

# CARICOM REGIONAL ELECTRIC VEHICLE STRATEGY (REVS) FRAMEWORK

This framework seeks to provide the building blocks of a more detailed strategy for the electric mobility transition in the Caribbean region. The aim, strategic imperatives and strategic initiatives from which the REVs will be based are presented.

## AIM OF THE REVS

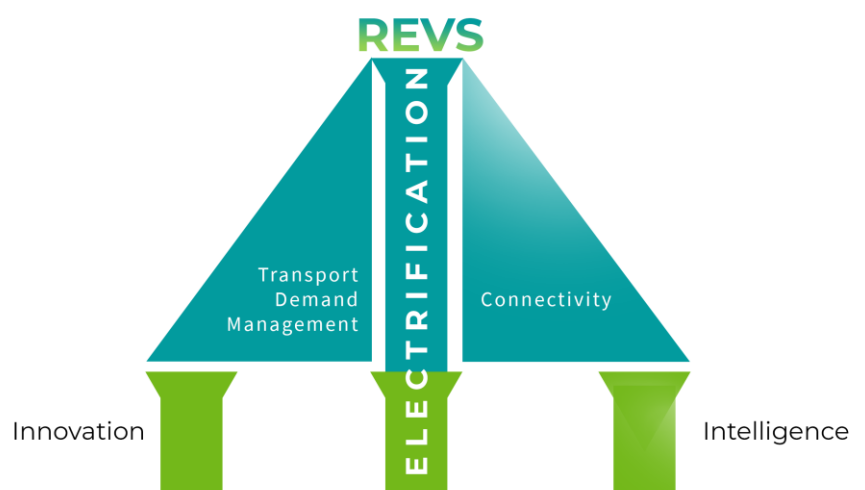
***“To deliver intelligent, modern, affordable, clean, efficient and safe mobility solutions for CARICOM citizens and businesses through the electrification of surface transportation within the Community.”***

The Regional Electric Vehicle Strategy (REVS) aims to specifically catalyse the deployment of electric vehicles across all modes of transportation in the Caribbean, while acknowledging the urgent need for comprehensive changes in the transport systems, driving behaviours and mobility preferences of the Caribbean people. The transport sector is a significant contributor to economic development and is increasingly linked with the energy sector, which has prompted an era of disruption ignited by emerging transport technologies and changing stakeholder requirements.

As Caribbean countries pursue the transition towards a sustainable, efficient and effective transportation sector, the accompanying successful delivery of future transport services will be driven by three main disruptors: (1) Electrification, (2) Connectivity through Digitalisation and (3) Shifting and Managing Transport Demand.

## STRATEGIC IMPERATIVES

To harness the three main disruptors and facilitate the transition to a modern, sustainable and affordable transportation system, the REVS relies on three strategic imperatives/pillars. These strategic imperatives are at the heart of the strategy and are the basis for the strategic initiatives recommended for implementation at the regional and national levels. These strategic imperatives guide key considerations spreading across the full gamut of economic, fiscal, technical, institutional, policy and even climate



and resilience dimensions; towards achieving the aim of this regional strategy. The three pillars/imperatives are innovation, intelligence and electrification and are detailed below.



## A. INNOVATION

Innovative business models – including policy makers, utility companies, consumers and the private sector; particularly gas stations, commercial centres, telecommunication providers, insurance companies, car dealers and technicians (electricians and auto-mechanics) – will be essential to meet the demands of a transition to electric mobility. This means that robust business cases related to electric mobility will be required to support sustainable solutions.

The large-scale integration of electric vehicles into the transport and energy systems requires innovation in energy supply models and pricing schemes, as well as infrastructure for charging, to encourage uptake and to meet consumer demands. Innovative technology and infrastructure solutions must also meet the needs of consumers in ensuring safety and reliability in the transport sector.



## B. INTELLIGENCE

Intelligence in electric mobility encompasses intelligence in vehicle operations, electrical power infrastructure, and grid integration. A connected network of cars and drivers, infrastructure and communities are important elements of sustainable electrified transport systems, which will require a transition to smart networks. Intelligence must be incorporated to ensure optimised accessibility to infrastructure for charging including dynamic interactions with the electric grids, traffic management systems, and data mining. The latter is important in the regional context to support tracking electric vehicle uptake, calculating emissions, economic benefits, among other measurable and replicable successes. Notwithstanding the data sharing requirements to effectively manage the operation of the transport system, cyber-security is an important element to ensure the sustainability and safety of the system.



## C. ELECTRIFICATION

The integration of mobility into the electricity sector through the deployment of digital technologies requires flexibility options for grid management, appropriate storage capacities and options. These options should be based on a renewable and efficient energy supply, to the benefit of Caribbean countries. With electrification based on renewable electricity generation, the region can benefit from reduced fuel import dependence, a diversification of their fuel mix, price stability and a healthier environment and society.

Electrification of the sector means fundamental changes in the traditional interaction among policy instruments, complex political economies, technology deployment, electricity production capacity and energy mix, market dynamics and supply chains. This disruptive transition must take into account major changes in political tax economies, import and insurance regimes, maintenance and first responder strategies. These areas of consideration come with opportunities and challenges which manifest beyond environmental benefits; and include factors such as automotive industry supply chains, job creation, market structures, international and regional trade relations, electricity networks,

diversification of roles of incumbent companies, and the introduction of new competitors. Therefore, at the heart of electrification, is the meticulous and timely investment in technologies, modernization of power grids to accommodate electricity demand growth, more renewable energy, and establishing the right policies; all these aspects are critical to large scale electric mobility integration.

## STRATEGIC INITIATIVES FOR IMPLEMENTATION

A series of initiatives will facilitate the achievement of the overall aim of the REVS, taking the three strategic imperatives into account and creating a dynamic enabling framework for electric mobility in the areas of:



Policy & Regulation



Technology & Infrastructure



Capacity Development & Awareness



Finance, Market Development & Innovation

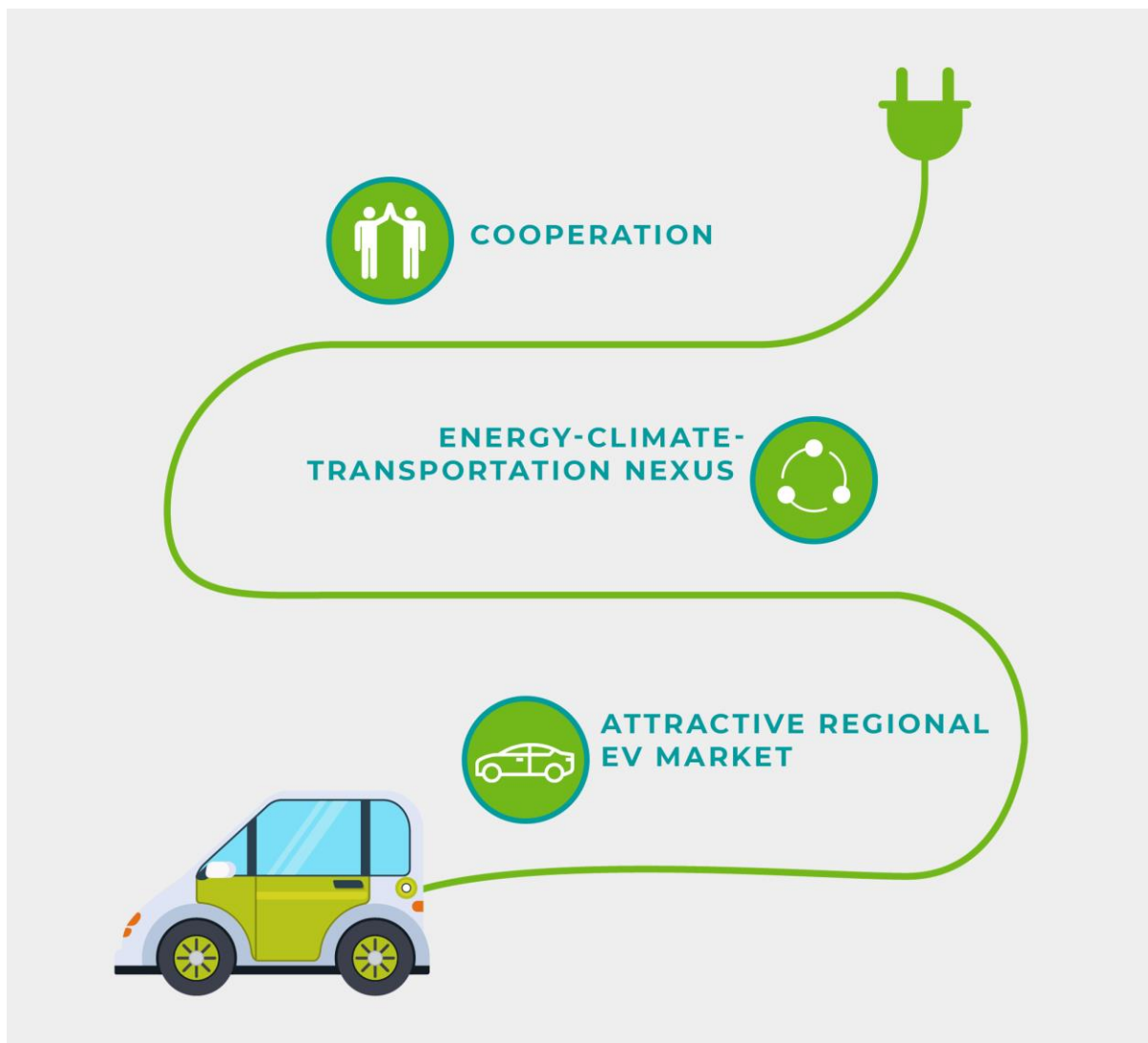
Throughout these initiatives, a market-specific approach that considers all relevant stakeholders will be applied. High-use vehicles in public and commercial fleets will be prioritised, and technology and infrastructure will be deployed with a view to meet current and future transportation requirements.

### 1. POLICY AND REGULATION



The CARICOM region strives to create a favourable policy, legal and regulatory framework to support the transition to sustainable mobility which is conducive to innovations in technology and transport services in the region. Regional and international partnerships and cooperation will be supported to take account of the multi-faceted nature of electric mobility, achieve economies of scale and ensure the unrestricted availability of suitable vehicles for the regional context. Policies and regulations will be designed to appropriately capture the challenges and opportunities of an increasing wealth of data and intelligence, including data protection and security issues, and to support a sustainable electrification of the sector.

A regionally coordinated multi-stakeholder approach will be applied to facilitate the e-mobility transition, by 1) encouraging greater cooperation between relevant actors; 2) strengthening the integration of the energy-climate-transportation nexus; and 3) creating an attractive regional market for electric vehicles with more favourable market conditions than what can be offered in individual markets.



The attractiveness and competitiveness of sustainable transportation options will be enhanced through a mix of support measures, including the introduction of vehicle efficiency and emission standards, standardisation of charging technologies and infrastructure, digital information platforms and appropriate incentives. The increasing integration of energy and transportation systems should be supported by a transition to smarter electrical grids and enhanced grid management practices like Distributed Energy Resources Management Systems (DERMS). The establishment of national data collection systems, regimes and harmonised methodologies will enhance data management and intelligence in the sector. This shall include the data collection and assessment of the health-related and environmental impacts of the current transportation system. The flow of data and information through the system shall be governed by the creation of a regional Intelligent Transportation System (ITS) Architecture.

The electrification of public and private surface transportation will be guided and supported through the development of national transport demand management models and programmes, and the creation of enabling frameworks, minimum standards and incentives for:

- the prioritisation of public and private high-use vehicle fleets;
- the deployment of the necessary charging infrastructure (to include energy storage devices);
- the management of charging demand, including smart charging and smart metering; and
- the further integration of telecommunication and transportation networks

Based on a regional needs assessment, appropriate policy, legal and regulatory measures will be developed and introduced to encourage and support the electrification of riverine and indigenous maritime transportation.

As for internal combustion engine (ICE) vehicles, policies and strategies for the end-of-life management of electric vehicles (EVs), including recycling, repurposing and safe disposal of EV batteries, will have to be developed.

## 2. TECHNOLOGY & INFRASTRUCTURE



The region is committed to support innovation in vehicle technologies and infrastructure, as well as the provision of sustainable transportation services across its Member States.



*The most favourable transport options within the Caribbean context will be identified and deployed, giving particular regard to the potential of e-mobility to enhance climate resilience and simultaneously improve existing road and other transport infrastructure. This will be achieved through enhanced R&D, techno-economic feasibilities and total-cost-ownership studies.*

With the advent of EV data mining and the increasing digitalisation of the sector, the application of advanced technologies and datasets can strengthen the regional knowledge base and intelligence. These developments will have to be guided by appropriate regional and national policies and regulations, to ensure the necessary data protection and cyber security in the sector.

Strategic interventions shall further include the digitalisation of public transport information through online information platforms and services like payment systems, route schedules and multi-modality management to enhance the intelligence and attractiveness of public transportation options.

Technology pilots for surface transportation shall serve to enable the application of innovative technologies, such as vehicle-to-grid (V2G) or vehicle-to-home (V2H) integration, battery swapping services, public and private fleet transition or second-life applications for vehicle batteries. Additionally, riverine and maritime transportation pilot projects will test the utilisation and scale-up potential of hybrid and electric ferries.

## 3. CAPACITY DEVELOPMENT AWARENESS



Capacity building and awareness in all Member States is essential to initiating widespread local/national action towards the transformation of the transport sector to one characterised by electric mobility. Capacity must be built and awareness raised at all levels and among all stakeholders to encourage the large scale and transformative integration of electric transport. Capacity building initiatives must target both incumbent and future private sector firms and relevant government agencies.

Institutional capacity must be built among relevant government agencies responsible for transportation, energy, climate, infrastructure and finance. Policy and decision makers must be

equipped with the correct information and long term understanding of the transport and energy sectors; and how they will be affected by the disruption of electric mobility. This will result in the development and implementation of the appropriate policies and regulation for a successful transition.

Utility companies, regulators and private sector companies shall also be sufficiently equipped as key stakeholders and agents of change for such a transition. Member States shall therefore promote and encourage greater coordination, collaboration and information and experience sharing between regulators and their utilities, at national levels with the aim of encouraging EV adoption.

Another major strategic intervention for capacity building on a regional level, is the exchange among Member States through the hosting of workshops, and exhibitions. The flagship event, a Regional Cleaner Transportation Tradeshow and Exposition, will be held annually with a rotation of the host country.



**Across all transport sectors, a regional approach must include the following:**

- 1) the establishment of a community of best practice that allows for the exchange of knowledge and experience among regional electric mobility stakeholders; and
- 2) the design and mainstreaming of a technical-vocational training programme

The training programme will include components or specialised training to enhance and build capacities in maritime and riverine electric mobility among operators and technicians. Big data analytics and machine learning content must also be incorporated into the Caribbean Advanced Proficiency Examination (CAPE) curriculum and other tertiary level curricula, across the region. This training programme would involve key stakeholders such as the Regional Network of Universities, among others.

With a focus on private transportation, the effective training of first responders, technicians (electricians and auto-mechanics) and emergency personnel must be given priority. For private consumers, raising awareness is critical to the market uptake of EVs across the region. Consumers must be made aware of the benefits, opportunities and challenges of electric mobility.

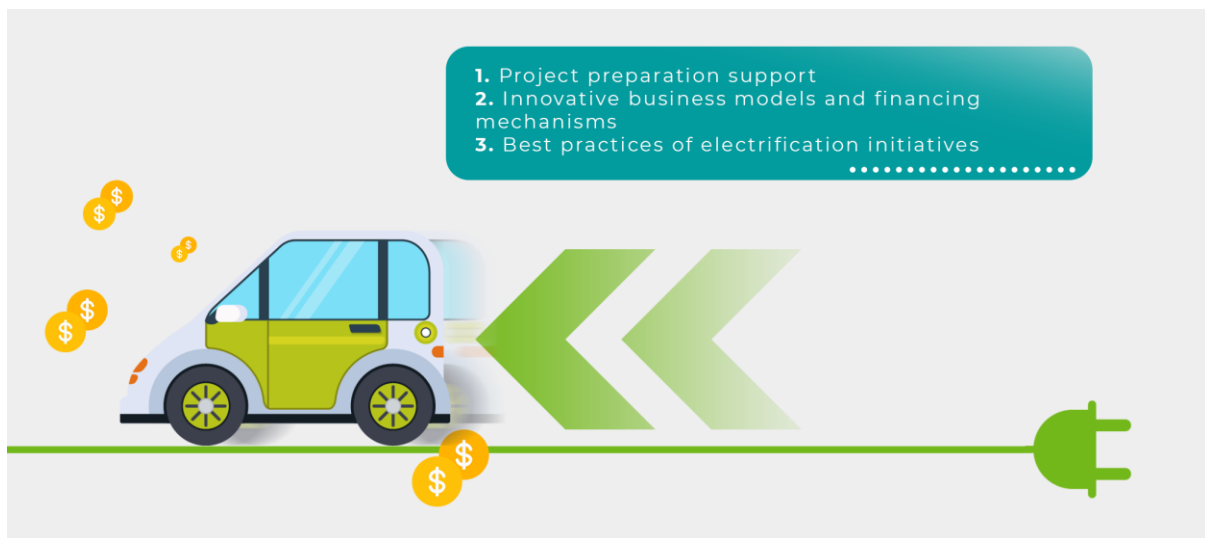
## **4. FINANCE MARKET DEVELOPMENT & INNOVATION**



Development of the electric vehicle market must engage stakeholders ranging from government agencies to utilities and non-utility participants in the e-mobility transition. For initiatives within the transport sector to encourage multi-modality and ride sharing, they should include the promotion of transportation tariff options, bundled mobility packages, and the development and use of digital traveller-based technologies.

Initiatives to provide project preparation support towards accessing grant and loan funding from developmental partners and other international and regional funding agencies for the electrification

of transportation in the region, are key to the REVS. The CCREEE Project Preparation Facility (PPF) shall serve the region in this regard by providing this support to both public and private sector actors.



For the transition of public and private surface transportation, the appropriate tailored financing packages must be made available by regional and local commercial and development financial institutions (FIs); this can be accomplished in tandem with the CCREEE PPF. Support and capacity building should also be provided to the FIs to better equip them to provide these specialised services.

Business innovation involving incumbent utilities and regulators, other incumbent and future non-utility private sector participants shall be encouraged through the development of new financial programmes and models.

The application of innovative business models and financing mechanisms like the Integrated Utility Services model, is encouraged to enable technology and infrastructure deployment.

Strategic interventions include encouraging battery or EV leasing programmes and arrangements, demand response programmes and transportation tariff options which include time-of-use tariffs, pay as you go tariffs and bundled mobility packages that combine mobility services as a pre-paid service, technology partnerships, solar charging garages, bundled energy solutions, among others.

Strategic interventions which will particularly benefit indigenous marine and riverine electric mobility transitions include learning from the experiences of existing electrification initiatives.

The strategic adoption of relevant applied technology options, financing and business models is important to the successful deployment of electric mobility to diversify and meet the needs of marine and riverine transportation in the region. Furthermore, support shall be provided to financial institutions in the development and provision of specified financial instruments to encourage this market.