



Jema
Irizar Group

innovative
energy



Jema | Innovative Energy

RFI – Electric charging infrastructure for 200 articulated buses at Stubberud

Ruter#



> ABOUT JEMA

> Jema is a technology company specialized in the **design and manufacture** of customized **energy conversion systems**.



San Sebastian



More than 65 years of experience



3 business sectors



More than 400 installations worldwide



> **THE SECURITY OF A LEADER**
IRIZAR
GROUP



130
years of
history



More than
3.350
employees



13 production plants
around the world



More than 750
million
Euros sales in 2019



1st
electromobility
factory in
Europe





Renewables



Emobility

SECTORIAL
SOLUTIONS



Big Science

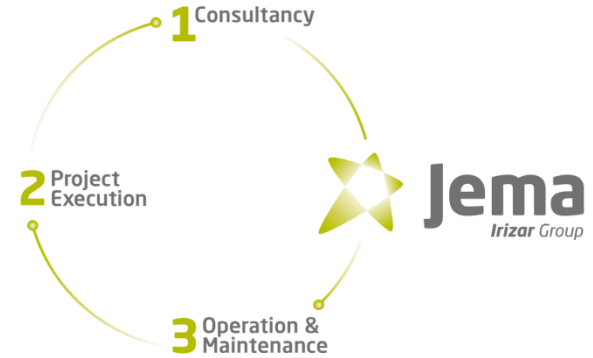
> WHAT WILL YOU FIND IN



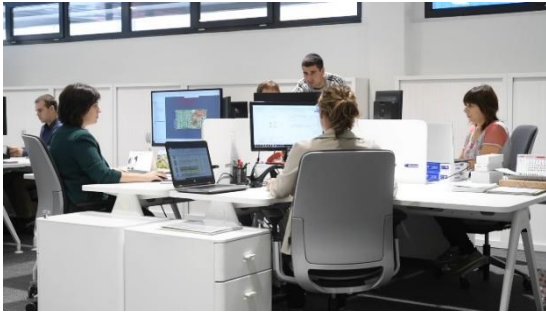
More than 65 years of experience,
flexibility, proximity



Member of the standardization committee



Project management



Jema's engineering



A 360° knowledge
of the electromobility sector



After-sales service

> EMOBILITY

- > More than 200 charger stations installed.
- > Production in the first European Facility dedicated to electromobility at 100%
- > Opportunity charger of 85% SOC in less than 5 minutes.



PRODUCTS

- > ECI CHARGERS
- > I2E CHARGERS
- > PANTOGRAPH CHARGING



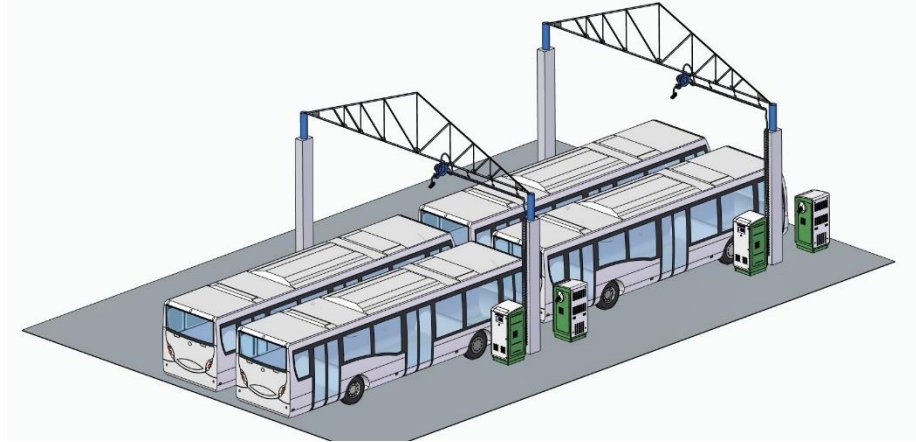


>
JEMA'S
ENGINEERING

> JEMA'S ENGINEERING

Jema's engineering department works on the following points:

- > Charging analysis and study
- > Simulation and analysis of different scenarios
- > Installed power recommendation
- > Charger power recommendation
- > Study of implementation in the depot: layout
- > Depot communication network study
- > Intelligent charging management system adaptable to operating conditions
- > Electrical studies and acceptance permits management from electricity companies for medium voltage connections
- > Documents required for all electrical connection permits



> JEMA'S ENGINEERING

- > Different opportunity loader solutions: concrete shelters, containers, underground solutions, integration of the shelters with the landscape.
- > Supply of convenient chargers
- > A set of hardware required to integrate the equipment previously listed in the selected location
- > A set of specific elements according to local standards
- > Integration in medium voltage containers or Shelters for electrical connections
- > A set of documents (electrical mechanical and maintenance program)
- > Coordination with different stakeholders (project owner, operator, etc)
- > Commissioning: setting of protections, validation on site
- > Preventive and curative maintenance



> SOLUTIONS FOR EMOBILITY



> SOLUTIONS FOR EMOBILITY

I2E CHARGERS



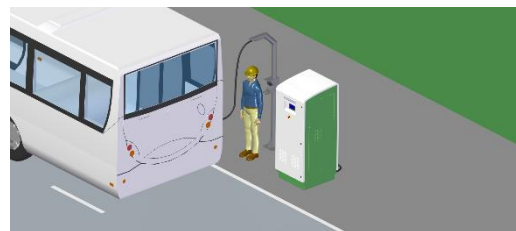
ECI SERIES CHARGERS



OPPORTUNITY CHARGERS



ADDITIONAL PRODUCTS



> SOLUTIONS FOR EMOBILITY



I2E CHARGERS

This family of chargers, based on an IGBT topology, is for the slow charging of electric vehicles.

- > Reduced maintenance time
- > Communication modules for remote control (MODBUS TCP) and local control with a touchscreen
- > Service life of more than 20 years, thus reducing your installation's carbon footprint.
- > Built-in COMBO 2 cable.

MAIN PROPERTIES

- > 80 kW to 100 kW outdoor and indoor charger
- > Not interoperable, conversion possibility
- > V2G and G2V functions
- > All battery states displayed on screen
- > Indoor and outdoor systems
- > Adjustable cable length

> SOLUTIONS FOR EMOBILITY



ECI SERIES

The ECI family chargers, with 50 kW of power, are modular and interoperable.

The premium charger solution is of modular design: 1x50 kW, 2x50 kW, nx50 kW.

2x50 kW means that two independent chargers in a single cabinet can charge two vehicles at the same time at a maximum power of 50 kW.

MAIN FEATURES

- > Interoperable according to IEC61851-1-23-24, DIN70121 and ISO15118 standards
- > Communication modules for remote control (MODBUS TCP or OCPP 2.0 protocol) and local control with a touch screen.
- > 8m cable or pantograph connection
- > Integrated Intelligent Load Management

> SOLUTIONS FOR EMOBILITY



OPPORTUNITY CHARGERS

Opportunity chargers (indoor and outdoor) power between 500 kW and 600 kW, allowing a vehicle to be charged to up to 85%* of SOC in less than 5 minutes.

CHARGING BY PANTOGRAPH

The charging stations are placed at strategic points in cities but there is also the possibility of the complete automation of slow charging in depots with a structure of contact gantries installed over the parking spaces.

The pantograph loading system allows to create cable free depots and provides more comfort for the moment of loading.



* Depending on the battery model

INDOOR OPPORTUNITY CHARGERS

Opportunity charger 500-600 kW, allowing a vehicle to be charged to up to 90% of SOC in under 5 minutes.

Main features:

- > Bidirectional for G2V and V2G energy flows
- > Opportunity chargers with 4-5 pole pantographs
- > Automatic pantograph contact
- > Possibility to completely automate slow charging in depots by installing and commissioning vaulted contract structures above the parking spaces.



OUTDOOR OPPORTUNITY CHARGERS

Turnkey solution opportunity chargers 500-600 kW, ready to connect to medium voltage grid or low voltage grid.

MAIN FEATURES

- > Container-based opportunity chargers.
- > G2V and V2G.
- > Opportunity chargers with 4-5 poles pantographs.
- > Outdoor opportunity chargers for a power up to 600 kW throughout the operating range.
- > Possibility of integrating the chargers in buildings of supply of a fully-equipped container for low or medium voltage connection.



> SOLUTIONS FOR EMOBILITY

MOBILE CHARGING STATION- MECI

> 20 kW

> Suitable as a backup charger

> Interoperable



ADDITIONAL PRODUCTS

In order to provide the complete equipment for the projects, we offer a series of additional ones that will help to adapting the facilities to the needs of the client.

> Cable Pole: possibility of Wallbox extensible pole of 100 m and additional pole of 2 m.

> Cable pole + Plug

> Mechanical protector





The smart charging system is a control center that efficiently manages all the charging conditions/restrictions in the depot, identifying the different charging needs of each bus to optimize the total power required.

Centralised management

- Daily reports
- Warnings
- Integration into the clients charging management system TCP IP of OCPP 1.6
- Remote monitoring
- Pre-Analysis for After Sales Service



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> EXPERIENCES

Métropole Amiens **France**



23 ECID 50 kW



6 ECI 600 kW



Smart charging system
included



> EXPERIENCES

EMT Madrid **Spain**

Charging infrastructure for the first 100% electric bus network in Madrid.



20 ECI chargers 100 kW



15 I2E chargers 80 kW



The charging infrastructure can be monitored remotely.



> EXPERIENCES

Luxembourg **Luxembourg**



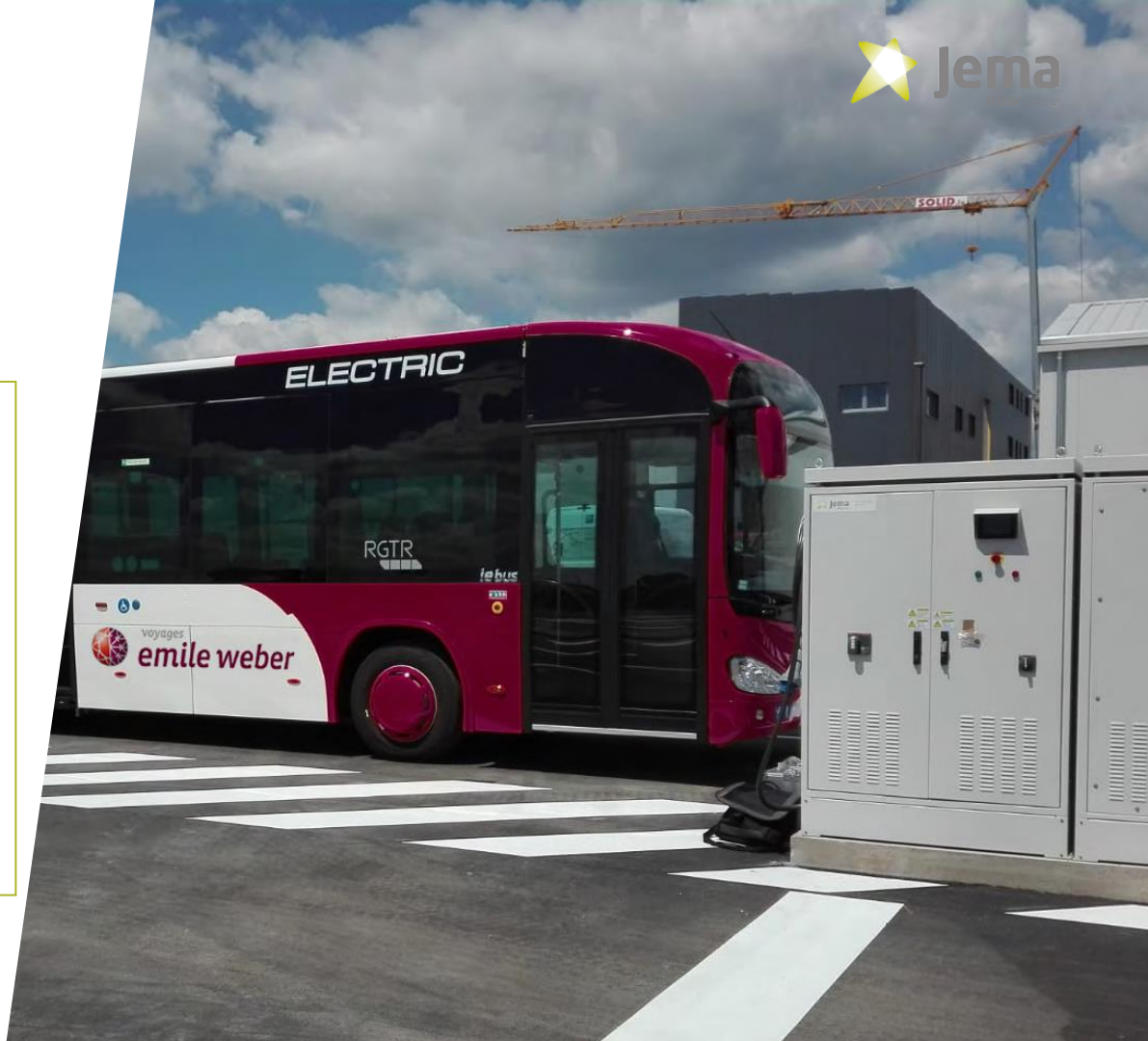
14 interoperable chargers ECI
100 kW for 12 meter buses



8 chargers I2E 80 kW



OCPP 1.6J



> EXPERIENCES

Schaffhausen Switzerland



7 ECID 50 kW
2 ECI 150 kW



13 ECI 600 kW



ENGINEERING: The quick charging system will be installed inside an old bunker under the city's main street.



> EXPERIENCES

Vitoria-Gasteiz Spain



100% SUSTAINABLE



7 ECID 50 kW



4 ECI 600 kW



Engineering



Smart charging
system included





Jema Service

Asset Management

Warranty

Service network

Spare parts management

Remote monitoring

Commissioning

Training

Maintenance



WARRANTIES

Focused on providing the best customer service, Jema offers a warranty extension of up to 25 years.

We adapt the guarantees to your needs:

- > **Basic warranty:** shared maintenance with the customer
- > **Full warranty:** Full coverage of materials and labor
- > **Guarantee of availability:** Commitment to support and availability

	Basic Warranty	Basic Warranty Extension	Complete Warranty Extension	Availability Warranty Extension
Duration (years)	Up to (*)	5- 25	1-25	1-25
Material - Spares	●	●	●	●
Consumables	●	●	●	●
Training	●	●	●	●
Corrective level (A/B)	●	● (*)	●	●
Preventive	●	●	●	●
Spare part availability	●	●	●	●
Remote support	●	●	●	●
Response time	-	-	-	24h
Availability	-	-	-	98%

(*) Depends on the product range

● Included ● Optional



SPARE PARTS MANAGEMENT

Jema provides the right spare part to minimize project costs and avoid stock-outs.

In our spare parts management service you will find:

- > Availability of the necessary spare parts
- > Provide spare parts according to your needs
- > Access to inventory, control and reports of the stock
- > Management of equipment obsolescence





MAINTENANCE

We offer a maintenance service designed to suit each project.

- > Hotline/Helpdesk Service
- > Commitment of assistance and material replacement
- > Preventive and corrective maintenance plan
- > Audits and inspections
- > Technicians training
- > Total flexibility in the maintenance services





TECHNICIANS TRAINING

We offer a complete training plan taught by Jema's technical specialists. The plan is oriented to the plant O&M personnel to take the maintenance tasks from level I to IV.

The technicians achieve a high level of autonomy thanks to the diagnostic tools and always with Jema's support.





RUTER Case Study

ELECTRIC CHARGING INFRASTRUCTURE AT STUBBERUD



> JEMA's PROPOSAL

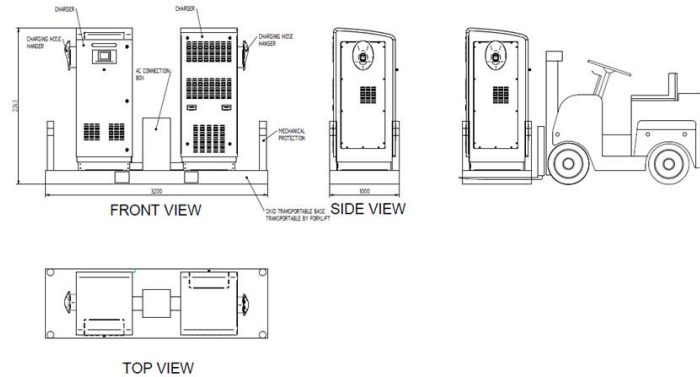
Key requirement: The solution must be ready to be moved to another depot in the future → MODULARITY

- ✓ Complete substations mounted in containers
- ✓ Chargers mounted on outdoor skids
- ✓ Skids prepared for easy lifting
- ✓ Wires standing on the floor, not buried

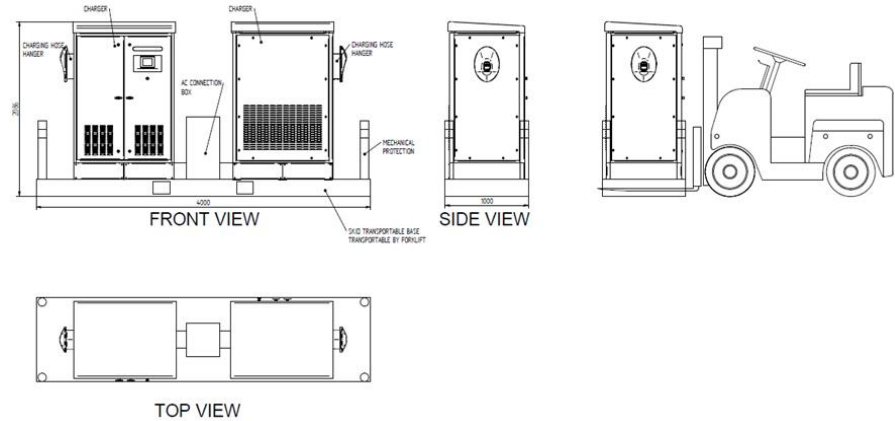


> JEMA'S PROPOSAL

Chargers for slow charging with CCS connectors mounted on skids:



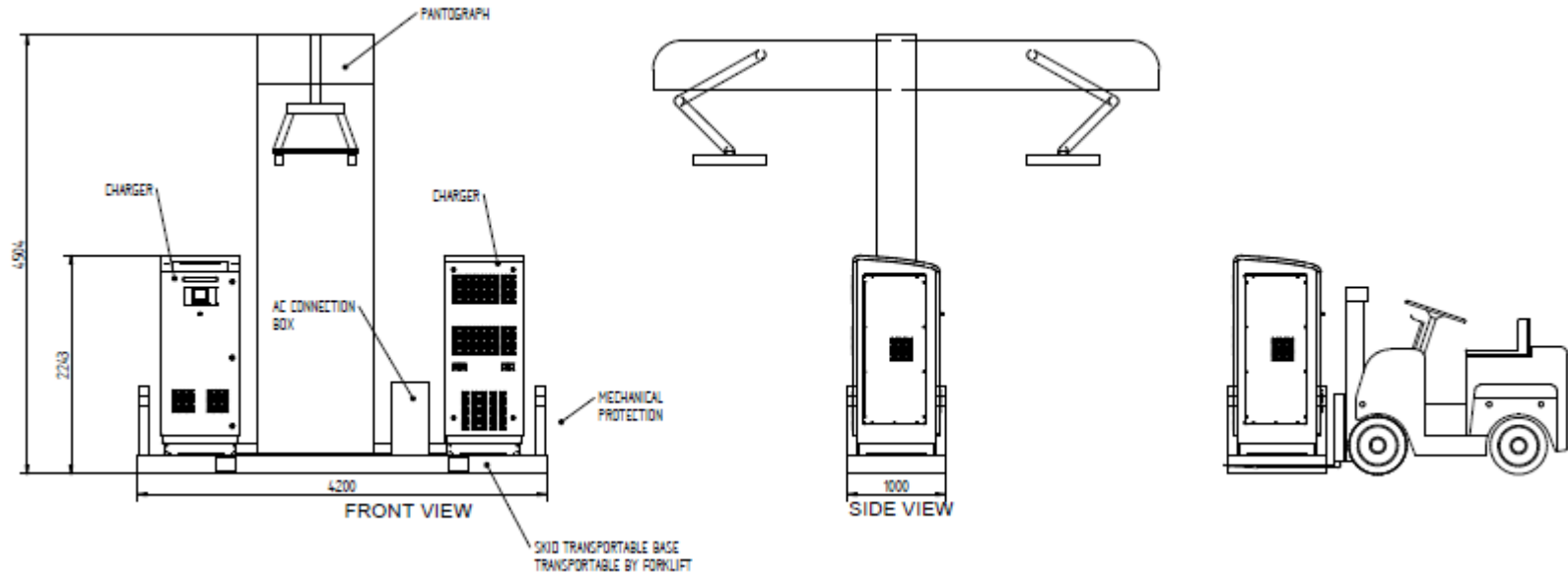
2x 100kW chargers



2x 150kW chargers

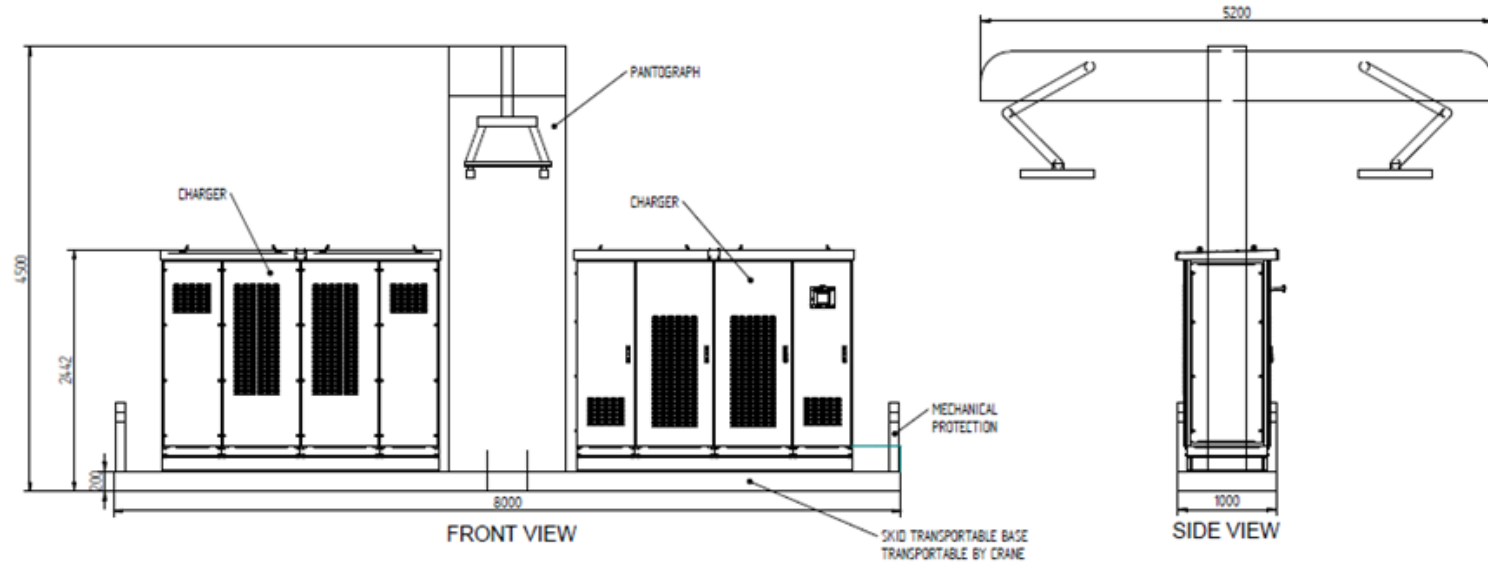
> JEMA'S PROPOSAL

Chargers for slow charging with pantograph mounted on skids:



> JEMA'S PROPOSAL

Chargers for opportunity charging with pantograph mounted on skids:





For any questions, please contact:

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TUSSEN TAKK | **ESKERRIK ASKO** |
THANK YOU | **MUCHAS GRACIAS** |