# TOYO TIMES

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TOYO ENGINEERING

# Striving to expand new orders and realize the earliest possible recovery of profitability

## NEXT TOYO 2015: first half review and strategies going forward

Having passed the mid-way point of the medium-term business plan NEXT TOYO 2015, which started in 2012, TOYO is now steadily accumulating new orders, boosted by positive market conditions. TOYO also intends to achieve further growth through its integrated global operations system. We talked with President Ishibashi about TOYO's performance review in the first half of NEXT TOYO 2015 as well as management strategies heading into the next two years.

### Excellent Results in New Orders, Issues in Terms of Profitability

**To begin with, would you please give us a brief review of the first two years of NEXT TOYO 2015?**

In fiscal 2013, the year ended March 31, 2014, new orders on a consolidated basis reached a record high of ¥365.1 billion. This is a historical high for TOYO. But even further, if the new orders of our Brazilian and Singaporean equity method affiliates are added to this amount in proportion of our stock ownership ratio, the figure for new orders would be approximately ¥500.0 billion. Therefore, we have essentially

achieved the amount we had assumed for new orders as of the middle of the plan.

On the other hand, we faced an unsatisfying result in terms of profitability. The main cause was substantial losses on a fertilizer project in Indonesia for PT Pupuk Kalimantan Timur (Kaltim). The losses resulted in a more than 70% year-on-year decline in consolidated operating income last year. Therefore, we have some profitability issues to deal with in the second half of the plan.

**New orders in frontier markets, such as TOYO's first order from Turkmenistan, stood out in fiscal 2013.**

Under NEXT TOYO 2015, TOYO defined "prioritized markets," in which TOYO has an extensive performance record, such as Asia, Latin America and the Middle East, and "frontier markets," which we want to more deeply develop for the future, such as Russia and other CIS countries, North America, Iraq, and Sub-Saharan Africa. Looking at frontier markets, in September 2013, Toyo-Canada won an order for a bitumen (extremely heavy oil recovered from oil sands deposits) production facility in the Province of Alberta, Canada—TOYO's first oil sands facility project. And in March 2014, TOYO was awarded its first project in Turkmenistan—a large gas chemical complex for the national gas company. These large projects are worth close to ¥100 billion, and TOYO can apply the advantages of its integrated global operations system during their execution. I believe that properly executing and successfully completing these projects will raise TOYO's overall capabilities to a higher level.

**How do you reflect upon the various issues that occurred with the Indonesian fertilizer plant project?**

Toyo-Japan, Toyo-Korea, and PT. Inti Karya Persada Tehnik (IKPT) are collaborating on the Kaltim fertilizer project. This project presented various issues in the division of work and responsibility for project execution. Based on feedback, Toyo-Japan is taking the necessary measures to fundamentally strengthen IKPT's organization, such as assigning more than 10 managers and engineers from Toyo-Japan to its divisions and accelerating the recruitment of senior level staff. While "Development of Global Human Capital" is set forth as one of the basic policies in NEXT TOYO 2015, I was reminded once again of the importance of developing human resources and of organizational reinforcement.

## Measures to Accelerate Upstream Business Expansion

**Another one of the basic policies of NEXT TOYO 2015 is "more toward upstream." Has there been any progress in this area over the past two years?**

There are two meanings of "upstream" in this policy. One meaning is to expand TOYO's range of business to include oil and gas development. To this end, in April 2013, we established the Energy Business Unit as an independent operating division and are focusing intensively on the energy development field. We provide comprehensive engineering services based on GESA*1 with several companies, including Iraq's state-owned South Oil Company (SOC) and some other major oil companies. We also are concentrating on expanding our asset management business for oil and gas fields. This business involves applying EOR*2 for existing oil and gas wells for which production has significantly declined, providing technology and additional capital, and sharing in the profits from the additional oil production. We are marketing these businesses widely to our clients, aiming for some concrete results.

The other meaning of "upstream" is where TOYO enters the upstream sector of the client's value chain, such as project investment planning or FEED*3 services. For the past few years, TOYO has been exploring a new business style: participating in the early stage of the clients' project planning, which includes TOYO investing in the project. As a result, TOYO has received a great deal of work from the clients, such as FEED and paid proposals. There are also some cases in which we have targeted winning an EPC*4 contract by being involved in the project from the planning stage.

*1. GESA: General Engineering Service Agreement
*2. EOR: Enhanced Oil Recovery
*3. FEED: Front End Engineering Design
*4. EPC: Engineering, Procurement and Construction

## Robust Global Plant Market Led by the United States

**Entering the third year of the medium-term business plan, how are conditions in the plant and the energy development markets?**

Business conditions in these markets are generally favorable. Especially in the U.S. market, we have gotten many enquiries about shale gas-related projects for fertilizer or ethylene plants. The emergence of shale gas does not only increase projects in the U.S., but has tipped the balance in energy markets. The destinations of gas exports from Russia are changing from an overdependence on Europe and spreading into Asia. Amidst this trend, TOYO is actively

working to participate in the project to produce high-value-added products from oil and gas.

Elsewhere, we are focusing on Brazil, Iraq, Russia and other CIS countries. In Brazil, it was announced that the national oil company Petróleo Brasileiro S.A. (PETROBRAS) will continue its large-scale deep-sea gas and oil field development. In Iraq, we participate in planning work of oil development based on GESA. There are also active investments being made in CIS countries such as Turkmenistan. And investment planning is increasing in the Far East of Russia. However, in the case of the projects in regions where there is an unstable political situation, we need to proceed with caution.

### As the number of orders increases, how will the collaboration system work with group companies?

The primary role of our group companies, first and foremost, is to properly execute their business in their own markets. After that, Toyo-Korea, together with Toyo-Japan, is trying to win orders in third countries, because its domestic market is limited. Given its large number of resources, Toyo-India works with Toyo-Japan as well as other group companies on third-country projects, in addition to handling its own domestic projects. To optimize TOYO's overall business, we aim to utilize the resources of Toyo-China and IKPT on third country projects and provide our clients with the same high standard of quality, whichever company is handling the project.

## Successful Projects Are the Best Sales Point

### Would you describe market trends in the social infrastructure market?

TOYO is developing its Infrastructure Business in the electric power, water treatment, and transportation system markets. In the electric power market, orders are influenced by trends among leading manufacturers that produce the boilers, turbines, and other major equipment, even though a large volume of orders are being made globally.

TOYO participated in the construction of a total of seven gas-fired combined cycle electric power plants in Thailand from 2010 to 2013 and completed them on schedule, which earned high praise from the client. It is expected that this appreciation will lead to more projects in the future. Moreover, our experience on the project will be useful in our marketing activities.

### So the success of one project creates a positive cycle, leading to another project?

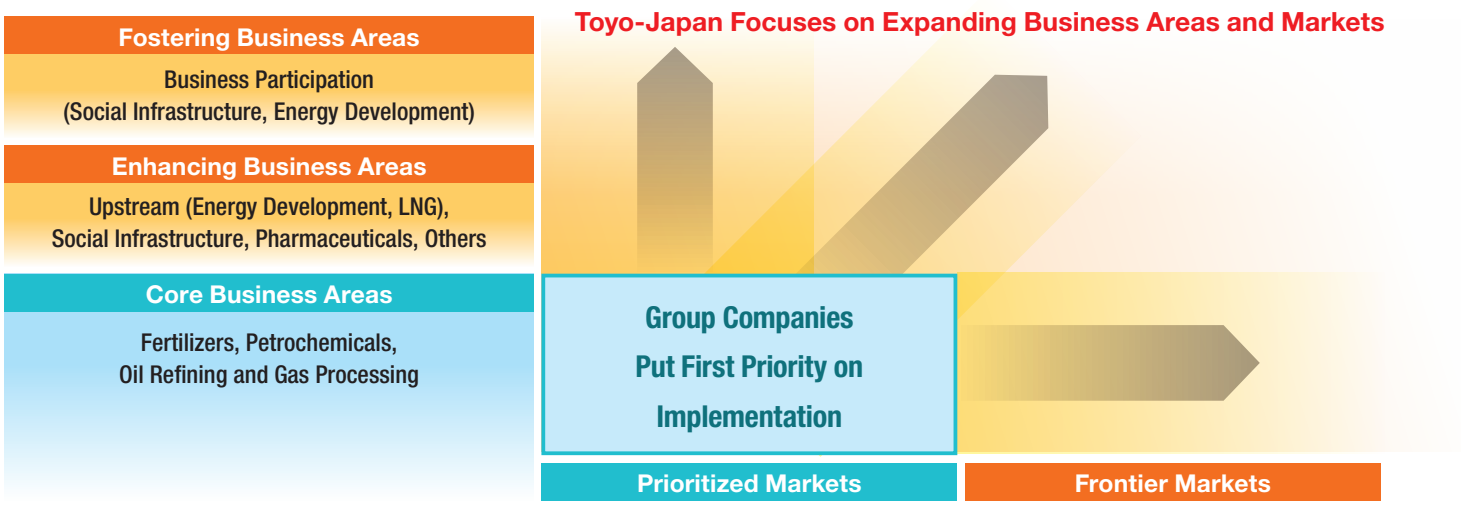
Yes, exactly. For example, TOYO did a lot of work in Iraq before the war occurred in the 1980s. And the excellent reputation we earned from that work is still proving to be our advantage since TOYO's performance at that time is remembered today. Similarly, there are many clients who remember TOYO's work in Russia during the Soviet era—and the TOYO brand is still trusted. Executing projects properly and earning the clients' confidence is clearly the best marketing activity possible. These examples show how well-executed projects lead to new orders, and how excellent work helps with networking in the project's country. These are essential for engineering companies.

## Seamless Project Management System by Strengthening Group Companies

### What are your basic strategies for the next two years of NEXT TOYO 2015?

When we formulated the plan in 2012, we established three basic policies—"Enhancement of Integrated Global Operations System," expanding our business into the "Upstream Sector & Customer Value Chain," and "Development of Global Human Capital." We are going to continue enforcing those policies in the second half of the plan. However, in order to prevent a project from negatively affecting our profitability, we have added further strengthening the capability of our group companies as a pressing task. In particular, we placed directors from Toyo-Japan in charge of strengthening our companies in India, Korea and Indonesia. These directors then developed action plans to improve capabilities. Toyo-India is implementing its action plan on its regasification plant projects in India, while Toyo-Korea is doing so on the bitumen production facility project in Canada and the polyethylene plant project in the United States. IKPT is working with experienced managers and engineers assigned from Toyo-Japan on upgrading operations by strengthening its organization.

Business Areas & Markets in Focus




**So strengthening the capabilities of each group company is the key to increasing the overall profitability of TOYO?**

Under NEXT TOYO 2015, we clarified our areas of focus. We made a matrix chart for our strategy by dividing our regions into the previously mentioned prioritized markets and frontier markets as well as our business strategy into the "core business areas" and "enhancing business areas." The ideal situation would be if each group company could independently handle the core business areas in prioritized markets—Asia, Latin America and the Middle East. This is because TOYO cannot achieve the level of growth we have planned if Toyo-Japan is occupied with projects in prioritized markets. Toyo-Japan must focus on business in frontier markets such as Russia and CIS countries, North America, Iraq and Sub-Saharan Africa, as well as in enhancing business areas. Therefore, we have to improve the project execution capabilities of each group company, and establish a seamless project operation system integrating Toyo-Japan, the group companies, and construction sites.

**TOYO is putting a great deal of effort into developing markets for new products. Would you give us some examples?**

To achieve sustainable growth, TOYO has to be constantly exploring and developing new business domains to expand its orders and diversify its sources of income. Right now, we are continuing to aim at winning orders for LNG and Micro-GTL* technology related projects, and to promote *SUPERHIDIC*, our energy saving distillation system. We completed validation testing of the Micro-GTL technology at a demonstration plant in Brazil in 2013, and started pre-sales activities. *SUPERHIDIC* technology has applications in the petrochemical and oil refinery fields, and we are hoping to achieve some concrete results in the current fiscal year. In other areas, we won a large-scale photovoltaic power plant project being built in Okayama Prefecture, Japan, in June 2014, and based on that success we are now aiming to win another large-scale photovoltaic power plant project.

*GTL: Gas to Liquids

## High Aspiration of All Employees Drives TOYO's Expansion

**Competition is expected to further intensify. What strengths do you think TOYO has that will keep it competitive globally?**

I believe that our greatest strength is that all of our companies firmly share a common corporate philosophy and business goals. In 2009, we set forth that corporate philosophy in the form of TOYO's MVV (Mission, Vision and Values), clearly setting out TOYO's mission and the role it should play. The formation of TOYO's MVV also represents a strong message from the top management to all our employees, informing them that if our global operation systems don't become stronger, TOYO is not going to prosper and expand. Through the formulation of the MVV, the feeling among our employees that each is a TOYO group member has solidified. In addition, the MVV has fostered high aspirations within each of our companies to not be just a cost center, but to strive to expand their operations as an autonomous EPC company. I believe that this heightened awareness among our employees is both our greatest strength and asset.

**In conclusion, would you please tell us about your resolve to achieve the goals of NEXT TOYO 2015?**

Two years have passed since I became the president of Toyo Engineering Corporation. While profitability issues remain, I think that attaining a record high in new orders is a significant result for an engineering company dependent on orders. I am determined to reach the goals of NEXT TOYO 2015 by maintaining a high level of orders while increasing profitability by upgrading our project management system and evolving our consolidated management. I am confident that TOYO can push forward toward further growth.

# Gas Monetization Options

## Oil-Gas Price Gap Generates Profits

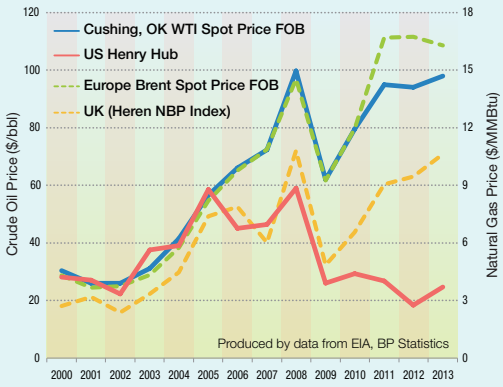
Currently, there is a large gap in crude oil prices, which remain at a high level, and natural gas prices, which maintain a low level caused by the increase of shale gas production due to advances in drilling technologies.

As a result, the more profitable businesses utilizing natural gas are now booming.

Seeking higher economic performance, many companies are planning production business using gas instead of crude oil as raw material, which requires gas utilization technology.

Production technology based on natural gas is one of TOYO's areas of expertise. TOYO can offer the "best practices" to meet the needs of customers and the market by a variety of applications, including proprietary technologies.

### Crude Oil and Natural Gas Price



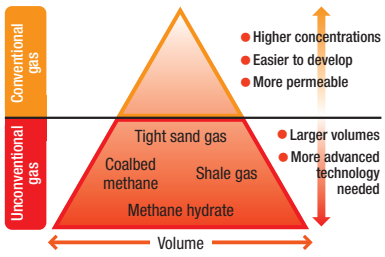

## What are natural gas resources?

Along with coal and oil, natural gas has been one of the resources essential to the development of industry. There are several types of gas sources:

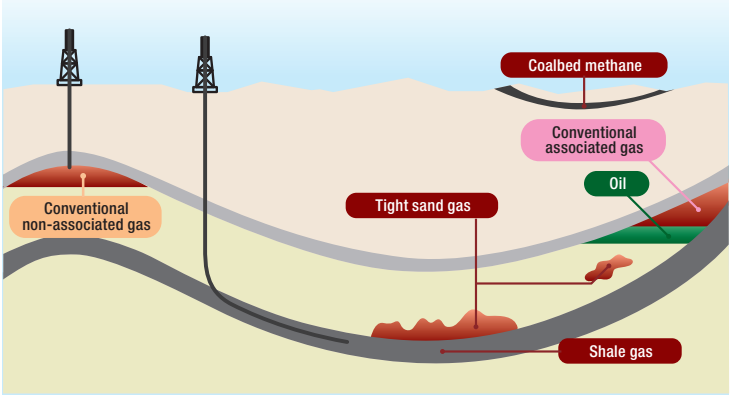
- **Conventional: onshore and offshore gas fields and associated gas**
- **Unconventional: tight sand gas, coalbed methane, shale gas, methane hydrate, and others**

While their composition is different, the major component of all natural gases is methane. Other components heavier than methane are separated, recovered and used as raw materials for higher value-added chemicals. Further, since natural gas emits less $CO_2$, it is an effective resource from a global warming prevention viewpoint.

### Natural Gas Resources




Source: IEA




Source: EIA

## Gas Transportation

**[Pipeline]**

Gas is commonly transported and distributed by a pipeline network with a compressor station. TOYO has engaged in pipeline construction projects.


Gas pipeline in Brazil

**[LNG]**

For offshore transportation, natural gas is liquefied by refrigeration. This technology realizes the overseas trading of gas. TOYO can cope with a variety of LNG plants: large-scale LNG, mid-scale LNG, FLNG*, LNG receiving terminal.

*FLNG: Floating LNG


Mid-scale LNG

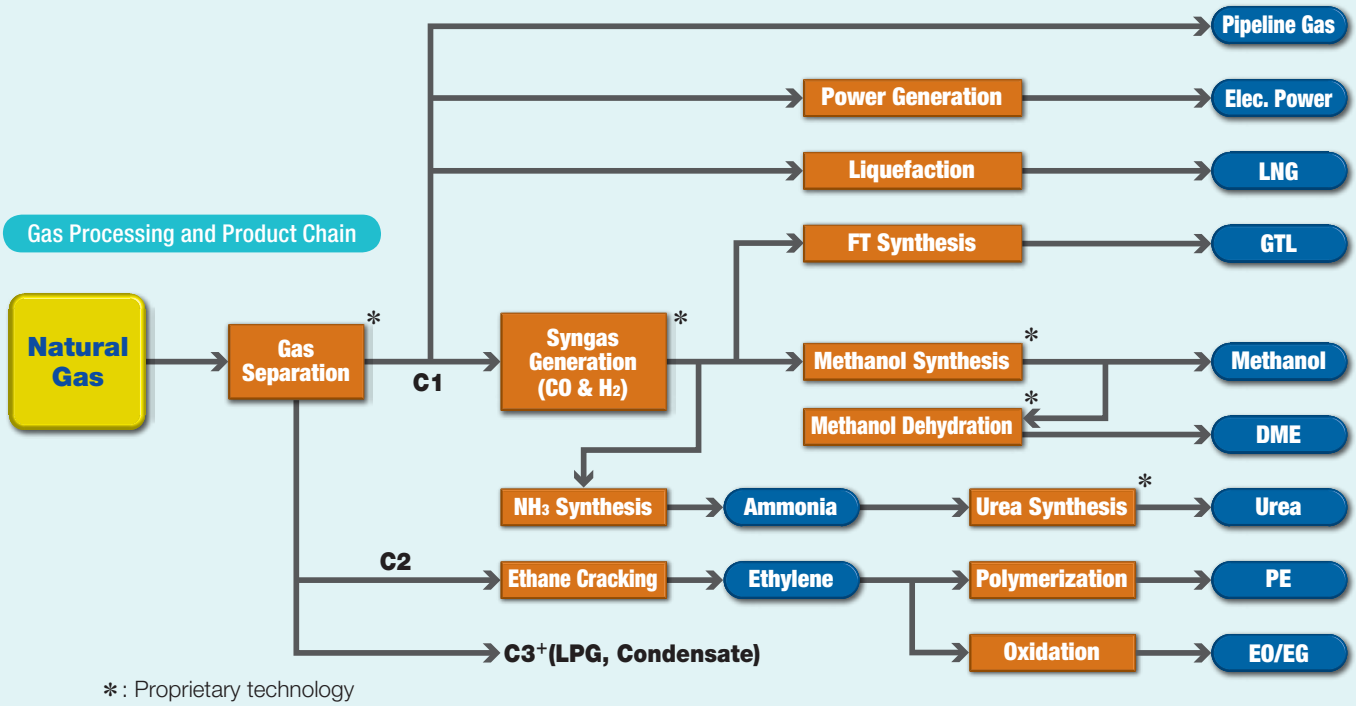

FLNG

## Gas to Power

Natural gas combined cycle electric power plants, which have a low environmental impact, are becoming the trend worldwide. TOYO aims to expand its business to large-scale and complex projects by applying its engineering expertise.


Combined cycle electric power plant in Thailand

## Gas Processing and Product Chain




*: Proprietary technology

## Gas to Liquid Fuel

### [GTL]

GTL is a technology that produces liquid fuel such as diesel oil. GTL is optimal for associated gas and small gas fields. TOYO has demonstrated a GTL plant in Brazil.


Micro-GTL demonstration plant in Brazil

### [DME*1 • MTG*2]

DME, a substitute for LPG*3 or gasoline (MTG), is produced from methanol synthesized from gas. TOYO has proprietary DME technology.

*1. DME: Dimethyl Ether
*2. MTG: Methanol to Gasoline
*3. LPG: Liquefied Petroleum Gas


DME plant in China

## Gas to Hydrogen


Hydrogen production facilities in Korea

TOYO has a proprietary steam reforming technology to produce hydrogen, which has attracted attention as a clean energy.

## Gas to Fertilizer

Urea fertilizer is produced via ammonia from natural gas. TOYO provides its proprietary urea process technology "ACES21®" together with KBR's ammonia process technology.


Fertilizer plant in Indonesia

## Gas Processing

Natural gas contains valuable heavier components other than methane, which are used for higher value-added chemical products. TOYO provides its highly efficient separation and recovery technology, COREFLUX®.*

*See page 8.


Gas separation plant in India

## Gas to Chemicals

### [Ethylene, PE*1, EO/EG*2]

Ethylene is produced from ethane in gas by thermal cracking and used to produce PE, EO/EG, and other higher value-added petrochemicals.

*1. PE: Polyethylene
*2. EO/EG: Ethylene Oxide/Ethylene Glycol

### [MTO*]

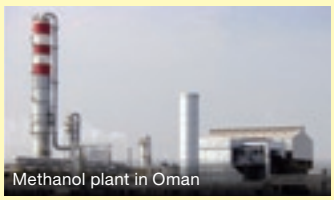
MTO is a technology to produce olefins via methanol, both of which can be used to produce a wide range of derivatives. TOYO has a proprietary methanol process technology.

*MTO: Methanol to Olefins


Ethylene plant in Thailand


Polyethylene plant in Thailand


EO/EG plant in Saudi Arabia


Methanol plant in Oman

## TOYO Wins Consecutive LNG Regasification Facility Projects in India

PLL signing ceremony

TOYO recently won an order from Petronet LNG Limited (PLL) to build an LNG regasification facility at Dahej in the State of Gujarat, India. The project is to expand the LNG receiving capacity at the current facility from 10 million tons to 15 million tons per year. TOYO also was awarded a project to construct a regasification facility with a receiving capacity of five million tons for GSPC LNG Limited at Mundra in the same state. Toyo-India will take the lead on both projects, doing the EPCC* work on a lump-sum turnkey basis. Completion of both facilities is scheduled for the second half of fiscal 2016.

The history of the PLL facility began in 2000, when a consortium consisting of IHI Corporation, TOYO, ITOCHU Corporation, and Mitsui & Co., Ltd., received an order from PLL to build India's first five million ton per year LNG receiving terminal. In 2006, PLL awarded an IHI Corporation and TOYO consortium a project to expand the capacity to 10 million tons per year.

India is producing growing volumes of electricity as well as fertilizer, which uses natural gas as its raw material. To meet demand for those materials, more than 10 additional LNG receiving terminals are currently in planning. In response, TOYO is ramping up its marketing activities in the country to secure LNG-related and gasification projects.

*EPCC: Engineering, Procurement, Construction and Commissioning

## Ammonia Plant Project in Brazil

In cooperation with SOG - Óleo e Gás S.A. (SOG), a leading Brazilian engineering company, TOYO is constructing an ammonia plant (UFN-5) with a production capacity of 1,500 tons per day for Petróleo Brasileiro S.A. (PETROBRAS), the Brazilian national oil company. The plant is to be installed at Uberaba, state of Minas Gerais, in southeastern Brazil. The project scope covers licensing (with technology by KBR, U.S.A.), engineering, procurement of equipment and materials, installation, commissioning and operation assistance. The plant is scheduled to be completed in the first half of 2017.

In May 2014, a cornerstone laying ceremony was held on the planned construction site. Among the many dignitaries attending the ceremony were Dilma Rousseff, President of Brazil, and Edison Lobão, Brazilian Minister of Mines and Energy.

Brazil is one of the world's leading agricultural countries, but it imports most of the fertilizer it uses. Therefore, producing fertilizer domestically is a priority issue for the nation.

TOYO began its relationship with PETROBRAS in 1965 by supplying urea technology. Since then, TOYO has been awarded a continued stream of projects from PETROBRAS in a wide range of fields. Currently, among other projects for this client, TOYO is working on large-scale utility facilities for a refinery and petrochemical complex, a gas processing plant, and FPSO* topsides units projects.

*FPSO: Floating Production Storage and Offloading


Cornerstone laying ceremony

## TOYO Awarded Large Gas Chemical Complex in Turkmenistan

Signing ceremony

In collaboration with three Korean companies, Hyundai Engineering Co., Ltd., Hyundai Engineering & Construction Co., Ltd., and LG International Corporation, TOYO was awarded a contract to build a large gas chemical complex for State Concern "TurkmenGas," Turkmenistan's national gas corporation. Scheduled to be completed in 2018, the complex is TOYO's first project in the country.

TurkmenGas plans to produce ethylene, high-density polyethylene and polypropylene from natural gas produced on the Caspian Sea shelf in the western Turkmenbashi district of Balkan Province. TOYO will be responsible for the engineering, procurement, and commissioning of a gas separation unit (with an annual production capacity of five billion cubic meters), a 400 thousand ton ethylene production unit, and an 80 thousand ton polypropylene production unit.

Various proprietary technologies are being used on the project. The gas separation unit will employ TOYO's COREFLUX® technology to achieve a high recovery rate of ethane and LPG and BASF's OASE™* technology for acid gas removal. Lummus Technology will provide ethylene production technology, and W. R. Grace & Co.-Conn. will provide polypropylene production technology.

With its abundant reserves of natural gas, Turkmenistan sustains rapid economic growth by the export of abundant natural gas and gas based products. Against this backdrop, the country is expected to be investing in many new plants in the oil and gas fields.

*OASE™: A registered trademark of BASF

## COREFLUX® Technology Used in Large Gas Chemical Complex in Turkmenistan

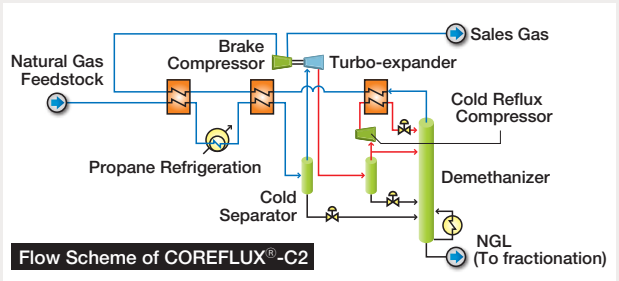
The COREFLUX®* technology developed by TOYO involves processes that extract natural gas liquid from natural gas or LNG utilizing a unique reflux enhancement method. The COREFLUX® processes can achieve a high product recovery rate with relatively low energy consumption.

There are two types of COREFLUX® processes. The COREFLUX®-C2 process recovers ethane from light hydrocarbon gases, such as natural gas, associated gas, and off-gas from a refinery. On the other hand, the COREFLUX®-LNG process recovers ethane and LPG from LNG. The COREFLUX®-C2 process will be used in the large-scale gas separation unit being built for Turkmenistan's national gas corporation. With this process, the facility will be able to achieve not only a more than 95% recovery of ethane from natural gas, but also realize substantial power saving in the operation of the compressor.

Amid the expanding use of natural gas worldwide, including shale gas, TOYO is providing production facilities with high efficiency and energy conservation through its COREFLUX® technology, thereby meeting current demand.

*COREFLUX®: Cold Reflux Technology

The gas processing plant of Oil and Natural Gas Corporation Limited (ONGC), India, uses COREFLUX®-LNG technology.




Flow Scheme of COREFLUX®-C2

## TOYO Consortium Completes Large-Scale Fertilizer Project in Venezuela

A consortium of TOYO and two other companies has completed a large-scale fertilizer project in Venezuela for the national petrochemical company Petroquímica de Venezuela, S.A. (PEQUIVEN). The two other members of the consortium are Ferrostaal AG, Germany, and Y&V, a Venezuelan engineering company.

The project was to construct a fertilizer complex comprising a 1,800 metric ton per day ammonia plant, a 2,200 metric ton per day urea plant, and utility and offsite facilities utilizing natural gas as feedstock. The complex is located in the Moron Petrochemical Complex, which is approximately 200 kilometers west of Caracas, the capital of Venezuela. Products from the facility will be used domestically to increase agricultural production.

Urea plant makes its first drop.

Responsibilities for the project were divided up among the consortium. The ammonia plant, which utilized the technology of KBR, Inc., U.S.A., was the responsibility of Ferrostaal. TOYO provided its proprietary urea technology and took charge of the urea plant. Y&V undertook the utility and offsite facilities. The three members of the consortium worked as one contractor in front of PEQUIVEN.

The complex is located along a beautiful ocean coastline where sea turtles are known to lay eggs. Since starting the project, the consortium has participated in many beach-cleaning activities hosted by the client.

Although the schedule for the project had to be extended during the construction period, the persevering efforts of PEQUIVEN and the consortium members succeeded with the production of the urea plant's first drop in April 2014.

## TOYO Completes Installation of Fractionator on Egyptian Project

Installation of the ethylene fractionator

In March 2014, TOYO successfully completed the installation of the ethylene fractionator on an ethylene plant project currently under way in Alexandria, Egypt. This completion represents a major milestone in the construction phase. The large-scale tower has a diameter of 4.2 meters, is 101 meters high, and weighs about 370 tons. TOYO used a 1,250 ton crane to lift the tower into position during installation. The project involves the construction of a 460,000 ton per year ethylene plant, a 400,000 ton per year polyethylene plant, and a 20,000 ton per year butadiene extraction plant.

TOYO and Egyptian engineering company ENPPI are building the ethylene plant based on the technology of Lummus Technology for the Egyptian Ethylene and Derivatives Company (ETHYDCO), which is affiliated with Egypt's Ministry of Petroleum, under a lump-sum turnkey contract. Construction is being handled by Egyptian construction company PETROJET as a subcontractor, and is scheduled for completion in 2015.

## TOYO Wins First Large-Scale Solar Power Generation Project


Construction site (panels are an artistic rendering)

TOYO has been awarded a large-scale photovoltaic power plant project to be built in Kumenan-cho, Okayama Prefecture, Japan, by Pacifico Energy Kumenan G.K. on a turnkey basis ranging from the engineering to the commissioning of the plant. The plant will have a power generating capacity of 32.256 MW, and will be completed in March 2016. All the power generated will be sold to the Chugoku Electric Power Co., Inc. It is TOYO's first solar power generation project.

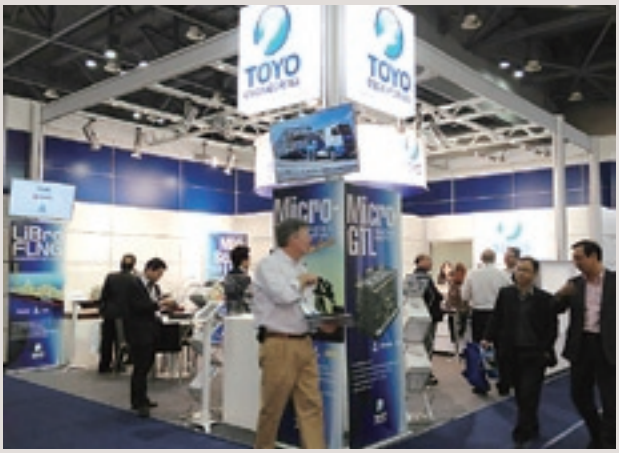
Pacifico Energy Kumenan, a special purpose company set up jointly by the GE Group, which is investing in renewable energy projects worldwide, and the Jamieson Group, a California-based enterprise, is leading the project. A total of ¥11 billion in financing has been raised on a non-recourse project finance basis.

Because it is a renewable energy source, photovoltaic power generation is expected to play an increasingly important role in the energy market from a global environment conservation perspective. TOYO plans to continue its efforts in this field.

## TOYO Technologies and Services on Exhibit at Gastech 2014

TOYO participated in Gastech 2014 held in Seoul, Korea, from March 24 to 27. The Gastech Conference and Exhibition is held every 18 months in different locations around the world. At the event, international companies in the gas and energy industries present their products and services. Companies from 45 countries exhibited at the show, with about 13,000 people from over 60 countries visiting the exhibition. TOYO presented various options for achieving profitability at the earliest stages in developing small- to mid-sized gas fields, featuring "Micro-GTL", "Micro-GTL Onshore" and "LiBro®* FLNG" technology jointly developed with MODEC, Inc., Japan, and Velocys Inc., U.S.A. Also on exhibit was the mid-scale LNG technology jointly developed with Chart Energy & Chemicals, Inc., U.S.A., as well as other energy industry-related technologies and services. Micro-GTL was exhibited with a see-through model of a micro reactor as well as with tablets featuring demo software that allowed visitors to see how the equipment was operated. The exhibition helped visitors better understand the technology and internal structure.

*LiBro®: A registered trademark of MODEC, Inc.




TOYO booth at Gastech

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