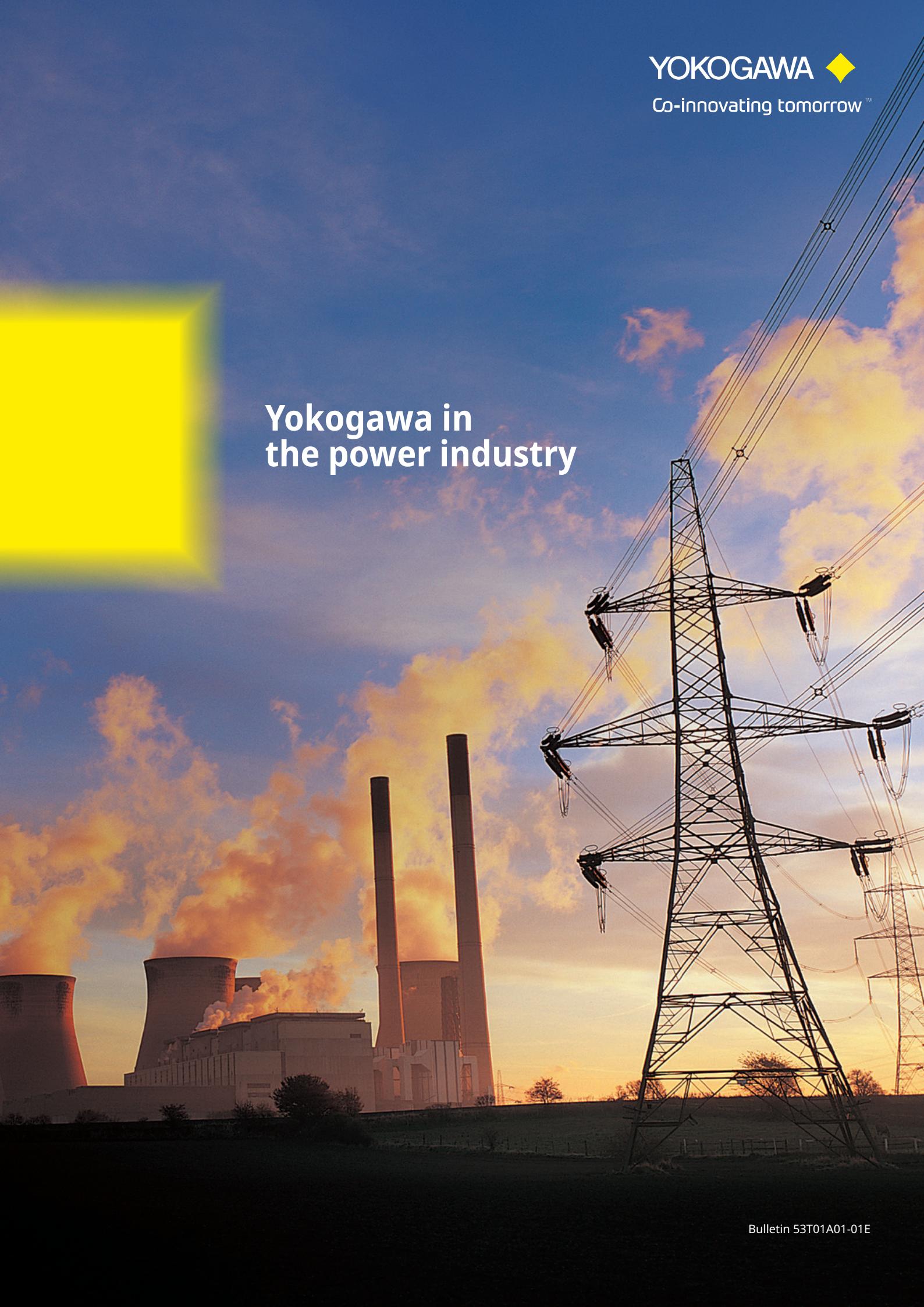


Yokogawa in the power industry



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



Solar thermal power plant



Wind power plant



Geothermal power plant

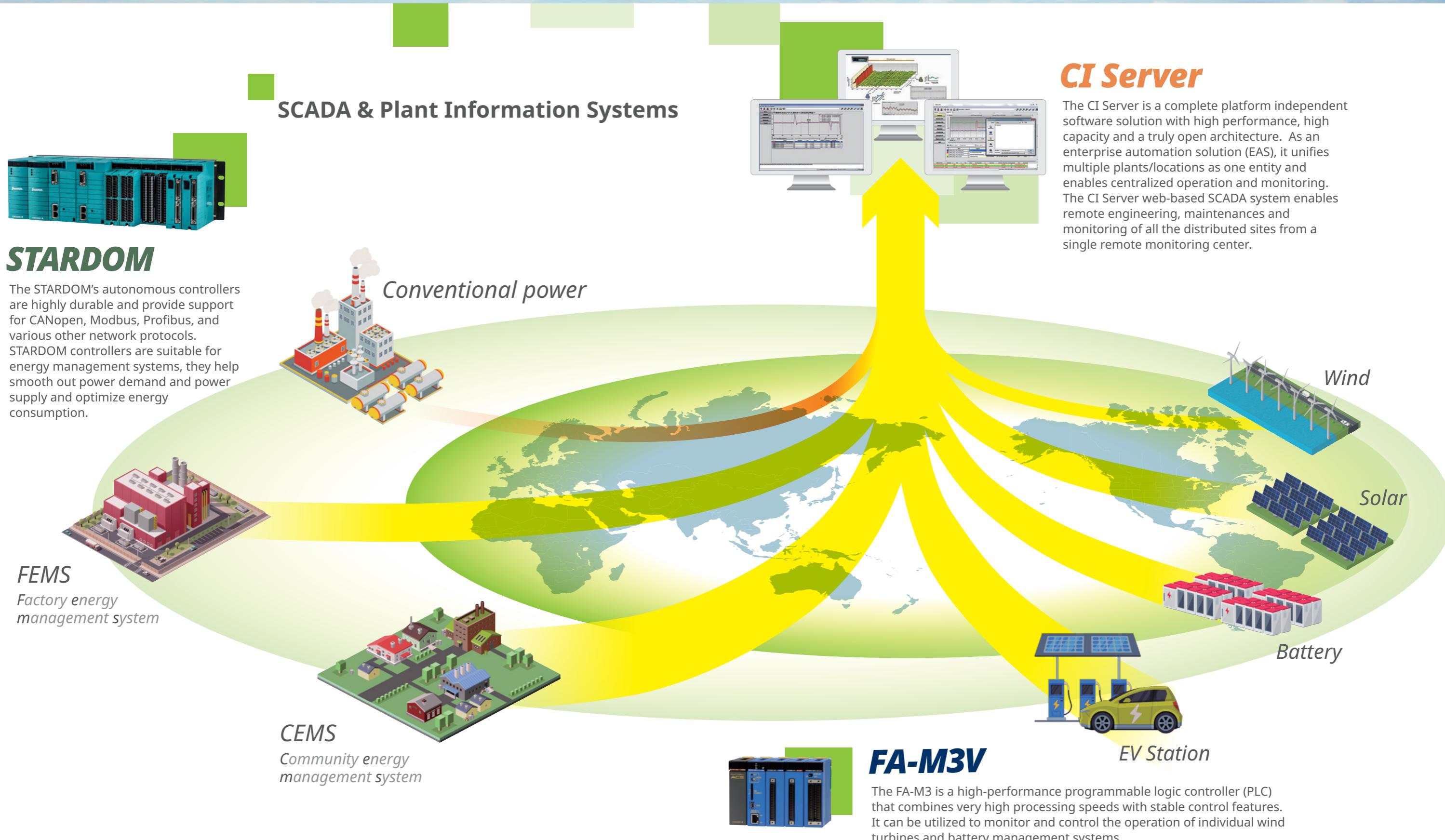


Biomass power plant



Hydroelectric power plant

Optimum energy operation with IIoT technologies for smart communities



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.



CENTUM VP

STARDOM



Turbine Governor Control
The Servo Module and Protection Module in a controller enable:

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

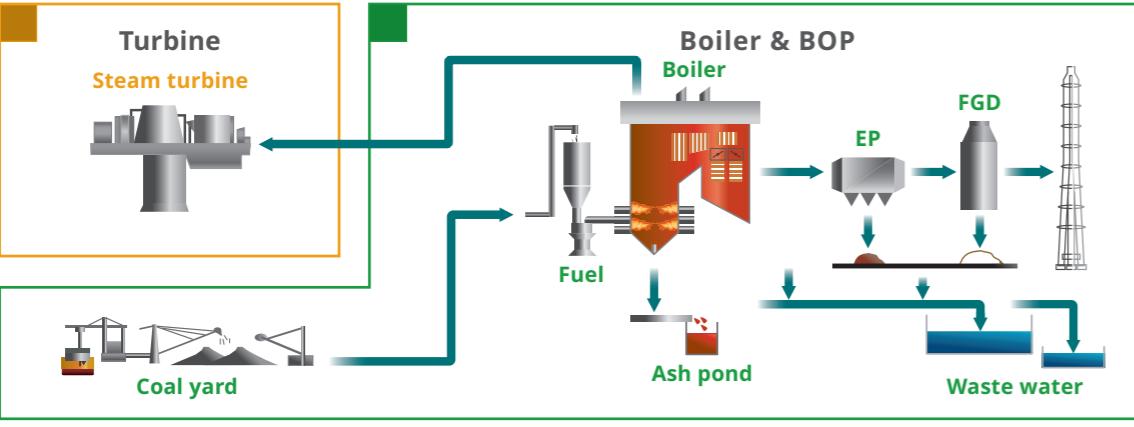
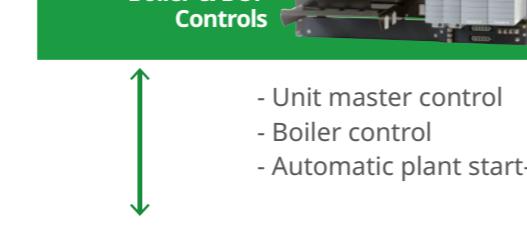


Field Control Station (FCS)

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

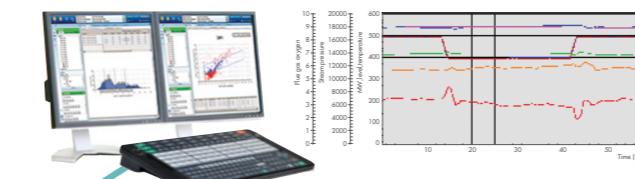


- Unit master control
- Boiler control
- Automatic plant start-up



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.



ProSafe-RS



Power Plant Protection

- 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-spare technology.



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

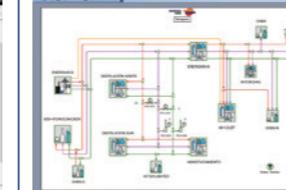
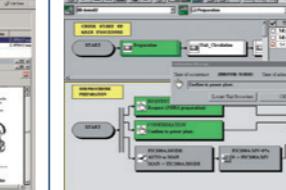
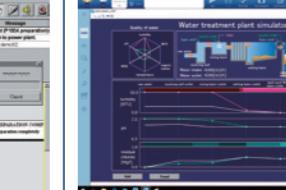


Control LAN (Vnet/IP)

Your single-source partner for operational excellence

OpreX™ Transformation



Production Management		Asset Management and Operation Efficiency				
Plant performance calculation and monitoring	Plant optimization	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)	
						

OpreX™ Control

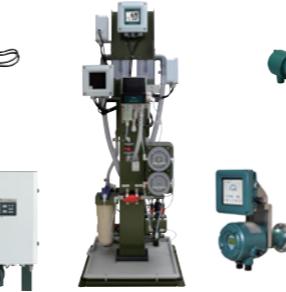


Control and Safety System				Control Devices		
Integrated Production Control	Integrated Safety Control	Hybrid PLC/RTU	SCADA	PLC	Industrial AI Platform	Controllers & Indicators
						
CENTUM VP	ProSafe-RS series	STARDOM	CI Server	FA-M3V	e-RT3 Plus	UTAdvanced / YS1000

OpreX™ Measurement



Field Instruments							
Flow	Multi-variable	Pressure	Level	Temperature	Wireless	Distributed Temperature Sensors	Handheld Instruments
							

Analyzers					Data Acquisition	
Analyzers					Data Acquisition Equipment	
						

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"

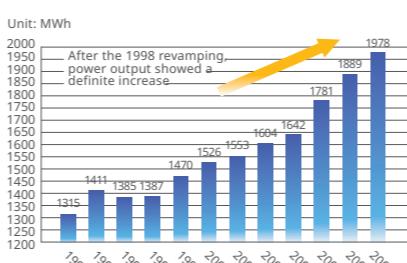
Ts. Bayarbaatar, Ex-Executive Director of the 4th Thermal Power Plant, Mongolia

"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 x 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."

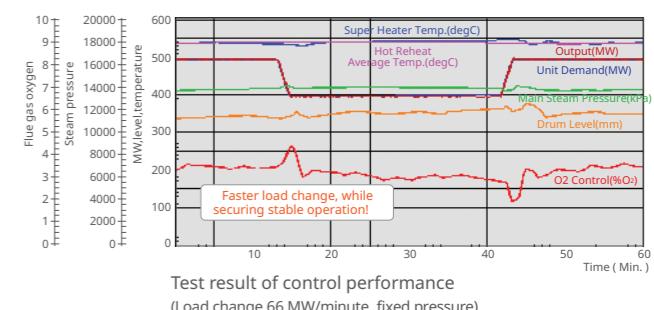
"Expectations exceeded, our plant was back in operation ahead of schedule"

Michael Mortiss, Project Manager of Eraring Energy

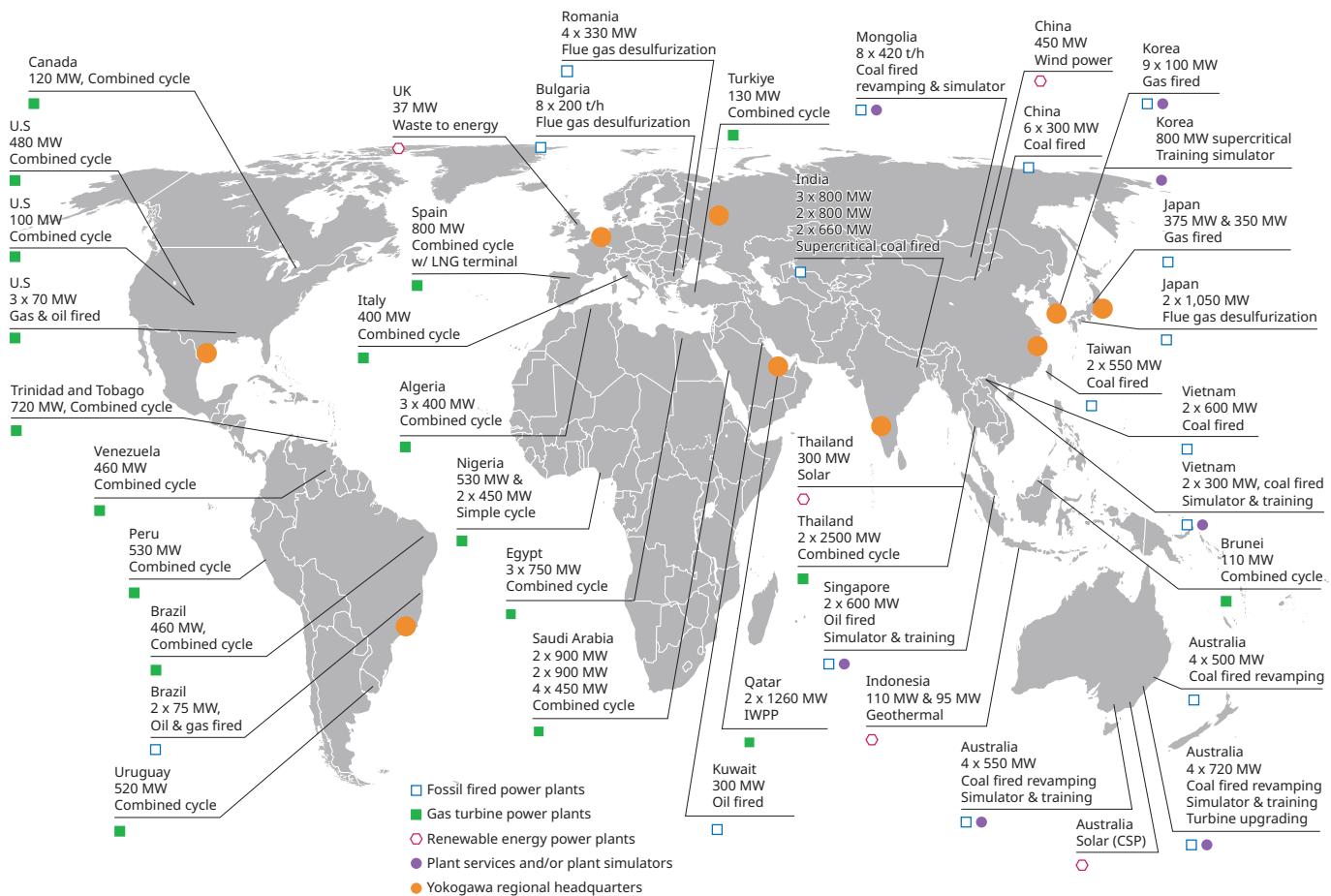
"Yokogawa has exceeded our expectations, bringing each revamped unit back into reliable service ahead of schedule. Utilizing a full replica simulator, our engineering team and Yokogawa fully tested the new logic and control configurations before they were loaded on the actual plant. This significantly 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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