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2018

EV READI NESS ASSESSMENT



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UN HABITAT
FOR A BETTER URBAN FUTURE



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SOLUTIONS



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**READI
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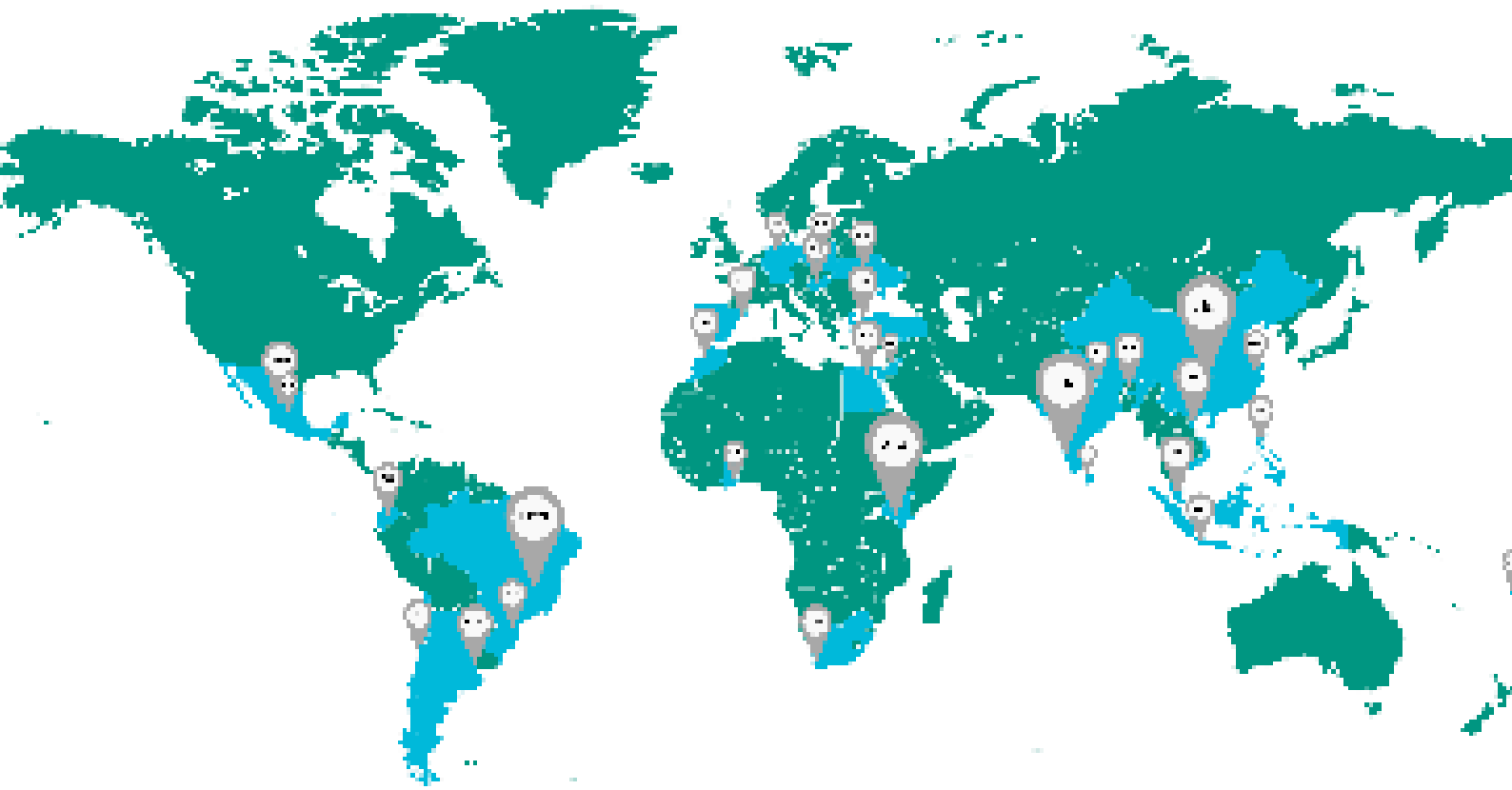
ASSESSMENT



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UEMI SOLUTIONS COUNTRIES

KEY FACTS & FIGURES

CITY

ACCRA

Accra is the capital of Ghana, a country located in the Western region of Sub-Saharan Africa. The population of the city as at 2014 was estimated at 2.27 million people (World Population Review, 2018). With the population increasing at a rate of 4%, Accra is noted to be among the fastest urbanizing cities in Africa (Atlas of Urban Expansion, 2016).

POPULATION
28,206,728

Population: 28,206,728 (2016)

Population Growth rate: 2.2% (2016)

Share of Urban Population: 53.39% (2014)

Urban Population Growth: 3.4% (2016)

GDP: 42.69 Billion USD (2016)

GDP Growth rate: 3.6% (2016)

GDP Per Capita: 1707.70 USD (2016)

Total Surface Area: 238,500 sq.km

It is estimated that Accra alone hosts about 50% of the total registered vehicles nationwide numbering about 1,134,599 vehicles by 2017 (EPA, 2017). In Accra, most trips are made by private cars, taxis, mini-buses (called trotro) and buses; the latter three constituting the core of public transport services in the city. In recent times, there is an increase in the use of motorcycles and bicycles as a means of transporting goods and people. The use of motorcycles popularly called **“Okada”** constituted **8% of all modes of public transportation** as at the year 2015 and has gained popularity though it is considered illegal (Graphiconline, 2018).

OKADA MAKE UP 8% OF
ALL PUBLIC TRANSPORT

UEMI



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DESCRIPTION & MEASURES

Based on the assessment of electric mobility options for Accra as made in the previous section, this study proposes the electrification of the bus service sector with specific consideration for the Quality Bus Service (QBS) under operation in Accra. This is partly based on the rationale that the QBS is part of Government's effort to promote mass transportation in Accra and as indicated, fits into the nationally determined contributions of the country to the global agenda to reduce GHGs emissions. Any initiative to promote this policy action hence, is likely to receive the needed stakeholders' support.

Also, having in mind that electric buses are becoming cheaper than diesel-run buses as revealed in a report by Bloomberg Finance (2018), the introduction of electric buses into the QBS in Accra can be an explorative and innovative effort to revolutionize sustainable urban transportation in the city.

CURRENT POLICY/IMPLEMENTATION PROCESS

Currently, the QBS is operated by the Greater Accra Passenger Transport Executive (GAPTE) and runs mainly on one route within the capital city of Accra. It must be mentioned however, that all the buses run on fossil fuel.

With regards to political support, the QBS project in particular had received strong political support; however, as characteristic of many government-initiated projects in Ghana, the political support has been inconsistent especially because of changes in government administration over the years.



POLICY ENVIRONMENT

NATIONAL POLICY FRAMEWORK

A review of literature shows that there is no government policy action specifically targeting electric mobility. However, a broader programme of action to expand inter and intra city mass transportation modes (Rail and bus transit system) in 4 cities including Accra, is included in the country's NDCs submitted to UNFCCC in 2015 with emphasis on improving fuel efficiency (Government of Ghana, 2015b).

The National Transport Policy also sets actions to promote sustainable transportation by prioritizing mass transport (such as BRT) in urban areas to move at least 80% of passengers; and discourage private car ownership. The following government policy actions as stated in the National Transport Policy can be supportive of the deployment of electric buses in Accra.

FUEL EFFICIENCY

Promotion of fuel efficiency, conservation and pollution control measures for road transportation (for example the limitation placed on the importation of used vehicles through increased taxes and imposition of tax penalties ranging from 5% to 50% on vehicles and engines more than 10 years old).

SUPPORT

Government's support for investments in transport infrastructure that provide social and environmental benefits



Again, the National Transport Policy acknowledges the link between the energy and transport sectors and sets out to develop joint development and application of research on energy technologies in the transport sector. The technical skills for transport infrastructure constructions and maintenance is however limited.

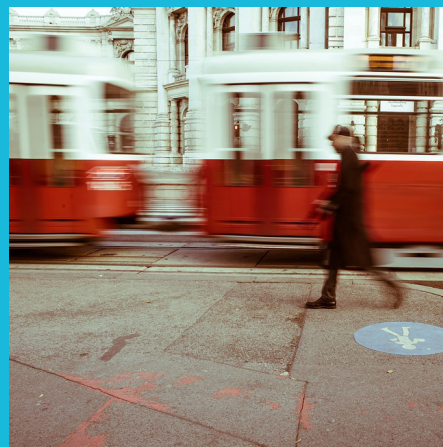
Though there is no car or bus manufacturing industry in Ghana, there are investment companies and businesses importing new vehicles into the country. A typical example is the Scania Group which has collaborated with GAPTE in procuring new buses for the QBS operations in Accra. The services of such business entities can be instrumental in the deployment of electric vehicles in Accra.

Since the energy sector plays a key role in the deployment of electric mobility, this study highlights the following national energy policy intents relevant to electric vehicles development in Accra.

KEY RECOMMENDATIONS

1. The development of alternative transportation fuels to help diversify and secure future energy supplies of Ghana.

2. Support for decentralised off-grid alternative technologies (such as solar, Photovoltaic and wind) in case they are competitive with conventional electricity supply. This measure can facilitate the development of charging infrastructure and immensely contribute to the mitigation of climate change effects (Government of Ghana, 2010).

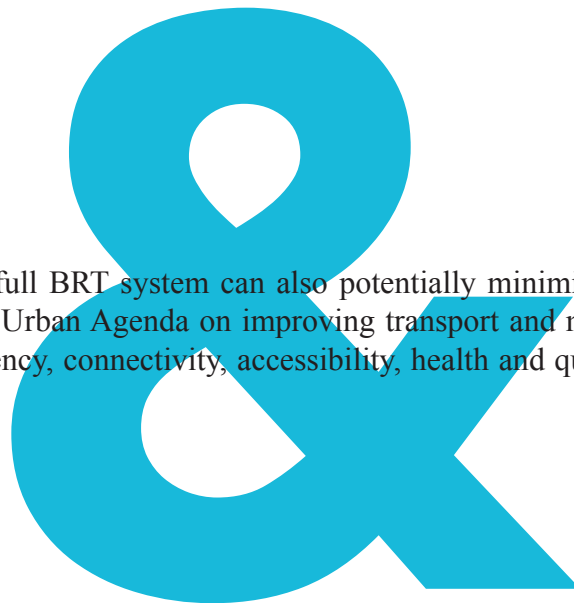


POTENTIAL CONTRIBUTION SDG NUA CO2 EMISSION REDUCTION

It is estimated that the development of a BRT in Ghana has the potential of reducing emissions by 1.63MtCO₂ by the year 2040 when combined with other climate change mitigation measures (Government of Ghana, 2015b). The electrification of the QBS in Accra will therefore enhance this abatement potential.

ACCESS

The QBS when developed to a full BRT system can also potentially minimize traffic congestion in Accra thereby contributing to the New Urban Agenda on improving transport and mobility infrastructure systems and consequently enhance efficiency, connectivity, accessibility, health and quality of life of urban dwellers (UN-Habitat, 2016).



MOBILITY

**SUSTAINABLE DEVELOPMENT
GOALS**

Ultimately, as a contribution to the Sustainable Development Goals, electrification of QBS buses in Accra will contribute to the Goal 11 which seeks to among other actions invest in public transport to eventually make cities and human settlements inclusive, safe, resilient and sustainable (SDGs, 2015).

SAFE, RESILIENT AND SUSTAINABLE

AIR



QUALITY

IMPLEMENTATION



PARTNERSHIPS

COUNTER

PART AT THE

CITY LEVEL

GAPTE – the Coordinating Institution currently operating the QBS in Accra

Ministry of Transport



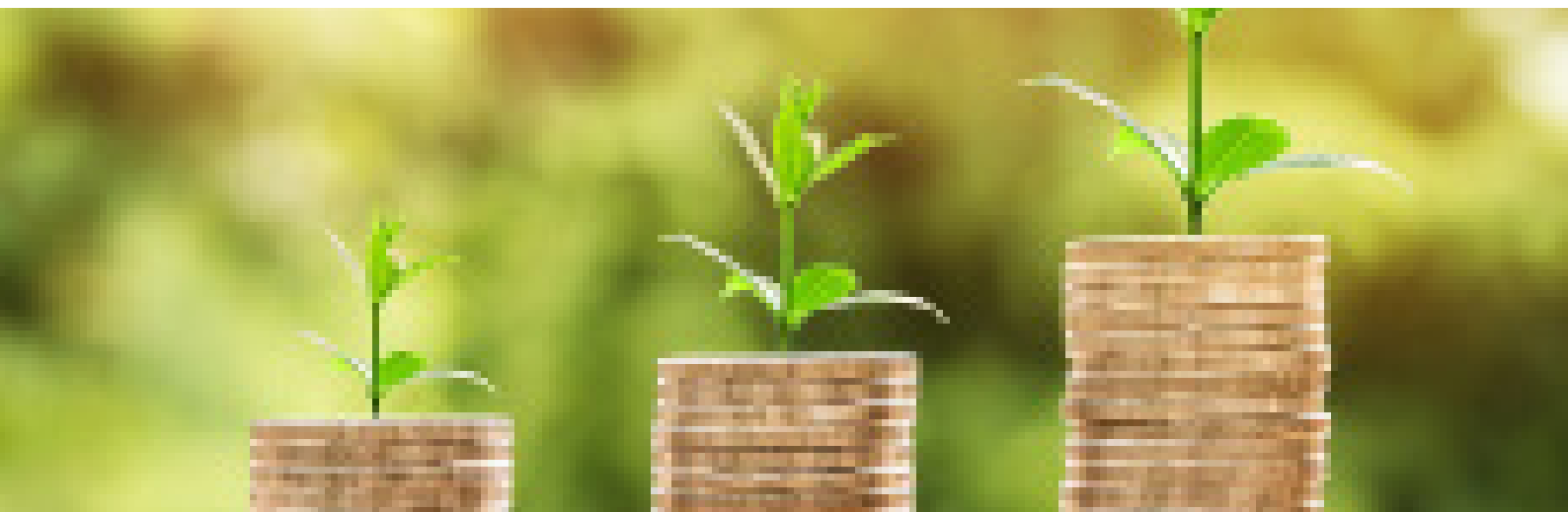
- 1 ■ National Budget - Government subsidies
- 2 ■ International institutions with low carbon focus such as C40
- 3 ■ Multilateral funds

POTENTIAL
FINANCE
PARTNERS

Bilateral agreements 4 ■

Private capital market 5 ■

International carbon market 6 ■



FINANCE REQUIRE MENTS

1. Installation of charging infrastructure which is dependent on solar energy
2. Procurement and operation of electric bus(es) on one corridor in Accra
3. Technical capacity building for key stakeholders and operators of the electric buses

PILOT PROJECT LEVEL

■ 10.000 -
100.000 EUR

IMPLEMEN TATION PROJECT

3 - 300 ■
MILLIONS

1. Expanded installation of charging infrastructure which is dependent on solar energy
2. Procurement and operation of more electric buses on more than one corridors in Accra

TECHNOLOGY REQUIREMENTS

TECHNICAL BARRIERS TO THE PROJECT

Non-existence charging infrastructure

Unreliability of electricity generally characterized by persistent load shedding

UNRELIABLE ELECTRICITY

Lack of technical expertise in the area of electric vehicle deployment

The variety of stakeholders in the transport and energy sectors in Ghana can create a complex institutional environment that hampers collaboration and coordination

VARIETY OF STAKEHOLDERS



ELECTRICITY MIX & RELIABILITY OF THE GRID

Hydro – 41.6%
Thermal – 57.8%
Renewable – 0.6%

Electricity mix: Hydro – 41.6%
Thermal – 57.8%
Renewable – 0.6%

In Ghana, electricity is generated by three (3) major groups of institutions namely: the Volta River Authority (VRA), Bui Power Authority (BPA) and Independent Power Producers (IPP). Transmission is done by the National Interconnected Transmission System (NITS) owned and operated by the state-owned Ghana Grid Company Ltd (GRIDCo). Electricity is finally distributed to consumers by two (2) state owned

companies: - the Electricity Company of Ghana (ECG) responsible for the southern sector of Ghana including Accra; and the Northern Electricity Distribution Company (NEDCo) which distributes electricity to the northern sector of Ghana (Government of Ghana, 2010). Electricity access as at 2016 is estimated to cover about 82.5% of the Ghanaian population. Though the government of Ghana is committed to achieving universal electricity coverage by 2020, electricity supply remains inadequate with intermittent power cuts. This according to the 2010 National Energy Policy is mainly due to inadequate generation capacity as a result of fuel shortage, transmission losses and poor tariff structure (Government of Ghana, 2010)

National Energy Policy

POLICY & GOVERNANCE REQUIREMENTS

SUPPORT FROM THE LOCAL, STATE AND NATIONAL POLICY LEVELS

At the local level, the various Metropolitan, Municipal and District Assemblies within the Accra Metropolitan Area through their Transport Departments are mandated to formulate and implement policies on transport services within the framework of national policies. The GAPTE which plays the coordinating roles for these districts can provide the necessary collaborative support for the project.

At the National level, the Ministries of Transport, Energy and Local Government can as mandated provide policy guidance and regulatory support for the procurement of the electric buses, installation of charging infrastructure and operations of the vehicles respectively.



KEY STAKEHOLDERS

The implementation of this action concept (electrification of QBS buses) can be successful with the involvement of the following stakeholder institutions:

- 1 ■ Ministry of Transport (Mandate to promote fuel-efficiency and biofuel requirements; and reduce urban traffic by promoting public transport)
- 2 ■ Ministry of Local Government and Rural Development (Mandate to guide, control and coordinate the activities of local government authorities)
- Ministry of Energy (Mandate to promote increased energy efficiency and promote energy security through the development of renewable sources) 3
- Ministry of Environment, Science, Technology and Innovation (Mandate to integrate broader climate environmental related issues) 4
- 5-9 ■
 - 5. Metropolitan, Municipal and District Assemblies within the Accra Metropolitan city
 - 6. Private Transport Unions and Associations
 - 7. Electricity service providers
 - 8. Private entities in the car/bus trading and investment sector
 - 9. Civil Society Organizations
- Greater Accra Passenger Transport Executive (GAPTE) 10 ■
- Driver and Vehicle Licensing Authority 11 ■
- Financial Institutions 12 ■



STEPS TOWARDS IMPLEM ENTATION

FEASIBILITY OF THE IMPLEMENTATION

According to its third National Communication Report to the UNFCCC, Ghana projected 2020, 2030 and 2040 as its target years for achieving its mitigation and adaptation measures. As such preliminary feasibility studies to electrify QBS in Accra can start from now (2018) to 2020. Actual implementation (deployment of buses and installation of charging infrastructure) can therefore proceed after the year 2020 when all feasibility studies are completed and positive. By this time, the impact of the current QBS operations can also be measured against the proposed electrification initiative.



READINESS

Summary of the key issues of assessment



There is currently no charging infrastructure available in Accra; hence an agenda to introduce electric buses must consider massive investments into the development of charging points.



POLITICAL & INSTITUTIONAL & FINANCIAL READINESS

■ Though the electricity supply in Accra is unreliable and erratic, Ghana's energy policy is supportive of private sector investments into renewable off-grid energy alternatives; a measure which can be capitalized for charging infrastructure development

■ The absence of a car/bus manufacturing industry in Ghana is not necessarily an obstacle since there exist car and bus trading businesses who can provide support to the electric bus venture

■ There are multiple stakeholder institutions in the transport and energy sectors in Accra; whose involvement can be potentially intricate for a smooth implementation of a transport



electrification agenda. Finding innovative institutional solutions to harmonize all stakeholders' concerns is therefore essential

■ There are no specific government policy actions on electric vehicles development in Ghana; however, the country's commitments to reducing GHG emissions and climate change impacts has manifested in its signing into several international agreements and conventions that aim to promote sustainable urban development initiatives such as electric mobility. An attempt to develop electric vehicles in the capital city of Accra is therefore potentially feasible.

POLICY ENVIRONMENT

This section summarizes the policy environment and governance issues that need to be considered in the electrification of buses for the QBS in Accra. Here too, it must be noted that there is no government policy or instrument specifically on the development of electric vehicles in Ghana; hence the summary as presented in the table below dwells on government policy intents and measures that potentially favor the electrification of transport.

National Transport Policy (2008): This is the first comprehensive National Transport Policy in Ghana.

The policy is silent on electric mobility but emphasizes on promoting a sustainable transport system for the country.

Limitations are placed on the importation of used vehicles with increased taxes and duties on vehicles and engines more than 10 years old. The policy prioritizes mass transportation in urban areas

The act establishes an Authority to promote good driving standards and ensure the use of road worthy vehicles on the roads and in other public places in the country.

Physical inspection and testing of all vehicles including emission conditions and standards.

Driver and Vehicle Licensing Authority Act - 1999 (Act 569)



Road Traffic Regulations, 1974 (L.I. 952)

Regulation No. 33 stipulates that: “No person shall drive a motor vehicle which emits exhaust fumes in such quantities as to be a hazard or annoyance to road users or pedestrians.”

This regulation is however vague in that it does not prescribe a specific measurement of emissions.

Road Traffic Act - 2004 (Act 683)

Prescribe the condition of motor vehicles such that its use on the road does not cause a danger of injury to any person. Such dangers include air pollution emanating from fuel combustion from vehicles

National Energy Policy (2010)

The development of alternative transportation fuels to provide substitute fuels for the transportation sector hence diversifying and securing future energy supplies of Ghana.

Renewable Energy Act (2011)

Promote the development of off mini-grid and stand-alone Renewable Energy systems. This policy action can facilitate the development of charging infrastructure for the bus electrification initiative

Establishment of GAPTE as a Company Limited by Guarantee

The Company was established as an output of the Ghana Urban Transport Project (GUTP) and plays coordinating roles on behalf of the districts within the Accra Metropolitan Area.

Coordinate urban transport activities of Local Authorities in the city of Accra. The company currently operates the QBS.

The existence of this institution can be harnessed to provide institutional support for transport electrification agenda

National Policy on Public-Private Partnership (2011)

The policy provides clear guidance on processes of PPP project development and Implementation. One of the guiding principles of the policy focuses on environmental, climate and social safeguards which requires that all PPP projects must conform to all environmental laws of Ghana.

The policy encourages private participation in the delivery of public infrastructure through innovative financing mechanisms

Customs Act, 905 (2015)

The following penalties apply on taxes and duties of imported used vehicles:

Where the age does not exceed 10 years – NIL

Where the age exceeds 10 years but does not exceed 12 years – 5%

Where the age exceeds 12 years but does not exceed 15 years - 20%

Where the age exceeds 15 years - 50%

National Energy Policy

The policy advances the phasing out of government subsidies on petroleum products by introducing the automatic utility and petroleum price formulate. This is intended to serve as disincentive for excessive consumption of petroleum products and encourage more cleaner fuels.

National Transport Policy

The policy was published in 2008 to guide policy makers and stakeholders on the development of Transport in Ghana.

National Energy Policy

This policy provides the public with information on Government's objectives concerning the effective management and development of the energy sector.

Centre for Urban Transport, Act 799 (2010)

The act establishes the Centre to serve as an advisory and research body on transport.

The Centre is expected to research on sustainable transportation initiatives; disseminate results and advise policy makers and stakeholders.

It is noteworthy here that the Centre is not functional due to financial and administrative difficulties encountered during the implementation of the GUTP



National Transport Policy (2008)

The policy states that Government should take the exemplary initiative in adopting sustainable transport innovations such as installing fuel efficiency devices on vehicles.

From the framework presented in table 6 above it can be seen that there exist numerous legal provisions in Ghana that support the development of sustainable transport initiatives. Though none of these legal instruments is specific on electric vehicles, most of them focus on ensuring that vehicles used in Ghana are of high environmental standards particularly with regards to fuel efficiency. Knowing the potential environmental benefits of electric mobility therefore, it is expected that the deployment of electric buses will be in coherence with these legal requirements.

Again, as illustrated in the table, there are financial instruments in Ghana which either incentivize private participation in transport development or discourage the use of environmentally unfriendly vehicles. As conceptualized in this study, such financial instruments are only applicable but not binding on those affected by the measure provided in the instrument. In the case of Ghana, only few of such instruments exist

LEGAL INSTRUMENTS

COMMUNICATION

for the promotion of sustainable urban transport. A typical example as stated in the table above is the disincentive placed on the import of old vehicles which affect the more those who import over-aged vehicles.

With regards to communication the various policy instruments, particularly the Transport and Energy Policies propagate government's intentions and aims for the development of the respective sectors. The policies also serve as mediums to persuade and guide potential investors interested in the transport sector.

Finally, this study revealed that there are few policy instruments that encourage the direct involvement or actions of government in the urban transport sector in Ghana. Even though the National Transport Policy encourages government to lead by example for instance in the acquisition of fuel efficient vehicle innovations, these measures are not comprehensively detailed.

READINESS

CONCLUSION

As set out in this study to assess the electric mobility options for the city of Accra, this research showed that opting to deploy electric buses in Accra can derive the most environmental benefits for city dwellers in Accra. This can be achieved when there is a shift from the use of private cars, mini-buses (trotros) and taxis to mass public transport such as the Quality Bus System being run in Accra. Since the buses currently operate on fossil fuel, introducing electric buses in the QBS can therefore generate greater positive impacts in the bid to reduce greenhouse gas emissions in the city's transport sector. A readiness assessment of this electrification

option as presented in this study suggests that though there are barriers to the deployment of electric mobility in Ghana such as absence of charging infrastructure and unreliability of electricity, the general policy environment is supportive of the development of sustainable mass transportation. The policy environment can be capitalized to attract investments into charging infrastructure installation, development of off-grid renewable energy source for charging, and procurement and deployment of electric buses for the operations of the QBS. The realization of this electrification agenda in Accra can be instrumental in achieving the country's emissions abatement goal for the urban transport sector in Ghana.



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