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TOYO ENGINEERING

Striving to Fully Complete the Revival Plan By Mobilizing TOYO's Total Strength

Strategies for Revival and Vision for the Future

Haruo Nagamatsu
President and CEO

My Primary Goal Is to Return TOYO to a Growth Track

■ President Nagamatsu, you started your position on the first of April. What are your aspirations for the future?

Firstly, I must extend my most sincere apologies to our stakeholders as TOYO fell deeply into deficit and dividends were not issued. As President, I see it as my essential mission to revive business performance as soon as possible and put TOYO back on a growth track. We are, however, starting to see solid results from measures implemented under the Revival Plan, which we launched in 2015. One example is that nearly all projects awarded after the start of the Revival Plan are in process according to plan. We were also able to secure awards exceeding our objectives for fiscal 2017. This included the award of fertilizer plants, which is one of TOYO's areas of strength, and our first biomass power plant, as well as an expansion of project awards independently acquired by overseas group companies. By focusing on Revival Plan measures related to risk screening for proposals and strengthening quality control management for projects, I believe we will be able to prevent cost increases for ongoing projects and achieve the early recovery of business performance.

■ What is your evaluation and analysis of the consolidated results for fiscal 2017?

We recorded a net loss for the period of ¥26.8 billion. The deterioration of profits was caused mainly by a cost increase for an ethylene project in the United States. It has been attributed partly to continuous rain and hurricanes, but was mostly due to delays in progress caused by insufficient mobilization

of the workforce by the subcontractor in proportion to the increase of construction volume. Because there were growing concerns that costs might swell and the construction schedule might be delayed if shortages in the workforce continued, the decision was made to decisively strengthen the construction system in the fourth quarter. Revenue worsened further after recalculating costs to the end of the project, including this strengthening countermeasure. I deeply regret that, in this case, TOYO's project and risk management systems did not function appropriately.

■ What specific measures were taken to strengthen the construction system?

As I've mentioned, construction schedule delays were generated by insufficient mobilization of the workforce by the construction subcontractor. In April, we newly contracted two local construction companies with mobilizing power in the areas of piping and electrics/instrumentation, and we shifted around half of the existing company's work scope to them. Accompanying this, we increased the number of TOYO's supervisors at the construction site as a measure to bring construction progress back on track. Construction costs increased due to these recovery measures, but we were able to overcome the issues in this project, such as securing an adequate workforce and improving progress. In addition to carrying out these kinds of drastic measures, TOYO worked together with the construction companies to develop a new construction system, grasp the actual situation at site in a timely manner and implement necessary countermeasures. We can estimate that we will be able to complete the project within the current budget.

¥309.3 Billion in Orders Secured during Fiscal 2017

■ Fiscal 2017 orders topped ¥309.3 billion, exceeding 160% of the previous period. Please explain about the market environment and situation of new orders during this period.

In the previous period, we received many inquiries in the ethylene and fertilizer fields—areas in which we specialize—and we were able to secure new orders. With the steady progress of the world economy, demand is expanding globally in downstream petrochemical fields, including ethylene. Further, against the backdrop of population increase, agricultural policies are growing in importance, and there are signs indicating a trend toward an increase in fertilizer projects centered on Asia, India and Africa. Economic growth in emerging nations is causing power shortages, and we are seeing the emergence of various power generation projects, ranging from gas-fired to renewable energy. It is reassuring to see that the market is strong in fields such as petroleum, fertilizers and infrastructure, where TOYO is most competitive. I believe the most important thing is that we incorporate this worldwide increase in demand into TOYO's group companies by accurate sales activities according to client needs.

■ Digital Fertilizer operations have begun.

TOYO is a licenser of urea manufacturing technologies and provides comprehensive services for the whole lifecycle of fertilizer production, from technology licensing through to plant construction and operation support. By fully utilizing the experience

and knowledge accumulated in this field since TOYO's founding, we developed "Digital Fertilizer," an IoT system that optimizes fertilizer plant operation and maintenance. In December of last year, the first Digital Fertilizer was implemented at a state-owned fertilizer company in Indonesia, and its operation has begun.

At present, fertilizer plants operating with TOYO licenses total 11 in Indonesia and approximately 100 around the world. In addition to pursuing the global implementation and operation of Digital Fertilizer, we would like to move forward with a new business model that, based on the data obtained, proposes solutions related to plant operations and maintenance. We are also planning to expand Digital Plant solutions to use in petrochemical plants, such as Digital Ethylene for ethylene plants.

■ In December 2017, a collaboration between TOYO and NSENGI was announced. What are the objectives of this agreement?

In December of last year, we signed a comprehensive collaboration agreement with Nippon Steel & Sumikin Engineering Co., Ltd. (NSENGI) for the purpose of further expanding the corporate values of both companies. In contrast with TOYO's overseas-focused business, NSENGI is centered on diverse business in Japan. NSENGI has a wealth of experience in waste-to-energy plants, pipelines, and other facilities related to the development of oil and gas—areas with which TOYO is less familiar. Because of the differences in work content and fields of expertise, we believe we can create a synergy by complementing each other's business resources. Mutual utilization of staff between NSENGI and TOYO has already begun, and a steering committee headed by the presidents of both companies is held periodically. Lively discussions have begun between staff members working at corresponding levels, and there are plans for determining and further exploring specific collaborative projects.

The Challenge of Creating a New Business Structure around the Two Pillars

■ Fiscal 2018 is an important year that marks the full completion of the Revival Plan. By what management policies will you lead TOYO during this period?

We will put our full efforts into reviving TOYO while sticking firmly to the three fundamental policies of the Revival Plan—reformation of the business

structure, enhancement of organizational capabilities and reinforcement of the financial base. To reform the business structure, we will work hard to create a new portfolio with the two pillars of plant and infrastructure businesses. Further, we will promote innovation, and explore and create the business possibilities that will become the core of TOYO in the future. In enhancement of organizational capabilities, we will be working to establish an organizational structure that can respond to changing market conditions according to the circumstances by, for example, shifting human resources to a prioritized field and optimizing the operations of global group EPC* companies. And we will work towards reinforcement of the financial base, which I see as the most important aspect of our business, by exploring and implementing various measures, including the compression of sales, general and administrative expenses and fixed costs. First of all, I believe we must ensure stable profits. Our net capital was damaged by large cost increases in the U.S. ethylene project, and we are not in a position to carry out everything that we would like to do. I plan to set management strategies and put them into action after carefully considering cost-effectiveness.

*EPC: Engineering, Procurement and Construction

■ Orders worth ¥300 billion are planned for fiscal 2018. How do you see market trends developing in the future?

With the economic recovery in advanced nations and economic development in emerging nations, I believe plant and infrastructure markets will be strong for the time being. New projects related to petrochemicals such as ethylene and fertilizers, as well as power generation, are being planned around the world. Further, conditions are in place to proactively promote technologies that support improvements in client revenue, such as Digital Plants and our advanced energy-saving distillation system, *SUPERHIDIC*.® In Japan, construction projects for renewable energy power plants such as biomass are booming, and we expect an increase in demand. Taking advantage of these favorable market conditions, TOYO's group will combine its full strengths to secure projects.

Striving to Become a Corporate Group Trusted by Stakeholders with the MVV as a Guideline

After efforts in fiscal 2018 are complete, TOYO will start on a new growth track. What are your mid- to long-term growth strategies and your vision for the future?

Engineering businesses such as ours have a role in supporting economic and industrial growth. I don't see any limit to the areas to which this support can apply. Continuing to complete each project with great care, based on a relationship of trust with our clients, is what will lead to further growth in the future. On the other hand, there are limits to the fields of operation TOYO can cover on its own. It is important for us to expand our business portfolio by continuing to take a forward-thinking approach based on forming alliances with external partners, such as in the comprehensive collaboration with NSENGI. I would like to achieve a quick return to a growth track through stable project execution and optimized partnering, and rebuild a solid revenue-generating base.

In order to complete the Revival Plan and return to a growth track, TOYO must fully apply its unique strengths. What is TOYO's competitive edge?

TOYO has sufficient strengths that we will continue to build on as we move forward. Examples include our high-level technical prowess with engineering for fertilizer and ethylene plants, our project execution abilities developed through a wealth of experience, and our relationships of trust built with clients over many years. However, at the foundation of this is the sharing of the same values and vision between all TOYO employees, including those of global group companies. Our policy in the execution of our day-to-day work is the sharing of the same mission, vision and values, or what we call our "MVV." This is the unshakable basis from which we draw our vision for the future. Every plant on which TOYO works is a customized item. Precisely because of this, each of TOYO's people, based on the MVV, can look at any issue from an individual perspective as a specialist, take the time to fully think out that issue, and provide the best solution from an organizational perspective. I believe this is what gives TOYO its competitive edge. Further, I would like to enhance TOYO's capability by utilizing experiences not only for the purposes of reflecting on mistakes, but to thoroughly analyze the causes.

Lastly, could you give a message to your stakeholders?

We recorded large losses in fiscal 2017, and I would like to apologize once again for the great inconvenience and concern this has caused to our stakeholders. In the current period, in addition to preventing cost increases in our U.S. ethylene project and focusing on its completion, we are striving to revive TOYO by obtaining new orders that secure appropriate profitability, and by steadily completing projects in process. In addition, while concentrating our managerial attitude primarily on revenue, we will build win-win relationships with clients and partner companies. Also, we will be pursuing the stabilization of profitability by differentiating ourselves from other companies by increasing our EPC capabilities and expanding our power as TOYO group. I am dedicated to restoring the trust we have damaged, and we will do so by solidly securing our revenue objectives. I humbly ask for your continued kind support.

PROFILE

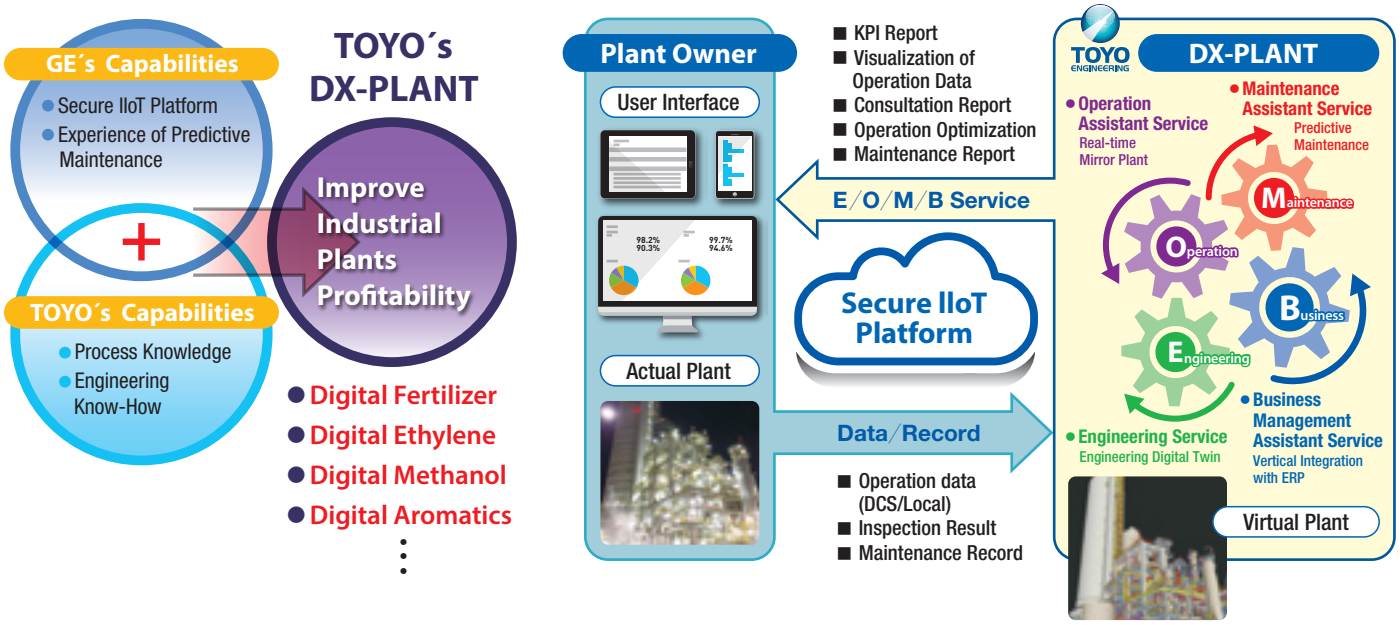
President and CEO **Haruo Nagamatsu**

Haruo Nagamatsu joined TOYO in April of 1981. He has participated in overseas gas plant projects as a mechanical engineer, and also gained experience in non-hydrocarbon projects, such as industrial facilities and monorails in South East Asia and the United States. For four years from 2000, he served as President of Toyo-Malaysia, and helped the company develop so that it was able to take on lump-sum EPC projects. After returning to Japan, he worked on business development for power generation and transportation in the division that preceded the Infrastructure Business Unit. After this, in 2009, he became the project manager for FPSO* topside projects and worked at overseas collaborators' offices in Singapore and other countries. His experience working overseas spans more than twenty years. In 2013, he was appointed Executive Officer and contributed to project success as the General Manager of the Infrastructure Project Division. In April 2016, he was appointed Unit Director of the Infrastructure Business Unit and Senior Executive Officer. In June 2017 he joined the Board of Directors, and in April 2018 he was appointed President and CEO. His motto is, "Where there is a will, there is a way. Take action." With his natural leadership skills, he drives the whole company to first resolve the issues immediately at hand and to return TOYO to a growth track.

*FPSO: Floating Production Storage and Offloading

Launching the World's First DX-PLANT for Fertilizer

Since Internet use began in the 1990s, TOYO has been working on IT development and applications for chemical plants. Today, toward achieving the fourth industrial revolution by IoT technology, TOYO started collaborating with General Electric (GE), under a memorandum of understanding signed with GE in November 2016, to develop services for the Digital Transformation (DX)-PLANT. The DX-PLANT is aimed at maximizing client revenue by leveraging TOYO's engineering expertise in processes and operations for fertilizer and petrochemical plants while providing services through GE's



Comprehensive Collaboration with NSENGI

Steering Committee for Promotion of the Collaboration

On December 27, 2017, TOYO and Nippon Steel & Sumikin Engineering Co., Ltd. (NSENGI) signed a comprehensive collaboration agreement with the aim of enhancing the business portfolios of both companies. The companies will cooperate widely for businesses, projects and in other ways in expectation of an increase in the corporate values of both companies. Collaboration will be made through the mutual provision of their respective business resources in such areas as business cooperation both in Japan and abroad, new business development, equipment and material procurement, sharing of engineering know-how, and human resources utilization. In order to promote collaboration, TOYO and NSENGI established a steering committee and develop collaborative businesses and projects based on the agreement.

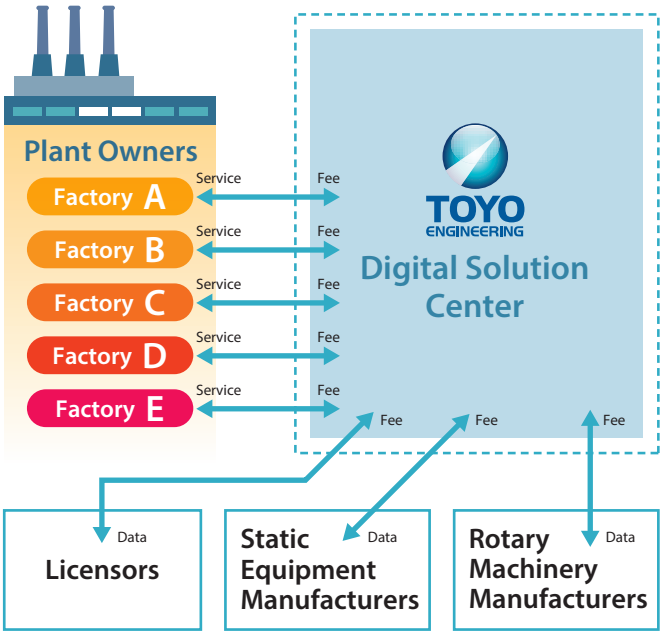
As there is little overlap in the two companies' business portfolios, this relationship will allow the companies to complement each other with their respective strengths. NSENGI specializes in steel plants, waste-to-energy solutions,

cloud-based Platform (PREDIX), which is built for the industry.

Through DX-PLANT, TOYO provides solutions for the four fields of engineering (E), operations (O), maintenance (M) and business (B). This system will realize "digital twins" of an actual plant and a virtual plant on a cloud-based platform built from stored big data relating to operation data, inspection records and maintenance histories. Clients are able to access this cloud system whenever and wherever they desire and widely share the results of solutions for their plants. Finally, an improvement in production and the optimization of operation and maintenance are achieved.

As a first step, TOYO has developed Digital Fertilizer and implemented it since December 2017 at a plant with a production capacity of 2,750 tons per day that is owned and operated by state-owned Indonesian fertilizer company PT Pupuk Sriwidjaja Palembang (PUSRI) in Palembang, South Sumatra, Indonesia (commercial operations began in 2017). The plant uses TOYO's state of the art urea technology, ACES21®. At present, phase-1 is completed, which involved collecting the operation data and realizing the insight as the primary step. For further development as the next phase, TOYO is working on providing solutions for the various pain points of clients.

TOYO will keep moving forward to expand its Digital Fertilizer to the more than 100 other plants which have been built around the world that utilize TOYO's technology licensing. And DX-PLANT will be extended to other petrochemical plants beyond fertilizer plants. TOYO will establish a Digital Solutions Center by connecting multiple plants to provide the total solution, and endeavor to expand the new business.



offshore oil & gas development, building construction/steel structures, and pipelines, while TOYO's specialties include petroleum/petrochemical plants, chemical fertilizer plants, infrastructure facilities, and energy development. In net sales by region, NSENGI derives 80% from the domestic market, while TOYO draws 80% from the overseas market. In terms of business configuration, EPC*1 contracts are central for TOYO, while O&M*2-related contracts account for an indispensable part of NSENGI's business.

For the purpose of strengthening and expanding the relationship, TOYO has set up the Partnership Promotion Department inside the Corporate Strategy Division to promote collaboration from a company-wide perspective and to provide support for issues such as compliance-related matters to collaboration. At present, preparations are underway for cooperative work in domestic and overseas projects, overseas procurement, utilization of TOYO's overseas group companies and NSENGI's subsidiaries, and the joint search for new business opportunities. Also, interactions are taking place in human resource development and training. The Steering Committee for Promotion of the Collaboration was held in May, and subjects included specific policies for collaborations in areas such as renewable energy, IoT, and the promotion of overseas business.

Areas of Collaboration

1. Collaboration in domestic cooperative business
2. Collaboration in overseas cooperative business
3. Joint investigation into new business opportunities to be advanced collaboratively
4. Collaboration in procurement
5. Reciprocal disclosure and sharing of engineering know-how
6. Human resources utilization and other cooperation that enhances both companies' corporate values

*1. EPC: Engineering, Procurement and Construction
*2. O&M: Operation and Maintenance

Large-Scale Fertilizer Complex Project in India

Signing ceremony

TOYO has been awarded a contract for a project to construct a large-scale fertilizer complex in Gorakhpur, Uttar Pradesh state, India. The project was awarded by Hindustan Urvarak & Rasayan Limited, a joint venture company established by Coal India Limited, NTPC Limited and Indian Oil Corporation Limited as the lead promoters with Fertilizer Corporation of India Limited and Hindustan Fertilizer Corporation Limited as the other two partners. The objective of this project is to construct a large-scale fertilizer complex composed of an ammonia plant with production capacity of 2,200 tons per day, a urea plant with production capacity of 3,850 tons per day, and a utility supply facility. Toyo-Japan will oversee basic engineering and procurement, and Toyo-India will be responsible for detailed engineering, procurement, and construction work. The ammonia production technology of Kellogg Brown & Root LLC (KBR), United States, and TOYO's urea synthesis technology, ACES21®, will be employed.

This project is part of a series of national projects promoted under the "Make In India" slogan by the Government of India, which aims to fully achieve domestic production of chemical fertilizers to support India's growing population. Further, the construction location for this plant, Gorakhpur, is where TOYO worked on the first fertilizer plant exported to India by a Japanese company in 1963, three years after the company's founding. Since that time, TOYO has accumulated a list of achievements in fertilizer plants in India. Including the project currently under construction in Kota, Rajasthan, this will be TOYO's sixteenth Indian fertilizer project.

Awarded Successive Petrochemical Plants in Indonesia

Groundbreaking ceremony for the polyethylene plant

TOYO received an award from Indonesia's largest petrochemical company, PT Chandra Asri Petrochemical Tbk. (CAP), for a new polyethylene swing plant to be constructed inside their existing petrochemical plant in Cilegon, Banten, on the western tip of Java, Indonesia. The groundbreaking ceremony was held in February 2018.

The plant will produce a combined total of 400,000 tons per year of HDPE, LLDPE and mLLDPE in accordance with demand. Toyo-Japan and Toyo-Korea will oversee detailed engineering and procurement outside of Indonesia, and TOYO's Indonesian group company PT. Inti Karya Persada Tehnik (IKPT) will oversee domestic procurement and construction work, with completion scheduled for 2019. This EPC*1 project is a continuation of the FEED*2 project awarded to Toyo-Korea.

Further, in May 2018, TOYO was awarded construction projects from CAP and its subsidiary PT Petrokimia Butadiene Indonesia (PBI) for new facilities inside the same complex. These include a butane-1 unit with a production capacity of 43,000 tons per year, an MTBE unit with a production capacity of 127,700 tons per year, and an enclosed ground flare system for the entire petrochemical complex. Toyo-Japan will manage a portion of the overseas procurement, and IKPT will manage domestic procurement and construction work, with plant completion scheduled for 2020.

TOYO is currently executing EPC for a synthetic rubber plant with a production capacity of 120,000 tons per year for PT. Synthetic Rubber Indonesia—a joint venture between Michelin, France, and a CAP subsidiary. Also, TOYO is working on the expansion of a butadiene plant for PBI, which will increase the plant's total production capacity from 100,000 tons per year to 137,000 tons per year.

*1. EPC: Engineering, Procurement and Construction
*2. FEED: Front End Engineering Design

Awarded Second Train Project for Fertilizer Plant in Nigeria

TOYO was awarded a contract for engineering, procurement and commissioning support service in a construction project for the second train (Train-2) of a fertilizer plant from Indorama Eleme Fertilizer & Chemicals Limited (IEFCL). At the end of 2012, TOYO received an order for IEFCL's first train fertilizer plant located at Port Harcourt, Rivers state, Nigeria. After overcoming many difficulties, such as an outbreak of Ebola fever, the project was completed in 2016. TOYO's engineering technology and project execution capability in that project helped secure this second train project.

The Train-2 facility, to be built adjacent to the first train, is of the same production capacity and configuration, producing 2,300 tons per day of ammonia and the world's largest level of granulated urea, at 4,000 tons per day, and includes relevant utilities and offsite facilities. Train-2 will employ technology licenses from KBR, United States, for ammonia, and from TOYO for urea.

TOYO is committed to executing the Train-2 project based on the best practices and lessons which were learned through the first train project execution, and to accumulating experience in the fast-growing Sub-Saharan Africa region.

Panorama of the first train

Toyo-Malaysia Awarded Rejuvenation Project for Gas Processing Plant

Clients and the project's team members

Toyo-Malaysia was awarded a rejuvenation project (ALEXIS6) from PETRONAS Gas Berhad (PGB), a subsidiary of the Malaysian national oil company PETRONAS, for its gas processing plant No. 6 (GPP6) in Santong, on the east coast of Malaysia. This project will extend the life of the gas processing plant, ensuring that safe, stable operations will continue for the next twenty years. Toyo-Malaysia will execute the project as a lump-sum turnkey contract for engineering, procurement, construction and commissioning.

Since being awarded the contract for gas processing plant No. 1 (GPP1) in 1983, TOYO has constructed multiple plants, including gas processing plant No. 2 (GPP2). TOYO has also worked on various other projects for PGB, including a revamp project (PRR1) for GPP1 in 2001, a revamp project (PRR2) for GPP2 in 2009, and a rejuvenation project (PRR4) for gas processing plant No. 4 (GPP4) in 2012. Completion of the ALEXIS6 project is scheduled for April 2019.

Expansion of Naphtha Cracking Furnace Project in Japan

TOYO was awarded a project to construct a naphtha cracking furnace by Tosoh Corporation for producing ethylene, a raw material of basic chemicals, at its Yokkaichi Complex, Mie Prefecture in Japan. TOYO participated in this construction project from an early stage of the client's investment planning.

With this naphtha cracking furnace, TOYO will be first to introduce an SRT-VII furnace to Japan. This cutting-edge, increased-yield ethylene cracking furnace is based on the latest technology from Lummus Technology, United States, a company with which TOYO has maintained an alliance for several decades. Lummus' technology is employed in around 40% of all ethylene plants globally, and TOYO has been involved in construction of 45 ethylene production plants using these systems in various countries and regions. TOYO's group company TEC Project Services Corporation (TPS) will carry out most of the construction work on this project.

Groundbreaking ceremony

TOYO's First Biomass Power Plant Awarded

Biomass power plant 3-D model (image for reference)

TOYO, jointly with Obayashi Corporation, was awarded a contract for a project to construct a 50 MW dedicated biomass power plant for Obayashi Kamisu Biomass Power Generation Corp. in Kamisu City, Ibaraki Prefecture, Japan. It is TOYO's first biomass power plant project.

The objective of this project is to construct a dedicated biomass-fired power plant using wood pellets as the primary fuel. The power generation facility will be a highly efficient biomass-fired plant based on a reheating system.* Working with Obayashi Corporation, TOYO will carry out engineering, procurement, construction, and commissioning services for the power generation unit on a turn-key basis. Completion is scheduled for 2021.

Renewable energy is expected to play an important role in global warming prevention in the future. TOYO will use this project as a foothold for expanding its involvement in biomass energy, and will contribute to the achievement of a low-carbon society.

*A system that achieves highly efficient power generation by taking steam that has been used in a steam turbine, reheating it in a boiler, and passing it through a steam turbine again.

Awarded Three Large-scale Photovoltaic Power Plant Projects in Japan

Groundbreaking ceremony in Iwaki, Fukushima

In September 2017, TOYO was awarded a project from Pacifico Energy Iwaki G.K. for a large-scale photovoltaic (mega solar) power plant to be built in Iwaki City, Fukushima Prefecture, and work on the project is underway. The plant will have a power generating capacity of 42 MW and is scheduled for completion in 2019. The power generated will be sold to Tohoku Electric Power Co., Inc.

Further, in December of last year, TOYO was awarded two successive mega solar power plant contracts. The first is for a plant to be constructed for Pacifico Energy Minami G.K. in Gujo City, Gifu Prefecture, which will have a power generating capacity of 55 MW. The groundbreaking ceremony was held in March, and the plant is scheduled for completion in 2019. The power generated will be sold to Chubu Electric Power Co., Inc. The other contract is for a mega solar power plant project in Katsuura City, Chiba Prefecture, by KS Power 1 G.K. The plant will have a power generating capacity of 32 MW and is scheduled for completion in 2019. The power generated will be sold to TEPCO Energy Partner, Inc.

TAG O&M Services Corporation, an affiliate of TOYO, has been awarded the operation and maintenance work after EPC of the plants in Iwaki City and Katsuura City.

TOYO has completed construction of Hosoe mega solar power plant in Miyazaki City, Miyazaki Prefecture (96 MW) and is carrying out commissioning of a plant in Setouchi City, Okayama Prefecture (235 MW). Including these three projects, the total combined power generating capacity of all of TOYO's eight mega solar power plant projects is over 590 MW.

Construction Completed on Pharmaceutical Multi-Plant in Japan

Liquid injection chambers

TPS has completed construction of a pharmaceutical facility for Yuki Gosei Kogyo Co., Ltd., in Fukushima Prefecture, Japan and in May 2018, a ceremony was held to mark the completion. This facility is a pharmaceutical ingredient multi-plant designed to expand the client's pharmaceutical business in line with their medium-term management plan strategy. In addition to the development of new products, it is expected to contribute to an expansion in the client's product lineup and production capacity for existing products and consignments.

TPS oversaw the entire project, from basic engineering to construction. Using the latest digital technologies, TPS applied 3-D engineering and succeeded in performing efficient engineering checks through, for example, incorporating virtual reality from the engineering stage onward. These advanced approaches enabled the company to provide high-quality engineering and to deliver the completed plant on schedule.

Brazilian FPSO P-74 Begins Oil Production

FPSO P-74 and the project's team members

Estaleiros do Brasil Ltda. (EBR), a subsidiary of TOYO's Brazilian equity method affiliate company TS Participações e Investimentos S.A., has completed construction work on the P-74 FPSO*1 project for the Brazilian national oil company Petroleo Brasileiro S.A. (Petrobras). In February 2018, the FPSO sailed from the EBR yard toward the Búzios field in the pre-salt of the Santos Basin. Petrobras planned this FPSO construction project in line with the government policy of increasing the ratio of local content. EBR was awarded a contract for the FPSO topsides in April 2013.

The scope of EBR's project included EPCI*2 and commissioning. All modules, except for five assembled overseas, were fabricated starting in September 2014 at the EBR yard. After the hull to house, the modules arrived at the yard in August 2016, and lifting included work on a 2,900-ton module, which set the record for the heaviest module lifted in South America.

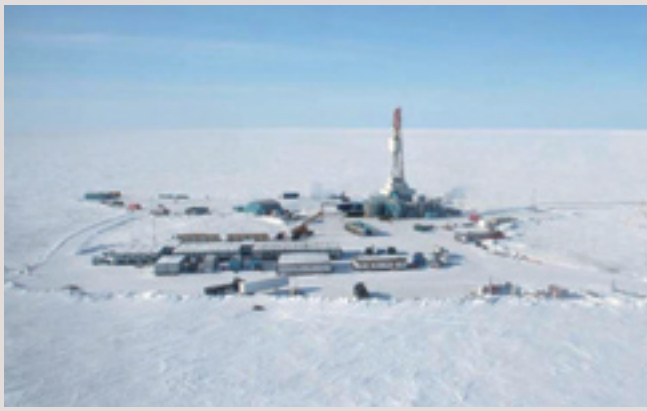
This project faced many difficulties during execution, unavoidably putting work behind schedule. Design changes caused delays, Brazilian domestic political and economic upheaval impacted work, and it became impossible to move forward with the project at one point. However, TOYO's expertise in FPSO topsides made it possible to overcome these challenges. After accepting some additional hull work that was not part of the initial plan, the project was completed and handed over to the client two months earlier than stipulated in the renegotiated contract. Two months after deployment, the FPSO began production at the oil fields.

*1. FPSO: Floating Production Storage and Offloading
*2. EPCI: Engineering, Procurement, Construction, and Installation

Planning System Development for Long-term Onshore Methane Hydrate Production Testing

The Japan Oil, Gas and Metals National Corporation (JOGMEC) is conducting studies into long-term onshore methane hydrate production testing in a permafrost region in Alaska, United States, in collaboration with the U.S. National Energy Technology Laboratory (NETL), which operates under the umbrella of the U.S. Department of Energy. Since receiving the project from JOGMEC in 2016, TOYO has been carrying out work supporting the planning of system development for long-term onshore methane hydrate production testing.

This project is composed of the following four stages: conceptual design, detailed engineering, long-term production testing preparations, and long-term production testing support. The conceptual design stage was completed at the end of 2016, and detailed engineering is currently underway.



Second onshore production testing operation, carried out in 2007–2008 in Canada (image for reference)

Although methane hydrate development and production technologies are yet to be established, TOYO is working with partners Baker Hughes, a GE company, an expert in subsurface technologies, and ASRC Energy Services, LCC, which is knowledgeable regarding the land of Alaska, toward joint achievement of one year of production testing in the permafrost region.

Stratigraphic drilling is scheduled at the proposed site in winter 2018. If the area is determined appropriate for testing, plans will be made to enter full-fledged preparations for long-term production testing.

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