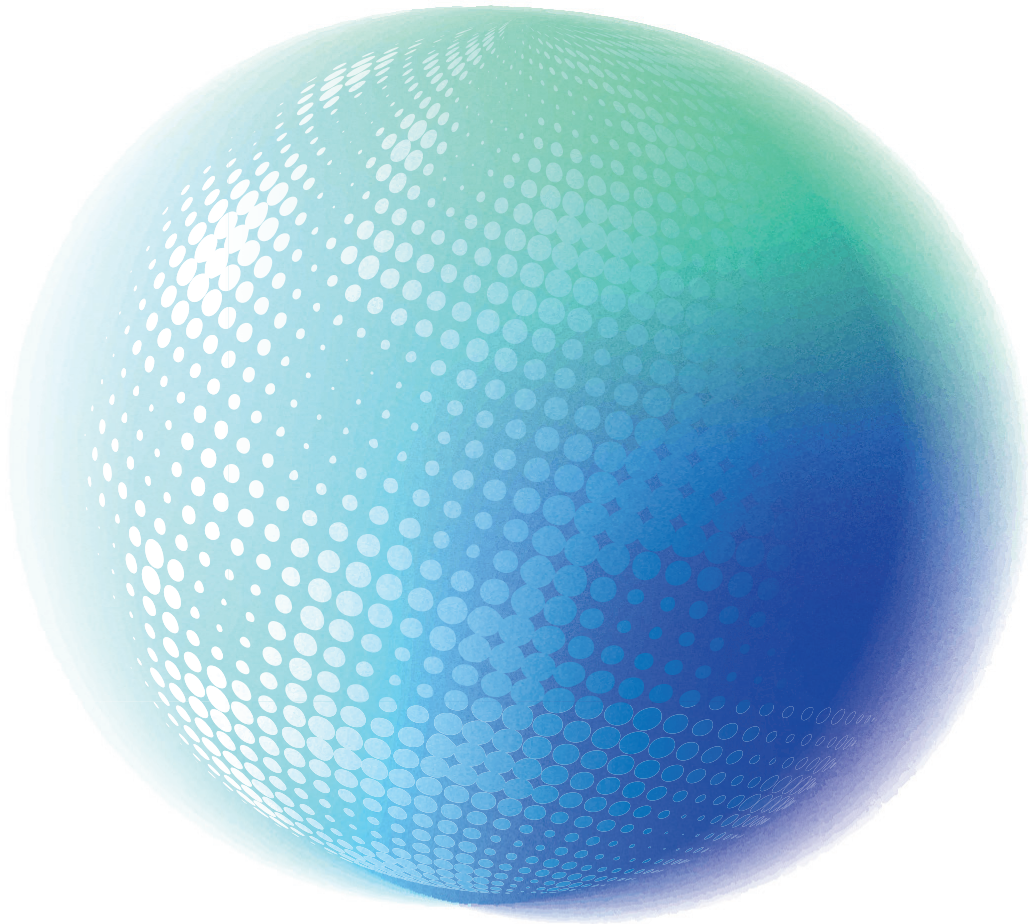


A global leader in eco-friendly energy systems,
enhancing quality of life
and **advancing** a sustainable future



PANASIA

02

About PANASIA

03

Smart Technology

04

Solutions

Emission
Fuel Supply
Measurement & Control
Service
Global Network

About PANASIA

PANASIA is a global eco-friendly energy solutions company dedicated to creating a sustainable future in harmony with our planet. From air quality and water treatment to hydrogen solutions, PANASIA develops technologies that align with nature and advance environmental standards. Backed by core technologies and proven expertise, PANASIA continues to lead through innovation, tackling diverse environmental challenges worldwide.



PANASIA Head quarter / Happy Work Campus

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PANASIA Energy Solution Center

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PANASIA Green EPC Center (GEC)

350, Mieumsandanro, Gangseo-gu, Busan, South Korea (46747)



Subsidiary Company

55, Mieumsandan 3-ro, Gangseo-gu Busan, South Korea (46744)

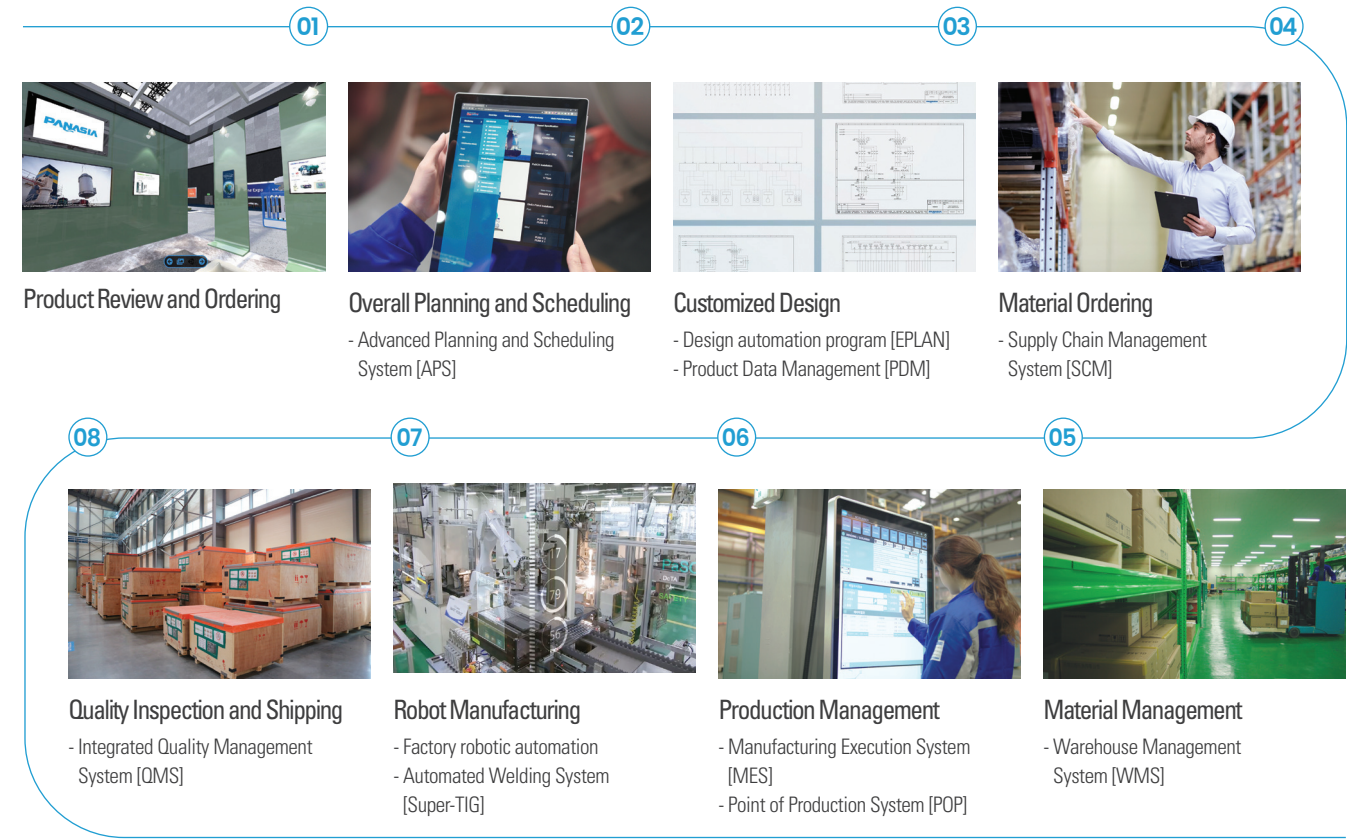
Smart PANASIA

Smart PANASIA
 - Advanced Technology, Global Excellence

From design and production to distribution and sales, PANASIA elevates product quality through AI-powered robotics and advanced manufacturing systems. By integrating and managing every process with smart technologies, we ensure flawless production and on-time delivery. PANASIA is your trusted innovative partner, delivering both efficiency and reliability.

Process

Design-Delivery Process

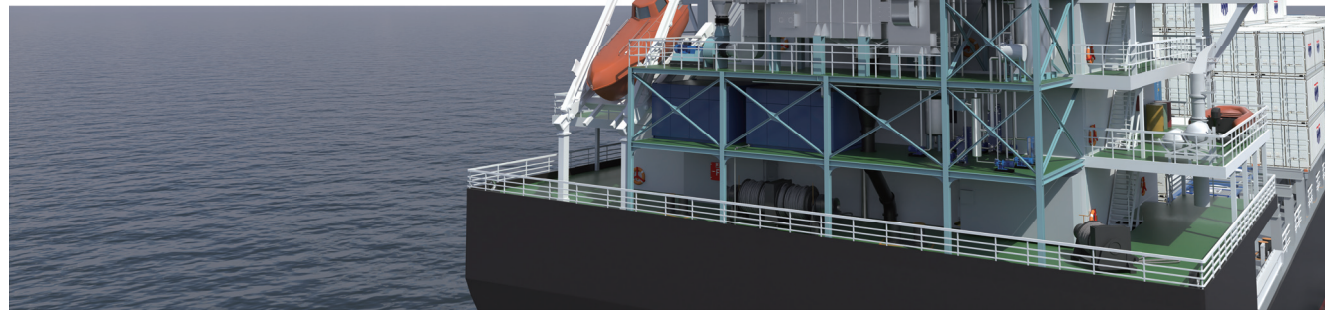


Training-After-sales service (A/S)

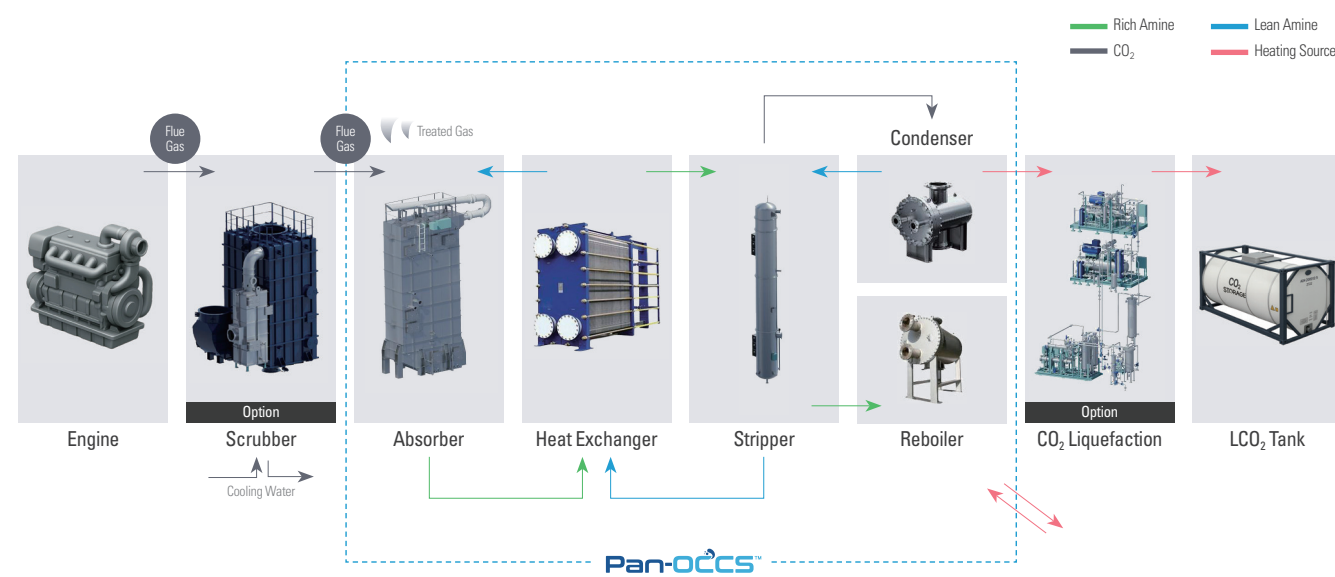


Pan-OCCS™ Onboard Carbon Capture System

The Pan-OCCS™ (Onboard Carbon Capture System) is designed to capture and prevent carbon dioxide emissions from ships from being released into the atmosphere. PANASIA OCCS is an eco-friendly technology that captures and stores CO₂ from ship exhaust gas in real time using an amine absorbent, enabling compliance with carbon emission regulations enforced by the IMO(International Maritime Organization) and EU.



Flow Diagram



Optional items



PaSOx™ De-SOx Scrubber System

The PaSOx™ system reduces sulfur oxides (SOx) generated during vessel combustion, helping to prevent air pollution. This seawater-based wet scrubber lowers SOx emissions produced when burning high-sulfur fuel oil—the primary fuel used by many vessels—thereby protecting air quality and supporting regulatory compliance.



U-Type | 1-80MW I-Type | 1-80MW Square Type | 1-70MW Micro Type | 1-6MW



Main Component

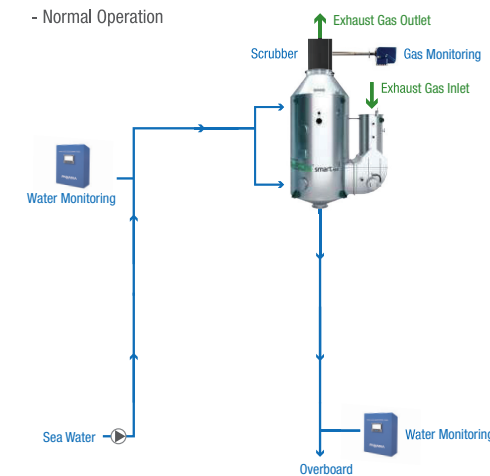


Physical-Chemical Type

PANASIA's scrubber features a hybrid process system that combines physical-chemical treatment with membrane technology. Through high-speed coagulation, sedimentation, and membrane filtration, it effectively purifies wash water.

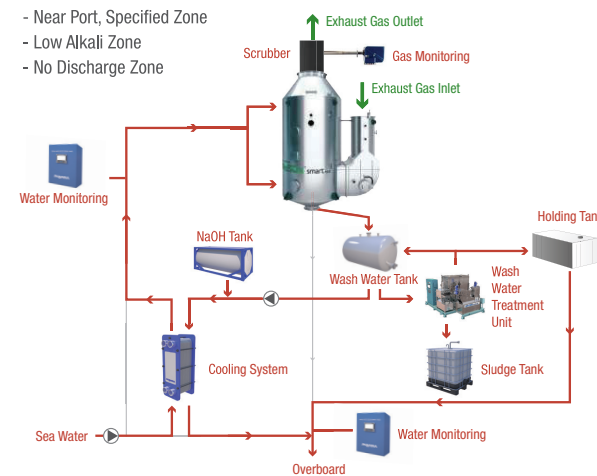
Open Mode

- Normal Operation



Close Mode

- Near Port, Specified Zone
- Low Alkali Zone
- No Discharge Zone



PaNOx™ De-NOx SCR System

The PaNOx™ system applies Selective Catalytic Reduction (SCR) technology to decompose and reduce nitrogen oxides (NOx) in exhaust gases into harmless water (H₂O) and nitrogen (N₂), delivering a clean and eco-friendly solution.



Main Component

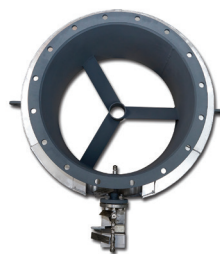
PaNOx smart V2 (Under 6 sets of Engine)

The existing Pump Unit & Dosing Control Unit can be manufactured with one equipment called the IDU (Integrated Dosing Unit) for more efficient installation.

SCR Reactor



CI (Compact Injector) - Mixer + Injector



Control Panel Integrated Dosing Unit



PaNOx smart V3 (Under 4 sets of Engine)

The IDU equipment in V2 is combined with the Control Panel and manufactured with a single equipment called PanSIS (SCR Integrated Control System) to secure footprint and price competitiveness.

PanSIS (Control Panel + Dosing Unit)



SCR Reactor

Capacity	PaNOx smart V1.0			PaNOx smart V2.0			Reduced by
	Length	Height	Length	Capacity	Height	Width	
1000kw	970	970	2750	953	947	2680	6.52%
3000kw	1293	1284	3240	1189	1181	3240	15.42%
4000kw	1613	1601	3240	1425	1415	3240	21.92%
4500kw	1923	1605	3362	1661	1649	3240	14.48%
8000kw	-	-	-	2133	2121	3240	-



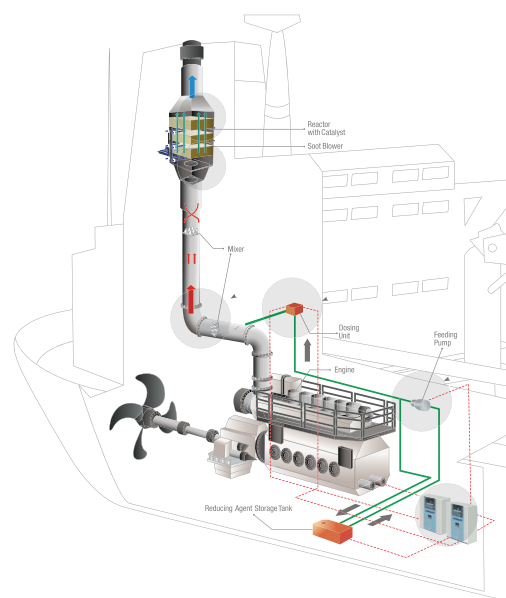
Volume Down
14.6%

I.D.U

Component	Length	Height	Length	Surface Area(m ²)	
				PaNOx smart V1.0	PaNOx smart V2.0
PaNOx smart V1.0	Pump Skid	1630	900	1516	10.6
	Dosing Unit	1200	320	1150	4.26
PaNOx smart V2.0	IDU	1070	500	1360	5.34
Reduced by					64.06%



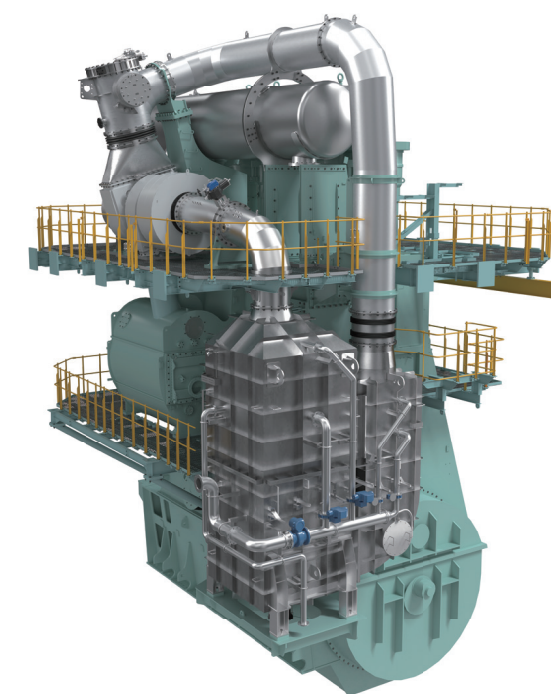
Volume Down
64.1%



Pan-iCER iCER

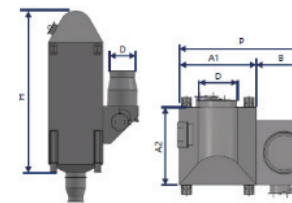
Intelligent Control by Exhaust Recycling

The iCER system cools and recirculates a portion of the engine's exhaust gas back into the combustion chamber. As a key eco-friendly technology for modern vessels, it supports both marine environmental protection and cost-efficient operation.



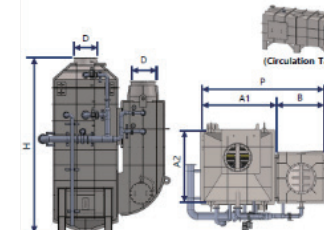
Type.1 :

On Engine-Micro type (Integrated Circulation Tank)



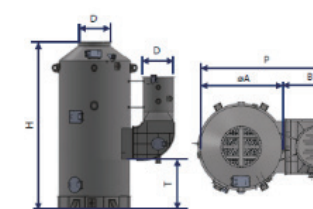
Type.2 :

On Engine type (With Circulation Tank)



Type.3 :

Off Engine type (Integrated Circulation Tank)



Pan-EMS CEMS

Continuous Emission Monitoring System

The CEMS provides continuous, real-time monitoring of gas concentrations and volumes from vessels and industrial facilities, ensuring accurate emissions management.



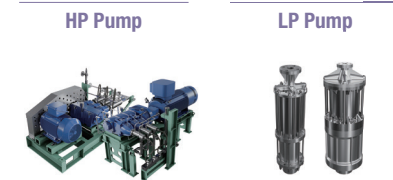
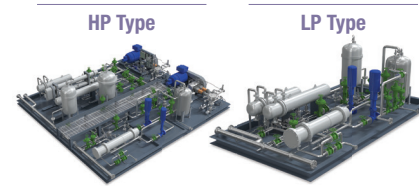
Key Benefit

Measured Gases	All in one System	Automated Regulatory Reporting	Real-Time Remote Monitoring
Nitrogen oxides (NO _x , NO ₂) Sulfur dioxide(SO ₂) Carbon monoxide (CO) Carbon dioxide (CO ₂) Methane (CH ₄) Nitrous oxide (N ₂ O) Oxygen(O ₂)	Integrates all gas monitoring functions required for vessel operation into a single system, enabling efficient reporting	Generates reports automatically in compliance with international formats such as IMO and EU MRV, enhancing management efficiency	Enables real-time remote monitoring through the maritime satellite control system (MSCS)

PanFGSS™

LNG Fuel Supply System

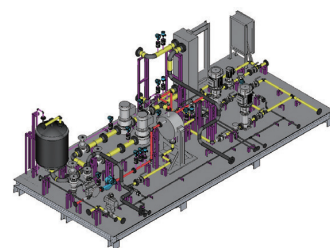
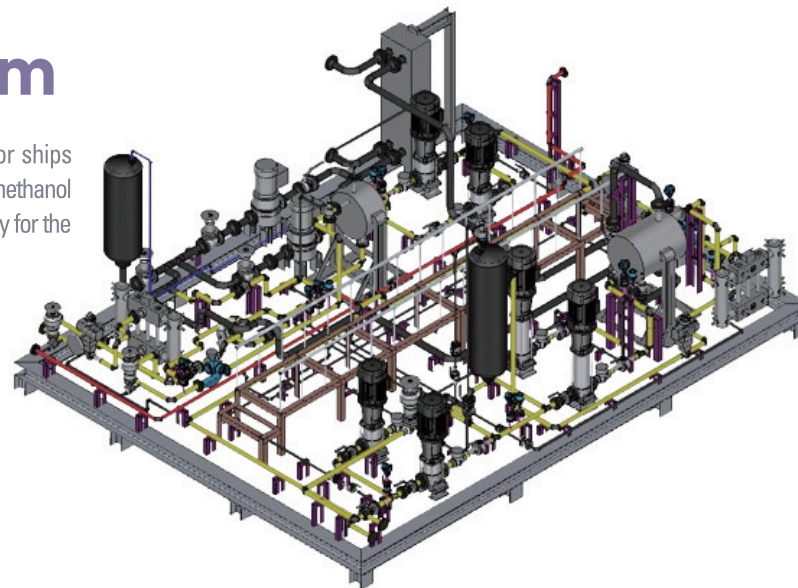
The LNG Fuel Gas Supply System (FGSS) provides ships with liquefied natural gas (LNG) as fuel. Depending on the engine model, it is classified into high-pressure (HP) and low-pressure (LP) types.



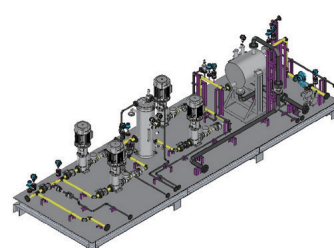
PanLFSS™

Methanol Fuel Supply System

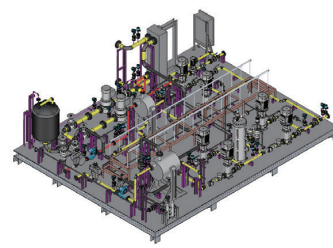
The Methanol Fuel Gas Supply System is designed for ships operating on methanol fuel. It safely stores and transfers methanol in its liquid state to the engine, serving as a core technology for the adoption of eco-friendly alternative fuels.



G/E-G.W LINE SKID



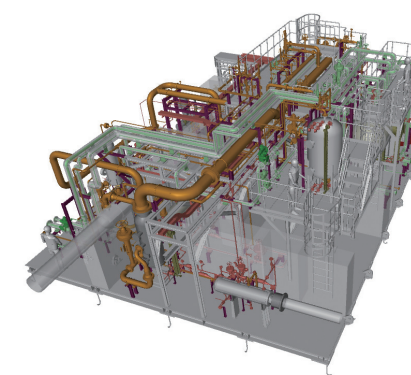
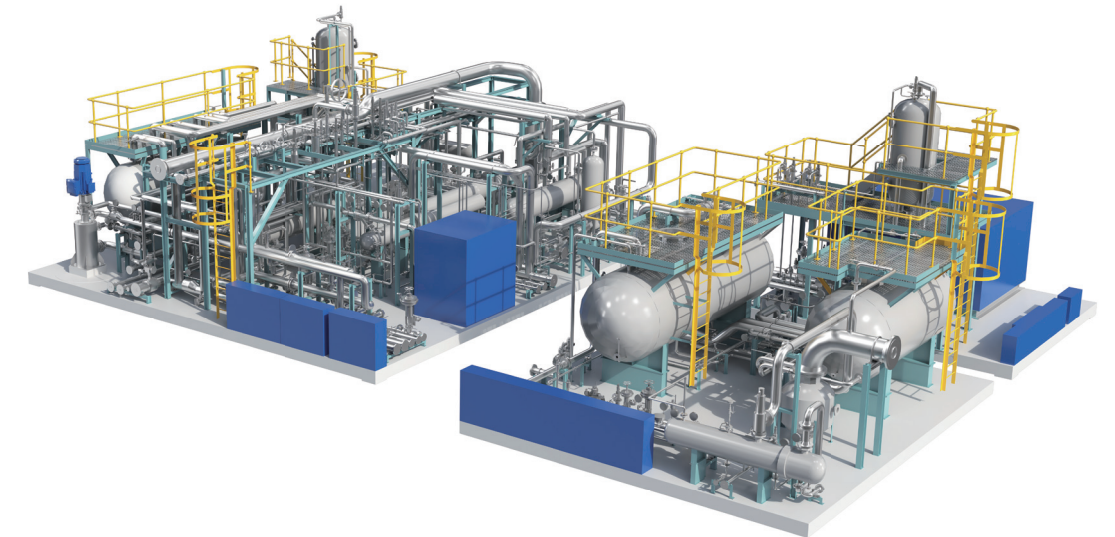
M/E LINE SKID



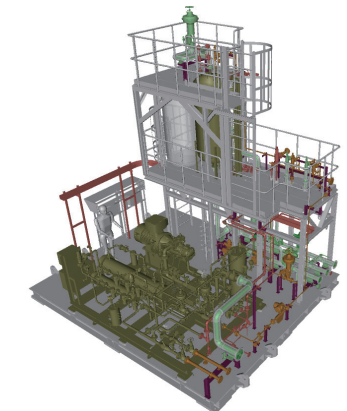
ONE SKID

Ammonia Fuel Supply System

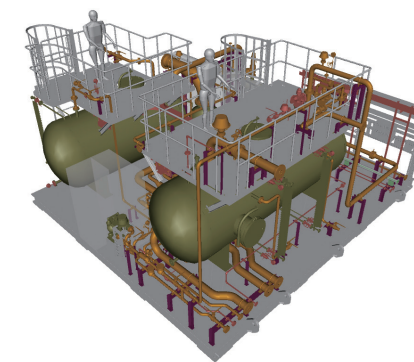
PANASIA's Ammonia Fuel Gas Supply System is designed for ships operating on liquefied ammonia fuel. Sharing a common architecture with LNG, LPG, and methanol supply systems, it ensures the safe delivery of liquefied fuels to the engine and helps ships achieve zero-carbon operation.



NH₃ Supply Skid



NH₃ Liquefaction Skid



NH₃ Dilution Skid



NH₃ Catch Skid

Cargo Monitoring System

This system accurately measures and monitors liquid levels, temperature, and pressure inside tanks, while also providing alarm functions. It enables real-time monitoring of cargo, ballast, fuel, and draft tanks, and integrates with ship control systems to ensure safe, stable, and efficient vessel operations.



Radar Beam Type Cargo Tank Monitoring System

Magnetic Float Type Cargo Tank Monitoring System

Tank Level Gauging System

The level gauging system accurately measures and transmits the status of various tanks and draft on board, enhancing the safety and efficiency in vessel operations. By converting pressure or hydrostatic head into electrical signals, it enables stable level monitoring and reliable maintenance.



LEVEL 3000™

Electric Pressure Type Level Transmitter

Air Purge Type Tank Level & Draft Gauging System

Electric Pneumatic Type Tank Level & Draft Gauging System

High Precision Electric Pneumatic Type Level Transmitter

Level Gauge

The level gauging system is designed to intuitively and reliably indicate and monitor liquid levels in tanks using various methods—such as glass reflection, float, dial, and capillary—without the need for external power or complex devices. It is simple to install and easy to operate.



Flat Type Glass Level Gauge

Magnetic Float Type Level Gauge

Self-Powered Contents Gauge

Dial Type Float Level Gauge

Level Switch

The level switch product line is available in multiple types—including horizontal and vertical magnetic floats, displacement models, and reed switches. It accurately detects liquid levels in tanks and provides reliable on/off signals for alarms and control systems



Horizontal Mounted Float Type Level Switch

Vertical Mounted Float Type Level Switch

Displacement Type Level Switch

Reed Switch Type Float Level Switch

Alarm System

This system quickly detects hazardous conditions such as cargo overflow or flooding and triggers alarms to prevent marine pollution while ensuring the safety of crews and vessels. Compliant with international regulations including USCG, SOLAS, and IMO, it provides early warning in emergencies to safeguard lives and support safe navigation.



Magnetic Float Type High & Overfill Alarm System

Water Ingress Alarm System

Vapour Monitoring System

Fixed Gas Detection System

Others



Pressure Switch (PPS-100)



Temperature Sensor (PPT-100 series)



Pressure Transmitter (PTX-100)



Electric Indicator



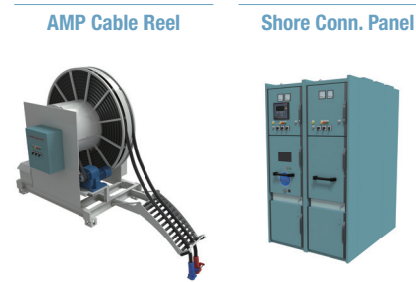
Baragraph Type Indicator



Alarm & Display Monitor

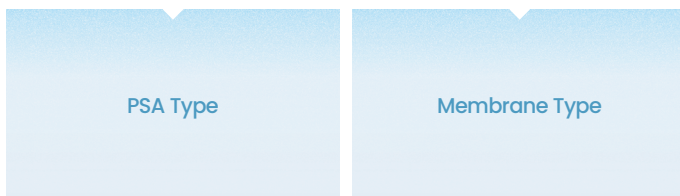
Pan-AMP Alternative Maritime Power

AMP (Alternative Maritime Power) is a system that enables vessels to receive electrical power from onshore sources while at a berth, allowing auxiliary engines to be shut down. By switching to shore power, ships can reduce fuel consumption and significantly lower air pollution from exhaust gases.



Pan-N₂GEN N₂ Generator

N₂ Generator produces nitrogen onboard the vessel and delivers it to various shipboard systems as required. It serves multiple purposes—including fire prevention, cargo protection, and purging—ensuring stable and efficient operation while eliminating dependence on shore-based nitrogen supply.



Pan-ORC Organic Rankine Cycle

ORC (Organic Rankine Cycle) is an eco-friendly power generation system that produces electricity from low- to medium-temperature waste heat. Onboard vessels, the system recovers heat from engine exhaust gases or cooling water and converts it into stable electrical power for ship operations.

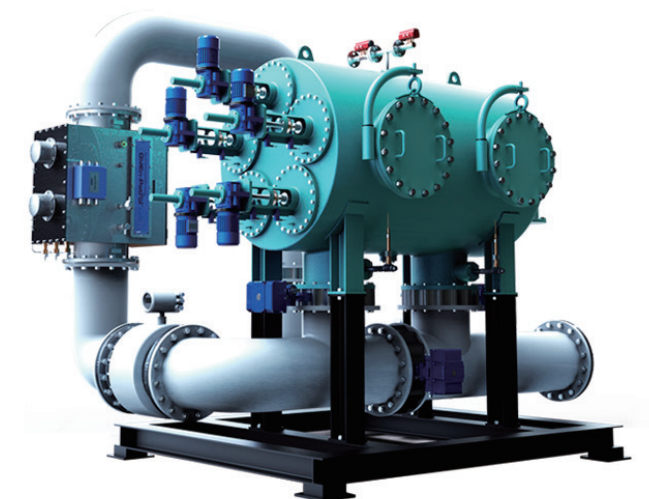


Benefits

AMP & PMSG Type 	Integrated expander-generator design
Non-explosive & non-flammable working media 	Applicable to waste heat above 75°C

GloEn-Patrol™ Ballast Water Treatment System

Ballast Water Treatment System disinfects microorganisms in ballast water to protect the marine ecosystem. Utilizing a 100% physical treatment process—filtration combined with UV lamp sterilization—it provides safe, reliable, and eco-friendly ballast water management.

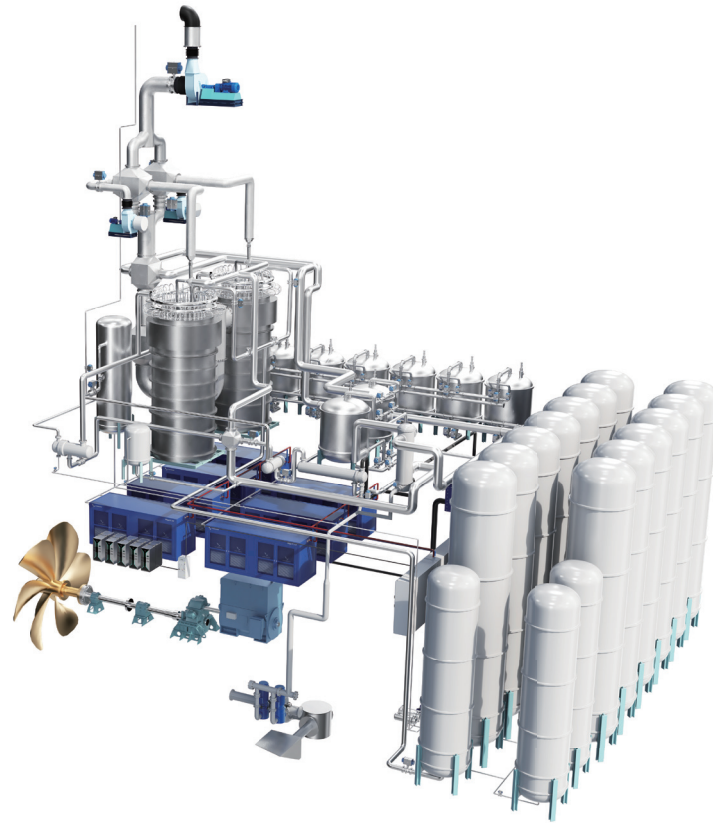


Product Line-up

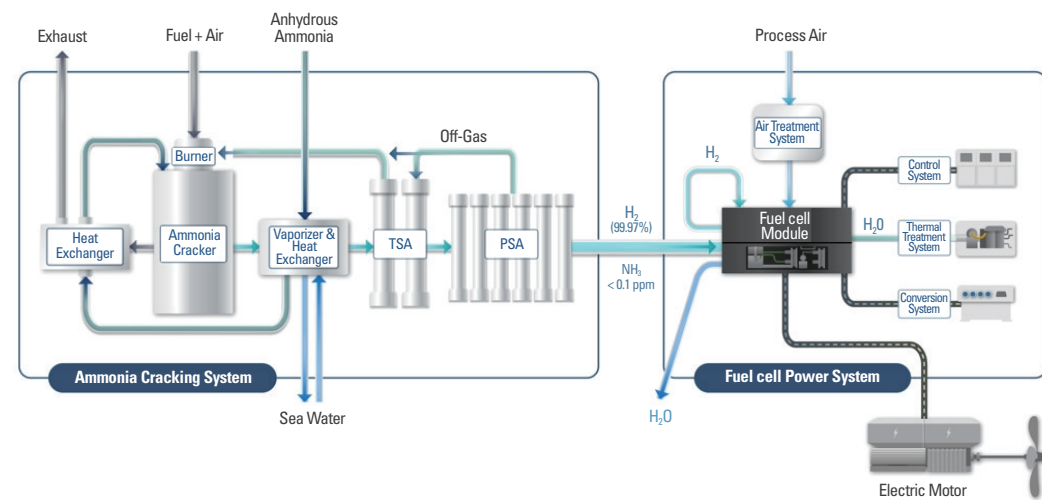
	GloEn-Patrol™ GI	GloEn-Patrol™ GIII
Combination	Original Filter Unit / Original UV Unit	MEGA Filter Unit / MEGA UV Unit
Treatment Capacity	50-700 m ³ /hr	750-3,000 m ³ /hr
Features	Small capacity with single unit	High efficiency in power consumption and footprint

PanaGen[™] Ammonia Cracking System

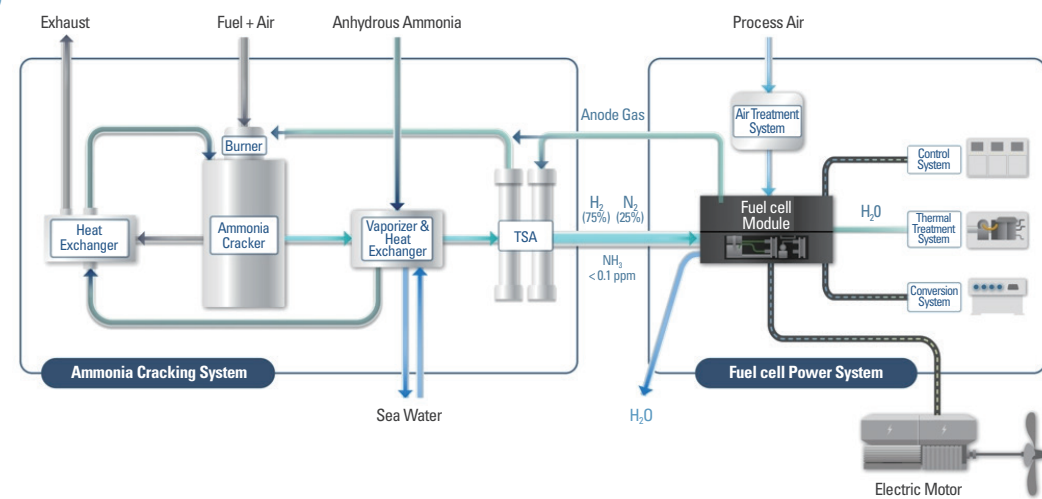
By cracking ammonia, hydrogen is extracted and supplied to fuel cell systems and energy storage devices, generating electrical power for marine applications. This technology can supplement or replace conventional propulsion and auxiliary power systems, enabling vessels to meet increasingly stringent environmental regulations.



System Flow (PSA include)



System Flow (PSA exclude)



Specifications

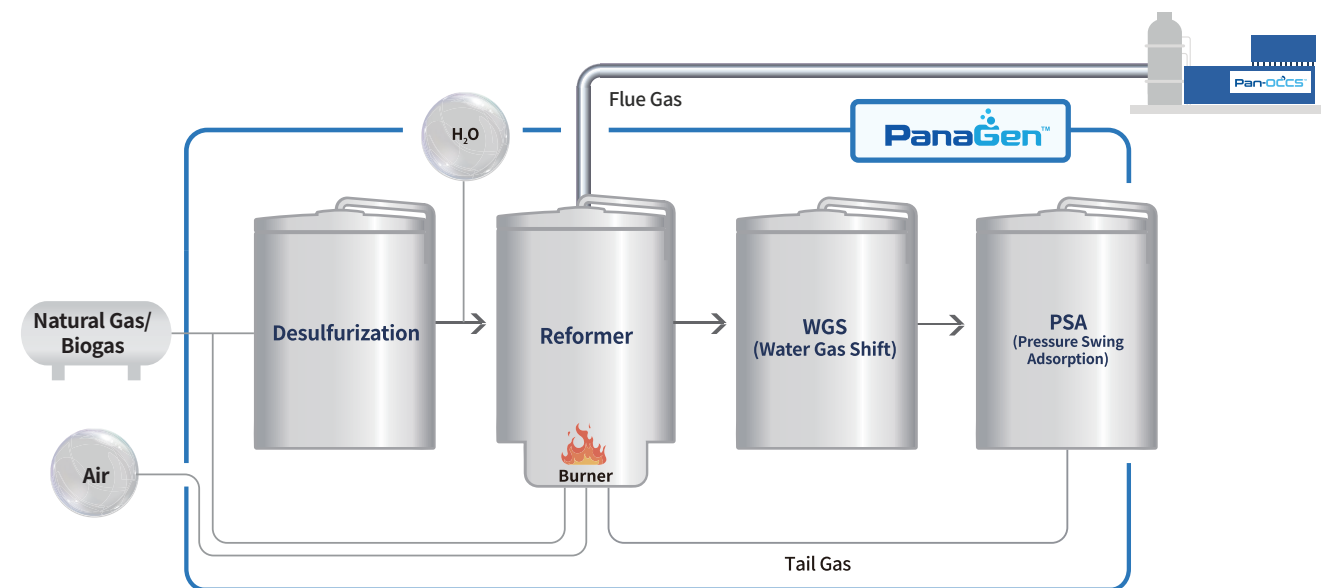
Feed Gas	Pressure	Product(H ₂)		
		Capacity	H ₂ Purity	Pressure
Ammonia	~15 bar.g	Customized	Above 99.97–98% (NH ₃ < 0.1 ppm)	10 bar.g

PanaGen[™] Steam Methane Reforming System

Hydrogen is produced through steam methane reforming (SMR) of natural gas. Onsite production enables flexible hydrogen supply for industrial facilities, power plants, and hydrogen refueling stations.



System Flow

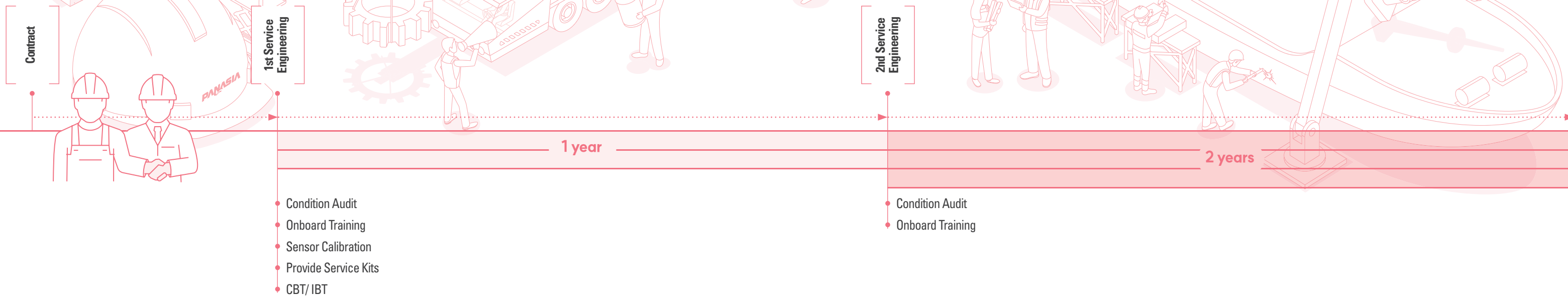


Specifications

Feed Gas	Pressure	Product(H ₂)		
		Capacity	H ₂ Purity	Pressure
Methane (Biogas and etc)	9.5 bar.g	Customized	99.999%	6 bar.g

MRO Maintenance, Repair and Operation

PANASIA provides comprehensive solutions for cost reduction and performance improvement through continuous maintenance and repair, preventive inspections, and diagnostic training services.



Inspection

Sensor Calibration

Sensors installed on vessels require regular calibration and replacement—every two years for scrubbers and annually for BWTS. PANASIA manages these schedules to ensure reliability, allowing customers to focus on safe and efficient vessel operations.

Monitoring & Control

Pan-MSCS™ is a maritime satellite control system that manages PANASIA products such as BWTS and SOx scrubbers. Using vessel satellite communication, it collects operational data and generates user-friendly reports to support equipment management. With customized ICT services, Pan-MSCS™ enables real-time monitoring of product status, helping vessels operate efficiently and contributing to the smart ship ecosystem.

Condition Audit

PANASIA helps the ship crew to continue operating in normal condition by grasping future problems in advance through preventive check-ups and condition inspection activities.

Training

Onboard Training

During regular crew rotations, operators often need time to adapt to the multiple systems installed onboard. PANASIA provides customized operational training for crew members and delivers detailed, professional programs through action learning.



Crew Training Program (CBT/IBT)

PANASIA MRO services provide product training programs accessible anytime, anywhere. Available both online and offline, the training can be accessed on tablets or laptops for maximum convenience. Covering product features, operating guidelines, maintenance, troubleshooting, and more, PANASIA's training programs support professional and efficient product operation.



CBT(Computer Based Training Program)

IBT(Internet Based Training Program)

PANASIA IBT Certificate

Certificate of
PANASIA Internet Based Training

This is to certify that
Date : June 21st, 2023

NAME : Adhitya Jose Augustine Ramon Juanitas
COMPANY : UTILELEN AS
has attended Internet Based Training on Gledin-Patrol™(IBT/ITS) hosted by PANASIA CO., LTD. on June 21st, 2023 and has successfully fulfilled all of the requirements.

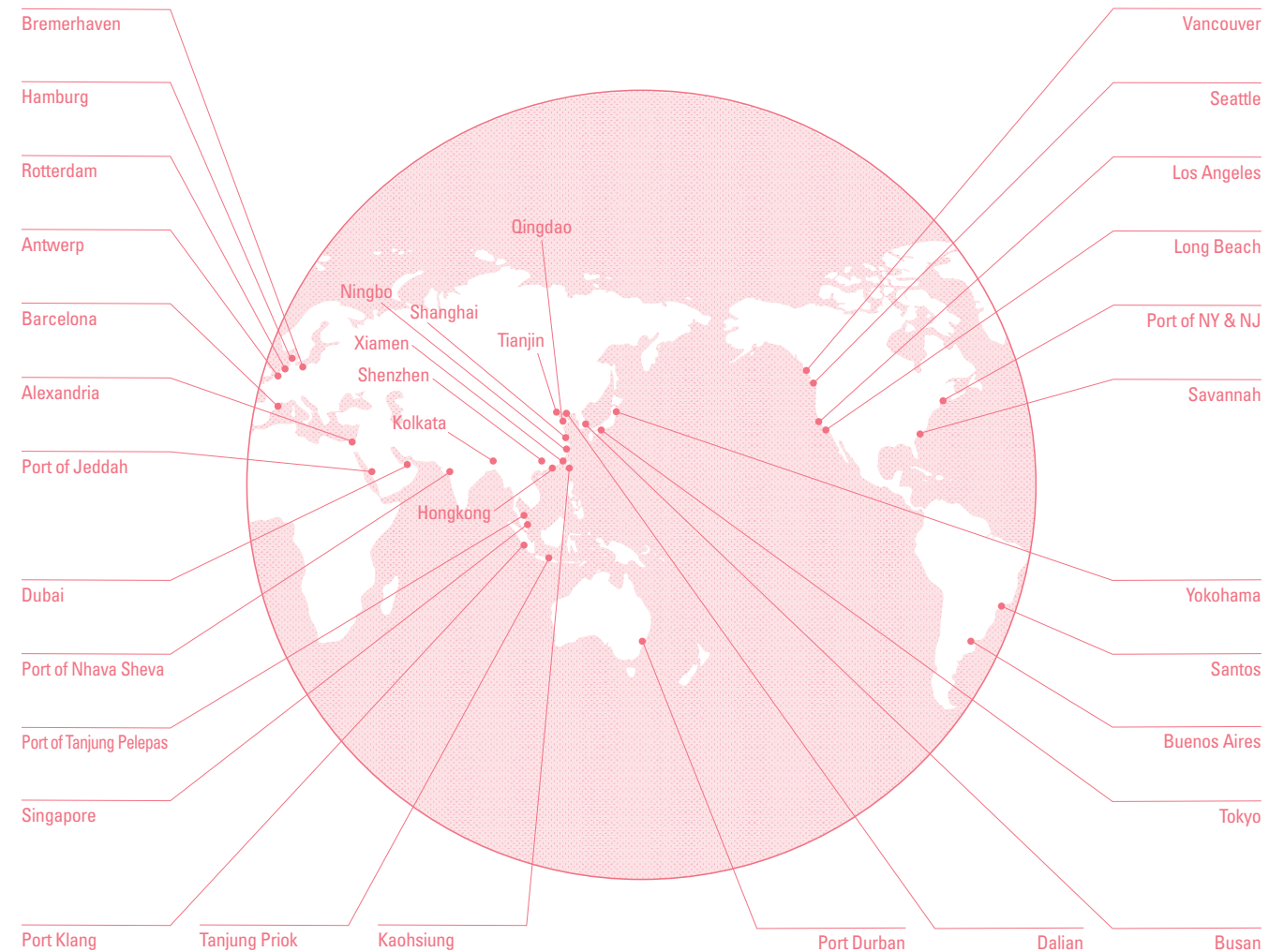
Retrofit

PANASIA is recognized for its advanced technology both domestically and internationally, delivering high-quality services. From equipment supply to engineering and construction, PANASIA offers the full range of capabilities to manage every stage of the process.



Global Network

47 Global Service Networks in 37 Countries



Our Services

You may determine the scope of work for installation on operating vessels

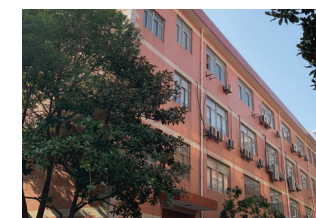
Equipment	Engineering	Design
<ul style="list-style-type: none"> · BWTS Equipment · SCRUBBER Equipment · Commissioning · Demonstration 	<ul style="list-style-type: none"> · Onboard Survey · Basic Design · Owner / Class Plan Approval · Interface with Existing Automation System 	<ul style="list-style-type: none"> · Installation Drawing · Manufacturing Drawing
Material Supply	Installation Work	Supervision
<ul style="list-style-type: none"> · Steel Structures · Pipe Spools · Installation Materials · Cables 	<ul style="list-style-type: none"> · Pipe Spools Installation · Laying & Connection Cables 	<ul style="list-style-type: none"> · Schedule Control · Quality Control · Instruction to Workers

Retrofit Contract Cases

4 Types of Contract Cases

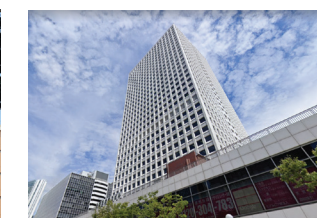
CASE 1	System + Supervision
CASE 2	System + Engineering + Supervision
CASE 3	System + Engineering + Materials installed (piping, steel outfitting, electricity) + Supervision
CASE 4	System + Engineering + Materials installed (piping, steel outfitting, electricity) + Installation + Supervision

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25th Oct. 2025

To reflect PANASIA's corporate philosophy of seeking eco-friendly and sustainable value, this booklet was printed with naturally biodegradable soy ink that makes paper recycling easier.