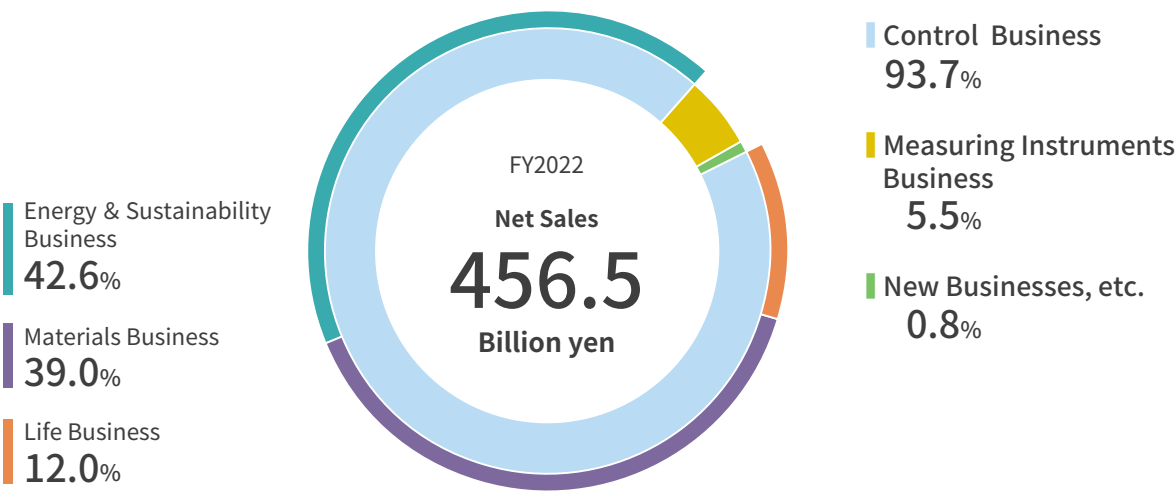


# Yokogawa's Business

## Yokogawa's Business Portfolio

Drawing on its ability to measure and connect, Yokogawa collaborates with its customers. Making full use of the expertise in measurement, control, and information technologies that it has acquired over the years, Yokogawa addresses social issues through its business activities. To attain these goals, the company's core business of industrial automation and control business has been divided into three segments: energy & sustainability, materials, and life. Yokogawa's measuring instruments business and new businesses also significantly contribute to the advancement of industry and technology.



### Control Business

#### Energy & Sustainability Business

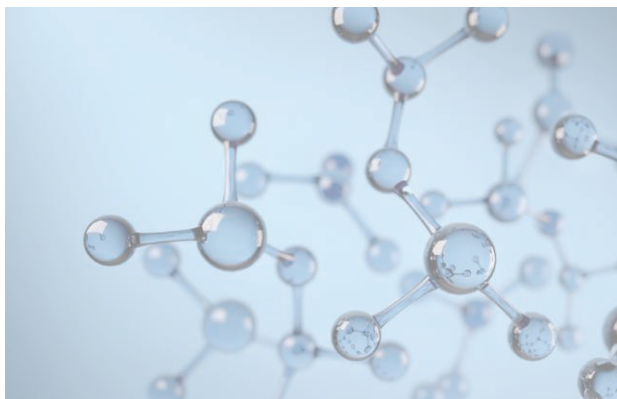


Given the expected surge in global energy demand, the renewable energy market is primed for growth. Yokogawa's energy and sustainability business promotes safe and efficient energy use by interacting with the entire value chain—from the production, supply, and use of energy to disposal and recycling. The business segment aims to protect the environment by achieving a sustainable, carbon-neutral society.

##### Main Markets

- Oil and gas
- Petrochemical
- Renewable energy
- Electricity
- Energy management system (EMS)
- Energy storage

#### Materials Business



Among the requirements in this segment are efficient energy use, recycling, and the use of raw materials that have a low environmental impact. Drawing on its expertise in ecological solutions and digital technologies, Yokogawa is striving for a world that maintains a balance between comfort and sustainability. Our materials business is critical to achieving a circular economy that can exist in harmony with the environment.

##### Main Markets

- High performance chemicals
- Biomass materials
- Paper and pulp
- Mining
- Textiles
- Steel
- Non ferrous metals
- Mobility
- Electrical and electronics

#### Life Business



The growing global population is putting a strain on the production and supply of food and water. Demand for pharmaceuticals is also rising steeply. Yokogawa's life business supports the supply of medicines and food and water so that people everywhere can live safely and enjoy good health.

##### Main Markets

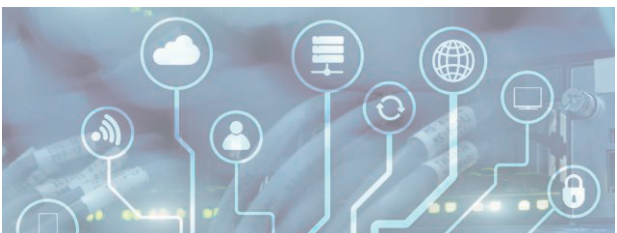
- Pharmaceuticals
- Healthcare
- Food
- Water

### Measuring Instruments Business



Often considered to be the mother tools of modern industry, measuring instruments have been an integral part of Yokogawa's business since the company's inception. Taking advantage of our expertise in the precision measurement of power, voltage, light, pressure, and other physical quantities, we are pursuing decarbonization by helping our customers in such areas as vehicle digitization and electrification, renewable energy, environmental measurement, next-generation communications technology, and plant maintenance.

### New Businesses, etc.



Setting its sights on easing the use of the industrial internet of things (IIoT), Yokogawa provides the necessary hardware, software, and cloud solutions. In the materials market, the company has launched a biomass materials business to provide environmentally friendly bio-based materials.

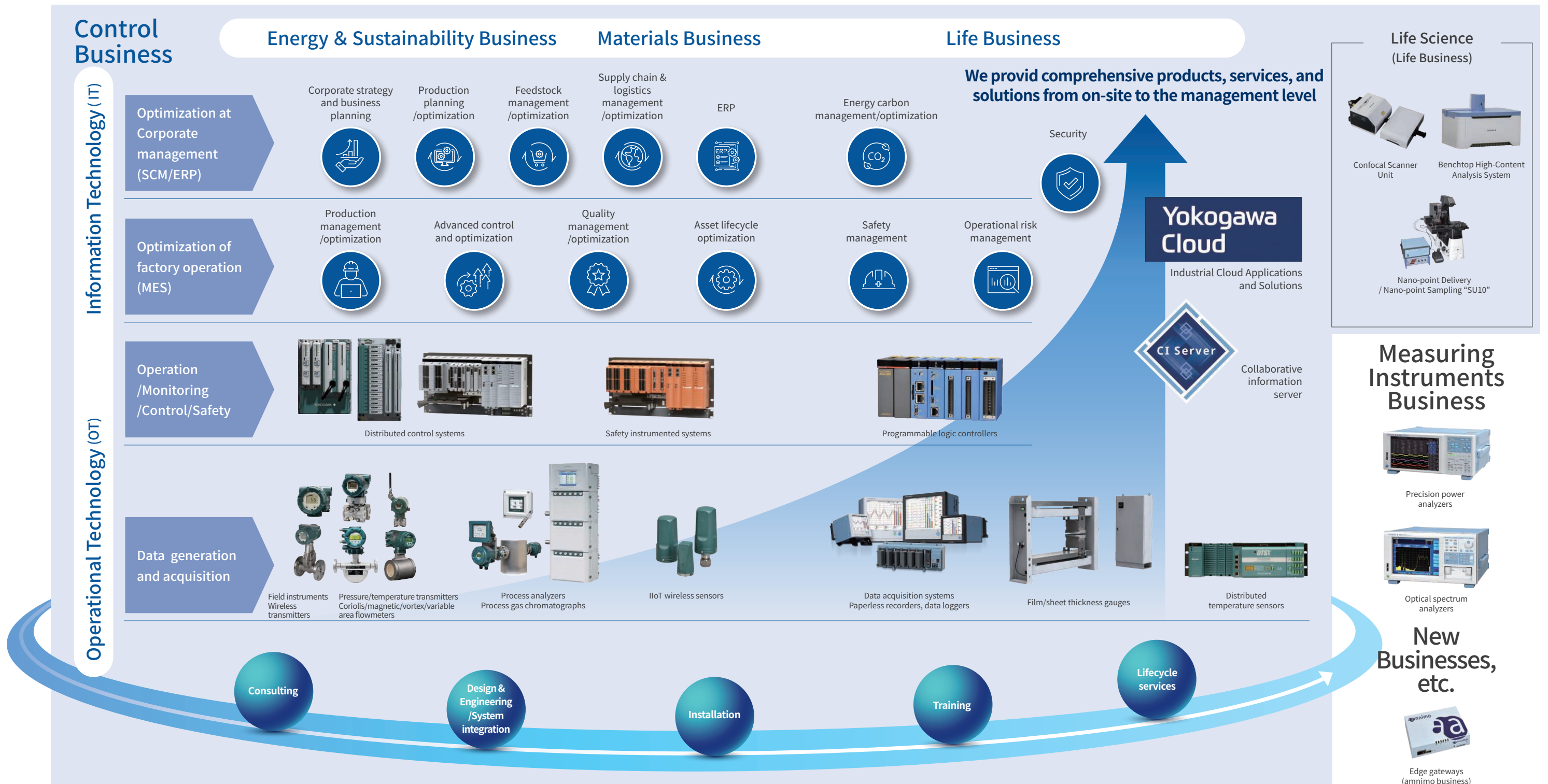
### Areas for exploration

Disaster prevention, space, and ocean

# Yokogawa's Products and Solution Portfolio

Yokogawa integrates high-quality, high-reliability products and solutions, ranging from the measurement and control technologies acquired over many years to the latest technologies, such as Digital Twin and AI, to solve customer issues and maximize customer business value.

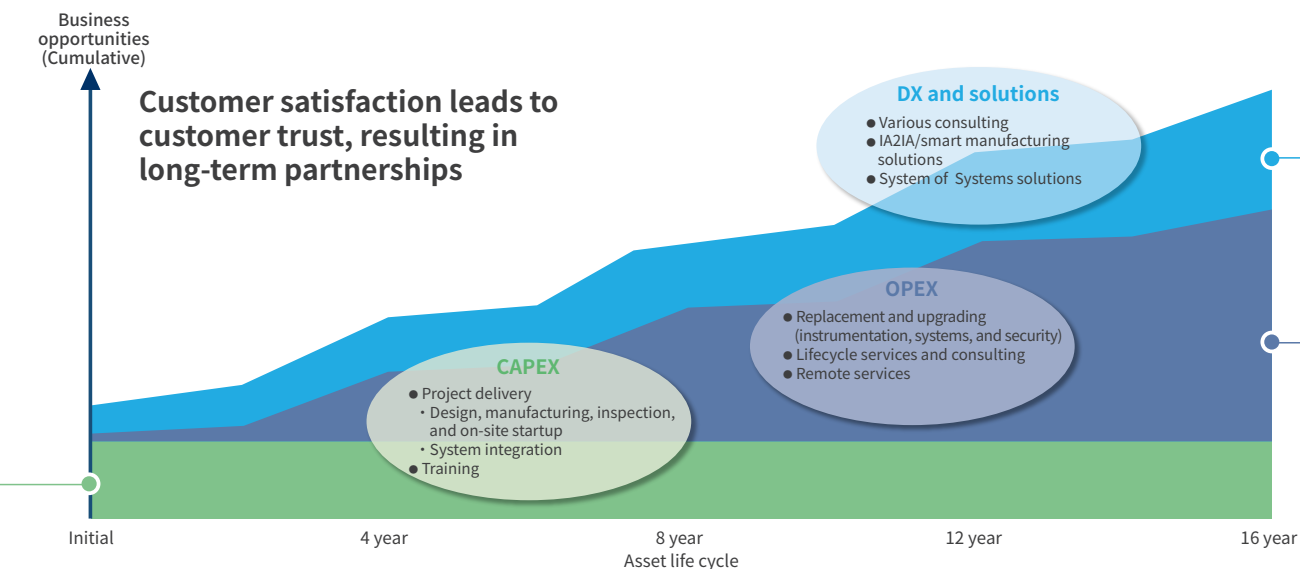
# OpreX™





# Business Model of Industrial Automation and Control Business

Yokogawa continues to add value, including through products, solutions, and services as a business partner throughout the long lifecycle of customer's assets.



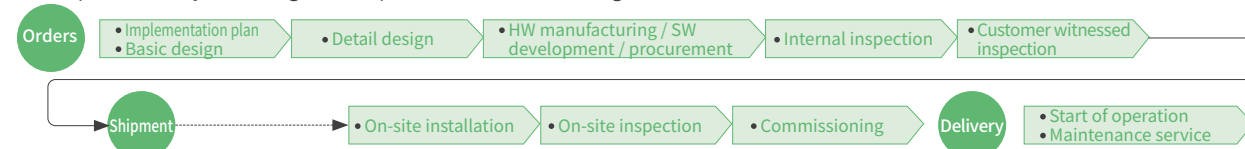
## Strengths of CAPEX

### High-quality, high-reliability measurement and control products

We meet every needs in production on-site from small scale to large scale through high quality, high reliability, and high efficiency product lineups including control systems, industrial instruments, and analyzers that support customers' operations over many years.

### Excellent capabilities of project implementation and system integration

We have a wealth of experience and successful track records of many projects in the countries and regions where we conduct our business through prominent project implementation capability and sophisticated system integration capabilities that enable integration from OT to IT.



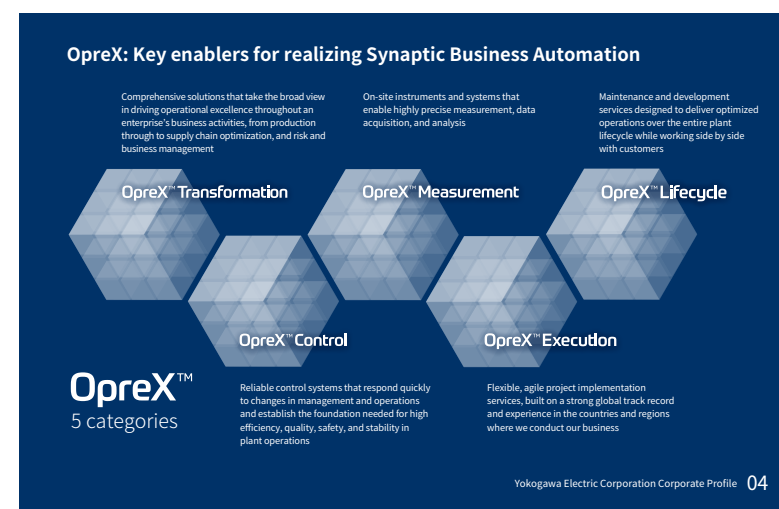
OpreX™ Measurement

OpreX™ Control

OpreX™ Execution

## About OpreX

OpreX is the comprehensive brand of Yokogawa's industrial automation and control business portfolio.



## Strength of DX and Solution

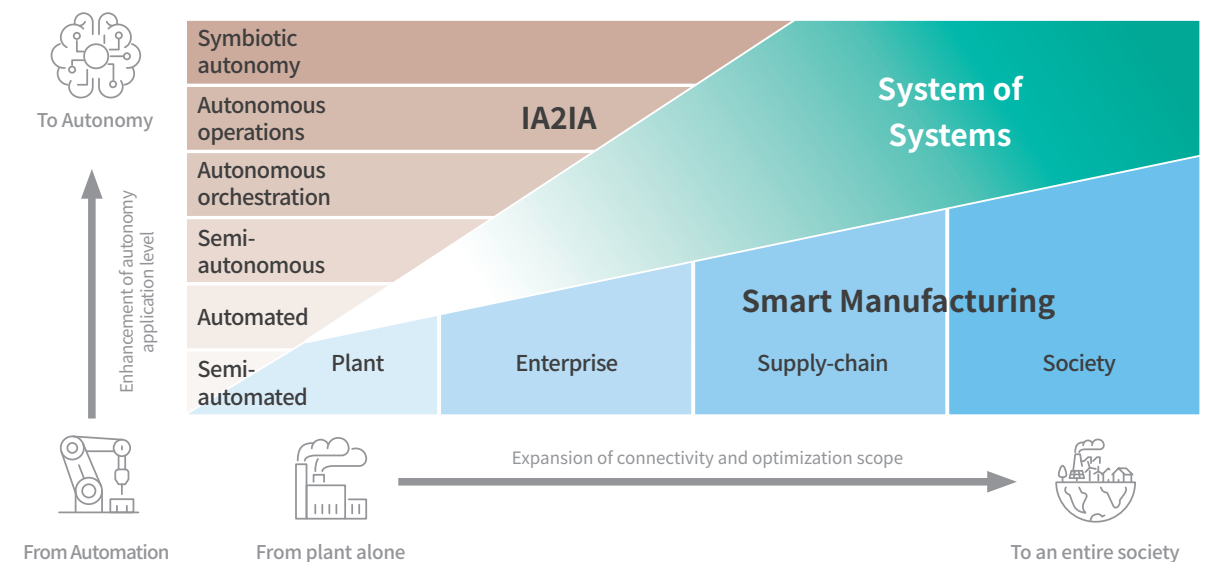
### Operation optimization solution based on a wealth of experience and domain knowledge

We offer comprehensive solutions for customers to support the optimization of customers' operations and realize transformation conducive to the enhancement of corporate value, by integrating our consulting ability utilizing best-in-class know-how that contributes to management, a wealth of expertise that has led the industry, and automation ability that supports production activity.

OpreX™ Transformation

### Expansion of value to be provided to customers through IA2IA and Smart Manufacturing approaches

IA2IA stands for a shift from industrial automation to industrial autonomy and smart manufacturing refers to optimization through applying DX to the manufacturing industry. By expanding their target scope, greater value can be created. Through these two approaches, we are working with customers to realize the optimization of the entire society with the system of systems.



## Strengths of OPEX

### Comprehensive service realizing long-term stable operations of assets

For ensuring the long stable operation of assets over the entire life cycle, we provide solutions for maintaining and enhancing the soundness of customers' assets and also contribute to making the service and maintenance work innovatively efficient.

OpreX™ Lifecycle

### Global service network with 24H/7 days

We provide a reliable support system through a network consisting of response centers in nine locations overseas centered on the Global Response Center and service engineers in each other country.

The security operations centers provide the service of remotely monitoring the security conditions of customers' plants and the structure is established to promptly provide services for various issues related to customer assets.



Service networks

Countries and regions served

200+

Service sites

180+

Service engineers

2,500+

## Responding to Changes in Business Environment

Yokogawa responds to the changing business environment and customer needs. We would like to introduce two of our various initiatives.

### Initiatives for Open Process Automation (OPA)

#### Changing Customer Needs

In process industries such as steels, oil refinery, and pharmaceuticals for which stable plant operations are required, highly reliable and rigid distributed control systems have contributed to enhancing customers' value. Though control systems have evolved differently in line with the development of digital technologies, they are built basically as unique, closed systems for each company.

However, recently, customers' business environments are significantly changing through ESG management and digital transformation (DX). Our customers need a faster innovation cycle for higher competitiveness and transformation by achieving the reduction of total cost of ownership and improvement of profitability over a life cycle of their plants, while contributing to decarbonization through improving operations and energy efficiency. Customer needs for control systems are also changing due to this impact. One of such changes is the open innovation in the control systems.

Utilizing open technology in systems allows customers to freely select and combine fit-for-purpose products from multiple suppliers and expect merits such as cost reductions, more diverse functions, procurement improvement, and innovation acceleration through adoption of the latest IT technologies. We, as a supplier of control systems, need to operate our business responding to such customers' needs and accelerate transformation.

#### Problems of customers to conventional control systems

1. Obsolescence of systems and high renewal cost
2. Difficulties and high cost of integration with other companies' products and information technology
3. Limited user access to market products and new technologies
4. Lack of expandability and agility to changes
5. Patchy and not intrinsic security

#### Resolutions by open innovation of control systems open

### Set-up and Efforts of Industrial Association

Under the initiative of customers, efforts for standardization of control systems are under way to resolve problems of conventional control systems. NAMUR, a chemical industry body in Europe, announced NAMUR Open Architecture in 2016. Also in the same year, led by ExxonMobil, Open Process Automation Forum (OPAF) was established with the purpose of introducing open technologies to the control system industry. In OPAF, end users in various industries, suppliers of various systems, instruments, and software, system integrators, and representatives from IT companies as well as academic organizations have gathered and are selecting the industry technology standards toward practical implementation of open, secure, and interoperable next-generation control systems. OPAF has a standardized data interface in the OT field. This improves interoperability among each instrument, unit, and system, making integration of products from different suppliers and new technologies easier. As this is only standardization of interfaces, internal technologies and knowhow of suppliers are not made open.

### Our Efforts and Future Outlook

To continue to provide value to customers amid changing customers' business environments and needs, Yokogawa must accelerate transformation by developing the business leveraging open technology. In this context, we joined OPAF to contribute to formulating global standards. We were selected by ExxonMobil as a system integrator responsible for establishing its OPA test bed in 2019 and as a system integrator for the field trials for introducing the OPA system to actual plants in 2022. In addition, as OPA systems are expected to be introduced to customers' plants on a full scale, we are responding to this trend by the entire group and setting up the Open Readiness Center (ORC) in 2022. ORC is working to expand the OPEX business by examining YOKOGAWA's optimal role in the ecosystem, building a business model that can maximize profits, and supporting operations and management in an open system over the entire lifecycle.

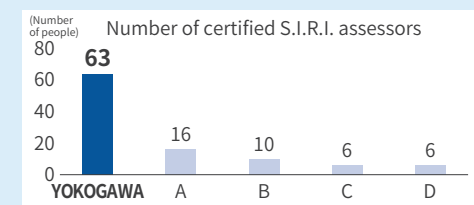
It is expected that the progress of openness will lead to more commoditization of products. However, we will advance the use of open technologies with customers by utilizing our high project implementation capability cultivated through past experiences and high value-added solutions, and realize a new type of operation brought about by open innovation.

### Initiatives to realize Smart Manufacturing with S.I.R.I. human resources as a core

"We have a Smart Manufacturing vision but do not know where to start" and "We are not able to make a detailed roadmap towards its realization" – Yokogawa hears such customers' voices. For these challenges, Yokogawa assists customers to realize their Smart Manufacturing by making use of its state-of-the-art insights and domain knowledge on IT-OT. S.I.R.I. human resources play the leadership role.

#### What is S.I.R.I.?

S.I.R.I.\* is a framework by which enterprises can efficiently assess their digital maturity level and take a systematic transformation approach. Yokogawa embraces 63 certified S.I.R.I. assessors, which is the largest capacity in the world as an enterprise. (63 assessors out of 231 globally (as of June 2, 2023)). Yokogawa also helped compile the Japanese version of the S.I.R.I. white paper.

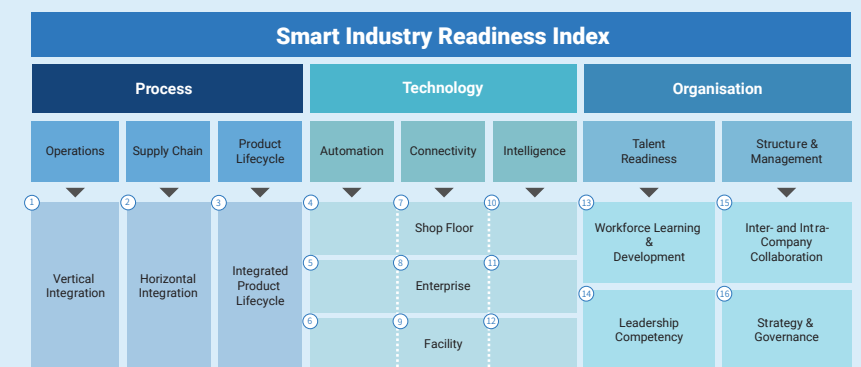


Data source: International Centre for Industrial Transformation (INCIT)



S.I.R.I. white paper (Japanese version)

\*S.I.R.I.: Smart Industry Readiness Index. The Singapore Economic Development Board (EDB) established the index through cooperation with major technology companies, consulting companies, and a network of industrial and academic experts. It assesses the digital maturity level of enterprises in terms of process, technology, and organization that are basic components of Industry 4.0. In 2022, S.I.R.I. activity shifted from the EDB to the International Centre for Industrial Transformation (INCIT). S.I.R.I. assessment is based on the definite framework consisting of the three major basic components of process, technology, and organization, and 16 dimensions divided from them (see figure on the right). The definite framework enables us to bring beneficial results in a relatively short amount of time and to benchmark industry specific maturity levels.



Data source: International Centre for Industrial Transformation (INCIT)

Yokogawa's certified S.I.R.I. assessors, along with Yokogawa's team of IT-OT domain experts, engage extensively with stakeholders in customers' organization through workshops, interviews, and site surveys to assess digital maturity across their enterprise, prioritize digitalization efforts, and analyze functional area gaps. This allows customers to create a roadmap to focus their plans on the next steps.

Furthermore, as customers progress along the path of their Smart Manufacturing roadmap, Yokogawa is building an IT-OT data platform by digitizing information and integrating data, providing digital solutions that can be expected to produce results in the short term, and ultimately, contribute to the implementation of digital solutions required to achieve business goals and sustainable digital transformation.

### Global S.I.R.I. Network

Yokogawa has established the Global S.I.R.I. Network consisting of certified S.I.R.I. assessors and consultant business owners of regional offices, and holds meetings every month. In this network, we share best practices in Yokogawa's Smart Manufacturing and consulting-sales approach at all offices toward solving various customer challenges.

#### Case Study

The S.I.R.I. / Smart Manufacturing assessment consulting service provided by Yokogawa has received a lot of response and adoption from our customers. We have already provided assessment consulting services to customers in various industries such as energy, chemicals, oil and natural gas, food and beverage, pharmaceuticals, and electronics worldwide on more than 30 occasions.

Taiwan Everlight Chemical kindly provided the following words. "We appreciate Yokogawa's excellent work and are confident that the analysis and proposal report submitted will be very beneficial in our Smart Manufacturing transformation journey."



Taiwan Everlight Chemical