EV Technology & its Real-Time Issues

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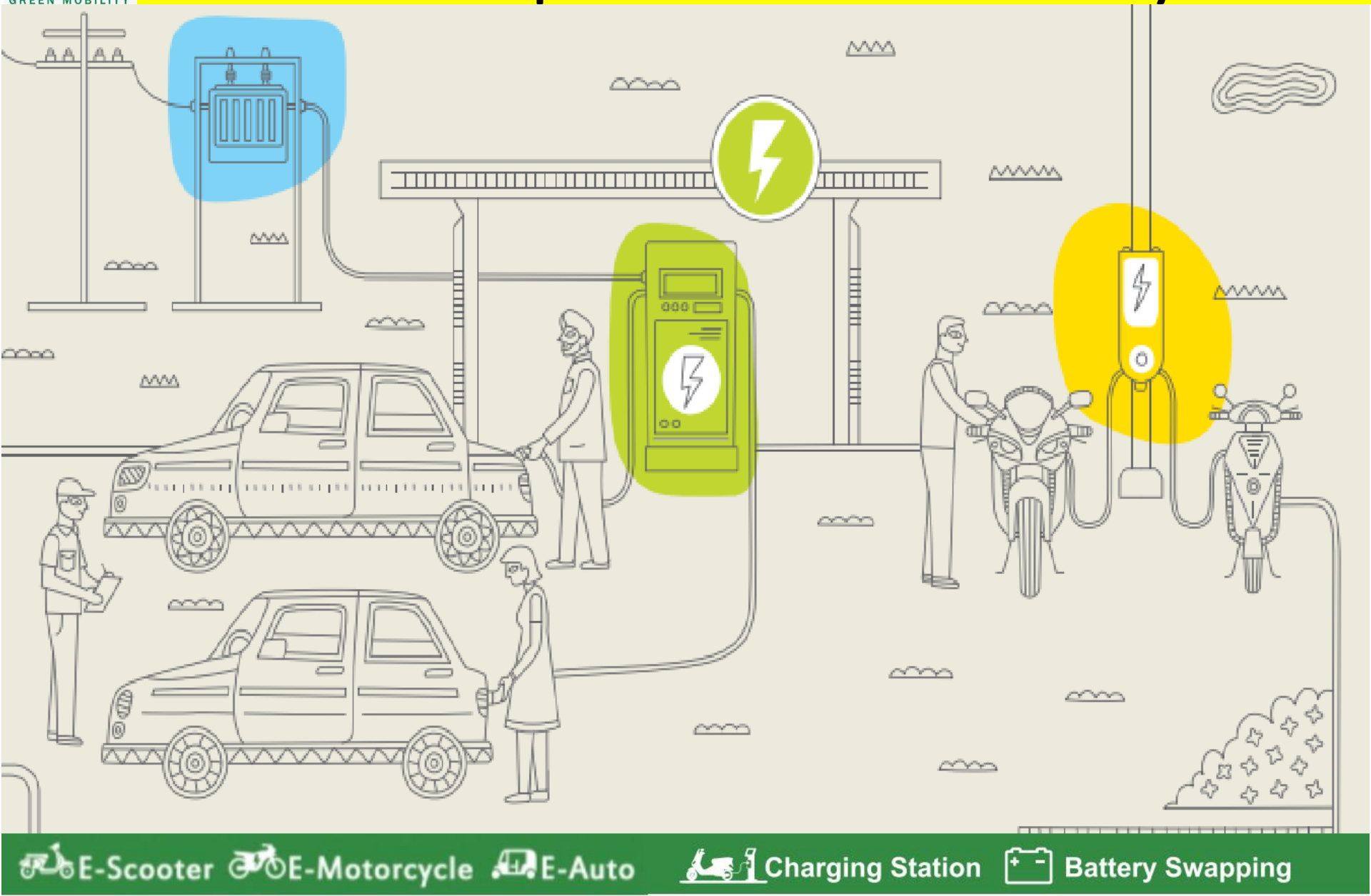
GREEN MOBILITY

Electric Vehicles is the future!

Explore the world of E-Mobility !



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ADVANTAGES IN INDIA FOR EV BUSINESS

2nd
HIGHEST POPULATION

OPTIMISTIC INVESTMENT CLIMATE

~55th RANK
GLOBAL COMPETITIVENESS

G20
MEMBER

GDP GROWTH RATE +7%

550+
MILLION INTERNET USERS, 2018

2nd LARGEST MARKET, FOR CONSUMING - CLASS HOUSEHOLDS

GROWING EDUCATION AND HEALTHCARE

DOUBLE DIGIT GROWTH IN EXPORT & IMPORTS

~50+
PURCHASING MANAGERS' INDEX

DOUBLE DIGIT GROWTH IN GROSS EXPENDITURE ON R&D

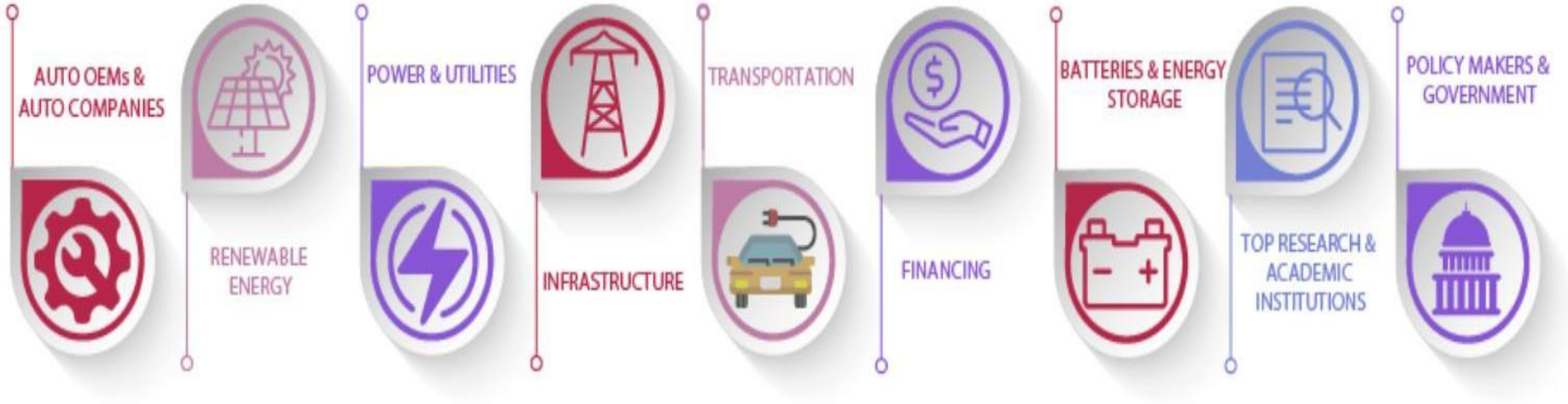
NATIONAL HIGHWAYS: 115,530+ KM
STATE HIGHWAYS: 176,166+ KM

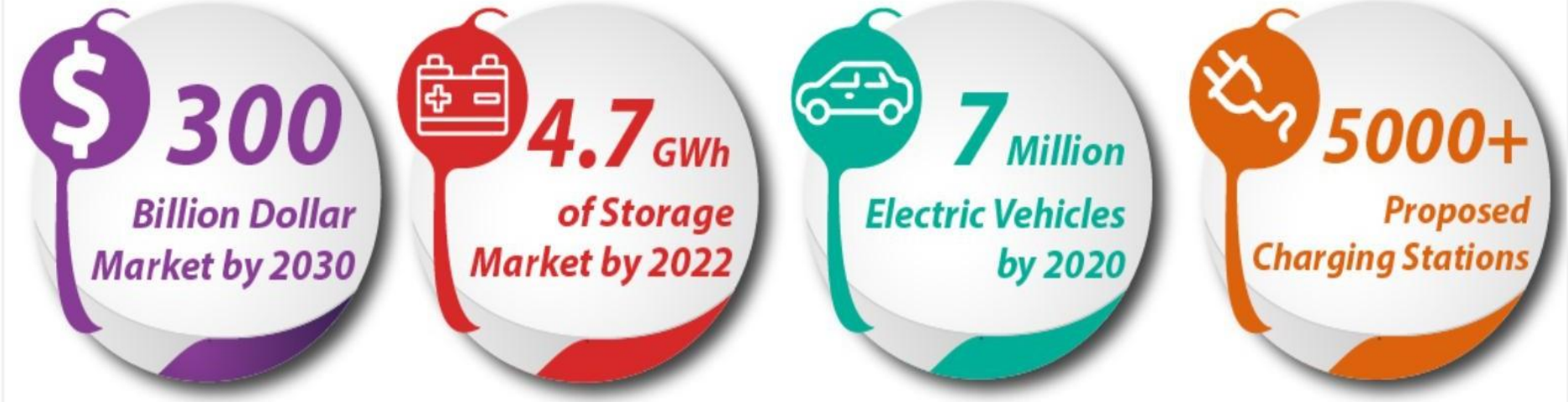
GROSS VALUE ADDED (GVA)
INDUSTRIAL SECTOR GROWTH: +5%
SERVICE SECTOR GROWTH: +8%

STRENGTHENING OF INDEX OF INDUSTRIAL PRODUCTION

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

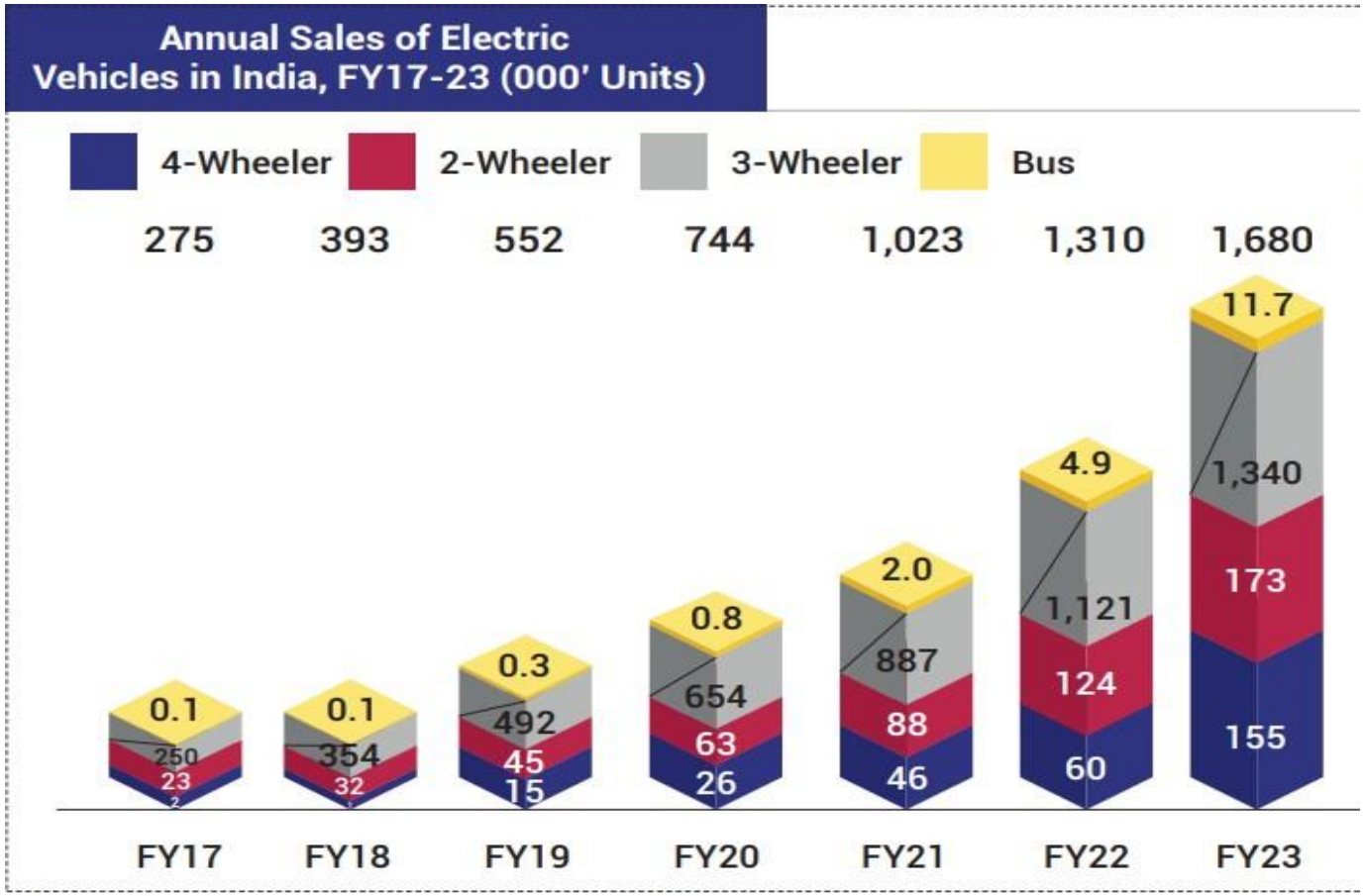
Opportunities and Key Stake Holders





E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

Annual Sales of Electric Vehicles in India



Source : Avalon Consulting Research and Analysis

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

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Comparison of different vehicle types

EV Type	Driving Component	Energy Source	Features	Problems
BEV	• Electric motor	• Battery • Ultracapacitor	• No emission • Not dependent on oil • Range depends largely on the type of battery used • Available commercially	• Battery price and capacity • Range • Charging time • Availability of charging stations • High price
HEV	• Electric motor • ICE	• Battery • Ultracapacitor • ICE	• Very little emission • Long range • Can get power from both electric supply and fuel • Complex structure having both electrical and mechanical drivetrains • Available commercially	• Management of the energy sources • Battery and engine size optimization
FCEV	• Electric motor	• Fuel cell	• Very little or no emission • High efficiency • Not dependent on supply of electricity • High price • Available commercially	• Cost of fuel cell • Feasible way to produce fuel • Availability of fueling facilities

Criteria for the battery of the future

- Reliability
- Energy and power density
- Outstanding lifespan
- Scalable and sustainable
- Low-cost large-scale production

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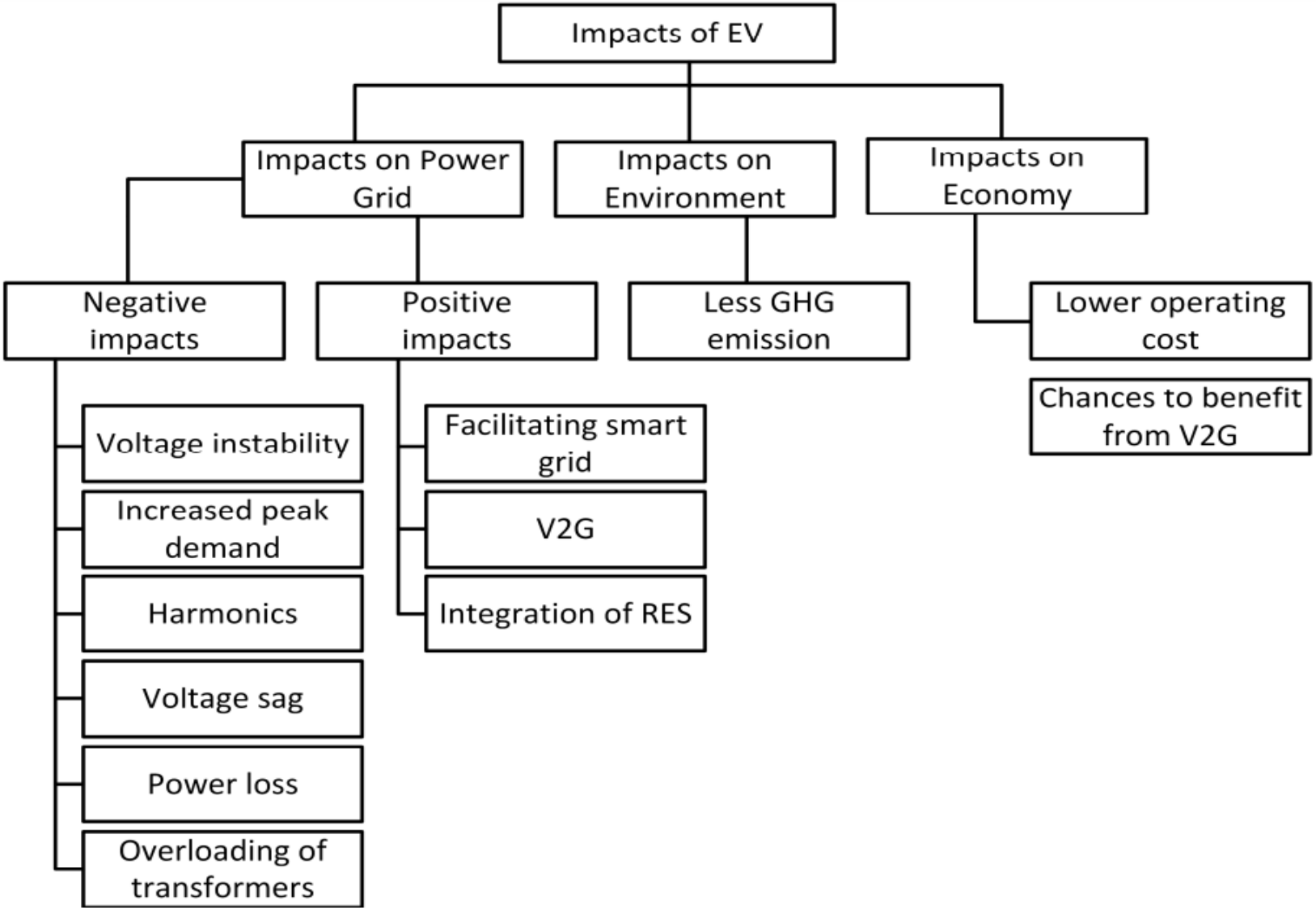
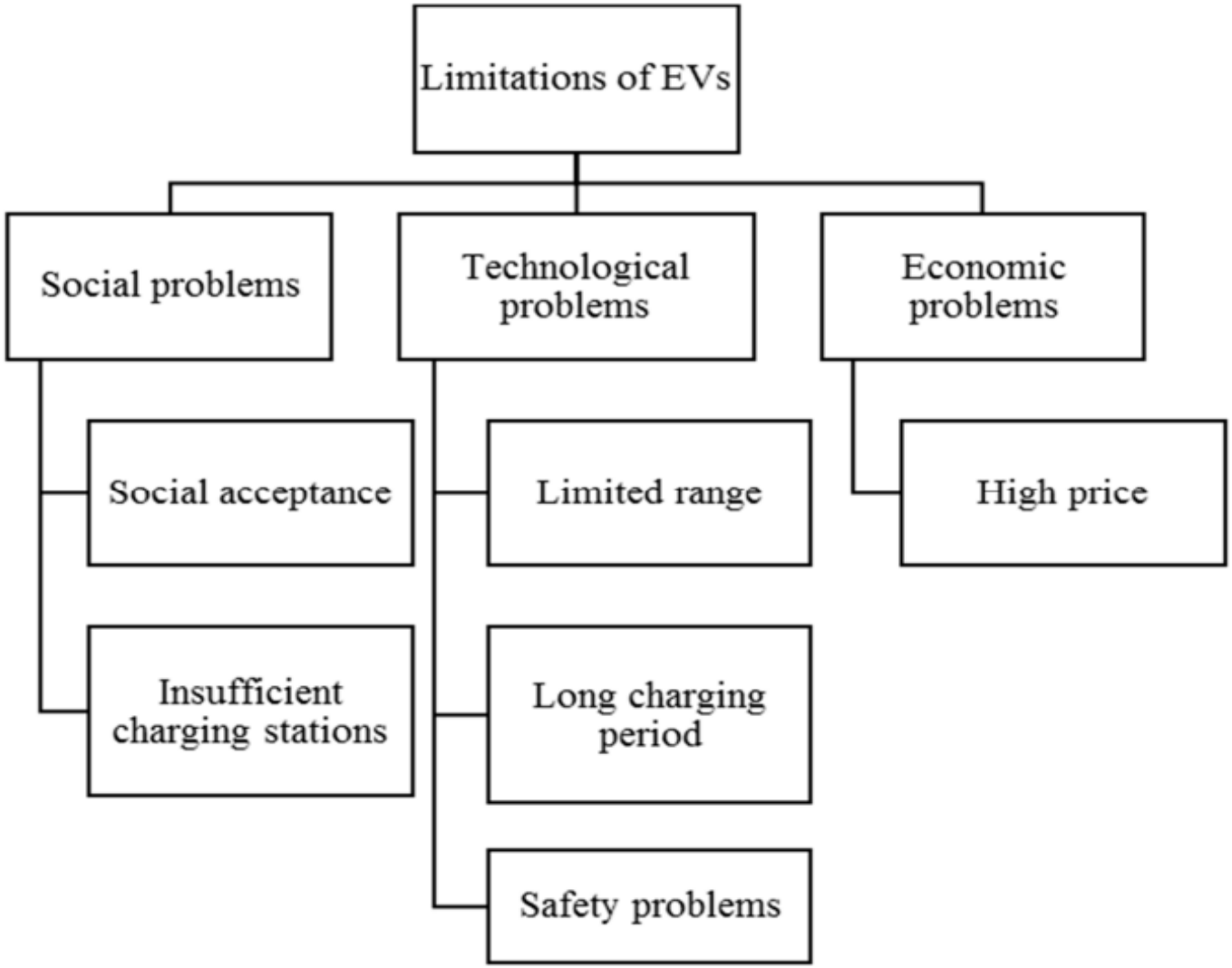
Impacts of EVs on the power grid, environment and economy.



Social, technological, and economic problems faced by EVs



Main Parts of an E-Vehicle

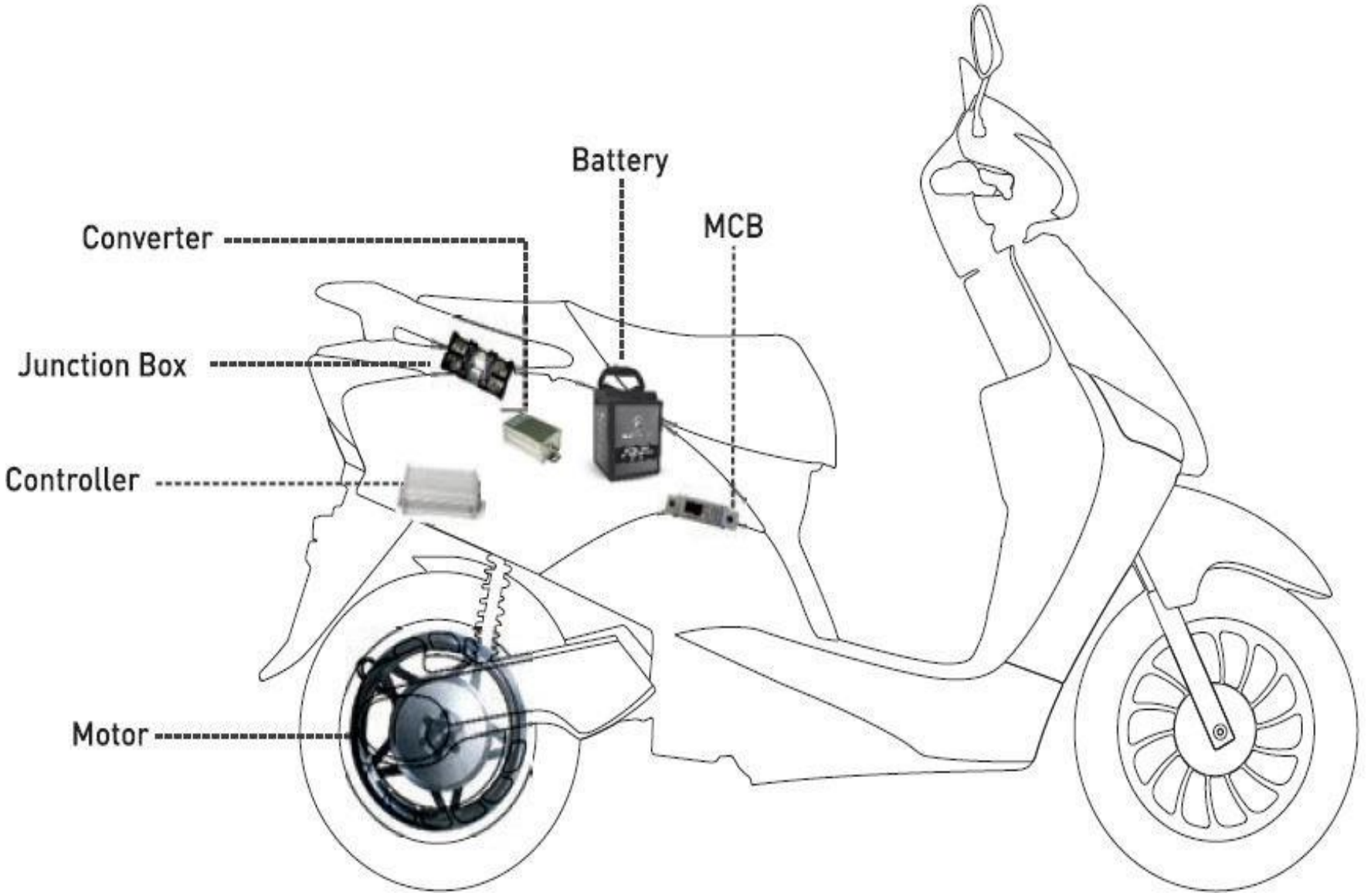
Electrical

- Battery
- Charger
- Motor
- Controller
- DC to DC converter
- Throttle
- Wiring Harness
- Speedometer
- All switches

Mechanical

- Chassis
- Brakes
- Wheel
- Suspension
- Plastic parts

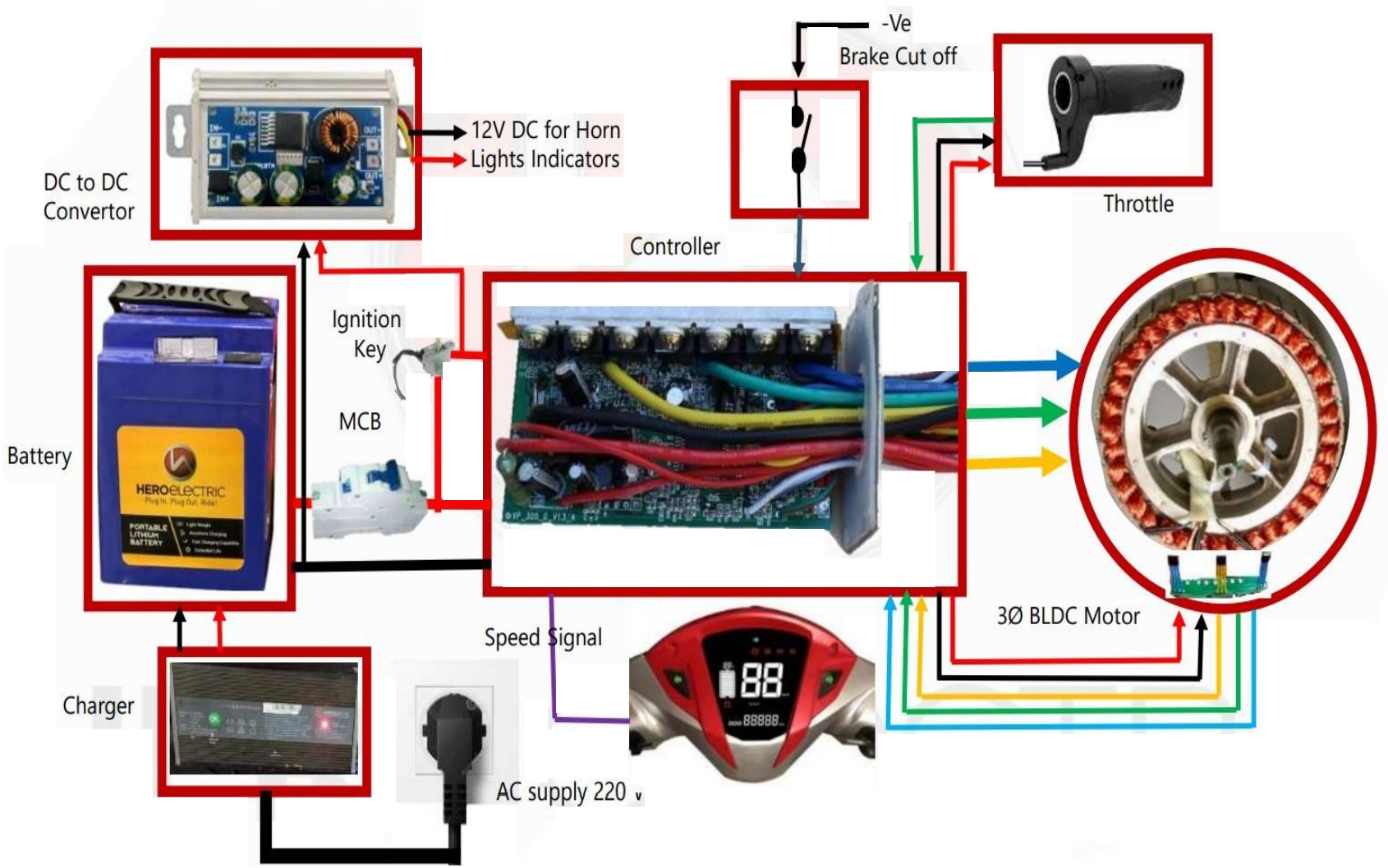
Main Parts of an E-Vehicle



EV Configurations

- An EV can be considered as a system incorporating three different subsystems energy source, propulsion and auxiliary.
- The energy source subsystem includes the source, its refueling system and energy management system.
- The propulsion subsystem has the electric motor, power converter, controller, transmission and the driving wheels as its components.
- The auxiliary subsystem is comprised of auxiliary power supply, temperature control system and the power steering unit.

Subsystems of Electric Vehicle



Types of Batteries

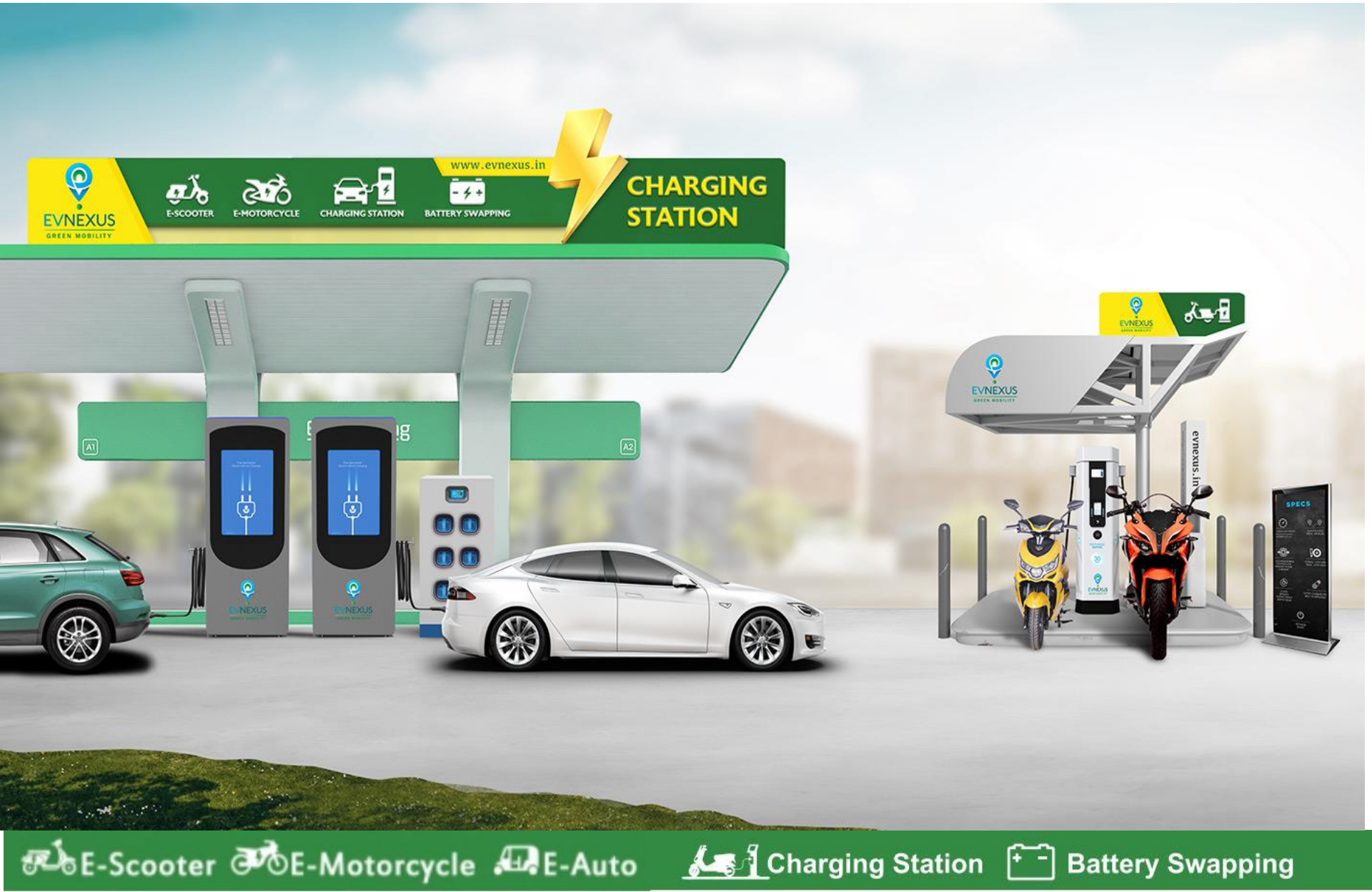
- **Li-Ion**
  - LFP with PVDF & Super conducting Carbon Black
  - NMC
  - LMO
  - LMO +NMC

- **Lead Acid**
  - **VRLA**
    (Valve regulated lead Acid battery)
    - sometimes called sealed lead acid (SLA) or maintenance free batter

Advantages of LI-ION Battery

- High specific energy and high load capabilities with Power cells
- Long cycle and extend shelf-life; maintenance-free
- High capacity, low internal resistance, good columbic efficiency
- Simple charge algorithm and reasonably short charge times
- Low self-discharge (less than half that of NiCd and NiMH) Portable
- High life cycle
- Less charging time
- Low Maintenance - no periodic discharge is needed; there is no memory

Charging Stations



Advanced forms of smart charging

V1G = Unidirectional controlled charging
Vehicles or charging infrastructure adjust their rate of charging

V2H/B = Vehicle-to-home/-building
Vehicles will act as supplement power suppliers to the home

V2G = Vehicle-to-grid
Smart grid controls vehicle charging and returns electricity to the grid

Battery Swapping

E-mobility hesitancy is primarily due to long waiting time for charging. To overcome this drawback, refueling comes as a boon. In battery swapping, the discharged batteries are swapped with fully-charged batteries reducing the time taken for recharging. This helps you save time, one of the primary limitations of zero-emission vehicles. The proposed battery swapping model, to get rid of the discharged batteries from vehicles, overcomes a number of challenges faced in electric vehicles such as lengthy charging time, anxiety of waiting and huge costs involved.

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RTO Registration 2 W & 3W Models

2 - Wheelers

E-Scooter

E-Motorcycle

3 - Wheelers

E-Auto

E-Rickshaw

Goods carriage

High Speed 2W Electric Vehicle
(L1 & L2 Categories)

RTO Registration 3W Electric Cargo Auto
(L5N & L3 Categories)

We have various ranges of Products & Models

RTO Registration : Registration 2W Electric Vehicle- 6 Models

2W : eMotorcycle - 2 Modles

2W : eScooters - 4 Modles

Non-Registration Slow Speed Categories of Electric Vehicle- 6 Models with ICAT

L5N & L3 3W- Electric Cargo & Auto Rickshaw -4 Models with 4 Application

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

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We & Suppliers Possess necessary Certificate Approval from Indian Government

MoRTH
Ministry of Road Transport and Highways

Vahan dIEn

CIRT
Excellence in Transport

Bureau of Indian Standards

ARAI®
Progress through Research

ICAT
Innovation • Service • Excellence

GLOBAL AUTOMOTIVE RESEARCH CENTRE
ENSURING SAFE DRIVE

IEEE

IEC

MINISTERIO
DE INDUSTRIA, COMERCIO Y
TURISMO

MCCAA
MALTA COMPETITION AND
CONSUMER AFFAIRS AUTHORITY

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de la Mobilité
et des Travaux publics

Département de la mobilité
et des transports

SOCIÉTÉ NATIONALE DE
CERTIFICATION ET D'HOMOLOGATION
S.A.

Registre de Commerce: B 27180

L-8070 Bertrange

snch

Standards & Governmental Approvals Certifications as per National Automotive Board (NAB)

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

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Homologation Certification for 2 W & 3W Models

Category A: Means a Category Agricultural Tractor Power tillers are included in this category.

Category C: This is Construction Equipment Vehicle (CEV).

Category L1: Means a motorcycle with maximum speed not exceeding 45 km/h and engine capacity not exceeding 50cc if fitted with thermic engine or motor power not exceeding 0.5 kilo watt if fitted with electric motor.

Category L2: Means a motorcycle other than Category L1.

Category L3: Means a two wheel motorcycle with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm3 or whatever the means of propulsion a max. design speed exceeding 50 km/h. with more then 50 cc and speed of more then 50 kmph.

Category L5M: Means a L5M category-Passenger carrier (Auto rickshaw) and Gross vehicle Weight is equal to 1500 kilograms.

Category L5N: Means a motorcycle other than Category above.

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EVNEXUS Aims to Develop the NPD and Innovative Concepts

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

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Quality Standards & Features


Fire resistant Battery


Long-term warranty


Long range battery


Lifecycle of over 3000 charges


Has High-temperature resistance


Offers strong safety performance


Brushless motor


In-built Overcharge Prevention Systems


Over-current Protection


Over-charge Protection


Over-discharge Protection


Water Protection


Quality plastics & Rust free Steel


Short Circuit Protection


Temperature Protection


Effficient shock absorption


Voltage Equalization


Tubeless tyre

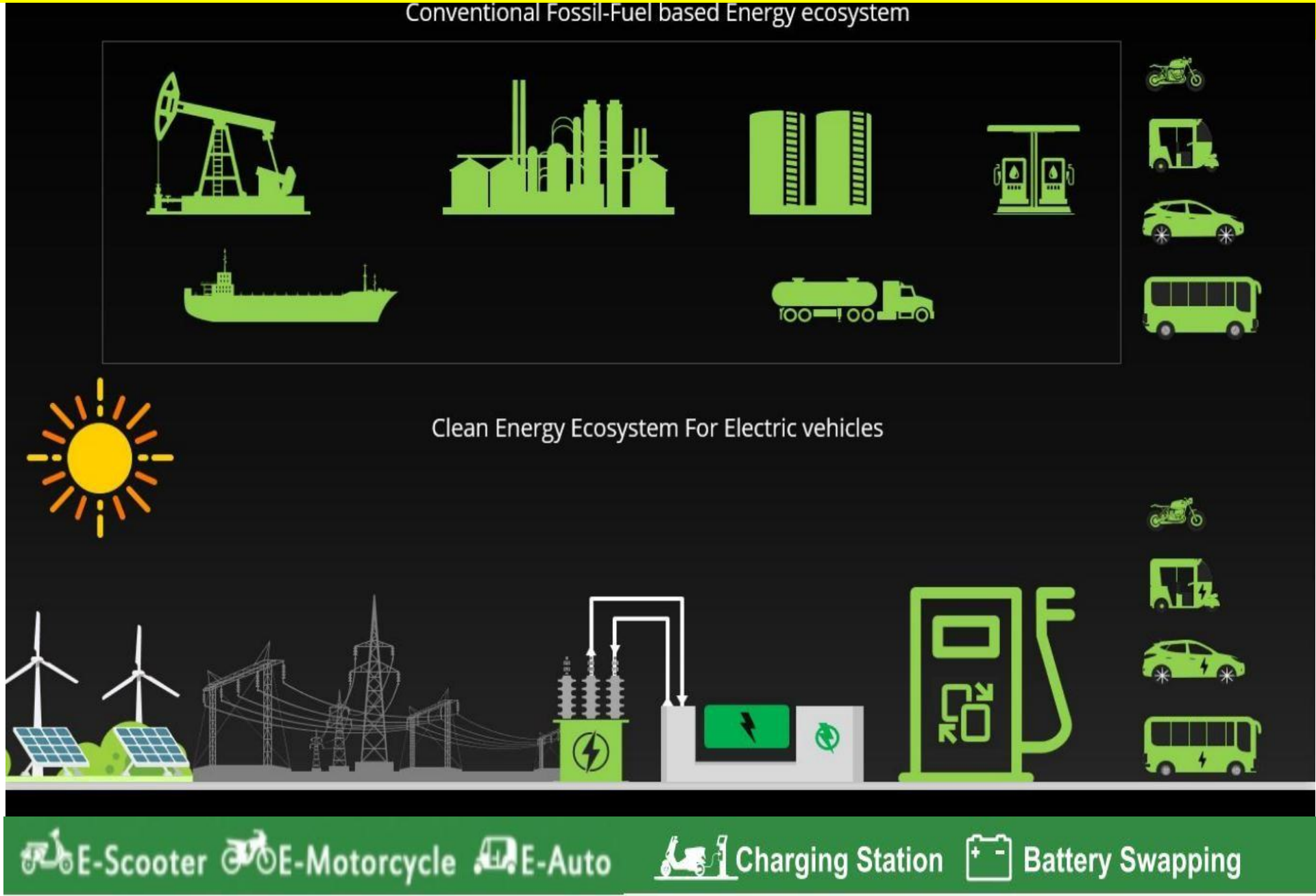

Remote alarm


LED Display

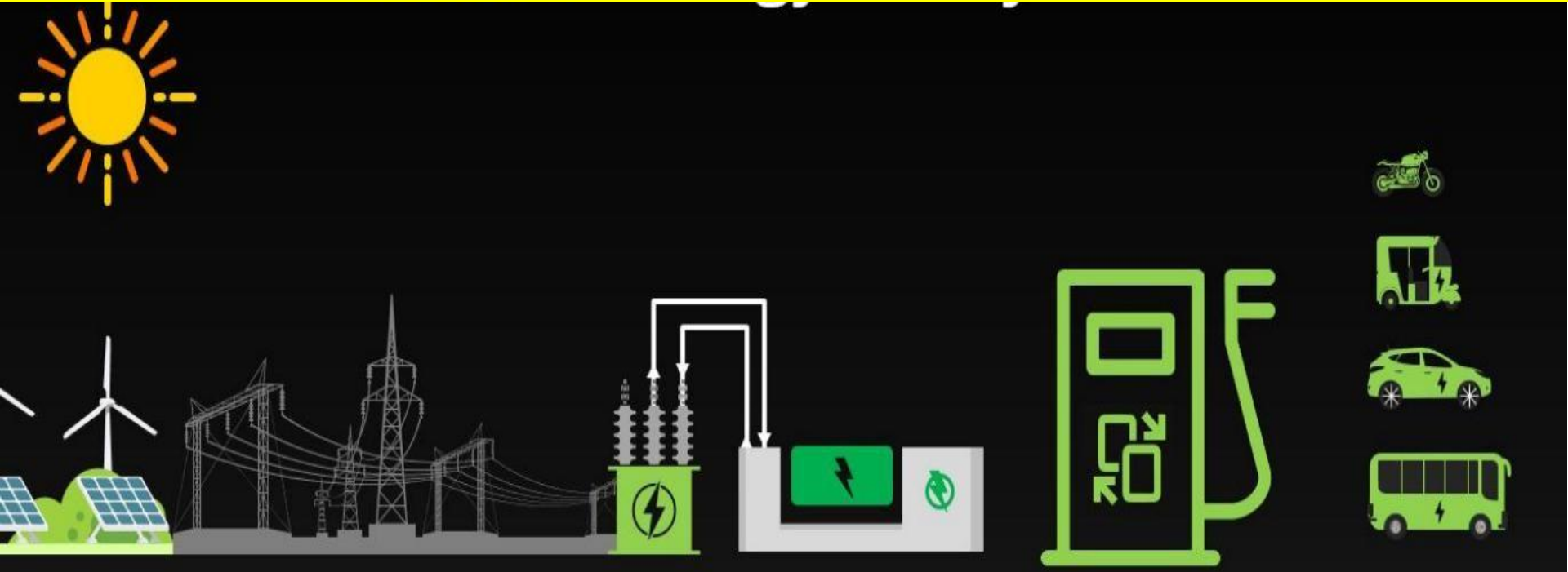

Bright Headlights

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

Old to New


Conventional Fossil-Fuel based Energy ecosystem
Clean Energy Ecosystem For Electric vehicles
E-Scooter
E-Motorcycle
E-Auto
Charging Station
Battery Swapping

Future Energy System

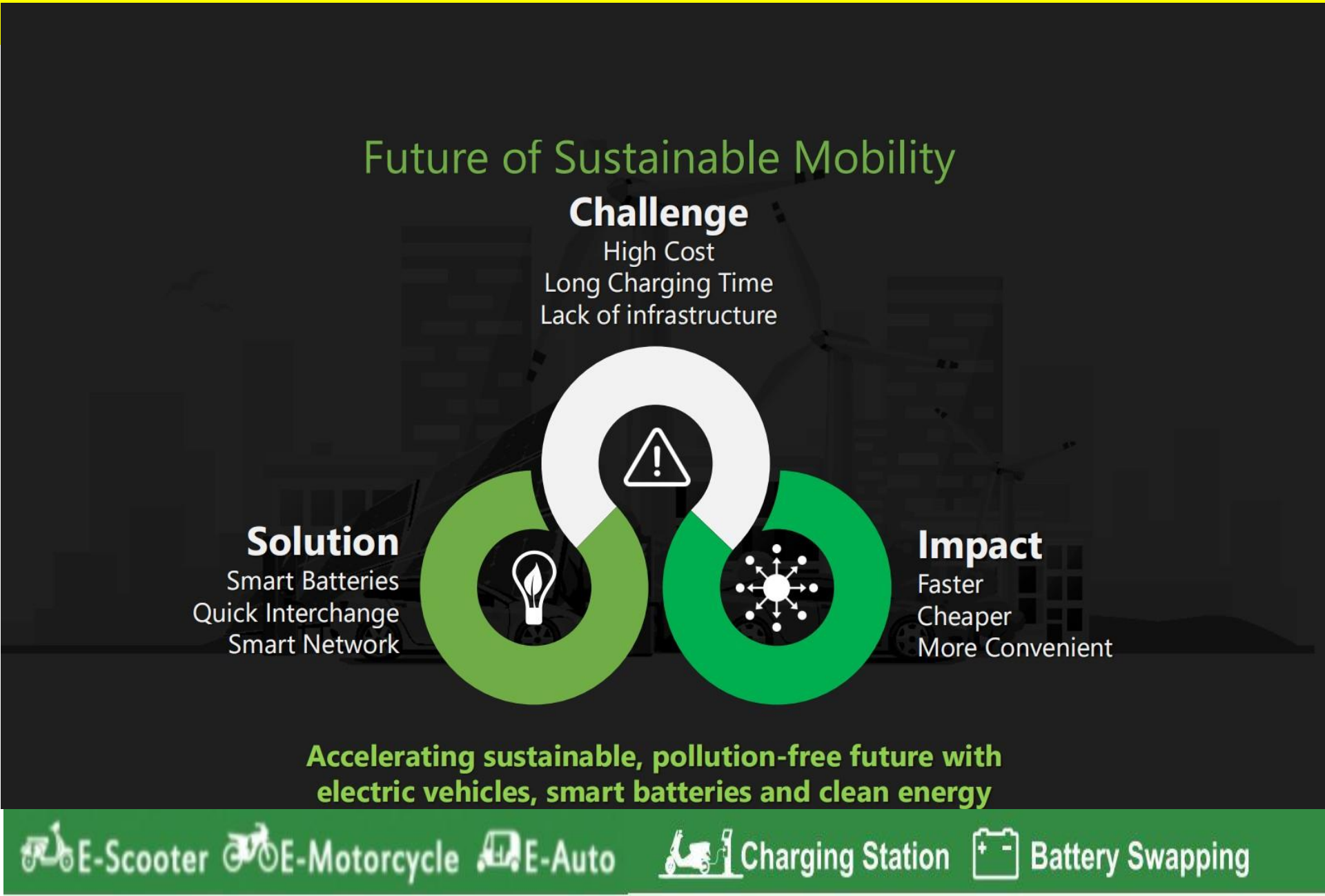


"Fuel" will be replaced by

- Smart Batteries
- Quick Interchange Stations
- Charging
- Solar

E-Scooter E-Motorcycle E-Auto Charging Station Battery Swapping

Future Sustainable Mobility



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ONE STOP SOLUTION *For* ELECTRIC VEHICLE

Thank You..,!

Coming together is a beginning;
keeping together is progress;
working together is success.

-Henry Ford