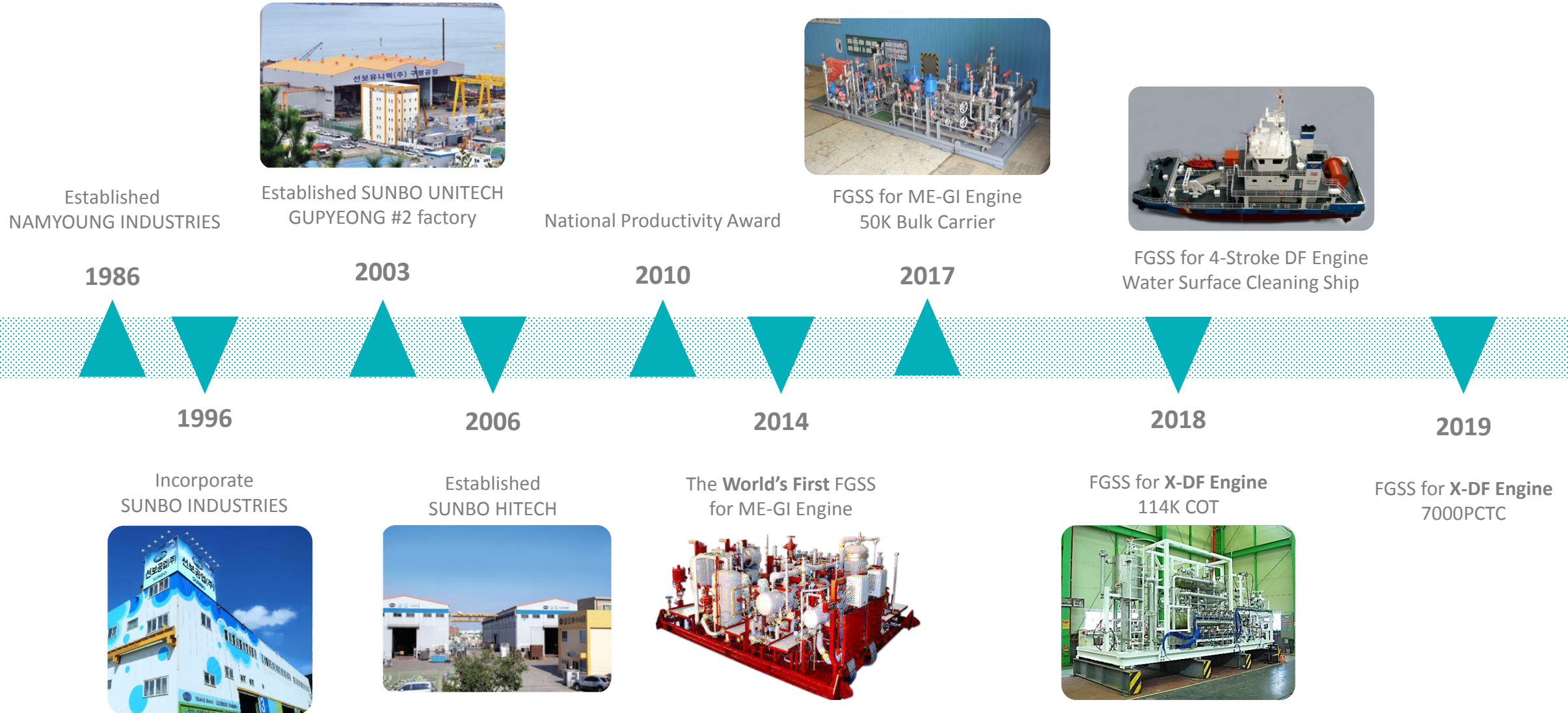




SUNBO INDUSTRIES

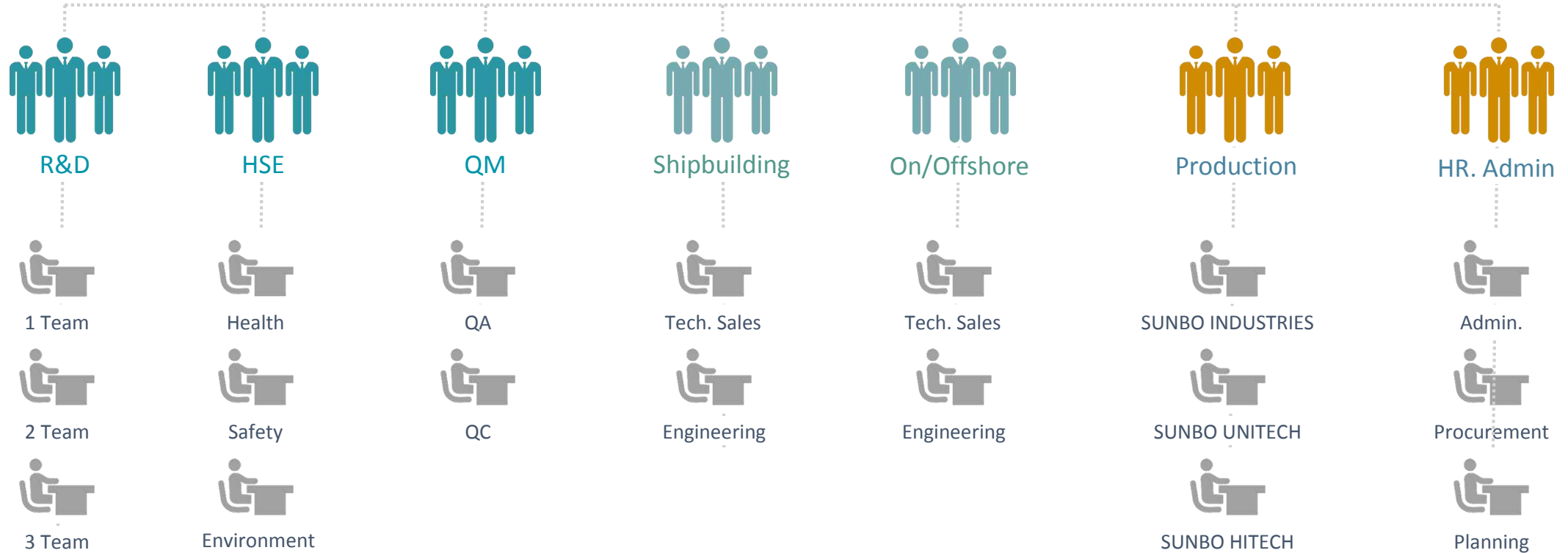
Cleaner World with LNG Fuel
LNG Fuel Gas Supply and Regas. Solution Provider

TIMELINE



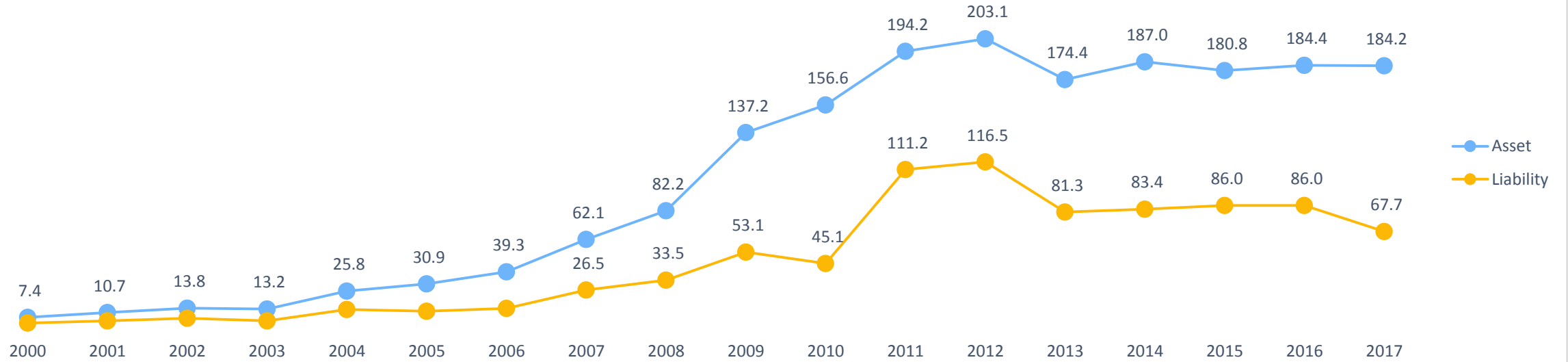
ORGANIZATION

Total	776
Design	53
R&D	16
Office	214
Production	562

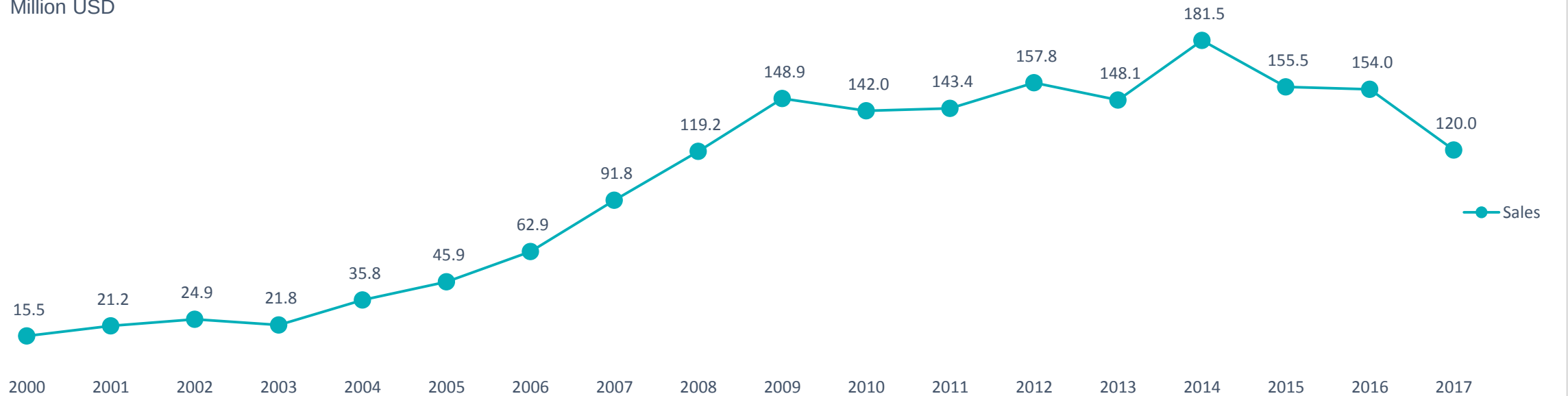


FINANCIAL STATUS

Million USD



Million USD



CERTIFICATION

ISO 9001



ISO 14001



OHSAS 18001



ASME U STAMP



ASME S STAMP



ACHILLES FPS



COMPANY AWARD & RECOGNITION

2004
産業表彰



2010
國家生産性大賞



2012
銅塔産業勳章



2010
釜山産業大賞



2005
HHI 功勞賞



2018
革新優秀協力會社



HHI 優秀協力會社



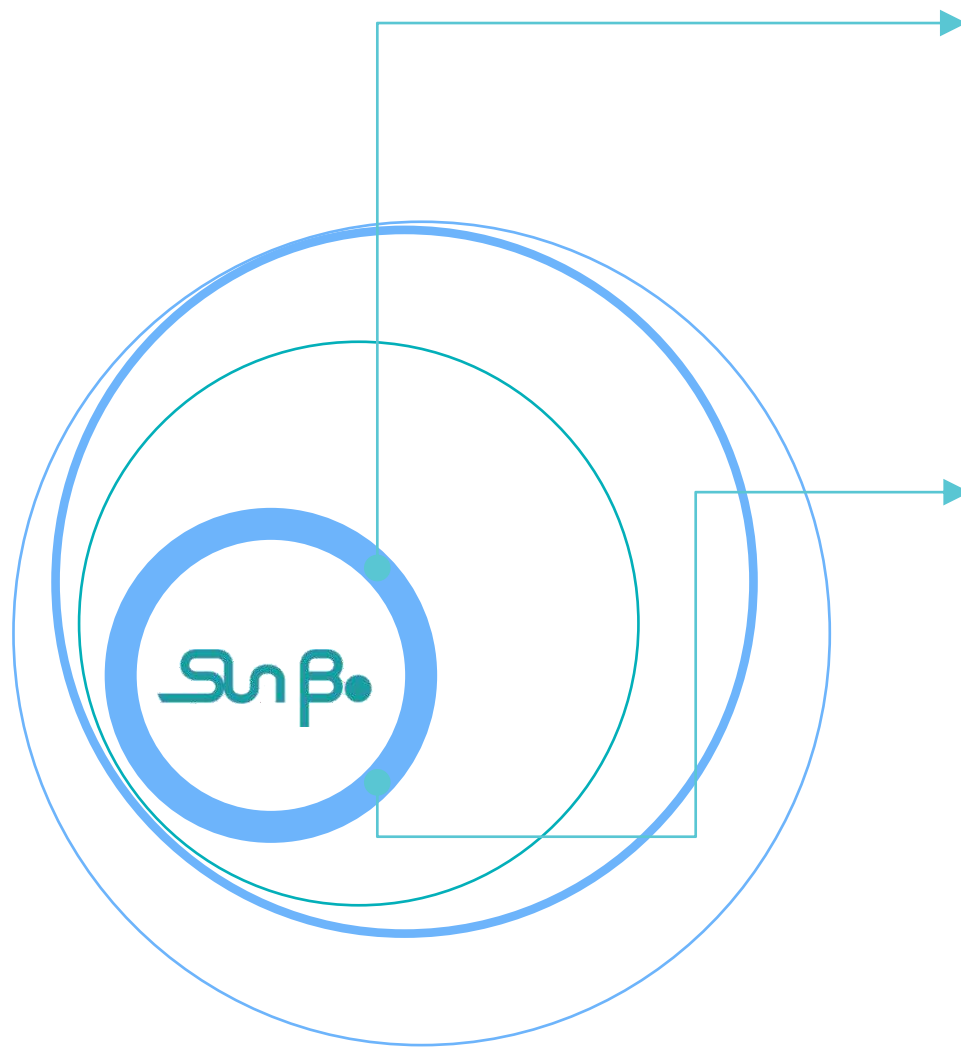
DSME 最優秀協力會社



SHI Q-GOLD MARK



BUSINESS FIELD



SHIPBUILDING



- Main deck unit | E-Room unit | Tank top unit | Strainer | Silencer | Stern tube unit | LNG Fuel Gas Supply System | PRS | FSRU Regas system | BWMS

ON/OFFSHORE



- Process and Utility package: Purifier skid | SRU/UF | TEG | MEG
- Pipe rack module

FACTORY LOCATION

SUNBO INDUSTRIES. 1st Factory



- Main product
- Small Unit & Package
- Head Quarters
- 8,264.46m²
- Floor Space : 7,603m²

SUNBO INDUSTRIES. 2nd Factory



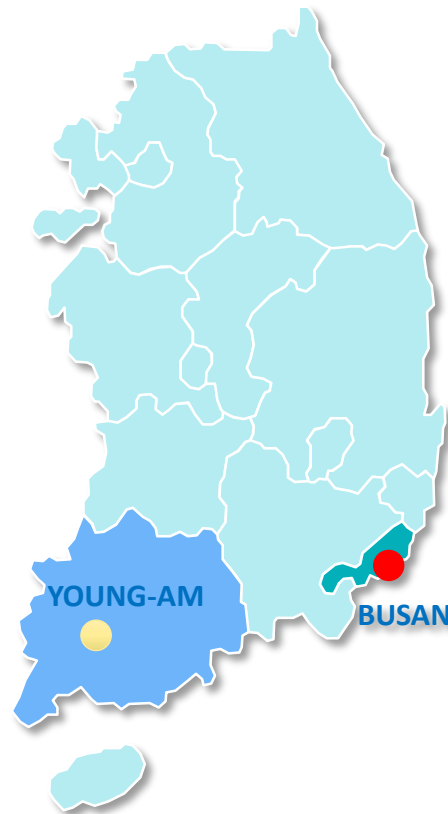
- Main product
- Small Unit & Package
- 16,528.93m²
- Floor Space : 8,264.46m²

SUNBO INDUSTRIES. 3rd Factory



- Main product
- W/O Strainer
- Silencer / Calorifier
- 15,200.17m²
- Floor Space : 5,640.78m²

- Factory : 6
- Busan Area : 5
- Jeolla Province: 1

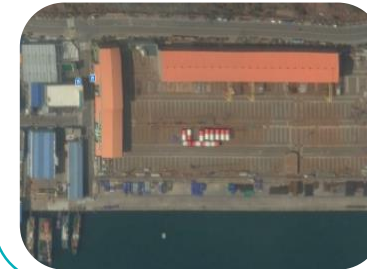


SUNBO UNITECH. Gu-pyeong Factory



- Main product
- Oil & Gas Process Package
- Jetty 130m
- 21,487.60m²
- Floor Space : 6,611.6m²

SUNBO UNITECH. Gu-pyeong 1st Factory



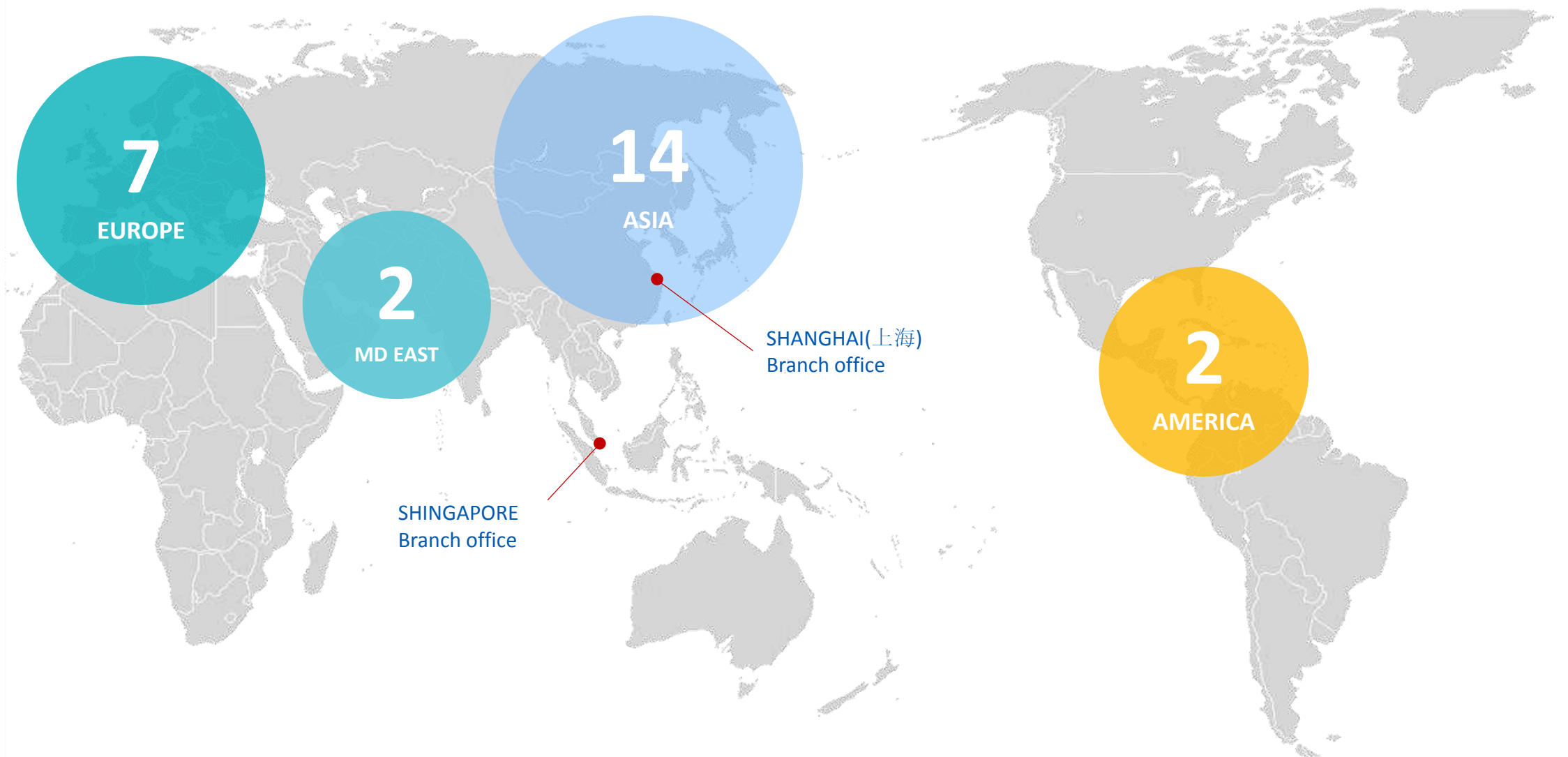
- Main product
- Process & Power Plant
- Jetty 450m
- Max. Water depth 14m
- 68,300.00m²
- Floor Space : 16,048m²

SUNBO HITECH. Young-am Factory



- Main product
- Tank top unit
- Under group unit
- 11,239.67m²
- Floor Space : 2,975.2m²

WORLDWIDE NETWORK



MARPOL ANNEX VI

To meet MARPOL ANNEX VI, prevention of air pollution from ships, “SCR (or EGR) + Scrubber” or “Clean Fuel” shall be required

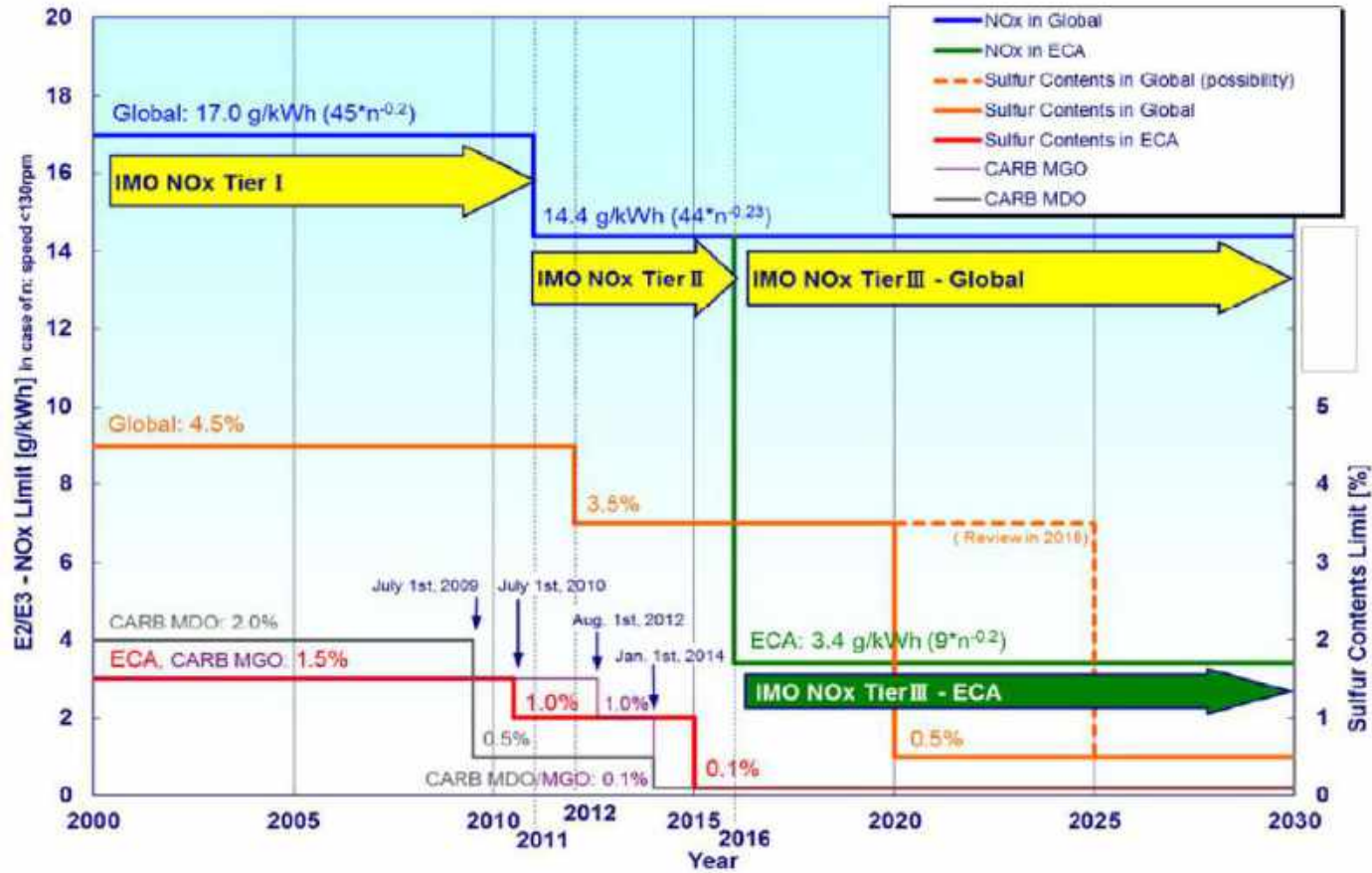
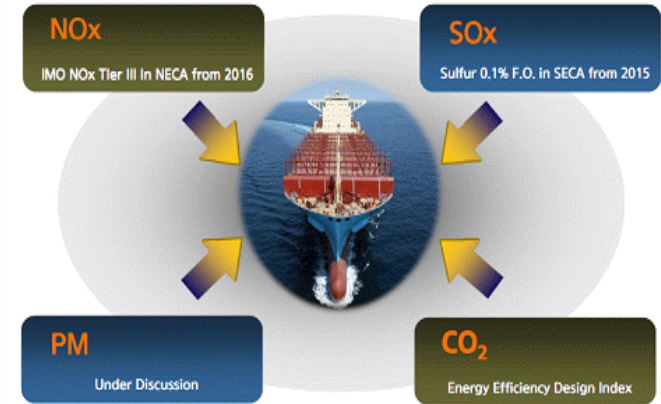


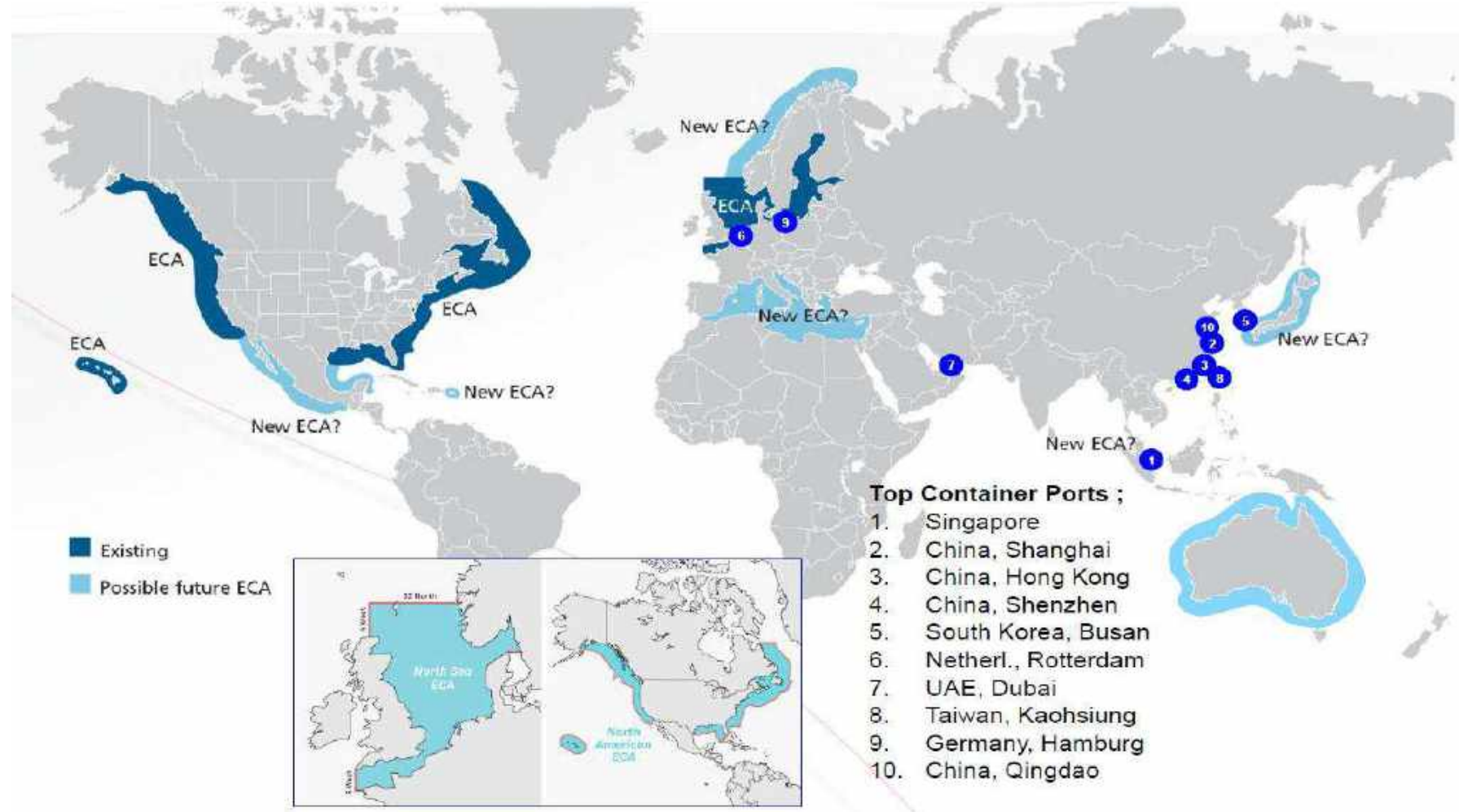
Figure 1 IMO emission regulations



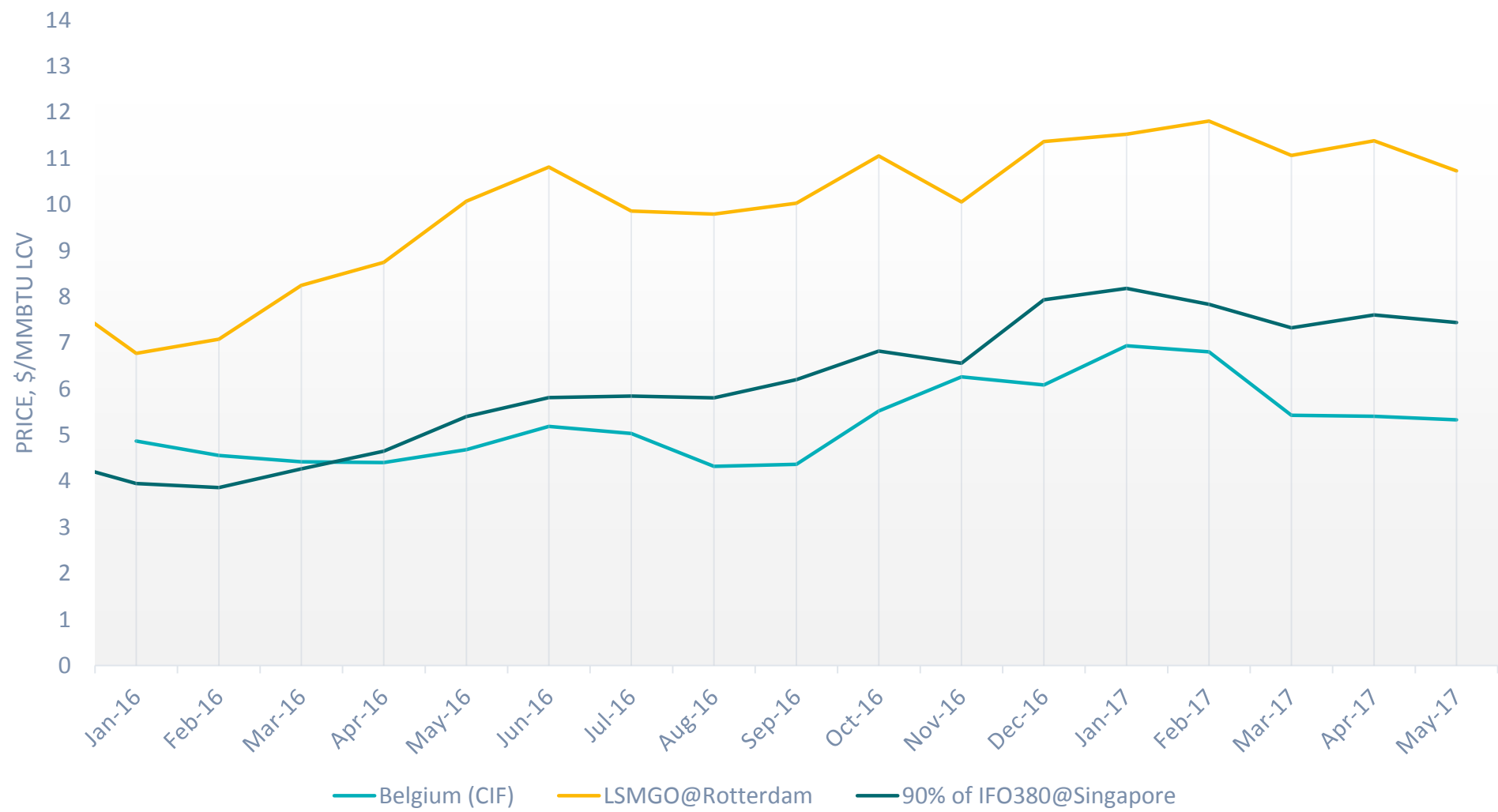
Control Matters	Rules	Control Area	Year										Remarks
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
NOx	MARPOL Annex VI Regulation 13	ECA			Tier II							Tier III	Ban on Keel of New Green Vessel
		GLOBAL											
SOx	MARPOL Annex VI Regulation 14	ECA			1.0 %S								Sulfur contents 0.5% in the fuel to be reviewed in 2018
		GLOBAL											
CO ₂ (EEDI)	MARPOL Annex VI	ECA/ GLOBAL			Phase 0								Phase 1 Phase 2
		US-EPA											
BWM (Ballast Water Management)	IMO	All											Expected to be come into force in 2015
	USCG	USA						Phase 1					Phase 2 (To be discussed)

ECA: Emission Control Area

ECA shall be extended in the future.



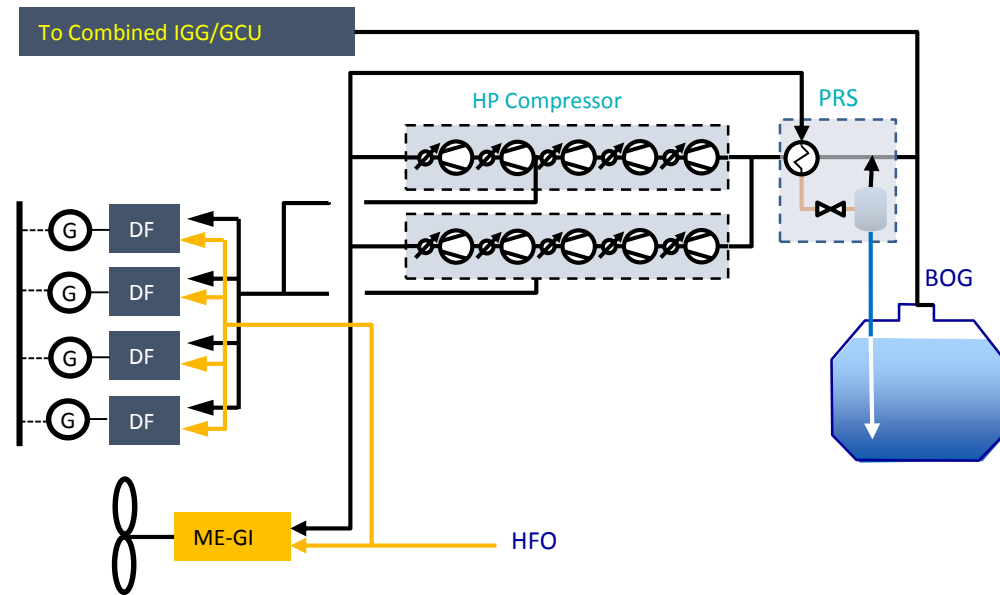
FUEL PRICE TREND



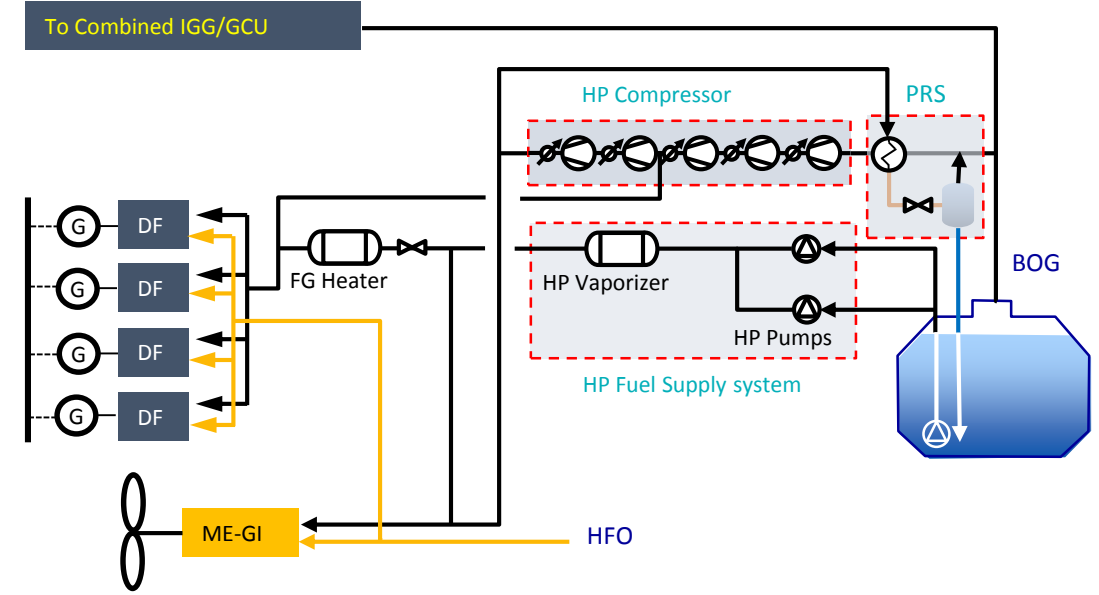
Source: eurostat

SOLUTION for LNG CARRIER (ME-GI Engine)

CASE 1



CASE 2



BOG COMPRESSOR SYSTEM (Gupyeong 1st Factory)



BUCKHARDT
Reciprocating Compressor

BOG COMPRESSOR SYSTEM REFERENCE

TOTAL : 45 sets

YEAR	SHIP TYPE	CLIENT	SHIP OWNER	UNIT	YARD	CLASS	STATUS
2015	FSRU	BCAG	MOL	2	DSME	BV	Completion
2016	LNGC	BCAG	SEA TANKER	2	DSME	ABS	Completion
2016	LNGC	BCAG	KLC	2	DSME	KR	Completion
2016	LNGC	BCAG	HYUNDAI	2	DSME	KR	Completion
2016	LNGC	BCAG	MARAN GAS	4	DSME	DNV	Completion
2016	LNGC	BCAG	CHANDRIS	2	DSME	LR	Completion
2016	LNGC	BCAG	MARAN GAS	2	DSME	ABS, LR	Completion
2016	FSRU	BCAG	HOEGH	1	HHI	DNV	Completion
2016	LNGC	BCAG	BP	12	DSME	LR	Completion
2017	LNGC	BCAG	TEEKAY	2	HHI	DNV	Completion
2017	FSRU	KOBELCO	PARDUS	1	HHI	BV	Completion
2018	LNGC	BCAG	CHANDRIS	2	DSME	LR	Completion
2018	LNGC	BCAG	MARAN	6	DSME	ABS/LR	Ongoing
2018	LNGC	BCAG	SEA TANKER	2	DSME	ABS	Completion
2018	LNGC	BCAG	BW	3	DSME	DNV	Ongoing

DETAIL
ENGINEERING

PROCUREMENT

CONSTRUCTION

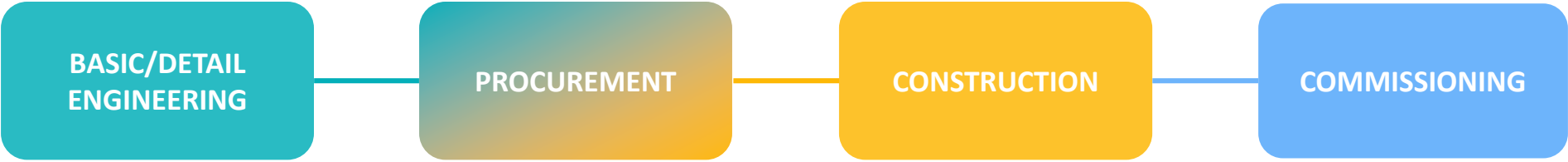
HP FUEL SUPPLY SYSTEM (Dadae 2nd Factory)



HP FUEL SUPPLY SYSTEM REFERENCE

TOTAL : 5 sets

YEAR	SHIP TYPE	CLIENT	OWNER	UNIT	YARD	CLASS	STATUS
2015	ME-GI TEST	ACD	DOOSAN Engine	1	-	KGS	Completion
2017	173.4K LNGC (4 ships)	DSME	TEEKAY	4	DSME	DNV-GL	Completion



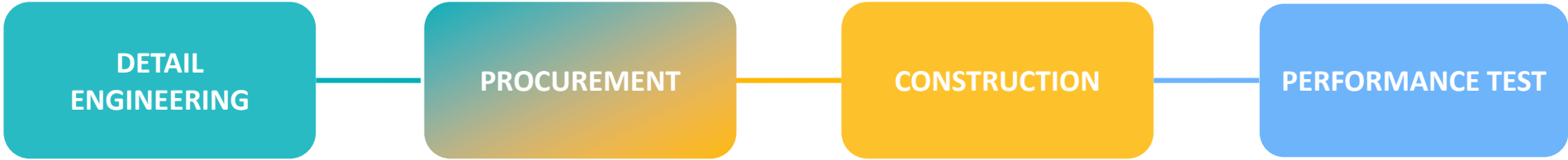
PRS: PARTIAL RE-LIQUEFACTION SYSTEM (Dadae 2nd Factory)



PRS REFERENCE

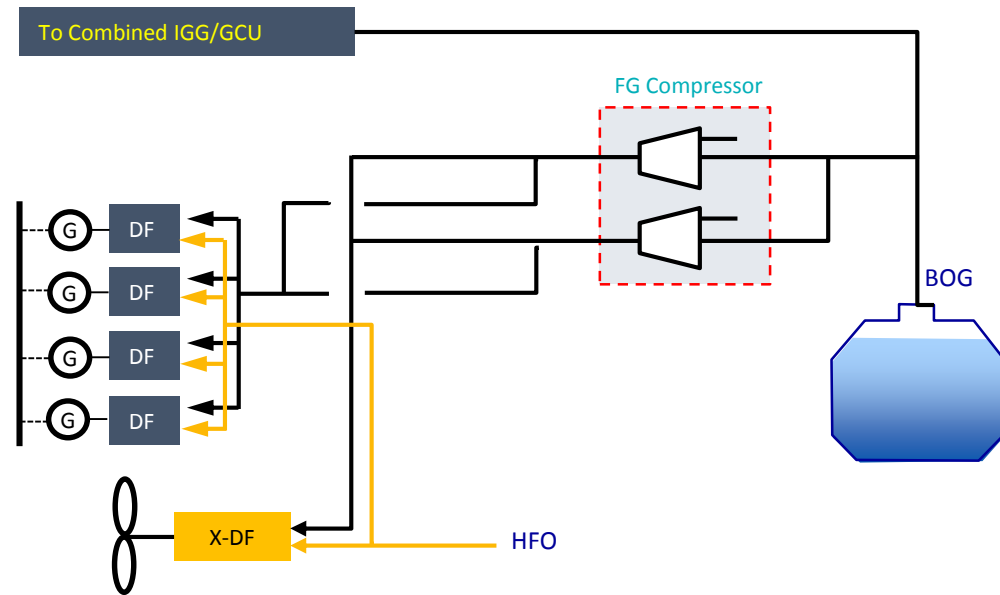
TOTAL : 16 sets

YEAR	SHIP TYPE	CLIENT	SHIP OWNER	UNIT	YARD	CLASS	STATUS
2016	173.4K LNG Carrier	DSME	KOREA LINE	2	DSME	ABS, KR	Completion
2016	173.4K LNG Carrier	DSME	MARAN GAS	4	DSME	DNV, LR, ABS	Completion
2016	173.4K LNG Carrier	DSME	BW GAS	2	DSME	DNV	Completion
2016	173.4K LNG Carrier	DSME	SEA TANKERS	2	DSME	ABS	Completion
2017	173.4K LNG Carrier	DSME	SEA TANKERS	2	DSME	ABS	Completion
2018	173.4K LNG Carrier	DSME	BW GAS	1	DSME	DNV-GL	Ongoing
2018	173.4K LNG Carrier	DSME	MARAN GAS	3	DSME	ABS / LR	Ongoing

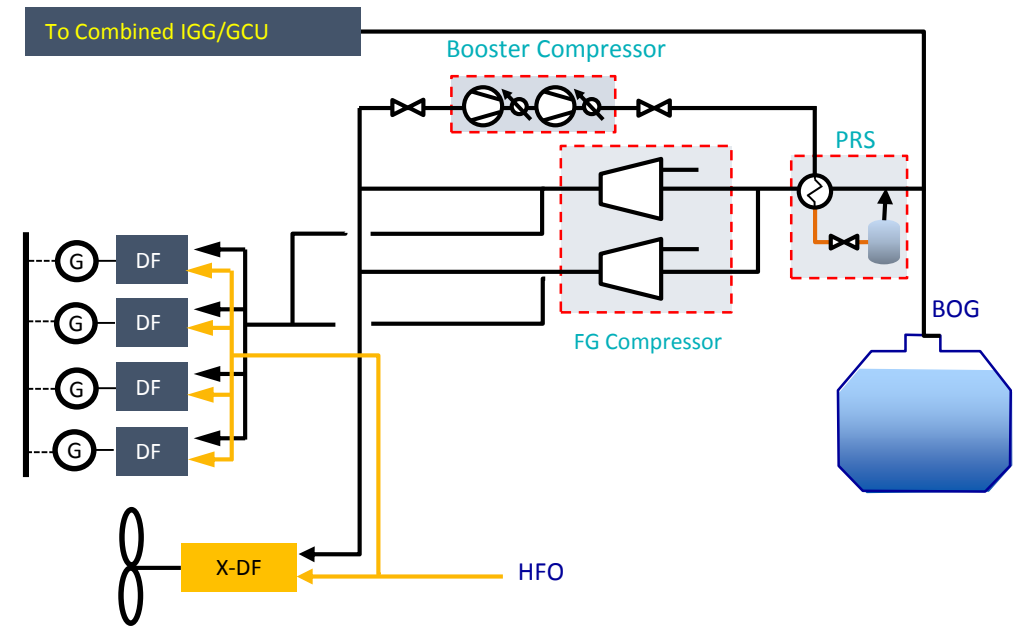


SOLUTION for LNG CARRIER (X-DF Engine)

CASE 1



CASE 2



FG COMPRESSOR SYSTEM (Gu-pyeong Factory)



**KOBELCO
Screw Compressor**

BOOSTER COMPRESSOR SYSTEM (Gu-pyeong Factory)



KOBELCO
Booster Compressor

FG COMPRESSOR SYSTEM REFERENCE

YEAR	SHIP TYPE	CLIENT	SHIP OWNER	UNIT	YARD	CLASS	STATUS
2017	LNGC	KOBELCO	MOL	2	DSME	BV	Completion
2017	LNGC	KOBELCO	SK SHIPPING	4	HHI	ABS	Completion

BOOSTER COMPRESSOR SYSTEM REFERENCE

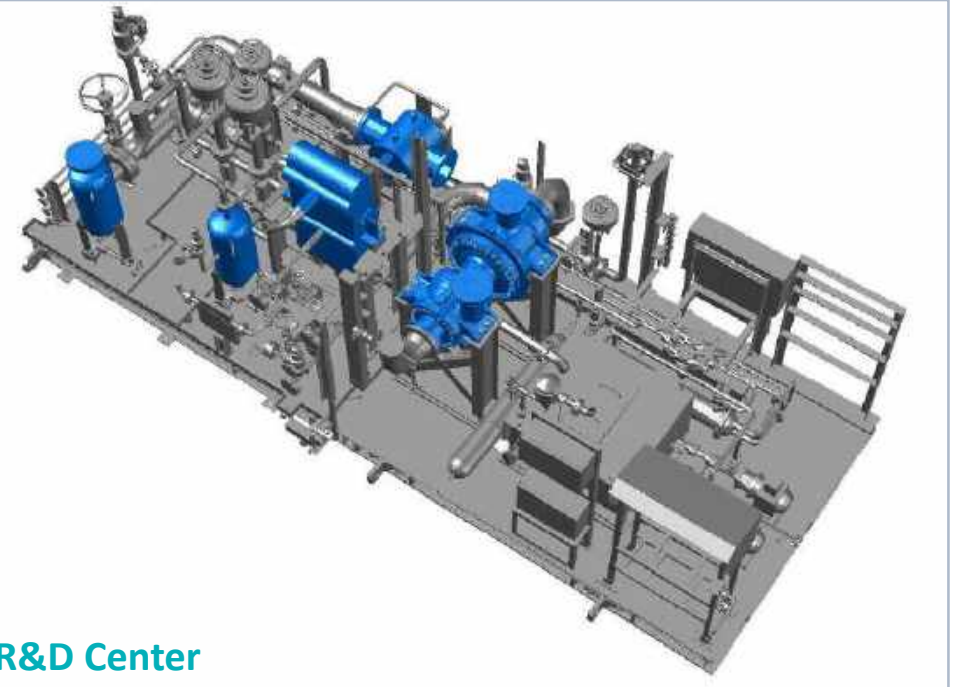
YEAR	SHIP TYPE	CLIENT	SHIP OWNER	UNIT	YARD	CLASS	STATUS
2017	LNGC	KOBELCO	MOL	1	DSME	BV	Completion



PRS & MRS



DSME



R&D Center

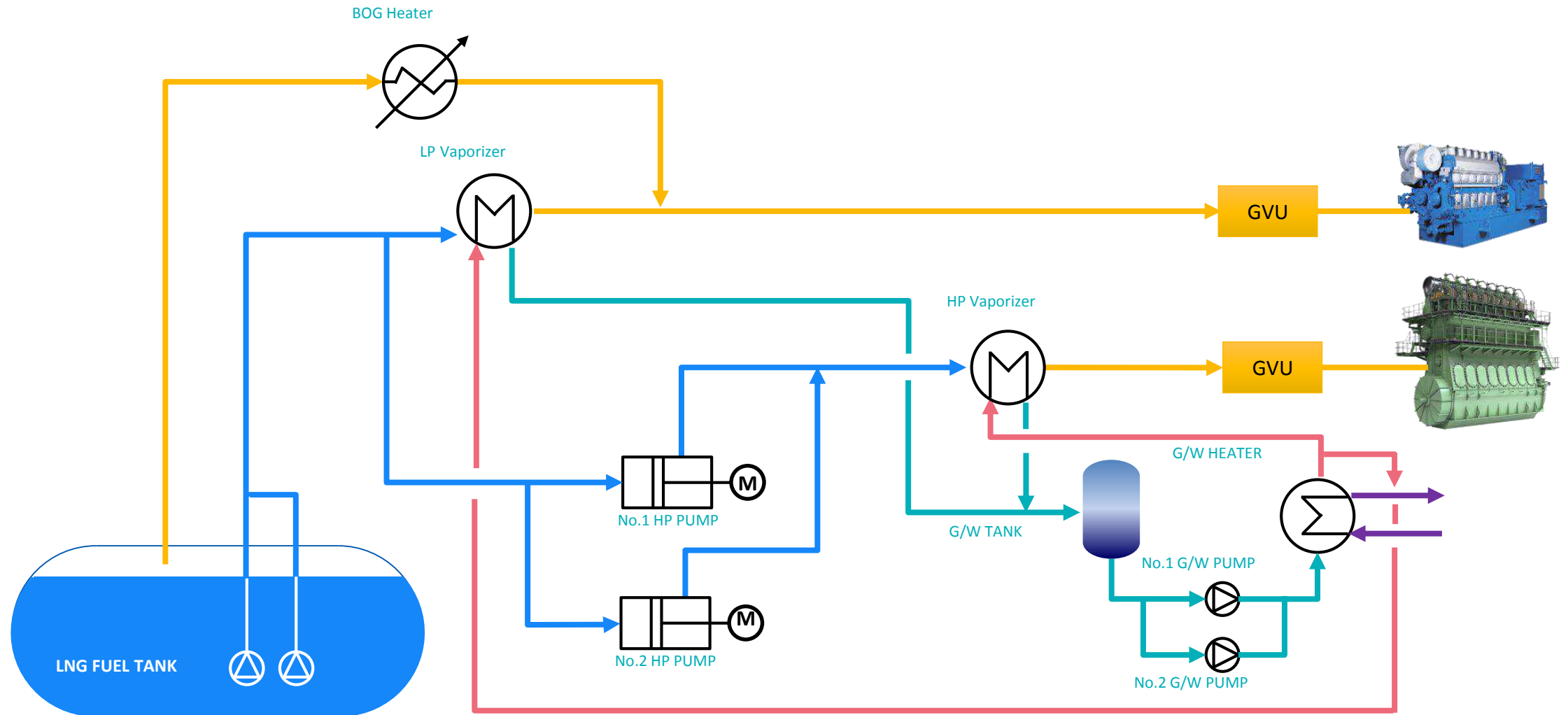


MRS

MRS : Methane Re-liquefaction System
- Refrigeration Cycle
- PRS + Comander

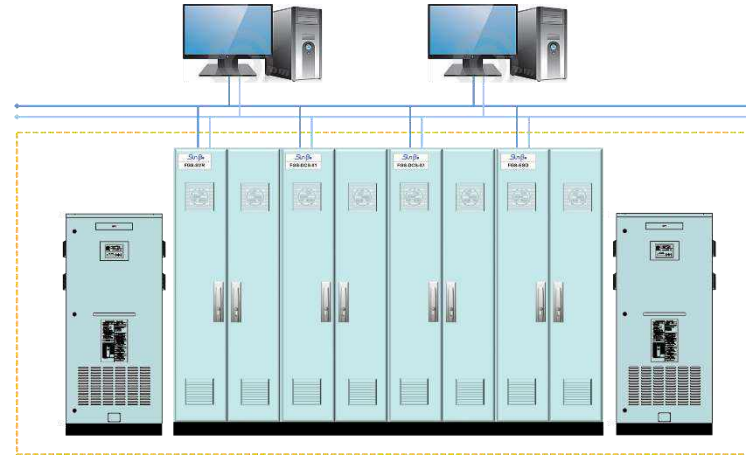
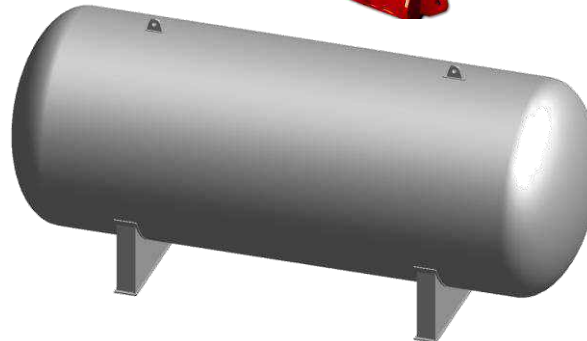
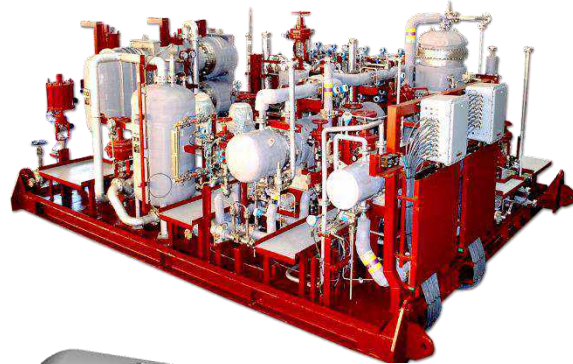
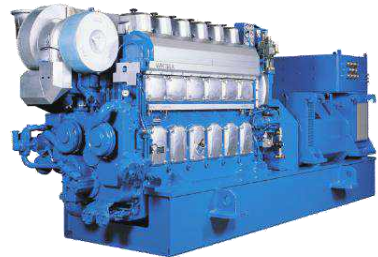
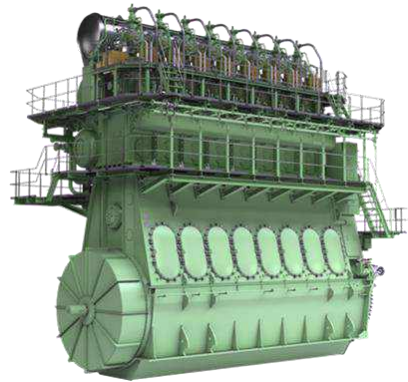
PRS

SOLUTION for LNG FUELED SHIP (ME-GI ENGINE)



SCOPE OF WORK/SUPPLY (ME-GI ENGINE)

SUNBO TOTAL SOLUTION



ME-GI ENGINE (NEW BUILDING Only)

TOTAL : 14 Ship(s)

Engine delivery : by 2018

OWNER	SHIPYARD	SHIP TYPE	No. OF SHIP	ENGINE DELIVERY	SHIP DELIVERY	FGSS MAKER
TOTE(USA)	NASSCO (USA)	3,100TEU Container: LNG Fueled	2	2014	2015	SUNBO
Crowley	VT Halter	2,400TEU Con/RO-RO: LNG Fueled	2	2015	2018	TGE
Navigator Gas	Jiangnan	35,000m3 LPG Carrier: LNG Fueled	4	2015	2016, 2017	TGE
Wallenius & NYK	NACKS	3,800 SSC PCTC: LNG Fueled	2	2015	2016	TGE
Matson	NASSCO	3,600TEU Container: LNG Ready	2	2016	-	
Ilshin(Korea)	HMD (Korea)	50,000DWT Bulk Carrier: LNG Fueled	1	2017	2017	SUNBO
ESL Shipping	Jinling	25,000DWT Bulk Carrier: LNG Fueled	1	2017	2018	LGM
TOTE	PHILLY	3,700TEU Container: LNG Fueled	2		Currently on Pending	

FGSS: Fuel Gas Supply System (Dadae 2nd Factory)

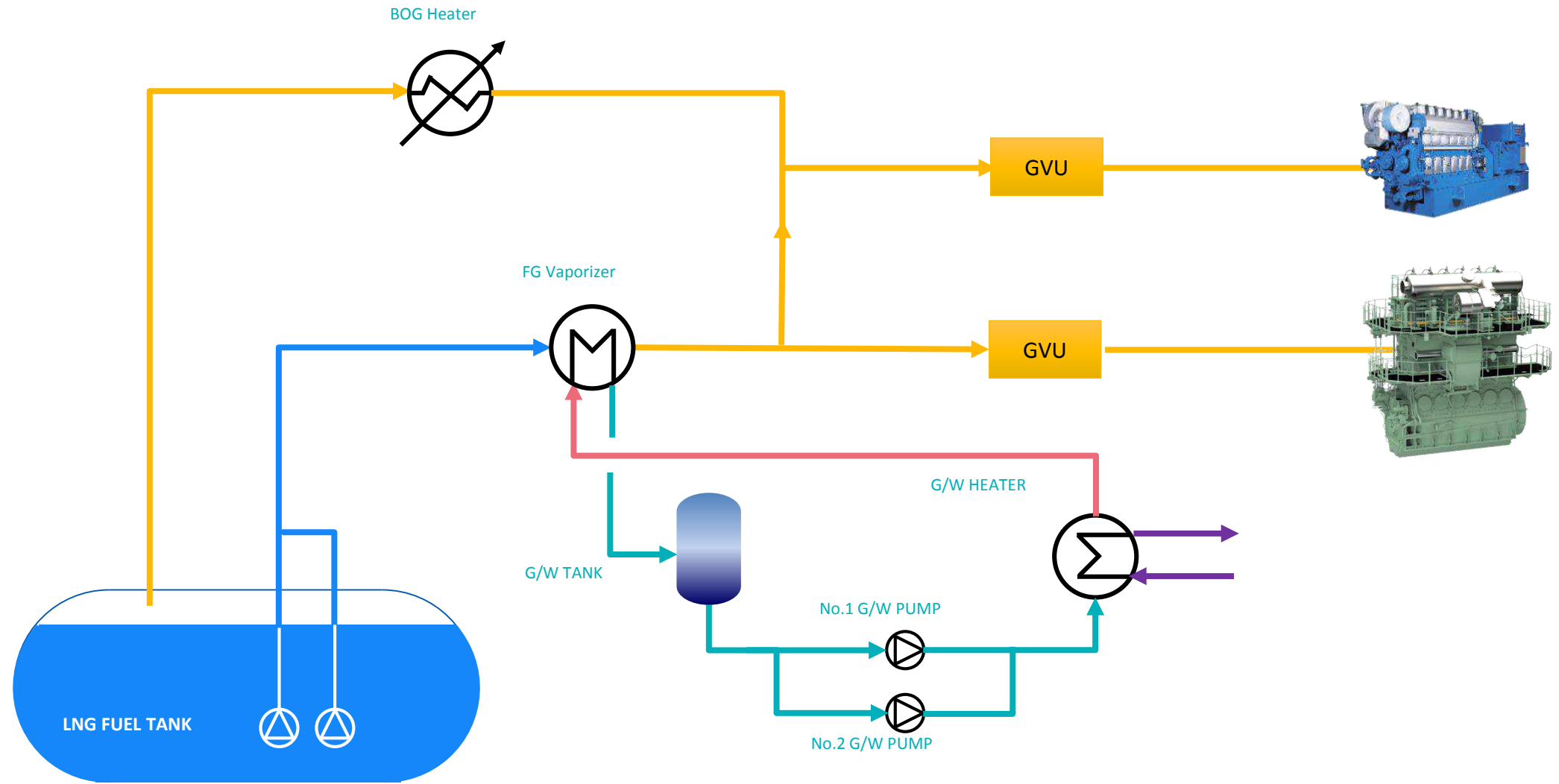
TOTE
3,100TEU
Container
Ship



ILSHIN
50K Bulk
Carrier

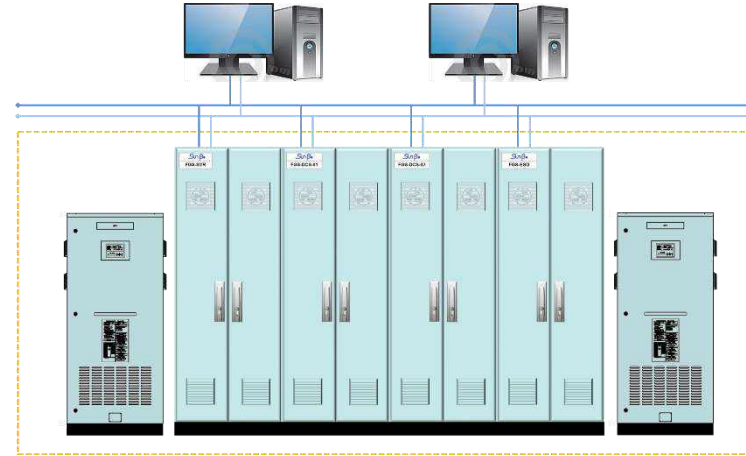
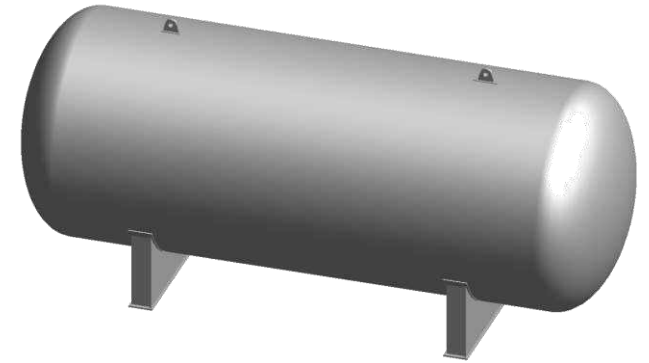
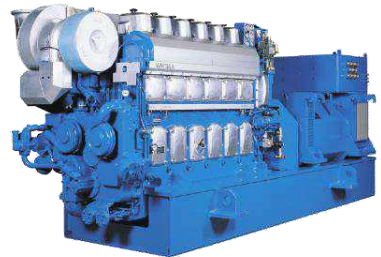
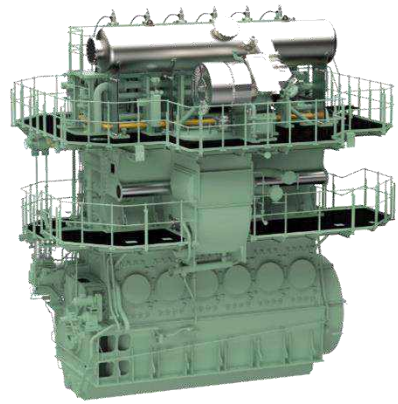


SOLUTION for LNG FUELED SHIP (X-DF ENGINE)



SCOPE OF WORK/SUPPLY (X-DF ENGINE)

SUNBO TOTAL SOLUTION



X-DF ENGINE (NEW BUILDING Only)

TOTAL : 23 Ship(s)

Engine delivery : by 2016

OWNER	SHIPYARD	SHIP TYPE	No. OF SHIP	FGSS MAKER
Temptank	-	15,000DWT Chemical Tanker	4	
Nordic Hamburg Shipping	WENCHONG	1,400TEU Container	4	TGE
Transport Desgagnes	-	15,000DWT Asphalt Carrier	4	
Sovcomflot	HSHI	115,000DWT Tanker	9	SUNBO
★ AET	SHI	114,000DWT Tanker	2	SHI
★ K-LINE	SHIN KURUSHIMA	7,000 PCTC	1	MSB/SUNBO

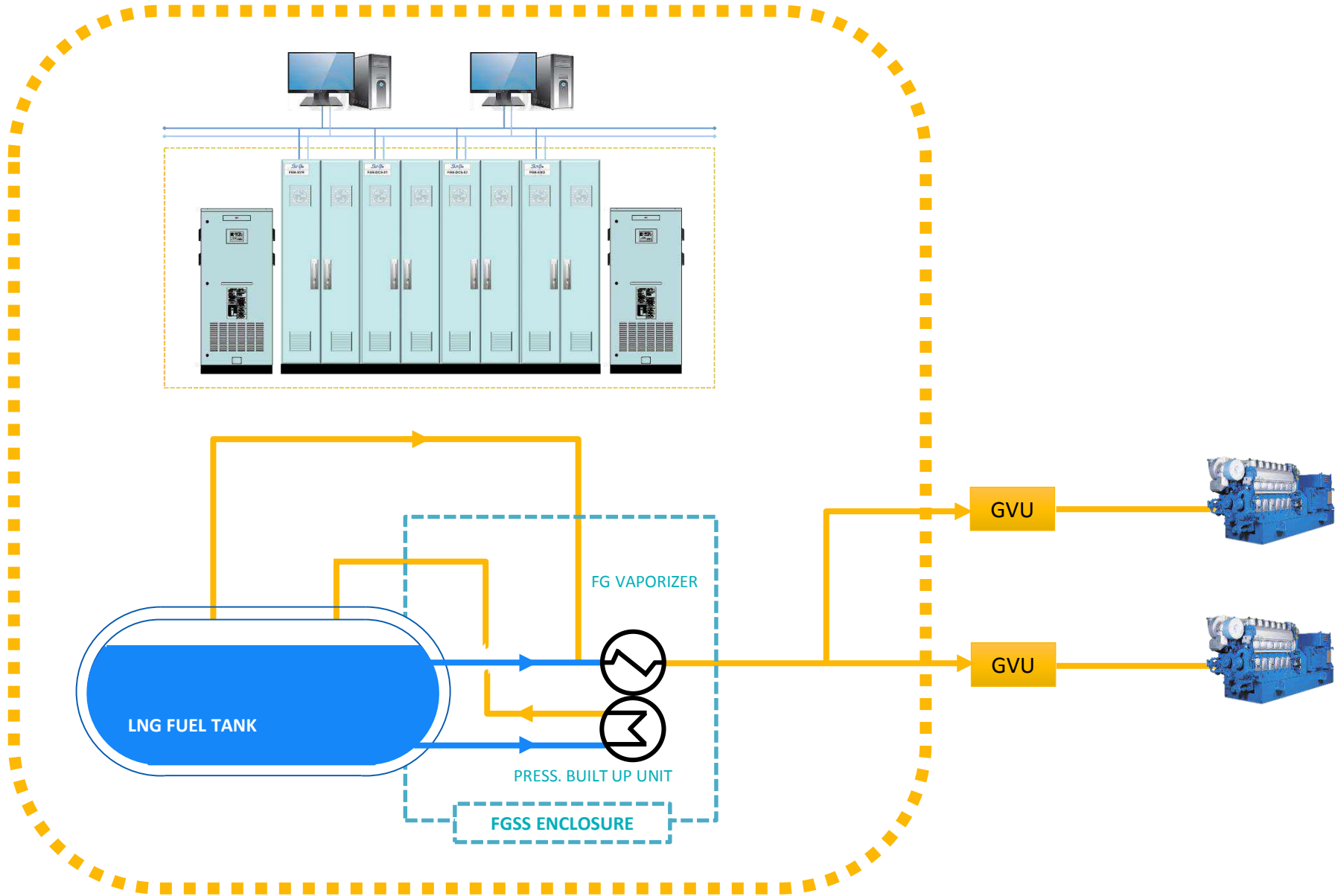
★ In progressing

FGSS: Fuel Gas Supply System (Dadae 2nd Factory)



SOVCOMFLOT
115K COT

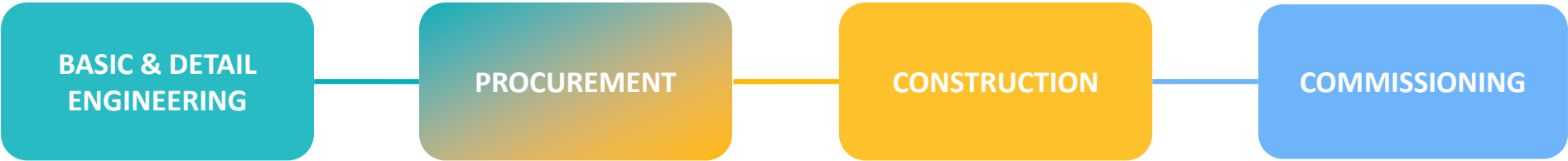
SCOPE OF WORK/SUPPLY (4-Stroke Engine)



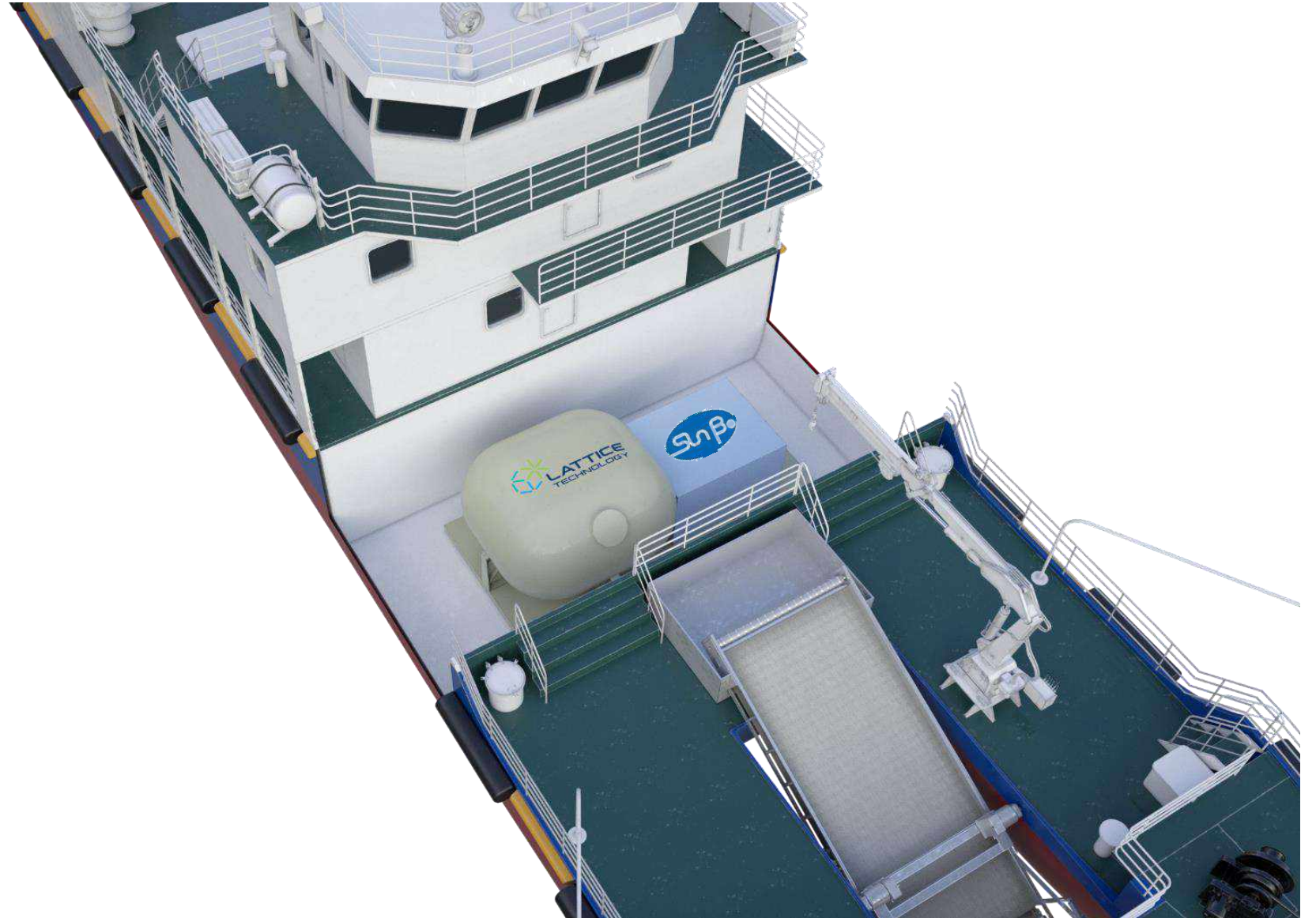
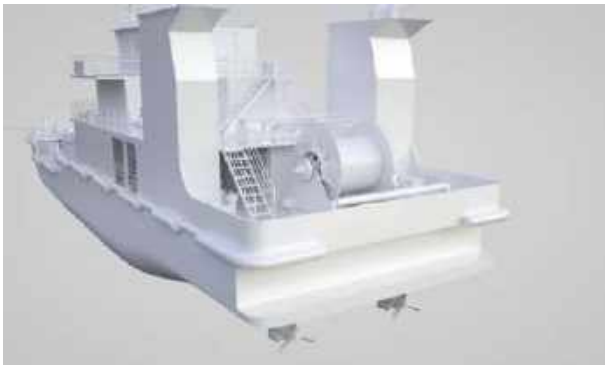
FGSS REFERENCE

YEAR	PROJECT	MAIN ENGINE	END-USER	YARD	CLASS
2018	Harbor Cleaning Ship	Hyundai HiMSEN	Ulsan Port Authority	Korea Shipyard	KR

- Additional Scope of Work and Supply are the followings:
 - LNG Fuel Tank & Fuel Preparation Room Fabrication
 - Installation of Double-walled Piping, Etc.



3D IMAGE



FGSS SIMULATOR



STRONG POINT OF SUNBO FGSS

1

PROVEN TECHNOLOGY!

- THREE YEARS OPERATING ON
ACTUAL VESSEL
- SEVERAL REFERENCE

2

TECHNICAL ASSISTANT!

- DRAWING
- COMMISSIONING
- GAS TRIAL

3

COMPACT SIZE!

- SMALL FOOT AREA
- EASY INSTALLATION

REGASIFICATION for FSRU (Gupyeong 1st Factory)



- Project : PRIMUM FSRU
- Item : Regasification Unit
- Capacity : 1000 mmscfd
- Ship type : 170K FSRU
- Dimension : 22m x 18.5m x 13.5m
- Weight : 760 tons



REGASIFICATION for FSRU (Gupyeong 1st Factory)

- The Detail Scope of Supply are following:

DESCRIPTION	WORK OF SCOPE		REMARK
	SHIPYARD	SUNBO	
ENGINEERING	BASIC/DETAIL	FABRICATION	
PROCUREMENT	TAGGED ITEMS (EQUIPMENT, VALVLE, INSTRUMENT AND ETC)	BULK MATERIAL (PIPING, STRUCTURE, INSTRUMENTATION AND ELECTRICAL)	
FABRCATION, COATING AND ASSEMBLY		ALL	Included Insulation
TEST AND INSEPCTION	FREE ISSUED ITESM	FABRICATION AND COATING INSPECTION MACHINICAL COMPETION TEST WITH COLD TEST	
DELIVERY		DDP, HHI YARD WITH BARGE	SEA TRANSPORTATION

- Project Reference

YEAR	SHIP TYPE	SHIP OWNER	UNIT	YARD	CLASS	STATUS
2018	FSRU	PRIMUM	1	HHI	BV	Delivered
2018	FSRU	SWAN	2	HHI	LR	Ongoing

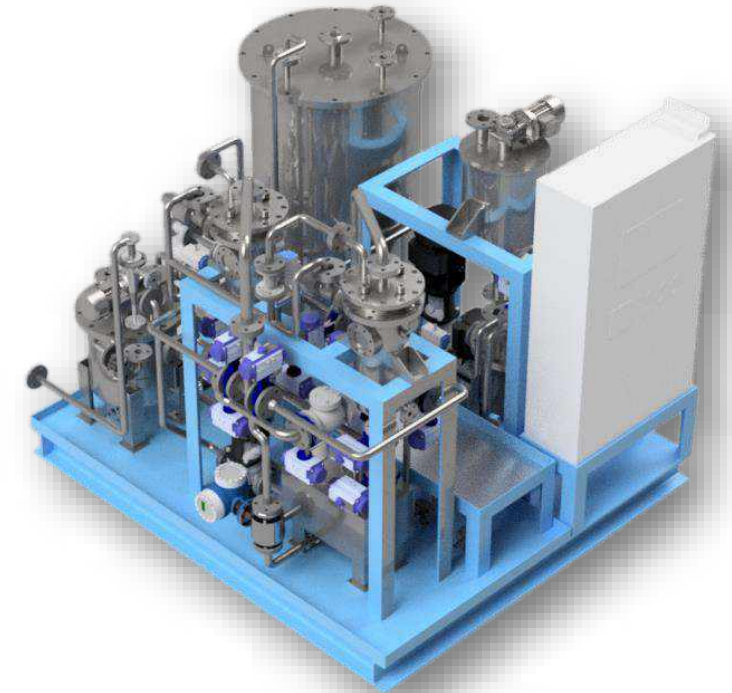
SOLUTION for CLEAN EMISSION (WTS for EGR)

- MAN Diesel & Turbo : Provision Certification of Approval, Sales
- Small Spaces install WTS One Package
- Low power technique Only Operating One motor
- Low operating costs

Diatomite price 1ton (2000times) = 200~600usd

1 time operating amount used : 450~500 gram

- Easy repair & maintenance



MARINE PACKAGE UNIT (Dadae 1st Factory)



PURIFIER UNIT



M/E & G/E , BOILER F.O. SUPPLY UNIT



FRESH WATER GENERATOR UNIT

Factory Dadae 1st and Youngam

Dadae 1st and Youngam

Dadae 1st and Youngam

Supply to Korean Major Shipyards and
Others in overseas

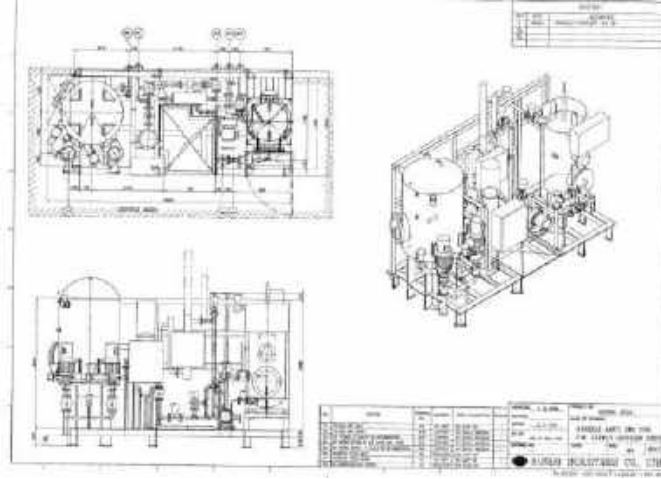
Korean Major Shipyards and
Others in overseas

Korean Major Shipyards and
Others in overseas

Remark Developed in 1995

Developed in 1993

CONTAINERIZED UNIT



SIMPLE INSTALLATION

(Only Pipe Connection)
Equipment Guaranty
Price Competitiveness



Fresh Water Generator Unit

Hydrophore Tank + Calorifier
+ Mineralizer + UV Sterilizer



One Container Transportation

ENGINE ROOM UNIT (Gu-pyeong 1st Factory)



TANK TOP UNIT



MAIN DECK UNIT

Factory

Gu-pyeong

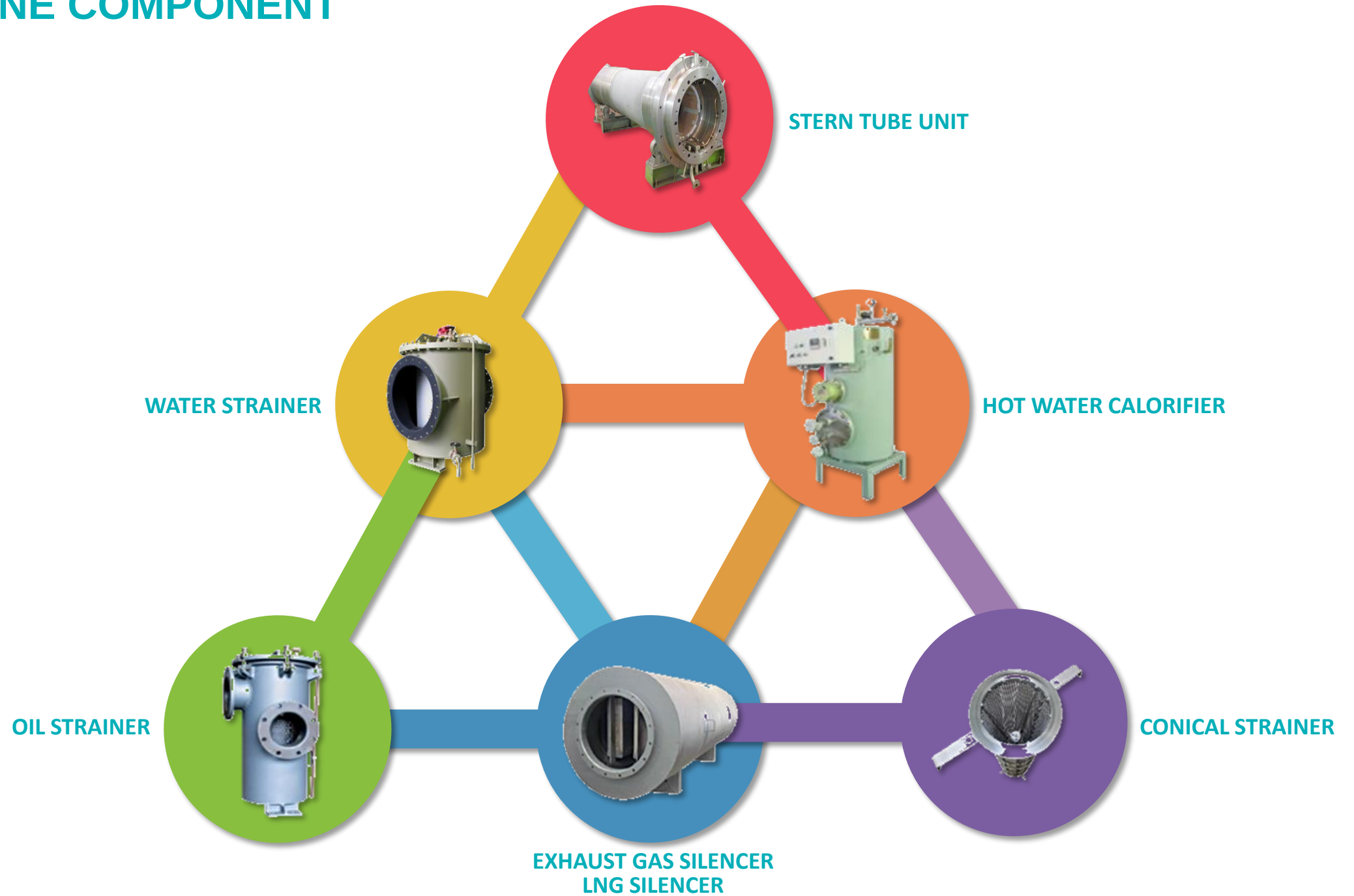
Gu-pyeong 1st

Supply to

**Korean Major Shipyards and
Others in overseas**

**Korean Major Shipyards and
Others in overseas**

MARINE COMPONENT



OFFSHORE MODULES



WHY? SUNBO

1. EPC provider
(In own factory)

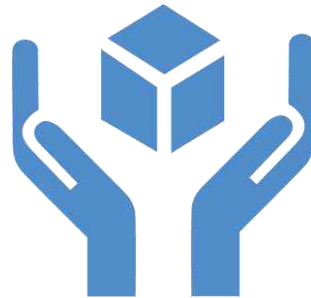


3. CAN do PERFORMANCE TEST
in the shop



2. TOTAL SOLUTION PROVIDER

- FGSS
- Ship system



4. CAN supply
SIMULATOR for training





THANK YOU