

GAS **MONETIZATION**



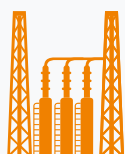
SAIPEM

GAS MONETIZATION EPC CAPABILITIES

MAIN FIELDS OF EPC ACTIVITIES



AMMONIA-UREA



GAS TO LIQUID



METHANOL



HYDROGEN

Saipem holds a leading share of the total installed capacity worldwide of ammonia-urea. Our long list of successfully implemented projects includes both the design and execution of **large integrated ammonia urea** complexes, methanol and hydrogen plants. Moreover, Saipem has implemented new solutions in order to expand the production

of existing plants, achieving significant results in improving product quality, reducing emissions and optimising energy consumption.

Saipem is the front runner of the largest single line plant capacity worldwide: the first to build a urea plant with over 3000 MTPD in the 2000's and the first to build a urea plant with over 4000 MTPD in the 2010's.

MEGA EPC PROJECTS

QAFCO 5&6 PROJECTS, QATAR

DANGOTE PROJECT, NIGERIA

OMIFCO PROJECT, OMAN

RECORDS

170+

PROJECTS WORLDWIDE

37

COUNTRIES

50+

GRASS ROOTS PLANTS

TRANSFORMING BUSINESS

We anticipate the changes in our reference sectors, focusing on digital technologies and on a true sustainable value creation. Through an internal development Programme and with the establishment of Strategic Partnership we support the Business transformation being the front-runner of new pioneering Services and Products.

■ **PROJECT FINANCING**

We are capable of leading the coordination of Project Financing structures as early as the feasibility stage. Saipem is very well positioned to offer economic, financial and legal advisory services as well being part of the project implementation.

■ **DIGITAL TRANSFORMATION: ADVANCED TOOLS COMBINED WITH SOLID KNOW-HOW**

A roadmap for digitalization is currently on-going to embrace all aspects of Saipem's activities bringing innovative solutions to the industry. When this roadmap meets the expertise of Saipem's proprietary Snamprogetti™ Urea Technology, new services can be offered to our customers.

■ **SYNERGIES WITH GREEN SOLUTIONS**

We are capable to integrate solutions from our New Energies portfolio into Syngas and Fertilizer projects leading innovation towards sustainable system. For certain solutions time is still needed to reach product maturity but is imperative for Saipem to contribute to the development of such green solutions.

■ **CARBON CAPTURE UTILIZATION**

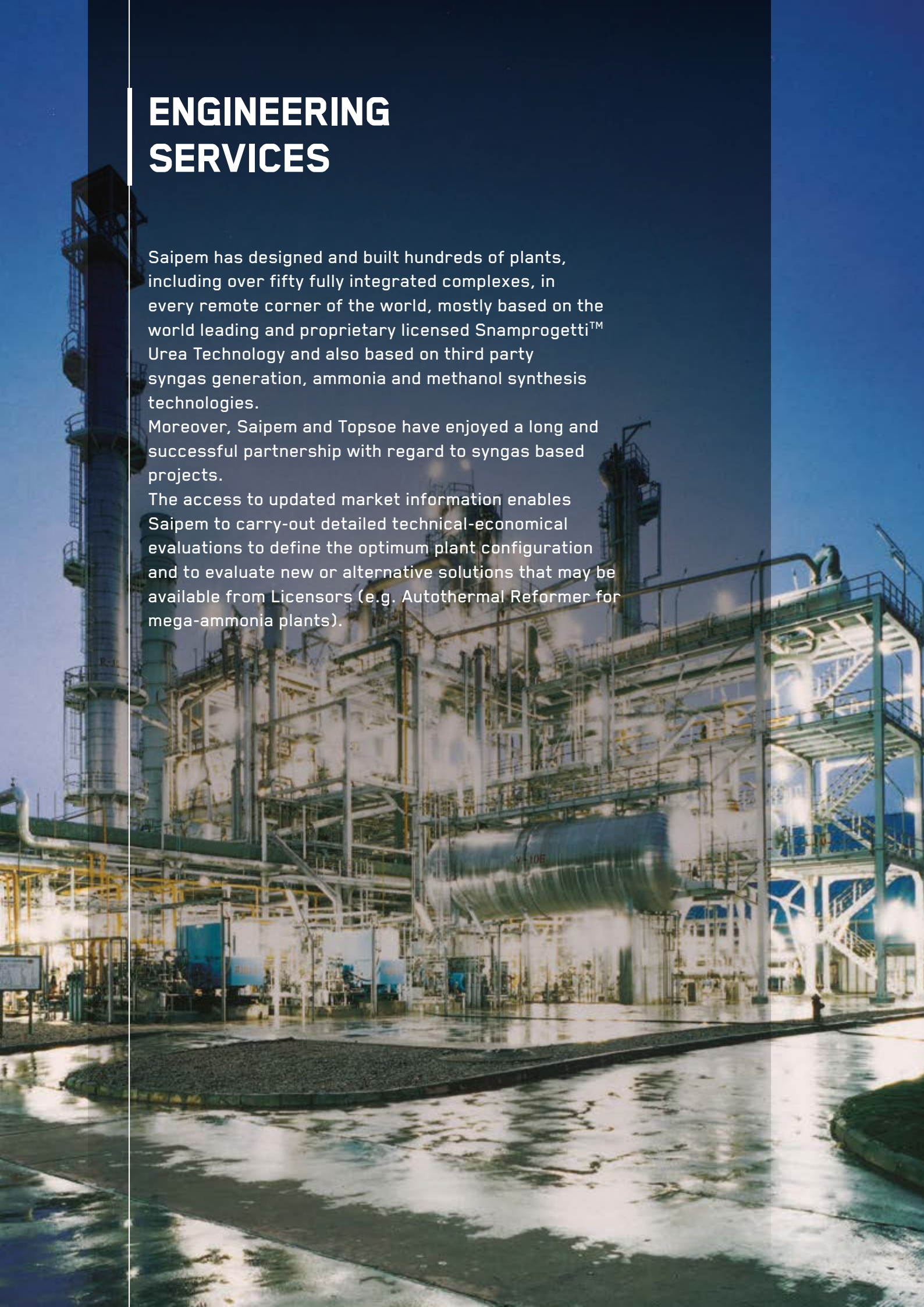
Within the Saipem New Energies portfolio to support the industry's transition to a lower-carbon energy future, Saipem provides innovative integrated solutions thus creating a value such as CO₂ captured and converted into Urea and Methanol.

ENGINEERING SERVICES

Saipem has designed and built hundreds of plants, including over fifty fully integrated complexes, in every remote corner of the world, mostly based on the world leading and proprietary licensed Snamprogetti™ Urea Technology and also based on third party syngas generation, ammonia and methanol synthesis technologies.

Moreover, Saipem and Topsoe have enjoyed a long and successful partnership with regard to syngas based projects.

The access to updated market information enables Saipem to carry-out detailed technical-economical evaluations to define the optimum plant configuration and to evaluate new or alternative solutions that may be available from Licensors (e.g. Autothermal Reformer for mega-ammonia plants).



OUR STREAMS OF ACTION

PLANT EXECUTION

Innovation

The peculiar nature of Saipem being both EPC Contractor and Licensor of Snamprogetti™ Urea Technology enables the continuous and seamless transfer of knowledge from technology to engineering and construction.

DESIGN OPTIMISATION

Enviromental care

Saipem design uses solution optimized in house to reduce emissions and eliminate effluents to comply with the strictest environmental requirements.

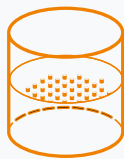
CO₂ MANAGEMENT

Valuable products

Saipem pursues a sustainable approach in order to reduce CO₂ emissions, develop innovative solutions to increase energy efficiency and CO₂ = convert the CO₂ in Urea or Methanol.



PLANT
EXECUTION



DESIGN
OPTIMISATION



CO₂
MANAGEMENT

LICENSING

SNAMPROGETTI™ UREA TECHNOLOGY'S LICENSE AND KNOW-HOW ARE AVAILABLE TO UREA MANUFACTURERS

The technology, based on the ammonia stripping process, has already been proven in more than 130 plants throughout the world for capacities ranging from a few tenths to over 4000 MTPD in one line. The majority of these plants were engineered by Snamprogetti/Saipem, a factor which greatly contributes to improving the technical details, especially those relating to

equipment and machinery. Several plants engineered by Authorised Contractors are available worldwide to meet all the specific financing, local engineering, procurement and other needs as required.

The issue of a Customised Basic Engineering Package (CBEP) enables the appointed contractor to perform the detailed engineering and all other project aspects.

ASSISTANCE AT THE VENDOR'S WORKSHOP IS MANDATORY FOR CRITICAL ITEM

TAILOR-MADE **TRAINING PROGRAMMES**, "ON-THE-JOB" AND "HANDS-ON" TRAINING AND **OPERATING TRAINING SIMULATOR** ARE AVAILABLE UPON REQUEST.

A COMPLETE RANGE OF CAPABILITIES AND SERVICES

CUSTOMISED BASIC ENGINEERING PACKAGE (CBEP)

- process flowsheet with mass balance of process fluids and utilities
- P&I diagrams
- equipment specifications with material of construction
- quality and quantity of effluents
- suggested layout
- area classification
- instrument data sheet and interlock system
- data for safety valves
- vendor list
- commissioning and operating manual
- recommendations for maintenance
- checking of detailed engineering
- performance test-run procedures
- analytical manual
- training programs for client personnel
- commissioning services

DURING THE DESIGN STAGE OF DETAILED ENGINEERING, SNAMPROGETTI™ UREA TECHNOLOGY IS IN CLOSE CONTACT WITH THE AUTHORISED CONTRACTOR TO CARRY OUT THE REQUIRED **CHECKS** AND TO **SELECT THE MAIN EQUIPMENT AND MACHINERY**.



TECHNOLOGIES

APPROACH TO INNOVATION AND CARING FOR THE ENVIRONMENT WITH A PROVEN PORTFOLIO

PROJECT INTEGRATION

Integration of sub-systems into complex Systems:

- Digital oriented Configuration and Interfaces Management
- Digital single data repository from early design stages to commissioning and performances validation
- Development of Asset Management System / Maintenance Management Information System (MMIS)

EFFICIENT SYNERGIES FOR A SMART EXECUTION

DIGITAL ADAPTATION

We are committed to renewing the way we do business and redefine our approach to Value creation:

- Cooperation with Technology Partners and universities to promote innovation oriented and start-up culture
- Standardised project data management embracing digital transformation to support a stable data-centric approach

BUSINESS TRANSFORMATION TO RECOVER EFFICIENCY AND IMPROVE PROFITABILITY

VALUE ENGINEERING

A dedicated in-house Engineering Team:

- Implementation of optimized solutions to reduce Capex and Opex
- Innovative solutions to cope with the most challenging environment
- Adoption of cost effective solutions in full compliance with the most stringent environmental standards

TRANSFORM NEEDS OF STAKEHOLDERS INTO SERVICES AND CUSTOMIZABLE PRODUCTS





MODELLING

Processes and Workflows structured for the adoption of computer aided modelling through the entire project life cycle:

- Use of commercial software with In house Model
- Acquisition of data through latest digital technologies
- Analysis and processing of raw data and Big Data management

PROVIDING ADDED VALUE WITH THE MOST CUTTING-EDGE TOOLS IN THE INDUSTRY

SUSTAINABILITY AND ENVIRONMENT

Focus on Project Legacy:

- Sustainability integrated in our product and services
- Flexible and customized approach to Stakeholders' engagement
- Promotion of widespread Environmental awareness and adoption of best practices
- Experienced in the application of Sustainability Standards
- Consolidated track records for environmental monitoring and mitigation

RISK MANAGEMENT AND QHSE THROUGH SAIPEM CONSOLIDATED PROCESS

AMMONIA & UREA COMPLEXES

QAFCO 5&6

THE LARGEST FERTILIZER COMPLEX EXECUTION EVER

- 4600 MTPD, Total Ammonia Production
- 7700 MTPD, Total Urea Production
- 120,000,000, Total Construction Manhours
- 125,000 tons, Total weight for Material and Equipment

The QAFCO 5&6 project represents the largest worldwide EPC execution in the fertiliser industry.

The project is broken down into three main areas:

- Grass root Qafco 5&6 plant
- Construction works in the existing Qafco site plant
- Interconnecting facilities linking the new Qafco 5&6 site to the existing Qafco plant

OUR STREAMS OF ACTION

ENVIRONMENTAL CARE

Zero effluents concept, recycling of contaminants in the process, reuse of Sea Water discharged by the existing facilities,

IMPRESSIVE MAGNITUDE

Five Gas Turbines with HRSGs, one Steam Turbine Generator, two Auxiliary Boilers, Sea Water Cooling Cells, two Urea Bulk Storage with a total capacity of 275,000 tons, two ammonia storage with a total capacity of 100,000 m3, 5 km pipe conveyor, new Jetty.

SYNERGIES AND INTEGRATION

Material handling system with interconnection with existing facilities, improved energy efficiency and reliability.



OMIFCO

FAST AND SAFE EXECUTION

- 3500 MTPD, Total Ammonia Production
- 5060 MTPD, Total Urea Production
- 32,000,000, Total Construction Manhours
- 70,000 tons, Total weight for Material and Equipment

At the time of start-up in 2005, the Omifco fertiliser complex was the largest ammonia-urea project in the world supplying granular urea.

The project was built quickly and started up smoothly:

- First gas fed into the ammonia plant 32 months after the financial closure and 35 months after signing the EPC contract
- First production only after:
 - 18 days for ammonia one and 1 day for urea one
 - 12 days for ammonia two and 1 day for urea two

Major units of the complex:

- 2 ammonia trains
- 2 granulated urea trains
- utilities including power generation, desalinated water, steam, cooling water, nitrogen
- 2 ammonia storage tanks (30,000 mt/each)
- 2 urea storage buildings (75,000 mt/each) and a marine terminal for ammonia and urea ship loading



DANGOTE

THE LARGEST FERTILISER PLANT IN AFRICA

- 4400 MTPD, Total Ammonia Production
- 7700 MTPD, Total Urea Production
- 75,000 tons, Overall weight to be erected
- 62,000 m³, Concrete volume

The execution of this EPC contract has faced challenging environmental constraints that were successfully managed thanks to the involvement of local resources and personnel.

Major features of the complex:

- extensive use of pile foundation (6000 piles installed)
- complex in island mode (3 steam turbine power generators)
- automatic bagging and truck loading facilities for urea product



GAS TO LIQUID

GTL ESCRAVOS - NIGERIA

A WORLD CLASS MODULARISED GTL COMPLEX

- 10,000 BPD, Total Naphtha Produced
- 22,000 BPD, Total Diesel Produced
- 920 BPD, Total LPG Produced

In addition to being one of the first applications of the Gas-to-Liquids technology on a world-class scale (process technologies by Sasol, Chevron, Haldor Topsøe and others), the design and construction of this complex dealt with severe constraints such as the harsh and remote site environment.

The Project met a government mandate to eliminate gas flaring in the oil and gas sector.

In order to simplify local construction on site in Escravos, Nigeria, many plant sections were designed and built in a U.A.E. fabrication yard then shipped to the site.

THE MAIN FEATURES OF THE COMPLEX CONSIST OF:

- Modularisation design: the largest ever Saipem modularised plant (pipe rack modules over 1,000 tons each, process modules over 2,000 tons each)
- Reactor size erection: 2008 World Class Record
- Overall modularisation: approximately 50% the total plant weight.



METHANOL PLANTS

BANDAR IMAN FROM CO₂ TO METHANOL

- 3030 MTPD, Methanol Production
- 14,000 tons, Total material weight
- 360,000 MTPA, CO₂ Reduced emission

At the time of the design in 2001, the Bandar Iman Third Methanol was the largest methanol project in the world, supplying high quality grade methanol (AA).

A significant feature of this plant is the compression of CO₂ and the 6 km pipeline built to reuse CO₂ and convert it into methanol. Besides reducing CO₂ emissions, this solution maximises production and guarantees profitability.



HYDROGEN VALUE CHAIN PLANTS

PROJECT	LICENSOR / TECHNOLOGY ¹	CLIENT	COUNTRY	SCOPE OF WORK	COMPLETION DATE
BARENTS BLUE AMMONIA PLANT (3,000 MTPD)	TOPSOE (ATR)	Horisont Energi	Norway	Pre-FEED	ongoing
CERES PROJECT (3507 MTPD AMMONIA, 2x3100 MTPD UREA)	TOPSOE (ATR) BASF (CO2 Removal)	Perdaman Chemical and Fertilizers PTY LTD	Australia	EPCC	ongoing
HAIFA AMMONIA PLANT (300 MTPD)	TOPSOE (SMR) GV (CO2 Removal)	Haifa	Israel	EPCC	ongoing
BLUE AMMONIA PLANT (2 x 1,2 MTPA)	TOPSOE (ATR)	Major O&G Company	Middle East	Eng. Serv.	ongoing
BLUE HYDROGEN PLANT (285,000 Nm ³ /h)	TOPSOE (ATR)	Major Chemical Company	Europe	Feed	2022
BLUE HYDROGEN PLANT (235,000 Nm ³ /h)	To Be Selected	Major O&G Company	Africa	Eng. Serv.	2022
CARBON CAPTURE AND COAL FREE HYDROGEN PRODUCTION (1,8 MTPA CO2 CAPTURE)	UOP (CO2 Removal, H2 Purification)	Undisclosed	USA	Pre-Feed	2022
METHANOL PLANT (7,650 MTPD)	TOPSOE (ATR)	Major Chemical Company	Russia	Feed + OBE	2021
JAZAN IGCC – 2,400 MWe H2 CAPACITY: 186,000 Nm ³ /h	SHELL ² (Gasification) UOP (CO2 Removal, H2 Purification)	Saudi Aramco	Saudi Arabia	EPC	2020
DANGOTE FERTILIZER PROJECT - AMMONIA (2 x 2,200 MTPD) - UREA & UREA GRANULATION (2 x 3,850 MTPD)	TOPSOE (SMR) BASF (CO2 Removal)	Dangote Fertilizer LTD.	Nigeria	EPCC + O&M interim services	2020
FOD PROJECT - ZERO FUEL OIL H2 CAPACITY: 46,000 Nm ³ /h	GE ² (Gasification) UOP (CO2 Removal, H2 Purification)	Raffineria di Milazzo	Italy	Feed	2018
AEGEAN REFINERY PROJECT (ARP) (214,000 BPSD) H2 CAPACITY: 160,000 Nm ³ /h	TECHNIP (SMR)	Star Refineri A.S. (JV Socar 81.5% / Turcas 18.5%)	Turkey	EPCC + O&M interim services	2018
QUANTUM GREENFIELD METHANOL PLANT (3,000 MTPD)	TOPSOE (SMR+ATR)	Quantum Petrochemical Processing Plant LTD	Nigeria	Eng. Serv.	2016
JUNIN 5 DOWNSTREAM PROJECT - PETROBICENTENARIO REFINERY H2 CAPACITY: 675,000 Nm ³ /h	TECHNIP (SMR)	Eni Div. Exploration & Production	Venezuela	Eng. Serv.	2016
SANNAZZARO DE' BURGONDI REFINERY - ENI SLURRY TECHNOLOGY H2 CAPACITY: 100,000 Nm ³ /h	TOPSOE (SMR)	Eni S.p.A. DIV. Refining & Marketing	Italy	EPCm	2013
ESCRAVOS GAS TO LIQUIDS PROJECT (33,000 BPSD) SYNGAS CAPACITY: 2x285,000 Nm ³ /h	TOPSOE (ATR)	Chevron Nigeria LTD. (CNL)	Nigeria	EPC	2013



SAIPEM SpA
Via Luigi Russolo, 5
20138 Milan
Italy

SAIPEM.COM

LET'S KEEP IN TOUCH

