CHIYODA CORPORATION

Energy and Environment in Harmony

company outline

CONTENTS

Laffan Refinery (Qatar)

photo Laffan Refinery Company Limited 2

Energy and Environment in Harmony

Chiyoda Corporation is a world-leading, fully integrated international engineering company and EPC contractor.
We apply our technological expertise and extensive project execution experience by providing planning, engineering, procurement, construction, operation and maintenance services in a wide range of business fields including oil & gas, chemicals and petrochemicals, pharmaceuticals, environmental technology, renewable energy, social infrastructure and industrial facilities. Since its founding in 1948, Chiyoda has provided Project Lifecycle Services in the successful completion of numerous projects in over 60 countries around the world.

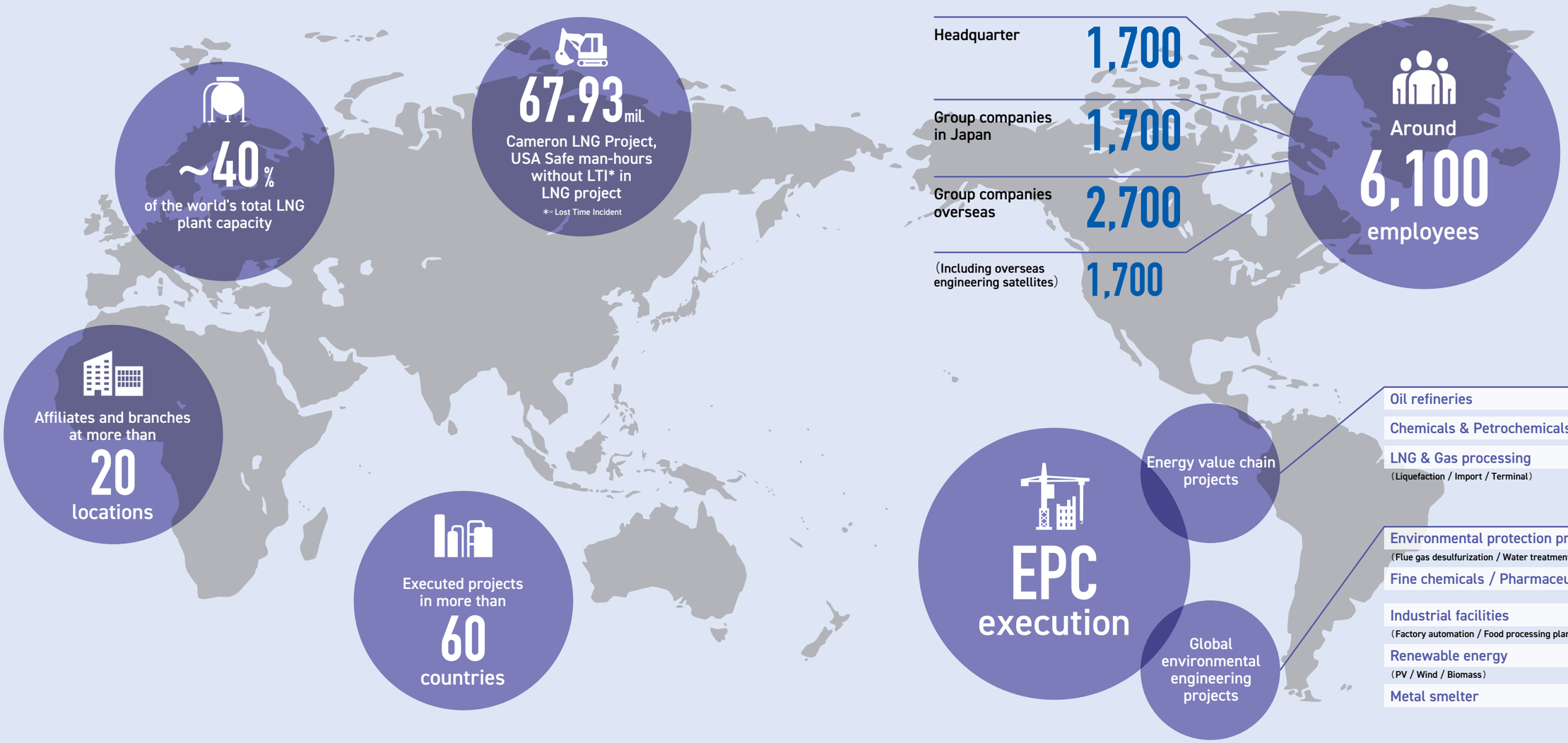
While global energy demand from growing economies steadily increases and the shale gas revolution affects the energy demand and supply balance, society is simultaneously undergoing a transition towards low-carbon emissions.

As a leader in energy-related technology, we use engineering to conquer business challenges with the aim of achieving a balance between energy consumption and preserving the environment.
Chiyoda continues to develop these strengths in the pursuit of a sustainable future for society based on our corporate philosophy of 'Energy and Environment in Harmony'.

OUR MISSION

AT A GLANCE

Chiyoda Corporation is a world-leading, integrated engineering and construction company.
The Chiyoda Group has developed its cutting-edge technology in this highly challenging industry and a wealth of experience throughout the last seven decades.
The Chiyoda Group provides excellent services backed by ample experience and technical knowledge, while striving for vital business with 'Energy and Environment in Harmony.'



INITIATIVES FOR THE FUTURE

The Chiyoda Group has released a Medium-Term Management Plan (MTMP): 'Initiatives for Revitalization and the Future', commencing from fiscal year 2019 to 2023.
The aim is for Chiyoda to become a global top-tier 'Integrated Engineering and Service Provider' in the energy and environment fields.

Given current macrotrends, such as changes in energy supply and demand, heightened awareness of the global environment and digital innovation driving changes in industry, Chiyoda will:

1) Strive for harmony between energy and the environment as a core value by providing technological and project execution expertise;
2) Contribute to the development of a sustainable society; and
3) Create a corporate management structure that resonates with stakeholders and earns their recognition and trust.

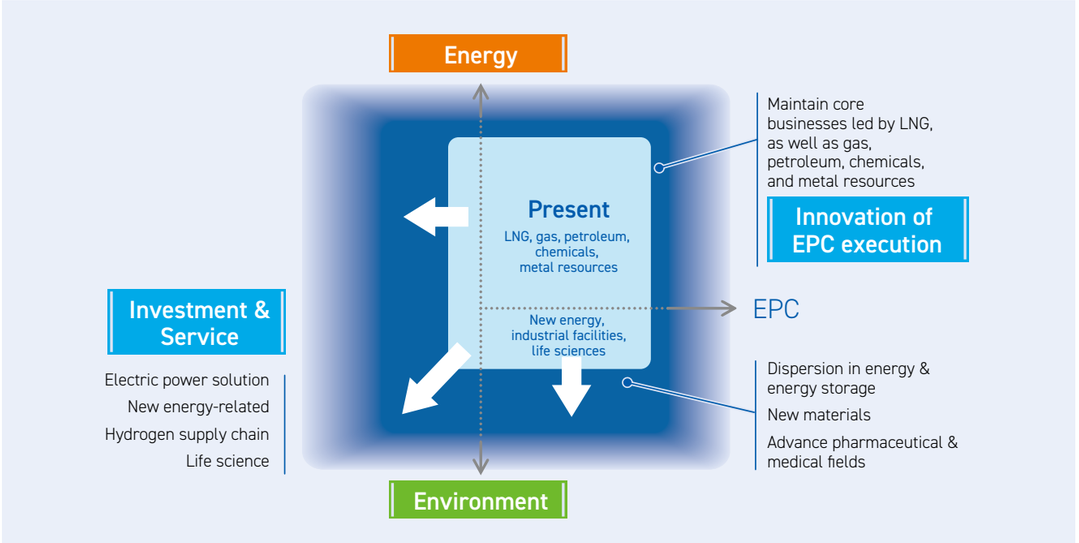
In the MTMP, Chiyoda simultaneously pursues: (i) a solid management base for future growth (Structural Reform) and, (ii) the expansion of business fields and transforming the long term (10 years) business model (Growth Strategy).

Chiyoda's strengths backed by our proven track record

GROWTH STRATEGY

Expansion of Business Fields and Transformation of the Business Model

We plan to expand the two key business fields of energy and the environment. We also aim to innovate Engineering, Procurement and Construction (EPC) execution and diversify our business into investment and services using innovative digital technologies.



Mirai* Engineering for the future for energy and global environment

Until now

- ◆Services provided for each phase of the project life cycle, mainly in FEED/EPC
- ◆Optimize individual plants
- ◆In-house R&D and implementation of external new technologies through EPC services

Challenges & needs of society / clients	What Chiyoda envisions with its engineering capabilities	Solutions
◆Optimization and improvement of existing business assets through digitalization ◆Dilemma between increasing population / energy demand and resource limitation / climate change (decarbonization) ◆Enhancement in disaster resilience ◆Continuity of healthcare system	❶ Realize technologies Project life cycle partner to maximize the clients' asset value ❷ Integrate technologies Integration partner to provide compound system fit for complex energy needs & restrictions ❸ Accelerate future technologies Incubation partner for future technology development to solve challenges in energy and global environment	◆Data-centric plant delivery ◆Optimized plant system operation to improve productivity, save manpower, automated, and remotely controlled ◆Development and provision of optimal diversified compound energy systems and demand chain systems ◆Creation of a carbon neutral society through managing carbon and developing new technology ◆Development of technologies related to smart cells, iPS cells for fundamental cure and regenerative medicine ◆Development of manufacturing process to reduce drug production cost

(*) Mirai means future in Japanese

ENERGY VALUE CHAIN

Chiyoda contributes to the sustainable development of society by engineering and constructing energy projects that efficiently utilize fossil fuels and satisfy customer requirements.

Cameron LNG, Louisiana State, USA

PNG LNG Project（Papua New Guinea）

photo Courtesy of Cameron LNG, LLC
Courtesy of ExxonMobil PNG Limited

～Total Project Optimization～

Chiyoda participates in the initial phases of energy projects and contributes to improving profitability by optimizing midstream, downstream and operations.

～Developing into the world's No.1 LNG Contractor～

As the world's No. 1 LNG Contractor, Chiyoda has participated in 40% of global LNG production capacity, is constructing and has successfully completed LNG projects in seventeen countries, while Chiyoda has participated in approximately 50% of the LNG receiving terminal projects in Japan, the world's largest LNG importer.

Chiyoda will continue to be a guardian for the global environment by securing future projects in LNG, an environmentally friendly source of energy.

Sabetta-Firstcargo2017

photo Courtesy of JSC Yamal LNG

ENERGY VALUE CHAIN

Olefins facilities for Gulf Coast Growth Ventures on the US. Gulf Coast. : CG

Plant overview of the INPEX-operated Ichthys LNG onshore processing facilities, in Darwin Australia.

photo Courtesy of Gulf Coast Growth Ventures
Courtesy of INPEX Operations Australia Pty Ltd.

～Effective Utilization of Fossil Fuels～

Since its foundation in 1948, Chiyoda has been engaged in more than 800 refinery projects, 600 petrochemical and chemical projects.

Chiyoda is executing EPC for a world class olefins facility for Gulf Coast Growth Ventures on the Gulf Coast in the USA. The project adopts notably unique construction strategy on the Gulf Coast in that the plant is modularized and manufactured outside the Gulf of Mexico to minimize the on-site construction work. Chiyoda and our US partner have been involved in the project since July 2017, having executed the Front End Engineering Design (FEED).

Condensate Refinery

photo Courtesy of Qatargas Operating Company Limited

GLOBAL ENVIRONMENTAL ENGINEERING

Metal Smelter
～Effective Utilization of Mineral Resources～

Chiyoda executed the EPC of a metal smelter for nonferrous metals (eg: copper, nickel, titanium etc.) commonly used around the world in familiar household goods, electric appliances, Electric Vehicles (EV) and the aerospace industry.

Titanium Sponge Plant (Saudi Arabia)

photo Courtesy of Advanced Metal Industries Cluster and Toho Titanium Metal Company Limited (ATTM)

Chiyoda Visual Management
～Visualizing, Accelerating and Modernizing Project Execution～

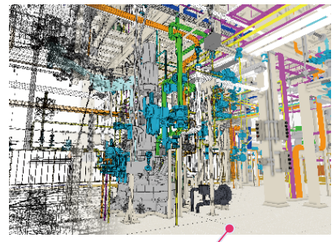
Chiyoda brings customer ideas to life and manage projects more efficiently through visualization technology such as 3 Dimension Computer Graphics (3DCG) and Virtual Reality (VR), accelerating information sharing and facilitating more effective decision-making in upgrading to 'next-generation' facilities.

Renewable Energy/Green Energy
～Pursuing an ideal supply of energy～

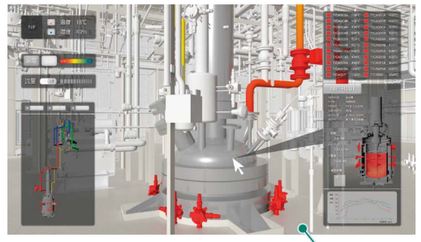
Chiyoda contributes to reducing the world's carbon footprint and protecting the environment from global warming by exploring renewable energy/green energy, including photovoltaic solar power and biomass energy which utilize natural and bio power discharge.

By blending fossil fuels and new technology for renewable/green energy from battery sources, Chiyoda is pursuing the most ideal combination for the supply of energy.

Chiyoda Visual Management
Examples of 3DCG Application in Every Project Phase



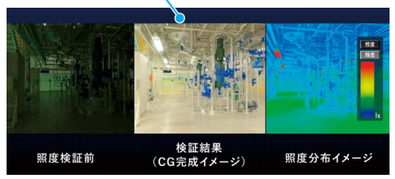
Restoration of drawings of existing facilities for modernization



Visualization of Big Data collected through IoT

Feasibility Study → FEED/ Basic Engineering → EPC (Engineering, Procurement, Construction) → Operation & Maintenance

Virtual simulation of the complex construction process



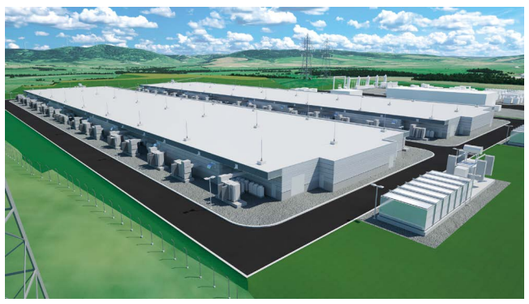
Verification from multiple perspectives
(required space/function/environment of manufacturing facilities)

Completion of plant/factory

Realizing "Overall Optimization"

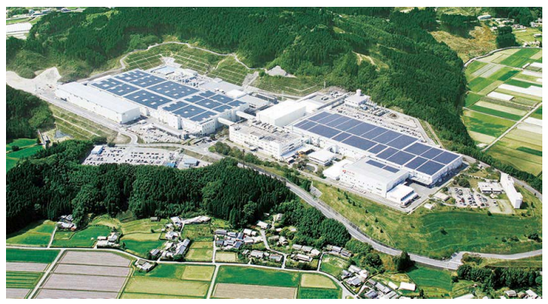
(productivity enhancement, maximize performance, efficient operation etc.)

Renewable Energy / Green Energy



The Battery Energy Storage System Project in Hokkaido Prefecture, Japan;CG

Chiyoda prepared an aerial photography in the about CG based on a map made by Geospatial Information Authority of Japan



CIS Solar Cell Plant and Mega Solar（Japan）

photo Courtesy of Solar Frontier K.K.

GLOBAL ENVIRONMENTAL ENGINEERING

GMP Vector Manufacturing Plant for Tissue Engineering（Japan）

Cardiomyocytes-like cells induced from iPS cells (cultured at our laboratory)

Vegetable factory in Dubai

Photo Courtesy of I'ROM Group.Ltd / ID Pharma Co.Ltd.
Courtesy of Chiyoda Corporation

SPERA Hydrogen®
～Establishing a Hydrogen Supply Chain～

Energy from Hydrogen, once considered a distant dream, has become a reality and "SPERA Hydrogen®", Chiyoda's innovative technology transporting liquefied Hydrogen at ambient temperature and pressure, has made it remarkably simple to use. As a further step towards a zero emission society, Chiyoda aims to develop an international hydrogen supply chain comprising a hydrogenation plant at Negara Brunei Darussalam and a dehydrogenation plant in Kawasaki's coastal region of Japan. Chiyoda and our partners have established the Advanced Hydrogen Energy Chain Association For Technology Development (AHEAD) and have commenced the world's first global hydrogen supply chain demonstration project, funded by NEDO*1, schedule to open for one year in 2020.

*1 NEDO：New Energy and Industrial Technology Development Organization

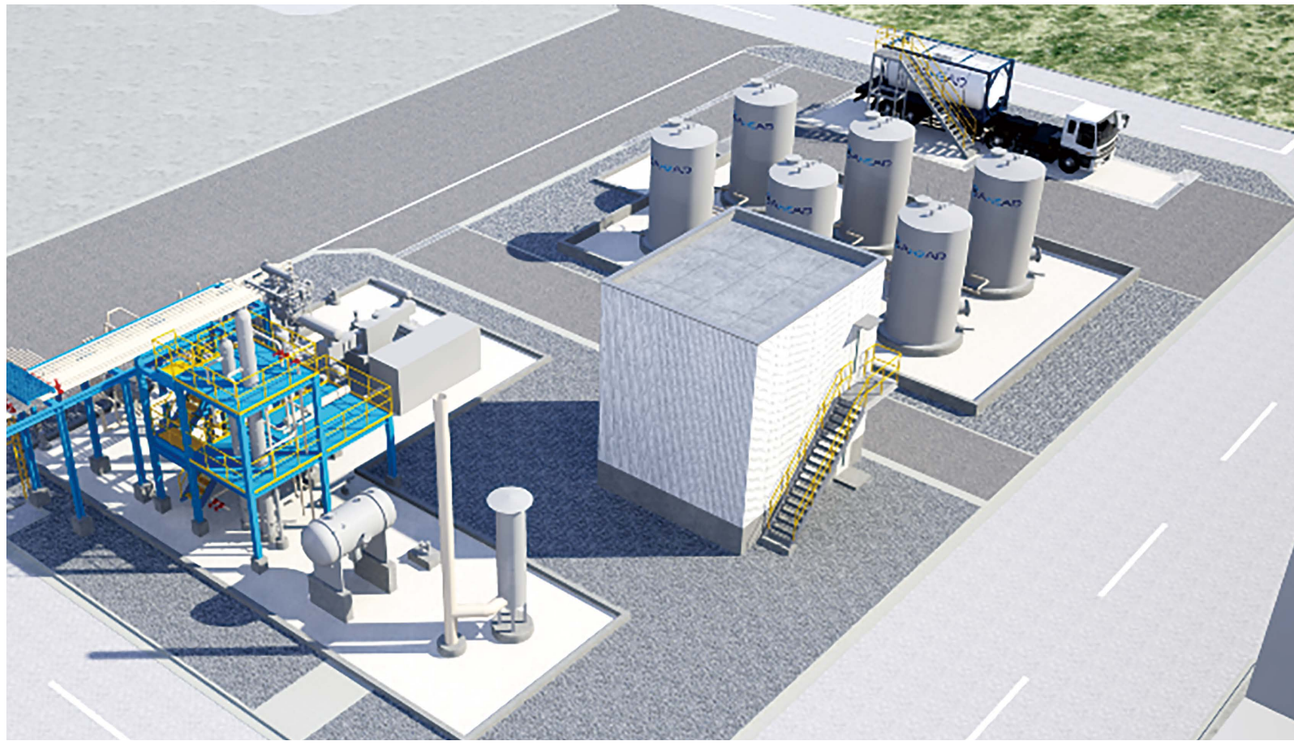
Life Sciences
～Engineering the Preservation of our Health and Well-Being～

Close management and high levels of engineering skill are required to satisfy stringent international standards and protect our health and well-being in the manufacture of pharmaceutical products.
Chiyoda provides total engineering services, perfected from the successful completion of more than 500 pharmaceutical related projects over 40 years, to meet customer globalization, diversification and manufacturing efficiency requirements. We also design and construct production facilities for regenerative medicine, requiring rigorous quality control, using our pharmaceutical plant engineering experience and advancements from Research and Development to analyze the culturing process including, but not limited to, iPS cells.

～Building Industrial Infrastructure by Promoting Stable Self-Sufficiency in Food～

Chiyoda's contribution to society as a solution provider is further demonstrated by the construction vegetable factories in Fukushima prefecture and Dubai in the Middle East to support vegetable cultivation, adding the life sciences to Chiyoda's repertoire of strengths.

The Dehydrogenation Plant in TOA OIL's Keihin Refinery, Kawasaki's Rinkai Industrial Area and Port（Japan）



CMIC CMO Co., Ltd. Ashikaga Plant, new parenteral drug manufacturing plant

photo Courtesy of Chiyoda Corporation
Courtesy of CMIC CMO Co.Ltd.

CHIYODA DIGITAL SOLUTION

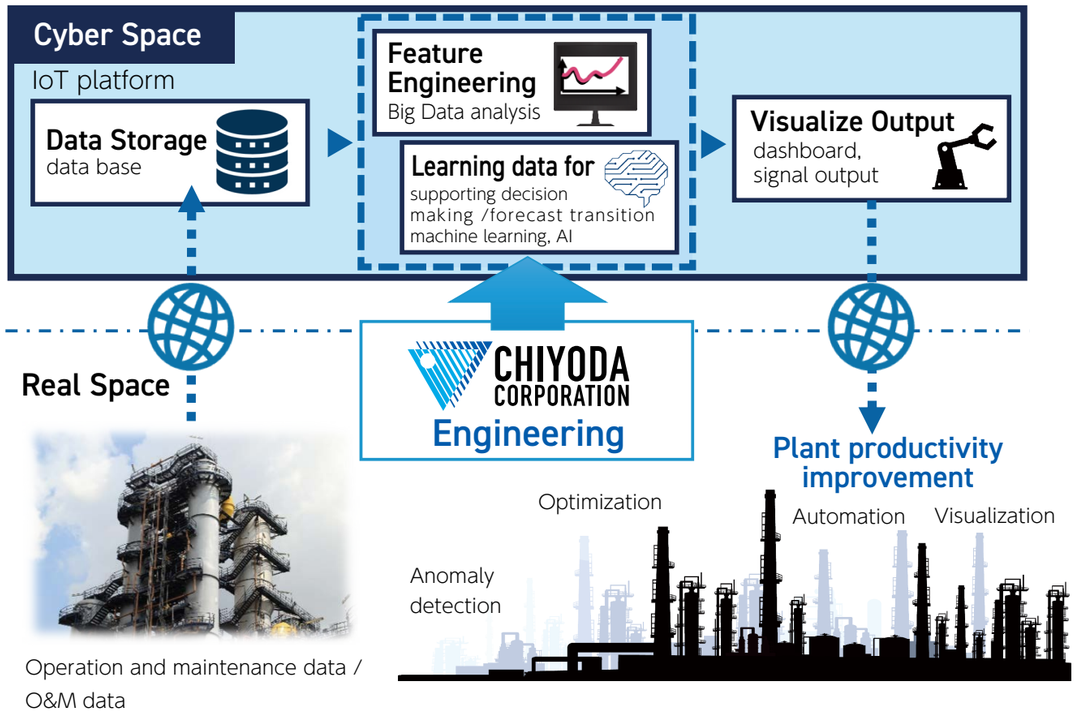
CHIYODA Digital Solution

Digital Solutions for Plant Operation & Maintenance

Chiyoda applies significant advances in digital technology, such as AI, Big Data and IoT, to plant operation and maintenance by combining their engineering and digital technology expertise cultivated over many years providing these services.
By providing solutions that cannot be replicated elsewhere, we will realize further productivity improvements for our customers.

Collaboration with Advanced AI Technology Companies

Chiyoda entered into a business alliance agreement with Grid Inc. in December 2016, combining our engineering proficiency with Grid Inc. AI technology to create one of Japan's leading technology venture companies with advanced AI expertise to provide high value-added solutions with cutting-edge digital technology.



Toward practical use of digital solutions

Chiyoda conducted AI/Big Data analysis for the Abu Dhabi Gas Liquefaction Company and on an LNG plant in the United Arab Emirates, combining our advanced plant engineering technology with state-of-the-art AI technology to provide advanced digital technology services. By optimizing plant Operation and Maintenance and improving production efficiency, we improve the asset value of our customers.

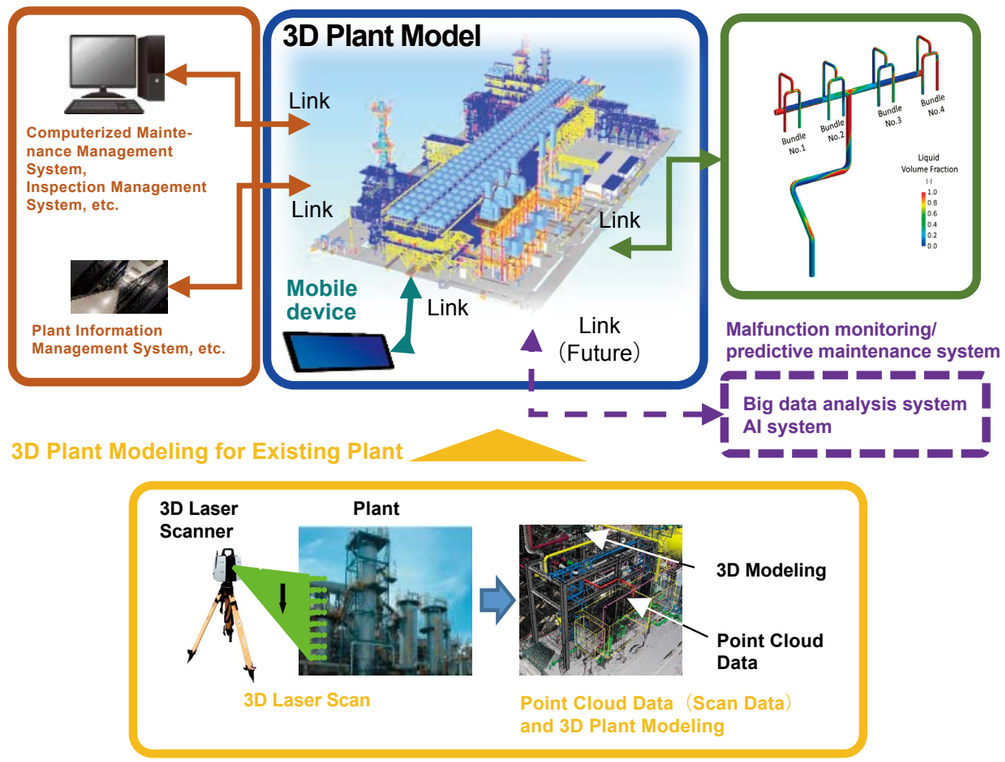
We also implemented AI for Indonesia's Dongi Sonoro LNG Company on an LNG plant and provided operational support to improve production efficiency. This is the first LNG project in the world where an innovative AI product – Deep Learning, has been introduced on an existing LNG facility to rapidly and safely increase LNG production and improve plant efficiency with no plant modifications.

Chiyoda will continue to work to improve customer asset values through the provision of digital technology.

Photo provided: Japan External Trade Organization;

Plant Digital Twin™ Data Platform

3D Plant Model Data Platform with Advanced Safety



SERVICE

Chiyoda is always ready to provide high quality service at any phase of project, anytime and anywhere in the world.

Chiyoda is engaged in numerous projects in countries throughout the world. Our activities, which are focused mainly on plant engineering, procurement and construction (EPC), are wide ranging—from energy to industrial facilities, pharmaceutical products and fine chemicals. Additionally, we are actively developing our own technologies in order to provide further advances in the fields of environmental and chemical engineering.
Using the skills and expertise we have acquired throughout the years in plant construction, we have also developed Project Lifecycle Engineering. This service helps provide support for plants and the social infrastructure throughout their entire life cycles, starting with project planning and consulting, through to engineering, procurement, construction, operation and maintenance.

FEED※1 Phase

FEED Services

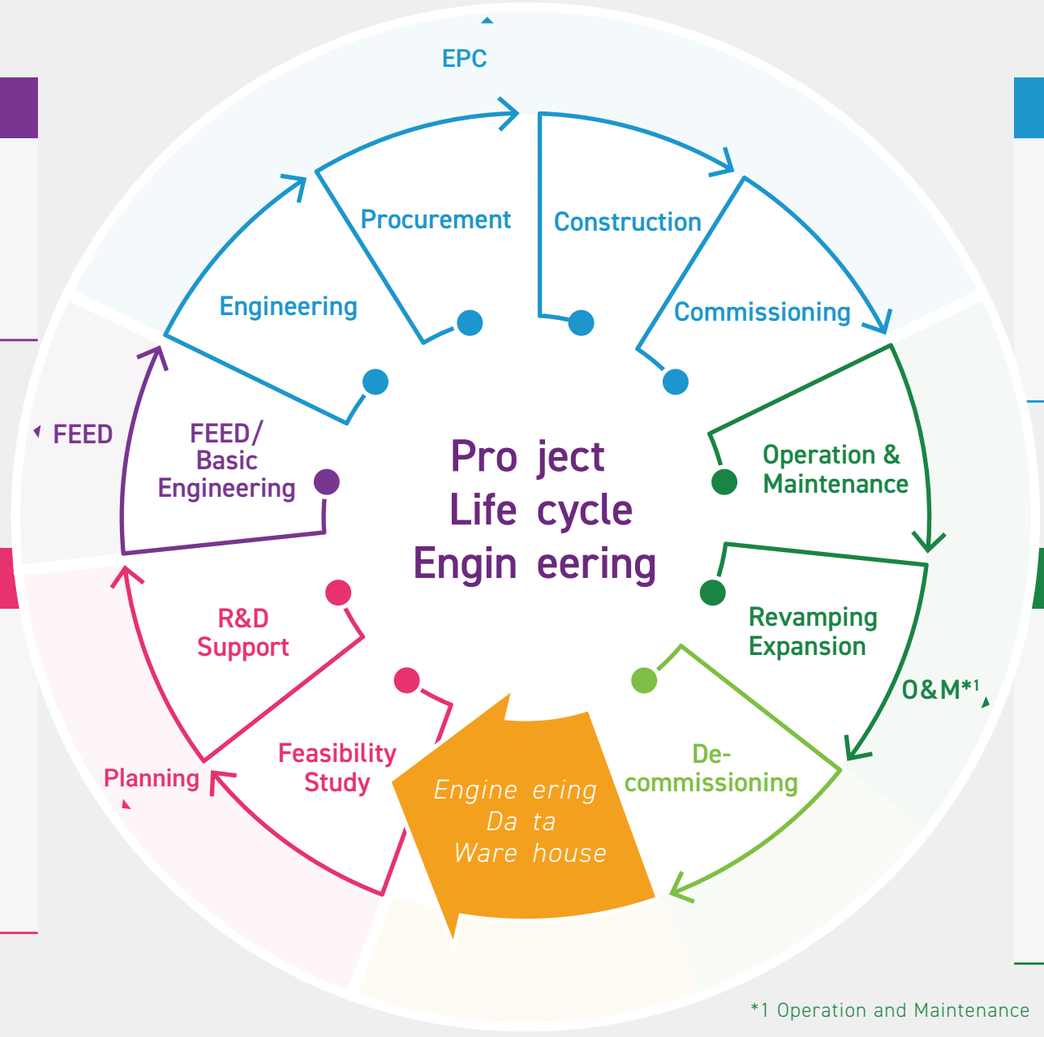
- FEED
- Basic Engineering
- Case Study / Optimization Study

※1 FEED: Front End Engineering Design

Planning Phase

Consulting Services

- Conceptual Design
- Preparation of Pre-FEED
- Feasibility Study
- Process Development Support
- Technology Selection
- Construction Planning
- Existing Plant Re-use Planning



*1 Operation and Maintenance

EPC Phase

EPC Services

- Engineering
- Procurement
- Construction
- Project Management

EPCm Services

- Engineering
- Procurement Service
- Construction Management
- Project Management

Operation and Maintenance Phase

Operation & Maintenance

- Training
- Technology Transfer
- Shut-down Maintenance
- Emergent Maintenance
- Maintenance Planning
- Spare Parts Management
- CMMS※2

※2 CMMS: Computerized Maintenance Management System

Asset Management Service

- Risk and Reliability Management
- Equipment and Machine Diagnostics
- Energy Saving
- Advanced Process Control
- Advanced CAE※3 Solutions
- Debottlenecking

※3 CAE: Computer Aided Engineering

Vision for the Revitalization and Future

The Chiyoda Group pledges to continue as an enterprise that optimizes the use of the cutting-edge technology and human resources to create value for society.
Our Corporate Philosophy proclaims "harmony between energy and the environment," and we are pursuing business with our CSR Values as shared values.
We re-define our strength of engineering value in the implementation of “Revitalization Plan” and accelerate growing strategy by expanding of core business fields “Energy” and “Global Environment”.

Revitalization Plan

Mirai Engineering for energy and global the future for environment

Chiyoda's strengths

EPC execution

Optimize design
Guarantee high quality

New technology commercialization

Integration of basic research capability and knowledge applied from EPC

Integration & Optimization

Provide the best solution for complex constraints and challenges by utilizing a mix of technologies across varying areas

Value Provided

- Data-centric EPC* execution and plant delivery
- Optimized plant system operation to improveproductivity, save manpower, automated,and remotely controlled
- Development and provision of optimal diversified compound energy systems and demand chain systems
- Creation of a carbon neutral society through managing carbon and developing new technology
- Development of technologies related to smart cells, iPS cells for fundamental cure and regenerative medicine

Realization of the Corporate Philosophy

- The Mission for us to Accomplish -

Enhance our business in aiming for harmony between energy and the environment and contribute to the sustainable development of a society as an integrated engineering company through the use of our collective wisdom and painstakingly developed technology.

- Achievement of SDGs
- Enhancement of Corporate Value

Global Standards

- ISO26000
- United Nations Global Compact
- SDGs
- Paris Climate Agreement
- United Nations Convention on Biological Diversity

The Chiyoda Group’sCSR Values

1. A Reliable Company
2. Environmental Initiatives
3. Social Contributions
4. Respect for Human Rights
5. Commitment to Fairness

Social Issues

- Human Rights
- Anti - Corruption
- Global Warming
- Securing Energy Resources
- Economic Disparity
- Fair Employment
- Individual Issues in Local Communities

What are the SDGs (Sustainable Development Goals)?

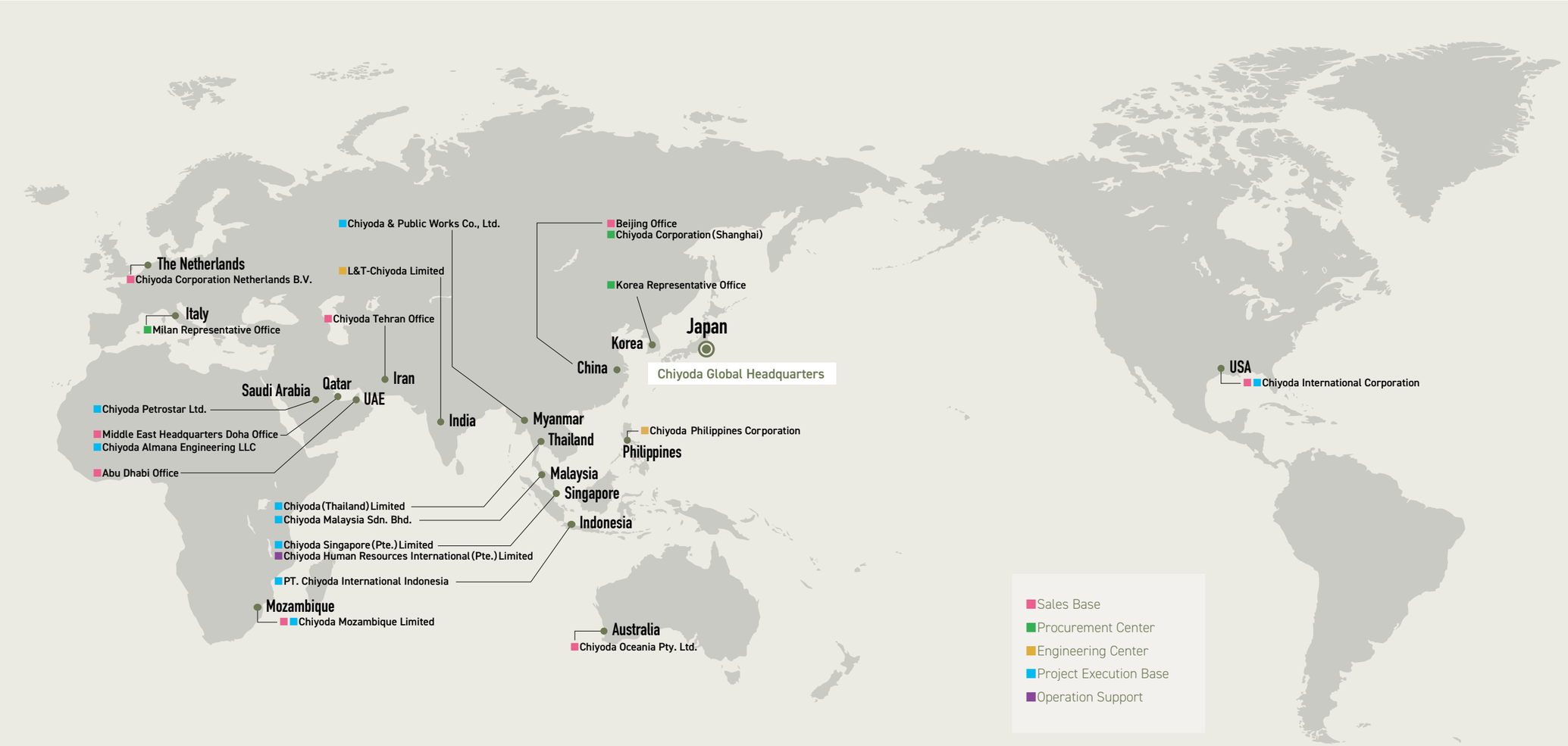
These are goals that need to be realized by the year 2030 in order to achieve a sustainable development of society. They consist of 17 major goals and 169 targets that were adopted by the United Nations General Assembly in September 2015 to provide a basic framework for action in the international community of both developing and developed countries. In this report, we are reconfirming our own corporate activities and displaying icons for the relevant goals side by side with such activities.

CHIYODA GROUP The Chiyoda Group Supports the SDGs.

GLOBAL NETWORK

Optimizing Chiyoda's Strength through Global Operations

Chiyoda's global network enables Project Lifecycle Engineering to be offered all over the world. Chiyoda has expanded its network in order to provide prompt support for customers' business activities on a global scale. We pursue a group operation style based on region, business fields and function under the core strategy of CGH (Chiyoda Global Headquarters).
Our services cover the entire life cycles of project—from planning, engineering, procurement and construction through operation and maintenance. With a view to meeting the ever-changing needs of our customers, we offer services by utilizing local offices and group companies with a thorough knowledge of the latest local and global circumstances in countries around the world.
※CGH：Chiyoda Global Headquarters



Corporate History

1948	Foundation of the Company. Receipt of the first order (Oil extractor).
1949	Receipt of the first order for a cracking plant.
1960	Receipt of an order of grass-roots refinery in Mizushima.
1961	Listed on the first section of Tokyo Stock Exchange.
1966	Receipt of the order for Jeddah Refinery in Saudi Arabia.
1972	Published a booklet "Legacy for the 21st Century" (Environmental Declaration).
1973	First order awarded for LNG plant (UAE).
1984	First order awarded for CT-121 Flue Gas Desulfurization plant (USA).
1994	Foundation of Engineering Center (India).
1995	Foundation of Engineering Center (The Philippines).
1999	Commended by the Project Management Institute for Qatargas LNG project as the "International Project of the Year".
2000	Received from the Japan Industrial Journal "the Grand Prize for the Global Environment Award".
2001	Expansion of natural gas related business.
2003	Receipt of the order for Sakhalin II LNG Project Achieved no LTI throughout the year at domestic projects.
2004 ~2005	Order awarded for 6 trains of the world's largest LNG plants for Qatargas and RasGas from 2004 to 2005.
2008	The 60th anniversary of our company's establishment Capital and Business Alliance with Mitsubishi Corporation.
2012	Receipt of the order for Ichthys LNG Project (Australia).
2013	Order awarded for refinery and petrochemical complex (Vietnam). Confirmed proof of concept for SPERA Hydrogen®, a system and technology for massive H2 storage and transportation, through 10,000 hours of operation in its demo plant.
2014	Order awarded for Cameron LNG Project (USA). Order awarded for Yamal LNG Project (Russia).
2015	Order awarded for Titanium Sponge Plant (Saudi Arabia). Order awarded for Freeport LNG Project Train 3 (USA).
2016	Order awarded for Tangguh LNG Project Train 3 (Indonesia). SPERA Hydrogen® received "2016 Nikkei Global Environmental Technology Awards."
2017	Annouced Medium-Term Management Plan "Mirai Engineering" - A Grand Opportunity for the Future.
2018	Order awarded for World-Scale Ethylene Project (USA)
2019	Order Awarded for Golden Pass LNG Project (USA) Issuance and Subscription of Preferred Shares to Mitsubishi Corporation by Third Party Allotment

Major Group Companies in Japan

Chiyoda Kosho Co., Ltd.

Design, construction and maintenance for domestic projects

Chiyoda System Technologies Corporation

Engineering, procurement, construction and maintenance of electrical and instrumentation, and of social infrastructures. Consulting, development and operation for integrated IT systems.
Supplying spare part and materials

Chiyoda TechnoAce Co., Ltd.

Design and construction for pharmaceutical facilities

Chiyoda U-Tech Co., Ltd.

Technical consulting of energy and environment, staffing of engineers and outsourcing services

CHIYODA GROUP

Chiyoda Corporation
Minato Mirai Grand Central Tower
4-6-2, Minatomirai, Nishi-ku, Yokohama
220-8765, Japan
www.chiyodacorp.com

WE SUPPORT UN GLOBAL COMPACT

The Chiyoda Corporation is a signatory of the United Nations Global Compact.

201908