TOYO TIMES

TOYO COMMUNICATIONS

September 2011 | Vol. 4

50th Anniversary

TOYO ENGINEERING CORPORATION

Thanks to your support

TOYO reaches the half-century mark

*At its foundation, Toyo Engineering Corporation, the origin of TOYO, was a spinoff from the engineering department of Toyo Koatsu Industries (presently Mitsui Chemicals, Inc.). Since then, TOYO has successfully delivered several thousands of projects, mainly in the plant engineering field, in more than 50 countries worldwide. In the past 50 years, TOYO has globalized itself as its area of operations expanded throughout the world, building its bases in Asia, Europe, the Americas, and the Middle East. Today, TOYO has the Global Toyo structure, networking its subsidiaries with EPC *capabilities in India, Korea, China, Malaysia, and other countries.*

On May 1, 2011, TOYO celebrated its 50th anniversary since its foundation. Achievement of this milestone owes much to the support and cooperation of all involved in TOYO's operations, such as shareholders and clients, licensors and many people from cooperating companies, institutions and organizations, all employees, present and past, and their families.

On the occasion of the 50th anniversary, we reaffirm our commitment to our mission of delivering "Engineering for Sustainable Growth of the Global Community" and to our vision of being the "Global Leading Engineering Partner." In the pursuit of this mission and vision, we look forward to your continued guidance and support.

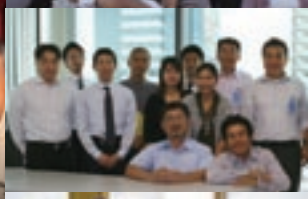
** Engineering, Procurement and Construction*





ANNIVERSARY










王磁大奖





Global Development Partners

Sadako Ogata
President, Japan International Cooperation Agency (JICA)

On the occasion of Toyo Engineering Corporation (TOYO)'s 50th anniversary this year, I would like to express my congratulations and respect for the leading role TOYO has taken over the last half-century in the international business development of Japanese industries, and particularly for contributions to industrial progress in developing countries.

TOYO and JICA have a long-standing cooperative relationship through Japan's Official Development Assistance (ODA) programs for developing countries. It all began with an ASEAN industrialization project in the 1970s (an urea plant in Aceh Province, Indonesia). In the course of time, the collaboration projects extended to Thailand, India, Bangladesh, China, and Pakistan. Entering the 21st century, it broadened to the Central Asia and Caucasus region, such as Azerbaijan.

Over the years, TOYO has steadily built a record of cooperation on natural resource development and plant construction around the world. For example, when natural gas was discovered in the Gulf of Thailand in the 1970s, JICA assisted the Thai government in making the large-scale regional development plan (Eastern Seaboard Development Program), and TOYO participated in building the natural gas processing plant as a core JICA-financed project of the plan. This comprehensive development program provided the driving force for rapid economic growth in Thailand that would lead to the "East Asian miracle." We look forward to TOYO's cooperation in the Middle East and other regions in the near future.

It was March 11 this year when the Great East Japan Earthquake hit the northeastern region of Japan. Since then, more than 150 countries have offered their help in the form of donations, relief supplies, or other assistance. In

fact, most of these offers came from developing countries. These generous offers likely represented a high regard and great appreciation for the development cooperation that Japan has provided to these countries over the years. Such cooperation includes both the ODA programs on a governmental level and the long-standing efforts of Japanese companies to build partnerships with these countries and work together with them on-site to foster their industries.

When we travel around in developing countries, we still realize a high esteem and expectations for Japanese advanced science and technology—perhaps even higher than before. One reason is Japanese industries' continuous

PROFILE

Sadako Ogata

Born in Tokyo in 1927, Sadako Ogata holds B.A. (University of the Sacred Heart, Tokyo), M.A. (International Relations, Georgetown University) and Ph.D. (Political Science, UC Berkeley). After a series of academic stints at International Christian University and Sophia University in Japan, she served as the United Nations High Commissioner for Refugees from 1991 to 2000. In 2001, she was appointed the Special Representative of the Prime Minister of Japan on Afghanistan Assistance. She has been the President of the Japan International Cooperation Agency (JICA) since 2003.

Japan International Cooperation Agency【JICA】

JICA is a government agency that implements Japan's Official Development Assistance (ODA) programs. In addition to assisting developing countries through technical cooperation, financing (ODA loans and investments) and grant aid, JICA helps with international emergency relief efforts in times of natural disaster. The agency also runs Japan Overseas Cooperation Volunteers (JOCVs) and provides various training programs for trainees from developing countries.

efforts to achieve innovation through industry-academia collaboration. Another is probably their image of diligent Japanese engineers and people. They are seen as the key to opening the door to economic growth and prosperity. We often see engineers from Japanese companies teaching at local universities. Also Japanese companies open their plants and training centers for practical education and training. When I see Japanese companies using advanced technology to expand business in developing countries, building trust and understanding, and actively sharing their skills and knowledge, I feel that I have caught a glimpse of how "partnerships" should be.

I instruct all JICA staff members to vigorously follow this hands-on approach. I firmly believe that, to provide effective development assistance, it is essential to work *with* people in the field, and thereby accurately understand their needs and swiftly offer solutions in a creative manner. I imagine that the same holds true in the plant engineering world as well—the hands-on approach *on-site* is the essential factor.

In today's world of globalization and mutual dependence, Japan shares a responsibility as a member of the international community to dedicate itself to the development of the whole world. It is indispensable if Japan is to coexist and prosper together with the rest of the world. It is my hope that TOYO and JICA will both continue to value the "on the ground" efforts, and partnerships with local people in leading Japan's international contributions.

(translated from the original script in Japanese)

TOYO's ODA loan projects

Fertilizer plant in Ache, Indonesia (1980)

Urea plant in Chittagong, Bangladesh (1984)

Gas separation plant in Thailand (1982)

Ammonia plant in Inner Mongolia, China (1992)

Natural gas pipe line in Azerbaijan (2002)

Looking back on TOYO's 50 years —and moving into the future

On May 1, 2011, TOYO celebrated the 50th anniversary of its founding. Throughout constant changes in the business environment from era to era, TOYO has pursued becoming an engineering partner that endeavors to contribute solutions to its clients' issues and to create new value. In this issue, we interviewed President Yutaka Yamada about the past 50 years and the future direction of TOYO.

TOYO's efforts to contribute to the revitalization of the disaster-stricken region and Japan's society

Q **On March 11 of this year, the Great East Japan Earthquake and Tsunami occurred, resulting in the loss of many precious lives.**

Myself and the entire Toyo Group pray that the many people who lost their lives will rest in peace. We also express our deepest sympathy to the victims and evacuees of the disaster. It pains us to think of those who are living unavoidably difficult lives.

The restoration of the affected region and of Japan is a pressing issue. People doubt their senses of values in the wake of this disaster. Rather than just restoration, we need to build a whole new way of living and a new society. On both a company and personal level, TOYO intends to provide support and contribute as much as possible toward the revitalization of the disaster-stricken region and of Japan.

Q **We hear that some of TOYO's clients and vendors suffered damages from the disaster. What affect has this had on TOYO's business?**

Many of our clients in the affected regions suffered damages from the disaster, including chemical, petroleum, pharmaceutical, food product, electronics and semiconductor, and electric power companies. We cooperated in many ways to help their plants restart operations as soon as possible, including dispatching staff and analyzing damage to facilities. There were also cases where deliveries of new plants were slightly delayed because the manufacturing facilities of several companies that produce plant construction materials were damaged in the disaster. With the cooperation of all those involved, we investigated the situation and explained delivery extensions to our clients in Japan and overseas. We believe that TOYO has an obligation to keep our clients informed with transparency and explain clearly to our clients about the impact of the disaster and our measures to deal with those issues since TOYO has been trusted by the client and given their orders. We hope that the damages caused by the disaster will be quickly repaired and that our clients and associates' businesses will recover as quickly as possible.

Half a century of corporate culture built on integrity

Q **This year TOYO celebrated its 50th anniversary. As head of management, what are your thoughts on reaching this milestone?**

I think we have to remember that TOYO exists as it is today thanks to the support of all stakeholders, including our clients; licensors that provide us with technology; partner companies; shareholders; and regional communities. In addition, I'd like to express

my gratitude to my predecessors in management and to the employees who have served TOYO over the past 50 years. Of course, 50 years of operations is only one step on the road to TOYO's further growth and development. Going forward, we will provide services that are always in the best interests of our clients and aim to be their most trusted partner.

Q **What would you say are the reasons that TOYO has been able to continue to grow as a trusted and reliable engineering company in Japan as well as elsewhere in the world over the long period of 50 years?**

Over the past half century, the world's economy and society have experienced turbulent fluctuations. These included high economic growth, oil shocks, the rise and fall of the economic bubble, the Cold War, currency crises, and the emergence of the BRIC countries. In particular, Japan has undergone a large-scale change in its international standing during the past 20 years—from a world leading economic power to a mature economy suffering from long-term economic stagnation. Throughout these eras, TOYO has sought to achieve sustained growth by accurately responding to the changes in its operating environment. This type of agility in dealing with change epitomizes the mindset of engineering companies.

Even as targeted regions and products change, one thing that has pervaded TOYO's business since its foundation and remained unchanged has been our corporate philosophy. If I were to describe the essence of the philosophy in just one phrase it would be "seriousness and sincerity." We want to contribute to the success of our clients' businesses and take it seriously and sincerely. The basis of TOYO's corporate philosophy is our belief in working seriously and sincerely to address our clients' issues. I believe this stance has also provided the momentum for our growth and evolution.

Q **Is TOYO's sincere attitude towards its work also behind the firm trust of your clients?**

Well, of course project results are the most important factor. In addition, the essence of an engineering company is its comprehensive capabilities, such as project management skills, integrated engineering technologies, optimum alliance building, and advanced global networking. On the other hand, to execute a project smoothly, it is indispensable to maintain daily and close communications with and report regularly to clients and business associates. All of TOYO's organizations and employees are always thinking of how they can contribute to the job, and working in the spirit of fairness. This is what makes us willing to provide value. Being honest always in all situations is perhaps what allows us to earn the trust of our clients and business partners.

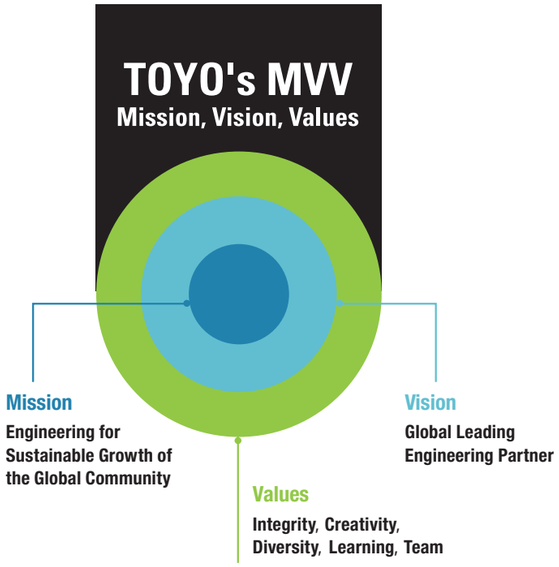
Using the MVV to foster a sense of unity throughout Global Toyo

Q **TOYO formulated a Mission, Vision, and Values (MVV) statement in 2009. Would you tell us again what the purpose was behind its formulation?**

TOYO employees seriously consider the significance of their work and how they should go about building their relationship with society, regardless of their nationality. Moreover, they constantly ensure that they are fair in the execution of their jobs and are dedicated to increasing the corporate value of our clients' businesses. The MVV statement is the written embodiment of the shared principles and goals of Global Toyo, borne of a time-honored corporate culture that arose from our 50 years of history. In creating the MVV statement, we discussed its contents with Toyo-India, Toyo-Korea, and other Group members, and took care to foster a sense of unity throughout the Group.

Q **How is the MVV statement applied to everyday operations?**

Generally, overseas subsidiaries have trouble with company credos formulated by Japanese head offices. This is because they are tailored to Japanese corporate culture and overseas employees are not used to them. However, our MVV statement represents a set of values created with the participation of all Global Toyo employees. Therefore, it functions as a guideline for daily business operations even for the staff of overseas bases in India, Korea, China, Malaysia, and other countries.



I receive project reports that consistently include feedback on whether the current work is appropriate given the principles of the MVV statement, or what should be done in order to achieve the goals of the MVV statement.

Another result is a heightened awareness of team spirit—one of the group values in the MVV statement is "team." Employees are even more aware than before that clients, partners, and TOYO are all one team and should mutually cooperate to achieve their goals.

Q **Does TOYO's policy of respecting each culture and tradition of countries and regions support the high morale of employees at overseas bases?**

Another thing that hasn't changed over the past 50 years at TOYO is its "policy of localization." Not only do we work together with the local staff in executing projects, but we also respect local culture, practices, and religions. Because engineering companies work on projects of a highly public nature, their mission is to contribute to the development of local regions. Furthermore, projects such as plant construction and infrastructure building play a role in the formation of the economic foundations of a region or country. Therefore, if you don't truly come to care about the country and its people, you're not going to get a good result. I believe that our "policy of localization" is the core of TOYO's successful business method.

Aggressively investing business resources for energy fields in new markets

Q **Next, I would like to ask about TOYO's direction for the future. To start with, would you please tell us what business fields and regions of the world you will be concentrating on?**

We plan to concentrate our efforts on fields of common concern for mankind: the environment and energy fields, as well as the fertilizer field, which is related to expanding food supply. We are also targeting the social infrastructure field, such as electric power and water. In terms of regions, we will continue to look for projects in natural resource rich countries or countries with emerging markets, such as the BRICs and countries in the Middle East and Southeast Asia. Taking into consideration the fierce competition among engineering companies around the world, we also plan to aggressively develop our businesses in Canada and Africa—markets where our competitors have yet to enter widely.

Canada is a major natural resource rich country blessed with such resources as the oil sands and unconventional gas deposits. Energy development is just starting to take off in that country. In 2010, TOYO acquired Tri Ocean Engineering Ltd. (presently Toyo Engineering Canada), in the province of Alberta and has begun full-fledged efforts to win heavy crude development and other energy projects in Canada.

In other parts of the world, Sub-Saharan Africa is drawing a great deal of attention because new gas and oil fields have been recently discovered in that region. Japan's private and public sectors are working together to promote development that will ensure stable energy supplies and contribute to improvements to the food supply in Africa.

Q **How did you go about enhancing the Global Toyo operation?**

Looking back over the past 20 years, progress in IT has rapidly lowered the barriers of time and distance between countries and regions around the world. Looking at TOYO's clients, what they expect of an engineering company in regions with very different cultures than Japan, such as Europe, North America, Asia, South America, and the Middle East, is surprisingly the same. To cope with the changes in those needs, individual bases have to establish the same operating conditions worldwide. This includes engineering methods, management systems, sense of transparency, and even their way of thinking about solutions to issues. That is one point that has driven our efforts to achieve further advances in Global Toyo.

Another point that has emerged recently is the growing capabilities in the quality of our EPC bases. Up to now, Toyo-Japan provided the guidance for the operations of Global Toyo. In recent years, however, our bases have enhanced their capabilities, and in many cases are providing new ideas to Toyo-Japan about engineering methods, project management, and technology development. Moreover, the number of cases where individual bases are completely responsible for a project, from sales to execution, is increasing. We also have cases where a mixed team is formed—for example, Toyo-Japan, Toyo-India, and Toyo-China—and is responsible for managing the project in a fourth country. If the trend toward borderless operations continues, the framework of Global Toyo and walls between our individual bases will disappear and we will become just TOYO worldwide.

Q **With globalization and borderless business advancing, it will become important to develop human capital with international mindsets. What type of measures are you implementing to address this point?**

Right now, we are expanding our "mutual exchange program" to develop and utilize our human capital. We are sending the young employees of Toyo-Japan overseas in increasing numbers and introduced our "junior staff's OJT (On the Job Training) system" in 2010. With regard to this system, Japanese employees receive OJT under the management of our overseas bases.

On the other hand, there are many enthusiastic and ambitious employees at our overseas bases that want to get involved with overall group management

or to become a specialist in a technology field. We will develop this human capital at our other EPC bases and at Toyo-Japan. In the near future, I'm sure we will see cases where a project manager from Toyo-India will become the senior project manager on another country's project being done in collaboration with Toyo-Japan. Strengthening our global human capital is an important management issue that will affect the future of TOYO, and we are working Groupwide on this issue.

Leveraging abundant EPC know-how, proposing a grand design for overall regions

Q **The mission section of TOYO's MVV statement includes the "realization of a 'Sustainable Global Community.'" What does an engineering company consider to be social contribution?**

Since we are a private-sector company, pursuing profit is one of the premises we operate on. However, we don't just construct plants. TOYO's basic stance is to address all of the needs of the region in which we are doing business.

In recent years, energy development and fertilizer have become large-scale operations, moving plants from downtown areas to more remote locations. For that reason, it has become common for us to address the issue of creating a grand design for the people and the region as a whole using those large-scale industry operations as a core. We play this role by offering our recommendations and proposals based on our abundant EPC know-how as an engineering company.

TOYO also is making an entrance into the transportation field. We are not just proposing projects for facilities like railways or stations. Making wide-ranging proposals that include peripheral railway businesses and services will become an important part of our job. An example would be building a refrigerated transportation network using high-speed trains.

Q **I get the feeling that Japan is searching for what type of society it should become after the major earthquake. Do you think that TOYO's regional development capabilities can be applied to this?**

How do you rebuild, create new towns, and develop regions in the wide-ranging disaster-stricken area? The government has set up a commission to work on this problem, but it seems they are not able to come up with a grand design as of yet.

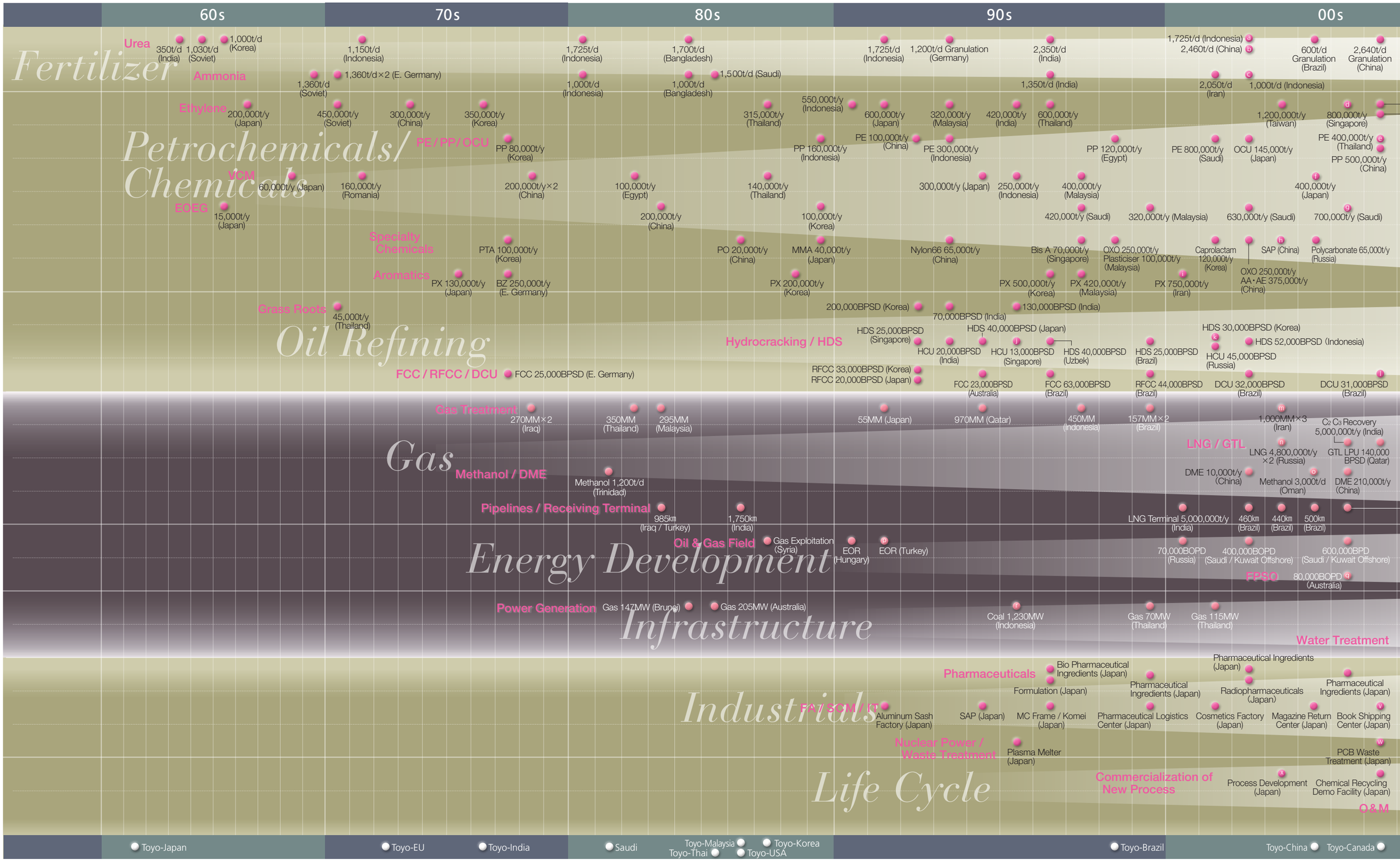
Engineering companies such as TOYO specialize in investigating the various requirements in regional development from many angles and creating a design from scratch. We are committed to fully using the technologies and know-how accumulated over many years to contribute to the restoration of the devastated region and to the revitalization of the Japanese economy.

Q **In conclusion, do you have a message for our readers?**

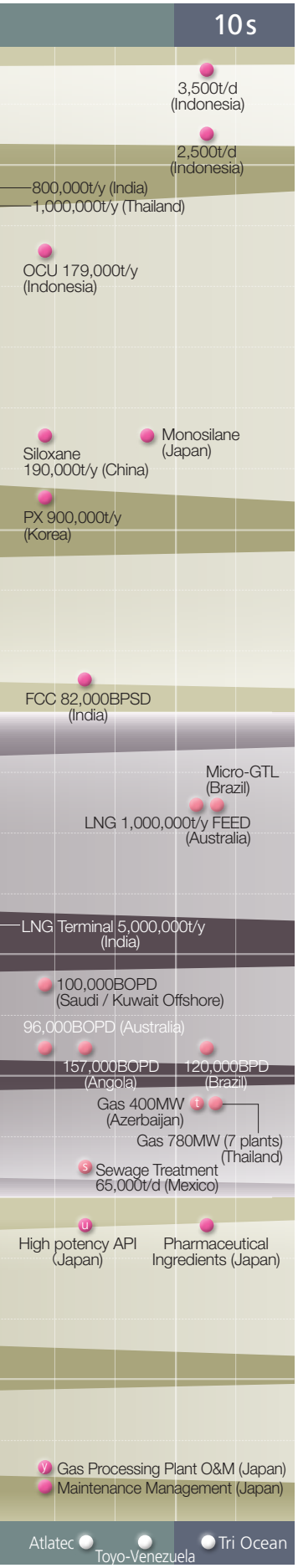
During the turbulent changes in the world over the past half-century, TOYO has had to face many difficult business environments. We were able to overcome these difficulties and to make contributions to society through our work thanks to the strong support of our stakeholders. Therefore, I would like to once again express my sincere gratitude to them.

Having reached the milestone of its 50th anniversary, TOYO now intends to keep up the challenge to create next-generation businesses and further solidify its reputation as a trusted engineering partner. We look forward to your continued guidance and support. ■

TOYO's Challenge —— Transitioning along with the changing times



BZ: Benzene Bis A: Bisphenol A DCU: Delayed Coker Unit DME: Di-Methyl Ether FPSO: Floating Production Storage and Offloading GTL: Gas To Liquids HCU: Hydrocracker Unit HDS: Hydrodesulfulization MMA: Methyl Methacrylate OCU: Olefin Conversion Unit PX: Paraxylene PO: Propylene Oxide PTA: Purified Terephthalic Acid
BPD: Barrels Per Day BPSD: Barrels Per Stream Day BOPD: Barrels of Oil Per Day MM: MMSCFD (Millions of Standard Cubic Feet per Day)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Gas Processing Plant O&M (Japan)
Maintenance Management (Japan)
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Toyo-Venezuela
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Signing Ceremony for Large-Scale Fertilizer Plant in Indonesia

Signing ceremony

In June 2011, TOYO attended the signing ceremony for a fertilizer project ordered from the state-owned Indonesian fertilizer company, PT Pupuk Kalimantan Timur (Kaltim). The plant will be constructed in Bontang, East Kalimantan Province, Indonesia. TOYO and PT Inti Karya Persada Teknik will jointly implement the project and their scope is EPC on a lump-sum turnkey basis contract.

As Kaltim currently operates four plants in Indonesia, the new plant will be their fifth in that country. With a production capacity of 2,500 tons per day of ammonia and 3,500 tons per day of urea plus utilities facilities, the new plant is in the largest class in the world. The bidding started in September 2010. A total of five groups from Europe, Korea, and Japan bid for the project, with TOYO overcoming the competition, owing to its high technological capability and cost efficiency, to receive the order.

TOYO's proprietary ACES21® urea synthesis technology and urea granulation technology, which reduce construction costs and energy consumption, will be employed for the plant. Currently, TOYO's ACES21® technology is being used at six plants, and its urea granulation technology at 20 plants around the world. The new plant will be exactly the 100th urea plant using TOYO's synthesis technology that the Company has built in areas across the globe. Purifier technology from KBR (U.S.A.) will be utilized for the ammonia production section.

Demand for fertilizer is growing, especially in emerging countries, due to the need to produce more food accompanying population growth.

TOYO Awarded Indonesia's First Butadiene Plant Contract

In June 2011, TOYO was awarded a contract to build a butadiene plant with a capability of 100,000 tons per year. This is the first butadiene plant in Indonesia, and will be constructed at Cilegon in West Java by PT Petrokimia Butadiene Indonesia, a subsidiary of PT Chandra Asri Petrochemical Tbk, the country's largest petrochemical company. Butadiene will be utilized as feedstock to produce synthetic rubber, the primary raw material used to meet the rapidly growing demand for automotive tires. Raw material stock will be supplied by the adjacent 600,000 ton per year capacity ethylene plant (constructed by TOYO in 1995) owned and operated by Chandra Asri.

TOYO will execute the project on a lump-sum turnkey basis contract, covering from EPC to commissioning, based on Lummus/BASF technology. The plant is scheduled for completion in 2013.

TOYO has executed 30 projects in Indonesia since the Company was awarded a contract for a urea plant in 1971. In the summer of 2010, it completed the propylene plant at Balongan Refinery for PT Pertamina, Indonesia's state-owned oil company.

TOYO Concluded Contract to Provide Urea Production Technology in India


Signing ceremony

In June 2011, TOYO concluded a contract covering licensing and development of basic design for a urea production plant in the fertilizer complex to be constructed at Kanpur in the State of Uttar Pradesh by Jaiprakash Associates Limited (JAL), a company of India's infrastructural conglomerate, Jaypee Group.

India is now confronted with a growing demand for fertilizer to increase food production to meet the rising demand prompted by the growing population. Many companies now plan to build fertilizer plants to cover such needs. Against this background, JAL has decided to make their new way into the fertilizer business.

The planned fertilizer complex will consist of an ammonia plant with a production capacity of 2,200 tons per day and a urea plant with two trains of 1,925 tons per day each. The ammonia process will be based on the technology from KBR while the urea process will utilize TOYO's own technology. TOYO has completed 11 fertilizer projects in India since the Company built its first urea plant in 1963. This will be the eighth plant to which ACES21® is applied worldwide.

TOYO Awarded India's First Large-Scale Synthetic Rubber Plant Contract

In May 2011, TOYO was awarded a contract to build a Styrene-Butadiene Rubber (SBR) plant with a capacity of 120,000 tons per year. The plant will be constructed at Panipat in the State of Haryana in northwestern India by Indian Synthetic Rubber Limited (ISRL)—a joint venture among Indian Oil Corporation Ltd. (IOCL), India's largest state-owned oil company, TSRC Corporation, a large Taiwanese synthetic rubber supplier, and Marubeni Corporation of Japan.

Adjacent ethylene plant supplying butadiene

Synthetic rubber produced by this plant will be utilized as feedstock to meet the rapidly growing demand for automotive tires, using butadiene supplied from an adjacent ethylene plant. This project for India's first large-scale synthetic rubber plant will utilize TSRC's technology. TOYO will execute this project on a lump-sum turnkey basis contract covering from EPC to commissioning. The plant is scheduled for completion in 2013.

TOYO completed an 800,000 ton per year ethylene complex for IOCL in 2010, and is now constructing a Fluidized Catalytic Cracker (FCC) and Propylene Recovery Unit at IOCL's Paradip Refinery in the State of Orissa in eastern India.

TOYO Building Functional Resins and Chemical Materials Plant in East China for Hitachi Chemical

In July 2011, TOYO received an order from Hitachi Chemical (Nantong) Co., Ltd., to build a functional resin and chemical materials manufacturing plant in the Nantong Economic & Technological Development Area of Jiangsu Province, China. Hitachi Chemical (Nantong) is a Chinese subsidiary of Hitachi Chemical Co., Ltd.

Hitachi Chemical is building a new manufacturing base in East China in anticipation of a rapid increase in domestic demand for its products accompanying China's economic development. The plant will produce functional resins and chemical materials, such as epoxy resin hardeners, acrylates, paint resins, polyester resins, acrylic resins, and electrical insulating varnish.

Hitachi Chemical awarded the project to TOYO in recognition of its record of over 180 projects in China, more than half of which have been chemical process plants. Hitachi Chemical highly evaluated TOYO's ability to meet cost, quality, and delivery targets, and selected TOYO as the partner that could meet its requirements in China.

TOYO Wins Order for Acrylic Acid and SAP Plants from PT. NIPPON SHOKUBAI INDONESIA

TOYO recently won an order for an 80,000 metric ton per year acrylic acid plant and a 90,000 metric ton per year Superabsorbent Polymer (SAP) plant from PT. NIPPON SHOKUBAI INDONESIA (NSI). The plants will be built in Cilegon, Indonesia, at an approximate cost of US$300 million, with a planned completion date of the end of February 2013.

SAP plant in China

Demand for SAP, the main raw material for disposable diapers, is growing by 7% to 8% annually, particularly in emerging countries. As the top global manufacturer of SAP, NIPPON SHOKUBAI is preparing to meet that demand growth. NSI is taking the lead in this large-scale SAP production capacity expansion, which includes a plant for acrylic acid, the raw material for SAP.

The current project is TOYO's fourth project for NIPPON SHOKUBAI. Previously TOYO has built SAP plants in China (2003), Belgium (2004), and the U.S.A. (2010). TOYO received the new order because of its global capabilities, such as international procurement through its overseas network and local know-how.

Opening Ceremony for Evonik Monosilane Japan's Monosilane Plant

Opening ceremony

TOYO has recently completed construction of a monosilane plant for Evonik Monosilane Japan Co., Ltd. (EMJ), in Yokkaichi, Mie Prefecture, Japan. EMJ is a Japanese group company of Evonik Industries AG Group of Germany.

On June 3, 2011, an opening ceremony was held for the plant. It was attended by many guests, including Dr. Engel, Chairman of the Executive Board of Evonik Industries, and Mr. Tanaka, mayor of Yokkaichi City.

The project started in fall of 2007 with a contractor survey by the client. TOYO participated in this project by support for a feasibility study in 2008. TOYO also provided support for the basic design and carried out pre-EPC work, which led to the effectuation of the EPC contract in June 2009.

Good collaboration among the client, the partners, and equipment manufacturers contributed to the successful execution of the project. TOYO completed the plant on time for the original delivery target of the beginning of spring 2011 and handed over the plant to the client.

Monosilane is an industrial gas that is used to form major components applied in the electronics and solar cell fields. The new plant is the first monosilane facility that Evonik has built outside of Europe. With the extremely rapid development of the solar cell market in Asia, the project will play a major role in Evonik's Asian market strategies.

TOYO is handling the daily maintenance of the plant and is planning to serve a role as Evonik's engineering partner by supporting its growth strategies.

TOYO Receives *Kampo* Medicine Extraction Plant Order


Kracie's *kampo* medine

TOYO recently received an order for a project for expansion of a herbal extraction plant for *kampo* medicine, Japanese traditional herbal medicine originated in China, at the Takatsuki No. 2 plant of Kracie Pharma, Ltd., Osaka Prefecture, Japan. The scope of the project covers engineering including validation support, procurement, and construction on a lump-sum turnkey basis.

This project is intended to expand production capacity to keep up with the growth of Kracie Pharma's *kampo* medicine business. The project will include the introduction of a new production line adapted to Good Manufacturing Practice standards and large-scale improvements to upgrade the existing utility system. Based on the planned expansion, the new plant will have approximately double its previous production capacity.

The *kampo* medicine herbal extraction process includes weighing, extraction, solid-liquid separation, concentration, and spray drying of the crude drug as well as collecting the extract powders for compounding into prescribed mixtures in a clean room. Upon completion, the plant will be producing 58 products including Kakkonto, a popular *kampo* medicine for colds.

As both the new construction and renovation will be going on at the same time, the several challenges are expected in this project such as meticulous adjustment of the equipment and the different types of piping between the new and the existing facilities.

In addition, it will be essential to keep plant downtime to a minimum. For that reason, TOYO is executing the project based on careful planning in order to keep the customer satisfied, including running detailed simulations of all the construction procedures before starting.

Commissioning Preparations for Micro-GTL Pilot Plant


GTL module constructed in Thailand

The Micro Gas to Liquids (GTL) process development project being jointly undertaken by TOYO and MODEC, Inc., of Japan, and Velocys Inc., of the U.S.A., is entering its final stages. The companies are currently installing a pilot plant at an oil refinery owned by Petróleo Brasileiro S.A. (PETROBRAS), of Brazil. The pilot plant was fabricated in Thailand with a modular construction method and transported to Brazil. With the cooperation of PETROBRAS, a demonstration run will begin as soon as installation is completed, with the goal of completing commercialization by the end of fiscal 2012.

The GTL process is a technology for converting natural gas to synthetic petroleum products. Against the backdrop of growing demand for crude oil and soaring prices, GTL technology will have an increasingly important role in producing liquid fuel from undeveloped gas fields in the future. For example, converting natural gas from small- to medium-sized gas fields and associated gas from oil fields in oceans and remote areas into liquids renders it transportable and increases its value. These features make it possible to make effective use of these undeveloped gas resources.

The main feature of this Micro-GTL technology is the use of microchannel reactors, for which Velocys holds the master patent. Microchannel reactors can achieve extremely high heat transfer efficiency between the heat generation and heat absorption components because exothermic and endothermic reactions occur adjacently with only a wall between them in narrow channels. As a result, the necessary reactor size per production unit and the amount of catalyst used can be greatly reduced. Therefore, the huge reactors of several tens of meters in height used in traditional GTL plants are no longer necessary, enabling substantially down-sized plants. Furthermore, the Micro-GTL plant is resistant to the motion of the ship. This stability allows the processing of natural gas offshore on a ship, or associated gas from oil fields using an FPSO facility. Moreover, using microchannel reactors decreases the size and weight of the facilities and enables modularization, making small- and medium-sized GTL facilities more economical.

Groundbreaking Ceremony Held for Extension of Dow Corning Toray Komatsu Plant

Groundbreaking ceremony

On May 16, the groundbreaking ceremony was held for the Komatsu Plant expansion project for Dow Corning Toray Co., Ltd. Despite difficulty in procuring plant construction materials caused by the Great East Japan Earthquake, the project is on schedule.

The project's purpose is to extend the manufacturing facilities of the Komatsu Plant in Ishikawa Prefecture, Japan. The project also includes the construction of new buildings. This plant is positioned by Dow Corning Toray as the strategic manufacturing base for electronics-related advanced technology materials. It is establishing a manufacturing system for Light Emitting Diode (LED) materials as well as sealants, adhesives, and other advanced materials.

TOYO received this order from Dow Corning Toray as a result of successful team building. The client's staff in charge of the silane and siloxane project completed for Dow Corning Corporation (DC) in Zhangjiagang, China, got involved with the new project from the proposal stage. During the selection process of contractors eligible for DC's global specification and method standards, TOYO put together a team that included staff with experience on the China project.

At this point, the engineering and procurement processes are in their final stages and construction is about to enter its most intensive phase. We are aiming to complete the construction in a short period and begin manufacturing operations in early spring 2012. TOYO will be working closely with its client's staff to drive project execution forward.

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