



South Africa_Cape Town
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EV
READI
NESS
ASSESSMENT

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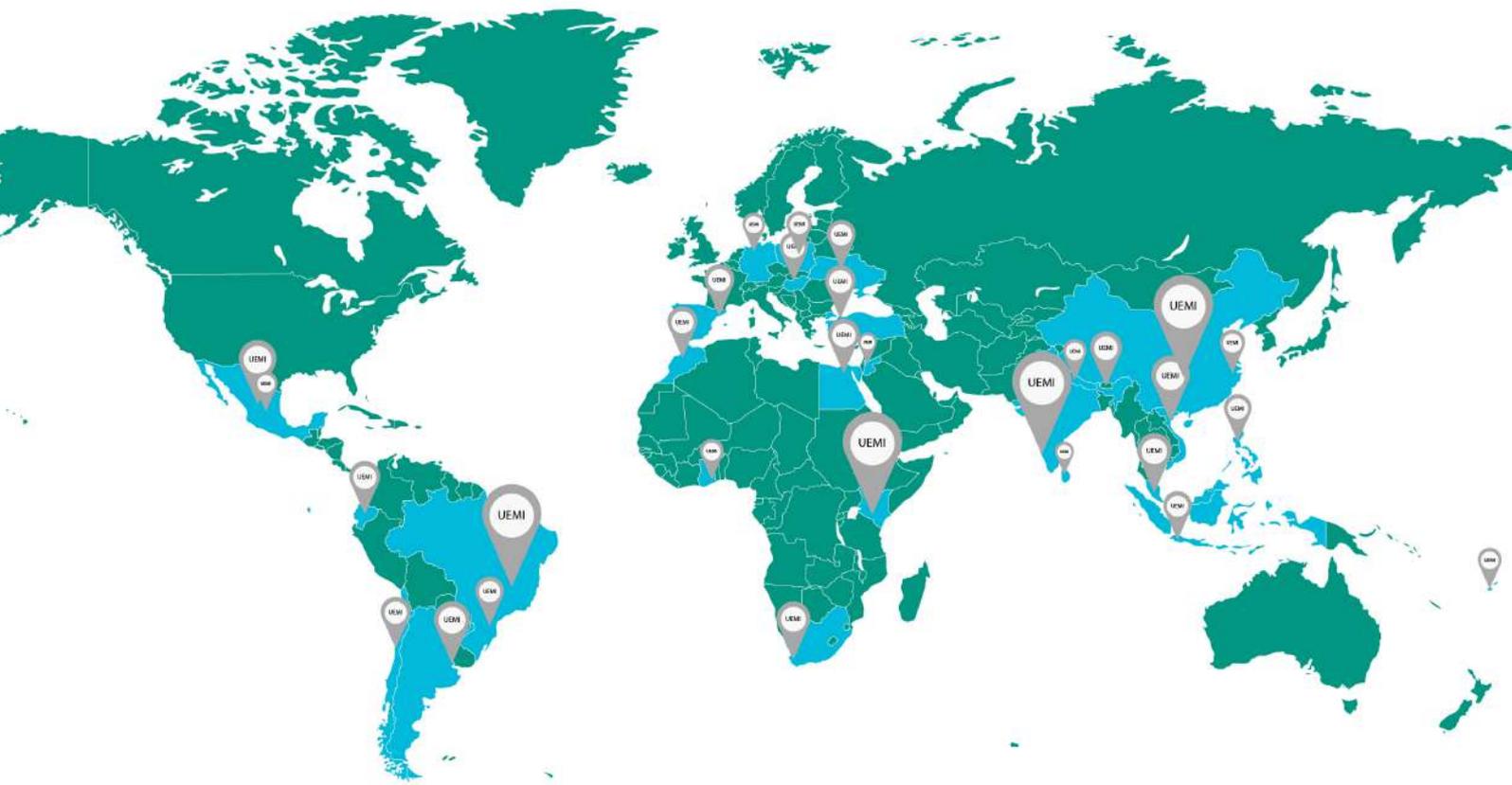
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UEMI SOLUTIONS COUNTRIES

KEY FACTS & FIGURES

**POPULATION OF
4,004,793 PEOPLE**

CAPE TOWN

CITY

The city of Cape Town is located on the southern most tip of the African continent, and is the legislative capital city of the Republic of South Africa. Cape Town is home to a population of 4,004,793 people, with an estimated total population growth size in 2023 to reach 4,232, 273 – equates to an approximate 5.4% growth of the 2017 base estimate (Western Cape Government , 2016). The economy of Cape Town is primarily a service driven economy, which relies on agricultural exports, and tourism. The central City district is also the home of the provincial government as well as the national houses of parliament of South Africa.

CO₂ EMIS- SIONS

South Africa is the single largest emitter of CO₂ on the African continent, and the 13th largest emitter in the world (Boden, Marland, & Andres, 2011) – with GHG emissions totally 579 million tons CO₂e in 2010. South Africa has committed to reduce CO₂ emissions by 34% from business as usual (BAU) by 2020, and by 42% by 2025. SA’s intended Nationally Determined Contributions (INDCs) sets the country ambitions to reduce GHG emission to a target of 212-428 Mt CO₂e by 2050 and 398-614 Mt CO₂e between 2025 and 2030 (DEA, 2015) The City of Cape Town’s Carbon footprint amounted to 5.6tCO₂-e per capita in 2012 indicating a higher carbon footprint than other similar cities due to mostly its poor energy security matrix, rapidly urbanising population, and increased urban sprawl. Cape Town’s carbon emissions are made up of 40% from transportation, 44% from industry, 13% from households, and 3% from public administration. Emissions from transportation in South Africa amounts to 10.8% of the total greenhouse gas emissions, with road transportation being responsible for 91.2% of these total transportation emissions in general (Eskom, 2018).

**COMMITMENT TO REDUCE CO₂
EMISSIONS BY 34% BY 2020**

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E-MOBILITY IN CAPE TOWN

Transportation has been a key driver of economic and social activity, and also one of the largest and fastest growing energy end-user sectors. An uptake of electric vehicles is envisaged to be an important part of low-carbon technology pathways for transportation. The Urban Electric Mobility Initiative (UEMI) supports the phasing out of conventionally fuelled vehicles and increase the share of electric vehicles in the total volume of individual motorised transports in cities to at least 30% by 2030. Within this context the preceding chapters evaluate the Electric Vehicle Readiness (EV-Readiness) of the Republic of South Africa's city of Cape Town. The evaluation that follows includes a review of the policy environment, contributions to Sustainable Development Goals (SDGs) and the United Nation's New Urban Agenda. While in many respects the Republic of South Africa has made numerous advancements, this paper identifies that the governing administration of SA needs to increase support towards infrastructure development and support the EVs industry switch over – both users and industry, review the taxation policy for the uptake of EVs into the current environment; provide for a tax incentive for those users who want to make the shift, and engage with all stakeholders in the process of EVs adaptation and implementation.

DESCRIPTION & MEASURES

Status of EVs in South Africa

Electric vehicles uptake in South Africa has been generally sluggish, although the national department of Trade and Industry in its 2015/16 to 2018/19 industrial policy action plan included the electric vehicle market as one of its projects earmarked for investment. SA's Department of Trade and Industry stated "this is intended to break the so-called chicken and egg-dilemma, whereby without the necessary supply and distribution infrastructure for green transport fuels in place, consumers, will be reluctant to buy green vehicles, while without adequate levels of consumer demand, there is little or no incentive to invest in a local supply distribution and production infrastructure" (Eskom, 2018).

E-bus Fleet

The city of Cape Town is the first African city to have added 11 electric buses to its fleet. Early 2018, the city of Cape Town's "MyCITI" bus rapid transport service added 11 electric buses into its fleet. The e-buses are 12m long with 34 seats and 63-passenger carrying capacity – the BYD renewable energy technology Company won the public tender to provide the city with the K9UR bus classic specification. The bus fleet is locally manufactured by Busmark 2000 and has a range of 200 km on a single charge. The city administration has indicated that the pilot project will aim to evaluate performance, energy consumption, life cycle costs on specific route deployments – using the data gathered for future decisions regarding future acquisition and deployments (George, 2018). The 11 electric buses have cost the city administration ZAR 128 million (approximately 8 000 000 Euro).

Homologation

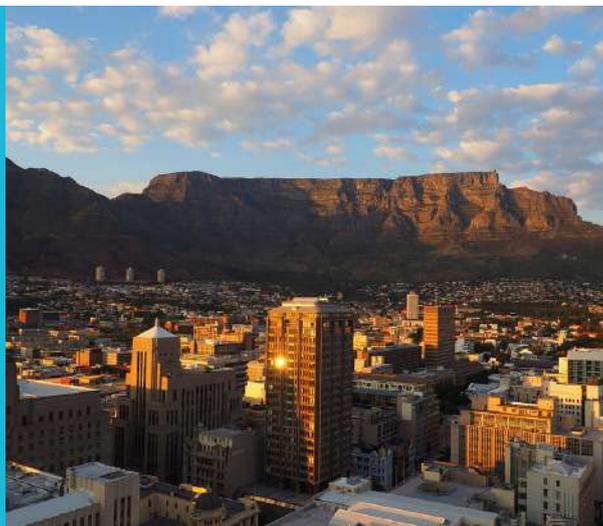
South Africa conforms with international homologation (the process of certification or approving products hence meeting the legislative and regulatory requirements) legislation in regards to EVs.

Incentives

South Africa lags behind in incentives for consumers and public sector uptake of EVs. Currently, there are no tax rebates, no financial incentives and no subsidies (outside those offered by vehicle manufactures). The local EV private purchase has been consumer driven by the small market of those attracted and aware of the advantages of driving EVs. Public policy for incentives for EVs is also in its infant stages.



POTENTIAL FOR JOB CREATION



A net job creation potential for EVs in South Africa is expected to increase the vehicle and component manufacture export industry positively. South Africa's primary electricity supplier, Eskom, generates 90% of all electricity used in the country and needs to be incorporated when developing EVs policies. The shift of the transportation sector from internal combustion engine to EVs offers South Africa market an opportunity for economic development while also reducing negative environmental impact from the transportation sector. South Africa's national department of Transport's Green Transport Strategy 2017 to 2050 has committed to reduce emissions from the transport sector by 5% by 2050, keeping with South Africa's Nationally Determined Contribution (NDC) obligations, which aim to limit the GHG emissions to peak at a range between 398 and 614 CO₂eq over the period 2025-2030. Moreover, South Africa's submission to the Paris Agreement on climate change has indicated that the country will aim to have more than 2.9million electric cars on the roads by 2050 – investing 6.5 trillion ZAR into the EV industry over the next four decades (Eskom, 2018).

PUBLIC SECTOR

While the national department of Trade and Industry has institutionalised a Electric Vehicle Industry Association body but government incentives to make the switch has not been as adequate. South Africa does comply with international best practices and has committed to include EVs in its NDC emissions reduction strategy. On the ground developments are still lagging and government at the local and municipal level have not formed policy or legislation that supports EVs rollout within society.

POLITICAL WILL

POLICY

ENVIRONMENT



South Africa's promotion and introduction of Electric Vehicles (EVs) via the South African Low-Carbon Transport Project and the Electric Vehicle Industry Association of South Africa – who's objective is to create awareness of electric vehicle technology and increase EV charging infrastructure in SA. The electric vehicle industry association of South Africa does this by collaborating with a broad range of industry stakeholders.

The National Transport Master Plan, 2050, places added importance on the Preservation of the environment – its strategic Pillar 7. The Promotion of electric and hybrid-electric vehicles is a strategic principle in this document. Currently, a Draft Green Transport Strategy is out for comment by the South African government. This strategy includes the objectives of the transport sector to enable its effort to combat climate change by promoting sustainability and cleaner mobility development and to facilitate the sectors transition to climate resilient and low carbon economy and society.

DRAFT GREEN TRANSPORT STRATEGY

The Draft Green Transport Strategy includes objectives to improve EVs uptake in SA by:

- Removing and relaxing import duties on EVs, particularly the classification of EVs in SA as a luxury imports.
- To offer EV manufacturers incentives to both produce and sell affordable EVs in SA, focussing on the local and international market.
- Stimulate an environment for academics and research into the EV market and industry.
- Offer incentives to sell affordable EVs in SA.
- Introduce the conversion of old technology vehicle with higher emission factors to be retrofitted with EV technology.

The South African National Energy Development Institute (SANEDI) and the United Nations Industry Development Organisation (UNIDO) have partnered on the Low Carbon Transport (LCT SA) project. The partnership aims to align policies that inform the introduction of alternative modes and alternative energy for transportation. With the City of Johannesburg and eThekweni Municipality, the project supports the development of non-motorized transport (NMT) plans and installation of charging infrastructure for electric vehicles. SANEDI further provides support to National Government Departments regarding research and policy development. With the Department of Transport, the development of the NMT and Green Transport strategy documents are in process Two PV-solar charging stations have been constructed in support of the 30 electric vehicles used in Tshwane. The charge station at the Mayoral Chambers in Centurion was unveiled during the opening ceremony of the 2016 Transport Month celebration by the MEC of Gauteng Transport.

LOCAL ACTIVITIES

INTERNATIONAL**ACTIVITIES**

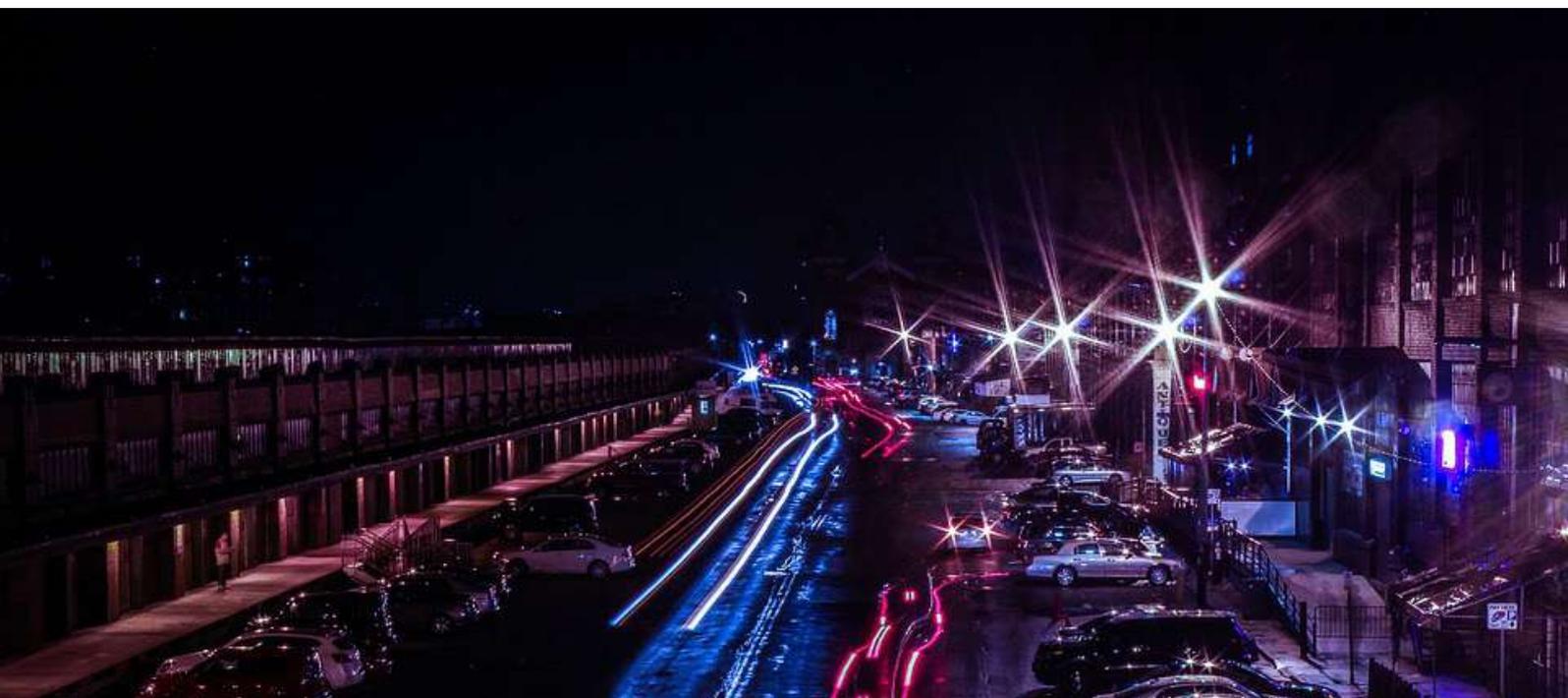
SANEDI participates in the International Energy Agency's Implementing Agreement on "Hybrid and Electric Vehicles", as well as the Clean Energy Ministerial "Electric Vehicle Initiative" on a regular basis.

UYILO - E-MOBILITY TECHNOLOGY**INNOVATION PROGRAMME**

The South African Technology Innovation Agency (TIA) launched its independent e-mobility programme in 2013. This was done to implement a fast track of the development and commercialisation of key technologies that will primarily support the integration and speed up-take of the EVs market in SA. The programme aims to identify and maximise value in the niche technologies that South Africa has capacity and capability to develop or add value to adapt to local conditions. Hosted by Nelson Mandela Metropolitan University (NMMU) the programme seeks to ready South Africa for the introduction of e-mobility by creating new business opportunities and generating the know-how to support electric vehicles. The name uYilo is derived from the local Xhosa language which means "to create".

CITY OF CAPE TOWN'S ENERGY**2040 STRATEGY**

The city of Cape Town has begun a Transport and spatial planning focussed programme that aims to ensure public transport, transit oriented development, maintenance of the urban edge, and non-motorised transport and transport demand management is in keeping with its strategy.



POTENTIAL CONTRIBUTION SDG NUA CO2 EMISSION REDUCTION

One of the major benefits of the EV market is that these vehicles produced can optimally use almost all kinds of energy resources available – thus reducing the transportation sectors reliance on the volatile petroleum market. EVs can take on the advantages of renewable energy generation thus no emissions emitted from vehicles can become a reality. Therefore, while EVs are considered to be beneficial in theory for the environment, the practical reality of this depends on the cleanliness of the electricity grid and energy supply chains.



ELECTRICITY MIX & RELIABILITY OF THE GRID

EVs and South Africa's energy mix

In lieu of a generally reliability of sources of renewable energy, EVs in South Africa will continue to contribute to emitting of GHG emissions due to the energy cycle. Research has indicated that when the current grid in SA is used to charge electric vehicles there has been an increase in the CO2 emission between 17% and 64% . If South Africa's energy generation mix does become more capable of including renewable energy the CO2 emissions from EVs will of course amount to less (Hildebrandt & Liu, 2012).

Industrial Development:

Electric Vehicle sector identified as a potential sector to boost industrial development in SA. EVs project in SA aims to stimulate the uptake of EVs in the SA transport sector to trigger a range of spin-offs opportunities for new businesses and supporting industry for example; recharging infrastructure, and energy storage components (batteries).

REGULATORY FRAME- WORK FOR EVS

Green Transportation Strategy: green transportation policy, in line with the NDCs of SA, emphasise green transportation so that the adverse impacts of transportation activities on the environment can be minimalised. This strategy also address the current and future transportation demands based on sustainable development principles – working alongside the Roads Policy, Green Transport report and Low Carbon Transport SA Project.

Energy Policy: objectives based on attaining universal access to energy, accessible affordable and reliable energy, especially for the disadvantage and diversifying primary energy sources while also reducing the dependency on coal. This incorporates involving the private sector, such as automobile industry to ensure environmentally responsible development and investments.

Green Cars (zero emission electric vehicle programme): seeks to ensure that SA contributes to the reduction of environmentally harmful gases by promoting the use of cleaner sources of fuel by the automotive industry – support driven by the Green Fund that promotes the transition to low-carbon development pathway.

Lithium-ion Battery Programme: supported by the department of science and technology, this programme aims to develop energy storage technologies that meet the requirement for electricity suppliers for on grid storage, renewable energy integration and EVs applications. The Department of Science and Technology has been supporting a programme aimed at local production of batteries at highly competitive cost based on SA raw materials and intellectual property.

POLICY & GOVERNANCE REQUIREMENTS

SUPPORT FROM THE LOCAL, STATE AND NATIONAL POLICY LEVELS

Cape Town

In 2013, the City of Cape Town adopted its Urban Design Policy framework. This policy document legislates public environment developments in the city. In conjunction, a Transit Oriented Development (TOD) strategic framework was also adopted in 2016. This framework outlines that the city of Cape Town will make an effort to “progressively move toward a compact, well connected, efficient, resilient and urban form and movement system that is conducive to economic and social efficiency and equality whilst providing cost effective access to mobility, with the least possible negative impacts on the environment. UNIDO and the South African government



have formed a partnership to increase low carbon transport projects in SA. While SA lags behind the rapid global developments in electric mobility market, some traction has been made towards policy alignment and industry collaboration in electric vehicle development.



South Africa

In 2013, the Department of Trade and Industry launched the EV Industry Roadmap for SA, together with the Department of Environmental Affairs launching its first government department ‘green fleet’. Electric Vehicle Infrastructure Alliance (EVIA), an Initiative in 2014 by uYilo, SANEDI, GridCars, BMW and Nissan was developed to be a guide

To the development of EV infrastructure hardware and software standards as well as the roll-out and positioning of recharging stations in South Africa. EVIA renamed as the Electric Vehicle Industry Association at the official launch in 2016. The local industry also began to offer 100% local electric vehicles within the local market and began to initiate local production of eMobility platforms with the establishment of the plug in hybrid technology. In addition, in 2016 the Department of Trade and Industry launched a study report that identified national projects and initiatives for its EV programme.

KEY STAKEHOLDERS

1 ■ Department of Trade and Industry

In the Industry Policy Action Plan (IPAP) 2015/2016 – 2018/2019 lists electric vehicle market as a potential economic programme that could positively contribute to South Africa's industrial development. South Africa already has a large automobile industry sector in the country and supporting the EVs market could potentially boost the economy of the country. The 2015/16 – 2018/19 IPAP indicates that the SA economy could benefit from EVs industry by stimulating the uptake of EVs in the transport sector thereby triggering a range of 'spin-off' opportunities for new businesses that support the industry through recharging infrastructure, energy storage components such as batteries, and other related economic activity – incorporating aspects of the UNIDO Low Carbon transport project .

2 ■ Department of Transport

The Environmental Coordination Directorate in the Integrated Transport Plan of the department of Transport. In its recently launched Green Transportation Strategy document plans have been highlighted that aim to emphasise green transportation while minimising the adverse impact of transport activities on the environment and addressing the current and future transport demands based on sustainable development principles.

Department of Environmental Affairs ■ 3

The Department of Environmental Affairs launched the Green Cars (ZERO Emission Electric Vehicles programme in February 2013. The initiative seeks to ensure that South Africa contributes to the reduction of environmentally harmful gases by promoting the use of cleaner sources of fuel by the automotive industry. South African Governments through the Department of Environmental have also established the Green Fund to support the transition to a low-carbon development path.

Department of Science and Technology ■ 4

Department has been supporting the lithium-ion battery key programme aimed at local production of the batteries at highly competitive cost based on South African raw materials and intellectual property.

5 ■ Local market

In early 2018, the private electric vehicle market recorded having sold 375 vehicles in South Africa. The three main manufacturers to introduce EVs in SA are Optimal Energy, Nissan, and BMW. Optimal Energy's Joule project is South Africa's own locally produced electric vehicle - the project started in 2005 and ended in 2012. Charging facilities are currently available in each of South Africa's province, with Gauteng (the province which is home to Johannesburg and Pretoria).

STEPS TOWARDS IMPLEMENTATION

FEASIBILITY OF THE IMPLEMENTATION

In the South African submission to the Paris Agreement on climate change, the administration indicated that it would support 2.9 million electric vehicles to be used on SA roads by 2050 and have ZAR 6.5 trillion investment within the industry over the next four decades. To make the transfer of EVs in SA more attractive a further capital investment is required for the charging station infrastructure and societal promotion to move towards EVs.

- Policy interventions through DoT (Green Transport Strategy and The Roads Policy), dti (Green Transport Study Report)
- UNIDO's Low Carbon Transport South Africa Project (LCT SA)
- SANEDI's Cleaner Mobility Programme
- The CSIR Energy Centre (EV Fleet)
- uYilo E-Mobility Programme
- GIZ Transport NAMA Project
- E-Bike sharing schemes (Growthpoint, City of Tshwane pilot, University of Stellenbosch, NMMU)
- EV Charging infrastructure roll outs (LCT SA, SANEDI's Cleaner Mobility, City of Tshwane, City of Cape Town)
- EV Public transport developments (MyCiTi e-Buses, 100% tuk-tuks by Mellow Cabs, the green cab, Futran system-concept stage)
- Blue-Rock village

EV PROJECTS & DEMONSTRATIONS IN SOUTH AFRICA

- Awareness creation efforts-Solar challenge, low carbon race (WWF), Communications and PR Strategies to communicate the right message, EV Media master classes
- Capacity building through EVIA workshops, myth busting sessions, EV training and manuals to guide stakeholders switching to an electric drive
- Supporting of government departments in converting part of their fleet to EV

READINESS

Technological Barriers

Crime is high in South Africa and insecurity exists for using EVs within urban areas due mostly to lack of charging facilities at households and most charging stations linked to shopping malls or car manufactures facilities. . Only 3 manufacturers offer private EV for sale on the market. Distribution of public Charging stations is uneven. Different manufacturers could potential have different specification for charging and policy is currently not streamlined in this area.

Summary of the key issues of assessment

Electricity availability

South Africa has experienced a unique electricity phenomenon called Load Shedding – driven by the demand limitations of the current utility supplier Eskom. The insecurity attached to reliability of Electricity in combination with high crime rate in the country deters the switch to EVs .

ELECTRICITY AVAILABILITY

BARRIERS TO EVS IN SOUTH AFRICA

Key focus areas for developing South Africa's electric vehicle industry

- a. Increased government support towards infrastructure development and support to industry.
- b. Analysis of current infrastructure reality and adequate shifts to accommodate users and industry
 - a. Taking into account labour impacts and economic impact
 - c. Policy environment revelation – i.e. currently taxation on electric vehicles are 25%, while conventional vehicle imports are charged 18%.
 - d. All stakeholders need to be consulted: government, industry, labour and users.

Barriers to EVs in South Africa

- Electricity is not recognised as a transport energy
- Electric vehicles face currently maximum import duty at 25 to 40 % - identified as a luxury good
- The NDCs does shift SA towards a more inclusive EV policy direction
- Lack of infrastructure – perceived and real exists
- Comprehensive policy framework non-existent

KEY FOCUS AREAS



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