MINISTRY OF SCIENCE, ENERGY, TELECOMMUNICATIONS AND TRANSPORT

ELECTRIC VEHICLE **POLICY**

JUNE 2023



ELECTRIC VEHICLE POLICY

GOVERNMENT OF JAMAICA

JUNE 2023

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List of Acronyms

- AC Alternate Current
- ADA Automobile Dealers Association of Jamaica
- ATF Authorized Treatment Facility
- BEV Battery Electric Vehicle
- BSJ Bureau of Standards of Jamaica
- CAPEX Capital Expenditure
- CO_2 Carbon Dioxide
- CSO Civil Society Organization
- DC Direct Current
- eSAD Electronic Single Administrative Document
- EV Electric Vehicle
- EVSE Electric Vehicle Supply Equipment
- GDP Gross Domestic Product
- GEF Global Environment Facility
- GER Government Electric Regulator
- GHG Greenhouse gas
- GOJ Government of Jamaica
- HEV Hybrid Electric Vehicle
- ICE Internal Combustion Engine
- ICT Information and Communication Technologies
- IDB Inter-American Development Bank
- IEA International Energy Agency
- IRF International Road Federation
- IRP Integrated Resource Plan
- ITA Island Traffic Authority
- JCA Jamaica Customs Agency
- JPS Jamaica Public Service
- JUTC Jamaica Urban Transit Company
- kboe kilo barrel of oil equivalent
- kW kilowatts
- LDV Light-duty vehicle
- LEV Low Emission Vehicle
- LEZ Low Emission Zone
- LIB Lithium-ion Battery
- MEGJC Ministry of Economic Growth and Job Creation

- MFAFT Ministry of Foreign Affairs and Foreign Trade
- MFPS Ministry of Finance and Public Service
- MIIC Ministry of Industry, Investment and Commerce
- MLGRD Ministry of Local Government and Rural Development
- MOEY Ministry of Education and Youth
- MSETT Ministry of Science, Energy, Telecommunications and Transport
- $MtCO_{2eq}$ Million tons of carbon dioxide equivalent
- MTM Ministry of Transport and Mining (Transport Division now within the MSETT)
- MVIP Motor Vehicle Import Policy
- NDC Nationally Determined Contribution
- NEC National Electrical Code
- NEP National Energy Policy
- NEPA National Environment and Planning Agency
- NFC Near Field Communication
- NFPA National Fire Prevention Association
- NRCA Natural Resources Conservation Authority
- NSWMA National Solid Waste Management Authority
- NTP National Transport Policy
- OCHP Open Clearing House Protocol
- OCPI Open Charge Point Interface
- OCPP Open Charge Point Protocol
- OUR Office of Utilities Regulation
- PHEV Plug-in Hybrid Electric Vehicle
- PIOJ Planning Institute of Jamaica
- PPV Public Passenger Vehicle
- PSI Pre-shipment Inspection
- PV Photovoltaic
- R&D&I Research, development and innovation
- R&D Research and development
- RE Renewable Energy
- RET Renewable Energy Technologies
- SBP Strategic Business Plan
- SFEM Strategic Framework for Electric Mobility
- SIDS Small Island Development State
- SUV Sports Utility Vehicle
- TA Transport Authority

- TAJ Tax Administration Jamaica
- TCC Tax Compliance Certificate
- TCO Total cost of ownership
- TBL Trade Board Limited
- TRN Taxpayer Registration Number
- TWG Technical Working Group
- USD United States Dollars
- VAT Value-added tax

Acknowledgements

The Ministry of Science, Energy, Telecommunications and Transport (MSETT) has led the development of Jamaica's first Electric Vehicle Policy (2023) with a wide cross section of stakeholders. Jamaica spends more than US$1.6 billion (2021) a year importing petroleum-based fuel, and the country's transportation sector is dependent on products made from oil. It is firmly believed that the adoption of Electric Vehicles (EVs) in the country will not only alleviate the aforementioned difficulties but also result in job creation and economic advancement with the appropriate governmental framework.

The Ministry of Science, Energy, Telecommunications and Transport wishes to thank the members of the Electric Vehicle Policy Working Group for providing technical support and guidance to the development of this policy. The National Energy Policy 2009 – 2030 provided the overarching framework for the development of this Electric Vehicle Policy.

Notably, we also want to express our gratitude to the members of the Energy Division, Thematic Working Group of the Vision 2030 Jamaica – National Development Plan Monitoring and Evaluation Process as well as the various Ministries and Agencies that contributed by sharing relevant information and taking part in the consultative procedure that is so crucial for the creation of national policies.

Additionally, we would like to thank our International Development Partners for their ongoing support in helping Jamaica advance its energy and transport industries. This support has been particularly helpful as we work to increase energy security, diversify the nation's energy supply and reduce our carbon footprint.

Message from the Minister of Science, Energy, Telecommunication and Transport



The Hon. Daryl Vaz, MP
Minister of Science, Energy, Telecommunication and Transport

The global transportation and energy sectors are at the forefront of a major change. Our existence as a society is under severe threat from changing climatic conditions. As a consequence, global heating is likely to be the greatest existential threat to humanity and various species during this century.

We are already experiencing the effects. According to the Intergovernmental Panel on Climate Change (IPCC) 1.5°C average rise may put 20-30% of species at risk of extinction. If the planet warms by more than 2°C most of the ecosystems will struggle to survive. Many countries around the world are enacting polices to fight this threat. As transportation is one of the largest causes of greenhouse gas emissions, many nations are have introduced electric based transportation to drastically reduce emissions. In fact, many countries are planning to ban all forms of fossil fuel based transportation in the future by at least 2035.

Studies have come to a clear conclusion that if we were to build out any country's transportation system from scratch, the economics alone would dictate that at a minimum the transportation infrastructure would be built up around EVs powered by electricity generated from renewable sources. In 2022, the transportation sector (road, rail, shipping and aviation) represented 58% of petroleum consumed by activity on the island. Imagine the tremendous benefits to our nation's balance of payments if we replaced these imported molecules of petroleum with indigenously produced renewable energy?

A national effort is highly encouraged in making the implementation of EVs a reality by using green energy. The National Electric Vehicle Policy was developed to place the country on a pathway to achieve decarbonization, energy security and sustainability with the potential profound economic benefits.

Executive Summary

Presented in this document is the National Electric Vehicle Policy, which has been designed to achieve:

"The promotion of the deployment of electric vehicles to contribute the reduction of vehicle emissions, decarbonization of electricity generation, deployment of recharging infrastructure and sustainable re-use of batteries."

The creation of this Policy was a specific response to the National Energy Policy 2009-2030, which calls for the development of actions to deal with global trends such as energy conservation and efficiency, climate change, and renewable energy.

Additionally, its foundation is built on the specific objectives outlined in the Strategic Framework of Electric Mobility developed by the Inter-American Development Bank and approved by the Cabinet in March 2021; where, besides including a detailed evaluation of the current situation in Jamaica, different incentives, policies and regulatory frameworks were proposed to maximize the benefits of electric mobility in the island.

This Policy aims to encourage electric vehicle uptake and provide guidelines and the adequate tools for the EV market in the country, whilst setting actions to contribute to the achievement of the EV penetration targets set in the Strategic Framework for Electric Mobility, accounting for 12% of EVs being privately owned fleet by 2030 and, 16% of EVs being public transport fleet by 2030.

As a result, the Policy's main objectives rely on the provision of an overarching framework to:

- Provide guideline tools to increase users' awareness and accessibility to the EV market.
- Provide an interoperable EV charging network throughout the country, ensuring charging options availability for users.
- Enable and promote the development of the EV related ecosystems.
- Provide tools for stakeholders' engagement and commitment in the development of EV related ecosystems and activities.
- Enhance the development of new activities and industries revolving the EV market.
- Promote the development of new business models and stakeholder collaboration to provide users with competitive solutions.
- Incentivize EV adoption by promoting actions to increase EV driving experience for users.

In order to accomplish the previous objectives and embrace EV deployment and adoption in Jamaica, as well as the creation of an EV ecosystem within the country, this Policy establishes six main goals:

1. Develop an enabling environment to guarantee the **penetration of electric vehicle fleet**, by setting a regulatory framework regarding import and registration procedures for both private and public users, as well as promoting alternatives for governmental and public transport fleets.

2. Ensure a dynamic and responsible national system for the deployment of efficient **charging infrastructure** in the island, through a well-established legislative and institutional framework that covers the proper planification, installation, maintenance and the establishment of the minimum standards required to ensure its success.

3. Ensure the existence of a **competitive Electric Vehicle infrastructure market**, developing specific guidelines for the correct operation of the charging infrastructure, ensuring the adoption of interoperability and communication standards and promoting new business models involving the EVSE market.

4. Ensure the development of the adequate framework to guarantee the **proper management of batteries and other EV components** second-life and recycling.

5. Foster **training and development capabilities, promoting world-class training programmes** to develop EV knowledge among technical experts and key professionals.

6. **Incentivize EV use and raise social awareness** among Jamaican population by developing effective communication campaigns and establishing preferential treatment to EVs.

All these goals will be achieved through a mix of short to medium-term actions, as well as long-term strategic priorities for the Government, private sector and civil society.

Background, overview and context

Introduction

Climate change has become a global concern over the last few decades. Sectors such as **electricity and heat or road transport have had a major role in the rapid increase in the global temperature in recent years**. As it is shown in Figure 1, in 2019 both sectors combined represented around 48% of total global greenhouse gas (GHG) emissions (Our World in Data, 2020) [1]. These arise as critical sectors to be targeted in order to reduce their related emissions, so worldwide carbon neutrality goals can be achieved.

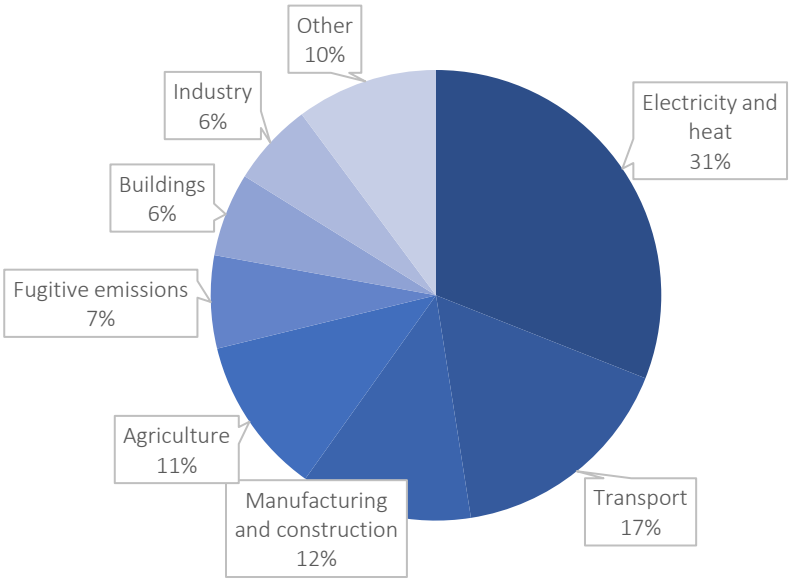


FIGURE 1: *SHARE OF GLOBAL GHG EMISSIONS BY SECTOR, 2019.*

As a result, targets have been set in the most polluting sectors, encouraging to explore the transition towards cleaner solutions and, therefore, reducing GHG emissions. As within the energy sector, special efforts globally have been set on increasing renewable energy (RE) shares, the transport sector has set focus on the development of sustainable transportation technologies, such as the electric vehicles.

Electric mobility is being considered as one of the most relevant solutions to decarbonize the transportation sector, whilst obtaining additional benefits derived from this technology and potential synergies with other sectors and industries.

Amongst all the benefits arising from electric mobility adoption, impacts on reducing GHG emissions are critical considering climate change raising concerns. **The shift from Internal Combustion Energy vehicles (ICE) to EVs will result in a significant reduction in fossil fuel**

consumption from the transportation sector. Furthermore, if the transition to electric mobility is combined with an increasing penetration of renewable energy sources within the energy sector, - subsequent reduction in fossil-fuel dependence and related emissions can be achieved.

Furthermore, additional social, environmental, or economic benefits nation-wide can be achieved from electric mobility adoption, such as:

(i) Electric mobility adoption contributes to increasingly reducing emissions of particulates and other pollutants, which significantly improves air quality and health conditions for the population.

(ii) Electric vehicles are quieter than vehicles with combustion engines, as they do not require mechanical valves, fans or gears of traditional combustion engines. As a result, electric mobility adoption contributes to reducing noise pollution, improving noise quality specially in congested urban areas.

(iii) Electric mobility contributes to reducing fossil-fuel consumption from the transport sector which has increased by 36% since 2009, and therefore impacts the National Balance of Trade and Gross Domestic Product (GDP), through the reduction of fossil-fuel imports dependance.

(iv) Electric mobility sector is relatively recent and has a bright outlook for the future, so it represents a great opportunity for the development of an ecosystem leading the charge of the creation of new businesses models and consequently impacting employment growth rates and national economic growth.

(v) Although the initial investment in electric vehicles is currently higher than internal combustion engine vehicles, if considering the total cost of ownership, electric vehicles represent a more profitable long-term investment for owners and users.

EVs have the potential to solve critical challenges faced by Jamaica in the 21st century. EVs will substantially limit the bill for oil import which is the largest import commodity in Jamaica. Moreover, EVs have a potential to set up a whole new industry in Jamaica, creating numerous green businesses and employment opportunities at the same time it is ameliorating the overall socio-economic situation of the country.

Therefore, the Government of Jamaica (GOJ) has put the spotlight on the development of electric mobility deployment strategies to strengthen the transition into a greener ecosystem, reducing emissions and decarbonizing Jamaican economy. The National Electric Vehicle Policy will strengthen Jamaica's resolve to fight climate change at the national level.

Global EV overview

The world is fast moving towards an electric mobility revolution, as electric vehicles bring in several benefits to the economy. Decarbonization in the energy sector, combined with the electrification of the transportation sector, represents critical drivers to **reduce greenhouse gas emissions**. Improving energy efficiency, reducing the carbon content, and replacing the direct use of fossil fuel with carbon-free energy are some of the main pillars in this regard. In addition, electrification of the transportation sector not only contributes to a reduction of emissions, but it is also an opportunity to increase the support of the path to the energy transition.

Globally, EVs are steadily capturing the automobile industry. They are also being particularly promoted in view of the global commitments to reduce greenhouse gas emissions, considering that the transport sector is one of the major contributors to GHG emissions worldwide.

Due to rapid urbanization, transport infrastructure has increased leading to congestion and pollution. Electric vehicles can improve the above scenario by reducing local concentrations of pollutants in the world. **Many countries have included EVs as key elements of their transportation policies.** Their responses vary according to their stage of economic development, energy resources, technological capabilities and above all political prioritization of their response to climate change.

The electric vehicle market has evolved drastically over the last decade. Compared to 2012, where only 120,000 vehicles were sold worldwide, figures have reached a new high in 2021, amounting up to 6.6 million vehicles. As shown in Figure 2, in 2021, the market share for electric vehicles was around 8.6% worldwide, up from just 2.5% in 2019 (IEA Global EV Data Explorer, 2023) [2]. With this, there are now over 16.5 million electric vehicles on the road worldwide, which is three times more than there were in 2018. **With 2 million electric vehicle sales in the first quarter of 2022, a 75% increase over the same time in 2021, the market for electric vehicles has continued to grow rapidly.**

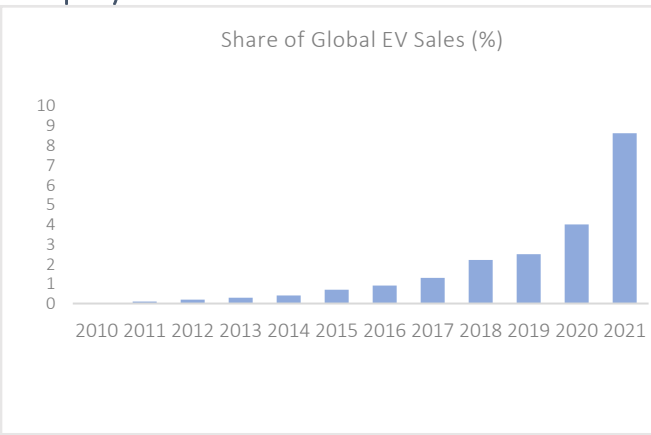


FIGURE 2: *SHARE OF GLOBAL EV SALES (%).*

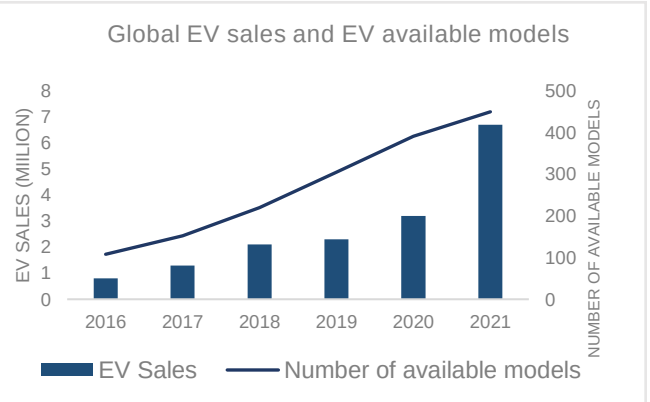


FIGURE 3: *GLOBAL EV SALES AND AVAILABLE MODELS.*

It must be noted that the increase in EV sales in 2021 was primarily led by China, where 3.3 million vehicles were sold, accounting for half of the global EV growth, followed by Europe and United States.

Furthermore, technology evolution and the availability of EVs during the last years, have contributed to the growth in EV sales. Electric vehicle models have increased over 15% in 2021, where around 450 electric vehicle models were available.

Another determining factor in the increasing presence and relevance of electric mobility is technology. Progress in development of batteries has led to rapid commercialization in the past few years of more and more models in even heavier weight segments and with increasing ranges. What's more, according to various forecasts the battery prices are falling rapidly, reducing notably capital cost of EVs.

In addition, **considering that driving range is one of main concerns towards establishing sustainable electric mobility adoption, technology solutions have been made available for users**, and are expected to increasingly evolve. EVs growth rates are impacted by the availability of EV models equipped with larger batteries that enable a higher driving range option. Nevertheless, this situation is still conditioned by increased resource needs and the derived increase in the vehicle price.

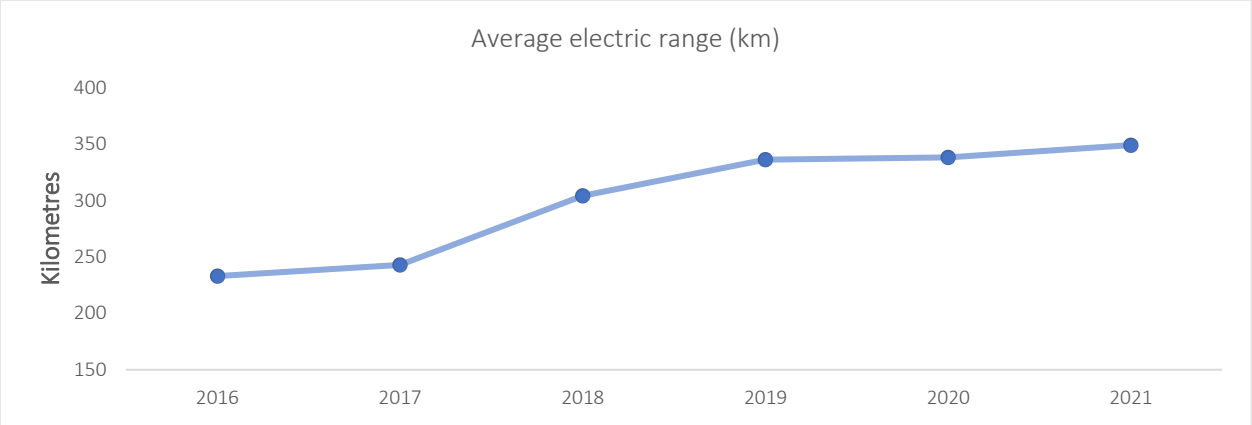


FIGURE 3: *EVOLUTION OF AVERAGE RANGE OF ELECTRIC VEHICLES (GLOBAL ELECTRIC VEHICLE OUTLOOK 2022).*

EV adoption development has had a different degree of roll out and success in different regions. Nearly two thirds of the global market for electric vehicles are accounted for by China, Europe, and the United States (combined sales accounted for approximately 95% of global EV sales in 2021). Moreover, less than 0.5% of all sales in developing nations like Brazil, India, and Indonesia are made up of electric vehicles, yet there has been significant development in recent years despite the low sales levels. However, there have been encouraging developments in 2021, which

may have hinted to more promising futures. In 2021, EV sales in emerging regions soared to previously unheard-of heights: in Asia, they more than doubled to 33,000 units; in Eastern Europe, Central Asia, and West Asia, they reached 32,000 vehicles; **and in Latin America and the Caribbean, they have reached 18,000 vehicles** (Global Electric Vehicle Outlook 2022).

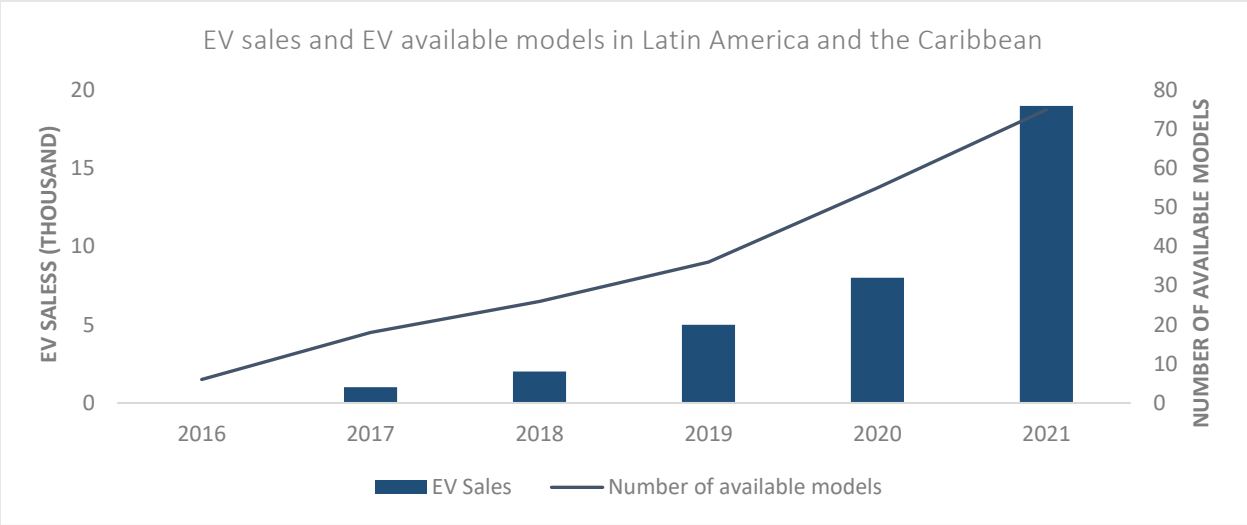


FIGURE 4: *EV SALES AND EV AVAILABLE MODELS IN LATIN AMERICA AND THE CARIBBEAN.*

However, the degree of adoption needs to further take into consideration the different approaches that have been adopted around the world to promote and enhance EVs adoption. Policy support is considered as one of the drivers to promote electric mobility adoption.

Some countries have announced plans to completely halt the sale of ICE vehicles:

(i) The **European Union** agreed to a ban on the sale of new petrol and diesel cars from 2035, although further discussions in March 2023 have resulted in permitting sales and registration of internal-combustion engine models after the 2035 deadline providing those vehicles operate only on carbon-neutral fuels (e-fuels).

(ii) In the **United States**, the entire fleet of government-owned ICE vehicles will be phased-out and will be replaced with electric vehicles by 2035-2040, while all privately-owned light-duty vehicles with ICE engines will be replaced with EVs by 2050.

(iii) **China** plans to phase out conventional gas-burning cars by 2035. Of all new vehicles sold that year, 50% are to be "new-energy" vehicles (electric, plug-in hybrid or fuel cell-powered) and the other half are to be hybrids.

(iv) Costa Rica has proposed in its National Decarbonization Plan that 100% of sales of new light vehicles for the transport of people and goods will be zero-emission by no later than 2050.

(v) The island of Cape Verde is targeting to prohibit the importation of ICE vehicles that use fossil fuel from 2035, to only allow the acquisition of electric vehicles.

Furthermore, major automakers have considered within their strategic actions to accelerate the transition to electric mobility, as well as, setting electric vehicles sales targets. Announcements have been made around automaker plans for new product lines development and manufacturing capacity conversion. Some examples that can be highlighted are as follows [3]:

- Volvo has announced its commitment to becoming a fully electric car company by 2030.
- Mercedes announced that from 2025 all new launched vehicles will be fully electric.
- Toyota, Volkswagen, Hyundai, and Kia, among others, have set ambitious targets on electric vehicle sales shares to be achieved by 2030.

Overall, more than 120 countries (accounting for around 85% of the global road vehicle fleet, excluding two/three-wheelers) have announced economy-wide net-zero emissions pledges that aim to reach net zero in the coming few decades.

The expansion of electric mobility does not only occur in larger economies, as EVs are also gaining ground and making progress in developing and emerging countries. Some cases where their deployment is being carried out successfully are:

(i) India: this country has announced to increase their share of EV sale to 30% and completely shift to all electric buses by 2030. India also plans on establishing a huge network of charging infrastructure with at least one charging facility available in each 3x3 km block in cities and every 25 km along both sides of national highways.

(ii) Barbados: the quantity of renewable energy vehicles as a share of total number of vehicles imported has been steadily increasing over the last two years on this island, becoming one of the world's top users of electric vehicles. Out of the total alternative energy vehicles imported by 2022, 74.6% were hybrids, 24.7% were battery electric and the remainder were either fuel cell or natural gas vehicles.

This impulse of electric mobility has been, in large part, due to the measures and consistent policies developed and supported by governments, these being a trigger for mass adoption of electric vehicles and contributing to their popularity.

It must be highlighted that public subsidies and financial incentive mechanisms, that contribute to reduce upfront costs of EVs, have been a key driver to promote and accelerate electric mobility

adoption in the last years. These actions are being continued to promote a sustainable growth on EVs adoption. Furthermore, Governments' purchase subsidies and tax waivers for EVs adoption doubled in 2021 to nearly USD 30 billion (Global EV Outlook, 2022).

Although fiscal benefits are often the most common, other incentives such as preferential treatment for EVs (free parking spaces, development of zones where only EVs can access, access to special lanes, etc.) have also played a major role in promoting electric mobility. Figure 6 includes some of these measures that have been adopted internationally.

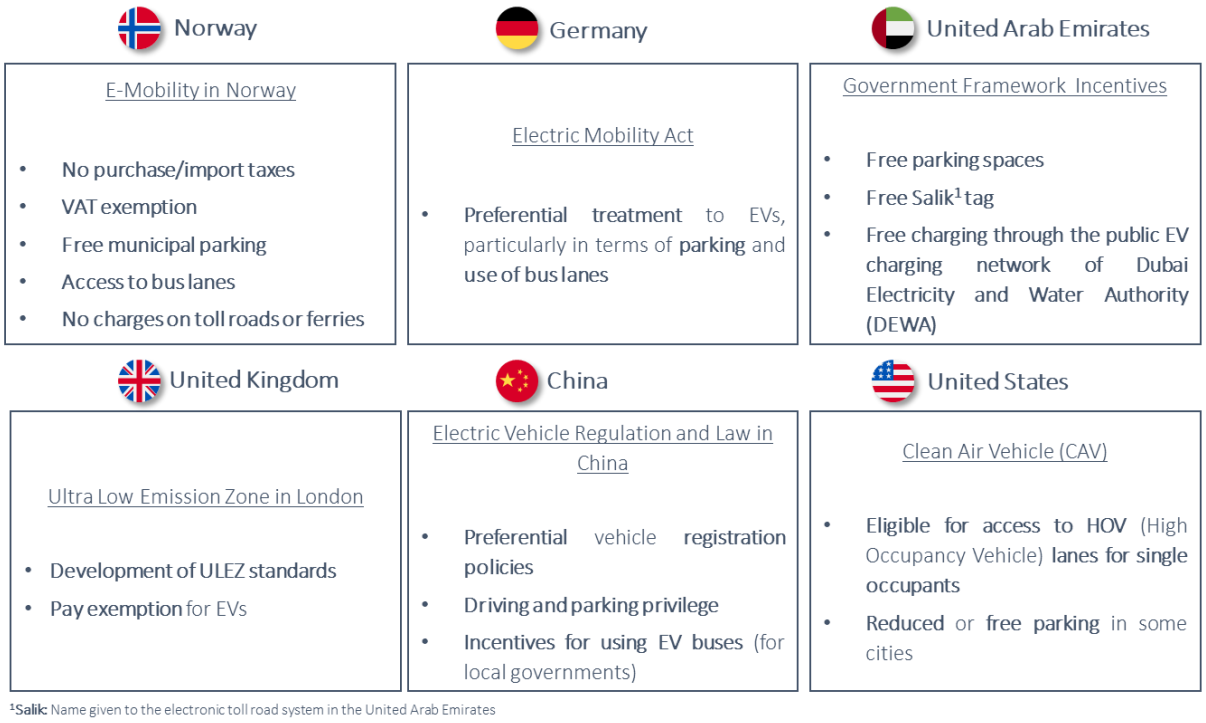


FIGURE 5: *POLICY INCENTIVES FOR EVS IN OTHER COUNTRIES.*

Furthermore, it must be noted that policy attention and actions need go further and broaden to other transport modes, in particular commercial vehicles – light-commercial vehicles, medium- and heavy-duty trucks, and buses – as they have an increasing and disproportionate impact on energy use, air pollution and CO_2 emissions. Medium- and heavy-duty vehicles represent 5% of all four-wheeled road vehicles in circulation but almost 30% of CO_2 emissions.

Jamaican context

GHG emissions in Jamaica

In 2019, Jamaica's total GHG emissions accounted for approximately 11.94 million tons of carbon dioxide equivalent ($MtCO_{2eq}$) (Our World in Data, 2020). As stated in Figure 7, GHG emissions were mainly dominated by the electricity and heat sector, which represented more than 24.2% of the total GHG emissions, followed by the transport and manufacturing and construction sector emissions which accounted for 21.3% and 19.5% of total GHG emissions respectively [4].

These emissions are highly related to the dependence on fossil fuels in these sectors. Hence, the Government of Jamaica is highly committed towards the reduction of greenhouse gas emissions in order to mitigate the dependence on fossil fuels in the main sectors and achieve social and economic benefits, improving the country's public health and decreasing fuel imports.

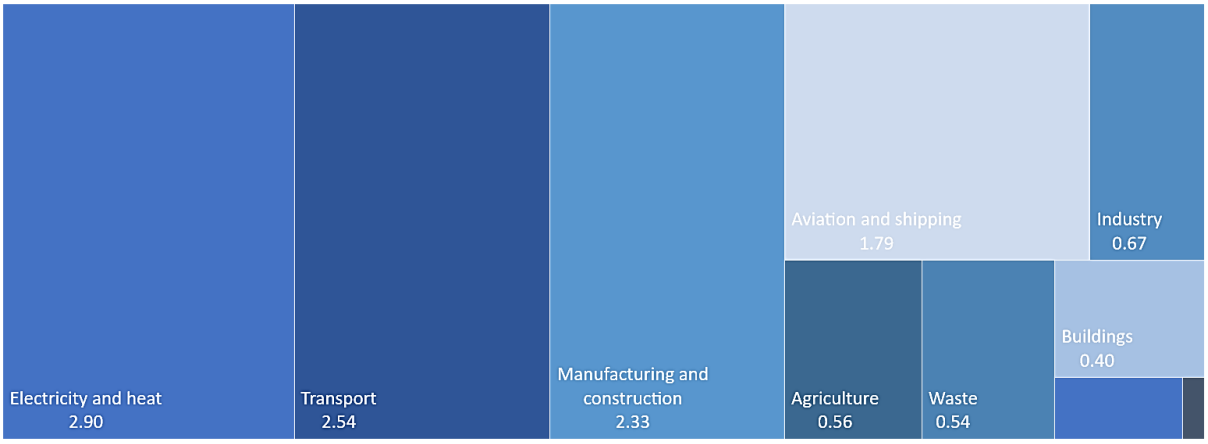


FIGURE 6: *GHG EMISSIONS BY SECTOR IN JAMAICA IN $MtCO_{2EQ}$ MILLIONS CO_2EQ, 2019.*

It must be highlighted that Jamaica remains committed to making its contribution as the world moves to address the challenge of climate change. Therefore, Jamaica has increased its ambition of the mitigation component of its Nationally Determined Contribution (NDC), aligned with the Paris Agreement requirements.

The energy sector in Jamaica

Due to the adoption of the nation's first long-term National Energy Policy (NEP) 2009–2030, the development of Jamaica's energy sector shows great promise in reducing reliance on imported petroleum, lowering consumer energy costs, and creating a framework for better use of energy

through energy conservation and efficiency by all Jamaicans. To address the situation where the energy sector is "marked by an almost full dependency on imported petroleum; high rates of energy use; and an inadequate policy and regulatory framework," the national policy was promulgated in 2009.

Considering the country's heavy reliance on imported petroleum, which consumes 87% of its foreign exchange earnings, there are major economic effects. Using energy in Jamaica to suit its varied demand, Jamaica currently uses roughly 60,000 barrels of oil each day. The amount of annual oil imports decreased from 23.6 million barrels in 1999 to around 22.1 million barrels in 2009 over the course of the preceding ten years, reflecting an average annual fall of 1%.

Only 6.6% of Jamaica's primary energy comes from domestic sources, making it severely dependent on imported fossil fuels like most Caribbean islands. Without considering the usage of bagasse by the sugar industry (1.3%), fuelwood (2.8%), and charcoal (0.9%), the percentage of domestic renewable energy technologies such as hydro, wind, and solar photovoltaic (PV) is only close to 1.5%.

This heavy dependence on fossil fuels can also be seen in the energy generation sector. **In 2021, in Jamaica, 88% of the country's primary energy came from imported fossil fuels** (petroleum and liquid natural gas, which has only recently been made available in the island), **with renewable resources making up 12% of the mix**. The most relevant renewable energy sources are wind, hydro and solar (Figure 8) (OLADE, 2023) [5].

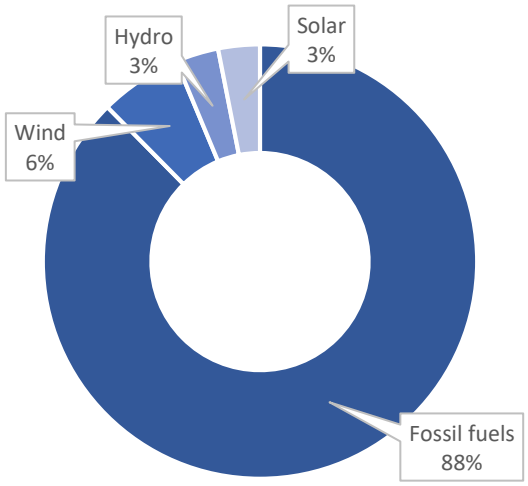


FIGURE 7: *ENERGY GENERATION BY FUEL SOURCE IN JAMAICA IN 2021*.

Considering the foregoing, the increase of renewable energy resources into a greener energy mix is crucial to support the decrease of GHG emission targets and to achieve Jamaican government ambitious goals of raising the share of RE up to 50% by 2030.

Jamaica has refinery capacity for crude oil equivalent to 36% of primary demand, from which it obtains fuel oil, transportation fuels (gasoline, diesel, jet fuel), and residue products (bitumen and asphalt). The greater portion of oil derivatives are imported at a rate of 10,480 kilo barrel of oil equivalent (kboe) per year (50.8% of primary supply), including gasoline (15.4%), diesel oil (10.2%), and fuel oil (24.1%).

The bauxite and alumina industries import 31% of the total amount of fuel oil used (5,247.3 kboe per year). The cement industry imports fossil coal (2.1%) for the manufacturing of clinker, whereas natural gas makes up 2.5% of all energy use. In 2019, the refinery (Petrojam) and marketing companies imported USD 1,461 million worth of petroleum, totaling USD 1,618 million when accounting for the bauxite industry [6].

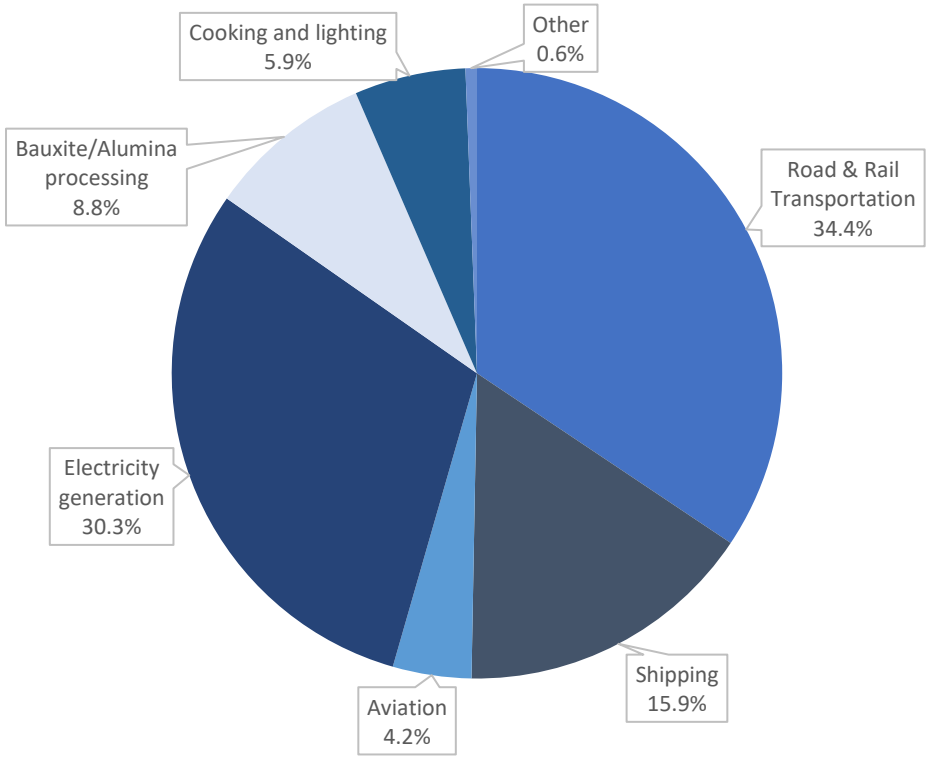


FIGURE 8: *PETROLEUM CONSUMPTION BY ACTIVITY IN 2021 IN JAMAICA.*

Figure 9 shows the country's total consumption of petroleum by activity in 2021 [6] (Jamaica Energy Statistics 2021, MSETT). Road and rail transportation accounted for 34.4% of total consumption,

while electrical production made up 30.3%. The consumption of shipping and bauxite/alumina processing are also significant, accounting for 15.9% and 8.8% respectively.

Energy security and efficiency are envisioned as National Outcome #10 in the country's overarching policy document Vision 2030 Jamaica - National Development Plan (2009), which also lists diversification, competitive energy cost levels, and environmental sustainability as significant themes. The effect of local pollution on public health is a problem when it comes to the road transportation industry. A wide range of initiatives, including more energy-efficient automobiles, alternative energy vehicles, and improved mass transit, must be taken to promote energy efficiency in the transportation sector.

Renewable energy sources in Jamaica

Jamaica has a great renewable energy potential and opportunities for the development of RE throughout the island. In fact, Jamaica is relatively advanced in the development of renewable energy, surpassing several Caribbean countries. These resources include wind, biomass, mini-hydro and photovoltaic energy. In addition, the potential for the conversion of waste to energy, and biofuels is being explored.

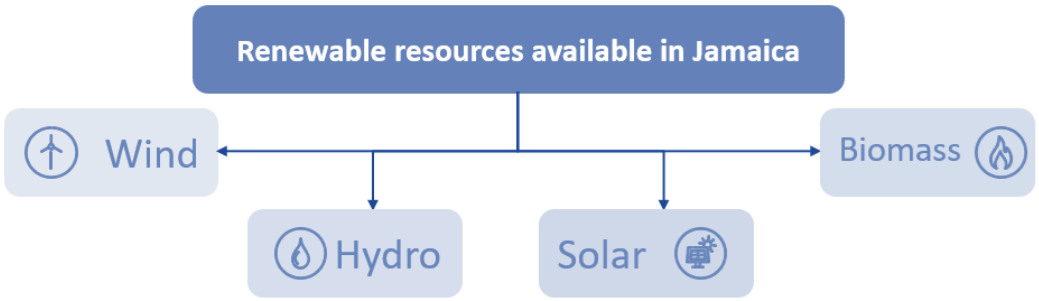


FIGURE 9: *MAIN RENEWABLE ENERGY RESOURCES AVAILABLE IN JAMAICA.*

In 2021, renewable technologies accounted for just under 13% of the energy generation in the island. This figure, however, is set to increase considerably in the coming years, as Jamaica is committed to meeting climate targets to decarbonize the country. As a result, following the Cabinet's mandate, Jamaica aims to **produce 50% of its electricity coming from renewable sources by 2030**.

All in all, electric mobility represents a great opportunity to reach this goal, as a way to increase renewable energy resources into the generation mix and mitigate variability of supply via electric mobility distributed storage capacity.

Electric vehicles and renewable energy sources offer the potential to substantially decrease carbon emissions from both the transport and power generation sectors of the economy. Different positive impacts can be expected from the introduction of EVs, including lower vehicle operating costs, reduced CO_2 emissions and the ability to support and contribute to grid power quality and stability when the right infrastructure is adopted. One of the most significant benefits is the ability of EVs to assist in the integration of renewable energy sources into the electric grid. It should be highlighted that, while the deployment of electric vehicles can partly reduce some of the negative impacts of large-scale renewable deployment, other methods and technologies are likely needed to integrate a high penetration of RE.

Additionally, there are existing **synergies between electric vehicle technology and self-consumption**, which means the potential for renewable energy to increase in Jamaica. The synergy is understood as distributed storage combined with distributed generation, enabling electric vehicles to act as vehicle-to-home solutions once the right grid infrastructure upgrades are in place.

The benefits swiftly rise if the users are incentivized to adopt self-consumption that will upturn electricity network reliance and decrease fuel dependence as well as greenhouse gas emissions.

The transport sector in Jamaica

According to the World Road Statistics 2022 developed by the International Road Federation (IRF, 2023), in 2020 the national fleet consisted of almost 723,000 four-wheeler vehicles (data includes passenger cars, vans, pickups, lorries, road tractors, buses and motor coaches), and around 20,000 two-wheeler vehicles [7]. As practically all automobiles of the total national fleet are conventional ICE vehicles, **the country's transportation sector is still heavily dependent on products made from oil.**

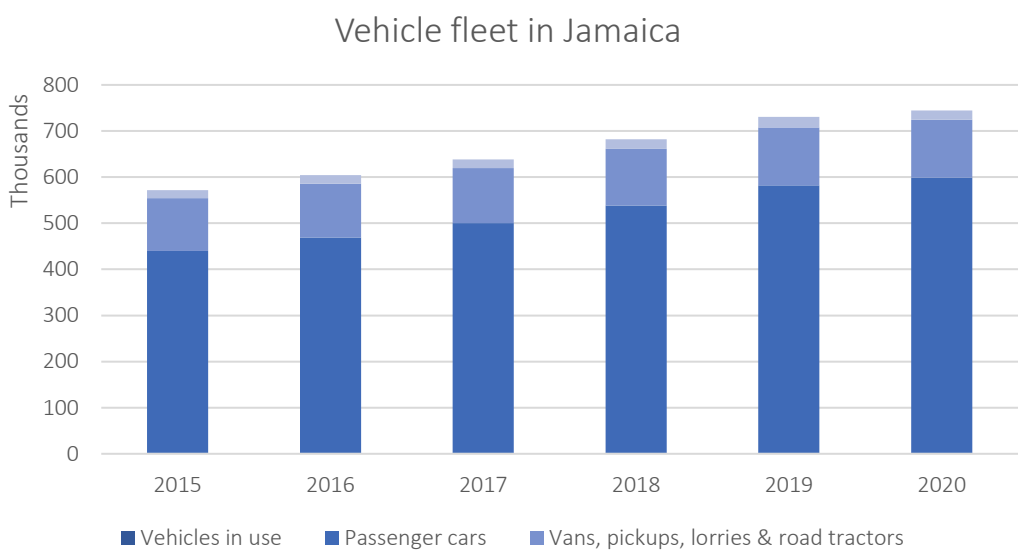


FIGURE 10: *VEHICLE FLEET IN JAMAICA THROUGH THE YEARS (2015-2020).*

Jamaica is experiencing **an increase in the number of registered EVs**: while there were only **10** EVs registered in **2018**, this number has increased to **150** by the end of **2022** [8].

The then Ministry of Transport and Mining (MTM), whose Transport Division is now subsumed within the MSETT, has responsibility for all elements of the transportation sector in the country, and the National Transport Policy (NTP, 2007 developed under the then MTM) serves as the policy framework. Environmental preservation and energy efficiency have been given top priority by the NTP in recent years. Within the then MTM's Strategic Business Plan, special focus has been set related to:

(i) Modernizing national transportation policy, specifically:

a. Incorporating new strategies and trends in the sector.

b. Establishing a framework for environmentally sound transportation infrastructure and services in support of sustainable economic and social growth.

(ii) Land transportation, to rationalize the land transportation system by including alternatives like Uber and electric cars.

The 2007 NTP is currently under review by the MSETT, in order to incorporate and reflect the new mobility realities within the transportation sector.

Potential for the development of Jamaica's EV sector

Electric vehicles have several benefits, particularly for oil-dependent island developing states where switching from internal combustion engines to EVs will significantly boost energy security and lower greenhouse gas emissions. **Adoption of EVs will also support in achieving the goals set forth by the Government of Jamaica in its National Energy Policy 2009-2030, including fuel diversity, energy efficiency, and the development of renewable energy sources**.

Even when they are driven by electricity produced from oil derivatives, EVs are about 50% more efficient at converting liquid fuels to motive power. This indicates that even with Jamaica's current fuel mix and energy rates, it costs roughly 50% less to drive an EV the same distance as an ICE vehicle.

An important goal in the switch to electric transportation should be to produce enough electricity from renewable sources to power EVs, which eliminates the need for oil in the process. Renewable energy systems have already been installed in Jamaican homes and businesses to help them produce their own electricity and cut energy expenditures. Jamaicans can increase their level of energy independence by adding charging infrastructure to these "distributed generating" systems for private use.

In Jamaica, 95% of the population has access to electricity supply. The infrastructure for supplying energy typically follows the main routes on the island. The placement of EV charging stations is not seen as a barrier or restriction to the deployment of EVs in Jamaica due to the size of the country's road network and the accessibility of its electricity supply infrastructure. However, additional investments in EV charging and related local distribution grid infrastructure will be needed to directly support EV penetration. A stable and priced energy grid is the essential infrastructure to support the introduction of EVs. This will serve as the foundational infrastructure for the electrification of the transportation industry initially.

The adoption of EVs will reduce Jamaica's current reliance on fossil fuels because the transportation industry is the most dependent on petroleum usage. With distributed storage capacity, EVs offer a chance to expand renewable energy sources and reduce supply variability.

When combined with an energy mix strategy that uses more renewable and low-emission energy generation technologies, the levels of dependence on fossil fuels will be reduced even more. In the energy sector, natural gas is also being used to replace power plants that burn fuel with a high sulfide content.

Combining EVs with the network grid digitalization offers the chance to enhance renewable energy sources while also balancing network load and congestion. The increase of renewable energy will

be supported by addressing coordinated charging, electricity demand management, and power production, which will also help to improve the network grid's supply security. The network-wide grid enhancement projects that Jamaica Public Service is currently investing in will help with the adoption of EVs, such as efforts to standardize voltage in the transmission and distribution systems.

Promoting EVs in heavily utilized transportation modes and deploying it in densely populated areas can reduce traffic congestion, as well as localized emissions and enhance air quality. The existing land transport model contributes to a concentration of pollutants, such as particles, in the major urban centers, in addition to greenhouse gas emissions.

Better air quality and reduced "localized emissions" should have a big influence on Jamaica's health and environment. The development of an ecosystem for EVs will lead to new ventures and activities that will boost the economy and create jobs.

On the other hand, integration of self-consumption is an increasingly widespread possibility and a popular option among consumers, giving the user the chance to find potential cost-reduction strategies. According to the International Energy Agency (IEA) Global EV Outlook 2021, 9.5 million (about 88%) of all light-duty vehicle (LDV) chargers were private in 2020 [9]. The primary factors influencing the prevalence of private charging are convenience, cost efficiency, and a range of support measures (such as preferred rates, equipment purchase incentives, and rebates). Private residences and workplaces are the preferred places to charge EVs in many EV markets. Most homes already have the bare necessities for in-home charging, such as a compatible electrical outlet and charger plug. Public chargers are thought to make up just about 12% of LDV chargers globally.

To this end, it must be noted that Jamaica has taken steps in the last years, towards the adoption of electric vehicles and providing charging infrastructure services in the island. Jamaica has increased the number of registered electric vehicles up to 150 registered vehicles as of March 2022 according to CARICOM [8].

Jamaica's environment and climate change commitment can also be seen in the development of measures such as the launch in January 2023 of the first public passenger battery electric bus in the country. This pilot programme is still underway, as Jamaica Urban Transit Company (JUTC) is still testing the vehicle to gather empirical data to determine the next steps regarding electric buses with the aim of deploying more electric buses in the short-term.

Additionally, efforts have been made related to the deployment of available public charging infrastructure in the island. In March 2022, there were 25 charging points in the country [8], but it is expected that a higher number of charging stations will be reached in coming years as a result

of the initiatives related to the installation of new charging stations carried out by JPS and other private agents (e.g., Evergo).

National Policy Objectives

Policy Framework

As a result of Jamaica's commitment to tackle climate change and mitigate its detrimental effects, the country has developed different policies and plans addressing this subject.

Jamaica has created several laws and programmes aimed at lowering emissions and air pollution. The Vision 2030: National Development Plan for Jamaica offers a thorough planning framework that integrates the governmental, social, economic, and environmental facets of national development. Energy supply diversification and the promotion of energy efficiency and conservation are also part of Vision 2030. Vision 2030 Statement 6 specifically calls for "An energy sector backed by databases that are reliable and exact to enable analysis, forecasting, and general management of the sector, particularly information relating to the transportation sector."

In addition, Jamaica's National Energy Policy 2009-2030 approved by the Cabinet in October 2009, represents the revision to the energy Policy Green Paper 2006-2020, which seeks to ease the adoption of a comprehensive programme of efficiency improvement and energy diversification to provide high-quality, affordable, environmentally friendly energy and to reduce the country's dependence on high cost imported oil. The Energy Policy recognized the key role and importance of energy in the socio-economic and development of the country.

The National Energy Policy 2009-2030, created by the MSETT, governing the energy industry, the Goal 1 – " Jamaican's use energy wisely and aggressively pursue opportunities for conservation and efficiency," contemplates the following areas such as energy supply security through fuel and renewable energy technologies (RET) diversification, modernization of Jamaica's energy infrastructure, development of RE sources like solar and hydro, energy conservation and efficiency and the development of a thorough governance structure.

The National Transport Policy (NTP), under the MSETT, responsible for all elements of the transportation sector, seeks to increase Jamaica's competitiveness in the global environment, through lowering of transport costs, and help foster economic growth, and to underpin continued human development by attracting overseas investments. Amongst the key strategic areas of action considered within the NTP, the promotion of energy conservation and environmental protection is one of the strategic objectives pursued by the transportation sector.

Jamaica has also updated the Petroleum Quality Control Act (1990), the Air Quality Regulations (1996) of the former Natural Resources Conservation Authority (NRCA), and the Motor Vehicle Emissions Standards. A license scheme based on the levels of air pollutant emission is one of the aspects of the regulation of air quality.

In addition, the then MTM (now the MSETT) released its Operational Plan (2019/20-2020/21) and Integrated Strategic Business Plan (SBP) 2019-2023. The strategic objectives of the SBP are to: "establish an integrated transport system that facilitates greater land, rail, air and sea connectivity to increase services and the efficient movement of people and goods across the island"; and to "promote energy efficiency and conservation practices in all aspects of business".

In February 2020, the government of Jamaica approved the **Integrated Resource Plan (IRP)** making out a 20-year plan with the aim of delivering investment of around USD 7.3 billion in the electricity sector by 2037 (IEA, 2022). The IRP, among other measures, aims to provide a 1,600 MW increase in energy capacity by 2037.

The needs and challenges of the energy and transportation sectors in order to reduce the carbon footprint and mitigate the impact of climate change have become very significant tasks. As a result, Jamaica has set a **target to reduce emissions between 7.8% and 10% below a business-as-usual scenario mainly from the energy sector by 2030,** as stated in The Nationally Determined Contribution (NDC) of the United Framework Convention in Climate Change.

Concurrently with the aforementioned policies, the Cabinet approved in March 2021 the **Strategic Framework for Electric Mobility** (SFEM) developed by the Inter-American Development Bank (IDB) where different incentives, policies, regulatory frameworks and business models were proposed in order to maximize the benefits of electric mobility deployment in the country, as well as the creation of a new ecosystem. The Framework included an **integrated diagnostic assessment of the current situation in Jamaica, as well as a shared vision and collection of stakeholder perspectives on electric mobility**. The foundation of this EV Policy is built on the specific and measurable objectives outlined in the Strategic Framework, with established targets, based on the development of a scenario modelling assessment.

The Strategic Framework assesses four (4) possibilities for EV adoption in Jamaica, each with its own combination of incentives and regulations, as well as outlining the necessary steps to encourage electric mobility adoption in the country, considering the following areas of action:

1. Tax policy and fiscal considerations related to incentive mechanisms to promote electric mobility adoption.
2. The need to develop technical, efficiency, and interoperability standards.
3. Areas of action to enhance the energy sector readiness.
4. Areas of action to enhance the transport sector readiness.
5. The development of the electric mobility ecosystem.

The Strategic Framework strives to maximize the development and full-benefit deployment of EVs on the Jamaican society.

Furthermore, the Strategic Framework establishes Jamaica's overall electric mobility penetration targets to be achieved by 2030. The targets set in the Strategic Framework for Electric Mobility account for **12% of EVs of privately owned fleet by 2030 and, 16% of EVs of public transport fleet by 2030.**

The implementation of an electric vehicle policy is becoming increasingly necessary considering the growing threat of climate change and the need for sustainable development. Additionally, an electric vehicle policy aims to support and promote job creation in the electric vehicle industry, which can help to stimulate the economy. Finally, it aims to promote the use of renewable energy sources, further reducing greenhouse gas emissions from the transportation sector due to the introduction of fuel-efficient green technologies and ensuring environmental sustainability by reducing pollution.

National Policies are key players of Government mechanisms to stimulate the economic development and growth. Thus, the implementation of a National Policy effectively is a key aspect to carry out when moving towards a new paradigm since there are great uncertainties related to electric mobility deployment and the ecosystem surrounding its adoption. Thus, through Green Economy initiatives there will be an increase in employment generation.

Scope of the Policy

The policy is geared towards **reaching the goal of energy efficiency and a cleaner environment**. The policy seeks to provide the overarching framework for associated ecosystems for electric vehicles through a three-phased strategy that comprises market expansion and public awareness, alternative to petroleum-based vehicles and local adoption to reach the penetration goals for electric vehicles.

Market expansion and public awareness	Alternative to petroleum-based vehicles	Local adoption
Establish standard for EV charging infrastructure.	Promotion of the use of fuel-efficient vehicles such as hybrid vehicles.	Conversion of Government fleet to EVs.
Provide incentives for the importation of EVs.	Promotion of net-zero emission vehicles.	Conversion of public transportation fleet to EVs.
Raise public awareness through conferences and campaigns.		

Undertake legislative/regulatory reform to address any apparent restriction to the establishment of a competitive EV market.		
Develop a legal/regulatory framework to address participation and competition in the EV charging market.		

TABLE 1: *THREE-PHASED STRATEGY FOR ELECTRIC VEHICLES.*

Therefore, the need to develop an effective National Electric Vehicle Policy in Jamaica, which is led by the MSETT, and will be based on the following:

(i) Introduction of incentive measures to accelerate the shift to sustainable mobility.

(ii) Keeping up to date with technological innovations in the automotive sector.

(iii) Manage and mitigate market uncertainty.

(iv) Provide regulatory certainty.

(v) Creation of a uniform policy across the country.

Electric vehicles considered under the scope of the policy include light-duty automobiles, medium- and heavy-duty electric vehicles and electric micro mobility (three and two wheelers).

Limitations of the Policy

Jamaica being a developing country, with less developed road infrastructure and facing limitations in providing specific funding and subsidies for EVs, may subsequently face the following problems, which need solutions through coordination amongst various government agencies and stakeholders.

1. Inexistence of vehicle retirement and replacement plans. No vehicle retirement policy is currently in place in Jamaica, therefore the treatment of aged vehicles (cars, buses, and trucks) comprising the national vehicle fleet that are a main source of emission will require to be addressed in order to achieve further reduction on emissions from the transport sector.

2. EVs pricing is considered still high over internal combustion engine vehicles. EVs are a costly option, especially considering the initial upfront costs that are required, as the battery cost constitutes a significant share of the total cost of the vehicle and normally lasts at least a decade before needing replacement. The investment required to shift from internal combustion engine vehicles to electric vehicles may be considered as a

stopper by the Jamaican population. Incentivizing EV adoption to make it more attractive for users' needs to be addressed.

3. Road development is required to enable EVs adoption. The road infrastructure in Jamaica, especially in the lesser developed parts of the country, does not suit EVs which are expected to be sophisticated and light weight vehicles.

4. No dedicated funding is available to support gradual import substitution through localization which may bring down costs of EV specific parts in future. Standardization, quality, and safety of equipment will be a challenge in view of less developed conformity assessment mechanism in Jamaica.

Barriers and challenges

Despite the potential for global adoption and the progress that has already been made, several obstacles that are, in some form or another, prevalent in most nations throughout the world, are impeding the acceptance of EVs.

Specifically to Jamaica, these barriers include [8]:

1. The institutional capacity and policy framework.
2. The availability of technology, such as EVs, charging infrastructure, and deployment thereof.
3. Business models and skills for delivering EVs.
4. The high upfront purchase cost for an EV.
5. The availability of information and the lack of public awareness.

(i) The institutional capacity and policy framework

EV requires the cooperation between energy policy and planning, and the transport policy. The Ministry of Finance and Public Service (MFPS), Jamaica Customs Agency (JCA) and the Tax Authority (TAJ) are responsible for collecting taxes, which are lost because of the conversion from diesel and gasoline to electric charging. Setting goals and developing a road map can be done using the recently passed Electricity Act, IRP and the Strategic Framework for Electric Mobility. Jamaica's (draft) Green Paper on Hazardous Garbage Management, submitted to the Cabinet in December 2020, is also pertinent because it addresses how to treat the electronic waste and EV batteries produced by EV systems.

EV technology is new, and its possibilities and ramifications for Jamaica are not yet fully grasped, despite the skills available inside GOJ. The GOJ might designate focal points to advance the EV

agenda and mainstream technical issues into sector policies and strategies to increase human capacity and knowledge. The GOJ recently organized a Technical Working Group for this aim (TWG). The GOJ is expanding its capacity in several areas, such as technical standards, updating traffic laws, registering electric vehicles, financial and tax policies, and public procurement. The Bureau of Standards of Jamaica (BSJ), the Transport Authority (TA), the Island Traffic Authority (ITA), the TAJ, and staff from the technical divisions of the ministries are among the organizations involved in public administration.

In 2021 an EV Council was established to oversee a consultative process on the introduction of electric mobility, give oversight and review any policies, legislation and regulations related to the deployment of EVs in Jamaica, and comment and provide feedback on matters relating to safety and suitability of EV technologies contemplated for Jamaica. The EV Council also responds to queries or concerns from stakeholders within a reasonable time period; and advises the Minister with responsibility for Energy, regarding the extent to which the strategic framework is being implemented.

The Council held its first meeting on May 14, 2021, and approved the e-mobility strategic framework.

(ii) Technology availability

Jamaica faces difficulties with the adoption of EV technology because EVs and their supporting infrastructure must be imported from developed nations. In the absence of experiences under local conditions, specialized training, and research programmes, the necessary skill set is not yet in place. A comprehensive EV supply chain, EV repair and maintenance services, waste management, and a product offering that is affordable for a large part of society are all required components of an integrated EV ecosystem.

To effectively dispatch rolling stock for public bus transportation, operators like JUTC must create new strategies. For EVs, this depends on factors like battery autonomy, the design of the EV charging network and its characteristics, technology availability on motor power rating of EV buses to support public transportation systems, road conditions, and financial constraints.

Given the requirement for a comprehensive approach, Jamaica might gain from the sharing of experiences by EV bus operators in the region under the Global Programme, as well as toolkits created for nations with similar features to Jamaica.

The limited motivation for technical advancements in the transportation industry is a systemic barrier; in practice, capital assets frequently totally depreciate, and the business model is dependent on operational expenses and revenues. This predicament can be attributed to Jamaica’s status as a lower middle-income nation, where most of the populace lacks the purchasing power necessary to pay for a good standard of service. This method of doing business discourages the use of new technologies and the benefits they provide. The introduction of EV

buses presents a chance to bring about change, but it will require proper long-term financial and policy support to enable investment recovery.

Regarding private EV users, the current low number of available EV charging infrastructure limits opportunities for the general public to adopt electric mobility and presents a challenge to existing users of EVs who may not have enough options for refueling.

(iii) Business models and skills for delivering EVs

As part of the envisioned "environment", electric mobility necessitates the development of new human abilities. The Strategic Framework for Electric Mobility (SFEM), for instance, offers an analysis. First responders, such as police officers, firefighters, and ambulance staff, as well as mechanics for automobiles, are key agents. By certifying candidates and using training programmes that have been approved, confidence and safety components can be ingrained throughout the value chain.

Universities, as well as representatives from the public and private sectors, should do research and analysis on EV. Notably, EV will be used as part of an all-encompassing and systemic strategy to mobility concerns. For this reason, the SFEM suggests rewarding research, development and innovation (R&D&I) initiatives that could create connections between fields including engineering, social sciences, urban planning, economics, and policy. However, given Jamaica's advantageous position in relation to information and communication technologies (ICT), electric mobility can present considerable chances for the country to establish creative start-up businesses.

For the Jamaican market, specific business models are required for the ecosystem's following components:

(i) Ownership and deployment of EV charging stations.

(ii) Financing and leasing of EVs, including (capital-intensive) buses.

(iii) Re-use and recycling of EV batteries. Gas stations are becoming multi-fuel in several nations, offering energy for EVs, conventional fuels, and biofuels. The creation of an even playing field for energy suppliers in the transportation business requires the involvement of numerous stakeholders and industries. Toolkits for assessing scenarios and establishing a plan may be beneficial for Jamaica.

(iv) The high upfront EV purchase cost

The high prices for EVs, comparing with ICE vehicles, make them less cost-competitive to car buyers. One estimate suggests that EVs have about a 30% higher acquisition cost than ICE vehicles, that's why most imported and sold vehicles in Jamaica are used vehicles due to their affordability.

Furthermore, used EVs are still sold at a higher price point than used ICE vehicles. This high upfront cost also is a concern for bus and taxi fleet, that are forced to consider other options rather EVs for their fleets.

Even though life-cycle expenses are often cheaper, high upfront prices make EV impractical for most individual consumers. It would be necessary to reduce the higher upfront fees, which are prohibitive for most Jamaicans. Like most other nations, the market is eagerly awaiting cheaper middle-class and small electric vehicles. They can be adopted more quickly in Jamaica with the help of suitable (long-term) credit programmes, cash rewards, and tax advantages like import duty and/or value-added tax (VAT) exemptions.

Bus operators are an example of institutional buyers who have more options and choose investments based on the lowest initial Capital Expenditure (CAPEX) rather than TCO. Public procurement regulations are frequently not set up for a life-cycle cost strategy. The expansion of EV bus infrastructure in Jamaica would require public investment or concessions because it would exceed the financial capabilities of JUTC and other operators. Given the large construction expenses, revenues and operating costs must be accurately estimated and secured for an operation that is both economically and financially viable. The EV bus system's business model and governance are related to the finance barrier. Given that electric buses have lower operating costs than ICE vehicles, private bus firms in Jamaica have expressed interest in operating them. The fact that the private investors supporting these businesses are also involved in Jamaica's significant tourist sector boosts their ability to present an alluring business case to potential clients and investors.

(v) The availability of information and the lack of public awareness

There are several informational obstacles in the way of Jamaica's adoption of EV technologies. Data on the transport sector was found to be few, out-of-date, and occasionally dispersed among many organizations. Vehicle stock statistics understate the overall number of vehicles on the road because not all vehicles are registered. Data on public passenger bus operations are not usually reported and consolidated (in terms of distance and customers served). These difficulties are related to transportation sector governance and are appropriately highlighted in the then MTM's SBP.

It is unknown to what extent authorities and bus firms have access to georeferenced socioeconomic data for designing bus routes and vehicle specifications based on local mobility needs. Information gaps would restrict the ability to develop an integrated mobility system and to differentiate and alter services in response to local demand. Global initiatives like the C40 Cities36 and the Global Environment Facilities (GEF) Sustainable Cities Platform35 often start with municipal governments and transportation providers after extensive collaboration with civil society organizations (CSOs). This is somewhat different from Jamaica's situation, where the GOJ assumes leadership (rather than, for example, in geographic/administrative regions such as the Kingston Metropolitan Area). To close this gap and identify mobility desires and trends in depth,

including in regard to gender and socioeconomic factors, proactive engagement with local stakeholders may be necessary.

For the Jamaican private automobile industry to gain traction, potential customers must be aware of the benefits of EV technology. Training more mechanisms in EV technology would be a useful way for Jamaica to scale up its EV market and improve awareness. Middle-class families are more likely to justify purchases, thus EV marketing and promotion tactics should emphasize the advantages by making them obvious and concrete. In parallel, financial package design and promotion that may be assisted by (tax) incentives can handle the cost side. Market participants such as new and used car dealers, auto finance, lease, and assurance firms, and customer organizations currently have limited knowledge of EV products.

Policy Objectives

Considering the previous, the present policy aims to encourage and promote EV adoption, contributing to achieve the following national goals and priorities:

- To promote carbon free transportation therefore mitigating climate change through a reduction in emissions from the transport sector through introduction of fuel-efficient green technologies.
- To have 12% of privately owned fleets being EVs by 2030 [10].
- To have 16% of public transport fleet being EVs by 2030 [10].
- To have 100% of GOJ fleet being EVs by 2030.
- To ensure environmental sustainability by reducing pollution.
- To increase energy efficiency and conservation.
- To create an ecosystem for the importation of EV components in Jamaica.
- To promote Innovation and facilitate Research & Development in the areas relating to EVs & Battery.
- To generate employment in the country through Green Economy initiatives.
- To reduce dependance of fossil fuels, and therefore reducing the oil import bill.
- To lead the development of affiliated industry such as charging infrastructure and battery recycling.
- To establish regulations to support the creation of jobs in driving, selling, financing, servicing, importing, and charging of EVs.

The policy aims to encourage EV uptake and to provide adequate signals for the EV market and ecosystem development in the country. To this end, the Policy's objectives rely on the provision of an overarching framework to:

- Provide guideline tools to increase users' awareness and accessibility to the EV market.
- Provide an interoperable EV charging network throughout the country, ensuring charging options availability for users.
- Enable and promote the development of the EV related ecosystems.
- Provide tools for stakeholders' engagement and commitment in the development of EV related ecosystems and activities.
- Enhance the development of new activities and industries revolving the EV market.
- Promote the development of new business models and stakeholder collaboration to provide users with competitive solutions.
- Incentivize EV adoption by promoting actions to increase EV driving experience for users.

In order to achieve the previous objectives and set the path to EV adoption in Jamaica, the Policy establishes the following Goals:

(i) An **enabling environment to guarantee the penetration** of the electric vehicle fleet.

(ii) A dynamic and responsive national system for **the deployment of efficient charging infrastructure**, through a well-established legislative and institutional framework.

(iii) Ensure the existence of a **competitive EV infrastructure market,** by enabling a multistakeholder environment.

(iv) Ensure the development of the **adequate framework to ensure the proper management of batteries and other EV components** second-life and recycling.

(v) An **excellent training and development capability**; promotion of world-class training programmes to develop EV knowledge among technical experts.

(vi) **Incentivize electric vehicle use and promote social awareness** among Jamaican population.

POLICY GOALS

Goal 1: An enabling environment to guarantee the penetration of the electric vehicle fleet

In order to overcome the possible barriers for electric vehicle market penetration, considerable attention and efforts are being made towards the establishment of different standards and continuous improvements on public tools as enablers to electric mobility adoption.

Therefore, together with the Government and Public Authorities' commitment, it is necessary to set the **criteria** that **ensures the optimal deployment of the electric vehicle within the Jamaican fleet in a unified and efficient way, whilst promoting EV adoption**.

Jamaica is a vehicle importer, and therefore special focus should be set towards ensuring optimal criteria regarding vehicles being imported into the country. Ensuring an efficient management of the relevant vehicle information is critical to ensure the success in the deployment of new transportation technologies, such as electric vehicles and the related activities.

KEY ISSUES ADDRESSED

To this end, **the present Policy has set the objective of developing the necessary mechanisms for the adoption of EVs in Jamaica whilst promoting the development of an enabling environment to embrace electric mobility**. This goal will address the following aspects:

- Establishment of EV import standards requirements, to ensure that EVs entering the country follow common guidelines.
- Update the vehicle registration procedures to incorporate electric vehicles particularities, both for private and public automobiles.
- Promotion of the development and study of technological alternatives for Public Government and Public Transportation fleets, assessing in the fleet renewal process.

OBJECTIVES

1.1. Establish EV import standards requirements

Jamaica is heavily dependent on vehicle imports, representing around **7.11% of the 2021 National Trade Balance** (Trade Map, 2022). Moreover, current automobile market is strongly **dominated by used vehicles**, were approximately 75% of vehicles purchased in Jamaica are used vehicles.

The leading country of origin for imports of vehicles to Jamaica in 2019, based on import value was, by a huge margin, Japan; followed by Thailand, Germany, United States and South Korea (Figure 12) [11]. As to vehicle parts imports, in 2020 United States was the main provider, followed by China, Japan, Germany and Belgium (Figure 13) [12].

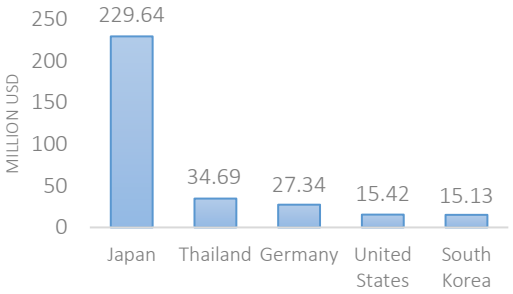


FIGURE 11: *LEADING VEHICLE IMPORT COUNTRIES TO JAMAICA IN 2019.*

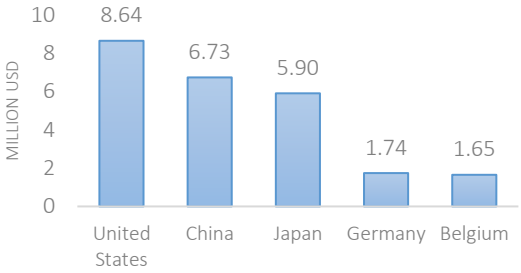


FIGURE 12: *LEADING COMPONENTS IMPORT COUNTRIES TO JAMAICA IN 2020.*

As shown in the figures above (Figure 12 and Figure 13), Jamaica imports vehicles and components from various countries (Statista, 2022). These countries of origin have their own policies and requirements that do not necessarily follow the same criteria among each other. Therefore, it is required to unify import requirements and establish standards to ensure that electric vehicles entering the country follow common guidelines.

Strategies

1.1.1. Setting of the technical requirements to import electric vehicles

(i) **Establishment of an age limit for EVs being imported into Jamaica, considering manufactured year of the vehicles**.

a. Electric cars should not exceed three (3) years.

b. Motorcycles should not exceed three (3) years.

c. Light commercial vehicles should not exceed three (3) years.

d. Trucks, buses, ambulances, fire brigades, hearses and limousines should not exceed three (3) years.

In all these cases, the 3-year limits are defined as a maximum of 36 months from manufacture date.

(ii) **It is recommended that electric vehicle batteries comply with the vehicles age limit**, as established above. Nevertheless, electric vehicle batteries will need to comply with the required verification procedures as indicated in Section 1.1.2. and in Section 1.1.5. of this policy, to guarantee the adequate status of this component and the well-functioning of the imported vehicles.

(iii) **It is highly recommended** that Electric vehicles being imported shall be **right-hand drive vehicles**.

(iv) It is recommended that electric vehicles being imported **utilize active thermal management system** to maintain the integrity of EVs within the Jamaican market.

1.1.2. Standardization of the technical information requirements to import electric vehicles

Current information requirements for vehicle imports need to be updated in order to ensure all relevant data and information is captured to (i) evaluate whether or not electric vehicles being imported into the country comply with the minimum technical requirements and (ii) to enable an adequate and complete information management from public authorities towards evaluating and promoting actions to enhance the development and evolution requirements of the electric mobility ecosystem for the country.

To this end, the analysis and definition of the detailed information that is required to be provided by electric vehicles being imported is required to be established and published by the competent authorities, along with the development of a National Electric Vehicle Import Guideline in consultation with the Ministry of Industry, Investment and Commerce (MIIC) that serves as a reference document on EV imports requirements for users.

However, the electric vehicles and related components being imported into Jamaica will be required to comply with at least the following information, in addition to current requirements that are in force in the MVIP related to vehicle imports:

(i) **Requirements on specific technical information related to the electric vehicle**, including, amongst other information that can be required by the competent authorities, at least the following information:

a. Brand/model.

b. Dimensions.

c. Electric motor (model, type, voltage, power).

d. Driving range.

e. Battery Type.

f. Battery Capacity.

g. Maximum Charging Rate.

(ii) **Requirements on Import Licenses** issued by the Trade Board Limited authorizing the importation of the vehicle, following the already existing trade regulatory framework set by the Motor Vehicle Import Policy (MVIP) in 2014.

(iii) **Requirements on other documents to import an electric vehicle**. The title, Bill of Lading/Order, invoice, Tax Compliance Certificate (TCC) and Electronic Single Administrative Document (eSAD) will have to be obtained before importation is done (same as for conventional ICE vehicles, as established in the MVIP).

(iv) In keeping with the Government of Jamaica MVIP, the Trade Board Limited (TBL), introduced the **Pre-shipment Inspection (PSI)** Programme on February 1, 2018, to facilitate the inspection of all used motor vehicles being imported into Jamaica from designated countries. To this end, aligned with the MVIP, MSETT, in collaboration with the TBL, will develop and establish inspection criteria for the pre-inspection of EVs prior to importation.

1.1.3. Development of a battery labelling system

In order to ensure an adequate battery management, a labelling system that enables categorization of these elements and their capability to be used on electric vehicles (or other potential secondary uses) shall be developed. This labelling system aims to collect key specifications and ensures reliable adhesion and good legibility. To arrange this, the marking system must match the corresponding standardized requirements to later collect the batteries when their life-use ends, so they can be given a second life use or, otherwise, be recycled.

The information to be collected within the labelling system, which must be in English, must include, as a minimum:

(i) Manufacturer information.

(ii) Main materials.

(iii) Capacity.

(iv) Voltage.

(v) Weight.

(vi) Temperature conditions.

(vii) Density.

Based on the information collected, batteries shall be labelled, providing a labelling distinct from the battery's owner, that will reflect the category in which the battery has been classified. The development of the labelling system will be established in the medium-term (3-5 years) since the approval of this Policy.

1.1.4. Publication of public guidelines regarding the electric vehicle and battery import procedures

The MSETT will collaborate with Jamaica Customs Agency to develop a step-by-step guide for EV and battery import procedures (comprising required documentation, terms, benefits, etc.), available both at official Government facilities and on the official website of the Jamaican Government.

1.1.5. Update of inspection procedures for imported vehicles and batteries

Upon the arrival of the imported vehicle in the island, an examination of the vehicle must be conducted aligned with the current import legislation, providing greater protection to consumers. By attending to a Vehicle Examination Centre, the vehicle inspection certified engineer will carry out a technical identification verification of the electric vehicle.

Regarding batteries importation, an inspection shall be conducted to determine its condition. This assessment shall include:

(i) Visual inspection.

(ii) Voltage and capacity verification.

(iii) Assessment of state of health and cycling studies (charging and discharging under well-defined conditions) to check their performance and their physical properties.

All used vehicles and used battery imports will require the compliance with inspection procedures and will be required to be in possession of a special certificate for registration and licensing purposes, issued by entitled vehicle inspection entities indicating the inspection results.

Vehicle Examination Centres that have been certified by the public authorities to provide battery inspection services will be published and available for users' consultation, listing the entities approved considering with the specific and certifiable training to develop the electric vehicles and batteries inspection procedures.

Inspection certificates issued by inspection engineers different from the ones indicated above, will not be valid towards the registration and licensing procedures of the vehicles and/or the batteries.

1.2. Update vehicle registration procedures to incorporate electric vehicles particularities

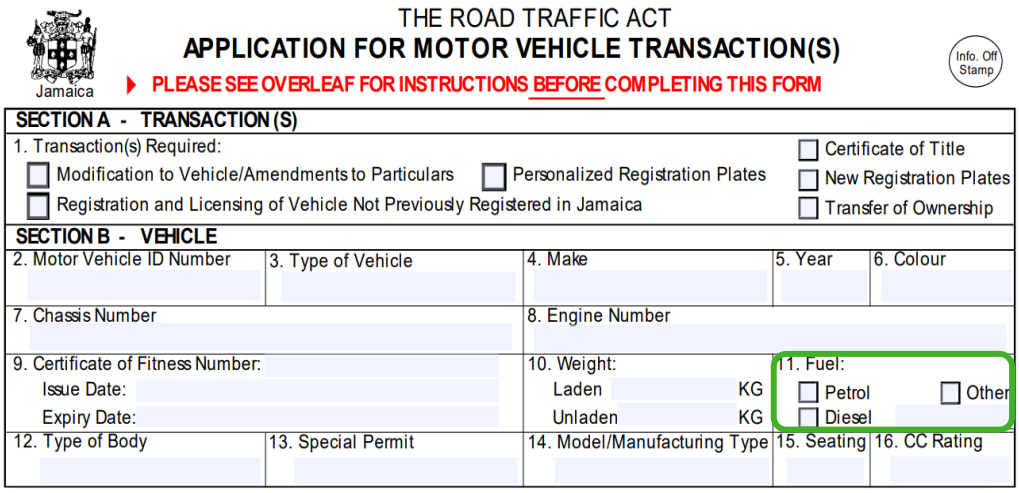
It is essential to provide the Government with the necessary tools to monitor the deployment of electric mobility in the country, in order to help the Government have valuable, official and updated information about the situation of electric vehicles in Jamaica. **This registry shall be implemented as soon as possible (1-3 years)**, to allow proper tracking of EV penetration target achievement within the island.

Strategies

1.2.1. Development of private EV registration procedures

One major issue to be addressed when developing electric mobility policies and strategies is the **importance of the process of registering an electric vehicle**. Sometimes, registration procedures for EVs are complex, vague or even non-existent, which discourages and has a negative impact on the acquisition of these vehicles.

Currently, to register a motor vehicle in the country, a Jamaican resident must visit a TAJ office to apply in-person. Along with other relevant documentation such as the title transfer of the vehicle, the sale invoice from the seller or the Insurance Certificate, an **application form for vehicle registration** (‘*Application for Motor Vehicle Transaction(s) MV01*’) **must be obtained and filled.**



Jamaica

THE ROAD TRAFFIC ACT

APPLICATION FOR MOTOR VEHICLE TRANSACTION(S)

Info. Off Stamp

PLEASE SEE OVERLEAF FOR INSTRUCTIONS BEFORE COMPLETING THIS FORM

SECTION A - TRANSACTION (S)

1. Transaction(s) Required:

☐ Modification to Vehicle/Amendments to Particulars ☐ Personalized Registration Plates ☐ Certificate of Title

☐ Registration and Licensing of Vehicle Not Previously Registered in Jamaica ☐ New Registration Plates ☐ Transfer of Ownership

SECTION B - VEHICLE

2. Motor Vehicle ID Number	3. Type of Vehicle	4. Make	5. Year	6. Colour

7. Chassis Number	8. Engine Number

9. Certificate of Fitness Number:	10. Weight:	11. Fuel:
Issue Date:	Laden KG	☐ Petrol ☐ Other
Expiry Date:	Unladen KG	☐ Diesel

12. Type of Body	13. Special Permit	14. Model/Manufacturing Type	15. Seating	16. CC Rating

FIGURE 13: *Application MV01 for motor vehicle transactions*.

As shown above in Figure 14, ‘*Section B – VEHICLE*’ is mainly focused on the vehicle characteristics: year, colour, weight, model… Section 11, for its part, focuses on fuel, with only three options

available: petrol, diesel or other. This means that, **at the moment, there is no mechanism to register an all-electric vehicle in Jamaica.**

The MSETT, in collaboration with relevant entities, shall develop procedures for the registration of EVs, taking the following measures:

1. **Base the categorization of registration on the EV rated electric motor (motive power in kilowatts)**. For two-three wheelers and low speed cars (low speed cars in USA and Canada comprise vehicles that have a maximum capable speed of about 40 km/h) three categories will be defined, whereas for common electric cars (including jeeps and Sports Utility Vehicles (SUVs)) and commercial vehicles (including trucks, vans and buses) four categories will be set. More information is provided in the following table (Table 2).

Categories	Two-three wheelers, low speed cars	Common electric cars/Commercial vehicles
Category 1	0 – 7.5 kW	50 – 60 kW
Category 2	7.5 – 15 kW	75 – 100 kW
Category 3	15 – 50 kW	100 – 150 kW
Category 4	-	Above 150 kW

Table 2: *EV CATEGORIZATION SYSTEM*.

2. **Design a specific application form for electric vehicles registration or update existing ones considering EVs special features**. New application forms should be developed to address all new electric mobility options: hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), fuel cell electric vehicles (FCEV) and battery electric vehicles (BEVs).

   Therefore, new sections shall be included: motor type, rated power, battery type and EV category.

3. **Requirement of supporting documentation**. Along with the previously discussed application form, the following documents will have to be attached:

   (i) Certification of Title.

   (ii) Registration Certificate.

   (iii) Valid insurance Certificate/Cover Notes in buyer's name.

   (iv) Valid identification (e.g. driver's license).

   (v) Valid Certificate of Fitness.

(vi) Letter of authorization along with the company's stamp if application is for a company.

(vii) If a lien is attached to the vehicle, the discharge of lien is needed.

In addition to the registration procedures, **other relevant measures** regarding this subject that will be developed include:

1. **Record EVs in the National Vehicle Register**, in order to follow properly their penetration and deployment in the country, as well as collecting valuable data for statistical analysis.
2. **Use of a distinct registration plate color and design for EVs**, so they can be easily identified. This plate will be allocated by registration authorities.
3. **Exemption on the registration fee and renewal fee over the next 5 years**. Electric vehicles receive a full exemption from the registration and the renewal fee for 5 years, as an incentive programme to promote electric mobility in the island.
4. **Development of a public guideline for the electric vehicle registration**, by the implementation of an online web-based platform and a tab on the official Jamaican Government website where users can find a step-by-step guide about EV registration process, as well as information about existing incentives, subsidies, and fee reductions for EVs.

1.2.2. Development of public EV registration procedures

Besides the private sector, the electrification of vehicles within public transport fleets is crucial, as it would be a leading example for a shift in mobility patterns. In Jamaica, **public passenger vehicles (PPVs) are divided into five different categories**: route taxis, hackney carriages, rural stage carriages, express carriages, and contract carriages.

Applicants for PPV Licenses are required to:

(i) Be 21 years old or older.

(ii) Complete the corresponding application form, available on the Transport Authority's website or at its offices.

(iii) Fill and submit the form, attaching the following documentation:

a. Registration Certificate.

b. Certificate of Fitness.

c. Insurance Certificate/Cover Note.

d. Proof of address.

e. Valid identification (e.g., passport, driver's license).

f. Owner's Taxpayer Registration Number (TRN).

g. Original Road License.

h. Police Record.

(iv) Pay a processing fee at the tax office.

(v) Upon approval, pay the corresponding license fee.

Information regarding the required application form, duration of the license and license fees for each category of PPV is reproduced in Table 3.

Public Passenger Vehicles	Application form to be filled	New license fee ($)	Duration	Renewal fee ($)
Route Taxi	K1	15,000	1 year	12,000
Hackney Carriage	K2	15,000	1 year	13,500
Rural Stage Carriage	K1	3,000/seat 10,500/inspection	4 years	3,000/seat 10,500/inspection
Express Carriage	K1	120,000	1 year	120,000
Contract Carriage	K2	16,600	1 year	15,600

TABLE 3: *PPVS CATEGORIES.*

As it happened with the application form for vehicle registration MV01, K1 and K2 licensing forms do not consider electric vehicles. Thus, **the MSETT will collaborate with the Transport Authority to develop procedures for the issuing of licenses for public transportation, adopting the following actions:**

1. **Design a specific application form for PPVs license request or update existing ones addressing EVs**. New application forms should consider electric mobility, so a new question shall be added to the form where applicants can indicate clearly and specifically the use of an electric vehicle for the operation of the service.
2. **Extend the duration of licenses for EVs**, as a way to incentivize EV adoption within the public fleet, according to the duration estimated by the competent authorities.

3. **Reframe the current license issuance model**, so it considers a maximum number of licenses and has a priority issuance ranking, including criteria such as fuel efficiency and emission factors. Thereby, electric vehicles will be prioritized over conventional internal combustion engine vehicles.

1.3. Promote the development and study of technological alternatives for transportation fleets

Regarding the renewal of government and public fleets, promoting the adoption of electric mobility, is necessary to advise the competent entities to measure the real performance of electric vehicles, the economic savings and the environmental benefits of electric vehicles compared to conventional vehicles.

In addition, the adoption of electric vehicles by public entities would serve as an incentive for the sector, rising popularity among Jamaicans whilst leading by example.

These assessments shall be performed as soon as possible (in a short timeframe of 1-3 years once this Policy is approved), to quickly achieve a large deployment of EV and reach the national target by 2030.

Strategies

1.3.1. Assessment of governmental fleets

Electric vehicles have the potential to significantly improve governmental fleet efficiency and reduce vehicle operation and maintenance costs.

When the need to renew part or all the governmental fleets arises, an analysis of the different technological alternatives must be carried out, prioritizing the change to electric vehicles.

The MSETT will collaborate with relevant entities to conduct a feasibility study and prepare a report to determine viable alternatives available for the renewal of the government fleet, in such a way that electric mobility and its advantages are considered.

For this analysis, the following aspects will have to be taken into account:

(i) Consideration of the government fleet age in Jamaica.

(ii) Emission levels of different mobility technologies. Government fleet emissions will be controlled and will have to meet certain standards, so it would be appropriate to prioritize the most sustainable technologies.

(iii) Fleet renewal process must prioritize electric vehicles, addressing its current economic viability and future outlook (i.e., long-term saving in operation and

maintenance costs), as well as environmental benefits, to determine if their implementation is reasonable.

Once the aforementioned study has been carried out, **the information must be submitted to the MSETT to evaluate final decisions on fleet renewal processes from the Government's Agencies and Authorities**.

After adopting EVs into their fleet, public sector entities shall be required to perform periodic performance and operating cost evaluations of assigned vehicles based on industry key performance indicators for EVs.

1.3.2. Assessment of public transport fleets

To achieve carbon neutrality in the public passenger transport fleets (buses), electrification has emerged as a leading alternative for decarbonizing surface transportation.

Such an approach will contribute to attracting customers, pushing citizens from individual transport and pulling them into the public transport network.

The Government of Jamaica, in collaboration with the Transport Authority, shall conduct an exhaustive study and prepare a report regarding the possible viable alternatives available when renewing the public fleet, in such a way that electric mobility and its advantages are considered.

The assessment when considering the renewal of public fleet will take into account the following:

(i) Consideration of the public transport fleet age in the country.

(ii) Emission levels of different mobility technologies. Public transport fleet emissions will be controlled and will have to meet certain standards, so it would be appropriate to prioritize most sustainable technologies.

(iii) Consideration of renewing the fleet with electric vehicles, addressing its current economic viability and future outlook (i.e., long-term saving in operation and maintenance costs), as well as environmental benefits, to determine if their implementation is reasonable.

(iv) Development of cost-benefit analyses, considering a business-as-usual scenario over an electric bus scenario.

(v) Route analysis and evaluation in regard to the deployment of electric transportation modes.

Once the aforementioned study has been carried out, **the information must be submitted to the Transport Authority and the Island Traffic Authority** to evaluate public transportation entities conclusions and final decisions on the fleet renewal.

After adopting EVs into their fleet, public sector entities shall be required to perform periodic performance and operating cost evaluations of assigned vehicles based on industry key performance indicators for EVs.

Goal 2: A dynamic and responsive national system for the deployment of efficient charging infrastructure, through a well-established legislative and institutional framework

One of the most common key issues towards promoting electric mobility adoption relates to the public charging infrastructure availability and users range anxiety concerns. Electric mobility users will not be willing to engage in this new technology transportation mode if there is an insufficient deployment of a public charging infrastructure network.

The deployment of the optimal and adequate charging infrastructure network is critical towards promoting electric mobility adoption and ensuring public charging infrastructure availability aligns with users' needs. To this end, this policy aims to establish the guidelines and minimum requirements to (i) provide common guides for stakeholders engaging in the deployment of the publicly available charging infrastructure network, (ii) provide a framework to promote a an optimal and adequate deployment of the required charging infrastructure equipment available based on users' needs, (iii) developing the necessary compliance requirements for stakeholders engaging in the deployment of the charging infrastructure network and (iv) enhancing informed users.

Moreover, the deployment of an efficient and optimal charging infrastructure network needs to consider not only users' needs, but also other aspects that impact the electricity grid and public spaces codes and procurement procedures. An evaluation of the demand for EV charging must be used to inform several planning steps for the infrastructure network, including evaluation of power supply limitations. It should also be used to examine grid capacity and the need for improvements as well as to design the locations for public charging infrastructure. Location planning for public charging infrastructure helps identify optimal locations for setting up public charging facilities.

KEY ISSUES ADDRESSED

The policy aims to establish the **path and guides towards an efficient deployment of the public charging infrastructure network**, addressing the following aspects:

- Planning procedures to ensure availability of charging stations aligned with users' needs, whilst providing confidence to users, as well as anticipating impacts on related

activities due to increasing adoption of EVs and Electric Vehicle Supply Equipment (EVSE)[1].

- Ensuring interoperability and data security (See Goal 3) amongst the charging stations by providing rules and guides on the different compliance requirements and standards throughout the EVSE value chain.
- Providing information to stakeholders and users on the development of the charging infrastructure network.

OBJECTIVES

2.1. Planning Strategy Development

It is important to ensure that the stations are well distributed geographically, considering population densities, and building types within different areas. Therefore, Government in collaboration with local authorities shall create a formal institution to address this issue with a further unified decision-making process.

Optimal location will require the definition of a planning strategy, considering different areas of analysis. The policy aims to determine the key actions to promote the identification and evaluation of the most critical areas for EVSE deployment.

Strategies

2.1.1. Development of a spatial zoning exercise

A spatial zoning exercise by parish is required to obtain the proper distribution. Several parishes may be located inside each of the zoned divisions of the area. Each parish will be given a zone after being evaluated for its population, housing stock density, traffic density, and percentage of registered electric vehicles (excluding institutional registrations which may skew the data).

Each zone division will be responsible to develop their individual planning strategy, aligned with the guidelines and requirements established in this policy, which will be submitted to the Governing Committee to be approved. Upon approval, local planning strategies will be published by local authorities to inform stakeholders.

[1] EVSE stands for "Electric Vehicle Supply Equipment". The EVSE, as defined by the National Electronics Manufacturers Association (NEMA), represents the devices that provide electric power to the vehicle and use that to recharge the vehicle's batteries. EVSE systems include the electrical conductors, related equipment, software, and communications protocols that deliver energy efficiently and safely to the vehicle."

2.1.2. Development of a Location Planning Strategy by establishing optimal locations for the deployment of publicly available infrastructure in each division

The identification of the optimal locations is critical to ensure an efficient deployment of the charging infrastructure network. Therefore, the evaluation and analysis of the different zone divisions established by the spatial zoning exercise, is required to ensure users' needs are covered. To this end, the present policy comprises the development of the following aspects related to establish a planning strategy to ensure the publicly available minimum requirements:

(i) **Establishment and publication of the location guidelines, requirements and procedures regarding density between charging points**, considering the type of charging infrastructure, comprised of the following:

- Publicly available charging infrastructure in urban areas shall be made available to users' considering at least the minimum density criteria.

  Publicly available charging infrastructure in urban areas will be dependent on the different types of electric vehicle supply equipment deployed according to the minimum requirements of type of equipment in each location, that additionally will be required to comply with the minimum technical requirements and standards established in Section 2.6. of the present policy.

  Planning for urban areas will require the inclusion of the following guidelines:

  - ❖ Conduct traffic and transit density evaluation for each of the division zones, including prioritizing different areas based on users' needs analysis:
    - High density and transit areas will be a priority within the definition of the planning strategy, representing the primary areas towards promoting the deployment of Electric Vehicle Supply Equipment, including:
      - In the short-term prioritize the deployment in major cities such as Kingston, Spanish Town, Portmore, Ocho Rios and Montego Bay.
      - Prioritize that every major city should have at least one publicly available direct current (DC) fast charging station installed.
    - Low density and transit areas roll-out will be considered in the deployment planning of secondary phases. **Medium-**

term expansion to secondary cities and updating of charging needs in major cities based on demand-driven analysis. Demand-driven analysis will consider both electricity demand and populations transit trends in the areas analyzed.

- ❖ Provide recommendations for minimum number of EVSE's to be deployed in each area by density indicators and supporting mechanisms to ensure achievement of minimum requirements.
- ❖ Local authorities will be required to present a deployment plan for a timeframe of 5 years, including the previous aspects, which will be reviewed, approved, and monitored by the Governing Committee.

In addition, EVSE deployment plans must at least take into consideration and promote, within the previous established timeframe, the following:

- ❖ Off-Street public Parking Spaces and Service Stations located in high density division zones established within the planning strategy shall provide connection for electric vehicle charging, considering the following:
  - o Off-Street public Parking Spaces will be required to provide at least one spot destined to EV charging for each 25 spots.
  - o Service stations will be required to provide at least one spot designated to EV charging.
- ❖ Public Buildings shall include at least one spot available for EV charging within their premises.
- ❖ Non-residential new developments with parking spaces shall include the provision of EV charging infrastructure and, at least, one EV charging spot.

- Publicly available charging infrastructure along highways or long-distance transited road infrastructure shall be made available to users considering the minimum distance established, on both sides of the highway/road.
  - ❖ Conduct traffic and transit density evaluation for each of the division zones, including prioritizing analysis considering highly used long-distance road infrastructure.

- ❖ Provide recommendations for minimum number of EVSE's to be deployed in each area by distance indicators and supporting mechanisms to ensure achievement of minimum requirements.
- ❖ Local authorities will be required to present a deployment plan for a timeframe of 5 years, including the previous aspects, which will be reviewed, approved, and monitored by the Governing Committee.

In addition, EVSE deployment plans must at least take into consideration and promote, within the previous established timeframe, the following:

- ❖ Eligible service stations, based on the planning criteria established by the local authorities, along the identified road infrastructure will be required to provide:
  - Accessible charging spaces both for Light-Duty Vehicles and Heavy-Duty Vehicles.
  - At least two charging spaces for EV users. At least, one of the charging spaces made available shall be a Fast-Charging EVSE.
- ❖ Applications for the development of new service stations along the identified road infrastructure, will be required to incorporate EV Supply Equipment within the project's development.

- Adequate publicly available charging infrastructure along the transportation road network for heavy duty vehicles shall be made available both in urban areas and highways considering the optimal distance and location.

(ii) Establishment of the minimum requirements considering the type of charging infrastructure to be deployed in each location, which will consider the following:

- Publicly available charging infrastructure in each location identified along within urban areas will be required to, at least, install Level 2 or Level 3 Electric Vehicle Supply Equipment connectors (Section 2.6. of the present Policy).

  To this end, at least, one charging station will be required to be available in every 3x3 kilometre area considering the types of connectors as established in Section 2.6. of the present Policy.

- Publicly available charging infrastructure in each location identified along highways and roads shall at least require the deployment of Level 3 Electric Vehicle Supply Equipment connectors.

  Along motorways and highways, Level 3 (DC Fast chargers), as defined in in Section 2.6. of the present Policy, will need to, at least be installed in a range of 20-25 kilometres, considering the location of rest stops/service stations authorized to this extent.

The previous ranges have been established considering the following input information related to power and charging ranges from the different type of EVSE (US Department of Transportation, 2023) [13]:

	Level 1	Level 2	Level 3 (DC Fast Charging)
Typical power output	1 kW	7 - 19 kW	50 - 350 kW
Estimated BEV Charge Time from Empty (considering an average battery of 60 kWh)	40 - 50 h	4 - 10 h	20 min - 1 h
Estimated Electric Range per Hour of Charging	3.2 – 8 km	16 – 32 km	290 – 380 km

TABLE 4: *OVERVIEW OF EV CHARGERS.*

(iii) Update of public location planning.

Additional planning mechanisms are required in order to take into consideration the increase in the EV share over the years. Therefore, monitoring and evaluation mechanisms need to be developed in relation to the EV Charging Infrastructure Planning Strategy.

Public location planning will require annual review of criteria and the need for the planning strategy to be updated. Reviews will consider charging infrastructure demand-driven approaches, to identify areas of high demand of charging needs.

To this end, charging infrastructure operators will be required to provide local government authorities responsible for each division zones information related to their facilities usage by the users. The Governing Committee will publish the information requirements to be submitted by charging infrastructure operators to local government authorities.

The development of this planning strategy is not binding for the deployment of the charging infrastructure by private stakeholders.

2.1.3. Establishment of a Governing Committee

A **Governing Committee will set the zoning range definitions and define and monitor the planning Strategy principles compliance**, comprising annual reviews and updates, and considering public consultation inputs. The MSETT shall assist in creating a comprehensive list of suggested members of the Governing Committee, which shall include:

(i) A representative of the MSETT.

(ii) Local Government representatives.

(iii) A representative of JPS.

(iv) A representative of Automobile Dealers Association of Jamaica (ADA).

(v) A representative of public charge points operators.

2.2. Enhancing electric grid readiness

Increasing the number of electric vehicles and the infrastructure would increase the demand for electricity and put pressure on Jamaica's electricity grid.

The power grid will face challenges because of the electrification of transportation and its long-term evolution as the average load will rise. The load generation curve will flatten along with the average load increase when vehicle-to-grid solutions start to be implemented and bidirectional energy flows are created.

Due to a gradually rising level of acceptance for EV, the impact of the electric vehicle on the Jamaican electric grid is probably going to be minimal in the short term. However, if not properly planned, the demand for electricity will rise along with grid prices as the share of electric vehicles in the national fleet rises.

Strategies

2.2.1. Evaluation of the impact of charging infrastructure on the grid

- Competent authorities in the energy system will need to **assess how electric vehicles will affect the electrical grid from a planning and operation standpoint**.
- In addition, planning the deployment of publicly available charging infrastructure needs to address the electricity grid capacity in order to assess the need for investments and network upgrade to support the charging infrastructure network deployment. The location planning strategy will require an **exhaustive evaluation of the impact it will have on the grid**, focusing on:

(i) EV charging infrastructure allocation by parish and expected power demand.

(ii) Assessment of existing feeders and loads.

(iii) EV charging power requirements for different EV penetration levels.

(iv) Analysis of Jamaican Public Service (JPS) transmission system.

Furthermore, electricity demand increase from private charging demands will also be required in order to evaluate and plan on the grid's upgrade needs and management of EV grid integration.

MSETT, in collaboration with JPS, will determine the critical data inputs that will need to be provided by EVSE stakeholders to facilitate the grid planning process.

- Grid planning needs to be proactive, anticipating needs arising from EV uptake, whilst exploring benefits. The MSETT will collaborate with the JPS with the following: (i) conduct an evaluation on the impact on the grid due to electricity demand increase from EV and assess on the grid's needs, (ii) plan on required strategies and measures to support EV uptake and (iii) identify investments needs towards strategies implementation to provide flexibility and enhance EV grid integration.

  The previous evaluation and grid planning will need to address, considering a 5-year timeframe:

  (i) Grid infrastructure requirements and alternatives to support local planning strategies. To this end, collaboration and consultation between JPS and local authorities is critical.

  (ii) Measures and strategies to promote managed charging and leveraging flexibility potential, and consequently the required investments for grid upgrade, digitalization, communication, and control requirements.

  (iii) Measures to incentivize and promote renewable sources integration by providing solutions to allow contracting options of renewable capacities.

  This evaluation and planning strategy, aims to identify actions that will be required to support the electric vehicle charging infrastructure network, assessing on grid capacity and grid network infrastructure upgrade or extension, as well as, planning on EV grid integration.

- Evaluation and grid planning will be updated before the end of the 5-year period in case of significant changes on the evolution of the EV uptake scenario considered.
- The evaluation and planning strategy conducted by JPS, will be reviewed and approved by the Office of Utilities Regulation (OUR) and the MSETT, including consideration and

establishment on the remuneration treatment for these required investments. Annual monitoring and supervision on the strategy implementation will be monitored by the OUR.

2.3. Engaging stakeholders in the deployment of publicly available charging infrastructure

Key consideration must be set on engaging stakeholders in the deployment of the publicly available charging infrastructure network to support electric vehicles adoption. Increasing participation of multiple stakeholders in the charging infrastructure deployment will provide confidence in the availability of charging infrastructure for users.

To this end, the provision of a framework to enhance and provide certainty to participants on how to proceed and the opportunities towards the deployment of charging infrastructure equipment is critical to ensure availability and users' needs are covered.

Public policy development on this aspect aims to contribute as an enabling tool to promote engagement in the deployment of publicly available charging infrastructure.

This policy aims to:

(i) Encourage the private sector stakeholders to participate in the deployment of charging infrastructure for public access.

(ii) Identify areas with no action being taken by the private sector in order to ensure the required charging infrastructure is deployed.

Strategies

2.3.1. Establishment of the stakeholder engagement framework in the charging infrastructure

A stakeholder framework in the charging infrastructure shall be defined and set, comprising the following aspects:

- Any individual or entity should be entitled to install publicly available charging infrastructure whilst meeting the requirements established by the competent authorities.
- The operation of the EVSE will be exclusively for vehicle charging; any other improper use will be prohibited and will be considered a serious infraction.
- Additionally, JPS will be enabled to be the last resort holder of public charging infrastructure, provided that after a competitive procedure it is resolved that there is no interest in private initiative, in the terms and conditions established by regulation by the Government.

  In addition, the Government will determine (i) regulations applicable procedures and cost recovery mechanisms, under JPS's regulatory framework, related to the charging infrastructure deployed under these circumstances and (ii) potential procedures for the

transmission of the infrastructure by JPS to other owners, when the conditions of economic interest are met.

Furthermore, in order to ensure the adequate functioning of the EVSE system, MSETT in collaboration with OUR will need to: (i) review existing regulations and legal framework to identify and overcome potential hurdles to EVSE deployment and (ii) define the EVSE activity framework, to ensure an enabling activity environment.

2.4. Developing guidelines for stakeholders regarding charging infrastructure installation

The installation of charging infrastructure requires the development of guidelines to ensure an optimal deployment. The definition of this guideline aims to establish common lines of action and provide a cross-country framework to ensure deployment success through a homogeneous and well-developed system, whilst aligning with related regulations in force.

Strategies

2.4.1. Establishing general installation procedures and requirement guidelines for the deployment of charging infrastructure

An infrastructure to enable sufficient charging points needs to be installed to effectively promote EVs and assure their market penetration in order to ensure the deployment is carried out in a homogeneous and orderly manner. In addition, it is required that the installation does not cause any damage to the system or the users.

To this end, the development of the minimum requirements of installation guidelines, in collaboration with JPS, will be needed in the process of proper EV Supply Equipment deployment, both for private and publicly available charging infrastructure, comprising the following aspects:

- These guidelines will need to include an assessment of the current regulatory and legal framework regarding electricity in Jamaica, updating the necessary aspects to include and consider EVSE deployment.
- General guidelines will determine that individuals and entities installing EV Supply Equipment, will be required to have successfully applied for the related electricity network grid access and connection permits and procedures.
- Additionally, these guidelines need to include the related considerations as to requiring individuals and entities installing EV Supply Equipment, to have successfully applied for the related public permits and building codes, as required.
- Guidelines need to address that installed EV Supply Equipment must meet electricity grid connection technical requirements, as established under the electricity regulatory framework in force.

Furthermore, JPS will need to evaluate the need to upgrade electricity connection codes, in order to ensure adequate requirements are established for EVSE grid integration.

- In relation to publicly available installed EV Supply Equipment, this must meet at least, the technical and, interoperability and safety standards requirements, as established in Section 2.6. respectively, of the present Policy.
- Considerations regarding the signage requirements that need be made visible for users. To this end, EV Supply Equipment will be required to incorporate the specific signage related to electrical risks and components information and be made visible for users.
- Furthermore, in order to properly guarantee adequate deployment of EVSE, as well as integration into the electricity grid, EVSE will demand an inspection certificate issued by qualified professionals to this effect. The inspection certificate will need to ensure that the EVSE complies with (i) minimum established technical and safety requirements to enable an adequate use of the facility and (ii) connection to the electricity grid codes.

  MSETT, in collaboration with BSJ and the Government Electric Regulator (GER), will design the necessary certificates to be issued to ensure a high level of quality control of EVSE equipment.

  The guidelines establishing the criteria for the realization of the previous inspections will be determined and published by the Government. In addition, updates on these guidelines will be published considering the regulatory framework development and technology evolution, as indicated in section 2.7. of this policy.

  Facilities with successful inspection certificates will have to incorporate among the signage required for the EV Supply Equipment the distinctive designed for this purpose.
- Qualified professional to certify installation requirements compliance, will need to be registered for this purpose with the government authorized body. The list of registered professionals entitled to carry out this inspection procedures will be published for users' access.

2.4.2. Establishing installation application procedures for public charging infrastructure in public lands

- Local authorities in each division zone will need to develop specific procurement procedures and fair competitive processes to support the deployment of publicly available charging infrastructure on public land.
- The development of the previous, requires the development of the necessary guidelines that will be published and will be available for stakeholders' consultation. These set of guidelines will need to assess on the compliance requirements for stakeholders to successfully apply for the installation of charging infrastructure on public lands.
    (i) Compliance related to electrical infrastructure access, connection, and safety requirements.
    (ii) Charging infrastructure technical and interoperability established standards.
    (iii) Charging infrastructure safety established standards.
    (iv) Public land and building codes requirements.
- Any individual or entity may apply to the competent local authorities in each division zone for the installation of public charging infrastructure in public lands, complying with technical and public land requirements established by the local authorities.
- Local authorities in each zone division will be entitled to launch fair competitive procedures in regards for individuals and entities to install public charging infrastructure in specific locations.

2.5. Developing guidelines for stakeholders regarding charging infrastructure maintenance

Maintenance of charging infrastructure is necessary to ensure the well-functioning of the charging infrastructure network, to guarantee their proper operability and to provide a charging service under conditions of optimal efficiency and minimum cost from which EV users can benefit.

Strategies

2.5.1. Development of EVSE maintenance guidelines

Charging infrastructure maintenance will need to accomplish, at least, the following guidelines covered in this Policy:

(i) Maintenance tasks will be managed by charging infrastructure owner.

(ii) Charging infrastructure will be evaluated to ensure they are in optimal conditions and meet the operation guidelines.

(iii) These authorized evaluations will be conducted by dedicated personnel certified by the Government, at least, once every two years. Once the evaluation is completed, an official certificate will be issued to the owner of the corresponding charging station.

Evaluation by certified personnel will include the inspection of the following:

- Compliance with the required technical standards.
- Compliance with the required safety standards.
- Compliance with the EVSE signage requirements.

The guidelines establishing the criteria for the realization of the previous inspections will be determined and published by the Government. In addition, updates on these guidelines will be published considering the regulatory framework development and technology evolution, as indicated in section 2.7. of this policy.

(iv) Qualified professional to certify installation requirements compliance, will need to be registered for this purpose. The list of registered professionals entitled to carry out this inspection procedures will be published for users' access.

(v) The owner will have to submit this official certificate to JPS and the Government.

(vi) JPS and/or the Government will have the authority to perform maintenance evaluations whenever it deems appropriate.

2.6. Setting technical, safety and accessibility standards' minimum requirements across the charging infrastructure network

EVs have evolved from a concept car to an accepted technology. Electric Vehicle Supply Equipment is supported by electronics, both for charging the vehicle and for enabling communication flows. EVSE involves two critical sectors, transportation, and energy, that have never been connected electronically previously. EVSE includes different protocols, software and equipment that allow the entire system to work effectively to charge an EV car and keep everything under control and safe. The most popular charging technology is conductive charging, also known as plug-in (wired) charging. The amount of EVSE needed for conductive charging depends on several variables, including the type of vehicle, the battery capacity, the charging techniques, and the power ratings.

The three main components of an Electric Vehicle Supply Equipment are: (i) the software, (ii) the enclosure and (iii) the plug.

Moreover, EV charging involves supply of DC to the battery pack. As electricity distribution systems supply alternate current (AC) power, a converter is required to provide DC power to the battery. Conductive charging can be AC or DC. In the case of an AC EVSE, the AC power is delivered to the onboard charger of the EV, which converts it to DC. A DC EVSE converts the power externally and supplies DC power directly to the battery, bypassing the onboard charger.

AC and DC charging are further classified into four charging modes, with Modes 1-3 pertaining to AC charging and Mode 4 pertaining to DC charging.

1. Normal power AC charging is adequate for electric two/three-wheelers and e-cars.
2. Single-phase AC chargers, with a maximum power rating of 19.2kW, are adequate for low emission vehicles (LEVs) and cars with single phase on-board chargers.
3. Three-phase AC chargers, with a power rating up to 22kW, are required for e-cars with larger onboard chargers. Input power supply for normal power charging can be provided from the standard electricity distribution network.

The connection from the electric vehicle to the electric vehicle supply equipment (EVSE) is ruled by **charging standards, both physical and safety standards**. On the other hand, the connection between the EVSE to the grid is ruled by **installation codes**.

As shown in Table 5, there are three different levels of charging:

1. **Level 1:** on-board type AC charging is used in this sense for charging electric vehicles. The standards voltage outlet of 120 V, 15A is suitable for Level 1 charging.
2. **Level 2:** as in Level 1, on-board type AC charged is used. The standard voltage outlet of 50 V, 80 A.
3. **Level 3:** for charging electric vehicles at this level, off-board type DC charging is used. The standard DC fast-charging voltage outlet of 50 V to 1,500 V and 80 A to 400 A.

Levels of charging	Types of chargers	Assumed EV battery capacity	Estimated charging time
Level 1 (AC)	Onboard charger	60 kWh	40 – 50 h
Level 2 (AC)	Onboard charger	60 kWh	4 – 10 h
Level 3 (DC)	Off-board charger	60 kWh	20 min – 1 h

TABLE 5: *DIFFERENT LEVELS OF CHARGING.*

There are four types of EV chargers on existing vehicles on the island, two types of AC chargers and two types of DC chargers. Furthermore**, these types of chargers will be the ones that will be present in the charging infrastructure in Jamaica.**

1. **AC plugs are classified as Type 1 and Type 2**. The electric vehicle can charge up to 43 kW using AC EV connectors. It must be plugged into the car and the other end should be plugged into the standard grid voltage.

    (i) **Single-phase Type 1 (J-1772)** plugs are the norm for EVs from North America and Asia. Depending on the car's charging capacity and the grid's capacity, you can charge your vehicle at a speed of up to 19.2 kW.

    (ii) **Triple-phase plugs are Type 2** plugs because they have three extra wires that allow electricity to flow through. They can therefore charge your car quicker, of course. The maximum charging power available at home is 22 kW, while the maximum charging power available at public charging stations is 43 kW, again based on the charging capacity of the car and the grid.

2. **DC plugs are classified as CHAdeMO and CCS.** Using these types of connectors, the electric vehicle can be charged up to 350 kW.

    (i) **CHAdeMO EV connector:** This fast-charging technology was created in Japan and supports both bidirectional charging and very high charging capacities. Now, Asian automakers are setting the standard for CHAdeMO-compatible electric vehicle offerings. It supports charging at 100 kW maximum.

    (ii) **CCS connector:** The Combined Charging system combines AC and DC connectors. It can use Combo 1 (CCS1) or Combo 2 (CCS2) connectors, to provide power up to 400 kW. CCS1 and CCS2 are extensions of the Type 1 and Type 2 connectors, with two additional DC contacts to allow high-power DC fast charging. CCS1 plugs typically can be found on chargers with USA specifications (480 V, 3-phase) while CCS2 plugs typically have European (IEC) or English (United Kingdom) standards and power supply specification (415 V, 3-phase).



FIGURE 14: *EV CHARGE CONNECTORS*.

Ensuring interoperability amongst the EV charging infrastructure network is critical to providing confidence to EV users, as well as enhancing and promoting EV adoption. Due to the multiple possibilities and options surrounding electric vehicles charging, **the definition and establishment of minimum requirements to comply with the deployment of the charging infrastructure network arises as a key area of action for public policy**.

Proper selection of codes and standards can (i) **encourage EVSE and EV adoption** and, (ii) **ensure safety and consistency** for both **EV users** and **installers**.

Strategies

2.6.1. Technical standards

Technology innovation is, mostly, the key driver of economic growth in any new market, although innovations also bring risks. Fortunately, the risks can be managed through the demonstration of safety, reliability, and ease of use of these new technologies. This is where common technical standards adoption is so critical to the security and positive proliferation of the electric vehicle industry.

- In order to provide certainty on the interoperability of the charging infrastructure network, minimum requirements on technical standards are required. To this end, public charging infrastructure will need to comply with, at least, the following technical standards:

    1. **EN 2-62196 'Plugs, socket-outlets, vehicle connectors and vehicle inlets'.** Dimensional compatibility and interchangeability requirements for AC pin and contact-tube accessories.
    2. **IEC 1-60884 'Plugs and socket-outlets for household and similar purposes – Part 1: General requirements'.** This is in line with Annex II to Directive 94/2014/EU and the technical specifications. The use of mechanical shutters for socket outlets is being made mandatory.
    3. In compliance with the **Commission Delegated Regulation (EU) 674/2018**, publicly accessible alternating current charging points reserved for L-category vehicles (two or three-wheeler motorbikes or mopeds) up to 3.7 kW shall be equipped with at least one of the following:

        (i) Socket-outlets or vehicle connectors compliant with standard EN 2-62196 (for Mode 3 charging).

        (ii) Socket-outlets compliant with IEC 1-60884 (for Mode 1 or Mode 2 charging).

(iii) Public charging points reserved for L-category electric vehicles above 3.7 kW shall be equipped with at least socket-outlets or vehicle connectors of Type 2 as described in standard EN 2-62196.

- Public charging stations within urban areas shall have one or more electric boards with, as a minimum, installation of one Type 1 connector and one Type 2 connector. The board may have options for installation of additional chargers (e.g., CHAdeMO, CCS1 or CCS2) if required.
- All installations shall comply with the Electricity Installation Regulations/Codes and shall be installed by a licensed electrician.
- To this end, JPS will need to evaluate the required guidelines and codes for EVSE connection to the grid, ensuring EVSE grid integration does not put at risk the system's reliability.
- The previous technical standards minimum requirements will not apply for private charging infrastructure, considering this as the EVSE deployed without commercial nature.

2.6.2. Safety standards

As the previously considerations mentioned above, safety measures are a mandatory part when developing the deployment of electric vehicle charging infrastructure and grid integration.

Safety required standards for EVSE deployment need to consider (i) the provision of safety guidelines and requirements to ensure no damage is done to the electricity grid from EVSE connection and (ii) ensure the EVSE incorporate the adequate safety components for users' operation.

- Most common safety standards that address charging infrastructures [14], and **that will be required to be considered, at least one of the two following**, when deploying charging infrastructure in Jamaica, are:

1. National Fire Prevention Association (NFPA) standards

The standard released by NFPA in the area of EV and its grid integration is NFPA 70 [15], which covers instructions on electrical equipment wiring and safety on the customer side of the facility. They include:

(i) Electric conductors and equipment installed within or on public and private buildings and other structures.

(ii) Electric conductors that connect the installations to a supply of electricity and other outside conductors and equipment on the premises.

(iii) Optical fiber cable.

(iv) Buildings used by the electric utility that are not integral part of a generating plant, substation or control center.

2. National Electrical Code (NEC) standards

NEC is another standard provider focused on safety measures in the electric vehicle industry. It also provides the different standards for EV charging infrastructure equipment.

(i) Standard NEC 625 stated as ***"Electric Vehicle Charging and Supply Equipment Systems".*** It provides the standards for off-board EV charging systems. It covers the infrastructure connected to either feeder or branch circuits for EV charging, such as conductors, connecting plugs and inductive charging devices, and provides the installation instructions for electric vehicle charging station equipment.

(ii) Standards NEC 626 titled as ***"Electrified Truck Parking Spaces".*** It covers the area of parking spaces for trucks. It defines the specifications for the electrical equipment and conductors external to the truck which are used to charge the trucks. The specifications include circuit breakers, groundings, cable sizes, back feed prevention and so on.

2.6.3. Accessibility standards

Accessibility standards shall be developed for public EV charging points in order to ensure that disabled people with mobility or dexterity impairments can easily access charging infrastructure.

These standards must consider, as a minimum, the following aspects:

- EV chargers must be located on an accessible route, with no physical barriers (e.g., curbs) and positioned for an unobstructed side reach.
- EV charging points must provide a vehicle charging space of, at least, 3 metres wide and 6 metres long, in such a way that there is enough space for a wheelchair user to move comfortably. In addition, there must be an adjoining access aisle of at least 1.5 metres wide.
- The positioning of the cradle holding the charging plugs needs to be low enough, at arm level for wheelchair users. Additionally, charging plugs will need to have a spring holding at the top of the cable, in order to help when lifting the weight of the cable, making delivering the cable to the car easier.

- The operable portion of the EV charging point (e.g., screen, card reader) must be within an accessible reach range, not exceeding 1.2 metres in height (measured from the bottom of the EVSE).
- Owners of existing public charging infrastructure will be required to assess how accessible their charge points are currently and will be required to make any necessary improvements in accordance and complying with accessibility standards once published.

2.7. Provide certainty on inspection requirements for the installation and maintenance of EVSE

Strategies

2.7.1. Creation of an EVSE Inspection Certified Entities Registry

- In order to provide certainty on inspection and verification requirements for the installation and maintenance of the EVSE, the Government will develop and publish a Registry that comprises those entities that have the adequate credentials and certifications to develop the works and services required by this policy.
- The entities comprising this registry will have to comply with the following:
    a. Entities activity must be one of those included in the standards set by the Government, following the established criteria.
    b. Entities will have to comply with the specific training certifications established by the Government to this effect, comprising electrical and EV specific training.
- All requirements to be achieved by entities willing to enter the Registry will be published by the Government, as well as the corresponding application forms.

This registry shall be established as soon as possible (in a short timeframe of 1-3 years once this Policy is approved), to facilitate the operationalization of the EV Policy.

2.8. Providing publicly available charging infrastructure information to stakeholders and users

Information represents a key driver, both for stakeholders engaging in the deployment of charging infrastructure, and users considering the charging infrastructure availability. The provision of information needs to serve as a useful tool for stakeholders and users.

Strategies

2.8.1. Public information available for stakeholders

Stakeholders engaging in the deployment of EVSE will additionally require information for the decision-making process and promote efficient charging infrastructure deployment whilst simplifying procedures.

Considering the previous, local authorities in each division zone will develop a platform comprising all the relevant information related to:

- Charging infrastructure installation application requirements.
- Local planning strategies and related updates.
- Open procurements to deploy charging infrastructure.

Moreover, JPS, aligned with the local authorities will provide stakeholders, through publicly available information, with information related to capacity availability in each location, as well as the specific access and connection application requirements.

2.8.2. Charging infrastructure Registry and Public Database

The creation of a Public Charging Infrastructure Registry will be key to providing EV users with the ability of locating available charging infrastructure. Therefore, the creation of a Public Charging Infrastructure Database for users is a tool that enables the users with critical information.

- Any individual or entity having ownership of a publicly available charging infrastructure will be required to register the facility within the Public Charging Infrastructure Registry.
- To proceed with the registration of a facility in the Public Charging Registry, the facility is required to have successfully completed all installation requirements, meaning the facility is appropriately approved and ready to use.
- The information provided by the charging infrastructure owners will be publicly available for users.
- Publicly available information will comprise at least the following:
    (i) Owner of the facility.
    (ii) Type of facility.
    (iii) Location of the facility.
    (iv) Technical connectors specifications.
- The public competent authority will create a Public Charging Infrastructure Database through an electronic platform to publish the previous information, and that will be accessible to all individuals. No registration will be required to access the Public Charging Infrastructure Database.

This database will be also an important platform to facilitate JPS undertaking grid assessments and planning for the expansion of the EVSE. To this end, in this database all charging points shall be visible and shall provide, at a minimum, the following parameters:

(i) Nameplate data such as charging station type, model, power, voltage, current ratings and operating limits.

(ii) Location (GPS and physical address).

(iii) Real-time telemetered values (analog and status) collected directly from the EV charging stations or a third-party aggregator.

(iv) Maximum charge rate.

(v) Amount of energy needed.

(vi) Capability of discharge.

(vii) Available energy to discharge.

(viii) All the charge management programmes the EVs are enrolled in (i.e., contractual charging schedules).

(ix) Controllability (local at the charging station or remote by the charging network operator).

The Public Charging Infrastructure will be updated periodically to provide updated information to users.

Goal 3: Ensure the existence of a competitive EV infrastructure market

Building infrastructure on this scale demands significant investment in the electricity sector. Charging infrastructure is generally competitive, as markets will drive investment. These levels of investment, however, will need to increase markedly as EVs grow. Government, along with relevant entities, can help promote (and protect) competition in this sector by taking action, so a competitive EV infrastructure market is guaranteed within the island.

KEY ISSUES ADDRESSED

This Policy aims to:

- Develop specific guidelines for the correct operation of the charging infrastructure.
- Promote new business models and activities involving the EVSE market.
- Ensure operational interoperability and communication standards to ensure transaction safety.

OBJECTIVES

3.1. Development of operating guidelines for stakeholders

The establishment of guidelines is needed to ensure an optimal deployment and the correct operation of charging infrastructure. These guidelines comprise the necessary aspects to promote ease of use, as well as ensuring open networks for users.

EVSE operations need to ensure that the adequate information is provided to users, in addition to incentivize EVSE use by providing accessible options. Therefore, this policy establishes, as set-out below, the minimum guidelines for EVSE operators.

Strategies

3.1.1. Establishment of guidelines for EVSE operators

- These guidelines will need to include an assessment of the current regulatory and legal framework regarding electricity in Jamaica, updating the necessary aspects to include and consider EVSE deployment.
- EVSE operators will need to ensure all relevant information is provided to the JPS for an adequate management of electricity demand.

- EVSE operators will need to ensure all relevant information is provided to the users for an adequate use of the equipment, comprising step by step instructions on how to use all components of the EVSE.

  The existence of simple guidelines at charging stations for the use of the facilities will be mandatory to ensure their safety and proper use. These guides will indicate in simple steps how to proceed from the moment the charging station is accessed until the electric vehicle battery is charged at the desired level set by the user.

- EVSE operators will provide, as a minimum, the following information in this regard:

  (i) Charge station type and model.

  (ii) Number of chargers to be installed.

  (iii) Rated output (kW).

  (iv) Maximum charge rate.

  (v) Supply characteristics power, voltage, current and operating limits.

  (vi) Available control actions.

  (vii) Connector types.

  (viii) Charge management subscription/enrolled programme.

  (ix) GPS coordinates and site plan.

  (x) Projected load growth.

  (xi) Expected start date.

  (xii) Expected date of completion.

  (xiii) Hours of operation.

  (xiv) Communication protocols.

- Every charging station will need to have, at least, one customer service system (cabin, board, panel, etc.) with integrated telephone service, so EV users are able to report any breakdown or issue easily and effectively.

- Operators of recharging points must clearly display the prices publicly in the charging stations at the point of sale, so EV users are able to know them before initiating a charging session. The price (in Jamaican dollars), by default, will be determined according to the energy consumed ($/kWh).

Operators will be required to inform the Government of the prices established at each EVSE. The Government will publish price tariffs on the national website determined for this purpose, for the public consultation.

The Government will ensure free market and free competition among operators and charging station entities. If an irregularity is detected (e.g., abusive prices), Government will have the power to intervene revising and finally, amending prices by setting a price-cap.

- Operators can limit the time of use that an electric vehicle may be charged at the charging station.
- Related to payment gateways, this policy aims to establish the minimum requirements to ensure and promote users' accessibility to the deployed charging network. Therefore, EVSE operators shall provide users with at least two options of payment. In addition, charging points will have to, as a minimum, offer electric vehicle users the option to pay through the download of a mobile application, with no need of membership. The mobile application will allow the user to input a credit card, through which the payment will be directly executed once the recharge is completed.

  Additional payment methods can be provided by charging stations operators, including membership models.

  Operators may establish different price schedules if offering subscription or membership.

  To this end, operators will need to inform users, through the available media of the payment options and prices provided at each charging location.

3.2. Interoperability and communication protocols

The capacity for several systems to operate together without limitations is known as interoperability. Interoperability in the context of electric vehicle charging infrastructure refers to the compatibility of essential system elements, including electric vehicles, charging stations, networks, the grid, and the software systems that support them. This compatibility enables seamless and efficient operation of all components.

Interoperability reflects the ability of information systems and the procedures that support data sharing and enables the exchange of information and knowledge between them. It will be necessary to develop interoperable charging infrastructure communication and operational requirements, providing scalability, security and simplicity in charging processes.

There are two main areas where interoperability protocols exist [16]:

1. Charger and Network Interoperability protocols that allow EVSE owner-operators to switch charging networks without having to purchase a new EVSE or make expensive equipment upgrades.
2. Network to Network Interoperability protocols allowing drivers to access different charging networks without having to become a member.

Standard protocols carry out the communication between the car, the charging stations, the grid, and the roaming platforms. Communication functions include identification, authorization, battery status, etc. It is required to make charging stations operated by different providers accessible for a broad range of clients, therefore operators of charging infrastructure need to use the Open Clearing House Protocol (OCHP) or the Open Charge Point Protocol (OCPP) [17]. Different protocols exist:

(i) Open Clearing House Protocol (OCHP)**:** Open-source protocol that enables boundless electric vehicle charging across charging station networks. Using OCHP, service providers for EV charging can connect to infrastructure providers to provide access to their network.

(ii) Open Charge Point Interface (OCPI) is a protocol used by charging networks to allow 'roaming'.

(iii) Open Charge Point Protocol (OCPP) is a language between the EVSE and the network management system:

a. Physically separates the appliance aspects of the EVSE from the network back-end component.

b. Prevent stranded assets.

c. Allows site host to switch networks if needed or wanted without replacing the entire EVSE.

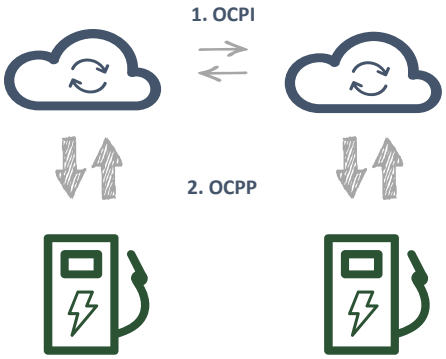


Figure 15: *INTEROPERABILITY PROTOCOLS*.

The complexity and sensitivity of the information flows arising from EVSE, require taking into consideration the necessary measures to promote security and confidentiality on information exchange. To this end, consideration on the types of information flows in the charging of EV needs to be addressed:

1. Financial flows: Financial flows ensure that the charging service is paid for.
2. Electricity flows: Electricity flows also ensure that electric vehicles are charged and available for users.
3. Electronic flows within the electric vehicle.
4. Information flows that transfer data to users.

All the information flows outlined above are vulnerable to cyber-attacks. Fraudulent activities may involve the movement of personal and financial information. Electricity information flows can be changed to, among other things, reflect variations in consumption, create harmonic frequency distortions, and have a negative influence on system dependability. Since most of the features of electric vehicles are managed by an internal communication system, electronic information transfers are extremely sensitive.

Additionally, the information flows contain sensitive information that could be jeopardized by unauthorized access. To support the growth and expansion of the electric vehicle ecosystem in Jamaica, cybersecurity for electric vehicle information flows is a key driver that requires cross-sector engagement. Different countermeasures must be built and described to achieve a communication flow network free of dangers for users and the system. Protocols for cryptography are frequently used to secure data flows and the encryption of data to ensure security from unauthorized access.

Strategies

3.2.1. Definition of protocols to ensure interoperability and EV communication flows

As a result of the previous, an **operational code** for EVSE operators, including EVs communication flows, should be established, together with the prerequisites and the adoption of the adequate cybersecurity guidelines. The operational code should consider:

1. The planning and execution of the various communication flows that will be handled, and communication protocols adoption.
2. An explanation of the obligations of the many agents involved and relation amongst them.
3. Definition of cybersecurity guidelines, including the following:
    (i) Assembling an appropriate collection of industry stakeholders to create comprehensive and integrated action plans.
    (ii) Analysis of risks is generated from the evaluation of hazards' potential effects.

Additionally, a cross-sector "Standardization Committee" will be established to oversee and guide the protocols implementation and cybersecurity guidelines adoption. The MSETT shall assist in creating a comprehensive list of suggested members, including:

(i) A representative of the MSETT.

(ii) Local Government representatives.

(iii) A representative of JPS.

(iv) A representative of ADA.

(v) A representative of public charge points operators.

(vi) A representative of OUR.

Goal 4: Ensure the development of the adequate framework to ensure the proper management of batteries and other EV components second-life and recycling

The use of electric vehicles is key for reducing air pollution and GHG emissions and also reducing dependency on fossil fuel imports. Hence, it offers a way towards a more feasible and sustainable mobility option. Despite its multiple benefits, one major concern regarding electric mobility, sometimes neglected while developing EV policies or strategies, is **how to proceed once EVs reach their end-of-life**. EVs have special technical characteristics (electronic components) that should be considered for its **end-of-life management**.

Lifecycle of an electric vehicle is mainly determined by its major component: the battery. The most common type of battery used in electric vehicles is **lithium-ion batteries** (LIBs). LIBs consist of five key components: cathode, anode, separator, electrolyte, and cell container. Each one of these components is made of different materials, such as graphite (anode), copper (anode current collector), aluminium (cathode current collector), plastics (separator and cell container) and lithium metal oxide combined with a transition metal like nickel, cobalt, iron or manganese (cathode) [18].

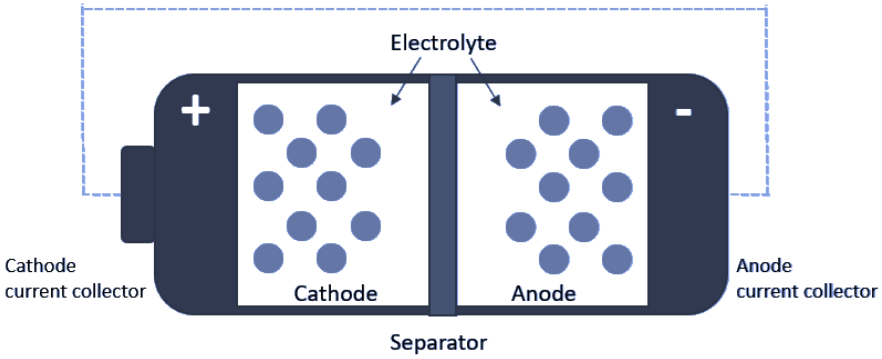


FIGURE 16: *MAIN BATTERY COMPONENTS*.

LIBs are the **predominant battery type** used in portable consumer electronics and electric vehicles, mainly because of their suitable properties for these applications [19]:

(i) High energy density.

(ii) Relatively long lifecycle.

(iii) Low self-discharge.

(iv) Low maintenance (they do not suffer from memory effect).

(v) Lightweight and compact.

As EV global market has been growing exponentially in recent years, the demand – and, therefore, the production – of batteries has significantly increased. According to the Global EV Outlook 2022 by the IEA, automotive lithium-ion battery demand was 340 gigawatt hours in 2021, more than twice the level of 2020 (IEA, 2022). Although LIBs have a relatively long lifecycle, after some time (usually after **8 to 12 years of usage**) they finally reach their end-of life. Once this point is reached, capacity and characteristics of the battery are no longer optimal for the vehicle, making it unsuitable for usage in an EV. However, in this situation the battery can still store at least 70% of their original capacity, which can be **repurposed for other applications**. The potential demand of batteries for energy storage services represents an opportunity for electric mobility equipment re-use solutions. Moreover, it presents economic advantages for electric vehicle owners since they would be able to recover part of their initial investment.

In addition to battery repurposing, **battery recycling** should also be taken into account, as it is a key method to tackle detrimental environmental effects associated with battery manufacturing, to address the concern of toxic materials waste and an opportunity to reobtain valuable raw materials.

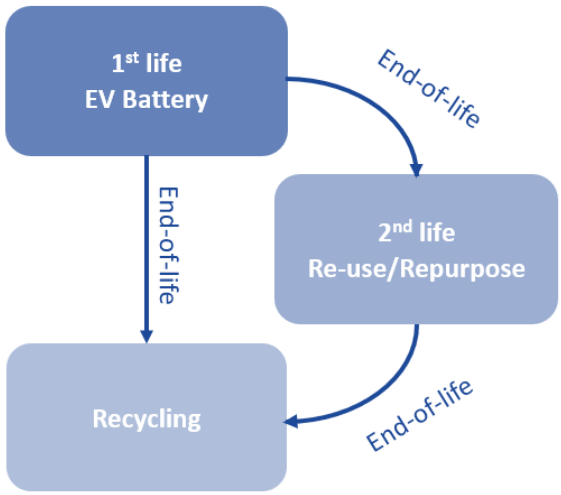


FIGURE 17: *EXTENDED BATTERY LIFECYCLE.*

KEY ISSUES ADDRESSED

This Policy aims to cover the following aspects in order to **set up a re-use and recycling ecosystem for batteries within the country**:

- Development of strategies and guidelines regarding battery management considering all the stages after the end of its useful life in EVs, emphasizing its possible re-use for other purposes.
- Development of battery recycling guidelines to ensure its adequate treatment.
- Promote and enable the creation of new businesses and activities around battery collection and treatment.

OBJECTIVES

4.1. Analysis and outline policy strategies and guidelines regarding battery re-use methods and solutions

For an orderly and effective re-use of batteries, it is necessary for the country to establish some guidelines to follow once the batteries reach their end of useful life, addressing all the aspects involved, from correct labelling to possible second-life applications.

Strategies

4.1.1. Standardization and labelling of EV batteries

With more than 450 EV models in the market, non-standardized battery system and lack of labelling make battery evaluation once it reaches its end-of-life complex and complicates its potential re-use. **Better standards around the labelling of batteries would have several benefits**, including:

(i) Cheaper and less dangerous removal of the packs.

(ii) More automation in the disposal process (lower costs).

(iii) Safer and easier repurposing process.

(iv) Interoperability across the battery swapping system would be facilitated.

Therefore, a **standardization and labelling system of EV batteries will be supported and promoted** in the island, through **import regulations, as established on Section 1.1 of this policy** – so that imported batteries match the international criteria – and the **development of a national database with information about the characteristics of each type of battery**, focusing on its main chemical components and their degree of hazard.

4.1.2. Safe collection and transport of used batteries

Prior to re-use, **batteries must be removed and transported to the appropriate facility in a safe way**. There, the batteries will be accumulated and stored for a period of time until enough batteries are collected for a cost-effective shipment or re-purpose.

To successfully achieve this key point, the policy aims to set the framework for policy development **regarding collection, transportation, and storage infrastructure as set out below**:

(i) Collection: automobile dealers or shops where the EV (and, therefore, the battery) was purchased will be responsible for EV batteries collection. They will be able to nominate a third party to carry out this activity.

Additionally, a collection infrastructure to bring used batteries to a few central locations from which they can then be transported to recycling/re-use entities will be established.

Entities responsible for battery collection will need to develop and implement the necessary re-use evaluation procedures and recycling or disposal procedures according to this policy.

(ii) Transportation: development of a hazardous materials regulation and specialized transportation entities, with special consideration for damaged batteries need to be developed. Authorized registered entities will be responsible to provide transportation for batteries collection services.

In addition, promotion towards determining an adequate network of battery recycling/refurbishment centers, as well as transportation route planning needs to be determined, so there is an optimal distance to cover when transporting them, lowering costs.

(iii) Storage: as batteries are treated as hazardous waste due to their potential to cause fire, storage infrastructure will have to meet the fire safety standards.

4.1.3. Battery status assessment

Once used batteries are collected, an **exhaustive evaluation of their health will be carried out**, to check how well the battery works and whether it is suitable for re-use purposes. The battery status assessment will include:

(i) Mechanical integrity evaluation, to identify any leakage or damage of the battery. Visual inspection is the most used technique, in the future safer and more reliable methods might be developed, such as X-rays or acoustic tools.

(ii) Electrochemical performance, several parameters will be analyzed: open circuit voltage, internal resistance, capacity and temperature.

(iii) Safety evaluation, implementing conventional safety tests (thermal, mechanical and electrical abuse tests) along with the development of more specialized tests for retired batteries to detect minor defects inside them.

This procedure will allow the **identification of batteries with similar characteristics, so they can be grouped in different categories with similar performances and level of degradation,** for their future use in relatively homogenous second-life applications (if their assessment is favorable and indicate so).

4.1.4. Re-use of batteries

Re-use or repurposing refers to the use of a batteries in another application once it reaches its end-of-life within the EV. As it has already been stated, batteries are retired from use in an EV when the range or performance is no longer acceptable; however, **they still have remarkable remaining capacity** – around 70% to 80% -, so they can still offer significant value in other applications. Re-using batteries can help extend their usable life before they are ultimately recycled.

This Policy strongly promotes battery re-use and repurposing by taking the following measures:

1. **Standardization of the criteria for battery re-use**. Development of guidelines with clear criteria whether the battery is suitable for re-use or not, focusing on its performance, remaining capacity and physical and electric properties. This will consider the results obtained in its previous evaluation once the battery health is determined.

   Therefore, battery status-assessment needs to comply with standard analysis criteria established by the Government, along with relevant stakeholders from related industries that will be fit to accommodate used batteries. In order to set standards criteria, a Standardization Working Group will be established, which will be responsible for the development of the guidelines to ensure criteria suits the re-use requirements.

2. **Encourage new applications, especially energy storage coming from renewable sources**. Energy storage requires a lower current energy density from the battery than the use in an electric vehicle; hence, it is appropriate for second-life batteries. They can range from small sized applications (for residential and commercial storage) to large scale industrial facilities, and storage systems based on used EV batteries are more profitable and sustainable than first use battery systems [20].

Back-up power and off-grid energy storage applications are meaningful and should be promoted, as they could provide electricity in case of power outages or in areas of the island where grid infrastructure is not optimal.

All in all, the implementation of a second-life system for used EV batteries will have a beneficial impact on the country, as it directly tackles e-waste, creates new job opportunities in the island and helps Jamaica reach its environmental objectives.

4.2. Development of battery recycling and disposal guidelines and responsible entities

Whether used batteries are not suitable for their re-use or they have already reached their end-of-life point after repurposing, their recycling and disposal is the next step. Battery recycling or disposal management avoids detrimental environmental effects and social impacts.

The previous requires the development of specific battery recycling procedures to manage waste in a safe and environmentally friendly way.

Strategies

4.2.1. Development of specific battery recycling procedures

- Automobile dealers where the EV was purchased will be responsible for the collection of used batteries. They will be able to nominate a third party to carry out this activity.
- Other interested stakeholders (e.g., managed and regulated disposal facilities) will be able to carry out this activity as long as they are affiliated with Authorized Treatment Facilities (ATF).
- The MSETT will collaborate with the National Environment Planning Agency (NEPA) and the National Solid Waste Management Authority (NSWMA) to establish specific disposal procedures for their recycling, once (i) they have not passed the assessment for their re-use or (ii) they have already been repurposed and have reached their second end-of-life.
- These procedures shall include mechanisms to export the batteries to countries with the adequate infrastructure and facilities for their management, ensuring their proper recycling.

4.3. Address and mitigate identified impacts caused by other EV components

Batteries are the key element of electric vehicles, and therefore their correct management including re-using and recycling procedures has been highly emphasized. However, EVs also have different components such as the electric drive motor or power electronics (inverter, DC voltage converter, onboard charger, etc.) that should also be addressed while assessing their end-of-life management and their environmental aspects.

Strategies

4.3.1. Development of strategies and guidelines regarding other EV components recycling

- Most of the other EV components can be recycled and treated as conventional ICE vehicle components; however, a regulation update is needed to ensure EV special features are considered.
- Therefore, the removal of batteries will be mandatory prior to disposal of EVs, as well as the removal of all electric components (electric motors and power electronics). By doing so, these components will have a special treatment in order to recover some minor metals.
- Regarding the motor, after its disassembly its main components (mainly copper, steel and aluminium) can be incorporated into conventional recycling routes. Likewise, once power electronics are removed, it can be treated like normal electronic scrap, following its corresponding procedures (comminution, classifying, sorting and further metallurgical processing) [21].

4.4. Supporting local battery and other components recycling and disposal centers

Battery treatment along with the different activities of the re-purposing and recycling process, as well as scrapping EVs activities, involve some challenges, most of them related to safety: the risk of electrocution, the large number of powerful magnets inside electric motors among others.

Strategies

4.4.1. Development of the necessary recycling and disposal network

- To support an adequate deployment of the battery and other components recycling and disposal system, specialized centers to support recycling and disposal of batteries and other EV components, ensuring an adequate treatment of these will be key. Therefore, entities responsible for the appropriate certifications related to high-risk waste and electronic waste management will be promoted to ensure the development of the necessary recycling and disposal network, acquiring the condition of Authorized Treatment Facilities.
- ATF will need to comply with the certification requirements established by the Government.

Goal 5: An excellent training and development capability; promotion of world-class training programmes to develop EV knowledge among technical experts

As electric vehicle use expands and mobility patterns change, it is necessary to update the skill levels of all stakeholders in relation to electric mobility. As a result, several training programmes shall be developed based on the type of services stakeholders provide and for those professionals who are expected to be the real target of the new developments.

The development of local capabilities for key stakeholders is vital to guarantee the viability of electric mobility deployment, in which the Government and competent authorities will have a proactive position in order to implement the required programmes.

KEY ISSUES ADDRESSED

The present Policy has the objective to **set the requirements to develop a series of certification and training programmes to support the local capabilities**, comprising:

- Establishment of specific preparation programmes for key professionals to guarantee their proper training.
- Development of specialized training and research programmes related to battery re-use and recycling, encouraging innovation and coming up with new ideas and solutions.

OBJECTIVES

5.1. Training programmes for key professionals

Specific preparation programmes and an adequate education will be required, as a way to ensure readiness for electric mobility. Re-training programmes for Jamaican labor force (who are currently specialized in ICE vehicles) will be required as well, so local professionals become certified in servicing electric vehicles.

Strategies

5.1.1. Development of Certification programmes for mechanics, technicians and other professionals for EVs and battery assessment

With the introduction of inspection procedures for imported vehicles and batteries, mechanics and technicians from local centers and workshops must be able to carry out the evaluation correctly, taking into account the needs and special characteristics of electric mobility. Therefore, mandatory certification programmes shall be developed for competent professionals, in such a way that they acquire the necessary skills and abilities to deal with electric vehicles.

Certification programmes will train professionals on EV and EVSE diagnosis, repair and maintenance.

Programmes will need to be provided by the requisite training entity, established to this effect by the Government, and will need to comprise both theoretical and laboratory instruction. Giving the scale and pace of adoption of EVs desired, collaboration between the Government and the private sector will be also encouraged, promoting the development of official training programmes through accredited private institutions.

The Government will publish recommended training courses to obtain the condition of certified technician. If professionals consider different training courses than the ones recommended by the Government, the content will need to be validated by the Government in order to consider the training programme as valid.

5.1.2. Development of Certification programmes for first response fleet professionals (police officers, firefighters, ambulance drivers, etc.)

These professionals must know how to deal with possible accidents that can be caused by electric vehicles, such as fire mishaps. Thus, certification programmes and specific training are highly needed, so that they know how to proceed properly. These programmes shall focus on safety, studying and analyzing the risks in the use and attendance of emergencies involving EVs.

The Government will develop specific training courses for first responders around EVs and EVSE.

5.1.3. Development of mandatory training programmes for electricians, service technicians and other relevant personnel regarding charging infrastructure

The deployment of charging infrastructure throughout the island must, first of all, be installed safely and correctly; and later it will need operation and maintenance tasks on a regular basis. Hence, the development of an official training programme (with its corresponding certificate) will be required for electricians and technicians who will provide these services.

In these programmes, local professionals will be instructed about the technical standards, security measures, interoperability and electrical characteristics of the different charging points available in Jamaica, focusing on both operation and maintenance technologies.

By certifying candidates and using training programmes that have been approved, confidence and safety components can be ingrained throughout the value chain.

5.1.4. Setting up Skill Centers with provision for training related to jobs in EV ecosystem

Different Skill Centers shall be established in Jamaica, where all these training and Certification programmes already mentioned for key professionals will take place.

5.2. Development of specialized training and research programmes related to battery re-use and recycling

As previously discussed, used batteries, after reaching their end-of-use within electric vehicles, can be employed for other purposes. Jamaican public institutions have an interesting role in raising public awareness about battery re-use and recycling, as well as encouraging the Jamaican population in the development of new ideas and solutions, fostering innovation.

Strategies

5.2.1. Development of sessions about battery use after reaching their end-of life

Public sessions and talks about battery management shall be developed and promoted in Jamaica, where all relevant aspects of batteries will be discussed:

(i) A brief description of their characteristics and chemical components, addressing the possible risks involved if they are not managed carefully.

(ii) Their lifecycle.

(iii) How to identify when they have reached their end-of life.

(iv) What to do once they reach their end-of-life (i.e., where batteries are collected for further treatment).

(v) Introduce the possible second-life for batteries showing its advantages and how it can be implemented in Jamaica, promoting their re-use.

(vi) Present and describe the established recycling and disposal procedures requirements, and how they can contribute to improve the environmental situation in Jamaica.

These sessions shall be carried out periodically, in such a way that, over time, people become aware about battery management, so this will help to set up a re-use and recycling ecosystem for batteries in the country.

5.2.2. Promotion of entrepreneurship programmes to incentivize innovative solutions for batteries second-use

Fostering entrepreneurship programmes can be beneficial through the introduction of specialized research initiatives created to encourage businesspeople to come up with creative solutions to the problems associated with battery second use.

By doing so, innovation regarding research and development in the areas relating to EVs and batteries will be facilitated and encouraged.

5.2.3. Training programmes for professionals in charge of battery recycling

Staff of Authorized Treatment Facilities, where battery waste and disposal will be managed, must be put through additional training programmes, as they will have to deal with EV scrapping. These specialized programmes will be mainly focused on procedures and safety guidelines.

These training programmes may be extended to include the feeder chain of informal suppliers that will become mainstays in the supply chain of the used parts business.

Goal 6: Incentivize electric vehicle use and promote social awareness among Jamaican population

Jamaica's Government through the MSETT and other competent authorities play a major role promoting electric vehicle adoption through a series of supportive policy incentives.

This Policy aims to provide incentives on EV adoption by increasing EV driving experience for users, whilst in addition promote social awareness regarding EV benefits.

KEY ISSUES ADDRESSED

- Development of communication campaigns, to raise awareness about EV benefits.
- Establishment of incentives to increase EV driving experience and encouraging their use.

OBJECTIVES

6.1. Development of communication campaigns to promote awareness of the benefits of electric mobility

Communication from public entities is crucial, as it plays a fundamental role in raising social awareness among residents about a specific topic. Therefore, an intense and effective campaign regarding electric mobility must be carried out by the Government, presenting and emphasizing the multiple benefits of electric vehicles.

Strategies

6.1.1. Effective communication and education campaigns to increase population awareness and knowledge of the opportunities and benefits

The Government understands that communication to create awareness is crucial to promote growth of electric vehicles in the country. The following table shows the different communication strategies that will be employed under the different phase of implementation:

Phase	Strategy
Phase 1	EV awareness campaign through community sensitization. In addition to all the benefits electric mobility offers, it is also worth mentioning that these campaigns shall also address the risk EVs pose as to accidents and pedestrians, as well as prevention measures.
Phase 1	Policy points (Do's and Don'ts) strategies highlighted through multimedia (mass and digital/online), MDAs, industry and community engagement.
Phase 2	Activities encompassing a multi-level/multi-sector approach to include forums/conferences, competitions, roadshows or giveaways.
Phase 3	Promote sector sensitization through test rides in collaboration with various vehicle dealers.
Phase 3	Promotion of zero-emission days/green days.

TABLE 6: *STRATEGIES TO BE DEPLOYED AT DIFFERENT PHASES.*

In order to ensure greater reach and impact, it is recommended that the Government partners with critical market stakeholders in the roll-out programme of the communication campaigns.

6.1.2. Development of sessions and public talks about new mobility alternatives and their advantages

Different talks shall be held at relevant facilities or centers, where new transport modes like car-sharing and micro mobility will be introduced to the Jamaican population, explaining these new concepts and emphasizing their advantages. Likewise, in these public sessions, attendees may ask any questions they have related to this topic, facilitating discussion among participants.

Furthermore, test drives and test experiences will be developed to provide the Jamaican population with the experience in new mobility services.

6.2. Incentivize EV driving experience

To promote the acquisition and the use of electric vehicles, some incentives such as preferential treatment for EVs will be established, as they also play a major role in promoting electric mobility.

Strategies

6.2.1. Parking incentives for EVs

The MSETT and the competent authorities must develop and implement parking incentives, as a minimum, the following:

(i) Temporary exemption from parking fees.

(ii) Reserved parking spots: reserved slots shall be made available in all major public parking spaces across target cities. Charging infrastructure installation shall also be promoted in these slots.

An individual may not park a motor vehicle within any on or off-street parking space specifically designated by a local authority for parking and charging EVs unless the vehicle is an EV fueled by electricity. A person found responsible for a violation is subject to traffic violation penalties.

6.2.2. Deployment of a Low Emission Zone (LEZ)

LEZs have been gaining momentum in recent years, spreading increasingly along the deployment of electric vehicles ecosystem. **LEZs shall be implemented in specific areas** of Jamaica (e.g., typically congested places such as city centers), and **electric vehicles will have free access and circulation** in these low emission zones.

The competent authorities will follow the following steps when creating a successful LEZ:

(i) Clearly define the objectives, area(s) involved, scope and timelines.

(ii) Communicate well in advance, involving citizens and businesses in the process.

(iii) Ensure effective and fair enforcement.

(iv) Provide targeted financial support by the corresponding entities.

(v) Monitor the effects and set a progressive calendar to a fully transition to a zero-emission zone in the long-term.

Policy implementation, monitoring and evaluation

Key implementation actions

The MSETT, together with the Government and other key institutions, critical to the successful implementation of the policy, will continue developing and driving related policies and actions to support the Electric Vehicle Policy.

These actions and policies, are needed for the optimal deployment of the Electric Vehicle Policy, and are aligned with the main areas mentioned during the elaboration of the policy, as:

1. Development of an enabling environment to guarantee the **penetration of electric vehicle fleet**, by setting a regulatory framework regarding import and registration procedures for both private and public users, as well as promoting alternatives for governmental and public transport fleets.
2. Ensure a dynamic and responsible national system for the deployment of efficient **charging infrastructure** on the island, through a well-established legislative and institutional framework that covers the proper planification, installation, maintenance and the establishment of the minimum standards required to ensure its success.
3. Ensure the existence of a **competitive Electric Vehicle infrastructure market**, developing specific guidelines for the correct operation of the charging infrastructure, ensuring the adoption of interoperability and communication standards and promoting new business models involving the EVSE market.
4. Ensure the development of the adequate framework to guarantee the **proper management of batteries and other EV components** second-life and recycling.
5. Promote **excellent training and development capabilities, promoting world-class training programmes** to develop EV knowledge among technical experts and key professionals.
6. **Incentivize EV use and promote social awareness** among Jamaican population by developing effective communication campaigns and establishing preferential treatment to EVs.

In addition, the approved policy will be followed with a Policy Implementation Plan to be agreed within [90] days of this Policy's approval which will identify the costing of the measures proposed, and the milestones marking the implementation progress.

Actions	Policy Goal	Responsible agencies	Indicator	Timeline
Setting of the technical requirements to import electric vehicles	1	MSETT, TBL	Number of technical requirements developed to import EVs into the country	< 6 months
Standardization of the technical information requirements to import electric vehicles	1	MSETT, TBL	% completion in the standardization of the technical information requirements to import EVs into the country	< 6 months
			% completion in the standardization of the technical information requirements to import EV batteries into the country	
Development of a battery labelling system	1	MSETT, NEPA, MIIC	% completion in the development of a battery labelling system	1 year
			Number of batteries labelled	
Development of EV Import Guidelines	1	MSETT, Jamaica Customs Agency, TBL, MIIC	Number of guidelines published at official Government facilities and on the official website of the Jamaican Government	< 6 months
Publication of guidelines regarding battery import procedures	1	MSETT, Jamaica Customs Agency, TBL	Number of guidelines published at official Government facilities and on the official website of the Jamaican Government	< 6 months
Update of inspection procedures for imported vehicles and batteries	1	MSETT, TBL, MIIC	Number of technical assessments of imported EVs conducted	1 year
			Number of technical assessments of imported batteries conducted	
			Number of certifications issued by the vehicle inspection certified engineer	

			Official publication of the list including the identification of certified engineers	
Update private EV registration procedures to incorporate electric vehicles particularities	1	MSETT	% completion in the development of a categorization system to register EVs	< 6 months
			% completion in the update of current application forms to include EV technology	
			Number of EVs recorded in the National Vehicle Register	
			Number of distinct registration plate for EVs issued by the authorities	
			Number of EVs benefitting from the exemption on the registration and renewal fee	
			Publication of guidelines for EV registration at official Government facilities and on the official website of the Jamaican Government	
Update public EV registration procedures to incorporate electric vehicles particularities	1	MSETT, Transport Authority	Number of licenses issued for EVs	< 6 months
			% completion in the update of current application forms licenses to include EV technology	
			Number of licensed EVs benefited from the extension on the license duration	
			% completion in the modification of the current license issuance model	

Assessment of governmental fleets	1	MSETT	Number of EVs registered for use in the government fleet	1-3 years
Assessment of public transport fleets	1	MSETT, Transport Authority, ITA	Number of EVs registered for use in the public transport fleet	1-3 years
Development of spatial zoning exercise	2	MSETT, MLGRD, PIOJ	% completion in planning procedures for EV zoning	< 6 months
Development of a Location Planning strategy	2	MSETT, MLGRD, PIOJ	% completion in EV location planning strategies	1 year
Establishing of a Governing Committee	2	MSETT, MLGRD, ADA, JPS	% completion in planning location strategies and number of annual of reviews and updates	< 6 months
Evaluation of the impact charging infrastructure has on the grid	2	MSETT, PIOJ, JPS, OUR	% completion in the evaluation processes	1 year
Engaging stakeholders in the deployment of publicly available charging infrastructure	2	MSETT, MLGRD, JPS	Number of public charging infrastructure deployed annually	2 years
Establishing general installation procedures and requirement guidelines for the deployment of charging infrastructure	2	MSETT, MLGRD, JPS	% of effective deployment of charging infrastructure as a result of the publication of specific requirements	< 6 months
Review the current state of the legislative and regulatory framework within the electricity sector	2, 3	MSETT	% completion in the evaluation of the Jamaican electricity legislative and regulatory framework and the publication of the regulation applicable to EVSE deployment	1 year
Establishing installation application procedures for public charging infrastructure in public lands	2	MSETT, MLGRD, JPS	% of effective deployment of public charging infrastructure as a result of the publication of specific requirements	1-3 years

Designing a post-installation inspection certificate	2	MSETT, BSJ, GER	Number of certificates issued	1 year
Development of guidelines for stakeholders regarding charging infrastructure maintenance	2	MSETT, MLGRD, JPS	Number of guidelines developed ensuring maintenance requirements	1 year
Technical standards establishment	2	MSETT, OUR, JPS	% of EV technical standards adoption	< 6 months
Safety standards establishment	2	MSETT, OUR, JPS	% completion in the adoption on the required safety standards	< 6 months
Accessibility standards establishment	2	MSETT, OUR	% completion in the development and adoption on the required accessibility standards	< 6 months
Establishment of a EVSE Inspection Certified Entities Registry	2	MSETT, MIIC	Number of entities included in this registry according to the Government's established criteria	< 6 months
Public information availability for stakeholders	2	MSETT	% of available public information	1-3 years
Creation of a charging infrastructure registry and public database	2	MSETT, MLGRD	% completion of a registry for charging infrastructure and public database	1-3 years
Development of operation guidelines for stakeholders	3	MSETT, MLGRD, JPS	% completion in the establishment of requirements for the proper operation of charging infrastructure	< 6 months
Development of interoperability and communication protocols	3	MSETT, OUR	Number of interoperability standards adopted	< 6 months
			% completion in the development of an operational code regarding cybersecurity	

Establishment of a Standardization Committee	3	MSETT, MLGRD, ADA, JPS, OUR	% completion in the development of instructions regarding protocols implementation and cybersecurity guidelines	< 6 months
Standardization and labelling of EV batteries	4	MSETT, TBL, NEPA, MIIC	Number of import regulations established for EV battery import % completion in the development of a national database with information about the characteristics of each type of battery	2 years
Safe collection and transport of used batteries	4	MSETT, NEPA, NSWMA	% completion in the creation of specific regulation regarding battery collection, transportation and storage	1-3 years
Battery status assessment	4	MSETT, NEPA, NSWMA	Number of batteries evaluated annually	3-5 years
Re-use of batteries	4	MSETT, NEPA, NSWMA	% completion in the development of guidelines for battery re-use and repurposing	1-3 years
Development of specific battery recycling procedures to manage waste in a safe and environmentally friendly way	4	MSETT, NEPA, NSWMA	% completion in the development of specific disposal procedures for battery recycling	1-3 years
Development of safe electronic components recycling procedures	4	MSETT, NEPA, NSWMA	% completion in a regulation update for other EV components recycling	1-3 years
Establishment of new Authorized Treatment Facilities or strengthening existing ones with dedicated and specialized resources	4	MSETT, MEGJC, NEPA, NSWMA	Number of certified ATF within the island	1-3 years
Development of Certification programmes for	5	MSETT, MEGJC, MOEY, Universities	Number of certification training programmes developed for technical professionals	< 6 months

mechanics, technicians and other professionals for EV and battery assessment			Number of official certifications issued for key technical professionals	
Development of Certification programmes for first response professionals (police officers, firefighters, etc.)	5	MSETT, MEGJC, MOEY, Universities	Number of certification training programmes developed for first response fleet professionals Number of official certifications issued for first response fleet professionals	2-3 years
Development of mandatory training programmes for electricians, service technicians and other relevant personnel regarding charging infrastructure	5	MSETT, MEGJC, MOEY, Universities	Number of certification training programmes developed for electricians and EVSE technicians Number of official certifications issued for electricians and EVSE technicians	2-3 years
Setting up Skill Centers with provision for training related to jobs in EV ecosystem	5	MSETT, MEGJC	Number of Skill Centers established	1-3 years
Development of sessions about battery use after reaching their end-of life	5	MSETT, NEPA, MOEY, Universities	Number of sessions conducted	2-3 years
Promotion of entrepreneurship programmes to incentivize to find innovative solutions for batteries second-use	5	MSETT, MOEY, Universities	Number of specialized research initiatives introduced	2-3 years
Training programmes for professionals in charge of battery recycling	5	MSETT, NEPA, MEGJC, MOEY, Universities	Number of additional training programmes conducted for ATF staff	1-3 years
Effective communication and education campaigns to increase population awareness and knowledge of the opportunities and benefits	6	MSETT, MOEY, Universities	Number of communication and education campaigns conducted annually Degree of advancement in the established communication strategies	1-3 years

Parking incentives for EVs	6	MSETT, MFPS	% completion in the implementation of a temporary exemption from public parking fees for EV users	< 6 months
			Number of reserved parking spots for EVs	
Deployment of a Low Emission Zone	6	MSETT	% completion in the development of a LEZ and number of LEZ implemented	1 years

Key considerations

The following are the key considerations that encompass the development of action necessary for promoting EV adoption. For the effective deployment of the policy, these additional measures will have to be taken by the applicable competent authorities of the Government, which will have to be aligned with each other.

Tax regime and fiscal considerations to boost adoption

Development of an incentive programme

In order to scale up the attractiveness of the deployment of electric vehicles, it is necessary to develop an incentive programme to stimulate the purchase and help promote the expansion of EVs throughout the country.

Incentive programmes most of the time have positive effects on EVs adoption, since they are carried out after extensive studies of consumer preferences and behaviors.

The development of incentive programmes, shall consider, among others:

(i) Tax credits, tax re-design and purchase benefits.

(ii) Subsidies for EV charging infrastructure.

Furthermore, to encourage EV uptake import duty reduction should be extended to different types of vehicles, including its application to heavy-duty vehicles, where costs of these type of electric vehicles is significantly higher than an ICE vehicle.

Additional consideration will need to be set towards the development of measures to discourage ICE vehicles, such as (i) reviewing and adjust applied tariffs to ICE vehicles to disincentivize users' preferences for this type of vehicles and (ii) evaluate the definition of a cease mandate on ICE vehicle imports.

Technical, efficiency and interoperability standards

Vehicle to grid services and business model development structuring

The release of different policies with the aim of encouraging the penetration of electric vehicles throughout Jamaica, will support a remarkable growth in the EV market. This increasing penetration of electric vehicle will also affect the demand on the power system.

On the one hand, the penetration of renewables implies a decrease in market prices because the energy production through renewable sources has a zero marginal cost, which causes prices to drop significantly, resulting in a more competitive system.

On the other hand, the integration of EVs into the power grid becomes a key issue for the efficient operation of the electrical system and for the penetration of RE due to the changes in consumption habits. EV users are commonly encouraged to charge their EVs at night (a low peak period) when consumption is minimal. With this, the flattering of the load curve and the penetration of RE is achieved.

Furthermore, the EV can be used as a storage mobile facility for the electricity grid, providing back up technology that would address RE intermittency. The previous approach would result in the empowerment of the electric vehicle and its proper deployment in Jamaica.

Government of Jamaica, together with the competent authorities must deploy new technologies and development of new business models with pilot programmes aimed at digitalizing the transportation grid and taking advantages of synergies between sectors.

Upgrading emissions and efficiency norms for ICE vehicles

Automotive sector contributed significantly to greenhouse gas emissions to the atmosphere. In order to mitigate this issue, there is a need to upgrade emission standards (i.e., the legal requirements governing air pollutants released into the atmosphere), to become more ambitious and to further reduce harmful air and climate pollutant emissions, improving public health and consumer savings due to the rection of fuel and maintenance costs.

As Jamaica has a huge percentage of second-hand vehicles, emission limits and standards should be established and aligned with other measures such as age limit or emission restriction when importing or developing of tagging system for congested areas.

Some of the measures to be included are:

(i) Development of cost-benefit analysis on adopting GHG emissions standards.

(ii) Greenhouse gas emission limits and standards for internal combustion engine vehicles import requirements.

(iii) Monitoring systems and data collection mechanisms to evaluate the efficiency of the norms.

Emissions and efficiency norms can further support categorization of the national vehicle fleet and adopting measures to incentivize EV driving experience over ICE vehicles, as well as promoting transition to less contaminating means of transportation.

Developing a tagging system for congested areas

A tagging system for private cars shall be implemented in the country, as a way to supervise and monitor vehicle circulation. MSETT shall design specific guidelines regarding this new tagging system, addressing:

(i) Definition and update of the technical standards towards vehicle categorization and circulation conditions.
(ii) Alignment of vehicle labelling based on emission and efficiency norms.
(iii) Mechanisms to monitor and identify non-compliance.

Enhancing energy sector readiness

Vehicle to grid integration and distributed energy aggregators, technical and commercial regulation, new business models

A specific policy regarding vehicle-to-grid integration shall be developed by the Office of Utilities Regulation, in collaboration with the MSETT. This policy shall set guidelines and address critical aspects of vehicle-to-grid technology, such as (i) technical operation of the bidirectional flow, (ii) aggregator operation, (iii) participation of stakeholders in vehicle-to-grid solutions and (iv) new business models.

Additionally, a smart grid programme and regulatory framework shall be developed, in consistency with the aforementioned policy.

Furthermore, in regard to promoting innovation, collaboration with universities to explore vehicle-to-grid will need to be supported by the government.

Regulatory and market mechanisms for scaling up renewables in the power sector

Jamaica has very limited fossil fuel resources but, otherwise, has a huge potential for renewable energy. There is a need to develop regulatory mechanisms promoting the deployment of RE and increasing its share of the energy mix as well as encouraging the reduction of GHG emissions.

Moreover, it is important to develop different national policies, focusing on regulatory mechanisms that set out comprehensive and strategic plans to manage all energy and energy-related activities, including:

1. Enforce information systems and social awareness about renewable energy
2. Financing mechanisms to boost RE adoption
3. Policy support when developing regulatory and market frameworks
4. Upgrade grid infrastructure deployment of smart meters and load controls

Enhancing transport readiness

Update general transport policy

With all the new developments that the introduction of a National EV Policy entails, it is necessary to update the general transport policy, which must be aligned with the country's energy policy and other existing regulations.

Financial schemes for public transport operators to adopt new technologies

Different financial schemes (public-private partnerships, public loan access, etc.) for public fleets will have to be considered and included in the updated National Transport Policy.

Immediate renewal programme structuring

The expected increase in the fleet of electric vehicles in Jamaica, must be driven and supported by efficient and optimal planning. Together with the new or updated regulations and standards that will be implemented in the country by the different government entities that apply, it will be necessary to launch a series of programmes and strategies when carrying out any action in the short-term.

The renewal of the national public fleet is a key issue, exhaustive analysis and studies are required to make it efficient.

Long-term and renewal phases guidelines for electric public transport fleets

MSETT and Transport Authority shall create a new license issuance model. This new model shall:

- Consider a maximum number of licenses issued.
- Have a priority issuance ranking based mainly on fuel efficiency and emission factors, benefiting EV owners.

Monitoring systems of the renewal programmes

A specific database of issued licenses of public transportation fleets shall be created, as a mechanism so the Government of Jamaica can directly monitor and supervise the evolution of these fleets and the penetration of EV within them.

Post implementation renewal phases – feasibility studies

MSETT, along with relevant entities, shall carry out and design market research through pilot programmes introducing EVs in both public and private fleets, monitoring that EV deployment is being carried out properly in the country.

Updated guidelines for the definition of service levels

Public operators, in collaboration with the MSETT, shall design and establish targets and objectives within public fleets, as well as conduct surveys among public transport users.

If the set objectives are achieved, economic incentives can be considered as a way to motivate public operators to optimize their services.

Electric bus deployment pilot

In January 2023, Government of Jamaica launched the first public passenger battery electric bus, and its testing period is still underway. Jamaica Urban Transit Company shall develop different pilot programmes related to the deployment of electric buses and their charging infrastructure, analysing their performance, integration and benefits achieved.

Creating an e-mobility ecosystem in Jamaica

E-mobility research and development programmes with universities, private and public sector

Government collaboration with industries, public and private sector and educational institutions (universities) to promote and develop R&D programmes and R&D&I projects, focusing on the main areas of e-mobility, such as power generation, energy storage or battery applications. To successfully incentivize these projects, public authorities shall (i) define the requirements for the development of these programmes, (ii) implement financing procedures to grant funding and (iii) deploy pilot programmes for further evaluation and monitoring.

E-mobility ecotourism programme with key stakeholders

Partnerships between the public and private sector shall be developed, so that charging infrastructure can be deployed within tourism areas (e.g., hotels) and established tourism operator routes.

In addition, car rental companies should be encouraged to provide EV offering.

E-mobility infrastructure and human capital development through the private sector

The Government of Jamaica, along with relevant public entities, shall make alliances with the private sector, as its collaboration will be key to (i) accelerate the deployment and support funding of infrastructure and (ii) provide funds for the development of training programmes, talks, sessions and workshops.

E-mobility training programmes for technocrats within the Government

The Government of Jamaica, along with relevant training and educational entities, should develop specific training programmes that would enable personnel to be exposed to the nuances of the

electric mobility sector, empowering them to develop further policies and other forms of legislations for the sector.

Regulatory model for new shared mobility services

A regulatory framework for new shared mobility services (shared transportation) shall be designed, addressing stakeholders' obligations as well as required operational and safety standards of the service.

Regulatory model for electric car-sharing and urban rental services

MSETT shall develop car-sharing pilot programmes, defining targeted urban areas for the deployment of these services, in order to analyze their viability. Key outcome will be based on monitoring and evaluation mechanisms.

Financial solutions for new acquisitions of EVs (leasing), mechanisms to increase market penetration for EVs

MFPS shall develop specific policies to provide financial support particularly for the medium and low-income segments of society, so they can afford to buy electric cars, making them accessible and incentivizing electric mobility preferences.

In addition, financial institutions shall provide loans to citizen with lower interest rates and longer payback periods, encouraging the purchase of EVs.

Furthermore, other financial mechanisms such as leasing contracts shall be set, in such a way that customers can benefit from the advantages of electric mobility without having to buy a new car.

Legislative Framework

According to the measures stated in the current National EV Policy, the following policies, licences and legislations may need to be considered for amendment:%

Act/Policy	Ministry/Responsible Agency	Date
Climate Change Policy	Economic Growth and Job Creation	2015
Government of Jamaica Public Sector Procurement Policy	Finance and the Public Service	2010
Motor Vehicle Import Policy	Industry, Investment and Commerce	2014
National Energy Policy 2009-2030	Science, Energy and Technology	2010
National Foreign Trade Policy and Action Plan	Foreign Affairs and Foreign Trade	2017
National Investment Policy (draft)	Industry, Investment and Commerce	2022
National Policy and Strategy for the Environmental Management Systems	Economic Growth and Job Creation	2017
National Policy and Strategy for the Environmentally Sound Management of Hazardous Wastes	Economic Growth and Job Creation	2017
National Transport Policy	Transport and Mining	2007
Vision 2030 Jamaica - National Development Plan	Planning Institute of Jamaica	2009
Natural Resources Conservation Authority (Air Quality) Regulations	Economic Growth and Job Creation	2006
Cybercrimes Act	Science, Energy and Technology	2015
Electricity Act	Office of Utilities Regulation	2015
Electricity Licence	Office of Utilities Regulation	2016
Fair Competition Act	Industry, Investment and Commerce	1993

Act/Policy	Ministry/Responsible Agency	Date
Natural Resources Conservation Authority Act	Economic Growth and Job Creation	1991
Road Traffic Act	Transport and Mining	2018
National Solid Waste Management Act	Science, Energy and Technology	2003
Petroleum (Quality Control) Act	Local Government and Community Development	1990
Road Traffic Regulations	Transport and Mining	2022
Tax Administration Jamaica Act	Finance and the Public Service	2013

Definitions

- **Back-up power:** Various electrical systems that keep the lights on when your primary power fails.
- **Battery Electric Vehicle:** Vehicle propelled by electric motors.
- **Battery repurposing/re-use:** Batteries are retired from their first use but can be repurposed or re-use for a secondary use ("second-life").
- **Business-as-usual scenario:** Scenario for future patterns of activity which assumes that there will be no significant change in people's attitudes and priorities, or no major changes in technology, economics, or policies, so that normal circumstances can be expected to continue unchanged.
- **Green House Gas Emissions:** Greenhouse gas emissions from human activities strengthen the greenhouse effect, contributing to climate change. Most of this is carbon dioxide from the burning of fossil fuels: coal, oil and natural gas.
- **High Duty Vehicles:** Any motor vehicle having a manufacturer's gross vehicle weight rating greater than 6,000 pounds, except passenger cars.
- **Internal combustion engine:** An engine that creates its energy by burning fuel inside itself.
- **Internal Combustion Engine Vehicles:** Vehicles burning fuel to get power.
- **Light Duty Vehicles:** Vehicles primarily used to transport passengers.
- **Low Emission Zone:** Schemes that cover specific areas (typically in cities) designed to tackle air pollution. They discourage certain types of vehicles from entering a specified zone.
- **Medium Duty Vehicles:** Truck classification widely used by those in the trucking industry.
- **Net-zero emissions:** It refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere.
- **NFPA 70:** National Electrical Code (NEC) is the benchmark for safe electrical design, installation, and inspection to protect people and property from electrical hazards.
- **Off-grid energy storage:** System working on its own that relies on electricity generated in combination or individually by solar panels, generators, or hydro systems which is then stored in batteries. The power stored by the batteries then supplies the power to your house.

- **Off-Street Parking Spaces:** Available parking spaces for vehicles within an enclosed parking lot or garage.
- **Plug-in Hybrid Electric Vehicle:** Vehicles using batteries to power an electric motor and another fuel, such as gasoline, to power an internal combustion engine.
- **Private charging infrastructure network:** Charging stations not available for public usage. They are dedicated to an individual apartment, office, or private buildings.
- **Private fleet:** The owner is a private entity or an individual.
- **Public building parking spaces:** land or a building or part thereof that is accessible to the general public for parking purposes.
- **Public charging infrastructure network:** Refers to any charge point along urban areas or highways accessible by the general population.
- **Public fleet:** Means a fleet under ownership of a public entity as Governments.
- **Renewable energy resources:** Clean energy coming from natural sources or processes.
- **Total cost of ownership:** Represents the complete financial cost during the time a consumer owns the vehicle.
- **Urban areas:** Locations with high population density.

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