



Saipem Services for the Natural Gas Distribution Chain

The new Saipem

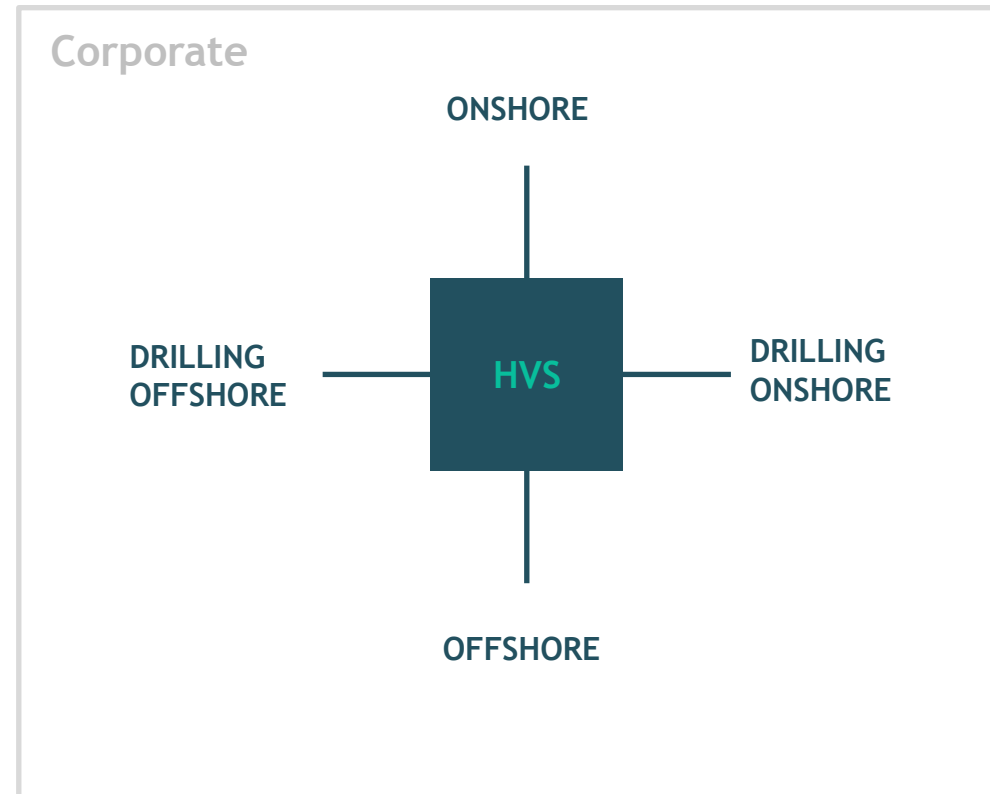
Interconnected Divisions

CORPORATE's ROLE

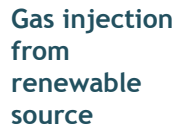
- Focused on group strategic guidance and governance
- Strong delegation to Divisions / Legal Entities
- Responsible for Regulatory System Policies and MSGs design

NEW DIVISION MODEL

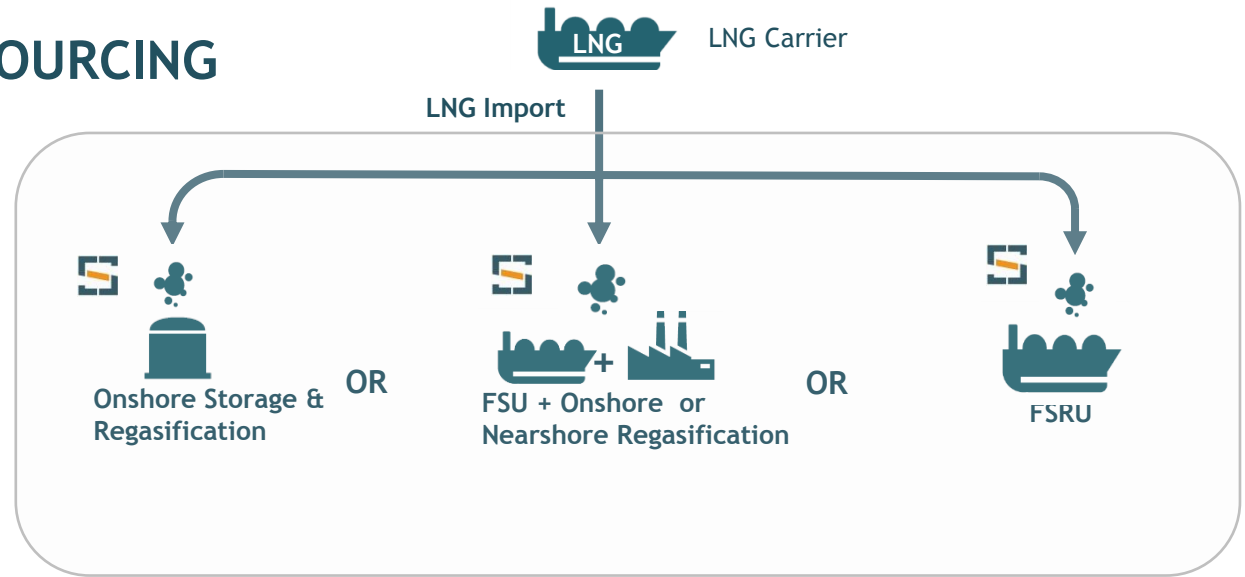
- Autonomous business entities
- More effective structures and processes
- Project as a cornerstone of all the processes and decisions
- Closer to Clients needs



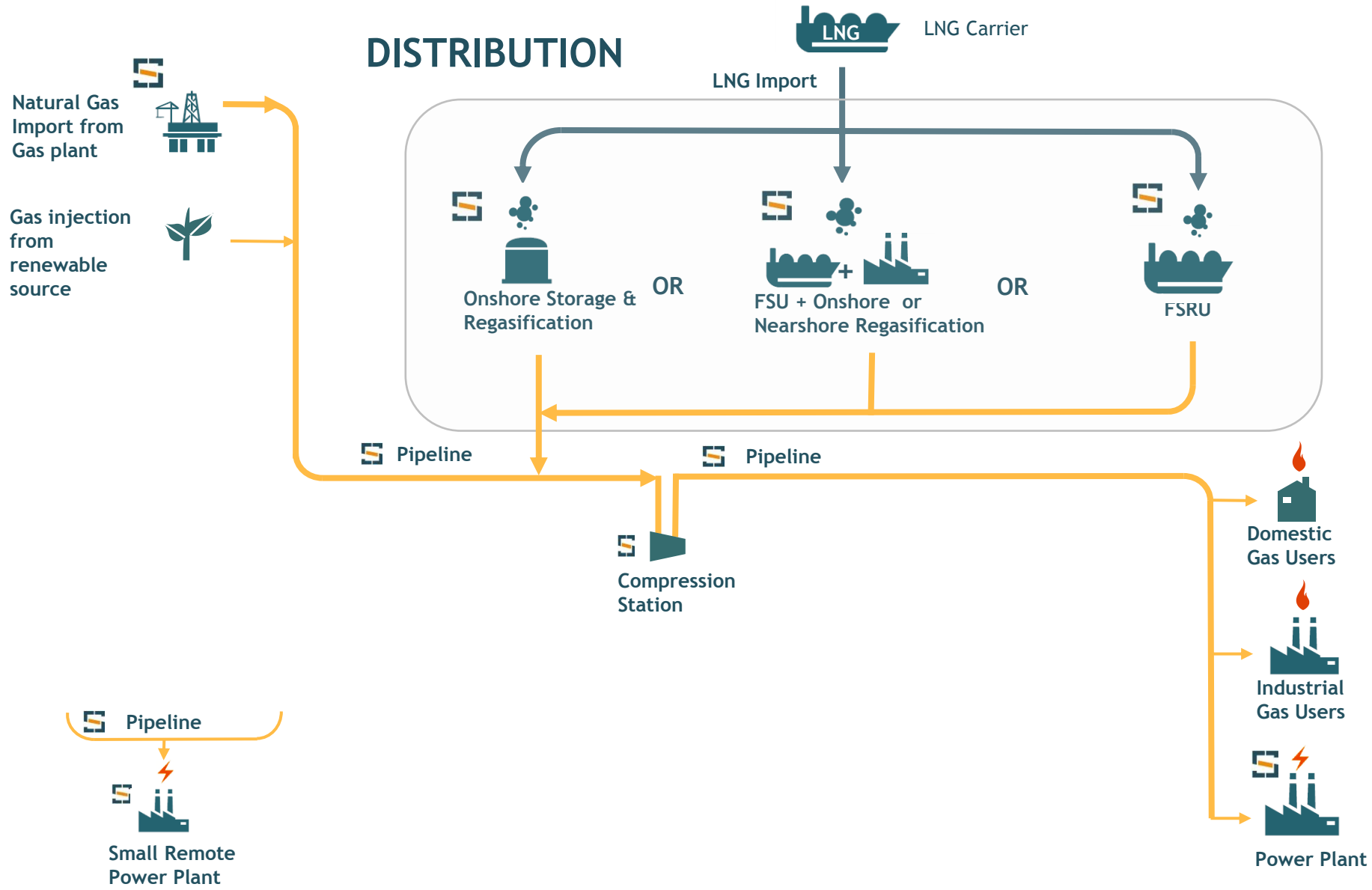
Saipem Services across the natural gas value chain



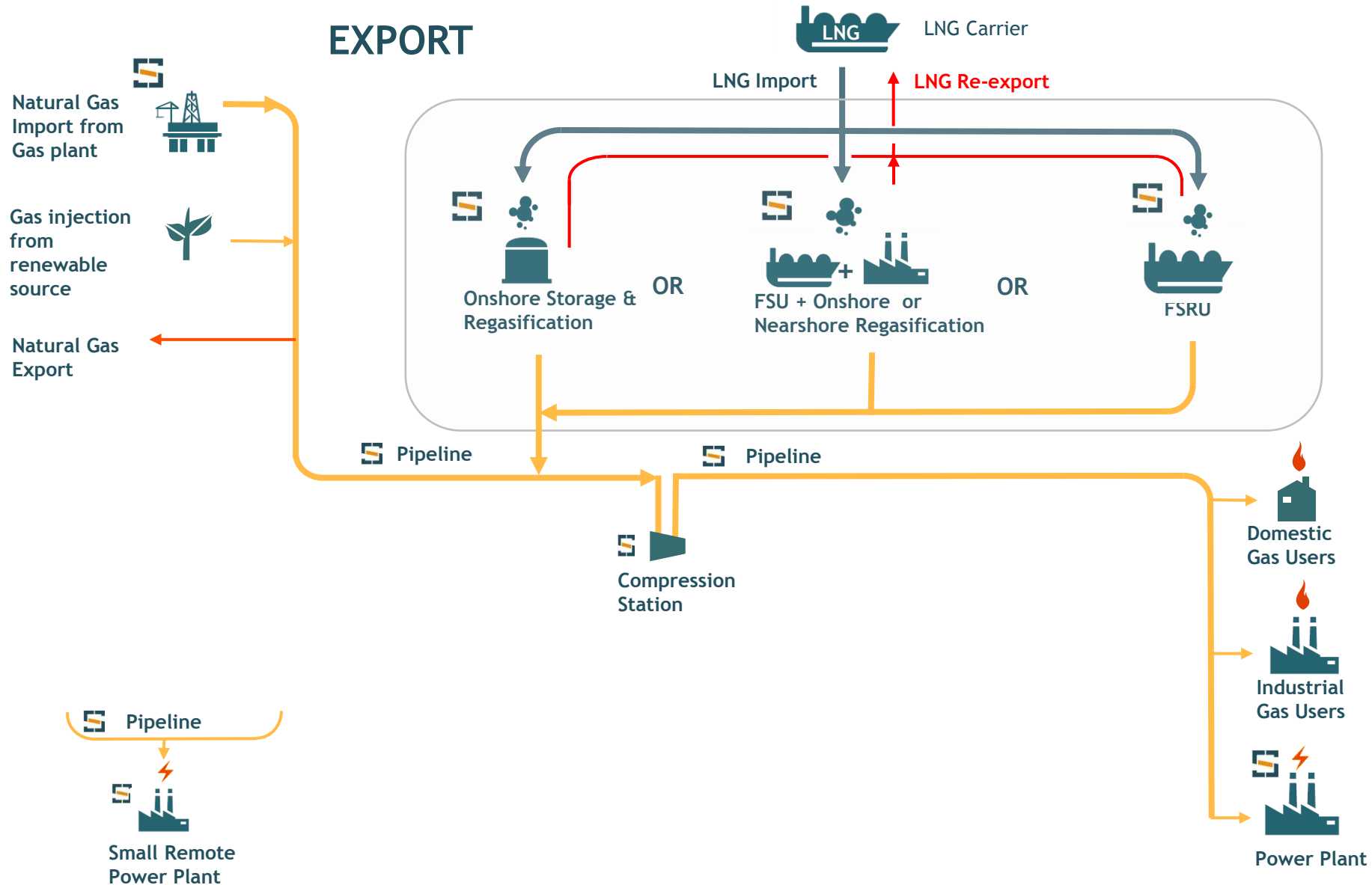
SOURCING



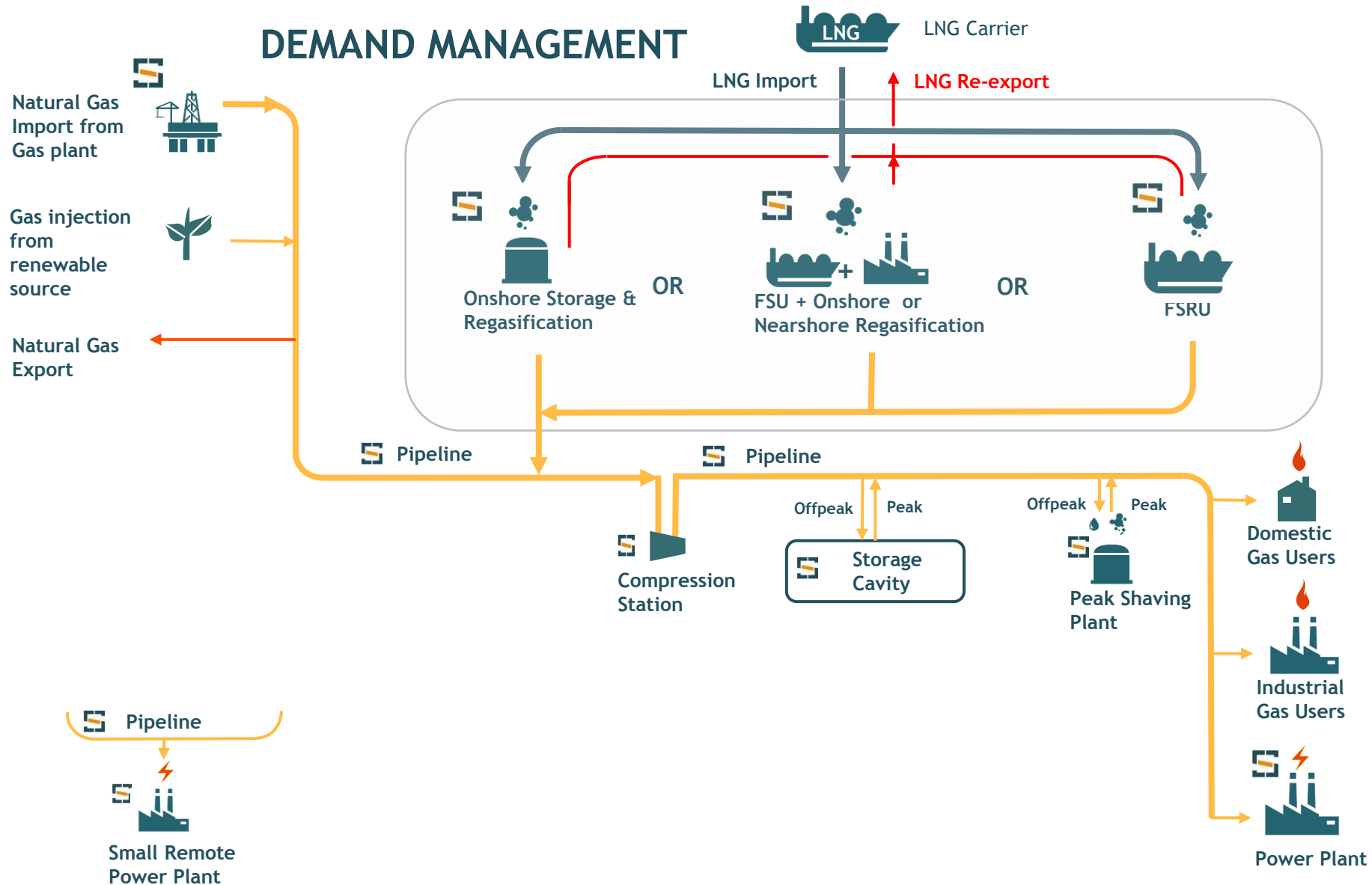
Saipem Services across the natural gas value chain



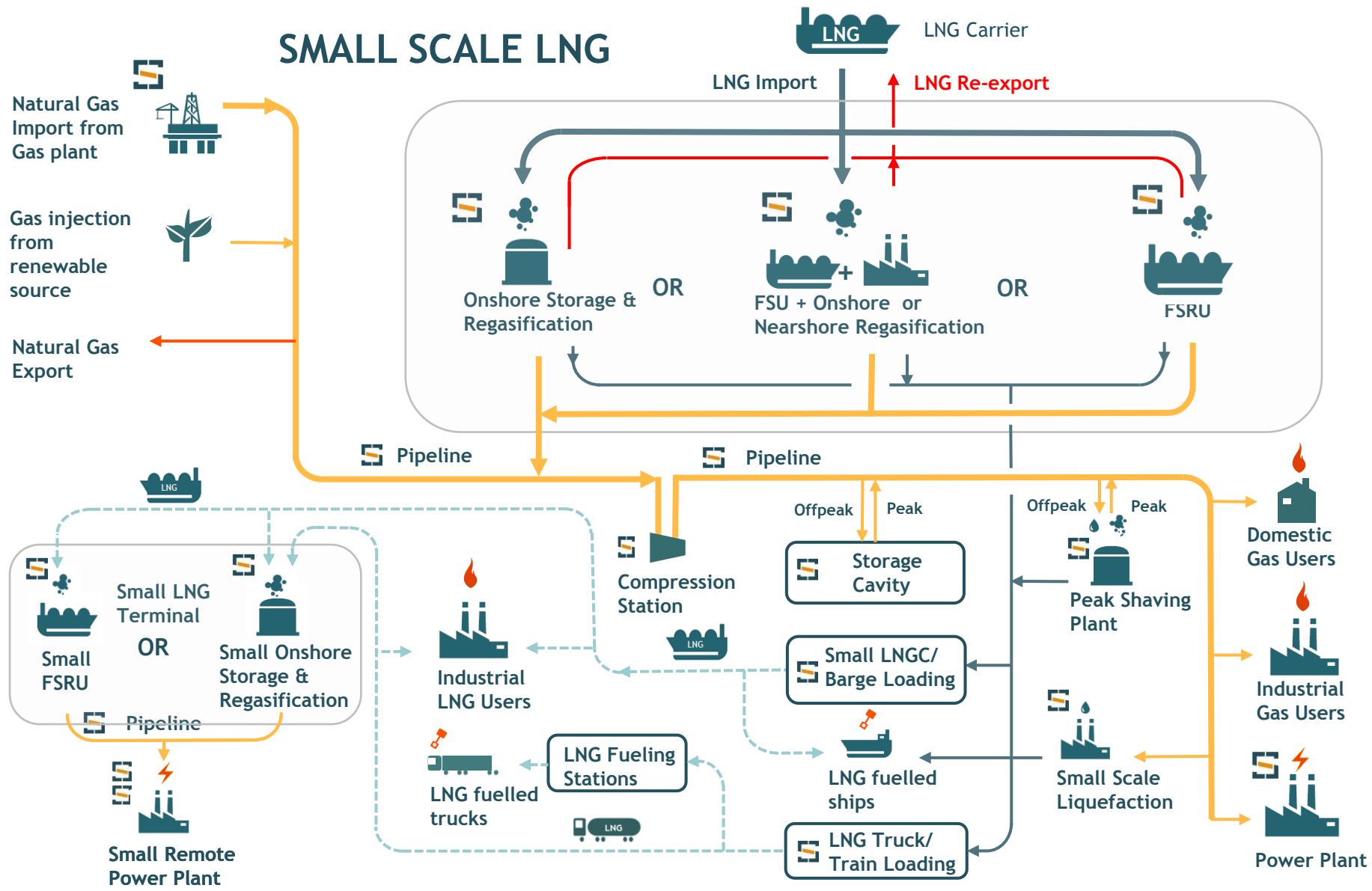
Saipem Services across the natural gas value chain



Saipem Services across the natural gas value chain



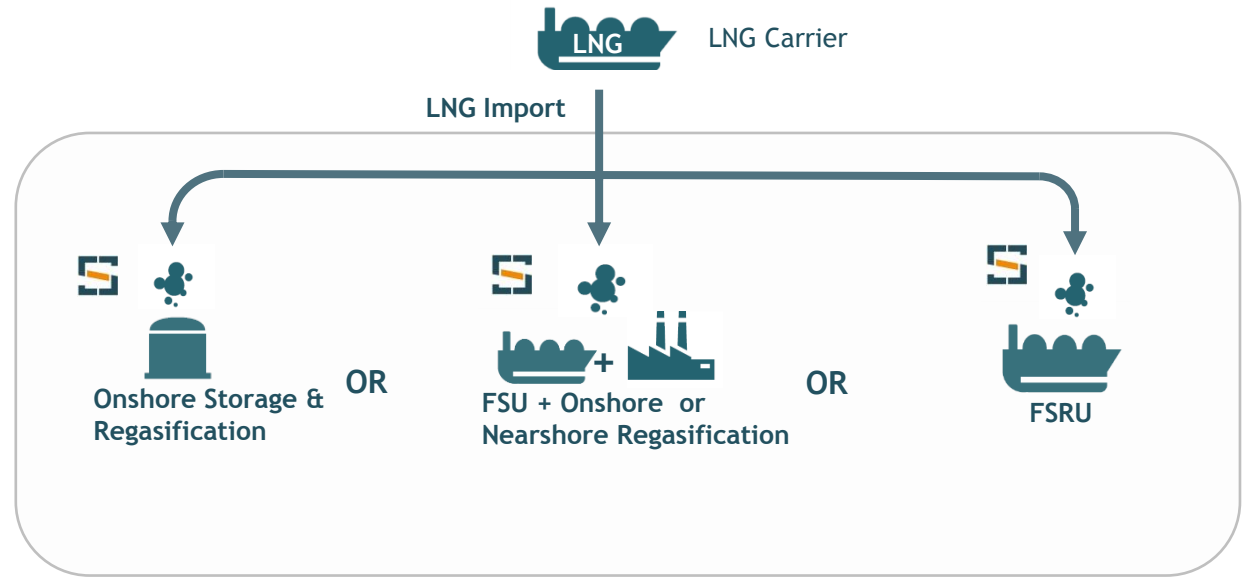
Saipem Services across the natural gas value chain





Back-up and references

Expertise in LNG and Regasification



ATMOSPHERIC LNG STORAGE TANKS EXPERTISE

- Technologies for large scale LNG storage:
 - 9% Ni
 - Membrane
- Capacity in providing guidance on technology selection and construction strategy

47 LNG Storage Tanks in operation for a total storage capacity of 5,903,500m³



Courtesy of GTT

LNG REGASIFICATION PROCESSES EXPERTISE

Different and advanced technical solutions to meet customers requirements (plant size, enviromental conditions, plant capabilities, etc.)

- ORV - Open Rack
- SCV - Submerged Combustion
- IFV - Intermediate Fluid
- S&T - Shell and Tube
- Air Vaporization
- Advanced regasification solutions
 - In-house proprietary and open-art “cold” electrical power generation schemes
 - Waste heat utilization for vaporization



SMALL SCALE LNG

SMALL SCALE LNG KNOW-HOW AND DISTRIBUTION

Extensive LNG technology expertise...

- LNG loading facilities (including truck and small carrier loading stations)
- Onshore / offshore cryogenic storage :
 - Small atmospheric tank
 - Vacuum insulated pressurized vessel
 - IMO Type C tanks
- LNG vaporisation
- LNG liquefaction



LNG Truck Loading



Small Scale LNG Vaporization

... Complemented by differentiating skills

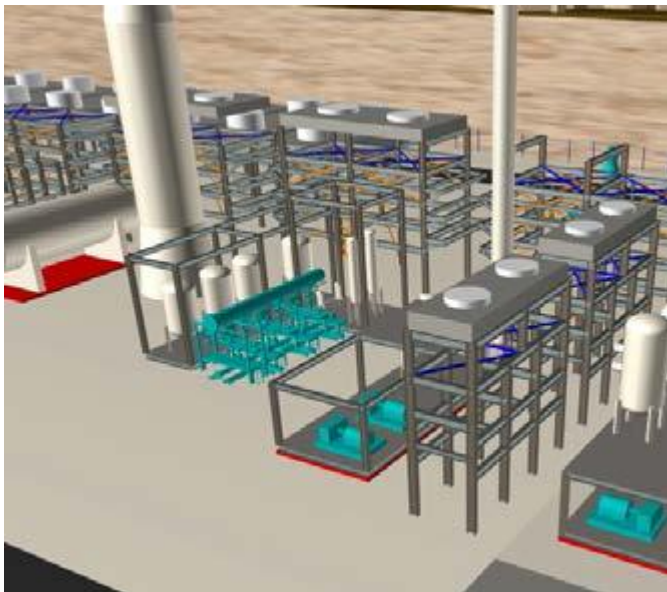
- Knowledge and experience of LNG marine regulation and marine LNG design
- Modularized design expertise
- Onshore / Nearshore / Offshore experience
- Experience of areas with severe HSE constraints

Application on new innovative Solution: **xDIM®**
Digital collaborative platform

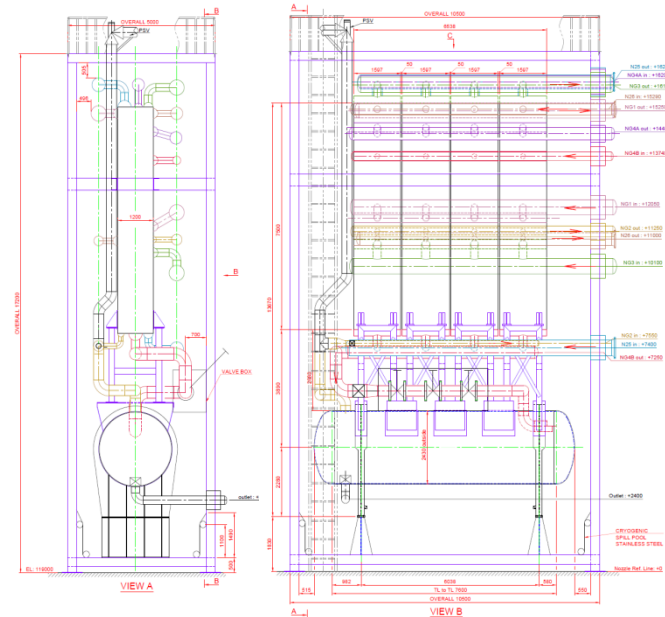
SMALL SCALE LNG LIQUEFACTION KNOW-HOW

Drivers

- Modular, compact process
- Pre-engineered solution
- High level of intrinsic safety
- Low CAPEX
- Robust operation and maintenance



Modular 0.05MTPA LNG liquefaction



Saipem Liqueflex™ Cold Box

Technologies

- 0.05 to 0.25MTPA:
 - Open-art Dual Nitrogen Expander process
- From 0.25MTPA onwards: Saipem Liqueflex™
 - Proprietary Natural Gas / Nitrogen Triple Expander process
 - Integrated selective C5+ extraction

APPLICATION EXAMPLE #1 : POLSKIE LNG

POLSKIE LNG Main Project Info

POLSKIE LNG - SWINOUJSCIE LNG TERMINAL - POLAND

CLIENT POLSKIE LNG

CONTRACTOR SAIPEM (JV Leader), TECHINT and PBG

CONTRACT EPC



POLSKIE LNG Technical Data

LNG TANKS	▪ 2 x 160,000 m ³ - (ID 75 x H 38 m)	LNG CARRIER CAPACITY	▪ 75,000 - 216,000 m ³
JETTY	▪ 1650 m long	UNLOADING RATE	▪ 12,000 m ³ /h
BERTHS N°	▪ 1	STORAGE CAPACITY	▪ 320,000 m ³
LNG UNLOADING	▪ 4 Unloading Arms - 2 Liq.+1 Vap.+1 L/V	REGASIFICATION CAPACITY	▪ 4 MTPA
NG TRANSFER	▪ 80 km pipeline (GAZ-SYSTEM S.A.)	POWER SUPPLY	▪ from National Grid

Low environmental footprint in natural reserve

APPLICATION EXAMPLE #2 : FSRU TOSCANA

FSRU TOSCANA Main Project Info

GOLAR FROST LNG MOSS TYPE CARRIER
RECONVERSION IN FSRU

CLIENT OLT (Offshore LNG Toscana SpA)

- IREN Group
- UNIPER
- GOLAR LNG

CONTRACT From FEASIBILITY to EPCIC



FSRU TOSCANA Technical Data

HULL	■ Golar Frost LNG carrier (301 x 48 x 26 m)	LNG CARRIER CAPACITY	■ 65,000 - 155,000 m ³
MOORING	■ External turret (Offshore moored)	UNLOADING RATE	■ 12,000 m ³ /h
WATER DEPTH	■ 120 m	STORAGE CAPACITY	■ 135,000 m ³
LNG TRANSFER	■ Side by side (rigid arms for FSU-)	REGASIFICATION CAPACITY	■ 3.9 MTPA
NG TRANSFER	■ 36.5 km pipeline (Snam Rete Gas)	INSTALLED POWER	■ 30,000 kWe

First side by side offloading in open sea

Integrated BOG handling, vaporisation and power generation solution

APPLICATION EXAMPLE #3 : MALTA LNG FSU

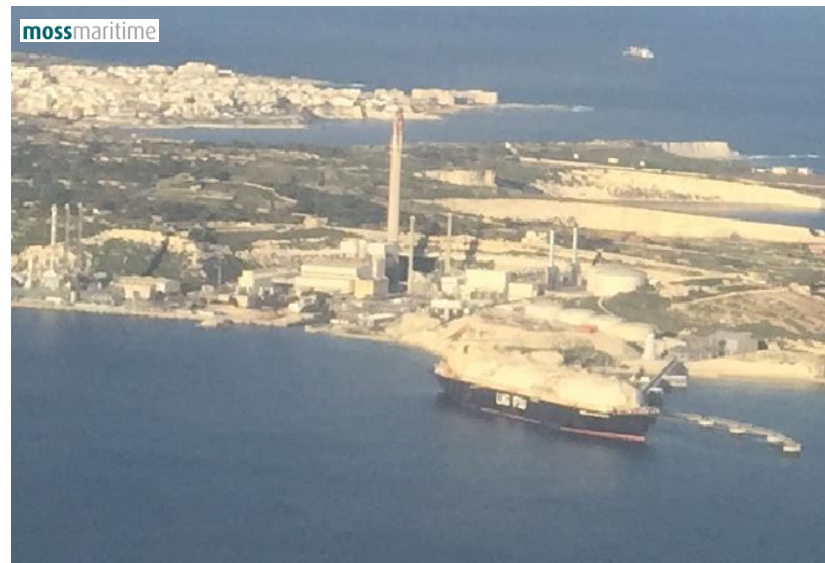
MALTA LNG FSU Main Project Info

MOSS TYPE CARRIER RECONVERSION IN FSU

(associated with Onshore LNG plant)

CLIENT BUMI ARMADA

CONTRACT From FEASIBILITY to Detailed engineering for the FSU portion of the project



MALTA FSU Technical Data

HULL	▪ Wakabu Maru Moss LNG carrier	UNLOADING RATE	▪ 4,500 m ³ /h
MOORING	▪ Jetty moored	STORAGE CAPACITY	▪ 125,000 m ³
LNG TRANSFER	▪ Side by side (LNGC-FSU by hoses, FSU-onshore plant via rigid arm)		
EXPORT RATE	▪ 0.6MTPA via new export line and export pumps		

Hybrid floater / onshore regasification solution

TRACK RECORD

LNG regasification plants

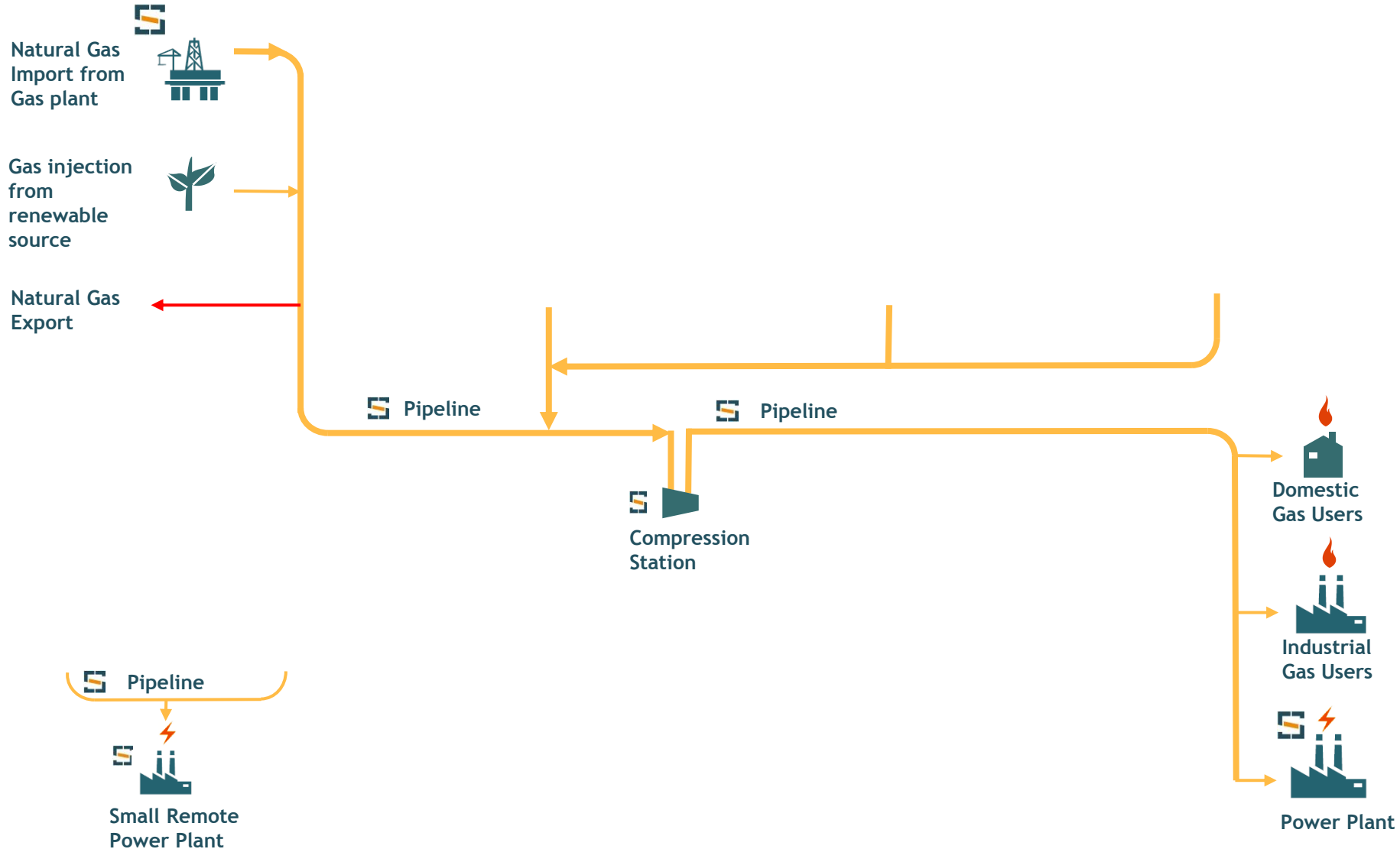


PROJECT	Capacity (MTPA)	No. of Tanks and Capacity (m ³)	COMPLETION DATE
POLSKIE LNG - POLSKIE, Poland	2.0	2 x (160.000)	2015
OLT - OLT LIVORNO FSRU, Italy	4.0	137,000	2013
GAZ DE FRANCE - FOS CAVAOU, France	6.6	3 x (110.000)	2010
CANAPORT LNG Ltd (Repsol, Irving Oil) - CANAPORT, Canada	7.7	3 x (160.000)	2009
FREEPORT LNG - FREEPORT, USA	10.0	2 x (160.000)	2008
FLUXYS LNG - ZEEBRUGGE Exp., Belgium	5.7	1 x (140.000)	2008
GUANGDONG DAPENG LNG (BP, CNOOC) - GUANGDONG, China	3.55	3 x (160.000)	2007
HAZIRA LNG (Shell, Total) - HAZIRA, India	2.0	2 x (160.000)	2005



AROUND 45 MTPA (≈60 bcm) REGAS CAPACITY

Expertise in Natural Gas Distribution

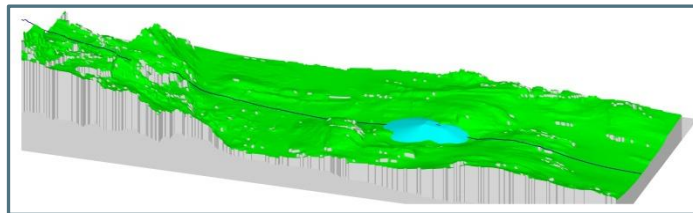


Transportation Systems PIPELINES - KNOW-HOW & EXPERIENCE

Excel in all steps of the Oil & Gas value chain - Onshore and Offshore

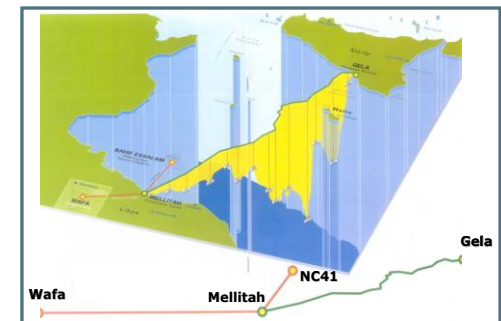
Design of Pipelines field, technologies and Applications

- ❑ Decades of experience and designed the most challenging offshore pipelines worldwide
- ❑ Provided engineering solutions to solve complex and strategic challenges
- ❑ Strong engineering track record to provide fit-for-purpose solutions to the issues faced by customers



Worldwide experience in:

- Feasibility Studies
- FEED
- EPC - EPIC
- Trunkline



APPLICATION EXAMPLE #1: SAKHALIN II - ONSHORE

FLAGSHIP PIPELINE INTEGRATED MEGA-PROJECT: SAKHALIN II - Main Project Info

CLIENT	Sakhalin Energy Investment Co. (SEIC)
LOCATION	Far East Russia Sakhalin Island
CONTRACTOR	Saipem main contractor
CONTRACT	Basic Design and EPC
Contract Value \$	Range 1-3 Billion
Start-up	Dec. 2008



Highlights and Technical Data

- Built over 5,000 km of temporary access roads
- Several segments of sealines and subsea power and communication cables
- Offshore transportation and installation of two massive integrated platform decks
- Oil & gas twin 780 km land pipeline system
 - Oil: 24" Gas: 48"
 - > 80 MM construction man-hours
 - Driven > 150 MMkm

**Best Environmental Project
of the year 2008 by Ministry
of Ecology and Natural
Resources (Russian
Federation)**



**SHELL Safety
Awards 2008**



APPLICATION EXAMPLE #2 : BLUE STREAM - Pipeline System (BSPS)

TAP - Main Project Info

CLIENT	Blue Stream Pipeline Company BV
CONTRACTOR	SAIPEM
CONTRACT	Eng. Study - Detailed Eng. - PM - EPC
Location	Black Sea (from Russia to Turkey)
Project Schedule	Former Contract Validity 2003-2013
Max. Water Depth	2140 m



Highlights and Technical Data

Project Overview:

- 2 x ND 24" x approx. 380km long export trunklines from Russian shore to Turkish shore and relevant Trap areas at both landfalls.
- The Project is a "Life of Field" Contract covering Maintenance and Inspection services for the BS Pipeline System and any other Technical/Engineering support related to possible operations of the System either in normal regime or in contingency cases .

Scope of Work:

- Preparation of the technical and contractual documentation for the contracts assignment to CY Contractors, including assistance during Contractors Qualification process, Tendering, Follow-up phases and Supervision for the Inspection and Maintenance activities execution performed by Contractors
- Process and engineering evaluation of the inspection results, with relevant management and update of the historical data base, structural integrity assessment, engineering evaluation of possible criticalities and relevant remedial measures definition, design and assistance for actuation. Risk Assessment and safety procedures
- Planning of Inspection and Maintenance activities (Inspection and Maintenance Program) including Operating Envelope and Operating Manuals preparation.

APPLICATION EXAMPLE #3 : TRANS ADRIATIC PIPELINE (TAP) - OFFSHORE

TAP - Main Project Info

CLIENT	Trans Adriatic Pipeline
CONTRACTOR	SAIPEM
CONTRACT	Design and EPC
Location	Offshore Italy and Albania
Max. Water Depth	820m
Project Schedule	2012 - 2020
Route Length	Approx. 105 km



Highlights and Technical Data

Project Overview:

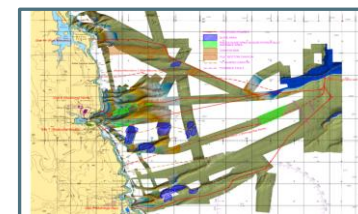
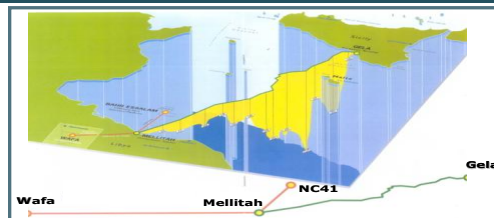
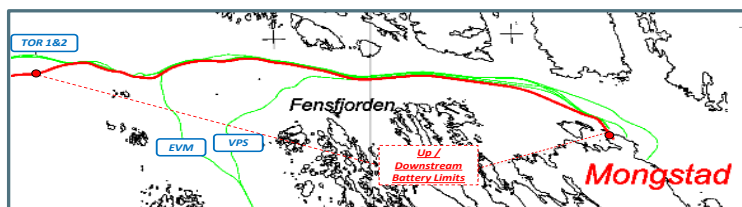
- a 36" (ID) Trunkline, Material grade : L450, Transport capacity: 10 bcm/y (possible expansion up to 20 bcm/y),
- Design Pressure: 145 barg, Design T: Max/Min +60° C/-20° C
- a FOC installed parallel to the P/L to enable communication between the onshore systems placed in Italy and Albania;
- a RFO system for pipeline pre-commissioning

Scope of Work:

- Management Services, Design Basis, Familiarization,
- Preliminary Cost and Schedule Evaluations
- Detail Design of Landfall in Albania,
- of Offshore pipeline crossing the Adriatic Sea, of Landfall in Italy
- Fiber Optic Cable Engineering, Geotechnical Evaluations
- Environmental and Social Impact Assessment assistance, Input to ITT's
- Studies and Verifications, Follow-on Engineering during Construction

TRACK RECORD

Onshore/Offshore Transportation Systems - Pipelines - FEED



Project	Clients	Work Location	Award Date
Johan Sverdrup Pipeline Nearshore Engineering	STATOIL	NORWAY	2015
SHAH DOL - PHULPUR GAS PIPELINE PROJECT DETAILED DESIGN	RELIANCE INDUSTRIES LTD	INDIA	2012
Mamba Straddling Development Project - FEED Optimization	Eni East Africa spa	Mozambique	2016
CORAL SOUTH DEVELOPMENT PROJECT - Mozambique program	ENI E&P	Mozambique	2015
JoSEPP Alternative Nearshore Route via Fensfjorden - Conceptual Study	Statoil	North Sea	2014
Export Val D'Agri	ENI S.P.A	Taranto, Italy	2014

Power generation and distribution



Small Remote
Power Plant



Power Plant

Power Plant and Distribution - KNOW-HOW & EXPERIENCE

Power Plant Field, Technologies and Applications

- ❑ Designed and built over 10,000 MW (EPC basis)
 - ❑ Natural gas and syngas,
 - ❑ Combined and single cycle,
 - ❑ Combined heat and power,
 - ❑ From waste to energy
- ❑ Management of Major Power Supply Player (such as Ansaldo, GE, Alstom, Siemens for turbines)



Berrouaghia - Algeria



Ravenna - Italy



Dombasle - France



Okpai - Nigeria



Ferrera Erbognone - Italy

TRACK RECORD

Power Plants Station and Distribution - Feasibility Studies, Basic, FEED - Det. Engineering

PROJECT	Clients	Type	Location
BlackRhino - QIPP Preliminary Activities	QIPP Investment BV (part of Black Rhino Group)	Eng. Serv. –Preliminary Design	NIGERIA
Adeguamento Centrale di Cogenerazione di Bolgiano	ENIPOWER	Project Mngt Serv.	ITALY
REVAMPING NUCE NORD COMBINED CYCLE POWER PLANT (480 MW)	ERG NUONE CENTRALI S.p.A.	Detailed Design and PMC	ITALY
RAVENNA INDUSTRIAL WASTES INCINERATION PLANT - F3 FURNACE (30,000 t/y)	AMBIENTE S.p.A.	Eng. Serv. - Basic Design	ITALY
TARANTO REFINERY - NEW COGENERATION PLANT (39 MW)	SERLEASING S.p.A.	Eng. Serv. - Basic Design	ITALY
RAVENNA ENERGY PROJECT - COGENERATION PLANT WITH COMBINED CYCLE (125 MW)	ENICHEM S.p.A.	Eng. Serv. - Basic Design	ITALY
TARANTO REFINERY - NEW COGENERATION PLANT (39 MWe) - ENGINEERING SERVICES FOR CIVIL WORKS	AGIP RAFFINAZIONE S.p.A.	Eng. Serv. - Detailed Engineering	ITALY
MILAZZO REFINERY - POWER STATION MODERNIZATION	RAFFINERIA MEDITERRANEA	Eng. Serv. - Basic Design	ITALY
SANNAZZARO DE` BURGONDI REFINERY 'PHASES 2 & 3' - COMBINED CYCLE (56 MW)	AGIP RAFFINAZIONE S.p.A.	Eng. Serv. - Basic Design	ITALY
AZZAWIYA REFINERY - GAS TURBINE POWER STATION, NITROGEN PLANT AND INSTRUMENT AIR COMPRESSOR	AZZAWIYA OIL REFINING CO. INC. (ARC)	Eng. Serv. - Basic Design	LIBYA

HVS Proposal Services - DIGITAL Solutions 1

New Innovation System - xDIM®



xDIM® - SAIPEM AS ENGAGING PlatFirm

- ✓ Digital collaborative platform integrating the stakeholders' activities along the full project life-cycle
- ✓ Adoption of a strong collaborative approach, enforcement of a data-centric methodology of co-creation and redefinition of work processes
- ✓ Real-time decision making, increased productivity, improved risk & opportunity management, continuous handover to client, reduced claims or litigation

