



Tricare EV & Renewables

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SCAN ME



Electric Mobility Solutions

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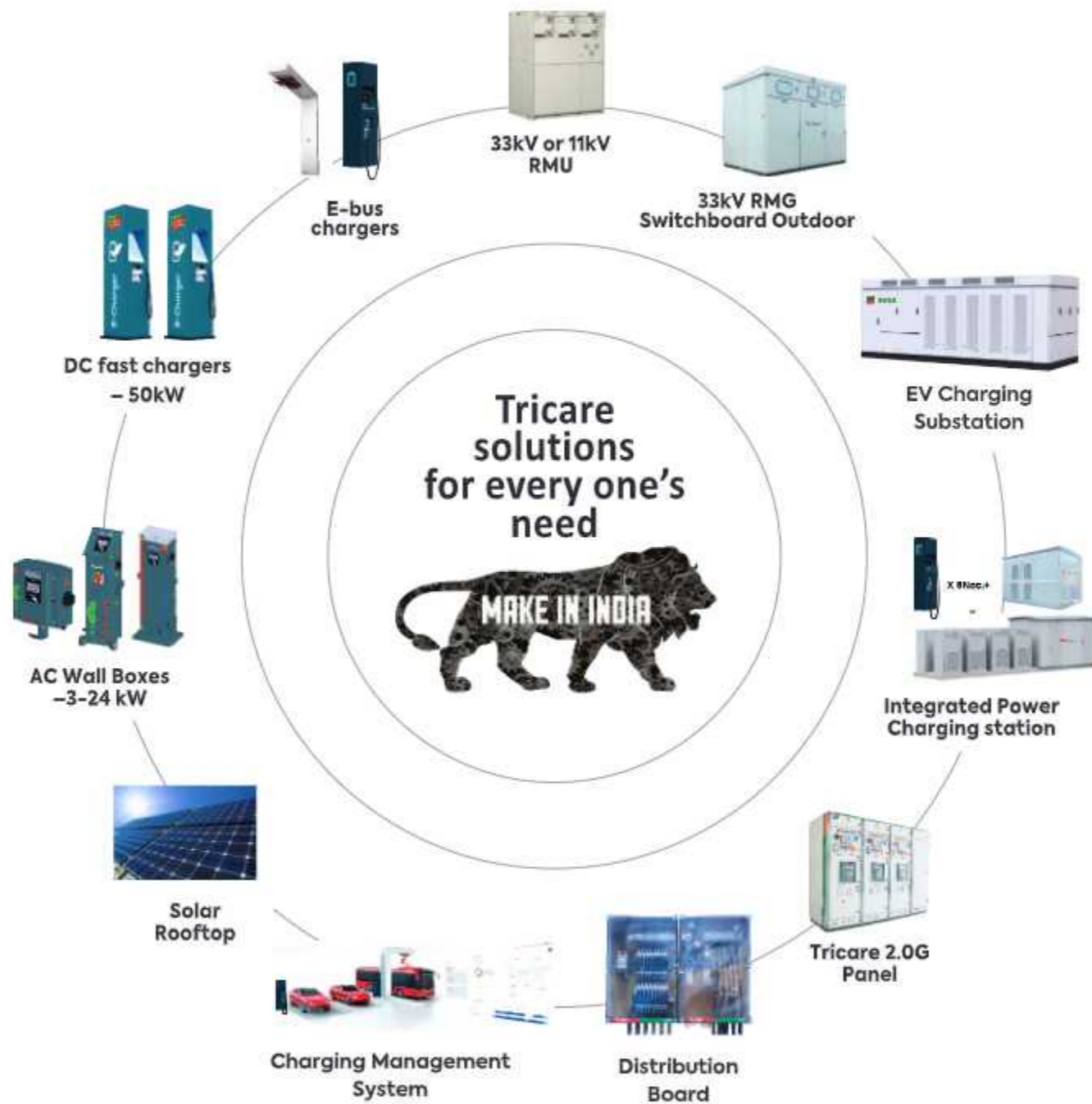
Smart Electric Mobility

Welcome to a TriCare world, a journey built on innovation and imagination. A world touched by the Intelligence of our superior technology. Come and experience the latest technology & research, how we build power and move the world with our attitude to change.



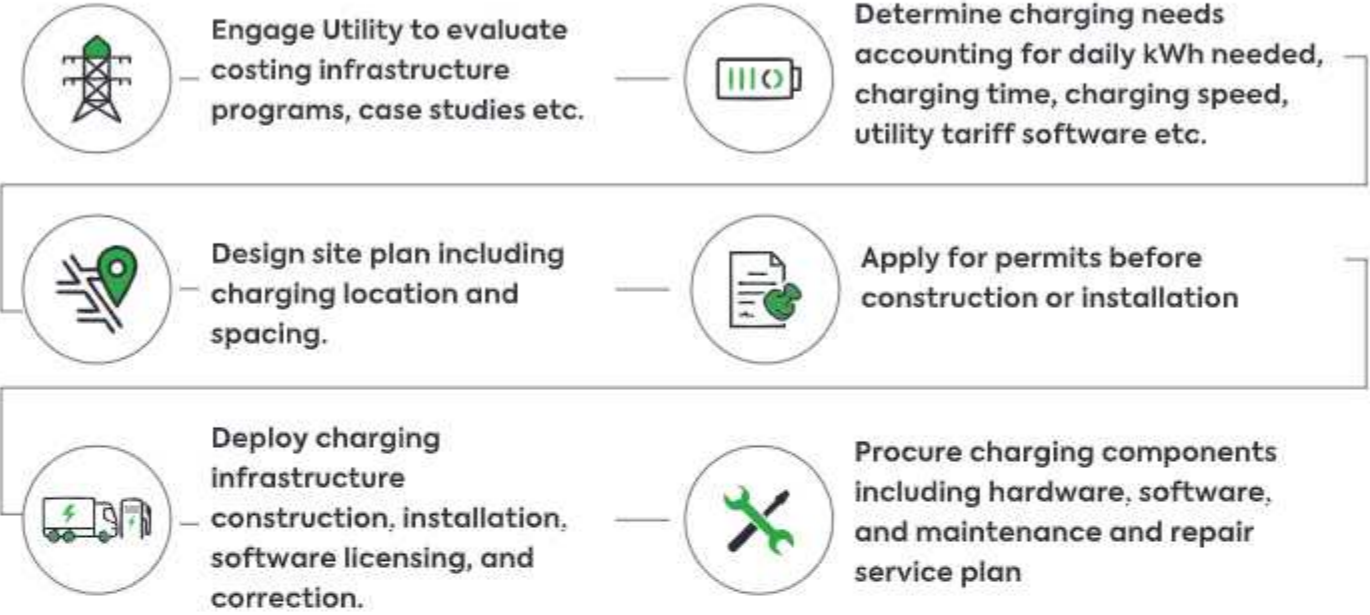
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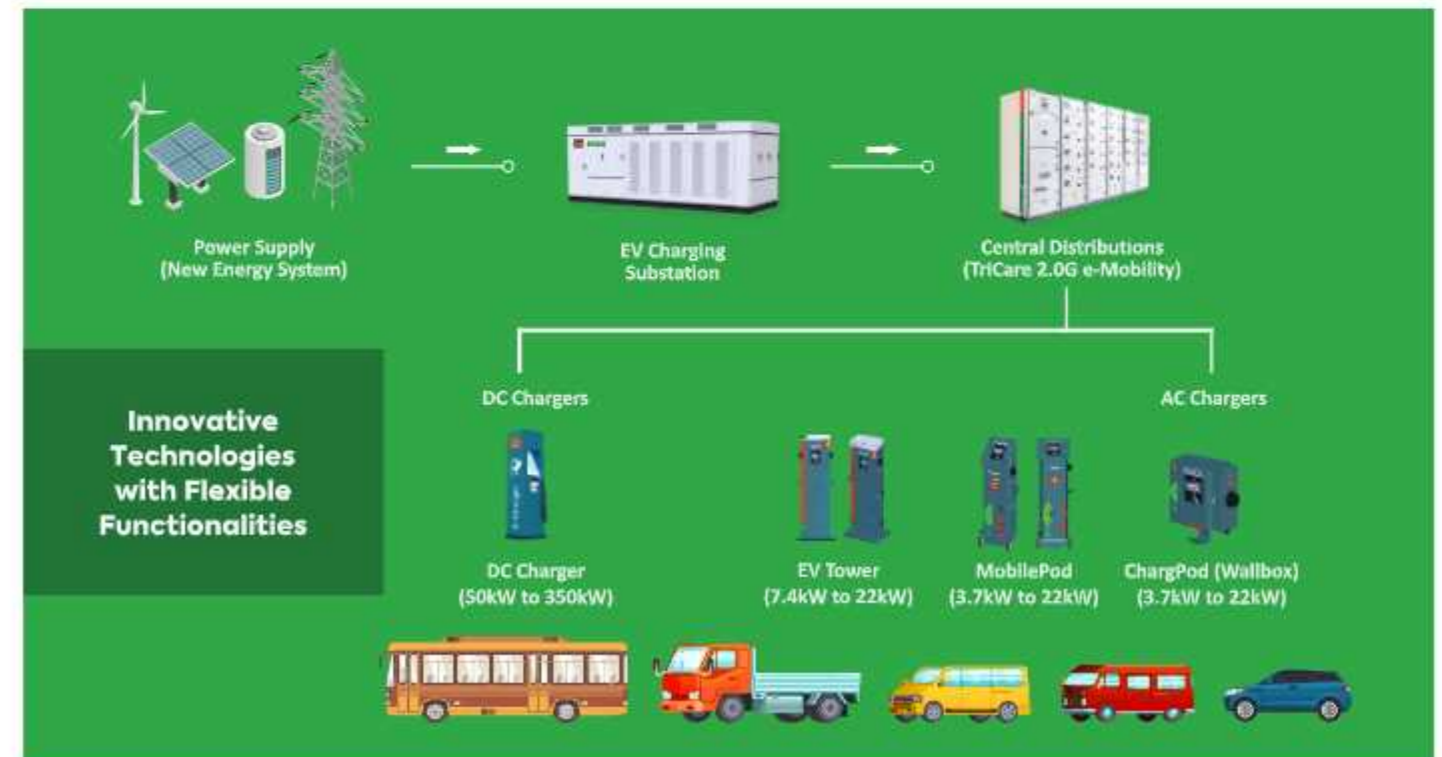
Process we follow

EPC Solutions



Services Offered

Design Consultancy | Project Financing | EPC Services
Operation and maintenance



11kV RMU



Item Description	C-module		F-module		V-module	
	Switch Disconnecter	Earthing Switch	Switch Fuse Disconnecter	Downstream Earthing switch	Vacuum circuit breaker	Earthing Switch
Rated voltage kV	12/17.5/24	12/17.5/24	12/17.5/24	12/17.5/24	12/17.5/24	12/17.5/24
Power frequency withstand voltage kV	28/38/50	28/38/50	28/38/50	28/38/50	28/38/50	28/38/50
Impulse withstand voltage kV	95/95/125					
Rated current A	630/630/630				630/630/630	
Breaking capacities:						
active load A	630/630/630					
closed loop A	630/630/630					
off load cable charging A	135/135/135					
off load transformer A						
earth fault A	200/150/150					
earth fault cable charging A	115/87/87					
short circuit breaking current kA					21/16/16	
Making capacity kA	62.5/52.5/52.5	62.5/52.5/52.5		12.5/12.5/12.5	52.5/40/40	52.5/40/40
Short time current 1 sec. kA	25/-/-	25/-/-		5/5/5	21/16/16	
Short time current 3 sec. kA	21/21/21	21/21/21				21/16/16



33kV RMU



Item Description	C-module		F-module		V-module	
	Switch Disconnecter	Earthing Switch	Switch Fuse Disconnecter	Downstream Earthing switch	Vacuum circuit breaker	Earthing Switch
Rated voltage kV	36/40.5	36/40.5	36/40.5	36/40.5	36/40.5	36/40.5
Power frequency withstand voltage kV	70/95	70/95	70/95	70/95	70/95	70/95
Across disconnecter kV	80 / 110		80 / 110			
Lightning impulse withstand voltage kV	170 / 185	170 / 185	170 / 185	170 / 185		170 / 185
Across disconnecter kV	195 / 215		195 / 215			195 / 215
Rated current A			200/200		630/630	
Breaking capacities:						
active load A	630/630		200/200			
closed loop A	630/630		200/200			
off load cable charging A	20/21		20/21		50 (Class C1)	
earth fault A	60 / 63		60 / 63			
earth fault cable charging A	35/36		35/36			
Transfer current A			840 / 750			
Short circuit breaking current kA					20 / 20 (Class E1,S1)	
Making capacity kA	50 / 50 (5 times)	50 / 50 (5 times)		2.5 / 2.5 (5 times)	50/50	50/50
Class (Electrical endurance)	E3 / E2	E2 / E2		E2 / E2	E1 / E1	E2 / E2
Short time current 1 sec. kA	16 / 16	16 / 16	-/-	1/1	16 / 16	16 / 16
Short time current 3 sec. kA	16 / 16	16 / 16			16 / 16	16 / 16
Internal arc classification IAC AFL, 1s kA	20 / 20		20 / 20		20 / 20	



Electrical Vehicle Charging Sub-Station (EVSS)



Introduction

EVSS is the unique product developed for EV Charging stations considering the Spl. requirements of the application.

Electrical Vehicle Sub Station, better known as EVSS is a unitized solution consisting of Medium Voltage Switchgear, Step Down transformer, Low Voltage distribution switchgear panel, APFC panel etc requirement.

Available Options

- System Primary Voltage – 3.3kV / 6.6kV / 11kV / 33 kV, 3 Phase 3 Wire
- System Secondary Voltage – 415 Volt, 3 Phase 4 Wire
- MV Side – Single VCB, 1 Isolator + 1 VCB, 2 Isolator + 1 VCB, 3 Isolator + 1 VCB, 2 VCB, 3 VCB
- MV Metering – Yes available with upto 0.2 Class Accuracy.
- Communications are available on both MV & LV Side as per the requirement.
- LV Panel for protection and distribution can be customized as per the actual customer requirement.
- No of feeders can be accommodated.
- 2 Rows of Upto 6-7 Vertical LV Panel can be accommodate.
- CMS (Charging Management Software) and EMS (Energy Management software) are also available.
- Safety equipment's like Fire Extensors, Rubber Mat, First Aid Kit, Fire Alarm System etc are available.

Integrated Power Charging Station

Integrated Power Charging Station

Completely factory made Unitized solution for EV Charging solution having capacity up to 8 Units of chargers having capacity up to 315kW each with integrated on board supply distribution, Low Voltage Power Distribution Panel Board, Automatic Power Factor Correction Panels for power quality improvement and compensation of no load losses, Power Distribution transformer up to 2500kVA capacity and Medium Voltage Switchgear Panel of 11kV OR 33kV rating as per the requirement.

Benefits

- Portable
- Skid Mounted
- Complete solution for charging of all kind of EV either it is a 2 Wheeler, 4 Wheeler, Electric Bus OR Truck. All solutions are available.
- No need of any major civil work,
- No need of any major electrification work, cable laying etc.
- All communications, EMS, CMS etc services are also available as per the requirement.



TriCare 2.0G Modular LV Switchboard

Environmental friendly product design



TriCare is up front in dedicating considerable resources to achieving sustainable development and environmental protection objectives. Confirmation of this is provided by all the company production sites having obtained ISO 9001 quality certification and ISO 14001 environmental management system certifications.

Tricare 2.0G is completely different in LV switchboards and one of its kind. We have design our product in such a way that it has all the latest features and compatibilities along with flexibilities to adopt customer requirements as well. Our Switchboard is completely Modular, Welding less construction, made of GI Sheet, all internal parts does not required any Chemical OR painting process which safes the environment, life of our team associates and also increases the life of switchboard up to 20 Years.

IP Protection up to 55 can be achieved which protect the all internal electrical equipment to work safely and does not allow any foreign particle to enter inside the enclosure.

Construction Highlights

- 100% modular structure design.
- Flexible Horizontal / Vertical Bus bar and Cable compartments configuration.
- Compartmentalized up to Form 4.
- Ingress Protection Up to IP 55
- Flexible Compartment sizes starts from 200mm up to 2000mm in multiple of 100mm.
- Panel can be expendable in all 3 Directions and bayed together.
- Standard colour shades. SIEMENS Grey RAL 7035 for all doors, covers, Top & Bottom. Black RAL 9000 for Base Channel.
- All Internal Partitions, Trays, Segregations, Channels etc. will be without paint, made of GI Sheet with 275 GSM coating.
- Welding less construction
- Fully Folded design
- Kit form Structure
- Standard Compartment sizes.
- Possibility of changes is very easy and adoptable.

Benefits of the modifications in the design

Due to the modifications, the TriCare 2.0G Panels immensely reduces the time taken in the process of manufacturing of every unit, which makes the delivery time shorter as compared to the conventional LT Panels. The risk involved in welding process and the possibility of weak joints due the improper joints are also eliminated completely. The cost and the time involved in the process of unpainted area is also saved. The toxic emission to the nature and wastage is also reduced to the considerable amount.



33kV RMG Switchboard Outdoor

Supply System	33 Kv
Rated Current	1250 A to 3150 A
Rated Frequency	50 Hz
Short Time Withstand Current	31.5kA For 3 Second
Degree of Protection Overall	IP:55
Earth Switch	Yes, Optional
Applicable Standard	IEC 62271-200



*Customized sizes & configuration are also on request

*Specially designed for Solar & Wind Energy

TriCare Distribution Boards (DB's)

The distribution boards' offered by TriCare is a combination of the most advanced engineering technology & aesthetic design to fulfill each and every possible application. It incorporates the most effective compact designing which ensures the maximum convenience for both utilization and installation. The DB's are fabricated with utmost precision and passion in well-equipped plant by the team of experts in their field.

Construction

The finest quality of CRCA steel enclosures are used for fabrication, which gives DB's a strong build and a flawless finish. The desired numbers of MCBs and rating can be fitted conveniently at site except for the one to four pole enclosures on duly fitted Din Channel, Neutral Link, Earth Bar and Bus Bar along with detachable grand plates.

Painting Process Followed

Distribution Boards are coated with high quality paint and baked at a precise temperature for a lasting coat. Before powder coating, the housing goes through an Anti-Rust Conditioning in an eight tank process which ensures a smooth and lasting finish with protection against corrosive atmospheres. All types of Distribution Boards are available in Single & Two tone colors.



EV Chargers



EV Chargers



Electric Vehicles are the new need for the regular traveling requirements, hence the effective charging system for such vehicles becomes the most vital factor for the EVs to be successful in the country. Our team is working on fulfilling the same requirement by embedding the latest technologies to manufacture and establish our own charging stations at public and private places for the ease of people to charge their vehicles at the most convenient location where they can spend some time for their utilities while their cars gets charged.

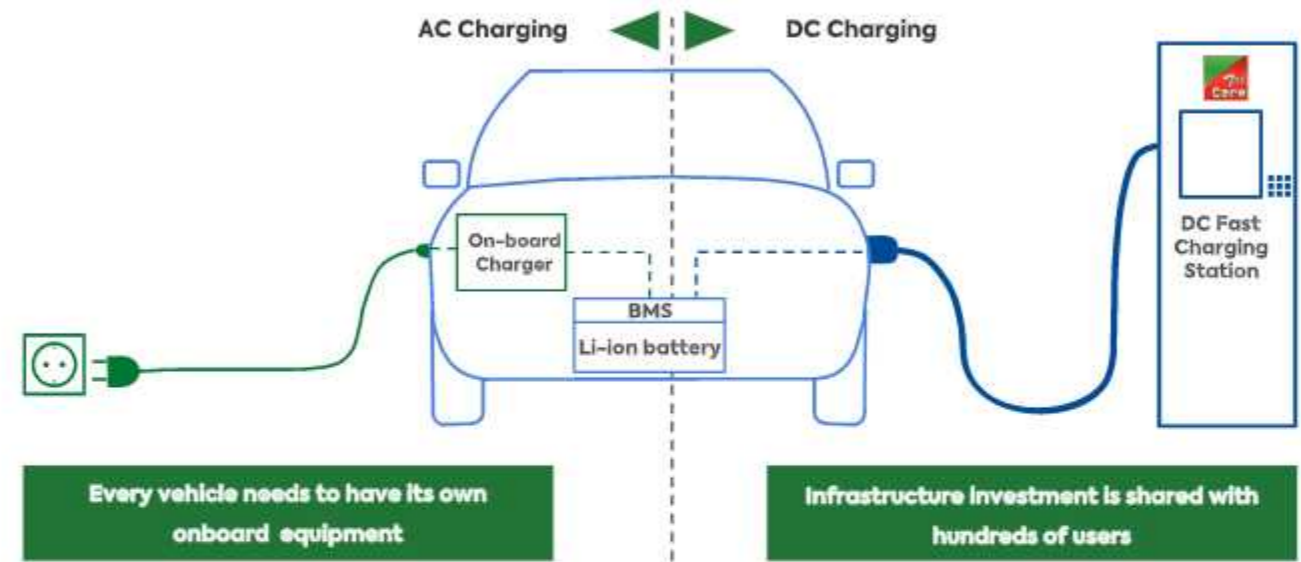
We offer AC Home Chargers, DC Fast chargers as charging stations on roads and highways etc. with variable charging capacity ranging from 7kW to 600kW.

We have collaborations with team of experts in the related field in hardware and software for our product, to provide the best in industrial solutions for EV Charging stations

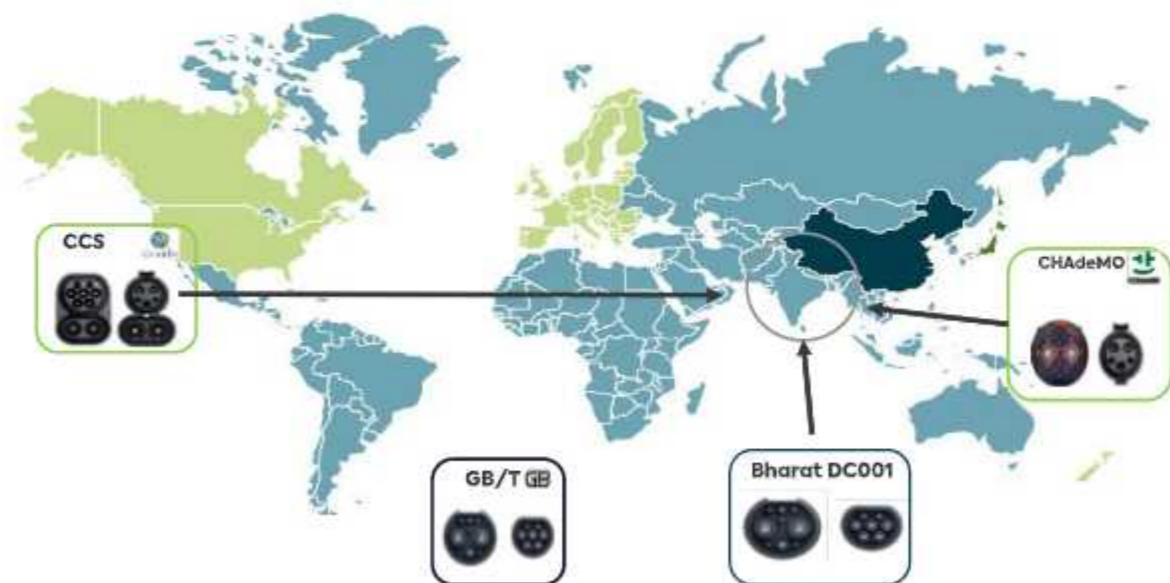
Different types of EV Chargers we offer:

1. AC wall-box chargers:
 - 3-22kW
 - Charging time take up to 4-16 hours
2. DC wall-box chargers:
 - 20-25kW
 - Charging time take up to 1-3 hours
3. DC fast charger:
 - 50kW
 - Charging time take up to 20-90 minutes
4. DC High Power charger:
 - 150-350kW
 - Charging time take up to 10-20 minutes
5. Pantograph Up chargers: 150-300-450-600kW
6. Pantograph Down chargers: 150-300-450-600kW

AC Charging vs DC Charging



AC Charging vs DC Charging





EV Charging Standard

Primary types of Open charging standard



Slow AC (7 kW)

AC type 2 is mainly used for slow charge single phase upto 7kW destination charging



Medium Power DC (20kW to 50kW)

50kW CHAdeMO public charging is benchmarked for the next 5 years because of the existing installed Nissan Leaf base.



50kW 500V CCS2 will be on every public fast charger for the foreseeable future as this is the most acceptable DC fast charging standard.



High Power DC (100kW & above)

>150kW 800V CCS2 will enter the market in low volume (starting end 2017) as a successor to existing high volume 50kW 500V CCS2. It will not replace 50kW CCS2.

TriCare: AC Chargers Portfolios

An intelligent TriCare EV Chargers (AC) for today and for the Future.

1. ChargPod



2. EV Tower



3. MobilePod



4. Digicharg



5. Bharat AC001



TriCare: DC Chargers Portfolios

An intelligent TriCare EV Chargers (DC) for today and for the Future.

1. Rapid Tower



2. Rapidpod



2 and 3 Wheelers Charger



TriPort

Battery Swapping Station



TriConnect Station (Upcoming)



TriCare: Serving the growing EV Charger market



Cost of electric cars

Evs will be cheaper than internal combustion engine (ICE) alternatives in almost every market

01



Better for Environment

They emit less greenhouse gases and air pollutants over their life than a petrol or diesel car.

02



Global EV Sales

Electric vehicle (EV) sales are expected to reach 45 million units per year by 2040, with a total global EV stock of 323 million.

03



Passenger EV Sales

Passenger EV sales will account for 10 million by 2025, rise to 28 million in 2030 and 56 million by 2040.

04



TriCare Charghub is more than just charging: Networking, communication and control for all locations.

Use Cases



Residential



Office



Commercial



Public

TriCare: EV Chargers

Charge plug/Socket	Type 2 socket (European standard with shutter), Type 1 cable & plug for US
Locking	Optional socket actuator and lock release module
Power rating	Up to 22 kW
Standard compliance	ISO / IEC 62196, ISO / IEC61851-1 & -22, ISO / IEC15118 ready (Plug'n'Charge), energy management-capable

Communication

Mobile Network	2G (GSM, GPRS, EDGE), 3G (UMTS) & 4G (LTE)
Encryption	TLS
Protocol	OCPP 1.5 / 1.6 (with binary option, roaming capable)
Functionality	Authorization, remote-start, configuration, maintenance, monitoring, operating

User Interface

Status Display	LED array (green, yellow, blue), LCD Display optional
Authorization	RFID (Mifare Classic, Desfire EV 2 & other 13.56 MHz RFID standards)

Metering

Integrated Meter	MID Meter, other smart meters are optional
Remote Meter Access	Remote meter reading SO & Modbus, meter status visible in backend

Safety

RCD	Type A, integrated DC 6mA sensing system for Type B RCD
Degree of protection	B
Impact	IK0

Mounting

Housing	Aluzinc, various colours
Dimensions (L x W x H)	200x 250 x 1050 mm
Mounting	Lamp post, wall and pole for standalone solution
Power inlet	Attached cable, depending on power rating

Inputs/outputs and operation

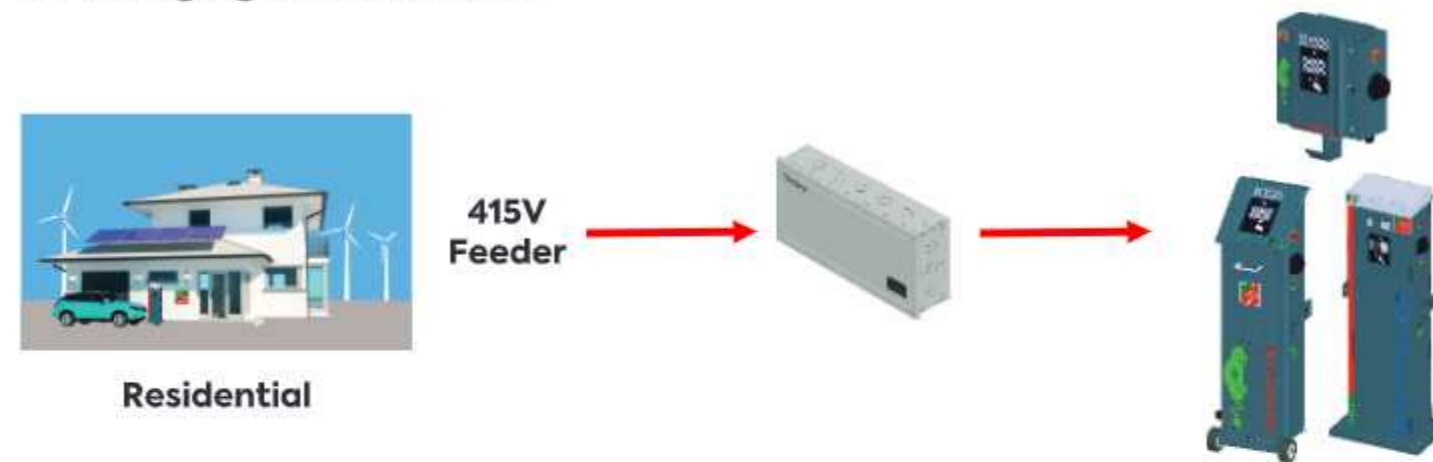
USB1	USB devices (Ethernet, WLAN, ...)
SIM card	micro-SIM

Features (optional)

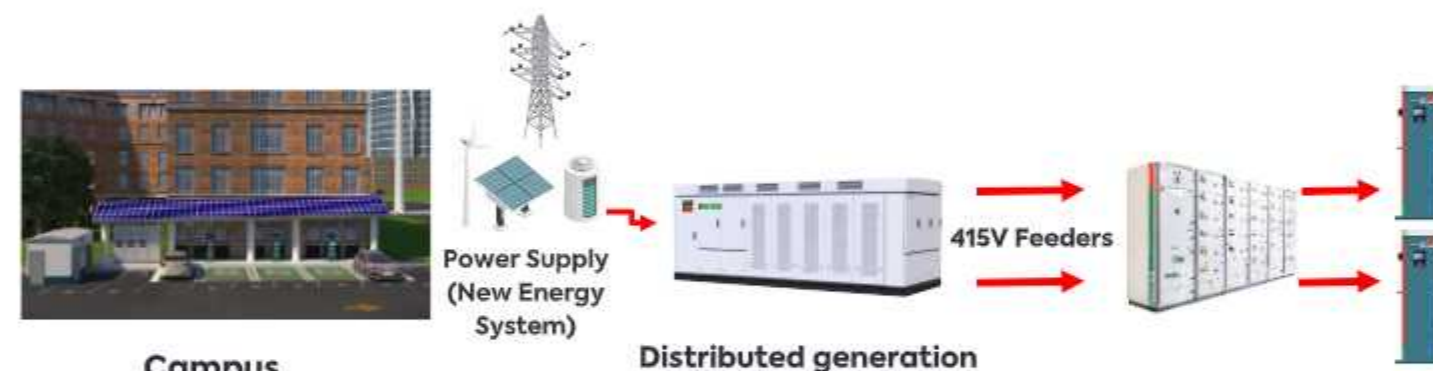
Communication	Master for Master/Slave communication with up to 250 Slaves (USB, Ethernet, WLAN, RS485)
Load management	Customer specific & dynamic distribution of power resources
Energy management	Yes
Automatic release	Automatic charge plug release in the case of a power blackout
Grid connection	Directly connectable to the grid
Configuration & Firmware	via USB or remote via backend



Market Offering EV Charging Infrastructure

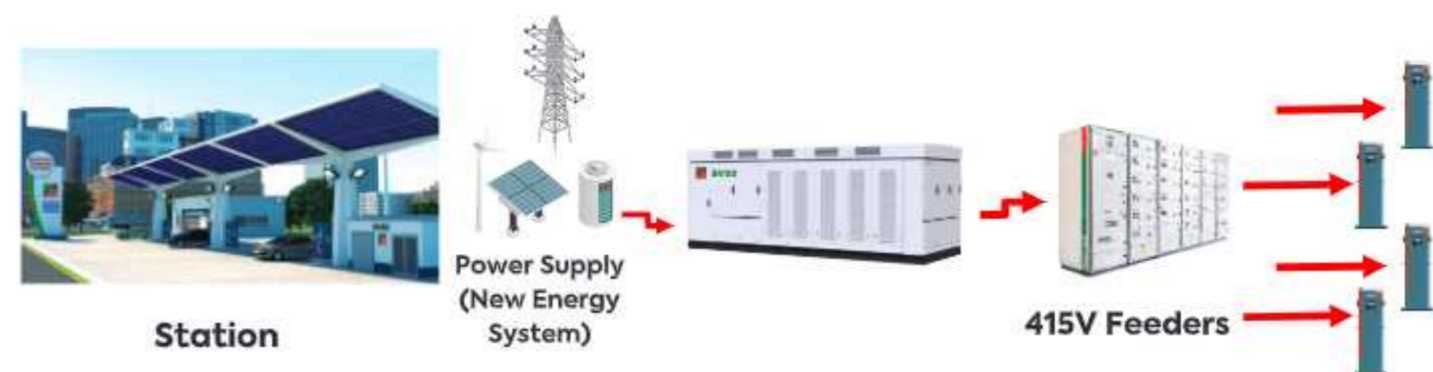


Residential



Campus

Distributed generation



Station

Market Offering

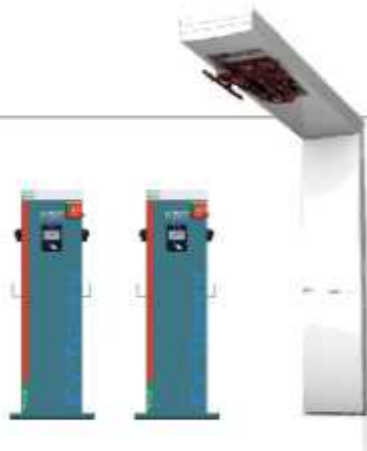
E-Bus & Logistics

3 main ways of charging buses



Pantograph Down (PD) –OppCharge

CCS 2 connector



Pantograph Up (PU)



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The perfect time to charge an electric vehicle. Employees spend up to 70% of their daytime at work, visitors spend 20-70%. With the increasing number of electric vehicles, the expectations of responsibility and hospitality that companies should provide are changing.

- + Provide an additional benefit for your employees
- + Reduce the carbon footprint
- + Convey the green credentials of the company



The perfect opportunity. Until now, drivers just searched for a safe and convenient place for parking their car. Now, charging possibilities become a completely new motivation for visiting a parking space or spending a bit more time.

- + Increase the utilization & revenue of parking spaces
- + Attract customers with a point of interest (POI) destination
- + Set a statement for sustainability & innovation
- + Provide an additional benefit for your employees
- + Reduce the carbon footprint
- + Convey the green credentials of the company

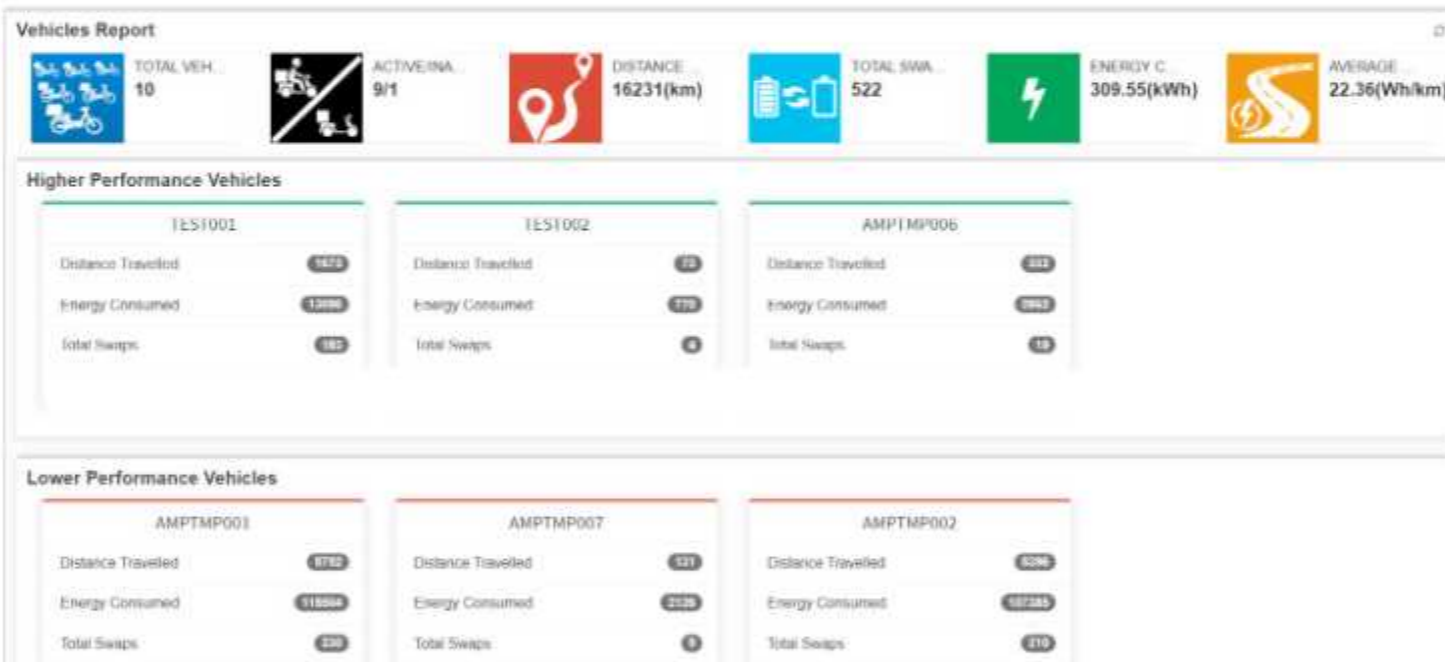
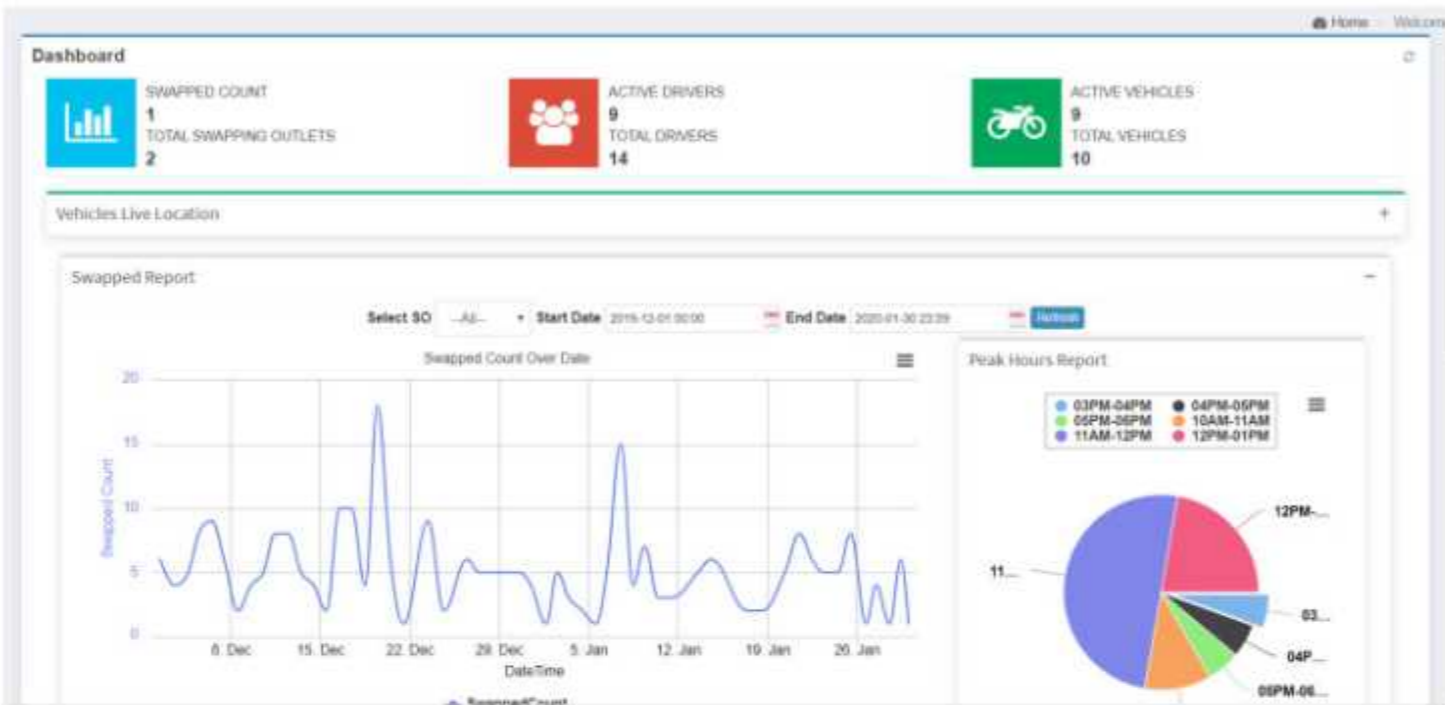


Higher Performance Batteries

ID	Distance Travelled	Energy Consumed	Total Swaps
INCB0010203F0106509	5	5	4
INCY0010203H0105209	271	4423	10
INCY0010203H0109809	379	4791	27
INCY0010203H0105709	363	1348	28

Lower Performance Batteries

ID	Distance Travelled	Energy Consumed	Total Swaps
INCY0010203H0109309	217	3003	18
INCB0010203F0108109	1140	38220	87
INCY0010203H0110009	102	1084	5
INCY0010203H0108809	1088	10945	48

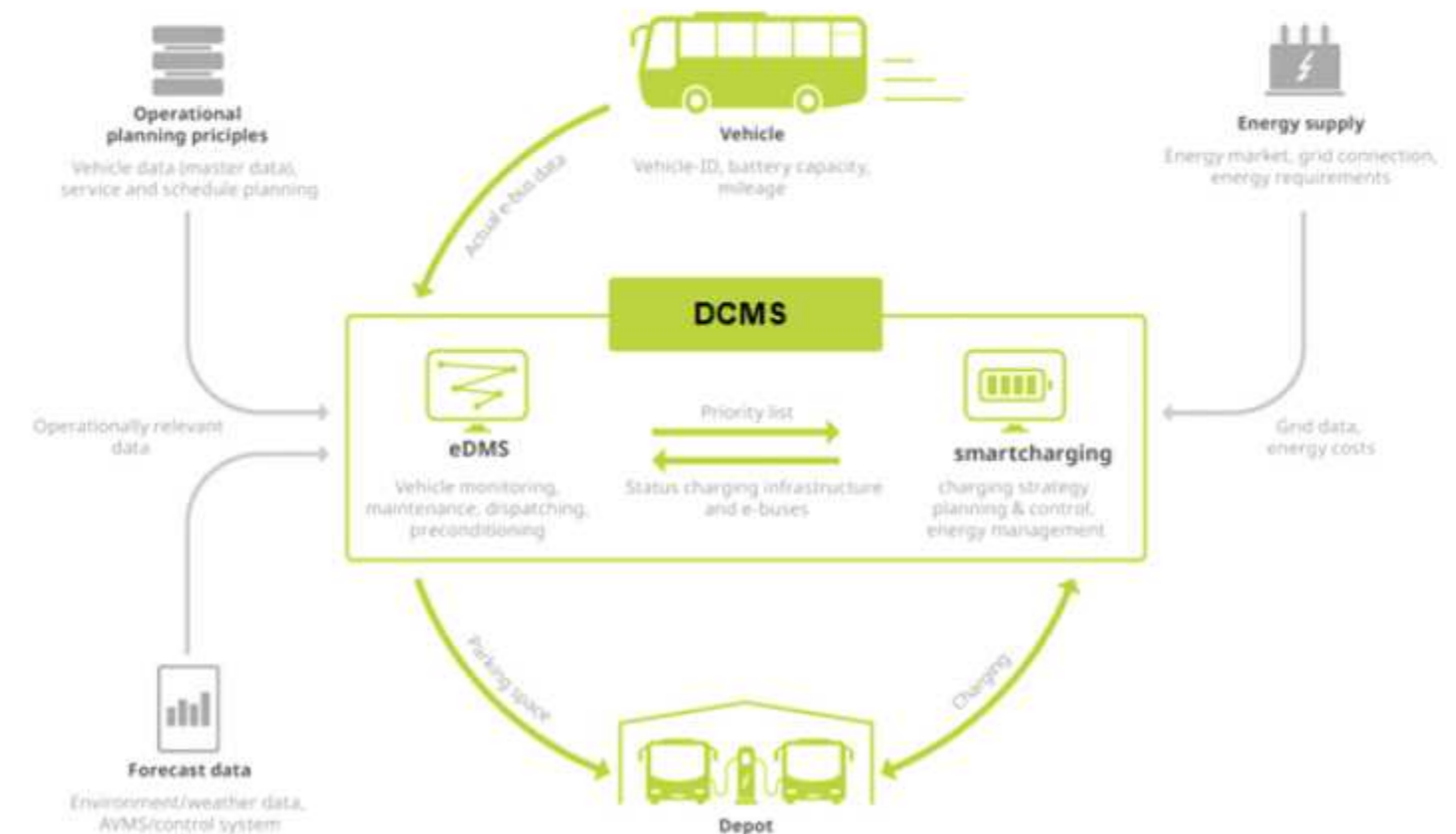


Depot Charging Management System

DCMS provides you with an integrated software solution that leverages expertise in both EV transport processes and energy supplies.

The system combines the depot management module with the charging management System makes its smart-charging software.

- Vehicle monitoring during operation
- Charging process control and automatic vehicle dispatching
- AI-based forecasting of ranges, energy consumption and demand
- Parking space and charging station allocation
- Preconditioning
- smart-charging - Dynamic load and charging management.
- Planning the charging process
- Charging control and trickle charging
- Monitoring the electrical system in the depot
- Optimizing the energy supply
- Support of grid-assistive operation



Connected Services

Tricare provides Charging infrastructure to de-risk and accelerate the adoption of electric buses, trucks, and passenger vehicles by public and private fleets through its simple price-per-kms-driven model.

Tricare provides a fully managed charging solution that enables authorities, OEMs and commercial fleets to deploy electric vehicles confidently & without hassles.

Tricare handles all aspects of charging operations on behalf of fleet owners and are optimised for the lowest electricity costs.

Electric bus charging infrastructure is a capital intensive and will have significant impact on the electrical network.



Reliable 24/7 connectivity is fundamental for a commercial operation of a network of chargers!

Key Considerations In Planning The Charging Infrastructure

- Model, simulate and optimise charging strategy
- Minimise capital and operational costs
- Optimise number and type of chargers
- Assess impact on existing electrical network
- Evaluate onsite generation and storage options
- Electric Vehicle Fleet Management Software - Bus/Heavy Vehicle like Trucks.

Connectivity of EV Chargers

To successfully run a commercial charging network in a dynamic environment it is crucial to connect EV chargers to the Internet.

Connectivity helps EV charging network operators to:

- Remotely monitor and configure charge points
- Service the equipment efficiently and with minimal operational effort
- Increase charger uptime and the reliability of their charging network
- Build a scalable and flexible charging infrastructure
- Minimize investments in IT Infrastructure & Backend Software
- Up-to-date charging infrastructure with software updates
- Support EV drivers in case they have issues
- Adapt business and pricing models over time

Evolution of Electric Bus





In the System architecture roadmap: (for Understanding the electric bus industry phases)

Transition Phase: Present Scenario In India

Technology adoption:

- Established fleet transition plans
- Mixed fuel vehicles fleets
- eBuses fully part of revenue service

Industry & technology standardization:

- Defined & commonly implemented
- Technology reliability is expected

e-Bus charging infrastructure:

- Standardized & interoperable
- Adaptable and scalable architecture
- Smart charging required as e-Fleet grows

Full-scale electrification phase: Upcoming possibility

Technology adoption:

- Vast majority of fleet procurement programs include e-Buses

Industry & technology standardization:

- Technology improvement continues with lessons learned from the field

e-Bus charging infrastructure:

- Optimized energy and asset usage
- Grid-integrated
- Energy Management System
- Energy Storage
- Contingency plan & on-site generation

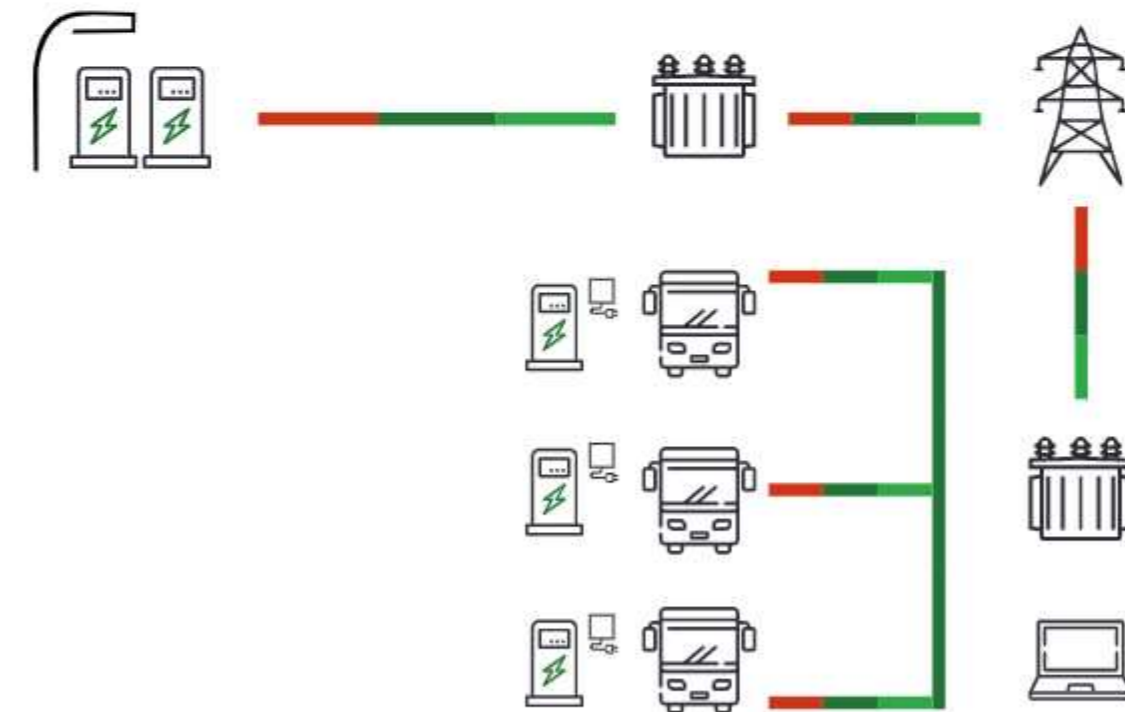
Understanding Transition phase

Evolutionary and adaptable

Key charging infrastructure concepts:

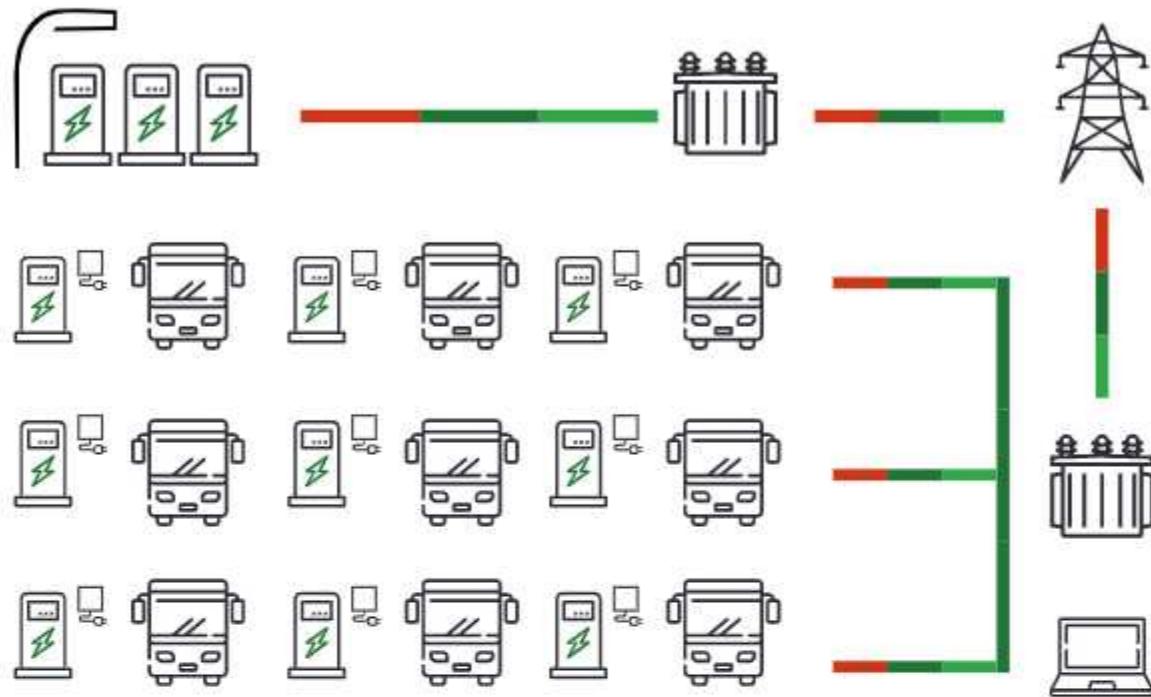
- Scalable
- Smart charging solution
- Modular power architecture
- Standardized to ensure compatibility with multiple vehicle OEMs
- Remote monitoring & control
- Fleet & power management
- Often brown field projects
- Modular physical architecture
- Major civil & electrical works -> initial phase

First part in timeline of Transition Phase





Middle part in timeline of Transition Phase



Understanding Full-scale electrification phase

Comprehensive and grid-integrated:

Key charging infrastructure concepts:

- Optimized asset utilization
- Smart charging solution
- Cab Services/Fleet Management System (FMS)
- Integrated grid solutions
- Energy Management System (EMS)
- Energy Storage & On-site generation
- V2X for specific use-cases
- Fully integrated into your operations
- Digitized operations + electrified depot
- Often green field projects

Turn lessons learned from previous phases into a comprehensive solution

Last part in timeline of Transition Phase

