

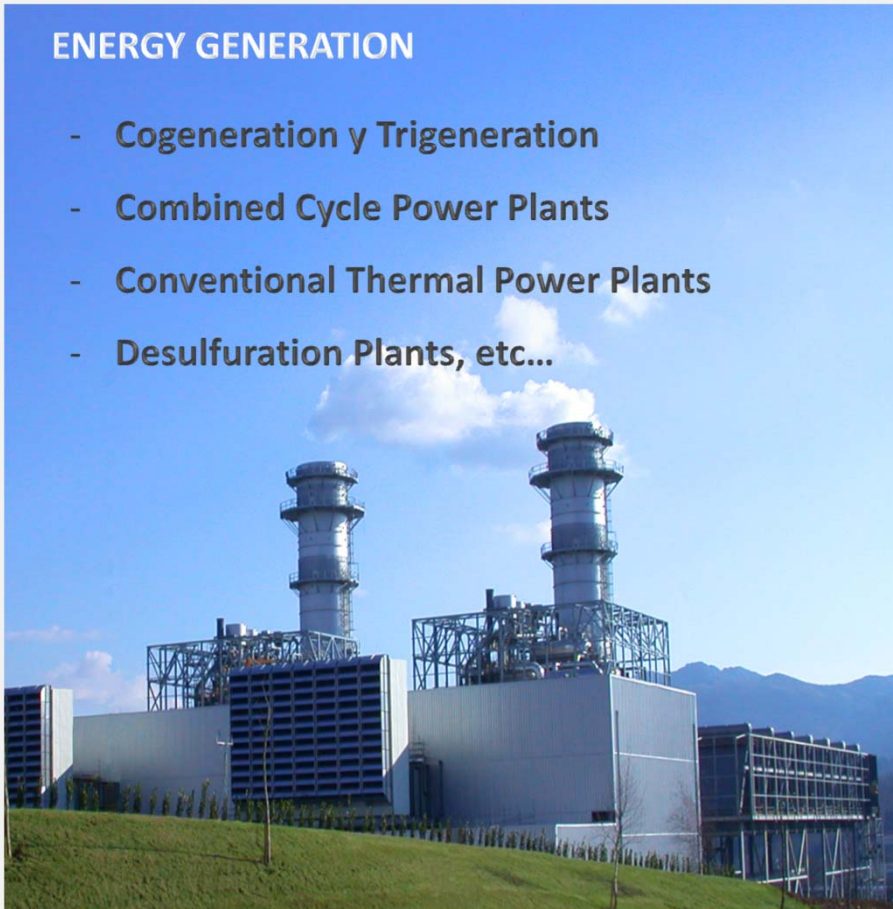
Ingeteam

ENERGY AND EFFICIENCY

Electrical Equipment, Automation and Process Control, developing specific applications covering the entire production process.

ENERGY GENERATION

- Cogeneration y Trigeration
- Combined Cycle Power Plants
- Conventional Thermal Power Plants
- Desulfuration Plants, etc...



EFFICIENCY

- Efficiency equipment
- Installations Reautomatization
- Energy Management System



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EFFICIENCY

SERVICES

PROJECTS

High-end products and engineering solutions designed to meet the most demanding applications

Power Generation



Power Distribution



Power Converters

INGEDRIVE®



Motors

INDAR®



PCRs

INGEHOUSE®



Submersible Pumps

INDAR®



Automation & Control



Condition Monitoring



Energy Management



Services



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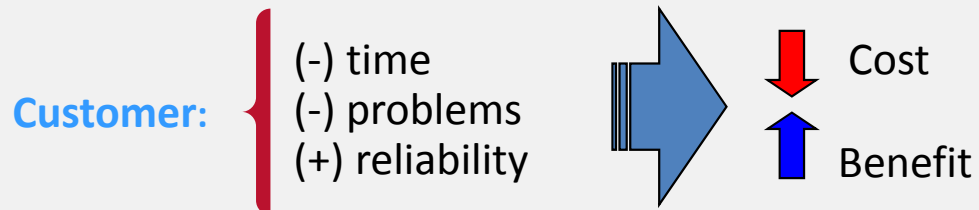
SERVICES

PROJECTS



Turnkey Solutions

- Project Management
- Complete Electrical Engineering
- Development of Software, PLCs, SCADA, Protections...
- Supply of Electrical and Control Equipment
- Integration and Coordination with other suppliers
- Integral Testing
- Electrical Erection and/or Erection Supervision
- Commissioning
- Training
- Maintenance Services and 24-hour online assistance
- Spare Parts



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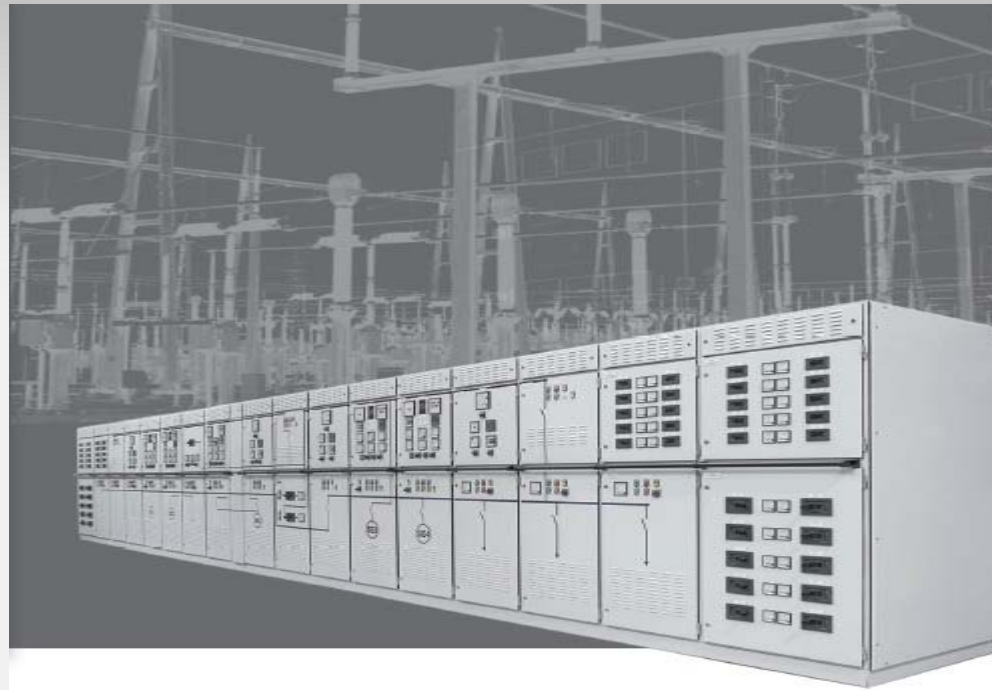
EFFICIENCY

SERVICES

PROJECTS

Complete Electrical Installation

- Electrical Connection Substation
- Main and auxiliary service transformers
- Electric generators
- Medium-voltage distribution
- General plant control system, regulation, electrical protection, monitoring and operation
- Motor Control Centers (MCC)
- Low-voltage distribution and lighting
- Batteries, UPS and DC Distribution
- Earthing Systems



Design and Construction of Electrical Panels

- Distribution Panels from 1 to 36 kV
- Transforming Substations
- Motor Control Centers, from 400 Vac to 7,2 kV
- Control and Protection Panels
- Lighting, pushbutton panels, etc.
- Vac and Vdc distribution panels
- Desks, Consoles, Synoptic/block diagrams

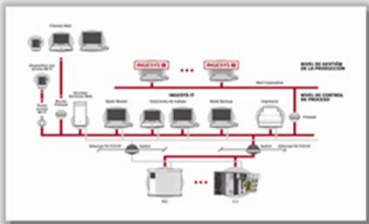
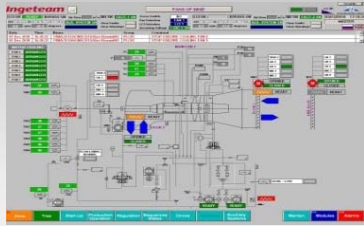
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PROJECTS



■ Main Automation for Processes

- Custom-made engineering solutions for:
 - New projects
 - Upgrades or expansions
- Software development and specific control functions:
 - Ensuring the quality of the process and increasing productivity
 - Maximizing plant performance and profitability
 - Flexibility and adaptability for future expansions
- Scalable and open-architecture based on recognized standards, enabling integration with third-party software, communication with a wide variety of industrial devices, and interface with other levels of the plant.
- Own hardware control system platforms and software tools.

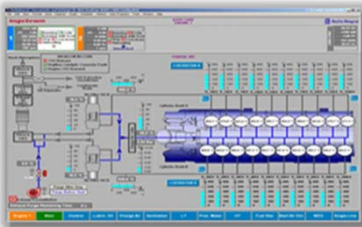
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PROJECTS



■ Automation Systems

- Control desk and local control panels
- Field devices and sensors
- Logic and sequential control systems based on programmable controllers PLCs
- I/Os remote units for field data acquisition
- Industrial networks (Profibus-DP, Modbus, Ethernet,..)
- Engineering stations
- Human Machine Interface systems for supervision and process control (SCADA)
- Control, supervision, and remote technical assistance.

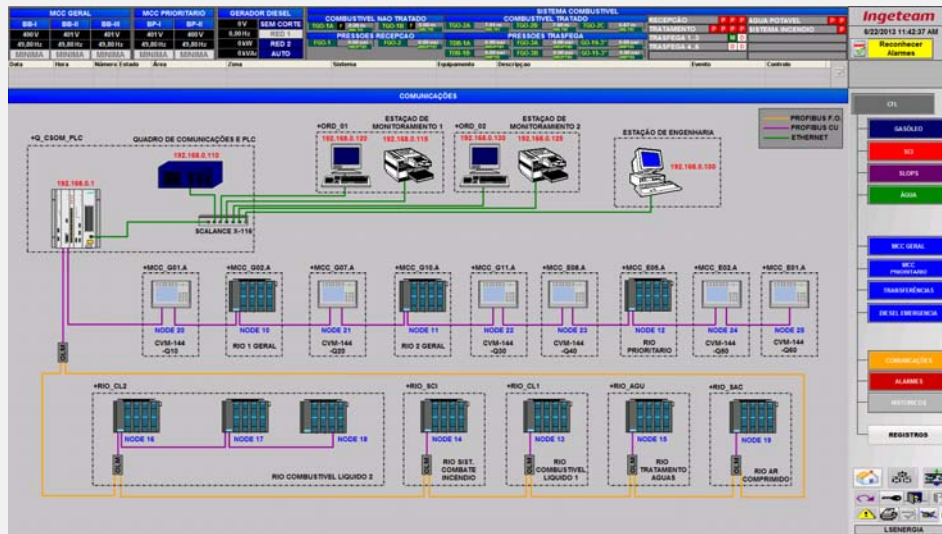
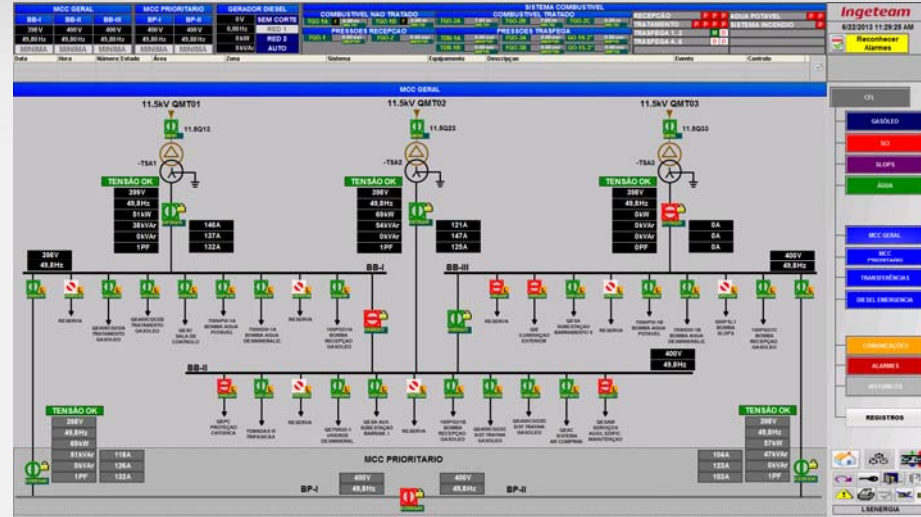
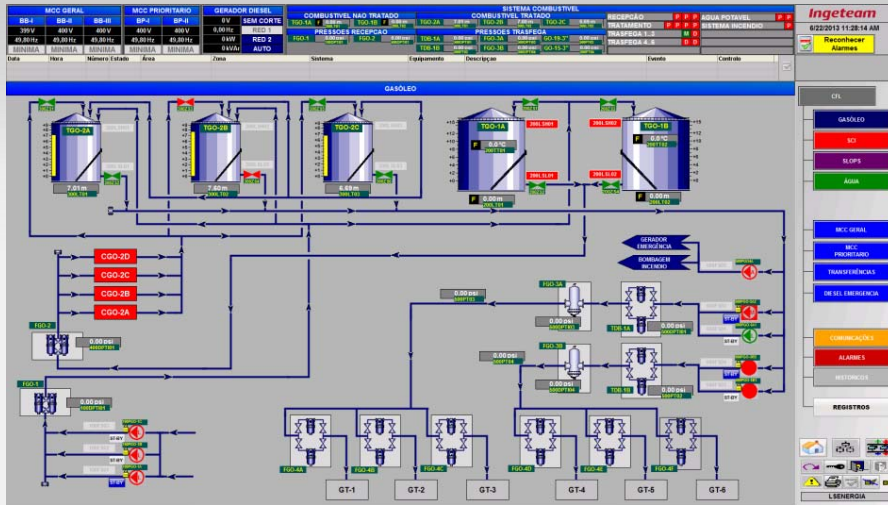
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Agri-food Sector:
Greenhouses, Canning Industry...



Industrials Processes:
Ceramic, Textile, Waste-paper...



Tertiary Sector:
Hotels, Hospitals, Airports...



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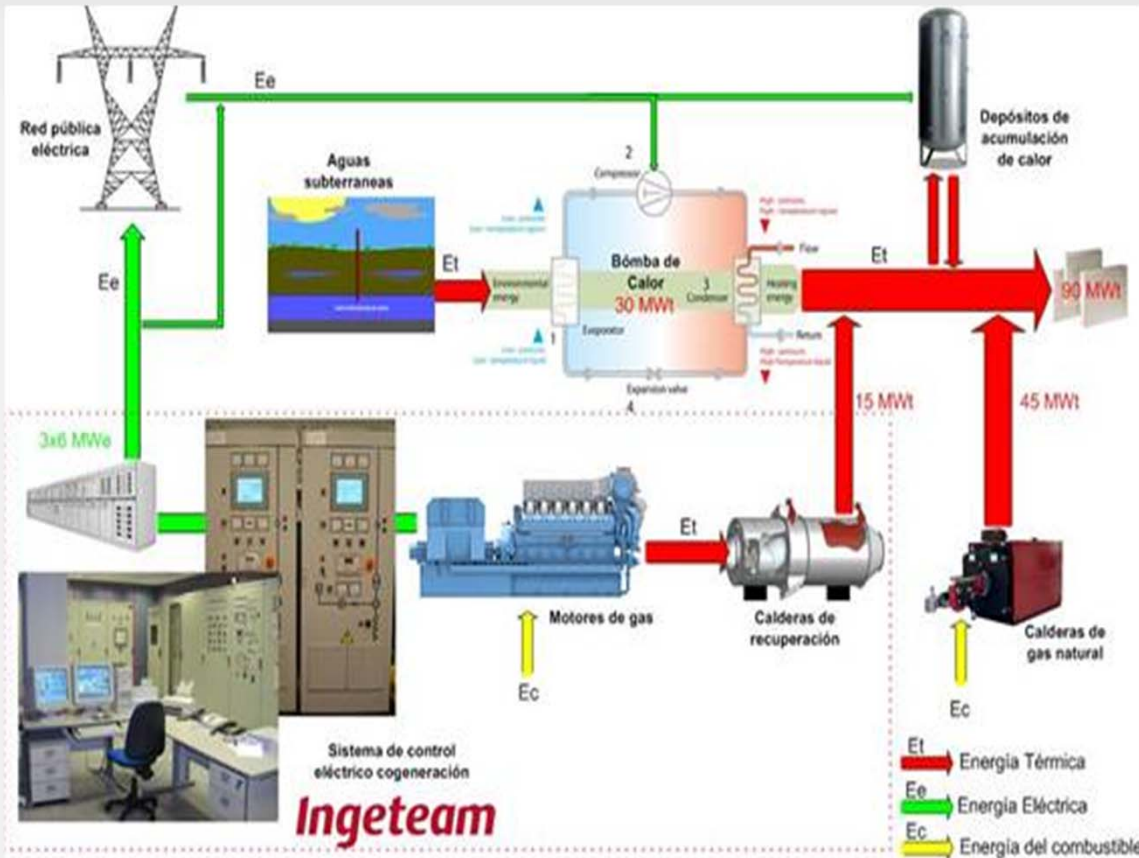
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SERVICES

PROJECTS

Plants designed to arrangements for the provision of electricity and combined heat / cold.



■ Integrated Control System

- Interconnection to the electrical grid: line protection, measurement and control positions.
- Integrated control for generators:
 - Control Sequences
 - Voltage and reactive power regulation.
 - Synchronization.
- Control of auxiliary systems (water, air, etc,...)
- Boiler/ Absorption machine Control
- SCADA System for control y supervision
- Remote Control

■ Electrical Generators

- Synchronous until 60 MVA
- Continuous Voltage until 4.000 kW
- Synchronous with permanent magnets until 8 MVA

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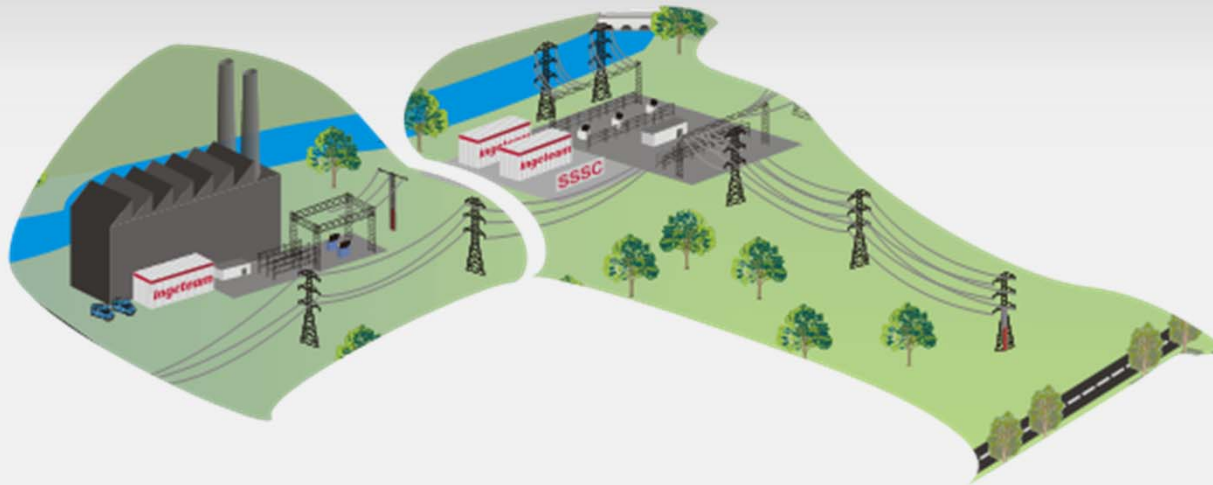
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PROJECTS

Efficiency Grid ⇒ best performance ⇒ energy saving



Objetives

- **Provide uninterrupted power** to the entire plant or controlled process
- **Maximize** the efficiency of the variety of installed equipment and maintenance personnel
- **Allow flexibility** and adaptability to accommodate rapid growth (integration)
- **Get a saving** in energy consumption per production unit and emissions reduction
- Integration of the information in a local control panel and supervision for taking decisions
- **Electricity reduction** cost for the end customer

INGETEAM, guided by ISO 50001 and EN 16001 (energy management systems) is able to facilitate the incorporation of energy management.

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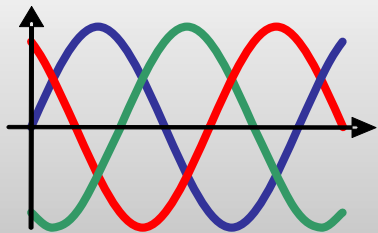
SERVICES

PROJECTS

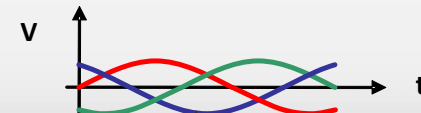
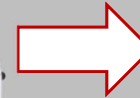
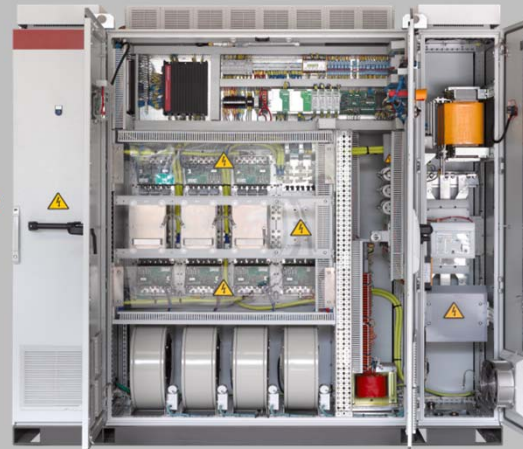
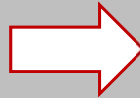
AC DRIVES

INGEDRIVE™

Grid



Fixed Frequency

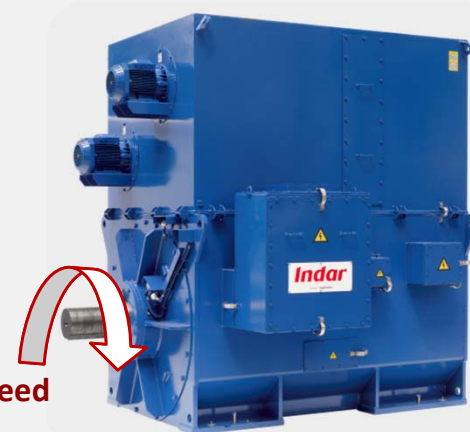


Variable Frequency



AC Frequency Converters based on a combination of a rectifier stage with different options (DFE or AFE), a capacitor bus and an inverter stage with two or three levels depending on the output voltage.

Variable Speed



Industrial Solutions

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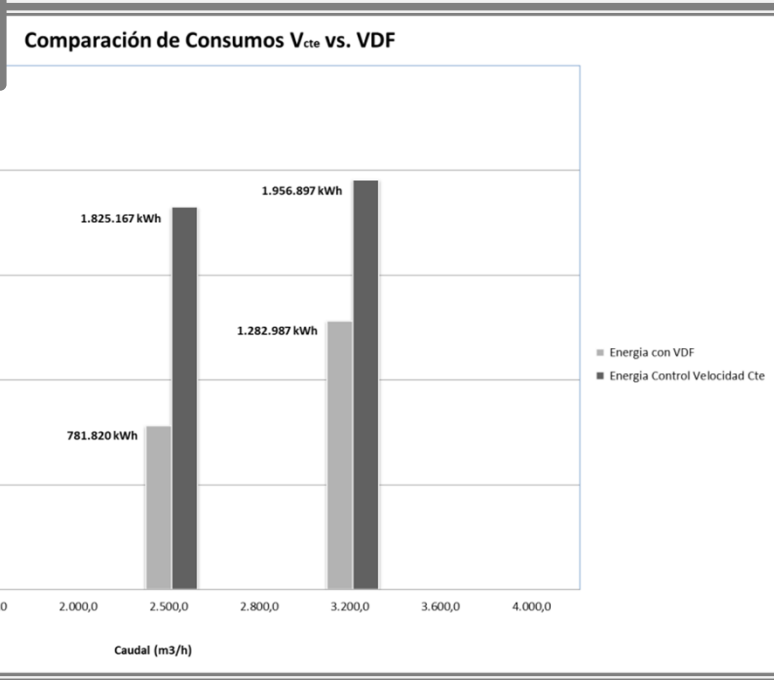
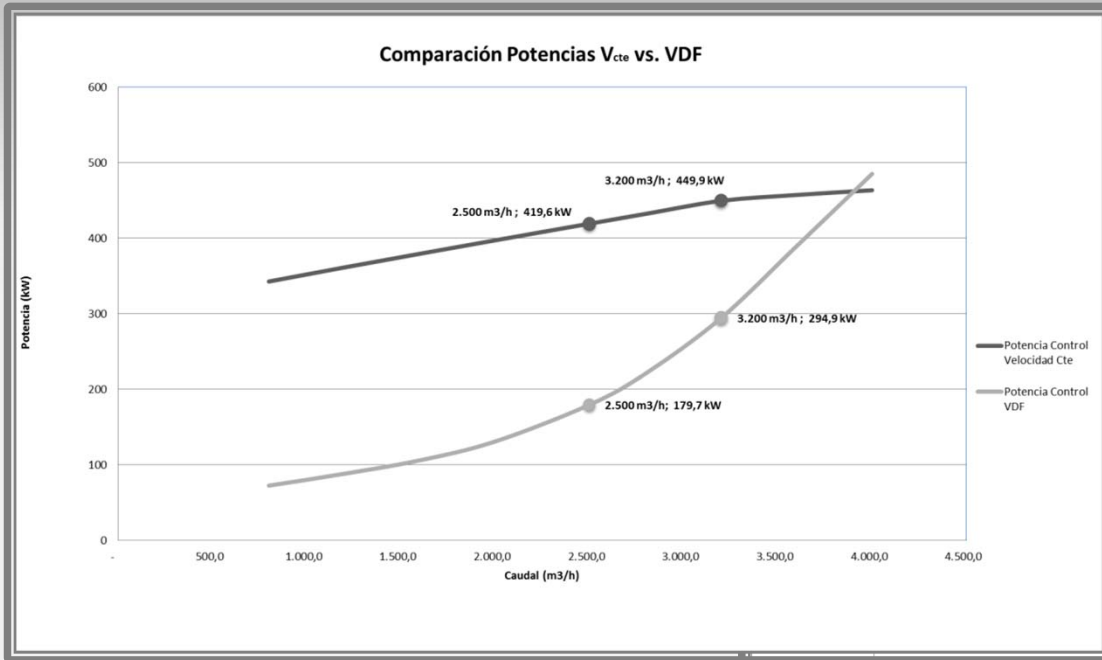
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PROJECTS

Example of Energy Saving



Annual Energy Saving

Up to 50 %

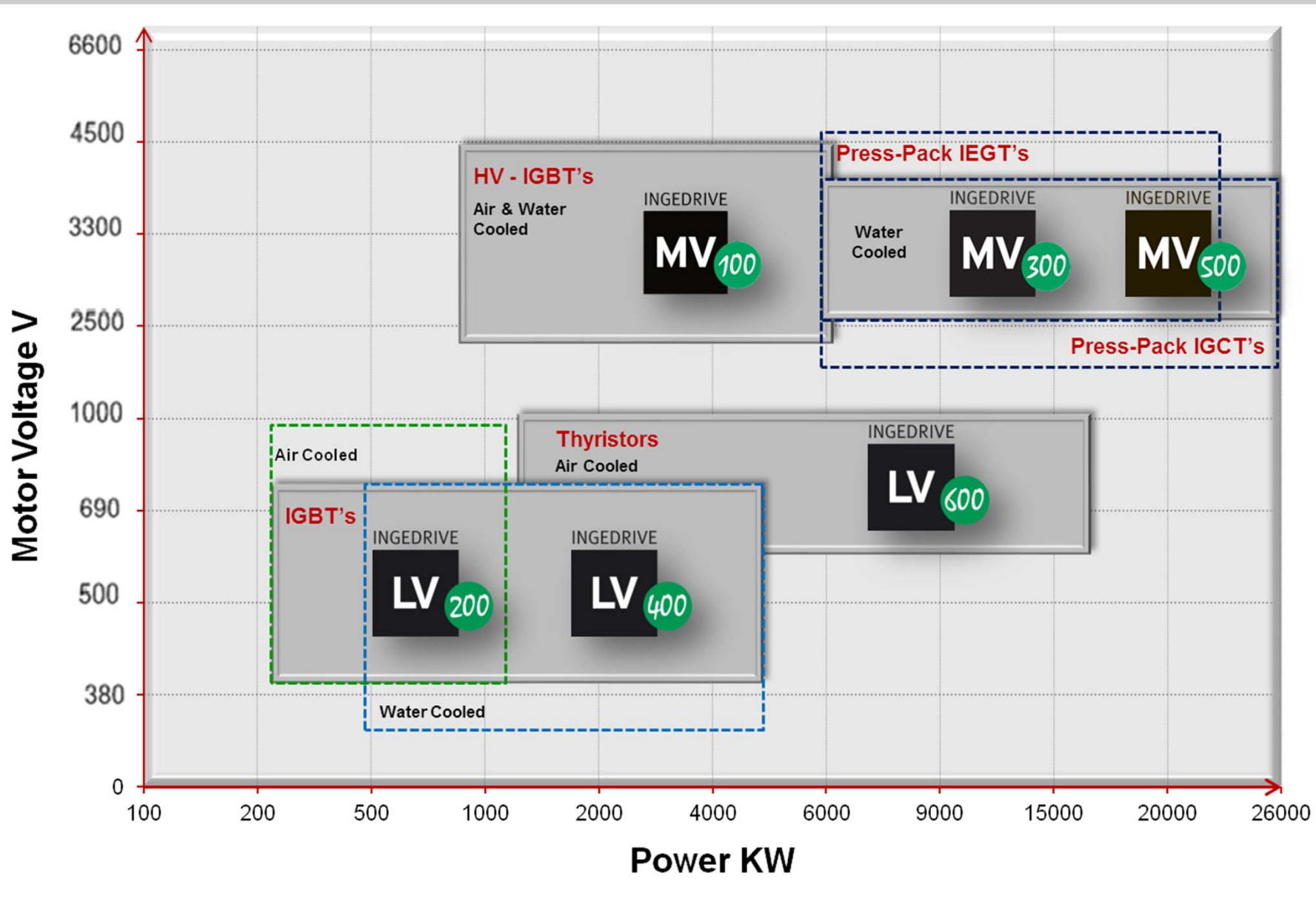
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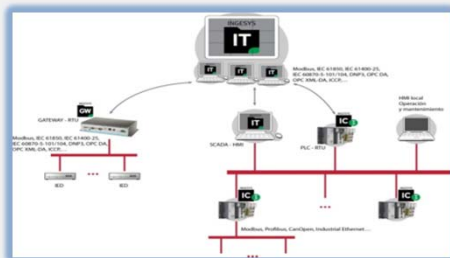
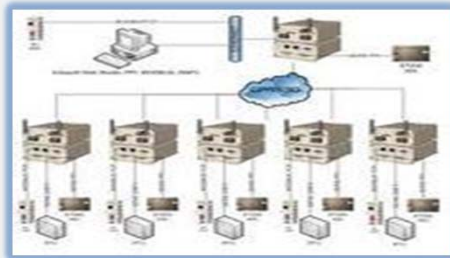
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SERVICES

PROJECTS



■ Ingeteam EMS

- Assures continuous power service
- Maximizes process productivity
- Provides the tools to help control energy costs
- Flexible and scalable to integrate future plant expansions

■ Products and Services

- Consultancy and engineering (Automation & Control, energy efficiency, communications)
- **INDAR/INGEDRIVE**. High efficiency motors and power converters
- **INGESAS MULTITRANS**. Energy measurement equipment
- **INGESAS PQM300**. Power quality analyzers
- **INGESAS PL300/PD300/PM300**, **INGESAS TCP**. Protection relays (motors, transformers, switch breaker)
- **INGEGRID**. Power electronics for energy management (energy recovery, energy storage, reactive power control)
- **INGESAS RIO**. Remote IO units

■ Communications

- **INGESAS IC3**. Powerful IEC61850 communications client for substations and industrial environments.
- **INGESAS GATEWAY**. Protocol converter family offering standard-based communication solutions (Modbus, IEC 61850, IEC 60870-5-101/104, DNP3, OPC, ICCP, etc.)

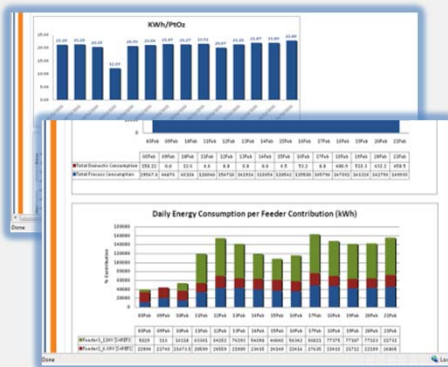
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PROJECTS



■ SCADA

Fully integrated solution for plant power consumption supervision, control and data acquisition: INGESYS IT

- Categorize major power consumers, efficiency and influence factors
- Energy base line creation
- Open-architecture and scalable
- Real-time supervision to integrate process control
- Web access module

■ EMS. Analysis

Fully integrated approach to control energy costs both for production processes and power installation.

- Power consumption analysis and electricity pricing
- Forecasting energy consumption
- Early detection of power capacity limits
- Report generator, with historic data, trends and statistics
- Energy efficiency rates and indicators

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Energy Generation

Thermal Plants and Desulfuration Plants

- Angola - Thermal Plant Dos Caminhos Do Ferro / LS Energía-ENE
- Angola - Thermal Plant Quileva-Lobito / LS Energía-ENE
- Spain - Distributed Control System(DCS) FGD de C.T. Lada IV (Desulfuration Plant)/ Iberdrola
- Spain - Electrical Engineering FGD de C.T. Lada IV (Desulfuration Plant)/ Iberdrola
- Spain - Sistema Control Distribuido (DCS) FGD de C.T. Velilla (Desulfuration Plant)/ Iberdrola
- Spain - Ingeniería Eléctrica FGD de C.T. Velilla (Desulfuration Plant)/ Iberdrola
- Spain - C.T. Combined Cycle Boroa / Bizkaia Energía- ESB (2x300 MVA + 1x200 MVA)
- Spain - Sangüesa Plant/ E.H.N. – Acciona (1x25MVA)
- Spain - C.T. Escombreras / Iberdrola (2x332MVA)

Cogeneration and Trigeneration

- Mozambique – Ressano Garcia/ GIGAWATT (Motor Gas 13x9,6MW -Rolls Royce)
- Russia)– CHP Dalsem/ Rolls Royce (Motor Gas 4x6,8 –Rolls Royce)
- Holland - CHP Greenvliet / Greenvliet (Motor Gas 1x6,8MW -Rolls Royce)
- Holland - CHP Redstar/ Redstar B.V. (Motor Gas 1x7,5MW-Rolls Royce)
- United Kingdom - CHP APS Salads / APS Salads Ltd (Motor Gas 1x7,5MW-Rolls Royce)
- Norway - Test Stand/ Rolls Royce (Motores Gas-Rolls Royce)
- Romania - CHP Focsani / Municipio de Focsani (Motor Gas 1x6,8MW-Rolls Royce)
- Belgium - CHP Het Groene Huis / Het Groene Huis (Motor Gas 1x7,5MW-Rolls Royce)

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- Holland - CHP Redstar/ Redstar B.V. (Motor Gas 1x7,5MW-Rolls Royce)
- Holland - CHP Van Marrewijk/ Jan Van Marrewijk B.V. (Motor Gas 1x7,5MW-Rolls Royce)
- Holland - CHP Agro Care/ Agro Care Growers (Motor Gas 1x7,5MW-Rolls Royce)
- Russia - CHP Lukoil/ Lukoil (Motor Gas 5x6,3MW-Rolls Royce)
- Turkey - CHP Sireci/ Sireci Textiles (Motor Gas 1x8,2MW-Rolls Royce)
- France - CHP Clermont Ferrand / VINCI (Motor Gas 1x17MW-GE Oil&Gas)
- Spain - CHP Intermalta/ Intermalta (Motor Gas 1x6,8MW-Rolls Royce)
- USA- Test Stand / Waukhesa (G-M 1x20MW + G 1x6,8MW)
- Spain - CHP Papertech/ Papertech (Motor Gas 1x8,5MW-Rolls Royce)
- Italy - CHP Chieri/ High Power s.p.a. (Motor Gas 1x5,1MW-Rolls Royce)
- Spain -Test Stand/ Wartsila Ibérica (Motor Gas/Diesel 1x1,2MW-Wartsila + VSD-Ingeteam)
- Spain - CHP Nufri/ Nufri (Motor Gas 2x6,8MW-Rolls Royce)
- Spain - CHP Tudela/ Hidrocantábrico (Motor Gas 2x5,1MW-Rolls Royce)
- Niger - CHP Cadbury /Cadbury Nigeria Plc (Motor Gas 1x3,6MW-Rolls Royce)
- Pakistan - CHP Rupali/ Rupali Poliester Limited (Motor Gas 2x3,6MW-Rolls Royce)
- Yemen - Uqlah Oil Processing Facility/OMV Exploration GmbH (Motor Gas 3x5,1MW + Motor Diesel 1x4,1MW -Rolls Royce)
- Pakistan - CHP Cresent Textil/ Cresent Nahuman Ltda. (Motor Gas 2x3,1MW-Rolls Royce)
- Spain - CHP Sales Monzón/ Sales Monzón (Motor Gas 2x6,8MW-Rolls Royce)
- Spain - CHP Movialsa III /EQTEC-Movialsa (Motor Gas 2x5,1MW-Rolls Royce)

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- Italy - CHP Savigliano/ High Power s.p.a. (Motor Gas 2x6,8MW-Rolls Royce)
- Italy - CHP Chieri/ High Power s.p.a. (Motor Gas 2x5,1MW-Rolls Royce)
- Italy - CHP Mondovi/ High Power s.p.a. (Motor Gas 3x3,6MW-Rolls Royce)
- Turkey - CHP Istanbul Airport/TAV Turkish Ataturk Airport(Motor Gas 3x3,6MW-Rolls Royce)
- USA- CHP Basell / Basell North América Lake Charles, LA (Motor Gas 2x8,5MW-Rolls Royce)
- Bangladesh - CHP Unique III / Everest Power (Motor Gas 3x8,5MW-Rolls Royce)
- Russia - CHP LLC Advise / Rolls Royce (Motor Gas 2x6,8MW-Rolls Royce)
- Italy - CHP AEM Canavese / AEM s.p.a. (Motor Gas 3x5,1 MW-Rolls Royce)
- Holland - CHP Elpiri / Elpiri Energie (Motor Gas 1x6,8MW-Rolls Royce)
- Holland - CHP De Jong / De Jong - Franke (Motor Gas 1x5,1 MW-Rolls Royce)
- Holland - CHP Green Vliet / Green Vliet (Motor Gas 1x6,8MW-Rolls Royce)
- Holland - CHP Kesgro / Kester Grootscholten Beheer B.V. (Motor Gas 2x8,5MW-Rolls Royce)
- Holland - CHP Agro Care / Agro Care Growers (Motor Gas 2x8,5MW-Rolls Royce)
- Spain - CHP Girasol / Bunge Ibérica (Motor Gas 3x3,6MW-Rolls Royce)
- Spain - CHP Soja / Bunge Ibérica (Motor Gas 3x3,6MW-Rolls Royce)
- Spain - CHP Monjuic / Bunge Ibérica (Motor Gas 3x3,6MW-Rolls Royce)
- Spain - CHP TTT /Tratamientos Térmicos T.T.T. (Motor Gas 1x1,8MW-DEUTZ)
- Spain - CHP Project Rofeica / Wartsila Diesel
- Spain - Sistema de Excitación Estático/ Cristalería Española
- Spain - CHP Benavente / Azucarera Benavente
- Spain - CHP / Guascor

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- Spain - CHP / Campofrío
- Spain - CHP / Enviroil
- Spain - CHP Bañares/ Wartsila Diesel
- Spain - CHP Tortosa - Tortosa Energía (Turbina 1 x 25 MW)



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Energy Efficiency

- Spain - VDF Water Pump/Valdelentisco Desalinization Plant (1x Pump 2MVA 3,3kV)
- Spain - EMS Emergency Generators /Enagas Regasification Plant (Huelva)
- Spain - EMS Emergency Generators /Enagas Regasification Plant (Cartagena)
- China -VDF / Tonting (1x 2300kW; 3,15 kV : MV100)
- Spain - VDF A.T./Red Eléctrica (4x8MW; 3,15kV)
- Russia - VDF Molinos/ Outotec (1xSAG Mill 2.300kW; 3,15 kV : MV100)
- Russia - VDF Molinos/ Outotec (1xBall Mill 2.100kW; 3,15 kV)
- Spain - Heating, Ventilating and Air Conditioning Ingeteam
- China - VDF Elevator/ Huaibei Mining Industry Co., LTD (2x2.000kW; 3,15 kV)
- Russia - VDF Mining fan/ Norilks Nickel (2x4.600kW; 6kV)
- India - Combustion Gases Fan CHP/ NTPC Ramagundam (1x1200kW; 3,15kV)
- Spain - VDF Water Pump/Acciona Energía (680 kW; 690V : LV200)
- India - VDF Nuklear Central Pump/ Bhavini (2x3,6MW; 3,15kV + 2x2,7MW; 3,15kV)
- Spain - VDF Water Pump/Acciona Energía (680 kW; 690V : LV200)
- Germany - VDF Chemist Plant/ Basf (1130kW; 690V: LV400)

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technology + innovation + commitment

Ingeteam Power Technology, S.A.

Parque Tecnológico, Edificio 106 - 48170 Zamudio - Spain

T +34 94 656 95 00

Email: sales.is@ingeteam.com

Web: www.ingeteam.com