POWER GENERATION

Industrial Motors

Commercial & Appliance Motors

Automation

Digital & Systems

Energy

Transmission & Distribution

Coatings

Excellence in technologies and solutions













COMMERCIAL OPERATIONS

in 37 countries

AlgeriaArgentinaAustraliaAustriaBelgiumBrazilChile

China

- ColombiaEcuadorFranceGermanyGhanaIndiaItalyJapan
- KazakhstanMalaysiaMexicoNetherlandsNorwayPeruPolandPortugal
- Russia
 Sweden
 Singapore
 South Africa
 South Korea
 Spain
 Thailand
 Turkey
- United Arab EmiratesUKUkraineUSAVenezuela



AUSTRIA

1 manufacturing site



52 MANUFACTURING SITES

in 15 countries



WEG Group

























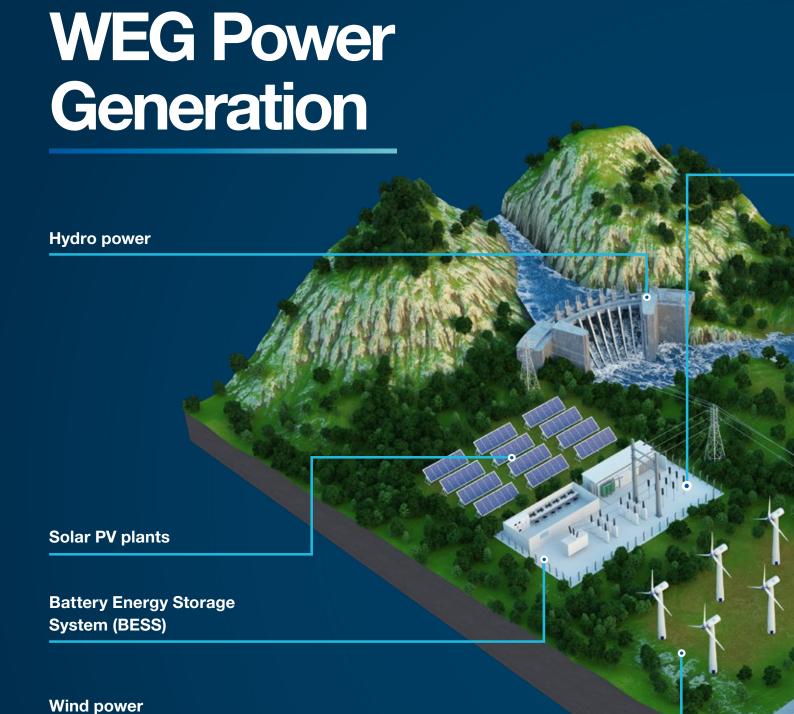












Renewable energy

Concerned about the growing importance of renewable energy for the world, WEG invests in technological innovations in several segments that bring efficient and eco-friendly solutions for the planet.

Complete substations

Transmission & Distribution





Track-record on power generation

Wind power



Wind turbines

Solar power



Solar generation

Thermal power plants (Cogeneration)



4 poles 62,500 kVA

2 poles 200,000 kVA

aerogenerators 806 MW wind generators 5,655 MW

solar farms under operation 3,947 MW

2,033 turbogenerators 40,155 MW

1.255 steam turbines 14,280 MW



104,365 MW installed worldwide

Gensets



Distributed power generation 25,000 kVA

Hydro power plants



Small hydro <5 MW

Micro hydro <30 MW

Hydro >30 MW

240,541 alternators 45,134 MW 3,189 hydrogenerators

8,668 MW

928 hydraulic turbines 2,630 MW



Aerogenerators – AGW platform

During the development of its aerogenerators, WEG counts with state-of-the-art technologies to add value and high reliability to the customers. Always concerned with the future, WEG adds sustainability to its quality and today is a reference in the wind power market, from manufacturing to specialized maintenance, repair and recovery services.

Currently, WEG has two aerogenerators platforms in its portfolio: AGW 147/4.2 and AGW 172/7.0.



AGW 147/4.2

Model	AGW 147/4.2
Wind class	S
Annual average wind speed	9.0 m/s
Rated power	4,200 kW
Rotor diameter	147 m
Hub height	125 m
Technology	Direct drive
Generator	Synchronous with permanent magnets
Converter	Full power

The AGW 147/4.2 platform consists of 4.2 MW rated power and 147 meters diameter rotor. This platform uses the direct drive concept (gearless) and features a modular design and easy maintenance. With a permanent magnet synchronous generator coupled to a full power converter, it is capable of smooth interconnection and complies with worldwide network requirements, adding availability and reliability.







Model	AGW 1/2/1.U
Wind class	S
Annual average wind speed	11.0 m/s
Rated power	7,000 kW
Rotor diameter	172 m
Hub height	134 m
Technology	Medium speed gearbox
Generator	Synchronous with permanent magnets
Converter	Full power
Generator	Synchronous with permanent magnets

The AGW172/7.0 model is an evolution of the WEG portfolio, with 7 MW rated power and a 172 meters diameter rotor, offering best-in-class power output. This platform uses the medium speed gearbox and delivers advantages such as smooth and controlled connection to the network, pre-assembly on site with small size cranes, reduced installation time, among others. Like the previous platform, the AGW 172/7.0 has a modular and easy maintenance design, adding high reliability and availability.

Scope of supply

- Equipment (wind turbines)
- Site-delivery logistics
- Site-mounting and installation
- Commissioning and start-up
- Operation and maintenance

Engineering services

- Micrositing optimization
- Mechanical load assessment
- Site-specific power curve
- 24/7 performance-driven monitoring
- Park controller features
- Monitoring system, predictive maintenance
- Third-party components assessment and repairing



Wind generators

The WEG generators are developed with modern design technologies, materials and manufacturing processes, resulting in compact generators with excellent performance, suitable for a wide range of power generation applications. WEG offers generators for wind turbines in the following configurations:

- Single-fed induction generators (SFIG)
- Double-fed induction generators (DFIG)
- Permanent-magnet synchronous generators (PM)
- Electrically excited synchronous generators (EESG)

Technical features

- Output: up to 15,000 kW
- Voltage: up to 13,800 V
- Frequency: 50 and 60 Hz
- Insulation: F or H

Refrigeration

- Air
- Water
- ODP with forced ventilation



Single-fed induction generators (SFIG)



Electrically excited synchronous generators (EESG)



Double-fed induction generators (DFIG)



Permanent-magnet synchronous generators (PM)



Services

Electrical repairs

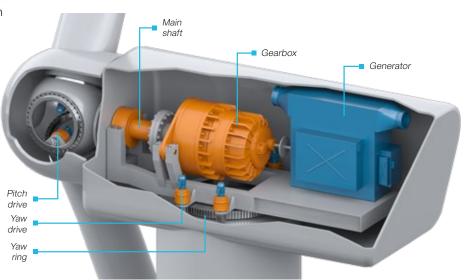
Aerogenerators

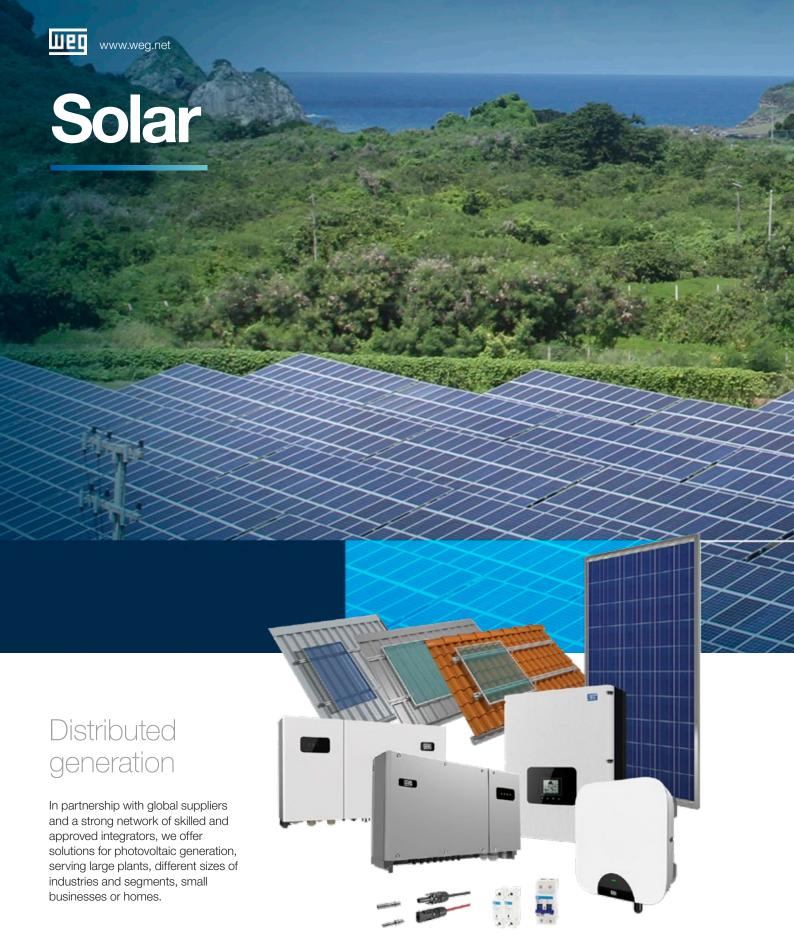
- Repair
- Reverse engineering
- Retrofit
- Rewinding (stator and rotor)
- Magnets replacement
- Reembaralhamento de pacote (magnetic core)
- Shaft replacement

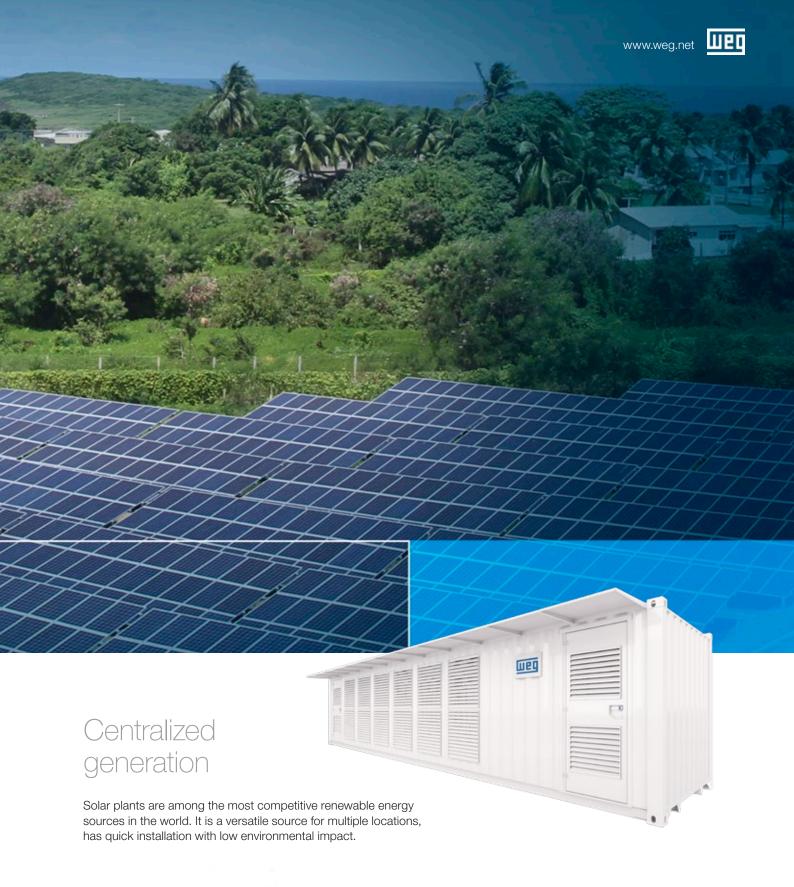
Shaft metallization

Mechanical repairs

Gearbox Main Shaft Pitch Drive Yaw Drive Yaw Ring









To meet the market demands and adapt to the global search for renewable energy sources, WEG provides full equipment solutions for energy generation in solar plants.

For investors who wish to be ahead and contribute to a more sustainable world, WEG offers turn-key solutions, ensuring reliability and performance of solar plants.



Complete, integrated and intelligent solution

With a complete line of products and solutions for steam power generation, WEG manufactures and installs steam turbines, gear boxes, generators and control and automation panels. Produced with high technology and international quality standards, they are available for the most varied industrial segments and operate with steam from sources such as biomass, biogas, municipal solid waste (MSW), among others.

Main advantages



All components manufactured and installed with 100% WEG technology



Larger steam turbines facility of Latin America



Customized solutions



High efficiency equipment, technology and reliability



Complete supply of the energy generation and cogeneration system

Steam turbines

WEG has a complete line of steam turbines from 0.1 MW to 150 MW to drive small to large generators. Can also be used in mechanical drives such as pumps, blowers, among others. With modular construction, ensures greater flexibility in installation.

Technical features

- Action and reaction technology
- Back pressure and condensation
- With or without extraction and/or induction
- Rated output power up to 150 MW
- Inlet pressure up to 140 bar
- Inlet temperature up to 540 °C

Turbo gearboxes

Manufactured in state-of-the-art facilities, the turbo gearbox lines are designed and manufactured according to international standards with high quality machines, guaranteeing the better contact between gears and low noise levels. Developed for power generation or mechanical drive, they deliver high resistance, more efficiency, safety and operational availability.

Lines

- SuperTurbo
- RTS/RTM



Generators

Designed for power generation, the turbogenerators are available in a wide range of power, based on WEG's experience on the supply and dimensioning of rotating machines. They can be driven by steam or gas turbines.

Lines

- ST20
- ST40
- ST41

Control and automation

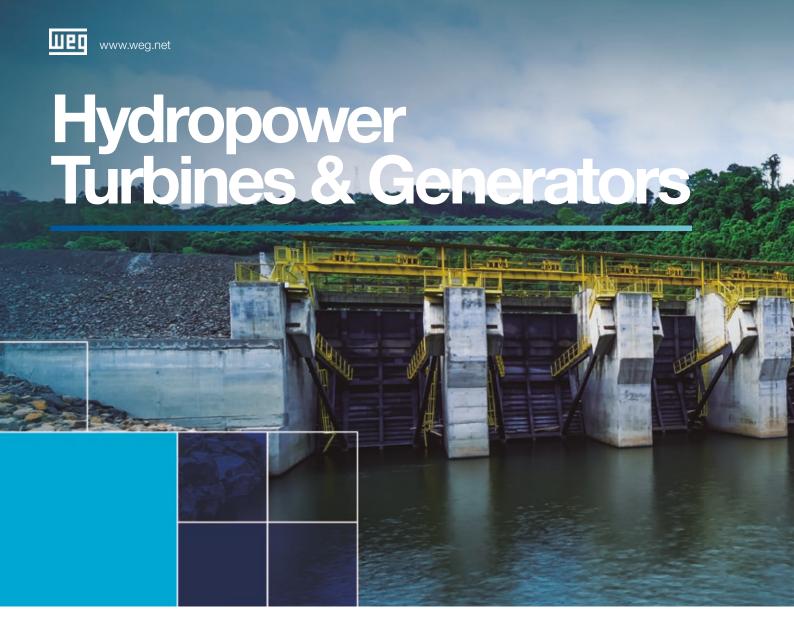
WEG automation facilitates the operation and control of the power generation ensuring safety and reliability of measurement information for equipment maintenance management and production and energy consumption reports.

Integrated systems

- Distribution, control and protection panels
- MV operation and control panels
- Monitoring and control

Services

WEG solutions for steam power generation are delivered with specialized services in the field, including installation, commissioning and start-up. In addition, we provide after-sales services for WEG and other manufacturers, such as: retrofit, technical assistance, long-term contract, planned maintenance, field services and training.



Complete and flexible systems for sustainable energy

The Turbines and Generators are the main equipment for Hydropower Plants, having an important play role in the investment and, even, in the feasibility or not of the project. Due to this it is very important that the definition of their features is done properly since the beginning of the studies of the economic feasibility of the project.

WEG delivers the full range of specialized equipment and services for small and medium hydropower plants: complete and flexible systems for sustainable energy.





Hydrogenerators

Hydro generators have a wide range of power and speed options based on WEG's experience in providing and designing hydro generators. The winding process adopted by WEG is specially designed and specified for the selected generation voltage. The hydro generator coils are made of rectangular copper wire or Roebel bars.

Output: up to 150 MVA

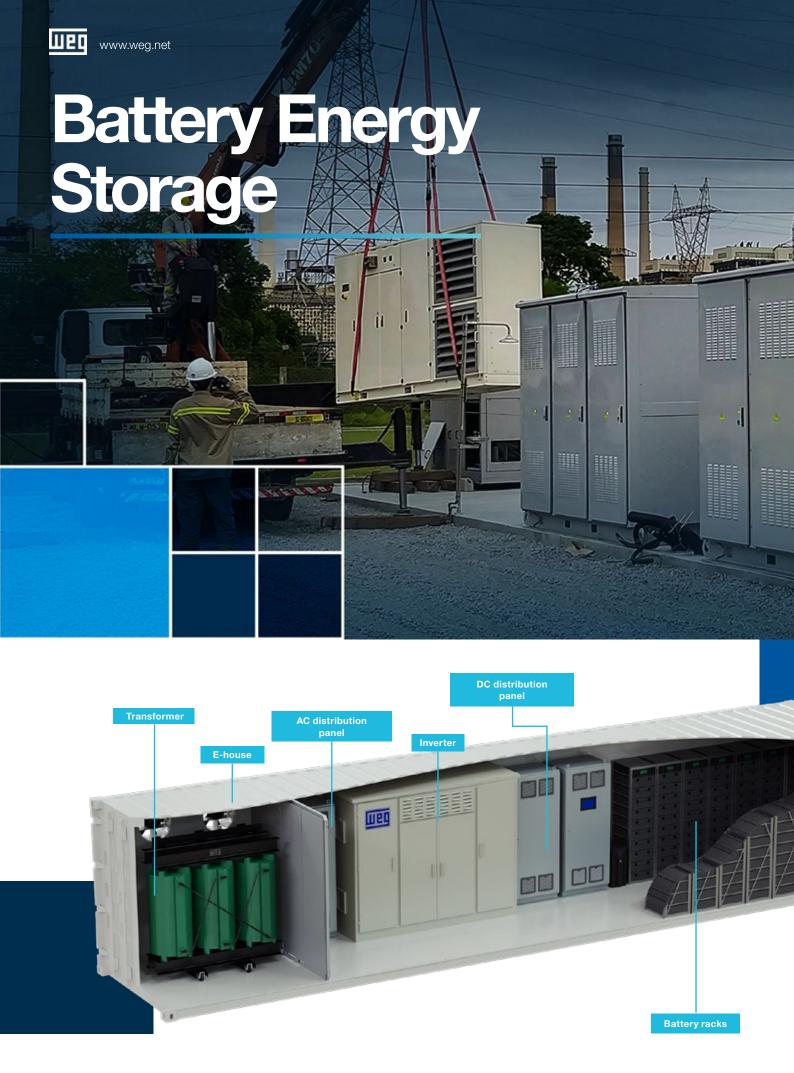


Turbines (Kaplan, Francis, Pelton)

WEG hydraulic turbines deliver high performance and reliability. This is a result of the great experience applied in design and manufacturing. Over 60 years of experience in the manufacturing of hydraulic turbines for Brazil, South America and Central America. We manufacture Pelton, Francis and Kaplan turbines in various versions and applications, as per IEC 61364 standard. Qualified rofessionals, modern softwares and state-of-the-art equipment ensure the expected results.

Output: up to 50 MW







Refrigeration system

Energy Storage System (ESS) is a system combined of an energy management and control solution that coordinates operating modes and optimizes their operation, ensuring higher efficiency and utilization of energy resources, as well as operational flexibility and power supply reliability.

- Modular and customizable system
- Parallel operation with multiple power sources
- On-grid and off-grid operation
- Monitoring and remote control
- Complete energy management
- Real time operation setup
- Does not generate pollutants
- High energy density
- Integration with renewable generation sources
- High storage capacity
- Extended life time
- Low maintenance

Note: other modes can be implemented.

Modes of operation

- Power factor regulation
- Peak shaving
- Frequency regulation
- Voltage regulation
- Spinning reserve
- Load management
- Power smoothing
- Energy management
- Time shifting
- Black start
- Load levering



Realiable power for demanding applications

WEG offers a wide range of alternators to meet the requirements of different applications in virtually any environment. The alternators are specially designed according to the specific characteristics of each application so as to meet the customers needs: generator sets, wind turbines, turbogenerators (steam or gas) and hydrogenerators.

The use of a generator set ensures power supply regardless the power grid, which makes WEG alternators an excellent solution for emergency or continuous operation in maritime and ground applications.

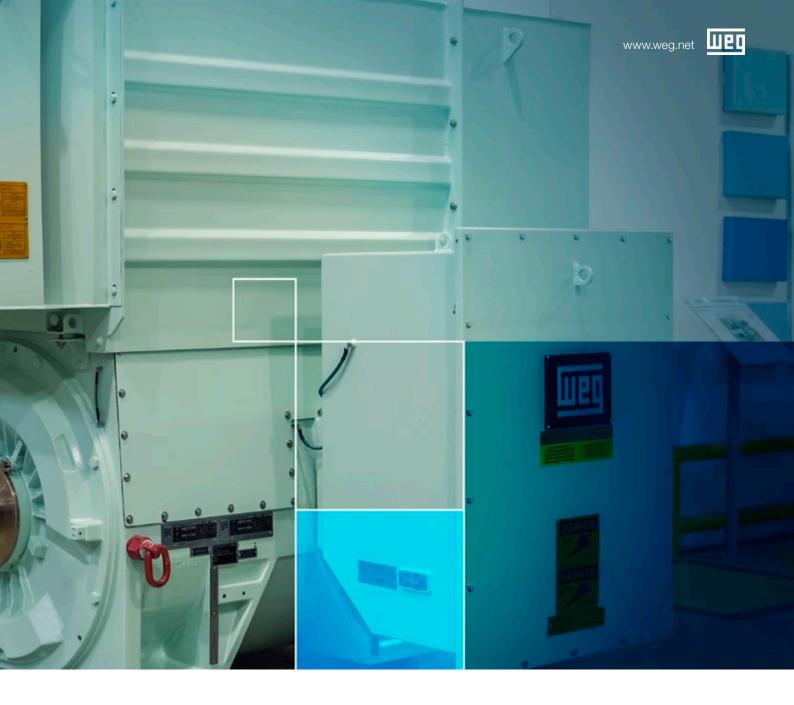
Output: up to 20 MVA





Efficiency and reliability for the industry

Manufacturing state-of-the-art low and medium voltage electric motors is what WEG has been doing since its foundation. Regardless of the market segment, the company continues to dedicate extensive resources and effort in order to produce long-lasting electric motors so as to ensure reliability of production for your industry.



This is what differentiates WEG as the manufacturer of industrial motors, always meeting the most demanding application requirements of the Power Generation Segment.

With output power up to 50 MW and voltages up to 13.8 kV, WEG delivers flexible mechanical design associated with high operational reliability, which make motors easy to be installed with extremely low downtime and service maintenance. Our team of engineers has conducted extensive technical research to produce suitable products complying with the most respected industry standards, according to both NEMA or IEC.





Vertical production process aligned with the application of high quality raw materials and project customization, differentiate WEG Transmission and Distribution solutions for the power generation segment. Offering complete solutions, WEG provides the entire electrical package, including the construction of internal distribution networks, transmission lines and connection to local utilities, always accompanied by technical support.



Conventional substations

WEG Substation Division has know-how and extensive experience designing and building medium and high-voltage electrical systems all over Brazil. It offers solutions for turnkey conventional substations, from the basic design to the detailed engineering design, comprising electrical studies, product and material supply and specialized works and services, which include commissioning and after-sales support, coordinating and integrating all the participants of the process.



Disconnectors

WEG offers competitive solutions for different needs in order to meet several technical requirements in 15 kV to 550 kV disconnectors. An economical and highly customized solution suitable for every substation layout, even within a limited space.







Available in voltage classes up to 550 kV they are designed to guarantee high performance in all applications.

The vertical manufacturing processes (production of the electrical insulating varnish, electric wires, tanks, insulating kits, coatings, etc.) is a remarkable characteristic and advantage of WEG, allowing broad quality control of the different production steps, as well as flexibility in lead times.



Oil transformers and dry transformers

Oil and dry transformers with power up to 20,000 kVA and voltage class up to 36.5 kV. With quality assured, WEG is among the main manufacturers of this line, ensuring the preference of consumer market. Developed by an engineering team specifically dedicated to this range of transformers due to the particularities and requirements to meet each application, these products have dimensions optimized for the purpose of provide space saving installation.





Integrated system

WEG automation equipment facilitates operation and control of power generation through system integration, thus ensuring security and reliability of information. Measurements for equipment maintenance management and production reports and energy consumption for generation, transmission and distribution companies.





Distribution, control and protection panels

Made of steel lamination type PNW / LCW / CCM-03 with IP42 degree of protection, meeting IEC 60439 standard with TTA certification.

Medium voltage operation and control panels

They are factory assembled and tested for 2.3 kV voltages at 36 kV, nominal currents from 1,250 to 4,000 A, and symmetrical short-time current from 25 to 50 kA. Designed to meet the demanding national and international standards NBR IEC 62271-200, with ease assembly and maintenance, thus as the flexibility to adapt to the different characteristics required by the market.







Supervision and control

WEG supervision and control system enables full integration between operator and power station, providing visualization of power, voltage, temperature, pressure, lubrication and protection status variables of equipment. Maintenance is reduced due to the level of information presented through event logging, alarms, history, trend graphs and operation log. Energy production and consumption reports are available through an easily accessible database, enabling integration with management systems. The ease and flexibility of power control makes plant operation simple and effective.





High resistance and performance coatings

Hydropower plants

High resistance to the corrosive effects with excellent impermeability and greater resistance to the mechanical abrasion caused by abrasive abrasion, are requirements met by WEG Coatings in the painting of floodgates, conduits and other hydroelectric equipment. We have developed a wide range of environmentally friendly power generation products with advanced technology to protect all types of substrates in new construction and maintenance for painting of hydromechanical equipment.



Thermal plants

Resisting corrosion and high temperatures is a requirement for the coatings that will be used in thermoelectric plants that operate with any fuel source. For this, the formulations have pigments rich in zinc to increase the anti-corrosion resistance, as well as modified silicones that guarantee resistance to temperatures up to 600 °C (1,112 °F).

WEG develops paints for metallic structures in buildings with boilers, machines and equipment capable of withstanding high temperatures and long periods of use, protecting the equipment and increasing the interval between maintenance.

Biomass and other sources

High performance coatings indicated for application in energy generation plants through the use of biomass, also being applied in panels, cubicles and substations.



Wind power

WEG Coatings offers a wide range of solutions for wind power segment, from the painting of the blades and tower structure to the most diverse internal and external equipment of the plant. They combine the versatility of products that can be applied on diverse substrates, such as fibers, concrete, galvanized steel and plastic, and excellent anticorrosive protection and high performance.

Transformers

In order to serve this demanding market, WEG Coatings has developed high technology coatings and varnishes, ideal for application in all kinds of transformers. The industrial system meets the strictest resistance and performance tests required by the industry. Our products bear certifications of compliance with the requirements of ABNT Standards in addition to several homologations.



Service

Services and support with the quality of weg products

Protecting your investment means more than insuring the plant. It also means keeping your equipment in top condition to maximize service life. That's why you can count on WEG - the responsive company with comprehensive rotating equipment services and support.

WEG has earned a reputation for quality by supporting our customers with specialized technical product and services, and our ability to respond promptly to customer demands. Excellent service is assured by people who understand your equipment and process needs. Our experienced staff of service engineers can spot potential performance problems and recommend corrective action.

Continue to enjoy the benefits of first-hand product knowledge and problem solving capabilities by having us train your on-site staff. We can recommend ways to improve your equipment life time and maximize your equipment availability. With that in mind, WEG is pleased to present the following key benefits that will bring a safe and reliable operation for the electric motors in the most remote and toughest environmental conditions.

Retrofitting and repowering service ranges

WEG also have the same facilities structure and standards to perform retrofitting and repowering services, extending the large equipment life time.

- Generators and DC motors
- Three-phase induction motors
- Synchronous motors
- Turbogenerators
- Hydrogenerators

- Steam Turbines (24/7 service)
- Hydraulic turbines
- Wind turbines
- Gearboxes and multipliers (24/7 service)

Energy efficiency

Identification of potential reduction of power consumption in electric motors, drives and deviations in the power factor, proposing solutions and defining the necessary retrofit. Results presented with individual return deadlines, making the decision flexible.

Recoverability capacity limit

Definition by means of technical and economic criteria of the feasibility to repair or replace the electric motors. The work is performed with the help of a specific software application, analyzing the data of each plant, allowing the cost analysis of the life cycle of the motors.

Commissioning and start up

Bearing in mind the magnitude of the projects and complexity of the installed equipment, WEG offers specialized technical support for the installation, from beginning to end including supervision services. Also included is verification of equipment details and concept integration with the entire system.

Project management

Complex hydroelectric power plants projects usually require very strict control of technical documents, production schedule, inspections and logistic procedures. In those cases WEG offers dedicated staff structure to support tasks at different stages of the project execution. With these initiatives WEG provides clear and up to date information on the equipment manufacturing stages and keep all parties involved informed on the production and delivery progress.

Preventive maintenance

Checkup and preparation of preventive plans according to maintenance concepts focused on reliability and adjustments according to operating conditions for each plant.





WEGCIGITAL SOLUTIONS



A new way to combine smart people, companies and products.



Based on its engineering expertise, WEG made available a new way of combining people, companies, software and intelligent products, resulting in a global solution that transforms energy into more reliable, efficient and intelligent solutions.

No matter your company size, we can help you:

Scalable and flexible solutions

- Easy to be implemented independently of the type of industry.
- Flexible solution designed for you.

WEG Expertise

We have the ability to contribute to increasing the operational efficiency of our partners and reducing waste in different industry processes.

Co-working

- We support you to migrate from traditional industry into Industry 4.0.
- We share our technologies and experience to benefit your business.









WEG ENERGY MANAGEMENT is resource consumption management software, such as electricity, water, gas, compressed air and fuels, for industrial, commercial and even condominium applications. It transforms the data collected by **energy and utilities measuring** devices into information for monitoring and managing the use of these resources, in real time and in a user-friendly way.



Compatibility with various market measurement devices (reduces the Total Cost Ownership)



Collection and visualization of data online



Co-creation for customizing dashboards and reports



Configuration of access rules for users



Resource management in an integrated, digital and intelligent way. Unified information on just one platform: EASY TO MANAGE, SIMPLE TO USE.



Virtual oscilloscope for accurate diagnostics



User configurable calculations, alarms and reporting functions



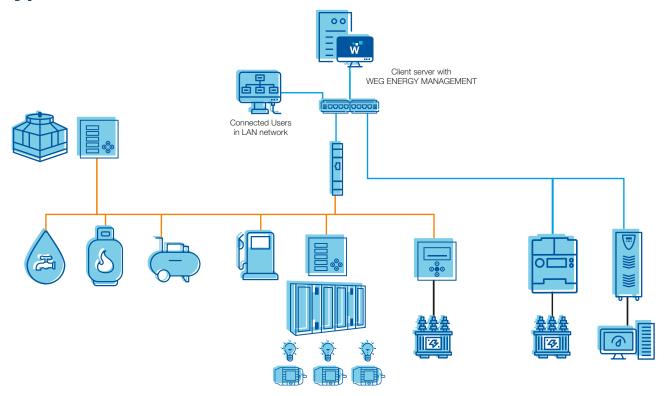
Integration with other systems ERP, MES, SCADA and databases



Scalable system, allowing expansion of measurement points

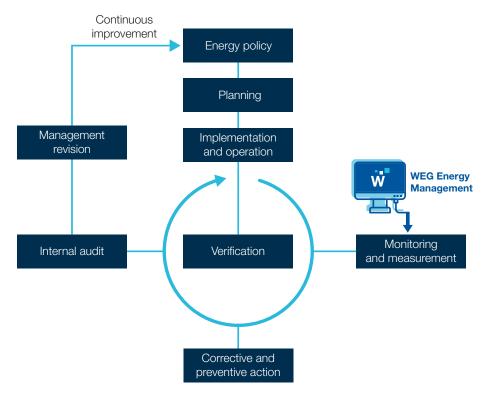


Typical architecture



Continuous improvement in energy management

WEG Energy Management assists in the implementation of the most diverse global regulatory standards for energy management, such as ISO 50001.



Flowchart of the energy management process according to ISO 50001

WEGnology[®]

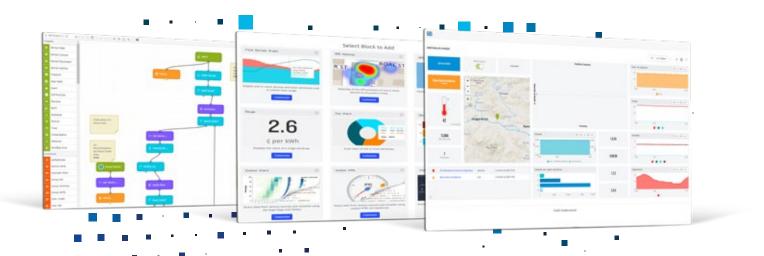
WEG IoT platform

WEGnology® IoT platform is a powerful tool based on cloud computing especially developed to create connected solutions. The practical use of the tool, whether for simple or more complex applications, allows the creation of collaborative ecosystems, in addition to enabling the co-creation of solutions focused on the digitization of processes and gains in efficiency.

Highly scalable, the WEGnology® IoT platform has advanced resources for data collection, aggregation and view, allowing its application in the most varied segments, in addition to providing a better understanding of the large amount of data coming from factory floor devices, such as sensors, motors, actuators, drives, controls, among others.

Main characteristics

- The drag and drop function in the visual workflow simplifies and accelerates the development of IoT solutions while streamlining the adaptations and adjustments according to the natural and constant evolution of the business logics
- Easily customizable dashboards are built simply and quickly, meeting the business requirements
- Geolocation and correlation between variables are also easily configured by the user. Multitenant applications, as well as specific domains or reports are also possible in the "organization" environment
- The platform also allows data processing and transformation, numerical simulation, statistical modeling and machine learning through the use of Jupyter Notebooks





Industrial boilers, quite common in the sugar and ethanol industry, are systems that transform water into steam, which later it will be used in several processes within the same factory. Normally, the boiler is composed of a furnace or oven, where the fuel is burned, generating energy to transform water into steam, inside the pressure vessels.

The BirminD expertise for boilers aims to generate a reduction in fuel consumption, as well as increase the efficiency of burners and steam generation, acting on the factors below.

- Monitoring critical points of the process
- Understand and optimize oxygen consumption in burners
- Decrease fuel consumption
- Fine tuning of process PID loops and advanced control optimization

For boiler optimization, the important thing is to understand how the control loops interact with each other, through the data already collected by the equipment. The survey of the control and measurement system installed in the boiler is also relevant, because through this equipment it will be possible to carry out the improvement of the process.

Site Survey

- Field survey of equipment
- Data and PID analysis through history
- Elaboration of technical documentation for implementation
- Preliminary ROI calculation
- Survey of improvements

Implementation

- Installation of the necessary sensors and devices
- System commissioning
- Interaction with the existing supervisory

Application

- Advanced control parameterization
- Optimization of PID loops
- Fine-tuning sensors and actuators

Validation

- Monitoring of implemented logics
- Consumption validation
- Presentation of ROI obtained





Sustainability



WEG, as a way of reaffirming its commitment to **Sustainable Development**, is a signatory to the UN Global Pact. And it continuously works to align its strategy and operations with the Ten Universal Principles in the areas of Human Rights, Labor, Environment and Anti-Corruption. This adherence also reaffirms WEG's alignment with the Sustainable Development Goals (SDGs).

HUMAN RIGHTS



- 1 Businesses should support and respect the protection of internationally proclaimed human rights.
- 2 Make sure that they are not complicit in human rights abuses.

LABOUR



- 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.
- 4 The elimination of all forms of forced and compulsory labor.
- 5 The effective abolition of child labor.
- 6 The elimination of discrimination in respect of employment and occupation.



ENVIRONMENT

- 7 Businesses should support a precautionary approach to environmental challenges.
- 8 Undertake initiatives to promote greater environmental responsibility.
- 9 Encourage the development and diffusion of environmentally friendly technologies.



ANTI-CORRUPTION

10 - Businesses should work against corruption in all its forms, including extortion and bribery.



TO DEVELOP **TECHNOLOGIES AND** SOLUTIONS CONTRIBUTING TO A MORE EFFICIENT **AND SUSTAINABLE** WORLD.



Global Presence

With more than 40,000 employees worldwide, WEG is one of the largest electric motors, electronic equipments and systems manufacturers. We are constantly expanding our portfolio of products and services with expertise and market knowledge. We create integrated and customized solutions ranging from innovative products to complete after-sales service.

WEG's know-how guarantees our *Power Generation* is the right choice for your application and business, assuring safety, efficiency and reliability.



Availability is to have a global support network



Partnership is to create solutions that suits your needs



Competitive edge is to unite technology and inovation







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The scope of WEG Group solutions is not limited to products and solutions presented in this catalogue.

To see our portfolio, contact us.



www.weg.net





+55 47 3276.4000



info-br@weg.net



Jaraguá do Sul - SC - Brazil