



E-MOBILITY

CENTRE OF EXCELLENCE



CENTER OF EXCELLENCE GREEN MOBILITY

SERVICES & FACILITIES

EV /HEV SERVICES

E-Motor and Controller Characterization.

- 220 kW, 150 kW, 30 kW Motor Test bed

Traction Battery and BMS

- Characterization of Li-ion Cells, Module and Pack
- Battery Abuse Testing
- Electrochemical Impedance Spectroscopy / Analysis
- Battery & BMS Emulation
- BMS Testing



EV Charger

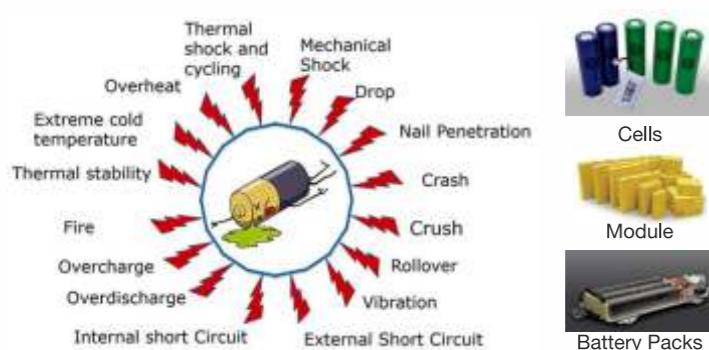
- EMC Electrical Safety and ENV Testing
- Protocol Validation (EVSE to EV and EVSE to CMS)

Electric /Hybrid Electric Vehicle Testing

- Performance on Chassis Dynamometer
- Vehicle Safety Testing (Electric Shock/IP/Water Effect Testing)

EMC Testing

- CAE Simulation for Chassis Design and Battery Pack
- Material Characterization for Lithium-Ion Battery



E-POWERTRAIN SERVICES



30 kW, 150 kW, 220 kW E-Motor Test bed With Environmental Chamber



E-POWERTRAIN VALIDATION

Hardware in Loop

- Multi disciplinary Plant model
- Real time simulation for Invertor, MCU, VCU

E-Powertrain Validation

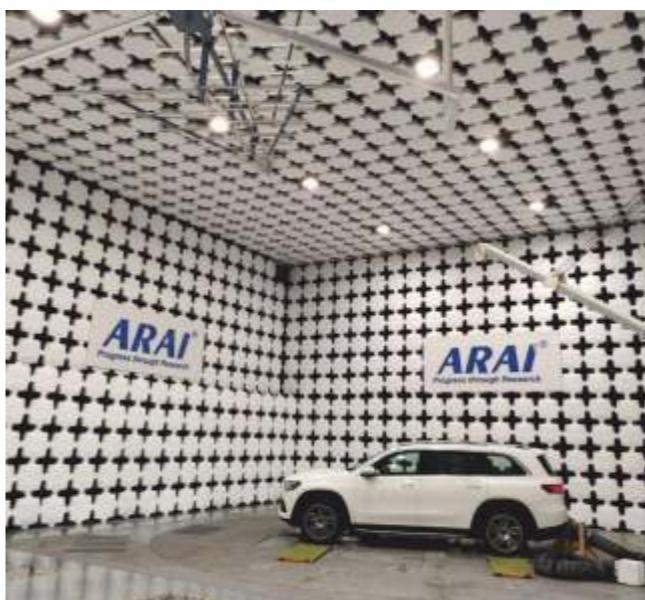
- Net Power, Continuous Power and efficiency
- Reliability, durability and overload capacity.
- Dynamic behaviour and dynamic measurements.
- Testing of regenerative braking, Thermal Characteristics

Vehicle in Loop

- E-powertrain Components in Machine-in-loop
- Setup for Accelerated Development process.
- Development of Vehicle Control Unit Software and Validation of various algorithms with Real and Emulated Components.
- Integration of Electric Vehicle components in Lab Environment and Simulation of Real-world Conditions.



ARAI'S STATE OF THE ART VEHICLE EMC FACILITY



Chamber Dimensions	26m X 18m X 9m
Vehicle Entry Gate	4m X 4m
Dyno Axle control	2 active axles, for vehicles with rear /front or four-wheel drive
Turn-Table Diameter	9 m
Dynamometer Axle Load	12,000 kg per axle
Radiated Immunity	150 V/m from 100kHz to 6 GHz
Radiated Emission	EMI Receiver along with suitable antennas for the frequency range 9 kHz to 18 GHz
Provisions for EV/HEV testing	Grid compatibility testing like Harmonic, flicker, EFT, Surge, Power fail simulation, etc. Suitable high voltage AC/DC RF filters for integration of battery simulator, AC/DC chargers, etc.

Services	Vehicle / devices
CMVR Type Approval	All types of 2 & 3 Wheelers
EMC control plans & Guidelines	All types of Passenger cars
Pre-compliance & Compliance Testing	HCVs up to 9m length
Failure Analysis & Design improvement	Construction equipment, Agricultural Tractors & Gensets
Utilization of facility for development & trials	Industrial/ Medical electronics, Military equipment & Telecommunication devices

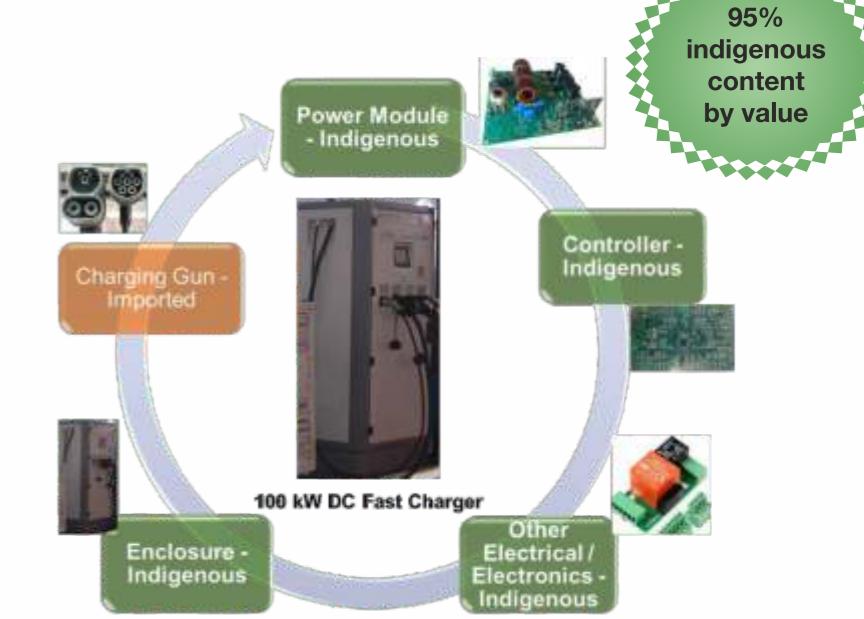
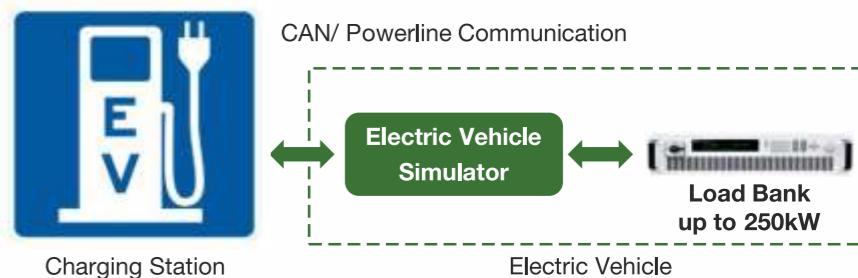
EV CHARGING – INFRASTRUCTURE SERVICES

- EV charger Technology know-how transfer
- EV and EVSE Simulation for Interoperability
- Development of Charger Control Unit for EV
- Charger testing and Validation
- Grid compatibility testing
- OCPP Back End Simulation



ARAI developed AC and DC chargers for Indian operations

Golden Simulator for ensuring Interoperability (In house development)



Certification Services for xEV



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The Automotive Research Association of India
(Affiliated to Ministry of Heavy Industries, Govt. of India)

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