

# KAOMBO FPSO PROJECT

A project to pursue growth opportunities, leverage engineering capabilities and create local value.



Field location: Block 32, Angola

Max water depth	<b>1,950</b> m	barrels of oil storage capacity	<b>1.7</b> mln
standard cubic feet/day gas compression capacity	<b>100</b> mln	barrels/day water injection capacity	<b>200,000</b>
		barrels/day oil treating capacity	<b>115,000</b>

## PROJECT DESCRIPTION

In 2014, Saipem was awarded two contracts for the Kaombo Field Development Project, located in Block 32 in Angola: the first, for the engineering, procurement, construction, supply and commissioning of two converted VLCCs (Very Large Crude Carrier) into FPSO (Floating Production Storage and Offloading) units; the second, for the field operation and maintenance services of the two vessels (a 7-year contract).

The six fields involved cover an area of 800 km<sup>2</sup> in the central and southeast part of the block, connected via 300 km of subsea pipelines to the two FPSO units, Kaombo Norte and Kaombo Sul.

The Kaombo FPSO Project is an international project with fabrication and installation works spread all around the world, onshore and offshore:

- GPC (Gulf Piping Co) yard, in Abu Dhabi (United Arab Emirates), where the fabrication of the 2 lower turrets started in March 2015 before being delivered to the integration yard of Sembawang, in Singapore (about 2.6 million man-hours were spent on their fabrication, reaching a peak of about 600 workers per day, in Abu Dhabi);
- Sembcorp Marine Admiralty yard (Sembawang), in Singapore, where the conversion works of the two VLCCs, the integration of the modules and the commissioning activities are taking place;
- Saipem Karimun yard (Indonesia), where process and utility modules were fabricated, representing a total of approximately 26,500 tonnes;
- Schneider Wasco yard in Batam (Indonesia), where the P2 modules (technical buildings) for both Kaombo Norte and Kaombo Sul were fabricated;

3D model of the FPSO



- Profab/Nov yard in Batam, where the S3 Modules for Kaombo Norte and Kaombo Sul are fabricated under an EPC contact awarded to Siemens;
- Petromar yard in Ambriz (Angola), for the fabrication of the suction pipes, the mooring lines, as well as the crew boat landings and S2 and S5 models for Kaombo Sul;
- the S3000 vessel was used for the offshore installation of the 18 mooring piles (27 m high, 5 m in diameter and 160 tonnes) in offshore Block 32 in Angola;
- the Onshore Logistic base designed, built and operated by Saipem's consortium partner Interoil in Viana (Angola).

## PROJECT STATUS

By the first quarter of 2017, all the modules for Kaombo Norte will be fabricated and integrated onto the FPSO in Sembcorp Marine Admiralty Yard.

The various parts of the upper turret have been integrated in sequence. Commissioning activities have started and are expected to increase significantly. Sail away is planned for the second semester of 2017. The preparation for field operation services is ongoing and the Onshore Logistics base is operational.

### Worked man-hours

**+45** mln

As of mid February 2017.

## HSE INITIATIVES

### Health, Safety, Environment: Kaombo FPSO core values

With a view to establishing a collaborative and constructive approach to achieving project objectives, since the beginning the Kaombo FPSO has engaged the top management of project key actors (Saipem, the client Total, partners, subcontractors) in an HSES Charter workshop.



HSES Charter workshop

The outcome of this event, held in 2014, was the definition of a common HSES vision, as a platform of agreed values in order to guide action plans, share and integrate lessons learned during project execution, ensure effective implementation of safety leadership programmes, commit to protecting the environment and respecting local communities.

Through clear organisation, an integrated team ensured effective supervision, coordination and improvement of HSE aspects.

From the design phase and throughout the execution of the project on all worksites, the LiHS (Leadership in Health & Safety) Programme was customised and cascaded through joint Saipem/subcontractor sessions in order to spread the safety culture throughout the workforce. At the same time, Health, Safety and Environment awareness campaigns (i.e. Life Saving Rules-LSR Campaign) and training programmes were deployed. A joint contractor/client Health, Safety, Environment & Sustainability (HSES) Incentive Scheme was deployed to encourage and reward the promotion of a safety culture, a proactive attitude to protecting the environment and a respectful and context-specific approach to local communities in the areas where the project is executed. Through this scheme and with client support and participation, Saipem developed initiatives for the neighbouring local communities in Indonesia and Angola.

## COMMITMENT TO LOCAL DEVELOPMENT

### Training and developing a multicultural workforce

The Kaombo Project is spread over 5 geographic areas and brings together a multicultural, multidisciplinary team with a diverse set of experience, skills and knowledge. At peak, the project will employ over 10,000 people in the different worksites.

To optimise the available resources and to ensure the right profile skills and experience for each targeted position within the offshore phase, a Competence Assurance & Assessment process is in place.

The process starts prior to employment and continues throughout the mobilisation period through a series of evaluation tools: each candidate is assessed against the target position to define suitability as well as the training needed and duration. After mobilisation, the evaluation of skills continues with on-the-job behaviour assessment, performed on a yearly basis.

For the operational phase of the project, a training catalogue was developed establishing the necessary training needs.

Recruitment of Angolan personnel follows the same assessment and development strategy and is targeted to meet contractual and legislative requirements in terms of local content. In 2016, 8 Angolans were recruited at control room operator level and were engaged in a comprehensive training programme that will take 9-12 months. The training programme consists of on-the-job training on the existing Gimboa FPSO, additional formal

academic courses and familiarisation of the FPSO in Singapore during the commissioning phase.

### Introducing children to health, safety and the environment

Since 2016, 340 children in Karimun (Indonesia) and almost 200 children from Ambriz (Angola) took part in the Little LiHSE (Little Leaders in Health, Safety and Environment). The goal of this programme was to introduce them to the basic attitudes and values of health, safety and environmental protection that they can use daily at school and at home and encourage them to spread this culture to their families and in their local community.



### Health care for families

In 2015-2016, the Family Health Post located in West Pangke Village, a community in the vicinity of the Saipem Karimun Yard, was expanded and refurbished

and provided with additional furniture and necessary equipment. The Health Post is targeted at mothers, their children and elderly women, and is visited by doctors and nurses from the local hospital who provide



## EMPOWERING ANGOLANS

### What is Angolanisation?

Angolanisation is the replacement of an expatriate occupying a key technical, administrative or management position by an Angolan national with equivalent technical competences, academic background and professional experience. Saipem has implemented an Angolanisation Plan to achieve its Angolanisation objectives, implementing several strategies to guarantee that the process occurs in conditions of safety, thus preventing any deviations from the business goals set.

The objectives of the Angolanisation Plan are:

- training and development of Angolan workers;
- facilitating Angolans to have access to the Oil industry with a wide knowledge of the field;
- boosting local involvement in the energy sector facilitated by government activities;
- transferring know-how from expatriates to Angolan Nationals.

For every Angolan hired, a training plan and a coaching plan has been implemented to ensure proper integration of employees into key positions in accordance with the Company's Competence Development Plan and National Human Resources Policy objectives within the framework of the Angolanisation Plan. To make the building of local capabilities effective, each local employee development plan is reviewed annually.

The programme's first step is mapping the knowledge and experience requirements for every position. Once validated, the mapping is followed by interviews

and tests to determine the existing gaps between the competences held by a specific person, and those required by the job to be filled. Training is then provided in order to fill those gaps. The on-the-job training sessions are held in Paris, India and Angola. In this context, the expatriates are designated as mentors during the entire training stage, coaching and advising the Angolan in the new position. Many activities support the final objectives of the Angolanisation Plan: organisation of technical workshops and programmes, partnerships with local universities, initiatives aimed at local suppliers, etc.

A comparison of the figures of the last four years confirms the success of the Saipem Angolanisation programme:

<b>Percentage of local workforce in 2016</b>	<b>83%</b>
<b>Increase of ratio between local and international staff since 2013</b>	<b>+19%</b>
<b>Total number of trainees since 2013</b>	<b>331</b>
<b>Training man-hours delivered in 2016 (almost doubled compared to 2013)</b>	<b>10,420</b>
<b>Total number of training man-hours delivered since 2013</b>	<b>24,769</b>

health assistance or improve awareness on certain topics.

### **Developing young talents**

The Talentissimo programme was firstly launched in Angola in 2015 with the objectives of enhancing Saipem's recognition in universities and engineering schools; developing student technical competences thus enhancing their employability and attracting the best students for potential recruitment. The programme, through different steps (such as preparatory classes, a selection process and an award ceremony) , saw the participation of 58 students in 2015 and 60 students in 2016 from two Angolan engineering schools (Agostinho Neto and Catholic universities). The students had the opportunity to use state-of-the-art design tools, becoming familiar with the type of technology that they are likely to find in most Oil & Gas companies. The students worked on a design case study under the supervision of a Saipem engineer in small teams. After the award ceremony, 4 students were selected for the Engineering Internship. The programme was deployed in 2016 in the Saipem engineering centre in Luanda with the objective of developing student employability.



*Talentissimo Programme students*



*Malaria Prevention Programme in Ambriz*

### **Fighting malaria**

As malaria is a major health issue in Angola, being the principal cause of morbidity and mortality, Saipem continued to implement a Malaria Prevention Programme. It was developed by a Saipem team in collaboration with the local health authorities in order to complement the National Malaria Control Programme (NMCP). In 2016, the programme saw the implementation of a training course for 10 local technicians in Indoor Residual Spraying (IRS) & Fumigation and an awareness campaign for 140 families and more than 200 people. The programme will continue in 2017 with the organisation of the awareness campaign, the IRS & Fumigation campaigns, the training of nurses and laboratory technicians.