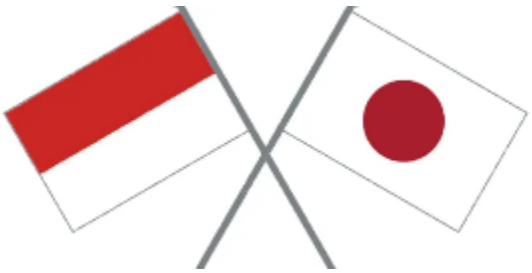
Business Catalog by Japanese Companies Contributing to Indonesia's Decarbonization and Climate Change Adaptation

"81 Solutions that contribute to Global Warming Countermeasures"



July 2024

JETRO Jakarta Office

JETRO

Japan External Trade Organization

This business catalog introduces solutions which can contribute to emission reduction and climate change adaptation measures in Indonesia by Japanese companies.

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With zero cost initial investment, green electric power installation is possible

Onsite solar power generation equipment rental

PT. Sojitz Indonesia

Product and service outline

- PT. Surya Nippon Nusantara (“SNN”), a joint venture between Sojitz and SUN Energy (“SUN”), the largest rooftop solar developer in Indonesia, aims to provide decarbonized energy solutions including rooftop solar PV system to industrial and commercial customers in Indonesia.
- Our service includes an entire process from engineering, procurement, construction and O&M, as well as support for obtaining permits and licenses. Customers can achieve reductions in GHG emissions and lower electricity costs without any initial investment and maintenance burden during operation.
- Through an industrial park in Bekasi (Deltamas/GIIC), Sojitz is committed to the long-term development of the industry in Indonesia. Together with SUN who has the most extensive track record of rooftop solar PV system in Indonesia, we provide most stable and high-quality services to our customers through long-term contracts.
- If you are interested in implementing decarbonized energy solutions such as onsite rooftop solar PV system and green electricity use, please reach our contact person as mentioned below.

Actual result and example

[Sojitz group renewable energy project]

- Sojitz group has developed and participated in many power plant projects globally in which renewable energy power plant is about 2GW in total.
- As for solar, we have owned and managed 12 power plants in Japan with a total of 284MW, and 4 projects in overseas with a total of 700MW. In addition, we have also owned, managed, and developed 116MW domestic, 872MW overseas wind power plants, and 75MW domestic biomass power plant.

[Onsite solar installation actual result in Indonesia]
***Followings are the track record of our partner, SUN.**

- Global consumer product manufacturer (200kWp)
- Japanese automotive manufacturer (1,900kWp)
- Local group shopping mall (2,000kWp)
- and others. (at the end of 2023, the total installed capacity is more than 70MWp)

Indonesia: Onsite solar

Contact point

PT Sojitz Indonesia
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Ready to start decarbonization measure

Solar Power Generation Rental

PT Alam Energy Renewables



Product and Service Outline

- Mainly offering solar power generation equipment rental service toward industrial customers such as manufacturing industry and business facilities. Customers don't need to bear by themselves the solar power generation system establishment cost, green electric power can be procured for long term without initial investment. It can be called [third party ownership model], the operation and maintenance management during the contract will be carried out by our company. In addition to the contribution to the decarbonization target, it will also contribute to electric utility expense reduction which is assumed to be rising hereafter.
- As for the plan and construction, our company will assign our onsite contractor quality control, and we also will handle the technology standard completion from the customer's main office, so leave it to our company with no concern. During the term of the contract, proper management operations also will be performed.
- In addition, a solution comprising 100% renewable energy of used electric power for application of the Joint Crediting Mechanism (JCM) of the Ministry of the Environment (Japan), resilience enhancement through battery storage installation, and renewable energy certificate (I-REC) will be offered comprehensively.

Actual Result and Example

PT Alam Energy Renewables has owned the installation actual result of solar power generation equipment for each place in West Java, East Java, Bali island, and Batam island.

<Construction complete actual result>

1.22 MWp	West Java	Pharmaceutical company factory
0.46 MWp	West Java	Pharmaceutical company factory
1.20 MWp	East Java	Wood processing plant
0.54 MWp	East Java	Wood processing plant
0.47 MWp	Bali Island	Car dealer (several stores)
0.36 MWp	Batam Island	Car dealer (several stores)
0.31 MWp	East Java	Steel pipe factory
0.66 MWp	East Java	Steel pipe factory
0.22 MWp	West Java	Power plant
0.81 MWp	West Java	Pharmaceutical company delivery center

<Installation schedule (July 2022) >

Paper industry, daily necessities, and packaging manufacturer (all in West Java)


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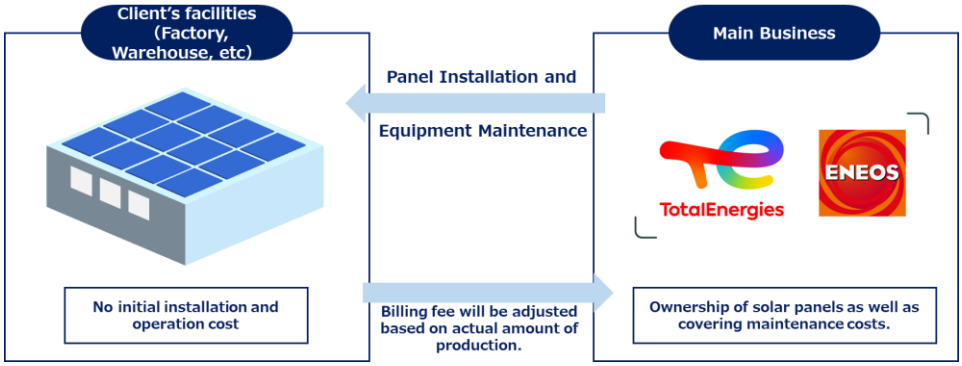
Rooftop Solar Power Plant with Zero Initial Cost

B2B Solar Distributed Generation

PT. Nippon Oil Indonesia

Our Product and Service Overview

- Our company is collaborating with TotalEnergies, a global energy company, and start Independent Rooftop Solar Power Generation business support in Asia (※)
  ※ Japan, Indonesia, India, Thailand, Vietnam, Philippines, Cambodia, Singapore, Malaysia
- To realize reduction of customer's electricity costs and supply of low-carbon energy by installing rooftop power generation equipment on the premises and facilities (factories, warehouses) at zero initial cost for corporate customers.
- Taking advantage of achievements and foundation as experienced energy companies, ENEOS & TotalEnergies support steady supply of Renewable Energy.
- Similar proposal can be implemented for countries (※) outside Indonesia, where this business is being developed.



Our Portfolio and Clients

- ENEOS Group has developed distributed solar power generation project for gas stations and factories in Japan. In collaboration with TotalEnergies, we are starting to develop projects outside Japan.
- TotalEnergies own 2GW of power generation capacity in distributed solar power generation business with extensive experiences in Asia.

<Solar Power Generation Business Support Project in Indonesia>

※ Some example of our partner's, TotalEnergies, clients

- Petrochemical Factory — Capacity 1,200 kWp
- Food Processing Factory — Capacity 6,800 kWp
- Manufacturing — Capacity 4,800 kWp

and many others.

Contact Us:

PT. Nippon Oil Indonesia

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On-site Solar PV Leasing

Installation of Solar PV System on Customer Roofs at Zero Initial Cost

Mitsui & Co., Ltd. / PT Xurya Daya Indonesia (“Xurya”)

Product and Service Outline

- Xurya provides development, operation and maintenance ("O&M") services for solar installations for industrial and commercial customers in Indonesia. Xurya offers on-site solar power installations in a lease format with no initial investment and no O&M cost burden for customers.
- In October 2022, Mitsui invested in Xurya (see Mitsui Topics). Mitsui, as a shareholder of Xurya, will support and promote Xurya's on-site solar power generation business by leveraging its knowledge of distributed solar power business cultivated in countries around the world and through its network in Indonesia and abroad.
- If you are interested in installation of on-site solar power generation to reduce CO_2 emissions and electricity cost, please contact us at the contact information below.

Actual Result and Example

Mitsui Group's Renewable Energy Business

- As of September 30, 2022, Mitsui is involved in 2.6 GW of renewable energy projects including hydroelectric power generation (Mitsui’s net capacity) of which Mitsui owns over 0.7 GW of solar assets.
- Mitsui is involved in distributed solar projects in the U.S. and other countries around the world.

Xurya’s track record in On-Site Solar Power

- Established in 2018. Xurya is a leading company and a first mover in Indonesian on-site solar market.
- With a total of over 70 sites for small, medium, and large companies, including textile and food manufacturers, including Japanese companies, and will continue to meet the needs of C&I customers in Indonesia, which is expected to grow in the future.

<Xurya’s awarded capacity>
As of the end of Oct 2022, more than 90 MWp
<Project case examples>
Japanese consumer goods manufacturer (6.0 MWp)
Japanese auto parts manufacturer (3.2 MWp)
National ceramics manufacturer (5.6 MWp), etc.

Site at Center of Jakarta City

Site at a Japanese Manufacturing Company

Xurya as 1st top Green & RE startup in G20 Event

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Solar System Installer (EPC)

Using Original Light Weight Panel Without Bolt and Screw on Your Roof

PT. Quint Solar Indonesia

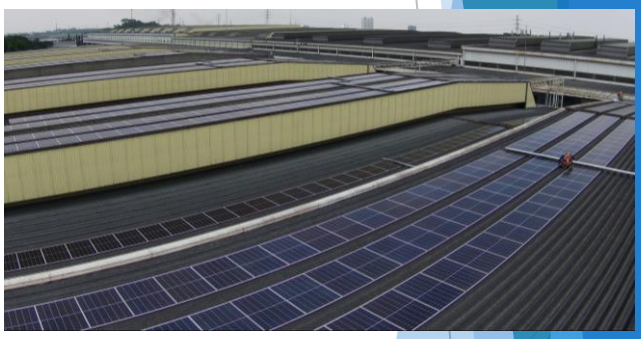
Product and service outline

- Rooftop solar system installation work and maintenance service
- Ground installation solar system installation work and maintenance service
- Floating solar system installation work and maintenance service
- Farming type solar system installation work and maintenance service
- Target area: Entire Indonesia
- 365 days x 24 hours monitoring service center
- Utilizes the original solar panel installation method that does not use bolts or screws on the roof

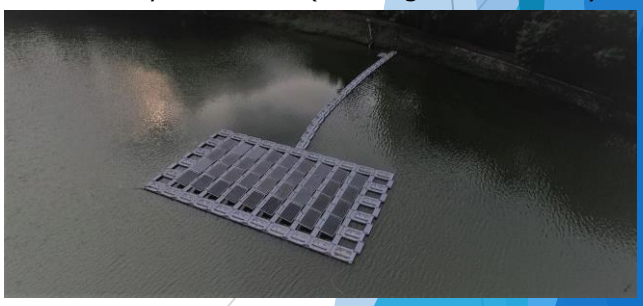
Actual result and example

- PT. Pigeon Indonesia
- Papaya Super Surabaya Darmo
- Papaya Super Surabaya Pakuwon
- Papaya Super Bali Kuta
- Papaya Bekasi
- PT. Meiji Indonesian Pharmaceutical Industries
- PT. Kao Chemical Indonesia
- PT. Yamaha Indonesia Motor Manufacturing
- PT. Katolec Indonesia
- University Indonesia

PT Yamaha Indonesia Motor Manufacturing
(Roof Top 1330KW)



University Indonesia (Floating solar 12KW)



Contact Us:

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EBLOX/Triple Hybrid Generation System

Stable and Maximum Use of Solar

PT. MHI ENGINE SYSTEM INDONESIA

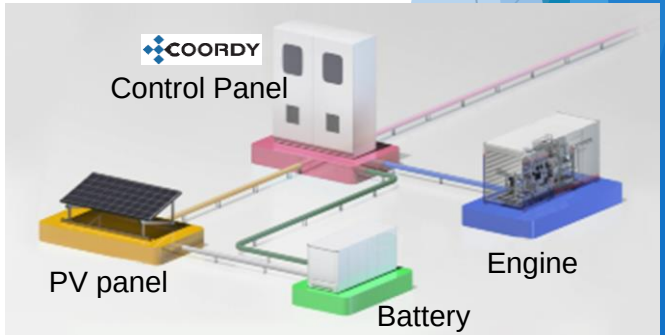
Product and Service Outline

- Under the circumstances where decarbonization efforts are required worldwide, all companies were being required not only setting their target, but also establishing a practical plan and its verification. Other than short term solution such as Renewable Energy Certificates (REC), we propose you to install EBLOX triple hybrid generation system to stabilize your power generator while your company maximize the utilization of solar power plant that is not stable as a sustainable and developmental solution to achieve low carbon operation in the company.
- Compared with Japan and other Southeast Asian countries, Indonesian electricity supply is still dependent on low efficient and carbon intensive coal-fired power plants. Therefore, CO_2 reduction by the installation of EBLOX triple hybrid generation system in Indonesia is significantly larger than other countries. Furthermore, there is an opportunity to utilize the Joint Crediting Mechanism (JCM) subsidy by the Ministry of Environment of Japan.
- EBLOX system can control automatically three kinds of energy sources such as solar power, engine, and storage battery, and aiming for the maximization of the solar power plant. EBLOX engine will stabilize the power electricity supply at bad weather and night. On the other hand, because the voltage frequency of solar power plant is not stable, the storage battery will stabilize it. MHI is also using the technology of VSG (Virtual Synchronous Generator). In the future, through replacing component to hydrogen engine may creates carbon negative. Because the power plant can operate independently, this will contribute to Business Continuity Plan(BCP) of the users.

Achievements and Examples

- EBLOX was awarded by Cogen Award in 2021 in Japan.
- Engine can be either diesel engine or gas engine. Gas engine is expected to contribute to much higher efficiency and CO_2 reduction with cogeneration utilizing waste heat.
- The reliability of Eblox system has been verified through demonstration facility in Japan and overseas. We can provide a simulation test of the factory load in advance.
- Engines are manufactured in Japan. And in the past 30 years we have delivered more than 3,000 units in Indonesia, and we also provide the best after sales service.
- EBLOX is capable for sound operation under both 1) On-grid operation and parallel operation with other generators, and 2) Off-grid operation in remote area or in case of disasters.
- By reflecting weather forecasts and/or factory demand forecasts using MHI AI cloud system, you can expect more efficient battery operation (charge/discharge).
- Remote monitoring is available and make it easy for users to monitor the systems in multiple locations from office and labor saving.
- Depend on our customer demand, site, and their target of CO_2 reduction, we will verify the number of units and the size of each solar power, engine, and storage battery, then we will propose the suitable detail for our customer.

Demonstration & Verification Plant in Japan



Triple Hybrid Power Generation system

Contact point

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Hydro power plant IPP project

NiX JAPAN Co., Ltd.

Product and Service Outline

- Our company is not only in Japan but also carrying out hydro power IPP project in Indonesia, about the Tongar hydro power IPP project, NiX group Indonesia subsidiary corporation PT. NiX Indonesia Consulting (NIC) and NiX JAPAN Co., Ltd. (NiX) are performing below service;
  - ・Engineering: FS, Planning, Design, Construction management
  - ・Finance: Fund raising, Investment
  - ・Commercial: JV partner discover, JV establishment, License
- Even for the design and construction stage in this place which is a high-risk project, the construction DX such as BIM/CIM technology has taken in actively, while using 3D, 4D model the system is arranged to be able to do construction management on the site where the design and construction performed or even with remote work, such as managing the construction progress from 4 points that are the actual site, Jakarta office, Japan main office, and work from home staff, and by performing EPC management, construction quality management NiX group owners engineering, can measure the project cost reduction, risk reduction, and can manage a high-quality project.
- Moreover, this project can contribute to greenhouse gas (GHG) emission amount reduction due to application of the Joint Crediting Mechanism (JCM) of the Ministry of the Environment (Japan), offering solutions toward ESG management such as contribution in Japan and Indonesia renewable energy installation and expansion.

Tongar hydro power plant Specification

Location	Padang, Sumatra island
Subject	Tongar river
Power Generation Output	6.2MW
Power Generation Form	Run of river Design flow rate 16m3/s Effective fall distance 44.4m
Equipment	3.1MW (horizontal axis Francis turbine) × 2 unit
Selling Electricity Amount for a Year	38.73GWh (equal to 46,000 units standard house in Indonesia)

Actual Result and Example

- NiX was established in 1979, performing infrastructure engineering service, domestic and overseas IPP business as the mainline project, and taking form as the NiX group with 15 companies domestic and overseas country including the special purpose company. About the power generation project, the small hydro power project initiative started in 2010 in Japan, and at present has owned actual results of more than 50 hydro power equipment designs. As the IPP developer, managing 3 spots of our company's small hydro power plants in Toyama prefecture and Ishikawa prefecture. In April 2019, we are making the best use of experience cultivated in Japan for the overseas project, establishing PT. NiX Indonesia Consulting as the local corporation in Jakarta, for strengthening the overseas hydro power project such as construction management, technology consideration, and development in Indonesia. Tongar hydro power plant, which was developed in West Sumatra Province, has begin commercial operation in November 2023. In order to further expand hydropower business overseas, Ketaun hydro power plant (13,000kW) is currently under development in Lebong Regency, Bengkulu Province. Now we are proceeding to conclude a PPA (power purchase agreement).

＜Actual result of power plant in Japan＞

- Hiraso river small hydro power plant 2015 Ishikawa prefecture
- Yudani river small hydro power plant 2018 Toyama prefecture
- Kanazawa yuwaku small hydro power plant 2022 Ishikawa prefecture

<Overseas in-house power plant results>

- Under operation: Tongar hydro power plant 2023 West Sumatra 6,200kW

<Overseas in-house power plant project>

- Under development: Ketaung hydro power plant, Bengkulu Province, 13,000kW

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IoT Solution for Reducing Problem at Geothermal Power Plant

Contributes to decarbonization by preventing unexpected troubles with predictive failure diagnosis technology and supports from Toshiba local subsidiary in Indonesia

Toshiba Energy Systems & Solutions Corporation(TESSC)
PT. Toshiba Asia Pacific Indonesia(TAPI)

Product and Service Outline

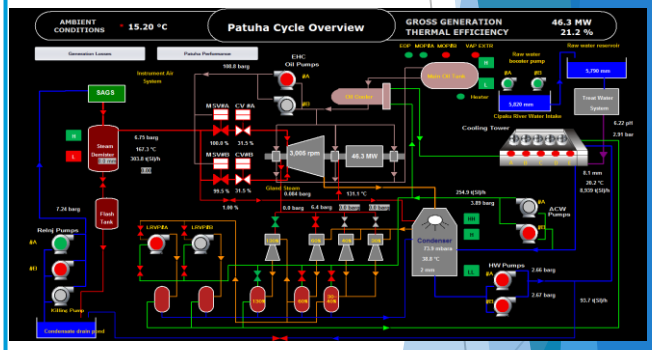
- We offer IoT service which uses IoT and AI technologies, including predictive failure diagnosis and performance monitoring. This service aims at improving the utilization rate of the power generation facilities at geothermal power plant which is decarbonized power supply.
- This system is distinguished technologically by its use of AI to analyze real-time power plant operation data obtained from various sensors and detect signs of anomalies that may cause problems during normal operation. In doing so, it reduces the number and duration of power plant shutdowns; a demonstration project conducted by NEDO (New Energy and Industrial Technology Development Organization) showed that it was able to reduce the rate at which problems occurred by over 20%. Another significant feature is the ability to detect signs of anomalies under conditions specific to geothermal power plants, such as the unstable condition of the steam flowing into the turbine, which is not the case with thermal power plants.
- This system can be used for consideration of preventing problems by analyzing real-time power plant operation data at plant and by sharing analysis results between customer, TESSC and each location in Indonesia through information technology.
- Engineers of our local subsidiary in Indonesia, PT. Toshiba Asia Pacific Indonesia (TAPI), share the trouble information and support customers with speedy resolution, regular inspection, periodical inspection and daily maintenance.

Actual Result and Example

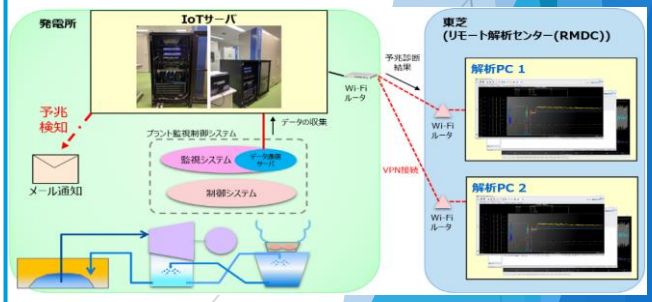
- We have concluded a IoT service contract with Indonesia's PT Geo Dipa Energi (Persero) which includes predictive failure diagnosis and performance monitoring at plant.
- This service represents a commercial version of what has been implemented as a NEDO demonstration project for this power plant in October 2019*. The demonstration project verified the effectiveness of the company's IoT-based predictive failure diagnosis technology and helped with the contract's conclusion. The system provided through this service employs EtaPROTM, a software suite acquired by Toshiba ESS last year.
- EtaPRO™ is a Plant monitoring software for power generation operators that has been installed for more than 30 years at power plants in 60+ countries with an approximate total capacity of 700 GW, including thermal, hydro, wind, and solar plants.
- We will be proactive in proposing the IoT solutions that enable optimal operation that will help to solve issues faced by individual current and future customers.

*: NEDO (New Energy and industrial Technology Development Organization) "Research and Development of Geothermal Energy Generation Technologies"

EtaPRO™ Predictive Failure Diagnosis Overview



Remote monitoring utilizing predictive failure diagnosis



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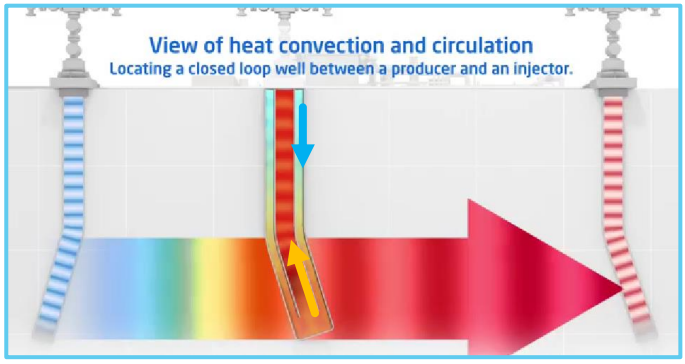
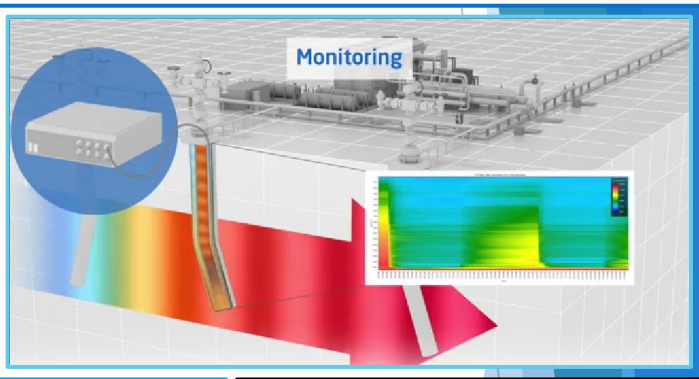
Comprehensive Service for Geothermal Power Plants

TOYO Engineering Corporation

Product and Service Outline

- TOYO Engineering Corporation provides comprehensive service related to the development, operation and maintenance of geothermal power plants.
- PT Inti Karya Persada Tehnik(IKPT), an Indonesian affiliate, carries out the Engineering, Procurement and Construction(EPC) for geothermal power plants in Indonesia.
- TOYO provides services for additional geothermal development using “Geothermal Closed Loop”. “Geothermal Closed Loop” is the system that circulates fluid from above the ground in pipes installed underground, recovering energy from underground heat sources without taking out fluid from underground. The system enables geothermal development only using a heat source. It has major environmental advantages such as preventing the depletion of hot springs, as well as the cost advantages like repurposing the abated old wells.
- TOYO provides downhole monitoring by optical fiber, and remote monitoring service that combines its plant operation support service, DX-PLANT®.





Actual Result and Example

- PT Inti Karya Persada Tehnik (IKPT) carries out a large number of EPC (Engineering, Procurement and Construction) projects for geothermal power generation facilities.
- TOYO has a track record of operation and maintenance support of downhole monitoring and DX-PLANT® in the oil and gas upstream field and fertilizer plants.
- TOYO and PT Geo Dipa Energi (GDE), Indonesia's state-owned geothermal development company, signed a memorandum of understanding, to conduct a joint study on comprehensive geothermal utilization, including green power generation, geothermal closed-loop technology, mineral recovery from-produced hot water, and green fuel generation.
- TOYO is discussing with multiple geothermal operators in Indonesia toward the demonstration and commercialization of “Geothermal Closed Loops”.

Contact Us:

TOYO Engineering Corporation
Carbon Neutral Business Division

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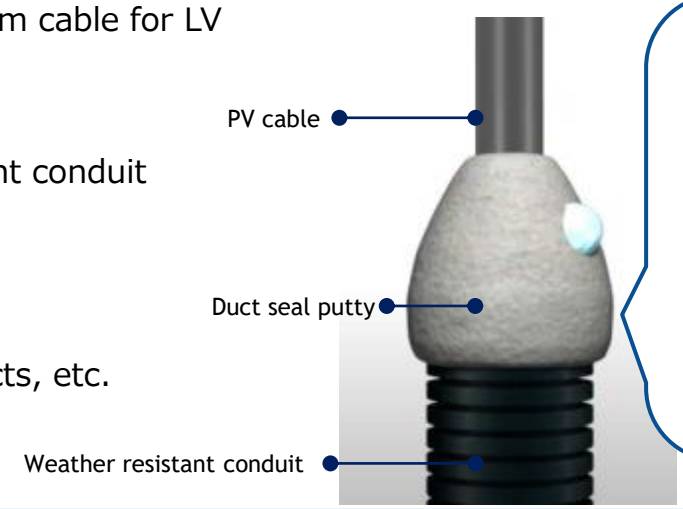
Products for the Renewable Energy Market (Solar and Geothermal)

- Easy construction, shortened construction lead time, and reliable quality -

PT. Furukawa Electric Indonesia

Product Overview

- Products for solar and geothermal power generation
  - Flexible aluminum cable for LV
  - Fiber Optic
  - PV cable
  - Weather resistant conduit
  - Green Trough
  - EFLEX
  - Duct seal putty
  - Fire Stop products, etc.



Duct seal putty

No melting in high temperature and high humidity

Easy installation, Light weight, half of other products.

Feature

- PT. Furukawa Electric Indonesia deals with a wide range of cables, piping cable, fire stop products, and power storage systems, etc. for the renewable energy market.
- Products based on the concept of "safe, secure, and comfortable living".
- Ample examples of adoption in ODA projects and private renewable energy facilities.

Maximum 24 kg
Easy to carry and safe
Green trough
from Recycled materials

Contact Us:

PT. Furukawa Electric Indonesia

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NEW

Off-grid Solar System

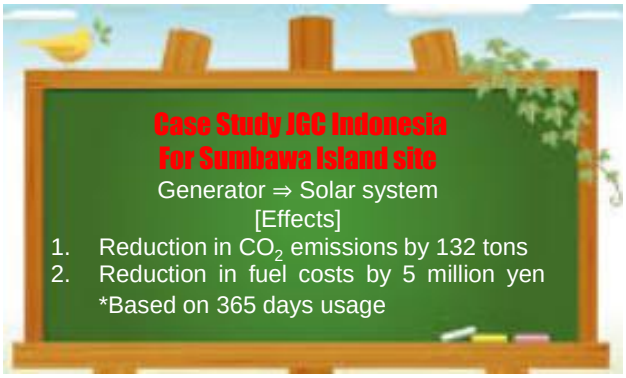
- Use Electricity even in Places where there is no Electricity -

Daiwa Tech Co., Ltd. Jakarta Representative Office

D+Daiwatech
simple + ecology + technology

Product and Service Outline

By using natural energy to generate electricity, we have found a way to use solar power generation, which is environmentally friendly and can reduce carbon emissions Our product, Solar System House, has been registered with the new technology NETIS of the Ministry of Land, Infrastructure, Transport and Tourism

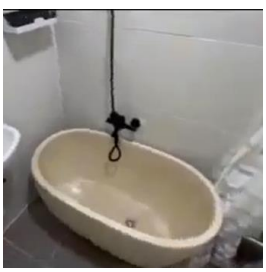


Actual Result and Example

2022 : Selected as a support project implemented by International Organizations

2023 : Signed a memorandum of understanding for joint research with Waseda and Padjadjaran University

2023 : Daiwa Tech products have been used by PT. JGC Indonesia on Sumbawa Island..



Daiwa Tech is a small company operating in the field of Solar Power

Keeping the electricity on

Remote Monitoring System

Monitoring Tool :

- Smart phone
- PC
- Tablet

Contact Point

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2．Biomass/Waste Power Generation

- **Clean Biomethane Fuel Manufacturing Business** (JGC HOLDINGS CO., LTD.)
- **NF Nanotechnology (NEFS Device)** (Nanofuel Co., Ltd.)
- **Sustainable Aviation Fuel (SAF) Business** (JGC HOLDINGS CO., LTD.)
- **Sustainable Aviation Fuel (SAF) Production** (CHIYODA Corporation)
- **Energy Recovery from Factory Wastewater with Energy-Saving WWT System** (AIKEN KAKOKI K.K.)
- **Effective Utilization of Oil Palm Trunks Project** (Green Earth Institute Co., Ltd.)
- **Manufacturing and Selling Biomass Pellet Fuel Made from Palm-Derived Agricultural Residues** (TESS Engineering Co. Ltd./PT PTEC Research and Development)
- **Renewable Natural Gas Production and Distribution Business** (PT. Energasindo Heksa Karya)
- **Development/Manufacturing/Sales of Pellets Fuel Using Agriculture Residues** (Toda Corporation Co., Ltd)
- **Biomass Fuel from EFB/Fertilizer Ingredient from Chicken Manure** (Hitachi Zosen Corporation)
- **Biomethane Supply** (PT. OSAKA GAS INDONESIA)
- **Technology Development Platform for CO_2 Reduction and Wastewater Purification by Microalgae** (Algal Bio)
- **Dry Anaerobic Digestion Biogas Plant** (Hitachi Zosen Corporation)

Palm oil wastewater (POME) as a raw material

Clean Biomethane Fuel Manufacturing Business

JGC HOLDINGS CO., LTD.

Products and Service Outline

- The palm oil industry contribute to 4.5% of GDP and 3 million jobs in Indonesia and is regarded as a key industry in the country.
- Since the waste liquid (Palm Oil Mill Effluent :"POME) generated in the oil extraction process of palm oil contains a large amount of organic matter, it is subjected to an anaerobic fermentation treatment in an open lagoon of an open atmosphere prior to discharge into a river and an environment, but in the process, a large amount of methane is generated and released into the atmosphere (methane causes greenhouse effect of 25 times as compared with CO_2)
- Emissions of GHGs from POME in Indonesia are about 36 million tons per CO_2e per year, and measures against emission methane are an urgent issue.
- The four companies jointly concluded MOUs at the 2022 AGGPM Forum for the recovery of methane discharged from Indonesian palm oil waste fluids and the production of biomethane fuels.

Actual Results and Examples

- Business: Sales of methane with bio-certification and issuance and sale of carbon credits
- Partner companies: Pertamina Gas Negara, Osaka Gas and INPEX, JGC Holdings
- Biomethane production: 10,000 tons/year*
  Planned production increase to 0.1 million tons/ year by 2030
- Reduced GHG emissions: 8,000 tons/ year (fuel conversion to biofuels)/150,000 tons/ year (methane recovery)
- Start of operations (forecast):Q1 2025

AGGPM 2022

PERTAMINA JGC INPEX Daigas

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NF Nanotechnology (NEFS Device)

Achieving “Carbon Neutrality” with Non-Liquid Fossil Fuels and New Liquid Biomass Fuels

Nanofuel Co., Ltd.

Product and Service Outline

-The NEFS system has reduced fuel costs and hazardous substances-

- Manufacture/sales/maintenance of nano-emulsion fuel equipment
- Development/manufacturing/sales of new liquid biomass fuel using nanotechnology
- Diesel power generation business using new liquid biomass fuel
- Development/manufacturing/sales/maintenance of agitator for various liquid fuel

NF company NEFS equipment

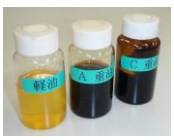
【300L・1000L/hr】

Certified as “Low Carbon Kawasaki Brand” 2021

Actual Result and Example

-Nano-emulsion significantly improves combustion efficiency-

1) Nano Fuel Co., Ltd.’s nanotechnology NEFS equipment reduces the consumption of liquid fossil fuels, cuts costs through energy savings, and reduces harmful emissions such as CO_2, NO_X, and PM.



Heavy oil/ light oil

Kerosene

stirring

Water

stirring

Additive

liquid fuel reformer

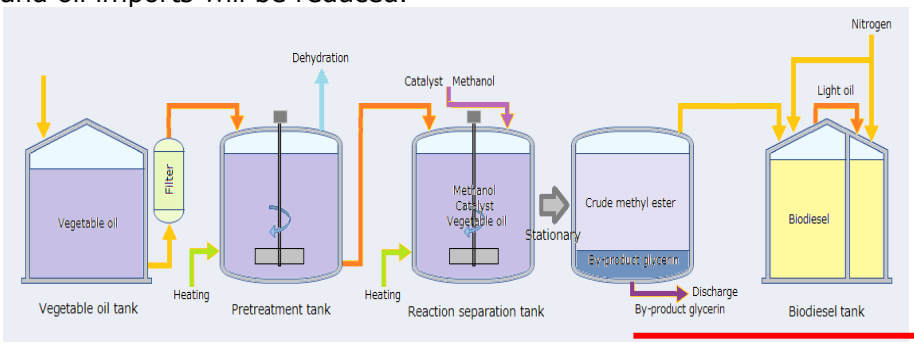
NF company NEFS equipment

【300L・1000L/hr】

Liquid new fuel (N-NEW-F)

-Production process of BDF and by-product glycerin-

2) We have succeeded in developing a nanoglycerin fuel and manufacturing system that solubilizes by-product glycerin and liquid fossil fuels such as light oil using our unique nanotechnology. Demand for this fuel is expected to be high, as it is significantly cheaper than diesel fuel. In addition, CO_2 can be reduced, and oil imports will be reduced.

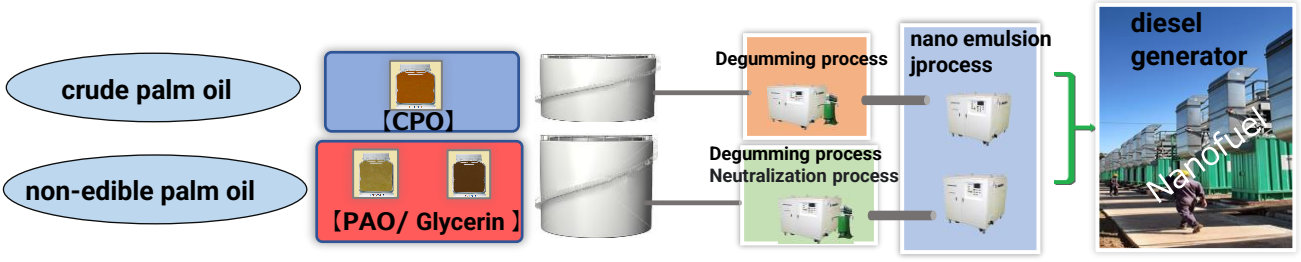


By-product glycerin

nanoglycerin fuel

- New liquid biomass fuel diesel power generation business -

3) In Indonesia and Malaysia, we will generate diesel power using locally produced palm oil and its oxidized oil as fuel. Our technology reforms the fuel to improve combustion efficiency, and it is possible to use non-edible oils such as PAO/glycerin, reducing electricity costs.



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Sustainable Aviation Fuel (SAF) Business

JGC HOLDINGS CO., LTD.

Products and Service Outline

- Amid efforts to reduce global CO_2 emissions, the airline industry also set a target (CORSIA) to prevent CO_2 emissions from increasing from 2020 onward in the international airline sector. Significant reductions in effect gas emissions can be expected from the introduction of SAF as a solution. SAFs can reduce CO_2 emissions by about 80% over conventional aviation fuels over the lifecycle from the production and collection of raw materials, such as biomass, waste food oil, and municipal waste, to manufacturing and burning. Existing infrastructure can also be used as is.
- JGC Group established a Japanese SAF manufacturing supply chain in collaboration with a partner for Japan's first large-scale commercial production of SAF. It also conducts FS and technical valuations. Based on the results and knowledge of these SAFs, furthermore, it is possible to provide highly reliable services such as support for commercializing and optimal scheme proposals.

Actual Results and Examples

- JGC Group is working with Levo International Co., Ltd. and Cosmo Oil Co., Ltd. to create a domestically produced SAF manufacturing supply chain by hydrotreatment of Used Cooking Oil(UCO). A SAF production plant with an annual production capacity of approximately 30,000 kL is planned to be put into operation in 2025, with the Cosmo Oil Sakai Refinery as its base, using waste edible oil recovered from restaurants and food factories by Levo International Co., Ltd.
- In addition, in collaboration with Levo International, Inc., All Nippon Airways Co., Ltd., Japan Airlines Co., Ltd., and other companies, we established ACT FOR SKY, a volunteer organization working to commercialize, disseminate, and expand domestic SAFs. In the future, it aims at the development of Japan's aviation network and the industry as well as the realization of a sustainable society.

Business entity	**JGC HD (60%),** Cosmo Oil (30%), Levo International (10%)
FEED+EPC	JGC
Plant Construction site	Cosmo Oil Sakai Refinery
Start of operation	2025 (planned)

(Record)

Customer	Partner	Country	Scope	Raw materials	Process	Capacity	Completed
A	—	Asia	FEED	Sugar cane	ATJ	100,000 kl/yr	In progress
—	Cosmo Oil, Levo International	Japan	FEED, EPC	UCO	HEFA	25,000 kl/yr	2025 (planned)

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Sustainable Aviation Fuel (SAF) Production

Plant Operation Optimization by AI System

CHIYODA Corporation

Product and Service Outline

- The use of SAF is being promoted as a decarbonization of the aviation industry.
- Renewable energies are subject to large fluctuation ranges, and their use in plants requires technology to absorb these fluctuations and ensure stable operation.
- Our AI technology can predict the amount of electricity generated from renewable energy sources and provide dynamic, optimized operating metrics for complex downstream plant operations.

Units

Operation Control
real-time reaction control, visualization of the reaction state, and yield prediction

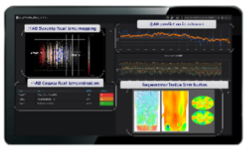
FCC AI Optimizer

Improvement of Plant Availability
Detecting signs of operation abnormalities and failures reduces unplanned equipment outages, contributing to stable equipment operation and reduction of operating costs.

Foaming Prediction AI System

Trouble prevention
Providing O&M support, trouble prevention by remote monitoring / equipment diagnosis.

F-Dr.s



Anomaly Prediction AI system

Plant

Productivity improvement
Plant operation optimization, operation automation / autonomy by real-time operation control

LNG Plant AI Optimizer　CDU Optima

Reduction of environmental load
Improve productivity by optimizing operation and plant efficiency reduce GHG emissions

LNG Plant AI Optimizer　CDU Optima

Advanced maintenance
Quantitatively evaluate the damage accumulated in each device and instrument in real time provides maintenance plan

Plant AI Optimizer

Supply Chain

Data integration platform
Collecting and creating linkage for all design, plant operation, equipment management, inspection data, etc.

Mirai Fusion

Effective use of data and information

- Optimization of supply and demand balance
- Sophistication of operation, security and maintenance
- Production planning, Risk management
- BtB collaboration (tracking by blockchain technology)

Mirai Fusion

Actual Results and Example

- The effects of modeling reaction and overall optimization have been confirmed in various process plants.
- Early detection of abnormalities caused by process fluctuations and automatic optimization as a set will reduce operator load, ensure safe plant operation, and optimize the cost balance.

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Energy Recovery from Factory Wastewater through Energy-Saving WWT System

-Water Pollution and the Utilization of Energy from Unused Prevention of Biomass Resources -

AIKEN KAKOKI K.K.

Product and Service Outline

▶ Demand in Palm Oil Industry

The palm oil industry and the dyeing industry, which are Indonesia's major industries, mainly treat their factory wastewater in open treatment ponds. In addition to water pollution, the release of biogas into the atmosphere is an issue.

▶ Proposed Product and Technology

Targeting the food and chemical industries such as palm oil factories and dyeing factories, the organic wastewater from these factories will be treated with high efficiency. Meanwhile, biogas and biofuel generated from the treatment process are recovered and used to prevent water pollution, reduce GHG emissions and contribute to the return on investment.

▶ Expected Result

A stable treatment for industrial wastewater and prevent~~ion~~ the release of biogas into the atmosphere. The use of recovered energy (biogas and biofuel) as fuel for generators and boilers will promote the decarbonization of factories and create economic benefits.

Achievements

- Approximately 20 years of development and commercialization, and more than 20 units installed.
- Other than palm oil industry, the technology is installed in the general food industry (beverages, agriculture product processing, seafood processing, dairy products, confectionery, seasonings, fermented products, etc.) and general chemical industry (dyed textiles, daily necessities, bioethanol, etc.).

Examples

- Agricultural Product Processing Plant

Prior to the installation, the operation costs on water treatment were 150 million yen/year. After the installation, it generated profit 35 million yen. There is an economic effect around 200 million yen annually, resulting the investment value recovered within ±3 years. In addition, more than 2,000 t-CO_2 GHG reduction has been achieved per year.

- Textile Factory

Prior to the installation, the operation costs were about 100 million yen/year, after the installation, the factory earn additional profit at 10 million yen, and resulting in an economic effect of more than 100 million yen/year.

- Palm Oil Industry

From April 2023, as a JICA project, we are planning to install the equipment at the state-owned palm oil factory (PTPN5) in Riau.

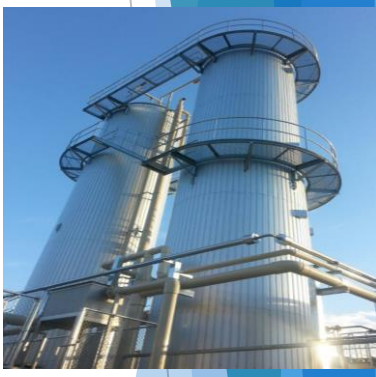
【Example Cases（Japan）】

Vol.	COD	Electricity Generation	Industry
m^3/d	Influent	kWh/d	
1,000	6,000	5,760	Agriculture Product
1,000	8,000	8,120	Textile
650	4,300	2,817	Food

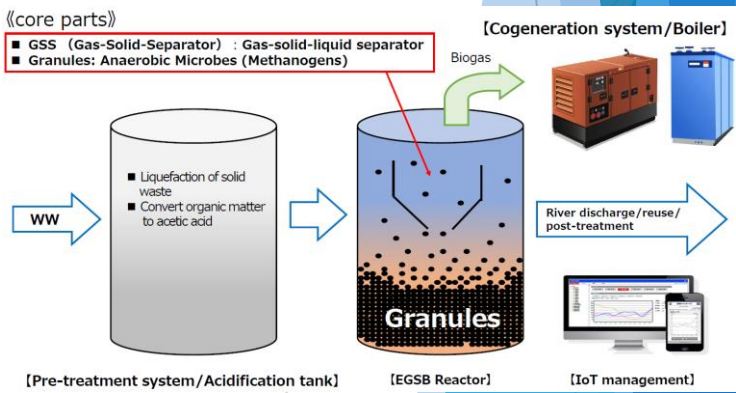
Granular sludge

Biofuel

EGSB WWTP（2.6Φx15H）



Energy recovery from WW （Net zero energy type WWTS）



Contact Point

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Effective Utilization of Oil Palm Trunks Project

Building the Integrated Business of Biofuel and Green Chemical utilizing Oil Palm Trunk

Green Earth Institute Co., Ltd.

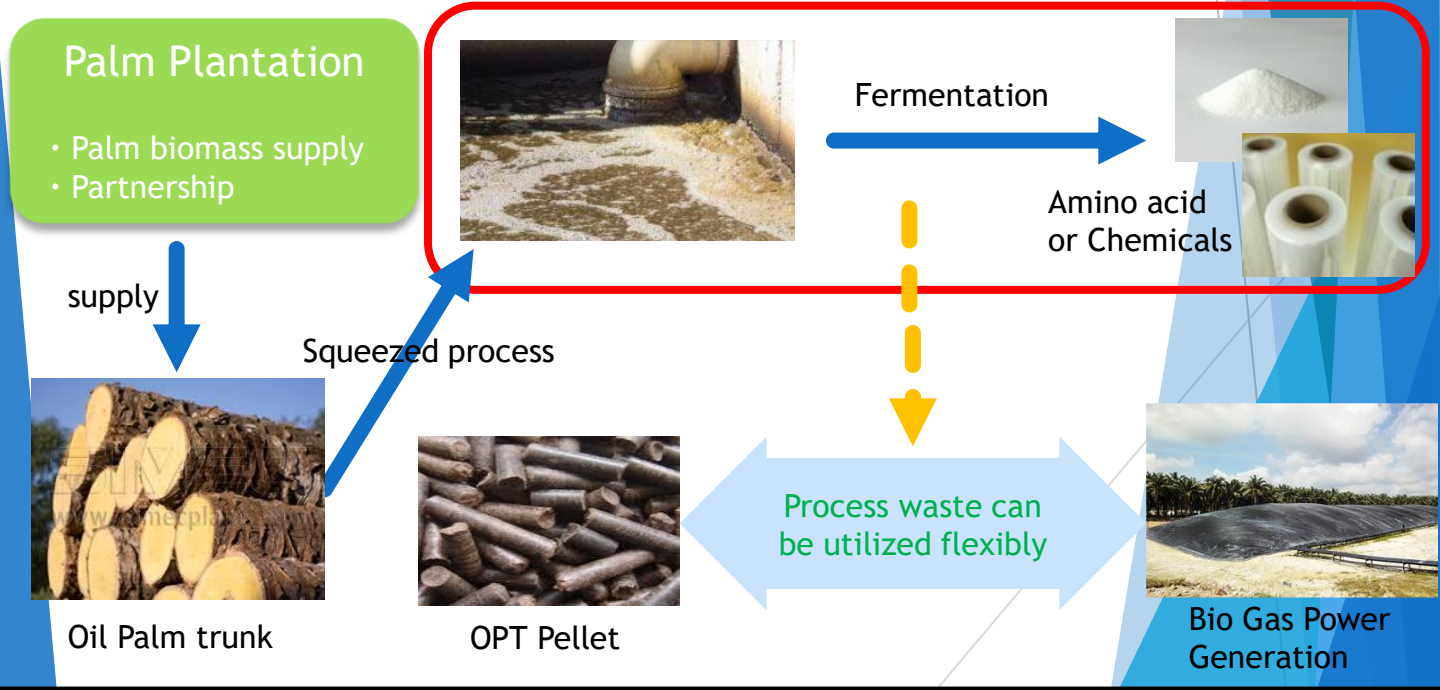
Business Outline

- Palm oil is the most widely used vegetable oil in the world for food, detergents, and cosmetics. The demand and production of palm oil is also increasing year by year. Oil palm trees in plantations that support such enormous global demands are regularly replanted to maintain the yield of palm fruits, and a large amount of OPTs are discarded every year. Until recently, OPT has been shredded and landfilled in plantations, but in recent years, its utilization as a source of biofuel has been attracting attention.
- Our business is an initiative to integrate the production of OPT pellets and the fermentation and production of bioethanol and other chemicals from the OPT squeezed juice generated during the production of OPT pellets.
- These new business initiatives are expected to contribute to the healthy development of the palm oil industry as an effective way to utilize OPTs that have been disposed in the past and upcycle them into biofuels and chemicals.
- The reduction of CO_2 emissions in the aviation sector is a challenge shared by the world. The main means of achieving this goal is the introduction of SAF (Sustainable Aviation Fuel).We are planning to conduct a feasibility evaluation of a project to produce bioethanol, the raw material for SAF, from OPT obtained in Indonesia.

Activity Status

- Currently executing FS to building up integrated OPT business in Indonesia with a business company.

Bioconversion Technology by **Green Earth Institute**



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Manufacturing and Selling Biomass Pellet Fuel Made from Palm-Derived Agricultural Residues

TESS Engineering Co. Ltd.
PT PTEC Research and Development

Overview of Products and Services

【BACKGROUND】

- Palm-derived residues (EFB & OPT) are currently **left unused** and **contribute to the generation of methane gas (25 times more potent than CO_2)**. Reducing the impact of palm-derived residue is an urgent matter.
- To achieve the goal of a "decarbonized society" set by the Japanese and Indonesian governments, it is crucial for manufacturers to make **transition from fossil fuels to decarbonized alternatives fuel**.

【Business Description】

- We **manufacture pellet fuel from unused residues (EFB & OPT)** and sell it to thermal power plants in Indonesia and overseas. Switching from fossil fuels to our biomass pellet is **expected to reduce CO_2 effects that is equivalent to 240,000 t-CO_2 per year (**)**.

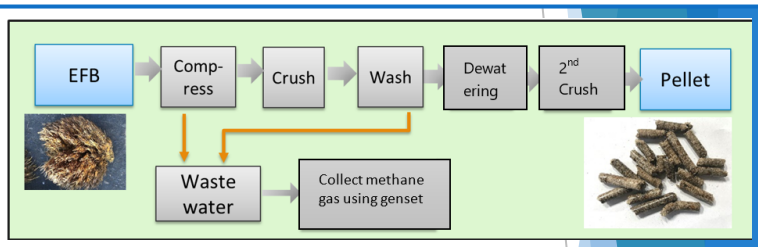
  **including the methane suppression effect resulting from utilizing abandoned EFB

Achievements/Examples

- ✅ **Test plant** in operation since 2021
- ✅ Construction plan for **commercial plant.**

Production volume: 200,000t/year
Operation commence: year 2025

- ✅ Already conducted **co-firing combustion tests at several coal-fired power plants** in Japan and Indonesia
- ✅ Already conducted **several combustion tests for drying furnace** in Indonesia
- ✅ Established **partnership with PTPN (state owned palm company)** regarding supply of raw materials and land



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Renewable Natural Gas Production and Distribution Business

Decarbonization of thermal energy

PT. Energasindo Heksa Karya (invested 33% by Tokyo Gas)

Business outline

- PT. Energasindo Heksa Karya (hereinafter referred to as EHK) is a company engaged in the transportation and distribution business of natural gas, and has experience to convert from other fossil fuels to natural gas which is a stable energy and low carbon fuel.
- This project will recover methane (CH_4) generated from raw material supply partners' organic waste and agricultural and livestock composts/residues to produce a gaseous decarbonized fuel (RNG) that can be used in the same way as natural gas. Also, this is a business that supplies RNG to nearby partner factories.

Expected effects

- Raw material supply partners : It can contribute to reduce and effectively utilize greenhouse gases generated from factory wastewater, organic waste, and various composts/residues.
- Gas use partners: Enables decarbonization of energy, clean exhaust gases, and the use of highly efficient and easy-to-maintain gas-fueled equipment.

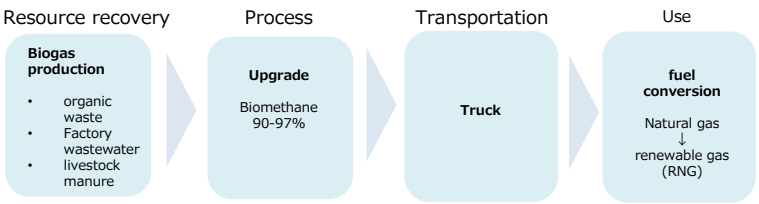
EHK leverages our know-how of natural gas distribution business to connect Raw material supply partners and Gas use partners to decarbonize and provide a stable energy.

Actual result and example

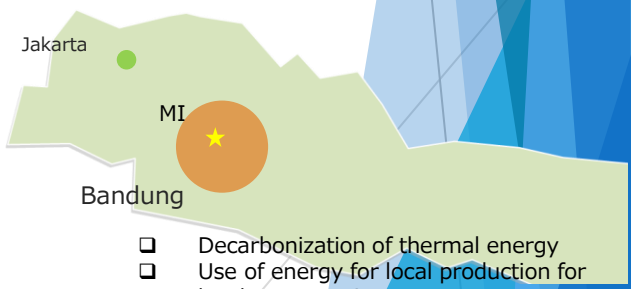
- Operation area of natural gas business :
  Java Island（West Java, Banten, Central Java）,
  Sumatra Island（Jambi、Riau）
- Raw material supply partners :
  Palm plantation, Livestock farm, Others
- Gas use partner :
- PT. Moriuchi Indonesia(MI), Others

❑ Under studying business feasibility of RNG production and supply for MI in Bandung, West Java.

Location	West Java
RNG size	100mmbtu/day
Target	2025～



Signed a memorandum of understanding regarding RNG joint development with PT.Moriuchi Indonesia (Gas use partner)



❑ Decarbonization of thermal energy
❑ Use of energy for local production for local consumption

Contact point

PT. Energasindo Heksa Karya

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Development/Manufacturing/Sales of Pellets Fuel Using Agriculture Residues

Zero Emissions & Value Added

Toda Corporation Co., Ltd（PT Toda Group Indonesia）

Business Summary

- 2021, We've started considering the treatment of agriculture residues generated by our local partner's plantation group.
- 2022, Among agricultural residues, we focused on EFB, as our partner not utilized it & study on conversion method started to turn it into fuel.
- 2023, Started manufacturing & selling wood pellets using wood waste generated from producing pulp.

Problem of Wood Waste

- Incineration process generates CO_2
- Costly due to high fuel prices

Problem of EFB

- High moisture content
- High **potassium** and **chlorine** content
  ➡ **Clinker** generate Boiler clogging

Disposal Composting

Unsuitable for fuel

- Methane gas generation during composting process

CH_4 = Global warming potential is equivalent to 25 times of CO2

Fuel Pellets

Zero Emissions **Added Value**

Potassium Reduction Pellets

Torrefaction Pellets

Countermeasure for global warming through appropriate treatment and effective utilization

- We're obtaining FSC certification for wood pellets (to be issued in 2023).
- In the future, we plan to expand export sales of WP (mainly to Japan).
- In parallel, we will continue developing the several agriculture residues (mainly EFB) to achieve zero emissions & adding value to this waste.

Contact us

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Biomass Fuel from EFB/ Fertilizer Ingredient from Chicken Manure

Hitachi Zosen Corporation

Product and service outline

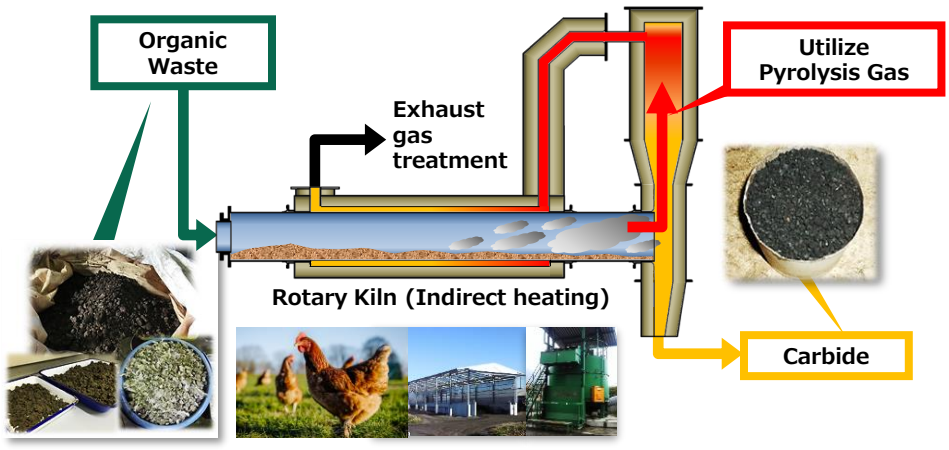
- EFCaR (Energy Free Carbonizing for Resource Recovery) is our technology to convert organic waste into carbide. In Indonesian market, the following organic wates are targeted.
  1. **EFB(Empty Fruits Bunch)**: Carbide from EFB can be utilized **for biomass fuel**.
  2. **Chicken Manure**: Carbide from chicken manure can be utilized **for fertilizer ingredient**.
- Outline of System:

  Throughput: Organic waste like EFB, chicken manure (Water Content 65%): 31tpd

  Throughput: Organic waste like chicken manure (Water Content 40%): 18tpd x 1 unit

  Carbide Production Ratio: 30% (5.4tpd)

  CO_2 Reduction: approx. 1,000tpd (depending on project conditions)
- Eligible for **JCM** (Joint Crediting Mechanism), a Japanese government financial support.
- We are pleased to be in contact with the companies below.
  1. Agricultural companies own palm mills and/or chicken farms as a supplier for organic waste
  2. Companies for cement, steel industry, etc. as an off-taker



1. Continuously producing carbides **under uniform temperature without fossil fuel**.
2. Carbide constituents for fertilizer have high solubility so that **they can be absorbed well**.
3. In the process, harmful substances like pesticides, antibiotics etc. **are decomposed and detoxified**.
4. **No unpleasant smell of livestock** remains once it is converted into carbide.

Actual result and example

- Operational demonstration has been successfully conducted. Commercialization in FY2024 is aimed.

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Biomethane Supply

Reduction of greenhouse gas (Scope 1) emissions with no initial investment

PT. OSAKA GAS INDONESIA

Overview of services

- The company provides biomethane supply by pipeline. We can offer your support regarding to natural gas and biomethane supply.
- Biomethane will be produced in Sumatra by 4 companies namely, Osaka Gas, JGC Holding, INPEX and PGN, and supplied through existing pipelines to customers in Java area.

Characteristics of biomethane.

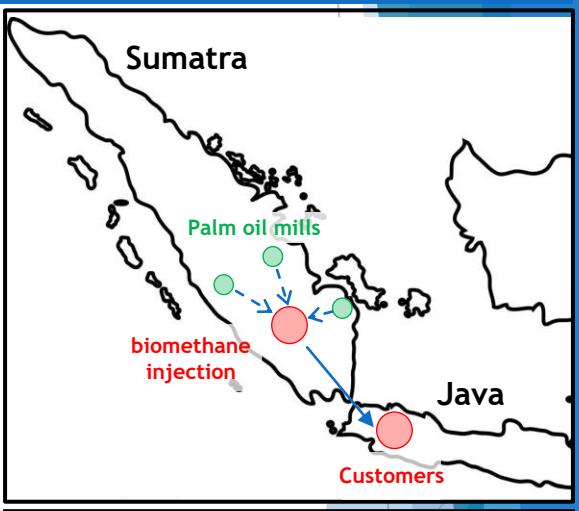
I. No initial investment because the existing facilities can be utilized

II. Reduction of Scope 1 greenhouse gas emissions with ISCC Plus certification, an international certification scheme.

III. The ratio of biomethane can be selected.

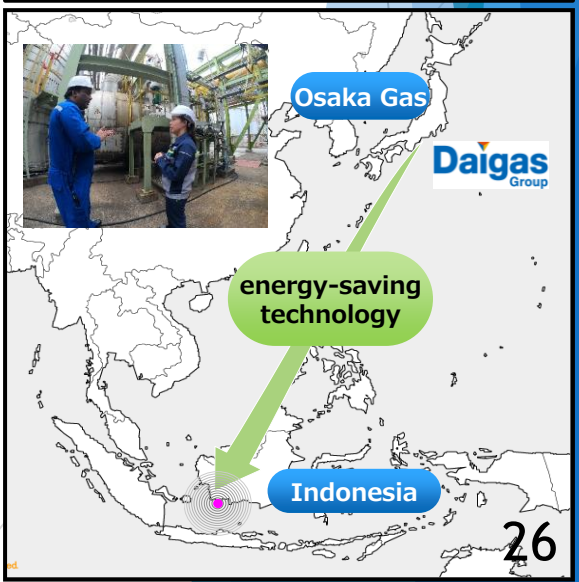
Biomethane supply overview (Plan)

- Start of supply
  in 2025
- Biomethane volume
  440,000 MMBTU/year
  ※Volume is planned to increase 10 times by 2030.
- Greenhouse gas reductions (Scope 1)
  0.058 t-CO2/MMBTU
  ※In case of conversion from Natural gas to Biomethane
- Biomethane supply period
  More than 10 years
- Biomass certification scheme
  ISCC Plus.



Other services

- Support of making a carbon neutral strategy
- Support for fuel switching from coal and oil fuels to natural gas
- Energy conservation consulting services



contact point

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Technology Development Platform for CO_2 Reduction and Wastewater Purification by Microalgae

Algae Biofoundry Platform

Algal Bio

algal bio

Product and service outline

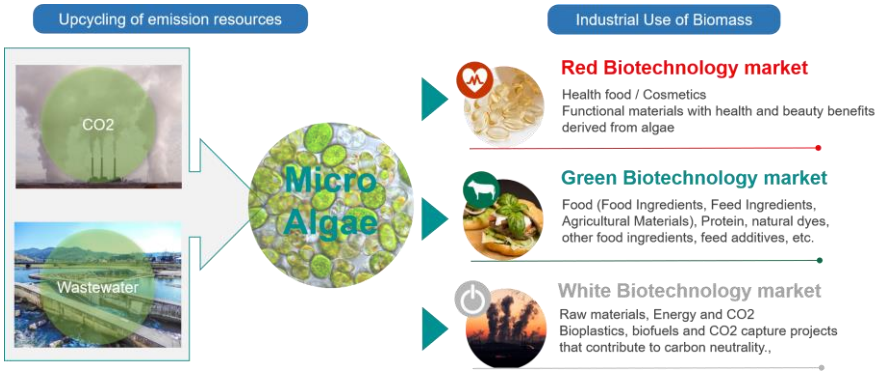
- Algal Bio is a cleantech startup company from the University of Tokyo.
- To solve various global-scale social issues such as human health, more sustainable food supply, and environmental problems, we are promoting the commercialization of new algae-derived products and solutions through the establishment of the “Algae Biofoundry Platform.”

Attractiveness of Microalgae

- Microalgae absorb carbon dioxide through photosynthesis and contribute to the mitigation of global warming. Due to their ability to multiply quickly, they have potential as a source of biomass energy and can also be used as a food resource due to their high nutritional value.
  In addition, they are effective in water purification. Microalgae are considered an indispensable biological resource for ensuring environmental sustainability because they can grow in any location, even on land unsuitable for general agriculture and cultivation, from snow-covered mountains to hot springs.

Actual result and example

- Kansai Electric Power Co.
  We are working on "Research and Development of CO_2 Fixation by Microalgae and Production of Useful Chemicals". In this project, we are developing a compact and highly efficient microalgae cultivation system by combining the development of microalgae with high CO_2 fixation efficiency using genome editing breeding technology and a highly productive mass cultivation method, aiming at CO_2 fixation in medium and large-scale factories and power plants. Furthermore, we are aiming to establish a sustainable carbon recycling technology by utilizing CO_2-fixing microalgae to produce high-value-added functional chemicals such as fucoxanthin and EPA, and by using the residue after extracting functional components as a raw material for bioplastics.
- Others
  We also provide solutions for upcycling, such as the use of valueless materials such as "factory wastewater," "waste oil," and "food waste" for cultivating microalgae and using the biomass to produce functional chemical products, alternative proteins, and raw materials for bioplastics.



Contact point
Algal Bio Co., Ltd.
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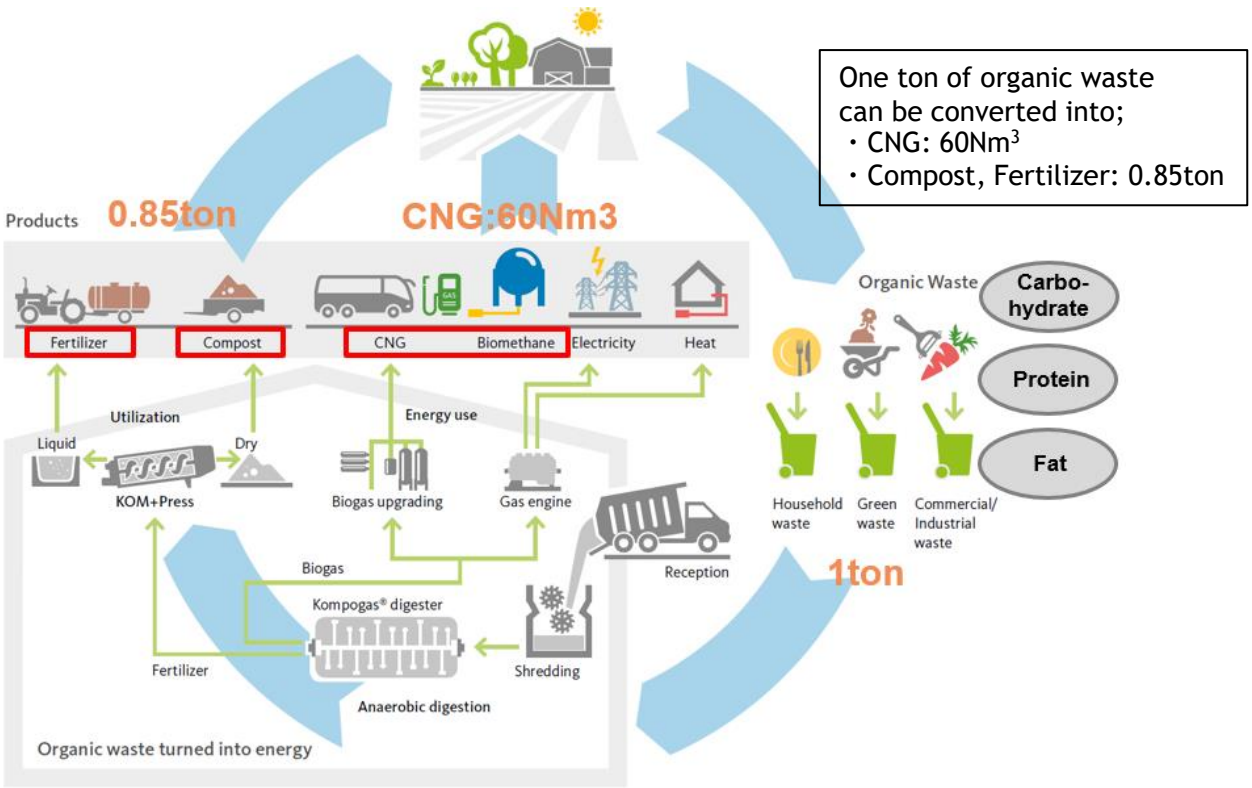
—E-mail address— ：kida@algalbio.co.jp
(Available languages：Japanese and English)

Dry Anaerobic Digestion Biogas Plant

Hitachi Zosen Corporation

Product and service outline

- Our **dry anaerobic** digestion biogas plant can convert **organic waste** into **biogas** which can be purified into **CNG**. Digestive residues can generally be utilised for compost and liquid fertilizer.
- In addition to **EPC service** including engineering, procurement and construction, **operation and maintenance service** can be provided.
- Other than the above services, we can **operate plants** as investment projects, while **investing**.
- We would like to **support you in developing project plans** as follows;
  - Biogas Generation Amount: is different in each organic waste. The analysis can be supported.
  - Plant Capacity: can appropriately be considered, taking into account annual operation period etc.
  - Operation Plan: can be considered with maintenance plan etc.
  - CO_2 Reduction: whose calculation can be supported once prerequisites for calculation are ready.
  - Assumption on EPC and Operation Cost: can be supported once prerequisites are ready.



Actual result and example

- A total of references is **more than 100**.

Contact point

Hitachi Zosen Corporation, Yasukazu Aono

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3. Decarbonization of Fossil Fuels, CCUS/ Carbon recycling, Hydrogen and Ammonia

- **CCS Technologies Supporting the Transition to a Decarbonization** (JGC HOLDINGS CO., LTD.)
- **Carbon Recycling Technology** (CHIYODA Corporation)
- **CT-CO2AR™ CO_2 Reforming Catalyst** (CHIYODA Corporation)
- **CO_2 Reduction with Gas Co-Generation** (PT. MHI ENGINE SYSTEM INDONESIA)
- **CO_2 capture technology to support de/low-carbonization in a wide range of industrial fields** (PT. Toshiba Asia Pacific Indonesia)
- **Hydrogen/Ammonia Regenerative Burner/Air Pollution Control System** (PT. CHUGAI RO INDONESIA)
- **Hydrogen Station, Hydrogen Generation System (PEM)** (Hitachi Zosen Corporation)

CCS Technologies
Supporting the Transition to a Decarbonization

JGC HOLDINGS CO., LTD.

Outline of Services

- CCS stands for Carbon dioxide Capture and Storage and refers to the collection and storage of CO_2. This technology recovers CO_2 generated in the process of refining fossil fuels or by burning them into the atmosphere, injects them into the ground, and stores them stably over a long period of time. By applying these applications to CO_2 generated during the manufacturing and use of fossil fuels, we can reduce the environmental burden. In recent years, high attention has been paid to it as a trunk card for measures to combat global warming.

Results and Examples

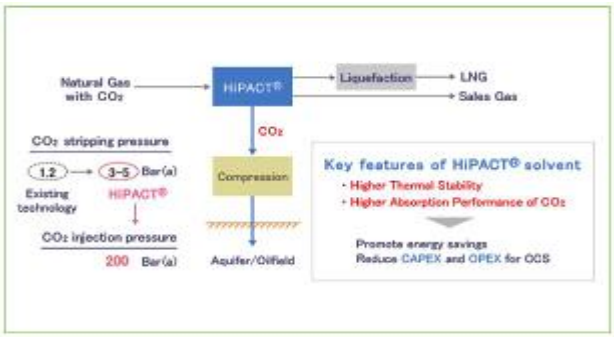
High-Pressure Recycled CO_2 Collection Process "HiPACT®"

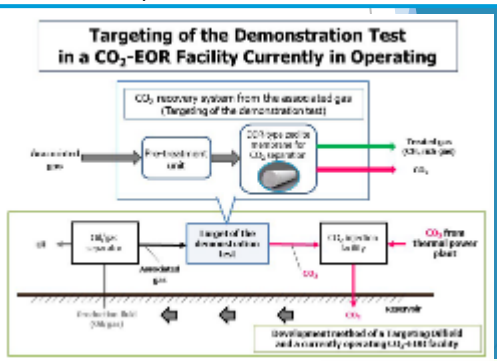
HiPACT® has superior high-temperature durability and can separate and recover CO_2 at higher pressures than before, reducing the energy and equipment costs of CCUS's CO_2 compressors. Higher CO_2 absorbency also reduces the volume of amide circulation and reduces the cost of the device itself. We have a result track record of commercial equipment in natural gas plants.

Results and Examples

CO_2 Separation Techniques Using DDR Zeolite Membranes

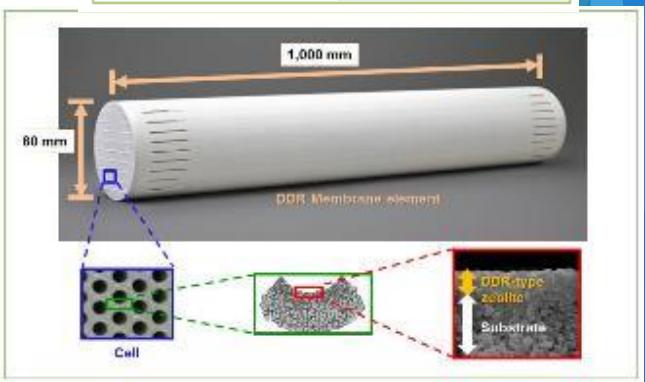
The DDR-type zeolite membrane is one of the largest ceramics CO_2 separators in the world. It allows for precise separation of CO_2 even under harsher conditions with higher pressure and higher CO_2 concentrations than in the past. We are currently conducting demonstration tests to separate CO_2 from associated gases in the U.S. oil field. This technology received the GSC Award Incentive Award in recognition of its past result achievements





HIPACT® プラント
（ナフトナ・インダストリア・サービシュ(NIS) 社、セルビア国）

HIPACT® plant
NIS a.d. Novi Sad (Serbia)



DDR膜モジュール

Contact Us:

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Carbon Recycling Technology

Solutions to Achieve Carbon Neutrality

Chiyoda Corporation (PT. Chiyoda International Indonesia)

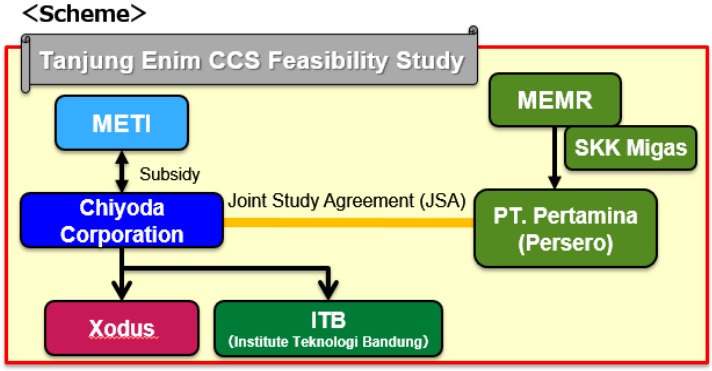
- Chiyoda Corporation has a wealth of experience and technology in the fields of design, procurement and construction of petroleum, natural gas and chemical plants. As a comprehensive engineering company, Chiyoda provides a variety of solutions for the realization of a decarbonized society.
- In Indonesia, we are currently conducting a feasibility study for a CCS project together with Pertamina. We are also actively working on the development of CCUS (CO_2 Capture, Utilization and Storage: carbon dioxide separation, recovery, utilization and storage) technologies, and are proceeding with demonstration and commercialization of those in Japan and overseas.

Use cases

CCS Feasibility Study

- Conduct a Feasibility Study on the large-scale CO_2 capture, transportation, and storage in South Sumatra together with Pertamina and ITB.

<Scheme>



Para-xylene (Polyester clothes/Plastic bottles)

- Para-xylene production from CO_2 and H_2
- Para-xylene is essential to manufacture polyester clothes and pet bottles
- R&D stage in NEDO Project (July 2020 – March 2024)

- Partnership with the University of Toyama, Nippon Steel Engineering Co.,Ltd., Nippon Steel Corporation, HighChem Company Ltd., and Mitsubishi Corporation

https://www.chiyodacorp.com/media/200714_e.pdf

Carbonate (Concrete)

Waste concrete

Capture/Fix CO_2 with Calcium

Recycled aggregate

Aggregate

- ◆ Technology by “Blue Planet” (start-up company in US).
- ◆ Chiyoda has entered into MOU with Blue Planet and Mitsubishi Corporation.
- ◆ Chiyoda participates in project demonstration in US by providing technical support and accelerating commercialization.

https://www.chiyodacorp.com/media/210205_e.pdf

Contact Us:

PT. Chiyoda International Indonesia

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CT-CO2AR™

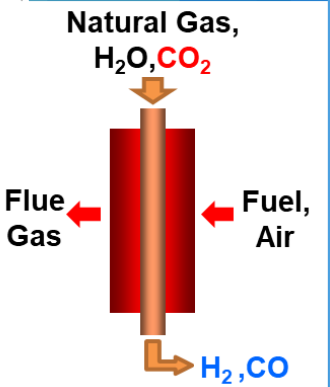
CO_2 Reforming Catalyst

Chiyoda Corporation (PT. Chiyoda International Indonesia)

Product and Service Outline

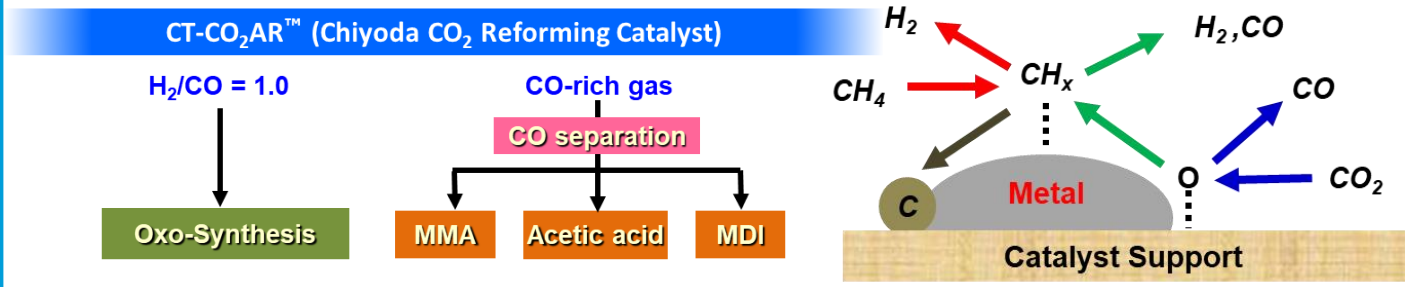
- CT-CO2AR™ is a unique & advanced technology utilizing CO_2 as reforming agent to efficiently produce synthetic gases of varying H_2/CO ratios.
- CT-CO2AR™ enables the monetization of low-calorie, CO_2-containing natural gas fields and can also be applied to the efficient reuse of CO_2 emitted from various industrial processes.
- Synthesis gases are the feeds for producing various chemicals and liquid fuels (DME, GTL-fuels etc.).
- The CT-CO2AR™ consumes CO_2 as a reforming agent and in tandem with its unique reforming catalyst, achieves high energy-efficiency. CT-CO2AR™is thus, an environment-friendly technology due to significant reduction in emissions.

See more on YouTube: https://www.youtube.com/watch?v=f6TtfF_vm-E



Feature

- **Direct production of Synthesis gases with a wide range of H_2/CO ratios**
  CT-CO2AR™ enables the efficient production of synthesis gases with a wide range of H_2/CO ratios by varying the feed gas ratios such as steam/carbon ratio and CO_2/carbon ratio.



- **Synthesis gas production under optimum conditions with a novel catalyst**
  CT-CO2AR™ has high resistance to carbon formation, and results in significant reductions in the amount of steam and CO_2. Consequently, CT-CO2AR™ produces synthesis gases with high energy efficiency.
- **High energy-efficiency and cost-competitive performance**
  Compared to conventional reforming catalysts, CT-CO2AR™ reduces the amount of feed, natural gas fuel and recycled CO_2. This results in improved energy efficiency and a significant reduction in CAPEX, OPEX and CO_2 emissions.
- In the case of H_2/CO=1.0, more than 10% of the total energy input (feed and fuel natural gas + utility consumption), and more than 20% of the CO_2 emissions are reduced compared to conventional catalysts.

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CO_2 Reduction with Gas Co-Generation

Also Contributing to BCP (Business Continuity Plan)

PT. MHI ENGINE SYSTEM INDONESIA

Product and Service Outline

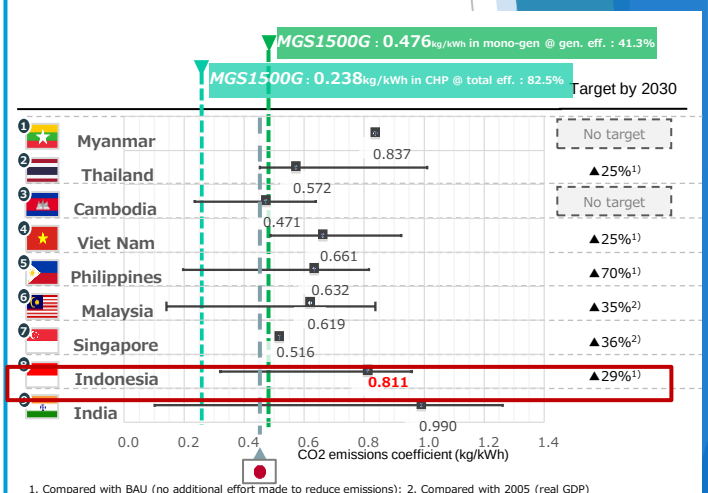
- Under the circumstances where decarbonization efforts are required worldwide, all companies were being required not only setting their target, but also establishing a practical plan and its verification. Other than short term solution such as Renewable Energy Certificates (REC), we propose Gas Co-generation System as a sustainable and developmental solution to achieve low carbon operation of the companies.
- Compared with Japan and other Southeast Asian countries, Indonesian electricity supply is still dependent on low efficient and carbon intensive coal-fired power plants. Therefore, CO_2 reduction by the installation of Gas Co-generator System in Indonesia is significantly larger than other countries. Furthermore, there is an opportunity to utilize the Joint Crediting Mechanism (JCM) subsidy by the Ministry of Environment of Japan.
- Depending on the future development and availability of hydrogen and other carbon-free fuels, users may replace the engine or its components with continuous utilization of existing auxiliary system. Which means, emission reduction in the transition period is compatible with the preparation of zero carbon in the future.
- In the event of disaster, the Gas Co-generation System can generate electricity independent from the electricity grid. Such resilience contributes to Business Continuity Plan (BCP).

Achievements and Example

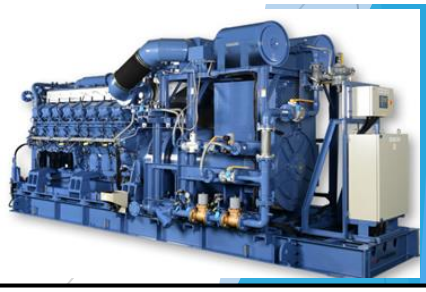
- The highly reliable gas engines are developed and produced in Japan accompanied by its service system.
- The Gas Co-generation Systems have been widely installed in Japan such as automotive, food, pharmacy and chemical factories with a good achievement.
- Corresponding to electricity/heat demand and operation mode of each factory, we can propose optimal output and number of units for each factory.
- For more than 30 years of operation in Indonesia, we have supplied more than 3,000 units of engines which is reliable and can be trusted.
- In addition to supply the equipment, we also provide services related to leasing and energy for business operators.
- It is also possible to propose a method of assuming that biogas is used while using pipeline natural gas.

	MGS500G-1	MGS1000G-1	MGS1500G-1
Engine Model	GS6R2	GS16R2	
Output	500kW	1000kW	1500kW
Gen. Eff.	40.2%	44.0%	41.3%
Hot water	19.6%	13.5%	18.9%
Exhaust heat	21.3%	19.6%	22.3%
Total. Eff.	81.1%	77.1%	82.5%
Maximum annual CO2 reduction amount in Indonesia	1500 t/unit	3200 t/unit	4700 t/unit

Power Grid CO_2 Emissions by country



1. Compared with BAU (no additional effort made to reduce emissions); 2. Compared with 2005 (real GDP)
Source: https://www.iges.or.jp/, IGES_GRID_EF_v11.0_20221012.xlsx



Contact Us:

PT. MHI Engine System Indonesia (Mr. Joko Nugroho and Mr. M.Muaz Afra Y English and Bahasa support)

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—E-mail address : joko.nugroho.sr@mhi.com & muaz.afra.8y@mhi.com

CO_2 capture technology to support de/low-carbonization in a wide range of industrial fields

PT. Toshiba Asia Pacific Indonesia

Outline of the Products and Service

- CCS/CCU means Carbon dioxide Capture and Storage, or Utilization technology. In this context, we aims to establish and promote CO_2 capture technology.
- Toshiba ESS applies post combustion capture technology based on chemical absorption process. Using chemical absorbents which has a characteristic to selectively capture CO_2 within the flue gas at a certain temperature condition in the absorber tower, and to release it at a different temperature condition in the stripper tower, CO_2 is continuously separated from the flue gas of the CO_2 emitting plant.
- Post combustion capture technology applies not only to coal fired power plants, but also to other CO_2 emitting power plants, such as oil fired, gas fired, gas combined cycle, biomass fired plants. Technology applies not only to new build plants, but also as retrofit to existing plants. The portion of CO_2 emission to be captured from the plant can be customized, giving this technology the flexibility to answer to various needs of the market and industry.

Experience / Case

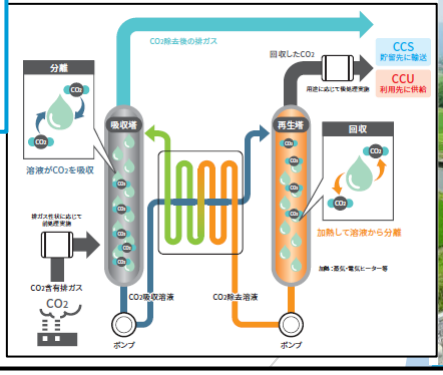
Environmental-Friendly CCS Demonstration Project (Ministry of the Environment) CO_2 Capture Facility

- The facility separates and captures 600 tons of CO_2 per day, which is more than 50% of the CO_2 emitted from the Mikawa Power Station, and started operation in Oct 2020.
- In response to the issue of extremely small amounts of CO_2 capturing liquid being released into the air, a cleaning liquid was installed at this demonstration facility and as a result of comparison with the conventional method*, it was confirmed that the amount of released CO_2 capturing liquid would be reduced to about 10% than the conventional method.* Toshiba's own Mikawa Pilot Plant

Experience / Case

CO_2 capture and utilization (CCU) for Saga City Incineration Plant.

- This facility separates and captures 10 tons of CO_2 per day from the exhaust gas of the Saga City Incineration Plant, and started operation in Sep 2016.
- Field demonstration of a new CO_2 absorbing liquid at the facility began in April 2023. The new CO_2 absorbing liquid will lead to a reduction in equipment maintenance and management costs.



Contact Point

PT. Toshiba Asia Pacific Indonesia
Mr. Ryuji Nagaie : +61 21 50716700(Office), ryuji.nagaie@toshiba.co.jp (Japanese／English)
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agung_pratomo_subagio@tasia.toshiba.co.jp (English ／Bahasa Indonesia)

Hydrogen/Ammonia Regenerative Burner/ Air Pollution Control System
～Leave to decarbonization to Chugai Ro's thermal technology～

PT. CHUGAI RO INDONESIA

Product and service outline

BROCHURE LIST

CHUGAI RO INDONESIA was established in 2012 as a local subsidiary of Chugai Ro Co., Ltd.

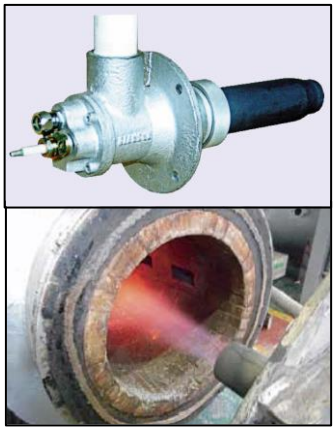
We sell and provide after-sales service for Industrial furnaces, Combustion equipment, and Industrial machinery. To actualize carbon neutral, we develop combustion technology which is not emitting CO_2, and heat treatment equipment for EVs, rechargeable battery, and semi-conductor component.

We will provide all solution needed by customers related to thermal technology as an effort to create sustainable society.

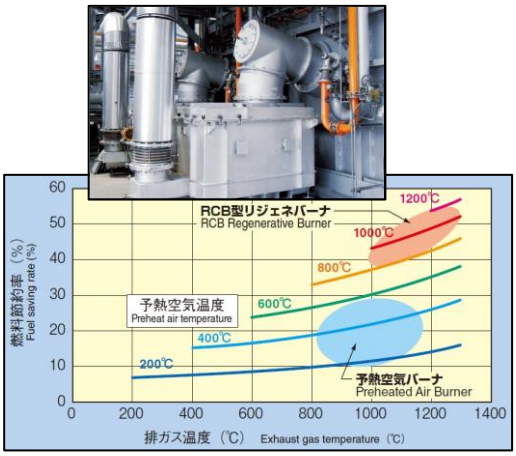
- Burner and combustion control equipment (hydrogen burner, ammonia burner, regenerative burner, oxygen burner, etc.)
- Plant for steel/non-steel metals and reheating furnace/heat treatment furnace (SUS-APL/BAL, Cu-APL/BAL. AL-CAL, CGL, H2-BAF, CCL/AL-CCL)
- Heat treatment furnace for automobiles mechanical parts, batteries, circuit boards, catalysts, magnetic materials, shapes of materials, pipe materials, and wire rod.
- Air Pollution Control System (RTO), Environmental Equipment (Multi-retort Rotary Kiln, Fluidized Bed Type Heating System)

Actual result and example

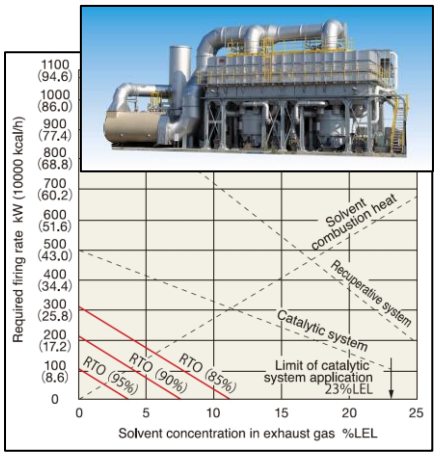
- 1994 Developed and started sales of RTO (No. 1 system in Japan, with over 320 units ordered and delivered)
- 2018 Developed hydrogen burner in the world's first in conjunction with Toyota Motor Corporation
- 2021 Adopted for NEDO "Energy and Environment New Technology Leading Research Program (Decarbonized Industrial Furnace Using Innovative Ammonia Combustion)" and "Ammonia Mixed Firing Thermal Power Generation Technology and Verification Project"
- 2022 Order for Japan's first hydrogen combustion Exhaust gas treatment equipment
- 2023 Participated in the Ministry of the Environment's JCM Project "Decarbonization and Smart City Formation Promotion Project for Sakai city and Vietnam cities"
- 2023 Adopted for NEDO “Green Innovation Fund Project/Decarbonization of Thermal Processes in Manufacturing Field”



Hydrogen Burner



Regenerative Burner



Regenerative Thermal Oxidizer(RTO)

Contact point

PT. CHUGAI RO INDONESIA

Phone number：+62-21-5279652

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Bahasa Indonesia/English： Zulfikar（E-mail : engineeringengineering01@n-crid.com）

https://chugai.co.jp

Hydrogen Station, Hydrogen Generation System (PEM)

Hitachi Zosen Corporation

Product and service outline

We provide;

- **Hydrogen stations** with our **PEM type** hydrogen generation system;
- **EPC service** including engineering, procurement, construction;
- **Remote monitoring system** and maintenance service;
- **Automatic operation system** which requires no complicated operation management;
- Functionality to **follow acute fluctuation of photovoltaic power etc.**;
- Comforts with **no need to treat wastewater** due to no use of alkaline solution;
- Easy installation at sites and shorter construction period as it is a container type;
- Several units if H_2 generator's capacity is more than 200 Nm^3/h.
- One unit if H_2 generator's capacity is less than 200Nm^3/h.

<Product Specification>

H2 Gas Generation	Nm3/h	10	100	200
Generated Pressure	MPaG	Up to 0.85		
H_2 Gas Purity	%	Up to 99.999		
Dew Point	℃	-15～-70		
Required Pure Water	L/h	10	100	200
Power Consumption	kWh/Nm^3-H_2	5.0 (depending on designs)		
Dimensions	M	2 x 4.8 x 2.5	2.44 x 12.2 x 2.9	

<Image>

Actual result and example

- A total of references is **47**. One of them is operating for **14 years**.

Contact point

Hitachi Zosen Corporation, Yasukazu Aono

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4. Electrification of Vehicles, Battery

- **BaaS** (PT. Santomo Green Power Management)
- **DENDO DRIVE HOUSE**
  (PT. Mitsubishi Motors Krama Yudha Sales Indonesia)
- **Ultra Rapid Charging EV Bus**
  (Toshiba Corporation (Battery Business Dept.))
- **EV Charging “Terra Charge”** NEW
  (Terra Charge Corporation)

BaaS -Battery as a Service-

PT. Santomo Green Power Management

Product and Service Outline

- While working on electric motorbike batteries using BaaS (Battery as a Service) business, we are also contributing to the realization of Indonesia's decarbonization and ecosystem construction. At the present time we are conducting electrical motorbike sale and battery replacement station service for the motorbike, and also offering services related to all of these.
- Electric motorbike being sold at present has 60 km maximum travel distance with 1.500 W power. Roughly it has the same running performance as an 80cc engine displacement gasoline motorbike. The most special feature is the battery can be switched, so it doesn't necessary to charge it at home or charge it at the charging station. The battery usually needs a charging time of around 4 to 6 hours, but this service offers a battery switch within seconds, which is realizing waiting time solution for the user's charging challenges. Users will use an exclusive application, so they can see the motorbike's condition and the nearest battery switch station.
- At the present, electric power for the battery switch station has been supplied by PLN, but by using a renewable energy source's supply which has been considered to have more contribution to carbon neutral. And for now, the battery is only used for electric motorbikes, but function expansion to use it for other household appliances has been considered and hereafter there is a plan to carry out a verification experiment.

Actual Result and Example

- On February 17th 2022, there was an MOU signing with PT Swap Energi Indonesia, acquiring exclusive operating rights for battery swap stations in the eastern Indonesia area. At the present we established and operating 7 battery swapping stations in Makassar city, Sulawesi island. Based on the cooperation with PLN, 6 stations were established in the PLN offices within Makassar city.
- On March 18th 2022, there was an MOU signing with PT Goto Gojek Tokopedia and started free trial of 20 electric bikes to Gojek driver
- On August 29th 2022, we began installing battery exchange stations at Alfamart stores, a major convenience store chain, improving drivers' access to charging stations.
- On November 28th 2022, there was an MOU signing with PT Smoot Motor Indonesia. We have acquired exclusive sales rights for Smoot brand electric motorcycles in East Indonesia and have begun full-scale sales in the region.
- Opened a directly managed showroom in Makassar City on April 27th 2023, establishing a system to provide one-stop sales/service/spare-parts.
- On June 21th 2023, we began installing battery swapping stations at Circle K stores, a major convenience store chain. At this point, approximately 50 stations are in operation.
- On September 15th 2023, we launched a paid rental business for online drivers, including Gojek drivers.
- On December 12th 2023, we started the operation of a battery swapping station and the sale of electric motorcycles in Lombok Island.

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sunsun.linus@gpm-swap.id (Indonesian Language)

DENDO DRIVE HOUSE (DDH)

PT. Mitsubishi Motors Krama Yudha Sales Indonesia（MMKSI）

Product and Service Outline

- DDH is an eco-system package for home use, consisting of Mitsubishi Motors' electrified vehicle, V2H(*1) bi-directional charger, solar panels, etc. It enables the user to charge their electrified vehicle with solar generated power and conversely supply power from electrified vehicle to their home, saving electricity costs and providing convenience as an emergency power source.
- The user can save electricity costs by charging the electrified vehicle with the excess power generated by the solar panels and supplying power from the electrified vehicle to their home at night.
- By using the clean electric power generated by the solar panels to power home appliances or electrified vehicle, the user can contribute to the realization of a low carbon society.
- Even during urgent situation such as power failure, DDH provides a power source that can supply power generated by the solar panels or power from the electrified vehicle to run appliances in the home.

BE PART OF THE ENERGY
DDH
DENDO DRIVE HOUSE

(*1) Vehicle to Home: A system of supplying homes with electric power stored in electrified vehicle batteries.

Actual Result and Example

- After being exhibited for the first time at Geneva International Motor Show 2019, DDH has been exhibited in various exhibitions such as Tokyo Motor Show.
- In March 2022, DDH was set up and opened for the public at the head office of Mitsubishi Motors Krama Yudha Sales Indonesia（MMKSI), Mitsubishi Motors' sales company in Indonesia.
- Indonesia is the third country after Japan and Thailand where Mitsubishi Motors has set up DDH in its head office-related facility.
- MMKSI's DDH has a co-working space and meeting rooms that can be used by visitors and employees, as well as an energy flow panel that visualizes DDH's flow of electricity and the amount of CO_2 and electricity bill reductions. It is also equipped with a power failure demonstration function, showing how the electric power is supplied from the electrified vehicle in the event of a power failure.
- Starting with the installation at the head office, MMKSI plans to continue to expand the showcase of DDH in Indonesia.

Contact Us:

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guntur.harling@mitsubishi-motors.co.id (MMKSI: Mr. Guntur)

Ultra Rapid Charging EV Bus

EV Bus system that can be realized
only with SCiB™'s safety, long life, and rapid charging

Toshiba Corporation (Battery Business Dept.)

Product/Service Outline

- SCiB™ is a unique lithium-ion battery provides **a rapid charging of over 80% in 6 minutes, a Long life of over 20,000 charge/discharge cycles, and a high level of safety that does not burn when nailed.**
- By using SCiB™, the total number of EV buses can be reduced.
- Normally, EV buses take more than 3 hours to charge. This standby time does not exist for diesel buses. When replacing diesel buses with EV buses, spare EV buses must be **introduced** to account for this standby time. **The EV bus with SCiB™ can provide a solution to this problem.**

Actual Result and Example

Reduction in the number of buses

Unlike diesel buses, EV buses require **more than 3 hours** of standby time for charging. To compensate for this standby time, you need to introduce spare EV buses. This problem will **become more apparent when all one route is replaced with EV buses,** so it will become more pronounced as EV buses become more popular in the future. On the other hand, if **EV buses** are equipped with SCiB™, the **number of spare EV buses can be reduced** by minimizing the standby time through **ultra rapid charging**.

Improving electricity consumption

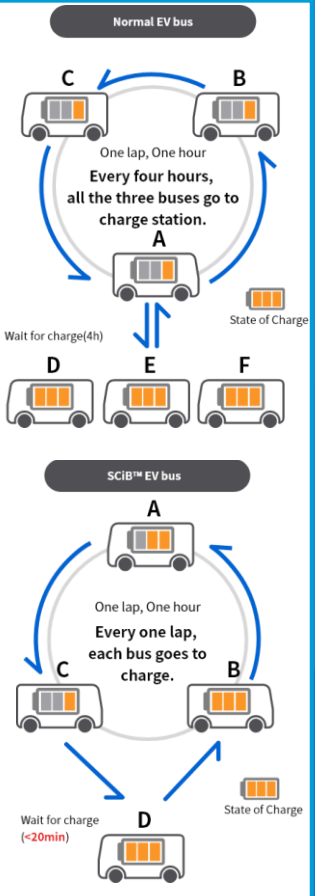
For electric buses, **the body weight** and **the electricity consumption** are **a trade-off**. In order to travel longer distances, they need to carry a lot of batteries. If the amount of batteries is increased, the body weight will increase and the electricity consumption will decrease. On the other hand, if ultra rapid charging is possible, and the operational efficiency of EV buses is improved. They won't need to travel long distance from one charge. As a result, the amount of batteries loaded per EV bus can be reduced and the electricity consumption can be improved.

Ultra Rapid Charging

To realize the operation of the Ultra rapid charging EV bus, There are two essential capabilities that a battery should have.
1.**Rapid charging** 2.**Long charge/discharge life.** The reason why a longer service life is also needed is that rapid charging improves battery operating rates, resulting in several times more charge/discharge cycles per day than in normal operation. Ultra rapid charging EV bus is a solution **that is only possible with SCiB™**.

Recruitment Results

More than 2,000 SCiBTM-powered ultra-fast charging electric buses are in operation worldwide, mainly in Europe.



Contact point

Toshiba Corporation Battery Business Dept.
Web inquiry form Inquiry Form | TOSHIBA Rechargeable battery SCiB™
PT. Toshiba Asia Pacific Indonesia
Mr. Agung Pratomo Subagio : +62 813 1757 1957, agung_pratomo_subagio@tasia.toshiba.co.jp
(English ／Japanese／Indonesian)

NEW

EV Charging "*Terra Charge*"

You can use EV Charging Service Everywhere

Terra Charge Corporation

Overview of Product and Service

- Terra Charge was formerly known as Terra Motors Corporation, which is involved in the development and sales of EVs in Japan and other countries and holds the top share of the EV tricycle market in India. We have been consistently involved in the EV business since our establishment in 2010, and have started EV charging business in Japan in 2022 with the aim of becoming the top global EV infrastructure company.
- In 2023, we got the top market share in Japan, and later expanded our business to Indonesia in December 2023.
- Without an increase in charging spots, it's difficult to purchase an EV, and without more EVs, it's challenging to invest in charging infrastructure. To tackle this challenge of EV adoption, we're reducing initial costs and running expenses, lowering the burden on site owners considering installing EV charging facilities. Additionally, we're supporting the introduction of charging facilities in a wide range of facilities, including condominiums with difficult consensus building, commercial facilities, and office towers. Leveraging our expertise in the EV industry, we offer a one-stop solution for everything from the development of EV charging facilities, charging spot deployment, installation works, to providing and managing charging services for end-users, a task that would be difficult without specialized knowledge in EV operations.
- Charging service can be easily used via our mobile app, and site owner management is simplified because we provide EV charging spot search, reservation, charging, and payment all in one place.

Achievements and Examples

- Orders for 25,000 EV charging sites have been received in Japan (as of Jan. 2024)
- We are working extensively with major developers in Indonesia to reduce the hurdles to introducing EV charging facilities.

<Apartment>
Setiabudi Skygarden/Saveria Apartment/Fraser Menteng/Bogor Apartemen Icon/Eksekutif Menteng/Mediterania Boulevard,etc.

<Office>
CEO Building/Mega Plaza/18 Office Park/Kartika Tower/IFC Tower, etc.

<Accommodations>
Marriott Group/Radisson Group/Ra Suites Group/Sheraton Group, etc.

< Commercial facilities, Golf course, etc. >
Pondok Cabe Golf / Chillax / Seavis Park / ACA SUZUKI,etc.

Examples of EV Charging Facilities

Contact
PT. Terra Charge Indonesia
—Phone number— : +62-852-10922491
—E-mail address— : go.suzuki@terra-charge.co.jp
(Mr. Go Suzuki : English・Japanese)

5. Energy Conservation

- **Low Carbon Solution for Industry**
  (PT. Mitsubishi Heavy Industries Indonesia)
- **Continewm** (Continewm Co., Ltd)
- **α-ESG(Fluid Stirring Device)** (ESG TECHNOLOGIES CO., LTD)
- **HERO - Hybrid Energy System Re-Optimization**
  (Toyo Engineering Co., Ltd)
- ***SUPERHIDIC®*** (Toyo Engineering Co., Ltd)
- **Control Solution for Building Energy Saving (ESCO)**
  (PT. Azbil Berca Indonesia)
- **Energy Saving Solution Service : ENEOPT™**
  (PT. Azbil Berca Indonesia)
- **Solutions and Products for Productivity and Sustainability**
  (SATO HOLDINGS CORPORATION)
- **Galilei Airtech System** (FUKUSHIMA GALILEI CO. LTD.)
- **ENERGY SAVING SOLUTION**
  (PT. MITSUBISHI ELECTRIC INDONESIA)
- **B to B Solution Provider**
  (PT RECOMM BUSINESS SOLUTIONS INDONESIA)
- **NATRUS^{+e} W Pedestrian Flow Solution**
  (Nabtesco Corporation　NABCO Automatic Door)
- **Carbon-Neutral Society realization by ECO appliance launches**
  (PT Panasonic Gobel Indonesia)
- **“Thermal Insulation Mix” by Win Armor 03 (Heat Insulation Painting Material) for Window Glasses**
  (Marugen Takeuchi Gumi Co.,Ltd.)

Low Carbon Solution for Industry

EMS (Energy Management System), High-Efficiency Power Generator (Gas Engine, Fuel Cell), High-Efficiency Chiller, Waste Heat Power Generator, CO_2 Capture Technology

PT. Mitsubishi Heavy Industries Indonesia

Product and Service Outline

- Mitsubishi Heavy Industries (MHI) Group offers a wide range of technologies and solutions to realize decarbonization and low carbon society (energy transition, energy saving, electrification, CO_2 capture, etc.), that meet customer needs.
- CO_2 emission reduction has become an important managerial issue for each industry and factory in Indonesia. Although, Implementation of rooftop PV system is progressing, it is not necessarily effective depending on conditions such as limitation of power generation capacity and output fluctuation.
- CO_2 emission source is different for each industry and factory; therefore, it is the most important to analyze current conditions by each Scope and select appropriate solutions for CO_2 reduction. MHI Group supports CO_2 emission reduction on each Scope with the following solutions.

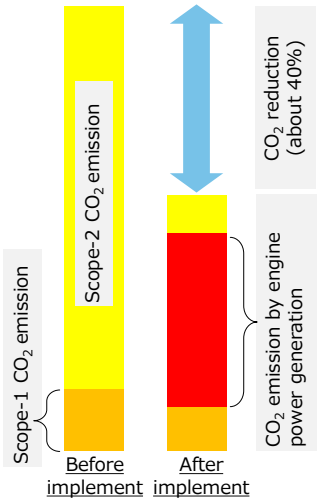
Scope-1 (direct emission) CO_2 capture unit
Scope-2 (indirect emission) Energy saving operation by $EMS_{※1}$, high-efficiency chiller, in-house power generation by gas engine and fuel cell ($SOFC_{※2}$), and power generation by waste heat recovery with $ORC_{※3}$

- Furthermore, MHI Group offers solutions in view of future utilization of hydrogen and ammonia for in-house power generation,.

※1 Energy Management System ※2 Solid Oxide Fuel Cell ※3 Organic Rankine Cycle

Experience and Example

- MHI Group has been offering low carbon solutions that suit diverse needs of various customers .
- The figure on the right shows an example that our customer achieved around 40% of CO_2 emission reduction by applying our engine power generation.
- In addition to engine power generation, MHI Group can offer established and reliable technologies and solutions shown below. With these technologies, MHI Group realizes CO_2 emission reduction and economical efficiency improvement of customers considering their $ICP_{※4}$, an increase of electricity consumption and an introduction of PV system in the future.



EMS : Control system used for thermal power plants which MHI Group constructed.
Engine Power Generation/High-Efficiency Chiller : Has a major share in the Japanese market.
CO_2 Capture : Has top market share in the world and has constructed world's largest plant in the US.
ORC : Abundant delivery records such as geothermal power plants, biomass power plants and waste heat recovery from factory furnace, etc.

※4 Internal Carbon Pricing


EMS (Energy Management System)


High-Efficiency Chiller


Power Generation by Natural Gas / Hydrogen (Gas Engine, Fuel Cell)


Waste Heat Power Generation


CO_2 Capture Unit

Contact Person

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—E-mail address:
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achmad.hikam.ta@mhi.com (Japanese/English/Indonesian)

CONTINEWM

The Realization for Electric Utility Expense Reduction with Low Cost and Easy Installation

Continewm Co., Ltd

Product and Service Outline

- With plus static electricity charge in air conditioner, [heat exchange efficiency] will be lowering because the air flowing won't become an airflow following the turbulence design, so it will spend some amount of electric power (electric power loss about 20%). By installing [continewm] to the existing air conditioning equipment (AC or chiller), the static electricity charge will be decreasing and then the heat efficiency will improve, it can preserve the temperature faster and longer on the set temperature, and finally, the compressor burden is lowering and that is the idea.
- During installation there is no need to reconstruct the existing equipment, only cleaning will be carried out and the installation or removal is easy. Moreover, after installation, there will be only periodic cleaning without running cost. The product durability will be years and for indoor use, it can be around 10 years (but it is no longer applied if there is a heat or pressure burden and used while bending).

Actual Result and Example

- Our company business is to help [raising the value by ESG measure] toward the realization of a sustainable society. In short E's point of view in E (Environment), S (Social), and G (Governance), contributes to the strategy making for the climate change risk and handling.

<Actual result conducted within Japan>
*some selection

Manufacturing industry :
・Denso Co., Ltd
・Totsuka denshi Co., Ltd
・Komatsu Co., Ltd
・Nippon mektron Co., Ltd
・Coca cola bottlers Japan Co., Ltd

The others :
・Toyota museum
・NTT east Japan Co., Ltd

<Actual result conducted overseas>
*some selection

The others :
・Embassy of Canada（Thailand）
・Embassy of France（Thailand）
・Seto denshi Vietnam Co., Ltd（Vietnam）
・Jia tsun Industrial Co., Ltd（Taiwan）

Contact Us:

Company name：PT. Toyota Tsusho Mechanical＆Engineering Service Indonesia (TTME)
Location：MM2100 industrial park
Website：https://www.ttme.co.id/

—Contact person
（Japanese）
Name: Kenji Tsunoda
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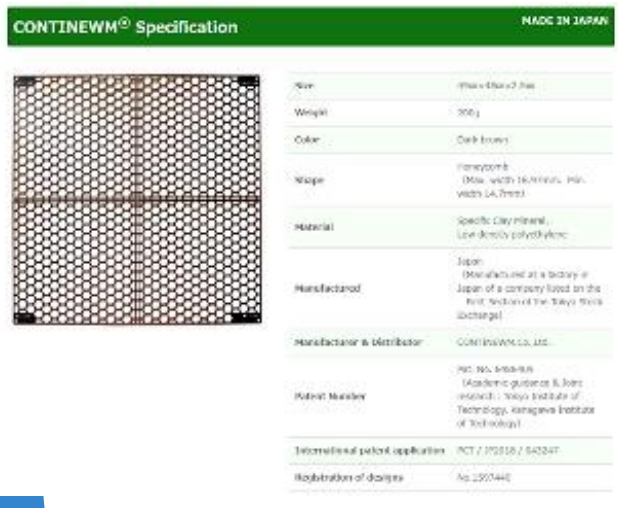
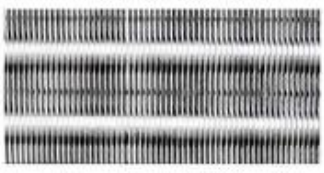
（ Indonesian, English ）
Name: Intan Wahyu Widianingrum
E-Mail: intan.wahyu@ttme.co.id
Phone: +62-811-875-6163



Without CONTINEWM

With CONTINEWM



Fluid Agitation Device “α-ESG” (Fluid stirring device)

Lowering Outdoor Machine Operating Rate and Reducing Consumption of Electric Power

ESG TECHNOLOGIES CO.,LTD

Product and Service Outline

- α-ESG is a fluid stirring device that reduces the flow resistance inside the pipe.
- By powerful stirring action it proceeds the liquefaction of freezer and refrigerator oil, reduces the flow resistance, and reduces the consumption of electric power by lowering the air conditioning, freezer, and refrigerator’s compressor burden, this is also a product that contributes to reducing CO_2. The result will be different due to the environment and function of the equipment used, but the target is to reduce the consumption of electric power by about 10 to 30 %.
- The installation is just connecting it to the copper pipeline (liquid tube) that comes out from the outdoor machine, it is just a standard pipe construction. Moreover, there is no running cost because it is not using water or power, and the life span is the same as the standard pipe.
- But it is not possible to reduce the consumption of electric power on all kinds of air conditioning, refrigerator, and freezer.
  - —Household and small-scale business purposes will be out of the subject.
  - —If it is an air conditioning unit and in the condition of moving in as a tenant, then it will need permission from the management company.
  - —Water-cooled, turbo type, and absorption type will be out of the subject.

Actual Result and Example

- ESG technologies is a company that carries out environment, energy-saving, renewable energy-related products, and system planning, construction, and suggestion for companies that are serious about energy-saving and CO_2 reduction strategies.
- 「αESG」had accepted the authorization as a system product and advanced equipment for advanced energy-saving investment facilitation support business on general incorporated association sustainable open innovation initiative (SII) 2021.

＜Actual result conducted within Japan＞*some selection

Company name	Industry type	Area	Installation location	Device	Air conditioning capacity	Reduction rate
NG kogyo Co., Ltd	Machine part production	Kanagawa	Production line	Air conditioning unit	28.00 kW	19.30%
Buil system Co., Ltd	Equipment manufacturing	Ibaraki	Examination room	Air conditioning unit	33.50 kW	30.20%
C-west Co., Ltd	Beverage production	Fukuoka	Product storage	Air conditioning unit	28.00 kW	21.30%
S Hospital	Hospital and facility	Shiga	Inside hospital	Air conditioning unit	61.50 kW	23.30%
T buhin kogyo Co., Ltd	Automobile component production	Aichi	Office	Air conditioning unit	45.00 kW	22.10%
K coffee	Restaurant	Fukuoka	Inside store	Air conditioning unit	22.40 kW	22.90%
N foof service Co., Ltd	Frozen food production	Chiba	Product storage	Freezer	56.00 W	21.10%
N group	Amusement center	Osaka	Hall	Air conditioning unit	553.00 kW	27.10%

Contact Us:

Company name：PT. Toyota Tsusho Mechanical＆Engineering Service Indonesia (TTME)

Location：MM2100 industrial park

Website：https://www.ttme.co.id/

—Contact person

（Japanese）

Name: Kenji Tsunoda

E-Mail: kenji_tsunoda@ttme.co.id

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（Indonesian, English）

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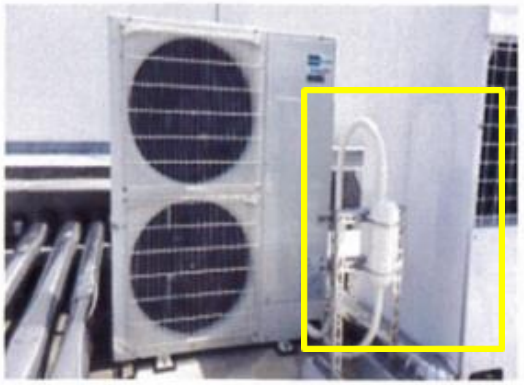
E-Mail: intan.wahyu@ttme.co.id

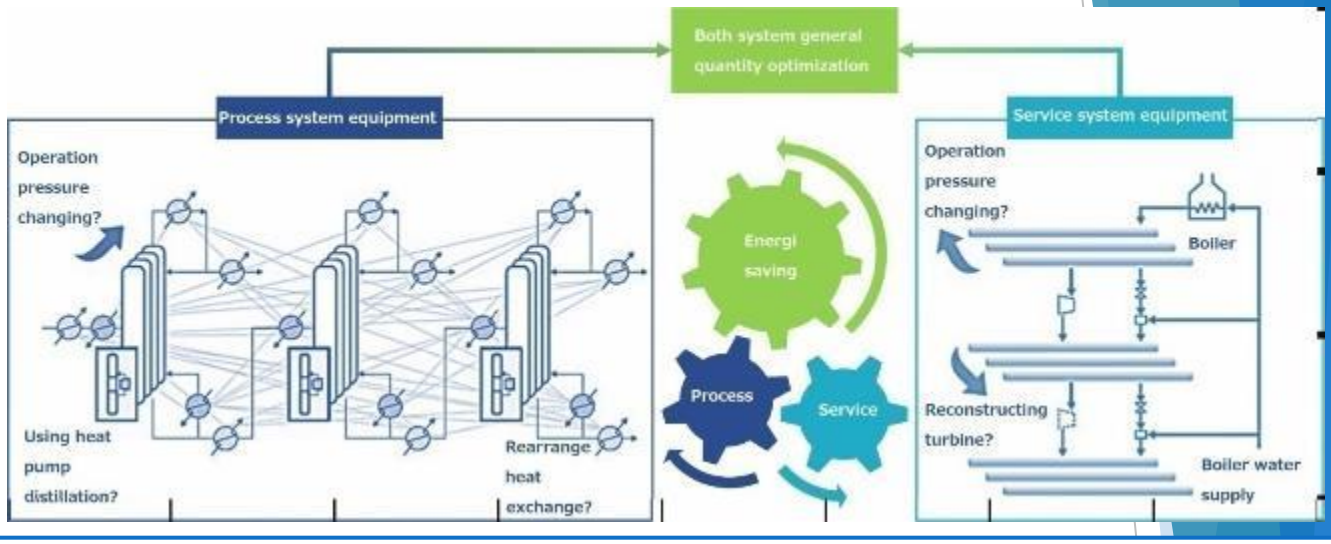
Phone: +62-811-875-6163



Whole Plant Energy-saving Consulting Service

HERO Hybrid Energy system Re-Optimization

TOYO Engineering Co., Ltd



Product and Service Outline

- HERO is a whole plant energy-saving consulting service. Realizing the optimization of service system and process system which has challenging barriers in the existing consideration rule, at the same time, according to quantity optimization technology. Giving the most suitable operation condition and required construction suggestion, following the customer request from the combination of several astronomical operation terms, design terms, and customer's characteristic limitation term. Even for a plant that has already performed high-grade energy-saving measures, a big energy-saving effect can be expected.

Characteristic

1. **Simultaneous optimization of Process and service system based on quantity optimization technology**
   - Constructing a big-scale model containing the whole plant. According to mixed integer linear programming, by discovering the complicated and huge trade-off relation, both system's same-time optimization can be realized.
2. **Offering improvement options which are difficult in the existing consideration technique, along with process system and service system**

   <Improvement option example on the processing system>
   - Operation pressure, temperature, and heat burden change
   - Conducting new heat exchange
   - Conducting heat pump technology such as ***SUPERHIDIC®***

   <Improvement option example on the service system>
   - Steam supply pressure change
   - Changing the driving force steam of the steam turbine
   - Adding new steam header
3. **Flexible suggestions comply with the customer's business environment**
   - In HERO, a specialized personal optimization model is being constructed for each customer. Because of that, it is possible to offer a line-drawn improvement plan with general purpose technology consideration.
   - Not only the equipment special characteristic, by including the most suitable model such as investment requirement, limitation related to improvement and operation idea, the energy saving plan that comply with customer's request can be offered.

Actual Result and Example

There are total of 5 conducted consideration has been carried out inside and outside Japan, mainly for petrochemistry plant. Several projects are in progress toward equipment improvement operation based on the optimization suggestion obtained according to the most suitable consideration

Example (an aromatic plant)

Consideration effect example
- Steam consumption reduction: >25 ton/year (>20 %/year reduction)
- Fuel gas reduction: equivalent to 1.5 MW
- Increase in power generation consumption amount : slight increase (additional pump part)

Contact Us:

TOYO Engineering Corporation
Plant Solution Business Unit,
Advanced Technology Business Department
Tel: +81-47-454-1571
E-mail: toshihiro.wakabayashi@toyo-eng.com
Web site: https://www.toyo-eng.com/jp/

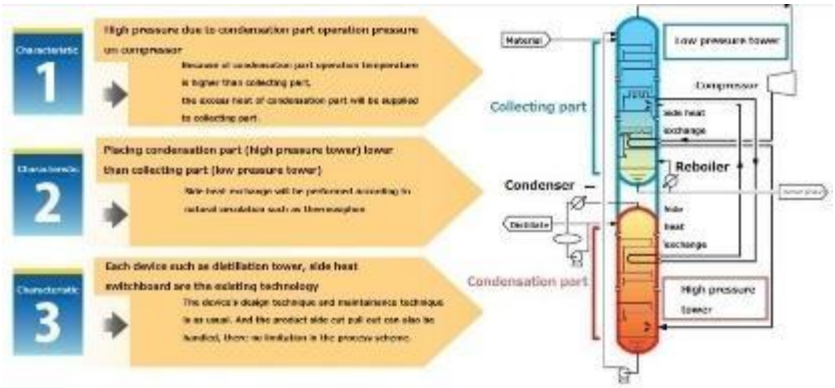
Innovative energy saving distillation system

SUPERHIDIC®

TOYO Engineering Co., Ltd

Product and Service Outline

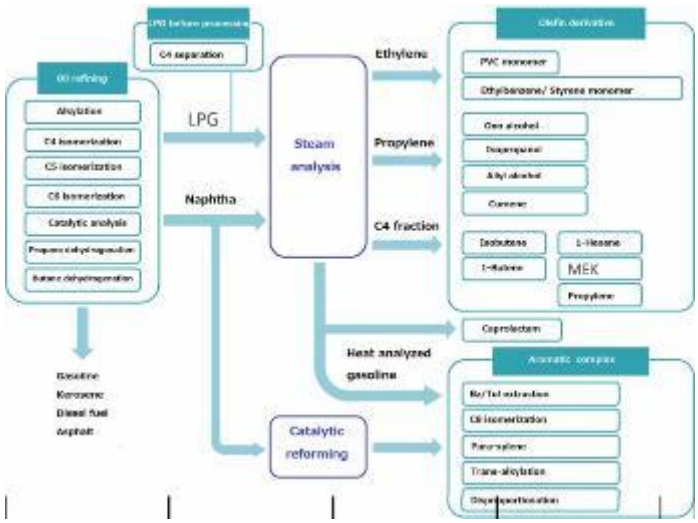
- Through many services of petrochemistry and oil refinery, more than 50% energy saving performance can be secured. Without using any special equipment, by applying to the existing distillation technology, the GHGs reduction effect can be offered due to energy shift from heat to electricity and the high economic saving, while preserving the existing maintainability.



Applied subject

Whether the existing improvement or new establishment can be expected to have a superior economic effect, by the following distillation tower.

- The tower top and tower bottom operation temperature is within 80°C
- Using a highly-priced service
- Having a condenser burden, and reboiler burden that can receive the advantage of scale
- Process unit example that can secure a big energy-saving performance, by using *SUPERHIDIC*®



Actual Result and Example

SUPERHIDIC® which can realize ultimate energy saving form in distillation operation is used by Maruzen Petrochemical Co., Ltd alcohol ketone device in 2014, as a contribution target in energy saving advancement and greenhouse effect gas emission amount reduction, then starting the business operation in 2016 and has been running well.

Established country	Japan
Process unit	Alcohol ketone production equipment
Processing amount	21kL/h (Materials flow amount)
Conventional type distillation tower's energy consumption amount	6.3MW
Energy saving rate	50%+

Moreover, a high rating has been obtained from the industry-academic government, as shown in the following

- 2014 24th Nikkei global environmental technology award, excellence award
- 2018 Energy saving grand prize (Ministry of economy, trade, and industry, Minister's award)
- 2018 Chemical engineering association technology award
- 2022 Certified in advanced equipment and system, at General incorporated association, environmental co-creation initiative advanced energy-saving investment promotion support project cost subsidy. Et cetera

Contact point

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Plant Solution Business Unit,
Advanced Technology Business Department
Tel: +81-47-454-1571
E-mail: toshihiro.wakabayashi@toyo-eng.com
Web site: https://www.toyo-eng.com/jp/

Control solution for building energy saving (ESCO)

Energy saving in building HVAC, with initial investment reduction by ESCO scheme

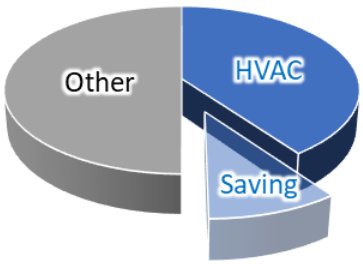
Azbil Corporation/PT. Azbil Berca Indonesia

ESCO Energy Service COmpany

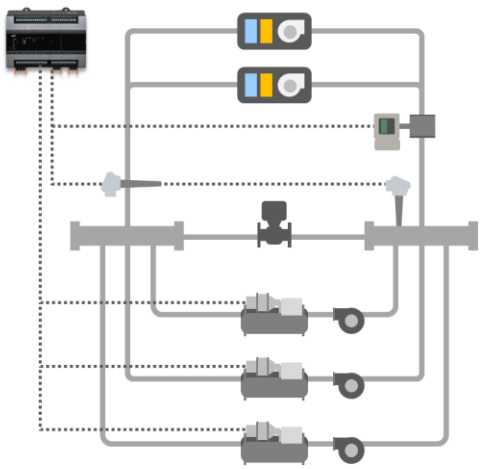
A business that provides comprehensive services to realize energy saving in buildings and receives service-remuneration from the actual energy saving performance.

Site Check → Proposal → Contract → Installation → Guarantee

Energy saving in HVAC, which consumes a large amount of energy consumption in Bldg.



Providing unique energy-saving methods with utilizing high-efficiency equipment, optimal operation control or tunings for the entire facility, and monitoring system (BMS).



Product and Service Outline

- **Optimization of overall facility operation**
  - For larger energy savings, we not only install high-efficiency equipment that is common in Bldg. energy savings, but also optimize the overall operation of HVAC equipment with a control & monitoring system (BMS) and tuning service.
- **No initial investment with Lease financing**
  - Initial investment will be unnecessary, if lease financing can apply in ESCO scheme (Depends on the potential of energy saving through site surveying.)
- **Energy saving performance guarantee by Azbil**
  - Azbil guarantees energy saving performance when utilize ESCO scheme
  - Azbil will compensate the unachieved amount, if not achieve the saving performance target.
- **Long-term Support**
  - Report quarterly with advices until ESCO term completion.
  - No worries regarding BMS system maintenance because that maintenance is packaged in ESCO service scope.

Actual Result

- 250+ ESCO projects in Japan
- 50+ energy-saving projects in Indonesia
- Samples of ESCO result in Indonesia
  - Complex building 1,920 MWh down in annual
  - Shopping mall 1,260 MWh down in annual
  - Machinery factory 630MWh down in annual

Contact point PT.Azbil Berca Indonesia (Building Automation Div.)

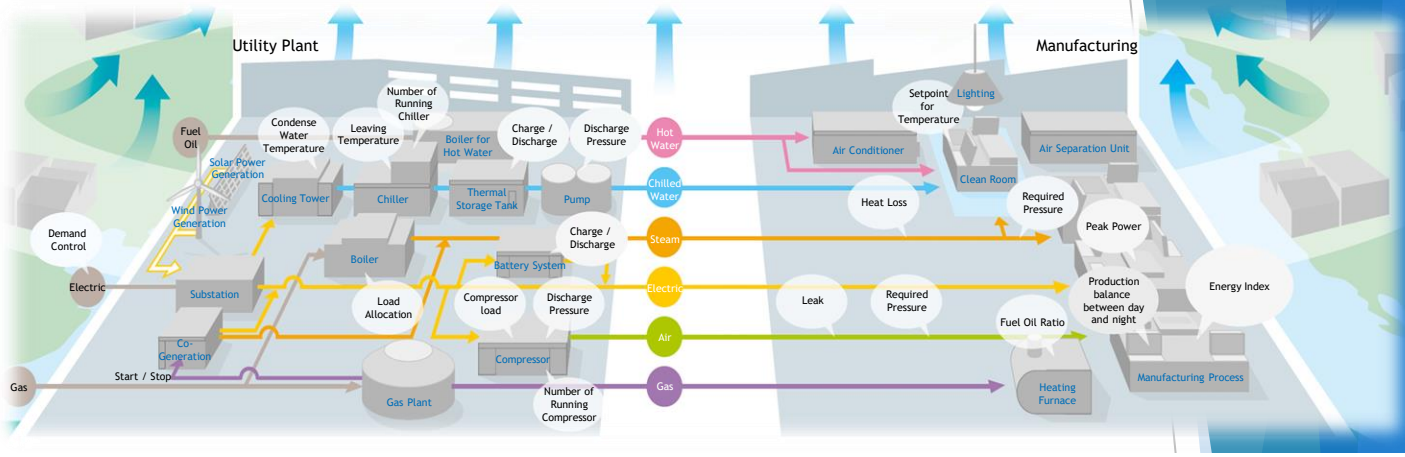
E-Mail : azbil.ba@id.azbil.com Phone : +62-21-230-5538

Inquiry Form : https://berca.azbil.com/ContactUs/contact.html

Energy Saving Solution Service : ENEOPT™

for Energy Conservation to Contribute Sustainable CO_2 Reduction

Azbil Corporation/PT. Azbil Berca Indonesia



Product and Service Outline

- ENEOPT is one of ***energy conservation solutions*** towards a decarbonized society by Optimization Control.
- The target applications: ENEOPT is energy-saving improvement support system that minimizes CO_2 emissions and energy costs of ***Utility Plant*** such as Boiler, Turbine facilities.
- General step for ***ENEOPT solution service***.
  - ✓ **Step1**: Find Opportunity for Energy Saving from Operation Improvement
  - ✓ **Step2**: Feasibility study to estimate CO_2 reduction by using actual operation data
  - ✓ **Step3**: ENEOPT System Installation/Customized and set up to suit customer's plant's need.
  - ✓ **Step4**: Operational support and maintenance services by Azbil to ensure the performance of ENEOPT

Actual Result and Example in Indonesia Oil Refinery

- This was one of three demonstration projects in Indonesia for the Joint Crediting Mechanism (JCM), organized by Japan's New Energy and Industrial Technology Development Organization (NEDO).
- Azbil control technology at a power plant to ***optimize boiler operation***, and succeeded in reducing CO_2 emissions
  - ✓ Optimized boiler system operation cuts appx. ***35,000 tons/year*** of CO_2 emissions

(Implement at Boiler-Utilities Plant in PT Kilang Pertamina International-Pertamina RU IV Cilacap)

ENEOPT is a trademark of Azbil Corporation.

Contact point
PT. Azbi Berca Indonesia (Industrial Automation Dept. Team)
—E-mail address : Info_IA@id.azbil.com

Solutions and Products for Productivity and Sustainability

SATO HOLDINGS CORPORATION

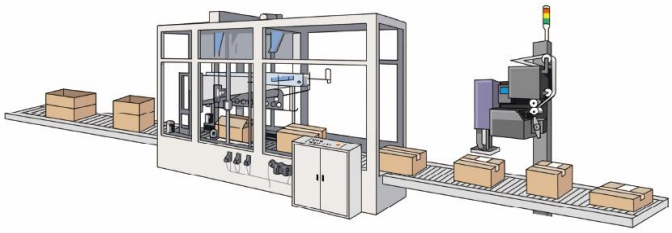
Product and Service Outline

- SATO is a global auto-ID solutions provider for various industries. We tag every 'thing' using RFID and barcode technologies, make the most of data and derive the best solution for each unique site. SATO has 82 years of expertise with 5,600+ employees across the globe (as of Mar 2022).
- SATO has business presence in over 90 countries/regions. We engineer and produce hardware (label/tag printers) and consumables (labels and stickers), develop and integrate solutions, and provide maintenance services.
- Our mission is to "contribute towards a better and more sustainable world." We resolve societal challenges by offering solutions for accuracy, labor- and resource-savings, safety and reassurance, sustainability and emotional connections.

Example I
Automation of shipping processes

We offer a full range of products that support shipping processes: barcoded shipping labels, label printers and barcode scanners, and software to control these devices.

Our auto-labeling systems in particular apply labels faster and with greater precision compared to manual labeling. Operation efficiency leads to labor savings and reduction of carbon emissions.



Sample case

Expected benefits*1 from automating carton sealing & measuring and label printing & application:

- ✓ **Productivity: Up 2.2 folds**
- ✓ **Labor saved: 40%**
- ✓ **CO_2 emissions cut: 14 tons/year*2**

*1 Estimations are derived by multiplying worker-hour savings by an emission factor associated with the customer's industry, and **do not guarantee the amount of actual reduction.**
*2 Calculation method was developed under supervision of relevant authorities and experts.

Example II
Linerless labels

We develop products addressing environmental concerns. Linerless labels are an example.

Linerless labels save wood pulp material and energy consumption in production, while reducing liner waste.

As a single roll comes with about 40% more labels than standard rolls, it reduces shipping and storing costs.

We have a selection of label printers that are compatible with linerless labels.

Sample case

Expected benefits*3 from replacing 200,000 labels of 4 x 7 cm with linerless labels:

- ✓ **Waste reduced: 78 kg**
- ✓ **CO_2 emissions cut: 196 kg**

*3 Estimations are calculated with certain conditions set by SATO.

SATO Official YouTube page

Contact point : PT. SATO LABEL SOLUTIONS
(Phone) : +62 21 28080270 / (E-mail) : marketing-sni@sato-global.com / Japanese, English and Bahasa support

Galilei Airtech System

PMV control using AI technology

FUKUSHIMA GALILEI CO. LTD.

Product and Service Outline

- Reducing energy costs, improving in-store environments, and increasing productivity by improving air-conditioning ventilation methods in supermarkets and other stores.
- Utilizing the air conditioning system with separation process of latent heat and sensible heat, a desiccant air conditioner is introduced for latent heat treatment, and a high sensible heat air conditioner is introduced for sensible heat treatment.
- Comfortable and energy-saving store environment will be achieved by controlling the positive pressure inside the store and supplying dehumidified air from the bottom of the showcase.
- The air-conditioning load due to ventilation in summer can be reduced by 70%, and the load on refrigeration equipment can be reduced by 20%.
- Automatic optimization maintains a comfortable store environment and contributes to labor saving. This system is a system suitable for the "*with-corona*" era, contributing to energy saving with proper ventilation.

Actual Result and Example

At a supermarket (3,800m^2)

[Energy saving effect]

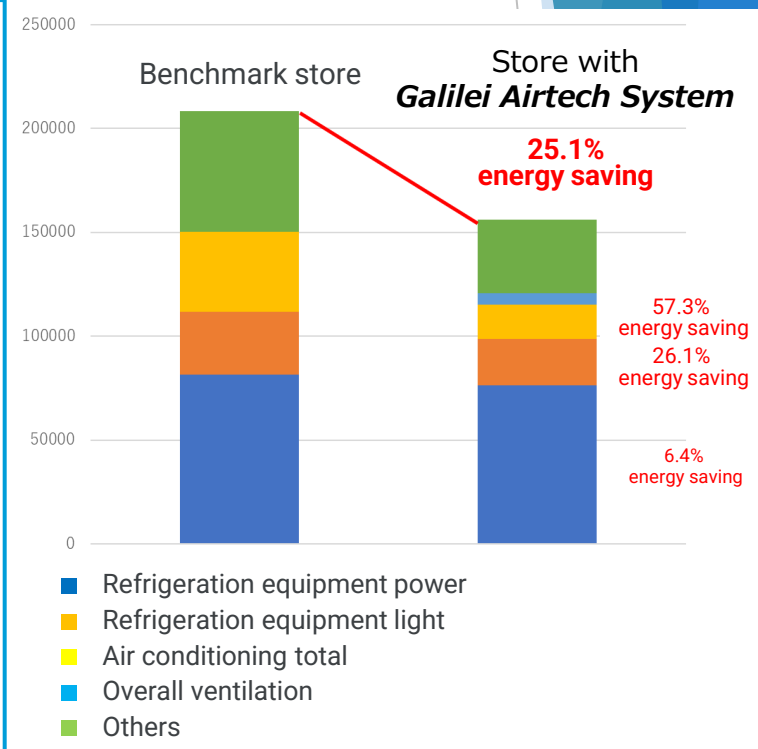
- More than **20% reduction in power consumption** in summer from conventional system (See figure on the right).
- Annual energy saving effect : around 370 juta IDR
- Additional Equipment cost : around 1 milyar IDR
- Payback period : around 2.9 years

[In-store environment] in front of showcase

- Benchmark store: temperature (21℃) and humidity(93%)

- Store with ***Galilei Airtech System***
- Temperature (24℃) and humidity (47%) (comfortable)

※The figures based on the data from examples in Japan.



Comfort + **Labor saving**

+ **Energy saving** + **confidence**

Contact point :

PT. FUKUSHIMA GALILEI INDONESIA

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(E-mail) : oosugi.kaz@galilei.co.jp (Mr. OOSUGI : English and Bahasa)

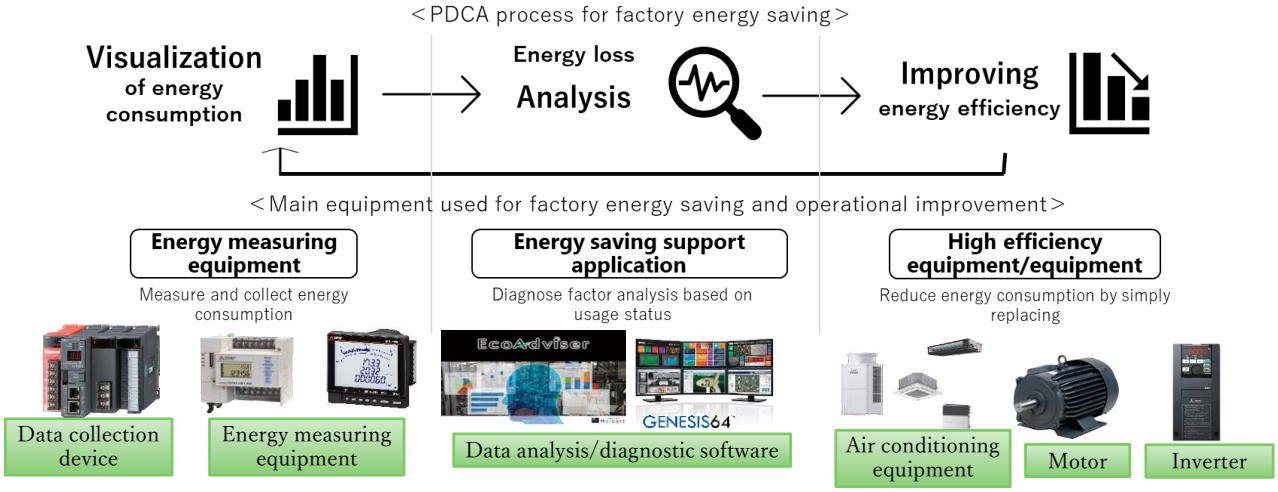
ENERGY SAVING SOLUTION

Solutions that contribute to decarbonization by discovering and reducing wasteful energy

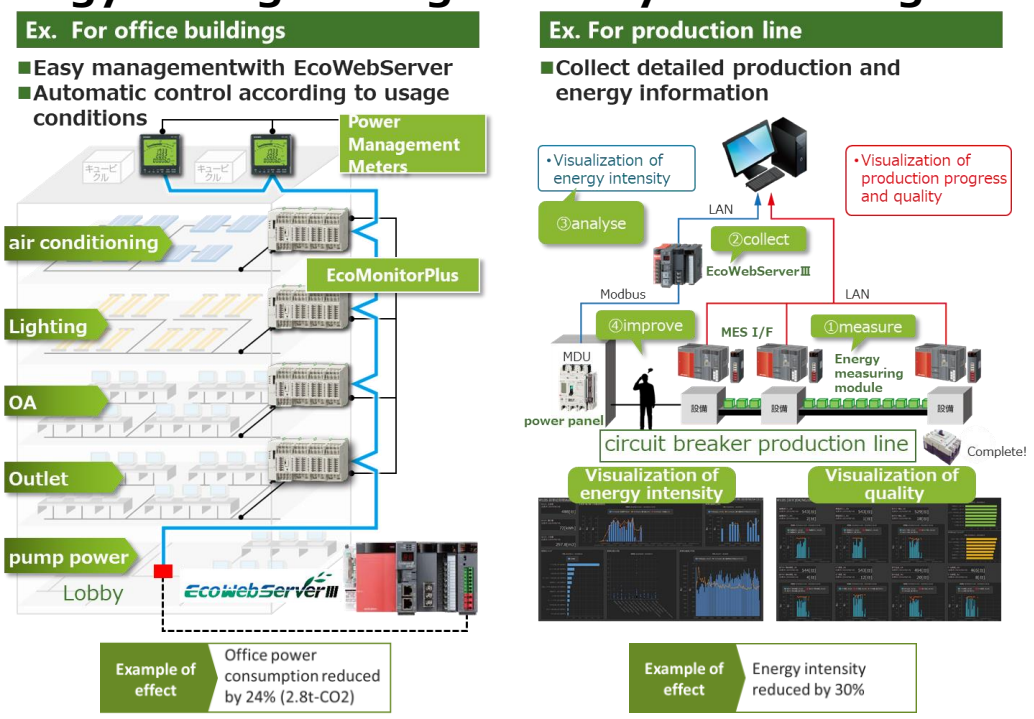
PT. MITSUBISHI ELECTRIC INDONESIA

Product and service outline

- We support the reduction of CO_2 emissions by promoting energy conservation in buildings, factories, etc. We have a variety of equipment and applications necessary for this purpose.



<Ex. Energy saving management system configuration>



Contact point
PT. MITSUBISHI ELECTRIC INDONESIA
—Phone number : +62-21-31926461 (English/Indonesian available)
—E-mail address : MEIN.FAID@asia.meap.com (Japanese/English/Indonesian available)

B to B Solution Provider

Providing Carbon Neutral and Cost Reduction Solutions

PT RECOMM BUSINESS SOLUTIONS INDONESIA

Product and Services Summary

Since July 2019, PT RECOMM BUSINESS SOLUTIONS INDONESIA has been developing solutions for customers that have carbon neutral program, mainly with following proposal:

- Carbon Neutral and Cost Down Solutions

Providing carbon-neutral and cost-cutting solutions that reduce CO_2 emissions and SG&A expenses such as electricity bills through the effects of new LED lighting.

Carbon Neutral Solutions Further Implementation

Low Energy Consumption Devices

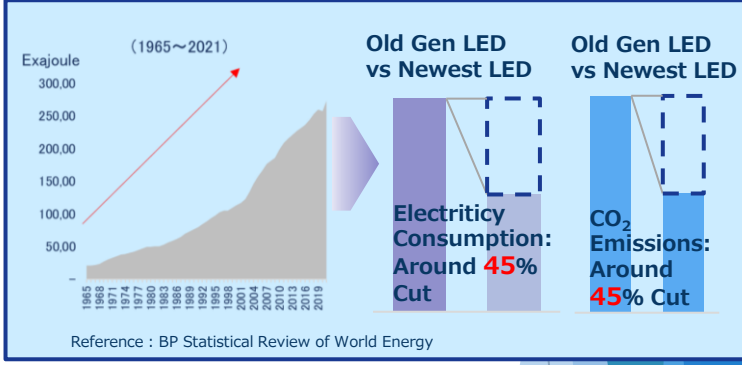
Low Energy Consumption

- Limited variety of mass-produced original brand products
- Wide variety of national brand around 50.000 items

Eco-friendly

- Low energy consumption and large CO_2 emission reduction
- Providing products that match the area and installation environment of factories and offices

Result



Proposing Carbon Neutral Solutions, Contributing to electricity bills and CO_2 Emission Reduction

Result and Example

【LED】Our original brand products are designed to consume significantly less electricity than conventional LED lightings, with a long warranty period of 5 years. Therefore, around 520 Japanese companies in Indonesia already have been using our products.

Contact Us:

PT. Recomm Business Solutions Indonesia

- Atsugi Dai : +62 811 2555 631 d.atsugi@recomm.co.jp
- Akbar Andika Gumay : +62 813 1316 8827 andika.gumay@recomm.co.jp

NATRUS+e W Pedestrian Flow Solution

Latest Technology Automatic Door Sensor for Energy Loss Reduction

Nabtesco Corporation　NABCO Automatic Door

Product and service outline

- NATRUS+e W is equipped with two sensors(infrared ray sensor and image sensor) for detection . By utilizing these two types of sensors , the pedestrian flow detection area has been made around four times larger than the conventional one, making it possible to reliably detect the pedestrian flow in a wider area . This allows the automatic doors to open precisely at the right time for smooth entry and exit.
- Detecting the movement of both people and objects(wheelchairs , baby chairs , carts , etc.), makes it very suitable for barrier-free facilities such as stations , commercial facilities and educational institutions.
- Reducing unnecessary automatic door openings helps to minimize energy loss and improve the indoor environment of buildings.

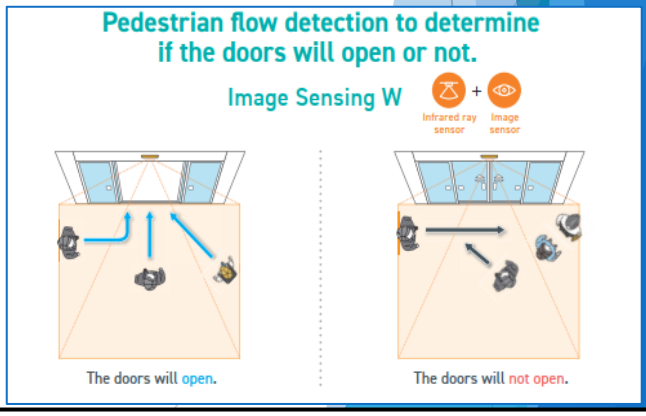
More information: https://nabco.nabtesco.com/en/nabco-select/natrus_ew/

Actual Result and Example

- To verify the effectiveness of this product, we conducted a demonstration installation at the entrance of the "NEOPASA Suruga Bay Numazu" service area on the Shin-Tomei Expressway.
- Previously, there were frequent unnecessary door openings due to high pedestrian traffic. However, after the installation, the door's opening time was reduced by approximately 21% compared to our conventional sensor-equipped automatic doors *1, and there was also an improvement in pedestrian flow of about 20% *2(according to our research).

*1 Sensor that detects the entry of objects into the sensor area and signals the door to open.

*2 The percentage of doors opening faster than with conventional sensors, based on pedestrian flow.



Contact Point

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HP：https://nabco.nabtesco.com/en/

Carbon-Neutral Society realization by ECO appliance launches - Introduction of Energy saving Aircon and Refrigerators -

PT Panasonic Gobel Indonesia

Product and service outline

- We will support realization of Carbon Neutral Society in Indonesia by introducing energy saving inverter air conditioners and the ones with R32 with low burden to global warming.
- Our refrigerators can realize energy saving by introducing inverter functions as well as Panasonic unique technology of Econavi.

Panasonic

INVERTER

ECONAVI

INVERTER R32 REFRIGERANT

Actual result and example

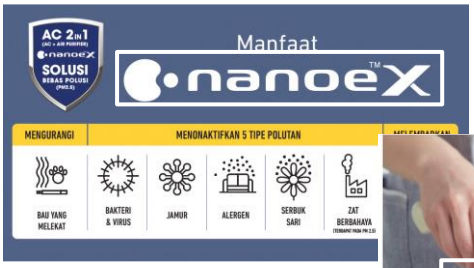
- **Aircon Inverter Technology**
  - In one day usage (16hrs) non-inverter needs Rp18,000 of electricity, but inverter only requires Rp5,500. (70% down)
  - 1st 1hr requires 670W of electricity but the remaining 15hrs needs only 190W.
- **Usage of new refrigerant R32**
  - R32 is HFC(Hydrofluorocarbon) and it is considered not to break the Ozone layer. (Ozone breakage 0, Global warming rate675)
  - R32 is well balanced refrigerant, which is effective to be cooled and which can save the usage of electricity.

Out of 19 lineups, inverter models are 16 and we use R32 for all models

- **Inverter & Econavi Refrigerators**
  - We are realizing energy saving of 40% with inverter technology.
  - At the same time, with Econavi function we can detect the food volume inside fridge and realize 10% of energy saving.

Can save energy by 70% after 16hr usage of Aircon

Other energy saving technology



Panasonic Aircon has air purification function as well.

Upper-class fridge has Prime Fresh function, which can keep the compartment as -3℃. By this there is no need to use MWO for unfreezing purpose.

Contact Point

PT. Panasonic Gobel Indonesia

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—E-mail Address— : jiro.nakami@id.Panasonic.com （Mr. Jiro Nakami : Japanese and English）

“Thermal Insulation Mix” by *Win Armor 03* (Heat Insulation Painting Material) for Window Glasses

Marugen Takeuchi Gumi Co.,Ltd.

Overview of Products and Services

- Simply applying "Win armor 03" to window glass can completely change the indoor temperature environment.
- The air conditioner will work better, which can significantly reduce the electricity bill of the air conditioner.
- Thermal barrier paint for window glass that lets light in but blocks heat, something that has never been done before.
- Can be applied to tempered glass, film, molded glass, and plastic panels.
- We can help companies that want to stand out from the competition by saving electricity, going carbon neutral, and being SDGs compliant.
- Agency recruitment in Indonesia.
- The physical sensation is solid, so it is easy to understand the sales PR.
- Raising the air conditioner temperature setting by 1°C can reduce power consumption by 10%.
- Reducing indoor temperature by 1°C increases productivity by 2%.

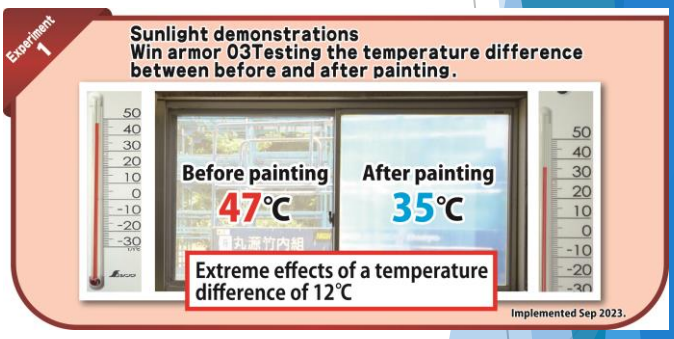
Target: Reduce electricity bill for air conditioners by 50%

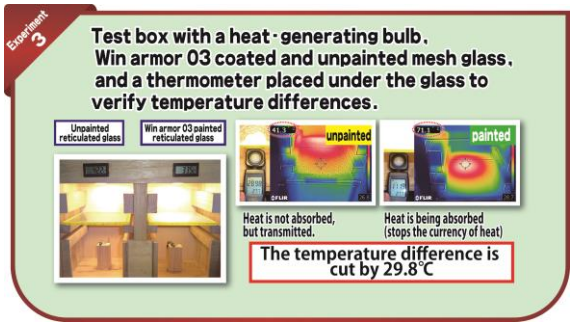
- **Room temperature of -8°C or higher (max. -12°C) under a window coated with "Win armor 03".**

Achievements and Case Studies

- Suzuki Motor Corporation.
- Bellsonica Co.,Ltd
- TOYOTSU RECYCLE CORPORATION
- SAKURAI LTD.
- SUZUKI MUSICAL INSTRUMENT MFG. CO., LTD.
- SAHARA INDUSTRY CO.,LTD.
- SYSTEC Corporation.
- KOYAMA SEIKI Co.,Ltd
- GOSHI GIKEN CO.,LTD.
- NTN Corporation Iwata Works
- INOAC CORPORATION

Four TV stations also came to interview us.





Contact point
Marugen Takeuchi Gumi Co.,Ltd.
－Phone number：+81-53-452-7450 （Mr. RYUSUKE TAKEUCHI ）
－Contact Form： https://marugen-tg.co.jp/contact/

6. Utilization of digital technology

- **MaaS ~ Mobility as a Service ~**
  (PT. Nagase Impor-Ekspor Indonesia)
- **Plant Operations Digital Transformation Solution EFEXIS®**
  (CHIYODA Corporation)
- **Operation Optimization Navigator LNG Plant AI Optimizer™**
  (CHIYODA Corporation)
- **Climate Cloud Platform for Measuring CO_2 Emissions**
  (Asuzero Singapore Pte. Ltd.)
- **GHG Emission Calculation Cloud Service** (Zeroboard Inc.)
- **IT Solution for Transport Management** (Zenmov Inc.)
- **Digital Twin System for Chiller Plant (CPDT)**
  (Azbil Corporation/PT. Azbil Berca Indonesia)
- **Power Usage Visualization Solution** (PT. KDDI INDONESIA)
- **“KANNA Service” Contributes to Decarbonization by Improving Productivity in the Construction and Manufacturing Sector**
  (Aldagram Inc.)

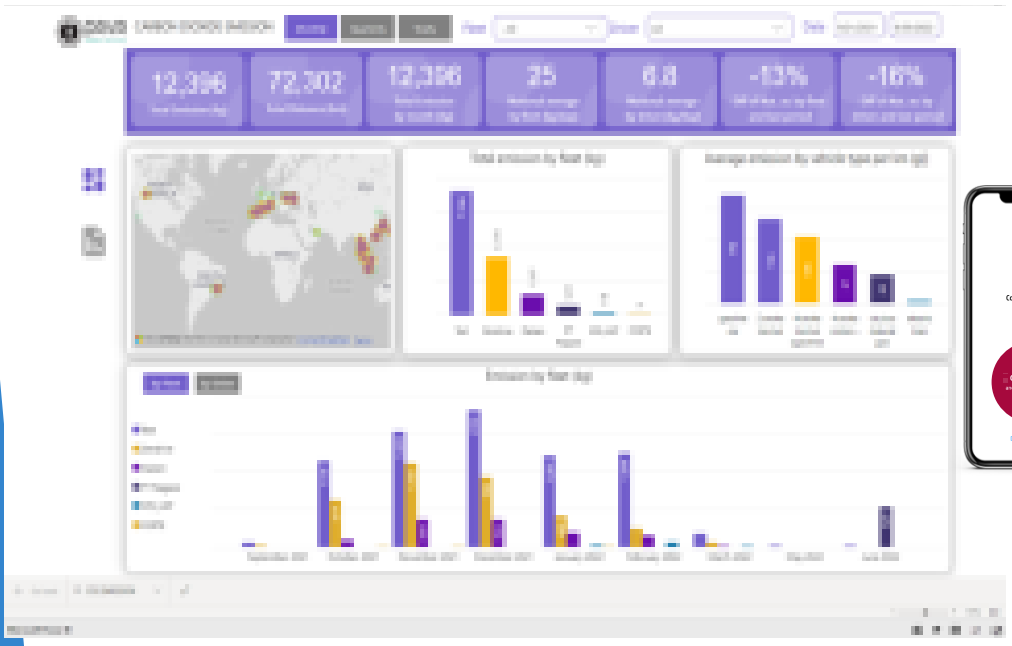
MaaS ~ Mobility as a Service ~

Telematics Service Solutions

PT. Nagase Impor-Ekspor Indonesia

Product and service outline

- Making full use of advanced algorithm which use AI/Cloud that has been proven in European, American, and ASEAN countries, we provide a Telematics service for business and corporation that can contribute on cost improvement, distribution efficiency, fuel consumption improvement, labor cost reduction, improvement of driving propensity, accident reduction, insurance premium reduction, and CO_2 emission amount reduction, et cetera.
- The service is easy to be implemented and can be operated only by installing our company application on the driver's smartphone. *As for the special data service, the device needs to be installed in the car.
- The UI/UX supports 4 languages (Japanese, English, Thai, and Indonesian) , therefore operations from both the management and staff can use this service smoothly.
- The CO_2 emission is calculated on the application based on the vehicle model, year, driving propensity, cruising distance, and fuel consumption, and the results are provided in real time.
- Various analyzed data, reports, and feedback for improvement can be provided in a real time manner based on our 3 main service which are Fleet Management System, Drive Insight and Drive Safe.
- With software that supports expandability, this allow our system to be combined and integrated with the customer's existing system.



Contact point

PT. Nagase Impor – Ekspor Indonesia
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Josua Siagian (Bahasa Indonesia and English)
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E-mail : josua@nagase.co.id

Actual result and example

- Our company has experience with multiple companies in the US, Australia, and ASEAN region, especially for Automotive OEM, Insurance industry, logistics industry, and public transportation. In Indonesia, we are conducting PoC with several companies and full deployment of our service will start in October 2022.

Target industry

- Logistics industry, insurance industry, lease and rental industry, car maker, automobile dealer, et cetera.

Plant Operations Digital Transformation Solution

EFEXIS ®

CHIYODA Corporation

Product and Service Outline

- EFEXIS®, the brand name of Chiyoda's innovative digital solution, improves the productivity and stability of industrial facilities.
- We provide solutions in the form of optimization, stabilization, safety, remote control, labor saving, and visualization for the operation, maintenance, and security of your plant.
- By using the EFEXIS® solution, you can improve productivity by optimizing plant operation, reduce costs for operation, maintenance, and safety, and reduce environmental impact without major equipment modifications.

Actual Results and Use Cases

PLANT AI Optimizer
・Installed in LNG facilities and Oil Refineries

Abnormal detection AI
・Installed in LNG facilities

Remote monitoring and diagnose system
・Installed in Oil Refineries

Automation & autonomy operation system
・Proven in Oil Refineries

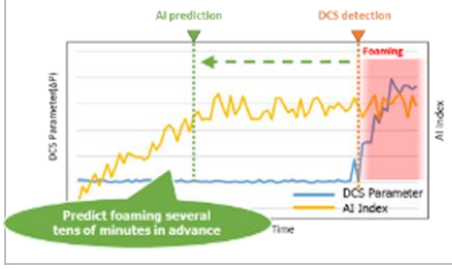
Boost Performance Reduction of OPEX, De-carbonization

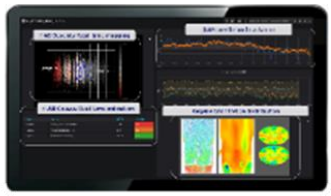
EFEXIS™ PLANT AI OPTIMIZER
Increase productivity
Reduce environmental impacts

EFEXIS™ CDU Optima
Automation & Autonomy Operation

Improvement of Utilization

EFEXIS® Anomaly Prediction AI system
Early detection of abnormal operation and failure of equipment





Contact point

CHIYODA Corporation
+81-45-225-4725

Digital Marketing Section
digital@chiyodacorp.com

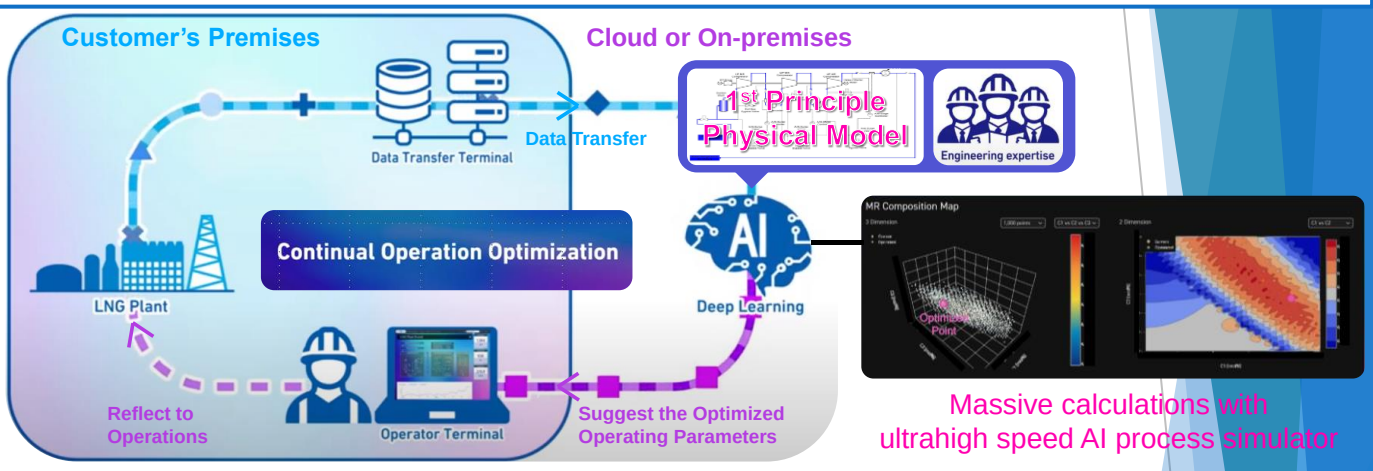
Operation optimization navigator

LNG Plant AI Optimizer™

CHIYODA Corporation

Product and Service Outline

- The demand for liquefied natural gas is expected to increase significantly in the future due to the increase in global energy demand and in response to environmental issues. In addition, reduction of LNG production cost is strongly required.
- It is possible to safely increase LNG production and improve economic efficiency without physical modifying plant facilities based on our experience in LNG plant engineering, procurement, and construction, combined with innovative AI technology.



Actual Results and Use Cases

For the PT Donggi-Senoro LNG plant in Indonesia, we confirmed increased LNG production through improved efficiency by using the "LNG Plant AI Optimizer™".

- Increased earnings through up to 5% increase in annual LNG production.
- Contribution to Fuel Gas Saving (Energy Saving) and up to 5% reduction of CO_2 emissions.
- No modification of plant facilities or installation of additional equipment is required. The system can be installed and operational in a very short period of time. The system can be introduced without changing the current plant operation methods and operators.
- The system has a learning function that continuously improves the efficiency of plant operation.

Contact point

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Digital Marketing Section
digital@chiyodacorp.com

Product Movie

Climate Cloud Platform for Measuring CO_2 Emissions

Asuene APAC Pte. Ltd.

Product and Service Outline

- To take actions on climate change and sustainability, as the first step, measuring GHG emissions to understand the current situation is required.
- Asuzero, a climate cloud platform for enterprises to measure GHG emissions, can reduce man-hours for calculation by up to 70% and provides a one-stop solution including lectures of calculation methods, goal settings and also consultation for reducing CO_2 emissions.

FEATURE 01 **AI-OCR & High Accuracy**

- AI-OCR scan and visualize: Automatic calculation and intuitive user-friendly experience
- Highly accurate and reliable: Certified according to ISMS and ISO14064-3*1

FEATURE 02 **CDP Accredited Consultation**

- Not only cloud platform, but also offering comprehensive sustainability consultation to reduce CO2 emissions and report according to global initiatives, such as TCFD and CDP

FEATURE 03 **One-stop solutions for decarbonization**

- Support for energy efficiency, energy creation and carbon offsert with our partners

Track Record

- 4,000 customers
- Working across various industries such as manufacturing, construction, real estate, logistics, transportation and finance

Customers

- Obayashi Corporation (the major construction company headquartered in Japan)
  - Succeeded to visualize GHG emissions of each construction site
- ST Engineering (the technology and engineering company headquartered in Singapore)
  - Succeeded to unify the method of calculating GHG emissions of each entity throughout the global supply chain

Contact Point

PT. Asuene APAC Pte. Ltd.

—Phone number：(65)92997662（Shu Setogawa：English）
(81)5017900593（Yuna Sato：Japanese）

—E-mail address ：sg-sales@asuzero.com （Yuna Sato：English / Japanese）

GHG Emission Calculation Cloud Service

Transforming Climate Change into Social Possibilities
~ Working diligently to solve the shared challenge of climate change ~

Zeroboard Inc.

Product and service outline

The calculation and visualization of greenhouse gas (GHG) emissions not only improves corporate value but also contributes to cost reductions. Zeroboard is a cloud service that calculates GHG emissions according to international rules and manages efforts to reduce GHG emissions.

▶ **Reliable**

Verified to follow ISO14064-3 calculation standards
Zeroboard is ISMS（ISO27001）certified

▶ **Track Record and Usability**

With over 2,600 companies already using our product, zeroboard has a solid reputation for ease of use based on customer feedback.

▶ **Network Effect**

Ability to acquire and link primary data from suppliers, harnessing the network-effect to create a rapidly growing ecosystem.

Actual result and example

Zeroboard is used by a wide range of companies ranging from large cap to SMEs who are required to disclose their Scope 1-3 GHG emissions.

Used by
Over 2,600
companies

Companies committed to decarbonizing operations with Zeroboard

Contact point

Zeroboard (Thailand) Co., Ltd.（Mr. Suzuki: English support）

―E-mail address ：shintaro.suzuki@zeroboard.jp

IT Solution for Transport Management

Bringing order to traffic with our cloud-based fleet management system “SMOC”

Zenmov Inc.

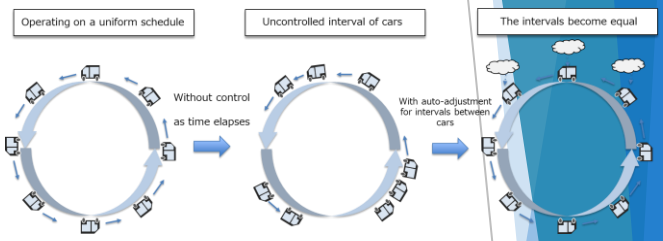
Product and service outline

Our proprietary cloud-based fleet management system “SMOC” transforms chaotic traffic into organized and disciplined traffic

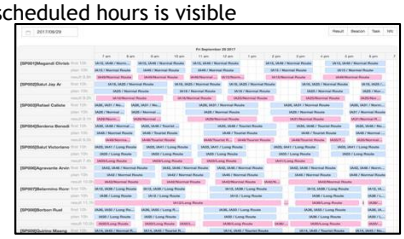
1. The system allows for monitoring vehicle operation status and management of vehicle dispatch according to the situation. (solving the demand-supply imbalance)
2. The vehicle interval adjustment function enables keeping intervals in equal moments. (optimal allocation of vehicles according to travel demand and environment in the area)
3. The system automatically creates drivers' schedules and visualizes each driver’s performance, enabling the operators to have the most efficient transport management.
4. Low vehicle utilization rates can be solved by implementing management of operational modes tailored to the transportation demand.
5. The complexity of equipment management can be simplified by incorporating device management and fleet management functionalities

(1) Schedules automatically generated by the data collected

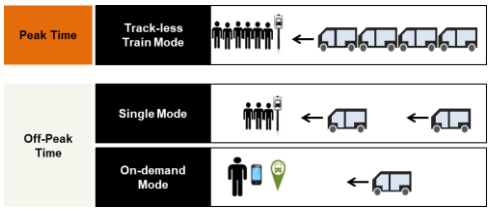
(2) Adjust the intervals which would be inevitable without our system



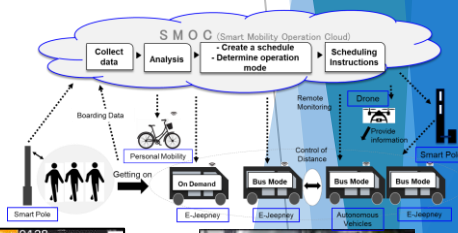
(3)Discrepancy of actual work hours and scheduled hours is visible



(4) Different Operation modes according to the demand



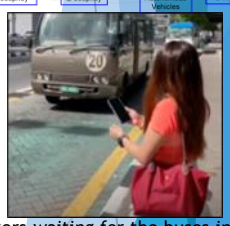
(5) One system manages all vehicles



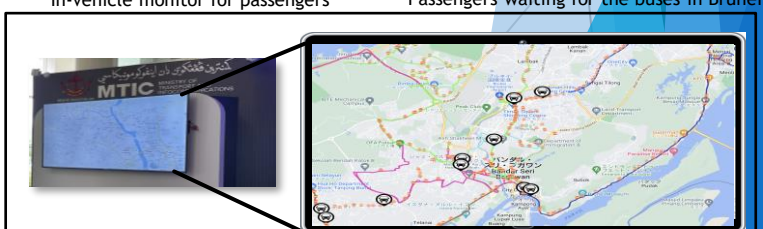
Achievements

- Providing the service to the transport operator (Jeepney Operator) in the Philippines
- “Demonstration Project for Smart Mobility for New Clark City and the entire Clark Economic Zone“ Philippine, Clark Area, funded by NEDO
- “Creation and dissemination of low-carbon emission technologies through co-innovation” at Pasay City, Philippines, funded by the Ministry of the Environment, Japan
- “FY2022 Smart JAMP Research and Study for the Realization of Smart Cities in Bandar Seri Begawan, Brunei Darussalam,” funded by the Ministry of Land Infrastructure Transport and Tourism Japan

In-vehicle monitor for passengers



Passengers waiting for the buses in Brunei



Monitor installed at the doorway of the Ministry of Transport and Infocommunications in Brunei

Contact point

Zenmov Inc.（Yukari Fuchi: English and Japanese）

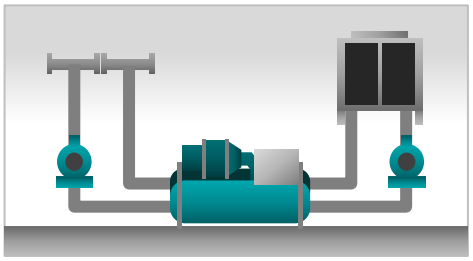
—Phone number：+81-90-3455-9904

—E-mail address ：info@zenmov.com (English and Japanese)

Digital Twin System for Chiller Plant (CPDT)

AI adaptive-cooling and machine-learning actionable insights redefine smart building management and characterize the initiatives of Green Building Masterplan.

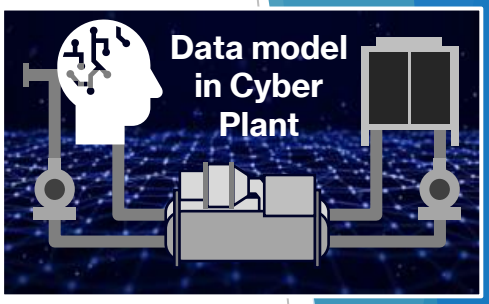
Azbil Corporation/PT. Azbil Berca Indonesia



Physical Chiller Plant

Machine learning using real-time operational data.

Incorporating AI-driven analytical results.

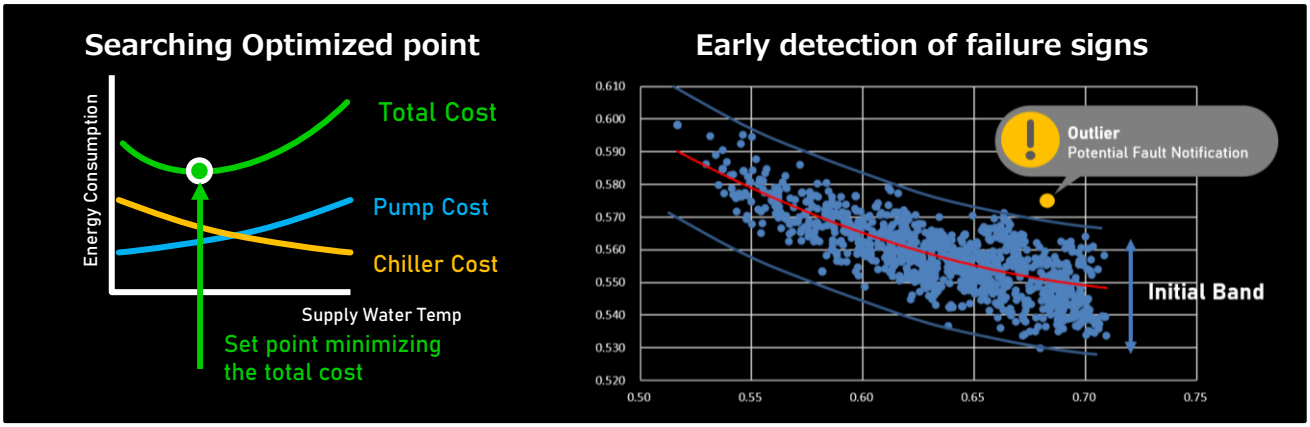


Product and service outline

The CPDT digital simulator is a valuable tool for optimizing the operation of building chilled water systems and achieving energy savings.

CPDT AI engine creates an accurate virtual space that adjusts to changing conditions and degradation using machine learning. By utilizing this virtual space, users receive optimal operating plans that align with their facility management strategies, leading to optimal operation of the chiller plant.

- **Data Visualization**
  - Identify current usage status with various Dash Boards
- **Optimization & Evaluation**
  - Trial & Error in the cyber space for Energy-saving operation
- **Judgement Enhancement**
  - Operational fault detection by Comparison with ideal status
- **Operation Enhancement**
  - Actionable insights, Operational Advice



Contact point **PT.Azbil Berca Indonesia (Building Automation Div.)**

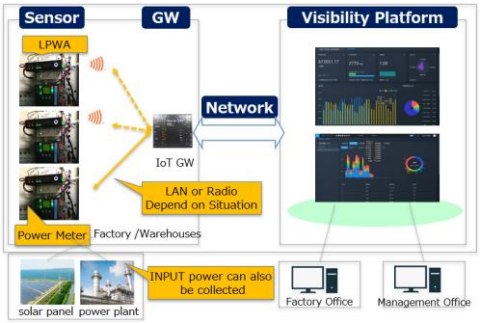
- E-Mail : azbil.ba@id.azbil.com Phone : +62-21-230-5538
- Inquiry Form : https://berca.azbil.com/ContactUs/contact.html

Power Usage Visualization Solution
First Step to Decarbonization

PT. KDDI INDONESIA

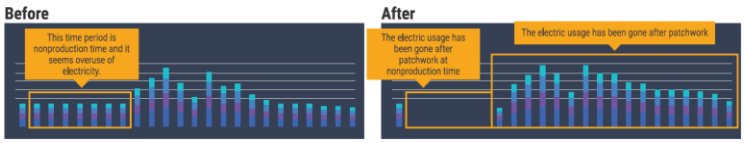
Product and service outline

- First and most important initiative to achieve decarbonization is to understand the current situation. Even if we can grasp the amount of electricity used in our entire office/factory/warehouse, almost many companies do not know the detailed consumption amount at the actual production site.
- Visualizing power usage is a very useful action for not only understanding the current position, but also for checking the status of equipment and improving energy consumption efficiency. We KDDI Indonesia uses ICT to support the visualization of electricity usage in offices and factories as a first step toward decarbonization.
- By utilizing both wired and wireless networks, we can collect data from any location and build a flexible "visualization platform" tailored according to size and environment of offices, factories, warehouses, etc.
- Visualization dashboards are available in both the versatile cloud-based SaaS format or on-premises format with flexible customization.
- We provide an all-in-one service, from sensor selection, sensor procurement, until installation network construction, and providing the dashboard.



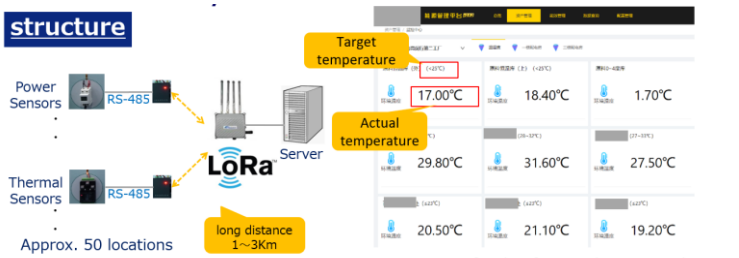
Actual result and example

Electric visibility help to detect compressor air leak



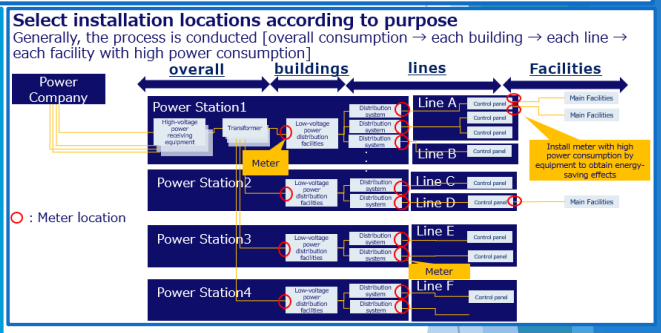
Analyzing power consumption of each equipment and time period. In the example above, 3% of power consumption was reduced by saving power.

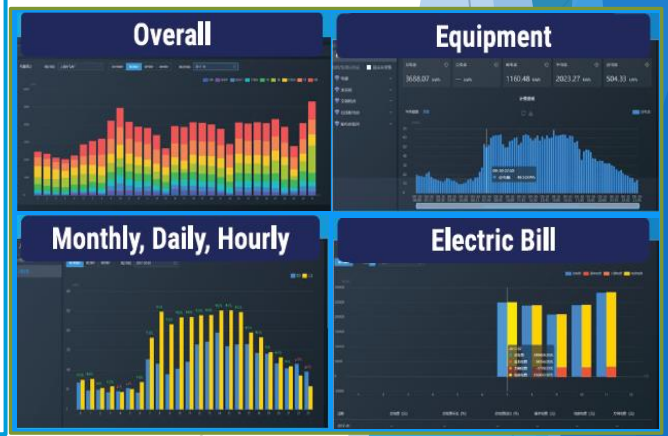
Visualization of temperature and electricity power, and control refrigerator temperatures



Promotes food safety and waste reduction

In a food factory, identifying inefficiency such as overcooling, and reducing electricity costs and carbon emissions by optimization of refrigerator temperature.





Contact point

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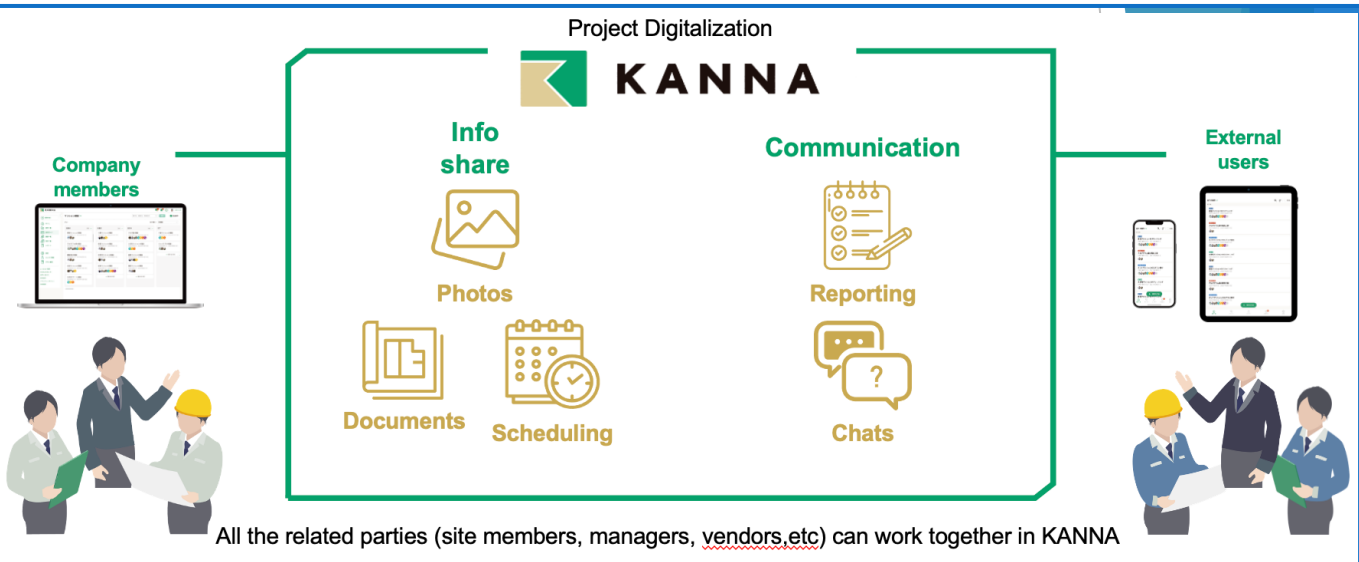
—E-mail address ：sales@kddi.co.id

“KANNA Service” Contributes to Decarbonization by Improving Productivity in the Construction and Manufacturing Sector

Aldagram Inc.

Product and service outline

- **KANNA Project:** KANNA Project is a digitalization service that improves productivity of non-desk working industries such as construction, real estate, manufacturing, etc. KANNA Project allows you to visualize the progress of projects that are running concurrently and manage them all in a single centralized platform.
- **KANNA Report:** KANNA REPORT is a customized digital reporting tool that drastically improves work efficiency by digitalizing paper reports. You can upload the reports/forms that you normally use to KANNA and fill them out using mobile devices and PCs. You can save, edit, and download these reports. Various data formats such as numbers, dates, radio buttons, photos, and hand-written signatures could be used in the report.



Actual result and example

(A) Electrical Engineering Company

Before: CEO runs the company alone. He moves to all the construction sites by his car, takes photos, and the comes back to the office to write reports.

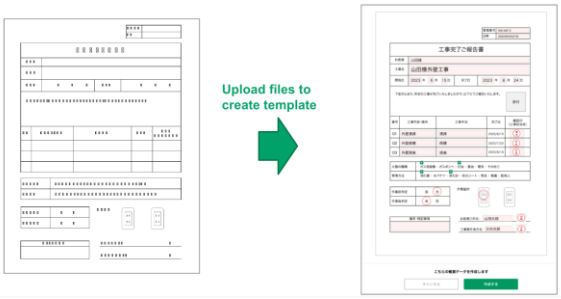
After: Using KANNA, he can take photos on-site, create reports, and share them with the client so that the client can check them right away, eliminating the need to go back and forth to the site to fix reports. As a result, more than 50km of transportation was eliminated.

50 km by car (normal van for 4-6 passengers) ＝9 kg of CO_2（Worth a volume of 900 soccer balls.)

(B) Construction Company

Before: All documents were created in Excel, printed out in advance of work, and stored on paper.

After: Most of the documents, which used to be about 800 sheets per month, are now stored on PCs. Monthly paper consumption was reduced to about 80 sheets, resulting in a 90% paper reduction.



Contact point

Aldagram Inc.（Mr. Shinji Ito: English and Japanese support）
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—E-mail address ： shinjiito@aldagram.com

7. Effective Use/Conservation of Resources

- **Waste Plastics and Waste Textile Recycling Technology** (JGC HOLDINGS CO., LTD.)
- **LIMEX　An Innovative New Material Made with Limestone** (PT.SODANIKKA INDONESIA/TBM Co., Ltd.)
- **Eco-Friendly Plastics** (PT CHORI INDONESIA)
- **Eco-friendly Asphalt Modifier「NEWTLAC」** (PT. Kao Indonesia Chemicals)
- **Recycling Coal Ash and Reducing CO_2** (FKG Corporation)

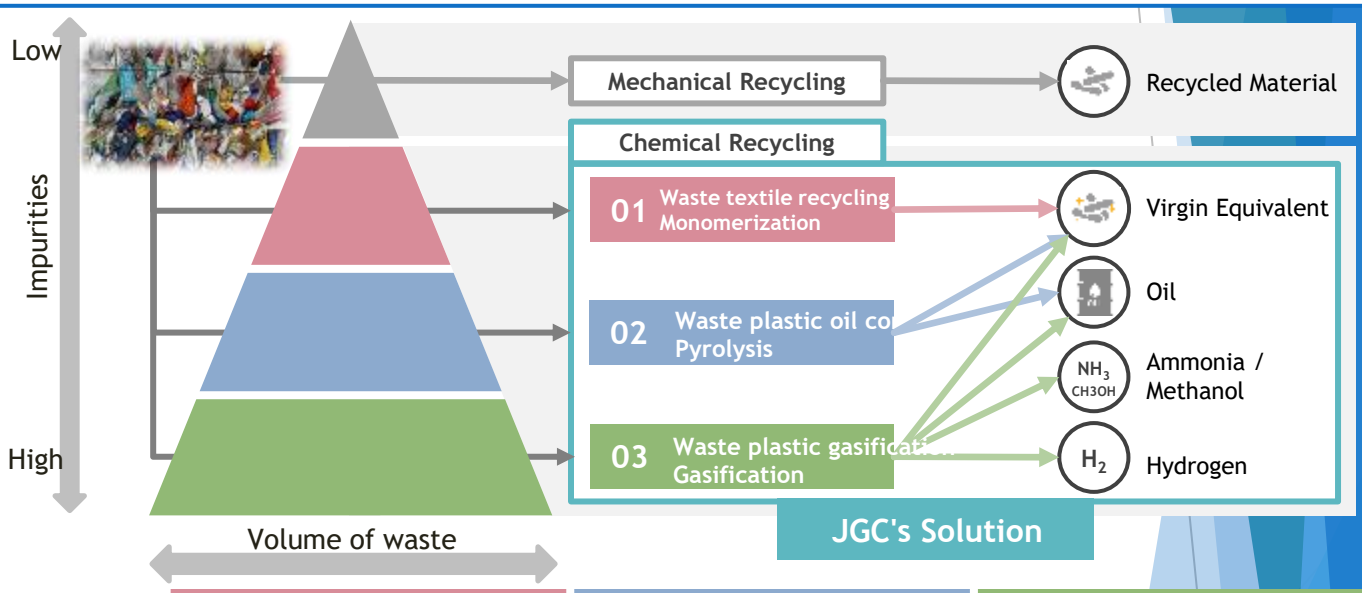
Waste Plastics and Waste Textile Recycling Technology

- JGC Group's Chemical Recycling Technologies to Contribute to the Realization of a Recycling-Oriented Society-

JGC HOLDINGS CO., LTD.

Outline of Products and Services

- Recently, there is a need to establish effective solutions for global social issues such as marine pollution by waste plastics, proper disposal of waste, and reduction of GHG emissions. The JGC Group aims to realize a low-carbon society by providing chemical recycling technologies for waste plastics and waste fibers.
- The JGC Group has three chemical recycling technologies: waste fiber recycling, waste plastic oiling, and waste plastic gasification. Considering the degree of impurities contained in waste plastics, which are raw materials, product needs, economic efficiency, and CO_2 emissions, we propose optimal solutions that meet the needs of customers and society.



	Waste textile recycling Monomerization	Waste plastic oil conversion Pyrolysis	Waste plastic gasification Gasification
Characteristics	✓ Textile-to-Textile Recycling ✓ Excellent in eliminating dyestuffs and impurities compared to material recycling	✓ Process of obtaining heat decomposition oil derived from waste plastics ✓ Waste plastics containing PVC and PET can be processed without separating them.	✓ Converted plastic containing mixed plastics and impurities into recycled products via synthetic gas ✓ Contributing to the Manufacture of Local Production and Consumption Hydrogen
Results and examples	✓ Only technology with a proven track record of decolorization, impurities removal, and commercial operations	✓ 10-year commercial operation record	✓ Long-term commercial track record (only in gasification)

Contact Us:
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LIMEX

An innovative new material made with limestone

PT.SODANIKKA INDONESIA/TBM Co., Ltd.

Product and Service Outline

- LIMEX is an inorganic filler-dispersion composite material containing more than 50% inorganic materials such as calcium carbonate. LIMEX is developed, and manufactured by TBM Co., Ltd. with its patent in over 40 countries.
- LIMEX uses limestone as its main raw material. It can be molded into plastic and paper alternative products and can also be recycled.
- LIMEX Pellet can be processed into items such as packing material, containers, and daily products with existing molding machines, and LIMEX Sheet can be printed and bound with existing printers and binding machines.
- LIMEX Pellet can reduce plastic usage and greenhouse gas emissions compared to petroleum-based plastics, and LIMEX Sheet can reduce water consumption by approximately 97% compared to plain paper, and since it does not use any wood pulp, it can conserve natural resources at risk of depletion.
- LIMEX was introduced at international conferences such as COP and G20, and the technology has been registered with UNIDO's Sustainable Technology Promotion Platform "STePP".

Actual Result and Example

More than 10,000 companies have adopted LIMEX.

- TBM Co., Ltd. and Indonesia's largest cosmetic container molding manufacturer, which handles products for major cosmetic manufacturers around the world, has concluded a sales agreement for LIMEX Pellet (injection molding grade only) for cosmetic containers. We are collaborating closely to deliver LIMEX cosmetic containers to the global market.
- Bio LIMEX Bag made of limestone and plant-based resin is used for shopping bags at stores in Haneda Airport.

※Bio LIMEX Bag is not biodegradable.

- LIMEX Sheet is used for the table menu of the Japanese branch of 添好運（Tim Ho Wan), a Michelin-starred dim sum specialty restaurant in Hong Kong operated by WDI Co.
- LIMEX is used in a Gundam series plastic model and a dinosaur skeleton plastic model produced by BANDAI SPIRITS Co.
- LIMEX Sheet is used for the store displays of POLA INC. and the in-store illuminated menus of MOS BURGER.


LIMEX Pellet


LIMEX Sheet

LIMEX Products

Contact point: PT.SODANIKKA INDONESIA,SODANIKKA CO.,LTD, Jakarta Rep.

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Eco-Friendly Plastics
-Bio-Degradable Resin for Film-

PT CHORI INDONESIA

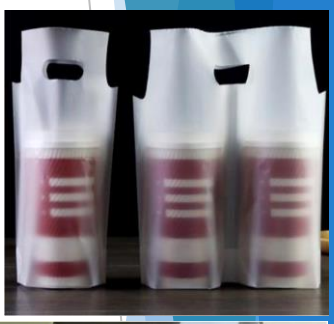
Product and service outline

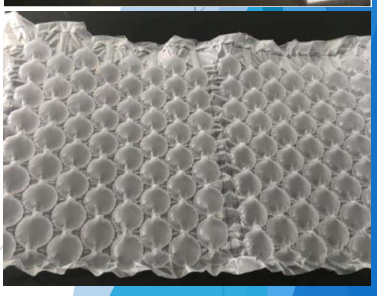
- Biodegradable plastic can be used in the same way as ordinary plastic. It is an environmentally friendly product that is eventually decomposed into "water and carbon dioxide" by the activity of microorganisms. It is considered as one of the solutions to the plastic waste problem.
- PT CHORI INDONESIA can supply biodegradable/ocean-decomposable plastics such as PBAT, PBS, PLA(polylactic acid), and PPC. Also, We propose compound of these base materials and composite materials to supply a variety of compound resins. The compounds can improve price competitiveness and resin moldability.
- In order to contribute to solving the waste problem in Indonesia, we have started promoting biodegradable plastic resin.

About PT CHORI INDONESIA

- PT CHORI INDONESIA is the distributor specialized in textile and chemical and machinery, established in 1995 in Jakarta.
- Our parent company is CHORI Co.,Ltd. Japan. 蝶理株式会社 (chori.co.jp)
- In our Chemical dept, we have been handling eco-friendly materials such a plant-based and less CO_2 emission etc.

Example of use of biodegradable resin





About Bio-Degradable Resin for Film

Product: Polybutylene Adipate Terephthalate(PBAT) Resin
Manufacturer : Huafon Group Co.,Ltd. (CHINA)
Characteristic : Bio-degradable、Mass production、Technical Advantage
- PBAT Resin can be decomposed under composting conditions, meeting the requirements of US ASTM D6400, European EN 13432, Chinese GB/T 28206, and other biodegradable material standards, which make them good substitutes for traditional PE materials in film blowing, and injection molding field such as packaging materials, agricultural films, disposable tableware, etc. Huafon has planned 11.8 billion yuan investment for the manufacturing of PBAT 300,000 ton and other bio-degradable plastic.

Application : Garbage bag / Shopper bag / Flexible Film / Air cushion / Mulch film

Contact Point

PT CHORI INDONESIA Chemical & Machinery Dept. (Authorized Agent in Indonesia)
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—E-mail Address— : kupu-kupu.sales@chori.co.id
(Mr. Kuwano & Yusuf : English/Indonesia/Japanesse)

Eco-friendly Asphalt Modifier「NEWTLAC」

Next-generation road pavement that is friendly to the environment and people

PT. Kao Indonesia Chemicals

Product and service outline

- The Kao Group's corporate slogan is ``Cleanliness in our hearts, in our future,'' . To achieve this goal, the Chemical Business Division promotes research and development that contributes to the construction of social infrastructure. In December 2020, we launched NEWTLAC, a modifier that uses waste PET as part of the raw material and improves durability by adding it to asphalt pavement. It is already being used for paving public roads, store parking lots, distribution centers, and factories.
- Rather than mixing waste PET as is, we use our proprietary technology to transform it into a new modifier.
- Increases the durability of added asphalt pavement by up to 3 times.
- By making asphalt pavement more durable, it is possible to reduce road surface damage and reduce CO_2 emissions associated with repair work. It also helps provide safe and secure roads for users over a long period of time without incurring large costs.

Actual result and example

(As of February 2024)

<Achievements in Japan>

■ From 2020, full-scale rollout begins

⇒ Over 90 records ; Retail store parking lots, highway parking areas, Logistics company bases, prefectural roads, city roads, etc.

■ Japan Resilience Award, Resilience Award ; Received the semi-grand prize and gold prize (2022)

■ Received the Minister of the Environment Award at the 50th Environmental Awards (2023)

■ 22nd Green Sustainable Chemistry Award Received the Minister of the Environment Award (2023)

<Overseas expansion>

■ United States, Thailand, Taiwan etc.

■ Indonesia expansion 2022

Confirmed the compatibility of NEWTLAC with Indonesian materials (asphalt and gravel) in an official evaluation organization

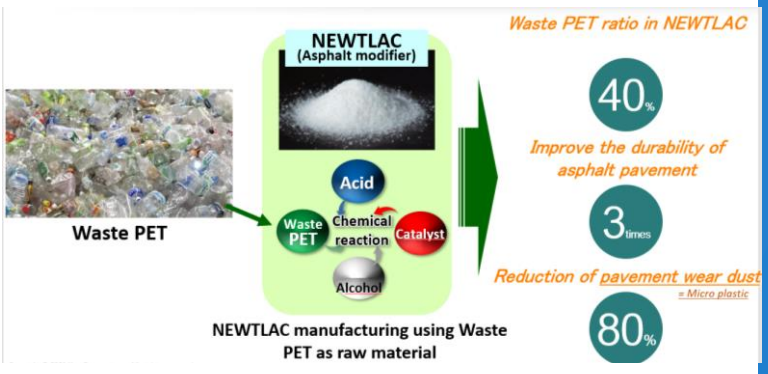
■ Indonesia expansion 2023

・Trial construction on our premises

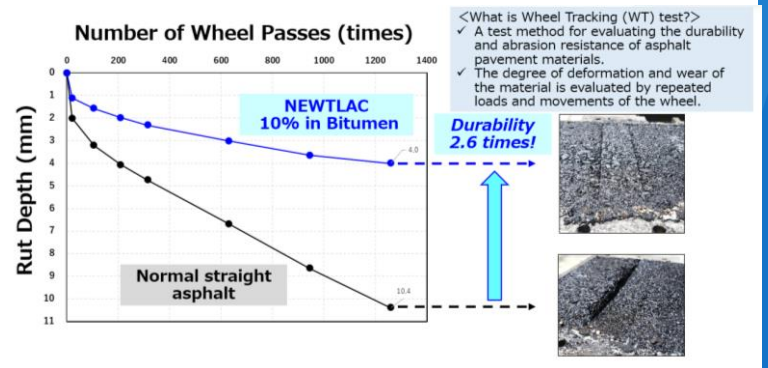
・Test construction on private land outside the company

・Adopted in a private project

Positive recycling : From waste PET to highly durable asphalt



Wheel tracking test in Indonesian public institutions (Using Indonesian asphalt raw materials)



Contact point

PT. Kao Indonesia Chemicals (Bambang : Japanese, English and Bahasa support)

—Phone number： +62-811-1085-198

—E-mail address ： bambang@kaochem.co.id

Recycling Coal Ash and Reducing CO_2

- Realizing Carbon Neutral Society and Prevent of Disaster -

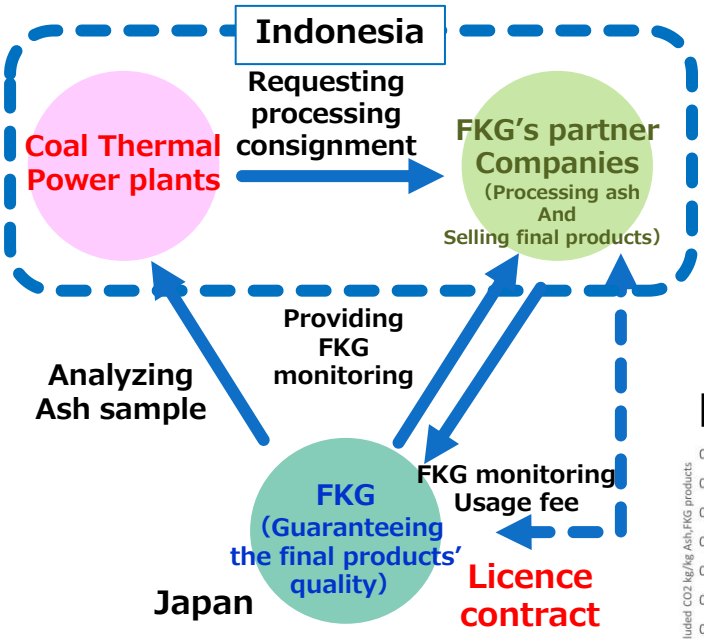
FKG Corporation

Product and service outline

FKG developed a system which can be processing coal ash(included the environmentally-hazardous substances) safely. FKG named this system "FKG monitoring". We can process coal ash safely in Indonesia when Indonesian company adopts it. The final products which is processed using FKG technology can be used crashed stones or embankment. Moreover, these products have significant advantages and its contribute our sustainable society.

- FKG monitoring : Ash analysis system using FKG's ash processing technologies. It helps us with processing coal ash in Indonesia.
- Advantages : High performance against earthquakes、Disaster prevention and risk reduction、Purification of water、Reducing CO_2、Highly absorbent etc.

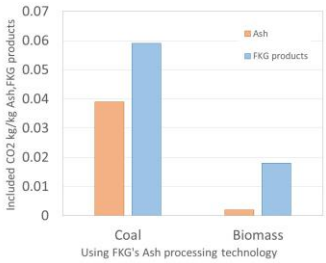
【Scheme e.g.】



【Case1.】 Protecting our lives

FKG's products were not washed away, but maintained their integrity.

【Case2.】 Reduction of CO_2



16kg～ 20kg/ton

※per 1 ton of FKG products
※when using FKG's ash processing technologies

Actual result and example

In Japan : Ash processing plants using FKG monitoring 2 plants : FKG HQ and a partner company)
Under consideration who wants to use FKG monitoring : Many companies

Contact Point

FKG Corporation
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—E-mail:address— : kourogi@w-fkg.jp (Mr. Kourogi : JP/EN)

8. Agriculture and Forestry Sector

- **Satellite data for soil analysis, fertilizer optimization and decarbonization of agricultural land**
  (Sagri (SATELLITE × AI × GRID))
- **One Stop Carbon Credit Solution Provider** (Green Carbon Inc.)
- **Mangrove Planting and Forest Conservation Project**
  (YL Forest Co., Ltd.（PT. Yamamoto Asri))

Satellite data for soil analysis, fertilizer optimization and decarbonization of agricultural land

Creation and sale of agriculture-derived carbon credits

Sagri (SATELLITE × AI × GRID)

Product and service outline

Using satellite data analysis and the power of AI, we analyze the soil of farmland to reduce excessive use of chemical fertilizers, thereby creating and selling carbon credits which provide additional income for farmers.

- Farmland Compartmentalization by Machine Learning of Satellite Data (Patented)
- Soil analysis using satellite data, resulting in optimization of chemical fertilizer usage amounts
- Through optimization of fertilizer usage, we generate and sell carbon credits to the private sector.

The business model is to partner with agricultural companies, food companies, agri-tech companies, etc. which have a network of farmers to implement the project and share the profits from the creation of credits.

＊Companies interested in purchasing credits are also welcome to contact us.

Sagri

Actual result and example

- Impact startup from Gifu University, founded in 2018, certified as a J-startup by METI Japan in 2023.
- Through our subsidiaries in Singapore and India, expanded business not only in Asia but also in Africa and Latin America and excellent in expanding business overseas.
- In Japan, trusted by central and local governments for public works projects, while in global business, conducting farming and carbon credit businesses.
- In India and Thailand, already reduced the use of chemical fertilizers in rice cultivation and has already completed the application for carbon credit projects.
- Has participated in many Japanese government projects in the past, such as JICA/ JETRO/Ministry of Agriculture/METI projects (examples on the JICA DX website).
- Contact us if you are from agricultural companies, food companies, agri-tech companies, etc. which have networks with farmers, we are happy to cooperate with you.
- Contact us if your company is considering or intend to purchase credit carbon.

Contact point

Sagri Singapore Branch　Kazuki Sakamoto (Japanese & English)

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—E-mail address ：Sakamoto-kazuki@sagri.tokyo

Linkedin (Kazuki)

One Stop Carbon Credit Solution Provider

Through agriculture-based decarbonization projects,
We reduce GHG emissions as well as increase Indonesian farmers' income

Green Carbon Inc.

Our Service Overview

- We develop carbon credit creation projects that are used to offset emissions for companies and local governments. We are involved in the entire process of carbon credit-related project formation, project registration, and the sale of the credits created.
- In particular, we focus on decarbonization activities (GHG reduction activities) using agriculture to combat global climate change and increase farmers' incomes through credit earnings. The project has a wide range of methods, some of which are shown on the right. The project areas are Southeast Asia (Indonesia, Philippines, Vietnam, Cambodia, etc.), Japan, Australia, and Latin America (Costa Rica).
- The types of credits are tailored to meet the needs of buyers, and can include JCM (Bilateral Credit Mechanism), VCS (Verified Carbon Standard), Gold Standard, as well as J-Credits, ACCUs, and other national schemes in each country.

List of Agri-based Projects

Regenerative agriculture (cover crops)

AWD (Intermittent Irrigation) of paddy fields

Biochar

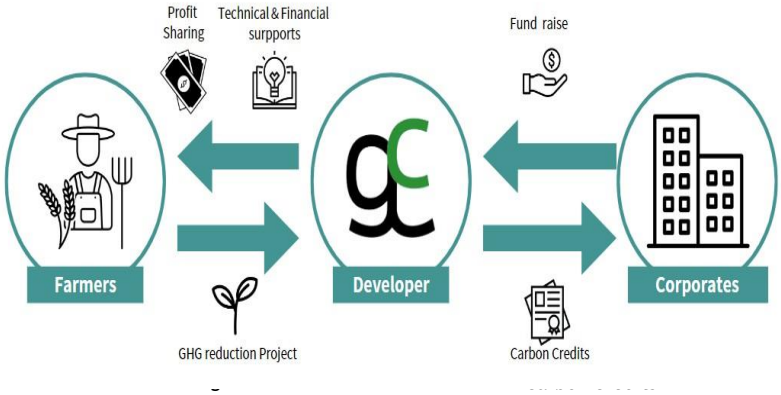
Agroforestry

Cow Burp

Afforestation/Mangrove

Achievements and Case Studies

- With investment from companies committed to decarbonization, we will provide farmers with greenhouse gas reduction technologies and financing to form decarbonization projects and obtain carbon credits. Share revenue from sales of the carbon credits generated with farmers, thereby contributing to reducing global warming and increasing farmers' income



PIC Contact

Green Carbon Inc.

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E-mail : t.senoo@green-carbon.inc

★Haruki Yokoyama (Mr.) : Japanese
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E-mail : h.yokoyama@green-carbon.inc

Mangrove Planting and Forest Conservation Project

Toward The Realization of CO_2 Absorption and Fixation through Blue Carbon and Sustainable Aquaculture

YL Forest Co., Ltd.（PT. Yamamoto Asri)

Product and service outline

In 2006, we established a local subsidiary in Batam City and started mangrove planting and forest conservation projects. We are developing 1) afforestation projects in tidal flats (new afforestation), 2) Silvofishery-type mangrove afforestation projects (forest regeneration), and 3) REDD+ projects (forest conservation). Additionally, as part of “Corporate Forest Development" project, we undertake the entire process from site selection to site negotiations, tree planting, and cultivation management for Silvofishery-type mangrove plantations.

Overview of Silvofishery (“Corporate Forest Development” with Silvofishery)

Silvifishery is a system that combines “Silviculture” and “Fishery”. Mangroves are planted on the site of aquaculture ponds or in aquaculture ponds where productivity has declined, and aquaculture is started in the surrounding area. Since aquaculture is cultivated in the mangrove ecosystem, it is possible to carry out aquaculture at low cost while preserving the natural environment without polluting the environment. It also leads to a stable livelihood for locals.

Actual result and example

- **Mangrove plantations at Batam Botanical Garden and other places @ Batam City**

Since 2006, we have concluded MoU with the Batam government and developed new mangrove plantation project for 1,500 ha.

- **OKI-REDD+Project**

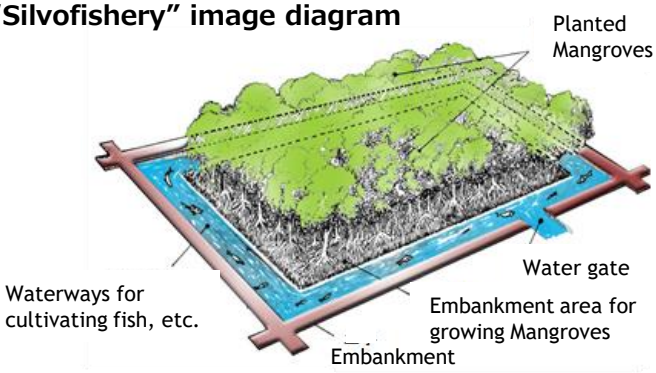
Since 2013, we have obtained Indonesia's first "Environmental Service Utilization Business Permit in Protected Forests" in the coastal area of Ogan Komering Ilir Regency in South Sumatra Province, and now in progress of afforestation and conservation mangroves in 23,500 ha. We aim to reduce and absorb 11 million tons of CO_2 over 30 years.
Joint developer: Mitsui O.S.K. Lines, Ltd.

- **Corporate Forest Development (Silvofishery)**

- Ricoh Bintan Forest
- Paramount Bed Mangrove Forest
- Honda Cars Saitama Kita Forest

etc.

“Silvofishery” image diagram



- **Measures against Global Warming:** Attract attention as blue carbon, and is known to have a high ability to accumulate carbon not only in trees but also in the soil.
- **Green Infrastructure (Eco-DRR,F-DRR):** Acts as a natural breakwater and seawall, contributing to disaster prevention resilience.
- **Ecosystem Conservation / Environmental Maintenance:** Mangroves form a unique ecosystem called the ”cradle of life in the sea.”
- **Realizing a Sustainable Society:** By coexisting and co-prospering with nature, we will achieve both sustainable forest management and aquaculture, contributing to the stability of local residents' lives.

Contact point

YL Forest Co., Ltd.
—E-mail address ：info@ylforest.co.jp (Japanese/English/Indonesian support)
Website：https://ylforest.co.jp/

9. Finance/Insurance

- **Insurance Product Development et cetera**
  (PT. Marsh Indonesia)
- **Leasing for Installing the Carbon Free Equipment**
  (PT. Mitsubishi HC Capital and Finance Indonesia (MHCI))
- **Environmental Investment in Indonesia using JCM (Joint Crediting Mechanism)**
  (Tokyo Century Corporation)

Insurance product development toward carbon neutral realization, project insurance adviser business, risk management service

PT. Marsh Indonesia

Product and Service Outline

(Insurance broker business and insurance adviser business in renewable energy issues)

- As an insurance broker and adviser company, we are carrying out a lot of insurance broker business and insurance adviser business on the renewable energy issues (solar, wind power, hydropower, biomass, geothermal energy) in Indonesia.
- On the project financing issues, we are having an actual result as being a business owner's adviser and lender's adviser, carrying out insurance arrangement and insurance program with insurable and bankable condition.

(Industrialization support on the insurance side for hydrogen, ammonia multi-fuel combustion, CCS project)

- In this field, besides the case's composition, the insurance market dialogue is an important thing. Our company is grasping insurance market new trends and initiative plans through habitual communication with the insurance market, and all this information will be needed for industrialization. In addition to the insurance market undertaking condition, carrying out a case composition will be supporting the insurance and risk management point of view in the project.
- We are working on insurance product development toward an electric car and carbon neutral related product popularization and selling promotion.

(Creating ESG risk rating)

- Recently, insurance companies take charge of natural disaster risk are getting more interest in ESG, and customer company ESG initiatives are starting to bring an effect in insurance terms. Besides making dialogue with the insurance company, our company also performs a [visualization] of customers company ESG initiative, collecting the dialogue materials with the insurance market, and carrying out the insurance undertaking support.

Actual Result and Example

- Insurance broker, insurance adviser's actual result (business owner's insurance adviser, lender's adviser) on the hydroelectric power generation, wind power generation, solar power generation, biomass power generation, geothermal electric power generation's case
- Carrying out a roadshow and explanation meeting to the insurance market about customers company's hydrogen, ammonia multi-fuel combustion, and CCS initiative
- Insurance product development and composition related to electric car
- Insurance product development and consideration of the product related to carbon neutral

Contact Point

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Shinnosuke.Izumi@marsh.com (Izumi)
—Location—
World Trade Centre 3, 16th Floor, Jl Jend Sudirman Kav 29-31, Jakarta 12920, Indonesia

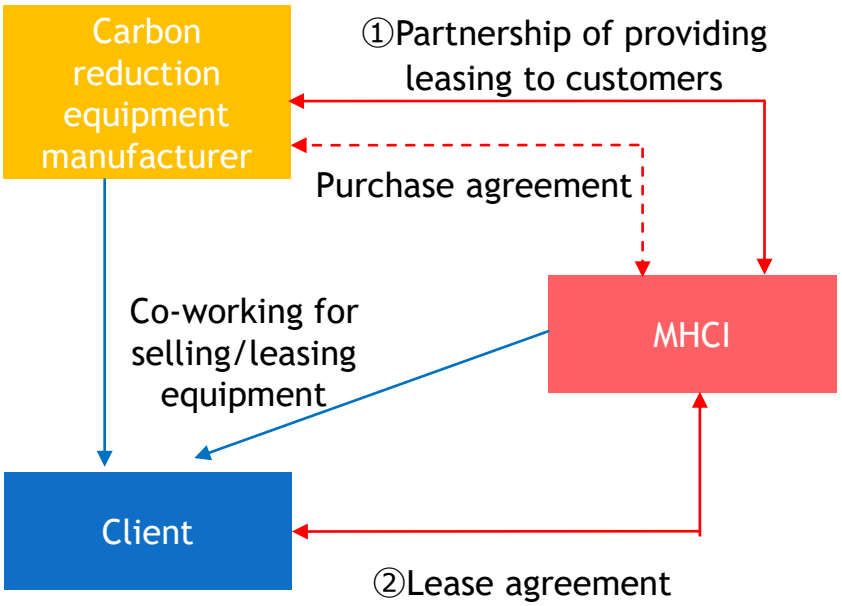
Leasing for installing the Carbon Free Equipment

～Leveling investment cost, Electricity cost reduction, Tax Benefit～

PT. Mitsubishi HC Capital and Finance Indonesia (MHCI)

One of our Service Outline

- We established a new division, “Sustainability and Business Development Division” and leasing for solar panel, boiler, gas turbine, air conditioner and so on which can contribute to carbon reduction.



【①Partnership Agreement】

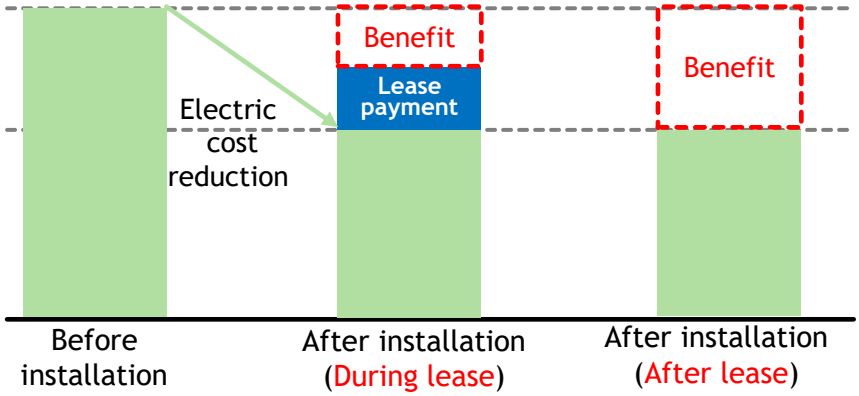
- Partnership agr. between manufacturer and MHCI. Co-work to offer the installation of equipment.

【②Lease Agreement】

- MHCI provides lease to customer

※MHCI also provides manufacturing equipment leasing, car leasing etc.

【Case example of Solar panel leasing】



(※) Above chart is just an image. Cost reduction may change depends on the condition and electricity cost fluctuation. MHCI does not guarantee the cost reduction.

<Benefit of leasing>

- ✓ Leveling investment cost
- ✓ Reduction of Electricity cost
- ✓ Tax benefit (Leasing payment is counted as COST for tax purposes)

Contact point

- Kei Mitarai（Japanese/English） kei.mitarai@mitsubihi-hc-capital.co.jp
- Tantiono Sujono（Indonesia/English） tantiono.sujono@id.mitsubishi-hc-capital.com

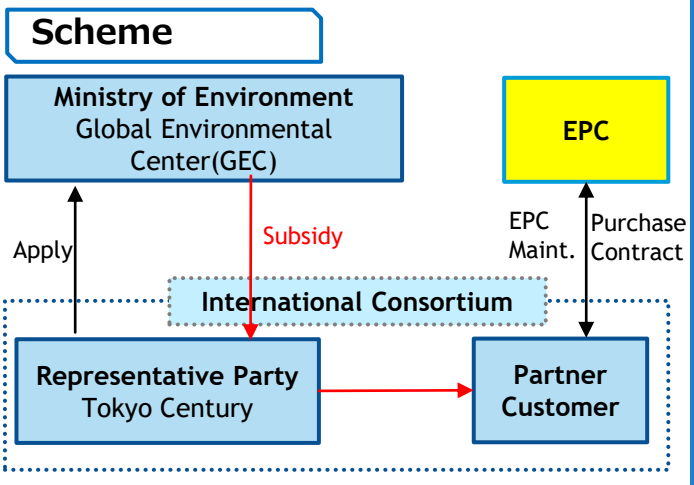
Environmental Investment in Indonesia using JCM（Joint Crediting Mechanism)

Tokyo Century Corporation

Overview of Product/Service

- Japan implements JCM (Joint Crediting Mechanism) in order to contribute to the reduction and absorption of global GHG emissions, and to build a mechanism for technology transfer and countermeasures that can respond flexibly and promptly to the situation in developing countries.
- Among the JCM financial support programs, JCM Model Project will provide subsidy up to 50% of CAPEX, reducing investment cost.
- Tokyo Century is the first Japanese financial service company to Represent JCM, in developing businesses using decarbonization technologies in SEA countries.

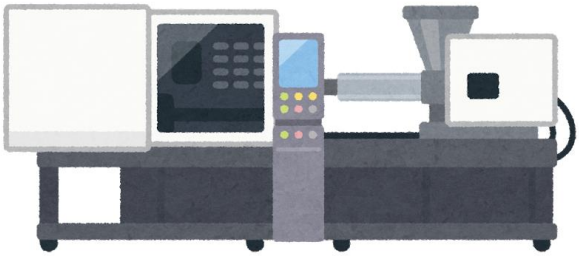
Scheme



Project Example

- JCM Model Project　(FY2017)
  Absorption Chiller installed at a Chemical Factory in Karawang West Jawa
- JCM Model Project　(FY2018)
  High Efficiency Injection Molding Machine installed at Plastic Factory in Bekasi West Jawa
- JCM Model Project（FY2022）
  2.1MW Solar Power Plant installed at Aluminum Factory in Bogor West Jawa

(Absorption Chiller)



(High Efficiency Injection Molding Machine)

(Solar Power Plant)

Contact:

Tokyo Century Subsidiary in Indonesia

Tel：+81-5209-7438 (Mr.Ban, Mr.Kakumoto)

E-mail：kakumoto.k@tokyocentury.co.jp

10. Transportation

- **Rail Transport as an alternative to Truck Transportation**
  （PT YUSEN LOGISTICS INDONESIA）
- **“K” Line’s Activity to Transport Liquefied CO_2**
  (Kawasaki Kisen Kaisha, Ltd. （”K” Line）)
- **Creating Carbon Credits in the Transportation Domain**
  (Spatial Pleasure Co., Ltd.)

Rail Transport as an alternative to Truck Transportation

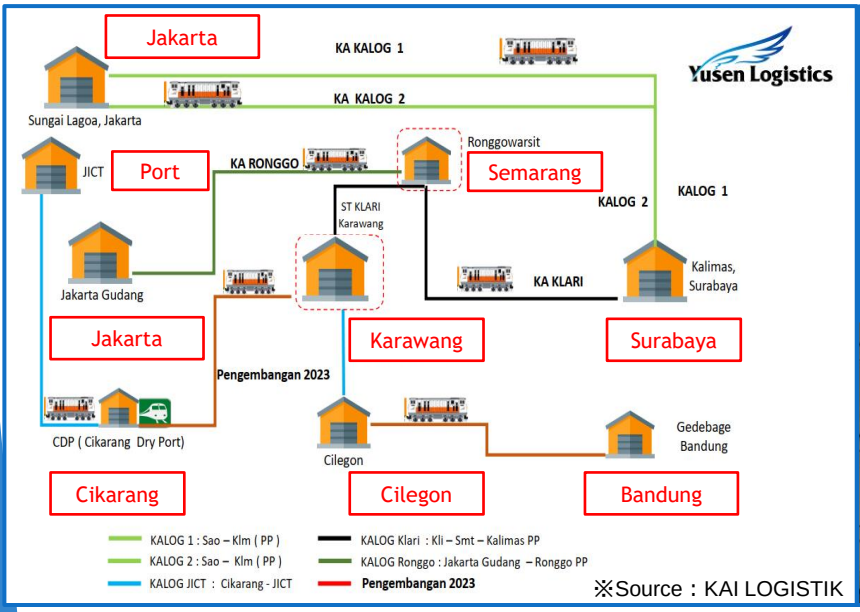
～ Why don't you consider it as one of the contributions to reducing CO_2 emissions ? ～

PT YUSEN LOGISTICS INDONESIA

Product and Service Outline

- Trucking is essential transportation for your business continuity. However, the general image of truck transportation in Indonesia is that there are many old vehicles, and it emit a lot of CO_2.
- In order to respond the request **"we would like to consider decarbonization measures little by little because we can do it", Yusen Logistics is proposing rail transportation** as an alternative to truck transportation in Java Island. We estimate that CO_2 emissions can be reduced by approximately 80% (by own calculation) when using rail transportation compared to truck transportation.
- Rail transportation can be used in a wide range of requirements, such as full container transportation loaded in factories/warehouses, less than container load (LCL) services, and domestic transportation or as a hub for international transportation.
- Please inform us what is your preference and consideration. On the other hand, we installed fast (battery) chargers in our company's facility outside Jakarta areas to facilitates trial operation for EV trucks.

＜ Rail Route Map ＞



※Source：KAI LOGISTIK

＜ Loading on Rail for Full Container / Less than Container Load ＞

Actual Result & Example

- Full Container : Loading cargo in Cikarang factory and deliver it by train from Cikarang to Surabaya. Then the container will be unloaded in Factory in Surabaya.
- Consolidation : Pick up cargo from Surabaya factory and deliver it by train from Surabaya to Jakarta, then continue the delivery process through Export Air Freight.
  : Pick up cargo from Semarang factory and deliver it by train from Semarang to Jakarta, then deliver it to factory in Tangerang.

Depend on the consultation subject, we also coordinate rail transport and pre- / post- rail transport arrangement.

Contact point
PT Yusen logistics Indonesia

◆Departure from Jakarta or Other Area
Jakarta Head Office (ID/EN) : YLID.ML.IFF.BD@id.yusen-logistics.com
◆Departure from Surabaya Area
Surabaya Branch (ID/EN) : YLID.ML.SUB.BD@id.yusen-logistics.com
◆For support in Japanese Language (JP) : YLID.ML.JAPANESE.SALES.TA@id.yusen-logistics.com
Contact Person : Mr. NAKAGAWA / 0811-1991-1729

“K” Line’s Activity to Transport Liquefied CO_2 Pioneer in marine transportation serving CCUS

Kawasaki Kisen Kaisha, Ltd. （”K” Line）

Product and Service Outline

- “K” Line is working to support the decarbonisation of our customers from perspective of a shipping company, as part of the "*decarbonisation of society*" to achieve net zero GHG emissions by 2050.
- One such solution is liquefied CO_2 (LCO_2) transport, which contribute to customers’ CCUS in the world. It shall become essential solution in Indonesia too because it is suitable for transportation between islands and remote areas.
- Based on years of experiences in LPG/LNG transportation, “K” Line as a pioneer in mass marine transport of CO_2 and is involved in CCS projects managed by leading world prominent of CO_2 emission and storage companies.

Actual Result and Example

- **Participation in Northern Lights project**
  - “K” Line is participating in the world's first commercial CCS project supported by Norwegian Government. In 2024 “K” Line is planning to purchase and manage 2 unit of LCO_2 carriers.
  - The state-of-the-art vessels are equipped with variety of environmental-friendly equipment, LNG Engine, Rotor Sail utilizing wind power, a device that generates foam on bottom of vessel to improve drive performance, etc.

- Demonstration of Low-Temp/Low-Pressure
  - Temperature and pressure zones known as “Low-Temperature & Low-Pressure” (LTLP) is essential for the mass transport of LCO_2.
  - “K” Line together with its partner in Japan, was entrusted by the government of Japan (NEDO) to be involved in operation of a technology demonstration vessel for LTLP transport start from the end of 2023.

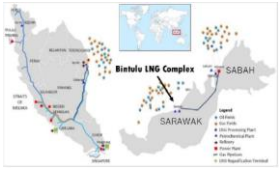
- Participation in CCS Projects worldwide.
  - “K” Line was recognized of their track record in LPG/LNG transport and above activities as a pioneer in liquefied CO_2 transport. “K” Line is also taking part in joint study of CCS projects worldwide.
  - One of the published examples is the joint study with PETRONAS on CCS off Bintulu, Malaysia.

- International Rule-making & Tech Development
  - “K” Line is sending experts to SIGTTO and ISO working groups to lead/chair the international rule-making.
  - Taking part in a research related to the handling of liquefied CO_2 on ship, verify the collection of CO_2 on ship and also involve in joint study, etc. to handle cargo on ship as an initiative by Singapore MPA.

7,500m³ LCO_2 Carrier Source: Northern Lights JV DA

PETRONAS

Bintulu CCS



Onboard CCS

SIGTTO

ISO International Organization for Standardization

International Rule-making

Contact Point

PT. “K” Line (Indonesia)

TEL： +62-(0)21-521-4070 E-mail : wijaya.wira@id.kline.com

(Mr. Wira Wijaya : English and Bahasa support)

“K” LINE KAWASAKI KISEN KAISHA, LTD.

Creating Carbon Credits in the Transportation Domain

Digital Measurement Reporting Verification Software

Spatial Pleasure Co., Ltd.

Product and service outline

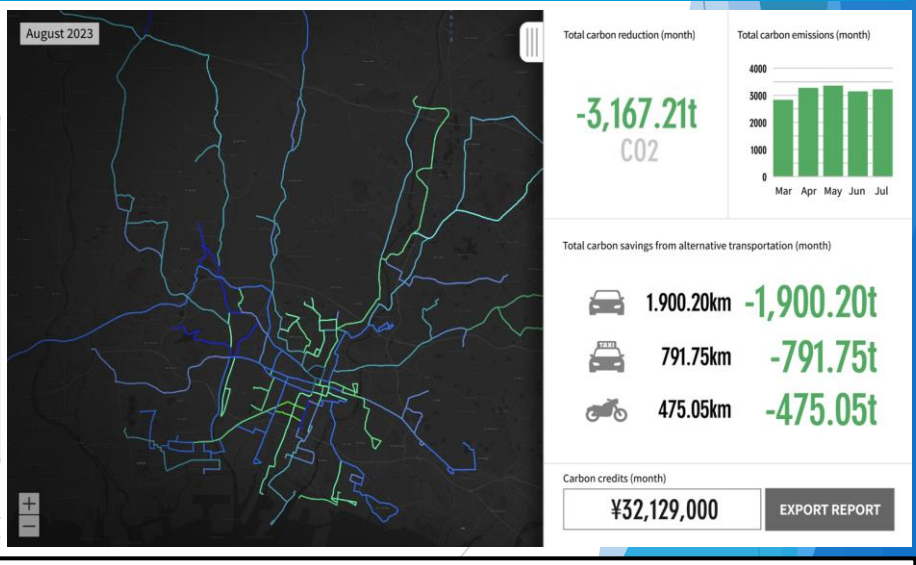
- Spatial Pleasure is developing DMRV (Digital, Measurement, Reporting, Verification) software to certify and measure carbon credits for transportation operators contributing to the decarbonization of an area.
- Through collaboration with bus and bicycle-sharing operators, our aim is to decarbonize the entire region by quantifying the environmental benefits of each transportation operator and issuing carbon credits.

Actual result and example

- Spatial Pleasure has agreed to conclude a partnership with Sinar Mas Land, part of the major conglomerate Sinar Mas Group, and its corporate venture capital firm, Living Lab Ventures, to promote decarbonization in urban transportation domain in Indonesia.
- The above-mentioned initiative was supported by JETRO (Japan External Trade Organization), aiming at promoting decarbonization of urban transportation, with BSD City at its center.
- BSD City is one of Indonesia's largest urban development projects, with approximately 400,000 people living on an approximately 6,000 hectare site. As the operating company of BSD City, Sinar Mas Land has been actively promoting measures to reduce transportation-related carbon dioxide emissions. These efforts include a variety of projects such as shuttle bus networks and sidewalk improvements.

Spatial Pleasure

Data platform for Decarbonizing the transportation sector in City.



Contact point

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−Phone number : +81-80-9530-4903
−E-mail address : soma@spatial-pleasure.xyz

11. Strategy Formulation and Consulting for Decarbonization

- **Strategic Consulting for Decarbonization** (Qunie Corporation)
- **CMP WAY** (CM PLUS GROUP CORPORATION)
- **GX Management Cycle Actualization Service** (ABeam Consulting Ltd.)
- **Decarbonization Solution Advisory Services** (Enel X Advisory Services Japan G.K.)
- **Building Trust with Sustainability** (PwC Indonesia)

Strategic Consulting for Decarbonization

From Strategy Formulation to Implementation in High-tech, Electricity and energy, and Mobility

Qunie Corporation

Product and Service Outline

- Qunie Corp. is a consulting company in the NTT DATA Group, providing consulting services in Japan and globally, from management strategy formulation to implementation to achieve corp. innovation.
- In the decarbonization area, our GSB team offers consulting to assist Japanese corps in establishing new businesses and management strategies in Japan and abroad in high-tech, electricity and energy, and mobility areas. We can also provide support in collaboration with our other teams and NTT DATA.

(GSB Team) Decarbonization Consulting Service

□ Industry
- Power Energy & Infra
- Decarbonization･ESG
- Mobility（EV･Charging Infra）
- Battery
- High-tech（Cloud / AI/IoT）

□ Solution
- Global Biz Strategy/Org. Reform
- NewBiz Develop/Open Innovation
- M&A/Alliance Strategy/Execution
- Patent/IP Strategy
- Macro Environ Surveys/Analyses

□ Tool
- Latest Global technology with comprehensive advanced business model
- Networking with Global Corps (Incl. Ventures Overseas)
- Global Risk management

GSB team Service line

- **Support covers from Macro-environmental understanding and Strategy formulation to Implementation in global perspectives.**

About GSB Team

- The GSB team specializes in global consulting projects. The team consists of members who are fluent in a third languages other than Japanese or English, as well as from major global companies and consulting firms, and is capable of handling various global projects.

Actual result･Example

- **Global Decarbonization Strategy Development Support**
  Support for building a global organization consisting of the client's Japan HQ and global offices to establish a global decarbonization strategy, and conduct marketing research and client capability research in APAC related to decarbonization and sustainability.
- **Basic research on LCA methodology**
  Research on LCA-related policies and rules, calculation methods, and case studies of advanced companies in Europe, China, which is a major EV country, and California, where strict environmental regulations are in progress.
- **Decarbonization Business Discovery &Market Research**
  Research on the latest decarbonization-macro environment, identifying use cases and techs of European and US firms in non-energy areas (food, etc.), and examining main solution based on the results of the research.
- **VPP Build via Portable Batteries**
  Support to develop and verify a new business model for VPP that links power generators using portable batteries and electricity users such as firms and households in Japan.

Contact Point

—Phone Number—

+62 811 1077 870 (Hironori Matsubara(Mr.))

+81 80 8455 4980（Tomoya Sakai(Mr.) : English Support）

—E-mail Address— : sakait@qunie.com （Tomoya Sakai(Mr.) : English Support）

CMP WAY

Comprehensive Energy Solution for operational plant

CM PLUS GROUP CORPORATION

Product and service outline

- Engineering
- GMP Consulting
- Matching
- Training Support

Energy Solution

CMP Way®

*CMP is the **unique professional Engineering/ Consulting service company** with project management Skill. For the solutions of carbon neutral, CMP provides the clients with services such as **FS with gap analysis, solution implementation management and advisory services.** We call it as **'CMP Way'.***

✓ **Process oriented Energy Reduction**
✓ **Utility oriented Energy reduction**
✓ **Continuous Optimization**

Comprehensive Energy Solution

Stages: 1 ***Feasibility Study***

To Propose Comprehensive energy saving solutions and road map to achieve the target from the GAP analysis from the viewpoint of production side and facility utility side

Stages: 2 ***Solution Implementation***

To perform engineering such as Conceptual Design and Request for Quotation for the various solutions to achieve the CARBON NEUTRAL reduction

Stages: 3 ***Advisory Stage***

To monitor the achievement of target baseline/Roadmap and make advise for the continuous further improvement

Procedure → Initial Gap analysis (walkthrough) is FREE

Implementation menu with Items:
Productivity Improvement, Energy Saving & ROI

"CMP is free from Vendors, free from contractors. We work for the clients only.

With CMP ways method, the client will get not only the right person/company which are suitable to execute the project but also the client will get a PLUS on how to improve the existing production process with provision of the future planning, in others word, the client will get double benefit, improvement and efficiency.

Please contact us if you have any questions or concerns about your facility construction project.

Contact point : PT. CM Plus Consulting Indonesia
(Mr. Shandy : English and Bahasa support)
—Phone number：+62-811-1358-088
—E-mail address ：shandy@cm-plus.com

- https://cm-plus.com/
- https://cm-plus.co.jp/
- https://www.cm-plus.co.id/

GX Management Cycle Actualization Service

ABeam Consulting Ltd.

Product and Service Overview

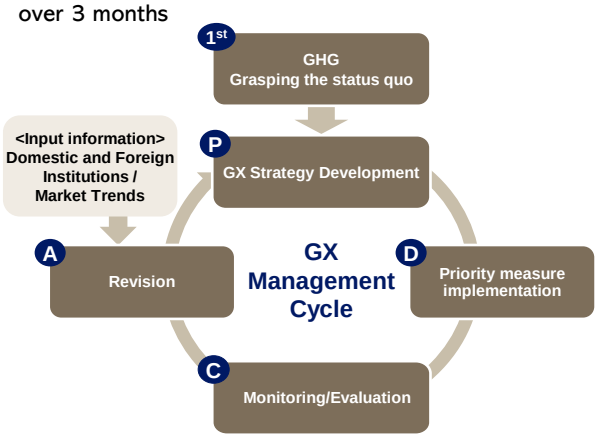
We provide one-stop support that includes not only the development of long-term GX strategy and a GHG reduction roadmap, but also the following services to help actualize a GX management cycle for evaluating and revising plans.

- **GHG status discovery service**
  Determining the data to be collected and its extent within each Scope / Calculating GHG emissions and performing theoretical verification
- **GX Strategy and Policy Development Service**
  Climate change-related information disclosure (TCFD, financial reporting), goal setting, **selection of priority measures**, **evaluation of implementation effectiveness** and **development of roadmap** and action plan (long and short term).
- **GX Solution Implementation Service**
  Introduction of various GX solutions for reduction and offset (renewable energy, certification, credits, EV, energy saving, new energy, CCUS, etc.)
- **GHG Emissions Management Cloud Service**
  GHG emissions management cloud services that include your company and supply chain

Results and Case Studies

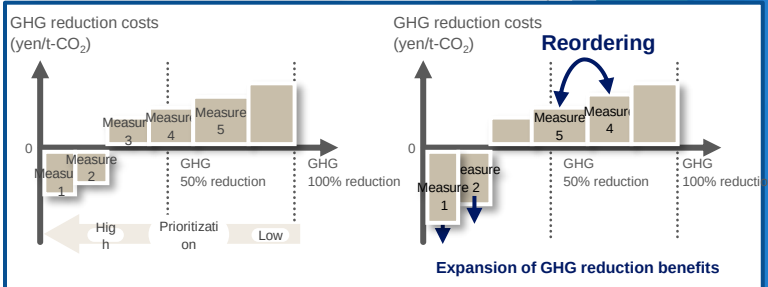
The Case of a Food Manufacturing Company

- GHG status quo: Calculated over 2 months
- GX strategy and policy development: Strategy development and priority setting over 3 months
- GX solution implementation: Parallel implementation of multiple measures such as PV, credits, etc.
- GHG emissions management cloud service: implemented over 3 months

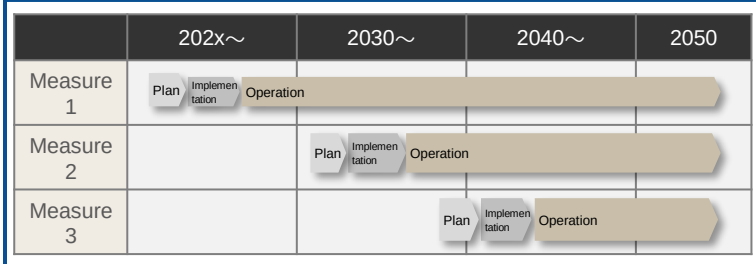


Priority assessment for implementation of measures

Review of priority measures and roadmap



Scope 1,2 Reduction Roadmap



Contact Point

PT. ABeam Consulting Indonesia

Phone: +62-21-526-8660 (available in English & Bahasa Indonesia)

E-mail address: idabglobalgx_iddl@abeam.com (Available in Japanese, English & Bahasa Indonesian)

Decarbonization Solution Advisory Services
Renewable Supply/ EACs/ Calculation on GHG emission etc.

Enel X Advisory Services Japan G.K.

CDP GOLD ACCREDITED PROVIDER 2023

Service outline

- Support for procurement of renewable energy (Virtual) PPA Advisory
- Support for calculation of Scope 1, 2, and 3 based on global standards
- Support for roadmap development, including mid/long-term energy strategies
- Global centralized procurement of environment certificate etc.

Service Features and Track Records

- A consulting arm of Enel group, a leading energy company in the world
- Support for global/local clients to achieve their decarbonization goals
- Market intelligence and energy market research for global/local clients
- Global and local support from over 400 advisors in 28 countries

Visualization of Energy Consumption	Optimizing energy procurement	Optimization of energy efficiency	Renewable energy procurement
Utility Data Management	Energy Procurement	Energy Efficiency	Advisory – Renewable Supply
- Calculation on GHG - Scope 1,2,3 emission - GHG emission reduction - RE100/CDP[1] report - Decarbonization roadmap strategy	- Energy Optimization - Market risk assessment - Risk management on energy procurement - Energy procurement through Auction	- Real time monitoring energy consumption - Algorithm analyse - Energy cost reduction	- Procurement on EACs - On-site PPA - Off-site PPA - Sustainability strategy

Tailor-made advisory for each country/ region available upon request

enel X

Contact:

TEL: +81-3-6774-7180

E-mail: enelxad-jp.enelx@enel.com

English/Japanese
- Ms. Yuko Yamasaki

English/Bahasa
- Ms. Udyani Putu

Building Trust with Sustainability

Comprehensive Services for Energy Transition and Decarbonization

PwC Indonesia

Product and service outline

ESG Strategy & Sustainable Supply Chain Roadmap

- ESG strategy & roadmap, Supply chain decarbonisation roadmap, ESG transformation, including people, process and system

Carbon Market Advisory

- Assistance on carbon project registration for local and international market, carbon credit evaluation, carbon credit project feasibility study, domestic and international carbon trading advisory, legal due diligence against the potential forestry concession area, and relevant accounting and tax advice for carbon trading etc.

Decarbonization Business Development

- Market analysis, feasibility study, business structuring and strategy development, regulatory advice, cash-flow modeling, and relevant accounting and tax advice on Renewable Energy, Bioenergy, Energy Efficiency, Energy Management, Smart Energy, EV & E-bike, Storage Battery, CCS/CCUS, Direct Air Capture, Hydrogen, Ammonia etc. related business development and implementation.

Sustainable Finance

- Green taxonomy mapping, climate stress testing, climate risk management, sustainable finance framework.

Sustainability Reporting

- Gap analysis on the current report against international standards/frameworks (including GRI Standards and IFRS S1 and S2), materiality assessment, Sustainability Reporting development assistance, Sustainability Reporting Assurance, climate risk and scenario analysis, GHG accounting and assurance, ESG Rating readiness & improvement and Internal Audit for improving internal process and control in the Sustainability-related areas etc.

Details of Indonesia carbon market advisory

PwC Indonesia offers professional services in a variety of phases for carbon market entry.

① Technical Study

- Measurement of actual emission baseline and results of emission reduction efforts, potential carbon stock and sequestration, carbon offset, and other carbon-related calculations

② Legal Study

- Identification of relevant regulations on Indonesian Carbon Market scheme and assistance on the related legal structure of the carbon project and implementation for local and international businesses to participate in the carbon market

③ Economical Study

- Carbon credit potential analysis which include potential cash inflow from carbon sequestration of carbon projects and carbon accounting services

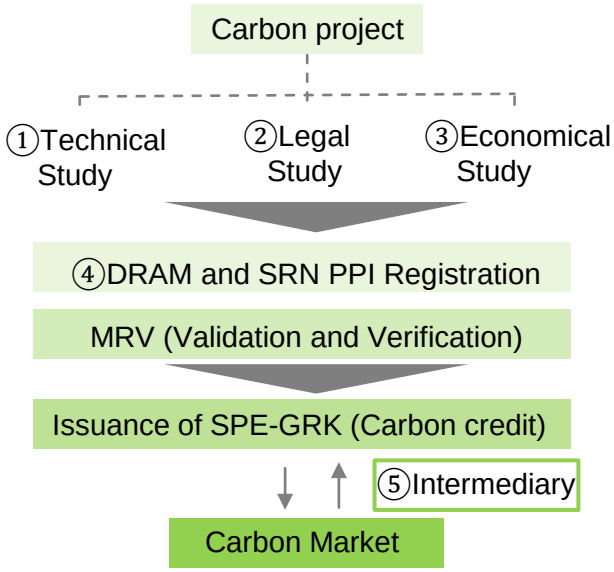
④ DRAM and SRN PPI Registration

- Assistance in preparing DRAM (Design document of climate change mitigation action) and navigating SRN PPI(National registry system for climate change) registration and procedures

⑤ Intermediary Analysis

- Advisory on carbon exchange administrator and intermediary services to participate in the carbon market

Carbon market entry (Voluntary market)



Contact point

PwC Indonesia Japan Business Desk, Advisor (ESG), Kotaro Asai（Japanese and English only）

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—E-mail address ：kotaro.asai@pwc.com

12. Comprehensive Solution to Decarbonization

- **Asset Optimization for NZE**
  (PT. Mitsubishi Power Indonesia)
- **JGC's Total Engineering for Renewable Energy**
  (JGC Holdings Corporation)
- **Housing and Community Decarbonization**
  (PT. Sumitomo Forestry Indonesia)

Asset Optimization for NZE

Asset Evaluation, Technology Introduction with simulation by Energy market Modeling

PT. Mitsubishi Power Indonesia

Product and Service Outline

- Countries are required to economically optimize the introduction of renewable energy and the stability of the power system while achieving carbon neutrality targets.
- MHI uses an analytical model of the electricity and energy markets to provide businesses and related organizations with asset evaluation and technology implementation optimization services that address the balance between decarbonization and economic efficiency.
- Based on its broad range of products and technical expertise related to Energy Transition, and the results of analysis conducted in various countries around the world, MHI propose an asset optimization policy for our customers.

MHI Market Model

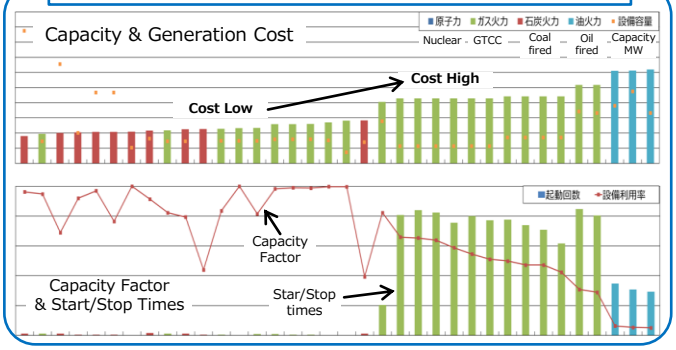
Case・Assumptions
- Decarbonize Target
- Demand, Fuel Price, VRE Introduction)

Asset database
- Transmission Line
- Generation Asset

(Location, Spec, Cost))

Interconnected Model
150～500kV

Operation Pattern Forecast / Upgrade Proposal



Experience and Example

1. Strategy to utilize existing asset

Expect the future utilization of facilities and propose measures to improve profit by modifying it using the best suitable technology for the business environment in future.

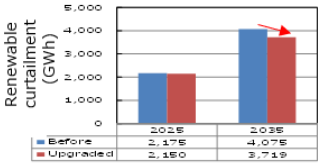
Efficiency of each power plant
(Cost reduction xCO2 $_2$ reduction)

Flexibility, Improvement, For, Renovation
Example:gas-fired power generation
- Minimum load (the minimum amount of standby power that must be maintained)
- ramp rate (speed of power up/down

Driving (Income) Change
Energy market ↑
Regulatory capacity market ↓
Total ↑

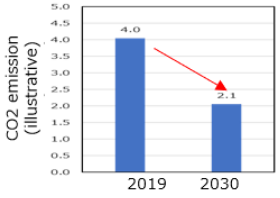
Improving operational efficiency across the grid

Renewable by renovating generators
Reduce energy control



✓ Minimize reduction of renewable energy generation

renewable energy
Maximum use of CO2 $_2$ and emission reduction



✓ Use of renewable energy regardless of grid constraints

2. Future Asset portfolio with decarbonatization

By showing the most economical power supply configuration in the future, we will propose the necessary technology and schedule capital investment, quantify the impact of the business environment, such as change in power demand, and policy options, such as the CO_2 target and use it to assess risks and provide data for policy discussions. MHI has been conducting a joint study with the Bandung Institute of Technology about the decarbonization strategy in Indonesia to propose several suggestions to make it economical and practical.

3. Optimizing facility specification for decarbonatization project

For hydrogen or ammonia project for production or storage, the economy should be estimated based on future generation patterns, equipment specifications, and collection prices. Based on case studies of equipment specifications, MHI propose an optimal equipment configuration based on the fluctuation of prerequisites.

Contact Person

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—E-mail address— kazuhiro.yoshida.2p@mhi.com (Japanese/English), rully.bakrie.tr@mhi.com (Japanese/English/Indonesian)

JGC's Total Engineering for Renewable Energy
(Solar, Geothermal, Hydrogen, Ammonia, Biomass, Wind, etc.)

JGC Holdings Corporation (PT. JGC Indonesia)

Product and service outline

- As a world-class Engineering contractor, JGC has delivered various plants and facilities globally, supporting client endeavors. Our robust track record spans 20,000+ projects across 80+ countries, earning us recognition for top-tier performance.
- JGC has long prioritized renewable energy, pioneering solar power in Japan since 2012. With a strong domestic solar power record and projects in Indonesia, Vietnam, Mongolia, and beyond, we're committed to fostering a low-carbon society. This includes expanding into energy transition, carbon management, and sectors like solar, geothermal, biomass, wind, hydrogen, and ammonia.
- With 1,000+ staff in Indonesia and 2,600+ in Asia, we focus on local projects for competitive pricing, agility, and quality. Our services, from Feasibility Studies to EPC, ensure optimal infrastructure regardless of project size.

Actual result and example

- Geothermal Power Generation (Binary Type) 28MW
- Geothermal Power Generation (Binary Type) 5.6MW
- Solar Power Generation 69MW
- Solar Power Generation 68.8MW
- Solar Power Generation 49MW
- Solar Power Generation 5MW + Battery Storage 3.6MWh
- Roof-Mounted Solar Power Generation Totaling 15MW
- Roof-Mounted Solar Power Generation 2MW
- Roof-Mounted Solar Power Generation 3.35MW
- Roof-Mounted Solar Power Generation 0.2MW
- Roof-Mounted Solar Power Generation 0.2MW
- Roof-Mounted Solar Power Generation 1.1MW
- Biomass Power Generation 75MW
- Biomass Power Generation 75MW

Others

Geothermal

Geothermal

Solar + BESS

Rooftop Solar

Hydrogen/Ammonia

Biomass Power

Contact point

PT JGC Indonesia

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Housing and Community Decarbonization

Providing highly efficient, EDGE-certified decarbonized housing

PT. Sumitomo Forestry Indonesia

Business Outline

- The Indonesian government has announced the goal to achieve Net-Zero Emissions or “carbon neutral” by 2060. In the housing and real estate industry, decarbonization has also become an important topic.
- By utilizing low-carbon building materials as well as promoting ZEH (Zero Energy Housing) and ZEB (Zero Energy Building), our company is working to reduce CO_2 emission during a building’s construction process and when a building is being occupied, and not only in Indonesia but also in other countries around the world. In 2022, we have opened our first LCCM (Live Cycle Carbon Minus) model house in Japan. *LCCM houses are homes that results in negative CO_2 emissions through minimizing CO_2 emissions in each stage of the house’s life cycle, from construction, occupancy to demolition, as well as creating renewable energy such as solar power generated electricity.
- As an effort to make CO_2 emissions during construction and occupancy more visible, we are currently in the process of obtaining EDGE certification which is promoted by IFC. Increasing the overall efficiency of a house will also benefit our customers through electricity and water saving. Our future projects in Indonesia will also incorporate environmental certification such as EDGE, and we will lead the decarbonization of housing in Indonesia. Our goal is not only to minimize CO_2 emission in residentials, but also the community and society as a whole.

Edge

IFC International Finance Corporation WORLD BANK GROUP

Creating Markets, Creating Opportunities

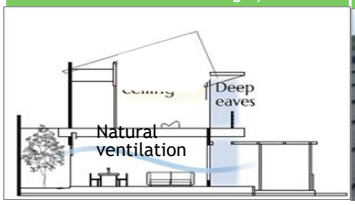
EDGE is a building environmental assessment system. EDGE certification is awarded to buildings that are able to save 20% or more on energy usage, water usage and embodied energy, compared to a typical building. Meanwhile, EDGE Advanced certification is awarded to buildings that are able to save 40% or more energy.

Portfolio and Future Projects

Project	1	2	3	4
Location	Bekasi	Makassar	Depok	Bogor
Progress	Handed over	Launch on Feb 2024	Launch on Nov 2023	Launch on Aug 2024
Area	5 ha	14 ha	6 ha	3 ha
Units	157	508	350	150
EDGE	N/A	Standard	Advanced	Under assessment
Decarbonization	Energy-saving design, LED, water-saving	Energy-saving design, LED, water-saving	Energy-saving design, LED, water-saving, smart home, solar panel, AAC	Energy-saving design, LED lights, water-saving

Morizen Cluster in Bekasi, West Java

Energy-saving design (natural circulation & shade from sunlight)



Solar panel (energy creation)

Water-saving appliance & LED light

AAC Blocks (replacing burned red bricks)

Contact point

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13. Climate Change Adaptation Technologies

- **Disaster Risk Assessment Services** NEW
  (Nippon Koei Co., Ltd.)

NEW

Disaster Risk Assessment Services

Protecting facilities and land from more frequent and more severe disasters due to climate change

Nippon Koei Co., Ltd.

Overview of Products and Services

- In Indonesia, river flooding and landslides are becoming more frequent due to the strong impact of global warming, and earthquakes, tsunamis, and volcanic eruptions are occurring.
- **As construction consultants, we properly assess disaster risks and propose countermeasures**. We help companies protect their facilities and land from various disasters.
- **Examples of our services**.

Facility Safety Improvement (Safety Assurance)

- Assess the disaster risk of existing facilities and propose necessary countermeasures.
- When building a new facility, we will propose a safe facility structure that addresses disaster risk.

Investment planning that avoids disaster risk

- When selecting investment locations for new projects, we identify properties with low disaster risk.

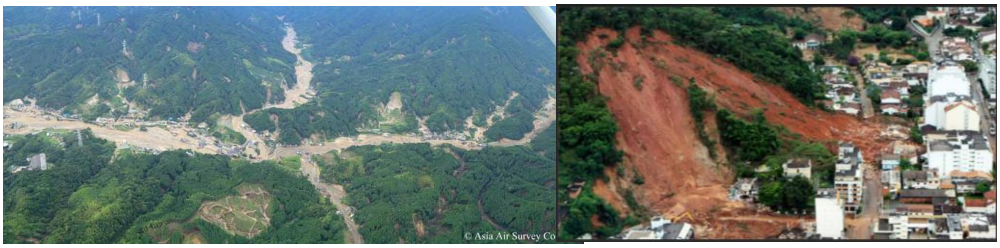


Photo: Damage from the July 2017 Northern Kyushu Torrential Rain Disaster
Example of multiple events (flooding, mudslides) occurring simultaneously

Simulation of Landslide Disaster

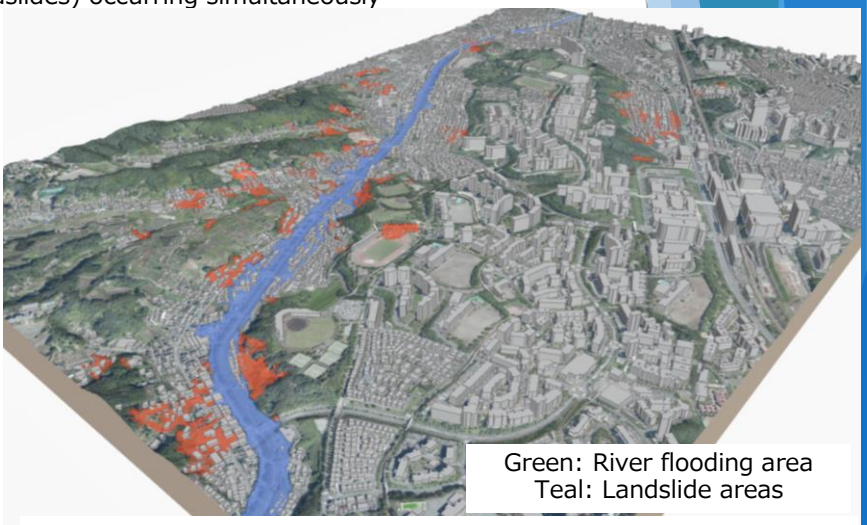
Achievements and Example

【Achievements】

- As the top construction consultants in Japan, we have been engaged in numerous disaster response and disaster prevention projects.
- East Japan Earthquake, Kumamoto Earthquake, Noto Peninsula Earthquake, and West Japan Torrential Rain Disaster.

【Example: Multi-hazard analysis using 3D City Model】

- We simulated the extent and scale of damage caused by heavy rain.
- Based on the results, it is possible to select safe locations for business investment and consider disaster countermeasures for existing facilities in dangerous locations.



3D disaster risk assessment map (simulation)

Contact and Information Inquiry

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—E-mail address— : koike-ta@n-koei.jp

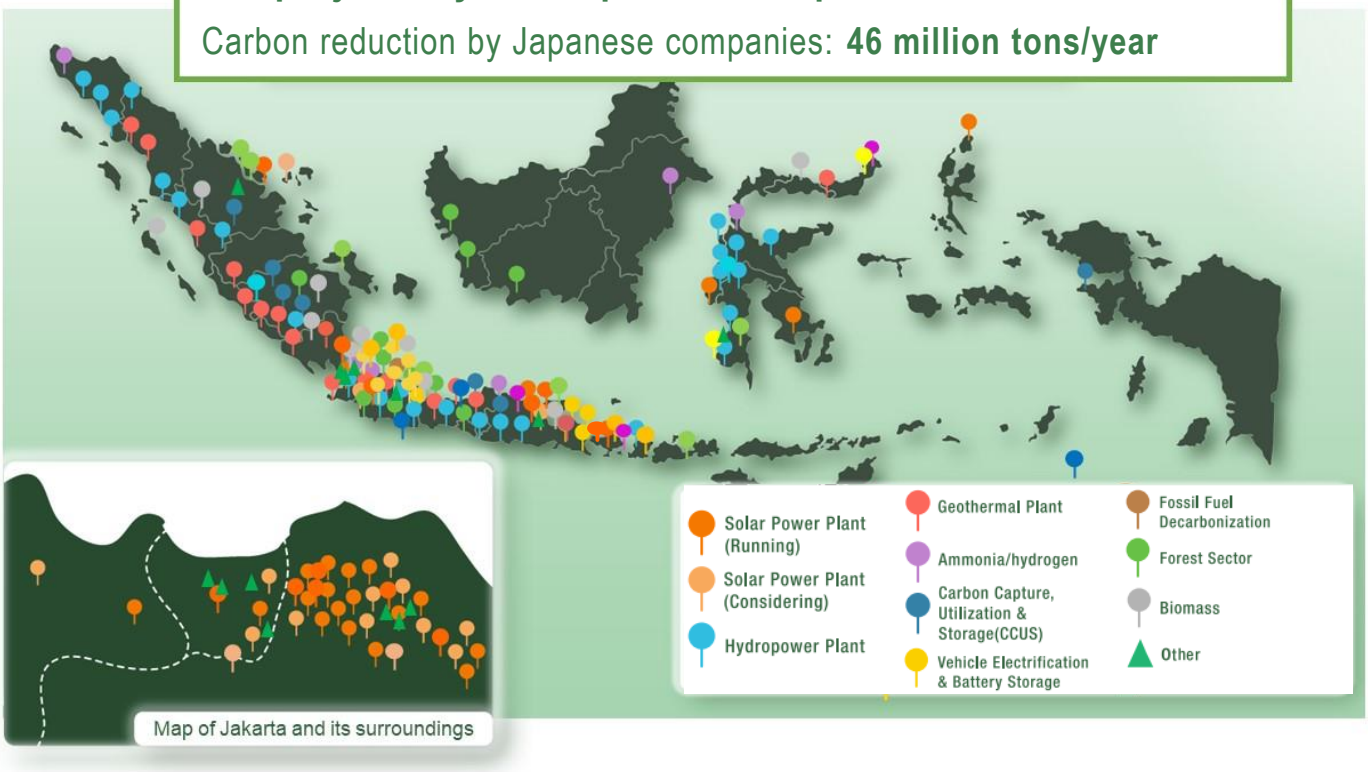
(Ms. Rosmeilan : English/Indonesian)

【Reference】
Map of Decarbonization Efforts by Japanese Companies

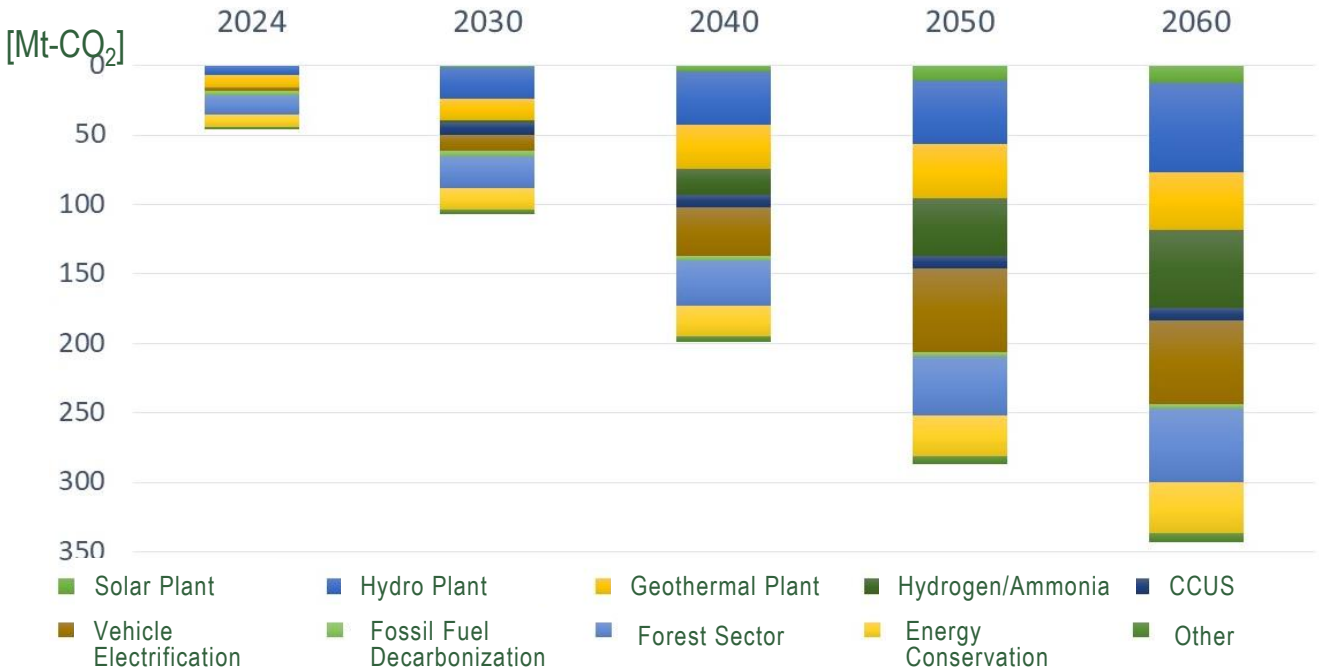
Jakarta Japan Club (JJC) and JETRO Jakarta publish decarbonization projects carried out by Japanese companies. It is estimated that Japanese effort reduces 46 million tons carbon dioxide in Indonesia in 2024.

638 projects by 266 Japanese companies

Carbon reduction by Japanese companies: **46 million tons/year**



Emission Reduction



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Talk to JETRO First!

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