COUNTRY PRESENTATION FOR
ELECTRIC VEHICLE AND ITS CHARGING INFRASTRUCTURE
MALDIVES

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Background: Maldives Primary Energy Mix

- In December 2020, the Government of Maldives Updated its nationally determined contributions under the Paris Agreement aims to reach net-zero by 2030 with support and assistance from the international community
- As per UNSD Energy Balance database, road transportation and electricity generation accounted for 31% and 34% of energy use vis-à-vis emissions respectively
- Renewable power generation, energy storage and electric mobility are the most promising pathways for achieving net-zero emissions in Maldives

Policy, planning, and institutions

- **Key actors:**
  - Ministry of Economic Development, Transport and Trade—vehicle regulation, EV plates, public fleets.
  - Ministry of Climate Change, Environment and Energy—climate and energy policy, net-zero roadmap.
  - STELCO & FENAKA—utilities managing grid integration and potential EV load.
  - MTCC—buses, ferries, and potential e-bus and e-ferry fleets.

- **International partners:** UNDP, World Bank, Japan and others supporting pilots, financing, and technical studies on EV potential and charging strategies.

Existing charging infrastructure

Solar-backed EV minibus route (Greater Malé):

First five solar-supported charging stations installed for an electric minibus route, signalling a shift to cleaner urban transport.

Community solar charging station (Raa Vaadhoo):
First community-built solar EV charging station, showing local ownership and decentralised green mobility.

Grid-linked public charging (concepts):

World Bank/ESMAP work models public EV charging, battery swapping, and rooftop PV for charging as part of integrated power-transport planning.

CURRENT STATUS OF EV ADOPTATION

- Growing EV presence:

  Increasing use of electric motorcycles, small vehicles, and pilot fleets in Greater Malé and selected islands.

- Regulatory formalisation (2026):

  Government introduced green licence plates for all EVs, making them distinct and formally recognised in the vehicle registry.

- Public EV taxi initiative:

  State-operated taxi service with 150 electric cars planned, using green plates with yellow lettering for commercial use.

Technical and economic considerations

- **Electricity prices & cost of charging:**
  - Domestic tariffs range roughly from 0.10–0.28 USD/kWh; commercial tariffs higher, shaping EV charging economics.
- **Grid impact and planning:**
  - Scenario modelling assesses EV load, fast vs slow charging, and how to align charging with solar generation to avoid peak stress.
- **Priority segments:**
  - Electric buses, solar/electric ferries, micro-mobility (e-bikes) identified as high-impact segments for decarbonisation.

EVs promise a cleaner, a more sustainable future, but widespread adoption faces several real-world challenges across technology, infrastructure, economy, policy, and behavior

Challenges in Maldives

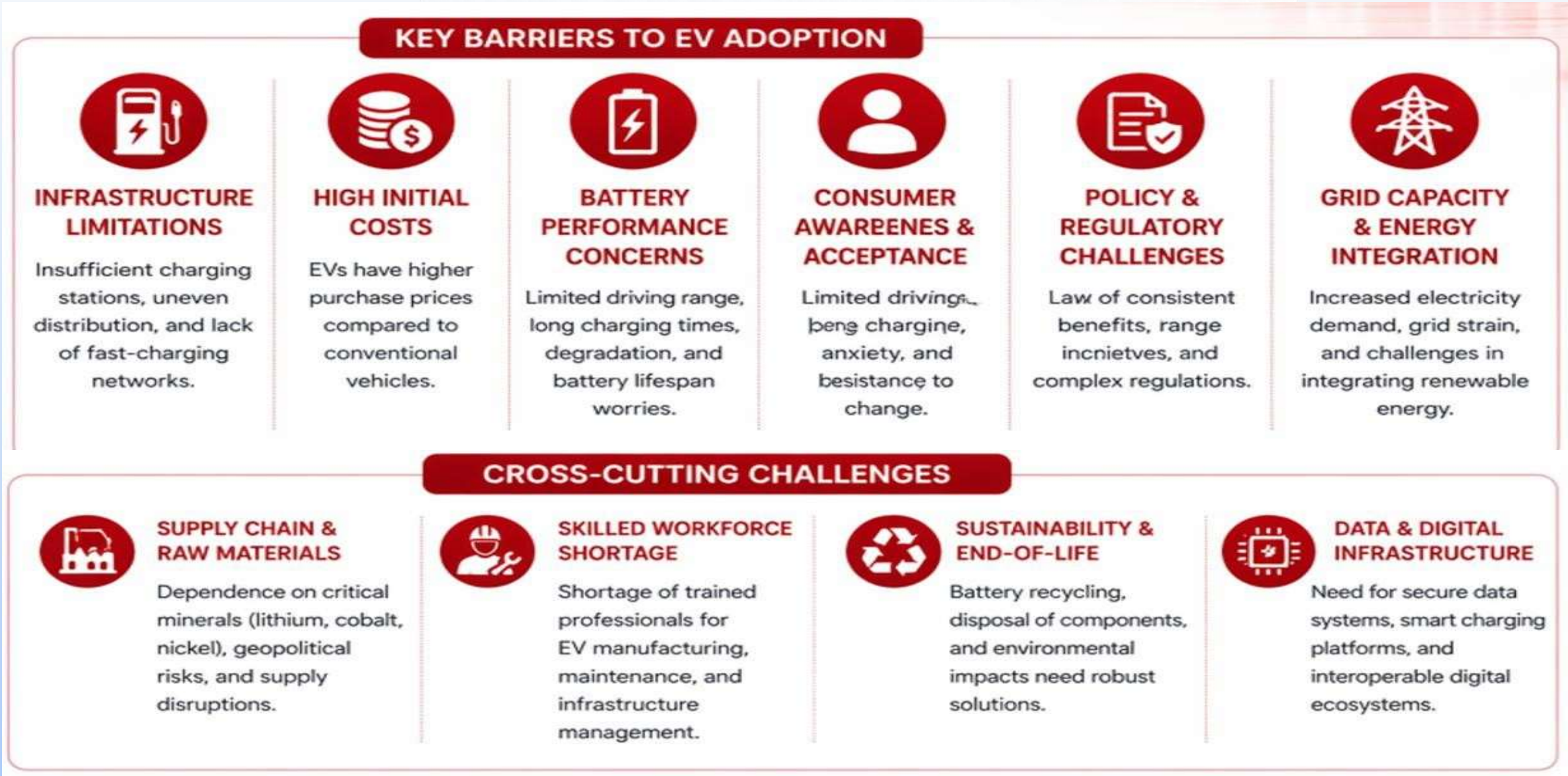
Infrastructure gaps: Limited number of public charging stations outside pilot areas; uneven access across islands.

Grid constraints: Small, isolated grids with diesel-based generation make large-scale fast charging challenging without careful planning.

Financing & scale-up: High upfront costs for fleets and charging infrastructure; reliance on concessional finance and grants.

Capacity & awareness: Need for technical skills (utilities, mechanics) and public confidence in EV reliability and safety.

ELECTRIC VEHICLE ADOPTION: CHALLENGES



Opportunities and strategic directions

Solar-EV synergy: Pairing rooftop PV and island solar farms with EV charging to cut fuel imports and emissions simultaneously.

Island-level pilots: Turn selected islands into "EV-first" zones with e-buses, e-bikes, and solar charging as living laboratories.

Tourism sector: Resorts and guesthouses can adopt EV fleets and private charging, branding Maldives as a low-carbon destination.

Regulatory evolution: Build on green plates with incentives—reduced registration fees, parking benefits, or dedicated EV lanes in dense areas.

EV CHARGING LEVELS

Different charging solutions for every need—
from home charging to high-powered fleet operations.

TYPE	POWER	CHARGING TIME	USE CASE	KEY FEATURES
1 Level 1 AC	~1–2 kW	8–20 hours	Overnight home charging, residential only	• Uses standard household outlet (120V) • Slowest charging option • Low installation cost • Ideal for plug-in hybrids and low daily mileage
2 Level 2 AC	~7–22 kW	1–8 hours	Homes, offices, destination charging	• Uses 240V (single/three-phase) • Faster charging than Level 1 • Ideal for daily use • Widely used in homes, workplaces, and public areas
3 DC fast charging	~50–150 kW	20–60 minutes	Urban fast charging, highway stops	• DC power—bypasses onboard charger • Suitable for mid-trip top-ups • Common in public fast charging stations • Charging speed depends on vehicle capability
4 Ultra-fast DC	150–350+ kW	10–60 minutes	Corridor hubs, premium fast turnaround	• High-power DC for ultra-rapid charging • Minimizes stop time on long journeys • Supports high-capacity EVs • Requires advanced infrastructure and cooling
5 MCS / MW class	>1 MW	20–60 minutes	Trucks, buses, logistics, depot operations	• Megawatt Charging System (MCS) for heavy-duty EVs • Enables high-energy transfer for large batteries • Essential for commercial fleets and long-haul operations • Supports future electrification of heavy transport

QUICK COMPARISON

From slow overnight charging to ultra-fast charging in minutes.

Higher power means shorter charging time and higher use case suitability.

Choose the right level based on your vehicle, needs, and location.

KEY TAKEAWAY

A robust mix of charging levels—at home, at work, on the go, and for heavy-duty applications—is essential to accelerate EV adoption and enable a seamless electric future.

Charging time varies based on vehicle battery capacity, charger power, battery state of charge, and ambient conditions.

Always follow manufacturer guidelines and use certified charging equipment.

POWER SYSTEM IMPACTS OF EV

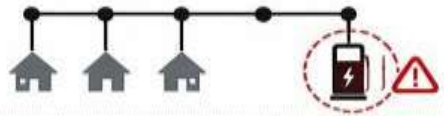
Widespread EV adoption directly affects the power system. Unmanaged charging can stress distribution networks and impact reliability, efficiency and power quality.

1 LOAD & PEAK DEMAND IMPACTS

Uncoordinated EV charging increases peak demand by **15–40%.**

Transformer overloading at distribution level (LV/MV).

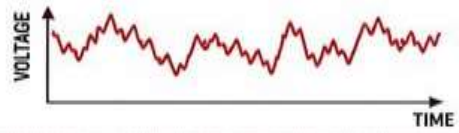
Voltage deviations & undervoltage near charger clusters.



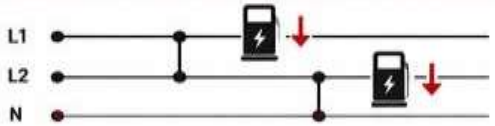
Increased power losses in feeder cables & transformers.

2 VOLTAGE QUALITY ISSUES

Voltage flicker from rapid charge fluctuations.

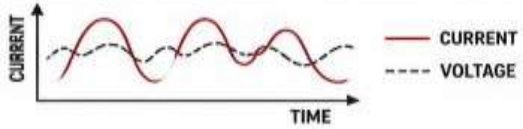


Voltage imbalance in single-phase charger installations.



Under-voltage at end-of-feeder nodes.

Reactive power demand from non-linear loads.



Coordinated charging, smart controls and grid-ready infrastructure are key to managing impacts and ensuring a reliable, efficient and future-ready power system.

- SMART CHARGING & LOAD MANAGEMENT
- GRID UPGRADES & CAPACITY PLANNING
- POWER QUALITY MONITORING
- STAKEHOLDER COLLABORATION

Thank you