



Scaling Hydrogen

A Comprehensive Solution Across the
Entire H₂ Ecosystem

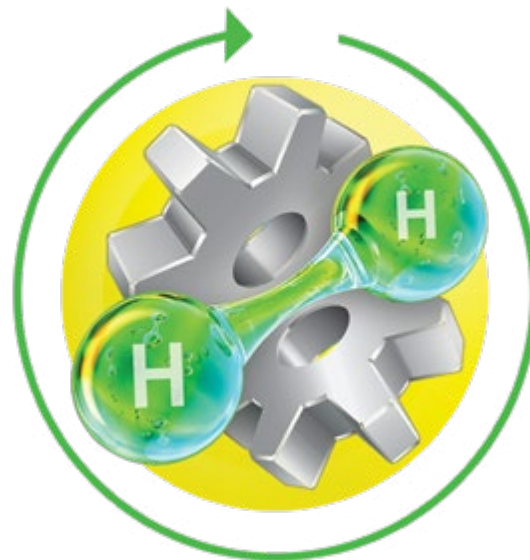
The Question Everyone is Asking...

How do You Make Hydrogen?

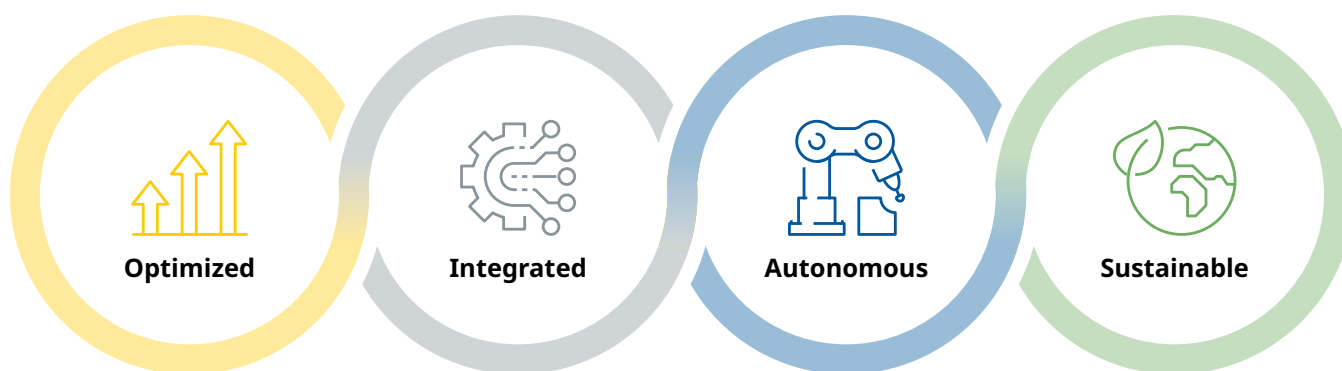
At Yokogawa, we understand that making hydrogen is not new. But recently, everyone has been asking a new question: How do **you** make hydrogen?

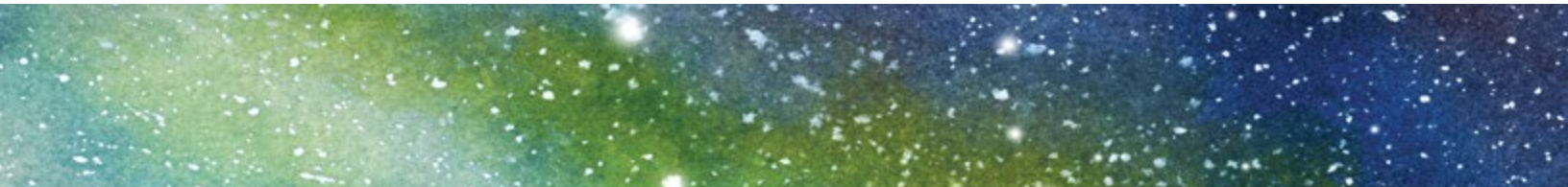
Which technology? Electrolysis? Methane reforming? Ammonia cracking? What color is it, **grey**, **blue**, or **green**? At Yokogawa, the questions don't stop there.

The hydrogen industry has reached an inflection point. A new hydrogen ecosystem is emerging. All over the world, we are co-innovating with customers on solutions that address new questions: How do you make hydrogen **optimized**? How do you make hydrogen **integrated**? How do you make hydrogen **autonomous**? How do you make hydrogen **sustainable**?






Yokogawa is Making Hydrogen...





“*I believe that water will one day be employed as fuel, that hydrogen and oxygen which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable.*”

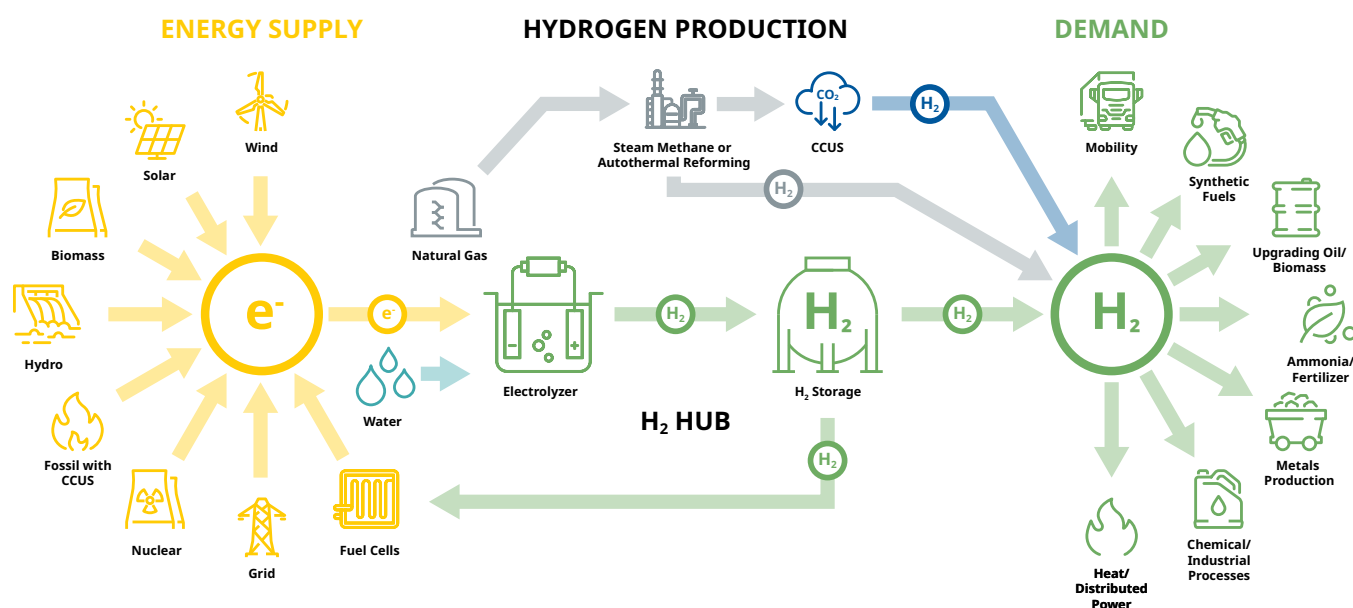
Jules Verne
(1874 - The Mysterious Island)

Grey Hydrogen	Blue Hydrogen	Green Hydrogen
PROCESS Steam methane reforming Gasification	PROCESS Steam methane reforming Gasification with carbon capture	PROCESS Electrolysis
SOURCE Methane Coal	SOURCE Methane Coal	SOURCE Renewable energy
		



Clean hydrogen energy, at any process level, plays an integral role in a cleaner future across the globe.

The Emerging Hydrogen Ecosystem



The hydrogen industry used to be about process units such as electrolyzers and reformers. Now, it is an emerging ecosystem complete with hydrogen hubs, power grids, and a broad consumer base.

Whether it is a single business enterprise or an assortment of businesses, consumers, and prosumers, the ecosystem requires optimization, integration, autonomy, and sustainability.



Optimized

Optimize production, storage, transportation, power plants, the grid, and consumer applications at the component level—and through the entire ecosystem value chain.



Autonomous

An autonomous operation possesses learning capabilities that enable real-time adaptation to market dynamics and operational realities. An autonomous hydrogen ecosystem can continuously improve and thrive as the business environment evolves.



Integrated

Integration enables real-time data sharing and interoperability across the ecosystem. It also enables the scalability for business enterprises to start small, think big, and achieve.



Sustainable

Hydrogen will be a key enabler to achieving net zero emissions. The optimized, integrated, autonomous hydrogen ecosystem provides zero emissions on the demand side and minimal emissions in production.

Yokogawa Featured Solutions



PXiSE is a vision for how to make the electrical grid work

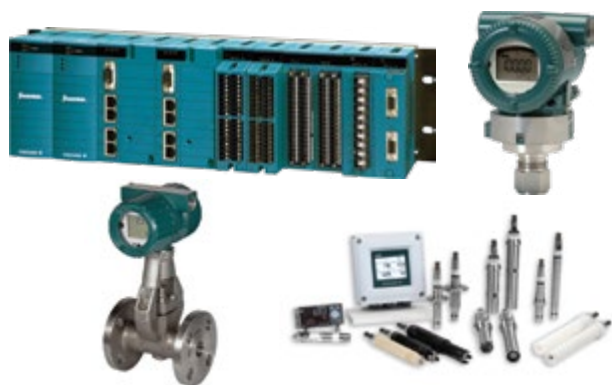
PXiSE (pronounced 'pice'), develops next-generation grid control software that unlocks the potential of distributed generation to improve grid reliability and increase renewable energy output, while helping ensure system balance and power quality.

PXiSE's products include:

- Microgrid Controller
- Distributed Energy Resource Management System (DERMS)
- Renewable Power Plant Controller

CI Server is an ecosystem-wide integration solution

Based in the Cloud, on-premise, or as a hybrid solution, the Collaborative Information (CI) Server enables optimization, autonomy, and sustainability throughout the entire hydrogen ecosystem. CI Server unlocks critical data from all ecosystem components to achieve data-driven optimization. From supply through production to demand, CI Server facilitates remote, autonomous operations and drives the ecosystem to function as a completely integrated value chain.



Yokogawa solutions help achieve the lowest levelized cost of hydrogen

The OpreX brand stands for excellence in the technology and solutions that Yokogawa cultivates through the co-creation of value with its customers.

OpreX includes all Yokogawa's control products, services, and other solutions that customers are using to digitalize and transform their businesses and drive growth in this time of unprecedented change.

Current Projects

Co-inventor, Optimizer, Safety Architect and Integrator of H₂ Projects

Yokogawa has already established a proven track record in the emerging H₂ energy industry.



Megawatt Scale Hydrogen Projects

Increasingly, Yokogawa is being commissioned by major clients for megawatt scale hydrogen projects. In these projects, Yokogawa is selected as Integrator of All, bringing together the various components of these highly innovative plants.

Managing variation is one of the key challenges Yokogawa is addressing. This type of project builds on the research investments Yokogawa has been making in large scale hydrogen for decades.



Researching the New Energy System

As the new energy system is unfolding, governments and industry are increasingly collaborating in research projects aimed at building high-tech infrastructure for production, distribution and use of hydrogen.

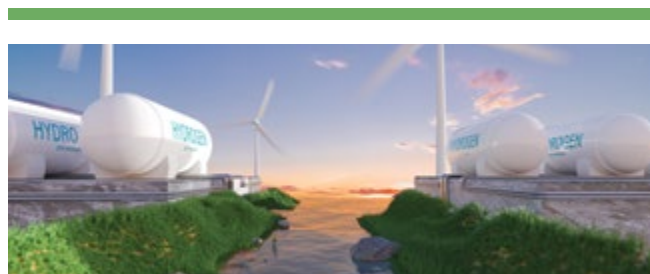
Yokogawa actively collaborates at early stages in multi-party research, focusing on control and integration designs.



Integrating Hydrogen Projects

The integration of hydrogen plants into pipeline infrastructure is key to enabling the energy transition.

Yokogawa works with clients to operate plants securely, and to integrate them into the surrounding infrastructure, supporting the supply of key industries with renewable infrastructure in industrialized regions.



Collaboration for Everyday Hydrogen Needs

Inter-industry collaboration is key to effective carbon recycling and resource optimization.

Yokogawa has begun work on an inter-industry collaborative project for the achievement of carbon neutrality at an industrial complex in the Goi district of Ichihara City in Chiba Prefecture. The project will examine the feasibility of company collaboration in different industries in the carbon recycling business.



Other Publications



Application Notes

Technicians are invited to review our real-world application note collection. These documents describe various processes and their related challenges, with hands-on solutions to resolve them.

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Brochures

Discover leading-edge technologies, dependable products, extensive expertise from diverse hydrogen projects around the world, as we work with you to provide sustainable business solutions.

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