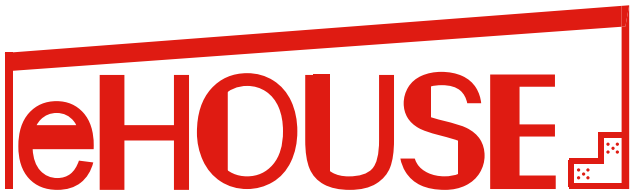
eHOUSE

MV SWITCHROOM & CONTROL ROOM

CR TECHNOLOGY SYSTEMS

www.crtsgroup.com



Catalogue: eHouse - Switchroom & Control room
Code: CRTS_Ctlg_Swticthroom_Eng
Publication: 2025
C.R. TECHNOLOGY SYSTEMS SPA

TABLE OF CONTENT

MODULAR POWER: ENGINEERED FOR QUICK INTEGRATION

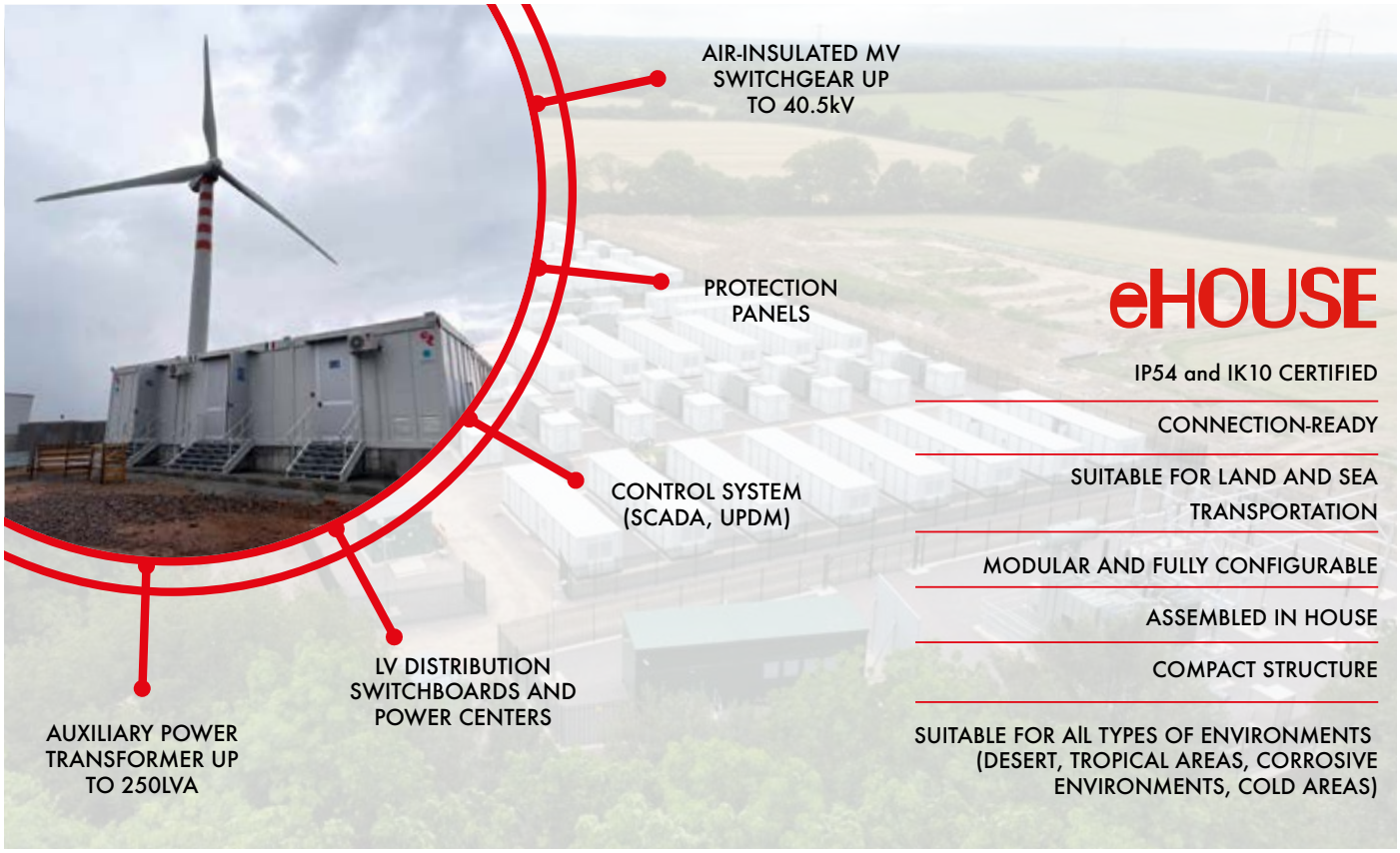
Our electrical eHouse is a modular, factory-assembled unit that integrates all components. Pre-tested before delivery, it enables immediate on-site connection and operation, cutting lead times by up to 50% compared to traditional concrete installations.

Modular components:

- Medium-voltage switchgear (engineered and manufactured by CRTS)
- Protection and Control Cabinets (engineered and manufactured by CRTS)
- Control SCADA software (software engineered by CRTS)
- Low-voltage Distribution switchboards and Power Centers (engineered and manufactured by CRTS)
- Auxiliary Equipment and systems

Its plug-and-play configuration simplifies installation and minimizes on-site work, making it ideal for fast-track projects and remote locations. This versatility makes our eHouse a reliable solution for a wide range of applications, including industrial plants, data centers, renewable energy facilities, and utility substations.

Built to the highest quality standards, each unit undergoes rigorous factory testing to ensure long-term performance, operational safety, and seamless integration into existing infrastructures.



WHY CHOOSE IT?

1. Efficiency and cost reduction

- Shorter installation time → minimized site activities
- Energy optimization → long-term savings on operating costs
- Lower maintenance requirements → reduced OPEX thanks to a design that enables quick and safe interventions

2. Reliability and quality

- High-quality materials and components → ensure long-lasting performance
- Compliance with international standards → guarantees certified safety and efficiency
- Ongoing monitoring and after-sales support → continuous assistance for maximum operational reliability

3.Flexibility and adaptability

- Modular solution → customizable size according to specific needs, no welding but screwed assembled design
- Applicable across various sectors → ideal for industrial, commercial, and energy applications (BESS, photovoltaics, eolic, hydro, hybrid)
- Scalability → suitable for future expansion or upgrade without replacement

4. Innovation and sustainability

- Cutting-edge technology → designed with the latest energy innovation
- Reduced environmental impact → lower emissions and hig her resource efficiency
- Secure investment → a reliable product that ensures long-term ROI through durability and performance

TECHNICAL SHEET

CLIMATE CONDITION

Operating temperature	-5°C / +40°C (+55°C on demand)
Relative humidity	Up to 95%
Climatic range	From modarate to tropical climate
Resistance to pollution	Degree 4

CONSTRUCTION FEATURES

Accessibility	Customized
IP Degree of protection	IP54
Assembly system	Modular bolted
Resistance to fire	Up to REI/EI 120
Fire-fighting system	Smoke detection / Fire detection and manual or automatic extinguishing
Intrusion detection system	Perimeter / Volumetric / Infrared
Air-conditioning system	Split / Industrial fixed / Industrial pull-out / Industrial on roof (on request)
Roofing system	Fixed / Roof shading
Protection against rust and corrosion	Painting cycle up to C4M (higher level on demand)
Plant distribution	Distribution on metal or plastic cableways Distribution in rigid and flexible PVC foambottom plate and cable gland
Cable entry	From below: direct / with blind bottom plate / with drilled bottom plate with bottom plate and cable gland

MATERIAL FEATURES

Insulating panels	Polyurethane
Construction elements	Galvanized steel (Sendzimir, Magnelis)
Load-bearing elements	Galvanized steel (Sendzimir, Magnelis)

PRODUCTS STANDARDS

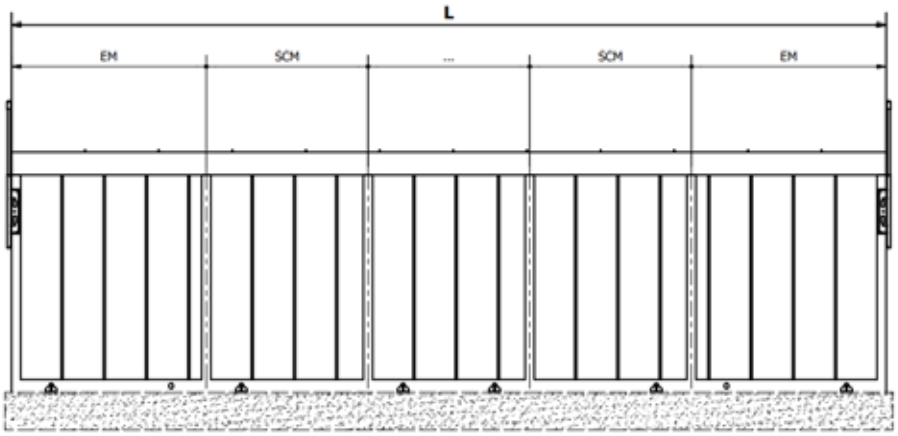
Low-voltage switchboard	IEC 61439-1/2
Medium-voltage switchgear	IEC 62271-200
Electrical substation	IEC 62271-202 / CEI 99-4 / IEC 61936
Civil distribution system	IEC 62271-202
Fire-detection plant	EN54

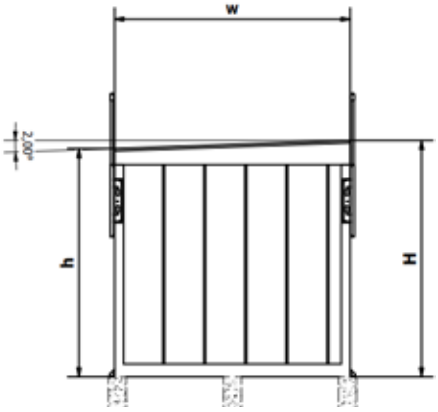
SWITCHROOM AND CONTROL ROOM

LAYOUT AND DIMENSIONS

MODULAR DESIGN AND CONSTRUCTION

Modular units, allowing for flexibility and scalability

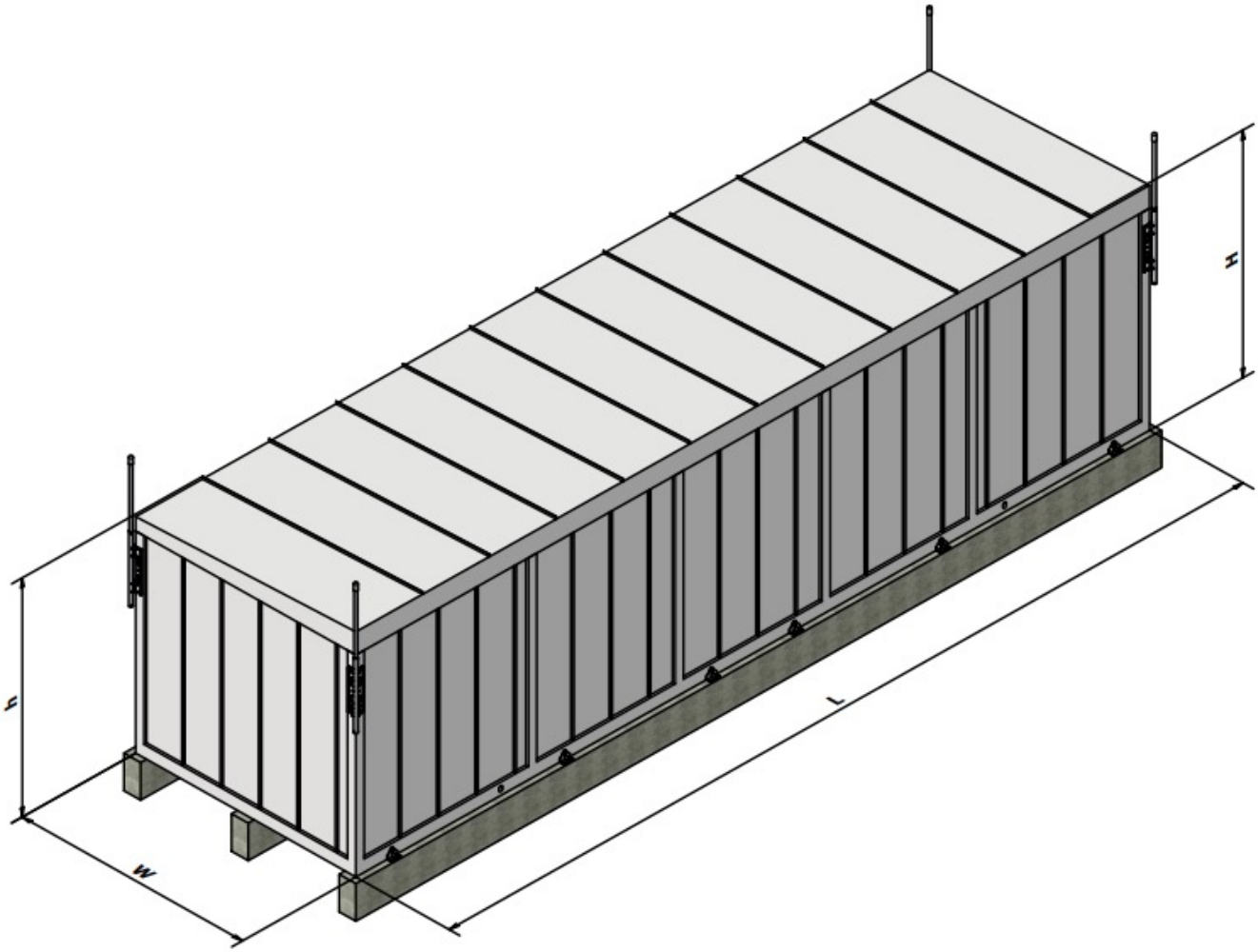




EM = End Module (2650mm)
SCM = Standard Central Module (2200mm)

TYPE	L Lenght	W Width 1	W Width 2	W Width 3	H Front Height	H Rear Height
1	7500	3300	3500	4000	3300	3185
2	9700	3300	3500	4000	3300	3185
3	11900	3300	3500	4000	3300	3185
4	14100	3300	3500	4000	3300	3185
5	16300	3300	3500	4000	3300	3185
6	18500	3300	3500	-	3300	3185

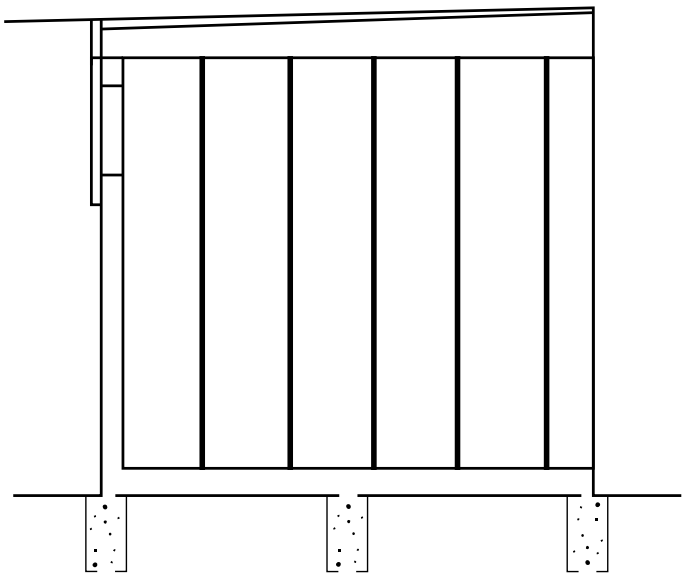
TRANSPORT AND HANDLING



The Switchroom requires a basement, which ensures proper levelling, enhances structural stability, and provides protection against environmental and weather-related elements. Typically, it is a concrete or steel structure frame and pillars, studied for allowing the most suitable power cable routing inlet from below.
It is equipped with special accessories (eyebolt and lifting plate) for lifting operations, which can be carried out using the provided hooks.

Transport must be carried out using a suitable trailer that guarantees good stability during the journey and compliance with current regulations.

Due to the sizing and weight of the Switchroom, the it is classified as exceptional transport, thus requiring suitable straps and, optionally, thermal covering.



SLOPED ROOF DESIGN

Its feature is the distinctive single-sloped roof design with a two-degree angular inclination. This architectural choice prevents water accumulation during rainfall, ensuring better durability and protection of the structure.

The sloped roof facilitates easier maintenance, reduces the risk of infiltration, and enhances the long-term reliability of the Switchroom even in harsh weather conditions.

MATERIALS

The Switchroom is engineered to guarantee solidity, durability, and protection in the most demanding environments. Its construction combines galvanized steel with advanced coatings and insulating layers, ensuring resistance to weather, thermal variations, and mechanical stress.

ELEMENT	MATERIAL	KEY FEATURES
Base and reinforcements	Galvanized steel sheets, coated with polyurethane resin for outdoor use.	Structural stability, corrosion resistance, long durability.
Uprights	Galvanized steel (30/10 thickness) angle brackets.	Positioned at corners and long sides, reinforcement of the structure.
Walls	External galvanized steel sheet (15/10) with polyurethane resin + inner polyurethane panels.	Thermal and acoustic insulation, weather resistance.
Roof	External galvanized steel sheet (15/10) with polyurethane resin + inner polyurethane panels.	High weather resistance, long durability, effective thermal protection.
Floor	Zinc-coated metal sheet with polyurethane resin finish.	Outdoor resistance, optional pre-cut cable entry openings on request.

** The thickness of the polyurethane insulated panels varies depending on the installation's climatic conditions or the project specifications. The structure has been designed to ensure a customizable fire resistance class.*

CERTIFICATIONS

Our eHouses are certified IK10 and IP54, ensuring the highest protection standards.

IK10 certification guarantees maximum resistance against mechanical impacts, protecting the structure from shocks and accidental damage.

IP54 certification ensures effective protection against dust ingress and water splashes, making the Switchrooms suitable for demanding outdoor environments.

These certifications confirm the robustness and reliability of our solutions in real operating conditions.

SUSTAINABLE MATERIAL SELECTION

In line with the proactive role of the company in caring for the environment, the R&D department is constantly engaged in the selection and development of materials and components, ensuring high efficiency, performance and minimizing the CO_2 emissions and our carbon footprint.

SENDZIMIR Z 275 is a galvanized steel, with a smooth and glossy appearance.
The zinc coating is offered in a wide range of thicknesses.
Application: entire structure
Characteristics: medium corrosion résistent, standard climate conditions

- Shiny, crystalline surface
- Corrosion resistant
- Guaranteed for 20 years
- Surface and thickness tolerance in accordance with NEN-EN 10143
- Hot-dip galvanized

MAGNELIS ZM 310 A is a metallic, steel-coated product which uses a metallic chemical composition of zinc with 3.5% aluminum and 3% magnesium.
Application: entire structure
Characteristics: high corrosion resistance, tropical climate (salt, sun, high temp and humidity)

- High corrosion resistance
- Long duration
- Alternative to Stainless Steel
- Edge protection during processing
- Environmentally friendly
- Performs well in its natural state
- Non-magnetic
- 100% recyclable

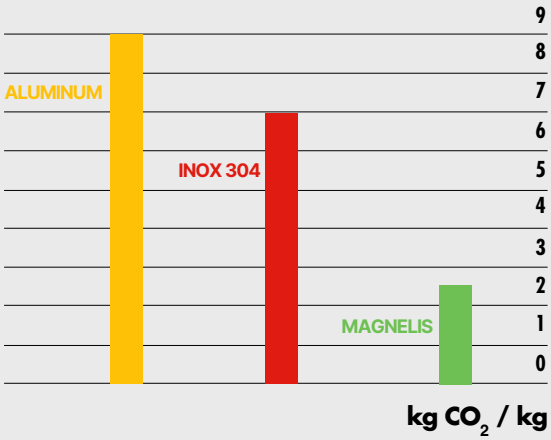
ALUMINUM 99.5 aluminum alloy that is at least 99.5% pure aluminum.
Application: seldom, for doors
Characteristics: high corrosion resistance

- Lightness
- High duration
- Ductile
- Corrosion resistant
- Non-magnetic
- 100% recyclable

MATERIAL IMPACT ON ENVIRONMENT

The table highlights the different degrees of kg CO emissions for each material.

By adopting low-carbon emission materials, our Switchrooms significantly reduce their environmental footprint over the entire life cycle. This approach contributes to lowering CO emissions, supporting circular economy practices and aligning with the global targets for decarbonization of the energy sector.



HOW TO SELECT THE RIGHT MATERIAL

Depending on the final destination and related environmental conditions, the criteria for selecting anticorrosive coatings (material type and paint cycle) are established.

The ISO 12944 standard suggests criteria for selecting the paint cycle based on the installation environment and the expected durability of the coating.

The more aggressive the atmosphere (due to the presence of pollutants and/or corrosive agents), the better the quality of the materials used and the painting cycle that must be applied.

For severe environmental conditions, highly corrosion-resistant sheet metal (Magnelis) and advanced painting cycles (C5) are employed to ensure long-term durability.

CORROSIVE LEVELS

The corrosive level depends on different factors:

- Humidity and temperature
- Presence of UV radiations
- Chemical exposure (e.g. pollution, salty and/or corrosive atmosphere)
- Mechanical damages (collision, abrasions, etc.)

COATING GRADE TABLE

Installation key points	I	II	III
Ambient temperature	<35°C	35-45°C	>45°C
Humidity	<60%	60-80%	>80%
Thermal excursion	15°C	20-25°C	>25°C
Proximity to the sea	> 20 km	5-20 km	< 5 km
Chemical exposure	Low risk	Medium risk	High risk
Quality of the air	Good - Satisfactory	Satisfactory - Low	Low – Extremely low

COATING CLASSES APPLICATION

	CORROSIVE LEVELS		
	I	II	III
C4	X		
C4 + Roof in Magnelis		X	
C4 + Magnelis		X	On demand
C5			
CX			On demand

STRUCTURE FEATURES

A unique feature of our eHouse is the absence of welding points: the entire metallic structure is assembled with engineered screws and bolts. This modular design ensures high solidity while offering clear advantages in terms of flexibility, easy dimension adjustments during project development, and simplified component disposal at the end of the product's life. On demand, the structure can also be certified according to EN-1090.

PAINTINGS

The painting cycle is selected depending on the destination.

Standard RAL color for metallic structures are:

Other colors are available on request.

FUNCTIONAL DESIGN AND AREAS

1. MEDIUM VOLTAGE SWITCHGEAR ROOM

This central section is designed to house medium-voltage switchgear and related equipment, ensuring reliable power distribution and system protection.
We manufacture our own SF6-Free MV switchgears, the metal-enclosed ATR36/ATR40 up to 40.5kV and the metal-clad CR POWER 36/40 up to 40.5kV.

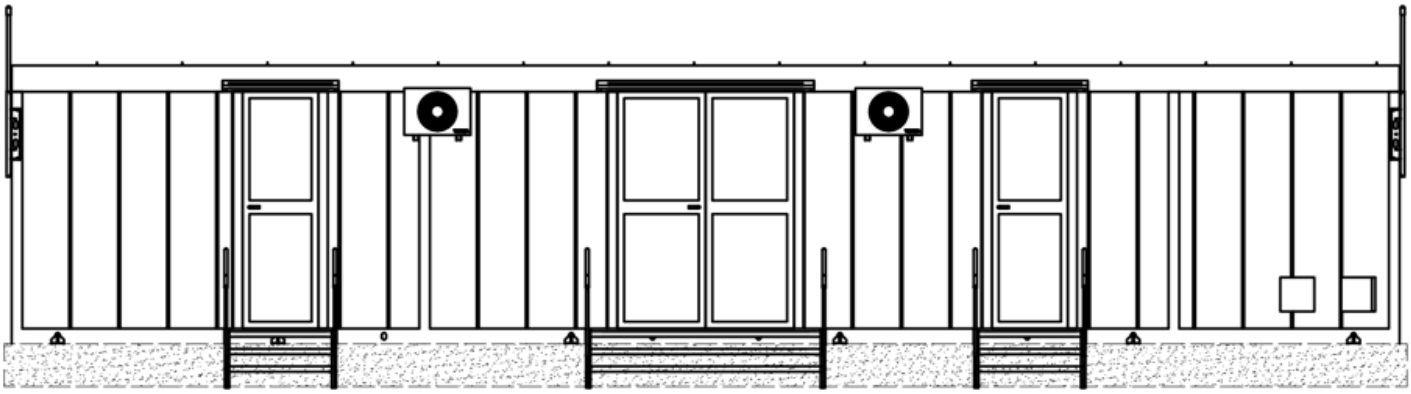
2. PROTECTION & CONTROL, LOW VOLTAGE ROOM

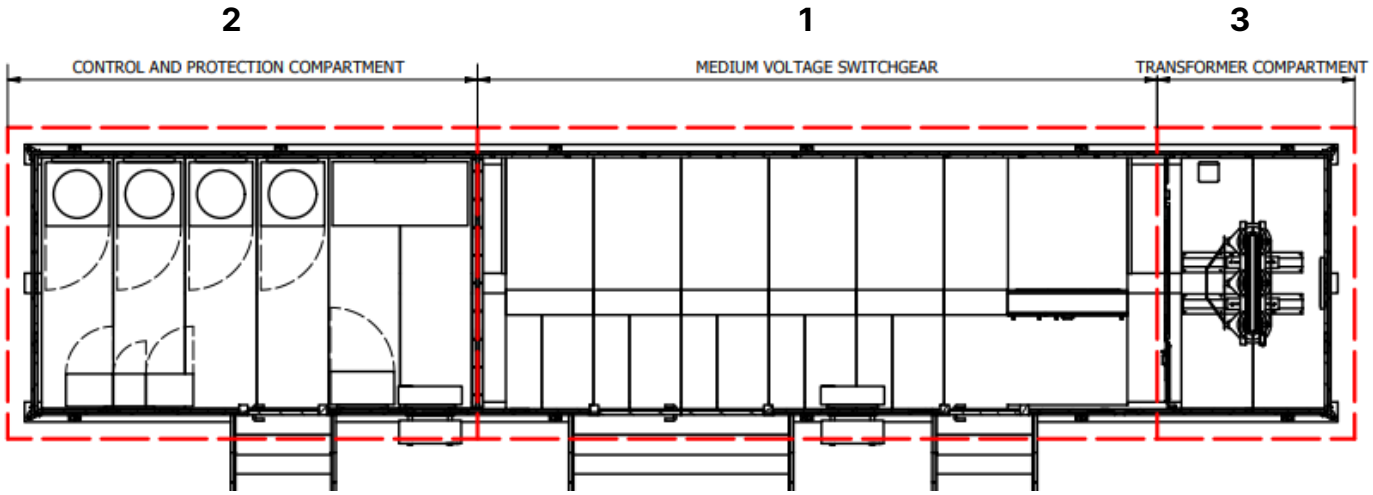
This area includes protection, servers' cabinets, SCADA control systems and Low Voltage switchboards. It serves as the core for monitoring and managing the electrical infrastructure.

3. TRANSFORMER COMPARTMENT

Dedicated to housing the transformer units, this section is engineered for safe integration and accessibility during maintenance operations.

**Specific configurations can be arranged according to the customer needs*



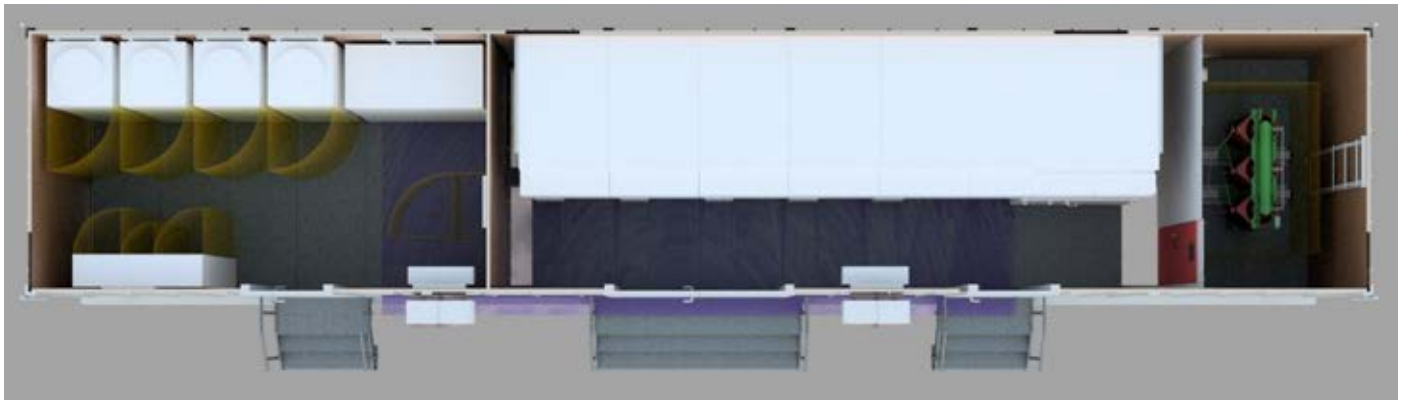


ELECTRICAL FEATURES

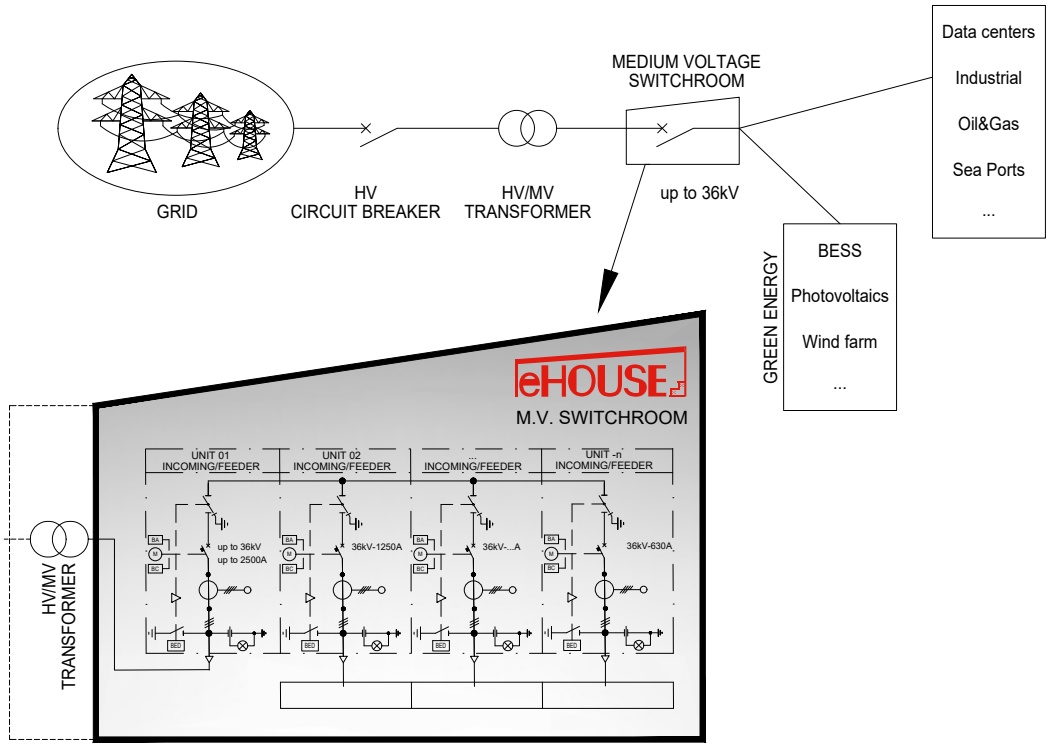
Switchroom external structure

MV electrical switchgear

Protection and control panels and SCADA system



With our MV electrical switchgears 36kV we can ensure a rated power connection up to 125MVA



DIGITALIZATION AND AUTOMATION SYSTEM

Built for the present, ready for the next-gen energy

In an increasingly digital and interconnected energy landscape, the integration of intelligent monitoring and automation systems is essential to ensure safety, efficiency, and continuity.
C.R. Technology Systems develops advanced solutions that support the digital transformation of electrical plants, enabling real-time diagnostics, predictive maintenance, and faster fault recovery.
By combining cutting-edge sensor technology with smart automation, our systems help reduce downtime, extend equipment lifespan, and optimize overall performance. These innovations are designed to meet the evolving needs of modern energy infrastructures, while remaining adaptable to future developments.
The following technologies represent our commitment to delivering reliable, scalable, and intelligent solutions for today's and tomorrow's power systems.

ARC-FAULT DETECTORS

The fast detection system uses light-wave sensors which detect the luminescence generated by the arc to ensure the circuit-breaker intervention on the load side or the feeder side, minimizing the duration of the electrical arc in less than 70 ms. In this way, it is possible to limit system faults and to isolate the fault point, thus guaranteeing a higher service continuity and a faster and more efficient system restoration.

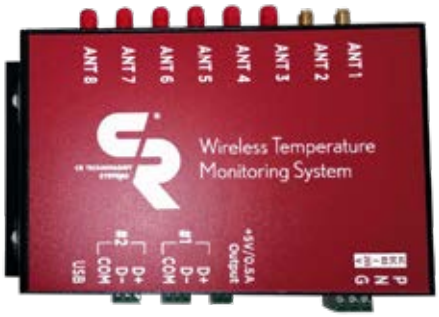
Knowing the trigger point of the arc, the reconstruction process is more effective, and it can ensure the improvement of the plant and its loyalty.

PR.E.SE. SENSORS

PR.E.SE. solution (PRedictive Electrical SEnsors) permits a wireless constant monitoring of temperature of the electrical equipment, based on the RFID technology (Radio Frequency Identification) in UHF band. These sensors play an important role in the prevention of the overheating of electrical devices (critical temperature >120°C) due to overload, corrosion, loose connections and difficult environmental conditions and permit predictive maintenance of the electrical insulation.

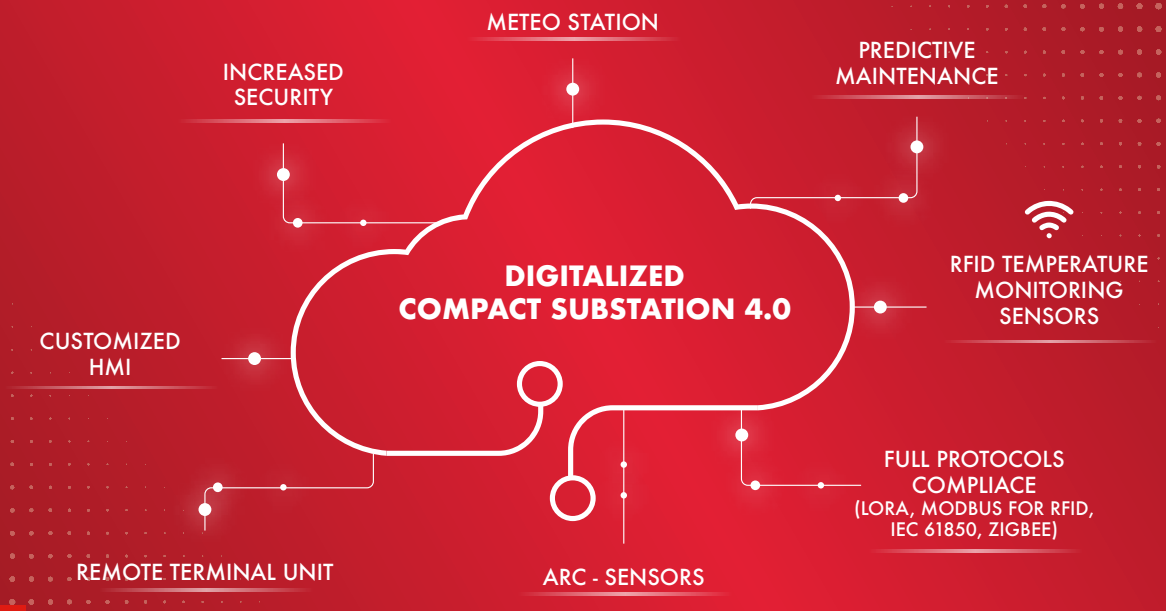
The sensors allow improving the performance of the system and extending its life cycle. Their technical features have several advantages:

- Adaptable: tags can be applied to any type of surface and environment, and in any weather condition.
- Reliable: tags are battery-less and do not require maintenance after their application.
- Modularity: sensors are equipped with a modular and scalable architecture. A large number of uniquely addressable sensors can be applied.
- Economic advantage: the technology based on radiofrequency allows lower costs than the traditional ones.
- Accuracy: sensors with ID prevent reading errors
- Retrofit: sensors can be integrated into operational plants, enlarging their lifespan.
- Tailor-made products: thanks to the different shapes and surfaces of the sensors, and the possibility of integrating them in a variable number according.



SCADA SYSTEM

One of the major components of an automation system is SCADA (Supervisory, Control And Data Acquisition) software, which allows monitoring and supervision of plants, through remote control. Furthermore, it reduces the plant's footprint and saves up to 80% of copper wiring with digitalization, minimizing the need for onsite visits. It is connected to smart sensors and allows real-time control of the plant.



C.R. Technology Systems integrates SCADA Systems and configurates a customized and user-friendly HMI (Human-Machine Interface).
The advantages of integrating this solution into the MV Switchroom are many:

- Timeliness in diagnostics and remote control
- Optimal preventive maintenance
- Plant continuity of service
- Environmental benefits, thanks to reduced energy losses and fewer staff travels
- Customized interface, on demand
- Possibility to monitor and control the site in viewport and alarm windows
- Transmits operational information related to the I/O point in real time
- Long-term data storage using the relational database
- Reports generation in various formats tailored to user needs

In an increasingly interconnected future, with a large amount of data that needs to be managed and processed, automation is an essential tool for the new model of innovation, based on the collaborative relationship between man-machine.

FOCUS ON APPLICATION

BATTERY ENERGY STORAGE SYSTEMS (BESS)

BESS systems (Battery Energy Storage Systems) guarantee a storage process with the aim of having continuous availability, day and nighttime, and in critical situations: emergency, plant failures, and maintenance. These systems are a key step toward energy autonomy from fossil fuels.

BESS systems are also fundamental in situations when renewable energy plants are able to produce beyond the request at a specific moment of input, thus avoiding energy waste or production shutdowns by storing excess energy for later use (during dark hours or days with lack of sun/wind).

C.R. Technology Systems promotes plug-in solutions for the battery control and distribution of energy produced by BESS. This solution consists of the turnkey supply of a prefabricated metal cabinet which includes all the equipment necessary to be able to interconnect the BESS to the grid.

PHOTOVOLTAICS

We develop projects mainly for photovoltaic plants, designing equipment for the manufacture and installation of the primary substation and its connection to the electricity transmission grid.

Our projects have involved different types of photovoltaic systems: ground PV plants, rooftop, floating, photovoltaic greenhouses and agriphotovoltaic.

GROUND-MOUNTED PHOTOVOLTAICS

Designed to maximize solar exposure in open fields, ground-mounted photovoltaic systems have evolved into highly efficient and scalable solutions for utility-scale energy production. These installations allow for optimal panel orientation and easy maintenance, making them ideal for large-scale renewable energy projects.

C.R. Technology Systems supports these infrastructures with modular Switchrooms engineered for high durability and flexibility. Their modular design allows for flexible configuration and easy transport, while the protection ensures safe operation even in dusty or muddy terrains.

ROOFTOP PHOTOVOLTAICS

Rooftop photovoltaic systems have become a key asset in urban and industrial energy strategies, transforming unused roof surfaces into clean energy generators.
Whether installed on commercial buildings, warehouses, or residential complexes, these systems contribute to energy independence and sustainability without occupying additional land.

C.R. Technology Systems integrates rooftop photovoltaic projects with modular and connection-ready Switchrooms.

FLOATING PLANTS

Born as the exploitation of fish basins to produce clean energy to support the same industries, today floating plants are expanding to many other fields, such as lakes, dams, hydroelectric plants to enhance spaces and surfaces that would otherwise be unused, in order to provide clean energy to support all main and ancillary services, thus reducing CO2 emissions.
C.R. Technology Systems has developed within its product portfolio a Switchroom with innovative features to reach an IP55 degree without resorting to the use of any welding and maintaining the modularity philosophy of the systems. It is built using highly reliable components to ensure long periods of operation in the absence of maintenance.

GREENHOUSE/AGRIVOLTAICS

The photovoltaic landscape is constantly evolving, thanks to huge investments in the study and research of new solutions to improve system performance and optimize installation surfaces.

Photovoltaic greenhouses and agrivoltaics (also known as agrovoltaics) are essentially the integration of solar panels into agricultural activities. This rapidly growing trend allows farms to enhance their energy output while simultaneously reducing water consumption.
Solar greenhouses enable a true symbiosis between agriculture and renewable energy. They make it possible to cultivate crops and generate clean energy at the same time, without occupying additional land. These are fixed structures, typically made of aluminum or iron, with walls and pitched roofs constructed from transparent glass or polyethylene film that serves as a protective covering.

Advantages of the photovoltaic greenhouse:

- Energy and economic savings
- Space optimization
- Eco-friendly technology

WIND FARMS

Wind farms are a cornerstone of the global transition to renewable energy, often deployed in synergy with photovoltaic systems to ensure a more balanced and continuous energy supply. These installations are typically located in remote or exposed areas, requiring robust infrastructure to support both generation and control systems.

C.R. Technology Systems contributes to wind farm projects by supplying Switchrooms designed to operate reliably in challenging environmental conditions, such as strong winds, temperature fluctuations, and limited accessibility.

OIL & GAS

The oil and gas sector demands high-performance infrastructure capable of operating in extreme conditions, including temperature fluctuations and remote locations. Electrical systems in these environments must guarantee safety, reliability, and compliance with strict industry standards.

C.R. Technology Systems provides installation-ready Switchrooms designed for oil & gas applications. Their robust construction and flexible configuration make them ideal for integration into complex plants, ensuring safe operation and long-term durability even in demanding industrial contexts.

DATA CENTERS APPLICATION

Data centers are critical infrastructures that demand uninterrupted power supply, high reliability, and scalable solutions to support growing digital workloads. These environments require precise control, efficient energy distribution, and robust protection systems. C.R. Technology Systems is ready to support data center applications with modular Switchrooms engineered for high performance, rapid deployment, and seamless integration. Our solutions are designed to meet the requirements of Tier-certified facilities, ensuring operational continuity, energy efficiency, and compliance with international standards.

PRIVATE POWER GENERATION SYSTEMS

A power generation system is a system for generating electrical energy: the set of machines, equipment, and processes that convert a primary form of energy (mechanical, thermal, chemical, solar, etc.) into electricity. Private high energy demanding industries often require dedicated power generation systems to ensure operational continuity, energy independence, and cost optimization. These systems are designed to meet specific load profiles and environmental conditions, offering reliable performance even in remote or critical locations.

UTILITY ON SECONDARY DISTRIBUTION GRIDS

Secondary distribution grids are essential for delivering electricity from primary substations to end users, including residential, commercial, and light industrial sectors. These networks require reliable, decentralized infrastructure to ensure continuity, safety, and efficiency in energy delivery, especially in areas with variable demand or renewable energy integration

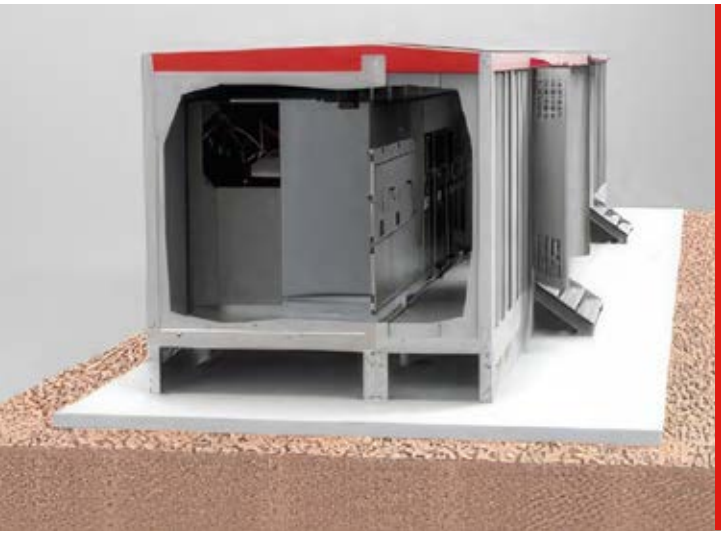
REMOTE AREAS

Rural areas offer significant potential for the development of renewable energy systems, thanks to the availability of land and the growing need for energy autonomy in agricultural and remote communities. Photovoltaic and hybrid installations in these regions not only support local energy needs but also contribute to the sustainability and modernization of rural infrastructures.

eHOUSE KEY STRENGTHS

- Modular structure
- Metallic without welding
- Connection-ready
- SF6-Free
- Manufactured MV switchgear
- Up to 40.5kV
- Simplified maintenance operations
- Transportable by land and by sea
- Resistant to atmospheric agents

WHAT WE GUARANTEE



- Design
- Materials purchasing
- Factory assembling
- On site installations
- Electrical plant building
- Tests
- Control and protection systems
- Commissioning

COMPANY CERTIFICATION

- **ISO 9001:2015 Quality Management System**
- **ISO 14001:2015 Environmental Management System**
- **ISO 45001:2018 Occupational Health and Safety Management System**

Commitment to quality, sustainability, and safety across all operationscomplying with internationally recognized standards.

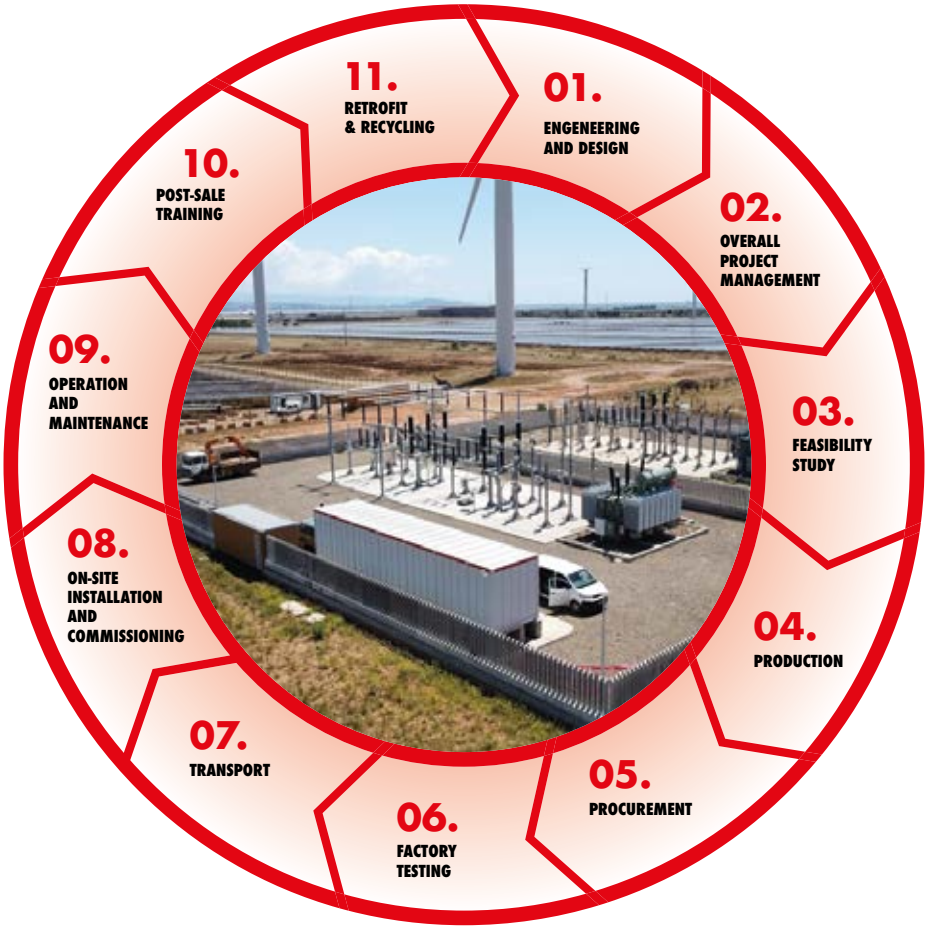
C.R. TECHNOLOGY SYSTEMS

YOUR PARTNER FOR CONNECTING THE POWER

- **WORLDWIDE PROJECTS**
- **ENGINEERING**
- **EXPORT EXPERTISE**
- **MANUFACTURING**
- **ONE RELIABLE INTERLOCUTOR**
- **CONNECTION-READY SOLUTIONS**
- **AUTOMATION SYSTEM INTEGRATION**
- **#GREENATTITUDE**
- **+4.5GW BESS AND +4GW PV PLANTS CONNECTED TO OUR MV SWITCHROOMS**

SUPPORT YOUR PROJECT FROM DESIGN TO DELIVERY

We oversee the entire project lifecycle: from concept to completion. With one dedicated point of contact efficiency. The advantages of having a single source are many, as listed below.



- **SINGLE POINT OF CONTACT**

Thanks to a global network of project managers, engineers, sales representatives, and authorized distributors, CRTS ensures comprehensive support, from design and application assistance to pricing, delivery, and warranty services, all through one coordinated channel.

- **CENTRALIZED COORDINATION**

Having a single, dedicated interlocutor throughout the project lifecycle simplifies communication and decision-making. C.R. Technology Systems ensures streamlined coordination while maintaining the flexibility to adapt to evolving project needs, technical specifications, and site conditions, thus enabling faster execution and more efficient problem-solving.

- **CUSTOM ENGINEERING AND SCALABILITY**

Each solution is designed to meet specific project requirements, with the flexibility to scale and adapt to future expansions or upgrades. Whether for small installations or large infrastructures, CRTS delivers tailor-made systems that grow with your needs.

- **UNIFIED COMMERCIAL FRAMEWORK**

C.R. Technology Systems ensures a consistent and streamlined commercial approach across all equipment and components. This contractual structure simplifies negotiations and facilitates integrated project management.

VISIT OUR WEBSITE

www.crtsgroup.com

CR TECHNOLOGY SYSTEMS

C.R. TECHNOLOGY SYSTEMS S.p.A.
Via Stezzano, 7E
24050 Zanica (BG) - Italy

Contact us:
sales@crtsgroup.com
Ph. +39 036334981
Fax +39 02 95732316
VAT 01637141001

LET'S TEAM UP AND MAKE GREAT AND CLEAN THINGS HAPPEN!

Via Crescenzio 82
00193 Roma
Italy

Via Rossaro, 9
24047 Treviglio (BG)
Italy

23 Avenue Hédi Nouira
Immeuble Mohamed Chérif,
Nabeul, 8000
Tunisia

Via dell'Industria, 57
01100 Viterbo
Italy