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Toyo Engineering Corporation

TOYO's project execution capabilities lead to developing the potential of the Central and South American markets

—Expanding TOYO's presence based on a relationship of trust with clients

Motoyoshi Kamoshima
Executive Officer
Regional Officer in Americas
President, Toyo-Brazil
Chairman, Toyo-USA

With the United States, Europe, and Japan's economies stagnant, the economies of Brazil and other Central and South American countries continue to maintain high growth rates based on plentiful natural resources. TOYO is meeting the diversified needs of its clients by developing these high-potential markets ahead of its competitors. In this interview, we discuss TOYO's current activities in Central and South America and strategies for the future with Toyo Engineering's Executive Officer and President of Toyo-Brazil, Motoyoshi Kamoshima.

Building Client Trust Though Epoch-Making Projects

Q To start with, please tell us about your relationship with the Central and South American markets.

I first began to work on Central and South American projects in 1996, when I was a member of the group responsible for technology sales in the International Sales and Marketing Unit. At that time, there was no sales department at TOYO that specialized in Central and South American projects. However, TOYO's activities in this region expanded steadily along with the expansion of business with Brazil, Venezuela, and other countries. In 1998, Toyo-Brazil was established and started a full-fledged operation for the Central and South

American markets. In 2009, we set up Toyo-Venezuela.

In 2010, the Company decided to expand our Brazilian operations as a business strategy, so our business base was moved to that country. As I was head of the Americas Sales and Marketing Division, I headed up the front lines as both Regional Officer in Americas and President of Toyo-Brazil. So I have been involved with the Central and South American markets for 17 years.

Q **Today, Central and South American markets have become a priority area, accounting for approximately 30% of TOYO's overseas sales in the previous several years. What were the forces behind that development?**

Well, I believe that the successful completion of projects is the most important factor. For example, in 1999, we successfully completed a gas processing plant for the Brazilian national oil company, Petróleo Brasileiro S.A. (PETROBRAS). Through this project, we received high praise from the client, who said "This is the first project that we have ever completed on schedule!" With project success, one's reputation as a reliable partner will grow steadily. Clients will begin to say "We'd like to work with TOYO again," and the relationship of trust will deepen.

One of the other reasons for our success was having a presence when Central and South American countries were finally emerging from their so-called "lost decade" economic crisis. Just as they were going through the recovery period, TOYO promoted effective marketing by offering a combination of financing and Engineering, Procurement, and Construction (EPC) services. Skillfully discerning that trend in the market and riding the wave was a big factor in our success in the region.

Q **Would you explain how you are developing TOYO's bases in Central and South America?**

Compared with the other bases such as Toyo-India and Toyo-Korea, Toyo-Brazil has a short history, and is still under development. Toyo-Brazil is clearly moving in the direction of becoming a company that provides EPC services independently of other TOYO Group companies, in cooperation with domestic partners in Brazil. Its strategy is to first expand our business through projects in Brazil. Toyo-Venezuela supports ongoing projects.

Plentiful Natural Resources Driving Continuous Expansion in Central and South American Markets

Q **What do you think are the unique characteristics of the Central and South American markets?**

The countries in the region largely maintain political stability, and their main focus is on economic growth. Among them, Brazil boasts plentiful natural resources and has recently discovered oil and gas fields in the deep sea one after the other. Active capital investment is expected to continue well into the future. Brazil will host the FIFA World Cup of soccer coming up in 2014, the 2016 Summer Olympics in Rio de Janeiro, and is even showing interest in hosting the World Fair or Expo 2020. The country has skillfully controlled inflation by alternately stepping on the brake and the gas pedal, and I think we can expect that development will continue to be stable and steady. Another characteristic of the Central and South American markets is the considerable power of the National Oil Companies (NOCs). PETROBRAS in Brazil, Petróleos de Venezuela, S.A. (PDVSA), ECOPETROL S.A. in Colombia—all of these companies have expanded to be able to rival international oil companies. It is clear that capital investment is going to continue to increase in these countries, led by the NOCs.

Q **What are some points to be careful about when doing business in Brazil and Venezuela?**

Naturally we have to respect the local customs and business practices, and give priority to the business timeline. Much of the final investment decision in these countries tends to take a long time to reach fruition from the planning stage. We try to accurately comprehend which stage a project is in, and to provide suitable services at each stage of the project.

Local content requirements are another issue that should be maintained. The development of domestic industries and promotion of employment are national policies in Brazil. Therefore, one of our core clients, PETROBRAS, always demands a higher local content ratio, in some cases over 80% of EPC services. TOYO has worked on more than 30 projects in Brazil to date, and cooperated with local companies to get the job done in all cases. In other areas, Brazil has unique taxation, legal, and labor protection systems. While it is an attractive market for international companies in terms of the growth in domestic demand, I feel that extensive know-how is required to participate in the market.

New Project Orders Being Received One after the other in Brazil and Venezuela

Q What sort of projects are you working on in Brazil at the moment?

Among ongoing projects, the first that comes to mind is the construction of utility facilities for the COMPERJ petrochemical complex being built by PETROBRAS. We received the order last December on an EPC lump-sum turnkey basis, and completion is scheduled for 2014. Our FPSO (Floating Production, Storage and Offloading) facility business, an alliance with MODEC, Inc., is also performing well. We are now working on the FPSO Cidade de Sao Paulo MV23 to be used by PETROBRAS in development in the BM-S-9 (Guara) Block and several other FPSO facilities as well.

Q Recently you have been involved with several big projects in Venezuela as well, haven't you?

We have three ongoing projects right now. The first is a fertilizer complex for Petroquímica de Venezuela S.A. (Pequiven) in Morón, located west of the capital, Caracas. It is being built on a full turnkey basis in cooperation with German and Venezuelan engineering companies, and its progress has exceeded 95%. TOYO is providing its ACES21® urea synthesis technology and urea granulation technology to the project.

The second project is the modernization of PDVSA's El Palito Refinery. The Front End Engineering and Design (FEED) has been completed. We are now preparing to enter the Engineering, Procurement service, and Construction management (EPsCm) and installation stages.

Another project is the heavy oil upgrading project for the Puerto La Cruz Refinery that was contracted in November. TOYO is on a Project Management Consultant (PMC) contract, working with the client, PDVSA, to manage the multiple contractors on the project.

Q Please tell us about activities in, and the potential of, other countries in Central and South America, such as Trinidad and Tobago or Cuba?

Around 1980, we built and upgraded a methanol facility that used natural gas in Trinidad and Tobago. In 2006, we provided the technology licensing and design for a urea plant which was part of a complex that combines fertilizer and melamine resin manufacturing facilities. We were also responsible for integration of the entire complex. The client is now planning to upgrade the complex again, and discussions with them are ongoing.

In Cuba, we concluded a technology licensing agreement for a urea plant for Cuvenpeq S.A., a petrochemical and fertilizer company in 2010. We plan to develop further business in Cuba, primarily technology licensing. Looking at other countries, we are carefully studying market trends in Colombia, Peru, and Mexico. With Colombia in particular, I want to redouble efforts to establish a beachhead there from which to develop the markets going forward.

Aiming at Rapid Commercialization, Micro-GTL Pilot Plant Starts Up

Q A Micro-GTL (Gas to Liquids) process development project is being carried out in cooperation with PETROBRAS. How is that progressing?

Last December, we completed construction of a pilot plant at an oil refinery in northeast Brazil owned by PETROBRAS. We will be conducting verification tests in 2012. During the tests we will vary the gases being used as raw material and the operating conditions. We will collect data in preparation for commercialization.

The Micro-GTL process development project is being carried out by TOYO and MODEC and Velocys Inc., of the U.S.A., based on a strategic alliance that has been ongoing since 2007. We are now finally in the last stages. After the testing is successful, we are planning on installing a Micro-GTL facility on an FPSO.

Q What is the social and economic significance of the development of the Micro-GTL process?

When drilling for oil in the ocean, associated natural gas is accompanied with crude oil. On the vessel, the gas is currently incinerated by flaring or re-injecting it into the oil field. However, if we could recover the gas and add value by converting it into syncrude, we could efficiently use these natural resources. It would also benefit us in terms of environmental strategies.

PETROBRAS has put together a very cooperative organization for us, from supplying a site for construction to providing raw materials and arranging operators based on PETROBRAS's targeted policy of "Zero Flaring."

Providing Unique Value, Further Strengthening the Relationship of Trust with Clients

Q Would you please tell us about your growth strategy in the Central and South American markets?

TOYO got a head start on other competitors, both Japanese and Korean, in the Central and South American markets. The Company has built a firm reputation over more than 10 years through successful completion of projects. We also have accumulated indispensable knowledge and know-how about developing business in these markets through project execution. Leveraging these advantages, I plan to delve deeper into these markets to get more new orders in the future. In addition, we also want to actively provide overseas market entrance support services to our Japanese clients and overseas companies entering the Central and South American markets. At Toyo-Brazil, we are developing even stronger local roots and taking a new step forward in business development. I want Toyo-Brazil to be a unique company featuring the dual aspects of contributing to the local economy as a Brazilian company and by providing additional value as an international contractor.

Q Finally, please share some episode that made an especially strong impression on you during your 17 years of doing business in Central and South America.

In August last year, I attended the 14th Japan Brazil Joint Economic Committee Meeting in Salvador, Brazil. This is a regular meeting where Japan's Federation of Economic Organizations meets with its Brazilian counterpart, the National Confederation of Industry (CNI), to provide a forum for business exchanges and determining a common policy by the public and private sectors.

As Japan's representative, I made a presentation during the natural resources and energy section of the meeting. I got up on stage with José Sergio Gabrielli de Azevedo, then President and CEO of PETROBRAS and Murilo Ferreira, President and CEO of Brazil's natural resource development company Vale S.A. Having both these captains of industry on the stage at once is a very rare event. Just being with them in talking about the potential of and issues facing the Brazilian market reaffirmed the importance of TOYO's presence in the market.

It has been more than 10 years since our full-fledged development of Central and South American business began. I felt that our sincerity and innovation in the projects we have worked on, and the building of close relationships with our clients were condensed into the wonderful spectacle of that meeting.

14th Japan Brazil Joint Economic Committee Meeting

Motoyoshi Kamoshima

Executive Officer / Regional Officer in Americas / President, Toyo-Brazil / Chairman, Toyo-USA

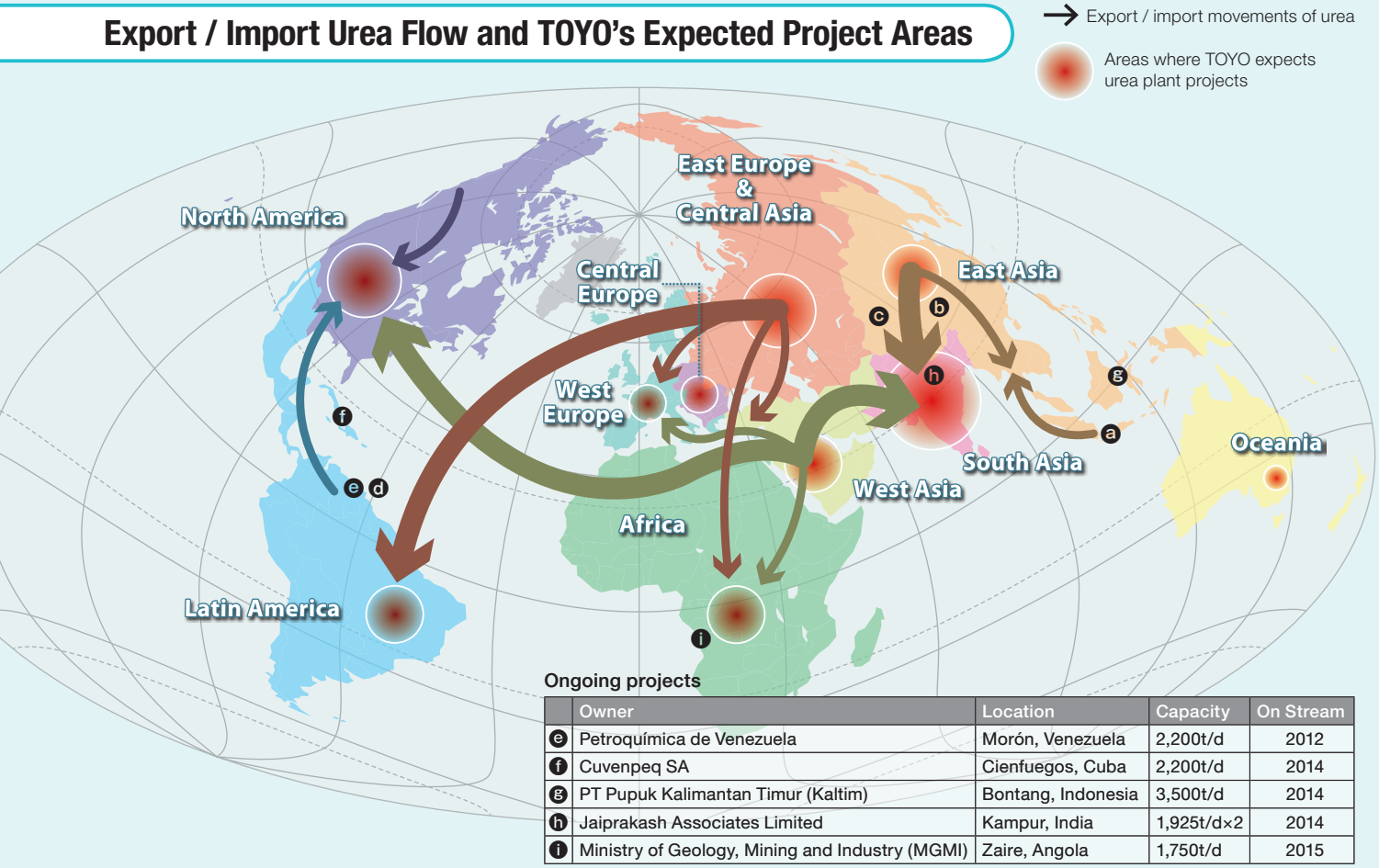
Profile

Mr. Kamoshima joined Toyo Engineering Corporation in 1979. After being placed in charge of process design at the Company, he was transferred to Toyo-USA in 1990. After handling technology sales in the International Sales and Marketing Unit, he was given responsibility for development of the Central and South American markets in 1996. Since then Mr. Kamoshima has contributed as a pioneer toward achieving the Company's goal of establishing a foothold in the Brazilian market. He has been involved with winning many large-scale orders and with raising TOYO's presence in the market. Those large-scale orders include modernization of oil refineries, installing gas processing facilities, and building gas pipelines. In 2004, he was appointed head of the Americas Sales and Marketing Division and manager of the No. 3 Sales Group. Mr. Kamoshima was made an Executive Officer in 2008, and has held his current positions since 2010.

Fertilizer Essential to Food Supply of 7 Billion People

Today, the world's population is in excess of 7 billion people. Spurred by the economic growth of emerging countries, that figure is projected to reach 9.3 billion people by the year 2050. Increased food supply is required to meet the demands of the large growth in population. This necessitates the production of more fertilizer, which provides nutrients essential to the growth of plants. Urea fills that role as a common type of nitrogen fertilizer. Aiming to contribute to its greater production, TOYO has developed its own proprietary urea production technology and has built more than 100 fertilizer plants around the world.

Export / Import Urea Flow and TOYO's Expected Project Areas



Ongoing projects

	Owner	Location	Capacity	On Stream
e	Petroquímica de Venezuela	Morón, Venezuela	2,200t/d	2012
f	Cuvenpeq SA	Cienfuegos, Cuba	2,200t/d	2014
g	PT Pupuk Kalimantan Timur (Kaltim)	Bontang, Indonesia	3,500t/d	2014
h	Jaiprakash Associates Limited	Kampur, India	1,925t/d×2	2014
i	Ministry of Geology, Mining and Industry (MGMI)	Zaire, Angola	1,750t/d	2015

Watching New Markets

Sub-Saharan Africa Along with the growth in the world's population and economy, many new fertilizer projects using natural gas as their raw material are on the planning boards. TOYO, in consortium with Mitsubishi Heavy Industries, Ltd., Sojitz Corporation, and Sumitomo Corporation, was awarded a contract for Front End Engineering Design (FEED) for a fertilizer plant in the Republic of Angola. The fertilizer plant is situated in Soyo, in the province of Zaire, about 300 km north of the capital, Luanda, consisting of an ammonia plant with a capacity of 2,000 tons per day, a urea plant with a capacity of 1,750 tons per day, and shipping facilities. The construction is scheduled to be completed by the end of 2015. Including installation of the surrounding infrastructure, the project is expected to cost in excess of US$1 billion. In other countries in the region, TOYO and Sumitomo Corporation are conducting a feasibility study for a fertilizer plant in Mozambique with the support of the Ministry of Economy, Trade and Industry, Japan.

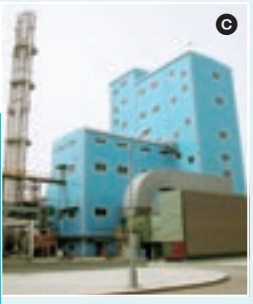
North America As an agricultural country, the United States had many fertilizer plants in the past. However, rising natural gas prices brought a drop in economic efficiency, and many of these plants have been closed. For that reason, the country imported 6,500,000 tons* satisfying the annual consumption of 12,450,000 tons of urea. However, with the recent strides made in new gas development technology for shale gas, North America's gas prices have become profitable in ammonia and urea production compared with other regions. Under this favorable circumstance, TOYO is expecting the projects resuming the production of price competitive urea in the United States.

* 2010 International Fertilizer Industry Association data

Over a long period of time, TOYO has been a leader in the urea industry and developed proprietary urea production technology which achieves energy conservation, plant cost reduction, high-value-added products, environmental protection, and low maintenance costs. In addition to licensing the urea production technologies, TOYO offers an integrated engineering business providing solutions that meet the demands of its clients through the entire lifecycle of a plant, utilizing its strong technical capabilities and abundant experience and accomplishments as an engineering contractor. TOYO's urea synthesis technology is currently being used in 101 plants around the world and its urea granulation technology in 21 plants.

Ammonia is the raw material used for producing urea. TOYO has maintained a good partnership with KBR, Inc., of the U.S.A., since building an ammonia plant in 1969 using their production process. To date, the companies have collaborated in the construction of 80 ammonia plants worldwide.

In this way, TOYO is one of the few fertilizer complex contractors that can offer comprehensive services from synthesis gas generation for ammonia production to the finished urea product. TOYO has constructed a total of 21 such ammonia and urea complexes globally.



ⓐ PT. Pupuk Kujang,
Cikampek, Indonesia, 1,725t/d

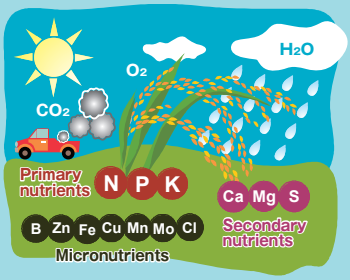
ⓑ Sichuan Chemical Company Ltd.,
Chengdu, China, 2,460t/d

ⓒ Tarim Oilfield Petrochemical Company,
Xinjiang, China, 2,640t/d

ⓓ Methanol Holdings (Trinidad) Limited,
Point Lisas, Trinidad and Tobago, 2,100t/d

ⓔ Petroquímica de Venezuela,
Morón, Venezuela, 2,200t/d (ongoing)

What is Fertilizer?



A fertilizer is a material that furnishes one or more of the chemical elements that comprise nutrients essential to the growth of plants. The major elements are primary nutrients (nitrogen, phosphorous, and potassium). Nitrogen fertilizers cover about 60% of the fertilizers consumed in the world with urea accounting for more than 60% of that group. A total of 150 million tons of urea is produced in the world annually. It is used as a raw material for the industrial production of feedstock, resins, and adhesives. Urea is also used as a deNOx agent by selective catalytic reaction for the emission gases of diesel engines. Recently, urea consumption is increasing for the production of grains and sugar cane for bio-fuels production. Urea is an extremely important chemical product for solving world food shortages, environmental issues, and energy problems.

TOYO Urea Technologies

Urea Synthesis Technology (ACES21®)

TOYO provides its own urea synthesis technology named ACES21® process, which not only cuts the construction costs by simplifying the urea synthesis section, but also reduces operation costs by improving operation conditions. Currently, with the growth in size of plants progressing, those using this process typically reach around 3,500 tons per day and are able to produce up to 6,000 tons per day in a single train.

ACES21® 3-D model

Urea Granulation Technology (Spout-Fluid Bed Process)

TOYO has a Spout-Fluid Bed Granulation Process that produces granular urea with low energy and operation cost. TOYO licenses this proprietary urea granulation process in combination with highly energy efficient ACES21® urea synthesis process.

DP28W™

Urea production is known as a process that uses extremely corrosive fluids. TOYO developed a higher corrosion-resistant duplex stainless steel, DP28W™, and applies it for the synthesis equipment for urea plants.

Other Related Technologies

TOYO provides the related technologies for supporting its clients throughout the lifecycle of urea plants.

- Operation assisting technology (operation training simulator, advanced process control system, remote plant monitoring system)
- Maintenance assisting technology (leak detection system, on-line analyzer, LCMS, RBI/RBM*)

* LCMS: Lifecycle Management System
RBI: Risk Based Inspection
RBM: Risk Based Management

Urea Licensee Meeting

As a urea licensor aiming for continuous support for clients and further technology development, TOYO invites clients to the periodical meeting to introduce the latest technologies and to exchange information about operation know-how, etc.

ULM2012, held in Kuala Lumpur in February 2012
(34 companies attended)

Awarded Utility Facilities for PETROBRAS


Signing ceremony

In consortium with Brazilian UTC Engenharia S.A. and Construtora Norberto Odebrecht S.A., TOYO has been awarded a contract by Brazil's national oil company, Petróleo Brasileiro S.A. (PETROBRAS), for the construction of utility facilities for a large-scale petrochemical complex called COMPERJ, now under construction in Itaborai, Rio de Janeiro, Brazil. The utility facilities consist of a 2,000 m^3/h raw water treatment facility, a 750 m^3/h wastewater treatment facility, a 260 MW power plant, and a 1,000 t/h steam supply facility. The scope of work of the consortium covers detailed design, procurement and construction on a lump sum contract. The project is scheduled to be completed in 2014.

This project is regarded as prime importance by PETROBRAS, who will utilize heavy oil produced in local oil fields as feedstock to meet increasing domestic demand for gas oil and petrochemical products. TOYO's project experiences for PETROBRAS exerted in technical capability, performance, and cooperation with local partners have led to customer confidence and resulted in obtaining the contract. In addition, the water treatment facilities included in this project will be the largest ever for TOYO, and are expected to provide a boost to the expansion of TOYO's focus on infrastructure business.

Awarded PMC Contract for Venezuelan Large Scale Heavy Oil Upgrade

In November 2011, TOYO signed a Project Management Consultant (PMC) contract for a heavy oil upgrading project of the Venezuelan national petroleum company Petróleos de Venezuela, S.A. (PDVSA) at its Puerto La Cruz Refinery in the State of Anzoátegui. The project will be done in consortium with Venezuelan engineering company Y&V Ingeniería y Construcción, C.A.

The client intends to increase the processing capacity of the refinery to enable maximum use of the extra heavy oil produced in the Orinoco Oil Belt to satisfy the energy demands of Venezuela's domestic and export markets.

The slurry hydrocraker "HDH Plus" being installed in this project will mark the first commercialization of heavy oil upgrading technology developed by PDVSA's R&D center. The PMC consortium will be responsible for working closely with PDVSA's project team to manage the multiple contractors involved with plant design, construction, and commissioning. The contract is scheduled to last for 52 months. Going forward, TOYO plans to actively support energy- and petrochemical-related projects in Venezuela.


Signing ceremony

Awarded FPSO Topside Facilities for Brazil

MODEC and TOYO Offshore Production Systems Pte. Ltd. (MTOPS), a Singapore-based joint venture of TOYO and MODEC, Inc., has been awarded a contract to install topside units for a Floating Production, Storage and Offloading (FPSO) facility from MODEC Offshore Production Systems (Singapore) Pte. Ltd., MODEC's Singaporean subsidiary. The contract is on a lump-sum turnkey basis and covers design, equipment and materials procurement, and construction of topside processing units with a production capacity of 100,000 BOPD.* Completion is scheduled for September 2013.

The FPSO will be delivered to OSX 3 Leasing B.V., a subsidiary of OSX Brasil S.A., a privately owned Brazilian oil development company. It will be used for oil field exploration work in the Campos Basin off the coast of Brazil.

MODEC is a leading FPSO contractor that has successfully delivered seven FPSO facilities to Brazil. This is the fifth order for FPSO facilities that TOYO has been awarded through its business alliance with MODEC.

Moving forward, TOYO is striving to expand upstream business such as oil & gas development and FPSO in collaboration with MODEC.

*BOPD: Barrels of Oil Per Day

Investment Adds Indonesian Engineering Company to Group Companies


IKPT Head Office

In January 2012, TOYO acquired 47% of shares of an Indonesian major engineering company, PT. Inti Karya Persada Tehnik (IKPT) and became the largest shareholder. IKPT, founded in 1982, has a lot of experience in Engineering, Procurement, and Construction (EPC) projects in a wide range of areas such as oil and gas, petrochemical and chemical including fertilizer, and infrastructure, including offshore development, LNG, and geothermal power generation. Having maintained a good relationship for over 20 years since their first collaboration on a fertilizer project, now TOYO and IKPT are jointly constructing the large-scale fertilizer plant in Indonesia.

Indonesia is experiencing economic growth and needs to accelerate development of infrastructure facilities such as power plants and transportation systems. The development of infrastructure in Indonesia is a target of Japan's public-private joint promotion. As such potential and positive outlook of the Indonesian economy is widely acknowledged in the world, the country is now attracting more foreign investments of not only oil & gas companies but manufacturers planning to establish overseas production facilities in Indonesia. TOYO's investment in and enhancement of collaboration with IKPT will expand business in Indonesia of both TOYO and IKPT with their technologies, know-how, and human resources shared by each other. TOYO expects IKPT to be a partner in its project operation out of Indonesia as well.

Awarded EDS Contract for Oil Sands Refinery Project

Toyo-Canada has been awarded a contract for Engineering Design Specification (EDS) for an oil refinery to be located northeast of Edmonton, Alberta, with North West Redwater Partnership. The oil refinery will process bitumen extracted from oil sands as feedstock. The contract covers a Sulfur Recovery Unit, a Light Ends Recovery Unit, a Sour Water Stripper Unit, and an Amine Treatment Unit. The EDS work is scheduled to be completed in August 2012.

The project will be realized in three phases that, when completed, will provide a total processing capacity of 150,000 BPSD.* The first phase is the construction of a bitumen refining unit that will process 50,000 BPSD of bitumen, producing naphtha, diesel oil, and other petroleum products.

Canada has the third-largest proven crude oil reserves in the world, following Saudi Arabia and Venezuela. Responding to the significant development needs in Canada's oil sands industry, TOYO plans to continue to expand its operations in this field.

*BPSD: Barrels Per Stream Day

Qatar Pearl GTL Project Completion

Qatar Pearl Gas to Liquids (GTL) Project, the world's largest GTL plant, has been successfully completed. On November 22, 2011, Shell held a big Pearl GTL Inauguration Ceremony where His Highness the Emir of Qatar officially inaugurated the complex. Over 2,000 guests attended, including all the contractors' CEOs; HRH Prince Andrew, Duke of York; and the ambassadors of several countries.

This GTL plant converts natural gas, delivered from the world's largest gas field offshore Qatar, into high-quality fuels and liquid hydrocarbons. The plant's design capacity is 260,000 BPD of products, including 140,000 BPD* of GTL products and 120,000 BPD of NGLs and ethane. THC's (Toyo-Hyundai Consortium; Toyo leader) scope of work was delivering the Liquids Processing Unit (LPU), the refinery process unit which is one of the main process units in the GTL plant.

*BPD: Barrels Per Day


Plant overview of Pearl GTL

Completion ceremony

Large-Scale Petrochemical Plant Expansion Completed in China

TOYO has completed the Integrated Petrochemical Site II (IPS-II) Project in Nanjing, Jiangsu Province, China. The completion ceremony was held on January 10, 2012. This was the second phase expansion of a project for BASF-YPC Company Limited (BYC), a joint venture between BASF and China Petroleum & Chemical Corporation (SINOPEC).

In 2005, BYC began operating a 600,000 MTPA ethylene plant in China as the core of a large-scale petrochemical complex. IPS-II added or upgraded a total of 16 process units at a cost of US$1.4 billion to increase annual production capacity up to 740,000 tons of ethylene. In addition, it expanded current utilities and off-site facilities.


Night view of completed plant

A consortium of TOYO, Fluor Corporation, U.S.A., and Daelim Industrial Co., Ltd., Korea, executed the project management on a cost reimbursable basis. TOYO was in charge of four units using a network of Toyo-Japan, Toyo-Korea, and Toyo-China. Toyo-Japan and Toyo-Korea completed Front End Engineering Design (FEED), with detailed designs being handled by two Chinese design companies in Beijing and Xian, with two units respectively.

As a result of TOYO's intensive project management, construction was completed with no incidents. TOYO successfully completed this global project involving people from 22 countries through close collaboration with the client, achieving 27,600,000 hours with no lost time injuries.

Polycarbonate Resin Plant Completed Ahead of Schedule in China


Overview of completed plant

TOYO has completed a Polycarbonate (PC) resin plant with an annual capacity of 80,000 tons for Lingyou Engineering-Plastics (Shanghai) Co., Ltd., in China. This company is a joint venture of MITSUBISHI GAS CHEMICAL COMPANY, INC., and Mitsubishi Engineering-Plastics Corporation. PC resin is an engineering plastic, which features special properties, such as impact and heat-resistance, transparency, and weatherability. The joint venture will leverage those features by finding applications for their PC in a wide range of product fields, such as electronic components, office automation equipment, cameras, automobiles, optical disks, and hemodialysis devices.

The plant is located in the Shanghai Chemical Industrial Park (SCIP), a leading chemical industry area in China. It is the first PC resin plant to be built by a major Japanese chemical manufacturer in the park.

Following its selection as the contractor, TOYO immediately began offering support, such as assisting with applications to the local authorities. Also, TOYO executed plant construction in close cooperation with the client. As a result, construction was completed two months ahead of schedule. Knowledge of Toyo-China experienced in local procurement helped TOYO to readily assure the quality and on-time delivery of domestically sourced equipment.

TOYO currently has 22 ongoing projects in China for European, U.S., and Japanese companies.

Awarded Food Flavoring Plant Project in Shanghai, China

In October 2011, TOYO received an order for a food flavoring plant with an annual capacity of 3,000 tons from Ogawa Flavors and Fragrances (Shanghai) Co., Ltd., Ogawa & Co., Ltd.'s local subsidiary in China. The plant is scheduled to be completed by the end of 2012 in the Songjiang district of Shanghai.

Ogawa & Co., Ltd., has already established a production facility in China. However, with domestic demand escalating due to high-paced growth in the Chinese economy, the company is building a food flavoring plant to expand production capacity.

TOYO was chosen to be the client's partner on this project not only because of its record of working on more than 190 projects in China, but also due to its reputation for reliability and excellence in terms of cost, quality, and construction completion.

Awarded Contract for Caprolactam Plant in China

Signing ceremony

TOYO was awarded a contract for a caprolactam plant by DSM Nanjing Chemical Company Ltd. (DNCC), a joint venture between Royal DSM N.V. (DSM) and China Petrochemical Corporation (Sinopec Group). The project is for the installation of a new caprolactam plant with an annual production capacity of 200,000 tons in Nanjing, China. Coupled with the existing plant, the project will make the plant the largest caprolactam producer in the world with an annual capacity of 400,000 tons. Toyo-China will take the lead on the project, providing Engineering, Procurement services and Construction management (EPsCm) on a lump-sum turnkey basis. The customer will invest approximately US$300 million in the project, which is scheduled to be completed in the second quarter of fiscal 2013.

Caprolactam, the raw material for a nylon fiber (nylon 6), nylon resin, and film, is one of DSM's core products. The company currently boasts a global annual production capacity of approximately 700,000 tons. The new 200,000 ton expansion in capacity is intended to meet growing market needs in China, where demand for caprolactam is expected to increase along with the country's continued economic development. In addition, the plant will incorporate DSM's latest technology, expanding the production scale while also saving energy.

Building Gas Recovery and Bioethanol Facilities in Malaysia


Signing ceremony

In July 2011, Toyo-Malaysia won an Engineering, Procurement, and Construction (EPC) contract to build a Flare Gas Recovery Unit by PETRONAS Gas Bhd., a subsidiary of state-owned PETRONAS. The unit will be built in the customer's existing gas processing plant in Terengganu. The project calls for the recovery of gas that would otherwise be flared or vented, reprocessing it into fuel products and making the existing plant environmentally friendly. The project will proceed between shutdown phases, with completion scheduled for July 2013.

In December 2011, Toyo-Malaysia was awarded yet another contract, this time to build a bioethanol facility project which is for a joint venture by the Malaysian subsidiary of Glycos Biotechnologies, Inc., of the U.S.A., and Malaysian Bio-XCell Sdn Bhd. It involves building a bioethanol production facility with an annual capacity of 10,000 tons in a biotechnology park in Johor Bahru, Malaysia. The plant will produce industrial grade bioethanol from crude glycerin. Toyo-Malaysia will execute the project under a turnkey contract covering EPC and Commissioning (EPCC). Completion is scheduled for June 2013.

Including these two projects, the yearly new orders of Toyo-Malaysia for fiscal 2011 has reached about 300 million Malaysian ringgit (US$96 million). This is the highest that yearly new orders have been since Toyo-Malaysia's establishment in 1986.

Innovative Energy Saving Distillation System *SUPERHIDIC*

Distillation plays an important role in unit operation to separate the mixtures in wide range of services. It involves supplying a large amount of heat to reboiler and removing from condenser, which makes this operation energy-intensive. For example, in a petrochemical plant, it accounts for approximately 40% of the energy used. Consequently, this is an area ripe for technological innovation. Focusing on these needs, TOYO has developed an innovative energy saving distillation system called ***SUPERHIDIC***.

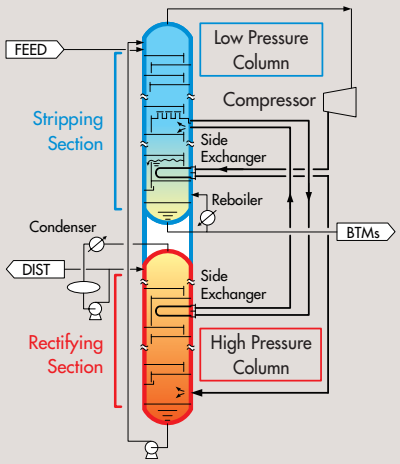
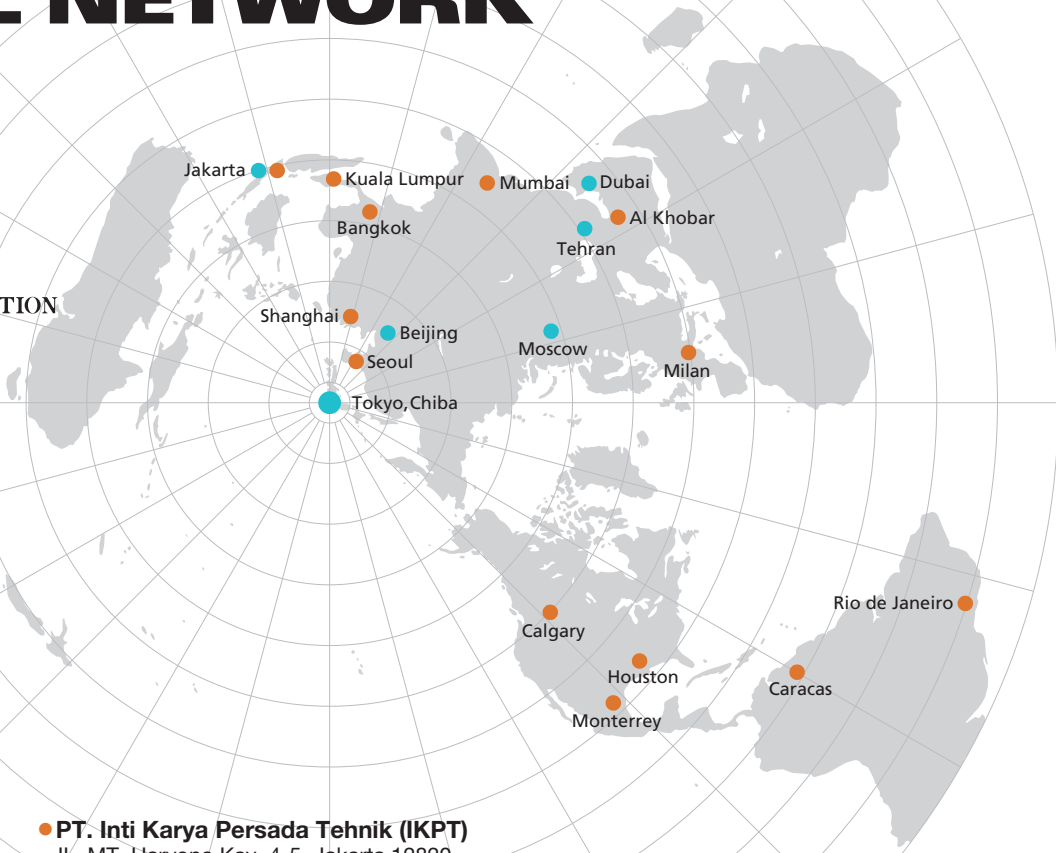


Illustration of ***SUPERHIDIC***

In ***SUPERHIDIC***, much less energy is required at reboiler and/or condenser since a large amount of heat duty can be shifted to side exchangers which are heat-integrated each other. This can be accomplished by installing the compressor in between the rectifying section and the stripping section. Subsequent pressure profile results in higher temperature in the rectifying section to the stripping section. The energy consumption in ***SUPERHIDIC*** can be less than 50% compared to the conventional distillation system. Moreover, the system employs well-proven distillation and heat transfer technology and does not require special equipment in the whole system. Accordingly, engineering and maintenance methods remain the same.

TOYO enhances the promotion of ***SUPERHIDIC*** in various plants and is willing to contribute to energy saving society and greenhouse gas abatement.

TOYO ENGINEERING GLOBAL NETWORK



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