

Yokogawa in the power industry

Co-innovating tomorrow™

In a business environment that has changed dramatically, Yokogawa continues to create new value with our partners and strive for growth along with our customers. We shall also continue as good citizens with the courage to innovate.

Wide application experience in the power industry

Fossil fuel fired power plants

- Coal/oil/gas fired
- Combined cycle
- Simple cycle
- Co-generation
- Industrial boilers
- Independent water and power producers (IWPPs)



Coal fired power plant



Combined cycle power plant



Industrial boiler plant/co-generation plant

Environment protection

- Flue gas desulphurization (FGD)
- Continuous emission monitoring system (CEMS)
- Steam and water analysis system (SWAS)



FGD plant

Renewable power plants

- Geothermal
- Biomass
- Waste to energy
- Solar PV&CSP
- Wind
- Hydroelectric



Geothermal power plant



Biomass power plant



Solar thermal power plant



Wind power plant



Hydroelectric power plant

Optimum energy operation with IIoT technologies for smart communities

SCADA & Plant Information Systems



STARDOM

The STARDOM's autonomous controllers are highly durable and provide support for CANopen, Modbus, Profibus, and various other network protocols. STARDOM controllers are suitable for energy management systems, they help smooth out power demand and power supply and optimize energy consumption.



Conventional power



FEMS

Factory energy management system



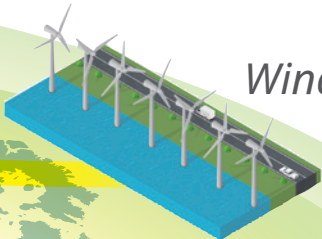
CEMS

Community energy management system



CI Server

The CI Server is a complete platform independent software solution with high performance, high capacity and a truly open architecture. As an enterprise automation solution (EAS), it unifies multiple plants/locations as one entity and enables centralized operation and monitoring. The CI Server web-based SCADA system enables remote engineering, maintenances and monitoring of all the distributed sites from a single remote monitoring center.



Wind



Solar



Battery



EV Station



FA-M3V

The FA-M3 is a high-performance programmable logic controller (PLC) that combines very high processing speeds with stable control features. It can be utilized to monitor and control the operation of individual wind turbines and battery management systems.

Total power plant control system

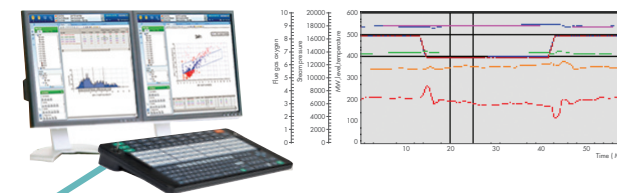
Human interface station/engineering station

The human interface station (HIS) provides a unified and intuitive operating environment. Screens are ergonomically designed and arranged to reduce operator fatigue and discomfort. The engineering station provides powerful configuration tools and a virtual test function.



Plant information management

All types of plant information including process data, alarms, events and sequence of events (SOE) are handled by plant information management, enabling the analysis of plant operational performance.



Plant resource management

Plant resource management integrates and manages maintenance information from field instruments and monitors online conditions.

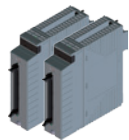


STARDOM



The Servo Module and Protection Module in a controller enable:

- Speed/load control
- Overspeed protection control
- Surge detection
- LVDT calibration
- Turbine run-up



Field Control Station (FCS)

The FCS provides powerful control functions with a highly reliable dual redundant configuration that incorporates Yokogawa's own pair-and-spare technology.



- Unit master control
- Boiler control
- Automatic plant start-up

ProSafe-RS



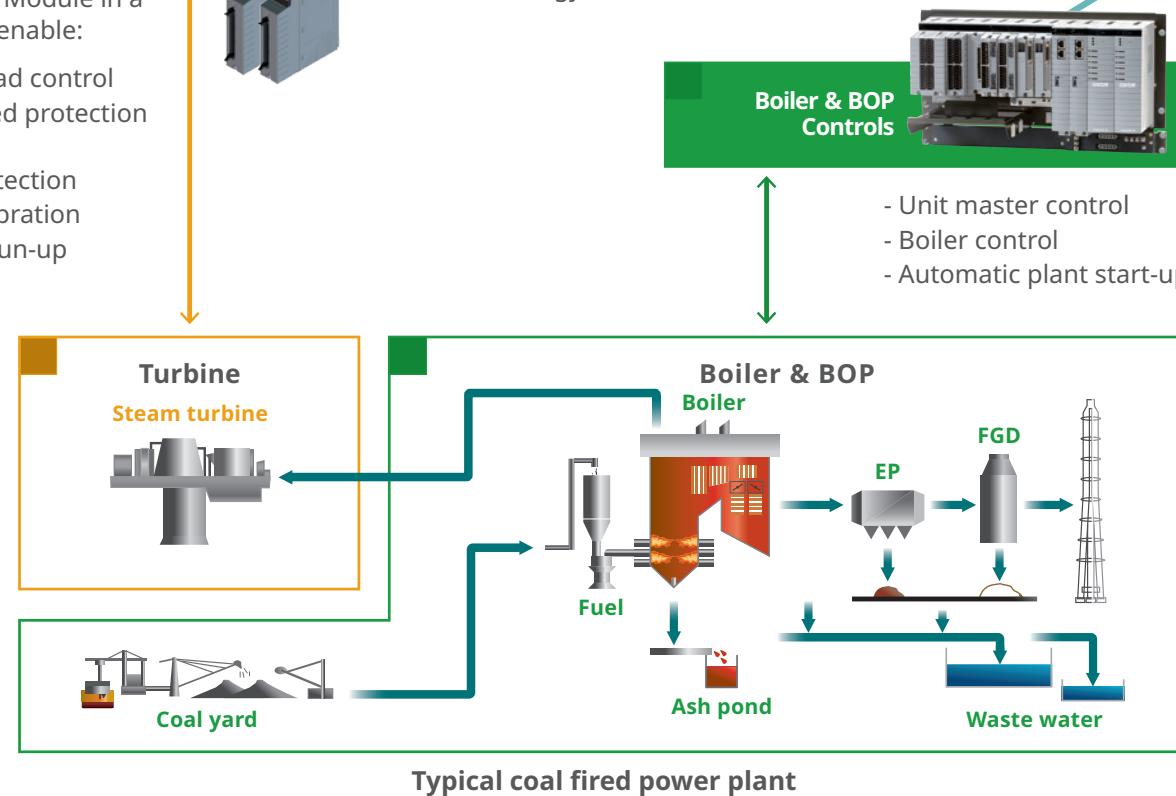
- Burner management system
- Boiler protection
- Turbine protection

Safety Control Station (SCS)

The ProSafe-RS SCS is a TÜV SIL2/SIL3 certified safety system that incorporates Yokogawa's own pair-and-spares technology.

Electrical Control

Integrated electrical control
and monitoring system via
IEC61850, IEC60870 and DNP3.0



Your single-source partner for operational excellence

OpreX™ Transformation



Production Management

Plant performance calculation and monitoring

Plant optimization

Asset Management and Operation Efficiency

Plant Resource Management

Operation Guidance

Operator Training Simulator

IIoT Wireless Solution

Exaquantum
Power performance calculation

RPO:
Real-time Production Organizer

Visual MESA

Plant Resource Manager (PRM)

Exapilot

Operator Training Simulator (OTS)

Sushi Sensor*

OpreX™ Control



Control and Safety System

Control Devices

Integrated Production Control

Integrated Safety Control

Hybrid PLC/RTU

SCADA

PLC

Industrial AI Platform

Controllers & Indicators

CENTUM VP

ProSafe-RS series

STARDOM

CI Server

FA-M3V

e-RT3 Plus

UTAdvanced / YS1000

OpreX™ Measurement



Field Instruments

Analyzers

Data Acquisition

Flow

Multi-variable

Pressure

Level

Temperature

Wireless

Distributed Temperature Sensors

Handheld Instruments

Analizers

Analizers

Data Acquisition Equipment

SMARTDAC+

Services for a lifetime of plant efficiency

Design & Engineering

Early involvement and collaborative project execution lowers the overall risk of the project. Yokogawa strives to understand the goals of each project upfront and to secure a firm ground for ongoing teamwork. Throughout execution, Yokogawa secures strict quality gates based on proven procedures.

Front-End Engineering & Design (FEED)
Main Instrumentation Vendor (MIV)
Services



“Seeing is believing”

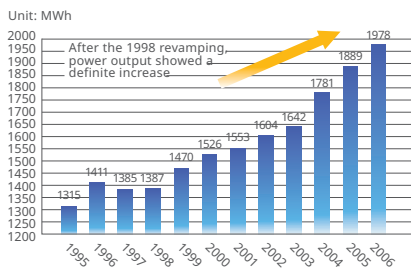
Ts. Bayarbaatar, Ex-Executive
Director of the 4th Thermal Power
Plant, Mongolia

“Seeing is believing. Whatever beautiful things sales people say, I will not believe until I see them at work. When we experienced the plant trip, I learned what makes Yokogawa different from others. I admire their sincerity and devotion toward customers.”

The 4th Thermal Power Plant



8 × 420 t/hr, coal fired, plant revamping
A more stable and robust power supply
The re-instrumented boilers realized both
higher stability and increased throughput,
assuring a stable energy supply.



Reduction of malfunctions and accidents
Since the renovation, equipment
malfunctions have dropped dramatically,
eliminating costly plant downtimes.

Installation & Commissioning

Good coordination between multiple suppliers and engineering teams is the key success factor in commissioning. Yokogawa ensures both human collaboration and technical integration throughout the project life cycle.

- Site Engineering
- Turn-Key Services
- Integration Testing
- Commissioning Services



Operation & Optimization

Ongoing adaptation and optimization requires continued collaboration. Yokogawa keeps in close touch with your plant through 24/7 operation support and expert consultation services.

- Optimization Consulting
- Online Diagnosis Support
- 24/7 Operation Support
- Operator Training



Revamp and Expansion

Complex revamp/expansion projects test the alertness, care, and skill of both the user and the supplier of automation. Yokogawa delivers practical engineering solutions with professional care, modernizing and expanding your plant with minimum disturbance to your business.



Maintenance and Upgrade

Be it diagnosis, root cause analysis, or predictive maintenance, practical solutions are in short supply. Yokogawa brings you the tools and services that help you take concrete actions to improve the effectiveness of your plant assets.

- Asset Optimization
- Operation & Maintenance Services
- Life Cycle Solutions
- Standard Knowledge Base



An industry leader on a clear path

In 2002, Eraring Energy began a revamp process to replace the original 1970s design hard-wired electronic control equipment and computer equipment at its Eraring Power Station, one of Australia's largest. Inviting and evaluating proposals for the latest equipment from the major control systems suppliers, Eraring Energy chose Yokogawa.



"For flexibility, experience and commitment, we selected Yokogawa"

Michael Mortiss, Project Manager of Eraring Energy

"Our decision to carry out the revamping project was based on the need to maintain a competitive advantage in the Australian deregulated electricity market. Maximizing plant availability for at least another 20 years, timely returns to service of each unit, and efficiency gains were also significant project drivers."

"While there are several very capable control systems vendors, Yokogawa provided the most completely integrated solution of plant control system, training simulator, plant asset management system, and plant information and management systems. Yokogawa's flexible approach to design and implementation of large power plant revamp projects, team of experienced power plant engineers, and commitment to meeting all-important project outage schedules were further reasons for selecting Yokogawa."

"We had already purchased other Yokogawa equipment such as transmitters and paperless chart recorders for our plant, and had received excellent service and on-going support."

"The ability to operate flexibly gives us a competitive advantage"

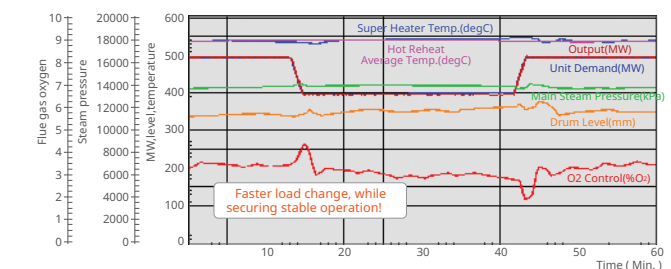
Jeff Hogan, Instrument and Control Team Manager of Eraring Energy

"Yokogawa took advantage of the flexibility of its equipment to suit the existing installation. Where possible, the new equipment slotted into existing cabinets, reusing existing field cables, terminations, cabinets, and connectors. New equipment was wired and tested in the factory. This avoided disturbing most existing cabling and greatly sped up installation and commissioning times."

"The new control equipment makes fault finding a breeze, while the new graphic displays show us all the details we need."

"The asset management system allows us to directly monitor and manage all smart field devices from our workshop."

"The renovated units are now more flexible and responsive than before, giving the station additional advantages in a highly competitive electricity market. The refitted control room is state-of-the-art and provides a quiet and stress free operating environment for our staff."



Test result of control performance
(Load change 66 MW/minute, fixed pressure)

"Expectations exceeded, our plant was back in operation ahead of schedule"

Michael Mortiss, Project Manager of Eraring Energy

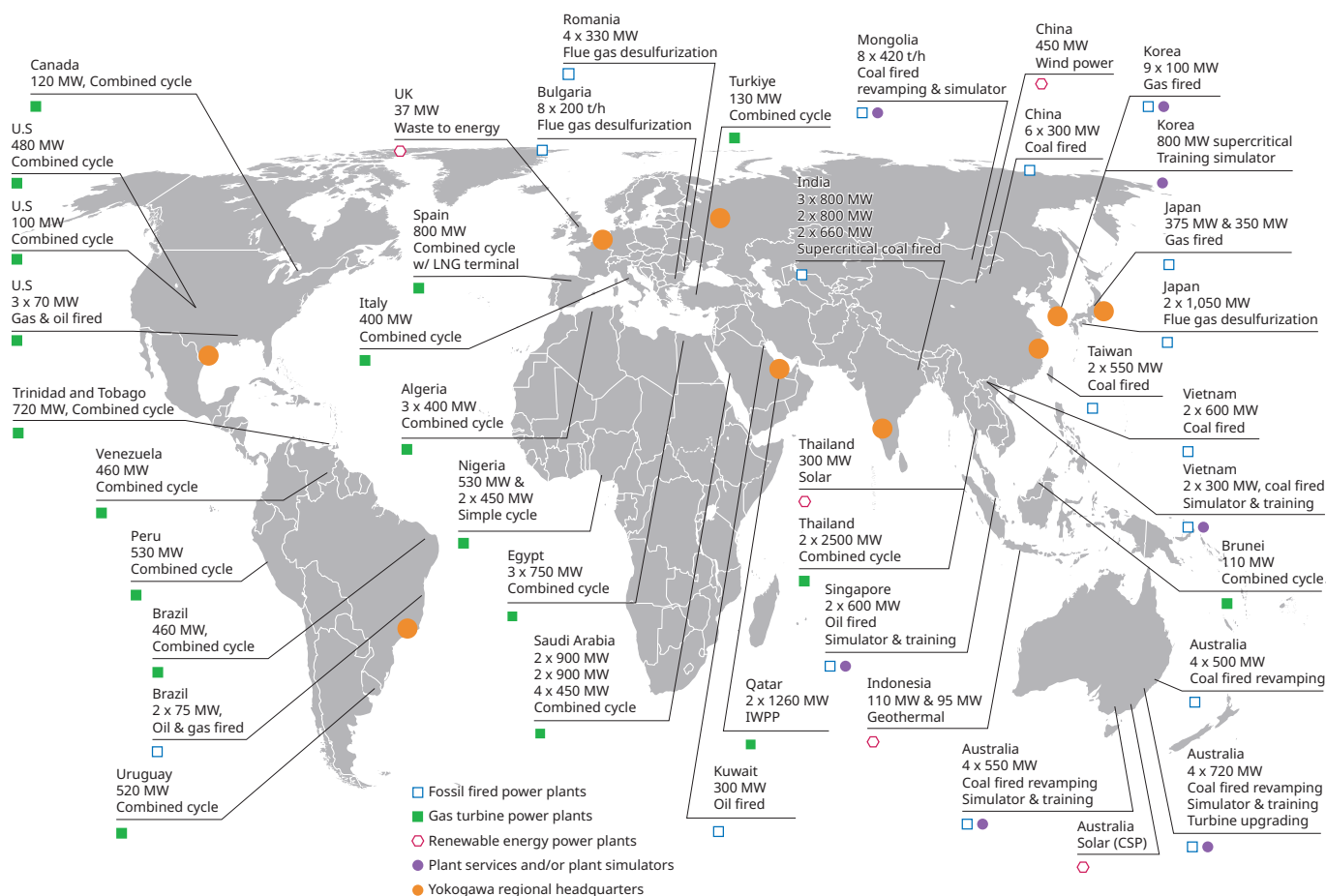
"Yokogawa has exceeded our expectations, bringing each revamped unit back into reliable service ahead of schedule. Utilizing a full replica simulator, our engineering team and Yokogawa fully tested the new logic and control configurations before they were loaded on the actual plant. This significantly reduced the time needed for site commissioning, and avoided plant trips during commissioning. Being thoroughly trained on the new screen-based control system training simulator, our operators were well prepared for the new control scheme in time for plant commissioning. This assisted in ensuring an uneventful, smooth return to service."

"Supported by the high-level operational and maintenance diagnostics, together with strong local support from Yokogawa, we are sure that Eraring Power Station will secure high plant availability for a further 20 years."



Let's co-innovate your business!

Yokogawa's representative power projects



OpreX™

Through the comprehensive OpreX portfolio of products, services, and solutions, Yokogawa enables operational excellence across the enterprise.

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