Jamaica Public Service Company Limited

Response: Electric Vehicle (EV) Stakeholders' Consultation

June 22, 2021

Jamaica Public Service Company Limited
6 Knutsford Boulevard
Kingston 5
Jamaica

Table of Contents

Abbreviations and Acronyms

AC	-	Alternating Current
ADMS	-	Automated Distribution Management System
AEV	-	All Electric Vehicle
AFV	-	Alternative Fuel Vehicle
BEV	-	Battery Electric Vehicle
CCS	-	Combined Charging System
CFV	-	Clean Fuel Vehicle
DC	-	Direct Current
DERMS	-	Distributed Energy Resource Management System
DG	-	Distributed Generator
DFV	-	Dual Fuel Vehicle
DOD	-	Depth of Charge
EA	-	Electricity Act, 2015
EMS	-	Energy Management System
EV	-	Electric Vehicle
ESS	-	Energy Storage System
EVCS	-	Electric Vehicle Charging Station
FCEV	-	Fuel Cell Electric Vehicle
FCHEV	-	Fuel Cell Hybrid Electric Vehicle
G2V	-	Grid to Vehicle
GCT	-	General Consumption Tax
GDP	-	Gross Domestic Product
GHG	-	Green House Gas Emissions
GIS	-	Geographic Information System
GOJ	-	Government of Jamaica
GPE	-	Government Procurement Entity

H2V	-	Hydrogen Vehicle
HEV	-	Hybrid Electric Vehicle
ICE	-	Internal Combustion Engine
IPP	-	Independent Power Producer
IRP	-	Integrated Resource Plan
JPS/Licensee	-	Jamaica Public Service Company Limited
kVA	-	Kilo Volt Amperes
kWh	-	Kilowatt-hours
Licence	-	The JPS Electricity Licence, 2016
MSET	-	Ministry of Science Energy and Technology
MTM	-	Ministry of Transport and Mining
MVA	-	Mega Volt Amperes
MW	-	Megawatt
MWh	-	Megawatt-hours
NG	-	Natural Gas
NTL	-	Non-Technical Losses
Office/OUR	-	Office of Utilities Regulation
O&M	-	Operating and Maintenance
OMS	-	Outage Management System
OPEX	-	Operating Expenses (prudently incurred)
OUR Act	-	The Office of Utilities Regulation Act, 1995 (as amended 2000, 2015)
PBRM	-	Performance Based Rate-Making Mechanism
PEV	-	Plug-in Electric Vehicle
PHEV	-	Plug-in Hybrid Electric Vehicle
PPA	-	Power Purchase Agreement
PPE	-	Property Plant and Equipment
PSP	-	Power System Plan

PV	-	Photovoltaic
RE	-	Renewable Energy
RES	-	Renewable Energy Source
SOC	-	State of Charge
TAJ	-	Tax Administration of Jamaica
TCO	-	Total Cost of Ownership
TOU	-	Time of Use
SBF	-	System Benefit Fund
T&D	-	Transmission & Distribution
TOU	-	Time of Use
TL	-	Technical Losses
WACC	-	Weighted Average Cost of Capital
USD	-	United States Dollars
VPP	-	Virtual Power Plant
VRE	-	Variable Renewable Energy
V2G	-	Vehicle to Grid
V2H	-	Vehicle to Home
V2V	-	Vehicle to Vehicle
ZEV	-	Zero Emissions Vehicle

1 Purpose of Document

The purpose of this document is to respond to the Offices of Utilities Regulation ("OUR/Office") Electric Vehicle (EV) Stakeholders' Consultation document published May 17, 2021.

JPS has conducted a detailed review of the document and the responses outlined in the document will focus on the areas relevant to our remit as the Single Buyer and System Operator.

Therefore, JPS responses are outlined in four broad themes as follows:

i. The Importance of Non-technical losses to the EV planning framework- a significant area which was not addressed in the OUR's document, but which is a priority concern for JPS.
ii. Regulatory and Market Model
iii. Grid Impact & Planning
iv. Network Investment Cot Recovery and Tariff
v. Incentivizing EV Penetration

JPS is aligned with the policy direction to increase the penetration of electric vehicles in Jamaica and anticipates that these responses will be taken into consideration in the formulation of the EV policy and the recommendations to the Government of Jamaica (GOJ).

2 Summary of JPS' Position

The Jamaica Public Service Company (JPS), a key stakeholder within the electricity sector, recognizes the importance of its role in contributing to the development of an enabling environment and ecosystem for the transition and adoption of electric vehicles throughout Jamaica.

This transition has the potential to unlock significant economic opportunities, reduce greenhouse gas emissions as well as realize other environmental benefits. Specific to the electricity sector there are opportunities for growth in the demand that may yield potential benefits to ratepayers.

An enabling and robust policy and regulatory framework is required to support the development of the EV sector. JPS has therefore undertaken a critical review of the OUR's stakeholder consultation document "**Proposals for a Regulatory Framework to Facilitate the Penetration of Electric Vehicles in Jamaica"** to ensure the inclusiveness and completeness of the recommendations for stakeholders in the sector

The following are JPS' major positions from its review. Responses are categorized under five (5) main headings and are outlined as follows:

1. **EV framework must give serious consideration to the treatment of electricity theft -** The OUR consultation document is silent on this important and persistent issue of electricity theft. However, given the socio-economic context of Jamaica, it is a matter that cannot be ignored, especially as electricity becomes the new fuel for transportation.

   Fuel is a top three highest variable cost in the operation of a vehicle averaged over its lifespan and electric vehicles will be no exception. Therefore, in the absence of strong legal deterrents including, active and responsive enforcement countermeasures, JPS foresees the prospect of a proliferation of electricity cheats in search of "free or cheap fuel" that stolen power represents to EV transportation.

   Against this background, JPS strongly urges the OUR to consider the following in making its final Determination:

   - Assess and expressly include the risk of the increased incidence of electricity theft that the electrification of transport can cause. This should be captured in the National Loss Reduction Plan (NLRP) currently in development by the GOJ.
   - Extend its recommendation that long-term planning for EV penetration be included in the Integrated Resource Plan (IRP) to incorporate a forecast of the effect of the theft of electricity on tariffs, system resources and investment.

- Encourage the Government of Jamaica to adopt a suite of strong anti-theft measures and a zero-tolerance attitude to electricity theft as an essential feature of the construction of the EV ecosystem.
- Designate the electricity grid as a critical national security infrastructure through legislative recognition with toughened and exemplary criminal sanctions.
- The creation of a special utility court to adjudicate matters relating to electricity theft.

2. **Legal and Regulatory Considerations –** EV charging involves the transfer of electricity through a charging point to the battery of an electric vehicle. Charging cannot occur outside of the presence of electricity and, therefore is not incidental to but instead, is the act of supplying a quantum of electricity consumed during the process which can be directly measured. EV charging therefore undoubtedly constitutes the supply of electricity.

   However, JPS supports the inclusion of multiple participants in the EV charging market through a Hybrid Business Model that incorporates the best features of the models proposed by the OUR and identified in the consultation document. The key differentiation in the Hybrid Model is that the supply of electricity remains the exclusive domain of JPS (as per the Electricity Licensing regime) and the ownership, operation, and maintenance of the public charging infrastructure can be the purview of third party investors. In this model, the revenue for the cost of electricity is collected on behalf of JPS at an approved OUR tariff and the third party investor recovers their investment and related cost for the charging infrastructure through a surcharge.

   This approach is best suited to the economic realities and the regulatory and legal framework of Jamaica and would greatly influence the penetration and distribution of EV infrastructure.

   JPS is open to dialogue with the GOJ that would further develop and operationalize the mechanics of the Hybrid Business Model.

3. **Grid Impact -** JPS welcomes the proactive approach adopted by the OUR as it relates to potential impacts on the electricity grid of EV adoption. We generally accept the principles of its broad technical assessment, and recommendations for the implementation of managed EV charging strategies, and the need for more robust assessment. However, JPS believes that the impact of EV penetration on the grid must be incorporated and assessed

within the broader system planning function of the Integrated Resource Plan (IRP). The IRP needs to take account of the policy framework objective to achieve high levels of EV utilisation for public and private transportation.

Additionally, JPS recommends that standards be introduced to establish requirements for smart telematics charging technologies at all EV charging points and sharing of relevant information with JPS such as the location, power, voltage and current requirements of charging units. This would aid the development of managed charging capabilities on the grid, which can only be achieved through the use of Automated Distribution Management Systems.

4. **Recovery of Grid Investment Costs and Tariffs -** The increase in electricity demand brought on by electric vehicle charging at residential or public chargers will at some point require new investments in network infrastructure to maintain the reliability and stability of the electricity system. These investments should be determined by the system planning framework already set out in the Integrated Resource Plan, with due consideration for a demand forecast that includes scenarios for varying levels of EV penetration.

   Once finalized and approved by the MSET, these upgrade investments become key inputs in JPS' medium-term business plan and Rate Review process as per the Licence requirements and subject to the review and approval of the OUR. Outside this framework, JPS rejects the inclusion of additional and onerous provisions that require it to further demonstrate and prove benefits that may accrue to ratepayers from these grid investments. JPS believes this recommendation will only serve to shift unduly the responsibilities from the policy decision to pursue EV adoption away from the relevant authorities. Such a recommendation is contradictory to the OUR's role in the tariff setting process and also undermines the GOJ's own policy position for the transition to electric mobility.

5. **Incentivizing EV take-up in Jamaica -** JPS supports the various fiscal and non-fiscal policy measures recommended throughout the OUR's consultation document. We share the view that procurement by the Government of electric vehicles for its own fleet is an important signal in driving acceptance and penetration. This should be a priority of the GOJ and can be undertaken in phases as fiscal space dictates.

   JPS has already committed investments valued at approximately US$1.5 M for the establishment of the first island-wide public charging infrastructure. We are also evaluating the transition to EV of select models within the fleet where possible.

JPS also continues to collaborate with the GOJ and international institutions to create an enabling ecosystem for the multi-dimensional support systems needed for the successful adoption of electric vehicles.

3 Electric Vehicles and Electricity Theft

Jamaica, by international industry benchmarks, has a very high rate of electricity theft as close to 18% of the generated product is stolen.

The Consultation document's silence on the implications of this fact with the introduction and wide-scale adoption of electric vehicles (EVs) on the island is therefore deafening. Electricity theft represents the greatest threat to the viability of the grid. Without a framework of effective countermeasures, the introduction of EVs will precipitate an acceleration in losses.

In 2020, JPS removed 156,000[1] illegal connections from the grid and conducted approximately 73,000 audits on customers with active accounts. Combined, JPS has spent approximately US$150M in capital and on operations to combat theft over the last five years, an average of US$30M per year.

In spite of that typical yearly effort and resources, total system losses as at March 2021 stood at 28.43%, representing an unrelenting steady increase over the last two decades (17.06% March 2002).

Electricity theft is the most prevalent crime in Jamaica. It is not restricted to any socio-economic class and both customers and non-customers of JPS steal power. No analysis about the creation of a new market around electrification can be complete without an analysis of this reality.

Given the high levels of electricity theft amidst the socio-economic context within Jamaica. It is noted that of the Jurisdictions examined by the OUR, none have any noticeable levels of non - technical losses. JPS, in its own research, was unable to find any similar example of EV deployment within a country with high rates of electricity theft. It was however observed that countries that are ahead in the adoption/transition to EVs are high-income economies with significantly low levels of non-technical losses so this challenge would not be a consideration in those jurisdictions.

The purpose of this section is to raise awareness of the risk posed so action on this threat can be included so as not to allow electricity theft to deny or erode the overwhelming and multi-dimensional benefits of EV deployment in Jamaica.

3.1 Electricity as Transport Fuel

Fuel is a top three highest variable cost in the operation of a vehicle averaged over its lifespan. The electrification of transportation extends the value of electricity to become a replacement

[1] The normal annual average is approximately 250,000. The reduction in 2020 was due to the constraints imposed by the Covid-19 pandemic.

fuel for transportation that offers the prospect of significant savings to owners and operators. This creates a new utility and economic value of access to electricity. In Jamaica's environment of pervasive electricity theft, cultural indifference and low effectiveness of the state to deter or sanction offenders, increasing EV penetration poses a very high risk of an escalation in non-technical losses due to theft of service.

3.2 Differences Between Petrol and Electricity Distribution

Many distinct differences between the current distribution system for petrol and that of electricity will facilitate more wide-scale electricity theft from the uptake of EVs.

Petrol has a highly regulated distribution channel due to the safety, storage, transportation, and dispensing requirements for the product. Access is controlled through a discreet network of regulated retailers island-wide of petrol. Fuel is transported from the point of importation, storage/or manufacture via specialised transportation to the controlled points of retail. Measured dispensing is then done directly into the purchasing vehicle from secure underground storage at the retailing petrol station.

The physics of electricity, on the other hand, requires the distribution network to deliver the product directly to the end-user at the point of use. Jamaica has a very high electricity penetration with 99% of Jamaicans having access according to the World Bank. This necessitates a vast network of 14,000 km of distribution lines traversing the country often through remote and isolated areas. It is not technically difficult to tap illegally into this network of mainly open (bare) conductors – the most cost-effective – at any point. Line taps (throw-ups) are the most common method of stealing electricity in Jamaica. Each year JPS removes in excess of 250,000 illegal line taps (or throw-ups) from the network with almost all returning soon after. JPS estimates that approximately 180,000 households have illegitimate access to electricity service, most by directly connecting to the distribution system.

Electricity theft is also a problem with metered customers. Meter tampering, direct bypass of the meter, and partial diversion of electricity by customers are also contributors to illegal power use. Unlike the structure of the closed and tightly regulated petroleum distribution industry, there are no discreet points through which JPS can increase control over losses in the electricity network. Neither can the company reasonably patrol the island-wide grid of 14,000 km to prevent the theft of electricity. With the prospect of electricity fuelling transport, the state's deterrence through law and enforcement will need to increase its effectiveness to control electricity theft.

In the absence of strong legal deterrents, active and responsive enforcement countermeasures, JPS foresees the prospect of a proliferation of electricity cheats in search of "free or cheap fuel" that stolen power represents to EV transportation. We see this occurring under two scenarios:

1. Increase in the theft of service by individuals, households, and commercial entities – many of whom may already be stealing – via the conventional methods now used to abstract energy for other purposes.
2. The even more ominous, credible risk of spawning a network of illegal commercial "charging stations" peddling top-ups across the island. This would be akin to the illegal underground filling stations that feature in the petroleum industry – but on a much wider scale given the relative ease of inconspicuous connection to the grid. Furthermore, charging infrastructure will get smaller and the power requirements less, especially for Level 3 and higher fast and ultra-fast chargers as technology improves and EV penetration rises globally. This will further reduce the technical hurdle to connection and facilitate mobility of this type of illegal operation that, if allowed to take root will prove extremely difficult to detect and apprehend.

3.3 EV Charging Technology and Losses

The majority of public EV charging stations deployed by private market participants and possibly JPS are expected to be installed on private or publicly owned property at locations with sufficient control, visibility, and monitoring to create a deterrence. The charging infrastructure will also incorporate features to deter fraud during use and so reduce the risk exposure at these points.

JPS however concurs with the outlook of the OUR that the vast majority of EV charging will not be done at public charging points but at residences or base locations of commercial vehicles as vehicle ranges increase due to battery technology improvements.

At its most basic, levels one and two charging will be as simple as plugging the vehicle into a domestic household outlet similar to any other appliances. EV charging technology will therefore not present a significant technical or economic hurdle to the illicit charging of EVs by the various methods currently used to steal electricity.

3.4 Electric Motorcycles

JPS has a different outlook on the future of electrified motorcycles than that of the OUR. While representing only 3% of motor vehicles up to 2018, it would not be surprising if the number of motorcycles has more than doubled over the past two years and is growing at a much faster rate than motor vehicles. Furthermore, it is important to note that there is a credible basis to conclude that only a fraction of the motorcycles in Jamaica are in fact registered resulting in an understating of the actual population of two-wheelers on the road, albeit illegally.

That reality is a cause for concern for JPS as we expect continued strong growth in motorcycle growth given the relatively low cost and the worsening traffic congestion in urban centres. Cheaper bikes that charge fast and cost less to operate and maintain could become a popular entry-level for many into the electrified transportation space.

While individually and even in aggregate the charging requirement and effect on the system of E-bikes may be negligible, clusters of them could have a noticeable power quality influence at the distribution feeder level. Importantly also, a high degree of informality appears to surround much of the ownership and operation of motorcycles in Jamaica that would create a conducive environment for illegal charging of E-bikes. It will therefore be vitally important for Government actions to signal clearly, its intolerance for electricity theft before mass migration commences and to closely monitor the tendency of early adoption clusters.

3.5 EVs, Theft & System Demand

JPS concurs with the OUR's analysis that EVs will impose significant demand on the power system, especially at times of coincident charging of vehicles. As EV penetration increases, careful grid management will become important to avoid overload conditions or avoidable investments in system expansion. Smart grid technology can be used to control legitimate charging on the network to manage the timing and loading conditions on the system. These controls can however be totally undermined by wide-scale electricity theft associated with illicit vehicle charging. This problem will be compounded under a scenario of unmanaged network charging that could impose large, random, uncoordinated, and unpredictable loads on the grid at any given moment, resulting in higher and unexpected capacity and network peaks.

These problems could migrate across all levels of the electricity systems triggering consequences that could range from power quality and equipment failure on local distribution feeders level to severe system instability and failure of the grid at high levels of EV penetration and theft.

3.6 Conclusions

The problem of electricity theft has been a growing one that has dogged the electricity sector for several decades and is the greatest threat to the sustainability of the grid. Even the most optimistic curve for EV penetration in Jamaica predicts modest take-up over the next few years with sharp acceleration beyond 2030, as key restrictions on ICE vehicles kick in globally.

The global experience with effective measures that reduce electricity theft is that it takes sustained effort over a similar period of roughly a decade to break an endemic culture of power theft. This period, therefore, poses the best opportunity for the Government to act on losses in preparation for EVs. Without a strong national focus to address electricity theft ahead of and during the transition to electric vehicles, the introduction of EVs poses a grave risk of an acceleration in the illegal abstraction of electricity.

In addition to the other challenges previously identified, higher theft through EVs would erode the significant promise of the technology to lower electricity prices by providing a strong boost in demand.

3.7 JPS' Recommendations for inclusion of NTL considerations in EV Framework

Against this background JPS urges the OUR to consider the following in making its final Determination:

- Include a full analysis of the increase in the theft of electricity due to the transition to EVs
- Advise the Government of Jamaica to request expressly that the National Loss Reduction Plan (NLRP) under development address the risk of electricity theft that the electrification of transportation can cause.
- Extend its recommendation that long-term planning for EV penetration be included in the Integrated Resource Plan (IRP) to determine system requirements such as additional peak supply or a different tariff design, and to incorporate forecast of the effect of the theft of electricity on tariffs, system resources and investment.
- Support the creation and sharing of an EV registry, with appropriate safeguards, with the System Operator to facilitate grid planning and monitoring.
- Mandate the incorporation of telematics into the standards for EV charging for Jamaica. The beneficial effect on network visibility for losses will be an added plus to the deployment of this technology. The ability to manage EV load on the grid and the future resilience it can add to the grid through Vehicle to Grid support capabilities, especially at times of natural disasters – makes it worth mandating the future-proofing of grid management from the outset of EV deployment.

- Encourage the Government of Jamaica to adopt a suite of strong anti-theft measures and a zero-tolerance attitude to power theft as an essential feature of the construction of the EV ecosystem.
- **Designate the electricity grid as a critical national infrastructure.** Utilities are now regarded as critical infrastructure to modern society that requires national security protection due to the central role they play in the economic and social life of a country. With the electrification of transportation, the importance and centrality of the electricity grid to Jamaica's economic and social welfare will markedly expand. The GOJ should consider giving legislative recognition to the grid as a critical national infrastructure with toughen and exemplary criminal sanctions.
- **Special utility court**: No theft reduction programme will be effective and sustainable without a high probability of offenders being caught and prosecuted. Given the prevalence of electricity theft, and other offences relating to utilities, prosecutions may be overwhelming to the court system. Some jurisdictions have resorted to special courts for mass processing of offences to avoid tying up the resources of law enforcement, judiciary and litigants for inordinate periods. This also sends a strong message to the public about the seriousness of the crime. Increased fines imposed and collected by the Government could aid the courts to be self-sustaining. We recommend that the GOJ establish such a court ahead of mass adoption of EVs as a strong signal of zero tolerance to power theft.
- **Specially trained police team**: Detecting an electricity breach relies on an element of technical knowledge. The prevalence, economic and social cost of electricity theft justifies an investment in the training of special police teams that can readily identify and intervene in this crime. This training can be provided by the utility to special teams of police that can lead operationally and cross-train other members of the force. Given the overall benefit of EVs to the electricity system, this could be funded from the electricity System Benefit Fund already provided for under the Electricity Act.

4 Regulatory and Market Model Assessment

4.1 Legal & Regulatory Framework

The electricity sector is governed by the provisions of the Electricity Act (EA) and regulations thereunder.

The Electricity Act (EA), provides the basic overarching administrative and planning framework of the electricity sector and defines the various roles and responsibilities of the OUR, the Minister, and the Single Buyer. Various components of the electrical system are also defined.

Under the EA, an electricity licence is defined as licence to do one more of the following with respect to electricity, namely:

i. generation
ii. transmission
iii. distribution
iv. despatch
v. supply

Section 2 of the EA defines "supply" as activities involved in the sale of electricity to consumers and a "supply licensee" as the person holding a licence to supply electricity.

The Licence authorizes JPS to generate, transmit, distribute and supply electricity for public and private purposes within Jamaica, pursuant to the relevant sections of the OUR Act. Condition 2, paragraph 4 (b) the Licensee shall have the exclusive right to transmit, generate, distribute and supply electricity in Jamaica from its effective date until expiration.

The EA makes it an offence to generate, transmit, distribute, despatch or supply electricity without the requisite licence (see Section 8(2)).

The EA also includes a provision for the unlawful abstraction or use of electricity. It states *"any person who…. uses or consumes, diverts or causes to be diverted any electricity supplied by a Single Buyer commits an offence and shall be liable on summary conviction in a Resident Magistrate's Court to a fine not exceeding five million dollars, or to imprisonment for a term not exceeding two (2) years or both such fine and imprisonment."* That is, under this clause, no person or entity is permitted to divert or cause to be diverted, the electricity supply from a JPS connection point.

The OUR generally regulates the activities of JPS as the Licensee in accordance with the various provisions within the regulations. All electricity tariffs are set by the Office within the Licence

provisions and the Performance-Based Rate Mechanism (PRRM), including efficiency improvement targets.

The OUR was established pursuant to the Office of Utilities Regulation Act ("OUR Act") with the power to regulate "prescribed utility services." Section 2 and the First Schedule of the OUR Act defines "prescribed utility services" to include *"the generation, transmission, distribution and supply of electricity."*

Section 4 of the OUR Act outlines the functions of the OUR, which includes the power to determine, in accordance with the various provisions of the Act, *"the rates or fares to be charged in respect of the provisions of a prescribed utility service."* It also states *"the Office shall regulate the sector generally."*

In addition to its general powers of regulation, the OUR Act also sets out specific powers and functions of the OUR which include the following:

At section 4(1):

"4.-(1) Subject to the provisions of this Act, the functions of the Office shall be to –

- *(c) conduct such research as it thinks necessary or desirable for the purpose of the performance of its functions under this Act;*
- *(d) advise the responsible Minister on such matters relating to the prescribed utility service as it thinks fit or as may be requested by that Minister …"*

4.2 OUR's Position

A common thread gleamed throughout the OUR's presentation is that the development of the EV market hinges on the regulatory framework. Accordingly, it states "*There must be a comprehensive assessment of the current provisions that may be directly or indirectly affect this initiative. This assessment will determine whether it may be necessary to amend existing legislations and policies or whether there should be the promulgation of new legislation to facilitate the development of a viable and sustainable EV market in Jamaica*."

In this vein, The OUR raised the issue of whether the provision of charging services can be classified as the transmitting, distributing and supplying of electricity. If this is the case, then JPS may be the only entity allowed to set up charging infrastructure and provide charging services due to the exclusivity provision of the Licence - Condition 2 Paragraph 4: "*The Licensee has the exclusive right to transmit, distribute and supply electricity throughout Jamaica until July 8, 2027."*

The Electricity Act 2015 defines "Supply", with respect to electricity, as the activities involved in the sale of electricity to consumers. This definition of "Supply" under the Act may preclude the participation of other non-utilities in the development of the relevant EV charging infrastructure.

Arising from the aforementioned legislative restriction the following recommendations were made by the OUR:

- GOJ to negotiate with current Licence holder (JPS) to facilitate a Licence amendment that would essentially exclude EV charging from being considered a "Supply" of electricity.
- GOJ to amend the Electricity Act to expressly exclude the activities of an EV charging station from being considered as a supply of electricity

The OUR has identified two (2) possible business models for the ownership of EV public charging infrastructure, i.e. an integrated model vs an independent model.

- **Independent Model:** Independent private (or public-private partnerships) investors own and operate EV charging stations under licences and it would be regarded as an unregulated service
- **Integrated Model:** The electric utility owns the EV charging infrastructure and operates it directly. This would be regarded as a regulated service.

Additionally, from its review of EV development in other jurisdictions, the OUR states that the provision of adequate infrastructure for EV charging is one of the key enablers of EV growth.

The OUR, surveyed what it considers different EV market models across several jurisdictions, namely India and several US states - including California, Arizona, Oregon, and New York - also taking into consideration the "exclusivity provisions" in those jurisdictions. A review of the jurisdictions that attempted to place a tight restriction on utility participation showed that ultimately, the regulatory bodies approved a number of utility projects to drive the market. However, some jurisdictions still took steps to mitigate the potential for monopolization by utilities.

After evaluating jurisdictions that initially excluded but later confirmed the participation of the utility in the EV market, the OUR raised the issue of the participation of independent entities (along with the utility) in the ownership of charging infrastructure in Jamaica. It claimed that the participation of these entities is dependent on whether EV charging is classified as the supply of electricity which is currently exclusive to the electric utility in Jamaica and so is a material restriction on non-utilities.

4.3 JPS' Response

EV charging involves the transfer of electricity through a charging point to the battery of a Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV). Charging does not occur outside of the presence of electricity and therefore is not incidental to but is in fact elemental to the act of charging. The quantum of electricity consumed during the process can be directly measured.

It is therefore JPS' position that EV charging constitutes the Supply of Electricity in one form. We concur with the OUR that under the current regulatory and legal framework this is an activity that is restricted to JPS. Any third party engaged in offering EV charging services under the current construct would be doing so in contravention of the law pertaining to the supply of electricity.

Opening EV charging to wider participation

JPS believes that having multiple participants in the EV charging market will promote confidence in the availability of a public EV charging infrastructure capable of supporting the rapid take-up of electric vehicles in Jamaica.

JPS supports a hybrid business model that incorporates the best features of the models identified in the consultation document, adapted to the economic realities and the regulatory and legal framework of Jamaica. This approach still achieves the objective of enabling the penetration and distribution of charging infrastructure.

The Hybrid Model - A key differentiation in the Hybrid model is the distinction maintained between the supply of electricity which remains the exclusive domain of JPS (as per the Electricity Licensing regime) and the ownership, operation, and maintenance of the public charging infrastructure. In this model, JPS would maintain exclusivity of the supply throughout the island, including to the EV charger. EV charging points would be private or public.

The entity that owns, operates, and maintains the Public Charging Infrastructure would then charge (as an agent, on behalf of the Utility) the fee for the supply of electricity used to charge the EV. This would be at the requisite published tariff approved by the OUR for public EV charging. The entity may then also charge an additional sum as a "convenience fee" or "surcharge" to recover the investment of the charging infrastructure, the Operation &Maintenance cost, its margin and any additional feature unique to its particular operation and siting.

Investors in EV charging would therefore compete on the value-add services and offerings at their EV charging location and supporting service model and recover their capital investment through

these fees. In this model, any commercial entity would also be able to install charging stations at their private locations for use by their customers or clients, free of charge. Commercial centers such as shopping malls and supermarkets could opt to include EV charging as a differentiating feature to attract business or to offer an additional service to all or select customers as determined by their own business models.

Table 1 below highlights in more detail the features of the different market models.

Table 1 – EV Model Comparison

	OUR's Integrated Model	**OUR's Independent Model**	**JPS' Hybrid Model**
Ownership of EV Charging Infrastructure	Rate-Based Asset of the Utility	Independent private (or public-private partnerships) investors	Anyone meeting the requisite criteria (including Independent private investors, public-private partnerships, and the Utility) However, the Utility would remain available to build out Public Charging infrastructure in underserved areas or for the general public good. In these instances, the charging infrastructure would be a rate-based asset of the utility.
Who Operates & Maintains EV Charging Infrastructure	The utility or its franchisees (or contractors)	The Independent private investor who may appoint EV Service Providers (EVSP) for charging operations and payment settlements, this ensures a certain level of interoperability	Independent private Investors and the Utility

	OUR's Integrated Model	OUR's Independent Model	JPS' Hybrid Model
		amongst different EV charging station network owners.	
Advantages	Utility insulated against low business volumes as the assets included in the approved regulated capex	Growth of the industry is market-driven	Growth of the industry is market-driven but still offers opportunities for marginally financially viable areas to be served by public charging infrastructure by policy. Allows for immediate participation in EV Public Charging by non-Utilities as no significant change to the regulatory framework is required. Any changes to the Licence that "*chips away*" at the rights granted to the utility as part of a carefully considered package of benefits and obligations, would take time to modify and would send the wrong signal to local and foreign investors about the sanctity of their arrangements with the Government of Jamaica. This would require compensation to the utility that would ultimately be borne by the government, the customers or the taxpayers.
Disadvantages	Seen as restricting the growth potential of the EV	Could result in some areas being underserved	

	OUR's Integrated Model	OUR's Independent Model	JPS' Hybrid Model
	Public Charging market		

In underserved areas, where other market participants are reluctant to deploy charging infrastructure, and it is deemed necessary by regulatory or public policy that these areas be served, JPS could be requested to facilitate such infrastructure. These chargers would be rate-based and recovery be done over an extended period.

This Hybrid Model achieves the same economic outcomes and broader market participation as the Independent Model but gives credence to the inescapable technical reality that the charging activities are indeed a supply of electricity. This view is buttressed in the OUR's own exploration of a number of jurisdictions that attempted to stretch the definition of the term/concept. As highlighted in the OUR paper many other jurisdictions explored the issue of whether EV charging activities can reasonably be said not to constitute a supply of electricity. These cases demonstrate that the attempts made to treat EV charging as not involving the supply of electricity were unsustainable, leading in many instances to legal challenges.

JPS recommends the Hybrid Business Model as the most progressive and most suited model to allow all market players, including the utility to have the flexibility to respond to market development. Additionally, this Hybrid Business Model could (a) enable participation by a wider pool of persons leading to the emergence of new markets and provide welcome stimulation of the economy; (b) facilitate demand growth which would ultimately lead to the lowering of electricity prices for all customers, and thereby boost economic productivity.

JPS also notes the discussion on whether to treat EV Charging as a regulated or unregulated service within the parameters of the OUR Act. This dichotomy is rooted in the view that under the present statutory construct EV charging activities would constitute an electricity supply. Recall that the EA defines "supply" as the activities involved in the sale of electricity to consumers. The Licence adopts a similar definition of "supply".[2]

[2] "**Supp**ly" means the business of the Licensee in selling electricity to customers (JPS Electricity Licence (Part II(3)).

"Prescribed Utility Services" are defined in the OUR Act to include the generation, transmission, distribution, and supply of electricity.[3] That Act goes on to provide that one of the OUR's mandates is to regulate Prescribed Utility Services.[4]

Given the Hybrid Business Model articulated above, JPS is not of the view that an amendment to the OUR Act would be required.

JPS is also of the view that other forms of regulation/licencing/registration should be imposed to address safety considerations, interoperability standards for EV Chargers, etc. In this regard, the Jamaica Bureaus of Standards is recommended.

5 Grid Impact and Planning Assessment

5.1 OUR's Position

The OUR indicated the importance of proactively investigating the impact that EV penetration can have on the electricity grid as this could result in grid security, reliability, and stability operating issues. It stated that it was also mindful of the impact that EV charging requirements may have on investment for the sector and subsequent retail tariffs for electricity customers.

The OUR conducted a high-level exploratory EV impact analysis on the transmission and selected sections of the distribution network, namely the Duhaney 210 Feeder and the Queens Drive 710 Feeder using DigSilent Power Factory.

Its main observations and recommendations were as follows:

i. The transmission network will not experience equipment loading violations for EV penetration levels of up to 30,000 vehicles
ii. based on characteristics of the distribution system, in addition to EV owners driving pattern and style, it would be impractical to have all EVs charging at the same time.
iii. to control charging and defer investment in infrastructure upgrades, the use of smart grid technologies and demand response schemes could be utilized. Tim- of-Use rates should also be offered to shift charging to off-peak periods.

[3] Section 2 and the First Schedule of the OUR Act
[4] Section 4(1)(a) of the OUR Act

iv. the major challenge exists at the local distribution level and grid upgrade requirement may vary by region
v. the utility needs to plan now for increased loads as the electrification of transportation grows to maintain system reliability and power quality
vi. the recommendation for JPS to undertake a comprehensive distribution study

5.2 JPS' Response

Electric Vehicles are increasingly being adopted by consumers globally. Countries are implementing and have implemented several policy measures that encourage the increased use of EVs as the preferred mode of private transport ownership. Some have even established aggressive policy stances such as the ban on the sale of new ICE vehicles. The sale of new electric cars, (including hybrids) has shown an increasing trend in key markets. Major car manufactures have announced future plans for the production of more and more EVs.

Generally, JPS accepts the OUR's recommendations and the general principles of its technical assessment. However, it is noted that the demand and system assumptions require further interrogation. The impact of EV penetration on the grid is a serious matter that must be viewed from a system planning perspective, as well as within the policy framework adopted by the GOJ to on-board high levels of EVs for public and private transportation. JPS welcomes this proactive dialogue on grid planning.

EVs will add significant additional load to a premise, both power, and energy. Without proper management, this can lead to costly upgrades and grid issues. EVs are also a unique type of load, they are mobile in the network and can plug in at almost any connection point. They are also batteries (storage), and can, in some instances, discharge into the network. Even when they can't discharge, they have storage and flexibility in charging which offers the potential for providing multiple grid services even if the energy is not discharged. While EVs can technically connect at almost any load point, the vast majority of charging occurs between a few known sites; home, workplace, commercial (public/private) charging stations, and at fleet depots, and over time, forecasts can be obtained from the historical trends.

Additionally, the fact that the EV can be either a source or a load at any point on the grid at any time, presents a bevy of challenges for system planning. Firstly, to create a network model that can be simulated to produce reliable study results for making decisions, and secondly for the system operator who needs real-time information to visualize and manage the grid.

The impact on the grid will be more evident on the primary and secondary distribution networks and an impact analysis needs to be incorporated into a new distribution expansion plan. The IRP will have to incorporate EVs into its demand forecast.

The OUR also recommended an important element in the management of EV charging - managed charging. The OUR defines *managed charging* as smart charging based on off-peak charging, time of use incentives, and applying smart grid technology. While JPS supports the use of TOU rates for EV owners, managed charging can only be achieved by the application of a Distributed Energy Resource Management System (DERMS), incorporated into an Automated Distribution Management System (ADMS).

The System Operator will be able to use the DERMS to achieve several grid management initiatives such as reducing peak load, reducing losses, mitigating ramps caused by VRE, minimize voltage violations in addition to facilitating market participation (aggregation of EVs that can behave as a Virtual Power Plant).

JPS also strongly recommends that all the charging points would need to be known, visible and provide at a minimum the following parameters:

1. Nameplate Data such as charging station type, model, power, voltage, and current ratings, and operating limits
2. Location (GPS and Physical Address)
3. Real-Time Telemetered Values (analog and status) collected directly from the EV charging stations or 3rd party aggregator
4. Maximum Charge Rate
5. Amount of Energy Needed
6. Capability to Discharge
7. Available Energy to Discharge
8. All the charge management programs the EVs are enrolled in (i.e. contractual charging schedules)
9. Controllability (local at the charging station or remote by the charging network operator)

6 Network Investment Cost Recovery and Tariffs

6.1 OUR's Position

The OUR in its consultation document provided two (2) primary recommendations that JPS considers to be especially relevant to electricity tariffs. These are the recovery of the utility's investment in network infrastructure upgrades, and pricing arrangement for third parties.

As it relates to the recovery of network investment costs required to reinforce the capacity of the grid to serve the additional demand that will arise from electric vehicle charging, the OUR is suggesting that the Government of Jamaica (GOJ) should "*determine whether recovery will only be from the EV users or generally from the ratepayers. If the decision is to make recovery from the ratepayers, it is proposed that this be only done where the utility can prove that investment has accorded some benefit to all the ratepayers or in the ratepayers' interest."* Additionally, the OUR recommended that clause be expressly stated the Licence or legislation that outlines the matters to be proven.

On the latter matter of third party pricing, the OUR is recommending that for "non-utility" EV charging stations who are customers of JPS, the GOJ or regulator consider negotiating "*with JPS to determine a rate structure that would assist in offsetting high billing that may result in the light of the anticipated low initial usage of charging infrastructure. This may include the removal of the demand charge and consider billing by way of time-of-use."*

It is also noted that in its 2019-2024 Final Determination, the OUR approved a time-of-use (TOU) residential tariff that will enable customers with access to private charging under their existing electricity supply. In addition, the OUR has determined that for public chargers, the applicable rate is the residential TOU rate plus 5 percent, and is intended to provide charging options in the early stages of EV uptake. Their approved tariff appears to be similar to their recommendation to the GOJ.

6.2 JPS' Response

Time-of-use tariffs are typically defined by the varying rates across the different TOU periods. In Jamaica, these periods are defined as Peak, Partial-Peak, and Off-Peak, where the peak generally represents the hours at which electricity demand is highest and occurs between 6 pm to 10 pm. Conversely, the off-peak refers to hours during which electricity demand is at its lowest, and occurs between 10 pm and 6 am.

During the Peak, electricity costs are at their highest as quick starting, expensive fuel generators are brought online to serve the demand. On the other hand, rates are at their lowest during the off-peak as higher cost generators are removed from the dispatch as total demand falls.

TOU rates, therefore, provide a price signal and incentive for customers to modify their behaviour by shifting consumption or use of high-demand equipment to the off-peak period to realize potential savings in electricity costs.

6.2.1 Residential TOU

A properly designed TOU tariff for residential customers is not exclusive to only customers with an electric vehicle. Households with above-average consumption are also able to benefit by modifying their consumption and use of heavy appliances to the off-peak.

Households with one or more electric vehicles are encouraged to make use of the residential TOU rate once available. From an EV owner's perspective, it makes financial and economic sense to take advantage of the off-peak rate to charge. The off-peak tariff also strengthens the argument for a lower cost of operation relative to a conventional internal combustion engine motor vehicle. It also aligns with the practical behaviour of getting a full charge or top-up overnight after a full of day of activities.

As the penetration of EV ownership increases across households, JPS recommends the creation of an EV registry at the appropriate regulatory authority, that provides geolocation information to JPS, having observed any necessary data integrity and security protocols. This information will support the planning precision for the growth in EV demand, especially at the distribution network.

From the utility and ratepayer perspective, the registry helps to manage the grid's existing capacity and therefore optimize network investments for minimal impact on electricity tariffs. This could be further strengthened with the installation and use of telematics and other smart EV charging technologies at home that would enable the grid to communicate with charging equipment.

6.2.2 Public/Third Party EV Tariff

The setting/ approval of electricity tariffs remains the remit of the OUR as provided for in the OUR Act (2015) and the Licence. Where JPS may propose a tariff or changes to a tariff structure,

all electricity rates are subject to the approval of the OUR, generally published through their Determination Notices and Rate Schedules.

The OUR Act empowers the OUR to determine rates to be charged for the generation, transmission, distribution, and supply of electricity. Schedule 3 of the Licence also states that "all rates shall be determined by the Office."

JPS, therefore, finds it puzzling that the OUR is suggesting that negotiations be held with JPS to determine an electricity rate structure for third-party EV charging stations. This position is further compounded by the OUR's Final Determination where they approved an EV tariff on a TOU basis, that is "applicable throughout Jamaica," and appears to be in line with their recommendation to the GOJ.

During the 2019-2024 Rate Review process, JPS had proposed an EV rate applicable to its own charging infrastructure based on its strategic decision to provide a *"first-step"* signal to the EV market and in support of GOJ energy policy initiatives.

Based on its 2019-2024 Final Determination and 2020 Rate Schedule, JPS recommends that the OUR provides clarity as to the applicability of the EV tariff.

JPS also recommends, that where applicable, any EV tariff be made subject to refinement and revisions pending load analysis and insights that may be garnered from established jurisdictions.

6.2.3 Recovery of Network Investment Costs

JPS agrees that the additional electricity demand that will arise from electric vehicle charging will require investment in network upgrades to meet new capacity requirements. This will arise regardless either through the installation of public chargers along the roadways, or households plugging in to charge their EVs. This potential is even more pronounced without the use of TOU rates for residential customers and smart charging telematics.

As the system operator, JPS has the responsibility to ensure the safe and reliable operation of the grid. These responsibilities are embedded within the Licence, the Electricity Act, and Grid Codes.

If the current capacity of the system or sections of the grid is at risk of being exceeded, due to the increased demand for EV charging, the reliability, integrity, and security of the network becomes a major risk and will yield unwanted consequences for all customers, and country alike.

To maintain the safe and reliable operation of the grid, investments are needed from time to time to replace, upgrade, or expand various network components. These can include distribution

transformers, distribution lines, and even substation equipment or transmission lines. The procurement of generation is also not exempt.

As the transition to electric mobility deepens, this reality becomes more and more likely and must become part of the planning process.

JPS finds the OUR's recommendation that investment costs recovery be subjected to the added and undue hurdle of first: determining if these costs are to be recovered from ratepayers and secondly for JPS to provide proof of benefits being accorded to ratepayers, to be problematic and in direct conflict with established regulatory process. Above all, the recommendation seeks to shift a policy and regulatory decision to become the sole responsibility of JPS. Such a recommendation is contradictory to the OUR's role in the tariff setting process and also undermines the GOJ's own policy position for the transition to electric mobility.

6.2.3.1 System Planning Framework

Network investments are not done without prior assessment of the need, impact, cost, and regulatory approval of the said investment. Investments may arise from a macro analysis from an Integrated Resource Plan and or JPS' internal system planning processes.

The Electricity Act empowers the Minister with the responsibility for planning the development of the system through an Integrated Resource Plan (IRP), consultation with the Office, JPS, and other sector participants, as well as the conduct of the relevant demand forecast. Importantly, the IRP is a long-term comprehensive assessment, usually 20 – 30 years, of network investment requirements (at least cost), that would be needed to support future demand.

Within this context, electric vehicles are important as they are expected to become the single largest contributor to growth in electricity demand.

The result of the IRP assessment will indicate the timing of investments along the electricity value chain, and the quantity (capacity) of that investment, given system constraints, security parameters, and GOJ policy initiatives. Once approved, the IRP becomes the overall planning framework for the electricity sector and informs JPS' key investment decisions.

6.2.3.2 The Rate Review Process

JPS operates within a Performance-Based Regulatory Mechanism (PBRM) under a forward-looking revenue cap.

Schedule 3 (Price Controls) of the Licence outlines the process and requirements for the submission of a rate application by JPS to the OUR. Among the requirements is the submission of a 5 - year business plan informed by the most recent IRP, supporting investment activities, and the OUR's Final Criteria.

All rate applications submitted by JPS are supported by relevant documentation and analysis. The OUR is also empowered to request additional information where it finds it necessary.

The existing legislation also enshrines the principle of cost-reflective tariffs, which can be generally interpreted that tariffs cannot be set above the cost incurred to provide the electricity – inclusive of network-related investment costs. This is intended to protect the interest of ratepayers.

Additionally, the OUR act empowers the Office with the agency of interrogation of any and all aspects of JPS' rate applications.

On completion of its review, the OUR publishes the non-fuel electricity rates through a Determination, which becomes effective once Gazetted.

Outside the existing system planning framework that already includes a mechanism that determines required investments through a least-cost system expansion study, and a tariff setting process that empowers the OUR with the full agency of interrogation of any and all aspects of JPS' rate application, JPS rejects the OUR's recommendation for the inclusions of additional provisions requiring it to further demonstrate benefits to ratepayers. JPS believes this recommendation will only serve to unduly shift the responsibilities from a policy decision to pursue EV adoption away from the relevant authorities as well as introduce potential conflicts within the regulatory mechanism.

7 Incentivizing EV take-up in Jamaica

JPS supports the various fiscal and non-fiscal policy measures recommended throughout the OUR's consultation document. The challenges for EV inclusion and the broader development of an electric mobility sector are widely documented and known throughout the industry and across leading jurisdictions that were early adopters. It is recognized that that policy measures employed by State and National Governments, in the United States, Europe, and China have helped to spur the adoption of electric vehicles in each respective jurisdiction.

Regionally, Barbados, the Cayman Islands, the Dominican Republic, and Bermuda are leaders in the adoption of EVs. Jamaica, though having a relatively low number of electric-type vehicles and

considered to be in the embryonic stages of EV adoption; policy development in support of an EV ecosystem has become one of the main priorities of the Ministry of Energy Science and Technology (MSET). Recently an Electric Vehicle Counsel has been established by the Minister with review oversight of policies, legislation, and regulations related to the deployment of EVs in Jamaica.

Another underlying and arguably the most significant signal of the GOJ's intent and policy direction is the procurement and EVs for the Government's fleet. This can be undertaken in phases as fiscal space dictates but should be a priority of the GOJ.

JPS as a key stakeholder within the electricity sector supports the national objectives as articulated in the National Energy Policy. For 2021, JPS has committed investments valued at US$1.5 MM for the establishment of the first island-wide public charging infrastructure, consisting of Level 3 fast-charging units and Level 2 ("medium-speed") units at strategic locations across the island. This was done in recognition of one of the main hurdles to EV adoption – range anxiety, especially given the current unfamiliarity of the technology with many Jamaicans.

Additionally, in its 2019-2024 Rate Application, JPS developed and proposed an EV tariff for use on its publically available charging locations. The residential TOU rate, once available will be a game-changer for households with an electric vehicle.

JPS will continue to employ its own strategies to educate stakeholders and customers alike on the coming technology and the potential benefits.

This Page is Left Blank Intentionally

8 Appendices – Response to Stakeholder Questions

Ref.	Subject	Stakeholder Questions	JPS' Comments
4.1	**Barriers to EV Ownership**	(a) What are your views on the relevance of the identified barriers to EV ownership in our jurisdiction?	JPS agrees with the barriers outlined and considers them relevant to varying degrees.
		(b) Are there other relevant barriers not contemplated? If so, please provide details?	The other barriers to EV ownership that should also be contemplated are: the unavailability of secondary market options (e.g. used car imports), lack of standards and interoperability for charging equipment, lack of clarity on calculations to easily compare the cost of electricity vs cost of petrol for the same journey, lack of access to competent mechanics, insurance and availability to First Responders.
		(c) What measures would you suggest to surmount these barriers?	The document outlines several options to surmount the barriers to EV ownership in Chapter 6 and we agree these options will significantly advance the process to overcome these barriers.
5.1	**Jamaica's Road Network**	(a) What are your views on the appropriateness of Jamaica's Road Network to support locating of charging infrastructure for EVs?	JPS believes there is adequate infrastructure with respect to the major road network and given the size of the island, it is easy to have island-wide coverage. However, the document does not consider the impact of mountainous terrain on EV growth especially in rural areas.
		(b) What would you consider to be an appropriate distance between EV charging stations in Jamaica to mitigate range anxiety?	A minimum of 30km up to 50km
		(c) Should the Jamaican Motor Vehicle Registry be allowed to share EV registration and owners' location with JPS?	Yes - this is essential. In fact, the charging infrastructure should be intelligent and include telamatic smart features to enable communication with the System Operator to facilitate grid management as well as support the management of non-technical losses.

Ref.	Subject	Stakeholder Questions	JPS' Comments
		(d) If the response to (c) is positive, do you think privacy concerns will act as a barrier to EV ownership?	There would be privacy concerns as with any other corporate database that would store personal client data but this should **not** act as a barrier to EV ownership as there are tariff based incentives that the registry would support JPS advising these owners of the benefits. It could also support the engagements with EV owners with intelligent charging infrastructure to transition to Vehicle to Grid (V2G) application.
6.1	**Regulatory Approaches and Incentives**	(a) Do you think that the GOJ and its agencies are doing enough to encourage the uptake of EVs and why?	JPS has been working with the GOJ to develop robust policies to encourage the uptake of EVs, however, it is important that the GOJ expedite the roll-out of these policies before the sector begins to grow exponentially.
		(b) What steps in your view are required to translate the various initiatives to actions?	Phased approaches and pilots are always best to translate the various initiatives to action for example the GOJ can transform select large fleets such as public transportation (Battery Electric Buses), Police Cars/Motorcycles to electric units. If the Prime Minister, Minister of Energy and corporate leaders/executives drove electric vehicles this would be a great example to make the transition.
		(c) Do you think that the GOJ and its agencies are doing enough to encourage the uptake of EVs and why?	With reference to the responses in (b) more needs to be done to ensure the GOJ is a leader in the development of the EV sector on the island.
		(d) What steps in your view are required to translate the various initiatives to actions?	Lower insurance premiums and innovative financing. Possible Energy Storage participation for Demand Management over in the long-term.
		(e) What are your views on the proposed approaches and incentives considerations to encourage EV take-up locally?	Yes the GOJ should mandate EV targets and it should be policy-driven such that if a new party forms the administration, the continuity is there.

Ref.	Subject	Stakeholder Questions	JPS' Comments
		(f) Are there any other appropriate incentives and/or approaches not identified? Please provide details.	The document provides a very comprehensive suite of incentives from the benchmarking exercise for consideration.
		(g) Do you share the view that GOJ should mandate EV targets for its own vehicle fleet?	Yes, we share the view that the GOJ should mandate EV targets for its own fleet.
		(h) What difficulties do you think the GOJ will experience in implementing the proposed incentives or adopting the proposed approaches?	Fiscal incentives will be challenging for the GOJ to consider as they are operating in a very tight fiscal regime over the short to medium term with the ongoing impacts of the pandemic, however, the non-fiscal incentives should be a lot easier to implement.
7.1	**Business Models for Infrastructure Ownership**	(a) What policy options adopted in other mature EV markets would be appropriate for Jamaica?	Non-utilities and JPS as the utility should be allowed to own charging infrastructure in Jamaica.
		(b) What other challenges can you identify that may be unique to Jamaica and would require a different set of policy options or variations to other jurisdictions?	The challenges with respect to EV across jurisdictions tend to be in very clear categories. The benchmarking exercise captured the main elements and the associated policy options that can be considered. Unique to Jamaica is the challenge of Non-Technical Losses. The EV framework must consider the risk of increased electricity theft. As electricity essentially becomes transport fuel and given the socio-economic context of Jamaica, there is the possibility for the perverse and accelerated illegal abstraction of electricity. Without due consideration and treatment of protective and strong policy measures and initiatives combatting electricity theft, any potential benefit to the system, namely the reduction in electricity prices, will not be achieved. In fact, the opposite is may happen, where electricity theft causes an increase in system demand that will require

Ref.	Subject	Stakeholder Questions	JPS' Comments
			added capacity, but those costs are only shared by paying customers.
		(c) What are your views on the appropriateness of the integrated and the independent business models for Jamaica?	JPS is open to having a Hybrid Business Model utilized in Jamaica that would mitigate the perceived restriction to open market participation due to the exclusivity of supply condition of the JPS All-Island Licence and definition of "supply" in the Electricity Act.
		(d) Are you of the view that both approaches are permissible in Jamaica? Please provide reasons for your answer.	See item © above.
		(e) If you are of the view that neither of the approaches in (c) is applicable, what business models for infrastructure ownership do you think would be suitable for Jamaica to successfully deploy EV charging infrastructure?	Not applicable
7.2	**Utility ownership of charging infrastructure- EV charging Regulation**	(a) What are your views on utility participation in the EV charging market?	The utility should participate in the EV charging market in a (market) model that includes non-utility players.
		(b) What, in your view, would be the benefits or disadvantages to utility participation in Jamaica?	It is important for the utility to participate to develop and spur the charging infrastructure market and facilitate innovation in the EV sector. This does not have to occur under a monopoly condition. The utility also provides an option to deploy EV infrastructure as part of its regulated business (rate base assets) in geographical zones that are not attractive for other investors.
		(c) What are your views on charging activities being considered a *'supply of electricity* under the current legislative and regulatory framework?	Yes, charging activities constitute the "Supply of Electricity."

Ref.	Subject	Stakeholder Questions	JPS' Comments
		(d) Do you think the current electricity regulatory framework facilitates or hinders the (private?) ownership and deployment of EV charging infrastructure, and why?	Currently, the electricity regulatory framework neither facilitates or hinders private ownership and deployment of EV charging.
		(e) In your view, do you think that there are aspects of the regulatory framework that can facilitate the rapid uptake of EVs. If yes, what aspects?	At this time there are no aspects of the existing regulatory framework that facilitate and promotes the rapid uptake of EVs.
		(f) What appropriate steps should the GOJ take to expressly exempt charging activity under the current legal and regulatory framework?	JPS does not see a need for the GOJ to expressly exempt charging activity under the current legal and regulatory framework. There are hybrid models that can be considered to achieve the objective of facilitating private ownership and operation of charging infrastructure without breaching the conditions of the Licence.
		(g) What are your views on the regulation of EV charging activities?	Regulatory activities in an open EV market (with utility and non-utility participants) should focus on EV standards, interoperability, safety, etc. for which the Jamaica Bureaus of Standards could be the regulator.
8.1	**Existing legislation, Regulation and Policies**	(a) Do you agree with the strategies proposed to incentivize EV penetration under the current regulatory framework?	JPS supports the recommended strategies for early implementation such as Government Procurement policies for EV's in the government ministries and agencies, encouraging EV charging arrangements across entities, free charging in public places (consumption paid by government authority), and encouraging commercial entities to provide free EV charging to its customers.
		(b) In your view what regulatory initiatives can be employed in short order to incentive EV take-up.	Increased public education on the current EV tariff and their applicability and benefits to the various EV charging infrastructure owners. The regulator should continue to

Ref.	Subject	Stakeholder Questions	JPS' Comments
			reassess the EV tariff to continue adjusting with the anticipated growth in the sector.
		(c) What, in your view, are the challenges to any of the proposals identified?	We do not see any challenges to the proposals identified as per (a).
		(d) In your view, what additional strategies can be employed to encourage EV take-up under the current regulatory framework?	See item (b) above.
9.1,9.2	**Impact of EVs on the environment and the economy**	(a) Do you think that more EVs in the system will significantly reduce the dependence on imported fuel?	Yes, more EVs in the system will reduce the dependence on imported fuel.
		If yes, how? If no, why not?	There would be an ongoing fuel substitution from imported fuel to electricity as the penetration of EV increases.
		(b) Do you agree that largescale EV adoption will significantly reduce greenhouse gas emissions in the environment? If yes, how? If no, why not?	Yes, large-scale EV adoption will significantly reduce greenhouse gas emissions especially with a material share of power generation provided by indigenous renewable energy sources.
		(c) Do you agree that large-scale EV adoption will have a positive impact on the economy? If yes, how? If no, why not?	Yes, large-scale EV adoption will have a positive impact on the economy. The impact of reduced imported fuel would be beneficial to the national budget as well as reduce the demand for foreign exchange. The reduction in emissions will also have a positive impact on the environment, especially in a country with a heavy dependence on tourism that requires significant expenditure to support a healthy environment for the tourist client.
		(d) The economic assessment carried out indicated that the pay-back period is more attractive for EVs traveling a high number of miles. Do you think that EVs would be	We agree that the economics are significantly better for an EV owner who travels many miles during a day/week. However, the decision to own an EV in Jamaica may not only be based on economics but also can be influenced by a

Ref.	Subject	Stakeholder Questions	JPS' Comments
		more economical for public passenger vehicles than private vehicles?	personal or corporate green agenda and social responsibility.
10.1	Impact of EV charging on electricity system operation	(a) What are your views on the effect of large-scale EV adoption on the electricity supply system?	Large-scale EV adoption will have an adverse impact on the electricity supply system if there is no medium to long-term EV demand forecasting and grid planning to facilitate the reinforcement and expansion of the network in advance.
		(b) What do you think of charging EVs at home and the workplace?	We anticipate (consistent with the document's position) that 90% of EV charging will occur at home and the next major block would be charging at work and public spaces.
		(c) Do you think the high adoption of EVs in Jamaica will reduce your electricity bill?	The high adoption of EVs will not reduce your electricity bill. It will increase as persons will be charging their vehicles primarily at home. However, the cost of fuel to fill up your vehicle would be eliminated which will result in an overall lower net expense to the EV owner.
		(d) Do you believe that the use of smart grid charging will allow for a greater penetration level of EVs when compared to uncontrolled charging? If yes, how? If no, why not?	It's difficult to predict at this stage whether smart grid charging will allow for greater penetration of EV.
		(e) What are your views on the effects of TOU billing on EV charging behaviour? Do you think that a TOU tariff option would enable reduce the impact of charging load on the grid?	A Time of Use (TOU) tariff is a favourable option to facilitate low-cost charging for EV owners during off-peak hours. Also this typically the period when they would charge at home.
		(f) What other do you think should be considered to smooth the demand spike that EV charging is expected to produce?	The implementation of a smart charging infrastructure that can facilitate demand response schemes.
		(g) What incentives should in your opinion be	Incentives can be provided in relation to Demand Response and Vehicle-to-Grid

Ref.	Subject	Stakeholder Questions	JPS' Comments
		offered for private charging of EVs?	services, provided a framework is established for these services.
		(h) How should the utility plan for increased uptake of EVs?	The utility should support the forecasting and system planning process – IRP, to ensure that grid reliability and stability can be maintained for the sustainable growth of EV. The utility has an important role to drive the technology in the early market development phases and participate in the public education and early market sensitization programmes for EV.