily mobility program followed by women is far more complex than those of men due to their double working day, since women are usually participating in productive tasks but also take care of domestic chores, children, elderly and the sick. The study by OECD/ITF found that women usually make more trips, with greater variety or routes, but within a more restricted geographical area, using generally less expensive modes of transport. Women have generally fewer accidents than men since they are more attentive to other road uses and road rules; and in their choice of travel mode they are more sensitive than men to environmental issues such as air pollution. Since normally fewer women are working in transport-related jobs, which are seen as "men's work", the needs of women are generally neglected.²⁸ Mobility and travel have significant influence of the life of women and can lead to a form of social exclusion.

Therefore, regardless of the project's gender category, the project aims to demonstrate good practices in mainstreaming gender aspects into **sustainable low-carbon transport projects**, wherever possible, and avoid negative impacts on women or men due to their gender, ethnicity, social status or age. For this purpose, during the PPG phase, a preliminary gender analysis of the country context has been conducted, based on which potential

²³ This would require the project to ensure at least 20% of the project outputs have clearly identified activities promoting gender equality and/or the empowerment of women, including gender-responsive indicators and a corresponding budget OR at least one indicator in each project output refers to gender in some way. Furthermore, a gender-analysis is conducted of gender issues are included in ESAs. Please see also "Gender Categorization Tool"

²⁴ ENERGIA "Turning Information into Empowerment: Strengthening Gender and Energy Networking in Africa. Leusden, 2008; Joy Clancy "Later Developers: Gender Mainstreaming in the Energy Sector", 2009

²⁵ Chantal Duchene, OECD/ ITF (International Transport Forum), "Gender and Transport", Discussion Paper 2011-11, April 2011

²⁶

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTTSR/0,,contentMDK:21246915~menuPK:2970901~pagePK:210058~piPK:210062~theSitePK:463716,00.html>;

<http://siteresources.worldbank.org/INTGENDERTRANSPORT/Resources/handout.pdf>

²⁷ Chantal Duchene, OECD/ ITF (International Transport Forum), "Gender and Transport", Discussion Paper 2011-11, April 2011

²⁸ Chantal Duchene, OECD/ ITF (International Transport Forum), "Gender and Transport", Discussion Paper 2011-11, April 2011

gender dimensions of project outcomes and outputs, as well as potential entry points for gender equality and women's empowerment (GEEW) were developed and incorporated into the project logical framework.

Project Gender Mainstreaming Strategy

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, Project 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 ESAs, etc.

B.3 Explain how cost-effectiveness is reflected in the project design:

The project focuses GEF funds on technical assistance to deliver sustained energy and CO₂ savings to Malaysia. The policy assistance and capacity building interventions to be delivered through the project will create sustainable impacts over the long term. The model for the project - based on policy development, technical capacity building, implementation of demonstration projects, and on the establishment of sustainable accessible financial mechanisms – has proven successful for UNIDO in a number of projects supported in other developing countries.

The cost effectiveness of the project in terms of CO₂ savings, from the direct impact only, per USD of GEF contribution, is estimated at around USD 11.87/tCO₂, which is reasonable considering that the EV market in Malaysia is at its initial stage and currently, EV uptake is very slow even in many industrialized countries. As the project aims at stimulating and catalyzing a market shift towards EVs at the national level, and to a certain extent within the ASEAN region, the Unit Abatement Cost of the indirect emissions of the project is a better reflection of the project's overall cost effectiveness; this is in the range of USD 1.55 to 3.95/tCO₂ based on bottom-up and top-down estimations.

C. DESCRIBE THE BUDGETED M&E PLAN:

Project M&E will be conducted in accordance with established UNIDO and GEF procedures. The Logical Results Framework (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. Implementation of the M&E Plan will be undertaken by the project team, national counterparts and UNIDO (see Annex F for more details). All M&E documents, such as periodic progress reports and terminal evaluation reports, as well as learning and knowledge sharing products, will include gender dimensions wherever adequate.

According to the M&E policy of the GEF and UNIDO, follow-up studies such as 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.

Project Start

A Project Inception Workshop will be held within the first 2 months of project start involving those with assigned roles in the project organization structure. The inception workshop is crucial to build on the consultations in the PPG phase and concretize ownership of the project for effective results and to plan the first year work plan. In

preparation for the Inception Workshop, a more detailed project workplan (building on the one developed in the PPG phase (Annex H)) and a ToR for the PSC will be developed.

The Inception Workshop will address a number of key issues including:

- Detail the roles, support services and complementary responsibilities of local stakeholders vis-a-vis the PMU. Discuss roles, functions and responsibilities within the project's decision making structures, including reporting and 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 workplan, verify and endorse the first annual work plan. Review and agree on the indicators, targets and their means of verification and re-check assumptions and risks;
- Provide a detailed overview of reporting, M&E requirements; 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 PSC meetings and verify and endorse the ToR for the PSC; roles and responsibilities of all project organization structures should be clarified and meetings planned;
- The first PSC meeting should be held within the first 12 months of the inception workshop.

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

M&E Budget

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) independent final evaluation. The estimated total budget for M&E is US\$ 335,000 (US\$ 105,000 from the GEF and US\$ 230,000 from co-financing).

Following is the table summarizing key M&E activities with the GEF budget:

M&E Activity Categories	Feeds Into	Time Frame	GEF Budget (US\$)	Co-Financing (US\$)	Responsible Parties
Measurement GEF Tracking Tool specific indicators	Project management	Continuous	65,000	160,000	PMU, UNIDO Project Manager
Monitoring of project impact indicators (as per LogFrame)	Project management;	Continuous			
Periodic Progress Reports	Project management; PSC Meeting	Semi-annually			
Independent terminal evaluation	Terminal Evaluation Review (TER) conducted and Terms of Reference for evaluation drafted by UNIDO EVA.	Project completion	40,000	70,000	Independent evaluator, PMU, UNIDO PM, and UNIDO Evaluation Group
TOTAL			105,000	230,000	

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.

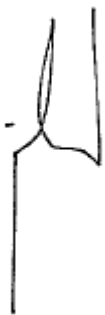

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this form. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Dr. Lian Kok Fei	GEF Operational Focal Point Undersecretary of Environmental Management & Climate Change Division	Ministry of Natural Resources and Environment	12/13/2013

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		07/13/2015	Mr. Khac-Tiep Nguyen, Industrial Development Officer, Energy Branch, UNIDO 	+43-1-26026-3086	K.Nguyen@unido.org

ANNEX A: PROJECT RESULTS FRAMEWORK

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
<p>Project Objective: To catalyze and accelerate widespread use of electric vehicles (EVs) as part of energy efficient low-carbon transport and low-carbon cities initiatives of Malaysia</p>	<p>A) Direct GHG emission savings (see the calculations and estimates of Annex G):</p> <ul style="list-style-type: none"> • Electric personal cars • Electric buses • Electric 2-wheelers <p>B) Indirect bottom-up and top-down emission savings</p>	<p>By mid-2015 about 15 e-buses are planned to be in operation. Number of electric cars is about 200 in 2014 and around 900 electric 2-wheelers. 38 charging stations have been built, but most of these are not fast-charging Level III type and none use solar as source of energy</p>	<p>A) Direct GHG emission reduction of</p> <ul style="list-style-type: none"> • 14,262 tCO₂/yr, due to E-cars: (9,000 of which 300 PV-charged); 2,590 tCO₂/yr E-buses (120, of which 20 PV-charged) and 2,788 tCO₂/yr due to electric 2-wheelers (30,000, of which 1,500 PV-charged) • Total cumulative direct: 168,525 tCO₂ <p>B) Indirect emission reduction:</p> <ul style="list-style-type: none"> • Bottom-up: 506 ktCO₂ • Top-down: 1,293 ktCO₂ 	<p>Validated energy savings from project reports and surveys</p>	<p>Willingness of state, industry and financial institutions to support the programme and invest time and money in its implementation</p>
<p>Component 1: Improvement of policy and regulatory frameworks for EV use and local manufacturing; strengthened capacity of concerned institutions and awareness raising</p>					
<p>Outcome 1.1 Enabling policies and regulatory framework, strengthened institutional capacity, and enhanced awareness catalyze and accelerate widespread use of EVs in Malaysia, resulting in GHG reductions, local manufacturing, job and income creation and environmental improvements.</p>	<p>C) Number of policy papers on low-carbon transportation endorsed by stakeholders;</p>	<p>A number of policy initiatives on the promotion of low-carbon transportation exist, but endorsement by a large range of stakeholders has been limited, thus resulting in limited coordination.</p>	<p>C) 3 policy papers on low-carbon transportation endorsed by stakeholders;</p>	<p>Official documents Websites of organizations</p>	<p>National authorities are willing to adopt specific regulations; Interest by stakeholders to promote low-carbon transportation exists and can be maintained.</p>
	<p>D) Number of financial incentive schemes established and endorsed by stakeholders.</p>		<p>D) 2 financial incentive schemes established and endorsed by stakeholders.</p>	<p>Publicity given in media</p>	
<p>Output 1.1.1 National policy and regulatory framework to catalyze and accelerate widespread use of EVs, both public and private: EV strategy and roadmap, business models, favorable</p>	<p>1) Number of policy papers developed (number of policy papers that include gender dimensions);</p>	<p>1) A number of policy initiatives on the promotion of low-carbon transportation exist, but endorsement by a large range of stakeholders has been limited, thus resulting in limited coordination.</p>	<p>1) At least 3 policy papers on low-carbon transportation developed (at least 2 policy papers should consider gender dimensions).</p>	<p>Technical reports Project progress reports Workshop</p>	<p>National authorities are willing to adopt specific regulations.</p>

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
tax/incentive schemes for local manufacturing, safety standards, etc. improved or developed;				proceedings	
Output 1.1.2 Institutional capacity built, and awareness on EV use raised.	2) Awareness raising materials developed (materials should be gender aware); 3) Number of workshops and seminars organized (% of female participants); 4) % of counterparts taking part in the development of policy papers report having benefitted from built capacity and raised awareness;	2) There are currently no trainings specifically targeting awareness raising/capacity building on low-carbon transportation.	2) Awareness raising materials available on EVs (materials should be gender aware); 3) At least 5 workshops and seminars organized (at least 25% female participants); 4) At least 70% of counterparts taking part in the development of policy papers report having benefitted from built capacity.	Technical reports Workshop proceedings Publicity in media Project progress reports	
Component 2: Development and demonstration of infrastructure for EVs, and local EV manufacturing capacity					
Outcome 2.1 Adequate infrastructure and skilled personnel to locally manufacture EV parts and components facilitate widespread utilization of EVs.	E) % increase in local manufacturing of EV parts and components; F) Number of charging stations and % of PV based.	E) Proton is expected to introduce their EV to the market in late-2015; 1 Malaysian company already manufactures electric motorcycles. In the BAU scenario, local manufacturing growth in this field can be estimated around 2-3%; F) 38 EV charging stations are in operation in Malaysia, 2 of which are fast-charging (see Annex J).	E) 6-7% increase in local manufacturing of EV parts and components; F) 300-600 (fast-)charging stations, 20% of which are PV-based, are foreseen in Malaysia.	Evaluation reports Website of organizations and companies Project progress reports	Availability and willingness of experts to receive training; Willingness of companies and vendors to receive expert training.
Output 2.1.1 At least 6 PV-based charging stations (fast and off-grid) for	5) Number of PV-based charging stations designed,	5) Only a few PV charging stations for demonstration (e.g. at UTM).	5) 6 PV-based charging stations designed, installed and tested;	Design and installation plans	

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
EVs, designed, installed, and tested; used for demonstration and further studies; 3 stations will be installed in Melaka and the other 3 tentatively in Kuala Lumpur, Putrajaya and Cyberjaya;	installed and tested under the project; 6) Percentage of ESIAAs, if required, that include gender dimension.		6) 100% of ESIAAs, if required, include gender dimension.	and reports.	
Output 2.1.2 Enhanced standards and regulations for EV infrastructure, including charging stations, safety, and support applications, developed;	7) Number of enhanced standard and regulations for EV infrastructure developed.	7) A technical committee of the GreenTech Malaysia is currently working on the improvement of such standards.	7) A minimum of 4 enhanced standards and regulations for EV infrastructure developed.	Technical reports Project progress reports Workshop proceedings	National authorities are willing to adopt specific standards/regulations.
Output 2.1.3 Local manufacturing of EV bus and motorcycle components supported through development of enabling support programmes; enhanced incentives and industry support to encourage Foreign Direct Investment in the sector developed;	8) Number of enabling support programmes developed; 9) Number of enhanced incentives developed; 10) Percentage of “enabling support programmes” or “enhanced incentives” that have specific recommendations or specifications for women.	8) A number of programmes/incentives focusing on low-carbon transport have been developed, but none are specifically tailored to supporting the local manufacturing of EV bus and motorcycle components.	8) 2 enabling support programmes developed; 9) 3 enhanced incentives developed; 10) 50% of “enabling support programmes” or “enhanced incentives” that have specific recommendations or specifications for women.	Technical reports Project progress reports Workshop proceedings	National authorities are willing to adopt specific standards/regulations.
Output 2.1.4 Effective capacity building and technology transfer to enable EV manufacturing facilitated.	11) Number of capacity building trainings facilitated for EV manufacturers.	11) There are currently no trainings specifically targeting EV manufacturers.	11) 5 capacity building trainings facilitated for EV manufacturers (at least 10% female participants).	Technical reports Workshop proceedings Project progress reports	

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).

No comments were received from the STAP or GEF Council Members.

GEF Review Sheet:

Review Criteria	Questions	Secretariat Comment at PIF (PFD)/Work Program Inclusion	UNIDO Response at CEO Approval
<p>Recommendations at the PIF Stage</p>	<p>25. Items to consider at CEO endorsement/ approval.</p>	<p>XT, April 26, 2014: Please address the following items at the CEO approval stage:</p> <p>a) A more concrete strategy to integrate the proposed project into overall urban planning and sustainable cities policy;</p>	<p>a) The proposed project will coordinate closely with the Malaysian policy-making departments to ensure that project outputs under Output 1.1.1 are in line with and incorporated into overall urban planning and sustainable cities policy. In addition, as Melaka City is part in the City Programme under the Science to Action (S2A) initiative, and the proposed GEF-UNIDO Sustainable City project under the IAP, project outputs will contribute directly to sustainable city efforts.</p>
		<p>b) Detailed estimate of direct CO2 emissions reduction brought by deployment of EVs, and of indirect CO2 emissions reduction, which includes reduction by replication;</p>	<p>b) Detailed estimates of direct and indirect CO₂ emissions are included in the Global Environmental Benefits section of A.5 and Annex G.</p>
		<p>c) The strategy to incentivize demand from both the demand and supply sides need to be spelled out;</p>	<p>c) The project specifically aims to target both the demand and supply sides of the market as part its key strategy to promote the widespread adoption EVs in Malaysia. This will entail: <i>Demand:</i> i) End-user awareness and acceptance through promotional campaigns and awareness raising events will be targeted under Output 1.1.2, and demonstration activities under Output 2.1.1; ii) The creation of an EV Strategy and Roadmap, business models, incentive schemes under Output 1.1.1. <i>Supply:</i></p>

			i) Enhanced manufacturing capacity through facilitation of investment and technology transfer.
		d) Risk mitigation measures need to be spelled out;	d) Risk mitigation measures have been elaborated on in Section A.6 as per consultations and assessments in the PPG phase.
		e) In-depth description of baseline projects, including their timelines;	e) Baseline projects and policies, and their timelines have been included in Section A.4.
		f) Collaboration with UNDP with regards to the GEF/UNDP project on Green Technology Application for the Development of Low Carbon Cities to promote complementarities.	f) The proposed project will coordinate with the GEF-UNDP project as outlined in A.7, as well as throughout the CEO AR, as per the comparative strengths of each organization to explore synergies and avoid overlap. Specific areas of coordination will be policy development to ensure coherence within the national policy frameworks, and at the local level in Melaka State.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS²⁹

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: \$50,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Baseline Assessment	25,000	20,000	5,000
Stakeholder Consultation and Commitment Confirmation	10,000	5,000	5,000
Detailed Project Design and Calculations of GHG Emission Savings	15,000	7,776	7,224
Total	50,000	32,776	17,224

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

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

N/A

ANNEX E: GENDER ANALYSIS OF MALAYSIA (ATTACHED)

²⁹ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue 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.

ANNEX F: MONITORING AND EVALUATION PLAN

F.1 Project start

A Project Inception Workshop will be held within the first 2 months of project start involving those with assigned roles in the project organization structure. The inception workshop is crucial to build on the consultations in the PPG phase and concretize ownership of the project for the effective results and to plan the first year work plan. In preparation for the Inception Workshop, a more detailed project workplan (building on the one developed in the PPG phase, see Annex H: Activity Timing) and a ToR for the PSC will be developed.

The Inception Workshop will address a number of key issues including:

- Detail the roles, support services and complementary responsibilities of local stakeholders vis-a-vis the PMU. Discuss roles, functions and responsibilities within the project's decision making structures, including reporting and 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 workplan, verify and endorse the first annual work plan. Review and agree on the indicators, targets and their means of verification and re-check assumptions and risks;
- Provide a detailed overview of reporting, M&E requirements; 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 PSC meetings and verify and endorse the ToR for the PSC; roles and responsibilities of all project organization structures should be clarified and meetings planned;
- The first PSC meeting should be held within the first 12 months of the inception workshop.

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

F.2 Semi-annual reviews: Will consist of: i) Summary of progress made during the most recent six-month period; and ii) Based on the initial risk analysis submitted, the risk log shall be regularly updated. Risks become critical when the impact and probability are high;

F.3 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 PSC may also join these visits.

F.4 End of project

An independent Final Evaluation will take place three months prior to the final PSC 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 G: GLOBAL ENVIRONMENTAL BENEFITS CALCULATIONS

GHG Emissions Reduction Estimation: Malaysia Low-Carbon Transport Project

The overall methodology in estimating greenhouse gas emission reduction as an impact of the project's intervention is given in the GEF *Manual for Calculating GHG benefits of GEF projects* (GEF/C.33/Inf.18). In addition, the STAP of the GEF has recently provided a guide to estimate emission reduction benefits for transport subsectors, *Calculating Greenhouse Gas Benefits of Global Environment Facility Transportation Projects*, which comes with a number of modules in Excel spreadsheets (TEEMP models), namely: a) Ecodriving; b) MRT and BRT (mass rapid transit, bus rapid transit) systems; c) NMT (non-motorized) projects; and d) travel management. However, these models do not specifically deal with electric vehicles or charging method (grid or solar) and different modelling in a spreadsheet was used. Nonetheless, calculations of GHG benefits are carried out as much as possible in line with the models and/or using model default factors (where data on local factors is not available). The calculations assume 100% electric vehicles as the focus of the project; not plug-in hybrid vehicles. It is further assumed that the fuel used in buses is diesel and gasoline in 2-wheelers and cars.

Direct emissions

The direct emission reduction is related to the amount of e-buses, EVs and electric 2-wheelers that are used. A rough estimate is that by mid-2018, when the project will be completed, Malaysia will have 15,000 EVs, 200 e-buses and 50,000 e-scooters³⁰, of which 60% will be attributed directly to the incremental result of the project. Of these vehicles, 20 e-buses, 300 EVs, and 1,500 e-scooters will be charged in 6 PV-powered stations to be installed with the project's support.

The following Table 1 present the results of the calculation of the GHG emission reduction of these vehicles over their lifetime (taken as 10 years), assuming grid emission and vehicle fuel emission factors, as given in the table³¹.

Table 1

Assumptions	10 yr			Source:
Lifetime vehicle	0.741 kgCO ₂ /kWh			
Grid emission factor	0.741 kgCO ₂ /kWh			a
	Bus	Car	2-wheeler	
Distance travelled	30000	15000	10000 km/yr	c
Power consumption	1	0.200	0.052 kWh/km	b
Emissions				
- fuel	1.337	0.249	0.046 kg/km	d
- electricity grid	0.741	0.148	0.039 kg/km	e
- electricity PV				f
Market				
Number of electric vehicles (2014/15)	36	200	909	
Number by 2018	200	15000	50000	
Direct emission reduction				
Project-related (2018)	120	9000	30000	g
- PV-charged vehicles	20	300	1500	h
Emission reduction				
- grid	1,788	13,142	2,100 tCO ₂ /yr	=c*(d-e)*(g-h)
- PV	802	1,120	689 tCO ₂ /yr	=c*(d-f)*h
- Total, direct (project)	2,590	14,262	2,788 tCO ₂ /yr	

Sources:

- Behavioural Climate Change Mitigation Options, Domain Transport, A. Schrotten (CE Delft; 2012)
- Electric Vehicle Roadmap for Malaysia, by M. Kothandabhay, KeTTHA, Presentation at Malaysian-German Sustainable Automotive Mobility Conference (18/10/2011), Kuala Lumpur
- *My Carbon GHG Reporting Guidelines*, Ministry of Environment and Natural Resources, UNDP, Eco-Ideal Consulting (version 15.0, April 2014)
- *The Estimation of Carbon Dioxide (CO₂) emissions from the Transport Sector in Malaysia (2000-2020)*, PowerPoint presentation ASMA, UPM, PTM

³⁰ Including 50 buses to be procured 2015-16 under Sustainable Mobility Fund; 15 e-buses planned to be installed for Sunway BRT in 2015, 11 e-buses to be installed with NEDO Japan support. Malaysia has already allocated budget to install 125,000 public charging stations until 2020, of which 300 will be installed in 2015.

³¹ STAP Manual: *Manual for Calculating GHG Benefits of GEF Transportation Projects*, Scientific and Technical Advisory Panel (STAP), Global Environment Facility (GEF), www.stapgef.org

- Various articles on Internet, see The Daily Telegraph (UK; 30/03/2015) (for e-bikes); www.carbonindependent.org (for e-buses)

Thus, direct emission reduction is 19,641 tCO₂ annually and lifetime direct reduction is 168,525 tCO₂.

Indirect emission reduction impacts

To estimate indirect emission reduction, two approaches can be followed, bottom-up (BU) and top-down (TD).

In the bottom-up approach, the direct emission reduction impact is multiplied by a ‘replication factor’ (RF), giving the number of times the project-related (direct) investments are replicated as within the project’s sphere of influence. We assume RF=3, representing the market transformation indirect impact. Thus, indirect (bottom-up) emissions reduction estimate is 506 ktCO₂.

For the top-down approach, the market potential is estimated with a period of 10 years after the project’s end (in 2018). It is assumed that the target given in the Electric Vehicle Roadmap presents the maximum realizable market size (we assume to be achieved by 2024 rather than 2020 as is optimistically projected in the Roadmap). Table 2 gives the annual emission reduction associated with the growing annual number of e-buses and EVs, under the same set of assumptions as in Table 1. Additionally, it is assumed that PV penetration in charging stations is 15%, while efficiency in fuel engines and electric motors increases 2 and 3% per year respectively.

Table 2:

(in tCO ₂ /yr)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Electric bus	200	294	431	632	928	1,363	2,000	2,300	2,645	3,042	3,498
car	15,000	20,578	28,231	38,730	53,133	72,892	100,000	115,000	132,250	152,088	174,901
2-wheeler	50,000	56,123	62,996	70,711	79,370	89,090	100,000	115,000	132,250	152,088	174,901
Emission reduction											
e-bus	4,196	6,159	9,040	13,268	19,475	28,586	41,958	48,252	55,490	63,813	73,385
car	27,391	37,577	51,552	70,723	97,024	133,106	182,606	209,997	241,497	277,721	319,380
2-wheeler	6,606	7,415	8,323	9,343	10,487	11,771	13,212	15,194	17,473	20,094	23,109
Total	38,193	51,151	68,915	93,334	126,986	173,463	237,777	273,444	314,460	361,629	415,873

Indirect top-down cumulative emission reduction is 1,293 ktCO₂. However, some of these emission reductions would have taken place in this period, even without the project’s intervention. A ‘coincidence factor’ (CF) is applied therefore to reflect the degree of the project’s impact. In this case, CF=60% is adopted, notably because of the effects of promotion of PV-powered electric vehicle charging, thus substantial indirect emission reduction can be attributed on top of the government’s (baseline, non-PV) efforts.

Summary:

Cumulative emission reduction, electric vehicles and buses		
- direct		168,525 tCO ₂
- indirect, bottom-up, RF=	3	505,575 tCO ₂
- indirect, top-down, CF=	60%	1,293,135 tCO ₂

ANNEX H: ACTIVITY TIMING

Outcome	Output	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Component 1: Improvement of policy and regulatory frameworks for EV use and local manufacturing; strengthened capacity of concerned institutions and awareness raising	Output 1.1.1 National policy and regulatory framework to catalyze and accelerate widespread use of EVs, both public and private: EV strategy and roadmap, business models, favorable tax/incentive schemes for local manufacturing, safety standards, etc. improved or developed;												
	Output 1.1.2 Institutional capacity built, and awareness on EV use raised.												
Component 2: Development and demonstration of infrastructure for EVs, and local EV manufacturing capacity.	Output 2.1.1 At least 6 PV-based charging stations (fast and off-grid) for EVs, designed, installed, and tested; used for demonstration and further studies; 3 stations will be installed in Melaka and the other 3 tentatively in Kuala Lumpur, Putrajaya and Cyberjaya.												
	Output 2.1.2 Enhanced standards and regulations for EV infrastructure, including charging stations, safety, and support applications, developed;												
	Output 2.1.3 Local manufacturing of EV bus and motorcycle components supported through development of enabling support programmes; enhanced incentives and industry support to encourage Foreign Direct Investment in the sector developed;												
	Output 2.1.4 Effective capacity building and technology transfer to enable EV manufacturing facilitated.												
Component 3: Monitoring and Evaluation	Output 3.1.1 Regular monitoring exercises conducted, tracking tools according to GEF requirements prepared;												
	Output 3.1.2 Final project evaluation conducted.												

ANNEX I: GEF BUDGET BREAKDOWN (ATTACHED)

Please see the attached annex.

ANNEX J: LIST OF CURRENT EV PUBLIC-ACCESS CHARGING STATION IN MALAYSIA

Location		Type
Putrajaya		
1.	Perdana Leadership Foundation	Slow Charger
2.	Prime Minister's Office	Slow Charger
3.	Ministry of Energy, Green Technology and Water (KeTTHA)	Slow Charger
4.	Ministry of Transport (MOT)	Slow Charger
5.	Ministry of Finance (MOF)	Slow Charger
6.	Putrajaya Corporation (PJC)	Slow Charger
7.	Energy Commission (Suruhanjaya Tenaga)	Slow Charger
8.	Sustainable Energy Development Authority Malaysia (SEDA)	Slow Charger
9.	Universiti Tenaga National (UNITEN)	Slow Charger
Klang Valley		
10.	Depoh Rapid KL, Jalan Klang Lama	Slow Charger
11.	Ministry of International Trade and Industry (MITI), Jalan Duta	Slow Charger
12.	Bangsar Shopping Centre, Jalan Maarof, KL	Slow Charger
13.	Headquarters of Petaling Jaya City Council (MBPJ)	Slow Charger
14.	Nissan Service Centre, Batu Caves	Slow Charger
15.	Petronas Solaris, Serdang	Slow Charger
16.	Nissan Service Centre, Kota Damansara	Slow Charger
17.	Kuala Lumpur City Centre, Jalan Ampang	Slow Charger
18.	Lot10, Jalan Sultan Ismail	Slow Charger
19.	Jaya One, Jalan Universiti, PJ	Slow Charger
20.	Nissan Showroom PJ, Jalan Kemajuan 12/18, PJ	Slow Charger
21.	Renault Showroom, Section 13, PJ	Slow Charger
22.	Nissan Service Centre Setapak, Jalan Genting Klang, Setapak	Slow Charger
Malacca		
23.	Kompleks Seri Negara, Ayer Keroh	Slow Charger
24.	Hatten Square, Bandar Hilir	Slow Charger

Pahang		
25.	Petronas Genting Sempah, Lebuhraya Karak	Slow Charger
26.	Nissan Showroom, Jalan Beserah, Kuantan	Slow Charger
Johor		
27.	Nissan Showroom, Johor Jaya	Slow Charger
Sarawak		
28.	Nissan Showroom, Jalan Datuk Edward Jelim Miri	Slow Charger
Pulau Pinang		
29.	Nissan Service Centre, Bayan Lepas	Slow Charger
30.	Autobinee Sdn. Bhd., Gelugor	Slow Charger
31.	Straits Quay Mall, Tanjung Tokong	Slow Charger
32.	Penang Second Bridge (Toll Plaza)	Slow Charger
33.	Penang Second Bridge (Toll Plaza)	Slow Charger
34.	Penang Second Bridge (Toll Plaza)	Slow Charger
35.	Penang Second Bridge (Toll Plaza)	Slow Charger
36.	Penang Second Bridge (Toll Plaza)	Slow Charger
37.	Penang Second Bridge (Toll Plaza)	Fast Charger
38.	Penang Second Bridge (Toll Plaza)	Fast Charger

ANNEX K: MALAYSIA'S 40% EMISSION REDUCTION COMMITMENT

ASPIRED SCENARIO

How Would The Carbon Emission Be In 2020 & 2030

Definition

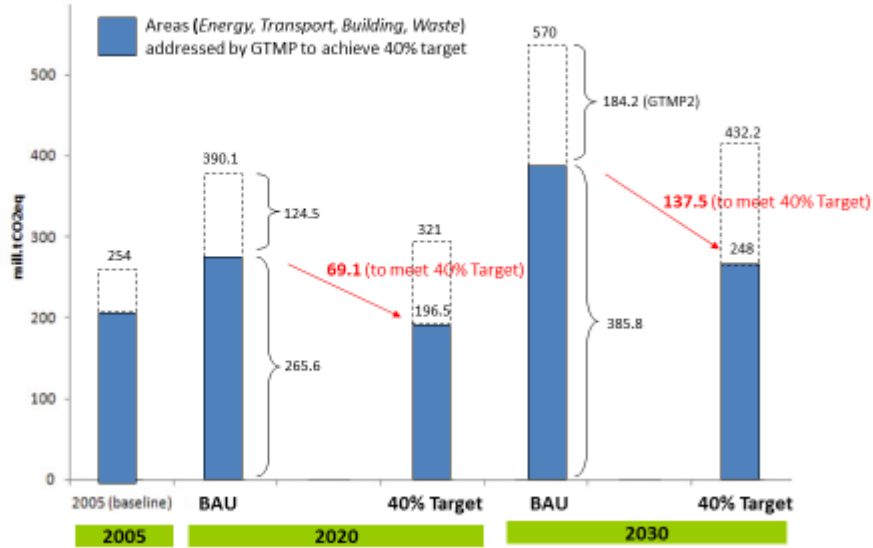
- **BAU:** No mitigation done to reduce the carbon emission
- **40%:** Targets estimated from Second National Communication (NC2) by NRE
- **MtCO₂eq:** Million tonne carbon dioxide equivalent

Relevant Document

- Second National Communication for the UNFCCC (NC2) by NRE
- 40% Carbon Reduction Roadmap (unpublished)
- Low Carbon Society 2030 Study by UTM & Kyoto University, Japan

Reference Figure

- 40% Carbon Reduction Roadmap

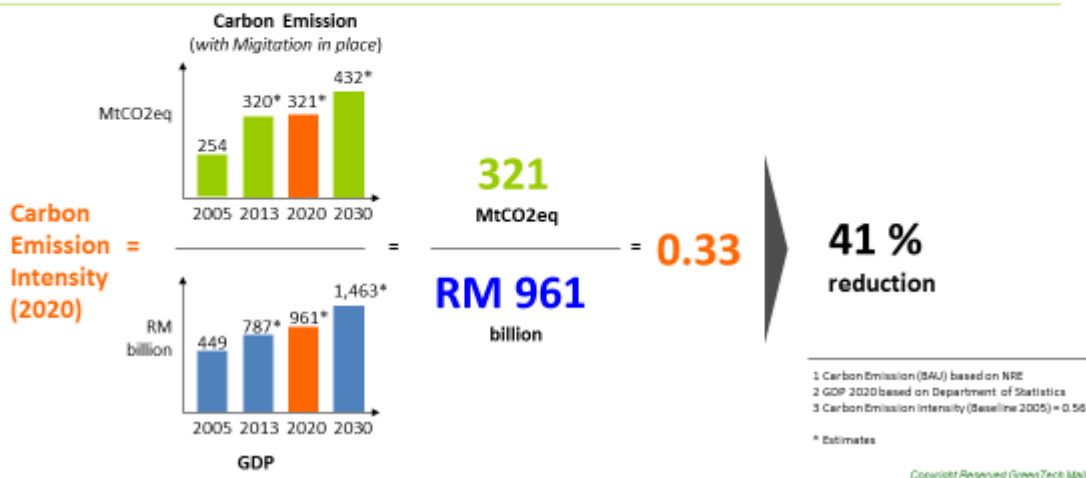


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ASPIRED SCENARIO

What Do We Need To Achieve 40% Reduction Target

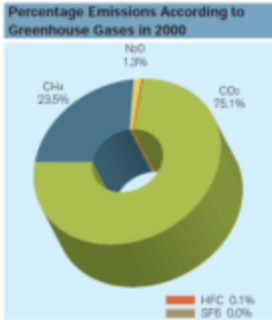
Difference of 69.1 will bring down our carbon emission in 2020 from 390.1 (BAU) to **321** (40% Target).



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ASPIRED SCENARIO

GTMP Carbon Emission Reduction Pathways & Mitigation Potential (85 MtCO₂eq)



Methane (CH₄)

- Avoid methane production
- Capture methane produced

Methane Mitigation Measures

Waste (11.3)

- Food Composting (1.6)
- Recycling (Paper, Plastic & Metal) (2.8)
- Palm Oil Mill Effluent (POME) to Biogas (4.7)
- Sanitary Landfill Methane capture (2.0)
- Biosolid (Waste Water Treatment) (0.2)
- Bioeffluent (Waste Water Treatment) (0.1)

Carbon Dioxide (CO₂)

- Reduce carbon emission
- Capture carbon (> 2020)

Carbon Mitigation Measures

Energy (Electricity) (44.6)

- Industrial Energy Efficiency (32.5)
- Renewable Energy (8.3)
- Low Carbon Power Generation (3.8)

Energy (Electricity)

- Projected emission (2020): 121.1
- Mitigation potential: 36%
- Aspired scenario: 76.5

Transport (25.7)

- Public Transportation (Modal Shift) (13.8)
- Electric Vehicle (1.7)
- EURO4 (10.2)

Transport

- Projected emission (2020): 88.7
- Mitigation potential: 28%
- Aspired scenarios: 63

Building (3.4)

- Green Building Certification (0.2)
- Government Lead By Example (0.3)
- MEPS Labelling (0.9)

Building

- Projected emission (2020): 9.2
- Mitigation potential: 36%
- Aspired scenario: 5.8

73.7

Waste

- Projected emission (2020): 46.6
- Mitigation potential: 24%
- Aspired scenario: 35.3

11.3

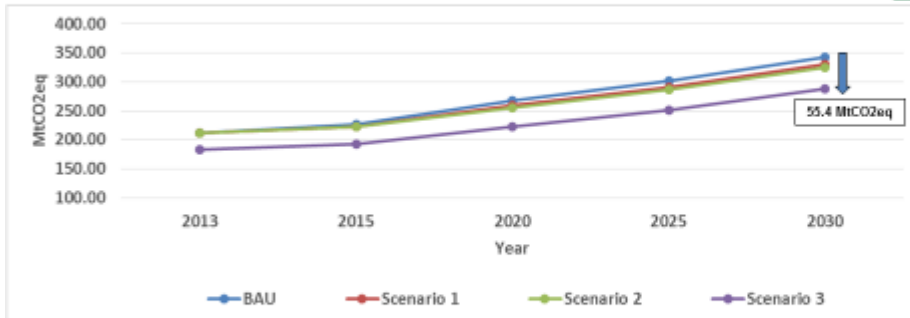
Total

- Projected emission (2020): 390.1
- Overall mitigation (technical potential): 85 MtCO₂eq**
- Buffer of 15.9

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ASPIRED SCENARIO

Energy (Electricity) Carbon Emission Mitigation Potential



- Scenario 1** Renewable Energy
- Scenario 2** Renewable Energy + Low Carbon Power Generation
- Scenario 3** Renewable Energy + Low Carbon Power Generation + Energy Efficiency in Industry

Mitigation 1: Renewable Energy

- Targets as per National Renewable Energy Policy & Action Plan target
- Potential in Solar PV & Biogas
- Key assumption: Pursue RE beyond Feed-In-Tariff (FIT)

Mitigation 2: Industrial Energy Efficiency

- Intensify Energy Management System
- Adoption of Advanced Energy technology

Mitigation 3: Low Carbon Power Generation

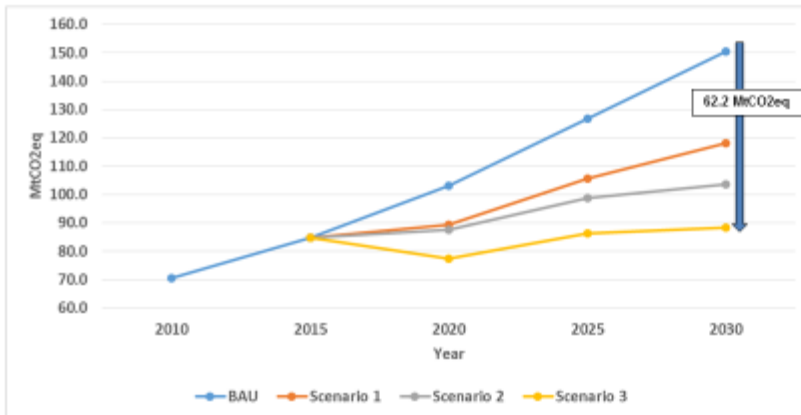
- Assumption: Coal as key fuel
- Pursue in the right direction with Supercritical technology
- Strengthen programme on clean coal technology and carbon capture

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ASPIRED SCENARIO

Transport Carbon Emission Mitigation Potential

19



Mitigation 1: Public Transport

- Shift from private → public mode (*rail-based within Klang Valley*)
- SPAD initiative (under ETP)

Mitigation 2: Electric Vehicle (EV)

- **EV Bus:** More trips expected to improve public transportation. Option of cleaner vehicle within cities required.
- **EV Cars (within cities):** Aggressive mitigation of tail-pipe CO₂ emission and health-related air pollutant
- Key assumptions:
 1. Couple with RE in cities (e.g. Solar PV)
 2. Complement public transport by tackling last mile solution

Mitigation 3: EURO4

- Mitigate tail-pipe CO₂ emission and health-related air pollutant

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- Scenario 1** Public Transport
- Scenario 2** Public Transport + Electric Vehicle (EV)
- Scenario 3** Public Transport + Electric Vehicle (EV) + EURO4

KEY ISSUES - TRANSPORTATION

Introducing zero emission (tail-pipe) buses in major cities

31



Current: 1 EV Bus
Target: 2,000 EV Bus

T1

Awareness among the bus operators in Malaysia to replace the conventional bus to electric bus and awareness on the benefits of electric bus in terms of fuel cost saving among the operator.

T2

High price of EV Bus (atleast 70% higher than diesel bus) - need investment from the bus operators or need to have other financial support.

T3

Difficulties to obtain financial support approval due to the status of EV bus as a new technology (lack proven track of record) and high price of the EV bus.

<http://intra.greentechmalaysia.my/feedback>

KEY ISSUES

Encouraging ownership of electric cars



Current: 46 EV Car
Target: 100,000 EV Car

T1 High price (atleast 70% higher than the conventional car, making it less attractive for people to buy).

T2 No special direct incentives have been introduced that can attract the public to buy EV car.

T3 Range anxiety and lack of widespread EV charging stations.

<http://intra.greentechmalaysia.my/feedback>

KEY ISSUES

Facilitating the use of EURO4 fuel standard



Current: Fuel Standard EURO2M
Target: Fuel Standard EURO4M

T1 Public acceptance on this new fuel quality standard, EURO4 which would definitely to cost more for consumers than the current diesel price.

T2 The oil companies readiness to move for EURO4 – need to upgrade with new refinery facility which is high cost process.

<http://intra.greentechmalaysia.my/feedback>

ANNEX L: REPORT: LFA WORKSHOP ON ENERGY EFFICIENT LOW-CARBON TRANSPORT IN MALAYSIA (ATTACHED)