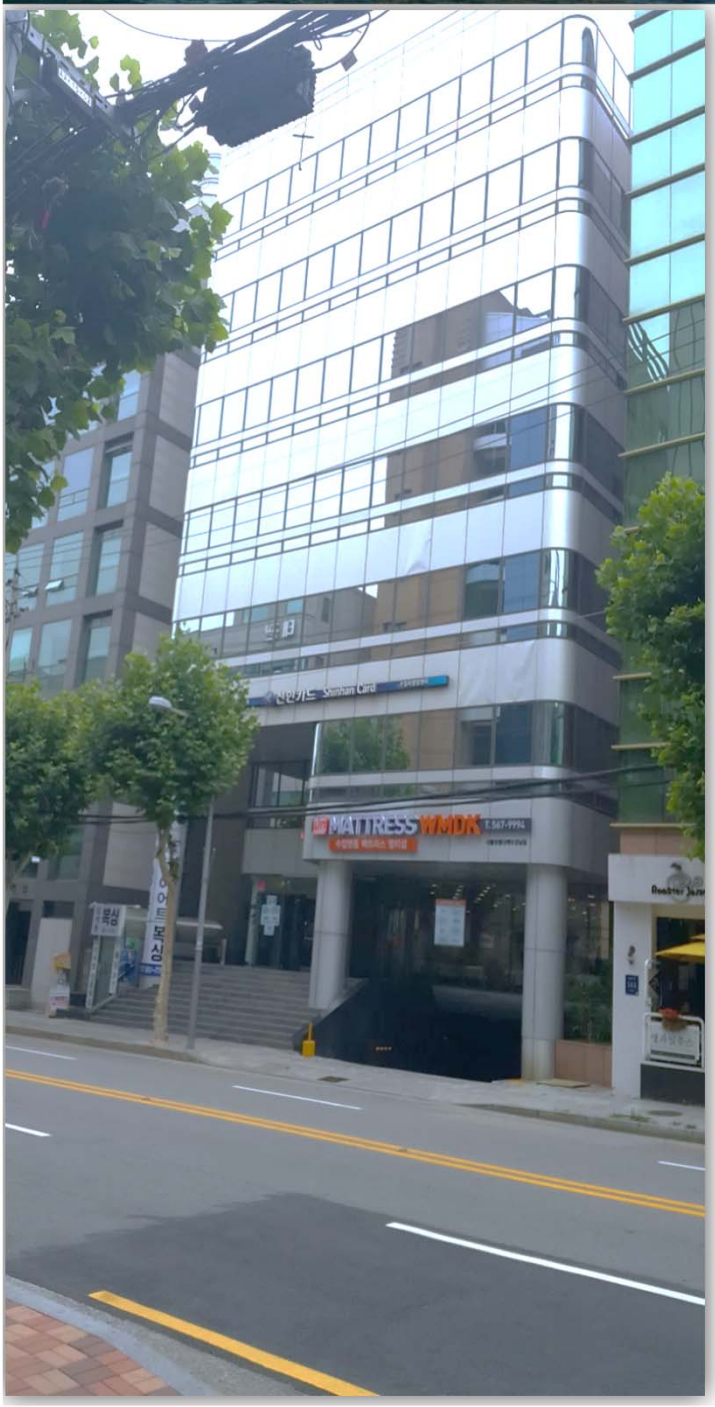
www.zentechpe.co.kr

Your Best Partners!

ZENTECH ENGINEERING CO., LTD.



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- Ship/Barge Mounted Power Plant
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- Harbour and Port
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Vision

Certificate

11 November, 2019

ZENTECH ENGINEERING

C.E.O's Message

Zentech is
always ready to meet an new Challenge

Zentech Engineering Co., Ltd. has established in November 2002 for performance of global engineering to advance technology of onshore and offshore engineering that require high technology.

Our company does service an advanced technology to client based on the many engineering experiences for extensive business field such as offshore-onshore platform, offshore wind. Wave/current power plant, pipeline and SPM, LNG Plant and LNG FSRU, oil tank farm, harbour, shipyard, marina etc.

Our company members have good dream for offshore, LNG, LPG and Plant of marine terminal, civil engineering to achieve the top of world engineering company with endless passion, development of new idea, spirit of progressive challenges. We are promise to you that any requirement of client will meet with good quality time.

I ask for your constant interest and support.

Thank you!

Choi, Byeong Ryeol / CEO

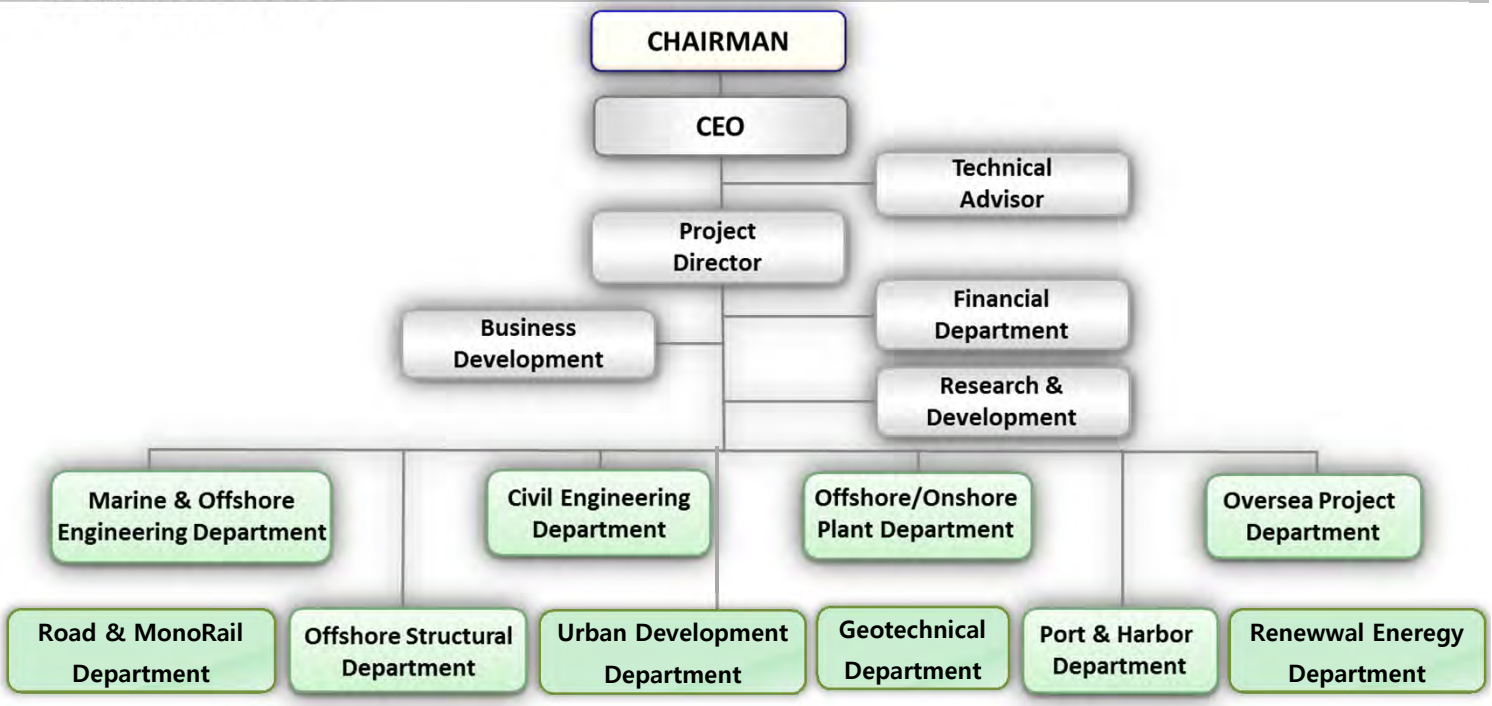
Zentech Engineering Co., Ltd.

Be awarded The Order of Science Merit on 20. April, 2018

Company History

May. 2000	Joined to Yooil Engineering and Architects Co., Ltd.
July. 2001	New Establishment of Space Engineering Group Inc. from Yooil Engineering and SACS Korea.
Nov. 2002	Company mane was changed to Zentech Enginering Co., Ltd.
Nov. 2002	Agency contracted to Zentech Engineering Inc in USA.
Oct. 2003	Company was changed to Corporation Limited.
Jan. 2006	Establishment of Malaysia Johor Branch Office.
Oct. 2008	M&A of A-Systems Co., Ltd. For Production Drawings.
Oct. 2015	Business Agreement with "MECON" in India.

Organization



Quality Assurance

Zentech Engineering's ISO9001:2001 and Professional Engineering Licence 10-02-033 Certificate of Registration


제 10-02-033 호

技術士免許
기술사사무소 개설등록증
Professional Engineering Licence
(☑ 개인 ☐ 합동)

技術部門 : 機設, 機械, 電機, 産業, 化學
專門分野 : 構造, 土質, 産業機械, 發送配電, 生産管理, 機械振動, 化工
사무소 명칭: ㈜젠텍엔지니어링 (ZENTECH ENGINEERING CO., LTD.)
기술사 성명: 최병렬 (Representative Professional Engineer : Byeong-Ryeol, Choi)
代表 技術士 : 崔 炳烈
생년월일: 1964.03.01
Techniques ection : Construction, Machinery, Electricity, Industry, Chemical Plant
기술부문: 건설, 기계, 전기, 산업, 화학
Professional Field : Structure, Geotechnique, Industry Mechanical, Electrical Distribution, 전공등의: 구조, 토질 지질, 일반산업기계, 발송배전, 생산관리, 항만·해안, 화공
Construction Management, Harbour and Coastal, Chemical Industry
소재지: 서울특별시 강남구 역삼로 140, 청암빌딩 6층(역삼동)
전화번호: 02-556-0781 Tel : 082-(0)2-556-0781
등록연월일: 2002년 11월 02일 Date of Registration : 02, Nov. 2002
Technical Judicial Article6, paragraph 1 and Article 26 of the Enforcement Decree in accordance with the third consignment accepted the authority of the Secretary Creation of Future Science proves the receipt of a registered Professional Engineer Office opened a base.
「기술사법」 제6조제1항 및 같은 법 시행령 제26조제3항제3호에 따라
미래창조과학부장관의 권한을 위탁받아 위와 같이 기술사사무소의 개설등
록을 받았음을 증명합니다 技術士法第6條第1項和施行令第26條被授第三代領受
未來科學秘書創作的權威證明，我的註冊專業工程師辦公室上述打開。
2015년 03월 24일
Date of Revised : 24, March. 2015
Chairman of Korean Professional Associated.
한국기술사회 회장
韓國技術社會 會長

Zentech Engineering's quality policy is to provide with engineering services of internationally recognized quality standards with its most advanced technology.

ZENTECH ENGINEERING

Shipyard Optimization

In-Service

1. Civil and Structure detail design
   1) Development for Overall Lay-out of Ship Yard
   2) Earthworks for yard preparation detail design
   3) Quay wall Design detail design
   4) Waterbreak dike detail design
   5) P.E and Foundation detail design
   6) Dry dock with equipment detail design
   7) Crane Rail Foundation Detail Design
   8) Drainage and Oil Sump detail design
2. Production Shop detail design
   1) Grand Production Shop equipment layout and structure detail design
   2) 3D Production Shop equipment layout and structure detail design
   3) 2D Production Shop equipment layout and structure detail design
   4) Painting Shop and equipment lay out and structure detail design
   5) Blasting Shop and equipment lay out and structure detail design
   6) Outfitting Shop and equipment lay out and structure detail design
3. Water storage dike and Gas Plant detail design
   1) Water storage dike detail design
   2) Gas station Plant detail design
   3) Piping and electrical detail design
4. Mechanical and Electrical detail Design
   1) Production and others shop mechanical and electrical capacity design
   2) Building mechanical and electrical capacity design
   3) Quaywall mechanical and electrical capacity design
   4) Yard mechanical and electrical capacity design
   5) Main and Substation mechanical and electrical capacity design
   6) Dry Dock mechanical and electrical capacity design
   7) Pier mechanical and electrical capacity design
5. Specifications

Construction

1) Cost Estimation
2) Construction and Engineering Schedule
3) PMC Work

Production Drawings

1. Civil and Structure detail Drawings
   1) Development for Overall Lay-out of Ship Yard
   2) Earthworks for yard preparation detail Drawings
   3) Quay wall detail Drawings
   4) Waterbreak dike detail Drawings
   5) P.E and Foundation detail Drawings
   6) Dry dock with equipment detail Drawings
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   1) Water storage dike detail Drawings
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   3) Quay wall mechanical and electrical capacity Drawings
   4) Yard mechanical and electrical capacity Drawings
   5) Main and Substation mechanical and electrical capacity Drawings
   6) Dry Dock mechanical and electrical capacity Drawings
   7) Pier mechanical and electrical capacity Drawings

Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2012.01-2012.05	Jin-Mok Shipyard	Basic & Detail Design Lifit Dock,Slipway and Quaywall, Berthing and Mooring, Ship maneuvering	Kum-Ho/Deco E&C
2	2010.02-2011.07	MMHE SHIPYARD OPTIMIZATION	Shipyard and Drydock, Quaywall Optimization Works for MMHE in Malaysia	MMHE-HANMI PARSUNS
3	2010.4-2010.10	Busan Korean Police Shipyard Development Project	Basic & Detail Design Lifit Dock , Slipway and Quaywall, Berthing and Mooring, Ship maneuvering	
4	2009.03–2009.05	30TON GANTRY CRANE DESIGN	30TON GANTRY CRANE DESIGN	DAE-DONG ENG.
5	2008.08–2009.05	UTC BRAZILIAN OFFSHORE YARD OPTIMIZATION	FEED Engineering for Offshore Yard Optimization for UTC, Yard Lay-Out, Dry Dock, DockGate, Production Shop(Grand, 3D,2D,Cutting shop, Blasting and Painting Shop)	UTC Brazil
6	2008.02–2008.04	STUDY FOR RAMMUNIA OFFSHORE YARD(SHIP YARD)	Pre-Study for Ship Yard Optimization Yard Foundation, PE. Etc.	Ramunia International Service Limited
7	2007.12–2008.02	GUNSAN HHI's DRY DOCK Project	Detail Foundation Design, Dock Gate Design, Gate Sill Design and Dry Dock Wall, Winch, Capstan, Pump Room, Substation Architecture Design for HHI	Hyundai Heavy Industries Co., Ltd.
8	2007.08–2008.12	HHI's H-DRY DOCK Project	Detail Foundation Design, Dock Gate Design, Gate Sill Design and Dry Dock Wall, Winch, Capstan, Pump Room, Substation Architecture Design, Painting and Production Shop Design for HHI	Hyundai Heavy Industries Co., Ltd.
9	2006.12–2007.08	SUBIC SHIP YARD OPTIMIZATION	Design for Part of Dock and C/C Foundation, PE. Etc. Design for Part of Dry Dock No. 1 and 2, Production and Painting Shop. Quay Wall(1000m) and Yard Foundation, PE. Etc.	HANJIN HEAVY Industries in Korea
10	2005.11–2006.05	OVERHEAD/GANTRY CRANE 900ton PJT	Structure Design and Fatigue, Local Design, Design for Mechanical items such as Hook, Loading Beam, Bogie	Shin-han Machinery Industries Co., Ltd.




Offshore/Onshore Platform for Oil and Gas

In-Service

1) Site Soil and Environmental Investigation
2) Material Selection
3) Material Balance Analysis
4) P&ID and Process Layout
5) Structure Layout
6) In-place Design
7) Seismic Design
8) Fatigue Design
9) Miscellaneous Design
10) Blasting Analysis
11) Piping Stress Design
12) Specifications
13) Bill of Material

Pre-Service

1) Loadout and Quaywall Stability design
2) Tow Analysis
3) Seafastening Design
4) Grilliage Design
5) Mooring Design
6) Loadout Vessel Ballasting Design
7) Topside/Deck Float-Over Design and Jacket Float-Off
8) Upending/Launching Design
9) Pile Drivability Analysis
10) Topside/Deck Lifting Design
11) Loadout Procedure
12) Transportation Procedure

Construction

1) Block Handling Design
2) Jacket F-Method Roll-up Design
3) Deck Cap Method Lifting
4) Fabrication Support Design
5) Heavy Equipment Lifting and Rigging
6) Block handling Procedure
7) Roll-up Procedure
8) Cost Estimation
9) Construction and Engineering Schedule
10) PMC Work

Production Drawings

1) Jacket/Deck Detail Shop Drawings
2) Joint Piece Drawings
3) Piping Layout and GA Drawings
4) Piping ISO Drawings

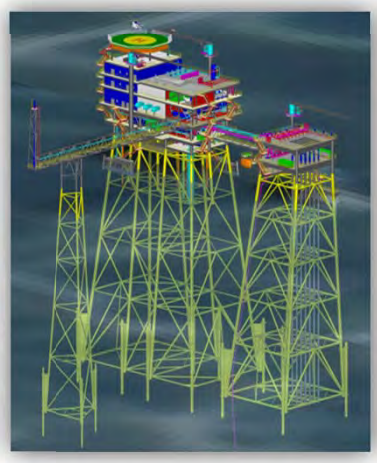

Jacket Float-Off


Jacket Transportation


Bahrain Offshore LNG Deck Float-Over


Bahrain Offshore LNG Deck Float-Over


Offshore Platform In-Service



Offshore Fixed Platform In-Place Analysis for Offshore Fixed Platform(Jacket and Topside)

Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2017.13-2018.4	Oral South Development Project	Laboratory & Utility ITR Building Engineering	MIDASIT
2	2015.09-2018.3	Bahrain Offshore LNG Terminal PJT	Regasification Fixed Platform FEED&Detail Engineering Work	OceanUs
3	2015.06-20.15.09	NASR II PJT	Transportation Fatigue Detail Design for Bridge, BST JKT & Deck	Hyundai Heavy Industries Co., Ltd.
4	2015.03-2016.02	Bergading Project	Offshore Fixed Platform Inplace/pre-service Detail Engineering	Hyundai Heavy Industries Co., Ltd.
5	2015.03-2016.02	Baronia Project	Offshore Fixed Platform Inplace/pre-service Detail Engineering	Hyundai Heavy Industries Co., Ltd.
6	2014.11-2015.09	Badamyar PJT	Offshore Fixed Platform Inplace/Pre-serives Detail Engineering	Hyundai Heavy Industries Co., Ltd.
7	2013.07-2015.02	CARLIGALI HESS BCP	Jacket Roll-up and Fabriction/Load-out Engineering	SamKang Co., Ltd
8	2013.01-2013.05	TEEKAY PETROJARL PJT	Offshore Fixed Platform Topside In-service and Pre-service Design	Samsun Heavy Industries, Co., Ltd.
9	2013. 08-2013.11	YETAGUN PHASE V DEVELOPMENT PROJECT	JACKET Launching/Upending and Onbottom Stability Design	HHI
10	2013.02-2013.05	Offshore Container /ONGC	High Pressure Container Box Design	COT Co., Ltd.
11	2012.07-2012.09	ONGC Heera Re-Development Project	Process Platform Float-Over Design	Hyundai Heavy Industries Co., Ltd.
12	2012.07-2012.12	Lube Oil Container /Vietnam	High Pressure Container Box Design	COT Co., Ltd.
13	2012.06–2013.03	Valemon Fixed Platform	MTO DESIGN, IN-SERVICE for INPLACE, FATIGUE, SEISMIC, BLASTING, PRE-SERVICE for LIFTING and, PILE DESIGN, TRANSPORTATION, INSTALLATION Design and PIPELINE / RISER 4”, 6’, 12”, 18”, 20” IN-SERVICE and PIPELAYING Detail Engineering	Samsung Heavy Industries
14	2012.02-2012.05.30	Umm Lulu PKG#2/ Abu Dhabi Marine Operating Company	Jacket and Module Fabrication Bidding Engineering	Young Chang Heavy Industries, Co. Ltd.
15	2011.11–2012.03	GUMUSUT KAKAP FPU TOPSIDE	Gumusut Kakap FPU East/West/South/North/ Topside Global Strengthening and Twisting Analysis	MMHE Malaysia

ZENTECH ENGINEERING

Offshore Wind/Wave/Current Power Plant

In-Service

1) Site Soil and Environmental Investigation
2) Material Selection
3) Blade Design Simulation
4) P&ID Layout
5) Structure Layout
6) In-place Design
7) Seismic Design
8) Fatigue Design
9) Miscellaneous Design
10) Blasting Analysis
11) Piping Stress Design
12) Specifications
13) Bill of Material

Pre-Service

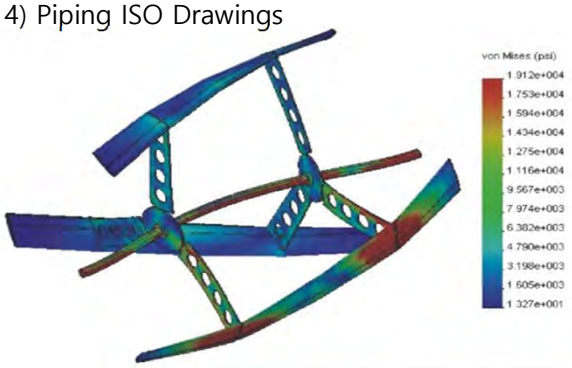
1) Loadout and Quaywall Stability design
2) Tow Analysis
3) Seafastening Design
4) Grillage Design
5) Mooring Design
6) Loadout Vessel Ballasting Design
7) Float-Over Design
8) Upending/Launching Design
9) Pile Drivability Analysis
10) Deck Lifting Design
11) Loadout Procedure
12) Transportation Procedure
13) Wind Flow Simulation

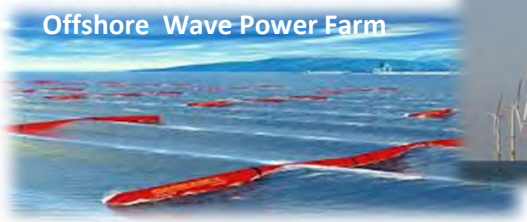
Construction

1) Block Handling Design
2) Jacket F-Method Roll-up Design
3) Deck Cap Method Lifting
4) Fabrication Support Design
5) Heavy Equipment Lifting and Rigging
6) Block handling Procedure
7) Roll-up Procedure
8) Cost Estimation
9) Construction and Engineering Schedule
10) PMC Work

Production Drawings

1) Jacket/Deck Detail Shop Drawings
2) Joint Piece Drawings
3) Piping Layout and GA Drawings
4) Piping ISO Drawings





Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2019. September, 20	SOC	Achievement Technology AIP for Design of Offshore Wind Jacket for Integrated Construction	KR
2	2016. September, 09	AIP	Achievement Technology SOC for Advanced Offshore Wind Turbine	KR
3	2018.8-2018.12	Wando Sea Meteorological Tower	Basic and Detail Engineering for Sea Meteorological Tower EPC	ADVACT Co., Ltd.
4	2016.8-2019.7	Hangyeong Wind Power Plant	Detailed Engineering for Foundation of Hangyeong Wind Power Plant in the southwestern part of Jeju Island	KLEM
5	2016.8-2019.8	R&D for 5MW Offshore wind Susstructure integrated Installation Method	Basic and Detail Engineering for 5MW Offshore Wind Farm R&D	Ministry Knowledge Economic in Korea Government
6	2012.7-2016.8	5MW Offshore wind Farm R&D at Westen-south in Korea	Basic and Detail Engineering for 5MW Offshore Wind Farm R&D	Ministry Knowledge Economic in Korea Government
7	2013.2-2014.2	1250MW Wind Farm at Santa Cruz in Argentina	Basic and Detail Engineering for 1250MW Wind Farm at Santa Cruz In Argentina	Vertek S.A
8	2013.02-2013.07	JEJU 7Mw x 10Sets Offshore Wind Power PJT	7MW x 10 Sets Offshore Wind Turbine Power Inplace/Fatigue/Tow/Impact Analysis	SHI & Yoosin
9	2012.05-2017.09	2 Phase Offshore Wind Power R&D	Substructure basic/detail engineering and installation engineering	Jen-Nam TP
10	2010.03-2010.04	Subsea Crurrent Power Project	Offshore Crane Boom Design	UnDin Co., Ltd.
11	2010.04-2010.06	50kw Wave Power Plant R&D Project	Wave Power Plant Package Offshore Installation and Floating/Sinking Design	SEKWANG ENG
12	2009.10–2010.12	Offshore Wave and Floating Solar Power R&D Project	Floater Type Inplace / Fatigue / Foundation Feasibility Study	R&D Center
13	2009.10–2012.04	Offshore Wind Power R&D Project	Jacket type / Mono-pile Type / TLF(Tension Leg Floater) Type Inplace / Seismic / Fatigue / Foundation	R&D Center
14	2009.01–2009.04	Wind Power Plant in Offshore	Inplace Design/Fatigue Design/Blade Design/Installation Design	DMS R&D
15	2008.08-2008.12	OFFSHORE WIND POWER STATION PROJECT	Offshore Tower Platform for Wind Power In-place and Seismic, Vibration and Fatigue Basic Design	YOOSHIN CO.

Subsea Pipeline and SPM

In-Service

1) Site Soil and Environmental Investigation
2) Material Selection
3) Chemical and Flow Simulation Study
4) Hydraulic Analysis and Deepsea Gas Hydrate Analysis
5) Pipeline Route Layout
6) In-place Design for Pipeline
7) In-place Design for Riser
8) Anode Design
9) Riser Seismic Design
10) Riser Fatigue Design
11) SPM Mooring and Anchor Design
12) SPM Hull Design
13) PLEM and Pile Design
14) SPM Chain hawse and Support Design
15) SPM Riser Hose Design
16) SPM Piping and Support Design
17) SPM Hull Fatigue Design
18) Miscellaneous Design
19) Specifications
20) Bill of Material

Pre-Service

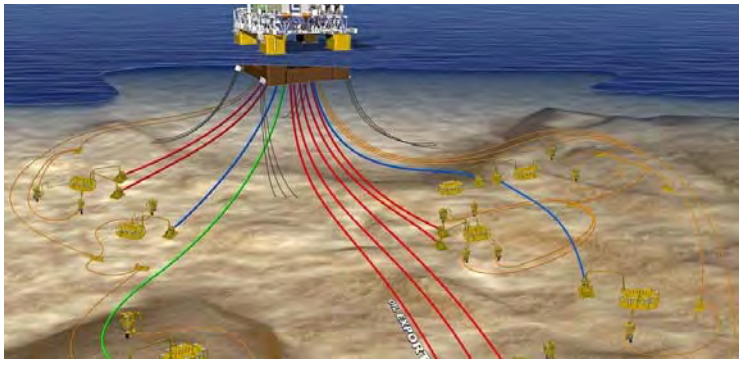
1) Pipeline Laying Case Study
2) Riser Installation Case Study
3) Davit Lifting Analysis
4) Lay-barge Mooring Pattern Design
5) PLEM Pile Drivability Analysis
6) SPM Installation Design
7) PLEM Installation Design

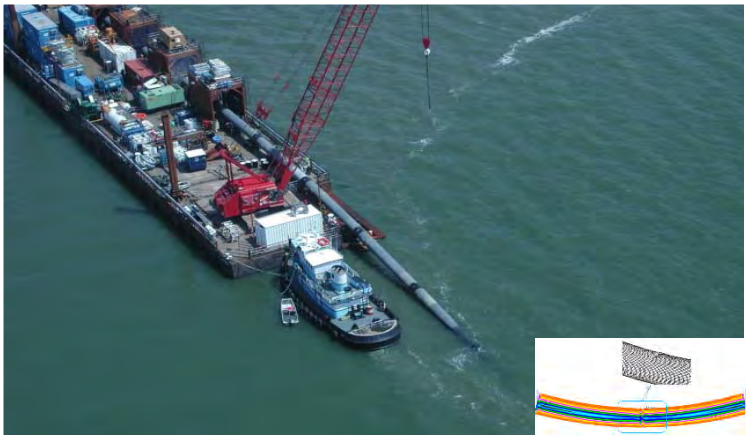
Construction

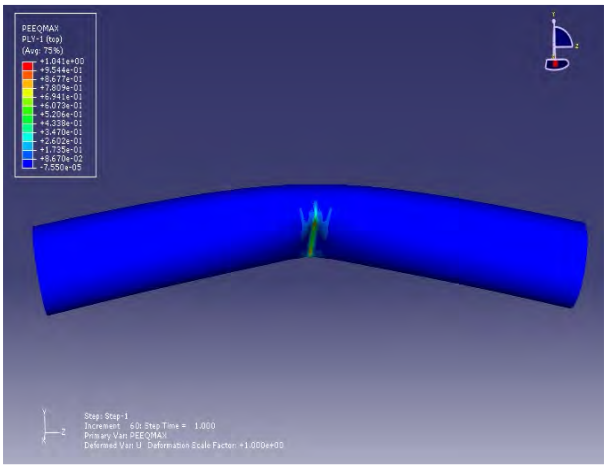
1) Cost Estimation
2) Construction and Engineering Schedule
3) PMC Work

Production Drawings

1) Pileline Route Drawings
2) Field Joint Detail Drawings
3) Anode Detail Drawings
4) PLEM and Pile Drawing Drawings
5) SPM Mooring Pattern Drawing
6) SPM Hull and Chain hawse Drawing
7) SPM Piping Drawings







Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2018.8.20-2018.12.17	Petron Aromatics BED Project	Basic Engineering Designfor Subsea Pipeline(48", 12", 14")and Intake&Outfall(55",47")	SK E&C
2	2015.09-2018.3	Bahrain Offshore LNG Terminal PJT	Gas 24"x9km with HDD Engineering Work	OceanUs
3	2017.4.-2017.6	AL MANDOUS PJT	4Line x 42" x 10km with SPM	SK E&C
4	2014.12-2018.3	ZOR-New Refinery PJT	5Line x 30" x 14km Subsea Pipeline FEED and Detail Engineering	HSS JV
5	2017.1-2018.1	NUCLEAR NEWG-KORI 5, 6	PCC 30" X 4KM PIPELINE DESIGN	BUYANG INDUSTRIES
6	2014.11-2015.01	TACE PROJECT	Sea Water Intake FEED	Hyundai Engineering
7	2014.10-2014.12	Ulsan Oil Hub PJT	Subsea Pipeline Bidding Engineering	SK E&C
8	2015.02-2015.05	Cable Installation PJT	Cable Turn-Table Installation Design	LGS & BEMHAN PANTOS
9	2014.11-2015.10	NSRP Package E PJT	Outfall and Intake Detail Design	TOYO E&C
10	2014.05-2015.01	NRP PJT	Bidding Engineering for Process / Subsea Pipeline Engineering	SK E&C
11	2013.11-2013.12	Cable Laying PJT	Turntable&Loading Tower Transportation Analysis	LGS & BEMHAN PANTOS
12	2013. 10-2013.11	LS Cable PJT	Cable Lay-Turntable & Loading Tower Tow Design	Bum Han Pantos
13	2013.04-2014.10	NSRP Package-C PJT	2-48"-34.5km Pipeline and PLEM/SPM/FOC Detail Design	SK E&C
14	2013.04-2014.03	Lithum FPSO R&D 4th Project	4"x 1Km Chemical Pipeline Basic$Detail, Installation Engineering	KIGAM
15	2013.02-2013.06	Mostaganem PJT in Algeria	Bidding Engineering for Outfall & Intake Engineering	Samsung C&T
16	2013.01-2015.03	Refinery and marine terminal Jazan/SAUDI	Detail Engineering for Offshore Pipeline 2-Lines 48"-8km and PLEM/SPM & 2ND SPM(2-Line x 2.5km)	HANWHA E&C
17	2013.01-2014.01	JAZAN REFINERY AND MARINE	FEED Verification for 48"x 8Km-2Line Submarine Pipeline and SPM/PLEM Detail Engineering	HANWHA E&C
18	2013.2-Till date	NGHI SON REFINERY AND PETROCHEMICAL PROJECT	Detail Engineering for 48"x 34.5Km-2Line Submarine Pipeline and SPM/PLEM Detail Engineering	SK E&C
19	2013.01-2013.02	MIRFA INDEPENDENT WATER AND POWER PROJECT/UAE	Outfall FEED Engineering	Samsung C&T-e Power Engineering
20	2012.12-2013.06	Ghana Takoradi T2 Expansion Project	3.5m x 1km x 4sets HDPE Intake Detail and Installation Engineering	POSCO Engineering Co., Ltd.

LNG/LPG Plant, Terminal and LNG FSRU/GSRU

In-Service

1) Site Soil and Environmental Investigation
2) Material Selection
3) Material Balance Analysis
4) PFD and P&ID and Process Layout
5) Equipenet Layout
6) LNG Storage and FSRU LNG Containment Design
7) In-place Design for Onshore and LNG FSRU
8) Seismic Design for Onshore Plant
9) Onshore Foundation Design
10) LNG FSRU Motion and Hydrodynamic and FE Analysis
11) Fatigue Design for LNG FSRU
12) Turret Mooring and Design for FSRU
13) Flexible Riser Design for FSRU
14) Offshore-Onshore Pipeline Installation Design
15) Receiver Station Design
16) Miscellaneous Design
17) Blasting Analysis
18) Piping Stress Design
19) Specifications
20) Bill of Material

Construction

1) Flexible Riser Installation Design
2) Offshore-Onshore Pipeline Installation Design
3) Tie-in Design

Construction

1) FSRU Hull Block Handling Design
2) FSRU Topside Lifting Design
3) Fabrication Support Design
4) Heavy Equipment Lifting and Rigging
5) Block handling Procedure
6) Cost Estimation
7) Construction and Engineering Schedule
8) PMC Work

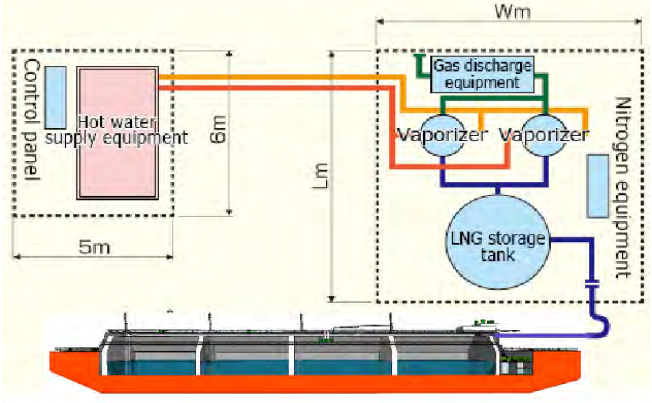
Production Drawings

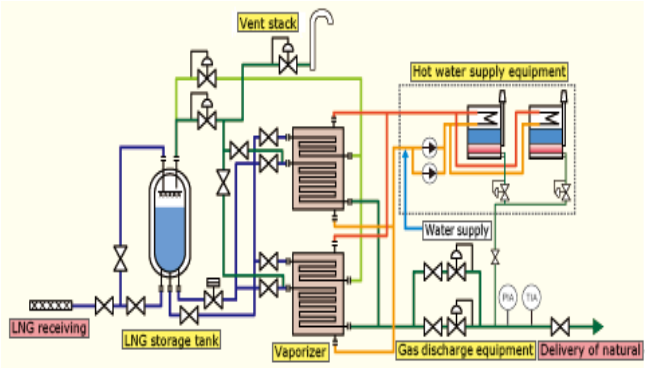
1) Onshore Plant Structure Detail Shop Drawings
2) Joint Piece Drawings
3) Piping Layout and GA Drawings
4) Piping ISO Drawings
5) LNG Storage Tank Drawings
6) LNG FSRU Hull and Containment Drawings
7) LNG FSRU Mooring and Turret Structure Drawings

LNG FSRU LAYOUT

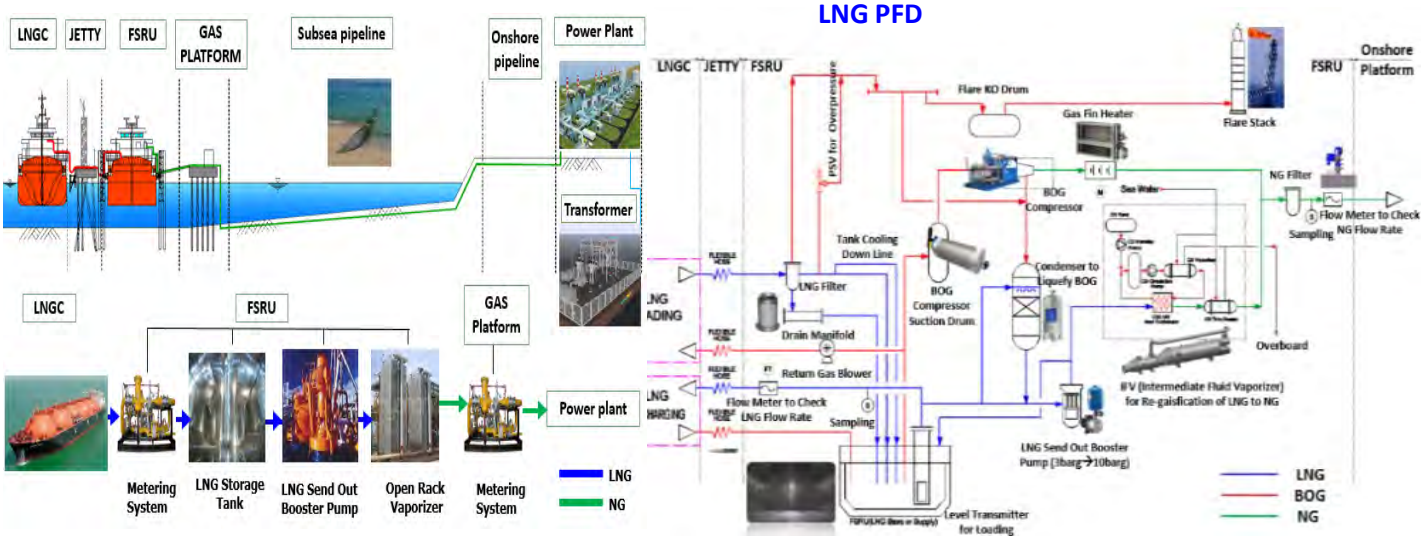
Onshore LNG Terminal

Onshore LNG Terminal

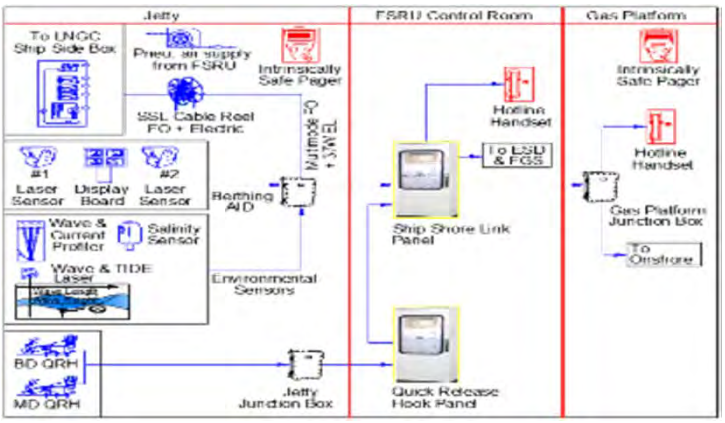




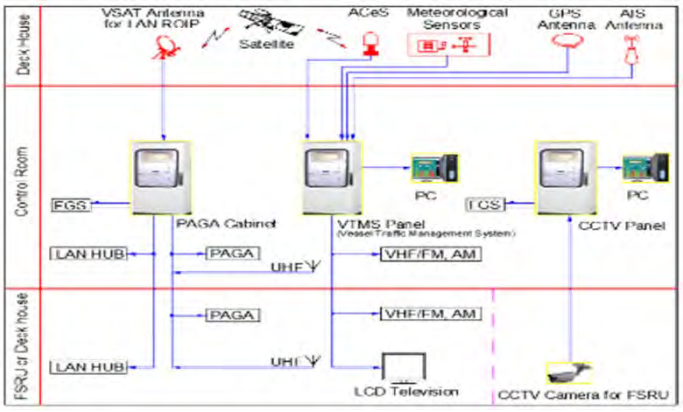
LNG PFD



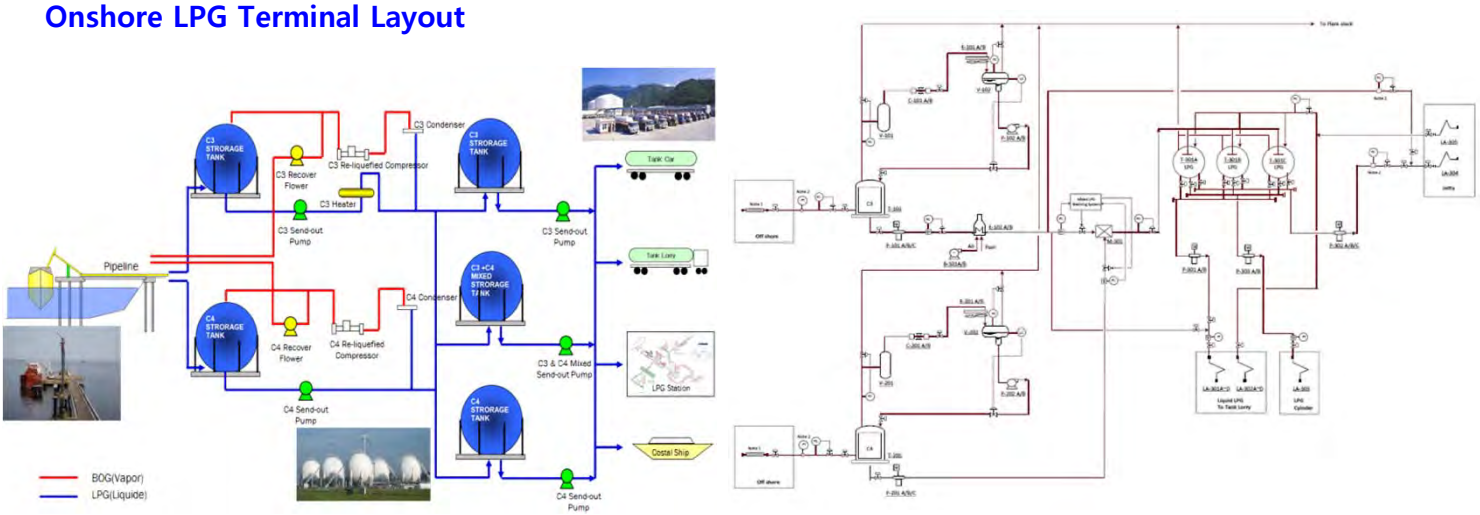
SSL Network Structure



Tele-Communication Network Structure



Onshore LPG Terminal Layout



High Pressure LPG Tank with ambient Temperature

Low Pressure LPG Tank with low Temperature

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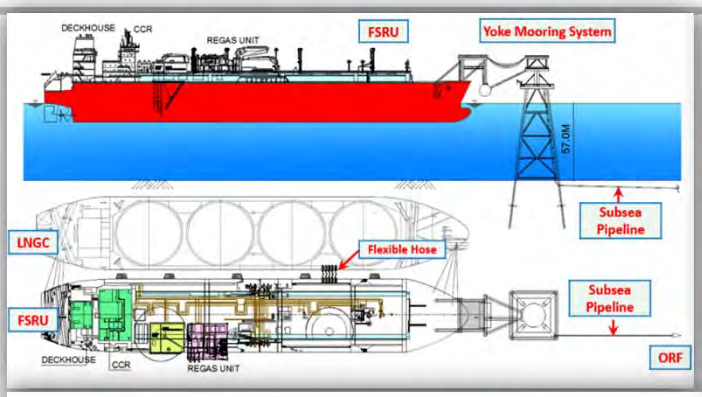
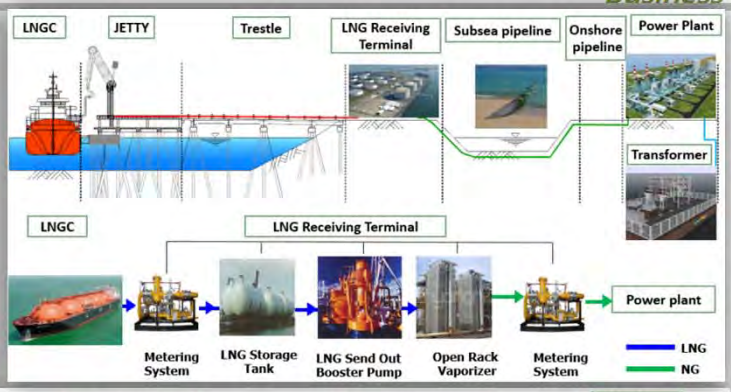
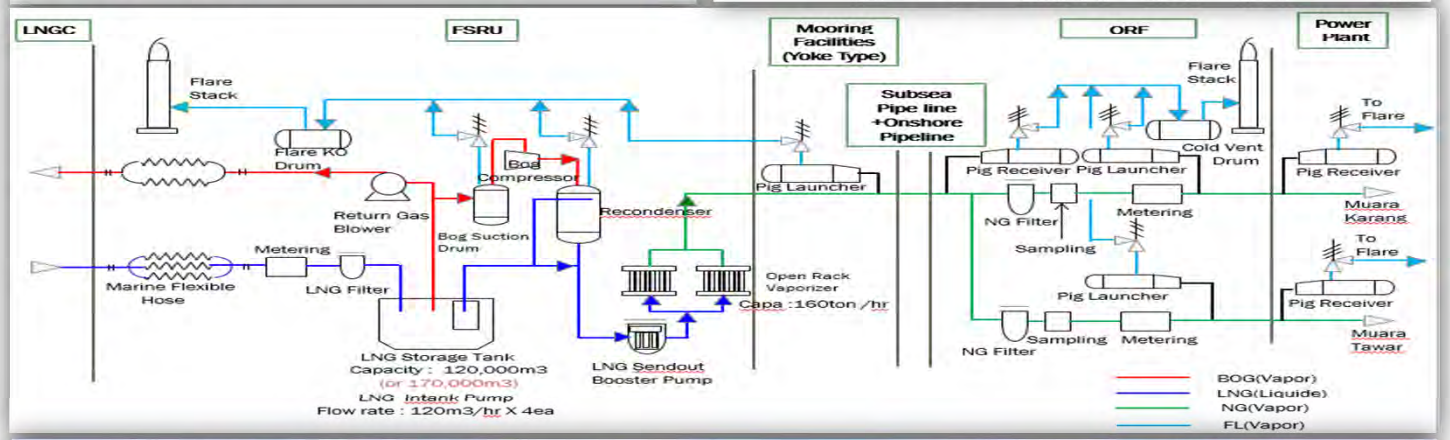
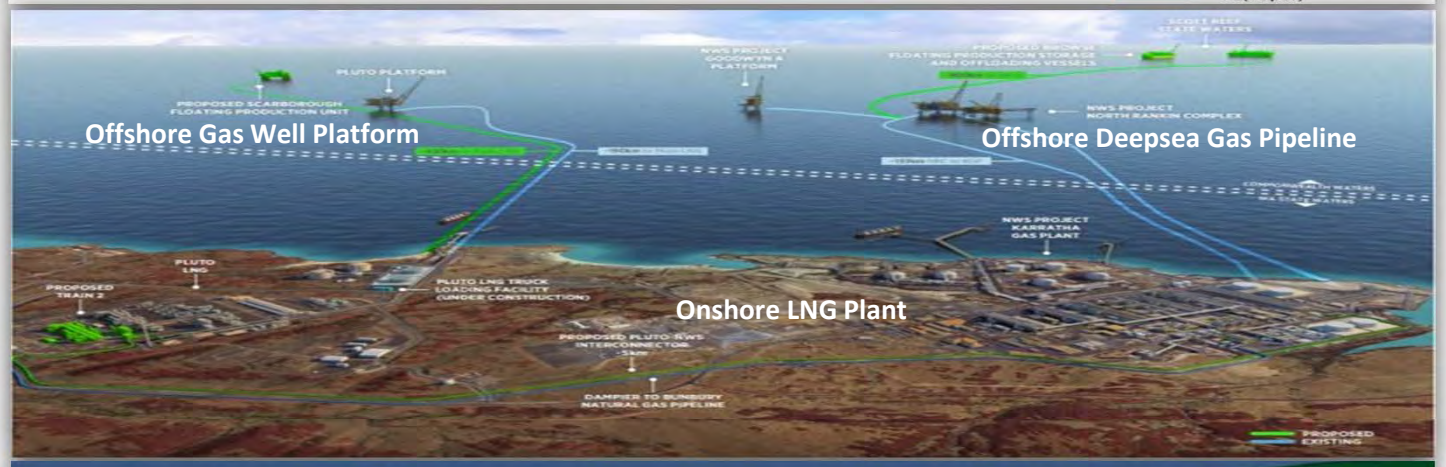
Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2018.10.8-2020.3.7	Project for Small-sized LNG Production Base	Model Development Service for Small-sized LNG Production Base	KOGAS
2	2018.7.2-2018.12.20	DMS for Deepsea(300m) Offshore Pipeline Project	Analysis for Deepsea Gas Hydrate, the Unsteady State and the Normal State of 900mmscfd for the Deep Sea Gas Pipeline from Greater Sunrise to Timor-Leste	KOGAS
3	2017.10-2018.4	Bangladesh LPG Terminal	FEED Design LPG Storage and Terminal	SK Gas
4	2016.6-2018.2	LNG 1,000MW Power Plant	FS for LNG Power Plant Project of Kuantana in Malaysia	SPC
5	2016.6-2018.3	BM LPG/LNG Terminal PJT	LPG and LNG Terminal FEED, Detail and Supervision Work	BM Energy
6	2017.11-2018.8	Unitex LPG CBM Terminal	Total Engineering Service of LPG Receving and Storage Terminal	Unitex
7	2017.5-2017.10	Dominica 360MW LNG PJT	FS for 360MW LNG Power Plant and Terminal	BEATCO
8	2016.01-till now	Concept Design LNG Terminal in Indonesia	1. North of Jakarta 200mmscfd FSRU and 20"x12.9km Pipeline. 2. Surabaya of Indonesia 95mmscfd Onshore 81,000m3 LNG Terminal and Regasification Unit and Jetty for 800MW Gas Power Plant 3. 100MW Gas Power Plant and Small Onshore 10,200m3 LNG Terminal and Regasification Unit and Jetty.	SPC in China
9	2015.03-2015.8	Basic & FEED Engineering for FSRU POMALA Project (INDONESIA)	- FEED for barge type FSRU, Capacity of 25,000cbm, as LNG storage Complete with Regasification facility. - MOORING FOR LNGC TO BD/MD. - Gas from LNG regasfied thru pipeline to the 8 unit Wartsila diesel generator, located at Pomala Sulawesi Province Indonesia. - Natural gas is proposed as fuel for mid scale 136MW power plant.	PGN LNG
10	2014.09-2018.2	Bahrain LNG Terminal PJT	FEED/Detail for rRe-Gasification Process and Fixed Platform and Mooring/Jetty/Pipeline Design	Daelim E&C
11	2014.09-2014.12	FEED for Bahrain LNG Terminal Marine Facilities	FSRU Process and Hull and Mooring/Jetty/Pipeline Design	DAELIM E&C
12	2014.04-2015.03	PTTLNG LNG PJT	Detail Engineering for LNG Terminal Marine Facilities	POSCO Engineering Co., Ltd.
13	2013.11-2016.12	LPG 84K Carrier PROJECT	Basic of 84K LPG Ship and Project Management Consulting Service for LPG 84K Class Shipbuilding	China Chiu Sing Petroleum Holding Limited
14	2013.03-2013.04	Inchon LPG Station	LPG Storage Concrete 2sets of 20MT-Tank Design	Q BEST
15	2013.01-2013.07	URUGUAY FSRU PJT	FSRU Process and Hull and Mooring/Jetty/Pipeline Design	Samsung C&T Corporation-Seoyoung Engineering
16	2011.10- 2012.04	FSjuRU- Offshore LNG Terminal Jamaica Project	FSRU Process and Hull and Mooring/Jetty/Pipeline Design	SamSung C&T Corporation
17	2011.06-2011.11	FSjuRU Indonesia LNG Terminal Project(Petamina)	FSRU Process and Hull and Mooring/Jetty/Pipeline Design	SamSung C&T Corporation
18	2010.06-2011.01	HYBRID CONCRETE LNG FSRU/GSRU TERMINAL in Korea	FEED and Basic Design for Conceptual and Feasibility Engineering	MISC
19	2010.06-2010.10	LPG Terminal in Indonesia	Feed and Basic Design for LPG Terminal(Capacity : 4 x 2500 MT-Ship unloading flowrate : 250 – 450 MT / hour) and Berthing Dolphin	Petamina
20	2010.04-2010.10	LNG Onshore Plant/LNG Barge/LNG FSRU(50,000MT) for Bolivia	Feed and Basic Design for Onshore Plant/LNG Barge/LNG FSRU	YPFB BOLIVIA
21	2010.02-2010.04	JAMAICA Offshore Floating LNG Terminal Turnkey Project	Process Design / Onshore Receiving Station / Pressure Regulating Station / Pipeline / 130000m3-FSRU Process, Hull, Containment / Riser / SPM FEED Design	Samsung Engineering(SECL)

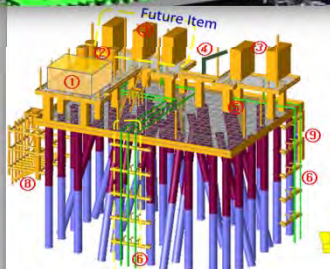


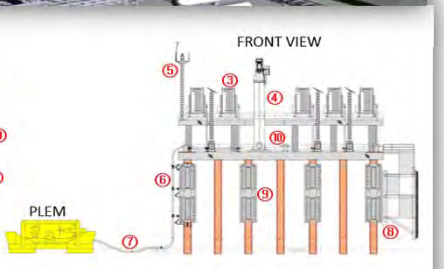






① Onshore Storage Tank and Office
② Subsea Pipe line (8" for LPG and 6" for Vapor Return)
③ PLEM (for 8" and 6")
④ Added Riser and Spool
⑤ Increase to 35K DWT LPG Vessel
⑥ Redesign of Four(4) Conventional Buoy
⑦ Four(4) Mooring Lines & Fixed Anchors
⑧ Fixed Platform considering 3 lines for Future use





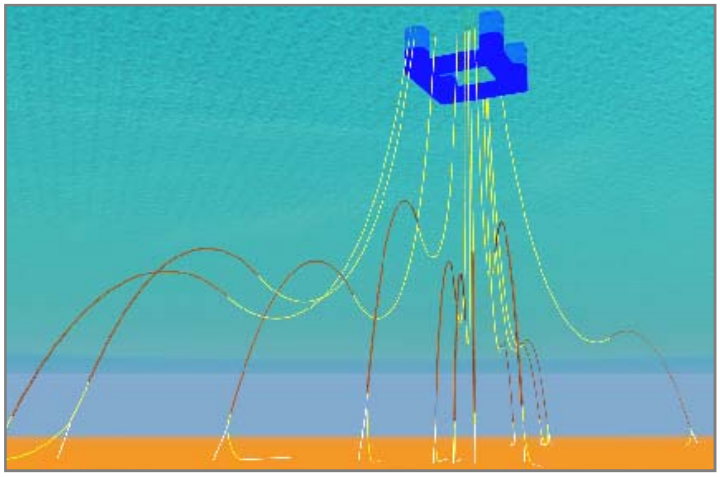
① Deckhouse & Generator
② Oil & Water Tank(3ea)
③ Reel for Hoses(5ea)
④ Crane(Length 30m, 1.4tf)
⑤ Lighting Pole, CCTV, Solar panel
⑥ Riser(6", 8")
⑦ Spool(6", 8")
⑧ Boat landing(Vessel size: 30DWT)
⑨ Fender(Vessel size: 1,000DWT)
⑩ Bitt(Capacity : 50ft, 3ea)

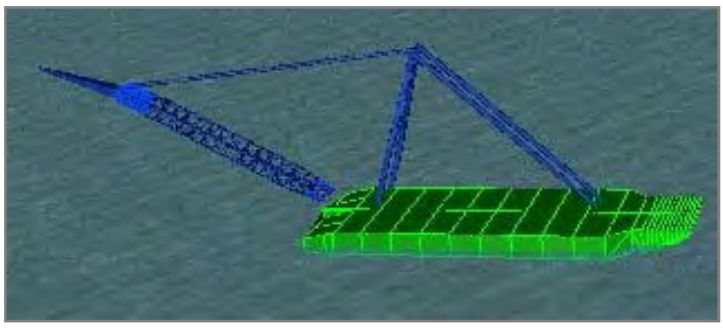
Offshore LPG Terminal Layout(CBM Type)

Ship and Floater

In-Service

1) Hull Scantling Design
2) Hydrodynamic and FE Analysis
3) Hull Fatigue Design
4) Vibration and Noise Design
5) Deck House Design
6) Compartment Design
7) Ballasting and Pump Design
8) Power generator Capacity Design
9) Speed Simulation
10) Outfitting and Piping Stress Design
11) Miscellaneous Design
12) Blasting Analysis
13) Specifications
14) Bill of Material



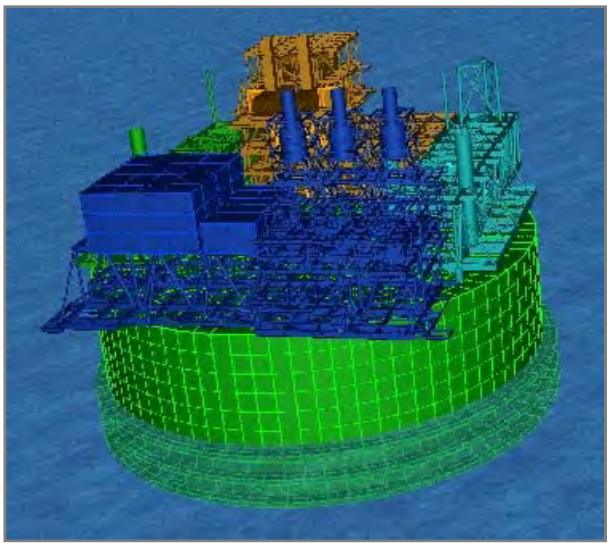


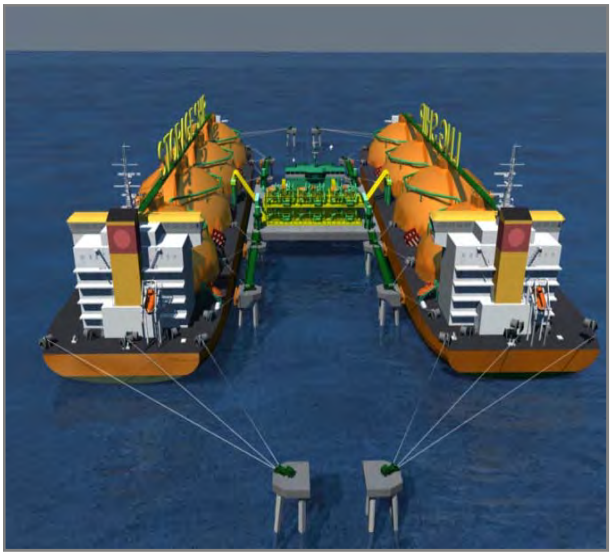
Construction

1) Block Handling Design
2) Fabrication Support Design
3) Heavy Equipment Lifting and Rigging
4) Block handling Procedure
5) Cost Estimation
6) Construction and Engineering Schedule
7) PMC Work

Production Drawings

1) G.A and Compro Drawings
2) Hull Structure Block Division
3) Hull structure Detail and Piece drawings
4) Piping and Outfitting Drawing
5) Deckhouse Detail Drawings
6) E&I and HVAC Detail Drawings





Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2017.11-2018.8	Unitex LPG Terminal	LPG SHIP MOORING CBM Detail and Supervision Work	Unitex
2	2016.6-2018.3	BM LPG/LNG Terminal PJT	LPG SHIP MOORING CBM Detail and Supervision Work	BM Energy
3	2015.03-2015.08	POMALA FSRU PROJECT	FEED ENGINEERING FOR POMALA 100mmscfd-FSRU Including LNGC 80K Berthing and pipeline	PGN
4	2015.04-2015.08	JACK-UP Barge R&D PJT	R&D for Jack-up System Stability and Structure Design	CDS
5	2015.03-2015.09	F-LNG Ichthys CPF Topside Project	Topside Piping support and piping Detail Design	Samsung Heavy Industries Co., Ltd.
6	2014.10-2015.02	15,000DWT FD PJT	15,000DWT FD DETAIL DESIGN	UNG-JIN
7	2014.10-2015.10	F-LNG Ichthys CPF Topside Project	F-LNG Topside Structure Inplace/pre-service Detail Engineering	Samsung Heavy Industries Co. Ltd.
8	2014.11-2014.12	CPF -FPSO PJT	ANCHOR DRIVEN PILE SUPPORT DESIGN	SamKang Co., Ltd..
9	2013.12-2014.12	Moho Nord FPU PJT	FPU Topside Module Structure In-service and Pre-service Analysis and Design	Hyundai Heavy Industries Co., Ltd.
10	2013.05-2015.02	CPF -FPSO TURRET PJT	Turret FE Analysis and Transportation/Motion Study	SBM
11	2013. 03-2014.03	Valemon Topside Project	Detail Engineering for Valemon FPSO Topside(Inplace, Motion Fatigue and Local Design)	Samsun Heavy Industries, Co., Ltd.
12	2013. 11-2016.12	LPG 84K -10 PROJECT	Basic of 84K LPG Ship and Project Management Consulting Service for LPG 84K Class Shipbuilding	China Chiu Sing Petroleum Holding Limited
13	2013.05-2013.06	CANADA-Sand Oil Modulization and Transportation Project	Ship Motion and Stability Design	EXPEDITE
14	2013.01-2013.04	Ung Jin F/D Design and Reinforcement	11,000ton- F/D Reinforcement Design(Strength, Stability, Motion)	Ung-Jin
15	2013.04-2014.03	Lithum FPSO R&D 4th Project	5,000ton Capacity Lithum GBS Concept Design	KIGAM
16	2013.01-2013.02	Working DCM Barge PJT	SINHUNG DCM Barge 8001 Stability and Design	Dong-a Geo Co., Ltd.
17	2013.01-2013.02	FD11000 VERIFICATION PJT	Floating Dock and Caisson Transportation and Floatation Analysis	Woong-Jin Industries

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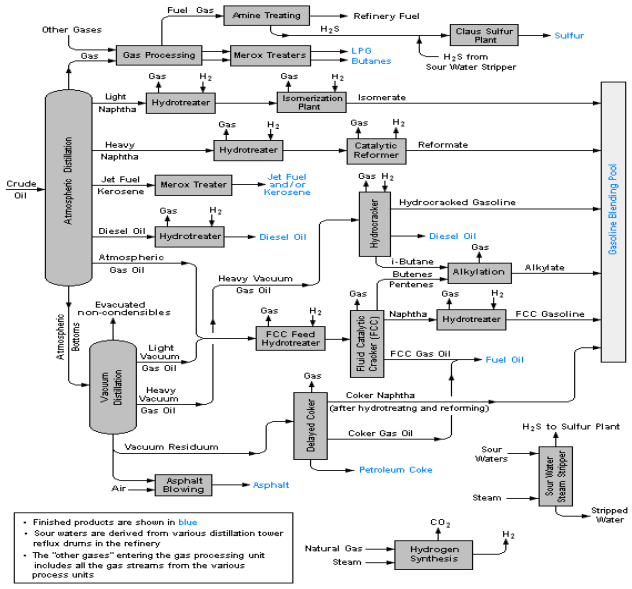
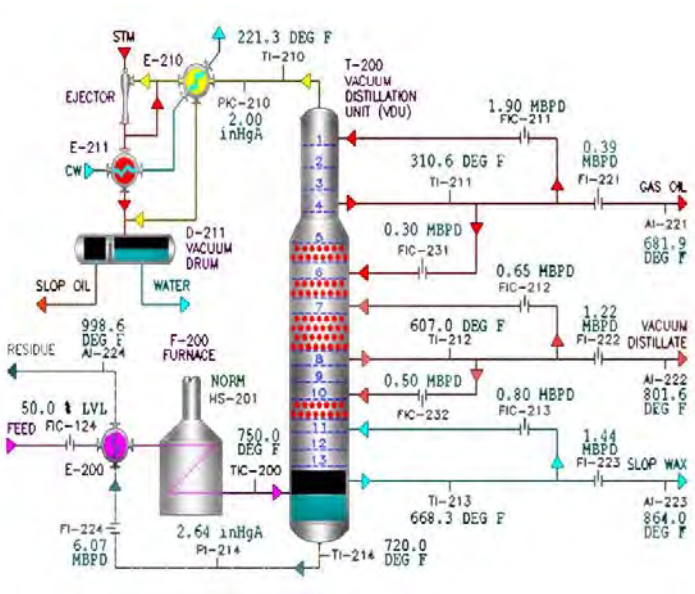
Refinery Plant downstream

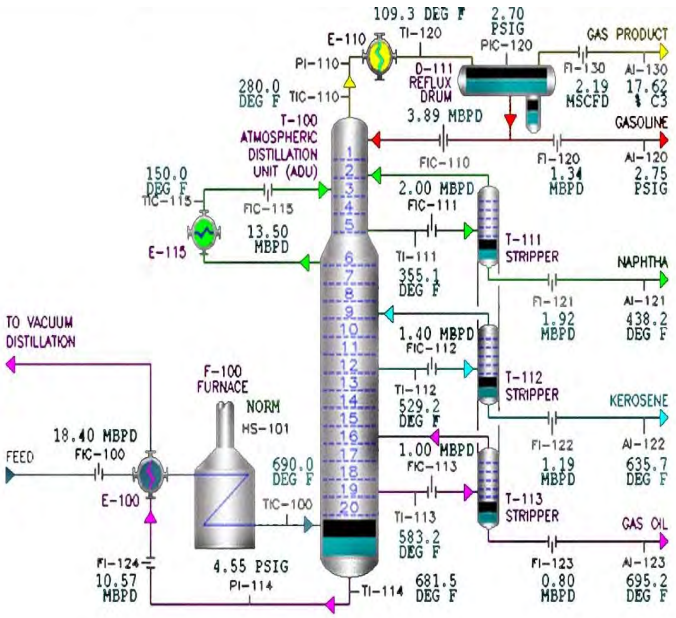
General Layout



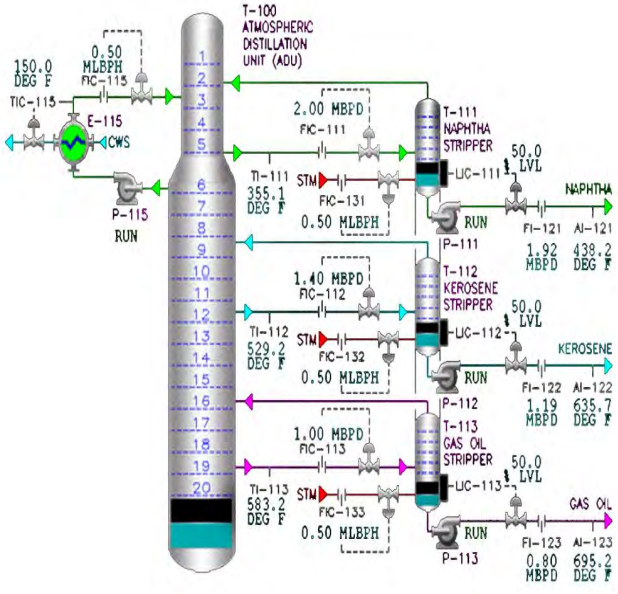
PFD-Vacuum Distillation Unit Overview



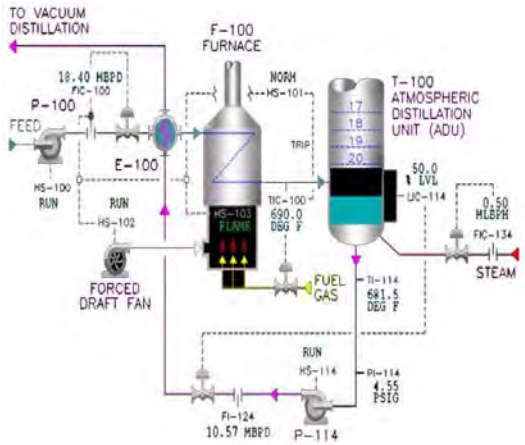
PFD-Atmospheric Distillation Unit for CrudeOil Pretreatment(DESALTIN



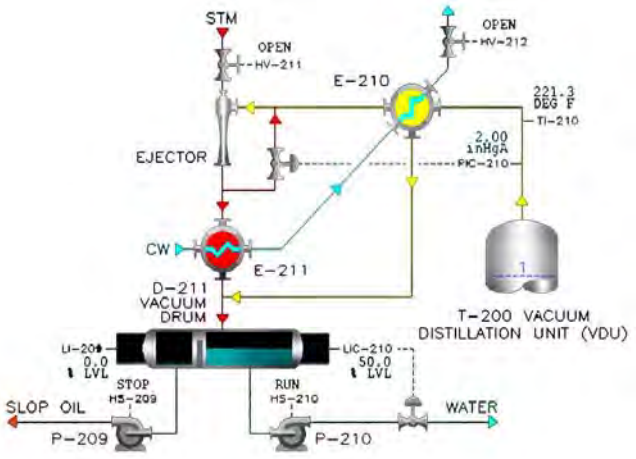
PFD-Atmospheric Distillation Unit Middle



PFD-Atmospheric Distillation Unit Bottom



PFD-Vacuum Distillation Unit Overhead



Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2017.9-2018.12	BOGCL Petrochemical PJT	Petrochemical Marine Terminal Concep/FEED/Detail Engineering Design	BOGCL
2	2015.11-2016.07	NASR II-Offshore Refinery PJT	Detail Engineering for Process & Utilities and In-service and Pre-Service of 73-Offshore Fixed Platform and Bridge	Hyundai Heavy Industries Co., Ltd
3	2015.11-2015.12	New Oil Jetty Construction Project	FEED Engineering for Crude Oil Loading system, Process, Electrical, Instrumentation, Telecommunication, Fire Protection, SSL, ETC.	HYUNDIA DEVELOPMENT COMPANY
4	2015.06-2015.09	NASR II -Offshore Refinery PJT	Detail Engineering of Process & Utilities , E&I, Structure, Transportation Fatigue Detail Design for Bridge, BST JKT & Deck	Hyundai Heavy Industries Co., Ltd.
5	2015.03-2016.02	Bergading -Offshore Refinery PJT	Detail design of Offshore Fixed Platform Process& Utilities andMechanical for Inplace/pre-service	Hyundai Heavy Industries Co., Ltd.
6	2015.03-2016.02	Baronia-Offshore Refinery PJT	Detail design of Offshore Fixed Platform & Utilities /E&I/ Mechanical for Inplace/pre-service	Hyundai Heavy Industries Co., Ltd.
7	2014.07-2014.10	Fort Hills Oil Sands-Onshore Refinery Project	FEED Design of & Utilities , E&I, Structure, Module Sea-Transportation Study	SK E&C
8	2014.09-2014.10	LOTTE CHEMICAL Project	FEED Design of Process for Chemical Plant Modulization Detail Engineering	Samsung Engineering Co., Ltd.
9	2014.07-2014.10	Fort Hills Oil Sands-Onshore Refinery Project	FEED Engineering and Modulization	SK E&C
10	2014.11-2015.09	Badamyar -Offshore Refinery PJT	Detail design of Offshore Fixed Platform Process/E&I/ Mechanical for Inplace/pre-service	Hyundai Heavy Industries Co., Ltd.
11	2014.09-2014.11	LOTTE CHEMICAL USA PJT	FEED Engineering for process, utilities, Piperack & Module In-service and Pre-service Engineering	Samsung Engineering Co., Ltd.
12	2014.03-2014.07	Petronas Pacific Northwest LNG PJT	FEED Engineering for process, utilities, Piperack & Module In-service and Pre-service Engineering	Samsung Engineering Co., Ltd.
13	2014.02-2014.04	Abu Dhabi Oil Refining Company PJT	FEED Engineering for process, utilities, Takreer Carbon Black & Delayed Coker UG Cable Design	Samsung Engineering Co., Ltd.
14	2013.01-2013.05	TEEKAY PETROJARL - Offshore Refinery PJT	Detail Design for Offshore Fixed Platform Topside Process & Utilities /E&I / Mechanical for Inplace/pre-service	Samsung Engineering Co., Ltd.
15	2013.09-2015.02	SATAH AL RAZBOOT (SARB) FIELD DEVELOPMENT PROJECT- PACKAGE 4 EPC WORK	FEED Engineering for process, utilities, Modulization Package design	HEC
16	2013. 02-2013.10	40,000 BPD REFINERY PLANT IN MONGOLIA PROJECT-Onshore Refinery Project	FEASIBILITY STUDY AND CASH FLOW SIMULATION FOR 2 PHASES OF 20,000BBL/DAY REFINERY PLANT IN MONGOLIA PROJECT	EMFMOC Mongolia
17	2012.06-2013.03	Valemon Fixed Platform-Offshore Refinery PJT	IN-SERVICE for INPLACE, FATIGUE, SEISMIC, BLASTING, PRE-SERVICE for LIFTING and, PILE DESIGN, TRANSPORTATION, INSTALLATION Design and PIPELINE / RISER 4", 6" , 12", 18", 20" IN-SERVICE and PIPELAYING Detail Engineering	Samsung Engineering Co., Ltd.

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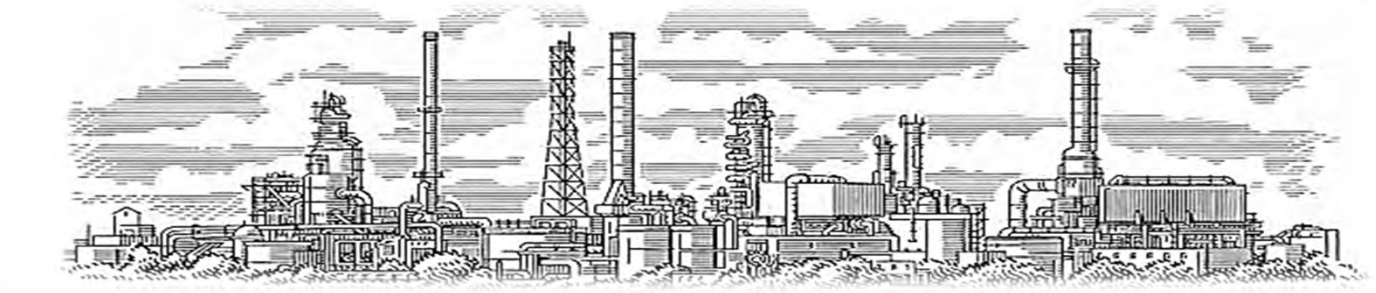
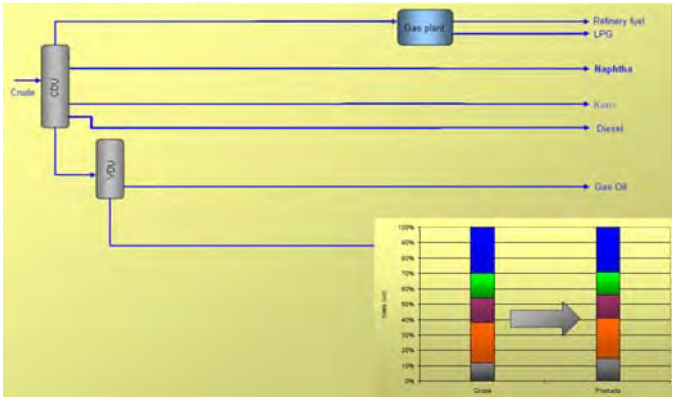
Engineering services of major project

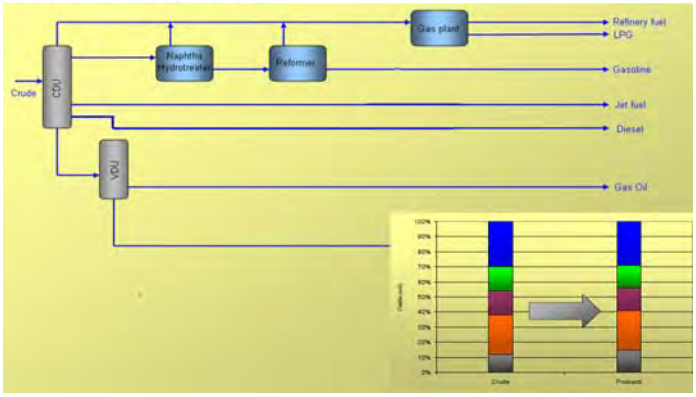
18	2012.03-2012.10	RUWAIS REFINERY EXPANSION PROJECT	Detail Design for Process, Utilities, E&I AND Pipe Rack Modulization Engineering/Design	GS Conctruction and Engineering Co., Ltd.
19	2011.11- 2012.05	UZ 750 project UAE-Onshore Refinery Project	FEED/BIDDING Engineering for Process, Utilities and E&I / Mechanical for Inplace/pre-service	Samsung Engineering Co., Ltd.
20	2007.12-2013.03	GUMUSUT KAKAP FPU - Offshore Refinery PJT	Topside Process & Utilities design and Super-Lift, Load-out, Float-off Design and Block handling Design, Hull FEM Analysis, Buckling Analysis, Motion Analysis , Hydrodynamic Analysis, Float-Off, Transportation, Detail Design and Pipeline and Flexible Riser	MMHE Malaysia
21	2011.03-2011.12	Refinery Barrancabermeja Project in Colombia	FEED/BIDDING Engineering for Process & Utilities, Modulization and Module Vibration and Inplace / Sea Transportation and Fabrication Design and Procedure	SK E&C
22	2010.12-2014.11	1&2 Phase of 2,000bbl/d Refinery Plant PJT	FS, Engineering, PMC and Supervision work of 1&2 Phase of 2,000bbl/d Refinery plant in Mongolia PJT	ENF MOC (ENF Mongolia Oil Company)
23	2010.09-2012.09	SKIKDA REFINARY PROJECT IN Algeria	Detail engineering of Process, Utilities, E&I and Modulization and Module Vibration and Inplace / Sea Transportation and Fabrication Design and Procedure	Samsung Engineering Co., Ltd.
24	2010.07-2011.12	KEARL OIL SANDS PROJECT FOR EXXON MOBIL-Onshore Refinery Project	Black Sand Oil Refinery Project Process, Utilities, E&I and Medialization Design and Ship Mooring Analysis and Module Sea Transportation and Sea fastening Design	Dong Bang Co., Ltd.



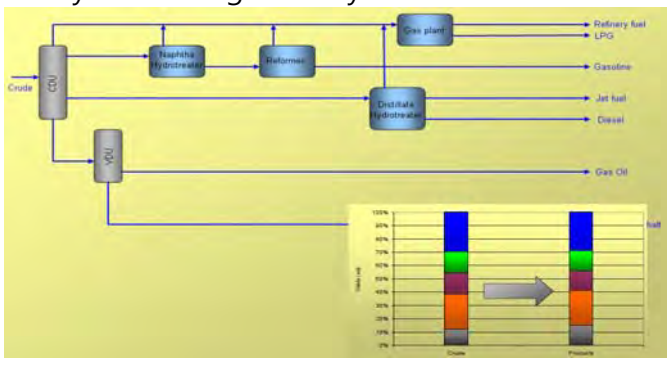
Topping Refinery



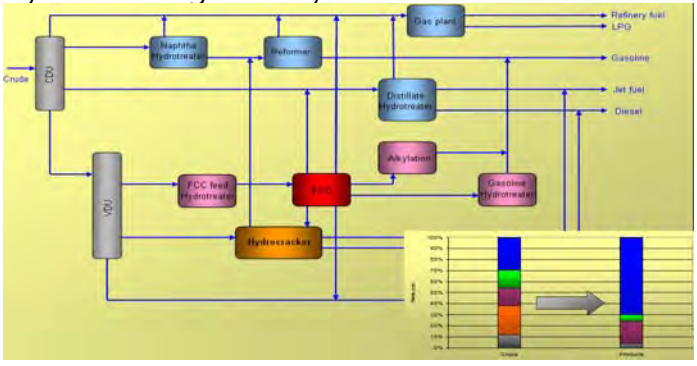
Skimming Refinery



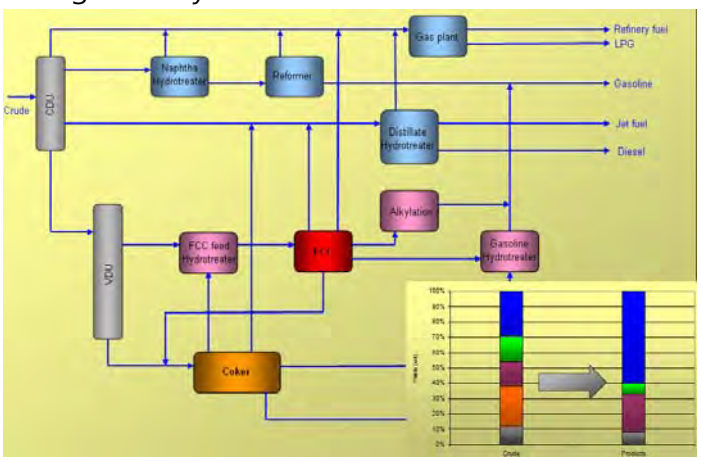
Catalytic Cracking Refinery

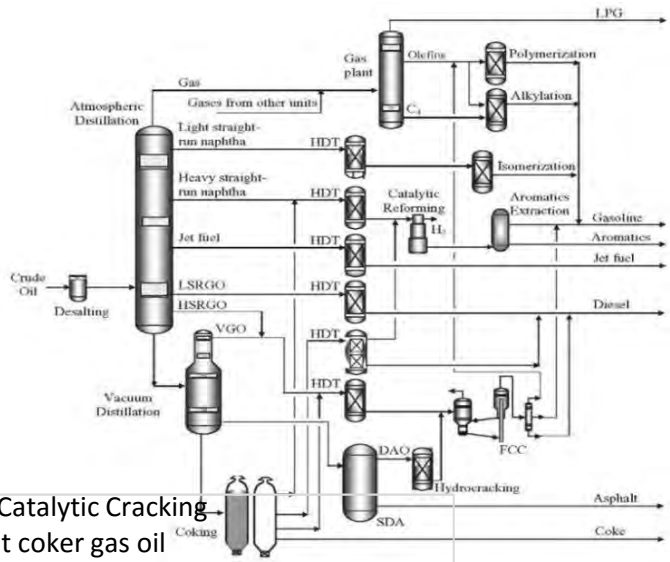


Hydro cracking Refinery



Coking Refinery





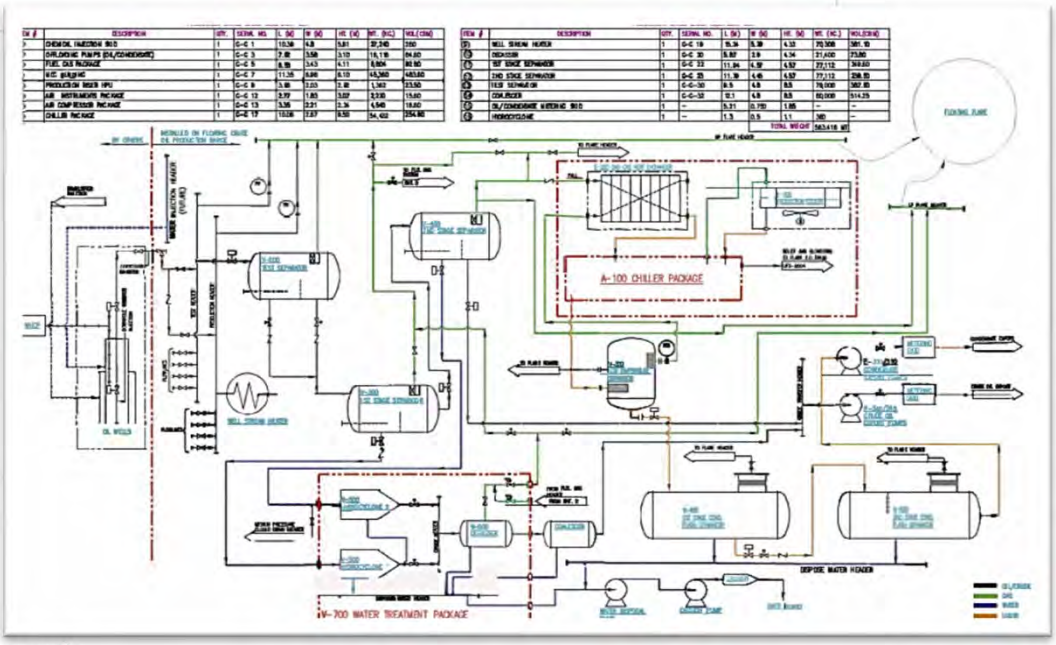
Equipment Description

VGO : Vacuum Gas Oil
LSRGO : Light Straight Run Gas Oil
HSRGO : Heavy Straight Run Gas Oil
HDT : Hydrotreater
DAO : Deasphalted oil
SDA : Solvent Deasphalting

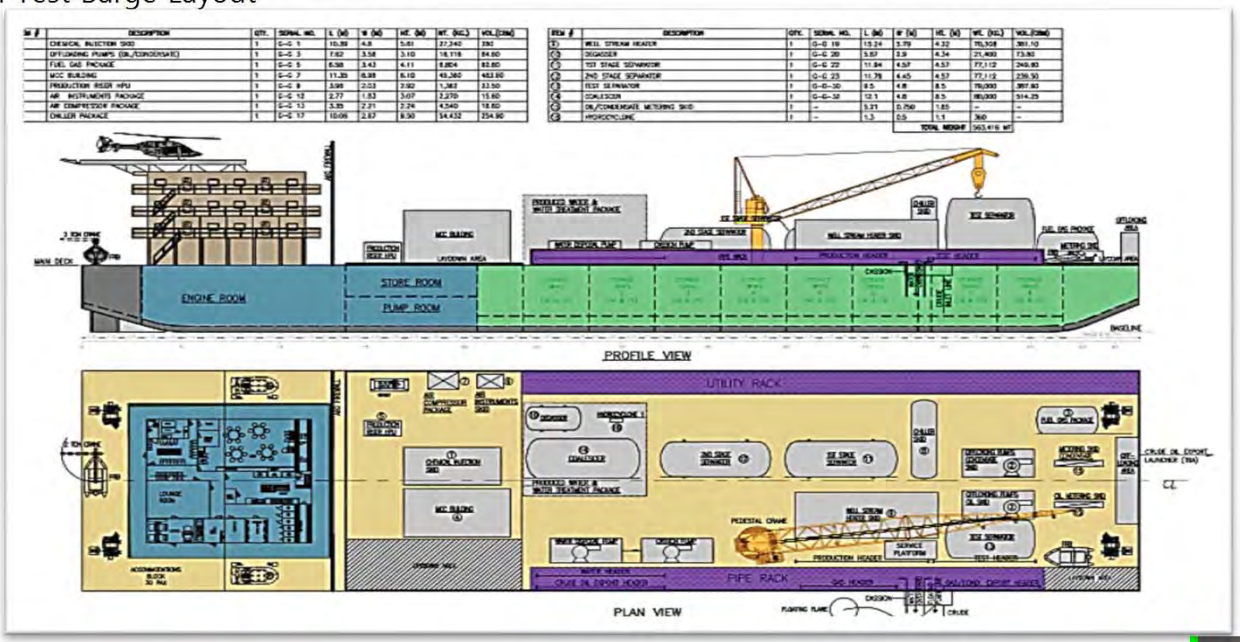
FCC : Fluid Catalytic Cracking
LCGO : Light coker gas oil
HCGO : Heavy coker gas oil
HDS : Hydro Desulfurization
GCU : Gas Concentration Unit

Floating well Test Barge

Process Flow Diagram

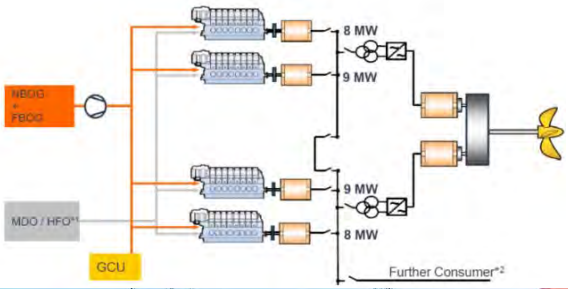


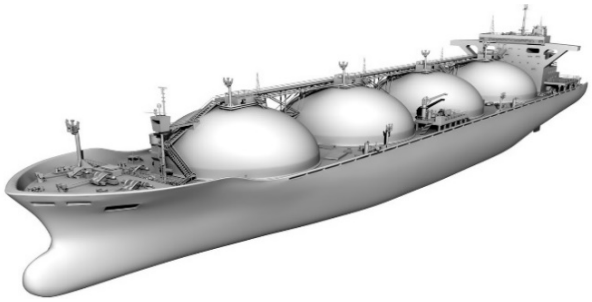
Floating well Test Barge Layout

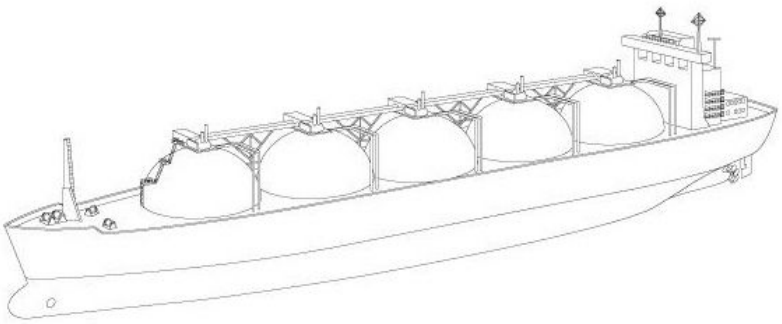


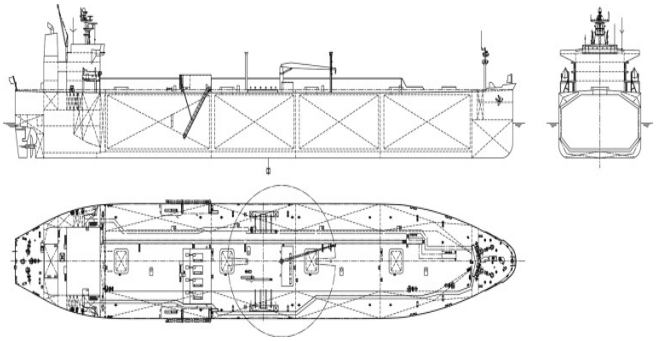
LNG Carrier Ship

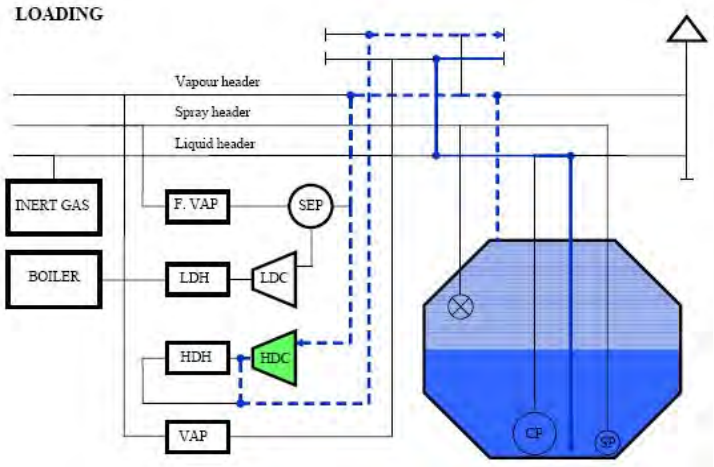
Dual Fuel Engines for LNGC

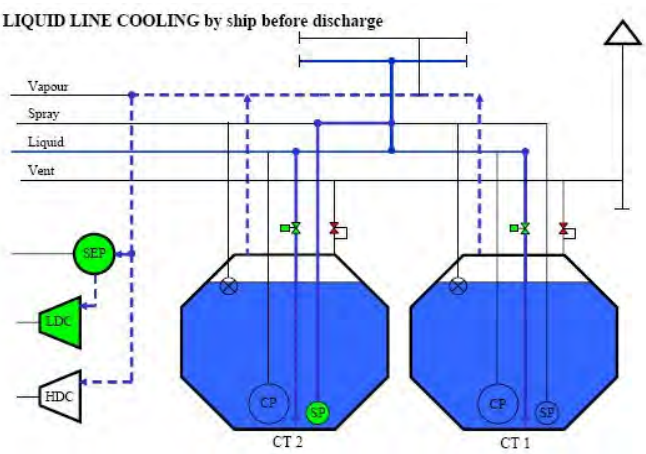








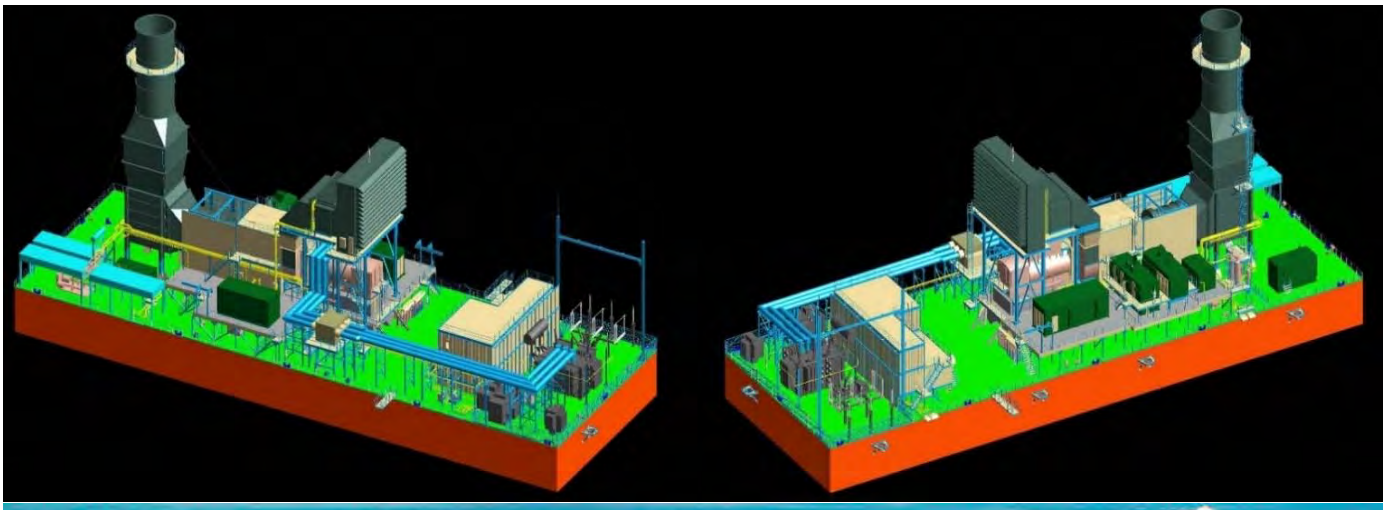




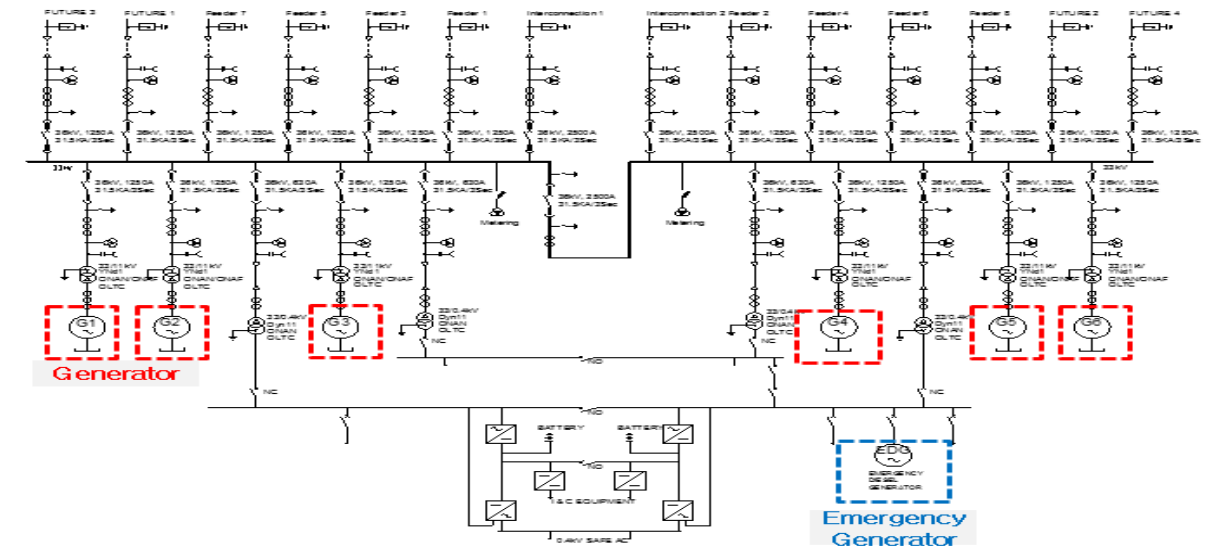
Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2007.09–2007.12	47K DWT CLASS LNG CARRIER (GEDEN)	DETAILED DESIGN OF HUL-OUTFITTINF FOR HMD	HMD
2	2006.04-2008.01	120000 DWT LNG WEST POLARIS	Detail Designed and Construction Engineering / Production Drawing / Technical Assistant for Construction / Technical Assistant for Commissioning.	Samsung Heavy Industries Co., Ltd.
3	2007.03–2007.12	CNG SHIP PROJECT	Concept Design For CNG Ship	MISC
4	2005.04–2006.04	CHEMICAL TANKER. 47K PROJECT	DETAILED DESIGN OF HULL'S OUT FITTING FOR HMD	HMD
5	2005.04–2006.10	CHEMICAL TANKER. 37K PROJECT	DETAILED DESIGN OF HULL'S OUT FITTING FOR HMD	HMD
6	2003.8–2003.12	46K PRODUCT / CHEMICAL TANKER(BP) PROJECT	DETAILED DESIGN OF HULL'S OUT-FITTING FOR HMD	HMD
7	2003.06-2005.03	NGANHURRA	Detail Designed and Construction Engineering / Production Drawing / Technical Assistant for Construction / Technical Assistant for Commissioning.	Samsung Heavy Industries Co., Ltd.
8	2003.01-2004.02	DALIA FPSO	Detail Design Document and AFC Drawing.	Samsung Heavy Industries Co., Ltd.
9	2003.08-2004.05	Ship No. = 1497, Ship Type = 393K FPSO, Owner = DALIA, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
10	2003.10-2004.10	Ship No. = 1502, Ship Type = 145K LNGC, Owner = MISC, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
11	2003.12-2004.07	Ship No. = 1445, Ship Type = 148K LNGC, Owner = KNUTSEN, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
12	2003.12-2005.10	Ship No. = 1480, Ship Type = 115K LNGC, Owner = BP, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
13	2003.06-2004.10	Ship No. = 1465s, Ship Type = 115K LNGC, Owner = TEEKAY, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
14	2004.04-2005.04	Ship No. = 1536s, Ship Type = 147K LNGC, Owner = OMAN, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
15	2004.07-2006.02	Ship No. = 1553s, Ship Type = 145K LNGC, Owner = BG, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
16	2004.09-2005.03	Ship No. = 1562s, Ship Type = 145K LNGC, Owner = APM, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
17	2005.04-2006.04	Ship No. = 1594s, Ship Type = 145K LNGC, Owner = 4J-LASGAS, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
18	2005.06-2006.08	Ship No. = 1563s, Ship Type = 150K LNGC, Owner = NYK, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
19	2006.04-2006.11	Ship No. = 1643s, Ship Type = 217K LNGC, Owner = TEEKAY, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
20	2006.09-2007.02	Ship No. = 1607s, Ship Type = 165K LNGC, Owner = AP MOLLER, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI
21	2007.01-2007.04	Ship No. = 1619, Ship Type = 155K LNGC, Owner = K-LINE, Shipyard = SHI	Hull Scantling Design / Full Ship FE Analysis based on DNV Rules and Stability / Motion Study and Outfitting and Piping and Shop drawings	SHI

Ship/Barge Mounted Power Plant



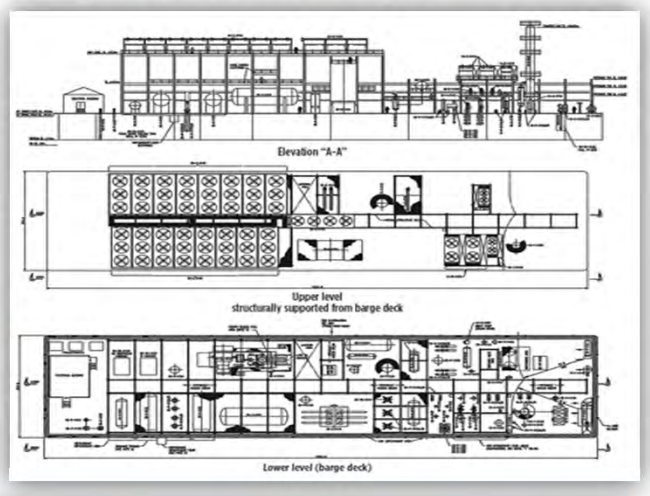
Single line Diagram (17MW gas Generator 6ea + Emergency Diesel Generator 1ea)



Floating LNG Power Plant Mounted on Barge

- Length : approx. 276.0 m
- Breadth : 44.0 m
- Depth : 26.0 m
- Generator Engine : 24 Gas Engines
- Endurance : abt. 68days (for 200MW)
- Cargo Containment System : Membrane Type, GTT NO96 (or equivalent)
- Nominal Voltage : 132kV (Can be adapted to cater for national grid)
- Frequency : 50 or 60Hz
- Complement : 17 persons
- Construction Terms : 30 months (From Contract to Sail Away)

Floating LNG Power Plant Layout

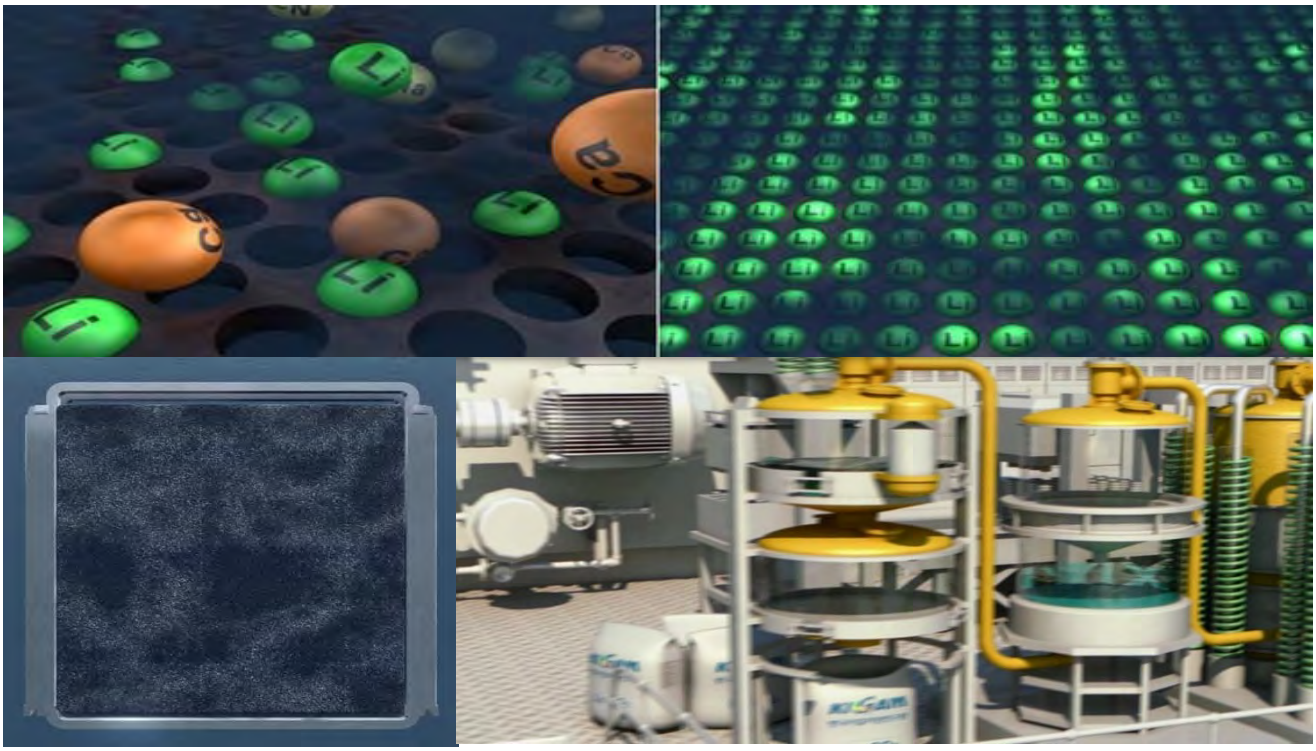


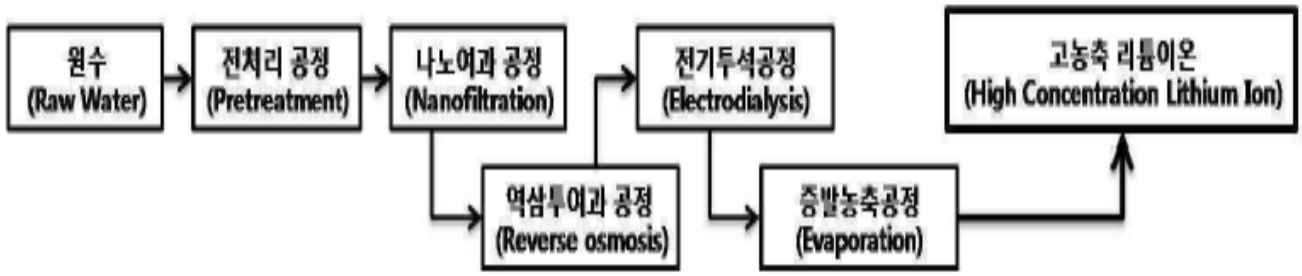
Engineering services of major project

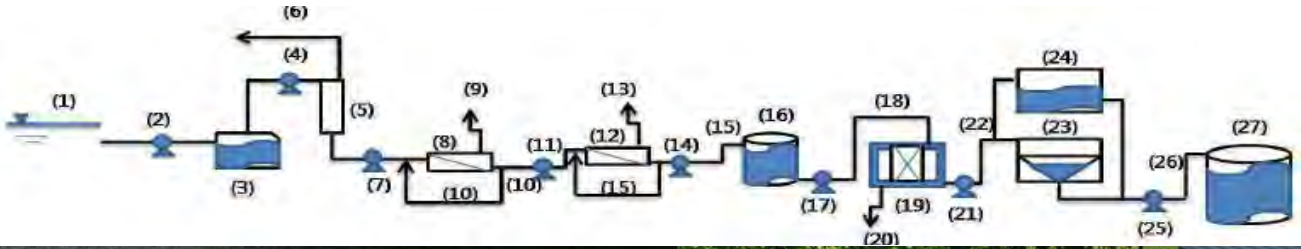
No	Date	Project Name	Project Description	Client
1	2009-2010	500MW DISSEL BARGE MOUNTED POWER PLANT	FEED Engineering for Barge Mounted 500MW Dissel Power Plant	HHI
2	2011-2013	1000MW GAS BARGE MOUNTED POWER PLANT	R&D for FEED Engineering OF Barge Mounted 1000MW LNG-GAS Power Plant	KETEP
3	2014-2015	100MW DUAL BARGE MOUNTED POWER PLANT	R&D for FEED Engineering OF Barge Mounted 100MW Dual Power Plant	KETEP

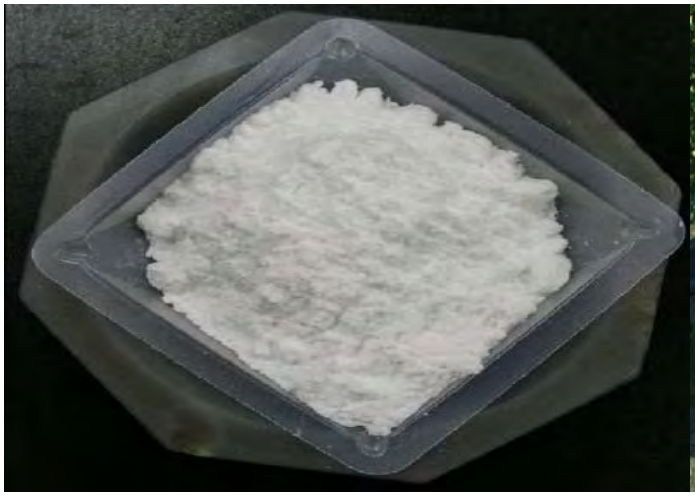
Seawater dissolved Lithium's 99.99% deportation Technologies

Separation Membrane Reservoir System







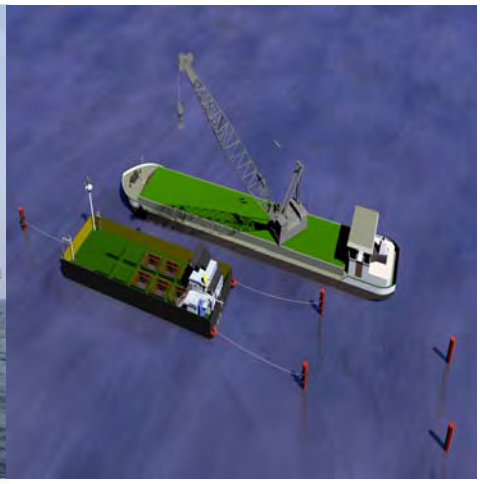


Seawater 1 Litter ->0.17mg Lithium

FPSO for Seawater dissolved Lithium deportation Unit

Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2017.04-2018.02	3rd-2Phase R&D for Seawater dissolved Lithium's 99.98% deportation Technologies	Enhancement of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit System	KIGAM/Korea Government
2	2016.04-2017.03	3rd-2Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Enhancement of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit System	KIGAM/Korea Government
3	2015.04-2016.02	3rd-1Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Enhancement of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit System	KIGAM/Korea Government
4	2014.04-2015.03	2nd-5Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Development of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit Operation at Site	KIGAM/Korea Government
5	2013.04-2014.03	2nd-4Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Development of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit Operation at Site	KIGAM/Korea Government
6	2012.04-2013.03	2nd-3Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Development of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit Installation at Site	KIGAM/Korea Government
7	2011.04-2012.03	2nd-2Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Development of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit Construction	KIGAM/Korea Government
8	2010.10-2011.03	2nd-1Phase R&D for Seawater dissolved Lithium's 99.99% deportation Technologies	Development of Separation Membrain Reservoir System and FPSO for Seawater dissolved Lithium deportation Unit Engineering	KIGAM/Korea Government

1. Lithium: 0.17mg/seawater 1-Litter, [100m x 100m x10m Station-14.688ton/day->Lithium 4259.5ton/ 1year]
2. 100mx100mx10m Offshore Staion will save the cost $336,805,784.00 Based on $79,071.30 per 1-ton Litium

Harbour and Port

In-Service

1) Site Soil and Environmental Investigation
2) Harbour and Port Layout
3) Water flow simulation
4) Ship Navigation Simulation
5) Quay wall inplace Design
6) Seismic Design
7) Concrete / Jetty Pile Fatigue Design
8) Miscellaneous Design
9) Soil Improvement
10) Crane Foundation Design
11) Ship Mooring and Berthing Analysis
12) Ship Wave Analysis
13) Fender / Bit Design
14) Specifications
15) Bill of Material

Pre-Service

1) Caisson Transportation Design
2) Caisson Float-Off Design
3) F/D Strength Design

Construction

1) Cassion Loadout Design
2) Loadout Seating Bed Design
3) Cost Estimation
4) Construction and Engineering Schedule
5) PMC Work

Production Drawings

1) Port Layout Drawings
2) Caisson and Jetty G.A
3) Re-bar arrangement Drawings
4) Misc drawings
5) Dredging Drawings

Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2018.8.20-2018.12.17	Petron Aromatics BED Project	Basic Engineering Design of Jetty Platform for 2 sets of 30,000DWT	SK E&C
2	2017.9-2018.12	BOGCL Petrochemical PJT	Marine Jetty FEED&Detail Engineering Work	BOGCL
3	2017.5-2018.2	JAZAN REFINERY PJT	JETTY DETAIL DESIGN	HAWHA E&C
4	2017.10-2017.12	16-NAVAL-00 PORT PJT	FEED DESIGN FOR TURNKEY PJT	SEYOUNG ENG
5	2017.5-2017.9	Jangbogo Port PJT	FEED DESIGN FOR TURNKEY PJT	YOUNGKWANG ENG
6	2015.9-2016.10	BUSAN WEST CONTAINER TERMINAL PJT	FEED AND DETAIL DESIGN	SEKWANG ENG
7	2015.04-2015.06	FD11000 VERIFICATION PJT	Launching Simulation for 2-Cassion	Ung-Jin
8	2014.03-2015.04	H-Dock Project	50ton Bitt Capsize Verification and Reinforcement Detail Engineering	Dae-Young Engineering
9	2015.01-2015.04	YeoSu New North Breakwater Turnkey PJT	Caisson Transportation, FSSI, Seismic Risk Analysis	SK E&C
10	2015.02-2015.03	SM200 Phase I PJT	Ship Mooring Case Study- BD & MD Design	Daelim E&C
11	2015.06-2015.12	Julong Port Project	Caisson Design and Transportation Detail Design	Daelim E&C
12	2015.04-2015.06	Busan North Port Project	Floating Bridge Detail Design	Kun-Il Engineering
13	2014.12-2015.05	Gosung Green Power Port Project	Ship mooring Detail Engineering	Yoo Sin Engineering
14	2014.02-2014.04	Inchon International Passenger Port 2nd Phase Ternkey	Detail Engineering of Caisson Block Transportation and Floating Dock Stability and Motion Study	Hyundai E&C
15	2014.07-2015.11	Turnkey GA-GU Port	Caisson Block Transportation and Floating Dock Stability and Motion Study	Samsung C&T
16	2013.08-2014.01	Turnkey for Ulsan New Port	350K-VLCC Motion for SPM Mooring and Caisson Block FD Stability and Motion	Hang-do Engineering Co., Ltd.
17	2013.11-2014.05	Turnkey PJT-Sadong Port	Caisson Block Transportation and Floating Dock Stability and Motion Study	SENEST CO., LTD.
18	2013. 06-2014.12	Nakhodka Mineral Fertilizer Plant (Phase1)	FEED Design for Water and Wave Simulation, Berthing and Mooring Simulation, Jetty & Pile Design, Construction Procedure, Specification, HSE, Intake &Oufall Pipeline, Electrical & Instrument, Mechanical and Ship Loader & Conveyer System design and Material Take-Off	HEC
19	2013.02-2013.06	Inchon International Passenger Port 2nd Phase Turnkey	Pontoon Mooring & Structural Design/ Ship Mooring & Manuvering Analysis / reliability Design for Caisson and 80m x 30m Bridge	Samsung C&T
20	2013.04-2013.06	Hyundai Steel Port Project	400,000ton Class Ship Mooring Design	SEKWANG ENG
21	2013.03-2013.06	Pohang South Port Phase 1 and Zone-1 Project	Detailed Engineering for Breakwater and Foundation	SK E&C

Oil Tank Farm

In-Service

1) Soil Investigation
2) Layout and Tank Size Design
3) Material Selection
4) Pumping System Design
5) Loading/Unloading System Design
6) Hydraulic Analysis
7) Structure and API Gravity Tank Layout
8) API Tank In-place Design
9) Soil Improvement
10) Foundation Seismic Design
11) Pile Foundation Design
12) Miscellaneous Design
13) Dike Design
14) Piping Stress Design
15) Water Reserviour
16) Specifications
17) Bill of Material

Construction

1) Cost Estimation
2) Construction and Engineering Schedule
3) PMC Work

Production Drawings

1) Piperack and Package Structure Detail Shop Drawings
2) Tank Detail Drawings
3) Joint Piece Drawings
4) Piping Layout and GA Drawings
5) Piping ISO Drawings
6) Pile Foundation Drawings
7) Mat Foundation Design
8) Dike and Water Reserviour Detail Drawings
9) Soil Improvement Detail

Engineering services of major project

No	Date	Project Name	Project Description	**Client**
1	2015.09-2015.12	Indonesia Kalimantan Tank Terminal PJT	FEED Engineering/ Total number of 77 Tanks for about 411,900K/L oil storage tanks, of various sizes similar to current Phase 1 project	KCC
2	2014.10-2014.12	Ulsan Oil Hub PJT	FEED for Process / Subsea Pipeline / Jetty / Tankfarm Engineering	SK E&C
3	2015.09-2014.01	Malaysia Johor Tank Terminal	FEED Engineering/ Total number of 65 Tanks for about 391,900K/L oil storage tanks, of various sizes	KCC
4	2012.05-2012.06	Construction of Oil Storage Tanks Phase 2 for ATB.	FEED Engineering/ Total number of 39 Tanks for about 600,000 cubic meter (m3) oil storage tanks, of various sizes similar to current Phase 1 project	Ingress/Malaysia
5	2015.5-2013.10	Dragon Oil (Turkmenistan) Limited (DOTL) Tank farm Terminal	FEED Engineering/ Total number of 11 Tanks for about 14,825m3 oil storage tanks, of various sizes in Turkmenistan	ILK Construction
6	2010.04-2010.06	Thailand Rayon Tank Terminal Jetty Project	Detail Engineering for Mooring Analysis/Liquid Berthing Design/Tank & Foundation Design/Pipeline Design	Daewoo Emgineerng Co., Ltd.
7	2009.10-2009.11	YESU- OT KNOC OIL STORAGE FACILITIES TURNKEY PJT	Bidding Engineering of Mooring/Berthing/Trestle Bridge and Storage Tank Design	Samsung Heavy Industries Co., Ltd.
8	2008.12-2009.06	SUN-IL TANK TERMINAL PROJECT in Korea	2,000KL API GRAVITY TANK-8SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	Sun-Il Tank Co., Ltd.
9	2007.12-2008.06	SUN-IL TANK TERMINAL PROJECT in Korea	2,000KL API GRAVITY TANK-10SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	Sun-Il Tank Co., Ltd.
10	2007.05-2007.10	BIO-OIL TANK TERMINAL PROJECT	2000KL API GRAVITY TANK-4SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	Bio-Oil Energy Co., Ltd.
11	2006.04-2006.10	SUN-IL CRUDE OIL TANK TERMINAL PROJECT	2000KL API GRAVITY TANK-8SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	SUN-IL TANK CO., LTD.
12	2006.06-2006.12	CRUDE OIL TANK TERMINAL PROJECT	990KL API GRAVITY TANK-5SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	NECS OIL CO., LTD.
13	2005.07-2006.01	LNG TANK TERMINAL PROJECT	990KL API GRAVITY TANK-9SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	HYE-IN CO., LTD.
14	2005.06-2005.12	CRUDE OIL TANK TERMINAL PROJECT	2000KL API GRAVITY TANK-7SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	SUN-IL CO., LTD.
15	2004.09-2004.12	LNG TANK TERMINAL PROJECT	2000KL API GRAVITY TANK-8SETS/990KL API GRAVITY TANK-4SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	JEM ENERGY CO., LTD.
16	2004.06-2004.09	CRUDE OIL TANK TERMINAL PROJECT	2000KL API GRAVITY TANK-8SETS Basic and Detail Engineering, Dike/Foundation and On-Land Pipeline Basic and Detail Engineering	KYEONG-DONG ENERGY CO., LTD.

Road and Bridge

In-Service

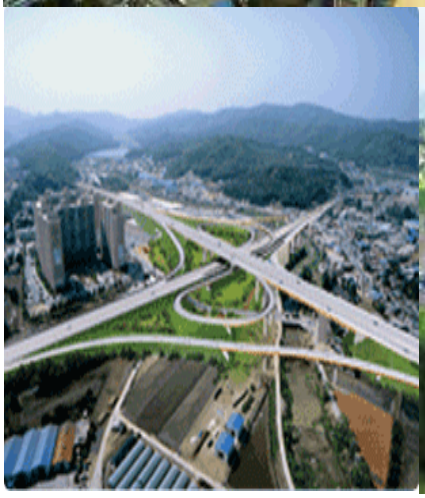
1) Site Soil and Environmental Investigation
2) Road and Bridge Route Simulation
3) Traffic Simulation
4) Road Curvature Design
5) Road Pavement Layer(Thickness) Design
6) Bridge Type Design
7) Bridge Abutment/Pier Design
8) Bridge Slab Design based on Traffic Lane
9) Miscellaneous Design
10) Soil-Pile Design
11) Seismic Design
12) Traffic Fatigue Design
13) Wind Flow Simulation
14) Vibration and Noise Analysis
15) Bill of Material

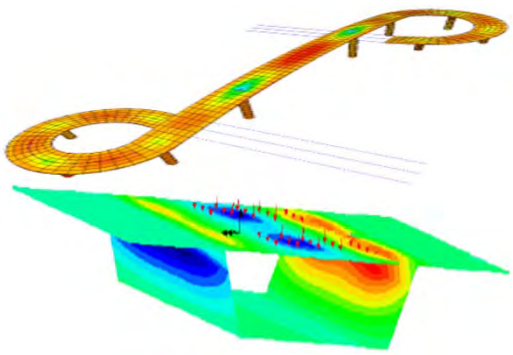
Construction

1) Offshore Bridge Installation Design by superlift
2) Temporary Structure Design
3) Sea Transportation Design
4) Cost Estimation
5) Construction and Engineering Schedule
6) PMC Work

Production Drawings

1) Road Route layout Drawings
2) Road Pavement Drawings
3) Bridge Slab and Box Detail Drawings
4) Bridge Abutment/Pier Detail Drawings





No	Date	Project Name	Project Description	Client
1	2017.6-2017.9	Floating Bridge PJT	DETAIL ENGINEERING WORK	KICT
2	2017.6-2017.9	Suspension bridge/Cable-stayed girder bridge PJT	DETAIL ENGINEERING WORK	KICT
3	2017.2-2017.9	Worldcup Bridge PJT	DETAIL ENGINEERING WORK	SAMsung Construction and Engineering Co., Ltd.
4	2015.08-2016.08	CAMBODIA 311Km Road PJT	DETAIL ENGINEERING FOR 311KM ROAD	CAMBODIA MINISTRY OF Road & traffic
5	2015.02-2015.03	Oid- yang-su Bridge Dismantlement Project	Verification for Capsizing of Transportation Barge	Sung-su Frontier
6	2015.03-2015.05	5,400 DWT PJT	5,400DWT SEA TRANSPORTATION STUDY	S&D Co., Ltd.
7	2014.12-2015.02	GSP Neptun Project	Bridge Lifting and Mooring Design using 900ton Derric Crane	Hankuk Bigeo Co', Ltd.
8	2013.07-2013.12	Gun-Jang Grand Bridge PJT	3600ton Bridge Lifting and Derric Crane Dynamic Motion Analysis	S&D Co., Ltd.
9	2013.10-2014.05	Old-Yang-Su Grand Bridge Dismantle PJT	Bridge Dismantle and Barge Motion and Super-Lift Engineering	Korea Strand Jack Co., Ltd.
10	2013.01-2013.02	TOP-SOME WALKWAY BRIDGE PJT	Detail design for Bridge	Lotte E&C
11	2012.03-2012.10	YangSu Grand Bridge Project	Bridge Float Over and Stability Design	Han-sin Industries Co., Ltd.
12	2012.02-2012.05	Young Kwang-HyeJae Grand Brideg	Bridge Ship Collision and Navigation Design	Yoosin/Hyoundai E&C
13	2011.02-2011.06	NOWHA-GUDO PHASE NO.2 OFFSHORE BRIDGE TURNKEY PJT	Bridge Ship Collision and Navigation Design	Hyundai Engineering
14	2011.03-2011.05	WHAYANG-CHEKUM PHASE NO.2 OFFSHORE BRIDGE TURNKEY PJT	Bridge Ship Collision and Navigation Design	Hyundai Engineering
15	2010.03-2010.09	SORAEPO-GU Port Ship Collision and Navigation Design	Ship Collision and Navigation Design	Samsung Construction and Engineering Co., Ltd.
16	2010.05-2010.07	Turnkey Pjt Sin gi-Kogum Bridge - Ship Collision and Navigation Design	Ship Collision and Navigation Design	Kolon E&C Co., Ltd. - Yoosin Eng
17	2010.03-2010.04	Han River Bridge - Ship Collision and Navigation Design	Ship Collision and Navigation Design	Hangang Development Co., Ltd. - Yoosin/Hanjong Eng
18	2010.05-2010.10	ManKyeong Phase No. 3 Ship Collision and Navigation Design	Ship Collision and Navigation Design for Korea Government	Lotte E&C-Dong-Il Eng

In-Service

1) Site Soil and Environmental Investigation
2) Railway Route Simulation
3) Traffic Simulation
4) Railway Curvature Design
5) Long Rail and station Design
6) Rail way Bridge Type Design
7) Rail way Bridge Abutment/Pier Design
8) Rail Bridge Slab Design based on Traffic Lane
9) Miscellaneous Design
10) Soil-Pile Design
11) Seismic Design
12) Traffic Fatigue Design
13) Wind Flow Simulation
14) Vibration and Noise Analysis
15) Bill of Material

Construction

1) Rail way Bridge Installation Design by super-lift
2) Temporary Structure Design
3) Sea Transportation Design
4) Cost Estimation
5) Construction and Engineering Schedule
6) PMC Work

Production Drawings

1) Railway Route layout Drawings
2) Rail way and station Drawings
3) Rail way Bridge Slab and Box Detail Drawings
4) Railway Bridge Abutment/Pier Detail Drawings





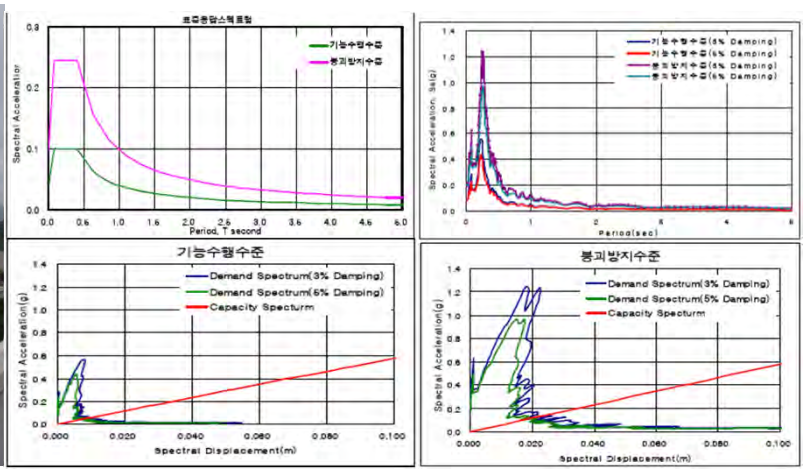




Engineering services of major project

No	Date	Project Name	Project Description	**Client**
1	2012.08-2013.01	Railway Bridge and Box for Western Line	Bridge and Tunnel Box Detail Design for Western Railway	KD Engineering
2	2010.07~2013.03	Master Plan for Construction of Busan Urban Railway	Feasibility Study and Master Plan	Saman
3	2008.06~2008.08	Basic Design for Construction of Honam High-Speen Railwayy	-Total length = 2.9 km -Station = 2 EA -Underground Road : 1EA	Saman
4	2005.01–2005.03	Gwang-myeong LRT Project	-Total length = 10.243 km -Station = 8 EA -Depot = 1 EA -Tunnel : 2EA	Korea Infra Developer Co., Ltd.
5	2005.03–2005.05	Gangnam New Transit Project New Project	-Total length = 6.707 km -Station = 10 EA -Depot = 1 EA	Korea Infra Developer Co., Ltd.
6	2005.05–2005.08	Yeouido Monorail SOC Project	-Total length = 7.6 km -Station = 12 EA -Depot = 1 EA	Korea Infra Developer Co., Ltd.
7	2006.04-2006.09	Il-san Monorail SOC Project	-Total length = 9.670km -Station = 10 EA -Depot = 1 EA	Korea Infra Developer Co., Ltd.
8	2006.06	Gwan-ak Monorail SOC Project	-Total length = 15.2 km -Station = 16 EA -Depot = 1 EA	Korea Infra Developer Co., Ltd.
9	2004.06-2005.08	Yong-in LRT Project Detail Design	-Total length = 18.6 km -Station = 15 EA	Korea Infra Developer Co., Ltd.
10	2006.06-2006.09	Between Ha-nam & Jin-ju Plowing Double Track Line Private Investment	-Total length= 20.352km -Earthwork= 6.670km -Stations= 2 -Bridges= 30 / 4.717km -Tunnels= 17 / 8.965km	Korea Infra Developer Co., Ltd.
11	2006.06–2006.09	Between Ik-san & Sin-li Double Track Line Private Investment	-Earthwork= 28.716km -Stations= 5 -Bridges= 50/ 3.480km -Tunnels= 5/ 1.903km	Korea Infra Developer Co., Ltd.
12	2003.07–2003.09	Je-Chon and Ssang-Yong Railway	-Project length -Main track 13.136km -Delta Track 3.568km, -Earthwork : 5.521km -Tunnels : 3/6.551km, -Bridges: 1/1.064km -Stations: 3(Je-Chon, Huk-Suk, Ip-SukLi)	Korea Infra Developer Co., Ltd.
13	2003.04–2003.08	Bu-San New Harbor Railway	Construction Management, Engineering	Korea Infra Developer Co., Ltd.

1. Nuclear Power Project



Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2014.06-2014.12	#2-KORI Nuclear Power Plant Head Change PJT	#2-KORI Nuclear Power Plant Head Change Construction Approval Work	JACE KOREA
2	2013.05-2015.10	#2-KORI Nuclear Power Plant Head Change PJT	#2-KORI Nuclear Power Plant Head Change Construction Engineering Work	JACE KOREA
3	2014.09-2014.12	Nuclear Power Plant Water Protection PJT	Detail Engineering for Flooding Protection of Nuclear Power Plant	JACE KOREA
4	2013.05-2014.10	YongKang 3&4 NuClear Power Plant Head Change PJT	Detail for Nuclear Head Change-Construction Engineering	JACE KOREA
5	2013.01-2013.12	Uljin Nuclear 3,4Nos - SGR Project	Structure Seismic Design and Construction Design	JACE KOREA
6	2013.01-2013.12	ULJIN Nuclear No. 3,4-SGR PJT	Detail Engineering for Nuclear Power of Structure	JACE KOREA

2. Hydro Electric Power Project

Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2017.5-2017.12	Seoul Combined Power Plant PJT	Detail Engineering Work	JD ENG
2	2014.09-2014.12	Water Crossing Test Station	Detail Engineering for Water Crossing Test Station	HyeLin Construction Co., Ltd.
3	2012.02-Till date	Boryeol Tidal Electric Power PJT	Feasibility and Pre-FEED for Tidal Hydro Electric Power-65.9Gwh/year	BASG Energy Holdings
4	2003.06–2004.08	Sihwa Tidal Electric Power Project	BASIC AND DETAIL DESIGN FOR Hydraulic Machinery and Dike-552.7GWh /year	DaeLim E&C.
5	2007.07-2008.10	JeJu Hangwon small Hydro electric power Project	BASIC AND DETAIL DESIGN FOR Hydraulic Machinery and Dike-372MWh /year	JeJu City
6	1995 –2001	Houay Ho Hydropower Project	Managed and Supervised Work of Engineering Contract Management Related to Hydraulic Machinery Selection, Specification Framing, Bid Evaluations, Bill of Quantities, Cost Estimation, Model Testing, Design Review, Shop Inspections for Hydroelectric Project Constructed in LAOS	DAEWOO Construction Co., Ltd .

ZENTECH ENGINEERING

Tunnel & Geotechnical Project

In-Service

1) Site Soil and Environmental Investigation
2) Tunnel Section Design
3) Tunnel Excavation Method Design
4) Tunnel Lining Design
5) Excavation and Strut Design
6) Soil Improvement
7) Temporary Structure Design
8) SSI Design
9) Miscellaneous Design
10) Specifications
11) Bill of Material

Construction

1) Cost Estimation
2) Construction and Engineering Schedule
3) PMC Work

Production Drawings

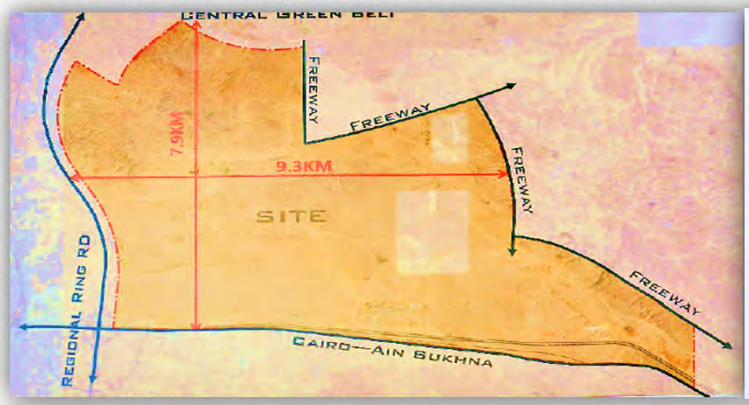
1) Tunnel Section Drawings
2) Tunnel Excavation Method Drawings
3) Tunnel Lining Drawings
4) Excavation and Strut Drawings
5) Soil Improvement Drawing
6) Miscellaneous Drawings

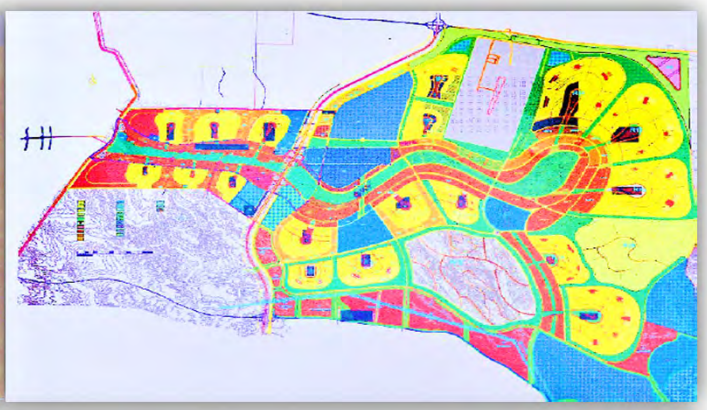
Engineering services of major project

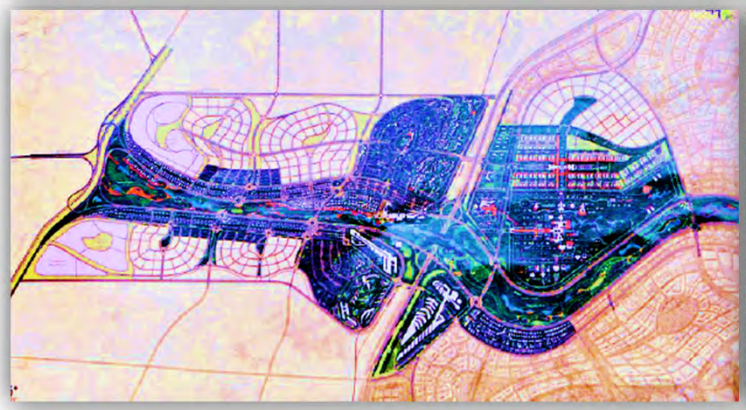
No	Date	Project Name	Project Description	Client
1	2017.9-2018.12	BOGCL Petrochemical PJT	Soil Investigation	BOGCL
2	2015.09-2018.3	Bahrain Offshore LNG Terminal PJT	Soil interpretative Rewiew	OceanUs
3	2013.07-2013.12	Gun-Jang Grand Bridge PJT	Temporary Structure and Bridge Detail Engineering	S&D Co., Ltd.
4	2012.08-2013.01	Railway Bridge and Box for Western Line	Temporary Structure and Bridge and Tunnel Box Detail Design for Western Railway	KD Engineering
5	2012.03-2012.10	YangSu Grand Bridge Project	Detail Design for Bridge and Temporary Structure	Han-sin Industries Co., Ltd.
6	2012.02-2012.05	Young Kwang-HyeJae Grand Bridge	Detail Design for Bridge and Temporary Structure	Yoosin/Hyundai E&C
7	2012.02-2012.10	Monitoring Settlement in Entrance Structures to Main, North & West Grandstands Project	ENGINEERING SERVICES FOR MONITORING SETTLEMENT IN ENTRANCE STRUCTURES	ADMM, UAE
8	2011.02-2011.06	NOWHA-GUDO PHASE NO.2 OFFSHORE BRIDGE TURNKEY PJT	Basic Design for Bridge and Temporary Structure	Hyundai Engineering
9	2011.03-2011.05	WHAYANG-CHEKUM PHASE NO.2 OFFSHORE BRIDGE TURNKEY PJT	Basic Design for Bridge and Temporary Structure	Hyundai Engineering
10	2010.09-2011.02	YEOSU EXPO Marina Pontoon Design	Floating Structure Pile and Geotechnical Design	Hyundai Construction and Engineering Co., Ltd.
11	2010.09-2011.01	SKIKDA REFINARY PROJECT IN Algeria	Module Foundation and Transportation Road Reinforcement	Samsung Engineering Co., Ltd.
12	2010.05-2010.07	Turnkey Pjt Sin gi-Kogum Bridge	Temporary Structure and Bridge Detail Engineering	Kolon E&C Co., Ltd. / Yoosin
13	2009.12-2011.03	HA YI- SIN YI BRIDGE TURNKEY PROJECT	Basic & Detail Design for Bridge and Temporary Structure	Yoosin & NAMYANG CONSTRUCTION CO., LTD.
14	2010.04-2010.06	YEOSU THERMAL POWER PLANT PJT	Soil bearing and Underground existing pipeline stress Analysis	Kwang-Won ENG
15	2007.05-2010.01	Geo-Ga Grand Bridge	Immersed Tube Tunnel Detsil Design and Installation Design	Daelim E&C
16	2003.11–2004.02	Development of tunnel and bridge construction method	(FDM analysis of Tunnel and wind tunnel development, Bridge VIV and Arch. Bridge construction development)	R&D Center

Urban Development Project

Contents





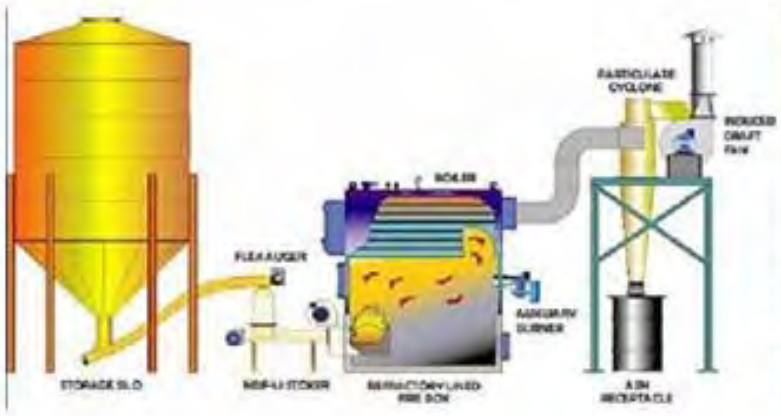


Engineering services of major project

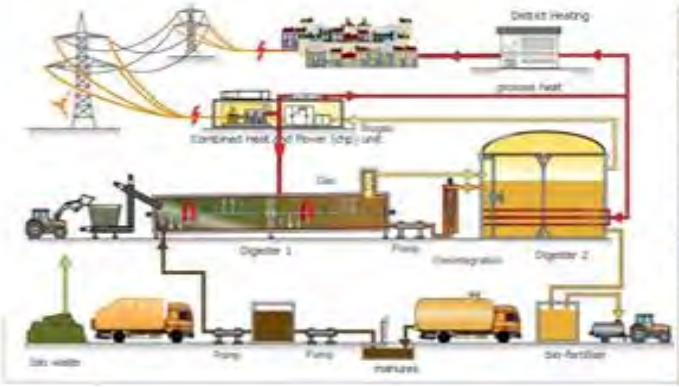
No	Date	Project Name	Project Description	Client
1	2018.5-2019	Urban Development Project in Egypt	Urban Development PJT	SGN's Company
2	2016.3-2017.8	Jeju Ritz Carlton Resort PJT	Master Plan of Jeju Ritz Carlton Resort	Viatel Co., Ltd.
3	2013.5-2014.5	Jeju International Recreation & Tourism City pjt	Master Plan of Jeju International Recreation & Tourism City	Bokwang Phoenix
4	2012.6-2017.10	Daecheon Amadeus Hapticel Resort PJT	Master Plan of Daecheon Amadeus Hapticel Resort	Viatel Co., Ltd.
5	2005.6-2006.6	Marine Tourism Complex in Jeju Seongsanpo	Basic and Detail Engineering of Maritime Observatory Corporation during the Development of Marine Tourism Complex in Jeju Seongsanpo	Bokwang Phoenix

Bio Mass/Bio Gas/MSW/Solar/Hydro Power Plant

Contents



Our Zentech has started the developing of engineering for BioMASS energy plant in 2015.

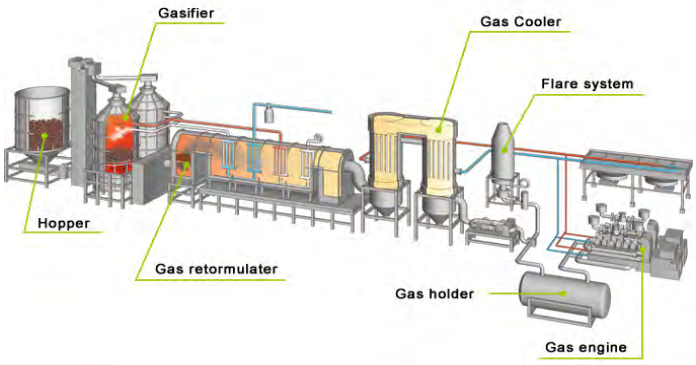


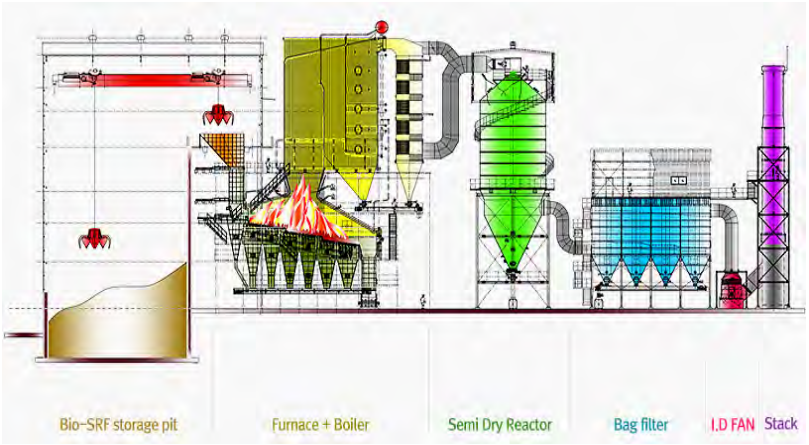
❖Biogas chemical composition and Energy

Chemical Properties	Natural Gas	Animal Dung	Crop	WOOD	Agricultural Wastes
Methane (CH4)	0.9377	0.55-0.75	0.045	0.04	0.044
Ethane(C2H6)	0.026	0	0	0	0
Propane (C3H4)	0.0037	0	0	0	0
Butane (C4H8)	0.001	0	0	0	0
Higher Hydrocarbons	0	0	0.0189	0	0.028
Carbon Monoxide(CO)	0	0-0.003	0.1525	0.18	0.102
Carrbon Dioxide (CO_2)	0.0102	0.25-0.45	0.1777	0.1	0.148
Hydrogen (H_2)	0	0-0.03	0.0418	0.195	0.117
Water Vapor (H_2O)	0	0	0	0.04	0.057
Nitrogen (N_2)	0.0214	0.01-0.05	0.5641	0.445	0.504
Hydrogen sulfide(H_2S)	0	0.001-0.006	0	0	0
Wet Fuel Molecular Weight(kg/mole)	17.1	5.6	29.2	23.7	26.2
Lower Heating Value(KJ/kg)	46787	17590	3913	5622	5094
Lower Heating Value(KJ/Nm^3)	35679	26000	5103	5977	6053
stoichiometric Air/Fuel Ratio(Volume Based)	9.51	1.04	1.16	1.31	1.41
Energy Content of stoichiometric Mixture(KJ/Nm3)	3396	2474	2358	3583	2514
Approx Temp. Rise of Stoich Mixture(°K)	2411	1483	1669	1882	1788

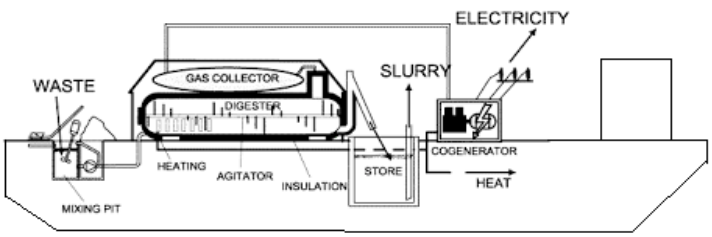
Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2019.9-2020.7	20-Site x 1MW Solar+Hydro+Biogas Power Plant	Feasibility Study	Myanmar of Inductries
2	2019.5-2020.5	10MW MSW(SRF) Power Plant	Feasibility Study	PLUS KOREA, Sri-Lanka
3	2019.5-2020.7	20MW MSW(SRF) Power Plant	FEED and Detailed Engineering	WTE, Korea
4	2019.12-2020.06	50MW MSW(SRF) Floating Power Plant	Frasibility and Concept Study	Basg Energy

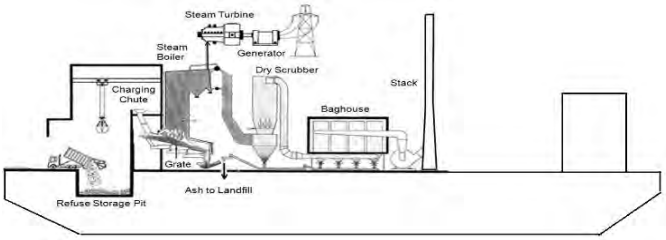




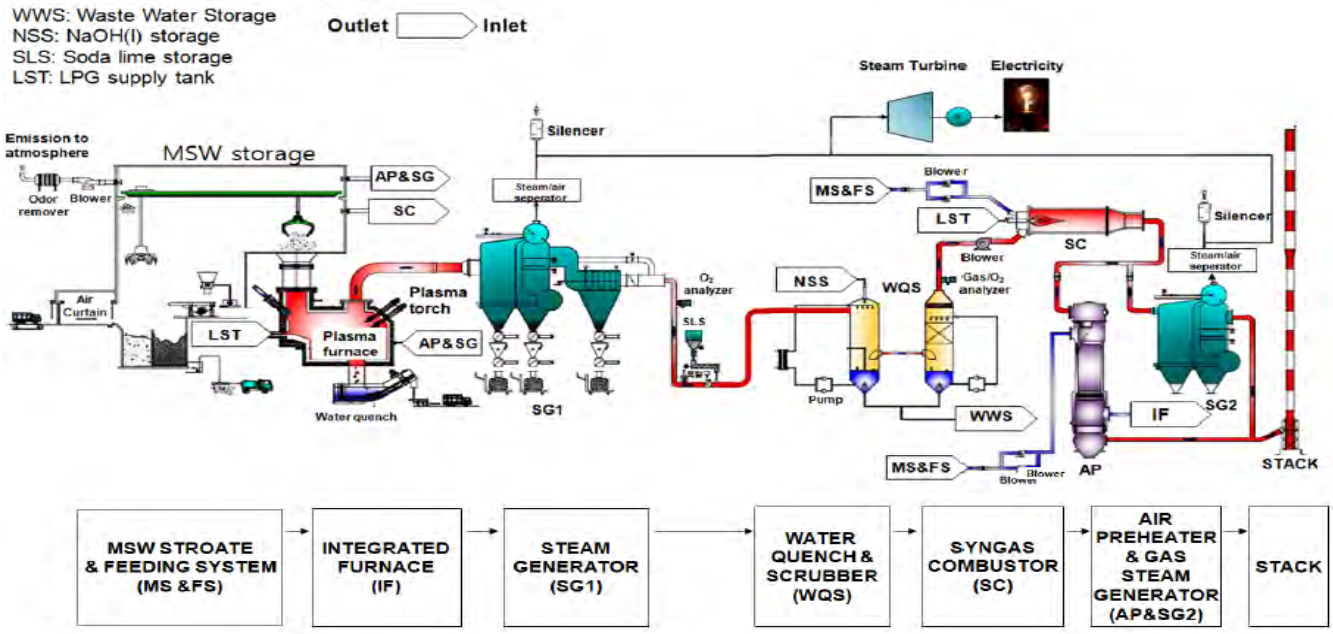
Floating BioGas Power Plant

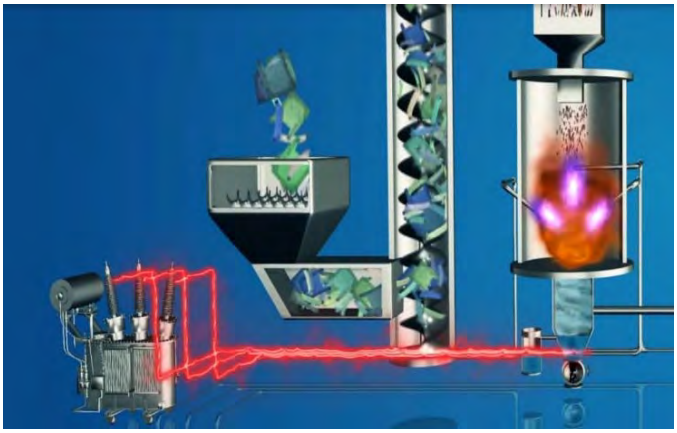


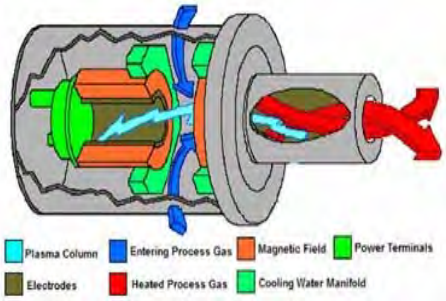
Floating MSW(SRF) Power Plant

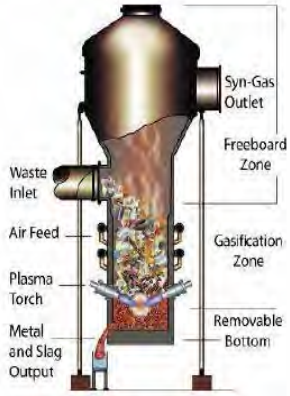


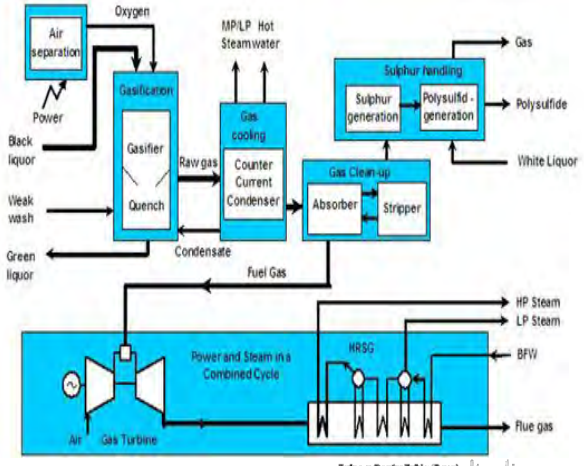
Plasma Gasification for Biomass Power Plant

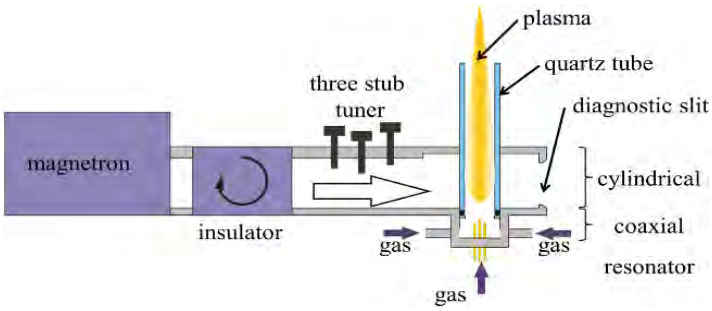


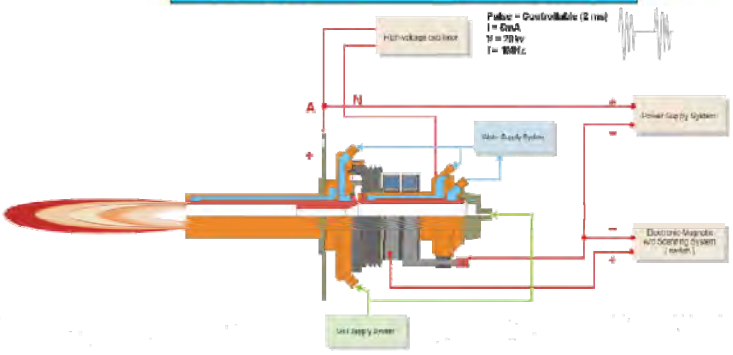












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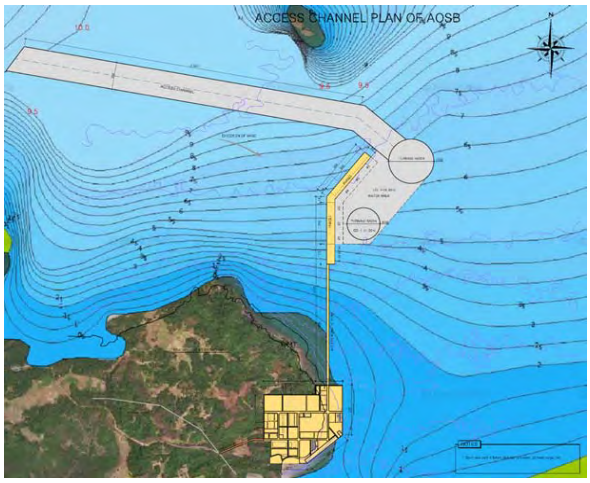
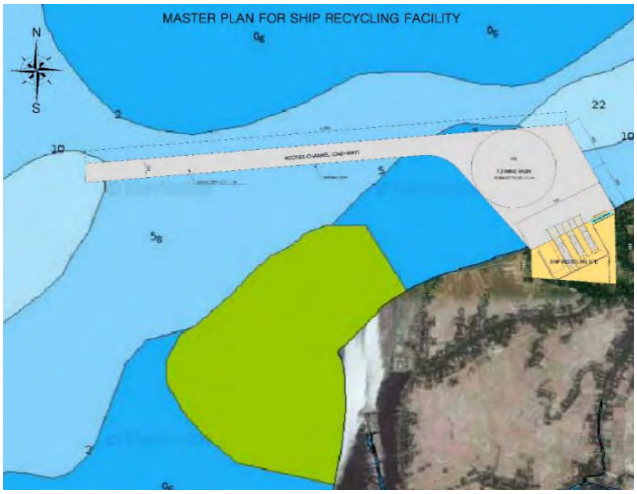
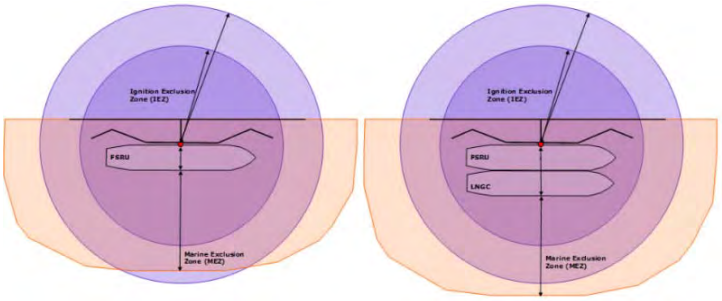
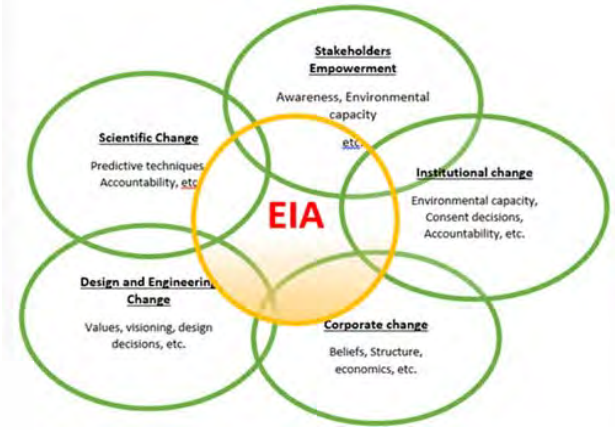
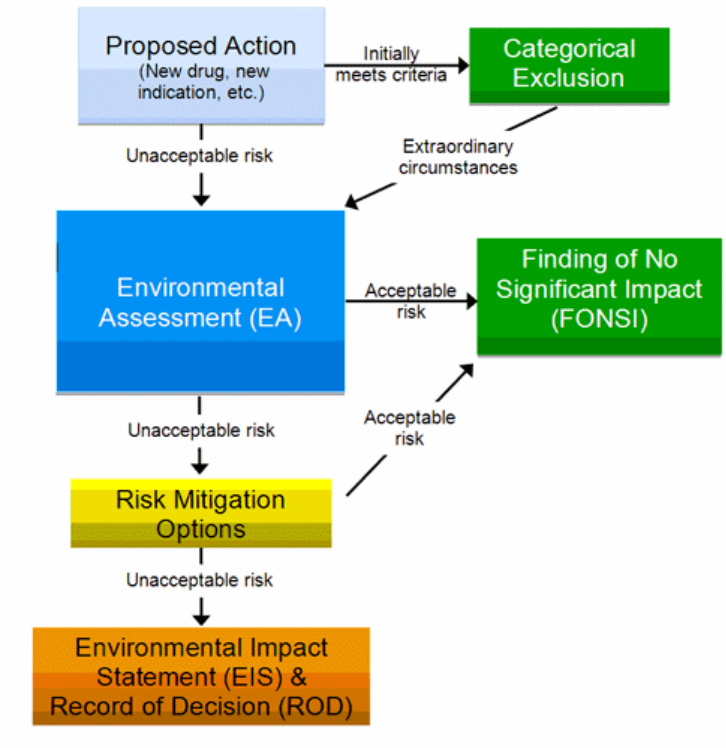
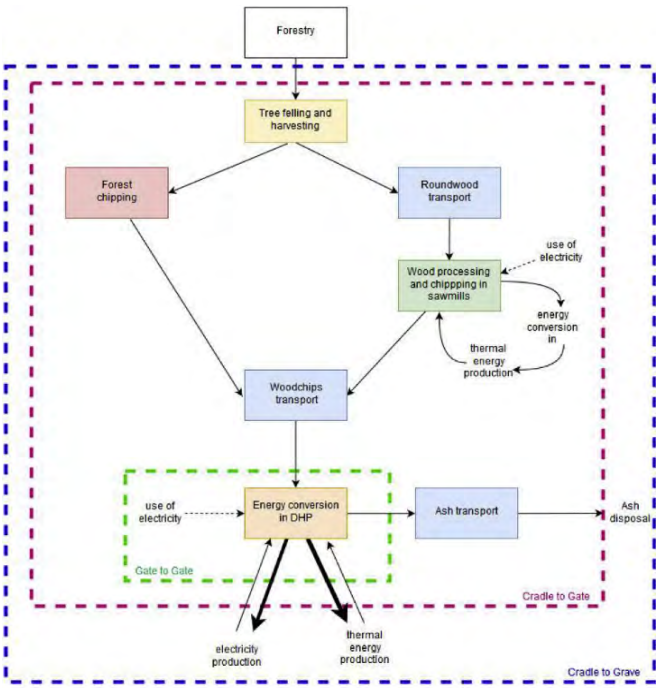












ZENTECH ENGINEERING

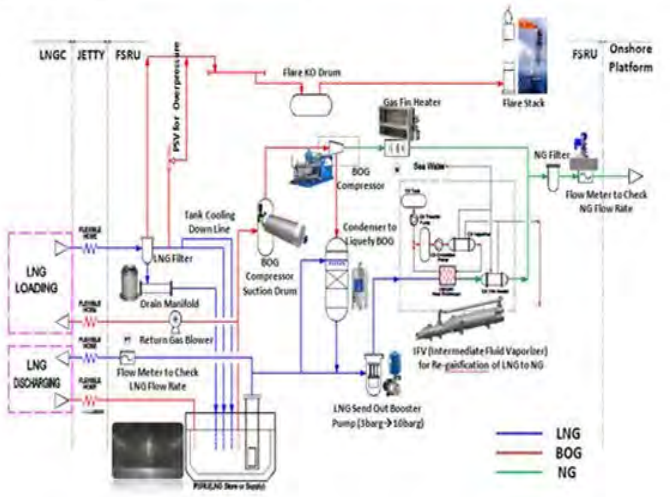
Engineering services of major project

No	Date	Project Name	Project Description	Client
1	2019.9-2020.7	20-Site x 1MW Solar+Hydro+Biogas Power Plant	Enviroment Impact Assessment	Myanmar of Inductries
2	2019.5-2020.5	10MW MSW(SRF) Power Plant	Enviroment Impact Assessment	PLUS KOREA, Sri-Lanka
3	2019.5-2019.12	Offshore Supply Port	Enviroment Impact Assessment	SIM, Myanmar
4	2019.1-2019.11	Ship Re-cycling Industry at Taltali Upazila, Barguna District	Enviroment Impact Assessment	BESC, Bangladesh
5	2015.1 - 2015.9	FSRU of PGN	Enviroment Impact Assessment	PGNLNG, Indonesia

Completed Achivement of Technologies in Creative VISION 2015

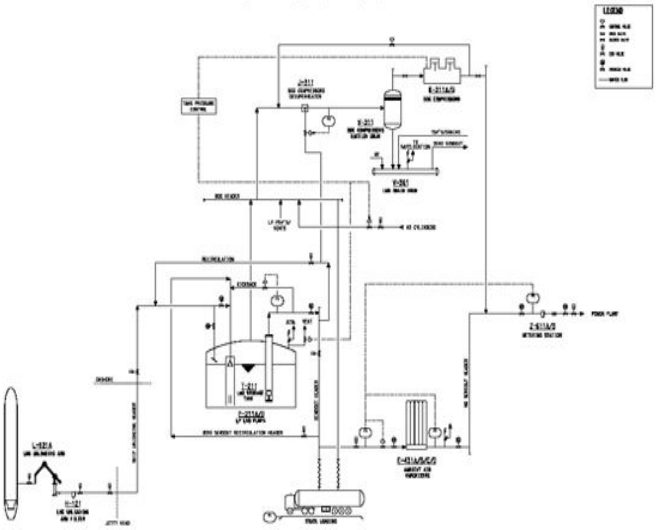
1. FSRU

Our Zentech has completed FEED Engineering up to 100% therefore the engineering capacities are achieved 100%.



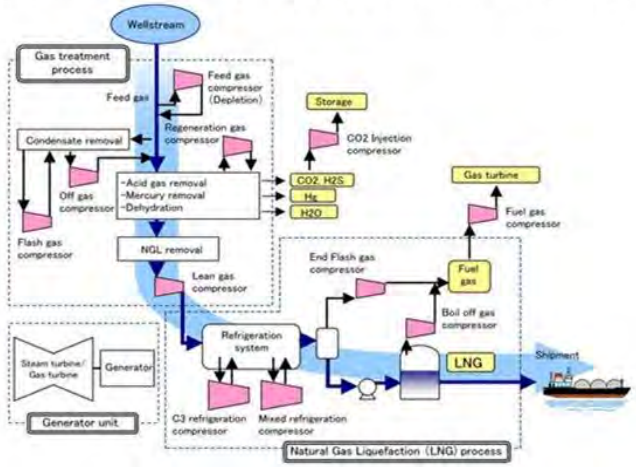
2. Onshore LNG Receiving Terminal & Regas

Our Zentech has almost achieved engineering capacity up to 100% based on FSRU's Technologies.



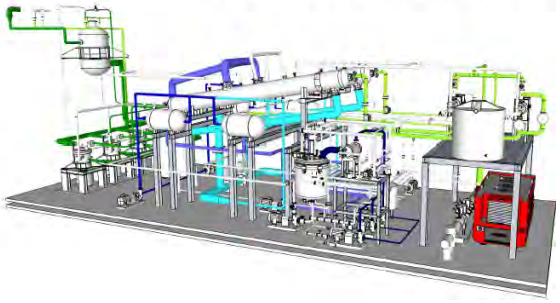
3. LNG Liguefied Natural Gas Plant

Our Zentech has almost achieved engineering capacity up to 100% based on FSRU's Technologies.



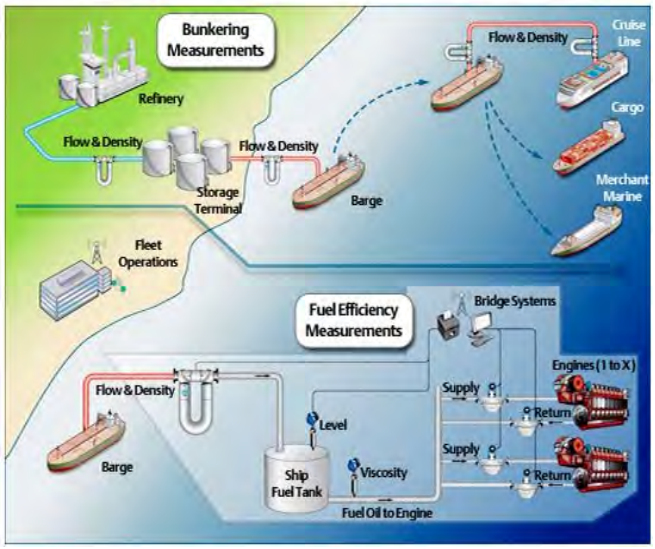
4. LNG Regasification Unit

- Length : approx. 30.0 m
- Breadth : approx. 10.0 m
- Depth : approx. 6.0 m
- Regasification Capacity : 100mmscfd
  Up to 500mmscfd as per client requirement
- Electric Consumption : abt. 1,500 kw
- Complement : 6 persons
- Construction Terms : 14 months (From Contract to Sail Away)



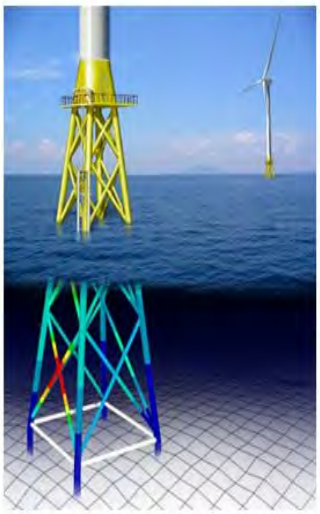
5. LNG Bunkering

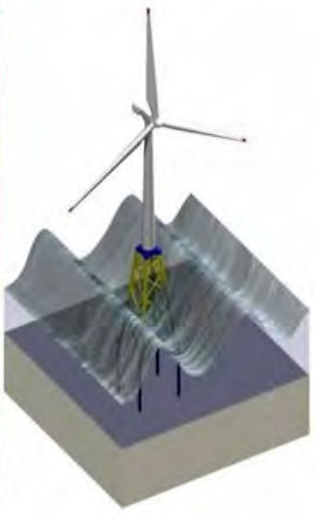
Our Zentech has developed LNG Bunkering system for Ship to Ship Method up to 90% of completion engineering.



6. OFFSHRE Wind Farm

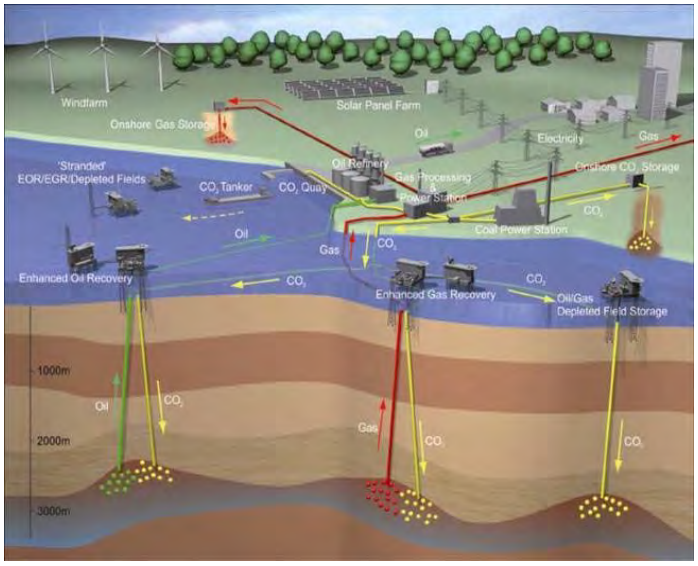
Our Zentech has completed 100% of engineering technologies and start up business for offshore wind farm.

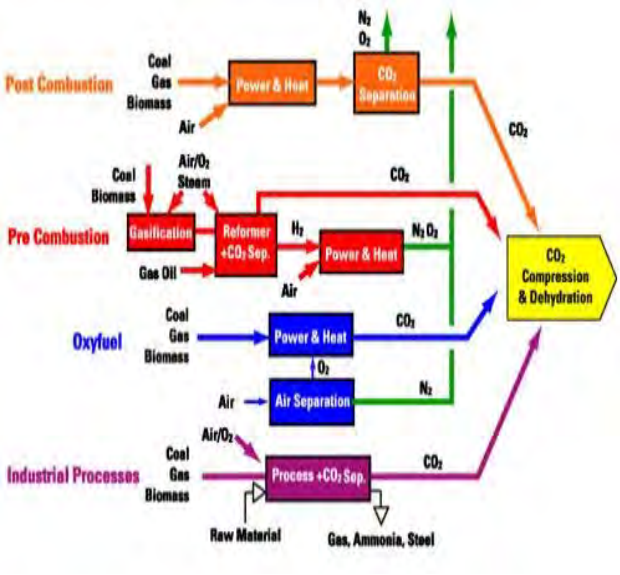




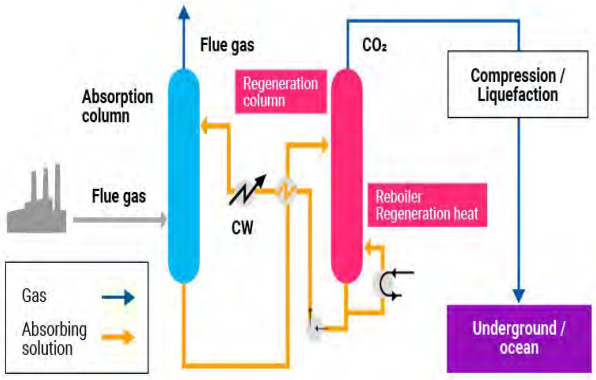
Completed Achivement of Technologies in Creative VISION 2019 - 2020

1. CO2 Capture and Storage Field



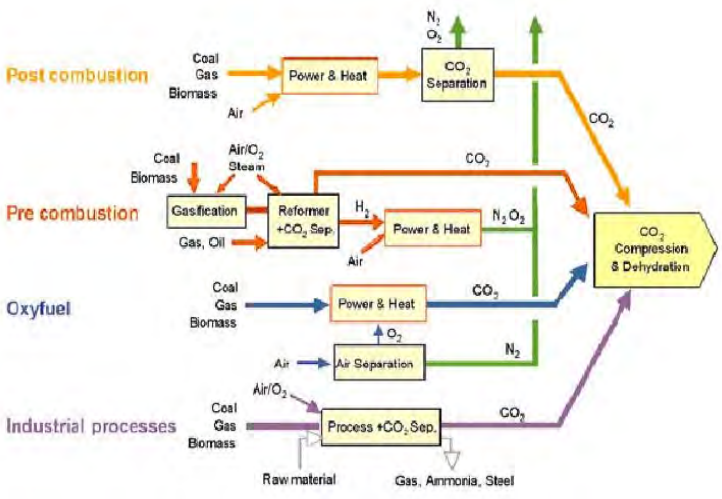


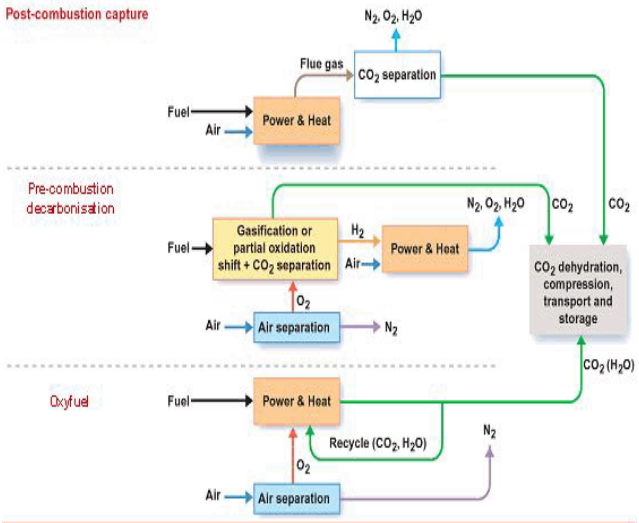
Example of Application to Power Plant Flue Gas (Post-combustion)



Direct air capture of carbon dioxide

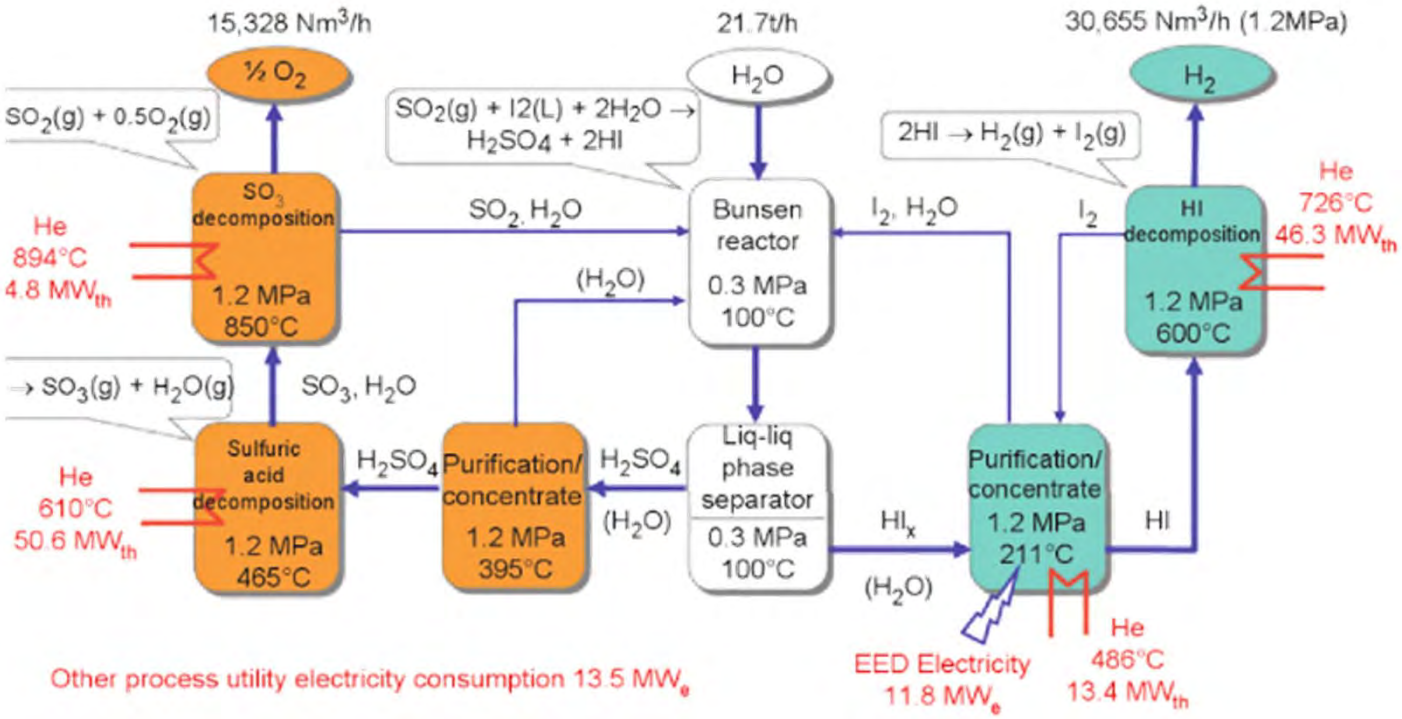
CO2 Capture System for Process Flow Diagram

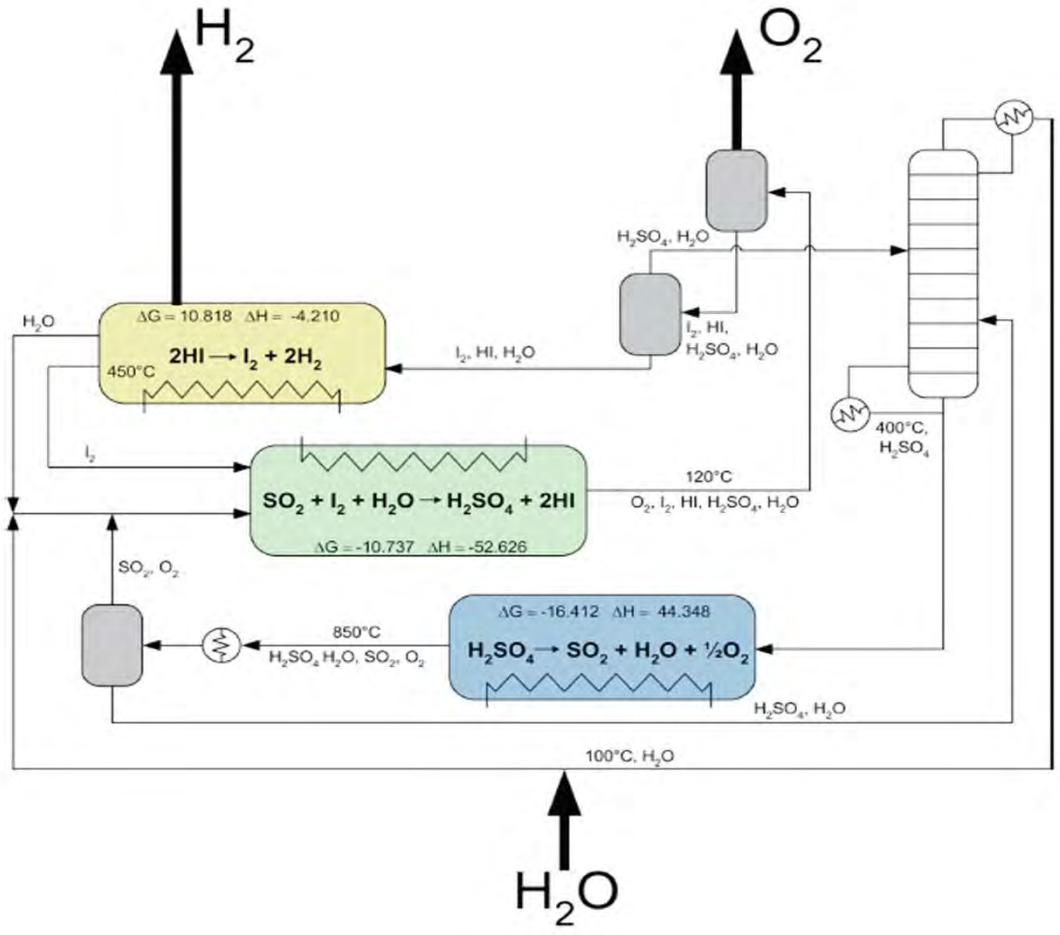




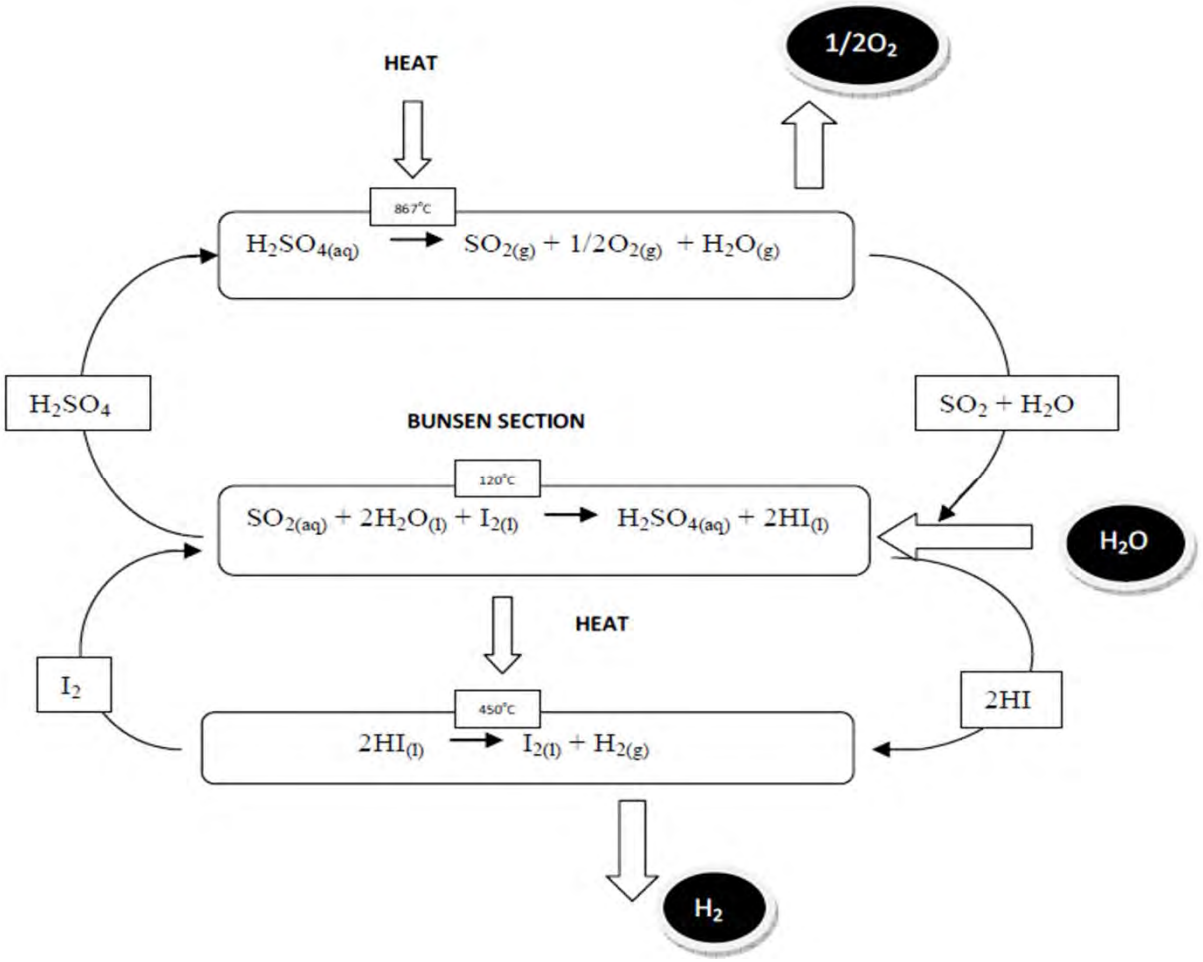
Completed Achivement of Technologies in Creative VISION 2020(Nuclear Hydrogen Product)-Cont.

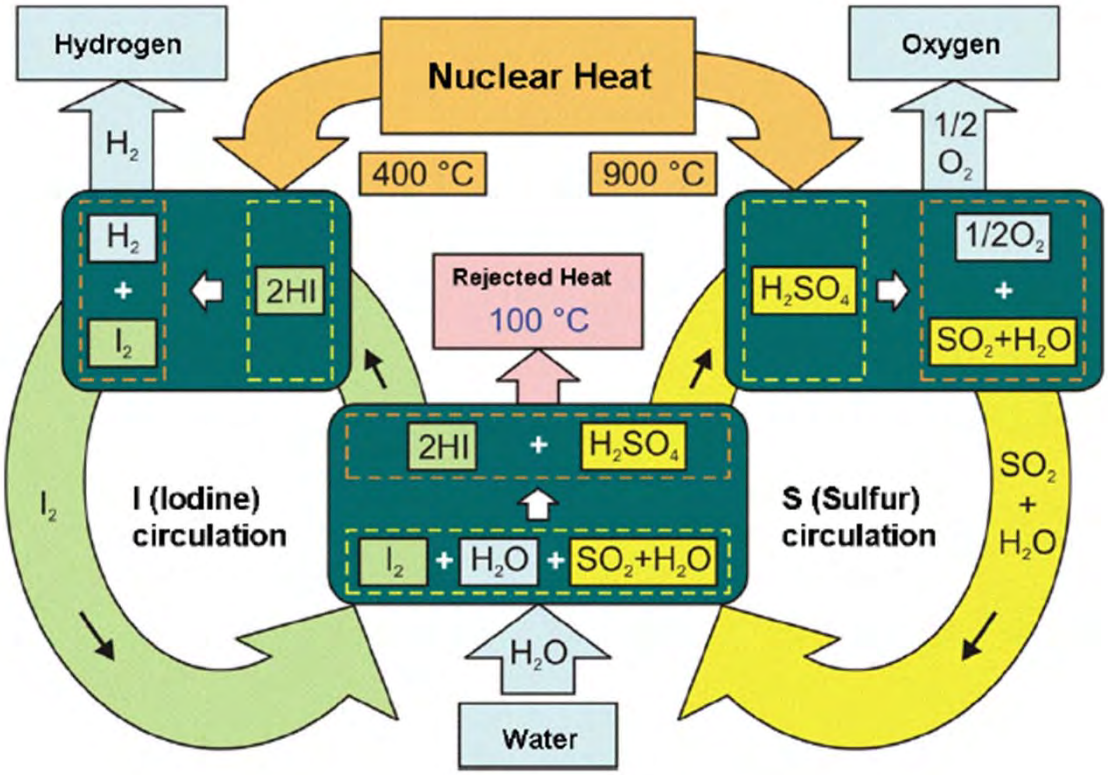
1) PFD of Nuclear Power sulphur iodine for Hydrogen Production



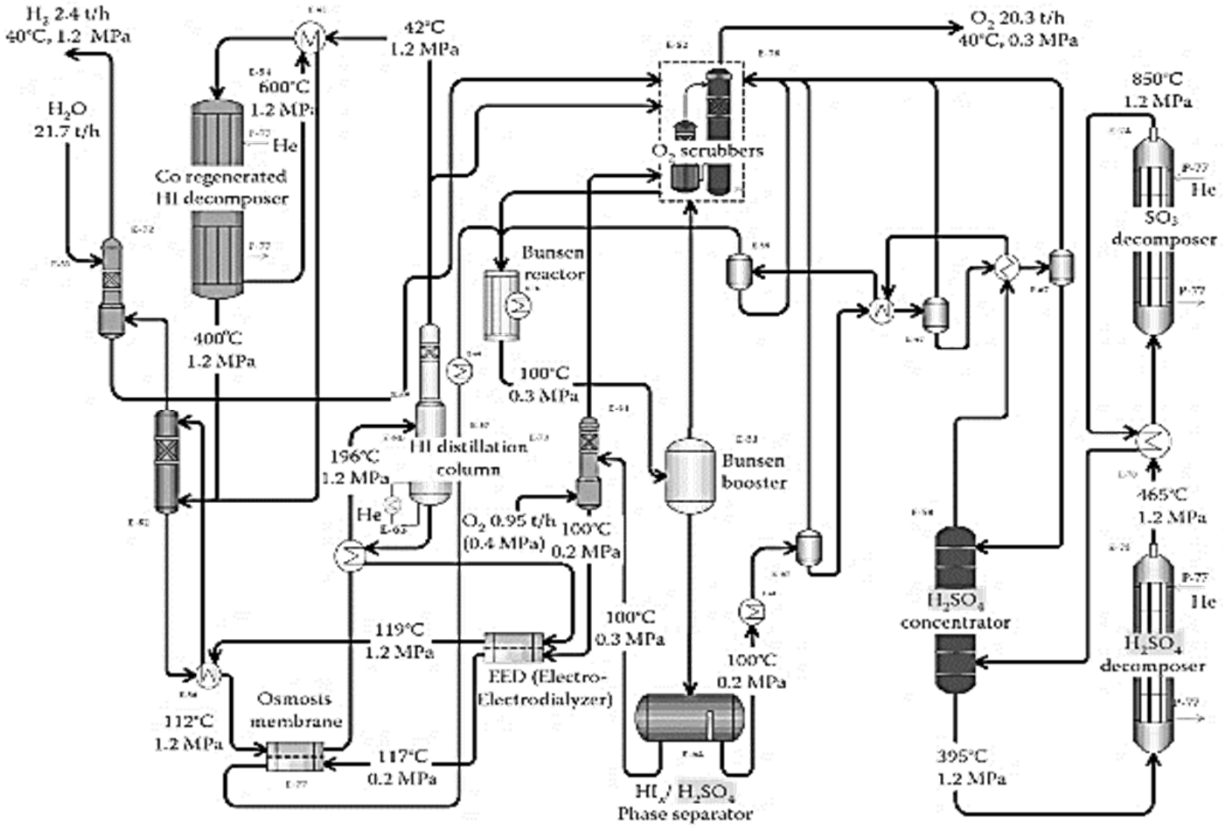


Completed Achivement of Technologies in Creative VISION 2020(Nuclear Hydrogen Product)-Cont.

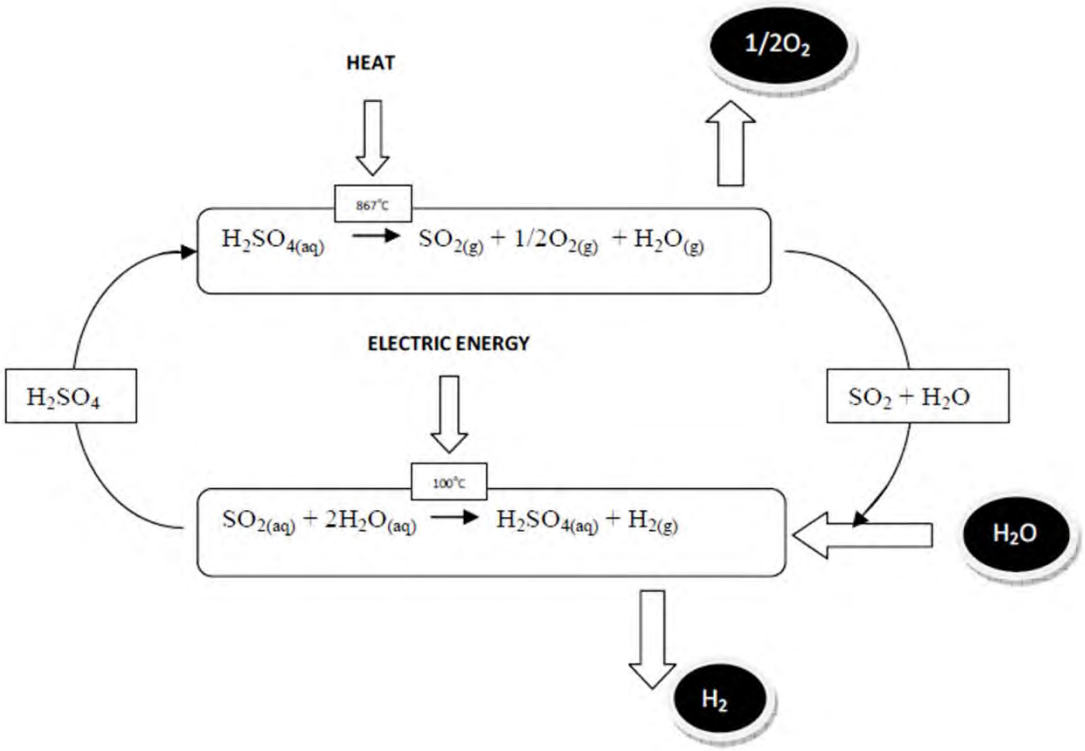




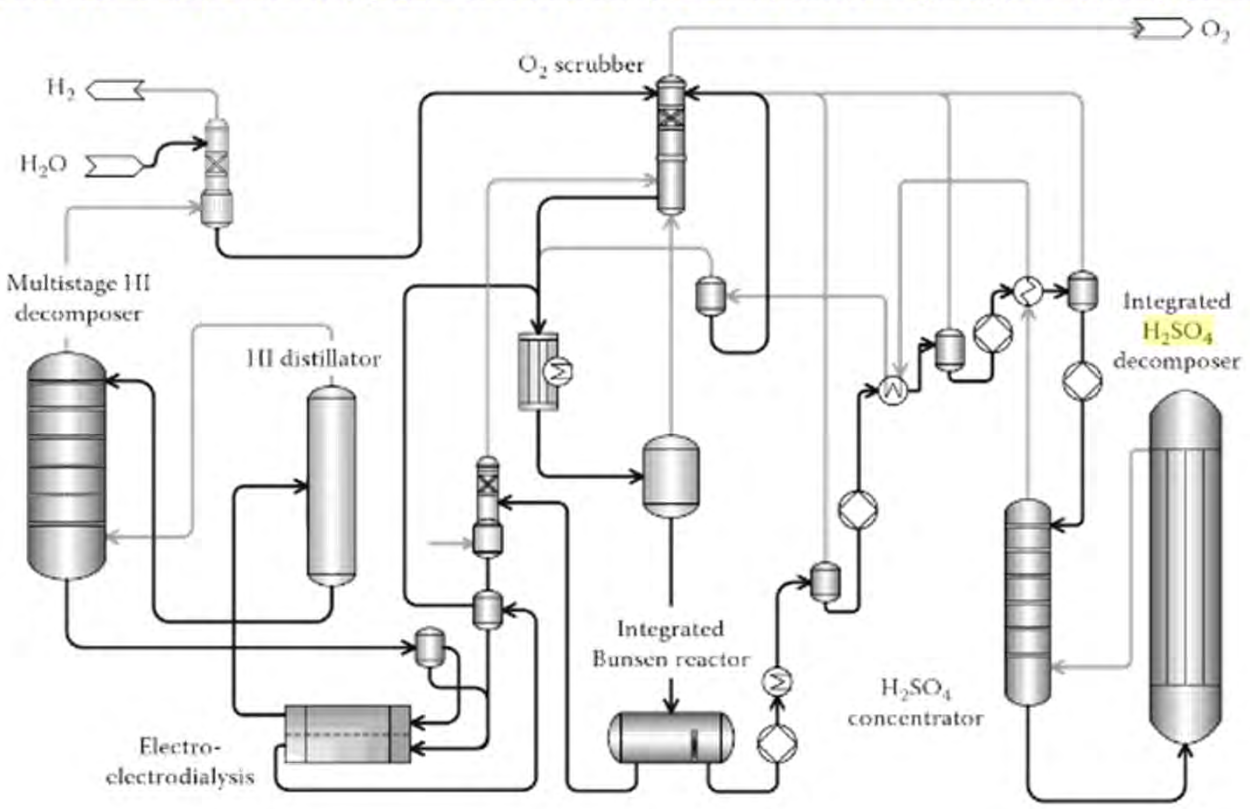
Completed Achivement of Technologies in Creative VISION 2020(Nuclear Hydrogen Product)-Cont.

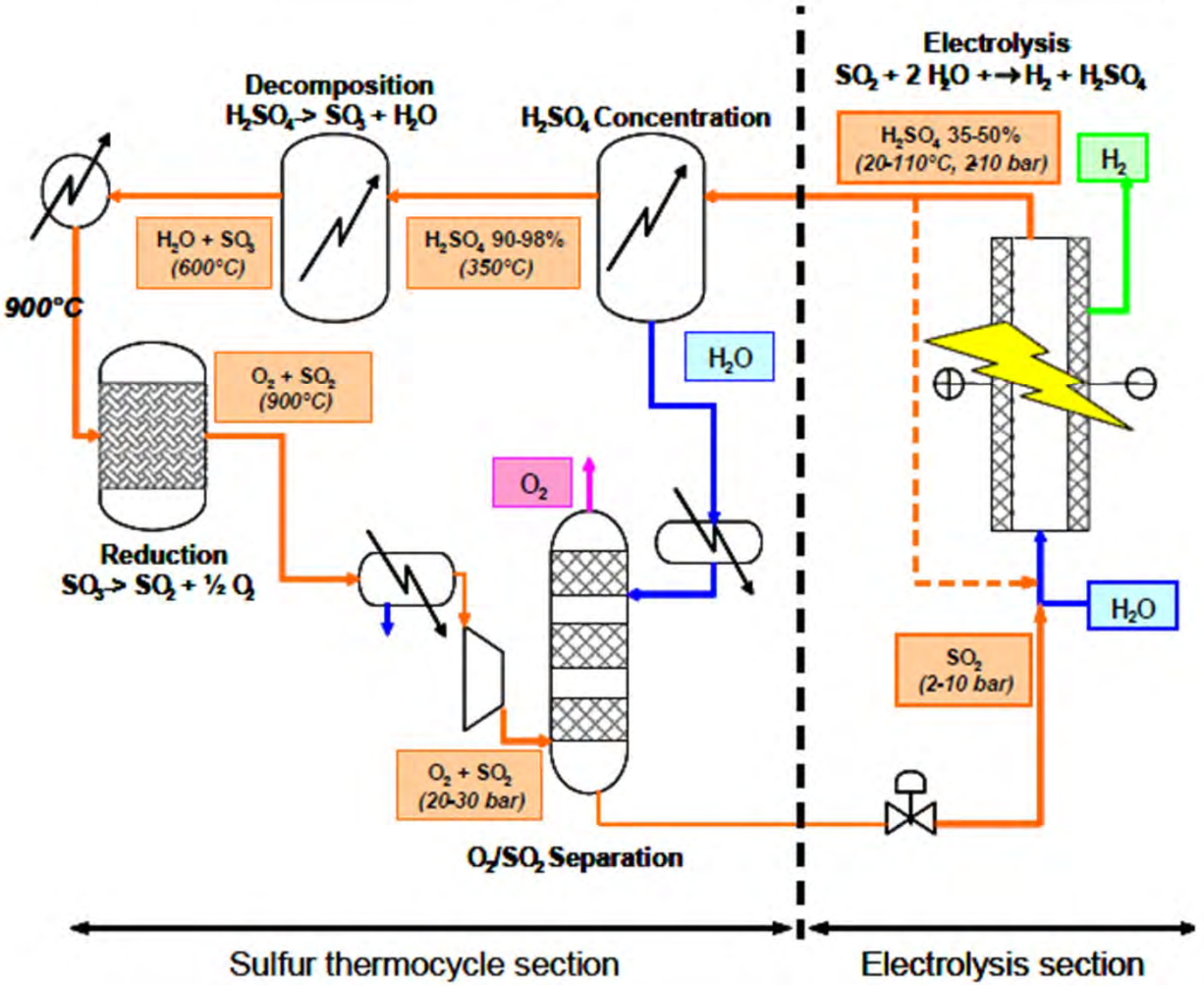


2) PFD of Nuclear Power hybrid sulphur cycle for Hydrogen Production

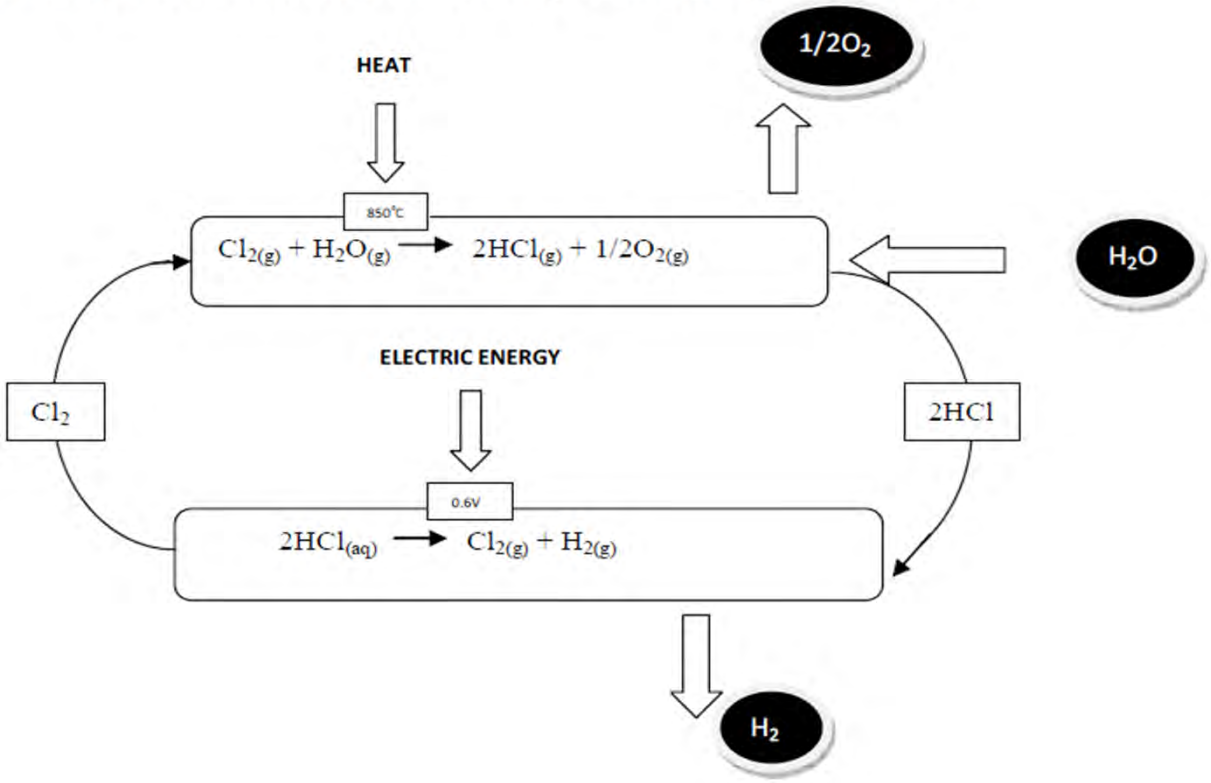


Completed Achivement of Technologies in Creative VISION 2020(Nuclear Hydrogen Product)-Cont.

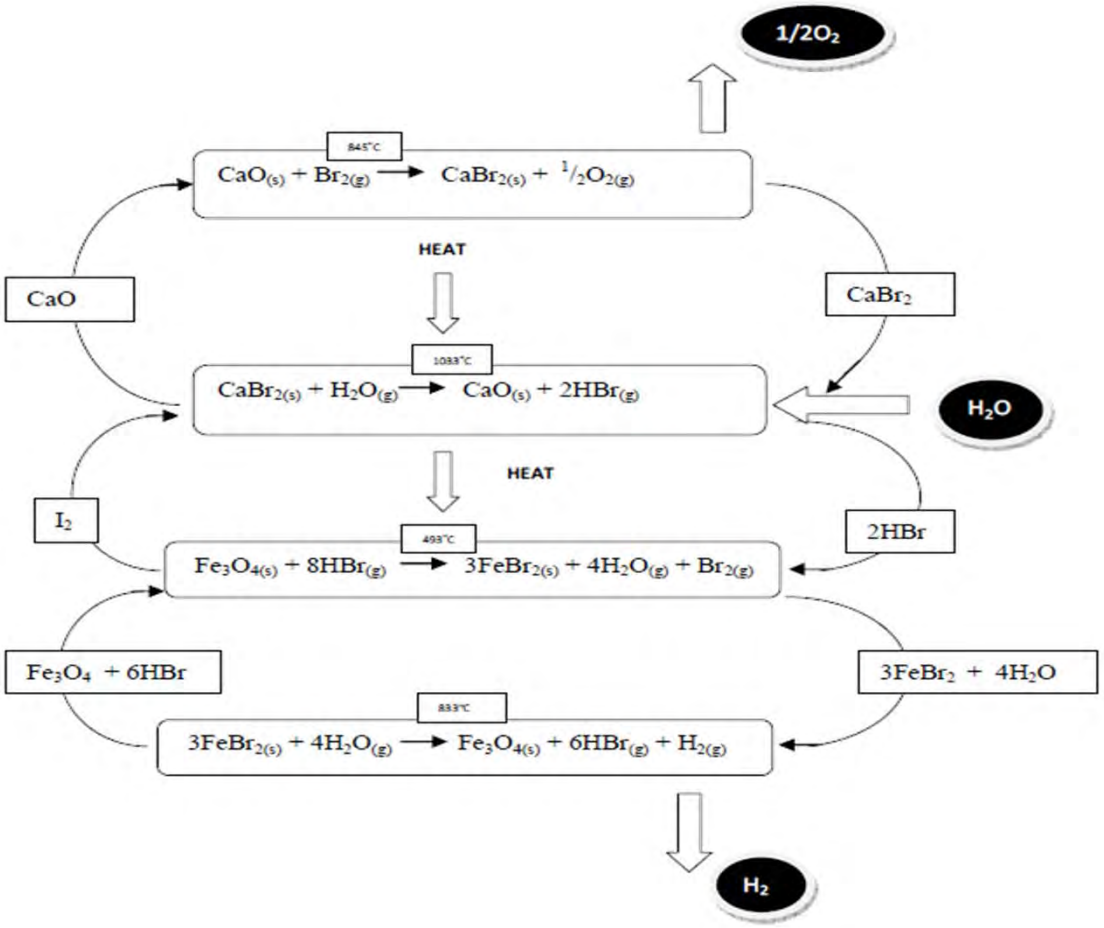




3) PFD of Nuclear Power hybrid chlorine cycle for Hydrogen Production

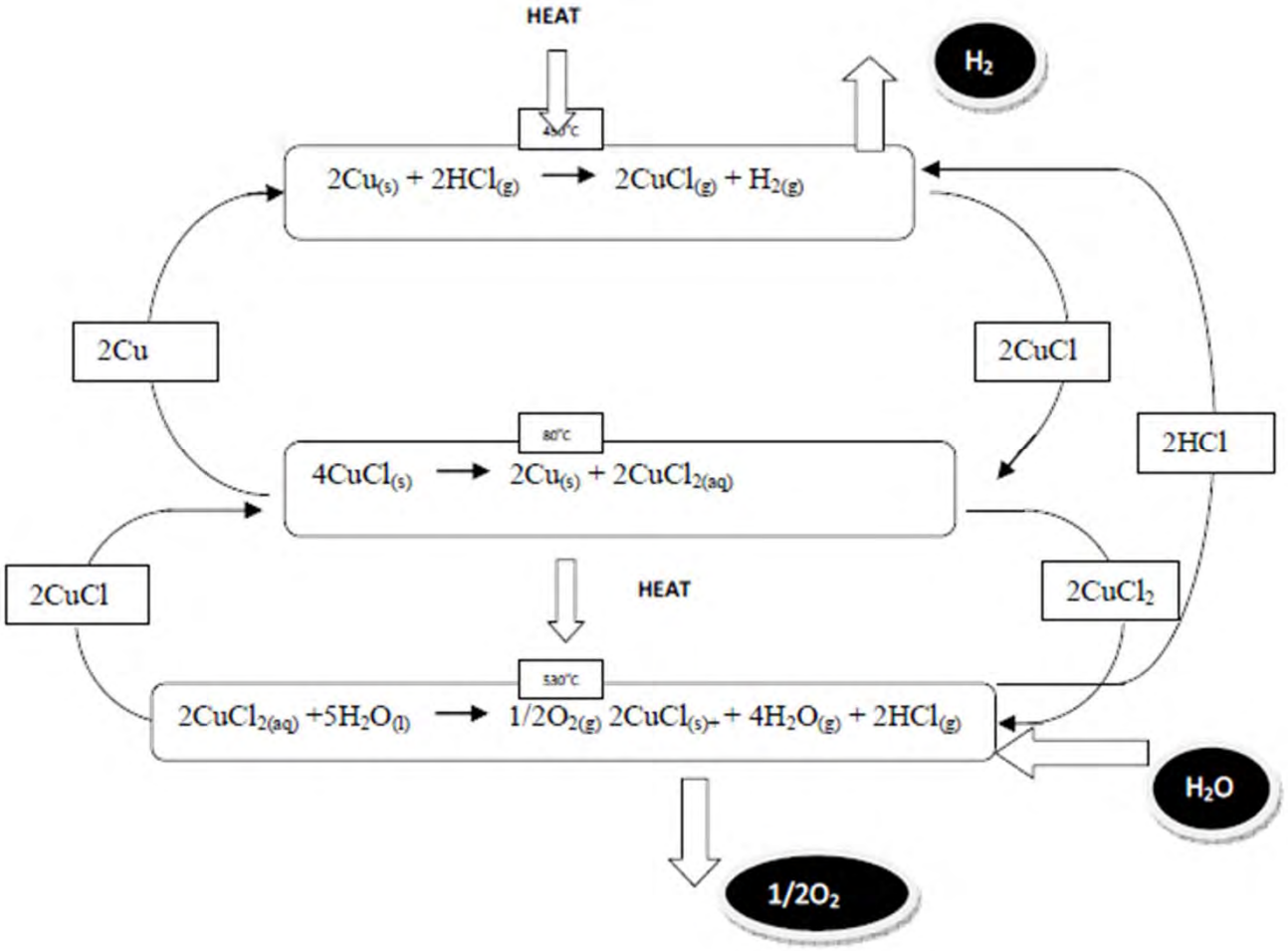


4) PFD of Nuclear Power UT-3 cycle for Hydrogen Production



Completed Achivement of Technologies in Creative VISION 2020(Nuclear Hydrogen Product)-Cont.

5) PFD of Nuclear Power copper chlorine cycle for Hydrogen Production



Design Hand Book for Process of Chemical Marine Terminal, SSCC/HIC Corrosion in Carbon Steel, CP System of Pipelines and without Isolation Joint at Landfall, Process of LNG FSRU Offshore Terminal and CAPEX of LNG Receiving Terminal and Fire Protection Facilities for Port Handling Hydrocarbons

Design Hand Book for Process of Chemical Marine Terminal, SSCC/HIC Corrosion in Carbon Steel, CP System of Pipelines and without Isolation Joint at Landfall, Process of LNG FSRU Offshore Terminal and CAPEX of LNG Receiving Terminal and Fire Protection Facilities for Port Handling Hydrocarbons

Byeong-Ryeol Choi
Hyo-Jae Jo
Sang-Gil Lee
Sang-Hyup Lee
Kang-Ho Lee
Han-Sik Choi
Wannacha Limthanakul

Design Handbook details of advanced science technologies are as follows;

- Process Simulation of the Petroleum Products on Marine Terminal
- Thermodynamic Simulation on the Petroleum Products on Marine Terminal
- SSCC/HIC Corrosion in Pipeline and HIC on Carbon Steel Structure in Seawater
- Corrosion Protection System of Pipelines and without Isolation Joint at Landfall Point
- Process Optimization of LNG Fraction for LNG Floating Storage Regasification Terminal
- Development for Process of Thermodynamics for LNG Floating Storage Regasification Terminal
- Process of BOG in LNG Storage Tank for LNG Floating Storage Regasification Terminal
- Process Optimization of Vaporizer and Recondenser Package for LNG Floating Storage Regasification Terminal
- CAPEX for Offshore and Onshore LNG Receiving Terminal
- Loss Rate in Petrochemical During Loading in Complex Plant Marine Jetty
- Loading Arm Envelope and Alarm Setting according to Ship Movement
- Fire Protection Facilities for Port Handling Hydrocarbons

The Zentech E&C and Ajupod Companies

Design Hand Book of Hydrate Formation Process of Water-Hydrocarbon Mixtures and Hydrate Prediction During Subsea Pipeline Operation

Design Hand Book of Hydrate Formation Process of Water-Hydrocarbon Mixtures and Hydrate Prediction of Water-Hydrocarbon Mixtures in Subsea Pipeline Operation

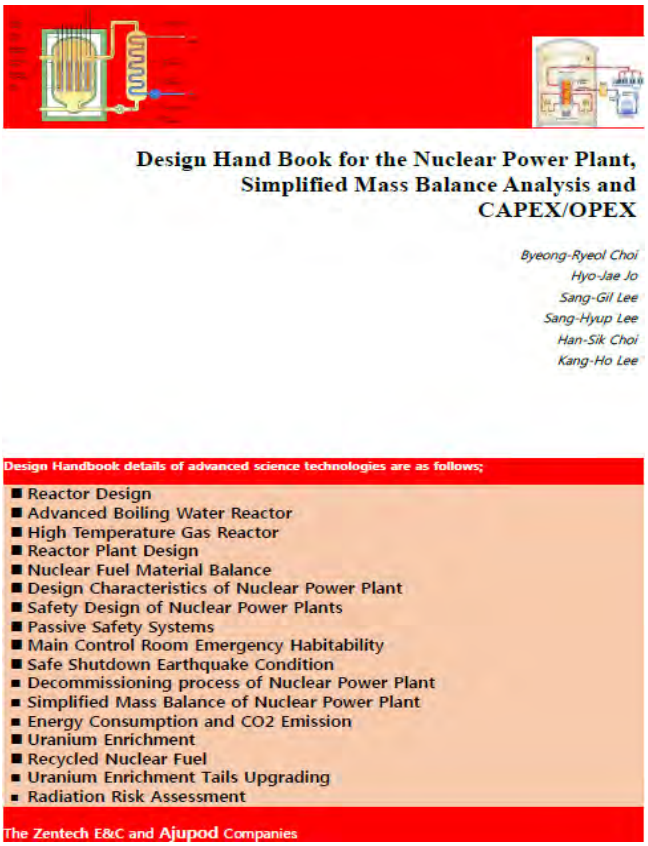
Byeong-Ryeol Choi
Hyo-Jae Jo
Sang-Gil Lee
Sang-Hyup Lee
Wannacha Limthanakul

Design Handbook details of advanced science technologies are as follows;

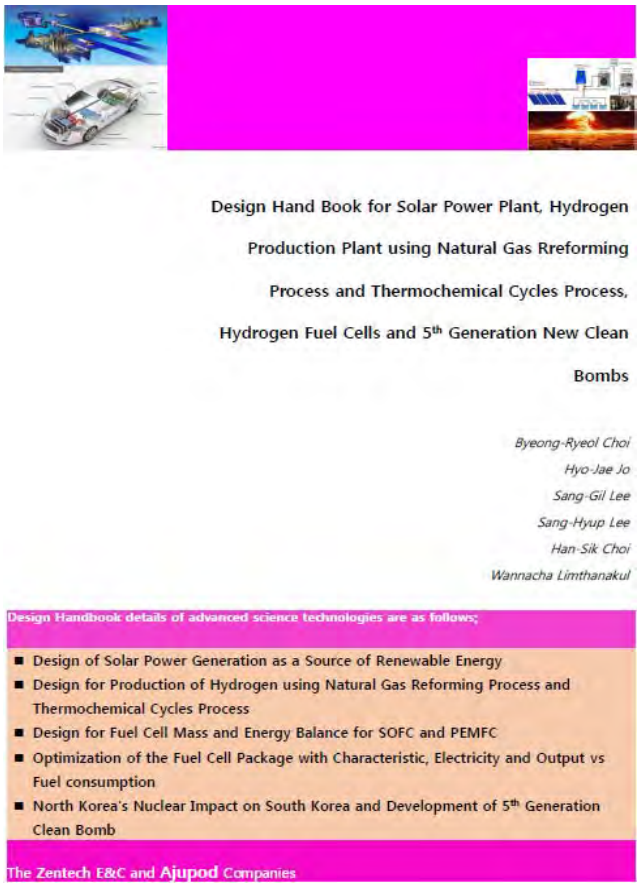
- Hydrate Formation Process of Water-Hydrocarbon Mixtures in Subsea Pipeline
  - Chemical Properties for water-hydrocarbon mixtures
  - Electrolyte of Seawater
  - Thermodynamic Inhibitor
  - Flow Simulation
- Hydrate Prediction of Water-Hydrocarbon Mixtures in Subsea Pipeline Operation
  - Pipeline Heat Transfer Characteristics
  - Fluid Thermodynamics for Heat Capacity and Temperature
  - Fluid Chemical Characteristics
  - Fluid Friction Characteristics and Pressure Drop due to Pipeline Friction, Head loss, and temperature

The Zentech E&C and Ajupod Companies

Design Hand Book of Nuclear Power Plant



Design Hand Book for Solar Power Plant, Hydrogen Production Plant using Natural Gas Rreforming Process and Thermochemical Cycles Process, Hydrogen Fuel Cells and 5th Generation New Clean Bombs



The Publication of Science and Technology Design Book

Design Hand Book of Environmental Impact & Risk Assessment for Offshore LNG Receiving Terminal and Subsea Pipeline

Design Hand Book of Environmental Impact & Risk Assessment for Offshore LNG Receiving Terminal and Subsea Pipeline

Byeong-Ryeol Choi
Hyo-Jae Jo
Sang-Gil Lee
Sang-Hyup Lee
Han-Sik Choi
Wannacha Limthanakul

Design Handbook details of advanced science technologies are as follows;

- Noise Environment
- Air Quality during LNGC with Assistant Tug for berthing into Jetty
- Siltation Dispersion for construction of Dredging and Trenching Work
- Hydrodynamic study to delineate effect on coastline changes
- Cooling Water Discharge Simulation
- Risk for FSRU
- Individual Risk Per Annum (IRPA)
- Emergency Management Plan
- Hydrodynamic Study – Coastline Changes
- CRZ(Coastal Regulation Zone) Demarcation Study

The Zentech E&C and Ajupod Companies

Design Hand Book for the Separator & SSCC/HIC Corrosion in Carbon Steel and Simplified Chemical Process for Chemconversion from Crude Oil & Gas, Biomass to Fuel and Power, Caustic Soda, PDH/PP, Cement Process &Production and CAPEX/OPEX

Design Hand Book for the Separator & SSCC/HIC Corrosion in Pipeline and Simplified Chemical Process of Chemconversion from Crude Oil & Gas, Biomass to Fuel and Power, Caustic Soda, PDH/PP, Best Optimization of Cement Process and Production Manufacturing Industries and CAPEX/OPEX

Byeong-Ryeol Choi
Hyo-Jae Jo
Sang-Gil Lee
Sang-Hyup Lee
Han-Sik Choi
Kang-Ho Lee
Wannacha Limthanakul

Design Handbook details of advanced science technologies are as follows;

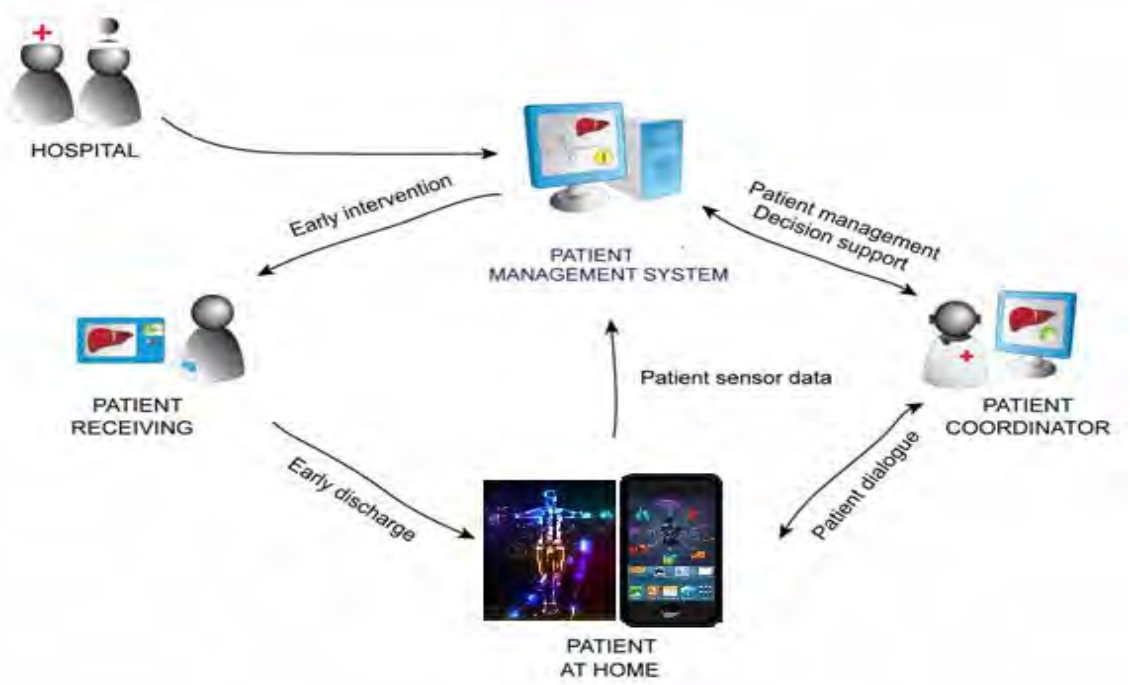
- Process Optimization of Separation System in the Oil and Gas Industry
- CO2/H2S Corrosion and Sulphide stress corrosion cracking & Hydrogen Induced Cracking
- Optimization of Simplified Oil Refinery Process Flow Simulation
- Optimization of Simplified Ammonia Production Process Flow Simulation
- Optimization Simplified Urea Process Flow Simulation
- Optimization of Simplified GTL Production Process Flow Simulation
- Optimization of Simplified Natural Gas to Methanol Production Process Flow Simulation
- Optimization of Simplified Gas to DME Production Process Flow Simulation
- Optimization of Simplified Methanol to Ethanol Production Process Flow Simulation
- Optimization of Simplified Bio-Diesel Production Process Flow Simulation
- Optimization of Simplified Bio-Ethanol Production Process Flow Simulation
- Optimization of Simplified Bio-Methanol Production Process Flow Simulation
- Optimization of Simplified Bio-LNG Production Process Flow Simulation
- Optimization of Simplified Bio-Gas Power Process Flow Simulation
- Optimization of Simplified Biomass Power Process Flow Simulation
- Optimization of Caustic Soda Production Process
- Optimization of LNG Production Process
- Optimization of PDH/PP Process
- Appendix : Desalination Plant
- Best Optimization of Cement Process and Production Manufacturing Industries

The Zentech E&C and Ajupod Companies

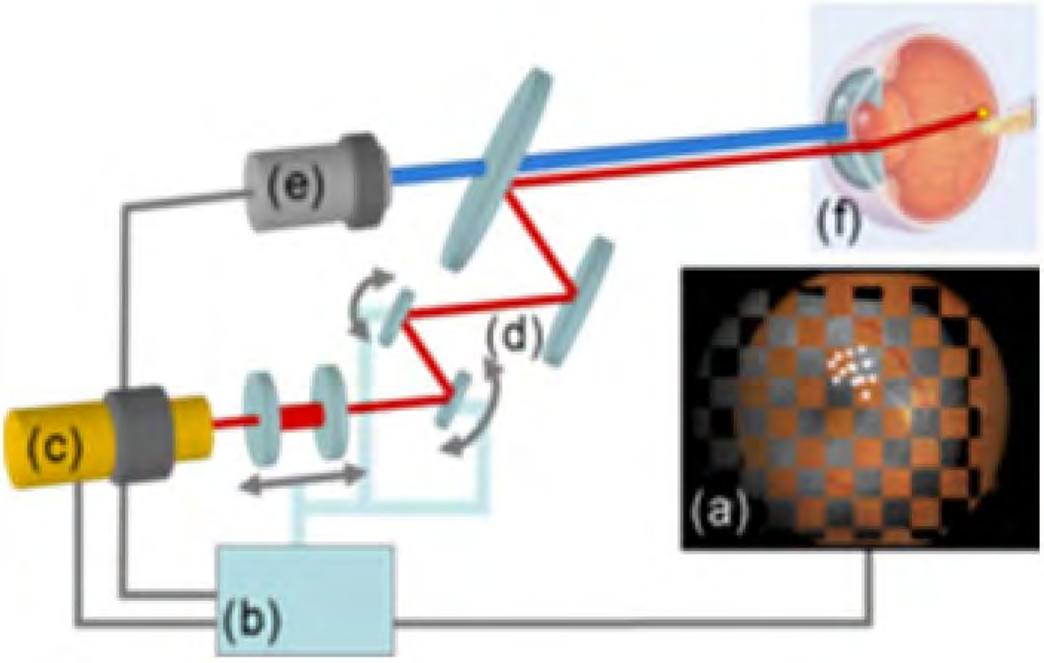
New Creative VISION 2035 (BIO-ICT SYSTEM)

1. d-Human Project

The d-Human project : Our Zentech will complete new challenge Bio-ICT management up to 2035 year for future(Big Data Human Project).



B. The laser photocoagulation system- computer



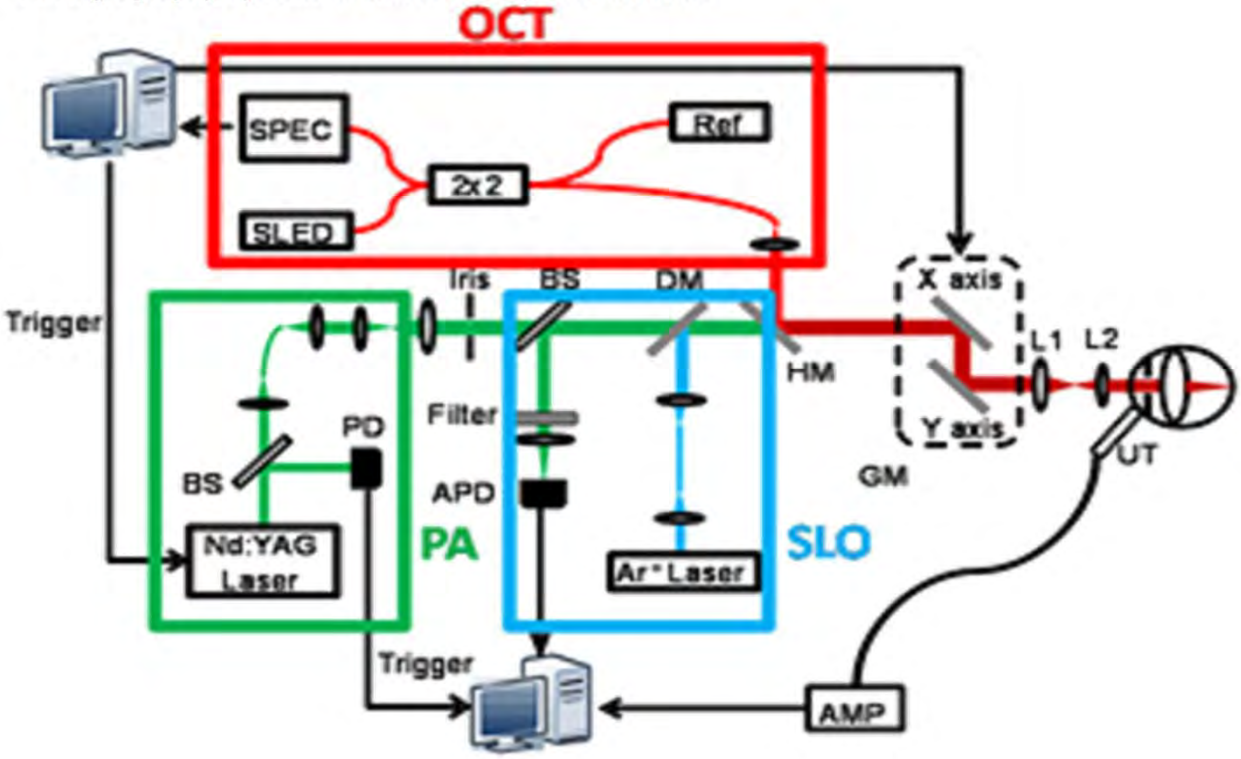
a.treatment plan,
b.control system
c.target and treatment laser
d.mirror system to derive the laser beam
e.video camera acquiring a live video stream
f.patient eye.

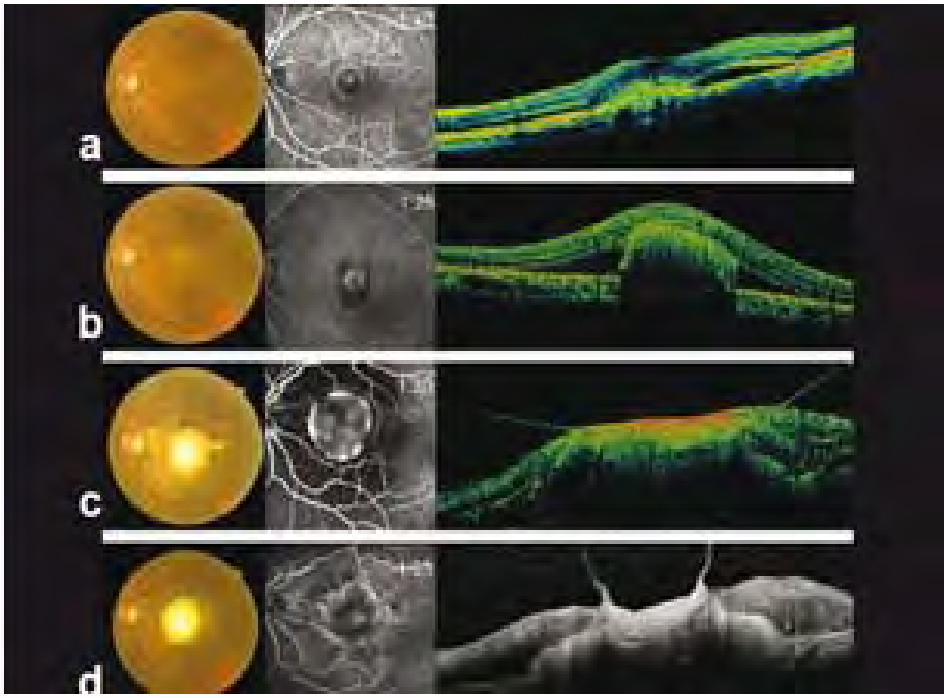
New Creative VISION 2035 (BIO-ICT SYSTEM)-Cont.

2. OCT angiography-photocoagulation project

The new challenge of Bio-IT for OCT-APP will be developed by Zentech engineering up to 2035 year for future Human Life.

A. Angiography System- A multimodal photo-acoustic

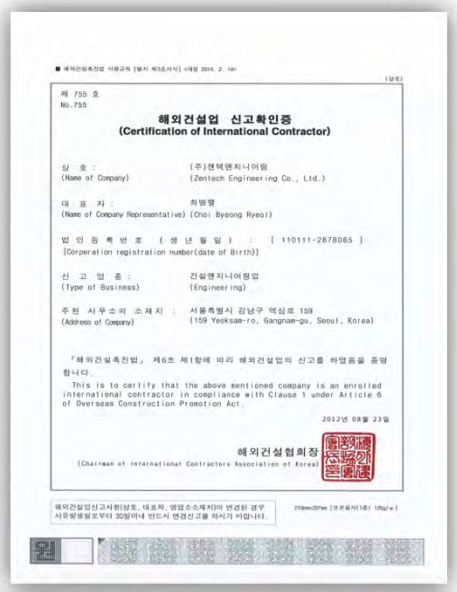




I.The schematic of integrated photo-acoustic scanning laser ophthalmoscopy (SLO),
II.Optical coherence tomography (OCT) image acquisition system.
III.Dichroic mirror (DM) and a hot mirror (HM) combine light from the three imaging modalities.

Certificate


사업자등록증
Certificate of Business Registration
(법인사업자)
(Corporate Taxpayer)


해외건설업 신고확인증
(Certification of International Contractor)

제 755 호
No. 755

(주)젠텍엔지니어링
(Zentech Engineering Co., Ltd.)

최병렬
(Choi Byeong Ryeol)

110111-2878085

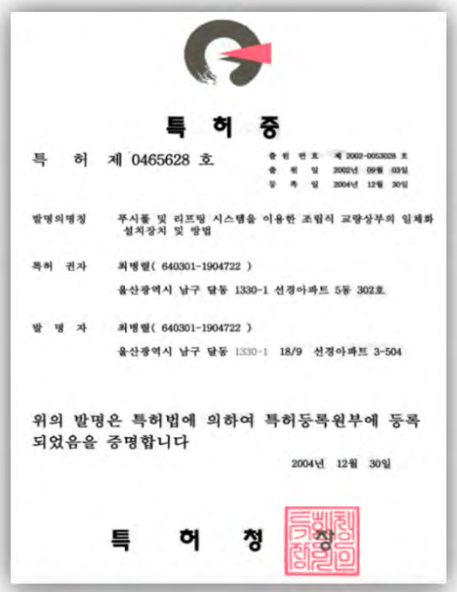
건설엔지니어링업
(Engineering)

서울특별시 강남구 역삼로 159
(159 Yeoksam-ro, Gangnam-gu, Seoul, Korea)

「해외건설촉진법」 제6조 제1항에 따라 해외건설업의 신고를 하였음을 증명합니다.
This is to certify that the above mentioned company is an enrolled international contractor in compliance with Clause 1 under Article 6 of Overseas Construction Promotion Act.

2012년 08월 23일

해외건설협회장
(Chairman of International Contractors Association of Korea)


특 허 증

특 허 제 0465628 호

발명의명칭 푸시풀 및 리프팅 시스템을 이용한 조립식 교량상부의 일체화 설치장치 및 방법

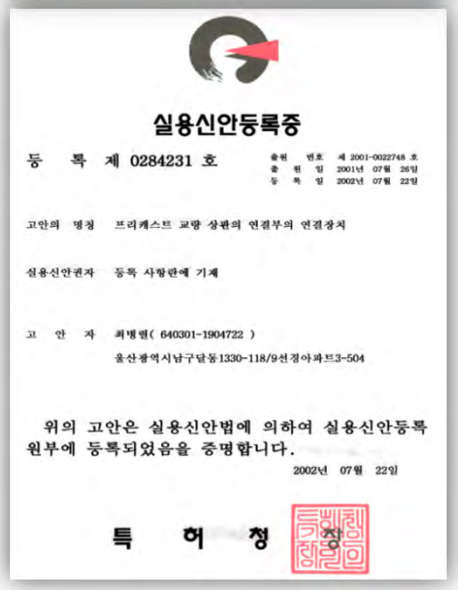
특허 권자 최병렬(640301-1904722)
울산광역시 남구 달동 1330-1 선경아파트 5동 302호

발 명 자 최병렬(640301-1904722)
울산광역시 남구 달동 1330-1 18/9 선경아파트 3-504

위의 발명은 특허법에 의하여 특허등록원부에 등록되었음을 증명합니다

2004년 12월 30일

특 허 청 장


실용신안등록증

등 록 제 0284231 호

고안의 명칭 프리캐스트 교량 상판의 연결부의 연결장치

실용신안권자 등록 사항란에 기재

고 안 자 최병렬(640301-1904722)
울산광역시남구달동1330-118/9선경아파트3-504

위의 고안은 실용신안법에 의하여 실용신안등록원부에 등록되었음을 증명합니다.

2002년 07월 22일

특 허 청 장


특허증
CERTIFICATE OF PATENT

특허 제 10-1646493 호

출원번호 제 10-2015-0117113 호
등록일 2015년 08월 20일
등록일 2016년 08월 02일

해상풍력 지지구조물 및 그 지중팁 하부구조물의 설치 방법

(주)젠텍엔지니어링(110111-*******)
서울특별시 강남구 역삼로 140,6층(역삼동,성암빌딩)

등록사항란에 기재

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.
This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.

2016년 08월 02일

특허청장
COMMISSIONER,
KOREAN INTELLECTUAL PROPERTY OFFICE

최 동 규


특허증
CERTIFICATE OF PATENT

특허 제 10-1661092 호

출원번호 제 10-2014-0110522 호
출원일 2014년 08월 25일
등록일 2016년 09월 23일

해상 풍력발전용 하이브리드 지지구조물 및 그 시공방법

(주)젠텍엔지니어링(110111-*******)
서울특별시 강남구 역삼로 159(역삼동, 젠텍타워)

등록사항란에 기재

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.
This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.

2016년 09월 23일

특허청장
COMMISSIONER,
KOREAN INTELLECTUAL PROPERTY OFFICE

최 동 규


제 10-02-033 호

기술사사무소 개설등록증

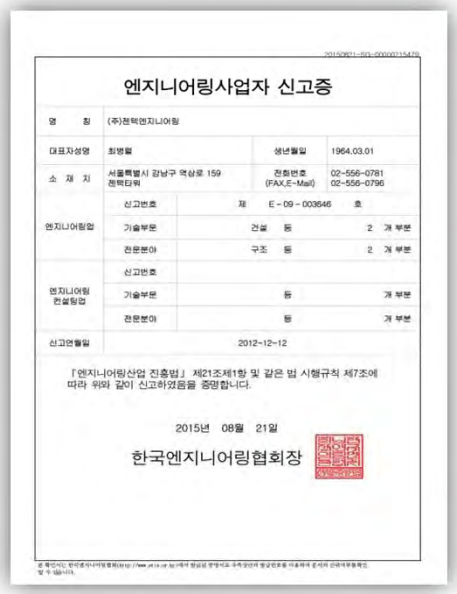
(☑ 개인 ☐ 합동)

사무소 명칭: ㈜젠텍엔지니어링
기술사 성명: 최병렬
생년월일: 1964.03.01
기술부문: 건설, 기계, 전기, 산업, 화학
전문분야: 구조, 토질·지질, 일반산업기계, 발송배전, 생산관리, 화공
소재지: 서울특별시 강남구 역삼로 159(역삼동) 젠텍타워 6층
전화번호: 02-556-0781
등록연월일: 2002년 11월 02일

「기술사법」 제6조제1항 및 같은 법 시행령 제26조제3항제3호에 따라 이래창조과학부장관의 권한을 위탁받아 위와 같이 기술사무소의 개설을 등록 하였음을 증명합니다.

2015년 08월 21일

한국기술사회 회장


엔지니어링사업자 신고증

업 체	(주)젠텍엔지니어링			
대표자성명	최병렬		생년월일	1964.03.01
소 재 지	서울특별시 강남구 역삼로 159 젠텍타워		전화번호 (FAX,E-Mail)	02-556-0781 02-556-0796
엔지니어링업	신고번호	제 E-09-003646 호		
	기술부문	건설 등	2	개 부문
	전문분야	구조 등	2	개 부문
엔지니어링 컨설팅업	신고번호			
	기술부문	등		개 부문
	전문분야	등		개 부문
신고연월일	2012-12-12			

「엔지니어링산업 진흥법」 제21조제1항 및 같은 법 시행규칙 제7조에 따라 위와 같이 신고하였음을 증명합니다.

2015년 08월 21일

한국엔지니어링협회장


BUREAU VERITAS Certification

ZENTECH ENGINEERING Co., Ltd.
6F Zentech Tower, 159, Yeoksam-ro, Gangnam-gu, Seoul, Korea

Bureau Veritas Certification Holding SAS – UK Branch certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2008

Scope of certification

- CONSTRUCTION INSPECTION, PROJECT MANAGEMENT, DESIGN & DEVELOPMENT FOR THE CIVIL ENGINEERING AND ARCHITECTURE.
- DEVELOPMENT OF THE REAL ESTATE
- AGENCY OF THE CIVIL ENGINEERING SOFTWARE

Original cycle start date: 14 December 2007
Expiry date of previous cycle: 09 December 2016
Certification / Recertification Audit date: 03 November 2016

Certification / Recertification cycle start date: 09 November 2016

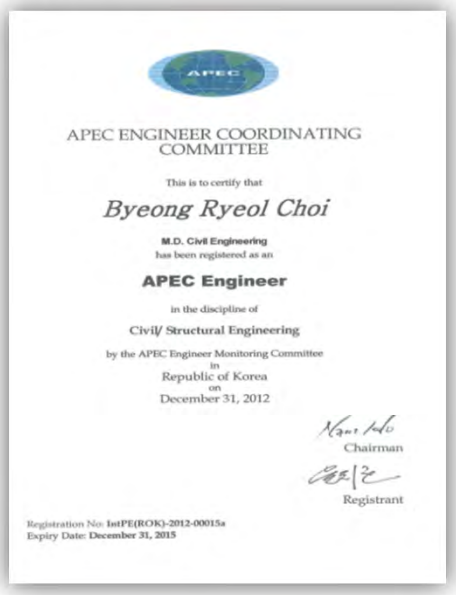
Subject to the continued satisfactory operation of the organisation's Management System, this certificate expires on: 14 September 2018

Certificate No. 10024000668 Version 1, Revision date: 09 November 2016

Signed on behalf of BVCH SAS UK Branch

UKAS

Certificate



APEC ENGINEER COORDINATING COMMITTEE

This is to certify that

Byeong Ryeol Choi

M.D. Civil Engineering
has been registered as an

APEC Engineer

in the discipline of

Civil/ Structural Engineering

by the APEC Engineer Monitoring Committee
in
Republic of Korea
on
December 31, 2012

Chairman

Registrant

Registration No: IntPE(ROK)-2012-00015a
Expiry Date: December 31, 2015

EMF-IRPE

INTERNATIONAL REGISTER COORDINATING COMMITTEE

This is to certify that

Byeong Ryeol Choi

M.D. Civil Engineering
has been registered as an

IntPE(ROK)

in the discipline of

Civil/ Structural Engineering

by the EMF-IRPE Monitoring Committee
in
Republic of Korea
on
January 25, 2013

Chairman

Registrant

Registration No: IntPE(ROK)-2013-0015
Expiry Date: January 24, 2016

Registration No. IntPE(ROK)-2013-0015

INTERNATIONAL ENGINEERING ALLIANCE

This is to certify that

Mr. Byeng Ryeol Choi

has been registered as

The APEC Engineer
and
The International Professional Engineer

in the Republic of Korea
on January 24, 2016

President/KPEA

Expiration Date: January 23, 2019

The Korean Professional Engineers Association

CERTIFICATE OF ACHIEVEMENT

PRESENTED TO

Zentech Engineering Co., Ltd.

IN RECOGNITION OF THEIR PARTICIPATION IN THE 2012 BE INSPIRED AWARD PROGRAM FOR

Modulazation Design for RUWAIS Refinery Project
(Teekay FPSO Topside Design Project)

Bentley

CERTIFICATE OF ACHIEVEMENT

PRESENTED TO

Zentech Engineering Co., Ltd.

IN RECOGNITION OF THEIR PARTICIPATION IN THE 2012 BE INSPIRED AWARD PROGRAM FOR

2MW-Class Offshore Wind Turbine Project
(Zadco UZ 750 Project)

Bentley

CERTIFICATE OF ACHIEVEMENT

PRESENTED TO

PTTLNG Receiving Terminal
Expansion Project – Phase II

Outstanding achievement
as a NOMINEE in the
2014 Be Inspired Awards

Zentech Engineering Co., Ltd

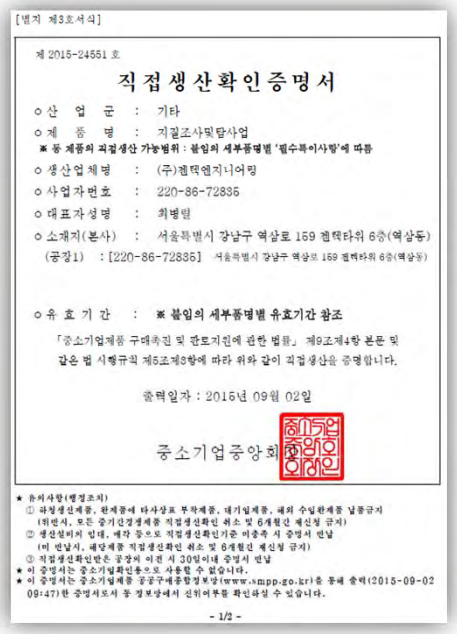
CERTIFICATE OF ACHIEVEMENT

PRESENTED TO

Satah Al Razboot (SARB) Field Development
Project – Package 4 EPC Work

Outstanding achievement
as a NOMINEE in the
2014 Be Inspired Awards

Zentech Engineering Co., Ltd



[별지 제3호서식]

제 2015-24551 호

직 접 생 산 확 인 증 명 서

○산 업 군 : 기타
○제 품 명 : 지질조사및탐사업
※ 동 제품의 직접생산 가능범위 : 붙임의 세부품명별 '필수특이사항'에 따름
○생산업체명 : (주)젠텍엔지니어링
○사업자번호 : 220-86-72835
○대표자성명 : 최병탈
○소재지(본사) : 서울특별시 강남구 역삼로 159 젠텍타워 6층(역삼동)
(공장1) : [220-86-72835] 서울특별시 강남구 역삼로 159 젠텍타워 6층(역삼동)

○유 효 기 간 : ※ 붙임의 세부품명별 유효기간 참조

「중소기업제품 구매촉진 및 판로지원에 관한 법률」 제9조제4항 본문 및 같은 법 시행규칙 제5조제8항에 따라 위와 같이 직접생산을 증명합니다.

출력일자 : 2015년 09월 02일

중소기업중앙회장

★ 유의사항(명칭조치)
① 타업생산제품, 완제품에 타사상표 부착제품, 대기업제품, 해외 수입완제품 납품금지 (위반시, 모든 중기간경쟁제품 직접생산확인 취소 및 6개월간 재신청 금지)
② 생산설비의 임대, 매각 등으로 직접생산확인기준 미충족 시 증명서 반납 (미 반납시, 해당제품 직접생산확인 취소 및 6개월간 재신청 금지)
③ 직접생산확인받은 공장이 이전 시 30일이내 증명서 반납
★ 이 증명서는 중소기업확인으로 사용할 수 없습니다.
★ 이 증명서는 중소기업제품 공공구매종합정보망(www.smpp.go.kr)을 통해 출력(2015-09-02 09:47)한 증명서로서 동 정보망에서 진위여부를 확인하실 수 있습니다.

- 1/2 -

제 20072507 호

기업부설연구소인정서

1. 연 구 소 명: (주)젠텍엔지니어링 한국해양기술연구소
[소속기업명: (주)젠텍엔지니어링]
2. 소 재 지: 서울 강남구 역삼동 834-46 청암빌딩 6층
3. 신고연월일: 2007년 8월 24일
(최초인정일 : 2007년 9월 19일)

기술개발촉진법 제16조 및 동법 시행령 제15조 제1항의 규정에 의하여 위와 같이 기업부설연구소로 인정합니다.

2011년 4월 11일

사단법인 한국산업기술진흥협회장

Achivement Technology for Offshore Wind Farm in Creative VISION 2015

Statement of Compliance
for the Design Evaluation

KR
KOREAN REGISTER

Statement number : KASC-S-0006-16

This statement is issued to

Korea Institute of Civil Engineering and Building Technology
283, Goyang-Daero, Ilsanseo-Gu, Goyang, Gyeonggi-Do, Republic of Korea
(Co-Works : ZenTech Eng.)

for the

Advanced Substructure for Offshore Wind Turbine (WS-ZT-5000)

Conformity evaluation has been carried out according to *IEC 61400-22: Wind turbine-Part 22: Conformity testing and certification.*

This statement attests compliance with *Technical Guidelines for Offshore Wind Turbines:2011 of KR*, concerning the *Design Evaluation*. It is based on the following reference documents:

Compliance Conditions;
See Annex I

Related Documents;
Evaluation Report No.: KASC-R-0010-16

This Statement of Compliance is issued on September 9, 2016 and valid until September 8, 2019.

KOREAN REGISTER OF SHIPPING
Nam, Hyun-Woo
Head of Department
R&D Center

Note : 1. The manufacturer should notify this Society of any modification or changes that may affect the validity of this Statement of Compliance.
2. The approval will be automatically suspended and the Statement of Compliance become invalid from the expiry date of the Statement of Compliance in the event that the extension has not been granted or is not yet in accordance for completion of the renewal evaluation.

Page: 1/2 Form. No.: KAS-FP-04-10(Rev.3, 2013.07.02)

KR
KOREAN REGISTER

APPROVAL IN PRINCIPLE

Certificate No. : SEL0028671-FTR-AIP0045 Date : 20th September, 2019.

Product : Design of Offshore Wind Jacket for the Integrated Constructions

Designer : Zentech Engineering Co., Ltd.
Zentech Tower, 159, Yeoksam-ro, Gangnam-gu, Seoul, Republic of Korea

This is to certify that the design concept of Offshore Wind Jacket for the Integrated Constructions has been evaluated and approved in accordance with the following Regulations :

- KR Rules (2014) - Rules for the Classification of Fixed Offshore Structures
- IEC 61400-1:2005 - Wind Turbines - Part 1: Design Requirements
- IEC 61400-3:2009 - Wind Turbines - Part 3: Design Requirements for Offshore Wind Turbines
- NORSOK STANDARD N-004(2004) - Design of Steel Structures
- API RP 2A-LRFD 1st Edition - Recommended Practice for Planning, Designing, and Constructing Fixed Offshore Platforms-Load and Resistance Factor Design

The evaluation has been based on the submitted technical documents. The approval conditions are described on a separate document titled "Statement for Approval in Principle".

Issued at Headquarters of KR

한 국 선 급
KOREAN REGISTER OF SHIPPING
Ha, Tae-bum
Managing Director
R&D Center, R&D Division

제 322 호

포 장 증

(주) 젠 텍 엔 지 니 어 링

대표이사 최 병 렬

귀하는 과학기술진흥을 통하여 국가발전에 크게 이바지하였으므로 대한민국 헌법에 따라 다음 포장을 수여합니다.

과학기술포장

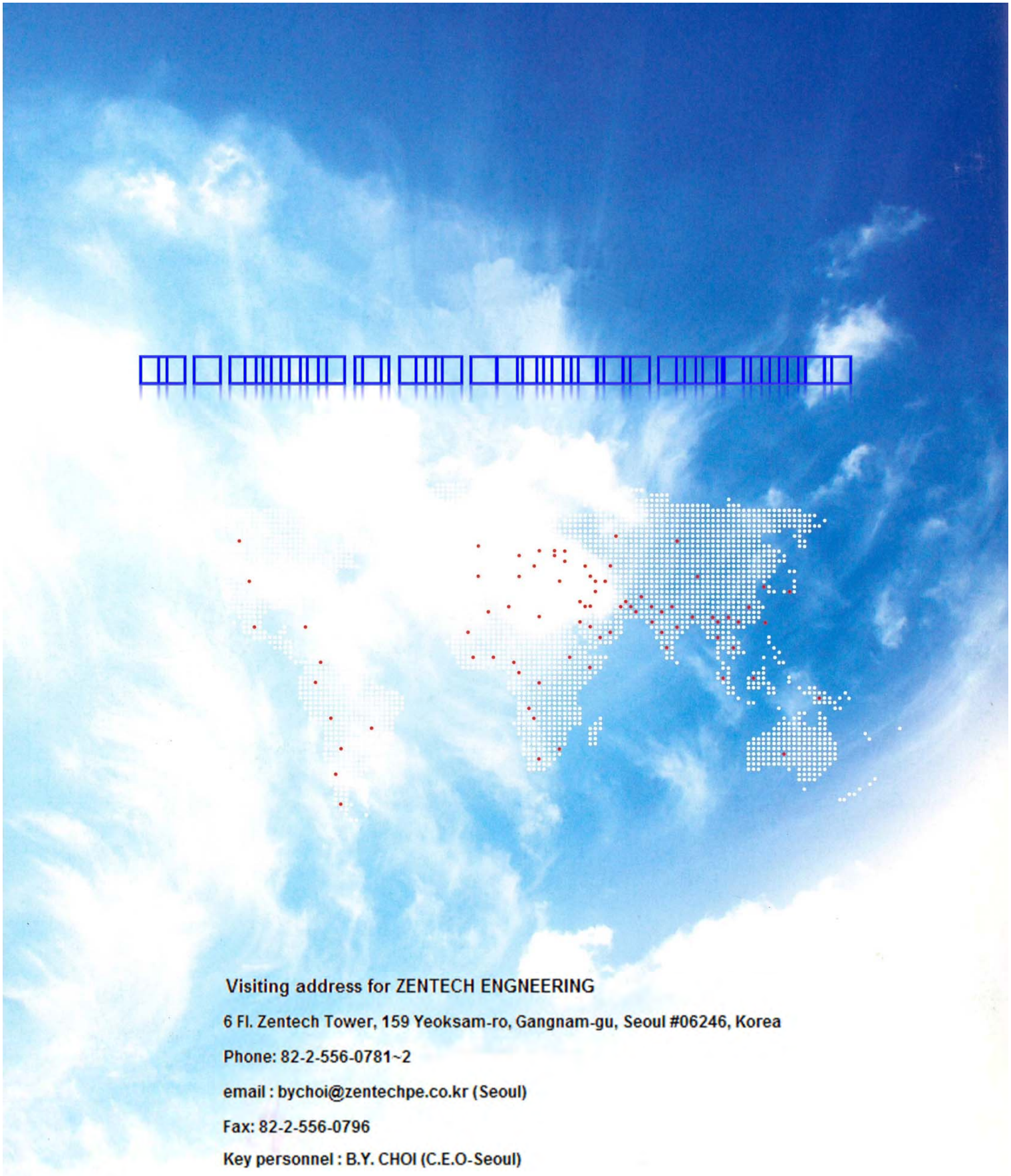
2018년 4월 20일

대 통 령 문 재 인

이 증을 과학기술포장부에 기재합니다.

행정안전부장관 김 부 겸

Be awarded The Order of Science Merit



Visiting address for ZENTECH ENGNEERING

6 Fl. Zentech Tower, 159 Yeoksam-ro, Gangnam-gu, Seoul #06246, Korea

Phone: 82-2-556-0781~2

email : bychoi@zentechpe.co.kr (Seoul)

Fax: 82-2-556-0796

Key personnel : B.Y. CHOI (C.E.O-Seoul)