



Project Identification Form (PIF) entry ? Medium Sized Project ? GEF - 7

## Accelerating the adoption and scale-up of electric mobility in Malaysia

### Part I: Project Information

#### GEF ID

10739

#### Project Type

MSP

#### Type of Trust Fund

GET

#### CBIT/NGI

☐ CBIT

☐ NGI

#### Project Title

Accelerating the adoption and scale-up of electric mobility in Malaysia

#### Countries

Malaysia

#### Agency(ies)

UNIDO

#### Other Executing Partner(s)

GreenTech Malaysia

#### Executing Partner Type

Government

#### GEF Focal Area

Climate Change

#### Taxonomy

Climate Change, Focal Areas, Climate Change Mitigation, Sustainable Urban Systems and Transport, Energy Efficiency, Renewable Energy, Influencing models, Transform policy and regulatory environments, Demonstrate innovative approach, Stakeholders, Private Sector, SMEs, Capital providers, Large corporations, Local Communities, Type of Engagement, Information Dissemination, Participation, Partnership, Gender Equality, Gender results areas, Capacity Development, Gender Mainstreaming, Sex-disaggregated indicators, Capacity, Knowledge and Research, Innovation

**Rio Markers**

**Climate Change Mitigation**

Climate Change Mitigation 2

**Climate Change Adaptation**

Climate Change Adaptation 0

**Duration**

60 In Months

**Agency Fee(\$)**

168,766.00

**Submission Date**

11/13/2020

**A. Indicative Focal/Non-Focal Area Elements**

<b>Programming Directions</b>	<b>Trust Fund</b>	<b>GEF Amount(\$)</b>	<b>Co-Fin Amount(\$)</b>
CCM-1-2	GET	1,776,484.00	16,200,000.00
<b>Total Project Cost (\$)</b>		<b>1,776,484.00</b>	<b>16,200,000.00</b>

## B. Indicative Project description summary

### Project Objective

To enhance the ecosystem in Malaysia for accelerated adoption of electric vehicles and support the implementation of national policy promoting reductions in transport related greenhouse gas emissions.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
1. Strengthening the national policy and institutional frameworks into implementation of up-scaling electric mobility adoption and sustainable battery use	Technical Assistance	1.1 Policy environment, institutional and regulatory framework implementation for electric mobility enhanced	1.1.1 Implementation guidelines and standards for smart charging to maximize renewable energy for charging and harmonization of electric vehicle supply equipment  1.1.2 Public transport and freight master plan enhanced based on modelling and scanning of electric drive technology options  1.1.3 Development of electric vehicle and sustainable battery ecosystem and value chain roadmap	GET	500,000.00	150,000.00

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
2. Investment and commercialization of electric mobility technologies	Investment	2.1 Technology innovation with electric mobility supported and financed	2.1.1 Development of business models and deployment of renewable energy based smart charging	GET	900,000.00	15,630,000.00
			2.2.2 Demonstration of EV battery repurposing and recycling			
			2.2.3 Development of business models and deployment of electric vehicle battery swapping technology integrated with renewable energy			

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
3. Capacity building and scale-up	Technical Assistance	3.1 Strengthened local knowledge-base and scale-up of electric mobility regionally and internationally	<p>3.1.1 Targeted training for municipal governments and private sector on electrifying fleets, charging infrastructure and sustainable use of batteries</p> <p>3.1.2 Training / workshops supporting development of electric vehicle and sustainable battery ecosystem and value chain with a focus on women participation</p> <p>3.1.3 Knowledge exchange and scale-up through participation in regional and international platforms</p>	GET	135,000.00	150,000.00

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
4. Monitoring and evaluation	Technical Assistance	4.1 Project achieves objective through effective monitoring and evaluation	4.1.1 Mid-term review 4.1.2 Final evaluation	GET	79,986.00	100,000.00
Sub Total (\$)					1,614,986.00	16,030,000.00
Project Management Cost (PMC)						
GET		161,498.00			170,000.00	
Sub Total(\$)		161,498.00			170,000.00	
Total Project Cost(\$)		1,776,484.00			16,200,000.00	

**C. Indicative sources of Co-financing for the Project by name and by type**

<b>Sources of Co-financing</b>	<b>Name of Co-financier</b>	<b>Type of Co-financing</b>	<b>Investment Mobilized</b>	<b>Amount(\$)</b>
GEF Agency	UNIDO	Grant	Investment mobilized	50,000.00
GEF Agency	UNIDO	In-kind	Recurrent expenditures	150,000.00
Recipient Country Government	KASA / Malaysian Green Technology Corporation (MGTC)	Grant	Investment mobilized	50,000.00
Recipient Country Government	KASA / Malaysian Green Technology Corporation (MGTC)	In-kind	Recurrent expenditures	200,000.00
Recipient Country Government	Green Technology Financing Scheme (Malaysian Green Technology Corporation)	Guarantee	Investment mobilized	7,500,000.00
Beneficiaries	Municipalities	Public Investment	Investment mobilized	2,000,000.00
Private Sector	Malaysian Electricity Supply Industries Trust Account (MESITA)	Public Investment	Investment mobilized	1,250,000.00
Private Sector	Perusahaan Otomobil Nasional (Proton)	Equity	Investment mobilized	2,500,000.00
Private Sector	Prasarana Malaysia Bhd	Equity	Investment mobilized	2,500,000.00
<b>Total Project Cost(\$)</b>				<b>16,200,000.00</b>

**Describe how any "Investment Mobilized" was identified**

Preliminary co-financing identified has included private sector partners supplying electric vehicles for demonstrating charging infrastructure and piloting innovative solutions to charging as well as using their sites for demonstrating technologies. Investment to be mobilized is based on the pipeline of investments and initial agreements with private sector (Prasarana Malaysia Bhd, Perusahaan Otomobil Nasional) and public sector sources (municipalities). This includes the use of electric vehicles (passenger vehicles and



buses) and public and private land for the purpose of technology demonstration. Potential for co-financing on smart charging demonstrations had been discussed with the Malaysian Electricity Supply Industries Trust Account, alongside investments in charging infrastructure. Financial intermediaries and institutions will be engaged under Component 1 and 2 through the 'Green Technology Financing Scheme' which provides a guarantee mechanism to banks and an interest rate subsidy for green technology development ? though to date it has mostly been used for solar PV project development. This is run by the Ministry of Finance (MOF) in cooperation with the Government-owned organization MGTC ? and is linked with various Malaysian banks. MGTC, KASA and UNIDO will provide in-kind co-financing in the form of staff time, office space and other administrative costs as well as grant co-financing in support of project delivery. Relevant amounts have been clarified in the PIF. Preliminary co-financing will be further developed and solidified during the PPG phase.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNIDO	GET	Malaysia	Climate Change	CC STAR Allocation	1,776,484	168,766	1,945,250.00
Total GEF Resources(\$)					1,776,484.00	168,766.00	1,945,250.00

E. Project Preparation Grant (PPG)

PPG Required

☐

PPG Amount (\$)

50,000

PPG Agency Fee (\$)

4,750

Agency	Trust Fund	Country	Focal Area	Programmin g of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNIDO	GET	Malaysia	Climat e Change	CC STAR Allocation	50,000	4,750	54,750.00
Total Project Costs(\$)					50,000.00	4,750.00	54,750.00

## Core Indicators

### Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO <sub>2</sub> e (direct)	346307	0	0	0
Expected metric tons of CO <sub>2</sub> e (indirect)	1731537	0	0	0

### Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO <sub>2</sub> e (direct)				
Expected metric tons of CO <sub>2</sub> e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

### Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO <sub>2</sub> e (direct)	346,307			
Expected metric tons of CO <sub>2</sub> e (indirect)	1,731,537			
Anticipated start year of accounting	2022			
Duration of accounting	10			

### Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)				

### Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)
Solar Photovoltaic	4.10			
<b>select</b>				

**Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment**

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
<b>Female</b>	5,000			
<b>Male</b>	5,000			
<b>Total</b>	10000	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

The project will contribute to the mitigation of greenhouse gases in the Malaysian transport sector. The project will result in direct emission reductions of an estimated 51,808 tCO<sub>2</sub> (as a result of technology demonstrations, GEF-funded and co-financed activities, and log frame activities) and secondary direct emissions reduction of 294,500 tCO<sub>2</sub> (as a result of larger changes in mobility due to the combined effect of factors such as policy changes and behavioral changes occurring during the project period), for total direct emission reductions 346,307 tCO<sub>2</sub>, at a cost per tonne reduction of 5.13 USD (based on total direct emissions only). Indirect emissions reductions (as a result of scaling-up actions after the project implementation period) have been estimated at 1,731,537 million tonnes using a conservative multiplication factor of 5. This also based on assumed installation of 4.1 MW of new PV capacity under the project. Please see the attachment, "Direct and Indirect Emission Reduction Calculations" for complete explanation of the proposal calculations. These estimations are based on increased use of electric vehicles and improved transport infrastructure. The methodology applied for GHG emissions under indicator 6 have been calculated based on the GEF "Manual for Calculating Greenhouse Gas Benefits of Global Environment Facility Transportation Projects", consistent with other projects within the Global Electric Mobility Program. The exact targets will be reviewed during the PPG stage, considering "Emissions avoided", "Energy saved", and "Increase in installed renewable energy capacity". Furthermore, the project anticipates a disaggregated split of 5000 women and 5000 men to be direct beneficiaries from the project's interventions, with half of these individuals switching their mode of transport and another half switching their vehicles. Other

direct beneficiaries are expected in the private and public sector as recipients of training on electric mobility and knowledge exchange through connecting with regional and global platforms. Additional co-benefits are anticipated including contributing environmentally to cleaner air and a decrease in noise pollution, socially in the creation of additional jobs in the automotive sector related to electric vehicles and economically in the development of new business models that support the adoption of electric vehicles. These calculations will be revisited as part of the PPG stage.

## Part II. Project Justification

### 1a. Project Description

#### **a) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description);**

Approximately two-thirds of all anthropogenic global greenhouse gas (GHG) emissions come from energy consumption. While innovation and dropping prices for renewable technologies are helping drive progress in the energy transformation / electricity generation and heat sectors, decarbonizing the transport sector remains a significant challenge for countries around the world. In 2017, the transportation sector accounted for 24% of direct CO<sub>2</sub> emissions with 77% attributable to road vehicles (cars, trucks, buses and two-wheelers). In order to meet the sustainable development scenario goals, emissions from transport must peak around 2020 and drop by over 9% by 2030. Presently, low-carbon transport vehicles represent 2% of global vehicle sales and it is estimated this figure must reach at least 30% by 2030 and 80% by 2050 for the transportation sector to sufficiently meet targets to decarbonize the global economy.

Electric mobility has gained increased attention as a low carbon transport solution. Innovations in battery and electric drive technologies in tandem with high volatility in oil markets have increased the interest in electric mobility as a potential alternative to vehicles with internal combustion engines (ICE). Additionally, provided the electricity used by an electric vehicle (EV) comes from renewable energy, electric mobility can be seen as a climate smart solution to decarbonizing the transport sector. In this respect, distributed, low-carbon power generation from renewables alongside innovations in battery storage remain critical for ensuring the global environmental benefits of reduced GHG emissions in the transport sector are realized.

In 2018, 5 million EVs were on the road with an increase of 2 million EVs in the same year. Drivers for the uptick in adoption of electric mobility include reductions in battery prices, evolution in battery technologies, developments in charging methods and increased government support. Under the International Energy Agency's EV30@30 Scenario which aligns with the IEA's Sustainable Development Scenario and assumes power grid decarbonisation, EV sales market share reaches 30% by 2030 (excluding two/three-wheelers) and results in a reduction of oil demand by an estimated 4.3 million barrels a day. This projected EV fleet would emit 770 Mt CO<sub>2</sub>-eq compared with about 770 Mt CO<sub>2</sub>-eq from ICE vehicles.

Despite growth in EV production and adoption, significant economic, regulatory and technical barriers exist to their mass adoption :

Economic barriers:

? EVs generally have higher price tags than conventional ICE vehicles.

? EVs face high costs of acquisition with fleet operators facing high capital costs to replace ICE vehicles with EVs (although EVs have very low operating costs)

Regulatory barriers:

? The characterization of EV charging as the sale of electricity or as a service.

? Tariff issues on charging stations and the cost-prohibitive prices on electricity.

Technical barriers:

? Charger standards and protocols not being standardized in countries resulting in lack of inter-operability.

? Grid stability related issues due to normal EV charging behavior place extra load on the grid during peak hours.

? Battery performance issues with respect to safety at high temperatures and the life cycle of the battery.

Information barriers:

? General awareness among policy makers, the private sector and the public about EVs, their performance, as well as incentives and regulations in place for their use

? Range anxiety due to EVs having limited range compared to ICE cars based on the size of the battery.

To overcome these barriers and seize the GHG mitigation opportunities electric mobility offers, intervention will be required by governments and policymakers.

### ***Malaysian context:***

In 2017, Malaysia's Final Energy Consumption (FEC) stood at 62,848 ktoe (kilotonnes of oil equivalent), which is 9.8% higher than the previous year. The transportation sector is the second fastest growing sector overall, its total FEC is 23,522 ktoe or 37 percent of the country's total. Based on the National GHG Inventory done for UNFCCC, as a whole, the transport sector has consistently remained the second largest GHG emitting sector in the country accounting for 20% of the country's total GHG emissions in 2014 (MESTECC, 2018). Of these 20%, about 18% comes from road transportation (55,366 Gg CO<sub>2</sub>eq). In 2016, out of the total carbon emissions from the land transport sector, 71% originated from cars and 9% from motorcycles. (GTMP, 2017). Malaysia's transport infrastructure has continued to develop over the years with a 3.5x increase in road network from 1995 to 2016 (NTP, 2018). In order to meet its targets and move towards a low-carbon future, Malaysia will need to address emissions from transport through a mix of urban planning, increased adoption of sustainable energy and technological development of low-carbon modes of transport. Malaysia also active in the automotive industry, with the third largest sector in Southeast Asia and 23<sup>rd</sup> largest in the world. In 2018, Malaysia total production volume for passenger and commercial vehicles was 564,971 and also produced 466,680 motorcycles.

Malaysia presently has few electric vehicles models on the market but has seen some growth in the sector. Of the 3,535,851 vehicles registered in Malaysia between 2015 and 2020, 28,681 were plug-in hybrid electric vehicles and 239 were battery electric vehicles with annual sales of EVs falling under less than 1%. Malaysian consumers have few options in terms of EV models to choose from and face higher upfront purchasing costs compared with the cost of comparative vehicles (ICE) with internal



combustion engines. The relatively affordable price of gasoline in Malaysia for ICE vehicles also provides less economic incentive for consumers to shift to EVs. Illustratively, in January 2021, the price of petrol and diesel in Malaysia is approximately 1.84 and 2.08 Malaysian Ringgit (0.45 USD and 0.51 USD) respectively. There is presently no electricity tariff for transport and most of the public stations installed do not require payment for charging but require an annual membership card (ChargEV membership costs 240 Malaysian Ringgit or about 60 USD a year) ? however, even with a relatively affordable membership fee (or in some cases no fee), the price of gas remains relatively affordable in comparison. Offering public charging of EVs for free has also been identified to be likely unsustainable in the long-term as there is no cost-recovery in place for the stations, especially if electric mobility and charging infrastructure expands in the country. Between 2015 and 2020, public charging stations have grown in that same period from no stations installed to 524 being installed presently. Renewable energy represents approximately 3.5% of Malaysia's electricity mix with the remainder primarily coming from natural gas and coal, meaning charging infrastructure is supported by fossil fuel sources of energy.

In order to meet its targets and move towards a low-carbon future, Malaysia will need to address emissions from the transportation sector through a mix of urban planning, increased adoption of renewable energy supporting charging infrastructure and technological development of low-carbon modes of transport. While there have been some encouraging signs of growth in electric mobility and charging infrastructure, barriers remain to meeting the large-scale adoption required to contribute to decarbonisation of the country's transportation sector as well as ensure that the safe reuse and disposal of EV batteries is accounted for as the EV sector grows. Many of these barriers mirror those found globally including consumer and fleet operators having concerns about the upfront cost of vehicles, range anxiety and lack of understanding on the concept of total cost of ownership. Although there have been encouraging steps towards the promotion of electric mobility (outlined in the next section) there remain gaps in policy, regulation and technical challenges to the scale-up of EVs, specifically with respect to ensuring charging infrastructure is supporting by sustainable energy, enabling the electrification of public transport and freight, the sustainable use of batteries and supporting a national ecosystem for EV manufacturing and value chain development. These key barriers are expanded on below:

*Barrier 1: Gaps in policy and regulations for smart charging and sustainable battery use*

There are presently no policies or regulations in place to support uptake of smart charging especially with respect to bi-directional charging. There is the perspective among stakeholders that EV growth would be problematic for the load demand. Policy makers and regulators lack information, references and tools to inform how growth in electric mobility could support grid management and there is a disconnect between the development of charging infrastructure and the adoption of renewable energy. To ensure charging infrastructure growth does not place drastic burden on national and local grids, as well as to create co-benefits in the form of increased grid flexibility and penetration of renewables, guidelines and standards are required to support implementation of smart charging.

Likewise, there is presently no policy, regulations and framework for managing any projected growth in EV battery disposal. Planning is also necessary for developing an ecosystem that supports reuse recycling and safe disposal.

*Barrier 2: Electric mobility for public transport and freight has not been integrated into existing transport policy and planning*

National policies and plans for public transport and freight presently do not include consideration for the adoption of electric mobility. There is a lack of knowledge and data on how different electric mobility solutions could be applied as well as how to approach integrating electric into existing plans. There is also lack of knowledge and capacity for monitoring GHGs from the transport sector at the local level ? creating challenges for establishing baselines, tracking progress and articulating potential benefits of electrifying transport and incentivizing further action. The benefits of electric fleets, such as lower maintenance and service costs, are also not well understood.

*Barrier 3: Localization of EV manufacturing and value chains within Malaysian automotive industry is low*

The adoption of electric vehicles will require further alignment within the Malaysian automotive industry as a whole. The current scheme for internal combustion engines remains relatively favorable, meaning assistance to the local EV industry alone will not be enough to support mass adoption of electric mobility. local contractors that install charging infrastructure are reliant on international manufacturers and suppliers which has impacted the reliability, serviceability and deployment of charging infrastructure locally. The challenge will have to be addressed systematically in order to create the competitive edge of the EV industry including developing local value chains, addressing gaps in expertise and reviewing incentives that favour ICE vehicles. An example of this is Malaysia's current taxes and duties (import tax, excise duty, sales tax and road tax), that are competitively based on engine CC, which pose challenges to making EVs competitive. The EV import duty privilege presently sits at 10% in comparison to 75% to 105% import duty privileges for ICE vehicles. Support is also necessary for developing an ecosystem for entrepreneurship for electric mobility along the value chain. Lack of consistent standards for batteries also creates a barrier to the adoption of battery-swapping modalities that could support upfront reductions in EV costs.

*Barrier 4: Lack of demonstrations for different EV business models, use of smart charging and battery repurposing and recycling*

As indicated above, public charging of EVs for free has also been identified to be likely unsustainable in the long-term as there is no cost-recovery in place for the stations, especially if electric mobility and charging infrastructure expands in the country. Additionally, smart and bidirectional charging has not been demonstrated, causing challenges for understanding how to localize the technology as well as practical implication it might have for the grid, public and private fleet adoption as well as consumer behaviour. There is a need for developing business models and demonstrating smart charging infrastructure for all types of vehicles (passenger, commercial and public transport) to ensure the system is financially viable as well as ensures any growth does not put strain during peaks on the grid,

while supporting the penetration of renewable energy. Small-scale and controlled demonstrations are necessary to increase knowledge and understanding among stakeholders on how the technology could be applied. Alternative business models and technological solutions for vehicles that reduce the upfront costs have also not been trailed, such as battery leasing and swapping for electric vehicles. EV battery reuse and recycling also requires assistance in the form of technology transfer and localization.

*Barrier 5: Lack of knowledge, capacity and awareness on electric mobility and sustainable battery use*

This barrier has been expressed across the previous four barriers as it is cross-cutting. There remains a need for communicating the benefits of electric mobility among policy makers, especially at the local level, as well as among fleet managers. The concept of total cost of ownership (TCO) and EVs relative low maintenance and fuel costs are also not salient in the minds of fleet managers. Capacity is also required to support development of Malaysia electric mobility value chain. This includes the sustainable use of batteries and approaches to their reuse and recycling.

**b) The baseline scenario and any associated baseline projects;**

As a signatory nation to the Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), Malaysia has pledged in its Intended Nationally Determined Contribution to reduce its Greenhouse Gas (GHG) emission intensity per Gross Domestic Product (GDP) by up to 45% by 2030 relative to 2005 levels. This consists of 35% on an unconditional basis and a further 10% is conditional upon receipt of climate finance, technology transfer and capacity building from developed countries (GTMP, 2017). The most recent 'Third National Communication and Second Biennial Update Report' included measures on energy efficient and electric vehicles:

'Energy Efficient Vehicles (EEV) through strategic investments and adoption of high technology for domestic market and to penetrate regional and global markets by 2020. The EEVs include fuel-efficient internal combustion engine (ICE) vehicles, hybrid vehicles, electric vehicles (EV) and alternative fuelled vehicles.'; and

'Electric Vehicles (Increase availability of electric vehicles in the market to reduce fuel consumption)' with a target of '100,000 electric cars and 100,000 electric motorcycles on-the-road by 2030'.

There are a number of nation-wide policies / programmes and investment frameworks, which are relevant to addressing the issue of transport emissions:

11th Malaysia Plan (2015-2020) Encouraging low carbon mobility through utilisation of energy efficient vehicles and public transport.

The National Transport Policy for 2019 - 2030 sets the strategic direction for the future growth of a sustainable transport sector. NTP Policy Thrust 4 is advance towards a green transport ecosystem. Under this policy thrust, strategic thrust 4.3 is on accelerate implementation of low carbon mobility initiatives.

National Automotive Policy aims to make Malaysia the hub for energy efficient vehicles (EEVs) and to promote competitive and sustainable domestic industry. 100% EEV (including Electric Vehicle) is the target by 2030. The revised National Automotive is anticipated to emphasize on Electric Vehicle ecosystem and value chain development.

The Third National Communication and Second Biennial Update Report submitted to the UNFCCC reported that increase availability of electric vehicles in the market is one of mitigation scenarios towards contributing in reduction of 12.41 Million tonnes CO<sub>2</sub>eq emissions from transport by 2030

The National Land Public Transport Master Plan (NLPTMP) has the potential to improve the Quality of Life and Environmental Sustainability focuses on urban rail (i.e. MRT, LRT and Monorail), bus and other supporting infrastructure (i.e. Bus Rapid Transit, Park & Ride bays, etc.).

The National Biofuel Policy (NBP) adopted in 2013 has resulted in palm-based biodiesel displacing 382,000 tonnes of petroleum diesel in 2015 and plans are currently being considered for significant up-scaling.

The Logistic and Trade Facilitation Master Plan has action item on Creating Regional Footprint (2020 and beyond) with the objective of developing and promoting logistics service providers who can compete globally, taking advantage of the AEC and liberalisation of the logistics industry. Its action item include provide green initiative support via acceleration of Green Logistic Industry.

Low Carbon Cities Framework has been formulated to provide framework and tool for further implementation of the whole spectrum of strategic and policy development on sustainability within the Malaysian context; with specific focus on tracking carbon emissions at city levels. Urban transportation is one of the four key elements identified to comprehend the cities' carbon footprint.

A number of municipalities and other sub-national public entities are also moving forward to support sustainable transport initiatives ? including encouraging modal switching, including some supported by various municipalities are planning / implementing projects to encourage modal-switching, in part with the cooperation of the UNIDO/GEF project 'Sustainable-City Development in Malaysia' (GEF ID #9147) and the UNDP/GEF project 'Green Technology Application for the Development of Low Carbon Cities (GTALCC)' (GEF ID #5329).

The COVID-19 **National Economic Recovery Plan** included indirect measures relevant to consumers that may purchase electric vehicles and automotive manufactures on the supply side. This includes sales tax exemption on the purchase or importation of passenger cars from June to December 2020 with a 100% sales tax exemption on locally assembled cars and 50% tax exemption on imported cars ? though these provisions do not specifically target electric vehicles.

These initiatives and policies mostly are geared towards increasing the demand for sustainable transport options. At the same time, there is also great potential for Malaysia to be a leading player for innovation in supplying the globe related to sustainable transport. For example:

? There are a number of programmes to support cleantech companies and innovators though they have had limited success in attracting interest from the mobility sector. These include the ?Green Technology Financing Scheme? which provides a guarantee mechanism to banks and an interest rate subsidy for green technology development ? though to date it has mostly been used for solar PV project development.

? Some of the key auto manufacturers such as Geely Auto Group (owners of the large national automobile company Perusahaan Otomobil Nasional (Proton) have goals that 85% of vehicles produced in Malaysia will be EEVs by 2020. Anticipating substantial increase in vehicle production volume in the future, PROTON is exploring utilization of renewable energy and to reduce maximum demand (potentially via V2G) for their production line.

? Electric motorcycle manufacturing is a growing industry in Malaysia as is electric charging station development ? with one manufacturer (Eclimo) reporting leasing over 800 units of Electric motorcycle for KFC food deliveries, Royal Malaysia Police, and City Councils in Melaka, Selangor and Penang. battery pack technology and its direct-drive electric motor, both of which have been successfully commercialized.

? DHL eCommerce provides nationwide domestic delivery with fully owned operations in Malaysia has rolled out a fleet of electric vehicles in Malaysia. There is plan for delivery hubs in Puchong and Cheras in Malaysia to be retrofitted with electric charging points with fast charging capabilities.

? As a move to localize EV technology, University Malaya Power Energy Dedicated Advanced Centre (UMPEDAC, UM) is conducting research on Mobile Hybrid Energy Storage System for Emergency Power Dispatch and Grid Support. The project covers the attention to energy solution that can help to increase grid reliability and resilience energy power that can support the grid.

? Many of electric vehicle charging stations are being produced or could be produced in Malaysia. Furthermore, conversations with charging station producers indicate that Vehicle to Grid (V2G) and Storage to Grid (S2G) technologies could be developed in Malaysia, which could significantly affect the market both in Malaysia and abroad.

As noted above, there are a number of baseline investment programmes ongoing which could be linked to innovation in cleantech to scale up electric vehicles in Malaysia. These include, for example the following programmes with relevant stakeholders:

? ?Green Technology Financing Scheme? which provides a guarantee mechanism to banks and an interest rate subsidy for green technology development ? though to date it has mostly been used for solar PV project development. This is run by the Ministry of Finance (MOF) in cooperation with the Government-owned MGTC ? and is linked with various Malaysian banks.

? Interest from car and bus companies in investing in potential V2G and S2G technology. A number of private sector companies and publicly owned bus companies have expressed interest in piloting this technology for eventual scale-up ? including Perusahaan Otomobil Nasional (Proton) which is a major

vehicle manufacturing company in Malaysia who is interested in integrating RE, e-charging, and e-vehicles into their production facilities.

? Investments from various cities in sustainable mobility efforts ? including modal switching (which could include bicycle lanes, buses, etc.). A number of cities including Kuala Lumpur, Putrajaya, Iskandar, Malacca are already engaged with these activities ? some of which are already supported by GEF resources and some of which are not.

? Investments in the scaling up of electric vehicle charging stations throughout the country ? which is being implemented partially by the main electricity distribution company and by MGTC but could also be scaled up with a number of additional private companies being involved.

**Baseline project:**

In addition to the above projects and initiatives, this project specifically builds on the nearly approve **?Low Carbon Mobility Blueprint (LCMB)?**, developed by MGTC in consultations with key stakeholders and support of UNIDO under the GEF-5 project, ?Energy Efficient and Low Carbon Transport in Malaysia?. The objectives of the LCMB are (i) to achieve an appropriate reduction in energy consumption in the transport sector and (ii) to obtain a reasonable reduction in GHG emissions in the land transport sector as compared to the business as usual (BAU) case in 2030. The LCMB uses Long-Range Energy Alternative Planning System (LEAP) software developed by the Stockholm Environment Institute as its primary modelling tool. It is estimated that implementation of the LCMB will result in a reduction of 26.90 million tonnes of CO<sub>2</sub>eq, a reduction of 44% of the national GHG reduction needed to meet Malaysia's 2030 target.

The GEF-5 project and the LCMB have a larger scope than the proposed project in that they apply an avoid-shift-improve strategy to sustainable transport and frames its research, consultations and interventions around this approach with electric mobility identified as one of four focus areas. The outputs of the LCMB are organized into four focus areas focused on addressing GHG emissions and energy reduction with each having a set of strategies. Each is outlined here to provide context to where electric mobility fits within the larger approach:

**Focus Area A: GHG Emission & Energy Reduction via Vehicle Fuel Economy & Emission Improvement**

- i. Encourage adoption of low emission vehicle (light duty vehicle)
- ii. Strengthen Energy Efficient Driving Program

**Focus Area B: GHG Emission & Energy Reduction via Electric Vehicle Adoption**

- a. Electric car adoption in strategic application
  - i. Government led by example
  - ii. EV adoption for taxi fleet
  - iii. EV incentives for the market
  - iv. Ensuring EV charging infrastructure sufficient for private EV penetration
  - v. Supporting the manufacturers of local EV cars

b. Electric bus adoption in strategic application

- i. Government led procurement for EV bus fleet
- ii. Electric buses as stage buses, feeder buses, communal service by municipalities, shuttle services by company, shopping complex, hotels, etc.
- iii. Supporting the manufacturers of local EV buses

c. Electric motorcycle adoption in strategic application

- i. Electric motorcycle for government enforcement fleet
- ii. Electric motorcycle for delivery services
- iii. Standards and regulations
- iv. Battery swapping
- v. Supporting local manufacturers of electric motorcycle

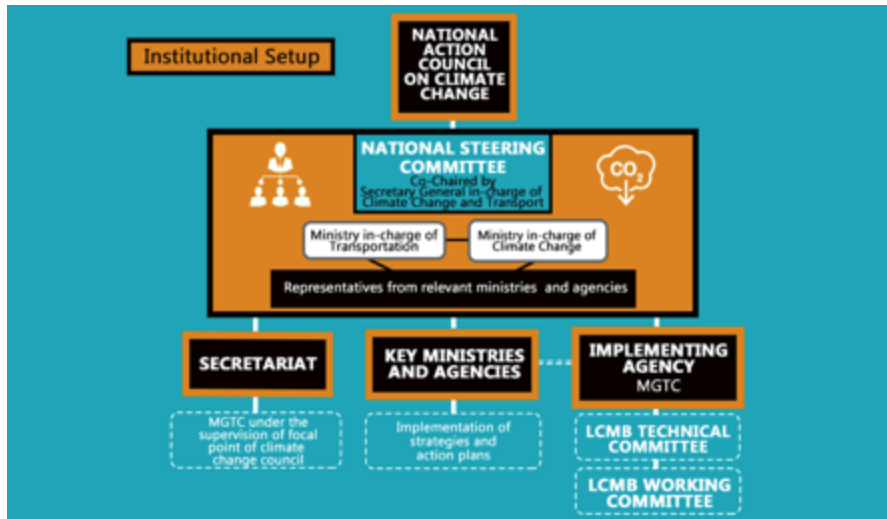
Focus Area C: GHG Emission & Energy Reduction via Alternative Fuel Adoption

- i. Enhance the use of biodiesel in road transport
- ii. Creating the eco-system for alternative fuel industry growth

Focus Area D: GHG Emission & Energy Reduction via Mode Shift

- i. Mode shift private transport towards public transport
- ii. Land use development promoting public transport
- iii. Improvement of traffic flow
- iv. Freight mode shift from road to rail
- v. Promote active mobility

An institutional set-up for the LCMB has been proposed covering the four focus areas, with a National Task Force Committee on Low Carbon Mobility overseeing overall implementation and including representation from key ministries, civil society and industry. This includes the Ministry of Environment and Water (MEWA), Ministry of Transport, Ministry of Energy and Natural Resources (KeTSA), Ministry of Finance (MOF) and the Ministry of International Trade and Industry (MITI). Under this arrangement, MGTC acts as the secretariat and monitors progress, with different ministries responsible for the LCMB's implementation as well as supporting with co-financing. This institutional set-up addresses a gap in coordination that was identified in the LCMB's development.



As secretariat of the LCMB, the MGTC is well-positioned as the executing agency for ensuring that this project's outputs and activities align and compliment with projects supporting the LCMB's implementation. MGTC will coordinate execution of the project's components and report to a project steering committee comprised of key stakeholders identified during the PIFs development and outlined under the coordination section of the PIF. Coordination is also required between this project, the LCMB including the National Transport Policy (NTP 2030), National Policy on Climate Change (2009), Green Technology Master Plan (GTMP) 2019, the National Physical Plan 3 (NPP 3) and the National Automotive Policy (2020). Coordination between the project and these policies implementation is made possible through the inclusion of the appropriate line Ministry for each policy. For example, the Ministry of International Trade and Industry is the lead ministry for the National Automotive Policy 2020, which is relevant for both the LCMB and this project, and supports the implementation of the LCMB and is also a member of the project's steering committee. The MGTC is also well positioned for connecting the project with financial intermediaries. The aforementioned 'Green Technology Financing Scheme' is run by the Ministry of Finance in cooperation with the MGTC and is linked with various Malaysian banks. The Green Technology Financing Scheme provides a guarantee mechanism to banks and an interest rate subsidy for green technology development though to date it has mostly been used for solar PV project development.

The LCMB enhances and compliments the existing policies listed in the previous section, broadly considering Malaysia's energy efficient vehicle (EEV) definition and strategy. An example of a gap the LCMB address is the National Automotive Policy (NAP 2020), which does not give any specific focus on EVs. Rather, NAP focuses on Mobility As A Service (MaaS), Next Generation Vehicles (NxGV), Autonomous Vehicles and Industry 4.0. The LCMB compliments this by having a focus area specific to electric vehicles. The LCMB also compliments the National Transport Policy 2019 for its 'Advancing towards Sustainable Transport' thrust. There is multiple action that are common to LCMB and a project charter is being developed to execute some of these components among stakeholders.

The LCMB outlines an enabling framework for implementation of the plan focusing on five areas: 1) Strengthening institutional framework; 2) Facilitating conducive economic instruments; 3) Capacity,



skills and knowledge development; 4) Technology nurturing and commercialization; and 5) Consumer communication, education and public awareness.

Within these areas, some key areas this project can help address have been identified. With respect to strengthening institutional framework, a need has been identified to ensure policy coherence across existing policies on transport at different levels of government, in particular with respect to ensuring alignment between national policy and spatial planning at the city and district level as it applies to mode shift and planning for electric charge infrastructure.

In relation to LCMB, this project scope is specific to advancing Focus Area 2: GHG Emission & Energy Reduction via Electric Vehicle Adoption, on the vehicle electrification for car, bus and motorcycle. GEF funding and technical assistance is necessary to enable advancement of the LCMB, specifically as it relates to the adoption of electric mobility. Three specific priority areas where GEF funding would have an immediate impact based on the need for technical assistance and their alignment with GEF-7 funding priorities for electric mobility:

- i. Advance charging technology demonstration for better grid management and environmental benefit: Malaysia needs to shift further the sustainable effort on the electricity sector. Although Malaysia has pledged to raise national renewable electricity generation to 20%, demonstrations on smart charging are necessary to support awareness on the technology and how it could support raising national ambitions moving forward.
- ii. Develop the holistic repurpose and recycling solution for the lithium ion battery: This year, Malaysia has started the Advance Automotive Treatment Facility to help address vehicle recycling. This project would add needed support into the capacity to manage the lithium ion battery within the licenced facilities or guidelines and competencies.
- iii. Support development of Malaysia's EV supply chain: The bus and motorcycle segment have been identified as preliminary sectors for attention under this project as there are a few e-bus and e-bikes initiatives already launched in Malaysia. A 'post-mortem' of these precedence projects would be a starting point for further development under the project. Additionally, this project would support addressing the current gap in after-sales and maintenance of the EVs.

**c) The proposed alternative scenario with a brief description of expected outcomes and components of the project;**

While the Low Carbon Mobility Blueprint has been developed, the GEF funding will be critical in ensuring the implementation of the LCMB activities targeting electric mobility and upscaling of electric vehicle uptake in Malaysia. The objective of the project is to enhance the ecosystem in Malaysia for accelerated adoption of electric vehicles and support the implementation of national policy promoting reductions in transport related greenhouse gas emissions. In doing so, the project will reduce GHG emissions from the transport sector in Malaysia through the scale up of various types of

electric vehicles to reduce the GHG impact per vehicle. A theory of change for the project outlining how the outputs will contribute to its goal of mitigation of GHG in the transportation sector has been attached to the submission.

The following specific actions are foreseen within the project:

**Component 1: Strengthening the national policy and institutional frameworks into implementation of up-scaling electric mobility adoption and sustainable battery use**

**Outcome 1.1. Policy environment, institutional and regulatory framework implementation for electric mobility and sustainable battery use enhanced**

**Outputs:**

**1.1.1 Implementation guidelines and standards for smart charging to maximize renewable energy for charging and harmonization of electric vehicle supply equipment**

A barrier to the adoption of policy on smart charging is a lack of understanding on the impact it will have on the grid, as well as a lack of understanding on what regulatory environment is necessary to make smart charging attractive to the private sector for investment. Simulation analysis includes assessment on impacts of smart charging on the electricity grid (generation, transmission, and distribution) and assessment of GHG emissions and socio-economic impacts. It will also assess the implications for harmonization of electric vehicle supply equipment for passenger vehicles, bus and motorcycle. This output will include development of business model and investigates the complementarity potential between variable renewable energy sources and EV, adopting smart charging approaches.

**1.1.2 Public transport and freight master plan enhanced based on modelling and scanning of electric drive technology options**

This output will assess the investments involved and policies necessary to shift from diesel-based transport of freight (either trucks or trains) to electric rail transport ? including the costs and benefits of such a shift, an assessment of GHG emissions, environmental pollutants and socio-economic impacts. This will also include modelling of the investments involved, policies and regulatory necessary to shift of passenger traffic in major cities like Kuala Lumpur to more sustainable modes of transport (from cars to public transport, walking, bicycles, and e-vehicles). The various technologies will be evaluated with an appropriate discount rate to find the financial rates of return on investments, the level of financial and non-financial incentives necessary, and the non-financial benefits.

### **1.1.3 Development of electric vehicle and sustainable battery ecosystem and value chain roadmap**

On the supply side, policy, investment and capacity building is required local auto manufacturing to transition to EV development. This will involve establishment of environmentally sustainable transport network in EV ecosystem and value chain with OEM, regulatory, component suppliers, project owners committed on game changer implementation towards development of entire value chain ecosystem around electric vehicles, building off of the work to charging stations and including the various steps towards value added product development of e-vehicles and their component parts in Malaysia. Electric buses and motorcycles have been preliminarily identified as an area where Malaysia could develop its value chain further. The results will include an EV Industry Roadmap for Malaysia. This output will also explore requirements of Energy Efficient vehicle labelling system (fuel consumption and CO2 emissions, database input for Corporate Average Fuel Economy determination, EEV standard development and awareness programme. Regulations including the amendment of Environmental Quality Act 1974 will be adopted describing the requirements of this scheme. This will include the adoption of specific standards, potentially pricing support for low-emission (EV) vehicles. This emissions guideline will be based on verification testing procedure as per UN R101 or Road Transport Act 1987. This output will also consider policy and regulations required for the safe recycling and disposal of electric vehicle batteries.

## **Component 2: Investment and commercialization of electric mobility technologies**

### **Outcome 2.1: Technology innovation with electric mobility supported and financed**

#### **Outputs:**

#### **2.1.1 Development of business models and deployment of renewable energy based smart charging**

This will involve the implementation of a number of smart-charging trials for electric vehicles linked to renewable energy such as solar PV ? wherein it is investigated how to best match supply and demand of the electricity system to minimize system costs and GHG emissions. This would include distributed solar photovoltaics for electric vehicle charging and a controller to be developed to analyse the impact of an electric vehicles PV integrated system. The system would look at grid storage batteries accepting electricity from the solar PV and stored in the storage battery during the daytime and recharge the EV from the battery storage during night time. This could potentially also include developing Vehicle-to-Grid capacity, wherein the vehicles serve as a battery for grid stabilization (taking off power during low demand times and supply during peak times). This will also include an impact assessment for government fleets, e-buses and e-taxis and linked to government support schemes.

#### **2.1.2 Demonstration of EV battery repurposing and recycling**

In connection with output 1.1.3, this output will involve a demonstration and support for the re-use of EV batteries, for example as batteries for PV electricity production which could be then used for later

EV charging or feed into the grid during peak demand times. Linkages may potentially exist with 2.1.1 however this output also looks beyond reuse but will also link with the new Advance Automotive Treatment Facility to showcase options for EV battery recycling.

### **2.1.3 Development of business models and deployment of electric vehicle battery swapping technology integrated with renewable energy.**

In connection with output 1.1.3, business models that apply battery swapping technologies will be developed in support of decreasing existing upfront costs of EV purchasing. E-motorcycles have been preliminarily identified as a potential vehicle type to conduct a pilot. The demonstration will also connect with policy and regulations looking to address battery management through the value chain.

## **Component 3: Capacity building and Scale-up**

### **Outcome 3.1: Strengthened knowledge-base and scale-up of electric mobility**

#### **Outputs:**

#### **3.1.1 Targeted training for municipal governments and private sector on electrifying fleets, charging infrastructure and sustainable use of batteries**

This output connects with outputs 1.1.1 and 1.1.2 and will include capacity building for municipal governments and the private sectors on means for electrifying public and private fleets, installing charging infrastructure supported by renewable energy sources and the sustainable use of batteries. It will also support agencies to establish standard operating procedures (and if needed policies) for reporting, and verification of impacts of their sustainable transport / electric vehicle support programmes for monitoring progress. This output will also involve the development of an eco-driving training module for passenger vehicles, government and public fleet and logistics operators to understand how to reduce their fuel consumption while driving, how to assess whether E-vehicles or other modes of transport are better for their circumstances, etc.

#### **3.1.2 Targeted training and entrepreneur programme supporting development of electric vehicle and sustainable battery ecosystem and value chain with a focus on women participation**

This output connects with output 1.1.3, complimenting it by developing training programmes for entrepreneurs and SMEs in support of local development of electric mobility software, manufacturing of hardware and hardware service and repair. This also includes training and workshops on smart charging and different business models for electric mobility including battery-swapping programmes. The execution of the programme would come from co-financing. The aim is to address local contractors' reliance on international manufacturers.

#### **3.1.3 Knowledge exchange and scale-up through participation in regional and international platforms**

This output will connect this project with regional and international platforms on focused on electric mobility for the purpose of facilitating knowledge exchange on lessons learned from this project. This would include participating in the UNEP/IEA led GEF 7 Global Programme to Support Countries with the Shift to Electric Mobility. Specifically, connections would be explored with the regional Support and Investment platforms managed by the Asian Development Bank. Further opportunities would be explored through ASEAN.

#### **Component 4: Monitoring and evaluation**

##### **Outcome 4.1: Project achieves objective through effective monitoring and evaluation**

###### **Outputs:**

###### **4.1.1 Mid-term review**

At the mid-point of the project (after approximately 2.5 years), UNIDO will coordinate an independent mid-term review to identify the achievements to date, make suggestions as needed to revisions of the project, and identify lessons learned to be disseminated within UNIDO (and perhaps to other sustainable transport projects funded by the GEF).

###### **4.1.2 Final evaluation**

UNIDO will facilitate a final evaluation by an independent evaluator within 6 months of project closure to verify achievements to date, make any final suggestions for the closing period of the project, and identify lessons learned.

###### **d) Alignment with GEF focal area and/or Impact Program strategies;**

This project is categorized under the GEF-7 Climate Change Mitigation (CCM) focal area, specifically addressing the strategic area of CCM-2: Promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technologies and electric mobility. The project supports decarbonisation of Malaysia's transport sector and industries by promoting the adoption of low-carbon technologies and innovative approaches to market transformation. In particular, the project aligns with GEF's CCM focal area by increasing the competitiveness and productivity of industrial firms and their processes, contributing to direct reductions in GHG emissions and indirect reductions via scale-up within the industry and the market.

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

The GEF financing will lead to an unlocking of existing mechanisms in Malaysia to encourage the upscaling of electric vehicle technology and produce global environmental benefits in the form of GHG reductions at a cost of 5.13 USD per tonne (based on direct emission reductions only). The GEF financing will build upon the Low Carbon Mobility Blueprint and allow for the scale up of investment in Malaysia through a triage of approaches:

- ? Policy, standards and regulation adoption that encourage the use of smart charging infrastructure, electrification of public transport and freight, and support the development of a national EV ecosystem and value chain;
- ? Targeted GEF grant supports linked to a large amount of investments in EVs and EV infrastructure ? including technology such as the re-use of EV batteries for grid stabilisation and / or charging infrastructure; and
- ? Capacity building for the scale up of knowledge of EV infrastructure installation & maintenance, EV fleet adoption, and how to monitor the impact of policies and investments.

The GEF financing will be critical in unlocking significant co-financing from private sector actors such as automobile manufacturers and at the same time assisting public sector actors such as municipalities, regional-level authorities, and national-level bodies in planning their investments / evaluating the impact of their investments and policies in the sector.

The incremental cost reasoning of the project are further summarized in the table below:

Component	Business as usual	Incremental cost reasoning	Main outcomes expected
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<p>1. Strengthening the national policy and institutional frameworks into implementation of up-scaling electric mobility adoption and sustainable battery use</p>	<p>Electric vehicle charging infrastructure will place greater demand on grid if EV use grows. Potential for grid flexibility in support of renewable adoption will also be missed.</p> <p>Integration of electric mobility into public transport and freight plans will be unlikely in short to medium term.</p> <p>Automotive sector in Malaysia will struggle in short and medium term to pivot towards electric mobility and be reliant on global supply chain.</p> <p>EV battery waste management will be developed reactively</p>	<p>Implementation guidelines and standards for smart and bi-directional charging developed.</p> <p>Accelerated adoption of electric mobility through amendment of the National Transport Policy.</p> <p>Development of an EV Industry Development Roadmap that includes the sustainable use of batteries.</p>	<p>Policy ecosystem, institutional and regulatory framework implementation for electric mobility enhanced.</p>
<p>2. Investment and commercialization of electric mobility technologies</p>	<p>National experience and understanding of smart charging technology and consideration in national energy planning will remain stagnant in immediate term.</p> <p>Lack of localized examples of EV battery reuse, recycling and safe disposal will not materialize in short to medium term.</p>	<p>Project will demonstrate application of smart charging.</p> <p>Active promotion and engagement with transportation sector and automotive industry to take up the financing and execution of innovation in electric mobility and sustainable use of batteries.</p>	<p>Benefits and application of smart charging are understood and considered in decision making and planning of energy system.</p> <p>Technology innovation in electric mobility, charging infrastructure, battery swapping and battery recycling is financed, supporting the mainstreaming and adoption and greater support for bottom-up innovation in electric mobility.</p>

3. Capacity building and scale-up	<p>Gaps in knowledge on opportunities for electric mobility and private sector fleet electrification will persist.</p> <p>Deployment of EV installation will depend on local contractor's base that are reliant on international manufactures.</p> <p>Lack of capacity for managing lithium ion battery repurposing and recycling will persist.</p>	<p>Capacity building for municipalities and private sector on electrification of fleets and adoption of electric mobility charging infrastructure supported by renewable energy systems.</p> <p>Capacity building for local development of software, manufacturing of hardware and hardware service and repair.</p> <p>Capacity building to manage repurpose or recycling of lithium ion battery and key components of EV (for end of life).</p>	Capacity development and knowledge exchange on lessons learned scaled-up to national, regional and global networks.
4. Monitoring and evaluation	Lessons from implementation are not captured and project risks not meeting its objectives	Effective monitoring and evaluation of project is completed	Project achieves objectives with lessons learned for improving future projects

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

The project will contribute to the mitigation of greenhouse gases in the Malaysian transport sector. The project will result in direct emission reductions of an estimated 51,808 tCO<sub>2</sub> (as a result of technology demonstrations, GEF-funded and co-financed activities, and log frame activities) and secondary direct emissions reduction of 294,500 tCO<sub>2</sub> (as a result of larger changes in mobility due to the combined effect of factors such as policy changes and behavioral changes occurring during the project period), for total direct emission reductions 346,307 tCO<sub>2</sub>, at a cost per tonne reduction of 5.13 USD (based on total direct emissions only). Indirect emissions reductions (as a result of scaling-up actions after the project implementation period) have been estimated at 1,731,537 million tonnes using a conservative multiplication factor of 5. This also based on assumed installation of 4.1 MW of new PV capacity under the project. Please see the attachment, "Direct and Indirect Emission Reduction Calculations" for complete explanation of the proposal calculations.

These estimations are based on increased use of electric vehicles and improved transport infrastructure. The methodology applied for GHG emissions under indicator 6 have been calculated based on the GEF "Manual for Calculating Greenhouse Gas Benefits of Global Environment Facility Transportation Projects", consistent with other projects within the Global Electric Mobility Program. The exact targets will be reviewed during the PPG stage, considering "Emissions avoided?", "Energy saved?", and "Increase in installed renewable energy capacity?".



Furthermore, the project anticipates a disaggregated split of 5000 women and 5000 men to be direct beneficiaries from the project's interventions, with half of these individuals switching their mode of transport and another half switching their vehicles. Other direct beneficiaries are expected in the private and public sector as recipients of training on electric mobility and electric drive technologies and knowledge exchange through connecting with regional and global platforms.

Additional co-benefits are anticipated including contributing environmentally to cleaner air and a decrease in noise pollution, socially in the creation of additional jobs in the automotive sector related to electric vehicles and economically in the development of new business models that support the adoption of electric vehicles.

All calculations will be further verified during PPG.

#### **g) Innovation, sustainability and potential for scaling up.**

##### **Innovation**

This project is ambitious in its intent to provide necessary technical assistance in support of delivering needed interventions for electric vehicles outlined in Malaysia's Low Carbon Mobility Blueprint (LCMB) while supporting three additional innovations. (1) The demonstration and adoption of smart charging infrastructure in support of increasing the penetration of renewables into Malaysia's grid and further decarbonisation of Malaysia's transportation sector. This intervention acknowledges and further prepares Malaysia for the larger trend of convergence between the energy and transportation sector; (2) The project supports national innovation within the automotive sector by supporting the development of a national EV Industry Roadmap, and improving capacity and knowledge for innovation along the EV value chain within Malaysia; and (3) The project supports the development of necessary capacity for lithium ion battery repurposing and recycling – a gap that is critical to the long-term sustainability of EV adoption in the country.

##### **Sustainability**

The project has high-level buy-in from relevant government ministries and agencies and their consistent engagement throughout the project is a key to ensuring the sustainability of the project's interventions. A high level of ownership over the outcome of the project will be facilitated by ensuring it continues to respond to the present and emerging needs of the Government and by actively engaging stakeholders throughout project planning and implementation. In particular, MGTC will play a significant role in executing the project, building capacity and knowledge in sustainable transport that will ensure continued implementation of the Low Carbon Mobility Blueprint following the conclusion of the project.

##### **Potential for scale-up**

The primary function of this project support initiatives outlined under the Low Carbon Transport Blueprint that would support that national scale-up of electric mobility within the country. Specifically,

the project targets interventions that support the LCMB's electric mobility focal area by ensuring multi-stakeholder engagement, facilitating partnerships with the private sector, capacity building that targets key public and private actors and infrastructure. The GEFTF grant will also fund key initiatives required to facilitate additional co-financing from the government for scale-up across the country. Co-benefits in terms of scale-up will also be realized with MGTC as an executing partner, with the knowledge and experience gained under this project crossing over into other initiatives outside the scope of this project, but also contributing to climate action within the country and in turn, global environmental benefits.

Additional opportunity for scale-up regionally and nationally will be facilitated through connecting this project with international platforms, facilitating knowledge sharing of best practices and lessons learned. This includes connecting the project with the UNEP/IEA led GEF 7 Global Programme to Support Countries with the Shift to Electric Mobility. Regional connections would be further through the regional Support and Investment platforms managed by the Asian Development Bank. Additional connectivity with regional and national platforms would be further elaborated on during the PPG phase.

#### **1b. Project Map and Coordinates**

**Please provide geo-referenced information and map where the project interventions will take place.**

The project is expected to primarily intervene on Peninsular Malaysia (3.9743° N, 102.4381° E). In consultations with the relevant project partners, the precise locations of the projects interventions will be determined during the PPG phase.



#### **2. Stakeholders**

**Select the stakeholders that have participated in consultations during the project identification phase:**

## **Indigenous Peoples and Local Communities**

**Civil Society Organizations** Yes

**Private Sector Entities** Yes

**If none of the above, please explain why:**

**In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement**

UNIDO is the GEF implementing agency of the project and is accountable for the GEF Grant. The Executing Agency is Malaysian Green Technology and Climate Change Centre (MGTC). As the executing agency, MGTC will also coordinate the execution of project delivery partners and experts through their procurement and recruitment processes.

The Ministry of Environment and Water (KASA) is the primary government counterpart for the project and will act as the primary the chair of the Project Steering Committee. Other key ministries are the Ministry of Transport (MOT), the Ministry of International Trade and Industry (MITI), Ministry of Finance (MOF) and the Ministry of Energy and Natural Resources (KeTSA)? which will be key counterparts on different components of the project and members of the project?s steering committee.

Stakeholders will form a comprehensive integrated structure to enhance a synergy among the project partners and serve as the knowledge source of new clean technologies, emerging entrepreneurs, knowledge network, applied research collaboration and additional team members. Furthermore, to promote gender quality and the empowerment of women the guiding principle will be to ensure equal opportunity for women and men to lead, participate in and benefit from the project, e.g. early involvement of women entrepreneurs, associations that promote GEEW and gender focal points. This will be in line with the GEF Policy on Stakeholder Engagement that sets out the core principles and mandatory requirements for stakeholder?s involvement.

The role of stakeholders in the project is further summarized in the table below:

	<b>Stakeholder</b>	<b>Role in the project</b>
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Implementation Agency	United Nations Industrial Development Organization (UNIDO)	<p>UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability.</p> <p><b>Role in the project</b> UNIDO will act as the Implementation Agency for the project and take a lead role in managing Component 4: Monitoring and Evaluation. This includes coordinating the Independent Midterm and Final Evaluations.</p>
Executing Agency	Malaysian Green Technology and Climate Change Centre (MGTC)	<p>The Malaysian Green Technology and Climate Change Centre (MGTC) is an entity under the Ministry of Environment and Water (KASA) and tasked on strategizing climate actions and promoting uptake of green technology innovations across industries</p> <p><b>Role in the project</b> MGTC will act as the project's executing agency. As the executing agency, MGTC will also coordinate the execution of project delivery partners and experts through their procurement and recruitment processes.</p>
Steering committee member	Ministry of Environment and Water (KASA)	<p>The Ministry of Environment and Water (KASA) is responsible for water management and sustainable environment</p> <p><b>Role in the project</b> KASA will provide oversight to the project through their role in the Project Steering Committee.</p>
Steering committee member	Ministry of Energy and Resources (KeTSA)	<p>Ministry of Energy and Natural Resources is the ministry that looks into strengthening sustainable energy initiatives and conservation of natural resources among others.</p> <p><b>Role in the project</b> For this project, KeTSA will also work alongside with project team and KASA for policy adoption (Component 1)</p>
Steering committee member	Ministry of Transport (MOT)	<p>The Ministry of Transport is the ministry in Malaysia responsible for all aspects of transport in the country: road transport, road safety, logistics, shipping, railway assets, rail transport, civil aviation, maritime safety and so forth. In this regard, the MOT is tasked with formulate and implementing policies and plans in these areas as well as facilitate and implementing regional and international cooperation on transport matters.</p> <p><b>Role in the project</b> For this project, the Ministry of Transport will be the primary counterpart for policy adoption (Component 1), and monitoring, reporting and verification protocols (Component 3).</p>

Steering committee member	Ministry of Finance (MOF)	<p>The Ministry of Finance is charged with the responsibility for government expenditure and revenue raising. The ministry's role is to develop economic policy and prepare the Malaysian federal budget. The Ministry of Finance also oversees financial legislation and regulation</p> <p><b>Role in the project</b> For this project, the MOF will be the primary counterpart on all matters related to government expenses.</p>
Steering committee member	Ministry of International Trade and Industry (MITI)	<p>The Ministry of International Trade and Industry (MITI) is responsible for formulating and implementing investment, trade and industrial policies to generate sustainable economic growth as well as create innovative and high skilled employment opportunities for Malaysia is growing workforce.</p> <p><b>Role in the project</b> The project will work with MITI on coordinating project components to support EV Industry Development.</p>
Project partner	Road Transport Department of Malaysia (JPJ)	<p>The JPJ is under the MOT and is responsible for the registration and licensing of drivers and all motor vehicles and trailers in Malaysia. As per the Road Transport Act, enforcement and regulatory responsibilities are under the JPJ's purview.</p> <p><b>Role in the project</b> For this project, the JPJ is a key counterpart for the training module and assessment (under Component 3) and other policies as appropriate.</p>
Project partner	Land Public Transport Agency (APAD)	<p>The Land Public Transport Agency (APAD) is an agency under the Ministry of Transport Malaysia responsible for planning and defining land-based public transport policies, programs and strategies to enhance the country's public transportation system, which is the core of the National Key Result Area (NKRA). This includes determining policies and planning rail, bus and taxi services and transporting goods through rails and roads.</p> <p><b>Role in the project</b> For this project, APAD is the main counterpart on policies and plans (such as support for modal switching to electric public transport under Component 1).</p>

Project partner	Malaysia Automotive, Robotics and IoT Institute (MARii)	<p>Malaysia Automotive, Robotics &amp; IoT Institute (MARii) is an agency under the Ministry of International Trade and Industry (MITI). Serving as the focal point, coordination centre and think tank for the nation's automotive industry, it functions to enhance technology, human capital, supply chain, market outreach and aftersales capabilities of all automotive stakeholders and ecosystems.</p> <p><b>Role in the project</b> For this project, MARii is a key counterpart for development and implementation of vehicle labeling programme (Component 1 and arrange relevant stakeholders consultation workshops). Opportunities for development of an EV Interoperability Centre will be explored during PPG.</p>
Project partner	Private sector	<p>The private sector partners will include automobile manufacturers like Perusahaan Otomobil Nasional (Proton).</p> <p><b>Role in the project</b> These partners will participate by providing co-financing in the form of equity, including offering electric vehicles and sites for demonstration of new technologies such as smart charging systems (Component 2).</p>
Project partner	Civil Society Organizations (CSOs)	<p>CSOs are essential stakeholders to the project design, implementation and long-term sustainability. Some relevant organizations envisioned to be engaged with the project include the EV Owner Association of Malaysia, the EV Association of Malaysia and the Centre for Environment, Technology and Development, Malaysia (CETDEM).</p> <p><b>Role in the project</b> CSOs will be engaged with providing inputs to policy enhancement recommendations under Component 1 as well as beneficiaries of capacity building and knowledge exchange under Component 3. CSOs will also participate in the design and development of demonstrations planned under Component 2 to ensure local needs are met and to instill a sense of ownership necessary for the project's sustainability and scale-up.</p>
Project partner	Academia	<p>The involvement of academic institutions within Malaysia is critical to the success of the project and long-term sustainability of its outcomes. Expertise and capabilities have been identified within national universities that would be relevant to this project.</p> <p><b>Role in the project</b> Project will partner with universities to inform policy enhancement under Component 1, technology demonstration under Component 2, and capacity building under component 3. This will include involving academics as technical panel experts as well as facilitate collaboration between academia and the private sector to commercialize technologies that already have proof of concepts.</p>

Project partner	National financial institutions	<p>Financial institutions engagement is critical to supporting the upscaling of the project activities and long-term adoption of electric mobility in the country. Institutions already engaged in green finance will play a role in extending support to EV adoption.</p> <p><b>Role in Project</b> Financial intermediaries and institutions will be engaged under Component 1 and 2 through the 'Green Technology Financing Scheme' which provides a guarantee mechanism to banks and an interest rate subsidy for green technology development though to date it has mostly been used for solar PV project development. This is run by the Ministry of Finance in cooperation with the Government-owned organization MGTC and is linked with various Malaysian banks.</p>
Project partner	Gender focal points and associations that promote GEEW	<p>UNIDO's mandate to promote inclusive and sustainable industrial development (ISID) relies on the advancement of gender equality and the empowerment of women. UNIDO addresses gender inequalities in industry and harnesses women's full potential as economic agents of change and leaders thereby transforming economies and generating inclusive growth. One of the guiding principles of the project will be to ensure that both women and men are provided equal opportunities to lead, participate in, and benefit from the project (UNIDO Gender Policy 2019). The project has been developed considering the UNIDO guide on gender mainstreaming in energy and climate change projects.</p> <p><b>Role in the project</b> Gender dimensions will be considered in all decision-making processes. With respect to project management, the Project Steering Committee meetings will aim to be gender balanced and extend invitations to observers that represent gender dimensions, such as organizations / associations promoting gender equality and advocating women's empowerment. During project activity implementation, effort will be given during stakeholder consultations towards focusing on gender equality and women's empowerment issues, in particular during policy review and formulation. Opportunities for targeted capacity building will also be explored during PPG through consultations with the Ministry of Women, Family and Community Development.</p>

### 3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

#### *Gender and Electric Mobility Nexus*

Climate change is one of the greatest environmental and development challenges facing the world today and has critical impacts on human rights and inequalities, including gender inequality. Renewable energy and energy efficiency technologies and approaches, such as

electric vehicles, are climate solutions that can boost sustainable and inclusive economic growth and industrialization. Strategic gender-responsive interventions, public policies and measures can help ensure that women can equally lead, participate in and benefit from the growing opportunities and employment in these dynamic sectors. Taking the needs of women and men into consideration during consultations and project planning can reduce conflicts and make energy infrastructure projects more inclusive and efficient.

Recently it has been criticized that electric carmakers are all making a mistake because they only marketing to men. According to the article "Women appear to be the primary influence for some 85% of all new U.S. vehicle purchases", which shows the influence of women on buying decisions and the need to consider gender dimensions in interventions that promote electric mobility. This could be explained with the findings of a University of Sussex study on who will buy electric vehicles and why stating that, "Men generally want speed, acceleration, style. Women want there to be a planet when their children grow up".

Energy infrastructure is an umbrella term that often relates to the generation, transmission and distribution of large-scale power, but that also encompasses charging stations for electric vehicles. Transmission and distribution projects focus on connecting generated energy (electricity or heat) to energy consumers. Sustainable energy infrastructure has the potential to be transformative by providing much needed energy access and reducing greenhouse gas emissions, whilst also increasing opportunities for women's empowerment, employment and gender equality. For instance, charging stations for EVs could help to increase safety through lighting, which improves the mobility of women and girls to safely access transport at night (e.g. roads, bus stations, public transport).

Discriminatory gender norms and practices, occupational segregation and lack of labour force experience and technical and professional skills can also impede women from engaging in employment opportunities associated with energy infrastructure and access projects. To address these issues projects can offer gender-sensitive training and skills development and encourage hiring women in non-traditional occupations where possible, while ensuring women's safe working conditions.

Both workers and the communities in and around which energy projects take place can be affected by sexual harassment and violence, HIV transmission and other occupational health and safety issues, with women and girls particularly at risk. Embedding codes of conduct on sexual exploitation within projects can help mitigate these impacts

Women can play a key role in promoting and implementing new clean technologies. Energy interventions that meet the needs of and involve both women and men increase the likelihood



of technologies being adopted and used. Entrepreneurship programmes and innovation accelerator programs have also proven effective in tapping into women's potential to identify affordable and scalable solutions for cleaner, more resilient economies. For instance, in South Africa, the woman-led business ZingCO won in 2015 with its innovative battery swapping solution for electric vehicles that aims to promote sustainable and affordable transportation.

### ***Status of women and gender equality in Malaysia***

Malaysia ranked 104<sup>th</sup> globally in Gender Gap Index 2020. Within East Asia and the Pacific, Malaysia was at position 13. The MGGI identifies the gap between women and men across four sub-indices encompassing economic participation and opportunity, educational attainment, health and survival, and political empowerment. A score of 1.0 (100%) indicates that equality between women and men has been achieved.

A study of the World Bank found that in Malaysia the most relevant constraint for women's labour market access is the solidification of social inequality due to an absence of support structures and empowerment programs. In addition, it documents that disparities between rural and urban living are an important driver of constraint to women's labour access and highlights that two groups of women, namely women living in public low-cost housings and single mothers, face particularly significant hurdles in accessing the labour market. Instead, they are frequently stuck in casual work or as operators of micro-businesses.

According to the Malaysian Journal of Economic Studies "Compared to patterns in East and South Asia, Malay family structures do not follow the typical patriarchal patterns of patrilineal descent, patrilocal residence of newly married couples, and preference for male children. Empirical research, including ethnographic studies of gender roles in rural villages and demographic surveys, shows that women were often economically active in agricultural production and trade, and that men occasionally participated in domestic roles."

Women in Malaysia account for 38% of the workforce, compared to 37% average in Asia-Pacific. They also contribute about 32% to Malaysia's GDP, compared to 36% in Asia-Pacific.

According to S&P "when looking at the share of female C-suite executives at energy companies globally, Malaysia with 20 per cent of its leadership made up of women is second only to the Philippines in the S&P Global BMI Energy (Sector) Index. In addition, Malaysia outperformed the regional average in the Asia-Pacific region, achieving roughly 23 per cent of women board members and senior managers at energy companies. The country ranks above a majority of the global developed markets, including Australia, the United Kingdom,

the United States and Japan. Looking across the region, others that significantly outperformed the regional average include the Philippines, Thailand and Hong Kong. In Malaysia, one of the key priorities of the government's 11th Malaysia Plan is to improve the female labour participation rate by five percentage points to 59 per cent by 2020.

Along with building a more equitable workforce, bringing women's participation in the workforce closer to parity would have economic benefits for Malaysia.

Active organizations include:

- Malaysia Women in Energy (MyWiE)
- 30% Club Malaysia, a business group that campaigns for more female directors on company boards, has helped advance women in directorships and leadership positions and is on course to achieve 30% women on corporate boards by 2020.

Gender mainstreaming of this project:

UNIDO acknowledge that the empowerment of women and gender equality have significant positive impacts on key drivers of poverty alleviation and social progress, such as sustained economic growth and inclusive industrial development. UNIDO's mandate to promote inclusive and sustainable industrial development (ISID) relies on the advancement of gender equality and the empowerment of women. UNIDO addresses gender inequalities in industry and harnesses women's full potential as economic agents of change and leaders thereby transforming economies and generating inclusive growth. One of the guiding principles of the project will be to ensure that both women and men are provided equal opportunities to lead, participate in, and benefit from the project (UNIDO Gender Policy 2019). The project has been developed considering the UNIDO guide on gender mainstreaming in energy and climate change projects.

In practical terms, gender mainstreaming will be demonstrated in a multitude of ways across the project:

? During PPG phase a Gender Analysis will be carried out and a gender mainstreaming action plan developed which will inform the project formulation. This will involve identification of the differentiated needs and roles of women and men as they relate to the project's interventions. In the project design UNIDO will ensure that the relevant gender dimensions are considered, and the project log-frame developed reflects key gender dimensions of the respective outputs, activities, indicators and targets. The gender analysis will identify how the project can improve gender equality and empower women, as well as propose gender specific targets to be monitored and evaluated throughout the project implementation period.

Additionally, the PPG stage will be used to create relevant tools and methodologies for tracking gender issues throughout the project's implementation. To establish a baseline and develop targets, basic relevant data and qualitative information will be collected during PPG as part of the gender analysis and gender markers will be assigned in the project design.

? Budget will also be allocated based on the gender mainstreaming action plan, to ensure project implementation will promote GEEW, including collecting additional baseline data and monitoring progress towards the targets.

? Gender-responsive recruitment will be practiced at all levels, where possible, especially in the selection of project staff, researchers and experts, as well as technical staff. Gender sensitive recruitment will be encouraged in instances where the project does not have direct influence.

? Existing staff, project teams and stakeholders will be trained and their awareness raised on gender issues.

? Gender dimensions will be considered when data collections or assessments are conducted as part of project implementation. Examples include sex-disaggregated data collection and performing gender analysis during PPG.

? Gender dimensions will be considered in all decision-making processes. With respect to project management, the Project Steering Committee meetings will aim to be gender balanced and extend invitations to observers that represent gender dimensions, such as organizations / associations promoting gender equality and advocating women's empowerment. During project activity implementation, effort will be given during stakeholder consultations towards focusing on gender equality and women's empowerment issues, in particular during policy review and formulation.

? Research, data and assessments will consider gender and age differentiated needs of women and men from different social groups.

? Women's groups, associations that promote GEEW, gender focal points and stakeholders that work in the area of gender and mobility will be involved in the project, e.g. they will be consulted during PPG phase to verify the final project log frame is gender mainstreamed as well as PPG funds will be allocated towards having a review completed by specialized expertise. Possible partners could be Professor Benjamin Sovacool, Director of the Centre on Innovation and Energy Demand (CIED) at the University of Sussex and Johannes Kester from Aarhus University who did a study on who will buy electric vehicles and why.

**Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes**

**closing gender gaps in access to and control over natural resources;**

**improving women's participation and decision-making; and/or Yes**

**generating socio-economic benefits or services for women. Yes**

**Will the project's results framework or logical framework include gender-sensitive indicators?**

Yes

#### **4. Private sector engagement**

**Will there be private sector engagement in the project?**

Yes

**Please briefly explain the rationale behind your answer.**

A key partner and beneficiary of the project is the private sector, especially the automotive sector. For this reason, the private sector (i.e. Proton) has been engaged in this proposal's development and will be continue to be involved through the design, implementation and execution of the project. The private sector will also provide co-financing for GEF funded activities in the form of electric vehicles and site locations for demonstrations on smart charging.

As outlined in Component 1 and 3, the project aims to develop an EV Industry Development Roadmap as well as provide training to public and private sector actors engaged in electric mobility to support creating an ecosystem within Malaysia for innovation in this market. The project also aims to support the private sector in the adoption of innovative new technologies and best practices within the industry.

Private sector engagement will be upscaled to the potential upstream value chain through vendor association group, OEM for product vision alignment and demonstration project such the V2X demo. Engagement will also be done with vehicle importer association for EV importation and market expansion. Although the market share from this group is less than 10% of total industry volume, the participation can assist in term of addressing upper level market and add on EV variation on the market for public exposures.

Closer ties will also be established with OEM for electric bus and electric motorcycle. A number of private sector companies and publicly owned bus companies have expressed interest in piloting this technology for eventual scale-up ? including Perusahaan Otomobil Nasional (Proton) which is a major

vehicle manufacturing company in Malaysia who is interested in integrating RE, e-charging, and e-vehicles into their production facilities.

Significant effort will be allocated in terms of developing the value-chain for some of these components. For electric motorcycle, there is recognition by key stakeholder of the potential for a leasing program. There is also interested in exploring the potential for electric motorcycle battery swapping system that will further increase the practicality of the e-motorcycle and ability to reduce the selling price via exclusion of the traction battery in the vehicles? pricing.

Private sector involvement will also be sought for leasing programs for electric bus to bus operators and municipalities, electric car leasing for fleet and ride hailing. The project will also seek for potential direct investment opportunity for both local and foreign on moving up the adoption via the leasing program.

Financial intermediaries and institutions will also be engaged through the ?Green Technology Financing Scheme? which provides a guarantee mechanism to banks and an interest rate subsidy for green technology development ? though to date it has mostly been used for solar PV project development. This is run by the Ministry of Finance (MOF) in cooperation with the Government-owned organization MGTC ? and is linked with various Malaysian banks.

Investments in the scaling up of electric vehicle charging stations throughout the country ? which is being implemented partially by the main electricity distribution company and by MGTC but could also be scaled up with a number of additional private companies being involved.

## 5. Risks to Achieving Project Objectives

**Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)**

An overview of all project risks is now provided below with risks related to COVID-19 and climate change elaborated on thereafter:

Risks	Risk Level	Risk description / Mitigation Actions
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Buy-in lacking from key stakeholders, namely government institutions	Low	<p>This risk is associated with a lack of continued buy-in / prioritization of electric vehicles and other aspects of the project. The risk is considered low given the continued support for this issue and the prominence of the automotive sector in Malaysia meaning that the country needs to keep up with global trends in order to remain competitive in this area.</p> <p>The risk will be mitigated through ongoing dialogue with key stakeholders and through a focus on the economic and environmental benefits of E-vehicles for Malaysia vis-?-vis traditional vehicles.</p>
Delays in the proposed improvements to institutional and regulatory framework by public institutions	Medium	<p>This risk is considered medium since the scale-up of infrastructure investments (e.g. Component 2) depend on a clear regulatory framework that sometimes can take a while to develop.</p> <p>The risk will be mitigated by engaging external consultants through the project to develop draft policies which can be quickly adopted by the government which are consistent with international best practice and ? where applicable ? international standards.</p>
Climate change risks - Infrastructure developed is vulnerable to climate risks.	Low	<p>This risk is due to climate risks (such as storms) causing damage to electricity transmission, distribution, and charging infrastructure. It is considered low since the transmission and distribution infrastructure in Malaysia is fairly well developed.</p> <p>The risk will be mitigated related to charging infrastructure by ensuring that this infrastructure meets current international standards and ? where applicable ? contracting will include a clause on resilience to climate impacts.</p>
Insufficient financial support system and incentives	Medium	<p>This risk is related to the risk of buy-in from authorities, but also includes the buy-in from private sector entities. The risk is considered medium since the pricing points are shifting quickly towards electric vehicles becoming more cost-competitive with internal combustion engines.</p> <p>The risk will be mitigated through in-depth analysis of the life-cycle costs of various types of technologies ? evaluated with an appropriate discount rate ? to find the financial rates of return on investments, the level of incentives necessary, and the non-financial benefits.</p>
Low participation rates of suitable female candidates due to lack of interest, inadequate project activity or missing qualified female population within engineering sector.	Low	<p>This risk will be mitigated through specifically targeting women involved in the sector for participation in trainings and potentially developing an awards system for gender-empowerment.</p>

Delays in implementation and execution due to COVID-19 Pandemic	Medium	This risk will be consistently monitored and consideration for potential delays will be developed into the project document during PPG. Opportunities to align the project with COVID-19 recovery will also be integrated based on consultations with relevant stakeholders.
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### *COVID-19 Pandemic*

The project faces a variety of potential risks due to the COVID-19 pandemic. First, general trends in people's transportation preferences in response to COVID-19 could pose challenges to the project's objectives of increasing adoption rates of electric mobility and the project's implementation. The demonstration and awareness raising linked to the adoption of electric public transportation could be hindered due to less interest in public transportation from the public, in turn creating challenges for the viability of the business model. Additionally, if people are nudged by the pandemic towards private transport, the high upfront purchase costs for electric vehicles for private use could push people towards purchasing vehicles with internal combustion engines. However, to date, national manufactures, Perodua and Proton have seen a significant drop in sales of private vehicles. In response to the first wave of COVID-19 in Malaysia, the government put in place a movement control order (MCO) which limited mobility between regions within the country and may have contributed to consumers not purchasing vehicles, as many were staying home. Throughout the course of the pandemic, the government has reintroduced the MCO with varying restrictions based on the severity of the level of cases within a region, also contributing to fewer individuals traveling to work and within regions.

The impacts can be further summarized as follows:

1. Reduction in total car sales volume. Compared to 2019, 2020 car sales volume decreased by almost 20%.
2. In term of behaviour, personal transportation need has been significantly reduced due to shift to Work from Home option.
3. As fuel price globally declined, so has the fuel price locally. Despite that, it is being observed that the travelling has been significantly reduced, presumably also reducing GHG emissions from the transportation sector. However, no hard data is being collected.
4. Delivery services however are on the rise, resulted from the increase of e-commerce transaction, home delivery services and also food delivery by motorcycle. This in return is helping the economy at great level especially on allowing small businesses to keep the operation running. Many new delivery company and digital platform had appeared. The delivery services operators are mainly coming from unemployed and job-lost category. This opens up opportunity to address electric mobility to this segment while providing initiative that reaching to the lower income population. (This is also the basis to push for the e-motorcycle segment, which is exploring battery swapping system).
5. For the light-goods delivery category from e-commerce, the vehicle choices are motorcycle, car (small %), van and small lorry. An attempt has been made in the past for looking at e-Van, however the effort was not successful. There is a lack of willing suppliers on this

segment. As such, effort is being put onto Complete Knock Down of the van in Malaysia. Sources from China are mostly Left-hand drive, hence there will be engineering works and cost involves to have it on right hand drive version. Other alternatives are being sought as well. It worth noting that Malaysia do not allow non-UNECE compliant vehicles such as tuk-tuk or Jeepney onto Malaysian road.

It is foreseeable that as conditions surrounding the pandemic improve, purchase of ICE vehicles and general transport usage could return to pre-pandemic levels once restrictions on movement are lifted, again contributing to GHGs in the transportation sector in line with pre-pandemic levels. To mitigate ongoing risks, the project will create linkages with international and national green recovery packages to build back the market towards electric mobility. To date and of relevance, Malaysia has released a suite of economic recovery measures, including the National Economic Recovery Plan which allocated 8.4 billion USD towards 'empowering people', 'propelling business' and 'stimulating the economy'. This included a tax incentive for the purchase of passenger cars to stimulate the automotive sector and provide financial relief to car buyers. This includes sales tax exemption on the purchase or importation of passenger cars from June to December 2020 with a 100% sales tax exemption on locally assembled cars and 50% tax exemption on imported cars – though these provisions do not specifically target electric vehicles.

During PPG, the project will discuss with stakeholders' additional opportunities to align the project with recovery measures.

The project will likely also face practical challenges in terms of delays due to potential restrictions in the movement of people and goods. Stakeholder consultations and site screening for technology demonstrations could be delayed as well as any needs for addressing maintenance or service issues after installation due to movement restrictions. To address these challenges, the project will build into its work plan a certain amount of consideration for potential delays as well as flexibility in terms of planning the potential need to conduct capacity building and stakeholder engagement through online approaches.

#### ***Preliminary climate risk assessment:***

Malaysia is located in the southeastern part of the Asian region, consisting of Malaysian Borneo and Malaysian Peninsula. The country has a tropical climate with a daily mean temperature that is fairly consistent year-round. Malaysia's geographical location as well as its low poverty rates mean its vulnerability and risk to natural hazards are relatively lower compared with neighbouring countries, although the country still grapples with high average annual losses – estimated at \$1.3 billion USD by UNISDR (2014). Malaysia grapples with natural hazards such as drought, earthquakes, storm surges and landslides, but the majority of the country's losses are due to flooding (World Bank Climate Change Knowledge Portal). Malaysia's climate also leaves it vulnerable to vector-borne diseases, including dengue fever in urban areas. Climate change is anticipated to further exacerbate the country's susceptibility to these diseases. Growing urban populations are also faced with exposure to flood risks – in particular flash floods due to high intensity rain fall. Furthermore, Malaysia's coasts are also



vulnerable to rising sea-levels ? exposing coastal settlements and ecosystems to storm surges, coastal erosion and saline intrusion.

Using the Coupled Model Intercomparison Project Phase 5 (CMIP5) models included under the IPCC's Fifth Assessment Report (AR5), key projected climate trends for Malaysia under the highest emission pathway (RCP 8.5), anticipate an average temperature increase of around 1.5oC by 2050 and 3oC by 2090. Higher emission pathways (RCP 6.0 and 8.5) project an increase in the mean annual number of hot days ? although the increase is only statistically significant at the end of the century. Climate change, resilience and disaster risk reduction are key considerations for urban planning and management in order to maintain a healthy population and prevent economic losses. However, high levels of uncertainty around future trends in precipitation and extreme event frequency have posed challenged for the country in developing an effective disaster risk management strategy. Presently the data collected has given no clear indication on the frequency and intensity of natural hazards Malaysia may expect.

The project's policy and capacity building component of this project apply to the entirety of the country while the technology demonstration sites have been yet to be selected. People and infrastructure along the region's coastlines have exposure to hazards such as flooding and storms that could potentially intensify during the course of the project and its outcomes lifetime. However, these risks will be managed by completing a climate risk assessment during PPG and incorporating its findings into the design of the project. Specifically, the project will mitigate any potential risk by selecting appropriate project sites that have minimal exposure to the identified hazards. With these measures in place, and given the unlikeliness that the project would be negatively impacted by the above risks, the project's climate change risk and sensitivity has been assessed as low. A summary of climate risks and mitigation measures by output is summarized further in the table below.

#### Climate risks and mitigation measures by output

Output	Climate risks (2020-2050)	Mitigation measures
1.1.1 Implementation guidelines and standards for smart charging to maximize renewable energy for charging and harmonization of electric vehicle supply equipment 1.1.2 Public transport and freight master plan enhanced based on modelling and scanning of electric drive technology options 1.1.3 Development of electric vehicle and sustainable battery ecosystem and value chain roadmap	<ul style="list-style-type: none"> <li>- Charging infrastructure and supporting renewable energy as a result of policy measures faces increased exposure to hazards</li> <li>- Energy demand increases beyond current projected needs</li> <li>- Electric vehicle and battery value chain faces increased risks and costs to disruptions along supply chain as a result of increased hazards locally and globally</li> </ul>	<ul style="list-style-type: none"> <li>- Climate risks are integrated into policy measures for smart charging and development of electric vehicle and sustainable battery ecosystem and value chain roadmap</li> <li>- Institutional capacity strengthened on addressing climate risks and knowledge of resilience enhancement measures.</li> </ul>

2.1.1 Development of business models and deployment of renewable energy based smart charging 2.1.2 Demonstration of EV battery repurposing and recycling 2.1.3 Development of business models and deployment of electric vehicle battery swapping technology integrated with renewable energy	- Infrastructure and technologies installed and demonstrated are exposed increasingly intense hazards such as flooding and storms	- Comprehensive risk assessment completed during PPG that ensures appropriate sites are selected that have minimal exposure to identified hazards -
3.1.1 Targeted training for municipal governments and private sector on electrifying fleets, charging infrastructure and sustainable use of batteries 3.1.2 Training / workshops supporting development of electric vehicle and sustainable battery ecosystem and value chain with a focus on women participation 3.1.3 Knowledge exchange and scale-up through participation in regional and international platforms	- Recipient of training programmes are not aware of climate risks related to fleet deployment, charging infrastructure and sustainable use of batteries contributing to these factors not being considered by local policy makers and entrepreneurs in measures taken during this time, increasing exposure to hazards	- Climate risk assessments related to fleet deployment, charging infrastructure and sustainable use of batteries is integrated into training programmes as well as principles of 'Build back better' as part of COVID-19 green recoveries - Project stakeholders engage with regional and international platform to facilitate knowledge exchange on best practices for addressing climate risks related to electric mobility

## 6. Coordination

**Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.**

UNIDO, as a GEF Implementing Agency, will lead project preparation and development with participation from key Government entities and private sector stakeholders. The Executing Agency is Malaysian Green Technology and Climate Change Centre (MGTC). As the executing agency, MGTC will also coordinate the execution of project delivery partners and experts through their procurement and recruitment processes. MGTC will host the Project Management Unit (PMU) that would be led by a National Project Director and responsible for the day-to-day management. The PMU would report to the PSC and UNIDO. During the PPG phase, MGTC's capacity for hosting the PMU will be further assessed and if it is deemed that they do not have the capacity for the required activities, the PMU will then be established within another executing partner that has the required capacity.

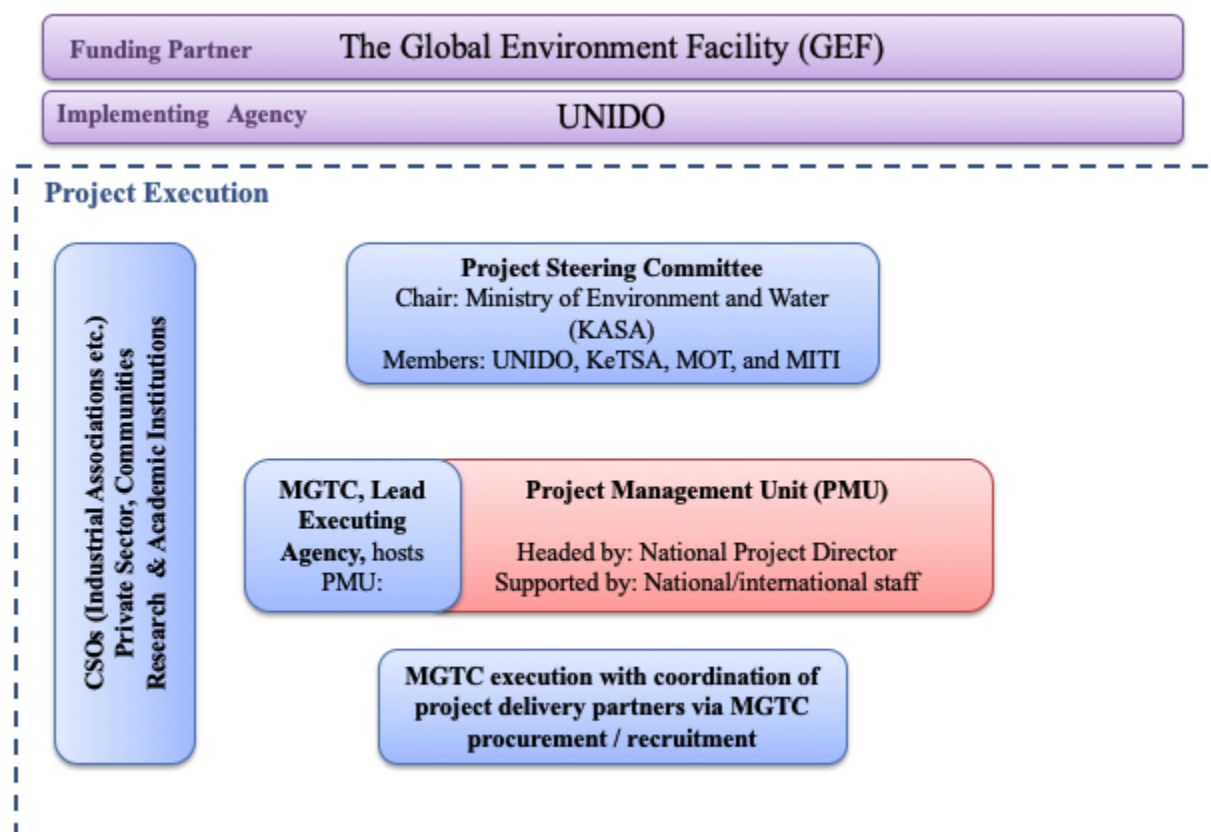
A Project Steering Committee (PSC) will be established to give strategic and operational guidance to the project while ensuring it is executed per the project document. This includes the PSC being consulted on matters relating to project budget and work plans, with any changes being done in accordance with the approved project document. The PSC's constitution will be formalized by the Government of Malaysia in coordination with the GEF Focal Point at the Ministry of Environment and

Water (KASA) and include Ministry of Water, Land and Natural Resources (KeTSA), Ministry of Transport (MOT), Ministry of Finance (MOF) and the Ministry of International Trade and Industry (MITI).

The project team will work with project stakeholders during the PPG phase to create and strengthen existing linkages with other agencies and actors presently planning or implementing relevant projects that could contribute to the final outcomes of this GEF project. The project team will actively identify relevant partners and engage in multiple stakeholder consultations to ensure related issues and concerns are considered in the implementation and management of the project. A comprehensive stakeholders' involvement plan will also be created to build on best practices and ensure lessons learned are incorporated by the project implementation team. A coordination mechanism will also be established to facilitate proper coordination and monitoring of the baseline project proponents.

During PPG, a complete work plan for the first year will be created and submitted to GEF with the CEO endorsement. The overall and yearly work plans will serve as monitoring and management tools by the PMU and UNIDO, to be reviewed and updated on a biannual basis.

Graphic of the project management structure is as follows:



Lessons learned will also be drawn between ongoing projects in Malaysia to avoid duplication of efforts and ensure coherence in approach and delivery for achieving similar objectives (i.e. reductions

in GHG emissions). The project will also build on support structures already part of the following projects:

? The UNIDO/GEF project "Energy Efficient Low-carbon Transport in Malaysia" (GEF ID #5741)

A key output of that project was the aforementioned Low Carbon Mobility Blueprint (LCMB). Whereas that project had a broad scope of decarbonizing Malaysia's transport sector focusing broadly on energy efficient vehicles, the focus of this project is implementing the activities in the LCMB, specifically targeting electric mobility, storage and ensuring connectivity with renewable sources of power generation.

? The UNIDO/GEF project "Sustainable-City Development in Malaysia" (GEF ID #9147)

This GEF-6 project is being implemented by UNIDO and executed by the Malaysian Industry Government Group for High Technology (MIGHT). The project has two objectives: 1) To promote an integrated approach to urban planning and management that is guided by evidence-based, multi-dimensional, and broadly inclusive planning process that balance economic, social and environmental resource consideration; and 2) To build awareness and institutional capacity, and promote investment in climate risks mitigation technologies through demonstration projects. A key relevant output related to this project is a smart grid technology demonstration, as this would also consider the integration of electric vehicles into the energy system. The project is presently undergoing a mid-term review (MTR) and recommendations from the result will be considered during PPG.

? The UNIDO/KOICA project "Supporting Southeast Asia countries to cope with climate change through policy consultation and capacity building in the area of renewable energy and energy efficiency" (ID 200041).

This project aims to support Malaysia's and Thailand's government and private sector in enhancing their capacity to reduce greenhouse gas emissions and achieve the sustainable development. The project will implement policies and strategies in renewable energy and energy efficiency; benchmark the strategies and experiences of advanced economies (the Republic of Korea); and develop policy recommendations and pilot project planning. The production of a White Paper by a team of selected Government Officers in target countries will contribute to improved policy implementation in Malaysia and Thailand, increase the ratio of renewable energy sources and enhance energy efficiency.

? The UNDP/GEF project "Green Technology Application for the Development of Low Carbon Cities (GTALCC)" (GEF ID #5329)

This GEF-5 project is being implemented by UNDP and is scheduled to be closed this year. The project's objective was to facilitate the implementation of low carbon initiatives in at least five Malaysian cities and showcase a clear and integrated approach to successful low carbon urban development. Key outputs that this project will build on include Outputs 1.1.1 and Output 1.1.3, which strengthen the capacity of cities to plan and develop an integrated approach, including last mile

mobility solutions and the adoption of low carbon personal travel. The lessons learned and recommendations of the project's terminal evaluation will be considered during PPG.

Transfer of assets:

Full or partial ownership of equipment/assets purchased under the project may be transferred to national counterparts and/or project beneficiaries during the project implementation as deemed appropriate by the government counterpart in consultation with the UNIDO Project Manager.

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.

## **7. Consistency with National Priorities**

**Is the Project consistent with the National Strategies and plans or reports and assessments under relevant conventions?**

Yes

**If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc**

- UNFCCC National Determined Contribution
- UNFCCC Technology Needs Assessment
- ASGM National Action Plan (ASGM NAP)
- National Adaptation Programme of Action Update
- Others

As a signatory nation to the Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), Malaysia has pledged in its Nationally Determined Contribution to reduce its Greenhouse Gas (GHG) emission intensity per Gross Domestic Product (GDP) by up to 45% by 2030 relative to 2005 levels. This consists of 35% on an unconditional basis and a further 10% is conditional upon receipt of climate finance, technology transfer and capacity building from developed countries (GTMP, 2017).

The project is fully in line with the most recent Third National Communication and Second Biennial Update Report, which includes the measures:

? Energy Efficient Vehicles (EEV) ?through strategic investments and adoption of high technology for domestic market and to penetrate regional and global markets by 2020. The EEVs include fuel-efficient internal combustion engine (ICE) vehicles, hybrid vehicles, electric vehicles (EV) and alternative fuelled vehicles.?

? Electric Vehicles (Increase availability of electric vehicles in the market to reduce fuel consumption)? with a target of ?100,000 electric cars and 100,000 electric motorcycles on-the-road by 2030?

## 8. Knowledge Management

**Outline the knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.**

A knowledge management plan will be developed to coordinate the gathering and distribution of all data, information and lessons learnt during the projects implementation. The plan will build on the measures put in place under the Low Carbon Mobility Blueprint and Action Plan (LCMB). The LCMB proposes the creation of a council to act as the national focal point for implementing and monitoring action on the document. This steering committee will also play a role in ensuring knowledge management between different stakeholder ministries and agencies.

The knowledge management plan will also include measures to ensure lessons learned and best practices are shared on a regional and global level. This includes connecting the project with the UNEP/IEA led GEF 7 Global Programme to Support Countries with the Shift to Electric Mobility. Regional connections would be further through the regional Support and Investment platforms managed by the Asian Development Bank. Additional connectivity with regional and national platforms would be further elaborated on during the PPG phase.

## 9. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

**Overall Project/Program Risk Classification \***

PIF

CEO  
Endorsement/Approval

MTR

TE

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate			

**Measures to address identified risks and impacts**

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

Based on this initial screening, the project has been assessed by UNIDO to be Category B. Likely impacts will be few in number, site-specific, and few if any will be irreversible. An ESMP will need to be completed as per UNIDO and GEF requirements.

**Supporting Documents**

Upload available ESS supporting documents.

Title	Submitted
Malaysia_EV_190393_ESS	
DIRECT AND INDIRECT EMISSION REDUCTION CALCULATION MALAYSIA 18Jan2021	
Theory of change - Malaysia 18Jan2021	

**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 with this template).**

<b>Name</b>	<b>Position</b>	<b>Ministry</b>	<b>Date</b>
Dr. K Nagulendran	GEF Operational Focal Point	Ministry of Environment and Water	9/29/2020



#### **ANNEX A: Project Map and Geographic Coordinates**

Please provide geo-referenced information and map where the project intervention takes place

The project is expected to primarily intervene on Peninsular Malaysia (3.9743° N, 102.4381° E). In consultations with the relevant project partners, the precise locations of the projects interventions will be determined during the PPG phase.

