

The 34th JCCP  
International  
Symposium



## PTSC Technological Strategy and Deployment



January 2016  
Mr. Phan Thanh Tung  
President & CEO

# Contents

1. Some highlights of changes in Vietnamese law and policy.
2. Overview of PTSC
3. PTSC Technological Strategy & Deployment
4. PTSC Strategy in current market situation

# Some highlights of changes in Vietnamese law and policy.

## 1. New Enterprise Law & New Investment Law (2014)

- ✓ State enterprise/ the State Owned Corporation (SOC) is the company where the State hold 100% capital;
- ✓ Currently, the State is making its divestment from the SOC and promote the equitization of the SOC
- ✓ The equitized SOC is now working under the Enterprise Law of the equitized company.
- ✓ The State is decreasing its protection towards SOC;
- ✓ Vietnam Government is now encouraging a multi-component economy.

## 2. WTO

- ✓ Vietnam officially joined WTO on 7th Nov 2006
- ✓ After years being a dynamic member of WTO, Vietnam economy grows stably and sustainably.



## Some highlights of changes in Vietnamese law and policy.

### 3. Trans-Pacific Partnership (TPP):

- ✓ Vietnam is opening to all contractor from TPP countries to equally supply goods and services without any discrimination;
- ✓ Foreign investors shall have more opportunities;
- ✓ Foreign investor, with its technical and financial strengths, are encouraged to increase their investment in Vietnam to diversify and increase the competitiveness in Vietnam market
- ✓ Vietnam is decreasing taxes on goods and services from TPP countries;
- ✓ Vietnam also have more stringent policies regarding environment protection, competition or intellectual property ... and other bindings related to technical barriers, sanitary and etc.

### 4. Free Trade Agreement (FTA):

- ✓ Currently Vietnam is also negotiating FTA with:  
EU, USA, South Korea, Japan



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# Overview of PTSC

PetroVietnam Technical Services Corporation (PTSC) is a member of the Vietnam National Oil and Gas Group (PVN) with PVN holding 51% of the charter capital.

PTSC currently has **27** branches, subsidiaries, joint ventures and others located inside and outside Vietnam, operating in **07** core services.

PTSC is currently listed on the Hanoi Security Trading Center with the stock code PVS.

The average annual growth rate is 10-15%.

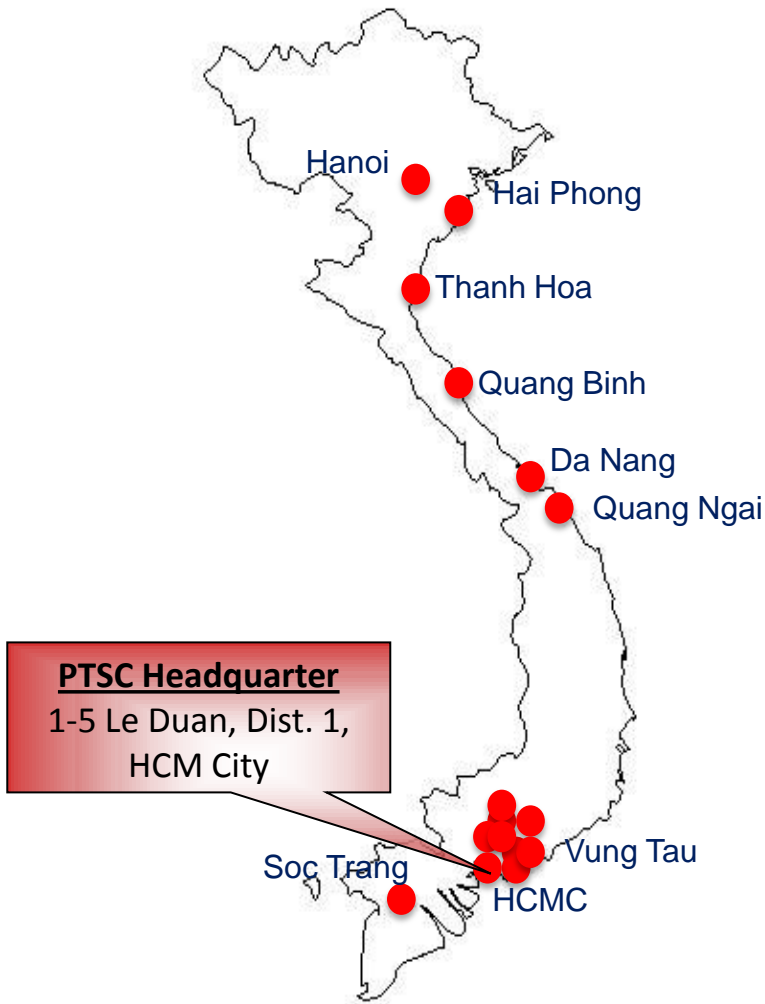
PTSC has nearly 10,000 employees in work force.

## Core Services:

- EPCI for Offshore Oil & Gas Facilities
- EPC for Industrial Facilities
- Marine Services
- FSO/FPSO Services
- Operation & Maintenance (O&M), Repairing, Installation and Transportation Services
- Seismic Survey, G&G Survey, ROV and Subsea Services
- Supply Base and Port Services



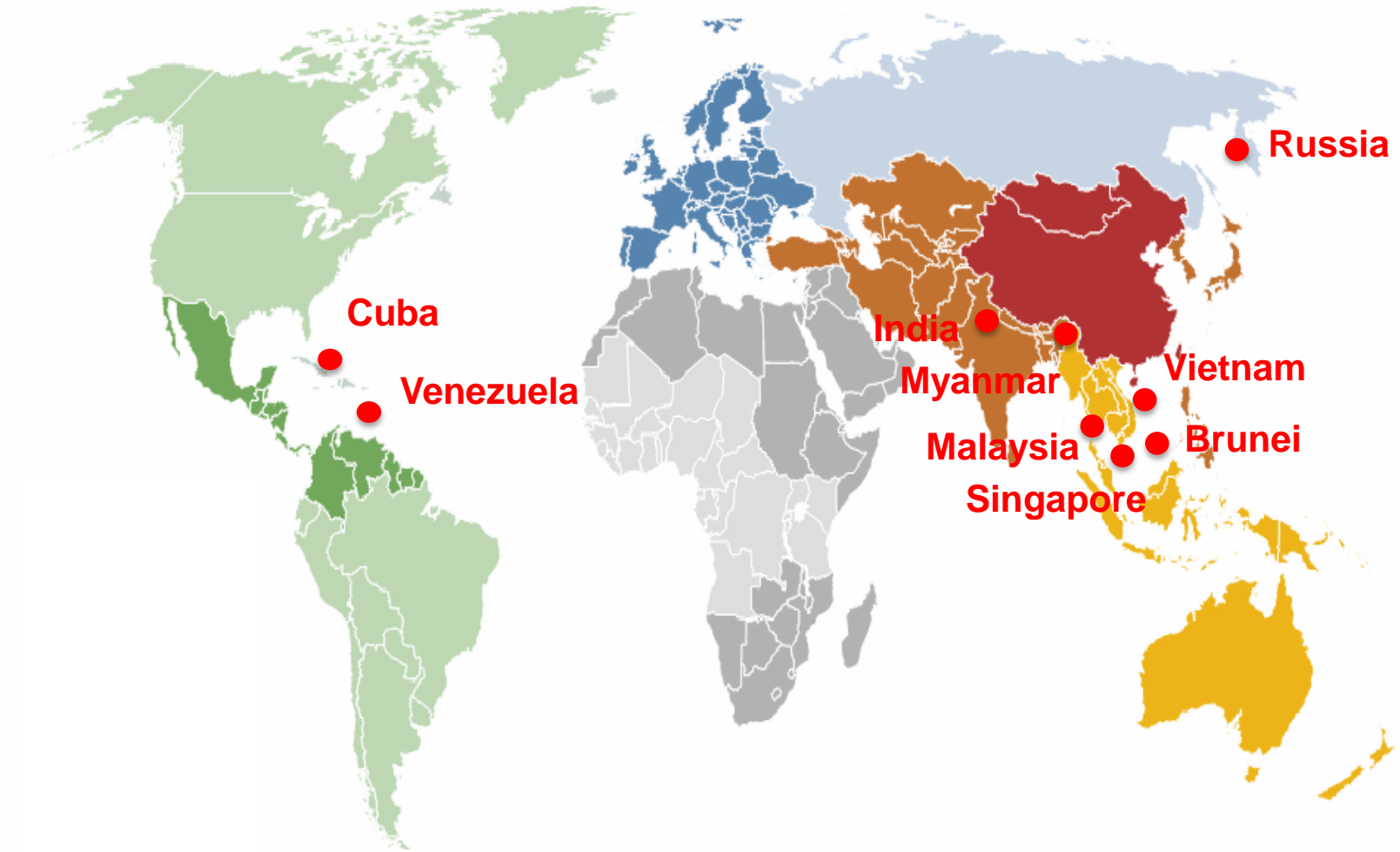
# PTSC'S BRANCHES, SUBSIDIARIES AND AFFILIATES IN VIETNAM



- PTSC Marine
- PTSC Supply Base
- PTSC M&C
- PTSC Offshore Services
- PTSC Production Services
- PTSC Geos and Subsea Services
- Engineering & Construction Division
- Petro Hotel
- PTSC CGGV Geos
- PetroVietnam Marine Shipyard
- Sao Mai – Ben Dinh
- PTSC Power
- PTSC Phu My Port
- PTSC Quang Ngai
- PTSC Da Nang
- PTSC Son Tra Port
- PTSC Quang Binh
- PTSC Thanh Hoa
- PTSC Dinh Vu
- PTSC's Ha Noi Branch
- PV Security



# OVERSEAS OPERATION

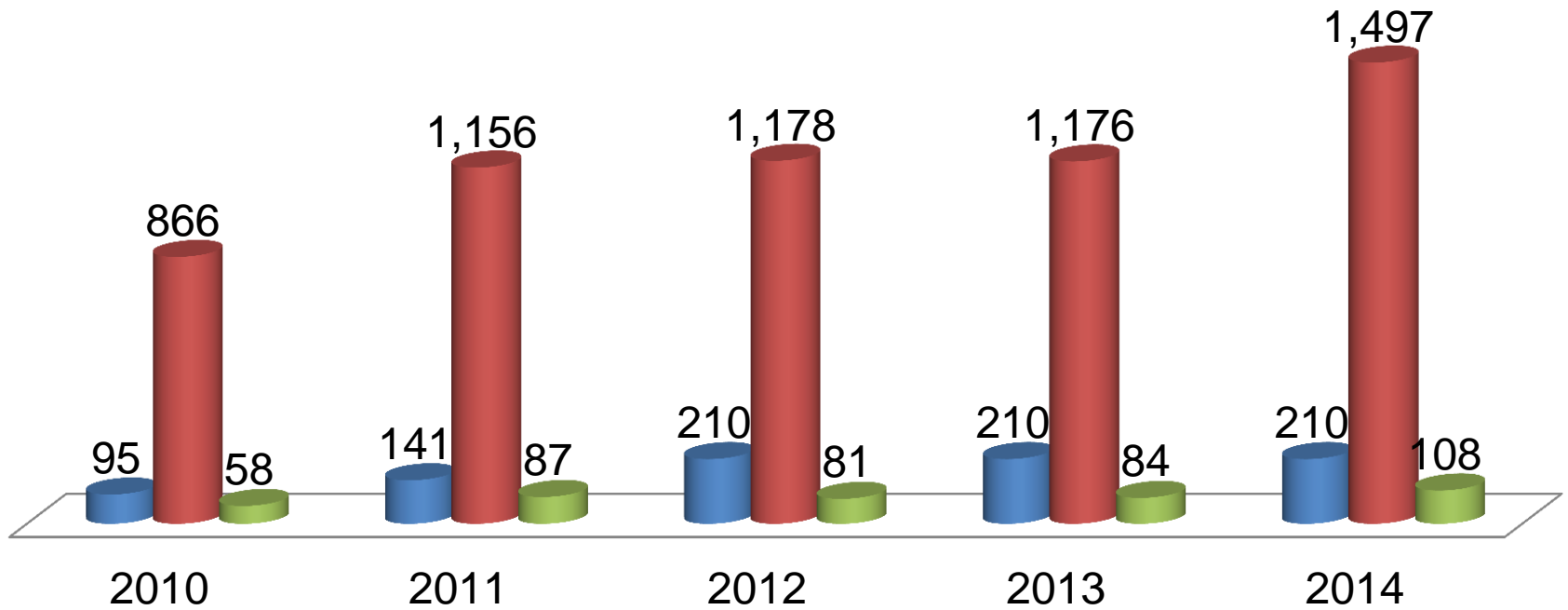




# PTSC BUSINESS OUTCOME

(amount in USD Million)

■ Charter Capital ■ Turnover ■ Profit



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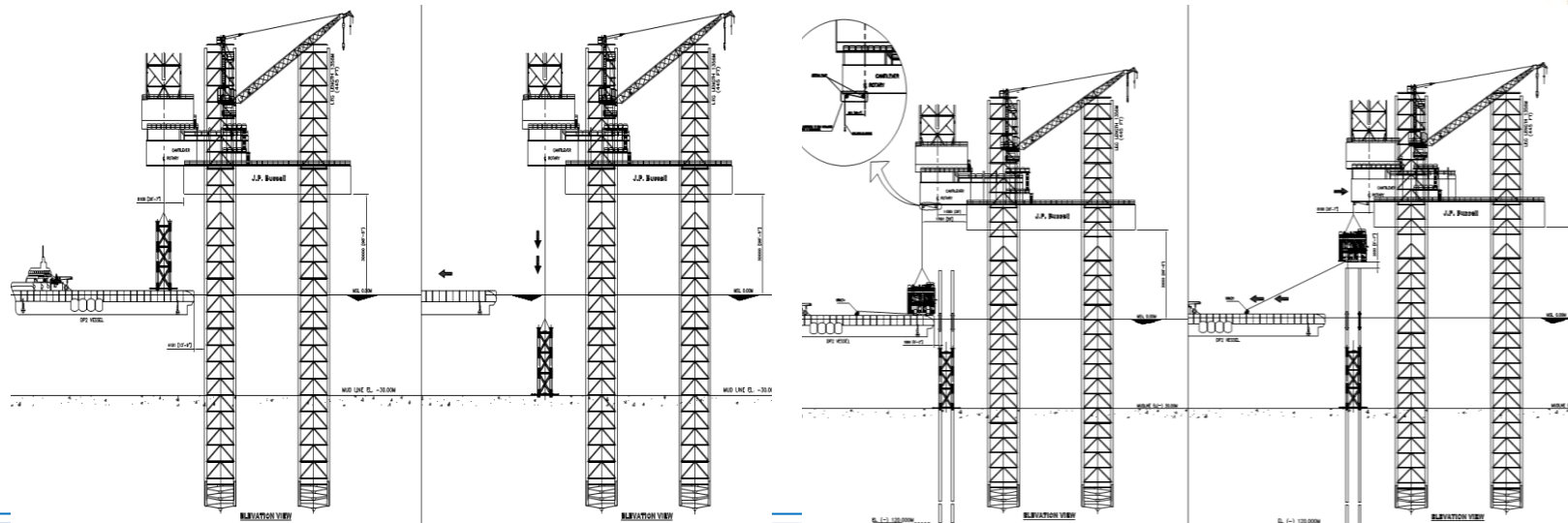
# EPCI for Offshore Oil & Gas Facilities

- ✓ Have successfully completed 60 turn key EPCI projects for Vietnam and exportation to foreigner countries (Malaysia, India, Brunei, Ghana) including Center Processing Platform (float-over or lifting modules) and Well Head Platforms.
- ✓ Have successfully completed number of Skids, vessels and equipment packages
- ✓ Fabrication capacity is up to 50,000T/year. Facilities are equipped for Heavy Structures up to 25,000 Te



## 1. Strategy for Marginal Field

- ✓ Minimum Offshore Substructure using suction pile, gravity foundation;
- ✓ Using generic platforms which are retrievable to be reused for several operating life cycles
- ✓ Design light structures so that Drilling Rig can be used for installation to save cost for mobilization of Heavy Lift Vessel

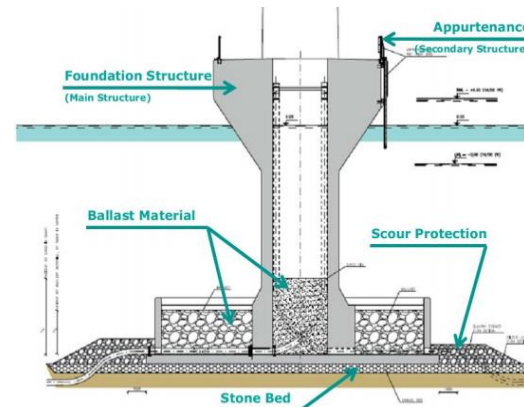


## Suction Piles & Gravity Based Structure

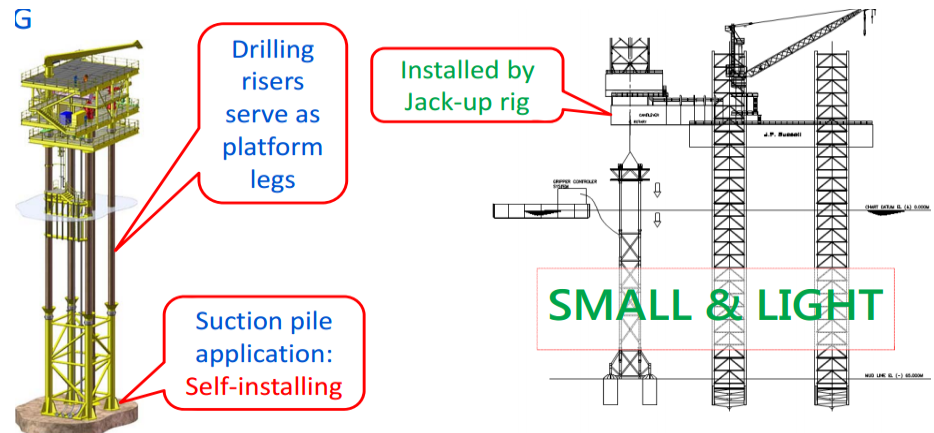
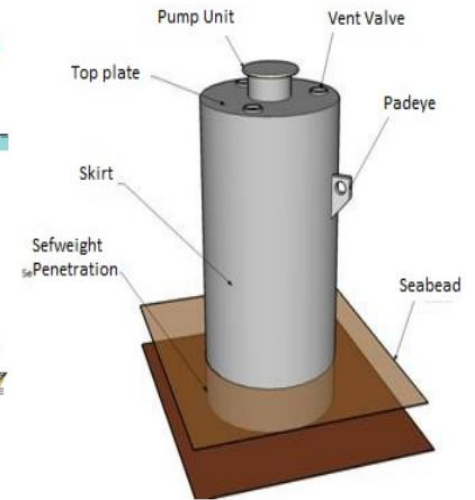
- ✓ Quick & easy Installation: Less than 12 hours for real installation activities (4 - 5 days for driven piles)
- ✓ Integral TS/JK/piles installed together
- ✓ Retrievable – REUSABLE
- ✓ Save hundred tons in comparison to driven piles
- ✓ Best solution for gravel & rocky soils, hard clayey soil

## Minimal Platform Concept

- ✓ Drilling risers serve as platform legs
- ✓ Using Self-installation suction piles
- ✓ Installed by Jack up Rig



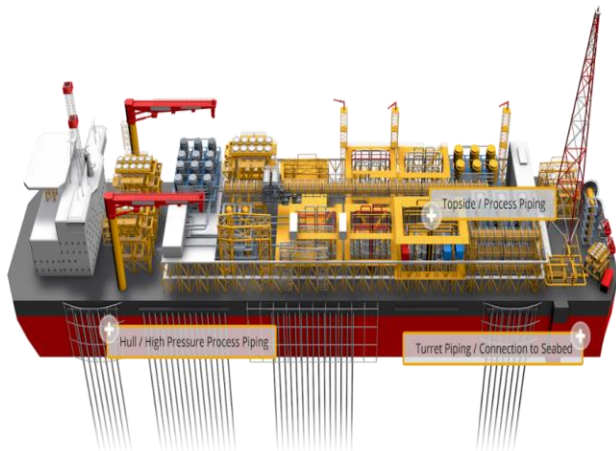
- Seabed preparation
- Scour protection



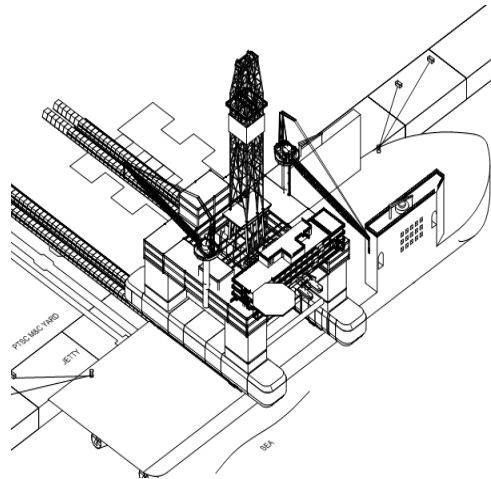


## 2. Strategy for Deep Water Technologies:

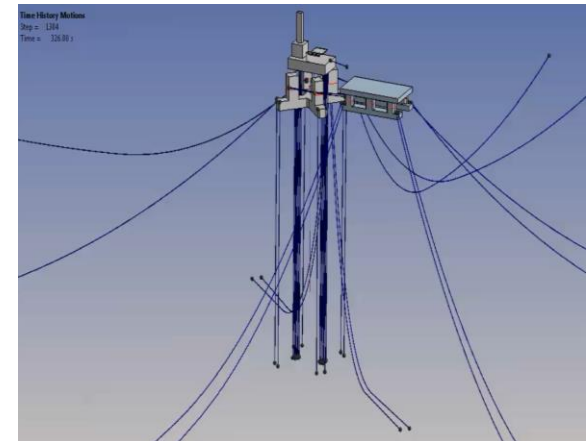
- ✓ Developing resources for Tension Leg Platforms; Semi-sub, Spars and FPSO



FPSO: capable to perform EPCI including integration at PTSC yard



Semi-Sub, TLP, SPAR: capable to perform EPCI including integration onshore at PTSC yard



Engineering Capability: Performed by in-house resources

#### 4. EPC/EPCI Strategy in current market situation:

- ✓ Cost optimization for EPCI Projects by utilizing: In-house engineering capabilities, competitive local resources, compact Project Management Team, contractors interface reduction, resources mobilization cost optimization.
- ✓ Capex optimization by sharing resources with multiple projects, multiple facilities tie-in concept, design optimization using retrievable light substructure that can be installed quickly.
- ✓ Promote the collaboration with international partners such as licensor for Conceptual Design





# EPCI & O&M for FPSO/FSO

- ✓ Have successfully completed 2 EPCI FPSO/FSO projects
- ✓ Currently jointly owned and operated a fleet of 5 FPSOs/FSOs
- ✓ Currently providing Operation & Maintenance services for 6 FPSOs/FSOs in Vietnam and Malaysia
- ✓ Have successfully decommissioned and disconnected 2 FPSO/FSO in Vietnam



**FPSO RUBY II**



**FPSO PTSC LAMSON**



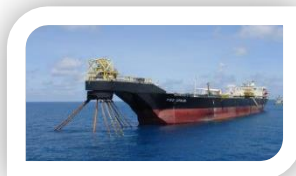
**FSO PTSC BIEN DONG 01**



**FPSO THAIBINH-VN**



**FSO MV12**



**FSO ORKID**



**FSO PTSC BACH HO**



**FPSO RUBY PRINCESS**

# Technological Strategy for FPSO/FSO EPCI Projects

Developing strategy to build **standard FPSO** with typical configuration (Processing modules, mooring system, storage capacity...) to:

- ✓ **Accommodate different fields' fluid** in multiple fields tie-in concept
- ✓ **Re-deploy for other fields** following field depletion

This is a good solution for new field development in current oil price situation

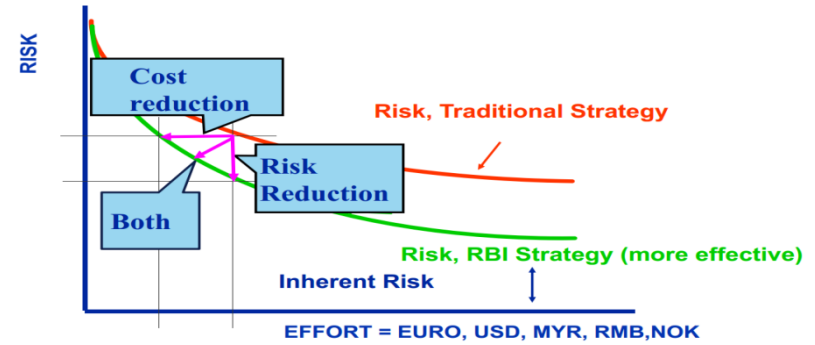
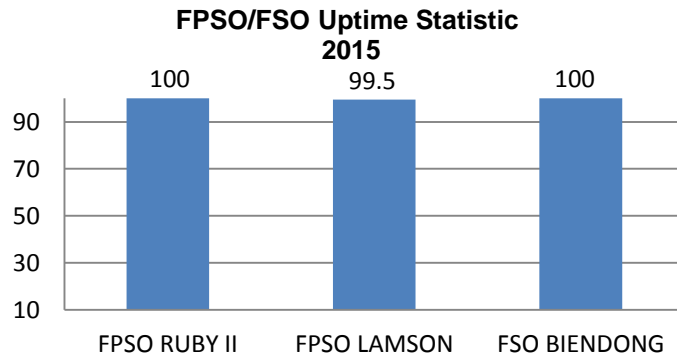


# Technological Strategy for FPSO/FSO Operation and Maintenance

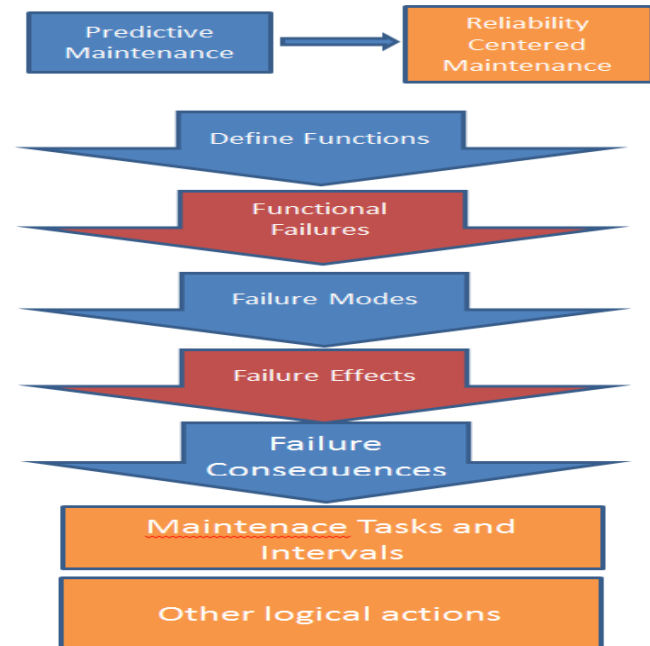
Moving from **“Repair – focused”** to **“Reliability-focused”** culture to increase uptime, reliability of facilities and reducing maintenance cost

- ✓ Application of **Risk Based Inspection (RBI)** for static equipment and structure
- ✓ Application of **Reliability Centered Maintenance (RCM)** for rotating equipment

Application of new maintenance strategies to achieve **optimal availability/reliabilities** of assets and equipment at **lower cost without compromising HSE.**



Source: Risk Based Inspection, DNVGL, 2014



# Seismic Survey, G&G Survey, ROV and Subsea Services

## 1. Geophysical Site Survey Services

- ✓ Have successfully performed number of Geophysical Survey Projects in the field of seabed geophysical structure survey, including:
  - 2D High-resolution Seismic survey.
  - Analogue survey:
  - Single beam Echo-Sounder.
  - Multi beam Echo-Sounder.
  - Side Scan Sonar.
  - Magnetometer.

## 2. Geotechnical Soil Boring Services

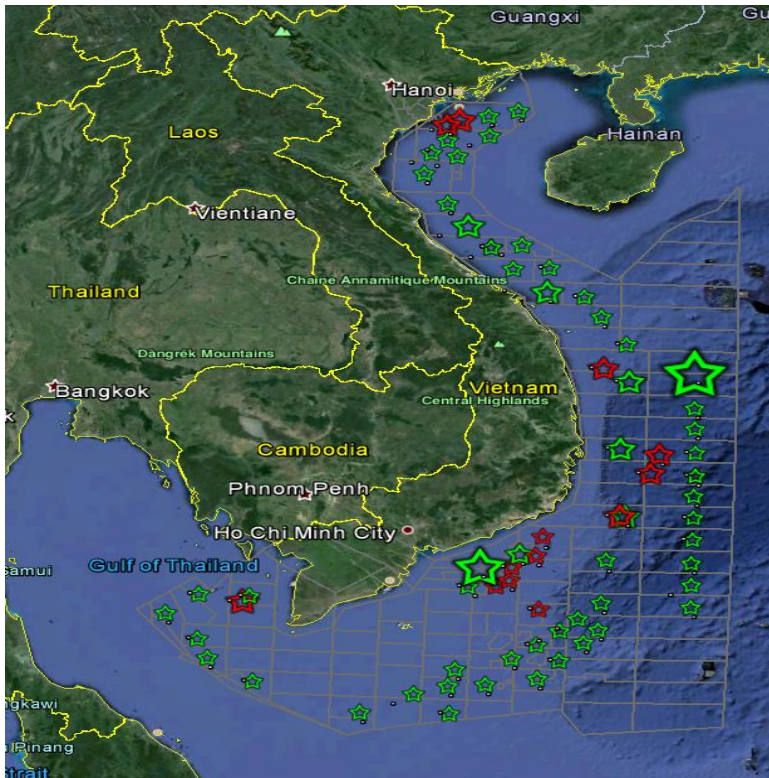
- ✓ Have successfully performed number of Geotechnical Soil Boring services including:
  - ✓ Offshore Soil Investigations.
  - ✓ Seabed Sampling/PCPT.
  - ✓ Offshore and Onshore Laboratory Testing.
  - ✓ Engineering Analysis for Foundation Offshore Structures, ....

## 3. ROV Survey & Subsea Works

- ✓ Have successfully performed number of Remotely Operated Vehicle & Diving Services certified by BV & DNV including:
  - ✓ Drilling support/Diving
  - ✓ Subsea Inspection/IRM Works
  - ✓ UWILD for FPSO/FSO
  - ✓ Installation/ Construction Support







-  Red: Amadeus
-  Green: Binh Minh 02

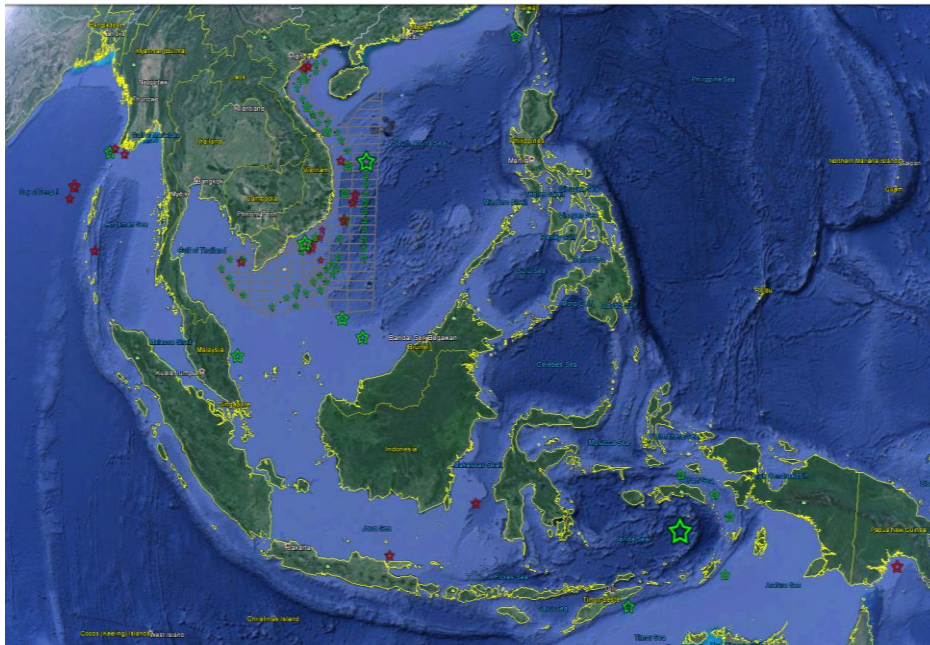


2D Vessel Binh Minh 02 – 01 x 12,000m sentinel solid streamer



3D Vessel CGG Amadeus – 8 x 8,100m sentinel solid streamers  
Broadseis and Broadsource (Broadband) Technology

Binh Minh 02 & CGG Amadeus have carried out surveys in Vietnam, Malaysia, Indonesia, Myanmar, Bangladesh, Taiwan, India, Papua New Guinea



Red: Amadeus  
Green: Binh Minh 02



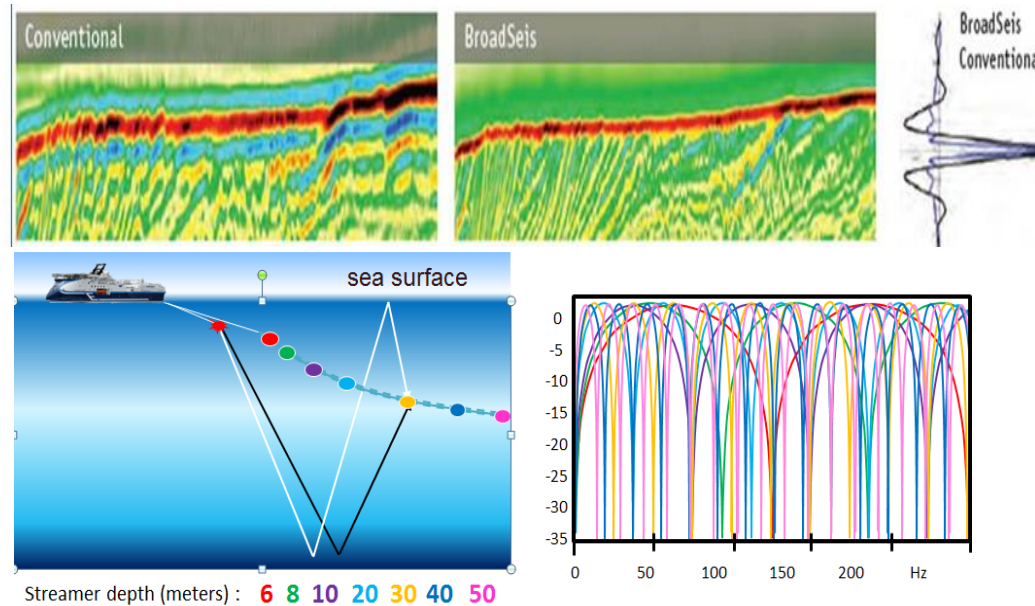
# Technological Strategy for Seismic Survey

- ✓ **Broadband Acquisition (BroadSeis / Broadsource):**

Industry-leading broadband marine acquisition solution combining advanced equipment, proprietary **variable-depth streamer profiles** and **de-ghosting** and **imaging technology**

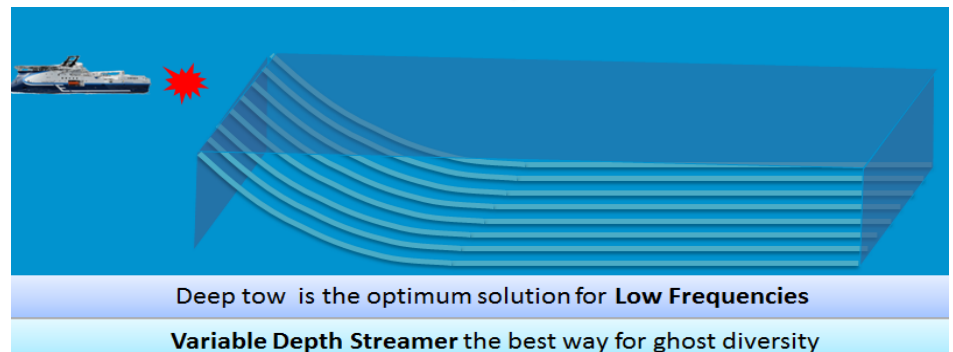
- ✓ BroadSeis: acquiring **physical data at any frequency of bandwidth**

- ✓ BroadSeis: **strong and reliable low frequency content**



Streamer depth (meters) : 6 8 10 20 30 40 50

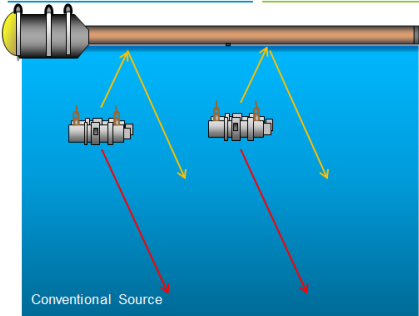
Variable Depth Streamer allows acquisition of physical data at any notches of the spectra



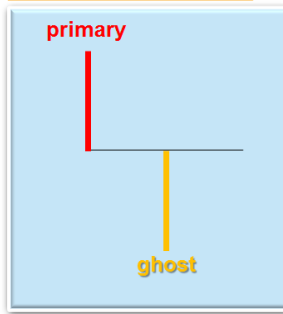


# Technological Strategy for Seismic Survey

## Seismic source principle

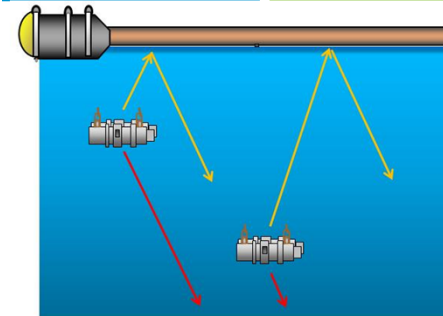


Focusing the primaries as well as their ghost

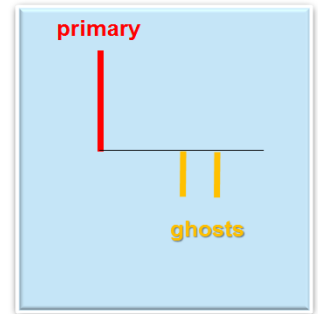


Conventional Source

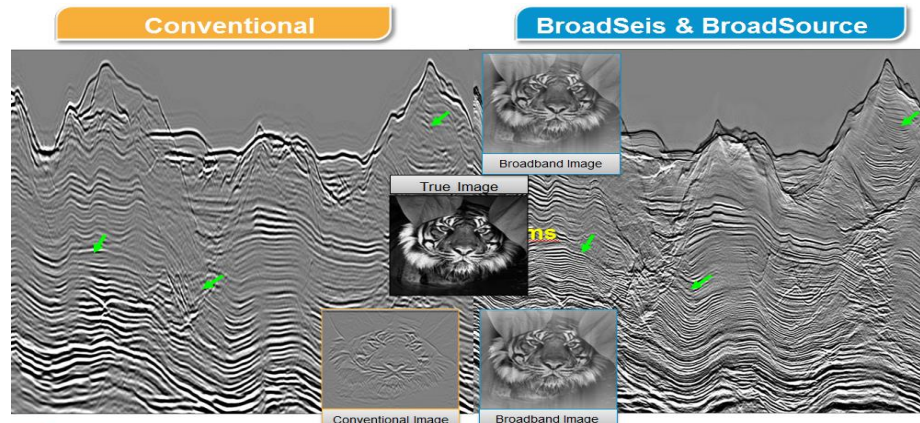
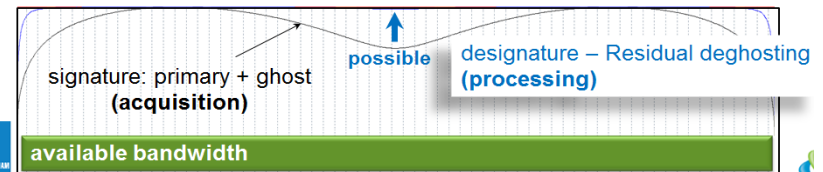
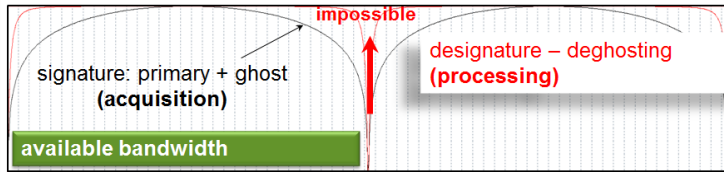
## Synchronized Multi Level Source: BroadSource



Focusing the primaries by defocusing their ghosts



Multi-Level Source



# EPC For Industrial Facilities

- ✓ Implement onshore EPC projects such as oil and gas plants, power plants, refinery units, process and mechanical skids, petrochemical and fertilizer plants etc.
- ✓ Cooperate and establish strategic partnership with numerous major players in the industry to jointly bid and execute the projects.
- ✓ Execute clients' projects with in-depth local and international understanding/knowledge and experience as well as international standards and professionalism.



Bio-ethanol Project



NCS Condensate Storage Project



Phu Quy Windfarm Project



# EPC For Industrial Facilities (On-going Projects)



## LONGPHU 1 THERMAL POWER PLANT

- Client: **PV Power**
- Project type: EPC
- Duration: 06/2013 – 05/2017
- Key SOW: **2x600 MW** with supercritical boilers and advanced low NOx technology and FGD, to satisfy the environmental requirements; Procurement and Construction for all Jetties
- Partner: Power Machines (Russia)
- Workforce: ~3,200 persons



## CA MAU GAS PROCESSING PLANT

- Client: **PV Gas**
- Project type: EPC
- Duration: 08/2015 – 04/2017
- Key SOW: Survey, Engineering (FEED and detailed design), Procurement, Construction/ Installation, Pre-commissioning and Commissioning
- Partner: Posco Engineering Co. Ltd (PEN), Korea
- Capacity : **6.2 MMSCMD**
- Products : **5.8MMSCMD** Residue Gas, **440-660** ton/day of LPG, **34-45** ton/day of Condensate



## NPK PLANT PROJECT

- Client: **PVFCCo**
- Project type: EPC
- Duration: 06/2015 – 09/2017
- Key SOW: Engineering, Procurement, Construction, Start-up , Precom/ Commissioning
- Partner: ThyssenKrupp Industrial Solutions (TKIS)
- Capacity : **250000 MTPY**



## NH3 REVAMPING PROJECT

- Client: **PVFCCo**
- Project type: EPC
- Duration: 06/2015 – 09/2017
- Key SOW: Engineering, Procurement, Construction Start-up , Precom/ Commissioning
- Partner: Technip
- Capacity : **Upgrade from 1350 to 1620 MTPD**

# Technological Strategy for Industrial Facilities EPC Projects

## 1. THERMAL POWER PLANT:

- ✓ Current Technology: Super critical boilers and advanced low NOx technology and FGD.
- ✓ New technology of **Ultra-Super critical** is being studied to **reduce CO2 emissions** from coal-fired electric generating plants with **improved thermal efficiency** by increasing steam temperatures to 700OC. **Less resource consumed (save ~11% coal), less impact to infrastructure demands.**
- ✓ Developing strategy to implement Gas Power Plant EPC.

## 2. GAS PROCESSING PLANT:

- ✓ Licensor : UOP (Universal Oil Product), USA.
- ✓ Main Process Technology: Single Column Overhead Recycle Technology (SCORE) is applied for Cryogenic NGL Recovery Unit. This technology can achieve **>99% Propane Recovery, maximize LPG product and minimize the total compression power in the plant.**

## 3. NH3 REVAMPING PROJECT:

- ✓ Licensor: Haldor Topsoe, Denmark.
- ✓ This is a new licenses such as **CMFP** in burner systems, logic system for system safety control, layout heat resistance concrete layer arrangement and ammonia synthetic equipment





## 4. NPK PLANT:

- ✓ Based on INCRO (Spain) licensed technology, chiefly devoted to produce DAP and NPK.
- ✓ Capable of producing **various grades of NPK fertilizer** in either of the following modes: Slurry granulation mode (chemical route) using either Pipe Reactor or Pre-neutralizer or a combination of both and with solid recycle.
- ✓ Solid granulation mode by injection of steam in granulator.



## 5. REFINERY:

- ✓ Developing strategy to implement Refinery EPC



# Transportation and Installation (T&I) for Offshore Facilities

- ✓ Have successfully completed number of Offshore Transportation and Installation Projects.
- ✓ Have successfully completed number of Offshore Hook up and Commissioning Projects
- ✓ Developing **Topside Float-Over** using twin barges with below advantages:
  - **Economical and cost efficient/ Easy and Safe installation**
  - **Overcome the difficulty in sourcing for 5000 ton or above Installation Crane Barge/ Project schedule optimization.**



Accom. Work Barge  
POS1 (300Pax)



Cargo Barge  
PTSC 01



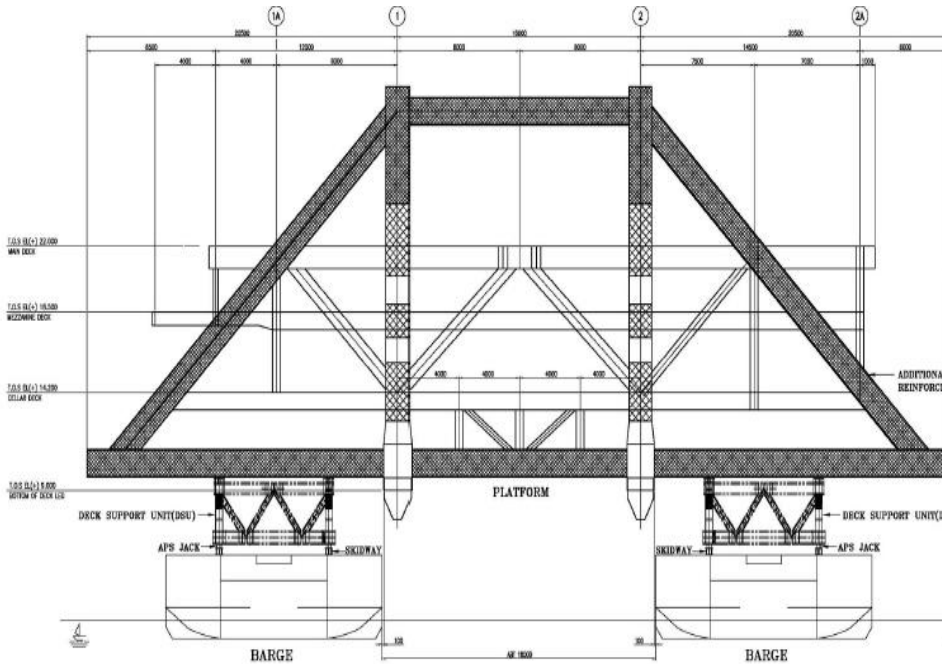
DP2 MSV POS2  
(Under Investment)



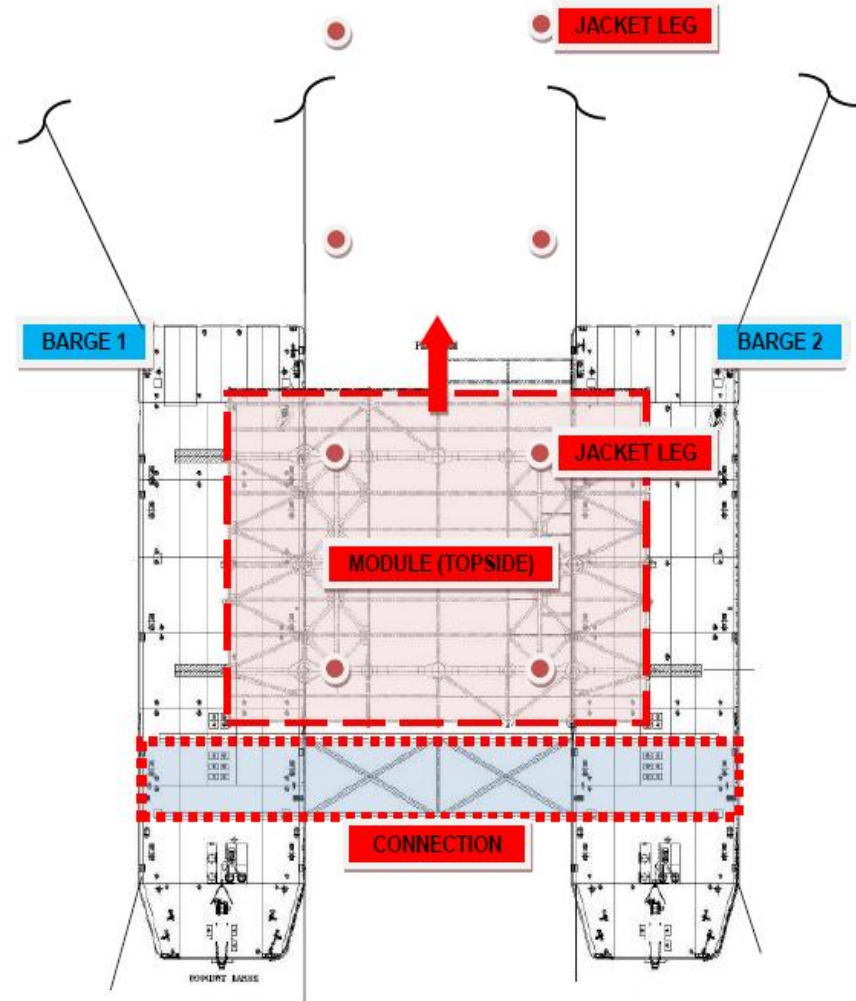


## TECHNOLOGY FOR OFFSHORE INSTALLATION WITHOUT CRANE BARGE

### TOPSIDES FLOAT-OVER USING TWIN BARGES



**TOPSIDES: 5000 – 10000 Tons**





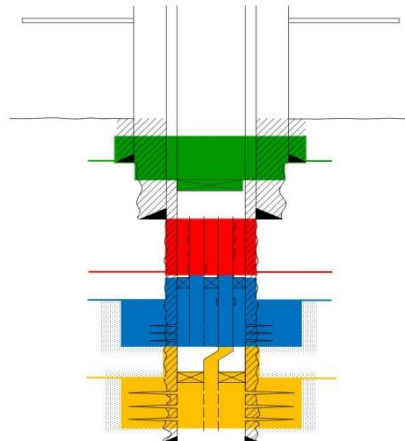
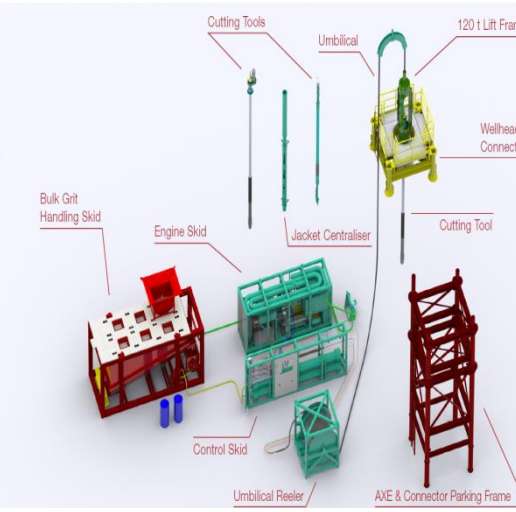
# Technological Strategy for T&I of Offshore Facilities

**TECHNOLOGY FOR OFFSHORE DECOMMISSIONING WITHOUT DRILLING RIG**



**RIGLESS FOR WELL PLUG & ABANDONMENT (WORK BARGE)**

**DOWNHOLE CUTTING TOOL**



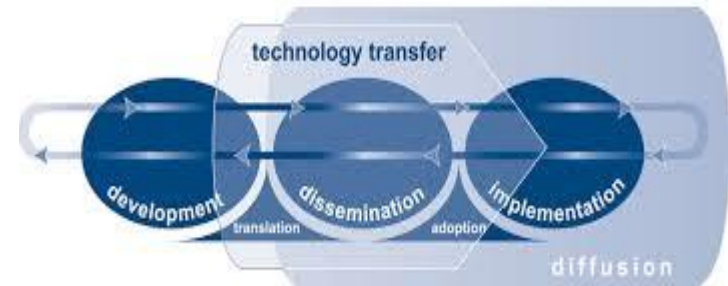
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# PTSC Strategy in current market situation

- ✓ Promote the cooperation/partnership/strategic partnership/long term collaboration with numerous major players/investors in the industry for every dedicated field, utilize the best and most competitive resources of both sides to promote potential business
- ✓ Promote the close relationship with global licensors/partners to approach, participate international bidding and execute projects of oil & gas, petrochemical, thermal power, other industries.
- ✓ Collaborate with licensors to create appropriate methodology for design philosophy and manufacturing and construction of main equipment, systems for the purpose of required quality, cost saving & schedule shortening for Vietnam's market, developing for international market.
- ✓ Promote the collaboration/partnership/agentship in manufacturing/sales/after sales, repair, maintenance, trouble-shoot... services of Oil & Gas and Industrial skids/equipment/auxiliaries, systems and for other industries.

Technology Transfer in the Innovation Process



# MAJOR CLIENTS & PARTNERS



Korea National Oil Corporation







***Thank you for your attention!***

