



REQUEST FOR CEO APPROVAL

PROJECT TYPE: Medium-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title: Energy Efficient Low-carbon Transport in South Africa			
Country(ies):	South Africa	GEF Project ID: ¹	5737
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	130281
Other Executing Partner(s):	SANEDI, TIA, City of Durban, City of Johannesburg, dti, DEA, DoT, DOE	Submission Date:	04/20/2015
		Resubmission Date:	05/29/2015
GEF Focal Area (s):	Climate Change	Project Duration(Months)	36
Name of Parent Program (if applicable):		Project Agency Fee (\$):	123,500
		➤ For SFM/REDD+ <input type="checkbox"/>	
		➤ For SGP <input type="checkbox"/>	
		➤ For PPP <input type="checkbox"/>	

A. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Cofinancing (\$)
CCM-4 Promote energy efficient, low-carbon transport and urban systems	Sustainable transport and urban policy and regulatory frameworks adopted and implemented	Cities adopting low-carbon programs	GEF TF	400,000	800,000
	Increased investment in less-GHG intensive transport and urban systems	Investment mobilized	GEF TF	900,000	6,315,000
Total project costs				1,300,000	7,115,000

B. PROJECT FRAMEWORK

Project Objective: Promotion of the widespread use of electric vehicles (EVs) and non-motorized transport (NMT), and the development of the necessary infrastructure, as part of the Green Transport and Green Cities initiatives of South Africa.

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Cofinancing (\$)
1. Improvement of policy and regulatory frameworks for EV use and local manufacturing, and NMT; capacity of concerned institutions built and awareness raised.	TA	1.1 Enabling policy and regulatory framework, together with strengthened institutional capacity and enhanced awareness; facilitating early and widespread use and local manufacturing of EVs and NMT in South Africa.	1.1.1 National policy and regulatory framework, incentive programmes, tax incentives, design, planning, and safety guidelines, etc. to promote early take-off, widespread use, and local manufacturing of EVs and NMT strengthened; 1.1.2 Concerned	GEF TF	350,000	700,000

¹ Project ID number will be assigned by GEFSEC.

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

			institutional capacity at the national level built, and awareness raised.			
2. Promotion of non-motorized and public transport in the Cities of Durban and Johannesburg, and development and demonstration of the supporting infrastructure for EVs.	TA	2.1 Improved non-motorized and public transport result in a reduction of GHG emissions in the transport sectors of the Cities of Durban and Johannesburg; adequate infrastructure facilitates widespread utilization of EVs powered by renewable energy.	2.1.1 Policy and regulatory frameworks to promote NMT and public transport in the Cities of Durban and Johannesburg enhanced;	GEF TF	650,000	4,865,000
			2.1.2 Institutional capacity for the Cities of Durban and Johannesburg strengthened and awareness raised on NMT; experience shared with the other 9 cities of South Africa under the DEA/KfW Green Cities Promoting NMT programme.			
	INV		2.1.3 Standards and regulations for EV infrastructure, charging stations, networks, support applications, etc. developed.			
			2.1.4 Design, installation and testing of at least 2 PV-based (fast, off-line) charging stations for EVs in the City of Johannesburg and in the Shamwari Game Reserve;	GEF TF	160,000	1,200,000
3. Monitoring & Evaluation.	TA	3.1 Adequate monitoring and evaluation mechanisms are in place, facilitating smooth and successful project implementation and sound impact.	3.1.1 Regular monitoring reports and tracking tools according to GEF requirements prepared;	GEF TF	50,000	100,000
			3.1.2 Final project evaluation conducted.			
Subtotal					1,210,000	6,865,000
Project management Cost (PMC) ³				(select)	90,000	250,000
Total project costs					1,300,000	7,115,000

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

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$) ⁴⁵

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount (\$)
GEF Agency	UNIDO	Cash	60,000
GEF Agency	UNIDO	In-kind	100,000
National Government	dti	In-kind	500,000
National Government	TIA	In-kind	1,740,000
National Government	SANEDI	In-kind	715,000
Local Government	eThekwini Municipality/City of Durban	In-kind	2,000,000
Local Government	City of Johannesburg	In-kind	2,000,000
Total Co-financing			7,115,000

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

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in \$)		
				Grant Amount (a)	Agency Fee (b) ²	Total c=a+b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				0	0	0

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

² Indicate fees related to this project.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount (\$)	Cofinancing (\$)	Project Total (\$)
International Consultants	175,000	50,000	225,000
National/Local Consultants	287,500	200,000	487,500

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

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

⁴ Contributions made by the eThekwini Municipality/City of Durban and the City of Johannesburg consist of municipal investment in ongoing or planned NMT projects that are in line with and complement the objectives of this project. Thus, these could be considered in-cash contributions.

⁵ In addition to the letters of co-financing received as per Table C, letters of support have been submitted by KfW and the DEA GEF5 CEO Endorsement Template-February 2013.doc

PART II: PROJECT JUSTIFICATION

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

The framework of the project remains the same and organized into three components: (i) At the national level, improvement of policy and regulatory frameworks for electric vehicles (EVs) and bicycle use, and local manufacture, and capacity of concerned institutions built and awareness raised; (ii) At the demonstration level, promotion of Non-Motorized and Public Transport in the cities, and development and demonstration of supporting infrastructure for EVs; and (iii) Monitoring and Evaluation. Only two changes have been made in comparison to the approved PIF; both relate to the demonstration sites under Component 2 as a result of the work carried out during the Project Preparatory Grant (PPG) phase: (i) the City of Johannesburg has been added as the second demonstration city, in addition to the City of Durban as foreseen in the PIF, and (ii) Shamwari Game Reserve has been chosen for additional demonstration of EV-use and photo-voltaic (PV)-based charging infrastructure at game reserves, in addition to the demonstrations in the cities. The decision to include Shamwari Game Reserve as a demonstration site of the project was made based on potential scaling up in the reserve itself, South Africa (there are more than 400 game reserves in South Africa), and other countries in the region, ongoing collaboration between Shamwari and project partners such as SANEDI and TIA, and the fact that Shamwari already has a number of EVs on site that could utilize the installed charging stations. The additional selection of the City of Johannesburg has been based on several considerations; in particular the alignment, coordination and synergy opportunities with the UNEP- Development Bank of Southern Africa (DBSA) child project on sustainable cities in South Africa. For example on areas such as: capacity strengthening for the establishment of compact low energy zones, which include also transport, pilots to demonstrate public transport modal shifts towards non-motorized transport (NMT) and alternative fuels, for example solar energy. More information on these changes is included in the relevant parts of this document.

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

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

The project is closely aligned with major national policies and programs on energy efficiency and conservation (EEC) and environment friendly technologies in South Africa. It aims to raise awareness and change mind-sets about low carbon transportation, while simultaneously creating opportunities for studying, testing and demonstrating progress achieved in South Africa with regard to EVs. The energy efficient transport sector is an innovative and attractive sector to capitalize on the available opportunities and expand its contribution to both employment and economic growth, namely stimulate the green industry and economy in the country. This will operate within the **National Industry Policy Framework (NIPF)** and as prescribed by the up-scaled **Industrial Policy Action Plan (IPAP) 2012/13-2014/15**, released by the Department of Trade and Industry (the dti) in April 2012, representing the fourth annual iteration of the first IPAP launched in the 2007/08 financial year.

The **Renewable Energy White Paper 2003** specifically addressed the potential for renewable energy in South Africa and established a target for renewable energy deployment. The draft **Revised White Paper on Renewable Energy Policy - 2010** for South Africa provides for an integrated renewable energy supply for the country, accounting for a minimum of 27% of the national energy demand by 2030, concurrently providing: i) increased access to energy services; ii) increased employment; iii) maximum use of natural resources; iv) a reduction in greenhouse gas (GHG) emissions and water use; and v) economic growth.

⁶ For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter “NA” after the respective question.

The **National Climate Change Response Policy (NCCRP)** was approved and published in October 2011 and represents South Africa's vision for the long-term just transition to a climate resilient and lower carbon economy and society. The main objectives of the policy are to: 1) effectively manage the impact of climate change through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity; and 2) make a fair contribution to the global effort to stabilize GHG emissions within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner. The **Transport Flagship Programme**, within the NCCRP, is a near-term priority intended to develop projects for enhanced public transport, efficient vehicles, rail re-capitalization and government vehicle efficiency. The NCCRP envisages cutting CO₂ emissions by 34% over the next decade by introducing emission caps on the major polluters.

As part of obligations under the UNFCCC, the Government of South Africa submitted its **1st National Communication (NC)** in December 2003 and the **2nd NC** in November 2011. The 2nd NC recognizes the high potential for improved transport systems as a climate change mitigation action and in particular, highlights the need to prioritize EVs, improve energy efficiency in the transport sector, and explore passenger modal shifts. The **Technology Needs Assessment (2007)** identified a number of key technologies for the transport sector which serve both mitigation and adaptation objectives: (i) Improvement of urban mass-transport systems; (ii) Fuel efficiency improvements; (iii) Improvement of traffic flow in urban areas; (iv) Use of advanced materials and greater recycling; and (v) Electric Vehicles, which were recognized as having significant savings potential in terms of both energy costs (forex) and GHG emissions. In addition, South Africa was noted as having an emerging competitive advantage in EVs due to its history of innovation in the sector. The TNA further suggested that focused mechanisms need to target consumers' choices and their behavior due to the sector's insensitivity to fuel prices.

The **Electric Vehicle Industry Roadmap**, issued by the dti in July 2013, encompasses 8 key action plans: (i) Government vehicle fleet procurement policy to include electric vehicles from 2015; (ii) Provision of investment support for the manufacture of EVs and components; (iii) development of regulatory framework and testing infrastructure for the introduction of EVs; (iv) foster energy storage research and development initiatives to reduce costs; (v) incentive schemes to support the charging infrastructure; (vi) tax incentives for EV purchasers; (vii) improve EV consumer awareness & public education; (viii) planning and management of urban infrastructure.

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

The proposed project's objective is fully consistent with the goal of the Climate Change Mitigation Focal Area, which supports developing countries and economies in transition toward a low-carbon development path. Specifically, it is in line with CC Focal Area Objective 4 to promote energy efficiency, low-carbon transport and urban systems.

A.3 The GEF Agency's comparative advantage:

Following the endorsement of the Lima Declaration in December 2013, UNIDO has a new mandate to promote inclusive and sustainable industrial development (ISID). Recognizing that future strategies for poverty reduction need to be economically empowered, UNIDO promotes ISID to harness the full potential of industry's contribution to the achievement of sustainable development, and lasting prosperity for all.

UNIDO has developed a strong level of expertise by working for several years in South Africa and other countries to assist automotive sectors to increase their competitiveness, and reduce their negative impact on the environment. Under an on-going project on industrial energy efficiency improvement in South Africa, many automotive factories have received project support to reduce their energy consumption. In some developing countries, UNIDO has worked with large car manufacturers, such as Volvo and BMW, in creating capacity to ascertain better maintenance for trucks. UNIDO, with GEF support, has already supported South Africa in successfully implementing the Non-Motorized Transport Programme for COP17 in 2011. Hence, UNIDO has gained invaluable experience, trust and a large network of international and national counterparts involved in this field. In addition, under the ICHET project in Turkey, UNIDO assisted the design, manufacture, operation and maintenance of a Hydrogen Fuel Cell (FC) van powered by solar energy for emergency situations, and a fleet of tri-wheelers in New Delhi using Hydrogen combustion. As a result, UNIDO has extensive experience working on low-carbon transport vehicles, specifically assisting local industries in the manufacturing, distribution and adoption of such.

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

implemented in the country with regard to the fostering of a green industrial sector and the transition towards a green economy.

UNIDO has experts at UNIDO Headquarters in Vienna, as well as a regional office in Pretoria, which is responsible for supporting UNIDO projects and activities in 10 SADC countries: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. In addition, UNIDO has a strong presence in South Africa with a very large cooperation programme, in particular on energy and climate change.

This proposed project will also be aligned with the other relevant projects of UNIDO in South Africa, in particular with those relating to the Environment Branch, such as the HCFC Phase-out management plan with a budget of US\$6.5 million and the other POPs programmes implemented in the region. The project will also seek to coordinate with and build on projects implemented by the Business, Investment and Technology Services (BIT) Branch that have focused on developing the capacity of local component suppliers, as well as building productive partnerships with local and international car manufacturers operating in South Africa. In addition, the capacity and knowledge of the Agri-Business Development Branch and Trade Capacity Building Branch in the region will be leveraged for knowledge sharing where relevant.

UNIDO, as part of their co-financing contribution to the project, will contribute US\$ 60,000 in cash and US\$ 100,000 in-kind to the project.

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

BASELINE SCENARIO

Economic Development & Energy Consumption

In the wake of the political shifts of 1994, successful economic policy reforms and increased integration into the global market have enabled South Africa to become one of the most developed and largest economies in Africa, only surpassed by Nigeria. In 2011, South Africa was admitted to the BRICS group (together with Brazil, Russia, India, and China) and is ranked by the World Bank as an “upper middle-income country,” indicating the significant progress made in a relatively short period of time. The South African economy is well diversified, with key sectors including manufacturing, retail, financial services, communications, mining, agriculture and tourism, and an average annual GDP growth rate of 3.7% in the decade leading up to the global financial crisis of 2008-2009.⁷

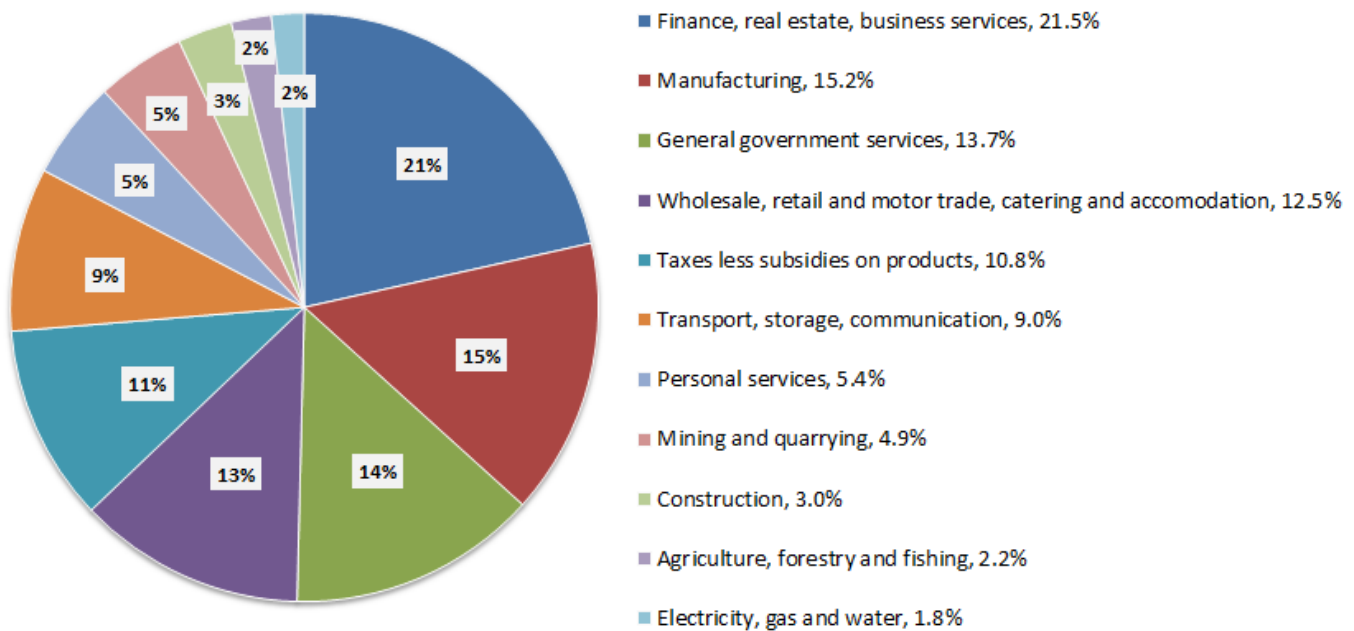


Figure 1: Key sectors contributing to GDP growth in 2013⁸

Driven largely by domestic consumption, the economy continued to grow in the wake of the recession, albeit at a slower rate, with GDP growth peaking at 3.6% in 2011 and dropping to 2.5% in 2012 and 1.9% in 2013. Growth is expected to pick up in 2015, but hinges on the recovery of Europe and on the government’s investment plans to

⁷ <http://databank.worldbank.org/data/views/reports/tableview.aspx?isshared=true>

⁸ Statistics South Africa

address bottlenecks in electricity and transport sector⁹. Currently, load shedding is taking place across South Africa in an attempt to balance electricity supply and demand and avoid the complete collapse of the national supply grid. This load shedding was announced by Eskom in late-2014 due to significant shortages of electricity demand; for instance, Stage 3 Shedding was announced in December, meaning a 4,000 MW shortage that requires two sets of outages per day, lasting 2.5 hours each.¹⁰ This has had a significant impact on economic and social activities in South Africa, and the general quality of life.

South Africa has the highest energy consumption (122.4 Mtoe) of the continent, accounting for approximately 30% of total primary energy consumption in Africa in 2013.¹¹ The energy sector is critical to the South African economy due to dependence on its energy-intensive coal mining industry, large coal deposits are used to meet most of the country's energy needs (72%), followed by oil (22%), natural gas (3%), nuclear (3%) and renewables (<1%).

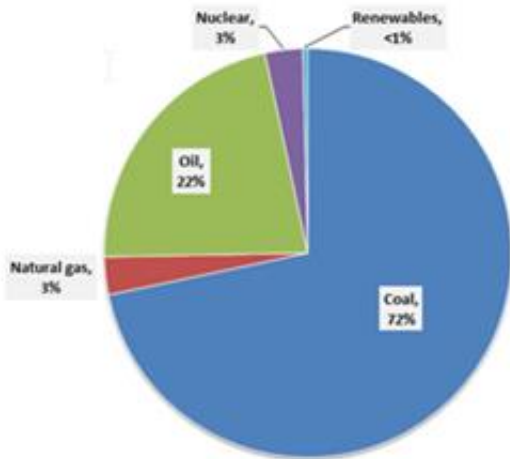


Figure 2: Total primary energy consumption in South Africa, 2013⁸

The transport sector accounts for 28% of final energy consumption in South Africa (97% of which is in liquid fuels) and demand is expected to double by 2050; therefore, the sector plays an increasingly important role in the overall economic and energy performance of South Africa. In addition, the transport sector accounts for the majority of oil consumption, most of which is imported from Middle Eastern and West African producers, but locally refined. South Africa is also experiencing a higher level of motorization as a result of increased commuting needs, an automobile dependent urban sprawl and personal wealth, in terms of both the number of wealthy people and disposable incomes. The ongoing use of transport fuel price subsidization only supports this growth, and is closely linked to the fact that automotive manufacturing is an important sector in South Africa, being labor intensive and considered a high yield investment opportunity.

GHG emissions

According to the latest estimates, South Africa's dependence on coal has led the country to become the leading CO₂ emitter in Africa and the 13th largest in the world. In 2011, 367.7 Mtons of CO₂ (tCO₂) were emitted from fuel combustion in South Africa, of which 78.9% stemmed from coal/peat and 19.9% from oil.¹² In 2013, the manufacturing and construction sector accounted for 63.7 MtCO₂, and the transport sector for 51.2 MtCO₂.¹³

The transportation sector's contribution to GHG emissions has increased by 33.3% in the 10 years from 2000 to 2010, from 35.6 to 47.4 MtCO₂; this translates into 13.1% of South Africa's total GHG emissions.¹⁴ Road transport contributed 91.6% towards the total transport GHG emissions in 2010, mainly due to increased motor vehicle sales. Energy carriers (fuels) consumed for transport activities consisted primarily of liquid fuels, with the most dominant fuel being petrol (53.3%), followed by diesel (34%) and jet fuel (10.9%).¹⁵

In recognition of this large increase and in an effort to encourage a shift to more environmentally friendly cars, the government imposed an emissions-related tax on passenger cars in September 2010; namely, owners of passenger vehicles with a CO₂-rating in excess of 120 g/km were obliged to pay R75 (US\$7) for every g/km over that value. This tax was increased to R90 (US\$8.20) in April 2013.¹⁶

⁹ http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2014/PDF/CN_Long_EN/Afrique_du_Sud_EN.pdf

¹⁰ <http://mybroadband.co.za/news/government/115267-this-is-a-catastrophe-electricity-expert.html>

¹¹ http://www.eia.gov/countries/analysisbriefs/South_africa/south_africa.pdf

¹² IPCC Sectoral Approach

¹³ EIA, Report on CO₂ emissions from fuel combustion, highlights 2013,

<http://www.iea.org/publications/freepublications/publication/co2emissionsfromfuelcombustionhighlights2013.pdf>

¹⁴ Dane, Anthony. The Potential of Electric Vehicles to Contribute to South Africa's Greenhouse Gas Emissions Targets and other Developmental Objectives; How Appropriate if the Investment in Electric Vehicles as a NAMA? *Research Report Series, Energy Research Centre, University of Cape Town*, 2013

¹⁵ GHG Inventory for South Africa: 2000-2010,

https://www.environment.gov.za/sites/default/files/docs/greenhousegas_inventorysouthafrica.pdf

¹⁶ The Economist Automotive Industry Report South Africa, October 2014,

http://industry.eiu.com/handlers/filehandler.ashx?issue_id=1392444523&mode=pdf

The South African Automotive Industry

The South African automotive industry is one of the country's most important sectors and incorporates the manufacture, distribution, servicing and maintenance of motor vehicles. The sector is crucial to the economy, accounting for around 10% of South African exports, creating around 30,000 jobs and contributing 7% to GDP (2013); South Africa's automotive industry is the largest manufacturing sector in the country.¹⁷ Large vehicle manufacturers such as Volkswagen (22.1% market share), Toyota (15.8%), Ford (10.8%), Mercedes-Benz (7.5%), General Motors/Isuzu (5.9%), BMW (5.8%), etc. have taken advantage of the investment opportunities and lower labor costs by establishing local production plants. Component manufacturers with production bases in South Africa include Arvin Exhaust, Bloxwitch, Corning, and Senior Flexonics; another 350 automotive manufacturers supply the industry on a non-exclusive basis. The industry is largely located in two provinces, the Eastern Cape (coastal) and Gauteng (inland), with the bulk of exports headed for Europe and sub-Saharan Africa. In 2012, around 67,000 vehicles were sold to Europe and around 61,000 within Africa, and 443,000 new passenger cars were registered in South Africa.

To date, none of the original equipment manufacturers (OEMs) operating in the South African automobile manufacturing sector have begun production of EVs in the country. Compounding this lack of growth, only one incentive scheme, the **Automotive Investment Scheme (AIS)**, offers additional incentives for the production of EVs over internal combustion engine vehicles (ICEVs); a 35% cash back incentive for EV production, versus 30% for ICEVs.¹⁸

The **Automotive Production Development Plan (APDP)**, issued by the dti, came into force in January 2013 and aims to encourage new investments in the industry, promote the use of local components, and boost annual production to 1.2 million vehicles by 2020. According to the National Association of Automobile Manufacturers (NAAM), the APDP will significantly increase production, particularly for light motor vehicles.¹⁹ While the dti has noted their support of EVs in the EV Industry Roadmap, local production of EVs has not been specifically referenced as a priority area in the APDP.

Despite the limited involvement of local manufacturers, the EV market is experiencing resurgence amongst traditional automakers, and in South Africa consumers have a number of EV options to consider. Toyota's Prius Hybrid was launched globally in 2001, and Honda and BMW now also have hybrid EVs available in the market. Full electric cars on the market or planned to penetrate the market in the near future include the Nissan Leaf and BMW i-line. The Nissan Leaf went on sale in South Africa in October 2013 and to date, has sold almost 100 vehicles in South African (primarily to businesses). BMW's i8 and i3 models will be available at four dealerships as of March 2015.²⁰

BASELINE PROJECTS

Green Mobility, Alternative Fuels, and E-mobility

The widespread adoption of EVs and NMT in the municipalities of South Africa has the potential to lead to significant benefits for the South African people and economy. A study conducted in 2008 predicts that the global stock of EVs will increase to 2 billion by 2030, 77% of which will stem from developing countries.²¹ This holds significant potential benefits for South Africa, considering that EVs have been shown to use 4-5 times less energy than petrol vehicles and have operating costs estimated at 75-99% lower than ICEVs (depending on peak or off-peak charging).²² These benefits have recently received increased acknowledgement by government institutions in South Africa and as a result, a number of strategies and actions plans have begun to incorporate EV adoption as key focus areas.

In the **Industrial Policy Plan 2010-2013**, the Department of Transport (DoT) proposes the provision of support and assistance to encourage the production of EVs and related components. In South Africa, technology developments in alternate fuels and propulsion systems have not yet been commercially exploited and in recognition of this, the DoT has verbally committed to fund the **Green Transport Programme** of the South African National Energy Development Institute (SANEDI). The strategic focus areas of the programme include piped compressed natural gas (CNG) & re-fuelling infrastructure; land-fill gas, and municipal waste harvesting for municipal fleets and public transport; liquid petroleum gas (LPG); biodiesel and micro-emulsification technologies and re-fuelling infrastructure; electric vehicles (EVs) and recharge infrastructure.

¹⁷ Dane, Anthony; 2013

¹⁸ Dane, Anthony; 2013

¹⁹ The Economist Automotive Industry Report South Africa, October 2014,

http://industry.eiu.com/handlers/filehandler.ashx?issue_id=1392444523&mode=pdf

²⁰ <http://www.engineeringnews.co.za/article/bmw-to-launch-electric-vehicle-market-in-sa-in-march-2015-01-12>

²¹ Dane, Anthony; 2013

²² Dane, Anthony; 2013

Work being conducted under the **WWF Low Carbon Frameworks project** is looking at the use of system dynamics modeling tools to explore the potential for various mitigation interventions to reduce emissions in the sector, as well as the effects of feedbacks in the system on uptake, mitigation potential and socio-economic impacts. The project is conducting two separate case studies, one on freighting and the other on passenger transport in Gauteng.

The **Electric Vehicle Industry Roadmap** for South Africa was launched in May 2013 and has recently closed for comments after receiving input from industry and is now pending final internal approval. Twelve departments, including the dti, Department of Science and Technology (DST) and Council for Scientific and Industrial Research (CSIR) were involved in its development, identifying 8 key areas of focus for the Roadmap; stimulating demand for EVs through potential preferential procurement of EVs, tax incentives, an awareness campaign, investment support, research and development, policy development, management of the electricity infrastructure, and urban infrastructure support.²³ The initial version of the Roadmap includes incentives for South African EV manufacturers that would offer a rebate of 1/3 of production costs over a three year period for manufacturers that produce more than 5,000 EVs. The Roadmap has been developed by the dti in cooperation with other relevant government departments and multinational car manufacturers. However, much is still to be done in order to align the South African EV Industry Roadmap content with international standards and best practices, as well as to include all potential EV alternatives and a concrete strategy for the promotion of local manufacturing. These ongoing areas for improvement provide ample opportunity for the proposed project to support the South African institutions in the finalization and implementation of the Roadmap.

Despite the number of EV options already or soon to be available on the South African market, consumer adoption will largely remain a function of government incentive schemes and the availability of EV charging options. However, currently no incentives for buyers of EVs are available and EVs continue to incur a relatively high import tax of 40%, falling in the same classification as a hearse or ambulance. In the case of charging options in the current market, most EV charging would take place at home and places of work; in order for EVs to gain widespread consumer adoption, it is critical for EV energy supply equipment (EVSE) infrastructure to exist in public places. In the meantime, the Department of Environmental Affairs (DEA) has launched a **Zero Emission Electric Vehicle Pilot Programme** using Nissan Leaf vehicles, and BMW has announced a partnership with Schneider Electric to create a network of public recharging points in the country's urban centers. These user-friendly charging facilities should be made available simultaneously with the launch of their two models.

Both BMW and Schneider Electric are members of the **Electric Vehicle Infrastructure Alliance (EVIA)**, a body consisting of public and private partners interested in developing an EV infrastructure for South Africa. The specific objectives of EVIA are to: (i) create an EV Charging Network with **open standards** for physical connections and data management; (ii) establish an **open data aggregation** platform accessible by all stakeholders; (iii) define strategic **geographic locations** for placement of charging infrastructure; and (iv) ensure **interoperability** of consortium members' products and services.

In addition to the initiatives being undertaken by the private sector, there are a number of research- and government-focused projects currently operating in South Africa that form the baseline situation and fall within the promotion of EV charging infrastructure in South Africa to pave the way for the introduction and adoption of EVs.

TIA, for instance, has been very active in conducting studies to assess the potential of e-mobility in South Africa, focusing on barriers, opportunities, prerequisites for success and potential solutions. A study conducted by Frost & Sullivan in January 2013, with funding from TIA, identified the following opportunities and recommendations for the development of e-mobility policy in South Africa:

- Develop a communication and incentive scheme to build customer awareness and demand;
- Increased collaboration/transparency throughout the ecosystem;
- Definition of a policy framework allowing greater participation of key stakeholders, especially from power generation and distribution;
- Harmonization of standards across applications: electric equipment, software/IT platforms;
- Actively support and fund commercial initiatives and strategic R&D projects (South African niche with global reach, e.g.: beneficiation, smart grid);
- Drive "smart grid" and "renewable energy" development with EVs in mind (energy demand, storage, balancing, etc.);
- Establishment of pilot cities to stress test various concepts.

²³ Dane, Anthony; 2013
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Another TIA-funded study was conducted by SINTEF to determine and understand pre-requisites for success in the development of key technological focus areas for the TIA uYilo Programme. Charging infrastructure technology was identified as one of the technology focus areas for the Programme. Key short-, medium- and long-term strategies were identified as part of the study:

Period	Strategy	Pre-requisites
Short-Term	Encourage collaborations and co-operation among key stakeholders, support roll-out of infrastructure, support the development of SABS standards	<ul style="list-style-type: none"> • Involvement of the energy companies as the DSOs to create partnerships and roll-out of the charging stations. Creation of interoperable and standardized solutions for charging stations. • Develop different business models and deploy technology that is neutral to the different business models and stakeholders under the supply chain. • Co-operation with local municipalities and governmental organizations.
Medium-Term	Local charging technologies developed and deployed, renewable energy sources integration and smart cities.	<ul style="list-style-type: none"> • Increase deployment of renewable energies (solar, wind, etc.) and development of cost effective technologies for load management and bi-directional transfer of energy. • Transformation of the grid towards a smart grid, and introduction of incentives for using renewable energies by the industrial and private actors. • Launch new initiatives that address smart cities' development by addressing buildings, transport, renewable energy sources as a common ecosystem.
Long-Term	Seamless integration of EVs into a charging infrastructure. Electro mobility as a service.	

Both these studies highlight the gaps currently in the South African market, as well as the actions required in order to achieve an integration of EVs in the South African urban infrastructure. The proposed project will target many of these identified issues, close partnerships with local municipalities and government organizations, the use of renewable energy for charging infrastructure, and the introduction of incentives.

In March 2013, the TIA launched a five year national multi-stakeholder **E-Mobility Technology Innovation Programme, named uYilo**, to facilitate the development and commercialization of South African developed electro-mobility technologies, to ensure their participation in the global supply chain. Hosted by the Nelson Mandel Metropolitan University (NMMU), uYilo aims to support local development and commercialization of electro-mobility technologies, facilitate development of scarce skills and support development of enterprises that will contribute towards the creation of new jobs. The uYilo Programme is in its second year of funding, focusing on demonstration of technologies to build new skills, create awareness of market opportunities and identify technology niches. These activities should lead to an enabling environment for showcasing EV technologies, strong partners and the skilled human resources, creating a platform for technology development, innovation and commercialization in Years 3-5.

Under Year 1, with funding of US\$ 707,500, the following activities were undertaken:

- *Battery testing center and Material service lab* to provide testing, validation and certification services for a variety of battery types and chemistries.
- *Live testing environment* consisting of the EV ecosystem elements which include EVs, charging stations and charge network management systems (ITS). Three charging stations and parking for the EV fleet have been established and the charging facility is to be extended in Year 2 to include fast charging, a software platform for data aggregation and charge management, integration of off-grid technologies (such as solar and wind from TIA-funded technologies) and establishment of a micro grid for energy management.
- *EV systems lab* for the development and maintenance of EV-related systems, such as electric motors, battery packs and inverters.

Under Year 2, with funding of US\$ 579,328, the following activities are foreseen:

- *Game viewer projects*: Demonstration projects create awareness of E-Mobility, generating data to create a business case for further deployment of EVs and to identify areas of improvement. Under this project, the NMMU and SANEDI will deploy a Game Viewer EV to Shamwari Game Reserve and Imperial Green Mobility will provide a Tomberlin Vanish Electric 4x4 ATV. A PV-based charging station has been installed for charging these two EVs. During the PPG phase, the project through SANEDI has assisted in the installation and deployment, and organization of the launch to raise awareness.
- *Vehicle Field Testing project* aims to create awareness and demonstration of existing E-Mobility technology, collecting credible vehicle usage data for analysis. This is centred on a six-vehicle fleet at the NMMU which includes four Nissan Leaf, Joule prototype vehicles and two Optimal Energy Bantams that are driven as pool cars.
- *E-Bikes project* consists of four e-Bikes and two e-Scooters as part of the Live Testing Environment (LTE).
- *Micro mobility pilot project* consists of various micro vehicles (4 micro utility vehicles, 2-wheeled micro vehicles) to provide services such as delivery, people carriers, utility and services. Six vehicle platforms will be provided by Imperial Green Mobility for this project.

Future years of the uYilo programme intend to focus on the expansion of the battery testing centre and the live testing environment, the further demonstration of e-mobility technologies, and the development of charging network infrastructure.

Building on its efforts under the uYilo programme, the NMMU has created a LTE for EVs and NMT in March 2014, a platform that will provide important insight into EVs' energy requirements and user acceptance. The LTE will also provide valuable information for OEMs and Utility and Energy companies for the further development and testing of procedures for controlled charging and feedback of electric energy into the power grid. The LTE plays an important role in demonstrating locally developed technology and intellectual property, as well as becoming a platform for the development and validation of national standards. The platform will, therefore, consist of testing and development of various EV ecosystem elements, such as electric vehicles, charge points, data and information communication systems, and smart grid devices.

The uYilo programme has made significant progress in Year 1 in the development of the background infrastructure for EVs in South Africa, and Year 2 will bring the first real demonstration projects across a variety of fields. In order for these demonstrations to achieve sustainability, however, the policy frameworks to support these technologies must be in place and this aspect is not dealt with by the programme. The proposed GEF project will aim to fill this gap by creating the required policy to ensure the sustainability of the efforts under the uYilo programme.

Envisaged projects based on discussions with stakeholders that will potentially could fall under EVIA:

Research and Development of DC Quick Charger Prototype (2014-15): This project will investigate the possibility of developing a locally developed charging station and proposes potential improvements to the EVSE currently available on the overseas market. The project aims to develop globally competitive quick DC chargers and locally produced EVSE product portfolio. Planned enhancements include: (i) Decreased charging time; (ii) Improved efficiency; (iii) Incorporated battery storage to decrease peak demand from the electricity grid; and (iv) Improved design of EVSE that can be integrated with solar panels and wind generators.

Data Aggregation: This project will investigate the development of a national aggregator, an easy to use database for charging stations, capable of real-time updates on the availability of charging stations. The system developed will allow the identification of charge point locations through a web-portal, thus securing a comprehensive overview of the charging infrastructure in South Africa and allowing for reservations of charging stations through a smartphone application.

EVSE Research Forum: Under this research project topics such as the cost of charging EVs will be investigated; tariff structures and other incentives to promote charging will be considered. Further investigations will include significant temporal, spatial and institutional variations in the cost of charging an EV on the South African grid; this is to allow consumers to make proper purchasing decisions. The project will also look into factors that influence consumer charging behavior, and how this behavior is expected to develop.

Integrated Data Management System: The widespread electrification of road transport must be accompanied with adequate electric infrastructure development and the grid integration concept must have a wide reach. When planning the introduction of EVs on the grid, issues such as infrastructure planning and costs, quick charging impact, bi-directional energy flow capabilities (V2G), standardization, and regulatory aspects (business models, billing issues, tariff schemes, etc.) need to be considered. This project, once off the ground, has the potential to develop and

implement systems to capture and collect EV data and run basic analytics to understand the impact of EVs on the national grid.

Structured Roll-out of Charging Infrastructure: As South Africa starts to roll out charge point infrastructure, there is a need to first understand how the rollout can be targeted, how the infrastructure network should be developed and where the demand really is. Such an initiative, with a strong research component, will help steer an economically efficient and targeted roll-out of infrastructure. This will also help the municipal distributors of electricity to identify and target early hotspots to be considered for medium voltage infrastructure upgrades.

With these projects in mind, the proposed project's approach will aim to fill the policy gaps still present in the baseline situation. For instance, while there is a multitude of projects focusing on the expansion of the EV market, very few dedicate adequate attention to the supporting policy framework or the building of capacity within the relevant institutions. The proposed project will correct this omission while also aiming to coordinate with existing projects for the development of the strategy papers under Component 1 of the project.

Non-Motorized Transport (NMT)

While the NMT modes in South Africa still have some way to go before they are fully integrated within the mobility system, South Africa has made great strides, particularly in the last 5 years, in their NMT policy and implementation.

The implementation of most NMT programmes and projects primarily fall within the following policies: (i) National Development Plan 2030, National Transport Master Plan 2011, and White Paper on Transport Policy, 1999. The draft **Non-Motorised Transport Policy** document was developed in 2008 to provide a single framework and an enabling environment for the DoT, other government departments and stakeholders to address the challenges inherent in NMT. The primary objectives of the NMT policy are: (i) to increase the role of NMT as one of the key transport modes, (ii) to integrate NMT as an essential element of public transport, (iii) to provide a safe NMT infrastructure, and (iv) to allocate adequate and sustainable funding for the development and promotion of NMT. The DoT has worked with provinces to develop the **NMT master plans** to improve the implementation of initiatives for mobility and access to basic needs, as well as social and economic opportunities for people. To date, however, no specific incentives for NMT are available. The proposed project will aim to support the DoT in further refining the NMT Policy and relevant Master Plans, providing technical advice and input, as well as playing a coordinating function for stakeholder engagement.

The roll-out of **Integrated Rapid Public Transport Networks (IRPTNs)** in major cities has paid dividends to local NMT policy and implementation, with the cities of Johannesburg, Durban, Nelson Mandela Bay, Mbombela and Cape Town preparing or updating NMT policy, strategy and design principles, as well as implementing pilot or integrated projects. In addition, both the City of Johannesburg and the City of Cape Town have prepared Feasibility Studies for the implementation of bicycle-sharing systems (2013). As there is still significant progress to be made in finalizing and operationalizing these policies at the City level, the proposed project will aim to do so through the support of the Cities of Durban and Johannesburg under Component 2, as well as the dissemination of success stories to the other large cities of South Africa.

The DoT and DEA have been the leading government departments in the implementation of NMT initiatives. The DEA, in partnership with KfW (German Development Bank) as part of their **National Greening Programme** is working on building the capacity of 11 cities of South Africa to promote NMT. Launched in May 2010, a strategic element of this programme is the implementation of demonstration walking and cycling infrastructure projects in these cities. So far, Durban has been the forerunner amongst the 11 cities, and has invested significantly in upgrading and building its 5 cycling routes and the associated infrastructure that was used during the COP17. Implementation of the first phase has led to successful infrastructure development of cycling lanes in three pilot cities (City of Johannesburg, Durban and Polokwane). The DoT, together with DEA and KfW, held a conference in October 2014 attended by more than 150 delegates from the government, municipalities, academia and some cycling and commuter organisations in South Africa. From their successes and lessons learnt during Phase 1, the DEA/KfW collaboration will continue in Phase 2 to focus on infrastructure development, awareness raising and advocacy activities.

The DoT has already engaged in major activities with the primary objective of making the lives of people in South Africa better with progressive improvement; a 10 year NMT roll-out was initiated with components in NMT infrastructure development, NMT promotion and awareness creation, safety, education and law enforcement and the Shova Kulula bicycle rollout, a National Bicycle Programme introduced as a pilot programme in 2001 to promote cycling as low cost mobility to improve rural accessibility/urban mobility to basic services including access to educational centers. Currently, a focus of the DoT is on the development of the Green Transport Strategy, whereby alternate fuels, CNG, LFG, LPG and propulsion systems would be developed for the public sector.

At the municipal level, several initiatives focusing on the promotion of NMT have also been adopted and rolled-out in a number of cities. In the cities with which the project will work, namely Durban and Johannesburg, the following key programmes are currently underway.

City of Durban, eThekweni Municipality:

The current baseline of EVs and NMT in Durban is as follows:

Electric Vehicles	No cars at this stage, and around 50 electric bicycles.
EV Charging Stations	None at this time
NMT	<ul style="list-style-type: none"> • 1.8km of bicycle pathways on both the western and eastern sides of the M12 from the city until Sandile Thusi Road; • 8.5m wide pathway to the stadium after Sandile Thusi Road, a route adjoining Peoples Park; • There are bicycle parking points with one or more bicycle racks at Moses Mabhida Stadium, Loram House (Strategic Projects Unit), City Engineers, City Architects, eThekweni Transport Authority (ETA), City Hall, and Florence Mkhize Building (Treasury).

Having partnered with UNIDO under the GEF-funded Greening the COP17 project in 2011, eThekweni has already shown a high level of interest in developing and improving NMT in their cities. A number of cycle paths were developed as part of the COP17 NMT Programme and an extensive **Priority Pedestrian Network** was developed for the FIFA World Cup 2010 linking key city attractions with upgraded footpaths and NMT corridors. The use of the NMT networks are limited, however, by indirect pedestrian routes to public transport, poor road/pathway conditions due to lack of maintenance, and noise and atmospheric pollution which often deters pedestrians from travelling longer distances on foot.

A **NMT Plan** for the eThekweni Municipality was drafted in 2012 as part of the IRPTNs, focusing on cycling and all other forms of NMT. The NMT Plan contributes to the eThekweni Municipality’s Integrated Development Plan’s Theme D: Transport which aims to: i) eliminate all atmospheric pollutants arising from transport energy use by maximizing the application of sustainable, energy efficient and renewable energy technologies in both the public and private sector; ii) promote NMT and dis-incentivize private motorized transport; and iii) develop a clean, safe, accessible and affordable integrated public transport system. Further, in order to maximize stakeholder engagement and streamline the decision-making process amongst numerous stakeholders, it has been recommended that a Stakeholder Liaison be appointed to initiate and manage a **NMT Committee**; this Committee would include representatives from the eThekweni Transport Authority, Energy Office, City Fleet, interim private contractors, as well as from civil society organizations/associations.

Under the larger NMT Plan, the **eThekweni Municipal Bicycle Programme** was developed comprising of four broad focal areas; i) Administrative and Legal Aspects; ii) Bicycle Route Identification and Construction; iii) Marketing and Communications; and iv) Management and Administration of Bicycles. To date, two inter-linked programmes have been implemented underneath the Plan; a staff-shared bicycle project and infrastructure development – safe NMT route identification and construction, and signage for NMT routes. Areas for further intervention include; expansion of the staff-shared project to other buildings, expansion of NMT infrastructure, institutionalization of the NMT programme within the eThekweni Transport Authority, and the promotion of renewable energy-use to power public transport through demonstration of an e-bus fleet. Within the scope of the eThekweni Municipal Bicycle Programme, further infrastructure improvement projects foreseen include expansion of the bike programme for municipal employees to more registered users, as well as to other buildings such as City Hall and City Fleet, increased route marking, and identification of more cycle initiatives

As part of *Bicycle Route Identification and Construction*, five routes have been identified, as well as a number of bicycle parking points located in the vicinity of large municipal buildings. These identified routes and parking points provide an opportunity for the proposed project to offer support and assistance to eThekweni in terms of institutional capacity building, policies and regulations development, and knowledge sharing from other countries. In addition, as eThekweni plans to offer workshops and training manuals on the bicycle sharing system, safety, the monitoring software, etc., the proposed project can leverage on these existing plans to provide advice and input for an improved and more comprehensive capacity building programme.

City of Johannesburg, Johannesburg Municipality

The current baseline of EVs and NMT in Johannesburg is as follows:

Electric Vehicles	Approx. 70 cars (50 Nissan Leaf, 20 BMW i3), and around 100 electric bicycles;
EV Charging Stations	12 charging stations at dealers, 1 solar station at the German Chamber of Commerce;
NMT	<ul style="list-style-type: none"> • 5km of dedicated cycle lanes, and a sidewalk upgrade completed in Orlando Soweto; 15km of dedicated cycle lanes under construction between Ellis Park and Sophiatown (focusing on a university corridor); most to be completed by July 2015; 5km of dedicated cycle lanes and walkways between Sandton and Alexandra – detailed design, including an iconic bridge were due to begin construction in March 2015 and completed in approx. September 2016; 20km of cycle lanes designed to link Rosebank, Sandton, park areas, etc. Funding for outer years is still being sought; • Cycle lanes/sidewalk upgrades focusing on scholars under design or construction in Ivory Park, Orange Farm; • Bicycle parking is being rolled out to Rea Vaya stations; • Gautrain stations have bicycle parking;

In recent years, Johannesburg has developed and approved a number of policies to support NMT development in their city; in 2009 the **NMT Framework** for the City of Johannesburg was adopted and in 2013 the **Strategic Integrated Transport Plan Framework** was approved, laying out the strategic direction for developing a cycle friendly City and positioning cycling within the integrated transport plan. The **Integrated Transport Network**, foreseen to be approved in June 2015, will include a revised integrated transport network for public transport, cycling and freight movements.

In terms of projects, cycle lanes and parking spaces are being built and upgraded throughout the Municipality, bike sharing schemes are under development and one bicycle repair empowerment center has been opened in partnership with a NGO. Bicycle access is also being increased through the donation of over 500 bicycles to school children under the **Shova Kuala Programme**.

For the increased awareness of the benefits of NMT and the services available, Johannesburg has, to date, organized two **Freedom Rides** with over 5,000 attendees each, as well as more than 10 Open Street events. The first **Cycle Jozi Week** is planned for March 2015, as well as the **Cycle Jozi Forum**, a bi-monthly meeting of cycle activists and stakeholders. These ongoing events provide ample opportunity for the proposed project to get involved, providing additional support, as well as leveraging on the existing momentum and awareness.

A key planned intervention is the development of a 15km bicycle path along the University Corridor, which includes 3 campuses of the University of Johannesburg, and the University of Witwatersrand. This project would entail; an increased number of bicycles available to purchase, rent or share, improved safety and general awareness, increased take up of cycling through the provision of training and awareness raising for behavioral shifts, and improved infrastructure (signage, parking, etc.). The City of Johannesburg has specifically outlined their interest to work with the proposed GEF project, as well as Johannesburg Urban Cycling Association (JUCA), Cycle Jozi Forum, University of Johannesburg, and Witwatersrand University, to improve, support and enable cycling by students, residents and workers in the area between Sophiatown and Ellis Park.

The above-listed initiatives have been identified by the eThekweni and Johannesburg Municipalities (see Annex I) as potential areas for cooperation with the proposed project. This partnership approach will allow the project to leverage on existing mechanisms and initiatives for improved impact and outreach with a limited budget, as well as ensure that project interventions are closely in line with and support national and municipal priorities.

Barriers:

Barrier	Mitigation Actions
<p>Policy Barriers</p> <p>Lack of enabling policy and incentive programmes to encourage early market take off and first-movers; limited coordination among relevant institutions in the field of EVs and</p>	<p>Baseline:</p> <p>While a number of strategy papers and action plans have been issued by the relevant institutions, limited coordination and integration within and across these parties persist and therefore, there is very slow implementation, hindering the stimulation of the EV and bicycle market and local industry in South Africa, as explained in the above baseline</p>

<p>NMT.</p>	<p>scenario and projects.</p> <p><u>Additional barriers for Non-Motorized Transport:</u></p> <p>There is a trend of increasing reference to and inclusion of NMT considerations in policies, however, current legislation impedes NMT, such as:</p> <p>Several municipal by-laws, some of which do not address matters pertaining to NMT or they contain provisions that could be restrictive towards implementing NMT proposals, i.e. The Minimum Requirements for ITPs and Provincial Land Transport Frameworks (PLTFs) should be amended to provide for more concrete key performance indicators that must be met in the promotion of NMT; the National Road Traffic Regulations, 2000, has problems or hurdles that may stand in the way of NMT promotion; planning legislation which lacks detailed provisions, etc.</p> <p>Johannesburg and eThekweni municipalities have a solid institutional environment to support the uptake and mainstreaming of NMT considerations. However, until the omissions and oversights that currently exist in relevant policy and legislation are addressed, the uptake of NMT considerations will be limited.</p> <p><u>Electric Vehicles:</u></p> <p>In the case of EVs, the current policy framework does not fully allow the participation of all key stakeholders, especially in the field of power generation and distribution, infrastructure roll-out, standards development, etc. As a result, the existing policies and standards do not completely meet the needs of all market players, and limited harmonization of existing standards across applications, such as electric equipment, software/IT platforms, etc., persists. These ongoing limitations in terms of a supporting policy environment, along with key opportunities for improvement (see pgs. 9-10 of this CEO Endorsement Request) have been highlighted in studies funded by TIA and conducted by Frost & Sullivan and SINTEF</p> <p>Alternative:</p> <p>The project will work closely with the relevant institutions through project activities and the Project Steering Committee (PSC) in South Africa to strengthen the existing policy framework, including policies, standards, regulations, etc. for the development of an enabling ecosystem that supports and fosters coordination. The project will also support the development of relevant incentive schemes for the promotion of EVs and NMT in South Africa.</p> <p><i>Related project outcome:</i> 1.1, 2.1</p> <p><i>Related project outputs:</i> 1.1.1, 1.1.2, 2.1.1, 2.1.3</p>
<p>Informational Barriers:</p> <p>Low awareness within the public of the opportunities associated with EVs and cycling; In particular with regard to the environmental benefits of EVs as the electricity generation in South Africa is very much based on coal.</p>	<p>Baseline:</p> <p>Concerns regarding high upfront investment costs, social status, weather, limited reliability and range persist in consumer perceptions, and are often inflated and not based on hard facts. In addition, consumers generally have limited awareness of the benefits associated with the use of EVs and bicycles. In an attempt to mitigate these barriers, the DEA's Green Cars Programme intends to roll out a consumer education and awareness campaign.</p> <p>Alternative:</p> <p>The project will develop and implement a targeted behavioral change programme to raise public awareness of the opportunities and benefits, such as environmental, health, and economic factors, associated with</p>

	<p>public transport, EVs and NMT. This increased awareness and better understanding of the low-carbon transportation options available on the market will serve to create demand in the South African market, thus increasing the likelihood of widespread adoption of EVs.</p> <p><i>Related project outcome:</i> 1.1, 2.1</p> <p><i>Related project outputs:</i> 1.1.2, 2.1.2</p>
<p>Infrastructure Barriers:</p> <p>Lack of the necessary supporting infrastructure to develop sustainable alternative forms of transportation. The growth of NMT, in particular cycling, and also EV use has been very low, similarly as in almost all developing countries due to a large extent to lacking infrastructure.</p>	<p>Baseline:</p> <p>There is no infrastructure for EV use and very limited existing infrastructure for NMT in South Africa. The development of infrastructure for EV use and NMT is primarily hindered by lack of enabling policy, regulation, guidelines and standards, and by lack of knowledge of the use of renewable energy in combination with EVs, as well as limited institutional capacity at the municipality level.</p> <p>Alternative:</p> <p>The project will support the development of EV and NMT infrastructure through policy and standards development and the design, installation and testing of at least 2 PV-based charging stations. These facilities will act as demonstration stations to raise awareness of EVs in the South African market and support the increased adoption of EVs. The project will also assist the Cities of Durban and Johannesburg to accelerate the development of the NMT infrastructure and share experience with other municipalities.</p> <p><i>Related project outcome:</i> 2.1</p> <p><i>Related project outputs:</i> 2.1.3, 2.1.4</p>

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

In light of the above barriers and specifically the need for coordination amongst the baseline projects and policies outlined earlier, this proposed project will assist South Africa in achieving the accelerated introduction and widespread adoption of EVs and the development of the EV market in South Africa, as well as the use and manufacture of bicycles. The main objective of the project is the promotion of the widespread use of EVs and NMT, and the development of the necessary infrastructure, as part of the Green Transport and Green Cities Initiative of South Africa. The project is expected to also have a significant long-term impact on income and job creation in South Africa, as well as environmental benefits such as a reduction in air and noise pollution, particularly in large cities. Furthermore, to link into global networks and maximize GHG reductions, the project will consider and incorporate the concept of integrated urban planning and sustainable city initiatives. This focus will establish a solid baseline for GEF-6 projects to be developed in the future, especially considering the strong focus on sustainable cities under the GEF-6 strategy.

The project approach is developed around two substantive components; the first one at the national level addressing policy, institutional capacity building, coordination and awareness raising, and the second focusing on demonstration at the municipal level and in game reserves, including institutional capacity development through the provision of guidance on the implementation and operationalization of the relevant national policies. These two components will promote EV and solar energy utilization and cycling in order to create a strong market demand for EVs and bicycles, and further reduce GHG emissions as compared to conventional fuel-based electricity. In order to ensure effective management of the project and a solid monitoring and evaluation (M&E) strategy, the project also has a comprehensive M&E component.

The knowledge gained and experience from this project will be shared nationally, regionally and internationally; for example, with the DEA-KfW programme, within the work of the CEM EVI, at the Vienna Energy Forum of the Government of Austria and UNIDO, and in particular with the parallel project on low-carbon transport in Malaysia.

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

This component will support the adoption of EVs and NMT in South Africa by providing support to the development of an enabling policy framework and the building of capacity at the relevant institutions. The developed policy and regulatory framework will be closely aligned with the principles of ISID and gender mainstreaming, as well as the environmental and social safeguards policies, while the development process will follow the public-private dialogue principle. Lessons learned and best practices in terms of EV goals, policies, incentives, etc. of both developed and developing countries, as clearly outlined in the EV City Casebook of the International Energy Agency (IEA), will be incorporated into the project activities focused on national policy design and regulatory framework setup. South Africa is a signatory to the CEM EVI agreement and has appointed SANEDI as the country focal point which will enable the project to assist South Africa to contribute to the development of the publication and also access to the information and knowledge shared within the CEM EVI.

The key outcome of this component is an enabling policy and regulatory framework, together with strengthened institutional capacity and enhanced awareness; facilitating early and widespread use and local manufacturing of EVs and bicycles in South Africa. The dti will lead activities related to the promotion of EV use, and local manufacturing of EVs, infrastructure and bicycles, whereas the DoT will focus on the promotion of cycling and cycling infrastructure development. The project will also create mechanisms to ensure the effective coordination between efforts and programmes implemented by various authorities and institutions on these areas.

Output 1.1.1 National policy and regulatory framework, incentive programmes, tax incentives, design, planning, and safety guidelines, etc. to promote early take-off, widespread use, and local manufacturing of EVs and NMT strengthened.

This output will seek to strengthen the existing policy framework for the creation of an enabling policy environment for the effective promotion of low-carbon transport with a focus on EVs and NMT. This will be undertaken by working closely with concerned national authorities and institutions, as well as in close consultation with all stakeholders, including the OEMs. Lessons and best practices from industrialized countries such as Denmark, Norway, the Netherlands, France, Germany, the US, Japan, etc., as well as developing countries such as China, on the promotion of e-mobility and cycling will be shared.

During the inception phase, additional consultations will be carried out with concerned stakeholders to identify the need for the further development of policies, strategies, roadmaps, implementation guidelines, etc. that will be developed during the project main phase to effectively stimulate both demand for and supply of EVs and bicycles in South Africa. For EVs, the project will focus on supporting the dti to further refine the EV Industry Roadmap, and creating a coordination mechanism for receiving and utilizing support from other stakeholders. Specifically, efforts will be made to support the incorporation of a strong strategy within the EV Industry Roadmap for the development of capacity and a market for the local manufacturing of EVs.

Specifically targeting the stimulation of market demand, the proposed project will assist in reviewing those incentive schemes which have been working well in other countries and recommending or drafting the most suitable ones for South Africa. These incentive schemes in other countries could include;

- Non-financial incentives could include the provision of exclusive parking or lanes, including using bus lanes, free city access (e.g. not having to pay the e-toll in Gauteng), or the linking of EV purchases to the provision of a slow charging station in the home or free charging at public stations, etc.;
- Regulatory interventions could include the introduction of minimum emission standards for vehicle fleets;
- Financial incentives could include soft loan schemes, various tax incentives, for example, reduced or no import tax and subsidies for vehicles and charging infrastructure.

These improved incentives, combined with the awareness raising events planned under Output 1.1.2, and the development of adequate charging infrastructure, will ensure that end-users are encouraged to invest in and adopt low-carbon transportation options. This approach will also seek to ensure market sustainability beyond the closure date of the proposed project.

As referred to above, the proposed project will aim to encourage and facilitate investment in infrastructure development and maintenance in the local manufacture of parts and maintenance facilities and human resources both for EVs and bicycles. This will be achieved by supporting national institutions to develop the appropriate incentives and mechanisms to encourage local manufacturers to begin production of EV and bicycle parts and components, initially through the inclusion of a Strategy within the EV Industry Roadmap. As this is a relatively new market

segment in South Africa, top-down support is required to encourage first-movers to take the initiative. The approach taken will seek to enhance partnerships, pool available resources and generally streamline the concerns associated with such investment, thus reducing the perceived investment risks. In line with the project's gender mainstreaming approach (see Section B.2), attention will also be given to addressing the gender-related aspects of the manufacturing workforce in the EV sector. The proposed project will also pay attention to the promotion of the development and use of public transport, in particular e-buses, with more people cycling to public transport stations. The policy framework will facilitate the development of PV-based infrastructure to reduce the consumption of fossil fuels and other GHG-intensive energy sources, such as coal.

A study will also be carried out under this Output with regard to the local manufacturing and assembly of special EVs for niche markets in South Africa and the SADC region, for example for the game reserves in South Africa that require vehicles with minimum environmental impact and noise for relatively short travel distances and rough terrain.

With regard to NMT, the project will support the DoT to further refine the NMT Policy and Master Plan, and create a coordination mechanism for receiving and utilizing support from other stakeholders. This will specifically entail working with the DEA and KfW to assist in the development of regulations, guidelines, incentive programmes to promote cycling and the design and construction of cycling lanes, parking stations, etc.

Output 1.1.2 Concerned institutional capacity at the national level built, and awareness raised

Institutional capacity building will be a key activity of the project's sustainability strategy, ensuring that the policies are implemented at the ground level and that a real impact is made in terms of reducing GHG emissions in South Africa. Capacity building will be achieved mainly through on-the-job trainings, study tours, and close cooperation between relevant institutions and local and international consultants. This built institutional capacity and increased awareness will play an important role in ensuring that sufficient investment is attracted and that the strengthened policy framework under Output 1.1.1 is built into the existing policy framework. The project will focus specifically on strengthening the capacity of relevant divisions, branches and programmes of the dti, the DoT, and SANEDI, for example the automotive division of the dti, the newly established NPT division of the DoT and the Green Mobility Unit of SANEDI. It is hoped that through capacity building of these institutions on policy relevant issues, these concepts will be internalized and adopted for lasting impact. In order to ensure sustainability and ownership, the project will make efforts to work closely with the in-house human resource divisions of the relevant institutions to incorporate the content of the trainings into the corporate learning and knowledge management structures of the institutions.

Awareness raising activities will also reach beyond institutions and target other relevant stakeholders, as well as the general public. Building on the developed strategies, roadmaps, and the results of the demonstrations under Component 2, the project will develop and implement a public awareness campaign focusing on the opportunities and benefits associated with public transport, EVs and NMT. This increased awareness and better understanding of the low-carbon transportation options available on the market will serve to create demand in the South African market, thus increasing the likelihood of widespread EV adoption. Experience from other countries in effective awareness raising will be considered and recommended, for example, EV car sharing in Paris, EV taxis in a number of Chinese cities, etc. Awareness raising materials and programmes will be carefully developed to promote the installation and operation of one PV-based charging station in the Shamwari Game Reserve, and one in Sandton in time for the Eco-Mobility Festival in Johannesburg in October 2015, under Output 2.1.4. Efforts will also be made to raise funds to install one more PV-based charging station in the City of Durban at a later stage. The project will also look for additional relevant events to further raise awareness.

Component 2: Promotion of non-motorized and public transport in the Cities of Durban and Johannesburg, and development and demonstration of the supporting infrastructure for EVs.

Building on the success of the NMT component of the very successful GEF-funded Greening the COP17 project implemented by UNIDO in 2011, this component supports the promotion of cycling in the Cities of Durban and Johannesburg, including cycling to and from public transport stations, hence contributing to the promotion of public transport. During the PPG phase, both cities have actively contributed to and taken part in various consultations and have carried out significant planning work, in particular the City of Johannesburg. In addition, the two cities have formally expressed their interest and commitment to work with the project through submission of detailed proposals (see Annex I). The decision to work with these two cities was made in close coordination with the Lead Executing Agency and is based on the proposals submitted by both cities in the PPG phase, as well as their ongoing and planned projects in the field of NMT. Further, both cities are members of the C40 Cities - Climate Leadership Group, and are engaged in the ongoing KfW/DEA programme which will focus on NMT in the second phase, offering numerous opportunities for scaling up and sustainable interventions.

Specifically, the City of Durban was selected at the PIF stage based on the ongoing cooperation with UNIDO on the COP17 project and has remained engaged with the project throughout the project development phase. In addition, the existing and planned projects in the field of NMT, as outlined in Annex I, provide a solid baseline upon which the project can build. In the case of the City of Johannesburg, their involvement in the upcoming UNEP project on sustainable cities and ongoing NMT initiatives (see Annex I) also make them an ideal partner for this project. Their position on the Project Steering Committee of the C40 Cities - Climate Leadership Group also offers substantial potential for dissemination of lessons learned and success stories on a regional and global scale.

The approach taken under Component 2 will stimulate not only the demand side of the market, but also the supply side by engaging the private sector. As part of the project's replication and upscaling strategy, the experience gained by these two cities will be shared with the other 9 cities of the DEA/KfW NMT programme with a focus on the promotion and development of the local production of bicycles. For example, a pre-investment study will be carried out for the setting up of local production of bicycles, and funding from the dti, the IDC, and other sources can be used for investment. The second aspect of this component will focus on the development of supporting infrastructure for the use of EVs, creating local manufacturing for EV parts and infrastructure equipment, and the local development of infrastructure facilities.

The Cities of Durban and Johannesburg will take the lead on Outputs 2.1.1 and 2.1.2 of this component, whereas TIA will provide guidance and support on Outputs 2.1.3 and 2.1.4. The expected outcome of the project will be: Improved non-motorized and public transport results in a reduction of GHG emissions in the transport sectors of the large South African cities; adequate infrastructure facilitates widespread utilization of EVs powered by renewable energy.

Output 2.1.1 Policy and regulatory frameworks to promote NMT and public transport in the Cities of Durban and Johannesburg enhanced.

This output will assist the Cities of Durban and Johannesburg to review existing policies, regulations, and support programmes on the promotion of cycling, and provide recommendations for improvements where necessary and alignment with the national policy and regulations developed during the project; this will include an improved policy framework and incentive programme for the promotion of local bicycle manufacturing and a pre-investment study. To ensure the input of relevant partners, the private sector and financing institutions, such as the KfW, will be involved throughout the development and implementation processes, including the incorporation of experiences from other countries such as the Netherlands, Denmark, France, and Germany. The development and improvement of the regulatory framework will encourage the growth of demand for new bicycles and other forms of NMT. By encouraging the demand side of the market, the supply of such products will follow accordingly (supported by Outputs 2.1.3 and 2.1.4), thus helping to create new skilled jobs in South Africa.

Other necessary strategies, roadmaps, incentive schemes, etc. will be developed in close cooperation with Durban and Johannesburg in order to ensure that new investments made/technologies developed are easily incorporated into the IRPTN to support the easy and wide-spread adoption by the public of NMT and e-buses. Various bicycle rental business models will also be developed to be implemented as follow-up to this project. For example, the project will focus on promoting park and ride facilities, as well as the related infrastructure, as a significant and sustainable transport intervention to encourage last mile/first mile bicycle trips, and effectively deal with one of the city's great challenges – sprawl and long-distances which make entire trips by bicycle difficult. This will also help strengthen the interconnectivity of public transport and NMT infrastructure in South Africa. The project will also assist in the development of comprehensive policies, strategies, best practices and specifications for bicycles, as well as an awareness and 'branding' programme for bicycle-friendly public transport vehicles. This component will effectively link the Durban and Johannesburg IRPTN with bicycle use.

Output 2.1.2 Institutional capacity for the Cities of Durban and Johannesburg strengthened and awareness raised on NMT; experience shared with the other 9 cities of South Africa under the DEA/KfW Green Cities Promoting NMT programme.

To support the policy improvement activities under Output 2.1.1, this Output will, in particular, focus on strengthening the institutional set-up and human resources in Durban and Johannesburg, for example the Energy Centre, the Transport Authority, etc. in Durban as well as the Transport Authority of Johannesburg, and other relevant institutions. This will involve providing assistance in designing, planning and implementing the NMT projects which have been listed in the background documents provided to the project during the PPG phase (see Annex I). To further support sustainability and institutional capacity, experienced international and local consultants will be recruited to work at the two Transport Authorities during the project implementation period and will provide on-the-job training for staff. Experience and lessons learned presented in the IEA EV City Casebook will also be taken into consideration and attention will be given to building up of maintenance capacity for bicycles in the two cities.

To ensure up-scaling of project activities, the experience gained in these two cities will be shared with the other 9 cities of DEA and KfW NMT programme. Workshops and training courses will be organized and a small number of officers from other cities can receive short-term on-the-job training in the Transport Authorities of the two project partner cities.

Output 2.1.3 Standards and regulation for EV infrastructure, charging stations, networks, support applications, etc. developed

For the maximization of project impact and sustainability, testing data and information will be collected and used for the development of a national standard and regulations for charging stations; these will contribute to the policy framework developed under Component 1 and are important to ensure the high quality of the developed infrastructure, safety, and consumer confidence and acceptance. The development of the standards and regulations will be done in close consultation with the private sector through the EVIA to ensure that their requirements are also met, as well as with the concerned international institutions, for example: the Clean Energy Ministerial – Electric Vehicles Initiative, Electrical Vehicles Symposium, ISO, etc. to ensure that adaptation is, as much as possible, in line with internationally accepted standards. It will also aim to facilitate the work currently being carried out by an inter-departmental technical working group coordinated by the South Africa Standards Bureau (SASB).

Output 2.1.4 Design, installation and testing of 2 PV-based (fast, off-line) charging stations for EVs in the City of Johannesburg and in the Shamwari Game Reserve.

In order to catalyze a shift from using fossil-based electricity to GHG-free electricity for charging EVs, and to demonstrate the other benefits of EVs, apart from being emission free (e.g. energy storage that can help to address the variable challenges of renewables), the proposed project will work with government and private sector partners to design, purchase the necessary equipment, install, operate and maintain at least 2 PV-based, off-line, fast charging stations. Typically, these stations will have one fast and two slow charging ports for vehicles, which is determined by the load allowed for the station. It is also simple to add additional ports for low demand electric bicycles. The costs associated with one such charging station is estimated between USD 85,000 to 110,000 for normal passenger EVs, depending on the location of the charging station, and at around USD 250,000 for e-buses. The first charging station will be installed in the City of Johannesburg in time for demonstration at the second international Eco-Mobility Festival in October 2015; and the other at a later stage in the Shamwari Game Reserve. A third PV-based charging station is likely to be installed in the City of Durban at a later stage.

The selection of the exact Direct Current (DC) quick charge technology, including the charging rate and additional functions, such as tracking, payment, communicating with the utility, etc. will be carried out in the inception phase together with the EVIA partners, which include OEMs and international charging station developers, such as ABB, Schneider, etc., and also based on experience shared by the CEM EVI. So far the following has been the recommended position of the EVIA with regards to EV conductive charging station standards:

- All public facing DC fast charging stations must be dual CHAdeMO and Combined Charging System 2 (CCS2) equipped;
- Such a dual standard charging station entails a cost increase of less than 10% of the overall costs of a single DC standard station, and represents a viable and cost effective solution for the South African market against the backdrop of the global DC charging standards status-quo;
- Where the station operator chooses to install a configuration that includes the above dual DC charging plug standards, but also includes an Alternating Current (AC) fast charging outlet, i.e. a so called “triple-charger,” this AC outlet must be of a Type 2 socket only;
- All public facing AC charging stations must be equipped with Type 2 sockets only;
- All EV conductive charging equipment supplied and installed in South Africa must adhere to the latest (2014 and upwards) versions of the following standards which have been adopted as SANS national standards:
 - IEC 62196 – in its entirety and specifically Parts 1-3;
 - IEC 61851 – in its entirety and specifically Parts 1, 2, 21-24.

The decision to install one station in Shamwari Game Reserve was made during the PPG phase based on the high potential to quickly deploy EVs in many game reserves in South Africa, as well as in the African continent. South Africa has more than 400 Game Reserves that due to the short distances required for game vehicles, and the heightened sensitivity to air and noise pollution within the reserves, are in an optimal position to adopt EVs and the necessary infrastructure. Further, as game vehicles have specific and unique requirements, this avenue presents significant opportunities in the form of a niche market for South African manufactured EVs. This concept will be promoted under Output 1.1.1 to potentially be included in the EV Industry Roadmap, using the demonstration in Shamwari Game Reserve to concretize and promote this potential.

In addition, Shamwari Game Reserve is strategically positioned in the vicinity of the Nelson Mandela Metropolitan University (NMMU), where the uYilo project of TIA has been established. Further, as Shamwari Game Reserve hosts a large training center for Ranger Field Guide Training, as well as two Born Free Centres for training and awareness raising of visitors, school children and students, an existing mechanism for the dissemination of the project demonstration activities is already in place. A new project concept for GEF-6 funding is currently under development to expand this deployment and the local manufacture of EVs and PV-based charging stations in other game reserves in South Africa.

The operation of the two stations will serve testing purposes, collection of information and data for further development, as well as for demonstration of EV charging. These stations will be used to charge the EVs already used or to be purchased by the Government authorities as stipulated in the Key Programmes associated with the EV Industry Roadmap, or to be provided by business partners, for example the 9 multi-national car manufacturers that have participated in the development of the Roadmap, as well as the existing EVs to be deployed in Shamwari. The project will also assist in increasing the use of some existing charging stations, for example those at the DEA, for the purpose of testing and demonstration.

South Africa's strong automotive cluster has, in recent years, received many support projects from UNIDO to increase their productivity, competitiveness and reduce waste, and thus has the willingness and capacity to expand into the production of EVs and supporting components. The project's policy activities, under Components 1 and 2, and specifically contributing to the EV Roadmap, which includes incentive programmes for the manufacture of EVs (see A.1 and A.2), will serve to further concretize these incentives in favor of EV and component manufacturing, specifically expanding into incentives for production of charging station components. This strengthened policy framework will incentivize manufacturers to invest in the production of EVs and EV infrastructure, as well as the existing baseline projects, such as the Research and Development DC Quick Charge Prototype (2014-15), which will further develop this capacity concurrently with the proposed project's activities.

This Output presents ample opportunity to cooperate with a number of private sector manufacturers at various points along the value chain, thus seeking strong partnerships with the private sector. Emphasis will be placed on sharing the information and experience from the design and installation of the PV-based charging stations under this Output with industry, thus building their awareness of the potential and opportunities of this market in South Africa. During the PPG phase, a number of discussions have been held with PV-charging station production/installation specialists, as well as potential hosts for the stations. In particular, in depth discussions have been held with Shamwari Game Reserve regards their existing solar installation and potential further installations and the City of Johannesburg.

UNIDO, with its focus on technology development, transfer and deployment, strengthening of manufacturing sectors of developing countries, and use of its convening power, will particularly use the results of this Output, together with that from the other low-carbon transport project in Malaysia, to leverage the efforts of developing countries. This will contribute to the promotion of e-mobility and renewable energy (RE) use, in particular solar energy, and also the promotion of smart-grids based on EV, RE and ICT applications, for example in the child project on sustainable cities in Malaysia, currently under development, and in Johannesburg which is part of on-going discussions with UNEP and DBSA under the child project on sustainable cities in South Africa.

Incremental reasoning and co-financing:

In the absence of the proposed GEF-UNIDO project, the widespread adoption of EVs and NMT in South Africa would remain slow and hindered by the existing barriers. The GEF project will provide assistance in the development of the relevant policies, regulations, incentives and standards needed to promote and build awareness of energy efficient transport in South Africa, and international best practices will be disseminated to ensure knowledge management. Furthermore, the capacity of the relevant institutions will be built and the required infrastructure for EVs and NMT will be demonstrated in two cities, as well as in a game reserve, highlighting the various uses of such technologies. Through this approach, the GEF project will play a catalytic role in transforming the market for EVs in South Africa in a sustainable manner.

Co-financing will be leveraged from a number of national and municipal partners ensuring their buy-in and commitment to the project activities. The committed co-financing by concerned authorities and institutions are mainly in the form of staff time, office space and some local expenditures relating to workshops, seminars, training courses, awareness campaigns and publications. SANEDI and TIA's contributions will also include investment in the development of technologies for various types of charging stations, batteries and game viewing e-vehicles. In the case of the Cities of Durban and Johannesburg, their contribution to the project will be in the form of NMT projects implemented in their respective Cities with the support of project activities under Component 2, awareness raising events and demonstration activities. Specific projects that could fall under these commitments are outlined in Annex I.

The dti and DoT will be responsible for the effective implementation of Component 1, while TIA will focus on the activities under Outputs 2.1.3 and 2.1.4.

In fact, the majority of co-financing from TIA will be in the form of investment in the development of concerned technologies, and contributions from the two Cities will consist of investment in upgrading or building new NMT infrastructure projects as mentioned in their background information (Annex I). Further, additional contributions will come from Shamwari in the form of investment in acquiring more EVs to be used in the reserve and testing the built charging station.

In addition to the summary on the GHG emissions reduction, as mentioned hereunder, and in more detail in Annex G, the project will result in significant air quality improvement and noise reduction, and also in biodiversity benefits from the intervention in Shamwari Game Reserve.

GHG Emissions Reduction

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

The direct emission reduction of the proposed GEF-UNIDO project is related to:

- a) The amount of electric buses (e-buses), electric cars (EVs), and e-bicycles, that can be attributed to the project’s activities;
- b) Non-motorized transport (NMT) projects (in Durban and Johannesburg) that will be supported

The indirect emission reduction is the results of the improved policy and regulatory framework, enhanced institutional capacity building, and awareness raising as well as demonstration projects.

Cumulative emission reduction, electric vehicles		
- direct		35,140 tCO ₂
- indirect, bottom-up, RF=	3	105,419 tCO ₂
- indirect, top-down, CF=	40%	301,245 tCO ₂
Cumulative emission reduction, NMT		
- direct		82,626 tCO ₂
- indirect, bottom-up, RF=	3	247,878 tCO ₂
- indirect, top-down, CF=	40%	778,009 tCO ₂
Emission reduction, totals		
- direct		117,766 tCO ₂
- indirect, bottom-up, RF=	3	353,297 tCO ₂
- indirect, top-down, CF=	40%	1,079,254 tCO ₂

Innovativeness, sustainability and potential for scaling up:

The GEF-UNIDO project will promote the widespread adoption of EVs and NMT alternatives in South Africa leveraging on sound and proven technologies that are hindered by market barriers. While a select few initiatives in this field have taken initial steps in South Africa, a number of barriers including low awareness and limited policy frameworks have continued to limit progress in this sector. The proposed project, through policy/regulatory/incentive framework support and awareness raising efforts will attempt to overcome these barriers, thus allowing these EV and NMT initiatives and strategies to gain traction in the South African market.

In addition, the project’s interventions in Shamwari Game Reserve will expand the approach of this project beyond a limited focus on climate change mitigation and incorporate biodiversity issues such as noise and air pollution in protected areas of South Africa. This innovative approach holds significant potential for replication, synergies and

scaling up in future projects, not only in South Africa, but also in other countries. The introduction of EVs and the relevant infrastructure in conservation areas are a sensible niche for South Africa that can lead to the development of the first complete mandated market for EVs, and can be seen as first stepping stones to EV industrial development in South Africa. As the proposed project will partner closely with both government and private sector partners, the use of Shamwari, and possibly Kruger, as pilot projects for demonstration of technology and awareness creation will aim to facilitate this scaling up. Specifically: i) Policy development for use of EVs in conservation environment; and ii) Roll-out of similar projects and experience sharing with other national parks. Discussions will be continued with the relevant authorities, for example the DEA, Department of Tourism, dti, and other institutions, such as SANPark, as well as interested OEMs and local manufacturers, to develop new projects on the promotion of e-mobility use and the local manufacture for this niche market.

In order for these comparatively new technologies to gain a foothold in the market and achieve consumer adoption, they must also be shown to be sustainable. The proposed project will support this sustainability through the development of an enabling policy environment, capacity building within the relevant institutions and partners through incorporation of the training content into the existing learning and knowledge management structure, support of a number of NMT initiatives in its partner cities and the promotion of the required supporting infrastructure. These interventions will continue on beyond the scope of the proposed project, and will serve to institutionalize these new transportation modalities into the existing South African transport infrastructure building on ongoing policy efforts and strategies. As a result, the capacity built will continue to achieve the project's objectives well beyond the 3 year scope of project implementation.

The project will initially focus on the Cities of Durban and Johannesburg, co-financing partners of the project, for the project's demonstration and outreach activities in order to achieve maximum impact and build upon the efforts already made under the Greening the COP17 project, undertaken in Durban. There is, however, large potential for expansion into additional South African Municipalities using the enhanced policy and regulatory framework, built institutional and manufacturing capacity, and infrastructure to encourage large implementation programmes by the private and public sectors. Furthermore, South Africa's first-mover image at the regional level also provides opportunities for additional expansion beyond the national borders.

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

Risk	Rating	Mitigation
Management priorities in the participating public and private sector organizations change over time, resulting in reduced participation or even termination of collaboration.	Low	South African institutions and the private sector have shown ongoing and increasing interest in initiatives to promote sustainable transport, partnering with UNIDO in 2011 under the GEF project, Greening the COP17, and since then with UNDP and UNEP on similar projects. Thus, a major shift in priorities is not foreseen and the risk is considered low. Any potential risk will be mitigated by the possible signing of Terms of Reference contracts or agreements before the commencement of key activities. Where possible, participating organizations will be legally bound to participate until the activity's completion.
The general public resists changes due to a lack of understanding and perceived danger of the technology.	Low	A number of demonstration projects in the field of EVs and NMT have been initiated in South Africa to date, and the public reaction has been positive. In addition, UNIDO's close partnership with South Africa institutions that have organized these events will aim to mitigate any such risk. In general, mitigation by means of public awareness and advocacy activities are part of Components 1 and 2; in addition, showcasing of the technology in a visible way to the public will also be undertaken (Component 2). In particular, relevant university courses and/or summer school initiatives will serve to inform the general public and educate a new generation of sustainable energy engineers from a technical and safety point of view.
Proposed improvements to the institutional and regulatory	Medium	Close cooperation of the project partners in the Project Steering Committee (PSC) will be sought and the project document has

Risk	Rating	Mitigation
framework are delayed by public institutions.		indicated in detail the roles and responsibilities of each project partner. For instance, the dti and DoT will jointly lead Component 1, including policy formulation, and the Cities of Durban and Johannesburg and TIA will jointly lead Component 2. The development of the enabling policy and regulatory framework, as well as the institutional capacity building, will strengthen public institutional capacity.
Incentive and financial support system are insufficient.	Low	Close coordination with the private sector and financing institutions will be sought under Component 2 of the proposed project to mitigate this issue, and incentive schemes at the national level will be proposed and supported under Output 1.1.1. The development of a strong policy framework is a key part of the project's sustainability strategy and financial incentives and support systems will play a key role in this.
Technology failure	Low	This risk can be considered low, as EV technology and the associated required equipment are now commercially and widely available.
Uptake by other South African cities is limited due to lack of interest and incentives.	Low	Relevant public bodies' agreement will be secured in order to guarantee the project's continuation after the end of the GEF funding period. The project's sustainability strategy has been built in throughout the project design, ensuring buy-in and commitment of the various project partners. This is particularly so in Component 2, where the project will partner with two Municipalities to support the activities in NMT and ensure that implementation is sustainable and effective. This approach will ensure the project activities are not temporary and are closely integrated with national policies and priorities for regional expansion.
Climate change negatively impacts the infrastructure installations put in place by the project.	Low	Detailed environmental assessments will be conducted before infrastructure, e.g. charging stations, are built to mitigate this risk and ensure long-term success of project interventions.

A.7 Coordination with other relevant GEF financed initiatives

Project implementation will also be closely coordinated with other GEF projects under the climate change (CC) Focal Areas in South Africa. For instance, coordination opportunities will be sought with the on-going **GEF-UNIDO Global Cleantech Programme for SMEs in South Africa**, as well as the **Promoting Organic Waste-to-Energy in SMMEs** project, currently being developed by UNIDO. In addition, the proposed project will seek synergies with the on-going **Industrial Energy Efficiency (IEE) project** funded by the Government of South Africa, SECO, and DFID, as well as the newly approved GEF-UNIDO follow-up project. The two IEE projects and this proposed project have the dti as the same PSC chairman, and their EnMS experts will be invited to contribute to the development of the policy and regulatory framework of the LCT project.

Coordination will be sought with the UNEP-DBSA project, **Building a Resilient and Resource Efficient Johannesburg; Increased Access to Urban Services and Improved Quality of Life** under the GEF Sustainable Cities IAP. The project aims at integrating the city's built environment in low energy zones through sector assessments and pilot projects in recycling, infrastructure and alternative fuels for public transport, as well as resource efficiency and food security. Given the shared objectives and same focus on the City of Johannesburg of this UNEP-DBSA project with those of the proposed project, there is ample area for cooperation and synergies. This UNIDO-proposed project will continue to work closely with the City of Johannesburg, UNEP and DBSA as already initiated during the PPG phase.

Cooperation will also be sought with the GEF-financed initiatives of other UN agencies, such as taking advantage of and drawing on the built awareness under the UNDP project on **Sustainable Public Transport and Sport** which promoted long-term modal shifts to more efficient and less polluting forms of transport and the adoption of low-GHG transport technologies. Similarly, opportunities to build on the work done under the UNEP project, **Reducing the**

Carbon Footprint of Major Sporting Events, FIFA 2010 and the implementation of the national greening programme in liaison with 2010 FIFA LOC, will also be sought.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

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

The Lead Executing Agency of project execution will be SANEDI that will coordinate project inputs from all project stakeholders, as well as nominate the National Project Director (NPD) to act as the government representative and daily focal point for the Project Management Unit (PMU) to ensure ongoing ownership of the project and that project execution is operationally implemented in line with Government priorities, rules and regulations. The NPD shall have adequate authority and knowledge within the Government to get the necessary support from all local project partners to perform his/her duties under the project.

UNIDO is the implementing agency of the project; recruitment of international and local consultants, travel plans and allowances, and all direct project procurement will be conducted in accordance with UNIDO rules and regulations.

Project Steering Committee (PSC)

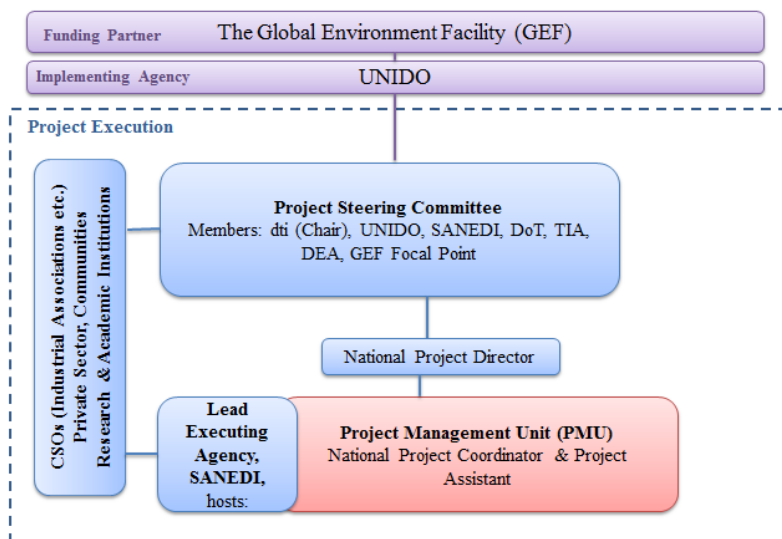
To ensure ongoing coordination of the project and cohesive leadership, the PSC will consist of high level representatives from the dti, UNIDO, SANEDI, DoT, TIA, DEA, and the GEF Focal Point; the PSC will be chaired by the dti. The purpose of the PSC is to provide strategic guidance of the project while ensuring no overlap with other development projects, and to maximize the input and participation of project counterparts, as well as coordinating these inputs. The PSC will also review and approve or reject amendments to the project based on the approved project document in accordance with UNIDO and GEF procedures, and in line with the GEF Council document C.39/Inf.4, and will meet on a six-month basis, but can also be organized on an ad hoc basis as required. The PMU will act as the Secretariat of the PSC, preparing and distributing the minutes of meetings to be signed by UNIDO and the dti.

Project Management Unit (PMU)

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

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

The below diagram shows the proposed project institutional arrangement.



A detailed list of the stakeholders and their engagement with the project is provided below.

Stakeholder	Role
South Africa National Energy Development Institute (SANEDI)	<p><u>General Role:</u> The main function of SANEDI is to direct, monitor and conduct applied energy research and development, demonstration and deployment as well to undertake specific measures to promote the uptake of Green Energy and Energy Efficiency in South Africa.</p> <p><u>Role in the project:</u> SANEDI will be the lead executing agency of the proposed project; responsible for coordination of the work to be carried out by other local project partners, nomination of the NPD, potential absorption of the project team after project closure and ongoing support on workshops/trainings, demonstration projects, etc.</p>
The Department of Trade and Industry (dti)	<p><u>General Role:</u> The dti's vision is of a South Africa that has a vibrant economy, characterized by growth, employment and equity, built on the full potential of all citizens. To achieve this, the dti has become an outwardly-focused, customer-centric organization. The dti's strategic objectives are to:</p> <ol style="list-style-type: none"> 1. Facilitate transformation of the economy to promote industrial development, investment, competitiveness and employment creation; 2. Build mutually beneficial regional and global relations to advance South Africa's trade, industrial policy and economic development objectives; 3. Facilitate broad-based economic participation through targeted interventions to achieve more inclusive growth; 4. Create a fair regulatory environment that enables investment, trade and enterprise development in an equitable and socially responsible manner; and 5. Promote a professional, ethical, dynamic, competitive and customer-focused working environment that ensures effective and efficient service delivery. <p><u>Role in the project:</u> The dti, together with DoT, will be responsible for the effective execution of Component 1 of the project, with dti focusing specifically on policy related to EV promotion and manufacturing. The dti will act as the Chair of the PSC.</p>
The Department of Transport (DoT)	<p><u>General Role:</u> The DoT is responsible for regulation of transportation in South Africa, specifically, public transport, rail transportation, civil aviation, shipping, freight, motor vehicles, and non-motored transport.</p> <p><u>Role in the project:</u> DoT, together with the dti, will be responsible for the effective execution of Component 1 of the project, with DoT focusing specifically on NMT promotion policy.</p>
City of Durban - eThekweni Municipality	<p><u>General Role:</u> eThekweni Municipality is a Category A municipality found in the South African province of KwaZulu-Natal. Its vision is that by 2030, eThekweni Municipality will enjoy the reputation of being Africa's most caring and livable City. Transport is a key issue for eThekweni, encapsulated in Plan Eight of the eThekweni Municipality's Integrated Development Plan.</p> <p><u>Role in the project:</u> eThekweni Municipality, together with the Johannesburg Municipality, will be responsible for the effective execution of Outputs 2.1.1 and 2.1.2 of the project, working with the project to develop and operationalize projects and policies for the</p>

	promotion of NMT in their city.
City of Johannesburg – Johannesburg Municipality	<p><u>General Role:</u> The City of Johannesburg, located within Guateng province, is the largest city in South Africa in terms of population, accounting for 8% of national population. In recent years, the City has initiated a number of projects focusing on the promotion of NMT, developing infrastructure and raising awareness.</p> <p><u>Role in the project:</u> Johannesburg Municipality, together with the eThekweni Municipality, will be responsible for the effective execution of Outputs 2.1.1 and 2.1.2 of the project, working with the project to develop and operationalize projects and policies for the promotion of NMT in their city.</p>
Shamwari Game Reserve	<p><u>General Role</u> Shamwari Game Reserve is home to over 5,000 head of game, having been bred and/or re-introduced into Shamwari, now a Game Reserve stretching over 25,000 hectares, consisting of 6 separate lodges, and employing over 325 local staff.</p> <p><u>Role in the Project:</u> Shamwari Game Reserve will host the installation of a charging station under Component 2, as well as a number of awareness raising events through their existing dissemination and promotion channels, the onsite training centers.</p>
The Technology Innovation Agency (TIA) - Ministry of Science and Technology	<p><u>General Role:</u> The TIA was established with the objective of stimulating and intensifying technological innovation in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations. TIA's core business objective is to support the development and commercialization of competitive technology-based services and products. The Agency primarily uses South Africa's science and technology base to develop new industries, support the creation of sustainable jobs and help diversify the economy. It invests in the following technology sectors: Advanced Manufacturing, Agriculture, Industrial Biotechnology, Health, Mining, Energy and ICT.</p> <p><u>Role in the project:</u> TIA will be responsible for the effective execution of Outputs 2.1.3 and 2.1.4 of the project, specifically focusing on infrastructure development and the associated technologies.</p>
Department of Environmental Affairs (DEA)	<p><u>General Role:</u> The DEA is mandated to ensure the protection of the environment and conservation of natural resources, balanced with sustainable development and the equitable distribution of the benefits derived from natural resources. The DEA fulfils its mandate through formulating, coordinating and monitoring the implementation of national environmental policies, programmes and legislation. DEA is also the GEF Focal Point in South Africa.</p> <p><u>Role in the project:</u> The DEA will be engaged throughout project development and execution to oversee project progress and strategically maintain the direction of the project in line with environmental priorities. In particular, the DEA will support the project's NMT activities and the development of national-level policies.</p>
Automotive Industry Development Centre (AIDC)	<p><u>General Role:</u> The AIDC has been established to assist in increasing the global competitiveness of the South African automotive industry to world-class levels. The AIDC works in partnership with business, local, provincial and national government, tertiary and further education institutions and other national and international organizations to provide technical services to the automotive industry across all tiers of suppliers and</p>

	<p>assemblers.</p> <p><u>Role in the project:</u></p> <p>The role of the AIDC will be to coordinate engagement with automotive manufacturers, particularly OEMs consulted during the PPG phase.</p>
CSOs	<p><u>Role in the project:</u></p> <p>The South African Local Government Association (SALGA), and the South Africa Cities Network have been involved in the development of the CEO Approval Request throughout the PPG phase, and will continue to play a role in awareness raising and policy inputs throughout the project</p>

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

Economic benefits:

The increased adoption of EVs and NMT in South Africa will result in economic benefits in terms of improved energy security through a smoothing-out of electricity consumption (increased efficiency, potential night charging of EVs, and electricity storage facilities) resulting in reduced electricity surges. This energy security will also reduce reliance on volatile oil prices. The load shedding currently underway in South Africa is having a significant negative impact on economic activities by reducing the number of productive working hours and generally causing disruptions. Additional economic benefits for users include improved efficiency and operating costs, as compared to the standard ICEVs currently in South Africa.

Due to the fact that gender, mobility and the economy are closely connected and because of their essential linkages with development, such as education and employment, and even health, sustainable policies relating to mobility and transport must incorporate gender issues. Improving access of both women and men to safer, cleaner and more efficient transport can increase economic development by reducing the time of trips, making available more frequent and safer transport, and making available markets and products to more buyers, as well as sellers.²⁴

In addition, the increased adoption of EVs that is targeted by the project and improved strategy for the promotion of local manufacturing capacity (Output 1.1.1), will stimulate demand in the South African market and support the development of a local market for EVs and the required components and infrastructure. This will help develop locally relevant innovation/technologies within South African industry, as well as supporting job creation and reduced cost of products due to improved localisation. As unemployment, standing at 24.9% in 2013, is a key issue for South Africa, this project will contribute to national priorities in the fields of both energy and social development. In addition, the creation of jobs will positively impact both men and women, and the project will actively seek to encourage women to partake in project activities, it is foreseen that the economic benefits of the project will benefit both men and women.

Social benefits:

Based on UNIDO's extensive experience in the implementation of energy projects in South Africa, the project is expected to contribute to the creation of additional jobs for South Africa and the improvement of technical skills, and thus income growth and improved living standards. The widespread adoption of EVs and increased use of public and NMT will also have social and environmental benefits through reduced pollution, and higher quality infrastructure services such as improved public transport and access to charging stations, etc. In addition, by smoothing-out electricity consumption through improved electricity storage opportunities, the project contributes to national priorities and provides social benefits to the citizens of South Africa through reduced pressure on the electricity grid and the need for load shedding. Deployment of EVs and PV-based charging stations in the two cities and the Game Reserve can also increase the number of visitors and tourists, thus increasing job opportunities.

Gender Dimensions:

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

²⁴ Chantal Duchene, OECD/ ITF (International Transport Forum), "Gender and Transport", Discussion Paper 2011-11, April 2011
GEF5 CEO Endorsement Template-February 2013.doc

This intervention in South Africa is expected to have limited direct influence over gender equality and/or women's empowerment in the country and therefore, could be classified as a project with "**limited gender dimensions**"²⁵ according to the UNIDO Project Gender Categorization Tool. This means that this project possesses few gender dimensions and entry points for gender mainstreaming activities and/or affirmative actions are rare.

Nevertheless, UNIDO recognizes that all energy interventions are expected to have an impact on people and are, therefore, not gender-neutral²⁶. In fact, due to diverging needs and rights regarding energy consumption and production, women and men are expected to be affected differently by the project (in terms of their rights, needs, roles, opportunities, etc.). This is also true for low-carbon transport since both women and men use vehicles for different purposes, and thus have different expectations and needs.

Until recently, little attention has been paid to the special aspects linking gender and transport, while greater account is increasingly being taken of gender in a variety of other areas. Our societies are gendered in both developed and developing countries, in that women and men play different roles. These differentiated responsibilities influence the time women and men have available and the trips (e.g. distances, frequency) they need to make in order to perform these activities.²⁷ Furthermore, it is important to take into consideration the critical issues that shape users' behaviour with respect to their choices and possibilities of transport, such as specific needs and priorities of women and men, their available resources, etc.²⁸

For instance, studies show that in many cases fewer women than men own a private car. Moreover, in both urban and rural areas, developed and developing countries, the daily mobility program followed by women is far more complex than those of men due to their double working day, since women are usually participating in productive uses but also take care of domestic chores, children, elderly and the sick. A study by OECD/ITF found that women usually make more trips, with greater variety or routes, but within a more restricted geographical area, using generally less expensive modes of transport; and in their choice of travel mode they are more sensitive than men to environmental issues such as air pollution. Since normally fewer women are working in transport-related jobs, which are seen as "men's work", the needs of women are generally neglected;²⁹ as mobility and travel have significant influence on the lives of women, this can lead to a form of social exclusion.

Therefore, regardless of the project's gender category, the project aims to demonstrate good practices in mainstreaming gender aspects into **sustainable low-carbon transport projects**, wherever possible, and avoid negative impacts on women or men due to their gender, ethnicity, social status or age. During the PPG phase, a preliminary gender analysis of the country context has been conducted, based on which potential gender dimensions of project outcomes and outputs, as well as potential entry points for gender equality and women's empowerment (GEEW), were developed and incorporated into the project logical framework.

Project Gender Mainstreaming Strategy

A guiding principle of the project will be to ensure that both women and men are provided equal opportunities to access, participate in, and benefit from the project, without compromising the technical quality of the project results.

In practical terms;

- Gender-sensitive recruitment will be practiced at all levels where possible, especially in selection of project staff. Gender responsive Terms of References (ToRs) will be used to mainstream gender in the activities of consultants and experts, and in cases where the project does not have direct influence, gender-sensitive recruitment will be encouraged. Furthermore, whenever possible, existing staff will be trained and their awareness raised regarding gender issues.
- All decision-making processes will consider gender dimensions. At the project management level, PSC meetings will invite observers to ensure that gender dimensions are represented. Also at the level of project

²⁵ This would require the project to ensure at least 20% of the project outputs have clearly identified activities promoting gender equality and/or the empowerment of women, including gender-responsive indicators and a corresponding budget OR at least one indicator in each project output refers to gender in some way. Furthermore, a gender-analysis is conducted of gender issues are included in ESAs. Please see also "Gender Categorization Tool"

²⁶ ENERGIA "Turning Information into Empowerment: Strengthening Gender and Energy Networking in Africa. Leusden, 2008; Joy Clancy "Later Developers: Gender Mainstreaming in the Energy Sector", 2009

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

²⁸ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTTSR/0,,contentMDK:21246915~menuPK:2970901~pagePK:210058~piPK:210062~theSitePK:463716.00.html>; <http://siteresources.worldbank.org/INTGENDERTRANSPORT/Resources/handout.pdf>

²⁹ Chantal Duchene, OECD/ ITF (International Transport Forum), "Gender and Transport", Discussion Paper 2011-11, April 2011

activity implementation, effort will be made to consult with stakeholders focusing on gender equality and women's empowerment issues. This is especially relevant in policy review and formulation.

- To the extent possible, efforts will be made to promote participation of women in training activities, both at managerial and technical levels. This can include advertising of the events to women's technical associations, encouraging companies to send women employees, etc.
- When data-collection or assessments are conducted as part of project implementation, gender dimensions will be considered. This can include sex-disaggregated data collection, performing gender analysis as part of ESIA's, etc.

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

The project focuses GEF funds on policy assistance, capacity building and demonstration interventions to be delivered through the project to create sustainable impacts over the long term. The approach to be employed by the project, developing close partnerships with local stakeholders, will ensure the sustainability and cost effectiveness of the project intervention.

The cost effectiveness of the project in terms of CO₂ savings, from the direct impact only, per USD of GEF contribution, is estimated at around USD 11/tCO₂, which is quite reasonable considering that this is a new market in South Africa. In addition, considering that a key focus of the project is stimulating and catalysing a market shift towards EVs and NMT, the Unit Abatement Cost of the indirect emissions of the project are a better reflection of the project's overall cost effectiveness; this can be estimated at USD 3.7-1.2/ tCO₂.

C. DESCRIBE THE BUDGETED M & E PLAN:

Project monitoring and evaluation (M&E) will be conducted in accordance with established UNIDO and GEF procedures. The Logical Results Framework (Annex A) provides performance and impact indicators for project implementation along with their corresponding means of verification. These will form the basis upon which the project's M&E Plan will be built. Implementation of the M&E Plan will be undertaken by the project team, national counterparts and UNIDO (see Annex F for more details).

According to the M&E policy of the GEF and UNIDO, follow-up studies such as Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to; (i) make available studies, reports and other documentation related to the project and; (ii) facilitate interviews with staff involved in the project activities.

Project Start

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

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

- Detail the roles, support services and complementary responsibilities of local stakeholders vis-a-vis the PMU. Discuss roles, functions and responsibilities within the project's decision making structures, including reporting and communication lines, and conflict resolution mechanisms. The terms of reference for project staff will be discussed again as needed;
- Based on the project results framework and workplan, verify and endorse the first annual work plan. Review and agree on the indicators, targets and their means of verification and re-check assumptions and risks;
- Provide a detailed overview of reporting, M&E requirements; M&E work plan and budget should be agreed upon and scheduled;
- Discuss financial reporting procedures and obligations, and arrangements for annual audit;
- Plan and schedule PSC meetings and verify and endorse the ToR for the PSC; roles and responsibilities of all project organization structures should be clarified and meetings planned;
- The first PSC meeting should be held within the first 12 months of the inception workshop.

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

M&E Budget

UNIDO will be responsible for overall management and tracking of project milestones as well as reporting to the GEF and concerned Government authorities. The M&E procedure will consist of: a) project inception; b) semi-annual reviews; c) tracking project progress and d) independent final evaluation. The estimated total budget for M&E is US\$ 150,000 (US\$ 50,000 from the GEF and US\$ 100,000 from co-financing).

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

M&E Activity Categories	Feeds Into	Time Frame	GEF Budget (US\$)	Co-Financing (US\$)	Responsible Parties
Measurement GEF Tracking Tool specific indicators	Project management	Continuous	20,000	60,000	PMU, UNIDO Project Manager
Monitoring of project impact indicators (as per LogFrame)	Project management;	Continuous			
Periodic Progress Reports	Project management; PSC Meeting	Semi-annually			
Independent terminal evaluation	Terminal Evaluation Review (TER) conducted and ToR for evaluation drafted by UNIDO EVA.	Project completion	30,000	40,000	Independent evaluator, PMU, UNIDO PM, and UNIDO Evaluation Group
TOTAL			50,000	100,000	

D. LEGAL CONTEXT

The following legal context will apply to the project: “The Government of the Republic of South Africa agrees to apply to the present project, mutatis mutandis, the provisions of the Standard Basic Assistance Agreement between the United Nations Development Programme and the Government, signed on 3 October 1994.”

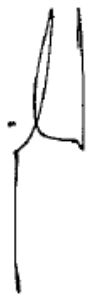

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

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

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mr. Zaheer Fakir	GEF Operational Focal Point, Acting Deputy Director-General, Department of Environmental Affairs (DEA)	DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA)	18 DECEMBER 2013

B. GEF AGENCY(IES) CERTIFICATION

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

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		05/29/2015	Mr. Khac-Tiep Nguyen, Industrial Development Officer, Energy Branch, UNIDO 	+43-1- 26026-3086	K.Nguyen@unido.org

ANNEX A: PROJECT RESULTS FRAMEWORK

Project Narrative	Indicator	Baseline	Target (by EOP, 2018)	Sources of Verification	Assumptions/Risks
<p>Project Objective: Promotion of the widespread use of electric vehicles (EVs) and non-motorized transport (NMT), and the development of the necessary infrastructure, as part of the Green Transport and Green Cities initiatives of South Africa.</p>	<p>A) Direct GHG emission savings (see the calculations and estimates of Annex G):</p> <ul style="list-style-type: none"> • E-cars • E-buses • Changes in modal shifts from cars, minibus and bus to cycling (incl. e-bikes) <p>B) Indirect bottom-up and top-down emission savings</p>	<p>Around 100 E-passenger cars, and 500 E-bicycles, one pilot E-bus. Some NMT initiatives and infrastructure (see main text)</p>	<p>A) Direct GHG emission reduction of</p> <ul style="list-style-type: none"> • 2,753 tCO₂/yr, due to E-cars: 2000 of which 20 PV-charged; and E-buses: 10, of which 2 at PV-chargers; • 6,685 tCO₂/yr, due to changes in modal shift in NMT projects in Johannesburg and eThekweni (Durban) of trips made in cars and minibus-taxi (2.5%) and bus (5%) to cycling (including use of 1000 trips/day on e-bikes); • Total cumulative direct: 117,766 tCO₂ <p>Indirect emission reduction:</p> <ul style="list-style-type: none"> • Bottom-up: 353 ktCO₂ (e-vehicles: 105 ktCO₂; NMT/e-bikes: 248 ktCO₂) • Top-down: 1,079 ktCO₂ (e-vehicles: 301 ktCO₂; NMT/e-bikes: 778 ktCO₂) 	<p>Validated energy savings from project reports and surveys</p>	<p>Willingness of state, industry and financial institutions to support the programme and invest time and money in its implementation</p>
<p>Component 1: Improvement of policy and regulatory frameworks for EV use and local manufacturing, and NMT; capacity of concerned institutions built and awareness raised</p>					
<p>Outcome 1.1 Enabling policy and regulatory framework, together with strengthened institutional capacity and enhanced awareness; facilitating early and widespread use and local manufacturing of EVs and NMT in</p>	<p>C) Number of policy papers on low-carbon transportation approved by the Government.</p> <p>D) Coordination mechanisms for the promotion of e-mobility and NMT</p>	<p>A number of policy initiatives on the promotion of low-carbon transportation exist, but no policy documents have been approved by the Government on NMT or electric vehicles. Very limited coordination between various stakeholders in promoting EV and NMT.</p>	<p>C) At least 2 policy documents, approved by the Government. very likely the EV Roadmap, and the NMT Policy</p> <p>D) Coordination mechanisms (2) established and functioning.</p>	<p>Official documents Websites of organizations Publicity given in media</p>	<p>National authorities are willing to adopt specific regulations; Interest by stakeholders to promote low-carbon transportation exists and can be maintained.</p>

Project Narrative	Indicator	Baseline	Target (by EOP, 2018)	Sources of Verification	Assumptions/Risks
South Africa.					
Output 1.1.1 National policy and regulatory framework, incentive programmes, tax incentives, design, planning, and safety guidelines, etc. to promote early take-off, widespread use, and local manufacturing of EVs and NMT strengthened;	1) Number of policy reviews/development (number that includes gender dimensions).	1) A number of policy initiatives on the promotion of low-carbon transportation exist, but no policy documents have been approved by the Government.	1) At least two study reports prepared on potential for local manufacturing of game reserves EVs and of NMT-bicycles with recommendation on policy, incentives and support programmes (both studies) should consider gender dimensions);	Technical reports Project progress reports Workshop proceedings	National authorities are willing to adopt specific regulations.
Output 1.1.2 Concerned institutional capacity at the national level built, and awareness raised.	2) Awareness raising materials developed 3) Number of workshops and seminars organized (percentage of female/male participants (disaggregated by age)) 4) % of counterparts taking part in the development of policy papers report having benefitted from built capacity and raised awareness;	2) There are currently no trainings specifically targeting awareness raising/capacity building on low-carbon transportation.	2) Awareness raising materials available on EV and NMT 3) At least 5 workshops and seminars organized (at least 20% female participants). 4) At least 70% of counterparts taking part in the development of policy papers report having benefitted from built capacity;	Technical reports Workshop proceedings Project progress reports	Interest by stakeholders to promote low-carbon transportation exists and can be maintained.
Component 2: Promotion of non-motorized and public transport in the Cities of Durban and Johannesburg, and development and demonstration of the supporting infrastructure for EVs.					
Outcome 2.1 Improved non-motorized and public transport result in a reduction of GHG emissions in the transport sectors of the Cities of Durban and Johannesburg; adequate infrastructure facilitates widespread utilization of EVs powered by renewable energy.	E) Number of NMT infrastructure projects implemented in the Cities of Durban and Johannesburg with the project support. F) Number of PV charging stations installed and operated. G) Percentage of policies/ regulations to promote NMT and public transport that have specific recommendations or specifications for women.	E) Lack of NMT infrastructure in the two cities F) Currently, there is limited infrastructure for EVs, charging stations that do exist or planned are mostly not PV-based,	E) At least 3 NMT projects implemented F) At least 2 PV-based, off-line and fast-charging stations designed, installed and operated serving demonstration and testing purposes. G) 50% of developed policies/ regulations to promote NMT and public transport have specific recommendations or specifications for women.	Evaluation reports Website of organizations and companies Project progress reports Survey results	National authorities are willing to adopt specific regulations; Interest by stakeholders to promote low-carbon transportation exists and can be maintained.

Project Narrative	Indicator	Baseline	Target (by EOP, 2018)	Sources of Verification	Assumptions/Risks
Output 2.1.1 Policy and regulatory frameworks to promote NMT and public transport in the Cities of Durban and Johannesburg enhanced;	5) Review of existing policies, regulations, and support programmes		5) Two studies on EVs and on NMT, reviewing existing policies, regulations, and support programmes with suggestions for necessary strategies, roadmaps, incentive schemes	Technical reports Project progress reports	
Output 2.1.2 Institutional capacity for the Cities of Durban and Johannesburg strengthened and awareness raised on NMT; experience shared with the other 9 cities of South Africa under the DEA/KfW Green Cities Promoting NMT programme.	6) Number of capacity building workshops and seminars organized (% of female/male participants (disaggregated by age)) 7) Number of NMT projects implemented in Cities of Durban and Johannesburg with project support 8) Number of workshops organized for regional cooperation amongst South African cities (% of female/male participants (disaggregated by age)).	6) eThekweni Municipality has initiated staff training on the operational aspect of the bicycle sharing programme.	6) At least 5 workshops and seminars organized (20% female participants) 7) At least 3 projects implemented on NMT (in Johannesburg and eThekweni) 8) At least 2 workshops organized for regional cooperation amongst South African cities (20% female participants).	Technical reports Project progress reports Workshop proceedings	National authorities are willing to adopt specific standards/regulations.
Output 2.1.3 Standards and regulations for EV infrastructure, charging stations, networks, support applications, etc. developed.	9) Number of enhanced standard and regulations for EV infrastructure developed;	A number of initiatives have discussed the development of such standards, including for inclusion in the EV Industry Roadmap but little ground-level progress has yet been made.	9) A minimum of 4 enhanced standards and regulations for EV infrastructure developed.	Technical reports Project progress reports Workshop proceedings	National authorities are willing to adopt specific standards/regulations.
Output 2.1.4 Design, installation and testing of at least 2 PV-based (fast, off-line) charging stations for EVs in the City of Johannesburg and in the Shamwari Game Reserve.	10) Number of PV-based, off-line and quick charging stations designed, installed and tested. 11) Percentage of ESIA's, if required, that include gender dimension	10) A number of charging stations have been installed at specific sites, such as dealerships and application specific sites, i.e. the Shamwari Game Reserve but these are mostly not PV-based, off-line or quick chargers.	10) At least 2 PV-based, off-line and quick charging stations designed, installed and operated serving demonstration and testing purposes. 11) 100% of ESIA's, if required, include gender dimension	Technical reports Project progress reports Design and installation plans and reports.	

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

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

GEF Review Sheet:

Review Criteria	Questions	Secretariat Comment at PIF (PFD)/Work Program Inclusion	UNIDO Response at CEO Approval
<p>Recommendation at PIF Stage</p>	<p>25. Items to consider at CEO endorsement/ approval.</p>	<p>XT, March 26, 2014: Please address the following items at the CEO approval stage:</p>	
		<p>a) A concrete demand-side strategy for promotion of EVs in South Africa;</p>	<p>The project's demand-side strategy for EVs and bicycles has been described in several parts of the CEO Approval Request, and generally will be two-fold: i) Building of end-user awareness and acceptance through promotional campaigns and awareness raising events under Output 1.1.3, and demonstration activities under Output 2.1.4; ii) Creating enabling policies, regulations, support programmes and incentive schemes under Component 1.</p> <p>This demand-side strategy will be supported by the required supply-side efforts and adequate infrastructure development to ensure market development.</p>
		<p>b) Calculation details of the direct and indirect GHG emission reductions;</p>	<p>Detailed emissions calculations of the direct and indirect emission reductions can be found in Annex G.</p>
		<p>c) A detailed strategy to establish synergies with the Green Mobility, Alternative Fuels, and E-mobility initiative in South Africa;</p>	<p>The strategy to establish synergies has been described in the CEO Approval Request. Generally, synergies will be sought by: i) project involvement and leadership by the respective institutions of these initiatives, SANEDI, the dti and the DoT; and ii) project focus on coordination and participation by all concerned stakeholders.</p>
		<p>d) Risk mitigation measures need to be spelled out;</p>	<p>The associated risks have been further assessed and outlined in Section A.6.</p>
		<p>e) In-depth description of baseline projects,</p>	<p>Ongoing baseline projects related to EVs and NMT in South Africa have been</p>

		including their timelines;	outlined in detail, with specific reference to timelines. Additional information on some of the baseline projects is included in the relevant annexes, for example, co-financing letters and background information from the Cities of Durban and Johannesburg.
		f) A strategy for partnership with KfW and DEA.	This sustainability strategy of the project, including partnering with the KfW and DEA, has been elaborated on throughout the CEO Approval Request. Further, a letter of support from the KfW has been obtained inviting the proposed project to participate in the Project Steering Committee of the NMT project.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS³⁰

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

PPG Grant Approved at PIF: US\$ 65,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Baseline Assessment	30,000	15,000	15,000
Stakeholder Consultation and Commitment Confirmation	10,000	5,000	5,000
Detailed Project Design and Calculations of GHG Emission Savings	25,000	8,470	16,530
Total	65,000	28,470	36,530

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

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

N/A

ANNEX E: GENDER ANALYSIS OF SOUTH AFRICA (ATTACHED)

³⁰ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

ANNEX F: MONITORING AND EVALUATION PLAN

F.1 Project Start

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

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

- Detail the roles, support services and complementary responsibilities of local stakeholders vis-a-vis the PMU. Discuss roles, functions and responsibilities within the project's decision making structures, including reporting and communication lines, and conflict resolution mechanisms. The terms of reference for project staff will be discussed again as needed;
- Based on the project results framework and workplan, verify and endorse the first annual work plan. Review and agree on the indicators, targets and their means of verification and re-check assumptions and risks;
- Provide a detailed overview of reporting, M&E requirements; M&E work plan and budget should be agreed upon and scheduled;
- Discuss financial reporting procedures and obligations, and arrangements for annual audit;
- Plan and schedule PSC meetings and verify and endorse the ToR for the PSC; roles and responsibilities of all project organization structures should be clarified and meetings planned;
- The first PSC meeting should be held within the first 12 months of the inception workshop.

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

F.2 Semi-annual reviews

Will consist of:

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

F.3 Annual review

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

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

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

F.4 End of project

An independent Final Evaluation will take place three months prior to the final PSC meeting and will be undertaken in accordance with UNIDO and GEF guidance. The final evaluation will focus on the delivery of the project's results as

initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The ToR for this evaluation will be prepared by the UNIDO Evaluation Group. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response. The GEF Focal Point will be involved in this Final Evaluation.

At the end of project implementation, the PMU shall develop the Terminal Report to be submitted to the PSC at least 2 weeks before the final PSC meeting. The Terminal Report should summarize the activities/achievements of the project implementation, lessons learned and future upscaling potential, as well as relevant gender dimensions.

ANNEX G: GLOBAL ENVIRONMENTAL BENEFITS CALCULATIONS

GHG Emissions Reduction Estimation: South Africa Low-Carbon Transport Project

The overall methodology in estimating greenhouse gas emission reduction as an impact of the project's intervention is given in the *GEF Manual for Calculating GHG benefits of GEF projects* (GEF/C.33/Inf.18). In addition, the STAP of the GEF has recently provided a guide to estimate emission reduction benefits for transport subsectors, *Calculating Greenhouse Gas Benefits of Global Environment Facility Transportation Projects*, which comes with a number of modules in Excel spreadsheets (TEEMP models), namely a) Ecodriving, b) MRT and BRT (mass rapid transit, bus rapid transit) systems, c) NMT (non-motorized) projects, and d) travel management. However, these models do not specifically deal with electric vehicles and different modelling in a spreadsheet was used. Nonetheless, calculations of GHG benefits are carried out as much as possible in line with the models and/or using model default factors (where data on local factors is not available). The calculations assume 100% electric vehicles as the focus of the project; not plug-in hybrid vehicles. It is further assumed that the fuel used in buses is diesel and gasoline in cars. On NMT it is assumed that a slight modal shift (2.5-5%) will take place away from using cars, minibus-taxis and buses to using bicycles, including some e-bikes.

Direct emissions

The direct emission reduction is related to:

- a) The amount of electric buses (e-buses) and electric cars (EVs) that can be attributed to the project's activities;
- b) Non-motorized transport (NMT) projects (in Durban, eThekweni, and Johannesburg) that will be supported that will enable modal shift towards using bicycles and e-bikes

Electric vehicles

Currently, there are 100 about EVs available on the South African market and only one e-bus; a rough estimate is that by mid-2018, when the project will be completed, South Africa will have 10,000 EVs and 40 e-buses, of which 2,000 EVs and 10 e-buses are attributed directly to the incremental result of the project. Of these vehicles, 1 e-bus and 40 EVs will be charged in 2 PV-powered stations, which will be installed with the project's support.

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

Table 1

Electric vehicles				Source:							
Lifetime vehicle	12 yr										
Grid emission factor	0.94 kgCO ₂ /kWh			a	www.nbi.org.za, "South Africa's Grid Emission Factor"						
Distance travelled	Bus 30000	Car 15000	km/yr	c	EU CC mitigation options, report Transport, (CE Delft, 2012)						
Power consumption	1	0.200	kWh/km	b	IEEE.org (electric vehicles)						
Emissions:				"Shades of Green" report at www.shakethatfootprint.com							
- fuel	1.337	0.276	kg/km	d	Bus: www.carbonindependent.org; STAP Manual						
- electricity grid	0.940	0.188	kg/km	e	=a*b (grid-powered)						
- electricity PV				f							
Market											
Number of electric vehicles (2014)	1	100									
Number at end of project (2018)	10	2000		g	own estimate						
- PV-charged vehicles	2	40		h	own estimate						
Direct GHG reduction, electric vehicles											
<i>Direct emission reduction</i>											
- grid	95	2,587	tCO ₂ /yr		=c*(d-e)*(g-h)						
- PV	80	166	tCO ₂ /yr		= c*(d-f)*h						
- Total, direct (project)	176	2,753	tCO ₂ /yr								
Indirect GHG reduction, electric vehicles											
PV penetration, charging	15%										
Fuel efficiency improvement	2% per year										
EV efficiency improvement	3% per year										
<i>(in tCO₂/yr)</i>	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Electric bus	5	8	13	20	32	55	80	127	201	319	505
car	2,000	5,000	10,000	15,000	25,000	35,000	45,000	55,000	65,000	75,000	85,000
Emission reduction											
E-bus	81	130	211	325	520	894	1,301	2,065	3,268	5,186	8,210
Car	3,506	8,764	17,528	26,292	43,820	61,348	78,876	96,405	113,933	131,461	148,989
Total	3,587	8,894	17,739	26,617	44,340	62,243	80,177	98,469	117,200	136,647	157,199

Notes:

- Behavioural Climate Change Mitigation Options, Domain Transport, A. Schrotten (CE Delft; 2012)
- Mitigation Report, South Africa's Greenhouse Gas Mitigation Analysis; Technical Appendix E – Transport Sector, DEA (2014)

Non-motorized transport

The GEF alternative intends to promote significant use of substantially cheaper NMT particularly walking and cycling, e.g. in three projects, at least one in CBD (Central Business District) of Durban. It is assumed that the typical intervention facilitates a modal shift from motorized transport to NMT modes over a 5km length per project.

The “Integrated Transport Plan Update 2010-2015” of the eThekweni Transport Authority (June 2010) and the draft “Strategic Integrated Transport Plan Framework for The City of Joburg” (2013) provides the following info on trips in the morning:

AM period trips (in '000)		
Car	437	62%
Taxi	518	74%
Bus	135	19%
Rail	190	27%

A factor 6 is used to convert the AM peak hours into daily volumes. Other input assumptions are on equivalent weekdays a year (285), fuel emissions (see Table 1) and annual traffic growth (2%). Modal shift for taxis and cars is 2.5%, for buses 5%³¹ and for rail 0%, based on data from other NMT activities³².

³¹ If knowing occupancy of the vehicles, the kilometers travelled can be converted into passenger.km. The Transport Plan Update gives occupancy of 1.5 (cars), 15 (minibus-taxi) and 60 (bus)

³² E.g. Polokwane, see UNDP/GEF project Document “Public Transport and Sport, a 2010 Opportunity”
GEF5 CEO Endorsement Template-February 2013.doc

Table 2

Non-motorized transport (eThekweni and Johannesburg)											
Conversion AM to daily trips		6		E-bikes		Distance		20 km/day			
Weekdays		285		E-bikes		Velocity		15 km/hr			
Average bicycle trip		8 km		E-bikes		Power use		333 Wh/day			
Annual traffic growth		2%		E-bikes		Power use		333 Wh/day			
NMT projects		3		E-bikes		Power use		333 Wh/day			
		emissions		vehicle.km		modal shift trips		avoided travel (km)		tCO ₂ /yr	
Vehicles	19800 trips/day	0.276 kgCO ₂ /km		158,400		2.5%		3960		311.5	
Minibus	70461 trips/day	0.841 kgCO ₂ /km		563,684		2.5%		14092		3379.5	
Bus	18353 trips/day	1.337 kgCO ₂ /km		146,824		5.0%		7341		2797.3	
E-bikes	1000 trips/day	0.313 kgCO ₂ /trip								-89.3	
										6399.1	
Direct emission reduction, NMT											
<i>(in tCO₂/yr)</i>		EoP:		2018							
Vehicles				330.6							
Minibus				3586.4							
Bus				2968.6							
Total				6885.5							
				vehicle.km		modal shift trips		avoided travel (km)		2017 (yr2) 2018 (yr3)	
										tCO ₂ /yr	
Vehicles	2,619,060 trips/day	0.276 kgCO ₂		20,952,480		2.0%		419,050		32,962 16,811	
Minibus	3,106,740	0.276		24,853,920		2.0%		497,078		39,100 19,941	
Bus	809,220	1.337		6,473,760		4.0%		258,950		98,672 50,323	
Indirect emission reduction - eThekweni, NMT											
<i>(in tCO₂/yr)</i>		2019		2020		2021		2022		2023	
Vehicles		34,294		34,980		35,680		36,393		37,121	
Taxi		40,680		41,493		42,323		43,170		44,033	
Bus		102,658		104,711		106,805		108,942		111,120	
Total		177632.1		181184.7		184808.39		188504.5554		192274.65	
										196120.139	
										200042.542	
										204043.4	
										208,124	
										212,287	

The direct emission reductions are calculated by summing up the emission reduction achieved during the project (2017, 2018) and multiplying by 10 (lifetime of the vehicle avoided). This gives a lifetime direct emission reduction (in the selected NMT projects) of 82,626 tCO₂.

Indirect emission reduction

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

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

For the top-down approach, the market potential is estimated with a period of 10 years after the project’s end (in 2018). Some assumptions had to be made on the maximum realizable market size, based on a production of 5,000 EVs annually during 2019-2021 and 10,000 EVs per year thereafter. Table 1 gives the annual emission reduction associated with the growing annual number of e-buses and EVs, under the same set of assumptions as used in the direct emission reduction estimate. Additionally, it is assumed that PV penetration in charging stations is 15%, while efficiency in fuel engines and electric motors increases 2 and 3% per year, respectively.

Similarly, the market potential is determined for the Durban and Johannesburg cities, based on the total trips per day (as mentioned in the eThekweni “Integrated Transport Plan Update 2010-2015” and the “Strategic Integrated Transport Plan Framework for The City of Joburg” (2013)) and extrapolating these for the period 2019-2028 on the basis of 2% annual traffic growth. The results are given in Table 2 and give an indirect (top-down) emission reduction of 778 ktCO₂.

However, some of these emission reductions would have taken place in this period, even without the project’s intervention. A ‘coincidence factor’ (CF) is applied therefore to reflect the degree of the project’s impact. In this case, CF=40% is adopted, notably because of the effects of promotion of PV-powered EV charging and awareness raising on NMT, thus substantial indirect emission reduction can be attributed on top of the government’s (baseline, non-PV) efforts.

Summary

Cumulative emission reduction, electric vehicles			Cumulative emission reduction, NMT		
- direct		35,140 tCO ₂	- direct		82,626 tCO ₂
- indirect, bottom-up, RF=	3	105,419 tCO ₂	- indirect, bottom-up, RF=	3	247,878 tCO ₂
- indirect, top-down, CF=	40%	301,245 tCO ₂	- indirect, top-down, CF=	40%	778,009 tCO ₂
Emission reduction, totals			Emission reduction, totals		
- direct		117,766 tCO ₂	- direct		117,766 tCO ₂
- indirect, bottom-up, RF=	3	353,297 tCO ₂	- indirect, bottom-up, RF=	3	353,297 tCO ₂
- indirect, top-down, CF=	40%	1,079,254 tCO ₂	- indirect, top-down, CF=	40%	1,079,254 tCO ₂

Notes:

- One PV charger for e-buses, which can also be used to charge EV passenger cars, and 1 for electric vehicles; cost for “Level 3, fast charging”;
- One e-bus charged and 20 EVs in PV charger, attributed to the Project;
- Investment in MNT infrastructure (cycle paths, signalling, proper lighting, crossings, etc.) estimated at USD 55,000/km (based on figures mentioned in UNDP/GEF project Document “Public Transport and Sport, a 2010 Opportunity”).

ANNEX H: ACTIVITY TIMING

Outcome	Output	2015		2016				2017				2018	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Outcome 1.1: Enabling policy and regulatory framework, together with strengthened institutional capacity and enhanced awareness; facilitating early and widespread use and local manufacturing of EVs and NMT in South Africa.	Output 1.1.1 National policy and regulatory framework, incentive programmes, tax incentives, design, planning, and safety guidelines, etc. to promote early take-off, widespread use, and local manufacturing of EVs and NMT strengthened;												
	Output 1.1.2 Concerned institutional capacity at the national level built, and awareness raised.												
Outcome 2.1: Improved non-motorized and public transport result in a reduction of GHG emissions in the transport sectors of the Cities of Durban and Johannesburg; adequate infrastructure facilitates widespread utilization of EVs powered by renewable energy.	Output 2.1.1 Policy and regulatory frameworks to promote NMT and public transport in the Cities of Durban and Johannesburg enhanced;												
	Output 2.1.2: Institutional capacity for the Cities of Durban and Johannesburg strengthened and awareness raised on NMT; experience shared with the other 9 cities of South Africa under the DEA/KfW Green Cities Promoting NMT programme.;												
	Output 2.1.3 Standards and regulations for EV infrastructure, charging stations, networks, support applications, etc. developed.												
	Output 2.1.4: Design, installation and testing of at least 2 PV-based (fast, off-line) charging stations for EVs in the City of Johannesburg and in the Shamwari Game Reserve.												
Outcome 3.1: Adequate monitoring and evaluation mechanisms are in place, facilitating smooth and successful project implementation and sound impact.	Output 3.1.1 Regular monitoring reports and tracking tools prepared according to GEF requirements												
	Output 3.1.2 Final project evaluation conducted												

ANNEX I: BACKGROUND INFORMATION – CITIES OF DURBAN AND JOHANNESBURG (ATTACHED)

ANNEX J: GEF BUDGET (ATTACHED)