



TECNOCONSULT

YOUR **ENGINEERING** PARTNER

COMPANY **PROFILE**

ABOUT US

INTRODUCTION TO TECNOCONSULT

Tecnoconsult is an outstanding multi-disciplinary engineering and management company operating since 1986 in the Oil & Gas and Power Generation industries covering Offshore and Onshore upstream and midstream engineering design and procurement assistance.

KEY NUMBERS

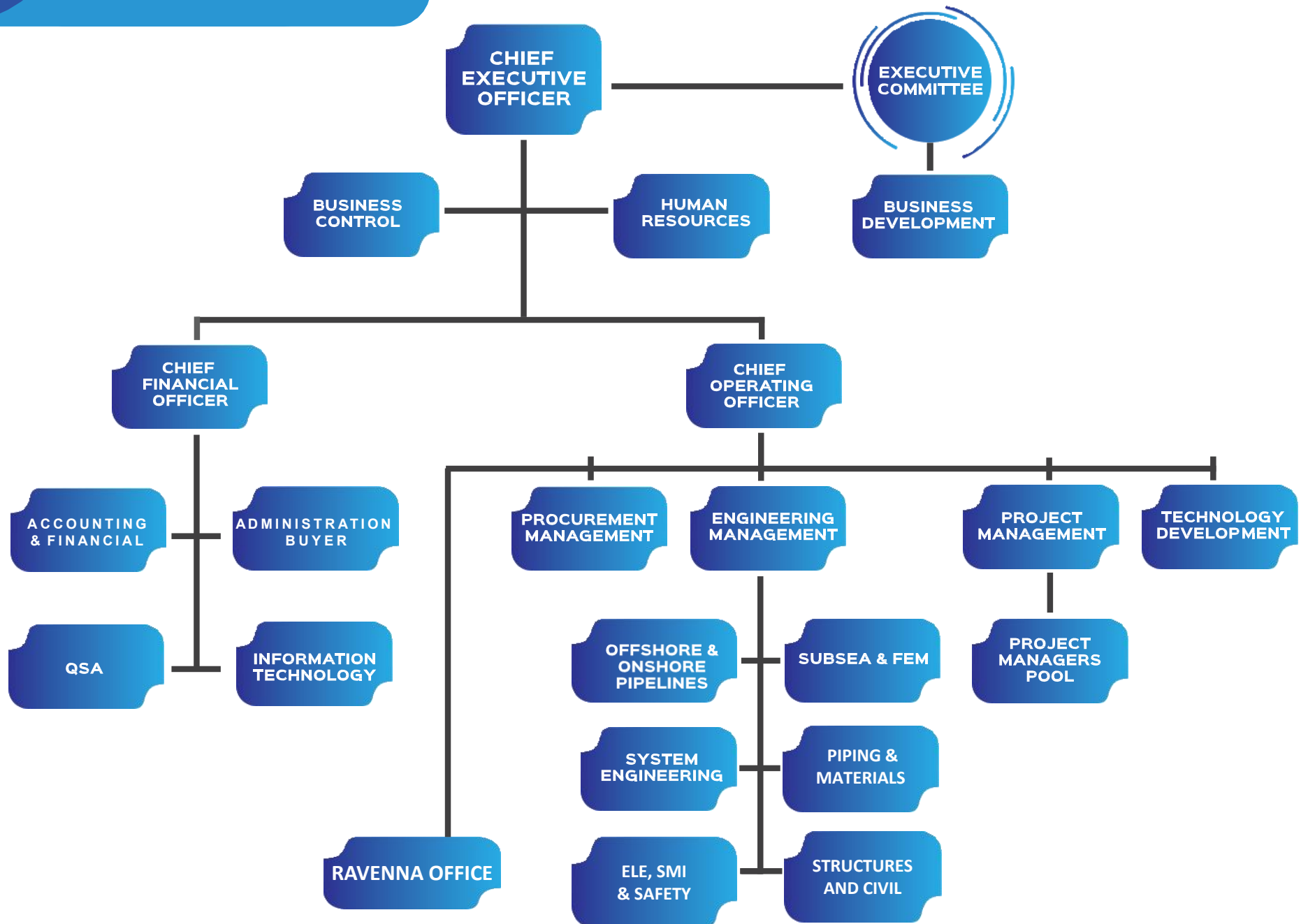
- 40 YEARS OF EXPERIENCE IN OIL & GAS AND ENERGY SECTOR
- 75 ENGINEERS IN STAFF AND CONSULTANTS
- TYPICAL WORK LOAD: 150,000 M/Y
- 1 HEADQUARTER SETTLED IN FANO (ITALY)
- 1 BRANCH OFFICE IN RAVENNA (ITALY)
- PROJECTS PERFORMED IN 4 CONTINENTS

IQNET and ICIM Certifications:

QM System **ISO 9001:2015**
HS Management System **ISO 45001:2018**
Environmental System **ISO 14001:2015**



ORGANIZATION CHART



ABOUT US

STRONG INTERNATIONAL EXPERTISE

Tecnoconsult is able to manage all engineering design activities, ensuring that the design meets project objectives for cost, schedule, safety and environmental impact. Tecnoconsult has acquired significant experiences to design Fast Tack projects to guarantee the best optimized solutions between the project schedule and the engineering quality.

TOOLS

Tecnoconsult has in-house and commercial softwares for engineering design and it is able to perform efficiently large and complex scientific and technical calculations.

Tecnoconsult uses state-of-the-art tools to provide the best results to its customers.



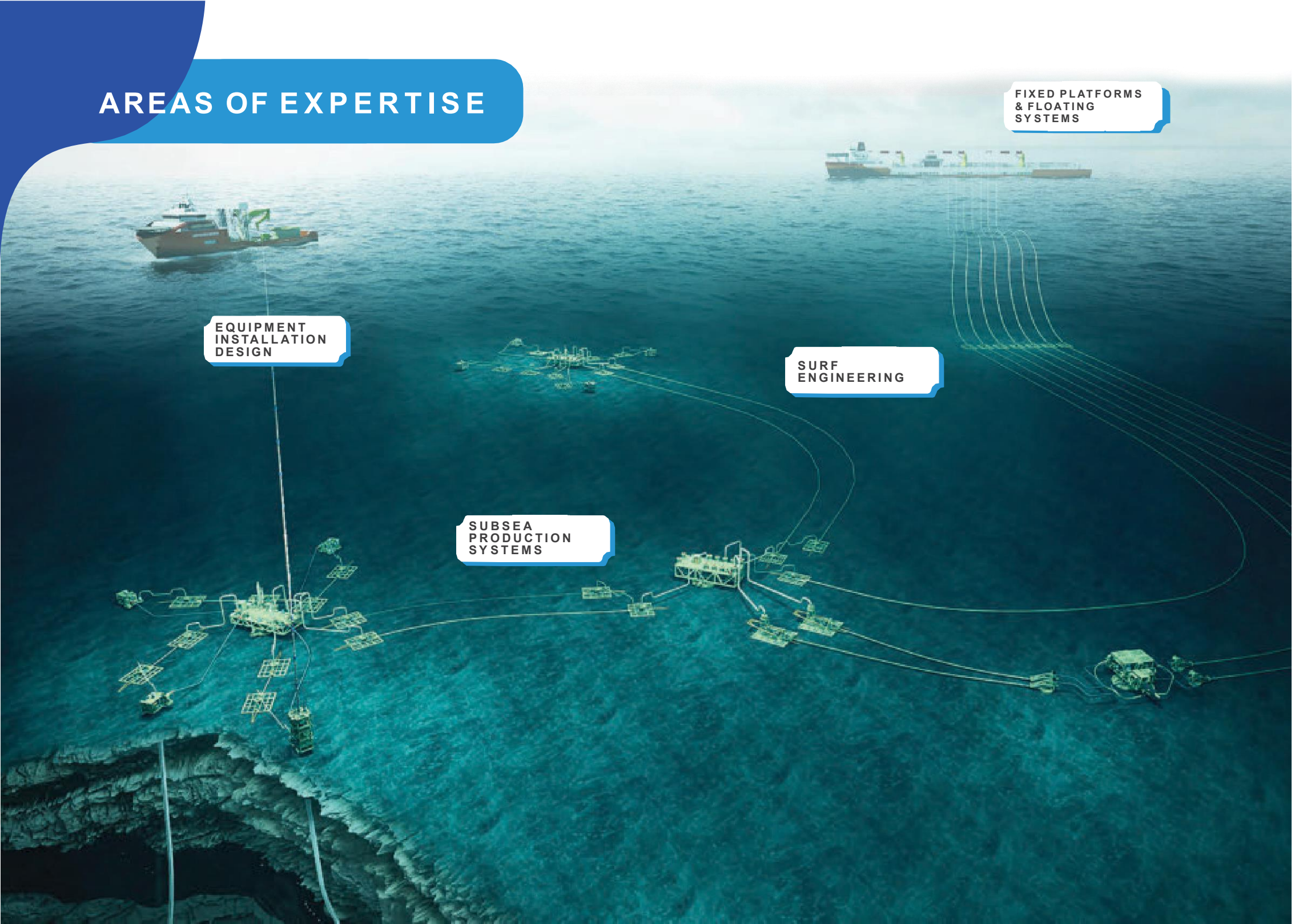
AREAS OF EXPERTISE

FIXED PLATFORMS
& FLOATING
SYSTEMS

EQUIPMENT
INSTALLATION
DESIGN

SURF
ENGINEERING

SUBSEA
PRODUCTION
SYSTEMS



SCOPE OF INTERVENTION

Tecnoconsult offers engineering support and specialized technical assistance with complete project expertise, from subsea wellhead to onshore processing and export facilities, covering all integrated design services.



OFFSHORE

FLOATING SYSTEM
FIXED PLATFORM
SUBSEA TIE BACK
SEALINE
SPM



ONSHORE

POWER PLANT
GAS PLANT
LNG PLANT
PIPELINE



TECHNICAL EXPERTISE

SUBSEA ENGINEERING

ENVIRONMENTAL ENGINEERING
RESERVOIR ENGINEERING
GEO AND SEISMIC HAZARD
SEALINES FACILITIES DESIGN (EXPANSION LOOPS, RISERS...)
SPS ENGINEERING (PLEMS, PLETS, MANIFOLDS, ETC.)
SURF ENGINEERING (RISER, FLOWLINE, UMBILICALS ETC.)
INSTALLATION ENGINEERING
AUXILIARY SYSTEMS (HOT TAP, TIE IN, ECT)
SUBSEA SYSTEMS
SUBSEA CABLES



ONSHORE & OFFSHORE FACILITIES DESIGN

GATHERING & ONSHORE PIPELINES DESIGN
JACKET & DECK DESIGN
SPM AND OFFSHORE TERMINAL DESIGN
LNG TERMINALS
FLOATING SYSTEM NAVAL



CONCENTRATED PLANT ENGINEERING

SYSTEM ENGINEERING, PROCESS AND FLOW ASSURANCE
HSE SAFETY DESIGN
PIPING LAYOUT
MACHINERY AND EQUIPMENT (ROTATING & STATIC)
ELECTRICAL & INSTRUMENTATION, AUTOMATION AND CONTROL
CIVIL AND STRUCTURAL AUXILIARY SYSTEMS & CONCENTRATED



TECHNOLOGIES DEVELOPMENT

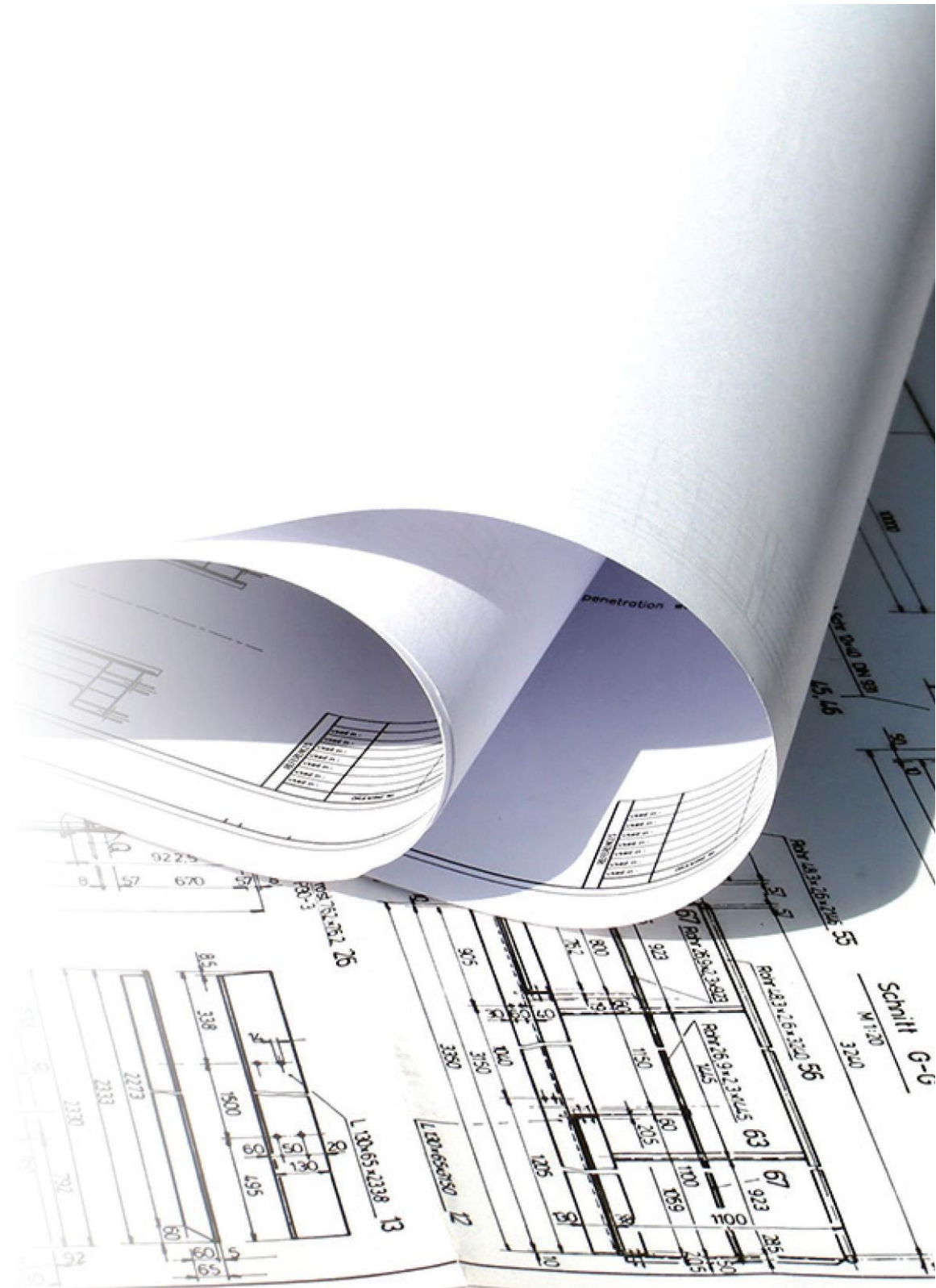
MARINE RENEWABLES (WIND FLOATING, WAVE, ETC)
GEO RESOURCES
METHANE VALUE CHAIN (BIOGAS, LNG)



CASE STUDIES

INDEX

- ✓ SEALINES
- ✓ MARINE TERMINALS
- ✓ OFFSHORE PLANTS
- ✓ SURF
- ✓ INSTALLATION DESIGN
- ✓ FLOW ASSURANCE
- ✓ GEOTECHNICS & GEOHAZARDS
- ✓ PMC



CASE STUDY

SEALINES

Tecnoconsult has a strong experience in design of subsea pipelines, ranging from shallow to ultra-deep waters, from geohazards identification to the identification of mitigation measures, from mechanical design to installation and commissioning aspects.

Tecnoconsult supports its Clients providing the most updated approaches and methodologies covering all the necessary skills tied to development of the Project.

FURTHER SIGNIFICANT PROJECTS

Jangkrik Complex Project

Litchendjili Gas Development Project

Marjan and Zuluf Project

Congo River pipeline Project

Fujairah F2 Plant SPM Project

Offshore Trunkline in LAM & ZDHANOV fields

CASE STUDY

ARABIYAH & HASBAH OFFSHORE FACILITIES (WASIT)



CLIENT	Saipem SPA
COMPANY	Saudi Aramco
SCOPE OF WORK	
PIPELINE, CABLES AND UMBILICALS DETAILED DESIGN	
DURATION	4 years
COUNTRY	Arabian Gulf Offshore Saudi Arabia



PROJECT FEATURES:

SAIPEM has been awarded EPIC contract, in the framework of the Al Wasit Gas Program, encompassing development of the offshore Arabiyah and Hasbah fields ,located approximately 150 kilometres northeast of Jubail industrial city, in the Arabian Gulf.

SCOPE OF WORK:

Pipelines, cables, and umbilicals design activities for a new onshore and offshore pipeline system.

The system includes:

- no. 7 Wellhead platforms at Arabiyah offshore field (50m WD approx.);
- no. 8 Wellhead platforms at Hasbah offshore field (50m WD approx.);
- no. 2 tie-in platforms (one for Arabiyah and one for Hasbah field,respectively, 50m WD approx.);
- no. 1 intermediate injection platform (25m WD approx.).

CRITICAL ASPECTS:

- . High temperature of the 12" flowlines and 36" trunklines;
- . Elevated number of pipelines, cables, and umbilicals (especially at tie-in platform approach) that affect both design and installation procedures;
- . Elevated number of crossings: pipe on pipe, cable on pipe, and cable on cable.

The product is collected at the relevant tie-in platform by means of dedicated 12" flowlines and then transported to the Wasit Gas Plant through no. 2 x 36" trunklines (offshore and onshore).

CASE STUDY

MARINE TERMINALS

Tecnoconsult has a consolidated experience in the design of marine terminals for hydrocarbons loading/unloading operations.

The development of Marine Terminal projects is carried out through an extensive evaluation of the environmental impact, of the expected meteo-marine conditions, of the typology and size of carriers and of the development plans of the existing harbour where the terminal will be integrated, in order to select the most promising configuration.

Our marine and structural departments, supported by specific computer programs (SESAM, ANSYS AQUA, SACS, ORCAFLEX, OPTIMOOR, OLGA, PIPENET and others) are able to develop the design of the systems starting from the definition of the overall architecture, down to the detailed design of the overall system.

FURTHER SIGNIFICANT PROJECTS

GAS EMERGENCY- Piombino FSRU and Connection to the
National Gas Pipeline Network

Seme Field Redevelopment - CBM/CALM system Fujairah F2 Plant SPM Project

LNG REGASIFICATION TERMINAL PANIGALIA

LNG TERMINAL LOCATION AND FEASIBILITY STUD

ERL- SPM Project

MARINE FACILITIES FOR NEW REFINERY IN MALAYSIA

CASE STUDY

Ravenna FSRU and Connection to the Gas Pipeline Network



PROJECT FEATURES:

Within the context of the initiatives linked to the construction of new regasification capacities governed by Article 5 of Decree Law no.50 of 17/5/2022 and aimed at diversifying gas procurement sources for the purpose of national energy security, the company SNAM FSRU Italia, 100% controlled by SNAM SPA ('SNAM'), intends to submit the request for authorisation for the mooring of an FSRU (Floating Storage and Regasification Unit) at the existing offshore platform called Petra located approximately

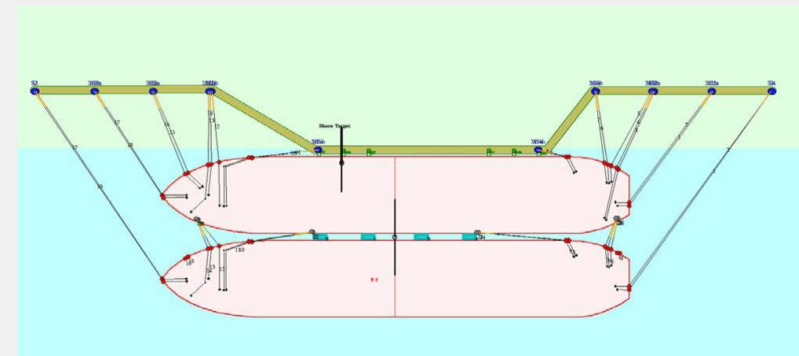
8,5 km off Ravenna and the transfer of natural gas up to the connection point with the National Grid pipelines.

The FSRU will be able to store up to 170 thousand cubic meters of Liquefied Natural Gas (LNG).

Scope of work is the adjustment and expansion of the existing platform and construction of a new platform in order to moor the FSRU and to allow the discharge of natural gas and its conveyance into the submarine pipeline.

SCOPE OF WORK:

- New Offshore Platform Structural Design;
- Structural verifications of existing platform and new extensions
- Mooring system Design;
- Topside platform main equipment/system design (i.e piping; loading arms, Electrical & Instrumentation system; fire & Gas and fire fighting system, Control system, etc)
- Technical Specifications (data sheets, IDS, RDDS) for main equipment's
- Technical Bid evaluation and Bidders follow-up;



CLIENT	TEN Italy Solutions
COMPANY	SNAM RETE GAS
SCOPE OF WORK	
PERMITTING, FEED AND DETAIL DESIGN ASSISTANCE FOR THE NEW OFFSHORE PLATFORM AND TOPSIDE FACILITIES	
DURATION	On going
COUNTRY Offshore Italy	



CASE STUDY

STRUCTURAL ANALYSIS & OFFSHORE PLATFORMS

Tecnoconsult has been involved in a wide number of projects for the design of fixed platforms with steel jacket also including foundations and installation analyses. Structural design activities are relevant to revamping of existing fixed platforms consisting of structural adjustment; relocation or insertion of new facilities on the deck, stretching of the design life.

Static, modal, harmonic and transient non-linear analysis are performed by the help of dedicated commercial FE software (i.e SESAM, SACS, ANSYS APDL) that allow to consider the elasto-plastic material behaviour to determine the Reserve Strength Ratio (RSR) of the structure. Our approach adhere to the main international codes: API, DNV, Noble Denton, ISO, NORSOK, ETC

Our engineering also cover: Heat Material Balance and Process studies, piping (3D model included), machinery, Electro-instrumental design, HSE studies, Process safety.

FURTHER SIGNIFICANT PROJECTS

Structural Assessment of LAM 22

Structural Integrity Assessment for LAM13 and LAM 28 Platforms

PMC for WELLHEAD AND DRILLING PLATFORM ZHDANOV A

PMC for WELLHEAD PLT LAMC

CASE STUDY

REVAMPING OF BARBARA T & T2 PLATFORMS



CLIENT	Renco SpA
COMPANY	Eni E&P
SCOPE OF WORK	
DETAIL ENGINEERING FOR REVAMPING OF BARBARA T & BARBARA T2 PLATFORMS	
DURATION	8 months

COUNTRY	Offshore Italy
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PROJECT FEATURES:

Barbara field consists of several production platforms where gas is supplied and collected on Barbara T to be sent by sealine to the compressor station in Falconara (Italy-Ancona).

As the present production profiles of the reservoir show lower pressure, it is necessary to convert the Barbara T compressor deck into a booster deck to increase the inlet pressure to the Barbara T2 compression deck.

The new configuration foresees that the three machines installed in Barbara T will be changed as they will be configured to boost the four upgraded compressors of Barbara T2.

SCOPE OF WORK:

Barbara T2

- Process Flow Diagram (PFD) and Piping and Instrumentation Diagrams (P&IDs);
- Design of machinery equipments and safety items (PSV and TSV), designed with in-house programs;
- Hydraulic Sizing calculations and Heat & Material Balance;
- Technical Specifications (data sheets, IDS, RDDS) for main equipments (turbocompressors, heat exchangers);
- Technical Bid evaluation and Bidders followup;
- Piping Plot Plan, Layouts, isometric drawings and MTO (with PUMA software);
- Structural verifications of existing platform and new extensions;
- Electrical and Instrumentation Layouts, Lists and MTO.

Barbara T

- Piping Plot Plan, Layouts, isometric drawings (performed with 3D Model software) and MTO (with PUMA software);
- Structural verifications of existing platform and new extensions;
- Electrical and Instrumentation Layouts, Lists and MTO.

CASE STUDY

SURF

Tecnoconsult has consolidated capabilities in the design of deep water subsea field development including Umbilicals, Risers, Flowlines, Manifolds and Tie-in Systems.

Deepwater fields require new concepts like flexible pipe, dynamic risers, umbilical, diverless technology as well as new floating plants (i.e SPARS, TLP, FPSO, FPU, FPO, etc).

Tecnoconsult, involved in the Deepwater technology and projects, has successfully set up a wide data base containing the major characteristics of any SURF system's component.

FURTHER SIGNIFICANT PROJECTS

Jangkrik Complex Project

Pre Salt_Top Bottom Assembly Hybrid Riser

Angola Block 15/06 West Hub

Angola Block 15/06 East Hub

Mozambique concept selection

OPL 245 Field development

CASE STUDY

GHANA OCTP DEVELOPMENT PROJECT - RF&I



PROJECT FEATURES:

At the end of the previous project phases (Conceptual and Basic), Company has selected the following development strategies in order to accelerate the production start-ups and optimize the synergy between the Oil and Gas discoveries.

- Phase 1 consists in the development of a total of 14 (fourteen) wells located in Sankofa field which 8 (eight) oil producers, 3 (three) water injectors and 3 (three) gas injectors, all tied-back to topsides by means of flexible flowlines and risers.
- Phase 2 currently foresees non-associated gas (NAG) production from 5 (five) subsea gas production wells: 4-off located at Sankofa field and 1 -off in Gye Nyame

CLIENT	Eni Ghana
COMPANY	Eni E&P
SCOPE OF WORK	
FEED STUDY FOR A DEEPWATER SUBSEA DEVELOPMENT FIELD - RISER, FLOWLINE AND INSTALLATION PACKAGE	
DURATION	1 years
COUNTRY Offshore Ghana West Africa	

SCOPE OF WORK:

The main objective of the work is to design and provide technical supporting documentation for the RF&I Package in order to:

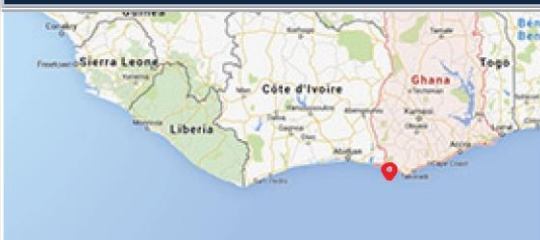
Develop a $\pm 15\%$ cost estimation for the RF&I EPCI Scope of Work.

Enable COMPANY to issue the Invitation to Tender (ITT) for the detailed Engineering, Procurement, Construction and Installation (EPCI) Contract of Ghana OCTP RF&I Package within CONTRACT schedule.

Support COMPANY on technical tender evaluations.

Significant activities for project:

- Interpretation of Geotechnical & Geophysical results/data;
- Technical support to COMPANY on interface management of various Contractors;
- Optimization of the subsea field layout, selection and recommendation of final routes;
- Risers and flowlines global performance;
- Wet storage feasibility studies Project specific functional specifications preparation;
- Preliminary installation engineering and testing
- philosophy; Project planning and schedule;
- Material Take Off and cost estimation;
- ITT technical package preparation;
- Technical support to COMPANY during the EPCI tender process.



CASE STUDY

INSTALLATION DESIGN

Tecnoconsult has a consolidated experience relevant to sealines and structures installation design activities in very shallow, shallow, deep and ultra-deep water.

Installation design activities are carried out through an extensive evaluation of typology, size and capabilities of foreseen marine spread, expected meteomarine conditions of the area, potential presence of geohazard or restricted areas, development plans of future and/or already installed offshore systems where the new flowlines and structures have to be integrated.

With reference to subsea field development projects, installation design capabilities include flexible/rigid flowlines and risers, manifolds and tie-in systems, umbilicals, etc

FURTHER SIGNIFICANT PROJECTS

Offshore Trunkline in LAM & ZDHANOV fields

Myanmar China Oil Gas Pipeline Project

Burgas-Alexandroupolis Project

Medgaz

Turkey to Greece Pipeline System

CASE STUDY

IZABELA FIELD DEVELOPMENT



CLIENT	Micoperi
COMPANY	EDINA
SCOPE OF WORK	
16" AND 10"+3" SEALINES INSTALLATION MANUALS	
DURATION	6 months
COUNTRY	Adriatic Sea



PROJECT FEATURES:

The main characteristics of the project are here below summarized:

- 16"ND concrete coated pipeline which will convey gas from Izabela South platform to Ivana K platform; the sealine length is about 26 km
- 10"ND concrete coated pipeline which will convey gas from Izabela North platform to Izabela South platform; the sealine length is about 2.9 km;

- 3"ND coated pipeline, piggy back to 10"ND pipeline, which will convey oil water from Izabela North platform to Izabela South platform; the sealine length is about 2.9 km.
- 16"ND, 10"ND and 3"ND spools installation in order to connect the existing risers at Izabela North platform, Izabela South platform and Ivana K platform

SCOPE OF WORK:

Development of Pipeline Installation Manuals of the both 16"ND and 10"+3" piggyback sealines which includes: Sealines detail design endorsement (for installation purpose) and metrology spool verification Laybarge firing line and stinger ramp setting Design of main installation activities as Start-up and Lay-down (including DMA definition), Normal Laying (static and dynamic analyses) and Contingency Scenarios, Weld Repair analysis Pipeline Pulling Heads design Cooperation with MICOPERI in the installation procedures and sequences preparation.

Critical aspects:

- Limited laybarge tension capacity
- Considerable pipelines submerged weight due to the presence concrete coating overweight and piggyback configuration;
- Start-up and laydown activities to be carried out in congested areas close to the platforms

CASE STUDY

FLOW ASSURANCE

Tecnoconsult has gained a good experience in the Flow Assurance analysis for mono and multiphase systems with the major Oil/Engineering Companies

The experienced systems are typically:

- Gas/liquid pipelines (monophase systems);
- Onshore/Offshore (shallow water and deep water) multiphase systems (gathering from well/wellhead to receiving facilities, gas condensate pipelines).

Our approach to design the gathering systems and/or transfer pipelines is supported by internationally recognized computer softwares (OLGA and PVTSim)

FURTHER SIGNIFICANT PROJECTS

Nord Stream Project

Mozambique Area - SURF project

WAHA 5J - WAFA 9W Lybia Projects

CAFC Project

Offshore Trunkline in LAM & ZDHANOV fields

CASE STUDY

GEOTECHNICS & GEOHAZARDS

Tecnoconsult has developed a wide experience in handling all geological-geotechnical aspects to be investigated in the design of subsea facilities and pipeline systems. The following activities are mainly performed by Tecnoconsult experts to define the aforementioned geotechnical and seismotectonic soil model:

- **Scientific literature review**
- **Planning of geophysical & geotechnical survey**
(technical assistance, on board supervision, data interpretation, etc...)
- **Critical analysis of survey results**
(e.g., processing of bathymetric data, setting of empirical relationships to interpret geotechnical results of in situ and laboratory tests etc...)
- **Pipe-soil interaction analysis**
(i.e. pipe settlement, scouring analyses, liquefaction-induced pipe settlements, etc...)
- **Geohazard identification and micro-zonation studies**
(i.e. 1D/2D amplification wave analysis; landsliding; faulting; lateral spreading; earthquake-induced subsidence, etc...)
- **PSHA, Probabilistic Seismic Hazard Assessment**
Subsea structures foundation assessment and settlement evaluation.

FURTHER SIGNIFICANT PROJECTS

Ghana R&F Project

Burgas - Alexandroupolis Project

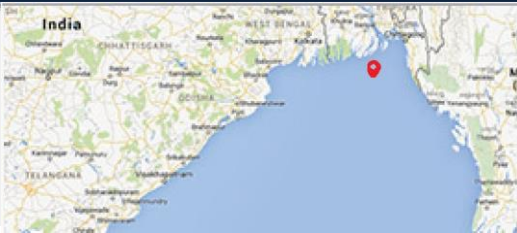
OLT Project

CASE STUDY

ERL REFINERY - SPM BANGLADESH



CLIENT	ILF
COMPANY	Eastern Refinery Limited (ERL)
SCOPE OF WORK	
Basic Design of SPM Terminal & Related Pipeline	
DURATION	6 months
COUNTRY	Bay of Bengal - Offshore Bangladesh



PROJECT FEATURES:

Eastern Refinery Limited (ERL) is the only local supplier of petroleum products in the Chittagong area and is subsidiary of Bangladesh Petroleum Corporation (BPC). ERL is basically a fuel refinery with an annual design capacity of processing 1.50 million metric tons of crude oil. ERL is currently aiming to expand its crude processing capacity by 3.00 million metric tons. As such ERL's total crude oil processing capacity after implementation of the expansion project will be 4.50 million metric tons.

Currently crude oil and diesel import is managed with a lightering process, where vessels up to 100.000 DWT are unloaded to smaller tankers that can dock to the refinery's Dolphin Jetty in the Karnaphuli river and deliver their load to the refinery's storage facilities. This process takes 11 days per ship.

SCOPE OF WORK:

Basic design of a Single Point Mooring System for unloading of crude oil and HDD products from tankers of different size (120.000 DWT, 80.000 DWT) through off-shore/onshore pipeline from SPM to refinery.

In particular the following activities relevant to Geohazard aspects have been performed:

- Seismotectonic framework identification (e.g. fault identification, earthquake catalogue construction, seismogenic source model development, etc...);

- Execution of Probabilistic Seismic Hazard Analysis (PSHA) according to classical approach (i.e. Cornell, 1968) and advanced model (i.e. Characteristic Earthquake Model) aimed to identify, for significant Return Periods, the Peak Ground Acceleration (PGA) and Uniform Hazard Spectrum (UHS) to be used as input data for pipeline design.

- Pipeline stress verification under seismic loads

CASE STUDY

PMC

Tecnoconsult has developed a world wide experience in PMC (Project Management Consultant) ensuring that EPC Contractors work to ensure compliance with Client scope of works.

Tecnoconsult as a professional organisation that acts on behalf of the Owner in large complex multi-unit projects or series of projects, and assists the owner in minimizing costs, maximizing return on investment and timely completion of the program

Activities apply on FEED, TENDERING and EXECUTION phase (after Contract Award) where assistance at CLIENT/EPCI Contractor office/Onboard installation vessel is also provided with high skilled personnel.

FURTHER SIGNIFICANT PROJECTS

PMC for ERL REFINERY - SPM BANGLADESH

PMC for WELLHEAD AND DRILLING PLATFORM ZHDANOV A

PMC for WELLHEAD PLT LAMC

CASE STUDY

BALONGAN SPM PROJECT



CLIENT	PT Pertamina Persero
COMPANY	PT Pertamina Persero
SCOPE OF WORK	
PMT FOR OFFSHORE PIPELINE AND SINGLE POINT MOORING	
DURATION	2 years
COUNTRY	Indonesia Java



PROJECT FEATURES:

PT Pertamina Persero intends to replace an existing SPM and its submarine pipeline with a new SPM and its associated PLEM and 2x32" submarine pipelines. The new SPM will be located offshore off the North-East coast of West Java approximately 15 km of Balongan Refinery, Indonesia in approximately 26 m water depth. The proposed SPM is to accommodate the offloading of crude oil from a tanker up to a size of 165,000 DWT

The system shall be suitable to be flushed from shore to shore by a cross over piece to be installed at the end of the floating hoses strings.

Pertamina has split the EPCIC contract in the following work packages:

- Line pipe and mother pipe for bends procurement;
- Line pipe coating;
- SPM (CALM buoy) & PLEM design and fabrication /Deep Geotechnical survey;
- Offshore pipeline and PLEM detail design and installation works relevant to pipelines, SPM and PLEM;

SCOPE OF WORK:

During Technical Bid Evaluation phase the following services have been provided both home office and in Pertamina premises:

- Technical assistance during clarification meeting with Line pipe Bidders (N° 7), Coating system Bidders (N° 2), SPM system Bidders (N°2), Installation Contractor
- Technical Bid Evaluation of Line pipe proposals, SPM system proposals, coating system Proposal,
- Site visit to Bredero Shaw Coating Plant (Batam) and Indal Steel Pipe coating plant (Gresik)

During project execution phase, as PMT, Technoconsult is providing support to the Company for the following activities:

- Revision of detail engineering of the offshore pipelines including installation analyses performed by the Installation Contractor;
- Revision of detail engineering of SPM and PLEM performed by SPM Contractor;
- Supervision during geotechnical survey execution;
- Supervision during fabrication, installation, precommissioning and commissioning of offshore pipelines, SPM and PLEM

INTERNATIONAL EXPERIENCE

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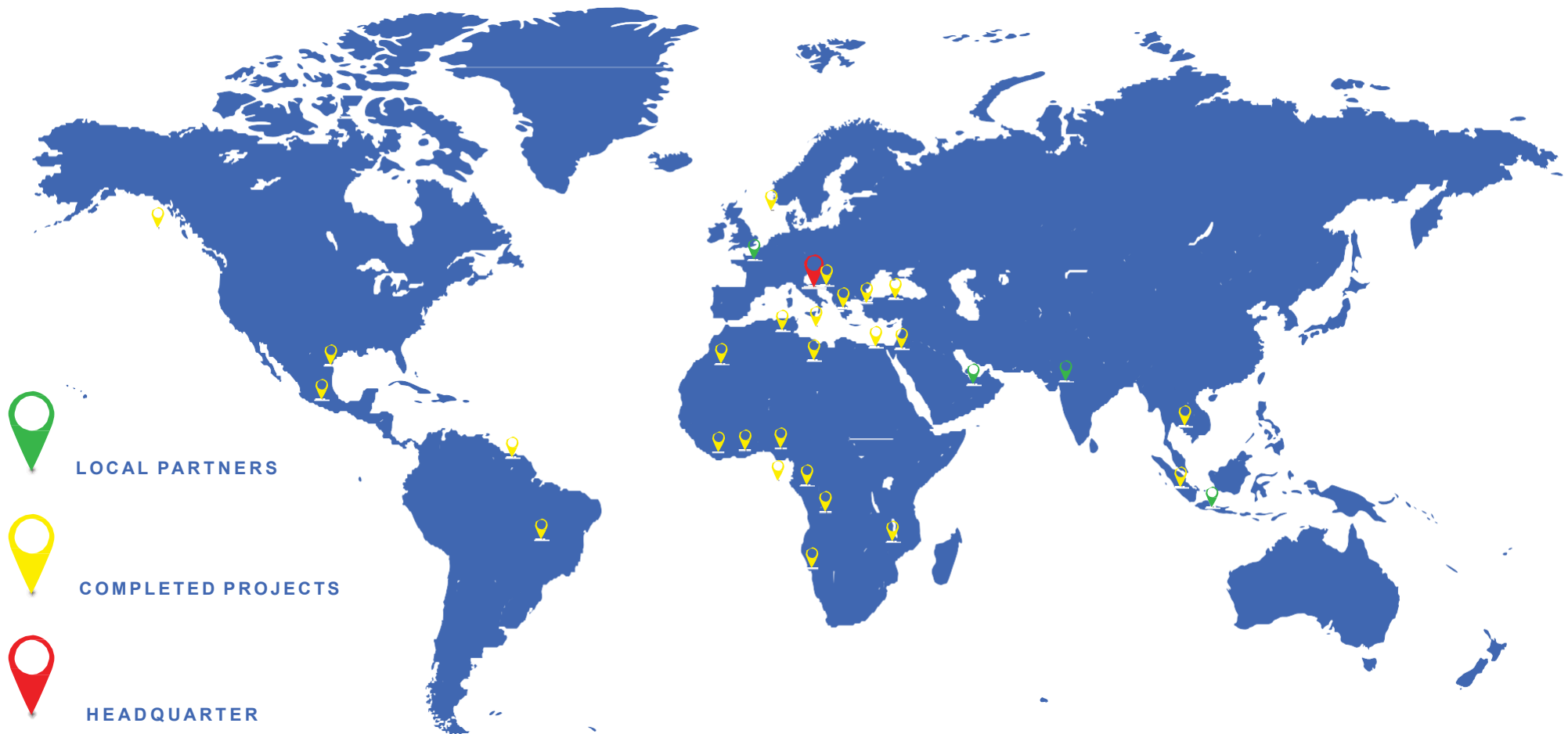
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ENGINEERS WORLDWIDE

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CONTINENTS



MAIN CLIENTS & PARTNERS





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